Andhra Pradesh State Skill Development Corporation

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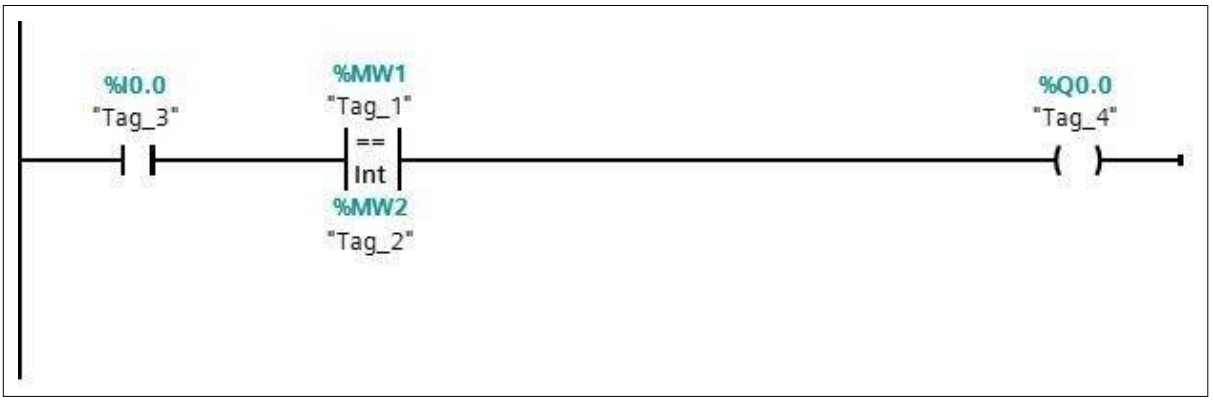
Basics of PLC

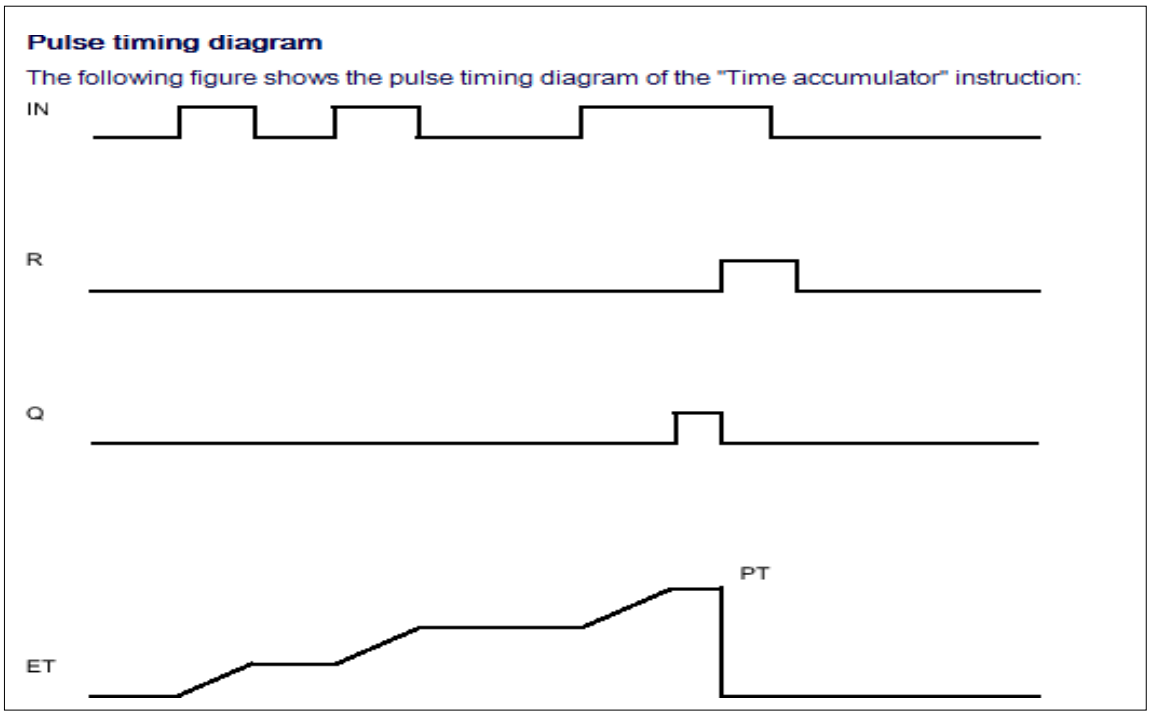
Introduction to Math Functions and Comparator Operations

