



Machine Controls Traceability Interface
Studio 5000

Global Common

SD-1052

ISSUED
REVISED

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| A. | Record of Revisions..... | Error! Bookmark not defined. |

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

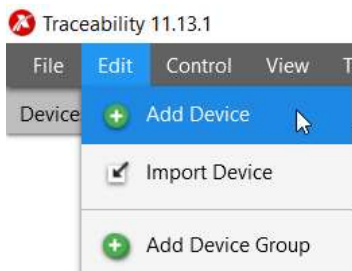
2 Traceability Part Permission & Result Data Configuration

The following configuration details show how to configure a device in the traceability application. Each device configured will have a connection to the PLC tags in a R26_Trace_V2_Station routine. Each import of this trace routine into the PLC requires a corresponding device configured in the traceability application.

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.

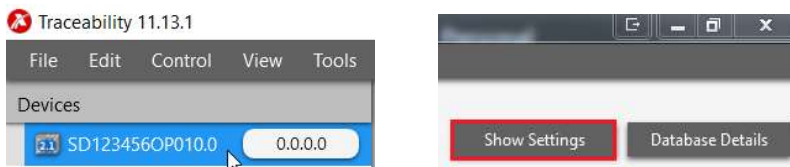


2. A dialog that is used to configure the new device connection will appear.
 - a. Enter the StationID value that is referenced in the Nexteer Traceability Input document. For example: SD123456X01, SD123456X51, SD123456OP010.0, SD123456ST02, etc.
 - b. Set the device type to Logix5000 Traceability v2.1 .
 - c. Click OK to finish adding the device connection.

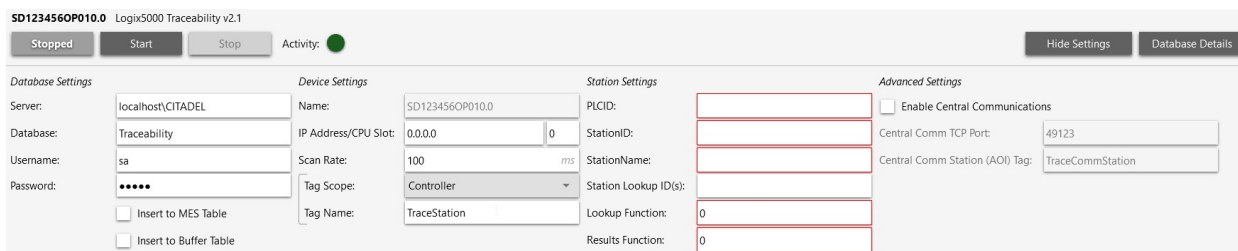


2.1.2 Device settings panel.

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.



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

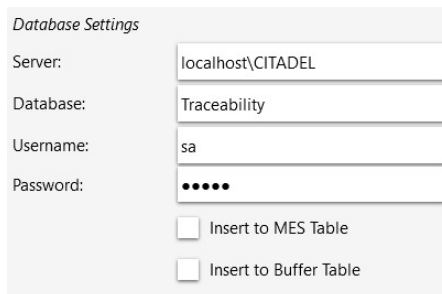


The screenshot shows the configuration interface for SD123456OP010.0. It includes buttons for 'Stopped', 'Start', and 'Stop', along with an 'Activity' indicator. The interface is divided into four main sections: Database Settings, Device Settings, Station Settings, and Advanced Settings. Database Settings includes fields for Server, Database, Username, and Password, with checkboxes for 'Insert to MES Table' and 'Insert to Buffer Table'. Device Settings includes fields for Name, IP Address/CPU Slot, Scan Rate, Tag Scope, and Tag Name. Station Settings includes fields for PLCID, StationID, StationName, Station Lookup ID(s), Lookup Function, and Results Function. Advanced Settings includes a checkbox for 'Enable Central Communications' and fields for 'Central Comm TCP Port' and 'Central Comm Station (AOI) Tag'.

2.1.3 Configure Database Settings

The default database configuration settings normally do not require modification.

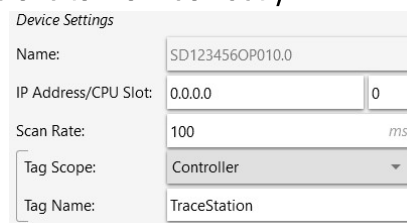
- Server:** The default Microsoft SQL server name is "localhost\CITADEL" which contains the standard Nexteer traceability database.
- Database :** The default database name is "Traceability".
- Username/Password :** This contains the credentials for the authorized database user. The default username is "sa" and password is "admin".
- Insert to MES Table :** Enable this checkbox if records from this device also need to be inserted into the dbo._status_mes table. These records are intended to be processed by an external MES system.
- Insert to Buffer Table :** Enable this checkbox if records from this device also need to be inserted into the dbo._status_buffer table. These records are intended to be moved to downstream database prior to a part arriving for permissions to work correctly.



This screenshot shows the 'Database Settings' panel. It contains input fields for 'Server' (localhost\CITADEL), 'Database' (Traceability), 'Username' (sa), and 'Password' (masked with dots). Below these fields are two checkboxes: 'Insert to MES Table' and 'Insert to Buffer Table', both of which are currently unchecked.

2.1.4 Configure Device Settings

- IP Address / CPU Slot :** Enter the IP Address of the PLC and slot number of the CPU within the PLC rack.
- 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.
- Tag Scope / Program Name / Tag Name :** The default tag name is "TraceStation". This is a user defined tag in the R26_Trace_V2_Station routine containing the tag structure needed to interface with the traceability application. When multiple R26_Trace_V2_Station routines exist in the same program, this tag name shall be unique such as "OPxxx_" or "STxxx_" + Name of the Component specified in the Traceability Input Document. The following 3 settings are used to configure a reference to the tag.



This screenshot shows the 'Device Settings' panel. It contains input fields for 'Name' (SD123456OP010.0), 'IP Address/CPU Slot' (0.0.0.0 and 0), 'Scan Rate' (100 ms), 'Tag Scope' (Controller), and 'Tag Name' (TraceStation).

- a. Tag Scope : Select the scope of the PLC 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):

| | |
|------------|--------------|
| Tag Scope: | Controller |
| Tag Name: | TraceStation |

Example (Program Scope):

| | |
|---------------|--------------|
| Tag Scope: | Program |
| Program Name: | OP10 |
| Tag Name: | TraceStation |

2.1.5 Configure Station Settings

1. PLCID: Enter the machines SD number for the PLC ID. For example: SD123456.
2. StationID : Enter the StationID value that is referenced in the Nexteer Traceability Input document. For example: SD123456X01, SD123456X51, SD123456OP010.0, SD123456ST02, etc.
3. StationName : Enter a description for the station. The recommended station name should include the machine / cell or line / operation or station / description. For example: BSI_Line 1_OP10_Load Station
4. Station Lookup ID(s): Enter a comma separated list of StationID values, with no spaces, that are used for filtering function (2) and function (4) lookup requests. See the following lookup function descriptions for more detail.

| Station Settings | |
|-----------------------|--------------------------------|
| PLCID: | <input type="text"/> |
| StationID: | <input type="text"/> |
| StationName: | <input type="text"/> |
| Station Lookup ID(s): | <input type="text"/> |
| Lookup Function: | <input type="text" value="0"/> |
| Results Function: | <input type="text" value="0"/> |

5. Lookup Function : Enter a numeric lookup function value from the following list.
- a. Function (1): Return the latest database record header information to the machine. Name/Data column information is not returned. This function is used primarily to check that a part was processed by the correct upstream machine and has an appropriate status to run.
 - b. Function (2): Return the latest database record to the machine, filtered by the list of StationIDs specified by the Station Lookup ID(s) setting. This function is used to return data from a specific list of upstream stations and is not to be use for permissions.
 - c. Function (3): Return latest record full record data to the machine. This function works the same as a function 1, but also includes Name/Data column information from the previous station.
 - d. Function (4): Perform two queries on the database to find the header information from the latest record for permissions, and Name/Data information filtered by the list of StationIDs specified by the Station Lookup ID(s) setting. The header data from the first query, and the Name/Data information for the second query are combined into a single record and returned to the machine. The purpose of this function is to perform both function (1) and function (2) type requests at the same time using a single lookup for efficiency.
6. Results Function : Enter a numeric results function value from the following list. Function (14) is reserved for CSV import processes and function (15) is reserved for In Process requests.
- a. Function (10): Standard end of cycle results insert that contains part status and process data that needs to be inserted into the database.
 - b. Function (12): Same functionality as function (10) and specifies that one or more subcomponent serial numbers exist in the Name/Data information. (Used for 'Marriage' of child to a parent part)
 - c. Function (20): Used for collecting a large amount of data that is intended to be sent directly to the Nextrace reporting system. A full data record is inserted into the `dbo._nextrace_data` table with the Name & Data values represented as separate comma separated strings in separate Name and Data columns. A small record is also insert into the `dbo._status` table that contains the header information to use for permissions if needed.
- Note: It is recommended to use function (22) instead of function (20) for new applications.

