

SECTION V INSTALLATION

SPECIFICATIONS

Power Requirements: 115 Vac \pm 15%, 50/60 Hz, 300 Volt
amps (Max)

Environment Requirements
Ambient temperature 0°C to 60°C
Humidity 0% to 95%
(non-condensing)

Dimensions:
184 Processor 22 in. x 12 in. x 13 in.
384 Processor 22 in. x 15-1/2 in. x 13 in.
Power Supply (115V) 7-5/8 in. x 25 in. x 13 in.
Power Supply (230V) 7 in. x 29-1/2 in. x 13 in.
Single I/O Housing 5 in. x 41 in. x 13-1/2 in.
Four Housings
(One Channel) 20 in. x 41 in. x 13-1/2 in.

Weight:
Processor 40 lb. (184); 45 lb. (384)
Power Supply 40 lb. (115); 45 lb. (230v)
I/O Module 5 lb.
Single I/O Housing 13 lb.
Four Housings
(One Channel) 52 lb.

INSTALLATION PROCEDURE

The various parts of the MODICON 184/384 Controller system are packaged in separate containers.

Container	Contents
C184/384	Processor unit with W600 cable for I/O channel No. 1 (up to four housings)
P420	Main Power Supply
B240	Input/Output housings (up to three housings per box)
P421	Auxiliary Power Supply (with I430 as option)
Bxxx	Input/Output Modules (up to six per box)
I425	Driver Assembly

The MODICON system is easily installed on any vertical surface capable of sustaining the specified weights. Each unit is provided with holes for mounting. Figure 126 shows a typical mounting plan for marking the wall for bolt-hole drilling.

NOTE

Be sure to check cable lengths provided before marking mounting surface.

MODICON provides a standard template. Dwg. No. SK-C184-200, full-size, which is available upon request.

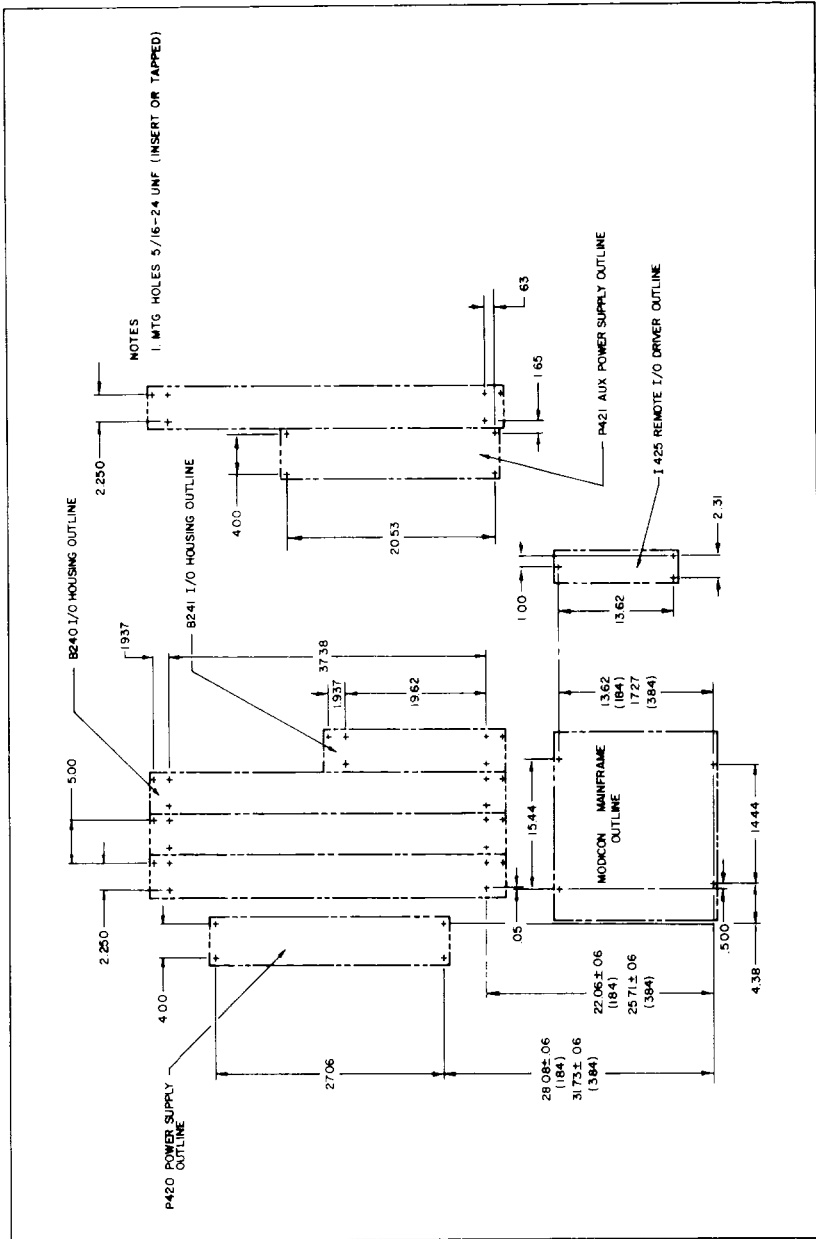


Figure 126. Typical Mounting Plan

Mounting and Check-Out Procedures

It is recommended that the Controller configuration be initially checked out (powered-up) before actual mounting. In any event, cabling procedures are the same. The following preliminary steps should be taken.

1. *Checking Serial Numbers.* The processor serial number is located on a tag positioned on the upper right-hand corner of the unit. The main Power Supply serial number is located on the underside of the supply.

NOTE

When corresponding with MODICON, concerning these units, please specify the unit type and serial number.

The capabilities of the MODICON 184 Controller's processor are expressed in terms of its memory capacity. This ranges over four options, indicated on the top of the Processor unit, which has a blue label specifying the memory size.

184-1	1K Memory Size
184-2	2K Memory Size
184-3	3K Memory Size
184-4	4K Memory Size

The MODICON 384 Controller is always supplied with 4K Memory Size.

