M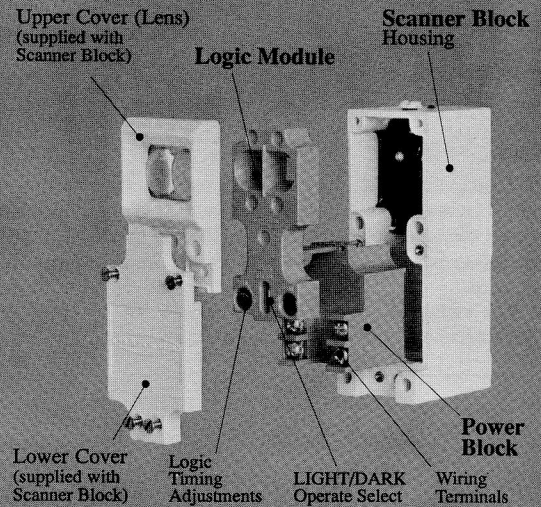ULTI-BEAM 3- & 4-wire power block modules provide regulated low voltage DC power to the scanner block and logic module in MULTI-BEAM modular photoelectric sensors, and contain a solid state infinite-life switch (except in emitter-only scanner blocks PBT-1 and PBT48-1) for switching external circuitry. Open-collector output transistors switch up to 250mA maximum (see specifications).
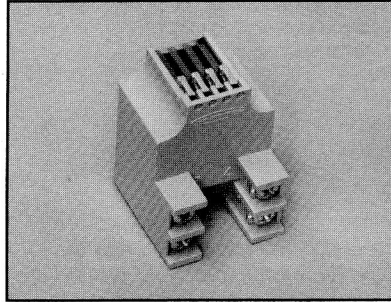
On-state voltage drop is less than 1V dc. Off-state leakage current is less than 10 microamps. Connections are made to heavy-duty screw terminals which accept up to #14 gauge wire (no lugs are necessary). All power blocks are epoxy-encapsulated and rated for -40 to +70 degrees C (-40 to +158 degrees F).

Models are available to operate from either 10-30V dc or 44-52V dc. Response times are determined by the scanner block module used. All DC power blocks are color coded gray for easy identification.

EXPLODED VIEW, MULTI-BEAM SENSOR

Upper Cover (Lens) (supplied with Scanner Block) — Logic Module — Scanner Block Housing — Lower Cover (supplied with Scanner Block) — Logic Timing Adjustments — LIGHT/DARK Operate Select — Power Block — Wiring Terminals

A MULTI-BEAM sensor consists of a scanner block module, a logic module, and a power block module (all purchased separately). Note: a scanner block module consists of a scanner block housing, an upper cover assembly, and a lower cover.
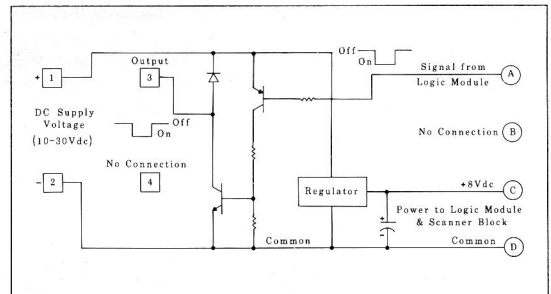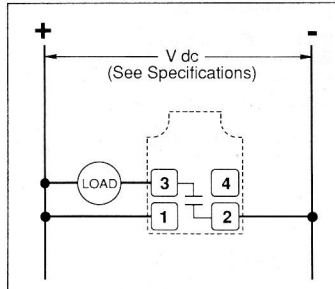

DC Models — *Connections* — *Functional Schematics*

PBT ⓊⓁ Listed ⓈⓅ Certified

Input: 10 to 30V dc at less than 60mA (current draw depends on scanner block used). 10% max. ripple.
Output: one open-collector NPN transistor (sinks current to negative side of power supply). 250mA maximum.
On state voltage drop: less than 1V dc
Off state leakage current: less than 10 microamps

