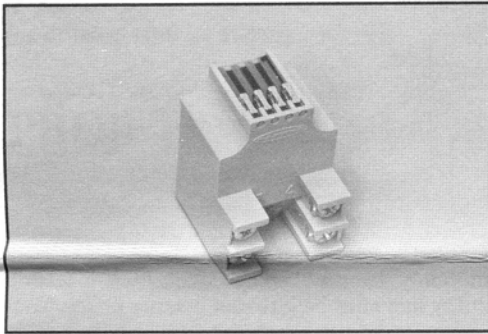


MULTI-BEAM[®] for MULTI-BEAM modular photoelectric sensors



3- and 4-wire AC Power Block Modules



MULTI-BEAM 3- and 4-wire AC power block modules provide regulated low voltage DC to power the scanner block module and logic module in MULTI-BEAM modular photoelectric sensors. They also contain a solid-state infinite-life switch (except in emitter-only scanner blocks) for switching external circuitry.

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). Response times are determined by the scanner block used.

All 3- and 4-wire AC power block modules are color-coded red.

AC Models

Connections

Functional Schematic

PBA

Input: 105 to 130V ac, 50/60Hz.

PBB

Input: 210 to 250V ac, 50/60Hz.

PBD

Input: 22 to 28V ac, 50/60Hz.

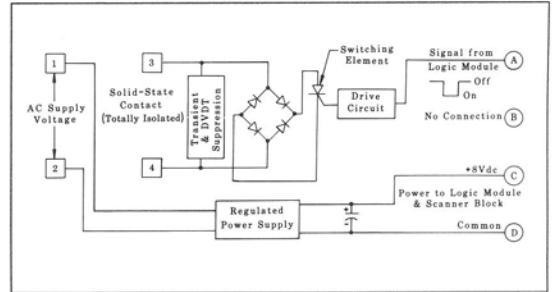
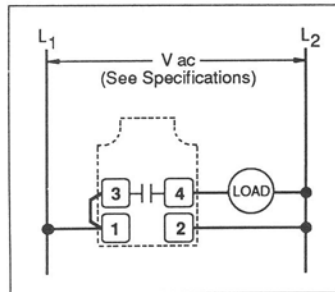
PBD-2

Input: 11 to 13V ac, 50/60Hz.

Output: SPST solid-state switch for AC, 3/4 amp maximum (derated to 1/2 amp at 70 degrees C). 10 amp maximum inrush for one second or 30 amps for one ac cycle (non-repeating).

On-state voltage drop of less than 2.5V ac at full load.

Off-state leakage current less than 100 microamps.



These power blocks are the most commonly used for ac operation. As the typical hookup shows, they are intended to switch the same ac voltage as is used to power the MULTI-BEAM sensor. However, the output of all four blocks is rated for 250V ac maximum, and is able to switch a voltage which is different than the supply as long as *both ac circuits share a common neutral*. For example, a PBA could switch a 24V ac door chime, etc. Observe local codes when mixing ac voltages in a wiring chamber. These blocks are designed to handle the inrush current of ac inductive loads like motor starters and solenoids. The "holding current" specification of any inductive load should not exceed the 750mA output rating. There is no minimum load requirement. These power blocks will interface directly to all AC programmable controller inputs. All contain built-in transient suppression to prevent false turn-on or damage from inductive loads and line "spikes". Outputs of multiple power blocks may be wired in series or parallel for "AND" and "OR" logic functions.

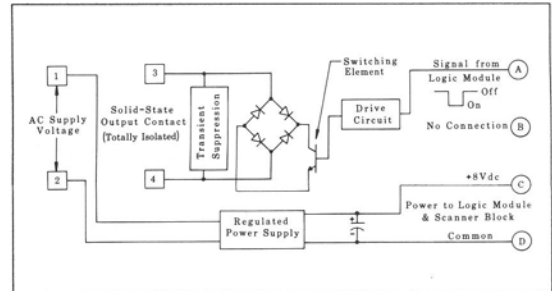
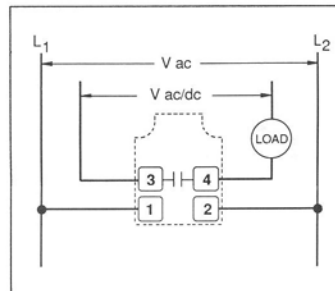
PBAT

Input: 105 to 130V ac, 50/60Hz.

