









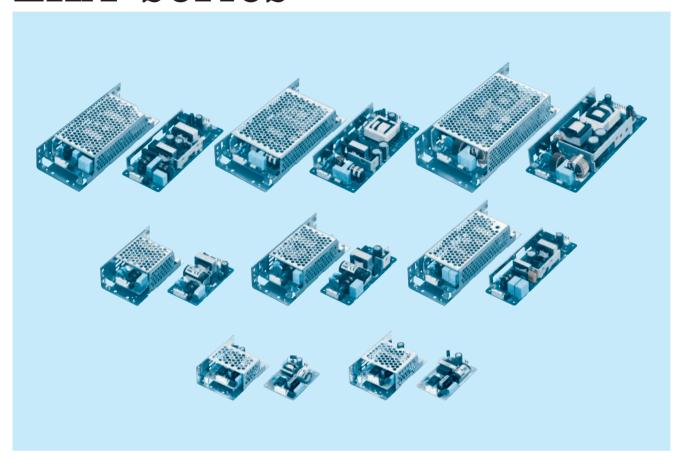








# LHA-series



#### Feature

EN62477-1 (OVC III)

Low-profile

Small and compact PCB construction

High efficiency

Low noise

Harmonic attenuator (Complies with IEC61000-3-2)

Power factor correction (LHA75F-300F)

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

EN62477-1 (OVC III): LHA150F, 300F

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 FCC-B, CISPR11-B, CISPR32-B, EN55011-B, EN55032-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

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High voltage pulse noise type : EAP series Low leakage current type : EAM 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 \*1
 C: with Coating
 J4: EP (TE Connectivity) connector type

S: with Chassis

SN: with Chassis & cover Y: with Potentiometer

For option details, refer to Instruction Manual 6.

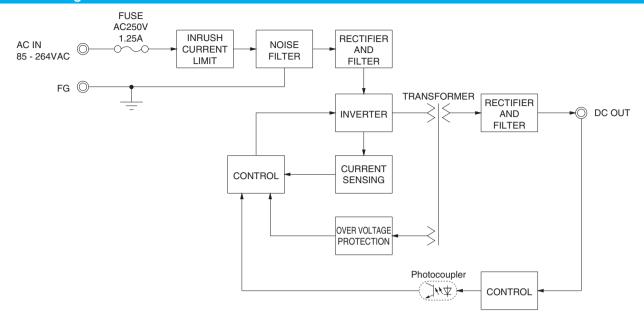
This power supply is manufactured by SMD technology. The stress to PCB like twisting or bending causes the defect of the unit, so handle the unit with care. \*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

MODEL	LHA10F-3R3-Y	LHA10F-5	LHA10F-12	LHA10F-15	LHA10F-24
MAX OUTPUT WATTAGE[W]	6.6	10	10.8	10.5	12
DC OUTPUT	2 3.3V 2A	5V 2A	12V 0.9A	15V 0.7A	24V 0.5A

#### **SPECIFICATIONS**

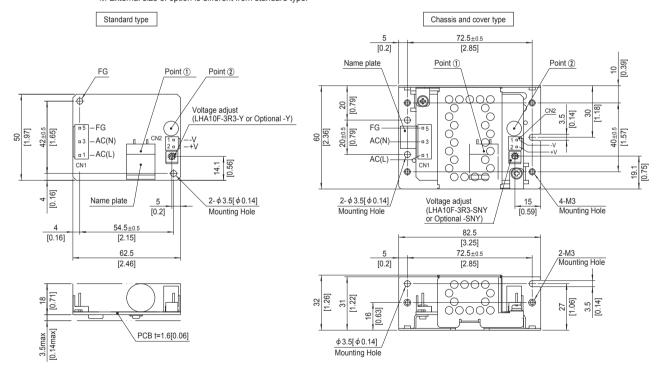
	MODEL		LHA10F-3R3-Y	LHA10F-5	LHA10F-12	LHA10F-15	LHA10F-24	
	VOLTAGE[VAC]	*2	85 - 264 1 φ (Refer to "Derating" and Instruction Manual 1.1)					
	CURRENT[A]		0.18typ	0.26typ				
	CONNENT[A]	ACIN 230V	0.10typ	0.14typ				
	FREQUENCY[Hz]		50 / 60 (45 - 440)					
NPUT	EFFICIENCY[%]	ACIN 100V	72.0typ	77.0typ	79.5typ	81.0typ	82.5typ	
	EFFICIENCI[%]	ACIN 230V	72.0typ	78.5typ	81.0typ	83.0typ	84.5typ	
	INRUSH CURRENT[A]	ACIN 100V	15typ (lo=100%)					
	INNUSTI CONNENT[A]	ACIN 230V	35typ (lo=100%)					
	LEAKAGE CURREN	T[mA]	0.07 / 0.15max (ACIN	100V / 240V, 60Hz, I	=100%, According to	IEC62368-1, and DEN	I-AN)	
	VOLTAGE[V]		3.3	5	12	15	24	
	CURRENT[A]	*2	2.0	2.0	0.9	0.7	0.5	
	LINE REGULATION[	mV] *3	20max	20max	48max	60max	96max	
	LOAD REGULATION	I[mV] *3	40max	40max	100max	120max	150max	
		0 to +60°C *7	80max	80max	120max	120max	120max	
	RIPPLE[mVp-p]	-10 to 0℃	140max	140max	160max	160max	160max	
	**	lo=0 to 25%	300max	300max	300max	300max	300max	
		0 to +60°C *7	120max	120max	150max	150max	150max	
UTPUT	RIPPLE NOISE[mVp-p]	-10 to 0℃	160max	160max	180max	180max	180max	
	*4	lo=0 to 25%	360max	360max	360max	360max	360max	
	TEMPEDATIDE DECILIATIONIMAL	0 to +60°C *7	50max	50max	120max	150max	240max	
		-10 to +60°C *7	60max	60max	150max	180max	290max	
	DRIFT[mV] *5		20max	20max	48max	60max	96max	
			40typ (ACIN 100V, lo=100%)					
			20typ (ACIN 100V, Io=100%) / 150typ (ACIN 230V, Io=100%)					
	OUTPUT VOLTAGE ADJUSTMENT	RANGE[V]	2.85 to 3.63		vailable for adjusting or	utput voltage between	±10%)	
	OUTPUT VOLTAGE SET	TING[V]	3.30 to 3.40	4.90 to 5.30	11.50 to 12.50	14.40 to 15.60	23.00 to 25.00	
	OVERCURRENT PROT	ECTION	Works over 105% of r	ating and recovers au	tomatically	·	'	
ROTECTION	OVERVOLTAGE PROTI		4.00 to 6.00	5.75 to 8.00	13.80 to 18.00	17.25 to 23.30	27.60 to 34.50	
IRCUIT AND	OPERATING INDICA		Not provided		1			
THERS	REMOTE SENSING		Not provided					
	INPUT-OUTPUT		AC3,000V 1minute, C	utoff current = 10mA,	DC500V 100MΩ min	(At Room Temperature	e)	
SOLATION	INPUT-FG		AC2,000V 1minute, Cutoff current = 10mA, DC500V 100M $\Omega$ min (At Room Temperature)					
	OUTPUT-FG		, ,	C500V 1minute, Cutoff current = 25mA, DC500V 100M $\Omega$ min (At Room Temperature)				
	OPERATING TEMP., HUMID. AND A	ALTITUDE *2	,	,	a), 5,000m (16,500feet)			
	STORAGE TEMP., HUMID. AND				g), 9,000m (30,000feet)			
NVIRONMENT	VIBRATION				60minutes each along			
	IMPACT		196.1m/s² (20G), 11m					
AFETY AND	AGENCY APPROVA	LS	. ,,		C22.2No.62368-1), EN	162368-1, Complies wi	th DEN-AN	
IOISE	CONDUCTED NOISE		, , ,					
	HARMONIC ATTENU		Complies with FCC-B, VCCI-B, CISPR11-B, CISPR32-B, EN55011-B, EN55032-B  Complies with IEC61000-3-2 (Class A) (No built-in power factor correction)					
	CASE SIZE/WEIGHT				es] (W×H×D) / 45g n			
OTHERS	COOLING METHOD *2 Convection/Forced				,	e c		

- The listed options may affect the published standard specifications. Please contact us for detailed product specifications.
- Derating is required.
- 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. This is the value that measured on measuring board with capacitor of 22  $\mu$ F and 0.1  $\mu$ F at 150mm from output terminal. Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN:RM104).
  - Ripple and ripple noise spec is change at lo=0 to 25% by burst operation. Audible noise may be generated.
- **\***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.
- 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.
- 3.3V, 5V, 12V output product, the maximum temperature of 55°C.
- To meet the specification, do not operate overload condition.
- Parallel operation is not possible
- Sound noise may be generated by power supply in case of pulse load.



#### **External view**

\* External size of option is different from standard type.



- % The back side of PCB of the power supply is assembled some
- Be careful not to bump against the attached area by vibration. W Use the spacer of 8mm [0.31] length or more for isolation.
- And do not use press-fitting bush.
- % Point ①, Point ② are thermometry points. Please refer to Instruction Manual 3.

I/O Connector		Mating connector			
CN1 B3P5-VH		VHR-5N	Chain	SVH-21T-P1.1	
CIVI	B3P3-VII	VIIK-SIN	Loose	BVH-21T-P1.1	
CN2 B2P-VH	DOD VIII	VHR-2N	Chain	SVH-21T-P1.1	
CINZ	BZP-VH	VHR-ZIV	Loose	BVH-21T-P1.1	

(Mfr: J.S.T.)

- ※ I/O Connector is Mfr.J.S.T.
- ※ Option:-J4:EP (TE Connectivity) connector type.

CN1

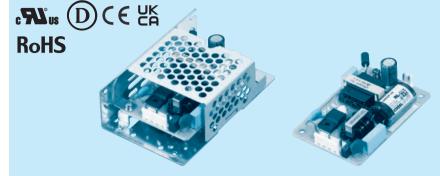
Pin No.	Input		Pin No.	Output
1	AC(L)		1	-V
2			'	-v
3	AC(N)		2	+V
4				T V
_	FG	1		

CN2

- % Pin No.2 and 4 is NC at CN1.

- Dimensions in mm, []=inches
   Tolerance: ±1 [±0.04]
   Weight: 45g max (with chassis and cover: 115g max)
- PCB Material / thickness : CEM-3 / 1.6mm [0.06]
   Optional chassis and cover material : Galvanizing steel board
- Mounting torque (Mounting hole of chassis): 1.5N m max

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Example recommended EMI/EMC filter EAC-03-472

High voltage pulse noise type : EAP series Low leakage current type : EAM 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 \*1
 C: with Coating
 J4: EP (TE Connectivity) connector type

S: with Chassis

SN: with Chassis & cover Y: with Potentiometer

For option details, refer to Instruction Manual 6.

