AC-DC Power Supplies Medical Type













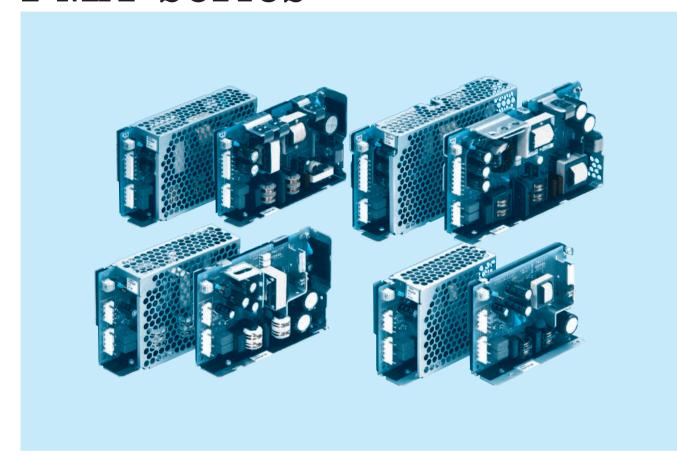








PMA-series



Feature

For medical electric equipment
Internal dual fuses
Harmonic attenuator (Complies with IEC61000-3-2)
Universal input (AC85 - 264V)
Efficiency increased with synchronous rectification
technology (PMA60F, PMA100F)
Variety of option

Safety agency approvals

UL60601-1, C-UL (CSA-C22.2 No.601.1), EN60601-1

EMI

FCC-B, CISPR11-B, CISPR22-B, EN55011-B, EN55022-B, VCCI-B

5-year warranty (refer to Instruction Manual)

CE marking

Low Voltage Drective RoHS Directive

UKCA marking

Electrical Equipment Safety Regulations RoHS Regulations

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

EN61000-4-2

EN61000-4-3

EN61000-4-4

EN61000-4-5 (Common mode Level4, Differential mode Level2)

EN61000-4-6

EN61000-4-8

EN61000-4-11

Ordering information

PMA15F

15

CRUS A CE UK **RoHS** Vertical terminal block Standard type with Cover Example recommended EMI/EMC filter NAM-04-000

Low leakage current type : NAM 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.



- Series name
 Single output
 Output wattage 4)Universal input
- ⑤Output voltage
- Optional *5
 T : Vertical terminal block
 T1: Horizontal terminal block
- N: with Cover
- J1: VH(J.S.T.)connector type

Specification is changed at option, refer to Instruction Manual.

Horizontal terminal block (option:-T1)

(option:-T)

(option:-N)

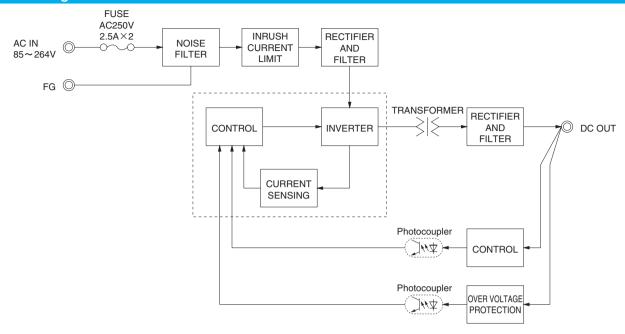
*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

MODEL	PMA15F-3R3	PMA15F-5	PMA15F-12	PMA15F-15	PMA15F-24
MAX OUTPUT WATTAGE[W]	9.9	15	15.6	15	16.8
DC OUTPUT	3.3V 3A	5V 3A	12V 1.3A	15V 1A	24V 0.7A

