Features

Regulated Converter

- Wide input voltage range (18-60VDC)
- IP67 protection for selective model
- Operating temperature range: -40°C to +75°C
- Protections: Input Reverse Polarity Protection,
- Input UVLO, Output OCL, SCP, OVP, OTP
- Parallel operation capability
- Control ON/OFF function

RECOM
DC/DC Converter

RMOD300-48-xxSEW

300 Watt
7.48"x2.99"
Single Output

Description

The RMOD300-EW On-Board DCDC converter is ideally for the use in all Off-highway electric vehicles. This family is an extremely robust plug & play module with 300 Watts (200W), which generates the isolated Vout = 12,2 / 13,7 VDC low voltage network from the traction battery level. The Extra wide input voltage range of 18-60V covers 24V, 36V and 48V battery voltages in this off-highway segment. Thanks to the waterproof and dust proof housing construction, the devices can directly be connected mechanically and thermally to the chassis (i.e. at any point on the vehicle) and operate reliably even under the most adverse conditions.

Selection Guide

Part Number	Input Voltage Range [VDC]	Output Voltage [VDC]	Output Current (1) [A]	Efficiency typ. (1) [%]	Output Power (2) [W]
RMOD300-48-12.2SEW	18-60VDC	12.2	24	88.3	300
RMOD300-48-13.7SEW	18-60VDC	13.7	22	88.7	300

Notes:

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

Note2: 300W at V_{IN}= 27-60VDC, 200W max. when V_{IN}<27VDC

Designed to meet:
UL 60950-1
EN 12895
ISO7637-2
CISPR11 Class A

Model Numbering

RMOD300-48-__ S EW/ F __ /__

- Output Power
- nom. Input Voltage
- nom. Output Voltage
- Single
- Extra Wide Input
- Fuse Holder (3)
- CTRL option (4)
- Connector option (5)

Notes:

Note3: with suffix "/F" = with integrated fuse holder, without suffix = no internal fuse

Note4: with suffix "/CTRL" = with control function
without suffix = without CTRL function

Note5: add suffix "/MO" for Molex MINI-FIT SR™ connector (IP20 rating only)
add suffix "/DT" for Deutsch DTP connector, refer to dimension drawings for detail

Model Matrix				
Model	/F/MO (IP20)	/F/DT	/CTRL/MO (IP20)	/MO (IP20)
RMOD300-48-12.2SEW	x	x	x	x
RMOD300-48-13.7SEW	x	x	x	x
x = standard portfolio / empty = not available				

