MULTI-BEAM 2-wire Power Blocks

MULTI-BEAM 2-wire power block models 2PBA, 2PBB, and 2PBD contain a low voltage power supply which utilizes a unique circuit to take a very small leakage current through the load and convert it to the dc power required to run the scanner block and logic module. They also contain the solid-state switch that operates the load, and a transient suppression circuit to prevent false operation from high voltage spikes on the incoming line. They are completely solid-state for unlimited operating life.

Model 2PBR is a 4-wire power block which works with 2-wire scanner blocks and logic modules and offers an SPST "hard" contact for switching heavy ac or dc loads. Model 2PBR2, also for use with 2-wire scanner blocks and logic modules, uses a 3- or 4-wire hookup with SPDT "hard" contacts for switching heavy ac loads. NOTE: MULTI-BEAM 2-wire ac power blocks are color-coded black.

Models	*Connections*	*Functional Schematics*

2PBA ⓊL listed   ⓈR certified
Operating voltage: 105 to 130V ac, 50/60Hz

2PBB ⓊL listed   ⓈR certified
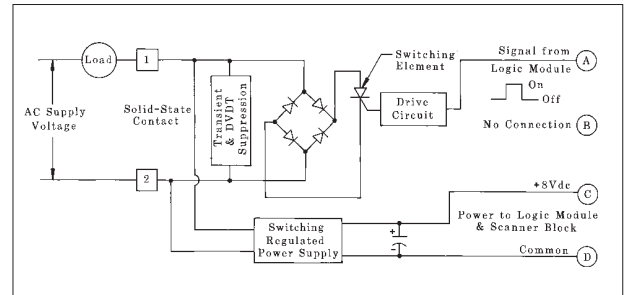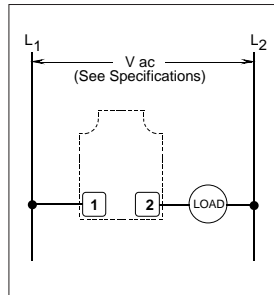**Operating voltage:** 210 to 250V ac, 50/60Hz

2PBD
Operating voltage: 22 to 28V ac, 50/60Hz

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

Maximum inrush: 10 amps for 1 second (non-repeating).

On-state voltage drop: less than 10 volts

**Leakage current:** less than 1 milliamp (resistive or inductive loads)

MULTI-BEAM 2-wire power blocks offer the ultimate in simplicity of sensor hookup. They wire directly in series with an ac load, exactly like a limit switch. Response time of 2-wire power blocks is determined by the scanner block, which is 10 milliseconds on/off. A built-in false pulse protection circuit holds the output OFF for 100 milliseconds after power is initially applied to the power block. 2-wire power blocks will operate from -40 to +70 degrees C (-40 to +158 degrees F). Resistive loads must be less than 15,000 ohms and inductive loads must be greater than 1.2 watts (10 milliamps).

2PBR *(Electromechanical relay output)*
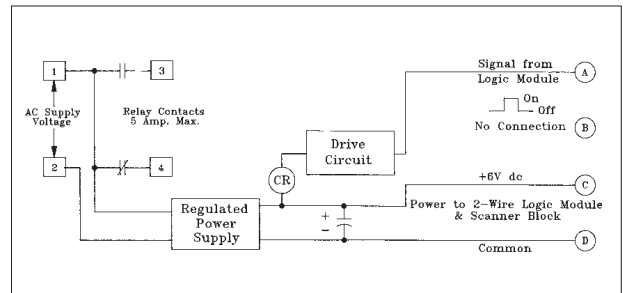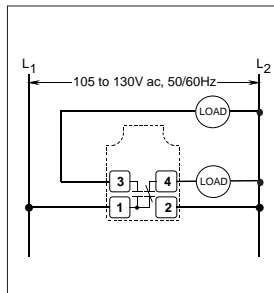**Input:** 105 to 130V ac, 50/60Hz
Output: SPST electromechanical relay contact.
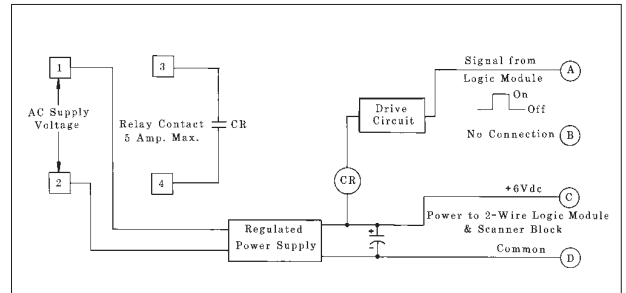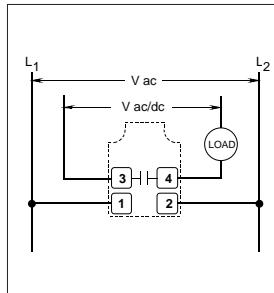
2PBR2 *(Electromechanical relay output)*
Input: 105 to 130V ac, 50/60Hz
Output: SPDT electromechanical relay contacts, both contacts common to terminal #1 (L1).