SPECIFICATIONS

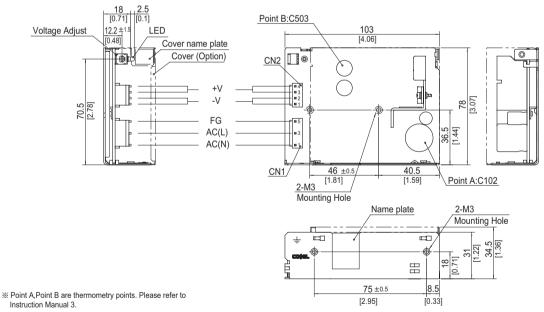
NRUSH CURRENT[A] ACN 200V 67typ 74typ 78typ 79typ		MODEL		PMA15F-3R3	PMA15F-5	PMA15F-12	PMA15F-15	PMA15F-24		
CURRENT[A] ACM 200V 0.15typ (io=100%) 0.20typ (io=100%)		VOLTAGE[V]		AC85 - 264 1 φ (Refe	r to the Instruction Man	ual 1.1 and "Derating")	*3			
PREQUENCY[Hz] FREQUENCY[Hz] FREQUENCY[H		OUDDENTIAL	ACIN 100V	0.30typ (lo=100%)						
Perficiency Acm 100V 68typ 70typ 74typ 76typ 79typ 79		CURRENT[A]	ACIN 200V	0.15typ (lo=100%)						
RRUSH CURRENT[A] ACN 200V 67typ 74typ 78typ 79typ		FREQUENCY[Hz]								
NRUSH CURRENT[A] ACN 1001 15type (10-100%) (At cold start)	INPUT	EEEIOIENOVIO/1	ACIN 100V	66typ	70typ	74typ	76typ	76typ		
NRIGHE CURRENT[A] ACM 2007 30 typ (10=100%) (At cold start) LEAKAGE CURRENT[A] 0.05/0.10max (ACIN 100V / 240V 60Hz, Io=100%, According to IEC60601-1)		EFFICIENCY[%]	ACIN 200V	67typ	74typ	78typ	79typ	79typ		
LEAKAGE CURRENT[m] 3.05(0.10max (ACIN 100V 240V 60Hz, lo=100%, According to IEC60601-1)		INDUCUI OUDDENTIAL	ACIN 100V	15typ (lo=100%) (At c	71 71 71 71					
VOLTAGE[V]		INNUSH CURRENT[A]	ACIN 200V	30typ (lo=100%) (At c	old start)					
CURRENTIA LINE REGULATION[mV] 20max 20max 48max 60max 96max 150max 120max 150max 120max 120max 120max 150max		LEAKAGE CURREN	T[mA]	0.05/0.10max (ACIN 1	100V / 240V 60Hz, lo=	100%, According to IEC	C60601-1)			
LINE REGULATION[mV] 20max 20max 48max 100max 120max 150max 150max 120max 150max		VOLTAGE[V]		3.3	5	12	15	24		
CAD REGULATION T		CURRENT[A]		3.0	3.0	1.3	1.0	0.7		
RIPPLE [mVp-p]		LINE REGULATION[mV]	20max	20max	48max	60max	96max		
POUTPUT Pout Pou		LOAD REGULATION	[mV]	40max	40max	100max	120max	150max		
DUTPUT Fig. 10-0°C 140max 140max 160max 160max 160max 160max 160max 150max 15		RIPPLE[mVp-p]	0 to +50°C	80max	80max	120max	120max	120max		
TEMPERATURE REGULATION 10 + 50°C 50 max 160 max 180 m		*1	-10 - 0℃	140max	140max	160max	160max	160max		
TEMPERATURE REGULATION(mV) 016 +50°C 50max 50max 120max 150max 240max 290max 20max 48max 60max 150max 290max 290max 48max 60max 450max 450max 290max 20max 48max 60max 450max 290max 20max 450max 20max 450max 20max 450max 250max 20max 450max 250max 20max 450max 250max 2		RIPPLE NOISE[mVp-p]	0 to +50°C		120max	150max	150max	150max		
TEMPERATURE RESULATION(m) 10 to +50°C 60 max 60 max 150 max 180 max 290 max 290 max 20 max 20 max 48 max 60 max 96 max 96 max 87 max 2001 pt (ACIN 100V, Io=100%) 85 max 2001 pt (ACIN 100V, Io=100%) 85 max 2001 pt (ACIN 100V, Io=100%) 20	OUTPUT	*1	-10 - 0℃	160max	160max	180max	180max	180max		
DRIFT[mV] \$2 20max 20max 150max 180max 290max 290max 20max 48max 60max 96max 96max 96max 55max 55max 57max 180max 290max 20mby (ACIN 100V, Io=100%) 85tart-up time is 700ms typ for less than 1minute of applying input again from turning off the input voltage HOLD-UP TIME[ms] 20typ (ACIN 100V, Io=100%) 00TPUT VOLTAGE ADJUSTMENT RANGE[V] 2.85 to 3.60 4.50 to 5.50 10.00 to 13.20 13.20 to 18.00 19.20 to 27.00 00TPUT VOLTAGE SETTING[V] 3.30 to 3.40 5.00 to 5.15 12.00 to 12.48 15.00 to 15.60 24.00 to 24.96 00TPUT VOLTAGE SETTING[V] 00TPUT VOLTAGE		TEMPEDATURE RECUI ATION(VI			50max	120max	150max	240max		
START-UP TIME[ms] 200typ (ACIN 100V, lo=100%) *Start-up time is 700ms typ for less than 1 minute of applying input again from turning off the input voltage HOLD-UP TIME[ms] 20typ (ACIN 100V, lo=100%)		TEMPERATURE REQUESTION[IIV]	-10 to +50°C	60max	60max	150max	180max	290max		
HOLD-UP TIME[ms] 20typ (ACIN 100V, Io=100%) 0UTPUT VOLTAGE ADJUSTMENT RANGE[V] 2.85 to 3.60 4.50 to 5.50 10.00 to 13.20 13.20 to 18.00 19.20 to 27.00 0UTPUT VOLTAGE SETTING[V] 3.30 to 3.40 5.00 to 5.15 12.00 to 12.48 15.00 to 15.60 24.00 to 24.96 0VERCURRENT PROTECTION OVERCURRENT PROTECTION Unique to 10.00 t		DRIFT[mV] *2			1			1		
OUTPUT VOLTAGE ADJUSTMENT RANGE[V] 2.85 to 3.60 4.50 to 5.50 10.00 to 13.20 13.20 to 18.00 19.20 to 27.00		START-UP TIME[ms]								
OUTPUT VOLTAGE SETTING[V] 3.30 to 3.40 5.00 to 5.15 12.00 to 12.48 15.00 to 15.60 24.00 to 24.96		HOLD-UP TIME[ms]								
