

GTF is a RECOGNIZED COMPONENT
Electromagnetic Interference filters
(ANSI/UL 1283 - 4th Edition, 6/1998; rev 2/2004),
and (CSA C22.2 No. 8 - M1986).

20A Ground Transient Filter Overview

Features

- ETL Recognized technology.
- Installs in series with the ground wire to protect equipment from high frequency ground transients caused by ground faults, atmospheric conditions or other discharges on the ground.
- Does not impede 60Hz fault current.
- May be used as a kit in conjunction with surge suppressors or factory installed into a variety of Lowell power products.
- 20A rating with fast response for current and voltage rise.
- Compact size and reasonable price provides real insurance against equipment damage and downtime.

Description

Lowell's exclusive 20A Ground Transient Filter (GTF) utilizes advanced technology to block potentially damaging electromagnetic transients / noise on the ground wire. It is recommended for safeguarding sensitive equipment such as that used in telecommunications, security, fire, A/V and data applications as well as corporate boardroom and consumer electronics, PCs, retail point of sale terminals, and wherever power quality is victimized by high frequency noise.

The Lowell GTF is available as a stand-alone kit for use in existing installations, and as a built-in option in Lowell ACSP series single circuit and multi-circuit transient voltage surge suppressors (see page 4 for model information).

Grounding Basics

The purpose of the "ground" wire in a piece of electrical equipment is first and foremost - safety. The ground wire provides a permanent, low-impedance path to carry fault current from the point of a ground fault back to the power source. When this happens, it facilitates operation of the protective circuit breaker or other circuit overcurrent device which disconnects the circuit and removes the hazard of electrocution and fire. A ground fault is defined as "An unintended electrical connection between an ungrounded hot conductor and any metal or conductive part of an enclosure or equipment."

Another purpose of the ground is to transfer unwanted electrical noise that is created during standard operation of electrical / electronic equipment from the device to the common safety ground of the building.

Unresolved Problem

Excess energy on the ground line, sometimes called ground transients, can originate from many different sources such as ground faults (as noted above), atmospheric conditions (thunderstorms and lightning), utility company switching and load shifting, as well as electrostatic discharge and arcing from industrial lighting, motors and machinery. All of these occurrences result in energy flowing towards the earth ground, whether it be via the ground line of equipment or the common ground system of the building itself. What many professionals do not realize is that all of this excess energy is NOT always absorbed by the earth ground. It can and will flow back up the ground line and disrupt the operation of electronic equipment. Consider too that all facilities in a building share the common ground system so when an electrical disturbance is introduced into this shared system, it can be distributed anywhere throughout the building before it reaches the earth ground, at which time it may or may not be completely absorbed. Sensitive equipment may be vulnerable.



GTF

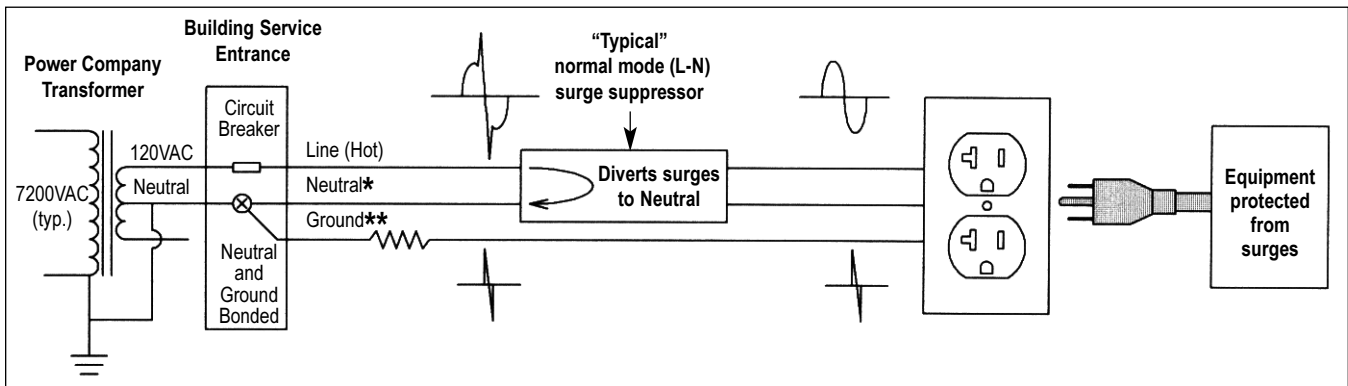
20A Ground Transient Filter & Surge Suppressors with Built-in GTF