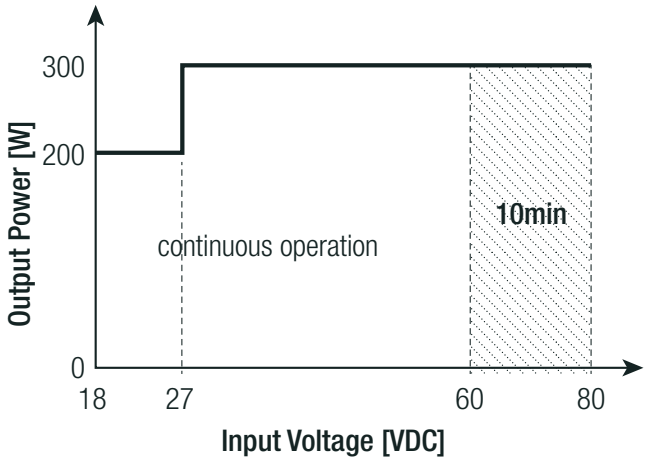
RMOD300-48-xxSEW Series

Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

BASIC CHARACTERISTICS

Parameter	Condition			Min.	Typ.	Max.
Input Voltage Range				18VDVC		60VDC
Extended Input Voltage	10min max. (refer to ***"Input Voltage Range"***)					80VDC
Under Voltage Lockout (UVLO)	DC-DC ON DC-DC OFF			16VDC 14VDC	17VDC 15VDC	18VDC 16VDC
	hysteresis			1VDC	2VDC	3VDC
Input Current	V_{IN}= 18VDC				12.6A 13.2A	13.1A 14A
Inrush Current	V_{IN}= 48VDC					10A
Quiescent Current	RMOD300-48-12.2SEW		V_{IN}= 24VDC		85mA	110mA
			V_{IN}= 48VDC		40mA	70mA
	RMOD300-48-13.7SEW		V_{IN}= 24VDC		90mA	120mA
			V_{IN}= 24VDC		40mA	70mA
Output Current (refer to ***"Input Voltage Range"***)	RMOD300-48-12.2SEW		V_{IN}= 18-27VDC			16A
			V_{IN}> 27VDC			24A
	RMOD300-48-13.7SEW		V_{IN}= 18-27VDC			14.5A
			V_{IN}> 27VDC			22A
Minimum Load				0%		
Start-up Time	V_{IN}= 48VDC				750ms	900ms
Rise Time					130ms	160ms
Internal Operating Frequency					175kHz	
Output Ripple & Noise	all types	V_{IN}= 36/48VDC	20MHz BW, peak to peak		100mV	160mV
			r.m.s.		35mV	50mV
	RMOD300-12.2SEW	V_{IN}= 24VDC	20MHz BW, I_{OUT}= 16A, peak to peak		60mV	90mV
			I_{OUT}= 16A, r.m.s.		20mV	30mV
	RMOD300-13.7SEW	V_{IN}= 24VDC	20MHz BW, I_{OUT}= 14.5A, peak to peak		80mV	110mV
			I_{OUT}= 14.5A, r.m.s.		15mV	30mV
Reflected Back Ripple Current	V_{IN}= 48VDC		RMOD300-12.2SEW			0.2A
			RMOD300-13.7SEW			0.1A

Input Voltage Range



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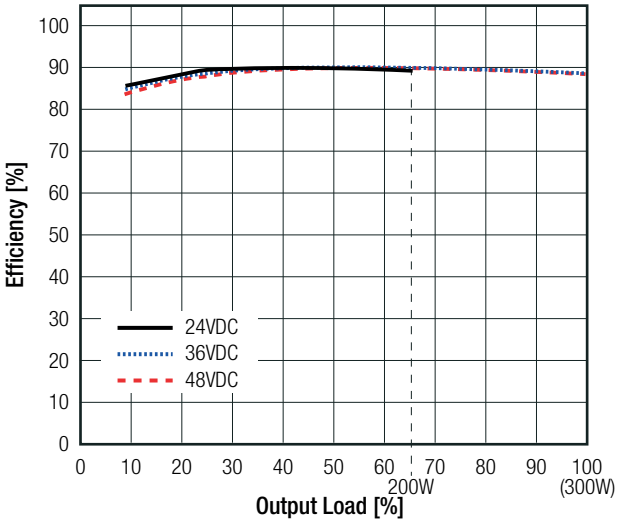
RMOD300-48-xxSEW Series

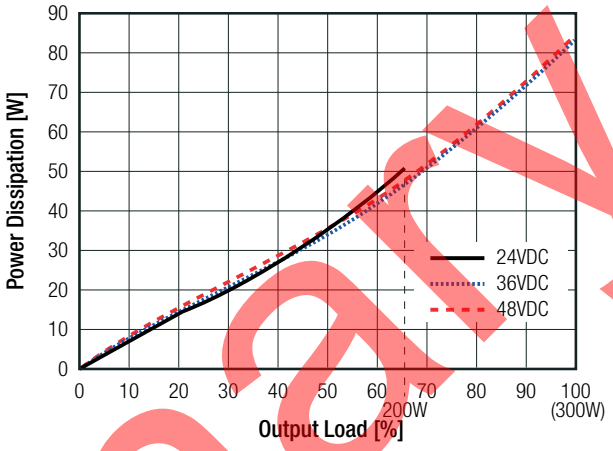
Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

RMOD300-48-12.2SEW

Efficiency vs. Load

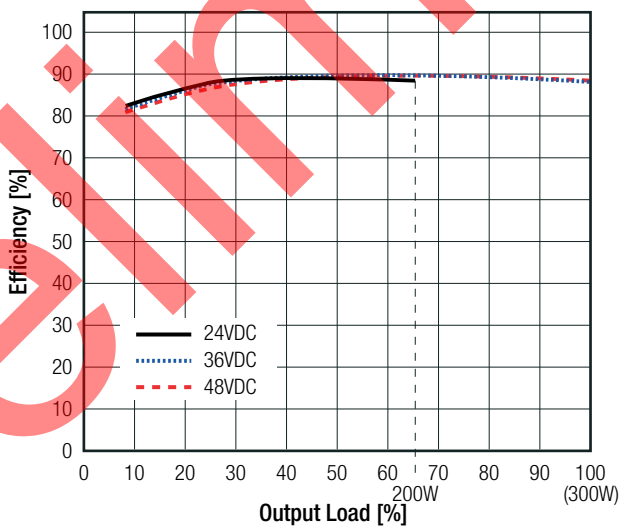


Power Dissipation vs. Load



RMOD300-48-13.7SEW

Efficiency vs. Load



CTRL ON/OFF (non-isolated to primary side)		
Parameter	**Condition**	**Value**
ON/OFF CTRL	DC-DC ON	CTRL Pin to $+V_{IN}$ or floating
	DC-DC OFF	CTRL Pin to $-V_{IN}$