Additional specifications, both models:
Contact rating: 250V ac max, 30V dc max, 5 amps max. (resistive load); install MOV across contact if switching an ac inductive load.
Closure time: 20 milliseconds
Release time: 20 milliseconds
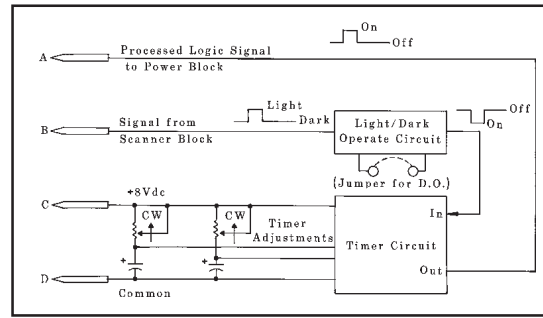*Maximum switching speed:* 20 operations/second
Mechanical life of relay: 10,000,000 operations

Model 2PBR actually requires a 4-wire hookup and model 2PBR2 requires a 3- or 4-wire hookup, even though they only work with 2-wire scanner blocks and logic modules. Both are powered by 120V ac across terminals #1 and 2. The **2PBR** offers an SPST "hard" relay contact between terminals #3 and 4. Model **2PBR2** is an SPDT version, with both contacts common to terminal #1: terminal #3 is a normally open output, and terminal #4 is normally closed. These configurations allow MULTI-BEAM sensors to directly interface large loads which draw more than 3/4 amp like clutches, brakes, large contactors, and small motors. **Model 2PBR can switch both ac and dc loads; model 2PBR2 switches the ac line voltage to an ac load** (see connection diagrams). The 2PBR and 2PBR2 also eliminate the problem of voltage drop from series strings of sensors operating low voltage ac loads. NOTE: install an appropriate value MOV (metal oxide varistor) transient suppressor across the power block relay contacts when switching an ac inductive device.

MULTI-BEAM 2-wire Logic Modules

2-wire logic modules provide the mechanical and electrical connection between the scanner block and the power block of a 2-wire MULTI-BEAM sensor. In addition, the logic module provides the LIGHT/DARK programming of the output plus delay or pulse timing, if required. 2-wire logic modules are all color-coded black (3- and 4-wire logic modules are red). The timing ranges listed below are standard. Special timing ranges are available, on a quote basis, per the instructions given for 3- and 4-wire logic modules on page 23. NOTE: model LMT test module (page 23) may also be used with 2-wire systems.

