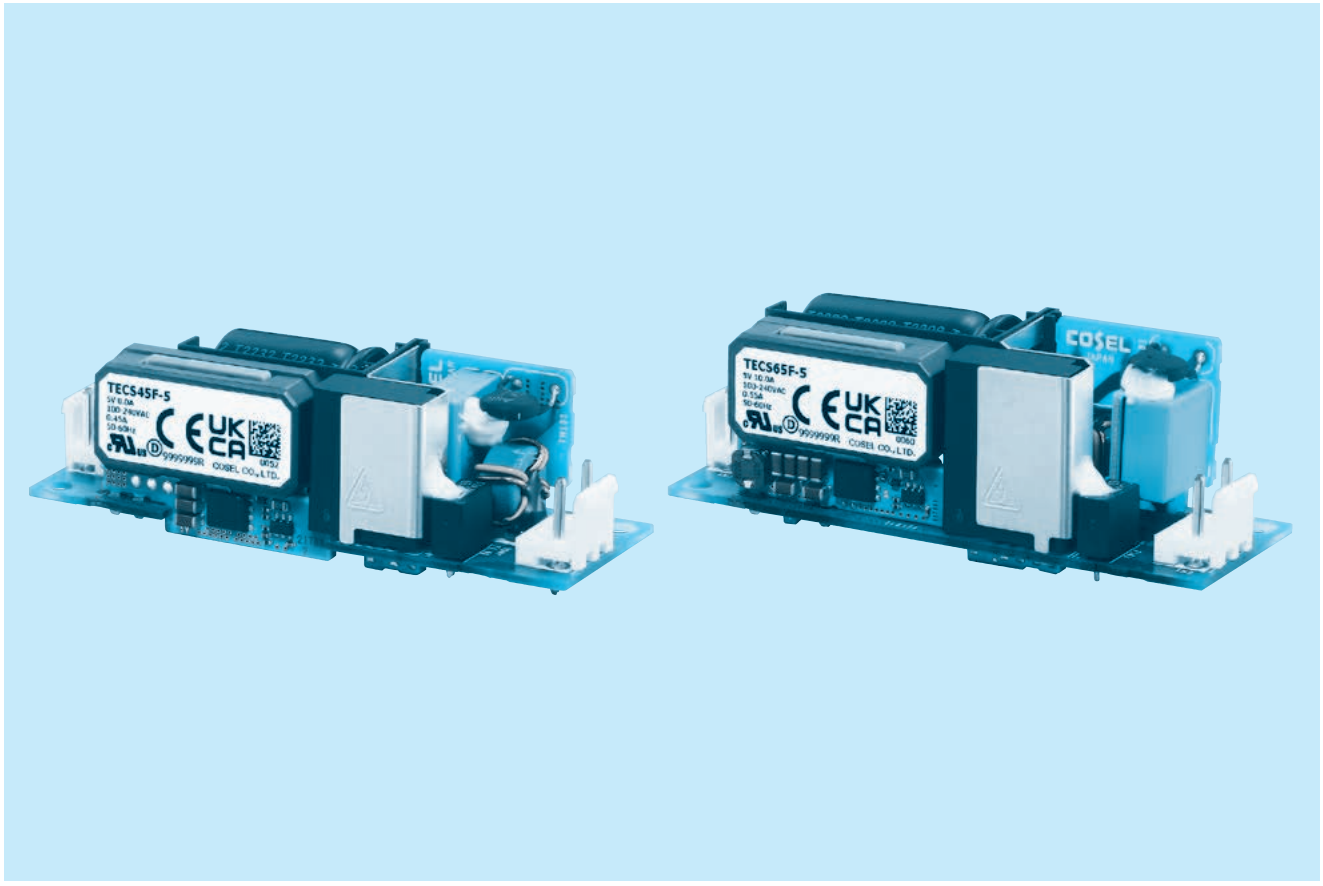
AC-DC Power Supplies Open Frame

World wide | Safety Approvals | EMI | Inrush current limiting | OCP | OVP

TECS-series



Feature

Low-profile
Small and compact PCB construction
High efficiency
Harmonic attenuator (Complies with IEC61000-3-2)
Universal input (85-264VAC)
Built-in inrush current, overcurrent and overvoltage protection circuits

