PICO
Electronics

Series AC3

Power Factor Corrected
Three-Phase AC Input: 208 VAC +/-20%
47 - 440 Hz Input Frequency
Hi Reliability Isolated Regulated
Fixed Operating Frequency: 100Khz
AC-DC Converter to 300 Watts

3 Phase Input Delta-Connection.
Meets all specifications even with loss of one phase.

3 Phase Input Voltage:208 VAC +/-20% (line to line), no neutral connection.
Power Factor Corrected: 0.95 typical (50 - 100% Full Load) at 60Hz; 0.92 typical (50 - 100% Full Load) at 400Hz
Space Saving Design: One module replaces two
Special Output Voltages Available
Regulated Output Voltage
Made in the USA, Fully Encapsulated
For 360 to 800Hz Input Frequency - Consult Factory at 800-431-1064

TYPICAL FEATURES/ELECTRICAL CHARACTERISTICS:

AC Line Input Voltage: Three-Phase, 208 VAC +/-20% 47-440 Hz
Output Power: 150 to 300 watts, see chart

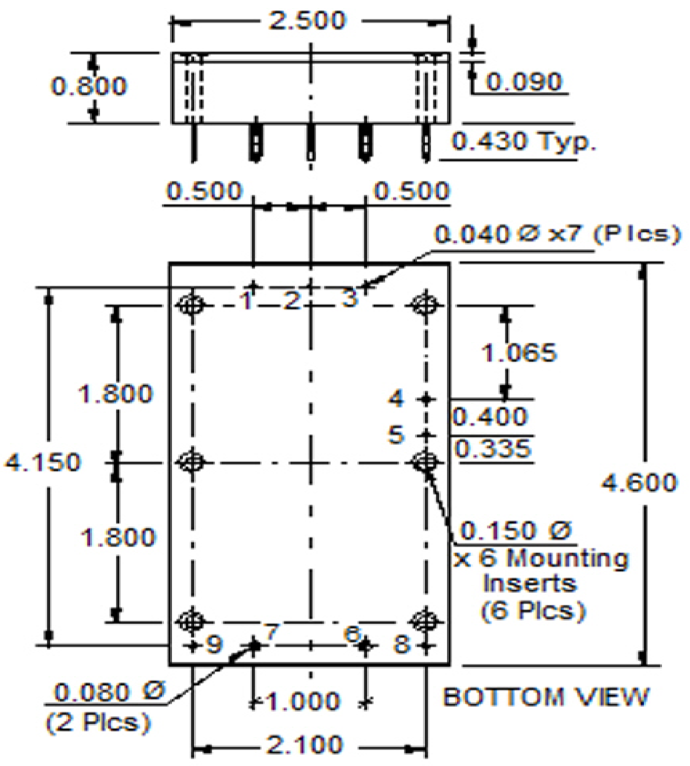
Output Voltage Ripple: 75-500 mV, See chart

Operating Temperature: 0 to 85º C, case temperature. See application notes for proper thermal considerations.
Availabe with -20°C and -40°C operating temperature range: Consult Factory
Isolation:

- From Input to DC Output: 4242 VDC
  From Input or DC output to Case: 2121 VDC
  From AC Input to Auxiliary 380 VDC Output: Non-Isolated

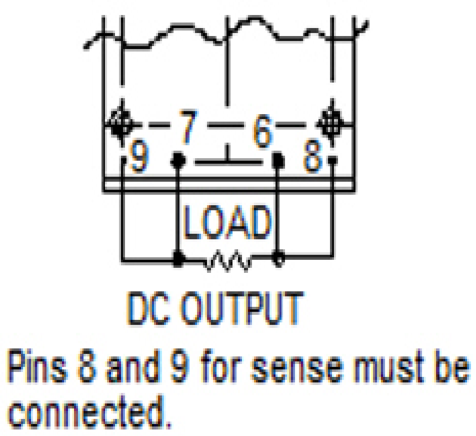
Capacitor Requirement: External at Auxiliary 380 VDC Pins: 220uf, 450 Volt Electrolytic*** MUST BE INSTALLED**
Current Limit Setpoint: 130 % of full load rating (Typical)
Operating Frequency: 100Khz: Fixed

