



Input Modules for TESLA Power System Recorders

Modules Described In This Document

DC Isolation Input Module - Model 401016 Input (ac or dc signals)

AC Current Module - Model 401014 (5 A) and 401020 (1 A) Input Module

AC Voltage Input Module - Model 401006

Split Core Current Transformer - Model 401013 (5 A) and 401017 (1 A)

Clamp On Current Transformer - Model 401012



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DC Isolation Input Module

Model 401016 Input (ac or dc signals)



The dc input module provides dc-coupled isolation and scaling for four independent dc or ac voltage or current channels. These channels have a bandwidth from dc to 2 kHz but are limited to 1.5 kHz by anti-aliasing inside the recorder. Externally mounted resistors set the input type and full scale range of the module. The output signals from the module provide isolation and conditioning for the TESLA disturbance fault recorder analog input channels.

Note:

Locate modules up to 1200 meters (4000 ft) from the recorder.

Specs	
Input Voltage	
Low range	0.1 to 200 Vdc full scale 0.1 to 150 Vrms full scale
High range	350 V to 1000 Vdc full scale 200 V to 600 Vrms full scale
Current (ac or dc shunt outputs)	
Direct input from transducers	1 to 500 mA dc full scale
ac or dc from high current shunts (mV)	0.1 to 1000 mV (ac or dc) across the shunt
Ratio (1 k Ω load)	Dependent on configuration
Input Impedance	Dependent on configuration
Power Supply	40 V to 300 Vdc or 120 Vac
Isolation	
Channel to Ground	1500 V
Channel to Channel	1500 V
Dimensions: L x W x H	172mm x 113mm x 67.2mm

AC Current Module

Model 401014 (5 A) and 401020 (1 A) Input Module



The ac current input module provides four isolated current channels for TESLA Disturbance Fault Recorder. These current modules are available in 1 A nominal (Model 401020) and 5 A nominal (Model 401014) versions. The current modules provide conditioning and isolation between the main CT secondaries and the inputs to the recorder. Apply the nominal phase current (I_n) – 5 A or 1 Arms – into the odd numbered input terminals with the dot (indicating ac instantaneous polarity) and out of the even numbered terminal for each current input.

Notes:

1. The output from the current module to the input of the recorder is an impedance-matched loop. Due to impedance matching requirements, the modules output channels cannot be connected to more than one TESLA Disturbance Fault Recorder input channels.
2. Locate modules up to 1200 meters (4000 ft) from the recorder. Use shielded wire (e.g. Belden 9728/30) for connection to the recorder's inputs. The ground cable should be attached only at the recorder end.

Specs	Model 401014 (5 A)	Model 401020 (1 A)
Nominal Current - 4 input channels Full Scale/Continuous Maximum Over-scale	$I_n = 5$ Arms $3 \times I_n = 15$ Arms $20 \times I_n = 100$ Arms for 1 second (no distortion)	$I_n = 1$ Arms $3 \times I_n = 3$ Arms $20 \times I_n = 20$ Arms for 1 second (no distortion)
Thermal Rating	$80 \times I_n = 400$ Arms for 1 second	$400 \times I_n = 400$ Arms for 1 second
Burden	<0.25 VA @ 5 Vrms	<0.25 VA @ 5 Vrms
Ratio (1 k Ω load)	79 mV/A	15.8 mV/A
Dimensions: L x W x H	172mm x 113mm x 67.2mm	172mm x 113mm x 67.2mm

AC Voltage Input Module

Model 401006



The ac voltage input module (Model 401006) provides three isolated voltage channels for TESLA Disturbance Fault Recorder. These voltage modules provide conditioning and isolation between the main PT/VT secondaries and the inputs to the recorder. Apply the nominal phase to ground voltage (V_n) - 69 Vrms - across one input to the module with a dot on the odd numbered input terminals indicating ac instantaneous polarity reference.

