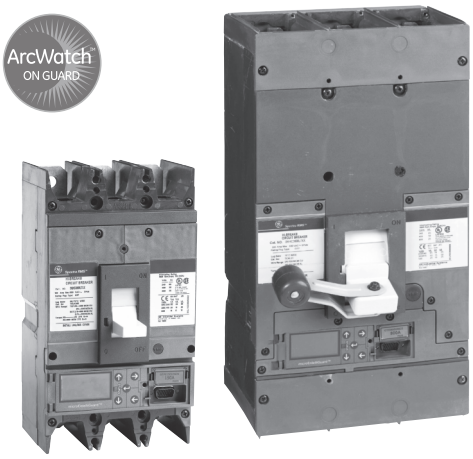
*micro*EntelliGuard™ Trip Unit

The *micro*EntelliGuard™ trip unit is the newest and most advanced trip unit available in the Spectra™ line of molded case circuit breakers. The trip unit design is based on the EntelliGuard™ TU trip unit platform. The *micro*EntelliGuard™ trip unit incorporates the advanced features and protective functions available on the EntelliGuard™ TU trip unit and is available in the 600-amp Spectra™ G and 1200-amp Spectra™ K frames. Spectra™ breakers with *micro*EntelliGuard™ trip units allow you to select the enhanced system protection, coordination, metering and communication options required for the application and allow a fully coordinated and integrated electrical system across GE's entire line of molded case, insulated case and low voltage circuit breakers. Spectra™ breakers with *micro*EntelliGuard™ trip units use all of the same power management system accessories as the MicroVersaTrip™ PM trip units (some new power management accessories are available for breakers that incorporate some of the new features offered with the *micro*EntelliGuard™ trip unit).

Standard Features

—Adjustable Long-Time pickup and delay bands with three curve shapes (MVT I^2t, CB and Fuse I^4t) for optimal system coordination (includes thermal memory for enhanced system protection)
—Adjustable Short-Time pickup with multiple delay bands, curve slopes, I^2t IN/OUT, and OFF setting
—Adjustable Instantaneous pickup
—3-Phase ammeter
—Backlit LCD display with five-button tactile keypad for function selection and set point adjustment and sealable, clear LEXAN cover for tamper resistant settings
—LED Status Indicator to show "health" of trip unit
—Trip Target indication and local pickup warning signal
—Interchangeable/Universal rating plugs
—Test set jack for GTUTK20 test kit
—True RMS current sensing for accurate response to high harmonic content waveforms
—EMI immunity per ANSI C37.90



Spectra™ SG600 and SK1200 breakers
with *micro*EntelliGuard™ Trip Units

Optional Features

—Ground Fault (Trip or Alarm) pickup and delay bands with multiple slopes, I^2t IN/OUT for optimal system coordination
—Neutral Protection provides overload protection on the system neutral
—Zone Selective Interlocking (ZSI) capability on Short Time, Ground Fault and Instantaneous settings for optimal system coordination and selectivity
—Reduced Energy Let-Through (RELT) setting for enhanced equipment and personnel protection
—Advanced metering option includes the ability to monitor current, voltage, energy, frequency, power factor, power (real/reactive/apparent) and peak power demand
—Modbus communications system with user selectable address assignment for communication directly with EnerVista Viewpoint power system monitoring software
—Waveform capture for enhanced system diagnostics
—Protective Relays that are user selectable in any combination
  —Voltage Unbalance
  —Current Unbalance
  —Under Voltage
  —Over Voltage
  —Power Reversal
  —Load Alarm
—Input relay for RELT signal or remote tripping of the breaker
—Two programmable output relays for enhanced signaling and diagnostics
—Control Power option provides connection capability for +24Vdc control power via the distribution cable system

Other Features

—UL Listed for reverse feed and HACR type (standard)
—UL Listed 100% continuous current rating (optional)
—UL Listed Current Limiting (optional on SG Frame)
—Internal Accessories (Shunt Trip, Undervoltage Release, Auxiliary Contacts, Bell Alarm) – UL Listed for field installation and common across the entire line of Spectra™ RMS breakers