For Output Voltages of up to and including 48V



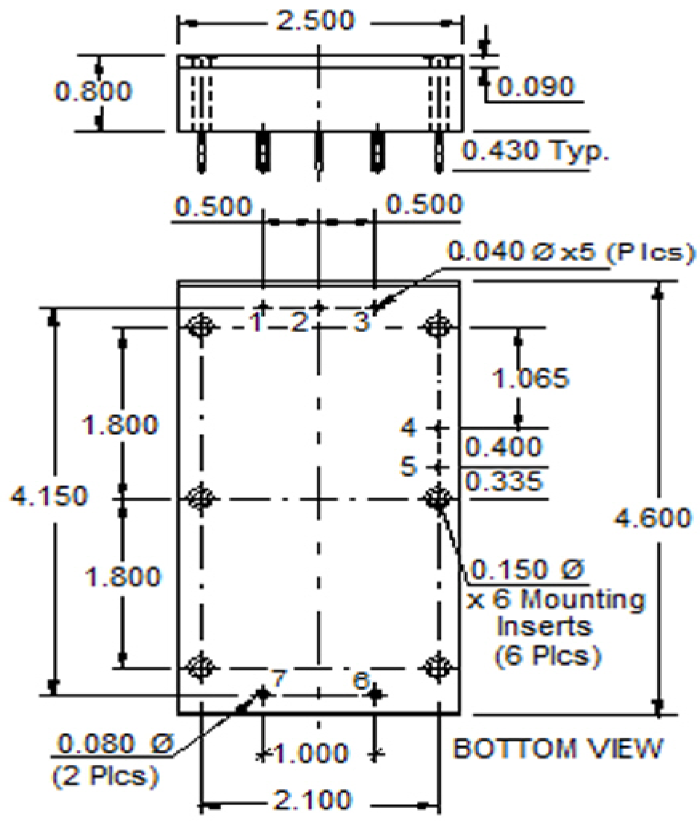
Weight: 340 Grams Typical
All dimensions are in Inches
NOTE: The torque for mounting screws must be 6 to 9 In-Lbs.

PIN No.	FUNCTION
1	AC IN
2	AC IN
3	AC IN
4	+380 V BUS
5	-V BUS
6	-V OUT
7	+V OUT
8	-SENSE
9	+ SENSE



NOTE: Pins 8 and 9 are for models with output voltages up to and including 48 Volts. They are not on the higher voltage models (Those greater than 48 Volts)

