AC-DC Power Supplies DIN Rail Type





# **KH-series**



#### Feature

For DIN (35mm) rail products Wide operating ambient temperature range I/O terminal has 2 types, Euro Style and Barrier Blocks Style Built in overcurrent protection, overvoltage protection circuits

- KHEA30F/60F/90F, KHNA30F/60F/90F Low power consumption at no load Complies with SEMI F-47 (Derating is required)
- KHEA120F/240F/480F, KHNA120F/240F/480F Built in remote ON/OFF Built in signal output for confirming output voltage Complies with SEMI F-47

#### Safety agency approvals

UL60950-1, UL508, C-UL (CSA60950-1), EN60950-1, ANSI/ISA12.12.01, ATEX Complies with DEN-AN

**5-year warranty** (refer to Instruction Manual)

#### CE marking

Low Voltage Directive RoHS Directive

#### EMI

Complies with FCC-B, CISPR22-B, EN55011-B, EN55022-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

Ordering information COSEL **AC-DC Power Supplies DIN Rail Type** HEA/KHNA K K F 30 KH Α -1 2 Example recommended EMI/EMC filter NAC-04-472-D KHE : Euro style I/O terminals KHN : Barrier blocks style СE c**AL**'us ( D I/O terminals 0.0 Single output ③Output wattage
 ④Universal input
 ⑤Output voltage
 ⑥Option LISTED UL508 . . High voltage pulse noise type : NAP series eco C : with Coating 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

\*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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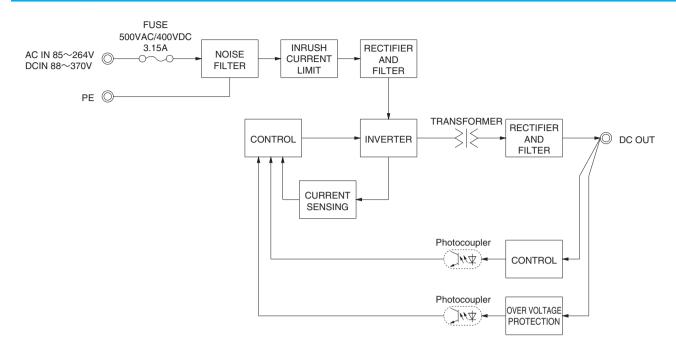
MODEL	KHEA/KHNA30F-5	KHEA/KHNA30F-12	KHEA/KHNA30F-24
MAX OUTPUT WATTAGE[W]	25	27.6	31.2
DC OUTPUT	5V 5A	12V 2.3A	24V 1.3A

in parallel with the power supply.

#### **SPECIFICATIONS**

VOLTAGE[V] CURRENT[A] FREQUENCY[Hz] EFFICIENCY[%] INRUSH CURRENT[A] *1 LEAKAGE CURRENT VOLTAGE[V] CURRENT[A] PEAK CURRENT[A]	ACIN 115V ACIN 230V ACIN 115V ACIN 230V ACIN 115V ACIN 230V [mA]	AC85 - 264 1 ¢ (Refer to "Derating") 0.45typ 0.30typ 50 / 60 (45 - 440) or DC 84.0typ 85.5typ 18typ (Io=100%) (at cold start Ta=2 35typ (Io=100%) (at cold start Ta=2	0.50typ 0.30typ 87.0typ 88.5typ	0.55typ 0.35typ 88.5typ	
FREQUENCY[Hz] EFFICIENCY[%] INRUSH CURRENT[A] *1 LEAKAGE CURRENT VOLTAGE[V] CURRENT[A] PEAK CURRENT[A]	ACIN 230V ACIN 115V ACIN 230V ACIN 115V ACIN 230V	0.30typ 50 / 60 (45 - 440) or DC 84.0typ 85.5typ 18typ (Io=100%) (at cold start Ta=2	0.30typ 87.0typ 88.5typ	0.35typ	
FREQUENCY[Hz] EFFICIENCY[%] INRUSH CURRENT[A] *1 LEAKAGE CURRENT VOLTAGE[V] CURRENT[A] PEAK CURRENT[A]	ACIN 115V ACIN 230V ACIN 115V ACIN 230V	50 / 60 (45 - 440) or DC 84.0typ 85.5typ 18typ (lo=100%) (at cold start Ta=2	87.0typ 88.5typ		
EFFICIENCY[%] INRUSH CURRENT[A] *1 LEAKAGE CURRENT VOLTAGE[V] CURRENT[A] PEAK CURRENT[A]	ACIN 230V ACIN 115V ACIN 230V	84.0typ 85.5typ 18typ (Io=100%) (at cold start Ta=2	88.5typ	88.5typ	
INRUSH CURRENT[A] LEAKAGE CURRENT VOLTAGE[V] CURRENT[A] PEAK CURRENT[A]	ACIN 230V ACIN 115V ACIN 230V	85.5typ 18typ (Io=100%) (at cold start Ta=2	88.5typ	88.5typ	
INRUSH CURRENT[A] LEAKAGE CURRENT VOLTAGE[V] CURRENT[A] PEAK CURRENT[A]	ACIN 115V ACIN 230V	18typ (Io=100%) (at cold start Ta=2			
LEAKAGE CURRENT VOLTAGE[V] CURRENT[A] PEAK CURRENT[A]	ACIN 230V		25°C)	89.5typ	
VOLTAGE[V] CURRENT[A] PEAK CURRENT[A]		35typ (lo=100%) (at cold start Ta=2		· · · ·	
VOLTAGE[V] CURRENT[A] PEAK CURRENT[A]	[mA]		25℃)		
CURRENT[A] PEAK CURRENT[A]		0.45 / 0.75max (ACIN 100V / 240V	60Hz, Io=100%, According to IE	C60950-1 and DEN-AN)	
PEAK CURRENT[A]		5	12	24	
		5.0	2.3	1.3	
		-	-	-	
LINE REGULATION m	יען <b>*</b> 2	20max	48max	96max	
		80max	100max	150max	
				150max	
RIPPLE[mVp-p] *3		300max	300max	300max	
				300max *4	
	0 to +70°C	180max	180max	180max	
BIPPLE NOISE[mVn-n] *3				360max	
				360max *4	
				240max	
TEMPERATURE REGULATION[mV]				290max	
				96max	
• • •			10 80 to 13 20	22.50 to 28.50	
				22.50 to 26.50	
				24.00 10 24.90	
				30.00 to 36.00	
		AC3,000V 1minute, Cutoff current = 10mA, DC500V 50M $\Omega$ min (At Room Temperature)			
			, , , , , , , , , , , , , , , , , , , ,		
			,		
. , .	-	,	0// 31	start-up (Relef to Defailing)	
	*0				
IMPACT	40 :				
AGENCY APPROVALS	<u> </u>		, , , , , , , , , , , , , , , , , , , ,	, ANSI/ISA12.12.01, ATEX, Compiles with DEN-AN	
	DC input				
	TOD				
	*/				
act us about dynamic load an alue that measured on measuri inal.	d input resp ing board wit	onse. h capacitor of 22 µ F and 0.1 µ F at 150mm from	<ul> <li>7 Case size contains neither the umbo.</li> <li>8 Only as standard mounting orientation If install other than standard mounting vibration and impact.</li> </ul>	(A). Refer to the "Assembling and Installation Method". orientation (A), please fix the power supply for withstand	
r to the instruction manual 1 ripple noise spec is change at perating under 0°C ambient te actor. change in DC output for an eig	7. t Io=0 to 30% emperature, ght hour peri	% by burst operation. the value is two times of specification at 0 to od after a half-hour warm-up at 25°C, with the	<ul> <li>* 10 If the overcurrent protection circuit opt the instruction manual 1.3.</li> <li>* 11 Under low DC input voltage below DC1 derating -1%/V are required.</li> <li>* To meet the specifications. Do not ope</li> </ul>	erates continuously, the output voltage shut down. Refer t 10V, the temperature derating -1°C/V or the output power rate over-loaded condition.	
	LOAD REGULATION[ RIPPLE[mVp-p] *3 RIPPLE NOISE[mVp-p] *3 TEMPERATURE REGULATION[mV] DRIFT[mV] START-UP TIME[ms] HOLD-UP TIME[ms] OUTPUT VOLTAGE ADJUSTIKENT I OUTPUT VOLTAGE ADJUSTIKENT I OUTPUT VOLTAGE ADJUSTIKENT I OVERCURRENT PROTE OVERCURRENT PROTE OVERCURRENT O	LOAD REGULATION[INV]       *2         Image: Construct of the state state of the state of the state of the state state of	LOAD REGULATION[mV]       *2       80max         RIPPLE[mVp-p]       *3       0 to +70°C       150max         RIPPLE NOISE[mVp-p]       *3       -20 - 0°C       300max *4         BIPPLE NOISE[mVp-p]       *3       -20 - 0°C       360max         Ib=0 - 30%       360max       *4         Ib=0 - 50%       20typ (ACIN 115V, lo=100%)       *5         DIFT[mV]       *5       20max         START-UP TIME[ms]       20typ (ACIN 115V, lo=100%)         OUTPUT VOLTAGE ADJUSTMENT RANGE[V]       4.50 to 5.50         OUTPUT VOLTAGE SETTING[V]       5.00 to 5.15         OVERCURRENT PROTECTION[V]       6.30 to 7.60         DC_OK LAMP       LED (Green)         INPUT-UPE       AC2,000V 1minute, Cutoff current =         OUTPUT-OUTPUT       AC3,000V 1minute, Cutoff current =	LOAD REGULATION[mV]         #2         80max         100max           RIPPLE[mVp-p]         #3         150max         150max           RIPPLE[mVp-p]         #3         20 • 0°C         300max         300max           RIPPLE NOISE[mVp-p]         #3         20 • 0°C         360max         43         360max           RIPPLE NOISE[mVp-p]         #2         20 • 0°C         360max         360max         44           TEMPERATURE REGULATION[MV]         #3         20 • 0°C         360max         43         360max         44           TEMPERATURE REGULATION[MV]         #3         20 • 0°C         60max         120max         48max           START-UP TIME[ms]         200typ (ACIN 115V, lo=100%)         HOLD-UP TIME[ms]         200typ (ACIN 115V, lo=100%)         HOLD-UP TIME[ms]         200typ (ACIN 115V, lo=100%)         UPUTVOLTAGE SETTING[V]         5.00 to 5.15         12.00 to 13.20           OUTPUT VOLTAGE SETTING[V]         5.00 to 5.15         12.00 to 13.20         OUTPUT VOLTAGE SETTING[V]         5.00 to 5.16         13.80 to 16.80           DC_OK LAMP         LED (Green)         Works over 105% of rating and recovers automatically *10         OverRoutage PROTECTION[V]         6.30 to 7.60         13.80 to 16.80           DC_OK LAMP         LED (Green)         INPUT-PE	