- d. Function (21): Used for collecting a large amount of data that is intended to be sent directly to the Nextrace reporting system. A full data record is inserted into the `dbo._nextrace_data` table with the Name & Data represented as separate comma separated strings in separate Name and Data columns. No records are inserted into the `dbo._status` table.

Note: It is recommended to use function (23) instead of function (21) for new applications.

- e. Function (22): Used for collecting a large amount of data that is intended to be sent directly to the Nextrace reporting system. A full data record is inserted into the `dbo._nextrace_data` table with the Name & Data values represented as single interlaced comma separated strings in a single NameData column. A small record is also insert into the `dbo._status` table that contains the header information to use for permissions if needed.
- f. Function (23): Used for collecting a large amount of data that is intended to be sent directly to the Nextrace reporting system. A full data record is inserted into the `dbo._nextrace_data` table with the Name & Data values represented as single interlaced comma separated strings in a single NameData column. No records are inserted into the `dbo._status` table.

2.1.6 Advanced Settings

1. Enable Central Communications: For large assembly lines with 20 or more stations this option can be enabled to conserve class 3 communication bandwidth of the PLC Controller. When using this you will need one `R26a_CentralComm` rung that shall be imported into each `R26_Trace_V2_Station` PLC routine.

Advanced Settings

☒ Enable Central Communications

Central Comm TCP Port: 49123

Central Comm Station (AOI) Tag: TraceComm_OP010

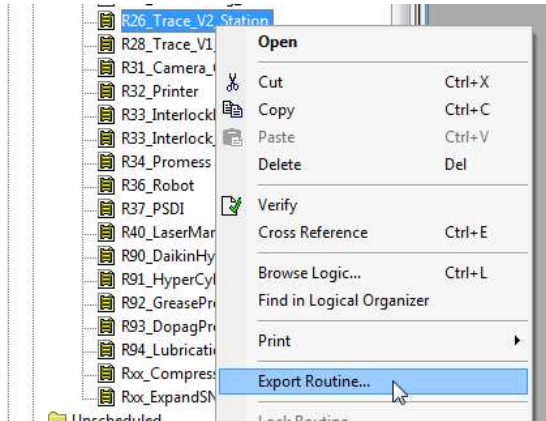
2. Central Comm TCP Port: This port number shall be unique from any other port numbers used in the same traceability PC. Port number range can be from 49100 to 49999.
3. Central Comm Station (AOI) Tag: This Tag name shall match the UDT tag name in the PLC for the `R26a_CentralComm` rung that was imported into each `R26_Trace_V2_Station` PLC routine.

2.2 Logic Configuration (R26_Trace_V2_Station)

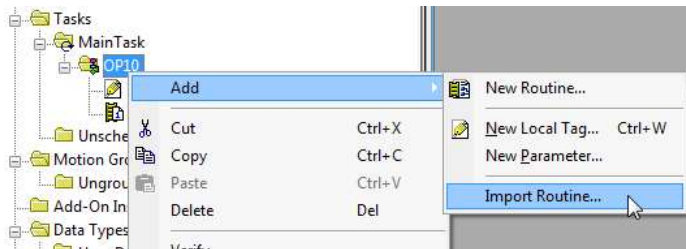
This routine is used for traceability part permissions and data collection for each configured device in the traceability application. A uniquely named routine shall be configured for each device defined in the traceability application. The logic in this routine shall modified to meet the requirements of the application. See Annex A for a detailed timing chart showing logic routine and traceability application communication.

2.2.1 Importing the Routine

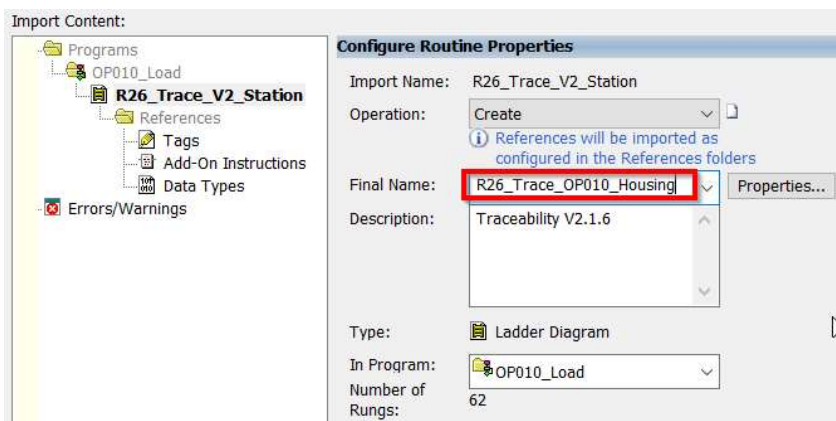
1. Export the R26_Trace_V2_Station from the Nexteer PLC library program by right clicking on the routine and clicking Export Routine... . Save the file to a location on your hard drive.



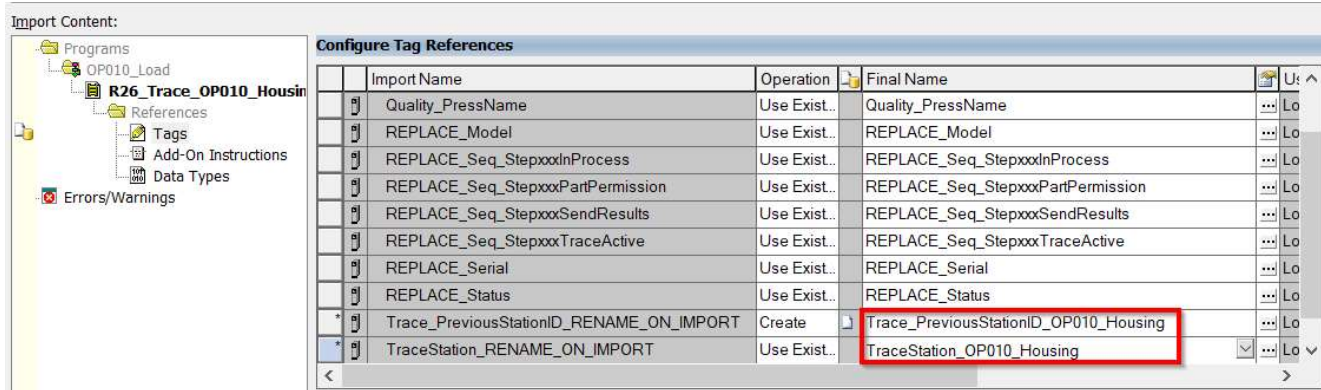
2. Right click on the program that R26_Trace_V2_Station needs to be imported into and click Add > Import Routine in the context menu. Browse to the location that exported routine was saved to and click Open.



3. The Import Configuration dialog will appear. Ensure that Operation is set to Create by entering a unique value for the Final Name setting. Typically, the name should be "R26_Trace_" + ("OPXXX_" or "STxxx_") + Name of the Component specified in the Traceability Input Document.



- Click on the Tags option in the Import Content tree. There are 2 tags that need to be renamed prior to importing the routine. These tags contain the value `RENAME_ON_IMPORT` in their tag name, which can be removed completely or replaced with a value that ensures that the tag is unique to the station.



