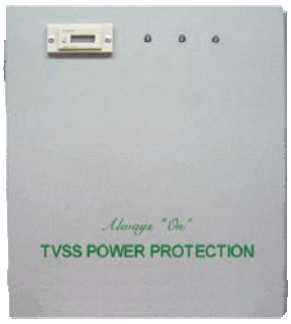
"ESE" ELECTRICAL SERVICE ENTRANCE

"TVSS" POWER PROTECTION



Products may not necessarily be as Illustrated

The **Always "On"** ***"ESE"*** **TVSS filter** is designed to protect, at the power panel, against externally and internally produced power aberrations, massive impulses, lightning induced effects as well as interference associated with low frequency harmonics and situations caused by accidents and/or failures in the electrical utility system. Also totally compatible with all operating loads including high frequency power supplies and constant current loads controlled by electronic switches.

APPLICATIONS:

Electrical Service Entrance Filters protect the electronic and electrical equipment in the building by supplying Power Protection at the Main and Sub-panel locations.

PROTECTION:

High end Protection for Industrial and Commercial environments. Specific designed and tuned circuitry provides protection against all potentially dangerous electrical aberrations. Eliminates and attenuates to safe levels: Common and Normal mode noise, massive surge impulses, indirect lightning strikes and their effects, interference associated with low frequency "Harmonics", Spikes, Transients as well as problems associated with electrical utility failures caused by accidents, storms etc.

Electrical and Electronic equipment create their own power aberrations, which creates problems for other loads and equipment downstream. These aberrations will travel down the power buss to the power panels where they propagate to other loads via other branch circuits.

By installing **Always "On"** ***ESE*** Power panel protection devices these problems **will not** occur.

Always "On" *ESE* Power protection offers TWO Methods of Protection

1) For all New Residential, Commercial and Industrial Construction:

The ESE protects electronic equipment in new buildings (security, environmental, networking, communications, appliances, systems etc) from potentially destructive and disruptive externally generated power spikes and transients, massive surges, indirect lightning strikes, low frequency harmonics, common and normal mode noise.

2) For all Commercial and Industrial Retrofits:

Same as above and; Protects down stream branch panels from externally and internally generated power aberrations such as spikes, transients, massive surges, low frequency harmonics, common and normal mode noise.

STOP THE PROBLEMS BEFORE THEY CAN OCCUR. **ELIMINATE** ALL POTENTIAL PROBLEM CAUSING AND DAMAGING POWER ABERRATIONS BY HAVING AN **ALWAYS"'ON"** ***"ESE"*** FILTER INSTALLED.

FEATURES:

Removable fuses per phase. (Eliminates DEDICATED and costly 3 phase panel breakers. Self-Diagnostics - LED indicators .

OPTIONAL: Form C contacts (remote monitoring), Surge Counter (indicates number of high energy, potentially damaging hits on a continual basis), Alarms (visual and audible) and a Flush Mount Container.

Always "On" UPS Systems Inc., #100 - 150 Campion Road, Kelowna, BC Canada V1X 7S8

"ESE" ELECTRICAL SERVICE ENTRANCE

"TVSS" POWER PROTECTION

SPECIFICATIONS

Frequency:	50/60Hz
Voltages:	208, 240, 480, 600 (other voltages available)
Phases:	Wye or Delta - Three phase and Single phase
Protection Modes:	10 for 3 wye, 6 for 3 delta, 5 for 2 wye
Technology:	Bi-Directional Parallel
Insertion Loss:	Nominal 60dB, Mil-Standard-220A@100kHz
Bandwidth:	10kHz-50MHz or 180Hz-50MHz
Response Time	Constant / Instantaneous
Standards:	UL1449 Rev. 1998 (TVSS) Peak
Surge Current	60kA to 600kA per phase
Sink Current Capacity / Ø:	25A
Operating Humidity:	0-97% (non-condensing)
Operating Temp:	-40°C to +65°C
Warranty:	10 years
Enclosure:	NEMA 12 (or Optional NEMA 4) Flange Mount 14"x12"x6" inches
Weight:	13.6kg / 30lbs (Approx)

Optional:

DC - Dry Contact (Form "C") Communications
SC - Surge Counter (LCD Display)
FM - Flush Mount Container (DIM 12"x12"x6")
FT - Fault Test Button

Specifications subject to change without notice to reflect upgrades and improvement in technology.

