General Mounting & Wiring

Controller

The controller body mounts on a DIN rail as shown in Figure 4.

Keypad/Display

Mount the keypad/display to a panel using the four studs on the back of the keyboard. Enclosures are available from Electro Cam if an appropriate mounting location does not exist.

DIP Switches

For convenience, set the DIP switches on the side of the controller and keypad to their proper positions before mounting the units in a panel. See page 2-13 for DIP switch information.

Environment

1. Allow space at both sides and the top of controller for terminal blocks to be unplugged.
2. Ambient temperature range is +32° to +130° F (0° to +55°C)
3. Locate the controller and keypad away from devices that generate electrical noise, such as contactors and drives.
4. Use the keypad/display gasket provided to prevent contaminants from getting into the cabinet.

Terminal Blocks

All terminal blocks can be unplugged from the controller. Each block is keyed so it cannot be plugged into the wrong socket. All terminals are labelled on each block.

Wiring Guidelines

Follow normal wiring practices associated with the installation of electronic controls. Some guidelines are:

⚠ CAUTION

1. Route input and output wiring away from high voltage, motor drive, and other high level control signals.
2. Use shielded cables for encoder, input, transistor output, and communication circuits. Also shield module output circuits that are driving low current electronic input circuits.
3. Ground shielded cables at the PS-6244 end **only** (except for encoder cable). Use any of the screws on the controller back for grounding.
4. Use appropriate suppression devices where module outputs are directly driving inductive loads.

Power Supply Wiring

Connect a 20 to 30 VDC power supply to TB8 (Fig. 5 or 6). Reversing the polarity will blow the 1-1/4 amp power fuse. The controller will not be damaged, but you must correct the polarity and replace the fuse before the controller will operate.

To insure electrical noise immunity, connect a good electrical ground to the ground terminal on the power supply terminal block.

Module Mounting

A phillips head screw holds each module in place. Individual modules can be removed and installed without affecting the other modules on the unit

⚠ WARNING

However, disconnect power to the controller before changing modules.

Figure 4—Mounting Dimensions

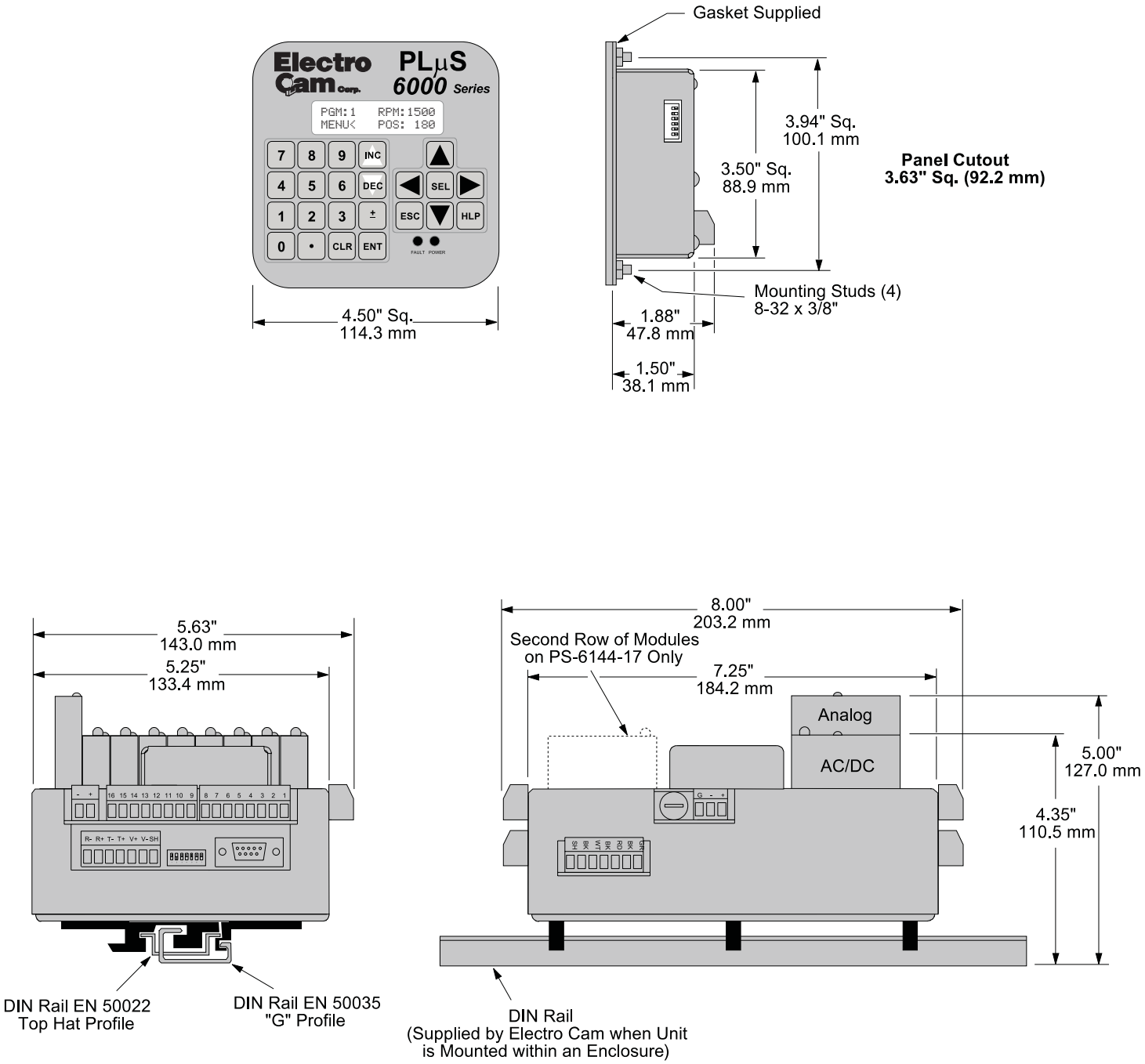
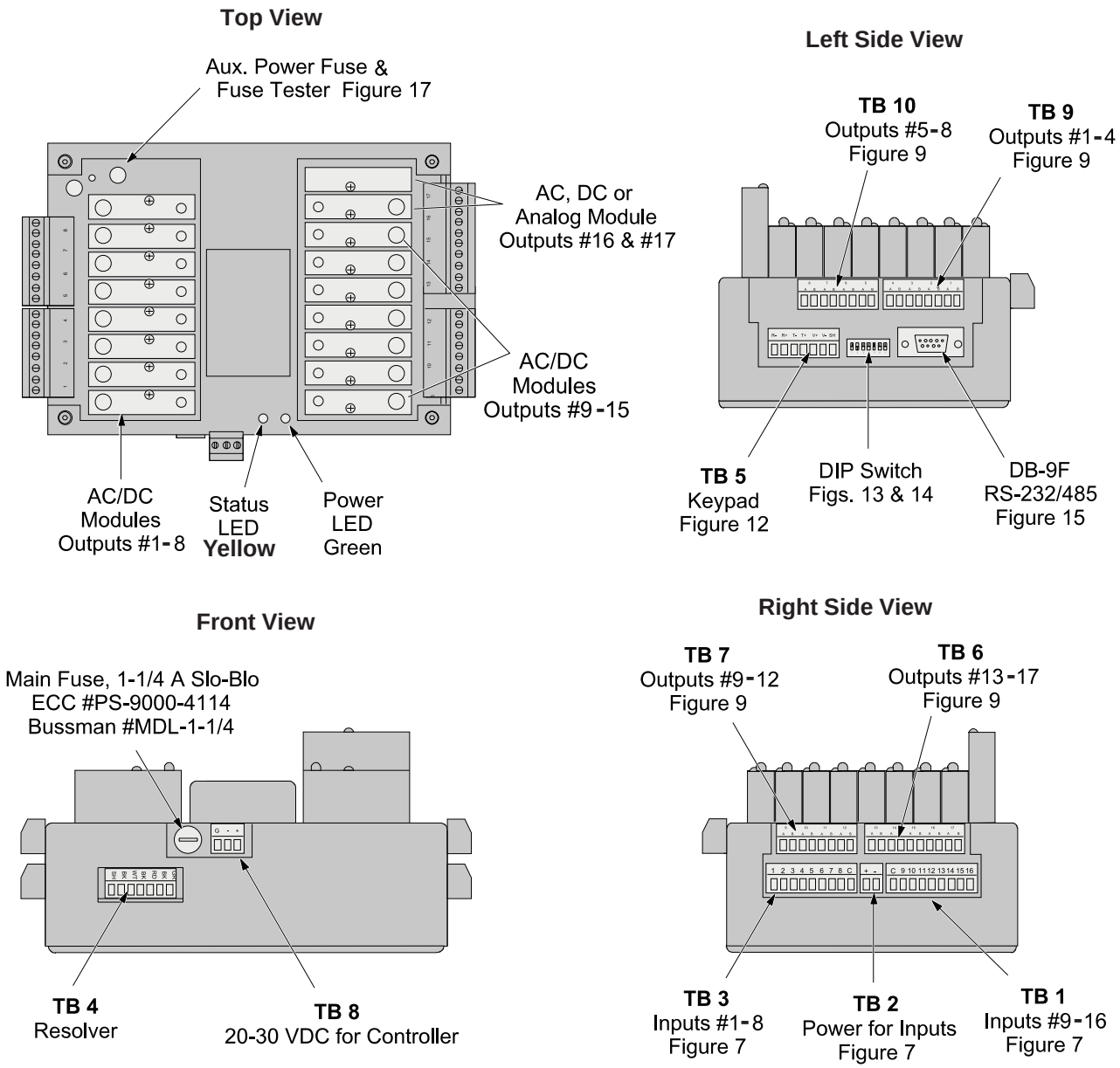


