

ESB201.LED IP40

Inrush Current Limiter, Inrush Current Protection, active For LED Power Supplies and Electronic Ballast for the Lighting 115Vac/230Vac 16A, 16 1/3 Hz - 440Hz, -20°C...+45(55)°C

Short Specification:

- Peak- / R.M.S. current limiter
- 90-130Vac / 184-265Vac, 16A continuous
- Flat 35mm housing IP40
- Springtype terminals 0,5-6mm² / 21-10AWG
- Integrated bypass relay
- Capacitive load 6000uF and 10.000uF
- Intergrated temperature protection
- IP40 UL94V-0 ABS-PA765 housing

The ESB is a budget-priced inrush peak current limiter for high loads in LED-applications. The ESB201 offers high recommended and interference free operation with both, the LED drivers & the electronic ballast. It is simple to integrate into existing equipment. The ESB101 is self- powering and does not require an external power supply.

16 1/3 Hz - 440Hz

No simple NTC-solution! It enables a reduction in cabling sections and to install fast circuit breakers in the lighting business. It offers 100% protection from tripping pre-installed circuit. It protects line switchers and contactors from wear.







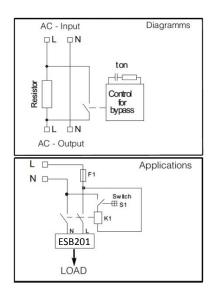


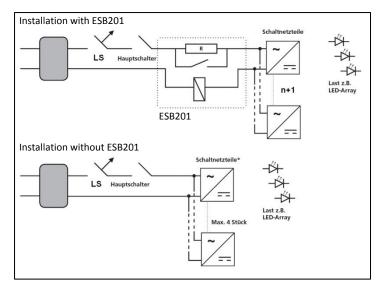
Technical Specification

Model ESB201.ED.230Vac ESB201.ED.151Vac Article Number 3041100101CA 3041100102CA	rechnical Specif	iicatioii			
Peak Current Limiting ±6% RM. S Current Limiting ±6% RIOWED (apacitive Load (max.) Limiting Time 300(±50)ms 300(±50)ms (T _{xx} -power On) Release Time S 50(±50)ms (T _{xx} -power On) Release Time (Release Time) Release Time (Release Time) Release Time (Release Time) Release Time (Release Time) Release Time (Release Ti	Model	ESB201.LED.230Vac		ESB201.LED.115Vac	
Limiting ±6% ### ### ### ### ### ### ### ### ### #	Article Number	3041100101CA		3041100102CA	
R.M.S Current Limiting ±6% Allowed Capacitive Load (max.) Limiting Time (T _{ax} Power On) Release Time (T _{ax} Power On) Release Time (T _{ax} Low Voltage) Limiting Interval (T _{totator} Low Voltage) Limiting Interval (Totator) Release Time (Totator) Smallest advisable Limiting Interval (Totator) Limiting Low Low Voltage Line Frequency Lin	Peak Current	48A		43A	
Limiting ±6% Allowed Capacitive Load (max.) Limiting Time (Tap Power On) Release Time (Tam tow Voltage) Limiting Time (Tam tow Voltage) Limiting Interval (Tam tow Voltage) AlfaA ≥813A	Limiting ±6%				
Allowed Capacitive Load (max.)	R.M.S Current	33,9A		30,4A	
Load (max.) Limiting Time (Top-Power On) Release Time (Top-Power On) Release Time (Top-Tower On) Smallest advisable Limiting Interval ITheroad For ACcont.) Smallest advisable Circuit Breaker \$ ≥813A \$ ≥115Vac Line Frequency \$ 16 ½ Hz − 440Hz \$ 16 ½ Hz − 440Hz \$ 16 ½ Hz − 440Hz \$ 79Vac AC Continous Range Line Frequency \$ 16 ½ Hz − 440Hz \$ 16 ½ Hz − 440Hz \$ 79Vac AC Continous Current \$ 4 Cower Margin \$ 52Vac (AC dump / drop) AC Continous Current \$ 165A for 20m5 / 800A for 200us (even while switching internal bypass relay) Fower Supply \$ 19mA constant at continuous operation \$ 2 vycles/minute Limiting Cycles \$ 3 cycles/minute Limiting Cycles Thermal Fuse protects overload & fire Cooling Operation Temp. Ambient temperature -20°C+45°C continuous/ +55°C short time \$ 500 years on Temp. Ambient temperature -20°C+45°C continuous/ +55°C short time \$ 18N5 022 class B EMS \$ EN51020-6-2,3 \$ 3 safety Norms \$ 18C/F06095-01 in accordance with cUL60950 MTBF Calculation MTBF Calculation \$ 384.000 (+30°C) (!EC/FN61790, Siemens SN29500) MTBT Calculation \$ 1900 years on Temp. \$ 100 years on T	Limiting ±6%				
Limiting Time (7.m Power On) Release Time (7.m Low Voltage) Limiting Interval (7.m Low Voltage) Limiting Interval ≥ 900ms ≥ 900ms ≥ 900ms [7.m Low Voltage) Limiting Interval ≥ 900ms ≥ 900ms [7.m Low Voltage) Limiting Interval ≥ 813A	Allowed Capacitive	6.000uF		10.000uF	
(To, Power On) Release Time 550(±50)ms 550(±50)ms (To, Iow Voltage) (To, Iow Salas) (To	Load (max.)				
Release Time (Torl Low Voltage) 550(±50)ms 550(±50)ms (Torl Low Voltage)	Limiting Time	300(±50)ms		300(±50)ms	
