

# EntelliGuard<sup>®</sup> TU Trip Unit

## Conversion/Upgrade Kits



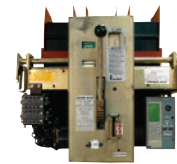
GE AK/AKR



GE WavePro



GE Power  
Break I & II



Allis Chalmers  
*New models  
now available*



I-T-E  
*New models  
now available*



Westinghouse

**Upgrade your existing equipment**  
Arc flash protection and selectivity at the same time



imagination at work

## Upgrade your low-voltage equipment with electronic trip unit technology.



Normal wear and tear of aging electro-mechanical trip devices on low-voltage circuit breakers can lead to loss of calibration that jeopardizes system coordination, protection and reliability.

GE has channeled its decades of trip system experience into the development of the EntelliGuard TU Trip Unit, which incorporates advanced algorithms that enable arc flash protection and selectivity at the same time. Upgrade and conversion kits are ANSI C37.59 design verification tested to ensure safe, reliable operation. These kits extend the life of your mechanically sound breaker and they:

- eliminate costly downtime due to nuisance tripping via a Waveform Recognition Instantaneous Algorithm
- improve electrical power system coordination and protection
- permit easy upgrades to communicating Power Management Control Systems (PMCS), open Modbus RTU protocol
- enable the implementation of RELT and Zone Selective Interlock Instantaneous to reduce arc flash energy levels.

### Standard Features

- Flexible time current settings
- 22 I<sup>2</sup>T Long Time Curves, Long Time Delay
- 22 Fused Long Time curves (I<sup>4</sup>T)
- Short Time, Short Time Delay, 3 Short Time I<sup>2</sup>T slopes
- Waveform Recognition Instantaneous
- Ammeter
- Large backlit LCD screen\*
- Date and time\*
- Breaker status indication
- Universal rating plugs
- Status and event log (10 Events)
- LED health status indicator\*
- Set-up software
- I/O – 1 input and 1 output\*
- Thermal memory, battery back-up
- Common interface across all versions

### Options

- Internal/external ground fault trip or alarm with 4 curves to select from (I<sup>2</sup>T, I<sup>4</sup>T, SGF, Definite Time Slope)\*
- Switchable ground fault trip / alarm (Not UL Listed)
- Modbus open RTU communications\*
- Waveform capture – enables harmonic analysis
- Full-function metering\*
- Protective relaying\*
- Zone Selective Interlock – GF, S, I\*
- RELT – Reduce Energy Let Through\*
- RELT and ground fault alarm harness kits
- Test Set GTUTK20

### Arc flash protection and selectivity at the same time

The EntelliGuard TU Trip Unit offers optimum circuit protection and system reliability simultaneously, with little or no compromise to either of these critical functions. With its Reduced Energy Let-Through Setting (RELT), the system protects at HRC1 or 2 for available fault currents as high as 100kA. Reliability and arc flash protection, in one package, at the same time, all the time.

### Algorithms enabling arc flash protection and selectivity

- RELT – Reduced Energy Let Through
- Zone Selective Interlocking – Instantaneous (ZSI-I)
- Waveform Recognition Instantaneous – coordinates with current limiting devices and reduces nuisance trips
- Flexible time current curves – create the shape you need

### Reliability – Health Status

- Non-volatile memory with continuous self-testing microprocessor
- Health Status LED indicates normal operation, errors, pick-up, trip
- External power not required with long-life lithium battery
- Positive setpoint recognition, values flash until saved

### Plug and Play

- Same form, fit, function as the popular MicroVersaTrip trip unit, simplifying upgrade to an existing converted breaker\*

### 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

### 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.

## Conversion/upgrade kits include everything you need

### AK, AKR, Westinghouse, ITE, Allis Chalmers Conversion Kits

- EntelliGuard TU trip unit and rating plug
- Direct acting flux shifter with automatic reset
- Epoxy encapsulated high-accuracy current transformers
- Specially designed mounting hardware and wire harnesses with communication cable and RELT harness for easy upgrade later
- Detailed instruction manual

