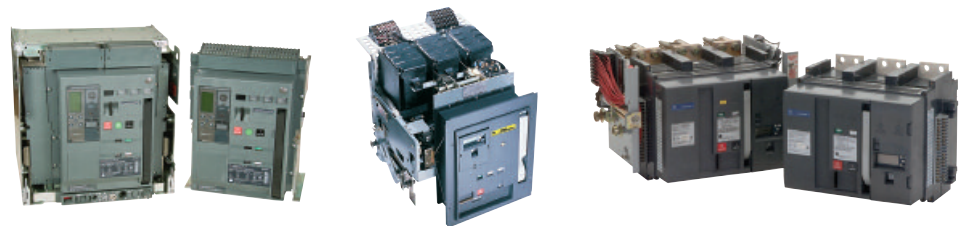


# EntelliGuard\* TU Trip Unit

Don't compromise arc flash protection for system reliability.



# Now you don't have to choose between selectivity and arc flash protection.

## GE delivers both, 24/7!

System reliability (selectivity) and protection are the key functions of any trip unit, and the EntelliGuard TU delivers exactly that, along with the flexibility to address an array of power distribution needs.

Technology that enables simultaneous arc flash mitigation, selectivity and selective coordination from medium voltage to a 20-amp 1-pole circuit breaker – and Instantaneous protection at every step even for lower level arcing faults when arc flash protection is most important.

### Fast Zone Based Protection Up to MV levels

Selective Instantaneous tripping all the way from low voltage branch circuit breakers to medium voltage substation feeders.

### Instantaneous Zone-Selective-Interlocking (I-ZSI)<sup>1,2</sup>

Sensitive and selective instantaneous pickups from the medium voltage transformer feeder, through low voltage secondary mains, ties and even down to medium sized molded case circuit breakers. GE Multilin's UR family of relays combined with GE's EntelliGuard TU and *micro*EntelliGuard\* trip units for system wide instantaneous protection and selectivity, 24/7.

### Threshold Zone-Selective-Interlocking (T-ZSI)<sup>1,2</sup>

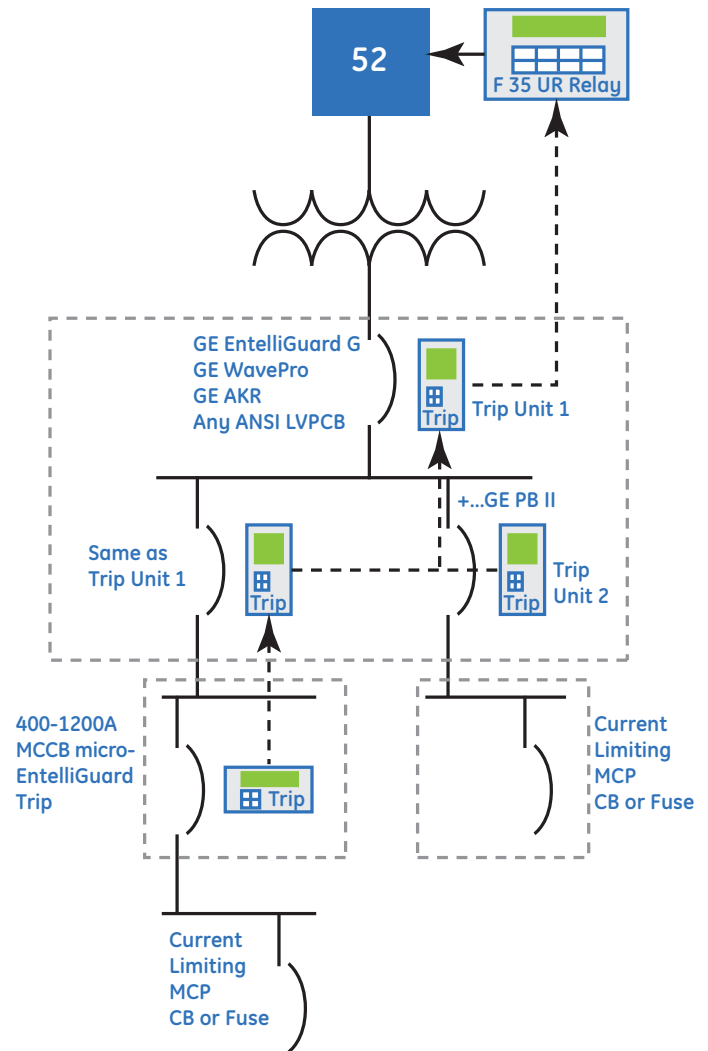
Unique GE capability to interlock pickup threshold allows circuit breakers with identically set pickup currents to maintain selectivity and protect their zones without the need to lose sensitivity as the system grows.