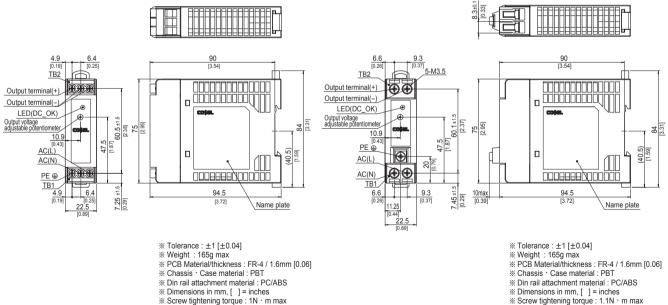




**External view** 

<KHEA30F(Euro Style I/O Terminals)>

<KHNA30F(Barrier Blocks Style I/O Terminals)>



Ordering information COSEL **AC-DC Power Supplies DIN Rail Type** HEA/KHNA K 6 ł F 60 KH Α -1 2 Example recommended EMI/EMC filter NAC-04-472-D KHE : Euro style I/O terminals KHN : Barrier blocks style c**AL**<sup>°</sup>us CE I/O terminals 0.0 Single output Output wattage
Universal input
Output voltage
Option LISTED UL508 High voltage pulse noise type : NAP series eco C : with Coating 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

\*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.

(\$1.51.5)

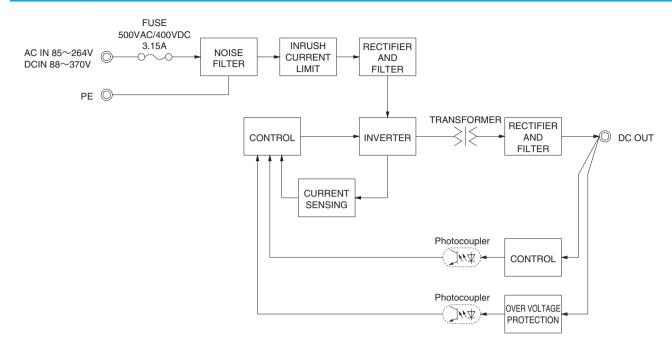
MODEL	KHEA/KHNA60F-12	KHEA/KHNA60F-24
MAX OUTPUT WATTAGE[W]	54	60
DC OUTPUT	12V 4.5A	24V 2.5A

in parallel with the power supply.

