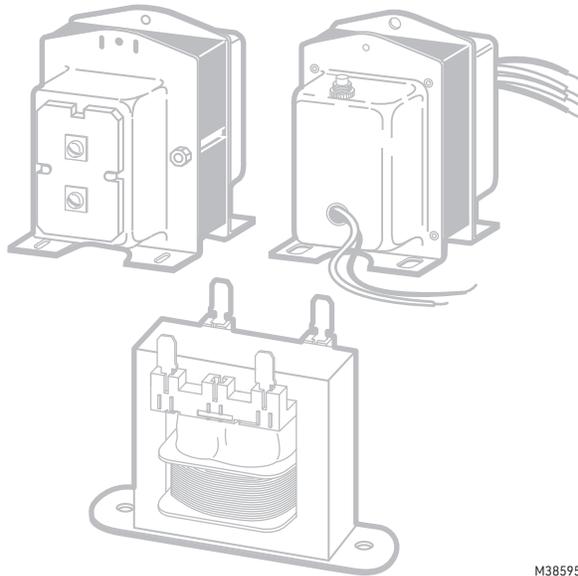




# AT120A-E; AT140A-E; AT150A,B,D-F; AT160B; AT175A-D,F Transformers

## PRODUCT DATA



M38595

## APPLICATION

These general purpose transformers provide power to 24 Vac circuits. They are typically used in heating/cooling control systems, but can be used in any application that doesn't exceed the load ratings.

## FEATURES

- AT120 is rated at 20 VA.
- AT140 is rated at 40 VA.
- AT150 is rated at 50 VA.
- AT160 is rated at 60 VA.
- AT175 is rated at 75 VA.
- All models meet National Electrical Code Class 2 not wet, Class 3 wet transformer requirements.
- All models conform to Underwriters Laboratories Inc. Standard UL 1585.
- Color-coded leadwires for primary connections and screw terminals for secondary connections, fixed 1/4 inch (6 mm) male quick-connects or color-coded leadwires for both primary and secondary, are standard.
- Models available with stripped leadwires, leadwires with variety of terminals, or special terminations as required on both primary and secondary.
- Mounting options include clamp mounting on outlet box knockout, plate mounting, foot mounting, panel mounting, conduit/panel and a combination.
- Models available for 120V, 240V, 277V, 480V, 120/240V, 208/240V, 277/480V, 120/208/240V, 208/240/480V, or 208/277/480V supply at 60 Hz.
- "F" models include a button for manually resetting the circuit breaker.

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# SPECIFICATIONS

**Models:** AT120A-E; AT140A-E; AT150A,B,D-F; AT160B; AT175A-D,F.

**IMPORTANT**

The specifications given in this publication do not include normal manufacturing tolerances. Therefore, a sample unit may not match the listed specifications exactly. Also, this product is built and tested under closely controlled conditions, and some minor differences in performance can be expected if those conditions are changed.

**Electrical Ratings:** See Table 1.

**Table 1. Electrical Ratings.**

Model Number	Output Rating at 100 Percent Power Factor <sup>a</sup>	Primary Input Voltage (60 Hz)	Secondary Output Voltage	
			Open Circuit	At Rated Power Output
AT120	20 VA	120, 240, 277, 480, 120/240, 208/240, 240/277, 277/480, 120/208/240, 208/240/480, or 208/277/480V	27.0	24.0
AT140	40 VA		27.5 <sup>b</sup>	
AT150	50 VA			
AT160	60 VA			
AT175	75 VA			

<sup>a</sup> Refer to regulation curves.

<sup>b</sup> Voltage is 27.0V on AT150F and AT175F models.

**Wiring Connections:**

"A", "C", and "D" models: Primary—9 inch (230 mm) leadwires; Secondary—screw terminals.  
 "B" and "E" models: Primary—9 inch (230 mm) leadwires or fixed 1/4 inch (6 mm) quick-connects. Different length leadwires and leadwires with stripped ends or with terminals attached also available. Specify when ordering.

Secondary—9 inch (230 mm) leadwires or fixed 1/4 inch (6 mm) quick-connects. Different length leadwires, leadwires with stripped ends or with terminals attached, and screw terminals also available. Specify when ordering.  
 "F" models: Primary and Secondary—9 inch (230 mm) leadwires.

**Mounting Means:**

Model Suffix Letter	Mounting Means
A	Includes clamp for outlet box knockout, 4 x 4 inch mounting plate for 2 x 4 inch or 4 x 4 inch outlet box, and mounting feet for surface mount.
B	Foot-mounted.
C	Includes clamp for outlet box knockout.
D	Integral 4 x 4 inch mounting plate fits 2 x 4 inch or 4 x 4 inch outlet box.
E	Panel mounted with two No. 8 screws (not included).
F	Includes 1/2-14 NPSM conduit connector and lock nut for mounting on plate or panel (not included) with 7/8 in. knockout, and mounting feet for surface mount.

**Dimensions:** See Fig. 1 through 5.

**Regulation:**

See transformer regulation curves, Fig. 6 through 10.

**Overcurrent Protection:**

Inherent on AT120, AT140, and AT150. Thermal fusible link on AT160 and AT175. Circuit breaker on AT150F and AT175F models.

**Approvals:**

UNDERWRITERS LABORATORIES INC. LISTED ("A", "C" and "F" models): File No. E14881, Guide No. XOKV.