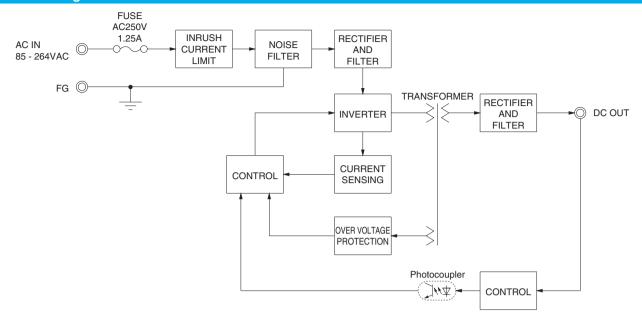
This power supply is manufactured by SMD technology. The stress to PCB like twisting or bending causes the defect of the unit, so handle the unit with care. \*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

MODEL	LHA15F-3R3-Y	LHA15F-5	LHA15F-12	LHA15F-15	LHA15F-24
MAX OUTPUT WATTAGE[W] *2	9.9	15	15.6	15	16.8
DC OUTPUT *2	3.3V 3A	5V 3A	12V 1.3A	15V 1.0	24V 0.7A

#### **SPECIFICATIONS**

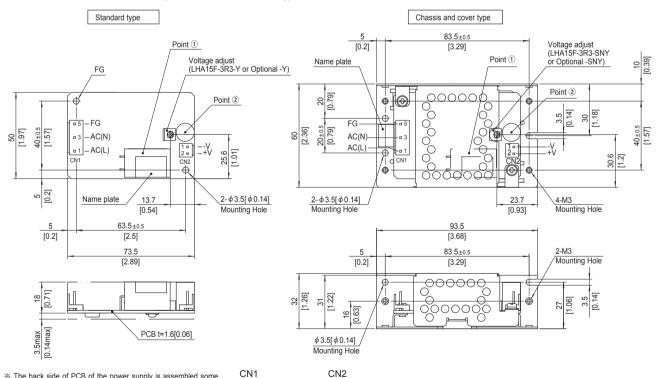
	MODEL		LHA15F-3R3-Y	LHA15F-5	LHA15F-12	LHA15F-15	LHA15F-24			
	VOLTAGE[VAC]	*2	85 - 264 1 φ (Refer to	"Derating" and Instructi	on Manual 1.1)					
	CURRENT[A]	ACIN 100V	0.24typ	0.35typ						
	CONNENT[A]	ACIN 230V	0.15typ	0.19typ						
	FREQUENCY[Hz]		50 / 60 (45 - 440)							
NPUT	EFFICIENCY[%]	ACIN 100V	71.5typ	75.0typ	79.0typ	80.0typ	81.5typ			
	EFFICIENCI[%]	ACIN 230V	72.5typ	77.0typ	82.0typ	83.0typ	84.5typ			
	INRUSH CURRENT[A]	ACIN 100V		15typ (lo=100%) Ta=25℃ at cold start						
		ACIN 230V	35typ (lo=100%) Ta=2							
	LEAKAGE CURREN	T[mA]	0.05 / 0.10max (ACIN		=100%, According to IE	C62368-1, and DEN-Al	N)			
	VOLTAGE[V]		3.3	5	12	15	24			
	CURRENT[A]			3.0	1.3	1.0	0.7			
	LINE REGULATION[			20max	48max	60max	96max			
	LOAD REGULATION	[mV] *3		40max	100max	120max	150max			
	RIPPLE[mVp-p]	0 to +60°C *7	80max	80max	120max	120max	120max			
	KIPPLE[IIIVP-P]   *4	-10 to 0°C	140max	140max	160max	160max	160max			
		lo=0 to 25%	300max	300max	300max	300max	300max			
	RIPPLE NOISE[mVp-p]	0 to +60°C *7	120max	120max	150max	150max	150max			
OUTPUT	*4	-10 to 0℃	160max	160max	180max	180max	180max			
		lo=0 to 25%	360max	360max	360max	360max	360max			
	TEMPERATURE REGULATION[mV]	0 to +60°C *7	50max	50max	120max	150max	240max			
		-10 to +60°C <b>*</b> 7	60max	60max	150max	180max	290max			
	<u> </u>		20max	20max	48max	60max	96max			
	START-UP TIME[ms]		40typ (ACIN 100V, Io=100%)							
	HOLD-UP TIME[ms]		71 \	20typ (ACIN 100V, Io=100%) / 150typ (ACIN 230V, Io=100%)						
	OUTPUT VOLTAGE ADJUSTMENT		2.85 to 3.63		ailable for adjusting out					
	OUTPUT VOLTAGE SET		3.30 to 3.40	4.90 to 5.30	11.50 to 12.50	14.40 to 15.60	23.00 to 25.00			
ROTECTION	OVERCURRENT PROT			ating and recovers auto						
IRCUIT AND	OVERVOLTAGE PROTI		4.00 to 6.00	5.75 to 8.00	13.80 to 18.00	17.25 to 23.30	27.60 to 34.50			
THERS	OPERATING INDICA	TION	Not provided							
	REMOTE SENSING		Not provided							
	INPUT-OUTPUT		AC3,000V 1minute, Cutoff current = 10mA, DC500V 100M $\Omega$ min (At Room Temperature)							
SOLATION	INPUT-FG		AC2,000V 1minute, Cutoff current = 10mA, DC500V 100M $\Omega$ min (At Room Temperature)							
	OUTPUT-FG		AC500V 1minute, Cutoff current = 25mA, DC500V 100M $\Omega$ min (At Room Temperature) -10 to +70°C, 20 - 90%RH (Non condensing), 5,000m (16,500feet) max							
	OPERATING TEMP., HUMID. AND				, , , , ,					
NVIRONMENT	STORAGE TEMP., HUMID. AND	ALIIIUDE	-20 to +75°C, 20 - 90%RH (Non condensing), 9,000m (30,000feet) max  10 - 55Hz, 19.6m/s² (2G), 3minutes period, 60minutes each along X, Y and Z axis							
	VIBRATION					, Y and ∠ axis				
A	IMPACT		196.1m/s² (20G), 11ms, once each X, Y and Z axis   UL62368-1, C-UL (equivalent to CAN/CSA-C22.2No.62368-1), EN62368-1, Complies with DEN-AN							
SAFETY AND	AGENCY APPROVA						DEN-AN			
IOISE	CONDUCTED NOISE				CISPR32-B, EN55011-					
IEGULATIONS	HARMONIC ATTENU				uilt-in power factor corr					
OTHERS	CASE SIZE/WEIGHT				s] (W×H×D) / 60g ma	X				
COOLING METHOD *2			Convection/Forced air	(Requires external fan	) (Refer to "Derating")					

- The listed options may affect the published standard specifications. Please contact us for
- detailed product specifications. Derating is required.
- 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. This is the value that measured on measuring board with capacitor of 22  $\mu$  F and 0.1  $\mu$  F at 150mm from output terminal. Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN:RM104).
  - Ripple and ripple noise spec is change at lo=0 to 25% by burst operation. Audible noise may be generated.
- 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.
- 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
- 3.3V, 5V, 12V output product, the maximum temperature of 55°C.
- To meet the specification, do not operate overload condition.
- Parallel operation is not possible
- Sound noise may be generated by power supply in case of pulse load.



#### **External view**

\* External size of option is different from standard type.



- \* The back side of PCB of the power supply is assembled some SMDs.
- Be careful not to bump against the attached area by vibration. \* Use the spacer of 8mm [0.31] length or more for isolation.
- And do not use press-fitting bush.
- % Point ①, Point ② are thermometry points. Please refer to Instruction Manual 3.

I/O Connector				Terminal		
ONIA	B3P5-VH	VHR-5N	Chain	SVH-21T-P1.1		
CNT	B3P5-VH	VHK-5IN	Loose	BVH-21T-P1.1		
ONIO	DOD VIII	VHR-2N	Chain	SVH-21T-P1.1		
CNZ	B2P-VH	VHR-ZN	Loose	BVH-21T-P1.1		

(Mfr: J.S.T.)

- \* I/O Connector is Mfr.J.S.T.
- ※ Option:-J4:EP (TE Connectivity) connector type.
- Pin No. 2 3 4 5

	0112									
	Input		Pin No.	Output						
	AC(L)		1	-V						
				- v						
	AC(N)		2	+V						
				+V						
I	FG									

- % Pin No.2 and 4 is NC at CN1.

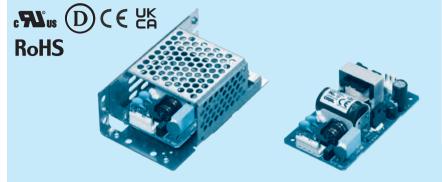
- Dimensions in mm, []=inches
   Tolerance: ±1 [±0.04]
   Weight: 60g max (with chassis and cover: 140g max)
- # PCB Material / thickness : CEM-3 / 1.6mm [0.06]

  Optional chassis and cover material : Galvanizing steel board

  Mounting torque (Mounting hole of chassis) : 1.5N m max

## LHA30F

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Example recommended EMI/EMC filter EAC-03-472

High voltage pulse noise type : EAP series Low leakage current type : EAM 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 \*1
 C : with Coating
 G: Low leakage current

J4 : EP (TE Connectivity) connector type

S: with Chassis

SN: with Chassis & cover

Y: with Potentiometer

For option details, refer to Instruction Manual 6.

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.

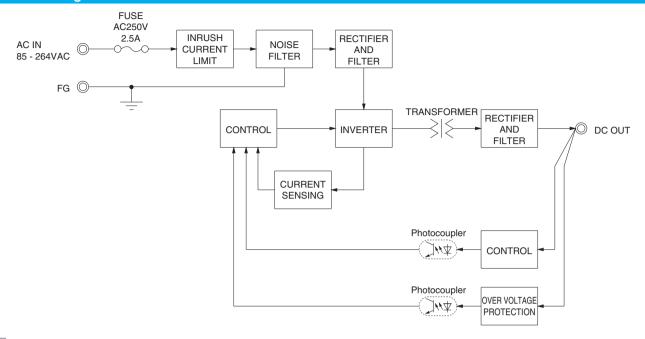
MODEL	LHA30F-3R3-Y	LHA30F-5	LHA30F-12	LHA30F-15	LHA30F-24
MAX OUTPUT WATTAGE[W] *2	19.8	30	30	30	31.2
DC OUTPUT *2	3.3V6A	5V6A	12V2.5A	15V2A	24V1.3A

