



## **TECHNICAL DATA**

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### **TYPE CVT VACUUM ON-LOAD TAP CHANGER**

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### **FOR DRY TYPE TRANSFORMER**

HM0.154.001



**SHANGHAI HUAMING POWER EQUIPMENT CO., LTD.**

## General

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1. General	2
2. Technical specification	2
3. Model designation	2
4. Terms and definitions	2
5. Installation of CVT OLTCr	4
6. Appendices	4
Appendix 1 CVT OLTC connection principle diagram	5
Appendix 2 CVTIII-160Y(D) / 12-0909, overall and installation dimensions	6
Appendix 3 Connection between OLTC and HMJK-10Z AVR	7
Appendix 4 HMJK-10Z AVR dimensions	8

# 1. General

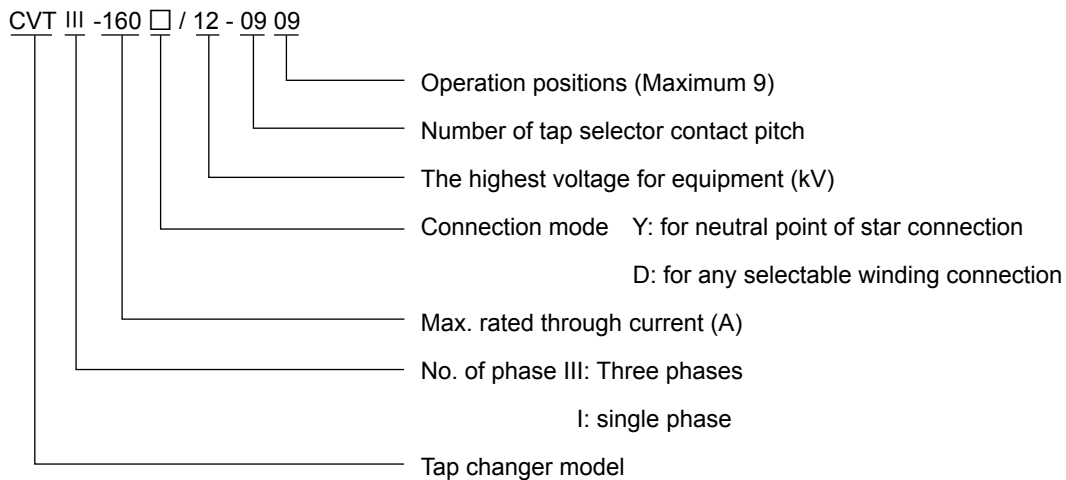
Type CVT vacuum on-load tap changer (hereafter refer as CVT or CVT OLTC) is a combined structure on-load tap changer, It comprises of diverter switch and tap selector. The tap selector changes tap from one to the adjacent without carrying current, and then the diverter switch switches under the load, the vacuum interrupters work as arcing contacts, which enables reliable performance and long life expectancy.

CVT OLTC is applicable to dry type transformer with voltage up to 12kV, the max. rated through current 160A, linear regulation up to 9 operation positions, regulation at any winding location of Delta or Start connection. CVT is equipped with HMJK-10Z automatic voltage regulator for manual and automatic operation.

# 2. Technical specifications

CVT OLTC is designed and manufactured according to IEC60214-1:2003. Please refer Table 1 on page 3 for the technical specifications.

# 3. Model designation



# 4. Terms and Definitions

## 4.1 Through current

Rated through current  $I_u$ :

The current flowing through an OLTC towards the external circuit, which the apparatus is capable of transferring from one tap to the other at the relevant rated step voltage and which can be carried continuously while meeting the requirement.

Max. rated through current  $I_{um}$ :

The highest rated through-current for which the tap changer is designed for and which forms the basis for all current related tests.