Basic Mathematical Functions: Comparison Operations

1. *CMP (==):Equal*

You can use the "Equal" instruction to determine if a first comparison value (<Operand1>) is equal to a second comparison value (<Operand2>).





If the condition of the comparison is fulfilled, the instruction returns the result of logic operation (RLO) "1". If the comparison condition is not fulfilled, the instruction returns RLO "0".

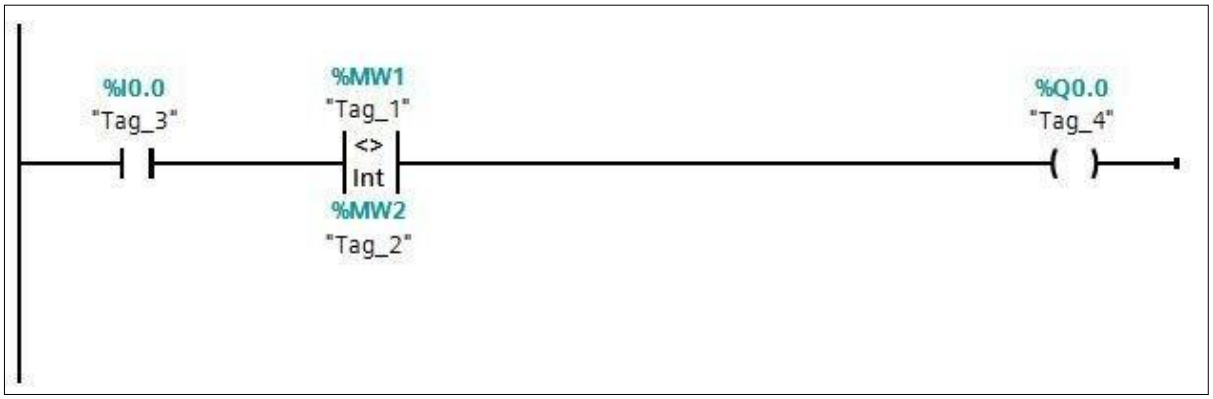
Parameters

Parameter	Declaration	Data type	Description
Operand 1	Input	integers, floating-point numbers, TIME, DATE	First comparison value
Operand 2	Input	integers, floating-point numbers, TIME, DATE	Second value to compare

1. *CMP (<>): Not equal*

You can use the "Not equal" instruction to determine if a first comparison value (<Operand1>) is not equal to a second comparison value (<Operand2>).

If the condition of the comparison is fulfilled, the instruction returns the result of logic operation (RLO) "1". If the comparison condition is not fulfilled, the instruction returns RLO "0".

