

# Motion Detection

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## Menu Path

MAIN SCREEN **SEL** ▼ to SETUP MENU **SEL** ▼ to MOTION DETECT **SEL**

## Background

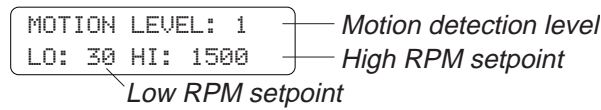
Motion Detection establishes one or two “Motion Levels,” or speed ranges, with low and high RPM values. These two ranges are independent of each other.

Using the MOTION ANDING screen, each output channel can be ANDed with either Motion Level. ANDed outputs will be enabled only when the encoder speed is within the specified speed range. Output channels that are not ANDed will be “on” whenever the machine position is within their programmed setpoints, regardless of machine speed.

One use of Motion Levels and Motion ANDing is to turn off devices such as glue guns if the machine stops or jams.

## Screen

The Motion Detection screen displays the Motion Level, the Low RPM, and the High RPM.



## Programming

Use the numeric keys and ENT to change values for Motion Level, Low RPM, and High RPM.

## Motion Detector

An output channel can be used as a motion detector by programming it to be on at “1” and off at “1,” and then ANDing it with the desired Motion Level. This will turn the output on constantly as long as the machine speed is within the specified Motion Level range.

## See Also

MOTION ANDING

# Offset

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## Menu Path

MAIN SCREEN **SEL** ▼ to SETUP MENU **SEL** ▼ to OFFSET **SEL**

## Purpose

This screen allows the encoder position to be set to zero at the desired machine position, eliminating the need to mechanically adjust the encoder shaft coupling to the machine.



## Position Setup

In order to set the Position to match the machine position, simply stop the machine at a known position and enter the desired Position value. For example, jog the machine to a position at the start of a new cycle, then set the Position to “0.”

## Absolute Offset

When you modify the Position, the Absolute Offset will change to the following number:

(Previous Absolute Offset) + (Change in Position)

- The Change in Position will be negative if the new position is less than the original position, and will thus be subtracted from the Previous Absolute Offset.

**Example:** Absolute Offset is zero, and the machine is jogged to the start of a new cycle, where the Position is 150. Using the keypad, the Position is reset to zero, for a change in Position of (–150). The new Absolute Offset is thus zero minus 150. Since the model of encoder used in this example shows positions from zero to 1000, the 150 is subtracted from 1000, resulting in an Absolute Position of 850.

Absolute Offset is intended to be used for “archival purposes”, in case you lose correct machine position and need to set the machine back up. Absolute Offset can be modified using the numeric keypad.

## Output Status

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**Menu Path** MAIN SCREEN **SEL** ▼ to SETUP MENU **SEL** ▼ to I/O STATUS **SEL** ▼ to OUTPUT STATUS **SEL**

**Purpose** This screen shows the On/Off state of the output channels.

*Both Models, Outputs 1-8*

```
12345678 OUTPUT
01001001 1-8<
```

Output Numbers (1-8)  
Output On/Off Status (0=Off, 1=On)

*PS-6344-17, Outputs 9-17*

```
901234567 OUTPUT
0100100AA 9-17<
```

Output Numbers (9-17)  
Analog Modules shown with "A"

*PS-6344-25, Outputs 9-25*

```
90123456 OUTPUT
01001000 9-16<
```

Output Numbers (9-16)

```
789012345 OUTPUT
0100100AA 17-25<
```

Output Numbers (17-25)  
Analog Modules shown with "A"

If any output positions have been programmed as analog outputs, the On/Off status will show "A" instead of "0" or "1."

**Selecting Outputs** To change the set of outputs displayed, press the SEL key.

## Password

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**Menu Path** MAIN SCREEN **SEL** PASSWORD **SEL**

This screen provides an area to enter a password. It also shows the current programming access level and the status of the Programming Enable terminals on the back of the keypad, Figure 12.

```
PASSWORD:*****<
LEV:NONE INP:OFF
```

Password entry area  
Keypad programming terminal input status  
Current programming level (hardware or software)

**Enable Levels** There are three programming access levels; OPERATOR, SETUP, and MASTER. See Figure 21 for a summary of the programming functions available to the different levels. The codes that correspond to each level are established in the ENABLE CODES screen.

