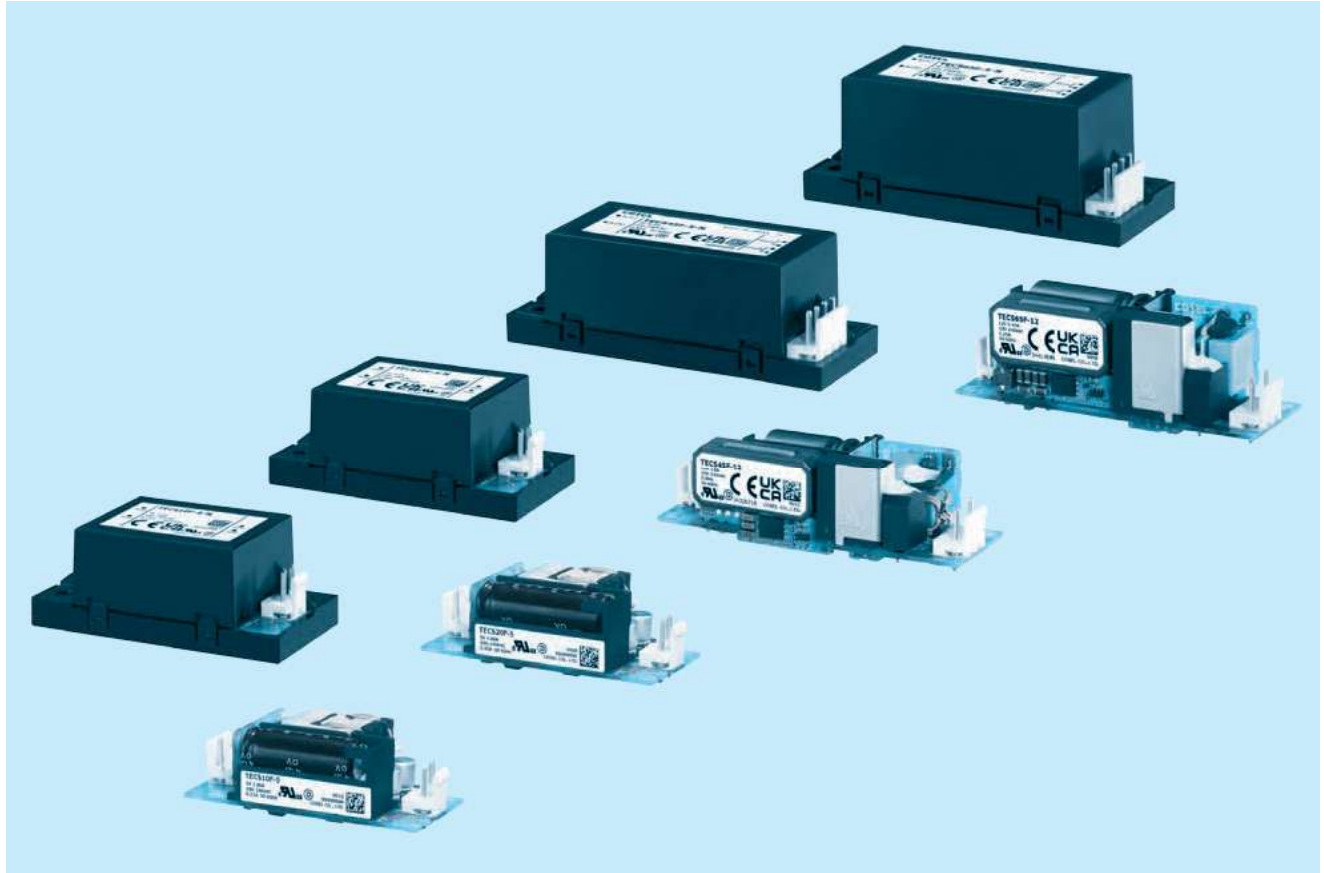




TECS-series



Feature

Small
 1"×2.3" (TECS10F/20F), 1"×3" (TECS45F/65F)
 High efficiency
 Harmonic attenuator (Complies with IEC61000-3-2)
 Universal input (85-264VAC)
 Built-in inrush current, overcurrent and overvoltage protection circuits
 ClassII

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

TECS10F

TEC S 10 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 safely 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.

- ① Series name
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Optional *1
 E2: Low leakage current
 Y : with Potentiometer
 H : with output peak current (12V,24V)
 N: with cover
 For option details, refer to Instruction Manual 6.

Class II

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.

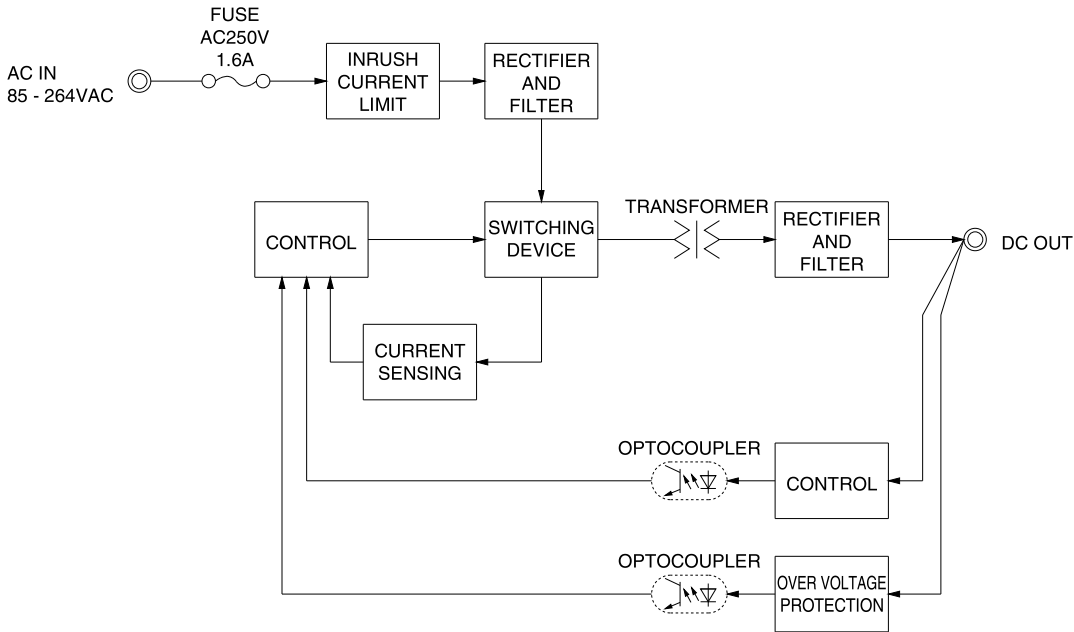
MODEL	TECS10F-5	TECS10F-12	TECS10F-12-H	TECS10F-15	TECS10F-24	TECS10F-24-H
MAX OUTPUT WATTAGE[W]	10.0	10.2	10.2 (15.0)	10.5	10.8	10.8 (15.6)
DC OUTPUT	5V 2.0A	12V 0.85A	12V 0.85 (1.25)A	15V 0.7A	24V 0.45A	24V 0.45 (0.65)A

