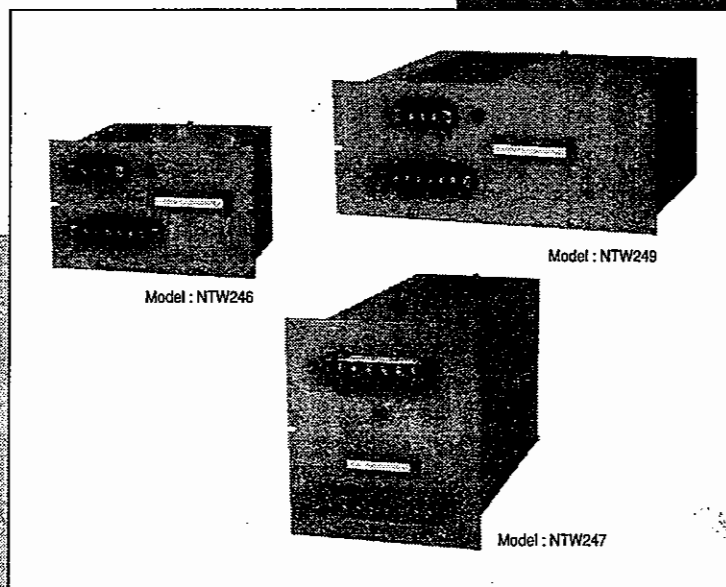


# Power Supply Unit

(Constant Voltage Transformer Type)

## Models NTW244/246/247/249

# Operator's Manual





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## ***RESTRICTIONS ON USE***

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To ensure system and equipment safety when this instrument is used in applications where safety is paramount, or with critical equipment, it should be operated in a fail-safe and redundant design environment that is subject to periodic preventive maintenance. Use this instrument in systems which safely tolerate malfunctions, damage and slow responses.

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## Safety Notes

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### Symbol

In this document, the following symbol is used to indicate potential danger which could result in bodily harm or damage to property. Before reading the main part of this document, read and understand the meanings of the symbol which is used throughout the document to indicate safety precautions (according to the level of risk).

 **WARNING**

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This indicates that failure to follow correct procedures could result in death or serious injury.

 **CAUTION**

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This indicates that failure to follow correct procedures could result in minor injury or damage to equipment or property.

### Other symbols



This symbol indicates “WARNING” or “CAUTION” if correct procedures are not followed. The type of danger is depicted in the symbol (here, *electric shock hazard*).



This symbol indicates actions that are prohibited to avoid danger. The type of prohibited action is depicted in the symbol (here, *Do Not Disassemble*).



This symbol indicates actions that should be taken to avoid danger. The type of action is depicted in the symbol (here, *Remove Plug*).

 **WARNING**

---



**Electric shock hazard:** Turn off power when installing, removing or wiring the instrument or the power supply unit.



**Electric shock hazard:** Connect the G terminal to a Class 3 grounding terminal.



**Electric shock hazard:** Attach terminal covers when all connections have been completed.



**Serious injury, damage to instrument:**  
Be careful not to drop this instrument when replacing.



**Electric shock hazard:** Do not remove the casing or covers. Do not touch the terminals or other live parts.

 **CAUTION**

---



Do not disassemble this instrument.



If the instrument becomes abnormally hot or emits smoke, turn off the power supply to this instrument and the equipment it is connected to immediately, and then disconnect the power cables.



When wiring, keep debris out of the instrument. Wiring debris can cause short circuits, fire and other problems.

# **MEMO**

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## Section 1. DESCRIPTION

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### 1.1 INTRODUCTION

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The NutroniK Power Supplies, model NTW240 series supply DC powers to the instruments.

Sola-type constant-voltage transformers (CVT) are incorporated and the NutroniK Power Supplies are of very simple construction. They provide an alarm signal (a contact signal) for abnormal voltage drop.

They are available in five models. 100V to 240V, and 50Hz and 60Hz are available for the primary voltage and frequency, respectively.

