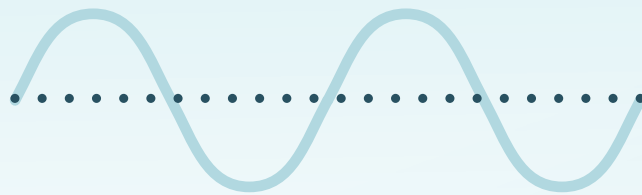


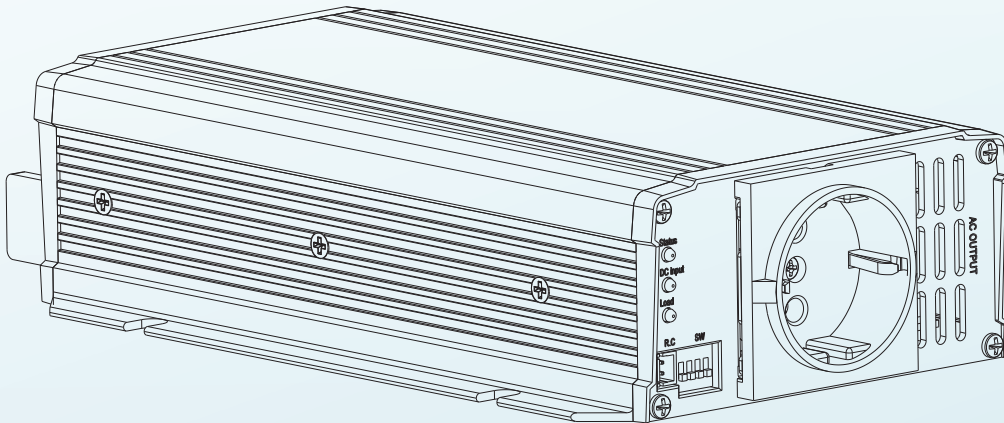


NTS & NTU Series Installation manual



True Sine Wave Inverter

• High Reliable Inverter •



NTS/NTU series are MEAN WELL's new generation high-reliability off-grid DC-AC pure sine wave inverters. The whole family has NTS-250P/400P, NTS-300/450/750/1200/1700/2200/3200, and NTU-1200/1700/2200/3200 series. The whole family of NTS/NTU are fully digital designed, with three major characteristics of miniaturization, high efficiency, and intelligence. The main features are, instantaneous peak load capacity which can reach up to 2 times of output wattage, as well as AC output voltage/frequency/power saving mode adjustment capability through the DIP switch of front panel (the idle standby consumption is 1.5W). It's efficiency reaches up to 93%, and it can be operated within temperature range from -25~+70°C. Built-in remote control, able to monitor the battery voltage and the load status of the inverter through IRC1/2/3. Not only intergrated multiple intelligent protections, but also passed safety regulations such as CB/DEKRA/E13/EAC/UL/RCM/FCC/CE/UKCA. Materials and components are strictly selected and 3-year warranty is provided. It is suitable for households, vehicles, yacht and remote areas without power grids. Common application such as, lighting, air conditioning, refrigerators, hair dryers, microwave ovens, computers, televisions, hand-held power tools, motor equipment, mobile AC power... etc.

Index

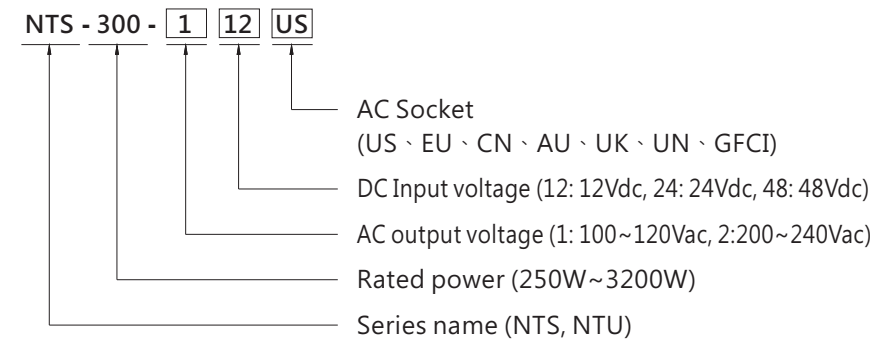
1.Safety Guidelines	1	6.Protections and Failure	41
2.Introduction	2	Correction	
2.1 Model number	2	6.1 Protections	41
2.2 Features	2	6.2 Failure Correction	41
2.3 Main specification	3	7.Warranty	43
2.4 Safety Overview	16		
2.5 Derating curve	17		
2.6 Mechanical specification	18		
3.Installation & Wiring	23		
3.1 Precautions	23		
3.2 System Block Diagram	23		
3.3 Installation procedures	24		
3.4 Cable selection	24		
3.5 Battery selection	25		
4.User Interface Panel	26		
4.1 AC panel	26		
4.2 DC panel	28		
4.3 LED indicator	29		
5.Explanation of settings	31		
5.1 Procedure of Setting	31		
Operating Mode, Output			
Voltage, Frequency, and			
power Saving Mode			
5.2 Function difference	32		
5.3 IRC1/IRC2/IRC3 Remote	32		
control unit			
5.4 RS-232 protocol	33		
5.5 UPS mode(only for	39		
NTU series)			

1.Safety Guidelines

- Risk of electrical shock and energy hazard. All failures should be examined by the qualified technician. Please do not remove the case of the inverter by yourself.
- Please do not install the inverter in places with high moisture or near water.
- Please do not install the inverter in places with high ambient temperature or under direct sunlight.
- Please only connect batteries with the same brand and model number in one battery bank. Using batteries from different manufacturers or different capacity is strictly prohibited!
- Never allow a spark or flame in the vicinity of the batteries because they may ignite explosive gases during normal operation.
- Make sure the air flow from the fan is not obstructed at both sides (front and back) of the inverter. (Please allow at least 15cm of space)
- Please do not stack any object on the inverter.
- Please do not turn on the inverter before start the engine if inverter connected to vehicle's battery directly.

2.Introduction

2.1 Model number



2.2 Features

- Full digital design with compact size and light weight.
- True sine wave output(THD<3%)
- Peak power up to 1.7~ 2 times
- AC voltage, frequency, power saving mode selectable.
- Multiple intelligent protections
DC Input : Reverse polarity protection/ Low DC voltage protection/ DC over voltage protection.
AC Output : Short circuit protection, over load protection, over temperature protection.
- LED indicator : Status, DC input, load status, AC input.
- Built-in Remote control
- Support IRC1/2/3 for 750~3200W models(optional)
- UPS functions(only for NTU series)
- Wide range of DC input voltage for lead acid or lithium batteries.
- CB/DEKRA/E13/EAC/UL/RCM/FCC/CE/UKCA certified.
- 3 year warranty

2.3 Specification

NTS-250P series

MODEL		NTS-250P-112	NTS-250P-124	NTS-250P-148	NTS-250P-212	NTS-250P-224	NTS-250P-248			
OUTPUT	RATED POWER(Continuous)	250W								
	OVER RATED POWER(3 Min.)	287.5W								
	PEAK POWER(10 Sec.)	375W								
	SURGE POWER(30 Cycles)	500W								
	AC VOLTAGE	Default setting set at 110VAC			Default setting set at 230VAC					
		100 / 110 / 115 / 120Vac selectable by DIP S.W			200 / 220 / 230 / 240Vac selectable by DIP S.W					
	FREQUENCY	Default setting set at 60Hz±0.1Hz			Default setting set at 50Hz±0.1Hz					
		50/60Hz selectable by DIP S.W			50/60Hz selectable by DIP S.W					
	WAVEFORM	Note.1 True sine wave (THD<3%)								
	AC REGULATION	±3.0% at rated input voltage								
LED STATUS	Please refer to section 3.4 of installation manual									
INPUT	BAT. VOLTAGE	12V	24V	48V	12V	24V	48V			
	VOLTAGE RANGE (Typ.)	10 ~ 16.5Vdc	20 ~ 33Vdc	40 ~ 66Vdc	10 ~ 16.5Vdc	20 ~ 33Vdc	40 ~ 66Vdc			
	DC CURRENT (Typ.)	25A	13A	7A	25A	13A	7A			
	NO LOAD DISSIPATION (Typ.)	NON-SAVING MODE	10W	10W	12W	10W	10W	12W		
		SAVING MODE	Default disable, ≤1.2W ~ 1.5W by models @ auto detec AC output load ≤10W will be changed to saving mode							
	OFF MODE CURRENT DRAW	<1mA at battery ~DC input must be disconnected								
	EFFICIENCY (Typ.)	Note.1 91%	91%	92%	92%	93%	93%			
	BATTERY TYPES	Lead Acid or li-ion								
PROTECTION	DC INPUT	FUSE (INTERNAL)	30A*2	30A*1	10A*2	30A*2	30A*1	10A*2		
			LOW	ALARM	11±0.3Vdc	22±0.5Vdc	44±1Vdc	11±0.3Vdc	22±0.5Vdc	44±1Vdc
				SHUTDOWN	10±0.3Vdc	20±0.5Vdc	40±1Vdc	10±0.3Vdc	20±0.5Vdc	40±1Vdc
		RESTART		12.5±0.3Vdc	25±0.5Vdc	50±1Vdc	12.5±0.3Vdc	25±0.5Vdc	50±1Vdc	
		HIGH	ALARM	15.5±0.3Vdc	31±0.5Vdc	62±1Vdc	15.5±0.3Vdc	31±0.5Vdc	62±1Vdc	
			SHUTDOWN	16.5±0.3Vdc	33±0.5Vdc	66±1Vdc	16.5±0.3Vdc	33±0.5Vdc	66±1Vdc	
	RESTART		15±0.3Vdc	30±0.5Vdc	60±1Vdc	15±0.3Vdc	30±0.5Vdc	60±1Vdc		
	BAT. POLARITY	By internal fuse open								
	AC OUTPUT	OVER TEMPERATURE	Protection type : Shut down o/p voltage, re-power on to recover							
		OUTPUT SHORT	Protection type : Shut down o/p voltage, re-power on to recover							
OVER LOAD (Typ.)		105 ~ 115% load for 180 sec., 115% ~ 150% load for 10 sec. Protection type : Shut down o/p voltage, re-power on to recover								
FUNCTION	REMOTE CONTROL DRY CONTACT	Power ON-OFF remote control by front panel dry contact connector (by RELAY) Open : Normal work ; Short : Remote off								
ENVIRON-MENT	WORK TEMP.	-20 ~ +70°C (Refer to "Derating curve")								
	WORKING HUMIDITY	20 ~ 90% RH non-condensing								
	STORAGE TEMP., HUMIDITY	-30 ~ +70°C / -22 ~ +158°F, 10 ~ 95% RH non-condensing								
	VIBRATION	10 ~ 500Hz, 3G 10min./1cycle, 60min. each along X, Y, Z axes								
OTHER	MTBF	279K hrs min. Telcordia TR/SR-332 (Bellcore) ; 84K hrs min. MIL-HDBK-217F (25°C)								
	DIMENSION	186*100.5*32mm (L*W*H)								
	PACKING	0.75Kg; 18pcs/ 14.5Kg/ 0.97CUFT								

NTS-400P series

MODEL		NTS-400P-112	NTS-400P-124	NTS-400P-148	NTS-400P-212	NTS-400P-224	NTS-400P-248			
OUTPUT	RATED POWER(Continuous)	400W								
	OVER RATED POWER(3 Min.)	460W								
	PEAK POWER(10 Sec.)	600W								
	SURGE POWER(30 Cycles)	800W								
	AC VOLTAGE	Default setting set at 110VAC			Default setting set at 230VAC					
		100 / 110 / 115 / 120Vac selectable by DIP S.W			200 / 220 / 230 / 240Vac selectable by DIP S.W					
	FREQUENCY	Default setting set at 60Hz±0.1Hz			Default setting set at 50Hz±0.1Hz					
		50/60Hz selectable by DIP S.W			50/60Hz selectable by DIP S.W					
	WAVEFORM	Note.1 True sine wave (THD<3%)								
	AC REGULATION	±3.0% at rated input voltage								
LED STATUS	Please refer to section 3.4 of installation manual									
INPUT	BAT. VOLTAGE	12V	24V	48V	12V	24V	48V			
	VOLTAGE RANGE (Typ.)	10 ~ 16.5Vdc	20 ~ 33Vdc	40 ~ 66Vdc	10 ~ 16.5Vdc	20 ~ 33Vdc	40 ~ 66Vdc			
	DC CURRENT (Typ.)	40A	20A	10A	40A	20A	10A			
	NO LOAD DISSIPATION (Typ.)	NON-SAVING MODE	10W	10W	12W	10W	10W	12W		
		SAVING MODE	Default disable, ≤1.2W ~ 1.5W by models @ auto detec AC output load ≤10W will be changed to saving mode							
	OFF MODE CURRENT DRAW	<1mA at battery ~DC input must be disconnected								
	EFFICIENCY (Typ.)	Note.1 89%	91%	91%	91%	93%	93%			
	BATTERY TYPES	Lead Acid or li-ion								
PROTECTION	DC INPUT	FUSE (INTERNAL)	40A*2	30A*2	10A*2	40A*2	30A*2	10A*2		
			LOW	ALARM	11±0.3Vdc	22±0.5Vdc	44±1Vdc	11±0.3Vdc	22±0.5Vdc	44±1Vdc
				SHUTDOWN	10±0.3Vdc	20±0.5Vdc	40±1Vdc	10±0.3Vdc	20±0.5Vdc	40±1Vdc
		RESTART		12.5±0.3Vdc	25±0.5Vdc	50±1Vdc	12.5±0.3Vdc	25±0.5Vdc	50±1Vdc	
		HIGH	ALARM	15.5±0.3Vdc	31±0.5Vdc	62±1Vdc	15.5±0.3Vdc	31±0.5Vdc	62±1Vdc	
			SHUTDOWN	16.5±0.3Vdc	33±0.5Vdc	66±1Vdc	16.5±0.3Vdc	33±0.5Vdc	66±1Vdc	
	RESTART		15±0.3Vdc	30±0.5Vdc	60±1Vdc	15±0.3Vdc	30±0.5Vdc	60±1Vdc		
	BAT. POLARITY	By internal fuse open								
	AC OUTPUT	OVER TEMPERATURE	Protection type : Shut down o/p voltage, re-power on to recover							
		OUTPUT SHORT	Protection type : Shut down o/p voltage, re-power on to recover							
OVER LOAD (Typ.)		105 ~ 115% load for 180 sec., 115% ~ 150% load for 10 sec. Protection type : Shut down o/p voltage, re-power on to recover								
FUNCTION	REMOTE CONTROL DRY CONTACT	Power ON-OFF remote control by front panel dry contact connector (by RELAY) Open : Normal work ; Short : Remote off								
ENVIRON-MENT	WORK TEMP.	-20 ~ +70°C (Refer to "Derating curve")								
	WORKING HUMIDITY	20 ~ 90% RH non-condensing								
	STORAGE TEMP., HUMIDITY	-30 ~ +70°C / -22 ~ +158°F, 10 ~ 95% RH non-condensing								
	VIBRATION	10 ~ 500Hz, 3G 10min./1cycle, 60min. each along X, Y, Z axes								
OTHER	MTBF	278.7K hrs min. Telcordia TR/SR-332 (Bellcore) ; 84K hrs min. MIL-HDBK-217F (25°C)								
	DIMENSION	186*100.5*32mm (L*W*H)								
	PACKING	0.75Kg; 18pcs/ 14.5Kg/ 0.97CUFT								

