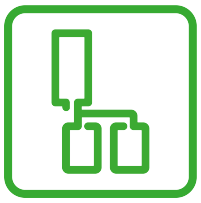
# Modicon Edge I/O NTS

## Field Device Master Modules

## User Guide

**Original instructions**

**EIO0000005270.01**
**10/2025**



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# Legal Information

The information provided in this document contains general descriptions, technical characteristics and/or recommendations related to products/solutions.

This document is not intended as a substitute for a detailed study or operational and site-specific development or schematic plan. It is not to be used for determining suitability or reliability of the products/solutions for specific user applications. It is the duty of any such user to perform or have any professional expert of its choice (integrator, specifier or the like) perform the appropriate and comprehensive risk analysis, evaluation and testing of the products/solutions with respect to the relevant specific application or use thereof.

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# Table of Contents

# Safety Information

## Important Information

Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, service, or maintain it. The following special messages may appear throughout this documentation or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

The addition of this symbol to a “Danger” or “Warning” safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

**⚠ DANGER**

**DANGER** indicates a hazardous situation which, if not avoided, **will result in** death or serious injury.

**⚠ WARNING**

**WARNING** indicates a hazardous situation which, if not avoided, **could result in** death or serious injury.

**⚠ CAUTION**

**CAUTION** indicates a hazardous situation which, if not avoided, **could result** in minor or moderate injury.

***NOTICE***

***NOTICE*** is used to address practices not related to physical injury.

## Please Note

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

A qualified person is one who has skills and knowledge related to the construction and operation of electrical equipment and its installation, and has received safety training to recognize and avoid the hazards involved.

## Before You Begin

Do not use this product on machinery lacking effective point-of-operation guarding. Lack of effective point-of-operation guarding on a machine can result in serious injury to the operator of that machine.

**⚠WARNING**

**UNGUARDED EQUIPMENT**

- Do not use this software and related automation equipment on equipment which does not have point-of-operation protection.
- Do not reach into machinery during operation.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

This automation equipment and related software is used to control a variety of industrial processes. The type or model of automation equipment suitable for each application will vary depending on factors such as the control function required, degree of protection required, production methods, unusual conditions, government regulations, etc. In some applications, more than one processor may be required, as when backup redundancy is needed.

Only you, the user, machine builder or system integrator can be aware of all the conditions and factors present during setup, operation, and maintenance of the machine and, therefore, can determine the automation equipment and the related safeties and interlocks which can be properly used. When selecting automation and control equipment and related software for a particular application, you should refer to the applicable local and national standards and regulations. The National Safety Council's Accident Prevention Manual (nationally recognized in the United States of America) also provides much useful information.

In some applications, such as packaging machinery, additional operator protection such as point-of-operation guarding must be provided. This is necessary if the operator's hands and other parts of the body are free to enter the pinch points or other hazardous areas and serious injury can occur. Software products alone cannot protect an operator from injury. For this reason the software cannot be substituted for or take the place of point-of-operation protection.

Ensure that appropriate safeties and mechanical/electrical interlocks related to point-of-operation protection have been installed and are operational before placing the equipment into service. All interlocks and safeties related to point-of-operation protection must be coordinated with the related automation equipment and software programming.

**NOTE:** Coordination of safeties and mechanical/electrical interlocks for point-of-operation protection is outside the scope of the Function Block Library, System User Guide, or other implementation referenced in this documentation.

# Start-up and Test

Before using electrical control and automation equipment for regular operation after installation, the system should be given a start-up test by qualified personnel to verify correct operation of the equipment. It is important that arrangements for such a check are made and that enough time is allowed to perform complete and satisfactory testing.

**⚠WARNING**

**EQUIPMENT OPERATION HAZARD**

- Verify that all installation and set up procedures have been completed.
- Before operational tests are performed, remove all blocks or other temporary holding means used for shipment from all component devices.
- Remove tools, meters, and debris from equipment.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

Follow all start-up tests recommended in the equipment documentation. Store all equipment documentation for future references.

**Software testing must be done in both simulated and real environments.**

Verify that the completed system is free from all short circuits and temporary grounds that are not installed according to local regulations (according to the National Electrical Code in the U.S.A, for instance). If high-potential voltage testing is necessary, follow recommendations in equipment documentation to prevent accidental equipment damage.

Before energizing equipment:

- Remove tools, meters, and debris from equipment.
- Close the equipment enclosure door.
- Remove all temporary grounds from incoming power lines.
- Perform all start-up tests recommended by the manufacturer.

# Operation and Adjustments

The following precautions are from the NEMA Standards Publication ICS 7.1-1995:

(In case of divergence or contradiction between any translation and the English original, the original text in the English language will prevail.)

- Regardless of the care exercised in the design and manufacture of equipment or in the selection and ratings of components, there are hazards that can be encountered if such equipment is improperly operated.
- It is sometimes possible to misadjust the equipment and thus produce unsatisfactory or unsafe operation. Always use the manufacturer’s instructions as a guide for functional adjustments. Personnel who have access to these adjustments should be familiar with the equipment manufacturer’s instructions and the machinery used with the electrical equipment.
- Only those operational adjustments required by the operator should be accessible to the operator. Access to other controls should be restricted to prevent unauthorized changes in operating characteristics.

# About the Document

## Document Scope

This guide describes the implementation of Modicon Edge I/O NTS Field Device Master modules. It provides the description, characteristics, wiring diagrams and configuration details for Modicon Edge I/O NTS Field Device Master modules.

## Validity Note

This document has been updated for the release of Modicon Edge I/O NTS Field Device Master modules firmware versions available at the publication date of this document.

This document has been updated for the release of the Modicon Edge I/O Configurator V1.0.1.

The characteristics of the products described in this document are intended to match the characteristics that are available on www.se.com. As part of our corporate strategy for constant improvement, we may revise the content over time to enhance clarity and accuracy. If you see a difference between the characteristics in this document and the characteristics on www.se.com, consider www.se.com to contain the latest information.