2. Check all connectors for mechanical flaws or damage.
3. Remove protective tapes from I/O housings (both right and left sides). Leave tape intact on right side of the last housing.

First Power-Up

The following is a recommended step-by-step procedure for correctly cabling and checking out the system's power connection prior to mounting.

1. Position Processor, the Main Power Supply and a B240 Housing on a table or floor in the same relative position they will have when mounted.
2. Connect a three-wire ac cord to terminals 1, 2, and 3 of the main Power Supply. (see Figure I27.)
3. Connect jumpers from terminal 1 to terminal 5, 2 to 6, and 3 to 7 of the Main Power Supply. This connects both the Main Power input (terminals 1 - 3) and the remote 'power control' signal (terminals 5 - 7).
4. Plug in cord to a 115 Vac 60 Hz (50 Hz or 230V 50 Hz if supply is so designated). The Main Power and the Control neon lights should be illuminated.
5. Disconnect the AC source from the supply.
6. Connect the Power Supply cable to the Processor, (Figure I28).
7. Reconnect the Power Supply to the AC power source.
8. Close the Port on the left of the Processor and turn the black controller interlock knob to the "ON" position. At this time both neon lights at the top of Power Supply and both indicators at the bottom should be illuminated. The lower indicators indicate a satisfactory output of the Supply, (see Figure I29).

CAUTION

Care must be taken whenever connecting cables from the processor to the I/O housings.

9. Turn controller power off and on, using the black interlock knob, and observe indicator lights for proper function.
10. Disconnect the AC source.
11. Slide I/O channel cable/W600 connector onto I/O channel B240 housing/receptacle (Figure I30.) so that it does not quite touch the metal stop above the housing receptor pins.

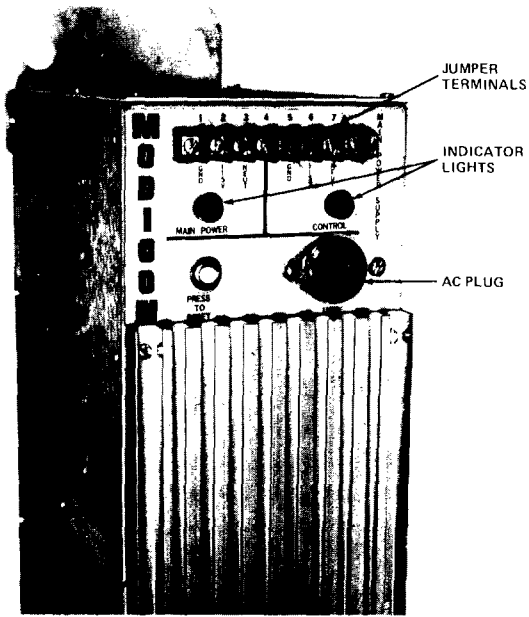


Figure 127. Main Power Supply AC Connections

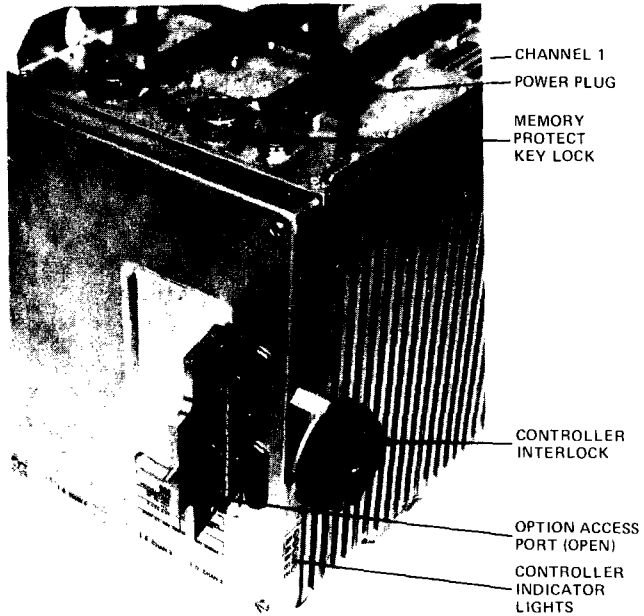


Figure 128. Cable Connection, Power Supply to Processor

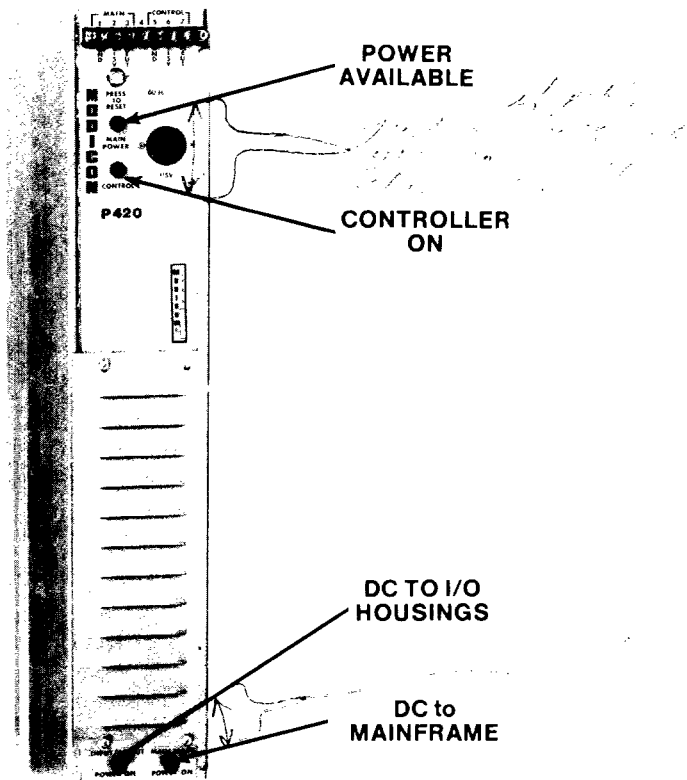


Figure 129. Power Supply Indicators

12. When properly inserted, the connector should be able to be locked into place by the locking cam provided (Figure 131.) without excessive force. If receptor pins do not easily mate with receptacle in W600 cable, realign W600 connector slightly.
13. Connect AC power and turn unit on. Repeat step 9.
14. Disconnect AC power line.