*micro*EntelliGuard™ Trip Unit Characteristics

	Long Time (C)	Short Time	Instantaneous & Reduced Energy Let-Through	Ground Fault (Trip or Alarm)
Pickup Settings	0.50 to 1.00 in increments of 0.05 (X, multiples of rating plug amps)	1.5 to 9.0 in increments of 0.5 (multiples of current setting C)	SK-H, L, P = 2.0 to 10.0 - Instantaneous 1.5 to 10.0 - RELT in increments of 0.5 (X, multiples of current sensor amps) **Breaker / Sensor Ampere / INST** SKS, SKT: 800 / 2.0 to 25.5 SKS, SKT: 1000 / 2.0 to 20.5 SKS, SKT: 1200 / 2.0 to 17.0	0.4 to 1.0 in increments of 0.05 (multiples of current sensor amps S)
Delay Bands[1] Settings (seconds)	MVT 1-4 (I^2t) (2.4, 4.9, 9.8, 20[2]) C1-C10 (thermal) (.2 to 9.6,15.4[2]) F1-F7 (I^4t) (.02 to 0.9)	1-12 (.07 to .49)		2-15 (.06 to .92)
Slope/Shape		0 - I^2t out 1 - low 2 - med 3 - high		0 - definite time 1 - I^2t 2 - selective ground fault 3 - fuse shape (I^4t)

X = Rating Plug Amperes
S = Sensor Ampere Rating
C = Long Time Current Setting Pickup = LT pickup setting x Rating Plug Amperes "X"
[1]Delay Bands shown at 600% of current setting at lower limit of each band
[2]Maximum setting not available on SG

Note: See section 29 for *micro*EntelliGuard™ time-current curves

Spectra™ RMS Circuit Breakers with *micro*EntelliGuard™ Trip Units

Functions	Accuracy and Description	Last Digit of Catalog Number Equals >>> X	2	6	8
		•	•			Metering (Basic)
				•	•	Metering (Advanced)
			•	•	•	Modbus
				•	•	Waveform Capture
					•	Protective Relays
Current (A)	Amps ± 4% Phase Selectable	•	•	•	•	
Voltage (V)	Volts ± 2% L-L or L-N and Phase Selectable			•	•	
Real Power (kW)	kWatts ± 6% L-L or L-N			•	•	
Reactive Power (kVAR)	kVAR ± 4% L-L or L-N			•	•	
Apparent Power (kVA)	kVA ± 4% L-L or L-N			•	•	
Peak Power Demand (kW)	kWatts ± 4%			•	•	
Energy (kWh/MWh)	kWh ± 7%			•	•	
Frequency (Hz)	± 1 Hz			•	•	
Power Factor (%)	± 7% max			•	•	
Communications	EnerVista Viewpoint (Modbus)		•	•	•	
Waveform Capture	COMTRADE file format			•	•	
Voltage Unbalance Relay	Adjustable Pickup 10 to 50% Adjustable Delay 1 to 15 sec or OFF				•	
Current Unbalance Relay	Adjustable Pickup 10 to 50% Adjustable Delay 1 to 15 sec or OFF				•	
Under Voltage Relay	Adjustable Pickup 50 to 90% Adjustable Delay 1 to 15 sec or OFF				•	
Over Voltage Relay	Adjustable Pickup 110 to 150% Adjustable Delay 1 to 15 sec or OFF				•	
Power Reversal Relay	Adjustable Pickup 10 to 990 KW Adjustable Delay 1 to 15 sec or OFF				•	
Load Alarm Relay	ON 0.55 to 1.00 x LT OFF 0.50 to 0.95 x LT				•	