#### **SPECIFICATIONS**

	MODEL		KHEA/KHNA60F-12	KHEA/KHNA60F-24	
	VOLTAGE[V]		AC85 - 264 1 \$\phi\$ (Refer to "Derating") or DC88 - 370 *	11	
INPUT		ACIN 115V	1.00typ	1.10typ	
	CURRENT[A]	ACIN 230V	0.60typ	0.70typ	
	FREQUENCY[Hz]		50 / 60 (45 - 440) or DC		
		ACIN 115V	87.0typ	89.0typ	
	EFFICIENCY[%]	ACIN 230V	88.0typ	91.0typ	
	INRUSH CURRENT[A]	ACIN 115V	18typ (lo=100%) (at cold start Ta=25°C)		
	*1	ACIN 230V	35typ (lo=100%) (at cold start Ta=25°C)		
	LEAKAGE CURRENT[mA]		0.45 / 0.75max (ACIN 100V / 240V 60Hz, Io=100%, According to IEC60950-1 and DEN-AN)		
	VOLTAGE[V]	[]	12	24	
	CURRENT[A]		4.5	2.5	
	PEAK CURRENT[A]		-	-	
	LINE REGULATION[n	nV1 *2	48max	96max	
	LOAD REGULATION		100max	150max	
	LOAD REGULATION	0 to +70℃	200max	200max	
	RIPPLE[mVp-p] *3	-20 - 0°C	300max	300max	
	RIPPLE[mvp-p]		300max *4	300max *4	
		lo=0 - 30%			
OUTPUT		0 to +70°C	260max	260max	
	RIPPLE NOISE[mVp-p] *3	-20 - 0°C	360max	360max	
		lo=0 - 30%	360max *4	360max *4	
	TEMPERATURE REGULATION[mV]	0 to +70℃	120max	240max	
		-20 to +70℃	150max	290max	
	DRIFT[mV] *5		48max 96max		
	START-UP TIME[ms]		200typ (ACIN 115V, Io=100%)		
	HOLD-UP TIME[ms]		20typ (ACIN 115V, Io=100%)		
	OUTPUT VOLTAGE ADJUSTMENT RANGE[V]		10.80 to 13.20	22.50 to 28.50	
	OUTPUT VOLTAGE SETT	ING[V]	12.00 to 12.48	24.00 to 24.96	
PROTECTION	OVERCURRENT PROTE	CTION	Works over 105% of rating and recovers automaticall	y *10	
CIRCUIT AND	OVERVOLTAGE PROTE	CTION[V]	13.80 to 16.80	30.00 to 36.00	
OTHERS	DC_OK LAMP		LED (Green)		
	INPUT-OUTPUT		AC3,000V 1minute, Cutoff current = 10mA, DC500V 5	$10M\Omega$ min (At Room Temperature)	
ISOLATION	INPUT-PE		AC2,000V 1minute, Cutoff current = 10mA, DC500V 5	0000 min (At Room Temperature)	
	OUTPUT-PE		AC500V 1minute, Cutoff current = 100mA, DC500V 5	OM $\Omega$ min (At Room Temperature)	
	OPERATING TEMP., HUMID. AND	ALTITUDE	-20 to +70°C, 20 - 90%RH (Non condensing) , Type te	ested for -40°C start-up (Refer to "Derating")	
	STORAGE TEMP., HUMID. AND A	ALTITUDE	-30 to +85°C, 20 - 90%RH (Non condensing)		
ENVIRONMENT	VIBRATION	*8	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60 minutes along Z axis (Non operating, mounted on DIN Rail)		
	IMPACT		196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis (Packing state)		
		AC input	UL60950-1, C-UL (CSA60950-1), EN60950-1, UL508 (NEC Cla	ss2 per UL1310), ANSI/ISA12.12.01, ATEX, Complies with DEN-AN	
SAFETY AND	AGENCY APPROVALS	DC input	UL60950-1, C-UL (CSA60950-1), EN60950-1		
NOISE	CONDUCTED NOISE		Complies with FCC-B, VCCI-B, CISPR22-B, EN55011	-B. EN55022-B	
REGULATIONS	HARMONIC ATTENU	ATOR	Complies with IEC61000-3-2 (Class A) *6 (Not built-ir		
	CASE SIZE	*7	32×90×90mm (W×H×D) [1.26×3.54×3.54 inches	,	
OTHERS	WEIGHT		270g max		
omeno	COOLING METHOD		Convection		
excluded. *2 Please con *3 This is the output tern Measured Please refine Ripple and	primary surge. The current of tact us about dynamic load an value that measured on measuri inral. by 20MHz oscilloscope or Rip er to the instruction manual 1. ripple noise spec is change a operating under 0°C ambient tr actor.	d input resp ing board wit pple-Noise m 7. t lo=0 to 30% emperature,	*6 Please contact us a *7 Case size contact us a *7 Case size contains *8 Only as standard m finistall other than vibration and impac *9 When two or more *10 If the overcurrent p the instruction man *11 Under low DC input */*/	heither the umbo. ounting orientation (A). Refer to the "Assembling and Installation Method". standard mounting orientation (A), please fix the power supply for withstand t it. units are operating it may not comply with the IEC61000-3-2. rotection circuit operates continuously, the output voltage shut down. Refer to ual 1.3. voltage below DC110V, the temperature derating -1°C/V or the output power	

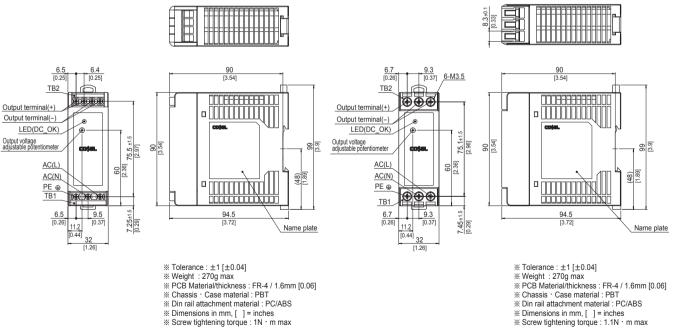




**External view** 

<KHEA60F(Euro Style I/O Terminals)>

<KHNA60F(Barrier Blocks Style I/O Terminals)>





\*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	KHEA/KHNA90F-12	KHEA/KHNA90F-24
MAX OUTPUT WATTAGE[W]	81.6	91.2
DC OUTPUT	12V 6.8A	24V 3.8A

in parallel with the power supply.

#### SPECIFICATIONS

	MODEL		KHEA/KHNA90F-12	KHEA/KHNA90F-24	
	VOLTAGE[V]		AC85 - 264 1 ¢ (Refer to "Derating") or DC88-250 *	10	
		ACIN 115V	0.85typ	0.95typ	
INPUT	CURRENT[A]	ACIN 230V	0.45typ	0.55typ	
	FREQUENCY[Hz]		50 / 60 (45 - 66) or DC		
		ACIN 115V	87.0typ	89.0typ (88.0typ for option -E)	
	EFFICIENCY[%]	ACIN 230V	88.0tvp	91.0typ (89.5typ for option -E)	
	POWER FACTOR	ACIN 115V	0.98typ		
	(lo=100%)	ACIN 230V	0.86tvp		
	INRUSH CURRENT[A]	ACIN 230V ACIN 115V	18typ (Io=100%) (at cold start Ta=25 $^{\circ}$ C)		
		ACIN 230V	35typ (10=100%) (at cold start Ta=25%)		
	LEAKAGE CURRENT		0.45 / 0.75max (ACIN 100V / 240V 60Hz, Io=100%, According to IEC60950-1 and DEN-AN)		
		[IIIA]	12	24	
	VOLTAGE[V]				
	CURRENT[A]		6.8	3.8	
	PEAK CURRENT[A]		-	=	
	LINE REGULATION[n	-	48max	96max	
	LOAD REGULATION		100max	150max	
		0 to +70℃	200max	200max	
	RIPPLE[mVp-p] *3	<b>-20 - 0</b> ℃	300max	300max	
		lo=0 - 30%	300max *4	300max *4	
UTPUT		0 to +70℃	260max	260max	
	RIPPLE NOISE[mVp-p] *3	<b>-20 - 0</b> ℃	360max	360max	
		lo=0 - 30%	360max *4	360max *4	
	TEMPERATURE REGULATION[mV]	0 to +70℃	120max	240max	
		-20 to +70°C	150max	290max	
	DRIFT[mV] *5		48max	96max	
	START-UP TIME[ms]		500typ (ACIN 115V, Io=100%)		
	HOLD-UP TIME[ms]		20typ (ACIN 115V, Io=100%)		
	OUTPUT VOLTAGE ADJUSTMENT F	RANGE[V]	10.80 to 13.20	22.50 to 28.50 (Fixed for option -E)	
	OUTPUT VOLTAGE SETT		12.00 to 12.48	24.00 to 24.96 (24.00 to 24.50 for option -E)	
ROTECTION	OVERCURRENT PROTE		Works over 105% of rating (101% for option -E), recov		
	OVERVOLTAGE PROTE		13.80 to 16.80	30.00 to 36.00 (26.40 to 33.60 for option -E)	
THERS	DC OK LAMP	••[1]	LED (Green)		
	INPUT-OUTPUT		AC3,000V 1minute, Cutoff current = 10mA, DC500V 5	50MQ min (At Boom Temperature)	
SOLATION	INPUT-PE		AC2,000V 1minute, Cutoff current = 10mA, DC500V 50M $\Omega$ min (At Room Temperature)		
	OUTPUT-PE		AC500V 1minute, Cutoff current = 100mA, DC500V 50M $\Omega$ min (At Room Temperature)		
	OPERATING TEMP., HUMID.AND		-20 to +70°C, 20 - 90%RH (Non condensing), Type tested for -40°C start-up (Refer to "Derating")		
	STORAGE TEMP., HUMID.AND A		$-30$ to $+85^{\circ}$ , 20 - 90% RH (Non condensing), type tested for $-40^{\circ}$ statt-up (Neter to Defaulty)		
NVIRONMENT	VIBRATION	*8			
	IMPACT				
	INFACT	AC input	196.1m/s <sup>2</sup> (20G), 11ms, X, Y and Z axis (Packing state) UL60950-1, C-UL (CSA60950-1), EN60950-1, UL508, NEC Class2 (24V output only option -E), ANSI/ISA12.12.01, ATEX, Complies with DEN-AN		
AFETY AND	AGENCY APPROVALS	DC input	UL60950-1, C-UL (CSA60950-1), EN60950-1		
OISE					
EGULATIONS	CONDUCTED NOISE		Complies with FCC-B, VCCI-B, CISPR22-B, EN55011-B, EN55022-B		
	HARMONIC ATTENU	-	Complies with IEC61000-3-2 (Class A) *6		
	CASE SIZE	*7	50×90×90mm (W×H×D) [1.97×3.54×3.54 inches	5]	
DTHERS	WEIGHT		405g max		
l l	COOLING METHOD		Convection		
			a built-in EMI/EMC Filter(0.2ms or less)is input voltage held	constant at the rated input/output.	