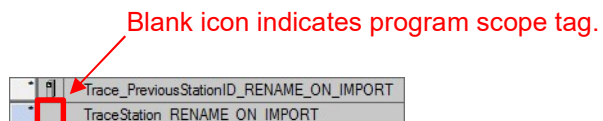
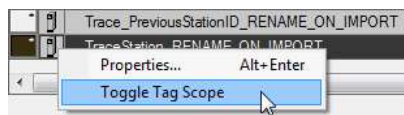
- For a single station machine, the `RENAME_ON_IMPORT` portion of the tag name should simply be removed from the tag names.

| | | |
|--|--------|-------------------------|
| Trace_PreviousStationID_RENAME_ON_IMPORT | Create | Trace_PreviousStationID |
| TraceStation_RENAME_ON_IMPORT | Create | TraceStation |

- For a machine that requires multiple `R26_Trace_V2_Station` routines to be imported, the `RENAME_ON_IMPORT` portion should be replaced with station specific information to ensure that the tag names are unique for each routine. Typically, the `RENAME_ON_IMPORT` portion of the name should be replaced with ("OPxxx_" or "STxxx_") + Name of the Component specified in the Traceability Input Document.

| | | |
|--|--------|---------------------------------------|
| Trace_PreviousStationID_RENAME_ON_IMPORT | Create | Trace_PreviousStationID_OP010_Housing |
| TraceStation_RENAME_ON_IMPORT | Create | TraceStation_OP010_Housing |

- The `TraceStation` tag is also allowed to be Controller or Program scope. The scope of the tag can be changed by right clicking the icon and choosing `Toggle Tag Scope` in the context menu.



2.2.2 General Configuration

- The current running model description shall be copied into the `TraceStation.ResultsModel` tag. The Plant should provide a standardized list of model descriptions. These descriptions should be referenced on a manufacturing sequence chart. Model descriptions should be descriptive and be consistent from one station to another.



2. The scanned serial number shall be copied to the TraceStation.Serial tag prior to turning on the TraceStation.TraceActive OTE instruction. The TraceStation.TraceActive OTE instruction enables the traceability functions. The logic that controls the TraceStation.TraceActive OTE instruction shall:
 - a. Remain on throughout the entire part processing sequence and until all traceability operations are complete. Do not use a part present or sensor signal that may transition during the machine in cycle.
 - b. Turn off between cycles.

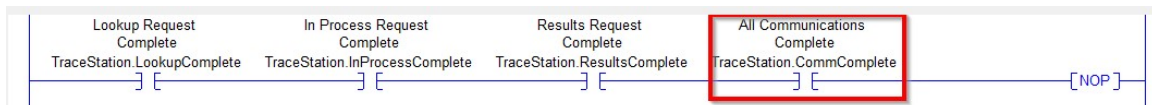
Note: Disabling the TraceStation.TraceActive tag will abort the Trace function requests and clears all TraceStation tag data.



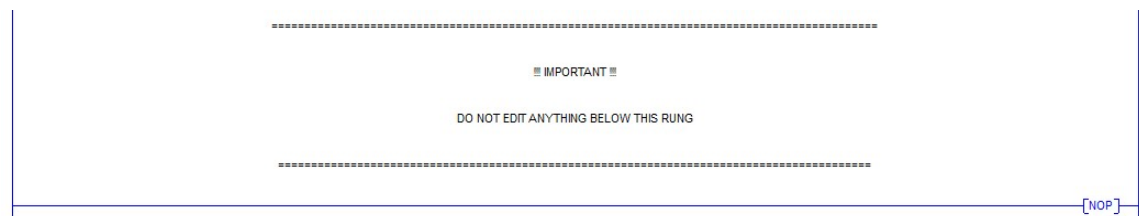
3. The TraceStation.HeartbeatTimeout tag is used to signal a loss of communication with the Trace PC and shall be used in the R08c_Fault_CycleStop routine to inhibit machine cycling. A loss of communication should prohibit the next cycle from initiating.



4. The TraceStation.CommComplete tag is used to signal that all enabled traceability functions are complete and can be used as a sequence complete condition.



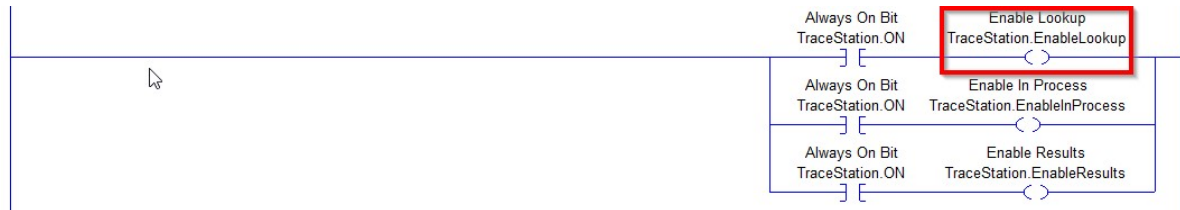
5. The R26_Trace_V2_Station shall not be edited below the phrase "DO NOT EDIT ANYTHING BELOW THIS RUNG"



2.2.3 Lookup Request (Permission to Run)

The Lookup Request is used to request information from the traceability application (SQL database) on a specific part serial number.

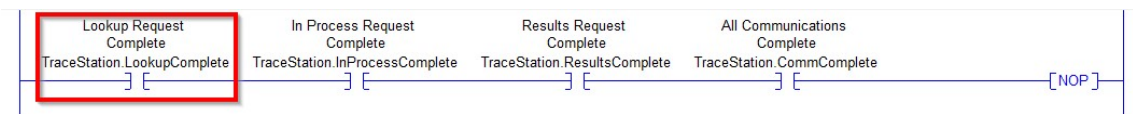
1. Enable the TraceStation.EnableLookup OTE instruction.



2. The Lookup Function is set by Traceability application. Refer to section [2.1.55](#).
3. The TraceStation.SendLookup OTE instruction initiates the Lookup Request with the Nexteer Traceability Application.

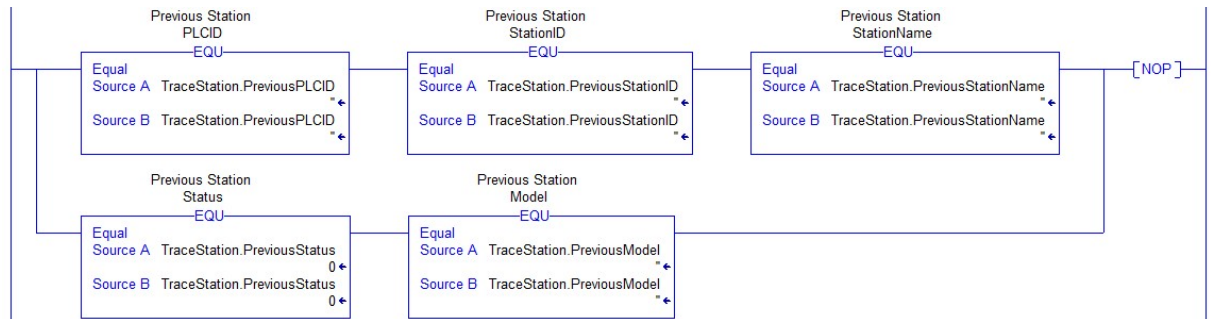


4. For Function (2) and (4) lookup requests the Station Lookup IDs are set by the Traceability application. Reference section [2.1.54](#).
5. All data has been returned to the PLC when the TraceStation.LookupComplete OTE is turned on.