NTS-300 series

MODEL		NTS-300-112 <input type="checkbox"/> NTS-300-124 <input type="checkbox"/> NTS-300-148 <input type="checkbox"/>		NTS-300-212 <input type="checkbox"/> NTS-300-224 <input type="checkbox"/> NTS-300-248 <input type="checkbox"/>					
		<input type="checkbox"/> = US, GFCI, UN		<input type="checkbox"/> = EU, CN, AU, UK, UN					
OUTPUT	RATED POWER(Continuous)	300W							
	OVER RATED POWER(3 Min.)	345W							
	PEAK POWER(10 Sec.)	450W							
	SURGE POWER(30 Cycles)	600W							
	AC VOLTAGE	Default setting set at 110VAC 100 / 110 / 115 / 120Vac selectable by DIP S.W		Default setting set at 230VAC 200 / 220 / 230 / 240Vac selectable by DIP S.W					
	FREQUENCY	Default setting set at 60Hz±0.1Hz 50/60Hz selectable by DIP S.W		Default setting set at 50Hz±0.1Hz 50/60Hz selectable by DIP S.W					
	WAVEFORM	Note.1 True sine wave (THD<3%)							
	AC REGULATION	±3.0% at rated input voltage							
FRONT PANEL LED Please refer to section 3.4 of installation manual									
INPUT	BAT. VOLTAGE	12V	24V	48V	12V	24V	48V		
	VOLTAGE RANGE (Typ.)	10 ~ 16.5Vdc	20 ~ 33Vdc	40 ~ 66Vdc	10 ~ 16.5Vdc	20 ~ 33Vdc	40 ~ 66Vdc		
	DC CURRENT (Typ.)	30A	15A	8A	30A	15A	8A		
	NO LOAD	10W	10W	12W	10W	10W	12W		
	DISSIPATION (Typ.)	NON-SAVING MODE	Default disable, ≤1.2W ~ 1.5W by models @ auto detec AC output load ≤10W will be changed to saving mode						
		SAVING MODE	1.2W	1.3W	1.5W	1.2W	1.3W	1.5W	
	OFF MODE CURRENT DRAW	≤1mA							
	EFFICIENCY (Typ.)	Note.1	90%	92%	92%	92%	93%	93%	
BATTERY TYPES Lead Acid or li-ion									
PROTECTION	DC INPUT	FUSE (INTERNAL)		30A*2	30A*1	10A*2	30A*2	30A*1	10A*2
		LOW	ALARM	11±0.3Vdc	22±0.5Vdc	44±1Vdc	11±0.3Vdc	22±0.5Vdc	44±1Vdc
			SHUTDOWN	10±0.3Vdc	20±0.5Vdc	40±1Vdc	10±0.3Vdc	20±0.5Vdc	40±1Vdc
			RESTART	12.5±0.3Vdc	25±0.5Vdc	50±1Vdc	12.5±0.3Vdc	25±0.5Vdc	50±1Vdc
		HIGH	ALARM	15.5±0.3Vdc	31±0.5Vdc	62±1Vdc	15.5±0.3Vdc	31±0.5Vdc	62±1Vdc
			SHUTDOWN	16.5±0.3Vdc	33±0.5Vdc	66±1Vdc	16.5±0.3Vdc	33±0.5Vdc	66±1Vdc
	RESTART		15±0.3Vdc	30±0.5Vdc	60±1Vdc	15±0.3Vdc	30±0.5Vdc	60±1Vdc	
	BAT. POLARITY		By internal fuse open						
	OVER TEMPERATURE		Protection type : Shut down o/p voltage, re-power on to recover						
	OUTPUT SHORT		Protection type : Shut down o/p voltage, re-power on to recover						
	AC OUTPUT	OVER LOAD (Typ.)		105 ~ 115% load for 180 sec., 115% ~ 150% load for 10 sec. Protection type : Shut down o/p voltage, re-power on to recover					
		GFCI PROTECTION		Design refer to UL458 (Only for "GFCI" AC socket, by request)		None			
FUNCTION		REMOTE CONTROL DRY CONTACT Power ON-OFF remote control by front panel dry contact connector (by RELAY) Open : Normal work ; Short : Remote off							
ENVIRON-MENT	WORK TEMP.		-25 ~ +65°C (Refer to "Derating curve")						
	WORKING HUMIDITY		20 ~ 90% RH non-condensing						
	STORAGE TEMP., HUMIDITY		-30 ~ +70°C / -22 ~ +158°F, 10 ~ 95% RH non-condensing						
	VIBRATION		10 ~ 500Hz, 3G 10min./1cycle, 60min. each along X, Y, Z axes						
OTHER	MTBF		281.9K hrs min. Telcordia TR/SR-332 (Bellcore); 85.3K hrs min. MIL-HDBK-217F (25°C)						
	DIMENSION		210*130*55mm (L*W*H)						
	PACKING		1.3Kg; 8pcs/ 11.4Kg/ 1.74CUFT						

NTS-450 series

MODEL		NTS-450-112 <input type="checkbox"/> NTS-450-124 <input type="checkbox"/> NTS-450-148 <input type="checkbox"/>		NTS-450-212 <input type="checkbox"/> NTS-450-224 <input type="checkbox"/> NTS-450-248 <input type="checkbox"/>					
		<input type="checkbox"/> = US, GFCI, UN		<input type="checkbox"/> = EU, CN, AU, UK, UN					
OUTPUT	RATED POWER(Continuous)	450W							
	OVER RATED POWER(3 Min.)	517.5W							
	PEAK POWER(10 Sec.)	675W							
	SURGE POWER(30 Cycles)	900W							
	AC VOLTAGE	Default setting set at 110VAC 100 / 110 / 115 / 120Vac selectable by DIP S.W		Default setting set at 230VAC 200 / 220 / 230 / 240Vac selectable by DIP S.W					
	FREQUENCY	Default setting set at 60Hz±0.1Hz 50/60Hz selectable by DIP S.W		Default setting set at 50Hz±0.1Hz 50/60Hz selectable by DIP S.W					
	WAVEFORM	Note.1 True sine wave (THD<3%)							
	AC REGULATION	±3.0% at rated input voltage							
FRONT PANEL LED Please refer to section 3.4 of installation manual									
INPUT	BAT. VOLTAGE	12V	24V	48V	12V	24V	48V		
	VOLTAGE RANGE (Typ.)	10 ~ 16.5Vdc	20 ~ 33Vdc	40 ~ 66Vdc	10 ~ 16.5Vdc	20 ~ 33Vdc	40 ~ 66Vdc		
	DC CURRENT (Typ.)	50A	25A	14A	50A	25A	14A		
	NO LOAD	10W	10W	12W	10W	10W	12W		
	DISSIPATION (Typ.)	NON-SAVING MODE	Default disable, ≤1.2W ~ 1.5W by models @ auto detec AC output load ≤10W will be changed to saving mode						
		SAVING MODE	1.2W	1.3W	1.5W	1.2W	1.3W	1.5W	
	OFF MODE CURRENT DRAW	≤1mA							
	EFFICIENCY (Typ.)	Note.1	88%	91%	91%	90%	93%	93%	
BATTERY TYPES Lead Acid or li-ion									
PROTECTION	DC INPUT	FUSE (INTERNAL)		40A*2	40A*1	10A*2	40A*2	40A*1	10A*2
		LOW	ALARM	11±0.3Vdc	22±0.5Vdc	44±1Vdc	11±0.3Vdc	22±0.5Vdc	44±1Vdc
			SHUTDOWN	10±0.3Vdc	20±0.5Vdc	40±1Vdc	10±0.3Vdc	20±0.5Vdc	40±1Vdc
			RESTART	12.5±0.3Vdc	25±0.5Vdc	50±1Vdc	12.5±0.3Vdc	25±0.5Vdc	50±1Vdc
		HIGH	ALARM	15.5±0.3Vdc	31±0.5Vdc	62±1Vdc	15.5±0.3Vdc	31±0.5Vdc	62±1Vdc
			SHUTDOWN	16.5±0.3Vdc	33±0.5Vdc	66±1Vdc	16.5±0.3Vdc	33±0.5Vdc	66±1Vdc
	RESTART		15±0.3Vdc	30±0.5Vdc	60±1Vdc	15±0.3Vdc	30±0.5Vdc	60±1Vdc	
	BAT. POLARITY		By internal fuse open						
	OVER TEMPERATURE		Protection type : Shut down o/p voltage, re-power on to recover						
	OUTPUT SHORT		Protection type : Shut down o/p voltage, re-power on to recover						
	AC OUTPUT	OVER LOAD (Typ.)		105 ~ 115% load for 180 sec., 115% ~ 150% load for 10 sec. Protection type : Shut down o/p voltage, re-power on to recover					
		GFCI PROTECTION		Design refer to UL458 (Only for "GFCI" AC socket, by request)		None			
FUNCTION		REMOTE CONTROL DRY CONTACT Power ON-OFF remote control by front panel dry contact connector (by RELAY) Open : Normal work ; Short : Remote off							
ENVIRON-MENT	WORK TEMP.		-25 ~ +70°C (Refer to "Derating curve")						
	WORKING HUMIDITY		20 ~ 90% RH non-condensing						
	STORAGE TEMP., HUMIDITY		-30 ~ +70°C / -22 ~ +158°F, 10 ~ 95% RH non-condensing						
	VIBRATION		10 ~ 500Hz, 3G 10min./1cycle, 60min. each along X, Y, Z axes						
OTHER	MTBF		281.3K hrs min. Telcordia TR/SR-332 (Bellcore); 85K hrs min. MIL-HDBK-217F (25°C)						
	DIMENSION		210*130*55mm (L*W*H)						
	PACKING		1.3Kg; 8pcs/ 11.4Kg/ 1.74CUFT						

NTS-750 series

MODEL		NTS-750-112 <input type="checkbox"/> NTS-750-124 <input type="checkbox"/> NTS-750-148 <input type="checkbox"/> NTS-750-212 <input type="checkbox"/> NTS-750-224 <input type="checkbox"/> NTS-750-248 <input type="checkbox"/>							
		<input type="checkbox"/> = US, GFCI, UN			<input type="checkbox"/> = EU, CN, AU, UK, UN				
OUTPUT	RATED POWER(Continuous)	750W							
	OVER RATED POWER(3 Min.)	862.5W							
	PEAK POWER(10 Sec.)	1125W							
	SURGE POWER(30 Cycles)	1500W							
	AC VOLTAGE	Default setting set at 110VAC 100 / 110 / 115 / 120Vac selectable by DIP S.W			Default setting set at 230VAC 200 / 220 / 230 / 240Vac selectable by DIP S.W				
	FREQUENCY	Default setting set at 60±0.1Hz 50/60Hz selectable by DIP S.W			Default setting set at 50Hz±0.1Hz 50/60Hz selectable by DIP S.W				
	WAVEFORM	Note.1 True sine wave (THD<3%)							
	AC REGULATION	±3.0% at rated input voltage							
FRONT PANEL LED		Please refer to section 3.4 of installation manual							
INPUT	BAT. VOLTAGE	12V	24V	48V	12V	24V	48V		
	VOLTAGE RANGE (Typ.)	10 ~ 16.5Vdc	20 ~ 33Vdc	40 ~ 66Vdc	10 ~ 16.5Vdc	20 ~ 33Vdc	40 ~ 66Vdc		
	DC CURRENT (Typ.)	75A	38A	19A	75A	38A	19A		
	NO LOAD	10W	10W	12W	10W	10W	12W		
	DISSIPATION (Typ.)	NON-SAVING MODE	Default disable, ≤1.2W ~ 1.5W by models @ auto detec AC output load ≤10W will be changed to saving mode						
		SAVING MODE	1.2W	1.4W	1.5W	1.2W	1.4W	1.5W	
	OFF MODE CURRENT DRAW	≤1mA							
	EFFICIENCY (Typ.)	Note.1	89%	90%	91%	91%	93%	93%	
BATTERY TYPES		Lead Acid or li-ion							
PROTECTION	DC INPUT	FUSE (INTERNAL)		40A*3	40A*2	25A*2	40A*3	40A*2	25A*2
		LOW	ALARM	11±0.3Vdc	22±0.5Vdc	44±1Vdc	11±0.3Vdc	22±0.5Vdc	44±1Vdc
			SHUTDOWN	10±0.3Vdc	20±0.5Vdc	40±1Vdc	10±0.3Vdc	20±0.5Vdc	40±1Vdc
			RESTART	12.5±0.3Vdc	25±0.5Vdc	50±1Vdc	12.5±0.3Vdc	25±0.5Vdc	50±1Vdc
		HIGH	ALARM	15.5±0.3Vdc	31±0.5Vdc	62±1Vdc	15.5±0.3Vdc	31±0.5Vdc	62±1Vdc
			SHUTDOWN	16.5±0.3Vdc	33±0.5Vdc	66±1Vdc	16.5±0.3Vdc	33±0.5Vdc	66±1Vdc
	RESTART		15±0.3Vdc	30±0.5Vdc	60±1Vdc	15±0.3Vdc	30±0.5Vdc	60±1Vdc	
	BAT. POLARITY		By internal fuse open						
	OVER TEMPERATURE		Protection type : Shut down o/p voltage, re-power on to recover						
	OUTPUT SHORT		Protection type : Shut down o/p voltage, re-power on to recover						
	OVER LOAD (Typ.)		105 ~ 115% load for 180 sec., 115% ~ 150% load for 10 sec. Protection type : Shut down o/p voltage, re-power on to recover						
	GFCI PROTECTION		UL458 (Only for "GFCI" AC socket, by request)		None				
FUNCTION	REMOTE CONTROL DRY CONTACT	Power ON-OFF remote control by front panel dry contact connector (by RELAY) Open : Normal work ; Short : Remote off Remote controller sold separately, Order No.: IRC1,IRC2,IRC3							
ENVIRONMENT	WORK TEMP.	-25 ~ +70°C (Refer to "Derating curve")							
	WORKING HUMIDITY	20 ~ 90% RH non-condensing							
	STORAGE TEMP., HUMIDITY	-30 ~ +70°C / -22 ~ +158°F, 10 ~ 95% RH non-condensing							
	VIBRATION	10 ~ 500Hz, 3G 10min./1cycle, 60min. each along X, Y, Z axes							
OTHER	MTBF	238.6K hrs min. Telcordia TR/SR-332 (Bellcore); 78K hrs min. MIL-HDBK-217F (25°C)							
	DIMENSION	270*158*67mm (L*W*H)							
	PACKING	2.3Kg; 4pcs/ 10.2Kg/ 1.77CUFT							

