



ULTRAECO
 1 KVA - 50 KVA | 10 KVA - 150 KVA
 Single Phase | 3 Phase
TRANSFORMER BASED HYBRID PCU

Smarten Transformer-Based Hybrid PCUs are designed to deliver reliable and efficient power management for both residential and commercial needs. Available in single-phase and three-phase models, these PCUs combine the benefits of solar energy, battery backup, and grid power to ensure uninterrupted electricity. The transformer-based design enhances durability and provides superior protection against voltage fluctuations, making them ideal for Indian power conditions.

In single-phase models, they cater to homes and small businesses with stable and efficient energy usage, while the three-phase models are built to support larger loads, industries, and institutions with seamless power distribution. With advanced hybrid technology, Smarten Transformer-Based Hybrid PCUs maximize solar utilization, ensure faster battery charging, and provide long-lasting performance with minimal maintenance.

- ### SALIENT PRODUCT FEATURES
- MNRE-approved, MPPT-based system
 - Tested as per IEC 61683, IEC 61727, EN 50530 and IEC 62116 / IS 16169, IEC 60068 (1, 2, 14, 30)
 - Active front-end charger
 - Low input current distortion
 - Remote device monitoring available
 - Live device monitoring on RS-232
 - Over 5 MW of systems successfully supplied
 - > 93% system efficiency
 - Compatible with all types of batteries
 - Can be configured as an Off-Grid system
 - Peak demand management
 - Wi-Fi enabled data through mobile application
 - Insensitive to Input Grid phase sequence

- ### APPLICATIONS
- Rural Electrification
 - Remote Sites
 - Farmhouses, Schools, Offices
 - Rural Health Schemes
 - Telecom, Oil & Gas pipelines
 - Defence
 - Industrial applications
 - Hospitals, Cold stores
 - Mini grid

