

Product Group: SG2 Programmable Relay
 Number: AN-SG2-019

Date Issued: 9/11/2017
 Revision: Original

Title: Counter Instruction Modes

Summary: Counter modes will be defined and demonstrated.

We will be using the SG2 Client V3.4 software in conjunction with the Windows 7. All examples will be shown using the Ladder Logic program with the SG2-12HR-D model selected.

Procedure:

1.0 Using the SG2 Client software, duplicate the program as shown in Figure 1 below.



Figure 1

2.0 Counter edit Contact/Coil window opens when C01 (Counter Coil) is placed in the last column of the Ladder Logic program.

2.1 Select Counter Instruction Number:

31 Counter instructions available

2.2 Select Mode:

*9 Operation Modes
(Counter Modes 0-8)*

2.3 Select Preset Type:

*13 Preset types available including DR
(Data Register), N (Numeric Constant), etc.*

2.4 Select Preset Value:

0~999999

2.5 Select Direction Set:

*22 contact types to select from.
Contact actuation controls the count
direction, and when active, the counter
will count down.*

2.6 Select Reset Input:

*22 contact types to set from. Contact
actuation will reset counter to 0 when
activated.*

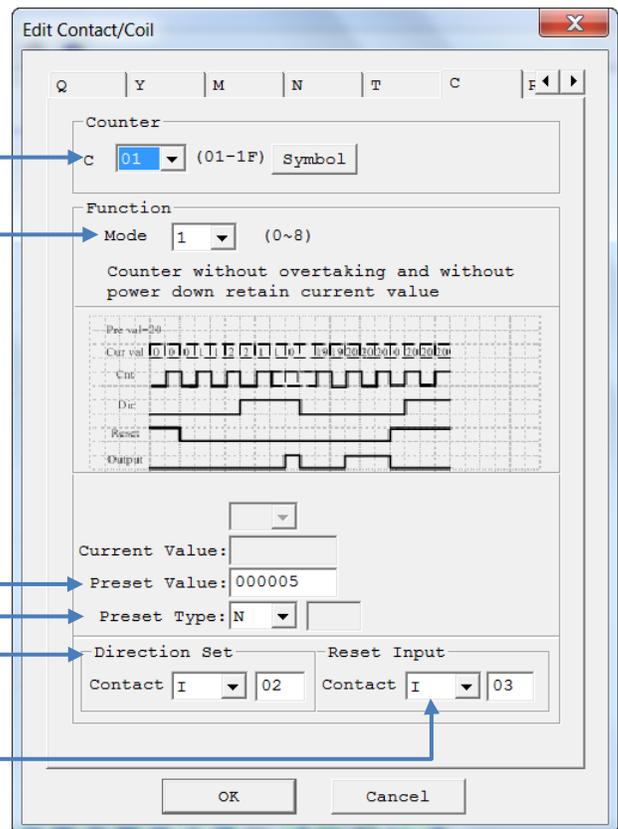


Figure 2

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Counter Instruction Examples:

The Figures in the following examples are of the diagrams provided by the SG2 Client Software. This diagram will not change according to the input values and is intended to serve only as an example of how the counter timer operates.

Example 1: Counter Mode 1 Counter without overtaking and without power down current value retention.

Mode: 1
Preset Type: N (Numeric Constant)
Preset Value: 5 (shown as 000005)
Direction Set: I02
Reset Input: I03