NTS-1200 series

MODEL		NTS-1200-112 <input type="checkbox"/> NTS-1200-124 <input type="checkbox"/> NTS-1200-148 <input type="checkbox"/> NTS-1200-212 <input type="checkbox"/> NTS-1200-224 <input type="checkbox"/> NTS-1200-248 <input type="checkbox"/>							
		<input type="checkbox"/> = US, GFCI, UN			<input type="checkbox"/> = EU, CN, AU, UK, UN				
OUTPUT	RATED POWER(Continuous)	1200W							
	OVER RATED POWER(3 Min.)	1380W							
	PEAK POWER(10 Sec.)	1800W							
	SURGE POWER(30 Cycles)	2000W							
	AC VOLTAGE	Default setting set at 110VAC 100 / 110 / 115 / 120Vac selectable by DIP S.W			Default setting set at 230VAC 200 / 220 / 230 / 240Vac selectable by DIP S.W				
	FREQUENCY	Default setting set at 60±0.1Hz 50/60Hz selectable by DIP S.W			Default setting set at 50Hz±0.1Hz 50/60Hz selectable by DIP S.W				
	WAVEFORM	Note.1 True sine wave (THD<3%)							
	AC REGULATION	±3.0% at rated input voltage							
FRONT PANEL LED		Please refer to section 3.4 of installation manual							
INPUT	BAT. VOLTAGE	12V	24V	48V	12V	24V	48V		
	VOLTAGE RANGE (Typ.)	10 ~ 16.5Vdc	20 ~ 33Vdc	40 ~ 66Vdc	10 ~ 16.5Vdc	20 ~ 33Vdc	40 ~ 66Vdc		
	DC CURRENT (Typ.)	120A	60A	30A	120A	60A	30A		
	NO LOAD	15W	25W						
	DISSIPATION (Typ.)	NON-SAVING MODE	Default disable, auto detec AC output load ≤10W will be changed to saving mode						
		SAVING MODE	1.2W	1.4W	1.5W	1.2W	1.4W	1.5W	
	OFF MODE CURRENT DRAW	≤1mA							
	EFFICIENCY (Typ.)	Note.1	89%	90%	91%	90%	92%	93%	
BATTERY TYPES		Lead Acid or li-ion							
PROTECTION	DC INPUT	FUSE (INTERNAL)		40A*4	40A*2	25A*2	40A*4	40A*2	25A*2
		LOW	ALARM	11±0.3Vdc	22±0.5Vdc	44±1Vdc	11±0.3Vdc	22±0.5Vdc	44±1Vdc
			SHUTDOWN	10±0.3Vdc	20±0.5Vdc	40±1Vdc	10±0.3Vdc	20±0.5Vdc	40±1Vdc
			RESTART	12.5±0.3Vdc	25±0.5Vdc	50±1Vdc	12.5±0.3Vdc	25±0.5Vdc	50±1Vdc
		HIGH	ALARM	15.5±0.3Vdc	31±0.5Vdc	62±1Vdc	15.5±0.3Vdc	31±0.5Vdc	62±1Vdc
			SHUTDOWN	16.5±0.3Vdc	33±0.5Vdc	66±1Vdc	16.5±0.3Vdc	33±0.5Vdc	66±1Vdc
	RESTART		15±0.3Vdc	30±0.5Vdc	60±1Vdc	15±0.3Vdc	30±0.5Vdc	60±1Vdc	
	BAT. POLARITY		By internal fuse open						
	OVER TEMPERATURE		Protection type : Shut down o/p voltage, re-power on to recover						
	OUTPUT SHORT		Protection type : Shut down o/p voltage, re-power on to recover						
	OVER LOAD (Typ.)		105 ~ 115% load for 180 sec., 115% ~ 150% load for 10 sec. Protection type : Shut down o/p voltage, re-power on to recover						
	CIRCUIT BREAKER		15A			10A			
GFCI PROTECTION		UL458 (Only for "GFCI" AC socket)		None					
FUNCTION	REMOTE CONTROL DRY CONTACT	Power ON-OFF remote control by front panel dry contact connector (by RELAY) Open : Normal work ; Short : Remote off Remote controller sold separately, Order No.: IRC1,IRC2,IRC3							
ENVIRONMENT	WORK TEMP.	-25 ~ +70°C (Refer to "Derating curve")							
	WORKING HUMIDITY	20 ~ 90% RH non-condensing							
	STORAGE TEMP., HUMIDITY	-30 ~ +70°C / -22 ~ +158°F, 10 ~ 95% RH non-condensing							
	VIBRATION	10 ~ 500Hz, 3G 10min./1cycle, 60min. each along X, Y, Z axes							
OTHER	MTBF	198.9K hrs min. Telcordia TR/SR-332 (Bellcore); 62.0K hrs min. MIL-HDBK-217F (25°C)							
	DIMENSION	333*184*70mm (L*W*H)							
	PACKING	3.3Kg; 2pcs/ 7.6Kg/ 1.16CUFT							

NTS-1700 series

MODEL		NTS-1700-112 <input type="checkbox"/> NTS-1700-124 <input type="checkbox"/> NTS-1700-148 <input type="checkbox"/>			NTS-1700-212 <input type="checkbox"/> NTS-1700-224 <input type="checkbox"/> NTS-1700-248 <input type="checkbox"/>				
		<input type="checkbox"/> = US, GFCI, UN			<input type="checkbox"/> = EU, CN, AU, UK, UN				
OUTPUT	RATED POWER(Continuous)	1500W			1700W				
	OVER RATED POWER(3 Min.)	1750W			2000W				
	PEAK POWER(10 Sec.)	2250W			2550W				
	SURGE POWER(30 Cycles)	3000W			3400W				
	AC VOLTAGE	Default setting set at 110VAC 100 / 110 / 115 / 120Vac selectable by DIP S.W			Default setting set at 230VAC 200 / 220 / 230 / 240Vac selectable by DIP S.W				
	FREQUENCY	Default setting set at 60±0.1Hz 50/60Hz selectable by DIP S.W			Default setting set at 50Hz±0.1Hz 50/60Hz selectable by DIP S.W				
	WAVEFORM	Note.1 True sine wave (THD<3%)							
	AC REGULATION	±3.0% at rated input voltage							
FRONT PANEL LED Please refer to section 3.4 of installation manual									
INPUT	BAT. VOLTAGE	12V	24V	48V	12V	24V	48V		
	VOLTAGE RANGE (Typ.)	10 ~ 16.5Vdc	20 ~ 33Vdc	40 ~ 66Vdc	10 ~ 16.5Vdc	20 ~ 33Vdc	40 ~ 66Vdc		
	DC CURRENT (Typ.)	150A	75A	37.5A	170A	85A	42.5A		
	NO LOAD DISSIPATION (Typ.)	NON-SAVING MODE 15W			25W				
		SAVING MODE Default disable, auto detec AC output load ≤10W will be changed to saving mode							
		1.2W	1.4W	1.5W	1.2W	1.4W	1.5W		
	OFF MODE CURRENT DRAW	≤1mA							
	EFFICIENCY (Typ.)	Note.1 89%		90%	91%	90%	92%	93%	
BATTERY TYPES Lead Acid or li-ion									
PROTECTION	DC INPUT	FUSE (INTERNAL)		40A*5	30A*3	30A*2	40A*5	30A*3	30A*2
		LOW	ALARM	11±0.3Vdc	22±0.5Vdc	44±1Vdc	11±0.3Vdc	22±0.5Vdc	44±1Vdc
			SHUTDOWN	10±0.3Vdc	20±0.5Vdc	40±1Vdc	10±0.3Vdc	20±0.5Vdc	40±1Vdc
			RESTART	12.5±0.3Vdc	25±0.5Vdc	50±1Vdc	12.5±0.3Vdc	25±0.5Vdc	50±1Vdc
		HIGH	ALARM	15.5±0.3Vdc	31±0.5Vdc	62±1Vdc	15.5±0.3Vdc	31±0.5Vdc	62±1Vdc
			SHUTDOWN	16.5±0.3Vdc	33±0.5Vdc	66±1Vdc	16.5±0.3Vdc	33±0.5Vdc	66±1Vdc
	RESTART		15±0.3Vdc	30±0.5Vdc	60±1Vdc	15±0.3Vdc	30±0.5Vdc	60±1Vdc	
	BAT. POLARITY		By internal fuse open						
	OVER TEMPERATURE		Protection type : Shut down o/p voltage, re-power on to recover						
	OUTPUT SHORT		Protection type : Shut down o/p voltage, re-power on to recover						
	AC OUTPUT	OVER LOAD (Typ.)		105 ~ 115% load for 180 sec., 115% ~ 150% load for 10 sec. Protection type : Shut down o/p voltage, re-power on to recover					
		CIRCUIT BREAKER(GFCI)		TBD					
GFCI PROTECTION		UL458 (Only for "GFCI" AC socket) None							
FUNCTION		REMOTE CONTROL DRY CONTACT Power ON-OFF remote control by front panel dry contact connector (by RELAY) Open : Normal work ; Short : Remote off Remote controller sold separately, Order No.: IRC1,IRC2,IRC3							
ENVIRON- MENT	WORK TEMP.		-20 ~ +70°C (Refer to "Derating curve")						
	WORKING HUMIDITY		20 ~ 90% RH non-condensing						
	STORAGE TEMP., HUMIDITY		-30 ~ +70°C / -22 ~ +158°F, 10 ~ 95% RH non-condensing						
	VIBRATION		10 ~ 500Hz, 3G 10min./1cycle, 60min. each along X, Y, Z axes						
OTHER	MTBF		TBD						
	DIMENSION		400*184*70mm (L*W*H)						
	PACKING		TBD						

NTS-2200 series

MODEL		NTS-2200-112 <input type="checkbox"/> NTS-2200-124 <input type="checkbox"/> NTS-2200-148 <input type="checkbox"/>			NTS-2200-212 <input type="checkbox"/> NTS-2200-224 <input type="checkbox"/> NTS-2200-248 <input type="checkbox"/>				
		<input type="checkbox"/> = US, GFCI, UN			<input type="checkbox"/> = EU, CN, AU, UK, UN				
OUTPUT	RATED POWER(Continuous)	2200W							
	OVER RATED POWER(3 Min.)	2530W							
	PEAK POWER(10 Sec.)	2750W							
	SURGE POWER(30 Cycles)	4400W							
	AC VOLTAGE	Default setting set at 110VAC 100 / 110 / 115 / 120Vac selectable by DIP S.W			Default setting set at 230VAC 200 / 220 / 230 / 240Vac selectable by DIP S.W				
	FREQUENCY	Default setting set at 60±0.1Hz 50/60Hz selectable by DIP S.W			Default setting set at 50Hz±0.1Hz 50/60Hz selectable by DIP S.W				
	WAVEFORM	Note.1 True sine wave (THD<3%)							
	AC REGULATION	±3.0% at rated input voltage							
FRONT PANEL LED Please refer to section 3.4 of installation manual									
INPUT	BAT. VOLTAGE	12V	24V	48V	12V	24V	48V		
	VOLTAGE RANGE (Typ.)	10 ~ 16.5Vdc	20 ~ 33Vdc	40 ~ 66Vdc	10 ~ 16.5Vdc	20 ~ 33Vdc	40 ~ 66Vdc		
	DC CURRENT (Typ.)	220A	110A	55A	220A	110A	55A		
	NO LOAD DISSIPATION (Typ.)	NON-SAVING MODE 15W			25W				
		SAVING MODE Default disable, auto detec AC output load ≤10W will be changed to saving mode							
		1.2W	1.4W	1.5W	1.2W	1.4W	1.5W		
	OFF MODE CURRENT DRAW	≤1mA							
	EFFICIENCY (Typ.)	Note.1 89%		91%	92%	90%	92%	93%	
BATTERY TYPES Lead Acid or li-ion									
PROTECTION	DC INPUT	FUSE (INTERNAL)		40A*5	30A*3	30A*2	40A*5	30A*3	30A*2
		LOW	ALARM	11±0.3Vdc	22±0.5Vdc	44±1Vdc	11±0.3Vdc	22±0.5Vdc	44±1Vdc
			SHUTDOWN	10±0.3Vdc	20±0.5Vdc	40±1Vdc	10±0.3Vdc	20±0.5Vdc	40±1Vdc
			RESTART	12.5±0.3Vdc	25±0.5Vdc	50±1Vdc	12.5±0.3Vdc	25±0.5Vdc	50±1Vdc
		HIGH	ALARM	15.5±0.3Vdc	31±0.5Vdc	62±1Vdc	15.5±0.3Vdc	31±0.5Vdc	62±1Vdc
			SHUTDOWN	16.5±0.3Vdc	33±0.5Vdc	66±1Vdc	16.5±0.3Vdc	33±0.5Vdc	66±1Vdc
	RESTART		15±0.3Vdc	30±0.5Vdc	60±1Vdc	15±0.3Vdc	30±0.5Vdc	60±1Vdc	
	BAT. POLARITY		By internal fuse open						
	OVER TEMPERATURE		Protection type : Shut down o/p voltage, re-power on to recover						
	OUTPUT SHORT		Protection type : Shut down o/p voltage, re-power on to recover						
	AC OUTPUT	OVER LOAD (Typ.)		105 ~ 115% load for 180 sec., 115% ~ 150% load for 10 sec. Protection type : Shut down o/p voltage, re-power on to recover					
		CIRCUIT BREAKER(GFCI)		TBD					
GFCI PROTECTION		UL458 (Only for "GFCI" AC socket) None							
FUNCTION		REMOTE CONTROL DRY CONTACT Power ON-OFF remote control by front panel dry contact connector (by RELAY) Open : Normal work ; Short : Remote off Remote controller sold separately, Order No.: IRC1,IRC2,IRC3							
ENVIRON- MENT	WORK TEMP.		-20 ~ +70°C (Refer to "Derating curve")						
	WORKING HUMIDITY		20 ~ 90% RH non-condensing						
	STORAGE TEMP., HUMIDITY		-30 ~ +70°C / -22 ~ +158°F, 10 ~ 95% RH non-condensing						
	VIBRATION		10 ~ 500Hz, 3G 10min./1cycle, 60min. each along X, Y, Z axes						
OTHER	MTBF		TBD						
	DIMENSION		400*270*98mm (L*W*H)						
	PACKING		TBD						