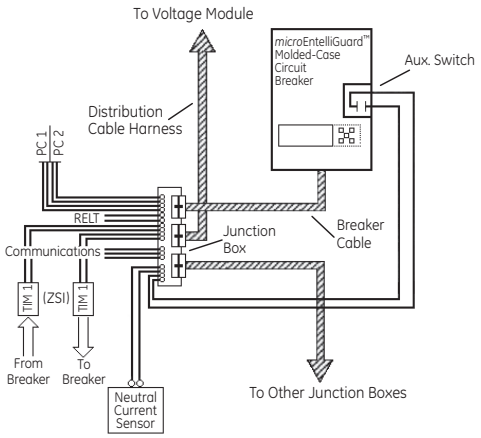
How to Order

—Select the appropriate breaker frame on the following pages taking into consideration the maximum ampere rating, the interrupt rating, whether or not a 100% rating is required, standard protection functions (LSI, LSIG, LSIA), advanced protection functions (Neut. Prot., ZSI, RELT), and advanced features and communications (basic or advanced metering, communications, waveform capture, protective relays)
—Select the rating plug and breaker lugs from the tables provided.
—Select the required power management system accessories.
—Select other accessories as required (such as an auxiliary switch or shunt trip).
—When ordering, specify separate product numbers for each item

Ordering Example

SG600 ampere frame, standard load rating and 400 maximum ampere rating, 350 amp rating plug with line and load lugs. Trip functions to include adjustable long-time (L), short-time (S), instantaneous (I), ground fault alarm (A), reduced energy let-through (RELT), and advanced metering, communications, waveform capture and protective relays. Metering and communications of voltage, current, power and breaker contact position are required. Local RELT enable is also required. The available system voltage is 480/277 Vac 3 phase/4-wire with an available fault current of 65kAIC. Power management accessories are to be mounted on plates with all of the necessary fuse protection, potential transformers, control power transformers, and required interconnect accessories. The required circuit breaker Product Number is SGLC3604L5R8.

Description	Product Number
Breaker Prefix	SGLC3604L5_ _
Adder 1 for R (RELT)	
Adder 2 for 8 (Adv Meter/Modbus/WFC/Relay)	
Complete Breaker	SGLC3604L5R8
Rating Plug	GTP0350U0408
Lug Kits (2)	TCLK365
Auxiliary Switch	SAUXGAB1
RELT Switch Kit	GTURSK
Power Supply Plate	SPSA480
Voltage Conditioner	GMPU7
Advanced J-Box	SDCJBBC
Distribution Cable Harness (2)	SDCHA11
400A Neutral CT	TSRG204



Trip Unit Function Definitions

Long-Time (L)	Adjustable current setting Adjustable long-time delay - three curve shapes (MVT I^2t, CB and Fuse I^4t)
Short-Time (S)	Adjustable short-time pickup (can also be turned OFF) Adjustable short-time delay - multiple slope options I^2t IN or OUT
Instantaneous (I)	Adjustable instantaneous pickup
Ground Fault (G)	Adjustable ground fault pickup
Ground Fault Alarm (A)	Adjustable ground fault delay - multiple slope options with I^2t IN or OUT
Control Power (CP)	+24Vdc control power connection
Trip Indication Targets	Standard
Neutral Protection	Adjustable current setting on Neutral: multiple of Long-Time setting
ZSI (ST/GF/INST)	Adjustable Zone Selective Interlock settings for Short-Time, Ground Fault, and Instantaneous
RELT	Adjustable Instantaneous: Reduced Energy Let-Through mode
Metering (basic)	Amperes (A/kA) - Phase selectable
Metering (advanced)	Current (A/kA) - Phase selectable Voltage (V) - L-L or L-N and Phase selectable Real Power (kW) - L-L or L-N Reactive Power (kVAR) - L-L or L-N Apparent Power (kVA) - L-L or L-N Peak Power Demand (kW) Energy (kWh/MWh) Frequency (Hz) Power Factor (%)
Communications	Modbus with user selectable address assignment Compatible with EnerVista Viewpoint power system monitoring software
Waveform Capture	Stores 8 cycles of data on trip or signal (COMTRADE file format)
Protective Relay Functions	Voltage Unbalance - pickup/delay/OFF Current Unbalance - pickup/delay/OFF Under Voltage - pickup/delay/OFF Over Voltage - pickup/delay/OFF Power Reversal - pickup/delay/OFF Load Alarm - pickup (ON)/OFF