OVERCURRENT PROTECTION Works over 105% of rating and recovers automatically OVERVOLTAGE PROTECTION[V] 4.00 to 5.25 5.75 to 7.00 15.00 to 18.00 20.00 to 25.00 30.00 to 37.00 OPERATING INDICATION LED (Green) REMOTE ON/OFF Not provided INPUT-OUTPUT AC4,000V 1 minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature) INPUT-FG AC2,000V 1 minute, Cutoff current = 25mA, DC500V 50MΩ min (At Room Temperature) OUTPUT-FG AC500V 1 minute, Cutoff current = 25mA, DC500V 50MΩ min (At Room Temperature) OPERATING TEMP, HUMID.AND ALTITUDE -10 to +70 °C, 20 - 90%RH (Non condensing), 3,000m (10,000 feet) max *3 STORAGE TEMP, HUMID.AND ALTITUDE -20 to +75 °C, 20 - 90%RH (Non condensing), 9,000m (30,000 feet) 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 AGENCY APPROVALS UL60601-1, C-UL (CSA-C22.2 No.601.1), EN60601-1 CONDUCTED NOISE Complies with FCC-B, VCCI-B, CISPR11-B, CISPR22-B, EN55011-B, EN55022-B REGULATIONS Complies with IEC61000-3-2 (Class A) *6 (Not built-in to active filter *4)		OUTPUT VOLTAGE ADJUSTMENT	RANGE[V]	2.85 to 3.60			13.20 to 18.00	19.20 to 27.00		
OVERVOLTAGE PROTECTION[V] 4.00 to 5.25 5.75 to 7.00 15.00 to 18.00 20.00 to 25.00 30.00 to 37.00		OUTPUT VOLTAGE SET	TING[V]				15.00 to 15.60	24.00 to 24.96		
OVERVOLTAGE PROTECTION(V) 4.00 to 3.25 5.75 to 7.00 15.00 to 18.00 20.00 to 25.00 30.00 to 37.00	DROTECTION									
OPERATING INDICATION LED (Green)		OVERVOLTAGE PROTEC	CTION[V]		5.75 to 7.00	15.00 to 18.00	20.00 to 25.00	30.00 to 37.00		
INPUT-OUTPUT AC4,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)	OTHERS		TION	, ,						
INPUT-FG AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)				'						
OUTPUT-FG AC500V 1minute, Cutoff current = 25mA, DC500V 50MΩ min (At Room Temperature) OPERATING TEMP,HUMID.AND ALTITUDE -10 to +70°C, 20 - 90%RH (Non condensing), 3,000m (10,000 feet) max *3 STORAGE TEMP,HUMID.AND ALTITUDE -20 to +75°C, 20 - 90%RH (Non condensing), 9,000m (30,000 feet) 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 AGENCY APPROVALS UL60601-1, C-UL (CSA-C22.2 No.601.1), EN60601-1 CONDUCTED NOISE Complies with FCC-B, VCCI-B, CISPR11-B, CISPR22-B, EN55011-B, EN55022-B HARMONIC ATTENUATOR Complies with IEC61000-3-2 (Class A) *6 (Not built-in to active filter *4)										
OPERATING TEMP,HUMID.AND ALTITUDE	ISOLATION									
STORAGE TEMP,,HUMID.AND ALTITUDE -20 to +75°C, 20 - 90%RH (Non condensing), 9,000m (30,000 feet) 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 AGENCY APPROVALS UL60601-1, C-UL (CSA-C22.2 No.601.1), EN60601-1 CONDUCTED NOISE Complies with FCC-B, VCCI-B, CISPR11-B, CISPR22-B, EN55011-B, EN55022-B HARMONIC ATTENUATOR Complies with IEC61000-3-2 (Class A) *6 (Not built-in to active filter *4)										
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 AGENCY APPROVALS UL60601-1, C-UL (CSA-C22.2 No.601.1), EN60601-1 CONDUCTED NOISE CONDUCTED NOISE CONDUCTED NOISE COMPLIES with FCC-B, VCCI-B, CISPR11-B, CISPR22-B, EN55011-B, EN55022-B HARMONIC ATTENUATOR Complies with IEC61000-3-2 (Class A) *6 (Not built-in to active filter *4)				·						
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 AGENCY APPROVALS UL60601-1, C-UL (CSA-C22.2 No.601.1), EN60601-1 CONDUCTED NOISE CONDUCTED NOISE CONDUCTED NOISE COMPLIES with FCC-B, VCCI-B, CISPR11-B, CISPR22-B, EN55011-B, EN55022-B HARMONIC ATTENUATOR Complies with IEC61000-3-2 (Class A) *6 (Not built-in to active filter *4)	ENVIRONMENT		ALTITUDE	, , , , , , , , , , , , , , , , , , , ,						
AGENCY APPROVALS UL60601-1, C-UL (CSA-C22.2 No.601.1), EN60601-1 CONDUCTED NOISE CONDUCTED NOISE COMPLIES with FCC-B, VCCI-B, CISPR11-B, CISPR22-B, EN55011-B, EN55022-B COMPLIES with IEC61000-3-2 (Class A) *6 (Not built-in to active filter *4)				. ,						
CONDUCTED NOISE Complies with FCC-B, VCCI-B, CISPR11-B, CISPR22-B, EN55011-B, EN55022-B HARMONIC ATTENUATOR Complies with IEC61000-3-2 (Class A) *6 (Not built-in to active filter *4)				· /·						
REGULATIONS HARMONIC ATTENUATOR Complies with IEC61000-3-2 (Class A) *6 (Not built-in to active filter *4)	-									
The state of the s				<u> </u>	<u>' </u>					
	NEGULATIONS			<u> </u>				<u> </u>		
OTHERS 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	OTHERS	CASE SIZE/WEIGHT		-	2 × 3.0 / × 4.06 inches]	(W×H×D) / 230g max	(with cover : 265g max	()		
COOLING METHOD Convection		COOLING METHOD		,						