Figure 5—PS-6244-24-M17 Terminals & Components

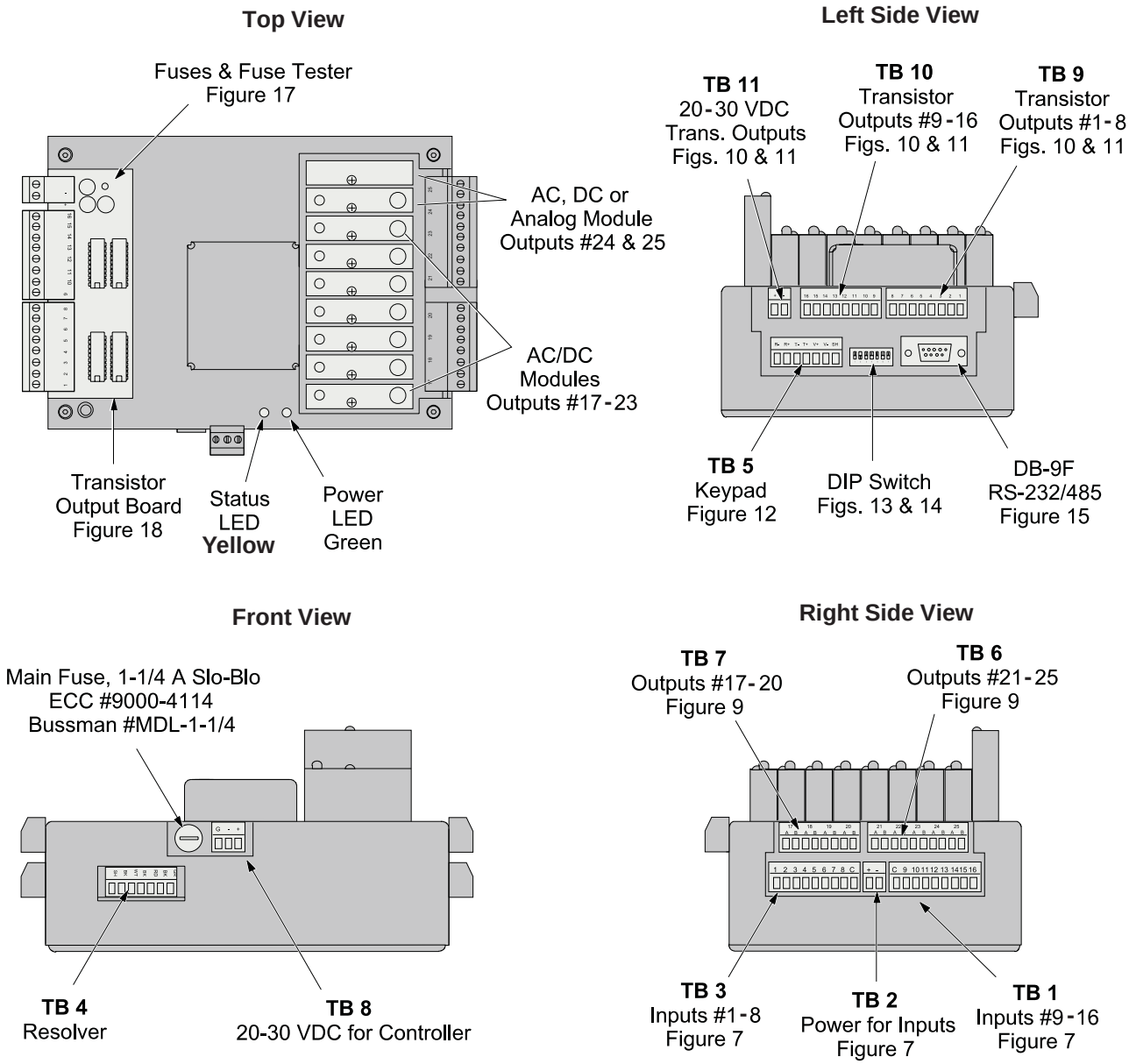


Terminal Block Details

Terminal Block	Function	ECC Part #[1]
TB 1	Inputs #9–16	PS-9006-0024
TB 2	Auxiliary power output	PS-9006-0018
TB 3	Inputs #1–8	PS-9006-0023
TB 4	Encoder connector	PS-9006-0032
TB 5	Keypad connector	PS-9006-0029
TB 6	Module outputs #13-17	PS-9006-0031
TB 7	Module outputs #9-12	PS-9006-0030
TB 8	Power for controller	PS-9006-0026
TB 9	Module outputs #1-4	PS-9006-0033
TB 10	Module outputs #5-8	PS-9006-0034

[1] Keyed to prevent accidental insertion into wrong sockets.

Figure 6—PS-6244-24-X16M09 Terminals & Components



Terminal Block Details

Terminal Block	Function	ECC Part #[1]
TB 1	Inputs #9–16	PS-9006-0024
TB 2	Auxiliary power output	PS-9006-0018
TB 3	Inputs #1–8	PS-9006-0023
TB 4	Encoder connector	PS-9006-0032
TB 5	Keypad connector	PS-9006-0029
TB 6	Module outputs #21–25	PS-9006-0028
TB 7	Module outputs #17–20	PS-9006-0027
TB 8	Power for controller	PS-9006-0026
TB 9	Transistor outputs #1–8, sinking	PS-9006-0019
	Transistor outputs #1–8, sourcing	PS-9006-0021
TB 10	Transistor outputs #9–16, sinking	PS-9006-0020
	Transistor outputs #9–16, sourcing	PS-9006-0022
TB 11	Power for transistor outputs	PS-9006-0017

[1] Keyed to prevent accidental insertion into wrong sockets.

Controller Input Wiring

Input Terminals

Hardware inputs can be used to select a program of setpoints, disable keypads, accept sensor signals, or clear the shift register. The 16 inputs on the PS-6244 are arranged on two terminal strips, TB 1 and TB 3, as shown in Figure 7. Each input is optically isolated and can be powered from an external DC power source or the Auxiliary Power terminals located on TB 2.

Sinking or Sourcing

Each terminal strip TB 1 and TB 3 can be wired to accept sinking or sourcing input signals, but all eight inputs on that strip will require the same type of signal. Many types of hardware can drive these inputs, including mechanical switches, relay contacts, DC 3-wire sensors, solid state DC output modules, and PLC DC outputs. 2-wire DC sensors can also be used, but may require a load resistor in parallel with the input. Typical wiring diagrams are shown in Figure 7.

Input Functions

Following are the input terminals and their corresponding functions:

Channel Enable (1-8)
These terminals accept signals from sensors or from PLC's. Each output channel on the 6244 can be ANDed with any one of these inputs so that the output is enabled only when a signal is present on the input terminal.

Program Select (9-13)
The on/off status of these terminals selects which program of setpoints is controlling the outputs. Binary, BCD, or Gray Code formats can drive these terminals as shown in Figure 8. Although standard controllers can store up to 48 programs, not all of these programs can be selected through the Program Select terminals.

