Chapter 25

Working with Runtime Totalization Objects

Introduction

The Runtime Totalization object tracks the number of one minute time intervals that elapse while a designated input, such as a binary or multistate value, has matched a specified state.

This chapter describes how to:

- add a Runtime Totalization object
- edit a Runtime Totalization object
- command a Runtime Totalization object
- delete a Runtime Totalization object

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Key Concepts

Runtime Totalization Object

A Runtime Totalization object accumulates total time only while a particular condition is satisfied (for instance, Supply Fan 1 is on). It answers the question "How long?" and is typically used to even out the use and wear of equipment, or to schedule maintenance after a certain amount of use. Data is recorded in minutes and converted to hours for the display.

The Runtime Totalization object can be added to any container or object. The Runtime Totalization object references any binary or multistate attribute value for input data for its own calculations.

Note: The Input Reference of a Runtime Totalization object should refer to enumeration or Boolean based attributes in order to perform as intended. Runtime Totalization objects referencing other attribute data types (e.g., floating point) yield unusual results, though not necessarily unusable results. Neither the VT100 nor Project Builder give an error message when this object is attached to any attribute other than enumeration or Boolean based attributes.

Typical uses for a Runtime Totalization object are determining:

- fan or pump runtime
- the amount of time a point is in alarm
- runtime of fixed loads (such as lighting) for energy totalization and tenant billback

The Runtime Totalization formula and an example are illustrated in Table 25-1. Refer to the *Attributes* section of this chapter for information about attributes used in the calculation.

Table 25-1: Runtime Totalization Formula and Example Calculations

Runtime Totalization	Calculation
Formula	Present Value (current) + TA / (3600 x Scalefactor) = Present Value (new)
Example	1.5 hours + 60 seconds/(3600 seconds/hour x 1) = 1.52 hours

Note: TA represents the time the Input Reference spends in the Reference state.

Runtime Totalization Object Reset

Describes under what conditions the reset of the Runtime Totalization object occurs and what conditions result due to the reset.

Table 25-2: Runtime Totalization Reset

Reset	Conditions
Occurs:	• When a Reset Command is received. • When the following attributes are rewritten: Low Cutoff Value Timebase Scalefactor Reset Totalize Limit, when the Present Value has reached the currently defined Totalize Limit value Rollover, when the Present Value has reached the currently defined Totalize Limit value • Following a return from a Totalization object's disabled state to an enabled state
Results In:	• Termination of ongoing calculations • Restoration of the Present Value and Rollover Count values to their initial states • Retriggering of all Change-of-Value state changes

Attributes

The values of an object's attributes determine how the object operates. The Runtime Totalization object attributes described below are listed in the order that they appear on the screen. Entry requirements for these attributes are in Table 25-4.

For additional information about the Runtime Totalization object and its attributes, refer to *Object Dictionary*.

Object Name

Identifies the object on the user interface.

Description

Provides optional information to further describe the object.

Object Type

Indicates the kind of object, such as Schedule, N2 Analog Input, or Runtime Totalization.

Object Category

Determines the general classification of an object to help define user access capability and message routing.

Enabled

Indicates if the object is active and executing an operational condition.

Input Reference

Specifies the object and attribute totalized by this object. If this attribute is unreliable or changes from the Reference (state) to another state, totalization is temporarily suspended.

Reference

Defines the state (0-31) totalized as defined in the Input Reference attribute. Writing this attribute forces the Reset condition.

Scalefactor

Indicates the value used to scale the totalized value to either a larger or smaller value than would otherwise result. Writing this attribute forces the Reset condition.

Totalize Limit

Defines a threshold value that the Present Value must meet or exceed in order for the Runtime Totalization object to take special action. The special action taken depends on the setting defined for the Rollover attribute.

Rollover

Defines the special action the Runtime Totalization object must take when the Present Value reaches the Totalize Limit value. If the Rollover attribute is set to False, the Runtime Totalization object ceases further operation when the Present Value equals or exceeds the Totalize Limit value. If it is True, it will reset the present Value to 0.0 and resume a new cycle of totalization.

States Text

Indicates the text that appears for the Present Value.

Units

Indicates the measurement units of this object.

Display Precision

Indicates the rounded position and decimal places to display for this object.

Present Value

Represents the current totalized value of the object. Writing this attribute forces the Reset condition. Present Value appears to the right of the object name in the container hierarchy after the object is created.

