INSTALLATION AND CONNECTION MANUAL
for

INTELLIMETER®

MODELS A-xxx/B, A5-xxx/B, AB-xxx/B, AB5-xxx/B, AP-xxx/B, AP5-xxx/B, ABP-xxx/B and ABP5-xxx/B

WARNING: Any work on or near energized metering equipment can present a danger of electrical shock. All work on these products should be performed only by qualified industrial electricians and metering specialists in accordance with local utility safety practices and procedures outlined in the **Handbook for Electricity Metering** (available from the Edison Electric Institute, 1111 19th St. NW, Washington, DC 20036). The Information contained within this book is intended to be an aid to qualified metering personnel. It is not intended to replace the extensive training necessary to install or remove meters from service.

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INTRODUCTION

The Intellimeter models A, A5, AB, AB5, R2 and PM2 are components of a system designed to measure electrical energy and communicate the measurements to a Central Station using powerline carrier signals over the power lines. AP, AP5, ABP and ABP5 are similar except they have pulse output only without the powerline carrier. The models A and AB are single- and dual-input watthour meters, respectively. The model R2 is a repeater which retransmits system messages over the powerline. The model PM2 is a dual-channel pulse monitor which accepts pulse input signals from water meters, gas meters, watthour meters or any other metering device with a pulse output. The PM2 receives, counts and transmits the pulse information to the system's Central Station using powerline carrier communication.

Detailed setup and programming instructions are in the Intellimeter Field Programming Instructions (Document 7004-00022-A).

Warning: If the equipment described is modified or used in any manner not specified by these instructions the protection provided by the equipment may be impaired.

0.1A Models	5.0A Models	Repeater, Pulse Monitor	Function	Elect. Rating	Notes
A-120/B	A5-120/B		1-Ch. Wattmeter	120Vac	1
AB-120/B	AB5-120/B		2-Ch. Wattmeter	120Vac	1
AP-120/B	AP5-120/B		1-Ch. Wattmeter, Pulse Output Only	120Vac	1
ABP-120/B	ABP5-120/B		2-Ch. Wattmeter, Pulse Output Only	120Vac	1
		R2-120/B	Repeater	120Vac	1
		PM2-120/B	2-Ch. Pulse Monitor	120Vac	1
A-277/B	A5-277/B		1-Ch. Wattmeter	277Vac	2
AB-277/B	AB5-277/B		2-Ch. Wattmeter	277Vac	2
AP-277/B	AP5-277/B		1-Ch. Wattmeter, Pulse Output Only	277Vac	2
ABP-277/B	ABP5-277/B		2-Ch. Wattmeter, Pulse Output Only	277Vac	2
		R2-277/B	Repeater	277Vac	2
		PM2-277/B	2-Ch. Pulse Monitor	277Vac	2
A-346/B	A5-346/B		1-Ch. Wattmeter	346Vac	3
AB-346/B	AB5-346/B		2-Ch. Wattmeter	346Vac	3
AP-346/B	AP5-346/B		1-Ch. Wattmeter, Pulse Output Only	346Vac	3
ABP-346/B	ABP5-346/B		2-Ch. Wattmeter, Pulse Output Only	346Vac	3
		R2-346/B	Repeater	346Vac	3
		PM2-346/B	2-Ch. Pulse Monitor	346Vac	3

NOTES: 1. 120Vac (Line to Neutral) for use on the following types of electrical service:

120Vac	1Φ2W
120/208Vac	3-Wire Network
120/240Vac	1Φ3W Edison
120/208Vac	3Φ4W

2. 277Vac (Line to Neutral) for use on 277/480Vac 3Φ4W electrical service
3. 346Vac (Line to Neutral) for use on 346/600Vac 3Φ4W electrical service

INSTALLATION AND CONNECTION INSTRUCTIONS

Working clearances should comply with NEC Article 110-16. If not, take corrective action. The Intellimeter is intended for indoor use only. Do not install in damp or wet location. Wire bending space should be in compliance with NEC Article 373-6. Verify that current transformer (CT), potential tap and wiring can be installed without crowding subpanel. Verify that the current transformer can be installed with a minimum 1/2-inch clearance to uninsulated live parts in subpanel, and without bearing against dead metal parts. Verify that power is 120/208, 120/240, 277/480 or 346/600Vac.