UNDERWRITERS LABORATORIES INC. COMPONENT RECOGNIZED ("B," "D," "E" models): File No. E14881, Guide No. XOKV2.

All models conform to Underwriters Laboratories Inc. Standard UL 1585.

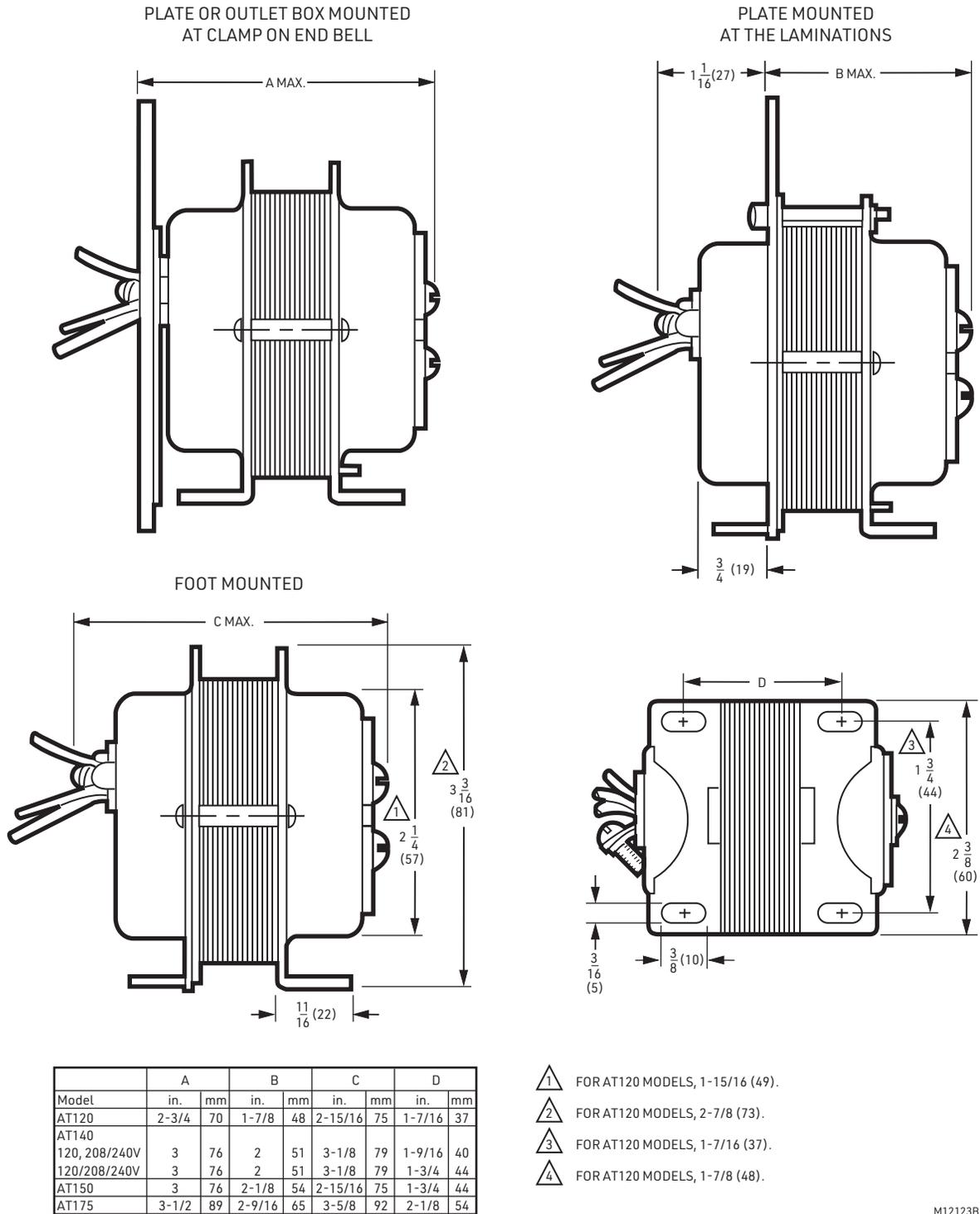
NATIONAL ELECTRICAL CODE: Class 2 not wet, Class 3 wet.

**Optional Specifications:**

End bells or caps on "B" through "E" models.  
 Terminations on "B" through "E" models.  
 Circuit breaker reset button on "F" models.