Safety agency approvals

UL62368-1, C-UL (equivalent to CAN/CSA-C22.2 No.62368-1), EN62368-1
Complies with DEN-AN

5-year warranty (refer to Instruction Manual)

CE marking

Low Voltage Directive
RoHS Directive

UKCA marking

Electrical Equipment Safety Regulations
RoHS Regulations

EMI

Complies with CISPR11-B, CISPR32-B, EN55011-B, EN55032-B, FCC Part 15-B, FCC Part 18-B, VCCI-B

EMS Compliance : EN61204-3, EN61000-6-2

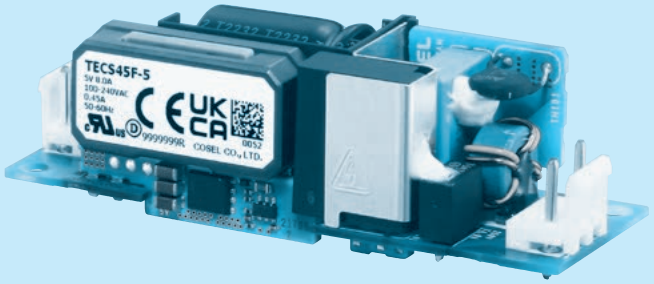
EN61000-4-2
EN61000-4-3
EN61000-4-4
EN61000-4-5
EN61000-4-6
EN61000-4-8
EN61000-4-11

COSEL AC-DC Power Supplies Open Frame

TECS45F

Ordering information

TEC	S	45	F	-□□	-□
①	②	③	④	⑤	⑥



Example recommended EMI/EMC filter
EAM-03-000

High voltage pulse noise type : EAP series 150KHz-1MHz(To safety ground the secondary side) : EAC series

＊A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

①Series name
②Single output
③Output wattage
④Universal input
⑤Output voltage
⑥Optional ＊1

ClassII

This power supply is manufactured by SMD technology. The stress to PCB like twisting or bending causes the defect of the unit, so handle the unit with care.
＊Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

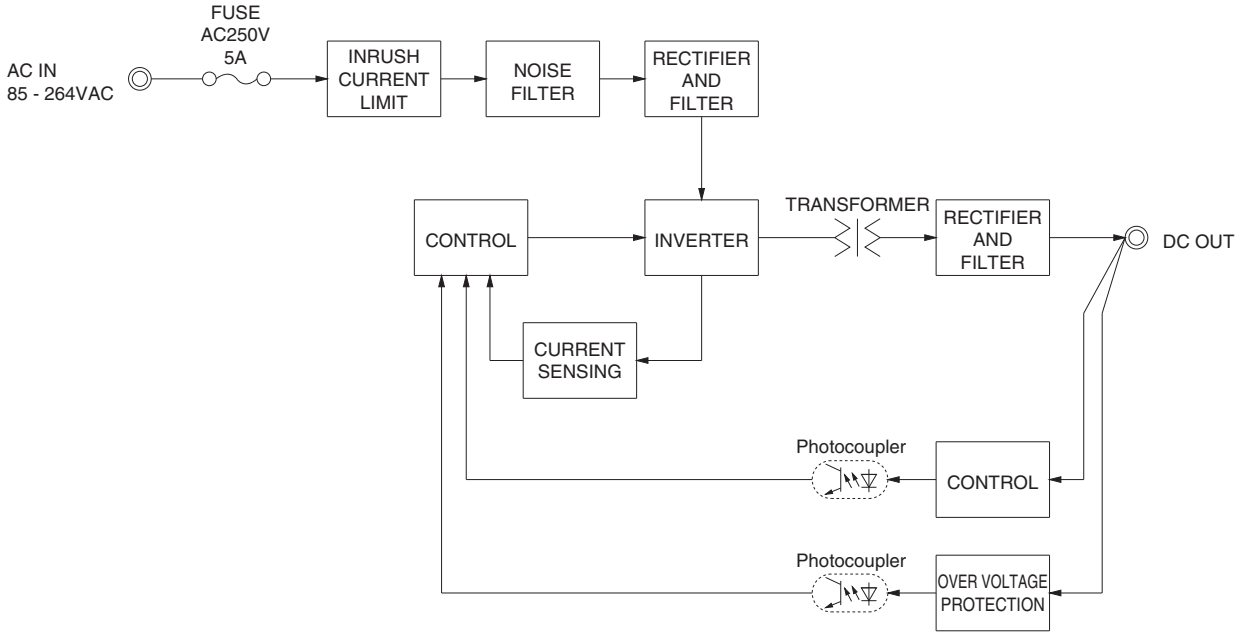
MODEL		TECS45F-5	TECS45F-12	TECS45F-24
MAX OUTPUT WATTAGE[W]	＊2	40.0	45.6	45.6
DC OUTPUT	＊2	5V 8.0A	12V 3.8A	24V 1.9A