#### **SPECIFICATIONS**

	MODEL		LHA30F-3R3-Y	LHA30F-5	LHA30F-12	LHA30F-15	LHA30F-24			
	VOLTAGE[VAC]	*2	85 - 264 1 φ (Refer to	"Derating" and Inst	ruction Manual 1.1)					
	CUDDENTIAL	ACIN 100V	0.42typ	0.62typ	,					
	CURRENT[A]	ACIN 230V	0.23typ	0.32typ						
	FREQUENCY[Hz]		50 / 60 (45 - 440)							
INPUT	EFFICIENCY[9/1	ACIN 100V	83.0typ	83.0typ	85.0typ	85.5typ	87.0typ			
	EFFICIENCY[%]	ACIN 230V	85.5typ	87.0typ	88.5typ	89.0typ	90.0typ			
	INRUSH CURRENT[A]	ACIN 100V	15typ (lo=100%) Ta=2	15typ (lo=100%) Ta=25℃ at cold start						
	INNUSH CURRENT[A]	ACIN 230V	35typ (lo=100%) Ta=2							
	LEAKAGE CURREN	T[mA]	0.20 / 0.45max (ACIN	I 100V / 240V 60Hz	, lo=100%, According t	o IEC62368-1 and DEN	I-AN)			
	VOLTAGE[V]		3.3	5	12	15	24			
	CURRENT[A]	*2	6.0	6.0	2.5	2.0	1.3			
	LINE REGULATION[	mV] *3	20max	20max	48max	60max	96max			
	LOAD REGULATION	[mV] *3	40max	40max	100max	120max	150max			
		0 to +50°C	80max	80max	120max	120max	120max			
	RIPPLE[mVp-p]	-10 to 0℃	140max	140max	160max	160max	160max			
	<b>↑</b> 4	lo=0 to 15%	300max	300max	300max	300max	300max			
		0 to +50℃	120max	120max	150max	150max	150max			
JTPUT	RIPPLE NOISE[mVp-p]	-10 to 0°C	160max	160max	180max	180max	180max			
	*4	lo=0 to 15%	360max	360max	360max	360max	360max			
	TEMPERATURE REGULATION[mV]	0 to +50°C	50max	50max	120max	150max	240max			
		-10 to +50°C	60max	60max	150max	180max	290max			
	DRIFT[mV] *5		20max	20max	48max	60max	96max			
	START-UP TIME[ms]		40typ (ACIN 100V, Io=100%)							
	HOLD-UP TIME[ms]	DLD-UP TIME[ms]		25typ (ACIN 100V, Io=100%) / 170typ (ACIN 230V, Io=100%)						
	OUTPUT VOLTAGE ADJUSTMENT	RANGE[V]	2.85 to 3.63	Fixed ("Y"option is	available for adjusting	output voltage between	±10%)			
	OUTPUT VOLTAGE SET	TING[V]	3.30 to 3.40	4.90 to 5.30	11.50 to 12.50	14.40 to 15.60	23.00 to 25.00			
	OVERCURRENT PROT	ECTION	Works over 105% of a	rating and recovers	automatically	·				
OTECTION	OVERVOLTAGE PROTE	ECTION	4.00 to 5.25	5.75 to 7.00	13.80 to 16.80	17.25 to 21.00	27.60 to 33.60			
RCUIT AND HERS	OPERATING INDICA	TION	Not provided	•		<del></del>	·			
IIENO	REMOTE SENSING		Not provided							
	INPUT-OUTPUT		AC3,000V 1minute, C	Cutoff current = 10m	A, DC500V 100MΩ mi	n (At Room Temperature	e)			
DLATION	INPUT-FG		AC2,000V 1minute, Cutoff current = 10mA, DC500V 100M $\Omega$ min (At Room Temperature)							
	OUTPUT-FG		AC500V 1minute, Cutoff current = 25mA, DC500V 100M $\Omega$ min (At Room Temperature)							
	OPERATING TEMP., HUMID. AND A	ALTITUDE *2	-10 to +70°C, 20 - 90°	%RH (Non condens	ing), 5,000m (16,500fee	et) max				
WIDONIAENT	STORAGE TEMP., HUMID. AND	ALTITUDE	-20 to +75°C, 20 - 90%RH (Non condensing), 9,000m (30,000feet) max							
VIRONMENT	VIBRATION		10 - 55Hz, 19.6m/s <sup>2</sup> (2	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							
FETY AND	AGENCY APPROVAL	LS	UL62368-1, C-UL (ed	uivalent to CAN/CS	A-C22.2No.62368-1), E	N62368-1, Complies w	ith DEN-AN			
DISE	CONDUCTED NOISE Complies with FCC-B, VCCI-B, CISPR11-B, CISPR32-B, EN55011-B, EN55032-B									
GULATIONS	HARMONIC ATTENU	CATTENUATOR *6 Complies with IEC61000-3-2 (Class A) (No built-in power factor correction)								
	CASE SIZE/WEIGHT		50×27×87.5mm [1.9	97×1.07×3.44 inch	nes] (WXHXD) / 100g	max (with chassis & co	ver : 210g max)			
THERS	COOLING METHOD	*2	•		fan) (Refer to "Derating		· /			

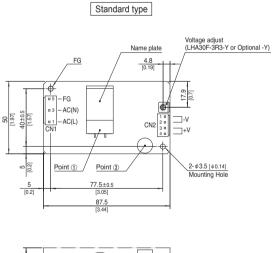
- The listed options may affect the published standard specifications. Please contact us for detailed product specifications.
- Derating is required.
- At low load conditions, the burst mode operation will start. To check load regulation, you will need to measure the characteristics at average mode with instruments. This is the value that measured on measuring board with capacitor of 22  $\mu$ F and 0.1  $\mu$ F
- at 150mm from output terminal. Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN:RM104). Ripple and ripple noise spec is change at lo=0 to 15% by burst operation.
- 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.
- 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 generated by power supply in case of pulse load.

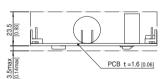
LHA-6 April 07, 2025 www.cosel.co.jp/en/



#### **External view**

\* External size of option is different from standard type.



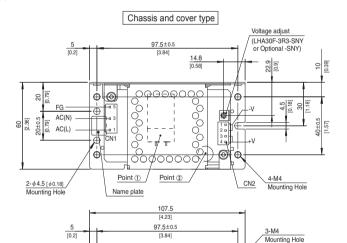


- $\ensuremath{\,\times\,}$  The back side of PCB of the power supply is assembled some SMDs. Be careful not to bump against the attached area by vibration.
- W Use the spacer of 8mm [0.31] length or more for isolation.
- And do not use press-fitting bush.
- % Point ①, Point ② are thermometry points. Please refer to Instruction Manual 3.

I/O Connector		Mating connector		
ONIA	B3P5-VH	VILID EN	Chain	SVH-21T-P1.1
CNT	B3P5-VH	VHR-5N	Loose	BVH-21T-P1.1
ONIO	B4P-VH	\#\ID 4\\	Chain	SVH-21T-P1.1
CNZ	B4P-VH	VHR-4N	Loose	BVH-21T-P1.1

(Mfr: J.S.T.)

- % I/O Connector is Mfr.J.S.T.
- ※ Option:-J4:EP (TE Connectivity) connector type.



00000000

	Mounting Hole									
N1			CN2							
in No.	Input		Pin No.	Output						
1	AC(L)		1, 2	-V						
2			1, 2	-v						
3	AC(N)		3, 4	+V						
4			3, 4	T V						
5	FG									

37.5 [1.48] 35.5 [1.4]

8.5 2- \$4.5 [\$0.18]

ф

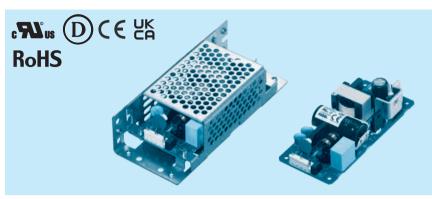
\* Pin No.2 and 4 is NC at CN1.

10

Pi

- ※ Keep drawing current per pin below 5A for CN2.
- ※ Dimensions in mm, [ ]=inches
- ※ Tolerance: ±1 [±0.04]
- Weight: 100g max (with chassis and cover: 210g max)
- ※ PCB Material / thickness : FR-4 / 1.6mm [0.06]
- ※ Optional chassis and cover material : Galvanizing steel board
- Mounting torque (Mounting hole of chassis): 1.5N·m max

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Example recommended EMI/EMC filter EAC-03-472

High voltage pulse noise type : EAP series Low leakage current type : EAM 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 \*1
 C : with Coating
 G: Low leakage current J4 : EP (TE Connectivity) connector type

S: with Chassis

SN: with Chassis & cover

Y: with Potentiometer

For option details, refer to Instruction Manual 6.

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	LHA50F-3R3-Y	LHA50F-5	LHA50F-12	LHA50F-15	LHA50F-24	LHA50F-36	LHA50F-48
MAX OUTPUT WATTAGE[W] *2	26.4	40	51.6	52.5	50.4	50.4	52.8
DC OUTPUT *2	3.3V8A	5V8A	12V4.3A	15V3.5A	24V2.1A	36V1.4A	48V1.1A

#### **SPECIFICATIONS**

	MODEL		LHA50F-3R3-Y	LHA50F-5	LHA50F-12	LHA50F-15	LHA50F-24	LHA50F-36	LHA50F-48		
	VOLTAGE[VAC]	*2	85 - 264 1 φ (R	efer to "Derating	and Instruction	Manual 1.1)					
	CURRENT[A]	ACIN 100V	0.56typ	0.82typ	1.05typ						
	CONNENT[A]	ACIN 230V	0.30typ	0.42typ	0.52typ						
	FREQUENCY[Hz]		50 / 60 (45 - 440)								
INPUT	EFFICIENCY[%]	ACIN 100V	80.0typ	83.0typ	87.0typ	85.5typ	86.0typ	86.5typ	86.5typ		
	EFFICIENCI[%]	ACIN 230V	83.5typ	86.5typ	90.5typ	89.0typ	89.0typ	90.0typ	90.0typ		
	INRUSH CURRENT[A]	ACIN 100V	15typ (lo=100%	yp (Io=100%) Ta=25°C at cold start							
	INNUSTI CONNENT[A]	ACIN 230V	35typ (lo=100%	35typ (lo=100%) Ta=25℃ at cold start							
	LEAKAGE CURREN	T[mA]	0.30 / 0.65max	0.30 / 0.65max (ACIN 100V / 240V 60Hz, lo=100%, According to IEC62368-1 and DEN-AN)							
	VOLTAGE[V]		3.3	5	12	15	24	36	48		
	CURRENT[A]		8.0	8.0	4.3	3.5	2.1	1.4	1.1		
	LINE REGULATION[mV] *3		20max	20max	48max	60max	96max	144max	192max		
	LOAD REGULATION			40max	100max	120max	150max	240max	240max		
	DIDDI E[m\/m m²	0 to +50℃		80max	120max	120max	120max	150max	150max		
	RIPPLE[mVp-p]	-10 to 0℃	140max	140max	160max	160max	160max	200max	200max		
		lo=0 to 15%	300max	300max	300max	300max	300max	300max	300max		
	DIDDLE NOICE(V1		120max	120max	150max	150max	150max	250max	250max		
OUTPUT	RIPPLE NOISE[mVp-p]	-10 to 0℃	160max	160max	180max	180max	180max	300max	300max		
		lo=0 to 15%	360max	360max	360max	360max	360max	360max	360max		
	TEMPERATURE REGULATION[mV]	0 to +50°C	50max	50max	120max	150max	240max	360max	480max		
		-10 to +50°C	60max	60max	150max	180max	290max	450max	600max		
	DRIFT[mV]	*5	20max	20max	48max	60max	96max	144max	192max		
	START-UP TIME[ms]		40typ (ACIN 100V, Io=100%)								
	HOLD-UP TIME[ms]		20typ (ACIN 100V, Io=100%) / 140typ (ACIN 230V, Io=100%)								
	OUTPUT VOLTAGE ADJUSTMENT	RANGE[V]	2.85 to 3.63				voltage between				
	OUTPUT VOLTAGE SET	TING[V]	3.30 to 3.40	4.90 to 5.30	11.50 to 12.50	14.40 to 15.60	23.00 to 25.00	34.50 to 37.50	46.00 to 50.00		
PROTECTION	OVERCURRENT PROT			% of rating and							
CIRCUIT AND	OVERVOLTAGE PROTI		4.00 to 5.25	5.75 to 7.00	13.80 to 16.80	17.25 to 21.00	27.60 to 33.60	41.40 to 50.40	55.20 to 67.20		
OTHERS	OPERATING INDICA	TION	Not provided								
	REMOTE SENSING		Not provided								
	INPUT-OUTPUT						n (At Room Temp				
ISOLATION	INPUT-FG						n (At Room Temp				
	OUTPUT-FG						At Room Tempe	rature)			
	OPERATING TEMP., HUMID. AND A			0 - 90%RH (Non							
ENVIRONMENT	STORAGE TEMP., HUMID. AND	ALTITUDE		0 - 90%RH (Non							
	VIBRATION						g X, Y and Z axis	S			
	IMPACT		196.1m/s² (20G), 11ms, once each X, Y and Z axis  UL62368-1, C-UL (equivalent to CAN/CSA-C22.2No.62368-1), EN62368-1, Complies with DEN-AN								
SAFETY AND	AGENCY APPROVA								.N		
NOISE	CONDUCTED NOISE						11-B, EN55032-	В			
REGULATIONS	HARMONIC ATTENU			EC61000-3-2 (C							
OTHERS	CASE SIZE/WEIGHT	•					nax (with chassis	& cover : 280g i	max)		
J.112110	COOLING METHOD	*2	Convection/For	ced air (Requires	external fan) (F	Refer to "Deratinຸ	<b>J</b> ")				