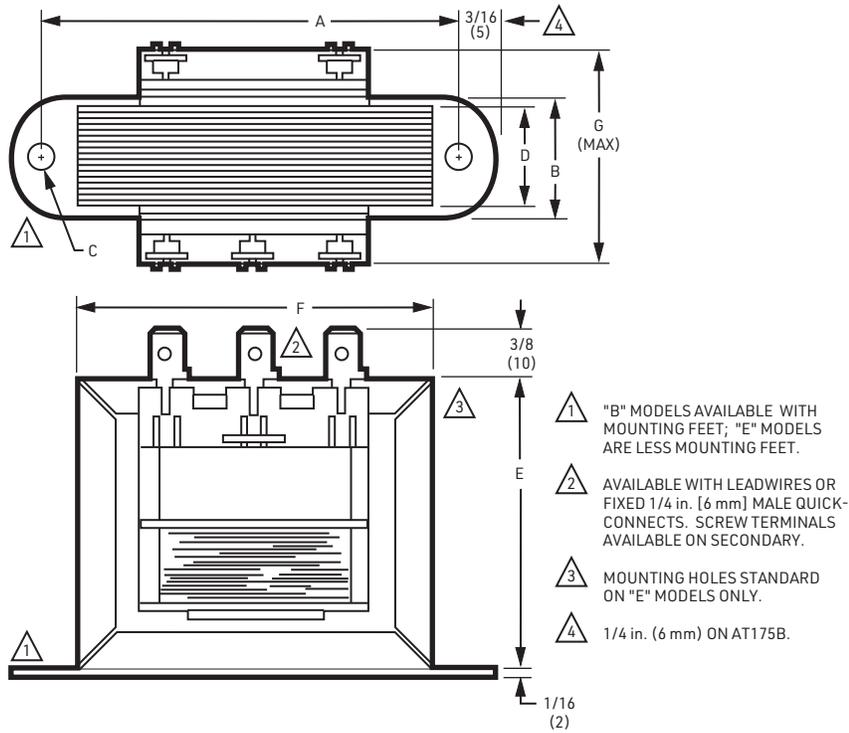
**National Electrical Code:**

Class 2 not wet, Class 3 wet



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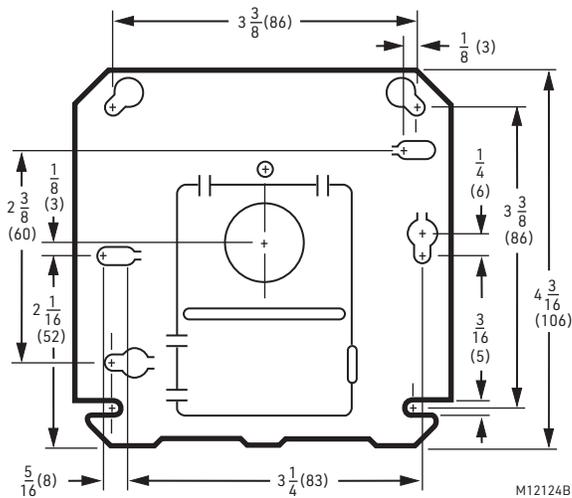
Fig. 1. "A" model transformer dimensions in in. (mm).



Model	A		B		C		D		E		F		G	
	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
AT120	2-13/16	71	1	25	3/16	5	15/16	24	1-5/8	41	1-7/8	48	1-3/4	44
AT140	3-1/8	79	7/8	22	3/16	5	13/16	21	2-1/4	57	2-9/16	65	1-11/16	42
AT150	3-1/8	79	7/8	22	7/32	6	7/8	22	2-1/4	57	2-9/16	65	1-3/4	44
AT160	3-1/8	86	1-3/8	35	7/32	6	1-1/4	32	2-1/4	57	2-9/16	65	2-1/4	57
AT175	3-1/8	86	1-3/8	35	7/32	6	1-7/16	37	2-1/4	57	2-9/16	65	2-1/4	57

M12107A

Fig. 2. "B" and "E" model transformer dimensions in in. (mm).



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Fig. 3. Mounting plate dimensions in in. (mm). Mounting plate is shipped with "A" model transformers and attached on "D" model transformers.