This is the value that measured on measuring board with capacitor of 22 µ P and 0.1 µ P at 150mm from output terminal. Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN: RM103). Please refer to the instruction manual 1.7. Ripple and ripple noise spec is change at 10–0 to 30% by burst operation. In case of operating under 0°C ambient temperature, the value is two times of specification at 0 to 20% load factor. Nony as standard mounting orientation (A). Nerer to the "Assembling and installation wethod". If install other than standard mounting orientation (A), please fix the power supply for withstand the vibration and impact.
 If the overcurrent protection circuit operates continuously, the output voltage shut down. Refer to the instruction manual 1.3.
 If the overcurrent protection circuit operates continuously, the output voltage shut down. Refer to the instruction manual 1.3.
 If one of the overcurrent protection circuit operate over-loaded condition.
 To meet the specifications. Do not operate over-loaded condition.
 A cound may occur from power supply at light one pack loading.

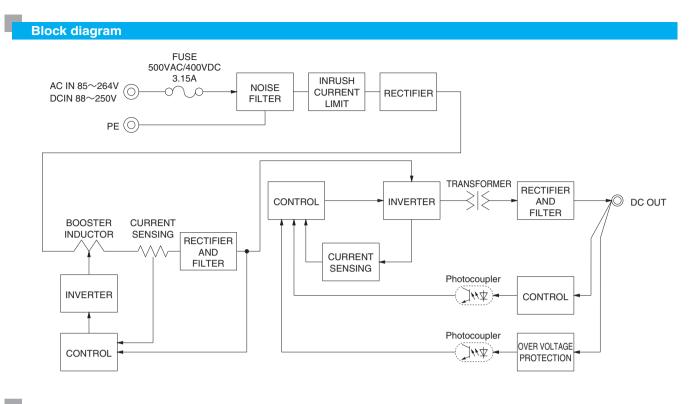
\*4

30% load factor. \*5 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the

#### June 29, 2020

A sound may occur from power supply at light or peak loading.

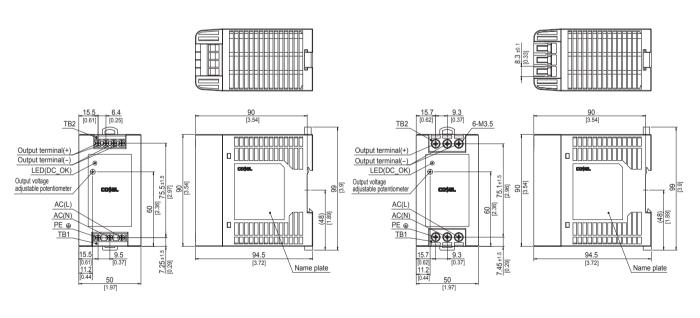
KH series | COSEL



**External view** 

#### <KHEA90F(Euro Style I/O Terminals)>

#### <KHNA90F(Barrier Blocks Style I/O Terminals)>



- % Tolerance : ±1 [±0.04]
  % Weight : 405g max
- \* PCB Material/thickness : FR-4 / 1.6mm [0.06]
- % Chassis · Case material : PBT
   % Din rail attachment material : PC/ABS
- Dimensions in mm, [] = inches
   Screw tightening torque : 1N m max

- % Tolerance : ±1 [±0.04]
  % Weight : 405g max
- \* PCB Material/thickness : FR-4 / 1.6mm [0.06]
- % Chassis · Case material : PBT
   ※ Din rail attachment material : PC/ABS
- Dimensions in mm, [] = inches
   Screw tightening torque : 1.1N · m max



\*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			KHEA / KHNA120F-24
MAX OUTPUT WATTAGE[W]			
DC OUTPUT			24V 5A (Peak 7.5A)
SPECIF	ICATIONS		
	MODEL		KHEA / KHNA120F-24
	VOLTAGE[V]		AC85 - 264 1 ¢ or DC88 - 370 *10
		ACIN 115V	1.2typ
	CURRENT[A]	ACIN 230V	0.6typ
	FREQUENCY[Hz]		50 / 60 (45 - 66) or DC
	ACIN 115V		90typ
NPUT	EFFICIENCY[%]	ACIN 230V	92typ
		ACIN 115V	0.98typ
	POWER FACTOR	ACIN 230V	0.93typ
	INRUSH CURRENT[A]	ACIN 115V	15typ (at cold start Ta=25°C)
		ACIN 230V	30typ (at cold start Ta=25°C)
	LEAKAGE CURRENT	[mA]	0.45 / 0.75max (ACIN 100V / 240V 60Hz, Io=100%, According to IEC60950-1 and DEN-AN)
	VOLTAGE[V]		24
	CURRENT[A]		5
	PEAK CURRENT[A]	*2	7.5
	LINE REGULATION[m		
	LOAD REGULATION	mV] *3	150max *4
		0 to +70℃	120max
	RIPPLE[mVp-p] *5	<b>-25 - 0</b> ℃	240max
		lo=0 - 30%	240max *4
		0 to +70℃	150max
UTPUT	RIPPLE NOISE[mVp-p] *5		300max
		lo=0 - 30%	300max *4
		0 to +70℃	240max *4
	TEMPERATURE REGULATION[mV]	-25 to +70°C	360max *4
	DRIFT[mV]	*6	96max
	START-UP TIME[ms]		750max (ACIN 115V, Io=100%)
	HOLD-UP TIME[ms]		20typ (ACIN 115V, Io=100%)
	OUTPUT VOLTAGE ADJUSTMENT R	ANGE[V]	22.5 to 28.5
	OUTPUT VOLTAGE SETTI	NG[V]	24.0±1.0%
	OVERCURRENT PROTE	CTION	Works over 101% of peak current and recovers automatically
	OVERVOLTAGE PROTEC	CTION[V]	30.0 to 36.0
ROTECTION	REMOTE ON/OFF (RC	;)	Provided
IRCUIT AND	DC_OK LAMP		LED (Green)
INENS	ALARM LAMP		LED (Red)
	DC_OK CONTACT		Relay contact 30VDC 1A max, 30VAC 0.5A max (resistive load) (Only KHEA)
	INPUT-OUTPUT		AC3,000V 1minute, Cutoff current = 10mA, DC500V 50M $\Omega$ min (At Room Temperature)
	INPUT-PE		AC2,000V 1minute, Cutoff current = 10mA, DC500V 50M $\Omega$ min (At Room Temperature)
SOLATION	OUTPUT-PE		AC500V 1minute, Cutoff current = 100mA, DC500V 50M $\Omega$ min (At Room Temperature)
	OUTPUT-RC, DC_OK		AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (At Room Temperature)
	OPERATING TEMP., HUMID. AND	ALTITUDE	-25 to +70°C, 20 - 90%RH (Non condensing), Type tested for -40°C start-up (Refer to "Derating")
	STORAGE TEMP., HUMID.AND A	LTITUDE	-40 to +85°C, 20 - 90%RH (Non condensing)
VIRONMENT	VIBRATION	*9	
	IMPACT		196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis (Packing state)
		AC input	UL60950-1, C-UL (CSA60950-1), EN60950-1, UL508, ANSI/ISA12.12.01, ATEX, GL, Complies with DEN-AN
AFETY AND	AGENCY APPROVALS	DC input	UL60950-1, C-UL (CSA60950-1), EN60950-1
OISE	CONDUCTED NOISE		Complies with FCC-B, VCCI-B, CISPR22-B, EN55011-B, EN55022-B
REGULATIONS		TOR	Complies with IEC61000-3-2 (Class A) *7
	HARMONIC ATTENUATOR		
	CASE SIZE	*8	37×124×117mm (W×H×D) [1.46×4.88×4.61 inches]
OTHERS		*8	3/×124×11/mm (W×H×D) [1.46×4.88×4.61 inches] 580g max

