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TECHNICAL DATA SHEET FOR
INVA TUBULAR BATTERY

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Power Protectors Canada Ltd. is the largest storage battery experts in Canada, USA, Europe, Australia, Mena & India and has pioneered battery technology in Canada for 3 glorious years.

INVA TUBULAR BATTERY

Power Protector InvaTublar 400, 500 & 750 are the next generation tubular batteries designed specially to withstand long and frequent powercuts. The Ultimate Inverter & Solar Batteries.

FEATURES

- Ironclad® Tubular Technology.
- Electrolyte level indicator.
- High Acid Volume per ampere hour.
- Deep cycle design.
- Tower type design.
- Common side vending.

Application

The next generation tubular battery designed specially to withstand long and frequent powercuts. It is the ultimate Inverter & Solar battery. In case of powercuts it acts as a backup special source for power supply.

Invatubular Batteries are 12V monoblock used for Inverters & Solar Applications.

ADVANTAGES

- Very Long Life.
- User Friendly.
- Acid Volume per Ampere Hour is 30% more than that of ordinary tubular batteries. It acts as a coolant & also ensures very low maintenance.
- Ensures consistent quality.
- Suited for use in areas of frequent power cuts (800 to 1000 cycles of deep discharge as against 300/400 cycles of other batteries)
- Can withstand overcharge better
- Occupies less floor space, totally new look.
- Less pollution, environment friendly

TECHNICAL SPECIFICATION

Model	Capacity at 27°C when discharged at C20 upto 1.75 vpc (1.280 sp. gr) (Ah)	Dimensions (+/- 3mm)			Weight (Kg.) +/- 5%		Vol. of Electrolyte	Initial Charge Minimum Ah Input (Ah)	Initial Charge at constant Current (A)		Constant Potential Limiting Current (Amps)	Trickle Charge (Current in Ma)	
		Length	Width	Height*	Dry	Filled	Liters		Start (up to 2.36vpc)	Finish (up to 2.75vpc)		Min	Max
PP115-12	115	500	187	416	29.00	53.80	20.28	450	12.0	6.0	25	100	400
PP150-12	150	500	187	416	33.77	59.81	20.58	540	14.4	7.2	30	120	480
PP200-12	200	500	187	416	41.44	66.00	19.80	810	21.6	10.8	45	180	720
PP230-12	230	500	187	416	51.20	75.42	21	900	24	12	50	200	800

***The height mentioned is upto terminal top.**

INITIAL CHARGING INSTRUCTIONS

1. Filling in Specific Gravity
2. Rest Period
3. Minimum Ah input
4. In order to reduce the charging time, the following routine may be adopted. For 11.400, the initial charging current may be 12A upto 2.36 vpc followed by 6A upto 2.75 vpc. For 11500, the initial charging current may be 14.4A upto 2.36 vpc followed by 7.2A upto 2.75 vpc. For 11550, the initial charging current may be 16.2A upto 2.36 vpc followed by 8.1A upto 2.75 vpc. For 11750, the initial charging current may be 21.6A upto 2.36 vpc followed by 10.8A upto 2.75 vpc.

However in both cases, minimum Ah input to be given. Under no circumstances, battery temperature should exceed 50°C. In case the temperature exceeds 50°C, adequate rest to be given till the electrolyte temperature comes to ambient temperature and charging to be continued.

5. Conditions of fully charged
   a) 3 consecutive hourly readings of specific gravity and voltage become constant
   b) Top of charge voltage will be around 16.2V - 16.5V
   c) All cells should gas freely
   d) Minimum Ah has been given
6. Specific Gravity at fully charged condition — 1.250 +1.0.005 at 27°C

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NORMAL RECHARGING INSTRUCTIONS

Recharging through Inverter at constant potential mode of 14.4V with limited current as specified. After battery potential reaches 14.4V, the battery should continue in trickle charge mode at constant potential of 13.5V.

