Installation Instructions

Part No. 50DJ-902---801, 50DJ-902---811

CONTENTS

SAFETY CONSIDERATIONS

Read these instructions entirely before installing the accessory Motormaster I Head Pressure Controller on the base rooftop unit.

⚠ WARNING

Before beginning any modification, make sure all power is disconnected to the unit and locked out. Failure to disconnect power supply prior to servicing may result in serious injury. All wiring must comply with applicable national and local codes.

Installation and servicing of air-conditioning equipment can be hazardous due to system pressure and electrical components. Only trained and qualified service personnel should install, repair, or service air-conditioning equipment.

Untrained personnel can perform the basic maintenance functions of replacing filters. All other operations should be performed by trained service personnel. When working on air-conditioning equipment, observe precautions in the literature, tags and labels attached to the unit, and other safety precautions that may apply.

Follow all safety codes. Wear safety glasses and work gloves. Use quenching cloth for unbrazing operations. Have fire extinguishers available for all brazing operations.

⚠ CAUTION

When removing panels from the unit, be careful not to damage the roof or other surfaces with the panels.

GENERAL

The accessory Motormaster I (MMI) head pressure controller is used to control the speed of the outdoor (condenser) fan motor (OFM) (see Fig. 1 for OFM1 location), permitting the unit to operate in cooling at down to –20 F outdoor ambient. In order to accomplish this, it is also necessary to install the accessory low-ambient kit and/or winter start kit on some units. Refer to the unit price pages for specific information on which kits to order, and to the literature included with the accessory low-ambient and winter start kits for their installation. Low-ambient and winter start kit wiring details are included in this book as appropriate.

NOTE: In addition, all 575-v units require installation of an accessory transformer (Carrier part no. HT01AH-954) not included in this package. Refer to the accessory transformer kit for wiring instructions for that accessory.

Table 1 shows MMI package numbers and usage, and Table 2 shows the contents of each MMI accessory package.

Table 1 — Motormaster I Package Numbers and Usage

PACKAGE NO.	UNIT SERIES NO.	UNIT V-Ph-Hz	MOTOR V-Ph-Hz
50DJ-902---801	1-- 5--	208/230-3-60 575-3-60	208/230-1-60
50DJ-902---811	6--	460-3-60	208/230-1-60

Table 2 — Motormaster I Package Contents

ITEM DESCRIPTION	ITEM QUANTITY		ITEM PART NUMBER
	50DJ-902---801*	50DJ-902---811	
Motormaster I Controller with Sensor (8-ft wire)	1	1	32LT-900---301
Motor, Outdoor Fan	1	1	HC52AE-235
Capacitor, 50 mfd	1	1	HC91CA-050
Boot, Capacitor	1	1	HC97ZZ-075
Strap, Capacitor	1	1	HC98ZZ-050
Spacer, Motor Mount	1	1	30GX500698
Fastener Package	1	1	—
Transformer, 460/230 V†	—	1	HT01AH-852

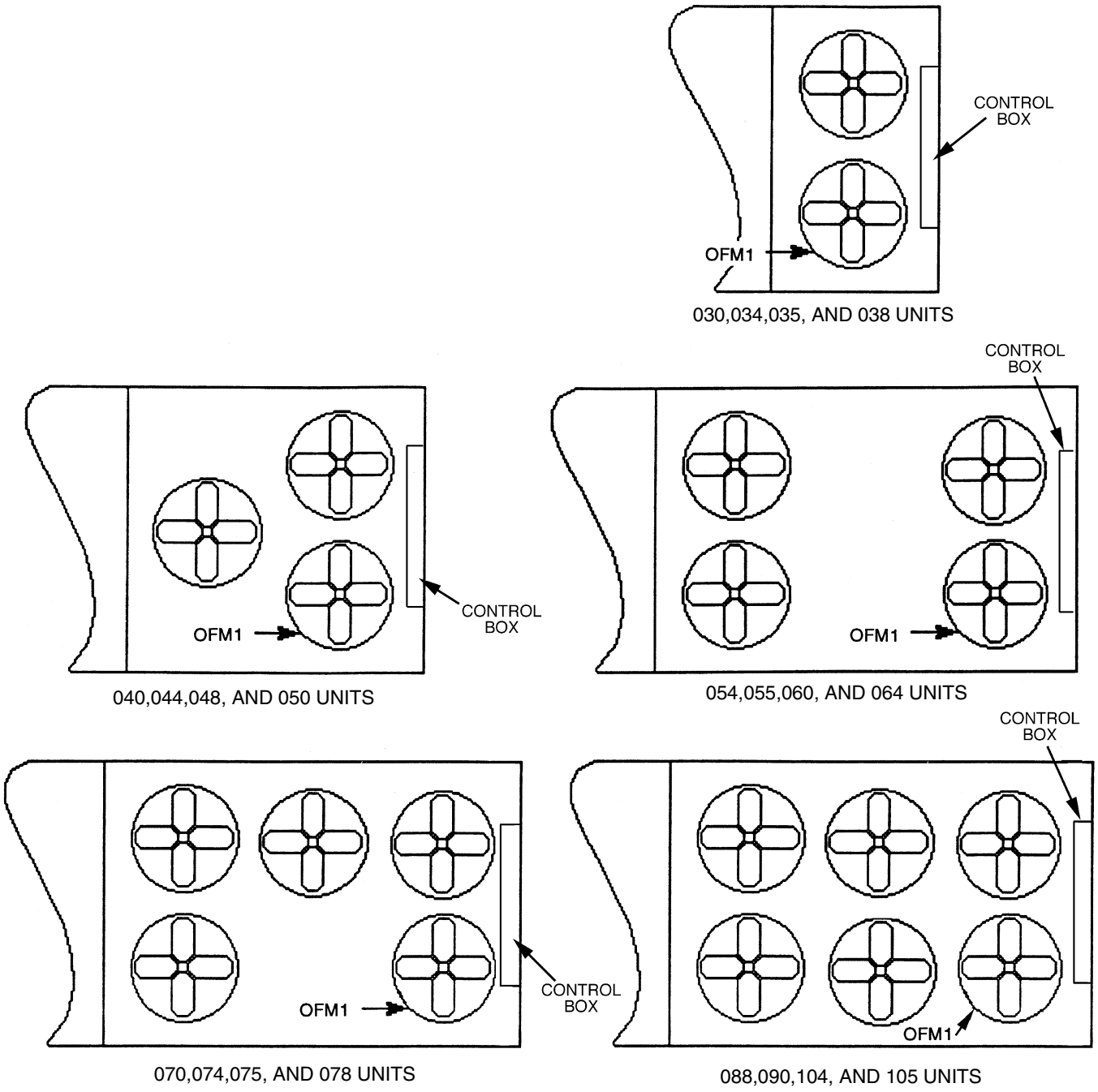
LEGEND

mfd — Microfarad

*For Motormaster I head pressure control device operation, 575-v units require installation of a transformer (Carrier part no. HT01AH-954) not included in this accessory package.
†The transformer is used to step down the power supply from 208/230 v to 460 v.