Notes:

1. The output from the voltage module to the input of the recorder is an impedance-matched loop. Due to impedance matching requirements, the modules output channels cannot be connected to more than one TESLA Disturbance Fault Recorder input channels.
2. Locate modules up to 1200 meters (4000 ft) from the recorder. Use shielded wire (e.g. Belden 9728/30) for connection to the recorder's inputs. The ground cable should be attached only at the recorder end.

Specs	
Nominal Voltage - across input channels Full Scale/Continuous Maximum Over-scale Thermal Rating	$V_n = 69$ Vrms $2x V_n = 138$ Vrms $3x V_n = 207$ Vrms for 10 seconds
Burden	<0.15 VA @ 69 Vrms
Ratio (1k Ω load)	12.14 mV/V
Dimensions: L x W x H	172mm x 113mm x 67.2mm

Split Core Current Transformer

Model 401013 (5 A) and 401017 (1 A)



The split core transformer measures current in a 5 A or 1 A secondary CT circuit and works in conjunction with the TESLA disturbance fault recorder to monitor secondary currents.

It is designed to clamp around the secondary circuit wires from the primary CT and is intended to connect an in-line CT for situations which do not allow an “open-circuit”.

The “on load” installation does not require the main CT to be taken out of service during testing. The secondary current “circuit” wire can be placed in the split core and the removable leg screwed back on the split core CT. The spring-loaded leg will mate with the core of the main housing (split core).

The outputs from the CT are scaled and impedance matched to connect directly to the TESLA’s analog input connectors.

Notes:

1. Due to impedance matching requirements, the CT cannot be connected to more than one TESLA input channel.
2. Locate modules up to 1200 meters (4000 ft) from the recorder. Use shielded wire (e.g. Belden 9728/30) for connection to the recorder’s inputs. The ground cable should be attached only at the recorder end.

Specs	Model 401014 (5 A)	Model 401020 (1 A)
Nominal Current	In = 5 Arms	In = 1 Arms
Full Scale/Continuous	3x In = 15 Arms	3x In = 3 Arms
Maximum Over-scale	20x = 100 Arms for 1 second (no distortion)	20x = 20 Arms for 1 second (no distortion)
Thermal Rating	80x = 400 Arms for 1 second	400x = 400 Arms for 1 second
Burden	<0.25 VA @ 5 Vrms	<0.25 VA @ 5 Vrms
Ratio (1 kΩ load)	79 mV/A	15.8 mV/A

Clamp On Current Transformer

Model 401012



The clamp-on CT works in conjunction with the TESLA disturbance fault recorder to monitor secondary current from the main CTs.

The device has a clothes-pin style “jaw mechanism” designed to clamp around the secondary circuit wires from the primary CTs and is intended for quick, temporary connection during testing, and installation of high voltage power equipment. The “on load” installation does not require the main CT to be taken out of service during testing. The “jaws” can accommodate conductors up to 250 MCM. The Clamp-on CT is scaled for a 5 A nominal current with a dynamic range that can pass 20x nominal currents continuously. The outputs from the CT are scaled and impedance matched to connect directly to the TESLA’s analog input connectors.

Notes:

1. Due to impedance matching requirements, the CT cannot be connected to more than one TESLA input channel.
2. Locate modules up to 1200 meters (4000 ft) from the recorder. Use shielded wire (e.g. Belden 9728/30) for connection to the recorder’s inputs. The ground cable should be attached only at the recorder end.

Specs	
Nominal Current	In = 5 Arms
Full Scale/Continuous	3x In = 15 Arms
Maximum Over-scale	20x = 100 Arms for 1 second (no distortion)
Thermal Rating	80x = 400 Arms for 1 second
Burden	<0.25 VA @ 5 Vrms
Ratio (1 kΩ load)	79 mV/A

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The specifications and product information contained in this document are subject to change without notice.
In case of inconsistencies between documents, the version at www.erlphase.com will be considered correct. (D02367R07)