TECHNICAL SPECIFICATIONS - SINGLE PHASE


INVERTER RATING (KVA)	1KVA	2KVA	3KVA	5KVA	5KVA	7.5KVA	10KVA	15KVA	20KVA	25KVA	30KVA	40KVA	50KVA	
A. SOLAR CHARGE CONTROLLER (SCC)														
Buck Type MPPT														
1. Charger Type & Topology														
2. PV Total Nominal Capacity (KVA)	1KW	2KW	3KW	5KW	5KW	7.5KW	10KW	15KW	20KW	25KW	30KW	40KW	50KW	
3. No. of MPPT Channels	1	1	1	1	1	1	1	1	1	1	1	1	1	
4. Per Channel PV Capacity (w/Nominal Peak)	1KW/1.1KW	2KW/2.2KW	3KW/3.3KW	5KW/5.5KW	5KW/5.5KW	7.5KW/8.2KW	10KW/11KW	15KW/16.5KW	20KW/22KW	25KW/27.5KW	30KW/33KW	40KW/44KW	50KW/55KW	
5. Max. open Circuit PV Volts (Voc)	240	240	240	240	300	300	400	700	700	700	700	700	700	
6. MPPT Voltage Range (Volts)	70-240	70-240	70-240	70-240	96-300	96-300	140-400	240-700	240-700	240-700	240-700	240-700	240-700	
7. PV Minimum Voltage (Volts)	48	48	48	48	96	96	120	240	240	240	240	240	240	
8. Max. I/P Amps per channel (Amps)	15	30	45	75	35	55	60	45	60	75	80	105	132	
9. Max. Battery Amps during PV Charging (Amps)	20	40	60	100	50	73	78	60	78	80	97	129	161	
10. Max. SCC O/P (Amps)	20	40	60	100	50	73	78	60	78	80	97	129	161	
11. Battery type Supported	VRLA / LMLA/Li-Ion/Li-Ph (User Settable)													
12. Min. Battery AH (Suggested)	150	150	150	150	150	150	150	300	300	300	300	300	300	
13. Peak charging Efficiency (%)	>93													
B. SOLAR INVERTER														
1. No. of Phases/Connection Type	1-Phased/2 wire													
2. Nominal Battery Voltage (Volts)	48	48	48	48	96	96	120	240	240	240	240	240	240	
3. Battery Ripple	5% for VRLA & LMLA/ 1% for Li-Ion & Li-Ph Battery													
4. Nominal Output Voltage/Frequency (Volts/Hz)	230/50													
5. Nominal KVA Capacity (KVA)	1KVA	2KVA	3KVA	5KVA	5KVA	7.5KVA	10KVA	15KVA	20KVA	25KVA	30KVA	40KVA	50KVA	
6. Output Amps	3.47	6.96	10.43	17.39	17.39	26.09	34.78	52.17	69.57	86.96	104.3	139.1	173.9	
7. Voltage Regulation (in Standalone Mode)	± 2%													
8. Freq. Regulation (in Standalone mode)	± 0.5 Hz													
9. THD	< 3%													
10. Load Power Factor	0.8 lag to unity													
11. Efficiency (%) Peak/ 100% Load/25% Load	>89/ >88/ >86	>89/ >88/ >86	>89/ >88/ >86	>90/ >87/ >86	>90/ >87/ >86	>90/ >87/ >86	>89/ >89/ >86	>89/ >89/ >86	>89/ >89/ >86	>89/ >89/ >86	>91/ >89/ >86	>91/ >89/ >86	>91/ >89/ >86	
12. Over Loads :	100-110% - 60 sec													
13. Max Allowed Phase Imbalance (%)	110-125% - 30 sec													
14. Auto Bypass Feature	125-150% - 5 sec													
15. Parallel Operation with Grid/DG	N/A													
16. Power Export to Grid Facility Enable / Disable	Provided													
17. Anti Islanding from Grid	Provided													
18. Grid Voltage Range (Voltage Sync. Range)	160V-280V (Phase to Neutral)													
19. Grid Frequency Range (Freq. Sync. Range)	50 Hz ±5%													
20. Max Grid Import Power (KVA)	1KVA	2KVA	3KVA	5KVA	5KVA	7.5KVA	10KVA	15KVA	20KVA	25KVA	30KVA	40KVA	50KVA	