INSTALLATION

1. Disconnect power to the unit.
2. Refer to Fig. 1. Disconnect outdoor (condenser) fan motor (OFM1) wiring at the motor junction box.
3. Remove OFM1 fan guard from the unit. Remove OFM1 with propeller fan from unit. Save all wires.
4. Remove rubber hub cap and propeller from OFM1 motor shaft and keep parts for installation on the speed control motor.



LEGEND

OFM — Outdoor (Condenser) Fan Motor

NOTE: All views are from the top of the unit.

Fig. 1 — Location of OFM1

5. Replace the existing motor mount spacer (see Fig. 2) with motor mount spacer provided in the accessory package.
6. Install speed control motor in place of the OFM1 removed in Step 3. This speed control motor becomes the new OFM1.
7. Re-install the propeller removed from Step 4. Adjust the fan height to the orifice edge per Fig. 3 (or specifications in base unit installation instructions). Use a straight edge laid across the top edge of the fan opening orifice. Tighten set screw and replace the rubber hub cap. Fill hub recess with Permagum if hub has no rubber hub cap. Check fan rotation (fan rotation should be clockwise facing into fan discharge).
8. Since the standard OFM1 is a 3-phase motor and the speed control motor is a single-phase motor, a capacitor is required. There is not enough space in the main control box to easily mount a capacitor, so it must be mounted outside the control box. The best location for the capacitor is inside the right-hand corner post.

   Drill holes and mount the capacitor with terminals pointing up using capacitor strap, boot, and screws. See Fig. 4 and 5.
9. *For clockwise OFM rotation (facing fan discharge)* — Connect yellow wire from terminal 22 on OFC1 (outdoor [condenser] fan contactor) to the capacitor (see Fig. 6 and 7, depending on unit voltage). Run a second wire (field supplied) from the same terminal to the yellow (T4) wire in the speed control motor junction box: connect using wire nut (supplied in fastener package). Tie the blue (T1) and black (T5) wires in the motor junction box together (see Fig. 6 or 7).

   For counterclockwise OFM rotation (facing fan discharge) — Connect yellow wire from terminal 22 on OFC1 to the capacitor. Run a second wire (field supplied) from the same terminal to the blue (T1) wire in the speed control motor junction box; connect using wire nut (supplied in fastener package). At the motor, tie the yellow (T4) and black (T5) wires in the motor junction box together using a wire nut (supplied in fastener package).
10. Run field-supplied wire from the other side of the capacitor or the red (T8) wire in the speed control motor junction box; connect with wire nut (supplied in fastener package).

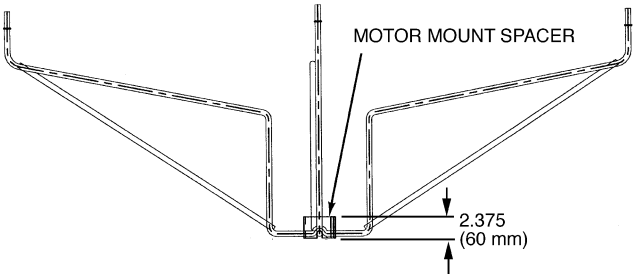


Fig. 2 — Motor Mount Spacer Location

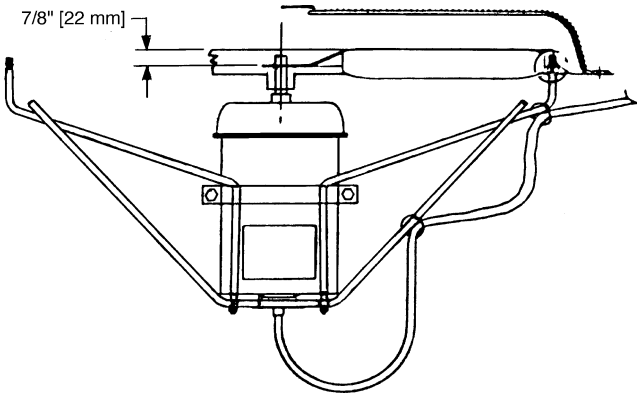


Fig. 3 — Condenser-Fan Adjustment

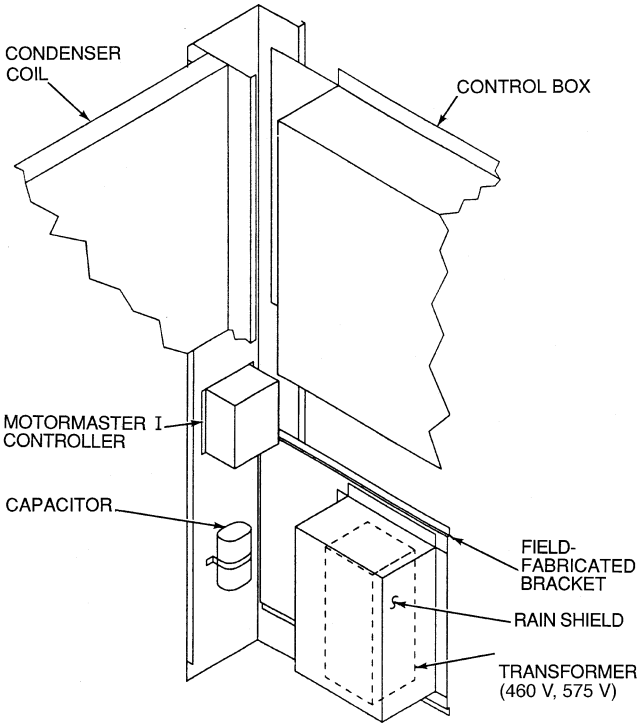


Fig. 4 — Mounting Motormaster® I Controller, Capacitor, and Transformer; Size 034-048 and 030-050 Units

11. Remove the blue wire that had connected the standard OFM to terminal 23 on OFC1 (not shown in Fig. 6 and 7). If this wire is not physically removed from the unit, be sure that it is disconnected from terminal 23 of OFC1 and that the end of the wire is placed in a wire nut (field supplied) and secured. The motor end of this wire must be securely wire-tied to the motor mount to prevent it from becoming entangled in the propeller fan when the unit is running.