Reset

Forces a Reset condition, after a write of this attribute to True. The reading of this attribute always returns a False condition. It is not displayed on the attributes screen but it is useful for advanced diagnostics.

Rollover Count

Indicates how many rollovers have occurred since the object started totalization, when the Rollover attribute is True. This is an internal attribute value. It is not displayed on the attributes screen but it is useful for advanced diagnostics.

Procedure Overview

Table 25-3: Working with Runtime Totalization Objects

To Do This	Follow These Steps:
Add a Runtime Totalization Object	Browse to and highlight the container or object where the Runtime Totalization object is to be added. Press the F3 (Add) key. Select Runtime Totalization and press Enter. Fill in the fields using Table 25-4. Press the F3 (Save) key. Check the User Assistance area of the screen to verify if the save was successful or if there were errors. Press any key to continue. Press the F4 (Cancel) key to return to the container hierarchy.
Edit a Runtime Totalization Object	Browse to and highlight a Runtime Totalization object. Press Enter to open the object. Press the F3 (Edit) key. Edit the fields using Table 25-4. Press the F3 (Save) key. Check the User Assistance area of the screen to verify if the save was successful or if there were errors. Press any key to continue. Press the F4 (Cancel) key to return to the container hierarchy.
Command a Runtime Totalization Object	Browse to and highlight a Runtime Totalization object. Press the F2 (Command) key. Use the Spacebar and the Backspace key to cycle through the list of commands until the desired command appears. Press Enter.
Delete a Runtime Totalization Object	Browse to and highlight a Runtime Totalization object. Press Enter to open the object. Press the Delete key. Press the Tab key to confirm the deletion.

Detailed Procedures

Adding a Runtime Totalization Object

To add a Runtime Totalization object:

1. Browse to and highlight the container or object where the Runtime Totalization object is to be added.
2. Press the F3 (Add) key. The Add Object list appears.
3. Select Runtime Totalization and press Enter. The Runtime Totalization object attribute screen appears (Figure 25-1).