Tom Low Voltage Limiting Interval ≥ 900ms ≥ 900ms	(T _{on} Power On)				
Limiting Interval ≥ 900ms ≥ 900ms ≥ 900ms Tistround for ACcent.	Release Time	550(±50)ms		550(±50)ms	
Timeword for ACcont.	(T _{off} Low Voltage)				
Smallest advisable Circuit Breaker at 30°C	Limiting Interval	≥ 900ms		≥ 900ms	
Circuit Breaker at 30°C AC Input Range 184-265Vac 115Vac Line Frequency 16 ½ Hz − 440Hz Switch-On Voltage AC Lower Margin AC Peak Current 165A for 20ms / 800A for 200us (even while switching internal bypass relay) Power Supply Current Consumption Limiting Cycles 10 yeles/minute Internal Protection Thermal fuse protects overload & fire Cooling Ambient temperature −20°C+45°C continuous / +55°C short time Storage Temp. EMS EMS ENSO Safety Class II VDE0805, VDE0100/ÖVE8001 MTBF Calculation MTFF Calculation MTFF Calculation MTFF Calculation MTFF Calculation MTFF Calculation MTFF Calculation MEAN Level (PNOTE) Le	[T _{interval} for AC _{cont.})				
at 30°C AC Input Range AC Continous Range 184-265Vac AC Continous Range 115Vac Line Frequency 16 ½ Hz − 440Hz Switch-On Voltage 144Vac 16 ½ Hz − 440Hz Switch-On Voltage 16 ∠ Continous Current 16 ∠ Continous AC Peak Current 165A for 20ms / 800A for 200us (even while switching internal bypass relay) Power Supply item is self-powering Current Consumption Limiting Cycles 3 cycles/minute Internal Protection Thermal fuse protects overload & fire Cooling Ambient temperature - 20°C+45°C continuous/ +55°C short time Storage Temp. Ambient temperature - 20°C+45°C continuous/ +55°C short time EMS EMS EN55022 class B EMS EN61000-6-2,3 Safety Norms IEC/EN60950-1 in accordance with cUL60950 Safety Class II VDE0805, VDE0100/ÖVE8001 MTBF Calculation 384.000h (+30°C) (IEC/EN61709, Siemens SN29500) HUMIdity 95% (+25°C) not condensing Pollution Degree 2 (IEC/EN601708) Environmental thermal environment 3K3, mechanics 3M4 (IEC/EN60721) Altitude max. 4000m (13123 ft.) above sea level Dimensions (WxHxD) UL94V-0 IP40 ABS (PA765) plastic housing; IP40 must use the equipped grommets Weight Connections Spring-type terminal with cable protection 0,56mm² 2110AWG according with IEC/EN601984	Smallest advisable			≥A16A	
AC Input Range AC Continous Range 230Vac 115Vac Line Frequency 16 % Hz - 440Hz Switch-On Voltage 144Vac 779Vac AC Lower Margin 52Vac (AC dump / drop) AC Continous Current AC Peak Current 165A for 20ms / 800A for 200us (even while switching internal bypass relay) Power Supply Lurrent Consumption Limiting Cycles Internal Protection Thermal fuse protects overload & fire Cooling Natural convection Operation Temp. Ambient temperature -20°C+45°C ozntinuous / +55°C short time Storage Temp. EMS Safety Norms IEC/EN69350-1 in accordance with CUL60950 Safety Class II NTEF Calculation MTBF Calculation Thermal environment 384, 300ch (+30°C) (IEC/EN61709, Siemens SN29500) Humidity 95% (+25°C) not condensing 2 (IEC/EN50178) Environmental Thermal environment 383, mechanics 3M4 (IEC/EN66721) Altitude max. 4000m (13123 ft.) above sea level Dimensions (WxHxD) UL94V-0 IP40 ABS (PA765) plastic housing; IP40 must use the equipped grommets Weight Connections Spring-type terminal with cable protection 0,56mm² 2110AWG according with IEC/EN661984	Circuit Breaker	≥ B13A		≥B13A	
AC Continous Range Line Frequency 16 ½ Hz - 440Hz AC Lower Margin 52Vac (AC dump / drop) 28Vac (AC dump / drop) AC Continous Current AC Peak Current Power Supply 16	at 30°C			≥Z16A	
Line Frequency 16 % Hz – 440Hz Switch-On Voltage 144Vac 79Vac AC Lower Margin AC Continous Current AC Continous Current 165A for 20ms / 800A for 200us (even while switching internal bypass relay) Power Supply 19mA constant at continuous operation Limiting Cycles Internal Protection Cooling Natural convection Operation Temp. Ambient temperature - 20°C+45°C continuous / +55°C short time EMS ENS5022 class B EMS EN61000-6-2,3 Safety Norms IEC/EN60950-1 in accordance with cUL60950 Safety Class II NTBF Calculation MTBF Calculation 384.000h (+30°C) (IEC/EN61709, Siemens SN29500) Humidity 95% (+25°C) not condensing Pollution Degree Environmental Athermal environment 13K3, mechanics 3M4 (IEC/EN60721) Altitude max. 1008 LIGHYON OF PA60 MS (PA765) plastic housing; Pl400 must use the equipped grommets Weight Connections Spring-type terminal with cable protection 0,56mm² 2110AWG according with IEC/EN60664-1, IEC/EN61984	AC Input Range	184-265Vac		90-130Vac	
