Electric, with an Edge

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SINGLE PHASE OVERHEAD TRANSFORMER

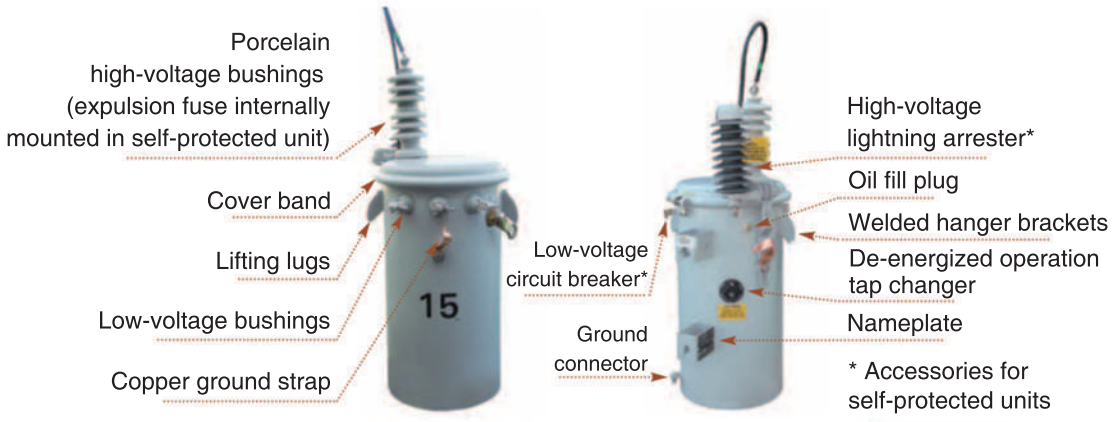
ANSI, DOE, IEEE, CSA and IEC

DAELIM BELEFIC®

GENERAL

Daelim Belefic Single Phase Overhead Transformer is designed and produced normally for stepping utility distribution voltages (ranging from 2400 to 34500 volts) down to lower utilization voltages. Although some are used for stepping down to commercial and industrial voltages such as 277, 240/480, 2400 and 4800, most are used for stepping down to the single-phase voltage of 120/240.

These transformers are also used for small substations, miscellaneous applications and can serve to step up voltages.



Popular configurations

Double hanger bracket one high-voltage bushing conventional unit.

Single hanger bracket two high-voltage bushings conventional unit.

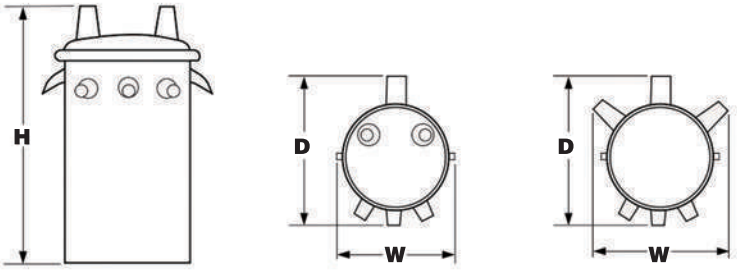
Single hanger bracket one high-voltage bushing self protected unit.

The transformer type describes the basic protective devices which are included as an integral part of the transformer package. Table I defines each type as a function of the protective device(s) included. These protective devices and their functions are described later in this section.

Table 1

Type	CSP	CP	SP	S
Protective Devices				
High Voltage Surge Arrester	Yes	No	Yes	No
Low Voltage Circuit Breaker	Yes	Yes	No	No
High Voltage Protective Link	Yes	Yes	Yes	No

SINGLE PHASE OVERHEAD CONVENTIONAL TRANSFORMER



Product Scope:

Capacity: 5-167KVA

Primary Voltage: 2400-34500V

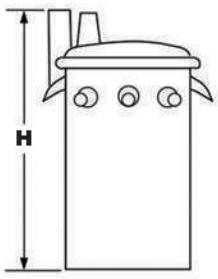
Secondary Voltage: 120-600 V

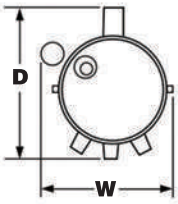
Technical Data for Single Phase Overhead Conventional Transformer