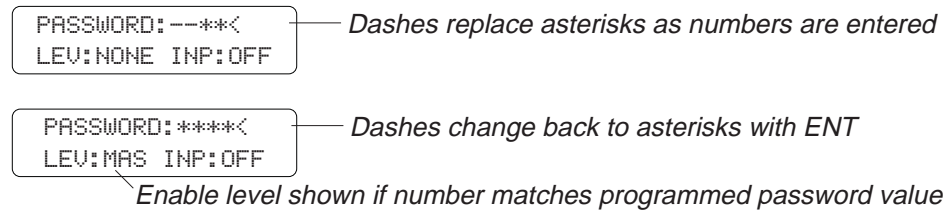
**Entering a Password** Enter a password through the numeric keypad followed by ENT. As you press the number keys, the asterisks will be replaced by dashes. If you make a mistake, press CLR to erase the last key you pushed.

## Password (Cont'd)

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If you enter a password that has been programmed through ENABLE CODES, the keypad will function at the corresponding programming level.

If either of the programming enable terminals on the back of the keypad is active when a password is entered, the programming level will be whichever is greater.



### Clearing a Password

When programming operations are completed, enter a password value of “0,” then ENT to clear the enable level.

If a keypad is left unattended with an active password, the access code will clear after five minutes of keypad inactivity and the keypad will revert to the “Normal Display” mode shown in Figure 21.

### See Also

ENABLE CODE

## Per Channel Enable

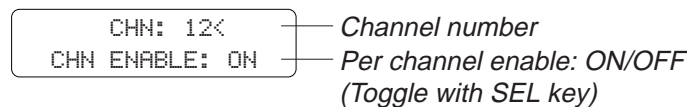
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### Menu Path

MAIN SCREEN **SEL** ▼ to CONFIG MENU **SEL** ▼ to PGM ENABLES **SEL** ▼ to PER CHN ENABLE **SEL**

### Purpose

This screen is used to enable Operator Level access to individual output channels. CHN ENABLE is used in conjunction with the ENABLE OPTIONS screen to assign Operator Level access to selected programming functions.



### Channel Select

Press the INC/DEC keys, or use the numeric keys and ENT.

### Enable Toggle

Press the SEL key to toggle the enable ON or OFF.

### See Also

ENABLE OPTIONS

## Program Copy

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### Menu Path

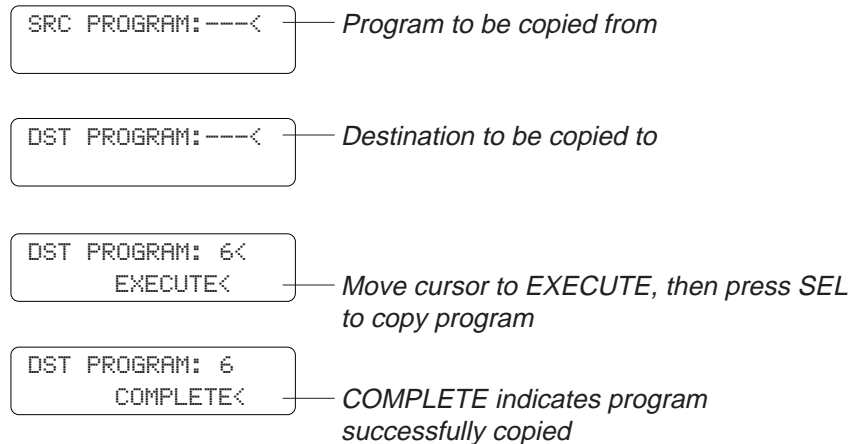
MAIN SCREEN **SEL** ▼ to SETUP MENU **SEL** ▼ to PGM COPY **SEL**

### Purpose

Program Copy allows you to copy all of the channels and setpoints from one program to another. It is often easier to copy an existing program and modify it, than to enter a new program from scratch.

### Screens

The Program Copy function consists of four screens:



### Programming

Use the numeric keys and SEL to enter program numbers.

During programming, the cursor keys allow you to move between the Source and Destination screens to allow you to change values before selecting EXECUTE.

## Program Select Mode

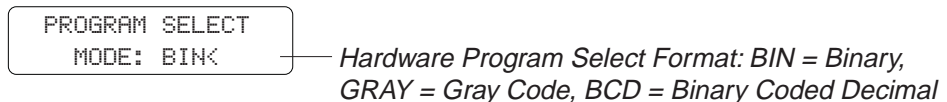
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### Menu Path

MAIN SCREEN **SEL** ▼ to CONFIG MENU **SEL** HARDWARE **SEL** ▼ to PGM SEL MODE

### Purpose

This screen allows you to specify the format for the hardware Program Select inputs on terminals 9 through 13 of Terminal Block 11, Figure 7.



The Program Select inputs can operate in Binary, BCD, or Gray Code formats as shown in Figure 8.

Use the SEL key to toggle the input format.

