

# Inductive Voltage Transformers

Types VEOT and VEOS



**TRENCH**

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## Introduction

Trench is a recognized world leader in the design and manufacture of high voltage equipment for application on electric utility and high energy industrial systems. As part of Trench's product scope, the Company produces a diversified range of Instrument Transformers which are installed on 69- 800 kV electrical systems. Instrument Transformers include: Voltage (Potential) Transformers (both inductive and capacitive type), Current Transformers and Combined Instrument Transformers (voltage and current transformer in one unit).



*Fig. 1  
Type VEOT 72.5(left) and  
VEOT 245(right)  
oil/paper Insulated  
Voltage Transformers*

Voltage Transformers must convert transmission class voltages to standardized low and easily measurable values, which will be used for metering, protection and control of the high voltage system. As such, the need for accurate and reliable voltage transformation is essential.

This brochure will detail the features and characteristics of types VEOT and VEOS inductive type Voltage Transformers. Please refer to Trench brochure E210 for additional general information concerning high voltage Instrument Transformers.

# Features



- Meet all IEC and ANSI metering and protection classes (other standards on request)
- Standard thermal burden ratings of 2000 - 2500 VA (higher on request)
- Quality Assurance in accordance with ISO 9001

- highly refined and processed oil/paper insulation system
- low weight and minimum oil volume
- use of high quality mineral oil, PCB free, biological decomposition
- excellent seismic performance as a consequence of optimized designs of flanges, porcelain and their interconnection
- excellent control of internal and external insulation stresses through the use of a proprietary finely graded bushing system
- essentially unaffected by stray external magnetic fields
- hermetically sealed stainless steel metallic bellows for units rated 123 kV and above
- welded housings sealed without screws
- stable accuracy over a long period of time
- perfect transient performance
- suitable for line discharging
- exclusive use of corrosion-resistant materials
- explosion resistant by
  - insulating system with high reliability
  - fine graded bushing
  - weak point in the aluminium head and tank castings and the metallic bellows serving as pressure release device
- successful field experience since the manufacture of the first voltage transformer in 1926
- maintenance free during a long life time of more than 30 years
- composite insulator available on request

## Construction

Trench types VEOT and VEOS Inductive Voltage Transformers are designed and constructed with the well proven, highly reliable, oil/paper insulation system. Each porcelain housed, hermetically sealed Voltage Transformer is equipped with stainless steel expansion bellows, calibrated to the internal oil volume and extremes in ambient operating temperatures.

For voltage classes up to 300 kV, the type VEOT is offered. For applications above 300 kV, Trench offers the type VEOS design. The VEOS is designed with a primary winding which is located in the mid-point of the structure. This feature serves to reduce the dielectric stresses and ensures optimized voltage distribution within the transformer. Please refer to figure Fig. 3 for the internal schematic diagram and mechanical details for both the VEOT and VEOS units.

## Standard Equipment

- aluminum flat pad primary terminal/ground terminal
- lifting lugs
- bellows position indicator
- oil filling port
- oil drain valve
- secondary terminal box with removable gland plate