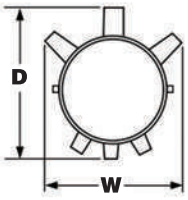
Rated Power (KVA)	High Voltage (V)	Low Voltage (V)	Loss(W)		Dimension(mm)			Weight(kg)	
			No-load Loss(W)	On-load Loss(W)	W	D	H	Oil Weight	Total Weight
5	34500/ 19920 13800/ 7957 13200/ 7620 12470/ 7200 or others	120-240 240-480 347 600	19	75	465	485	855	15	92
10			36	120	500	525	885	22	150
15			50	195	520	565	905	30	210
25			80	290	560	590	935	45	258
37.5			105	360	610	625	935	50	340
50			135	500	635	675	1035	62	395
75			190	650	745	840	1035	88	480
100			210	850	770	965	1135	94	530
167			350	1410	795	890	1335	138	680

Note: The above data is only subject to our standard design, special requirement can be customized.

SINGLE PHASE OVERHEAD COMPLETELY SELF PROTECTED (CSP) TRANSFORMER







Product Scope:

Capacity: 5-75KVA

Primary Voltage: 2400-34500V

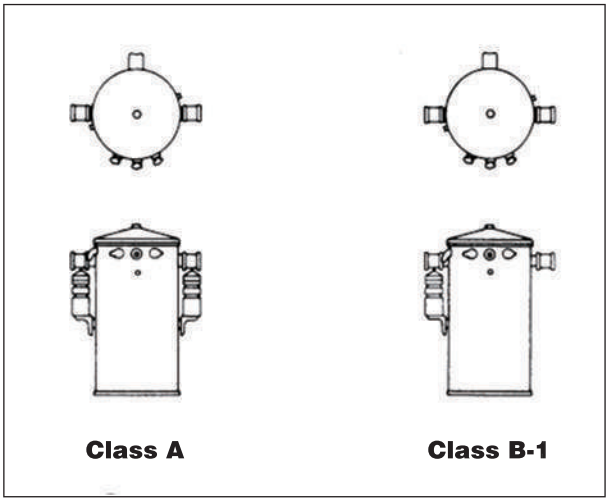
Secondary Voltage: 120-600V

Technical Data for Single Phase Overhead Completely Self Protected (CSP) Transformer

Rated Power (KVA)	High Voltage (V)	Low Voltage (V)	Loss(W)		Dimension(mm)			Weight(kg)	
			No-load Loss(W)	On-load Loss(W)	W	D	H	Oil Weight	Total Weight
5	34500/ 19920 13800/ 7957 13200/ 7620 12470/ 7200 or others	120-240 240-480 347 600	35	75	400	530	960	30	115
10			50	120	430	530	980	45	150
15			65	195	480	580	1000	55	205
25			105	290	500	580	1030	66	245
37.5			140	360	560	640	1080	78	335
50			180	500	560	640	1130	85	370
75			250	650	780	800	1170	138	505

Note: The above data is only subject to our standard design, special requirement can be customized.

Type CSP, 5 kV and Below, 10-100 kVA



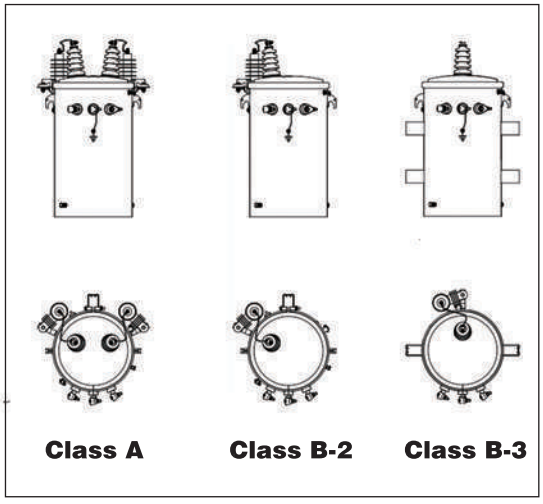
Class A: Two fully insulated high voltage bushings, two arresters, two protective links, and external breaker handle. Suitable for application on either wye or delta distribution systems. Single-position pole mounting in accordance with latest ANSI standards.