Other Features/Functions

HMI - Backlit LCD display & 5-button keypad	Ease of programming and viewing status/ metering displays, tactile feel
LED Status Indicator	Visual display of trip unit's "health"
Visual pickup waring signal	For quick diagnostics and pre-trip detection
Sealable LEXAN cover for tamper resistant settings	Tamper resistant settings
Test set jack for GTURSK test kit	Fully integrated with GTURSK test kit
Long Time Thermal Memory	For enhanced system protection
Input Relay[1]	Dedicated if RELT enabled or set to TRIP/OFF
Qty (2) Programmable Output Contacts[1]	RELT (dedicated) Ground Fault Alarm Overcurrent Trip Protective Relay Trip Load Alarm Health Status

[1]Included on breakers with 20-pin output harness

*micro*EntelliGuard™ Trip Unit Feature and Benefit Summary

Feature	Benefit	System/Asset Protection	Long Time and Short Time Coordination	Instantaneous Selectivity	Arc Flash	System Performance	Diagnostics/Reliability
Enhanced adjustability and flexibility of time current curve shape, slope, and delay bands	Enhanced system protection via tight coordination with upstream and downstream devices including fuses	•	•		•		
Ground Fault Trip or Alarm	Enhanced system and asset protection - especially for process driven applications	•					•
Zone Selective Interlock (ST/GF)	System protection	•			•		
Zone Selective Interlock (Instantaneous)	Maximum system protection, coordination, and selectivity	•		•	•		
Reduced Energy Let-Through	Enhanced system and personnel protection	•		•	•		
Protective Relay Functions	Enhanced system and asset protection via a suite of protective relays	•					
Neutral Protection	Protection on heavy harmonic loads	•					
Sealable LEXAN Trip Unit Cover	Prevents unauthorized trip unit setting changes for maximum system, personnel, and asset protection.	•			•		
Long Time Thermal Memory	Enhanced system protection	•					
Input Relay[1]	System and asset protection via remote trip (dedicated if RELT enabled)	•					
Programmable Output Contacts[1]	Maximize system uptime via signaling on GF alarm, overcurrent trip, protective relay trip, load alarm or health status	•					•
Advanced Metering	System performance monitoring and diagnostics of critical current, voltage, and power characteristics					•	•
Modbus Communications	System performance monitoring, reporting and diagnostics (compatible with EnerVista Viewpoint power system monitoring software)	•				•	•
Test Set Jack for GTUTK20 Test Kit	Maximize system uptime and enhanced diagnostics via the GTUTK20 test kit						•
Trip Indication Targets	Visual Trip indication for quick diagnostic evaluation						•
Event Log	Records last 10 trip events						•
Waveform Capture	Enhanced diagnostic feature to maximize system uptime						•
HMI - Backlit LCD Display and 5-button Keypad	Ease of programming and viewing status/metering displays						•
LED Status Indicator	Enhanced diagnostic feature to maximize system uptime (visual display of trip unit's "health")						•
Visual Pickup Warning Signal	For quick diagnostics and pre-trip detection						•

