



# **Quick Installation Guide**



## Transfotec International

400, du Parc,  
Saint-Eustache, Québec  
Canada, J7R 0A1  
Phone : 450.491.5671  
Fax : 450.491.3788  
Toll Free: 1.800.665.1166

Copyright application © 2005, 2006, 2007 by Transfotec Inc.

All rights reserved. Transfotec and the TFT logo are trademarks of **emd technologies** Inc., registered in the U.S.A. and other countries.

[www.transfotec.com](http://www.transfotec.com)

Contents of this publication may not be reproduced in any form or by any means, electronic or mechanical, including photocopying and recording, or by any information storage or retrieval system without the written permission of **emd technologies Inc.**, 400 du Parc, Saint-Eustache (Quebec), Canada, J7R 0A1.

### Improvements

**TFT** reserves the right to make changes and improvements to its products and assumes no obligation to incorporate any changes into units previously sold or shipped.

## Purpose of this System

---

The **OCTOPUS SYSTEM** is a revolutionary series of illumination devices specially intended for signage channel letters. It is based on a DPS Technology (Distributed Power Supply) that limits the presence of high voltage to only where it is needed. The design technology also reduces the duplication of electronic discrete components and increases the system's reliability. Other benefits include huge energy savings, simplified installation and the safest electrical procedures in the industry.

A typical Octopus system will illuminate up to 120 feet of 15 mm Argon/Mercury neon tubing.

## Application Note

---

As any illumination system, it is very important that all other components, especially "neon tubing", are built in full respect with the established industry's standards and the Octopus' electrical operation range (see specifications, p. 21). The **Octopus System** has been UL listed & CSA approved.

Only components designed as per TFT's specifications shall be used with the **Octopus system**.

**Failure to observe the above warning and to fully comply with the manufacturer installation procedures given in the present manual will void all warranty, UL 2161 listing and CSA approval.**



Listed UL2161

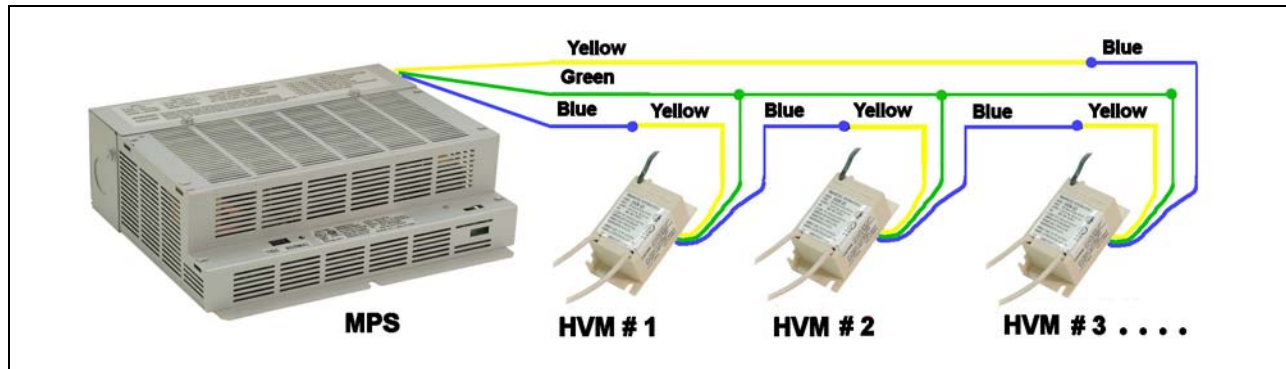


NRTL/C

March/22/2007

## READ THIS BEFORE INSTALLING !

1. The MPS unit must be installed **VERTICALLY** to ensure the free circulation of ambient air.
2. HVM units must be connected in **SERIES** only, **NEVER** in Parallel.



3. At least three (3) HVMs must be connected per MPS for proper operation.
4. High-Voltage modules can only be energized by TFT's MPS-120 power supply. Do not connect the Input Voltage (120 VAC) directly on the HVM as this will result in the complete destruction of the HVM and void warranty.
5. Never install an MPS in damp location. Direct contact with water will automatically destroy the MPS and void warranty.
6. The MPS can only be powered by 120 VAC electrical line. If any other input voltage is used, the MPS will fail.
7. The TFT-MPS-120 shall not be installed in a circuit controlled by an Energy Management System. Doing so may affect the performance of the Octopus System and proper illumination of the sign.



# CONTENTS

1.	INTRODUCTION TO THE OCTOPUS SYSTEM.....	1
1.1	BASIC OCTOPUS SYSTEM.....	1
1.2	OPTIONAL ACCESSORIES.....	2
2.	OCTOPUS SYSTEM INSTALLATION.....	3
2.1	TYPICAL INSTALLATION DIAGRAMS.....	3
2.2	INSTALLATION OF MPS UNIT(S).....	6
2.2.1	MOUNTING AND VENTILATION.....	6
2.2.2	ELECTRICAL WIRING.....	6
2.2.3	TWO OR MORE MPS INSTALLATION.....	7
2.2.4	MPS INSTALLATION GROUNDING.....	7
2.2.5	INTERMEDIATE JUNCTION BOX MARKING.....	7
2.3	HVM INSTALLATION.....	7
2.3.1	INPUT WIRING.....	8
2.3.2	OUTPUT WIRING.....	8
2.4	SYSTEMS WITH TEMPERATURE CONTROL MODULE (TCM).....	10
2.4.1	TCM INSTALLATION AND WIRING.....	10
2.4.2	NETWORKING TCM MODULES.....	11
2.4.3	TEMPERATURE PROBE INSTALLATION.....	12
2.4.4	OPERATION MODE SWITCH.....	12
2.5	SYSTEMS WITH OCTOBOX.....	13
3.	SYSTEM LOADING.....	15
3.1	SYSTEM LOADING WITH TCM.....	15
3.2	OCTOPUS LOADING CHARTS.....	16
4.	TROUBLESHOOTING.....	18
4.1	FAULT DETECTION CIRCUITS.....	19
4.2	SERVICE MODE.....	20
5.	OCTOPUS SYSTEM SPECIFICATIONS.....	21
5.1	MASTER POWER SUPPLY (MPS-120) SPECIFICATIONS.....	21
5.2	HIGH-VOLTAGE MODULES SPECIFICATIONS.....	22
5.2.1	HVM-30 & HVM-60 SPECIFICATIONS.....	22
5.2.2	HVM turbo-30 & HVM turbo-60 SPECIFICATIONS.....	23

---

# 1. INTRODUCTION TO THE OCTOPUS SYSTEM

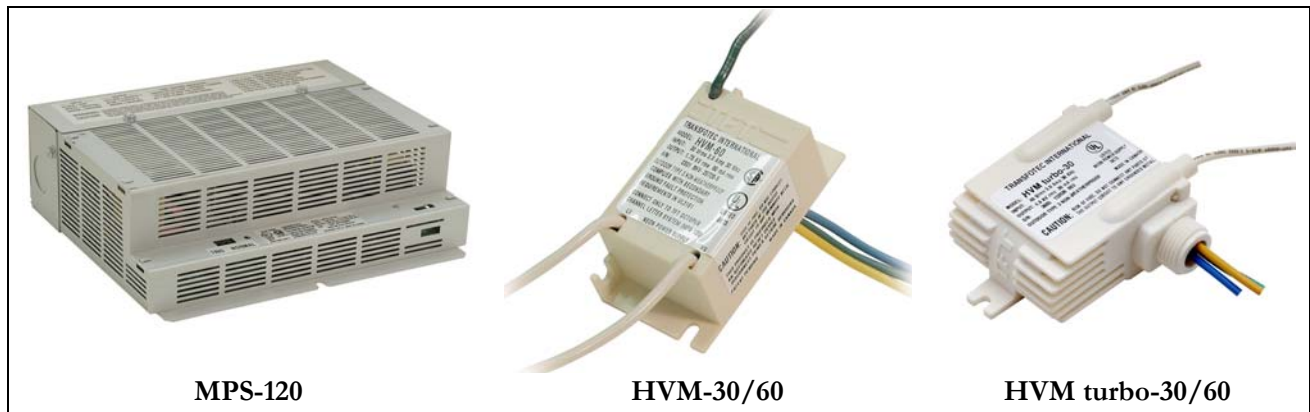
---

## 1.1 BASIC OCTOPUS SYSTEM

---

The **OCTOPUS SYSTEM** consists of the following two major elements (Figure 1):

- The **Master Power Supply** unit (MPS-120)
- The **High-Voltage Module** (HVM)
  - **HVM-30** or **HVM turbo-30**, (30 mA output current)
  - **HVM-60** or **HVM turbo-60**, (60 mA output current, not recommended for red neon)



**Figure 1** — Major components of **Octopus System**.



TFT's Master Power Supply (**MPS**) and High-Voltage Modules (**HVM**) are designed to work together and cannot be used with components from other sources. *The HVM cannot be energized by power supplies other than the MPS, and the Master Power Supply cannot supply transformers other than the HVM.*

The system provides the following benefits:

- Energy Consumption : 2.7 W/linear foot @ 30 mA
- Very High Power Factor (> .95)
- 600' of neon on one 20 A circuit
- Energy savings
  - Up to 40% compared to LED lighting
  - From 35% up to 40 % compared to conventional lighting

## 1.2 OPTIONAL ACCESSORIES

---

To facilitate, standardize or enhance an **OCTOPUS** installation, the following **OCTOPUS ACCESSORIES** can be provided optionally (Figure 2).

