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# Chapter 10

## TIMERS

### **Edition 1**

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## **Overview**

The function block class has a range of general purpose timers providing pulse outputs, delays and timing functions.

### PULSE\_TIMER FUNCTION BLOCK

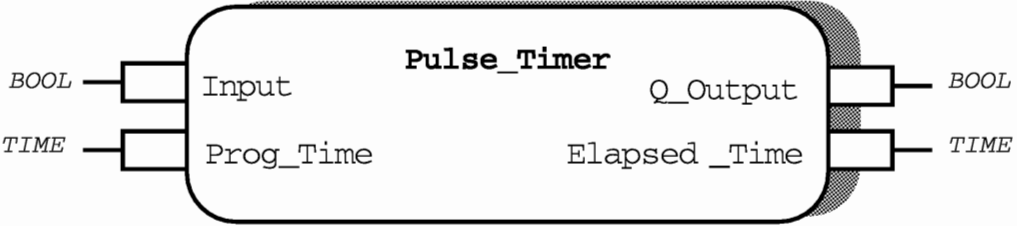
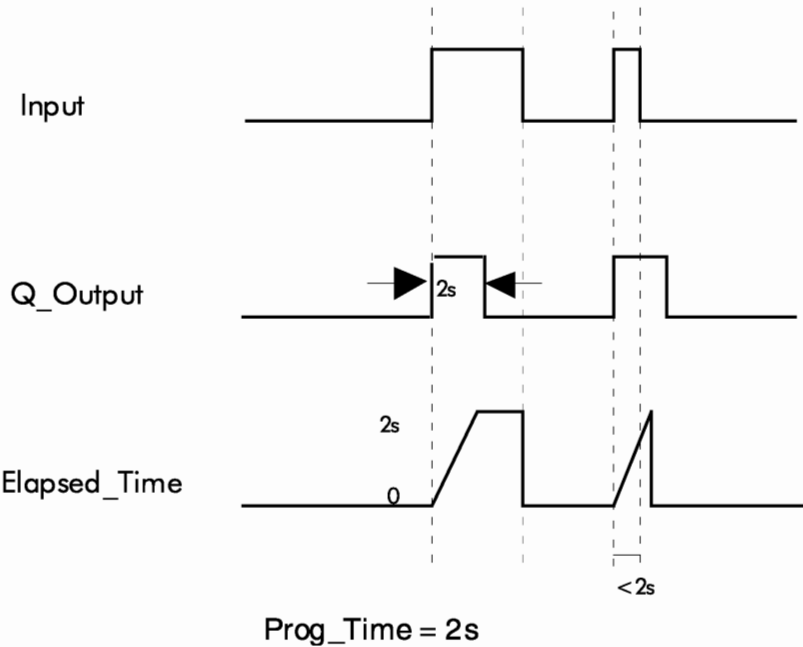


Figure 10-1 Pulse\_Timer Function Block Diagram

### Functional Description

The Pulse\_Timer function block provides a pulse of fixed duration on receipt of a rising edge input.

On the rising edge of changing Input from False (0) to True (1), Q\_Output will change from False (0) to True (1) and Elapsed\_Time will begin to increment in real time. When Elapsed\_Time has reached Prog\_Time, Q\_Output will reset from True (1) to False (0) and Elapsed\_Time will hold its final value until Input is False (0). Resetting Input to False (0) during the Elapsed\_Time ramp has no effect on the pulse duration, but on completion of the ramp it will reset Elapsed\_Time to zero.