21. Max Battery Amps During Grid Charging (Amps)	13	27	40	68	34	51	54	40	54	68	72.5	96.6	120.8	
22. Peak charging Efficiency (%)	>87													
C. GRID CHARGER														
1. PV Side	Reverse Polarity , Surg Protection													
2. Battery Side	Reverse Polarity , Over/Under Voltage , Current Limit													
3. Grid Side	Over/Under Voltage , Over/Under Frequency , Anti-Islanding, Surg Protection													
4. Load Side	Overloads , Short circuit													
5. System Protection	Over Temperature, Trip, Breakers at all Inputs, Emergency stop													
D. USER INTERFACE														
1. DISPLAY INTERFACE	Graphical Display with mimic diagram													
2. DISPLAYED PARAMETERS	Voltage, Charging Current, Discharging Current, AH-in, AH-out, Cumulative AH-in, Cumulative AH-out, charging state, charging/Discharging.													
3. Grid Parameters	Voltage, Current, Power, Cumulative, Today Generation, Irradiance, Ambient Temperature.													
4. Load Parameters	Voltage, Current, Frequency, Export Power, Import Power, Export Cumulative Energy, Import Cumulative Energy, Power Factor													
5. Data Logging	90 Days PV Generation, Export Energy, Import Energy, Load Energy.													
6. System Level	Faults and warnings													
3. INDICATIONS/PROTECTION														
1. LED Indications:	Power ON, PV Available, PV Charging, Inverter ON, Grid Import Mode, Grid Export Mode, Fault, HYBRID /OFF GRID Mode													
2. User Keypad for Settings Change	Keypad for Settings Input													
3. Breakers at all inputs/Space Heater/Emergency stop Button	Provided													
4. Over shoot due to misbehaviour of BHMS	Provided													
5. Remote monitoring: Optional	Data monitoring through GPRS (Optional)													
Designed and Manufactured the product as for IEC														
Tested as per IEC 61683, IEC 61727, IEC 62116 / IS 16169 EN 50530 and IEC 60068 (1, 2, 14, 30).														
MISCELLANEOUS														
1. Degree of Protection	IP31													
2. Cooling Method	Temp. Controlled Force Cooling													
3. Operating Temperature	0-55°C ambient operation													
4. Humidity (Non-condensing)	Max. 95% Non-Condensing													
5. Altitude (above sea level)	1000m above sea level													
6. Housing	Sheet Metal, Floor Standing						Floor Standing, Front/Rear Door							
7. Colour Shade	RAL-7035/RAL-7016 (Other Colours also available on request)													
8. Cable Entry	Rear Bottom						Front Bottom							
9. Cable Termination Type	Bus Bar Type with ring type lugs													
10. Terminal Sizes (PV/Battery/Grid/Load)	TERMINAL SCREW TYPE 35-50MM/35-50MM/25MM/25MM													
11. Dimensions in mm (H X W X D)	360X280X530	360X280X560	360X280X665	360X280X665	478X375X675	528X375X775	528X375X775						715X650X750	715X1000X750
12. Approx. Weight (kg)	30	35	60	80	80	130	140	160	215	245	260	300	350	