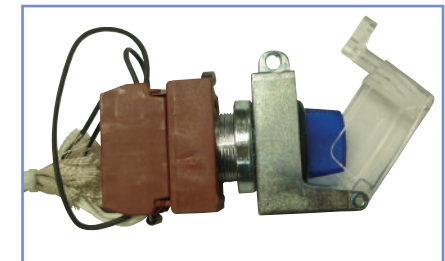
See pages 4-5



### EPIC, RMS9, MVT+, MVT PM Upgrade Options

- EntelliGuard TU trip unit and rating plug
- RELT and Ground Fault Alarm Harness Kits (see below)
- RELT Switch with warning labels kit – GTURSK
- Communication cable for Modbus & 24 VDC
- Power Break II carrier plate assemblies (authorized service only)
- WavePro secondary disconnect kits

See pages 6-8

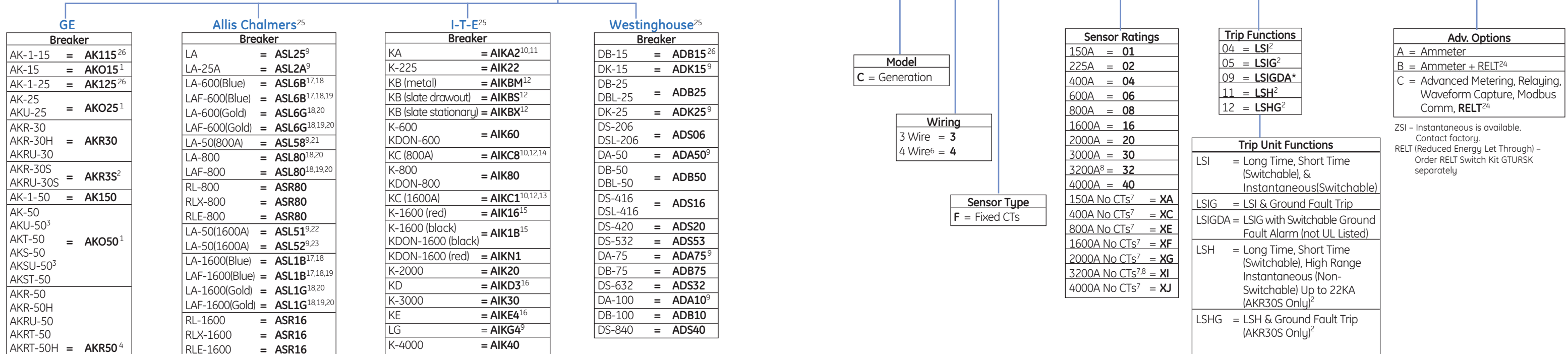


### Additional Key Components

See back cover for adding RELT to existing installations

Breakers	Component	Cat No.	Description
All	ZSI Module	TIM1	Zone Selective Interlock Module/Repeater
	Voltage Conditioners (set of 3)	PLVC1G01	Supplies isolated bus voltage signal from PT's to EntelliGuard Trip Units (PT's not included)
	Voltage Conditioners Plate (set of 3)	See Page 3-66 BuyLog	Voltage Conditioners and Potential Transformers mounted on a metal plate with fuses
	24V Power Supply	PLPS4G01	Power Leader 1.5A Power supply for up to 15 trip units
	Voltage Conditioner, PT's (set of 3) and Power Supply	See Pub DEP-056A	Includes Voltage Conditioners, Potential Transformers, 24V DC and Fuses all mounted on one Metal Plate
	EntelliGuard TEST Kit	GTUTK20	Used for testing phase currents, ground fault, disabling ground fault, RELT. Ability to Trip Breaker and used to connect to a PC with Set-up Software to download settings
	Rating Plug Removal Tool	TRTOOL	Simplifies rating plug removal
	Set-up Software	GTUSS	Set-up EntelliGuard Trip Unit offline or connected. Ability to view Waveform Captured by Trip Unit
	RELT Switch Kit	GTURSK	Includes Blue Lighted RELT Switch, lockable Cover, contacts, 8' wire harness, warning labels (see picture above)
AK, AKR, Allis Chalmers, ITE, Westinghouse	9 Pin Wire Harness Equipment side	GTUCHCONV1	9 Pin Equipment side wire harness 8' long for 24VDC, Communications, Voltage Conditioner Input
WavePro - All Frames	Plastic Door Kit	10060051P3	WavePro Trip Unit Plastic Door
Power Break I - All Frames	Power Break Micro Switch	See Pub DEH40391	Replacement Microswitch on Power Break I's with EPIC Trip Units
Power Break II - All Frames	Plastic Door Kit	10054335P3	Power Break II Trip Unit Plastic Door

