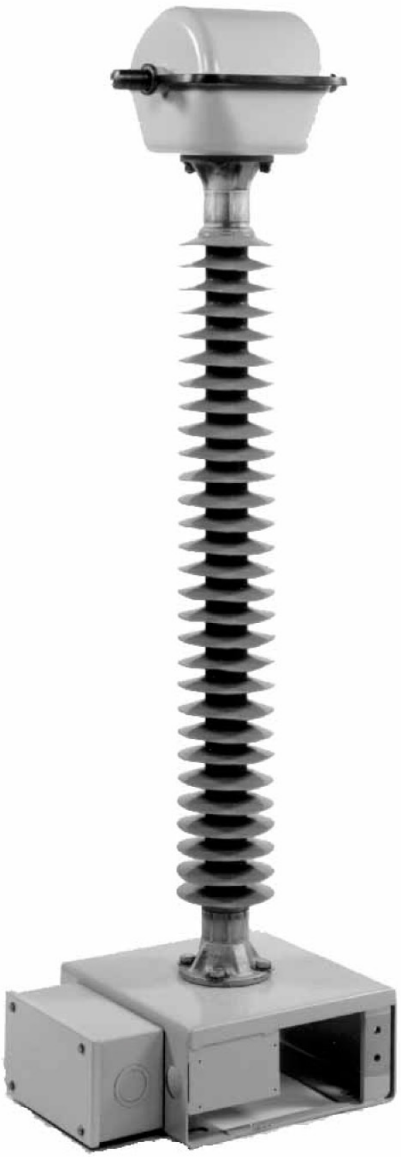
MOCT-P Optical Current Transformer System
72.5-800 kV Systems, 50/60 Hz