## Function Block Attributes

Type:.....28 10

Class:.....TIMERS

Default Task: .....Task\_1

Short List: ..... Input, Prog\_Time, Q\_Output, Elapsed\_Time

Memory Requirements: .....18 Bytes

Execution Time: .....20.5 μ Secs

## Parameter Attributes

Name	Type	Cold Start	Read Access	Write Access	Type Specific Information	
Input	<b>BOOL</b>	False (0)	Oper	Oper	Senses	False (0) True (1)
Prog_Time	<b>TIME</b>	0 ms	Oper	Oper	High Limit Low Limit	23 days 0
Q_Output	<b>BOOL</b>	False (0)	Oper	Oper	Senses	False (0) True (1)
Elapsed_Time	<b>TIME</b>	0 ms	Oper	Oper	High Limit Low Limit	23 days 0

Table 10-1 Pulse\_Timer Parameter Attributes

## ON\_DELAY FUNCTION BLOCK

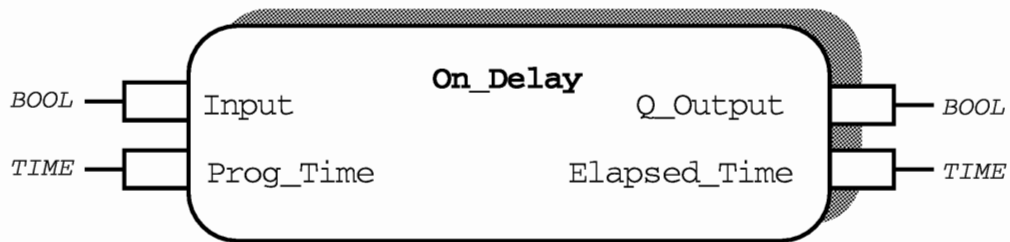
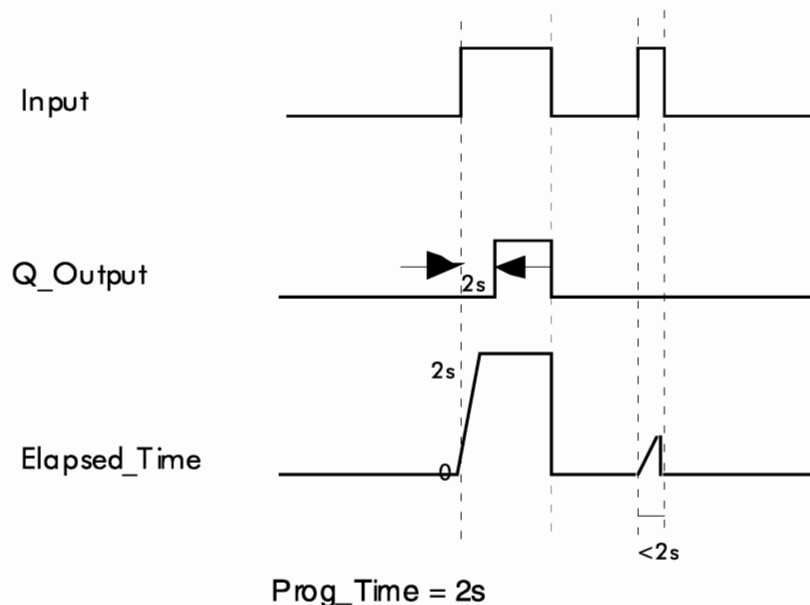


Figure 10-2 On\_Delay Function Block Diagram

### Functional Description

The On\_Delay function block provides a fixed delay between Input going True (1) and the Q\_Output going True (1). When the Input is reset to False (0), Q\_Output is set to False (0) immediately.

On Input changing from False (0) to True (1), Elapsed\_Time will begin to increment in real time. When Elapsed\_Time is equal to Prog\_Time, Q\_Output will change to True (1) and Elapsed\_Time will be held equal to Prog\_Time. If Input is reset to False (0) at any time, Q\_Output will immediately be reset to False (0) and Elapsed\_Time will be reset to zero.