SPECIFICATIONS

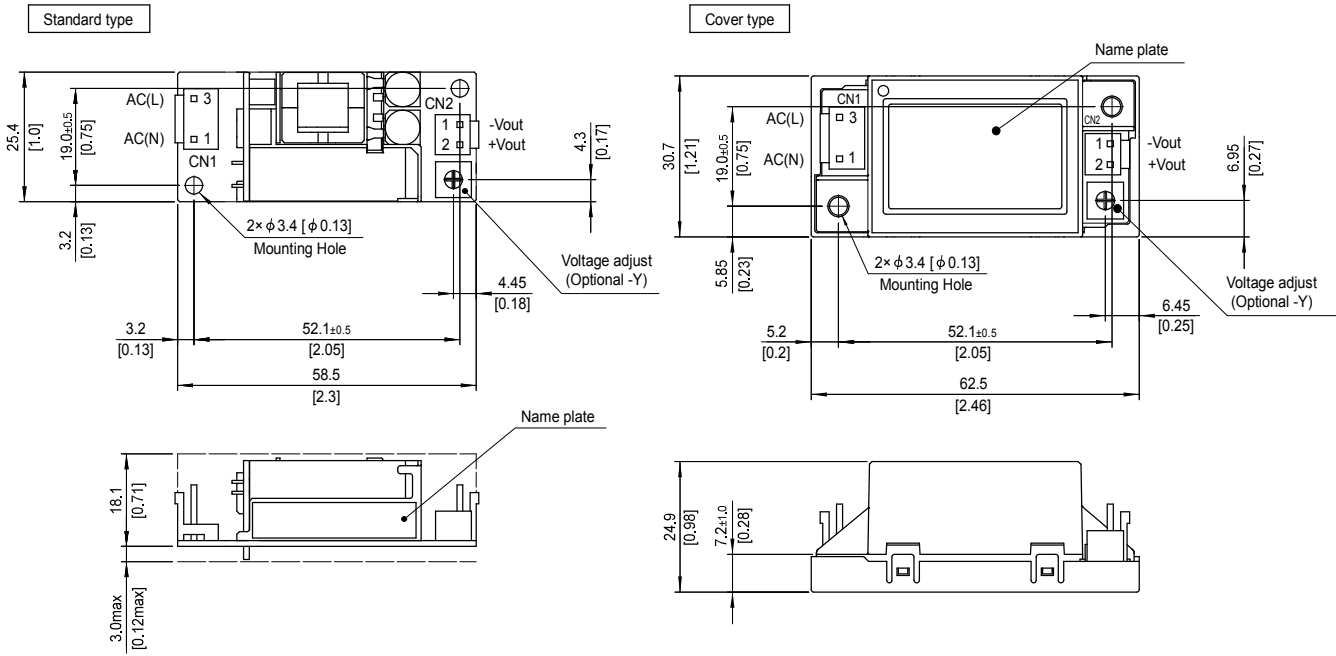
MODEL	TECS10F-5	TECS10F-12	TECS10F-12-H	TECS10F-15	TECS10F-24	TECS10F-24-H
INPUT	VOLTAGE[VAC] *2 85 - 264 1 φ (Refer to "Derating" and Instruction Manual 1.1)					
	ACIN 100V	0.21typ				
	ACIN 230V	0.12typ				
	FREQUENCY[Hz] 50 / 60 (45 - 440)					
	ACIN 100V	82.5typ	88.0typ	88.0typ	90.0typ	90.0typ
	ACIN 230V	84.0typ	88.0typ	88.0typ	90.0typ	90.0typ
	ACIN 100V	15typ (Io=100%) Ta=25°C at cold start				
	ACIN 230V	35typ (Io=100%) Ta=25°C at cold start				
	LEAKAGE CURRENT[ma] 0.1max (ACIN 264V, 60Hz, Io=100%, According to IEC62368-1, and DEN-AN)					
OUTPUT	VOLTAGE[V]	5	12	12	15	24
	CURRENT[A] *2	2.0	0.85	0.85 (Peak 1.25)	0.7	0.45 (Peak 0.65)
	LINE REGULATION[mV] *3	20max	48max	48max	60max	96max
	LOAD REGULATION[mV] *3	40max	100max	100max	120max	150max
	RIPPLE[mVp-p] *4	200max	200max	200max	200max	200max
	RIPPLE NOISE[mVp-p] *4	240max	240max	240max	240max	240max
	TEMPERATURE REGULATION[mV]	0 to +60°C *5	50max	120max	120max	150max
		-20 to +60°C *5	60max	160max	160max	200max
	DRIFT[mV] *6	20max	48max	48max	60max	96max
	START-UP TIME[ms]	80typ (ACIN 100/230V, Io=100%)				
	HOLD-UP TIME[ms]	15typ (ACIN 100V, Io=100%) / 110typ (ACIN 230V, Io=100%)				
	OUTPUT VOLTAGE ADJUSTMENT RANGE[V] *9	Fixed ("Y"option is available for adjusting output voltage between ±10%)				
	OUTPUT VOLTAGE SETTING[V]	4.90 to 5.30	11.50 to 12.50	11.50 to 12.50	14.50 to 15.50	23.00 to 25.00
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating (works over 101% of peak current at option -H) and recovers automatically				
	OVERVOLTAGE PROTECTION[V]	5.75 to 7.00	13.80 to 16.80	13.80 to 16.80	17.25 to 21.00	27.60 to 33.60
	OPERATING INDICATION	Not provided				
	REMOTE SENSING	Not provided				
ISOLATION	INPUT-OUTPUT	3,000VAC 1minute, Cutoff current = 10mA, 500VDC 100MΩ min (At Room Temperature)				
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE *2	-20 to +85°C, 20 - 90%RH (Non condensing), (Refer to "Derating"), 5,000m (16,500feet) max				
	STORAGE TEMP., HUMID. AND ALTITUDE	-40 to +85°C, 20 - 90%RH (Non condensing), 9,000m (30,000feet) max				
	VIBRATION	10 - 55Hz, 19.6m/s ² (2G), 3minutes period, 60minutes each along X, Y and Z axis				
	IMPACT	196.1m/s ² (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 IEC61000-3-2 (Class A) (No built-in power factor correction)				
OTHERS	CASE SIZE/WEIGHT	25.4 X 21.1 X 58.5mm [1.00 X 0.83 X 2.30 inches] (W X H X D) / 35g max max(with cover : 50g 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. () means peak current. There is a possibility that an internal device is damaged when the specification is exceeded. Please contact us about the detail.
 *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 output product, the maximum temperature of 50°C.
 *6 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, 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.
 *9 5V output product, with an adjustable output voltage range of -5% - +10%.
 * 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	J.S.T.
		Chain : SVH-21T-P1.1	
		Loose : BVH-21T-P1.1	
CN2	B2P-VH	VHR-2N	J.S.T.
		Chain : SVH-21T-P1.1	
		Loose : BVH-21T-P1.1	

- ※ Dimensions in mm, []=inches
- ※ Tolerance : ±1.5 [±0.06]
- ※ Weight : 35g max (with cover : 50g max)
- ※ PCB Material / thickness : FR-4 / 1.1mm [0.04]
- ※ Optional Case Material : PBT
- ※ There are two mounting holes.

TECS20F

TEC S 20 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 safely 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.

- ① Series name
 - ② Single output
 - ③ Output wattage
 - ④ Universal input
 - ⑤ Output voltage
 - ⑥ Optional *1
- E2: Low leakage current
 Y : with Potentiometer
 H : with output peak current (12V,24V)
 N: with cover
 For option details, refer to Instruction Manual 6.

Class II

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.