1. The Intellimeter PC Board is approved for mounting into a Type 1 enclosure. Mount the Intellimeter PC Board on a panel using the mounting diagram in in Figure 9 as a reference. Adequate clearance (0.75”) must be given around all sides of the board. Make sure that the lower left mounting stud is connected to earth ground, either with a separate wire or metal standoff and screw to the grounded panel.

   NOTE: Equipment grounding must be done in accordance with local and national codes of the authority having jurisdiction. A protective earth terminal is provided for this function.

2. Run CT leads, potential leads and neutral lead from cabinet to Intellimeter enclosure. Use a maximum size of #14 AWG THHN stranded wire and make all three wire harnesses a minimum of 10 inches long, otherwise you will have difficulty plugging in the 4-position and 6-position connectors. (See Figure 8.)

3. Cut leads to size and strip 1/4” insulation off ends. No uninsulated wire should be showing outside the connector. Identify leads with numbered tags at each end of wire within three inches of termination and current transformer. ID is to be visible after installation.

4. Connect voltage leads to the four-position connector PL11 as shown in Figure 1. Label each set of CT leads with the load/tenant ID. Connect single-load meter CTs to PL4 only (PL5 not used). Two-load meters use both PL4 and PL5. See Figure 2 for CT connections and polarity. Use Figures 5, 6, 7 and 8 for load connections.

   VERY IMPORTANT: Record on the Installation Specification Sheet (Document 7004-00083-A) and write on the blank label provided for the enclosure cover, the “load/tenant ID” you are plugging into PL4 (“A DIAL”) and the “load/tenant ID” you are plugging into PL5 (“B DIAL”). For the label, use an indelible black marker.

   NOTE: Intellimeters use terminal 1 for powerline carrier communications. Whenever possible, use Phase A for terminal 1 on all meters and low-voltage service couplers. Low-voltage service couplers are required to establish communication paths around transformers, between separate services, etc.

INSTALLATION AND CONNECTION INSTRUCTIONS, cont'd.

5. Turn off all breakers in cabinet. Check all loads for voltage.

6. Disconnect power to subpanel. Have temporary lighting at hand, if required.

7. Remove feeders from lugs and place feeder cables through current transformers **with current flow arrows pointed toward loads.**

8. Replace feeders in the lugs and tightly secure connections.

9. Using wire ties, secure CTs on feeders at least 1/2 inch away from uninsulated live parts and not in contact with dead metal.

10. Connect potential leads to feeders on line side of current transformers using an approved method for making the tap.

    Alternate: Route potential lead from input connector through the current transformer in the direction of the current flow arrow and connect to voltage on the load side of the current transformer.

    For proper operation observe proper phasing between potential taps and current transformers.

11. Connect neutral lead to neutral bus.

12. Use wire ties to bundle Intellimeter wiring harness and route it away from other conductors in cabinet. Also bundle wiring harness in Intellimeter enclosure with wire ties before the electronic assembly is installed.

13. Secure cover on subpanel.

14. Install the Intellimeter PC board assembly (See Figure 9.); Ensure electronic assembly is a "-120" meter for 120/208 or a "-277" meter for 277/480 or "-346" meter for 346/600 Volt service. Adjust tamper switch if necessary. Plug the three input connectors into the proper headers labeled PL11, PL4 and PL5. Observe the keying of the connectors.

15. If a local display is to be used ("D" option), install display per Figure 9. Connect to PL13 as shown before power is applied.

16. Reconnect power to the subpanel. Turn on the circuit breakers.

PULSE OUTPUT CONNECTIONS

The Intellimeter provides a KYZ output pulse for both the A dial and B dial kiloWatthours. These pulses can be used for load profile or demand side management. Each output is a solid-state, Form C, contact rated at 350V peak and 0.120A maximum.