SPECIFICATIONS

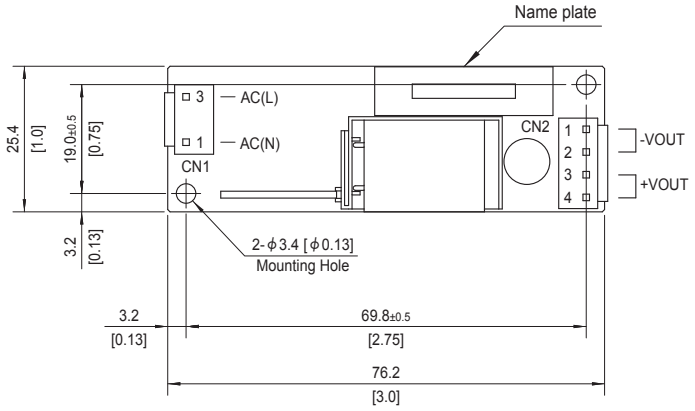
	MODEL		TECS45F-5	TECS45F-12	TECS45F-24
INPUT	VOLTAGE[VAC] ＊2		85 - 264 1 φ (Refer to “Derating” and Instruction Manual 1.1)		
	CURRENT[A]	ACIN 100V	0.80typ	0.90yp	
		ACIN 230V	0.45typ	0.50typ	
	FREQUENCY[Hz]		50 / 60 (45 - 66)		
	EFFICIENCY[%]	ACIN 100V	90.0typ	90.5typ	91.5typ
		ACIN 230V	90.5typ	91.5typ	92.5typ
	INRUSH CURRENT[A]	ACIN 100V	30typ (Io=100%) Ta=25℃ at cold start		
		ACIN 230V	65typ (Io=100%) Ta=25℃ at cold start		
	LEAKAGE CURRENT[mA]		0.25max (ACIN 240V, 60Hz, Io=100%, According to IEC62368-1, and DEN-AN)		
OUTPUT	VOLTAGE[V]		5	12	24
	CURRENT[A] ＊2		8.0	3.8	1.9
	LINE REGULATION[mV] ＊3		20max	48max	96max
	LOAD REGULATION[mV] ＊3		40max	100max	150max
	RIPPLE[mVp-p] ＊4	-10 to +50℃ ＊5	240max	300max	360max
	RIPPLE NOISE[mVp-p] ＊4	-10 to +50℃ ＊5	300max	380max	480max
	TEMPERATURE REGULATION[mV]	0 to +50℃ ＊5	50max	120max	240max
		-10 to +50℃ ＊5	60max	150max	290max
	DRIFT[mV] ＊6		20max	48max	96max
	START-UP TIME[ms]		200typ (ACIN 100V, Io=100%)		
	HOLD-UP TIME[ms]		10typ (ACIN 100V, Io=80%) / 60typ (ACIN 230V, Io=100%)		
	OUTPUT VOLTAGE SETTING[V]		4.90 to 5.30	11.50 to 12.50	23.00 to 25.00
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION		Works over 105% of rating and recovers automatically		
	OVERVOLTAGE PROTECTION[V]		5.50 to 6.50	13.20 to 15.60	26.40 to 31.20
	OPERATING INDICATION		Not provided		
	REMOTE SENSING		Not provided		
ISOLATION	INPUT-OUTPUT		3,000VAC 1minute, Cutoff current = 10mA, 500VDC 50MΩ min (At Room Temperature)		
ENVIRONMENT	OPERATING TEMP.,HUMID.AND ALTITUDE ＊2		-10 to +70℃, 20 - 90%RH (Non condensing), (Refer to “Derating”), 5,000m (16,500feet) max		
	STORAGE TEMP.,HUMID.AND ALTITUDE		-20 to +75℃, 20 - 90%RH (Non condensing), 9,000m (30,000feet) max		
	VIBRATION		10 - 55Hz, 19.6m/s² (2G), 3minutes period, 60minutes each along X, Y and Z axis		
	IMPACT		196.1m/s² (20G), 11ms, once each X, Y and Z axis		
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS		UL62368-1, C-UL (equivalent to CAN/CSA-C22.2No.62368-1), EN62368-1, Complies with DEN-AN		
	CONDUCTED NOISE ＊7		Complies with CISPR11-B, CISPR32-B, EN55011-B, EN55032-B, FCC Part 15-B, FCC Part 18-B, VCCI-B		
	HARMONIC ATTENUATOR ＊8		Complies with EN61000-3-2 (Class A) (No built-in power factor correction)		
OTHERS	CASE SIZE/WEIGHT		25.4×23.5×76.2mm [1.00×0.93×3.00 inches] (W×H×D) / 60g max		
	COOLING METHOD ＊2		Convection/Forced air (Requires external fan) (Refer to “Derating”)		

