

M186 SERIES

*THREE-PHASE
AC/DC POWER SUPPLY*



PRODUCT HIGHLIGHTS

- COMPACT
- HIGH EFFICIENCY
- HIGHT DENSITY
- SINGLE OUTPUT
- THREE PHASE AC/DC POWER SUPPLY
- UP TO 2000 W

M186 SERIES THREE-PHASE AC/DC POWER SUPPLY

<h3 style="margin: 0;">Applications</h3> <p style="margin: 0;"><i>Military Power Supply (Airborne, ground-fix, shipboard), Ruggedized, Telecom, Industrial Power Supply</i></p>					
<h3 style="margin: 0;">Special Features</h3> <table style="width: 100%; border: none;"> <tr> <td style="width: 33%; border: none; vertical-align: top;"> <ul style="list-style-type: none"> • Miniature size • High efficiency • Wide input range • High density: up to 30.5 W/in³ • Input / Output isolation </td> <td style="width: 33%; border: none; vertical-align: top;"> <ul style="list-style-type: none"> • Limited Inrush Current • Remote Inhibit (On/Off) • <u>Fixed</u> switching freq. (400 kHz) • <u>EMI</u> filters included • Cos $\phi > 0.92$ from 75% load </td> <td style="width: 33%; border: none; vertical-align: top;"> <ul style="list-style-type: none"> • Non-latching protections: <ul style="list-style-type: none"> ○ Output overload ○ Output short-circuit ○ Output over-voltage ○ Over temperature </td> </tr> </table>			<ul style="list-style-type: none"> • Miniature size • High efficiency • Wide input range • High density: up to 30.5 W/in³ • Input / Output isolation 	<ul style="list-style-type: none"> • Limited Inrush Current • Remote Inhibit (On/Off) • <u>Fixed</u> switching freq. (400 kHz) • <u>EMI</u> filters included • Cos $\phi > 0.92$ from 75% load 	<ul style="list-style-type: none"> • Non-latching protections: <ul style="list-style-type: none"> ○ Output overload ○ Output short-circuit ○ Output over-voltage ○ Over temperature
<ul style="list-style-type: none"> • Miniature size • High efficiency • Wide input range • High density: up to 30.5 W/in³ • Input / Output isolation 	<ul style="list-style-type: none"> • Limited Inrush Current • Remote Inhibit (On/Off) • <u>Fixed</u> switching freq. (400 kHz) • <u>EMI</u> filters included • Cos $\phi > 0.92$ from 75% load 	<ul style="list-style-type: none"> • Non-latching protections: <ul style="list-style-type: none"> ○ Output overload ○ Output short-circuit ○ Output over-voltage ○ Over temperature 			
<h3 style="margin: 0;">Electrical Specifications</h3> <table style="width: 100%; border: none;"> <tr> <td style="width: 33%; border: none; vertical-align: top;"> <p><u>Normal Input Voltage</u> AC variant voltage range: 115 ± 10% V_{AC,L-N}, 400 Hz, 3-Phase</p> <p>Optional for 50/60Hz Input frequency: Please consult factory for details.</p> <p><u>Line/Load regulation</u> Up to ±1% (no load to full load, -55 °C to +85 °C and over input voltage range).</p> <p><u>Ripple and Noise</u> 100 to 150 mV_{p-p}, typical (max. 1% of nominal voltage) measured across a 1µF ceramic capacitor.</p> </td> <td style="width: 33%; border: none; vertical-align: top;"> <p><u>DC Output:</u> Voltage range: 5 to 60 V_{DC} Current range: 0 to 80 A Power range: 0 to 2 000 W</p> <p><u>Efficiency</u> 90% - Typical (nominal line voltage, 28 V_{DC} output, full load, standard room temperature)</p> <p><u>Transient Over-and-undershoot</u> Voltage change less than 10% of nominal value for load step from 50% to 100%. Return to regulation in under 1 ms.</p> </td> <td style="width: 33%; border: none; vertical-align: top;"> <p><u>Isolation</u> Input to Output: 500 V_{DC} Input to Case: 500 V_{DC} Output to Case: 100 V_{DC}</p> <p><u>EMC</u> Designed to meet MIL-STD-461F**: CE102, CS101, CS114, CS115, CS116, RE102, RS101, RS103</p> <p><u>Turn on Transient</u> No Voltage overshoot during turn on.</p> </td> </tr> </table>			<p><u>Normal Input Voltage</u> AC variant voltage range: 115 ± 10% V_{AC,L-N}, 400 Hz, 3-Phase</p> <p>Optional for 50/60Hz Input frequency: Please consult factory for details.</p> <p><u>Line/Load regulation</u> Up to ±1% (no load to full load, -55 °C to +85 °C and over input voltage range).