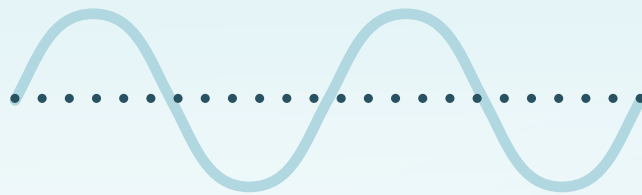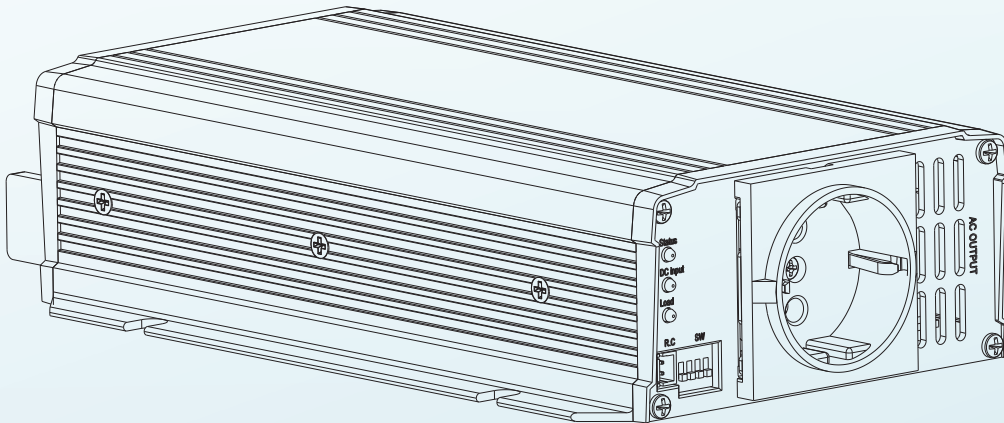# MW MEAN WELL

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℃. 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.
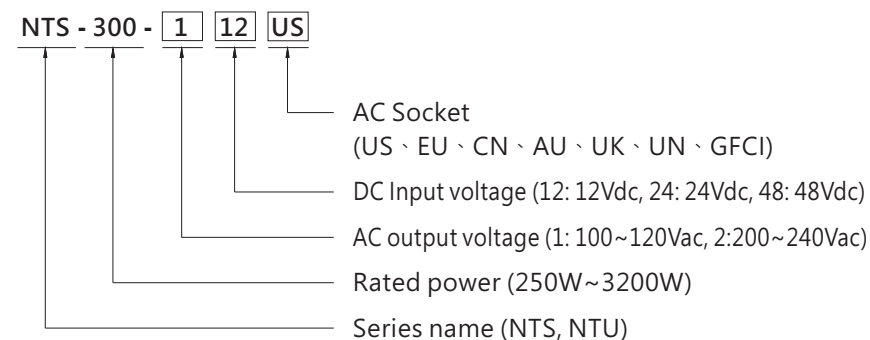
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1.Safety Guidelines

- 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.
- Branch rated over current protection for the AC output circuit is to be provided at the time of installation.

- Risque de choc électrique et danger d'électrocution. Toutes les pannes doivent être examinées par un technicien qualifié. Veuillez ne pas retirer vous-même le boîtier de l'onduleur.
- N'installez pas l'onduleur dans des endroits très humides ou à proximité d'eau.
- N'installez l'onduleur dans des endroits où la température ambiante est élevée ou sous la lumière directe du soleil.
- Veuillez ne insérer que des batteries de la même marque et du même modèle dans un seul banc de batteries. L'utilisation de batteries de fabricants différents ou de capacités différentes est strictement interdite!
- Ne laissez jamais une étincelle ou une flamme à proximité des batteries car elles peuvent enflammer des gaz explosifs lors du fonctionnement normal.
- Assurez-vous que le flux d'air du ventilateur n'est pas obstrué des deux côtés (avant et arrière) de l'onduleur. (Veuillez laisser au moins 15 cm d'espace)
- N'empilez aucun objet sur l'onduleur.
- N'allumez pas l'onduleur avant de démarrer le moteur si l'onduleur est connecté directement à la batterie du véhicule.
- Une protection contre les surintensités nominales de dérivation pour le circuit de sortie AC doit être fournie au moment de l'installation.

2.Introduction

2.1 Model number

NTS - 300 - 1 12 US

- AC Socket
  (US、EU、CN、AU、UK、UN、GFCI)
- DC Input voltage (12: 12Vdc, 24: 24Vdc, 48: 48Vdc)
- AC output voltage (1: 100~120Vac, 2:200~240Vac)
- Rated power (250W~3200W)
- Series name (NTS, NTU)

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 battries.
- 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 DISSPATION (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					
			1.2W	1.3W	1.5W	1.2W	1.3W	1.5W
	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
		LOW SHUTDOWN	10±0.3Vdc	20±0.5Vdc	40±1Vdc	10±0.3Vdc	20±0.5Vdc	40±1Vdc
		LOW 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
		HIGH SHUTDOWN	16.5±0.3Vdc	33±0.5Vdc	66±1Vdc	16.5±0.3Vdc	33±0.5Vdc	66±1Vdc
		HIGH 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℃ (Refer to "Derating curve")					
	WORKING HUMIDITY		20 ~ 90% RH non-condensing					
	STORAGE TEMP., HUMIDITY		-30 ~ +70℃ / -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℃)					
	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 DISSPATION (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					
			1.2W	1.3W	1.5W	1.2W	1.3W	1.5W
	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
		LOW SHUTDOWN	10±0.3Vdc	20±0.5Vdc	40±1Vdc	10±0.3Vdc	20±0.5Vdc	40±1Vdc
		LOW 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
		HIGH SHUTDOWN	16.5±0.3Vdc	33±0.5Vdc	66±1Vdc	16.5±0.3Vdc	33±0.5Vdc	66±1Vdc
		HIGH 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℃ (Refer to "Derating curve")					
	WORKING HUMIDITY		20 ~ 90% RH non-condensing					
	STORAGE TEMP., HUMIDITY		-30 ~ +70℃ / -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℃)					
	DIMENSION		186*100.5*32mm (L*W*H)					
	PACKING		0.75Kg; 18pcs/ 14.5Kg/ 0.97CUFT					

NTS-300 series

MODEL			NTS-300-112 ☐	NTS-300-124 ☐	NTS-300-148 ☐	NTS-300-212 ☐	NTS-300-224 ☐	NTS-300-248 ☐
			☐ = US, GFCI, UN			☐ = 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			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					
	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 DISSPATION (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					
			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					
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					
	GFCI PROCTECTION		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℃ (Refer to "Derating curve")					
	WORKING HUMIDITY		20 ~ 90% RH non-condensing					
	STORAGE TEMP., HUMIDITY		-30 ~ +70℃ / -22 ~ +158℉, 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℃)					
	DIMENSION		210*130*55mm (L*W*H)					
	PACKING		1.3Kg; 8pcs/ 11.4Kg/ 1.74CUFT					

NTS-450 series

MODEL			NTS-450-112 ☐	NTS-450-124 ☐	NTS-450-148 ☐	NTS-450-212 ☐	NTS-450-224 ☐	NTS-450-248 ☐
			☐ = US, GFCI, UN			☐ = 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			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					
	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 DISSPATION (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					
			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					
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					
	GFCI PROCTECTION		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℃ (Refer to "Derating curve")					
	WORKING HUMIDITY		20 ~ 90% RH non-condensing					
	STORAGE TEMP., HUMIDITY		-30 ~ +70℃ / -22 ~ +158℉, 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℃)					
	DIMENSION		210*130*55mm (L*W*H)					
	PACKING		1.3Kg; 8pcs/ 11.4Kg/ 1.74CUFT					

NTS-750 series

MODEL			NTS-750-112 ☐	NTS-750-124 ☐	NTS-750-148 ☐	NTS-750-212 ☐	NTS-750-224 ☐	NTS-750-248 ☐
			☐ = US, GFCI, UN			☐ = 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			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 60±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					
	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 DISSPATION (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					
			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
		LOW SHUTDOWN	10±0.3Vdc	20±0.5Vdc	40±1Vdc	10±0.3Vdc	20±0.5Vdc	40±1Vdc
		LOW 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
		HIGH SHUTDOWN	16.5±0.3Vdc	33±0.5Vdc	66±1Vdc	16.5±0.3Vdc	33±0.5Vdc	66±1Vdc
		HIGH 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					
		GFCI PROCTECTION	UL458 (Only for "GFCI" AC socket , by request)		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					
	RS-232 COMMUNICATION		RS-232 ~ RJ11 Type connector					
ENVIRON-MENT	WORK TEMP.		-25 ~ +70℃ (Refer to "Derating curve")					
	WORKING HUMIDITY		20 ~ 90% RH non-condensing					
	STORAGE TEMP., HUMIDITY		-30 ~ +70℃ / -22 ~ +158℉, 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℃)					
	DIMENSION		270*158*67mm (L*W*H)					
	PACKING		2.3Kg; 4pcs/ 10.2Kg/ 1.77CUFT					

NTS-1200 series

MODEL			NTS-1200-112 ☐	NTS-1200-124 ☐	NTS-1200-148 ☐	NTS-1200-212 ☐	NTS-1200-224 ☐	NTS-1200-248 ☐
			☐ = US, GFCI, UN			☐ = 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			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 60±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					
	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 DISSPATION (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*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
		LOW SHUTDOWN	10±0.3Vdc	20±0.5Vdc	40±1Vdc	10±0.3Vdc	20±0.5Vdc	40±1Vdc
		LOW 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
		HIGH SHUTDOWN	16.5±0.3Vdc	33±0.5Vdc	66±1Vdc	16.5±0.3Vdc	33±0.5Vdc	66±1Vdc
		HIGH 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					
		CIRCUIT BREAKER	15A			10A		
		GFCI PROCTECTION	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					
	RS-232 COMMUNICATION		RS-232 ~ RJ11 Type connector					
ENVIRON-MENT	WORK TEMP.		-25 ~ +70℃ (Refer to "Derating curve")					
	WORKING HUMIDITY		20 ~ 90% RH non-condensing					
	STORAGE TEMP., HUMIDITY		-30 ~ +70℃ / -22 ~ +158℉, 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℃)					
	DIMENSION		333*184*70mm (L*W*H)					
	PACKING		3.3Kg; 2pcs/ 7.6Kg/ 1.16CUFT					