Output: SPST isolated solid-state switch; 100mA maximum (no inrush capacity), 200V dc max., 140V ac max.

On-state voltage drop of less than 3 volts at full load.

Off-state leakage current less than 100 microamps.



Power block models PBAT and PBBT have an isolated solid-state output switch which may be used to switch either ac or dc. The switch is rated at 100mA maximum, and there is no capacity for inrush. As a result, these power blocks usually should not be used to switch ac inductive loads. However, 100mA is enough capacity to switch many inductive *dc* loads like small relays and solenoids.

Models PBAT and PBBT interface directly to all ac programmable controller inputs. NOTE: since the saturation voltage of these power blocks is typically greater than 1 volt, they should *not* be used to interface 5V dc logic circuits like TTL. Instead, use special order power block model PBOL or PBOBL.

PBBT

Input: 210 to 250V ac, 50/60Hz.

Output: SPST isolated solid-state switch; 100mA maximum (no inrush capacity), 350V dc max., 250V ac max.

On-state voltage drop of less than 3 volts at full load.

Off-state leakage current less than 100 microamps.



MULTI-BEAM 3- & 4-wire AC power blocks



AC Models

Connections

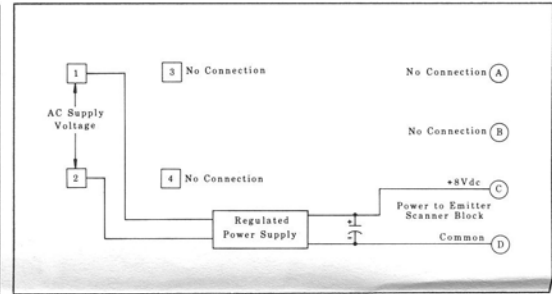
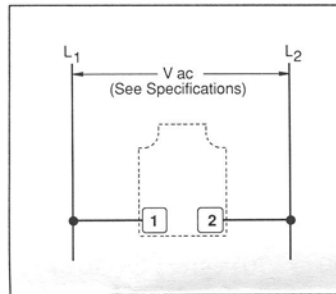
Functional Schematics

These are power blocks for emitter scanner blocks only (models SBE, SBED, SBEX, SBEV, SBEXD, SBEF, SBEXF). Emitter assemblies do not require logic modules.

PBA-1  Listed  Certified
Input: 105 to 130V ac, 50/60Hz.

PBB-1  Listed  Certified
Input: 210 to 250V ac, 50/60Hz.

PBD-1
Input: 22 to 28V ac, 50/60Hz.



These power blocks are used to power emitter-only scanner blocks. Models PBA-1, PBB-1, and PBD-1 save the cost of the output circuitry that must be included in other power block models. (These other power blocks may, however, be used to power emitter-only scanner blocks, with the output switching circuitry going unused.)

HOOKUP DIAGRAMS FOR AC POWER BLOCKS

HOOKUP TO SIMPLE AC LOAD

NOTE: output switching capacity is 3/4 amp maximum.

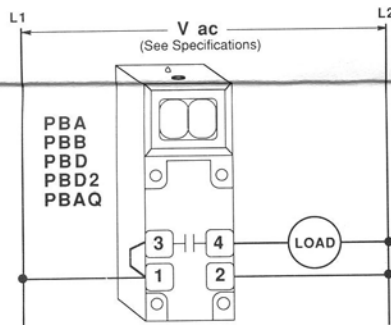
AC voltage is connected to terminals #1 and #2 to provide power to the MULTI-BEAM. The solid-state output switch behaves as if there were a contact between terminals #3 and #4. L1 is most conveniently applied to terminal #3 by jumpering terminals #1 and #3 inside the MULTI-BEAM.

The outputs of all five power block models are rated for 250V ac maximum, and can switch an AC voltage which is different from the supply as long as both AC circuits share a common neutral. Observe local wiring codes when mixing AC voltages in a common wiring chamber.

Since the output switch is a solid-state device, contact continuity cannot be checked by means of an ohmmeter, continuity tester, etc. To check the functioning of the output switch, a load must be installed and tested along with the MULTI-BEAM.

CAUTION: the output switch could be destroyed if the load becomes a short circuit (i.e., if L1 and L2 are connected directly across terminals #3 and #4).