- The **Temperature Control Module (TCM)**, with temperature probe.

Connected to TFT's MPS-120, the TCM will automatically convert your 60 mA installation into a 30 mA operation when the temperature rises over 41°F (5°C), and back to 60 mA operation when the temperature drops below 41°F (5°C) (using a temperature probe). This will greatly increase tube life, system performance and generate additional energy savings (25%).

- ⚠ **Note:** The TCM module is not intended to replace a MPS module. It shall always be used in combination with a MPS and a minimum of three (3) HVMs.
- ⚠ The **TCM** cannot be installed with HVM-30 modules. It uses HVM-60 modules only to deliver enough output during cold temperature conditions.

- The interconnection **Octobox**.

The TFT's junction box will connect up to eleven HVM modules with simple quick-connect plugs. This will guarantee a standard installation process as well as generate additional installation savings.

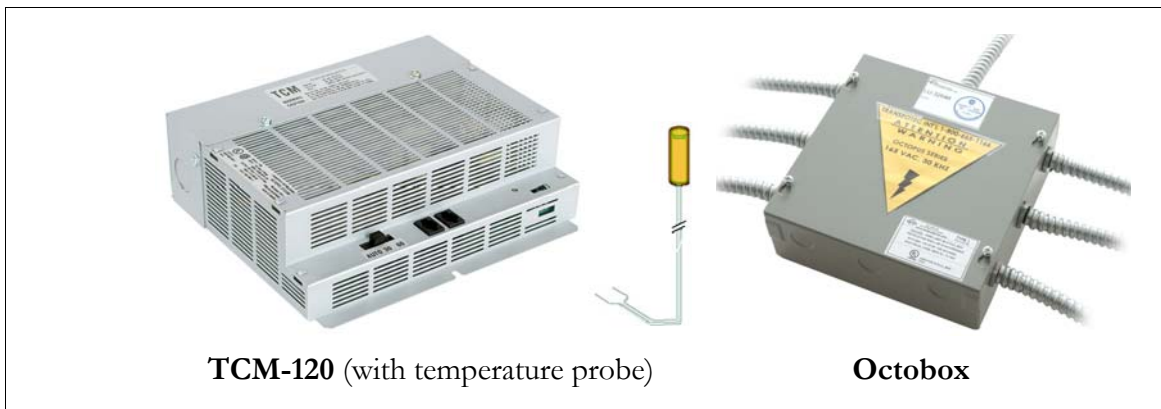


Figure 2 — Optional Accessories of **Octopus System**.

## 2. OCTOPUS SYSTEM INSTALLATION



1. Only components designed as per TFT's specifications shall be used with the **Octopus system**. Failure to observe the above warning will void all warranty and UL 2161 listing and CSA approval.
2. Installation of all components shall be done in accordance with the applicable electrical code and local regulations.

### 2.1 TYPICAL INSTALLATION DIAGRAMS

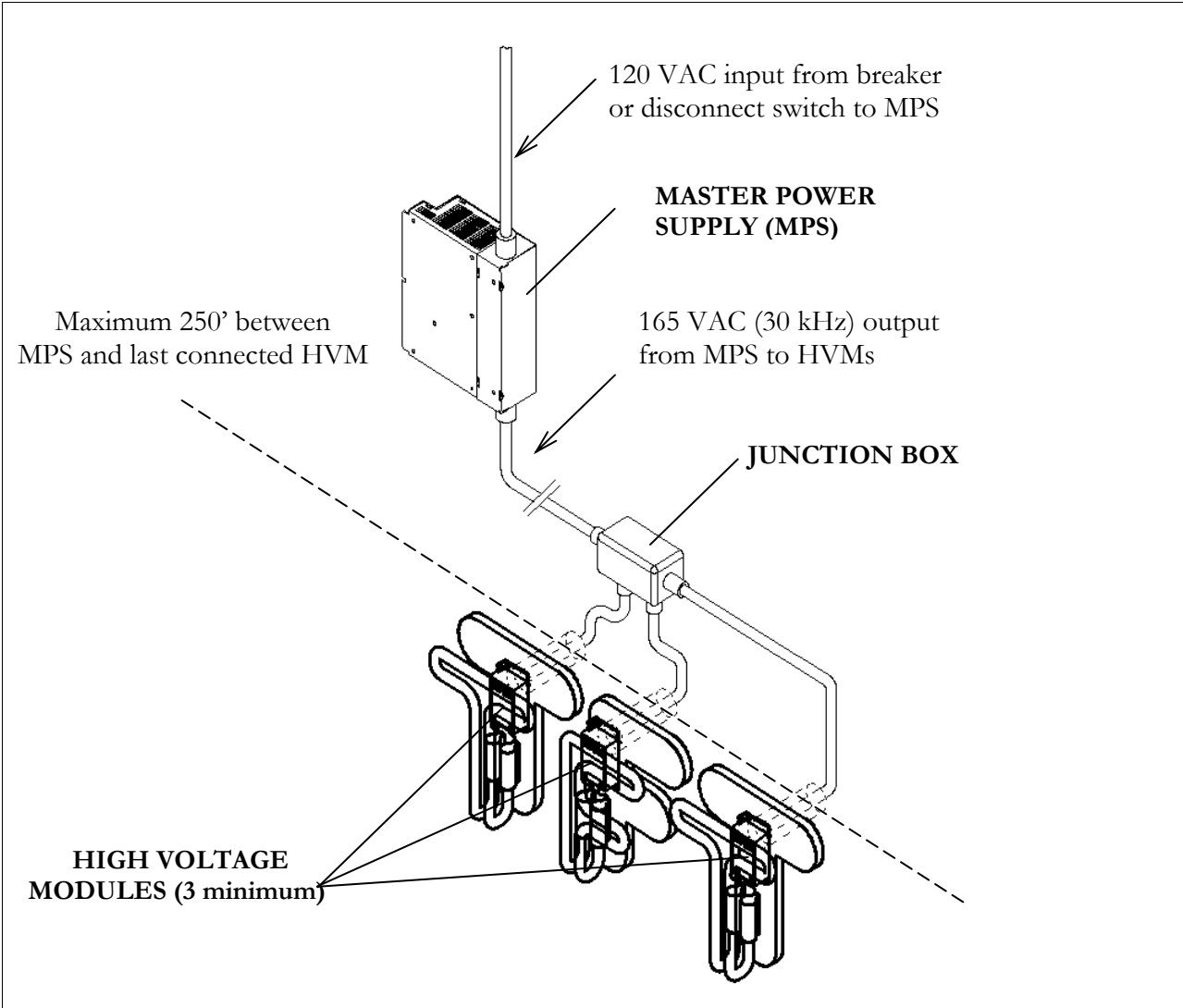


Figure 3 — Typical Installation Diagram for Octopus System (General View).