NTS-3200 series

MODEL		NTS-3200-112 <input type="checkbox"/> NTS-3200-124 <input type="checkbox"/> NTS-3200-148 <input type="checkbox"/>			NTS-3200-212 <input type="checkbox"/> NTS-3200-224 <input type="checkbox"/> NTS-3200-248 <input type="checkbox"/>				
		<input type="checkbox"/> = US, GFCI, UN			<input type="checkbox"/> = EU, CN, AU, UK, UN				
OUTPUT	RATED POWER(Continuous)	3200W			3200W				
	OVER RATED POWER(3 Min.)	3500W			3680W				
	PEAK POWER(10 Sec.)	4500W			4800W				
	SURGE POWER(30 Cycles)	6000W			6400W				
	AC VOLTAGE	Default setting set at 110VAC 100 / 110 / 115 / 120Vac selectable by DIP S.W			Default setting set at 230VAC 200 / 220 / 230 / 240Vac selectable by DIP S.W				
	FREQUENCY	Default setting set at 60±0.1Hz 50/60Hz selectable by DIP S.W			Default setting set at 50Hz±0.1Hz 50/60Hz selectable by DIP S.W				
	WAVEFORM	Note.1 True sine wave (THD<3%)							
	AC REGULATION	±3.0% at rated input voltage							
FRONT PANEL LED Please refer to section 3.4 of installation manual									
INPUT	BAT. VOLTAGE	12V	24V	48V	12V	24V	48V		
	VOLTAGE RANGE (Typ.)	10 ~ 16.5Vdc	20 ~ 33Vdc	40 ~ 66Vdc	10 ~ 16.5Vdc	20 ~ 33Vdc	40 ~ 66Vdc		
	DC CURRENT (Typ.)	300A	150A	75A	320A	160A	80A		
	NO LOAD DISSIPATION (Typ.)	NON-SAVING MODE 15W			25W				
		SAVING MODE Default disable, auto detec AC output load ≤10W will be changed to saving mode							
		1.2W	1.4W	1.5W	1.2W	1.4W	1.5W		
	OFF MODE CURRENT DRAW	≤1mA							
	EFFICIENCY (Typ.)	Note.1 89%		91%	92%	90%	92%	93%	
BATTERY TYPES Lead Acid or li-ion									
PROTECTION	DC INPUT	FUSE (INTERNAL)		40A*5	30A*3	30A*2	40A*5	30A*3	30A*2
		LOW	ALARM	11±0.3Vdc	22±0.5Vdc	44±1Vdc	11±0.3Vdc	22±0.5Vdc	44±1Vdc
			SHUTDOWN	10±0.3Vdc	20±0.5Vdc	40±1Vdc	10±0.3Vdc	20±0.5Vdc	40±1Vdc
			RESTART	12.5±0.3Vdc	25±0.5Vdc	50±1Vdc	12.5±0.3Vdc	25±0.5Vdc	50±1Vdc
		HIGH	ALARM	15.5±0.3Vdc	31±0.5Vdc	62±1Vdc	15.5±0.3Vdc	31±0.5Vdc	62±1Vdc
			SHUTDOWN	16.5±0.3Vdc	33±0.5Vdc	66±1Vdc	16.5±0.3Vdc	33±0.5Vdc	66±1Vdc
	RESTART		15±0.3Vdc	30±0.5Vdc	60±1Vdc	15±0.3Vdc	30±0.5Vdc	60±1Vdc	
	BAT. POLARITY		By internal fuse open						
	OVER TEMPERATURE		Protection type : Shut down o/p voltage, re-power on to recover						
	OUTPUT SHORT		Protection type : Shut down o/p voltage, re-power on to recover						
	AC OUTPUT	OVER LOAD (Typ.)		105 ~ 115% load for 180 sec., 115% ~ 150% load for 10 sec. Protection type : Shut down o/p voltage, re-power on to recover					
		CIRCUIT BREAKER(GFCI)		TBD					
GFCI PROTECTION		UL458 (Only for "GFCI" AC socket) None							
FUNCTION		REMOTE CONTROL DRY CONTACT Power ON-OFF remote control by front panel dry contact connector (by RELAY) Open : Normal work ; Short : Remote off Remote controller sold separately, Order No.: IRC1,IRC2,IRC3							
ENVIRON-MENT	WORK TEMP.		-20 ~ +70°C (Refer to "Derating curve")						
	WORKING HUMIDITY		20 ~ 90% RH non-condensing						
	STORAGE TEMP., HUMIDITY		-30 ~ +70°C / -22 ~ +158°F, 10 ~ 95% RH non-condensing						
	VIBRATION		10 ~ 500Hz, 3G 10min./1cycle, 60min. each along X, Y, Z axes						
OTHER	MTBF		TBD						
	DIMENSION		440*270*98mm (L*W*H)						
	PACKING		TBD						

NTU-1200 series(Built-in UPS function)

MODEL		NTU-1200-112 <input type="checkbox"/> NTU-1200-124 <input type="checkbox"/> NTU-1200-148 <input type="checkbox"/>			NTU-1200-212 <input type="checkbox"/> NTU-1200-224 <input type="checkbox"/> NTU-1200-248 <input type="checkbox"/>				
		<input type="checkbox"/> = US, GFCI, UN			<input type="checkbox"/> = EU, CN, AU, UK, UN				
OUTPUT	RATED POWER(Continuous)	1200W							
	OVER RATED POWER(3 Min.)	1380W							
	PEAK POWER(10 Sec.)	1800W							
	SURGE POWER(30 Cycles)	2000W							
	AC VOLTAGE	Default setting set at 110VAC 100 / 110 / 115 / 120Vac selectable by DIP S.W			Default setting set at 230VAC 200 / 220 / 230 / 240Vac selectable by DIP S.W				
	FREQUENCY	Default setting set at 60±0.1Hz 50/60Hz selectable by DIP S.W			Default setting set at 50Hz±0.1Hz 50/60Hz selectable by DIP S.W				
	WAVEFORM	Note.1 True sine wave (THD<3%)							
	AC REGULATION	±3.0% at rated input voltage							
FRONT PANEL LED Please refer to section 3.4 of installation manual									
INPUT	BAT. VOLTAGE	12V	24V	48V	12V	24V	48V		
	VOLTAGE RANGE (Typ.)	10 ~ 16.5Vdc	20 ~ 33Vdc	40 ~ 66Vdc	10 ~ 16.5Vdc	20 ~ 33Vdc	40 ~ 66Vdc		
	DC CURRENT (Typ.)	120A	60A	30A	120A	60A	30A		
	NO LOAD DISSIPATION (Typ.)	NON-SAVING MODE 15W			25W				
		SAVING MODE Default disable, auto detec AC output load ≤10W will be changed to saving mode							
		<8W							
	OFF MODE CURRENT DRAW	≤1mA							
	EFFICIENCY (Typ.)	Note.1 89%		90%	91%	90%	92%	93%	
BATTERY TYPES Lead Acid or li-ion									
PROTECTION	DC INPUT	FUSE (INTERNAL)		40A*4	40A*2	25A*2	40A*4	40A*2	25A*2
		LOW	ALARM	11±0.3Vdc	22±0.5Vdc	44±1Vdc	11±0.3Vdc	22±0.5Vdc	44±1Vdc
			SHUTDOWN	10±0.3Vdc	20±0.5Vdc	40±1Vdc	10±0.3Vdc	20±0.5Vdc	40±1Vdc
			RESTART	12.5±0.3Vdc	25±0.5Vdc	50±1Vdc	12.5±0.3Vdc	25±0.5Vdc	50±1Vdc
		HIGH	ALARM	15.5±0.3Vdc	31±0.5Vdc	62±1Vdc	15.5±0.3Vdc	31±0.5Vdc	62±1Vdc
			SHUTDOWN	16.5±0.3Vdc	33±0.5Vdc	66±1Vdc	16.5±0.3Vdc	33±0.5Vdc	66±1Vdc
	RESTART		15±0.3Vdc	30±0.5Vdc	60±1Vdc	15±0.3Vdc	30±0.5Vdc	60±1Vdc	
	BAT. POLARITY		By internal fuse open						
	OVER TEMPERATURE		Protection type : Shut down o/p voltage, re-power on to recover						
	OUTPUT SHORT		Protection type : Shut down o/p voltage, re-power on to recover						
	AC OUTPUT	OVER LOAD (Typ.)		105 ~ 115% load for 180 sec., 115% ~ 150% load for 10 sec. Protection type : Shut down o/p voltage, re-power on to recover					
		CIRCUIT BREAKER		15A			10A		
GFCI PROTECTION		UL458 (Only for "GFCI" AC socket) None							
FUNCTION		REMOTE CONTROL		CONNECTOR		ACCESSORY		Power ON-OFF remote control by front panel dry contact connector (by RELAY) Open : Normal work ; Short : Remote off Remote controller sold separately, Order No.: IRC1,IRC2,IRC3	
AC UPS MODE	AC INPUT RANGE		100/110/115/120Vac ±16%, recover ±13%			200/220/230/240Vac ±16%, recover ±13%			
	FREQUENCY RANGE		45 ~ 65Hz						
	TRASFER TIME (Typ.)		10ms inverter → AC by pass						
ENVIRON-MENT	WORK TEMP.		-25 ~ +70°C (Refer to "Derating curve")						
	WORKING HUMIDITY		20 ~ 90% RH non-condensing						
	STORAGE TEMP., HUMIDITY		-30 ~ +70°C / -22 ~ +158°F, 10 ~ 95% RH non-condensing						
	VIBRATION		10 ~ 500Hz, 3G 10min./1cycle, 60min. each along X, Y, Z axes						
OTHER	MTBF		166.3K hrs min. Telcordia TR/SR-332 (Bellcore); 58.3K hrs min. MIL-HDBK-217F (25°C)						
	DIMENSION		333*184*70mm (L*W*H)						
	PACKING		3.3Kg; 2pcs/ 7.6Kg/ 1.16CUFT						

NTU-1700 series (Built-in UPS function)

MODEL		NTU-1700-112 <input type="checkbox"/> NTU-1700-124 <input type="checkbox"/> NTU-1700-148 <input type="checkbox"/>		NTU-1700-212 <input type="checkbox"/> NTU-1700-224 <input type="checkbox"/> NTU-1700-248 <input type="checkbox"/>					
		<input type="checkbox"/> = US, GFCI, UN		<input type="checkbox"/> = EU, CN, AU, UK, UN					
OUTPUT	RATED POWER(Continuous)	1500W		1700W					
	OVER RATED POWER(3 Min.)	1750W		2000W					
	PEAK POWER(10 Sec.)	2250W		2550W					
	SURGE POWER(30 Cycles)	3000W		3400W					
	AC VOLTAGE	Default setting set at 110VAC 100 / 110 / 115 / 120Vac selectable by DIP S.W		Default setting set at 230VAC 200 / 220 / 230 / 240Vac selectable by DIP S.W					
	FREQUENCY	Default setting set at 60±0.1Hz 50/60Hz selectable by DIP S.W		Default setting set at 50Hz±0.1Hz 50/60Hz selectable by DIP S.W					
	WAVEFORM	Note.1 True sine wave (THD<3%)							
	AC REGULATION	±3.0% at rated input voltage							
FRONT PANEL LED Please refer to section 3.4 of installation manual									
INPUT	BAT. VOLTAGE	12V	24V	48V	12V	24V	48V		
	VOLTAGE RANGE (Typ.)	10 ~ 16.5Vdc	20 ~ 33Vdc	40 ~ 66Vdc	10 ~ 16.5Vdc	20 ~ 33Vdc	40 ~ 66Vdc		
	DC CURRENT (Typ.)	150A	75A	37.5A	170A	85A	42.5A		
	POWER SAVING MODE	≤1.2W@standby saving, mode when AC output load ≤10W, auto wake up when AC output load ≥15W							
	OFF MODE CURRENT DRAW	≤1mA							
	EFFICIENCY (Typ.)	Note.1 89%		90%	91%	90%	92%	93%	
	BATTERY TYPES		Lead Acid or li-ion						
PROTECTION	DC INPUT	FUSE (INTERNAL)		40A*5	30A*3	30A*2	40A*5	30A*3	30A*2
		LOW	ALARM	11±0.3Vdc	22±0.5Vdc	44±1Vdc	11±0.3Vdc	22±0.5Vdc	44±1Vdc
			SHUTDOWN	10±0.3Vdc	20±0.5Vdc	40±1Vdc	10±0.3Vdc	20±0.5Vdc	40±1Vdc
			RESTART	12.5±0.3Vdc	25±0.5Vdc	50±1Vdc	12.5±0.3Vdc	25±0.5Vdc	50±1Vdc
		HIGH	ALARM	15.5±0.3Vdc	31±0.5Vdc	62±1Vdc	15.5±0.3Vdc	31±0.5Vdc	62±1Vdc
			SHUTDOWN	16.5±0.3Vdc	33±0.5Vdc	66±1Vdc	16.5±0.3Vdc	33±0.5Vdc	66±1Vdc
	RESTART		15±0.3Vdc	30±0.5Vdc	60±1Vdc	15±0.3Vdc	30±0.5Vdc	60±1Vdc	
	BAT. POLARITY		By internal fuse open						
	AC OUTPUT	OVER TEMPERATURE		Protection type : Shut down o/p voltage, re-power on to recover					
		OUTPUT SHORT		Protection type : Shut down o/p voltage, re-power on to recover					
		OVER LOAD (Typ.)		105 ~ 115% load for 180 sec., 115% ~ 150% load for 10 sec.					
		CIRCUIT BREAKER(GFCI)		TBD					
		GFCI PROTECTION		UL458 (Only for "GFCI" AC socket) None					
	FUNCTION	REMOTE CONTROL	CONNECTOR	Power ON-OFF remote control by front panel dry contact connector (by RELAY) Open : Normal work ; Short : Remote off					
ACCESSORY			Remote controller sold separately, Order No.: IRC1,IRC2,IRC3						
AC UPS MODE	AC INPUT RANGE		100/110/115/120Vac±16%, recover±13%		200/220/230/240Vac±16%, recover±13%				
	FREQUENCY RANGE		45 ~ 65Hz						
	TRASFER TIME (Typ.)		10ms inverter → AC by pass						
ENVIRON- MENT	WORK TEMP.		-20 ~ +70°C (Refer to "Derating curve")						
	WORKING HUMIDITY		20 ~ 90% RH non-condensing						
	STORAGE TEMP., HUMIDITY		-30 ~ +70°C / -22 ~ +158°F, 10 ~ 95% RH non-condensing						
	VIBRATION		10 ~ 500Hz, 3G 10min./1cycle, 60min. each along X, Y, Z axes						
OTHER	MTBF		TBD						
	DIMENSION		400*184*70mm (L*W*H)						
	PACKING		TBD						

NTU-2200 series (Built-in UPS function)