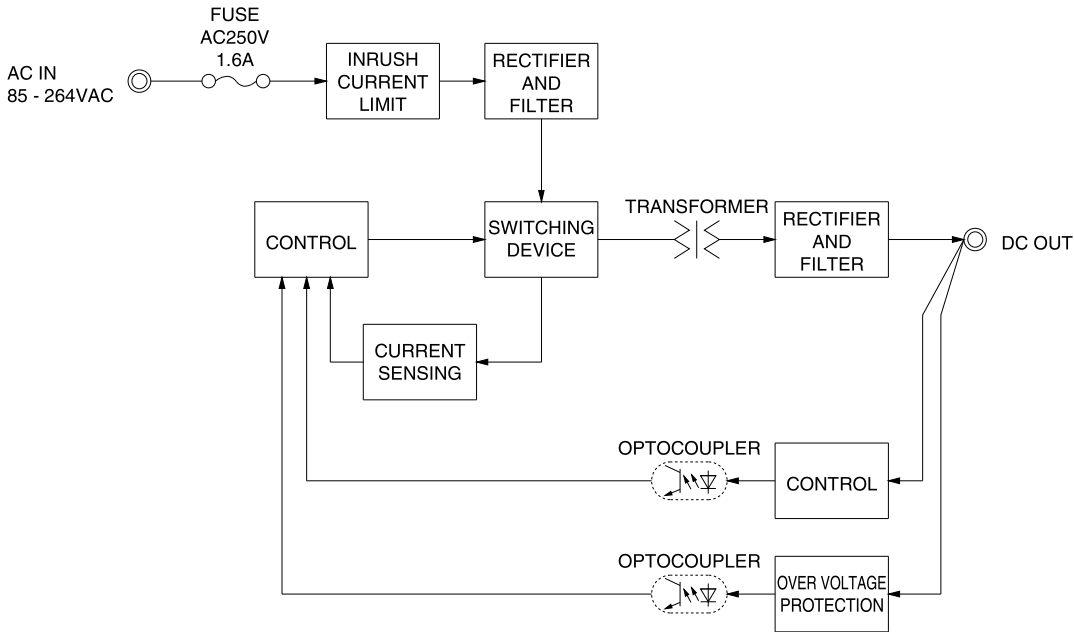
MODEL	TECS20F-5	TECS20F-12	TECS20F-12-H	TECS20F-15	TECS20F-24	TECS20F-24-H
MAX OUTPUT WATTAGE[W]	20.0	20.4	20.4 (30.0)	20.25	20.4	20.4 (30.0)
DC OUTPUT	5V 4.0A	12V 1.7A	12V 1.7 (2.5)A	15V 1.35A	24V 0.85A	24V 0.85 (1.25)A

SPECIFICATIONS

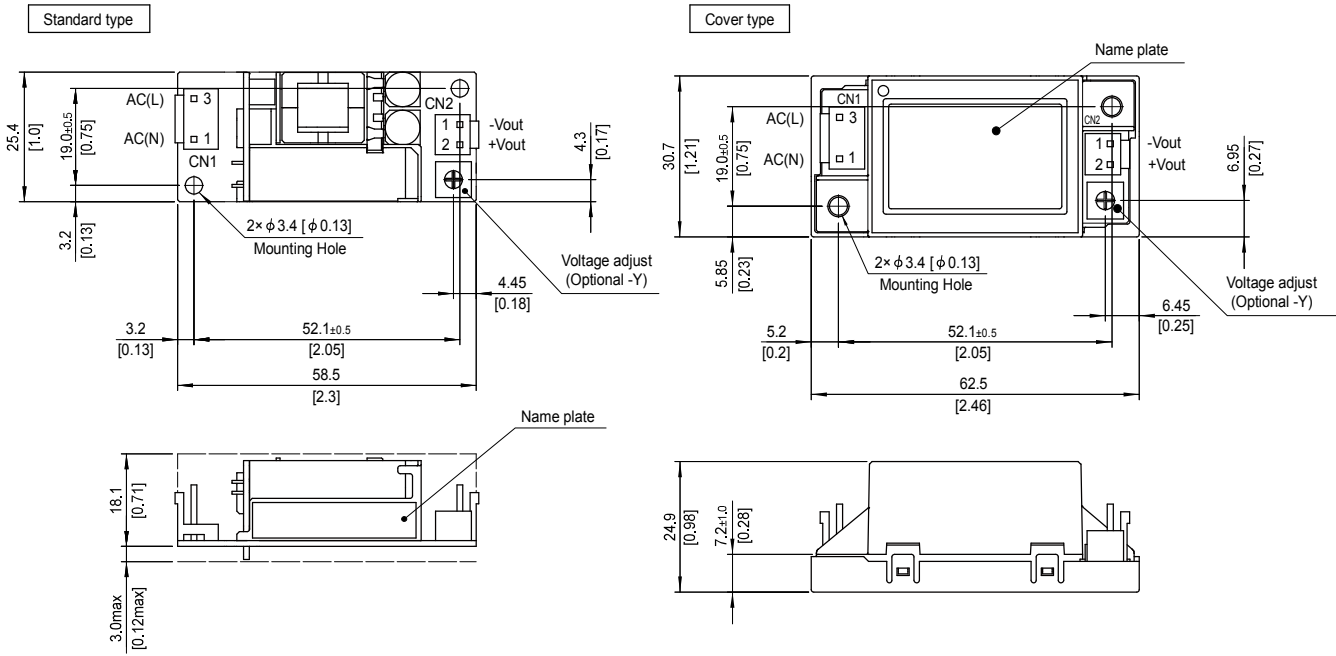
MODEL	TECS20F-5	TECS20F-12	TECS20F-12-H	TECS20F-15	TECS20F-24	TECS20F-24-H
INPUT	VOLTAGE[VAC] *2 85 - 264 1 φ (Refer to "Derating" and Instruction Manual 1.1)					
	ACIN 100V	0.40typ				
	ACIN 230V	0.23typ				
	FREQUENCY[Hz] 50 / 60 (45 - 440)					
	ACIN 100V	88.0typ	91.0typ	91.0typ	91.0typ	91.0typ
	ACIN 230V	90.0typ	92.0typ	92.0typ	92.0typ	92.0typ
	ACIN 100V	15typ (Io=100%) Ta=25°C at cold start				
	ACIN 230V	35typ (Io=100%) Ta=25°C at cold start				
	LEAKAGE CURRENT[ma] 0.1max (ACIN 264V, 60Hz, Io=100%, According to IEC62368-1, and DEN-AN)					
OUTPUT	VOLTAGE[V]	5	12	12	15	24
	CURRENT[A] *2	4.0	1.7	1.7 (Peak 2.5)	1.35	0.85
	LINE REGULATION[mV] *3	20max	48max	48max	60max	96max
	LOAD REGULATION[mV] *3	40max	100max	100max	120max	150max
	RIPPLE[mVp-p] *4	20 to +50C	200max	200max	200max	200max
	RIPPLE NOISE[mVp-p] *4	-20 to +50C	240max	240max	240max	240max
	TEMPERATURE REGULATION[mV]	0 to +50C	50max	120max	120max	150max
		-20 to +50C	60max	160max	160max	200max
	DRIFT[mV] *5	20max	48max	48max	60max	96max
	START-UP TIME[ms]	80typ (ACIN 100/230V, Io=100%)				
	HOLD-UP TIME[ms]	10typ (ACIN 100V, Io=100%) / 70typ (ACIN 230V, Io=100%)				
	OUTPUT VOLTAGE ADJUSTMENT RANGE[V] *8	Fixed ("Y" option is available for adjusting output voltage between ±10%)				
	OUTPUT VOLTAGE SETTING[V]	4.90 to 5.30	11.50 to 12.50	11.50 to 12.50	14.50 to 15.50	23.00 to 25.00
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating (works over 101% of peak current at option -H) and recovers automatically				
	OVERVOLTAGE PROTECTION[V]	5.75 to 7.00	13.80 to 16.80	13.80 to 16.80	17.25 to 21.00	27.60 to 33.60
	OPERATING INDICATION	Not provided				
	REMOTE SENSING	Not provided				
ISOLATION	INPUT-OUTPUT	3,000VAC 1minute, Cutoff current = 10mA, 500VDC 100MΩ min (At Room Temperature)				
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE *2	-20 to +85°C, 20 - 90%RH (Non condensing), (Refer to "Derating"), 5,000m (16,500feet) max				
	STORAGE TEMP., HUMID. AND ALTITUDE	-40 to +85°C, 20 - 90%RH (Non condensing), 9,000m (30,000feet) max				
	VIBRATION	10 - 55Hz, 19.6m/s ² (2G), 3minutes period, 60minutes each along X, Y and Z axis				
	IMPACT	196.1m/s ² (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 *6	Complies with CISPR11-B, CISPR32-B, EN55011-B, EN55032-B, FCC Part 15-B, FCC Part 18-B, VCCI-B				
	HARMONIC ATTENUATOR *7	Complies with IEC61000-3-2 (Class A) (No built-in power factor correction)				
OTHERS	CASE SIZE/WEIGHT	25.4 X 21.1 X 58.5mm [1.00 X 0.83 X 2.30 inches] (W X H X D) / 35g max (with cover : 50g 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. () means peak current. There is a possibility that an internal device is damaged when the specification is exceeded. Please contact us about the detail.
 *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 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.
 *6 When secondary circuit will be connected to earth, the spec will be changed. (Refer to Instruction Manual 2)
 *7 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.
 *8 5V output product, with an adjustable output voltage range of -5% - +10%.
 * 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

