

# VOTANO 100

## Technical Data



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# 1 Technical data

The data are specified for an ambient temperature of  $23^{\circ}\text{C} \pm 5^{\circ}$  ( $73^{\circ}\text{F} \pm 9^{\circ}$ ), a power supply of  $115/230\text{V}_{\text{AC}}$ , and after a warm-up time longer than 15 minutes. The data specified are valid for the period of one year after factory adjustment.

## 1.1 Mains power supply

Table 1-1: Mains power supply for *VOTANO 100*

Characteristic	Rating
Connection	Connector according to IEC 60320-1 C14
Mains voltage	100 - 240 $\text{V}_{\text{AC}}$ / 50/60 Hz / 6 A Instead of supplying <i>VOTANO 100</i> from phase-neutral (L1-N, A-N), it may also be supplied from phase-phase (for example, L1-L2, A-B). However, the nominal voltage must not exceed 240 $\text{V}_{\text{AC}}$ .
Mains fuses	2 x T6 AH 250 V (high-breaking capacity wire fuse 5 x 20 mm)

Table 1-2: Mains power supply for *VBO2*

Characteristic	Rating
Connection	Connector according to IEC 60320-1 C14
Mains voltage	100 - 240 $\text{V}_{\text{AC}}$ / 50/60 Hz / 0.2 A Instead of supplying <i>VBO2</i> from phase-neutral (L1-N, A-N), it may also be supplied from phase-phase (for example, L1-L2, A-B). However, the nominal voltage must not exceed 240 $\text{V}_{\text{AC}}$ . The <i>VBO2</i> does not provide an ON/OFF switch.

## 1.2 Outputs

Table 1-3: LOW VOLTAGE TEST section on *VBO2*

Characteristic	Rating
Output voltage / current	AC: 40 $\text{V}_{\text{rms}}$ / 5 $\text{A}_{\text{rms}}$ max. DC: 120 V / 5 A (15 $\text{A}_{\text{peak}}$ )
Output power	400 $\text{VA}_{\text{rms}}$ max.

Table 1-4: HIGH VOLTAGE TEST section on *VBO2*

Characteristic	Rating
Output voltage / current	4 $\text{kV}_{\text{rms}}$ / 40 $\text{mA}_{\text{rms}}$ max.
Output power	160 $\text{VA}_{\text{rms}}$ max.

## 1.3 Measurement inputs

Table 1-5: Measurement input 1 on VOTANO 100

Characteristic	Rating
Voltage ranges	0 - 0.3 / 3 / 30 / 300 V <sub>AC</sub> (auto ranging)
Accuracy	0.1 % (guaranteed)
Insulation	Reinforced insulation (R) to all other circuits

Table 1-6: Measurement input 2 on VOTANO 100

Characteristic	Rating
Voltage ranges	0 - 0.03 / 0.3 / 3 / 30 V <sub>AC</sub> (auto ranging)
Accuracy	0.1 % (guaranteed)
Insulation	Reinforced insulation (R) to all other circuits

## 1.4 Ratio and phase measurement accuracy

The VOTANO 100/VBO2 test system is factory calibrated prior to shipment using an ISO 17025 calibrated reference voltage transformer. To assure the accuracy of the measurement results, it is recommended to verify the calibration at least once per year using a calibrated voltage transformer. If the measurement results are not within the given limits, we recommend to send the VOTANO 100 test set back to OMICRON for calibration.

VOTANO 100 uses a mathematical model based on the equivalent circuit diagram of an inductive voltage transformer to calculate the ratio and phase error. The stated typical accuracy values given for the ratio and phase error are based on empirical measurement data obtained from calibrated voltage transformers of different types and different age, and from different manufacturers.

**Note:** The accuracy specified may be reduced under interfering conditions.

The accuracy is referred to the instrument transformer accuracy defined in IEC 61869/IEEE C57.13.

### 1.4.1 Accuracy for VT/CVT Test mode and Advanced VT/CVT Test mode

Table 1-7: Measurement accuracy for VT/CVT measurements

Voltage transformer type	Voltage level (line-line)	Typical accuracy for ratio measurement	Typical accuracy for phase measurement <sup>1</sup>
VT	0.6 kV - 35 kV	0.03 %	2 min
	> 35 kV - 123 kV	0.05 %	3 min
	> 123 kV	0.08 %	4 min
CVT/CCVT <sup>2</sup>	> 30 kV - 100 kV	0.05 %	2 min
	> 100 kV - 500 kV	0.07 %	3 min
	> 500 kV	0.09 %	4 min

1. Resolution for phase measurement: 0.01 min.

2. An additional burden caused by the damping unit may influence the accuracy if it is not considered for the measurement results. If known, the burden value of the damping unit should be added to the highest winding.

