



TEMPERATURE CONTROL MODULE HOUSINGS

5, 8, 12 and 16 Zone

Item #104280 / #104259 / #104242 / #158274

INSTRUCTION MANUAL



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IMS Company
10373 Stafford Road
Chagrin Falls, OH 44023-5296

Telephone: (440) 543-1615
Fax: (440) 543-1069
Email: sales@imscompany.com
Website: www.imscompany.com

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SAFETY SUMMARY

WARNING

This temperature controller housing uses electrical power that could cause electrocution or severe shock. All electrical connections and troubleshooting must be done only by qualified electrical technicians.

Lock out and tag out power to the electrical circuit before connecting or servicing housing. Turn OFF temperature control module ON/OFF switch and lock out and tag out power to temperature controller housing before removing or installing temperature control modules.

All electrical connections and troubleshooting must be done according to safe electrical practices.

If there is any procedure not fully explained in this manual, or if full safety cannot be guaranteed using the procedures in this manual, contact the IMS Company Electrical Engineering Dept at 216/543-1615.

WARNING

Do not modify this housing in any way. Modifications could create a danger to personnel or equipment. IMS Company assumes no responsibility for any injury or damage resulting from modifications done to equipment supplied by IMS.

WARNING

This equipment may be used with machines that present hazards of death, injury or shock. Do not install, use or service this temperature control system in a way that would expose you to any of these dangers. Follow the safety requirements of the machine maker.

SPECIFICATIONS

Power Input: 208-240 VAC, three phase,
50/60 Hz.

Can be field-modified for
120 or 208-240V single phase.

Transformers available from IMS
for converting from 480 to 240
three phase.

Overcurrent
Protection:

50 amp 3-leg circuit breaker.

NOTE: In hot-runner mold
applications, actual current draw
does not usually exceed 50 amps
even when nominal load does exceed
50 amps. This is because of soft
start and time proportioned use of
power by temperature control
modules. Also, usually not all
zones in a mold are drawing heavily
at one time.

Dimensions:

5-Zone: 8-1/2" high x 14-3/16 wide
x 11-1/2" deep

8-Zone: 8-1/2" high x 20-3/16 wide
x 11-1/2" deep

12-Zone: 8-1/2" high x 28-3/16 wide
x 11-1/2" deep

DESCRIPTION

1. General.

IMS Temperature Controller Housings are designed for multiple-zone control of heaters. Typical application is for mold temperature, using probe-type cartridge heaters with integral, type-J thermocouples.

In this system, temperature control modules are installed in a controller housing. Each temperature control module works with one thermocouple, and one heater in a closed-loop system.

This housing accepts IMS TM315 and TM315D control modules, along with DME® G-Series, EMI® E-Series, and Athena® (SPP).

2. Applications.

IMS Temperature Controller Housings are for standard 10 or 15-amp, temperature control modules.

A 5-zone unit houses 1 to 5 modules, an 8-zone houses 1 to 8 modules, and a 12-zone houses 1 to 12 modules. Each module works with one thermocouple and one heater to heat one zone.

NOTE

In most applications, only one heater can be used per temperature control module. Current draw rises dramatically if multiple heaters are wired in parallel; the control module would very likely become overloaded. If multiple heaters are wired in series, the effective wattage of the circuit drops dramatically.

Use more than one heater in a circuit only if an electrical engineer designs the circuit.

DESCRIPTION (continued)

3. Housing Description.

- a. Standard housings are wired to accept 208 to 240 VAC, three phase, 4 wire (3 power leads plus ground lead), 50/60 Hz power. All housings can be modified for 120 or 240V single phase.

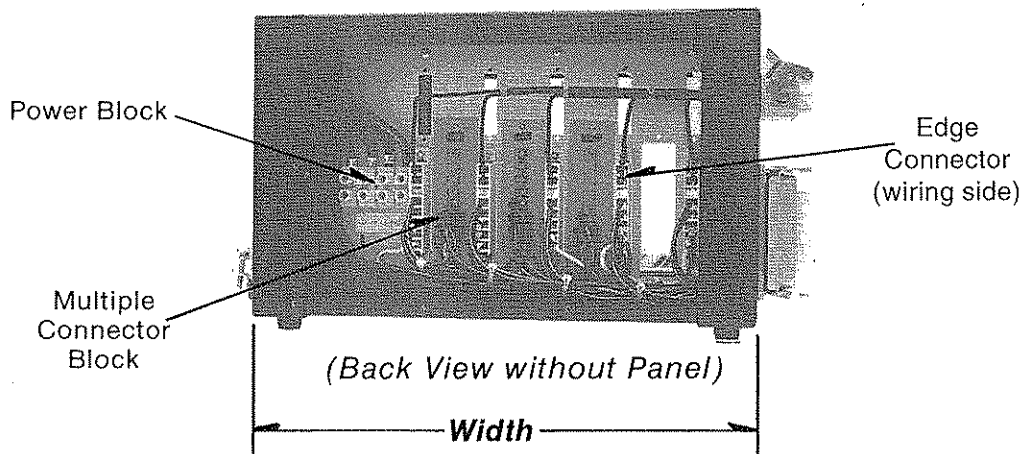
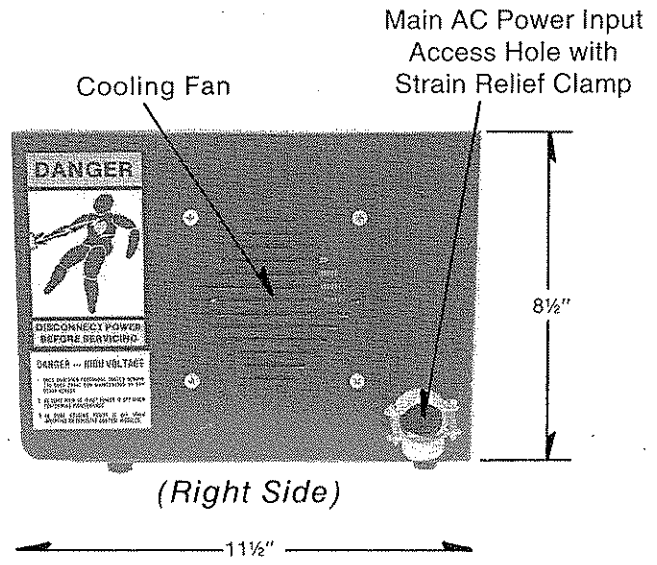
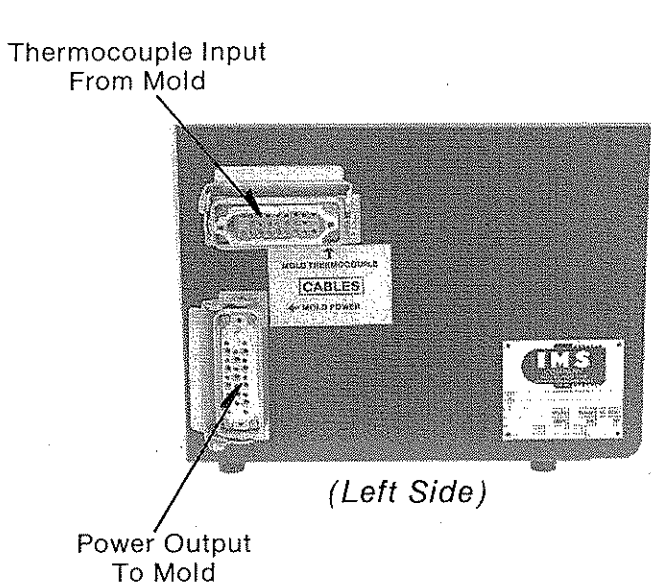
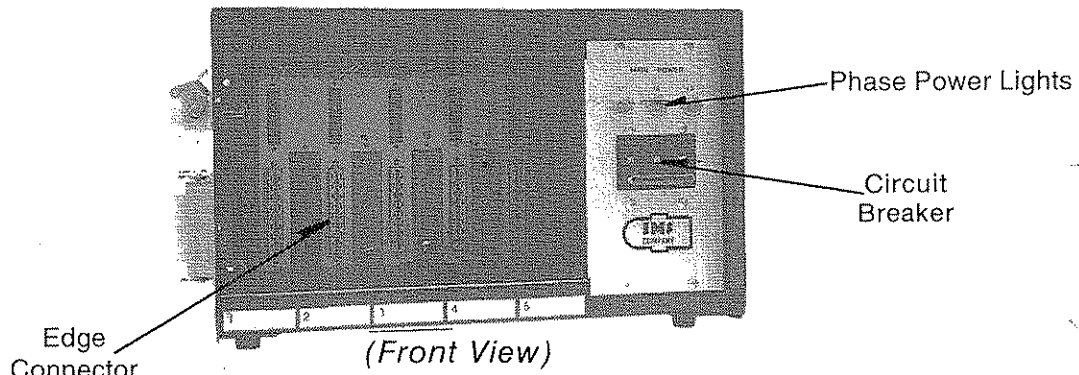
Note that 480-to-240V, three phase transformers are available from IMS (see Figure 10, Transformer Information).