## KH series



- The value is primary surge. The current of input surge to a built-in EMI/EMC Filter(0.2ms or less) is excluded. \*1
- \*2 Refer to 2, instruction manual,

4.4

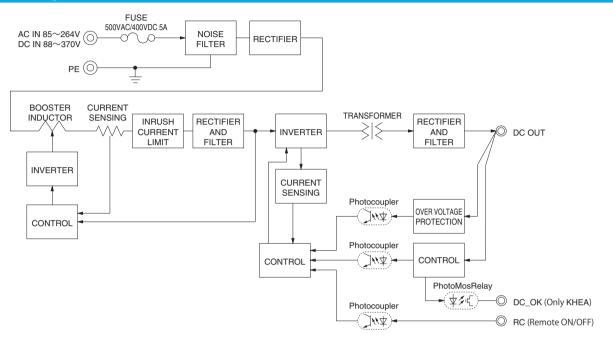
Hefer to 2, instruction manual. Please contact us about dynamic load and input response. The output voltage is below 23.5V, the value is equal to three times of the specification. This is the value that measured on measuring board with capacitor of 22 µ F and 0.1 µ F at 150mm from output terminal. \*5

Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN: RM103).

- Please refer to the instruction manual 1.7 Please refer to the instruction manual 1.7. 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. Case size contains neither the umbo. \*6

- Only as standard mounting orientation (A). Refer to the "Assembling and Installation Method". \*9
- If install other than standard mounting orientation (A), please fix the power It install other than standard mounting orientation (A), please fix the power supply for withstand the vibration and impact. \*10 Under low DC input voltage below DC110V, the temperature derating -1C/V or the output power derating -1%/V are required. \* To meet the specifications. Do not operate over-loaded condition. \* A sound may occur from power supply at light or peak loading.

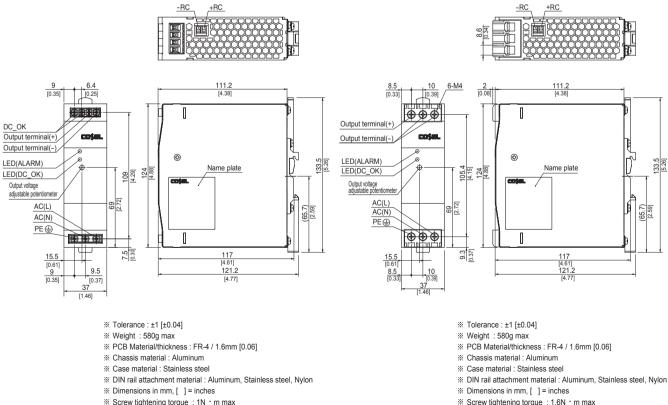
**Block diagram** 



#### **External view**

#### <KHEA120F(Euro Style I/O Terminals)>

#### <KHNA120F(Barrier Blocks Style I/O Terminals)>



June 29, 2020

\* Screw tightening torque : 1.6N · m max



\*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			KHEA / KHNA240F-24 240
MAX OUTPUT WATTAGE[W]			
DC OUTPUT			24V 10A (Peak 15A)
SPECIFI	CATIONS		
	MODEL		KHEA / KHNA240F-24
	VOLTAGE[V]		AC85 - 264 1 \$\phi\$ or DC88 - 370 *10
		ACIN 115V	2.3typ
	CURRENT[A]	ACIN 230V	1.2typ
Ī	FREQUENCY[Hz]		50 / 60 (45 - 66) or DC
		ACIN 115V	92typ
NPUT	EFFICIENCY[%]	ACIN 230V	94typ
[	DOWED EACTOR	ACIN 115V	0.98typ
	POWER FACTOR	ACIN 230V	0.93typ
	INRUSH CURRENT[A]	ACIN 115V	20typ (more than 3 sec. to re-start)
	*1	ACIN 230V	40typ (more than 3 sec. to re-start)
	LEAKAGE CURRENT	[mA]	0.45 / 0.75max (ACIN 100V / 240V 60Hz, Io=100%, According to IEC60950-1 and DEN-AN)
	VOLTAGE[V]		24
	CURRENT[A]		10
	PEAK CURRENT[A]	*2	15
	LINE REGULATION[n	nV] *3	96max
	LOAD REGULATION[	mV] *3	150max *4
		0 to +70℃	120max
	RIPPLE[mVp-p] *5	<b>-25 - 0</b> ℃	240max
		lo=0 - 30%	240max *4
OUTPUT		0 to +70℃	150max
	RIPPLE NOISE[mVp-p] *5	<b>-25 - 0</b> ℃	300max
		lo=0 - 30%	300max *4
	TEMPERATURE REGULATION[mV]	0 to +70℃	
		-25 to +70℃	360max *4
	DRIFT[mV] *6		96max
H	START-UP TIME[ms]		750max (ACIN 115V, Io=100%)
	HOLD-UP TIME[ms]		20typ (ACIN 115V, Io=100%)
	OUTPUT VOLTAGE ADJUSTMENT F	RANGE[V]	22.5 to 28.5
	OUTPUT VOLTAGE SETT	ING[V]	24.0±1.0%
	OVERCURRENT PROTE	CTION	Works over 101% of peak current and recovers automatically
POTECTION	OVERVOLTAGE PROTE		30.0 to 36.0
PROTECTION	REMOTE ON/OFF (RC	C)	Provided
DTHERS	DC_OK LAMP		LED (Green)
	ALARM LAMP		LED (Red)
	DC_OK CONTACT		Relay contact 30VDC 1A max, 30VAC 0.5A max (resistive load) (Only KHEA)
H	INPUT-OUTPUT		AC3,000V 1minute, Cutoff current = 10mA, DC500V 50M $\Omega$ min (At Room Temperature)
SOLATION -	INPUT-PE		AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)
	OUTPUT-PE		AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (At Room Temperature)
	OUTPUT-RC, DC_OK		AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (At Room Temperature)
-	OPERATING TEMP., HUMID.AND	ALTITUDE	-25 to +70°C, 20 - 90%RH (Non condensing), Type tested for -40°C start-up (Refer to "Derating")
	STORAGE TEMP., HUMID.AND A		-40 to +85°C, 20 - 90%RH (Non condensing)
	VIBRATION	*9	
	IMPACT		196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis (Packing state)
SAFETY AND	AGENCY APPROVALS	<u> </u>	UL60950-1, C-UL (CSA60950-1), EN60950-1, UL508, ANSI/ISA12.12.01, ATEX, GL, Complies with DEN-AN
NOISE		DC input	UL60950-1, C-UL (CSA60950-1), EN60950-1
REGULATIONS	CONDUCTED NOISE		Complies with FCC-B, VCCI-B, CISPR22-B, EN55011-B, EN55022-B
	HARMONIC ATTENU		Complies with IEC61000-3-2 (Class A) *7
Ţ	CASE SIZE	*8	50×124×117mm (W×H×D) [1.97×4.88×4.61 inches]
OTHERS	WEIGHT		900g max
	COOLING METHOD		Convection

## KH series

\*9



Only as standard mounting orientation (A). Refer to the "Assembling and Installation Method".

If instail other than standard mounting orientation (A), please thx the pow supply for withstand the vibration and impact.
 If Under low DC input voltage below DC110V, the temperature derating -1C/V or the output power derating -1%/V are required.
 To meet the specifications. Do not operate over-loaded condition.
 A sound may occur from power supply at light or peak loading.

