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# INDUSTRIAL INVERTER

Powerline Sine Wave Inverters helps you to keep the o/p voltage with a tolerance of 1% & work with efficiency more than 90%

## **INDUSTRIAL INVERTER**

As a leading manufacturer of electronic industrial products and services, VITRONIC CONTROLS, is driven by a vision to achieve highest standard of quality and customer satisfaction. Manufacturing high quality UPS, Stabilizers, Digital Inverters and Sine Wave Inverters of various ranges, VITRONICS CONTROLS takes care of all your power source problems giving you an uninterrupted and constant power supply enabling you to function efficiently and smoothly.

#### **Salient Features**

- Cutting Edge Technology
- Environment Friendly
- High, Reliability
- Extremely Flexible
- Versatile Operations

## NAKSH

#### **APPLICATIONS**

- Offices
- Hospitals
- Manufacturing units
- Elevators

- Hotels
- Mails
- Educational Institutions
- Residentials etc

## **FEATURES & BENEFITS**

#### DSP BASED DESIGN

DSP design use less components have high efficiency, faster feedback and precise control action. This ensures high reliability of operations.

#### SOLID STATE DESIGN

Solid State Design using semiconductors devices. No electromechnical components adds to higher reliable performances.

#### PURE SINE WAVE

Pure Sine Wave ensures better life of devices, Suitable to modern age loads of linear type.

#### USER FRIENDLY DISPLAY

Combination of LCD-LED display makes it easy for user to understand and handle the device. It provides maximum necessary information to the user about the input supply voltage frequency, output voltage, frequency, battery charging discharging.

#### **REDUNDANCY OPTIONS**

Ensures high availability of power during breakdown conditions. Thusmaking Luminous Pro and Pro+ series suitable even in critical applications.

#### **REMOTE MONITORING**

In view of variety of monitoring needs. Luminious offers options of communication through web or management systems through SNMP communication protocol.

UNBALANCE LOAD HANDLING CAPACITY In today's variety of application it is a common scenario when load is unbalanced in such scenario the inverters support 100% unbalance load conditions thus making high availability of clean power to load.

#### POWER FACTOR CORRECTED IGBT BASED CHARGER

During battery charging high power factor ensures lower KVA demand therefore saving in electricity bills.

#### INPUT CURRENT HARMONICS

Latest technology IGBT bases charger design injects <3% current harmonics into the upstream distribution. This reduces harmful effect of heating due to current harmonics and keeps the input switch gears, cables and Transformer cool and avoid harms to other connected load as well.

#### WIDE INPUT VOLTAGE AND FREQUENCY RANGE

Ensures minimum use of batteries thus enhancing the battery life and hence delay in investment for battery replacement



