Studio 5000 Tool Life

(For use with Traceability Application v11.9.3 or newer and PLC Tool Life Routine v2.0.0 or newer)

Global Common

SD-1055

ISSUED August 27, 2021
REVISED

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1 Scope and Purpose

1.1 Scope

1.1.1 This specification describes the traceability application configuration and PLC logic design requirements for Nexteer Automotive facilities utilizing Nexteer's Traceability System.

1.1.2 This specification applies to the equipment requiring Traceability communication for process flow, electronic error proofing, and data collection. Refer to the Manufacturing Engineer's written specification for details regarding traceability requirements.

1.1.3 This specification has associated PLC logic routines and HMI screens that reflect the requirements of this specification. In addition, the logic library provides the required routines and examples that may be applied to new equipment designs. All files are available at www.nexteerdataexchange.com.

1.1.4 The use of the word "shall" indicates requirements and the use of the word "should" indicates recommendations. The use of the word "may" indicates permission or allowance and the use of the word "can" indicates a possibility.

1.2 Purpose and Objectives

1.2.1 The purpose of this specification is to provide Nexteer requirements and guidance to Original Equipment Manufacturers (OEM) for use in their PLC logic designs to interface with Nexteer's Traceability System and to provide device configuration guidance for the Traceability application.

1.2.2 The objective of this specification is to provide common, maintainable, and cost-effective traceability controls systems that enhance both the productivity and ease-of-use of the system, while ensuring the quality of Nexteer products produced. The application of this specification will result in common traceability controls systems.

1.2.3 The Nexteer traceability systems are integrated at the machine, cell (group of machines), or asynchronous assembly line level. Depending on the configuration of the traceability system, it may cover multiple cells and / or multiple asynchronous assembly lines.

1.2.4 The Nexteer traceability system uses a Traceability computer, which runs the Nexteer Traceability Application and interfaces with the SQL Server traceability database.

1.2.5 This Document shall be used in conjunction with the Nexteer Traceability Input Document to configure and program the Traceability Program and PLC Logic

2 Tool Life

The R29_ToolLife_V2 routine shall be utilized when Tool Life Information is specified on the Traceability Input Document.

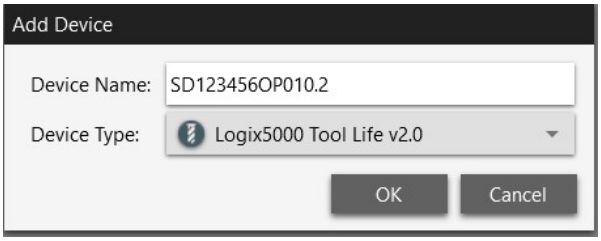
Tool Life Information			
ME REQUIRED SECTION			CONTROLS REQUIRED SECTION
Station and Tooling Description	Expected Tool Life Limit	Quantity to Increment per Cycle	Traceability Station ID = SD Number + (Xy or OPxxx.y or STxxx.y)
OP010 Axle Hardening Coil	10000	2	SD123456OP010.2
OP010 Axle Tempering Coil	10000	2	SD123456OP010.3

2.1 Traceability Application Configuration

2.1.1 Add a device connection.

1. Create a new device by clicking menu Edit > Add Device , or by right clicking the Devices list on the left side of the app and using the context menu.

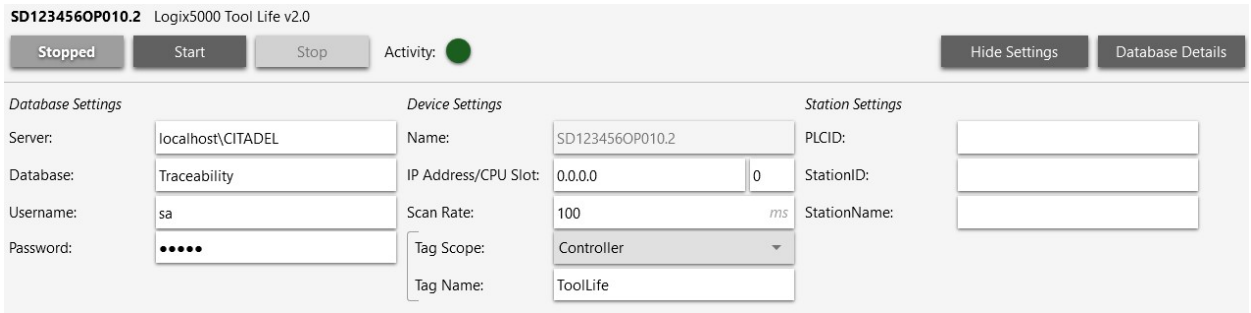
2. A dialog that is used to configure the new device connection will appear.
   a. Enter a name for the device. For example: SD123456X01, SD123456X51, SD123456OP010.2, SD123456ST02, etc. Note:
   b. Set the device type to Logix5000 Tool Life v2.0.
   c. Click OK to finish adding the device connection.



