PLUS+1™ GUIDE
Software

PLUS+1 Compliant
Liquid Temperature Sensor
Function Block
User Manual
About this Manual

Organization and Headings

To help you quickly find information in this manual, the material is divided into sections, topics, subtopics, and details, with descriptive headings set in red type. Section titles appear at the top of every page in large red type.

In the PDF version of this document, clicking an item underlined in blue italic type jumps you to the referenced page in the document.

Special Text Formatting

Controls and indicators are set in bold black type.

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A Table of Contents (TOC) appears on the next page. In the PDF version of this document, the TOC entries are hyperlinked.

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<th>Date</th>
<th>Comment</th>
</tr>
</thead>
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<tr>
<td>Rev CA</td>
<td>November 2011</td>
<td></td>
</tr>
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Overview

This function block:

- Receives resistance values from a Sauer-Danfoss liquid temperature sensor.
- Converts these resistance inputs into temperature outputs with a range of 50°C [122°F] to 125°C [257°F].

About the Input and Output Ranges of the Liquid_Temp Function Block

- Low fluid temperatures cause a liquid temperature sensor to output high resistance values. The Liquid_Temp function block converts these high resistance values into low temperature outputs.
  
  For example, the function block converts a 1000 Ω input into a 50°C [122°F] output.

- High fluid temperatures cause a liquid temperature sensor to output low resistance values. The Liquid_Temp function block converts these low resistance values into high temperature outputs.
  
  For example, the function block converts a 65 Ω input into a 125°C [257°F] output.

PLUS+1 controllers cannot accurately convert resistance values above 1000 Ω or below 65 Ω into temperature values.

- When fluid temperatures below 50°C [122°F] cause resistance values to rise above 1200 Ω, the Liquid_Temp function block:
  - Holds its temperature outputs at a steady 50°C [122°F].
  - Declares an input too high fault.

- When fluid temperatures above 50°C [122°F] cause liquid resistance values to fall below 60 Ω, the Liquid_Temp function block:
  - Holds its temperature outputs at a steady 125°C [257°F].
  - Declares an input too low fault.

Refer to the hardware application interface (API) specification for more about your hardware’s capabilities.
Inputs

Liquid_Temp Function Block Inputs

<table>
<thead>
<tr>
<th>Input</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flt Tm</td>
<td>——</td>
<td>0–65535</td>
<td>The Flt Tm (Fault Time) input sets the delay, in seconds, before the function block reports faults. The delay time begins when the controller powers on. The delay time allows for a warm-up period before the function block starts reporting faults. 1 = 1 s</td>
</tr>
<tr>
<td>Ohm</td>
<td>——</td>
<td>60–1200Ω*</td>
<td>Input for the resistance values output by a Sauer-Danfoss liquid temperature sensor. The function block declares out-of-range faults when input values drop below 60Ω or rise above 1200Ω. 1000 = 1000Ω.</td>
</tr>
</tbody>
</table>

Outputs

Liquid_Temp Function Block Outputs

<table>
<thead>
<tr>
<th>Output</th>
<th>Type</th>
<th>Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fault</td>
<td>U16</td>
<td>——</td>
<td>Outputs a Fault signal that indicates the operating condition of the function block.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- 0x0000 = Function block is OK.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- 0x0001 = Input value is too low.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- 0x0002 = Input value is too high.</td>
</tr>
<tr>
<td>Deg F</td>
<td>U16</td>
<td>1220–2570*</td>
<td>Outputs a Deg_F signal that indicates the temperature in degrees Fahrenheit.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1000 = 100.0°F.</td>
</tr>
<tr>
<td>Deg C</td>
<td>U16</td>
<td>500–1250*</td>
<td>Outputs a Deg_C signal that indicates the temperature in degrees Celsius.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1000 = 100.0°C.</td>
</tr>
</tbody>
</table>

*See About the Input and Output Ranges of the Liquid_Temp Function Block on page 4 for more information.
About Function Block Connections

<table>
<thead>
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<th>Item</th>
<th>Description</th>
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<td>1</td>
<td>Resistance input from a temperature sensor.</td>
</tr>
<tr>
<td>2</td>
<td>Function block faults.</td>
</tr>
<tr>
<td>3</td>
<td>Temperature in °F.</td>
</tr>
<tr>
<td>4</td>
<td>Temperature in °C.</td>
</tr>
</tbody>
</table>

Fault Outputs

The **Fault** output of the function block indicates the block’s operating condition.

The **Deg F** and **Deg C** outputs both return to normal as soon as a fault condition clears.

**Fault Conditions**

<table>
<thead>
<tr>
<th>Condition</th>
<th>Fault</th>
<th>Deg F Signal</th>
<th>Deg C Signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Block is OK.</td>
<td>0x0000</td>
<td>1220–2570°F</td>
<td>500–1250°C</td>
</tr>
<tr>
<td>Input value is too low.</td>
<td>0x0001</td>
<td>2570°F</td>
<td>1250°C</td>
</tr>
<tr>
<td>Input value is too high.</td>
<td>0x0002</td>
<td>1220°F</td>
<td>500°C</td>
</tr>
</tbody>
</table>

*See [About the Input and Output Ranges of the Function Block](#) on page 4 for more information.
About the Relationship between Function Block Input and Output Signals

The following plot shows the relationship between changing resistance values on the **Liquid_Temp** function block’s **Ohm** input and the block’s **Deg C** output.

- **< 60 Ω**: Fault—input too low
- **> 1200 Ω**: Fault—input too high
MC Controller—Input Configuration

If you have an SC controller, see SC Controller—Input Configuration on page 9.

You route the function block’s Ohm input through an AnIn.

You must change the AnIn default configuration to accept this input.

How to Configure an AnIn

1. In the GUIDE template, enter the Inputs page.

2. Enter the page that receives the input.

3. Make the changes that are shown in the preceding figure.
SC Controller—Input Configuration

If you have an MC controller, see MC Controller—Input Configuration on page 8.

You route the function block's Ohm input through an MFIn.

You must change the MFIn default configuration to accept this input.

How to Configure an MFIn

The MFIn that you use must have a resistance input.

1. In the GUIDE template, enter the Inputs page.

2. Enter the page that receives the input.

3. Make the changes that are shown in the preceding figure.
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