For Output Voltages over 48V

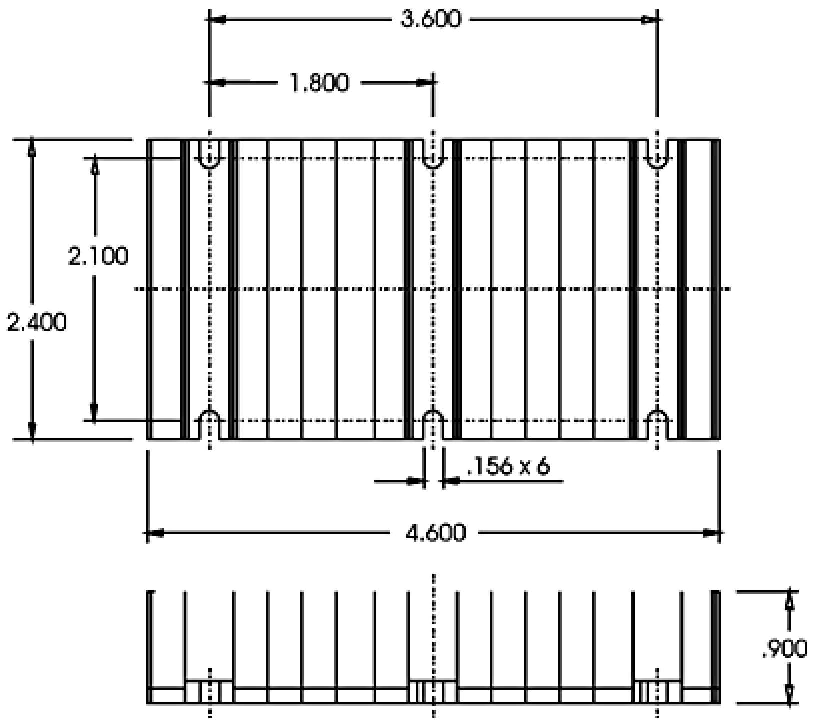


Weight: 340 Grams Typical
All dimensions are in Inches
NOTE: The torque for mounting screws must be 6 to 9 In-Lbs.

Pico Part No.	Output Voltage VDC	Max. Load Current (A) **	Max. Output Power (watts) **	EFF @ Full Load (%)*	Output Ripple Full Load 1-1 MHz BW mv p-p*	Output Voltage Tolerance (±%)*	V Ld. Reg 10-100% Load (±%)*	Line Regulation (±%)*	Price (US $)
AC3-5S	5	30	150	76	100	1.0	1.5	0.2	371.53
AC3-9S	9	27.8	250	78	100	1.0	1.5	0.2	371.53
AC3-12S	12	25	300	80	150	0.5	1.5	0.2	371.53
AC3-15S	15	20	300	80	150	0.5	1.5	0.2	371.53
AC3-24S	24	12.5	300	81	250	0.5	1	0.2	371.53
AC3-28S	28	10.71	300	82	300	0.5	1	0.2	371.53
AC3-48S	48	6.25	300	82	500	0.5	1	0.2	409.31
AC3-100S	100	2.50	250	85	250	1.0	1	0.2	506.28
AC3-125S	125	2.00	250	85	250	1.0	1	0.2	506.28
AC3-150S	150	1.67	250	85	350	1.0	1	0.2	506.28
AC3-175S	175	1.43	250	85	350	1.0	1	0.2	506.28
AC3-200S	200	1.25	250	85	400	1.0	1	0.2	545.15
AC3-225S	225	1.11	250	85	400	1.0	1	0.2	545.15
AC3-250S	250	1.00	250	85	500	1.0	1	0.2	545.15
AC3-275S	275	0.91	250	85	500	1.0	1	0.2	545.15
AC3-300S	300	0.83	250	85	500	1.0	1	0.2	583.32

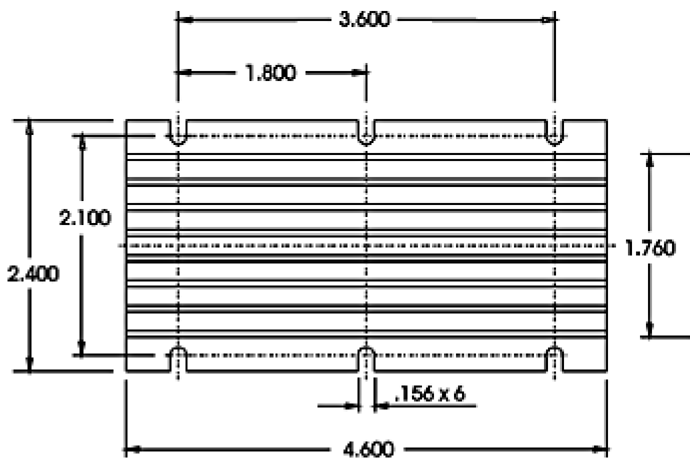
External Capacitor Required: 220µF, 450 V Aluminum Electrolytic Capacitor
*All specifications are typical at nominal (208 VAC, 60 Hz) three-phase input, full load and 25°C baseplate temperature unless otherwise stated.
** Using proper thermal considerations as outlined in the application notes.