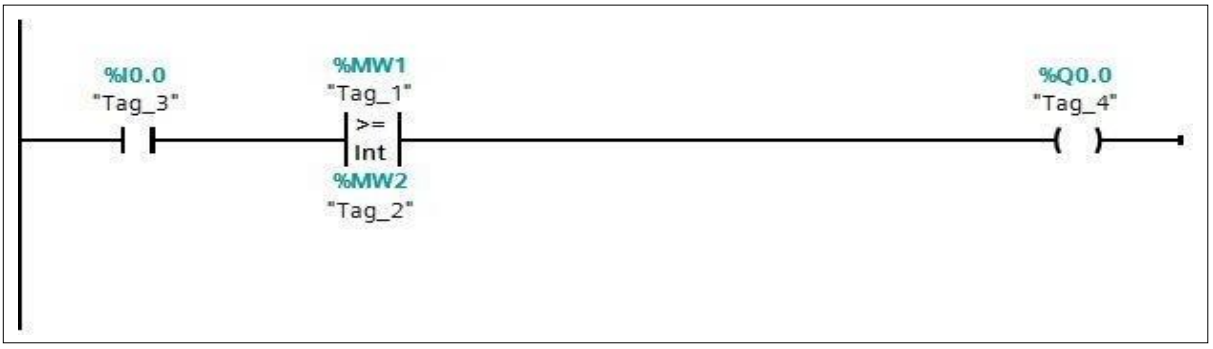


Parameters

Parameter	Declaration	Data type	Description
Operand 1	Input	integers, floating-point numbers, TIME, DATE	First comparison value
Operand 2	Input	integers, floating-point numbers, TIME, DATE	Second value to compare

2. *CMP (>=): Greater or equal*

You can use the "Greater or equal" instruction to determine if a first comparison value (<Operand1>) is greater than or equal to a second comparison value (<Operand2>). Both values to be compared must be of the same data type. If the condition of the comparison is fulfilled, the instruction returns the result of logic operation (RLO) "1". If the comparison condition is not fulfilled, the instruction returns RLO "0".



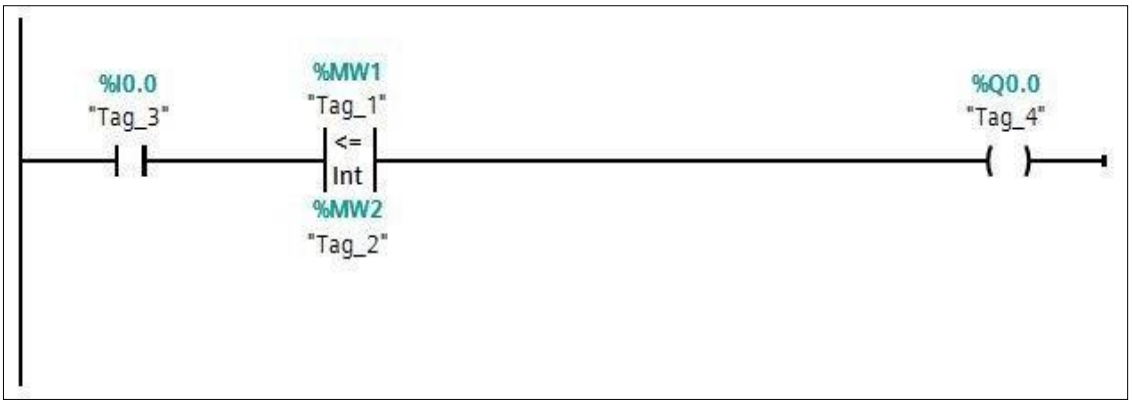
Parameters

Parameter	Declaration	Data type	Description
Operand 1	Input	integers, floating-point numbers, TIME, DATE	First comparison value
Operand 2	Input	integers, floating-point numbers, TIME, DATE	Second value to compare

1. *CMP (<=): Less or equal*

You can use the "Less or equal" instruction to determine if a first comparison value (<Operand1>) is less than or equal to a second comparison value (<Operand2>). Both values to be compared must be of the same data type.

If the condition of the comparison is fulfilled, the instruction returns the result of logic operation (RLO) =1. If the comparison condition is not fulfilled, the instruction returns RLO=0.