# AKO25 C 3 F 06 04 A



Blue = Blue-gray breaker with plastic escutcheon  
Gold = Gold breaker with metal escutcheon

### Rating Plugs

Plug Rating	May Be Used With		Trip Plug Catalog No.
	Minimum Sensor	Maximum Sensor	
60A	150A	150A	GTP0060U0101
80A	150A	150A	GTP0080U0101
100A	150A	225A	GTP0100U0103
125A	150A	225A	GTP0125U0103
150A	150A	400A	GTP0150U0104
200A	200A	400A	GTP0200U0204
225A	225A	600A	GTP0225U0306
250A	400A	630A	GTP0250U0407
300A	400A	800A	GTP0300U0408
350A	400A	800A	GTP0350U0408
400A	400A	1000A	GTP0400U0410
450A	600A	1200A	GTP0450U0612
500A	600A	1250A	GTP0500U0613
600A	600A	1600A	GTP0600U0616
700A	800A	1600A	GTP0700U0816
750A	800A	2000A	GTP0750U0820
800A	800A	2000A	GTP0800U0820
900A	1000A	2000A	GTP0900U1020
1000A	1000A	2500A	GTP1000U1025
1100A	1200A	2500A	GTP1100U1225
1200A	1200A	3200A	GTP1200U1232
1500A	1600A	4000A	GTP1500U1640
1600A	1600A	4000A	GTP1600U1640
1900A	2000A	5000A	GTP1900U2050
2000A	2000A	5000A	GTP2000U2050
2200A	2500A	5000A	GTP2200U2550
2400A	2500A	6400A	GTP2400U2564
2500A	2500A	6400A	GTP2500U2564
3000A	3000A	6400A	GTP3000U3064
3200A	3200A	6400A	GTP3200U3264
3600A	4000A	6400A	GTP3600U4064
4000A	4000A	4000A	GTP4000K4040 <sup>27</sup>
4000A	4000A	6400A	GTP4000U4064
5000A	5000A	6400A	GTP5000U5064
6000A	6000A	6400A	GTP6000U6064

Conversion kits come standard with a rating plug that matches the current sensor. For rating plugs with different values, price and order separately.

### Notes, Definitions

- For converting AK-2 version breakers and newer, not applicable for AK-1 or AKR.
- AKR30S Instantaneous Is Non-Switchable and the Non-Switchable High Range Instantaneous max is 22KA. LSH and LSHG Are Only Available on AKR30S.
- Breakers equipped with older style open fuse lockout devices (OFLO), must be retrofitted with newer style OFLO device prior to conversion process. Order replacement OFLO kits as follows: AKU-50 - order OFLO Kit #121C2870G2, AK-75 - order OFLO kit #121C2870G3, AK-100 - order OFLO kit #121C2870G4.
- Not applicable for converting breakers equipped with Power Sensor - contact factory.
- Contact the factory for stationary breaker applications.
- Only applicable to trip units with ground fault.
- Available only for MicroVersaTrip RMS-9 type AKR breakers equipped with fixed current sensors.
- Not available on AK-75 breaker frames.
- Contact factory for availability.
- Not applicable for slate version breakers.
- Left pole accessories must be removed or relocated.
- Right pole accessories must be removed or relocated.
- 1600-amp version of the KC breaker.
- 800-amp version of the KC breaker.
- Order for red or black insulator as applicable.
- Not applicable to fixed mounted breakers.
- Only applicable for blue-gray color version breakers.
- Applicable to both "A" and "B" version breakers.
- Applicable to both nameplated versions of integral fused breakers (i.e., LA-600F and LAF-600).
- Only applicable for gold color version breakers.
- 800-amp version of the LA-50 breaker.
- Only applicable for the 1600-amp, 6-pole primary disconnect version of the LA-50 breaker.
- Only applicable for 1600-amp, 12 pole primary disconnect version of the LA-50 breaker.
- Requires 24VDC control power.
- Existing Allis Chalmers, I-T-E and Westinghouse bell alarms will not work with EntelliGuard TU.
- Trip unit will be mounted horizontally on breaker.
- For ITE and Allis Chalmers 4000A breakers.