If install other than standard mounting orientation (A), please fix the power

- The value is primary surge. The current of input surge to a built-in EMI/EMC Filter(0.2ms or less) is excluded. \*1
- \*2 Refer to 2, instruction manual,
- \*4

Heter to 2, instruction manual. Please contact us about dynamic load and input response. The output voltage is below 23.5V, the value is equal to three times of the specification. 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. \*5

#### **Block diagram** FUSE 500VAC/400VDC 8A AC IN 85~264V NOISE RECTIFIER DC IN 88~370V FILTER PE (O) Ī BOOSTER CURRENT TRANSFORMER INDUCTOR SENSING RECTIFIER INRUSH RECTIFIER CURBENT INVERTER AND 7 DC OUT FILTER FILTER LIMIT INVERTER CURRENT SENSING Photocoupler OVER VOLTAGE ]\*\*本) PROTECTION CONTROL Photocoupler CONTROL ]\*\*\$ CONTROL PhotoMosRelay ⊷(⊉≉€)-- DC\_OK (Only KHEA) Photocoupler

Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN: RM103).

Please refer to the instruction manual 1.7. 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. Case size contains neither the umbo.

Please refer to the instruction manual 1.7

\*6

#### External view

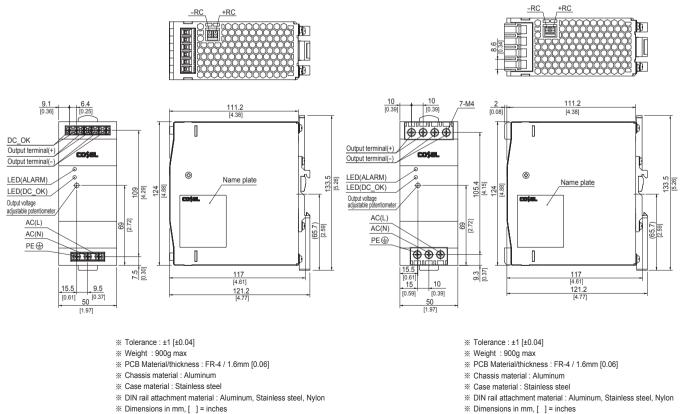
#### <KHEA240F(Euro Style I/O Terminals)>

#### <KHNA240F(Barrier Blocks Style I/O Terminals)>

% Screw tightening torque : 1.6N • m max

RC (Remote ON/OFF)

J###)



- ※ Screw tightening torque : 1N ⋅ m max
- June 29, 2020

**KH-11** 



\* Make sure passes or toots will be corried out on your and equipment with the pa aly installed in accordance with any required EMC/EMI regulations

MODEL			KHEA / KHNA480F-24	KHEA / KHNA480F-48	
MODEL MAX OUTPUT WATTAGE[W]			480	480	
DC OUTPUT			24V 20A (Peak 30A)	480 48V 10A (Peak 15A)	
			247 20A (Feak 30A)	Tor Ion (reak ISA)	
SPECIF	ICATIONS				
	MODEL		KHEA / KHNA480F-24	KHEA / KHNA480F-48	
	VOLTAGE[V]		AC85 - 264 1 ¢ (Output derating is required) or DC88 - 350 *10		
		ACIN 115V	4.6typ		
	CURRENT[A]	ACIN 230V	2.3typ		
	FREQUENCY[Hz]	1	50 / 60 (45 - 66) or DC		
		ACIN 115V	92typ		
INPUT	EFFICIENCY[%]	ACIN 230V	94typ		
		ACIN 115V	0.98typ		
	POWER FACTOR	ACIN 230V	0.93tvp		
	INRUSH CURRENT[A]	ACIN 115V	20typ (more than 3 sec. to re-start)		
		ACIN 230V	40typ (more than 3 sec. to re-start)		
	LEAKAGE CURRENT		0.75 / 1.5max (ACIN 100V / 240V 60Hz, Io=100%, Acco	ording to JEC60950-1 and DEN-AN)	
	VOLTAGE[V]	[	24	48	
	CURRENT[A]		20	10	
	PEAK CURRENT[A]	*2	30	15	
	LINE REGULATION[n		96max (lo=30-100%) *9	192max (Io=30-100%) *9	
	LOAD REGULATION	-	150max (lo=30-100%) *9	300max (lo=30-100%) *9	
	LOAD ILLUOLATION	0 to +70℃	120max	120max	
		-25 - 0°C	240max	240max	
			500max	750max	
		0 to +70℃	150max	150max	
OUTPUT	RIPPLE NOISE[mVp-p] *4	-25 - 0°C	300max	300max	
		lo=0 - 30%	600max	750max	
		0 to +70℃	240max	480max	
	TEMPERATURE REGULATION[mV]	-25 to +70℃	360max	600max	
	DRIFT[mV]	-25 10 +70 C *5	96max	192max	
	START-UP TIME[ms]	÷0	750max (ACIN 115V, Io=100%)		
	HOLD-UP TIME[ms]		20typ (ACIN 115V, Io=100%)		
	OUTPUT VOLTAGE ADJUSTMENT		22.5 to 26.4 45.0 to 55.2		
	OUTPUT VOLTAGE SETT		24.0±1.0%	48.0±1.0%	
	OVERCURRENT PROTE				
	OVERCORRENT PROTE		Works over 101% of peak current and recovers automatically       30.0 to 36.0       57.6 to 67.2		
PROTECTION	REMOTE ON/OFF (R		Provided	01.01001.2	
CIRCUIT AND	DC_OK LAMP	-)	LED (Green)		
OTHERS	ALARM LAMP		LED (Green)		
	DC_OK CONTACT		Relay contact 30VDC 1A max, 30VAC 0.5A max (resisti	ve load) (Only KHEA)	
	INPUT-PE		AC3,000V 1minute, Cutoff current = 10mA, DC500V 50M $\Omega$ min (At Room Temperature)		
ISOLATION	OUTPUT-PE		AC2,000V 1minute, Cutoff current = 10mA, DC500V 50M $\Omega$ min (At Room Temperature) AC500V 1minute, Cutoff current = 100mA, DC500V 50M $\Omega$ min (At Room Temperature)		
	OUTPUT-RC, DC OK		AC500V 1minute, Cutoff current = 100mA, DC500V 50M $\Omega$ min (At Room Temperature) AC500V 1minute, Cutoff current = 100mA, DC500V 50M $\Omega$ min (At Room Temperature)		
	OPERATING TEMP., HUMID.AND	ALTITUDE	$-25$ to $+70^{\circ}$ C, 20 - 90%RH (Non condensing), Type teste		
	STORAGE TEMP.,HUMID.AND		$-40$ to $+85^{\circ}$ , 20 - 90% RH (Non condensing), type test		
ENVIRONMENT	VIBRATION	*8	10 - 55Hz, $19.6$ m/s <sup>2</sup> (2G), 3minutes period, 60 minutes	along 7 axis (Non operating mounted on DIN Rail)	
	IMPACT		$196.1 \text{m/s}^2$ (20G), 11 ms, once each X, Y and Z axis (Pac		
	1	AC input	UL60950-1, C-UL (CSA60950-1), EN60950-1, UL508, ANSI		
SAFETY AND	AGENCY APPROVALS	<u> </u>	UL60950-1, C-UL (CSA60950-1), EN60950-1 UL60950-1, C-UL (CSA60950-1), EN60950-1	sion energy and the second s	
NOISE	CONDUCTED NOISE		Complies with FCC-B, VCCI-B, CISPR22-B, EN55011-B	EN55022-B	
REGULATIONS		ATOP		, LNOOOLL D	
	HARMONIC ATTENUATOR		Complies with IEC61000-3-2 (Class A) *6		

70×124×117mm (W×H×D) [2.76×4.88×4.61 inches]

OTHERS

CASE SIZE

COOLING METHOD

WEIGHT

1,200g max

Convection

## KH series



- The value is primary surge. The current of input surge to a built-in EMI/EMC \*1 Filter(0.2ms or less)is excluded
- \*2 Refer to 3, instruction manual,

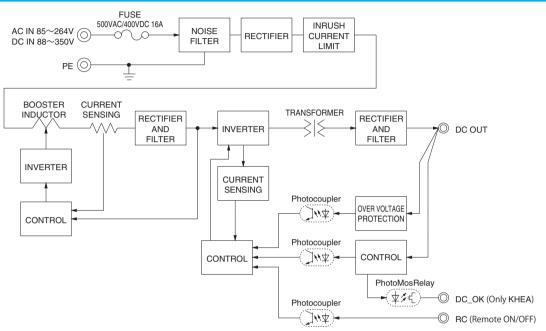
- \*5
- Please refer to the instruction manual 1.7. Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/ output
- Depase contact us about another class. Case size contains neither the umbo. Only as standard mounting orientation (A). Refer to the "Assembling and Installation Method".