NTS-1700 series

MODEL			NTS-1700-112 ☐	NTS-1700-124 ☐	NTS-1700-148 ☐	NTS-1700-212 ☐	NTS-1700-224 ☐	NTS-1700-248 ☐
			☐ = US, GFCI, UN			☐ = 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			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 60±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					
	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 DISSPATION (Typ.)	SAVING MODE	Default disable, ≦1.2W ~1.5W by models @ auto detect 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					
	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					
	CIRCUIT BREAKER(GFCI)		15A			10A		
	GFCI PROCTECTION		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					
	RS-232 COMMUNICATION		RS-232 ~ RJ11 Type connector					
ENVIRON-MENT	WORK TEMP.		-20 ~ +70℃ (Refer to "Derating curve")					
	WORKING HUMIDITY		20 ~ 90% RH non-condensing					
	STORAGE TEMP., HUMIDITY		-30 ~ +70℃ / -22 ~ +158°F, 10 ~ 95% RH non-condensing					
	VIBRATION		10 ~ 500Hz, 3G 10min./1cycle, 60min. each along X, Y, Z axes					
OTHER	MTBF		475.5K hrs min. Telcordia TR/SR-332 (Bellcore) ; 46.2K hrs min. MIL-HDBK-217F (25℃)					
	DIMENSION		400*184*70mm (L*W*H)					
	PACKING		4.63Kg; 2pcs/ 12Kg/ 1.76CUFT					

NTS-2200 series

MODEL			NTS-2200-112 ☐	NTS-2200-124 ☐	NTS-2200-148 ☐	NTS-2200-212 ☐	NTS-2200-224 ☐	NTS-2200-248 ☐
			☐ = US, UN, TB			☐ = EU, CN, AU, UK, UN, TB		
OUTPUT	RATED POWER(Continuous)		2200W					
	OVER RATED POWER(3 Min.)		2530W					
	PEAK POWER(10 Sec.)		3300W					
	SURGE POWER(30 Cycles)		4400W					
	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 60±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					
	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.)		250A	120A	60A	250A	120A	60A
	NO LOAD DISSPATION (Typ.)	SAVING MODE	Default disable, auto detec AC output load ≦10W will be changed to saving mode					
			1.7W					
	OFF MODE CURRENT DRAW		≦2mA					
	EFFICIENCY (Typ.) Note.1		89%	90%	91%	90%	92%	93%
	BATTERY TYPES		Lead Acid or li-ion					
PROTECTION	**DC INPUT** FUSE (INTERNAL)		40A*8	40A*4	25A*4	40A*8	40A*4	25A*4
	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					
	CIRCUIT BREAKER		25A (Only for "TB" AC socket)			None		
	TB TYPE		UL458 (Only for "TB" 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					
	RS-232 COMMUNICATION		RS-232 ~ RJ11 Type connector					
ENVIRON-MENT	WORK TEMP.		-25 ~ +70℃ (Refer to "Derating curve")					
	WORKING HUMIDITY		20 ~ 90% RH non-condensing					
	STORAGE TEMP., HUMIDITY		-30 ~ +70℃ / -22 ~ +158°F, 10 ~ 95% RH non-condensing					
	VIBRATION		10 ~ 500Hz, 3G 10min./1cycle, 60min. each along X, Y, Z axes					
OTHER	MTBF		364.7K hrs min. Telcordia TR/SR-332 (Bellcore) ; 34.9K hrs min. MIL-HDBK-217F (25℃)					
	DIMENSION		420*270*98mm (L*W*H)					
	PACKING		8.6Kg; 1pcs/ 10.4Kg/ 1.39CUFT					

NTS-3200 series

MODEL			NTS-3200-112 ☐	NTS-3200-124 ☐	NTS-3200-148 ☐	NTS-3200-212 ☐	NTS-3200-224 ☐	NTS-3200-248 ☐
			☐ = US, UN, TB			☐ = EU, CN, AU, UK, UN, TB		
OUTPUT	RATED POWER(Continuous)		3000W			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			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 60±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					
	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 DISSPATION (Typ.)	SAVING MODE	Default disable, auto detec AC output load ≦10W will be changed to saving mode					
			1.7W					
	OFF MODE CURRENT DRAW		≦2mA					
	EFFICIENCY (Typ.)　Note.1		89%	90%	91%	90%	92%	93%
	BATTERY TYPES		Lead Acid or li-ion					
PROTECTION	**DC INPUT**	FUSE (INTERNAL)	40A*12	40A*6	25A*6	40A*12	40A*6	25A*6
		LOW ALARM	11±0.3Vdc	22±0.5Vdc	44±1Vdc	11±0.3Vdc	22±0.5Vdc	44±1Vdc
		LOW SHUTDOWN	10±0.3Vdc	20±0.5Vdc	40±1Vdc	10±0.3Vdc	20±0.5Vdc	40±1Vdc
		LOW 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
		HIGH SHUTDOWN	16.5±0.3Vdc	33±0.5Vdc	66±1Vdc	16.5±0.3Vdc	33±0.5Vdc	66±1Vdc
		HIGH 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					
		CIRCUIT BREAKER	30A (Only for "TB" AC socket)			None		
		TB TYPE	UL458 (Only for "TB" 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					
	RS-232 COMMUNICATION		RS-232 ~ RJ11 Type connector					
ENVIRON-MENT	WORK TEMP.		-25 ~ +70℃ (Refer to "Derating curve")					
	WORKING HUMIDITY		20 ~ 90% RH non-condensing					
	STORAGE TEMP., HUMIDITY		-30 ~ +70℃ / -22 ~ +158°F, 10 ~ 95% RH non-condensing					
	VIBRATION		10 ~ 500Hz, 3G 10min./1cycle, 60min. each along X, Y, Z axes					
OTHER	MTBF		336.9K hrs min. Telcordia TR/SR-332 (Bellcore) ; 30.5K hrs min. MIL-HDBK-217F (25℃)					
	DIMENSION		420*270*98mm (L*W*H)					
	PACKING		8.6Kg; 1pcs/ 10.4Kg/ 1.39CUFT					

NTU-1200 series（Built-in UPS function）

MODEL			NTU-1200-112 ☐	NTU-1200-124 ☐	NTU-1200-148 ☐	NTU-1200-212 ☐	NTU-1200-224 ☐	NTU-1200-248 ☐
			☐ = US, GFCI, UN			☐ = 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			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 60±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					
	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 DISSPATION (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
		LOW SHUTDOWN	10±0.3Vdc	20±0.5Vdc	40±1Vdc	10±0.3Vdc	20±0.5Vdc	40±1Vdc
		LOW 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
		HIGH SHUTDOWN	16.5±0.3Vdc	33±0.5Vdc	66±1Vdc	16.5±0.3Vdc	33±0.5Vdc	66±1Vdc
		HIGH 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					
		CIRCUIT BREAKER	15A			10A		
		GFCI PROCTECTION	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					
	RS-232 COMMUNICATION		RS-232 ~ RJ11 Type connector					
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℃ (Refer to "Derating curve")					
	WORKING HUMIDITY		20 ~ 90% RH non-condensing					
	STORAGE TEMP., HUMIDITY		-30 ~ +70℃ / -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℃)					
	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 ☐	NTU-1700-124 ☐	NTU-1700-148 ☐	NTU-1700-212 ☐	NTU-1700-224 ☐	NTU-1700-248 ☐
			☐ = US, GFCI, UN			☐ = 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			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 60±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					
	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
		LOW SHUTDOWN	10±0.3Vdc	20±0.5Vdc	40±1Vdc	10±0.3Vdc	20±0.5Vdc	40±1Vdc
		LOW 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
		HIGH SHUTDOWN	16.5±0.3Vdc	33±0.5Vdc	66±1Vdc	16.5±0.3Vdc	33±0.5Vdc	66±1Vdc
		HIGH 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					
		CIRCUIT BREAKER(GFCI)	15A			10A		
		GFCI PROCTECTION	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					
	RS-232 COMMUNICATION		RS-232 ~ RJ11 Type connector					
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℃ (Refer to "Derating curve")					
	WORKING HUMIDITY		20 ~ 90% RH non-condensing					
	STORAGE TEMP., HUMIDITY		-30 ~ +70℃ / -22 ~ +158°F, 10 ~ 95% RH non-condensing					
	VIBRATION		10 ~ 500Hz, 3G 10min./1cycle, 60min. each along X, Y, Z axes					
OTHER	MTBF		421.9K hrs min. Telcordia TR/SR-332 (Bellcore) ; 45.3K hrs min. MIL-HDBK-217F (25℃)					
	DIMENSION		400*184*70mm (L*W*H)					
	PACKING		4.63Kg; 2pcs/ 12Kg/ 1.76CUFT					

NTU-2200 series (Built-in UPS function)

MODEL			NTU-2200-112 ☐	NTU-2200-124 ☐	NTU-2200-148 ☐	NTU-2200-212 ☐	NTU-2200-224 ☐	NTU-2200-248 ☐
			☐ = US, UN, TB			☐ = EU, CN, AU, UK, UN, TB		
OUTPUT	RATED POWER(Continuous)		2200W					
	OVER RATED POWER(3 Min.)		2530W					
	PEAK POWER(10 Sec.)		3300W					
	SURGE POWER(30 Cycles)		4400W					
	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 60±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					
	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.)		250A	120A	60A	250A	120A	60A
	NO LOAD DISSPATION (Typ.) SAVING MODE		Default disable, auto detec AC output load ≦10W will be changed to saving mode					
			15W					
	OFF MODE CURRENT DRAW		≦2mA					
	EFFICIENCY (Typ.) Note.1		89%	90%	91%	90%	92%	93%
	BATTERY TYPES		Lead Acid or li-ion					
PROTECTION	DC INPUT	FUSE (INTERNAL)	40A*8	40A*4	25A*4	40A*8	40A*4	25A*4
		LOW ALARM	11±0.3Vdc	22±0.5Vdc	44±1Vdc	11±0.3Vdc	22±0.5Vdc	44±1Vdc
		LOW SHUTDOWN	10±0.3Vdc	20±0.5Vdc	40±1Vdc	10±0.3Vdc	20±0.5Vdc	40±1Vdc
		LOW 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
		HIGH SHUTDOWN	16.5±0.3Vdc	33±0.5Vdc	66±1Vdc	16.5±0.3Vdc	33±0.5Vdc	66±1Vdc
		HIGH 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					
		CIRCUIT BREAKER	25A			15A		
		TB TYPE	UL458 (Only for "TB" 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					
	RS-232 COMMUNICATION		RS-232 ~ RJ11 Type connector					
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℃ (Refer to "Derating curve")					
	WORKING HUMIDITY		20 ~ 90% RH non-condensing					
	STORAGE TEMP., HUMIDITY		-30 ~ +70℃ / -22 ~ +158°F, 10 ~ 95% RH non-condensing					
	VIBRATION		10 ~ 500Hz, 3G 10min./1cycle, 60min. each along X, Y, Z axes					
OTHER	MTBF		344.9K hrs min. Telcordia TR/SR-332 (Bellcore) ; 34.8K hrs min. MIL-HDBK-217F (25℃)					
	DIMENSION		420*270*98mm (L*W*H)					
	PACKING		8.6Kg; 1pcs/ 10.4Kg/ 1.39CUFT					