2.1.2 Device settings panel.

1. Ensure that the newly added device connection is selected by clicking on it in the Devices list on the left side of the app. Click the Show Settings button to display the device settings.

2. The following panel will be displayed. It is used to configure the database and PLC connection settings.

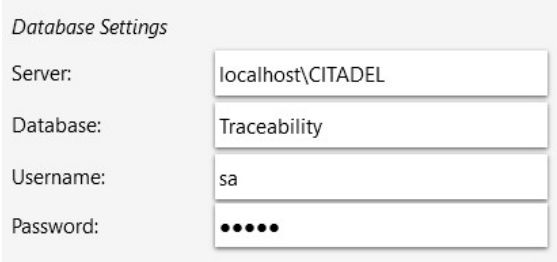


2.1.3 Configure Database Settings

The default database configuration settings normally do not require modification at MQ1.

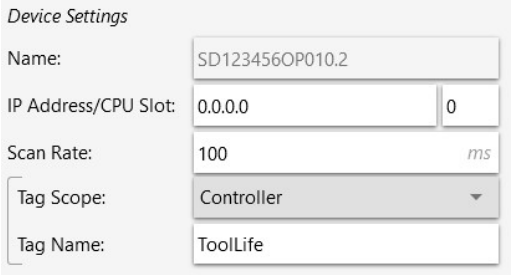
For MQ2 the settings shall be supplied by the destination plant.

1. Server : The default Microsoft SQL server name is “localhost\CITADEL” which contains the standard Nexteer traceability database.
2. Database : The default database name is “Traceability”.
3. Username/Password : This contains the credentials for the authorized database user. The default username is “sa” and password is “admin”.



2.1.4 Configure Device Settings

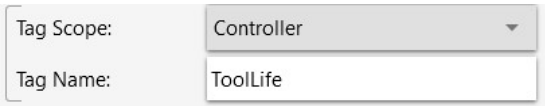
1. IP Address : Enter the IP Address of the PLC.
2. Scan Rate : The default scan rate of how often the software polls the machine for new data is “100” milliseconds. This should not require modification.



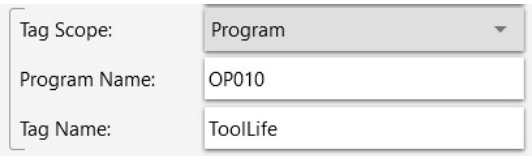
3. Tag Scope / Program Name / Tag Name : The default tag name is “ToolLife”. This is a user defined tag in the R29_ToolLife_V2_Component routine containing the tag structure needed to interface with the traceability application. When multiple R29_ToolLife_V2_Component routines exist in the same program, this tag name shall be unique. The following 3 settings are used to configure a reference to the tag.
   a. Tag Scope : Select the scope of the PLC tag.

      Note: Typically, Tag Scope for the UDT should be set to a Controller scope tag.
   b. Program Name (optional) : If Tag Scope is set to “Program”, this setting will be displayed. Enter the name of the program within the PLC where the tag resides.
   c. Tag Name : Enter the name of the PLC tag.

Example (Controller Scope):



Example (Program Scope):



2.1.5 Configure Station Settings

1. PLCID: Enter the machines SD number for the PLC ID. For example: SD123456.

   a. StationID: Enter a unique Station ID for the device configuration. For example: SD123456X01, SD123456X51, SD123456OP010.2, SD123456ST020, etc…

   Note: This should be match up with the Station ID under Tool Life Information on the Traceability Input Document.

Tool Life Information			
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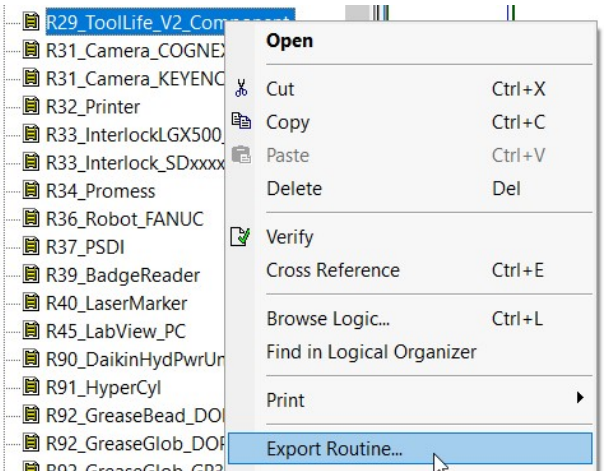
OP010 Axle Hardening Coil	10000	2	SD123456OP010.2
OP010 Axle Tempering Coil	10000	2	SD123456OP010.3

2. StationName: Enter a description for the station. The recommended station name should include the Station or Op Number, and a description for the Tooling. For example: OP010 Axle Hardening Coil.