CH HEATSINK



All dimensions are in inches ()=mm
Approx. weight = 145 grams

CV HEATSINK



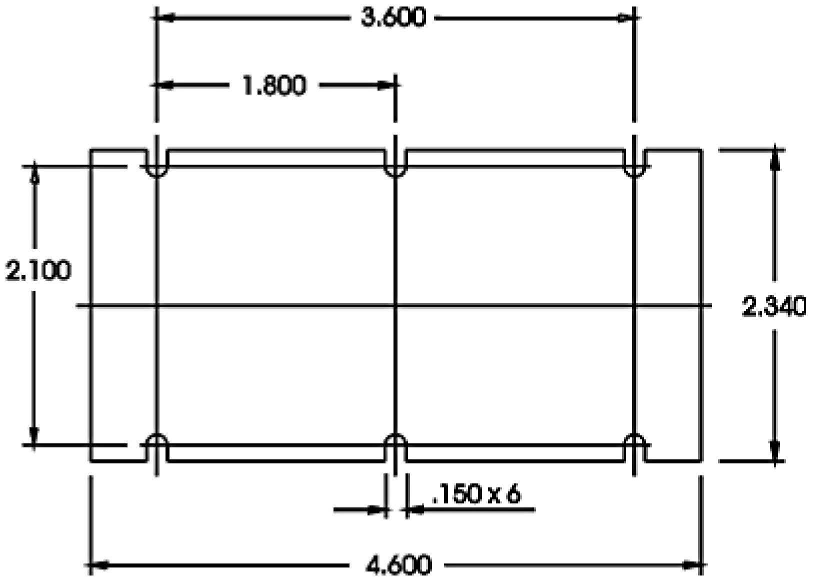
NOTE: Additional Heatsink options, consult fa
Approx. Weight = 145 grams

TYPE CH	$26.40
TYPE CV	$26.40
TYPE TI	$3.30

THERMAL INTERFACE
PART TI

Alloy Aluminum Substrate

Thermal Conductivity, (BTU-in/hr ft² ºF) ----1530
Coefficient of Thermal Expansion (25-100ºC, 10^{-6} in./in. ºF ---13.1
Hardness, Brinnell B ----23
Endurance Limit, psi. ----5000
Standard Thickness (inches) ---.002



Thermal Considerations

.	AC3 Series		
.	Baseplate	Heatsink CV	Heatsink CH
Free Air	4.8	3.3	2.8
200 LFM	2.6	1.6	0.9
400 LFM	1.6	1.0	0.6
600 LFM	1.3	0.7	0.5
800 LFM	1.1	0.6	0.4
1000 LFM	0.9	0.5	0.35

EXAMPLE 1:

An AC3-24S module has an efficiency of 81%. What is themaximum ambient temperature if 100 Watts of power is needed?

A) In free air:

From Table 1: $T_{rca} = 4.8$

Using relation (2)

$$\Delta T = 4.8\,(100)\left[\frac{1}{.81} - 1\right] = 112.6^{\circ}C$$

$$T_a = 85 - 112.6 = -27^{\circ}C$$

B) In free air with heatsink (CV):

$T_{rca} = 3.3$

$$\Delta T = 3.3\,(100)\left[\frac{1}{.81} - 1\right] = 77.4^{\circ}C$$

$$T_a = 85 - 77.4 = 7.6^{\circ}C$$

C) With 400 LFM of air flow:

$T_{rca} = 1.6$

$$\Delta T = 1.6\,(100)\left[\frac{1}{.81} - 1\right] = 37.5^{\circ}C$$

$$T_a = 85 - 37.5 = 47.5^{\circ}C$$

EXAMPLE 2:

What would be the maximum output power for an AC3-24S module at an ambient temperature of 50°C with an efficiency of 81%?

A) If the module is used in free air.

From Table 1: $T_{rca} = 4.8$

Using Relation (2):

$$85 - 50 = 4.8\,P_{out}\left[\frac{1}{.81} - 1\right]$$

$$P_{out} = \frac{35}{4.8\,[.23]} = 31.1 \text{ Watts}$$

B) If the module is used in an area with forced air at 200 LFM with no heatsink.