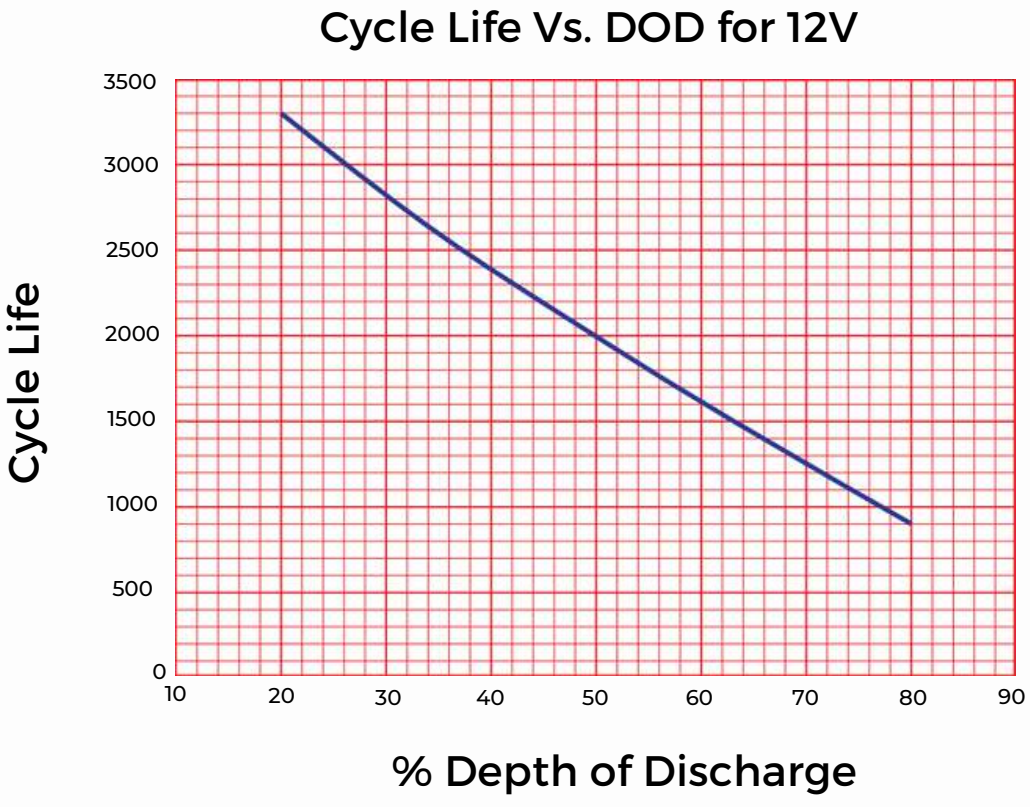
BATTERY SELECTION CHART

Electrical Load	System Voltage	Reco. Inverter Rating	Final Discharge Voltage(V/Cell)				
			5hrs	4hrs	3hrs	2hrs	1hr
4 Tubes + 4 Fans	12	650VA	2P PP200-12	2P PP150-12	2P PP115-12	PP200-12	PP115-12
4 Tubes + 5fans + 1 TV	12	850VA	3P PP200-12	2P PP200-12	2P PP200-12	2P PP150-12	PP200-12
8 Tubes + 9 fans + 1 TV	24	1450VA	2Sx2P PP200-12	2Sx2P PP200-12	2Sx2P IT500	2S PP200-12	2S PP150-12

Note:

If the limit current of one battery is'A'amp, for'N'no. batteries in parallel, the limit current for charging of inverter should be AxN amp. Otherwise there will be problem during charging in parallel connection. This point should be taken in consideration before putting batteries in parallel combination. S- Series connection; P- Parallel connection. 2S X 3P = A string containing 2 nos. batteries in series and 3 nos. such strings in parallel.

Statutory Notice: All batteries contain lead, which is harmful for humans and environment. As per statutory requirements, the used battery must be returned to the authorized dealer, manufacturer or at the designated collection centers.