REGULATIONS		
Parameter	**Condition**	**Value**
Output Accuracy		TBD
Line Regulation	low line to high line, full load	TBD
Load Regulation	10-100% load	TBD
Transient Response Recovery Time	50-75% load; 0.1A/us slew rate	150mV/µs typ. / 250mV/µs max.

RMOD300-48-xxSEW Series

Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

PROTECTIONS

Parameter	Type		Value
Internal Input Fuse	Ø6.35mm x 31.75mm		250VDC/30A fast-acting fuse
Short Circuit Protection (SCP)			hiccup mode, auto recovery
Input Reverse Polarity Protection			-60VDC max.
Over Voltage Protection (OVP)	RMOD300-48-12.2SEW		13-17VDC, hiccup mode, auto recovery
	RMOD300-48-13.7SEW		15-19VDC, hiccup mode, auto recovery
Over Current Protection (OCP)	RMOD300-48-12.2SEW	V_{IN}= 24VDC	16.5-20.5A, hiccup mode
		V_{IN}= 36/48VDC	25-31A, hiccup mode
	RMOD300-48-13.7SEW	V_{IN}= 24VDC	15.5-19.5A, hiccup mode
		V_{IN}=36/48VDC	24.5-28.5A, hiccup mode
Over Temperature Protection (OTP)	measured on NTC		118°C, automatic restart
Isolation Voltage (2)	I/P to O/P and I/P to case O/P to case		2250VDC 550VDC
Isolation Resistance	I/P to O/P		10MΩ min.
Isolation Capacitance	I/P to O/P		6000pF max.

Notes:

Note2: For repeat Hi-Pot testing, reduce the time and/or the test voltage

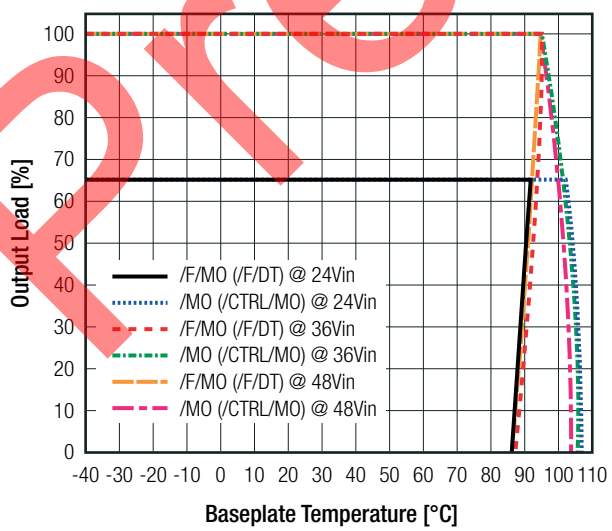
ENVIRONMENTAL

Parameter	Condition		Value
Operating Temperature Range			refer to ***"Derating Graph"***
Operating Humidity			95% RH
IP Rating	electronic part is encapsulated in IP67 level for all versions	/DT connector types	IP67
		/MO connector types	IP20
Shock	50G, 3 planes		according to IEC 60068-2-27
Vibration	10G, 15~200Hz, 3 planes		according to IEC 60068-2-6
MTBF	T_{AMB}= 25°, 80% load	RMOD300-48-12.2SEW	700 x 10^3 hours
		RMOD300-48-13.7SEW	950 x 10^3 hours

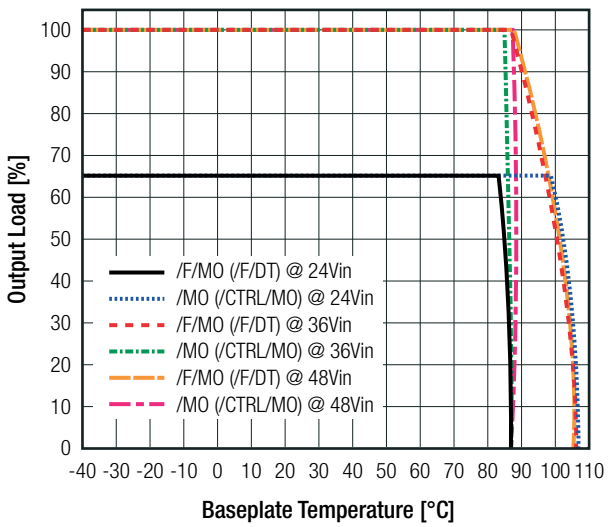
Derating Graph

(@ Chamber, unit mounted on 250x300x5mm aluminum table)