⚠ DANGER

If this wire is not disconnected from terminal 23 of OFC1, it will become energized when OFC1 is energized. This could result in serious injury or death.

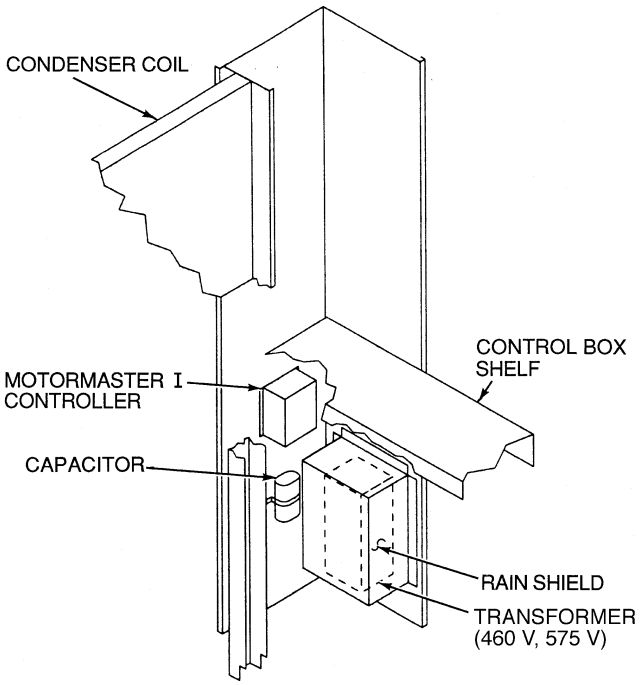
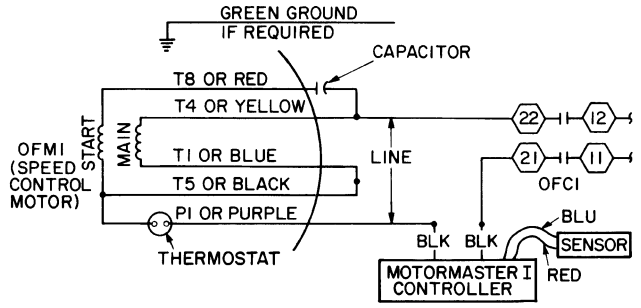


Fig. 5 — Mounting Motormaster® I Controller, Capacitor, and Transformer; Size 054-104 and 055-105 Units



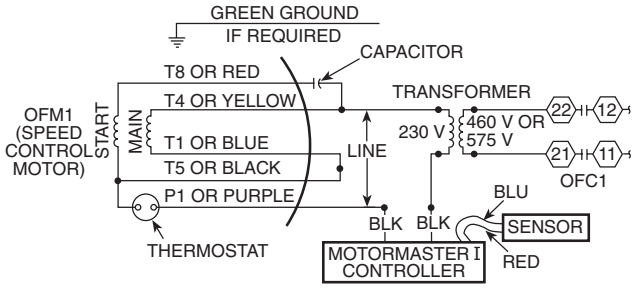
LEGEND

OFC — Outdoor (Condenser) Fan Contactor
OFM — Outdoor (Condenser) Fan Motor

NOTE: Wiring shown is for clockwise rotation. To reverse rotation, interchange T1 (blue) and T4 (yellow) leads.

Fig. 6 — Wiring Details, 208/230-V Unit (208/230-V Motor)

12. Mount the Motormaster I controller on the partition next to the capacitor. The controller must be mounted vertically with the leads coming out the bottom. Four holes must be field drilled using mounting template. (See template located at the back of this literature.) Attach controller using four No. 10 sheet metal screws (supplied in fastener package). To ensure electrical ground, insert star washers (supplied in fastener package) under the heads of the screws.



LEGEND

OFC — Outdoor (Condenser) Fan Contactor
OFM — Outdoor (Condenser) Fan Motor

NOTE: Wiring shown is for clockwise rotation. To reverse rotation, interchange T1 (blue) and T4 (yellow) leads.

Fig. 7 — Wiring Details, 460 or 575-V Unit (208/230-V Motor)

13. Connect the black wire from terminal 21 on OFC1 to one of the black wires in the Motormaster I controller using wire nut (already in unit) for connection (see Fig. 6 and 7). Run field-supplied wire from the other black wire in the Motormaster I controller (connect using wire nut) to the purple wire (P1) in the speed control motor junction box. Use wire nut (already in unit) to connect black and purple wires. Replace motor junction box cover.

⚠ CAUTION

Be sure that the wires running to the speed control motor are wire-tied securely to the motor mount to prevent the wires from becoming entangled in the propeller when the unit is running.

14. Reinstall the propeller fan and fan guard.
15. Route the sensor wire from the controller above the compressor access door to the header end of the condenser coil.

⚠ CAUTION

Sensor assembly is delicate; handle with care.

16. See Fig. 8-11 for sensor location. Secure the sensor to the coil return bend with No. 4-40 screw, 2 plate washers, and nut supplied in fastener package) as shown in the 32LT Installation, Start-Up and Service Instructions (included with MMI controller).
17. Coil up excess wire and secure it next to the MMI controller.
18. Provide sensor wire with protection from physical damage or wind movement by securing wire with wire ties when necessary.

19. *460-volt units only* — A stepdown transformer is supplied with the 50DJ-902---811 package and must be installed as described below:

⚠ CAUTION

Transformer is heavy. Use care when lifting.

a. Mount transformer (see Fig. 4 and 5) using field-drilled holes.

b. Connect yellow wire from terminal 22 on OFC1 to the primary side of the transformer (see Fig. 7). Connect the black wire from terminal 21 on the OFC1 to the other primary of the transformer.

c. Run field-supplied wire from the secondary of the transformer to the capacitor. Run second field-supplied wire to one of the black wires on the controller (see Fig. 7).

d. Install field-supplied rain shield over the transformer. See Fig. 12 for rain shield details.

20. *575-volt units only* — Transformer (Carrier Part No. HT01AH-954) must be ordered separately and installed as described below.

⚠ CAUTION

Transformer is heavy. Use care when lifting.

a. Mount transformer (see Fig. 4 and 5) using field-drilled holes.

b. Connect yellow wire from terminal 22 on OFC1 to the primary side of the transformer (see Fig. 7). Connect the black wire from terminal 21 on the OFC1 to the other primary of the transformer.

c. Run field-supplied wire from the secondary of the transformer to the capacitor. Run second field-supplied wire to one of the black wires on the controller (see Fig. 7).

d. Install field-supplied rain shield over the transformer. See Fig. 12 for rain shield details.

