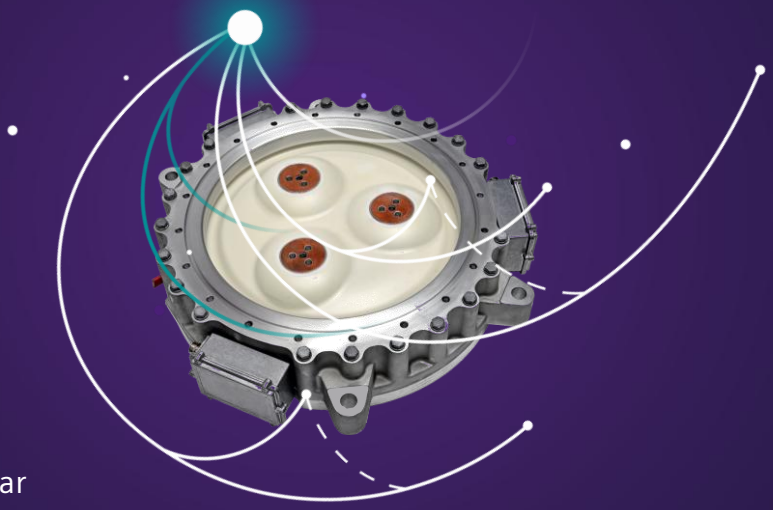
Low Power Instrument Transformer (LPIT)

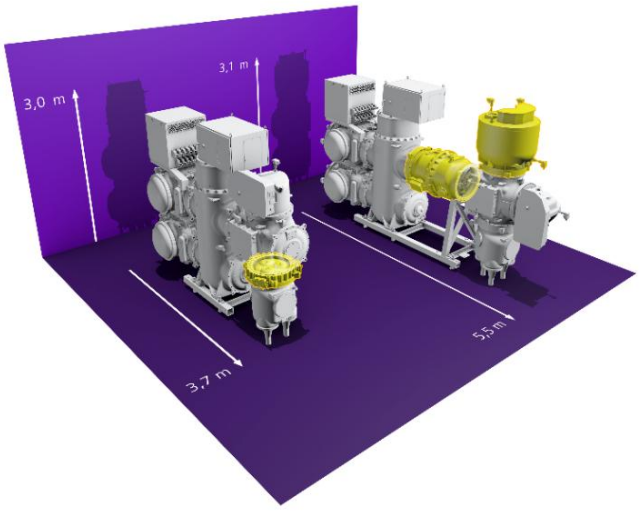
Measuring technology for protection and metering up to 420 kV



siemens-energy.com/gas-insulated-switchgear

Description

Siemens Energy LPITs are innovative low power current and voltage transformers providing a safe, reliable and standardized solution for measurement and protection applications in GIS.
The LPIT combines a Low Power Voltage Transformer (LPVT) and a Low Power Current Transformer (LPCT) fully compliant to the IEC 61869 series of standards in one device.
The measurement is based on Rogowski coils for current and on capacitive voltage sensors. Both sensors are integrated in the same GIS cast resin partition. They provide an analog output signals that can be connected to protection relays or merging units.
Siemens Energy successfully introduced LPITs first in their 145 kV and 170 kV GIS. Now LPITs for the 420 kV GIS are introduced for both clean air and SF_6 GIS.



Benefits

- **Smaller size and weight of the GIS** due to the small dimensions of the sensors and their integration into a GIS partition
- **Easy connection** and lower cabling and wiring effort
- **High reliability and long lifetime** due to the robust design of the passive sensors embedded in the cast resin
- **Less insulation gas** in the switchgear
- Excellent overvoltage performance - **no need for disconnection** during GIS or HV cable tests
- **No hazardous overvoltage** at open LPIT terminals
- **A single LPIT covers all** protection and metering requirements and thanks to its linearity also a wide range of primary currents and voltages, simplifying stock management, engineering and logistics.
- **Flexible definition and modification** of the settings for rated primary current and voltage in the Merging Unit at any phase of the project and afterwards. In this way the GIS remains flexible for future increases of nominal current.

Furthermore, the LPIT sensors provide improved measurement performance due to high linearity, no saturation (unlike conventional CTs), no ferro-resonance effects (unlike conventional VT) and a wide frequency range for measuring harmonics.

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Secondary equipment

The Siemens Energy three-phase LPITs were successfully tested in combination with the SIPROTEC 5 IO240 module. The IO240 is part of the SIPROTEC 5 family of I/O modules and can be used as an alternative to conventional CT/VT input modules. It can be integrated into the 6MU85 Merging Unit as well as other SIPROTEC 5 devices, including bay controllers and protection relays.

In addition, Sprecher Automation and Schweitzer Engineering Laboratories (SEL) are developing compatible Merging Units with redundant voltage measurement functionality. Sprecher Automation will further support LPIT applications with universal protection devices covering distance, overcurrent, and differential protection schemes. Primary and secondary injection test sets compatible with LPITs as well as test blocks are commercially available from different vendors.

The new 420 kV LPITs and all future Siemens Energy LPITs will feature fully IEC 61869-10/-11 compliant outputs, enabling straightforward integration with a broad range of interoperable secondary equipment from multiple vendors. This open and standardized approach provides customers with maximum flexibility in selecting protection, control, automation, metering, and power quality solutions.