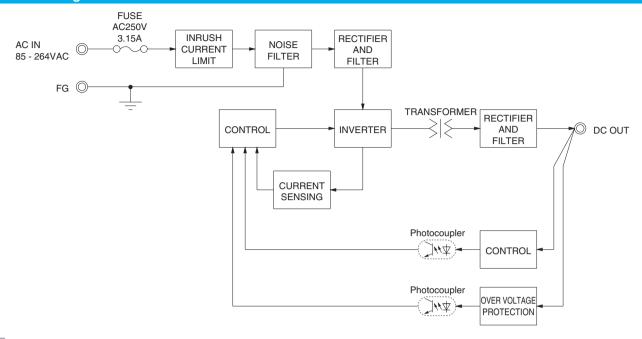
- The listed options may affect the published standard specifications. Please contact us for detailed product specifications
- Derating is required.
- At low load conditions, the burst mode operation will start. To check load regulation, you
- will need to measure the characteristics at average mode with instruments. This is the value that measured on measuring board with capacitor of 22  $\mu$  F and 0.1  $\mu$  F at 150mm from output terminal. Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN:RM104).

Ripple and ripple noise spec is change at lo=0 to 15% by burst operation.

- 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.
- 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 generated by power supply in case of pulse load.

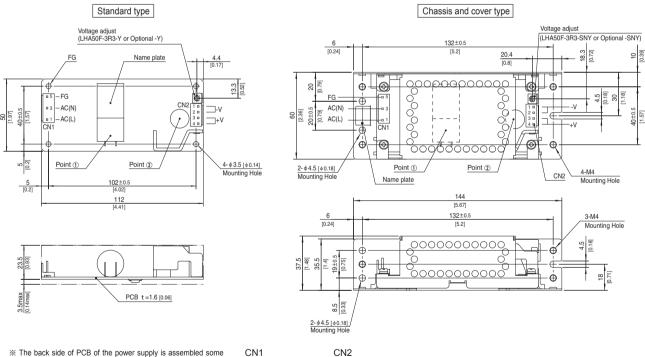
LHA-8 April 07, 2025 www.cosel.co.jp/en/





#### **External view**

\* External size of option is different from standard type.



- $\ensuremath{\,\times\,}$  The back side of PCB of the power supply is assembled some SMDs.
- Be careful not to bump against the attached area by vibration. W Use the spacer of 8mm [0.31] length or more for isolation. And do not use press-fitting bush.
- \* Point ①, Point ② are thermometry points. Please refer to Instruction Manual 3.

I/O	Connector	Mating connector		Terminal
ONIA	CN1 B3P5-VH VHR-5N		Chain	SVH-21T-P1.1
CNT	B3P5-VH	VHK-5N	Loose	BVH-21T-P1.1
ONIO	D4D VIII	V/UD 4N	Chain	SVH-21T-P1.1
CN2	B4P-VH	VHR-4N	Loose	BVH-21T-P1.1

(Mfr: J.S.T.)

- % I/O Connector is Mfr.J.S.T.
- ※ Option:-J4:EP (TE Connectivity) connector type.
- AC(L) 1, 2 -V AC(N) 3 +V 3. 4 4 FG
- ※ Pin No.2 and 4 is NC at CN1.

Input

Pin No.

- ※ Keep drawing current per pin below 5A for CN2.
- ※ Dimensions in mm, [ ]=inches
- % Tolerance : ±1 [±0.04]
- Weight: 140g max (with chassis and cover: 280g max)

Pin No.

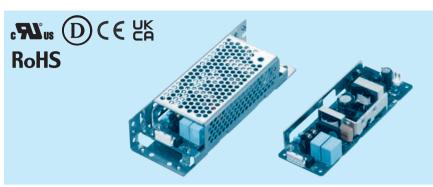
Output

- ※ PCB Material / thickness : FR-4 / 1.6mm [0.06]
- ※ Optional chassis and cover material : Galvanizing steel board
- Mounting torque (Mounting hole of chassis): 1.5N·m max

#### Ordering information

## LHA75F

A 75 F



Example recommended EMI/EMC filter EAC-03-472

High voltage pulse noise type : EAP series Low leakage current type : EAM 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.

111475540 111475545 111475504 111475500

Series name
 Single output
 Output wattage

4)Universal input

⑤Output voltage

Optional \*1
 C : with Coating
 G: Low leakage current

J4 : EP (TE Connectivity) connector type

S: with Chassis

SN: with Chassis & cover

Y: with Potentiometer

For option details, refer to Instruction Manual 6.

1114755 40

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.

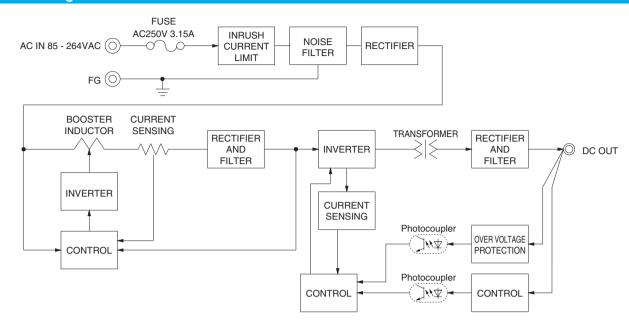
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MODEL	LHA75F-3R3-Y	LHA75F-5	LHA75F-12	LHA75F-15	LHA75F-24	LHA75F-36	LHA75F-48
MAX OUTPUT WATTAGE[W] *2	39.6	60	75.6	75	76.8	75.6	76.8
DC OUTPUT *2	3.3V12A	5V12A	12V6.3A	15V5A	24V3.2A	36V2.1A	48V1.6A

#### **SPECIFICATIONS**

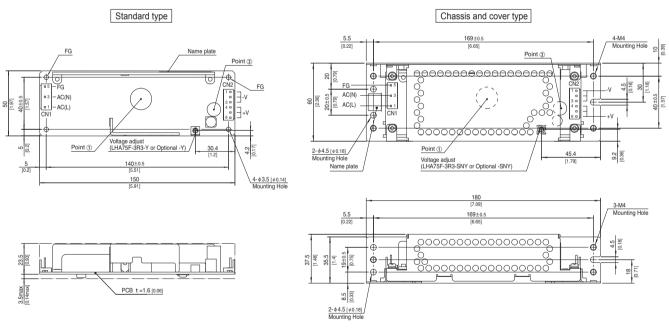
	MODEL		LHA75F-3R3-Y	LHA75F-5	LHA75F-12	LHA75F-15	LHA75F-24	LHA75F-36	LHA75F-48		
	VOLTAGE[VAC]	*2	85 - 264 1 φ (R	efer to "Derating	and Instruction	Manual 1.1)					
	CUDDENTIAL	ACIN 100V	0.6typ	0.8typ	0.9typ						
	CURRENT[A]	ACIN 230V	0.3typ	0.4typ	0.5typ						
	FREQUENCY[Hz]		50 / 60 (45 - 66)								
	EFFICIENCY[0/1	ACIN 100V	74.0typ	79.0typ	84.5typ	85.5typ	86.0typ	87.5typ	87.5typ		
INPUT	EFFICIENCY[%]	ACIN 230V	75.0typ	81.0typ	86.5typ	87.5typ	88.0typ	89.5typ	89.5typ		
	POWER FACTOR (Io=100%)	ACIN 100V	0.96typ	0.97typ	,						
	POWER FACTOR (10=100%)	ACIN 230V	0.70typ	70typ 0.80typ							
	INRUSH CURRENT[A]	ACIN 100V	15typ (lo=100%) Ta=25°C at cold start								
		ACIN 230V	35typ (lo=100%	35typ (lo=100%) Ta=25°C at cold start							
	LEAKAGE CURREN	T[mA]	0.40 / 0.75max	(ACIN 100V / 24	0V 60Hz, lo=10	0%, According to	IEC62368-1 an	d DEN-AN)			
	VOLTAGE[V]		3.3	5	12	15	24	36	48		
	CURRENT[A]	*2	12.0	12.0	6.3	5.0	3.2	2.1	1.6		
	LINE REGULATION[	mV] *3	20max	20max	48max	60max	96max	144max	192max		
	LOAD REGULATION[mV] *3		40max	40max	100max	120max	150max	240max	240max		
	DIDDLES 1/ -	0 to +50°C *7	80max	80max	120max	120max	120max	150max	150max		
		-10 to 0℃	140max	140max	160max	160max	160max	200max	200max		
	*4	lo=0 to 15%	300max	300max	360max	500max	500max	500max	500max		
	DIDDLE MOICEIV1	0 to +50°C *7	120max	120max	150max	150max	150max	250max	250max		
OUTPUT		-10 to 0℃	160max	160max	180max	180max	180max	300max	300max		
	**	lo=0 to 15%	360max	360max	400max	600max	600max	600max	600max		
	TEMPERATURE RECUI ATIONSVI	0 to +50°C *7	50max	50max	120max	150max	240max	360max	480max		
	TEMPERATURE REGULATION[mV]	-10 to +50°C *7	60max	60max	150max	180max	290max	450max	600max		
	DRIFT[mV]	*5	20max	20max	48max	60max	96max	144max	192max		
	START-UP TIME[ms]		100typ (ACIN 100V, Io=100%)								
	HOLD-UP TIME[ms]		20typ (ACIN 100V, Io=100%)								
	OUTPUT VOLTAGE ADJUSTMENT	RANGE[V]	2.85 to 3.63	Fixed ("Y"option	is available for a	djusting output vo	Itage between ±1	10%)			
	<b>OUTPUT VOLTAGE SET</b>	TING[V]	3.30 to 3.40	4.90 to 5.30	11.50 to 12.50	14.40 to 15.60	23.00 to 25.00	34.50 to 37.50	46.00 to 50.00		
DDOTECTION	OVERCURRENT PROT	ECTION	Works over 105	% of rating and	ecovers automa	tically					
PROTECTION CIRCUIT AND	OVERVOLTAGE PROTE	ECTION	4.00 to 5.25	5.75 to 7.00	13.80 to 16.80	17.25 to 21.00	27.60 to 33.60	41.40 to 50.40	55.20 to 67.20		
OTHERS	OPERATING INDICA	TION	Not provided								
JIIIENS	REMOTE SENSING		Not provided								
	INPUT-OUTPUT		AC3,000V 1min	ute, Cutoff curre	nt = 10mA, DC5	00V 100M $\Omega$ mir	(At Room Temp	erature)			
SOLATION	INPUT-FG		AC2,000V 1min	ute, Cutoff curre	nt = 10mA, DC5	00V 100M $\Omega$ mir	(At Room Temp	erature)			
	OUTPUT-FG		AC500V 1minut	e, Cutoff current	= 25mA, DC500	$NV\ 100M\Omega\ min\ ($	At Room Temper	rature)			
	OPERATING TEMP., HUMID. AND A	ALTITUDE *2	-10 to +70°C, 20	) - 90%RH (Non	condensing), 5,0	000m (16,500fee	t) max				
ENVIRONMENT	STORAGE TEMP., HUMID. AND	ALTITUDE	-20 to +75°C, 20	) - 90%RH (Non	condensing), 9,0	000m (30,000fee	t) max				
INVINCINIENT	VIBRATION		10 - 55Hz, 19.6	m/s² (2G), 3minu	tes period, 60mi	nutes each alon	g X, Y and Z axis	3			
	IMPACT			), 11ms, once ea							
SAFETY AND	AGENCY APPROVAL							plies with DEN-A	N		
NOISE	CONDUCTED NOISE			CC-B, VCCI-B,		PR32-B, EN550	11-B, EN55032-I	В			
REGULATIONS	HARMONIC ATTENU	JATOR *6		EC61000-3-2 (C							
OTHERS	CASE SIZE/WEIGHT		50×27×150mi	m [1.97×1.07×5	5.91 inches] (WX	H×D) / 190g m	ax (with chassis	& cover : 370g m	ax)		
OITERS	<b>COOLING METHOD</b>	*2	Convection/Ford	ced air (Requires	external fan) (R	efer to "Derating	")				