Winter Start Recommendations — For applications requiring winter start capabilities, modify the unit as follows:

1. Shut off all power to the unit. Open and tag all disconnects.
2. Jumper the existing low-pressure switch on circuit one.
3. Install an accessory loss-of-charge switch (LPS) Carrier part no. HK02ZB038 (opens at 5 psig and resets at 25 psig) on the liquid service valve on circuit one.
4. Mount an accessory freeze protection thermostat (FPT) Carrier part no. HH18HC102 (opens at 25 F and resets at 53 F) on any of the $^1/_2$-in. tubes leaving the evaporator coil and entering the suction header. See Fig. 13 and 14.
5. Wire the FPT and LPS switches as shown in Fig. 15.

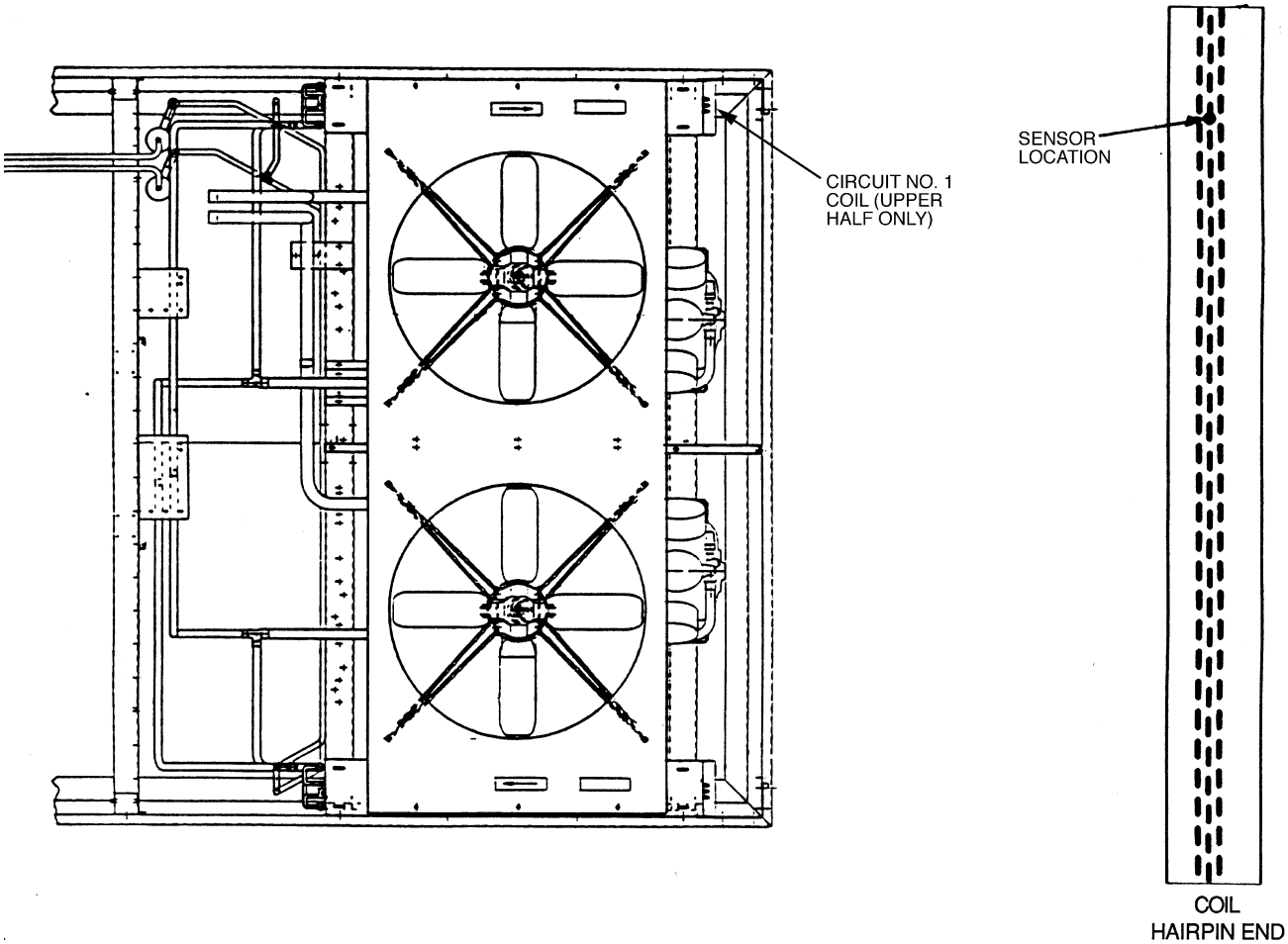


Fig. 8 — Motormaster® I Control Sensor Location, Size 030,034,035, and 038 Units

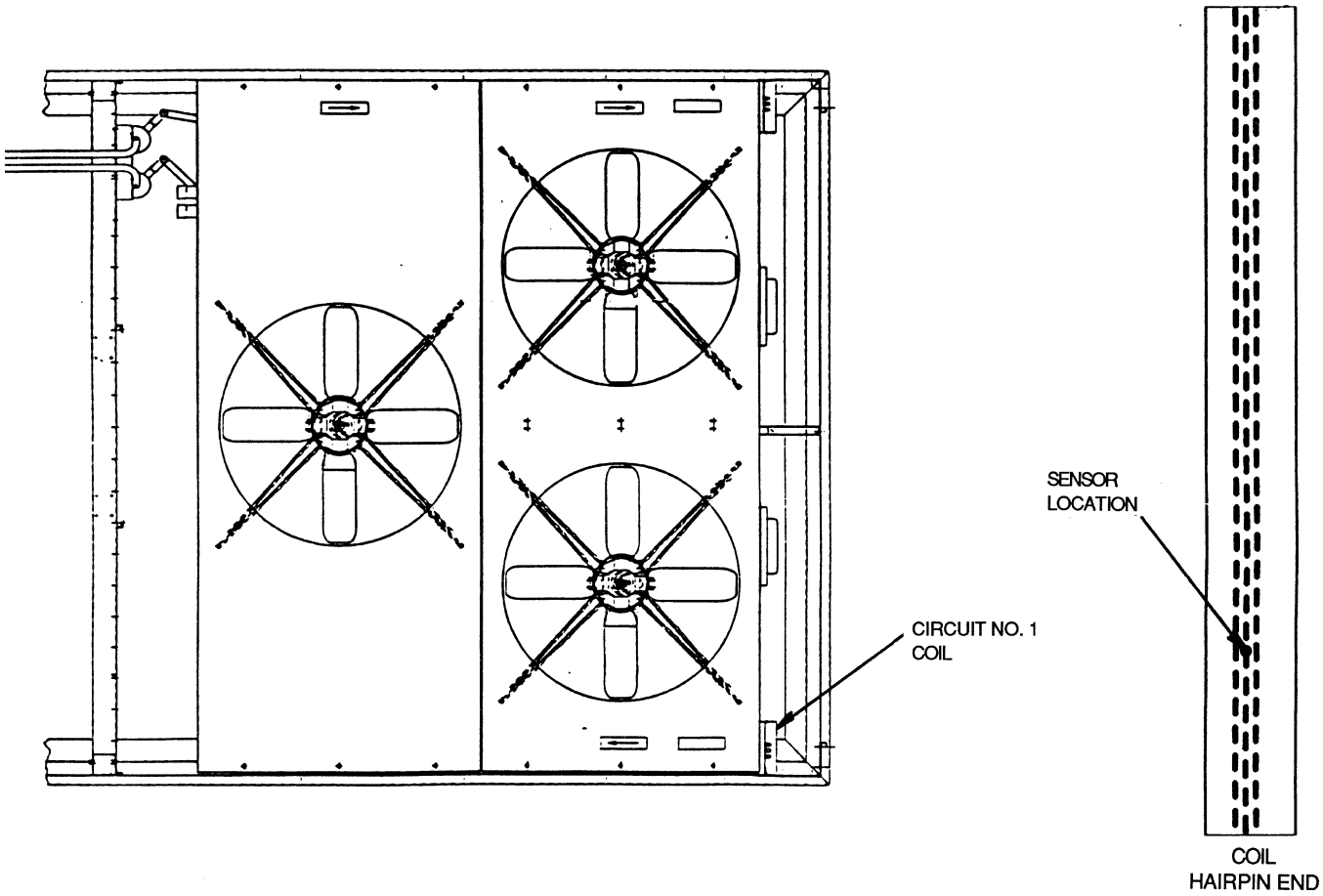