NTU-3200 series(Built-in UPS function)

MODEL			NTU-3200-112 □	NTU-3200-124 □	NTU-3200-148 □	NTU-3200-212 □	NTU-3200-224 □	NTU-3200-248 □
			□ = US, UN, TB			□ = EU, CN, AU, UK, UN, TB		
OUTPUT	RATED POWER(Continuous)		3000W			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			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 60±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					
	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 DISSPATION (Typ.)	SAVING MODE	Default disable, auto detec AC output load ≦10W will be changed to saving mode					
			15W					
	OFF MODE CURRENT DRAW		≦2mA					
	EFFICIENCY (Typ.) Note.1		89%	90%	91%	90%	92%	93%
	BATTERY TYPES		Lead Acid or li-ion					
PROTECTION	**DC INPUT**	FUSE (INTERNAL)	40A*12	40A*6	25A*6	40A*12	40A*6	25A*6
		LOW ALARM	11±0.3Vdc	22±0.5Vdc	44±1Vdc	11±0.3Vdc	22±0.5Vdc	44±1Vdc
		LOW SHUTDOWN	10±0.3Vdc	20±0.5Vdc	40±1Vdc	10±0.3Vdc	20±0.5Vdc	40±1Vdc
		LOW 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
		HIGH SHUTDOWN	16.5±0.3Vdc	33±0.5Vdc	66±1Vdc	16.5±0.3Vdc	33±0.5Vdc	66±1Vdc
		HIGH 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					
		CIRCUIT BREAKER	30A			16A		
		TB TYPE	UL458 (Only for "TB" 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					
	RS-232 COMMUNICATION		RS-232 ~ RJ11 Type connector					
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℃ (Refer to "Derating curve")					
	WORKING HUMIDITY		20 ~ 90% RH non-condensing					
	STORAGE TEMP., HUMIDITY		-30 ~ +70℃ / -22 ~ +158℉, 10 ~ 95% RH non-condensing					
	VIBRATION		10 ~ 500Hz, 3G 10min./1cycle, 60min. each along X, Y, Z axes					
OTHER	MTBF		319.3K hrs min.　Telcordia TR/SR-332 (Bellcore) ;　30.3K hrs min.　MIL-HDBK-217F (25℃)					
	DIMENSION		420*270*98mm (L*W*H)					
	PACKING		8.6Kg; 1pcs/ 10.4Kg/ 1.39CUFT					

2.4 Safety Overview

Enclosure type

Socket type	TYPE-US	TYPE-GFCI	TYPE-UN	TYPE-EU	TYPE-CN	TYPE-AU	TYPE-UK	TYPE-TB
	In Stock	By request	In Stock	In Stock	In Stock	By request	By request	In Stock
	USA	USA	UNIVERSAL	EUROPE	CHINA	AUSTRALIA	U.K	UNIVERSAL
110Vac NTS-300, NTS-450, NTS-750, NTS/NTU-1200, NTS/NTU-1700	DEKRA, FC (FCC)	FC (FCC), cULus (Except for 48V input), FC (FCC)	NA	NA	NA	NA	NA	NA
110Vac NTS/NTU-2200, NTS/NTU-3200		NA						cULus, DEKRA, FC (FCC)
220Vac NTS-300, NTS-450, NTS-750, NTS/NTU-1200, NTS/NTU-1700	NA	NA	EAC, E13	DEKRA, EAC, E13, CE, UKCA	DEKRA, EAC, E13, CE, UKCA	DEKRA, EAC, E13, (RCM), CE, UKCA	DEKRA, EAC, E13, CE, UKCA	NA
220Vac NTS/NTU-2200, NTS/NTU-3200								cRUus (only for NTS-2200-248), DEKRA, EAC, E13, CE, UKCA

PCB type

110Vac	NTS-250P	CB, FC (FCC)
	NTS-400P	
220Vac	NTS-250P	CB, EAC, E13, (RCM), CE, UKCA
	NTS-400P	

2.5 Derating curve

NTS-3200,NTU-3200

NTS-300,NTS-450,NTS-750,NTU-1200,NTS-1200,NTU-1700,NTS-2200,NTU-2200

NTS-1700

NTS-250P/400P

LOAD (%)

100
90
85
80
70
60
50
40
30
25
20
10
0

Natural convection

Force air with 25CFM fan for NTS-250P/400P

-25 -20 -10   0   10   20   30 35 40   50   60 65 70 (HORIZONTAL)

AMBIENT TEMPERATURE (℃)

others

LOAD (%)

100

80

50
40

20

NTS/NTU-1200,1700-12V

NTS/NTU-3200

NTS/NTU-1200-24,48V
NTS/NTU-1700

10Vdc   10.5Vdc   11Vdc   16.5Vdc
20Vdc   21Vdc   33Vdc
40Vdc   42Vdc   66Vdc

DC INPUT VOLTAGE

2.6 Mechanical specification

NTS-250P/400P

Screw size of M5 shall be used.(φ5.5)   M3(φ3.5)

M3(φ3.5)   M3(φ3.5)
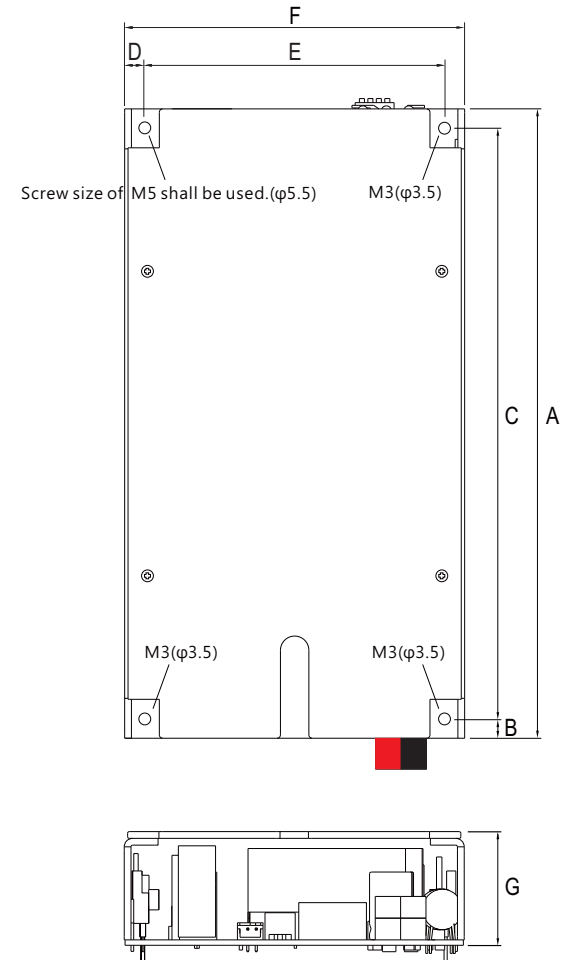
Model	A	B	C	D	E	F	G
NTS-250P	186	5.7	174.6	5.95	88.6	100.5	32
NTS-400P	186	5.7	174.6	5.95	88.6	100.5	32