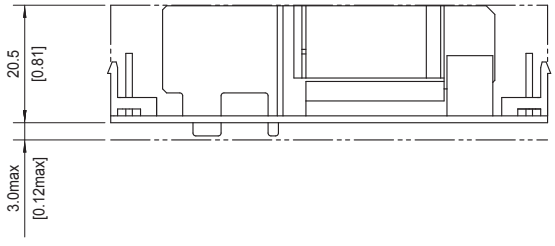
＊1 The listed options may affect the published standard specifications. Please contact us for detailed product specifications.
＊2 Derating is required.
＊3 At low load conditions, the burst mode operation will start. To check load regulation, you will need to measure the characteristics at average mode with instruments.
＊4 This is the value that measured on measuring board with capacitor of 22μF and 0.1μF at 150mm from output terminal. (Refer to Instruction Manual)
＊5 5V output product, the maximum temperature of 35℃. 12V output product, the maximum temperature of 40℃.
＊6 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25℃, with the input voltage held constant at the rated input/output.
＊7 When secondary circuit will be connected to earth, the spec will be changed. (Refer to Instruction Manual 2)
＊8 Please contact us about another class. When two or more units are operating it may not comply with the IEC61000-3-2. Please contact us for details.
＊ To meet the specification, do not operate overload condition.
＊ Parallel operation is not possible.
＊ Sound noise may be emitted from the power supply depending on operating conditions.

Block diagram



External view





Mating connector and terminal of CN1, CN2

I/O Connector		Mating connector	Terminal	Mfr.
CN1	B2P3-VH	VHR-3N	Chain : SVH-21T-P1.1 Loose : BVH-21T-P1.1	J.S.T.
CN2	B4P-VH	VHR-4N	Chain : SVH-21T-P1.1 Loose : BVH-21T-P1.1	J.S.T.

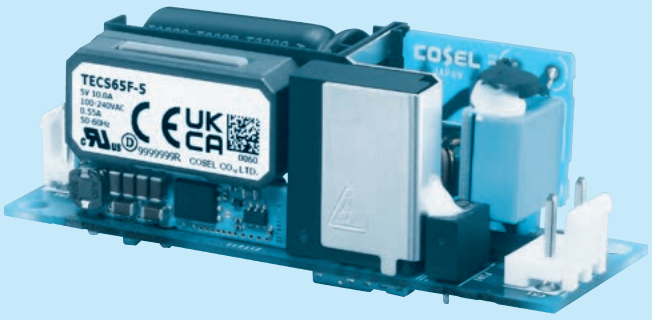
※ Dimensions in mm, [ ]=inches
※ Tolerance : ±1.5 [±0.06]
※ Weight : 60g max
※ PCB Material / thickness : FR-4 / 1.1mm [0.04]
※ Maximum current per contact at CN2 is 5A.
※ In case of metal chassis, insert spacers more than 8mm [0.31 inch] /length.
※ There are two mounting holes.

