

# External Charge/Load Attachment

Arbin charge/discharge testing system can be purchased with an optional external charge/load adapter hardware attached to the main I/V channels. The external charge/load adapting option is designed for several applications in which an external, often proprietary, power source (charger) or load interface is required. Three typical applications of this external attachment are the following:

- performance testing of an external charger on a specified battery ("external charge")
- determination of the current, voltage and power profiles for a power tool (simulation test of a power tool battery)
- battery discharge profiling of the current, voltage and power on a real load ("external load")

The option of external charge/load is programmable and selected based on the relay switch as seen in the block diagram of Figure 2. Once selected, the relay is switched to engage customer's external charger/load to charge/discharge the battery. During the time when the external charge/load option is selected, Arbin testing system does not control the current or the voltage, but acts as a data acquisition system to record the current, voltage, capacity, energy and data from auxiliary inputs; such as temperature, pressure and reference voltage sensors. While the option of external charge/load is not selected, Arbin tester will function as a standard battery charge/discharge testing system.

Figure 1. An 8-channel system of max 15V/10A with built-in external charger connections. Each of the 6-pin connector channel can be connected as shown below.

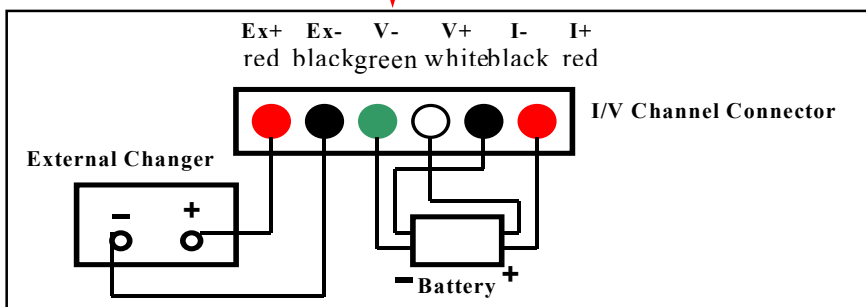
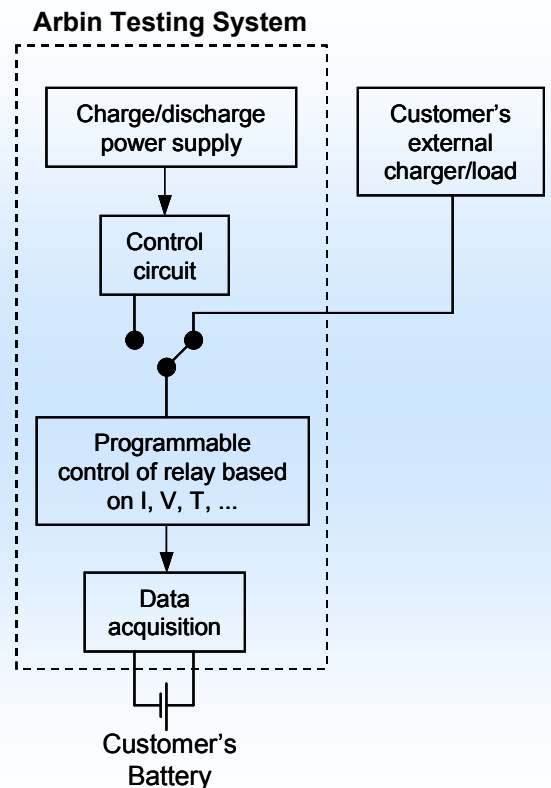


Figure 2. Schematic layout of Arbin testing system connected to an external charger/load.



## External Charge/Load Operation with MITS Pro Software

Arbin testing software, MITS Pro, allows the user to direct the test protocol to the external charger/load step according to predefined conditions. External charging/discharging steps are programmed in the test schedule. An example of this schedule is shown in the screen below.

	Step Label	Number Of Limits	Control Type	Control Value	Extra Control Value 1	Extra Control Value 2	Current Range
1	Step_A	1	Rest				
	Log Limit	Step Limit	Goto Step	Type1	Sign1	Value1	Type2
1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Next Step	PV_CHAN_Step_Tim	>=	00:00:10	
2	Step_B	1	External Charge				
	Log Limit	Step Limit	Goto Step	Type1	Sign1	Value1	Type2
1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Next Step	PV_CHAN_Voltage	>=	4.1	
3	Step_C	1	Current(A)	-0.5			High
	Log Limit	Step Limit	Goto Step	Type1	Sign1	Value1	Type2
1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	End Test	PV_CHAN_Voltage	<=	2.7	

Figure 3. A schedule to conduct external charging on Li-battery up to 4.1V, then discharge by Arbin control circuitry at  $-0.5A$  down to 2.7V.

When the external charge/load attachment is connected, the software can record both the current and voltage profile and use these data later to perform simulation testing on the battery life using Arbin testing system. Both voltage and current profile can be simulated.

	Step Label	Number Of Limits	Control Type	Control Value	Extra Control Value 1	Extra Control Value 2	Current Range
1	Step_A	1	Current Simulation				DEFAULT
	Log Limit	Step Limit	Goto Step	Assign Simulation File...		Value1	Type2
1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Next Step	PV_Cf	Edit Simulation File	0:00:00	

Figure 4. Performing current simulation using MITS Pro. Simulation data can be obtained from recorded external charge/load I/V testing profile.

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