The A-dial and B-dial pulses are output on PL1 and PL2, respectively. The following chart shows the pulse values for the various models using Intellimeter 0.1A-secondary current transformers.

WITH INTELLIMETER 0.1A-SECONDARY CURRENT TRANSFORMERS			
Model	**Kh for 100A Primary (Wh/Pulse)**	**Kh for 200A Pprimary (Wh/Pulse)**	**Kh for 400A Primary (Wh/Pulse)**
A(5)-120/B	1.2	2.4	4.8
AB(5)-120/B	1.2	2.4	4.8
AP(5)-120/B	10	20	40
ABP(5)-120/B	10	20	40
A(5)-277/B	2.4	4.8	9.6
AB(5)-277/B	2.4	4.8	9.6
AP(5)-277/B	20	40	80
ABP(5)-277/B	20	40	80
A(5)-346/B	3.36	6.72	13.44
AB(5)-346/B	3.36	6.72	13.44
AP(5)-346/B	30	60	90
ABP(5)-346/B	30	60	90

The multiplier for meters using 5A-secondary rated current transformers with 10-turn prewrap on 100:0.1 Intellimeter current transformers can be calculated by dividing the primary rating by 50.

WITH INTELLIMETER 5A-SECONDARY CTS WITH 10-TURN PRE-WRAP ON 0.1A-SECONDARY CTS						
Primary Rating	600	800	1000	1200	1600	2000
Multiplier	12	16	20	24	32	40

The new pulse value is the Kh for the meter used times the multiplier for the 5A-secondary current transformer used.

Full-load pulse rate output is calculated as follows:

$$\text{Pulse Rate Max} = \frac{V_N \times I_N \times 3}{Kh \times MULT}$$

V_N = nominal voltage, I_N = nominal current
MULT = multiplier as shown in chart above

$$= \frac{277 \times 600 \times 3}{2.4 \times 12}$$

For 277/480 Volt service using 600:5 CTs

= 17,312.5 Pulses/Hr @ Full Scale of 498,600 Watts

The addition of a potential transformer will require division by a second multplier equal to the value of the PT ratio (primary/secondary).

INPUT AND OUTPUT CONNECTORS (Connector Pin-outs)

VOLTAGE INPUT

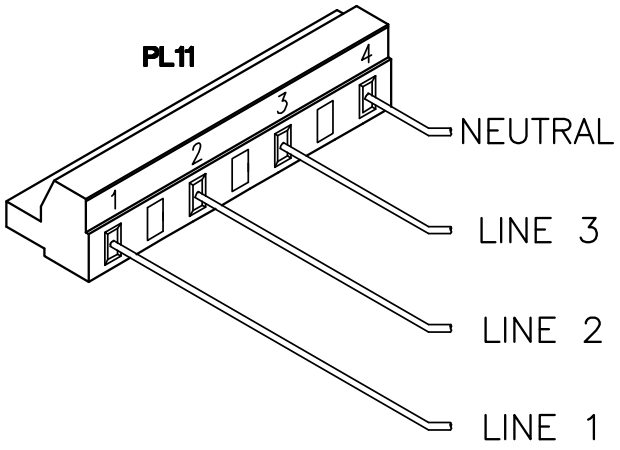
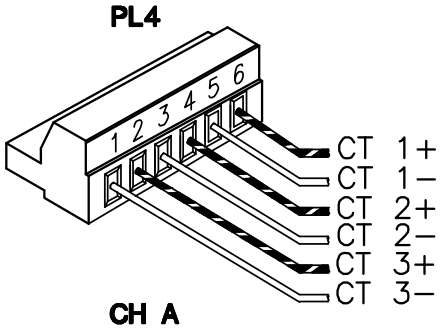
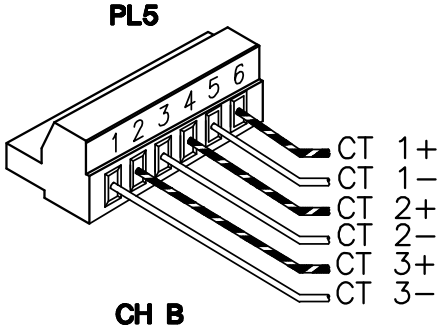