Unit:mm

NTS-300/450/750

Air flow direction

NTS-300
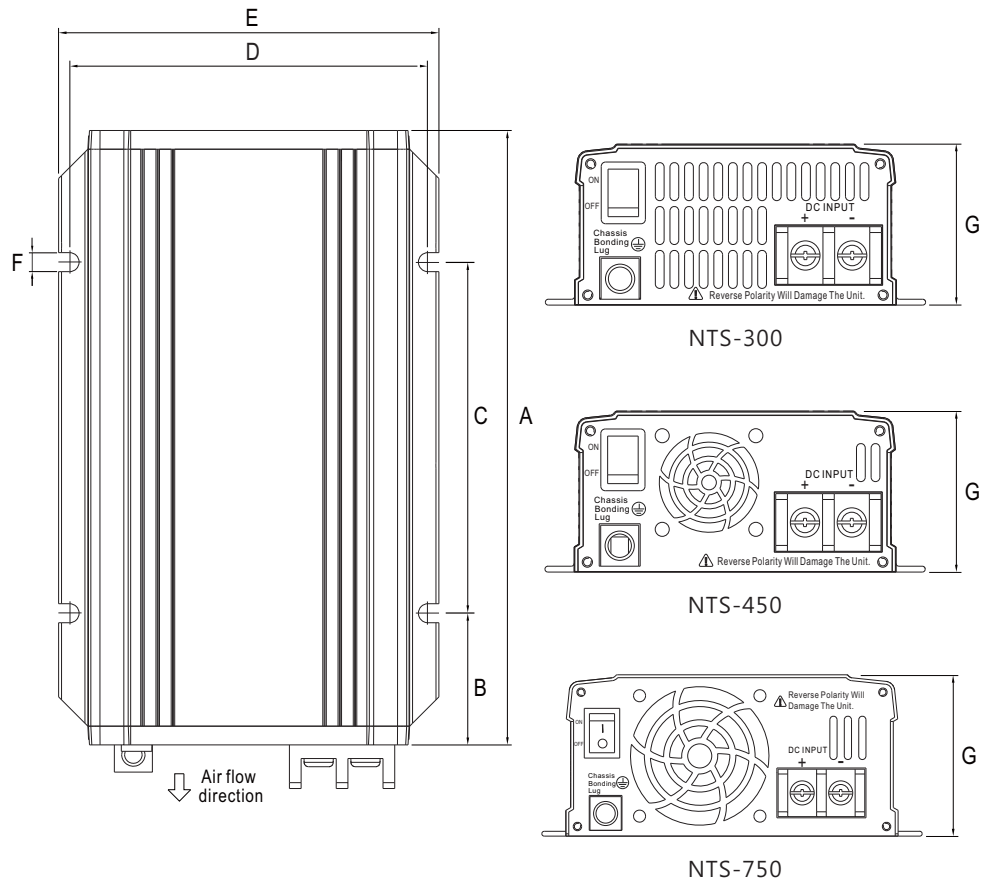
NTS-450

NTS-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

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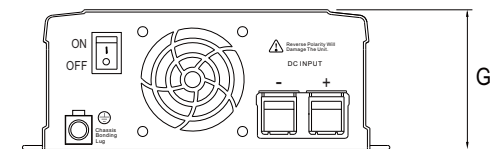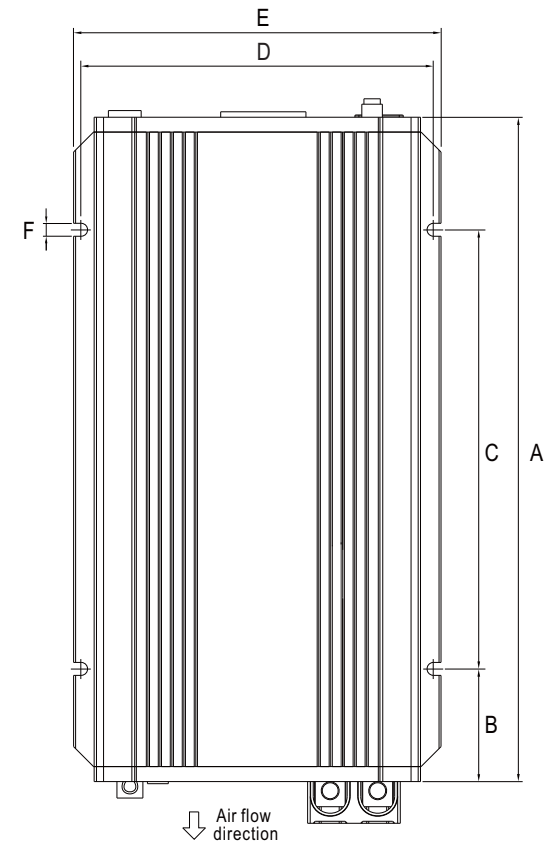
Model	A	B	C	D	E	F	G
NTS/NTU-1200	333	56.5	220	173	184	7	70
NTS/NTU-1700	400	62.5	275	173	184	7	70

Unit:mm

NTS/NTU-2200/3200

E

D

F

C A

B

Air flow direction ⬇   Air flow direction ⬇

DC INPUT
+   -
Reverse Polarity Will Damage The Unit.

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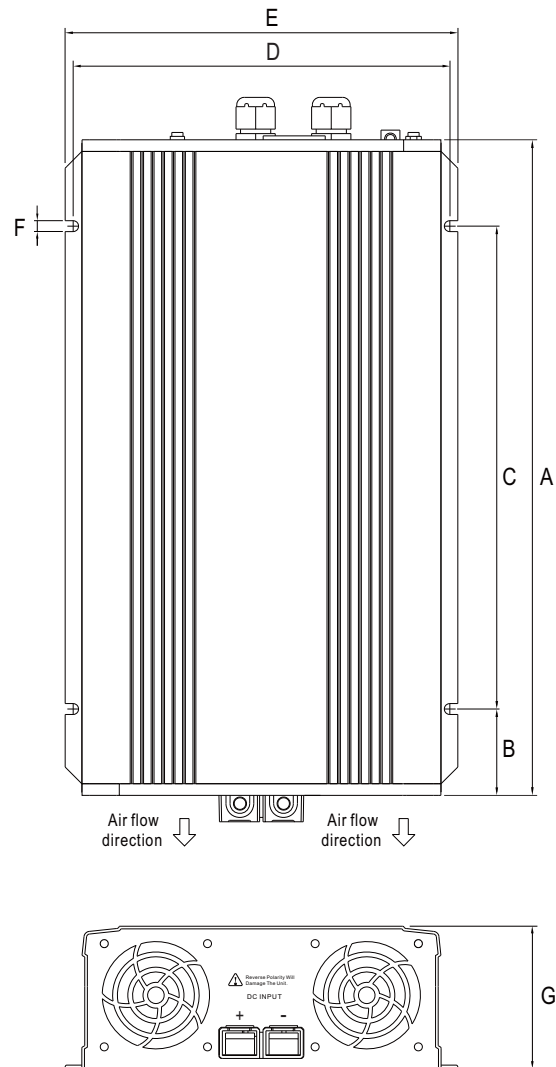
Model	A	B	C	D	E	F	G
NTS/NTU-2200	400	TBD	TBD	259	270	7.5	98
NTS/NTU-3200	440	TBD	TBD	259	270	7.5	98

Unit:mm

Accessories(Optional)

MW's Order No.	Item			Quantity
RJ11-RS232				1
Carry Handle	①	Pull Handle	27mm 18mm 180mm	1
	②	Foot pad		4
	③	Screw		2
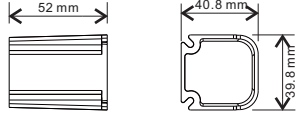
① Pull Handle   M4*2
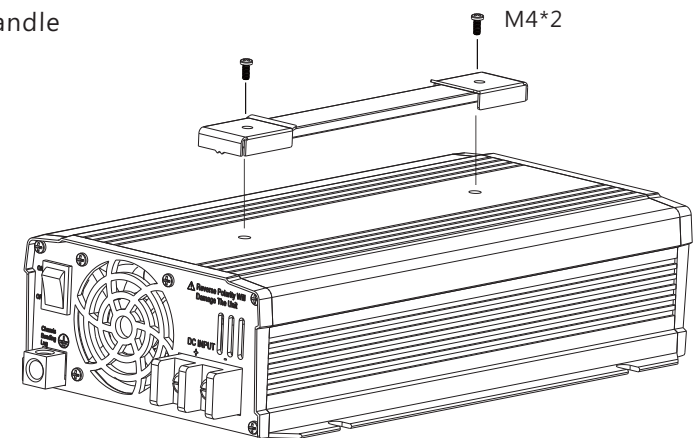
② Foot pad
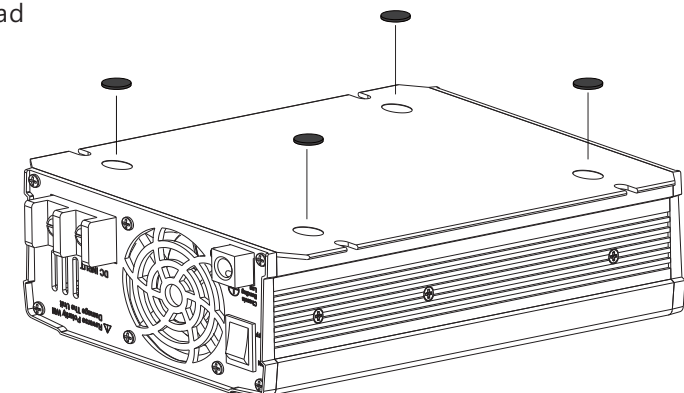
Accessories(Standard)

Item			Quantity
①		52 mm / 40.8 mm / 39.8 mm	1
②			1
③			4

M3*4
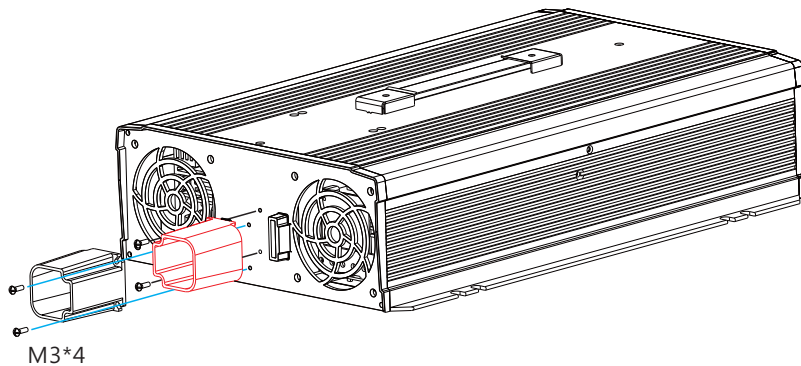
3.Installation & Wiring

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.

>15cm   Inverter   >15cm

Air flow   Air flow
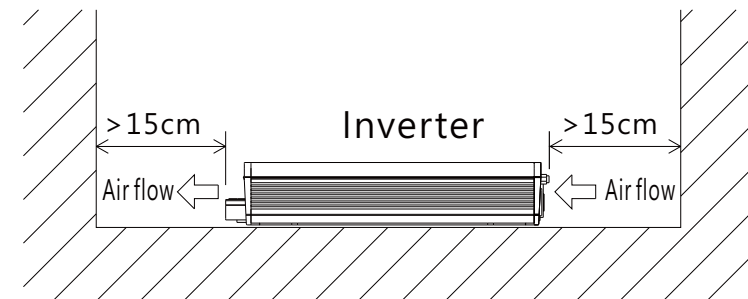
Figure 3-1 set-up recommendation

3.2 System Block Diagram

Cable should be as short as possible

Frame ground(FG)

Inverter

>15cm   Load

>15cm

battery

AC Input
(for NTU series only)

Cable should be as short as possible
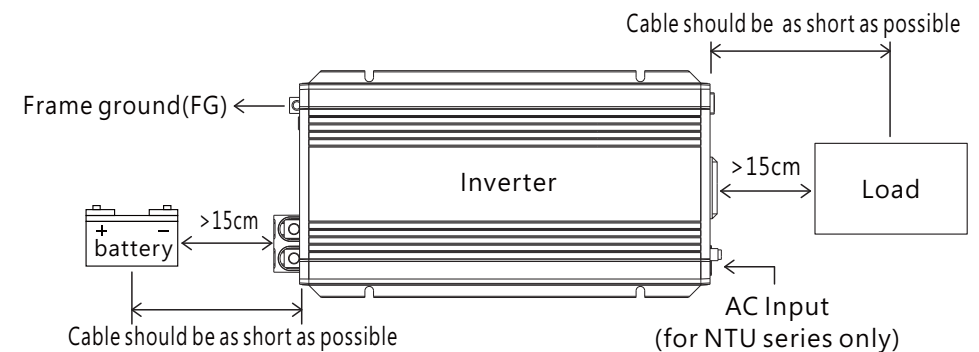
Figure 3-2 System Block Diagram

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 terminal of inverter, and connect the negative polarity of battery to the negative terminal of inverter.
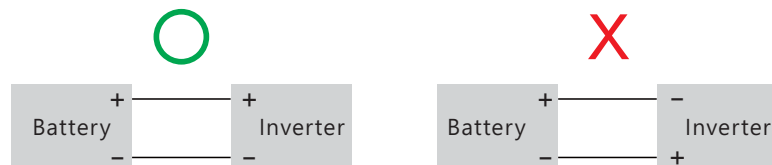
④ Turn the power switch to "ON" position, as soon as it shows green in status's LED, then it's ready.