**Table 1 CVT OLTC Technical Specifications**

No.	Type		CVT	
1	Number of phase		3-phase, 1-phase	
2	Maximum rated through current (A)		160	
3	Short-circuit current test (kA)	Thermal stability (3s)	3	
		Dynamic stability (peak value)	7.5	
4	Connection		Y- neutral point D-any connection	
5	Maximum step voltage (V)		500	
6	Rated step capacity (kVA)		80	
7	Rated frequency (Hz)		50 or 60	
8	Max. operation positions		9	
9	Insulation level (kV)	To ground	The highest voltage for equipment	12
		To ground and between phases	Rated separate source AC withstand voltage(kV/50Hz,1min)	35
	Rated lightning impulse withstand voltage (kV,1.2/50 $\mu$ s)		85	
	Between adjacent taps	Rated separate source AC withstand voltage(kV/50Hz,1min)	5	
		Rated lightning impulse withstand voltage (kV,1.2/50 $\mu$ s)	20	
	Across the tap winding	Rated separate source AC withstand voltage(kV/50Hz,1min)	15	
Rated lightning impulse withstand voltage (kV,1.2/50 $\mu$ s)		50		
10	Motor	Power (kW)	0.37	
		Voltage (V)	220V AC	
		Rated current (A)	2.68	
		Rated frequency (Hz)	50 or 60	
11	Time for one operation (second)		4.4	
12	Electrical life (operations)		Not less than 300,000	
13	Mechanical life (operations)		Not less than 800,000	
14	Overall dimensions (length $\times$ height $\times$ width) (mm)		1400 $\times$ 1475 $\times$ 475	
15	Net weight (kg) approx.		200	

**Note: Please contact with us for special requirement.**

## 4.2 Step voltage

Rated step voltage ( $U_s$ )

For each value of rated through-current, the highest permissible voltage between terminals which are intended to be connected to successive taps of the transformer.

Maximum rated step voltage ( $U_{im}$ )

The highest value of the rated step voltage for which the tap-changer is designed.

### 4.3 Step capacity

Step capacity is the product of step voltage and load current, that is  $P_s=U_i I_u$ . Rated step capacity is the maximum permissible step capacity for the tap changer under continuous working condition, that is  $P_{stIN}=I_{um} \times U_i$ . For a certain range of load, its rated step capacity can be represented by the range curve shown in Fig. 1. This range is defined by the maximum rated through-current on the horizontal axis and maximum permissible step voltage on the vertical axis. Loads within the defined curve is the rated values of the tap changer.

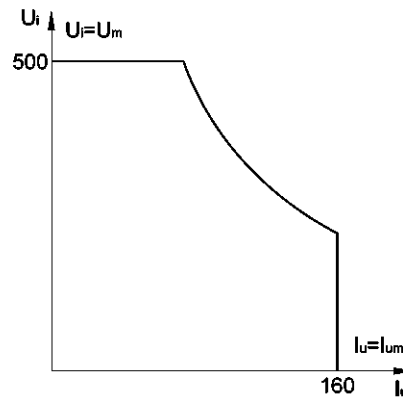


Fig1 Correlation between Rated Step Capacity, Step Voltage and Load Current

### 4.4 Operation conditions

- 4.4.1. It should be installed in indoor.
- 4.4.2. The ambient air temperature for OLTC is from  $-25^{\circ}\text{C}$  to  $40^{\circ}\text{C}$  .
- 4.4.3. The atmosphere humidity is not higher than 95% at  $25^{\circ}\text{C}$  .
- 4.4.4. There shall be no gas, steam or chemical dust which may seriously affect the insulation of the tap changer on site, or any explosives gas which may cause the explosion.
- 4.4.5. There shall be no serious vibrations on site.