SPECIFICATIONS, 2-WIRE LOGIC MODULES:
specifications for 2-wire logic modules are identical to those for 3- and 4-wire logic modules (see page 21).

| *Model and Function*	*Description of Logic*
2LM3 **on-off** OUTPUT SIGNAL	The **2LM3** is an on/off logic module that has the ability to be programmed for either LIGHT or DARK operate. It comes with a jumper wire installed: with the jumper in place, the output is DARK operated; with the jumper removed, the output is LIGHT operated. The 2LM3 is used when no timing function is desired.
2LM4-2 **one-shot** OUTPUT SIGNAL Setable time range: .1 to 1 second.	The **2LM4-2** provides a one-shot ("single shot") output pulse each time there is a *transition* from LIGHT to DARK (jumper installed) or from DARK to LIGHT (jumper removed). The output pulse time range is from adjustable from 0.1 to 1 second. The duration of the pulse is independent of the duration of the input signal. The timing of the 2LM4-2 is restarted each time the input signal is removed and then recurs. This is referred to as a "retriggerable" one shot, and this feature may be applied to some rate sensing applications.
2LM5 **on-delay** OUTPUT SIGNAL Setable time range: 1.5 to 15 seconds.	The **2LM5** is a true "on-delay" type logic module. The input signal must be present for a predetermined length of time before the output is energized. The output then remains energized until the input signal is removed. If the input signal is not present for the predetermined time period, no output occurs. If the input signal is removed momentarily and then reestablished, the timing function starts over again from the beginning. The standard time range is adjustable from 1.5 to 15 seconds, and other ranges are available.
2LM5R **off-delay** OUTPUT SIGNAL Setable time range: 1.5 to 15 seconds.	The **2LM5R** is an "off-delay" logic module, similar to the 2LM5, except that timing begins on the trailing edge of the input signal. When the input occurs, the output is immediately energized; if the input is then removed, the output remains energized for the adjustable predetermined time period, then deenergizes. If the input is removed but then reestablished while the timing holds the output energized, a new output cycle is begun. The LIGHT/DARK operate jumper wire option is included. Timing range is adjustable from 1.5 to 15 seconds, and op-tional ranges are available.
2LM5-14 **on- and off-delay** OUTPUT SIGNAL Setable time range: 1.5 to 15 seconds.	The **2LM5-14** combines the function of an "on-delay" and an "off-delay" into one logic module. When the signal is present for more than the output on-delay time, the output energizes. The off delay circuit is now active, and holds the output on even if the input signal disappears for short periods of time. If the input signal is gone for longer than the off-delay time, the output finally drops out. The time delays can control high and low levels in flow control applications. Each delay is independently adjustable for 1.5 to 15 seconds.
2LM5T **limit timer** OUTPUT SIGNAL Setable time range: 1.5 to 15 seconds.	The **2LM5T** "limit" timer combines the function of on-off logic and on-delay logic. As long as the signal is present for only short periods of time, the output "follows the action" of the input signal. If the input signal is present for longer than the predetermined time, the output deenergizes. The output only reenergizes when the input signal is removed and then reestablished. Interval timers are used to operate loads which must not run continuously for long periods of time, such as intermittent duty solenoids and conveyor motors. Timing range is adjustable from 1.5 to 15 seconds.

# MULTI-BEAM Accessories

Mounting Brackets

Model **SMB700** (right) is a general-purpose two-axis mounting bracket that is supplied with a cable gland assembly which is used to attach the MULTI-BEAM wiring base to the bracket. The gland assembly is threaded through the bracket and into the conduit entrance at the base of the scanner block. A large lockwasher is supplied to hold the scanner block firmly in place. The bracket is 11-gauge zinc plated steel.