## Product Related Information

**⚠⚠DANGER**

**HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH**

- Disconnect all power from all equipment including connected devices prior to removing any covers or doors, or installing or removing any accessories, hardware, cables, or wires except under the specific conditions specified in the appropriate hardware guide for this equipment.
- Always use a properly rated voltage sensing device to confirm the power is off where and when indicated.
- Replace and secure all covers, accessories, hardware, cables, and wires and confirm that a proper ground connection exists before applying power to the equipment.
- Use only the specified voltage when operating this equipment and any associated products.

**Failure to follow these instructions will result in death or serious injury.**

## ⚠WARNING

**LOSS OF CONTROL**

- Perform a Failure Mode and Effects Analysis (FMEA), or equivalent risk analysis, of your application, and apply preventive and detective controls before implementation.
- Provide a fallback state for undesired control events or sequences.
- Provide separate or redundant control paths wherever required.
- Supply appropriate parameters, particularly for limits.
- Review the implications of transmission delays and take actions to mitigate them.
- Review the implications of communication link interruptions and take actions to mitigate them.
- Provide independent paths for control functions (for example, emergency stop, over-limit conditions, and error conditions) according to your risk assessment, and applicable codes and regulations.
- Apply local accident prevention and safety regulations and guidelines.[1]
- Test each implementation of a system for proper operation before placing it into service.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

[1] For additional information, refer to NEMA ICS 1.1 (latest edition), *Safety Guidelines for the Application, Installation, and Maintenance of Solid State Control* and to NEMA ICS 7.1 (latest edition), *Safety Standards for Construction and Guide for Selection, Installation and Operation of Adjustable-Speed Drive Systems* or their equivalent governing your particular location.

## ⚠WARNING

**UNINTENDED EQUIPMENT OPERATION**

- Only use software approved by Schneider Electric for use with this equipment.
- Update your application program every time you change the physical hardware configuration.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

# General Cybersecurity Information

In recent years, the growing number of networked machines and production plants has seen a corresponding increase in the potential for cyber threats, such as unauthorized access, data breaches, and operational disruptions. You must, therefore, consider all possible cybersecurity measures to help protect assets and systems against such threats.

To help keep your Schneider Electric products secure and protected, it is in your best interest to implement the cybersecurity best practices as described in the Cybersecurity Best Practices document.

Schneider Electric provides additional information and assistance:

- Subscribe to the Schneider Electric security newsletter.
- Visit the Cybersecurity Support Portal web page to:
  - Find Security Notifications.
  - Report vulnerabilities and incidents.
- Visit the Schneider Electric Cybersecurity and Data Protection Posture web page to:
  - Access the cybersecurity posture.
  - Learn more about cybersecurity in the cybersecurity academy.
  - Explore the cybersecurity services from Schneider Electric.

# Environmental Data

For product compliance and environmental information, refer to the Schneider Electric Environmental Data Program.

# Related Documents

| Title of documentation | Reference number |
|---|---|
| Modicon Edge I/O - System Planning and Installation Guide | EIO0000004786 (ENG) |
| Modicon Edge I/O - Configurator and Web Interface - User Guide | EIO0000004810 (ENG) |
| Modicon Edge I/O - Software Integration and Compatibility - User Guide | EIO0000004818 (ENG) |
| Modicon Edge I/O - Diagnostic Data - User Guide | EIO0000004826 (ENG) |
| Modicon Edge I/O NTS - Network Interface Modules - User Guide | EIO0000004794 (ENG) |
| Modicon Edge I/O NTS - Discrete Modules - User Guide | EIO0000005238 (ENG) |
| Modicon Edge I/O NTS - Analog Modules - User Guide | EIO0000005246 (ENG) |
| Modicon Edge I/O NTS - Counting Modules - User Guide | EIO0000005262 (ENG) |

To find documents online, visit the Schneider Electric download center (www.se.com/ww/en/download/).

# Information on Non-Inclusive or Insensitive Terminology

As a responsible, inclusive company, Schneider Electric is constantly updating its communications and products that contain non-inclusive or insensitive terminology. However, despite these efforts, our content may still contain terms that are deemed inappropriate by some customers.

# Terminology Derived from Standards

The technical terms, terminology, symbols and the corresponding descriptions in the information contained herein, or that appear in or on the products themselves, are generally derived from the terms or definitions of international standards.

In the area of functional safety systems, drives and general automation, this may include, but is not limited to, terms such as *safety*, *safety function*, *safe state*, *fault*, *fault reset*, *malfunction*, *failure*, *error*, *error message*, *dangerous*, etc.

Among others, these standards include:

| Standard | Description |
|---|---|
| IEC 61131-2:2007 | Programmable controllers, part 2: Equipment requirements and tests. |
| ISO 13849-1:2023 | Safety of machinery: Safety related parts of control systems.<br>General principles for design. |
| EN 61496-1:2020 | Safety of machinery: Electro-sensitive protective equipment.<br>Part 1: General requirements and tests. |
| ISO 12100:2010 | Safety of machinery - General principles for design - Risk assessment and risk reduction |
| EN 60204-1:2006 | Safety of machinery - Electrical equipment of machines - Part 1: General requirements |
| ISO 14119:2013 | Safety of machinery - Interlocking devices associated with guards - Principles for design and selection |
| ISO 13850:2015 | Safety of machinery - Emergency stop - Principles for design |
| IEC 62061:2021 | Safety of machinery - Functional safety of safety-related electrical, electronic, and electronic programmable control systems |
| IEC 61508-1:2010 | Functional safety of electrical/electronic/programmable electronic safety-related systems: General requirements. |
| IEC 61508-2:2010 | Functional safety of electrical/electronic/programmable electronic safety-related systems: Requirements for electrical/electronic/programmable electronic safety-related systems. |
| IEC 61508-3:2010 | Functional safety of electrical/electronic/programmable electronic safety-related systems: Software requirements. |
| IEC 61784-3:2021 | Industrial communication networks - Profiles - Part 3: Functional safety fieldbuses - General rules and profile definitions. |
| 2006/42/EC | Machinery Directive |
| 2014/30/EU | Electromagnetic Compatibility Directive |
| 2014/35/EU | Low Voltage Directive |

In addition, terms used in the present document may tangentially be used as they are derived from other standards such as:

| Standard | Description |
|---|---|
| IEC 60034 series | Rotating electrical machines |
| IEC 61800 series | Adjustable speed electrical power drive systems |
| IEC 61158 series | Digital data communications for measurement and control – Fieldbus for use in industrial control systems |

Finally, the term *zone of operation* may be used in conjunction with the description of specific hazards, and is defined as it is for a *hazard zone* or *danger zone* in the *Machinery Directive* (*2006/42/EC*) and *ISO 12100:2010*.