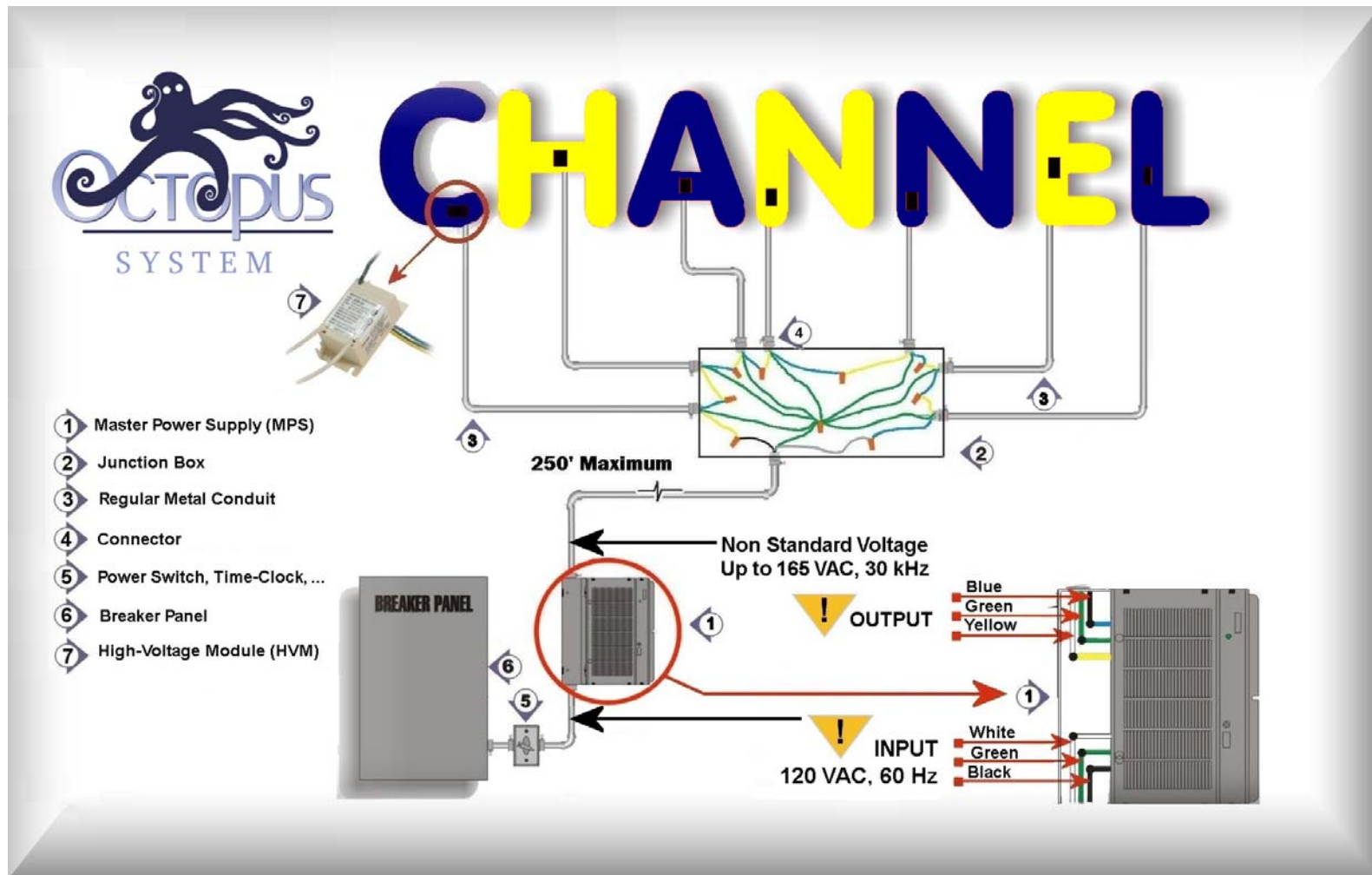
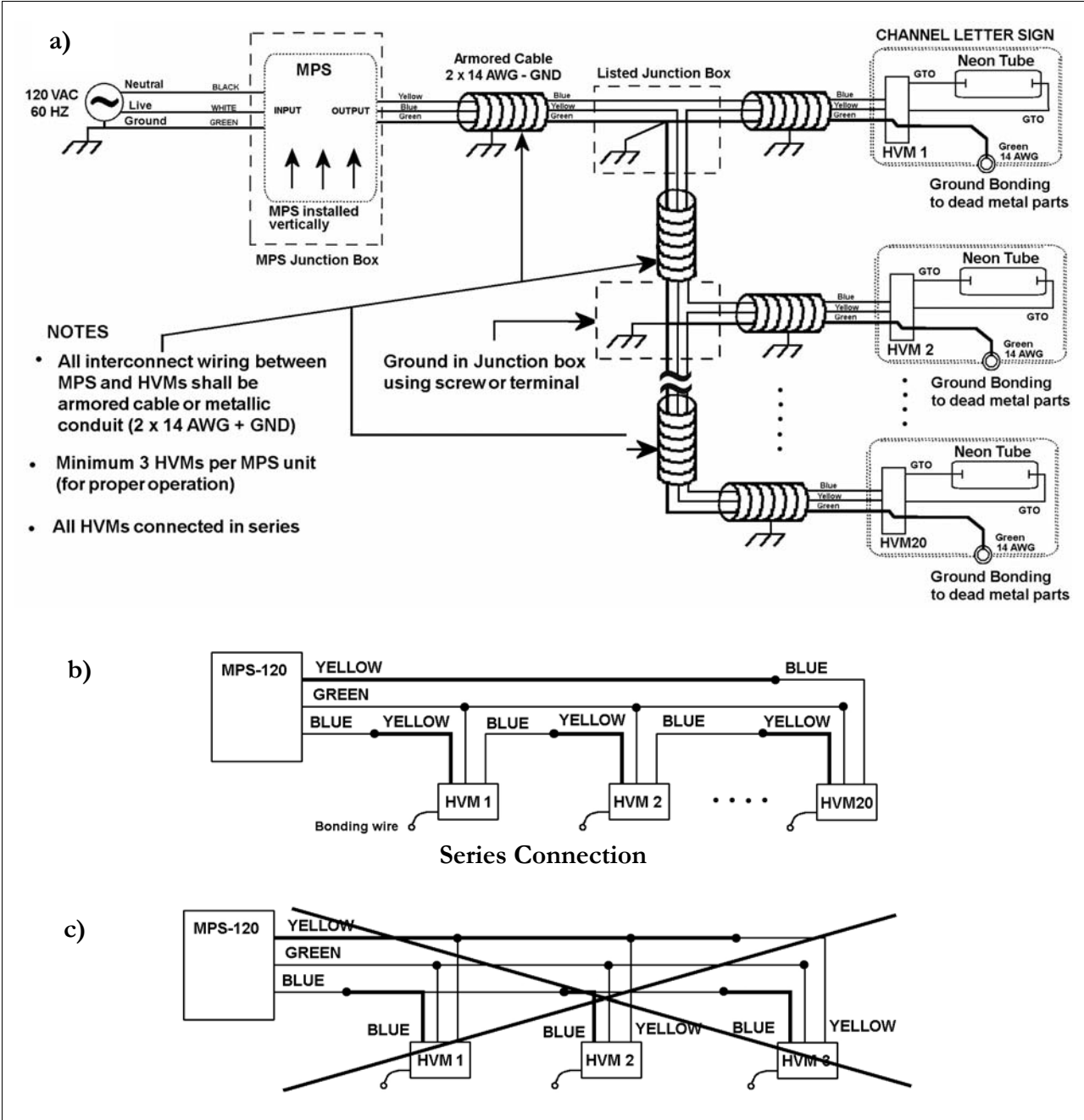


Figure 4 — Typical Installation Diagram for Octopus System (Global View).



a) Detailed Installation Diagram for **Octopus System**. See also Figure 4.  
 b) Interconnection of HVM modules, in **SERIES** only.  
 c) Parallel Interconnection of HVM modules **not allowed**.

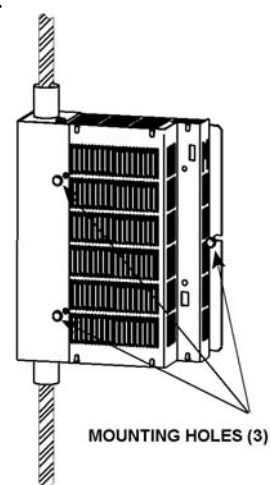
Figure 5

## 2.2 INSTALLATION OF MPS UNIT(S)

---

### 2.2.1 MOUNTING AND VENTILATION

1. The Master Power Supply (MPS) is rated for indoor use and outdoor non-waterproof environment; it must be installed in a controlled environment.
2. The MPS-120 can be installed on either a metallic or a nonmetallic surface.
3. The MPS-120 produces heat in normal operation. Normal airflow must circulate freely and constantly around the enclosure. Install the MPS in a location that minimizes overheating. Adequate ventilation is essential for long life operation. Always keep 4" of free space around the enclosure. Do not obstruct ventilation louvers.
4. The Master Power Supply must be installed **vertically** on a wall or structure to ensure maximum heat dissipation.
5. If more than one MPS is used, always keep a spacing of 4" minimum between each MPS.
6. The MPS unit must be secured in place with three (3) No 8 permanent fasteners, as shown opposite.



### 2.2.2 ELECTRICAL WIRING

#### MPS Electrical Supply (120 VAC, 60 Hz): See Figure 5a for illustration

The 3 input supply leads (black, white and green) must be connected to the electrical supply branch circuit.

#### MPS Output

1. Connection with the High Voltage Modules (HVM) is done in series only.



1. Input and output wiring shall not share the same conduit.
2. Maximum cable length of 250 ft is permitted between the MPS and the last HVM connected in the chain.

2. The MPS must be connected to the High-Voltage Module using listed cables, connectors and junction boxes.
3. Connections from the MPS to the sign shall be only metallic conduit or armored cable no less than 14 AWG copper gauge and rated 300 V minimum with 3 conductors (live, neutral and ground).

2.2.3 TWO OR MORE MPS INSTALLATION

**Caution:** If more than one MPS is installed for a single channel, use separate wiring or metal conduit for each MPS output circuit. Never connect the output of a MPS with another one.

**Caution:** On installations using more than one MPS and equipped with TCMs, install as many TCMs as there are MPS's. Each TCM shall have its own MPS. See also Section 2.4.

2.2.4 MPS INSTALLATION GROUNDING

All ground (green) wires must be connected together to ensure grounding continuity to the sign. No external ground wire is required to bond sign to the ground between letters when using the HVM ground wire.

2.2.5 INTERMEDIATE JUNCTION BOX MARKING

Each intermediate junction box must be marked with the following label.