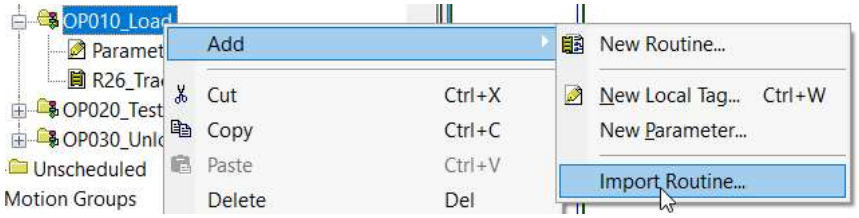
   Note: This should be match up with the Station and Tooling Description under Tool Life on the Traceability Input Document.

2.1.6 Importing the Routine

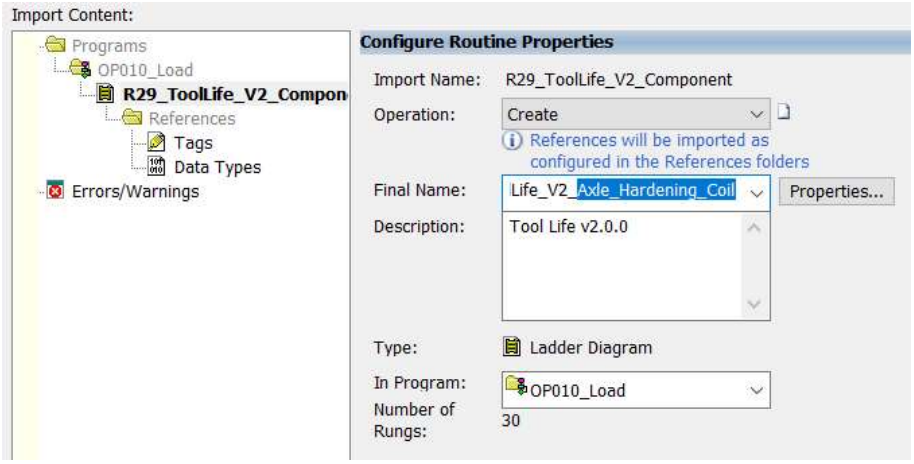
1. Export the R29_ToolLife_V2_Component from the Nexteer PLC library program by right clicking on the routine and clicking Export Routine… . Save the file to a location on your hard drive.



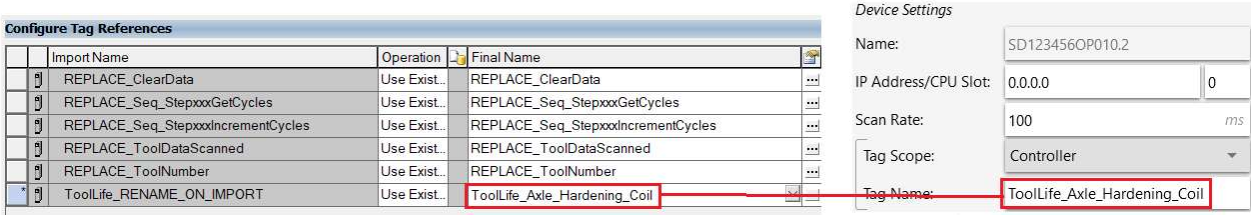
2. Right click on the Station routine of the PLC program that R29_ToolLife_V2_Component needs to be imported into and click Add > Import Routine in the context menu. Browse to the location that exported routine was saved to and click Open.



3. The Import Configuration dialog will appear. Rename the Final Name to the Tooling Description as specified on the Traceability Input Document.

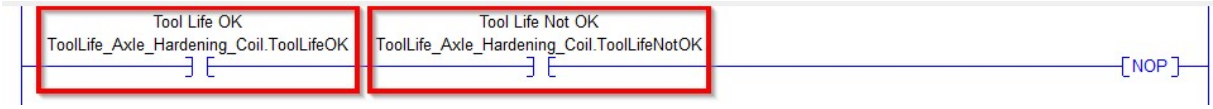


4. Click on the Tags option in the Import Content tree. The ToolLife_RENAME_ON_IMPORT Tag name must match the Tag Name in the Traceability Device Setting for this station.

