

Installation & Operation Manual

For Models PBCU and PBCU-DC

The Polara Push Button Control Unit is an interface device for Polara Bulldog pedestrian push buttons. It is designed as a double width plug-in module with support for 4 PED PHASES. It is offered in two versions. Model PBCU is AC powered and is primarily intended to be used in place of two Type 242 Isolators in a typical Cal-Trans style traffic signal cabinet. Model PBCU-DC is DC powered and is primarily intended for use in a standard detector rack in a NEMA style cabinet. Both are intended only for use with Polara Bulldog buttons. They are compatible with the BDL3 and all models of BDLM2 and BDLL2. While any normally open contact button will function with the PBCU models, only Polara buttons will take advantage of the features that they provide.

The PBCU models are fully compliant with MUTCD 2009 Section 4E.08 when used with latching Bulldogs. In either momentary or latching mode, the PBCU(-DC) will disable the audible and visible response of the Bulldog buttons in the event that the traffic signal controller enters FLASH mode⁽¹⁾. There are also two identical logic inputs. When either of these is activated, it will disable all buttons and place a constant call on all channels. The additional connections required to support these functions are accessed via a connector on the front of the module and a matching special cable included with either model.

Installation consists of wiring the special cable, inserting the PBCU(-DC) into the card slot, and connecting the cable to the front panel connector. For each pedestrian phase, the cable connects to the WALK and DON'T WALK load switch outputs. By monitoring these signals the PBCU(-DC) is able to respond to the traffic signal controller in flash mode. The WALK signal is also used to cancel the latched LEDs in latching mode.

The PBCU(-DC) has a switch selectable option to support the latching LED feature of the Polara BDL3 and BDLL2 push buttons. In this mode the PBCU models are a replacement for the Polara LPBCU. For traffic control cabinets where open slots are not available, Polara offers the PBCU-EB (external box) which allows the PBCU to operate in any cabinet. The PBCU-DC is not compatible with the PBCU-EB.

The PBCU obtains operating power from 115 VAC on contacts M and N of the card edge connector in the input file. The 24 VDC on contacts A and B is optional and only required to operate logic inputs.

The PBCU-DC is typically powered by 12 or 24 VDC on contacts A and B. Contacts M and N have no circuit connection.

In the event of a loss of operating power or certain failure modes, a constant PED call will be placed by the PBCU(-DC) to all four channels.

Please read this manual thoroughly in order to complete a trouble-free installation and save time in the process.

⁽¹⁾ Until the internal stored energy is depleted, the BDLM2 may indicate an LED flash or beep sound, but no PED CALL is placed.

Table of Contents

	Page
Cable Installation	3
PBCU Cabinet Wiring Diagram	4
Module Installation	5
Cal-Trans Style Cabinet	5
NEMA Style Cabinet	5
Button Field Wiring	5
Operation	6
Signal Flash Mode	6
Logic Inputs	6
Specifications	7
Mechanical	7
Electrical	7
Environmental	7
Card Edge Connector Pin Assignments	8
PBCU Switch Options	9
Switch 1 – Latching Mode	9
Switch 2 – Walk Option	9
Switch 3 – Not currently Used	9
Switch 4 – TS2	9
Cable Color Identification	10
10 Conductor Cable with Jacket	10
Single Wires	10