**NOTE:** The aforementioned standards may or may not apply to the specific products cited in the present documentation. For more information concerning the individual standards applicable to the products described herein, see the characteristics tables for those product references.

# IO-Link Field Device Master Module

## What's in This Part

# NTSFIO0400 Field Device Master Module, IO-Link Master, 4 Channels

## What's in This Chapter



# NTSFIO0400 Presentation

## Overview

This section provides a presentation of the NTSFIO0400 module.

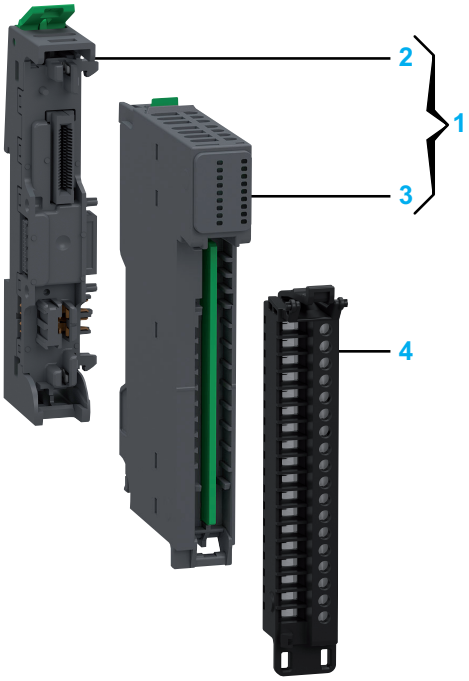
## Main Characteristics

The following table describes the main characteristics of the NTSFIO0400 module:

| Main Characteristics | Value |
|---|---|
| Product or component type | IO-Link master module with 4 channels:<br>• Compliant with IO-Link standard V1.1<br>• Without data consistency between channels |
| Number of channels | • Up to 4 IO-Link devices (3 /4 wire - Class A)<br>**NOTE:** IO-Link devices Class B (M12 connector) can be connected with an external power supply, see wiring diagram NTSFIO0400 Wiring diagram IO-Link Class B with external power supply, page 23<br>• Up to 4 (C/Q) discrete channels (configurable as input or output)<br>• Up to 4 additional discrete input (DI) channels |
| Input and output rated voltage | 24 Vdc |
| Input signal type | Sink |
| Input current | 2.5 mA / input channel |
| Output signal type | Push-Pull |
| Output current | 200 mA / channel for C/Q output |
| Operating mode | Asynchronous |

# Purchasing Information

The following figure presents the elements of the Modicon Edge I/O NTS NTSFIO0400 module:

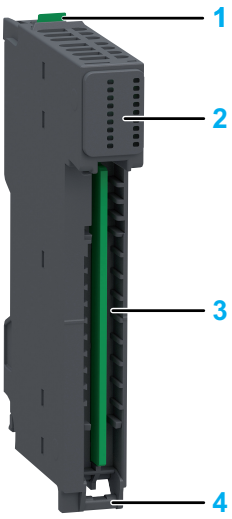



| Number | Reference | Description |
|---|---|---|
| 1 | NTSFIO0400K | Base + Module (kit)<br>**NOTE:** The module and its corresponding base can be purchased as a kit. |
| 2 | NTSXBA0100H | Spare Base, 1 Slot, for Input/Output Common or Expert Module, Hardened |
| 3 | NTSFIO0400 | Field Device Master Module, IO-Link Master, 4 Channels |
| 4 | NTSXTB18200H | Spring Terminal Block, 18 Points, 3.81 mm Pitch, Without Cover, use on Low Height Module, Hardened |
| | NTSXTB18201H | Spring Terminal Block, 18 Points, 3.81 mm Pitch, With Cover, use on Low Height Module, Hardened |
| | NTSXTB18000H | Screw Terminal Block, 18 Points, 3.81 mm Pitch, Without Cover, use on Low Height Module, Hardened |
| | NTSXTB18001H | Screw Terminal Block, 18 Points, 3.81 mm Pitch, With Cover, use on Low Height Module, Hardened |
| | | **NOTE:** The terminal blocks are purchased separately. |

**NOTE:** For more information on accessories and spare parts, refer to Modicon Edge I/O - System Planning and Installation Guide.

# Physical Description

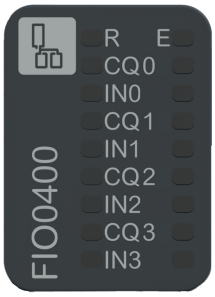
The following figure presents the elements of the module:




**1**: Release button for disengaging the module from the base
**2**: Status LEDs
**3**: Slot for the terminal block
**4**: Hinge for the terminal block installation

# Status LEDs

The following figure presents the NTSFIO0400 status LEDs:




The following table describes the status of LEDs:

| **R (Green)** | **E (Red)** | **CQ0...3 (Green / Red / Yellow)** | **IN0...3 (Green)** | **Description** |
|---|---|---|---|---|
| **Initialization and non-operational states** | | | | |
| OFF | OFF | OFF | OFF | Indicates that the module is not energized. |
| OFF | Fast Flash | - | - | Indicates that the module has detected a system error. |
| Regular Flash | OFF | - | - | Indicates that the firmware is being updated. |
| Regular Flash | ON | - | - | Indicates that a module mismatch is detected. |
| Single Flash | OFF | - | - | Indicates that the module is energized and not configured. |
| **Operational state** | | | | |
| ON | OFF | OFF | - | Indicates that the discrete input or output is deactivated.(1) |
| ON | OFF | Green ON | - | Indicates that the discrete input or output is activated.(1) |
| ON | OFF | Yellow ON | - | Indicates an active IO-Link communication.(2) |
| ON | Regular Flash | - | - | Indicates that a channel-related error is detected or the module is in fallback state. |
| ON | Regular Flash | Red Regular Flash | - | Indicates that a configured IO-Link device is not connected.(2) |
| ON | Regular Flash | Red ON | - | Indicates that a channel-related error is detected, for instance:(2)<br>• Indicates an undervoltage detection.<br>• Indicates an overload detection.<br>• Indicates an internal error detection.<br>• Indicates that the configured IO-Link device does not match the device connected. |
| ON | ON | - | - | Indicates that a module-related error is detected. |
| ON | - | - | OFF | Indicates that the discrete input is deactivated.(3) |
| ON | - | - | ON | Indicates that the discrete input is activated.(3) |

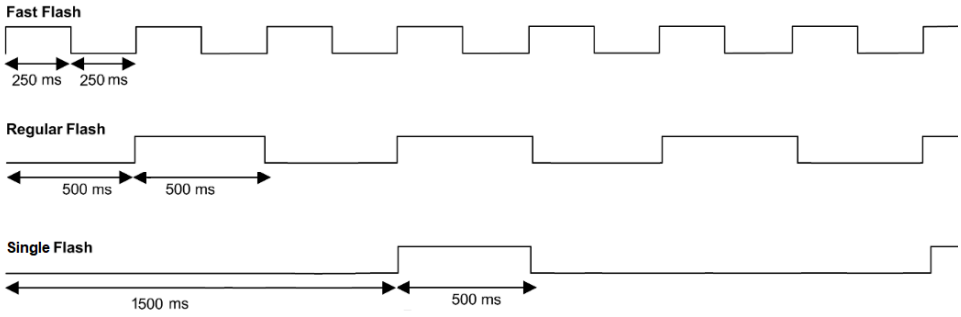
(1) Relevant if **Port Mode and CQ behavior** is set to **SIO input Mode** or **SIO output Mode**.

(2) Relevant if **Port Mode and CQ behavior** is set to **Manual Mode** or **Autostart Mode**.

(3) Relevant if **IQ Behavior**is set to **Digital input**.

**NOTE:** For an extended diagnostic, refer to the Modicon Edge I/O - Diagnostic Data - User Guide

The following graphic shows the system status of LEDs during module operation:




# NTSFIO0400 Characteristics

## Overview

This section provides a general description of the characteristics of the module.

**⚠WARNING**

**UNINTENDED EQUIPMENT OPERATION**

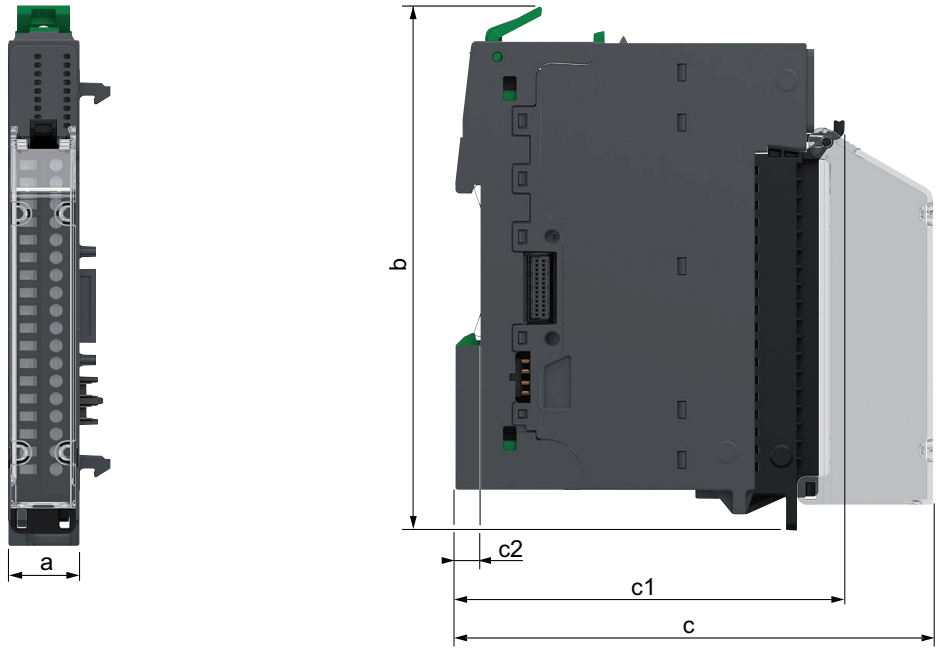
Do not exceed any of the rated values specified in the environmental and electrical characteristics tables.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

For more information on environmental characteristics, refer to Modicon Edge I/O - System Planning and Installation Guide.

