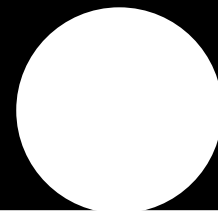


# PPC/50 - Photovoltaic Charge Control

## SPECIALTY CONCEPTS, INC.

### PHOTOVOLTAIC CHARGE CONTROLLER



The PHOTOVOLTAIC POWER CONTROL (PPC/50) is a versatile, industrial quality controller for the efficient use of photovoltaic energy and the protection of expensive batteries. It is available for 12, 24, 36 and 48 volt negative ground systems. Models are available for 50 amps of charge current.

The PPC/50 consists of a series-relay battery charge regulator with low-voltage load disconnect, battery, array and load circuit breakers, system status lights and digital metering. The lights indicate "CHARGING" and "LOW-VOLTAGE LOAD DISCONNECT" conditions and the digital meter monitors battery voltage, charging and load current. A provision is made for monitoring an external shunt. The PPC/50 is housed in a sealed indoor enclosure and has a terminal block for up to 6 gauge wire.

## FEATURES

### CHARGE REGULATION

- 50 amp charge current, 12, 24, 36 or 48 volt
- Two-step, series charging, 12,24 v
- Single step, series charging, 36,48 v
- Adjustable charging set-points
- Plug-in temperature compensation

### LOW-VOLTAGE LOAD DISCONNECT (LVD)

- 30 amp LVD, 12 volt
- 20 amp LVD, 24 volt
- 15 amp LVD, 36 and 48 volt
- Adjustable disconnect set-points
- Manual override switch

### DESIGN FEATURES

- Maximum array usage
- Over-current protection and manual disconnects - battery, array and load circuit breakers
- Reverse polarity protection
- Reverse leakage protection
- Lightning protection
- Input noise suppression
- Remote battery voltage sense

### MONITORING

- Digital volt / amp meter
- External shunt metering
- Charging light
- Load disconnected light

### MOUNTING

- Indoor wall mount enclosure
- Outdoor enclosure (optional)

## OPERATION (12,24 volt units)

Note: The operation of the 36 or 48 volt unit is identical with the exception that no float circuit is included.

### CHARGE REGULATION -

The PPC/50 features two charging steps to effectively charge the batteries and protect them from over-charge damage. The PPC/50 monitors the battery and array voltage, using a relay to control the charging.

**STEP 1-FULL CHARGE:** At sunrise, the rising array voltage will energize the charging relay and initiate a full charge mode, as indicated by the "CHARGE MODE" light. All available current from the array will pass through to the batteries and raise the battery voltage until the battery reaches the full charge termination threshold.

**STEP 2-FLOAT CHARGE:** When the battery reaches the full charge termination threshold, the full-charge mode ends and the "CHARGE MODE" light goes out. The PPC/50 resumes charging at a reduced charging rate. As the battery approaches the float voltage, the current will taper off, eventually reaching the battery's maintenance current.

### LOW-VOLTAGE DISCONNECT -

The low-voltage disconnect (LVD) of the PPC/50 prevents damage from deep-discharge of the batteries by automatically disconnecting the loads. The disconnect threshold is load current compensated, and has a time delay to prevent false disconnects. When disconnect occurs, the load relay is energized and opens, and the "LOAD DISCONNECT" light will indicate that the loads have been disconnected. Normal battery charging will continue. At the reconnect threshold the loads will automatically be reconnected and the light will go off. The LVD function has a reset/disable switch and user adjustable set-points.

### DESIGN FEATURES -

The PPC/50 has many superior design features that contribute to the controller's efficiency and reliability. This controller provides maximum utilization of the array during hours of charging by reconnecting the array for direct charging as soon as the battery drops below a full charge set-point.



PPC/50 - (with optional 4X outdoor enclosure)

Over-current protection is provided in the form of circuit breakers. A timing circuit will disconnect the array at night, to prevent reverse current leakage. The control circuit is protected from reverse polarity connection on all inputs, and has MOV lightning protection. Input noise suppression filters out most of the spikes and interference to reduce false switching. Remote battery sense terminals allow accurate monitoring of battery voltage.

