FEATURES

- Fully Encapsulated Plastic Case for Chassis and DIN-Rail Mounting Version
- Ultra-wide 4:1 Input Voltage Range
- Fully Regulated Output Voltage
- High Efficiency up to 85%
- I/O Isolation 3000 VDC
- Wide Operating Ambient Temp. Range
- No Min. Load Requirement
- Under-voltage, Overload and Short Circuit Protection
- Remote On/Off Control
- EMI Emission EN 55032 Class A Approved (EMI filter build-in)
- EMS Immunity EN 61000-4-2,3,4,5,6,8 Approved (EMS filter build-in)
- UL/cUL/IEC/EN 62368-1 Safety Approval & CE Marking

c UL us UL 62368-1

CE

CONFLICT FREE MINERALS POLICY

3 YEAR WARRANTY

RoHS Compliant

PRODUCT OVERVIEW

The MINMAX MJWI06C series is a new range of high performance DC-DC converters featuring a wide 4:1 input range in a chassis-mount package with terminal strip connections and optional DIN-Rail mounting offer system designers the opportunity to eliminate the power board request in the field application. Further features including high efficiency 85%, wide operating temp. range, I/O isolation 3000VDC for 60Sec, no min. load request, built-in EMC filter for EMI emission EN 55032 class A approved and EMS immunity EN 61000-4-2,3,4,5,6,8 approved, and abnormal operation protection with under-voltage, overload and short circuit protections. All family have been qualified per CB scheme with safety approvals to UL/cUL/IEC/EN 62368-1 with 3 years warranty.

Model Selection Guide

Model Number	Input Voltage (Range)	Output Voltage	Output Current	Input Current		Max. capacitive Load	Efficiency (typ.)
			Max.	@Max. Load	@No Load		@Max. Load
	VDC	VDC	mA	mA(typ.)	mA(typ.)	μF	%
MJWI06-24S05C	24 (9 ~ 36)	5	1200	309	10	680	81
MJWI06-24S051C		5.1	1200	315		680	81
MJWI06-24S12C		12	500	298		330	84
MJWI06-24S15C		15	400	298		330	84
MJWI06-24S24C		24	250	294		150	85
MJWI06-24S48C		48	125	301		68	83
MJWI06-24D12C		±12	±250	298		150#	84
MJWI06-24D15C		±15	±200	294		150#	85
MJWI06-24D24C		±24	±125	298		68#	84
MJWI06-48S05C	48 (18 ~ 75)	5	1200	156	8	680	80
MJWI06-48S051C		5.1	1200	159		680	80
MJWI06-48S12C		12	500	149		330	84
MJWI06-48S15C		15	400	149		330	84
MJWI06-48S24C		24	250	147		150	85
MJWI06-48S48C		48	125	151		68	83
MJWI06-48D12C		±12	±250	147		150#	85
MJWI06-48D15C		±15	±200	147		150#	85
MJWI06-48D24C		±24	±125	149		68#	84

For each output

Input Specifications

Parameter	Conditions / Model	Min.	Typ.	Max.	Unit
Input Surge Voltage (1 sec. max.)	24V Input Models	-0.7	---	50	VDC
	48V Input Models	-0.7	---	100	
Start-Up Threshold Voltage	24V Input Models	---	---	9	
	48V Input Models	---	---	18	
Under Voltage Shutdown	24V Input Models	---	8	---	
	48V Input Models	---	16	---	
Start Up Time (Power On)	Nominal Vin and Constant Resistive Load	---	30	---	ms
Input Filter	All Models	Internal Pi Type			

Remote On/Off Control

Parameter	Conditions	Min.	Typ.	Max.	Unit
Converter On	3.5V ~ 12V or Open Circuit				
Converter Off	0~1.2V or Short Circuit (Pin 1 and Pin 2)				
Control Input Current (on)	Vctrl = 5V	---	---	500	μA
Control Input Current (off)	Vctrl = 0V	---	---	-500	μA
Control Common	Referenced to Negative Input				
Standby Input Current	Nominal Vin	---	2.5	---	mA

