

PowerLogic™ T300 substation controller

LV150

Low Voltage Power monitoring unit

Installation Guide



NOTE

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

A qualified person is one who has skills and knowledge related to the construction, installation, and operation of electrical equipment and has received safety training to recognize and avoid the hazards involved.

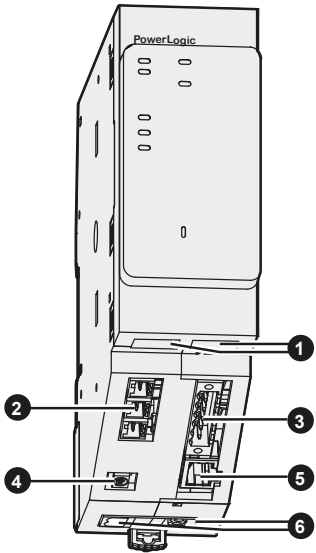
Part number	Designation
EMS59300	PowerLogic LV150-Low Voltage Power monitoring



Description

The LV150 module of T300 PowerLogic™ range is the Low Voltage measurement and transformer monitoring unit.

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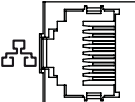
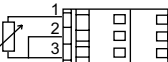


NOTICE

HAZARD OF INCORRECT CURRENT MEASUREMENTS

- Do not expose the device to conditions exceeding the electrical values specified in this document.
- The device should be installed vertically in an electrical cabinet, in accordance with the local regulations in force.
- The product must be connected to the ground (DIN rail) to help ensure compliance with electromagnetic compatibility (EMC) limits.
- Standby protection should be provided in accordance with national and international cabling regulations.
- An appropriate electrical disconnecting device must be installed in the building in question.
- Use only the type of connector supplied as an accessory for the LV150 module (product reference: EMS59220).
- Check that the connections correspond to the recommended cables before powering up the equipment.
- Use appropriate tools to perform cabling on the connectors (suitable screwdriver, crimped end-pieces, etc.).
- Strip the wires appropriately (not excessively) before connecting them to the connectors (see the recommendations in "Cabling" section in this document).

Failure to follow these instructions can result in equipment damage.

The LV150 is formed of the following components:

Port	Characteristics	Description																								
<div>1</div> <div>Double Ethernet ports LAN 1 and 2</div> <div></div>	10/100 base-T RJ45 connector	Double ports dedicated to internal communication between PowerLogic T300 modules or for connecting a PC. Isolation: 2 kVac 10 Ethernet jumpers (Ref: EMS59528) provide as accessories allow the internal Ethernet connection between the modules HU250, SC150, SC160 and LV150. See <i>NOTICE</i> below.																								
<div>2</div> <div>Analog inputs</div> <div><div><div>PT100 #1</div><div></div></div><div><div>PT100 #2</div><div></div></div><div><div>PT100 #3</div><div></div></div></div>	Plug-in leaf-spring connectors: <div><table><tr><th colspan="2">PT100 #1</th></tr><tr><td>1</td><td>In1</td></tr><tr><td>2</td><td>In2</td></tr><tr><td>3</td><td>Ref</td></tr></table><table><tr><th colspan="2">PT100 #2</th></tr><tr><td>1</td><td>In1</td></tr><tr><td>2</td><td>In2</td></tr><tr><td>3</td><td>Ref</td></tr></table><table><tr><th colspan="2">PT100 #3</th></tr><tr><td>1</td><td>In1</td></tr><tr><td>2</td><td>In2</td></tr><tr><td>3</td><td>Ref</td></tr></table></div>	PT100 #1		1	In1	2	In2	3	Ref	PT100 #2		1	In1	2	In2	3	Ref	PT100 #3		1	In1	2	In2	3	Ref	3 analog inputs for connection of 3 wire PT100 temperature sensors. Measurement : -55 to 250°C (-67°F to 482°F) Resolution : 1°C (1°F)
PT100 #1																										
1	In1																									
2	In2																									
3	Ref																									
PT100 #2																										
1	In1																									
2	In2																									
3	Ref																									
PT100 #3																										
1	In1																									
2	In2																									
3	Ref																									

NOTICE

HAZARD OF WRONG CONNECTION

Do not use the double LAN port 1 and 2 for connection to an external switch or router.