$T_{rca} = 2.6$

$$P_{out} = \frac{35}{2.6\,[2.3]} = 58.5 \text{ Watts}$$

C) If the module with heatsink (CV) is used in free air.

$T_{rca} = 3.3$

$$P_{out} = \frac{35}{3.3\,[.23]} = 46.1 \text{ Watts}$$

EXAMPLE 3:

At a maximum ambient temperature of 50°C and an efficiency of 81%, how could an AC3-24S module be used if 200 Watts of output power is required?

Using relation (2), we first find the maximum thermal resistance from case to air.

$$\Delta T = T_{rca}\,(200)\left[\frac{1}{.81} - 1\right]$$

$$85 - 50 = T_{rca}\,(46)$$

$$T_{rca} = .76$$

A) If no heatsink is used:

From Table 1, more than 1,000 LFM of airflow is required.

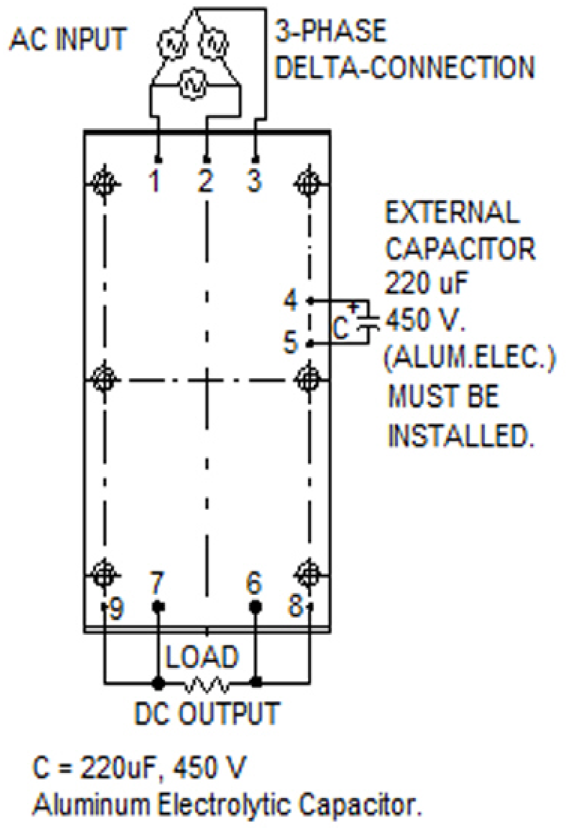
B) If a (CV) heatsink is used:

600 LFM of airflow is required.

C) If a (CH) heatsink is used:

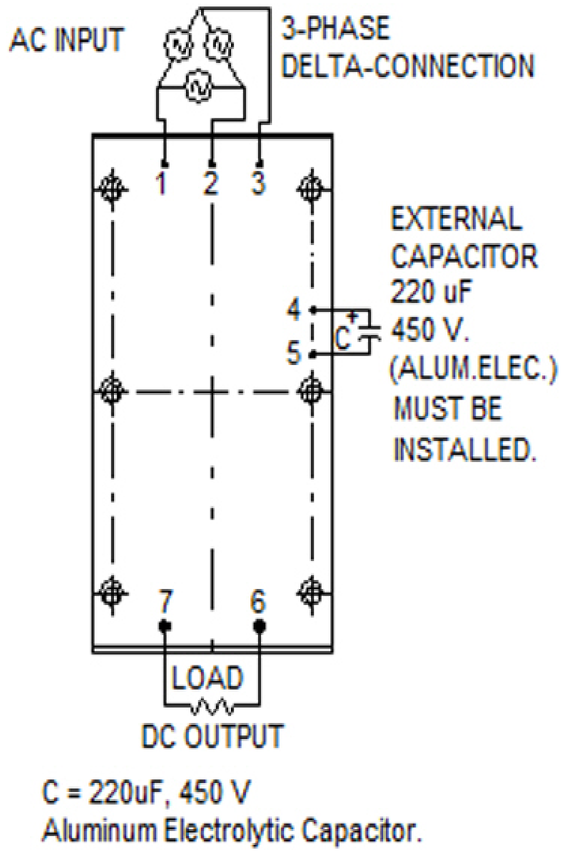
400 LFM of airflow is required.

