

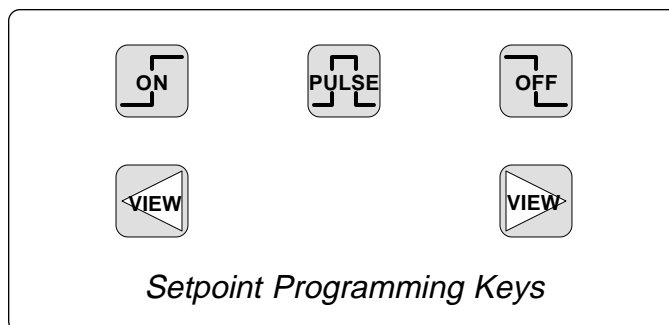
Output Channel Programming

SETPOINTS AND PULSES

NOTE:
The Program Enable Input (Logic Terminal Strip) Must be Energized to Allow Output Programming.

An output channel is programmed by entering ON and OFF setpoints. The ON duration between an ON setpoint and an OFF setpoint is referred to as a “pulse”. Each pulse requires both an ON and an OFF setpoint. The ON setpoint must always be entered before setting an OFF setpoint or an “E3-ordr” error will be displayed. Each channel may have up to 128 pulses (256 ON/OFF setpoints). Pulses may be programmed to go through zero.

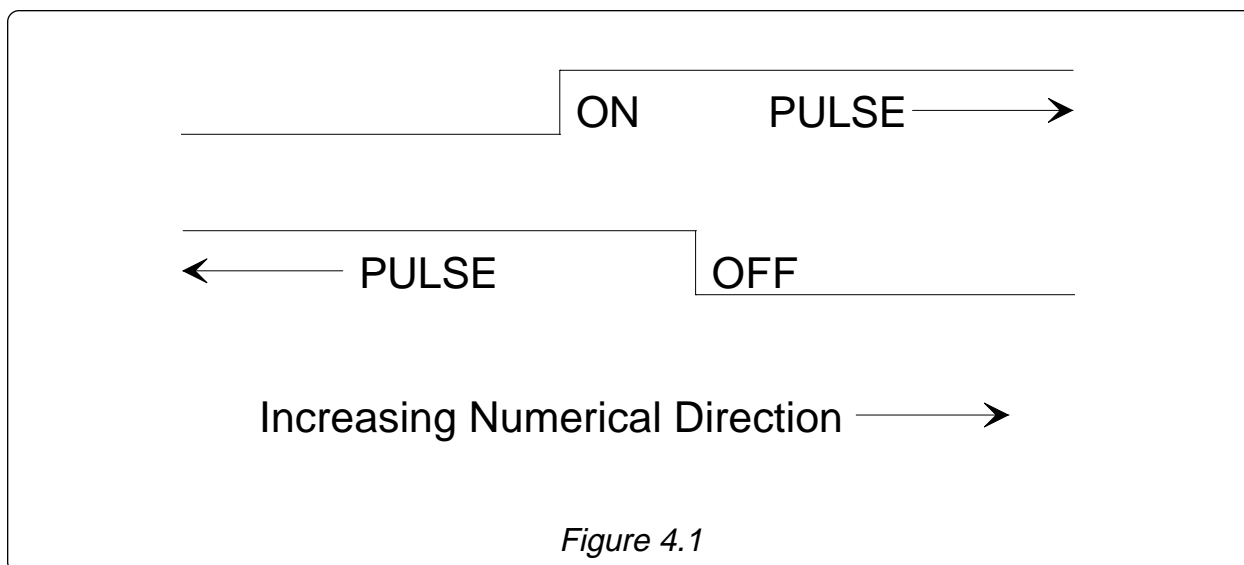
The PLuS Programmable Limit Switch keyboard has five keys that directly refer to pulses: the ON key, the PULSE key, the OFF key, the VIEW DECREASING key, and the VIEW INCREASING key:



When you have selected a channel to view or edit, pressing the VIEW keys will move successively through all the ON and OFF setpoints programmed into that channel. The VIEW INCREASING key will traverse setpoints in an increasing numerical direction, and the VIEW DECREASING key will traverse setpoints in a decreasing numerical direction.

Above the ON and OFF keys are LED indicators. When viewing setpoints, the ON LED, when illuminated, indicates that the displayed position is the FIRST “ON” POSITION of a pulse. You then know that at least one position is ON (the present one), and that it is the start of a pulse that extends in the INCREASING NUMERICAL DIRECTION, and may extend through 0 (example: ON at 270 and OFF at 90).

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When the OFF LED is illuminated, the display is indicating the FIRST “OFF” POSITION FOLLOWING a pulse. You then know that at least one position is ON (the next position in a DECREASING NUMERICAL DIRECTION), and that the indicated position is the end of a pulse that extends in the DECREASING NUMERICAL DIRECTION, and may go through 0 (e.g. ON at 270 and OFF at 90).