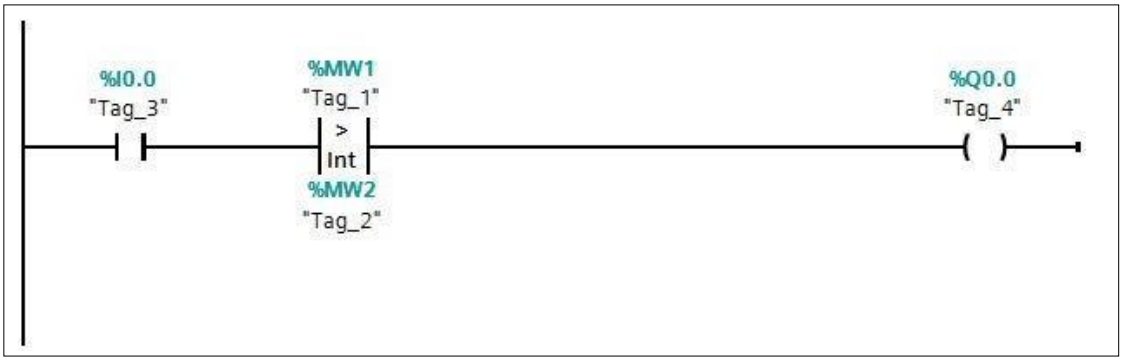
Parameters

Parameter	Declaration	Data type	Description
Operand 1	Input	integers, floating-point numbers, TIME, DATE	First comparison value
Operand 2	Input	integers, floating-point numbers, TIME, DATE	Second value to compare

2. *CMP (>): Greater than*

You can use the "Greater than" instruction to determine if a first comparison value (<Operand1>) is greater than a second comparison value (<Operand2>). Both values to be compared must be of the same data type.

If the condition of the comparison is fulfilled, the instruction returns the result of logic operation (RLO) "1". If the comparison condition is not fulfilled, the instruction returns RLO "0".



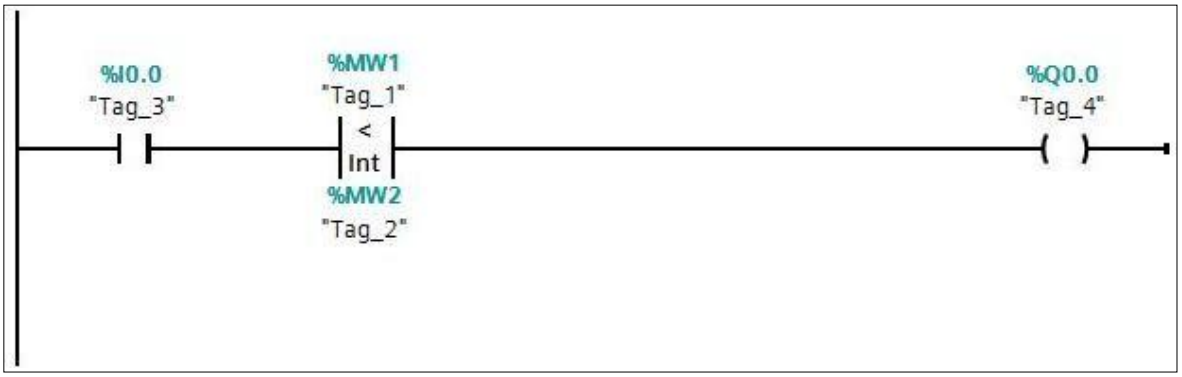
Parameters

Parameter	Declaration	Data type	Description
Operand 1	Input	integers, floating-point numbers, TIME, DATE	First comparison value
Operand 2	Input	integers, floating-point numbers, TIME, DATE	Second value to compare

1. *CMP <: Less than*

You can use the "Less than" instruction to determine if a first comparison value (<Operand1>) is less than a second comparison value (<Operand2>). Both values to be compared must be of the same data type.

If the condition of the comparison is fulfilled, the instruction returns the result of logic operation (RLO) "1". If the comparison condition is not fulfilled, the instruction returns RLO "0".



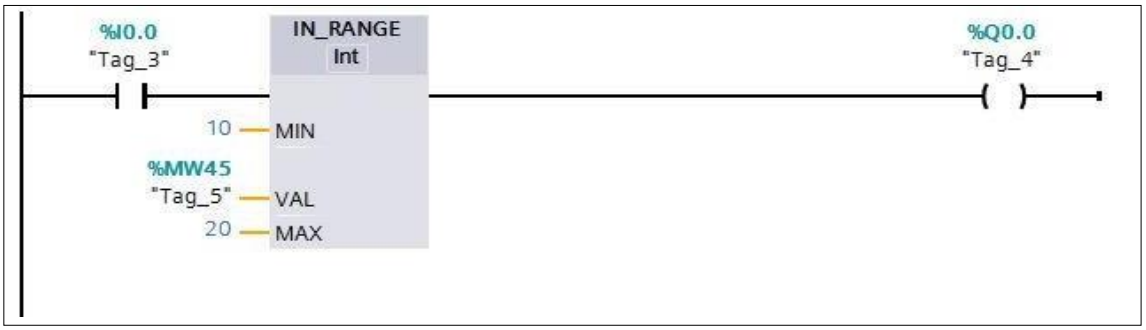
Parameters

Parameter	Declaration	Data type	Description
Operand 1	Input	integers, floating-point numbers, TIME, DATE	First comparison value
Operand 2	Input	integers, floating-point numbers, TIME, DATE	Second value to compare