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 recommendiation

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	

3.6 GFCI socket

To meet the requirements of UL458, external GFCI socket is required for use, the following GFCI socket models are recommended(for NTU/S-2200/3200-1XXTB UL458 type):

Manufacturer	Model No.
Eaton	SGF20

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. Please use UL Listed power supply cord, 14AWG/3C, Type SJ/SJT/SJO/SPT-3, terminates in a grounding type 3 prong molded-on attachment plug (NEMA 5-20P). Maximum 0.9 m long.

NTS-300/450   NTS-750

NTS-1200   NTU-1200

NTS-1700   NTU-1700

NTS/NTU-2200/3200
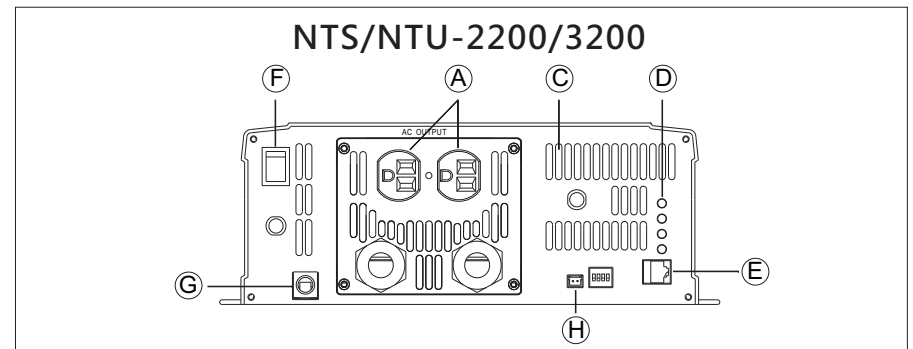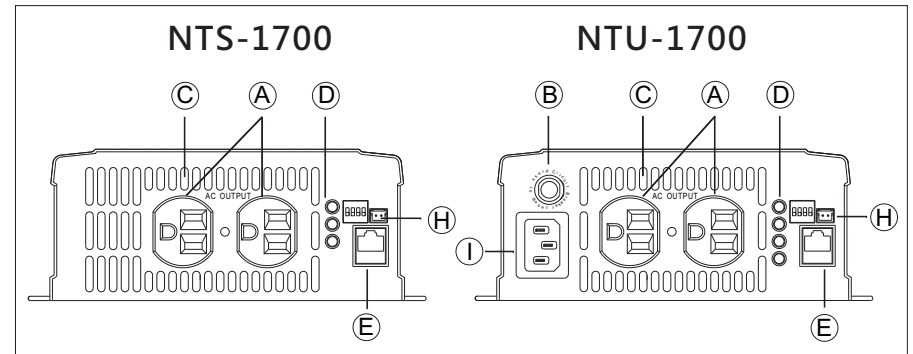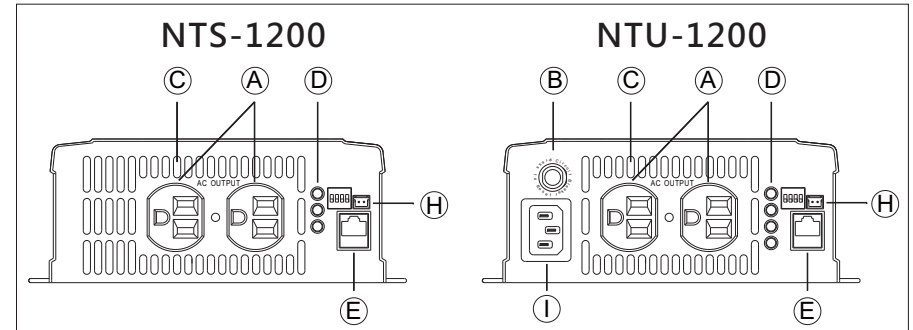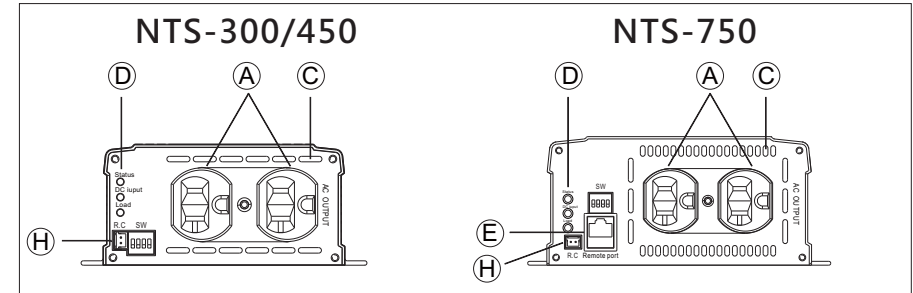
4.2 DC input panel

Ⓐ POWER ON/OFF switch: The inverter will turn ON if the switch is in the ON position, and vice versa.

Ⓑ Input terminals (+), (-)

Ⓒ Frame ground (FG)

Ⓓ Ventilation slits: The inverter requires suitable ventilation to work properly. Please make sure there is good ventilation and the lifespan of the inverter can preserved.

NTS-300   NTS-450

NTS-750   NTS/NTU-1200

NTS/NTU-1700   NTS/NTU-2200/3200
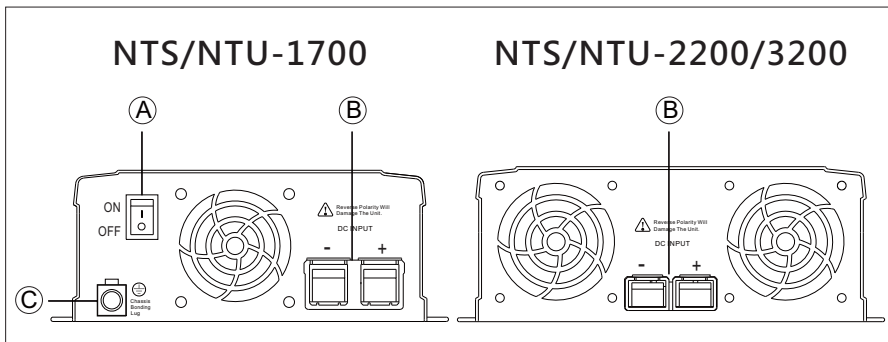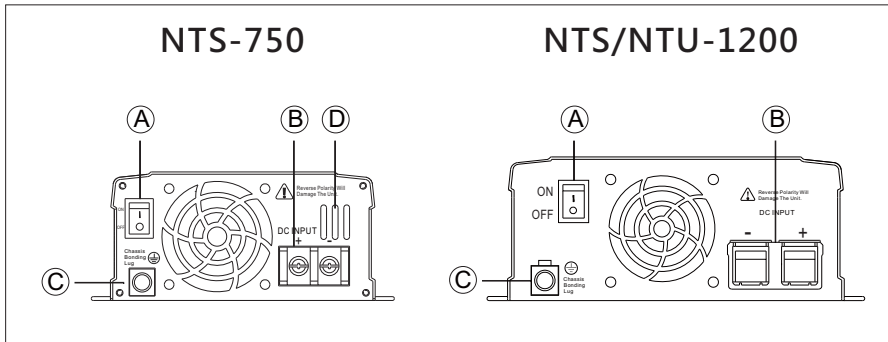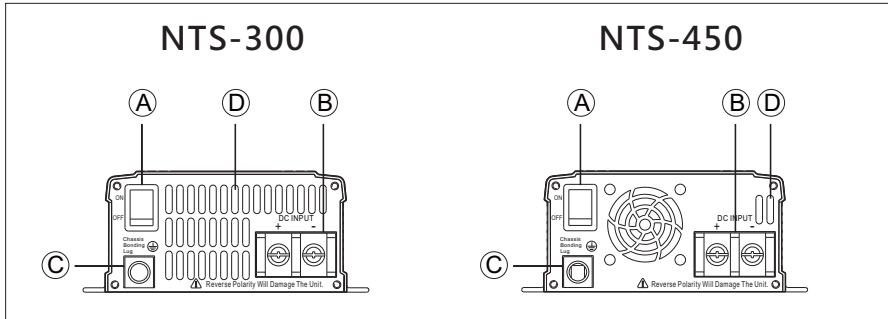
4.3 LED Indicator

Status indicator :

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

	Green	Orange	Red
Status	System check 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.

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

Load Condition Indicator :

Itr 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%.

	Green	Orange	Red
Load	<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 ±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.

|	Green
AC Input	● 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.
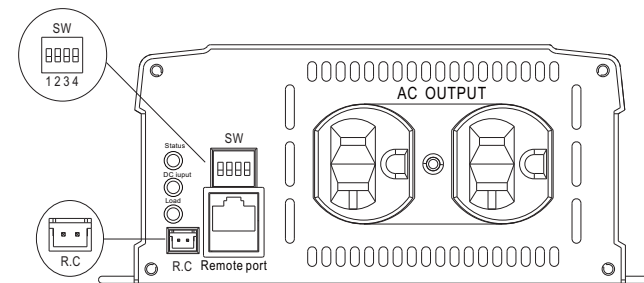
Type-US

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).

NOTE: Fan stops at power saving mode.

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	X	●	●
Support UART	●	X	X	X
UPS Function	X	X	X	●

● Standard

NOTE: Built-in thermal controlled DC fan. Fan stops at low internal temperature.