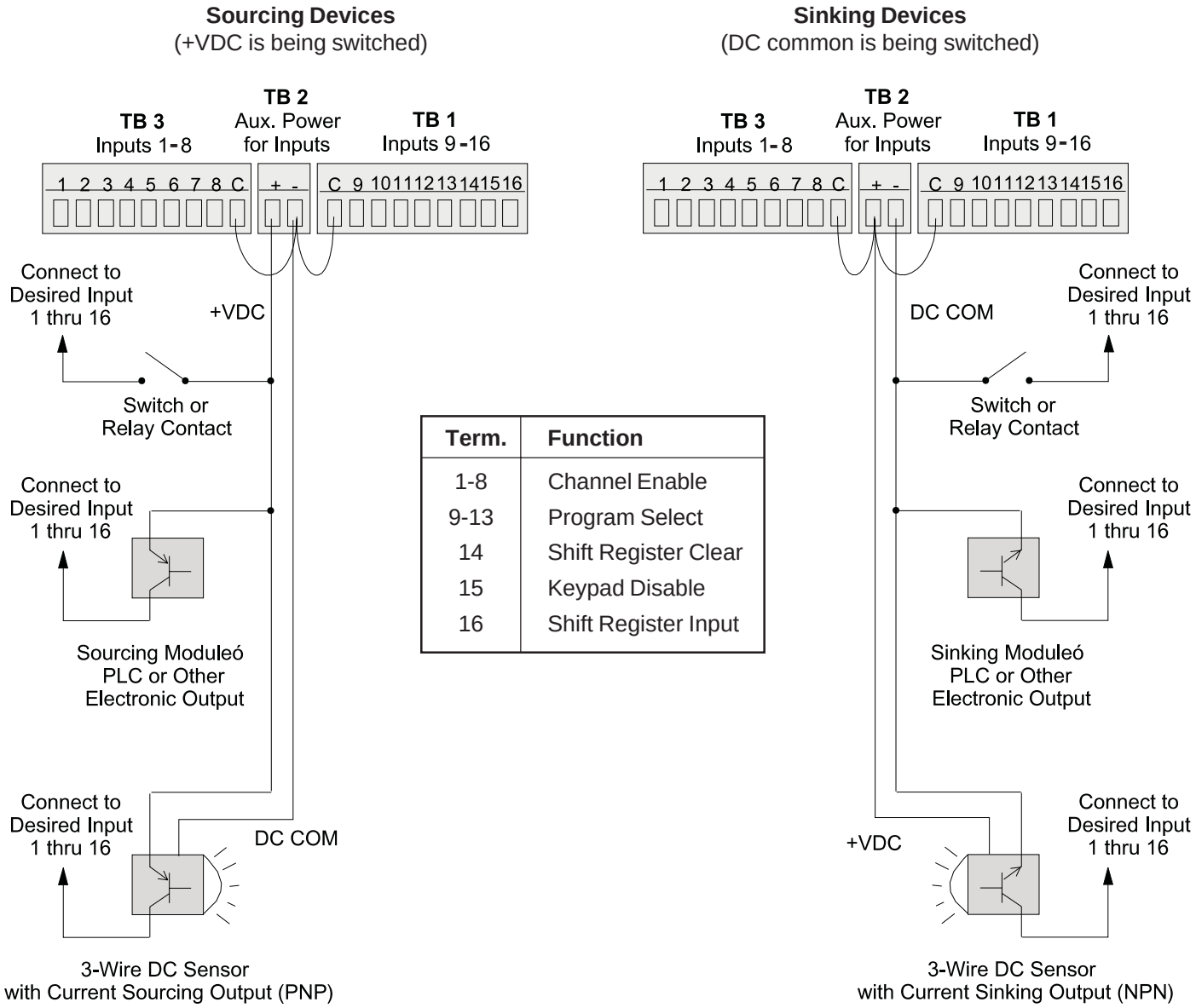
When all program select inputs are off, the "Default" program will become active as programmed through DEFAULT PROGRAM function.

Shift Register Clear (14)
A signal on this terminal will completely clear the shift register for all output channels.

Keypad Disable (15)
When energized, this terminal disables any keypads connected to the controller. If the controller will be used without any keypads, jumper this terminal so that it is always energized.

Shift Register Input (16)
The leading edge of a signal on this terminal sets a bit in the shift register. See SHIFT REGISTER ANDING for details.

Figure 7—Controller Input Wiring (See Figures 5 & 6 for Terminal Block Locations)



Term.	Function
1-8	Channel Enable
9-13	Program Select
14	Shift Register Clear
15	Keypad Disable
16	Shift Register Input

Input Wiring Guidelines

- Voltage from TB 2 will be the same as the voltage supplied to the controller.
- Each input powered from TB 2 will draw 11 mA at 24 VDC. TB 2 is fused at 1/4 amp.
- Inputs will operate with voltages from 10 to 30 VDC.
- An external power supply can be used instead of TB 2 to power inputs.
- A combination of mechanical and solid state devices can be used.
- TB 1 can be wired for sourcing while TB 3 is wired for sinking, and vice versa.

Figure 8—Program Select Terminals for Various Formats

BCD Program Select Table

The BCD format allows standard 1- or 2-digit BCD switches to operate the program select inputs. PLC's can also output values in BCD. The program number selected can be calculated by adding up the values associated with each of the input terminals that are on. For example, if Input Terminals 9, 11 and 13 are on, Program 15 would be active (10 + 4 + 1).

Please Note:

- Although the PS-6244 can store up to 48 programs, only Programs 1 through 19 can be selected using BCD input. A value larger than 19 will select Program 19.
- Only one of the normal four BCD digits for 10's is used.
- **9 is the largest valid value for the units digit.** A units digit combination larger than 9 will set the units digit to 9.

	10's	UNITS			
Input Term:	**13**	**12**	**11**	**10**	**9**
Value:	10	8	4	2	1
PGM					
Default	0	0	0	0	0
1	0	0	0	0	1
2	0	0	0	1	0
3	0	0	0	1	1
4	0	0	1	0	0
5	0	0	1	0	1
6	0	0	1	1	0
7	0	0	1	1	1
8	0	1	0	0	0
9	0	1	0	0	1

	10's	UNITS			
Input Term:	**13**	**12**	**11**	**10**	**9**
Value:	10	8	4	2	1
PGM					
10	1	0	0	0	0
11	1	0	0	0	1
12	1	0	0	1	0
13	1	0	0	1	1
14	1	0	1	0	0
15	1	0	1	0	1
16	1	0	1	1	0
17	1	0	1	1	1
18	1	1	0	0	0
19	1	1	0	0	1

Binary Program Select Table

The binary format is convenient for PLC program select output signals. The program number selected can be calculated by adding up the values associated with each of the input terminals that are on. For example, if input terminals 9, 11 and 13 are on, program number 21 would be active (16 + 4 + 1).

Please Note:

- Although the PS-6244 can store up to 48 programs, only Programs 1 through 31 can be selected using binary input. A value larger than 31 will select Program 31.

Input Term:	**13**	**12**	**11**	**10**	**9**
Value:	16	8	4	2	1
PGM					
Default	0	0	0	0	0
1	0	0	0	0	1
2	0	0	0	1	0
3	0	0	0	1	1
4	0	0	1	0	0
5	0	0	1	0	1
6	0	0	1	1	0
7	0	0	1	1	1
8	0	1	0	0	0
9	0	1	0	0	1
10	0	1	0	1	0
11	0	1	0	1	1
12	0	1	1	0	0
13	0	1	1	0	1
14	0	1	1	1	0
15	0	1	1	1	1

Input Term:	**13**	**12**	**11**	**10**	**9**
Value:	16	8	4	2	1
PGM					
16	1	0	0	0	0
17	1	0	0	0	1
18	1	0	0	1	0
19	1	0	0	1	1
20	1	0	1	0	0
21	1	0	1	0	1
22	1	0	1	1	0
23	1	0	1	1	1
24	1	1	0	0	0
25	1	1	0	0	1
26	1	1	0	1	0
27	1	1	0	1	1
28	1	1	1	0	0
29	1	1	1	0	1
30	1	1	1	1	0
31	1	1	1	1	1

Gray Code Select Table

Electro Cam 8-position Gray Code selector switches are available as accessories for PLuS controls.

Please Note:

- Although the PS-6244 can store up to 48 programs, only Programs 1 through 31 can be selected using gray code input. A value larger than 31 will select Program 31.