- *1 Measured by 20MHz oscilloscope or Ripple-Noise meter (equivalent to KEISOKU-GIKEN: RM101).
- *2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C.
- Refer to "Derating".
- When two or more units are used, they may not comply with the harmonic attenuator. Please contact us for details.
- *5 Please contact us about safety approvals for the model with option.
- Please contact us about another class.
- Parallel operation with other model is not possible.
 - Derating is required when operated with cover. A sound may occur from power supply at peak loading.
- PMA-2 May 14, 2025 www.cosel.co.jp/en/



External view

X External size of option T and T1 is different from standard model and refer to 5 Option of instruction manual for details.



Instruction Manual 3.

	I/O Connector		nnector Mating Connector		erminal
	2014	1-1123724-3	1-1123722-5	Chain	1123721-1
(-INT	1-1123724-3	1-1123722-5	Loose	1318912-1
	2010	1-1123723-4	1-1123722-4	Chain	1123721-1
1	JN2	1-1123723-4	1-1123722-4	Loose	1318912-1

(Mfr : Tyco Electronics AMP)

- % I/O Connector is Mfr.Tyco Electronics AMP % Option : -J1 : (J.S.T) connector type -T : Vertical terminal block type
- - - -T1 : Horizontal terminal block type

Refer to Instruction Manual 5.

<PIN CONNECTION>

N1		CN2	
Pin No.	Input	Pin No.	Output
1	AC(N)	1, 2	-V
2			
3	AC(L)	3, 4	+V
4		3,4	_ TV

- % Tolerance : ±1 [±0.04]
- Weight: 230g max (with cover: 265g max)
- ※ PCB Material/thickness : CEM-3 / 1.6mm [0.06inches]
- Chassis material: Hot-dip galvanized steel plate
- $\ensuremath{\mathbb{X}}$ Keep drawing current per pin bellow 5A of CN2.

- Dimensions in mm, []=inches
 Mounting torque : 0.6N ⋅ m (6.3kgf ⋅ cm) max
 Please connect safety ground to the unit in 2-M3 holes.

PMA30F

30

CRUS A CE UK **RoHS**



Example recommended EMI/EMC filter NAM-04-000



Low leakage current type : NAM 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.

- Series name
 Single output
 Output wattage
- 4)Universal input
- ⑤Output voltage
- Optional *5
 T : Vertical terminal block
 T1: Horizontal terminal block
- N: with Cover
- J1: VH(J.S.T.)connector type

Specification is changed at option, refer to Instruction Manual.

Horizontal terminal block (option:-T1)

(option:-T)

Vertical terminal block Standard type

with Cover (option:-N)

*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.

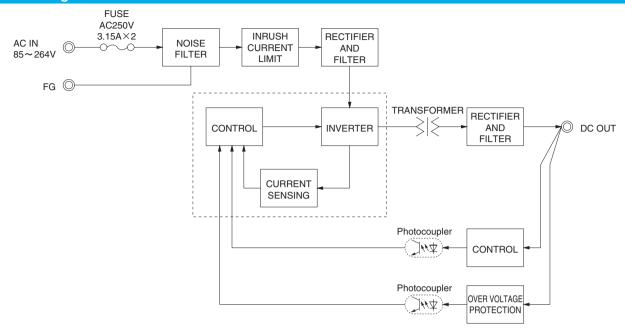
MODEL	PMA30F-3R3	PMA30F-5	PMA30F-12	PMA30F-15	PMA30F-24
MAX OUTPUT WATTAGE[W]	19.8	30	30	30	31.2
DC OUTPUT	3.3V 6A	5V 6A	12V 2.5A	15V 2A	24V 1.3A

SPECIFICATIONS

	MODEL		PMA30F-3R3	PMA30F-5	PMA30F-12	PMA30F-15	PMA30F-24		
,	VOLTAGE[V]		AC85 - 264 1 φ (Refe	r to the Instruction Man	ual 1.1 and "Derating")	*3			
Γ.	OUDDENTIAL	ACIN 100V	0.50typ (lo=100%)	0.70typ (lo=100%)					
'	CURRENT[A]	ACIN 200V	0.30typ (lo=100%)	0.40typ (lo=100%)					
1	FREQUENCY[Hz]		50 / 60 (47 - 440)						
INPUT ,	EFFICIENCY[0/1	ACIN 100V	67typ	71typ	76typ	77typ	77typ		
'	EFFICIENCY[%]	ACIN 200V	69typ	74typ	78typ	80typ	80typ		
[,	INRUSH CURRENT[A]	ACIN 100V	15typ (lo=100%) (At c	old start)					
'	INRUSH CURRENT[A]	ACIN 200V	30typ (lo=100%) (At c	old start)					
I	LEAKAGE CURRENT	Γ[mA]	0.05 / 0.10max (ACIN	100V / 240V 60Hz, lo:	=100%, According to IE	C60601-1)			
,	VOLTAGE[V]		3.3	5	12	15	24		
	CURRENT[A]		6.0	6.0	2.5	2.0	1.3		
ľ	LINE REGULATION[1	mV]	20max	20max	48max	60max	96max		
[1	LOAD REGULATION	[mV]	40max	40max	100max	120max	150max		
Ţ	RIPPLE[mVp-p]	0 to +50°C	80max	80max	120max	120max	120max		
L	*1	-10 - 0℃	140max	140max	160max	160max	160max		
Ī	RIPPLE NOISE[mVp-p]	0 to +50°C	120max	120max	150max	150max	150max		
OUTPUT	*1	-10 - 0℃	160max	160max	180max	180max	180max		
Γ.	TEMPERATURE REGULATION[mV]	0 to +50°C	50max	50max	120max	150max	240max		
'	TEMPERATURE REGULATION[IIIV]	-10 to +50°C	60max	60max	150max	180max	290max		
r	DRIFT[mV] *2 20ma		20max	20max	48max	60max	96max		
	START-UP TIME[ms] 200typ (200typ (ACIN 100V, Io=100	200typ (ACIN 100V, Io=100%) *Start-up time is 700ms typ for less than 1minute of applying input again from turning off the input voltage					
Į.	HOLD-UP TIME[ms]		20typ (ACIN 100V, Io=100%)						
[(OUTPUT VOLTAGE ADJUSTMENT	RANGE[V]	2.85 to 3.60	4.50 to 5.50	10.00 to 13.20	13.20 to 18.00	19.20 to 27.00		
(OUTPUT VOLTAGE SET	TING[V]	3.30 to 3.40	5.00 to 5.15	12.00 to 12.48	15.00 to 15.60	24.00 to 24.96		
DDOTEOTION (OVERCURRENT PROT	ECTION	Works over 105% of ra	ating and recovers auto	matically				
PROTECTION CIRCUIT AND	OVERVOLTAGE PROTEC	CTION[V]	4.00 to 5.25	5.75 to 7.00	15.00 to 18.00	20.00 to 25.00	30.00 to 37.00		
OTHERS	OPERATING INDICA	TION	LED (Green)						
	REMOTE ON/OFF		Not provided						
<u></u>	INPUT-OUTPUT				C500V 50M Ω min (At				
ISOLATION I	INPUT-FG				C500V 50M Ω min (At				
	OUTPUT-FG				500V 50M Ω min (At R				
_(OPERATING TEMP., HUMID. AND	ALTITUDE			, 3,000m (10,000feet) n				
ENVIRONMENT S	STORAGE TEMP.,HUMID.AND	ALTITUDE			, 9,000m (30,000feet) n				
LIVALION LIVI	VIBRATION			(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	AGENCY APPROVAL	-S		A-C22.2 No.601.1), EN					
	CONDUCTED NOISE			· · · · · · · · · · · · · · · · · · ·	CISPR22-B, EN55011-				
REGULATIONS 1	HARMONIC ATTENU				t built-in to active filter				
			31 X 82 X 120mm [1 2	2 X 3 23 X 4 72 inches]	(MXHXD) / 240a may	(with cover: 280g max	1		
OTHERS	CASE SIZE/WEIGHT		31 × 02 × 12011111 [1.22	2 × 0.20 × 4.72 [[Inches]]	(VV XTTX D) / 240g max	(With cover . 2009 max	1		