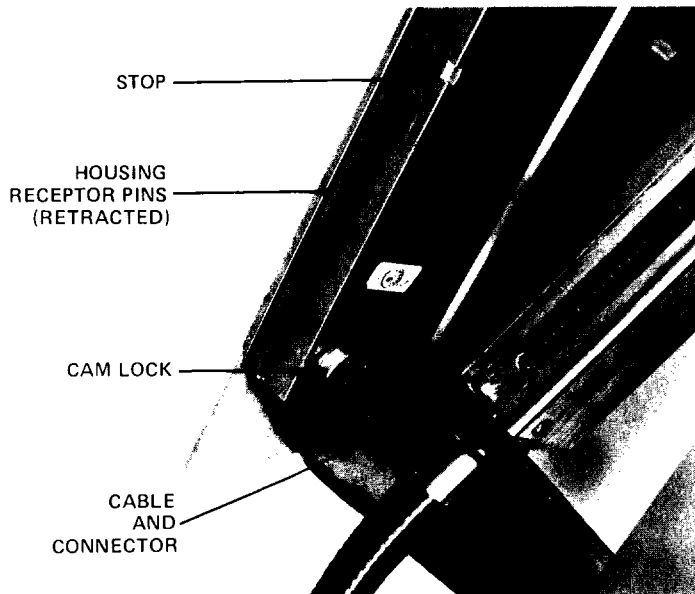


Figure 130. Typical I/O Channel Cable Connector and Housing Receptacle

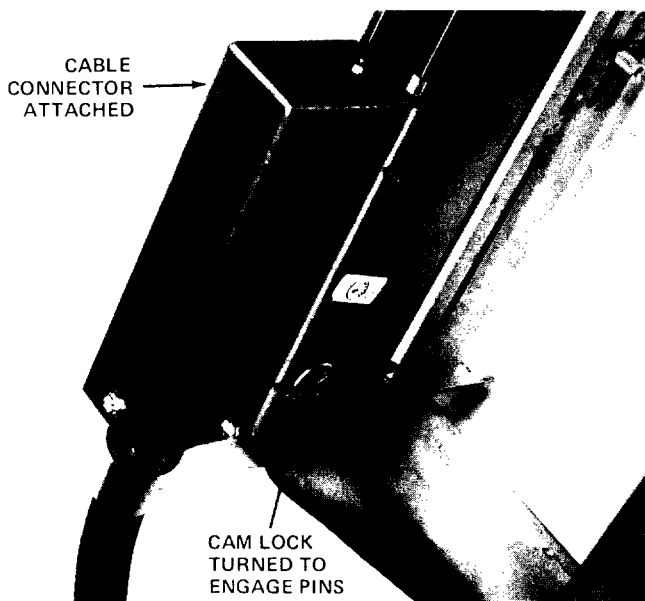


Figure 131. Cable Connector, Showing Locking Cam

Mounting Procedure

Figure 132 shows a typical system mounted, with one full channel (4 housings, each with up to four I/O modules); expansion to four such channels (total 16 housings or 64 I/O modules) is possible without modifications to the processor.

Step Procedure

1. Select one B240 Housing and remove the protective tape from the lower left side of the Housing. (Figure 133.)

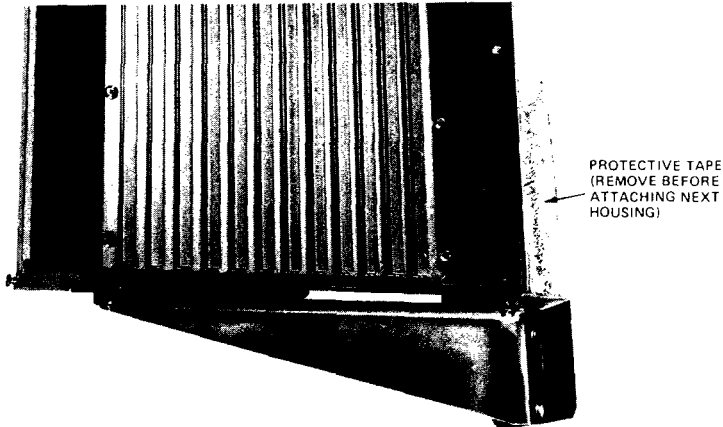


Figure 133. Mounted Housing, Showing Protective Tape

2. Loosely bolt this Housing into place for the right-most location for channel I.
3. Select the next B240 Housing and remove the protective tape from both the left and right side of the Housing.
4. Place to the left of the previously installed Housing and loosely bolt into place.
5. Rotate the connector cam located at the lower left-hand side of the previously installed Housing 180° clockwise to engage mating connectors. Use extreme caution when rotating cam so as not to damage mating connectors.
6. Repeat steps 3, 4, and 5 until the required number of I/O Housings are in place.
7. Securely tighten all mounting bolts in place.
8. If more than one channel of B240 Housings are required, assemble per steps 1 through 7 above.

Proceed next with the Processor unit mounting as follows:

9. Make sure that brackets are mounted properly (upper bracket is marked with a silver label). Securely mount the two Processor brackets to the panel.
 10. Install the Processor in place and tighten.
- Next mount the Main Power Supply in place as follows:
11. Start the top two bolts in place.
 12. Hang the Power Supply in place by the top two bolts.
 13. Insert bottom bolts in place and tighten.