- b. Multi-pin power and thermocouple connectors are built into housing to interface with your mold.

Separate power output and thermocouple input cables connect housing to connectors mounted on or near mold. During installation, individual heaters and T/C's are wired to those connectors.

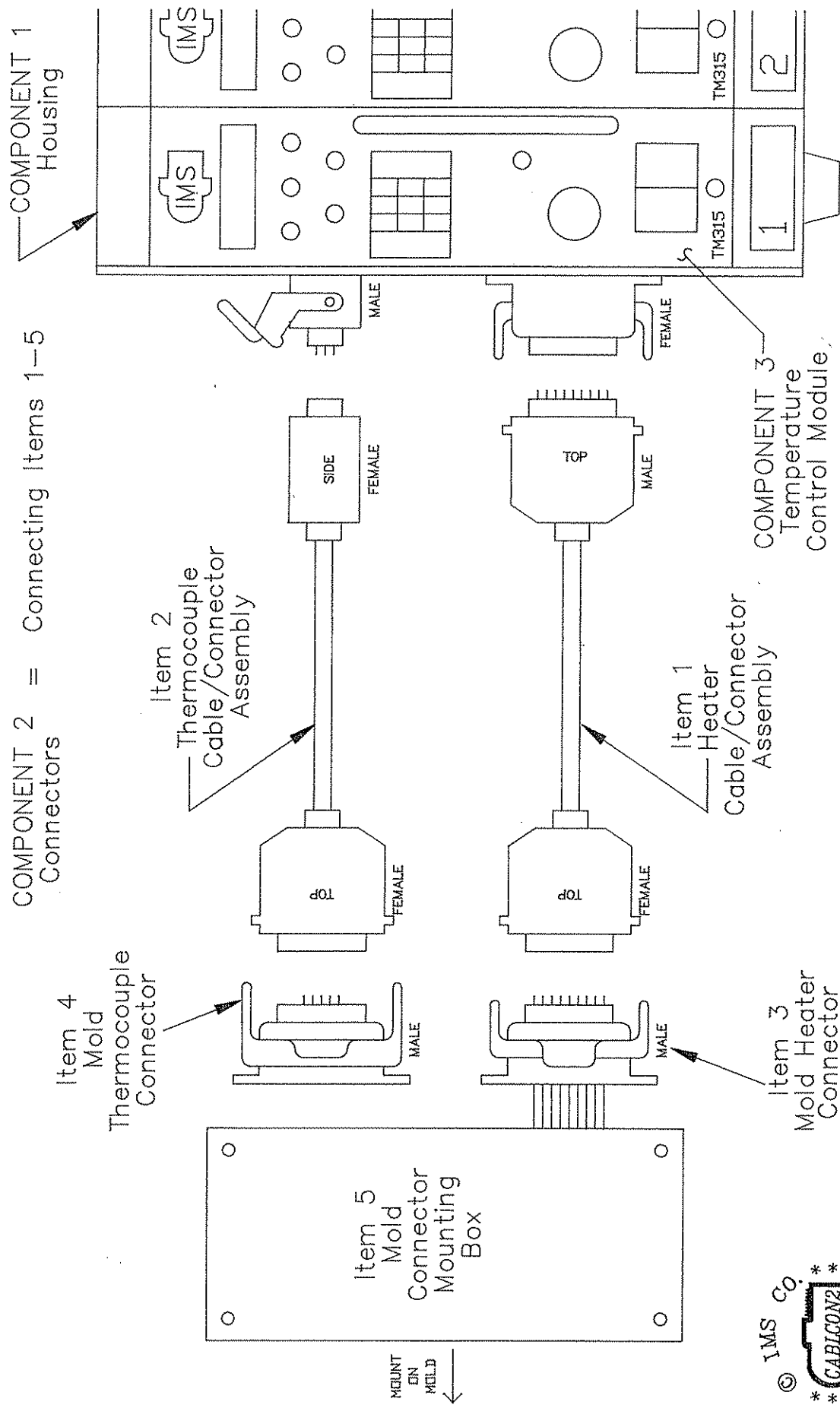
- c. See Figure 1, Housing, for pictorial layout and explanation of housing and its parts. Refer to Figure 2, Cables & Connectors, for overall interfacing scheme.
-

Figure 1 — HOUSING



PART NUMBER	WIDTH
COC2-5H (shown)	14 ³ / ₁₆ "
COC2-8H	20 ³ / ₁₆ "
COC2-12H	28 ³ / ₁₆ "

FIGURE 2 - CABLES & CONNECTORS



INSTALLATION

1. Select Location.

Locate housing where:

- Air can move freely in and out of housing.
- Equipment will not be exposed to dust, dirt, moisture, vibration, or excessive heat (maximum operating ambient 100°F).
- Unit is close enough to mold to make all connections.
- Front and rear panels are easily accessible for setup, adjustment and service.

A floorstand with casters is available from IMS for portable mounting. (See Figure 11, Floorstand Assembly, p. 30.)

2. Mount Connectors.

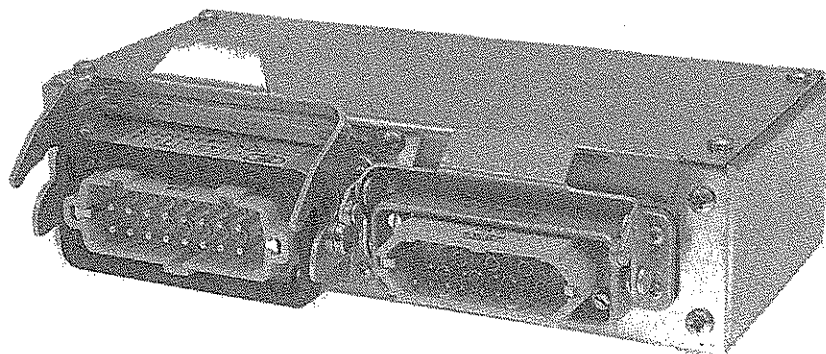
a. Optional Mold Connector Mounting Box.

If using connector box, mount it on mold or stationary platen in easily accessible position. (See Figure 3.)

Remember the following when selecting location:

- (1) Allow room to run wires through box.
 - (2) Allow room to get at connectors that will mount on front.
 - (3) Avoid pinch points, which could damage wire insulation and create an electrical hazard.
-

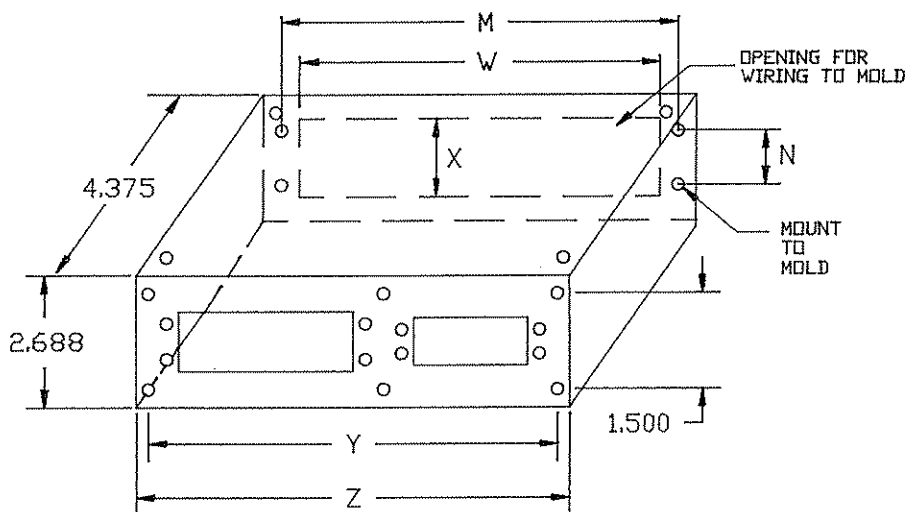
Figure 3 — MOLD CONNECTOR MOUNTING BOX (optional)



MOLD
THERMOCOUPLE
CONNECTOR

MOLD
HEATER
CONNECTOR

SAMPLE: COXX-8TMB
(with connectors installed)



PART NUMBER COXX-	HOUSES COC4-	Y	Z	M	N	X	W
5TMB	5MTC & 5MPC	8.031	8.688	8.063	1.500	1.625	7.500
8TMB	8MTC & 8MPC	8.844	9.438	8.875	1.500	1.625	8.375
12TMB	12MTC & 12MPC	9.906	10.563	9.938	1.500	1.625	9.375

Units = Inches

NOTE: All dimensions shown include allowance for hardware
(protruding assembly bolts) where applicable.

INSTALLATION (continued)

b. Mold Heater and Thermocouple Connectors.

