Technical Data Sheet

RACM30-K/277 Series / AC/DC Power Supply

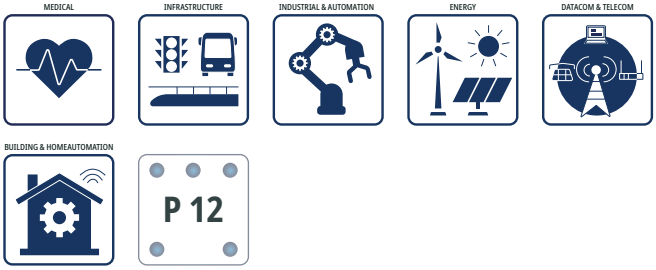
30W / Universal Input 100V - 277VAC

RECOM
AC/DC Converter

FEATURES

- Full load power: -40°C to +60°C
- Reduced load rating to 90°C
- OVC III up to 5000m and LPS
- Industry standard pinning [P12]
- Meets EN55032 “B” in PELV configuration
- Medical; household & industrial standard
- 2.0” x 1.5” encapsulated modules THT or Wired
- 3.0” x 1.5” Open Frame card
- Panel Mount and DIN-Rail Clip option
- 3 years warranty

APPLICATIONS



SAFETY & EMC

E314885

RoHS² compliant 10 from 10

Reach compliant

HOUSEHOLD CERTIFIED EN-60335-1

DESCRIPTION

RACM30-K/277 AC/DC modules provide a leading thermally effective Power yield of 9.2 Watts per inch³ at 60°C still air for continuous loads of 30 Watts plus additional peak capability. These Modules operate in a temperature range of -40° to 90°C in compliance with safety standards of medical MOPP, household-, industrial, and measurement markets. Safety reports rate the series as LPS limited power source and OVCIII for an operating altitude of up to 5000m. A comfortable margin to EMI Class B limits, even with outputs connected to the ground, ease system implementation for quick time-to-market without additional external circuitry such as fuses or filters. For designers, maximum flexibility for these encapsulated, solder-mountable modules is pin-to-pin compatible with the well-established series RAC20-K. Further mechanical derivatives are potted modules with wires or a panel mount option with spring-clamp connectors which is convertible to DIN-Rail mounting via available RECOM Clip accessory.

SELECTION GUIDE

Part Number	Input Voltage Range [VAC]	Output Voltage nom. [VDC]	Output Current max. [mA]	Efficiency typ. (1) [%]	Max. Capacitive Load (2) [µF]
RACM30-05SK/277	85-305	5	6000	86	10000
RACM30-12SK/277	85-305	12	2500	90	10000
RACM30-15SK/277	85-305	15	2000	90	10000
RACM30-24SK/277	85-305	24	1250	89	8000
RACM30-12DK/277	85-305	±12	±1250	86	±8000
RACM30-15DK/277	85-305	±15	±1000	86	±8000

Note1: Efficiency is tested at nominal input (230VAC) and full load at +25°C ambient

Note2: Measured @ T_{AMB}= 25C°, nom. V_{IN}, full load and after warm-up unless otherwise stated

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MODEL NUMBERING

Note3: "/277" only = THT printmount, encapsulated, potted
add suffix "/PMP" = panel mount version with push-in terminals
add suffix "/PMA" = panel mount version with 45° angled push-in terminal
add suffix "/W" for wired version (single output only), encapsulated, potted
add suffix "/OF" = standard 38.1mm x 76.2mm (1.5"x3") open frame version with header connectors

Note4: For other case/connection/footprint options, please contact RECOM Tech-Support.

ACCESSIBLE PART

Part Number	Description	Datasheet Link
R-DR/Clip	Din Rail mounting clip only for PMP and PMA	R-DR/CLIP.pdf

ORDERING INFORMATION

Model	nom. Output Voltage	Single/Dual	Package Type Suffix				
			"THT printmount"	"/PMP"	"/PMA"	"/W"	"/OF"
RACM30-05SK/277	5	Single	x	x	coming soon	x	x
RACM30-12SK/277	12	Single	x	x	coming soon	x	x
RACM30-15SK/277	15	Single	x	N/A	x	x	x
RACM30-24SK/277	24	Single	x	x	coming soon	x	x
RACM30-12DK/277	±12	Dual	x	N/A	N/A	N/A	x
RACM30-15DK/277	±15	Dual	x	N/A	N/A	N/A	x

x= standard portfolio / on request= MOQ may apply on project base / N/A= not available

BASIC CHARACTERISTICS (measured @ T_{AMB}= 25°C, nom. V_{IN}, full load and after warm-up unless otherwise stated)

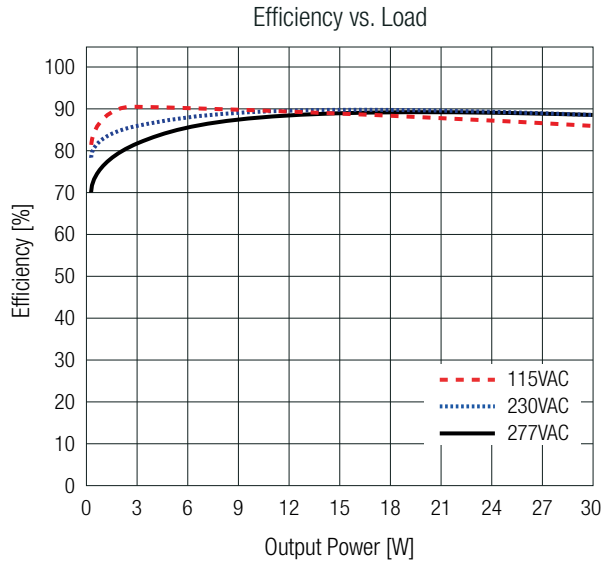
Parameter	Condition		Min.	Typ.	Max.
Nominal Input Voltage	50/60Hz		100VAC		277VAC
Operating Range (5)	47-63Hz		85VAC	230VAC	305VAC
	DC		120VDC		430VDC
Input Current	V_{IN}= 115VAC				650mA
	V_{IN}= 230VAC				350mA
	V_{IN}= 277VAC				300mA
Inrush Current	cold start at 25°C	V_{IN}= 115VAC			20A
		V_{IN}= 230VAC			30A
		V_{IN}= 277VAC			36A
No Load Power Consumption	230VAC				100mW
Ecodesign Standby Mode Use (Available output power for stated input power)	V_{IN}= 230VAC	P_{IN}= 0.3W			0.22W
		P_{IN}= 0.5W			0.39W
		P_{IN}= 1W			0.79W
Input Frequency Range			47Hz		63Hz
Minimum Load			0%		
Power Factor	V_{IN}= 115VAC			0.6	
	V_{IN}= 230VAC			0.5	
	V_{IN}= 277VAC			0.45	
Start-up time					150ms
Rise time					30ms
Hold-up time	V_{IN}= 230VAC		50ms		
Internal Operating Frequency	100% load at nominal V_{IN}				100kHz
Output Ripple and Noise (6)	20MHz BW				100mVp-p

