

For Battery Discharge testing  
and Power Supply testing

**24V / 400 Amp Electronic Load****Features:**

- Quality Product
- Rugged and Reliable Design
- Very Cost effective
- Microprocessor controlled
- 400 Amps at 30V (continuous rating)
- 12kW Rated
- Portable – very light weight Load
- Small case size with carrying handles
- Continuously variable current
- Constant Current operation is standard
- Options for CP, CR, CV modes.
- Completely powered from batteries.
- Two LCD digital panel meters for Voltage and current
- Thermally safe
- Fan fail detector on all fans / Air flow blockage detectors
- Fused protection
- Overvolt protection
- Intelligent Load feature: has built-in LVD to remove load at "End Voltage"
- Selectable "End Voltage" prevents deep discharge and possible damage
- Shunt output is available
- Remote enable / disable (suitable for UPS control)
- Anderson SB ® Series connector for DC power connection



## Introduction

This particular Load has been designed to operate with 24V battery systems and is extremely cost effective.

The load is continuously rated at 400 Amps at up to 30V DC, i.e. 12kW. The standard model has constant current operation. There is an option available for Constant Power, Constant Resistance and Constant Voltage. The mode selection will be via the front panel. The load current is continuously variable over the entire current range. The current is controlled via two knobs on the front panel, one coarse and one fine control.

As standard there is an option to have an in-built LVD, (Low Voltage Disconnect). It is possible to select the "End Voltage" per cell from 1.55V PC up to 1.90V PC. When enabled the load monitors the overall battery Voltage and when it drops to the "End Voltage" it will automatically disconnect the load and the current will drop to zero. Thus, the Load now becomes an *intelligent Load*, in that if it is left unattended it will prevent deep discharge of the batteries and hence prevent any possible damage to them.

When this load is used in conjunction with the "*Manatronics Data Logger DLM-09*", (which is recommended), the "End Voltage" will be programmed from the Logger and this will automatically disconnect the load when the Logger senses that the "End Voltage" has been reached. This feature will override the LVD in the load.

The Load is completely powered from the Batteries under test, i.e. no mains supply is required. Therefore tests are not terminated part way through by a temporary mains power outage. The unit uses forced air cooling. The Load is housed in a compact, rugged case with carrying handles and is ultra-lightweight for the power rating and is completely portable. The Load may be left on site, unattended, for an extended period of time, if required.

The case has various rear panel connectors and the front panel has two LCD panel meters, one for the DC input Voltage and one for the load current. There are also eight LED's to indicate the status of the Load.

The load has been designed to be very reliable, easy to use and suitable for *field* use. It is thermally safe and has fan fail detectors on all fans together with air blockage detectors. The DC input is fused and overvoltage protection is included. The DC power connection is Anderson SB ® Series connector on the rear panel. Monitor points are included on the front panel for access to the internal shunt. This is also provided via a D type connector on the rear panel.

Control selection is made from the front panel between "Load ON", "Load OFF", "Data Logger Control", "External Input Control", (e.g. suitable for UPS control).

The rear panel has a connector to link to the "*Manatronics Data Logger DLM-09*" or for an external load on / off control, (e.g. suitable for UPS control).

## **Applications**

Battery discharge testing  
Power Supply testing.

## **Applications for Mains powered version - see EL 12-24M**

Telecom Rectifier testing.  
All purpose Power Supply testing  
Load bank for Burn-in room facility

## **24V 400A Portable Battery Discharge Model**

### **Absolute Maximum Ratings**

DC Input Voltage ..... -0.5 to +32V

DC input current ..... 405A

Max Voltage between the chassis and the DC connector (SB350) ..... 50V ac or 120Vdc

*CAUTION: Stresses above those listed in "Absolute Maximum Ratings" may cause permanent damage to the unit. This is a stress only rating and operation of the unit at or above these limits is not implied.*