Class B-1: Two fully insulated high voltage bushings, one arrester, two protective links and external breaker handle. Normally applied on solidly grounded systems.

Class B-2: Not Available.

Class B-3: Not Available.

Type CSP, Above 5KV, 10-100 kVA



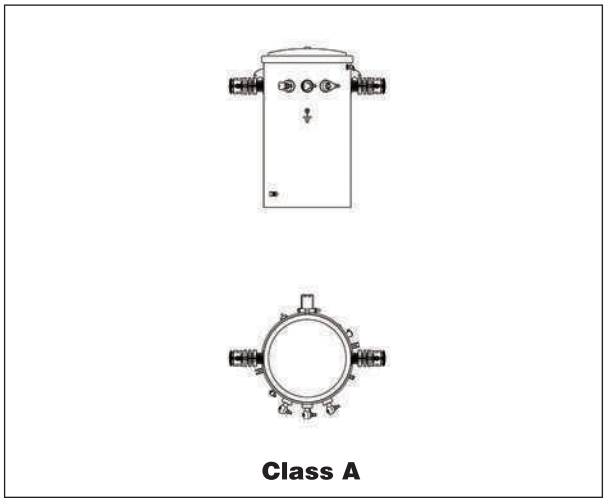
Class A: Two fully insulated high voltage bushings, two arresters, two protective links and external breaker handle suitable for application on either wye or delta distribution systems. Single-position pole mounting in accordance with latest ANSI standards.

Class B-1: Two fully insulated high voltage bushings, one arrester, two protective links and external breaker handle. Normally applied on solidly grounded systems.

Class B-2: One fully insulated high voltage bushing, one arrester, one protective link and external breaker handle suitable only for application on solidly grounded distribution systems.
Single-position pole mounting in accordance with latest ANSI standards.

Class B-3: Same as Class B-2 except with two-position mounting.

Type S. 5kV and Below, 10-500 kVA



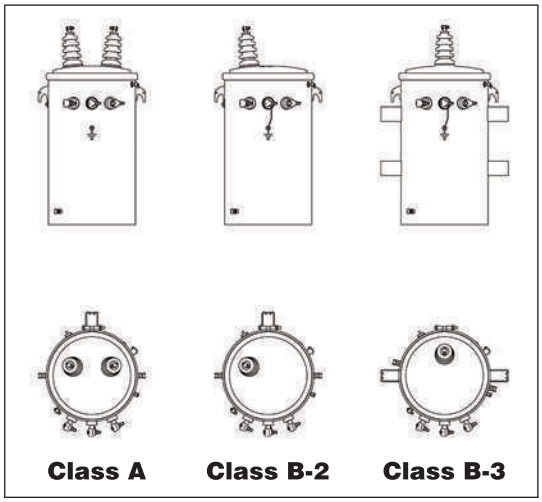
Class A: Two fully insulated high voltage bushings, suitable for application on either wye or delta distribution systems. Singleposition pole mounting in accordance with latest ANSI standards.