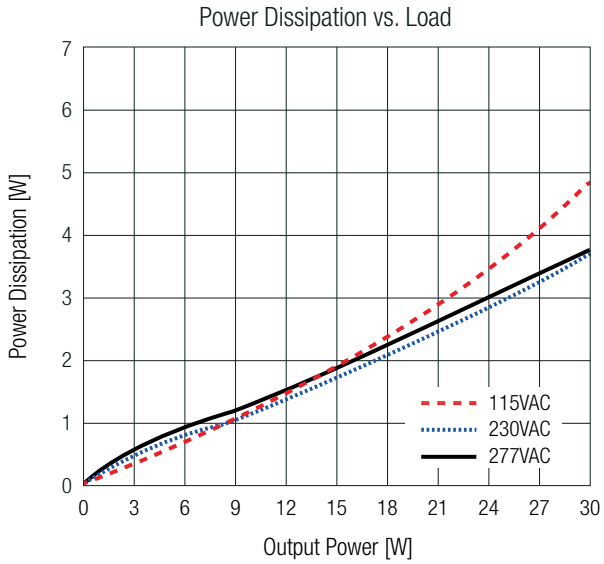
Note5: The products were submitted for safety files at AC-Input operation, and to IEC/EN61010-1 for DC-operation

Note6: Measurements are made with a 0.1µF MLCC & 10µF E-cap in parallel across output. (low ESR)

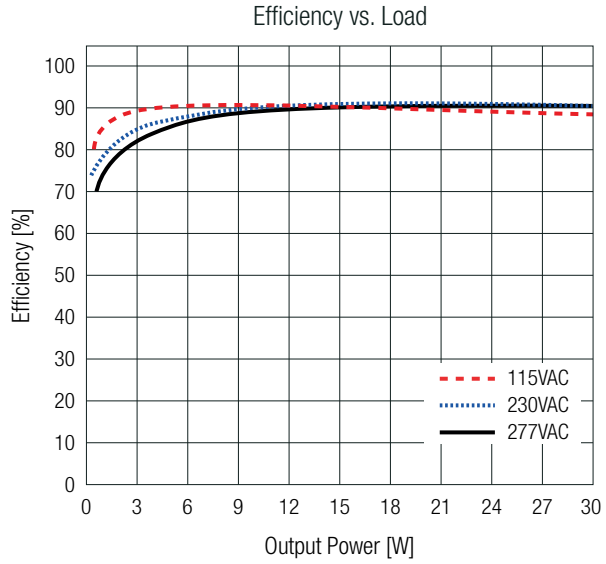
BASIC CHARACTERISTICS (measured @ T_{AMB}= 25°C, nom. V_{IN}, full load and after warm-up unless otherwise stated)

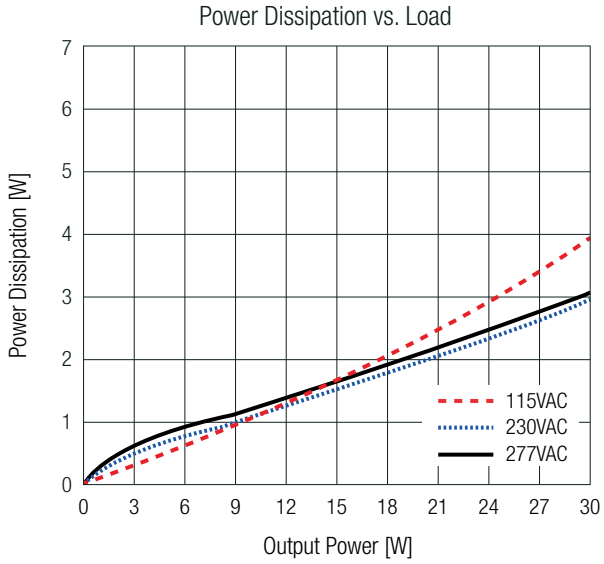
RACM30-05SK/277 & RACM30-24SK/277



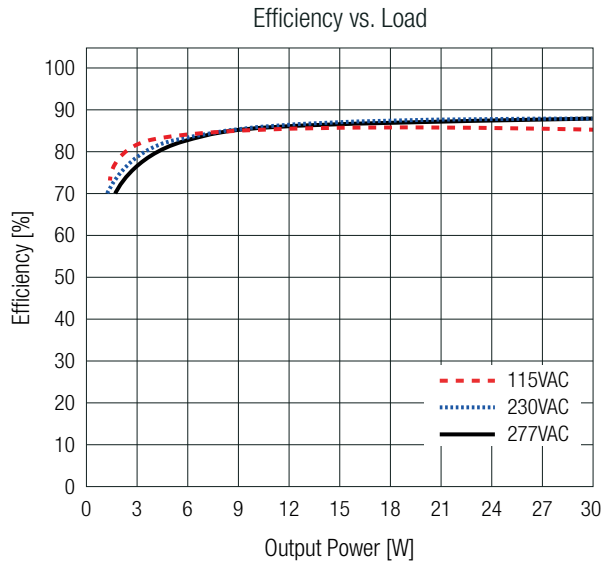


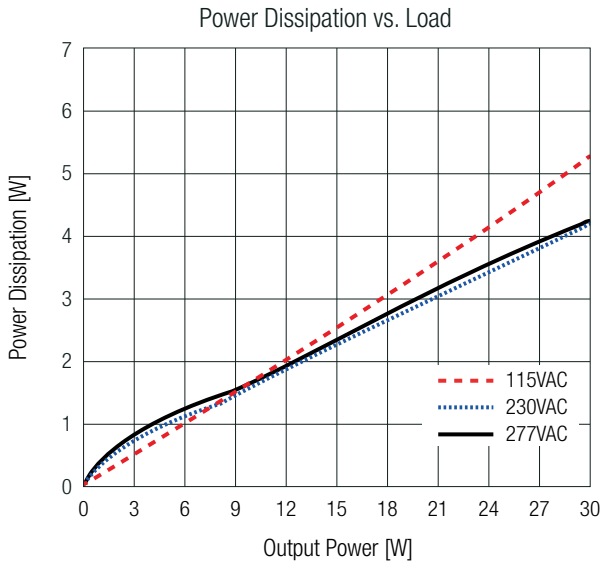
RACM30-12SK/277; RACM30-15SK/277





RACM30-12DK/277; RACM30-15DK/277





REGULATIONS (measured @ T_{AMB}= 25°C, nom. V_{IN}, full load and after warm-up unless otherwise stated)

Parameter	Condition		Value
Output Accuracy	single output		±2.0% typ.
	dual output		±3.0% typ.
Line Regulation	low line to high line	$5V_{OUT}$	±1.0% typ.
		others	±0.5% typ.
Load Regulation (7)	10% to 100% load	$5V_{OUT}$	3.0% typ.
		others	1.0% typ.
Cross Regulation	dual output only		±10.0% typ.
Transient Response	25% load step change		4.0% max.
	recovery time		500µs typ.

Note7: Operation below 10% load will not harm the converter, but specifications may not be met

PROTECTIONS (measured @ T_{AMB}= 25°C, nom. V_{IN}, full load and after warm-up unless otherwise stated)

Parameter	Type		Value
Input Fuse (8)			T3.15A, slow blow type
Short Circuit Protection (SCP)			hiccup, auto recovery
Over Voltage Protection (OVP)			150% - 195%, hiccup mode
Over Current Protection (OCP)			<180%, hiccup mode
Over Voltage Category (OVC)	"/THT printmount"; "/W"; "/PMP"; "/PMA"		OVCIII (5000m)
	"/OF"		OVCIII (3000m) / OVCII (5000m)
DC ON LED	only for "/PMP" and "/PMA"		green
Class of Equipment			Class II
Isolation Voltage (9)	I/P to O/P, I/P to case, O/P to case	1 minute	4kVAC
Isolation Resistance	V_{ISO} = 500VDC		1GΩ min.
Isolation Capacitance	I/P to O/P, 100kHz/0.1V		100pF max.
Insulation Grade	I/P to O/P		reinforced
Means of Protection	I/P to O/P		2MOPP
Medical Device Classification	built-in power supply		BF ready
Touch Current			100µA max.