Switch-On Voltage AC Lower Margin S2Vac (AC dump / drop) AC Continous Current AC Peak Current 165A for 20ms / 800A for 200us (even while switching internal bypass relay) Power Supply Item is self-powering Current Consumption Limiting Cycles 3 cycles/minute Internal Protection Thermal fuse protects overload & fire Cooling Ambient temperature - 20°C+45°C continuous/ +55°C short time Storage Temp. FMI ENS5022 class B EMI EMS EN61000-6-2,3 Safety Norms IEC/EN60950-1 in accordance with cUL60950 Safety Class II MOTE Calculation MTBF Calculation 300.000h (IEC/EN61709, Siemens SN29500) MTTF Calculation 384.000h (+30°C) (IEC/EN61709, Siemens SN29500) Humidity 95% (+25°C) not condensing Pollution Degree Environmental Athermal environment 3K3, mechanics 3M4 (IEC/EN60721) Altitude max. Dimensions (WxHxD) 200g Connections Spring-type terminal with cable protection 0,56mm² 2110AWG according with IEC/EN606664-1, IEC/EN61984	AC Continous Range	230Vac		115Vac	
AC Lower Margin 52Vac (AC dump / drop) AC Continous Current 16A continuous AC Peak Current 165A for 20ms / 800A for 200us (even while switching internal bypass relay) Power Supply Current Consumption 19mA constant at continuous operation Limiting Cycles 3 cycles/minute Internal Protection Thermal fuse protects overload & fire Cooling Natural convection Operation Temp. Ambient temperature - 20°C+45°C continuous/ +55°C short time Storage Temp. ENS5022 class B EMS ENS ENG1000-6-2,3 Safety Norms IEC/EN60950-1 in accordance with cUL60950 Safety Class II VDE0805, VDE0100/ÖVE8001 MTBF Calculation MTBF Calculation 300.000h (IEC/EN61709, Siemens SN29500) MTTF Calculation 384.000h (+30°C) (IEC/EN61709, Siemens SN29500) MTTF Calculation Pollution Degree 2 (IEC/EN50178) Environmental thermal environment 3K3, mechanics 3M4 (IEC/EN60721) Altitude max. 4000m (13123 ft.) above sea level Dimensions (WxHxD) Logs Connections Spring-type terminal with cable protection 0,56mm² 2110AWG according with IEC/EN60664-1, IEC/EN61984	Line Frequency	16 ⅓ Hz – 440Hz		16 ⅓ Hz – 440Hz	
AC Continous Current AC Peak Current AC Peak Current 165A for 20ms / 800A for 200us (even while switching internal bypass relay) Power Supply item is self-powering Current Consumption 19mA constant at continuous operation Limiting Cycles 3 cycles/minute Internal Protection Thermal fuse protects overload & fire Cooling Anatural convection Operation Temp. Ambient temperature -20°C+45°C continuous/ +55°C short time Storage Temp. 4-0°C+85°C for 2 years EMI EN55022 class B EMS EN61000-6-2,3 Safety Norms IEC/EN60950-1 in accordance with cUL60950 Safety Class II VDE0805, VDE0100/ÖVE8001 MTBF Calculation 300.000h (IEC/EN61709, Siemens SN29500) MTTF Calculation 384.000h (+30°C) (IEC/EN61709, Siemens SN29500) Humidity 95% (+25°C) not condensing Pollution Degree 2 (IEC/EN50178) Environmental thermal environment 3K3, mechanics 3M4 (IEC/EN60721) Altitude max. 4000m (13123 ft.) above sea level Dimensions (WXHxD) UL94V-0 IP40 ABS (PA765) plastic housing; IP40 must use the equipped grommets Weight Spring-type terminal with cable protection 0,56mm² 2110AWG according with IEC/EN6064-1, IEC/EN61984	Switch-On Voltage	144Vac		79Vac	
AC Peak Current Power Supply item is self-powering Current Consumption Limiting Cycles Internal Protection Cooling Natural convection Operation Temp. Storage Temp. EMS Safety Norms Safety Norms Safety Class II MTBF Calculation	AC Lower Margin	52Vac (AC dump / drop) 28Vac (AC dump / drop)		28Vac (AC dump / drop)	