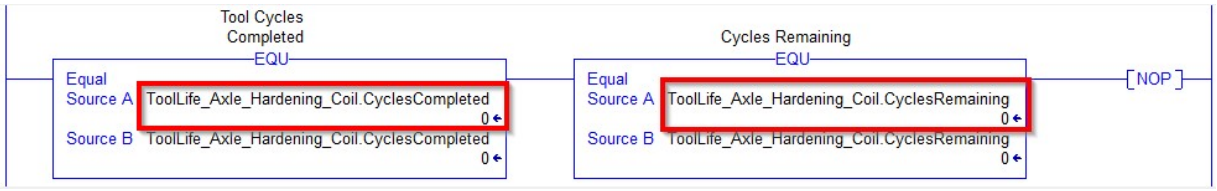


2.1.7 Tool Life Status Tags shall be used by the Machine Builder to integrate into Logic.

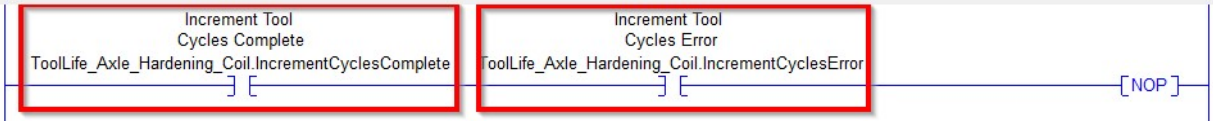
1. "Tool Life OK" – Tag shall be used in the machine logic (Sequence) to allow the part to process a cycle.
2. "Tool Life Not OK" – Tag shall be used to trigger a fault or message indicating that the Machine is NOT OK to start a cycle.



3. "CyclesCompleted" - Tag contains the total number of times that the tool has been cycled so far, which is retrieved from the database by the traceability software when a lookup or after a cycle increment is performed.
4. "CyclesRemaining" - Tag contains the remaining number of cycles for the tool.



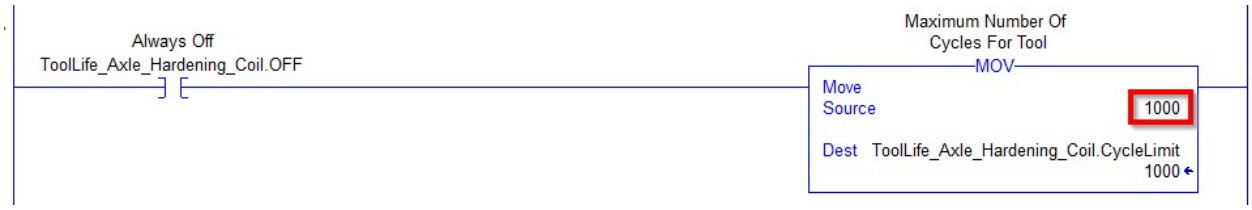
5. "IncrementCyclesComplete" – Tag is enabled when an increment request has been completed. This tag shall be used in the sequence logic to continue the cycle.
6. "IncrementCyclesError" – Tag is enabled if an increment request fails. This tag shall be used in the machine cycle stop fault routine to trigger a fault indicating the Tool Life Increment Cycle Count has errored.



7. "HeartbeatTimeout" – Tag shall be used in the machine cycle stop fault routine to trigger a fault indicating the communication with the traceability system has been interrupted.

2.1.8 Tool Life General Configuration logic that requires Machine Builder modifications.

1. "CycleLimit" – Tag shall be set to the maximum number of cycles that the tool is allowed to run. Remove the ALWAYS OFF instruction if you want to hard code the cycle limit here or the limit shall be set on the Tool Life screen on the HMI.



Note: This should match the quantity specified on the Traceability Input Document under Tool Life Information.

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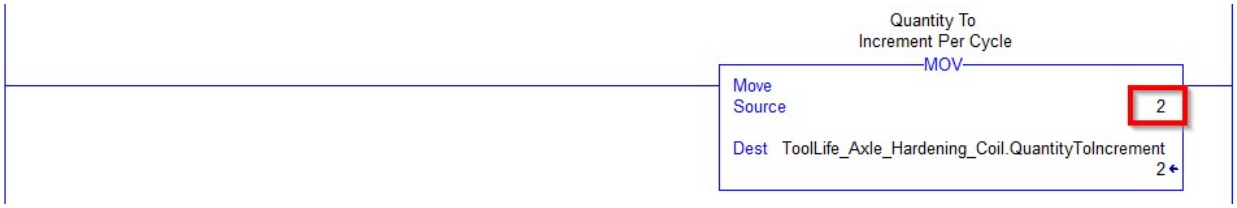
OP010 Axle Tempering Coil	10000	2	SD123456OP010.3

2. "QuantityToIncrement" – Tag shall be set to the amount to increment each machine cycle. Typically, this value can be left at (1) unless the tooling is used multiple times during a machine cycle and count needs to be incremented accordingly.



