

CONSTANT CURRENT TRANSFORMERS



2869 S. West Temple
Salt Lake City, Utah 84115

TEL (801) 433-4100
FAX (801) 433-4960

www.specialtytransformers.com

GENERAL INFORMATION

Street and highway lighting can be accomplished by the use of high efficiency lamps connected in series. To obtain full brilliancy, the current supplied to these lamps must not be lower than their rated current and in order to avoid short lamp life, the current must not be allowed to rise much higher than this value, regardless of the number of lamps in the circuit. Since electrical energy is generated at constant potential, these systems require an intermediate device to transform the energy from constant potential to constant current. Of the various devices in use at the present time, the moving coil constant current transformer is the most desirable because it gives the closest current regulation for all loads.

If the correct primary voltage is maintained, the constant current transformer cannot be overloaded, even under short circuit condition.

The earlier constant current transformers were built for indoor operation, were air-cooled and were called Station Type. Later, oil insulated pole-type constant current transformers were developed for outdoor use. These units are smaller, lighter, and less expensive than the Station Type. This transformer may not always be installed perfectly level on the pole and it is therefore necessary to guide the motion of the moving coil mechanically to prevent possible friction. Several mechanisms have been used for this purpose. In the Westinghouse design, the moving coil is carried in a cradle by a parallel-motion mechanism so that the moving coil is always parallel to the stationary coil. Remarkable close current regulation is obtained with this arrangement.

SELECTION OF TRANSFORMERS

There are so many combinations and special customer requirements, that style numbers are not practical for specific identification. For correct and complete ordering, the following check chart has been included for convenience and accuracy.

Each of the following items should be carefully reviewed to be certain that the unit ordered is what is actually required.

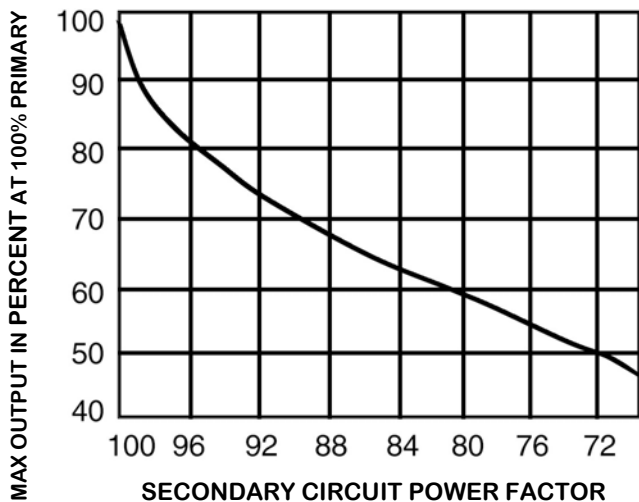
Each of the specific items is discussed in detail later in this text.

RATING	KW@99.5 P.F. Primary Volts Taps Secondary Amps Frequency Temperature Rise
TYPE	CPH (Base Unit) *CSPH (Packaged Unit) *CSPH-C (Capacitors) *CSPH-K (Cascade) CMH (Sealed) *Control Circuit must be specified.
PRIMARY BUSHINGS	Sidewall Mounted Cover Mounted Wiping Sleeve
SECONDARY BUSHINGS	Sidewall Mounted Cover Mounted
MOUNTING	Pole Type Platform Type Floor Mount
COOLING	Oil
MISCELLANEOUS ITEMS	Hanger Irons CSPH-C Capacitor Paint Other Auxiliaries

K.W. Rating

Constant current transformers are made in ratings of 5, 10, 15, 20, 25, 30, 40 and 50 K.W. - not KVA. They are designed to deliver rated K.W. output at a 99.5% power factor load and must be derated at reduced power factor secondary loads.

Early lighting circuits consisted entirely of incandescent filament-type lamps, and the resulting power factor of 99.5% or higher made it possible to use the actual load kilowatts as a basis for estimating the constant-current transformer kilowatts capacity required. However, the wide-spread use of mercury-vapor and fluorescent lamps with individual insulating transformers on series circuits has resulted in lighting-load power factors of 80 to 90%. The effect of load power factor on the output capability of a constant-current transformer is illustrated by the curve which is generally typical for all automatically operated constant current transformers.



Effect of secondary circuit power factor on out put of constant current transformer.

Manufacturers of products to be used on series lighting circuits generally specify the kilowatts capacity of constant current transformers needed to supply these products.

Constant current transformers are designed to deliver nominal KW output at 95% of rated primary voltage at a 99.5% factor load. A 7½% increase over nominal kilowatt rating at rated primary voltage shall be recognized.

Primary Volts

Single Voltage Ratings	Type	Primary Bushings
208 to 13,800	CPH	Cover or Sidewall
208 to 13,800	CMH	Cover
208 to 13,000	CSPH	Cover or Sidewall
208 to 7,620	CSPH-C	Cover or Sidewall
208 to 7,620	CSPH-K	Cover or Sidewall

Contact Factory for exceptions or for dual voltages.

