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AC Power Systems
T Series

California Instruments



California Instruments T Series of Invertron® AC Power Sources offer precise control of amplitude, frequency, phase-angle, and current. The T Series Power Sources range from fixed frequency configurations for frequency conversion applications to fully programmable systems for complex ATE requirements. Some typical applications include:

- Avionics Testing
- Frequency Conversion
- Instrument Calibration
- DC Power Supply Testing
- Ground Power Simulation
- Position Sensor (LVDT/RVDT, Synchros, etc.) Testing
- Circuit Breaker, Fuse, etc. Testing
- Military Electronics Testing - MATE
- Gyro Testing - Microsyn and Wheel Supplies

The T Series of Invertron AC Power Sources feature:

- Power Ratings from 100VA to 36,000VA
- Adjustable Output Voltages 0-270V RMS
- Variable Output Frequency 20Hz to 20kHz
- Adjustable Phase Angle
- Current Source Configurations
- Sine-Wave or Square-Wave Output
- Programmable Interface (IEEE-488 and BCD)
- Multi-Unit and Multi-Phase Configurations

System Configurations

California Instruments innovative modular building-block approach of combining the appropriate power controller/oscillator and power amplifier(s) allows configuration of power sources to meet specific voltage, current and output power rating requirements.

- Multi-Unit Single-Phase Systems

  Two or more like power amplifiers can be configured to provide higher output power capabilities. Only one single-phase power controller is required.

- Multi-Phase Systems

  Two-Phase, Three-Phase Delta, or Three-Phase Wye Systems can be configured from two or more power amplifiers. Only one multi-phase power controller is required to provide the drive signal for all phases.



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T Series Power Controllers/Oscillators

The power controller/oscillator converts user commands (manual adjustments or program statements) into the signals that drive the power amplifier(s).

Six modular "plug-in" models and one "rack mount" model are available for single phase and multi-phase configurations.

Manual Oscillators

The models 855T, 850T and 800T are designed for applications which do not require programmable control. Typical applications would include frequency conversion, bench test, production test and general laboratory testing and evaluation.

Model 800T/20-20K



This unit is designed for applications requiring a sweep through the band-width without steps. The 800T/20-20K features a large calibrated vernier scaled dial to select the desired frequency.

- Wien Bridge internal oscillator
- Extremely low distortion
- Frequency setable to 1%
- Phase accuracy ±1%
- 20Hz to 20kHz

Model 850T



The 850T is ideally suited for those applications requiring operator control of amplitude and frequency. The Model 850T features four front panel decade dials for selecting the desired frequency from 45Hz to 9999Hz in the three frequency ranges (4-decade resolution).

- Crystal-controlled synthesized frequency
- Low output distortion
- 0.001% frequency accuracy
- Frequency resolution (.01 Hz to 1 Hz)
- Phase accuracy 1° typical (multi-phase)
- Upper frequency limit (matched to power amplifier)
- Optional remote servo sense
- Optional remote amplitude control

Model 855T



The model 855T is designed for those applications where access to the frequency adjustment is to be limited. Frequency changes are by means of an internal DIP switch which can be set from 45Hz to 9999Hz. Amplitude adjustments are by a front panel control (optional "locked" amplitude control is available).

- Crystal-controlled synthesized frequency
- Low output distortion
- 0.001% frequency accuracy
- Frequency resolution (.01Hz to 1Hz)
- Phase accuracy 1° typical (multi-phase)
- Optional remote servo sense
- Optional remote amplitude control

Programmable Power Controllers

California Instruments four T Series programmable power controllers provide the interface between the ATE Systems host computer and the T Series power amplifiers. In addition to remote programming capability, local control and local programming are available for each controller. All units are available in single and multi-phase configurations. Output frequency ranges are from 45Hz to 9999Hz.

Model MXT10/959XP



This interface module and controller provides all T Series power amplifiers in the brochure the capability to program and measure output parameters, including current limit. Programs, displays and reports RMS Volts and Amps, Watts, VA, PI, Phase Angle and Frequency.