RMOD300-48-12.2SEW



RMOD300-80-12.2SEW



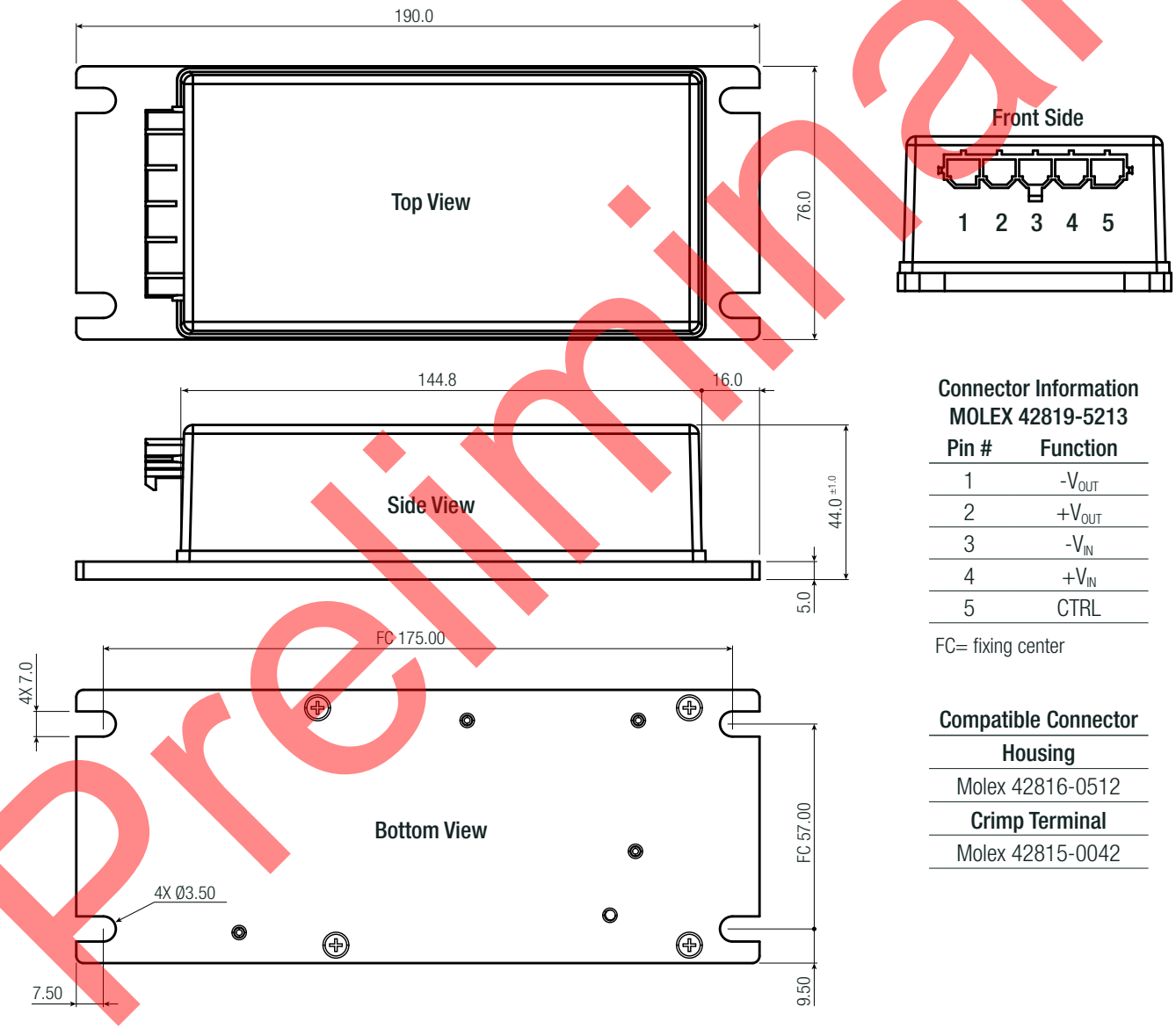
The module can be used in enclosed applications, as long as the cooling is sufficient to keep the baseplate temperature below 70°C. The surrounding temperature should not exceed 85°C.