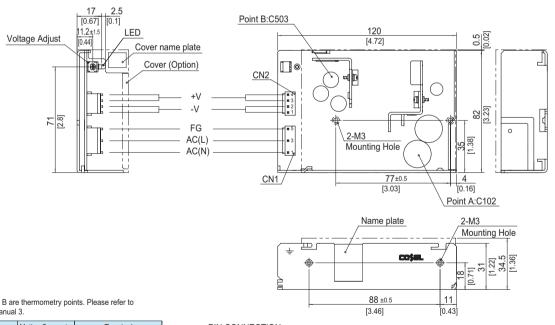
- *1 Measured by 20MHz oscilloscope or Ripple-Noise meter (equivalent to KEISOKU-GIKEN: RM101).
- *2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C.
- Refer to "Derating".
- When two or more units are used, they may not comply with the harmonic attenuator. Please contact us for details.
- *5 Please contact us about safety approvals for the model with option.
- Please contact us about another class.
- Parallel operation with other model is not possible. Derating is required when operated with cover.
 - A sound may occur from power supply at peak loading.





External view

** External size of option T and T1 is different from standard model and refer to 5 Option of instruction manual for details.



 $\ensuremath{\ensuremath{\mathbb{X}}}$ Point A,Point B are thermometry points. Please refer to Instruction Manual 3.

I/O Connector		Mating Connector	Terminal		
CNIA	1-1123724-3	1-1123722-5	Chain	1123721-1	
CIVI	1-1123/24-3	1-1123722-5	Loose	1318912-1	
ONIO	1-1123723-4	1-1123722-4	Chain	1123721-1	
CNZ	1-1123723-4	1-1123/22-4	Loose	1318912-1	

(Mfr : Tyco Electronics AMP) I/O Connector is Mfr.Tyco Electronics AMP
 Option: -J1: (J.S.T) connector type
 -T: Vertical terminal block type

-T1 : Horizontal terminal block type Refer to Instruction Manual 5.

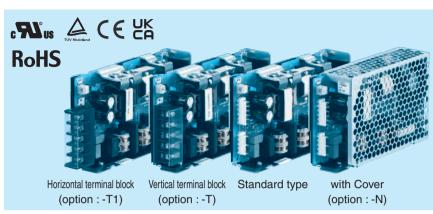
<PIN CONNECTION>

ו אוכ		CNZ	
Pin No.	Input	Pin No.	Output
1	AC(N)	1.0	-V
2		1, 2	-v
3	AC(L)	2.4	+V
4		3, 4	+v
5	FG		

- ※ Tolerance: ±1 [±0.04]
- Weight: 240g max (with cover: 280g max) PCB Material/thickness: CEM-3 / 1.6mm [0.06inches]
- * Chassis material : Aluminum
- Keep drawing current per pin bellow 5A of CN2.
 Dimensions in mm, []=inches
- Mounting torque : 0.49N ⋅ m (5kgf ⋅ cm) max
- * Please connect safety ground to the unit in 2-M3 holes.

PMA60F

PM A 60 F - -



Example recommended EMI/EMC filter NAM-04-000

Low leakage current type : NAM 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

Optional *5
 T : Vertical terminal block
 T1: Horizontal terminal block

N: with Cover

J1: VH(J.S.T.)connector type R: with Remote ON/OFF

Specification is changed at option, refer to Instruction Manual.

*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	PMA60F-3R3	PMA60F-5	PMA60F-12	PMA60F-15	PMA60F-24
MAX OUTPUT WATTAGE[W]	39.6	60	60	60	60
DC OUTPUT	3.3V 12A	5V 12A	12V 5A	15V 4A	24V 2.5A