Note8: For system integration with DC operation, consider a suitable DC fuse in front of the input
Note9: For repeat Hi-Pot testing, reduce the time and/or the test voltage

ENVIRONMENTAL (measured @ T_{AMB}= 25°C, nom. V_{IN}, full load and after warm-up unless otherwise stated)

Parameter	Condition		Value
Operating Ambient Temperature Range	@ natural convection (0.1m/s)	refer to **„Derating Graph"**	-40°C to +90°C
Maximum Case Temperature			+110°C
Temperature Coefficient			0.02%/K
Operating Altitude (10)	according to 62368-1, 60601-1, 61558		5000m
Operating Humidity	non-condensing		90% RH max.
Pollution Degree	"/THT printmount"; "/W"; "/PMP"; "/PMA"		PD3
	"/OF"		PD2
Vibration	according to MIL-STD-202G		10-500Hz, 2G 10min./1cycle, period 60min. each along x,y,z axes
	"/THT printmount" types only	according to IEC 60068-2-27	3 axis, 40 g half sine, 11 ms shock
		according to IEC 60068-2-65	5-500Hz, 20m/s², 1 Oct/min, 15min
		according to IEC 60068-2-64	10-500Hz; RMS 23,4m/s² ; 15min

ENVIRONMENTAL (measured @ T_{AMB}= 25°C, nom. V_{IN}, full load and after warm-up unless otherwise stated)

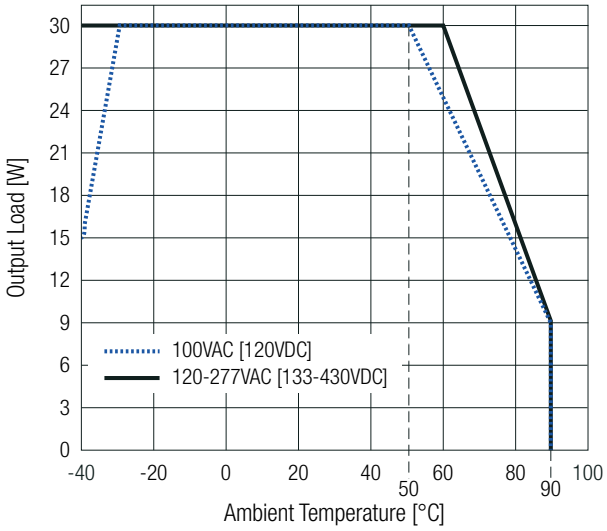
Parameter	Condition					Value
MTBF	according to MIL-HDBK-217, G.B.		"/THT printmount"; "/W"; "/PMP"; "/PMA"		+25°C	>1357 x 10^3 hours
					+40°C	>1096 x 10^3 hours
			"/OF"		+25°C	>1115 x 10^3 hours
					+40°C	>873 x 10^3 hours
Design Lifetime	230VAC/50Hz and full load	"/THT printmount"; "/W"; "/PMP"; "/PMA"	single output	$5V_{OUT}$	+45°C	>30 x 10^3 hours
				others	+50°C	
			dual output		+40°C	>30 x 10^3 hours
					+50°C	>17 x 10^3 hours
		"/OF"			+50°C	>30 x 10^3 hours

Note10: Recognized by safety agency for safe operation up to 5000m. High altitude operation may impact the performance and lifetime.

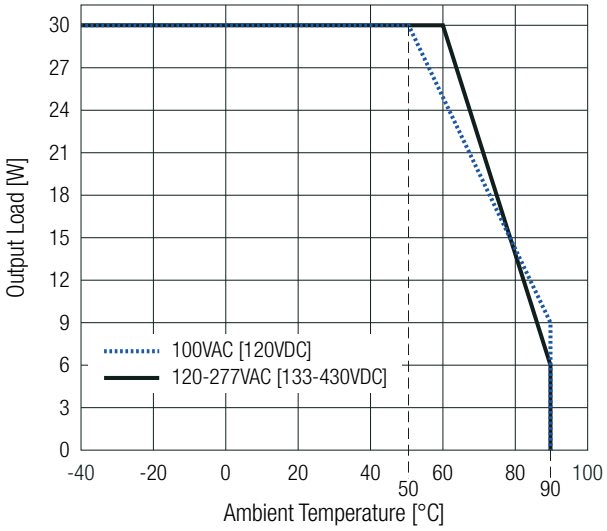
Derating Graph

(@ Chamber and natural convection 0.1m/s)

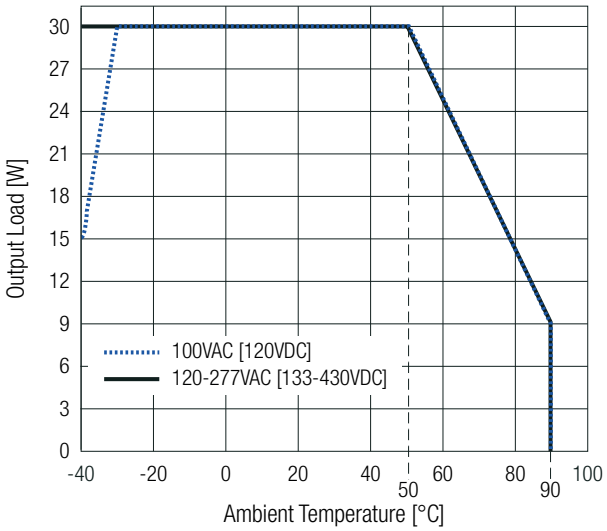
RACM30-05SK/277 (/W; /PMP; /PMA)



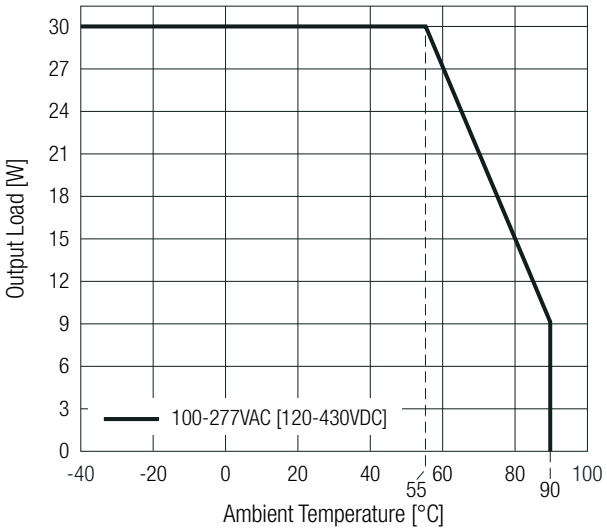
RACM30-xxS(D)K/277 (/W; /PMP; /PMA) others