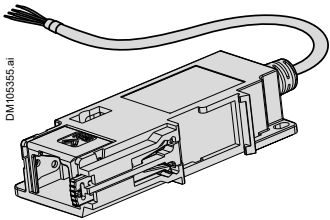
Failure to follow these instructions can result in equipment damage.

Port	Characteristics	Description																	
<div>3</div> <div>Current inputs</div> <div></div>	<div>6-pin plug-in screw connector:</div> <table><tr><th>CTs inputs</th></tr><tr><td>1</td><td>Phase current 1</td></tr><tr><td>2</td><td>Phase current 2</td></tr><tr><td>3</td><td>Phase current 3</td></tr><tr><td>4</td><td>Phase current common</td></tr><tr><td>5</td><td>Neutral current common</td></tr><tr><td>6</td><td>Neutral current</td></tr></table> <div>For the details of the connection, see chapter "Connecting CTs"</div>	CTs inputs	1	Phase current 1	2	Phase current 2	3	Phase current 3	4	Phase current common	5	Neutral current common	6	Neutral current	<div>4 inputs for connecting CTs:</div> <div>■ 3 phase CTs,</div> <div>■ 1 core for Neutral measurement.</div> <div>Allows the following types of setup:</div> <div>■ 3 phase CTs</div> <div>■ 3 phase CTs + 1 core for Neutral measurement</div> <div>Use a type of toroid with a primary / secondary ratio that matches the following settings configurable in the product:</div> <div>■ Primary: 50 to 3000 A</div> <div>■ Secondary: 1 or 5 A</div>				
CTs inputs																			
1	Phase current 1																		
2	Phase current 2																		
3	Phase current 3																		
4	Phase current common																		
5	Neutral current common																		
6	Neutral current																		
<div>4</div> <div>Zigbee antenna</div> <div></div>	<div>Snap-in connector</div>	<div>■ Connection of a Zigbee antenna for wireless radio communication with current sensors (CTs). (This communication is not operational at this time and is reserved for future use).</div> <table><tr><th>Parameter</th><th>Value</th><th>Unit</th></tr><tr><td>Operating frequency range</td><td>2400 - 2483.5</td><td>MHz</td></tr><tr><td>Maximum transmitted power</td><td>2.5</td><td>dBm</td></tr></table>	Parameter	Value	Unit	Operating frequency range	2400 - 2483.5	MHz	Maximum transmitted power	2.5	dBm								
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Operating frequency range	2400 - 2483.5	MHz																	
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<div>5</div> <div>Voltage inputs</div> <div></div>	<div>Connecting cable with the voltage sensor including an RJ45 connector on the LV150 side.</div> <table><tr><th>Voltage inputs</th></tr><tr><td>1</td><td>Ph2 voltage (-)</td></tr><tr><td>2</td><td>Ph2 voltage (+)</td></tr><tr><td>3</td><td>Neutral voltage (+)</td></tr><tr><td>4</td><td>Ph1 voltage (-)</td></tr><tr><td>5</td><td>Ph1 voltage (+)</td></tr><tr><td>6</td><td>Neutral voltage (-)</td></tr><tr><td>7</td><td>Ph3 voltage (+)</td></tr><tr><td>8</td><td>Ph3 voltage (-)</td></tr></table>	Voltage inputs	1	Ph2 voltage (-)	2	Ph2 voltage (+)	3	Neutral voltage (+)	4	Ph1 voltage (-)	5	Ph1 voltage (+)	6	Neutral voltage (-)	7	Ph3 voltage (+)	8	Ph3 voltage (-)	<div>Connecting cable LV150 - Voltage sensor adapter can be supplied as an accessory. The wiring of the RJ45 connector on the LV150 side is given solely for information. This connecting cable is supplied for the following adapter:</div> <div>■ LV150-VT adapter - 10 KV/1 sec (6 KV/1 mn) insulation - ref EMS59574.</div>
Voltage inputs																			
1	Ph2 voltage (-)																		
2	Ph2 voltage (+)																		
3	Neutral voltage (+)																		
4	Ph1 voltage (-)																		
5	Ph1 voltage (+)																		
6	Neutral voltage (-)																		
7	Ph3 voltage (+)																		
8	Ph3 voltage (-)																		
<div>6</div> <div>Power supply</div> <div></div>	<div>Plug-in screw connectors:</div> <table><tr><th>Power supply</th></tr><tr><td>+</td><td>+Vdc (+12 V to +48 V)</td></tr><tr><td>-</td><td>0V</td></tr></table>	Power supply	+	+Vdc (+12 V to +48 V)	-	0V	<div>2 power supply connectors connected internally, facilitating serial connections and allowing looping of power supplies between the T300 modules. (see Power Supply section).</div>												
Power supply																			
+	+Vdc (+12 V to +48 V)																		
-	0V																		