For output voltages up to and including 48V



Sense Pins must be connected
(see application note for remote sense)

For output voltages above 48V



Remote Sense Terminals (only on models with output voltages below and including 48V)

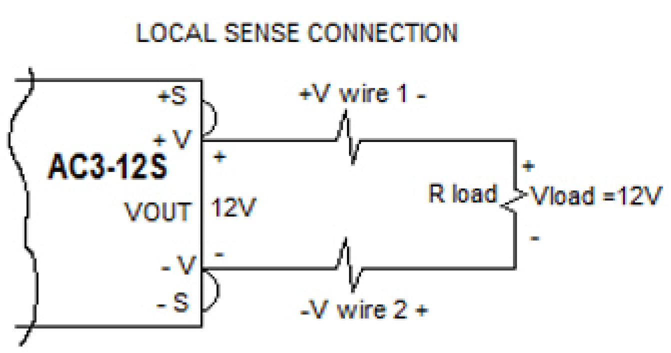
Remote Sense terminals must be connected for unit to operate properly. When conncected in local sense (+S connected to +V output terminal and -V output terminal), the output voltage is regulated at the output terminals.

If your load is connected more than a few inches away from the unit and you want to regulate the output voltage ON the load, remote sense is required. This means connecting the +S connection at the end of the +V wire (at the load), and the -S connection at the end of the -V wire (at the load). Since the load wires have current flowing through them and they have a certain resistance, there will be a voltage drop in them so that the output voltage at the load will be lower than the output voltage of the unit. Remote sense will prevent theis by compensating for up to 1V of drop in the load wires. This means that the output voltage of the unit will ge up to 1V higher than the nominal value, so that at the load, the voltage will be the nominal value.

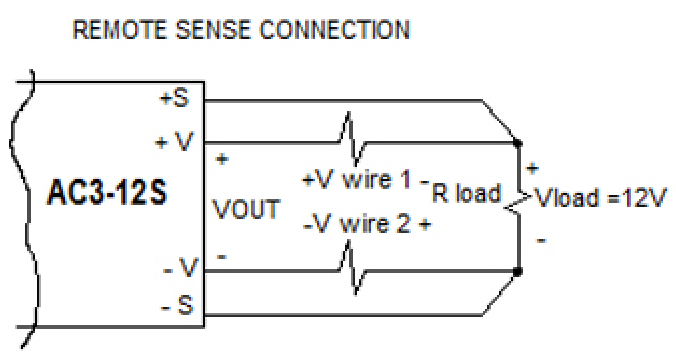
Example of local and remote sense connections, using the AC3-12S with a 0.2V drop in the wires connecting the +V and -V output terminals to the load

Vout = Voltage on the output voltage terminals of the unit.
Vload = Voltage on the load where the wires are connected.
Vout = Vload + Vwire1 + Vwire2

LOCAL SENSE CONNECTION



REMOTE SENSE CONNECTION



With local sense, Vout is regulated at 12V
So, Vout = 12V
Vload = Vout - Vwire1 - Vwire2
Vload = 12V - .2V - .2V = 11.8 Volts

With remot sense, Vload is regulated at 12V
So, Vload = 12V
Vout = Vload + Vwire1 + Vwire2
Vout = 12V + .2V + .2V = 12.4 Volts

The voltage drops in the wires connecting the +V and -V output terminals of the unit and the load depend on the size of the wire (or PCBoard trace) and the current flowing through them.

For immediate engineering assistance or to place an order:
Call Toll Free: 800-431-1064

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