RACM30-05SK/277/OF



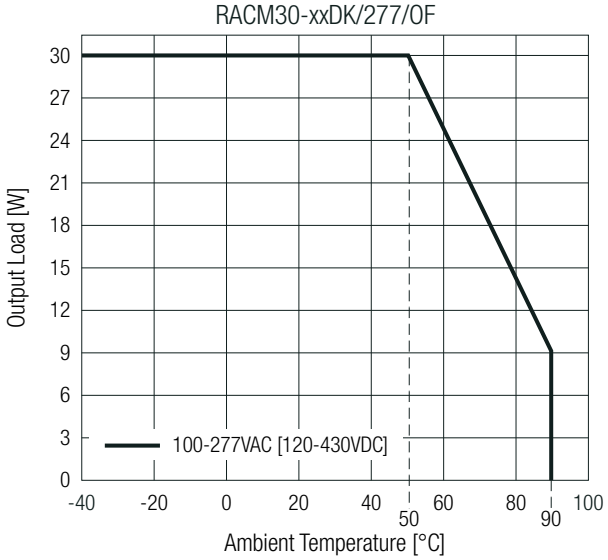
RACM30-xxSK/277/OF others



ENVIRONMENTAL (measured @ T_{AMB}= 25°C, nom. V_{IN}, full load and after warm-up unless otherwise stated)

Derating Graph

(@ Chamber and natural convection 0.1m/s)



PEAK LOAD CAPABILITY (SINGLE OUTPUT ONLY)

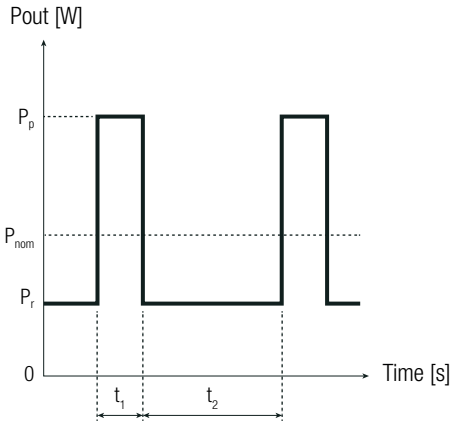
Calculation:

P_P	= peak output power	[W]
P_r	= recovery output power	[W]
t_1	= peak time set (10s max.)	[s]
t_2	= recovery time (min. 5 x t_1)	[s]
k	= safety factor 1.1	[ ]

$$P_r = \frac{30 \times (t_1 + t_2) - (P_P \times t_1)}{t_2 \times k}$$

Maximum Peak Power

nom. V_{OUT}= 5VDC nom. V_{OUT}= 12VDC	nom. V_{OUT}= 15VDC nom. V_{OUT}= 24VDC
33W	36W



Practical Example (RACM30-24SK/277):

Take the RACM30-24SK/277 at 230VAC input and full load at T_{AMB}= 25°C, with natural convection.

P_P = 36W
t_1 = 10s
t_2 = 50s
k = 1.1

$$P_r = \frac{30 \times (10 + 50) - (36 \times 10)}{50 \times 1.1} = 26.2W$$

SAFETY & CERTIFICATIONS

Certificate Type (Safety)	Report Number	Standard
Audio/Video, information and communication technology equipment - Part1: Safety requirements	64.210.22.02737.01	EN62368-1:2014+A11:2017 (2nd Edition)
Audio/Video, information and communication technology equipment - Safety requirements (CB)	085-220273601-100 (/THT printmount and open frame /OF only)	IEC62368-1:2018 (3rd Edition)
Audio/Video, information and communication technology equipment - Safety requirements (LVD)	64.210.22.02737.02 (except open frame /OF)	EN62368-1:2020+A11:2020 (3rd Edition)
Electrical Equipment For Measurement, Control, and Laboratory Use; Part 1: General Requirements (CB)	085-220277601-000 (/OF models pending)	IEC61010-1:2010+A1:2016 3rd Edition with IEC61010-2-201:2017
Electrical Equipment For Measurement, Control, and Laboratory Use; Part 1: General Requirements (LVD)	64.240.22.02776.01 (/OF models pending)	EN61010-1:2010+A1:2019 with EN IEC 61010-2-201:2018
Medical electrical equipment Part 1: General requirements for basic safety and essential performance (CB)	22SBDS06094-02771	IEC60601-1:2005+AM1:2012 3rd Edition
Medical electrical equipment Part 1: General requirements for basic safety and essential performance (LVD)		EN60601-1:2006+A1:2013+AC:2014
Medical electrical equipment Part 1: General requirements for basic safety and essential performance	E314885	ANSI/AAMI ES60601-1:2005+A2:2010/(R)2012
		CAN/CSA-C22.2 No. 60601-1:14 3rd Edition

SAFETY & CERTIFICATIONS

Certificate Type (Safety)	Report Number	Standard
Household and similar electrical appliances – Safety – Part 1: General requirements (CB)	64.260.22.02739.01	IEC60335-1:2010+C1:2016 5th Edition
Household and similar electrical appliances – Safety – Part 1: General requirements (LVD)		EN60335-1:2012+A2:2019+A15:2021
Measurement methods for electromagnetic fields of household appliances and similar apparatus with regard to human exposure		EN62233:2008
Safety of power transformers, power supplies, reactors & similar products for supply voltages up to 1100V	085-220273801-000	IEC61558-1:2017 3rd Edition
Safety of power transformers, power supplies, reactors & similar products for supply voltages up to 1100V Part 2: Particular requirements		IEC61558-2-16:2009+A1:2013 1st Edition
Safety of power transformers, power supplies, reactors & similar products for supply voltages up to 1100V	64.250.22.02738.01	EN IEC 61558-1:2019
Safety of power transformers, power supplies, reactors & similar products for supply voltages up to 1100V Part 2: Particular requirements		EN61558-2-16:2009+A1:2013
RoHS2		RoHS-2011/65/EU + AM-2015/863

EMC Compliance according to EN60601-1-2	Condition	Standard / Criterion
Medical electrical equipment Part 1-2: General requirements for basic safety and essential performance		EN60601-1-2:2015+A1:2021, Class B
ESD Electrostatic discharge immunity test	Air: ±2, 4, 8, 15kV Contact ±8kV	EN61000-4-2:2008 IEC61000-4-2:2009
Radiated, radio-frequency, electromagnetic field immunity test	10V/m (80-2700MHz); table 9	IEC/EN61000-4-3:2006 + A2:2010
Fast Transient and Burst Immunity	L-N: ±2kV	IEC/EN61000-4-4:2012
Surge Immunity	L-N: ±0.5, 1, 2kV	IEC/EN61000-4-5:2014 + A1:2017
Immunity to conducted disturbances, induced by radio-frequency fields	3Vrms (0.15-80MHz); 6Vrms (ISM and amateur radio bands within 0.15-80MHz)	IEC61000-4-6:2013 EN61000-4-6:2014
Power Magnetic Field Immunity	30A/m	EN61000-4-8:2010
Voltage Dips and Interruptions	Dips: 100% (0.5P, 1.0P); 30% (25P/30P) Interruption: 100% (250P/300P)	EN61000-4-11:2004 + A1:2017

EMC Compliance according to EN35032/EN35035	Condition	Standard / Criterion
Electromagnetic compatibility of multimedia equipment – Emission Requirements		EN55032:2015, Class B
Electromagnetic compatibility of multimedia equipment – Immunity requirements		EN55035:2017+A11:2020
Radiated, radio-frequency, electromagnetic field immunity test	3V/m (1800, 2600, 3500, 5000MHz)	IEC/EN61000-4-3:2006 + A2:2010, Criteria A
Fast Transient and Burst Immunity	L, N, L-N: 2kV DC load line: 0.5kV	IEC/EN61000-4-4:2012, Criteria A