PBT48

Input: 44 to 52V dc at less than 60mA (current draw depends on scanner block used). 10% max. ripple.
Output: one open-collector NPN transistor (sinks current to negative side of power supply). 250mA maximum.
On state voltage drop: less than 1V dc
Off state leakage current: less than 10 microamps
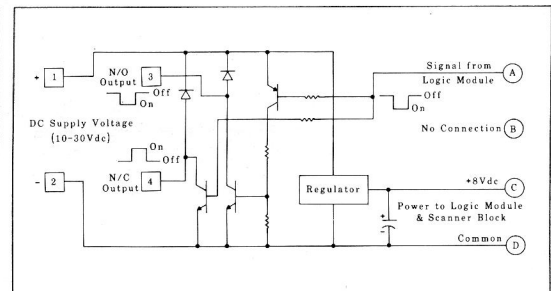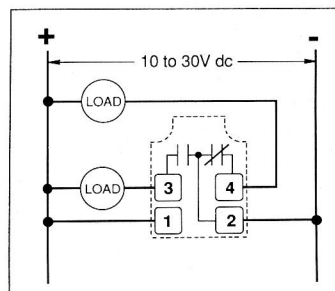
PBT: the most commonly used dc power block. Its output is an NPN transistor, which sinks current to the negative side of the power supply. The load is connected between the output and the positive side of the power supply. Switching capacity is 250mA. There is no connection to terminal #4.

PBT48: exactly the same configuration as the PBT, but for 48V dc systems.

PBT2: provides two NPN outputs; one normally open, the other normally closed (equivalent to SPDT relay). The normally closed output may be used when a load must de-energize when the MULTI-BEAM operates (e.g. normally closed one-shot). NOTE: both outputs are open when dc power is removed.

PBT2

Input: 10 to 30V dc at less than 60mA (current draw depends on scanner block used). 10% max. ripple.
Output: two open-collector NPN transistors (one normally open, one normally closed). 250mA maximum, each output.
On state voltage drop: less than 1V dc
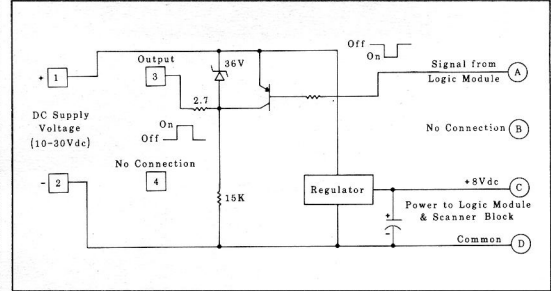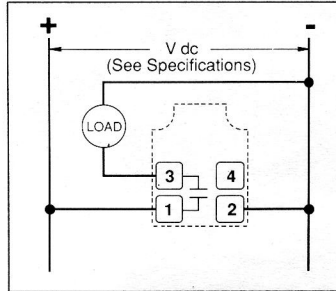**Off state leakage current:** less than 10 microamps

PBP ⓊLⓁ Listed ⓈP Certified

Input: 10 to 30V dc at less than 60mA (current draw depends on scanner block used). 10% max. ripple.
Output: one open-collector PNP transistor (sources current from positive side of power supply). 250mA maximum.
On state voltage drop: less than 1V dc
Off state leakage current: less than 10 microamps

PBP48

Input: 44 to 52V dc at less than 60mA (current draw depends on scanner block used). 10% max. ripple.
Output: one open-collector PNP transistor (sources current from positive side of power supply). 250mA maximum.
On state voltage drop: less than 1V dc
Off state leakage current: less than 10 microamps

PBP: similar to model PBT, except that it provides a PNP sourcing type output transistor. Sourcing outputs are frequently required when interfacing to logic systems and programmable logic controllers (PLCs) which require a positive source of dc voltage to generate an input condition. This type of interface may also be accomplished by using PBT with a "pullup" resistor installed between terminals #1 and #3.