**Caution:** Non Standard Voltage (165VAC, 30 kHz). Do not connect any other devices.

2.3 HVM INSTALLATION

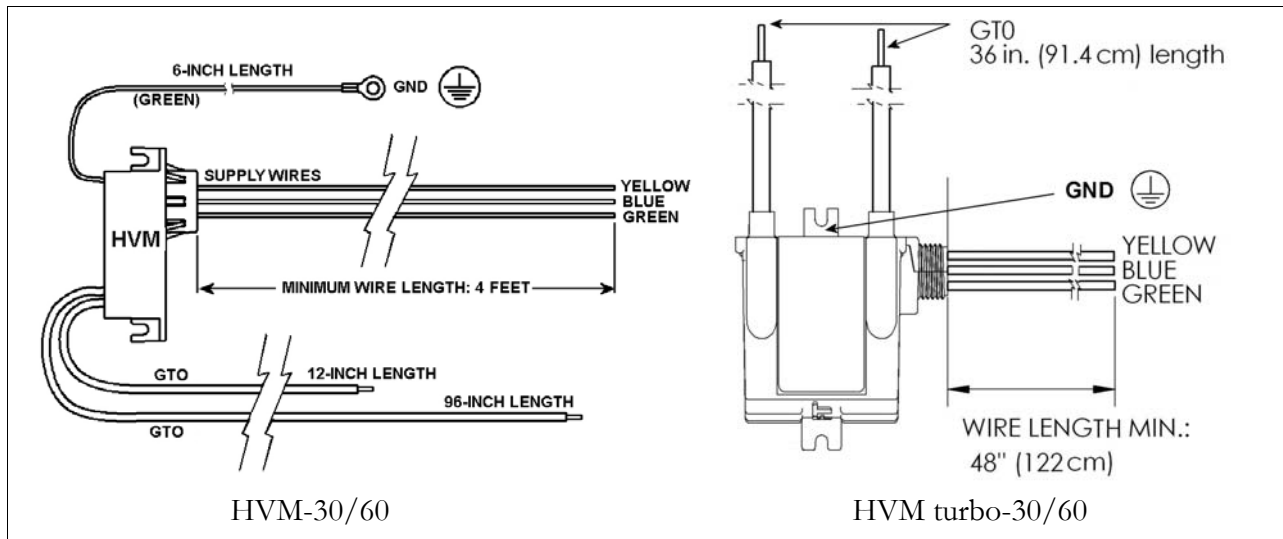


Figure 6 — Diagram for HVMS and attached wires for use with OCTOPUS system.

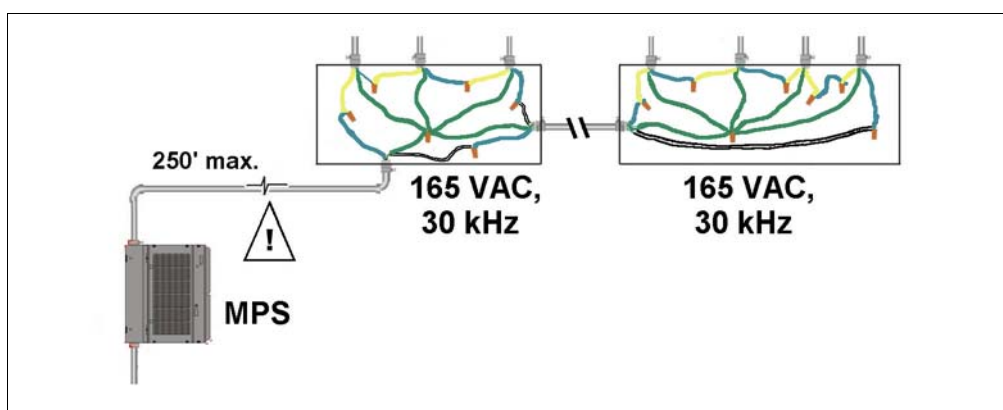
High-Voltage Modules are rated for outdoor non-weatherproof and can be used inside a channel letter. The HVM can be installed either on a metallic or non-metallic surface independently of mounting side. Secure each HVM using two (2) N° 6 permanent fasteners. Keep a minimum spacing of 3 inches between every installed HVM.

### 2.3.1 INPUT WIRING

1. HVM units are always connected in **series**. Connecting them in parallel is not allowed. Refer to Figures 5 and 7: Note that the yellow wire is connected with a blue wire in an alternating pattern. **DO NOT CONNECT** two yellow or two blue wires together.
2. Cut the wires at the required length and feed them inside a standard 3/8" flexible metallic conduit using a 1/2 inch threaded adapter to connect the HVM. Always use listed insulated spliced connectors (wire nut).



Maximum 250' cable length is permitted between the MPS and the last High-Voltage Module connected in the chain.



**CAUTION:** Non Standard Voltage (165 VAC, 30 kHz).  
Do not connect any other devices.

**Figure 7** — Interconnection for HVMs using several junction boxes.

### 2.3.2 OUTPUT WIRING

1. The HVM is equipped with two (2) GTO High-Voltage cables (Figure 6).
  - On the standard HVM:
    - One GTO cable is 12" (30,5 cm) long. It must be connected to the nearest sign electrode;
    - The other GTO cable is 96" (244 cm) long. Connect this GTO to the second electrode of the sign.
  - On the HVM turbo, both GTO cables are 36-inches long. Connect each cable to an electrode using the shortest cable length possible.
2. All GTO connections to the electrodes must be as short as possible. The GTO must be spaced at least one (1) inch from conductive or combustible materials.



GTO cables shall not be extended or spliced.  
Do not use metallic conduits.

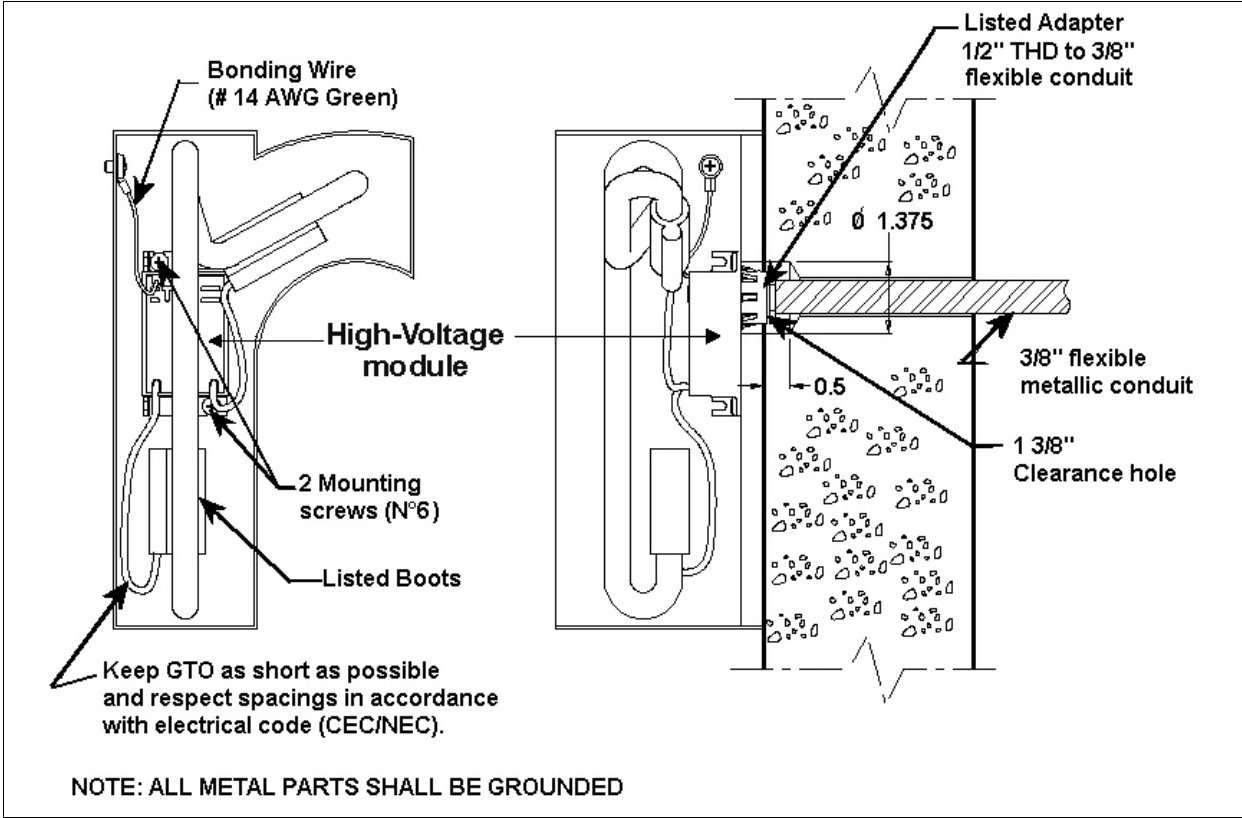


Figure 8 — Typical installation for single HVM inside a small letter.

