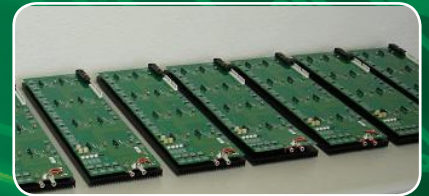
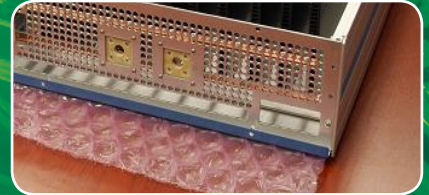
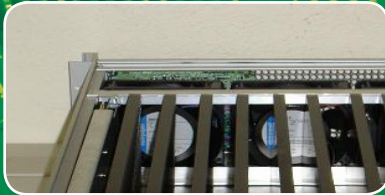
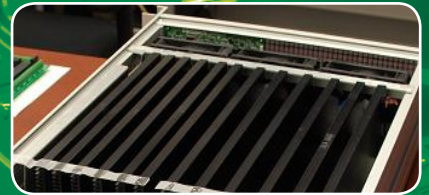
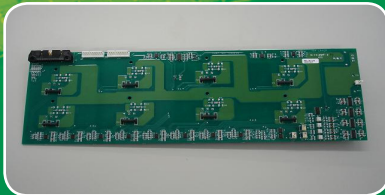


# ML Series of Programmable Electronic Loads

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**INTEPRO**  
SYSTEMS

**THE POWER TEST EXPERTS**

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# MODULAR PROGRAMMABLE DC ELECTRONIC LOADS.....

■ 300W LOAD

■ 600W LOAD

■ 900W LOAD

■ 1200W LOAD

## Overview

Intepro Systems ML Series of DC Electronic Loads are designed for ultimate flexibility and configuration in providing the ideal load solution for testing multi-output AC/DC power supplies, DC/DC converters, chargers, batteries, adapters, and power electronic components. These loads can be used for research, development, production, and incoming inspection applications.

The ML Series state-of-the-art microprocessor design with 16-bit DAC control is used to simulate a wide range of dynamic loading applications including independent slew rates and durations for rise and fall transitions and the ability to simulate non-linear loads using RC and RL operation modes. The 4K pattern depth allows for programming of complex load waveforms and dynamic sweeping of a load profile.

The ML Series offers the widest range of load voltages that can be mixed within a single 10 module chassis. Loads are rated to a maximum of 100VDC, 500VDC or 750VDC. Each 300W load can draw its full rated current to very low voltage (0.5V specified) to deliver its superior performance for modern Point-of-Load conditions and fuel cells.

Dual range 16-bit resolution measurements of voltage (V), current (I) and resistance (R) provide the accuracy of a DMM with the convenience of a single connection. Power (P) Measurement has three ranges to accommodate the even higher accuracy required for Energy Star testing. The loads are capable of taking measurements every 30 uSecs to enable fast test scenarios.

Intepro's modular loads are designed for easy integration into automated test systems or simple front panel operation. Every load comes standard with an Ethernet interface and CAN bus support (USB and GPIB optional). Each load is configured with a back drive relay to connect an OVP source to back drive the output. All loads have power up self-diagnostic and calibration routines and full protections against OP, OC, OV, OT and reverse polarity. This ensures the quality and reliability of the loads and provides protection of units under test.

## Modular Design

The 3000W load mainframe holds up to 10 loads making it ideal for testing multiple-output power supplies and batteries as well as other power products. All modules on the mainframe share a common address and can be synchronized with other loads or test instruments.

## Dynamic Loading

Intepro ML Series loads operate at the high speeds necessary to meet the demanding transient and dynamic response characteristics required for today's modern PSU. All ML Loads have independent control of the positive and negative slew rates. Two ranges provide full scale transitions from 10uSecs to 5mSec in 10uSec steps. This provides ultimate load simulation and control capability. Standard waveforms include sine, triangle, saw tooth, square and pulse.

## Load Modules

Independent of the voltage level, each Intepro ML Series load module is capable of 300W. Load modules can be paralleled to create loads of 600W, 900W or 1200W capability. The ML Series unique control design does not sacrifice low power accuracy when modules are paralleled, thus a 1200W loads has the same low current accuracy as a 300W load.



## Key Features

- 10 \* 300 Watt loads in one mainframe
- 16-bit program and measurement resolution
- 100V, 500V or 750V maximum voltage
- Maximum current to 0.5V; operates to 0.3V
- CC, CR, CV, CP and Short Circuit modes
- Capacitive (RC) and Inductive (RL) simulation
- 4K sequence depth
- Graphical Web Interface