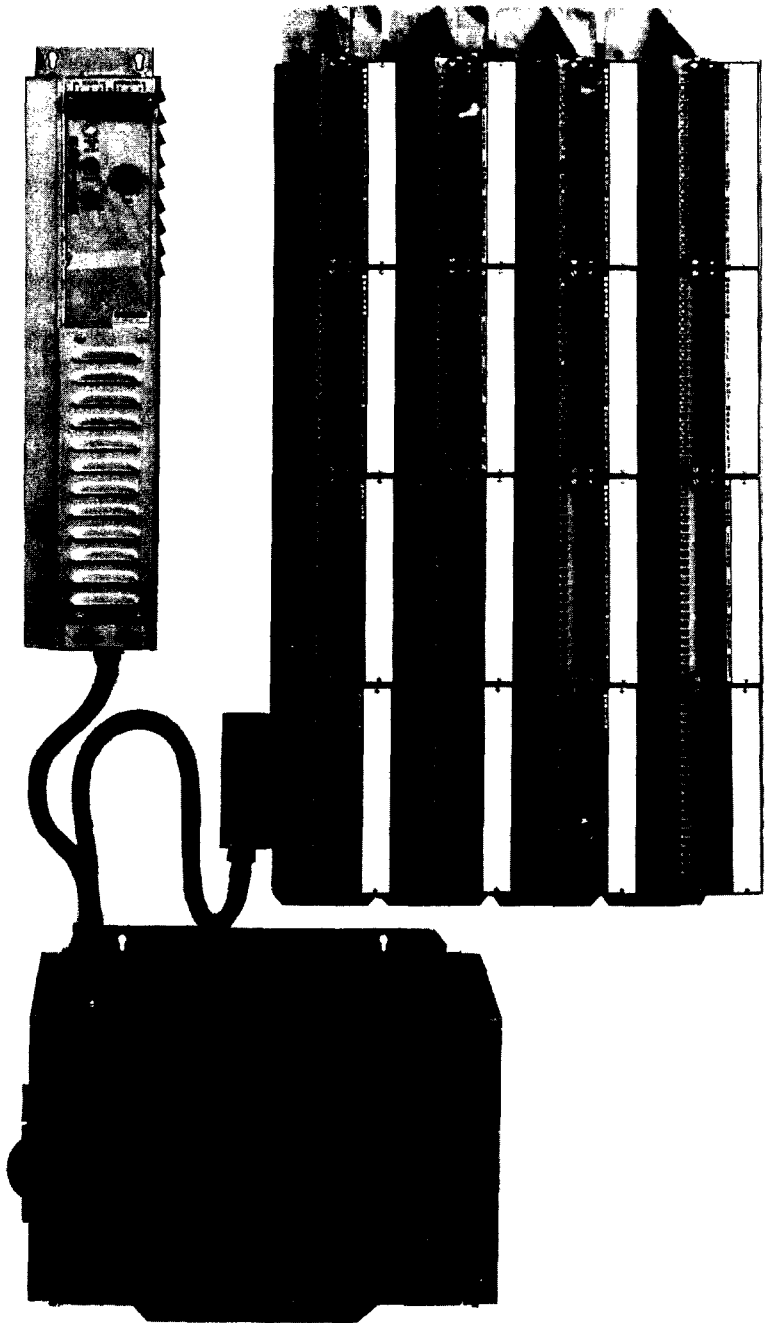


Figure 132. Typical Mounted Basic System

If more than one channel is to be used, next mount the Auxiliary Power Supply in place as follows:

14. Install the top two bolts loosely in place.
15. Hang the Power Supply in place.
16. Install lower bolts in place. Do not tighten. Rotate the connector cam for the adjacent B240 Housing 180° clockwise to engage connectors, being careful not to damage mating connectors by forcing cam.
17. Tighten mounting bolts.

Assemble connecting cables as follows:

1. Connect the W600 cable to the left-most I/O Housing for channel I by sliding it up the fitted extrusion carefully until the connectors can be engaged by turning the connector cam 180° clockwise.
2. Tighten the hex head lock screws to secure cable in place.
3. Connect the other end of the W600 cable to the smaller connector on the top rear of the Processor.
4. Connect the P420 Main Power Supply cable to the larger connector on the top front of the Processor.
5. Connect Auxiliary Power Supply cable(s) to its respective connector on the Processor. The Processor connectors are located on the bottom left side of the unit. From front to rear they are for channels II, III, and IV, respectively.

If a remote I/O I425 is to be installed, proceed as follows:

1. Bolt I425 in place.
2. Connect 6 ft. cable to the desired Processor Channel to be remotod (see Figure A-13). Attach interconnecting cable (2 required) from the I/O driver to the Auxiliary Power Supply I/O Interface. Match the 'S' location on the I425 with the 'S' location of the Auxiliary Supply*. Also match the 'C' location on the I425 with the 'C' location on the Auxiliary Supply*. Ground the outer cable shields to the posts provided to insure adequate unit grounding.

NOTE

The cable required is not provided by MODICON. Use Beldon cable part no. 8227-500, 20 AWG, 100 Ω, shielded, plastic jacketed twisted pair transmission line or equivalent.

INPUT/OUTPUT CONNECTIONS

Channel Cabling

If the user's system contains more than four I/O module housings, it is important to understand the channel concept. Standard MODICON cables connecting the housings to the Processor's unit normally handle up to four housings with their input-output signals. For this reason, the cable connecting the first four housings to the Processor is designated channel I. The internal circuitry of the Processor is designed to recognize this channel as such. Up to three additional channels (four housings each) may be used in a MODICON 184/384 Controller configuration (with Auxiliary Power Supply option). (See Figure 134.)

Specific receptacles are provided for channel cabling. The first channel in any system (channel I) is always connected to the cable receptacle at the top of the processor (Figure 135). Additional channel cabling is discussed later.

*Where 'S' is silver-clad wire and 'C' is copper-clad wire.