### WARNING

**If the input signals controlling program selection are lost due to a malfunction, the Default Program will activate. To prevent sudden changes in machinery operation that may damage equipment or injure personnel, program the Default Program with settings that will not cause harm in the event of sudden activation.**

### See Also

DEFAULT PROGRAM

# Pulse Copy

## Menu Path

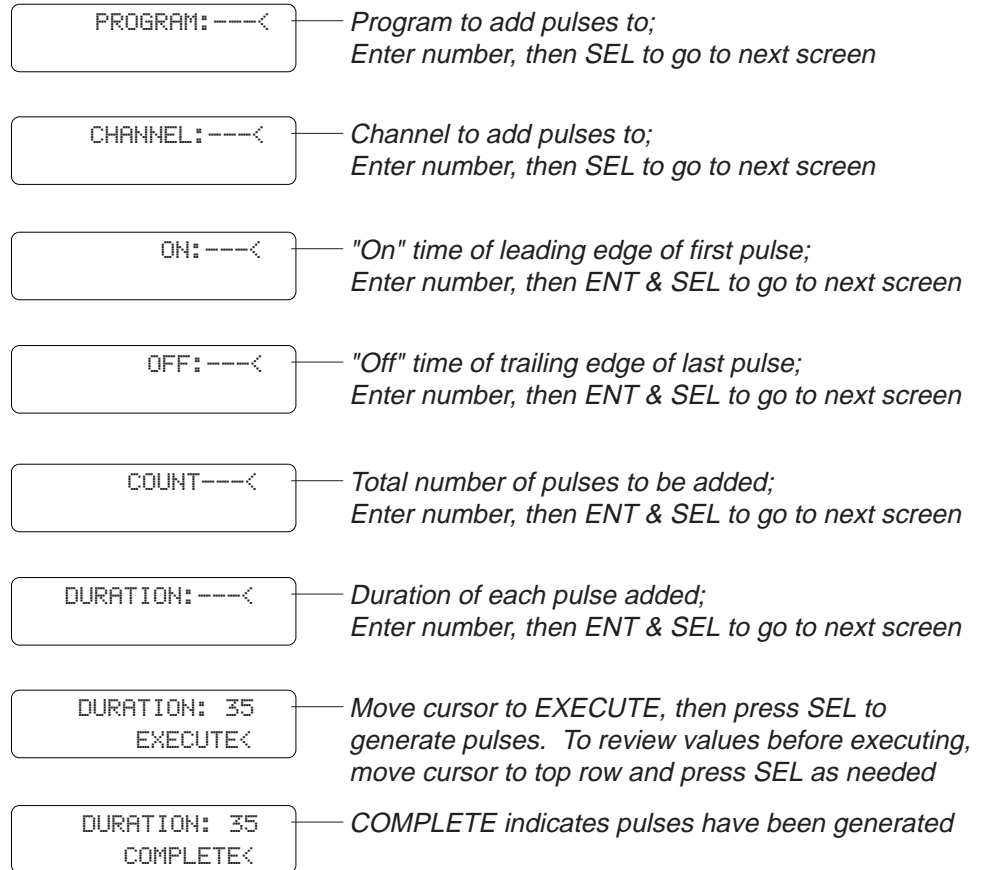
MAIN SCREEN **SEL** ▼ to SETUP MENU **SEL** ▼ to PULSE COPY **SEL**

## Purpose

Pulse Copy allows you to program a series, or “train” of pulses into a channel without having to enter the On and Off setpoints for each pulse. The Pulse Copy function prompts you for the beginning and ending setpoints for the pulse train; the number of pulses in the train; and the duration of a pulse. Pulse Copy then divides the designated portion of the encoder cycle into the specified number of pulses, evenly dividing the unused portion of the segment between the pulses.

## Screens

The Pulse Copy function consists of eight screens:



## Example

Generate a train of pulses for a Krones Label Check Unit as follows:

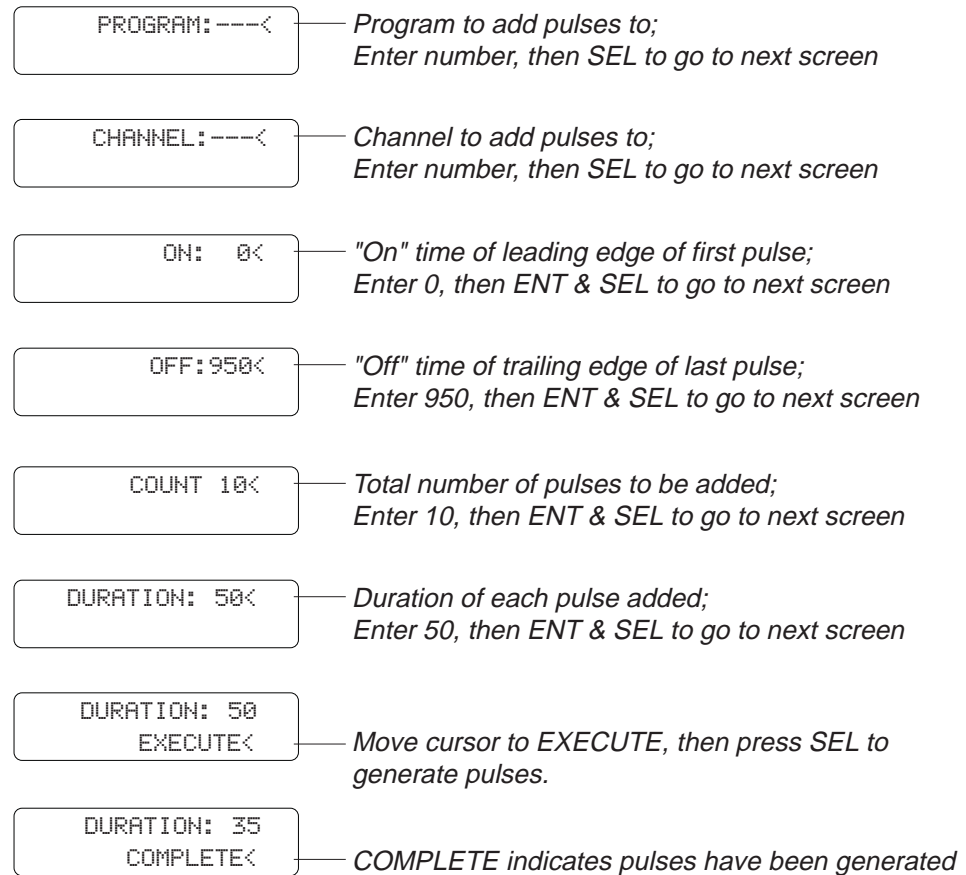
<u>Pulse</u>	<u>On</u>	<u>Off</u>
1	0	50
2	100	150
3	200	250
4	300	350
5	400	450
6	500	550
7	600	650
8	700	750
9	800	850
10	900	950

## Pulse Copy (cont'd)

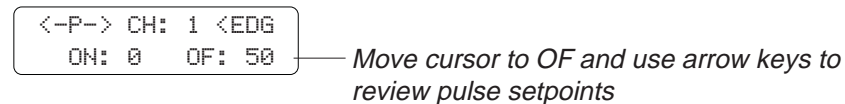
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Each pulse is 50 increments wide, separated from the next pulse by 50 increments.

Program PULSE COPY as follows:



Go to SETPOINTS to confirm the pulse train:



## Rate Setup

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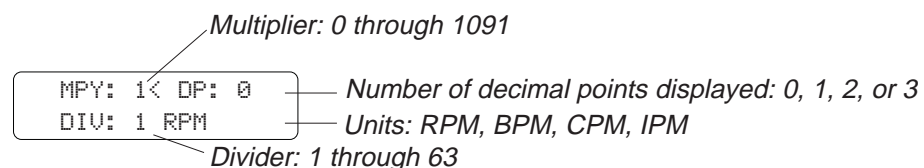
### Menu Path

MAIN SCREEN **SEL** ▼ to CONFIG MENU **SEL** ▼ to DISPLAY **SEL**  
RATE SETUP **SEL**

### Purpose

The Rate Setup function allows you to configure the RPM display on the Main Screen. The Main Screen can display the encoder speed in units of Revolutions Per Minute (RPM), Bags Per Minute (BPM), or Cartons Per Minute (CPM). The encoder speed can also be displayed as .5X, 1X, 2X, or 3X actual RPM.

### Screen



## Rate Setup (Cont'd)

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Press the SEL key to toggle display mode or rate. Following is a chart summarizing the relationships between encoder speed, units, and rate multiplier:

If Units Are...	And Rate Is...	Then an Encoder Speed Of...	Is Displayed As...
RPM	.5X	100 RPM	50 RPM
	1X	100 RPM	100 RPM
	2X	100 RPM	200 RPM
	3X	100 RPM	300 RPM
BPM	.5X	100 RPM	50 BPM
	1X	100 RPM	100 BPM
	2X	100 RPM	200 BPM
	3X	100 RPM	300 BPM
CPM	.5X	100 RPM	50 CPM
	1X	100 RPM	100 CPM
	2X	100 RPM	200 CPM
	3X	100 RPM	300 CPM

## RPM Update Rate

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### Menu Path

MAIN SCREEN **SEL** ▼ to CONFIG MENU **SEL** ▼ to DISPLAY **SEL** ▼  
RPM UPD RATE **SEL**

### Purpose

The RPM Update Rate is how often the RPM display on the Main Screen is updated. This rate can be programmed to be 1/Sec, 2/Sec, or 10/Sec.