EMC Compliance according to EN IEC61204-1	Condition	Standard / Criterion
Low voltage power supplies, d.c. output Part 3: Electromagnetic compatibility		EN IEC 61204-3:2018
ESD Electrostatic discharge immunity test	Air: ±2, 4, 8kV Contact ±4kV	EN61000-4-2:2008, Criteria A IEC61000-4-2:2009, Criteria A
Radiated, radio-frequency, electromagnetic field immunity test	10V/m (80-1000MHz); 3V/m (1400-2000MHz); 1V/m (2000-2700MHz)	IEC/EN61000-4-3:2006+A2:2010, Criteria A
Fast Transient and Burst Immunity	L-N: ±2kV	IEC/EN61000-4-4:2012, Criteria B
Surge Immunity	L-N: ±0.5, 1, 2kV	IEC/EN61000-4-5:2014+A1:2017, Criteria A
Immunity to conducted disturbances, induced by radio-frequency fields	10Vrms (0.15-80MHz)	IEC61000-4-6:2013, Criteria A EN61000-4-6:2014, Criteria A
Power Magnetic Field Immunity	30A/m	IEC61000-4-8:2009, Criteria A EN61000-4-8:2010, Criteria A

SAFETY & CERTIFICATIONS

Voltage Dips	100% (0.5P, 1.0P); 20% (250P/300P); 30% (25P/30P)	IEC/EN61000-4-11:2004 + A1:2017, Criteria A
Voltage Interruptions	100% (250P/300P)	IEC/EN61000-4-11:2004 + A1:2017, Criteria B
Limits of Harmonic Current Emissions	N/A (<75W)	EN IEC 61000-3-2:2019
Limits of Voltage Fluctuations & Flicker		EN61000-3-3:2013+A1:2019

EMC Compliance according to EN55014-1/EN55014-2	**Condition**	**Standard / Criterion**
Electromagnetic compatibility of household appliances, electric tools and similar apparatus - Emission Requirements		EN55014-1:2006 + A2:2011
Electromagnetic compatibility of household appliances, electric tools and similar apparatus - Immunity Requirements		EN55014-2:2015
Immunity to conducted disturbances, induced by radio-frequency fields	3Vrms (0.15-230MHz)	IEC61000-4-6:2013, Criteria A EN61000-4-6:2014, Criteria A

DIMENSION & PHYSICAL CHARACTERISTICS

Parameter	**Type**	**Value**
Materials	case/baseplate	plastic, (UL94-V0)
	potting	PU, (UL94-V0)
	PCB	FR4, (UL94-V0)
Dimension (LxWxH)	"/THT printmount"; "/W"	52.5 x 40.0 x 25.5mm 2.0 x 1.5 x 1.0 inch
	"/PMP"; "/PMA"	84.7 x 40.0 x 33.0mm 3.3 x 1.5 x 1.3 inch
	"/OF" Single output; "/OF" Dual output	76.2 x 38.1 x 25.0mm 3.0 x 1.5 x 0.98 inch
Weight	"/THT printmount"	93g / 0.21 lbs
	"/PMP"; "/PMA"	122g / 0.27 lbs
	"/W" type including wires	98g / 0.22 lbs
	"/OF"	49g / 0.11 lbs

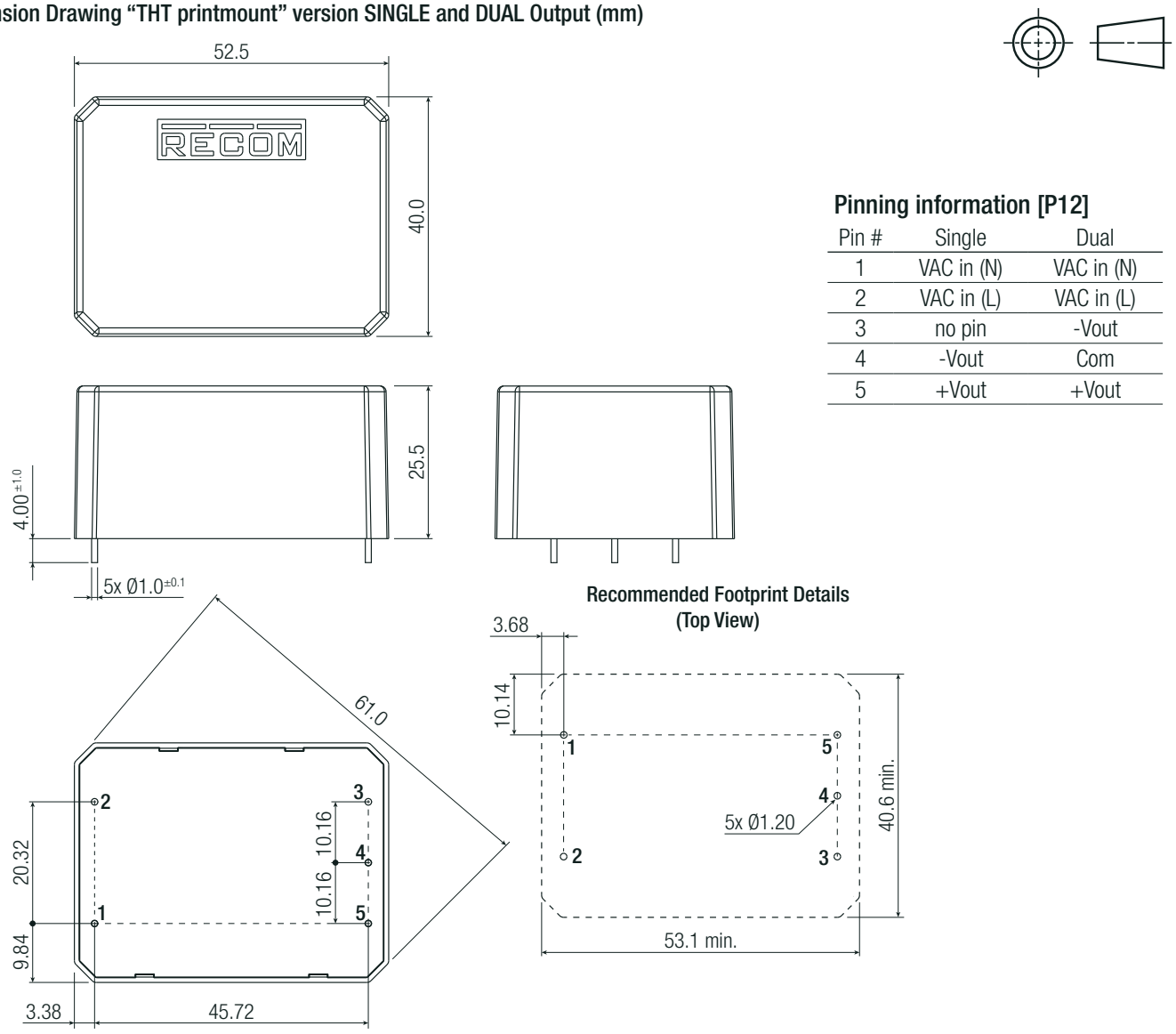
RACM30-K/277 Series / AC/DC Power Supply