Fig. 9 — Motormaster® I Control Sensor Location, Size 040,044,048, and 050 Units

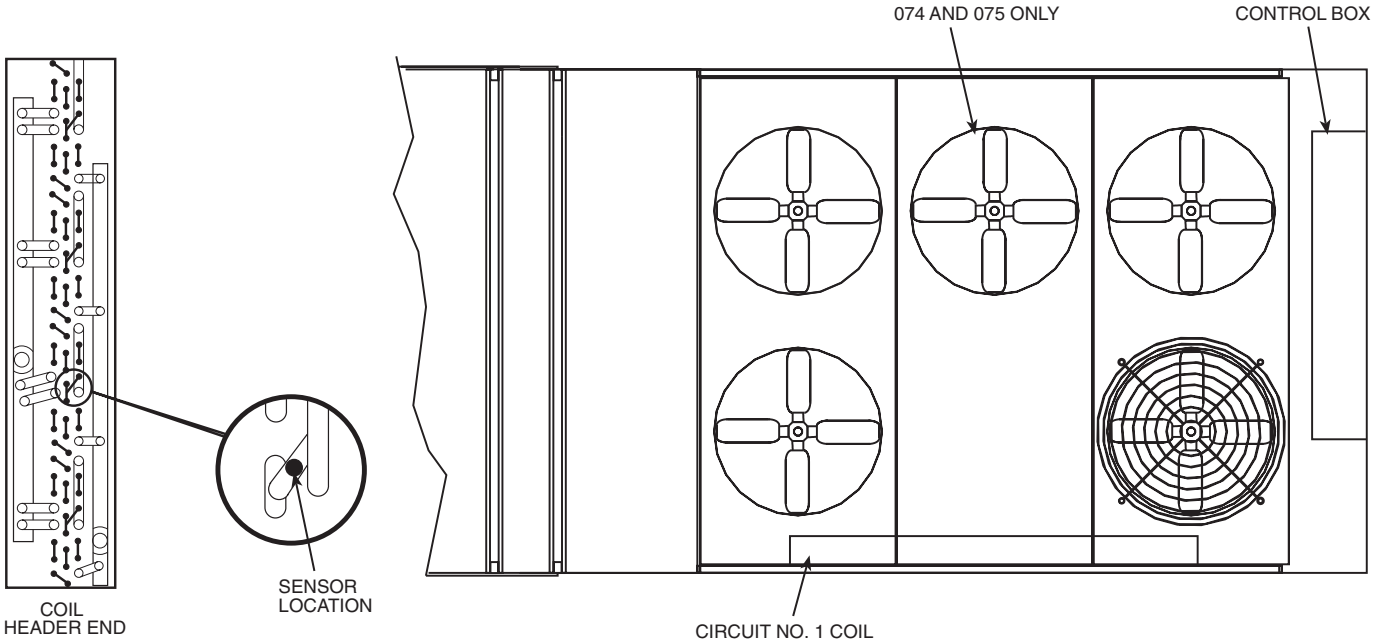


Fig. 10 — Motormaster I Control Sensor Location, Size 054-78 and 055-075 Units

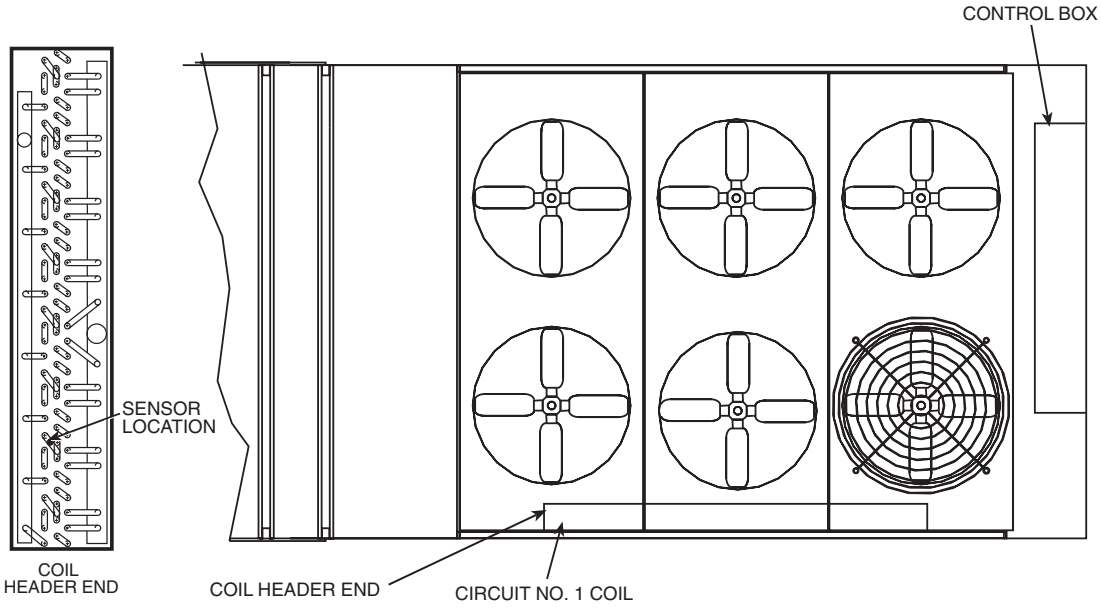
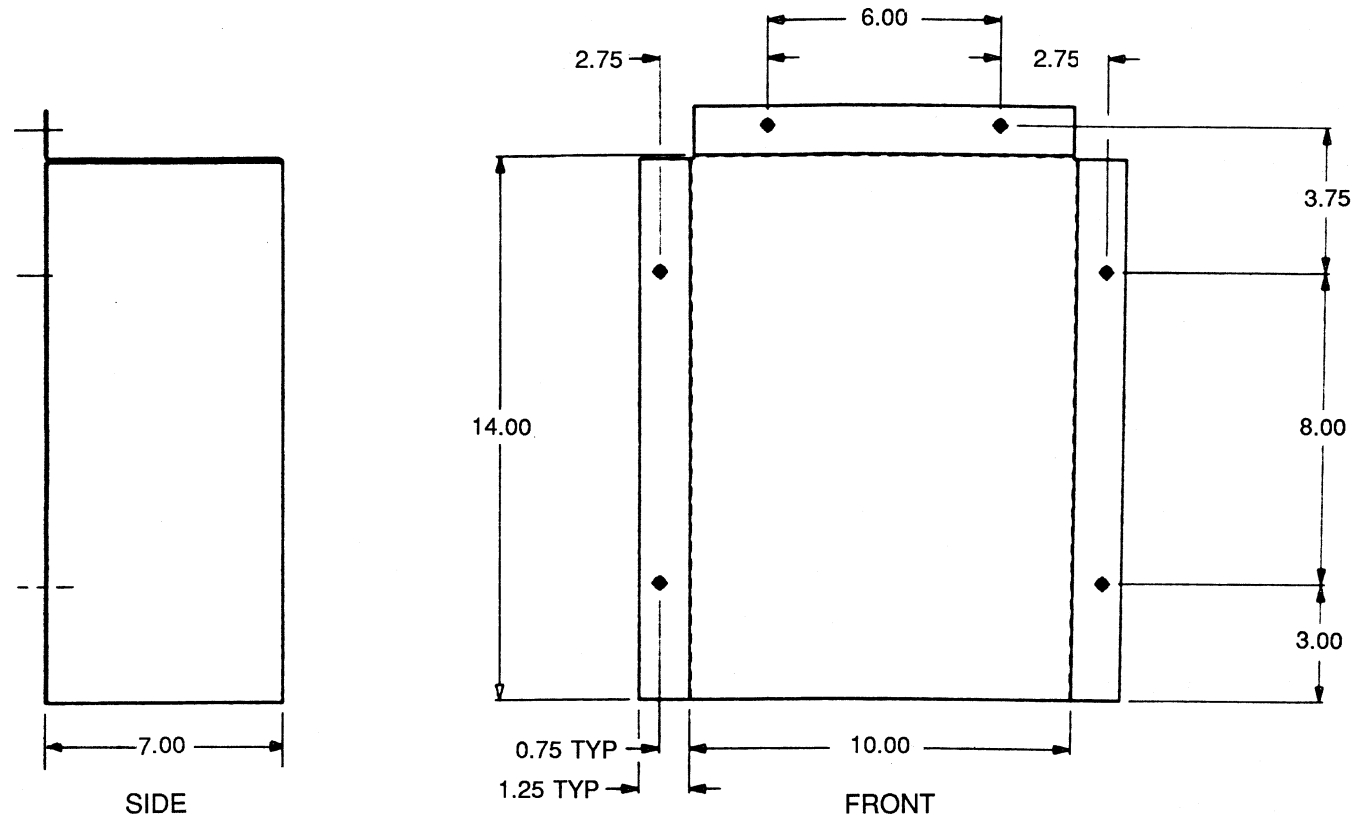
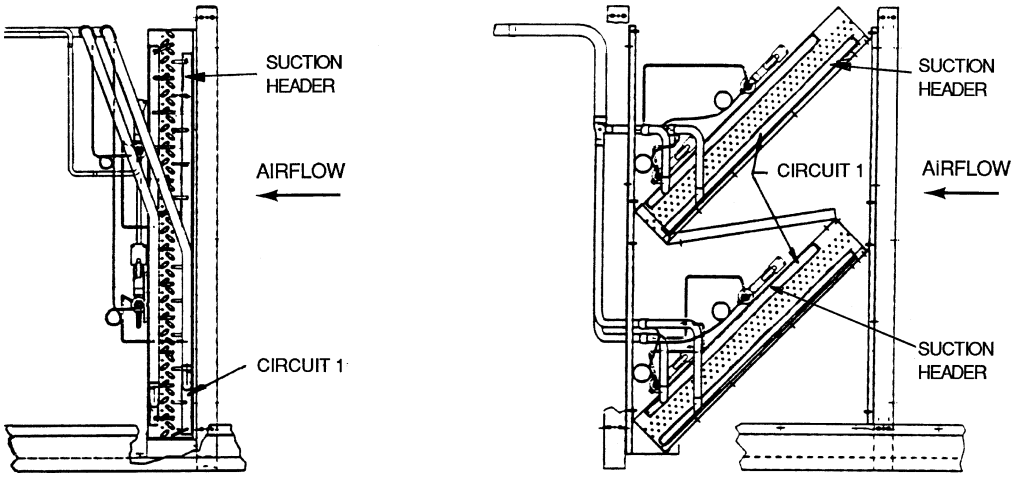


Fig. 11 — Motormaster® I Control Sensor Location, Size 088,090,104, and 105 Units



NOTE: Dimensions are in inches.