### Screen

 — *RPM Update Rate: How often RPM display on main screen is updated; 1/Sec, 2/Sec, or 10/Sec.*

Press the SEL key to toggle the selection.

## Scale Factor

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### Menu Path

MAIN SCREEN **SEL** ▼ to CONFIG MENU **SEL** ▼ to HARDWARE MENU **SEL** SCALE FACTOR **SEL**

### Purpose

The Scale Factor screen displays the number of increments into which one encoder revolution is divided. For the PS-6244 special unit, Scale Factor is fixed at 1000.

 — *Number of increments each revolution is broken into*

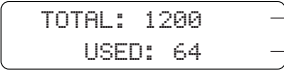
# Setpoint Use

---

**Menu Path** MAIN SCREEN **SEL** ▼ to SETUP MENU **SEL** ▼ to SYSTEM INFO **SEL** SETPOINT USE **SEL**

**Purpose** This function displays the total number of setpoint On/Off pairs, or “pulses” available for programming, and the number of pulses that have been programmed.

**Screen**



— Total number of pulses available for programming  
— Number of pulses programmed into all channels of all programs

The number of setpoints shown as "Used" is the sum of all pulses that are programmed into all channels of all programs. The "Total" value is the number of pulses that can be stored in non-volatile EEPROM memory. The difference between the two numbers is the number of pulses available for programming.

The number of pulses programmed into all channels of all programs cannot exceed the value displayed as Total.

There are no values that can be changed in this screen.

# Setpoints

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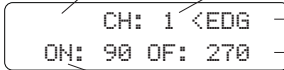
**Menu Path** MAIN SCREEN **SEL** ▼ to SETPOINTS **SEL**

**Screens** When SETPOINTS is selected, a preliminary screen specifies the program whose setpoints will be programmed.

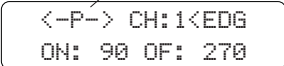


— Program to view or modify

The active program is displayed, but any other program can be specified by using the numeric keys or INC and DEC to choose a program, then pressing SEL to move to setpoint programming.



Blank if only 1 pulse in channel  
Channel  
— Pulse mode  
— OFF setpoint  
ON setpoint



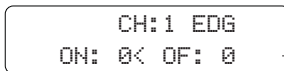
<-P-> indicates multiple pulses in channel

**Channel to Edit** Use the numeric keypad and ENT to select the channel to program.

- **CHN 91 is a special channel used for shift register functions.** See “Shift Register ANDing” for details.

**Setpoint Values** Use the left and right arrow keys to move between the On and Off setpoints.

- If a channel has more than one pulse, you may view the other pulses by pressing the right cursor key when viewing the Off setpoint, or by pressing the left cursor key when viewing the On setpoint.
- If a channel contains no pulses, the On and Off setpoints will be “0.”
- If a channel is always on, both the On and Off setpoints will be “1.”



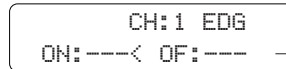
— ON and OFF setpoints both 0 if no pulses in channel. Both 1 if channel always ON

## Setpoints (cont'd)

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### Adding a Pulse

You may add a new pulse to a channel by pressing the SEL key when the cursor points to either the On or the Off setpoint.



```
CH: 1 EDG
ON: ---< OF: ---
```

Enter ON setpoint, then ENT or right cursor to OF.  
Enter OFF setpoint, then press ENT.

The display will change to show blank On and Off setpoints; the cursor will point to the On setpoint. Enter the On setpoint through the numeric keypad, and then press the ENT key or the right cursor to move to the Off setpoint. Enter the Off setpoint through the numeric keypad and then press the ENT key.

### Adding Multiple Pulses

If On and Off setpoints for a pulse are visible on the screen and you press SEL to program a new pulse, the original pulse will remain in the output channel. If the On or Off setpoints you enter overlap an existing pulse in the channel, you will see an “Error: Pulse Overlap” message.

To abort entering a pulse at any time, press ESC.

### Changing Setpoints

Change a setpoint value with the numeric keys followed by ENT, or with the INC and DEC keys.

### Pulse Modes

The Pulse Mode controls how the INC and DEC keys modify setpoints. There are three modes; **EDG** (edge), **PUL** (pulse), and **CHN** (channel.) You change the Pulse Mode by pressing the SEL key when the cursor points to the Pulse Mode.

In **EDG** mode, the INC and DEC keys will affect the selected On or Off setpoint only.

In **PUL** mode, both On and Off setpoints will be incremented or decremented simultaneously.