- The listed options may affect the published standard specifications. Please contact us for detailed product specifications.
- Derating is required.
- 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. This is the value that measured on measuring board with capacitor of 22  $\mu$  F and 0.1  $\mu$  F at 150mm from output terminal. Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN:RM104).
- Ripple and ripple noise spec is change at lo=0 to 15% by burst operation.
- 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.
- Please contact us about another class.
- 3.3V and 5V output product, the maximum temperature of 40°C. To meet the specification, do not operate overload condition.
- Parallel operation is not possible.
- Sound noise may be generated by power supply in case of pulse load.



#### **External view**

\* External size of option is different from standard type.



- $\ensuremath{\,\times\,}$  The back side of PCB of the power supply is assembled some SMDs.
- Be careful not to bump against the attached area by vibration. W Use the spacer of 8mm [0.31] length or more for isolation.
- And do not use press-fitting bush. % Point ①, Point ② are thermometry points. Please refer to Instruction Manual 3.

I/O	Connector	Mating connector	Terminal		
ONIA	DODE VIII	VILID EN	Chain	SVH-21T-P1.1	
CNT	B3P5-VH	VHR-5N	Loose	BVH-21T-P1.1	
ONIO	DOD VIII	\#UD 011	Chain	SVH-21T-P1.1	
CN2	B6P-VH	VHR-6N	Loose	BVH-21T-P1.1	

(Mfr: J.S.T.)

- % I/O Connector is Mfr.J.S.T.
- ※ Option:-J4:EP (TE Connectivity) connector type.

CN1		CN2				
Pin No.	Input		Pin No.	Output		
1	AC(L)		1 to 3	-V		
2			1 10 3	-v		
3	AC(N)		4 to 6	+V		
4			4 10 0	T V		
5	FG					

- \* Pin No.2 and 4 is NC at CN1.
- ※ Keep drawing current per pin below 5A for CN2.
- \* Dimensions in mm, [ ]=inches
- % Tolerance : ±1 [±0.04]
- Weight: 190g max (with chassis and cover: 370g max)
- \* PCB Material / thickness : FR-4 / 1.6mm [0.06]
- ※ Optional chassis and cover material : Galvanizing steel board

# LHA100F

100

CAL UK **RoHS** 

Example recommended EMI/EMC filter

High voltage pulse noise type : EAP series Low leakage current type : EAM 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 \*1
 C: with Coating
 G: Low leakage current

J4 : EP (TE Connectivity) connector type R2: with Remote ON/OFF

S: with Chassis

SN: with Chassis & cover

Y: with Potentiometer

For option details, refer to Instruction Manual 6.

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	LHA100F-5	LHA100F-12	LHA100F-15	LHA100F-24	LHA100F-36	LHA100F-48
MAX OUTPUT WATTAGE[W] *2	75	102	100.5	103.2	100.8	100.8
DC OUTPUT *2	5V15A	12V8.5A	15V6.7A	24V4.3A	36V2.8A	48V2.1A

#### **SPECIFICATIONS**

	MODEL		LHA100F-5	LHA100F-12	LHA100F-15	LHA100F-24	LHA100F-36	LHA100F-48		
V	/OLTAGE[VAC]		85 - 264 1 φ (Refe	er to "Derating" and	Instruction Manual	1.1)				
	CURRENT[A]	ACIN 100V	1.0typ	1.2typ						
	ACIN 230V		0.5typ	0.6typ						
F	REQUENCY[Hz]		50 / 60 (45 - 66)							
_	EFFICIENCY[%]	ACIN 100V	82.0typ	87.0typ	88.0typ	86.5typ	87.0typ	87.0typ		
NPUT	FFICIENCY[%]	ACIN 230V	84.0typ	89.0typ	90.0typ	89.0typ	89.0typ	89.0typ		
	OWED FACTOR (In 1000/)	ACIN 100V	0.97typ	0.97typ						
	OWER FACTOR (Io=100%)	ACIN 230V	0.83typ 0.87typ							
	NRUSH CURRENT[A]	ACIN 100V	15typ (lo=100%) Ta=25℃ at cold start							
	ACIN 230V		35typ (lo=100%) Ta=25℃ at cold start							
L	EAKAGE CURREN	Γ[mA]	0.40 / 0.75max (A	CIN 100V / 240V 6	60Hz, lo=100%, Ac	cording to IEC6236	8-1 and DEN-AN)			
V	/OLTAGE[V]		5	12	15	24	36	48		
C	CURRENT[A]	*2	15.0	8.5	6.7	4.3	2.8	2.1		
L	INE REGULATION[I	mV] *3	20max	48max	60max	96max	144max	192max		
L	OAD REGULATION	[mV] *3	40max	100max	120max	150max	240max	240max		
	NDDI E[\/1	0 to +50°C *7	80max	120max	120max	120max	150max	150max		
	RIPPLE[mVp-p]	-10 to 0°C	140max	160max	160max	160max	200max	200max		
		lo=0 to 15%	300max	360max	500max	500max	500max	500max		
_	RIPPLE NOISE[mVp-p]	0 to +50°C *7	120max	150max	150max	150max	250max	250max		
OUTPUT   K		-10 to 0℃	160max	180max	180max	180max	300max	300max		
	**	lo=0 to 15%	360max	400max	600max	600max	600max	600max		
т.	EMPERATURE REGULATION[mV]	0 to +50°C *7	50max	120max	150max	240max	360max	480max		
["	EMPERATURE REGULATION[IIIV]	-10 to +50°C <b>*</b> 7	60max	150max	180max	290max	450max	600max		
D	ORIFT[mV]	*5	20max	48max	60max	96max	144max	192max		
S	START-UP TIME[ms]		100typ (ACIN 100V, Io=100%)							
Н	HOLD-UP TIME[ms]		20typ (ACIN 100V, Io=100%)							
0	UTPUT VOLTAGE ADJUSTMENT	RANGE[V]	Fixed ("Y"option is available for adjusting output voltage between ±10%)							
0	OUTPUT VOLTAGE SET		4.90 to 5.30	11.50 to 12.50	14.40 to 15.60	23.00 to 25.00	34.50 to 37.50	46.00 to 50.00		
0	OVERCURRENT PROT	ECTION	Works over 105%	of rating and recov						
PROTECTION	OVERVOLTAGE PROTE	CTION	5.75 to 7.00	13.80 to 16.80	17.25 to 21.00	27.60 to 33.60	41.40 to 50.40	55.20 to 67.20		
_	PERATING INDICA	TION	Not provided							
_	REMOTE SENSING		Not provided							
	REMOTE CONTROL			nstruction Manual 6						
_	NPUT-OUTPUT-RC	*8				$DM\Omega$ min (At Room				
SOLATION I	NPUT-FG		,	<u>'</u>		$DM\Omega$ min (At Room				
C	DUTPUT-RC-FG					$M\Omega$ min (At Room $\Pi$				
	OUTPUT-RC					$\Omega$ min (At Room Te	emperature)			
	PERATING TEMP.,HUMID.AND A	_	-10 to +70°C, 20 -							
$NVIRONMENT \longrightarrow$	TORAGE TEMP.,HUMID.AND	ALTITUDE			lensing), 9,000m (3					
V	/IBRATION					ach along X, Y and	Z axis	· · · · · · · · · · · · · · · · · · ·		
	MPACT		196.1m/s² (20G), 11ms, once each X, Y and Z axis							
	AGENCY APPROVAL						, Complies with DE	N-AN		
	CONDUCTED NOISE		Complies with FC	C-B, VCCI-B, CISP	R11-B, CISPR32-E	B, EN55011-B, EN5	5032-B			
REGULATIONS H	HARMONIC ATTENU	ATOR *6								
DIHERS -	CASE SIZE/WEIGHT						chassis & cover : 45	0g max)		
C	COOLING METHOD	*2	Convection/Forced	d air (Requires exte	rnal fan) (Refer to	"Derating")				

- The listed options may affect the published standard specifications. Please contact us for detailed product specifications.
- specifications.

  Derating is required.

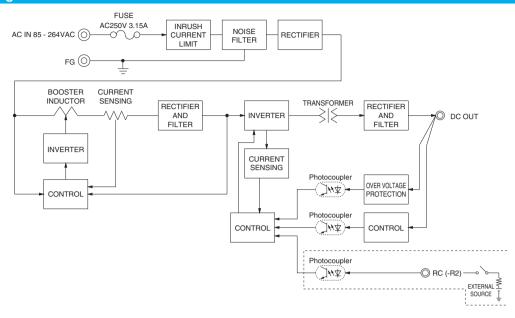
  At low load conditions, the burst mode operation will start. To check load regulation, you will need to measure the characteristics at average mode with instruments.

  This is the value that measured on measuring board with capacitor
- of 22 µ F and 0.1 µ F at 150mm from output terminal. Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN:RM104).
- Ripple and ripple noise spec is change at lo=0 to 15% by burst operation.
- operation.

  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.
- Please contact us about another class.

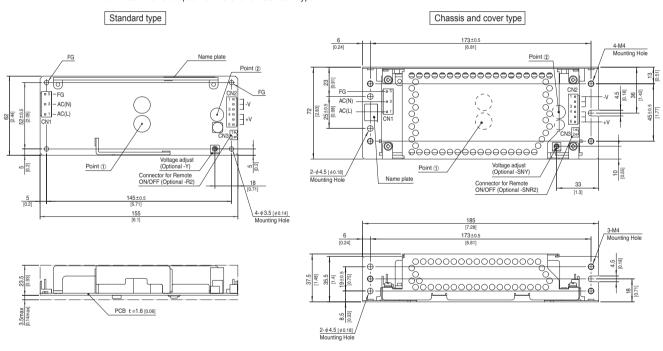
- riesse contact us about another class. 5V output product, the maximum temperature of 40°C. Applicable when Remote ON/OFF (optional) is added. To meet the specification, do not operate overload condition. Parallel operation is not possible. Sound noise may be generated by power supply in case of pulse load.