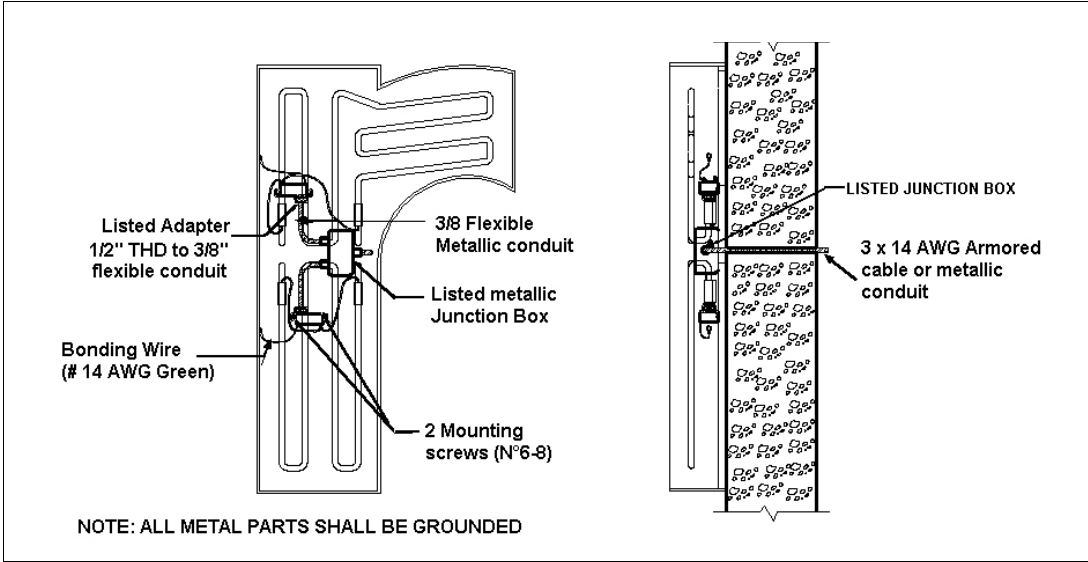
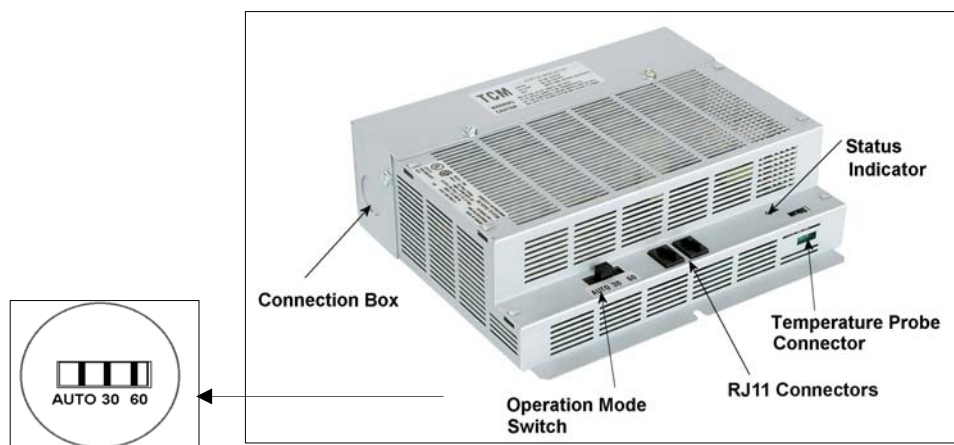


Figure 9 — Typical installation for multiple HVMs inside a large letter.

## 2.4 SYSTEMS WITH TEMPERATURE CONTROL MODULE (TCM)

The TCM unit is designed for use with **Octopus System** only and must be supplied by a TFT's Master Power Supply connected with at minimum three (3) HVM-60 modules only.



**Figure 10** — Diagram for HVM and attached wires for use with **OCTOPUS** system.

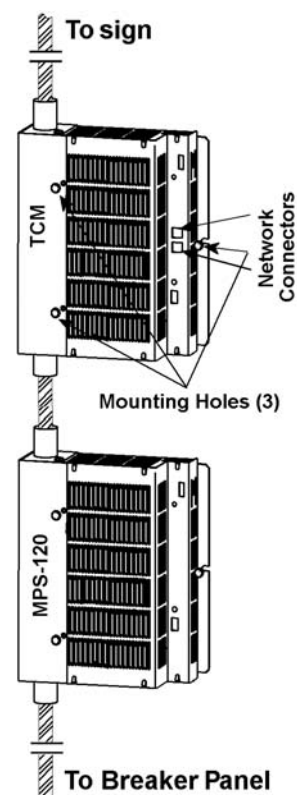
### 2.4.1 TCM INSTALLATION AND WIRING

The TCM device must be installed in a controlled environment and placed **vertically** on a wall or solid structure. For optimum efficiency, normal airflow must circulate freely and constantly around the device enclosure.

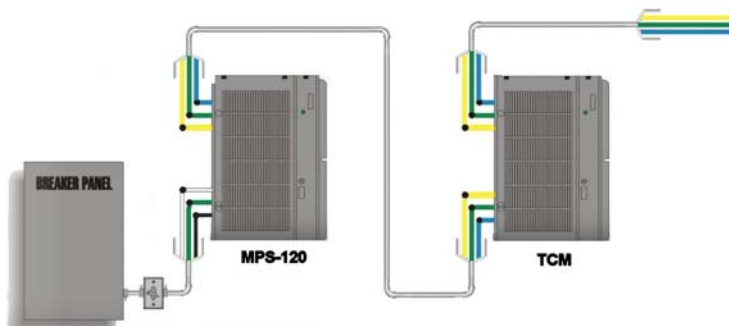
1. The TCM must be secured in place with three (3) No. 8 permanent fasteners, as shown opposite.
2. The TCM must be connected between the MPS-120 unit and the first HVM-60.

**⚠ Never connect the TCM directly to the main supply circuit (120VAC)**

3. The input leads of the TCM must be connected to the output wires of the MPS-120. The output leads of the TCM must be connected to the HVM-60. See Figure 11.



**Figure 11** — Interconnection of MPS and TCM modules.



4. All wiring shall be done in accordance with the MPS-120 installation procedure, using listed cables, connectors and junction boxes. Refer to Section 2.2.

### 2.4.2 NETWORKING TCM MODULES

1. When more than one MPS-120 is used on a sign, each MPS-120 must be connected to a distinct TCM.
2. Only one probe must be installed for all TCMs to avoid brightness mismatch.
3. Connect the TCM modules together using a phone handset cable terminated with 4 pins RJ-11 modular plugs in one of the two network connectors provided on the TCM (Figures 10 and 12).
4. The switch of each TCM must be in "Auto" position.

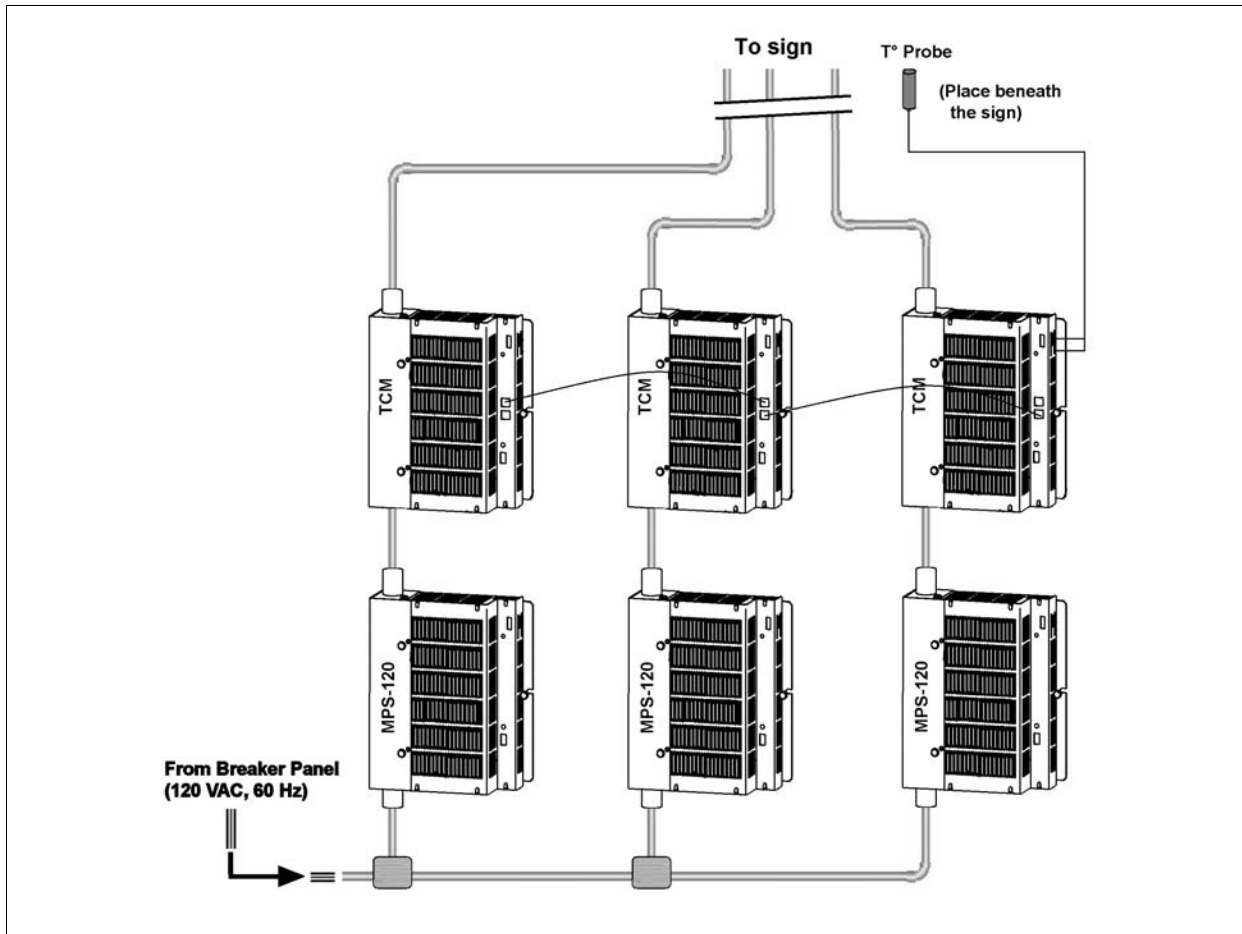
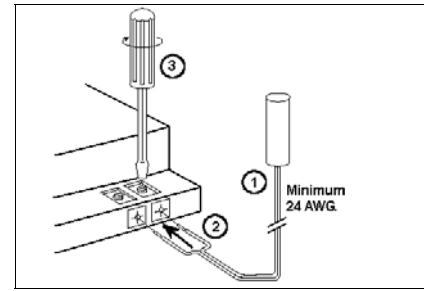


Figure 12 — Installation using more than one TCM module.