Features are:

1. Simple construction and high reliability.
2. Any practical number of power supplies of the same model can run in parallel.
3. A maximum hold time is 200 msec.
4. An output short-circuit protection.
5. Applicable to a system with a small to large-number of loops.

## 1.2 PHYSICAL DESCRIPTION

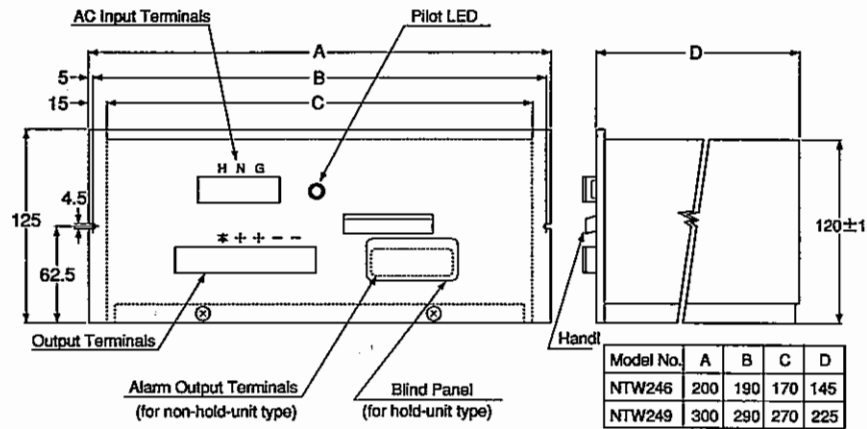
 **CAUTION**



Do not disassemble this instrument.

The Figure 1 shows dimensions of major models of NTW240 series power supplies.