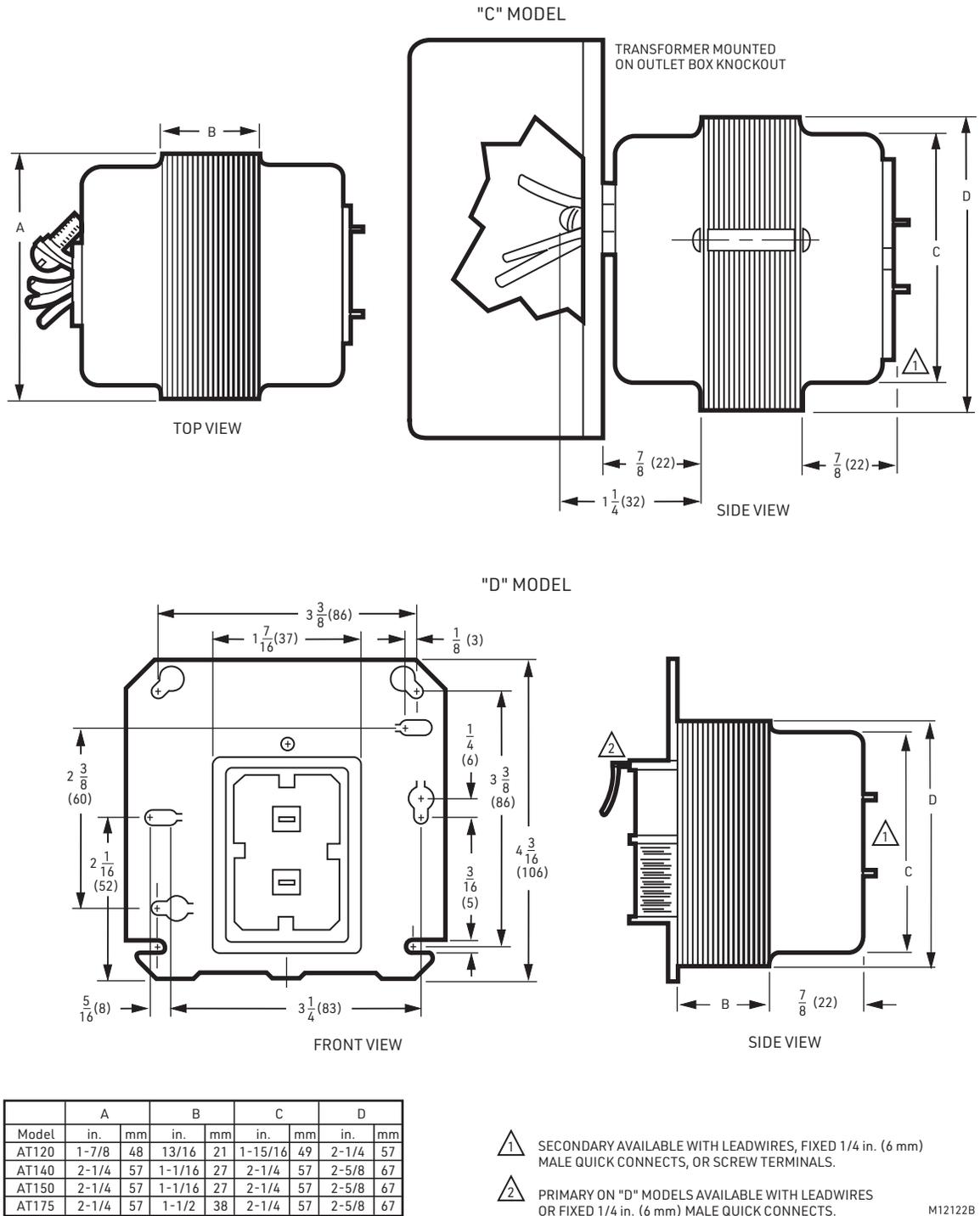


Fig. 4. "C" and "D" model transformer dimensions in in. (mm).

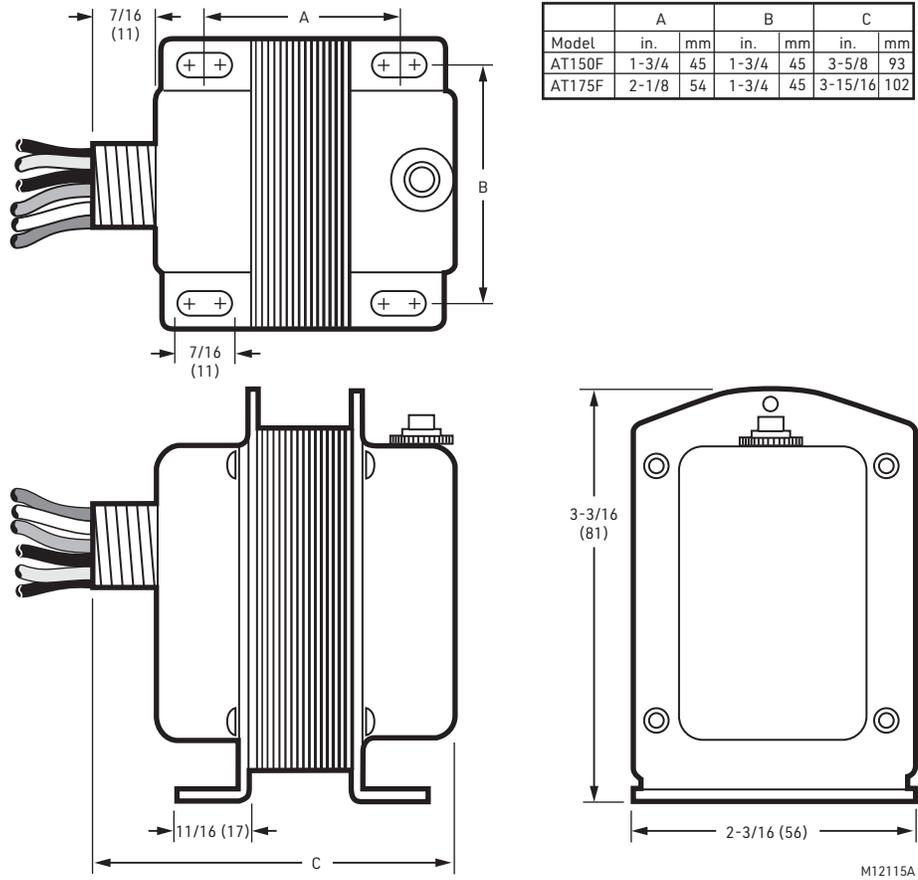


Fig. 5. "F" model transformer dimensions in in. (mm).

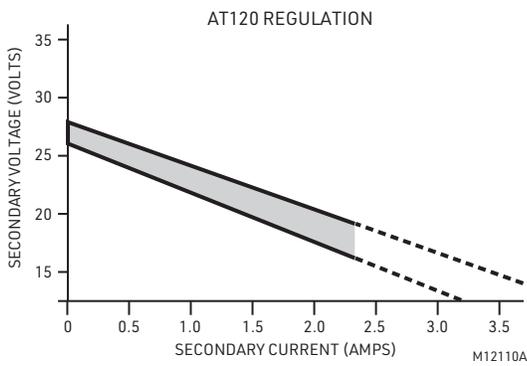


Fig. 6. AT120 regulation curve.