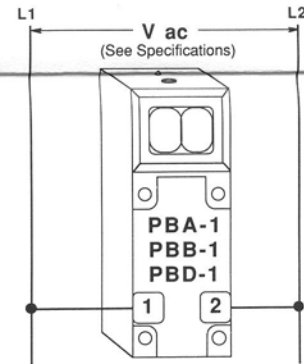
NOTE: this hookup depicts the output switch as a normally open contact. Model PBAQ actually has a normally closed output switch.



HOOKUP OF AC EMITTER

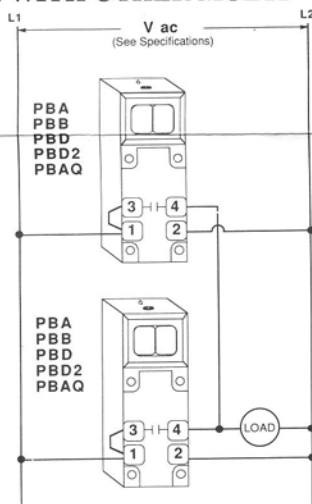
MULTI-BEAM emitter-only AC power blocks connect directly across the AC line, as shown.

Emitter models: SBE, SBED, SBEX, SBEV, SBEXD, SBEF, & SBEXF.



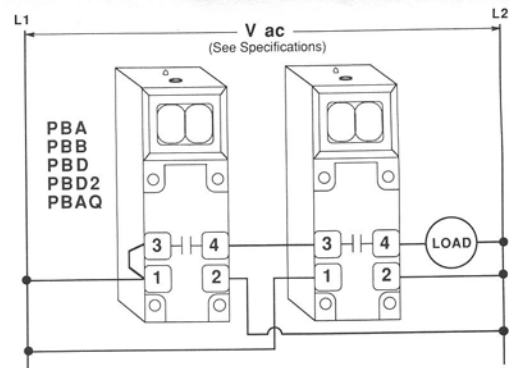
HOOKUP IN PARALLEL WITH OTHER MULTI-BEAMS

Any number of 3- & 4-wire MULTI-BEAM power block outputs may be connected in parallel to a load. Parallel sensor connection is usually used to yield "OR" logic (i.e., if an event occurs at any sensor, the load is energized). The total off-state leakage current through the load is the sum of the leakage current of the individual power blocks. However, the maximum leakage current of MULTI-BEAM 3- & 4-wire AC power blocks is only 100 microamps. As a result, installation of an artificial load resistor in parallel with the load is necessary only for large numbers of sensors wired in parallel to a light load.



HOOKUP IN SERIES WITH OTHER MULTI-BEAMS

MULTI-BEAM 3- & 4-wire AC power blocks may be wired in series with each other for the "AND" logic function. The total voltage drop across the series will be the sum of the individual voltage drops across each power block (approximately 3 volts per block). With most loads, 10 or more power blocks may be wired in series.



MULTI-BEAM 3- & 4-wire AC power blocks

AC Models

Connections

Functional Schematics

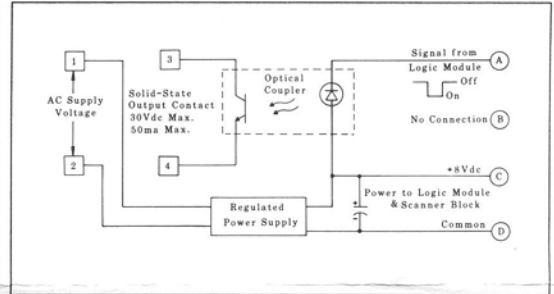
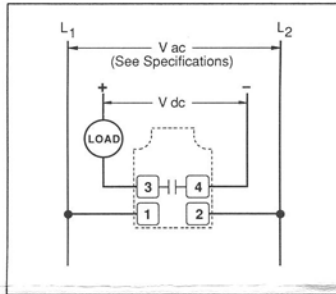
PBO

Input: 105 to 130V ac, 50/60Hz.

PBOB

Input: 210 to 250V ac, 50/60Hz.

Output: SPST isolated optically coupled transistor switch (will switch dc only); 50mA maximum, 30V dc max. On-state saturation voltage less than 1 volt at 2mA, less than 1.3mA at 50mA. Off-state leakage current less than 10 microamps.