PBP48: a 48V dc version of model PBP.

These are power blocks for emitter scanner blocks only (models SBE, SBED, SBEX, SBEV, SBEXD, SBEF, SBEXF). Emitter assemblies do not require logic modules.
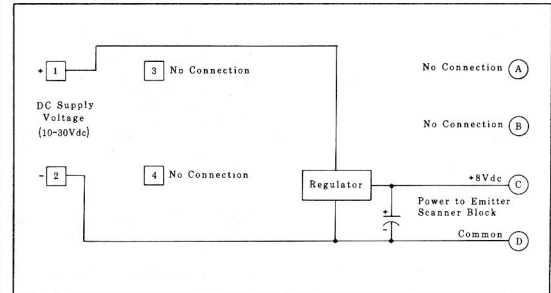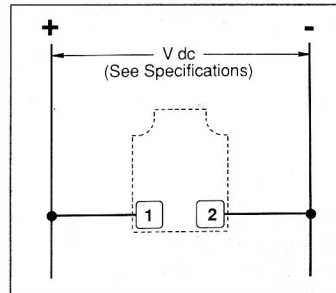
PBT-1 ⓊLⓁ Listed ⓈP Certified

Input: 10 to 30V dc at less than 60mA (current draw depends on scanner block used). 10% max. ripple.

PBT48-1

Input: 44 to 52V dc at less than 60mA (current draw depends on scanner block used). 10% max. ripple.


HOOKUP DIAGRAMS FOR DC POWER BLOCKS

HOOKUP TO A PROGRAMMABLE CONTROLLER requiring a current sink

Use power blocks with NPN outputs to interface to PLCs and other logic devices requiring a current sink at the inputs. Connect the output of the power block (terminal #3) to any input of the PLC. Also, connect the negative of the MULTI-BEAM power supply (terminal #2) to the negative of the PLC power supply.
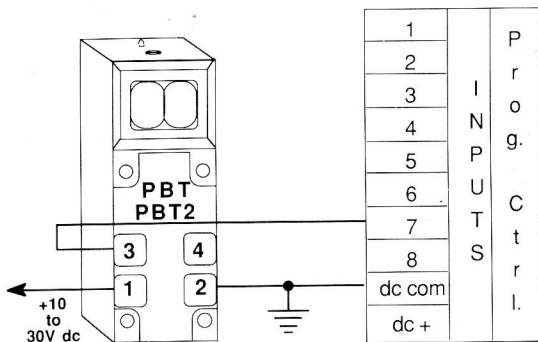
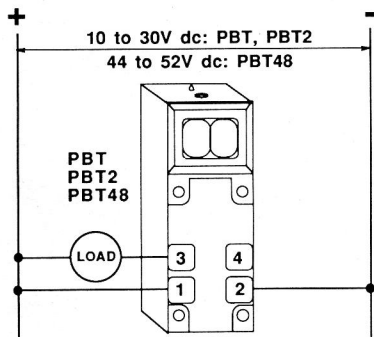## HOOKUP TO A PROGRAMMABLE CONTROLLER requiring a current source

Use power blocks with PNP outputs to interface to PLCs and other logic devices requiring a current source at the inputs. Connect the output of the power block (terminal #3) to any input of the PLC. Also, connect the negative of the MULTI-BEAM power supply (terminal #2) to the negative of the PLC power supply.
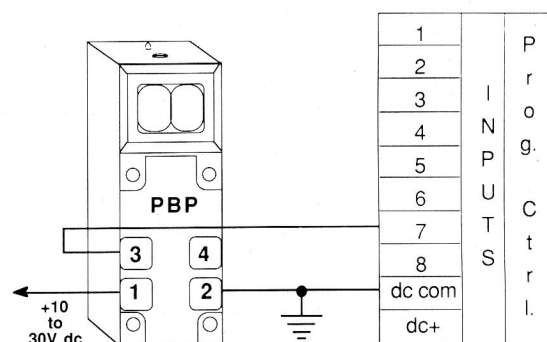
HOOKUP TO DC RELAY OR SOLENOID
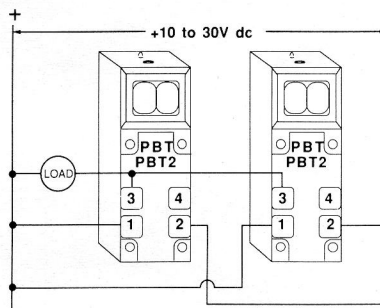### (using sinking output)