In **CHN** mode, **all** On and Off setpoints for all pulses in the channel will be incremented or decremented simultaneously.

### Deleting a Pulse

A pulse may be deleted by making On equal to Off, or vice versa. If there is more than one pulse in the channel, the next pulse will appear in the On/Off setpoint area. If the channel has no more pulses, the On and Off setpoint will both be zero.

### Clearing a Channel

To clear a channel of all pulses, enter a new pulse with On and Off setpoints of “0.”

### Channel Always ON

A channel may be programmed to be On for a full revolution (always On) by entering a new pulse with both On and Off values equal to “1.”

### Record Setpoints

Photocopy the form inside of the back cover and use it to write down setpoints for each program.

## Shift Position

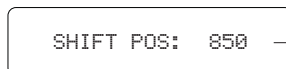
---

### Menu Path

MAIN SCREEN **SEL** ▼ to SETUP MENU **SEL** ▼ to SHIFT POSITION **SEL**

### Purpose

The Shift Position is the point in the encoder revolution at which the shift register data shifts. See Shift Register ANDing for details.



```
SHIFT POS: 850
```

Position at which Shift Register will shift.

### Programming

Use INC and DEC, or the numeric keys and ENT.

# Shift Register ANDing

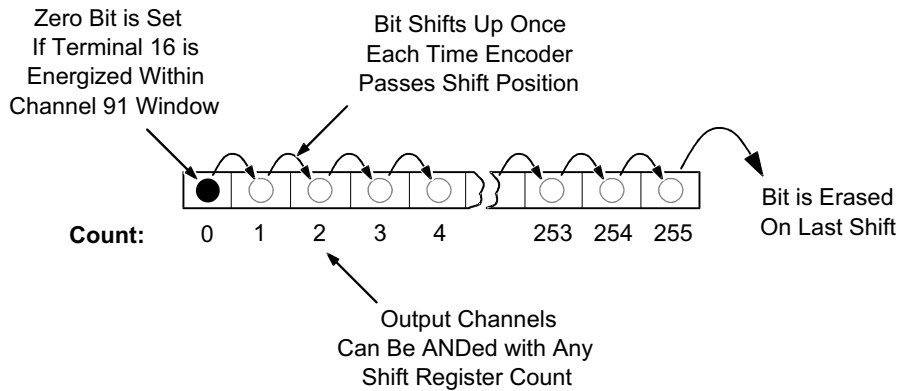
## Menu Path

MAIN SCREEN **SEL** ▼ to CONFIG MENU **SEL** ▼ to CHN ANDING MENU **SEL** SHFT REG ANDING **SEL**

## Background

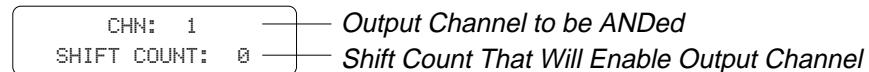
The shift register is a form of electronic memory that sets a “bit” in the zero count of the register when a signal is applied to Terminal 16, Fig. 7. Afterwards, each time the encoder passes the point programmed through SHIFT POSITION, the register “shifts” the bit to the next higher count. The bit passes along the shift register until, on the 256th shift, the bit is erased.

An output channel can be ANDed with any count in the shift register, so that the channel is enabled only when a bit appears in that count. In this way, output channels can be enabled up to 255 revolutions after Terminal 16 is energized.



## Programming

This screen allows you to enter the output channel to ANDed with the shift register, and the shift register count that will enable it.



To select the output channel and the shift register count, use the numeric keys and ENT, or use the INC and DEC keys.

- **ANDing an output channel with Count “0” is the same as turning Shift Register ANDing off.** The shift register will have no affect on channel operation.
- Any number of output channels can be ANDed to a single shift register count.
- Shift Register ANDing, Input ANDing, and Motion ANDing can be combined for any given output channel.

## Input Window

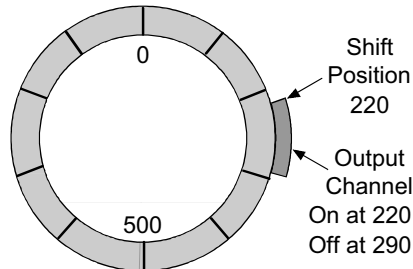
A bit is set in Position “0” of the shift register when Terminal 16 of TB 1, Figure 7, is energized. A special channel, Channel 91, is provided to limit the portion of an encoder revolution during which the signal will be accepted from Terminal 16. A “window” can be programmed into Channel 91 so that a bit is set in the register only if Terminal 16 becomes energized within that window.