Description of Model Number

ESE 200K 208 Y (DC SC FM FT - **Optional**)

- ESE — Model Type ESE
- 200K — SURGE CURRENT per phase

60K*	60kA per Phase
100K	100kA per Phase
120K	120kA per Phase
160K	160kA per Phase
200K	200kA per Phase
250K	250kA per Phase
300K	300kA per Phase
400K	400kA per Phase
500K	500kA per Phase
600K	600kA per Phase

- 208 — Voltages**: 208, 240, 480, 600
  **Other voltage options available consult manufacturer
- Y — Configuration Wye or Delta***
  ***Contact manufacturer for more information on Delta version
- (DC) Dry Contact Communication
- (SC) Surge Counter
- (FM) Flush Mount
- (FT) Fault Test

FOR ALL UPC ORDER CODES VISIT
WWW.ALWAYSONUPS.COM

* Note: 60K version is for residential use and comes in the 240Volt / Y configuration only. It is not recommended for commercial or industrial applications.

EXAMPLES:

MODEL	SURGE CURRENT	VOLTAGE	Y or D	OPTION	MODEL #
ESE	60K	240	Y		ESE-60K-240Y (SHP)
ESE	250K	480	D		ESE-250K-480D
ESE	500K	600	Y	DCSC	ESE-500K-600Y-DCSC

Surge Current: 60K, 100K to 600K
208/240/480/600 VOLTS
Y - Neutral wire required (Wye type transformer)
D - Neutral wire not required (Delta type transformer)

DC - Dry Contact Communication
SC - Surge Counter
FM - Flush Mount Container
FT - Fault Test Button

Optional Additional Cost

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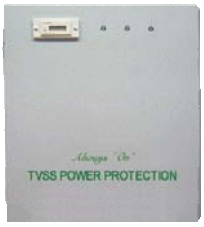