# Dimensions

The following figure presents the external dimensions of the assembled module:




**a**: 15 mm (0.59 in)
**b**: 116.6 mm (4.57 in)
**c**: 107.5 mm (4.21 in)
**c1**: 88.2 mm (3.46 in)
**c2**: 5.6 mm (0.2 in)

# Weight

- NTSFIO0400: 49 g (1.73 oz)
- NTSFIO0400K: 76 g (2.68 oz)

# General Characteristics

The following table describes the general characteristics of the NTSFIO0400 module:

| Characteristics | Value |
|---|---|
| Rated supplied voltage | 24 Vdc |
| Power supply source | Connected to the 24 Vdc field power segment |
| Power supplied voltage range | 20.4...28.8 Vdc |
| 24 Vdc I/O segment current draw | 1,709.6 mA |
| Power dissipation | 1.40 W |
| Maximum cable length | 20 m (65.6 ft) |
| Isolation between field power and I/O segment busses | 1,000 Vac |
| Isolation between IO-Link channels | No Isolation |
| Derating | 55 °C...60 °C (131 °F...140 °F): 4 signals are allowed. A signal can be DI, C/Q as input, C/Q as output or IO-Link. |

# Characteristics of L+ Supply

The following table describes the characteristics of L+ supply of the NTSFIO0400 module:

| Characteristics | Value |
|---|---|
| Maximum current | • Channel 0 : 250 mA<br>• Channel 1 : 250 mA<br>• Channel 2 : 200 mA<br>• Channel 3 : 200 mA |
| Voltage | Depending on the power supply |
| Short circuit protection | Yes |

**NOTE:** L+ and L- form the 24 Vdc power supply for the IO-Link device.

# Characteristics of the C/Q Signal in IO-Link Master Mode

The following table describes the characteristics of the C/Q signal in IO-Link master mode of the NTSFIO0400 module:

| Characteristics | Value |
|---|---|
| Transfer rates | • COM1: 4.8 kbaud<br>• COM2: 38.4 kbaud<br>• COM3: 230.4 kbaud |
| Data format | 1 start bit, 8 data bits, 1 parity bit (even), 1 stop bit |
| Data storage | 2048 bytes |

**NOTE:** C/Q is the IO-Link communication line.

# Characteristics of C/Q Signal in Discrete Input Mode and DI Signal

The following table describes the characteristics of the C/Q signal in discrete input mode and DI signal of the NTSFIO0400 module:

| Characteristics | Value |
|---|---|
| Input compatibility | Type 3 conforming to IEC 61131-2 |
| Rated input voltage | 24 Vdc |
| Rated input current at 24 Vdc | 2.5 mA (minimum 2 mA, maximum 3 mA) |
| Logic state 0 | < 5 Vdc |
| Logic state 1 | > 15 Vdc |
| Input logic type | Sink |
| Input filter | Software filter: 1.6 ms, not configurable |

## Characteristics of the C/Q Signal in Discrete Output Mode

The following table describes the characteristics of the C/Q signal in discrete output mode of the NTSFIO0400 module:

| Characteristics | Value |
|---|---|
| Output type | Push-pull |
| Output voltage | 24 Vdc |
| Maximum continuous output current | 0.2 A per output |
| Total output current | 0.8 A maximum |
| Maximum overcurrent threshold | Minimum 0.28 A, maximum 0.41 A per output |
| Output protection | • Thermal protection<br>• Short circuit protection<br>• Overcurrent protection<br>**NOTE:** To restart the channel after an overcurrent event, it is necessary to disconnect the load. |

# NTSFIO0400 Wiring

## Overview

This section provides the wiring diagram of the NTSFIO0400 module.

## Wiring Rules

For more information on the wiring, refer to Modicon Edge I/O - System Planning and Installation Guide.

## Wiring Diagrams

This module allows the use of an external power supply to energize the sensors.

**⚠WARNING**

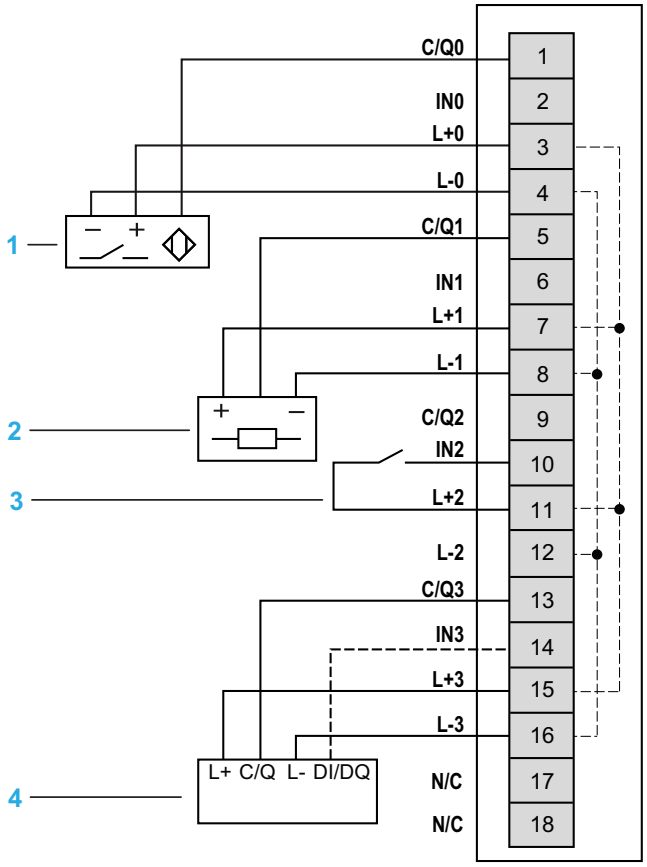
**UNINTENDED EQUIPMENT OPERATION**

Use the sensor and actuator power supply only for supplying power to sensors or actuators connected to the module.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

# NTSFIO0400 Wiring diagram IO-Link Class A

The following figure illustrates the connections of the IO-Link device (Class A):




**1**: 3-wire sensor
**2**: 3-wire actuator
**3**: Discrete input
**4**: IO-Link device (Class A) (4 wires)
**N/C**: No Connection