### Models NTW246 and NTW249



### Models NTW244 and NTW247

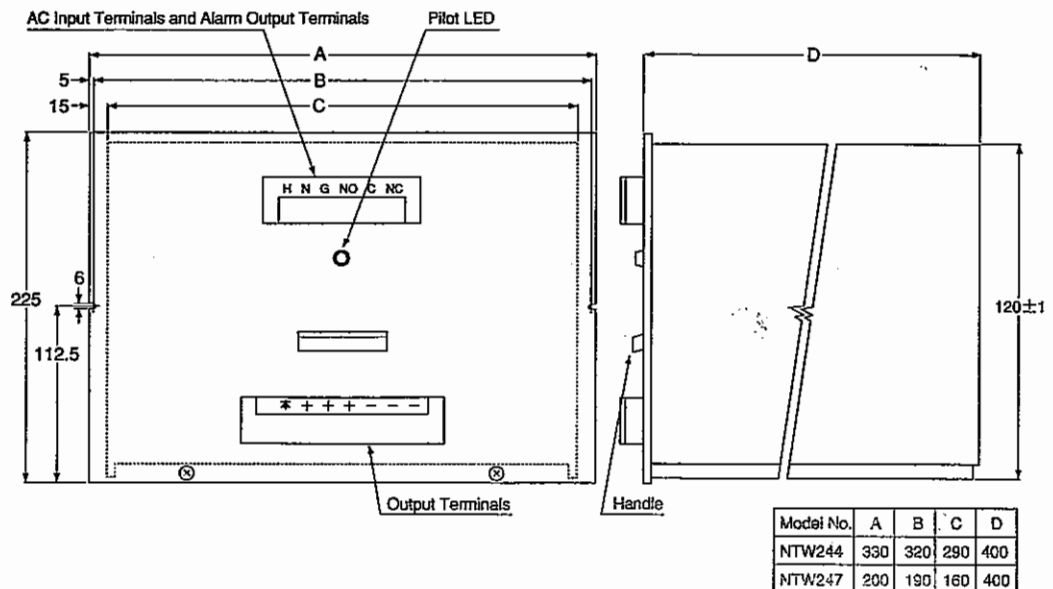


Figure 1. Dimensional Drawings

## 1.3 SPECIFICATIONS

Model No.		NTW246	NTW249	NTW247	NTW244
Item					
Construction					
Output indication		Pilot LED			
Output check		Connecting terminals			
Cable connection		Screw(M3)		Screw(M4)	
Prevention of erroneous contacting		Separator pieces provided.			
Cooling		Natural air cooling			
Color of finish		Light gray (Munsell 7.5BG 6/1.5)			
Mounting type		Rack or angle mount		Rack mount	
Input					
Voltage		AC 100/110/115/120/220/240 $\pm$ 10% (Single phase)			
Frequency		50 or 60 Hz $\pm$ 1 Hz (to specify)			
Current	105 VAC	0.6 A max.	1.6 A max.	4.5 A max.	9 A max.
	115 VAC	0.55 A max.	1.4 A max.	4.2 A max.	8.3 A max.
	230 VAC	0.3 A max.	0.7 A max.	2.1 A max.	4.2 A max.
Rush current		10 times of the input current rating at 100 % load at max.			
Power		53 W (63VA)	145 W (170VA)	320 W (380VA)	600 W (710VA)
Output					
Voltage		DC 25.5 V $\pm$ 2 V			
Current (100% load)		1 ADC	3 ADC	7.5 ADC	15 ADC
Allowable current change		0 ~ 100 % [Note 1]	10 ~ 100 %		
Ripple (100% load)		X type: 1.2 Vp-p D type: 0.5 Vp-p		0.5 Vp-p	
Output hold time	[Note 2]	X type: 50 ms D type: 200 ms		200 ms	
Power factor		85 %			
Efficiency (rated input and 100 % load)		55 %	60 %		
Allowable load shorting time		15minutes			
Output shorting protection		By drooping characteristic of transformer itself.			
Overvoltage at trouble		30 V or less			
Capacity of alarm relay contacts	[Note 3]	AC 100 V, 0.3 A, DC 24 V, 0.12 A (D type only)		AC 100 V, 0.3 A, DC 24 V, 0.12 A	
Operation		Possible to run in parallel. [Note 4]			
Ambient temperature		0 ~ 50 °C			
Ambient humidity		10 ~ 90 % RH			
Weight		6 kg	11 kg	17 kg	30 kg

Note 1 0% means open loop at the output terminals.

2 The time from the AC primary input opened until the output voltage to be DC 15.5V in the full load.

3 At resistance load.

4 Possible combinations for parallel run is shown later.

## 1.4 MODEL NUMBER TABLE

Basic Model No.	Selection Primary Input	Options	Description
NTW244			CVT type power supply unit (15ADC output)
NTW246			Ditto (1ADC output)
NTW247			Ditto (7.5ADC output)
NTW249			Ditto (3ADC output)
	-1		AC220/240V 50Hz
	-2		AC220/240V 60Hz
	-3		AC100V 50Hz
	-4		AC100V 60Hz
	-5		AC110/115V 50Hz
	-6		AC110/115V 60Hz
	-7		AC120V 50Hz
	-8		AC120V 60Hz
		-X	No option
		-D	Long hold time/with alarm output (for the models Nos. NTW246 and NTW249 only)

Table 1. Model No. Combinability of Parallel Run

Model No.		NTW246		NTW249		NTW244	NTW247
		X	D	X	D		
NTW246	X	O	-	-	-	-	-
	D	-	O	-	-	-	-
NTW249	X	-	-	O	-	-	-
	D	-	-	-	O	-	-
NTW244		-	-	-	-	O	-
NTW247		-	-	-	-	-	O

O : Yes

- : No

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## Section 2. INSTALLATION

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### 2.1 TYPICAL CONFIGURATION

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 **WARNING**

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**Electric shock hazard:** Turn off power when installing, removing or wiring the instrument or the power supply unit.