## TECHNICAL SPECIFICATIONS - **MAKSH** 1

Parameters Topology	5KVA	7.5KVA	<b>10KVA</b> T based, with trans	15KVA	20KVA
DC Voltage	72VDC/180VDC	180VDC	180VDC	240VDC	360VDC
Output	12120/100120	100720	100720	210700	000120
PF			0.8		
Configuration	3P+N+E (3Phase, 4 Wires + Earth)				
Output voltage setting	400/380VPhase-Phase(230/220V P-N) on Battery				
Output voltage regulation on battery	( <u>+</u> 2%)				
Output frequency on battery	50Hz+0.5Hz				
Output voltage in mains mode	Same as input				
Output frequency in mains mode	Same as input				
THD (Resistive load)	<3% linear load <7% non-linear load				
Overload	110% for 5min 50 for 15 sec 200% for 7 sec 300% for 3 sec				
Efficiency	>=88% inverter mode >=98% (exclusive charging) >=95% (including charging)				
Transfer time	Mains to inverter 1sec/0.5sec(user selectable) Inverter to mains, no break <2msec				
Transient response			<u>+</u> 5%		
Recovery time	<60msec to +2% 0f nomonal voltage				
O/p vtg regulation on 100% unbalanced load			<u>+</u> 5%		
Crest factor			3:1		
nput					
Nominal input voltage			V, 50Hz, 3 phase +		
Voltage range	150-280V/180-27	70V/190-60V(Single		V/312-468V/329-45	0V(Three phase
Frequency range			50Hz <u>+</u> 6Hz		
PF			0.85 to 0.92		
Current distortion		<1	15% charge mode		
Battery charger					
Туре		Fl	oat-boost CVCC ty	ре	
Battery selection			SMF/Flat/Tubular		
No. of batteries	6/15	15	15	20	30
Charging current even at lowest range		10A	/ 15A/ 20A (Selecta	able)	
Back up time	Battery dependand				
Ambient temperature	45 degree Celsius				
Environment			Ŭ		
Humidity			95% RH-humidity		
Noise level	55 db				
Dimension					
Dimension (W X H X D in mm)	320X625X530	320X625X530	320X625X530	400X755X680	400X755X680
Weight (in Kg)	77.5	77.5	89.6	125	130
P protection	!		1		
Class			lp20		
/entilation					
Cooling			Forced air cooled		
Protection					
	Input Breaker Battery Breaker Deadshort circuit				
	Input Break	ər	Battery Breaker	Dead	dshort circuit
	Input Break Input phase		Battery Breaker DC Low/ Over Vol		
	Input phase	reversal	DC Low/ Over Vol	tage High	Temperature
		reversal		tage High	
	Input phase	reversal High Cut	DC Low/ Over Vol Reverse Battery	tage High	Temperature
Display	Input phase	reversal High Cut	DC Low/ Over Vol	tage High	Temperature
Display ndications	Input phase Mains Low/	reversal High Cut	DC Low/ Over Vol Reverse Battery LCD Disply + LED	tage High Shor	Temperature t circuit
Display ndications	Input phase Mains Low/ Battery cha	reversal High Cut	DC Low/ Over Vol Reverse Battery LCD Disply + LED Inverter ON	tage High Shor	Temperature t circuit
Display ndications	Input phase Mains Low/ Battery cha Battery low	reversal High Cut rging/ charged	DC Low/ Over Vol Reverse Battery LCD Disply + LED Inverter ON Phase reversal	tage High Shor Ove	a Temperature t circuit erload/ short circ
Display ndications	Input phase Mains Low/ Battery cha Battery low DSP Sine Wave	reversal High Cut rging/ charged • Output Volta	DC Low/ Over Vol Reverse Battery LCD Disply + LED Inverter ON Phase reversal Ige Battery V	tage High Shor Ove /oltage Mains	a Temperature t circuit erload/ short circu
Display ndications LED indication	Input phase Mains Low/ Battery cha Battery low DSP Sine Wave Input Voltage	reversal High Cut rging/ charged Output Volta Output Load	DC Low/ Over Vol Reverse Battery LCD Disply + LED Inverter ON Phase reversal Ige Battery V in % Boost Vo	tage High Shor Ove /oltage Mains Itage Mains	a Temperature t circuit erload/ short circu s Low Cut s High Cut
Display ndications LED indication	Input phase Mains Low/ Battery cha Battery low DSP Sine Wave	reversal High Cut rging/ charged Output Volta Output Load	DC Low/ Over Vol Reverse Battery LCD Disply + LED Inverter ON Phase reversal ge Battery V in % Boost Vo Jency Float Vol	tage High Shor Ove /oltage Mains Itage Mains tage Inver	a Temperature t circuit erload/ short circ s Low Cut
Display ndications LED indication	Input phase Mains Low/ Battery cha Battery low DSP Sine Wave Input Voltage	reversal High Cut rging/ charged Output Volta Output Load	DC Low/ Over Vol Reverse Battery LCD Disply + LED Inverter ON Phase reversal ge Battery V in % Boost Vo Jency Float Vol Charging	tage High Shor Ove /oltage Mains Itage Mains tage Inver	a Temperature t circuit erload/ short circu s Low Cut s High Cut