## ⚠WARNING

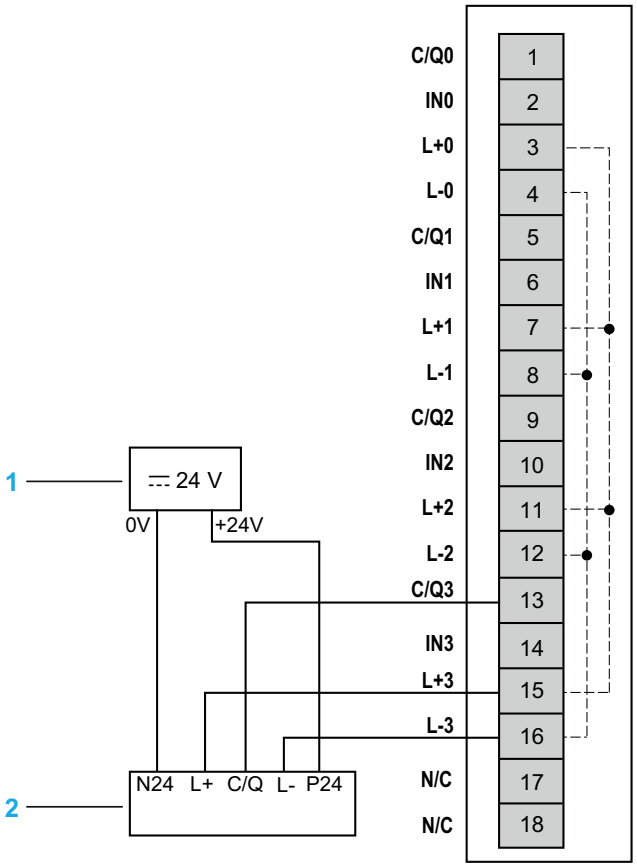
**UNINTENDED EQUIPMENT OPERATION**

Do not connect wires to unused terminals and/or terminals indicated as “No Connection (N/C)”.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

## NTSFIO0400 Wiring diagram IO-Link Class B with external power supply

The following figure illustrates the connections of the IO-Link device (Class B):




**1**: SELV External power supply isolated from field power
**2**: IO-Link device (Class B) (M12)
**N/C**: No Connection

**⚠WARNING**

**UNINTENDED EQUIPMENT OPERATION**

Do not connect wires to unused terminals and/or terminals indicated as “No Connection (N/C)”.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

# NTSFIO0400 Parameters

## Overview

This section presents the user parameters of the NTSFIO0400 module.

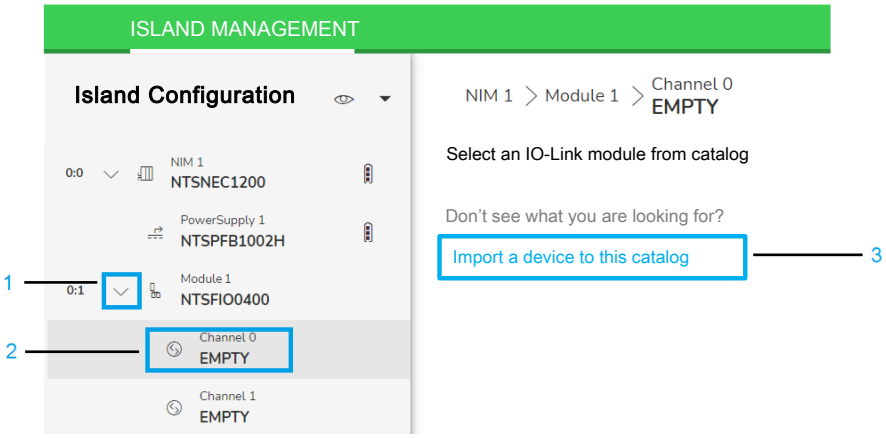
# IO-Link Device IODD Import and Selection

## Overview

The Modicon Edge I/O Configurator software and the embedded Modicon Edge I/O NTS Web Interface allow you to import the IO-Link device IODD description files for configuration creation or management.

## IODD Description Files Import to the Catalog

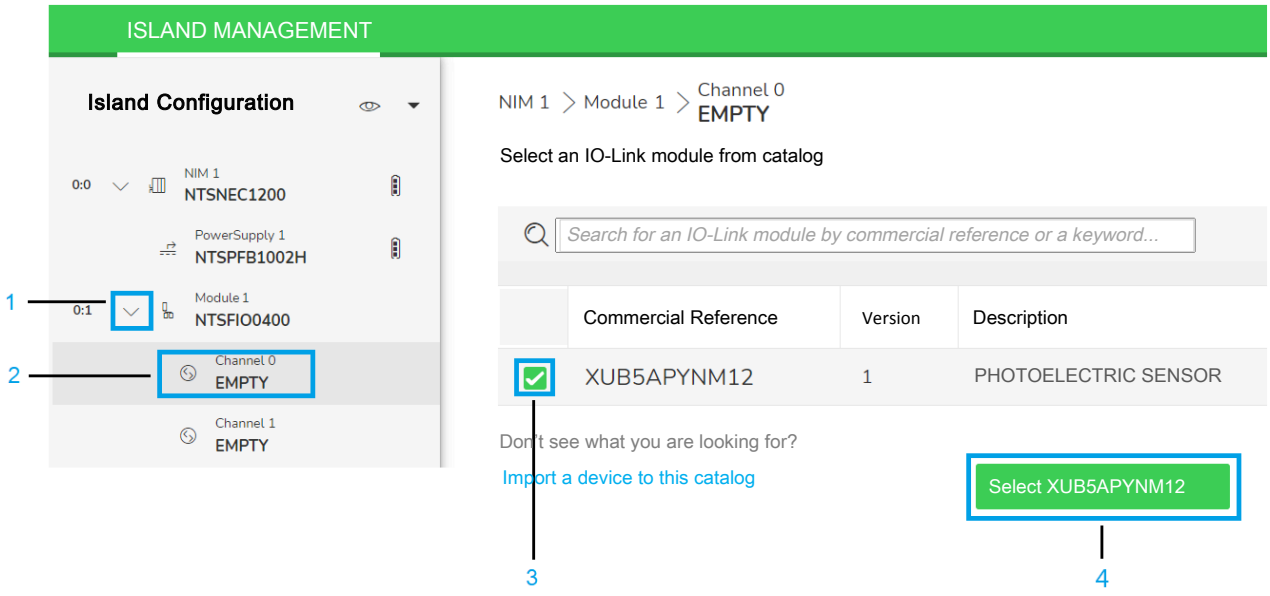
This submenu allows you to import IO-Link device IODD description files:




| Step | Action |
|---|---|
| 1 | In the **Island Configuration**, expand the list to display the channels of the selected module. |
| 2 | Click the **Channel**. |
| 3 | Click **Import a device to this catalog**.<br><br>Result: The Windows Open dialog box is displayed. |
| 4 | Navigate to the file location and select the IO-Link device IODD description file from your local PC or server.<br>Click **Open** to confirm the selection. |