**Electric shock hazard:** Connect the G terminal to a Class 3 grounding terminal.



**Electric shock hazard:** Attach terminal covers when all connections have been completed.



**Serious injury, damage to instrument:**  
Be careful not to drop this instrument when replacing.

 **CAUTION**

---



When wiring, keep debris out of the instrument. Wiring debris can cause short circuits, fire and other problems.

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Figure 2 shows a typical configuration. No fuse breakers are externally connected.

Appropriate no fuse breaker model Nos. are recommended in Table2.

Select those for "NFB" and "MNS", the line voltage drop of which is as small as possible. The "-" line and "SC" line must be connected in a position as close to the power supply as possible.

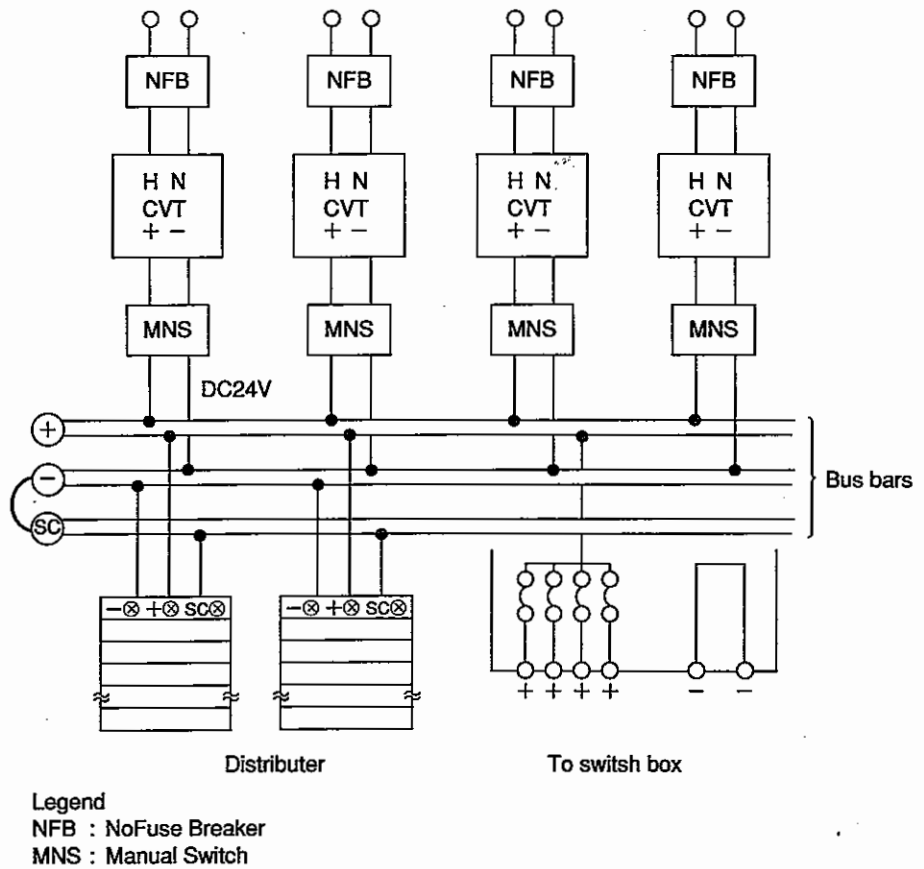


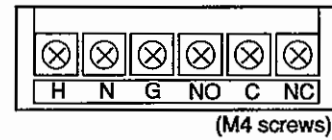
Figure 2. Typical Configuration

Table 2. No Fuse Breaker Recommendation

Model No.	Input Voltage (VAC)	Current Rating (A)	Recommended Model No.
NTW246	105	1	APL11-62F-1A
	115	1	ditto
	230	0.5	APL11-62F-0.5A
NTW247	105	5	APL11-62F-5A
	115	5	ditto
	230	2.5	APL11-62F-2.5A
NTW244	105	15	APL11-62F-15A
	115	15	ditto
	230	7.5	ditto
NTW249	105	1.6	APL11-62F-3A
	115	1.4	ditto
	230	0.7	APL11-62F-1.5A



Input : H, N  
 Ground : G  
 External signal : NO, C, NC



Check terminals : ★, -  
 Output terminals : + (3 ea.) and - (3 ea.)