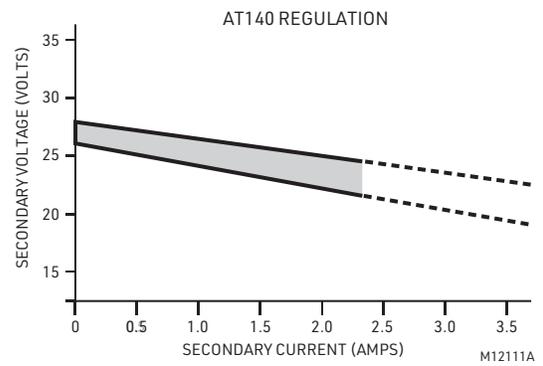


Fig. 7. AT140 regulation curve.

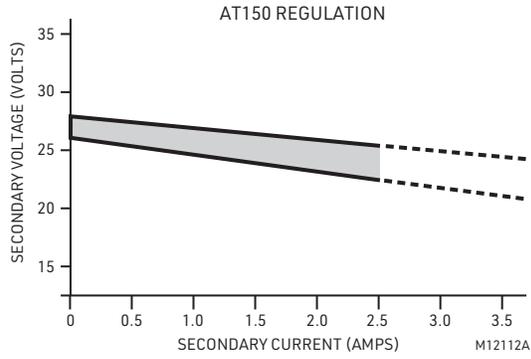


Fig. 8. AT150 regulation curve.

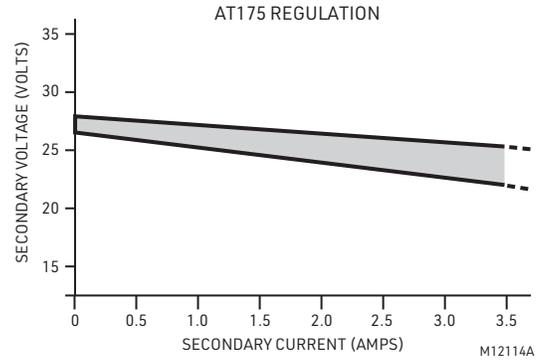


Fig. 10. AT175 regulation curve.

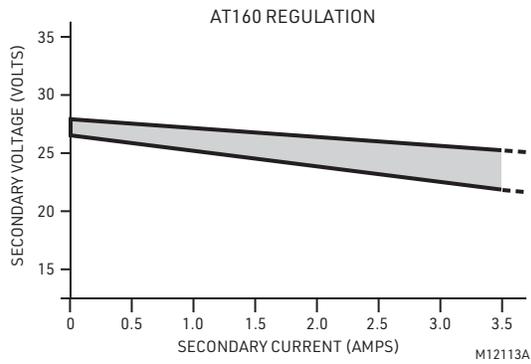


Fig. 9. AT160 regulation curve.

## INSTALLATION

### When Installing this Product...

1. Read these instructions carefully. Failure to follow them could damage the product or cause a hazardous condition.
2. Check the ratings given in the instructions and on the product to make sure the product is suitable for your application.
3. Installer must be a trained, experienced service technician.
4. After installation is complete, check out system operation as suggested in these instructions.

### CAUTION

Disconnect power supply before beginning installation to prevent electrical shock or equipment damage.

### Foot Mounting ("A", "B", and "F" Models Only)

Mount using screws (not supplied) through the two ("B" models) or four ("A", "F" models) holes in the mounting feet. Refer to Fig. 11. Line voltage primary connections must be made within an approved electrical enclosure. Discard the mounting plate ("A" models only).

### Plate Mounting (Refer to Fig. 12) ("A" and "D" models only) Mounting Plate to Transformer ("A" models only)

Mount the plate to the transformer either:

- a. at the clamp on the primary end ball...OR...
- b. at the laminations.

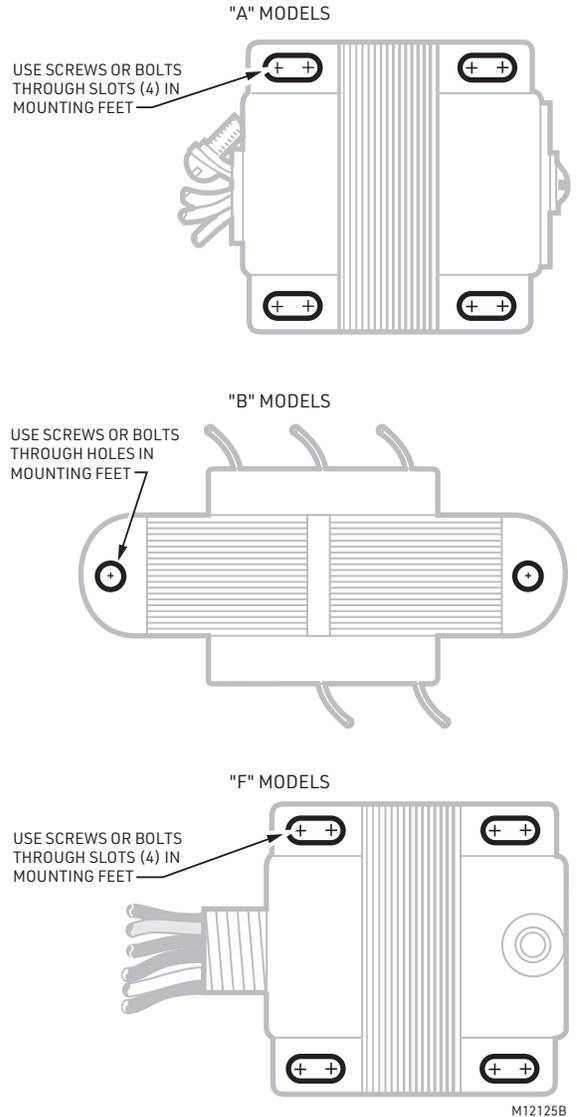


Fig. 11. Foot mounting.