Power Supply Current Consumption Limiting Cycles 3 cycles/minute Internal Protection Thermal fuse protects overload & fire Cooling Natural convection Operation Temp. Ambient temperature -20°C+45°C continuous/ +55°C short time Storage Temp. Final Enstance EMI ENSSO22 class B EMS EN61000-6-2,3 Safety Norms IEC/EN60950-1 in accordance with cUL60950 Safety Class II NTBF Calculation MTBF Calculation MSH.000h (+30°C) (IEC/EN61709, Siemens SN29500) MTTF Calculation MTBF Calculation MSH.000h (+30°C) (IEC/EN50178) MTBF Calculation MSH.000h (+30°C) (IEC/EN50178) MTBF Calculation MTB	AC Continous Current	16A continuous			
Current Consumption Limiting Cycles 1 3 cycles/minute Internal Protection Thermal fuse protects overload & fire Cooling Natural convection Operation Temp. Ambient temperature -20°C+45°C continuous/ +55°C short time Storage Temp. FN55022 class B EMI EN55022 class B EMS EN61000-6-2,3 Safety Norms IEC/EN60950-1 in accordance with cUL60950 Safety Class II NDE0805, VDE0100/ÖVE8001 MTBF Calculation MTBF Calculatio	AC Peak Current	165A for 20ms / 800A for 200us (even while switching internal bypass relay)			
Limiting Cycles Internal Protection Thermal fuse protects overload & fire Cooling Natural convection Operation Temp. Ambient temperature -20°C+45°C continuous/ +55°C short time Storage Temp40°C+85°C for 2 years EMI EN55022 class B EMS EN61000-6-2,3 Safety Norms IEC/EN60950-1 in accordance with cUL60950 Safety Class II VDE0805, VDE0100/ÖVE8001 MTBF Calculation 300.000h (IEC/EN61709, Siemens SN29500) MTTF Calculation 384.000h (+30°C) (IEC/EN61709, Siemens SN29500) Humidity 95% (+25°C) not condensing Pollution Degree 2 (IEC/EN50178) Environmental thermal environment 3K3, mechanics 3M4 (IEC/EN60721) Altitude max. Dimensions (WxHxD) 260x35,4x23,5mm Housing UL94V-0 IP40 ABS (PA765) plastic housing; IP40 must use the equipped grommets Weight 200g Connections Spring-type terminal with cable protection 0,56mm² 2110AWG according with IEC/EN60664-1, IEC/EN61984	Power Supply	item is self-powering			
Internal Protection Thermal fuse protects overload & fire Cooling Natural convection Operation Temp. Ambient temperature -20°C+45°C continuous/ +55°C short time Storage Temp40°C+85°C for 2 years EMI EN55022 class B EMS EMS EN61000-6-2,3 Safety Norms IEC/EN60950-1 in accordance with cUL60950 Safety Class II VDE0805, VDE0100/ÖVE8001 MTBF Calculation 300.000h (IEC/EN61709, Siemens SN29500) MTTF Calculation 384.000h (+30°C) (IEC/EN61709, Siemens SN29500) Humidity 95% (+25°C) not condensing Pollution Degree 2 (IEC/EN50178) Environmental thermal environment 3K3, mechanics 3M4 (IEC/EN60721) Altitude max. J000m (13123 ft.) above sea level Dimensions (WxHxD) 260x35,4x23,5mm Housing UL94V-0 IP40 ABS (PA765) plastic housing; IP40 must use the equipped grommets Weight 200g Connections Spring-type terminal with cable protection 0,56mm² 2110AWG according with IEC/EN60664-1, IEC/EN61984	Current Consumption	19mA constant at continuous operation			
Cooling Natural convection Operation Temp. Ambient temperature -20°C+45°C continuous/ +55°C short time Storage Temp40°C+85°C for 2 years EMI EN55022 class B EMS EN61000-6-2,3 Safety Norms IEC/EN60950-1 in accordance with cUL60950 Safety Class II VDE0805, VDE0100/ÖVE8001 MTBF Calculation 300.000h (IEC/EN61709, Siemens SN29500) MTTF Calculation 384.000h (+30°C) (IEC/EN61709, Siemens SN29500) Humidity 95% (+25°C) not condensing Pollution Degree 2 (IEC/EN50178) Environmental thermal environment 3K3, mechanics 3M4 (IEC/EN60721) Altitude max. 4000m (13123 ft.) above sea level Dimensions (WxHxD) 260x35,4x23,5mm Housing UL94V-0 IP40 ABS (PA765) plastic housing; IP40 must use the equipped grommets Weight 200g Connections Spring-type terminal with cable protection 0,56mm² 2110AWG according with IEC/EN60664-1, IEC/EN61984	Limiting Cycles	3 cycles/minute			