Fig. 12 — Transformer Rain Shield



SIZE 030,034,035,038

SIZE 040,044,048,050

Fig. 13 — Circuit 1 Evaporator Suction Headers for Freeze Protection Thermostat Location, Size 034-048 and 030-050 Units

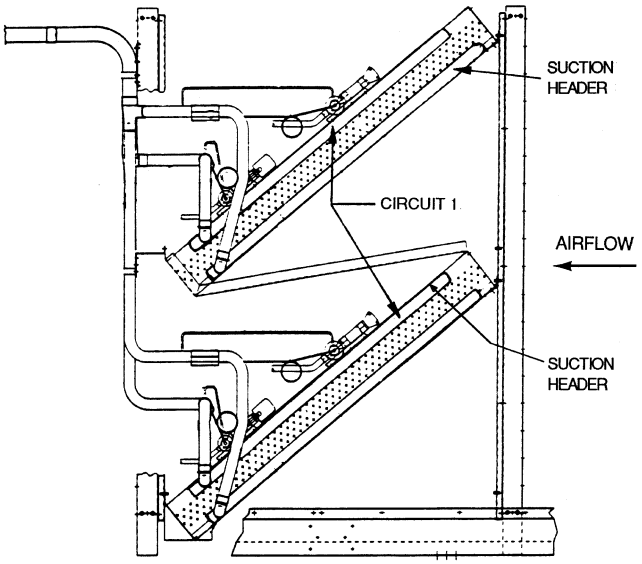
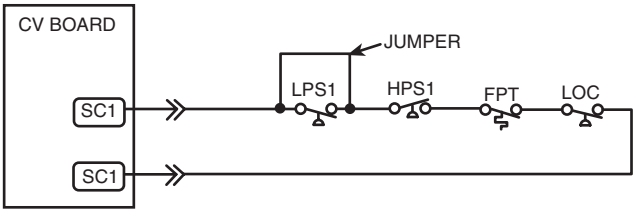
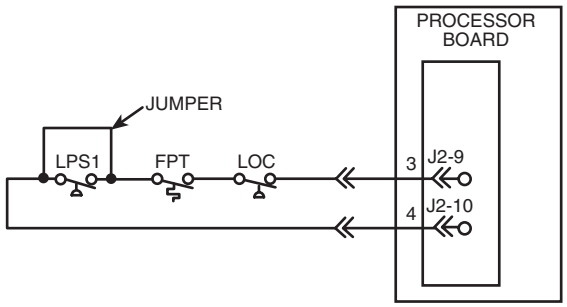


Fig. 14 — Circuit 1 Evaporator Suction Headers for Freeze Protection Thermostat Location, Size 054-104 and 055-105 Units



CONSTANT VOLUME



VARIABLE VOLUME

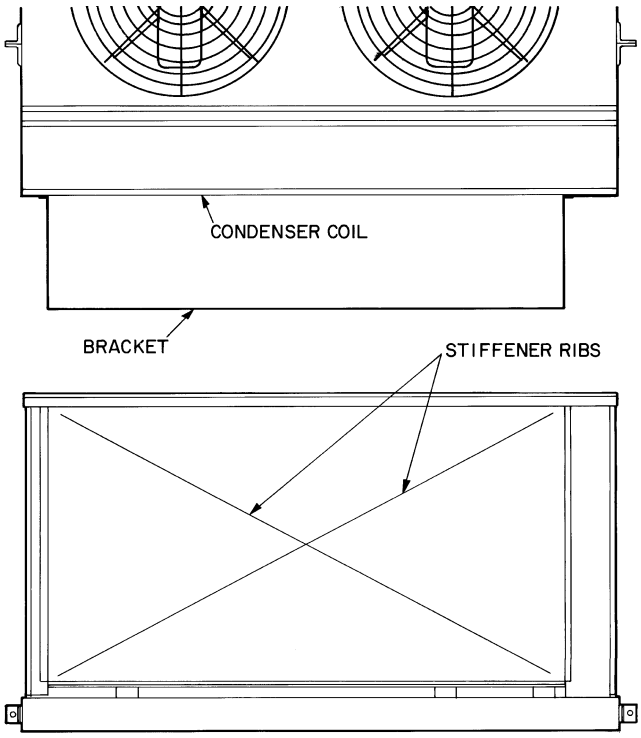
LEGEND

CV — Constant Volume
FPT — Freeze Protection Thermostat
HPS — High-Pressure Switch
LOC — Loss-of-Charge Switch
LPS — Low-Pressure Switch
SC — Safety Circuit