Unresolved Problem (continued)

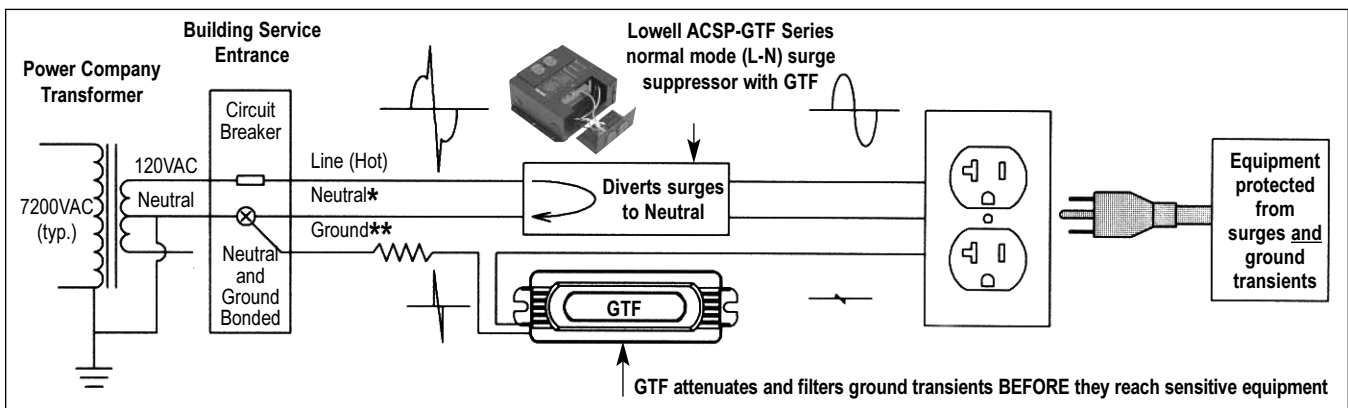
In many industries, including audio and video, much emphasis is placed on using “normal mode” surge suppressors which suppress noise and transients on the Line (‘Hot’) by diverting them to the Neutral which is bonded to Ground only at the building service entrance, thereby not “contaminating” the safety Ground (see Dia. 1). In fact, a “normal mode” Line to Neutral (L-N) surge suppressor has no connection whatsoever to the safety Ground except for the bonding jumper required for any metal enclosure or receptacle that may be part of the device. It is important to note that a normal mode surge suppressor does nothing to suppress noise and transients that are already present on a building’s ground wire system. These transients are simply passed on to the supposedly “protected” equipment, which can be a problem if the equipment’s sensitivity is such that it requires a clean and quiet Ground to function properly.

Solution - GTF Protection

Lowell Manufacturing and its Engineering Team is proud to have developed a solution that protects equipment from high frequency transients on the ground wire system. Lowell’s 20A Ground Transient Filter (GTF) is a patented and ETL recognized technology. The GTF installs in series with the ground line of electrical circuits to attenuate high frequency transients without impeding 60Hz fault current (see Dia. 2). It introduces less than 0.1 ohm at 60Hz to the ground circuit thereby assuring proper operation of any and all overcurrent protection devices (circuit breakers, fuses, etc.). At higher frequencies however, where the most damaging transients exist; the GTF provides significant attenuation. At 1MHz, for example, the GTF attenuates ground noise by 25dB which can be the difference between a sensitive system functioning continuously or having an interruption or ‘reset/reboot’ occurrence. As shown in the diagram 2 below, Lowell’s Ground Transient Filter (GTF) combined with a ‘normal mode’ surge suppressor provides a cost effective and easy-to-install 20A *CleanPowerSolution* for sensitive equipment of all types.



Dia. 1: Signal Flow - Normal Mode (L-N) Surge Suppressor WITHOUT GTF - (Typical)



Dia. 2: Signal Flow - Normal Mode (L-N) Surge Suppressor WITH GTF (Lowell ACSP-GTF Series)

GTF technology attenuates high frequency transients without impeding 60Hz fault current.