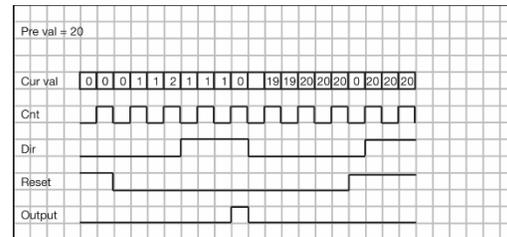


Figure 3

The C01 (Counter Instruction) will add 1 count to the current value of C01 each time it receives an Input Signal. The C01 coil will activate once the current value of C01 equals the preset value (5). The C01 coil will remain active until C01 receives a signal input from I03 (Reset Signal) or if the counter direction (I02) is set to count down and the current value drops below the preset value. C01 will subtract 1 count from its current value each time C01 receives an Input Signal and an I02 (Direction Set Input) simultaneously. The C01 coil will activate when I02 is active and the current value reaches 0. The C01 coil will remain active upon reaching 0 until I02 is deactivated. The C01 current value *cannot* exceed the preset value. The current value of C01 *will not be retained* when the power is taken away from the SG2.

Example 2: Counter Mode 2 Counter with overtaking and without power down current value retention.

Mode: 2
Preset Type: N (Numeric Constant)
Preset Value: 5 (shown as 000005)
Direction Set: I02
Reset Input: I03

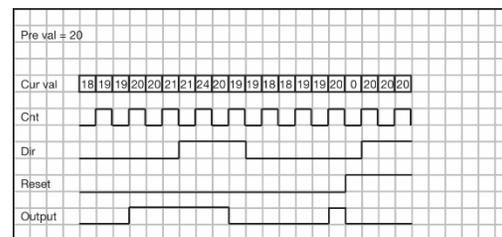


Figure 4

The C01 (Counter Instruction) will add 1 count to the current value of C01 each time it receives an Input Signal. The C01 coil will activate once the current value of C01 equals the preset value (5). The C01 coil will remain active until it receives a signal input from I03 (Reset Signal) or if the counter direction (I02) is set to count down and the current value drops below the preset value. C01 will subtract 1 count from its current value each time C01 receives an Input Signal and an I02 (Direction Set Input) simultaneously. The C01 coil will activate when I02 is active and the current value reaches 0. C01 will remain active until I02 is deactivated. The C01 current value *can* exceed the preset value. The current value of C01 *will not be retained* when the power is taken away from the SG2.

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Example 3: Counter Mode 3 Counter without over taking and with power down current value retention.



“C Keep” has to be selected in the Module System Set to retain Current Value.

Mode: 3
Preset Type: N (Numeric Constant)
Preset Value: 5 (shown as 000005)
Reset Input: I03

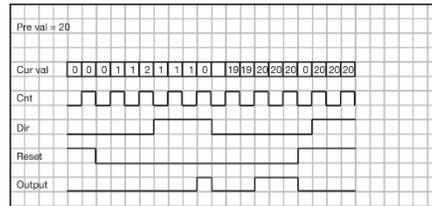


Figure 5

The C01 (Counter Instruction) will add 1 count to the current value of C01 each time it receives an Input Signal. The C01 coil will activate once the current value of C01 equals the preset value (5). The C01 coil will remain active until it receives a signal input from I03 (Reset Signal) or if the counter direction (I02) is set to count down and the current value drops below the preset value. C01 will subtract 1 count from its current value each time C01 receives an Input Signal and an I02 (Direction Set) signal input simultaneously. The C01 coil will activate when I02 is active and the current value reaches 0. The C01 coil will remain active until I02 is deactivated. The C01 current value *cannot* exceed the preset value. The current value of C01 *will be retained* when the power is taken away from the SG2.

Example 4: Counter Mode 4 Counter with overtaking and with power down current value retention.



“C Keep” has to be selected in the Module System Set to retain Current Value.