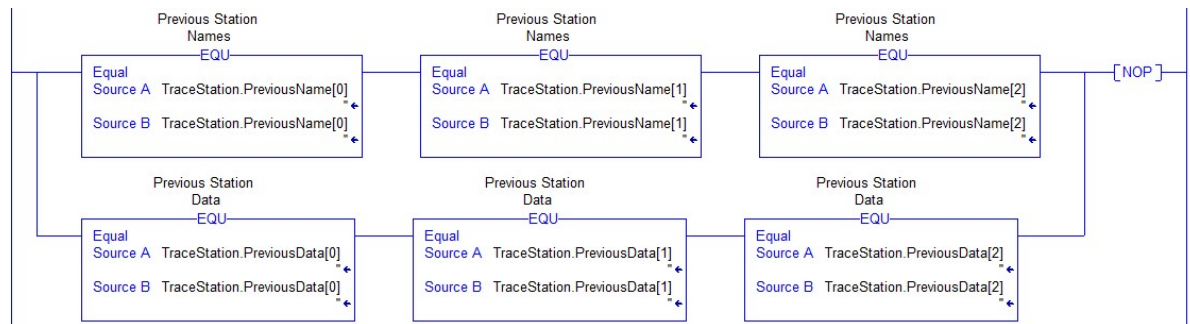


6. Previous station information.

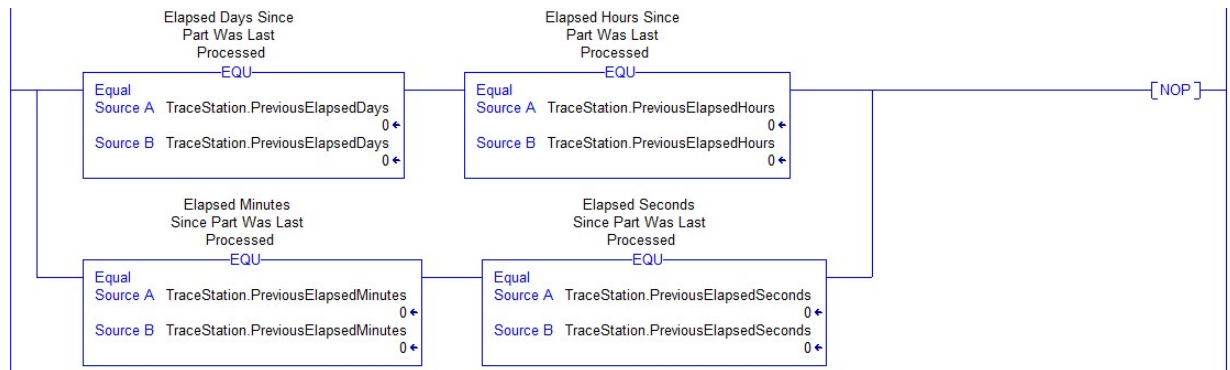
- a. The TraceStation.PreviousPLCID tag contains the machine identifier of the previous machine.
- b. The TraceStation.PreviousStationID tag contains the station identifier of the previous station. This tag is typically used for comparison against of list of expected StationIDs to ensure that the part was processed at a valid station previously.
- c. The TraceStation.PreviousStationName tag contains the human readable description of the previous station.
- d. The TraceStation.PreviousStatus tag contains the part status result from the previous station. This tag is typically used for comparison against of list of expected statuses to ensure that the part can be run.
- e. The TraceStation.PreviousModel tag contains the model that was configured when the part was run at the previous station.



7. Previous station data. These tags are only populated during a function (2), (3), or (4) Lookup request.
 - a. The TraceStation.PreviousName[X] tag array contains the descriptions of the process data that was collected at the previous station.
 - b. The TraceStation.PreviousData[X] tag array contains the process data values that were collected at the previous station.



8. The TraceStation.PreviousElapsed(...) tags contain the calculated elapsed time from the time that the previous record was inserted into the database to the time that the lookup is performed. These values are typically used for part permissions when a part must be processed within a time window, or if a specified amount of time needs to pass before the part can be run.



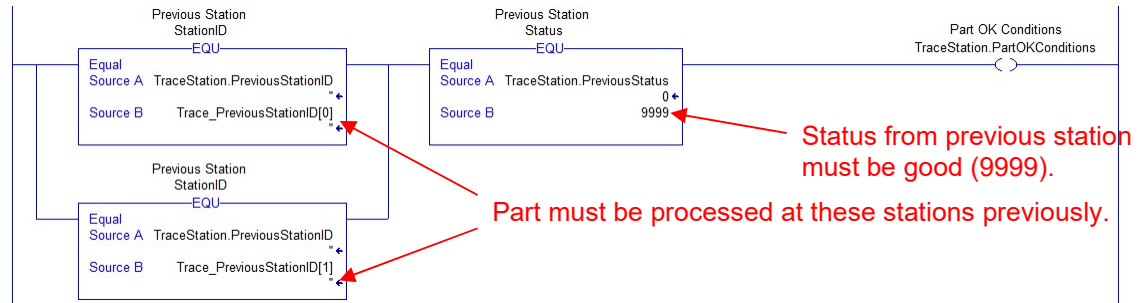
9. If the part is found to be blacklisted during a Lookup request, the TraceStation.Blacklist(...) tags will contain detailed information about the blacklist.



10. The logic shall be programmed to appropriately control the TraceStation.PartOKConditions OTE instruction for the application.

Note: The information from the Nexteer Traceability Input document shall be used for programming this section.

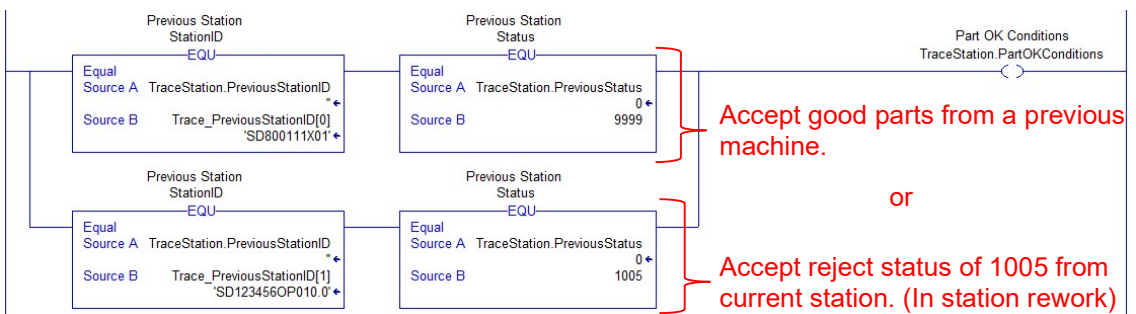
a. Example: Expecting good parts from one of two previous stations.



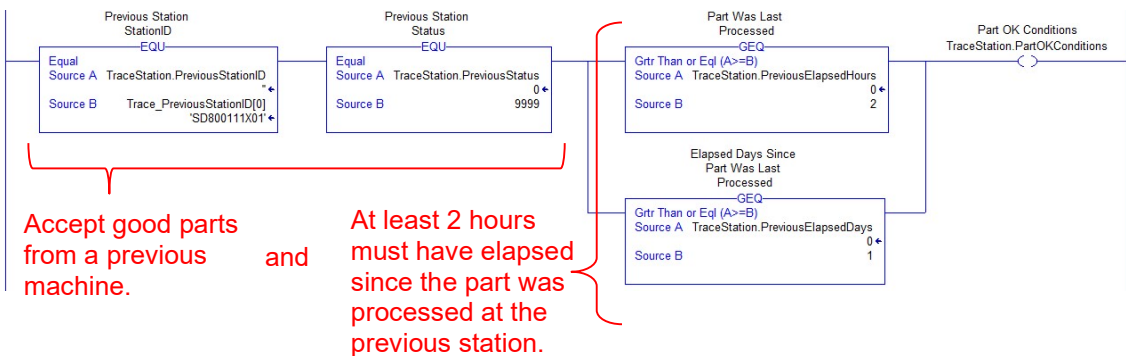
b. Example: Expecting no record found.



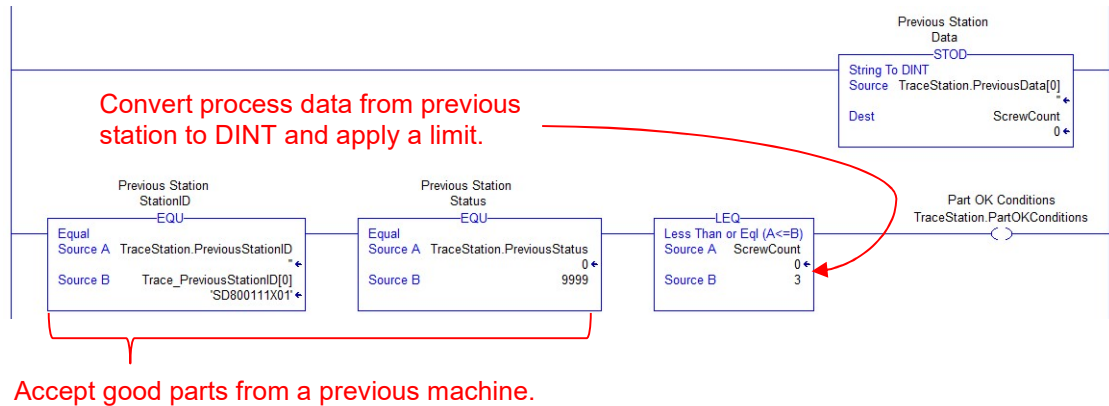
c. Example: Expecting good parts from previous station and rework of specific reject code in station.