RMOD300-48-xxSEW Series

Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

DIMENSION AND PHYSICAL CHARACTERISTICS		
Parameter	**Type**	**Value**
Material	baseplate	aluminum
	case	plastic
Dimension (LxWxH)	without connectors/wires	190.0 x 76.0 x 44.0mm
Weight		900g typ.

Dimension Drawing (mm) MOLEX Connector with CTRL function



Connector Information
MOLEX 42819-5213

Pin #	Function
1	$-V_{OUT}$
2	$+V_{OUT}$
3	$-V_{IN}$
4	$+V_{IN}$
5	CTRL

FC= fixing center

Compatible Connector
Housing
Molex 42816-0512
Crimp Terminal
Molex 42815-0042

Tolerance:
xx.x= ±0.5mm
xx.xx= ±0.25mm

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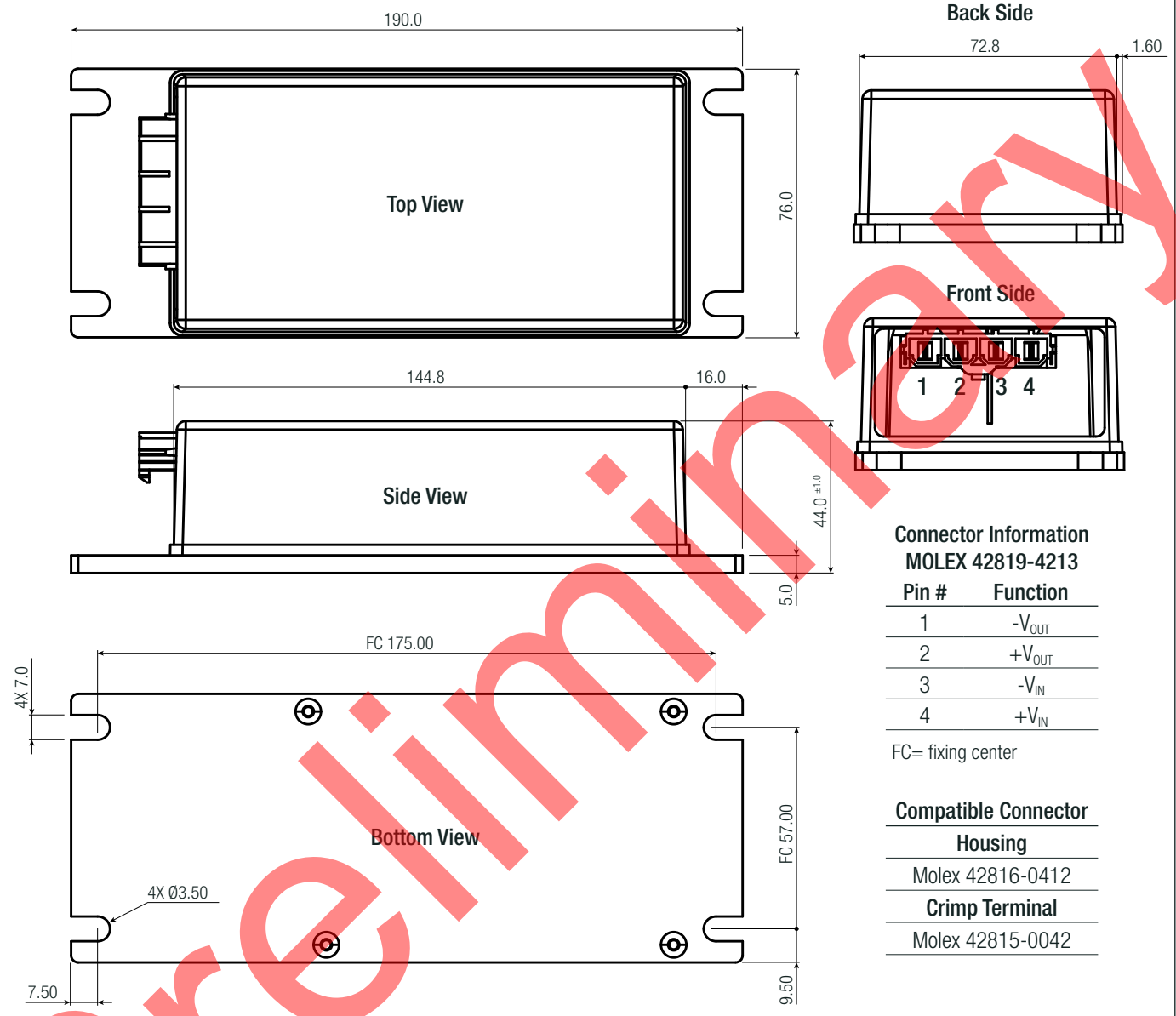
RMOD300-48-xxSEW Series

Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

Dimension Drawing (mm) MOLEX Connector without CTRL function



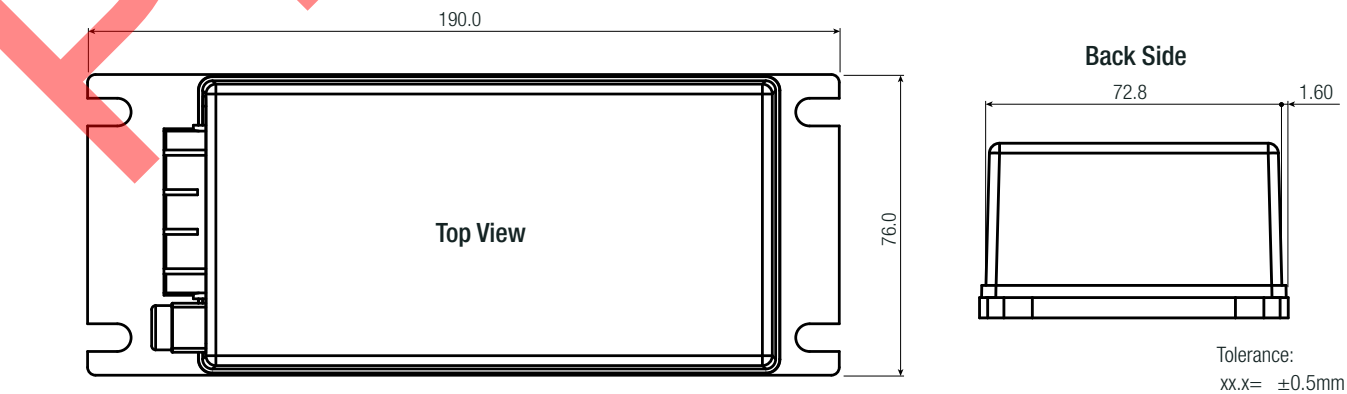
Connector Information
MOLEX 42819-4213

Pin #	Function
1	$-V_{OUT}$
2	$+V_{OUT}$
3	$-V_{IN}$
4	$+V_{IN}$

FC= fixing center

Compatible Connector
Housing
Molex 42816-0412
Crimp Terminal
Molex 42815-0042

Dimension Drawing (mm) MOLEX Connector with Fuse without CTRL function



Tolerance:
xx.x= ±0.5mm
xx.xx= ±0.25mm

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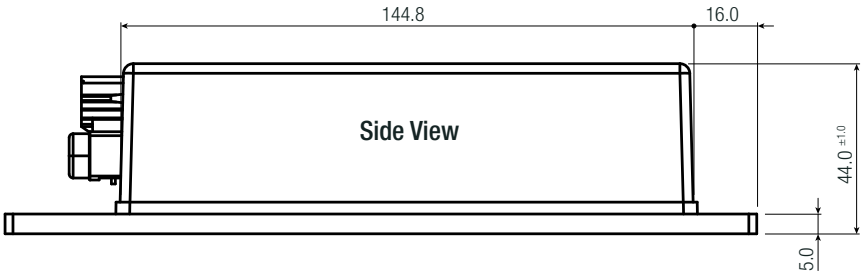
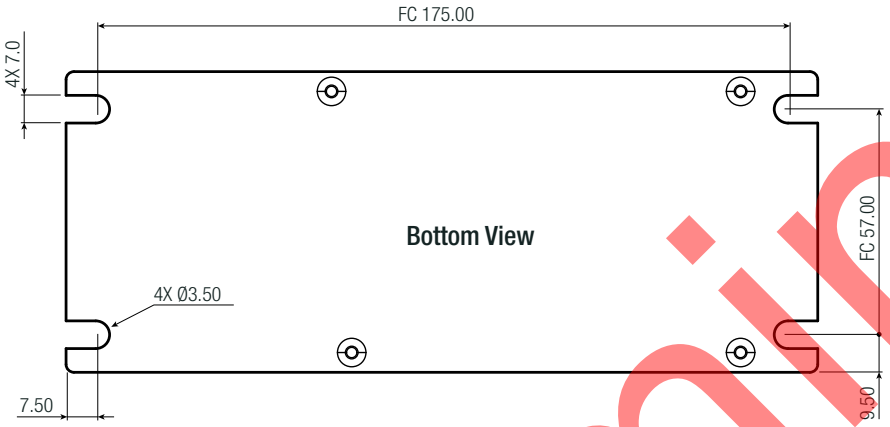
RMOD300-48-xxSEW Series