# Add an IO-Link Device

This submenu allows you to add the IO-Link device:




| Step | Action |
|---|---|
| 1 | In the **Island Configuration**, expand the list to display the channels of the selected module. |
| 2 | Click the **Channel** to be configured. |
| 3 | Select the check box for the IO-Link device to be added to the **Channel**. |
| 4 | Confirm using the **Select** button. |

# Device Configuration

After the IO-Link device is imported and added, configure the device parameters of the channel.

| Step | Action |
|---|---|
| 1 | In the **Island Configuration**, expand the list to display the channels of the selected module. |
| 2 | Click the **Channel** of the device to be configured. The device parameters are displayed, according to the IODD content. |
| 3 | Configure the device parameters.<br>**NOTE:** Parameters that are not modified are displayed with the value **Unset**.<br>If you are configuring your device offline, proceed to step 4 only.<br>If you are configuring your device online, skip step 4 and proceed directly to step 5. |
| 4 | The following actions are possible while being offline:<br>• Configure the device parameters by modifying the value. For more information on possible settings, refer to the device documentation.<br>• The **Set to default** drop-down list allows you to select one of the following actions:<br>◦ **All parameters**: All parameters are set to the default values defined in the IODD.<br>◦ **Unset parameters**: Parameters that are not modified are set to the default value defined in the IODD. Configured parameters are not modified.<br>• The **Unset parameters** button allows you to set the device parameters to **Unset**. |
| 5 | The following actions are possible while being online:<br>• The **Read Values** button allows you to read the values configured in the connected device. Two lists of parameters are displayed:<br>◦ **PARAMETERS**: Parameters that are accessible offline and online.<br>◦ **ONLINE PARAMETERS**: Parameters that are accessible only online.<br>• Configure the device parameters by entering or selecting the value. For parameters which type is **ButtonT**, you can send a command by clicking the corresponding button. For more information on possible settings, refer to the device documentation.<br>◦ To write a parameter value to the device, click **Write online value** icon.<br>◦ To read a parameter value from the device, click **Read online value** icon.<br>**NOTE:** Some IO-Link devices restart when a parameter has been written online. This may lead to an unsuccessful writing if another parameter is written before the restart of the device has completed as the IO-Link device is not accessible.<br>**NOTE:** If **Validation and Backup** is set to 3 (**Compatible with IO-Link V1.1, datastorage set as backup and restore**), the parameters may not be updated as intended.<br>**⚠WARNING**<br>**UNINTENDED EQUIPMENT OPERATION**<br>Verify that the writing of parameters to the IO-Link devices is successfully completed.<br>**Failure to follow these instructions can result in death, serious injury, or equipment damage.** |

# Parameters Description

## Configurable Parameters

The following table presents the configurable parameters for the NTSFIO0400 module:

| **Displayed Name**<br>***Parameter Name*** | **Value** | **Data type** | **Description** |
|---|---|---|---|
| **Device Mode**<br>*DeviceMode* | 0: **Normal***<br>1: **Optional**<br>2: **Virtual reserved** | ENUM | Allows you to select the device mode:<br>• **Normal**: The module is part of the software configuration and is physically connected in the cluster.<br>• **Optional**: The module is part of the software configuration. A dummy module or the configured module must be physically installed in the cluster. Whether either module is present does not cause a configuration error to be detected.<br>• **Virtual reserved**: The module is part of the software configuration. A dummy module must be physically installed in the cluster. If the virtual module is physically installed in the cluster, a configuration error is detected. |
| * Parameter default value | | | |

The following table presents the configurable parameters for the channels of the NTSFIO0400 module:

| **Displayed Name**<br>***Parameter Name*** | **Value** | **Data type** | **Description** |
|---|---|---|---|
| **Port Mode and CQ behavior**<br>*PortMode* | 0*: **Deactivated**<br>1: **Manual Mode**<br>2: **Autostart Mode**<br>3: **SIO input Mode**<br>4: **SIO output Mode** | ENUM | Port mode and C/Q behavior<br>Refer to Port Mode, Validation and Backup Parameters Description, page 34. |
| **Validation and Backup**<br>*ValidationAndBackup* | 0*: **No device verification**<br>1: **Compatible with IO-Link V1.0**<br>2: **Compatible with IO-Link V1.1, without datastorage**<br>3: **Compatible with IO-Link V1.1, datastorage set as backup and restore**<br>4: **Compatible with IO-Link V1.1, datastorage set as restore only** | ENUM | IO-Link version and device verification, and data storage configuration<br>• 1 and 2: Offline configuration is used.<br>• 3 and 4: Use the datastorage of the IO-Link specification.<br>Refer to Port Mode, Validation and Backup Parameters Description, page 34. |
| **IQ Behavior**<br>*IQBehavior* | 0*: **Not used**<br>1: **Digital input** | ENUM | Enables or disables the IN input as a discrete input. |
| **Master cycle time**<br>*PortCycleTime* | 0*: Computed fastest master cycle time<br>1...191: Fixed cycle time | BYTE | Computed cycle time of the data transmission between IO-Link master and IO-Link device at the port.<br>Refer to Master Cycle Time Description, page 34. |
| **Device Id**<br>*ValidationDeviceId* | – | UINT32 | Value set by the IODD file and used for validation.<br>Read only parameter |
| **Vendor Id**<br>*ValidationVendorId* | – | UINT16 | Value set by the IODD file and used for validation.<br>Read only parameter |
| **Device name**<br>*DeviceName* | – | STRING | Value set by the IODD file.<br>Read only parameter |
| **Vendor name**<br>*VendorName* | – | STRING | Value set by the IODD file.<br>Read only parameter |
| **Input process data length**<br>*InputProcessDataLength* | • Number of bytes defined by the IODD if **Port Mode and CQ behavior** is set to **Manual Mode**<br>• 32 bytes if **Port Mode and CQ behavior** is set to **Autostart Mode**<br>• 0 bytes otherwise | BYTE | Number of bytes used by *IProcessData*. |
| **Output process data length**<br>*OutputProcessData-Length* | • Number of bytes defined by the IODD if **Port Mode and CQ behavior** is set to **Manual Mode**<br>• 32 bytes if **Port Mode and CQ behavior** is set to **Autostart Mode**<br>• 0 bytes otherwise | BYTE | Number of bytes used by *QProcessData*. |
| * Parameter default value | | | |