Mount connectors and gaskets so that there is enough room for connector latch to swing into both the fully locked and fully unlocked positions. (See Figure 4.)

If mounting horizontally, mount so connector retaining latches swing DOWN to lock. This will help prevent latches from falling into open position. Use screws and nuts provided.

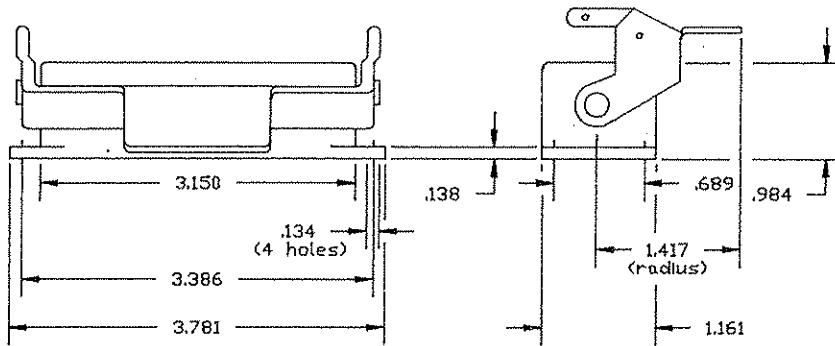
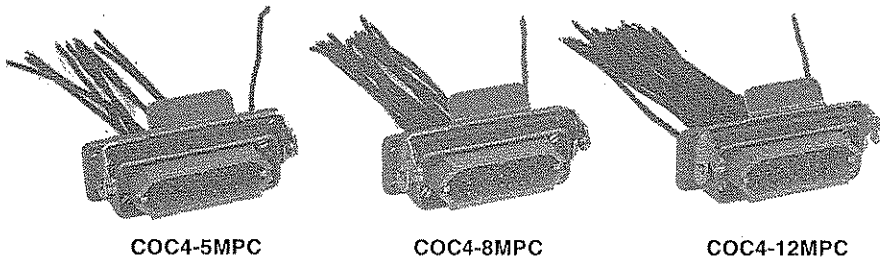
There are three possibilities for mounting locations:

- (1) On optional mold connector mounting box.
- (2) In mold recesses cut for this purpose (See Figure 5, Mold Pocket Layouts.)
- (3) In another location best for your machine.

Make sure installation is secure and that connectors will not be bumped by operator or machine.

Figure 4 — CONNECTORS

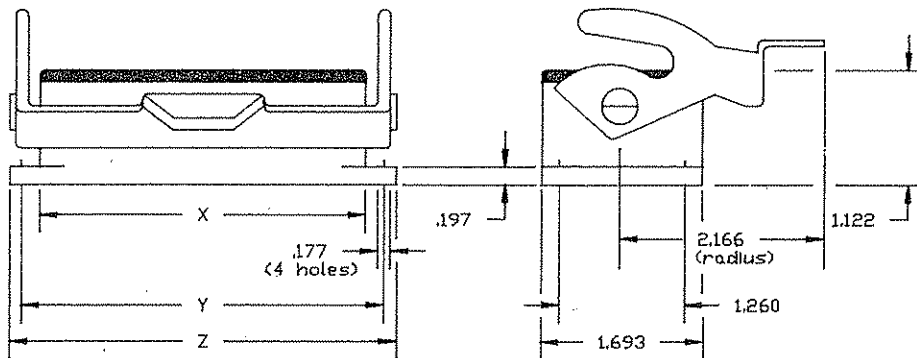
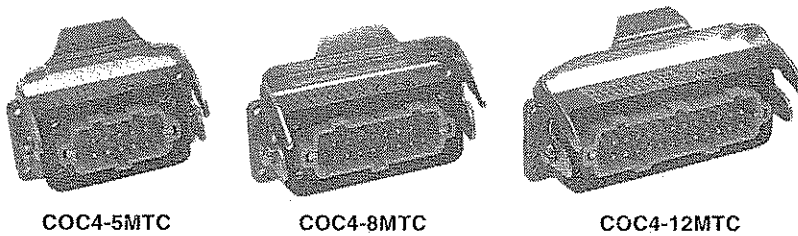
MOLD HEATER CONNECTORS



All dimensions in inches.

Mold Heater Connectors are physically interchangeable. Any Mold Heater Connector will fit any Heater Cable/Connector Assembly. The difference between the connectors is the number of active pin pairs (5, 8, 12), which determines the number of zones a connector can operate.

MOLD THERMOCOUPLE CONNECTORS



	5 ZONE	8 ZONE	12 ZONE
X	2,913	3,681	4,705
Y	3,268	4,055	5,116
Z	3,662	4,449	5,512

All dimensions in inches.

Mold Thermocouple Connectors are not physically interchangeable. Each connector will only fit the same size (5, 8, or 12 zone) Thermocouple Cable/Connector Assembly, which determines the number of thermocouples the connector and cable can operate.

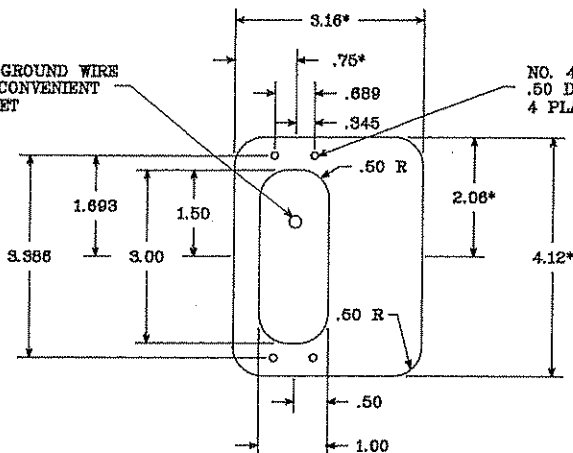
FIGURE 5 - MOLD POCKET LAYOUTS

MOLD HEATER CONNECTOR (Below Surface Mounting)

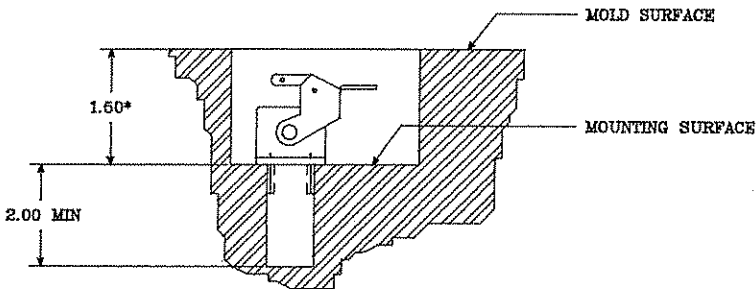
NOTE: SECURE GROUND WIRE (GREEN) TO A CONVENIENT PLACE IN POCKET

NO. 4-40 NC-2B TAP
.50 DEEP MINIMUM
4 PLACES

TOLERANCES:
.00 ±.010
.000 ±.005
All dimensions are inches.

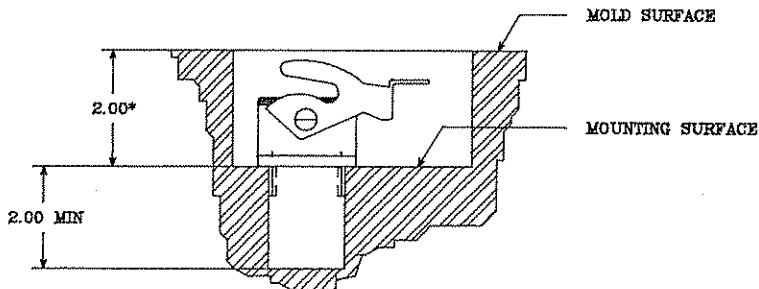
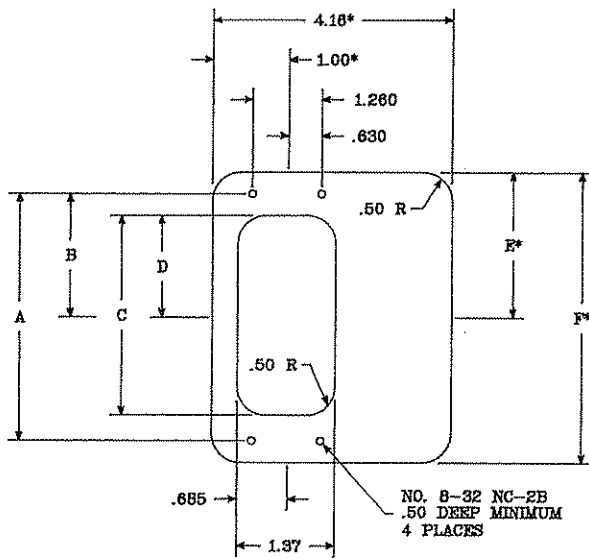


NOTE: Both drawings show below-surface mounting. For surface mounting, disregard dimensions marked with *.