Class B-1: Not Available

Class B-2: Not Available

Class B-3: Not Available

Type S. Above 5 kV, 10-500 kVA



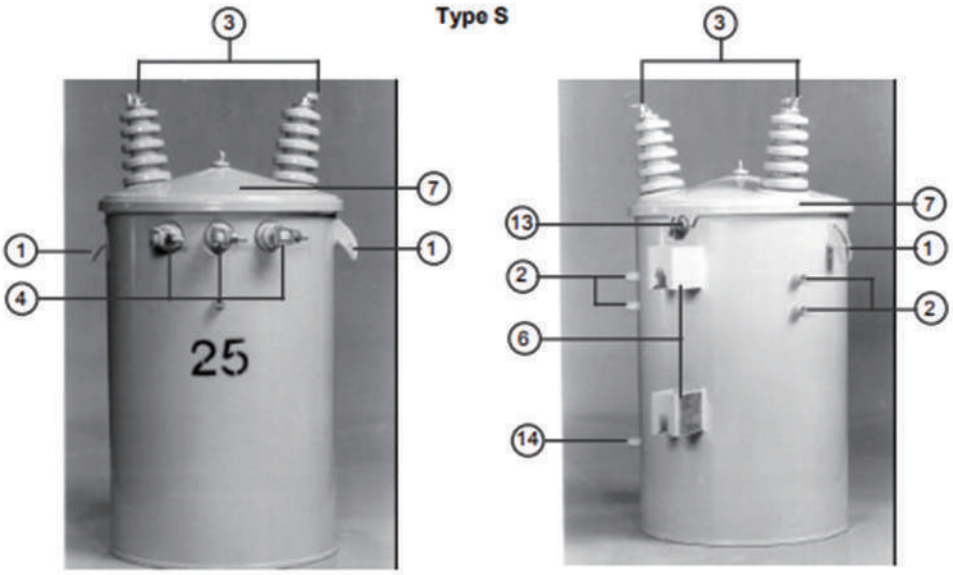
Class A: Two fully insulated high voltage bushings, suitable for application on either wye or delta distribution systems. Single-position pole mounting in accordance with latest ANSI standards.

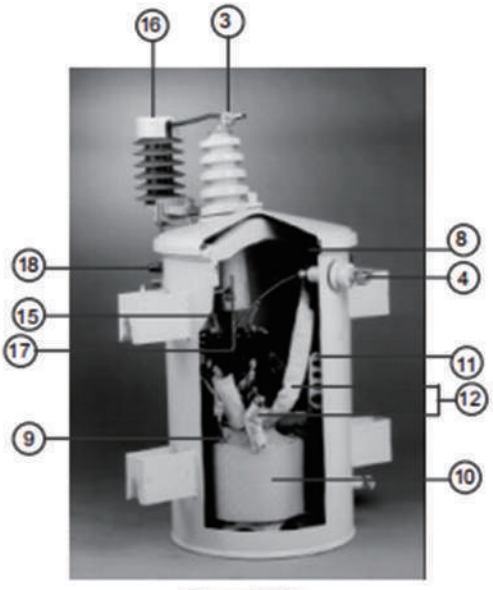
Class B-1: Not Available

Class B-2: One fully insulated high voltage bushing, suitable only for application on solidly grounded distribution systems. Single-position pole mounting in accordance with latest ANSI standards.

Class B-3: Same as Class B-2 except with two-position mounting.

Type S





Type CSP*

STANDARD FEATURES

1. LIFTING LUGS
2. ARRESTER MOUNTING PADS
3. COVER-MOUNTED HIGH VOLTAGE PORCELAIN BUSHING(S) WITH EYEBOLT TERMINAL
4. LOW VOLTAGE BUSHINGS WITH EYEBOLT TERMINALS
5. LOW VOLTAGE NEUTRAL GROUNDING STRAP (NOT SHOWN) (10-50 KVA CLASS B-2 AND B-3 ONLY)
6. ANSI SUPPORT LUGS (HANGER BRACKETS) WITH LASER INSCRIBED NAMEPLATE ON LOWER BRACKET
7. POLYESTER INSULATED COVER
8. SELF-VENTING AND RESEALING COVER ASSEMBLY
9. CORE
10. COIL
11. CENTERLINE CORE/COIL ASSEMBLY SUPPORT BRACKETS
12. LOW VOLTAGE LEADS
13. OIL FILL PLUG WITH COVER GROUND STRAP
14. TANK GROUND PAD