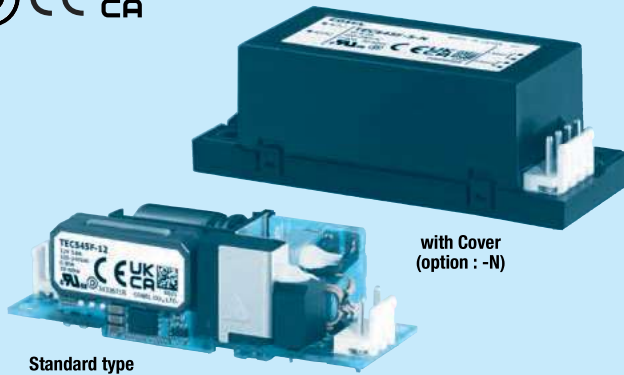
I/O Connector	Mating connector	Terminal	Mfr.
CN1	B2P3-VH	VHR-3N	J.S.T.
		Chain : SVH-21T-P1.1	
		Loose : BVH-21T-P1.1	
CN2	B2P-VH	VHR-2N	J.S.T.
		Chain : SVH-21T-P1.1	
		Loose : BVH-21T-P1.1	

- ※ Dimensions in mm, []=inches
- ※ Tolerance : ±1.5 [±0.06]
- ※ Weight : 35g max (with cover : 50g max)
- ※ PCB Material / thickness : FR-4 / 1.1mm [0.04]
- ※ Optional Case Material : PBT
- ※ There are two mounting holes.

TECS45F

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 safely 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.

- ① Series name
 - ② Single output
 - ③ Output wattage
 - ④ Universal input
 - ⑤ Output voltage
 - ⑥ Optional *1
- E2: Low leakage current
H : with output peak current (12V,24V)
N: with cover
For option details, refer to Instruction Manual 6.

Class II

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.

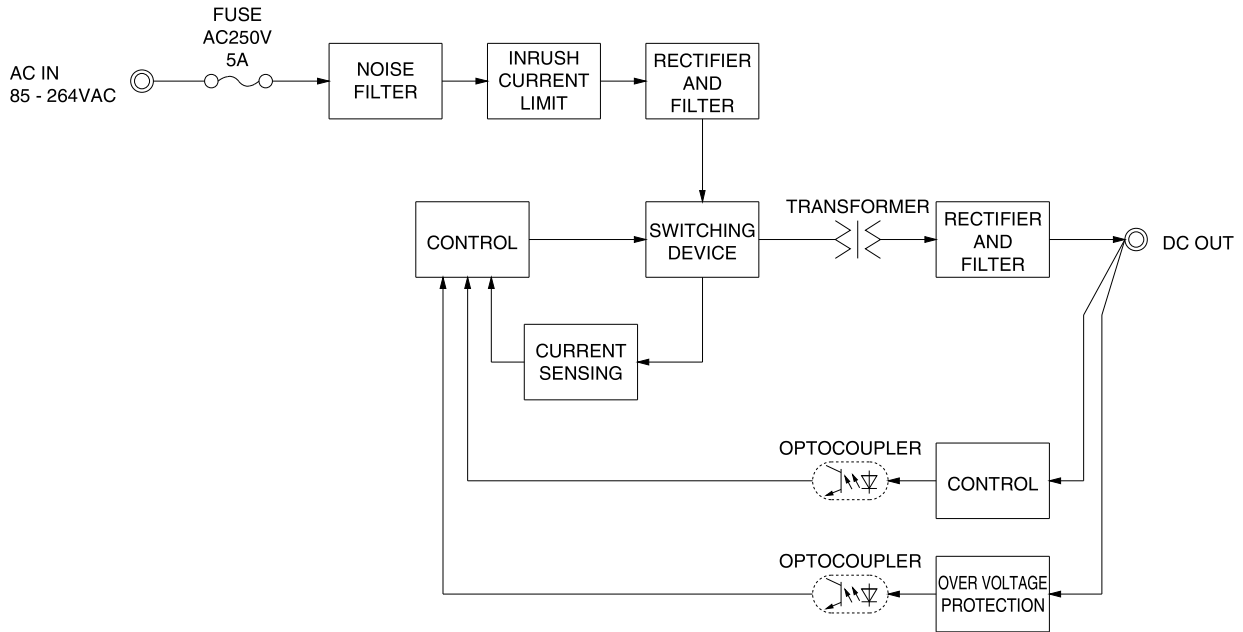
MODEL	TECS45F-5	TECS45F-12	TECS45F-12-H	TECS45F-24	TECS45F-24-H
MAX OUTPUT WATTAGE[W]	40.0	45.6	45.6 (65.4)	45.6	45.6 (66.0)
DC OUTPUT	5V 8.0A	12V 3.8A	12V 3.8 (5.45) A	24V 1.9A	24V 1.9 (2.75) A