### 2.4.3 TEMPERATURE PROBE INSTALLATION

1. The temperature probe must be installed outside of the building away from all heat sources, with the supplied bracket and screw. **Install it near the sign.**  
The probe wire can be extended up to 100 feet (30 meter).  
The wire type should be audio type, minimum 24 AWG.
2. Insert the bare wires into the holes (terminal block) on the TCM located on the front of the enclosure. The probe wires have no polarity.
3. With a screwdriver, tighten the screw so that the wire is held solidly.



**Figure 13** — Installation of the TCM Temperature Probe.

### 2.4.4 OPERATION MODE SWITCH

The TCM is provided with a 3-position switch to control the output current. The switch positions are AUTO, 30 mA and 60 mA.

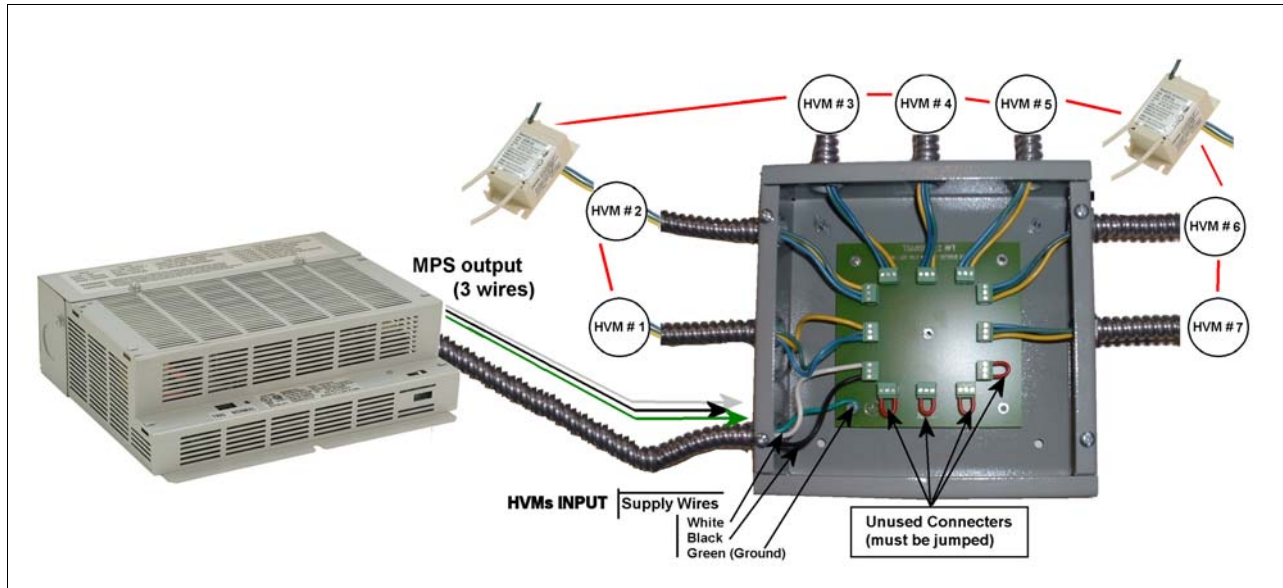
- In the 30 mA and 60 mA positions, the temperature sensor does not work and the output current is set according to the switch position.
- In auto mode, the TCM will switch the current to the tubes at 60 mA when the temperature sensor reaches 41°F (5°C) or below. The current in the tubes will remain at 60 mA until the temperature sensor reaches 50°F (10C) before switching it back to 30 mA. This difference in temperature avoids an unstable condition near the switching temperature.

**Table 1- TCM Operating Modes**

LED Status	Operative Condition
Green	30 mA in the tubes
Yellow	60 mA in the tubes
Red	Incorrect wiring. Input and output wiring are reversed. Refer to Section 2.4.1.

## 2.5 SYSTEMS WITH OCTOBOX

The Octobox is a TFT junction box specially designed for the **Octopus System**. It will facilitate the series connection of the HVMs. The device accepts up to eleven HVMs, plus the supply connection from the MPS (12 connectors). Unused connectors must be jumped (Figure 14).



**Figure 14 — OCTOBOX junction box used with Octopus System.**

1. Determine the number of conduits to be connected to the **Octobox**. For example, this could be eight (8) conduits (7 letters plus 1 MPS, as in Figure 14).
2. Remove the appropriate number of knockouts.
3. Determine the length of metal conduit required from the back of the channel letter.
4. Cut the 3 primary wires (yellow-green-blue) of the HVM approximately 3” longer than the metal conduit.
5. Install “screw-on” connectors to the metal conduit.
6. Strip the 3 primary wires by 3/16”, remove the red “By Pass” wire (\*) (jumper) from the male connector and insert the 3 wires into the male connector using a small screwdriver. **It is important that the green wire be installed in the center position of the 3-position connector.** The blue and yellow wires can be installed on either side of the connector (no polarity).  
 (\*) The Octobox is supplied with red “by-pass” wires (jumpers) in every connector.

7. Apply tape to connector for protection during the installation thru the wall structure.

**STEPS 8 AND 9 ARE SITE-RELATED**

8. Remove the bolt from the “screw-on” connector and install the metal conduit thru the holes in wall structure (previously drilled).
9. Apply “screw-on” type connector to secondary wires of the **Master Power Supply**. Cut 3 wires (black-ground-white) 3” longer than the length of metal conduit. Install black and white wires on either side of the center position of male connector. **Do NOT install ground wire to center position of connector.**

**WARNING: Master Power Supply output must be connected to the Octobox before applying primary voltage to the system.**

---

## 3. OCTOPUS SYSTEM LOADING

---



It is very important that the installation process (Section 2) be followed with a proper loading of the neon tubing of the **Octopus system**. Improper loading might result in a fault condition or erratic or deteriorated operative conditions.

1. Consult the MPS loading chart of Section 3.2 for appropriate loading.
2. For HVM loading, consult the applicable loading chart (Section 3.2).
3. The MPS is equipped with integrated loading measurements circuit and LED indicator that will display the percent (%) loading status by green, yellow or red color. Refer to Table 2, p. 18, for LED status versus operative condition.

Abnormal condition will also be displayed by the same indicator. Refer to Section 4, "Troubleshooting" (Table 3, p. 19).



**Caution:** The MPS operates at high frequencies (approx. 30 kHz). The current or voltage **measurement** can only be performed using true RMS instruments rated for the applicable frequency.

### 3.1 SYSTEM LOADING WITH TCM

---

1. To avoid improper system loading, the installation of the TCM must be done with the switch in the "**60 mA**" position.
2. The TCM does not affect the loading of the **Octopus system**.
3. Refer to the following MPS-120 and HVM-60 loading chart for tube length and proper system loading.

### 3.2 OCTOPUS LOADING CHARTS

<b>MPS-120 LOADING CHART (Length in Feet)</b> Total tube footage chart 100% loading at the maximum distance of 250 feet from MPS to last connected HVM of channel letter.									
Number of HVM-30		Neon tubes Above – 40°F/°C		Mercury-Filled tubes Above + 9°F (+ 5°C)		Number of HVM-60		Mercury-Filled tubes Above – 40°F/°C	
		12 mm	15 mm	12 mm	15 mm			12 mm	15 mm
3		30	36	39	45	3		24	30
4		40	48	52	60	4		32	40
5		50	60	65	75	5		40	50
6		60	72	78	90	6, 7 or 8		48	60
7		70	84	91	105	9		42	53
8, 9 or 10		80	96	97	120	10		36	47
11		75	90	91	113				
12		70	84	85	106				
Number of HVM turbo-30		Neon tubes Above – 40°F/°C		Mercury-Filled tubes Above + 9°F (+ 5°C)		Number of HVM turbo-60		Mercury-Filled tubes Above – 40°F /°C	
		12 mm	15 mm	12 mm	15 mm			12 mm	15 mm
3		60	72	78	90	3 or 4		48	60
4 or 5		80	96	97	120				
<b>MPS-120 LOADING CHART (Cnt.)</b> Using mixed combinations of turbo and standard HVMS									
Number of HVM-30		Neon tubes Above – 40°F/°C		Mercury-Filled tubes Above + 9°F (+ 5°C)		Number of HVM-60		Mercury-Filled tubes Above – 40°F/°C	
HVM-30	Turbo-30	12 mm	15 mm	12 mm	15 mm	HVM-60	Turbo-60	12 mm	15 mm
2	3 or 4	80	96	97	120	4, 5 or 6	1	48	60
4	2 or 3	80	96	97	120	4	2	48	60
6, 7 or 8	1	80	96	97	120	2	2 or 3	48	60
6	2	80	96	97	120				

**LOAD INDICATOR CHART**

Status of LED	Operative Condition	Possible Malfunction	System Status
Green	Normal operation	No effect	System is on
Progressive green to yellow	Normal operation with 80 to 99% loading	No effect	System is on
Progressive yellow to red with 1 red flash	Not recommended loading state	Under extreme climatic conditions or low line supply, the MPS may shut off frequently	System is on. Might turn off.