COSEL AC-DC Power Supplies Open Frame

TECS65F

Ordering information

TEC	S	65	F	-□□	-□
①	②	③	④	⑤	⑥



Example recommended EMI/EMC filter
EAC-03-000

High voltage pulse noise type : EAP series
150KHz-1MHz(To safety ground the secondary side) : EAC series

＊A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

①Series name
②Single output
③Output wattage
④Universal input
⑤Output voltage
⑥Optional ＊1

□ClassII

This power supply is manufactured by SMD technology. The stress to PCB like twisting or bending causes the defect of the unit, so handle the unit with care.
＊Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

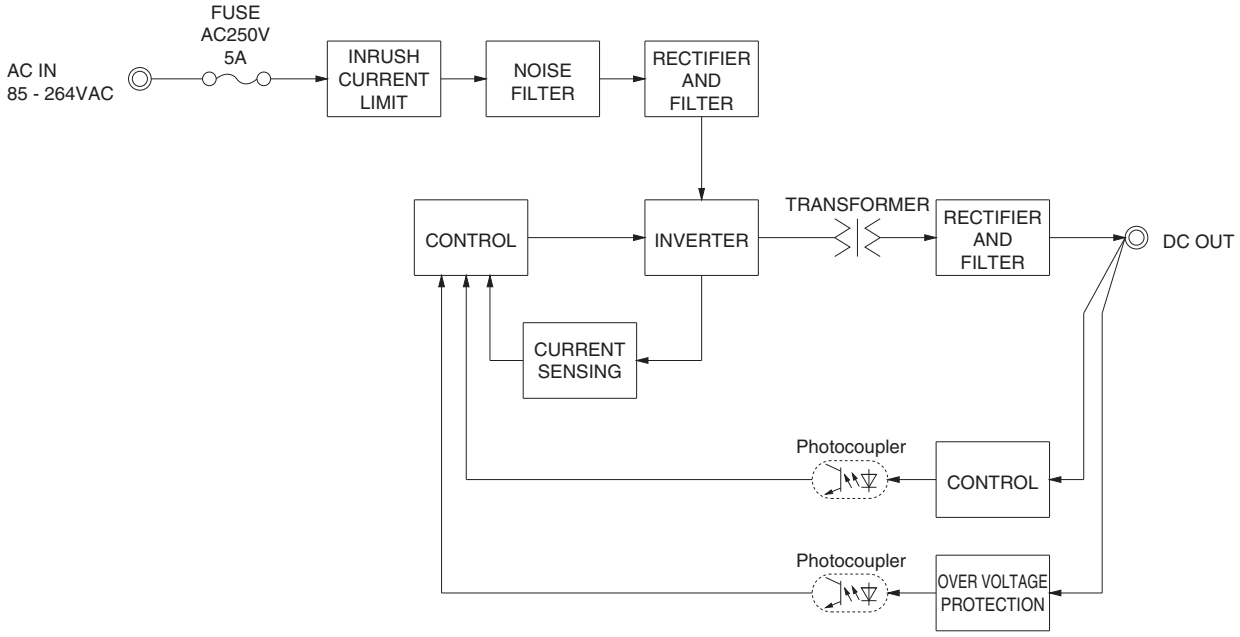
MODEL		TECS65F-5	TECS65F-12	TECS65F-24
MAX OUTPUT WATTAGE[W]	＊2	50.0	65.4	66.0
DC OUTPUT	＊2	5V 10.0A	12V 5.45A	24V 2.75A