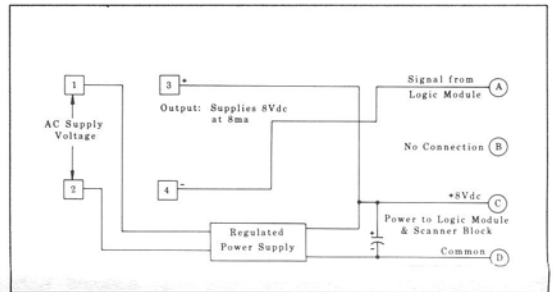
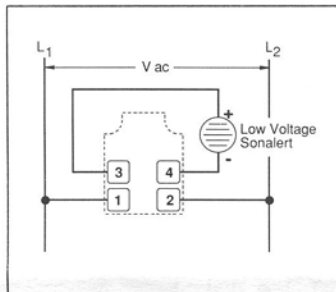


These power blocks are designed to interface an electronic circuit (or control) at a low DC voltage level, but where there is no DC supply voltage available to power the MULTI-BEAM. Since the output is isolated it may be wired to either source or sink current, and multiple units may be wired in either series or parallel. The output of model PBO or PBOB will directly interface Banner component system logic modules. NOTE: the 1-volt saturation prevents direct interfacing to 5-volt logic systems such as TTL. For these low-voltage interfaces, use instead special order model PBOL or PBOBL.

PBAM

Input: 105 to 130V ac, 50/60Hz.

Output: 8Vdc at 8mA maximum (short circuit proof).



Model PBAM is a special-purpose power block that is powered by 120V ac, and provides a low level source of DC output voltage when the sensor's output is energized. It is used primarily to power low voltage audio tone annunciators such as "SONALERTS". The PBAM may also provide a signal to many types of logic devices. The output is approximately 8V dc when energized, and the output impedance is 1K ohm (short circuit proof). The output is totally isolated from the AC supply voltage, and may be used to provide an input signal to many line-powered or battery-powered electronic totalizers.

If you are unable to find the power block for your interface, contact the Banner Application Engineering Department during normal business hours at (612) 544-3164.

PBAQ

Input: 105 to 130V ac, 50/60Hz.

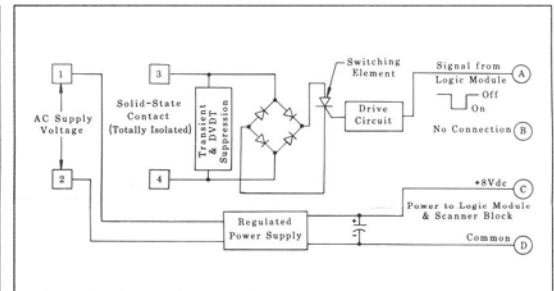
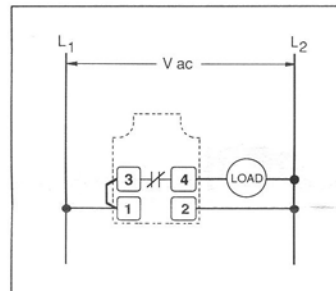
Output: SPST isolated solid-state switch; normally closed, 3/4 amp maximum (derated to 1/2 amp at 70 degrees C).

10 amp maximum inrush for one second or 30 amps for one ac cycle (non repeating).

On-state voltage drop of less than 2.5V ac at full load.

Off-state leakage current less than 100microamps.

NOTE: the output of the PBAQ will not conduct when power is removed from terminal #1 or 2.



Model PBAQ is identical to model PBA (page 1) except that the solid-state output contact is normally closed instead of normally open. It is used where it is necessary to have the load de-energize when something is sensed (e.g.- one shot pulse to de-energize load). When no timing logic is involved, model LM3 can program any power block for normally open or normally closed operation via the light/dark operate jumper.

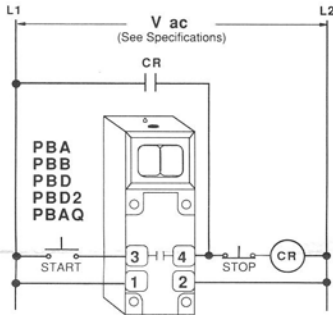
NOTE: model PBAQ is not compatible with logic module models LM5 and LM5-14. For normally closed on-delay logic, use PBA with LM5R and reverse the light/dark function.