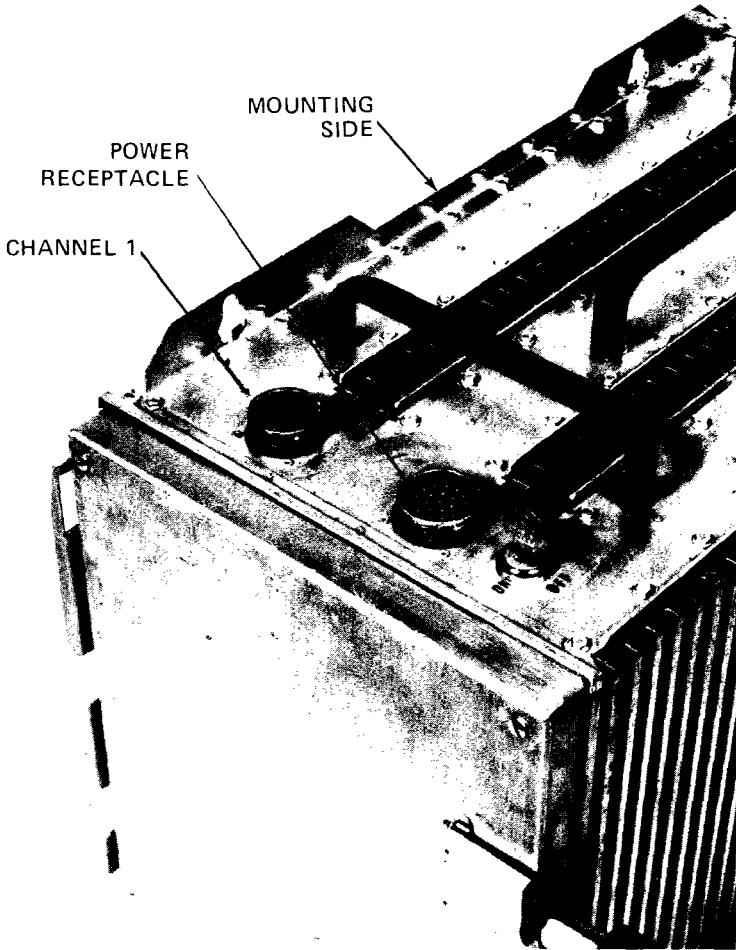


Figure 135. Processor, Top View

Module Addressing

Four housings may contain up to sixteen plug-in modules, either input circuitry or output. However, only eight of each type may be contained on one channel (with 128 points each).

Because of the Processor's internal organization, it is necessary to make a mechanical adjustment identifying (addressing) each module on a particular channel.

For this purpose, easily-adjustable address selectors are provided in slots in the housing, adjacent to the appropriate module (see Figure 136).

Care should be taken to make certain that each individual input module is separately addressed (up to eight), and likewise for the output modules. The system automatically recognizes whether the module is an input or output. Addressing should be accomplished prior to the installation of the I/O module.

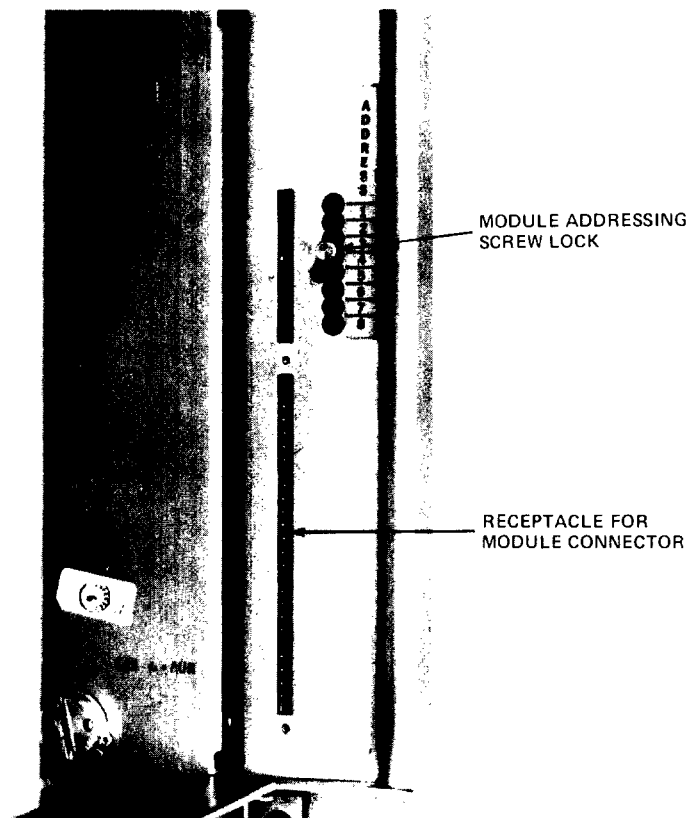


Figure 136. I/O Housing, Showing Module Address Selector

Additional Channel Cabling

Specific receptacles in the Processor are provided for channel expansion (up to three). These receptacles are located on the bottom of the Processor unit. Figure 137 shows the location of the additional channel receptacles. Figure 138 shows an expanded configuration.

I/O Housing and Module Wiring

NOTE

The protective metal tape must be removed before installing a module.

The plug-in I/O modules require no wiring since electrical contacts are automatically made via plated copper spring connectors once the module is seated in place.

NOTE

The modules are designed for heavy duty and resistance to extreme environments, and force may be required to insert and remove them from a housing after they are properly aligned. They are not easily susceptible to damage.

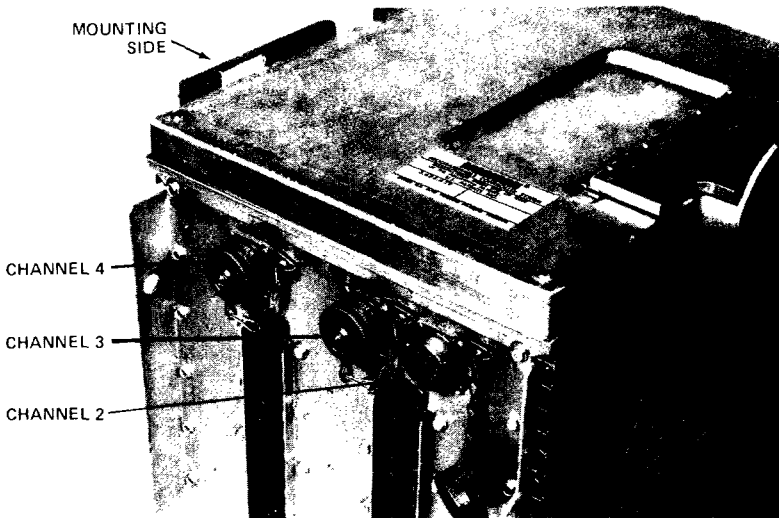


Figure 137. Processor, Bottom View

All in-plant wiring for inputs and outputs is done on the housing itself, within a wire duct on the left side. Bare-wire terminals are provided and are positioned adjacent to the appropriate module (slot). (See Figure 139.)