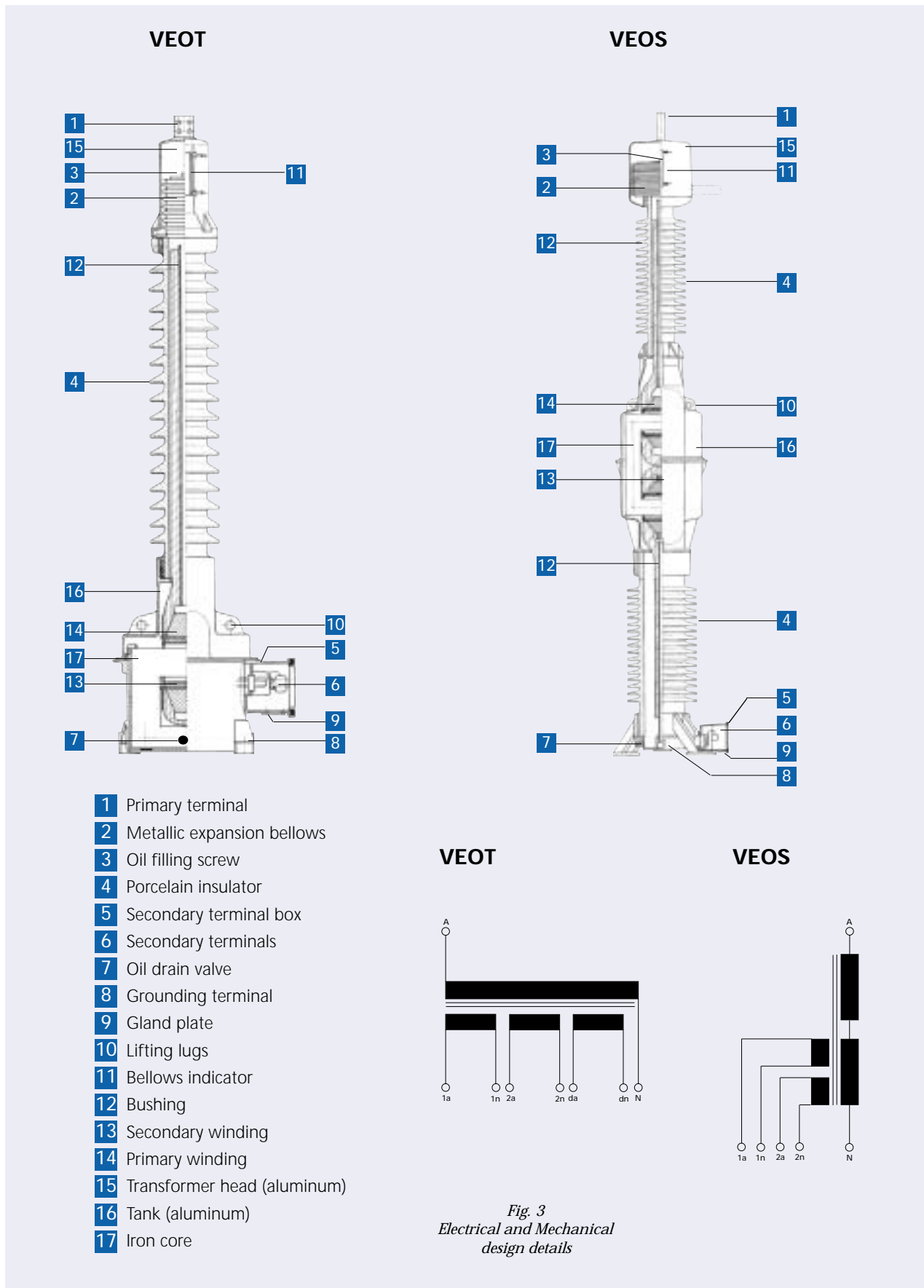
## Optional Equipment

- stud type primary terminal
- primary or ground cable connector
- Anti-corona rings
- Capacitance tap for measurement of tan delta of bushing or high voltage winding
- Gas Detection System (contact Trench for additional details)
- Secondary fuses or circuit breakers
- Terminal box heater
- Composite insulator



*Fig. 2  
Inductive  
Voltage Transformers  
VEOT*

# Sectional view



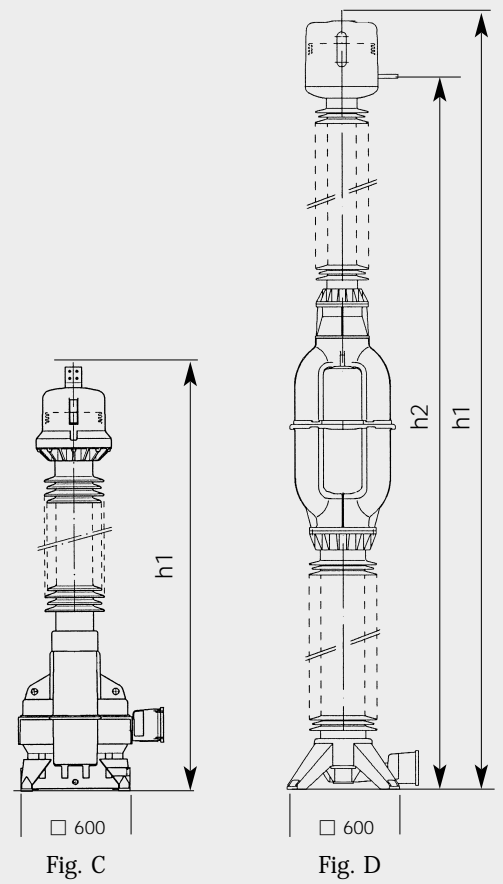
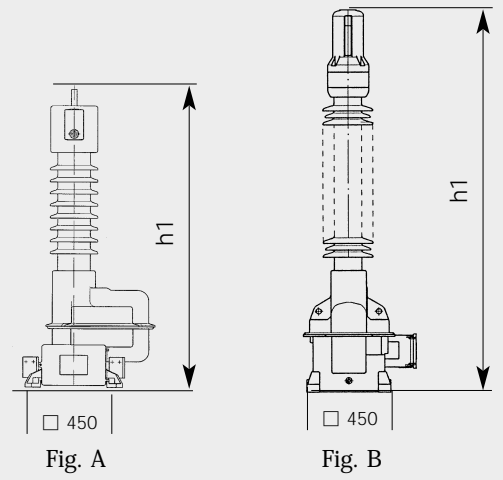
# Oil/Paper-insulated Inductive Voltage Transformers