VT adapter for LV150

LV150-VT adapter is the interface between the Low Voltage sensors and the LV150. An Ethernet RJ45 cable connecting the VT adapter and the LV150 can be supplied as accessory.

Refer to the **LV150-VT adapter Installation Guide** (ref: NT00393-xx) to have more information about the installation and connection of the LV150-VT adapter.



Cabling

Recommendation for lengths of cable less than 2 meters

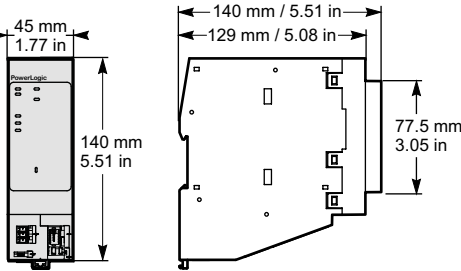
2	8 mm 0.315 in	0.14-0.5 mm² 26-20 AWG	-
3	7 mm 0.276 in	0.2-2.5 mm² 24-13 AWG	0.5-0.6 N.m 4.4-5.3 lb-in
6	12-48 V	1-2.5 mm² 17 AWG	0.5-0.6 N.m 4.4-5.3 lb-in

Installation

Installing the enclosure

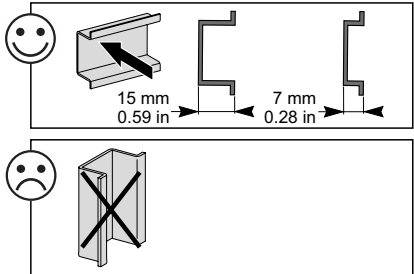
The LV150 module is fastened to a DIN rail. No tool is needed for mounting. Simply clip it in order to fasten it as shown below.

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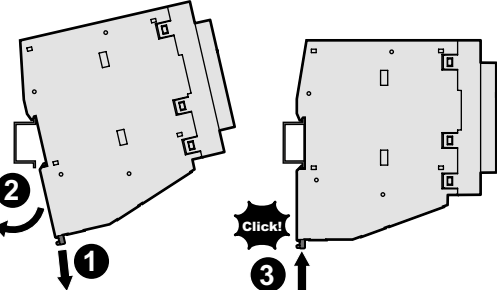


External dimensions of the LV150 enclosure

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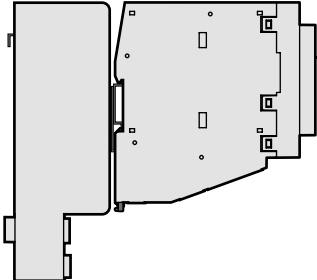


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Installing the LV150 module on DIN rail