It will be noted that 21 terminals are provided per module. Sixteen are for input or output lines; the remainder are for power lines or not used. Each terminal is numerically designated (Figure 140) and a record should be made and kept of which signal is associated with a terminal number, on a module-to-module basis. Appendix B shows which terminals are available for either output or input lines and which are used for power or grounding, according to the type of input or output module chosen by the user.

In wiring the Programmable Controller into the system, attention to some fundamental guidelines will increase the life of the input and output circuits. Figure 141 (2 sheets) illustrates a typical wiring for the 184/384 Controller. It also shows a single CRM contact to the Main Power Supply. This must be in the hot line of a grounded system. A CRM in both lines to Remote Control is recommended.

Inductive Loads

When both sides of the line are opened by the master control relay (CRM), the wiring illustrated in Figure 142 would allow inductive energy from the motor starters 2M and 3M to be dissipated into the Controller's input circuits. This can result in damage to the input circuits. As shown in Figure 141, Model 184/384 Controller Recommended Wiring, six separate pairs of CRM contacts will eliminate this possibility. One set of CRM contacts provides power for the master relay and motor starters. A second set provides control power to the Controller. Two sets of contacts are used to provide power to the outputs from the Controller. The last two sets of contacts are used for all the input circuits (Figure 141b).

Inductive spikes would also be present when an inductive load, such as relay or motor starter, is connected in parallel with an input as shown in Figure 143. You will note on Figure 141b that only non-inductive loads, such as an indicator lamp, are connected in this manner. Figure 144 illustrates a means for protecting the input when a parallel inductive load is unavoidable.