If install other than standard mounting orientation (A), please fix the power supply for withstand the vibration and impact. Burst operation at 30% load or less

- Burst operation at 30% load or less.
   10 Under low DC input voltage below DC110V, the temperature derating -1C/V or the output power derating -1%/V are required.
   To meet the specifications. Do not operate over-loaded condition.
   A sound may occur from power supply at light or peak loading.

Refer to 3, instruction manual. Please contact us about dynamic load and input response. 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: RM103).

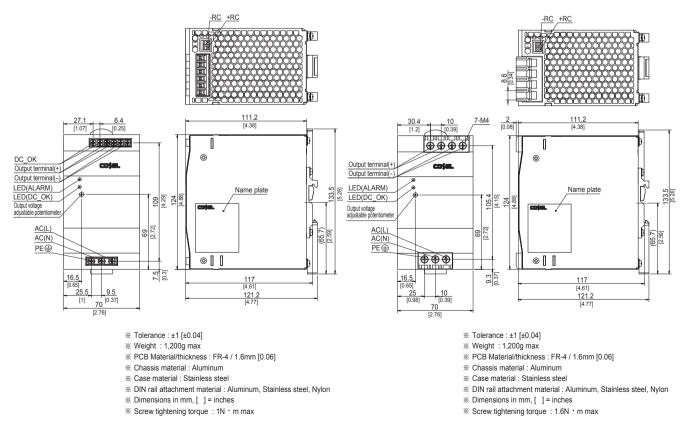
#### **Block diagram**



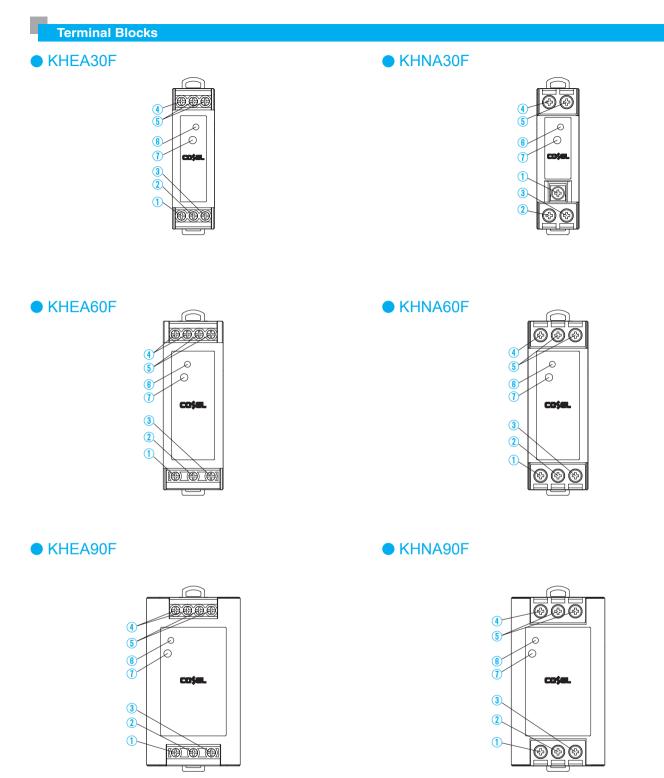
**External view** 

#### <KHEA480F(Euro Style I/O Terminals)>

#### <KHNA480F(Barrier Blocks Style I/O Terminals)>

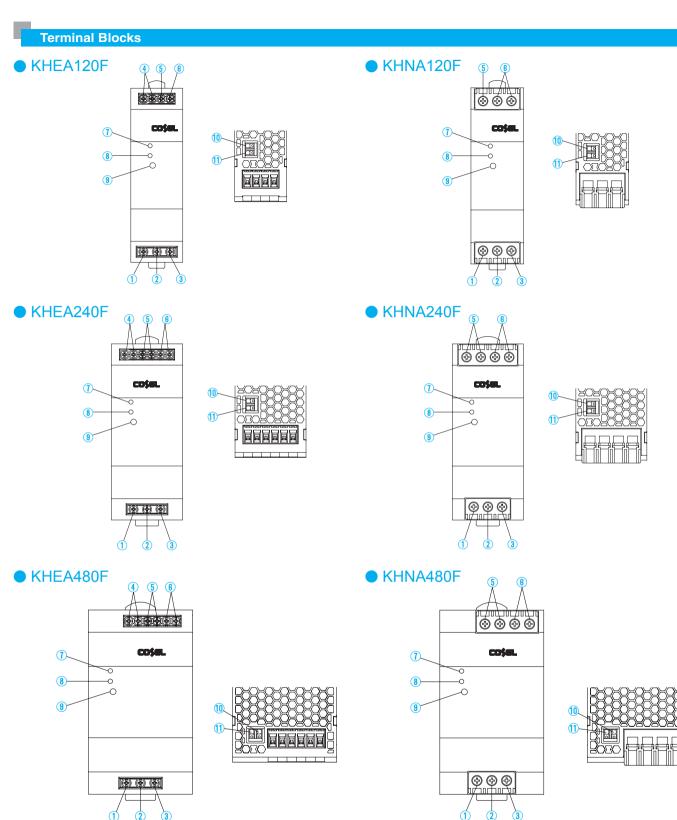


# **COŞEL** | KH-series



Terminal Number	Terminal Name	Function
1	PE	Protective earth Terminal
2	AC (N)	Input Terminals
3	AC (L)	input terminais
4	+VOUT	+Output Terminals
5	-VOUT	-Output Terminals
6	DC_OK	LED for output voltage confirmation
1	TRM	Adjustment of output voltage

KH-series | CO\$EL



Terminal Number	Terminal Name	Function
1	PE	Protective earth Terminal
2	AC (N)	Input Terminale
3	AC (L)	Input Terminals
4	DC_OK	Output voltage confirmation(relay contact)
5	+VOUT	+Output Terminals
6	-VOUT	-Output Terminals

3

Terminal Number	Terminal Name	Function
	ALARM	LED Alarm for lowered output voltage
8	DC_OK	LED for output voltage confirmation
9	TRM	Adjustment of output voltage
10	+RC	Remote ON/OFF Terminals
(1)	-RC	Remote ON/OFF Terminals

(2)

# **COŞEL** | KH-series

#### Assembling and Installation Method

#### Installation method

- ■About DIN-Rail Attachment available with DIN EN60715 TH 35 (35×7.5mm or 35×15mm) (Top hat shaped DIN rail)
- Below shows mounting orientation.

If install other then standard mounting orientation (A), please fix the power supply for withstand the impact and vibration.

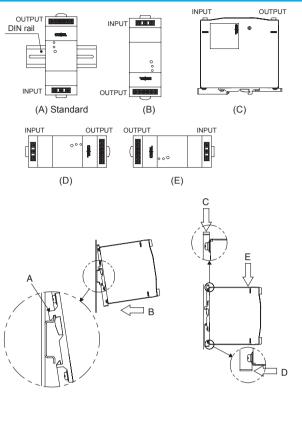
When you mount a power supply on a DIN rail, have the area marked A catch one side of the rail and push the unit to the direction of B. To remove the power supply from the rail, either push down the area marked C or insert a tool such as driver to the area marked D and pull the unit apart from the rail. When you couldn't remove the unit easily, push down the area marked C while lightly pushing the unit to the direction of E.

