Installation, Operation and Maintenance Manual
PN 750-0068-003 Rev A00

Electrical Transient Suppression Filter Systems
Featuring the Failure-Free ISM™
TransGuard® TG3™ suppression filter systems feature a powerful failure-free ISM™ (Integrated Suppression Module). The ISM™ contains individual thermally fused TPMOVs, surge-rated copper busing, robust filtering and advanced remote communications capabilities. The TG3™ protects today’s facilities from costly downtime and equipment damage caused by routine or catastrophic electrical disturbances.

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Thank you for choosing the Current Technology® TG3 Surge Suppression System. We look forward to fulfilling your facility-wide surge suppression filter system needs.

Monday through Friday, 8:00 a.m. to 5:00 p.m. (EST):
800.238.5000 or 804.236.3300

This manual provides guidelines for the proper installation of the TG3 family of devices. Proper product selection and compliance with these guidelines will help your new suppression system provide years of reliable service. If installers are unsure about the facility’s electrical configuration or have other installation related questions, it is recommended they consult a master electrician or other qualified electrical professional.

When shortcuts are taken or installation procedures are not followed, the TG3 system may be damaged or may not provide adequate protection. Improper installation may also void the warranty. It is extremely important to follow these installation procedures carefully.

However, should you have questions about installing the TG3 please call Current Technology® Technical Support at 800.238.5000.

**WARNING!**
HAZARDOUS VOLTAGES PRESENT: Improper installation or misapplication may result in serious personnel injury and/or damage to electrical system. Read the complete installation instructions before proceeding with installation. Remove all power to the electrical panel before installing or servicing the surge protective device (SPD).

**WARNING!**
IMPORTANT SAFETY INSTRUCTIONS: All work must be performed by licensed and qualified personnel. The electrical system must be properly grounded in accordance with the U.S. National Electrical Code, state and local codes or other applicable codes for this SPD to function properly. This device is suitable for installation where the available short circuit current is 200,000 rms symmetrical amperes at 600VAC or less.
Before Beginning

Confirm that the voltage(s) and service configuration shown on the TG3 product label are consistent with the voltage and service configuration of the system to which it is being attached. A model number is printed on the label affixed to the inside of the TG3 cabinet. Each model number corresponds to the voltage and service configurations as per sample model number scheme below:

### SAMPLE MODEL NUMBER SCHEME (TG3)

**Example:** TG3-050-208-3Y-PNT-M6E-F2

<table>
<thead>
<tr>
<th>Model</th>
<th>kA Rating</th>
<th>Voltage</th>
<th>Configuration</th>
<th>Cable Entry</th>
<th>Monitoring</th>
<th>Filter</th>
<th>Optional Feature</th>
</tr>
</thead>
<tbody>
<tr>
<td>TG3</td>
<td>050</td>
<td>208</td>
<td>3Y PNT M6E F2</td>
<td>T B</td>
<td>M0 M1 M2</td>
<td>F</td>
<td>2</td>
</tr>
</tbody>
</table>

**Configuration**
- **1G**: 1 Phase, Grounded
- **2G**: 2 Phase, Grounded, Split Phase
- **3Y**: 3 Phase, Grounded Wye
- **3R**: 3 Phase, Grounded High Resistance
- **3H**: 3 Phase, Grounded, High Leg Delta
- **3D**: 3 Phase, Grounded Delta
- **MN**: Metal Without Disconnect
- **MD**: Metal With Disconnect
- **SN**: Stainless Steel Without Disconnect
- **SD**: Stainless Steel With Disconnect
- **PN**: Fiberglass Reinforced Polyester Without Disconnect

**Voltage**
- 208: 120/208
- 240: 120/240
- 380: 208/380
- 480: 277/480
- 600: 347/600

**Filter Options**
- **F**: Filter
- **N**: No Filter

**Optional Feature**
- **2**: Test Port

**Stand-Alone Options**
- **DTS**: DTS-2 Diagnostic Test Set
- **MxX**: Remote Monitor Extension
- **M1X through M6EX**: Additional Monitor Options
- **HPI**: HPI Cable

*Consult factory for additional Voltage/Configuration options.*
Pre-Installation Checklist ✓

☐ Check to ensure that a proper neutral-ground bond is installed between the neutral and ground terminals at the transformer upstream from all 3-Phase WYE, 3-Phase High-Leg DELTA, or 1-Phase SPLIT-PHASE TG3 devices (see NEC article 250.) Lack of a proper bond will damage the TG3 and void the warranty.