## Electrical and Mechanical Data (1)

Type	Max. continuous operating voltage phase to phase  kV <sub>eff</sub>	test voltage 50/60Hz 1 min. dry/wet  kV <sub>eff</sub>	Impulse withstand 1.2/50 $\mu$ s  kV <sub>peak</sub>	Switching impulse test voltage  kV <sub>peak</sub>	min. sparking distance  mm	Standard creepage distance  mm
VEOT 72.5 HT	72.5	140	325	–	630	1815
VEOT 72.5	72.5	140	325	–	700	1815
VEOT 123	123	230	550	–	1200	3815
VEOT 145	145	275	650	–	1200	3815
VEOT 170	170	325	750	–	1400	4495
VEOT 245	245	395	950	–	2200	6300
VEOT 245	245	460	1050	–	2200	6300
VEOT 300	300	460	1050	850	2200	6300
VEOS 362	362	570	1300	950	2650	9050
VEOS 420	420	630	1425	1050	3200	11025
VEOS 420	420	680	1550	1050	3200	11025
VEOS 550	550	680	1550	1175	3800	13750

Notes:  
(1) Other ratings available on request

Fig	Net weight (approx)	Dimension		kg
		h1	h2	
Weight of oil	kg	mm	mm	
A	210	1515	-	40
B	290	2060	-	40
B	310	2560	-	43
B	320	2560	-	45
B	330	2760	-	47
C	670	3650	-	115
C	670	3650	-	115
C	670	3650	-	115
D	1020	5100	4765	220
D	1200	5650	5315	240
D	1200	5650	5315	240
D	1450	6300	5960	265





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and for the development of  
your new technology solutions  
of tomorrow.*

## Trench Facilities

Trench® Austria GmbH  
Paschinger Strasse 49  
Postfach 13  
A-4060 Linz-Leonding  
Austria  
Phone: 43-732-6793-0  
Fax: 43-732-671341

Trench® Brasil Ltda  
Via Expressa de Contagem, 2685  
Contagem, Minas Gerais  
CEP 32370-485  
Brazil  
Phone: 55-31-3391-5959  
Fax: 55-31-3391-1828

Trench® China  
MWB (Shanghai) Co., Ltd.  
No. 3658, Jiancheng Road  
Minhang, Shanghai  
Peoples Republic of China  
200245  
Phone: 86-21-54720088  
Fax: 86-21-54723118

Trench® High Voltage  
Products Ltd., Shenyang  
No. 2 Zhengliang Er. Road  
Jing Shen Xi San Street  
Dao Yi Economic Development Zone  
Shenyang 110136 P.R. China  
Phone: 86-24-89722688  
Fax: 86-24-89737200

Trench® Limited  
Bushing Division  
432 Monarch Avenue  
Ajax, Ontario  
Canada L1S 2G7  
Phone: 905-426-2665  
Fax: 905-426-2671

Trench® Limited  
Coil Product Division  
71 Maybrook Drive  
Scarborough, Ontario  
Canada M1V 4B6  
Phone: 416-298-8108  
Fax: 416-298-2209

Trench® Limited  
Instrument Transformer Division  
390 Midwest Road  
Scarborough, Ontario  
Canada M1P 3B5  
Phone: 416-751-8570  
Fax: 416-751-6952

Trench® Limited  
Power Line Carrier Division  
815 Middlefield Road, Unit 6A  
Scarborough, Ontario  
Canada M1V 2P9  
Phone: 416-291-8544  
Fax: 416-291-5581

Trench® France S.A.  
16, Rue du Général Cassagnou  
B.P. 70 F-68 302  
St. Louis, Cedex  
France  
Phone: 33-3 89-70-2323  
Fax: 33-3 89-67-2663

Trench® Germany GmbH  
Nürnberg Strasse 199  
D-96050 Bamberg  
Germany  
Phone: 49-951-1803-0  
Fax: 49-951-1803-224

Trench® Switzerland AG  
Lehenmattstrasse 353  
CH-4028  
Basel  
Switzerland  
Phone: 41-61-315-51-11  
Fax: 41-61-315-59-00

Trench® (UK) Limited  
South Drive  
Hebburn  
Tyne & Wear  
NE 31 1 UW  
Phone: 44-191-483-4711  
Fax: 44-191-430-0633

[www.trenchgroup.com](http://www.trenchgroup.com)

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