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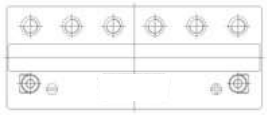
TECHNICAL DATA SHEET FOR PP115-12V, PP150-12V, PP200-12V



FEATURES

- Ironclad® Tubular Technology.
- Electrolyte level indicator.
- High Acid Volume per Ampere Hour.
- Deep Cycle Design.
- Common Side Venting.
- Deep Cycle Design.
- Resistance to Abuse.
- Tower Type Design.
- Conforms to IS 13369-1992

ADVANTAGES

- Very Long Life.
- User Friendly.
- Acid Volume per Ampere Hour is 30% more than that of ordinary tubular batteries. It acts as a coolant & also ensures very low maintenance.
- Ensures consistent quality.
- Suited for use in areas of frequent power cuts (800 to 1000 cycles of deep discharge as against 300/400 cycles of other batteries)
- Can withstand overcharge better
- Occupies less floor space, totally new look.
- Less pollution, environment friendly

SPECIFICATION CHART

Battery Type	Nominal Voltage (V)	Rated Capacity (Ah) at 27°C	Dimensions (IN mm.)			Weight (Kg.) +/- 5%		Volume of Electrolyte (1.220 Sp. Gr.) Liters per cell	Initial charge Minimum AH input (AH)	Initial Charge at constant Current (A)		Constant Potential Limiting Current (Amps)	Trickle Charge (Current in Ma)	
		C20 @ 1.75 Vpc	Overall Height +/-5	'L' +/-3	'W' +/-3	Dry	Filled			Start (up to 2.36vpc)	Finish (up to 2.75vpc)		Min	Max
PP150-12	12	150Ah	416	500	187	33.77	59.81	3.43	540	14.4	7.2	30	120	480
PP115-12	12	115Ah	416	500	187	29.00	53.80	3.38	450	12.0	6.0	25	100	400
PP200-12	12	200Ah	416	500	187	41.44	66.00	3.30	810	21.6	10.8	45	180	720

***The height mentioned is upto terminal top.**

INITIAL CHARGING INSTRUCTIONS

1. Filling in Specific Gravity
2. Rest Period
3. Minimum Ah input
4. In order to reduce the charging time, the following routine may be adopted. For 11.400, the initial charging current may be 12A upto 2.36 vpc followed by 6A upto 2.75 vpc. For 11500, the initial charging current may be 14.4A upto 2.36 vpc followed by 7.2A upto 2.75 vpc. For 11550, the initial charging current may be 16.2A upto 2.36 vpc followed by 8.1A upto 2.75 vpc. For 11750, the initial charging current may be 21.6A upto 2.36 vpc followed by 10.8A upto 2.75 vpc.

However in both cases, minimum Ah input to be given. Under no circumstances, battery temperature should exceed 50°C. In case the temperature exceeds 50°C, adequate rest to be given till the electrolyte temperature comes to ambient temperature and charging to be continued.

5. Conditions of fully charged
   a) 3 consecutive hourly readings of specific gravity and voltage become constant
   b) Top of charge voltage will be around 16.2V - 16.5V
   c) All cells should gas freely
   d) Minimum Ah has been given
6. Specific Gravity at fully charged condition — 1.250 +1.0.005 at 27°C

NORMAL RECHARGING INSTRUCTIONS

Recharging through Inverter at constant potential mode of 14.4V with limited current as specified. After battery potential reaches 14.4V, the battery should continue in trickle charge mode at constant potential of 13.5V.

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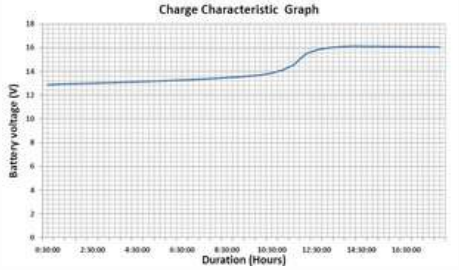
DISCHARGE DATA AMPS @27° C