Note: The specifications are subject to change due to continuous improvements. Higher rating systems are available on request.

TECHNICAL SPECIFICATIONS - 3 PHASE

INVERTER RATING (KVA)	10KVA	10KVA	12.5KVA	12.5KVA	15KVA	15KVA	20KVA	20KVA	25KVA	30KVA	40KVA	50KVA	50KVA	60KVA	80KVA	100KVA	100KVA	120KVA	150KVA
A. SOLAR CHARGE CONTROLLER (SCC)																			
1 ChargeType & Topology	Buck Type MPPT																		
2 PV Total Nominal Capacity (KW)	10KW	10KW	12.5KW	12.5KW	15KW	15KW	20KW	20KW	25KW	30KW	40KW	50KW	50KW	60KW	80KW	100KW	100KW	120KW	150KW
3 No. of MPPT Channels	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	3	3	3	3
4 Per Channel PV Capacity (w/Nominal Peak)	10KW/11KW	10KW/11KW	12.5KW/13.8KW	12.5KW/13.8KW	15KW/16.5KW	15KW/16.5KW	20KW/22KW	20KW/22KW	25KW/27.5KW	30KW/33KW	40KW/44KW	50KW/55KW	50KW/55KW	60KW/66KW	80KW/88KW	100KW/110KW	100KW/110KW	120KW/132KW	150KW/165KW
5 Max. open Circuit PV Volts (Voc)	320	620	320	620	320	620	320	660	660	660	660	660	900	900	900	660	900	900	900
6 MPPT Voltage Range (Volts)	175-320	350-550	175-320	350-550	175-320	350-550	175-320	240-660	240-660	240-660	240-660	240-660	360-900	360-900	360-900	240-660	360-900	360-900	360-900
7 PV Minimum Voltage (Volts)	140	280	140	280	140	280	140	240	240	240	240	240	360	360	360	240	360	360	360
8 Max. I/P Amps per channel (Amps)	60	30	75	35	90	45	120	60	75	90	70	70	83	110	100	140	92.5	80	100
9 Max. Battery Amps during PV Charging (Amps)	80	40	100	50	120	60	155	80	100	115	135	135	155	135	170	210	115	104	130
10 Max. SCC O/P (Amps)	80	40	100	50	120	60	155	80	100	115	135	135	155	135	170	210	115	104	130
11 Battery type Supported	VRLA / LMLA / Li-Ion / LFP (User Settable)																		
12 Min. Battery AH (Suggested)	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300
13 Peak charging Efficiency (%)	>93																		
B. SOLAR INVERTER																			
1 No. of Phases/Connection Type	3-Phased/4 wire																		
2 Nominal Battery Voltage (Volts)	120	240	120	240	120	240	120	240	240	240	240	240	360	360	360	240	360	360	360
3 Nominal Output Voltage/Frequency (Volts/Hz)	415/50																		
4 Nominal kW Capacity (KW) (Total Per Phase)*4	8.0/2.7	8.0/2.7	10.0/3.3	10.0/3.3	12.0/4.0	12.0/4.0	16.0/5.3	16.0/5.3	20.0/6.7	24.0/8.0	32.0/10.7	40.0/13.3	40.0/13.3	48.0/16	64.0/21.3	80.0/26.7	80.0/26.7	96.0/32.0	120.0/40.0
5 Output Amps per Phase (*4)	11.6	11.6	14.5	14.5	17.4	17.4	23.2	23.2	28.8	34.8	46.4	57.9	57.9	69.5	93	115.9	115.9	139.1	173.9
6 Voltage Regulation (in Standalone Mode)	±2%																		
7 Freq. Regulation (in Standalone mode)	±0.5%																		
8 THD	<3%																		
9 Load Power Factor	0.8 lag to unity																		
10 Efficiency (%) Peak/100% Load/25% Load	>90 / >91 / >80	>90 / >91 / >80	>90 / >91 / >80	>90 / >91 / >80	>90 / >91 / >80	>90 / >91 / >80	>90 / >91 / >80	>90 / >91 / >80	>90 / >91 / >80	>90 / >91 / >80	>90 / >91 / >80	>90 / >91 / >80	>90 / >91 / >80	>90 / >91 / >80	>90 / >91 / >80	>90 / >91 / >80	>90 / >91 / >80	>90 / >91 / >80	>90 / >91 / >80
11 Over Loads :	100-110% - 60 sec 110-120% - 30 sec 125-150% - 5 sec																		
12 Max Allowed Phase Imbalance (%)	N/A																		
13 Auto Bypass Feature	Provided																		
14 Parallel Operation with Grid/DG	Provided																		
15 Power Export to Grid Facility Enable / Disable	Enable / Disable (User Settable)																		
16 Anti Islanding from Grid	Provided																		
C. GRID CHARGER																			
1 Grid Voltage Range (Voltage Sync. Range)	160V-230V (Phase to Neutral)																		
2 Grid Frequency Range (Freq. Sync. Range)	50 Hz ±5%																		
3 Max Grid Import Power (KW)	8KW	8KW	10KW	10KW	12KW	12KW	16KW	16KW	20KW	24KW	32KW	40KW	40KW	48KW	64KW	80KW	80KW	96KW	120KW
4 Max Battery Amps During Grid Charging (Amps)	55	27	70	35	80	40	108	54	70	81	108	136	136	82	109	272	272	217	272