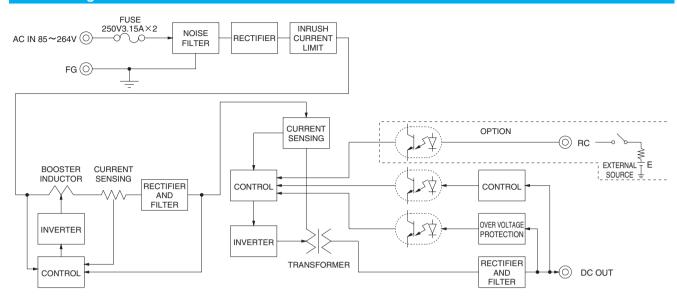
SPECIFICATIONS

	MODEL		PMA60F-3R3	PMA60F-5	PMA60F-12	PMA60F-15	PMA60F-24			
	VOLTAGE[V]		AC85 - 264 1 φ (Refe	r to the Instruction Man	ual 1.1)					
	CURRENT[A]	ACIN 100V	0.7typ (lo=100%)	0.8typ (lo=100%)						
	CONNENT[A]	ACIN 200V	0.4typ (lo=100%)							
	FREQUENCY[Hz]		50 / 60 (47 - 63)							
	EFFICIENCY[0/1	ACIN 100V	77typ	80typ	80typ	81typ	81typ			
INPUT	EFFICIENCY[%]	ACIN 200V	78typ	83typ	82typ	83typ	83typ			
	POWER FACTOR	ACIN 100V	0.98typ	21 12 12 12 12 12 12 12 12 12 12 12 12 1						
	(lo=100%)	ACIN 200V	0.85typ	0.90typ						
	INRUSH CURRENT[A]	ACIN 100V	15typ (lo=100%) (At cold start)							
	ACIN 200V		30typ (Io=100%) (At cold start)							
	LEAKAGE CURREN	T[mA]	0.09 / 0.18max (ACIN	100V / 240V 60Hz, lo	=100%, According to IE	C60601-1)				
	VOLTAGE[V]		3.3	5	12	15	24			
	CURRENT[A]		12.0	12.0	5.0	4.0	2.5			
	LINE REGULATION[20max	20max	48max	60max	96max			
	LOAD REGULATION	[mV]	40max	40max	100max	120max	150max			
	RIPPLE[mVp-p]	0 to +50℃	80max	80max	120max	120max	120max			
	*1	-10 - 0℃	140max	140max	160max	160max	160max			
	RIPPLE NOISE[mVp-p]	0 to +50℃	120max	120max	150max	150max	150max			
UTPUT	*1	-10 - 0℃	160max	160max	180max	180max	180max			
	TEMPERATURE REGULATION[mV]	0 to +50°C	50max	50max	120max	150max	240max			
		-10 to +50°C	60max	60max	150max	180max	290max			
	DRIFT[mV] *2		20max	20max	48max	60max	96max			
	START-UP TIME[ms]		250typ (ACIN 100V, lo=100%)							
	HOLD-UP TIME[ms]		20typ (ACIN 100V, lo=	20typ (ACIN 100V, Io=100%)						
	OUTPUT VOLTAGE ADJUSTMENT		2.85 to 3.60	4.50 to 5.50	10.00 to 13.20	13.20 to 18.00	19.20 to 27.00			
	OUTPUT VOLTAGE SET	TING[V]	3.30 to 3.40	5.00 to 5.15	12.00 to 12.48	15.00 to 15.60	24.00 to 24.96			
DOTECTION	OVERCURRENT PROT		Works over 105% of r	ating and recovers auto	matically					
ROTECTION CIRCUIT AND	OVERVOLTAGE PROTE	CTION[V]	4.00 to 5.25	5.75 to 7.00	15.00 to 18.00	20.00 to 25.00	30.00 to 37.00			
THERS	OPERATING INDICA	TION	LED (Green)							
	REMOTE ON/OFF		Optional (Required ex				,			
	INPUT-OUTPUT-RC	*3		utoff current = 10mA, D						
SOLATION	INPUT-FG	-	, ,	utoff current = 10mA, D						
	OUTPUT-RC-FG	*3		off current = 25mA, DC						
	OPERATING TEMP., HUMID. AND			6RH (Non condensing)						
NVIRONMENT	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	AGENCY APPROVAL			SA-C22.2 No.601.1), EN						
IOISE	CONDUCTED NOISE		· ·	, VCCI-B, CISPR11-B,	CISPR22-B, EN55011-	B, EN55022-B				
REGULATIONS	TIPATIMOTHIO AT TENE		Complies with IEC610							
OTHERS	CASE SIZE/WEIGHT			6 × 3.23 × 5.31 inches]	(W×H×D) / 350g max	(with cover : 395g max	x)			
	COOLING METHOD		Convection							

- *1 Measured by 20MHz oscilloscope or Ripple-Noise meter (equivalent to KEISOKU-GIKEN: RM101).
- *2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C.
- *3 Applicable when Remote ON/OFF (optional) is added. RC is insulated with input, output and FG.
- *4 Refer to "Derating".
- *5 Please contact us about safety approvals for the model with option.

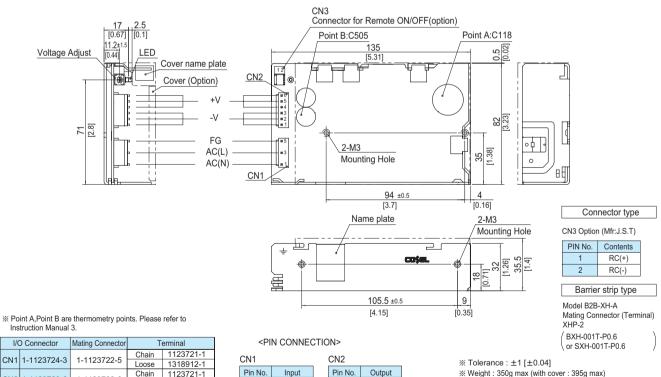
- *6 Please contact us about class C.
- * Parallel operation with other model is not possible.
- * Derating is required when operated with cover.
- A sound may occur from power supply at peak loading.





External view

X External size of option T and T1 is different from standard model and refer to 5 Option of instruction manual for details.



(Mfr : Tyco Electronics AMP)

* I/O Connector is Mfr.Tyco Electronics AMP

CN2 1-1123723-6

Option : -J1 : (J.S.T) connector type
 -T : Vertical terminal block type

1-1123722-6

Chain 1123721-1 Loose 1318912-1

-T1 : Horizontal terminal block type Refer to Instruction Manual 5.