Output Specifications

Parameter	Conditions / Model		Min.	Typ.	Max.	Unit
Output Voltage Setting Accuracy			---	---	±2.0	%Vnom.
Output Voltage Balance	Dual Output, Balanced Loads		---	---	±2.0	%
Line Regulation	Vin=Min. to Max. @Full Load		---	---	±0.5	%
Load Regulation	Io=0% to 100%		---	---	±0.5	%
Load Cross Regulation (Dual Output Models)	Asymmetrical Load 25/100% Full Load		---	---	±5.0	%
Minimum Load	No minimum Load Requirement					
Ripple & Noise	0-20 MHz Bandwidth	24V & ±24V & 48V Output Models	---	180	---	mV_{P-P}
		Other Output Models	---	75	---	mV_{P-P}
Transient Recovery Time	25% Load Step Change		---	---	500	μs
Transient Response Deviation			---	±3	±5	%
Temperature Coefficient			---	±0.01	±0.02	%/℃
Over Load Protection	Hiccup		---	150	---	%
Short Circuit Protection	Continuous, Automatic Recovery (Hiccup Mode 0.3Hz typ.)					

General Specifications

Parameter	Conditions	Min.	Typ.	Max.	Unit
I/O Isolation Voltage	60 Seconds	3000	---	---	VDC
I/O Isolation Resistance	500 VDC	1000	---	---	MΩ
I/O Isolation Capacitance	100kHz, 1V	---	2200	---	pF
Switching Frequency		---	370	---	kHz
MTBF (calculated)	MIL-HDBK-217F@25℃, Ground Benign	4,166,765	---	---	Hours
Safety Approvals	UL/cUL 62368-1 recognition(UL certificate), IEC/EN 62368-1 & 60950-1(CB report)				

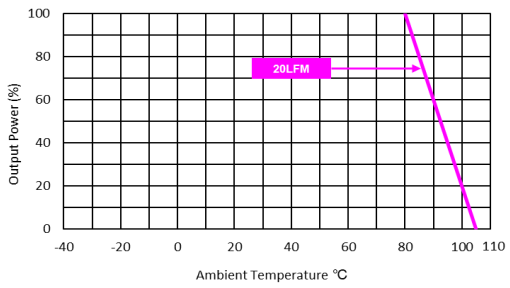
EMC Specifications

Parameter	Standards & Level			Performance
EMI	Conduction	EN 55032	Without external components	Class A
	Radiation			
EMS	EN55035			
	ESD	Direct discharge	Indirect discharge HCP & VCP	A
		EN61000-4-2 Air ± 8kV	Contact ± 6kV	
	Radiated immunity	EN61000-4-3 10V/m		A
	Fast transient	EN61000-4-4 ±2kV		A
	Surge	EN61000-4-5 ±2kV		A
	Conducted immunity	EN61000-4-6 10Vrms		A
	PFMF	EN61000-4-8 100A/m		A

Environmental Specifications

Parameter	Min.	Max.	Unit
Operating Ambient Temperature Range (See Power Derating Curve)	-40	+92.5	℃
Case Temperature	---	+105	℃
Storage Temperature Range	-50	+125	℃
Humidity (non condensing)	---	95	% rel. H
Lead Temperature (1.5mm from case for 10Sec.)	---	260	℃

Power Derating Curve

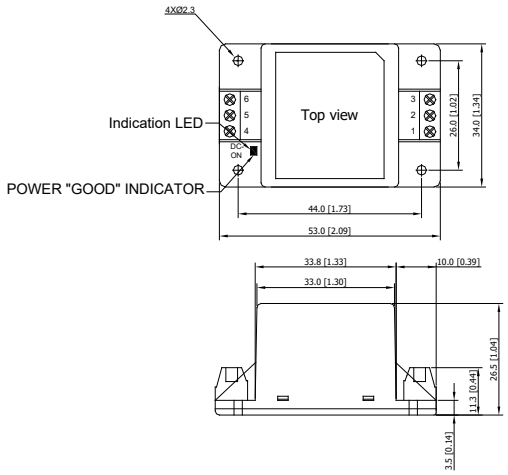


Notes

1 Specifications typical at Ta=+25℃, resistive load, nominal input voltage and rated output current unless otherwise noted.
2 Transient recovery time is measured to within 1% error band for a step change in output load of 75% to 100%.
3 We recommend to protect the converter by a slow blow fuse in the input supply line.
4 Other input and output voltage may be available, please contact MINMAX.
5 Specifications are subject to change without notice.
6 The repeated high voltage isolation testing of the converter can degrade isolation capability, to a lesser or greater degree depending on materials, construction, environment and reflow solder process. Any material is susceptible to eventual chemical degradation when subject to very high applied voltages thus implying that the number of tests should be strictly limited. We therefore strongly advise against repeated high voltage isolation testing, but if it is absolutely required, that the voltage be reduced by 20% from specified test voltage. Furthermore, the high voltage isolation capability after reflow solder process should be evaluated as it is applied on system.