Input	MSB				LSB
Term:	**13**	**12**	**11**	**10**	**9**
PGM					
Default	0	0	0	0	0
1	0	0	0	0	1
2	0	0	0	1	1
3	0	0	0	1	0
4	0	0	1	1	0
5	0	0	1	1	1
6	0	0	1	0	1
7	0	0	1	0	0
8	0	1	1	0	0
9	0	1	1	0	1
10	0	1	1	1	1
11	0	1	1	1	0
12	0	1	0	1	0
13	0	1	0	1	1
14	0	1	0	0	1
15	0	1	0	0	0

Input	MSB				LSB
Term:	**13**	**12**	**11**	**10**	**9**
PGM					
16	1	1	0	0	0
17	1	1	0	0	1
18	1	1	0	1	1
19	1	1	0	1	0
20	1	1	1	1	0
21	1	1	1	1	1
22	1	1	1	0	1
23	1	1	1	0	0
24	1	0	1	0	0
25	1	0	1	0	1
26	1	0	1	1	1
27	1	0	1	1	0
28	1	0	0	1	0
29	1	0	0	1	1
30	1	0	0	0	1
31	1	0	0	0	0

Output Wiring

Output Types

The outputs available depend on the PS-6244 Model:

Output Type	Model 6244-24-M17	Model 6244-24-X16M09
Transistor	None	Outputs 1-16
AC/DC/RR Modules Only	Outputs 1-15	Outputs 17-23
AC/DC/RR or Analog Modules	Output 16	Output 24
Analog Modules Only	Output 17	Output 25

The load device to be driven must match the output type.

Power Output Modules

Output modules can directly switch inductive loads and resistive loads that require more current or voltage than the transistor outputs can supply. **The modules do not supply the power for the load; they simply switch it.** Each output module has two dedicated terminals and therefore does not share any common signal with the other modules. This allows AC and DC modules to be mixed on the same control. DC modules can be wired to sink or source as shown in Figure 9.

Analog Output Modules

Analog output modules generate signals that are proportional to the encoder RPM. They can be used only in the output positions shown above. Either a 0-10 Vdc or 4-20 mA analog module can be used in either module position. ANALOG QTY must be programmed for the number of analog modules installed. An external power supply is not needed because the analog modules get the power they source from the controller. The analog output signal is completely isolated.

Transistor Outputs

PS-6244-25 models include 16 transistor outputs to drive the electronic input circuits of other control devices. The outputs are limited to 30 Vdc, 50 mA each and should not be used to control inductive devices such as solenoids, solenoid valves or relays.

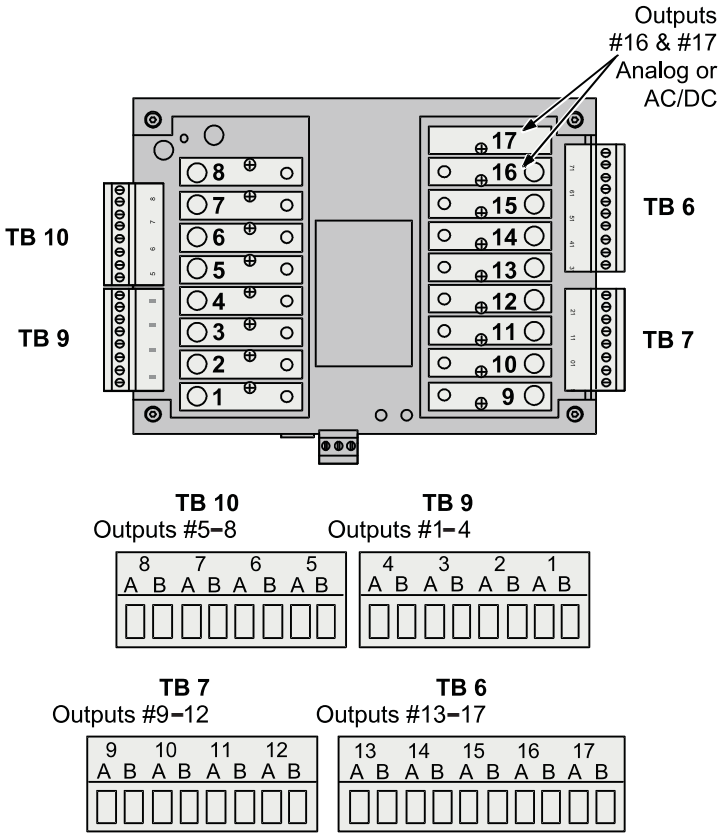
The control can be ordered with either sinking or sourcing transistor outputs. Both types require a 10-30 VDC power supply connected to TB 11 to drive the transistor output circuitry. The transistor output fuse will blow if the power supply polarity is incorrect, but the circuitry will not be damaged. See Figs. 17 & 18 for fuse and transistor chip replacement.

Sinking transistor outputs (N16 controls, Figure 10) conduct to the negative terminal of TB 11. Therefore the common for TB 11 and the load must be electrically the same. This may require connecting commons together if the power supplied to TB 11 is not also the load power supply. Electronic counters/ratemeters often fall into this category. The power supply that powers the load does not have to be the same voltage as the transistor power supplied to TB 11.

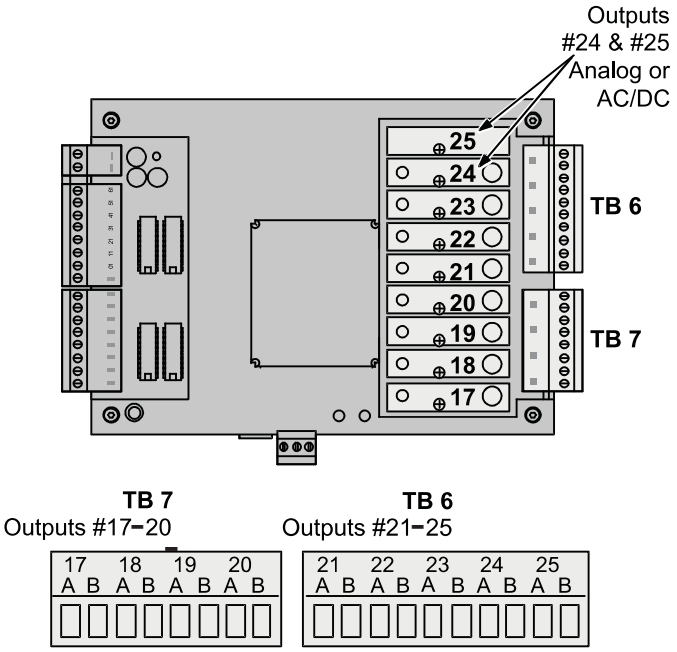
Sourcing transistor outputs (P16 controls, Figure 11) conduct to the positive power terminal of TB 11. The load is therefore powered from the same supply that is providing the transistor power.

Figure 9—Wiring for Output Modules

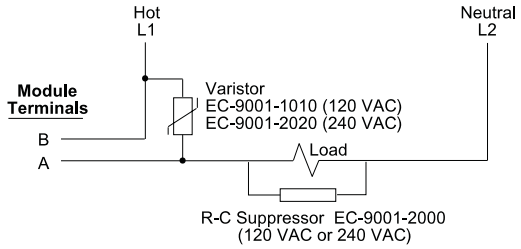
PS-6244-24-M17



PS-6244-24-X16M09

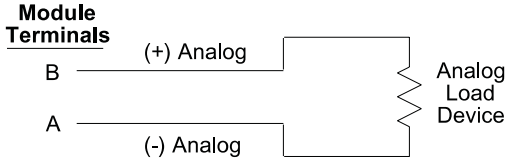


AC Output



- When other switching devices are in series or parallel with the AC output module, connect a varistor (MOV) across the terminals to prevent module damage from inductive voltage spikes.
- Output modules act like switches; they do not supply power to loads.

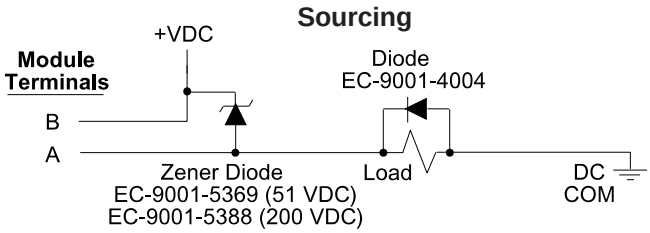
Analog Output



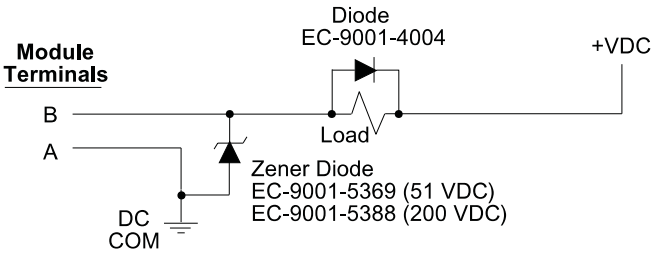
- Analog output modules source the analog signal.
- No external supply is required.
- Analog output signals are isolated.