MODEL		NTU-2200-112 <input type="checkbox"/> NTU-2200-124 <input type="checkbox"/> NTU-2200-148 <input type="checkbox"/>		NTU-2200-212 <input type="checkbox"/> NTU-2200-224 <input type="checkbox"/> NTU-2200-248 <input type="checkbox"/>					
		<input type="checkbox"/> = US, GFCI, UN		<input type="checkbox"/> = EU, CN, AU, UK, UN					
OUTPUT	RATED POWER(Continuous)	2200W							
	OVER RATED POWER(3 Min.)	2530W							
	PEAK POWER(10 Sec.)	2750W							
	SURGE POWER(30 Cycles)	4400W							
	AC VOLTAGE	Default setting set at 110VAC 100 / 110 / 115 / 120Vac selectable by DIP S.W		Default setting set at 230VAC 200 / 220 / 230 / 240Vac selectable by DIP S.W					
	FREQUENCY	Default setting set at 60±0.1Hz 50/60Hz selectable by DIP S.W		Default setting set at 50Hz±0.1Hz 50/60Hz selectable by DIP S.W					
	WAVEFORM	Note.1 True sine wave (THD<3%)							
	AC REGULATION	±3.0% at rated input voltage							
FRONT PANEL LED Please refer to section 3.4 of installation manual									
INPUT	BAT. VOLTAGE	12V	24V	48V	12V	24V	48V		
	VOLTAGE RANGE (Typ.)	10 ~ 16.5Vdc	20 ~ 33Vdc	40 ~ 66Vdc	10 ~ 16.5Vdc	20 ~ 33Vdc	40 ~ 66Vdc		
	DC CURRENT (Typ.)	220A	110A	55A	220A	110A	55A		
	POWER SAVING MODE	≤1.2W@standby saving, mode when AC output load ≤10W, auto wake up when AC output load ≥15W							
	OFF MODE CURRENT DRAW	≤1mA							
	EFFICIENCY (Typ.)	Note.1 89%		91%	92%	90%	92%	93%	
	BATTERY TYPES		Lead Acid or li-ion						
PROTECTION	DC INPUT	FUSE (INTERNAL)		40A*5	30A*3	30A*2	40A*5	30A*3	30A*2
		LOW	ALARM	11±0.3Vdc	22±0.5Vdc	44±1Vdc	11±0.3Vdc	22±0.5Vdc	44±1Vdc
			SHUTDOWN	10±0.3Vdc	20±0.5Vdc	40±1Vdc	10±0.3Vdc	20±0.5Vdc	40±1Vdc
			RESTART	12.5±0.3Vdc	25±0.5Vdc	50±1Vdc	12.5±0.3Vdc	25±0.5Vdc	50±1Vdc
		HIGH	ALARM	15.5±0.3Vdc	31±0.5Vdc	62±1Vdc	15.5±0.3Vdc	31±0.5Vdc	62±1Vdc
			SHUTDOWN	16.5±0.3Vdc	33±0.5Vdc	66±1Vdc	16.5±0.3Vdc	33±0.5Vdc	66±1Vdc
	RESTART		15±0.3Vdc	30±0.5Vdc	60±1Vdc	15±0.3Vdc	30±0.5Vdc	60±1Vdc	
	BAT. POLARITY		By internal fuse open						
	AC OUTPUT	OVER TEMPERATURE		Protection type : Shut down o/p voltage, re-power on to recover					
		OUTPUT SHORT		Protection type : Shut down o/p voltage, re-power on to recover					
		OVER LOAD (Typ.)		105 ~ 115% load for 180 sec., 115% ~ 150% load for 10 sec.					
		CIRCUIT BREAKER(GFCI)		TBD					
		GFCI PROTECTION		UL458 (Only for "GFCI" AC socket) None					
	FUNCTION	REMOTE CONTROL	CONNECTOR	Power ON-OFF remote control by front panel dry contact connector (by RELAY) Open : Normal work ; Short : Remote off					
ACCESSORY			Remote controller sold separately, Order No.: IRC1,IRC2,IRC3						
AC UPS MODE	AC INPUT RANGE		100/110/115/120Vac±25%, recover±12.5%		200/220/230/240Vac±25%, recover±12.5%				
	FREQUENCY RANGE		45 ~ 65Hz						
	TRASFER TIME (Typ.)		10ms inverter → AC by pass						
ENVIRON- MENT	WORK TEMP.		-20 ~ +70°C (Refer to "Derating curve")						
	WORKING HUMIDITY		20 ~ 90% RH non-condensing						
	STORAGE TEMP., HUMIDITY		-30 ~ +70°C / -22 ~ +158°F, 10 ~ 95% RH non-condensing						
	VIBRATION		10 ~ 500Hz, 3G 10min./1cycle, 60min. each along X, Y, Z axes						
OTHER	MTBF		TBD						
	DIMENSION		400*270*98mm (L*W*H)						
	PACKING		TBD						

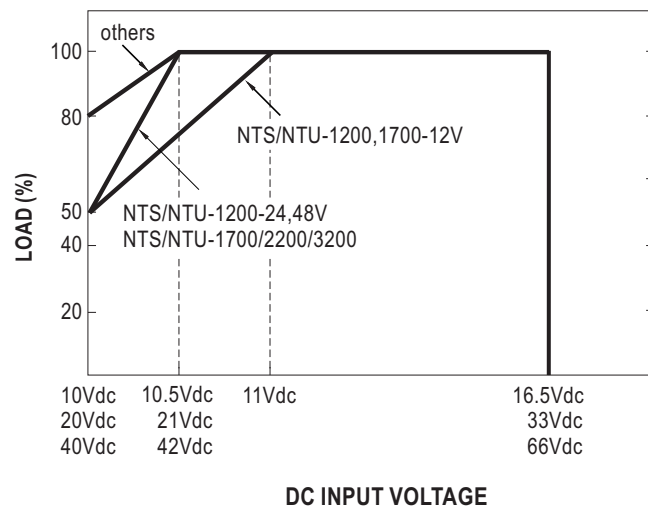
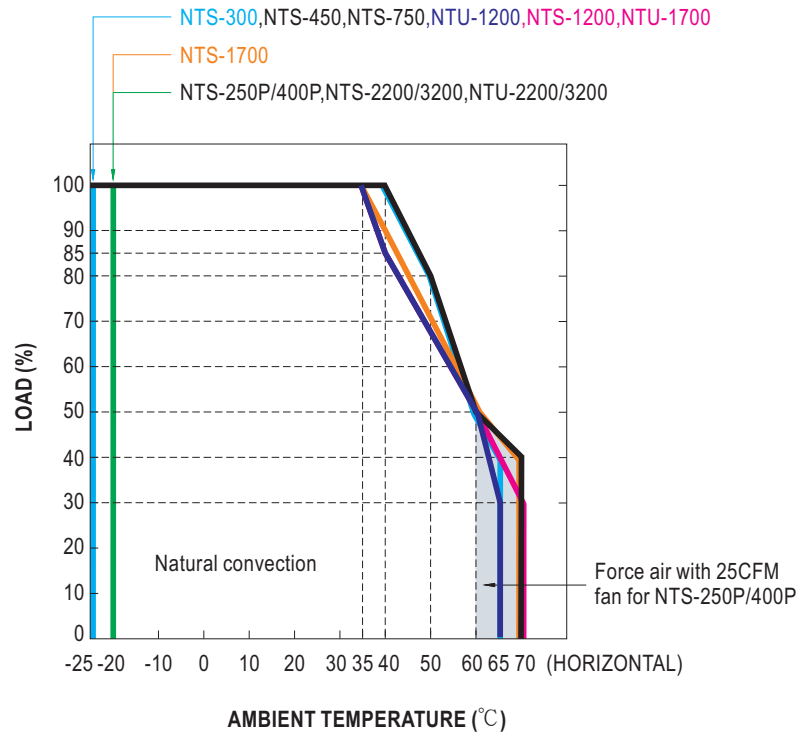
NTU-3200 series (Built-in UPS function)

MODEL		NTU-3200-112 <input type="checkbox"/> NTU-3200-124 <input type="checkbox"/> NTU-3200-148 <input type="checkbox"/>			NTU-3200-212 <input type="checkbox"/> NTU-3200-224 <input type="checkbox"/> NTU-3200-248 <input type="checkbox"/>				
		<input type="checkbox"/> = US, GFCI, UN			<input type="checkbox"/> = EU, CN, AU, UK, UN				
OUTPUT	RATED POWER(Continuous)	3200W			3200W				
	OVER RATED POWER(3 Min.)	3500W			3680W				
	PEAK POWER(10 Sec.)	4500W			4800W				
	SURGE POWER(30 Cycles)	6000W			6400W				
	AC VOLTAGE	Default setting set at 110VAC 100 / 110 / 115 / 120Vac selectable by DIP S.W			Default setting set at 230VAC 200 / 220 / 230 / 240Vac selectable by DIP S.W				
	FREQUENCY	Default setting set at 60 ± 0.1Hz 50/60Hz selectable by DIP S.W			Default setting set at 50Hz ± 0.1Hz 50/60Hz selectable by DIP S.W				
	WAVEFORM <small>Note.1</small>	True sine wave (THD<3%)							
	AC REGULATION	± 3.0% at rated input voltage							
FRONT PANEL LED Please refer to section 3.4 of installation manual									
INPUT	BAT. VOLTAGE	12V	24V	48V	12V	24V	48V		
	VOLTAGE RANGE (Typ.)	10 ~ 16.5Vdc	20 ~ 33Vdc	40 ~ 66Vdc	10 ~ 16.5Vdc	20 ~ 33Vdc	40 ~ 66Vdc		
	DC CURRENT (Typ.)	300A	150A	75A	320A	160A	80A		
	POWER SAVING MODE	≤ 1.2W@standby saving, mode when AC output load ≤ 10W, auto wake up when AC output load ≥ 15W							
	OFF MODE CURRENT DRAW	≤ 1mA							
	EFFICIENCY (Typ.) <small>Note.1</small>	89%	91%	92%	90%	92%	93%		
	BATTERY TYPES	Lead Acid or Li-ion							
PROTECTION	DC INPUT	FUSE (INTERNAL)	40A*5	30A*3	30A*2	40A*5	30A*3	30A*2	
		LOW	ALARM	11 ± 0.3Vdc	22 ± 0.5Vdc	44 ± 1Vdc	11 ± 0.3Vdc	22 ± 0.5Vdc	44 ± 1Vdc
			SHUTDOWN	10 ± 0.3Vdc	20 ± 0.5Vdc	40 ± 1Vdc	10 ± 0.3Vdc	20 ± 0.5Vdc	40 ± 1Vdc
			RESTART	12.5 ± 0.3Vdc	25 ± 0.5Vdc	50 ± 1Vdc	12.5 ± 0.3Vdc	25 ± 0.5Vdc	50 ± 1Vdc
		HIGH	ALARM	15.5 ± 0.3Vdc	31 ± 0.5Vdc	62 ± 1Vdc	15.5 ± 0.3Vdc	31 ± 0.5Vdc	62 ± 1Vdc
			SHUTDOWN	16.5 ± 0.3Vdc	33 ± 0.5Vdc	66 ± 1Vdc	16.5 ± 0.3Vdc	33 ± 0.5Vdc	66 ± 1Vdc
	RESTART		15 ± 0.3Vdc	30 ± 0.5Vdc	60 ± 1Vdc	15 ± 0.3Vdc	30 ± 0.5Vdc	60 ± 1Vdc	
	BAT. POLARITY		By internal fuse open						
	AC OUTPUT	OVER TEMPERATURE	Protection type : Shut down o/p voltage, re-power on to recover						
		OUTPUT SHORT	Protection type : Shut down o/p voltage, re-power on to recover						
		OVER LOAD (Typ.)	105 ~ 115% load for 180 sec., 115% ~ 150% load for 10 sec.						
		CIRCUIT BREAKER(GFCI)	TBD						
		GFCI PROTECTION	UL458 (Only for "GFCI" AC socket) None						
	FUNCTION	REMOTE CONTROL	CONNECTOR	Power ON-OFF remote control by front panel dry contact connector (by RELAY) Open : Normal work ; Short : Remote off					
ACCESSORY			Remote controller sold separately, Order No.: IRC1,IRC2,IRC3						
AC UPS MODE	AC INPUT RANGE	100/110/115/120Vac ± 25%, recover ± 12.5%			200/220/230/240Vac ± 25%, recover ± 12.5%				
	FREQUENCY RANGE	45 ~ 65Hz							
	TRANSFER TIME (Typ.)	10ms inverter → AC by pass							
ENVIRON- MENT	WORK TEMP.	-20 ~ +70°C (Refer to "Derating curve")							
	WORKING HUMIDITY	20 ~ 90% RH non-condensing							
	STORAGE TEMP., HUMIDITY	-30 ~ +70°C / -22 ~ +158°F, 10 ~ 95% RH non-condensing							
	VIBRATION	10 ~ 500Hz, 3G 10min./1cycle, 60min. each along X, Y, Z axes							
OTHER	MTBF	TBD							
	DIMENSION	440*270*98mm (L*W*H)							
	PACKING	TBD							

2.4 Safety Overview

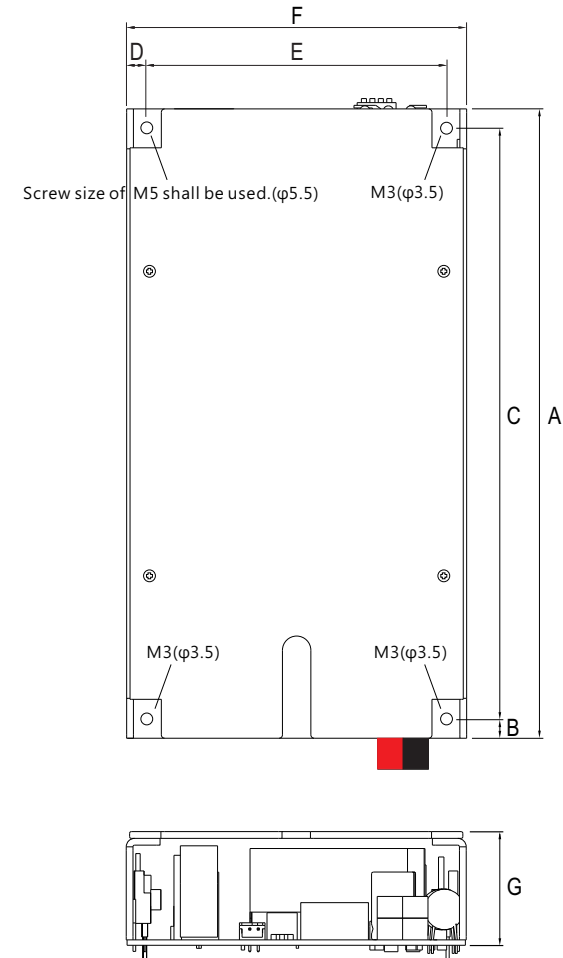
Socket type								
		TYPE-US	TYPE-GFCI	TYPE-UN	TYPE-EU	TYPE-CN	TYPE-AU	TYPE-UK
		Standard	Optional	Standard	Standard	Standard	Optional	Optional
		USA	USA	UNIVERSAL	EUROPE	CHINA	AUSTRALIA	U.K
110Vac	NTS-300	 	FC	NA	NA	NA	NA	NA
	NTS-450							
	NTS-750							
	NTS/NTU-1200							
	NTS/NTU-1700							
	NTS/NTU-2200							
	NTS/NTU-3200							
220Vac	NTS-300	NA	NA	 		 	 	
	NTS-450							
	NTS-750							
	NTS/NTU-1200							
	NTS/NTU-1700							
	NTS/NTU-2200							
	NTS/NTU-3200							