### Sensor Rating Selection

Frame	Sensors	Breaker Catalog Numbers			
		GE	Allis Chalmers	I-T-E	Westinghouse
225	150	AK-1-15, AK-15	Sensor rating not available.	KA, KA-225	DB-15, DK-15
	225				
600	150	AK-1-25, AK-25, AKU-25	-	-	-
	225				
	600				
800	150	AKR-30, AKR-30H, AKRU-30, AKR-30S, AKRU-30S	LA-50 (800A Version), LA-800, LAF-800, RL-800, RLE-800, RLX-800	KC (800A Version), K-800, KDON-800	DS-206, DSL-206
	400				
	800				
	800				
1600	800	AK-1-50, AK-50, AKU-50, AKS-50, AKSU-50, AKR-50, AKR-50H, AKRU-50, AKJ-50, AKJ-50H	LA-50 (1600A Version), LA-1600, LAF-1600, RL-1600, RLE-1600, RLX-1600	KC (1600A Version), K-1600, KDON-1600	DA-50, DB-50, DBL-50, DS-416, DSL-416
	1600				
2000	2000	AKT-50, AKST-50, AKRT-50, AKRT-50H, AKJT-50, AKJT-50H	RL-2000	K-2000	DS-420
3000	3000	AK-75	LA-75, LA-3000	KD, K-3000	DA-75, DB-75
3200	3200	AKR-75	LA-3200, RL-3200	-	DS-632
4000	4000	AK-100, AKR-100, AKW-100	LA-4000, RL-4000	KE, LG, K-4000	DA-100, DB-100, DS-840

Configure your own Conversion Kit! Visit [www.geindustrial.com](http://www.geindustrial.com) and navigate to the EntelliGuard TU Conversion Kit page.