Package Specifications

Mechanical Dimensions



Note:
Screw type Terminal: Wires 1.5mm^2 max.
Recommended Terminal Screw tightening torque: 0.2Nm (1.7lb.in.) max.

Pin Connections

Pin	Single Output	Dual Output
1	Remote On/Off	Remote On/Off
2	-Vin	-Vin
3	+Vin	+Vin
4	-Vout	-Vout
5	NC	Common
6	+Vout	+Vout

NC: No Connection

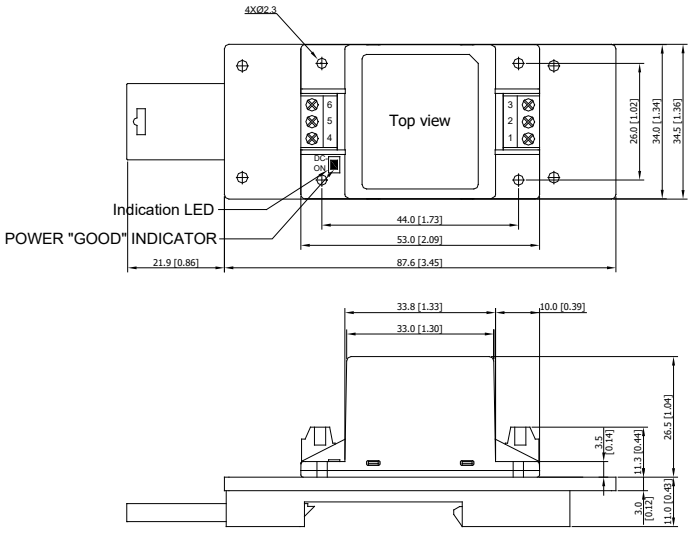
▶ All dimensions in mm (inches)
▶ Tolerance: X.X±0.5 (X.XX±0.02)
X.XX±0.25 (X.XXX±0.01)

Physical Characteristics

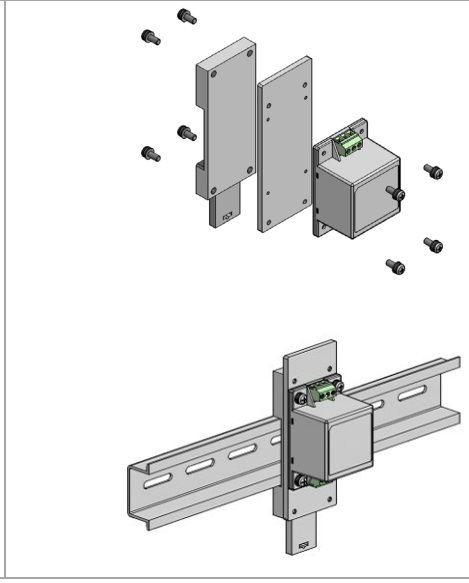
Case Size	:	53.0x34.0x26.5mm (2.09x1.34x1.04 inches)
Case Material	:	Plastic resin (flammability to UL 94V-0 rated)
Weight	:	49.05g

Package Specifications with DIN Rail Mounting Bracket (order code AC-DIN-04)

Mechanical Dimensions



DIN-Rail Mounting Kit



Physical Characteristics

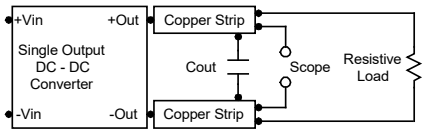
Case Size	:	53.0x34.0x26.5mm (2.09x1.34x1.04 inches)
Case Material	:	Plastic resin (flammability to UL 94V-0 rated)
Weight	:	92.05g