MOLD THERMOCOUPLE CONNECTOR (Below Surface Mounting)

DIM	THERMOCOUPLE CONNECTOR		
	5 ZONE	8 ZONE	12 ZONE
A	3.286	4.956	5.116
B	1.894	2.028	2.56
C	2.55	3.34	4.40
D	1.275	1.87	2.20
E	2.00	2.40	2.93
F	4.00	4.80	5.88



INSTALLATION (continued)

3. Connect Wires to Thermocouple Connectors.

(Refer to Figure 6, Thermocouple Wiring, and to Figure 7, Mold Interface Wiring Diagram.)

- a. Remove plastic pin housing block of connector from its metal frame by loosening corner screws from pin side.
- b. Turn connector so that pin side is facing away from you and you are looking at its back side (rear view), with pin numbers upright.

You can see each pin's recess where T/C wires will connect. All positive, white (iron) T/C wires will connect on top row and all negative, red (constantan) T/C wires will connect on bottom row.

NOTE

Before connecting T/C and heater wires, remember to feed them through metal frame of connector, and through connector box if used.

- c. Connect positive, white (iron) T/C wire from #1 cavity to pin #1. Connect negative, red (constantan) T/C wire to pin directly underneath pin #1. Tighten appropriate screws to secure connections.

With this connection, temperature control module in housing zone #1 will read temperature in cavity #1.

To preserve phase balancing where 3-phase power is used, always use lowest, consecutively numbered zones first.

- d. Connect rest of T/C wires, using same pattern.
-

INSTALLATION (continued)

- e. When all mold cavity T/C's are connected, feed leads back through metal frame until plastic pin housing block fits snugly inside.
- f. Tighten 4 corner screws to secure plastic pin housing block in frame.

4. Connect Wires to Heater Power Connectors.

- a. Mold heater connector pins are pre-wired with 6" pigtail leads. Each pigtail is numbered to coincide with appropriate zone in housing. (See Figure 7, Mold Interface Wiring Diagram.)
- b. Use insulated butt connectors to connect two heater wires from cavity #1 to two #1 pigtails on mold heater connector.

NOTE

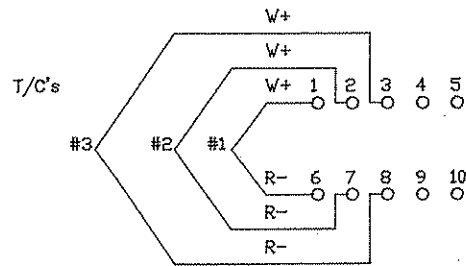
Before connecting heater wires, remember to feed them through metal frame of connector and through connector box if used.

- c. With this arrangement, temperature control module in housing zone #1 will control heater in cavity #1.
- d. Follow same pattern to connect remaining heater wires.
- e. When all heater wires are attached, connect green ground wire to good ground on mold.

5. Connect Cables.

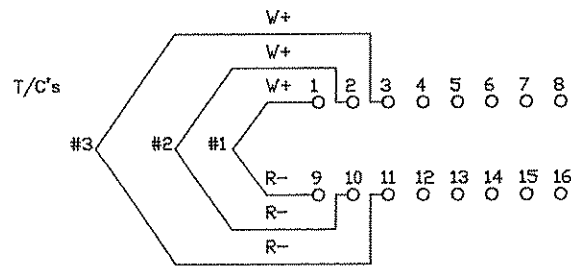
Connect thermocouple and heater cables to housing and to mold. Firmly set retaining latches. (See Figure 8, Cables, for descriptions and part numbers of cables.)

FIGURE 6 - THERMOCOUPLE WIRING



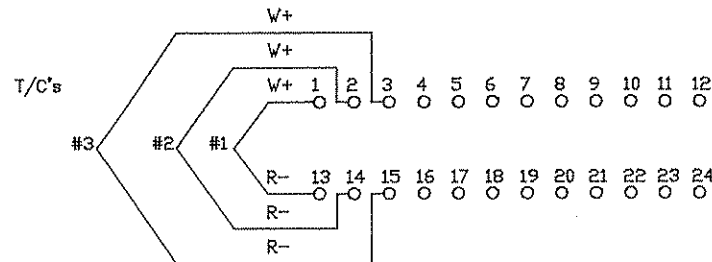
Mold Thermocouple Connector

5 ZONE



Mold Thermocouple Connector

8 ZONE



Mold Thermocouple Connector

12 ZONE

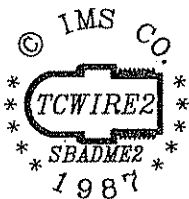
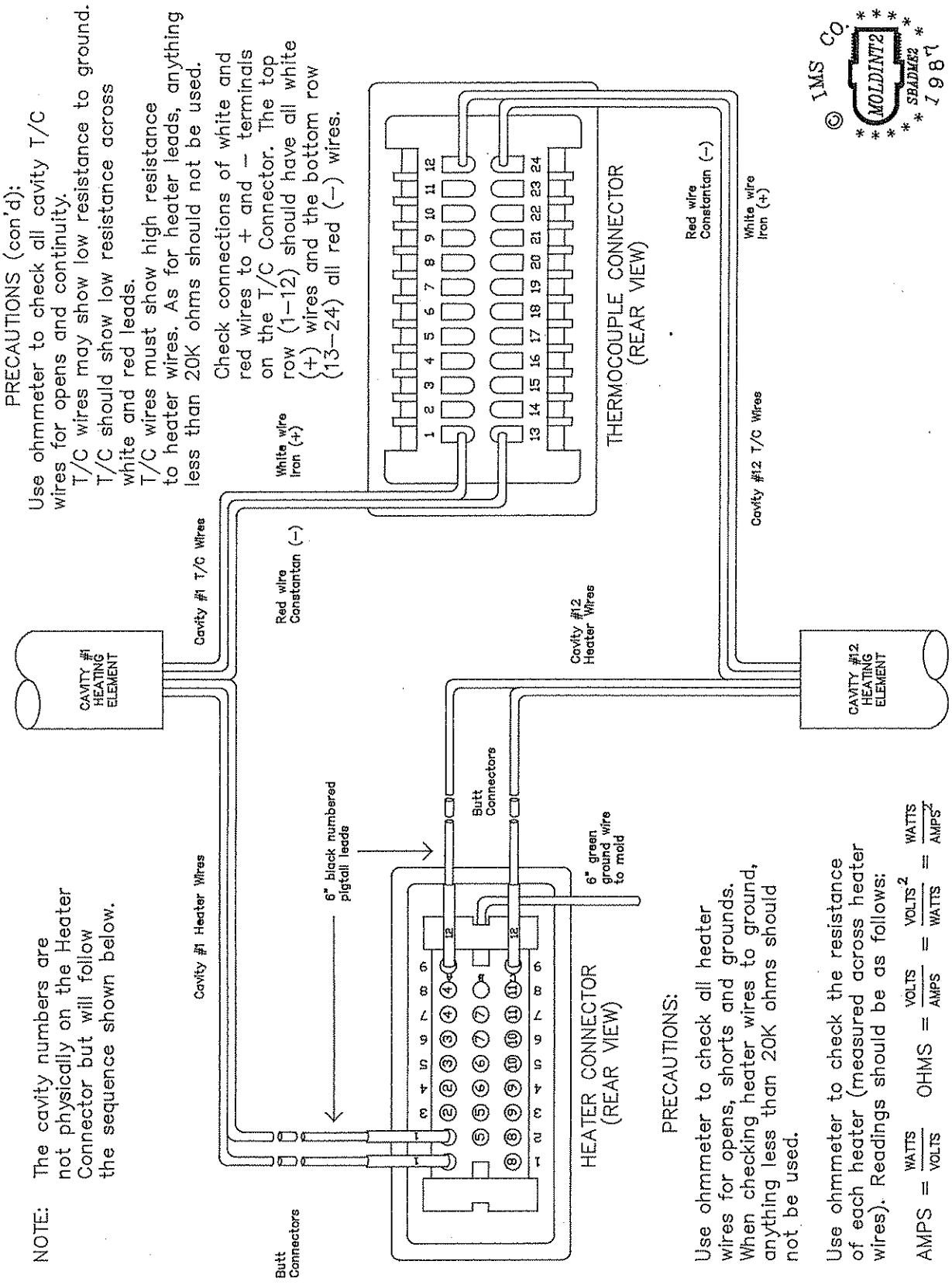


FIGURE 7 — MOLD INTERFACE WIRING DIAGRAM



NOTE: The cavity numbers are not physically on the Heater Connector but will follow the sequence shown below.

PRECAUTIONS (con'd):

- Use ohmmeter to check all cavity T/C wires for opens and continuity.
- T/C wires may show low resistance to ground.
- T/C should show low resistance across white and red leads.
- T/C wires must show high resistance to heater wires. As for heater leads, anything less than 20K ohms should not be used.