Taps

The unit will regulate properly as long as the primary supply voltage is not greater than 5% above or below rated tap voltage. All single voltage primaries have one tap for 90% of rated voltage, except primary windings of 208 volts. With the proper use of taps, the transformer will give correct secondary regulation at any primary voltage between 85.5% and 105% of rated voltage.

Secondary Amps

Standard current ratings are 6.6 amps or 20 amps. Specify current required.

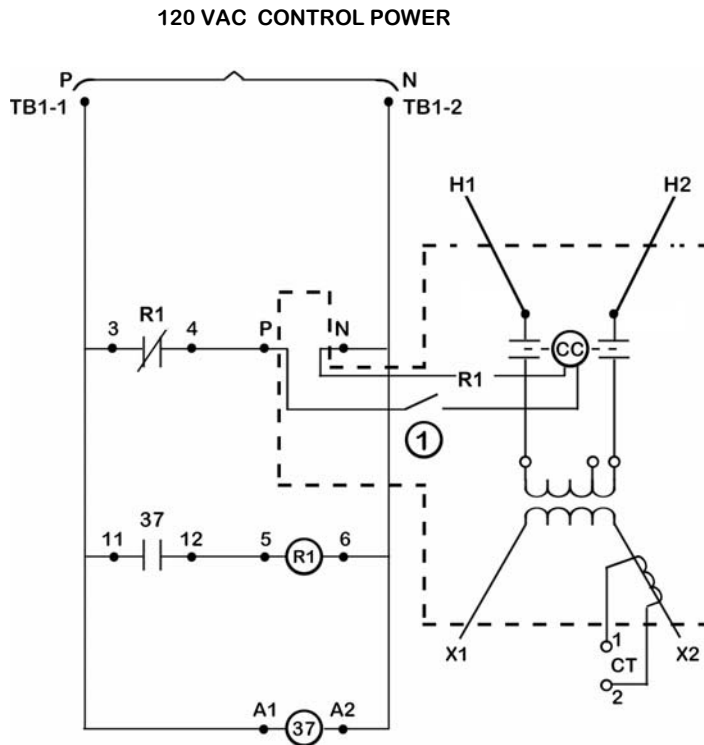
Frequency

Standard frequency is 60 Hertz. Other frequencies, or multiple frequencies are available.

Temperature Rise

Conforming to modern transformers standard design, temperature rise is 65°C at maximum elevation of 3300 feet. This temperature rise is based upon 50% of load rating for 8 hours, as this is the highest rise for any load on a constant current transformer.

Contact factory for exceptions.



① MANUAL OFF, AUTO, ON SELECTOR SWITCH.

- CONTACTS SHOWN AS DE-ENERGIZED.
- 37 CONTACT CLOSSES AFTER 2 SEC. UNDER-CURRENT CONDITION
- CONTROL POWER MUST BE DE-ENERGIZED TO RESET 37 RELAY.

TYPES OF UNITS AVAILABLE

CPH

This is the basic design consisting of two primary and two secondary bushings, moving-coil assembly and oil-filled. Primary and secondary DE-ION arresters can be supplied as an extra to protect the unit against lightning surges which might develop between primary and tank; primary to secondary, or secondary and

CMH

This is a basic design similar to the CPH, except it is designed for use in manholes or vaults and it is sealed against entrance of moisture.

CMH units are constructed using 304 stainless steel.

CSPH

This is a self-contained "package unit" and included an oil switch, protective relay and relay protection against open circuit secondary - a compact, complete assembly ready for installation and connection of leads. Installation of separately mounted items is unnecessary, resulting in decreased installation cost and uncluttered cross arms. Equipment consists of:

Auxiliary Hand-Operated Control

Three-position hand control lever is provided on the main tank for manual operation of the primary oil switch. In the "off" position, the primary oil switch contacts are open; in the "on" position, the oil switch contacts are closed. In the "auto" position, the transformer may be operated by remote control. The "on" and "off" positions are provided for emergency use, and for testing. In the automatic position, the oil switch is operated by the control circuit. Energizing the control circuit closes the oil switch, energizing the transformer.

Component Parts

All parts that are subject to high voltage and transient surges, including the oil switch, protective links and protected circuit series coil, are mounted under oil in the main tank. The only connections necessary to the transformer are the leads for the primary and secondary circuits and the control circuit.

Control Cabinet

Attached to outside of the tank. Contains control relay and control circuit terminals. Hinged door, gasketed to provide weather seal, allows easy access to control circuit terminals. Control may be provided by a time switch, photoelectric controller, or pilot wire circuit (not included in

Control Circuit

The standard control circuit is 120 Volts, 5 Ampere capacity, 60 Hertz.

DE-ION Arresters

Available at additional charge.