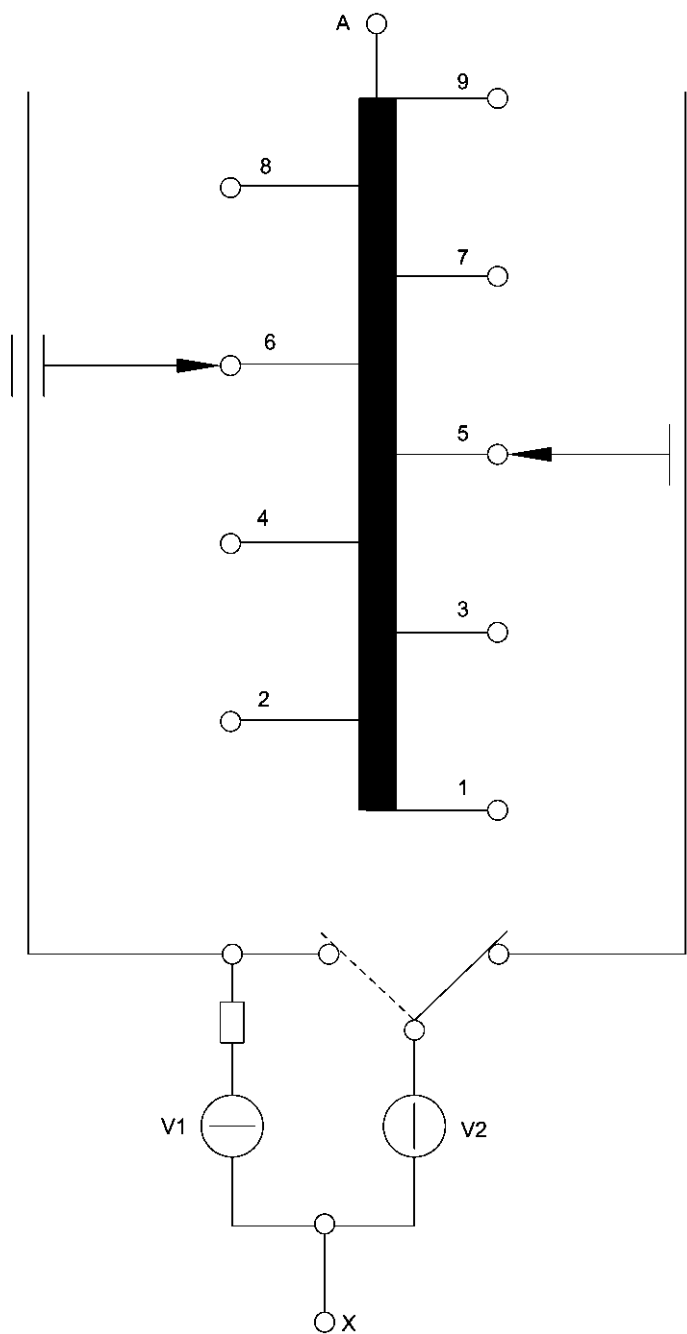
## 5. Installation of CVT OLTC

CVT OLTC shall be fixed to the ground by four M12 screws at the bottom. The detailed installation dimensions are shown in Appendix 2. When connecting CVT OLTC to the transformer, note that the connection leads should have suitable length to avoid any force applied to the tap changer, and sufficient insulation distance should be also considered between the leads.

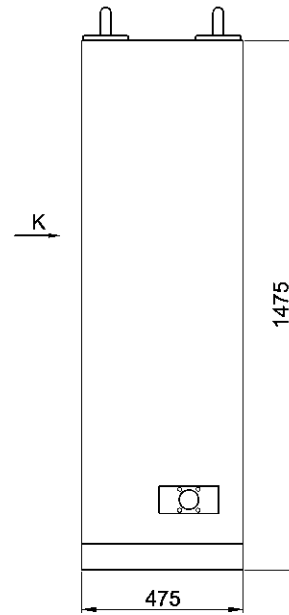
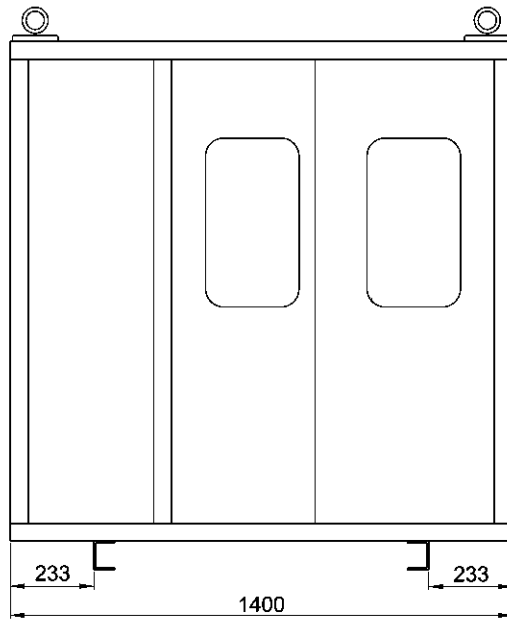
After connection, the tap changer should be operated a complete cycle without load, then measure the DC resistance of the winding and perform transformer ratio test. Be sure to check if the real operating position is in accordance with displayed position.