### 1.4.2 Accuracy for direct ratio and phase measurements

The accuracy specified applies to the no-load error of the voltage transformer under test at the specified test point. *VOTANO 100* provides a typical reproducibility of  $\pm 0.005\%$  and  $\pm 0.5$  min.

Table 1-8: Measurement accuracy for measurement of no-load ratio error and phase displacement

Typical accuracy for ratio measurements	Typical accuracy for phase measurements <sup>1</sup>
0.02 %	0.7 min

1. Resolution for phase measurement: 0.01 min.

## 1.5 Compact Flash card interface (*VOTANO 100*)

Table 1-9: Compact Flash card interface

Characteristic	Rating
Card type	CF type 1
Allowed memory size	16 MB - 2 GB

## 1.6 D-Sub 9 interfaces

### 1.6.1 Interface on *VOTANO 100* & MAIN UNIT interface on *VBO2*

The D-Sub 9 interface on *VOTANO 100* and the DSub-9 MAIN UNIT interface on *VBO2* are exclusively intended to connect the *VBO2* voltage booster to *VOTANO 100*.

Only use the RS232 crossover cable delivered by OMICRON.

## 1.6.2 SAFETY interface on VBO2

The SAFETY interface of the CONTROL INTERFACE section on VBO2 is exclusively intended to connect the SAB1 safety box.

## 1.7 USB interface (VOTANO 100)

The USB interface on VOTANO 100 is used to connect the VOTANO 100 test set to a computer.

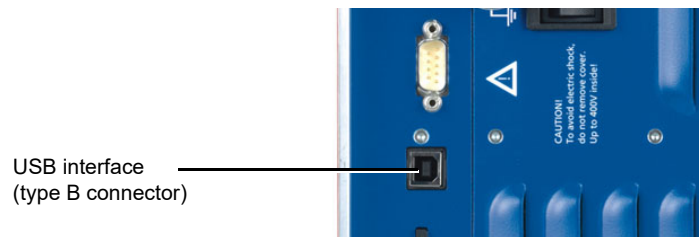


Figure 1-1: USB remote control interface (standard type B connector) on VOTANO 100

**Note:** Only use the original USB cable delivered by OMICRON or a shielded USB cable with ferrite cores applied to connect VOTANO 100 to a computer!

## 1.8 Environmental conditions

Table 1-10: Environmental conditions

Characteristic	Rating
Operating temperature	-10 ... +50°C (14 ... 122°F)
Storage and transportation	-25 ... +70°C (-13 ... 158°F)
Max. altitude	2000 m

## 1.9 Mechanical data

Table 1-11: Mechanical data for VOTANO 100




Characteristic	Rating
Weight	< 8 kg (17.1 lbs) without accessories
Dimensions W x H x D	360 x 285 x 145 mm (14.2 x 11.2 x 5.7")

Table 1-12: Mechanical data for VBO2

Characteristic	Rating
Weight	7.5 kg (16.5 lbs) without accessories
Dimensions W x H x D	358 x 230 x 114 mm (14.1 x 9.1 x 4.5")

## 1.10 Standards

Table 1-13: Standards conformity

EMC, safety		
EMC	IEC/EN 61326-1 (industrial electromagnetic environment) FCC subpart B of part 15, class A	  
Safety	IEC/EN/UL 61010-1	
Other		
Shock	IEC/EN 60068-2-27 (15 g/11 ms, half-sinusoid, 3 shocks in each axis)	
Vibration	IEC/EN 60068-2-6 (frequency range 10 Hz...150 Hz, acceleration 2 g continuous (20 m/s <sup>2</sup> /65 ft/s <sup>2</sup> ), 20 cycles per axis)	
Humidity	IEC/EN 60068-2-78 (5%...95% relative humidity, no condensation), tested at 40 °C/104 °F for 48 hours	
Protection class (VOTANO 100 / VBO2)	IP20 according to EN 60529	