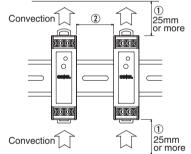
Shown below the notes about installation clearance of a unit.

#### • KHEA30F/60F/90F, KHNA30F/60F/90F

- Installation clearance at above and below the unit.
   Please have clearance of at least 25mm above and below the unit to avoid heat accumulation.
- (2) Installation clearance at the side of the unit.

Please have clearance of at least 5mm side the unit to insulating the internal components. However, refer to right figure, if adjacent device of the unit (including power supply) is a heat source.





No.	Model	Adjacent device of the unit				
		Non-heat source	Heat source(*)			
1	KHEA30F, KHNA30F	5mm or more	15mm or more			
2	KHEA60F, KHNA60F	5mm or more	15mm or more			
3	KHEA90F, KHNA90F	5mm or more	15mm or more			

\*Reference value when same power units are adjacent.



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

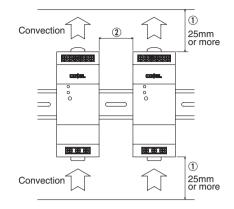
#### KHEA120F/240F/480F.KHNA120F/240F/480F

(1) Installation clearance at above and below the unit.

Please have clearance of at least 25mm above and below the unit to avoid heat accumulation.

(2) Installation clearance at the side of the unit.

Please have clearance of at least 15mm side the unit to avoid interfering with heat radiation from housing. However, refer to right figure, if adjacent device of the unit (including power supply) is a heat source.



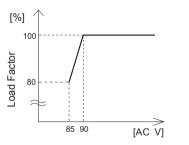
No.	Model	Adjacent device of the unit			
		Non-heat source	Heat source(*)		
1	KHEA120F, KHNA120F	15mm or more			
2	KHEA240F, KHNA240F	15mm or more			
3	KHEA480F, KHNA480F	15mm or more	50mm or more		

\*Reference value when same power units are adjacent.

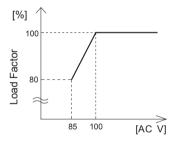
#### Derating

#### Derating curve for input voltage

#### KHEA30F/60F/90F, KHNA30F/60F/90F



#### KHEA480F, KHNA480F



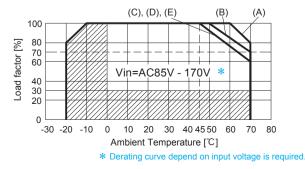
#### Ambient temperature derating

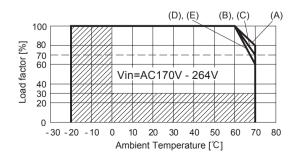
The operative ambient temperature as different by input voltage. Derating curve is shown below. In the hatched area, the specification of Ripple, Ripple Noise is different from other area.

#### Derating Curve (Convection)

Refer to instruction manual 4 for Ambient temperature measurement point.

#### KHEA30F, KHNA30F

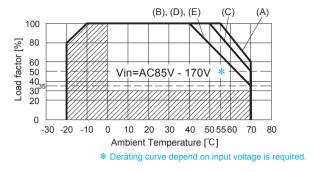


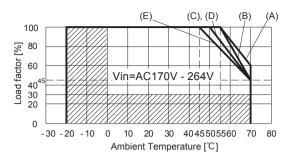


# **COŞEL** | KH-series

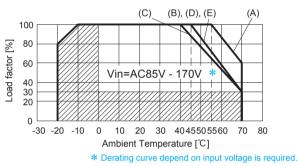
#### Derating

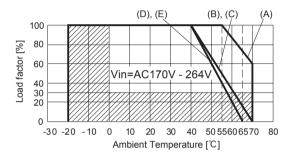
#### • KHEA60F, KHNA60F



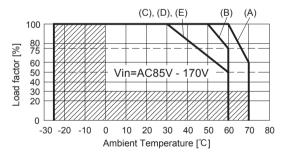


#### • KHEA90F, KHNA90F



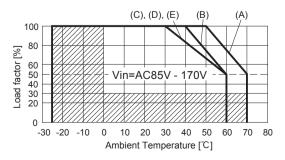


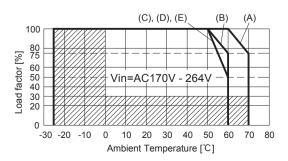
### KHEA120F, KHNA120F



#### (C), (D), (E) (B) (A) 100 80 75 Load factor [%] 60 Vin=AC170V - 264V 40 30 20 0 -30 -20 -10 0 10 20 30 40 50 60 70 80 Ambient Temperature [℃]

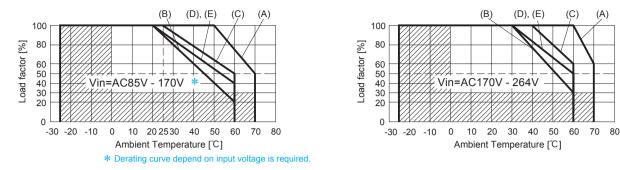






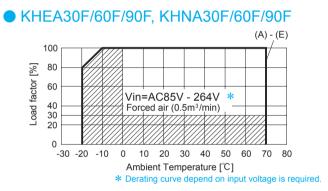
#### Derating

#### KHEA480F, KHNA480F

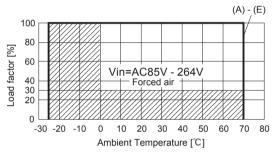


#### Derating Curve (Forced air)

Use the temperature measurement point as shown in instruction manual 4. Please use at the temperature dose not exceed the values in instruction manual 4.



#### • KHEA120F/240F, KHNA120F/240F



#### KHEA480F, KHNA480F (A) - (E) 100 80 Load factor [%] 60 Vin=AC85V - 264V \* 40 30 20 Forced air 0 -30 -20 -10 0 10 20 30 40 50 60 70 80 Ambient Temperature [°C] \* Derating curve depend on input voltage is required.

#### June 29, 2020

# **COŞEL** | KH-series

#### **Instruction Manual**

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

Instruction Manual Before using our product https://en.cosel.co.jp/product/powersupply/KH/ https://en.cosel.co.jp/technical/caution/index.html



#### **Basic Characteristics Data**

Model	Circuit method	frequency curi	Input	urrent input fuse	Inrush current protection circuit	PCB/Pattern		Series/Parallel operation availability		
			[A] <b>*1</b>			Material	Single sided	Double sided	Series operation	Parallel operation
KHEA30F	Flyback converter	50 - 200	0.55	500VAC/400VDC 3.15A	Thermistor	FR-4		Yes	Yes	No
KHNA30F										
KHEA60F	Flyback converter 50 - 2	50 - 200	200 1.10	500VAC/400VDC Thermistor	FR-4		Yes	Yes	No	
KHNA60F		50 200		3.15A		1 N-4		162	162	NU
KHEA90F	Active filter	20 - 500	0.95	500VAC/400VDC	Thermistor	FR-4		Yes	Yes	No
KHNA90F	Flyback converter	50 - 200		3.15A						
KHEA120F	Active filter	60 - 550	1.2	500VAC/400VDC 5A	Thermistor	FR-4		Yes	Yes	No
KHNA120F	LLC resonant converter	45 - 350								
KHEA240F	Active filter	60 - 550	2.3	500VAC/400VDC 8A	SCR	FR-4		Yes	Yes	No
KHNA240F	LLC resonant converter	45 - 350								
KHEA480F	Active filter	60 - 150	4.6	500VAC/400VDC 16A	Relay	FR-4		Yes	Yes	No
KHNA480F	LLC resonant converter	45 - 350								

\*1 The value of input current is at ACIN 115V and 100%.

\*2 Burst operation at light loading, frequency is change by use condition.

Please contact us about detail.

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