[1]Included on breakers with 20-pin output harness

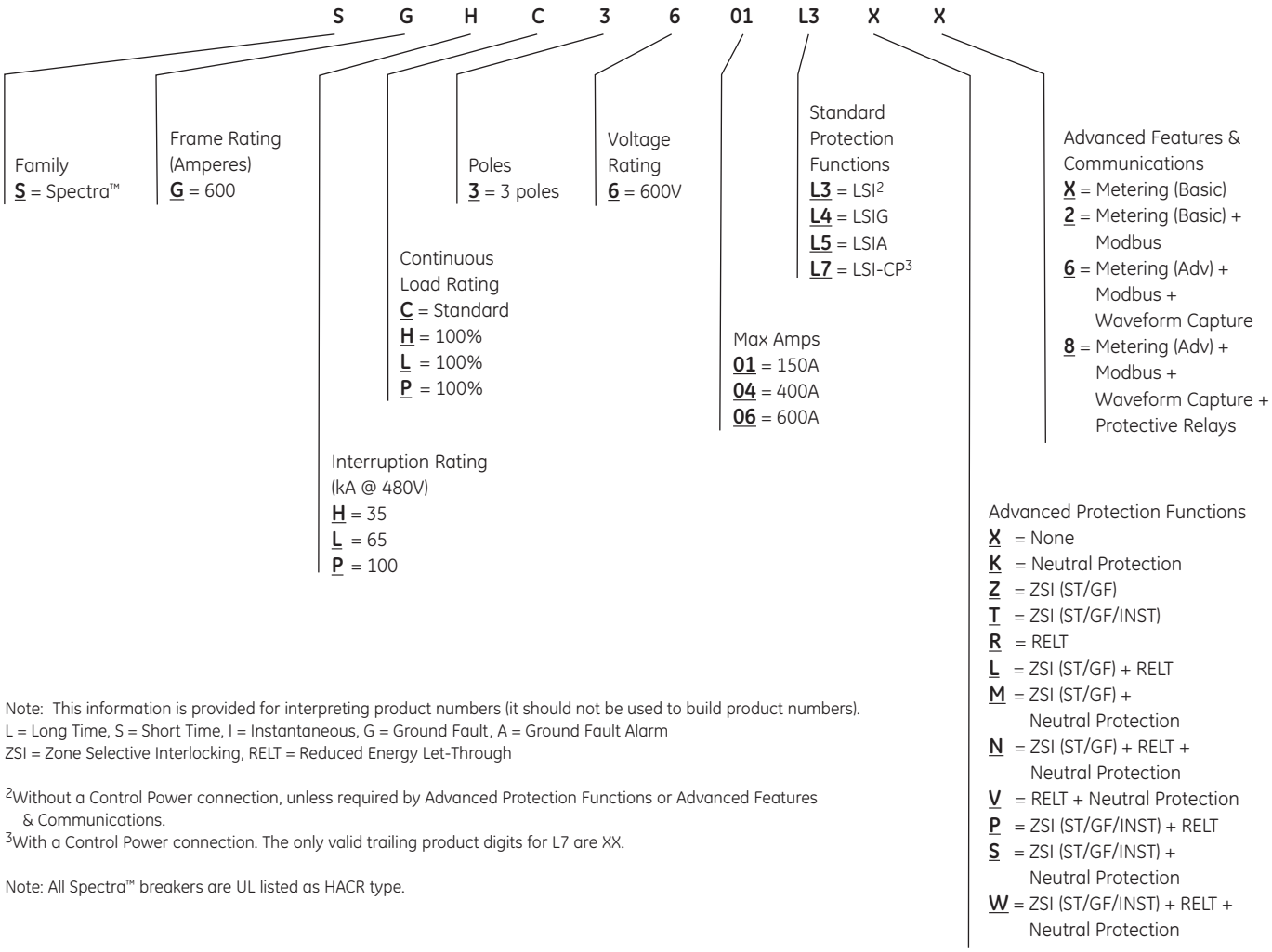
Spectra™ *micro*EntelliGuard™ Reference Publications

Spectra™ G Breaker w/ *micro*EntelliGuard™ Trip Unit	GEH-700
Spectra™ K Breaker w/ *micro*EntelliGuard™ Trip Unit	GEH-701
Universal Rating Plug	DEH-41318
MET Sealable Cover Kits	GEH-707
*micro*EntelliGuard™ Trip Unit Users Manual	GEH-702
*micro*EntelliGuard™ Jump Start Programming Instructions	GEH-703
Distribution Cable Terminal Block (SDCTBA11)	GEH-6257
Distribution Cable Terminal Blocks - MET only (SDCTBA11C & SDCTBA22C)	GEH-706
Distribution Cable Junction Box SDCJBB	DEH-006
Advanced Distribution Cable Junction Box SDCJBBC	GEH-704
Distribution Cable Harness (12-pin)	GEH-6255
Distribution Cable Extension (12-pin)	GEH-6256
Distribution Cable Extension - MET only (20-pin)	GEH-705
Power Supply Plate	GEH-6251
Power Supply Assembly	GEH-6253
Voltage Conditioner GMPU	GEH-6259
Voltage Conditioner SVCAA - OBSOLETE	GEH-6254
Voltage Conditioner Plate SVCA - OBSOLETE	GEH-6252
Voltage Module ADSVMA - OBSOLETE	GEH-6250
GTU Digital Test Kit (GTUTK20)	DEH-4568
Shunt Trip and UVR Instructions	GEH-5551
Aux Switch and Bell Alarm	GEH-5593
Accessories - Door Ring Interlock Catch Kits	GEI-70594
TIM-1 Zone Selective Interlock Module	GEK-64467