DC Output

Sourcing



Sinking

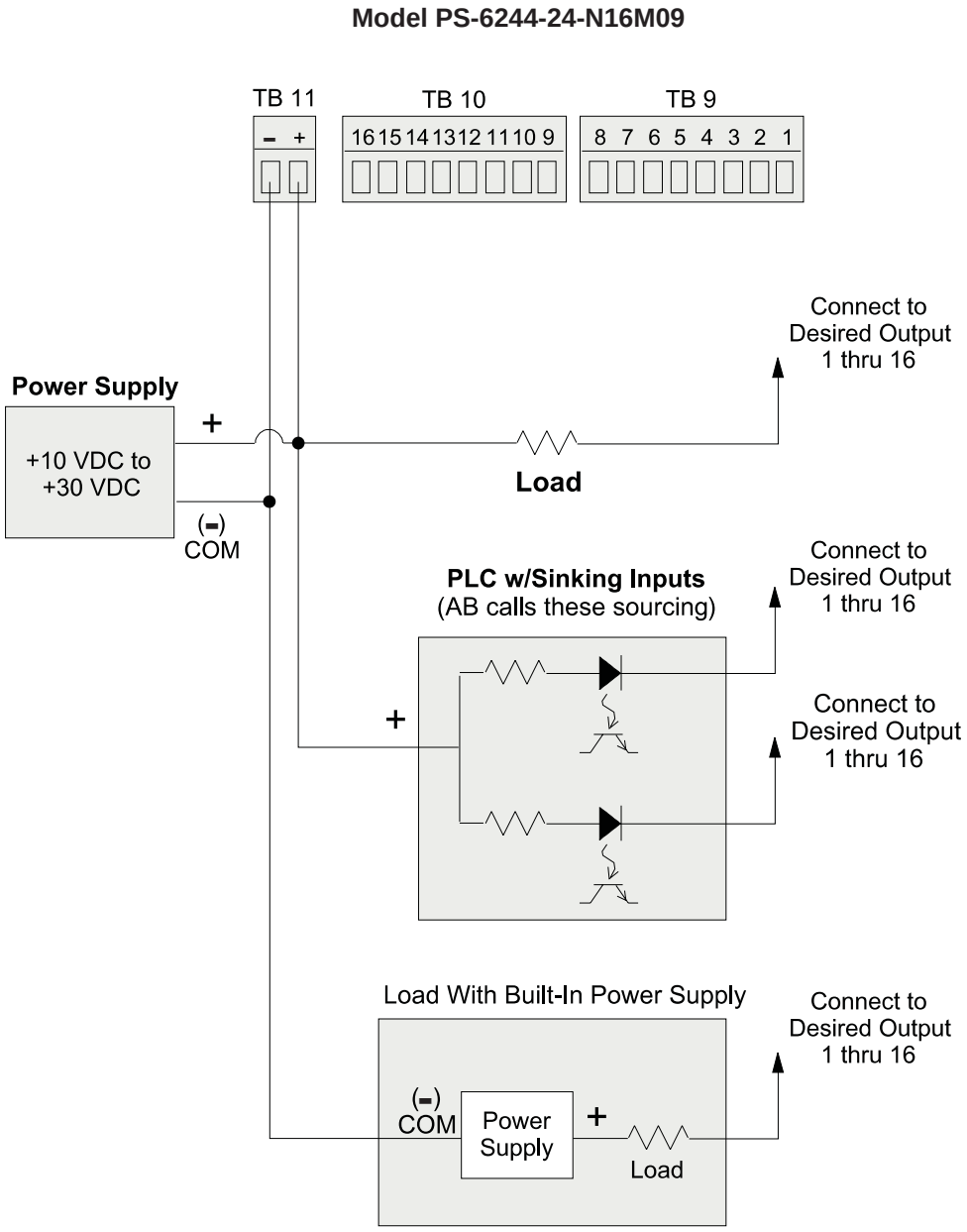


- Suppress spikes in inductive DC loads with one of the following methods:

  Connect a zener diode across the terminals. Turn off time will not be significantly affected. Voltage rating of diode must be greater than the normal circuit voltage. 50 VDC Zener, #EC-9001-5369; 200 VDC Zener, #EC-9001-5388.

  Connect a reverse-biased diode across the load. This will increase the turn off time of the load. #EC-9001-4004.

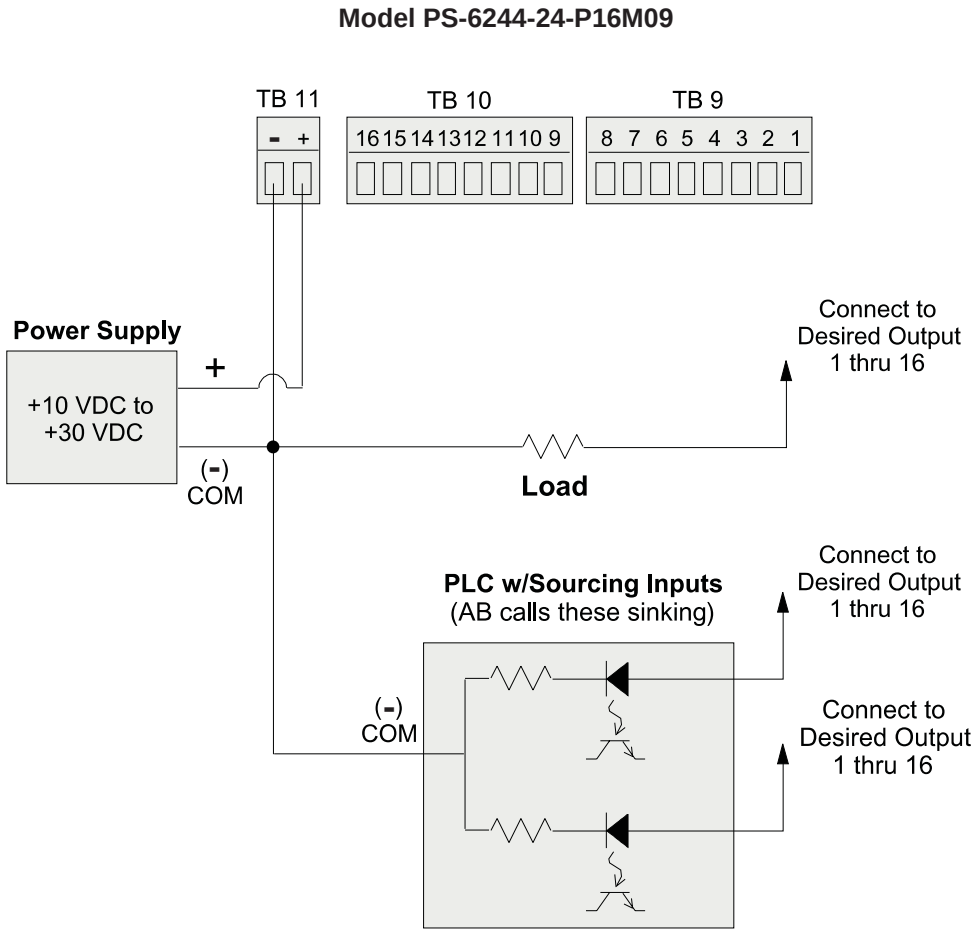
Figure 10—Wiring for Sinking Transistor Outputs (See Figure 6 for Terminal Block Locations)



Please Note:

- Outputs are rated at 30 VDC, 50 mA.
- Transistor outputs should not be used to switch inductive devices such as solenoids or relays.
- Sinking outputs conduct to the negative terminal of TB 11 when "on."
- The power supply shown in "Load with Built-In Power Supply" does not have to be the same voltage as the power supply connected to TB 11.

Figure 11—Wiring for Sourcing Transistor Outputs (See Figure 6 for Terminal Block Locations)



Please Note:

- Outputs are rated at 30 VDC, 50 mA.
- Transistor outputs should not be used to switch inductive devices such as solenoids or relays.
- Sourcing outputs conduct to the positive terminal of TB 11 when "on."