30W / Universal Input 100V - 277VAC

RECOM AC/DC Converter

DIMENSION & PHYSICAL CHARACTERISTICS

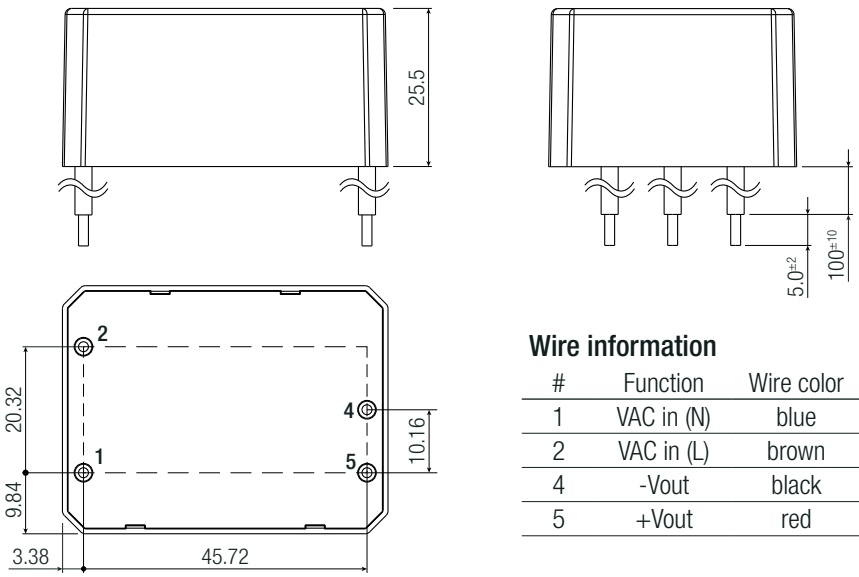
Dimension Drawing “THT printmount” version SINGLE and DUAL Output (mm)



Pinning information [P12]

Pin #	Single	Dual
1	VAC in (N)	VAC in (N)
2	VAC in (L)	VAC in (L)
3	no pin	-Vout
4	-Vout	Com
5	+Vout	+Vout

Dimension Drawing Wired version “/W” SINGLE Output (mm)



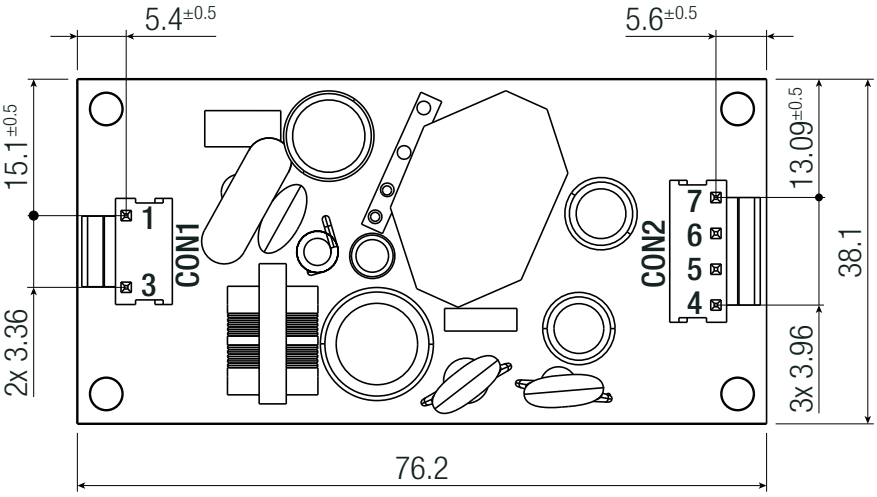
Wire information

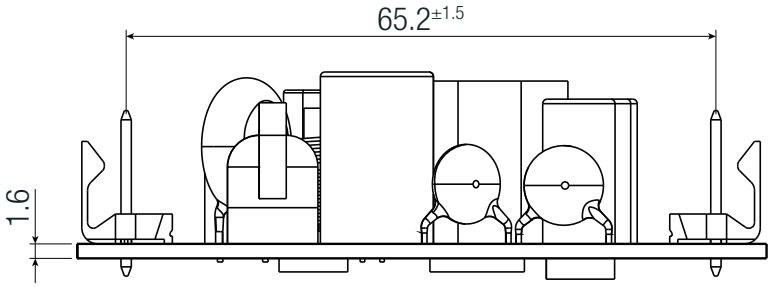
#	Function	Wire color	Type	AWG
1	VAC in (N)	blue	UL-1015	18
2	VAC in (L)	brown	UL-1015	18
4	-Vout	black	UL-1015	18
5	+Vout	red	UL-1015	18

Tolerance:
x.x= ±0.5mm
x.xx= ±0.25mm

DIMENSION & PHYSICAL CHARACTERISTICS

Dimension Drawing Open Frame "/OF" SINGLE Output (mm)

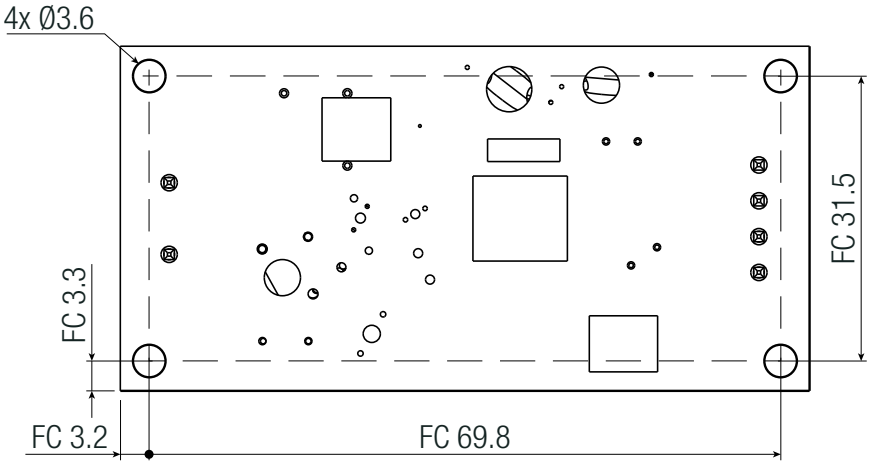




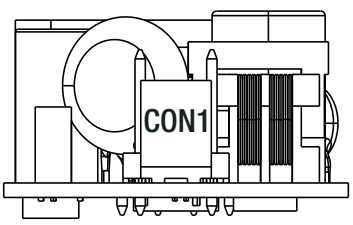
Connector Information - SINGLE

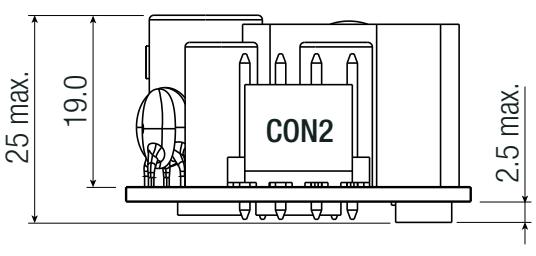
#	Function	Terminal
AC Input (CON1)		
1	VAC in (L)	Molex 26-62-4030
3	VAC in (N)	(Pin2 removed)
DC Output Connector (CON2)		
4, 5	+Vout	Molex 26-60-4040
6, 7	-Vout	

FC= fixing centers



Compatible Connector
Housing
Molex 41695 Series or equivalent
Crimp Terminal
Molex 2478 Series or equivalent