FIGURE 1

CURRENT TRANSFORMER (CT) INPUT





OBSERVE CT POLARITY

CT PRIMARY POLARITY IS MARKED BY:
AN ARROW (⟶) LINE TO LOAD
OR DOT (⊙) ON LINE SIDE (H1)

CT SECONDARY POLARITY
(+) (X1) BLACK/YEL OR BLACK
(-) YELLOW

FIGURE 2

PULSE INPUT

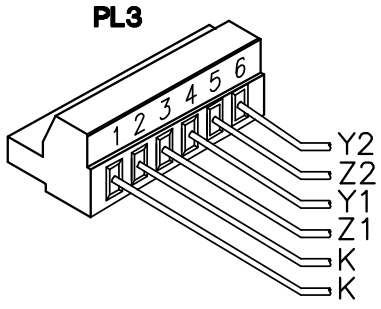
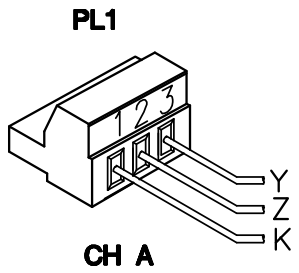


FIGURE 3

PULSE OUTPUT



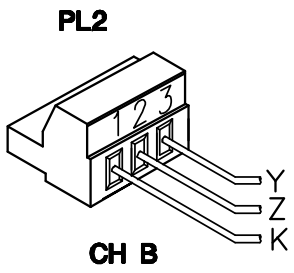


FIGURE 4