### Instantaneous WaveForm Recognition (WFR)<sup>2</sup>

Sensitive and selective instantaneous pickups above current limiting circuit breakers or fuses.

### Instantaneous Reduced Energy Let-Through with Positive Feedback (RELT)<sup>1</sup>

Alternate instantaneous pickup that can be used for even faster and more sensitive protection on a temporary basis, with a positive feedback signal that confirms the trip unit has received and reacted to the RELT enable command.



<sup>1</sup>ZSI and RELT may require harnessing  
<sup>2</sup>PB1 does not offer WFR and I-ZSI / T-ZSI  
Not all versions provide identical capabilities

## A system-wide solution

**Instantaneous Zone-Selective-Interlocking (I-ZSI) and Threshold Zone-Selective-Interlocking (T-ZSI)** allow multiple layers of large circuit breakers above the feeders serving the current limiting branches to operate as a system to achieve the fastest possible protection at the most sensitive possible settings. With small overloads or large faults, each circuit breaker will only operate when needed and act as backup only when necessary. GE's ZSI capability includes ground fault, short time and instantaneous for the fastest interlocked protection. You can get instantaneous protection and selectively, regardless of the size of your system or main circuit breaker. And, with our selective *micro*EntelliGuard trip unit for molded case circuit breakers as small as 400A, you receive the same I-ZSI and WFR instantaneous as in larger low voltage power or insulated case circuit breakers — all the way up to some medium voltage protective relays.

**Waveform Recognition** instantaneous algorithm allows a feeder circuit breaker (above a panel or MCC that has current limiting fuses or circuit breakers) to be set very sensitive and still offer selectivity while providing instantaneous protection where you need it. What's more, the setting is not dependent on a complex coordination study; it simply depends on the device with which you are trying to be selective. For example the setting required above the following devices is:

- 15-150A current limiting MCP  $\geq 9,600A$
- 250A current limiting circuit breaker  $\geq 11,200A$
- 400A class J fuse<sup>1</sup>  $\geq 15,000A$

Selectivity up to 100kA is possible regardless of the size or type of circuit breaker the trip unit is installed in — whether it's the latest GE generation of circuit breakers such as the GE EntelliGuard G ANSI low voltage power circuit breakers, GE EntelliGuard G insulated case circuit breakers, GE's Power Break\* II insulated case circuit breakers, or many older GE and other manufacturers' low voltage power circuit breakers!

**Reduced Energy Let-Through Instantaneous (maintenance switch) with Positive Feedback** provides more arc flash protection flexibility and assurance. An even faster trip with a separate threshold as low as 1.5X sensor size that can be locally or remotely enabled with "positive feedback" so you know it's on when you need it and you know it is off when you don't.

Extended Range Instantaneous allows low voltage circuit breakers to set instantaneous pickups as high as 30X the circuit breaker's continuous setting. This allows 400A circuit breakers to be set as high as 12,000A if required to achieve selectivity above similar sized devices.

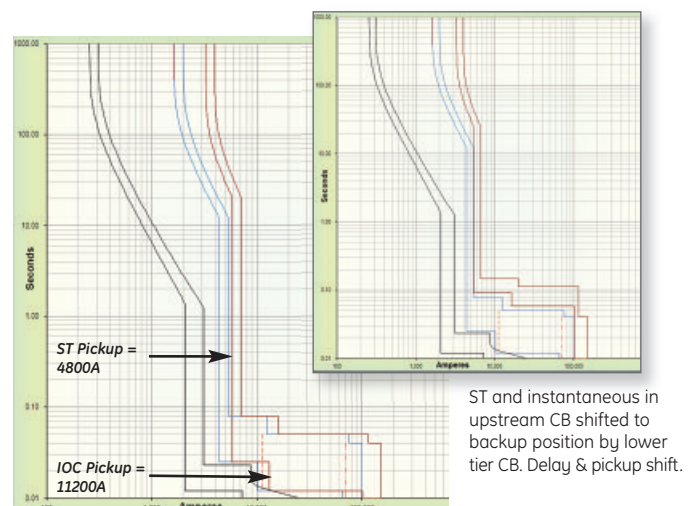
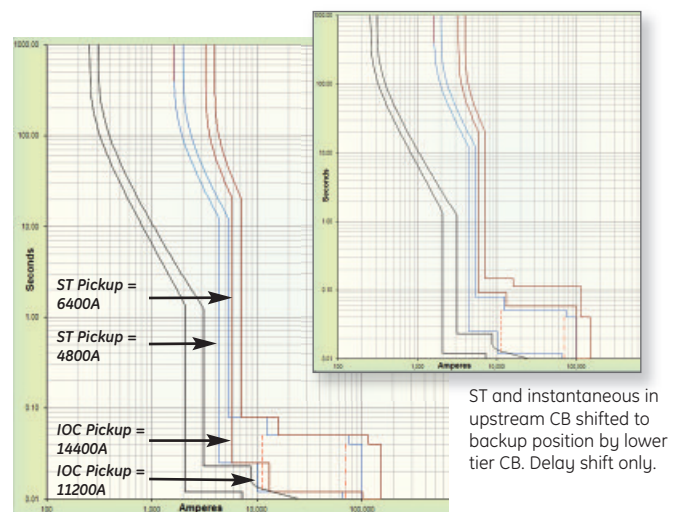
Ultra flexible time current curves and Zone-Selective-Interlocking provides the protection engineer selectivity options. From multiple slopes for short time, multiple shapes for ground fault protection, ½ cycle resolution in short-time delay bands, and the ability to Zone Interlock among all