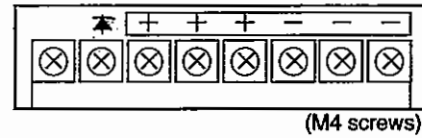


Figure 4. NTW244 and NTW247 Terminal Assignments

## 3.2 OPERATION

### CAUTION



If the instrument becomes abnormally hot or emits smoke, turn off the power supply to this instrument and the equipment it is connected to immediately, and then disconnect the power cables.

- (1) As the power is turned on, T1 provides a regulated AC voltage. The regulated AC voltage is full-wave rectified by D1, smoothed by C1 and C2 and set to the load.
- (2) Diode D2 prevents the reverse current when two or more power supply units run in parallel. Since the check terminal is internally connected to the anode of Diode D2, the voltage at the check terminal measures approximately 1 V higher than those at the output terminals.
- (3) The alarm signal at C-NC (close at alarm) is caused by:
  - 1) Overload or shorted load,
  - 2) Low frequency of the primary AC input,
  - 3) Low voltage of the primary AC input.
 The signal automatically restores as causes are removed.
- (4) When the load is shorted, the output voltage rapidly falls due to the drooping characteristic. The output voltage does not exceed 30 V even when the power supply has failed.
- (5) When one of the parallel-run power supply units has failed and close-contact signal is output at the terminals C-NC, immediately disconnect that power supply unit from the system as it may have failed.
- (6) Different models of power supply units cannot be connected in parallel.

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## Section 4. MAINTENANCE

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### WARNING

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**Electric shock hazard:** Do not remove the casing or covers.  
Do not touch the terminals or other live parts.

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### CAUTION

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Do not disassemble this instrument.

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## 4.1 VISUAL INSPECTION

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- (1) Check if Pilot LED is on.

Pilot LED is on.	normal output
Pilot LED is off.	no output or low output voltage

- (2) The voltage of the respective power supply unit needs to be measured between the CHECK terminal and the “-” terminal at parallel-run with other power supply units.
- (3) If the CHECK terminal measures no voltage although the load is normal, check the AC input power.
- (4) If the CHECK terminal measures no voltage although the AC input power is normal, there may be possibly a cause inside the power supply unit. In such a case, contact your Yamatake agent for corrective maintenance.

## 4.2 TROUBLESHOOTING

**Table 3. Troubleshooting Chart for Models NTW246 and NTW249**

Output terminal	Symptoms Pilot LED	Check terminal	Causes
X	X	X	NFB off or AC line power failure
O	X	O	Defective pilot LED (accessible from the rear)
O	O	X	Loose wiring connection
O	X	X	Defective electrical component, or NFB off while in parallel run
Δ	Δ	Δ	Droop state (output load shorted)
O	O	O	Normal or load open (0 %)