Mode: 4
Preset Type: N (Numeric Constant)
Preset Value: 5 (shown as 000005)
Direction Set: I02
Reset Input: I03

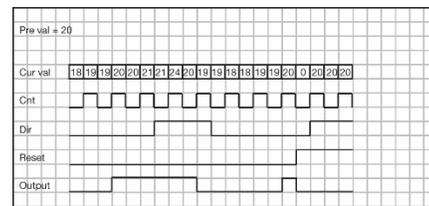


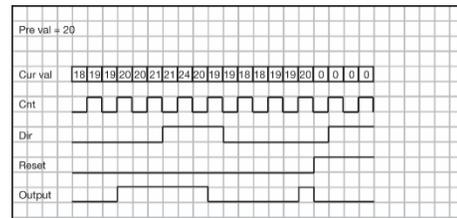
Figure 6

The C01 (Counter Instruction) will add 1 count to the current value of C01 each time C01 receives an Input Signal. The C01 coil will activate once the current value of C01 equals the preset value (5). The C01 coil will remain active until C01 receives a signal input from I03 (Reset Signal) or if the counter direction (I02) is set to count down and the current value drops below the preset value. C01 will subtract 1 count from its current value each time C01 receives an Input Signal and an I02 (Direction Set) signal input simultaneously. The C01 coil will activate when I02 is active and the current value reaches 0. The C01 coil will remain active until I02 is deactivated. The C01 current value *can* exceed the preset value. The current value of C01 *will be retained* when the power is taken away from the SG2.

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Example 5: Counter Mode 5 Counter with overtaking and without power down Compare Counter.

Mode: 5
Preset Value: 5 (shown as 000005)
Preset Type: N (Numeric Constant)
Direction Set: I02
Reset Input: I03



Example 7: Counter Mode 7 Scale input Counter (High Speed Counter) (DC Versions Only)



This example cannot be simulated due to refresh rates

Mode: 7
Preset Value: 20 (shown as 000020)
Preset Type: N (Numeric Constant)
Input I1/I2: I01 (I01 or I02 Only)
Reset Input: I03

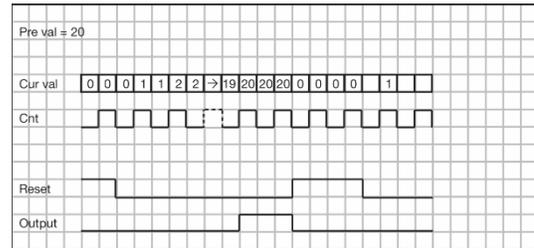


Figure 9

C01 (High Speed Counter Instruction) will start counting up when I01 Input Signal is active. Once the pulse count reaches the Preset Value and the C01 instruction becomes true, the C01 coil will activate. The C01 coil will remain active until the I03 (Reset Input) signal is given, resetting the counter value to 0 or I01 signal is no longer provided. Count will count up to preset value. Counter value cannot be retained if power is lost. High Speed Counter can be used for Up-counting for counting frequencies up 1K Hz.

Example 8: Counter Mode 8 1K Hz Input Counter (High Speed Counter) (DC Versions Only)



This example cannot be simulated due to refresh rates

Mode: 8
Fixed Time: N (Numeric Constant)
 5 (shown as 05.00)
Preset Value: 1000 (shown as 001000)
OFF: 500 (shown as 000500)
Input I1/I2: I02 (I01 or I02 only)

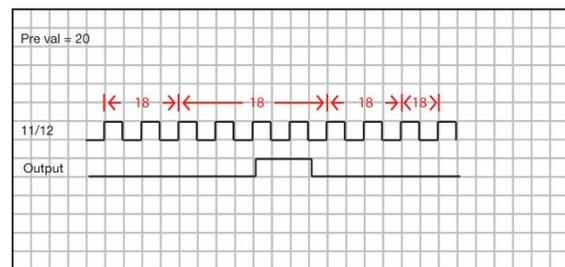


Figure10

C01 (High Speed Counter Instruction) will start counting up when I02 Input Signal is active. Once the pulse count reaches the Preset Value for the fixed time period, the C01 instruction becomes true, activating the C01 coil. The C01 coil will remain active until the OFF Preset Value is reached for the fixed time period or I01 is no longer provided. Count will not be retained if power is lost. High speed counter will count up to preset value and fixed time. The Counter coil will remain active until the OFF preset value and fixed time period is reached.

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