Check connections of white and red wires to + and - terminals on the T/C Connector. The top row (1-12) should have all white (+) wires and the bottom row (13-24) all red (-) wires.

PRECAUTIONS:

Use ohmmeter to check all heater wires for opens, shorts and grounds. When checking heater wires to ground, anything less than 20K ohms should not be used.

Use ohmmeter to check the resistance of each heater (measured across heater wires). Readings should be as follows:

$$\text{AMPS} = \frac{\text{WATTS}}{\text{VOLTS}} \quad \text{OHMS} = \frac{\text{VOLTS}}{\text{AMPS}} = \frac{\text{VOLTS}^2}{\text{WATTS}} = \frac{\text{WATTS}}{\text{AMPS}^2}$$



INSTALLATION (continued)

6. Install Modules.

WARNING

Installing module while POWER switch is on or housing power is on could expose you to dangerous electrical power. It could also destroy the module and edge connector.

Turn off module POWER ON/OFF switch, and lock out and tag out power to temperature controller housing before removing or installing temperature control module.

It is also best for all modules to be off when powering up housing. That will prevent a large current draw at power-up, which could trip the circuit breaker.

CAUTION

A 120V module cannot be used in housing wired for 240V; and 240V modules cannot be used in a housing wired for 120V. Make sure you are using correct voltage module for housing.

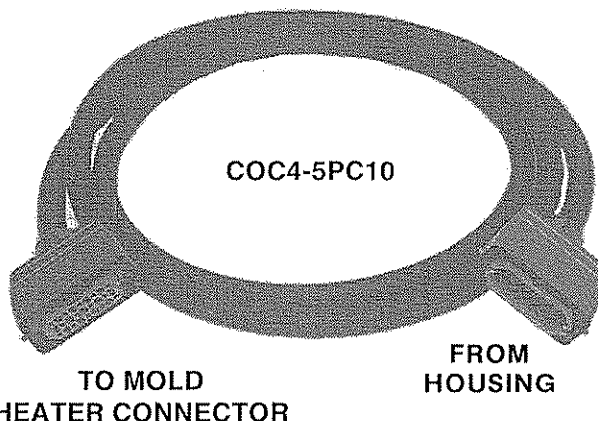
- a. Unlock module from housing by pulling gently on push-pin fastener (on bottom of front face of module).
- b. Slide temperature control module (IMS TM315 or TM315D, DME® G-Series, EMI® E-Series or Athena® SPP) in zone #1 of housing between top and bottom insert guides.

Push module firmly until card is fully seated in edge connector at back of zone.

- c. Press push-pin fastener in to lock module in place.
-

Figure 8 — CABLES

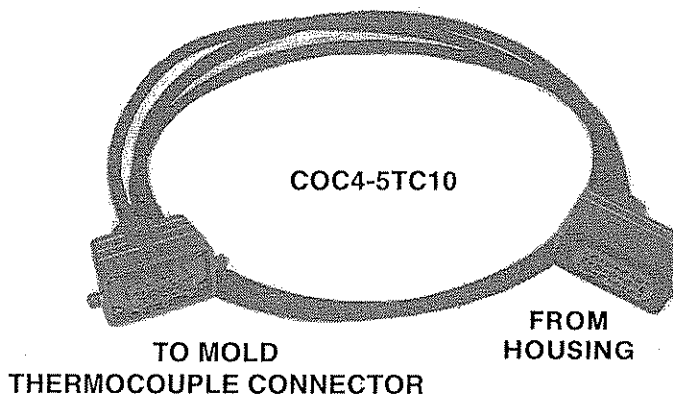
HEATER CABLE/CONNECTOR ASSEMBLY



PART NUMBER COC4-		NUMBER OF ZONES CONTROL- LABLE	CONNECT	
10 FT.	20 FT.		TO MOLD HEATER CONNECTOR COC4-	FROM HOUSING COC2-
5PC10	5PC20	1 to 5	5MPC, 8MPC, 12MPC	5H, 8H, 12H
8PC10	8PC20	1 to 8	8MPC, 12MPC	8H, 12H
12PC10	12PC20	1 to 12	12MPC	12H

The Heater Cable/Connector Assemblies are physically interchangeable. Any Heater Cable/Connector will fit any size housing or Mold Heater Connector. The difference between the cables is the number of active pins (pins wired end-to-end), which determines the number of zones a cable can operate.

THERMOCOUPLE CABLE/CONNECTOR ASSEMBLY



PART NUMBER COC4-		NUMBER OF ZONES CONTROL- LABLE	CONNECT	
10 FT.	20 FT.		TO MOLD T/C CONNECTOR COC4-	FROM HOUSING COC2-
5TC10	5TC20	1 to 5	5MTC	5H,8H,12H
8TC10	8TC20	1 to 8	8MTC	8H, 12H
12TC10	12TC20	1 to 12	12MTC	12H

The Thermocouple Cable/Connector Assemblies are physically interchangeable only on the housing end. The mold end of the cable will only fit the same size (5, 8, or 12 zone) Mold Thermocouple Connector, which determines the number of thermocouples the cable can operate.

INSTALLATION (continued)

- d. Install control modules in all zones you have wired. Zone #1 will control cavity #1 and so on.
- e. Install blank cover plates (Part # COXX-TMBP) over any empty slots.

7. Make Power Connections.

WARNING

This temperature controller housing uses electrical power that could cause electrocution or severe shock.

All electrical connections and troubleshooting must be done only by qualified electrical technicians. All electrical connections and troubleshooting must be done according to safe electrical practices.

Lock out and tag out power to the electrical circuit before connecting or servicing housing.

- a. Select power cord size.

An 8/4 SO power cord, rated at 50 continuous amps, is recommended. This is because the housing has a 50-amp circuit breaker and a strain relief sized for an 8/4 SO cord.

Even in applications where the nominal heater load well-exceeds 50 amps, the actual load is unlikely to go over 50 amps. This is because of soft-start and time-proportioning features, and the fact that seldom will all heaters draw heavily at the same time.

In very-heavy-use situations, a housing can be fitted with a 75 amp breaker and a larger strain relief.

- b. Remove back panel.
-

INSTALLATION (continued)

- c. With cord NOT connected to power, strip outer jacket of cord 3". Strip insulation 1/4" from each lead.
- d. Pass cord through strain relief in housing.

WARNING

All three leads on three phase system are electrically hot to ground. Wiring errors at either end of cable can make steel enclosure electrically hot and extremely hazardous. Make sure ground is attached to bottom block. Test connection to earth ground.

Exposed electrical leads could cause electrocution or shock. Do not apply power to housing when any cover is removed.

- e. Referring to Power Wiring Drawings, Figures 9A through 9E, connect power wires to correct power block screws (L1, L2, L3, ground) for your application. Pay particular attention to ground connection.

If using a transformer to convert from 480V to 240V, refer to Figure 10, Transformer Information.
 - f. Position power line cord in access hole such that there is no tension on individual leads. Tighten screws on outside strain relief clamp to secure this position.
 - g. Test housing to free end of ground wire before connecting power.
 - h. Make sure power is OFF to circuit, and attach leads to protected side of fused disconnect.

Make sure ground lead is attached to good earth ground. Test housing to ground.
 - i. Re-attach back panel. Secure with screws.
-

CHANGING WIRING ARRANGEMENT

If you ever need to change type of input power source, follow the basic wiring instructions in step 7 of the INSTALLATION section of this manual. Refer to Figures 9A through 9E. The main steps are:

1. Make necessary changes to power block input from power line cord.
2. Rearrange push-on lugs on multiple connector blocks (Figure 1) to adapt to new configuration.
3. Note that you CANNOT change supply voltage (120V or 208/240V) to modules without changing or modifying individual zone modules. You CAN rewire housing from single to three phase or vice versa without modifying modules.