## 6. Appendixes

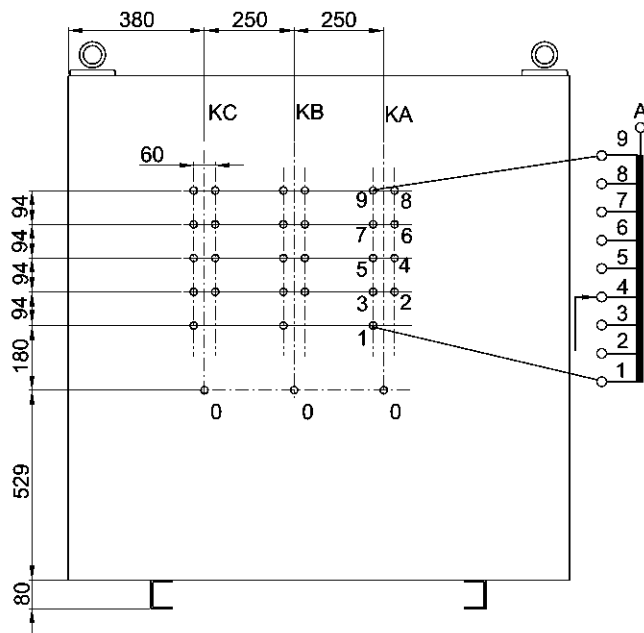
### Appendix 1. CVT OLTC connection principle diagram



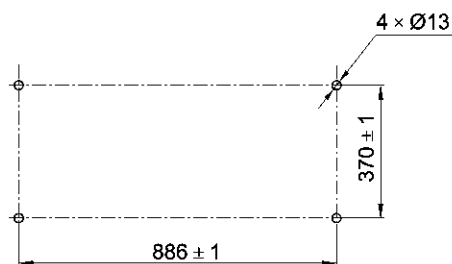
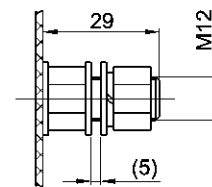
## Appendix 2. CVTIII-160Y(D)/12-0909 Overall and installation dimensions