THE FOLLOWING ADDITIONAL FEATURES ARE ALL STANDARD ON SELF-PROTECTED TYPE CSP UNITS ONLY:

15. PRIMARY PROTECTIVE LINK (MOUNTED IN HIGH VOLTAGE BUSHING)
16. SURGE ARRESTER
17. SECONDARY CIRCUIT BREAKER
18. SECONDARY BREAKER OPERATING HANDLE WITH EMERGENCY OVERLOAD RESET AND OVERLOAD SIGNAL LIGHT

1 SURGE ARRESTER

Surge arresters are mounted on the outside of the transformer tank. Their function is to intercept and divert to ground various overvoltage transients (such as lightning surges) which originate on the distribution system.

2 PROTECTIVE LINK

Improper coordination with primary protective devices separate from the transformer could prevent the link from operating properly both for load current characteristics and for fault current characteristics.

Transformer Types SP, CP and CSP have protective links (expulsion type fuses) in them. These are mounted either in the bottom of the high voltage bushing or in a terminal block between the high voltage coil and the high voltage bushing. These protective links must be under oil for proper operation. Upon request DAELIM provides curves giving characteristics of these protective links so their characteristics can be coordinated with protective devices on the primary side of the transformer.

Protective links are oil-immersed high voltage expulsion fuses designed to isolate the transformer from the primary distribution system in the event of a transformer fault inside the tank on the load side of the link. The purpose of this link is to prevent a line lockout when a transformer fails; not to provide overload or fault current protection for the transformer.

3 CURRENT-LIMITING FUSE

High voltage current-limiting fuses are designed to limit the flow of current (and energy) to a low impedance fault. When properly applied, they prevent almost all violent failure of transformers. Like protective links, their purpose is to isolate the transformer from the distribution system in the event of an internal transformer fault. Current-limited fuses usually are applied when the system available fault current exceeds the interrupting capability of the protective link. Because partial range type current-limiting fuses are normally applied on overhead distribution transformers, a series protective link is applied with each current-limiting fuse.

4 LOW VOLTAGE CIRCUIT BREAKER

Type CSP and CP transformers have circuit breakers mounted under oil and connected between the coils' low voltage winding leads and the low voltage bushings. These are to protect the transformer from severe overloads and short circuits external to the transformers. The low voltage breaker is not intended to protect secondary (low-voltage) circuits and connected apparatus (meters, meter sockets, connectors, service entrance equipment, etc.) from thermal and magnetic effects due to short circuits and overloads. The breaker is calibrated to trip when its bimental reaches a pre-determined temperature. Some breaker sizes have an additional feature that is a magnetic trip element so that breaker can respond quicker to higher fault current.

The breaker is primarily a protective device designed for only occasional switching operations; as such it is not intended for frequent (weekly or daily) switching duty.

The bimetallic element of the breaker is connected in series with the secondary windings of the transformer and responds thermally to the flow of transformer load current through it and to the oil temperature.

The circuit breaker is always used in conjunction with a protective link.

The circuit breaker coordinates with the protective link so it opens first on overloads and faults on the load side of the circuit breaker.

4a/ CIRCUIT BREAKER EMERGENCY CONTROL

Should it be necessary for a short time emergency situation, the breaker's calibration can be changed to allow additional overload capacity. The emergency trip setting of the breaker should be used only when absolutely necessary and for as short a duration as possible because extended use of the setting will result in higher winding temperatures before the breaker can trip. These higher winding temperatures cause a reduction in transformer life. When the emergency control setting is made it increases the load at which the signal light will come on and the breaker will trip by about 20%.

The breaker is recalibrated to the emergency position by removing the meter seal and rotating the emergency control handle upward, in a clockwise direction away from the breaker operating handle as shown in Figure 8. After the emergency condition, the emergency control handle should be returned to its normal position. It is recommended that a new seal be applied to the handle when it is returned to the normal position to avoid inadvertent operation of the emergency control.