## Shift Register ANDing (cont'd)

### Shift Position

The point in the encoder revolution at which the register shifts data is programmed through SHIFT POSITION. When programming Shift Position and the On/Off setpoints for a channel, remember the following:

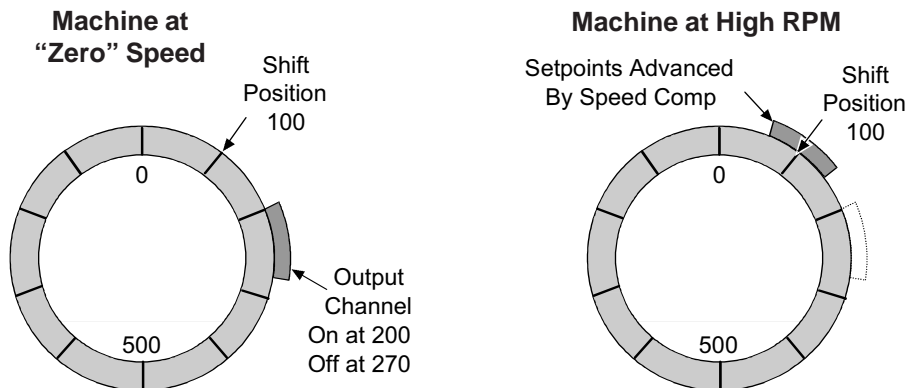
### Don't Place the Shift Position at the Start of a Pulse



When a pulse starts at the Shift Position, as shown here, the pulse will be enabled as soon as a bit is shifted into the programmed shift count.

Although the output will function normally on this revolution, a small output spike may occur on the following revolution as the bit is shifted to the next shift count.

### Don't Let Speed Comp Move a Pulse Onto the Shift Position



At "Zero" Speed in this example, the output turns on 100 increments after the Shift Position. However, as the machine accelerates, speed compensation advances the setpoints until they overlap the Shift Position. This may split the pulse between two machine cycles. The portion of the pulse following the Shift Position may activate during one cycle, while the portion ahead of the Shift Position may activate during the following cycle.

The Channel 91 Window is "edge sensitive" to the signal from Terminal 16. The leading edge of the signal must appear in the window for a bit to be set in the register.

### Shift Register Clear

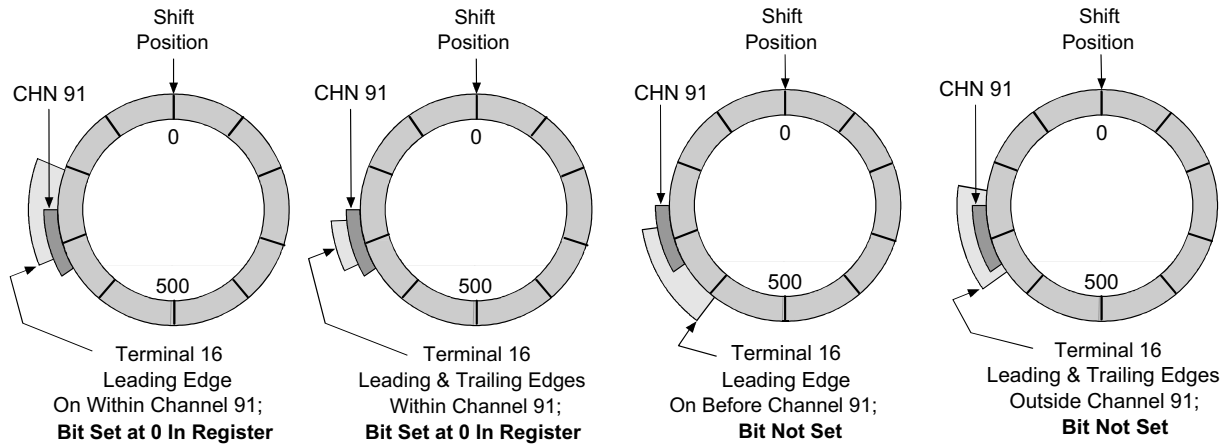
Energizing Terminal 14 on TB 1, Figure 7, clears all bits from the shift register immediately.

(continued)

# Shift Register ANDing (cont'd)

## Edge Sensitivity of Channel 91 Window

(Channel 91 programmed “on” at 650, “off” at 750 in this example; Shift Position = 0)



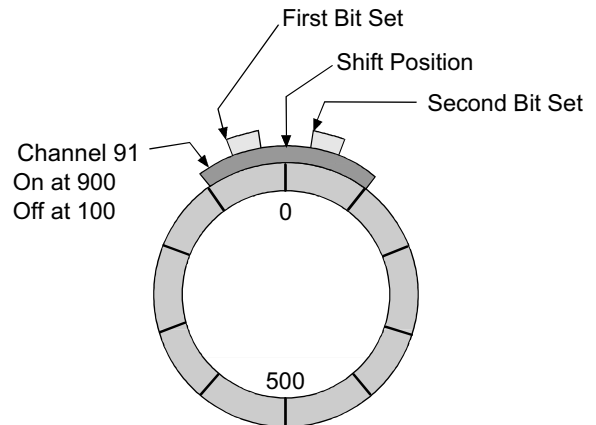
### Channel 91 Overlaps Shift Position—Not Recommended!