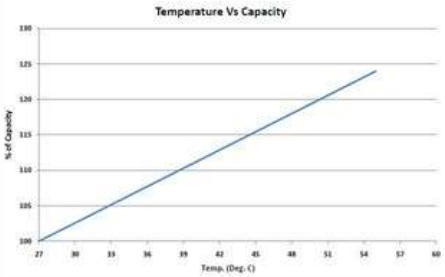
ECV	PP115-12V										
	1H	2H	3H	4H	5H	6H	7H	8H	9H	10H	20H
1.70	47.0	31.0	23.6	19.0	16.4	14.7	13.4	12.0	11.0	10.2	5.8
1.75	45.6	30.4	23.1	18.8	16.1	17.5	13.2	11.8	10.9	10.0	5.7
1.80	39.7	27.8	21.5	17.9	15.4	13.9	12.6	11.4	10.5	9.5	5.4
1.85	32.1	23.8	19.2	16.4	14.2	12.6	11.3	10.6	9.8	9.1	5.1

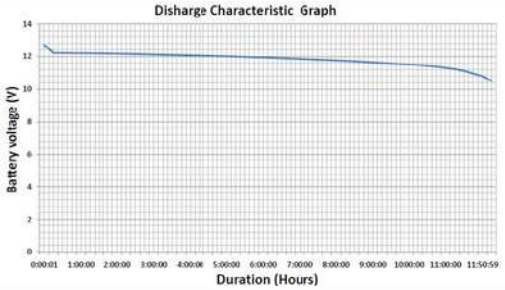
ECV	PP150-12V										
	1H	2H	3H	4H	5H	6H	7H	8H	9H	10H	20H
1.70	56.4	37.2	30.4	22.8	19.7	17.7	16.0	14.4	13.2	12.2	7.6
1.75	54.7	36.5	27.8	22.5	19.3	17.4	15.9	14.2	13.1	12.0	7.5
1.80	47.6	33.4	25.8	21.5	18.5	16.7	15.1	13.7	12.6	11.4	7.1
1.85	38.5	30.5	23.0	19.7	17.0	15.1	13.6	12.7	11.8	10.9	6.8

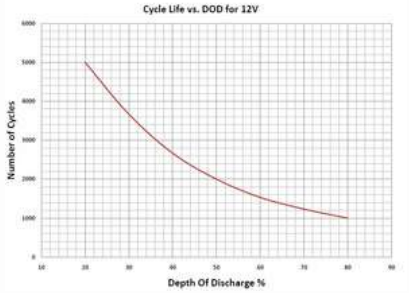
ECV	PP200-12V										
	1H	2H	3H	4H	5H	6H	7H	8H	9H	10H	20H
1.70	84.6	55.8	42.5	34.2	29.5	26.5	24.1	21.5	19.8	18.4	10.2
1.75	82.1	54.7	41.7	33.8	29.0	26.1	23.8	21.3	19.7	18.0	10.0
1.80	71.4	50.0	38.7	32.2	27.7	25.1	22.7	20.5	19.0	17.1	9.5
1.85	57.8	42.8	34.5	29.5	25.5	22.6	20.4	19.0	17.7	16.4	9.1

CHARECTERISTICS CURVES









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TECHNICAL DATA SHEET FOR PP230-12(V)