☐ Confirm that the environmental conditions are consistent with the following ranges:
  - Ambient Temperatures: The TG3 must be installed in an area with a temperature between -13° and +140°F (-25° and +60°C).
  - Humidity: The TG3 must be installed in an area with relative humidity between 5% and 95% non-condensing.
  - Altitude: The TG3 must be installed in a location where the altitude is below 13,000 feet.

⚠️ WARNING!

Discontinue installation if (1) your conditions are inconsistent with the checklist above or (2) your conditions cannot be verified. Call Thomas & Betts Power Solutions’ Technical Support at 800.238.5000 if you have any questions.

This device features an internal protection that will disconnect the surge protective component at the end of its useful life but will maintain power to the load now unprotected. If this situation is undesirable for the application, follow the manufacturer’s instructions for replacing the device.

For the Design Engineer and the Installer: Installation Methods for Common Service Configurations

The TG3 is a Type 1 SPD which is suitable for use in both Type 1 and Type 2 SPD applications. The TG3 is to be connected in parallel with the electrical system. It may be connected via a circuit breaker, molded case switch, fused switch, or connected directly to the bus of the panelboard or switchboard it is protecting. If direct bus connection is used, Current Technology®, recommends that the TG3 be equipped with the optional integral disconnect switch.
Service Configurations

Figures 1-4 show the electrical relationship between the TG3 and these four basic service configurations: WYE, DELTA, High-Leg DELTA and SPLIT-PHASE.

**FIGURE 1**
3-Phase, 4-Wire WYE

**FIGURE 2**
3-Phase, 3-Wire DELTA
FIGURE 3
3-Phase, 4-Wire High-Leg DELTA

*NOTE: HIGH LEG MUST BE B PHASE

FIGURE 4
1-Phase, 3-Wire SPLIT-PHASE

*NOTE: HIGH LEG MUST BE B PHASE
WARNING! The performance of the TG3 will be severely limited if the conductors are too long, are of too small a wire gauge, have too many bends, or have sharp bends.

These factors should be addressed during the design of an installation to ensure that there is a suitable place reserved for the stand-alone TG3 next to its point of connection to the panelboard it is protecting. The selected mounting location should ensure short conductor runs and a minimum of bends. If bends are required they should be sweeping bends. Do not make sharp 90° bends for aesthetic purposes.

Table 1

<table>
<thead>
<tr>
<th>Model</th>
<th>Use conductor lengths less than 10 feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>TG3-050</td>
<td>#6 AWG</td>
</tr>
<tr>
<td>TG3-080</td>
<td>#6 AWG</td>
</tr>
<tr>
<td>TG3-100</td>
<td>#6 AWG</td>
</tr>
<tr>
<td>TG3-125</td>
<td>#6 AWG</td>
</tr>
<tr>
<td>TG3-150</td>
<td>#6 AWG</td>
</tr>
<tr>
<td>TG3-200</td>
<td>#2 AWG</td>
</tr>
<tr>
<td>TG3-250</td>
<td>#2 AWG</td>
</tr>
<tr>
<td>TG3-300</td>
<td>#2 AWG</td>
</tr>
</tbody>
</table>

*All models accommodate #2 wire, but we recommend the sizes above.

NOTE: The above conductor sizing recommendations ensure that the effective clamping voltage of the TG3 at the point of connection is kept to a minimum in order to maximize protection.

Overcurrent Protection: As a Type 1 SPD the TG3 does not require upstream over current protection for safe operation, however, the design may require or the installer may choose to connect the TG3 to a circuit breaker, molded case switch or fused disconnect.
Current Technology® recommends feeding all TG3 models not equipped with an integral disconnect with a circuit breaker, molded case switch or fused disconnect.