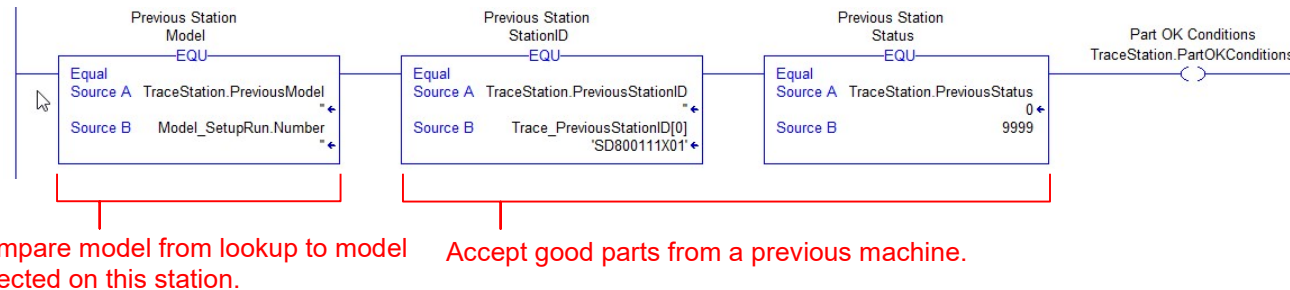
d. Example: Verification of elapsed time since part was processed at previous operation.



e. Example: Verification of previous data.



f. Example: Verification of model.



11. The **TraceStation.PartOK** tag shall be used in the sequence routine to allow the sequence of the machine to continue processing the part and shall also be used to control the part status message display to indicate the part is ok to run.



12. The **TraceStation.PartNotOK** tag shall be used in the sequence routine to prevent processing the part and complete the sequence as needed and used to control a fault condition and the part status message display to indicate the part is not ok to run.



2.2.4 In Process Request (Indicate Part Started)

The In Process Request sends a part status of 9000 to the SQL Database when enabled. This function is typically used to prohibit the reprocessing of parts if the cycle does not complete as expected, or to mark the part as consumed so it cannot be reprocessed in the machine. It shall be enabled by a sequence step before the machine begins to alter the part.

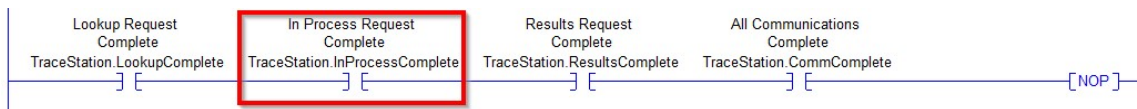
1. Enable the TraceStation.EnableInProcess OTE instruction.



2. The TraceStation.SendInProcess OTE instruction initiates the In Process Request with the Nexteer Traceability Application.



3. When the In Process Request is complete and a record has been inserted into the database the TraceStation.InProcessComplete tag will be turned on.



2.2.5 Results Request (Send Part Status and Process Data)

The Results Request is used to send the part status and process data to the Traceability Application (SQL database) on a specific part serial number typically when the part quality has been determined during the machine sequence.

1. Enable the TraceStation.EnableResults OTE instruction.

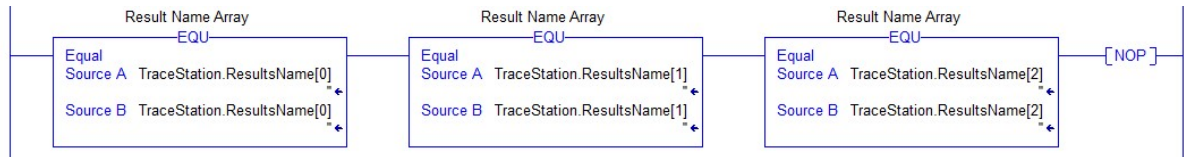


2. The Results Function is set by Traceability application. Reference section 2.1.56.
3. The TraceStation.ResultsStatus tag shall be loaded with the quality status of the processed part.



4. The TraceStation.ResultsName[X] array shall be updated to reflect the appropriate descriptions for each process data value, including units, that is to be collected at the end of the machine cycle. A maximum number of 150 Name values can be configured.

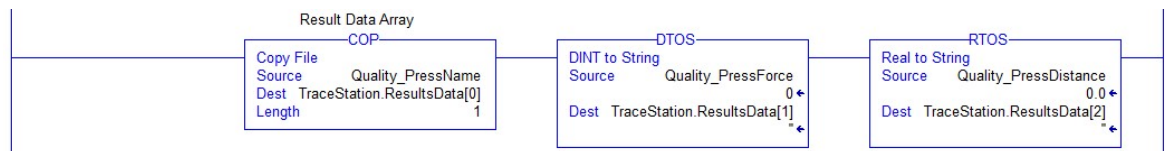
Note: The information from the Nexteer Traceability Input document shall be used for programming this section.



5. The TraceStation.ResultsData[X] array shall be updated to prepare the process data values that need to be collected at the end of the cycle. A maximum number of 150 Data values can be configured.

- STRING type data can be copied directly the array with a COP instruction.
- DINT type data must be converted to STRING type with a DTOS instruction prior to copying the array.
- REAL type data must be converted to STRING type with an RTOS instruction prior to copying to the array.

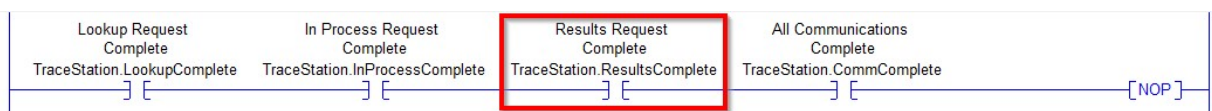
Note: Using a COP instruction with DINT or REAL types will cause data corruption and may lock up communication with the Traceability application.



6. The TraceStation.SendResults OTE instruction initiates the Results Request with the Nexteer Traceability Application.



7. When the Results Request is complete, and a record has been inserted into the database the TraceStation.ResultsComplete tag will be turned on.



2.2.6 Overriding Application Settings

In some situations, it may be necessary for the PLC to override settings that are configured in the Traceability application due to varying process requirements. For example, multiple models that have different traceability requirements., it may be necessary to change the StationID or LookupFunction depending on which model is currently set to run.

Note: Overriding Traceability application settings is not a normal process function. Nexteer Central Manufacturing IT shall be consulted before editing the following rungs.

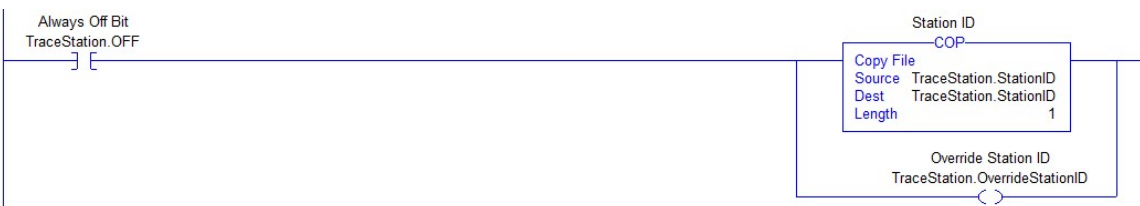
1. The TraceStation.Line setting can be overridden to change the line or program that the part being run is associated with.



2. The TraceStation.PLCID setting can be overridden to change the identity of the machine.



3. The TraceStation.StationID setting can be overridden to change the identity of the station, which is typically used to affect permissions downstream, or if multiple models can be run on the machine that have different amounts of process data and need to be separated logically in the database.



4. The TraceStation.StationName setting can be overridden to change the human readable description of the station.



5. The TraceStation.StationLookupIDs setting can be overridden to change which station IDs are used during a Lookup request.



6. The TraceStation.LookupFunction setting can be overridden to change which lookup function is used during a Lookup request.