Display ndications LED indication LED display	Input phase Mains Low/ Battery cha Battery low DSP Sine Wave Input Voltage	reversal High Cut rging/ charged Output Volta Output Load	DC Low/ Over Vol Reverse Battery LCD Disply + LED Inverter ON Phase reversal ge Battery V in % Boost Vo Jency Float Vol	tage High Shor Ove /oltage Mains Itage Mains tage Inver	a Temperature t circuit erload/ short circu s Low Cut s High Cut
Display Indications LED indication LED display Selection Switches	Input phase Mains Low/ Battery cha Battery low DSP Sine Wave Input Voltage Input Frequency	reversal High Cut rging/ charged Output Volta Output Load	DC Low/ Over Vol Reverse Battery LCD Disply + LED Inverter ON Phase reversal ge Battery V in % Boost Vo Jency Float Vol Charging Battery T	tage High Shor Ove /oltage Maine Itage Maine tage Inver J Current ype	a Temperature t circuit erload/ short circu s Low Cut s High Cut ter Switch ON
Display ndications LED indication LED display	Input phase Mains Low/ Battery cha Battery low DSP Sine Wave Input Voltage Input Frequency	reversal High Cut rging/ charged Output Volta Output Load	DC Low/ Over Vol Reverse Battery LCD Disply + LED Inverter ON Phase reversal ge Battery V in % Boost Vo Jency Float Vol Charging Battery T	tage High Shor Ove /oltage Mains Itage Mains tage Inver Current ype	a Temperature t circuit erload/ short circu s Low Cut s High Cut ter Switch ON
Display ndications LED indication LED display Selection Switches	Input phase Mains Low/ Battery cha Battery low DSP Sine Wave Input Voltage Input Frequency Inverter ON Manual bypass	reversal High Cut rging/ charged • Output Volta Output Load / Output Frequ	DC Low/ Over Vol Reverse Battery LCD Disply + LED Inverter ON Phase reversal ge Battery V in % Boost Vo Jency Float Vol Charging Battery T Battery Chargir	tage High Shor Ove /oltage Mains Itage Mains tage Inver Current ype type selection (SMI ng current selection(	a Temperature t circuit erload/ short circu s Low Cut s High Cut ter Switch ON F/Flat/Tubular) (Low/Medium/Hi
Display ndications LED indication LED display Selection Switches	Input phase Mains Low/ Battery cha Battery low DSP Sine Wave Input Voltage Input Frequency Inverter ON Manual bypass LCD display para	reversal High Cut rging/ charged • Output Volta Output Load / Output Frequ meters scroll/hold	DC Low/ Over Vol Reverse Battery LCD Disply + LED Inverter ON Phase reversal ige Battery V in % Boost Vo Jency Float Vol Charging Battery T Battery Chargir Output	tage High Shor Ove /oltage Mains Itage Mains tage Inver Current ype type selection (SMI ng current selection( voltage selection 22	a Temperature t circuit erload/ short circu s Low Cut s High Cut ter Switch ON F/Flat/Tubular) (Low/Medium/His 20V/230V
Display Indications LED indication LED display Selection Switches User selection Switches	Input phase Mains Low/ Battery cha Battery low DSP Sine Wave Input Voltage Input Frequency Inverter ON Manual bypass LCD display para	reversal High Cut rging/ charged • Output Volta Output Load / Output Frequ	DC Low/ Over Vol Reverse Battery LCD Disply + LED Inverter ON Phase reversal ige Battery V in % Boost Vo Jency Float Vol Charging Battery T Battery Chargir Output	tage High Shor Ove /oltage Mains Itage Mains tage Inver Current ype type selection (SMI ng current selection(	a Temperature t circuit erload/ short circ s Low Cut s High Cut ter Switch ON F/Flat/Tubular) (Low/Medium/Hi 20V/230V
Display Indications LED indication LED display Selection Switches User selection Switches Dptional	Input phase Mains Low/ Battery cha Battery low DSP Sine Wave Input Voltage Input Frequency Inverter ON Manual bypass LCD display para	reversal High Cut rging/ charged • Output Volta Output Load / Output Frequ meters scroll/hold	DC Low/ Over Vol Reverse Battery LCD Disply + LED Inverter ON Phase reversal in % Boost Vol ency Float Vol Charging Battery T Battery Chargir Output um/Wide) Battery	tage High Shor Ove /oltage Mains Itage Mains tage Inver Current ype type selection (SMI ng current selection( voltage selection 22	a Temperature t circuit erload/ short circ s Low Cut s High Cut ter Switch ON F/Flat/Tubular) (Low/Medium/Hi 20V/230V
Display ndications LED indication LED display Selection Switches User selection Switches Dptional Automatic phase reversal correction	Input phase Mains Low/ Battery cha Battery low DSP Sine Wave Input Voltage Input Voltage Input Frequency Inverter ON Manual bypass LCD display para Input window sele	reversal High Cut rging/ charged • Output Volta Output Load / Output Frequ meters scroll/hold ection(Narrow/Medi	DC Low/ Over Vol Reverse Battery LCD Disply + LED Inverter ON Phase reversal ge Battery V in % Boost Vo Jency Float Vol Charging Battery T Battery Chargir Output um/Wide) Battery	tage High Shor Ove /oltage Mains Itage Mains tage Inver Current ype type selection (SMI og current selection( voltage selection (SMI type selection (SMI	a Temperature t circuit erload/ short circu s Low Cut s High Cut ter Switch ON F/Flat/Tubular) (Low/Medium/Hi 20V/230V F/Flat/Tubular)