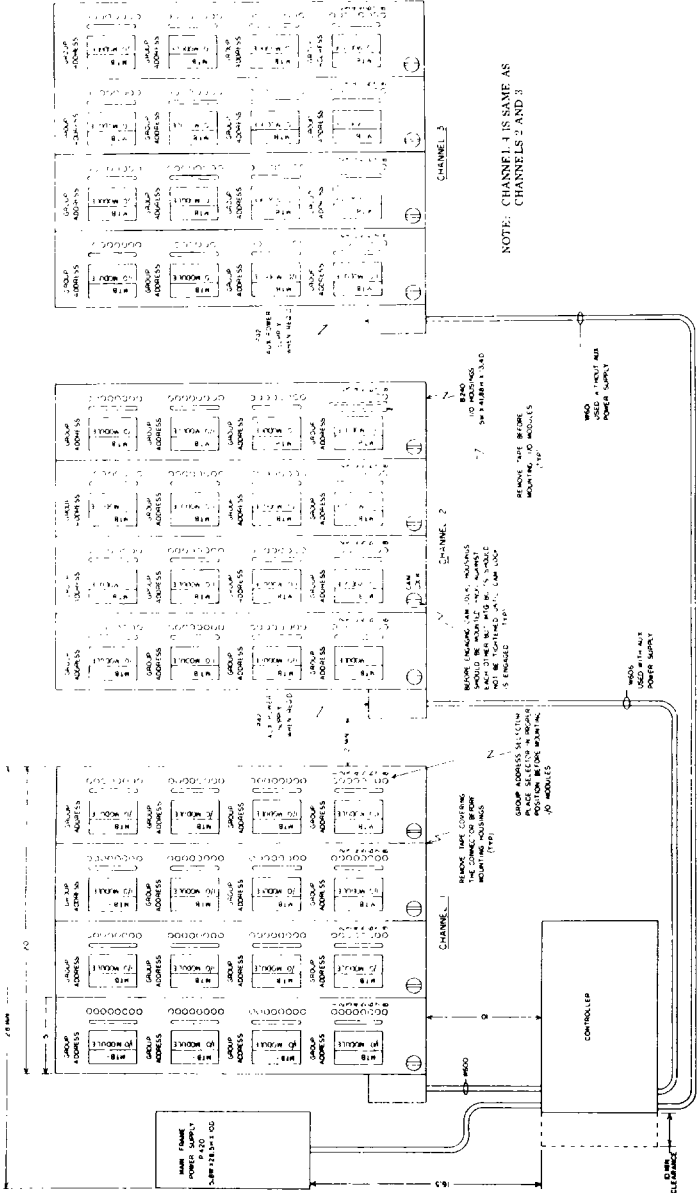


Figure 138. I/O Housing Overview, Showing Module Selection Switches

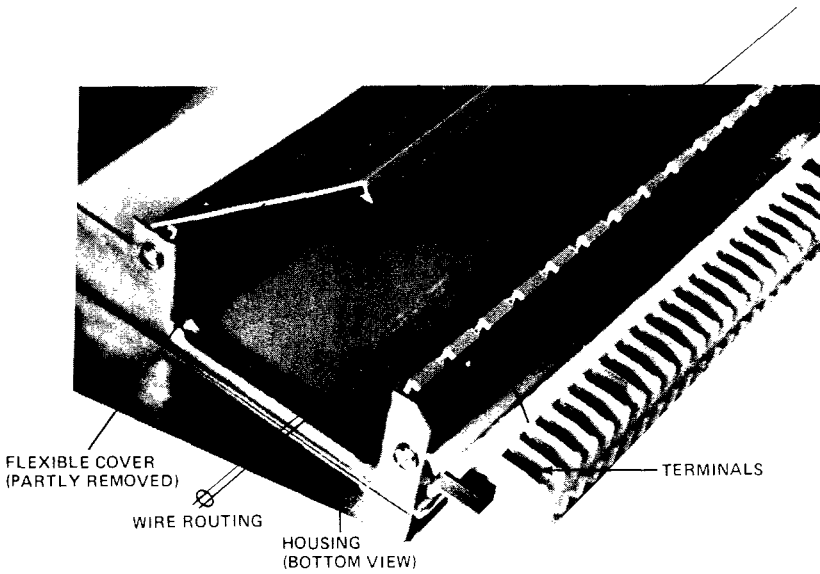


Figure 139. Housing. Showing Channel and Terminals for Wiring

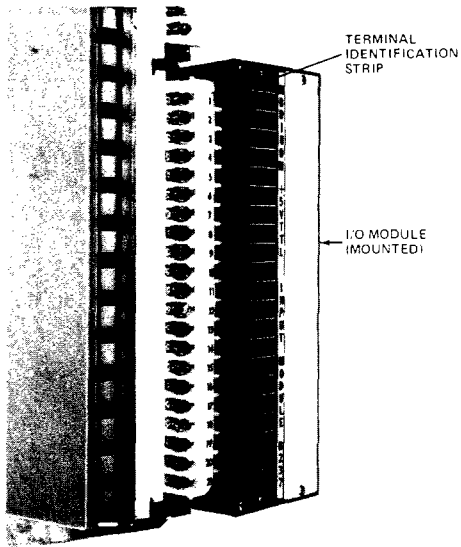


Figure 140. Housing. Showing Relationship Between Terminals and I/O Module Signal Identification Strip

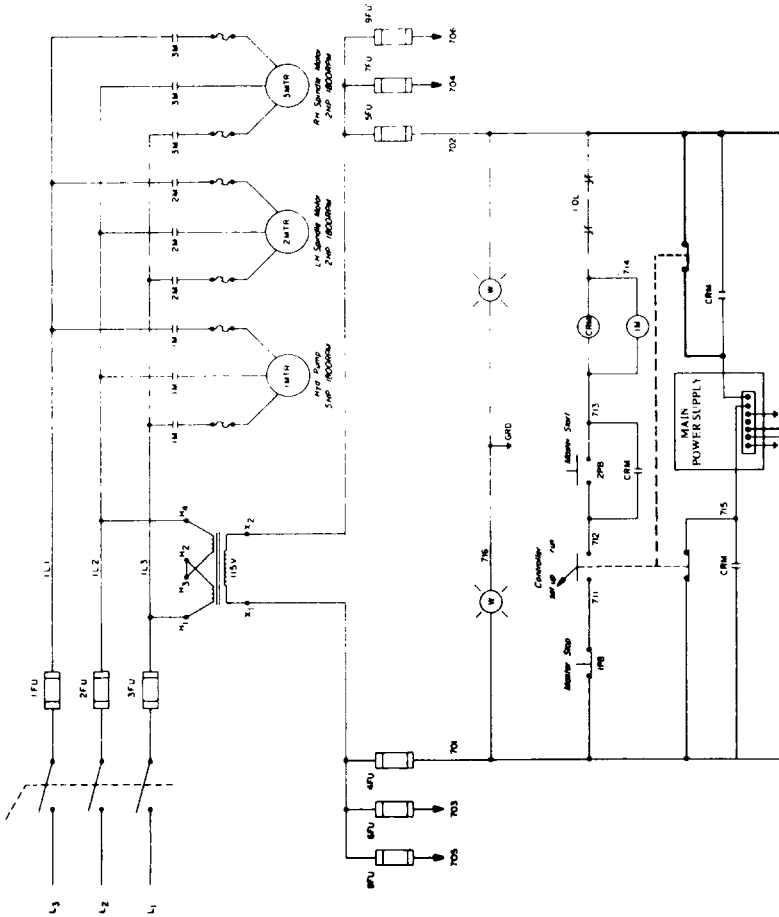


Figure 141a. Model 184/384 Controller Typical Wiring

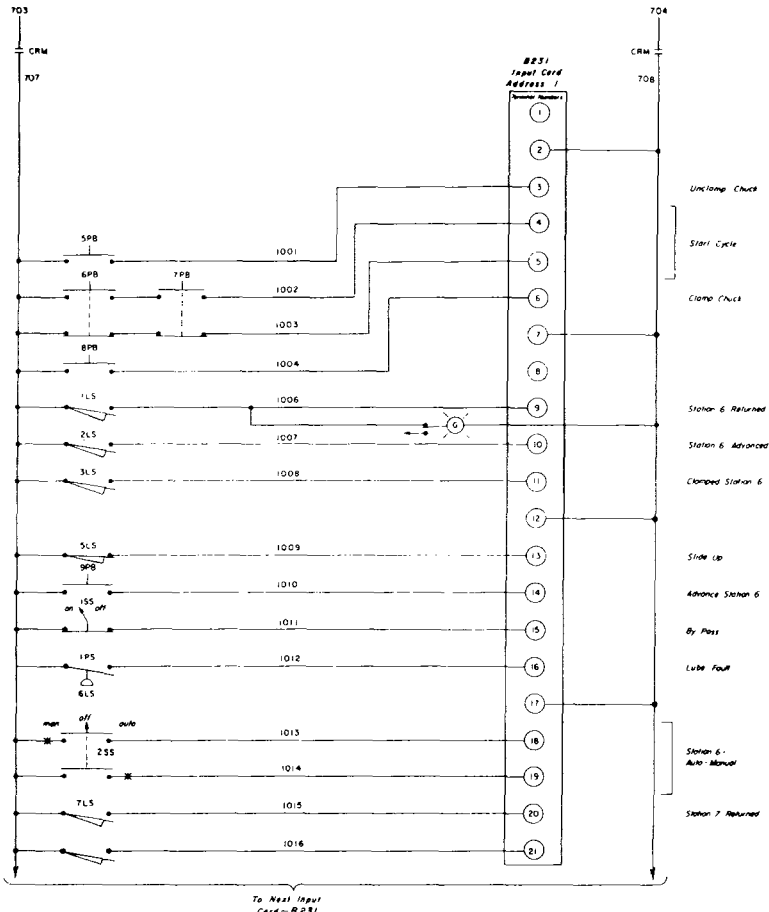


Figure 141b. Model 184/384 Controller Typical Input Wiring

There are also occasions when inductive loads must be operated by both contacts and an output from the controller. Figure 145 illustrates how this may be done with contacts both in series and in parallel with the output of the Controller. When output is in series with the contact, the contact must always be wired between the controller output and the load. The RC or thyrector is not required if the inductive load is greater than one Henry, since thyrectors are incorporated at the Output module.