SPECIFICATIONS

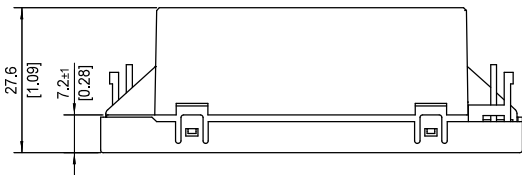
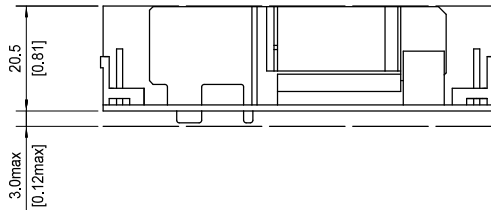
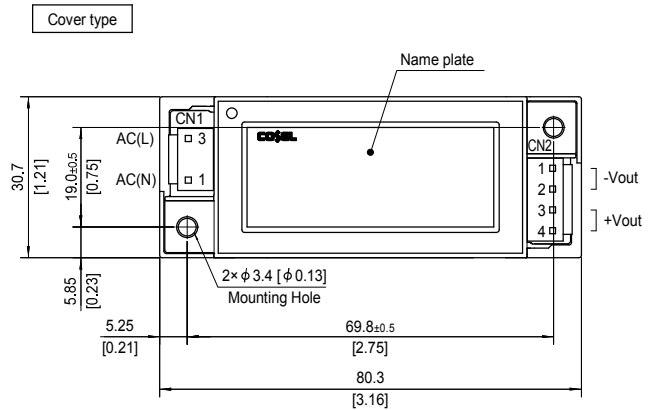
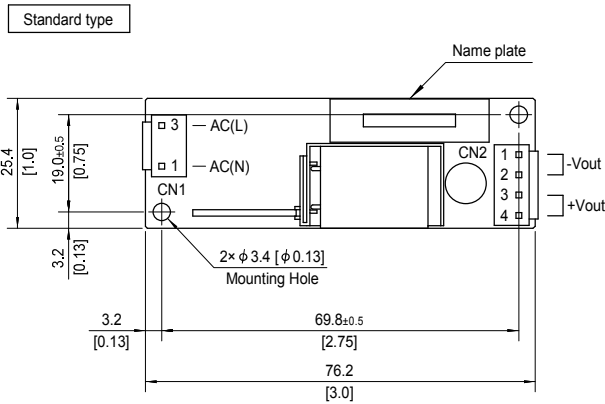
MODEL	TECS45F-5	TECS45F-12	TECS45F-12-H	TECS45F-24	TECS45F-24-H
INPUT	VOLTAGE[VAC] *2 85 - 264 1 φ (Refer to "Derating" and Instruction Manual 1.1) CURRENT[A] ACIN 100V 0.80typ / 0.90typ ACIN 230V 0.45typ / 0.50typ FREQUENCY[Hz] 50 / 60 (45 - 66) EFFICIENCY[%] ACIN 100V 90.0typ / 90.5typ / 90.5typ / 91.5typ / 91.5typ ACIN 230V 90.5typ / 91.5typ / 91.5typ / 92.5typ / 92.5typ INRUSH CURRENT[A] ACIN 100V 30typ (Io=100%) Ta=25°C at cold start ACIN 230V 65typ (Io=100%) Ta=25°C at cold start LEAKAGE CURRENT[ma] 0.25max (ACIN 264V, 60Hz, Io=100%, According to IEC62368-1, and DEN-AN)				
OUTPUT	VOLTAGE[V] 5 / 12 / 12 / 24 / 24 CURRENT[A] *2 8.0 / 3.8 / 3.8 (Peak 5.45) / 1.9 / 1.9 (Peak 2.75) LINE REGULATION[mV] *3 20max / 48max / 48max / 96max / 96max LOAD REGULATION[mV] *3 40max / 100max / 100max / 150max / 150max RIPPLE[mVp-p] *4 -10 to +50°C *5 240max / 300max / 300max / 360max / 360max RIPPLE NOISE[mVp-p] *4 -10 to +50°C *5 300max / 380max / 380max / 480max / 480max TEMPERATURE REGULATION[mV] 0 to +50°C *5 50max / 120max / 120max / 240max / 240max -10 to +50°C *5 60max / 150max / 150max / 290max / 290max DRIFT[mV] *6 20max / 48max / 48max / 96max / 96max START-UP TIME[ms] 200typ (ACIN 100/230V, 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 / 11.50 to 12.50 / 23.00 to 25.00 / 23.00 to 25.00				
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION Works over 105% of rating (works over 101% of peak current at option -H) and recovers automatically OVERVOLTAGE PROTECTION[V] 5.50 to 6.50 / 13.20 to 15.60 / 13.20 to 15.60 / 26.40 to 31.20 / 26.40 to 31.20 OPERATING INDICATION Not provided REMOTE SENSING Not provided				
ISOLATION	INPUT-OUTPUT 3,000VAC 1minute, Cutoff current = 10mA, 500VDC 100MΩ min (At Room Temperature)				
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE *2 -10 to +70°C, 20 - 90%RH (Non condensing), (Refer to "Derating"), 5,000m (16,500feet) max STORAGE TEMP., HUMID. AND ALTITUDE -20 to +75°C, 20 - 90%RH (Non condensing), 9,000m (30,000feet) max VIBRATION 10 - 55Hz, 19.6m/s ² (2G), 3minutes period, 60minutes each along X, Y and Z axis IMPACT 196.1m/s ² (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 IEC61000-3-2 (Class A) (No built-in power factor correction)				
OTHERS	CASE SIZE/WEIGHT 25.4 X 23.5 X 76.2mm [1.00 X 0.93 X 3.00 inches] (W X H X D) / 60g max (with cover : 80g 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. () means peak current. There is a possibility that an internal device is damaged when the specification is exceeded. Please contact us about the detail.
 *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 output product, the maximum temperature of 35°C. 12V output product, the maximum temperature of 40°C.
 *6 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, 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

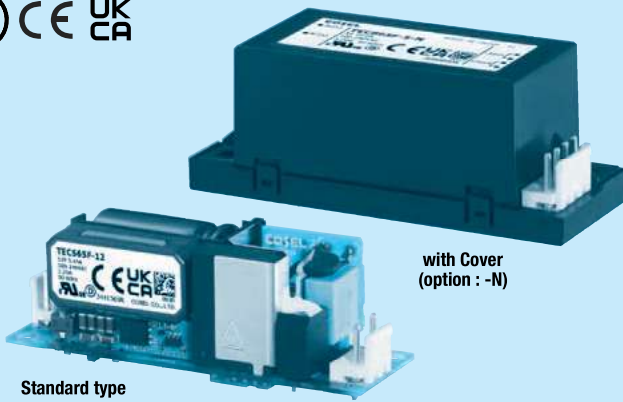
I/O Connector	Mating connector	Terminal	Mfr.
CN1	B2P3-VH	VHR-3N Chain : SVH-21T-P1.1 Loose : BVH-21T-P1.1	J.S.T.
CN2	B4P-VH	VHR-4N Chain : SVH-21T-P1.1 Loose : BVH-21T-P1.1	J.S.T.

- ※ Dimensions in mm, []=inches
- ※ Tolerance : ±1.5 [±0.06]
- ※ Weight : 60g max (with cover : 80g max)
- ※ PCB Material / thickness : FR-4 / 1.1mm [0.04]
- ※ Optional Case Material : PBT
- ※ Maximum current per contact at CN2 is 5A.
- ※ There are two mounting holes.

TECS65F

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 safely 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.

- ① Series name
 - ② Single output
 - ③ Output wattage
 - ④ Universal input
 - ⑤ Output voltage
 - ⑥ Optional *1
- E2: Low leakage current
H : with output peak current (12V,24V)
N: with cover
For option details, refer to Instruction Manual 6.

Class II

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.