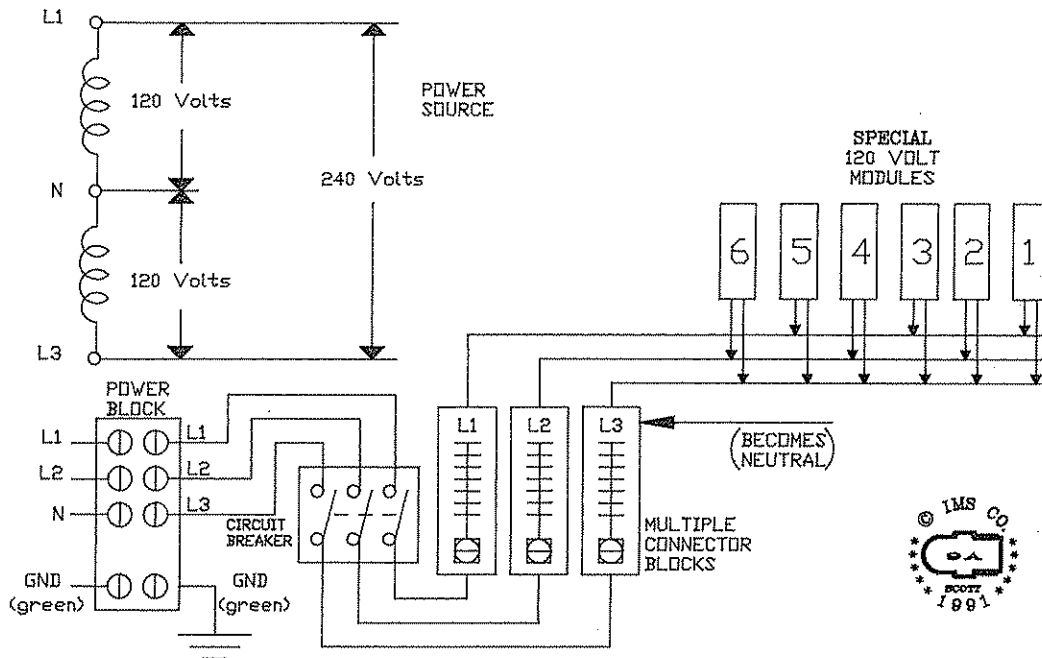
OPERATION

1. System must have been installed according to the instructions in this manual.
2. Turn ON external power fused disconnect switch to supply power to IMS Temperature Control System.
3. Apply power to control system by lifting MAIN POWER circuit breaker handle on right front panel of housing. Phase indicators (L1, L2, L3) will light to show which phases have power.
4. This supplies power to temperature control modules.

Operate modules according to module manufacturer's instructions.

5. To shut down system:
 - a. Turn individual modules off.
 - b. Shut off MAIN POWER circuit breaker on front of housing to shut off power to modules.
-

FIGURE 9A
POWER WIRING FOR
120 VOLT, 3 WIRE SINGLE PHASE SOURCE



- A. All housings are wired for 240 volt, 50/60 Hz, 3-phase power when shipped. Zones are wired in an L1/L2, L2/L3, L1/L3 repeating pattern, as shown in Figure 9D.
- B. To convert standard 240 volt, 3-phase wiring to accept a 120-volt, 3-wire, single-phase source (two hot wires, one neutral), use the following procedure:
1. Disconnect and lock out all AC power from external power source.
 2. Connect two hot leads from external AC power source to L1 and L2 terminals on power block.
 3. Connect neutral lead from external AC power source to L3 terminal on power block.
 4. Connect earth ground lead on power cable to ground terminal on power block.

CAUTION

Do not disconnect wires at edge connectors. Cut cable ties and trace wires carefully when making changes. Test all wiring before powering up.

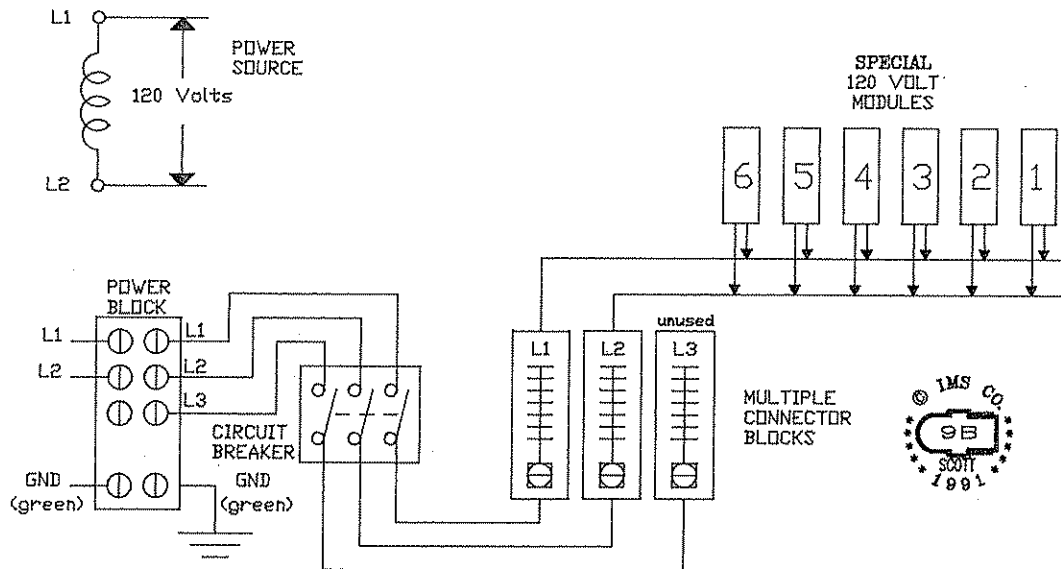
5. Change L1, L2 and L3 wires on multiple connector blocks so that one wire from each zone is connected to L3 block.
6. Change remaining L1, L2 and L3 wires on multiple connector blocks so that odd numbered zones are connected to L1 block and even numbered zones are connected to L2 block.

NOTE

Using a 120 volt, AC power source requires a special 120 volt temperature control module. The standard 240 volt module will not operate properly on 120 volts.

FIGURE 9B

POWER WIRING FOR 120 VOLT, SINGLE PHASE SOURCE



- A. All housings are wired for 240 volt, 50/60 Hz, 3-phase power when shipped. Zones are wired in an L1/L2, L2/L3, L1/L3 repeating pattern, as shown in Figure 9D.
- B. To convert the standard 240 volt, 3-phase power wiring to accept a 120 volt, 2-wire, single phase source, use the following procedure.
 1. Disconnect and lock out all AC power from external power source.
 2. Connect two leads from external AC power source to L1 and L2 terminals on power block.
 3. Connect earth ground lead from power cable to ground terminal on power block.

CAUTION

Do not disconnect wires at edge connectors. Cut cable ties and trace wires carefully when making changes. Test all wiring before powering up.

5. Change L1, L2 and L3 wires on multiple connector blocks so that one AC input power wire from each zone is connected to L1 and the other wire from each zone is connected to L2.

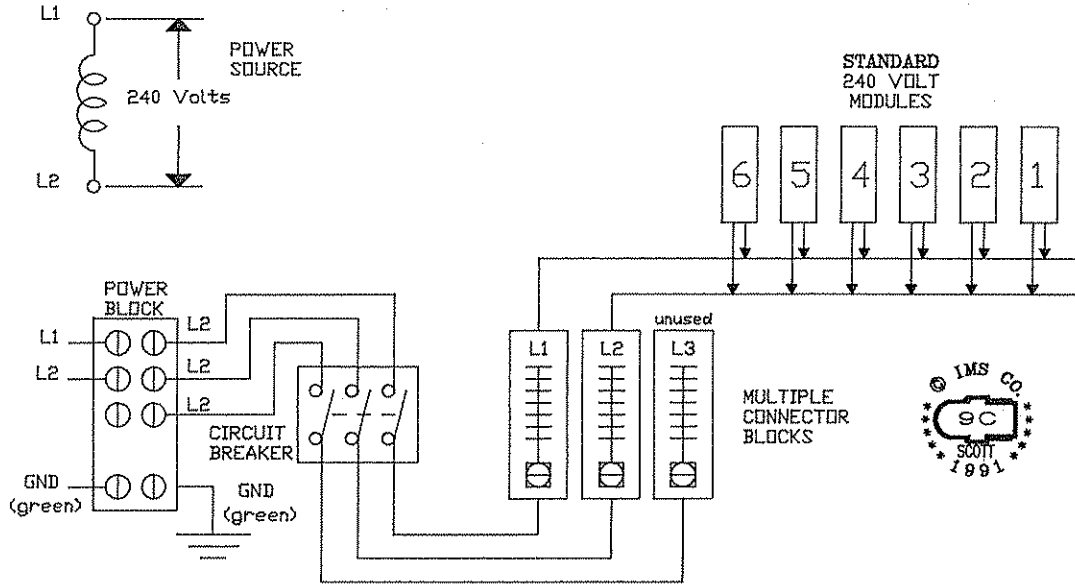
No wires should be connected to L3.

NOTE

Using a 120 volt, AC power source requires a special 120 volt temperature control module. The standard 240 volt module will not operate properly on 120 volts.

FIGURE 9C

POWER WIRING FOR 240 VOLT, SINGLE PHASE SOURCE



- A. All housings are wired for 240 volt, 50/60 Hz, 3-phase power when shipped. Zones are wired in an L1/L2, L2/L3, L1/L3 repeating pattern, as shown in Figure 9D.
- B. To convert the standard 240 volt, 3-phase power wiring to accept a 240 volt, 2-wire, single phase source, use the following procedure.
 1. Disconnect and lock out all AC power from external power source.
 2. Connect two leads from external AC power source to L1 and L2 terminals on power block.
 3. Connect earth ground lead from power cable to ground terminal on power block.