- Full IEEE-488 Talk and Listen
- 16 Linking Memory registers
- Variable speed Up/Down keys
- Bus or Keypad operation
- Single or Multi-phase
- Line Distortion Simulation with 959XPT

Model 847T and 846CM (Optional)



The Model 847T is specifically designed for ATE applications that require extremely fast processing speeds and where local control is generally not required. For those applications requiring local control, the Model 846CM Control Module is available as an optional accessory.

- IEEE-488 Listener/Talker or BCD control
- Programmable range change
- Remote sensing via servo feedback
- 0.001% frequency accuracy
- Fault status byte

Model 848TCM



For single phase and multi-phase applications where simultaneous control of amplitude and fixed-phase angles are required, the Model 848TCM should be considered. Local control is via a front panel 16-key keypad.

- IEEE-488 Listener/Talker
- Programmable range change
- Remote sensing via servo feedback
- 0.001% frequency accuracy
- Fault status byte
- Direct memory access (DMA) buffer
- 10-Program storage registers and user programmable RAM
- Group Execute Trigger (GET)

Model 849TA



The Model 849TA is designed for those multi-phase applications that require independent control of amplitude, phase angle, current limit and waveform for each phase. All programming and control features may be accessed using either the 20-key front panel keypad or over the IEEE-488 bus.

- IEEE-488 Listener/Talker
- Programmable range change
- Remote sensing via servo feedback
- 0.001% frequency accuracy
- Fault status byte for Built-In-Test (BIT)
- Front panel calibration/no internal adjustments
- Sine or square wave
- Ramp programming function
- Multi-page menu screen
- External sync
- Programmable start point

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T Series Power Amplifiers

The power amplifier produces the appropriate output frequency, amplitudes, phase angles, etc. from the precision drive signals generated by the controller/oscillator.

The T Series power amplifiers consist of ten single-phase models, and four three-phase single enclosure models. Other common features include input circuit breakers, power-on lamp and output voltage meter.

Single-Phase Power Amplifiers

(Stackable for Multi-Phase Applications)

California Instruments makes ten single-phase power amplifiers with power ratings from 100VA to 3kVA. These units can be used in single-phase applications or can be stacked in multi-phase systems to generate up to 36kVA.

Models 101T and 161T



Both the Model 101T and 161T are packaged in compact 3.5 inch panel height enclosures. These units are well suited for low power applications up to approximately 1.5 amps at rated voltages.

- Output power 100VA (101T), 160VA (161T)
- Output voltage 0-135V (101T), 0-120V (161T). Optional 0-30V, 0-35V, 0-270V (101T)
- Output frequency 45Hz to 10kHz (101T), 45Hz to 5kHz (161T)
- Panel height 3.5 inches

Models 251TCA, 251T and 351TC



The Models 251TCA, 251T and 351TC are ideal for those applications requiring between 1.5 amps and 3.0 amps at rated voltages. The 251T has a special feature of being able to deliver full rated power out to 20kHz at three voltage ranges.

- Output power 250VA (251TCA and 251T), 350VA (351TC)
- Output Voltage: 2 ranges (251TCA and 351TC), 3 ranges (251T)
- Output frequency 45Hz to 5kHz (251TCA and 351TC), 45Hz to 20kHz (251T)
- Panel height 5.25 inches

Models 501TC and 751TC



Models 501TC and 751TC are commonly used in single-phase and multi-phase systems, generating up to 2250VA.

- Output power 500VA (501TC), 750VA (751TC)
- Output voltages 0-135V, 0-270V (501TC), 0-130V, 0-260V (751TC)
- Output frequency 45Hz to 5kHz
- Panel height 7 inches

Model 1001TC



One of our most popular power amplifiers, the Model 1001TC, supplies approximately 9 amps on the lower voltage range of 0-130VAC. The 1001TC delivers full power down to 85% of the rated voltage ranges.

- Output power 1000VA
- Output voltages 0-130V, 0-260V
- Output frequency 45Hz to 5kHz
- Panel height 8.75 inches

Model 1501TC



The Model 1501TC provides 1500VA of output power over four operating voltage ranges.