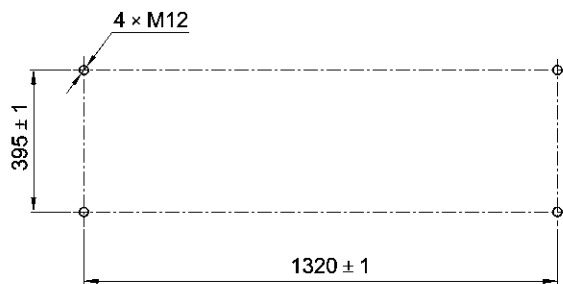
K向



Connection terminal

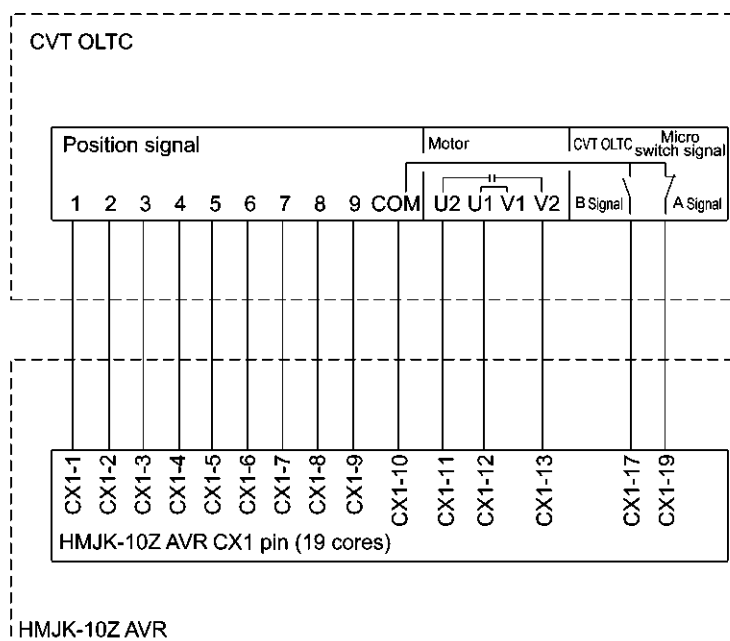
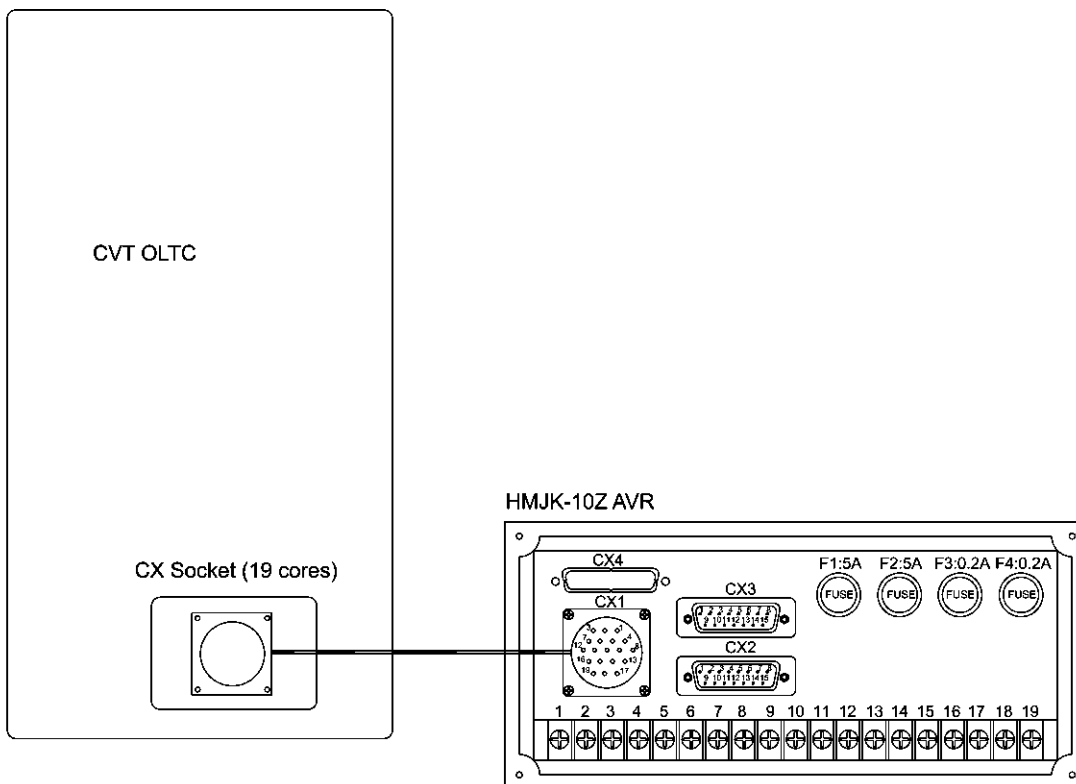


Bottom Installation dimensions



Lifting ring location

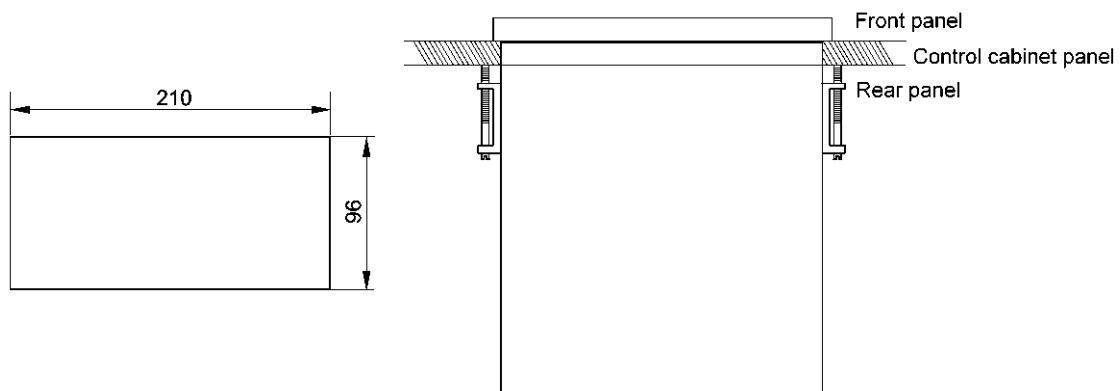
### Appendix 3. Connection between OLTC and HMJK-10Z AVR



Note: Please refer to HMJK-10Z automatic voltage regulator manual for details.



### Appendix 4. HMJK-10Z AVR dimensions





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