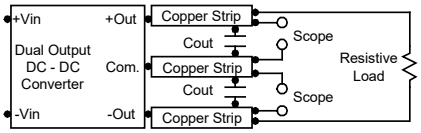
Order Code Table		
Standard	DIN Rail	Converter With DIN Rail Mounting
MJWI06-24S05C	AC-DIN-04	MJWI06-24S05C-DIN04
MJWI06-24S051C	AC-DIN-04	MJWI06-24S051C-DIN04
MJWI06-24S12C	AC-DIN-04	MJWI06-24S12C-DIN04
MJWI06-24S15C	AC-DIN-04	MJWI06-24S15C-DIN04
MJWI06-24S24C	AC-DIN-04	MJWI06-24S24C-DIN04
MJWI06-24S48C	AC-DIN-04	MJWI06-24S48C-DIN04
MJWI06-24D12C	AC-DIN-04	MJWI06-24D12C-DIN04
MJWI06-24D15C	AC-DIN-04	MJWI06-24D15C-DIN04
MJWI06-24D24C	AC-DIN-04	MJWI06-24D24C -DIN04
MJWI06-48S05C	AC-DIN-04	MJWI06-48S05C-DIN04
MJWI06-48S051C	AC-DIN-04	MJWI06-48S051C-DIN04
MJWI06-48S12C	AC-DIN-04	MJWI06-48S12C-DIN04
MJWI06-48S15C	AC-DIN-04	MJWI06-48S15C-DIN04
MJWI06-48S24C	AC-DIN-04	MJWI06-48S24C-DIN04
MJWI06-48S48C	AC-DIN-04	MJWI06-48S48C-DIN04
MJWI06-48D12C	AC-DIN-04	MJWI06-48D12C-DIN04
MJWI06-48D15C	AC-DIN-04	MJWI06-48D15C-DIN04
MJWI06-48D24C	AC-DIN-04	MJWI06-48D24C-DIN04

Test Setup

Peak-to-Peak Output Noise Measurement Test

Use a Cout 0.47μF ceramic capacitor. Scope measurement should be made by using a BNC socket, measurement bandwidth is 0-20 MHz. Position the load between 50 mm and 75 mm from the DC-DC Converter.





Technical Notes

Remote On/Off

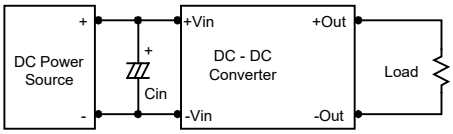
Positive logic remote on/off turns the module on during a logic high voltage on the remote on/off pin, and off during a logic low. To turn the power module on and off, the user must supply a switch to control the voltage between the on/off terminal and the -Vin terminal. The switch can be an open collector or equivalent. A logic low is 0V to 1.2V. A logic high is 3.5V to 12V. The maximum sink current at the on/off terminal (Pin 1) during a logic low is -500μA.

Overload Protection

To provide protection in a fault (output overload) condition, the unit is equipped with internal current limiting circuitry and can endure current limiting for an unlimited duration. At the point of current-limit inception, the unit shifts from voltage control to current control. The unit operates normally once the output current is brought back into its specified range.

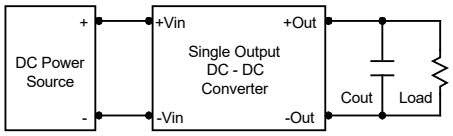
Input Source Impedance

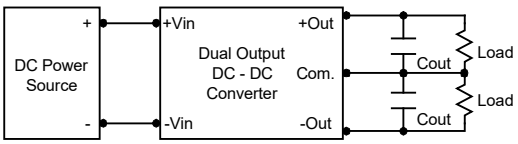
The power module should be connected to a low ac-impedance input source. Highly inductive source impedances can affect the stability of the power module.
In applications where power is supplied over long lines and output loading is high, it may be necessary to use a capacitor at the input to ensure startup.
Capacitor mounted close to the power module helps ensure stability of the unit, it is recommended to use a good quality low Equivalent Series Resistance (ESR < 1.0Ω at 100 kHz) capacitor of a 2.2μF for the 24V and 48V devices.



Output Ripple Reduction

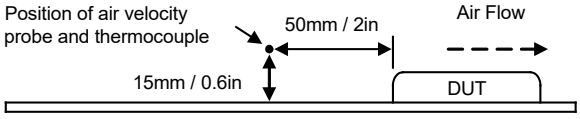
A good quality low ESR capacitor placed as close as practicable across the load will give the best ripple and noise performance. To reduce output ripple, it is recommended to use 3.3μF capacitors at the output.





Maximum Capacitive Load

The MJWI06C series has limitation of maximum connected capacitance at the output. The power module may be operated in current limiting mode during start-up, affecting the ramp-up and the startup time. The maximum capacitance can be found in the data sheet.

Thermal Considerations

Many conditions affect the thermal performance of the power module, such as orientation, airflow over the module and board spacing. To avoid exceeding the maximum temperature rating of the components inside the power module, the case temperature must be kept below 105℃.
The derating curves are determined from measurements obtained in a test setup.