Molded Case Circuit Breakers
Industrial Circuit Breakers

60-600A Circuit Breakers
Electronic Trip
Spectra™ RMS
SG600 with *micro*EntelliGuard™ Trip Units[1]

Product Number Structure



Note: This information is provided for interpreting product numbers (it should not be used to build product numbers).
L = Long Time, S = Short Time, I = Instantaneous, G = Ground Fault, A = Ground Fault Alarm
ZSI = Zone Selective Interlocking, RELT = Reduced Energy Let-Through

[2]Without a Control Power connection, unless required by Advanced Protection Functions or Advanced Features & Communications.
[3]With a Control Power connection. The only valid trailing product digits for L7 are XX.

Note: All Spectra™ breakers are UL listed as HACR type.

*micro*EntelliGuard™ Rating Plug Selection

Rating Plug Product Numbers	Trip Amps	SG (Max Amps) 150	400	600
GTP0060U0101	60	x		
GTP0080U0101	80	x		
GTP0100U0103	100	x		
GTP0125U0103	125	x		
GTP0150U0104	150	x	x	
GTP0200U0204	200		x	
GTP0225U0306	225		x	x
GTP0250U0407	250		x	x
GTP0300U0408	300		x	x
GTP0350U0408	350		x	x
GTP0400U0410	400		x	x
GTP0450U0612	450			x
GTP0500U0613	500			x
GTP0600U0616	600			x

Range of available rating plugs for each frame indicated by x.

Terminal Lugs for Front Connection (Cu/Al)

Sensor	Product Number	Wire Range
150 to 600	3 Pole Lug Kit TCLK365[4]	(2) 2/0 - 500 Cu/Al or (1) 8 - 600 Cu or (1) 6 - 600 Al

[1]May require 24 Vdc control power and voltage sensing signals. Refer to pages 6-62 to 6-68.
[4]Order one kit for either line or load end: two kits required for both.
Note: Reference BuyLog page 6-104 for alternate lug options.

60-600A Circuit Breakers
Electronic Trip
Spectra™ RMS
SG600 with *micro*EntelliGuard™ Trip Units[1]

*micro*EntelliGuard™, Standard UL Rated

SG600 Line, Suitable for Reverse Feed, UL File E-11592, CSA LR 40350
SGL, SGP UL Current Limiting; 3-Pole, UL/CSA: 600Vac Max., IEC 947-2: 630A, 690 Vac Max

Max Amps	Standard Protection Function	35kA Product Number Prefix	65kA Product Number Prefix	100kA Product Number Prefix	Product Number Suffix (two digits)
150	LSI	SGHC3601L3 _ _	SGLC3601L3 _ _	SGPC3601L3 _ _	Product Number is not complete. Select one value from each suffix tables below.
	LSIG[2]	SGHC3601L4 _ _	SGLC3601L4 _ _	SGPC3601L4 _ _	
	LSIA[2]	SGHC3601L5 _ _	SGLC3601L5 _ _	SGPC3601L5 _ _	
	LSI-CP[3]	SGHC3601L7XX	SGLC3601L7XX	SGPC3601L7XX	
400	LSI	SGHC3604L3 _ _	SGLC3604L3 _ _	SGPC3604L3 _ _	
	LSIG[2]	SGHC3604L4 _ _	SGLC3604L4 _ _	SGPC3604L4 _ _	
	LSIA[2]	SGHC3604L5 _ _	SGLC3604L5 _ _	SGPC3604L5 _ _	
	LSI-CP[3]	SGHC3604L7XX	SGLC3604L7XX	SGPC3604L7XX	
600	LSI	SGHC3606L3 _ _	SGLC3606L3 _ _	SGPC3606L3 _ _	
	LSIG[2]	SGHC3606L4 _ _	SGLC3606L4 _ _	SGPC3606L4 _ _	
	LSIA[2]	SGHC3606L5 _ _	SGLC3606L5 _ _	SGPC3606L5 _ _	
	LSI-CP[3]	SGHC3606L7XX	SGLC3606L7XX	SGPC3606L7XX	