# MODULAR PROGRAMMABLE DC ELECTRONIC LOADS

## ■ SPECIFICATIONS

Model	722-0060	722-0061	722-0062	722-0063	722-0064
Transistor type	FET	FET	FET	FET	Bipolar
Modes	CC, CR, CV, CP	CC, CR, CV, CP	CC, CR, CV, CP	CC, CR, CV, CP	CC, CR, CV, CP
Special modes	L,C Simulation	L,C Simulation	L,C Simulation	L,C Simulation	L,C Simulation
Parallel capability	yes (CC,CR,CP only)	yes (CC,CR,CP only)	yes (CC,CR,CP only)	yes (CC,CR,CP only)	yes (CC,CR,CP only)
Maximum Voltage (Vdc)	100	100	500	750	500
Maximum Current (Amps)	10	50	50	50	50
Maximum Power (Watts)	300	300	300	300	300
Minimum Operation Voltage (at full load)	0.50	0.50	0.50	0.50	3.00
Lowest Resistance Value ( $\Omega$ )	0.05	0.01	0.01	0.01	0.01
Short circuit resistance ( $\Omega$ )	0.003125	0.003125	0.030125	0.056375	0.009763
ADC Bit Count	16	16	16	16	16
ADC Error in bits	3	3	3	3	3
DAC Bit Count	16	16	16	16	16
DAC Error in bits	3	3	3	3	3
Constant Current (CC) Mode					
Current Range 1 (A)	0-10 Amps	0-50 Amps	0-50 Amps	0-50 Amps	0-50 Amps
Accuracy (A)	0.000458	0.002289	0.002289	0.002289	0.002289
Resolution (A)	0.000153	0.000763	0.000763	0.000763	0.000763
Current Range 2 (A)	0-1 Amp	0-5 Amps	0-5 Amps	0-5 Amps	0-5 Amps
Accuracy (A)	0.000046	0.000229	0.000229	0.000229	0.000229
Resolution (A)	0.000015	0.000076	0.000076	0.000076	0.000076
Constant Resistance (CR) Mode					
Resistance Range 1 (max_V/min_I)	2,184,533	436,907	2,184,533	3,276,800	2,184,533
Accuracy ( $\Omega$ )	5.66	28.28	141.42	212.13	141.42
Resolution ( $\Omega$ )	4.00	20.00	100.00	150.00	100.00
Resistance Range 2 (min_V/max_I)	0.050000	0.010000	0.010000	0.010000	0.060000
Accuracy ( $\Omega$ )	0.00000020	0.000001	0.000001	0.000001	0.000004
Resolution ( $\Omega$ )	0.040000	0.200000	1.000000	1.500000	1.000000
Constant Voltage (CV) Mode					
Voltage Range 1 (VDC)	100	100	500	750	500
Accuracy (VDC)	0.004578	0.004578	0.022888	0.034332	0.022888
Resolution (VDC)	0.001526	0.001526	0.007629	0.011444	0.007629
Voltage Range 2 (VDC)	10	10	50	75	50
Accuracy (VDC)	0.000458	0.000458	0.002289	0.003433	0.002289
Resolution (VDC)	0.000153	0.000153	0.000763	0.001144	0.000763
Constant Power (CP) Mode					
Power Range 1 (max_V/min_I) (W)	0.022888	0.022888	0.114441	0.171661	0.114441
Accuracy (W)	0.000001	0.000001	0.000007	0.000011	0.000007
Resolution (W)	0.000000	0.000000	0.000001	0.000001	0.000001
Power Range 2 (min_V/max_I) (W)	0.022888	0.022888	0.114441	0.171661	0.114441
Accuracy (W)	0.000001	0.000001	0.000007	0.000011	0.000007
Resolution (W)	0.000000	0.000000	0.000001	0.000001	0.000001
Power Range 3 (mid_V/mid_I) (W)	300.00	300.00	300.00	300.00	300.00
Accuracy (W)	0.000001	0.000001	0.000007	0.000011	0.000007
Resolution (W)	0.000001	0.000001	0.000006	0.000009	0.000006

# MODULAR PROGRAMMABLE DC ELECTRONIC LOADS.....

## ■ SPECIFICATIONS

Model	722-0060	722-0061	722-0062	722-0063	722-0064
<b>Measurement</b>					
<b>Voltage Range 1</b>	0-100VDC	0-100VDC	0-500VDC	0-750VDC	0-500VDC
<b>Accuracy %</b>	0.005	0.005	0.005	0.005	0.005
<b>Voltage Range 2</b>	0-10VDC	0-10VDC	0-50VDC	0-75VDC	0-50VDC
<b>Accuracy %</b>	0.005	0.005	0.005	0.005	0.005
<b>Current Range 1</b>	0-10A	0-50A	0-50A	0-50A	0-50A
<b>Accuracy %</b>	0.005	0.005	0.005	0.005	0.005
<b>Current Range 2</b>	0-1A	0-5A	0-5A	0-5A	0-5A
<b>Accuracy %</b>	0.005	0.005	0.005	0.005	0.005
<b>Resistance Range 1</b>					
<b>Accuracy %</b>	0.006	0.006	0.006	0.006	0.006
<b>Resistance Range 2</b>					
<b>Accuracy %</b>	0.006	0.006	0.006	0.006	0.006
<b>Power Range 1</b>					
<b>Accuracy %</b>	0.006	0.006	0.006	0.006	0.006
<b>Power Range 2</b>					
<b>Accuracy %</b>	0.006	0.006	0.006	0.006	0.006
<b>Power Range 3</b>					
<b>Accuracy %</b>	0.000	0.000	0.000	0.000	0.000

## Mainframe Specification

Number of slots	10 slots
Operating temperature	0~40°C
Input Power	175~253VAC Auto Range, 47~63Hz
Dimension (HWD)	3U Rack (5.24"x18.75"x26.5") ( 133 x 476 x 673 mm)
Weight (kg)	35 lbs (16kg) (with 10 modules installed)
Part Number	722-0050

## Modes of Operation for All Applications

The ML Series modules operate in constant voltage, current, resistance, power, or impedance (RC or RL) and short circuit modes to satisfy a wide range of test requirements. Example applications include:

CC Applications:	CR Applications (CR, RC, RL):	CV Applications:	CP Applications:
PSU Testing	Real world point of load simulation for PSU testing	Wall PSU charger test	Battery capacity test and capacity life cycle test
Battery discharge testing and life cycle test	Soft start test	PSU testing	
Fuel cell testing	LED drive source test	Photo Voltaic (PV) cell testing	
Loading pattern simulation		Fuel cell testing	

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