Pin No.	Output
1 - 3	-V
4 - 6	+V

AC(N)

AC(L)

FG

2

3

4

Weight: 350g max (with cover: 395g max)

※ PCB Material/thickness : CEM-3 / 1.6mm [0.06inches]

 \times Dimensions in mm, []=inches ※ Mounting torque: 0.49N ⋅ m (5kgf ⋅ cm) max

 $\ensuremath{\ensuremath{\%}}$ Please connect safety ground to the unit in 2-M3 holes.

PMA100F

100

CRU'US LUK CE UK **RoHS** Vertical terminal block Standard type with Cover Horizontal terminal block (option:-T1) (option:-T) (option:-N) Example recommended EMI/EMC filter NAM-06-000

Low leakage current type : NAM 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.

- Series name
 Single output
 Output wattage
- 4)Universal input
- ⑤Output voltage
- Optional *5
 T : Vertical terminal block
 T1: Horizontal terminal block
 - N: with Cover
 - J1: VH(J.S.T.)connector type R: with Remote ON/OFF

Specification is changed at option, refer to Instruction Manual.

*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	PMA100F-3R3	PMA100F-5	PMA100F-12	PMA100F-24	PMA100F-48
MAX OUTPUT WATTAGE[W]	66	100	102	108	100.8
DC OUTPUT	3.3V 20A	5V 20A	12V 8.5A	24V 4.5A	48V 2.1A

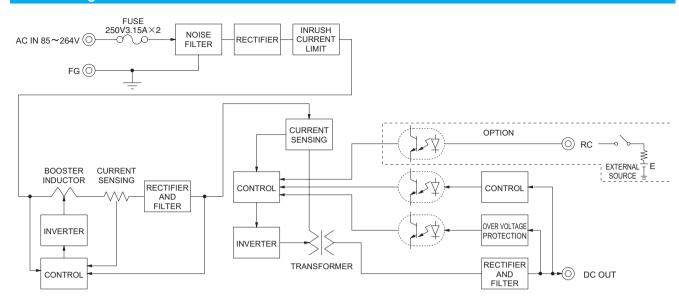
SPECIFICATIONS

	MODEL		PMA100F-3R3	PMA100F-5	PMA100F-12	PMA100F-24	PMA100F-48			
INPUT	VOLTAGE[V]		AC85 - 264 1 φ (Refer to the Instruction Manual 1.1)							
	ACIN 100		0.9typ (lo=100%) 1.3typ (lo=100%)							
	CURRENT[A]	ACIN 200V								
	FREQUENCY[Hz]		50 / 60 (47 - 63)							
	EFFICIENCY[9/]	ACIN 100V	77typ	81typ	82typ	84typ	84typ			
	EFFICIENCY[%]	ACIN 200V	78typ	83typ	83typ	86typ	86typ			
	POWER FACTOR	ACIN 100V	0.98typ							
	(lo=100%)	ACIN 200V	21 21							
	INRUSH CURRENT[A]	ACIN 100V								
	INKUSH CUKKENI[A]	ACIN 200V	40typ (lo=100%) (At cold start)							
	LEAKAGE CURRENT[mA]		0.09 / 0.18max (ACIN 100V / 240V 60Hz, lo=100%, According to IEC60601-1)							
	VOLTAGE[V]		3.3	5	12	24	48			
	CURRENT[A]		20.0	20.0	8.5	4.5	2.1			
	LINE REGULATION[LINE REGULATION[mV]		20max	48max	96max	192max			
	LOAD REGULATION[mV]		40max	40max	100max	150max	240max			
	RIPPLE[mVp-p]		80max	80max	120max	120max	150max			
	*1	-10 - 0℃	140max	140max	160max	160max	200max			
	RIPPLE NOISE[mVp-p]	0 to +50℃	120max	120max	150max	150max	250max			
ОИТРИТ	*1	-10 - 0℃	160max	160max	180max	180max	300max			
		0 to +50°C	50max	50max	120max	240max	480max			
	TEMPERATURE REGULATION[mV]	-10 to +50°C	60max	60max	150max	290max	600max			
	DRIFT[mV] *2		20max	20max	48max	96max	192max			
	START-UP TIME[ms]		250typ (ACIN 100V, Io=100%)							
	HOLD-UP TIME[ms]		20typ (ACIN 100V, Io=100%)							
	OUTPUT VOLTAGE ADJUSTMENT RANGE[V]		2.85 to 3.60	4.50 to 5.50	10.00 to 13.20	19.20 to 27.00	39.00 to 53.00			
ļ	OUTPUT VOLTAGE SETTING[V]		3.30 to 3.40	5.00 to 5.15	12.00 to 12.48	24.00 to 24.96	48.00 to 49.92			
	OVERCURRENT PROTECTION		Works over 105% of rating and recovers automatically							
PROTECTION	OVERVOLTAGE PROTECTIONIVI		4.00 to 5.25	5.75 to 7.00	15.00 to 18.00	30.00 to 37.00	58.00 to 65.00			
CIRCUIT AND	OPERATING INDICATION		LED (Green)							
IIIENO	REMOTE ON/OFF		Optional (Required external power source)							
	INPUT-OUTPUT-RC *3									
SOLATION	INPUT-FG		AC2,000V 1minute, Cutoff current = 10mA, DC500V 50M Ω min (At Room Temperature)							
	OUTPUT·RC-FG *3		AC500V 1minute, Cutoff current = 25mA, DC500V 50M Ω min (At Room Temperature)							
	OPERATING TEMP.,HUMID.AND ALTITUDE		-10 to +70°C, 20 - 90%RH (Non condensing), 3,000m (10,000feet) max *4							
	STORAGE TEMP.,HUMID.AND ALTITUDE		-20 to +75°C, 20 - 90%RH (Non condensing), 9,000m (30,000feet) max							
INVIRONMENT			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	AGENCY APPROVAL	LS	UL60601-1, C-UL (CSA-C22.2 No.601.1), EN60601-1							
IOISE	CONDUCTED NOISE		Complies with FCC-B, VCCI-B, CISPR11-B, CISPR22-B, EN55011-B, EN55022-B							
REGULATIONS			Complies with IEC61000-3-2 *6							
	OACE CIZE/MEIOLIT		34×93×168mm [1.34×3.66×6.61 inches] (W×H×D) / 560g max (with cover : 625g max)							
OTHERS	CASE SIZE/WEIGHT				Convection					