During programming, the ON and OFF keys are only used to enter a NEW pulse, and the LEDs above them are used to indicate whether you are entering a new ON or a new OFF setpoint.

The PULSE key is only used during programming. When pressed, it places the PLuS in “pulse mode”. In this mode, both setpoints of a pulse are moved simultaneously using the INCREMENT and DECREMENT keys. The PULSE key may also initiate “Multi-Pulse” mode, in which ALL setpoints of a channel are moved simultaneously. A pulse must already have been entered before using this key or an error code will appear.

NOTE:

In the following examples, the current active program will be used unless otherwise specified. The examples apply to all programs. To specify an action on a program different than the current active program you must specify the program number first. Once a program has been specified, it is not necessary to re-enter it if you wish to move to a different channel within the same program.

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PROGRAM/CHANNEL SELECTION (VIEWING CHANNEL ACTIVITY)

Before viewing or programming setpoints, you must first select the channel. If you select a channel without first selecting a program, the current active program is automatically selected. If you wish to view or edit a program other than the current active program, you must first select a program. Once a channel has been selected, the display will show the indicated encoder shaft position and channel activity in real time. The indicated encoder shaft position displayed is based on the offset associated with the channel being viewed.

- NOTE:**
- 1) When illuminated, the discrete PGM LED indicates that the program selected for editing is the current active program.
 - 2) When illuminated, the discrete CHN LED indicates that the channel is ON at the position indicated. If you are viewing the current active program, the CHN LED will reflect the status of the output for that channel.
 - 3) CHANGES MADE TO THE CURRENT ACTIVE PROGRAM WILL BE REFLECTED IMMEDIATELY BY THE OUTPUTS.

EXAMPLE:

Select channel 7 on current active program for viewing.

Select channel 7 (Current active program is automatically selected).



EXAMPLE:

Select channel 7 on program 3 for viewing.

Select program 3.



Select channel 7.



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VIEWING CHANNEL SETPOINTS

You may view the pulses in a channel at any time by selecting a channel and pressing either VIEW INCREASING or VIEW DECREASING to step through the setpoints. If there are no pulses programmed into the channel, both ON and OFF LEDs will be off and the display will show “0”. If the channel is always ON, both ON and OFF LEDs will be illuminated, and the display will show “1”.

EXAMPLE:

Assume that channel 7 of the current active program contains two pulses, 30 to 60 and 100 to 130. View these pulses.



Select channel 7 of current active program.



Press VIEW INCREASING to step through pulses in increasing numerical direction.



OR

Press VIEW DECREASING to step through pulses in decreasing numerical direction.



ENTERING A NEW PULSE

A new pulse may be entered through numeric entry. This operation may NOT be done while the encoder is turning.

EXAMPLE:

Enter a new pulse in channel 7 of the current active program to be ON at 30 and OFF at 60.

Select channel 7 of current active program.



Enter new pulse.



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CLEARING A PULSE

A specific pulse may be cleared by making one of the setpoints equal to the other (ON = OFF or OFF = ON). This operation may NOT be done while the encoder is turning.

EXAMPLE:

Assume that channel 7 of the current active program contains two pulses, 30 to 60 and 100 to 130. Clear the pulse from 100 to 130.



Select channel 7 of the current active program.



Press VIEW INCREASING until 130 appears in display.



Clear the OFF setpoint (130) and enter the ON setpoint (100).



The channel will now be programmed:



NOTE:

In the above example, you could have stopped viewing at the ON setpoint of 100 and made it equal to the OFF setpoint of 130.

CLEARING A CHANNEL

All pulses in a channel will be cleared if a pulse is entered with both ON and OFF equal to 0. When this operation is complete, both ON and OFF LEDs will be off and the display will show "0". This operation may NOT be done while in motion.

EXAMPLE:

Clear all pulses in channel 7 of current active program.

Select channel 7 of current active program.



Clear all pulses in channel 7.



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ENTERING A 360 DEGREE PULSE (Date Codes 8903 and Later)

A 360 degree pulse (channel always ON) may be programmed by entering a pulse with both ON and OFF setpoints equal to "1". When this operation is complete, both ON and OFF LEDs will be illuminated and the display will show "1". This operation may NOT be done while the encoder is turning. A channel that is always ON can be used to signal other machine devices that the PLuS system is powered up and not in an error condition.

EXAMPLE:

Set channel 7 of current active program to always be "ON".

Select channel 7 of current active program.



Set channel 7 to be "ON" for 360 degrees.



MODIFYING A PULSE WITH NUMERIC ENTRY

An ON or OFF setpoint of a pulse may be modified with numeric entry. While viewing channel setpoints, you may CLEAR a setpoint and ENTER another value. This operation may NOT be done while the encoder is turning.