4b/ SIGNAL LIGHT

Type CSP and CP transformers can be supplied with an overload signal light. When the signal light comes on it gives a warning that the transformer has experienced a heavy overload. The signal light remains lighted until reset by means of the breaker operating handle. It can be reset by operating the breaker handle to the maximum upward position and then back down to the closed position.

If the breaker handle is operated to the reset position and then to the close position and the signal light remains on, the temperature of the transformer oil is still too hot to allow the signal light to turn off.

If the signal light bulb is burned out, it can be replaced from outside the transformer by unscrewing the signal light lens and then the bulb.

5 PROTECTO-COMBO

The Protecto-Combo device consists of a flip open type of fuseholder and a surge arrester. The fuse link is normally supplied by the user. The Protecto-Combo device requires field assembly. This protective device is used only on transformers 50 kVA and below, Class B-2 or B-3 type units with one cover mounted high voltage bushing. This optional device is not shown on the nameplate.

6 TAP CHANGER

Tap changers are connected into the high voltage coil. The transformer output voltage can be increased or decreased by changing the tap changer setting.

The internal tap changer is operated by removing the transformer handhole cover, or transformer cover, and turning the tap changer handle to the position desired on the tap position indicator. The tap changer numbers on the position indicator are the same as ones on the transformer nameplate.

To change taps with the externally operated tap changer, loosen the locking screw in the handle, turn the handle to the tap position needed and tighten the locking screw.

7 DUAL VOLTAGE SWITCH

Dual voltage switches permit the use of transformers on different primary voltage systems. They are externally operated with a handle on the outside of the tank. Voltage ratings are given at the switch handle and on the transformer nameplate.

The switch handle is held in place by a locking screw. Back out the locking screw until it is clear from the locking hole, then rotate the handle. The locking screw should then be put into the locking hole for the new position and tightened.

8 TANK PRESSURE RELIEF

A unique feature of the transformer cover is its ability to flex and relieve pressure which can build up from some internal faults. Except in cases of extreme dynamic pressure build up, the cover automatically reseals itself. Whenever the cover needs to be removed, any internal static pressure is relieved automatically as the cover bolt is loosened. When the bolt is being loosened, the cover can vent but the bolt is still held by a nut in the cover beam.

The cover bolt should be tightened to 350 in. lbs. (27 ft. lbs.)+ 10% to insure that the cover vents properly. If there is a handhole cover on the transformer cover, the handhole cover bolt should be tightened to 150 in. lbs. (13 ft. lbs.) + 10%.

All transformers are tested in strict accordance with the latest revision of applicable ANSI™, IEEE™, NEMA, and RUS with test reports available by serial number of the transformer
Routine tests are:

- Leak test
- Polarity and phase relation
- Resistance
- No-load losses and excitation current
- Load losses and impedance
- Applied voltage
- Induced voltage
- Full wave impulse
- Ratio test

Electric, with an Edge

Quality ISO 9001 | Environment ISO 14001 | Health&Safety ISO 45001

CONTACT US

TEL: +86-10-65002471/65001715
FAX: +86-10-65001719
CELL: +86-17600626876 +86-13051965423
EMAIL: INFO@DAELIM-ELECTRIC.COM
WEBSITE: WWW.DAELIM-ELECTRIC.COM

ADD:

BEIJING OFFICE:
2707,No.4 BUSINESS BUILDING, CHINA CENTRAL PLACE, CHAOYANG DISTRICT, BEIJING, CHINA

JIANGSU FACTORY:
6 BAILONG ROAD, LOUZHUANG TOWN, JIANGYAN DISTRICT, TAIZHOU CITY, JIANGSU PROVINCE, CHINA

Safety Instructions

- For your safety,please read user's manual thoroughly before operating.
- Contact the nearest authorized service facility for examination,repair,or adjustment.
- Please contact qualified service technician when you need maintenance.
  Do not disassemble or repair by yourself!
- Any maintenance and inspection shall be performedby the perseanel having expertise