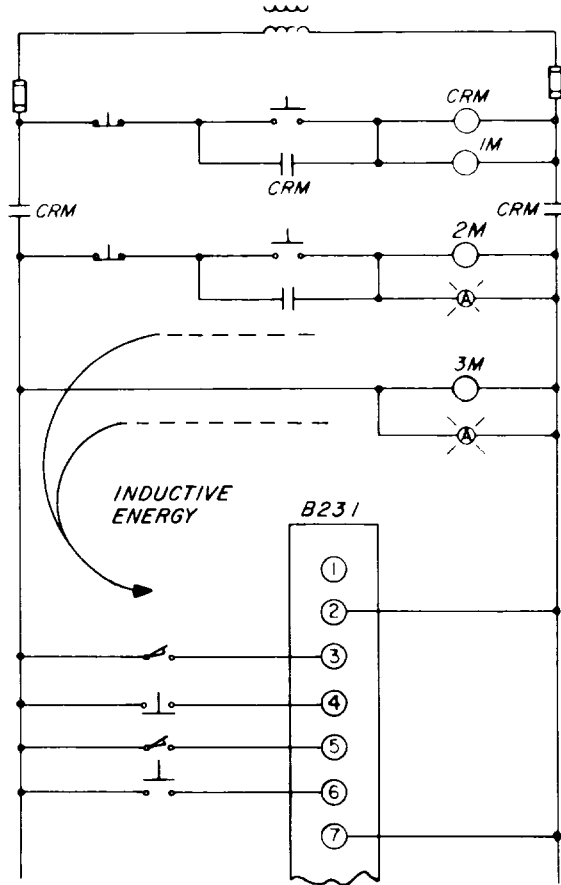


Figure 142. Example of Poor Input Circuit Wiring

Setup and Run Switch

The Setup and Run Switch, shown in Figure 141a permits the Controller to be programmed without providing power to the master control relay. This prevents any accidental operation of solenoids, motor starters, etc., while the Controller is being programmed. After programming the Controller, the switch is placed in the 'Run' position and the machine or process may be checked out in the normal manner.

Connecting Output to Input Circuits

Output circuits may be connected to input circuits in a wired 'or' configuration as shown in Figure 146. The outputs may be from the same Controller or from other Controllers. This is often used when more than one Controller is used on a single system. No more than four B230 outputs may be wired in parallel.

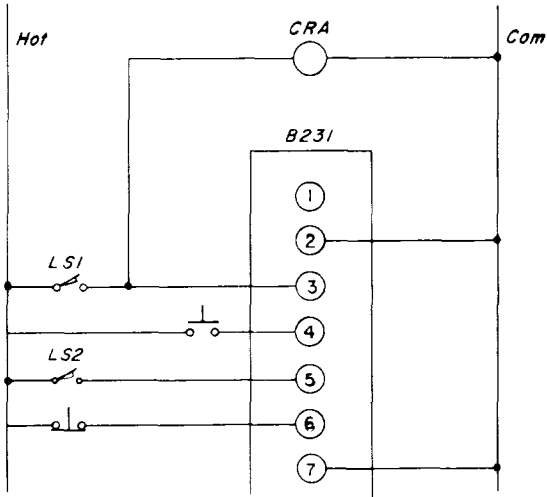


Figure 143. Inductive Load in Parallel with B231 Input Point

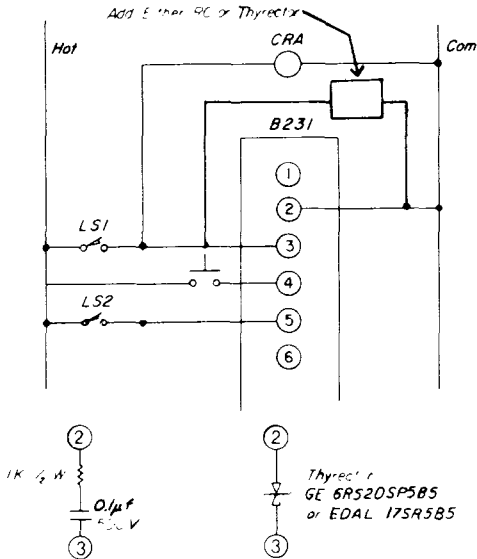


Figure 144. Protecting a B231 Input Point from a Parallel Inductive Load

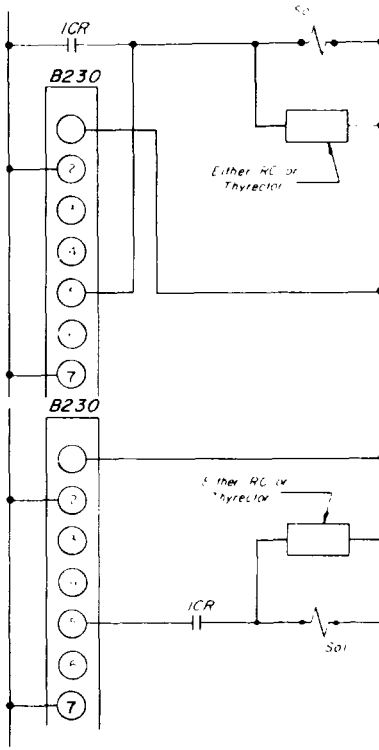


Figure 145. Inductive Load Operated by Both a B230 Outputs and a Set of Contacts

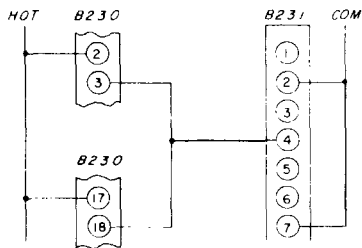


Figure 146. Connection of B230 Output to B231 Input Point