- * Neutral is a dedicated “current carrying, grounded conductor”. It is bonded directly to the center tap of the power company transformer which is bonded to the grounded side of the supply line.
- ** Ground does not carry current except during a ‘fault’ condition. Ground connections inside a building may be made through metal conduit, junction boxes, building structural steel, water pipes, etc. They are NOT always a direct connection to the service entrance, therefore the impedance of the ground can be much higher than the neutral. Transients CAN be induced on ground circuits and CAN find their way into sensitive equipment.

**P
O
W
E
R**

AC
Rackmount
19" EIA

AC Strips
Rackmount
Vertical

AC
Loadcenters
(sequenced)


 AC Surge
Protection
/ Filtering

AC
Remotely
Controlled

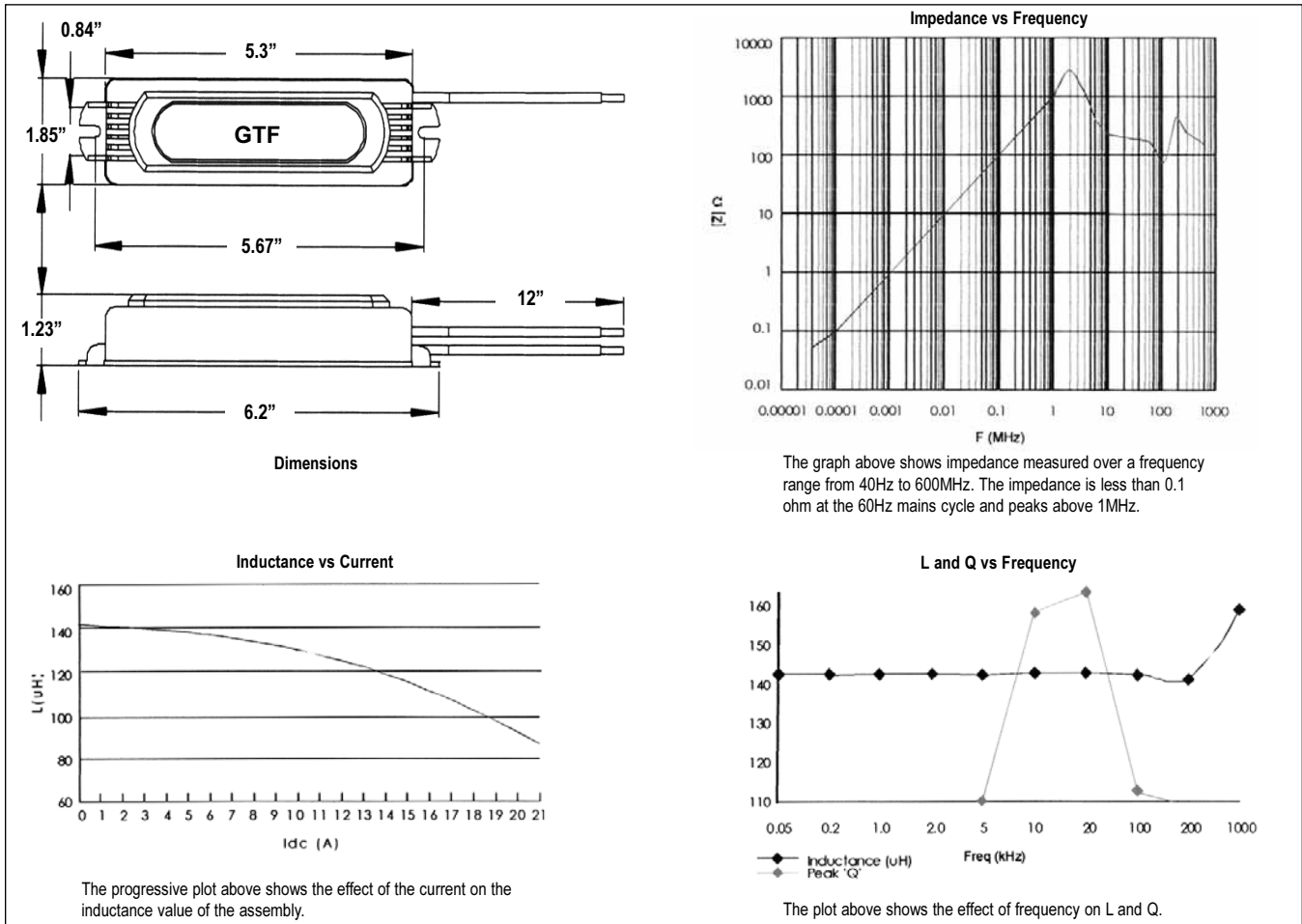
Low Voltage
Sequencers
Accessories

Ground Filter



GTF

20A Ground Transient Filter & Surge Suppressors with Built-in GTF



Model*	Voltage	Current	Freq.	DC Resistance	Impedance @ 60Hz	Pigtail Leads	Size (L x W x H)	Weight
GTF*	125 VAC	20A	60Hz	0.035 Ohms	0.06 Ohms	12"L , 12ga.	6.2" x 1.85" x 1.23"	1.75lbs.

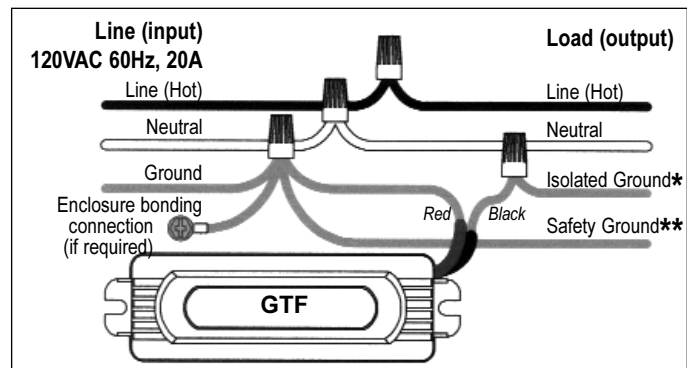
*Note: the GTF is not sold separately. It comes as a kit (Model AC-GTF20-IG with two duplex isolated ground outlets and wire nuts) or factory mounted in a variety of Lowell surge suppressor and power products.

Approvals / Certifications