When using power blocks with current sinking (NPN) outputs, simple loads connect between the power block output (terminal #3) and the positive supply (terminal #1).

HOOKUP TO DC RELAY OR SOLENOID
(using sourcing output)

When using power blocks with current sourcing (PNP) outputs, simple loads connect between the power block output (terminal #3) and DC common (terminal #2).

HOOKUP TO LOGIC GATE

A logic zero (0 volts DC) is applied to the gate input when the MULTI-BEAM output is energized. When de-energized, a logic one is applied. The logic supply must be common to the MULTI-BEAM supply negative.


PARALLEL HOOKUP TO A COMMON LOAD

Any number of MULTI-BEAMs may be connected in parallel to one load to create "LIGHT-OR" (light operate mode) or "DARK-OR" (dark operate mode) multiple sensor logic. In most situations, MULTI-BEAM DC power blocks cannot wire in series. However, addition of an interposing relay with a normally closed contact or a Banner logic module will permit "AND" logic with a parallel sensor array.

To load requiring current sink:
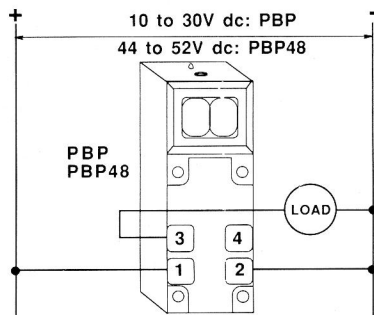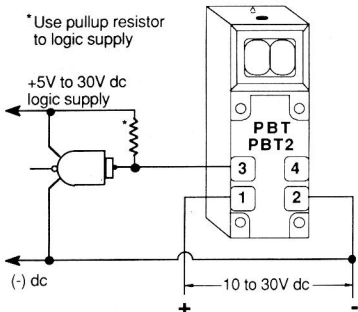

To load requiring current source:
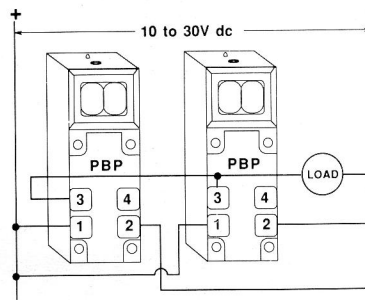
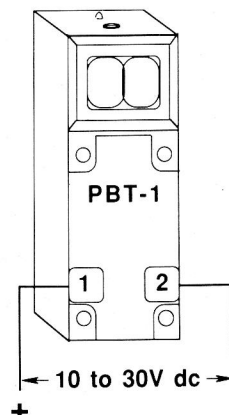*NOTE: MULTI-BEAM dc power blocks cannot be wired in series.*