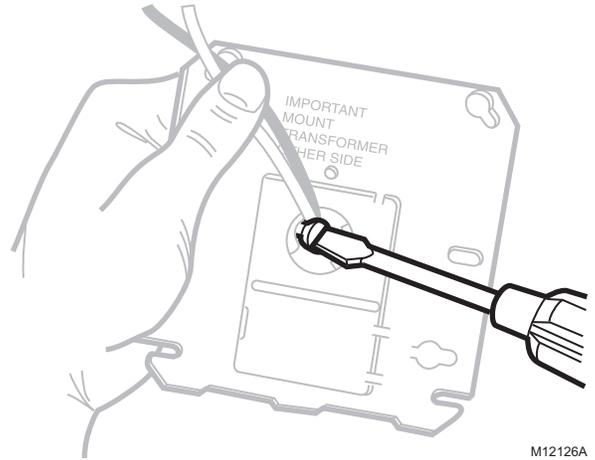
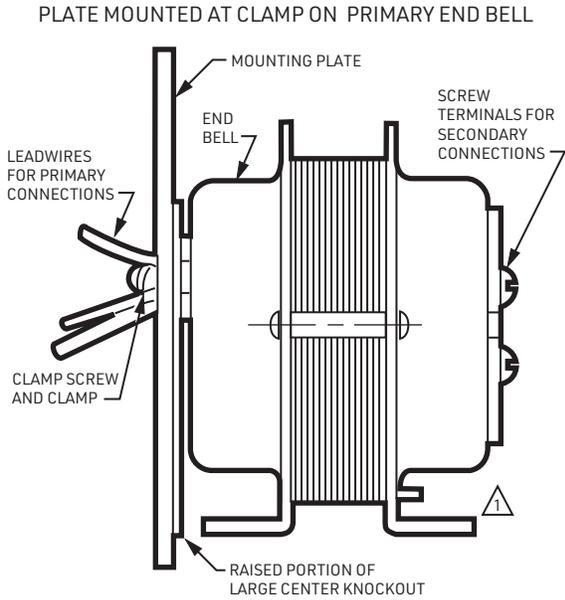


Fig. 13. When screw is tightened, clamp holds plate on transformer.

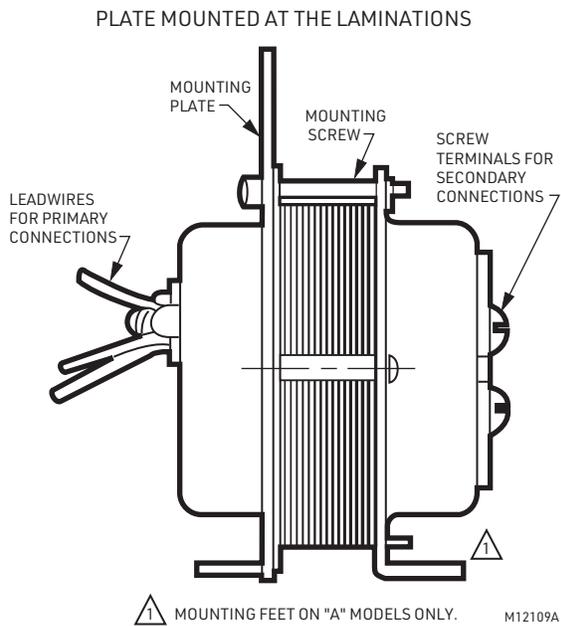


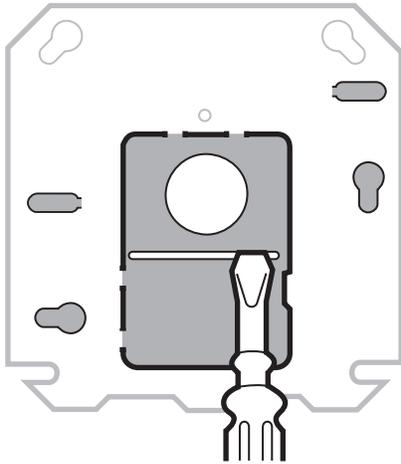
Fig. 12. On "A" models, plate may be mounted to transformer in either of two positions. On "D" models, plate is factory-mounted at laminations.

### To Mount Plate at Primary End Bell:

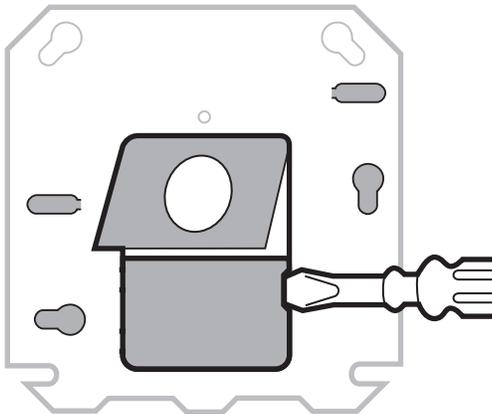
1. Turn the screw on the clamp almost completely out.
2. Hold the mounting plate with the keyhole slots up and the raised portion of the large center knockout away from you.
3. From the back, thread the primary leadwires through the round center hole in the plate.
4. Fit the clamp and screw through the round hole.
5. While holding the plate in place, tighten the setscrew securely against the rim of the hole. Refer to Fig. 13. Avoid damaging the leadwires with the screwdriver.