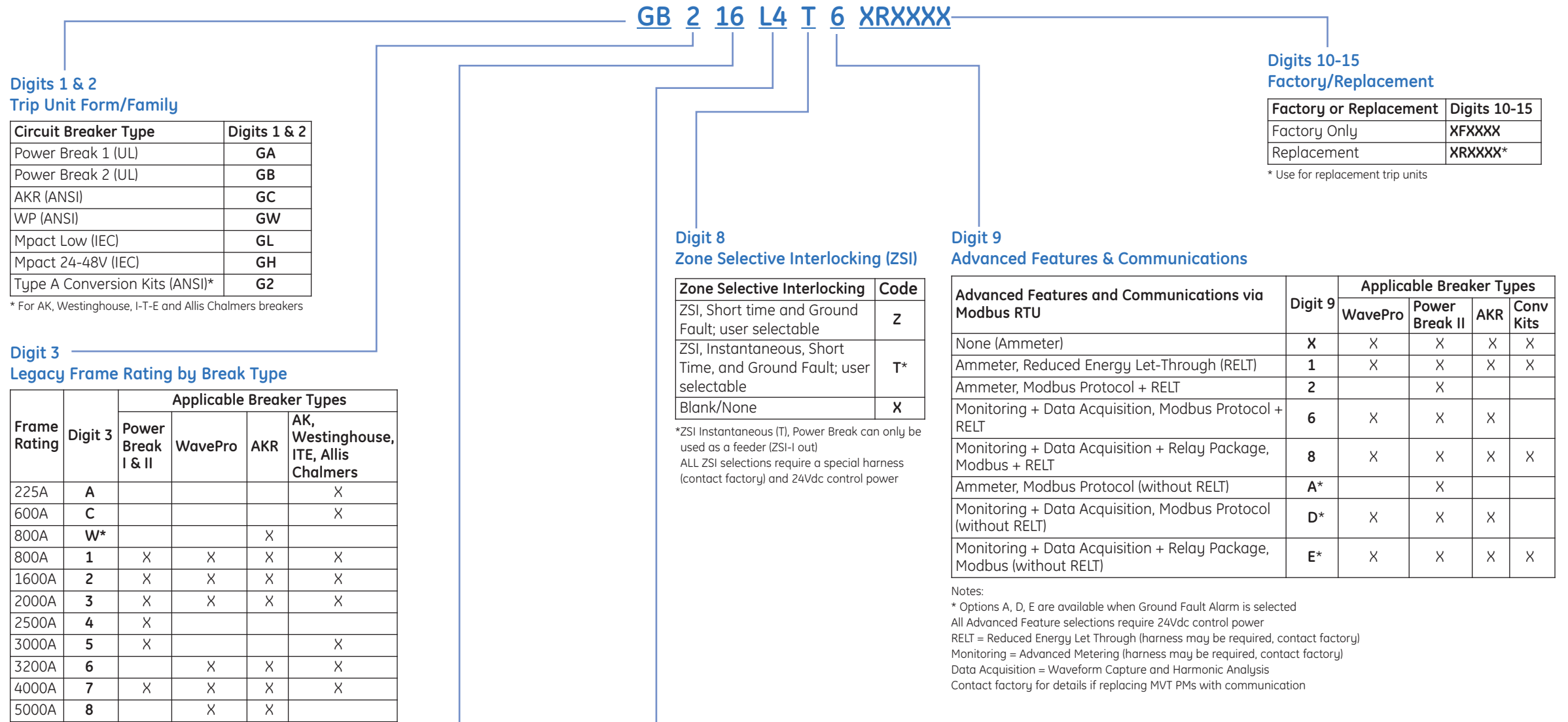
# Replacement EntelliGuard TU Trip Units

The EntelliGuard TU Trip Unit is a plug and play replacement for these legacy trip units:

- RMS9
- EPIC
- MicroVersaTrip
- Enhanced MicroVersaTrip
- Enhanced MicroVersaTrip+
- Enhanced MicroVersaTrip M/PM

If your existing breaker has one of these trip units and the breaker's current sensors, wiring harnesses and flux shifters are in good condition, then only a trip unit upgrade is needed. Note: Depending on options selected, a wiring harness may be needed to add RELT, ZSI, Metering or Communications to the existing breaker. Harnesses are list on pages 3 and 8 of this brochure.

**Warning:** If you have an EPIC, MVT M or MVT PM trip unit using Comnet communications, please contact your local field sales office for assistance. The EntelliGuard TU communicates using Modbus, which will require wiring changes and software changes to your current PMCS/BMS system.



### Digits 1 & 2 Trip Unit Form/Family

Circuit Breaker Type	Digits 1 & 2
Power Break 1 (UL)	GA
Power Break 2 (UL)	GB
AKR (ANSI)	GC
WP (ANSI)	GW
Mpact Low (IEC)	GL
Mpact 24-48V (IEC)	GH
Type A Conversion Kits (ANSI)*	G2

\* For AK, Westinghouse, I-T-E and Allis Chalmers breakers

### Digit 3 Legacy Frame Rating by Break Type

Frame Rating	Digit 3	Applicable Breaker Types			
		Power Break I & II	WavePro	AKR	AK, Westinghouse, ITE, Allis Chalmers
225A	A				X
600A	C				X
800A	W*			X	
800A	1	X	X	X	X
1600A	2	X	X	X	X
2000A	3	X	X	X	X
2500A	4	X			
3000A	5	X			X
3200A	6		X	X	X
4000A	7	X	X	X	X
5000A	8		X	X	

