

## General

The DLX.0 series active load is microprocessor controlled and satisfies every need of modern laboratories, industry and workshops. The Active Load has been designed by ATEC Robotics for high accuracy characterization tests for current, voltage and power. The dissipative method has been chosen because of its relative stability in terms of readout accuracy of voltage and current.



Its design has been optimized for already assembled battery packs or for single cells, and can dissipate up to 5kW in some models. The base size is the DL1.0 that can dissipate up to 1.2kW. It is cooled through controlled air flow. The other sizes DL3.0 and DL5.0 are respectively designed for 3 and 5kW power dissipation. They are basically water cooled. The Graphic User Interface (GUI) gives the user the possibility to setup tests for any possible type of cell. Doing so the main SW determines the cut-off voltage to avoid possible over-discharge that depends on cell typology (Pb, NiCd, Litium, LiFePo4, LiPo ecc). All functions are supported by an embedded processor that communicates with an external PC through an USB port. The Graphics User Interface runs under Windows 32/64 OS and is connected constantly with the ATEC Robotics data center that takes under control the status of the device and for maintenance forecasting. The main SW installed into the PC prints the test certificate autonomously as shown in the pictures. An application that runs under Android OS allows to check the test status remotely.

ATEC Robotics Dummy Load Rel.1.0

	V	A	Ah	Wh
Test	26.25	10.00	0006.4	0173.8
Targa	24.0	-	26.0	0624.0
POT [W]	262.5	T [°C]	Limite [°C]	Ventole [%]
		39.7	60.0	69

**Dati Batteria**  
 Pb  LiPo  Ni-Mh  
 Litio  LiFePo4  Ni-Cd  
 24 V 26 A  Personalizza  
 00.0 V 00.0 Ah   
 Celle 0 S 1 P   
 Cavo 0.22 L [m] 5.261 S [mmq]

**Impostazioni Test**  
 Verifica BMS  
 Test Dinamico  
 Mostra grafici  
 Incremento cut-off  
 +dV [V]  
 I max [A] 41.7  
 I test [A] 10.0

**Risultati Test**

Limite Cutoff [V]	21.0	N° celle	7
Cap misurata [Ah]	6.4	R batteria [Ω]	≤ 0.105
En misurata [Wh]	173.8	R cella S [Ω]	≤ 0.015
Capacità Effettiva %	25	R cella P [Ω]	≤ 0.015
Durata residua [h:m]	01:57	Durata effettiva [h:m:s]	00:38:26

C:\TESTER-DATA\Rappori\Rapp

## Operation modes

The loads provide the typical operation modes Constant Current or Dynamic Current (CC), Constant Power (CP) and Constant Voltage (CV). The mode is selected through the User Interface (GUI). Other settings are additionally effective to protect the test equipment. For example, constant current test can have a maximum power setting while constant voltage, power or resistance can have a maximum current setting. The limits are automatically determined by the SW and proposed for approval.

## Static and dynamic operations

During static operations one value can be set using the user interface. During dynamic operations the user can define a large set of values in order to achieve steps to all four physical units U, I, P or R.

## Battery test mode

During battery test mode, a battery can be discharged with a constant current or with different values until the battery voltage reaches a threshold that depends on the typology of the cells. Then the test automatically stops and a certificate with graphs is produced. The discharge time and dissipated charge (Ah) are measured, displayed and printed.

### Power derating

Units of the series are equipped with thermal derating in order to limit power and avoid overheating when operating in the maximum power range. All models have a thermal derating. For the base model that is cooled through an air controlled flow, the lower the ambient temperature and the better is the cooling, namely the higher the power that the load can dissipate. To circumvent this situation, models with an optional water cooling can be delivered for permanent performance at maximum value and in extreme conditions, namely DL-3.0 and DL-5.0 that can respectively dissipate up to 3 and 5kW.

### Recharge Function

The recharge function is provided in the following model ATR-DL-PRJ-060-R (R=Recharge). The function allow to automatically verify the efficiency of the charge/discharge phase, parameter that is included in the test report of this model.

### Display

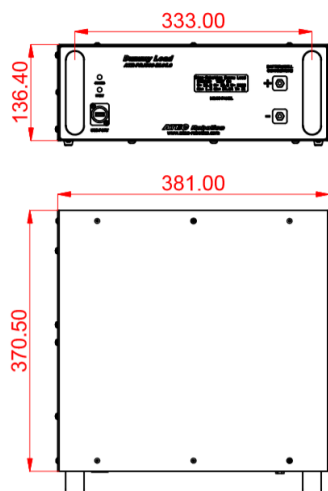
All important information are directly represented on the GUI. Thus, information about the actual output values or set values for U, I, P,R the actual regulation mode (CV,CC,CP,CR), error messages and settings in the setup menu are clearly available. Similarly, settings of the optionally available digital interfaces will be shown.

### Remote Status Check

An Android App is provided to remotely verify the status of the current test.

### Water cooling for DL-3.0 and DL-5.0

The water cooling replaces the standard fan cooling and has some advantages namely no hot air exhaust on the device, significantly lower noise, 100% permanent power.



Rapporto n° 89	
Tipologia Batteria Cella Battery Cell Type	Pb
Configurazione batteria Battery Specification	6S1P
Tensione nominale Nominal Voltage	[V] 12.0
Capacità nominale Nominal Capacity	[Ah] 40.0
Corrente di test Test Current	[A] 5.0
Livello di cut-off in scarica Voltage Cut-off discharge	[V] 10.5
Capacità rilevata Capacity	[Ah] 16.5
Energia rilevata Energy	[Wh] 191.8
Resistenza totale (*) Internal Resistance	[Ohm] 0.236
Resistenza media cella S (*) Internal Cell Series Resistance	[Ohm] 0.039
Resistenza media cella P (*) Internal Cell Parallel Resistance	[Ohm] 0.039
Verifica BMS BMS Validation Test	-
Durata del test Test duration	[h:m:s] 03:18:27

Note: Nessuna.

Nome Operatore: Pennampede Giuseppe      Firma .....

Allegato A: Grafici Test

(\*) Si considera la resistenza dei cavi (Lunghezza = 0.22 m, Area sezione = 1.261 mm²) che connettono la batteria al DUMY LOAD. La misura della resistenza viene effettuata dopo 30 s dall'inizio del test.

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### System Bus

The System is provided with a remote sensing input for ultra precise evaluation of the input voltage even if the system is provided with a computational method of the voltage drop due to the connection cables.

Order Code	
DL1.0-PRJ060-X	Max Continuous Current 50A
DL2.0-PRJ060-X cooled	Max Continuous Current 100A
DL3.0-PRJ060-X cooled	Max Continuous Current 200A
DL4.0-PRJ060-X cooled	Max Continuous Current 300A
X = 0 only discharge X = 1 with charge function	