Dwg# 0902-00690-B Rev B

SINGLE-LOAD METERING
(A-/B, A5-/B, AP-/B, AP5-/B)
4-WIRE 3-PHASE WYE CONNECTIONS
120/277/346V SERVICE

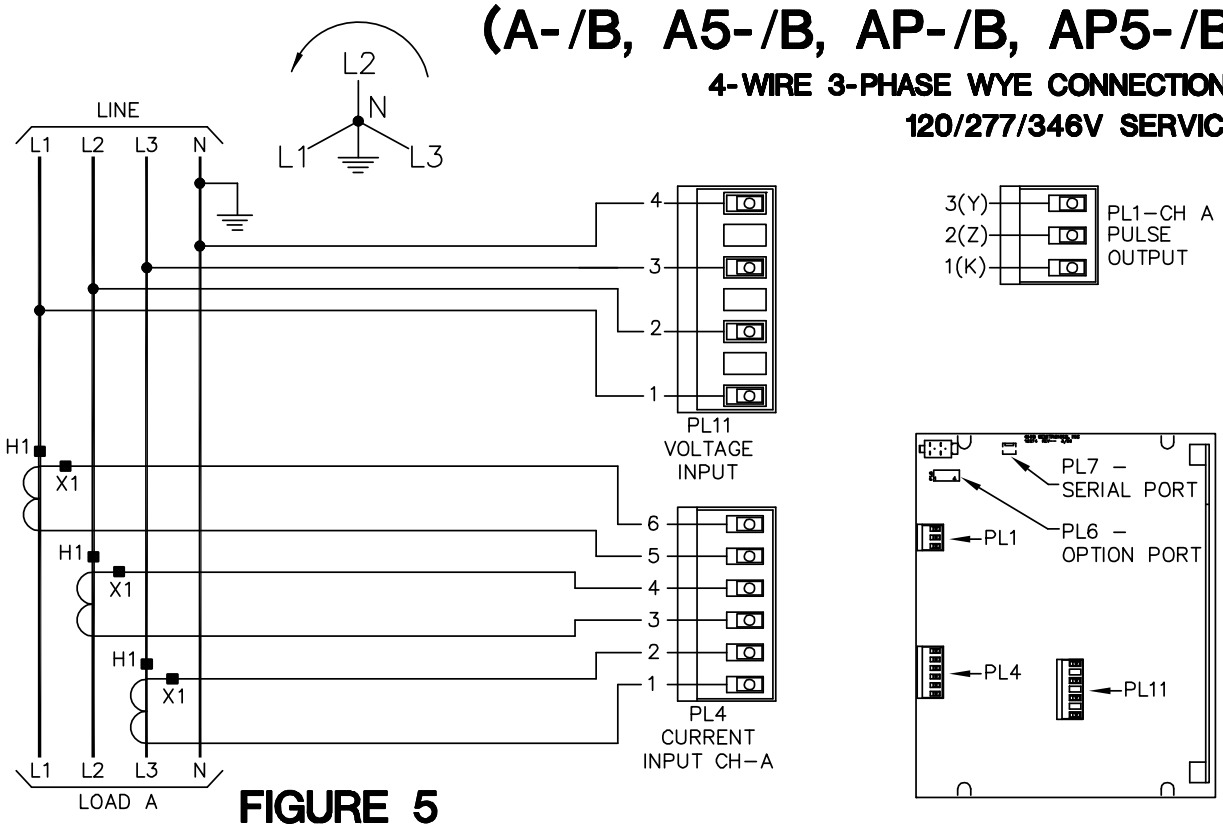


FIGURE 5

SINGLE-LOAD METERING
(A-/B, A5-/B, AP-/B, AP5-/B)
3-WIRE SINGLE-PHASE &
3-PHASE NETWORK
120/277/346V SERVICE

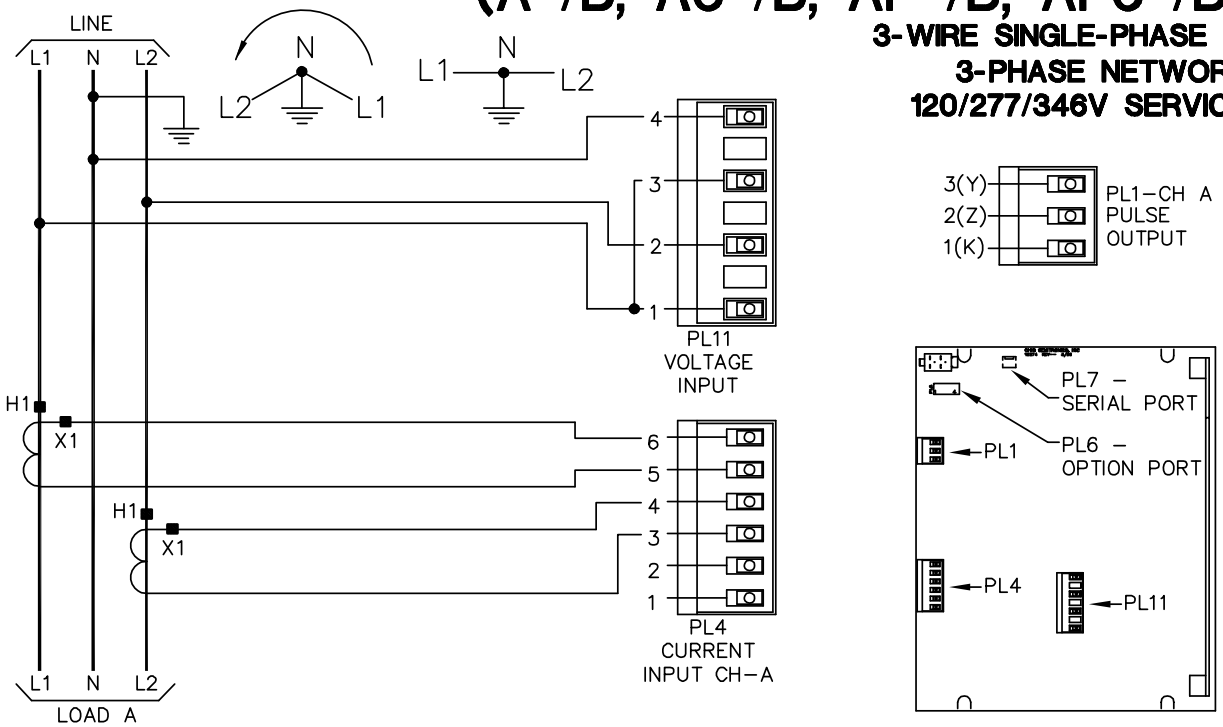


FIGURE 6

Dwg# 0902-00690-B Rev B

LOAD CONNECTIONS (Two-Load Meters)