5 Peak charging Efficiency (%)	>87																		
NOTE: 1) Overload Protection at load end is applicable only in standalone mode. *4) valid at unity power factor																			
D. USER INTERFACE																			
1 PV Side	Reverse Polarity, Surge Protection																		
2 Battery Side	Reverse Polarity, Over/Under Voltage, Current Limit																		
3 Grid Side	Over/Under Voltage, Over/Under Frequency, Anti-Islanding, Surge Protection																		
4 Load Side	Overloads, Short circuit																		
5 System Protection	Over Temperature, Trip, Breakers at all Inputs, Emergency stop																		
E. DISPLAY INTERFACE																			
1 DISPLAY INTERFACE	Graphical Display with MIMIC Diagram																		
F. DISPLAYED PARAMETERS																			
1 Battery Parameters	Voltage, Charging Current, Discharging Current, AH-in, AH-out, Cumulative AH-in, Cumulative AH-out, charging state, charging/Discharging																		
2 PV Parameters	Voltage, Current, Power, Cumulative, Today Generation, Irradiance, Ambient Temperature																		
3 Grid Parameters	Phase Voltage, Current, Frequency, Export Power, Import Power, Export Cumulative Energy, Import Cumulative Energy, Power Factor																		
4 Load Parameters	Voltage, Current, Frequency, Power, Cumulative, Power Factor																		
5 Data Logging	90 Days PV Generation, Export Energy, Import Energy, Load Energy																		
6 System Level	Faults and warnings																		
G. INDICATIONS/AUXILIARY																			
1 LED Indicators:	Power ON, PV Available, PV Charging, Inverter ON, Grid Import Mode, Grid Export Mode, Fault, HYBRID / OFF GRID Mode																		
2 User Keypad for Settings Change	Keypad for Settings Input																		
3 Breakers at all inputs (Space Heater/Emergency stop Button)	Provided																		
4 DESIGNED AND MANUFACTURED THE PRODUCT AS PER IEC STANDARD	* Inverter efficiency test - as per IEC 61683 "photovoltaic systems-Power conditioners -Procedure for measuring efficiency." * Islanding test - as per IS 16169/ IEC 62116 "Test procedure of islanding prevention measures for utility-interconnected photovoltaic inverters" * Grid parallel operation test - as per IEC 61727 "Photovoltaic (PV) system-characteristics of the utility interface " * Performance and functioning of charge controller - IEC 62509 * MPPT test as per EN50530 * Environmental test as per IEC 60068-2 (1,2,14,30)																		
8 Remote monitoring, Optional*	PV voltage, PV Current, Battery Voltage & Current, Grid voltage & current, Inverter Voltage & Current, Grid & Inverter, Frequency, Grid Power, Import and Export, PV Instantaneous, Daily & Cumulative Generation, Battery and Inverter Status, Cumulative Grid Import and Export Energy.																		
MISCELLANEOUS																			
1 Degree of Protection	IP21																		
2 Cooling Method	Temp. Controlled Force Cooling																		
3 Operating Temperature	0-55°C ambient operation																		
4 Humidity (Non-condensing)	Max. 95% Non-Condensing																		
5 Altitude (above sea level)	1000m above sea level																		
6 Housing	Sheet Metal, Floor Standing, Front/Rear Door																		
7 Colour Shade	RAL-7015/RAL-7016 (Other Colours also available on request)																		
8 Cable Entry	Bottom																		
9 Cable Termination Type	Bus Bar Type with ring type lugs																		
10 Terminal Sizes (PV/Battery/Grid/Load)	35-50MM/35-50MM/25MM/25MM SCREW TYPE																		
11 Dimensions in mm (H X W X D)	715x450x750	715x450x750	715x450x750	715x450x750	715x450x750	1100x750x750	1100x750x750	1100x750x750	1100x750x750	1350x1000x750	1635x1000x750	1635x1000x750	1800x1000x750	2000x1000x750	2160x1100x800	2160x1100x800	2160x1100x800	2160x1100x800	2160x1100x800
12 Approx. Weight (kg)	245	248	256	260	262	350	384	313	336	436	550	550	650	750	900	900	900	900	950