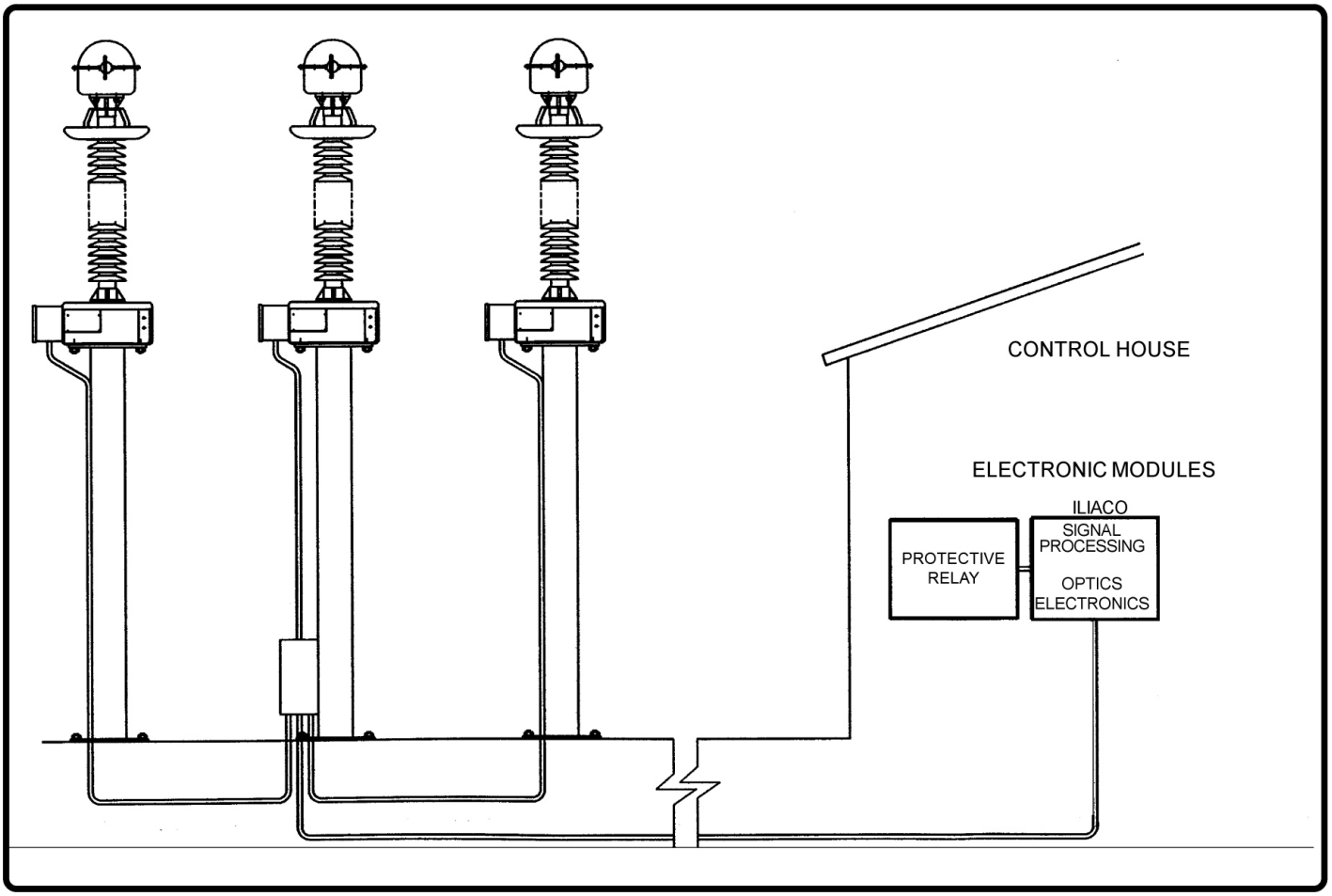
Application

The Magneto-Optic Current Transformer for Protection (MOCT-P) is a passive optical current transducer which uses light to accurately measure current on high voltage systems. The MOCT-P system is suitable for outdoor application and has a continuous current rating up to 3150 A with an accuracy limit factor of 40 x. It meets the protection class accuracy 5TPE, according to IEC 60044-8. The electronic unit 2100-PI uses ABB's patented dual-direction approach to make the output signal insensitive to shock and vibration. The optical design enables accurate reproduction of fully offset fault currents with decaying d.c. component without saturation or other source of distortion.

The MOCT-P system provides a 200 mV voltage output for use with protective relays.

- Three phases of MOCT-P sensors mounted on polymer insulator columns with preterminated fiber optic cable in the insulator.
- Electronic MOCT-P signal processing module 2100-PI suitable for installation in the substation control house.
- Fiber optic cables for transmission of the light signals between the optical sensors and the MOCT-P electronic module.