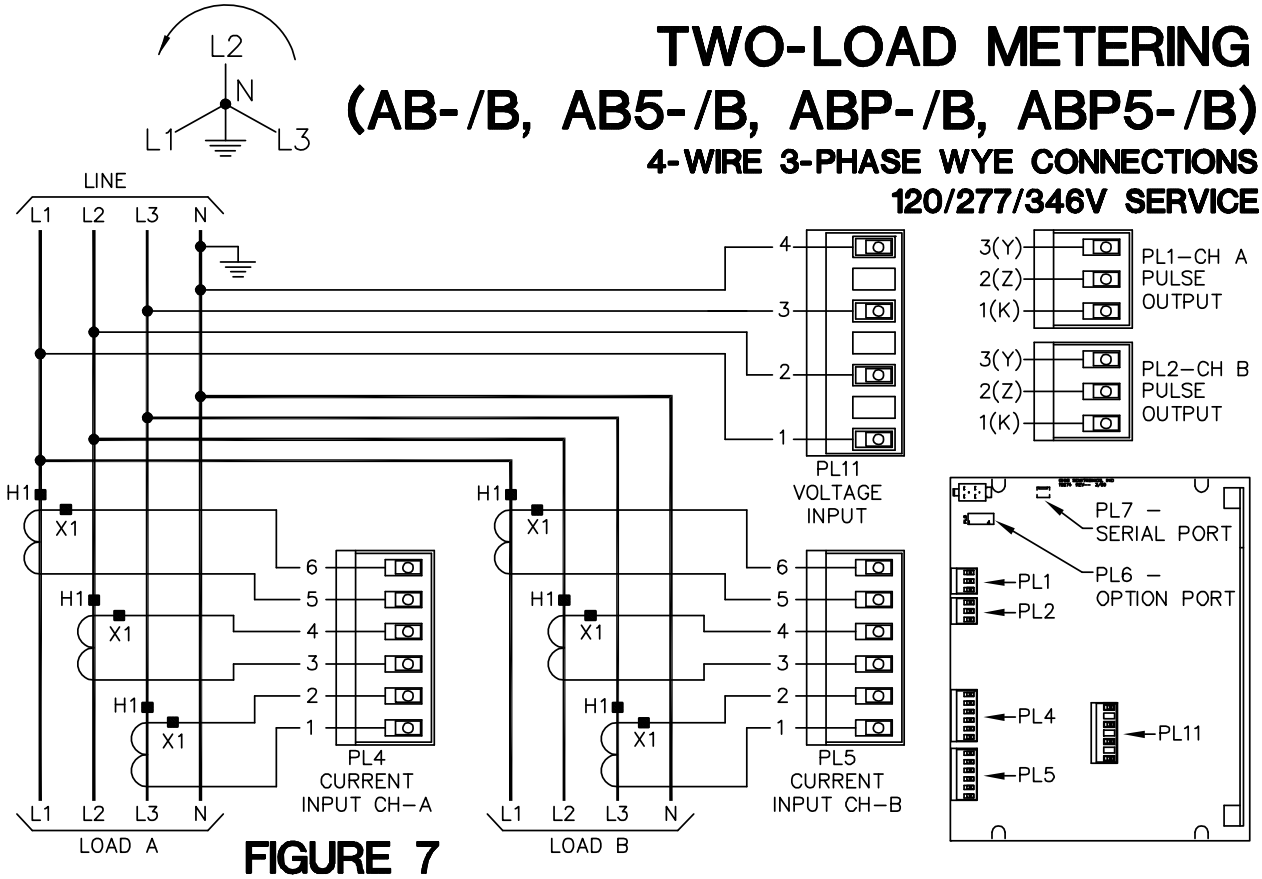


FIGURE 7

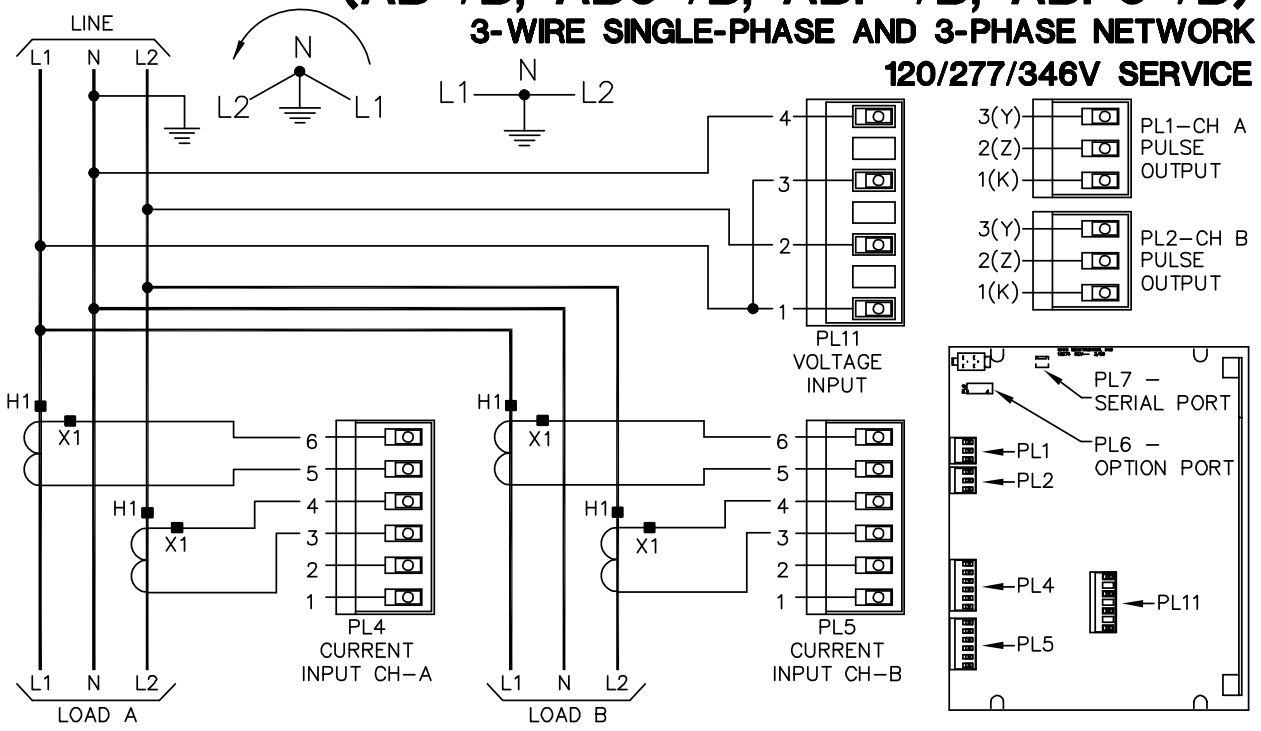