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	TN-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			

Remote port

HOLE IN CHASSIS
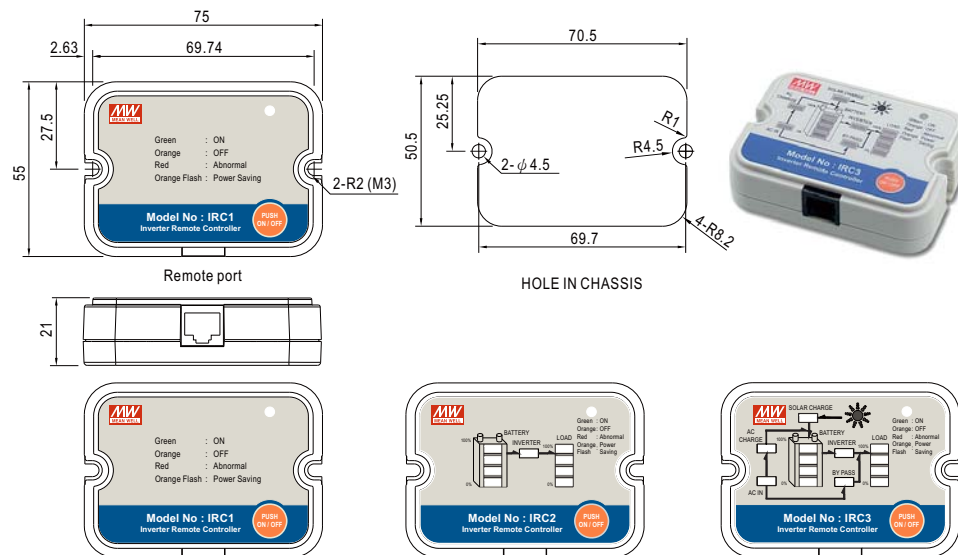
5.4 RS-232/UART Protocol

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

The RS-232/UART parameters of NTS/NTU series are defined as follows:

Parameter	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
C	W	Remote Control
V	R/W	Write voltage/Frequency Write: Need to enable with "pU" command first
pU	W	Enable/disable setting mode (for command "V")
I	R	INVERTER Information
W	W	Write Information into INVERTER EEPROM

Communication sequence

Min. request period (Controller/PC to NTU/NTS): 500mSec。
Max. response time (NTU/NTS to Controller/PC): 15mSec。
Min. packet margin time (Controller/PC to NTU/NTS): 10mSec。
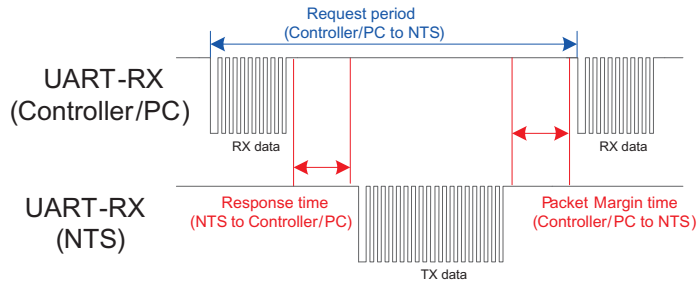
The write format and reply format of communication protocol

NTS/NTU communications are transmitted by using ASCALL codes. The end character of communication command is CR(0x0D), also CRLF (0x0D 0x0A) is the most common end character. Therefore, when decoding data, pay attention to whether LF (0x0A) is included and clear it to avoid data confusion. To improve transmission quality, some commands contain Checksum.

The Checksum is calculated as follows:

① Reset the Checksum in the Checksum data to zero.
② Add all the data before Checksum data，Including V or I commands.
③ If the total data is less than 2 bytes, add 0 to make up 2 bytes.

For example, the V command sets the inverter output to 110VAC/50Hz. The format of the V instruction is as follows :

0	1-3	4	5-7	8-9	10
V(0x56)	Voltage	SP(0x20)	Frequency	Checksum	CR(0x0D)

Fill in the instructions in the above format and the instruction data except checksum is as follows：

V(0x56)	1(0x31)	1(0x31)	0(0x30)	SP(0x20)	0(0x30)	5(0x35)	0(0x30)	checksum	CR(0x0D)

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① Reset the Checksum data to zero
② The checksum data is the sum of all written data
   Sum = 56 + 31 + 31 + 30 +20 + 30 +35 + 30 = 19D
③ Checksum = 01 9D

The format of the V command is as follows:

V(0x56)	1(0x31)	1(0x31)	0(0x30)	SP(0x20)	0(0x30)	5(0x35)	0(0x30)	0x019D	CR(0x0D)

Note：For details about the format of the V command, see the following write / read format and definition description.

The Q command：Used to confirm the inverter status, the parameters can be output voltage, output load percent (Digital), battery voltage, battery capacity, heat sink temperature, utility power voltage, output power frequency, DC bus, output load percent (Analog) and etc.

Write format：

0	1
Q(0x51)	CR(0x0D)

Reply format：

0	1~3	4	5~7	8	9~12	13	14~16
((0x28)	O/P Voltage	SP(0x20)	O/P load (Digital)	SP(0x20)	Battery voltage	SP(0x20)	Battery capacity
17	**18~21**	**22**	**23~25**	**26**	**17~30**	**31**	**32~34**
SP(0x20)	Heat Sink Temperature	SP(0x20)	Utility Power Volt.	SP(0x20)	Output Power Freq.	SP(0x20)	DC BUS Voltage
35	**36~38**	**39**	**40**	**41**	**42**	**43**	**44**
SP(0x20)	O/P Load (Analog)	SP(0x20)	b0	b1	b2	b3	b4
45	**46**	**47**	**48**	**49**	**50**	**51**	**52**
b5	b6	b7	b8	b9	b10	b11	b12
53	**54**	**55**	**56**	**57**	**58**	**59**	**60**
b13	b14	b15	b16	b17	b18	) (0x29)	CR(0X0D)

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Definition of command(Q)

49 byte data flow of command 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
VVV,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
SS.S,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℃	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

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 protection	U1	ASCII
b15,1	INV OVP	INV OVP	R	1: INV OVP protection	U1	ASCII
b16,1	INV Fault	INV Fault	R	1: INV Fault	U1	ASCII

Data byte	Funtion name	Description	R/W	Range	Data type	Uint
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

The C command: Used to remote control inverter.

Write format :

Remote OFF

0	1	2	3	4	5	6	6	8
C(0x43)	1(31)	0(30)	0(30)	0(30)	0(30)	0(30)	0(30)	0(30)

9	10	11	12	13	14	15	16
0(30)	0(30)	0(30)	0(30)	0(30)	0(30)	0(30)	CR(0x0D)

Remote ON

0	1	2	3	4	5	6	6	8
C(0x43)	0(30)	1(31)	0(30)	0(30)	0(30)	0(30)	0(30)	0(30)

9	10	11	12	13	14	15	16
0(30)	0(30)	0(30)	0(30)	0(30)	0(30)	0(30)	CR(0x0D)

Reply format :

0
C(0x43)

Definition of command(C)

15 byte data flow of command C	(Cb0b1b2b3b4b5b6b7b8b9b10b11b12b13b14)					
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

Data byte	Funtion name	Description	R/W	Range	Data type	Uint
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

The V command : Used to change output voltage and frequency.You need to send the "pU" command to unlock it before executing the V command.

Write format :

①
0	1
pU(0x70 0x55)	CR(0x0D)

(After sending data, delay at least 20ms before changing the voltage and current.)

②
0	1~3	4	5~7	8 9	10
V(0x56)	Voltage	SP(0x20)	Frequency	Checksum	CR(0x0D)

Reply format :

If the transmission parameters are correct, the inverter replies:

0	1~3	4	5~7	8 9	10
#(0x23)	Voltage	SP(0x20)	Frequency	Checksum	CR(0x0D)

If the transmission parameters are not correct, the inverter replies as follows, please confirm and retry.

0	1	2	3	4	5	6	7	8
#(0x23)	V(0x56)	SP(0x20)	C(0x43)	M(0x4D)	D(0x44)	SP(0x20)	E(0x43)	R(0x52)

0	1	2	3	4
R(0x52)	O(0x4F)	R(0x52))	Checksum	CR(0x0D)

Definition of command(V)

8 byte data flow of command V		(VWWW FFF)				
Data byte	Funtion name	Description	R/W	Range	Data type	Uint
WWW,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: Restore factory voltage setting (DIP switch setting mode)(Note)	U1	ASCII
FFF,3	Frequency setting	Frequency setting	W/R	050 : 50Hz 060 : 60Hz 000 : Restore factory frequency setting (DIP switch setting mode)(Note)	U1	ASCII
2	Checksum	Checksum				

Note: After setting voltage or frequency by "V" command, disconnect communication,the product can still maintain the set value.If you want to switch back to DIP switch settings.Please send 0(0x30)0(0x30)0(0x30) for voltage and frequency, and the new setting will take effect after restart.

The I command : Used to read inverter information. The parameters contain the inverter output voltage, frequency, model code,equalization voltage, floating voltage, alarm voltage, shutdown voltage and etc.

Write format：

0	1
I(0x49)	CR(0x0D)

Reply format：

0	1	2	3	4~7	8	9~12	13
#(0x23)	Voltage & Freq.	Saving mode	Model Code	Equalization Volt.	SP(0x20)	Floating Volt.	SP(0x20)

14~17	18	19~22	23	24~27	28	29~38	39
Alarm Volt.	SP(0x20)	Shutdown Volt.	SP(0x20)	Transfer Volt.	SP(0x20)	Manufacture Country	SP(0x20)

40~58	59	60~68	69	70~82	83	84	85
Serial Number	SP(0x20)	Revision	SP(0x20)	Model Name	SP(0x20)	Battery First Flag	SP(0x20)

86~95	96 97	98
Date	Checksum	CR(0x0D)

The W command: Used to modify inverter specifications. Such as alarm voltage, shutdown voltage, serie number, model name and etc.