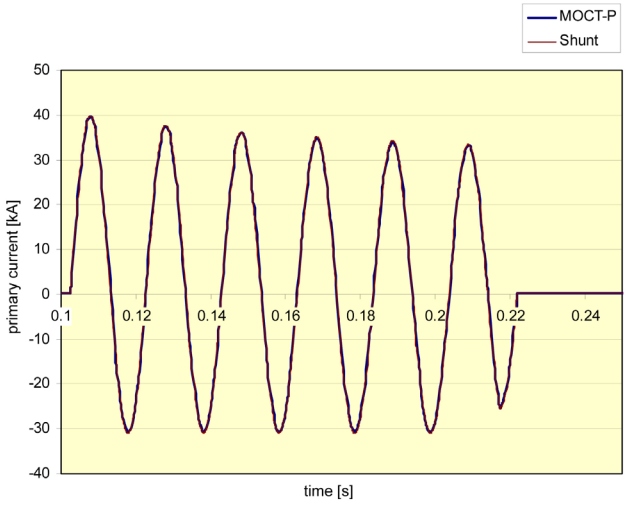


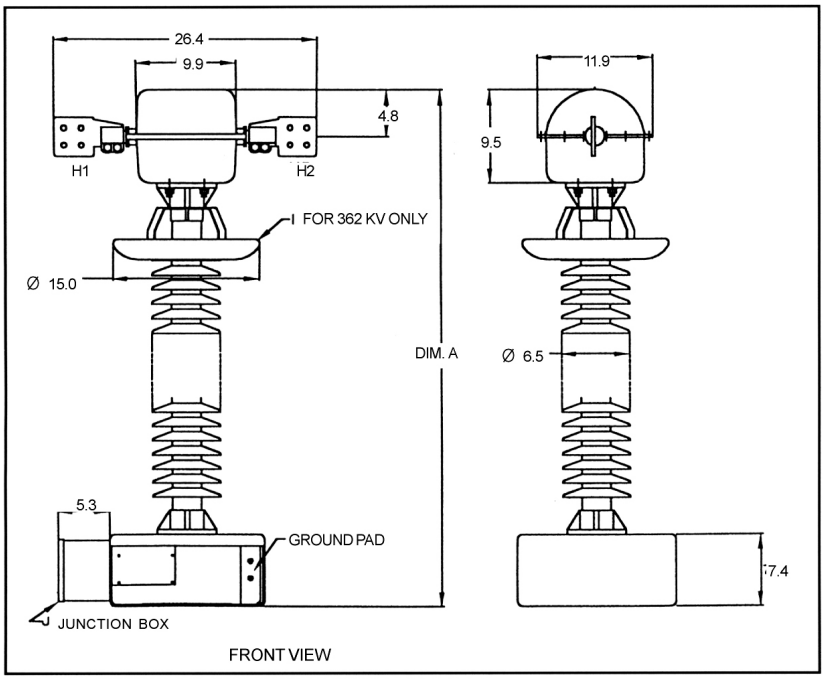
MOCT System Configuration

Benefits of the MOCT-P Optical Current Transducer System

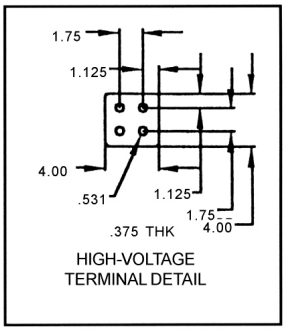
The MOCT-P system can satisfy current sensing needs for protective relaying in a wide variety of applications. Following is a list of key benefits:

- No requirement for oil or gas insulation system, environmentally safe.
- Shunt-like reproduction of fully offset fault current with decaying d.c. component with high accuracy and no saturation or other sources of distortion.
- Improved safety with no mechanism for failure or open secondary.
- Significantly smaller size and lighter weight than oil- or SF_6-insulated equipment.
- Total isolation from surges for microprocessor-based meters and relays.
- No magnetic core ferroresonace or saturation limits.

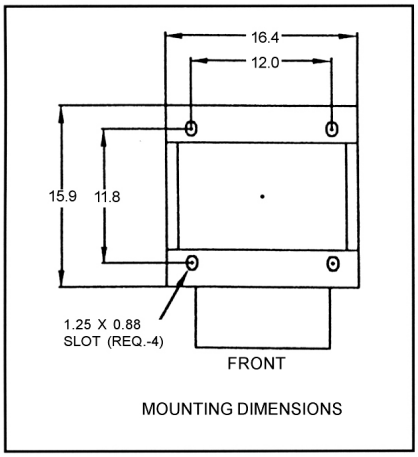




FRONT VIEW



HIGH-VOLTAGE
TERMINAL DETAIL



MOUNTING DIMENSIONS

Maximum System Voltage kV	BIL kV	Dimension A		Minimum Creep Distance		Weight	
		inches	mm	inches	mm	lbs.	kg
72.5	350	48.9	1242	70	1778	110	50
121	550	62.6	1590	113	2870	117	53
145	650	70.2	1783	137	3479	120	54
169	750	79.3	2014	165	4191	123	56
242	900	97.5	2477	222	5638	133	60
245	1050	109.6	2784	260	6604	139	63
362	1300	132.0	3355	272	6900	348	158
525	1800	191.2	4856	433	11000	410	186
800	2050	Contact Factory					