Lowell's Ground Transient Filter (GTF) technology is a recognized component that has been tested and is compliant with the Standards for Electromagnetic Interference filters (ANSI/UL 1283 - 4th Edition, 6/1998; rev 2/2004) and Electromagnetic Interference Filters (CSA C22.2 No. 8 - M1986). Additionally, Lowell's single-circuit and multi-circuit surge suppressor Series ACSP-GTF with factory installed GTF filter(s) are also ETL Listed.

A & E Specifications

Equipment installations shall include ground wire protection from noise and high frequency transients using Lowell's Ground Transient Filter (GTF) technology. The filter shall be compliant with the Standards for Electromagnetic Interference filters (ANSI/UL 1283 - 4th Edition, 6/1998; rev 2/2004) and Electromagnetic Interference Filters (CSA C22.2 No. 8 - M1986). If filter is used as an add-on component, it shall be ETL recognized; if used in a Lowell surge suppression device, it shall carry ETL Listing. The GTF filter shall have a 20A current rating and impedance of 0.06 ohms at 60Hz.



Hook up Diagram for GTF as an add-on (filter only)

- * For maximum effectiveness of the GTF, the isolated ground output should be connected to IG type receptacles and the connected equipment should be isolated from any other ground paths.
- ** The safety ground should be used for bonding any 'downstream' enclosures, junction boxes, conduit, etc. Refer to the National Electric Code (NEC) Article 250.146 (D) and associated FPN for more information on isolated ground installations.



GTF

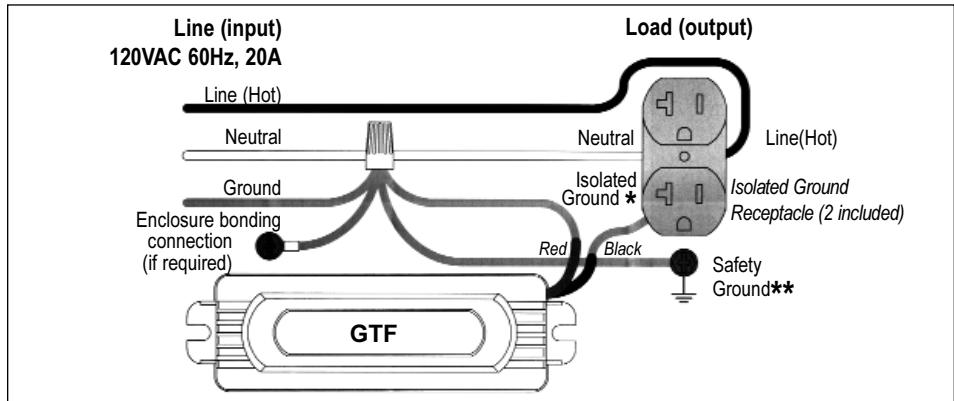
20A Ground Transient Filter & Surge Suppressors with Built-in GTF