*micro*EntelliGuard™, 100% UL Rated

SG600 Line, Suitable for Reverse Feed, UL File E-11592, CSA LR 40350
SGL, SGP UL Current Limiting; 3-Pole, UL/CSA: 600Vac Max., IEC 947-2: 630A, 690 Vac Max

Max Amps	Standard Protection Function	35kA Product Number Prefix	65kA Product Number Prefix	100kA Product Number Prefix	Product Number Suffix (two digits)
150	LSI	SGHH3601L3 _ _	SGLL3601L3 _ _	SGPP3601L3 _ _	Product Number is not complete. Select one value from each suffix tables below.
	LSIG[2]	SGHH3601L4 _ _	SGLL3601L4 _ _	SGPP3601L4 _ _	
	LSIA[2]	SGHH3601L5 _ _	SGLL3601L5 _ _	SGPP3601L5 _ _	
	LSI-CP[3]	SGHH3601L7XX	SGLL3601L7XX	SGPP3601L7XX	
400	LSI	SGHH3604L3 _ _	SGLL3604L3 _ _	SGPP3604L3 _ _	
	LSIG[2]	SGHH3604L4 _ _	SGLL3604L4 _ _	SGPP3604L4 _ _	
	LSIA[2]	SGHH3604L5 _ _	SGLL3604L5 _ _	SGPP3604L5 _ _	
	LSI-CP[3]	SGHH3604L7XX	SGLL3604L7XX	SGPP3604L7XX	
600	LSI	SGHH3606L3 _ _	SGLL3606L3 _ _	SGPP3606L3 _ _	
	LSIG[2]	SGHH3606L4 _ _	SGLL3606L4 _ _	SGPP3606L4 _ _	
	LSIA[2]	SGHH3606L5 _ _	SGLL3606L5 _ _	SGPP3606L5 _ _	
	LSI-CP[3]	SGHH3606L7XX	SGLL3606L7XX	SGPP3606L7XX	

Product Suffix 1

Advanced Protection Functions

X = None
K = Neutral Protection
Z = ZSI (ST/GF)
T = ZSI (ST/GF/INST)
R = RELT
L = ZSI (ST/GF) + RELT
M = ZSI (ST/GF) + Neutral Protection
N = ZSI (ST/GF) + RELT + Neutral Protection
V = RELT + Neutral Protection
P = ZSI (ST/GF/INST) + RELT
S = ZSI (ST/GF/INST) + Neutral Protection
W = ZSI (ST/GF/INST) + RELT + Neutral Protection

Product Suffix 2

Advanced Features and Communications

X = Metering (Basic)
2 = Metering (Basic) + Modbus
6 = Metering (Adv) + Modbus + Waveform Capture
8 = Metering (Adv) + Modbus + Waveform Capture + Relays

[1]May require 24 Vdc control power and voltage sensing signals. Refer to pages 6-62 to 6-68.
[2]For grounded neutral systems (1 phase/3-wire or 3 phase/4-wire) a neutral current sensor is required. Refer to page 6-66.
[3]For +24 Vdc Control Power Accessories refer to pages 6-62 to 6-66.

Notes: All Spectra™ breakers are UL listed as HACR type.
Neutral Protection requires a neutral current sensor. Refer to page 6-66.
ZSI (Zone Selective Interlock) requires TIM1 ZSI module and 24 Vdc control power (refer to pages 6-62 to 6-66 for accessories).
RELT (Reduced Energy Let-Through), Modbus, Ground Fault Alarm and Waveform Capture options require 24 Vdc control power (refer to pages 6-62 to 6-66 for accessories).