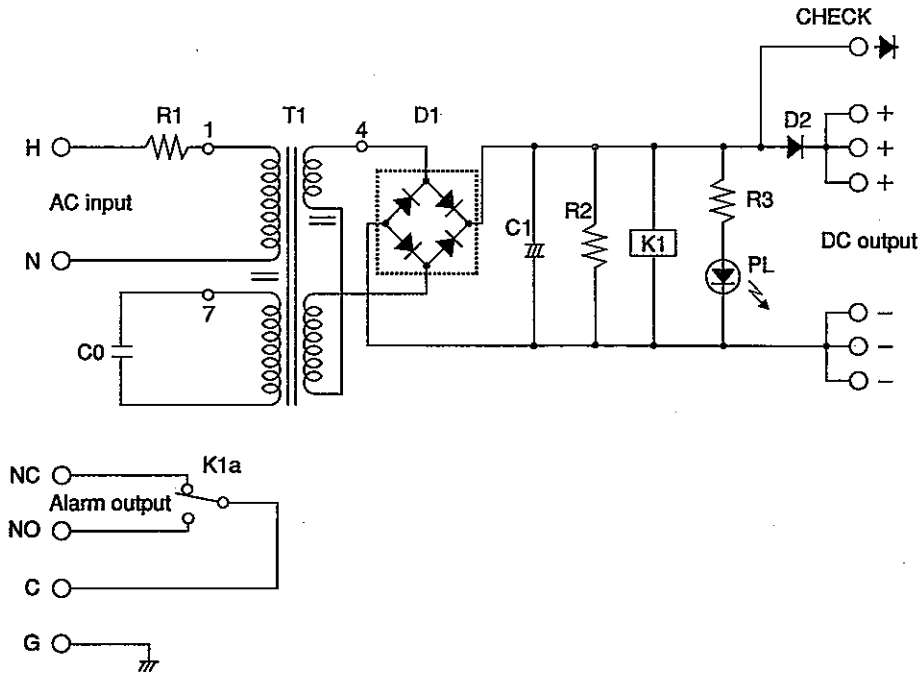
**Table 4. Troubleshooting Chart for Models NTW244, NTW246D and NTW247**

Output terminal	Symptoms Pilot LED	Check terminal	Relay	Causes
X	X	X	X	NFB off or AC line power failure
O	X	O	O	LED off or voltage defective
O	O	O	X	Defective relay
O	X	X	X	Defective electrical component, or NFB off while in parallel run
X	O	O	O	Loose wiring connection
Δ	Δ	Δ	O	AC line power off while in parallel run
O	O	O	O	Normal or load open (0 %)

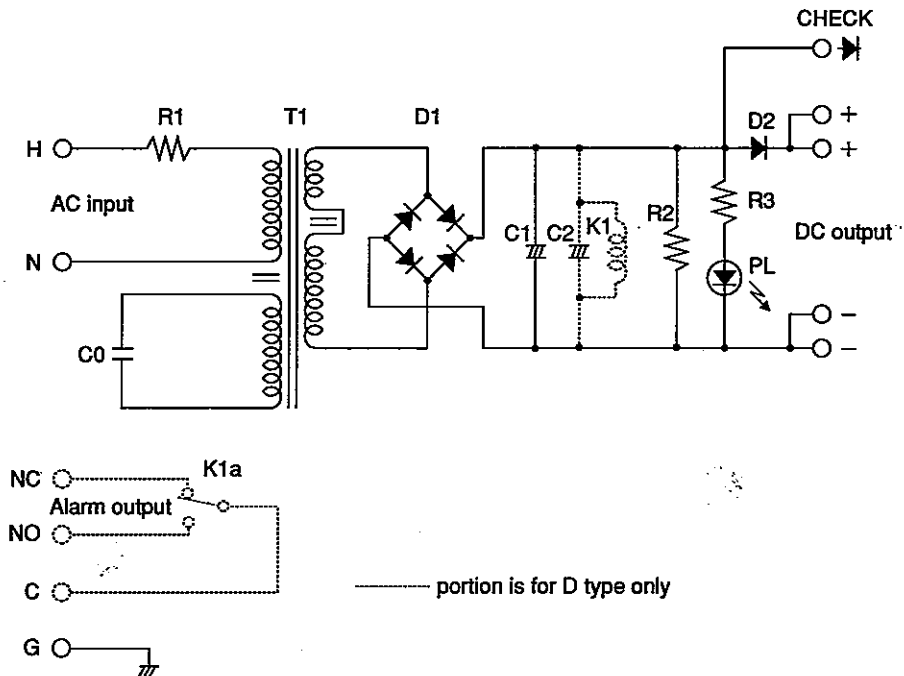
Legend: O = Normal  
 Δ = Abnormal  
 X = Off or no voltage

# APPENDIX SCHEMATICS

**NTW246 and NTW249**



**NTW 244 and NTW247**



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