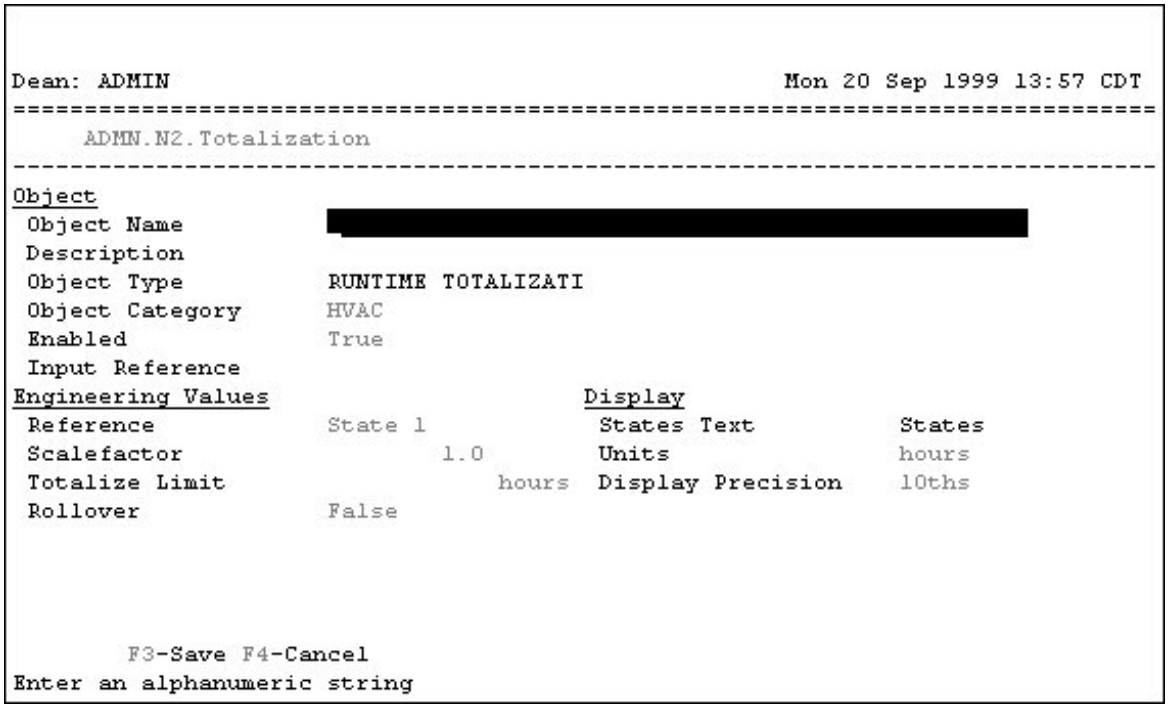

Figure 25-1: Runtime Totalization Object Attribute Screen

4. Fill in the fields using Table 25-4.

Table 25-4: Attribute Entry Requirements

Screen Area	Attribute	Required	Default	Options/Range
Object	Object Name	No	Blank	Maximum 32 characters Invalid characters: @ . ? * $ # : ' [ ] If not completed, the system assigns a name.
	Description	No	Blank	Maximum 40 characters
	Object Type	Yes	Runtime Totalization	The default is preset and cannot be changed.
	Object Category	Yes	HVAC	Use the Spacebar and Backspace key to view and select options: HVAC, Fire, Security, Services, Administrative.
	Enabled	Yes	True	Use the Spacebar and Backspace key to view and select options: True, False.
	Input Reference	Yes		If this Runtime Totalization object is being added to a container, the exact name of the object and attribute to be totalized must be entered. If this Runtime Totalization object is being added to another object, the name of that object appears automatically with its Present Value attribute. Example: `HEATING SP.Present Value.` Present Value is the default attribute that appears.
Engineering Values	Reference	Yes	State 1	Use the Spacebar and the Backspace key to cycle through the list of options: 0 to 31.
	Scalefactor	Yes	1.0	A float value greater than 0
	Totalize Limit	Yes	(hours)	A float value greater than 0
	Rollover	Yes	False	Use the Spacebar and Backspace key to view and select options: True, False.
Display	States Text	Yes	States	Use the Spacebar and Backspace key to view and select options. Refer to *States Text* in *Appendix A: Object Enumeration Sets* of the *Object Dictionary (LIT-694980).*
	Units	Yes	hours	Use the Spacebar and Backspace key to view and select options. Refer to *Units Enumeration Set* in *Appendix A: Object Enumeration Sets* of the *Object Dictionary (LIT-694980).*
	Display Precision	Yes	10ths	Use the Spacebar and Backspace key to view and select options. Refer to *Display Precision Enumeration Set* in *Appendix A: Object Enumeration Sets* of the *Object Dictionary (LIT-694980).*

5. Press the F3 (Save) key.
6. Check the User Assistance area of the screen to verify if the save was successful or if there were errors. If errors were detected, correct them and resave the entries. Once the save is successful, continue with Step 7.
7. Press any key to continue.
8. Press the F4 (Cancel) key to return to the container hierarchy.

Editing a Runtime Totalization Object

To edit a Runtime Totalization object:

1. Browse to and highlight a Runtime Totalization object.
2. Press Enter to open the object.

Note: Additional attributes appear. Refer to the *Object Dictionary* for more information.

3. Press the F3 (Edit) key. The Runtime Totalization object attribute screen appears (Figure 25-1).
4. Edit the fields using Table 25-4.
5. Press the F3 (Save) key.
6. Check the User Assistance area of the screen to verify if the save was successful or if there were errors. If errors were detected, correct them and resave the entries. Once the save is successful, continue with Step 7.
7. Press any key to continue.
8. Press the F4 (Cancel) key to return to the container hierarchy.

Commanding a Runtime Totalization Object

To command a Runtime Totalization object:

1. Browse to and highlight a Runtime Totalization object.
2. Press the F2 (Command) key. The Command field appears.
3. Use the Spacebar and the Backspace key to cycle through the list of commands until the desired command appears. The Runtime Totalization object supports the commands identified in Table 25-5.

Table 25-5: Supported Commands

Command	Description
Reset	Terminates ongoing calculations, restores the present value to its initial state, creates a reset date and time stamp, and reinitializes all Changes of Value.
Enable	Forces a Reset on the Runtime Totalization object and returns it to normal operation.
Disable	Locks out all outputs and prevents functionality of the Runtime Totalization object. Temporarily suspends totalization.

4. Press Enter.

Deleting a Runtime Totalization Object

To delete a Runtime Totalization object:

1. Browse to and highlight a Runtime Totalization.
2. Press Enter to open the object.
3. Press the Delete key.
4. Press the Tab key to confirm the deletion.