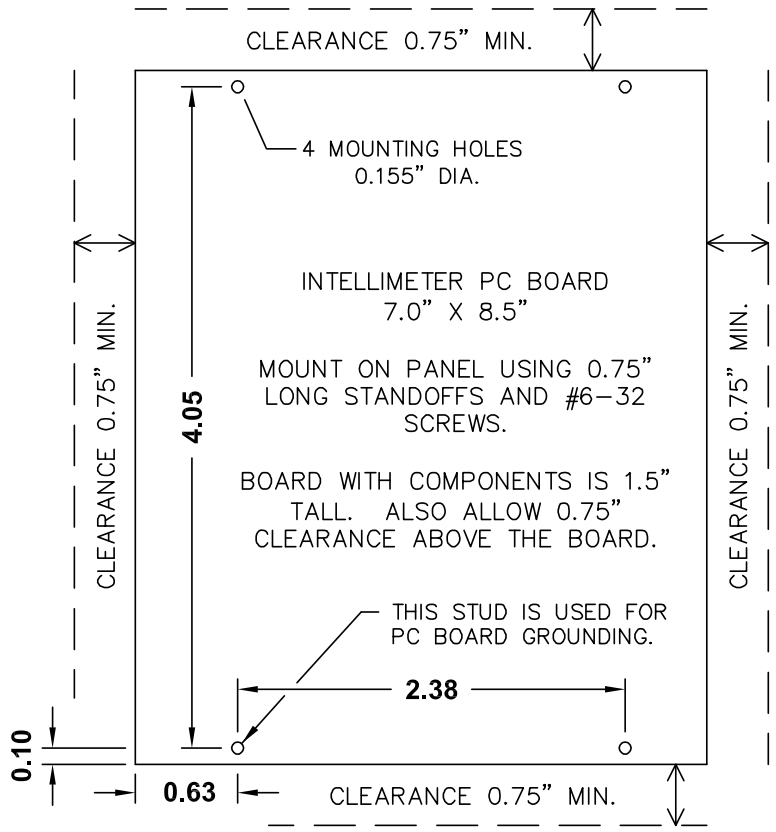
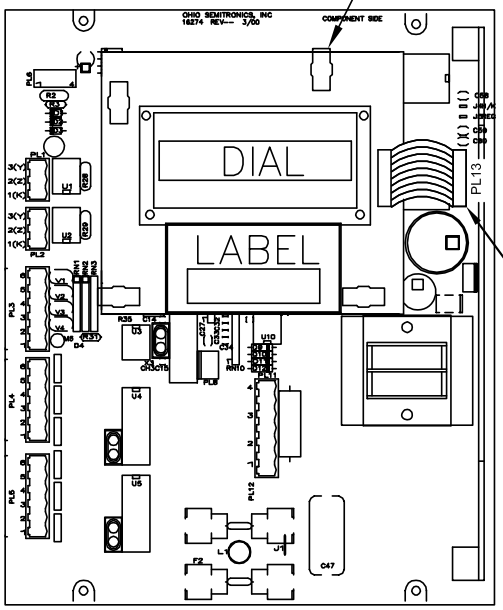