EXAMPLE:

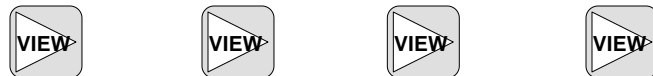
Assume that channel 7 of the current active program contains two pulses, 30 - 60 and 100 - 130. Change the second pulse to be ON at 100 and OFF at 115.



Select channel 7 of the current active program.



Press VIEW INCREASING until 130 appears in display.



Clear the OFF setpoint (130) and enter 115.



The channel will now be programmed:



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MODIFYING A PULSE USING THE INCREMENT/DECREMENT KEYS

An ON or OFF setpoint of a pulse may be modified with the INCREMENT or DECREMENT keys. While viewing channel setpoints, press either the INCREMENT or DECREMENT keys. This operation may be done while in motion.

EXAMPLE:

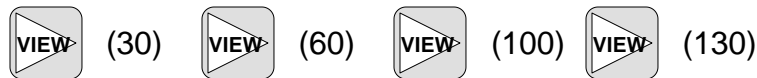
Assume that channel 7 of the current active program contains two pulses, 30 to 60 and 100 to 130. Change the second pulse to be ON at 100 and OFF at 125.



Select channel 7 of the current active program.



Press VIEW INCREASING until 130 appears in display.



Press the DECREMENT key until display reads 125. Notice that you skip over 129 and 127.



The channel will now be programmed:



PULSE MODE

Individual pulses can be moved, or an entire channel “rotated” through the pulse mode. The first press of the PULSE key while viewing channel setpoints will place the unit in “pulse mode”. Successive presses of the PULSE key will toggle the unit between standard pulse mode and “multi-pulse” mode. When in multi-pulse mode, the LED above the PULSE key will flash, indicating that if ANY setpoint is moved ALL setpoints will be moved.

STANDARD PULSE MODE

The ON and OFF setpoints of a pulse may be modified simultaneously in pulse mode with the INCREMENT or DECREMENT keys. While viewing channel setpoints, place the PLuS in pulse mode by pressing the PULSE key, and then press either the INCREMENT or DECREMENT keys. This operation may be done while the encoder is turning. Pulses can only be moved using the INCREMENT and DECREMENT keys.

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NOTE:

When any key other than INC or DEC is pressed, you will immediately exit pulse mode. You must again press the PULSE key to return to pulse mode.

EXAMPLE:

Assume that channel 7 of the current active program contains two pulses, 30 to 60 and 100 to 130. Change the second pulse to be ON at 95 and OFF at 125.



Select channel 7 of the current active program.



Press VIEW INCREASING until 130 appears in display.



Press the PULSE key to place the PLuS in pulse mode.



Press the DECREMENT key until display reads 125. Notice that you skip over 129 and 127. (See "E6" error in Section 6)



The channel will now be programmed:



NOTE:

The duration of the pulse will remain constant even if the difference between the resulting ON and OFF setpoints appears to change.

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MULTI-PULSE MODE

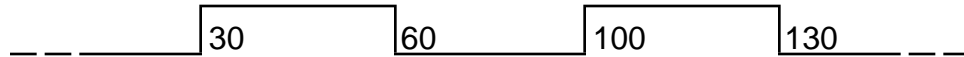
The ON and OFF setpoints of a ALL pulses in a channel may be modified simultaneously in multi-pulse mode with the INCREMENT or DECREMENT keys. While viewing channel setpoints, place the PLS in multi-pulse mode by pressing the PULSE key until the LED above the PULSE key begins flashing. Then press either the INCREMENT or DECREMENT keys to “rotate” the entire channel. This operation may be done while the encoder is turning. Channels can only be “rotated” using the INCREMENT and DECREMENT keys.

NOTE:

When any key other than INC or DEC is pressed, you will immediately exit pulse mode. You must again press the PULSE key twice to return to multi-pulse mode.

EXAMPLE:

Assume that channel 7 of the current active program contains two pulses, 30 to 60 and 100 to 130. Advance both pulses 5 degrees.



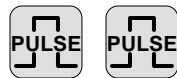
Select channel 7 of the current active program.



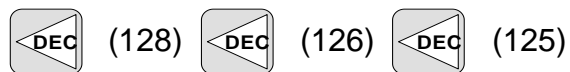
Press VIEW INCREASING until 30 appears in display.



Press the PULSE key twice to place the PLS in multi-pulse mode. Note that the LED above the PULSE key flashes on and off in multi-pulse mode.



Press the DECREMENT key until display reads 25. Notice that you skip over 29 and 27. (See “E6” error in Section 6)



The channel will now be programmed:



NOTE:

The duration of the pulses will remain constant even if the difference between the resulting ON and OFF setpoints appears to change.