7. The TraceStation.ResultsFunction setting can be overridden to change which results function is used during a Results request.



2.3 HMI Status Display and Diagnostics

1. Automatic Screen: Multi-state indicators and string displays shall be configured in the Automatic Screen of the HMI application to display the traceability status to the operator. These objects interface directly with the R26_Trace_V2_Station routine tags.

| AUTOMATIC CYCLE SCREEN | USER LOGOUT "S...S" Timeout = ## min | DIRECTORY SCREEN | S...S S...S SELECTED |
|------------------------------|--|---|---|
| MACHINE STATUS: | READY TO CYCLE | | SELECT AUTO MODE |
| PART STATUS: | READY TO CYCLE | | SELECT MANUAL MODE |
| LOT TRACKING: | READY TO CYCLE | | |
| CYCLE TIME: | ###.## SECONDS | SERIAL: PART STATUS: PLC ID: STATUS: | ##### PERMISSIONS ##### ##### |
| PART-TO-PART TIME: | ###.## SECONDS | | |
| OPERATOR PROMPT: | LOAD PART INTO FIXTURE | | RETURN ALL |

- 2.4 Trace Station Screen: The Trace Station screen shall be added to the HMI application for each R26_Trace_V2_Station routine to display additional traceability information detail. The grouped objects shall be copied to use for each additional traceability routine.

| | | | | | |
|-----------------------------------|--|--|-----------------------------------|---------------------|----------------------------|
| TRACE STATION SCREEN 1 OF X | USER LOGOUT "s...s" Timeout = ## min | | TRACE STATION SCREEN X OF X | DIRECTORY SCREEN | S...S S...S SELECTED |
|-----------------------------------|--|--|-----------------------------------|---------------------|----------------------------|

S...S - S...S

☐ TRACEABILITY ACTIVE SERIAL: SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS ACTIVITY: ☐

☐ LOOKUP PART STATUS: PERMISSIONS ELAPSED DAYS: NNN HRS: NN MIN: NN

☐ IN PROCESS PLC ID: SSSSSSSSSSSSSSS STATION ID: SSSSSSSSSSSSSSSSS

☐ RESULTS STATUS: SSSSSSSSSSSSSSS MODEL: SSSSSSSSSSSSSSSSS

COPY THE GROUPED OBJECTS ABOVE THE LINE AND PASTE HERE, IF MORE THAN
ONE "R26_TRACE_V2_STATION" ROUTINE EXISTS IN PLC PROGRAM.
UPDATE TAG CONNECTIONS AS REQUIRED.

!!! DELETE THIS NOTE !!!

| |
|----------------------------|
| SELECT AUTO MODE |
| SELECT MANUAL MODE |
| RETURN ALL MOTIONS |
| FAULT HISTORY SCREEN |

| |
|--------------------------|
| 000: NO MESSAGES PRESENT |
| 000: NO FAULTS PRESENT |

3 Central Comm Traceability Application Configuration

For large assembly lines that have 25 or more **R26_Trace_V2_Station** routines, it may be necessary to implement a special central communication plugin to significantly reduce class 3 communication between the PC and PLC. A single **Logix5000 Traceability v2.1 Central Comm** device can be configured to take over sending/receiving the **CommPLC & CommPC** tag values on behalf of all the **R26_Trace_V2_Station** routines. The communication is made more efficient by grouping the **CommPLC & CommPC** tags from all the traceability routines into a pair of arrays that are read and written by the central communication device each scan. These values are then made accessible to each **Logix5000 Traceability v2.1** device in the traceability software through an internal TCP communication protocol.

Each **Logix5000 Traceability v2.1** device must then be configured to communicate with the central communication device through a common TCP port, and will no longer read or write their respective **CommPLC & CommPC** tags in the PLC. However, when a request such as lookup or results is triggered, the **Logix5000 Traceability v2.1** device will directly read and write the required tags within the routines to perform the necessary functions.

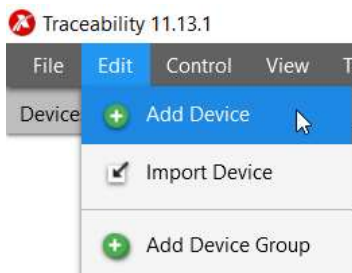
A single **R26a_CentralComm** rung must be added to each **R26_Trace_V2_Station** routine which contains an AOI that handles translating the **CommPLC & CommPC** tags from the routine into the array that the **Logix5000 Traceability v2.1 Central Comm** device can access.

This section explains how to configure a central communication device in the traceability application and the logic within the PLC.

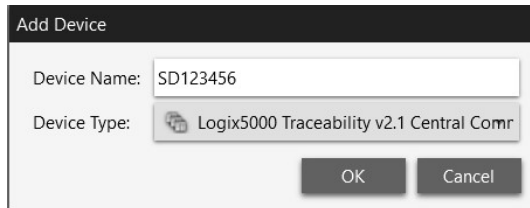
3.1 Traceability Application Configuration

3.1.1 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 the Device Name which is typically the machine SD number. For example: SD123456.
 - b. Set the device type to Logix5000 Traceability v2.1 Central Comm.
 - c. Click OK to finish adding the device connection.



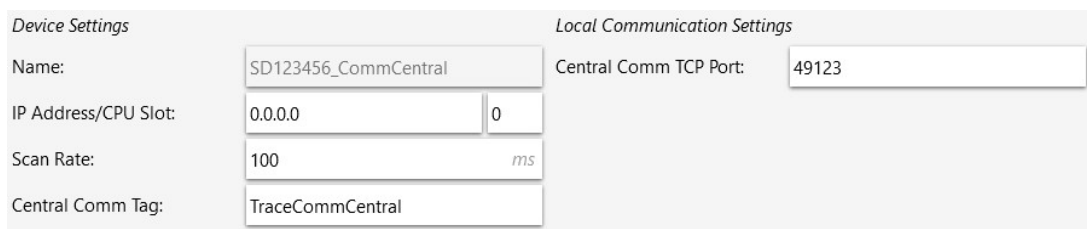
The 'Add Device' dialog box contains two input fields. The 'Device Name' field is populated with 'SD123456'. The 'Device Type' dropdown menu is set to 'Logix5000 Traceability v2.1 Central Comm'. At the bottom right, there are 'OK' and 'Cancel' buttons.

3.1.2 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.



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



The 'Device Settings' panel is divided into two sections. The left section, titled 'Device Settings', contains fields for:

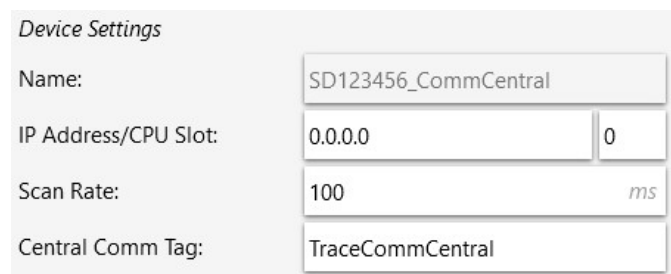
- Name: SD123456_CommCentral
- IP Address/CPU Slot: 0.0.0.0 and 0
- Scan Rate: 100 ms
- Central Comm Tag: TraceCommCentral

 The right section, titled 'Local Communication Settings', contains a field for:

- Central Comm TCP Port: 49123

3.1.3 Configure Device Settings

1. Name: Typically set to the SD number of the machine + "_CommCentral".
2. IP Address: Enter the IP Address of the PLC.
3. 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.



This is a duplicate of the 'Device Settings' panel shown in the previous block, displaying the same configuration fields for the device 'SD123456'.

4. Central Comm Tag: The default tag name is "TraceCommCentral". This is a user defined tag in the R26a_CentralComm routine containing the tag structure needed to interface with the traceability application.

3.1.4 Local Communication Settings

1. Central Comm TCP Port: This port number should be unique from any other TCP number used in the same Plant. Port number range can be from 49100 to 49999. This port number must match the port number setup in all of the Advanced Settings for all of the Logix5000 Traceability v2.1 devices.