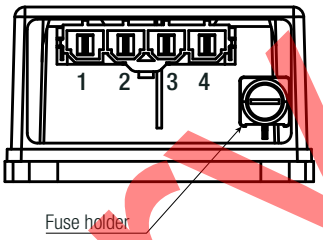
Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

Dimension Drawing (mm) MOLEX Connector with Fuse without CTRL function





Front Side



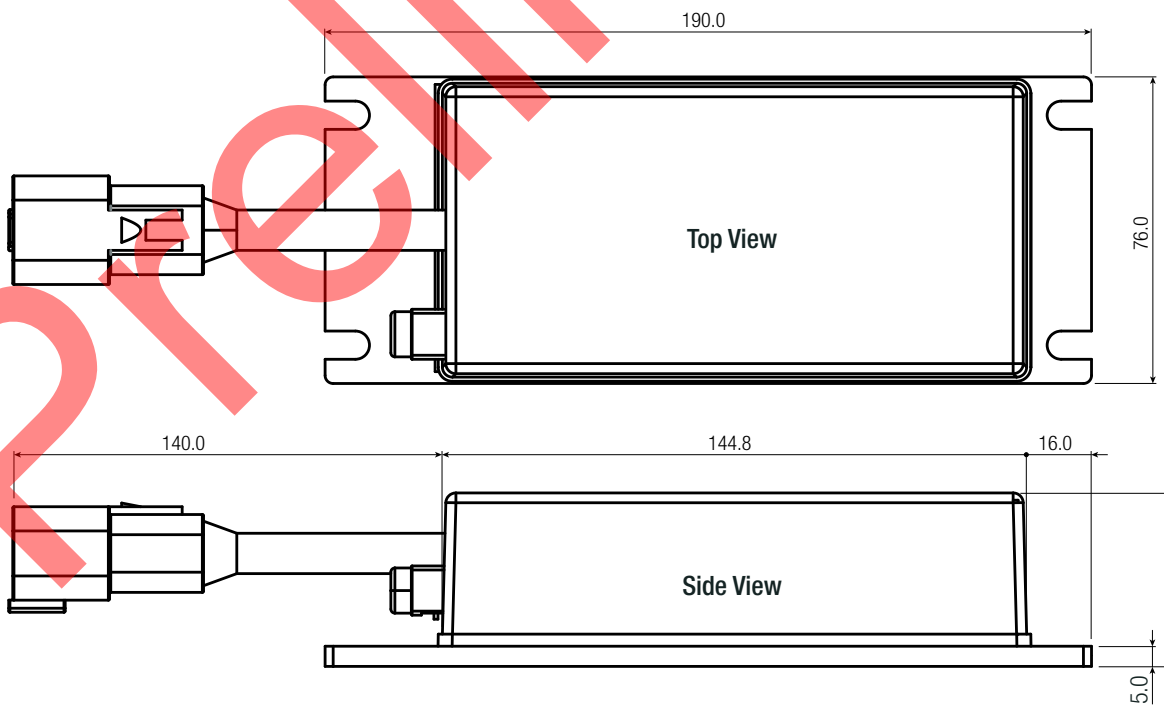
Connector Information
MOLEX 42819-4213

Pin #	Function
1	$-V_{OUT}$
2	$+V_{OUT}$
3	$-V_{IN}$
4	$+V_{IN}$

FC= fixing center

Compatible Connector
Housing
Molex 42816-0412
Crimp Terminal
Molex 42815-0042

Dimension Drawing (mm) DT Connector with Fuse without CTRL function



Tolerance:
xx.x= ±0.5mm
xx.xx= ±0.25mm

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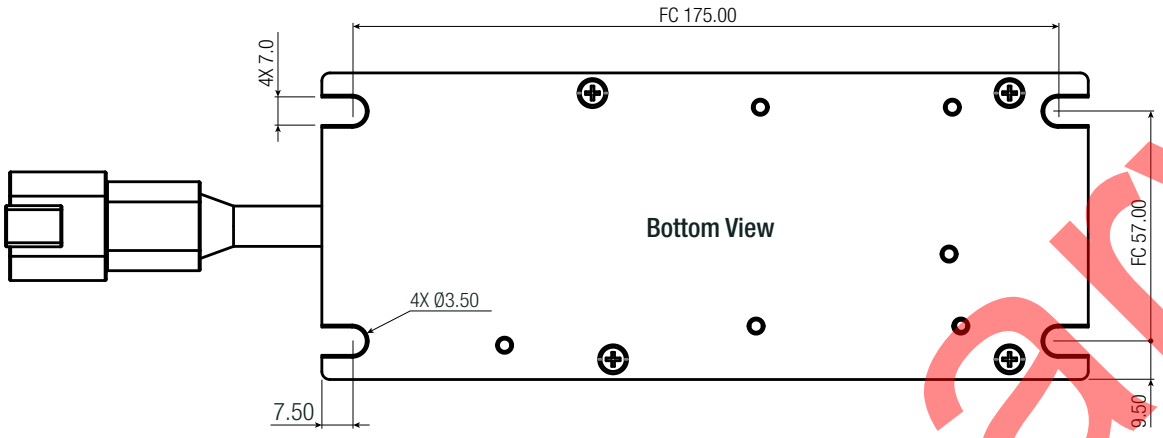
RMOD300-48-xxSEW Series

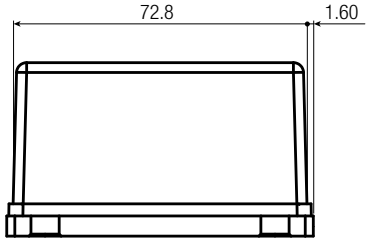
Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

Dimension Drawing (mm) DT Connector with Fuse without CTRL function

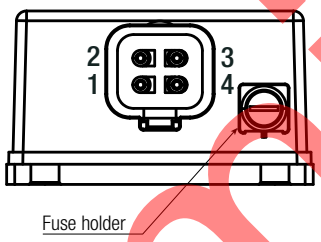
Tolerance:
xx.x= ±0.5mm