MULTI-BEAM 3- & 4-wire AC power blocks

HOOKUP DIAGRAMS FOR AC POWER BLOCKS (continued)

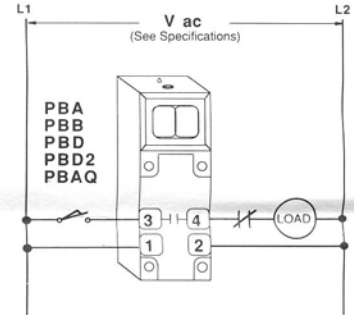
HOOKUP IN PARALLEL WITH CONTACTS OR SWITCHES

Any number of "hard" contacts may be wired in parallel with one or more MULTI-BEAM 3- & 4-wire power blocks. All models have less than 100 microamps (0.1 milliamp) of off-state leakage current. The load operates when either the contacts close or the MULTI-BEAM output is energized.



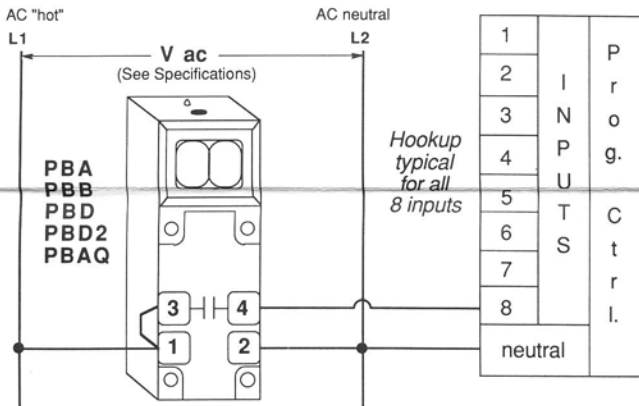
HOOKUP IN SERIES WITH CONTACTS OR SWITCHES

Terminals #3 and #4 of MULTI-BEAM 3- & 4-wire power blocks may be connected in series with one or more "hard" contacts. The load operates only when all contacts are closed and the MULTI-BEAM output is energized.

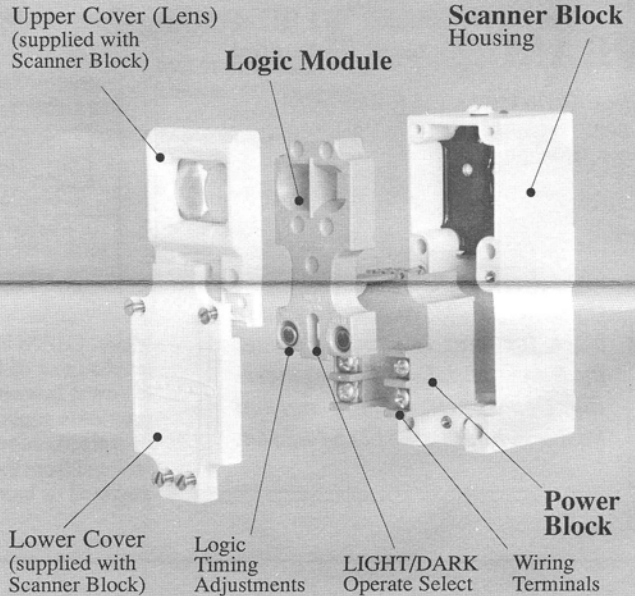


HOOKUP TO A PROGRAMMABLE LOGIC CONTROLLER (PLC)

Interfacing to a PLC I/O is direct with MULTI-BEAM 3- & 4-wire AC power blocks. All models have less than 100 microamps (0.1 milliamp) of off-state leakage current. If you have a question on hookup to a particular brand of PLC, contact the Banner Applications Department during normal business hours.



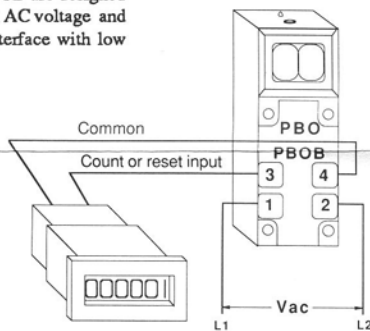
Exploded View, MULTI-BEAM Sensor



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

HOOKUP TO COUNTER

Power block models PBO and PBOB are designed to power the MULTI-BEAM with AC voltage and to permit the sensor output to interface with low voltage DC circuits and devices. A common situation involves inputting to battery-powered LCD totalizers, rate meters, etc. The output switch is the transistor of an optical coupler, which may be connected to switch DC common to the count input. Polarity must be observed.



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