Local Communication Settings

Central Comm TCP Port: 49123

3.1.5 Advanced Settings in Logix5000 Traceability v2.1 Devices

1. Enable Central Communications: This must be checked for Central Comms to function.
2. Central Comm TCP Port: This port number should be unique from any other TCP number use in the same Plant. Port number range can be from 49100 to 49999 and must match the port number setup in Central Comm Device Settings.
3. Central Comm Station (AOI) Tag: This Tag name should match the UDT tag name in the PLC for the R26a_CentralComm routine rung.

Advanced Settings

☒ Enable Central Communications

Central Comm TCP Port: 49123

Central Comm Station (AOI) Tag: TraceComm_OP010

3.2 Logic Configuration (R26a_CentralComm)

1. Determine the version of R26_Trace_V2_Station routine that is being used in your program by selecting one of the R26_Trace_V2_Station routines in your program and checking the version from the comment text on the first rung.

Note: Currently, the R26a_CentralComm routine only supports v2.1.5 and v2.1.6 R26_Trace_V2_Station logic routines.

TRACE_V2_STATION ROUTINE
Version: 2.1.6

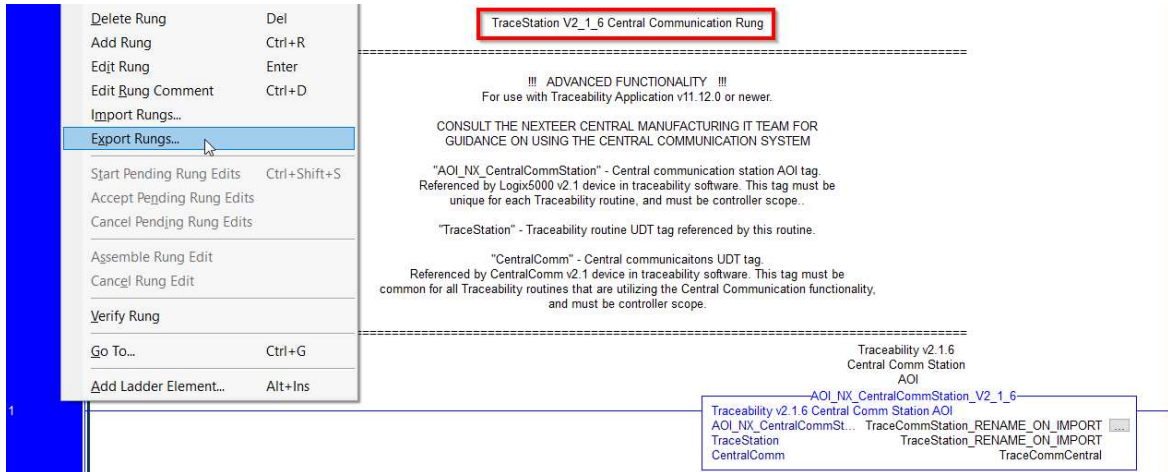
For use with Traceability Application v11.0.0 or newer, device type: Logix5000 V2.1
Traceability Application v11.12.0 or newer is required to utilize the Central Communication feature.

R26_Trace_V2_Station routine(s) communicate to the PC through PLC requests (both getting & sending data)
This routine must be included in all machines that require any traceability function.
This routine is required for each component with traceability requirements.
(This means multiple R26_Trace_V2_Station routines may be required in a single program).

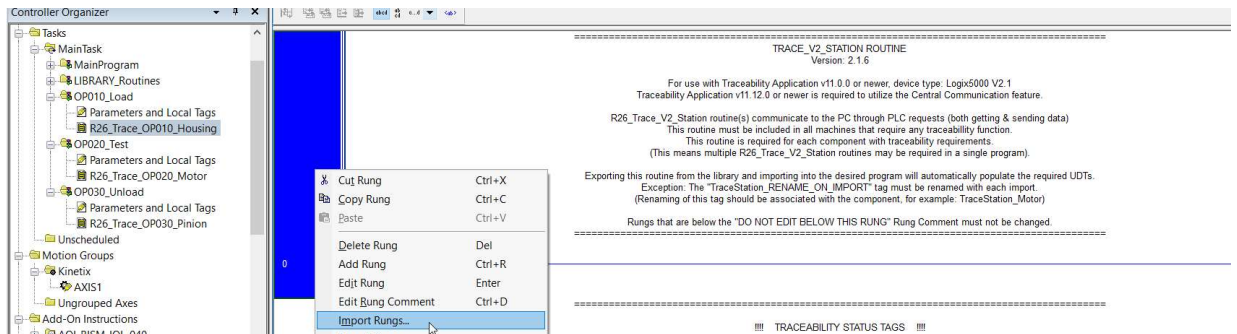
Exporting this routine from the library and importing into the desired program will automatically populate the required UDTs.
Exception: The "TraceStation_RENAME_ON_IMPORT" tag must be renamed with each import.
(Renaming of this tag should be associated with the component, for example: TraceStation_Motor)

Rungs that are below the "DO NOT EDIT BELOW THIS RUNG" Rung Comment must not be changed.

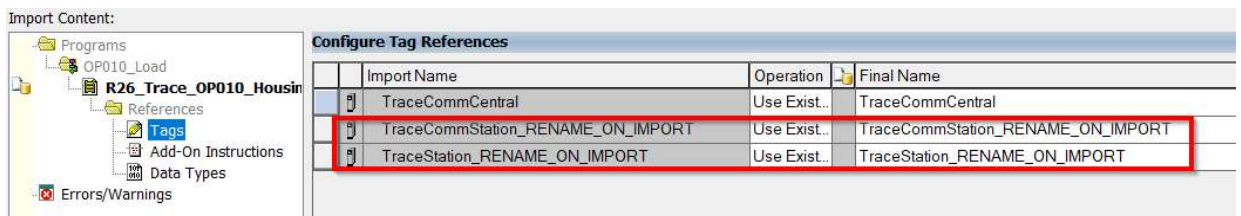
- From the R26a_CentralComm routine library select and export the rung that matches the version of the R26a_CentralComm routine your program is using. Save the file to a location on your hard drive.



- From the first R26_Trace_V2_Station routine select the first rung and import the rung that is saved to your hard drive.



- Click on the Tags option in the Import Content tree. There are 2 tags that need to be renamed prior to importing the rung. These tags contain the value RENAME_ON_IMPORT in their tag name which can be replaced with a value that ensures that the tag is unique to the station.



- The RENAME_ON_IMPORT portion should be replaced with station specific information to ensure that the tag names are unique for each routine. Typically, the RENAME_ON_IMPORT portion of the name should be replaced with 'OPxxx_ or STxxx_' + Name of the Component from the Traceability Input Document.

Note: Tag must be set as controller scope.

| Configure Tag References | | | |
|--------------------------|-----------------------------------|--------------|----------------------------|
| | Import Name | Operation | Final Name |
| | TraceCommCentral | Use Exist... | TraceCommCentral |
| * | TraceCommStation_RENAME_ON_IMPORT | Create | TraceComm_OP010_Housing |
| * | TraceStation_RENAME_ON_IMPORT | Use Exist... | TraceStation_OP010_Housing |

