

# TotalControl TCS-15

## TotalControl TCS-20

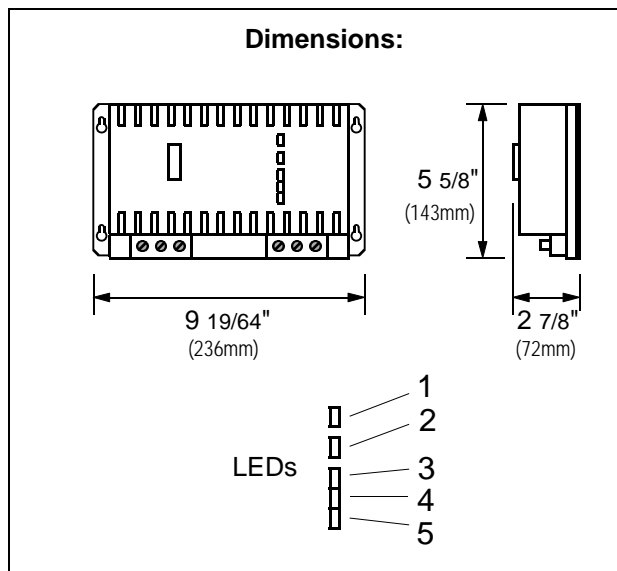
## TotalControl TCS-30

### PWM Solar Panel/Load Controller

The TotalControl is designed to work simultaneously as a charge/load controller in 12V solar energy systems. It assures maximum useful life to the battery, providing ideal charge/discharge conditions. It controls charging/flotation and also disconnects the load when the battery voltage drops to a minimum safety level, avoiding total discharge that would shorten battery life .

#### Features:

- . Designed to **12 V** ventilated lead-acid, lead-calcium, carefree, or absorbed electrolyte (MAT) batteries.
- . Controls individually or simultaneously charge and load (solar panels up to 30 Amps, load up to 30 Amps)
- . Controls the load, disconnecting it when battery voltage drops to 11,4V+-2%, reconnecting it when battery voltage reaches 12,7V+-2%. This system is known by LVD (Low Voltage Disconnection)
- . Uses automotive-type fuse, protecting against short-circuit and reverse connection to the battery
- . The front panel has 5 LEDs, as follows:
  - **LED 1:** Indicates reverse polarity connection to the panel or to the battery (in this case, the fuse will blow).
  - **LED 2: Battery charging condition:**
    - . **Off**, indicates that the battery is not being charged, (sunshine absence, bad contact, defective battery, or just because total charge has been achieved (see LEDs 2 to 4);
    - . **On**, battery being charged;
    - . **Blinking**, beginning of flotation regimen.  
As the battery approaches total charge, the interval between blinks becomes larger, and could extend to minutes.  
The indication given by this LED is equivalent to the one given by an ammeter, that is, the LED is lit when the battery is effectively receiving charge. The long interval between blinks at the end of the charging process means that the battery is totally charged, without the need for more current. In this case, LEDs 3 to 5 will be lit.
  - **LEDs 3 to 5: Indication of battery voltage:**
    - . All LEDs lit indicate maximum voltage (battery fully charged)
    - . Two LEDs lit indicate normal voltage condition (normal utilization range)
    - . Just one LED lit: low voltage, end of autonomy period
    - . All LEDs off: indicate deactivated output, either by low voltage disconnection (LVD) or by a burnt fuse, disconnected battery, etc.





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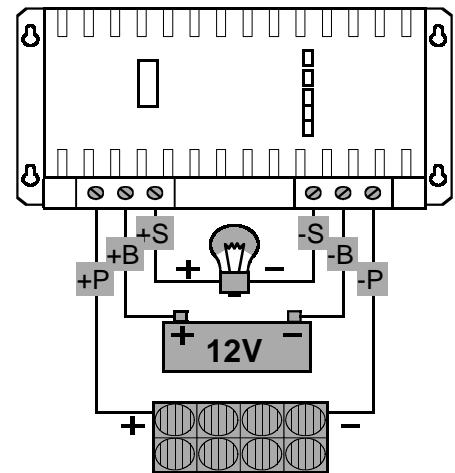
### PWM Solar Panel/Load Controller

#### Installation:

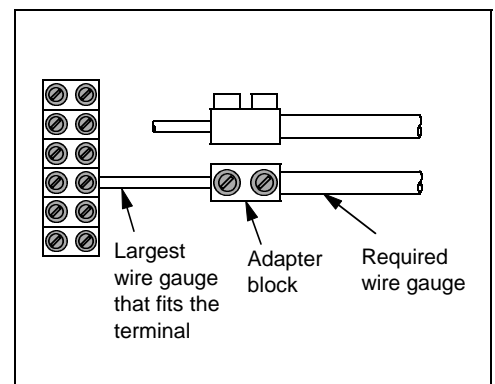
1. Cover the solar panel during the installation procedure, to avoid electricity being generated.
2. Connect the solar panel to the TotalControl TCS.
3. Install the TotalControl TCS close to the battery (maximum distance = 6ft, minimum wire size = 6AWG):  
terminals B+ e B-
4. Connections to the panel (P+ e P-) and load (S+ e S-) must have a wiring sized as shown in the table below.
5. Do not mismatch polarity: Use red wires for positive and black wire for negative.
6. Never interconnect TotalControl terminals, be them the positive or the negative ones.
7. The unit must be protected from rain and direct sunshine, in a spot with natural ventilation (do not install the unit inside closed compartments).
8. Tighten very well the connectors, avoiding bad contact, for this cause incorrect working and damage to the connectors.
9. Never use a fuse rated above the indicated value for each model, as follows:  
30A for the TCS-30  
20A for the TCS-20  
15A for the TCS-15

#### Connections:

+P: Solar Panel positive  
-P: Solar Panel negative  
+B: Battery positive  
-B: Battery negative  
+S: Load positive  
-S: Load negative



		Wire Gauge to be Used (AWG)								
		12	10	8	6	4	3	2	0	00
Current	10 A	10	15	25	35	60	80	120	150	230
	12 A	8	12	19	30	48	75	97	120	193
	14 A	6.5	10	17	27	40	50	83	103	167
	16 A	5.5	8	15	23	37	47	73	90	143
	18 A	5	7.5	13	20	33	40	63	60	126
	20 A	4.5	6.5	12	18	28	37	57	73	117
	25 A	4	5.5	9	14	23	29	46	58	92
	30 A	3.5	4.5	7	12	19	24	38	48	77
		Distance (ft)								



Note: The maximum wire size that the connectors bear is of 6AWG. If the wire gauge must be larger, have the installation carried out by specialized personnel, using adapter connectors, as shown above.