SPECIFICATIONS

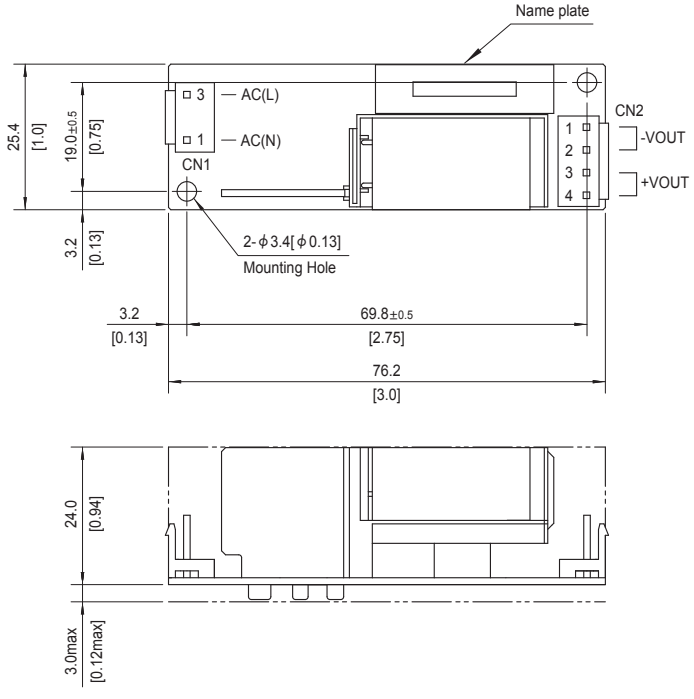
	MODEL		TECS65F-5	TECS65F-12	TECS65F-24
INPUT	VOLTAGE[VAC] ＊2		85 - 264 1 ϕ (Refer to “Derating” and Instruction Manual 3.1)		
	CURRENT[A]	ACIN 100V	1.00typ	1.25typ	
		ACIN 230V	0.55typ	0.70typ	
	FREQUENCY[Hz]		50 / 60 (45 - 66)		
	EFFICIENCY[%]	ACIN 100V	90.0typ	91.5typ	92.5typ
		ACIN 230V	91.5typ	93.0typ	93.5typ
	INRUSH CURRENT[A]	ACIN 100V	30typ (Io=100%) Ta=25℃ at cold start		
		ACIN 230V	65typ (Io=100%) Ta=25℃ at cold start		
	LEAKAGE CURRENT[mA]		0.25max (ACIN 240V, 60Hz, Io=100%, According to IEC62368-1, and DEN-AN)		
OUTPUT	VOLTAGE[V]		5	12	24
	CURRENT[A] ＊2		10.0	5.45	2.75
	LINE REGULATION[mV] ＊3		20max	48max	96max
	LOAD REGULATION[mV] ＊3		40max	100max	150max
	RIPPLE[mVp-p] ＊4	-10 to 45℃ ＊5	240max	300max	360max
	RIPPLE NOISE[mVp-p] ＊4	-10 to 45℃ ＊5	300max	380max	480max
	TEMPERATURE REGULATION[mV]	0 to +45℃ ＊5	50max	120max	240max
		-10 to +45℃ ＊5	60max	150max	290max
	DRIFT[mV] ＊6		20max	48max	96max
	START-UP TIME[ms]		500typ (ACIN 100V, Io=100%)		
	HOLD-UP TIME[ms]		10typ (ACIN 100V, Io=80%) / 60typ (ACIN 230V, Io=100%)		
	OUTPUT VOLTAGE SETTING[V]		4.90 to 5.30	11.50 to 12.50	23.00 to 25.00
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION		Works over 105% of rating and recovers automatically		
	OVERVOLTAGE PROTECTION[V]		5.50 to 6.50	13.20 to 15.60	26.40 to 31.20
	OPERATING INDICATION		Not provided		
	REMOTE SENSING		Not provided		
ISOLATION	INPUT-OUTPUT		3,000VAC 1minute, Cutoff current = 10mA, 500VDC 50MΩ min (At Room Temperature)		
ENVIRONMENT	OPERATING TEMP.,HUMID.AND ALTITUDE ＊2		-10 to +70℃, 20 - 90%RH (Non condensing), (Refer to “Derating”), 5,000m (16,500feet) max		
	STORAGE TEMP.,HUMID.AND ALTITUDE		-20 to +75℃, 20 - 90%RH (Non condensing), 9,000m (30,000feet) max		
	VIBRATION		10 - 55Hz, 19.6m/s² (2G), 3minutes period, 60minutes each along X, Y and Z axis		
	IMPACT		196.1m/s² (20G), 11ms, once each X, Y and Z axis		
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS		UL62368-1, C-UL (equivalent to CAN/CSA-C22.2No.62368-1), EN62368-1, Complies with DEN-AN		
	CONDUCTED NOISE ＊7		Complies with CISPR11-B, CISPR32-B, EN55011-B, EN55032-B, FCC Part 15-B, FCC Part 18-B, VCCI-B		
	HARMONIC ATTENUATOR ＊8		Complies with EN61000-3-2 (Class A) (No built-in power factor correction)		
OTHERS	CASE SIZE/WEIGHT		25.4×27.0×76.2mm [1.00×1.06×3.00 inches] (W×H×D) / 70g max		
	COOLING METHOD ＊2		Convection/Forced air (Requires external fan) (Refer to “Derating”)		