- Output power 1500VA
- Output voltages 0-32.5V, 0-65V, 0-130V, 0-260V
- Output frequency 45Hz to 5kHz
- Panel height 14 inches

Model 3001TCA



The Model 3001TCA is the primary building block for most high power single-phase and multi-phase systems up to 36kVA.

- Output power 3000VA
- Output voltages 0-32.5V, 0-65V, 0-130V, 0-260V
- Output frequency 45Hz to 2kHz
- Panel height 15.75 inches

Three-Phase Power Amplifiers

(Single enclosure models)

In addition to being able to stack any of the single-phase models in multi-phase configurations, California Instruments also provides four three-phase single-enclosure units. The units are available in the most popular power ratings: 150VA, 500VA, 1500VA and 2250VA.

Model 153T



The Model 153T provides 150VA of three-phase power and is packaged in an extremely compact 5.25 inch enclosure. The unit provides four output voltage ranges to select from and is able to deliver full power down to 81% of the rated voltages.

- Output power 150VA
- Output voltages 0-17.5V, 0-30V, 0-75V, 0-130V
- Output frequency 45Hz to 10kHz
- Panel height 5.25 inches

Model 503T



The Model 503T features four output voltage ranges and delivers full power output down to 78% of the rated voltages. Common to all three-phase single-enclosure units the Model 503T has a voltage meter with a selector switch for verifying all line-to-neutral and line-to-line voltages.

- Output power 500VA
- Output voltages 0-30V, 0-45V, 0-75V, 0-135V
- Output frequency 45Hz to 5kHz
- Panel height 8.75 inches

Models 1503TC and 2253TC



The higher power Models 1503TC and 2253TC provide three-phase precision power from a single 14 inch high enclosure. These units are the solution to those three-phase applications where panel height is critical.

- Output power 1500VA (1503TC), 2250VA (2253TC)
- Output voltages 0-75V, 0-135V (1503TC), 0-120V (2253TC)

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Specifications

Power Controllers/Oscillators

Model Number	Descriptions		Frequency	
Basic(1)	Type	Control	Range (Hz)	Accuracy (± %)
855T	Fixed—Internal DIP switches	Local(2)/Remote Opt.(3)	45-9999(4)	0.001%
850T	Variable—Decade dial	Local/Remote Opt.(3)	45-9999	0.001%
800T-20/20K	Variable—Vernier dial	Local	20-20000	1.000%
835T	Programmable—IEEE-488 or BCD	Local & Remote	45-9999	0.005%
847T(5)	Programmable—IEEE-488 or BCD	Local(6) & Remote	45-9999	0.001%
848TCM(7)	Programmable—IEEE-488	Local & Remote	45-9999	0.001%
849TA(7)	Programmable—IEEE-488	Local & Remote	45-9999	0.001%

Notes: (1) Add phase configuration number to basic model number: —1 for single phase, —2 for two-phase, —30 for three phase open Delta, —3 for three phase wye. Example: 855T-30.
(2) Local control of output amplitude only.
(3) Remote control with - RPV or - RPR option/amplitude servo with - S option.
(4) Frequency must be specified.
(5) Add GP option to power amplifier.
(6) Local control with 846 CM option.
(7) Add PC option to power amplifier.

Power Amplifiers

Model Number	Output							Input			Dimensions H x W x D (inches)	Weight (Lb.) Net
	Power (VA)	Voltage Ranges(1)				XX%(2)	Freq. (Hz)	Voltage(3)	Phase	Current(4) (Amp.)		
101T	100	0-30(5)	0-35(6)	0-135	0-270(7)	78%	45-10K	115	1	3.5	3.50 x 19 x 18	32
161T	160			0-120		92%	45-5K	115	1	4.8	3.50 x 19 x 18	33
251TCA	250			0-135	0-270	78%	45-5K	115	1	8.3	5.25 x 19 x 20	55
251T	250	0-30(8)	0-75(8)	0-135(8)	——	78%	45-20K	115	1	8.3	5.25 x 19 x 20	58
351TC	350			0-120	0-240	92%	45-5K	115	1	10.0	5.25 x 19 x 20	56
501TC	500			0-135	0-270	78%	45-5K	115	1	16.5	7.00 x 19 x 21	84
751TC	750			0-130	0-260	85%	45-5K	115	1	18.3	7.00 x 19 x 22	89
1001TC	1,000			0-130	0-260	85%	45-5K	230	1	12.2	8.75 x 19 x 22	128
1501TC	1,500	0-32.5	0-65	0-130	0-260	85%	45-5K	230	1	21.7	14.0 x 19 x 21	190
3001TCA	3,000	0-32.5	0-65	0-130	0-260	85%	45-2K	208	3	25.0/phase	15.75 x 19 x 22	242
153T	150	0-17.5	0-30	0-75	0-130	81%	45-10K	115	1	4.4	5.25 x 19 x 20	60
503T	500	0-30	0-45	0-75	0-135	78%	45-5K	115	1	17.4	8.75 x 19 x 21	111
1503TC	1,500		0-75	0-135		78%	45-1K	208	3	16.0/phase	14.0 x 19 x 21	202
2253TC	2,250			0-120		92%	45-2K	208	3	19.0/phase	14.0 x 19 x 21	204