\* W is used for only AKR30S breakers

### Digits 4 & 5 Sensor Rating

Sensor Rating	Digits 4 & 5
150	01
200	02
225	03
400	04
600	06
800	08
1000	10
1200	12
1600	16
2000	20
2500	25
3000	30
3200	32
4000	40
5000	50

### Digit 8 Zone Selective Interlocking (ZSI)

Zone Selective Interlocking	Code
ZSI, Short time and Ground Fault; user selectable	Z
ZSI, Instantaneous, Short Time, and Ground Fault; user selectable	T*
Blank/None	X

\*ZSI Instantaneous (T), Power Break can only be used as a feeder (ZSI-I out)  
ALL ZSI selections require a special harness (contact factory) and 24Vdc control power

### Digit 9 Advanced Features & Communications

Advanced Features and Communications via Modbus RTU	Digit 9	Applicable Breaker Types			
		WavePro	Power Break II	AKR	Conv Kits
None (Ammeter)	X	X	X	X	X
Ammeter, Reduced Energy Let-Through (RELT)	1	X	X	X	X
Ammeter, Modbus Protocol + RELT	2		X		
Monitoring + Data Acquisition, Modbus Protocol + RELT	6	X	X	X	
Monitoring + Data Acquisition + Relay Package, Modbus + RELT	8	X	X	X	X
Ammeter, Modbus Protocol (without RELT)	A*		X		
Monitoring + Data Acquisition, Modbus Protocol (without RELT)	D*	X	X	X	
Monitoring + Data Acquisition + Relay Package, Modbus (without RELT)	E*	X	X	X	X

Notes:  
\* Options A, D, E are available when Ground Fault Alarm is selected  
All Advanced Feature selections require 24Vdc control power  
RELT = Reduced Energy Let Through (harness may be required, contact factory)  
Monitoring = Advanced Metering (harness may be required, contact factory)  
Data Acquisition = Waveform Capture and Harmonic Analysis  
Contact factory for details if replacing MVT PMs with communication

### Digits 6 & 7 Overcurrent Protection Package

Type	Over Current (OC) Protection Package	Digits 6 & 7	
Legacy ANSI/UL OC Protection	AK, AKR, WavePro, Conv Kits	LSI (S, switchable) (I, switchable ANSI only)	L3
		LSIG (S, switchable) (I, switchable ANSI only)	L4
		LSIGA (S, switchable) (I, switchable ANSI only) (G, Alarm Only)	L5
		LSIGDA* (S, G, A switchable) (I, switchable ANSI only)	L8
	PB1, PBII	LSI (S, switchable) (I, Non-switchable)	L3
		LSIG (S, switchable) (I, Non-switchable)	L4
		LSIGA (S, switchable) (I, Non-switchable) (G, Alarm Only)	L5
		LSIGDA* (S, G, A switchable) (I, Non-switchable)	L8
	WavePro	LSI (S, switchable) (I, Non-switchable UL891 applications)	LP
		LSIG (S, switchable) (I, Non-switchable UL891 applications)	LQ
		LSIGA (S, switchable) (I, Non-switchable UL891 applications) (G, Alarm Only)	LR
		LSIGDA* (S, G, A switchable) (I, Non-switchable UL891 applications)	LS

\*Function combination is NOT UL Listed  
KEY:  
L = Long Time (I<sup>2</sup>T + fuse settings I<sup>4</sup>T, all trip units)  
S = Short Time (Switchable if Instantaneous (I) protection is enabled)  
I = Standard Range Adjustable Instantaneous, (IOC, 2x-15x)  
G = Ground Fault Protection (GFP, 3-wire or 4-wire, internal summing) Trip & Alarm  
D = Defeatable/Switchable Ground Fault NOT UL Listed  
A = Ground Fault, Alarm only  
GA = Ground Fault Alarm Only  
GDA = Ground Fault Trip and Ground Fault Alarm (all switchable, NOT UL Listed)

Loose trip units do not come with rating plugs, which must be ordered separately. For rating plugs, see page 5. For harnesses, see pages 3 and 8.