</p> <p><u>Ripple and Noise</u> 100 to 150 mV_{p-p}, typical (max. 1% of nominal voltage) measured across a 1µF ceramic capacitor.</p>	<p><u>DC Output:</u> Voltage range: 5 to 60 V_{DC} Current range: 0 to 80 A Power range: 0 to 2 000 W</p> <p><u>Efficiency</u> 90% - Typical (nominal line voltage, 28 V_{DC} output, full load, standard room temperature)</p> <p><u>Transient Over-and-undershoot</u> Voltage change less than 10% of nominal value for load step from 50% to 100%. Return to regulation in under 1 ms.</p>	<p><u>Isolation</u> Input to Output: 500 V_{DC} Input to Case: 500 V_{DC} Output to Case: 100 V_{DC}</p> <p><u>EMC</u> Designed to meet MIL-STD-461F**: CE102, CS101, CS114, CS115, CS116, RE102, RS101, RS103</p> <p><u>Turn on Transient</u> No Voltage overshoot during turn on.</p>
<p><u>Normal Input Voltage</u> AC variant voltage range: 115 ± 10% V_{AC,L-N}, 400 Hz, 3-Phase</p> <p>Optional for 50/60Hz Input frequency: Please consult factory for details.</p> <p><u>Line/Load regulation</u> Up to ±1% (no load to full load, -55 °C to +85 °C and over input voltage range).</p> <p><u>Ripple and Noise</u> 100 to 150 mV_{p-p}, typical (max. 1% of nominal voltage) measured across a 1µF ceramic capacitor.</p>	<p><u>DC Output:</u> Voltage range: 5 to 60 V_{DC} Current range: 0 to 80 A Power range: 0 to 2 000 W</p> <p><u>Efficiency</u> 90% - Typical (nominal line voltage, 28 V_{DC} output, full load, standard room temperature)</p> <p><u>Transient Over-and-undershoot</u> Voltage change less than 10% of nominal value for load step from 50% to 100%. Return to regulation in under 1 ms.</p>	<p><u>Isolation</u> Input to Output: 500 V_{DC} Input to Case: 500 V_{DC} Output to Case: 100 V_{DC}</p> <p><u>EMC</u> Designed to meet MIL-STD-461F**: CE102, CS101, CS114, CS115, CS116, RE102, RS101, RS103</p> <p><u>Turn on Transient</u> No Voltage overshoot during turn on.</p>			
<h3 style="margin: 0;">Protections *</h3> <table style="width: 100%; border: none;"> <tr> <td style="width: 33%; border: none; vertical-align: top;"> <p><u>Input</u></p> <ul style="list-style-type: none"> • Inrush Current Limiter Up to 6 times the maximum input current for less than 50 µs. </td> <td style="width: 33%; border: none; vertical-align: top;"> <p><u>Output</u></p> <ul style="list-style-type: none"> • Over-voltage Protection Passive transorb on output, 120% ± 10% of nominal voltage. • Current limiting Continuous protection (10 to 30% above maximum current) for unlimited time. </td> <td style="width: 33%; border: none; vertical-align: top;"> <p><u>General</u></p> <ul style="list-style-type: none"> • Over temperature protection Shutdown at baseplate temperature of +105 °C ± 5 °C. Automatic recovery at base plate temperature lower than +95 °C ± 5 °C. </td> </tr> </table>			<p><u>Input</u></p> <ul style="list-style-type: none"> • Inrush Current Limiter Up to 6 times the maximum input current for less than 50 µs. 	<p><u>Output</u></p> <ul style="list-style-type: none"> • Over-voltage Protection Passive transorb on output, 120% ± 10% of nominal voltage. • Current limiting Continuous protection (10 to 30% above maximum current) for unlimited time. 	<p><u>General</u></p> <ul style="list-style-type: none"> • Over temperature protection Shutdown at baseplate temperature of +105 °C ± 5 °C. Automatic recovery at base plate temperature lower than +95 °C ± 5 °C.
<p><u>Input</u></p> <ul style="list-style-type: none"> • Inrush Current Limiter Up to 6 times the maximum input current for less than 50 µs. 	<p><u>Output</u></p> <ul style="list-style-type: none"> • Over-voltage Protection Passive transorb on output, 120% ± 10% of nominal voltage. • Current limiting Continuous protection (10 to 30% above maximum current) for unlimited time. 	<p><u>General</u></p> <ul style="list-style-type: none"> • Over temperature protection Shutdown at baseplate temperature of +105 °C ± 5 °C. Automatic recovery at base plate temperature lower than +95 °C ± 5 °C. 			