Ratings per IEC 60044-8	Symbol	Value	Unit
Temperature Range for Outdoor Components (Sensor Column)		-5 … +40 or -25 … +40	°C
Temperature Range for Indoor Components (Electronics)		-5 … +40	°C
Rated primary current	I_{pr}	500 - 3150	A RMS
Rated continuous thermal current	I_{cth}	3150	
Rated short time thermal current	I_{th}	63	kA RMS
Rated dynamic current	I_{dyn}	2.5 x I_{th}	
Accuracy limit factor	K_{alf}	40	
Rated symmetrical short-circuit-current factor for transient performance	K_{ssc}	25	
Rated primary time constant	τ_{pr}	120	ms
Rated frequency	f_n	50 / 60	Hz
Standard frequency range		96 … 102	%
Auxiliary power supply AC voltage range		85-132 or 187-264	V a.c.
Rated auxiliary power supply AC frequency		50 or 60	Hz
Auxiliary power supply DC voltage range		88-140 or 176-280	V d.c.
Maximum power consumption		20	W
Output type		Analog	
Rated delay time	t_{dr}	0	µs
Rated secondary voltage	U_{sr}	200	mV RMS
Rated burden	R_{br}	20	kΩ
Accuracy class		5TPE	
Ratio error at rated primary current		±1	%
Phase error at rated primary current		± 1	°
Composite error at rated accuracy limit		5	%
Maximum peak instantaneous error		± 10	%
Lower SNR limit current (for SNR ≥ 30 dB, with maximum 22 dB attenuation)	I_{SNR}	1250	A RMS
Bandwidth		10	kHz
Maximum system attenuation		16	dB
Maximum secondary direct voltage offset	U_{sdc}	± 2	mV
Enclosure	**Symbol**	**Value**	**Unit**
Height	h	5.25	Inch
Width	w	17	Inch
Depth	d	16	Inch

Fiber-Optics	Symbol	Value	Unit
Connector type		FC-14°	
Fiber core / cladding		200 / 230	µm
Emitted light wavelength	λ	810	nm
Maximum allowable additional attenuation		6	dB
Electro-Magnetic Compatibility Tests per IEC 61000	**Level**	**Test Values**	
Part 4-13 Harmonic and interharmonic test	Class 2	Full harmonic distortion 10%	
Part 4-11 Voltage dips immunity test (AC)		30%, 0.1 s	
Part 4-29 Voltage dips immunity test (DC)		50%, 0.1 s	
Part 4-11 Short interruptions immunity test (AC)		0.02 s	
Part 4-29 Short interruptions immunity test (DC)		0.05 s, low impedance	
Part 4-11 Voltage variations immunity test (AC).		+10 %, -20%	
Part 4-29 Voltage variations immunity test (DC)		± 20%	
Part 4-8 Power frequency magnetic field immunity test	Level 5	100 A/m steady state, 1 kA/m short term	
Part 4-9 Pulse magnetic field immunity test	Level 5	1 kA/m peak	
Part 4-10 Damped oscillatory magnetic field immunity test	Class 5	100 A/m	
Part 4-3 Radiated, radio-frequency, electromagnetic field immunity test	Class 3	10 V/m	
Part 4-4 Electrical fast transient/burst immunity test	Class 4	4kV, 2.5 kHz power supply port 2kV, 5 kHz I/O ports	
Part 4-2 Electrostatic discharge immunity test	Class 2	4 kV	
Part 4-12 Oscillatory waves immunity test		2 kV common mode 1 kV differential mode	
Part 4-5 Surge immunity test	Class 4	4 kV common mode 2 kV differential mode	
Low Voltage Components Voltage Withstand Tests	**Level**	**Test Values**	
IEC 60255-5 Power-frequency voltage withstand capability		2.8 kV d.c., 1 min, power supply 700 V d.c., 1 min, I/O	
IEC 60255-5 Impulse voltage withstand capability		5 kV, 1.2/50 µs, power supply	
Environmental Tests	**Level**	**Test Values**	
IEC 60068-2-6 Sinusoidal vibration		10-60Hz, 0.15mm 60-150Hz, 20m/s^2	
IEC 60068-2-75 Mechanical impact test	2J	3 hits per location, 20 locations	
IEC 60068-2-1 Cold test		-5 °C, 16 h	
IEC 60068-2-2 Dry heat test		+40 °C, 16 h	

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