Reference Sheet for the Electrical Service Entrance Filter Application

Residential (Smart Home) and **Multi-residential** Complexes

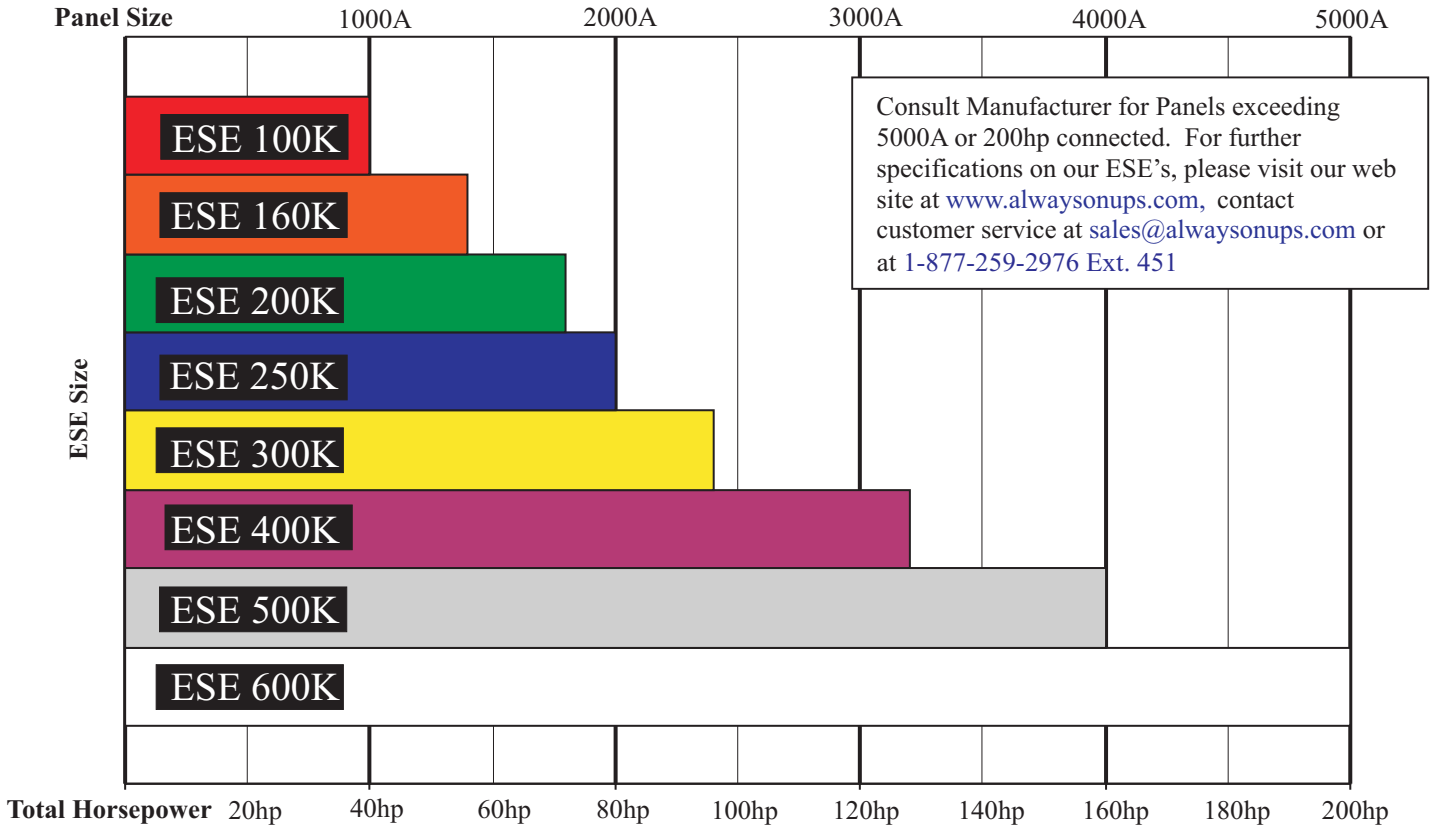
Model #	Panel Size
ESE-60K-240Y [2] (SHP)	Up to 200A
ESE-100K-208Y [3] (other voltages available)	Above 200A

Commercial (Office, Retail, etc.)

Model #	Panel Size
ESE-100K-208Y (DCSC) (Optional) [3] (other voltages available)	Up to 2000A
ESE-160K-208Y (DCSC) (Optional) [3] (other voltages available)	Up to 3000A
ESE-200K-208Y (DCSC) (Optional) [3] (other voltages available)	Above 3000A

Industrial

ESE Sizing Chart for Industrial Environments



Consult Manufacturer for Panels exceeding 5000A or 200hp connected. For further specifications on our ESE's, please visit our web site at www.alwaysonups.com, contact customer service at sales@alwaysonups.com or at 1-877-259-2976 Ext. 451

Base "ESE" size on Panel size or Total Horsepower rating. (Use the larger of the "ESEs" specified).

"ESE" ELECTRICAL SERVICE ENTRANCE

"TVSS" POWER PROTECTION

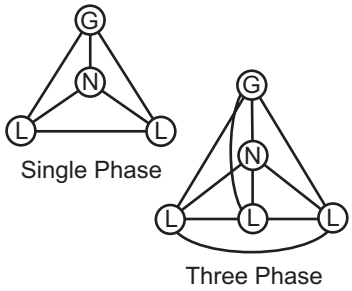
ANSI/IEEE TEST STANDARD

The ANSI/IEEE C 62.41 - 1991 - REV. 2 surge tests are the accepted industry standard for determining the effectiveness of power protection devices.