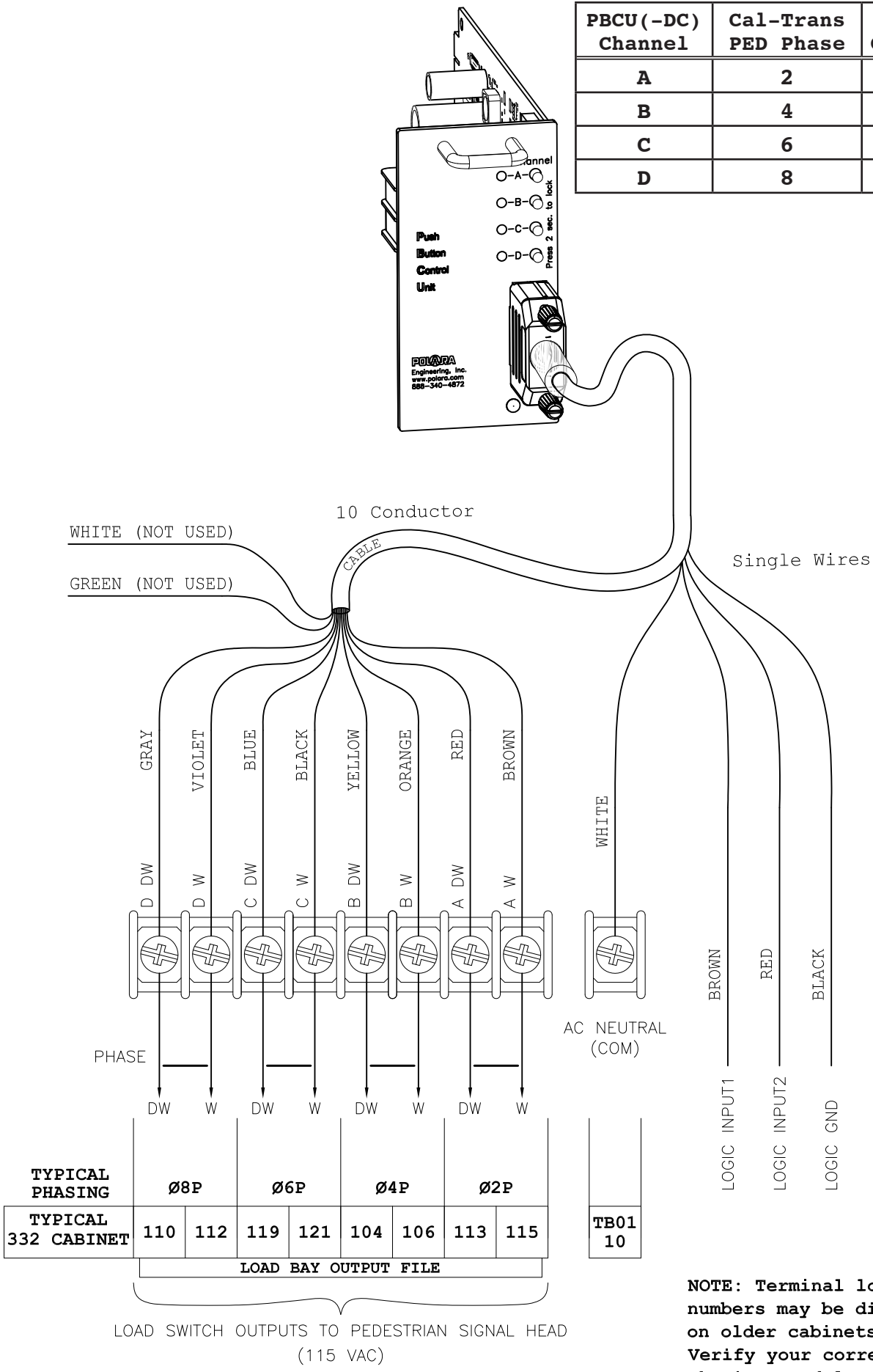
Cable Installation

Caution: Until the cable is connected to the PBCU(-DC), the connector may have 115 VAC on some of the pins. Connect the stripped end of the cable to the cabinet load switch output terminals. The connections should be electrically the same as the field wiring to the pedestrian signal heads. The cable expects to see 115 VAC for these signals. Omit connections for any unused PED PHASES. Connect the separate white wire to the AC Neutral bus. If logic inputs are used, connect the brown and/or red wire(s) to your logic signal(s). The black wire is internally connected to the cabinet logic ground. Shorting the brown or red wire to either the black wire or any other logic ground will activate that input. Incorrect wiring of the cable into the cabinet may damage the PBCU(-DC).

See Page 4 Wiring Pictorial

PUSH BUTTON CONTROL UNIT CABINET WIRING

PBCU (-DC) Channel	Cal-Trans PED Phase	NEMA Channel
A	2	3
B	4	4
C	6	1
D	8	2



NOTE: Terminal location numbers may be different on older cabinets. Verify your correct phasings and landings.

Module Installation

Note: Prior to inserting the module into the input file, set the switch options according to the desired operation. See the section "PBCU Switch Options" found later in this document.

In a Cal-Trans Style Cabinet (PBCU):

Insert the PBCU module into the input file in the spaces normally occupied by two PED ISOLATORS. This is typically slots 12 and 13 of input file I. Channels A and B represent the left slot and Channels C and D represent the right slot. In a typical installation, Channels A, B, C, and D would correspond to Pedestrian Phases 2, 4, 6, and 8 respectively.

In a NEMA Style Cabinet (PBCU-DC):

If the cabinet is NEMA TS2, the detector rack may include status monitoring. If this is the case, set dip switch TS2 to the ON position. This provides a "normal" status indication at all times. No other status indication is supported.

Insert the PBCU-DC module into a detector rack using the slot spaces of your choice. The card will contact the right slot in the two-slot space. Each NEMA slot supports four channels. The slot channel number 1, 2, 3, and 4 will correspond to PBCU-DC channels C, D, A, and B respectively.

After the module is in place, attach the connector of the special cable to the connector on the front of the PBCU-DC module.

Button Field Wiring:

For a Cal-Trans cabinet, if field wiring is in place, no changes are necessary. Otherwise, the connections are in accordance with standard practice where Type 242 isolators are used.

For a NEMA cabinet, the button field wires will need to connect to the channel inputs of the detector slot where the module is located.

Operation

The front panel of the PBCU(-DC) module has four red LEDs and four push button switches. These are assigned to the four channels A, B, C, and D, and are labeled as such.