DM105358.eps



Installing the LV150 module on a PS50 enclosure

NOTICE

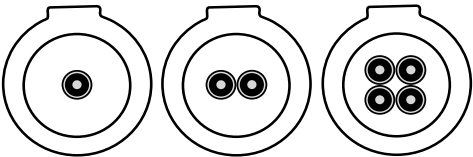
HAZARD OF TERMINAL DAMAGE OR INCORRECT POWER SUPPLY

- Use appropriate tightening torques for tightening connector screws (tightening torque values provided in this document).
- The LV150 module must be powered by a power supply of the SELV/PELV type (e.g. the PS50 module).
- The supply voltage of the LV150 module must not exceed 57.6 Vdc.

Failure to follow these instructions can result in equipment damage.

Installing CTs

The setup concerns a 3 split-core phase CTs or 3 split-core phase CTs + neutral CT.
The cables must be centered as far as possible inside the toroid to help ensure the accuracy of the measurement.



NOTICE

HAZARD OF INCORRECT CURRENT MEASUREMENT

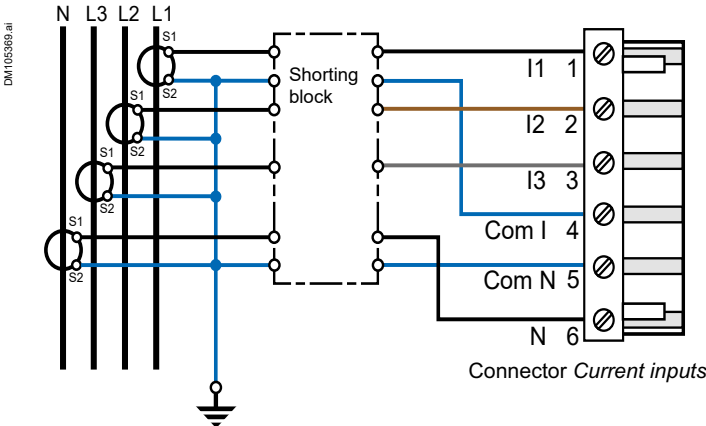
Pay attention to the mounting direction of the CTs. It must not have an impact on the current measurement.
Failure to follow these instructions can result in equipment damage.

DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- The current sensors used for measuring must be 1 A or 5 A secondary with security factor limiting the current to 100 A secondary -1 s (according to standard 61869-2).
 - The toroids must be short-circuited at the secondary when they are disconnected from the LV150 (eg during a maintenance operation). To do this, use a shorting block.
 - The low-voltage insulation of the PowerLogic CTs means they can only be used on insulated cables.
 - Always use grounded external CTs for current inputs.
 - Ensure the LV Network is turned off before to install the CTs on the LV cable and making the CTs connections to the LV150.
- Failure to follow these instructions will result in death or serious injury.**

Connecting CTs



Operation

Once the LV150 has been powered up, some indicator lamps on the front panel may be lit to indicate certain operating states.
These indications are summarized in the table below:

Part	Description of indications and actions
1 1.1 1.2	LV150 states: 1.1 LV150 operating, communication status with the HU250 1.2 Equipment status (potential software issue, potential hardware issue, potential configuration issue).
2 2.1 2.2	Not used
3 3.1 3.2 3.3	Not used
4 4.1	Voltage presence 4.1 Red: power on 3 phases Extinguished: Invalid measure or power off on 3 phases Orange: power on or off on at least one of the phases