xx.xx= ±0.25mm



Back Side



Front Side



Connector Information
DT: DTP04-4P

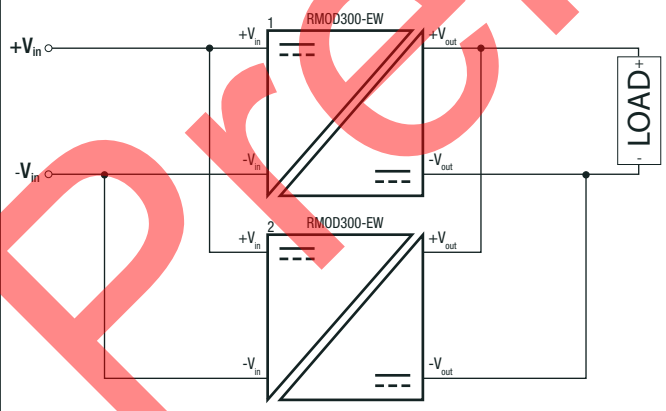
Pin #	Function
1	$-V_{OUT}$
2	$+V_{OUT}$
3	$-V_{IN}$
4	$+V_{IN}$

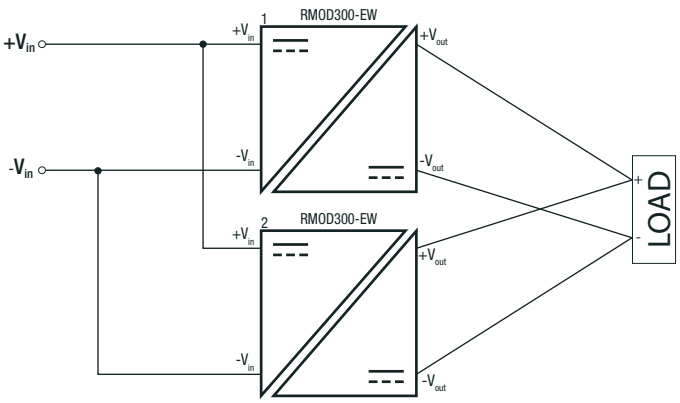
FC= fixing center

Compatible Connector
Housing
DTP06-4S
Crimp Terminal
0462-203-12141
Wedge Lock
WP-4S

PARALLEL OPERATION

Parallel operation is possible with all combinations DC/DC converter versions providing they have the same rated input voltage.
Use the same wire length for each power supply (star connection) and energize all units at the same time to avoid triggering overload protection.
For operation with more than two power supplies in parallel operation, please contact RECOM technical support for advice.





PACKAGING INFORMATION

Parameter	Type	Value
Storage Temperature Range		-40°C to +125°C
Storage Humidity	non-condensing	95% RH max.