AC-GTF20-IG
Ground Transient Filter Kit
for custom filtering applications

Ground Transient Filter (GTF) kit

Model AC-GTF20-IG is a kit for custom filtering use. The 20A Ground Transient Filter (GTF) is as an ETL recognized device that filters high frequency transients from the ground wire. The kit includes the slim profile filter, two isolated ground duplex receptacles and wire nuts.



Hook up Diagram for GTF Kit

- * For maximum effectiveness of the GTF, the isolated ground output should be connected to IG type receptacles and the connected equipment should be isolated from any other ground paths.
- ** The safety ground should be used for bonding any 'downstream' enclosures, junction boxes, conduit, etc. Refer to the National Electric Code (NEC) Article 250.146 (D) and associated FPN for more information on isolated ground installations.



ACSP2004-IG-GTF
Single-circuit Surge Suppressor
with Ground Transient Filter

Single-circuit Surge Suppressor with GTF

Model ACSP2004-IG-GTF is a compact, all-in-one device that features Lowell's UL Listed 20A surge suppressor Model ACSP2004IG with a factory installed ground transient filter (GTF). The ETL listed assembly uses Lowell's exclusive GTF filtering technology to eliminate potentially damaging electromagnetic transients / noise on the ground wire. The surge suppressor with GTF is ideal for protecting sensitive equipment such as that used in telecommunications, security, fire, audio/visual, data storage, test & monitoring, process control, as well as business/retail PC's and point of sale terminals.

The single-circuit surge suppressor meets GSA Grade **A** - Mode **1** - Class **1** requirements, defeat surges up to 72,000 amps, and comes with a 10 year warranty. The surge suppressor/ground filter assembly is designed for rear rack or wall installation. The 7"W x 8"H x 3"D device features one GTF filter and two 20A isolated ground duplex outlets on 90° plates that rotate for front or side access (patent pending). Two blank plates are also provided for clean hardwire applications. Units include knockouts on all sides and front LED status indicators.

See spec sheet for hook-up diagrams.



ACSP20-3C-GTF
3-Circuit Surge Suppressor
with Ground Transient Filter (shown)
for stand-alone or loadcenter use
(see also 2, 4, 5 and 6-circuit models)

Multi-circuit Surge Suppressors with GTF

ACSP20-()-GTF Series assemblies feature Lowell's ETL listed multi-circuit 20A surge suppressor Series ACSP20 with a factory installed Ground Transient Filter (GTF) added to each circuit (up to six 20A circuits per assembly). The ETL listed filters utilize Lowell's exclusive GTF technology to eliminate potentially damaging electromagnetic transients / noise on the ground wire. The multi-circuit surge suppressor with GTF on each circuit is ideal for protecting sensitive equipment such as that used in telecommunications, security, fire, audio/visual, data storage, test & monitoring, process control, as well as business/retail PC's and point of sale terminals.

The multi-circuit surge suppressor/ground filter assemblies are available with two, three, four, five or six 20A circuit modules, each with its own 20A GTF filter installed in a 14"W x 14.5"H x 4"D box with screw terminal outputs, knockouts on all sides and a cover plate. The cover plate is punched to expose each module's three LEDs for circuit status indication without opening the device. Versatile, multi-circuit assemblies may be used as stand-alone surge suppressor/ground filter or in conjunction with an AC loadcenter to provide protection to specific circuits. For large installations, more than one ACSP20-GTF Series may be connected to a single loadcenter. Additionally, the ACSP20-GTF Series may be used with Lowell's sequence controlled AC loadcenters (Series ACLC) to provide surge suppression/ground filtering along with time sequenced power activation/deactivation of circuits at the main box.

See spec sheet for hook-up diagrams.