Operation Temp. Ambient temperature -20°C+45°C continuous/ +55°C short time Storage Temp. -40°C+85°C for 2 years EMI EN55022 class B EMS EN61000-6-2,3 Safety Norms IEC/EN60950-1 in accordance with cUL60950 Safety Class II VDE0805, VDE0100/ÖVE8001 MTBF Calculation 300.000h (IEC/EN61709, Siemens SN29500) MTTF Calculation 384.000h (+30°C) (IEC/EN61709, Siemens SN29500) Humidity 95% (+25°C) not condensing Pollution Degree 2 (IEC/EN50178) Environmental thermal environment 3X3, mechanics 3M4 (IEC/EN60721) Altitude max. 4000m (13123 ft.) above sea level Dimensions (WxHxD) Logical Spring-type terminal with cable protection 0,56mm² 2110AWG according with IEC/EN60664-1, IEC/EN61984	Internal Protection	Thermal fuse protects overload & fire			
Storage Temp. -40°C+85°C for 2 years EMI EN55022 class B EMS EN61000-6-2,3 Safety Norms IEC/EN60950-1 in accordance with cUL60950 Safety Class II VDE0805, VDE0100/ÖVE8001 MTBF Calculation MTBF Calculation MTTF Calculation 384.000h (1EC/EN61709, Siemens SN29500) MTTF Calculation 384.000h (+30°C) (IEC/EN61709, Siemens SN29500) Humidity 95% (+25°C) not condensing Pollution Degree 2 (IEC/EN50178) Environmental thermal environment 3K3, mechanics 3M4 (IEC/EN60721) Altitude max. 4000m (13123 ft.) above sea level Dimensions (WxHxD) 1260x35,4x23,5mm Housing UL94V-0 IP40 ABS (PA765) plastic housing; IP40 must use the equipped grommets Weight 200g Connections Spring-type terminal with cable protection 0,56mm² 2110AWG according with IEC/EN60664-1, IEC/EN61984	Cooling				
EMI EN55022 class B EMS EN61000-6-2,3 Safety Norms IEC/EN60950-1 in accordance with cUL60950 Safety Class II VDE0805, VDE0100/ÖVE8001 MTBF Calculation 300.000h (IEC/EN61709, Siemens SN29500) MTTF Calculation 384.000h (+30°C) (IEC/EN61709, Siemens SN29500) Humidity 95% (+25°C) not condensing Pollution Degree 2 (IEC/EN50178) Environmental thermal environment 3K3, mechanics 3M4 (IEC/EN60721) Altitude max. 4000m (13123 ft.) above sea level Dimensions (WxHxD) 260x35,4x23,5mm Housing UL94V-0 IP40 ABS (PA765) plastic housing; IP40 must use the equipped grommets Weight 200g Connections Spring-type terminal with cable protection 0,56mm² 2110AWG according with IEC/EN60664-1, IEC/EN61984	Operation Temp.	Ambient temperature -20°C+45°C continuous/ +55°C short time			
EMS EN61000-6-2,3 Safety Norms IEC/EN60950-1 in accordance with cUL60950 Safety Class II VDE0805, VDE0100/ÖVE8001 MTBF Calculation MTBF Calculation 300.000h (IEC/EN61709, Siemens SN29500) MTTF Calculation 384.000h (+30°C) (IEC/EN61709, Siemens SN29500) Humidity 95% (+25°C) not condensing Pollution Degree 2 (IEC/EN50178) Environmental thermal environment 3K3, mechanics 3M4 (IEC/EN60721) Altitude max. 4000m (13123 ft.) above sea level Dimensions (WxHxD) 260x35,4x23,5mm Housing UL94V-0 IP40 ABS (PA765) plastic housing; IP40 must use the equipped grommets Weight 200g Connections Spring-type terminal with cable protection 0,56mm² 2110AWG according with IEC/EN60664-1, IEC/EN61984	Storage Temp.	-40°C+85°C for 2 years			
Safety Norms Safety Class II VDE0805, VDE0100/ÖVE8001 MTBF Calculation MTBF Calculation MTTF Calculation MTTF Calculation 384.000h (+30°C) (IEC/EN61709, Siemens SN29500) Humidity 95% (+25°C) not condensing Pollution Degree 2 (IEC/EN50178) Environmental thermal environment 3K3, mechanics 3M4 (IEC/EN60721) Altitude max. 4000m (13123 ft.) above sea level Dimensions (WxHxD) 260x35,4x23,5mm Housing UL94V-0 IP40 ABS (PA765) plastic housing; IP40 must use the equipped grommets Weight 200g Connections Spring-type terminal with cable protection 0,56mm² 2110AWG according with IEC/EN60664-1, IEC/EN61984	EMI	EN55022 class B			
Safety Class II VDE0805, VDE0100/ÖVE8001 MTBF Calculation 300.000h (IEC/EN61709, Siemens SN29500) MTTF Calculation 384.000h (+30°C) (IEC/EN61709, Siemens SN29500) Humidity 95% (+25°C) not condensing Pollution Degree 2 (IEC/EN50178) Environmental thermal environment 3K3, mechanics 3M4 (IEC/EN60721) Altitude max. 4000m (13123 ft.) above sea level Dimensions (WxHxD) 260x35,4x23,5mm Housing UL94V-0 IP40 ABS (PA765) plastic housing; IP40 must use the equipped grommets Weight 200g Connections Spring-type terminal with cable protection 0,56mm² 2110AWG according with IEC/EN60664-1, IEC/EN61984	EMS	EN61000-6-2,3			