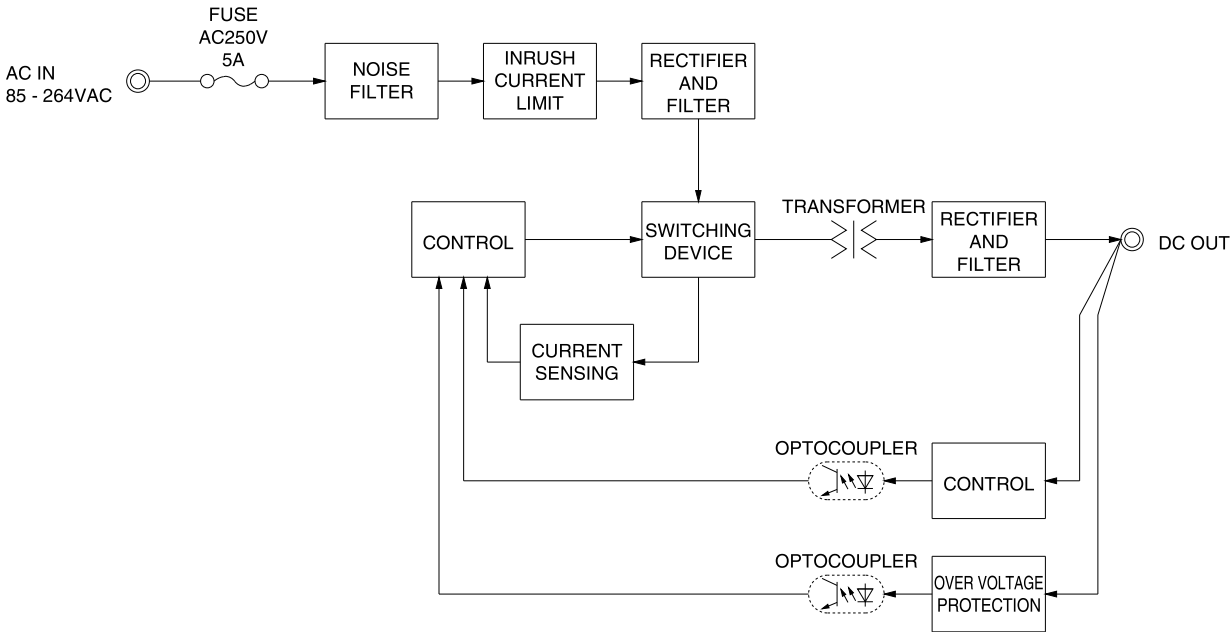
MODEL	TECS65F-5	TECS65F-12	TECS65F-12-H	TECS65F-24	TECS65F-24-H
MAX OUTPUT WATTAGE[W]	50.0	65.4	65.4 (90.0)	66.0	66.0 (90.0)
DC OUTPUT	5V 10.0A	12V 5.45A	12V 5.45 (7.50) A	24V 2.75A	24V 2.75 (3.75) A

SPECIFICATIONS

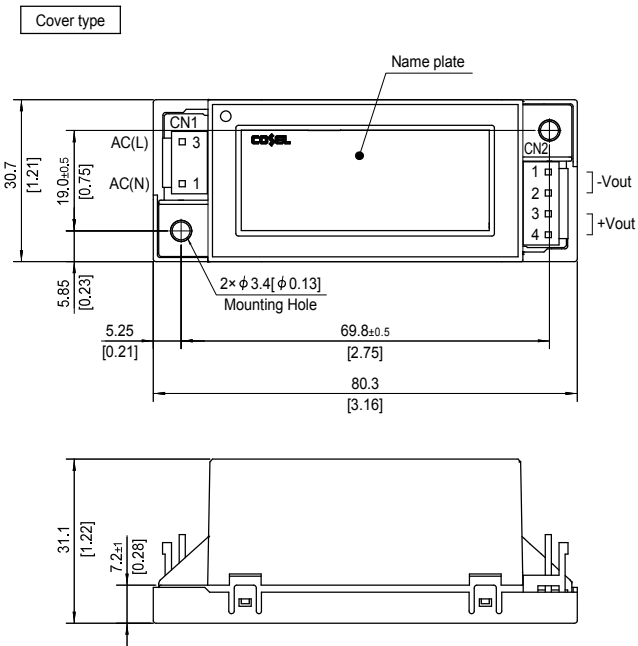
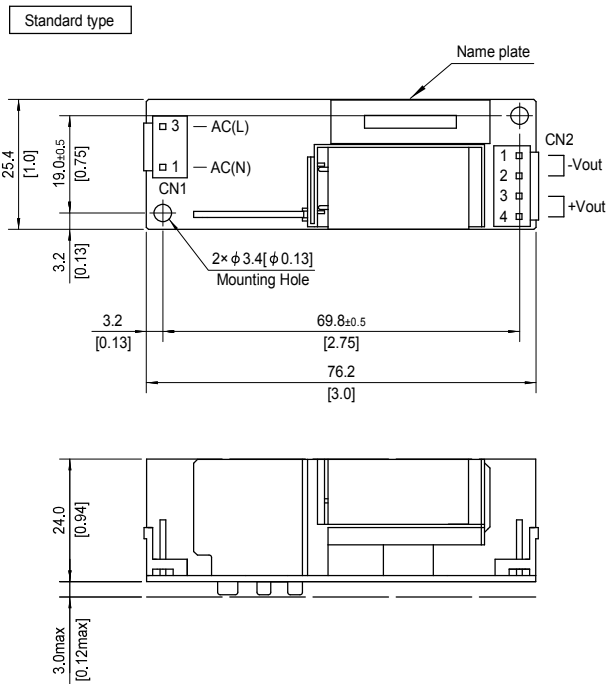
MODEL	TECS65F-5	TECS65F-12	TECS65F-12-H	TECS65F-24	TECS65F-24-H
INPUT	85 - 264 1 φ (Refer to "Derating" and Instruction Manual 1.1)				
VOLTAGE[VAC]	85 - 264 1 φ (Refer to "Derating" and Instruction Manual 1.1)				
CURRENT[A]	ACIN 100V	1.00typ	1.25typ		
	ACIN 230V	0.55typ	0.70typ		
FREQUENCY[Hz]	50 / 60 (45 - 66)				
EFFICIENCY[%]	ACIN 100V	90.0typ	91.5typ	91.5typ	92.5typ
	ACIN 230V	91.5typ	93.0typ	93.0typ	93.5typ
INRUSH CURRENT[A]	ACIN 100V	30typ (Io=100%) Ta=25°C at cold start			
	ACIN 230V	65typ (Io=100%) Ta=25°C at cold start			
LEAKAGE CURRENT[ma]	0.25max (ACIN 264V, 60Hz, Io=100%, According to IEC62368-1, and DEN-AN)				
OUTPUT	VOLTAGE[V]	5	12	12	24
CURRENT[A]	10.0	5.45	5.45 (Peak 7.50)	2.75	2.75 (Peak 3.75)
LINE REGULATION[mV]	20max	48max	48max	96max	96max
LOAD REGULATION[mV]	40max	100max	100max	150max	150max
RIPPLE[mVp-p]	240max	300max	300max	360max	360max
RIPPLE NOISE[mVp-p]	300max	380max	380max	480max	480max
TEMPERATURE REGULATION[mV]	0 to +45°C	50max	120max	120max	240max
	-10 to +45°C	60max	150max	150max	290max
DRIFT[mV]	20max	48max	48max	96max	96max
START-UP TIME[ms]	500typ (ACIN 100/230V, 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	11.50 to 12.50	23.00 to 25.00	23.00 to 25.00
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating (works over 101% of peak current at option -H) and recovers automatically			
OVERVOLTAGE PROTECTION[V]	5.50 to 6.50	13.20 to 15.60	13.20 to 15.60	26.40 to 31.20	26.40 to 31.20
OPERATING INDICATION	Not provided				
REMOTE SENSING	Not provided				
ISOLATION	INPUT-OUTPUT	3,000VAC 1minute, Cutoff current = 10mA, 500VDC 100MΩ min (At Room Temperature)			
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-10 to +70°C, 20 - 90%RH (Non condensing), (Refer to "Derating"), 5,000m (16,500feet) max			
	STORAGE TEMP., HUMID. AND ALTITUDE	-20 to +75°C, 20 - 90%RH (Non condensing), 9,000m (30,000feet) max			
	VIBRATION	10 - 55Hz, 19.6m/s ² (2G), 3minutes period, 60minutes each along X, Y and Z axis			
IMPACT	196.1m/s ² (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	Complies with CISPR11-B, CISPR32-B, EN55011-B, EN55032-B, FCC Part 15-B, FCC Part 18-B, VCCI-B				
HARMONIC ATTENUATOR	Complies with IEC61000-3-2 (Class A) (No built-in power factor correction)				
OTHERS	CASE SIZE/WEIGHT	25.4 X 27.0 X 76.2mm [1.00 X 1.06 X 3.00 inches] (W X H X D) / 70g max (with cover : 90g max)			
COOLING METHOD	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. () means peak current. There is a possibility that an internal device is damaged when the specification is exceeded. Please contact us about the detail.
 *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°C.
 *6 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, 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 (with cover : 90g max)
- ※ PCB Material / thickness : FR-4 / 1.1mm [0.04]
- ※ Optional Case Material : PBT
- ※ Maximum current per contact at CN2 is 5A.
- ※ There are two mounting holes.