ANSI/IEEE C 62.41 - 1991 - REV. 2 SURGE TEST

LOCATION CATAGORIES	CURRENT/VOLTAGE WAVEFORMS		
		COMBINATION WAVE 1.2/50us (V) 8/20us (A)	RINGWAVE CURRENT 0.5us x 100kHz
CATEGORY C OUTSIDE AND SERVICE ENTRANCE	C3	20kV, 10000A	
	C2	10kV, 5000A	
	C1	6kV, 3000A	
CATEGORY B MAJOR DISTRIBUTION PANELS AND SHORT BRANCH CIRCUITS	B3	6kV, 3000A	6kV, 500A
	B2	4kV, 2000A	4kV, 330A
	B1	2kV, 1000A	2kV, 170A
CATEGORY A LONG BRANCH CIRCUITS AND OUTLETS	A3		6kV, 200A
	A2		3kV, 130A
	A1		2kV, 70A

Modes of Protection/Circuits



Always "On" products withstand the above three IEEE surge/impulses on the power line.

Normal Mode: Line to Neutral (L-N)
Common Mode: Line to Ground (L-G)
Common Mode: Neutral to Ground (N-G)
Differential Mode: Line to Line (L-L)

	Category A3 Ring-wave 100kHz 6kV 200A	Category B3 Ring-wave 100kHz 6kV 500A	Category B3/C1 Impulse 6kV 3,000A
TVSS/ 3 phase	L-N L-L	L-N L-L L-G N-G	L-L L-N L-G N-G
	32V 32V	80V 80V 370V 370V	370V 370V 370V 370V

TVSS/ 3 phase	Category C3 20kV-10,000A impulse				Cascade Protection 20kV-10,000A impulse			
	L-L	L-N	L-G	N-G	L-L	L-N	L-G	N-G
208/120V =	<400V	<400V	<400V	<400V	<140V	<140V	<140V	<140V
480/277V =	<400V	<400V	<400V	<400V	<180V	<180V	<180V	<180V
600/347V =	<400V	<400V	<400V	<400V	<275V	<275V	<275V	<275V

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ESE Models "TVSS" Products

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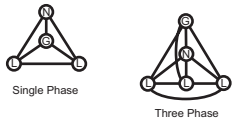
Peak Surge Current and Joule Rating (A)
Peak Surge Current Rating Based on 8 x 20μs Wave

ESE Model	Peak Surge Current per Circuit (A)	Total Peak Surge Current Capacity (A) 1∅Y, 2∅D	2∅Y, 3∅D	3∅Y
ESE-120K-240Y-DC	70,000	210,000	420,000	--

Joule Rating Based on 8 x 20μs Wave

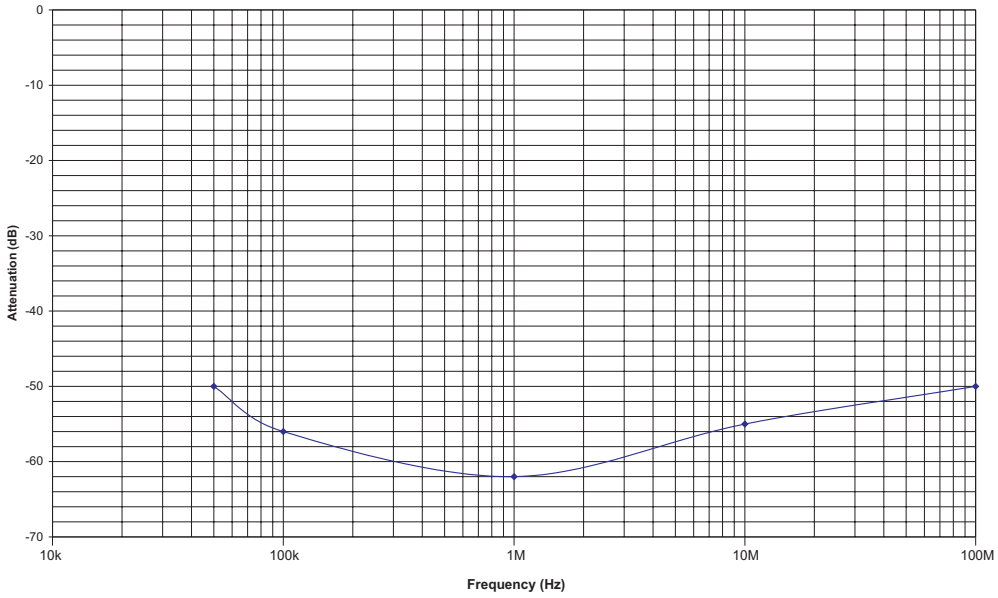
ESE Voltage (V)	Peak Surge Current per Circuit (A)	Joule Rating (J) 1∅Y, 2∅D	2∅Y, 3∅D	3∅Y
208 - 240	70,000	7,560	15,120	--