Note: The specifications are subject to change due to continuous improvements. Higher rating systems are available on request.



HELIX MPPT SOLAR PCU

- Panel Support Upto 1200W* • MPPT Technology
- Compatible with 24V Solar Panels
- Compatible with Li-Ion, LA & SMF • Wall Mount

*Panel capacity varies by model

TECHNICAL SPECIFICATIONS					
Model Name	HELIX 1100	HELIX 1250	Model Name	HELIX 1100	HELIX 1250
Mains Input mode			Solar Charge Controller		
Mains AC low cut UPS mode	175VAC ± 10VAC		Solar Charge Controller type	MPPT Type	
Mains AC low cut recovery UPS mode	185VAC ± 10VAC		Max Panel wattage can be connected	600W	1200W
Mains AC high cut UPS mode	265VAC ± 10VAC		Max PV Voltage	60±3V	
Mains AC high cut recovery UPS mode	255VAC ± 10VAC		Max PV current	30A	55A
Mains AC low cut WUPS mode	90VAC ± 10VAC		Reverse PV protection	Yes provided, it will also display on LCD panel	
Mains AC low cut recovery WUPS mode	110VAC ± 10VAC		Reverse current flow to PV	Yes provided, it will also display on LCD panel	
Mains AC high cut WUPS mode	295VAC ± 10VAC		Sharing of current when PV and Grid Both are available	If PV power is not sufficient enough to charge the battery, system will start sharing battery charging from PV and grid.	
Mains AC high cut recovery WUPS mode	285VAC ± 10VAC		Mode Option	Solar >> Grid >> Battery (In this condition first priority is Solar then Grid and Battery) Solar >> Battery >> Grid (in this condition first priority is solar then Battery and Grid) Grid >> Solar >> Battery (In this condition first priority is Grid then Solar and Battery, Mains will not be disconnect in this condition)	
Input Frequency Range	48Hz to 52Hz		Mains Disconnect SOC (State of charge)**	65% - of battery capacity*** Default SOC is 30% 75% - of battery capacity*** Default SOC is 40% 85% - of battery capacity*** Default SOC is 30% 90% - of battery capacity*** Default SOC is 30%	
Voltage Output in Mains Mode	Same as input		Mains Disconnect SOC definition(State of charge)**	Mains will disconnect if battery will charge defined SOC level	
Frequency Output in Mains Mode	Same as input		Mains Connect SOC (State of charge)**	20% of battery capacity 30% of battery capacity 40% of battery capacity 50% of battery capacity	
Battery			Mains Connect SOC definition(State of charge)**	Mains will be connect when battery use defined SOC value of full capacity	
Battery Type	LA/TUB/LI-ION		Battery Capacity**	100Ah	
DC input voltage	12V		Display and Alarms		
Battery Quantity 12V 100Ah LI-ION	1		LCD Initial Display	Welcome, SMARTEN Website Address, System Capacity, Charging Till 90VAC and Deep Discharge Battery, System Setting, UPS / WUPS mode, I/P range 90-295VAC / 170-265VAC, Battery Type Selected LA / SMF / Tubular/LI-ION, Battery Capacity Selected 100-135Ah / 150-200Ah	
Float charging voltage	13.7V±0.2V		LCD Status Display	Mains ON, Input Voltage, Input Frequency, Battery Voltage, Battery Charging, Battery Charged, Charging Current, Backup Mode, UPS ON, UPS OFF, Battery Voltage, Load %, Output Voltage, Output Frequency, Mains Low Cut, Mains High Cut, Mains Not Available, Mains Frequency Cut*	
Boost charging voltage for LA Battery	14V±0.2V		Buzzer	Audible beep for Overload, Short Circuit, Back feed, Low Battery, Over Temperature, Mains Fuse blown / MCB Trip	
Boost charging voltage for Tubular and SMF Battery	14.5V±0.2V		Mains Charging Enable and Disable	Yes, Provided user can set mains charging Enable/Disable from front keypad	
Bulk Absorption Battery Voltage	14.8V±0.2V		Unit Saving in Display	LCD Display will show the total saving unit from Solar	
Boost charging voltage for LI-ION Battery	14.2V±0.2V		Safety		
Battery deep Discharge Recovery	Yes (Independent Charger to Recover Deep Discharge Battery)		HV Test Input to Earth	Leakage current <5mA when 1.5kV applied for 1 min	
Charging Current LI-ION Battery	20A ± 3A		HV Test Output to Earth	Leakage current <5mA when 1.5kV applied for 1 min	
Charging mode	5Amp	5A ± 1A	IR Test Input to Earth	>5mΩ between @ 500VDC	
	10Amp	10A ± 2A	IR Test Output to Earth	>5mΩ between @ 500VDC	
	Enable	20A ± 3A	Earth Leakage current in Mains mode	< 2.5mA	
	Disable		Earth Leakage current in Backup mode	< 2.5mA	
Backup Mode			Definition		
Output voltage	220VAC +5% -10% (until battery low alarm)		* This option is enabled only for the LA/SMF/TUB batteries		
Output frequency	50Hz ± 0.2 Hz		** This option is enabled only for the LI-Ion Batteries		
Output waveform	Pure Sine Wave ≤ 5% THD		*** Default values in different modes (Close approximation)		
Discharging current @ full load	42±2A	62±2A			
Low Battery Warning	10.8V±0.2V				
Low Battery Cut	10.4V±0.2V				
Change over time UPS mode	< 10msec				
Change over time WUPS mode	< 25msec				
Protections					
Overload in backup mode	Yes provided, system will indicate on display at 101% load				
Short Circuit in Backup Mode	System will shutdown after 3 - retries in case of output short circuit				
Short Circuit in Mains Mode	Mains FUSE Blown				
Back feed	System will shutdown in case of back feed and there is no retry				
Over temperature	Yes provided, if heat sink temperature goes above 100°C System will shut down				
Reverse Battery	DC fuse will blow				
Phase to Phase protection in mains mode	Yes provided by electronic				
Battery High Protection	Yes provided by Firmware				