Description	Particulars
Type of battery	PP230 -12V FLOODED
Nominal Voltage	12V
Declared C20 Capacity at 27°C up to 1.75 ECV	230
Manufacturer's Name	Power Protectors
Standards to which battery is manufactured	12V Flooded ranges meets IS13369
Expected life of battery under normal operation & maintenance conditions	Design life in ideal float condition 10 years.
Loss in capacity in 28 days due to self discharge	<10% per month (As per IS13369)
Ampere hour efficiency	>90%
Watt hour efficiency	>75%
Initial Charging Instruction	
a) Filling in Specific Gravity	1.220±0.005 at 27°
b) Rest Period	12 hrs.
c) Minimum AH input	900AH
d) Initial current Input	14.4A upto 2.36V
e) Finishing current	7.2A upto 2.75V
f) Specific Gravity at fully charged condition	1.250±0.005 at 27°C
g) Normal charging instructions	Recharging through inverter at constant potential mode of 14.4V with limited current as specified. After battery potential reaches 14.4V, the battery should continue in trickle charge mode at constant potential of 13.5V.
Type of plate	
Positive Plates	Robust tubular plates consisting of a lead Antimony alloy, optimized for high corrosion resistance. **Alloy: Lead-Antimony (PbSb).**
Negative Plates	Grid plate construction consisting of a lead Antimony alloy, **Alloy: Lead-Antimony (PbSb).**
Type of Electrolyte	
Separators	Microporous and robust PE Envelop, for electrical separation of the positive and negative plates and optimized for low internal resistance.
Type of Vent and Filling Plugs	Microporous-Ceramic
Material of Container & Cover	Polypropylene co polymar
Sealing Method	Heat Sealed
Recommended storage life of Battery (Dry Self Life)	6 Months
Operating temp. range	-20°C to +55°C
OCV at 100% SOC	>12.5 Volt / Battery
Allowable charging current	0.15C Charging
No. of charge-discharge cycle battery can give during its entire life at 20% DOD at 50% DOD at 80% DOD	5000 Cycles 2000 Cycles 1000 Cycles

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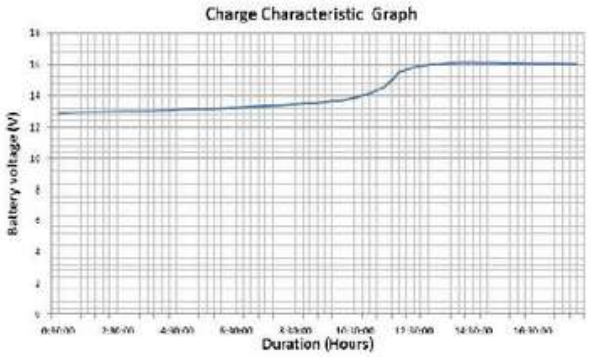
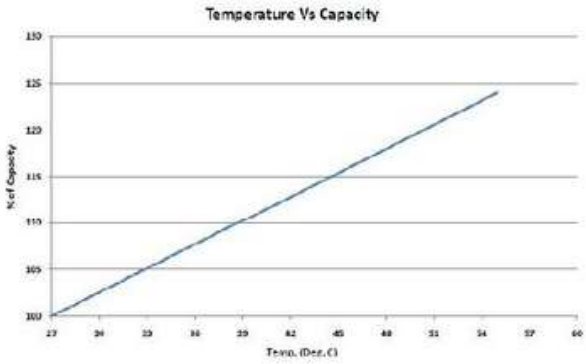
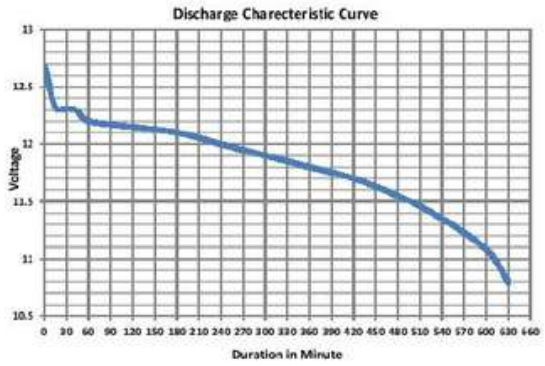
SPECIFICATION CHART

Battery Type	Normal Voltage (V)		Rated Capacity (AH) 27°C	Dimensions (in mm.)			Weight (Kg.) +/- 5%	Initial Charge minimum AH input (AH)	Constant Potential Limiting Current (Amps)	Trickle Charge (Current inMa)	
		C10 @ 1.75 Vpc	C20 @ 1.75 Vpc	Overall Height	'L'+/- 3	'W'+/- 3	Filled			Min	Max
PP230-12	12	200 AH	230 AH	416	500	187	77	900	50	200	800

CHARECTERISTICS CURVES







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