## Function Block Attributes

Type:.....28 20  
 Class:..... TIMERS  
 Default Task: ..... Task\_1  
 Short List: ..... Input, Prog\_Time, Q\_Output, Elapsed\_Time  
 Memory Requirements: ..... 18 Bytes  
 Execution Time: ..... 17.2  $\mu$  Secs

## Parameter Attributes

Name	Type	Cold Start	Read Access	Write Access	Type Specific Information	
Elapsed_Time	<b>TIME</b>	0 ms	Oper	Oper	High Limit Low Limit	23 days 0
Input	<b>BOOL</b>	False (0)	Oper	Oper	Senses	False (0) True (1)
Prog_Time	<b>TIME</b>	0 ms	Oper	Oper	High Limit Low Limit	23 days 0
Q_Output	<b>BOOL</b>	False (0)	Oper	Oper	Senses	False (0) True (1)

Table 10-2 On\_Delay Parameter Attributes

## OFF\_DELAY FUNCTION BLOCK

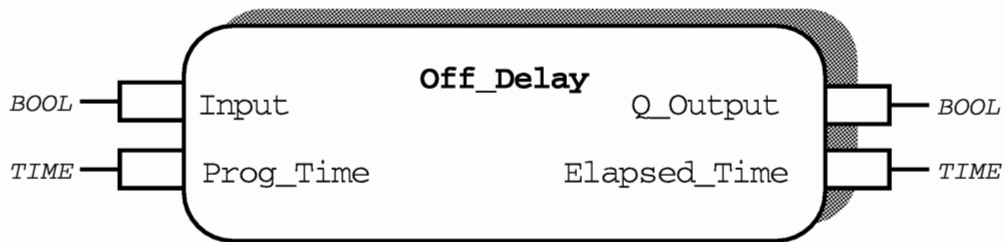
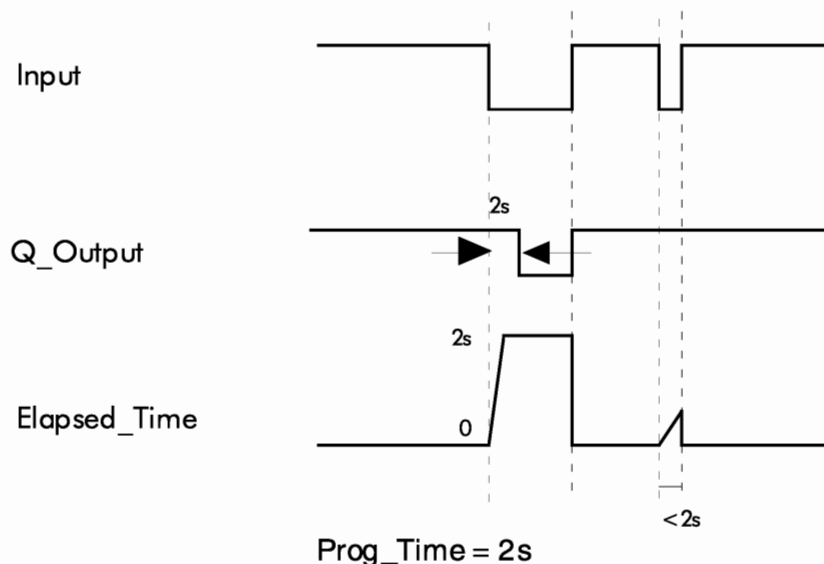


Figure 10-3 Off\_Delay Function Block Diagram

### Functional Description

The Off\_Delay function block provides a fixed delay between Input going False (0) and the Q\_Output going False (0). When the Input is reset to True (1), Q\_Output is set to True (1) immediately.

On Input changing from True (1) to False (0), Elapsed\_Time will begin to increment in real time. When Elapsed\_Time is equal to Prog\_Time, Q\_Output will change to False (0) and Elapsed\_Time will be held equal to Prog\_Time. If Input is reset to True (1) at any time, Q\_Output will immediately be reset to True (1) and Elapsed\_Time will be reset to zero.



## Function Block Attributes

Type:.....28 30  
 Class:.....TIMERS  
 Default Task: .....Task\_1  
 Short List: .....Input, Prog\_Time, Q\_Output, Elapsed\_Time  
 Memory Requirements: .....18 Bytes  
 Execution Time: .....17.2  $\mu$  Secs

## Parameter Attributes

Name	Type	Cold Start	Read Access	Write Access	Type Specific Information	
Input	<b>BOOL</b>	False (0)	Oper	Oper	Senses	False (0) True (1)
Prog_Time	<b>TIME</b>	0 ms	Oper	Oper	High Limit Low Limit	23 days 0
Q_Output	<b>BOOL</b>	False (0)	Oper	Oper	Senses	False (0) True (1)
Elapsed_Time	<b>TIME</b>	0 ms	Oper	Oper	High Limit Low Limit	23 days 0