Keypad Wiring

Number of Keypads

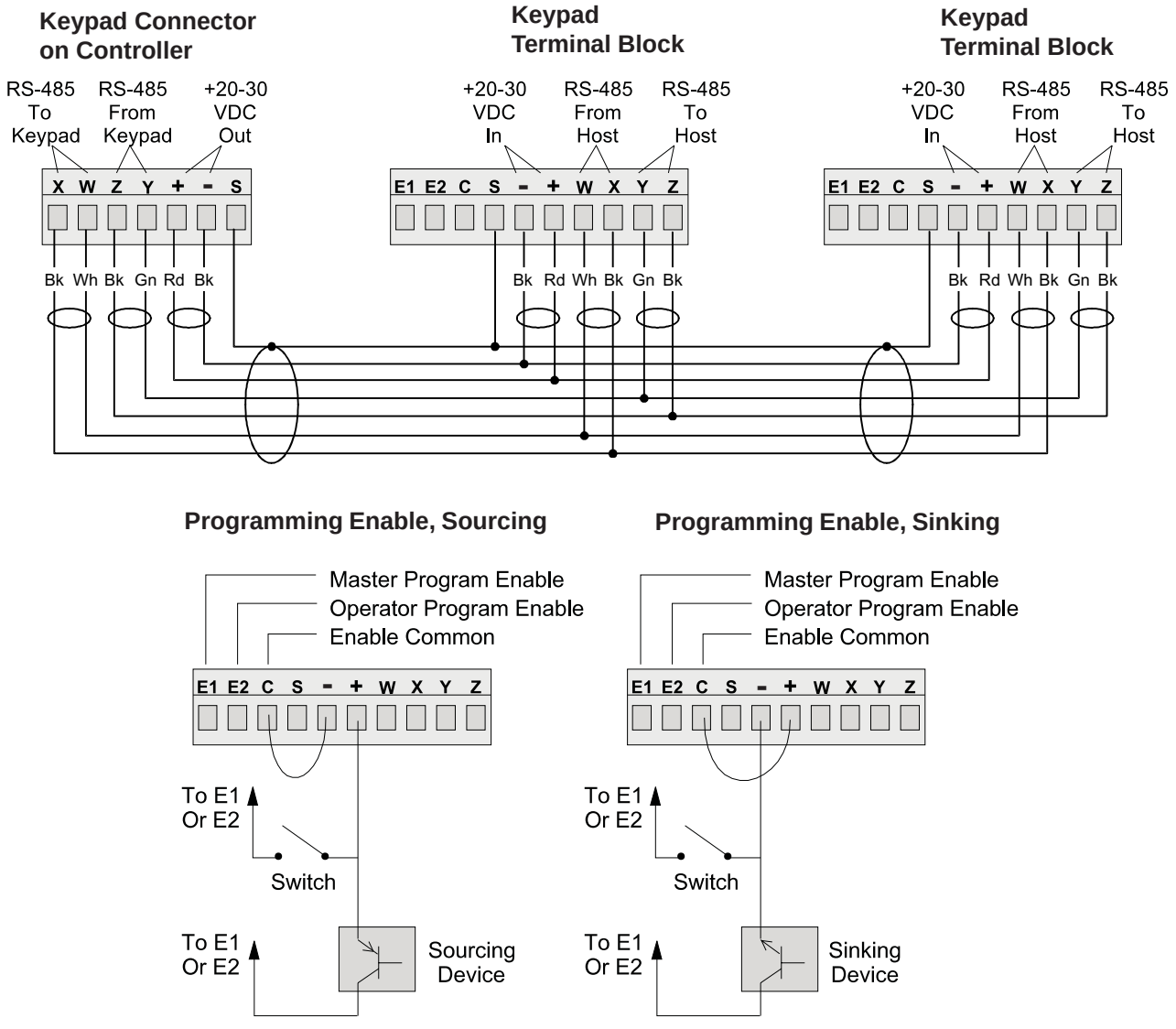
One or two keypads may be connected to a PS-6244 controller as shown in Figure 12. See Figure 14 for possible system configurations.

Programming Enable

The wiring connector on the back of each keypad includes terminals to select Operator or Master level programming for that keypad. These terminals can be temporarily jumpered during set-up to allow entry of programming access codes, or they can be switched with a variety of devices including mechanical switches, relay contacts, and PLC DC outputs. See ENABLE CODES in the programming section for details on programming access.

If a solid state device will be activating the Programming Enable terminals, that device will determine whether sourcing or sinking wiring should be used. For mechanical devices such as jumpers or key switches, either sourcing or sinking wiring may be used.

Figure 12—Keypad Wiring



DIP Switch Configurations

DIP Switches

Each keypad and controller has a DIP switch as shown in Figure 13. For convenience, set the DIP switches correctly before mounting the units in a panel.

Keypad Settings

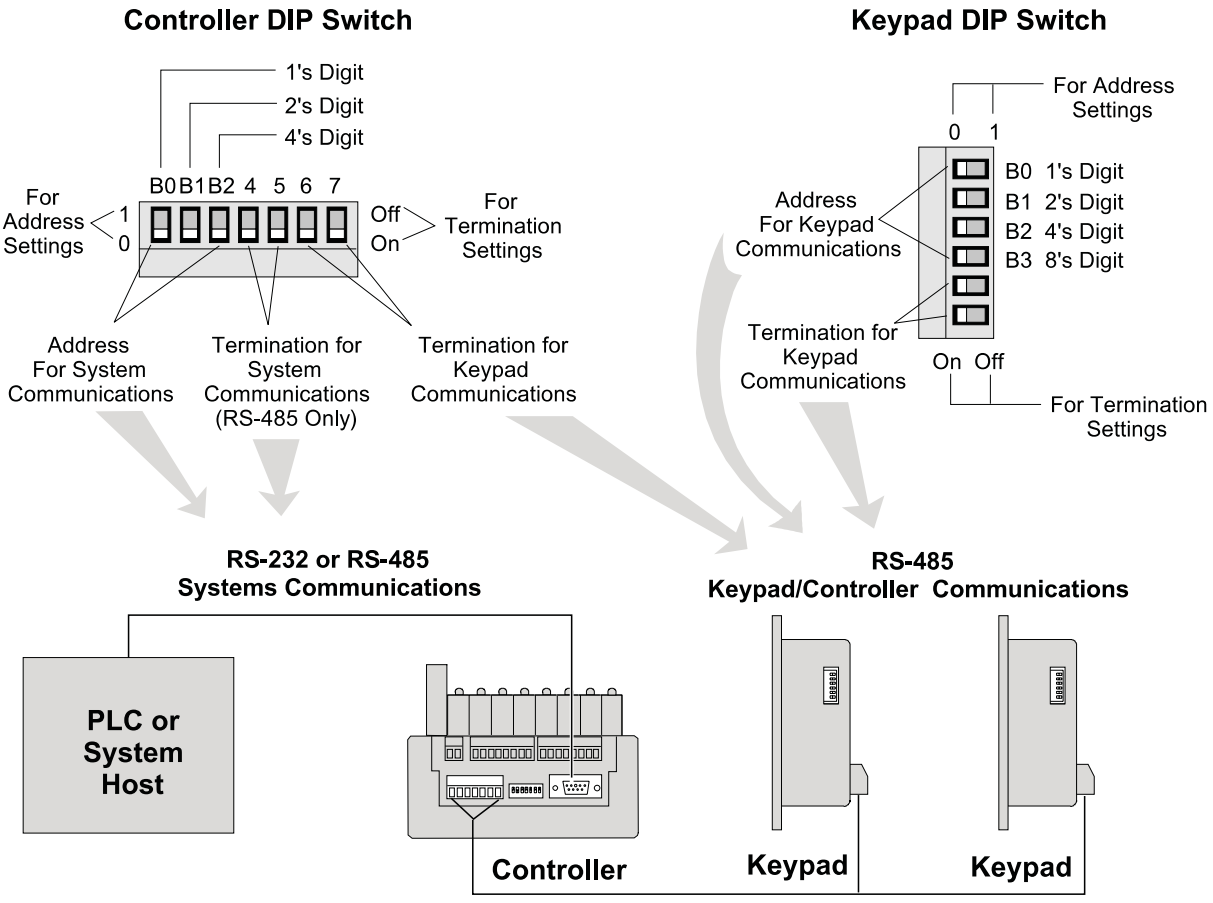
The address and termination settings on the **keypad** DIP switch apply to the RS-485 network that connects it to the controller. See Figure 14 for guidelines and sample settings.