When Channel 91 overlaps the shift position as shown here, two problems may occur.

**One Product, Two Bits:** Due to variations in conditions, sensors sometimes generate more than one pulse for a product. If the product sensor sends a pulse early in the window, that pulse will shift when the encoder reaches the shift position. If the sensor sends a second pulse for the same product after the shift position, a second bit will be set for the same product.

**Inconsistent Timing:** Some products may appear early in the Channel 91 window, while others appear late. For early products, a bit will be set, then immediately shifted at the shift position. For late products, a bit will be set after the shift position, and a full revolution will occur before the bit shifts to 1.

In most applications, programming Channel 91 to overlap the Shift Position will cause problems.



## Software Version

### Menu Path

MAIN SCREEN **SEL** ▼ to SETUP MENU **SEL** ▼ to SYSTEM INFO **SEL** ▼ to SOFTWARE VERSION **SEL**

### Purpose

The Software Version screen displays the revision number of the firmware contained within the controller. This information may be useful if the unit needs to be returned for service.

```
MAJOR REV: 1.75
BASE REV: 1.17
```

There are no values that can be changed in this screen.

# Speed Compensation

## Menu Path

MAIN SCREEN **SEL** ▼ to SETUP MENU **SEL** ▼ to SPEED COMP **SEL**

## Background

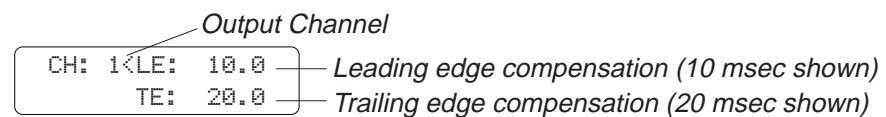
Some devices such as hydraulic cylinders and glue guns require a fixed amount of time to perform their function. As a machine speeds up, these devices need to be actuated earlier in the cycle in order to complete their action at the required time. Speed compensation automatically advances the On/Off setpoints of specified output channel(s) as the machine speeds up, maintaining proper synchronization at all speeds.

## Speed Comp Units

Speed compensation is programmed by entering the response time of the output device in milliseconds (.001 Sec). The output will always turn on this number of mSec before the programmed On position is reached, and turn off this number of mSec before the programmed Off position is reached. As speed increases, the number of degrees of advance will automatically increase to maintain the number of mSec of advance.

## Screen

The speed compensation screen shows the Output Channel and the speed compensation value for that channel.



To change speed comp values, use the numeric keys or INC and DEC. You can enter values of speed comp in milliseconds without using the decimal point: "12 ENT" will result in a value of 12.0.

To change output channels, move the cursor to the channel number and enter a new one. You may also INC or DEC the channel number.

## Negative Speed Comp

Negative values of speed compensation cause the output channel to lag its programmed machine position by the specified number of mSec.

It is used when an input sensor is being gated, by the corresponding output channel, into another control system (PLC, registration control, etc.) Sensor lag can cause an object that is present at the correct position in the cycle to appear late. Negative speed comp can retard the gate signal so the sensor and gate signals are in sync when the object is in the correct position.

Since most sensors have very fast response times, negative speed comp is needed only where the sensor is slow to respond or the machine speeds are high and sensor timing is critical.

It may also be used if there is mechanical "wrap up" present in the machine being controlled. Wrap up will cause machine elements to shift relative to each other as speed increases. This situation may cause an event to happen later in the cycle as the machine goes faster.

## Setting Negative Comp

Press the +/- key **after** entering a number but **before** pressing ENT, or by decrement a value below zero.

# Toggle RPM

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## Menu Path

MAIN SCREEN **SEL** ▼ to CONFIG MENU **SEL** ▼ to DISPLAY MENU **SEL** ▼ to TOGGLE RPM **SEL**

## Purpose

Toggle RPM is the encoder speed at which the Position display on the Main Screen will disappear. At speeds below the Toggle RPM the Position display will be visible; at speeds above the Toggle RPM the Position will not be shown.



TOGGLE  
RPM: 50

*Toggle RPM: Position display on main screen is not shown at speeds above Toggle RPM*

This screen displays the Toggle RPM.