- *1 Measured by 20MHz oscilloscope or Ripple-Noise meter (equivalent to KEISOKU-GIKEN: RM101).
 *2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C.
- Applicable when Remote ON/OFF (optional) is added. RC is insulated with input, output and FG.
- Refer to "Derating".
- Please contact us about safety approvals for the model with option.

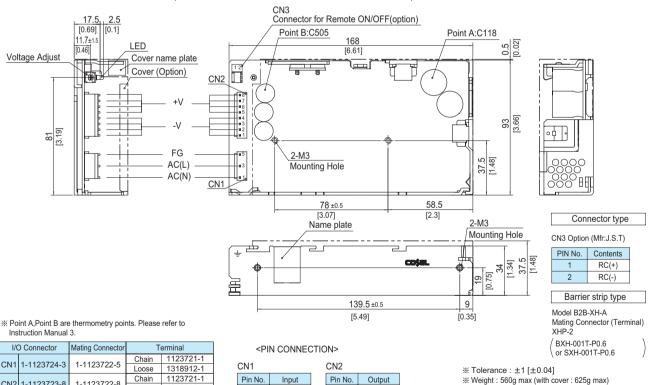
- Please contact us about class C.
- Parallel operation with other model is not possible.
- Derating is required when operated with cover
- A sound may occur from power supply at peak loading.





External view

** External size of option T and T1 is different from standard model and refer to 5 Option of instruction manual for detalis.



I/O Connector		Mating Connector	Terminal		
014	1-1123724-3	1-1123722-5	Chain	1123721-1	
CNT	1-1123724-3	1-1123722-5	Loose	1318912-1	
ONIO	1-1123723-8	1-1123722-8	Chain	1123721-1	
CNZ	1-1123723-8	1-1123722-8	Loose	1318912-1	

(Mfr : Tyco Electronics AMP)

- ※ I/O Connector is Mfr.Tyco Electronics AMP
- Option : -J1 : (J.S.T) connector type
 -T : Vertical terminal block type
- -T1 : Horizontal terminal block type Refer to Instruction Manual 5.

V 1			CN2	
in No.	Input		Pin No.	Output
1	AC(N)		1 - 4	-V
2			1 - 4	-v
3	AC(L)		5 - 8	+V
4			3-0	T V
E	FG	l		

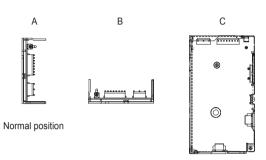
- Weight: 560g max (with cover: 625g max)
- % PCB Material/thickness : CEM-3 / 1.6mm [0.06inches]
- Chassis material: Aluminum
- * Keep drawing current per pin bellow 5A of CN2.
- * Dimensions in mm, []=inches
- ※ Mounting torque: 0.49N ⋅ m (5kgf ⋅ cm) max
- * Please connect safety ground to the unit in 2-M3 holes.

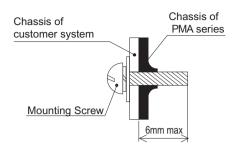


Assembling and Installation Method

Installation method

■Do not insert a screw more than 6mm from the outside of a power supply to keep enough insulation distance between the screw and internal components.

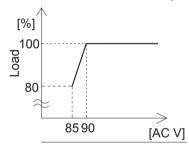




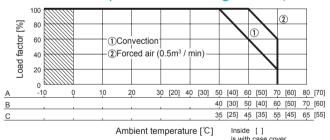
- ■If you use two or more power supplies side by side, please keep a sufficient distance between them to allow enough air ventilation.
- ■Ambient temperature around each power supply should not exceed the temperature range shown in "Derating".

Derating

PMA15F,PMA30F Input voltage Derating Curve



Ambient temperature Derating Curve (Reference value)



- ■In the hatched area, the specification of Ripple, Ripple Noise is different from other area.
- ■The ambient temperature should be measured 5 to 10 cm away from the power supply so that it won't be influenced by the heat from the power supply. Please consult us for more details.
- ■Make sure the temperature at point A and point B is less than the temperatures shown in Instruction Manual 3.

Instruction Manual

♦ It is neccessary to read the "Instruction Manual" and "Before using our product" before you use our product.

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







Basic Characteristics Data

Model	Circuit method	Switching frequency [kHz]	Input current [A] * 1	Inrush current protection	PCB/Pattern			Series/Parallel operation availability *2	
					Material	Single sided	Double sided	Series operation	Parallel operation
PMA15F	Flyback converter	100	0.4	Thermistor	CEM-3	Yes		Yes	No
PMA30F	Flyback converter	100	0.7	Thermistor	CEM-3	Yes		Yes	No
PMA60F	Active filter	60 - 550	0.8	Thermistor	CEM-3	Yes		Yes	No
	Forward converter	120							
PMA100F	Active filter	60 - 550	1.3	Thermistor	CEM-3	Yes		Yes	No
	Forward converter	120							

^{*1} The value of input current is at ACIN 100V and rated load. *2 Refer to Instruction Manual 2.