## OPTIONAL ENCLOSURES

- 3R - Outdoor, moderate protection
- 4X - Outdoor, maximum protection

# Photovoltaic Power Control

PARAMETERS	UNITS	NOMINAL VOLTAGES			
		12 v	24 v	36 v	48 v
Charge Current, Continuous	(Amps)	50	50	50	50
Charge Current, Max (60 seconds)	(Amps)	65	65	65	65
Load Current, Continuous (1)	(Amps)	30	20	15	15
Load Current, Max (60 seconds) (2)	(Amps)	39	26	20	20
Array Voltage, Max Voc	(Volts)	22	44	66	88
Operating Voltage @ Battery, Minimum	(Volts)	8.5	17.0	25.5	34.0
Quiescent Current (3)	(Milliamps)	20	20	20	20
Current Consumption, Charging (4)	(Milliamps)	170	170	110	110
Current Consumption, Load Disconnected (5)	(Milliamps)	150	110	100	100
Voltage Drop, Typ. (Array to Battery)	(Volts @ Max rating)	.15	.15	.15	.15
Voltage Drop, Typ. (Battery to Load)	(Volts @ Max rating)	.40	.40	.40	.40
Full Charge Termination (6)	(Volts)	14.8 ± .2	29.6 ± .4	44.4 ± .6	59.2 ± .8
Full Charge Resumption	(Volts)	12.8 ± .2	25.6 ± .4	38.4 ± .6	51.2 ± .8
Load Disconnect (7)	(Volts)	11.5 ± .2	23.0 ± .4	34.5 ± .6	46.0 ± .8
Load Disconnect Adjustment Range	(Volts)	11.0 to 12.0	22.0 to 24.0	33.0 to 36.0	44.0 to 48.0
Load Reconnect	(Volts)	13.0 ± .3	26.0 ± .6	39.0 ± .9	52.0 ± 1.2
Float Voltage	(Volts)	14.1 ± .2	28.2 ± .4	NA	NA
Float Current, Max	(Amps)	3	1	NA	NA
Meter Accuracy, Voltage		1 %	1 %	1 %	1 %
Meter Accuracy, Current		1 %	1 %	1 %	1 %
Temp. Compensation coef.(from 25°C)	(Volts/°C)	-.03	-.06	-.09	-.12
Operating Temp. Range	(°C)	0 to 50	0 to 50	0 to 50	0 to 50
Storage Temp. Range	(°C)	-20 to 70	-20 to 70	-20 to 70	-20 to 70

**Notes:**

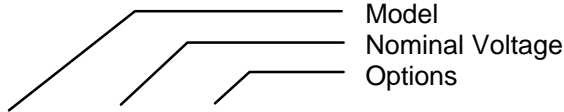
- (1) Non-inductive.
- (2) Carry only, Non-switching
- (3) Both relays unenergized, red L.E.D.s off, typical value.
- (4) Charge relay energized, red L.E.D. on, typical value.
- (5) LVD relay energized, red L.E.D. on, typical value.
- (6) Set-point adjustable. Refer to table.
- (7) Decreases by 10 mv for every amp of load current

**FULL CHARGE TERMINATION SET-POINTS**

Control Voltage	SWITCH POSITIONS			
	A	B	C	D
12	15.3	14.8	14.3	13.8
24	30.6	29.6	28.6	27.6
36	45.9	44.4	42.9	41.4
48	61.2	59.2	57.2	55.2

**PART NUMBERING KEY**

EXAMPLE:

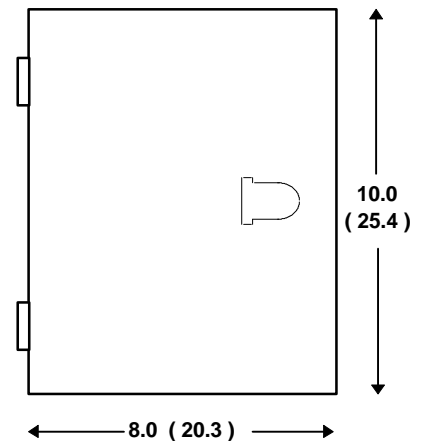


**PPC/50 - 12 - 4X**

MODEL	NOMINAL VOLTAGE	OPTIONS
PPC/50	12	3R - Outdoor enclosure - moderate protection
	24	
	36	4X - Outdoor enclosure - maximum protection
	48	

**DIMENSIONS**  
In Inches (cm)

**STANDARD ENCLOSURE (NEMA 1)**



Depth: 4.0 Inch ( 10.2 cm)  
Shipping weight: 10 lbs. (4.5 Kgs.)

Specifications and product availability subject to change without notice.

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