#### **External view**

\* External size of option is different from standard type.



- $\ensuremath{\,\times\,}$  The back side of PCB of the power supply is assembled some SMDs.
- Be careful not to bump against the attached area by vibration.
- W Use the spacer of 8mm [0.31] length or more for isolation. And do not use press-fitting bush.
- \* Point ①, Point ② are thermometry points. Please refer to Instruction Manual 3.

I/O	Connector	Mating connector		Terminal
ONIA	N1 B3P5-VH VHR-5N		Chain	SVH-21T-P1.1
CIVI	B3P5-VH	VHK-5IN	Loose	BVH-21T-P1.1
ONIO	CN2 B6P-VH	VHR-6N	Chain	SVH-21T-P1.1
CN2		VHK-6N	Loose	BVH-21T-P1.1

(Mfr: J.S.T.)

- % I/O Connector is Mfr.J.S.T.
- ※ Option:-J4:EP (TE Connectivity) connector type.

- ※ Dimensions in mm, [ ]=inches
- % Tolerance : ±1 [±0.04]
- Weight: 250g max (with chassis and cover: 450g max)
- ※ PCB Material / thickness : FR-4 / 1.6mm [0.06]
- ※ Optional chassis and cover material: Galvanizing steel board
- Mounting torque (Mounting hole of chassis): 1.5N·m max

CN1		CN2			
Pin No.	Input		Pin No.	0	
1	AC(L)		1 +0 2		
2			1 to 3		
3	AC(N)		4 to 6		
4			4 10 0		
5	FG				

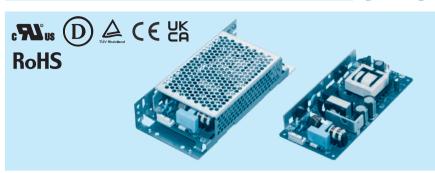
2			CN3 Opt	ion (Mfr:J.	S.T.)			
No.	Output		PIN No.	Contents				
to 3	-V		1	RC(+)				
			2	RC(-)				
to 6	+V	Model B2B-XH-A						

Mating Connector (Terminal) XHP-2 BXH-001T-P0.6

※ Pin No.2 and 4 is NC at CN1. or SXH-001T-P0.6 ※ Keep drawing current per pin below 5A for CN2.

## LHA150F

150



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.

Example recommended EMI/EMC filter EAC-03-472



High voltage pulse noise type : EAP series Low leakage current type : EAM 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 \*1
 C: with Coating
 G: Low leakage current

J4 : EP (TE Connectivity) connector type R2: with Remote ON/OFF

S: with Chassis

SN: with Chassis & cover

U1: Can be attached the external capacitor unit

Y: with Potentiometer

For option details, refer to Instruction Manual 6.

MODEL	LHA150F-12	LHA150F-24	LHA150F-36	LHA150F-48
MAX OUTPUT WATTAGE[W] *2	150	151.2	151.2	153.6
DC OUTPUT *2	12V 12.5A	24V 6.3A	36V 4.2A	48V 3.2A

#### **SPECIFICATIONS**

	MODEL		LHA150F-12	LHA150F-24	LHA150F-36	LHA150F-48				
	VOLTAGE[VAC]	*2	85 - 264 1 φ (Refer to "De	rating" and Instruction Manu	ual 1.1)					
	CURRENT[A]	ACIN 100V								
	CONNENT[A]	ACIN 230V	0.8typ							
	FREQUENCY[Hz]		50 / 60 (45 - 66)							
INPUT	EFFICIENCY[%]	ACIN 100V	86.5typ	89.0typ	89.5typ	90.0typ				
INPUT	EFFICIENCI[/8]	ACIN 230V	89.5typ	92.0typ	92.5typ	93.0typ				
	POWER FACTOR (Io=100%)	ACIN 100V	0.99typ							
	TOWEITTACTOR (IO-100/0)	ACIN 230V	0.91typ							
	INRUSH CURRENT[A]	ACIN 100V	15typ (lo=100%) Ta=25℃ at cold start							
		ACIN 230V	35typ (lo=100%) Ta=25℃ at cold start							
	LEAKAGE CURREN	T[mA]	0.40 / 0.75max (ACIN 100V / 240V 60Hz, lo=100%, According to IEC62368-1 and DEN-AN)							
	VOLTAGE[V]		12	24	36	48				
	CURRENT[A]	*2	12.5	6.3	4.2	3.2				
	LINE REGULATION[		48max	96max	144max	192max				
	LOAD REGULATION			150max	240max	240max				
OUTPUT	RIPPLE[mVp-p]  *4  RIPPLE NOISE[mVp-p]	0 to +50°C *7		120max	150max	150max				
		-10 to 0℃	160max	160max	200max	200max				
		lo=0 to 10%	160max	160max	200max	200max				
		0 to +50°C *7	150max	150max	250max	250max				
	*4	-10 to 0℃	180max 230max	180max	300max 300max	300max				
		0 to +50°C *7	120max	230max 240max	360max	300max 480max				
	TEMPERATURE REGULATION[mV]	-10 to +50°C *7	150max	240max 290max	450max	600max				
	DRIFT[mV]	*5	48max	96max	144max	192max				
	START-UP TIME[ms]		700typ (ACIN 100V, Io=10		144IIIax	19211lax				
	HOLD-UP TIME[ms]		20typ (ACIN 100V, Io=100%)							
	OUTPUT VOLTAGE ADJUSTMENT	RANGE[V]	Fixed ("Y"option is available for adjusting output voltage between +10%, -5%)							
	OUTPUT VOLTAGE SET		11.50 to 12.50	23.00 to 25.00	34.50 to 37.50	46.00 to 50.00				
	OVERCURRENT PROT			and recovers automatically		1 10100 10 00100				
PROTECTION			13.80 to 16.80	27.60 to 33.60	41.40 to 50.40	55.20 to 67.20				
	OPERATING INDICA	TION	Not provided							
OTHERS	REMOTE SENSING		Not provided							
	REMOTE ON/OFF		Option (Refer to Instruction Manual 6.1)							
	INPUT-OUTPUT-RC	*8	AC3,000V 1minute, Cutoff current = 10mA, DC500V 100MΩ min (At Room Temperature)							
ISOLATION	INPUT-FG	-	AC2,000V 1minute, Cutoff current = 10mA, DC500V 100MΩ min (At Room Temperature)							
ISOLATION	OUTPUT-RC-FG	*8	AC500V 1minute, Cutoff current = 25mA, DC500V 100M $\Omega$ min (At Room Temperature)							
	OUTPUT-RC		AC100V 1minute, Cutoff current = 25mA, DC100V 10MΩ min (At Room Temperature)							
	OPERATING TEMP., HUMID. AND									
ENVIRONMENT	STORAGE TEMP., HUMID. AND	ALTITUDE	-20 to +75°C, 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, or		00 4) EN00000 4 EN004	1 (0)(0    )				
SAFETY AND	AGENCY APPROVA		, , ,			1 (OVC III), Complies with DEN-AN				
NOISE	CONDUCTED NOISE				2-B, EN55011-B, EN55032-I	<b>B</b>				
nedulation5	HARMONIC ATTENU		Complies with IEC61000-3		'D\ / 200g may /!#b =b '-	9 aguar ( F70a r)				
OTHERS	CASE SIZE/WEIGHT			.07 × 6.30 inches] (W × H × quires external fan) (Refer	D) / 320g max (with chassis	s & cover : 5/Ug max)				
	COOLING WEINOD	*2	Convection/Forced air (Re	quires external fan) (Hefer	io Deraiing)					

- The listed options may affect the published standard specifications. Please contact us for detailed product specifications.
- Specifications.

  Derating is required.

  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.
- This is the value that measured on measuring board with capacitor of 22 µ F and 0.1 µ F at 150mm from output terminal. Measured
- by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN:RM104).
- Ripple and ripple noise spec is change at lo=0 to 10% by burst
- operation.

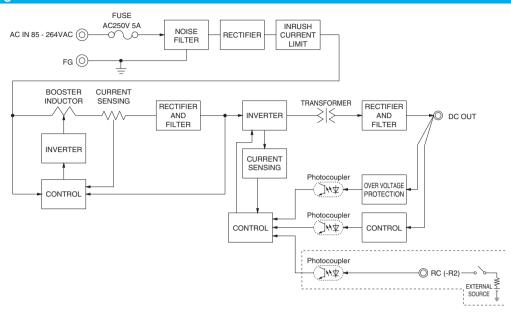
  Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25 C, with the input voltage held constant at the rated input/output.
- Please contact us about another class.

  12V output product, the maximum temperature of 40°C.
- Applicable when Remote ON/OFF (optional) is added. To meet the specification, do not operate overload condition.

- . arctical operation is not possible. Sound noise may be generated by power supply in case of pulse load.

**LHA-14** April 07, 2025 www.cosel.co.jp/en/

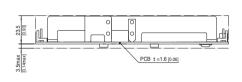




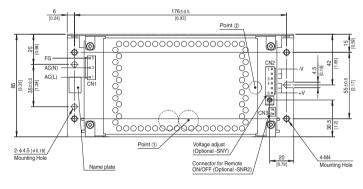
#### **External view**

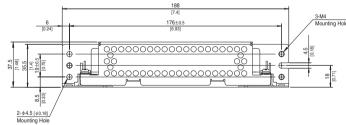
\* External size of option is different from standard type.

# Standard type Point ② - AC(N) - AC(L) Point (1 I- φ3.5 [φ0.14]



### Chassis and cover type





- $\ensuremath{\,\times\,}$  The back side of PCB of the power supply is assembled some SMDs. Be careful not to bump against the attached area by vibration.
- W Use the spacer of 8mm [0.31] length or more for isolation.
- And do not use press-fitting bush.
- ※ Point ①, Point ② are thermometry points. Please refer to Instruction Manual 3.

I/O	Connector	Mating connector			
ONIA	DODE VIII	VHR-5N	Chain	SVH-21T-P1.1	
CIVI	B3P5-VH	VHK-5IN	Loose	BVH-21T-P1.1	
ONIO	CN2 B6P-VH VHR-6N		Chain	SVH-21T-P1.1	
CNZ	B0P-VH	VHR-6N	Chain SVH-21T-P1 Loose BVH-21T-P1 Chain SVH-21T-P1	BVH-21T-P1.1	

(Mfr: J.S.T.)

- ※ I/O Connector is Mfr.J.S.T.
- ※ Option:-J4:EP (TE Connectivity) connector type.