HOOKUP OF DC EMITTER

MULTI-BEAM emitter-only scanner blocks use DC power block models PBT-1 or PBT48-1. These power blocks connect directly across the DC supply, as shown.
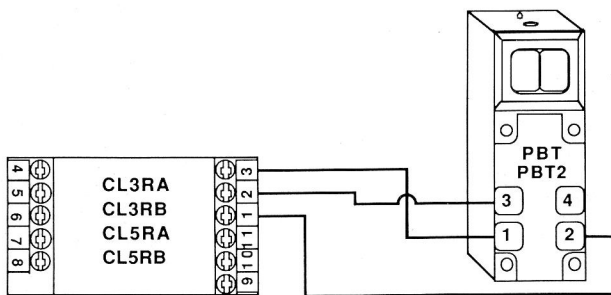
Emitter models:
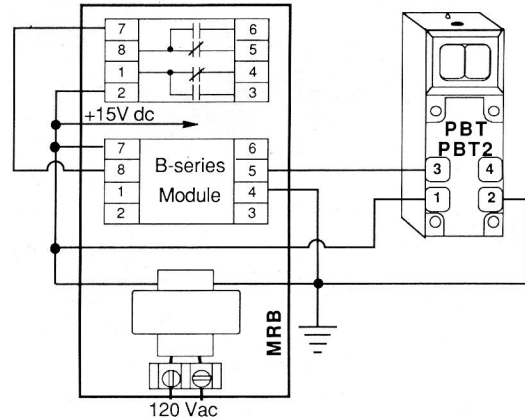SBE
SBED
SBEX
SBEV
SBEXD
SBEF

HOOKUP TO MAXI-AMP LOGIC MODULE

The current sinking output(s) of MULTI-BEAM power block models PBT and PBT2 may be connected directly to the input of CL-series MAXI-AMP modules. A MAXI-AMP which is powered by AC voltage offers a DC supply with enough capacity to power one MULTI-BEAM sensor, as shown in this hookup diagram. When emitter/receiver pairs are used, the emitter should be powered from a separate power source (e.g.- using PBA-1, etc.)

HOOKUP TO "B" SERIES LOGIC (MRB CHASSIS)

The current sinking output(s) of MULTI-BEAM power block models PBT and PBT-2 may be connected directly to the input (terminal #5) or the auxiliary input (terminal #3) of any Banner B-series logic module. The MULTI-BEAM is powered by the MRB chassis as shown. Additional logic may be added on a longer chassis. Banner PLUG-LOGIC modules may also be used.

## HOOKUP TO MICRO-AMP LOGIC (MODEL MPS-15 CHASSIS)

The current sinking output(s) of MULTI-BEAM power block models PBT and PBT2 may be connected directly to the primary input (terminal #7) or the other inputs of MICRO-AMP logic modules. The following logic modules may be used:

MA4-2   One shot
MA5   On/off delay
MA4G   4-input "AND"
MA4L   Latch
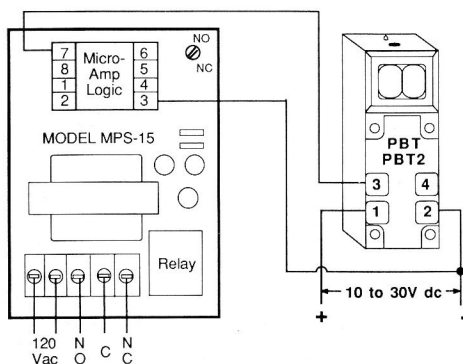
HOOKUP TO COUNTER

Most counters, totalizers, rate meters, etc., including the battery-powered LCD types, accept the NPN current sinking output of MULTI-BEAM power block models PBT and PBT2 as an input. Counters which are powered by AC line voltage usually offer a low voltage DC supply with enough capacity to power one MULTI-BEAM ($\geq$10V dc at $\geq$60mA).
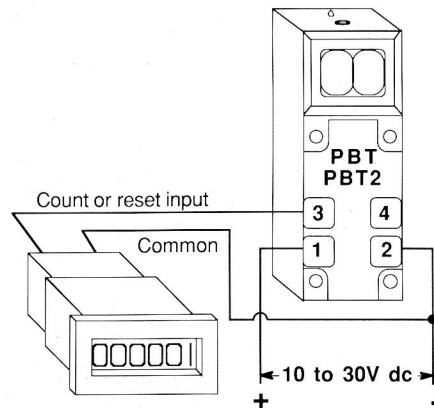
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