Controller Settings

The address settings on the **controller** DIP switch apply to a network connecting the controller to a PLC or other system host. When the DIP switch is set to zero, the default address programmed through the COMMUNICATIONS function takes affect. Whereas the DIP switches can set a maximum address of "7", the COMMUNICATIONS function can establish much higher address numbers. **These settings are not related to communications with the keypads.**

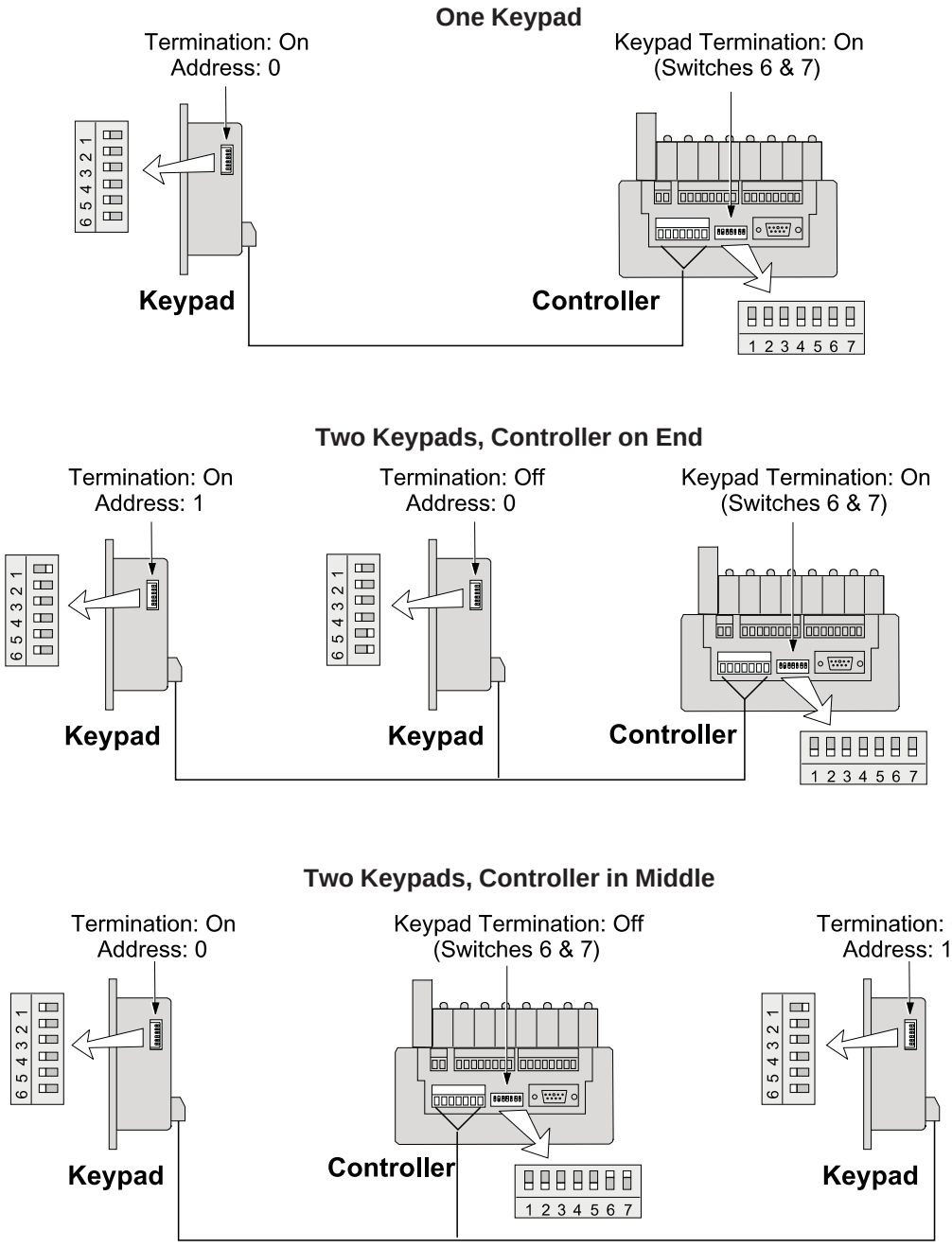
Two sets of termination switches are included on the controller. One set establishes the termination value for an RS-485 network connecting the controller to a PLC or other system host. It does not apply to an RS-232 network. The other termination switches apply to the keypad network. See Figure 14 for guidelines and sample settings.

Figure 13—DIP Switches and Related Communications Networks



NOTE: Both termination switches in a pair must be in the same position.

Figure 14—DIP Switch Settings for Typical Systems



DIP Switch Guidelines

Termination:
- Termination must be "on" for devices on each end of the chain.
- Termination must be "off" for devices in the middle of the chain.
- Both termination switches in a pair must be in the same position.

Address:
- Keypad addresses must be assigned starting with "0" and increasing sequentially.
- The physical location of a keypad in the chain has no relationship to its address.
- During initial programming, the KEYBOARD QTY function must be used to enter the number of keypads in the chain. KEYBOARD QTY can be accessed only through the keypad whose address is "0."

Communications Wiring

DB-9F Port — Serial communication to a PLC or other system host is provided through a DB-9 female connector as shown in Figures 5 & 6. This connector can be wired for RS-232 or RS-485 communications.

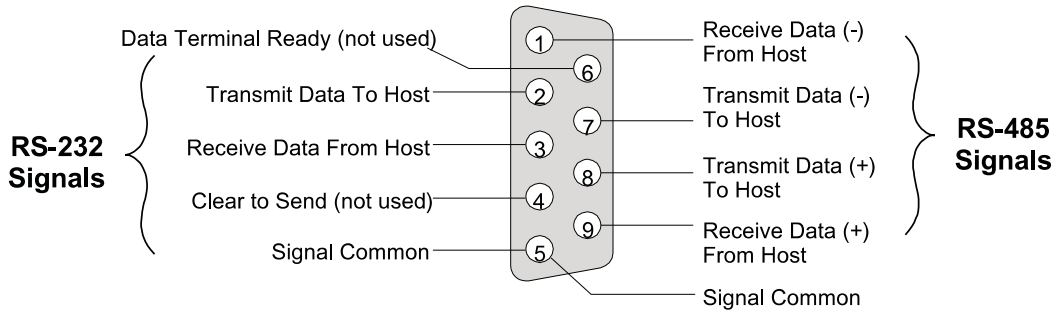
RS-485 — RS-485 can be used for “multi-drop” networks where more than one controller could be connected to the system host.

RS-232 — RS-232 can connect only a single PS-6244 to a system host.

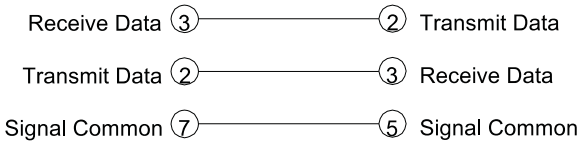
RS-232/485 Selection — Use the COMMUNICATIONS function to select RS-232 or RS-485 communications.

Figure 15—Communications Wiring

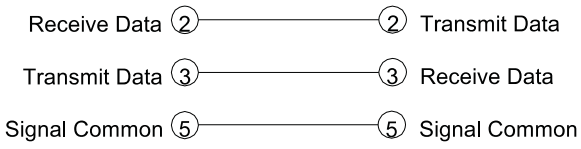
DB-9 Female Connector on Controller
(See Figures 5 & 6 for Location)



RS-232 Cable Wiring
DB-25 (Host) **to DB-9F** (PS-6244)



RS-232 Cable Wiring
DB-9 (Host) **to DB-9F** (PS-6244)



Encoder Wiring

General Information

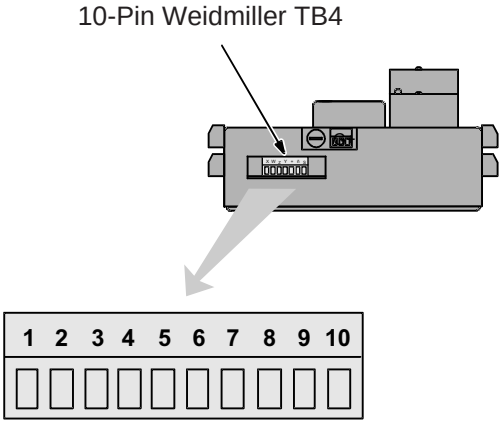
Choose a mounting location for the encoder that allows convenient mechanical connection of the encoder shaft to the machine. The encoder is normally driven at a 1:1 ratio to machine cycles, but this is not true in all applications. Commonly used methods for driving the encoder shaft include flexible couplings, timing belts and pulleys, chains, and sprockets. Insure that the coupling method used is tight enough to minimize backlash without placing excessive side load on the encoder shaft.

If possible, select a location that shelters the encoder from accidental mechanical abuse, lubricants, wash down chemicals or any other liquids.

Encoder Wiring

Use shielded cable for wiring the encoder to the PS-6244 controller.

