

Technical Note

TDL JOLTER PV Motor Starter



Thermo Dynamics Ltd.
44 Borden Avenue
Dartmouth, Nova Scotia
Canada, B3B-1C8
Tel: (902) 468-1001 Fax: (902) 468-1002
Email: solarinfo@thermo-dynamics.com
www.thermo-dynamics.com

1.0 General

This Technical Note applies to the TDL Solar Pump™ and to TDL Solar Boilers™, that are equipped with the Solar Pump™.

2.0 Linear Current Booster (LCB) Operation

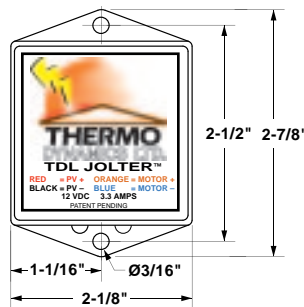
The Solar Pump™ is powered by a photovoltaic (PV) module. An electronic current booster, supplied as part of the Solar Pump™, is between the PV module and the motor of the Solar Pump™. The current booster maintains the voltage of the PV module at 15 VDC. At this voltage the PV module delivers maximum electrical power to the motor. If motor voltage rises above 15 VDC, then the current booster allows the PV voltage to rise with the motor voltage. Otherwise, the PV voltage should be 15 VDC, except in the early hours of the morning as the sun rises above the horizon, and in the late hours of the day as the sun sets. At sunrise, PV voltage will climb from 0 to 15 VDC. At sunset, PV voltage will decrease from 15 to 0 VDC.

3.0 TDL Jolter™ Operation

TDL Solar Boilers™ shipped in May 2001, and thereafter, may be equipped with a new current booster, the TDL Jolter™. The Jolter™ is an advanced current booster. At low intensities of sunlight, when the PV module does not produce sufficient power to drive the Solar Pump™, the Jolter™ stores the electrical energy from the PV module, and then releases it in a burst to cause rotation of the pump. This feature serves to start the pump earlier in the day, when it otherwise might remain at rest due to stickiness after resting over night.



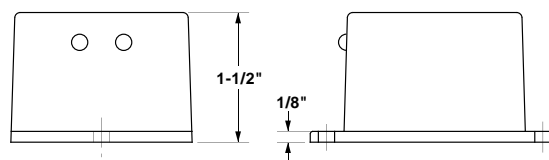
U.S. PATENT PENDING



TDL Jolter Specifications

Red wire	PV +	[positive]	[spade connector]
Black wire	PV -	[negative]	[spade connector]*
Orange wire	Motor +	[positive]	[female connector]
Blue wire	Motor -	[negative]	[male connector]

Voltage (nominal):	12.0 VDC
Voltage (maximum):	21.0 VDC
Current (maximum):	3.3 amperes



RED LED = TDL Jolter™ is storing electrical current from PV
GREEN LED = TDL Jolter™ is delivering electrical current to the motor

*(some older LCB's have a white wire)

3.1 TDL Jolter™ LED's

The Jolter™ is equipped with two light emitting diodes (LED's). While the red LED is illuminated, the Jolter™ is storing electrical current from the PV module. When the green light is illuminated, the Jolter™ is delivering current from the PV module to the motor. During low levels of solar radiation, the red and green LEDs will be alternately illuminated as the TDL Jolter™ attempts to start the motor. If the red LED stays illuminated, there is insufficient solar power to start the motor.

3.2 TDL Jolter™ Operation at Low Sunlight

With very low sunlight, such as early in the morning, or during heavy overcast or fog, the green LED may be illuminated with the motor in the stalled position. This erroneous signal occurs because the PV module cannot deliver sufficient current to the Jolter™ to enable the circuitry to function correctly. In these very low light conditions, there is insufficient energy to perform any useful function. This incorrect signal at very low sunlight does not indicate that the Jolter™ will malfunction when the level of sunlight increases to a useful value.