1. *IN_RANGE: Value within range*

You can use the "Value within range" instruction to determine if the value at the VAL input is within a specific value range.

You specify the limits of the value range with the MIN and MAX inputs. The "Value within range" instruction compares the value at the VAL input with the values of the MIN and MAX inputs and sends the result to the box output. If the value at the VAL input fulfills the comparison MIN <= VAL or VAL <= MAX, the box output has the signal state "1". If the comparison is not fulfilled, the box output has the signal state



"0".

If the box input has the signal state "0", the "Value within range" instruction is not executed. The comparison function can only execute if the values to be compared are of the same data type and the box input is interconnected.

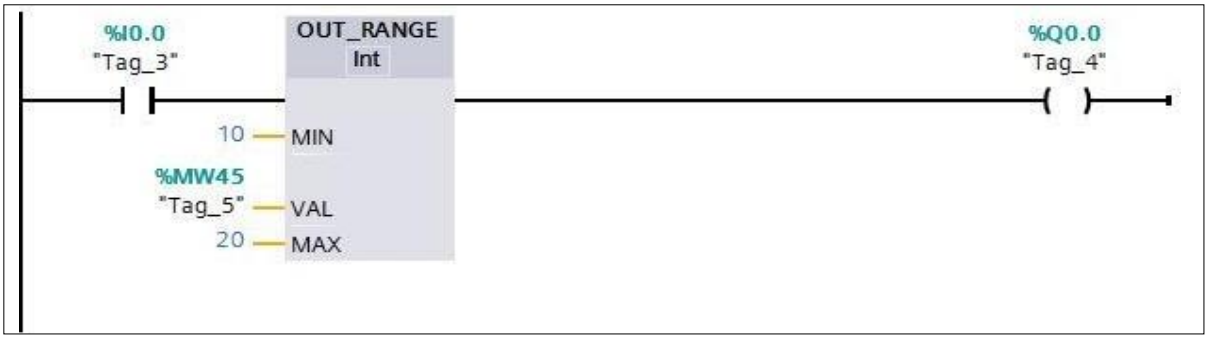
Parameters

Parameter	Declaration	Data type	Description
Input	Input	BOOL	Result of the previous logic operation
MIN	Input	Integers, floating-point numbers	Low limit of the value range
VAL	Input	Integers, floating-point numbers	Comparison value
MAX	Input	Integers, floating-point numbers	High limit of the value range
Output	Output	BOOL	Result of the comparison

2. *OUT_RANGE: Value outside range*

You can use the "Value outside range" instruction to determine if the value at the VAL input is outside a specific value range.

You specify the limits of the value range with the MIN and MAX inputs. The "Value outside range" instruction compares the value at the VAL input with the values of the MIN and MAX inputs and sends the result to the box output. If the value at the VAL input fulfills the comparison MIN > VAL or VAL > MAX, the box output has the signal state "1". The box output also has the signal state "1" if a specified operand with the REAL data type shows an invalid value.



The box output returns the signal state "0", if the value at input VAL does not satisfy the MIN > VAL or VAL > MAX condition.

If the box input has the signal state "0", the "Value outside range" instruction is not executed. The comparison function can only execute if the values to be compared are of the same data type and the box input is interconnected.

Parameters

Parameter	Declaration	Data type	Description
Input	Input	BOOL	Result of the previous logic operation
MIN	Input	Integers, floating-point numbers	Low limit of the value range
VAL	Input	Integers, floating-point numbers	Comparison value
MAX	Input	Integers, floating-point numbers	High limit of the value range
Output	Output	BOOL	Result of the comparison