Write format：

0	1	2	3	4~7	8	9~12	13
W(0x57)	Voltage & Freq.	Saving mode	Model Code	Equalization Volt.	SP(0x20)	Floating Volt.	SP(0x20)

14~17	18	19~22	23	24~27	28	29~38	39
Alarm Volt.	SP(0x20)	Shutdown Volt.	SP(0x20)	Transfer Volt.	SP(0x20)	Manufacture Country	SP(0x20)

40~58	59	60~68	69	70~82	83	84	85
Serial Number	SP(0x20)	Revision	SP(0x20)	Model Name	SP(0x20)	Battery First Flag	SP(0x20)

86~95	96 97	98
Date	Checksum	CR(0x0D)

Reply format：

If the transmission parameters are correct, the inverter replies:

0	1	2	3	4~7	8	9~12	13
#(0x23)	Voltage & Freq.	Saving mode	Model Code	Equalization Volt.	SP(0x20)	Floating Volt.	SP(0x20)

14~17	18	19~22	23	24~27	28	29~38	39
Alarm Volt.	SP(0x20)	Shutdown Volt.	SP(0x20)	Transfer Volt.	SP(0x20)	Manufacture Country	SP(0x20)

40~58	59	60~68	69	70~82	83	84	85
Serial Number	SP(0x20)	Revision	SP(0x20)	Model Name	SP(0x20)	Battery First Flag	SP(0x20)

86~95	96 97	98
Date	Checksum	CR(0x0D)

If the transmission parameters are not correct, the inverter replies as follows, Please confirm and retry.

0	1	2	3	4	5	6	7	8
#(0x23)	W(0x57)	SP(0x20)	C(0x43)	M(0x4D)	D(0x44)	SP(0x20)	E(0x43)	R(0x52)

0	1	2	3	4
R(0x52)	O(0x4F)	R(0x52))	Checksum	CR(0x0D)

Definition of command(I、W)

87 byte data flow of command I、W		(I/WVDMEE.E FF.F AA.A SS.S TT.T MEANWELL LOC-xxxxxxxxxxxxxx vv.v XXXXXXXXXXXXX B MM/DD/YYYY)					
Data byte	Funtion name	Description	R/W	Range	Data type	Uint
V,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 (Defined by DIP SW)(Note1)	U1	Binary
D,1	Saving mode	Saving mode	R	Disable=00 Enable=01 (Defined by DIP SW)(Note1)	U1	Binary
M,1	Model Code	Model Code	R	112=00 124=01 148=02 212=03 224=04 248=05 (Defined by DIP SW)(Note1)	U1	Binary
EE.E,4	Equalization Volt.	Equalization Volt.	W/R	12: 9.0~15.0Vdc 24: 18.0~30.0Vdc 48: 36.0~60.0Vdc (Unsupported)(Note2)	U1	ASCII
FF.F,4	Floating Volt.	Floating Volt.	W/R	12: 9.0~15.0Vdc 24: 18.0~30.0Vdc 48: 36.0~60.0Vdc (Unsupported)(Note2)	U1	ASCII
AA.A,4	Alarm Volt.	Alarm Volt.	W/R	12: 9.9~12.5Vdc 24: 19.8~25.0Vdc 48: 39.6~50.0Vdc (Note3)	U1	ASCII

Data byte	Funtion name	Description	R/W	Range	Data type	Uint
SS.S,4	Shutdown Volt.	Shutdown Volt.	W/R	12: 9.7~12.0Vdc 24: 19.4~24.0Vdc 48: 38.8~48.0Vdc (Note 3)	U1	ASCII
TT.T,4	Transfer Volt.	Transfer Volt.	W/R	12: 9.0~15.0Vdc 24: 18.0~30.0Vdc 48: 36.0~60.0Vdc (Unsupported)(Note2)	U1	ASCII
10	Manufacture Country	Manufacture Country	W/R	MEANWELL (Note4)	U1	ASCII
19	Serial Number	Serial Number	W/R	LOC-xxxxxxxxxxxxxxxx (x: 0~9)	U1	ASCII
9	Revision	Revision	R	REV:vv.v (Defined by Firmware, not changeable)	U1	ASCII
13	Model Name	Model Name	W/R	Define by each model (max of 14 digits)	U1	ASCII
B,1	Battery First Flag	Battery First Flag	W/R	0 = Disable 1= Enable	U1	ASCII
10	Date	Date	W/R	Date : MM/DD/YYYY	U1	ASCII
2	Checksum	Checksum				

① The read value can be any arbitrary code, the BYTE length must be met when writing data, and the value can be arbitrary.

② If the related parameters are unsupported · please set the maximum voltage when writing :
   12V: 15.0V (0x31 0x35 0x2E 0X30)
   24V: 30.0V (0x33 0x30 0x2E 0x30)
   48V: 60.0V (0x36 0x30 0x2E 0x30)

③ The battery voltage setting must meet the following conditions:12.5V≥ Alarm_Volt.>Shutdown_Volt.≥9.7V. And Alarm_Volt. - Shutdown_Volt.≥0.2V. If the above conditions are not met, the setting is invalid.

④ If the data cannot fill the number of bytes set by the instruction ,please write in blank code(0x20) after the write data. For example, the manufacturer "MEANWELL" has 8 bits, and 2 bits need to be added. The ASCII code is:
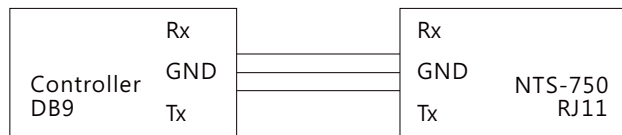
M(0x4D)	E(0x45)	A(0x41)	N(0x4E)	W(0x57)	E(0x45)	L(0x4C)	0(0x20)	0(0x20)

5.4.2 Communication Practices

Examples of RS-232/UART communications are provided below

1. Connect PIN3, PIN5, and PIN2 of the back-end controller DB9 to Rx(PIN2),GND(PIN3), and Tx(PIN4) of the RJ11 communication terminals of the NTS-750-248UN.

2. The communication entity layer is set as follows：

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

3. Q Instruction transmission
   The NPB-750-248UN model is used as an example to read the inverter status
   request instructions：51 0D
   Return instruction：28 32 33 30 20 30 32 35 20 34 38 2E 33 20 30 37
   35 20 32 30 2E 30 20 30 30 30 20 35 30 2E 30 20 30 30 30 30 20 30 32
   33 20 31 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 29 0D

Request instruction interpretation:

Digit position	0	1
Input order	51	0D
Function	Q instruction confirmation	End mark
Explain	Q instruction write	End of instruction

Return instructions explained：

Digit position	0	1-3	4	5-7	8	9-12	13	14-16
Return instruction	28	32 33 30	20	30 32 35	20	34 38 2E 33	20	30 37 35
Function	(	Output voltage	spacing	output power (%)	spacing	input voltage	spacing	battery capacity
Explain	(	230V	spacing	0<~≤30%	spacing	48.3V	spacing	51%<~≤75%

17	18~21	22	23~25	26	27~30	31	32~34	35	36~38
20	35 30 2E 30	20	30 30 30	20	35 30 2E 30	20	30 30 30	20	30 32 33
Spacing	temperature	Spacing	input the mains voltage	Spacing	output voltage frequency	Spacing	DC Bus voltage	Spacing	output power (percentage value)
Spacing	20.0℃	Spacing	0V	Spacing	50Hz	Spacing	0V	Spacing	23%

39	40	41	42	43	44	45	46	47	48
20	31	30	30	30	30	30	30	30	30
spacing	INVERTER Mode detection	Bypass Mode detection	Utility Power detection	Utility Charge detection	Solar Charger detection	Saving Mode detection	Battery Exhausted Mode detection	Shutdown Mode detection	Battery OVP detection
spacing	In inverter mode	Not in Bypass mode	No utility Power supply	Utility Charge disable	Solar Charger disable	Not in Saving Mode	Not in Battery Exhausted Mode	Not in Shutdown Mode	Not in Battery OVP

49	50	51	52	53	54	55	56	57	58
30	30	30	30	30	30	30	30	30	30
Remote Shutdown	OLP 100~115%	OLP 115%~150%	OLP 150%~	OTP	INV UVP	INV OVP	INV Fault	EEPROM error code	System Shutdown
Remote shutdown is not enabled	The load does not reach 100~115% of the rated load	The load does not reach 100~115% of the rated load	The load does not reach more than 150% of the rated load	The power supply is not in over temperature protection mode	The power supply is not in over temperature protection mode	The output voltage is normal, and the OVP function is not triggered	The power supply works normally without fault	Data storage works properly without failure	The system works properly and is not shut down

59	60
29	0D
)	End mark
)	End of return

4. C Instruction transmission

The NPB-750-248UN model is used as an example to perform the remote shutdown command.
Request instruction：43 31 30 30 30 30 30 30 30 30 30 30 30 30 30 30 0D
Return instruction：43

Request instruction interpretation：

Digit position	0	1	2	3-15	16
Return instruction	43	31	30	30	0D
Function	C instruction confirmation	Shut down	Turn on INVERTER	No special functions, reserved for other locations	End mark
Explain	C instruction write	Shutdown instruction on	Power-on instruction off		End of instruction

Return instructions explained：

Digit position	0
Return instruction	43
Function	C command return
Explain	C instruction in effect

5. V instruction transmission

In the example of NPB-750-248UN, the output frequency is changed to 60Hz.
（1）First unlock with the pu command
Input instruction：70 55 0D
No return
（2）Input instruction：56 32 33 30 20 30 36 30 01 A1 0D
Return instruction：23 32 33 30 20 30 36 30 01 6E 0D

Input instruction interpretation:

Digit position	0	1-3	4	5-7	8-9	10
Return instruction	56	32 33 30	20	30 36 30	01 A1	0D
Function	V instruction confirmation	Output voltage etting	Spacing	Frequency setting	Check	End mark
Explain	V instruction write	230V	Spacing	60Hz	Check bit	End of instruction

Output instruction interpretation：

Digit position	0	1-3	4	5-7	8-9	10
Return instruction	23	32 33 30	20	30 36 30	01 6E	0D
Function	(	Output voltage reading	Spacing	Frequency reading	Check	End mark
Explain	(	230V	Spacing	60Hz	Check bit	End of instruction

6 . I instruction transmission
Take PBB-750-248UN model as an example to read inverter information.
Request instruction : 49 0D
Return instruction : 23 03 00 05 30 30 2E 30 20 30 30 2E 30 20 34 34 2E 30 20 34 30 2E 30 20 30 30 2E 30 20 4D 45 41 4E 57 45 4C 4C 20 20 20 4C 4F 43 2D 30 31 32 33 34 35 36 37 38 39 20 20 20 20 20 52 45 56 3A 30 31 2E 34 20 20 4E 54 53 2D 30 37 35 30 2D 32 34 38 20 20 31 20 30 30 2F 30 30 2F 30 30 30 30 12 6C 0D