MTTF Calculation 300.000h (IEC/EN61709, Siemens SN29500) MTTF Calculation 384.000h (+30°C) (IEC/EN61709, Siemens SN29500) Humidity 95% (+25°C) not condensing Pollution Degree 2 (IEC/EN50178) Environmental thermal environment 3K3, mechanics 3M4 (IEC/EN60721) Altitude max. 4000m (13123 ft.) above sea level Dimensions (WxHxD) 260x35,4x23,5mm Housing UL94V-0 IP40 ABS (PA765) plastic housing; IP40 must use the equipped grommets Weight 200g Connections Spring-type terminal with cable protection 0,56mm² 2110AWG according with IEC/EN60664-1, IEC/EN61984	Safety Norms	IEC/EN60950-1 in accordance with cUL60950			
MTTF Calculation 384.000h (+30°C) (IEC/EN61709, Siemens SN29500) Humidity 95% (+25°C) not condensing Pollution Degree 2 (IEC/EN50178) Environmental thermal environment 3K3, mechanics 3M4 (IEC/EN60721) Altitude max. 4000m (13123 ft.) above sea level Dimensions (WxHxD) 260x35,4x23,5mm Housing UL94V-0 IP40 ABS (PA765) plastic housing; IP40 must use the equipped grommets Weight 200g Connections Spring-type terminal with cable protection 0,56mm² 2110AWG according with IEC/EN60664-1, IEC/EN61984	Safety Class II	VDE0805, VDE0100/ÖVE8001			
Humidity 95% (+25°C) not condensing Pollution Degree 2 (IEC/EN50178) Environmental thermal environment 3K3, mechanics 3M4 (IEC/EN60721) Altitude max. 4000m (13123 ft.) above sea level Dimensions (WxHxD) 260x35,4x23,5mm Housing UL94V-0 IP40 ABS (PA765) plastic housing; IP40 must use the equipped grommets Weight 200g Connections Spring-type terminal with cable protection 0,56mm² 2110AWG according with IEC/EN60664-1, IEC/EN61984	MTBF Calculation	300.000h (IEC/EN61709, Siemens SN29500)			
Pollution Degree 2 (IEC/EN50178) Environmental thermal environment 3K3, mechanics 3M4 (IEC/EN60721) Altitude max. 4000m (13123 ft.) above sea level Dimensions (WxHxD) 260x35,4x23,5mm Housing UL94V-0 IP40 ABS (PA765) plastic housing; IP40 must use the equipped grommets Weight 200g Connections Spring-type terminal with cable protection 0,56mm² 2110AWG according with IEC/EN60664-1, IEC/EN61984	MTTF Calculation	384.000h (+30°C) (IEC/EN61709, Siemens SN29500)			
Environmental thermal environment 3K3, mechanics 3M4 (IEC/EN60721) Altitude max. 4000m (13123 ft.) above sea level Dimensions (WxHxD) 260x35,4x23,5mm Housing UL94V-0 IP40 ABS (PA765) plastic housing; IP40 must use the equipped grommets Weight 200g Connections Spring-type terminal with cable protection 0,56mm² 2110AWG according with IEC/EN60664-1, IEC/EN61984	Humidity	95% (+25°C) not condensing			
Altitude max. 4000m (13123 ft.) above sea level Dimensions (WxHxD) 260x35,4x23,5mm Housing UL94V-0 IP40 ABS (PA765) plastic housing; IP40 must use the equipped grommets Weight 200g Connections Spring-type terminal with cable protection 0,56mm² 2110AWG according with IEC/EN60664-1, IEC/EN61984	Pollution Degree	2 (IEC/EN50178)			
Dimensions (WxHxD) 260x35,4x23,5mm Housing UL94V-0 IP40 ABS (PA765) plastic housing; IP40 must use the equipped grommets Weight 200g Connections Spring-type terminal with cable protection 0,56mm² 2110AWG according with IEC/EN60664-1, IEC/EN61984	Environmental	thermal environment 3K3, mechanics 3M4 (IEC/EN60721)			
Housing UL94V-0 IP40 ABS (PA765) plastic housing; IP40 must use the equipped grommets Weight 200g Connections Spring-type terminal with cable protection 0,56mm² 2110AWG according with IEC/EN60664-1, IEC/EN61984	Altitude max.	4000m (13123 ft.) above sea level			
Weight 200g Connections Spring-type terminal with cable protection 0,56mm² 2110AWG according with IEC/EN60664-1, IEC/EN61984	Dimensions (WxHxD)	260x35,4x2	3,5mm		
Weight 200g Connections Spring-type terminal with cable protection 0,56mm² 2110AWG according with IEC/EN60664-1, IEC/EN61984	Housing	UL94V-0 IP40 ABS (PA765) plastic housing;	UL94V-0 IP40 ABS (PA765) plastic housing; IP40 must use the equipped grommets		
	Weight				
	Connections	Spring-type terminal with cable protection 0,56mm ² 21.	10AWG according	g with IEC/EN60664-1, IEC/EN61984	
Cord grip 610mm integrated into the clamp covers	Cord grip	610mm integrated into the clamp covers			