Whenever a call is placed to a channel output during normal operation, the channel LED will illuminate, regardless of the source of the call. A call can originate from a PED BUTTON in the field, a press of the channel button on the front panel, or use of one of the logic inputs. A call due to power loss or board failure will not illuminate LEDs.

The channel buttons on the front panel of the PBCU(-DC) have three functions.

1. A short press of the button will place a call for the duration of the press.
2. A press for greater than 2 seconds will lock a call on. A brief blink of the LED will mark the 2 second time.
3. If a call is locked, any press of the button will release the lock.

A locked call as a result of a channel button press will be released in the event of a power failure, or following the activation of a logic input.

The PBCU(-DC) monitors the signals connected to the pedestrian signal head. The presence of the WALK signal is used to cancel the latched LEDs of the PED BUTTONS. It does this by removing power to the buttons. If the Walk Option switch is in the ON position, the removal of power is only long enough to clear the LEDs. Otherwise, the power remains off for the duration of the WALK signal.

Signal Flash Mode

By monitoring both the WALK and DON'T WALK signals, the PBCU(-DC) is able to detect a traffic signal controller in FLASH mode. Any time both WALK and DON'T WALK are off, the PBCU will remove power to the PED BUTTONS in the field. The response time to the off condition is less than 2 seconds.

Logic Inputs

The two logic inputs are separate inputs with identical function. A logic input in the TRUE(low) state, will force all of the channels to power off, and will place a PED CALL to all four channels. The response time is less than 2 seconds. INPUT 1 is the separate brown wire and INPUT 2 is the separate red wire. Connecting either wire to the separate black wire, or to another source of logic ground in the cabinet will place the input in a TRUE state. +24Volts DC must be present on pin B in order for the logic inputs to operated. If the logic inputs are not used, 24VDC is not required on the PBCU. The PBCU-DC, however, will automatically support use of the logic inputs.

Specifications

Mechanical

Height: 4.50 inches

Width: 2.34 inches

Length: 7.00 inches excluding pull handle

Electrical

AC Power Input (PBCU): 115 volts nominal (89 to 135)

DC Power Input (PBCU for Logic Input Operation): 24 volts nominal (20 to 28)

DC Power Input (PBCU-DC): 10 to 28 volts

AC Walk / Don't Walk Inputs: 80 to 150 volts AC

Logic Inputs: Low (true) less than 8 volts DC; High (false) greater than 12 volts DC

Voltage supplied to field buttons: 18 volts DC regulated

Environmental

Specified operation from -34C to 74C

Operation from 0% RH to 95% RH non-condensing

Operation to 10,000 ft. altitude

Card Edge Connector Pin Assignments

A – Logic Ground	1 – NC
B – +24 VDC	2 – NC
C – NC	3 – NC
D – Channel C button input	4 – NC
E – Channel C button input	5 – NC
F – Channel C output (+)	6 – NC
H – Channel C output (-)	7 – Channel C Status*
J – Channel D button input	8 – NC
K – Channel D button input	9 – NC
L – Chassis Ground	10 – NC
M – AC Neutral	11 – AC Neutral
N – AC Line	12 – AC Line
P – Channel A button input	13 – NC
R – Channel A button input	14 – NC
S – Channel A output (+)	15 – NC
T – Channel A output (-)	16 – Channel A Status*
U – Channel B button input	17 – NC
V – Channel B button input	18 – NC
W – Channel D output (+)	19 – NC
X – Channel D output (-)	20 – Channel D Status*
Y – Channel B output (+)	21 – NC
Z – Channel B output (-)	22 – Channel B Status*

***Switch selectable option for TS-2 compatibility**

Note: Pins E, K, R, and V are common negative field button connection terminals.

PBCU Switch Options

Switch 1 – Latching Mode

OFF – Used for momentary LED buttons

ON – Used for latching LED buttons

Switch 2 – Walk Option

OFF – While the WALK sign is on, the buttons are disabled and button LED's are off

ON – Buttons operate while the WALK sign is on. LEDs are not latched on. A 5 second press and hold will result in a brief call placed after the end of the WALK sign.

Switch 3 – Not currently used

Switch 4 – TS2

OFF – Used for all installations except NEMA TS2

ON – Used for NEMA TS2 – provides status signals which are fixed as always normal

Cable Color Identification

10 Conductor Cable with Jacket

Brown	-	Ch A Walk
Red	-	Ch A Don't Walk
Orange	-	Ch B Walk
Yellow	-	Ch B Don't Walk
Black	-	Ch C Walk
Blue	-	Ch C Don't Walk
Violet	-	Ch D Walk
Gray	-	Ch D Don't Walk
White	-	Not Used (cut off)
Green	-	Not Used (cut off)

Single Wires

White	-	AC Neutral (Common for Walk/Don't Walk)
Black	-	Logic Ground (Connects to pin A of PBCU(-DC) card edge)
Brown	-	Logic Input 1
Red	-	Logic Input 2