Assembling and Installation Method

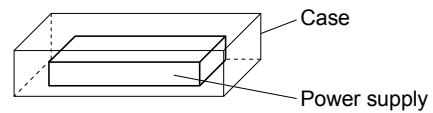
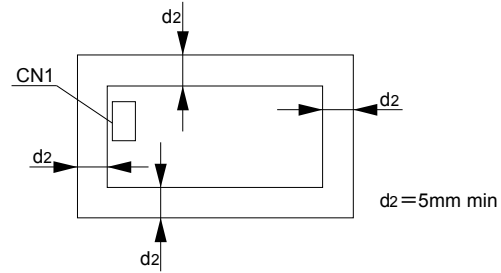
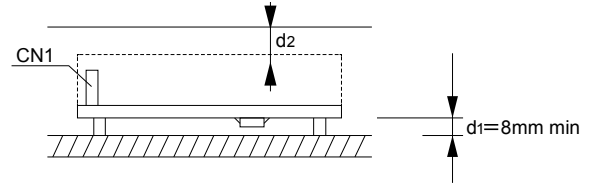
Installation method

■ 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 (except -N model).

If d_1 and/or d_2 are less than the value mentioned in right figure, insert an insulating sheet with reinforced insulation between the power supply unit and metal chassis (except -N model).

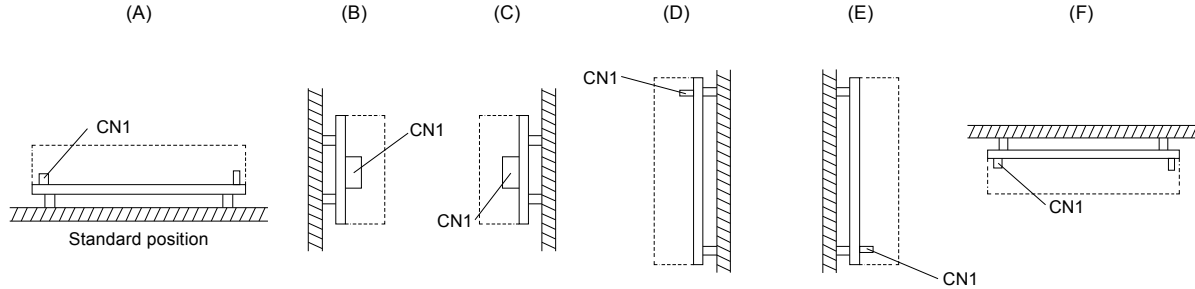
The following distance is not satisfactory for cooling condition. Please refer to "Derating" and Instruction Manual 4 for cooling method.



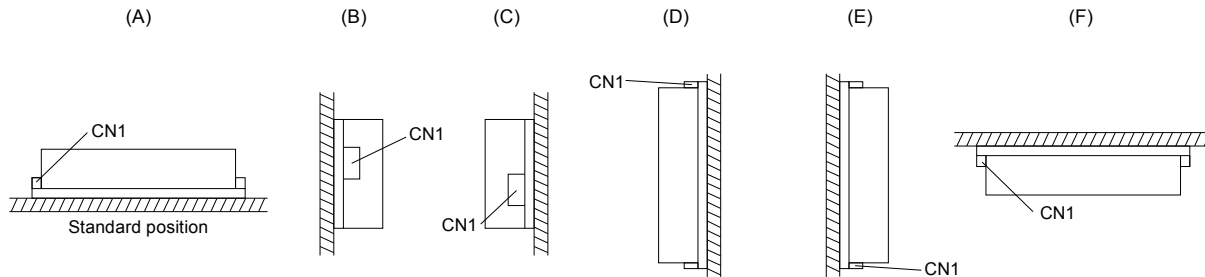
■ There is a possibility that it is not possible to cool enough when the power supply is used by the sealing up space as showing in right figure.

Please use it after confirming the temperature of points ① of Instruction Manual 4.

■ Standard model can be mounted in the mounting position shown in the figure below.

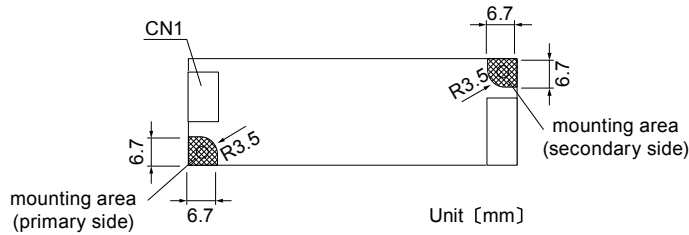


■ Option-N model can be mounted in the mounting position shown in the figure below. The installation of (F) possible only forced air cooling.



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.

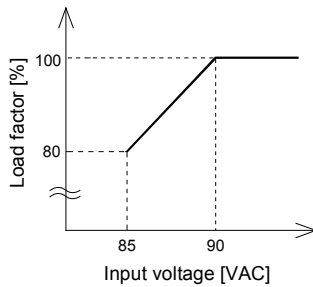
■When installing, be careful to avoid contact with mounted components.

■This product uses SMD technology. Please avoid the PCB installation method which includes the twisting stress or the bending stress.

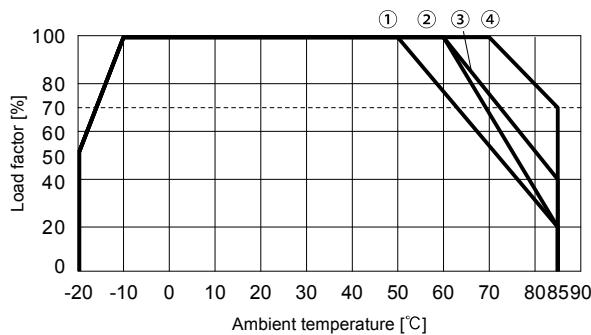
■Do not touch any SMD components on the unit and soldering points.