* Thresholds and protections can be modified / removed – please consult factory.

** Depending on configuration, an external filter may be required to comply with EMI requirements.

M186 SERIES THREE-PHASE AC/DC POWER SUPPLY

Environmental Conditions

Designed to Meet MIL-STD-810F

Temperature

Methods 501.4 & 502.4

Operating: -55°C to +85°C (at baseplate)

Storage: -55°C to +125°C (ambient)

Altitude

Method 500.4

Procedure I – Storage/Air transport:

up to 70,000 ft. (non-operational)

Procedure II – Operation/Air Carriage:

up to 40,000 ft. (operational)

Humidity

Method 507.4

Up to 95% RH

Vibration

Method 514.5

Procedure I, Category 24

General minimum integrity exposure

IAW Figure 514.5C-17

1 hour per axis.

Shock

Method 516.5

Procedure I

20 g / 11 ms terminal peak sawtooth shock pulse

Salt Fog

Method 509.4

Reliability

100,000 hours, calculated IAW MIL-HDBK-217F Notice 2 at +85 °C baseplate, Ground fixed conditions.

M186 SERIES THREE-PHASE AC/DC POWER SUPPLY

Pin Assignment

Connector type: M24308/24-39F or eq.

Mating connector type M24308/2-3F or eq.

Pin No.	Description
4, 5, 17	PHASE A
7, 8, 20	PHASE B
10, 11, 23	PHASE C
15	+ SENSE †
2	- SENSE †
14	INHIBIT
1	SIGNAL RTN
25	CHASSIS

† Please inform factory if sense lines are required to be tied to the output from within, or if the remote sense compensation function will be used.

M186 SERIES THREE-PHASE AC/DC POWER SUPPLY

Functions and Signals

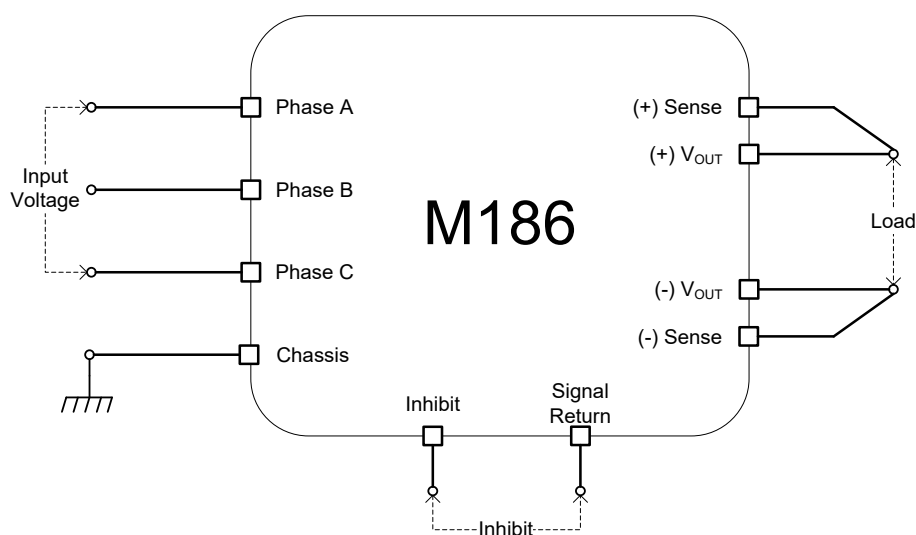
INHIBIT

The **INHIBIT** signal is used to turn the power supply ON and OFF.
 OPEN – will turn on the power supply.
 SHORT – between pin 14 and pin 1 will turn off the power supply.
 This signal is referenced to the **SIGNAL RTN** pin.