## Harness Kits and Hardware to add RELT (Reduced Energy Let Through)

See page 3 for additional components that may be required for your installation

Breakers	Component	Cat No.	Description
All	24V Power Supply	PLPS4G01	Power Leader 1.5A Power supply for up to 15 trip units
	RELT Switch Kit	GTURSK	Includes Blue Lighted RELT Switch, lockable Cover, contacts, 8' wire harness, warning labels
AK, AKR, Allis Chalmers, ITE, Westinghouse	RELT Harness Kit	GTURHA	6 wires (4 for RELT, 2 for 24VDC), Manual Disconnect, Terminal Block and Warning Label. Used to add RELT to an existing MVT Installation. Comes standard with kits. Order only for existing trip unit replacement/upgrade.
WavePro - 800-2000A	RELT Harness Kit	GTURHWP1	6 Wires (4 for RELT, 2 for 24VDC) from Trip Unit to Secondary Disc Block. Used to add RELT to an existing MVT Installation.
WavePro - 3200-4000A	RELT Harness Kit	GTURHWP2	6 Wires (4 for RELT, 2 for 24VDC) from Trip Unit to Secondary Disc Block. Used to add RELT to an existing MVT Installation.
WavePro - 5000A	RELT Harness Kit	GTURHWP3	6 Wires (4 for RELT, 2 for 24VDC) from Trip Unit to Secondary Disc Block. Used to add RELT to an existing MVT Installation.
WavePro - All Frames	WavePro "C" Disconnect Block	GTUSDWP1	WavePro Breaker Side Secondary Disconnect "C"
WavePro - 800-2000A	WavePro "C" Disconnect Block	GTUSFSD361	WavePro Equipment Side Secondary Disconnect "C", Includes 36 wire harness*
WavePro - 3200-5000A		GTULFSD361	
Power Break I - All Frames	Power Break I Disconnect Block	TDOSD6S	Power Break I Secondary Disconnect 6 Circuit Drawout - Equipment Side
		TDOSD6B	Power Break I Secondary Disconnect 6 Circuit Drawout - Breaker Side
		TDOSVD04	Power Break I Secondary Disconnect with Zone Interlocking
Small Frame Power Break II	RELT Harness Kit	GTURHAPB2SF	6 wires (4 for RELT, 2 for 24VDC) and complete wired carrier plate. Used to add RELT to an existing MVT Installation. (Installation by Authorized service only)
Large Frame Power Break II	RELT Harness Kit	GTURHAPB2LF	6 wires (4 for RELT, 2 for 24VDC), complete wired carrier plate, and 6 wire harness from Terminal Block to Secondary Disconnect. Used to add RELT to an existing MVT Installation. (Installation by Authorized service only)
Power Break II - All Frames	Power Break II "B" Disconnect Block	SPDOSD36S	Power Break II Secondary Disconnect Block B - Equipment Side
		SPDOSD36B	Power Break II Secondary Disconnect Block B - Breaker Side

\*WavePro Equipment Side Secondary Disconnect "C" is available as 16 wire harness: GTUSFSD361 & GTULFSD361.

EntelliGuard TU Trip Units are compatible with MicroVersaTrip, RMS9, EPIC RMS9, MicroVersaTrip Plus & PM, Enhanced MicroVersaTrip Plus & PM Trip Units models.

Also Available from GE:

**Power Break II in a Power Break I (fixed and drawout) – see DEA-520**

**AKR Remote Rackers – see DET-440A**

Coming Soon!

**EntelliGuard G in AKD-5, AKD-6, AKD-8 switchgear line-ups**

Contact factory for availability and options

Information provided is subject to change without notice. Please verify all details with GE. All values are design or typical values when measured under laboratory conditions, and GE makes no warranty or guarantee, express or implied, that such performance will be obtained under end-use conditions.

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