2.5 Derating curve



2.6 Mechanical specification

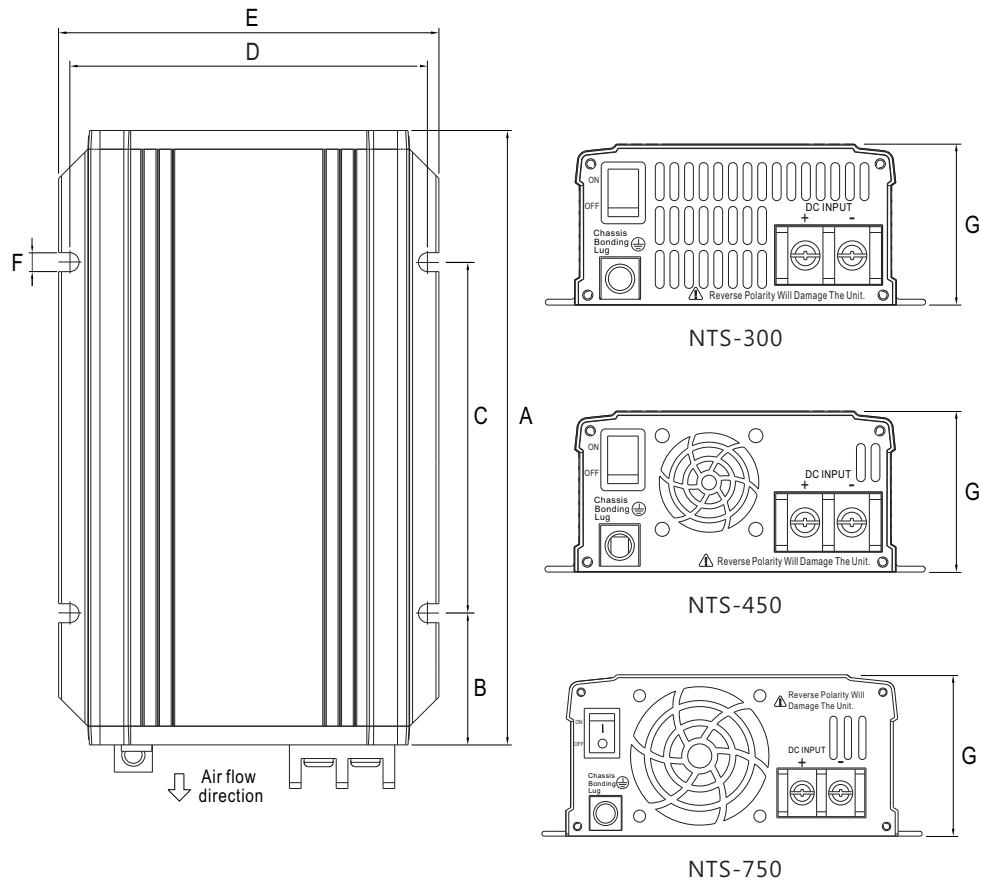
NTS-250P/400P



Model	A	B	C	D	E	F	G
NTS-250P	186	5.7	174.6	5.95	88.6	100.5	32
NTS-400P	186	5.7	174.6	5.95	88.6	100.5	32

Unit:mm

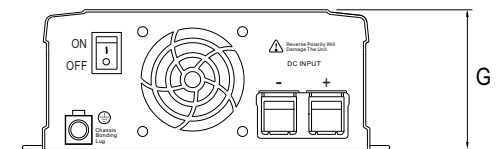
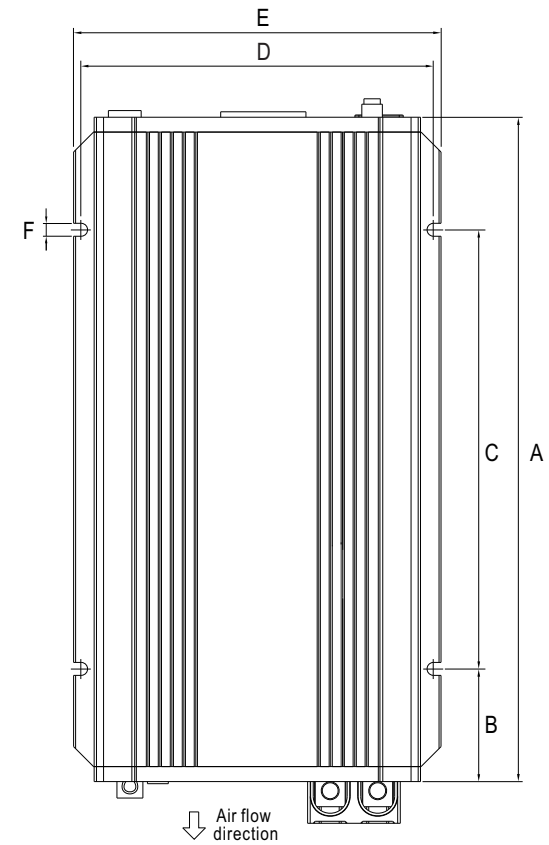
NTS-300/450/750



Model	A	B	C	D	E	F	G
NTS-300	210	45	120	119	130	7	55
NTS-450	210	45	120	119	130	7	55
NTS-750	270	45	180	147	158	7	67

Unit:mm

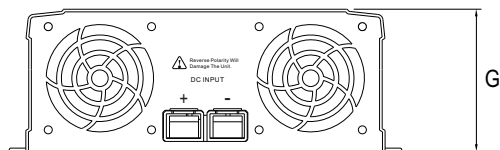
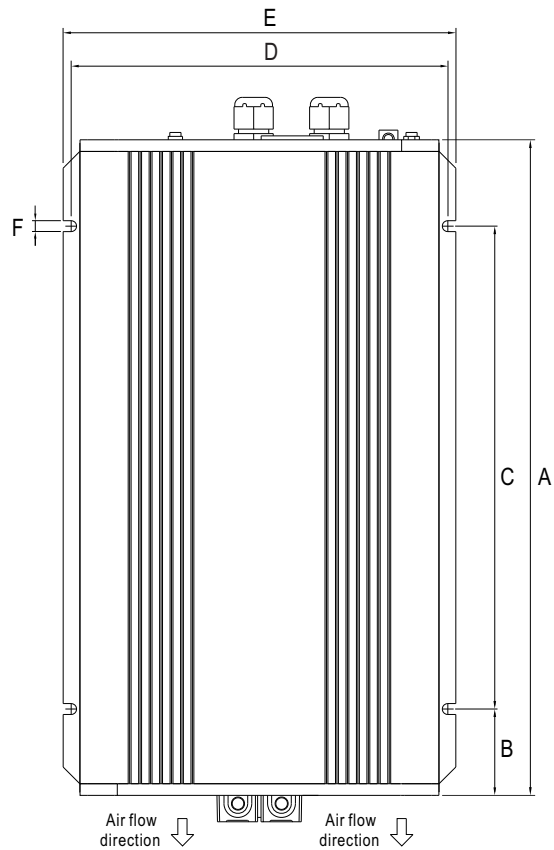
NTS/NTU-1200/1700



Model	A	B	C	D	E	F	G
NTS/NTU-1200	333	56.5	220	173	184	7	70
NTS/NTU-1700	400	62.5	275	173	184	7	70

Unit:mm

NTS/NTU-2200/3200



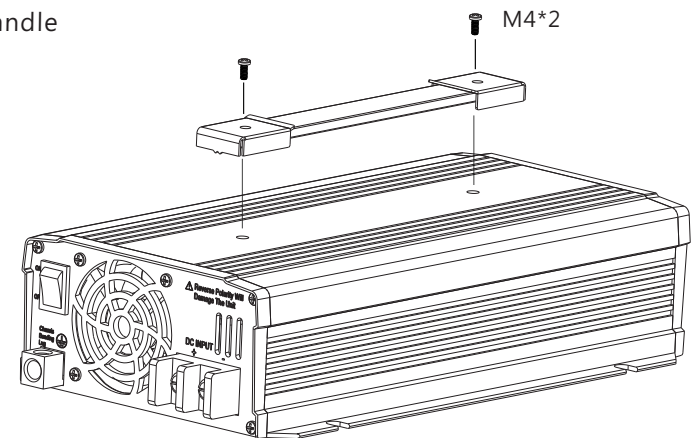
Model	A	B	C	D	E	F	G
NTS/NTU-2200	400	TBD	TBD	259	270	7.5	98
NTS/NTU-3200	440	TBD	TBD	259	270	7.5	98

Unit:mm

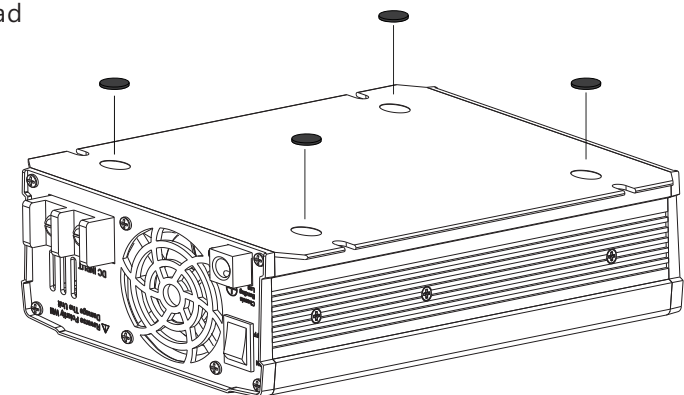
Accessories(Optional)

MW's Order No.	Item	Quantity
RJ11-RS232		1
Carry Handle	① Pull Handle	1
	② Foot pad	4
	③ Screw	2

① Pull Handle



② Foot pad



3. Installation & Wiring

3.1 Precautions

- The unit should be mounted on a flat surface or holding rack with suitable strength.
- In order to ensure the lifespan of the unit, you should refrain from operating the unit in environment of high dust or moisture.
- NTS-450~3200/NTU-1200~3200 are design with built-in DC fan. Please make sure the ventilation is not blocked. We recommend that there should be no barriers within 15cm of the ventilating slits, which is shown as follow.

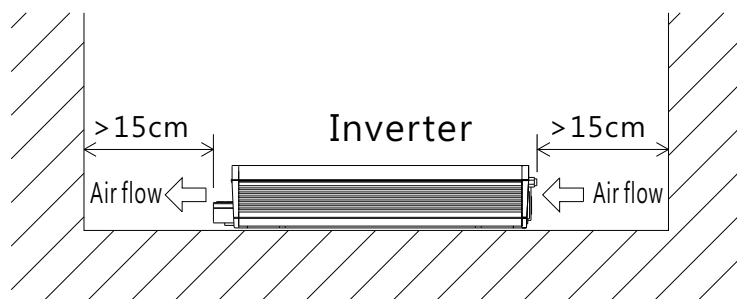


Figure 3-1 set-up recommendation

3.2 System Block Diagram

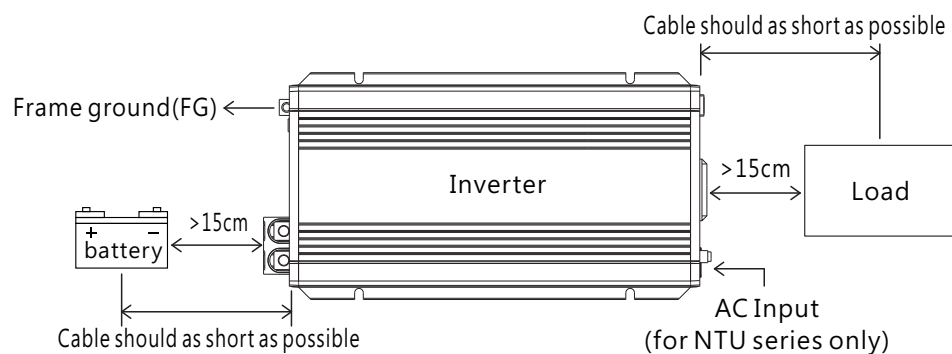
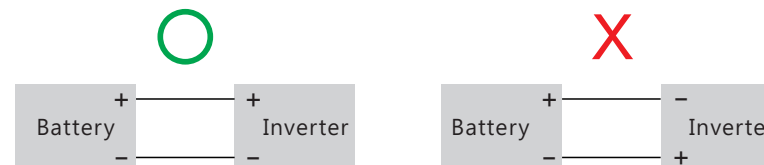


Figure 3-2 System Block Diagram

3.3 Installation procedures

- ① Please turn off the inverter first.
- ② Select proper cable for connection between battery and inverter by referring to section 3.4
- ③ Connect the positive polarity of battery to the positive of inverter, and connect the negative polarity of battery to the negative of inverter.



- ④ Turn the power switch to "ON" position, as soon as it shows green in status's LED, then it's ready.

3.4 Cable selection

Wire connections should be as short as possible and less than 1.5 meter is highly recommended. Make sure that suitable wires are chosen based on safety requirement and rating of current. Small cross section will result in lower efficiency, less output power and the wires may also become overheated and cause danger. Please refer to table 3-1.

Rated current(A)	Corss section(mm ²)	AWG
10A ~ 13A	1.25	16
13A ~ 16A	1.5	14
16A ~ 25A	2.5	12
25A ~ 32A	4	10
32A ~ 40A	6	8
40A ~ 63A	10	6
63A ~ 80A	16	4
80A ~ 100A	25	2
100A ~ 125A	35	1
125A ~ 160A	50	0

Table 3-1 Cable recommendation

3.5 Battery selection

Battery types : Lead acid or lithium ion batteries

Voltage range : 10~16.5Vdc (12V), 20~33Vdc (24V), 40~66Vdc (48V)

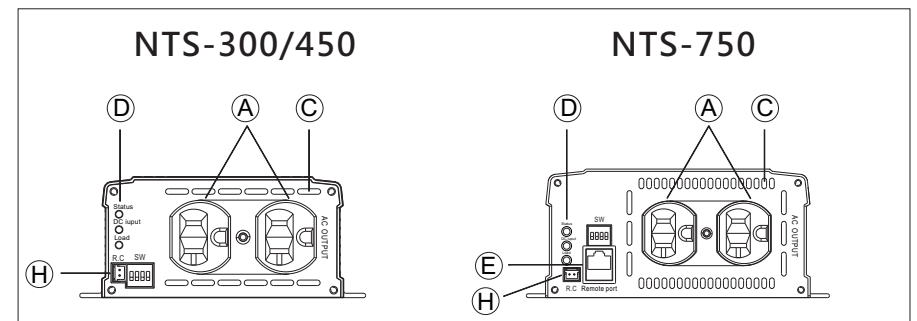
Battery capacity : Please refer to the following table.

Model/Output	112	212	124	224	148	248
NTS-250P	85Ah or above		45Ah or above		25Ah or above	
NTS-300	100Ah or above		50Ah or above		30Ah or above	
NTS-400P	150Ah or above		70Ah or above		35Ah or above	
NTS-450	170Ah or above		85Ah or above		45Ah or above	
NTS-750	250Ah or above		130Ah or above		65Ah or above	
NTS/NTU-1200	400Ah or above		200Ah or above		100Ah or above	
NTS/NTU-1700	500Ah or above		250Ah or above		125Ah or above	
NTS/NTU-2200	735Ah or above		370Ah or above		185Ah or above	
NTS/NTU-3200	1000Ah or above		500Ah or above		250Ah or above	

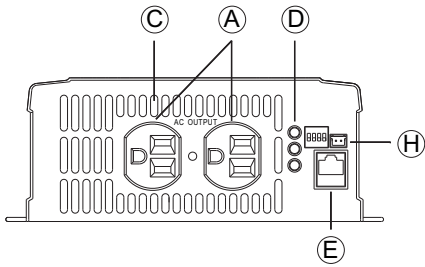
4. User Interface

4.1 AC panel

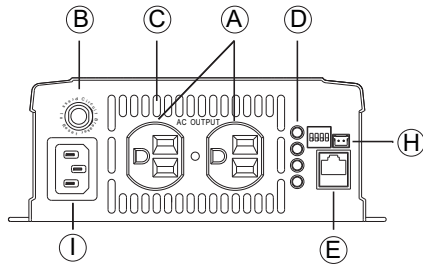
- Ⓐ **AC output socket** : Please refer to Pg. 16 for varies socket for different regions.
- Ⓑ **No fuse breaker with reset button (only for NTU-1200/1700/2200/3200 GFCI series ; NTU-1200/1700/2200/3200 series)** : Under "bypass mode", when the AC output is shorted or the load current exceeds the rated current of the No fuse breaker, the breaker will trip and that stops bypassing energy for the utility thus prevent possible danger. When the abnormal condition is cleared, the user can press down on the reset button to resume operation.
- Ⓒ **Ventilation slits**: The inverter requires good ventilation for proper operation and prolonging its lifetime.
- Ⓓ **LED indicators** : Indicate the status of inverter and the load condition.
- Ⓔ **Communication port**: For remote monitoring purpose, the unit can be connected to a PC through this communication port by using the or a cable and monitoring software. Also for remote control purpose, the unit can be connected to the IRC module through this port.
- Ⓕ **Power ON/OFF switch** : The inverter will turn ON if the switch is in the ON position, and vice versa.
- Ⓖ **FG connection**
- Ⓖ **Remote ON/OFF** : Inverter will turn on if the pins of RC connector is open. And, inverter will turn off if the pins are shorted.
- Ⓖ **AC bypass socket** : When AC mains is available, by connecting the AC mains to the AC socket, it will enable AC bypass function, which the energy will provide to load from AC mains directly.