General Description:

The ESB201-series are cost effective inrush current limiters. The limiters are made for 115/230Vac 16A networks. The line frequency range is 16%Hz – 440Hz. The ESB201-Limiter shall be located between the line-switcher/contactor and the load (p.2/Fig.1). The ESB-models are designed for inductive and capacitive loads. In the moment of switching-on the system the inrush current of the installed load will be limited for the defined time T_{on} (p.4/Fig.5). Independent from the previous inrush level; the current limiting is always strict. After T_{on} elapses the current limiting circuit of the ESB201 will be bypassed. Then the load is directly connected to the AC. The electrical network can be stressed with current loads as normal (e.g. motors, pumps). If an AC dump overshoots the defined time T_{off} , it will be detected by the ESB201 (p.4/Fig.6). As soon as the AC recovers the inrush will be limited, again (p.2/Fig.3 & 4). The ESB201-models provide an internal temperature control. In case of a failure the device shuts down to safely prevent from overheating or burning.





(Fig.1)

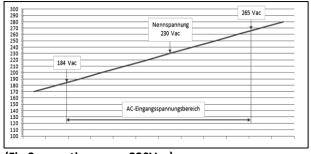
(Fig.2)

Field Applications:

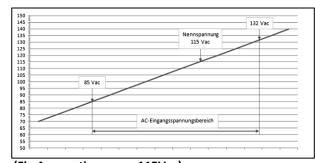
The ESB201 limiter allows connecting much more loads (e.g. LED-power supply / LED-driver) to a pre-installed circuit breaker CB (Fig.2). The ESB definitely avoids that the MCB can be tripped. This occurs independent to the objective initial current. The result is that the number of A.C. branch lines and the pre-installed MCB can be reduced dramatically. Installation cost exhibit a sustained decline.