＊1 The listed options may affect the published standard specifications. Please contact us for detailed product specifications.
＊2 Derating is required.
＊3 At low load conditions, the burst mode operation will start. To check load regulation, you will need to measure the characteristics at average mode with instruments.
＊4 This is the value that measured on measuring board with capacitor of 22 μF and 0.1 μF at 150mm from output terminal. (Refer to Instruction Manual)
＊5 5V, 12V output product, the maximum temperature of 40℃.
＊6 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25℃, with the input voltage held constant at the rated input/output.
＊7 When secondary circuit will be connected to earth, the spec will be changed. (Refer to Instruction Manual 2)
＊8 Please contact us about another class. When two or more units are operating it may not comply with the IEC61000-3-2. Please contact us for details.
＊ To meet the specification, do not operate overload condition.
＊ Parallel operation is not possible.
＊ Sound noise may be emitted from the power supply depending on operating conditions.

Block diagram



External view



Mating connector and terminal of CN1, CN2

I/O Connector		Mating connector	Terminal	Mfr.
CN1	B2P3-VH	VHR-3N	Chain : SVH-21T-P1.1 Loose : BVH-21T-P1.1	J.S.T.
CN2	B4P-VH	VHR-4N	Chain : SVH-21T-P1.1 Loose : BVH-21T-P1.1	J.S.T.

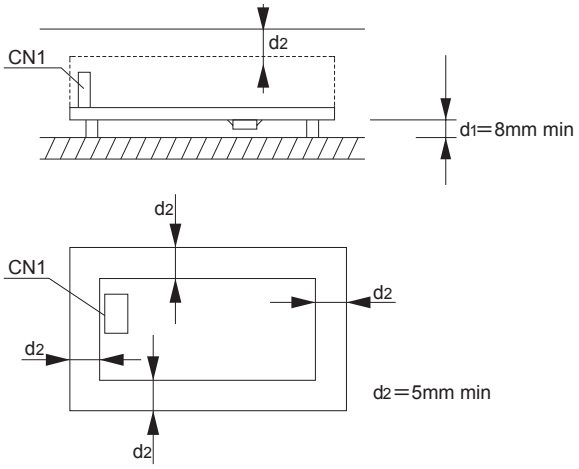
※ Dimensions in mm, [ ]=inches
※ Tolerance : ±1.5 [±0.06]
※ Weight : 70g max
※ PCB Material / thickness : FR-4 / 1.1mm [0.04]
※ Maximum current per contact at CN2 is 5A.
※ In case of metal chassis, insert spacers more than 8mm [0.31 inch] /length.
※ There are two mounting holes.

Assembling and Installation Method

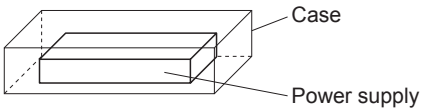
Installation method

■This power supply is manufactured by SMD technology. Do not touch any SMD components on the unit. Be especially careful when handling.

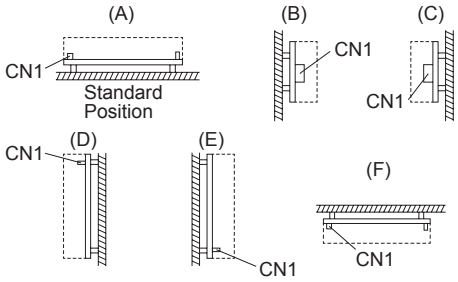
■If using a metal chassis, keep proper insulation between the component and metal chassis, use the spacer of 8mm or more between bottom of power supply and metal chassis.
If d1 and/or d2 are less than the value mentioned in right figure, insert an insulating sheet with reinforced insulation between the power supply unit and metal chassis.
The following distance is not satisfactory for cooling condition. Please refer to “Derating” and Instruction Manual 4 for cooling method.



■There is a possibility that it is not possible to cool enough when the power supply is used by the sealing up space as showing in right figure.
Please use it after confirming the temperature of points ① of Instraction Manual 4.