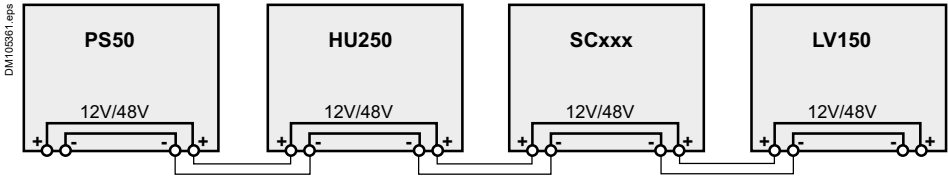
DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Wear your personal protective equipment (PPE) and comply with the safe electrical work practices. See NFPA 70E in the USA or applicable local standards.
 - Only qualified person should install this equipment. Such work should be performed only after reading this entire set of instructions.
 - Switch off the electric power supply of the LV150 and of all the devices to which the LV150 is connected before any handling or replacement operation.
 - Always use a properly rated voltage sensing device to confirm that all power is off.
 - Do not connect VT adapter directly to the LV sensors. Always use fuse and disconnect switch (maximum voltage allowable on the VT adapter inputs : 10 Vac).
 - Never short the secondary of a Voltage Transformer (VT).
- Failure to follow these instructions will result in death or serious injury.**

Power supply

The LV150 includes two connectors to connect the power supply. These two connectors are connected together internally in the LV150. Having two power supply connections can facilitate connection between the modules. No strapping is necessary.
Connect the LV150 as shown in the following diagram in order to have the benefit related to power supply loopback.



Parameters setup

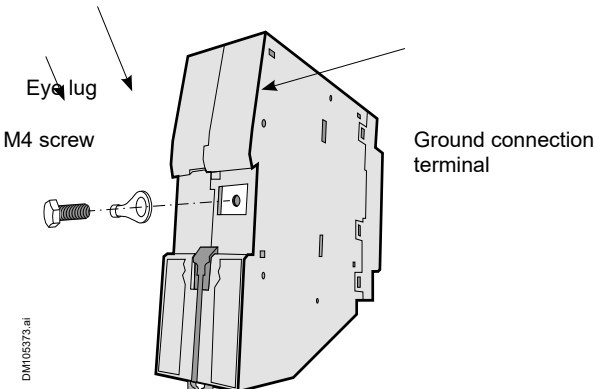
Installation of the LV150 module requires no parameters setup. This is performed during the commissioning/configuration stages.
Refer to the PowerLogic T300 User Manual and Quick Start Guide for any further information.

Identification

The serial number of the LV150 is formed as follows: Year - Week - Work order, e.g. 16340265 (265th product manufactured, week 34 of the year 2016)

Grounding

- The LV150 module must be connected to the ground:
- Either via the mounting DIN rail. The DIN rail helps ensure electrical continuity (preferably use a DIN rail in 304L stainless steel to withstand the climatic conditions).
 - Either by means of an eye lug and a M4 screw (max. Length 10 mm), screwed in the threaded hole at the back of the LV150 housing (see diagram below). Use a green/yellow wire of length 300 mm maximum (11.81 in) and 4 mm² section (11 AWG) for the connection between the eye lug and the ground.



NOTICE

HAZARD OF INCORRECT CURRENT MEASUREMENTS

- The DIN rail on which the LV150 is installed (if the LV150 is grounded by the DIN rail) must be grounded and of metallic type and must comply with electrical continuity in all climatic conditions.
 - If the LV150 is installed on a PS50 power supply module, the grounding of the module is done via the PS50's DIN rail, which must be grounded via a dedicated terminal near the PS50 power input connector. Refer to the Installation Guide of the PS50 power supply.
- Failure to follow these instructions can result in equipment damage.**

Meaning of indicator colors and states

Indicator state	Flashing			Steady			Unlit
	Red	Green	Orange	Red	Green	Orange	
1 1.1 1.2	Start-up -	- -	- -	Fault Major fault	OK -	Com OFF Minor fault	- OK
2 2.1 2.2			Not used				
3 3.1 3.2 3.3			Not used				
4 4.1	-	-	-	ON (3 ph.)	-	ON (1 or 2 ph.)	Invalid or OFF (3 ph.)

Note: The indications in bold letters correspond to normal operation (first power up without existence of a potential issue indication). The voltage presence states cannot be determined for normal operation, because that depends on the state of the network.

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