Model **SMB700SS** is an 11-gauge stainless steel version of the SMB700. It is sold alone, without the cable gland assembly and lockwasher.
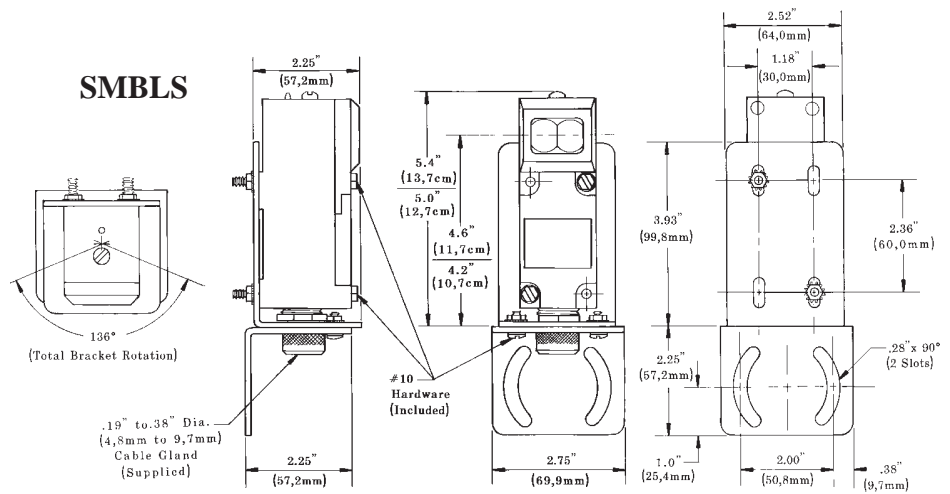
Model **SMB700F** (photo, below) is a flat, single-axis version of the SMB-700. It is sold without hardware.
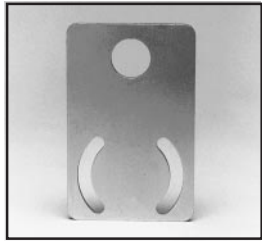
SMB700
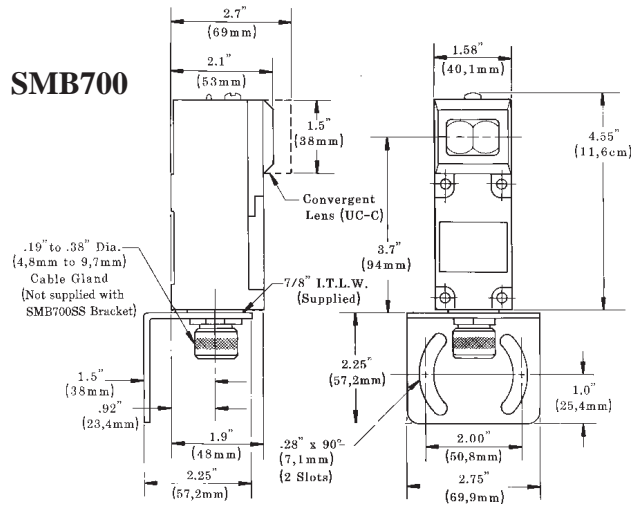
Model **SMBLS** (right) is a two-part bracket assembly which allows adjustment in three directions. It consists of two 11-gauge zinc plated steel right-angle brackets which fasten together so that they rotate relative to each other. The MULTI-BEAM wiring base attaches to the upper bracket and slots are provided for vertical adjustment. The bottom bracket is a modified version of the SMB700. Assembly hardware and a cable gland are included.

SMBLS

SMB700M

Heavy-duty 1/4-inch (6mm) zinc plated steel bracket that allows the MULTI-BEAM to retrofit to installations of MICRO-SWITCH models MLS8 or MLS9 sensors. Includes cable gland and lockwasher.

SMB700P

Heavy duty 1/4-inch (6mm) zinc plated steel bracket that allows the MULTI-BEAM to retrofit to installations of PHOTOSWITCH series 42RLU and 42RLP sensors. Includes cable gland and lockwasher.
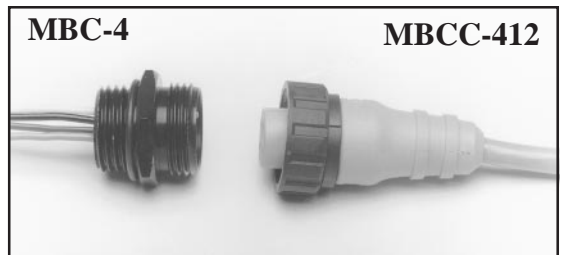
RF1-2NPS

Cable gland assembly for MULTI-BEAMs. Includes cord grips for .1 to .4 inch diameter cable. Bracket lockwasher is also included.

MBC-4   **MBCC-412**

MBC-4 is a 4-pin male industrial-duty connector that threads into the base of all MULTI-BEAMs. **MBCC-412** is a 12-foot long (3,6m) "SJT" type cable. It is interchangeable with standard industry types of several different manufacturers.

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