Fig. 15 — Freeze Protection Thermostat and Loss-of-Charge Switch Wiring Details

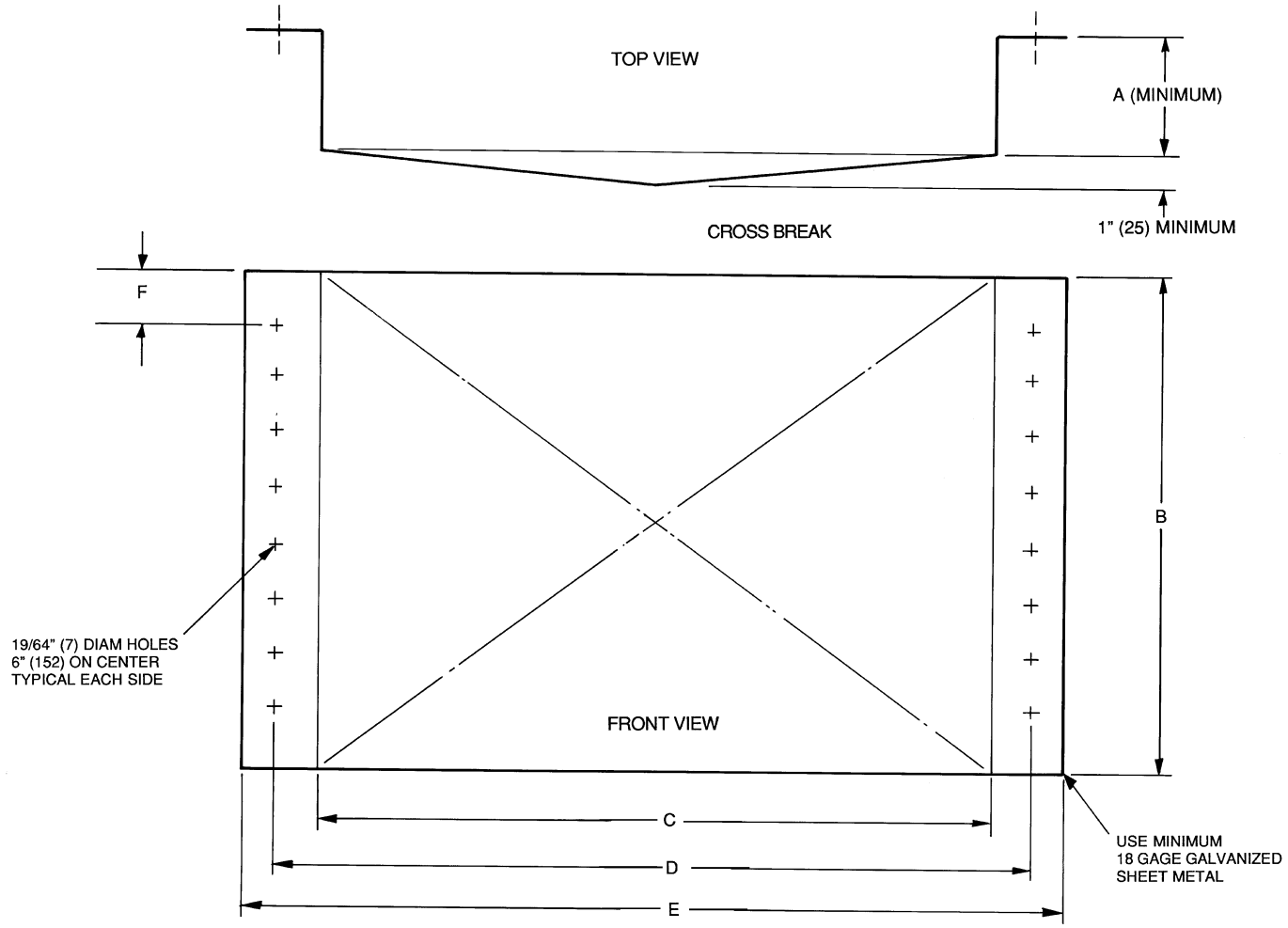
WIND BAFFLE

For low-ambient duty, a baffle should be installed in front of the condenser coil to prevent cross currents from causing abnormal operation. See Fig. 16 and 17 for baffle details



USE FIELD-SUPPLIED $^{1}/_{4}$-20 FASTENERS FOR MOUNTING OF BRACKET

Fig. 16 — Suggested Wind Baffle Design

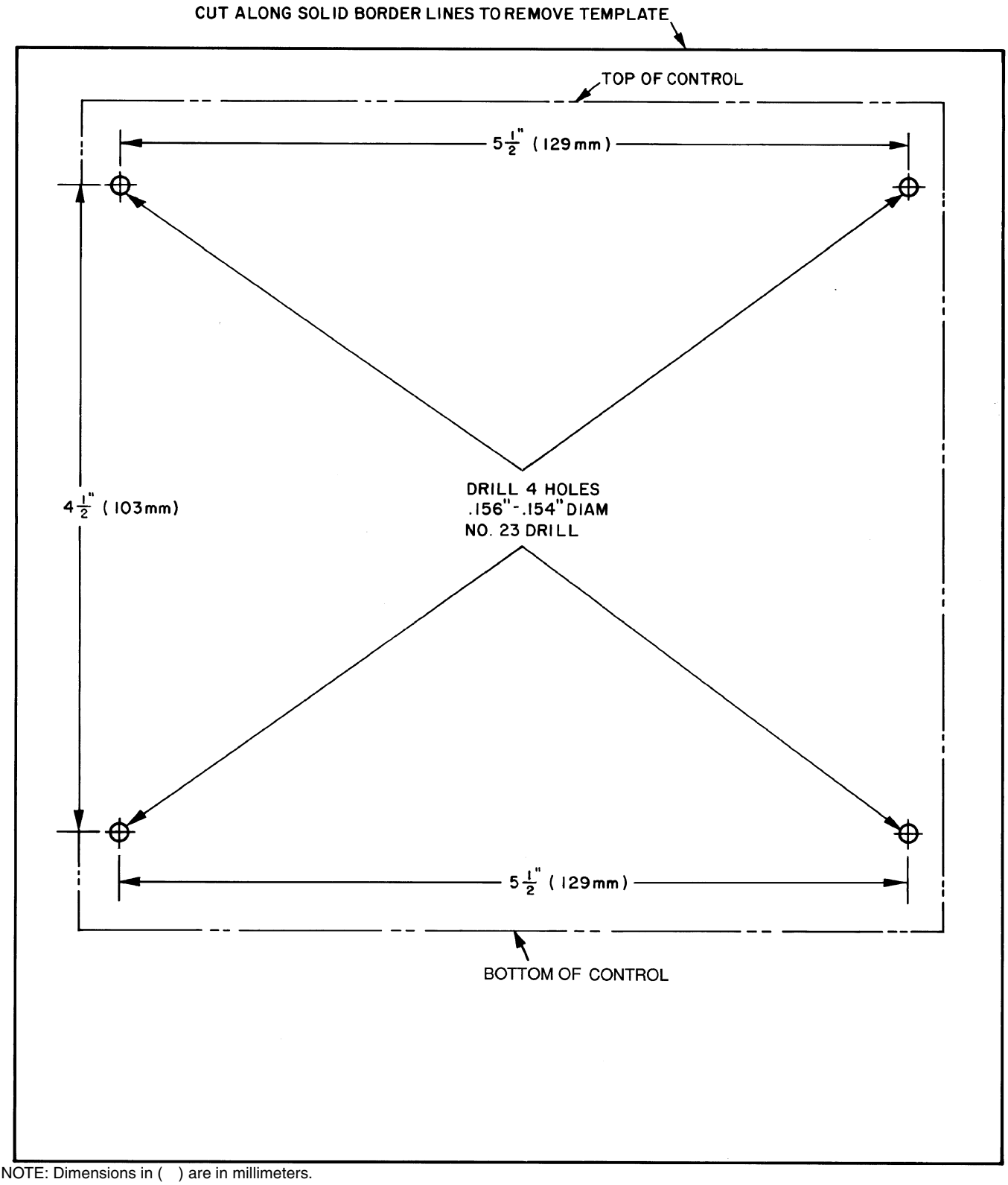


NOTE: Dimensions shown in ( ) are in millimeters.

UNIT SIZE	DIMENSIONS											
	A		B		C		D		E		F	
	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
030,034,035,038	10	254	59	1500	44	1118	45 1/2	1156	47 1/2	1207	2	51
040,044,048,050	10	254	59	1500	59	1500	60 1/2	1537	62 1/2	1588	2	51
054,055,060,064	10	254	31	787	72	1829	73 3/4	1873	75 3/4	1924	1	25
074-104 and 070-105	10	254	31	787	108	2743	109 1/2	2781	111 1/2	2832	1	25

Fig. 17 — Wind Baffle Mounting Details

MOTORMASTER® I CONTROLLER MOUNTING TEMPLATE



CUT ALONG DOTTED LINE

CUT ALONG DOTTED LINE

NOTE: Dimensions in ( ) are in millimeters.