CSPH-C

This transformer is the same as type CSPH, except for the addition of a capacitor mounted externally on the tank. The purpose of the capacitor is to correct the power factor for all conditions of load within the capacity and rating of the constant current transformer.

Although the capacitor is mounted externally, it is connected behind the oil switch so that it is only on the line when the transformer is energized.

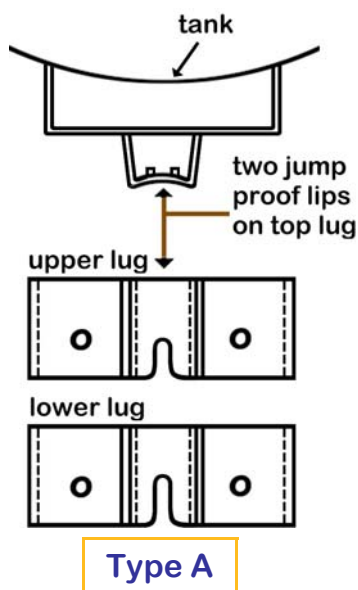
The CSPH-C is recommended for all roadway lighting circuits where it is desirable to maintain a high primary power factor and a minimum KVA on the primary circuit. This is desirable for distribution circuits that are heavily loaded.

CSPH-K

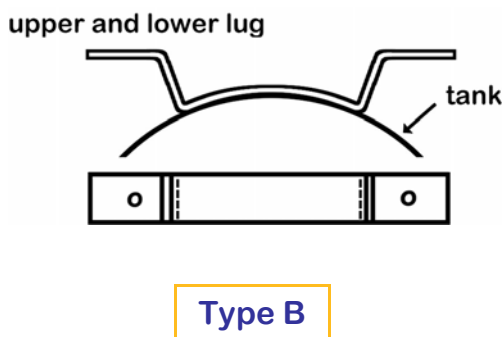
For series cascade control. This unit is identical to the CSPH, except the control current for the oil switch is supplied by the secondary current of another constant current transformer. Thus, the other constant current transformer has the necessary time controls or light intensity controls to energize or de-energize this unit and its load.

OPTIONS

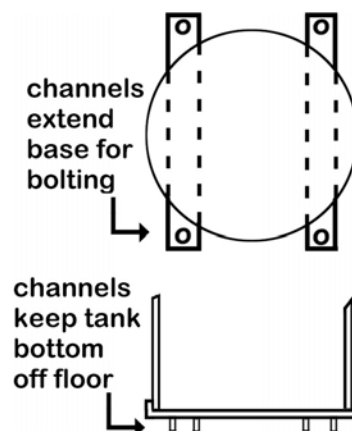
Primary Bushings	Select primary bushings from table under primary voltage.
Secondary Bushings	Standard design calls for sidewall secondary bushings. Contact factory for exceptions.
Capacitors for CSPH-C Units	The capacitors can be furnished and mounted at the factory.
Mounting	<p>Pole Type Hanger lugs are welded to tank for direct pole mounting, or for use with hanger irons. Hanger lugs spacing conform to standard transformer design. See data under hanger irons.</p> <p>Platform/Floor Type Hanger lugs are omitted and two base channels are extended out from base of tank for bolting to platform.</p>
Cooling	Shell Diala AX Transformer oil.
	Consideration must be given to KW rating of transformer if the load power factor is less than 99.5%.
Paint	Standard paint is ANSI outdoor Gray #70 for outdoor units. Contact factory for other paint specifications.
Packing	Standard packing (included in price) is open skid.



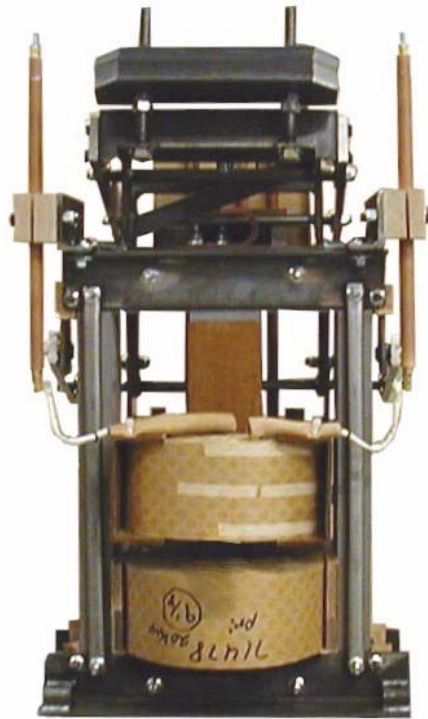
POLE MOUNT



PLATFORM MOUNT/FLOOR



INTERNAL DESIGN FEATURES



Secondary coil
(Movable)

Primary coil
(Stationary)

Ball bearings at all pivot points eliminate friction and assure accurate current regulation.

HIPERSIL steel



floor mount CSPH



pole type CPH with 2 side wall mounted bushings