Notes: (1) Optional programmable output voltage range change - 3320 for models 251TCA, 351TC, 501TC, 751TC, 1001TC, - 3231 for model 3001TCA.
(2) Full output power (VA) available from "XX"% to 100% of rated output voltage. See power rating graph below.
(3) Additional "standard" input voltages available. Contact Factory.
(4) Recommended "service" amperage for input voltages shown.
(5) —672 option for 101T.
(6) —638 option for 101T.
(7) —771 option for 101T.
(8) —560 option for 251T. (0-67.5V, 0-130V, 0-270V)

Amplifier Specifications

Load Regulation: ±1% over the frequency range of 45Hz to 5kHz* when tested at unity power factor.
±2% over the frequency range at 45Hz to 20kHz* when tested at unity power factor.
(*) Frequency range is limited by Model specification.

Line Regulation: ±0.25% of full output for a ±10% input line voltage change.

Amplitude Stability: ±0.25% for 24 hours at constant line, load and ambient temperature conditions following a one-hour warm up.

Frequency Response: ±0.5dB within specified frequency range.

AC Noise Level: 80dB below full output while measured with a shorted input.
60dB below full output while measured at full power output.

Overload and Short Circuit Protection: Complete protection from overloads and short circuits is provided.

Amplifier Drive Requirements: 5 volts RMS (maximum) produces maximum rated output voltage. NOTE: Amplifier drive is obtained from oscillator.

AC Input Frequency: 48 to 66Hz (400Hz available on special order).

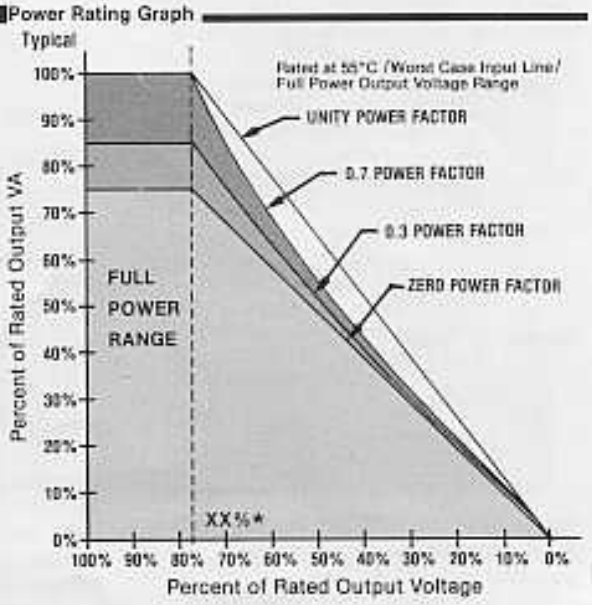
Operating Temperature: 0 to 55°C.

Front Panel Finish: Gray, 26440 per Federal Standard 595 with black silk-screened lettering.

THD 0.3% (Typical)

★ Unique to California Instruments is the "range rated" full power capability. All California Instruments T Series power amplifiers are capable of delivering full power from XX% to 100% of rated output voltages. For most power amplifiers, this full power range is from 78% to 100% of rated output voltages.

Power Rating Graph



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