Derating

● Derating curve for input voltage



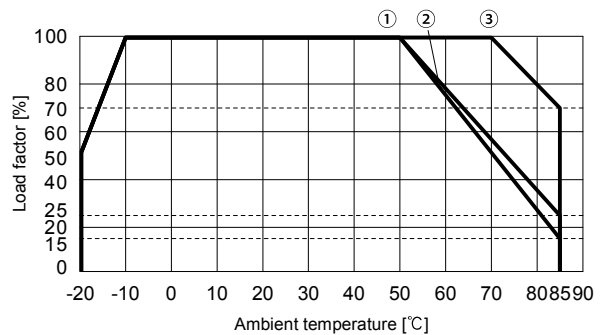
● TECS10F Ambient temperature derating curve at rated input (Reference value)



Cooling method	Output voltage	Installation condition
		A,B,C,D,E,F
Convection	5V	①
	12V,15V	②
	24V	③
Forced air (0.5m³/min)	5V,12V,15V,24V	④

■In case of forced air cooling, ventilation must be uniform.

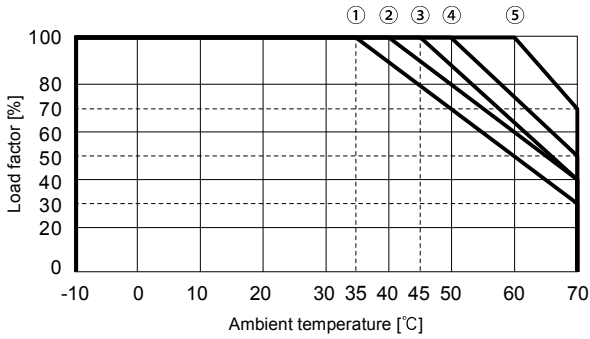
● TECS20F Ambient temperature derating curve at rated input (Reference value)



Cooling method	Output voltage	Installation condition
		A,B,C,D,E,F
Convection	5V	①
	12V,15V,24V	②
Forced air (0.5m³/min)	5V,12V,15V,24V	③

■In case of forced air cooling, ventilation must be uniform.

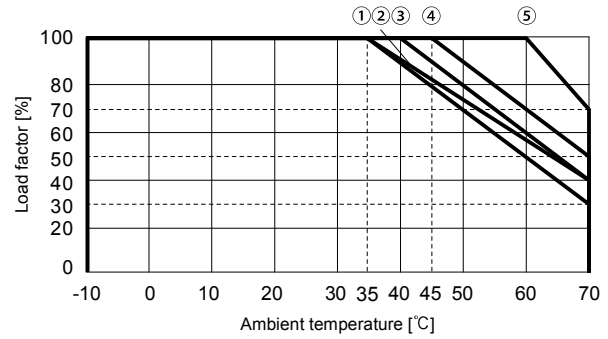
● TECS45F
Ambient temperature derating curve at rated input (Reference value)



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	

■ In case of forced air cooling, ventilation must be uniform.

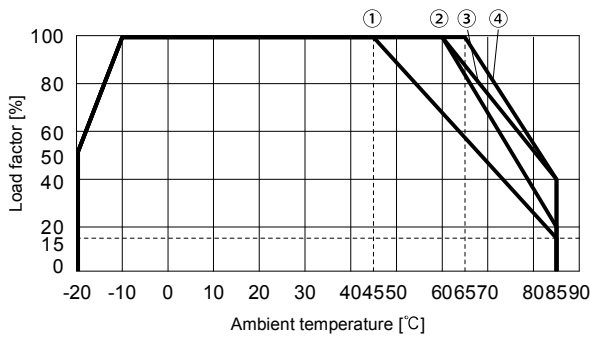
● TECS65F
Ambient temperature derating curve at rated input (Reference value)



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		

■ In case of forced air cooling, ventilation must be uniform.

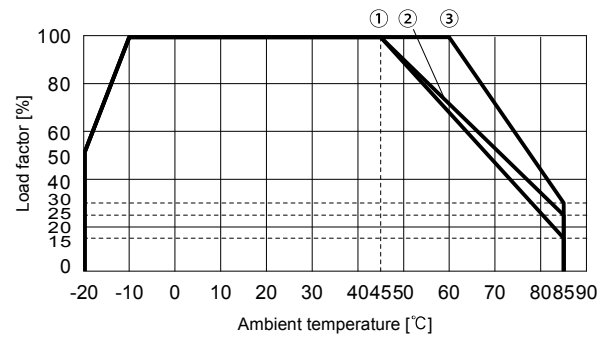
● TECS10F-N
Ambient temperature derating curve at rated input (Reference value)



Cooling method	Output voltage	Installation condition	
		A,B,C,D,E	F
Convection	5V	①	-
	12V,15V	②	-
	24V	③	-
Forced air (0.5m³/min)	5V,12V,15V,24V	④	

■ In case of forced air cooling, ventilation must be uniform.

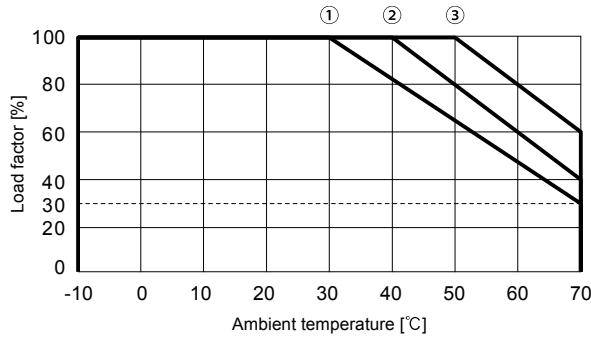
● TECS20F-N
Ambient temperature derating curve at rated input (Reference value)



Cooling method	Output voltage	Installation condition	
		A,B,C,D,E	F
Convection	5V	①	-
	12V,15V,24V	②	-
Forced air (0.5m³/min)	5V,12V,15V,24V	③	

■ In case of forced air cooling, ventilation must be uniform.

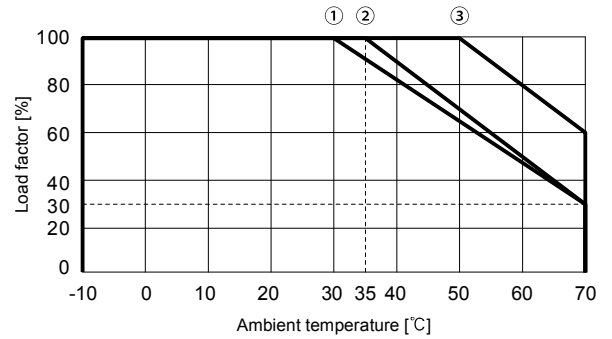
● TECS45F-N
Ambient temperature derating curve at rated input (Reference value)



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

■ In case of forced air cooling, ventilation must be uniform.

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



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

■ In case of forced air cooling, ventilation must be uniform.

Instruction Manual

◆ Please see catalog and instruction manual before you use.

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
TECS10F	Flyback converter	20 to 125	0.21	Thermistor	FR-4		Yes	Yes	No
TECS20F	Flyback converter	20 to 125	0.40	Thermistor	FR-4		Yes	Yes	No
TECS45F	Flyback converter	20 to 250	0.90	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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