WITH RAISED PORTION OF KNOCKOUTS FACING YOU:

1. PRY UP TOP SECTION OF LARGE KNOCKOUT BY INSERTING SCREWDRIVER FIRST AT ONE SIDE OF SLOT AND THEN AT THE OTHER SIDE.



2. THEN PRY UP BOTTOM SECTION OF KNOCKOUT.



3. REMOVE BOTH SECTIONS OF KNOCKOUT WITH PLIERS.

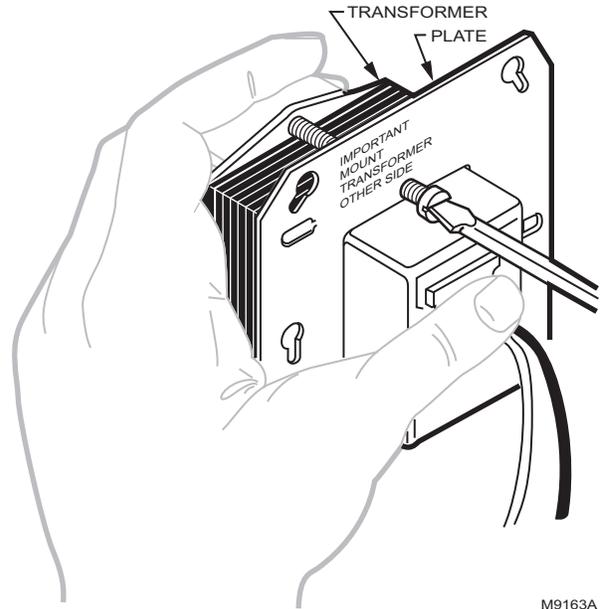
SHADED AREAS REPRESENT KNOCKOUTS AND SCREW SLOTS USED WITH 2 X 4 INCH OR OCTAGONAL OUTLET BOXES.

M9188B

Fig. 14. screwdriver to pry out both sections of knockout.

### To Mount Plate at Laminations:

1. Remove the large rectangular knockout in the mounting plate as shown in Fig. 14.
2. Hold the transformer with the clamp on the end bell facing you.
3. With the keyhole slots up, fit the mounting plate over the primary leadwires and the end bell. Insert the small tab at the bottom of the plate into the slot in the transformer mounting foot.
4. Insert the mounting screw (provided) through the holes as shown in Fig. 15. Secure the plate to the transformer, but do not overtighten the screw.



M9163A

Fig. 15. Secure plate on transformer with mounting screw and tab.

### Mounting Transformer and Plate on Outlet Box

The mounting plate may be mounted on 4 inch square boxes, 2 x 4 inch rectangular boxes, and on 4 inch octagonal boxes.

1. Line up the plate with the box to determine the proper mounting holes. The mounting feet and secondary terminals will be outside the box.
2. Remove the mounting hole knockouts if necessary.
3. Mount the plate on the outlet box using two screws (obtain locally).

### Mounting Through Outlet Box Knockout ("A" and "C" Models Only)

The transformer can be mounted on an outlet box using the clamp on the primary end bell. The mounting plate ("A" models only) is not used. To mount the transformer on an outlet box:

1. Turn the clamp screw almost completely out.
2. From outside box, thread the primary leadwires through suitable 7/8 inch knockout. Fit the clamp and screw through the knockout.
3. Tighten the clamp screw securely against the rim of the knockout. Avoid damaging the leadwires with the screwdriver.

### Panel Mounting ("E" Models Only)

"E" model transformers are designed for mounting inside a panel using No. 8 screws and washers (obtain locally) through at least two of the four holes in the laminations. Refer to Fig. 16.

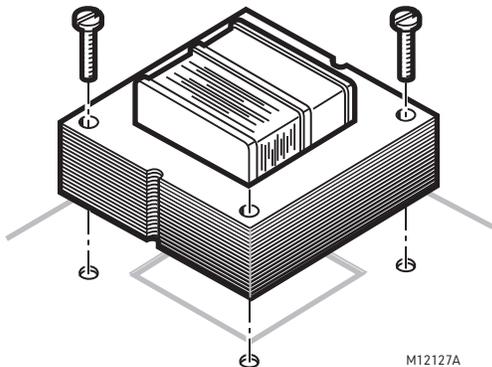


Fig. 16. Mounting "E" model transformer in a panel cutout.

### Conduit/Panel Mounting

Mount the transformer on a plate or panel (not included) with a 7/8 in. knockout. The transformer has a 1/2-14 NPSM conduit connector and lock nut.

NOTE: To meet UL requirements, mount the transformer on a plate or panel with a maximum thickness of 0.15 in. This allows three and one-half threads of the conduit spud to be exposed after the transformer is mounted.