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3. "REPLACE_ToolNumber" – Tag shall be replaced with the appropriate tag containing the Tool Serial Number from the appropriate routine.
4. "REPLACE_ToolDataScanned" – Tag shall be replaced with a tag that indicates that the serial number of the tooling has been read and is valid.

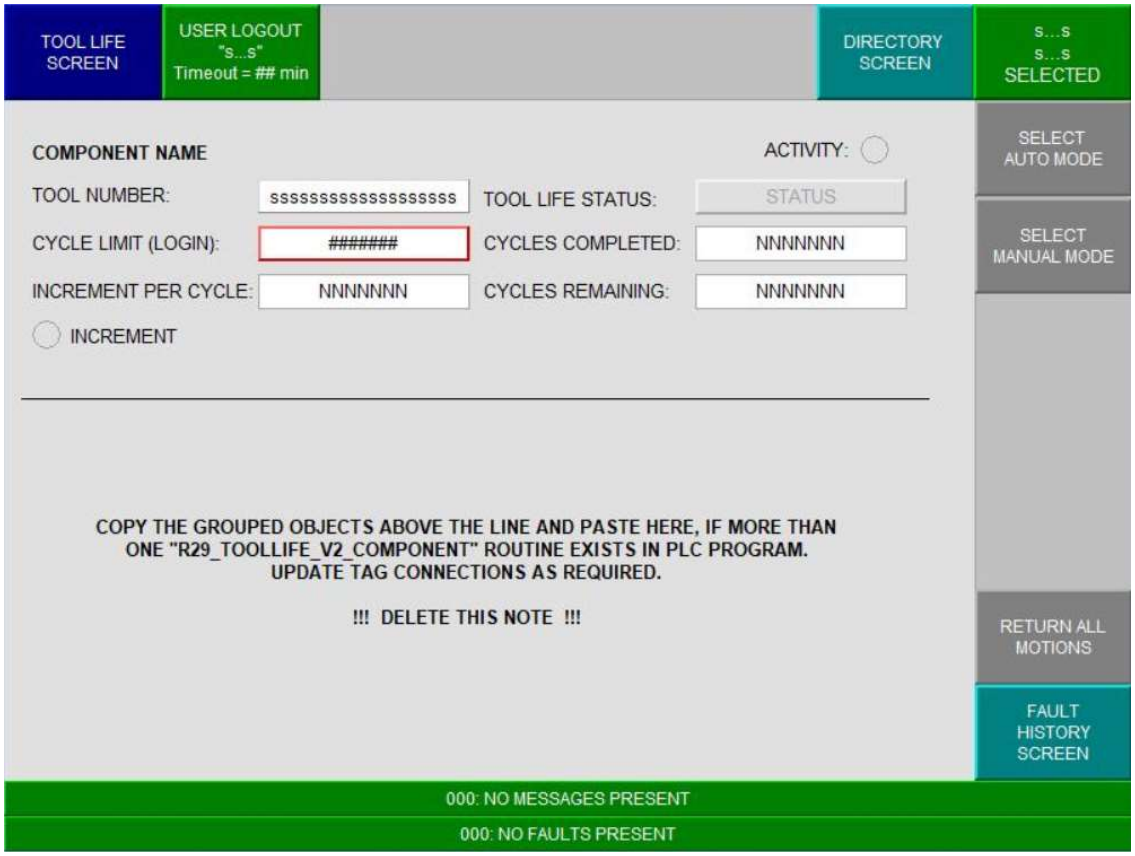
5. "REPLACE_ClearData" – Tag shall be replaced with a tag that indicates that the tooling has been removed from the machine.

Note: This Tag is optional. When a new Tool serial number is scanned the current Tool Life data will be replaced with the new tooling Tool Life data.

6. "REPLACE_Seq_StepxxxIncrementCycles" Tag shall be replaced with a tag from the sequence step logic that will trigger an increment in the Tool Life Cycle Counter.

2.2 HMI Status Display and Diagnostics

1. Automatic Screen: A multi-state indicator shall be configured in the Automatic Screen of the HMI application to display the Tool Life statuses to the operator.



Record of Revisions

Revision No	Date	Section	Description
001	27AU21	All	Original Approval & Issue Date
002			
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