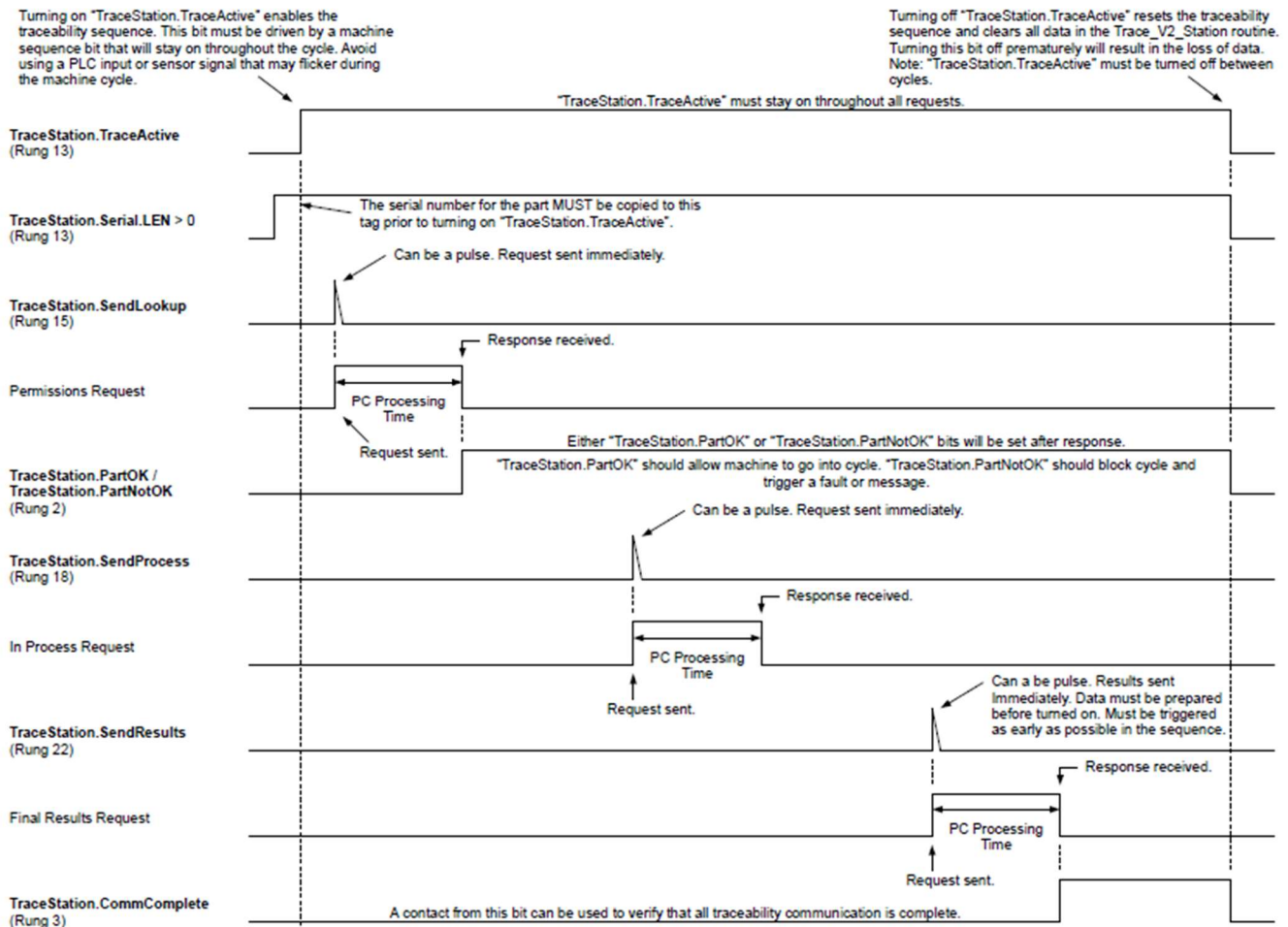
5. For the Central Comm to properly function, the Tag names in the PLC rung for Central Comms must match the tag names defined in the Traceability Comm Central device and the Station Traceability device as shown below.

6. Repeat steps 3 through 5 for the remaining R26_Trace_V2_Station routines.

A. Traceability Timing Chart

Trace_V2_Station routine sequence timing guide

Last Updated: July 26th, 2018
By: Adam Romzek



B. Traceability Field Guidelines

Timestamp,PLCID,StationID,DataFunction,SerialNumber,Status,Model,StationName,Name000,Data000,Name001,Data001

| Cat | Field Name | Example | Comments |
|--------|------------------------|---------------------------------|--|
| Header | Timestamp | 2015-06-26 09:06:57.007 | <p>"Timestamp" name may not be used for any other field.</p> <p>Time values should differ for each record.</p> <p>All PLC's and PC's should be synchronized to a time server to ensure accurate timestamps (reference Annex F for syncing to a timeserver PC).</p> |
| | PLCID | SD800788X | <p>"PLCID" name may not be used for any other field.</p> <p>Must begin with "SD".</p> |
| | StationID | SD800788X01 | <p>"StationID" and "StationOP" names may not be used for any other field.</p> <p>Must begin with "SD".</p> <p>Must be unique – verify after copying PLC Code.</p> <p>Typically, 11 characters in length.</p> <p>StationID is typically referenced on the Manufacturing Sequence chart.</p> |
| | DataFunction | 10 | <p>"DataFunction" name may not be used for any other field (reference Annex B for description of all Data Functions).</p> |
| | SerialNumber | 38017975151762436302 | <p>"SerialNumber" name may not be used for any other field.</p> <p>Serial Numbers cannot be blank (the text "No Serial" should be used if the serial scan failed).</p> <p>Format depends on the value stream (reference process sheet where format can be retrieved).</p> <p>Some value streams use Direct Part Marking Spec (34000869) to specify the format. The Plant will provide format for master parts, these can be different length and/or format.</p> <p>SerialNumbers may be referenced on manufacturing sequence chart.</p> <p>Component Serial Numbers will not be displayed in this column; they will be one of the early "Data" fields.</p> <p>Only primary and assembly serial numbers will be displayed in this column.</p> <p>Serial Numbers that include Julian dates must have values within range of 1 – 366.</p> <p>Serial Numbers that include shift must have values within 1 – 3.</p> <p>Serial Numbers that include the year must have two digits.</p> |
| | Status | 9999 | <p>"Status" and "PLC_Status" names may not be used for any other field.</p> <p>Status Codes may be included on the Manufacturing Sequence Chart (reference Annex E for Status Code Examples).</p> |
| | Model (Part Number) | L RWD LDLA BASE LHD 05154744 | <p>Since part numbers change regularly, it is preferable to use text to describe the Model.</p> <p>"Model" name may not be used for any other field.</p> <p>Plant will provide standardized list of model descriptions. This should be documented on the manufacturing sequence chart.</p> <p>Model descriptions will be consistent from one station to another.</p> <p>Model descriptions should be descriptive.</p> <p>If a Model description is not required, the tag should be populated with "N/A."</p> |

| | | | |
|-------------|-------------|---|---|
| | StationName | 084-BSI-Line1-Sta220-OP20 to210 Pallet Data | <p>"StationName" name may not be used for any other field.</p> <p>Should include the Three Digit Department Number indicated on the Manufacturing Sequence Chart.</p> <p>Should include the Cell or Line Name (e.g. BSI, Grey Room, Rack, Ball Nut, etc.).</p> <p>Should include the Cell or Line Designation: "-Cell" or "-Line" plus number (one digit) (e.g. 1, 2, 3, ...) or letter (e.g. A, B, C, ...).</p> <p>Could include a three digit Station Number preceded by "-Sta" (e.g. -Sta220).</p> <p>Could include a three digit Operation Number specified on the Manufacturing Sequence Chart preceded by "-OP".</p> <p>Could include a range of three digit Operation Numbers specified on the Manufacturing Sequence Chart preceded by "OP" (e.g. – OP20 to 210).</p> <p>Should include a high level description (e.g. Pallet Data).</p> |
| Name / Data | Name[xxx] | RackSN Magnet Press Distance [mm] | <p>No field name is duplicated.</p> <p>Field names are consistent between lines containing same data.</p> <p>Field names include units in brackets (e.g. [N]).</p> <p>Field names are spelled correctly.</p> <p>Cannot use "FTQ_Results", "FTQ_Desc", "FTQ_FirstTime", "FTQ_PreviousRun", "FTC".</p> <p>No field is named a header field (e.g. "Status").</p> |
| | Data[xxx] | 38010205151761061501 | <p>Data content from one field does not conflict with another, e.g. BSI – cannot have a good status with a Fail Code.</p> <p>Where field content is expected to be variable, such as a press load, indicate this as "Variable Values" on the Manufacturing Sequence Chart.</p> <p>Where field content is supposed to be within a range, such as Pallet Numbers, ensure that the data varies within that range. Indicate this as "Range of Values" on the Manufacturing Sequence Chart.</p> <p>Where field content contains fixed values, such as reading NTC Codes from a part, ensure that the data is consistent. Indicate this as "Fixed Values" on the Manufacturing Sequence Chart.</p> <p>If this part is not required for the current running model, populate this tag with "N/A."</p> <p>All fields are populated regardless of errors. If there is no data to report, then display "No Data" for text fields and 0 for Numeric fields.</p> |

RECORD OF REVISIONS

| Revision No | Date | Section | Description |
|-------------|--------|---------|--------------------------------|
| 001 | 27AU21 | All | Original Approval & Issue Data |
| 002 | | | |
| 003 | | | |
| 004 | | | |
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