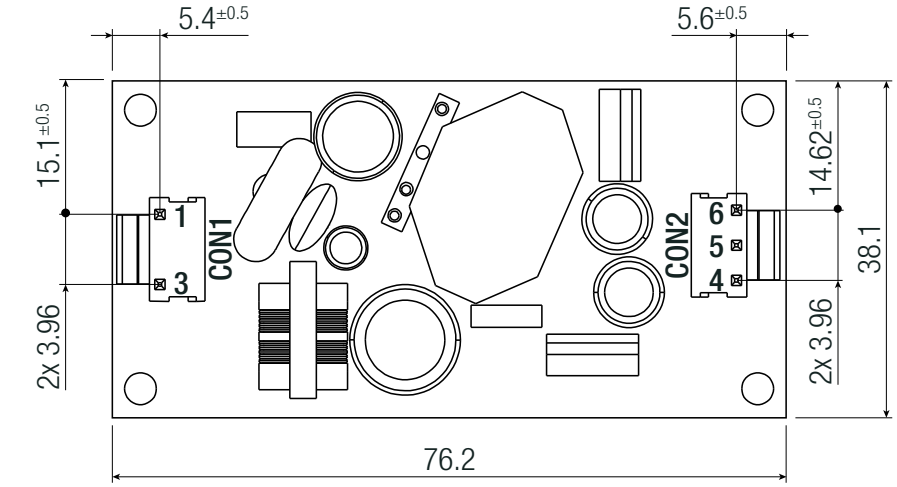


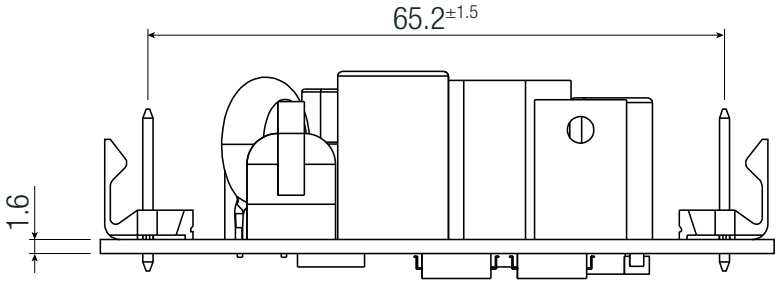


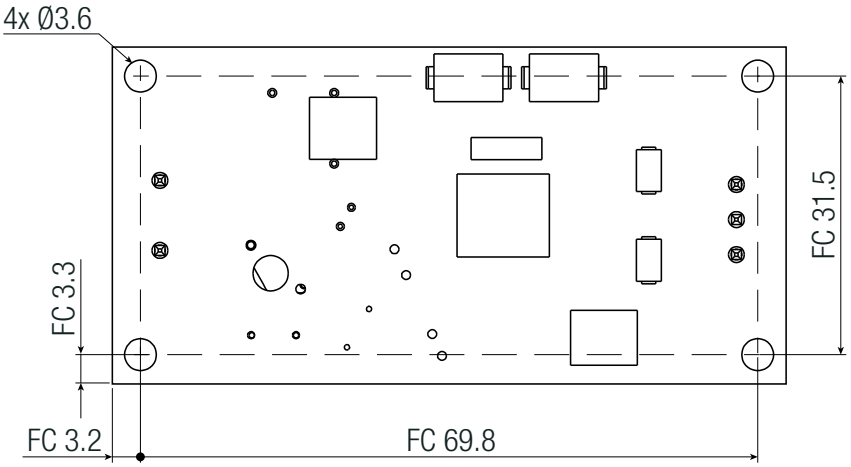
Tolerance:
x.x= ±0.5mm
x.xx= ±0.25mm

DIMENSION & PHYSICAL CHARACTERISTICS

Dimension Drawing Open Frame "/OF" DUAL Output (mm)





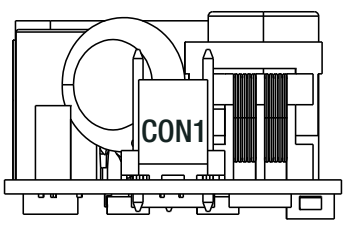


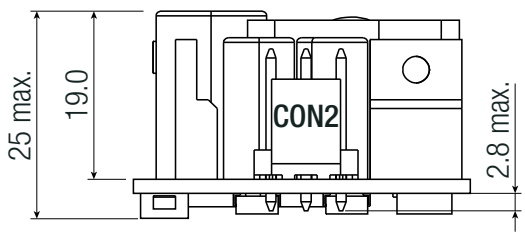
Connector Information - DUAL

#	Function	Terminal
	AC Input (CON1)	
1	VAC in (L)	Molex 26-62-4030
3	VAC in (N)	(Pin2 removed)
	DC Output Connector (CON2)	
4	+Vout	
5	Com	Molex 26-60-4030
6	-Vout	

FC= fixing centers

Compatible Connector
Housing
Molex 41695 Series or equivalent
Crimp Terminal
Molex 2478 Series or equivalent





Tolerance:
x.x= ±0.5mm
x.xx= ±0.25mm

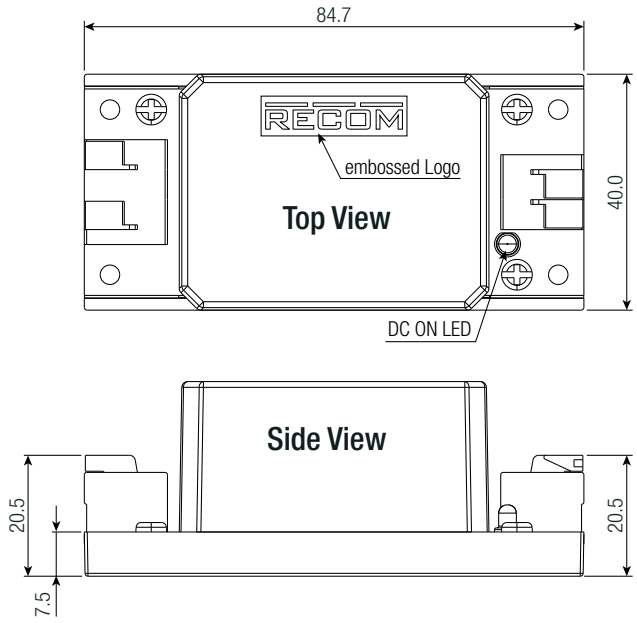
RACM30-K/277 Series / AC/DC Power Supply