Figure 16—Encoder Connector Wiring



Pin	Connection
1	+ENC
2	VREF
3	A
4	–A
5	B
6	–B
7	Z
8	–Z
9	COM
10	Shield

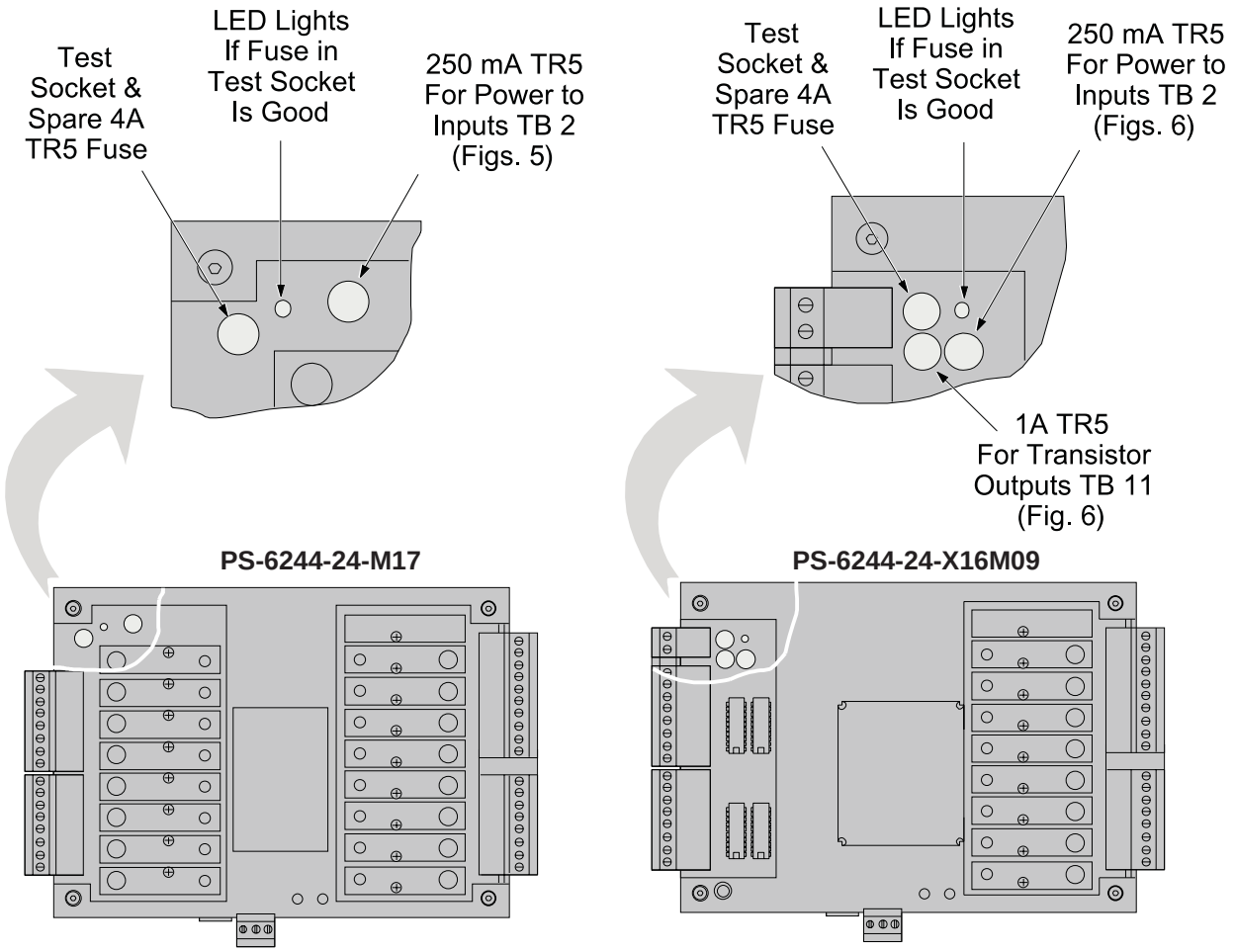
TB4 is EC part# PS-9006-0032.

It is keyed to prevent accidental insertion into the wrong sockets.

Fuse Tester

Figure 17 shows the location of a fuse test socket and LED which can be used to test TR5 style fuses. PS-6244 controllers are shipped with a spare 4A fuse mounted in the test socket.

Figure 17—TR5 Fuse Tester and Fuse Locations



Replacement TR5 Fuse Part Numbers

Rating	Function	ECC Part #	Wickmann Part #
250 mA	Power for Inputs (TB 2)	PS-9005-0250	1937-035
1 A	Power for Transistor Outputs (TB 11)	PS-9005-0001	19370
4 A	Fuse for Output Modules	PS-9005-0004	19370-K

Output Transistor Replacement

Check Fuse First

If all of the transistor outputs fail to work, check the 1A fuse shown in Figures 17 & 18. Also check to be sure that a 10–30 VDC power supply is connected to TB 11, Figure 6.

Correct Problems

Chips will most likely be damaged by one of two events:

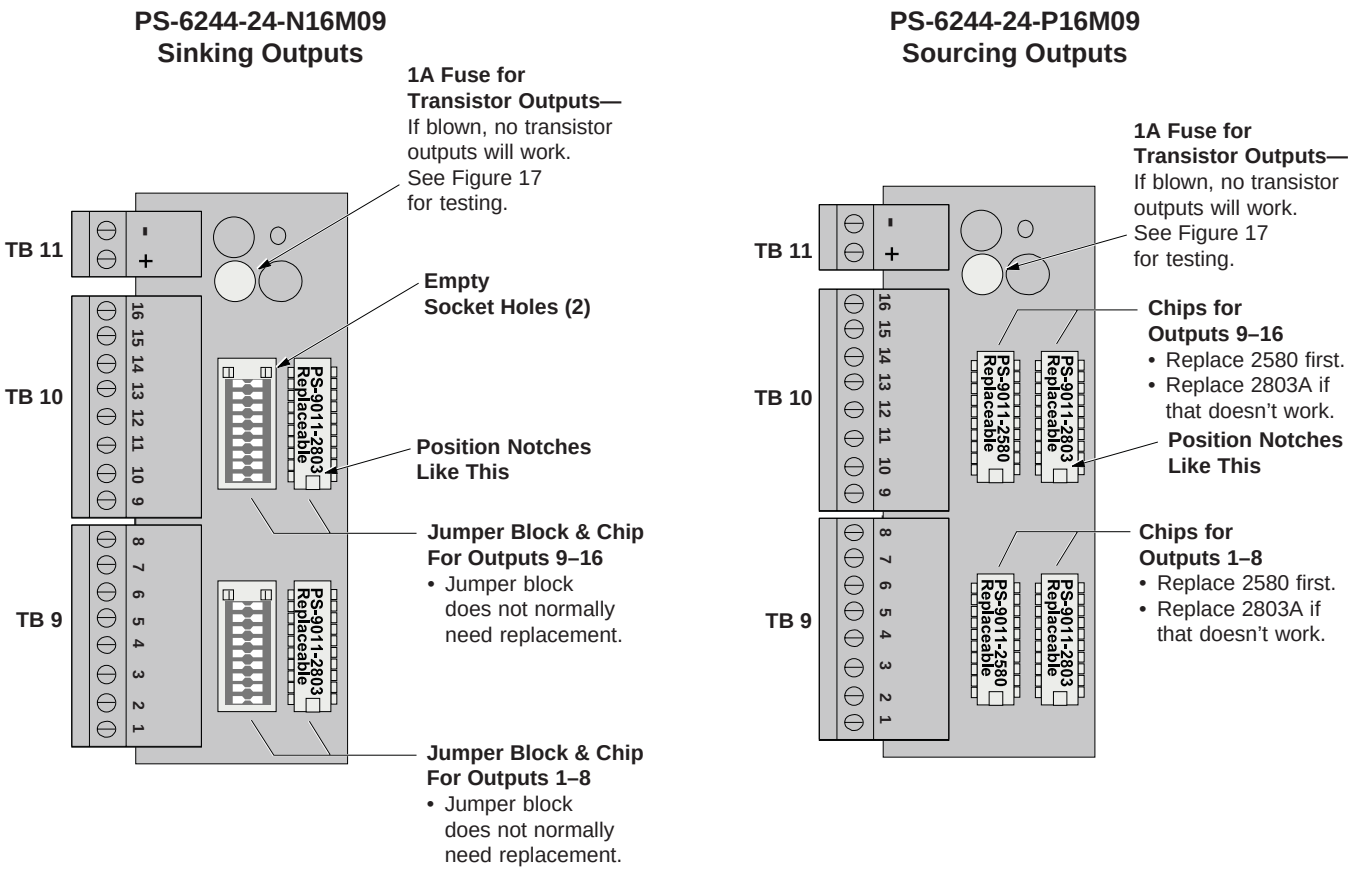
- A short circuit connected to one of the transistor outputs.
- A load exceeding 50 mA connected to one of the transistor outputs.

Before replacing a transistor output chip, fix the problem that damaged it.

Proper Placement

When replacing a chip, be sure that all of the pins are properly seated in the socket. Position the notch on the end of the chip as shown below.

Figure 18—Transistor Chip Replacement



Replacement Part Numbers

Description	ECC Part #
UDN 2580	PS-9011-2580
ULN 2803A	PS-9011-2803
DIP Jumper Block	PS-9006-0015