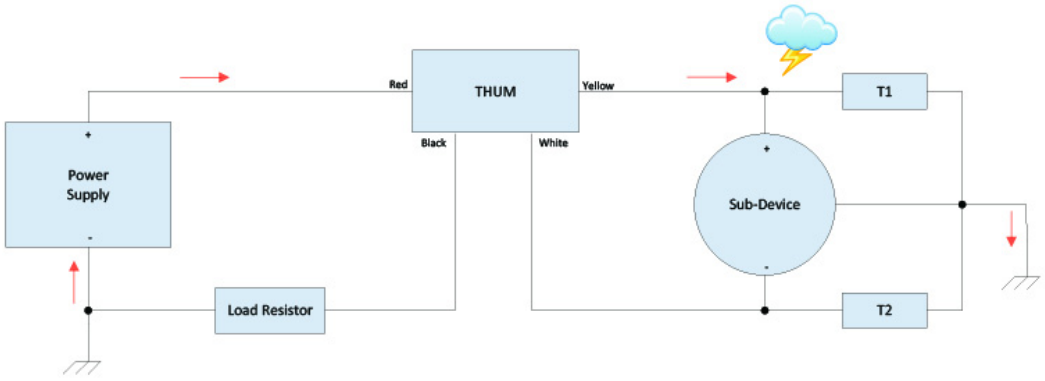
# Emerson™ Smart Wireless THUM™ Adapter Transient Installations

The THUM Adapter may be damaged in certain passive loop applications that contain sub-devices with transient protection. Damage to the THUM Adapter occurs when its 0.5 amp current rating is exceeded. Under normal operating conditions the current flowing through the THUM Adapter is well below this limit. Figure 1-1 illustrates the loop configuration and conditions required to induce a current capable of damaging the THUM Adapter.

**Figure 1-1. Conditions to Produce Damaging Current**




Damage is possible if all of the following are true:

- The loop uses a power supply capable of delivering more than 0.5 amp.
- The load resistor is located on the low side of the loop.
- The negative terminal of the power supply and sub-devices housing is connected to earth ground.
- Transient protection is present either internal to the sub-device or external.

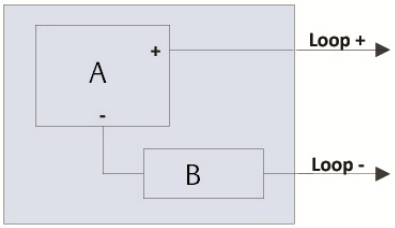
Introduction of a voltage transient on the high side of the loop causes element T1 to conduct. Momentary conduction of T1 allows current to flow from the positive terminal of the power supply through the THUM Adapter to the negative terminal of the power supply through T1. This creates a secondary current path bypassing the load resistor as shown by the red arrows. The current in this path is now only limited by the current capability of the power supply. If the supply exceeds the THUM Adapter's 0.5 amp limit, damage to the THUM Adapter may occur.

There are two primary means of addressing this issue. If the application permits, set the current limit of the power supply below 0.5 amp. For all other applications either moving of the load resistor or adding resistance to the high side of the loop will protect the THUM Adapter. Three of the more common installation types are discussed below.

1. For installations where the load resistor is integrated into a control system and cannot be easily moved to the high side of the loop, Install a 50 ohm 1 watt resistor on the high side of the loop as illustrated in Figure 1-2. Care must be taken to ensure the power supply can provide the necessary voltage to operate the loop. The addition of the resistor raises the compliance voltage of the loop by 1.15 volts. It is strongly recommended to perform a loop check to verify proper operation after installing the resistor.

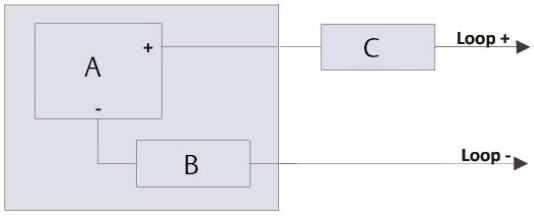
**Figure 1-2. Integrated Load Resistor**

**Existing configuration**




A. Power supply
B. Load resistor

**Recommended configuration**

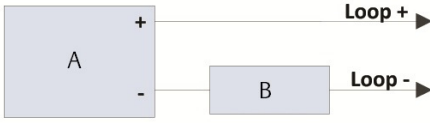



C. Resistor, 50 ohm, 1 watt

2. For installations where the load resistor is local to the power supply, moving the load resistor to the high side of the loop as shown in Figure 1-3 will protect the THUM Adapter.

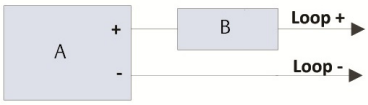
**Figure 1-3. Load Resistor Local to Power Supply**

**Existing configuration**




A. Power supply

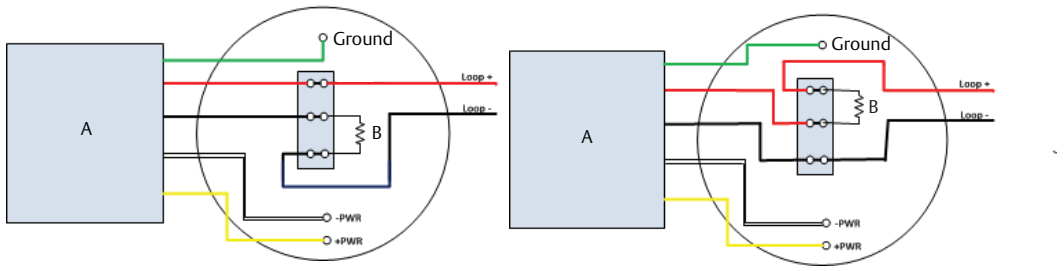
**Recommended configuration**




B. Load resistor

3. For installations where the load resistor is local to the sub-device, moving the load resistor from the negative to the positive side of the loop as shown in Figure 1-4 will protect the THUM Adapter.

**Figure 1-4. Load Resistor Local to Sub-Device**




A. THUM Adapter
B. Load resistor

## Global Headquarters

**Emerson Process Management**
6021 Innovation Blvd.
Shakopee, MN 55379, USA
+1 800 999 9307 or +1 952 906 8888
+1 952 949 7001
RFQ.RMD-RCC@EmersonProcess.com

## North America Regional Office

**Emerson Process Management**
8200 Market Blvd.
Chanhassen, MN 55317, USA
+1 800 999 9307 or +1 952 906 8888
+1 952 949 7001
RMT-NA.RCCRFQ@Emerson.com

## Latin America Regional Office

**Emerson Process Management**
1300 Concord Terrace, Suite 400
Sunrise, Florida, 33323, USA
+1 954 846 5030
+1 954 846 5121
RFQ.RMD-RCC@EmersonProcess.com

## Europe Regional Office

**Emerson Process Management Europe GmbH**
Neuhofstrasse 19a P.O. Box 1046
CH 6340 Baar
Switzerland
+41 (0) 41 768 6111
+41 (0) 41 768 6300
RFQ.RMD-RCC@EmersonProcess.com

## Asia Pacific Regional Office

**Emerson Process Management Asia Pacific Pte Ltd**
1 Pandan Crescent
Singapore 128461
+65 6777 8211
+65 6777 0947
Enquiries@AP.EmersonProcess.com

## Middle East and Africa Regional Office

**Emerson Process Management**
Emerson FZE P.O. Box 17033,
Jebel Ali Free Zone - South 2
Dubai, United Arab Emirates
+971 4 8118100
+971 4 8865465
RFQ.RMTMEA@Emerson.com



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