Display ndications LED indication LED display	Input phase Mains Low/ Battery cha Battery low DSP Sine Wave Input Voltage Input Voltage Input Frequency Inverter ON Manual bypass LCD display para Input window sele	reversal High Cut rging/ charged Output Volta Output Load Output Frequ meters scroll/hold ection(Narrow/Medi of any one phase f	DC Low/ Over Vol Reverse Battery LCD Disply + LED Inverter ON Phase reversal in % Boost Vo Jency Float Vol Charging Battery T Battery Chargir Output um/Wide) Battery Yes failure the single ph	tage High Shor Ove /oltage Mains Itage Mains tage Inver Current ype type selection (SMI og current selection( voltage selection (SMI voltage selection (SMI voltage selection (SMI	a Temperature t circuit erload/ short circu s Low Cut s High Cut ter Switch ON F/Flat/Tubular) (Low/Medium/Hi 20V/230V F/Flat/Tubular)
Display ndications LED indication LED display Selection Switches User selection Switches Dptional Automatic phase reversal correction Operation on two phases	Input phase Mains Low/ Battery cha Battery low DSP Sine Wave Input Voltage Input Voltage Input Frequency Inverter ON Manual bypass LCD display para Input window sele	reversal High Cut rging/ charged • Output Volta Output Load / Output Frequ meters scroll/hold • ction(Narrow/Medi of any one phase f	DC Low/ Over Vol Reverse Battery LCD Disply + LED Inverter ON Phase reversal age Battery V in % Boost Vol Lency Float Vol Charging Battery T Battery Chargir Output um/Wide) Battery Yes failure the single ph y phases in mains	tage High Shor Ove /oltage Mains Itage Mains tage Inver Current ype type selection (SMI og current selection( voltage selection (SMI voltage selection (SMI voltage selection (SMI	a Temperature t circuit erload/ short circu s Low Cut s High Cut ter Switch ON F/Flat/Tubular) (Low/Medium/Hig 20V/230V F/Flat/Tubular)
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Display ndications LED indication LED display Selection Switches User selection Switches Dptional Automatic phase reversal correction Operation on two phases Redundancy options Temprature compensated charging	Input phase Mains Low/ Battery cha Battery low DSP Sine Wave Input Voltage Input Voltage Input Frequency Input Frequency LCD display para Input window sele	reversal High Cut rging/ charged • Output Volta Output Load / Output Frequ meters scroll/hold • ction(Narrow/Medi of any one phase f healt	DC Low/ Over Vol Reverse Battery LCD Disply + LED Inverter ON Phase reversal age Battery V in % Boost Vol Dency Float Vol Charging Battery T Battery T Battery Chargir Output um/Wide) Battery Yes failure the single ph y phases in mains in 100% hot standby Yes	tage High Shor Ove /oltage Mains Itage Mains tage Inver Current ype type selection (SMI og current selection ( voltage selection (SMI voltage selection (SMI voltage selection (SMI mase load will keep r mode	a Temperature t circuit erload/ short circu s Low Cut s High Cut ter Switch ON F/Flat/Tubular) (Low/Medium/Hig 20V/230V F/Flat/Tubular) unning on two
Display ndications LED indication LED display Selection Switches User selection Switches Dptional Automatic phase reversal correction Operation on two phases Redundancy options	Input phase Mains Low/ Battery cha Battery low DSP Sine Wave Input Voltage Input Voltage Input Frequency Input Frequency LCD display para Input window sele	reversal High Cut rging/ charged • Output Volta Output Load / Output Frequ meters scroll/hold • ction(Narrow/Medi of any one phase f healt	DC Low/ Over Vol Reverse Battery LCD Disply + LED Inverter ON Phase reversal age Battery V in % Boost Vol Dency Float Vol Charging Battery T Battery T Battery Chargir Output um/Wide) Battery Yes failure the single ph y phases in mains in 100% hot standby Yes	tage High Shor Ove /oltage Mains Itage Mains tage Inver Current ype type selection (SMI og current selection ( voltage selection (SMI voltage selection (SMI voltage selection (SMI mase load will keep r mode	a Temperature t circuit erload/ short circu s Low Cut s High Cut ter Switch ON F/Flat/Tubular) (Low/Medium/Hig 20V/230V F/Flat/Tubular) unning on two