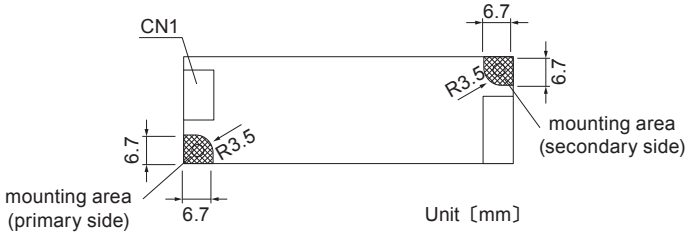


■Installation method shown right is possible.



Mounting Area

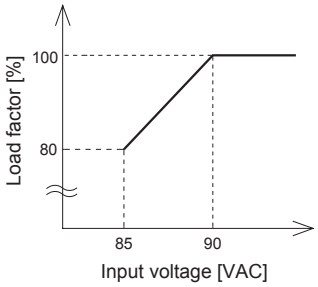
■The mounting screw should be M3. The hatched area shows the allowance of mounting area.



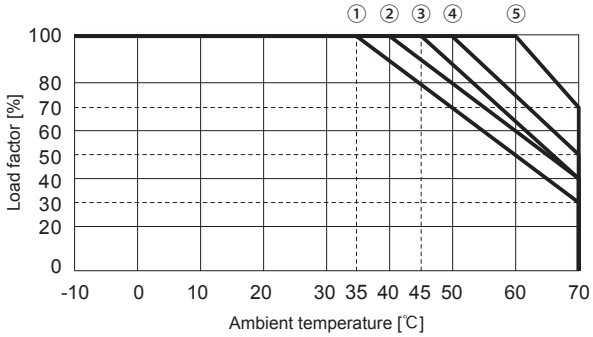
■The mounting area (primary side) must be insulated from areas that user accessible parts of the final product, so if the enclosure is metal and the mounting components and spacers are metal, be careful to insulate them.
■When installing, be careful to avoid contact with mounted components.
■This product uses SMD technology. Please avoid the PCB installation method which includes the twisting stress or the bending stress.
■Do not touch any SMD components on the unit and soldering points.

Derating

Derating curve for input voltage

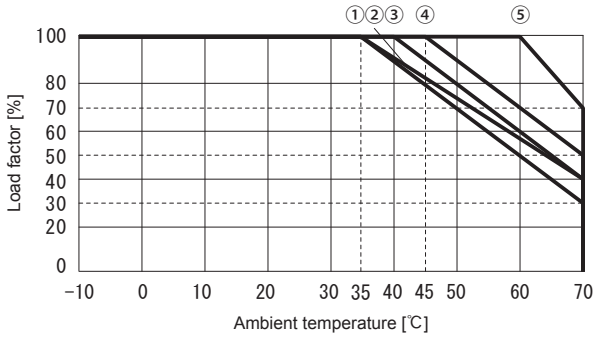


TECS45F
Ambient temperature derating curve at rated input (Reference value)



Cooling method	Output voltage	Installation condition	
		A,B,C,D,E	F
Convection	5V	①	①
	12V	②	①
	24V	④	③
Forced air (0.5m³/min)	5V,12V,24V	⑤	

TECS65F
Ambient temperature derating curve at rated input (Reference value)



Cooling method	Output voltage	Installation condition		
		A,B,C,E	D	F
Convection	5V	③	③	②
	12V	③	③	①
	24V	④	③	③
Forced air (0.5m³/min)	5V,12V,24V	⑤		

Instruction Manual

◆ Please see catalog and instructionmanual before you use.

Instruction Manual https://www.cosel.co.jp/redirect/catalog/en/TECS/
Before using our product https://en.cosel.co.jp/technical/caution/index.html

TECS NOTICE

Basic Characteristics Data

Model	Circuit method	Switching frequency [kHz]	Input current [A] ＊1	Inrush current protection	PCB/Pattern			Series/Parallel operation availability	
					Material	Single sided	Double sided	Series operation	Parallel operation
TECS45F	Flyback converter	20 to 250	0.9	Thermistor	FR-4		Yes	Yes	No
TECS65F	Flyback converter	20 to 800	1.25	Thermistor	FR-4		Multilayer	Yes	No

＊1 The value of input current is at ACIN 100V and rated load.

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