Request instruction interpretation:

Digit position	0	1
Return instruction	49	0D
Function	W instruction confirmation	End mark
Explain	W instruction write	End of instruction

Return instructions explained：

Digit position	0	1	2	3	4-7	8	9-12	13
Return instruction	23	03	00	05	30 30 2E 30	20	30 30 2E 30	20
Function	(	Voltage/frequency gear	Saving Mode	Mode code	Equalization Volt.	Spacing	Floating Volt.	Spacing
Explain	(	240V/50Hz	Power saving mode off	Mode 248	0V	Spacing	0V	Spacing

14-17	18	19-22	23	24-27	28	29-38
34 34 2E 30	20	34 30 2E 30	20	30 30 2E 30	20	4D 45 41 4E 57 45 4C 4C 20 20
Alarm Volt.	Spacing	Shutdown Volt	Spacing	Shutdown Volt	Spacing	Manufacture Country
44.0V	Spacing	40.0V	Spacing	0V	Spacing	MEANWELL

39	40-58	59	60-68
20	4C 4F 43 2D 30 31 32 33 34 35 36 37 38 39 20 20 20 20 20	20	52 45 56 3A 30 31 2E 34 20
Spacing	Serial Number	Spacing	Revision
Spacing	LOC-12345678	Spacing	REV:01.4

69	70-82	83	84	85	86-95
20	4E 54 53 2D 30 37 35 30 2D 32 34 38 20	20	31	20	30 30 2F 30 30 30 2F 30 30 30 30
Spacing	Model Name	Spacing	Battery First Flag	Spacing	Date
Spacing	NTS-0750-248	Spacing	Enable	Spacing	00/00/0000

96-97	98
12 6C	0D
Check	End mark
check bit	End of instruction

7 . W instruction transmission

In the example of NPB-750-248UN, the W command is used to change the alarm voltage to 42.0V.

Request instruction：57 03 00 05 36 30 2E 30 20 36 30 2E 30 20 34 32 2E 30 20 34 30 2E 30 20 36 30 2E 30 20 4D 45 41 4E 57 45 4C 4C 20 20 20 4C 4F 43 2D 30 31 32 33 34 35 36 37 38 39 20 20 20 20 20 20 52 45 56 3A 30 31 2E 34 20 20 4E 54 53 2D 30 37 35 30 2D 32 34 38 20 20 31 20 30 30 2F 30 30 2F 30 30 30 30 12 B0 0D

Return instruction：23 03 00 05 30 30 2E 30 20 30 30 2E 30 20 34 32 2E 30 20 34 30 2E 30 20 30 30 2E 30 20 4D 45 41 4E 57 45 4C 4C 20 20 20 4C 4F 43 2D 30 31 32 33 34 35 36 37 38 39 20 20 20 20 20 20 52 45 56 3A 30 31 2E 34 20 20 4E 54 53 2D 30 37 35 30 2D 32 34 38 20 20 31 20 30 30 2F 30 30 2F 30 30 30 30 12 6A 0D

Request instruction interpretation:

Digit position	0	1	4	3	4-7	8	13	13
Return instruction	23	03	00	05	36 30 2E 30	20	20	20
Function	(	Voltage/ frequency gear	Saving Mode	Mode code	Equalization Volt.	Spacing	spacing	spacing
Explain	(	240V/50Hz	Power saving mode off	Model 248	60V	48.3V	Spacing	Spacing

14-17	18	19-22	23	24-27	28	29-38
34 34 2E 30	20	34 30 2E 30	20	36 30 2E 30	20	4D 45 41 4E 57 45 4C 4C 20 20
Alarm Volt.	Spacing	Shutdown Volt	Spacing	Shutdown Volt	Spacing	Manufacture Country
42.0V	Spacing	40.0V	Spacing	60.0V	Spacing	MEANWELL

| 39	40-58	59	60-68
20	4C 4F 43 2D 30 31 32 33 34 35 36 37 38 39 20 20 20 20 20	20	52 45 56 3A 30 31 2E 34 20
Spacing	Serial Number	Spacing	Revision
Spacing	LOC-123456789	Spacing	REV:01.4

69	70-82	83	84	85	86-95
20	4E 54 53 2D 30 37 35 30 2D 32 34 38 20	20	31	20	30 30 2F 30 30 30 2F 30 30 30 30
Spacing	Model Name	Spacing	Battery First Flag	Spacing	Date
Spacing	NTS-0750-248	Spacing	Enable	Spacing	00/00/0000

96-97	98
12 6C	0D
Check	end mark
Check bit	End of instruction

For the W return instruction, refer to the I return instruction.

5.5 UPS Mode(only for NTU series)

5.5.1 Explanation of UPS mode
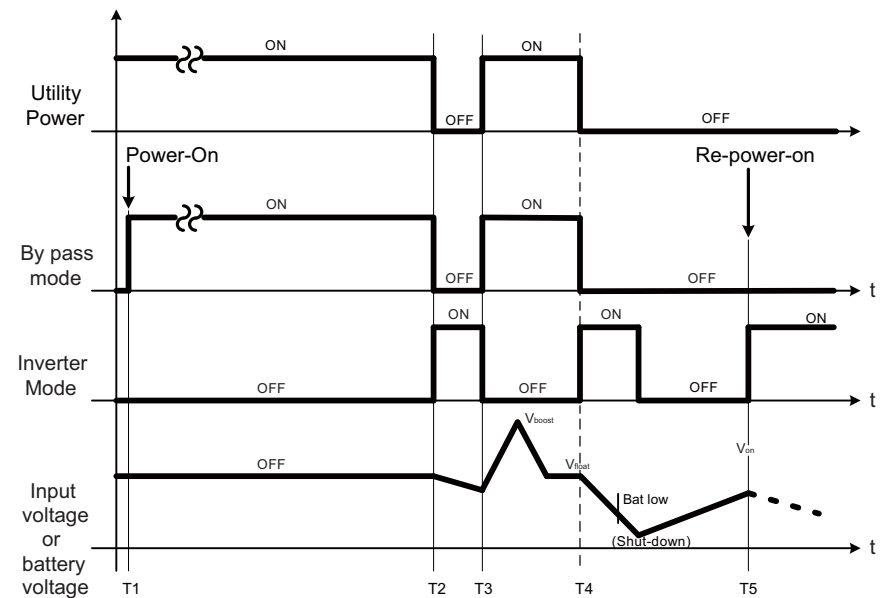
T1: When the user turns on the NTU, if the mains voltage is normal, the NTU will enter the bypass mode, and the mains voltage will supply the load. At this time, the battery is fully charged.

T2: If the mains voltage momentarily fails to supply AC output or the mains voltage momentarily exceeds the range of ±16% of the NTU set output, NTU will immediately switch to inverter mode so that the customer's equipment will not have blackout phenomenon due to the instability of the mains voltage. Take the NTU-1200-124 (the preset output voltage is 110Vac) as an example: When the mains voltage is greater than 127.6Vac or less than 92.4Vac, the NTU-1200-124 will enter the inverter mode for power supply, at which time the battery begins to provide energy to the inverter to achieve backup function.

T3: If the mains has returned to normal or the mains voltage is within the range of ±13% of the NTU set output, the NTU will switch to Bypass mode again, and the mains will supply power to the load, at which time the battery can be charged through an external charger.

T4: When the battery string voltage is consumed to the lower limit of the inverter output voltage, and the power is off.At this time, the external battery charger cannot provide energy, so the inverter will continue to act to guide the battery voltage below the lower limit of the operating voltage.

T5: When the external battery voltage is restored due to the mains and the external charger charges the battery voltage to the operating voltage of the inverter, the inverter automatically restarts and operates.

T6: When the NTU-1700 series or higher power models work in Bypass mode, and the mains supply power to the load end, connect the inverter to the battery string to start fan heating.

5.5.2 UPS mode configuration reference figure
NTU-1200/1700/2200/3200 must be used with the charger to maintain the working quality of the UPS mode.When the NTU works in Bypass mode, the charger ensures that the battery voltage can provide sufficient power for the inverter mode when the mains is abnormal.When the mains returns to normal work from the abnormal state, the charger can also make up for the power lost in the inverter mode. When connecting the charger, select the wire with the appropriate diameter according to the output current to connect the battery and the inverter. For details, see Table 3-1 Cable Usage suggestions
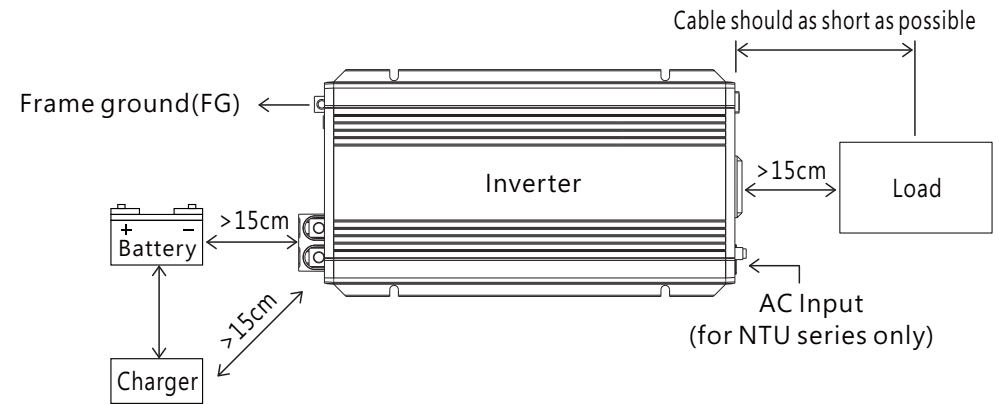
(Suggest to work accompany with MEAN WELL NPB/NPP chargers)

6.Protections and Failure Correction

6.1 Protection Funtion:

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 remover, 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 remove, 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

MEAN WELL WEB   Inverter Manual

8. Environmental declaration information

https://www.meanwell.com//Upload/PDF/RoHS_PFOS.pdf
https://www.meanwell.com//Upload/PDF/REACH_SVHC.pdf
https://www.meanwell.com//Upload/PDF/Declaration_RoHS-E.pdf

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