Merging Unit Siemens SIPROTEC 6MU85 with integrated IO240, flush mounted version



Merging Unit SEL-700MU with LPIT sensor input card



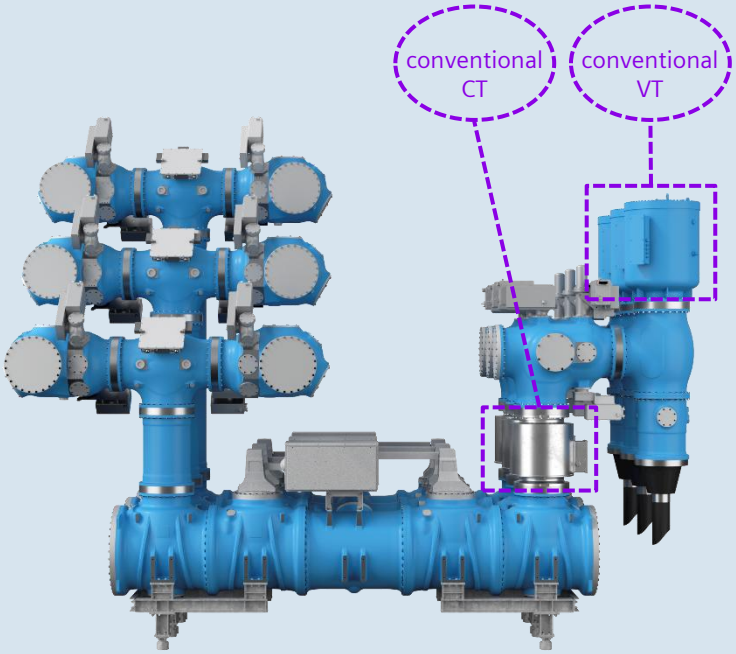
Sprecher Automation universal protection device with LPIT inputs – user panel and backside view

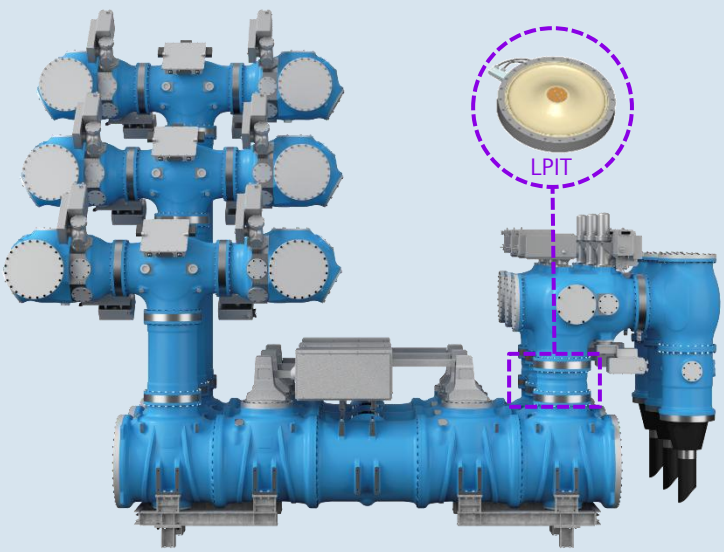


LPIT test blocks and plugs by SecuControl and Phoenix Contact

LPIT 420 kV – 8VQ3 clean air GIS

- 4,500 kg materials saved
- Redundant current and voltage measurement
- Compatible with all IEDs with LPIT/LEA inputs
- Accuracy class 0.2S and class 0.2P





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	145 kV (8DN8)	145 kV (8VN1)	170 kV (8DN8)	420 kV (8DQ1)	420 kV (8VQ3)
Rated insulation level	145 / 275 / 650 kV	145 / 275 / 650 kV	170 / 325 / 750 kV	420 / 650 / 1425 kV	420 / 650 / 1425 kV
Rated frequency f_r	50 Hz / 60 Hz				
Rated short-time thermal current I_{th}	50 kA (3 s)	50 kA (3 s)	63 kA (3 s)	80 kA (3 s)	80 kA (3 s)
Temperature range	-30°C / +55 °C	-50°C / +55 °C	-30°C / +55 °C	-30°C / +55 °C	-50°C / +55 °C
Weight	100 kg	185 kg	185 kg	45 kg	74 kg
Applied standard	IEC 61869 / IEEE C37.92				
LPCT					
Rated primary current I_{pr}	200 A	200 A	200 A	201 A @22.5 mV / 50 Hz	206 A @22.5 mV / 50 Hz
Rated extended primary current factor K_{pcr}	15.75	15.75	20	31	31
Nominal current range	200 to 3150 A	200 to 3150 A	200 to 4000 A	206 to 6300 A	206 to 6300 A
Rated accuracy class*	0.2S / 5P250 / 2TPM	0.2S / 5P250 / 2TPM	0.2S / 5P315 / 2TPM	0.2S / 5P389 / 5TPE	0.2S / 5P389 / 5TPE
Rated symmetrical short-circuit current factor K_{ssc}	250	250	315	389	389
LPVT					
Rated primary voltage U_{pr}	66 to 138 / √3 kV	66 to 138 / √3 kV	66 to 154 / √3 kV	up to 400 / √3 kV	up to 400 / √3 kV
Rated accuracy class LPVT	0.2 P	0.2 P	0.2 P	0.2 P	0.2 P
Divider ratio	-	-	-	100000:1	10000:1
Rated voltage factor F_V and permissible duration	3 / 2000 h				

**TPE at the analog output, TPM at the digital output of the Merging Unit*

A technical user guide will be available soon:
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