**If a breaker or molded case switch is used for connecting the phase conductors, Current Technology® recommends a 100 amp rating.**

TG3 models equipped with a filter system ("-F" suffix), and have a neutral connection, come with a green jumper wire that loops out of the 3-pin connector on the ISM and connects a filter neutral to ground. In certain medical applications, or circuits which employ GFCI protection, this Neutral to Ground filter connection should be removed.

⚠️ **WARNING!** Prior to proceeding, ensure the SPD unit does not have voltage applied to its input terminals.

Removal is accomplished by pulling the green jumper from the connector on the ISM. Once removed, the jumper should be placed in the clear vinyl pocket containing the unit test data for future use if desired.
Standard: Top-Feed TG3™ Products

Conduit Openings
(Metallic Enclosure, NEMA 4/12)

Punch holes only in the shaded areas as shown in the following illustration.

Typical Enclosure Configurations
(Metallic Enclosure, NEMA 4/12)

Top-Feed TG3™ with Disconnect

Top-Feed TG3™ without Disconnect

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Option: Bottom-Feed TG3™ Products

Conduit Openings for Bottom-Feed Products (Metallic Enclosure, NEMA 4/12)

Punch holes only in the shaded areas as shown in the following illustration.

Typical Enclosure Configurations for Bottom-Feed Products (Metallic Enclosure, NEMA 4/12)

Bottom-Feed TG3™ without Disconnect

Bottom-Feed TG3™ with Disconnect
Non-Metallic Enclosures

Conduit Openings
(Non-Metallic Enclosure, NEMA 4X)

Mount the TG3 to the building structure using construction methods and hardware appropriate for your site. Install the conduit and pull the conductors as specified above or according to the engineer’s design.

**Phases, Neutral* and Ground:** Connect the phase, neutral and ground conductors.

For TG3 models equipped with an integral disconnect switch, remove the disconnect barrier, connect the phase conductors to the line-side lugs on the disconnect and the ground and neutral* conductors to the lugs labeled “G” and “N” on the blue device (ISM). Reinstall the disconnect barrier once all terminations have been made.

For TG3 models without an integral disconnect switch, connect the phase conductors to the lugs labeled “A”, “B”, and “C” on the ISM and the ground and neutral* conductors to the lugs labeled “G” and “N”.

*DELTAs-configured TG3 models do not have a Neutral Lug.
Field Testing: Your TG3 has been carefully tested before leaving the factory. However, the performance of this unit as a surge suppression device can be confirmed in the field prior to startup using a portable DTS-2 Tester.

The optional DTS-2 Tester may have been purchased along with your TG3 or Field Startup Testing Service may have been specified during the purchase of the TG3. Check with the owner or owner’s representative to see if this test is required at your site.

If you have questions about Field Startup Testing or would like to arrange for this service, call Current Technology® Technical Support at 800.238.5000.

Confirm Pre-Installation Checklist: Confirm that the “Pre-installation checklist” found in the beginning of this manual was completed correctly before proceeding.

Confirm Line Voltage: Measure the line to line voltages feeding the panelboard or disconnect and be sure they are within ±10% of the rated line voltage of the TG3. Use the following table to determine the range of acceptable voltages for each model of the TG3.

Acceptable Voltage Ranges for All TG3 Models

<table>
<thead>
<tr>
<th>TG3 MODEL NO.</th>
<th>NOMINAL L-L VOLTAGE</th>
<th>-10% TO +10% L-L VOLTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>TG3-xxx-240-2G-xxx-xx-xx</td>
<td>240</td>
<td>216 to 264</td>
</tr>
<tr>
<td>TG3-xxx-208-3Y-xxx-xx-xx</td>
<td>208</td>
<td>188 to 228</td>
</tr>
<tr>
<td>TG3-xxx-380-3Y-xxx-xx-xx</td>
<td>380</td>
<td>342 to 419</td>
</tr>
<tr>
<td>TG3-xxx-480-3Y-xxx-xx-xx</td>
<td>480</td>
<td>432 to 528</td>
</tr>
<tr>
<td>TG3-xxx-600-3Y-xxx-xx-xx</td>
<td>600</td>
<td>540 to 660</td>
</tr>
<tr>
<td>TG3-xxx-240-3H-xxx-xx-xx</td>
<td>240</td>
<td>216 to 264</td>
</tr>
<tr>
<td>TG3-xxx-240-3D-xxx-xx-xx</td>
<td>240</td>
<td>216 to 264</td>
</tr>
<tr>
<td>TG3-xxx-480-3D-xxx-xx-xx</td>
<td>480</td>
<td>432 to 528</td>
</tr>
<tr>
<td>TG3-xxx-600-3D-xxx-xx-xx</td>
<td>600</td>
<td>540 to 660</td>
</tr>
</tbody>
</table>