- % Dimensions in mm, [ ]=inches
  % Tolerance : ±1 [±0.04]
- Weight: 320g max (with chassis and cover: 570g max)
- ※ PCB Material / thickness : FR-4 / 1.6mm [0.06]
- ※ Optional chassis and cover material : Galvanizing steel board ※ Mounting torque (Mounting hole of chassis) : 1.5N·m max

CN1				CN2		
Pin No	).	Input		Pin No.	Output	
1		AC(L)		1 to 3	-V	
2				1 10 3	-v	
3		AC(N)		4 to 6	+V	
4				4 10 0	ΨV	
5		FG				
<ul><li>Pin No.2 and 4 is NC at CN1.</li><li>Keep drawing current per pin below 5A for CN2.</li></ul>						

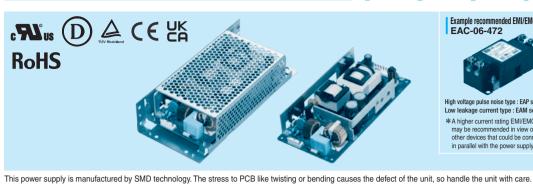
# Pir

N2		CN3 Option (Mfr:J.S.T.)	
in No.	Output	PIN No. Contents	
l to 3	-V	1 RC(+)	
1 10 3	- v	2 RC(-)	
1 to 6	+V	Model B2B-XH-A Mating Connector (Terminal)	
		mating connector (reminar)	

XHP-2 BXH-001T-P0.6 or SXH-001T-P0.6

# LHA300F

300



I HA300E-12-V

Example recommended EMI/EMC filter EAC-06-472

High voltage pulse noise type : EAP series Low leakage current type : EAM 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

3 Output wattage
4 Universal input
5 Output voltage
6 Optional \*1
C: with Coating

G: Low leakage current

4: EDW learkage current
J4: EP (TE Connectivity) connector type
J5: 8 pin type(Output connector)
R2: with Remote ON/OFF
S: with Chassis

SN: with Chassis & cover

T: Terminal block type
T4: Push-in Terminal block type
U1: Can be attached the external

capacitor unit

For option details, refer to Instruction Manual 6. \*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.

1 HA300E-48-V

MODEL	LHA300F-12-Y	LHA300F-24-Y	LHA300F-48-Y
MAX OUTPUT WATTAGE[W] *2	300	300	302.4
DC OUTPUT *2	12V 25A	24V 12.5A	48V 6.3A

I HA300E-24-V

#### **SPECIFICATIONS**

MODEL

	MODEL		LHA300F-12-Y	LHA300F-24-Y	LHA300F-48-Y		
	VOLTAGE[VAC]	*2	85 - 264 1 φ (Refer to "Derating" and Instruction Manual 1.1)				
	CUDDENTIAL	ACIN 100V					
	CURRENT[A]	ACIN 230V	1.6typ				
	FREQUENCY[Hz]		50 / 60 (45 - 66)				
	EEEIOIENOVIO/1	ACIN 100V	90.0typ	91.5typ	92.0typ		
INPUT	EFFICIENCY[%]	ACIN 230V	92.0typ	93.5typ	94.0typ		
	DOWED FACTOR (In 1000/)	ACIN 100V	0.99typ				
	POWER FACTOR (10=100%)	ACIN 230V	0.93typ				
	INDUCUI OUDDENTIAL	ACIN 100V	20typ (Io=100%) Ta=25℃ at cold star	rt			
	INHUSH CURRENT[A]	ACIN 230V	40typ (Io=100%) Ta=25℃ at cold star	rt			
	LEAKAGE CURRENT[mA]		0.40 / 0.75max (ACIN 100V / 240V 6	60Hz, Io=100%, According to IEC62368	3-1 and DEN-AN)		
	VOLTAGE[V]		12	24	48		
	CURRENT[A]	*2	25.0	12.5	6.3		
	LINE REGULATION[	mV] *3	48max	96max	192max		
	LOAD REGULATION	[mV] *3	100max	150max	240max		
	DIDD! Et 1/ -	0 to +50°C *7	120max	120max	150max		
	KIPPLE[mVp-p]	-10 to 0℃	160max	160max	200max		
	***	lo=0 to 10%	160max	160max	200max		
T C	RIPPLE NOISE[mVp-p]	0 to +50°C *7	150max	150max	250max		
		-10 to 0℃	180max	180max	300max		
	**	lo=0 to 10%	180max	180max	300max		
	TEMPERATURE REQUILATIONS	0 to +50°C *7	120max	240max	480max		
	TEMPERATURE REGULATION[MV]	-10 to +50℃*7	150max	290max	600max		
	DRIFT[mV] *5		48max	96max	192max		
	START-UP TIME[ms]		700typ (ACIN 100V, Io=100%)				
	HOLD-UP TIME[ms]		25typ (ACIN 100V, Io=100%)				
S H 0	OUTPUT VOLTAGE ADJUSTMENT	RANGE[V]	11.40 to 13.20	22.80 to 26.40	45.60 to 52.80		
	<b>OUTPUT VOLTAGE SET</b>	TING[V]	12.00 to 12.48	24.00 to 24.96	48.00 to 49.92		
	OVERCURRENT PROT	ECTION	Works over 105% of rating and recov	ers automatically			
PROTECTION	OVERVOLTAGE PROTI	ECTION	13.80 to 16.80	27.60 to 33.60	55.20 to 67.20		
CIRCUIT AND	OPERATING INDICA	TION	Not provided				
OTHERS	REMOTE SENSING		Not provided				
	REMOTE ON/OFF						
	INPUT-OUTPUT-RC	*8					
ISOLATION	INPUT-FG						
ISOLATION			AC500V 1minute, Cutoff current = 25mA, DC500V 100MΩ min (At Room Temperature)				
	OUTPUT-RC						
	OPERATING TEMP.,HUMID.AND	ALTITUDE *2	-10 to +70°C, 20 - 90%RH (Non condensing), 5,000m (16,500feet) max (EN62477-1 (OVC III) : 2,000m (6,600feet) max)				
ENVIRONMENT		ALTITUDE	, , , , , ,				
LITTII OHWILITI	VIBRATION				Z axis		
	IMPACT						
SAFETY AND			, , ,				
NOISE	CONDUCTED NOISE				5032-B		
REGULATIONS	ACM 100V   90.01yp   91.51yp   92.01yp   94.01yp   94						
OTHERS	CASE SIZE/WEIGHT				assis & cover : 890g max)		
O.HEHO	COOLING METHOD	*2	Convection/Forced air (Requires exte	rnal fan) (Refer to "Derating")			
· · · · · · · · · · · · · · · · · · ·							

- The listed options may affect the published standard specifications. Please contact us for detailed product specifications.
- Derating is required.
- 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.
- This is the value that measured on measuring board with capacitor of 22  $\mu$  F and 0.1  $\mu$  F at 150mm from output terminal. Measured
- by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN:RM104).
  Ripple and ripple noise spec is change at lo=0 to 10% by burst operation.
- Drift is the change in DC output for an eight hour period after a halfhour warm-up at 25°C, with the input voltage held constant at the rated input/output.
- Please contact us about another class.
- 12V output product, the maximum temperature of 35℃.
- Applicable when Remote ON/OFF (optional) is added.
- Applicable When Hendrie Ordon (Optional) is added.

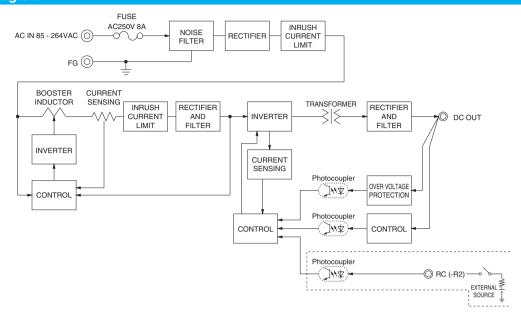
  To meet the specification, do not operate overload condition.

  Parallel operation is not possible.

  Sound noise may be generated by power supply in case of pulse

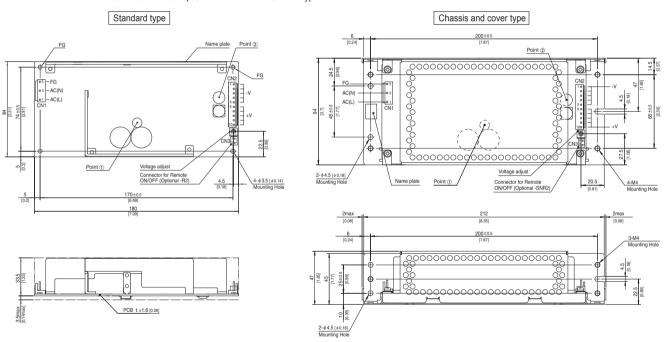
**LHA-16** April 07, 2025 www.cosel.co.jp/en/





#### **External view**

\* External size of option is different from standard type.



- $\ensuremath{\,\times\,}$  The back side of PCB of the power supply is assembled some SMDs.
- Be careful not to bump against the attached area by vibration.
- W Use the spacer of 8mm [0.31] length or more for isolation. And do not use press-fitting bush.
- ※ Point ①, Point ② are thermometry points. Please refer to Instruction Manual 3.

I/O	Connector	Mating connector			
ONIA	DODE VIII	VILID EN	Chain	SVH-21T-P1.1	
CNT	B3P5-VH B10P-VH	VHK-5IN	Loose	BVH-21T-P1.1	
ONIO	NO 5405 VIII VIII 40N		Chain	SVH-21T-P1.1	
CNZ	B10P-VH	VHR-5N         Chain         SVH-21T-F           Loose         BVH-21T-F           Chain         SVH-21T-F	BVH-21T-P1.1		

(Mfr: J.S.T.)

- \* I/O Connector is Mfr.J.S.T.
- ※ Option:-J4:EP (TE Connectivity) connector type.
- \* Option:-J5:Output connector as 8 pin type.

- ※ Dimensions in mm, [ ]=inches
- % Tolerance : ±1 [±0.04]
- Weight: 580g max (with chassis and cover: 890g max)
- ※ PCB Material / thickness : FR-4 / 1.6mm [0.06]
- ※ Optional chassis and cover material : Galvanizing steel board
- Mounting torque (Mounting hole of chassis): 1.5N·m max

#### CN1 Pin No. Input AC(L) 2 AC(N) 3 4 FG

CN2	
Pin No.	Output
1 to 5	-V
6 to 10	+V

CN3 Option (Mfr:J.S.T.				
PIN No.	Contents			
1	RC(+)			
2	RC(-)			
Model B2B Mating Cor XHP-2	-XH-A nnector (Term	inal)		

BXH-001T-P0.6 or SXH-001T-P0.6 ※ Keep drawing current per pin below 5A for CN2.

※ Pin No.2 and 4 is NC at CN1.



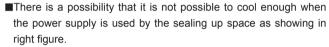
#### **Assembling and Installation Method**

#### 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.

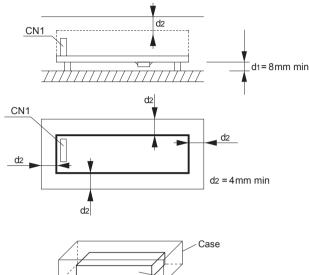
If d1 and/or d2 are less than the value mentioned in right figure, insert an insulating sheet with reinforced insulation between the power supply unit and metal chassis.

The following distance is not satisfactory for cooling condition. Please refer to "Derating" and Instruction Manual 3 for cooling method.

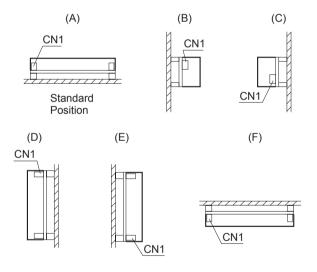


Please use it after confirming the temperature of points ① and points ② of Instraction Manual 3.

- ■Installation method shown right is possible.
- ■In optional -SN, Method (F) is not available with convection cooling. If method (F) is used, use with forced air cooling or derate temperature / load. For more details, please contact us.