SENSE

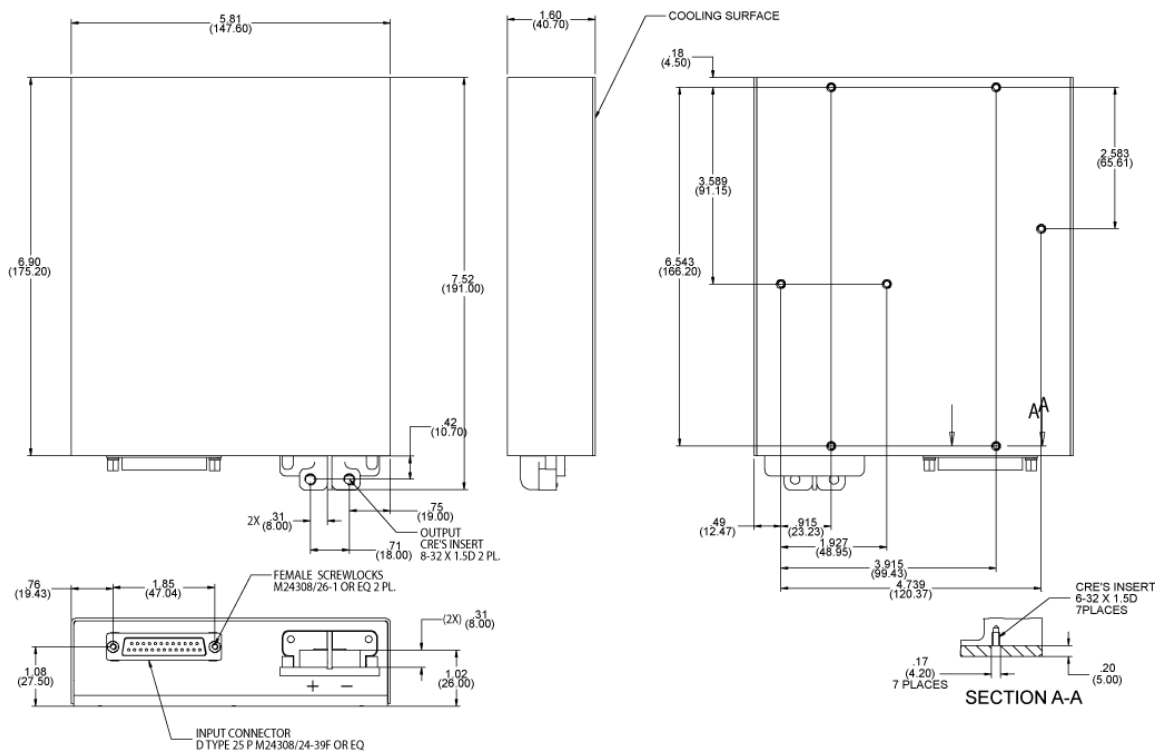
The SENSE is used to achieve accurate load regulations at load terminals (this is done by connecting the pins directly to the load's terminals).
 The use of remote sense has a limit of voltage dropout between converter's output and load terminals of 2-10% of voltage output (up to 2V).
 Please note that if Sense lines are not used the output may rise as much as 2V above nominal outputs.

Typical Connection Diagram



M186 SERIES THREE-PHASE AC/DC POWER SUPPLY

Outline Drawing



Heat Dissipation Surface



Dissipation Area
40.08 in²
(258.6 cm²)

Notes

- Dimensions are in inches [mm]
- Tolerance is:
 - .XX ± 0.025 in
 - .XXX ± 0.010 in
- Weight: Approx. 4.4 lbs [2 kg]

M186 SERIES THREE-PHASE AC/DC POWER SUPPLY

Standard Configurations

Part number	Input		Output	
	Voltage range	Frequency	Voltage	Current
M186-100	3-phase, 103 to 127 V _{AC}	400 Hz	12 V _{DC}	70 A
M186-101	3-phase, 103 to 127 V _{AC}	400 Hz	15 V _{DC}	70 A
M186-102	3-phase, 103 to 127 V _{AC}	400 Hz	24 V _{DC}	70 A
M186-103	3-phase, 103 to 127 V _{AC}	400 Hz	28 V _{DC}	70 A
M186-104	3-phase, 103 to 127 V _{AC}	400 Hz	36 V _{DC}	55 A
M186-105	3-phase, 103 to 127 V _{AC}	400 Hz	48 V _{DC}	40 A
M186-110	3-phase, 103 to 127 V _{AC}	300-800Hz	12 V _{DC}	70 A
M186-111	3-phase, 103 to 127 V _{AC}	300-800Hz	15 V _{DC}	70 A
M186-112	3-phase, 103 to 127 V _{AC}	300-800Hz	24 V _{DC}	70 A
M186-113	3-phase, 103 to 127 V _{AC}	300-800Hz	28 V _{DC}	70 A
M186-114	3-phase, 103 to 127 V _{AC}	300-800Hz	36 V _{DC}	55 A
M186-115	3-phase, 103 to 127 V _{AC}	300-800Hz	48 V _{DC}	40 A

Note: Specifications are subject to change without prior notice by the manufacturer