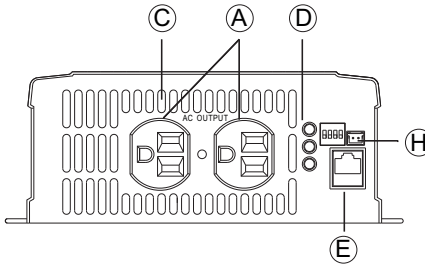
NTS-1200



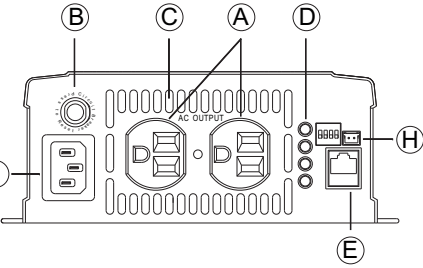
NTU-1200



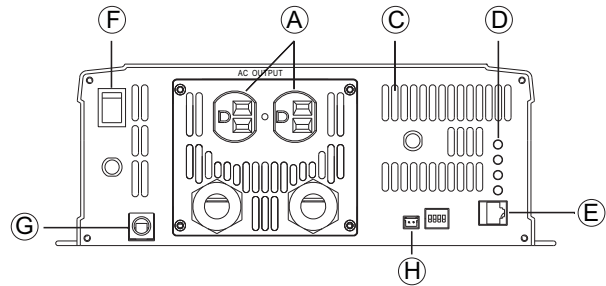
NTS-1700



NTU-1700



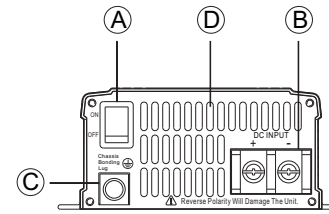
NTS/NTU-2200/3200



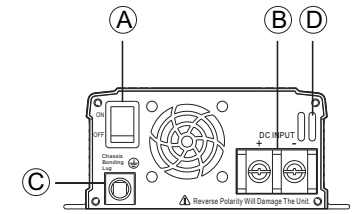
4.2 DC input panel

- (A) POWER ON/OFF switch: The inverter will turn ON if the switch is in the ON position, and vice versa.
- (B) Input terminals (+), (-)
- (C) Frame ground (FG)
- (D) Ventilation slits: The inverter requires suitable ventilation to work properly. Please make sure there is good ventilation and the lifespan of the inverter can be preserved.

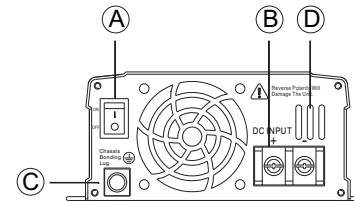
NTS-300



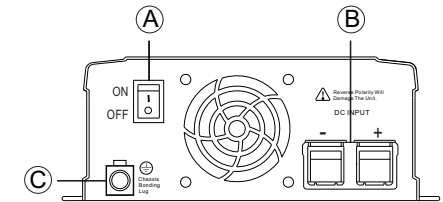
NTS-450



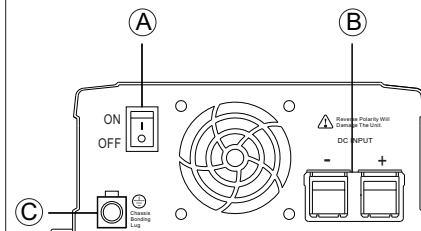
NTS-750



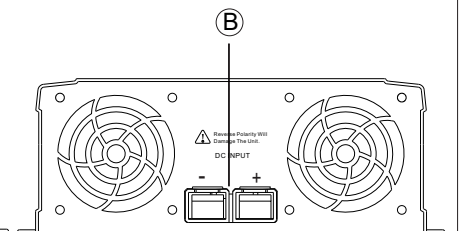
NTS/NTU-1200



NTS/NTU-1700







NTS/NTU-2200/3200



4.3 LED Indicator

Status indicator :

The LED is used to indicate the status of inverter, including inverter OK, remote on/off and power saving mode.

Status	Green	Orange	Red
	 Inverter OK	 Remote off  Saving mode	 Abnormal Status (See below table)

DC Input Indicator :

It is used to show the input status of inverter.

Green light :










When input voltage is greater than 12.5V(12V)/25V(24V) 50V(48V).

Orange light :

When input voltage is within 11V~12.5V(12V)/22V~25V(24V)/44V~50V(48V).

Red light :

When input voltage is lower than 11V(12V)/22V(24V)/44V(48V) or over it's specification. It flashes and warning sound will be activated.

DC Input	Green	Orange	Red
	 12.5~15.5Vdc	 11~12.5Vdc	 <11Vdc or >15.5Vdc
	 25~31Vdc	 22~25Vdc	 <22Vdc or >31Vdc
	 50~62Vdc	 44~50Vdc	 <44Vdc or >62Vdc




Load Condition Indicator :

It represents the magnitude of output loads

Green light : When load is lesser than 40%.

Orange light : When load is between 40%~80%.

Red light : When load is greater than 80%.

Load	Green	Orange	Red
	 <40% load	 40~80% load	 >80% load

AC Input Indicator :

Represents the magnitude of AC main.

Green light :




When AC mains is connected and the voltage is present normally.




Flash in green light :

When the mains is connected but the voltage exceeds $\pm 10\%$ of the rated voltage, the green light will start flashing for warning.

Light off :

when the mains is disconnected or not connected, LED will be in off.

AC Input	Green
	 Utility OK
	 Utility error
	 Utility disconnect

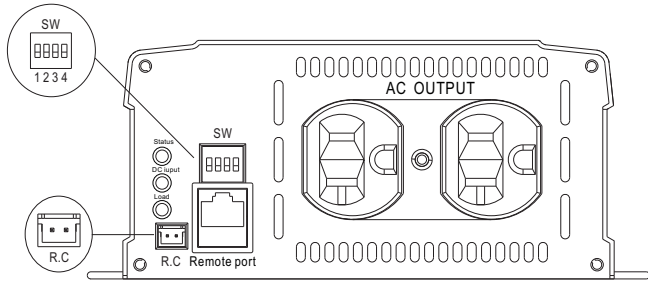
-  Light
-  Flash
-  Light off

5. Explanation of Operation

5.1 Procedure of setting Operating Mode, Output Voltage, Frequency, and Saving Mode

5.1.1 Output Voltage and Frequency Setting

Factory settings are either 110Vac/60Hz or 230Vac/50Hz, users are able to adjust the voltage and frequency, through the DIP switch of position 1,2,3,4 on the AC panel.



Type-US

AC Output Voltage、 Frequency、 Power Saving Mode、 Selectable by DIP SW			
SW1	SW2	SW3	SW4
OFF	OFF : 100Vac or 200Vac	ON : 50Hz	ON : Power saving mode
OFF	ON : 110Vac or 220Vac		
ON	OFF : 115Vac or 230Vac	OFF: 60Hz	OFF: Non-power saving mode
ON	ON : 120Vac or 240Vac		

5.1.2 Power Saving Mode setting

When the inverter is in no load status, in order to reduce battery energy consumption by inveter accidentally, Position 4 of DIP S.W. on the panel of inverter, can be adjusted to the "ON" position. When this mode is activated, if the load is less than 10W, the inverter will turn off the output and enter the power saving mode after 3 second. In the power saving mode, the inverter MCU will periodically detect the output load status. When a load greater than 25W is connected, the inverter will switch back to normal mode and start output again. (Non-power saving mode is used as factory setting)

5.1.3 Remote ON/OFF

R.C Switch	
Open	Normal work
Short	Remote off

5.2 Function Difference

Funtion/model	NTS-250P/400P	NTS-300/450	NTS-750/1200/1700/2200/3200	NTU-1200/1700/2200/3200
Support IRC	X	X	●	●
Support RS-232	●	X	●	●
UPS Function	X	X	X	●

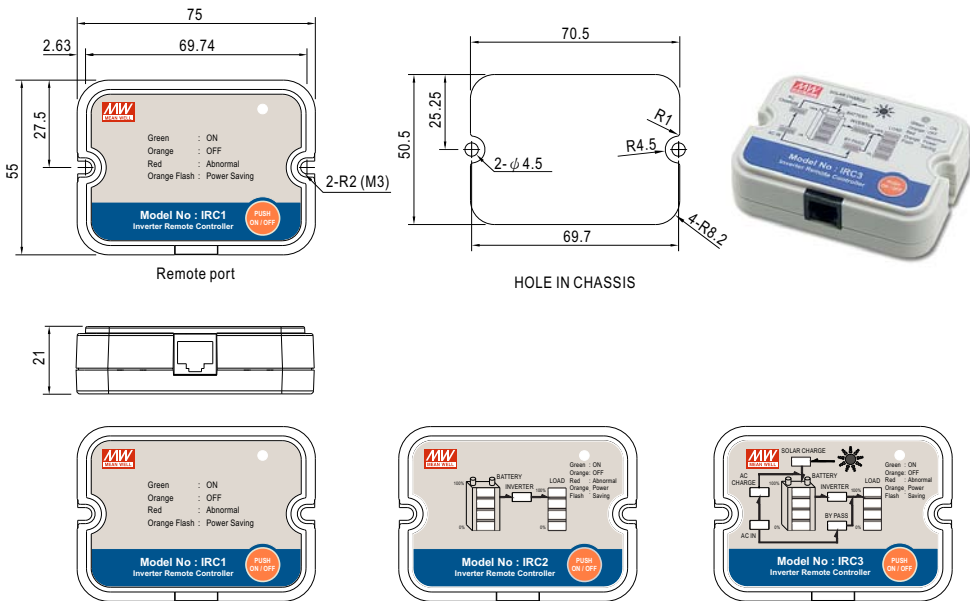
- Standard

5.3 IRC1/IRC2/IRC3 Remote Control Unit

- IRC1/IRC2/IRC3 is the monitoring and control unit used for the inverter series.
- IRC1/IRC2/IRC3 can decode the RS-232 signals sent by the inverter series and display through digital meters.

Note: Part of the control signals will not function properly due to different compliance of each model.

MODEL	IRC1	IRC2	IRC3
OUTPUT	DIGITAL METER ----- Display the battery level, output load level, and operating status of inverter unit		
	CONTROL OUTPUT Remote ON/OFF for inverter unit		
	LED INDICATOR Remote turn ON(Green) ; Remote turn Off(Orange) ; Abnormal (Red) ; Saving mode (Orange flash)		
FUNCTION	REMOTE ON/OFF CONTROL The controlled inverter unit can be turned ON/OFF on the remote control panel for IRC1 / IRC2 / IRC3		
	POWER SAVING CONTROL Power saving enable / disable activation		
	SUITABLE SERIES	TS-700 / 1000 / 1500 / 3000 TN-1500 / 3000 NTS-750 / 1200 / 1700 / 2200 / 3200 NTU-1200 / 1700 / 2200 / 3200	TS-700 / 1000 / 1500 / 3000 NTS-750 / 1200 / 1700 / 2200 / 3200 NTU-1200 / 1700 / 2200 / 3200
ENVIRONMENT	WORKING TEMP. -20 ~ +50℃		
	WORKING HUMIDITY 20 ~ 90% RH non-condensing		
	STORAGE TEMP., HUMIDITY -40 ~ +85℃, 10 ~ 95% RH non-condensing		
	VIBRATION 10 ~ 500Hz, 2G 10min./1cycle, 60min. each along X, Y, Z axes		
EMC	EMC EMISSION Compliance to EN55032 class A, EN61000-3-2,3, FCC PART 15 class A		
	EMC IMMUNITY Compliance to EN61000-4-2,3,4,6,8		
OTHER	DIMENSION (L*W*H) (Unit:mm) 186*100.5*32mm (L*W*H)		
	PACKING 0.75Kg; 18pcs/ 14.5Kg/ 0.97CUFT		
NOTE	1. The remote control can not re-power on for inverter at abnormal status. 2. The ambient temperature derating of 3.5℃/1000m with fanless models and of 5℃/1000m with fan models for operating altitude higher than 2000m(6500ft). ※ Product Liability Disclaimer : For detailed information, please refer to https://www.meanwell.com/serviceDisclaimer.aspx		



5.4 RS-232 Protocol

RS-232 communication can be used between NTS/NTU series products and external controller (Controller) or PC software. The internal data of single NTS/NTU can be read through RS-232, but Multiple units in a bus is not allowed.

The RS-232 of NTS/NTU series are defined as follows.