30W / Universal Input 100V - 277VAC

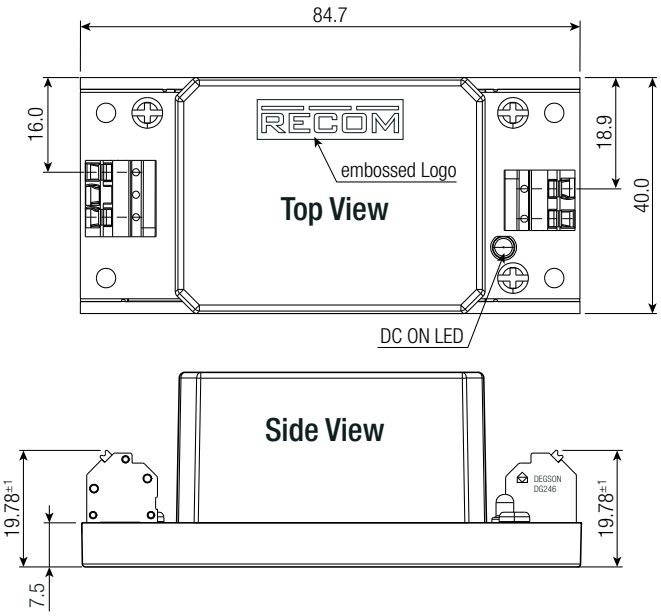
AC/DC Converter

DIMENSION & PHYSICAL CHARACTERISTICS

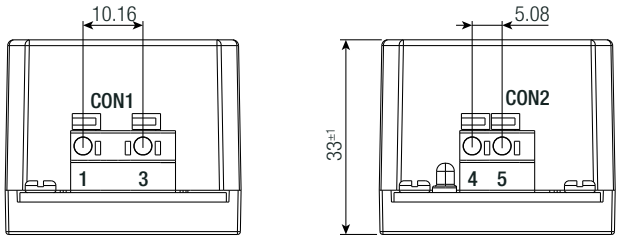
Dimension Drawing Panel Mount "/PMP" SINGLE Output (mm)



Dimension Drawing Panel Mount "/PMA" SINGLE Output (mm)



AC Input Side / DC Output Side



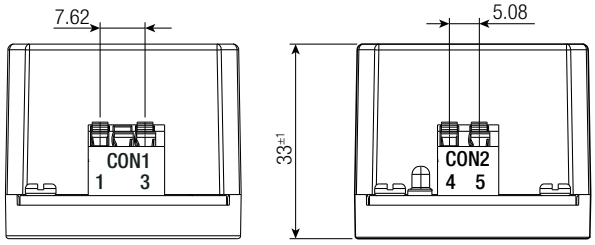
Push-In Spring Terminal

#	Function	Pitch
	AC Input (CON1)	
1	VAC in (N)	10.16mm pitch
3	VAC in (L)	pin2 removed
	DC Output (CON2)	
4	-Vout	2 pins
5	+Vout	5.08mm pitch

Terminal Information
AC Input (CON1)
Degson (DG142R-5.08-02P-2Y)
DC Output (CON2)
Degson (DG142R-5.08-02P-1Y)

Wire stripping length: 11mm
Wire cross section: 22-16AWG (0.2-1.5mm²)
Usable wire cable: Solid and stranded
FC= fixing centers

AC Input Side / DC Output Side



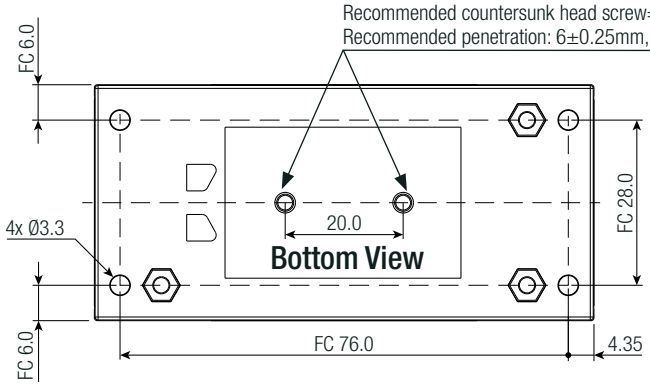
Push-In Spring Terminal

#	Function	Terminal
	AC Input (CON1)	
1	VAC in (N)	7.62mm pitch
3	VAC in (L)	pin2 removed
	DC Output Connector (CON2)	
4	-Vout	2pins
5	+Vout	5.08mm pitch

Terminal Information
AC Input (CON1)
Degson (DG246-3.81-02P-24)
DC Output (CON2)
Degson (DG246-5.08-02P-14)

Wire stripping length: 10mm
Wire cross section: 22-16AWG (0.2-1.5mm²)
Usable wire cable: Solid and stranded
FC= fixing centers

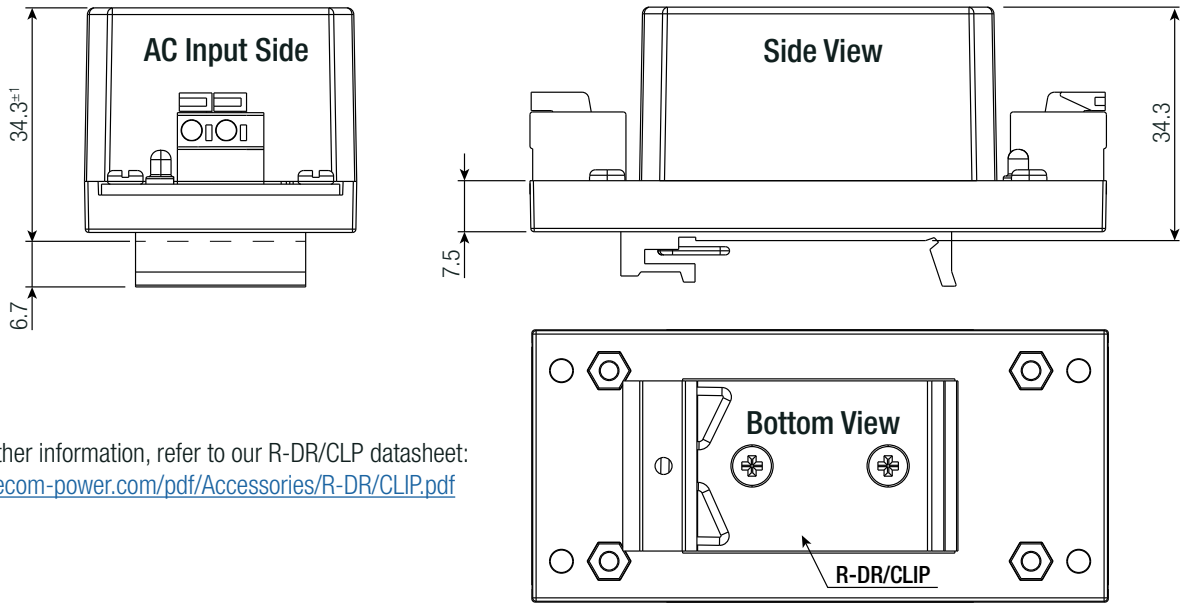
2x M3x0.5 threads for RECOM accessory R-DR/CLIP din rail clip
Recommended countersunk head screw= M3x0.5
Recommended penetration: 6±0.25mm, Maximum tightening torque: 0.7Nm



Tolerance:
x.x= ±0.5mm
x.xx=0.25mm

INSTALLATION AND APPLICATION

Dimension Drawing RACM30-K/277/PMP after conversion with the RECOM Din Rail Clip "R-DR/CLIP" accessory part



For further information, refer to our R-DR/CLP datasheet:
www.recom-power.com/pdf/Accessories/R-DR/CLIP.pdf

PACKAGING INFORMATION

Parameter	Type		Value
Packaging Dimension (LxWxH)	tube	"/THT printmount"	490.0 x 56.0 x 40.0mm
	tray	"/W"; "/PMP"; "/PMA"	405.0 x 360.0 x 55.0mm
		"/OF"	360.0 x 205.0 x 50.0mm
Packaging Quantity	"/THT printmount"		11pcs
	"/W"; "/PMP"; "/PMA"		24pcs
	"/OF"		12pcs
Storage Temperature Range			-40°C to +90°C
Storage Humidity	non-condensing		95% RH max.