**HVM-30 / HVM-60 LOADING CHART (Length in Feet)**

100% Loading HVM Tube Footage Chart	Red Neon – 40°F (– 40°C) and up		Mercury Filled Tube + 9°F (+ 5°C) and up		Mercury Filled Tube – 40°F (– 40°C) and up	
	12 mm	15 mm	12 mm	15 mm	12 mm	15 mm
<b>HVM-30</b>	10	12	12	15	10	12
<b>HVM-60</b>	—	—	8	10	8	10

**HVM turbo-30 / HVM turbo-60 LOADING CHART (Length in Feet)**

100% Loading HVM Tube Footage Chart	Red Neon – 40°F (– 40°C) and up		Mercury Filled Tube + 9°F (+ 5°C) and up		Mercury Filled Tube – 40°F (– 40°C) and up	
	12 mm	15 mm	12 mm	15 mm	12 mm	15 mm
<b>HVM turbo-30</b>	20	24	24	30	20	24
<b>HVM turbo-60</b>	—	—	16	20	16	20



**IMPORTANT NOTE:** Both MPS-120 and HVM-30/60 modules have their separate maximum loading charts. In any case, the maximum tube length and number of HVMs on the system shall not exceed the values listed above.



**MAXIMUM LOADING CHARGE**

All values listed above are indicative and represent an average. Values can significantly vary due to tube filling pressure, temperature, high voltage cable length, electrode type and sign material. For each pair of electrodes, deduct 12” (30 cm).

## 4. TROUBLESHOOTING



Never replace an MPS or TCM if the Load/Fault indicator is on. Repair the fault identified using the Troubleshooting Chart first to resume to normal operation.

A LED indicator located on the front of the MPS enclosure (Figure 15) indicates the current operative condition of the **Octopus** Installation. When the indicator lights on green or yellow-green, the system runs normally.

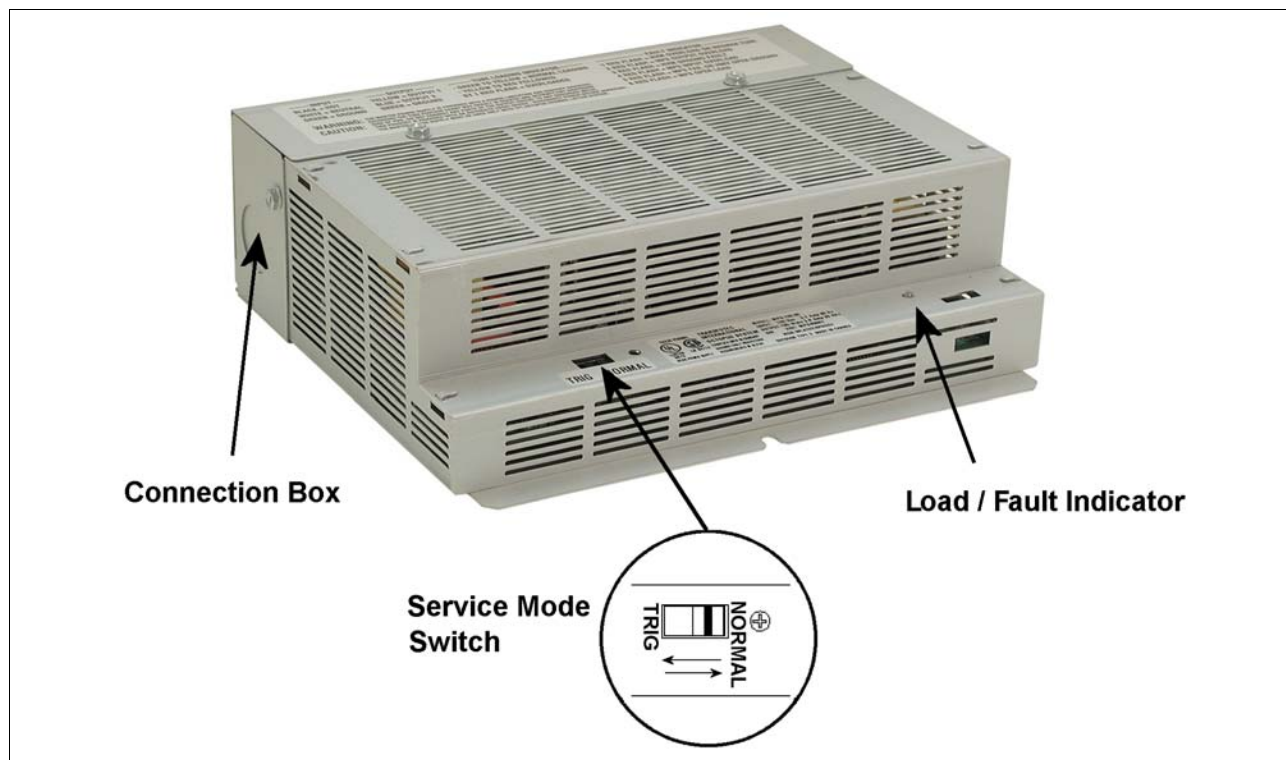


Figure 15 — OCTOPUS MPS device with Load/Fault Indicator and Service Switch.

Table 2- NORMAL OPERATION

LED Status	Operative Condition
Green	Optimum condition
Green-Yellow	Load between 80 and 99%
Progressive yellow to red with 1 red flash	Maximum operating limit

## 4.1 FAULT DETECTION CIRCUITS

---

1. The Master Power Supply is equipped with six (6) **fault detection circuits** including a **Secondary Ground Fault Protection (SGFP)** circuit.



*The Secondary Ground Fault Protection circuit does not protect against shock hazard.*

2. **Automatic Reset:** Upon fault detection, the **MPS** momentarily shuts down for 10 seconds and tries to reset three (3) times consecutively. Then, if the fault condition persists, the MPS shuts down definitively. The MPS can also be reset manually by turning the power on and off successively at the service panel.
3. **Flashing Pattern:** Upon fault occurrence, the LED indicator (Figure 15) flashes red in a specific pattern as a function of the nature of the fault. Wait until the automatic resets are done (3 cycles), then use the **Troubleshooting Chart** of Table 3 to identify the fault origin.

**Table 3- TROUBLESHOOTING CHART**

LED Status	Detected Fault
Red 1 flash	Broken tube or High Voltage Module overload
Red 2 flashes	Master Power Supply overload > 20 %
Red 3 flashes	Ground Fault
Red 4 flashes	Input voltage > 135 V <sub>RMS</sub>
Red 5 flashes	High Voltage not grounded or less than 3 HVM connected
Red 6 flashes	Master Power Supply open output circuit
Lights on red	Service switch in Trig position. Flip to Normal to resume normal operation

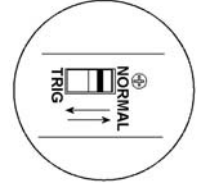
4. **How to Read the Fault LED Status:** The flashing pattern repeats itself continually until the system power is turned off or the fault is lifted. Every flashing sequence is separated from the next one by a two-second interval of non-flashing (pause). As there are six (6) fault detection circuits, the flashing pattern can be from one to six flashes repeating continually.
5. **Uneven Brightness:** If the MPS and HVM are wired in parallel, no fault is flagged on the MPS Fault/Load indicator. This wrong connection will nevertheless result in uneven brightness from neon tube to neon tube.

## 4.2 SERVICE MODE

---

When the fault condition persists, the sign must be serviced by a qualified personal using the MPS service mode.

Use a small screwdriver to slide the service switch located on the MPS enclosure. To **invoke** the service mode, move the switch from NORMAL to TRIG position, and then to Normal position again, as shown opposite.



When the **Octopus system** is in service mode and the fault has been previously identified using the Troubleshooting Chart, it is easy to locate where exactly the faulty component or circuit is. Then, *disconnect the line supply from the Master Power Supply and repair the sign.*



The Secondary Ground Fault Protection circuit is disabled in service mode.

**Special care must be taken to avoid electrical shock or fire hazard.**

*Always disconnect the line supply from the Master Power Supply when servicing the sign.*

To **quit** the service mode at any time, turn off the power to the MPS unit. The MPS will exit the service mode automatically after 30 minutes.