Control	Setting
Baud Rate	9600
Data Bits	8
Stop Bit	1
Parity	None
Flow Control	None

Definition of MEAN WELL RS-232 protocol

Command Code	Type	Command name
Q	R	Status Inquiry
I	R	INVERTER Information
W	W	Write Information into INVERTER EEPROM
C	W	Remote Control INVERTER
pU	W	Enable setting mode (for "V")
V	R/W	Write voltage · Frequency

Definition of command(Q)

49 byte data flow of commandd Q		(VVV QQQ SS.S BBB TT.T MMM RR.R DDD PPP b0b1b2b3b4b5b6b7b8b9b10b11b12b13b14b15b16b17b18)				
Data byte	Funtion name	Description	R/W	Range	Data type	Uint
WWW,3	O/P Voltage	O/P Voltage	R	0~250Vac	U1	ASCII
QQQ,3	O/P load percent (Digital)	O/P load percent (Digital)	R	0% =000 0 < ~ ≤30% =025 31 < ~ ≤50% =050 51 < ~ ≤75% =075 76 < ~ % =100	U1	ASCII
SSS,4	Battery voltage	Battery voltage	R	12:0~17.0Vdc 24:0~34.0Vdc 48:0~68.0Vdc	U1	ASCII
BBB,3	Battery capacity	Battery capacity	R	0 ≤ ~ < 25% =025 26 < ~ ≤50% =050 51 < ~ ≤75% =075 76 < ~ ≤100% =100	U1	ASCII
TT.T,4	Heat Sink Temperature	Heat Sink Temperature	R	0~99.9°C	U1	ASCII
MMM,3	Utility Power Voltage	Utility Power Voltage	R	0~250Vac	U1	ASCII
RR.R,4	Output Power Frequency	Output Power Frequency	R	40.0~70.0 Hz	U1	ASCII
DDD,3	DC BUS Voltage	DC BUS Voltage	R	0V	U1	ASCII
PPP,3	O/P load Percent (Analog)	O/P load Percent (Analog)	R	0~100%	U1	ASCII
b0,1	INVERTER Mode	INVERTER Mode	R	1: INVERTER Mode	U1	ASCII
b1,1	Bypass Mode	Bypass Mode	R	1: Bypass Mode	U1	ASCII
b2,1	Utility Power supply	Utility Power supply	R	1: Utility Power	U1	ASCII

49 byte data flow of commandd Q		(VVV QQQ SS.S BBB TT.T MMM RR.R DDD PPP b0b1b2b3b4b5b6b7b8b9b10b11b12b13b14b15b16b17b18)				
Data byte	Funtion name	Description	R/W	Range	Data type	Uint
b3,1	Utility Charger Enable	Utility Charger Enable	R	1: Enable	U1	ASCII
b4,1	Solar Charger Enable	Solar Charger Enable	R	1: Enable	U1	ASCII
b5,1	Saving Mode Occurred	Saving Mode Occurred	R	1: Saving Mode	U1	ASCII
b6,1	Battery Exhausted Mode	Battery Exhausted Mode	R	1: Battery low	U1	ASCII
b7,1	Shutdown Mode (Battery used up)	Shutdown Mode (Battery used up)	R	Shutdown Mode (Battery used up)	U1	ASCII
b8,1	Battery OVP	Battery OVP	R	1: Battery OVP	U1	ASCII
b9,1	Remote Shutdown	Remote Shutdown	R	1: Remote Shutdown	U1	ASCII
b10,1	OLP 100 ~ 115 %	OLP 100 ~ 115 %	R	1: Occurred OLP 100%~	U1	ASCII
b11,1	OLP 115 ~ 150 %	OLP 115 ~ 150 %	R	1: Occurred OLP 115%~	U1	ASCII
b12,1	OLP 150% ~	OLP 150% ~	R	1: Occurred OLP 150%~	U1	ASCII
b13,1	OTP	OTP	R	1: Inverter OTP 2: Fan lock protection	U1	ASCII
b14,1	INV UVP	INV UVP	R	1: INV UVP	U1	ASCII
b15,1	INV OVP	INV OVP	R	1: INV UVP	U1	ASCII

Data byte	Funtion name	Description	R/W	Range	Data type	Uint
b16,1	INV Fault	INV Fault	R	1: INV Fault	U1	ASCII
b17,1	EEPROM error code	EEPROM error code	R	1: EEPROM error	U1	ASCII
b18,1	System Shutdown	System Shutdown	R	1: Shutdown	U1	ASCII

Definition of command(I · W)

Data byte	Funtion name	Description	R/W	Range	Data type	Uint
1	Voltage & Freq. setting	Voltage & Freq. setting	R	100V(200V)/50Hz=00 110V(220V)/50Hz=01 115V(230V)/50Hz=02 120V(240V)/50Hz=03 100V(200V)/60Hz=04 110V(220V)/60Hz=05 115V(230V)/60Hz=06 120V(240V)/60Hz=07 (Defermind by DIP SW)	U1	Binary
1	Saving mode	Saving mode	R	Disable=00 Enable=01 (Defermind by DIP SW)	U1	Binary
1	Model Code	Model Code	R	112=00 124=01 148=02 212=03 224=04 248=05 (Defermind by DIP SW)	U1	Binary
4	Equalization Volt.	Equalization Volt.	W/R	12: 9.0~15.0Vdc 24: 18.0~30.0Vdc 48: 36.0~60.0Vdc (Unsupported)	U1	ASCII
4	Floating Volt.	Floating Volt.	W/R	12: 9.0~15.0Vdc 24: 18.0~30.0Vdc 48: 36.0~60.0Vdc (Unsupported)	U1	ASCII

Data byte	Funtion name	Description	R/W	Range	Data type	Uint
4	Floating Volt.	Floating Volt.	W/R	12: 9.0~15.0Vdc 24: 18.0~30.0Vdc 48: 36.0~60.0Vdc (Unsupported)	U1	ASCII
4	Alarm Volt.	Alarm Volt.	W/R	12: 9.0~15.0Vdc 24: 18.0~30.0Vdc 48: 36.0~60.0Vdc Note 1・2	U1	ASCII
4	Shutdown Volt.	Shutdown Volt.	W/R	12: 9.0~15.0Vdc 24: 18.0~30.0Vdc 48: 36.0~60.0Vdc Note 1・2	U1	ASCII
4	Transfer Volt.	Transfer Volt.	W/R	12: 9.0~15.0Vdc 24: 18.0~30.0Vdc 48: 36.0~60.0Vdc (Unsupported)	U1	ASCII
10	Manufacture Country	Manufacture Country	W/R	MEANWELL	U1	ASCII
19	Serial Number	Serial Number	W/R	LOC-xxxxxxxxxxxxxxxxxx (x: 0~9)	U1	ASCII
9	Revision	Revision	R	REV:vv.v (Define by FW, not changeable)	U1	ASCII
1	Model Name	Model Name	W/R	Define by each model (max of 14 digits)	U1	ASCII
1	Battery First Flag	Battery First Flag	W/R	0 = Disable 1 = Enable	U1	ASCII
1	Date	Date	W/R	Date: MM/DD/YYYY	U1	ASCII
1	Checksum	Checksum			U1	ASCII

Definition of command(C)

Data byte	Funtion name	Description	R/W	Range	Data type	Uint
b0,1	Shut down	Shut down	W	1: Remote Shutdown	U1	ASCII
b1,1	Turn on INVERTER	Turn on INVERTER	W	1: Remote On INV	U1	ASCII
b2,1	Preserved	Preserved		Fixed" 0x30"	U1	ASCII
b3,1	Preserved	Preserved		Fixed" 0x30"	U1	ASCII
b4,1	Preserved	Preserved		Fixed" 0x30"	U1	ASCII
b5,1	Preserved	Preserved		Fixed" 0x30"	U1	ASCII
b6,1	Preserved	Preserved		Fixed" 0x30"	U1	ASCII
b7,1	Preserved	Preserved		Fixed" 0x30"	U1	ASCII
b8,1	Preserved	Preserved		Fixed" 0x30"	U1	ASCII
b9,1	Preserved	Preserved		Fixed" 0x30"	U1	ASCII
b10,1	Preserved	Preserved		Fixed" 0x30"	U1	ASCII
b11,1	Preserved	Preserved		Fixed" 0x30"	U1	ASCII
b12,1	Preserved	Preserved		Fixed" 0x30"	U1	ASCII
b13,1	Preserved	Preserved		Fixed" 0x30"	U1	ASCII
b14,1	Preserved	Preserved		Fixed" 0x30"	U1	ASCII

Definition of command(V)

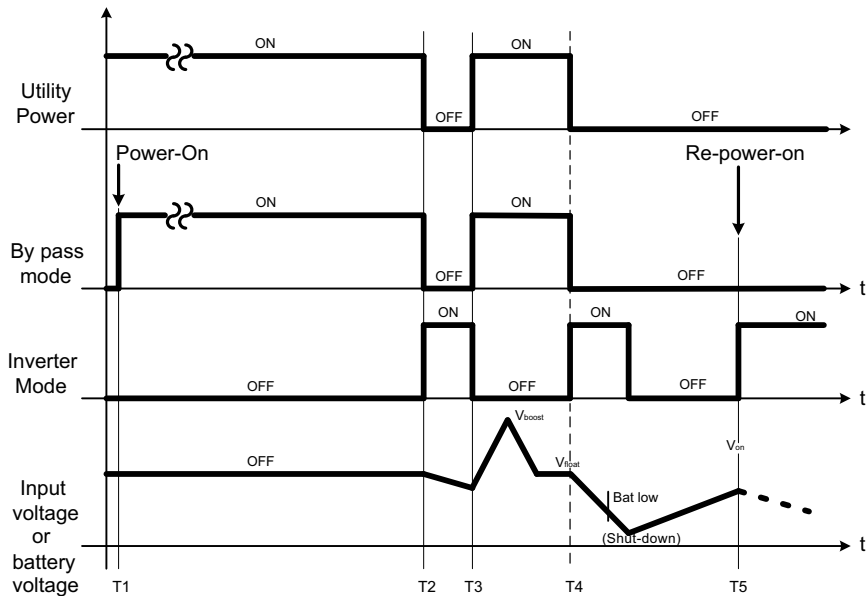
Data byte	Funtion name	Description	R/W	Range	Data type	Uint
3	Voltage setting	To set any AC Voltage within the range	W/R	110 Series 100~127 : 100~127Vac 220 Series 200~240 : 200~240Vac 000 : disable (Voltage is define by DIP SW.)	U1	ASCII
3	Frequency setting	Frequency setting	W/R	050 : 50Hz 060 : 60Hz 000 : disable	U1	ASCII
2	Checksum	Checksum				

Note:

1. Voltage setting of battery must fulfill following conditions
 $15.0\text{V} > \text{Equalization_Volt.} > \text{Floating_Volt.}$
 $> \text{Alarm_Volt.} > \text{Shutdown_Volt.} > 09.0\text{V}$
In order to comply the requirement, use max. of 15.0V for setting when it's not supported.
2. If $\text{Alarm_Volt} \leq \text{Shutdown_Volt.}$, then the command is not valid.

5.5 UPS Mode(only for NTU series)

5.5.1 Explanation of UPS mode



- T1: After the user turns on the NTU-1200/1700/2200/3200, if it detects that the mains voltage is normal, the NTU will enter the bypass mode, so the load will be supplied by the mains directly. While battery is in a fully charged status.
- T2: If the AC mains fails or when the voltage of AC mains exceeds $\pm 16\%$ of the setting, the NTU will immediately switch to inverter mode, to ensure customer's equipment will not be affected. Take NTU-1200-124 (default 110Vac) as an example, when the voltage of AC mains is greater than 127.6Vac or less than 92.4Vac, NTU-1200-124 will enter the inverter mode to keep equipment running, and the energy is consumed from the battery.

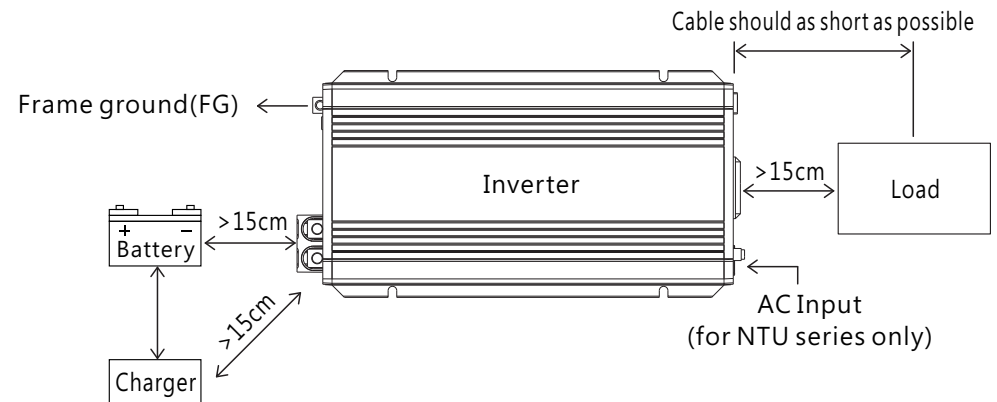
T3: If the AC mains has returned to a range within $\pm 13\%$ of the NTU's set value, the NTU will switch to bypass mode again and supply power from the mains to the load. In the meantime, the battery can be charged through an external charger.

T4: When the voltage of battery pack is consumed to the lower limit of the inverter's operating range, and the AC main still not valid. At this time, the battery charger cannot provide energy any more, so the inverter will keep operate until the battery voltage has consumed till the lower limit of the inverter's operating voltage. Eventually, inverter will shutdown.

T5: When the voltage of battery returned to operating range, inverter will restart automatically.

5.5.2 UPS System Block Diagram

When NTU works in bypass mode, the charger can maintain the battery voltage and provide enough power when the AC mains is abnormal. If the AC mains returns from abnormally, the charger can also provide the power that lost when operating in inverter mode. For connection, please select wires or cable with a suitable wire diameter according to the output current when connect the battery and inverter. Please refer to table 3-1 for connection.



(Suggest to work accompany with MEAN WELL NPB/NPP chargers)

6. Protections and Failure Correction

6.1 Protection Function:

AC Output Protection :

- AC Output Over Load Protection :
When overloaded, the inverter is able to supply power for a period of time. If the load does not drop back to the normal range, the OLP will be triggered and turn off the inverter. Once the OLP condition is removed, re-power on the inverter to start operation again.
- AC Output Short Circuit Protection :
When short-circuit occurs or the load increasing significantly, the inverter will turn off for protection. After removing the fault condition, re-power on the inverter to start operation.

DC Input Protection :

- DC Polarity Protection :
When connecting the DC polarity reversely, the internal fuse will blow for protection. The unit then must return to MEAN WELL's distributor for further support.
- Low DC Input Protection :
When DC input is lower than the operating range, inverter will turn off automatically for protection.
- Over Voltage of DC Input :
When the voltage of DC input over the operating range, the inverter will turn off for protection. After the fault condition is removed, inverter will restart automatically. If the inverter cannot operate normally afterwards, it represents that the inverter is damaged. Please return the unit to MEAN WELL's distributor if needed.

Inverter Protection :

- Over temperature protection(OTP) :
When the temperature inside the inverter raise to a certain level, the inverter will turn off for protection. After the temperate dropped back to operating range, re-power the inverter for operation.

6.2 Failure Correction

Once failure condition occurs, the LED on panel of inverter will show different LED light for indication. Fault condition can be separated into 4 categories, AC output protection, DC input protection, over temperature protection or other. Please refer to the following table for fault indication and correction. If the fault condition cannot be solved, please contact MEAN WELL's distributor for further assistance.

fault signal	Possible cause	Suggestions for Fault correction
Status ● DC Input ○ Load ☀	Over load protection	Check if the load requires high startup current, such as inductive or capacitance loads. After the fault condition is removed, re-power the inverter for operation.
	Short circuit protection	Check if the load requirement exceed the rated value or if the circuit is shorted.
Status ● DC Input ☀ Load ○	Aged battery or malfunction	Change a new battery
	Wrong battery capacitance	Re check if the parameter of battery suits inverter's operating parameter
Status ● DC Input ☀ Load ☀	Over temperature protection	Remove subject away from venthole if any. If it's due to high ambient, please lower the temperate or load to proceed. After the fault condition is removed, re-power inverter for operation.
Status ☀ DC Input ○ Load ○	Other fault condition that's not defined	Contact MEAN WELL's distributor

Note: ● Light
 ☀ Flash
 ○ Light off

7. Warranty

This product provide three years warranty under normal usage. Do not replace parts or any form of modification to the product in order to keep the warranty effectively.

※ MEAN WELL posses the right to adjust the content of this manual. Please refer to the latest version of our manual on our website. <https://www.meanwell.com>



明緯企業股份有限公司

MEAN WELL ENTERPRISES CO., LTD.

248 新北市五股區五權三路28號

No.28, Wuquan 3rd Rd., Wugu Dist., New Taipei City 248, Taiwan

Tel:886-2-2299-6100 Fax:886-2-2299-6200

<http://www.meanwell.com> E-mail:info@meanwell.com