### **Electrical Specifications (assumes TA= -10°C to +40°C unless otherwise stated)**

<b>Parameter</b>	<b>Min</b>	<b>Typ</b>	<b>Max</b>	<b>Units</b>	<b>Comments</b>
DC Input Voltage	0		30	V	
DC Input Current	0		400	A	
<b>Common to all Modes (e.g. CC, CP, CR and CV).</b>					
Min Voltage required to achieve max current		18.6		V	(see next line)
Minimum series resistance		0.075		Ohm	
<b>Constant current Mode</b>					
Current range	2.5		400	A	
Demand sensitivity		80		A/V	i.e. 5V demand input gives 400A.
Demand sensitivity tolerance		+/-0.1		%	
<b>Constant power mode</b>					
Power range	.078		12	kW	At 60V input
Demand sensitivity				W/ V	1V demand input sets W load.
<b>Constant resistance mode</b>					
Resistance range	0.075		7.6	Ohm	
Demand sensitivity					See constant resistance mode text.
<b>Constant voltage mode</b>					
Voltage range	19		30	V	
Demand sensitivity					See constant Voltage mode text.
<b>Shunt Output</b>					
Accuracy (worst case)			0.5	%	50mV 500A
<b>LVD</b>					
Accuracy		2		%	

N.B. Modes are CC CP CR or CP.

## 24V 400A Portable Battery Discharge Model

### Absolute Maximum Ratings

#### Logic input signals on rear D9 connector

Enable Input Voltage ..... -2.0 to +14V wrt to Load DC -ve.  
 Mode select (LSB) Input Voltage ..... -2.0 to +14V wrt to Load DC -ve.  
 Mode select (MSB) Input Voltage ..... -2.0 to +14V wrt to Load DC -ve.

Fault output Voltage ..... -2.0 to +16V wrt to Load DC -ve.

Demand inputs (+/-) ..... -10 to +10V wrt to Load DC -ve.

0V reference on D9 connector ..... 50mA

*CAUTION: Stresses above those listed in "Absolute Maximum Ratings" may cause permanent damage to the unit. This is a stress only rating and operation of the unit at or above these limits is not implied.*

### Electrical Specifications (assumes TA= -10°C to 40°C unless otherwise stated)

Demand input	Min	Typ	Max	Units	Comments
CMRR of differential demand input stage		50		dB	For DC
Common mode range of differential demand input stage	-10		+10	V	wrt load -ve DC input
Demand current; temperature drift.		0.5		%	Over the temperature range
Demand current offset		15		mA	
Demand current linearity		0.2		%	
Demand Voltage, 3dB cutoff frequency, for CC, CP and CR Modes.		800		Hz	can be increased at factory up to 20kHz.
Demand Voltage, step response, for CC, CP and CR Modes.		1		mS	10% to 90% rise or fall
Demand Voltage, 3dB cutoff frequency, for CV Mode only.		1.59		Hz	
<b>Logic inputs</b>					
Range Input Voltage (High Level)	7			V	Internal pull up resistor 3k3 to +12V
Range Input Voltage (Low Level)			4	V	
Enable Input Voltage (High Level)	10			V	Internal pull up resistor 2k2 to +12V
Enable Input Voltage (Low Level)			7	V	
Mode select (LSB or MSB) Input Voltage (High Level)	7			V	Internal pull up resistor 22k to +12V
Mode select (LSB or MSB) Input Voltage (Low Level)			3.5	V	

**24V 400A Portable Battery Discharge Model**

	Min	Typ	Max	Units	Comment
<b>Logic outputs</b>					
Fault output high (I <sub>out</sub> = 10 $\mu$ A)		11		V	
Fault output low (active) (sink 30mA)		1.2		V	
<b>Static Characteristics</b>					
Noise and ripple, psophometric		0.7		mA	RMS
Noise and ripple, psophometric		0.1		mV	RMS see note 1.
Noise and ripple, wideband		3		mA	RMS
Noise and ripple, wideband		0.2		mV	RMS see note 1.
Settling time, 0 – 100A step		300		$\mu$ S	
<b>DC Input Resistance of load</b>		1		Meg Ohm	When off without fans running.

Note 1. Measured at the DC input terminals with a 24V battery connected in CC mode.

**PHYSICAL AND OTHER SPECIFICATIONS**

<b>Dimensions</b>	482 wide x 267 (6U) high x 415 deep	mm	
<b>Weight</b>	21.5	kg	
<b>Dimensions</b>		inches	
<b>Weight</b>	47.5	lb.	

Specifications herein, are subject to change without notice. This publication supersedes and replaces all information previously supplied.

### Options:

- Remote control box, (in place of front panel controls, for ease of use, when the load unit is under a bench or some distance away.
- Module for Constant Power, Constant Resistance and Constant Voltage.

### Ordering Information

**Model number: BD 12-24 P**

### Protection

Fan fail detectors  
Over Temperature detector  
Air flow blockage detectors  
Overvoltage detector that switches the load current to zero.

### DC Power input connectors

Anderson SB ® Series connector for DC power connection.

### External enable

Both active high and low inputs provided.