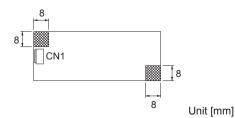


Power supply

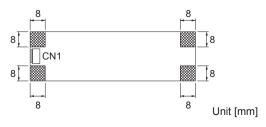


#### **Mounting screw**

- ■The mounting screw should be  $\phi$ 3mm. The hatched area shows the allowance of metal parts for mounting.
- LHA10F, LHA15F, LHA30F



#### LHA50F, LHA75F, LHA100F, LHA150F, LHA300F

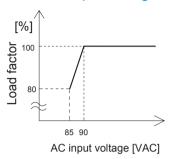


- ■If mounting metallic fittings on the board surface, ensure there is no contact with components.
- ■This product uses SMD technology. Please avoid the PCB installation method which includes the twisting stress or the bending stress.

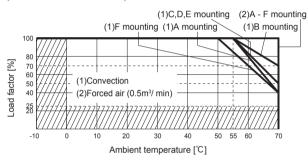


#### Derating

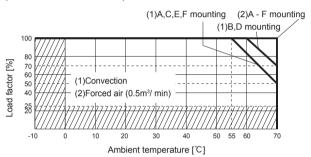
#### Derating curve for input voltage



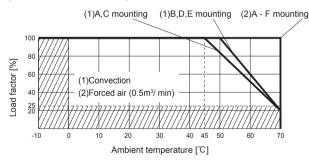
#### LHA10F-3R3-Y,-5,-12 Ambient temperature derating curve (Reference value)



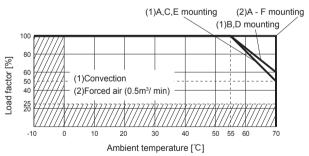
#### LHA10F-15,-24 Ambient temperature derating curve (Reference value)



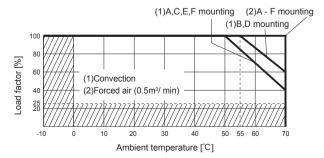
#### LHA10F-3R3-SNY,-5-SN,-12-SN Ambient temperature derating curve (Reference value)



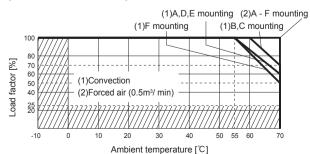
#### LHA10F-15-SN,-24-SN Ambient temperature derating curve (Reference value)



#### LHA15F-3R3-Y,-5,-12 Ambient temperature derating curve (Reference value)

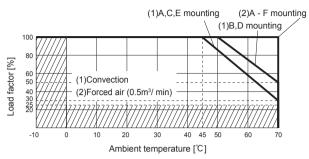


#### LHA15F-15,-24 Ambient temperature derating curve (Reference value)

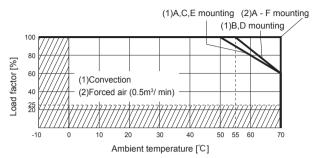


#### Derating

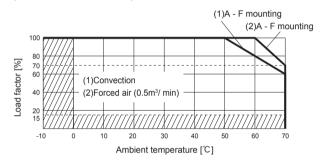
 LHA15F-3R3-SNY,-5-SN,-12-SN Ambient temperature derating curve (Reference value)



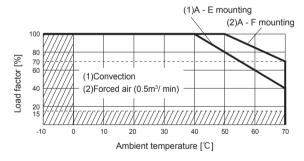
LHA15F-15-SN,-24-SN
 Ambient temperature derating curve (Reference value)



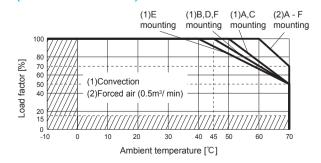
 LHA30F-3R3-Y,-5,-12,-15,-24
 Ambient temperature derating curve (Reference value)



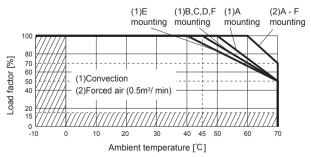
 LHA30F-3R3-SNY,-5-SN,-12-SN,-15-SN,-24-SN Ambient temperature derating curve (Reference value)



■ LHA50F-3R3-Y, -5, -24, -36, -48 Ambient temperature derating curve (Reference value)



LHA50F-12, -15
 Ambient temperature derating curve (Reference value)



Ambient temperature derating curve

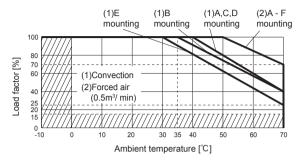


#### Derating

LHA75F-3R3-Y, -5

(Reference value)

LHA50F-3R3-SNY.-12-SN.-24-SN.-36-SN.-48-SN Ambient temperature derating curve (Reference value)

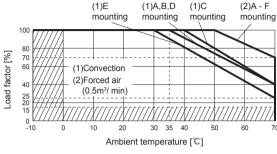


Ambient temperature derating curve

) LHA75F-12, -15, -24, -36, -48

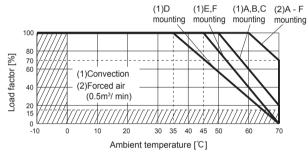
LHA50F-5-SN.-15-SN

(Reference value)

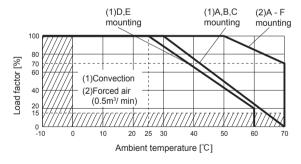


(1)E,F (1)A,B,C (2)A - F mounting mounting mounting mounting 100 \_oad factor [%] (1)Convection (2)Forced air (0.5m<sup>3</sup>/ min) 10 30 35 40 60 Ambient temperature [°C]

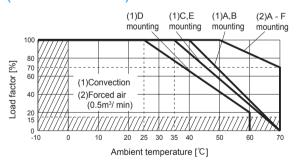
Ambient temperature derating curve (Reference value)



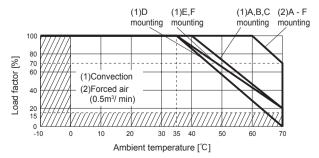
LHA75F-3R3-SNY,-5-SN Ambient temperature derating curve (Reference value)



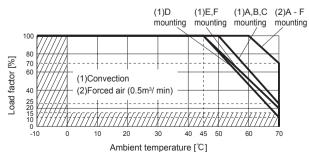
LHA75F-12-SN,-15-SN,-24-SN,-36-SN,-48-SN Ambient temperature derating curve (Reference value)



■ LHA100F-5 Ambient temperature derating curve (Reference value)

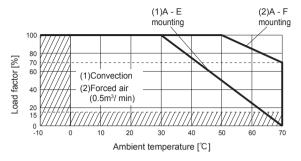


LHA100F-12, -15, -24, -36, -48 Ambient temperature derating curve (Reference value)

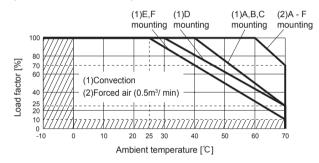


#### Derating

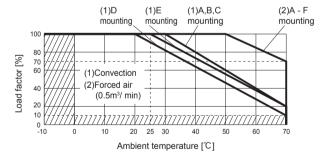
LHA100F-5-SN
 Ambient temperature derating curve (Reference value)



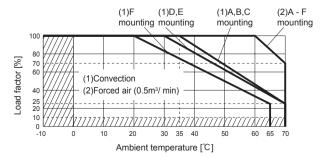
 LHA150F-12 Ambient temperature derating curve (Reference value)



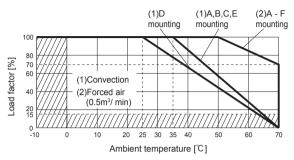
LHA150F-12-SN
 Ambient temperature derating curve (Reference value)



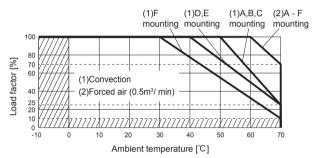
LHA300F-12-Y
Ambient temperature derating curve (Reference value)



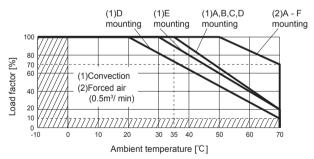
 LHA100F-12-SN,-15-SN,-24-SN,-36-SN,-48-SN Ambient temperature derating curve (Reference value)



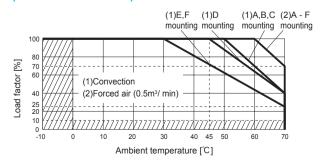
LHA150F-24, -36, -48
 Ambient temperature derating curve (Reference value)



 LHA150F-24-SN, -36-SN, -48-SN Ambient temperature derating curve (Reference value)



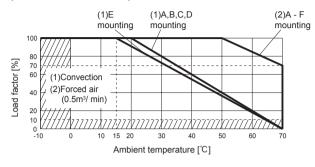
■ LHA300F-24-Y, -48-Y Ambient temperature derating curve (Reference value)



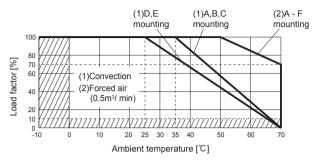


#### Derating

#### LHA300F-12-SNY Ambient temperature derating curve (Reference value)



#### LHA300F-24-SNY, -48-SNY Ambient temperature derating curve (Reference value)



- ■The operating ambient temperature is different by with / without chassis cover or mounting position.
- ■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 make sure the maximum component temperature rise given in Instruction manual 3 is not exceeded.
- ■Please contact us for more information about operating ambient temperature.

#### **Instruction Manuals**

Please see catalog and instructionmanual before you use.

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





#### **Basic Characteristics Data**

Madal Circuit mathed		Switching	Input current	Inrush	PCB/Pattern			Series/Parallel operation availability	
Model	Circuit method	frequency [kHz] *1 *2	*3 [A]	current protection	Material	Single sided	Double sided	Series operation	Parallel operation
LHA10F	Flyback converter	20 to 125	0.26	Resistance *4	CEM-3	Yes	-	Yes	No
LHA15F	Flyback converter	20 to 125	0.35	Thermistor	CEM-3	Yes	-	Yes	No
LHA30F	Flyback converter	30 to 130	0.62	Thermistor	FR-4	-	Yes	Yes	No
LHA50F	Flyback converter	30 to 130	1.05	Thermistor	FR-4	-	Yes	Yes	No
LHA75F	Active filter	15 to 300	0.9	Thermistor	FR-4	_	Yes	Yes	No
LHA75F	Flyback converter	50 to 140	0.9	mermision	FN-4	-	res	res	INO
1114400	Active filter	15 to 300	1.0	Theymieter	ED 4		Vas	Vaa	No
LHA100F	Flyback converter	35 to 130	1.2	Thermistor	FR-4	-	Yes	Yes	No
11144505	Active filter	15 to 300	1.0	Thermodeten	ED 4		\/	\/	NIa
LHA150F	LLC resonant converter	90 to 280	1.8	Thermistor	FR-4	-	Yes	Yes	No
11140005	Active filter	15 to 300	0.5	Thermalists	ED 4		\/	V	Nie
LHA300F	LLC resonant converter	65 to 200	3.5	Thermistor	FR-4	-	Yes	Yes	No

<sup>\*1</sup> The value changes depending on input and load.

<sup>\*2</sup> At light load, burst operation is performed to reduce input power. The switching frequency is changed by using condition. Please contact us for more details.

<sup>\*3</sup> The value of input current is at ACIN 100V and rated load.

<sup>\*4</sup> Resistance of the line filter.