Modes of Protection/Circuits



INSERTION LOSS
-50dB @ 50kHz
-56dB @ 100kHz
-62dB @ 1MHz
-55dB @ 10MHz
-50dB @ 100MHz

INSERTION LOSS (MIL STD 220A)



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ESE MODELS: REACTIVE STORAGE TABLE

VAR

	60Hz	50Hz
25A Sink		
45A Sink		

PHASE / VOLTS	1Y	2Y	3Y	2D	3D
120	54 / 45 109 / 90				
208	163 / 136 326 / 272	272 / 226 543 / 452	651 / 543 1302 / 1086	163 / 136 326 / 272	498 / 408 978 / 816
220	183 / 152 365 / 304	275 / 228 550 / 456	732 / 609 1464 / 1218	183 / 152 365 / 304	549 / 456 1098 / 912
230	199 / 166 399 / 332	299 / 250 598 / 500	795 / 663 1590 / 1326	199 / 166 399 / 332	597 / 498 1194 / 996
240	217 / 181 434 / 362	325 / 271 650 / 542	867 / 723 1734 / 1446	217 / 181 434 / 362	651 / 543 1302 / 1086
380	544 / 454 1089 / 907	910 / 758 1820 / 1516	2181 / 1818 4362 / 3636	544 / 454 1089 / 907	1632 / 1362 3264 / 2724
415	649 / 541 1299 / 1082	1083 / 903 2166 / 1806	2598 / 2166 5196 / 4332	649 / 541 1299 / 1082	1947 / 1623 3894 / 3246
480	869 / 724 1737 / 1448	1449 / 1206 2898 / 2412	3477 / 2895 6954 / 5790	869 / 724 1737 / 1448	2607 / 2172 5214 / 4344
600	1357 / 1131 2714 / 2262	2261 / 1885 4522 / 3770	5427 / 4524 10854 / 9048	1357 / 1131 2714 / 2262	4071 / 3393 8142 / 6786

NOTE: 220/230/240 2Y assume split phase wiring.

Watts is the measure of work done.
VA is the measure of power supplied.
VAR is reactive power generating magnetic fields required by motors and transformers

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ESE MODELS: CHARGE STORAGE TABLE

milli coulomb (mC)

25A Sink
45A Sink

VOLTS \ PHASE	1Y	2Y	3Y	2D	3D
120	1.2 2.4	----	----	----	----
208	2.1 4.2	4.5 9.0	9.9 19.8	2.1 4.2	6.3 12.6
220	2.2 4.4	4.4 8.8	10.4 20.8	2.2 4.4	6.6 13.2
230	2.3 4.6	4.6 9.2	10.9 21.8	2.3 4.6	6.9 13.8
240	2.4 4.8	4.8 9.6	11.4 22.7	2.4 4.8	7.2 14.4
380	3.8 7.6	8.0 16.0	18.0 36.0	3.8 7.6	11.4 22.8
415	4.2 8.3	9.0 18.0	19.8 39.6	4.2 8.3	12.6 24.9
480	4.8 9.6	10.3 20.6	22.7 45.4	4.8 9.6	14.4 28.8
600	6.0 12.0	12.9 25.9	28.4 56.8	6.0 12.0	18.0 36.0

NOTE: 220/230/240 2Y assume split phase wiring.

Capacitance is the abiliy to store electrical energy measured in farads (F)

Coulombs is the quantity of electricity (charge) transferred by a current in a given period of time. (1C = 1 Amp x 1 Second.)

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