1. With the conduit connector side of the transformer facing the plate, thread the leadwires through the plate knockout.
2. Insert the connector in the knockout.
3. While holding the plate in place, assemble and tighten the lock nut to fasten the transformer securely. See Fig. 17. Avoid damaging the leadwires with the screwdriver.
4. Make line voltage primary connections within an approved enclosure.

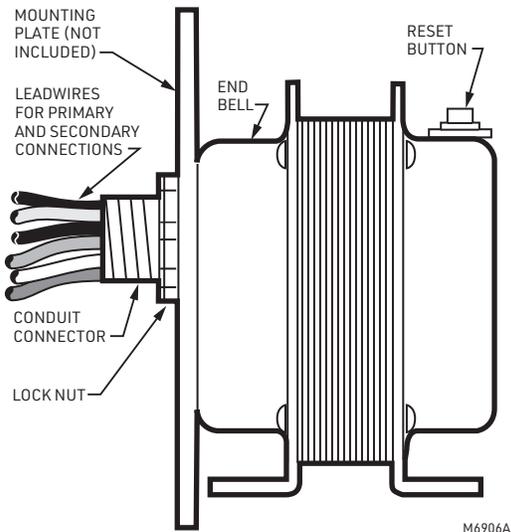
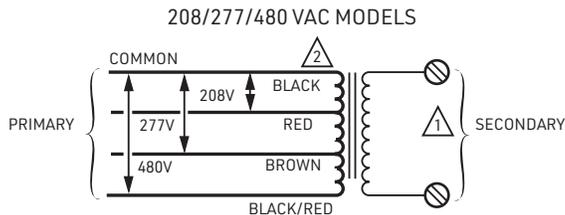
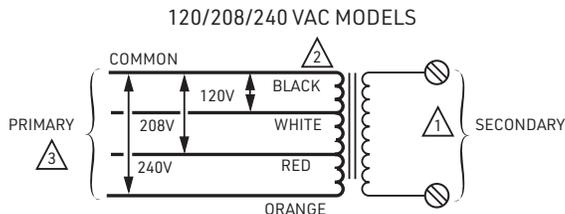
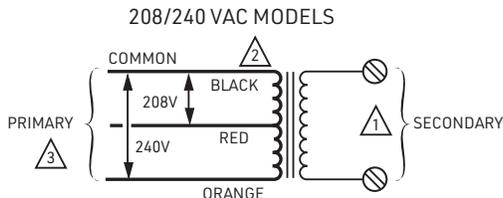
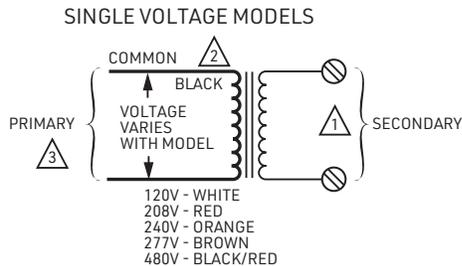


Fig. 17. Conduit/panel mounting (plate not included).



- 1 SECONDARY CONNECTIONS ARE SCREW TERMINALS, 1/4 INCH QUICK-CONNECTS OR BLUE AND YELLOW LEADWIRES.
- 2 BLACK IS COMMON WITH RESPECT TO THE TRANSFORMER WINDING ONLY AND NOT THE EXTERNAL CIRCUIT.
- 3 SOME MODELS AVAILABLE WITH 1/4 INCH QUICK-CONNECTS.

M12108B

Fig. 18. Schematic for single and multitap transformers.

### WIRING

All wiring must comply with local codes and ordinances. Disconnect power before making wiring connections to prevent electrical shock or equipment damage.

1. Make primary connections to the line voltage power supply. On multitap models, make sure to use the correct leads or terminals for the available power supply. Refer to Fig. 18.
2. On multitap models with leadwires, insulate the ends of the unused leads by taping or capping with a solderless connector.
3. Make secondary connections to 24 Vac control circuit.

## CHECKOUT

### CAUTION

Do not short transformer secondary terminals. Overload current protection inherent on AT120, AT140, and AT150. 3.5 Amp fuse available on AT160B and AT175A-D.

## Voltage Check

After installation is complete, turn on power supply and perform a voltage check.

1. Place the controlled equipment in operation and observe through one complete cycle.
2. Using a voltmeter, verify proper primary and secondary voltages.
3. If voltage readings are incorrect, ensure primary voltage connections are made properly (refer to Fig. 18).
4. Measure voltage again.

- a. If proper primary voltage is measured and secondary voltage is significantly less than the voltage shown on the regulation curves, transformer winding is damaged. Replace transformer and repeat checkout procedures.
  - b. If primary voltage is 0V, make sure power supply is connected properly or repair if necessary. Repeat checkout procedures.
5. Do not put the system into operation unless correct primary and secondary voltages are measured.

## Circuit Breaker (AT150F, AT175F Models only)

Overloading the AT150F or AT175F Transformer results in tripping the circuit breaker. If the secondary side of the transformer is short circuited, the circuit breaker trips in less than one minute. Reset the circuit breaker by pressing the reset button on the top of the transformer. It can take up to one hour for the transformer to cool, allowing it to reset. If the circuit breaker continues to trip, thoroughly check the system for short circuits and the current draw.



Resideo Technologies, Inc.  
1985 Douglas Drive North, Golden Valley, MN 55422  
1-800-468-1502

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

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