CAUTION

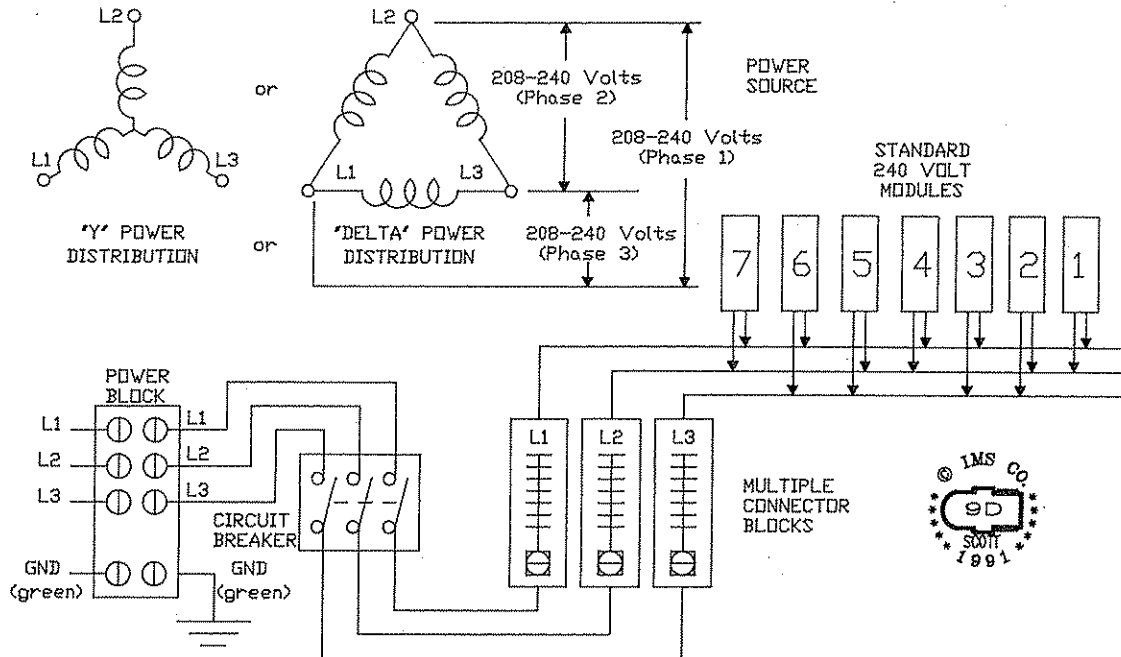
Do not disconnect wires at edge connectors. Cut cable ties and trace wires carefully when making changes. Test all wiring before powering up.

5. Change L1, L2 and L3 wires on multiple connector blocks so that one AC input power wire from each zone is connected to L1 and the other wire from each zone is connected to L2.

No wires should be connected to L3.

FIGURE 9D

POWER WIRING FOR 240 VOLT, THREE PHASE SOURCE



- A. All housings are wired for 240 volt, 50/60 Hz, 3-phase power when shipped. Zones are wired in an L1/L2, L2/L3, L1/L3 repeating pattern, as shown above.
- B. To connect standard housing to power source, use the following procedure.
1. Disconnect and lock out all AC power to external power source.
 2. Connect two three power leads from external AC power source to L1, L2 and L3 terminals on power block.
 3. Connect earth ground lead from power cable to ground terminal on power block.

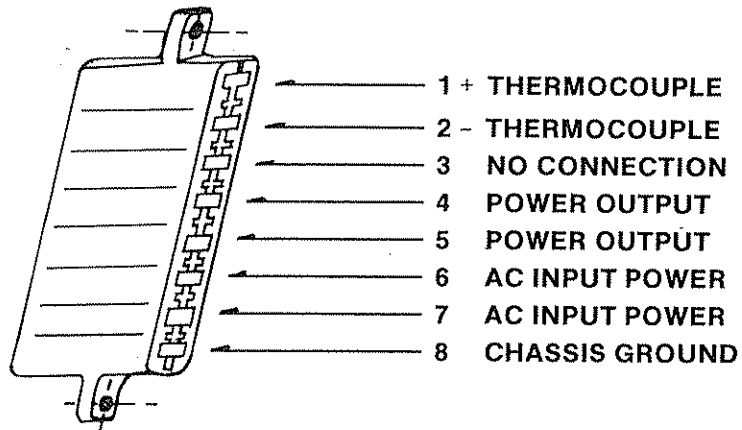
- C. No changes to multiple connector blocks are necessary unless one side of housing circuit breaker continues to blow. If this happens, the loads on the three power phases need to be balanced.

There may also be an energy-saving advantage to balancing the phases if they are significantly out of balance.

CAUTION

Do not disconnect wires at edge connectors. Cut cable ties and trace wires carefully when making changes. Test all wiring before powering up.

- D. To change load balance, rearrange AC input power wiring on multiple connector blocks as described in ZONE WATTAGE BALANCING AND KVA CALCULATION in Figure 10.

FIGURE 9E — EDGE CONNECTOR

TYPICAL TRANSFORMER REQUIREMENTS

Typical 480 to 240 VAC, three phase, delta power distribution transformers for IMS temperature control systems are:

- 6 KVA for 5 zone systems
- 9 KVA for 8 zone systems
- 15 KVA for 12 zone systems

Other standard transformers are available upon request, such as 3 KVA, 22.5 KVA, 30 KVA, and 45 KVA. (Any transformer larger than 15 KVA will not fit on the transformer stand supplied by IMS.)

ZONE WATTAGE BALANCING AND KVA CALCULATION

1. Determine the heater wattage for each zone.
(Watts = Volts x Amps = Volts² / Ohms)
2. Add all zone wattages together and divide the total by 3 to obtain a target wattage for each leg.
3. Balance the zone wattages over the three legs of the transformer such that the total wattage of each leg is as close to the target wattage as possible.

NOTE

You will probably need to rewire the housing to balance the load. The starred modules (*) on page 2 of this insert represent zones that needed rewiring (from the normal 240 VAC 3-phase wiring scheme) to balance the load.

4. Find the minimum transformer capacity needed by multiplying the largest leg wattage by 3 and dividing by 1000 (1000 W = 1 KVA).

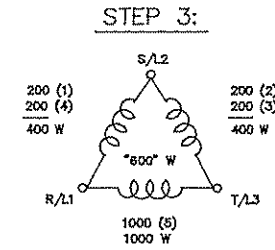
STEP 1:

ZONES 1-4	200 W
ZONE 5	1000 W

STEP 2:

800 W
1000 W
1800 W

$1800W/3 = "600" W$

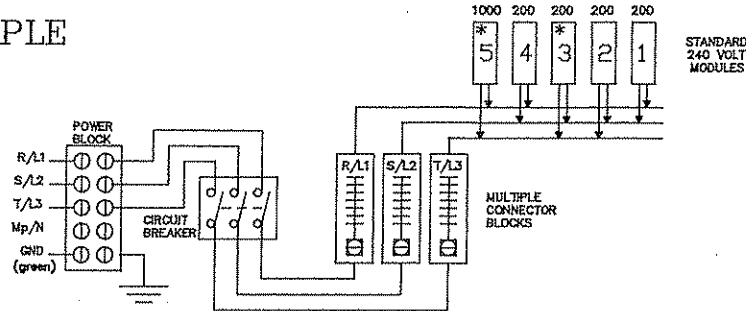


STEP 4:

$1000 W \times 3 = 3000 W$

$3000 W = \underline{\underline{3 KVA}}$

5 ZONE EXAMPLE



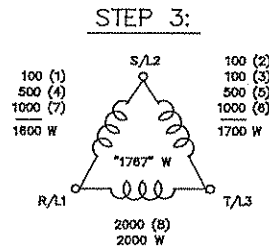
STEP 1:

ZONES 1-3	100 W
ZONES 4-5	500 W
ZONES 6-7	1000 W
ZONE 8	2000 W

STEP 2:

300 W
1000 W
2000 W
2000 W
5300 W

$5300W/3 = "1767" W$

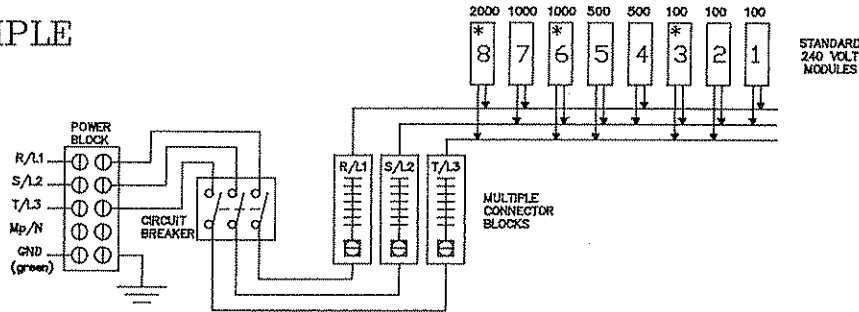


STEP 4:

$2000 W \times 3 = 6000 W$

$6000 W = \underline{\underline{6 KVA}}$

8 ZONE EXAMPLE



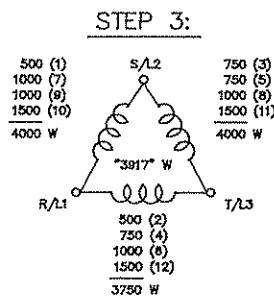
STEP 1:

ZONES 1-2	500 W
ZONES 3-5	750 W
ZONES 6-9	1000 W
ZONES 10-12	1500 W

STEP 2:

1000 W
2250 W
4000 W
4500 W
11750 W

$11750W/3 = "3917" W$

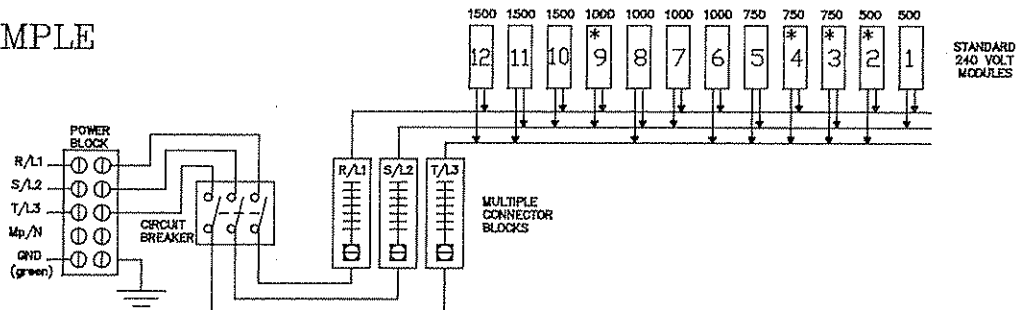


STEP 4:

$4000 W \times 3 = 12000 W$

$12000 W = \underline{\underline{12 KVA}}$

12 ZONE EXAMPLE



5-ZONE STAND ASSEMBLY

CROSS BRACES

A to 3 w/ 3/4" bolt, flat washer, lock washer and nut

B to B w/ 1" bolt, flat washer, lockwasher and nut

C to 1 w/ 3/4" bolt, flat washer, lockwasher and nut

PANELS

X to 4 and **Y to 5** w/ 2 1/2" bolt, flat washer, lockwasher and nut

Housing mounts to panels w/ 1/2" bolts and lockwashers

HARDWARE NOT USED

- 2) 2 3/4" bolts

8-ZONE STAND ASSEMBLY

CROSS BRACES

A to 3 w/ 3/4" bolt, flat washer, lock washer and nut

B to B w/ 1" bolt, flat washer, lockwasher and nut

C to 1 w/ 3/4" bolt, flat washer, lockwasher and nut

Housing mounts to stand w/ 2 1/2" bolts and lockwashers

HARDWARE NOT USED

- 2) 2 3/4" bolts
- 4) 1/2" bolts
- 4) flat washers
- 4) hex nuts
- 4) lockwashers
- 2) adapter plates

12-ZONE STAND ASSEMBLY

CROSS BRACES

A to 3 w/ 3/4" bolt, flat washer, lock washer and nut

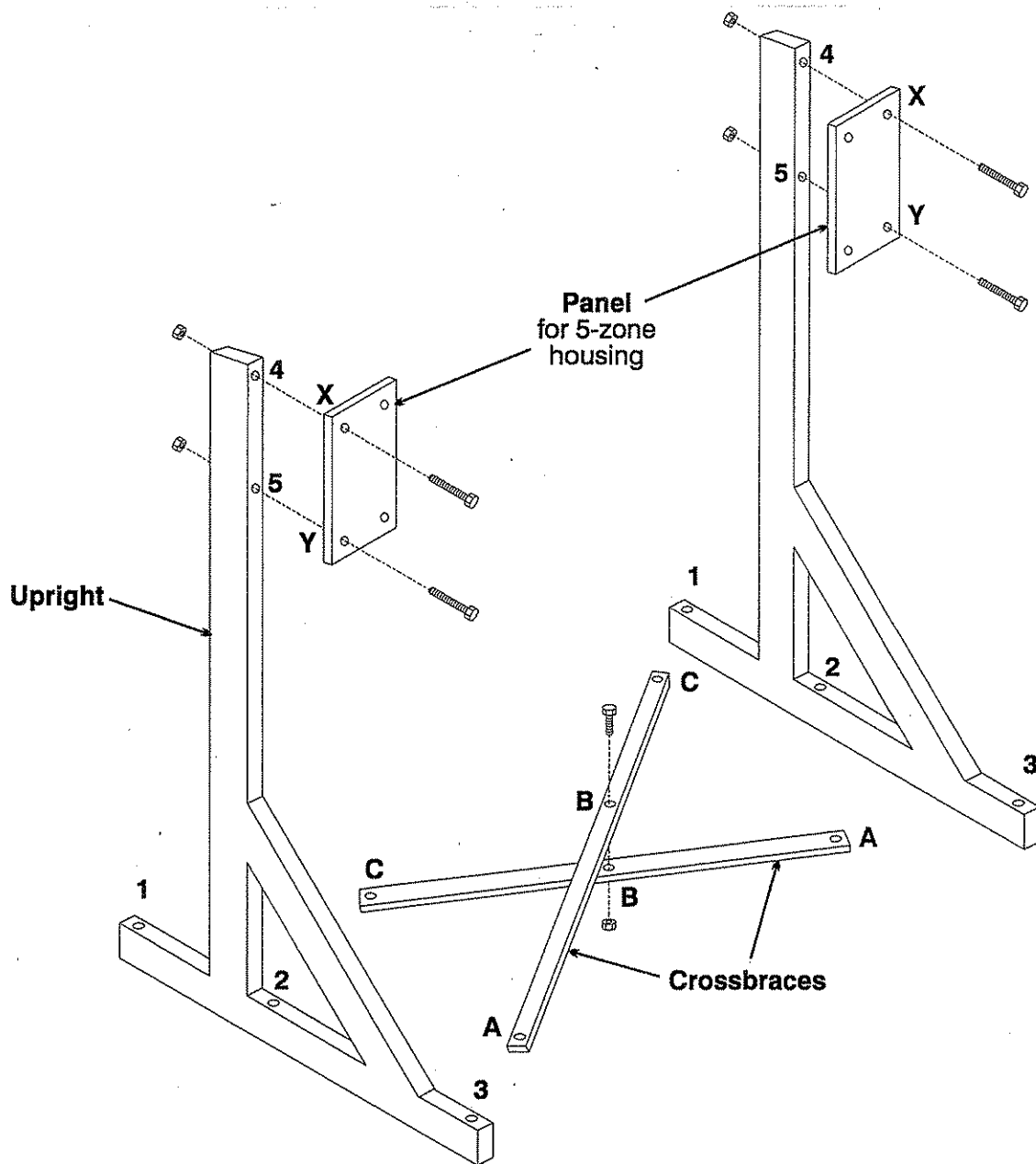
B to B w/ 1" bolt, flat washer, lockwasher and nut

C to 2 w/ 2 3/4" bolt, flat washer, lockwasher and nut

Housing mounts to stand w/ 2 1/2" bolts and lockwashers

HARDWARE NOT USED

- 2) 3/4" bolts
- 4) 1/2" bolts
- 4) flat washers
- 4) hex nuts
- 4) lockwashers
- 2) adapter plates



ASSEMBLY

Item numbers refer to drawing on previous page.

1. Insert 1"-long screw (3) through middle holes of crossbraces (2). Loosely install one lockwasher (6) and nut (7) on screw.
2. Form an X with crossbraces.
3. Lay one upright (1) horizontally on a flat surface.
4. **For 5 or 8-Zone Housings**

Position holes in crossbraces over front and back holes in upright. Insert 3/4"-long screws into holes. Attach lockwashers and hex nuts to screws on underside of upright. Snug nuts but do not tighten them.

5. **For 12-Zone Housing**

Position holes in crossbraces over front and middle holes in upright. Insert 3/4"-long screw into front hole. Insert 2-1/2"-long screw (4) through middle hole. Attach lockwashers and hex nuts to screws on underside of upright. Snug nuts but do not tighten them.

6. Stand assembly up and attach crossbraces to second upright, following step 4 or 5.
7. Tighten all nuts (5 total) and stand assembly on casters. Insert endcaps on all open channels.

8. **8 or 12-Zone Housing**

Install housing on front of frame, using 2-1/2"-long screws and lockwashers. Insert screws through frame and thread into tapped holes in housing.

9. **5-Zone Housing**

Install adapter plates on front of frame, using 2-1/2"-long screws and lockwashers. Insert screws through frame and thread into tapped holes in adapter plates.

Attach 5-zone housing to adapter plates, using 1"-long screws and lockwashers. Insert screw through adapter plate into tapped holes in back of housing.

MAINTENANCE RECORD
AND NOTES