## **TECHNICAL SPECIFICATIONS - MAKSH 3**

Parameters	10KVA 15KVA 20KVA 30KVA 40KVA 50KVA 60KVA 70KVA 80	0KVA 100KVA 120KVA 150KVA 200KVA				
Тороlоду	DSP controlled IGBT based, with the					
DC Voltage	240VDC 360VDC 480VDC					
Output						
PF	0.8					
Configuration	3P+N+E (3Phase, 4 Wires + Earth)					
Output voltage setting	400/380VPhase-Phase(230/220V P-N) on Battery					
Output voltage regulation on battery Output frequency on battery	( <u>+</u> 1%)					
Output voltage in mains mode	50Hz+ <u>0</u> .5Hz Same as input					
Output frequency in mains mode	Same as input					
THD (Resistive load)	<1% linear load	<3% non-linear load				
Overload	125% for 10min	150% for 1min				
Efficiency	Upto 90% Upto 92% Upto					
Transfer time	<7msec	· · · · · ·				
Transient response	<u>+</u> 5%					
Recovery time	Within one cycle to 98% of nominal voltage					
O/p Vtg regulation on 100% unbalanced load	<u>+</u> 1%					
Short Circuit Protection	Yes					
Crest factor	3:1					
Input						
Nominal input voltage Voltage range	415V, 50Hz, 3 phase +ne <u>+</u> 15%	ural				
Frequency range	<u>+</u> 15% 50Hz <u>+</u> 6Hz					
PF	> 0.99					
Current distortion						
Battery charger						
Туре	Float-boost CVCC type					
Battery selection	SMF/Flat/Tubular					
No. of batteries	20 30	40				
Charging current even at lowest range	10A 15A 20A 30A 40A 45A 55A	A 60A 70A 85A 105A 140A				
Back up time	Battery dependand					
Environment						
Humidity	95% RH-humidity					
Noise level	60 dBA					
Ambient temprature	0-40 degree celsius					
Dimension		0000/0000//1750				
Dimension (W X H X D in mm)	500X800X1100 600X800X1200	800X800X1750				
Weight (in Kg) IP protection	225 275 315 380 405 445 475	5 550 625 775 810 885				
Class	lp20					
Ventilation	ipz0					
Cooling	Forced air cooled					
Protection						
	Mains Low/ High Cut Short circuit	Deadshort circuit				
	DC Low Voltage Mains Input Breaker	High Temperature				
	DC high voltage Battery Switch	Phase reversal input				
Display						
	LCD Disply + LED					
Indications						
	Battery on float	Mains switch ON				
LED indication	Battery on boost Inverter switch ON   Battery low Load ON					
	Battery low Battery charging/discharging	Inverter ON				
	Battery-voltage & current	Power (KVA /KW)				
	Mains-voltage, current, frequency	Output load in %				
LED display	Inverter-voltage, current, frequency	Battery Voltage				
	Inverter heat sink temperature	System setting				
Selection Switches						
	Manual bypass Battery ty	pe selection (SMF/Flat/Tubular)				
User selection Switches	LCD display parameters with push button Charging	current selection(Low/Medium/High)				
	Input window selection(Narrow/Medium/Wide) Output vo	put window selection(Narrow/Medium/Wide) Output voltage selection 220V/230V				
Optional						
Automatic phase reversal correction	Yes					
Temprature compensated charging	Yes					
Potetial free contacts	2 Isolated digital inputs, 2PFC - NO and NC panel, sms - mail generation					
Monitoring DG control from inverter	Web monitoring event logging, remote indi9cation panel, sms-mail generation					
DG control from inverter	Yes					
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