of them as needed, optimizes selectivity and protection regardless of system needs without sacrificing more protection time than is necessary.

**Why is this important?** Simply because to have good arc flash protection, you need your circuit breaker to trip as fast as possible — to do that, it must be sensitive even to lower magnitude arcing faults while still allowing the system to sustain loads reliably 24/7. That's how you best protect people from arc flash and equipment from faults while not hosting unnecessary trips. **The GE EntelliGuard family of trip units, protective relays and molded case circuit breakers help to give you both safety and selectivity, at the same time, all the time!**

## Selectivity & arc flash protection simultaneously

Time-current curve for large main (3200A), medium feeder (1600A) and small branch breaker (250A) showing selective instantaneous set below typical arcing current for an industrial system. Selectivity between feeder and branch provided by WFR instantaneous. First set of curves below demonstrates ST and I-ZSI. Second set adds T-ZSI.



<sup>1</sup>1400A class J TD fuse by Mersen, lower settings possible for lower fault current levels

# The EntelliGuard family of trip units is available for multiple types of GE and non-GE circuit breakers

Capabilities vary slightly between circuit breakers but the most important capabilities are available in all of them including for non-GE ANSI low voltage power circuit breakers.

## Standard features for exceptional flexibility

- Highly flexible time current settings
  - up to 22 Long Time Delays
  - up to 22 (fuse shaped) Long Time
  - up to 14 Short Time Delay bands
  - 3 Short Time slopes (I<sup>2</sup>T)... novel GE feature
- Selective Instantaneous algorithm (WFR)...novel GE feature
- Ammeter
- Large backlit LCD screen\*\*
- Breaker status indication
- Universal rating plugs – less plug inventory
- Status and event log (10 events)
- Date and time event stamping\*\*
- LED health status indicator\*\*
- Free set-up software
- Discrete I/O\*\*
- Thermal memory, battery back-up
- Common interface across all versions
- Mechanism self-timing...novel GE feature

## Optional full-function metering

- Current (Amps, kAmps)
- Voltage (Ph-Ph, Ph-N)
- Energy (kWh, MWh, GWh)
- Real power (kW, MW)
- Total power (kVA, MVA)
- Frequency (Hz)
- Demand (avg. kW, MW) and peak demand

## Options

- Internal/external ground fault trip or alarm with 4 curves to select from (I<sup>2</sup>T, I<sup>4</sup>T, special selective GF curve and definite time slope)\*\*
- Switchable ground fault trip / alarm (now password protected and UL Listed)
- Modbus RTU communications\*\* (Profibus also available for EntelliGuard G)
- Waveform capture for harmonic analysis
- Full-function metering\*\*
- Protective relaying\*\* (see list of functions below)
- Zone-Selective-Interlocking for GF, ST, Instantaneous (I-ZSI)\*\*...novel GE feature
- Threshold Zone-Selective-Interlocking for ST and Instantaneous (T-ZSI)\*\*...novel GE feature
- Built-in Zone-Selective-Interlocking test capability...novel GE feature
- RELT – Reduced Energy Let Through\*\*
- RELT and ground fault alarm harness kits
- Test Set GTUTK20
- Digital Test Kit Software, available December 2013

## Optional protective relaying functions

- Undervoltage
- Overvoltage
- Voltage unbalance
- Current unbalance
- Power reversal
- Power direction setup

\*\*Note: Some options require 24VDC additional hardware to enable Metering, Relaying, RELT, ZSI, Modbus to be added to the breaker, equipment cubicle and equipment sections.

### Flexible:

- ✓ **Wide application:** Fits all existing large GE circuit breakers globally
- ✓ **Multi-standard application:** Passes and exceeds UL, ANSI, NEMA and IEC standards
- ✓ **Reduced spare parts:** Universal spare trip unit fits any GE EntelliGuard G CB!
- ✓ **Reduced spare parts:** Universal trip plugs work with any sensor ratings!
- ✓ **Exceptional setting flexibility:** More curves, shorter delays, more adjustability

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imagination at work