FIGURE 8

Dwg# 0902-00690-B Rev B

PC BOARD ASSEMBLY





INTELLIMETER MAIN BOARD WITH OPTIONAL DISPLAY BOARD INSTALLED. TO INSTALL THE DISPLAY, LOCK PCB STANDOFFS SUPPLIED WITH THE OPTIONAL BOARD ONTO THE MAIN BOARD IN THE POSITIONS SHOWN. FOOTPRINT OF STANDOFFS ARE SHOWN ON THE BOARD SCREEN. LOCK BOARD ONTO STANDOFFS.

PLUG CONNECTOR INTO PL13 (LOCATED ON THE RIGHT SIDE OF THE BOARD).

FIGURE 9

Dwg# 0902-00690-B Rev B

MAINTENANCE

Routine Maintenance

There are no required maintenance operations for the Intellimeters. However, qualified personnel may wish to perform an annual inspection of wiring connections.

Cleaning

The meters are not suitable for hose-down cleaning. Use only a damp cloth to remove dust or dirt from the outside of the enclosure.

REPAIRS

It is not recommended that field personnel replace any of the internal components, including fuses. If it is necessary to replace an Intellimeter, qualified personnel should follow the procedure below:

1. Have replacement board available before starting procedure.
2. Disconnect power from the metered load and the meter.
3. Remove the cover from the Intellimeter enclosure.
4. Unplug the connectors. (Intellimeter current transformers have internal electronic shorting switches and will not be damaged by being left in an open-circuit condition.)
5. Replace the electronic assembly (Refer to installation instructions on page 4).
6. Return the electronics assembly to the dealer or distributor from whom it was purchased for replacement.

REFERENCES

The following documents may be useful when installing an Intellimeter unit:

1. Intellimeter Field Programming Instructions (Document 7004-00022-A)
2. Intellimeter A and AB Specification Sheet (7004-00046-A)
3. Intellimeter ABP Specification Sheet (7004-00053-A)
4. Intellimeter Installation Data Sheet (Document 7004-00083-A)