Alternatively the cross section of the branch lines can be reduced when using smaller and faster responding circuit breakers. The cost saving from copper is essential. Sensitive AC networks can be fused safer (e.g. Traffic Control Systems, Street-Lighting, Parking Lots and Tunnels). The inrush limiting time is adjusted to the values of a typical LED power supply or LED-drivers. The connectable load capacity is such as high, that even in the extremes cases it is rather impossible to exceed it in a 16A network. Installed contractors will be discharged and their lifetimes will considerable increase. As well, the ESB201 LED-models are made to support the conventional lighting technology. The operation of an ESB201 with an electronic ballast leads to the same repeatable results.

When the ESB201 is installed correctly, the neutral wire (N) is looped trough (Fig.1). The inrush protection circuit always acts to the line conductor. The load is connected with the AC in such a way that a circuit breaker or an earth-leakage-trip works within the limits of the legal rules. This fact is also applied while the limiting circuit acts.



(Fig.3 operating range 230Vac)



(Fig.4 operating range 115Vac)

Design-In of the ESB201 into A.C. Networks

The ESB201 models are the precise inrush current limiter with an overall tolerance of $\pm 6\%$ of the face value. For the dimension of an upstream connected circuit breaker the R.M.S is the key value of the inrush current, not the peak current. The thermal trigger point will not be met, even while using an extreme fast MCB. All-dominant is the magnetic trigger current. By using the empirical formula $I_{(peak)} \times 0.707_{(factor)} = I_{(r.m.s.)}$ the tripping current can be defined fairly exact. Bear in mind that all the higher the inrush current is, all the faster the input capacitor of a number of connected switch mode power supplies will be loaded. The ESB201 are designed to achieve the best compromise between both values.

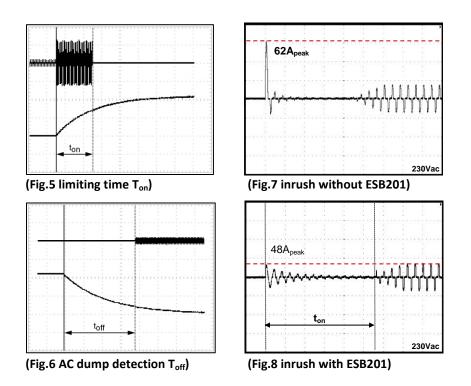


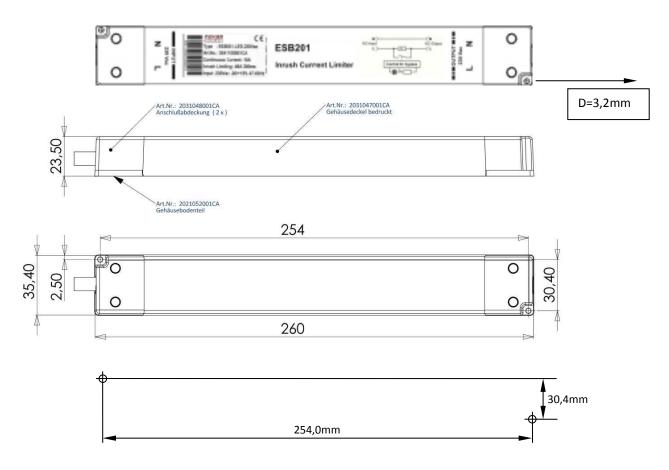
Fig.7 and Fig.8

Fig.7 and Fig.8 show the typical start behaviour of a NTC protected switch mode power supply. The used test item is an HSE10001.24T with an output of 24V/42A (1008W) on DIN-Rail.

The peak current recordings show the precise limiting of the inrush from formerly 62A_{peak} to 48A_{peak}. The corresponding R.M.S level, that is responsible for the magnetic tripping of the CB, is mark down by factor 0,707. After the time T_{on} elapsed it is identified that the power supply starts neatly into the continuous operation mode. Now the current is absorbed pulse-shaped from the AC. In detail the full load R.M.S. current consumption level of the HSE10001 hits 9A @ 230Vac.

Mechanics:

IP40 housing (material ABS PA-765 with UL94V-0) and clamp covers contact protection. The dimensions of the ESB201 allow easy fir into lighting channels of LED-downlights. IP40 must use the equipped grommets at the cable entries.



p.4/4 02.14B