---

## 5. OCTOPUS SYSTEM SPECIFICATIONS

---

### 5.1 MASTER POWER SUPPLY (MPS-120) SPECIFICATIONS

---

**Table 4-** Master Power Supply (MPS) Main Characteristics

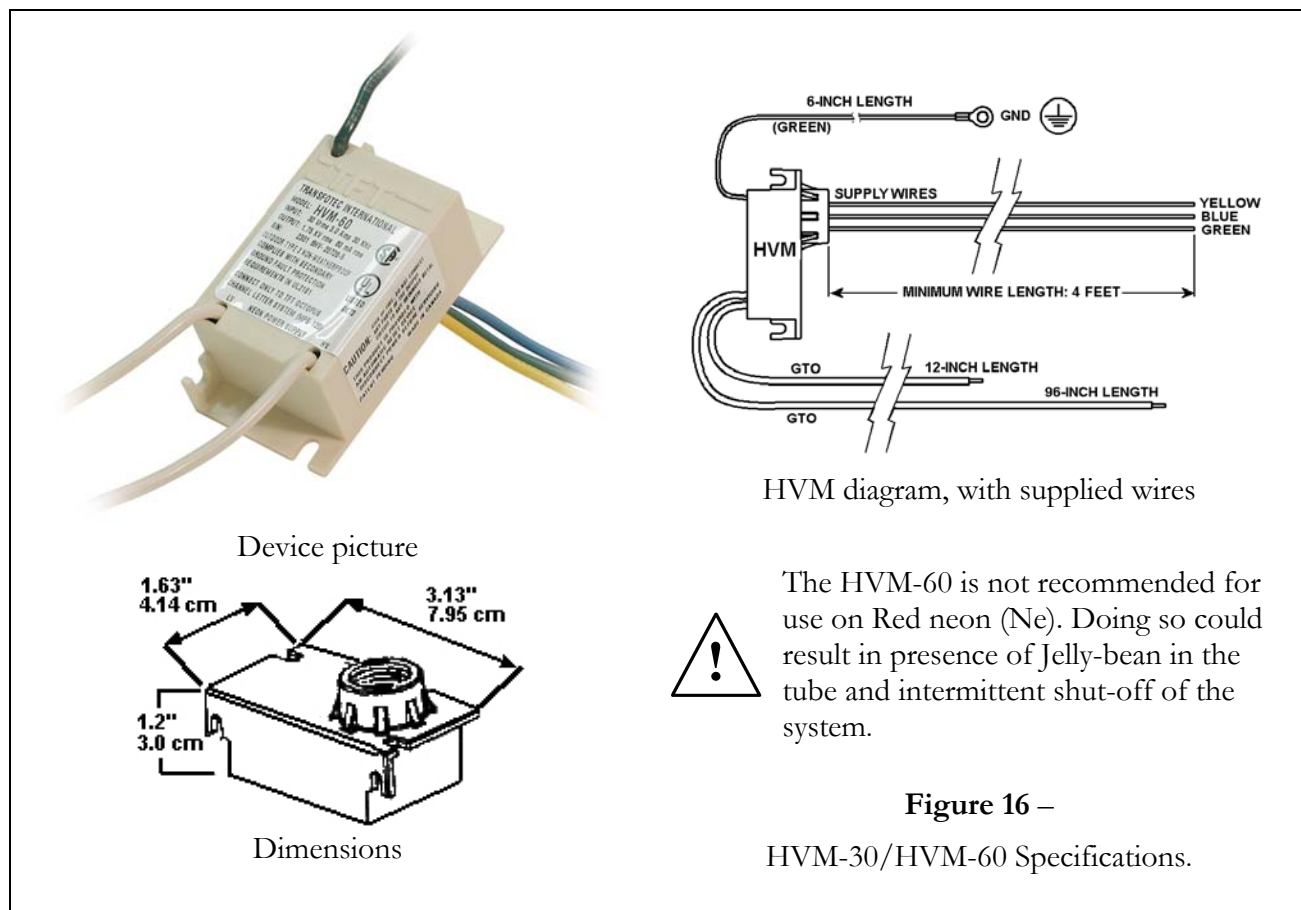
Input Voltage	120 VAC $\pm$ 10%, 60 Hz
Maximum Input Current (Full load)	3.2 A (max.)
Power Factor	Very High Power Factor > 0.95
Operating Temperature	0°C to 40 °C (32° to 104°F)
Operating Environment	Indoor & outdoor non-weatherproof
Output Voltage (Open circuit voltage)	165 VAC @ 30 Hz
Maximum Output Current	3.0 A
Weight	3.3 lb (1.5 kg)

The MPS unit supplies the **OCTOPUS SYSTEM** by using TFT's HVM modules ONLY.

## 5.2 HIGH-VOLTAGE MODULES SPECIFICATIONS

The High Voltage Modules (HVM) are high voltage components dedicated to the **Octopus System** and must be energized by TFT's MPS-120 unit only. Since there are no active components in the HVMs, the overall system dramatically gains in reliability and simplicity.

### 5.2.1 HVM-30 & HVM-60 SPECIFICATIONS



**Table 5-** HVM-30/HVM-60 Main Characteristics

Characteristics	HVM-30	HVM-60
Input Voltage	20 VAC	30 VAC
Maximum Input Current (Full load)	3.0 A (average)	3.0 A (average)
Operating Temperature	- 40°F to +176°F (- 40°C to + 80 °C)	
Operating Environment	Outdoor non-weatherproof	
Output Voltage	2000 VAC (max.)	1750 VAC (max.)
Maximum Output Current	30 mA	60 mA
Weight	0.55 lb (250 g)	0.55 lb (250 g)

5.2.2 HVM turbo-30 & HVM turbo-60 SPECIFICATIONS

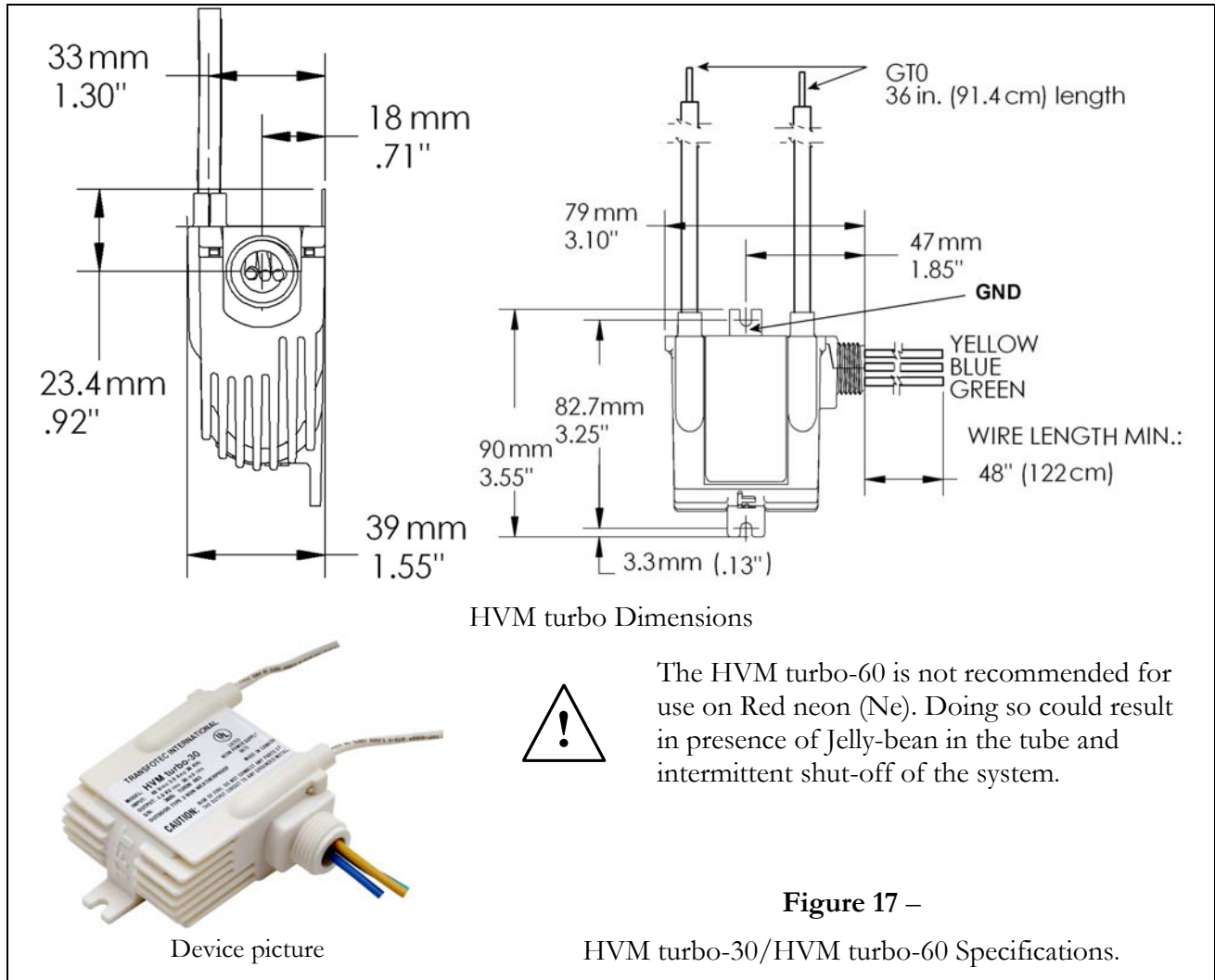


Table 6- HVM turbo-30/HVM turbo-60 Main Characteristics

Characteristics	HVM turbo-30	HVM turbo-60
Input Voltage	40 VAC	60 VAC
Maximum Input Current (Full load)	3.0 A (average)	3.0 A (average)
Operating Temperature	- 40°F to +176°F (- 40°C to + 80 °C)	
Operating Environment	Outdoor non-weatherproof	
Output Voltage	4000 VAC (max.)	3500 VAC (max.)
Maximum Output Current	30 mA	60 mA
Weight	0.55 lb (250 g)	0.55 lb (250 g)