Note: first “xxx” specifies rating of 050, 080, 100, 125, 150, 200, 250, 300kA

⚠️ WARNING!
Do not apply power if the measured voltage is not within the range specified for the TG3 model being installed.

- Apply power to the TG3 by closing the circuit breaker or switch (if any) feeding the TG3 or closing the TG3 integral disconnect.
If your TG3 has M1 Standard Monitoring (see picture):

Verify that only the green indicating lights are illuminated and that there are no red lights illuminated. Green lights indicate a normal condition for each phase. Orange lights indicate protection of 40–75% and Red lights indicate protection of <40%. Three-phase units have three (3) green indicating lights labeled “A”, “B”, and “C”. Split-phase units should only have lights “A” and “C” illuminated. See table below for LED status indication.

The M1 Standard Monitoring is equipped with a dual set of Form “C” contacts (see page 16). The relay containing the contacts is in the “alarm condition” or normally closed when the power is off to the unit, when the unit is encountering loss of power to one or more phases, or the TG3 is encountering more than 40% loss of capacity due to internal fuse operation. Test the operation of the Form “C” contacts by de-energizing the TG3 and checking the state of the contacts with a continuity tester or observing the effect of the contacts on the user provided remote alarm circuits.

If your TG3 has the M2 Option (see picture):

The M2 option is equipped with a surge counter. The number of surges detected by the counter is displayed on a 6-digit LCD display on the front of the TG3 door. The surge counter will also increment each time power is applied to the unit after being in the “off” state. The counter can be reset by pressing the button on the front of the counter.

The M1 and M2 Standard Monitoring also contain an audible alarm that should not operate under normal conditions. To silence audible alarm, press ALARM SILENCE button on display.

<table>
<thead>
<tr>
<th>CONDITION</th>
<th>CORRESPONDING GREEN PHASE LED</th>
<th>ALARM COND</th>
<th>PRIORITY*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase Loss (&lt;80%)</td>
<td>LED Off</td>
<td>Y</td>
<td>1</td>
</tr>
<tr>
<td>% Protection &lt;40%</td>
<td>LED On Red</td>
<td>Y</td>
<td>2</td>
</tr>
<tr>
<td>Filter/Cap Loss</td>
<td>LED Blinks Red once every 2 seconds</td>
<td>Y</td>
<td>3</td>
</tr>
<tr>
<td>% Protection 40–75%</td>
<td>LED On Orange</td>
<td>N</td>
<td>4</td>
</tr>
</tbody>
</table>

*Phase Loss takes priority over %
Dry Contacts: All TG3 models have a dual set of Form “C” dry contacts available for connection to user-provided remote alarm and monitoring circuits.

The installer must provide the appropriate raceway and wiring for this circuit observing the restrictions on conduit openings illustrated in an earlier section of this manual. The installer must route the monitoring conductors to the blue terminal blocks on the door-mounted circuit board. Choose the appropriate materials and routing to allow the door to open and close without pinching or stressing wires.

The following diagram shows the Form “C” contact configuration. The annotations on the diagram match the markings on the blue terminal block.
Your Current Technology® TG3 surge suppression system does not require periodic maintenance. The unit’s heavy-duty design should preclude the need for any repairs; however, the following indications and procedures can be checked:

<table>
<thead>
<tr>
<th>INDICATION</th>
<th>PROCEDURE</th>
</tr>
</thead>
</table>
| One or more phase indicator lights are off | • Check that the external power source supplying power to unit is energized  
• Check that the circuit breaker or switch (if appropriate) feeding the TG3 is turned “on” |
| Phase status lights are orange, indicating 40–75% protection  
Phase status lights are red, indicating <40% protection | • Check the cables connecting the door-mounted devices to the suppression module.  
_Exercise caution as High Voltage is present on door mounted PCBs_  
• If all of above are O.K., contact factory  
• If breaker is tripped, use a portable Diagnostic Test Set (DTS-2) to verify unit integrity before resetting the breaker  
Portable Diagnostic Test Set (Current Technology® Model DTS-2) indications are not in range* for the product | Contact factory |