Table 10-3 Off\_Delay Parameter Attributes



## STOPWATCH FUNCTION BLOCK

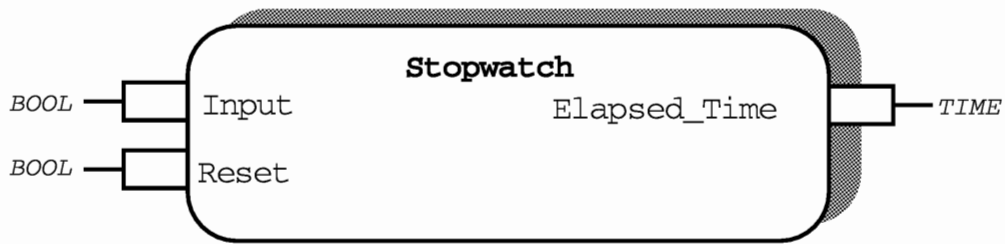


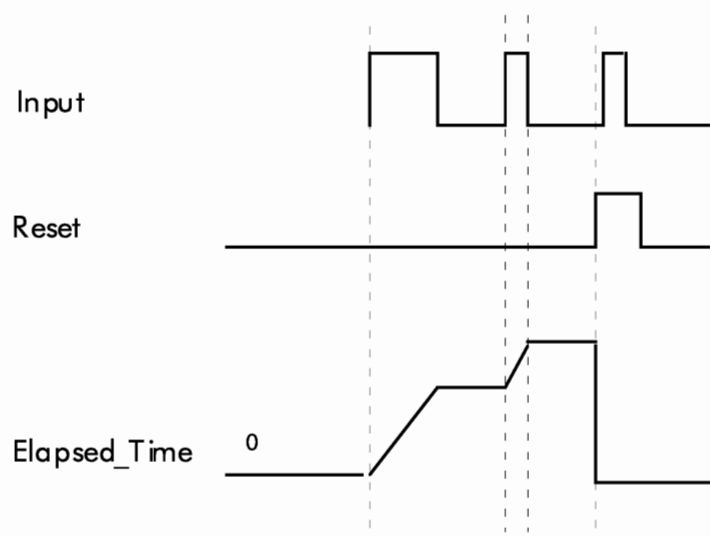
Figure 10-4 Stopwatch Function Block Diagram

### Functional Description

The Stopwatch function block has two boolean inputs (Input and Reset) and a time output (Elapsed\_Time). The block operates like a conventional stopwatch. When Reset is Off (0), setting Input to On (1) starts the stopwatch and setting Input to Off (0) stops the stopwatch. Setting Reset to On (1) resets the stopwatch to zero and holds it there. The operating modes of Stopwatch are summarised in the table below.

Input	Reset	Elapsed_Time
Off (0)	Off (0)	Held at constant value
On (1)	Off (0)	Increments in real time
Off (0)	On (1)	Reset to and held at zero
On (1)	On (1)	Reset and held at zero

Table 10-4 Stopwatch Operating Modes



## Function Block Attributes

Type: .....64 40  
 Class:.....TIMERS  
 Default Task:P .....Task\_1  
 Short List: .....Input, Reset, Elapsed\_Time  
 Memory Requirement:.....6 Bytes  
 Execution Time: .....13.6  $\mu$  Secs

## Parameter Attributes

Name	Type	Cold Start	Read Access	Write Access	Type Specific Information	
Input	<b>BOOL</b>	Off(0)	Oper	Oper	Senses	Off (0) On(1)
Reset	<b>BOOL</b>	Off(0)	Oper	Oper	Senses	Off (0) On(1)
Elapsed_Time	<b>TIME</b>	0 ms	Oper	Block	High Limit Low Limit	24d_21h_31m_23s 0

Table 10-5 Stopwatch Parameter Attributes