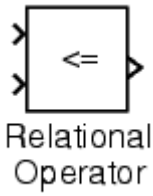
# Relational Operator

Perform the specified relational operation on the inputs

## Library

Simulink Math Operations and Fixed-Point Blockset Logic & Comparison

## Description




The Relational Operator block performs the specified comparison of its two inputs.

The relational operator connecting the two inputs is selected with the **Relational Operator** parameter. The block icon updates to display the selected operator. The supported operations are given below.

| Operation | Description |
|---|---|
| == | TRUE if the first input is equal to the second input |
| ~= | TRUE if the first input is not equal to the second input |
| < | TRUE if the first input is less than the second input |
| <= | TRUE if the first input is less than or equal to the second input |
| >= | TRUE if the first input is greater than or equal to the second input |
| > | TRUE if the first input is greater than the second input |

You can specify inputs as scalars, arrays, or a combination of a scalar and an array:

- For scalar inputs, the output is a scalar.
- For array inputs, the output is an array of the same dimensions, where each element is the result of an element-by-element comparison of the input arrays.
- For mixed scalar/array inputs, the output is an array, where each element is the result of a comparison between the scalar and the corresponding array element.

The output data type is specified with the **Output data type mode** and **Output data type** parameters. The output equals 1 for TRUE and 0 for FALSE.

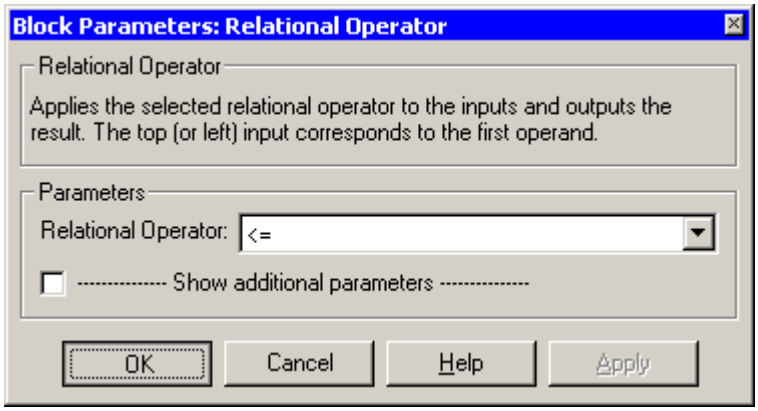
> **Note** ? The output data type selected should represent zero exactly. Data types that satisfy this condition include signed and unsigned integers and any floating-point data type.

## Data Type Support

A Relational Operator block accepts real or complex signals of any data type except `int64` and `uint64`. However, if the **Output data type mode** parameter is set to `Logical`, the input may only be `boolean` or `double`.

One input can be real and the other complex if the operator is `==` or `!=`.

## Parameters and Dialog Box

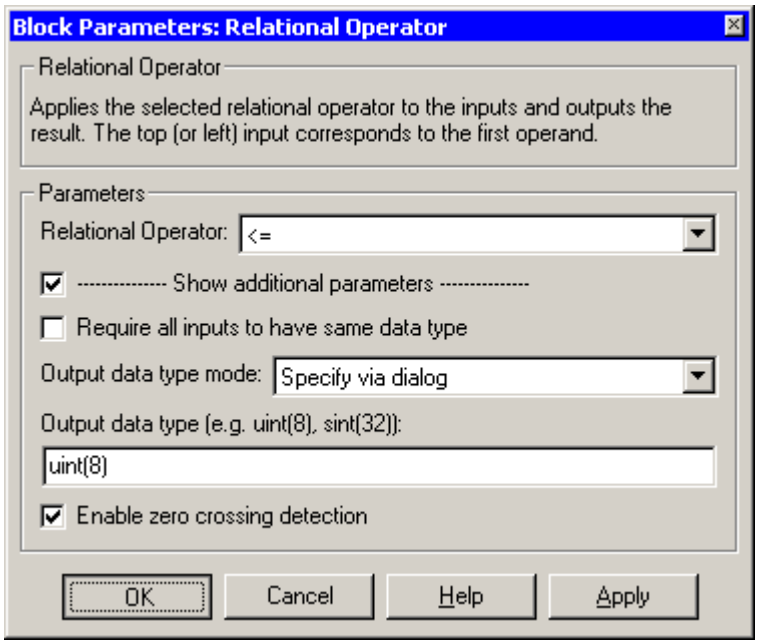



**Relational Operator**

Designate the relational operator used to compare the two inputs.

**Show additional parameters**

If selected, additional parameters specific to implementation of the block become visible as shown.




**Require all inputs to have same data type**

Select to require inputs to have the same data type.

**Output data type mode**

Set the output data type to `boolean`, or choose to specify the data type through the **Output data type** parameter.

Alternatively, you can select `Logical` to have the output data type determined by the **Boolean Logic Signals** parameter in the **Advanced** tab of the Simulink Simulation Parameters Interface. If you select `Logical` and **Boolean Logic Signals** is `on`, then the output data type is always `boolean`. If you select `Logical` and **Boolean Logic Signals** is `off`, then the output data type will match the input data type is always `double`.

**Output data type**

Specify the output data type. You should only use data types that represent zero exactly. Data types that satisfy this condition include signed and unsigned integers and any floating-point data type. This parameter is only visible if `Specify via dialog` is selected for the **Output data type mode** parameter.

**Enable zero crossing detection**

Select to enable zero crossing detection. For more information, see Zero Crossing Detection in the Using Simulink documentation.

## Conversions and Operations

The input with the smaller positive range is converted to the data type of the other input offline using round-to-nearest and saturation. This conversion is performed prior to comparison. Refer to Parameter Conversions in the Fixed-Point Blockset documentation for more information about parameter conversions.

## Characteristics

| | |
|---|---|
| Dimensionalized | Yes |
| Direct Feedthrough | Yes |
| Sample Time | Inherited from driving block |
| Scalar Expansion | Of inputs |
| Zero Crossing | No, unless **Enable zero crossing detection** is selected. |

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