*Ranges are located on the underside of DTS-2 lid.*

Our staff is available to support you.
Monday through Friday, 8:00 a.m. to 5:00 p.m. (EST):  
800.238.5000 or 804.236.3300

tnbpowersolutions.com/current_technology
When properly installed the TG3 Surge Suppression System will provide years of uninterrupted service.

With several levels of monitoring available, the user should be able to verify the normal operation of the TG3 and confirm that it is connected correctly to the power system.

Current Technology® does recommend testing in order to verify that the unit is able to clamp surges to an acceptable level.

This test should be coordinated with scheduled maintenance events in your facility. It can be performed in-house with the aid of the DTS-2 Portable Test Set or requested as a service from a Current Technology® authorized service representative.

The TG3 Surge Suppression System is available with the following options:

- **M1** LED/Phase + Audible Alarm, Dry Relay Contacts
- **M2** M1 + Surge Counter
- **M3** Advanced Monitoring, Character Display, Modbus RTU
- **M4E** M3 + Ethernet, Modbus TCP
- **M5** Advanced Monitoring, Graphics Display, Modbus RTU
- **M6E** M5 + Ethernet, Modbus TCP
- **DTS** DTS-2 Diagnostic Test Set
- **MxX** Remote Monitor Extension M1X through M6EX
- **HPI** HPI Cable

The following standards and listings apply to the TG3 product line:

- Canadian Standards (cUL)
- National Fire Protection Association (NFPA 70 [NEC], Article 285)
- Underwriters Laboratories UL 1449 3rd Edition 2009 Revision (effective 10/18/2010)
- UL 1283, 5th Edition
15 Year Limited Warranty

Thomas & Betts Power Solutions, LLC / Current Technology® warrants that TG3 suppression filter systems (the “Product”), shall meet applicable industry standards and specifications and be free from defects in materials and/or workmanship. Should any failure of the Product to conform to this warranty appear within fifteen (15) years from the date of the purchase of the Product, Thomas & Betts Power Solutions shall either repair or replace the defective Product, or part thereof, upon return to Thomas & Betts Power Solutions’ manufacturing facility in Richmond, Virginia with transportation charges prepaid.

Thomas & Betts Power Solutions shall have no liability under this warranty for any problems or defects directly or indirectly caused by misuse of the Product, alteration of the Product (including removal of any warning labels), accident, neglect or improper installation, application, operation, or repair of the Product.

THE WARRANTY STATED HEREIN IS THE SOLE AND EXCLUSIVE WARRANTY FOR CURRENT TECHNOLOGY® PRODUCTS, AND IS IN LIEU OF ALL OTHER EXPRESS AND IMPLIED WARRANTIES. THOMAS & BETTS POWER SOLUTIONS SPECIFICALLY DISCLAIMS ALL OTHER EXPRESS AND IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Installation, operation, or use of the Product for which this warranty is issued shall constitute acceptance of the terms hereof.

The liability of Thomas & Betts Power Solutions under this warranty is expressly limited to the replacement or repair of the defective Product or the defective part thereof, at Thomas & Betts Power Solutions’ sole option.

IN NO EVENT SHALL THOMAS & BETTS POWER SOLUTIONS BE LIABLE FOR SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES OF ANY KIND OR CHARACTER. IN NO EVENT WILL THOMAS & BETTS POWER SOLUTIONS’ LIABILITY EVER EXCEED THE PURCHASE PRICE PAID FOR SUCH DEFECTIVE PRODUCT.

This warranty is not transferable and may only be enforced by the purchaser. Claims under this warranty must be submitted to Current Technology® within thirty (30) days of discovery of any TG3 product defect.

Warranty Period

TG3™ 15 Years from original date of purchase
Open Frame with Disconnect

**TG3 050/080/100**

**TG3 125/150/200**

**TG3 250/300**
Model #

Date of Purchase

Date Installed

Installer