# Implicit Data

The following table presents the input implicit data for the NTSFIO0400 module:

| ***Parameter Name*** | **Value** | **Data type**<br>**Size in bytes** | **Description** |
|---|---|---|---|
| *GCS* | 0...255 | BYTE<br>1 | Group Cyclic Status<br>Bit 0: Data quality<br>Bit 1: General module status<br>Bit 2: I/O status<br>Bit 3: N/A<br>Bit 4: Output status<br>Bit 5: Advisory status<br>Bit 6: N/A<br>Bit 7: Data freshness<br>**NOTE:** For more information, refer to Modicon Edge I/O - Diagnostic Data - User Guide. |
| *ChannelHealth0_7*(1) | 0...255 | BYTE<br>1 | Bit 0...7 = Status of channel 0...7<br>• Bit = FALSE: Channel is invalid or not present.<br>• Bit = TRUE: Channel is valid or disabled. |
| (1) This parameter is not part of the implicit data if the optimized I/O profile is selected. | | | |

The following table presents the input implicit data for the channels of the NTSFIO0400 module:

| ***Parameter Name*** | **Value** | **Data type**<br>**Size in bytes** | **Description** |
|---|---|---|---|
| *C/Q_Level* | FALSE<br>TRUE | BOOL<br>1 | C/Q input level, valid if C/Q is configured as input |
| *DI_Level* | FALSE<br>TRUE | BOOL<br>1 | DI level, valid if DI is configured as input |
| *IFifoDiag* | Result of the FIFO diagnostic command on 32 bits in High word / Low word format<br>• First byte: Administrative information:<br>◦ bit 0: command mirror<br>◦ bit 1: other diagnostics available in the FIFO<br>• Second byte: value qualifier or 0 if no value<br>• Second word: event code or 0 if no value | UINT32<br>4 | Result of the FIFO diagnostic command, valid if C/Q is configured as IO-Link |
| *IProcessData* | - | BYTE<br>0...32 | IO-Link input process data, valid if C/Q is configured as IO-Link |
| *PortQualifier* | - | BYTE<br>1 | Port Qualifier, valid if C/Q is configured as IO-Link |

The following table presents the output implicit data for the channels of the NTSFIO0400 module:

| ***Parameter Name*** | **Value** | **Data type**<br>**Size in bytes** | **Description** |
|---|---|---|---|
| *C/Q_Level* | FALSE<br>TRUE | BOOL<br>1 | C/Q output level, valid if C/Q is configured as output |
| *OutputEnabled* | FALSE<br>TRUE | BOOL<br>1 | IO-Link output valid from the controller, valid if C/Q is configured as IO-Link |
| *QFifoDiag* | FALSE<br>TRUE | BOOL<br>1 | On rising edge, gets the next entry in the FIFO diagnostic queue, valid if C/Q is configured as IO-Link |
| *QProcessData* | - | BYTE<br>0...32 | IO-Link output process data, valid if C/Q is configured as IO-Link |

# Explicit Data

The following table presents the explicit data for the channels of the NTSFIO0400 module:

| ***Parameter Name*** | **Value** | **Data type**<br>**Size in bytes** | **Description** |
|---|---|---|---|
| *ApplicationSpecificTag* | - | STRING<br>0...32 | Application specific tag of the connected IO-Link device |
| *DeviceId* | 0...FFFFFF hex | UINT32<br>4 | Device ID of the connected IO-Link device |
| *DiagStatus* | - | STRING<br>0...192 | Diagnostic status of the connected IO-Link device<br>This parameter provides the list of the IO-Link events.<br>Each event entry is a set of 3 bytes:<br>• Byte 1: Event qualifier<br>• Byte 2, 3: Event code<br>Up to 64 array elements are available.<br>Refer to Event Qualifier description, page 33. |
| *InputDataLength* | - | BYTE<br>1 | Input data length of the connected IO-Link device |
| *MasterCycle* | 0*: No device connected<br>1...255: Fixed cycle time | BYTE<br>1 | Computed cycle time of the data transmission between IO-Link master and IO-Link device at the port<br>All bits at 0: No device connected<br>Bits 0...5: Multiplier (0...63)<br>Bits 6...7: Time base<br>• 00: 0.1 ms, with a minimum cycle time of 0.4 ms<br>• 01: 0.4 ms, with a minimum cycle time of 6.4 ms<br>• 10: 1.6 ms, with a minimum cycle time of 32 ms<br>• 11: Reserved |
| *OutputDataLength* | - | BYTE<br>1 | Output data length of the connected IO-Link device |
| *PortQualityInfo* | Bit 0: Input process data status<br>• 0: Valid<br>• 1: Invalid<br>Bit 1: Output process data status<br>• 0: Valid<br>• 1: Invalid | BYTE<br>1 | Port status of the connected IO-Link device |

| ***Parameter Name*** | **Value** | **Data type**<br><br>**Size in bytes** | **Description** |
|---|---|---|---|
| *PortStatusInfo* | 0: No active communication (COMLOST state)<br>1: Port configuration is in DEACTIVATED state.<br>2: The device is in PREOPERATE state, *DiagStatus* contains the diagnosis cause.<br>3: The device is in PREOPERATE state and will go to OPERATE or PORT_DIAG state.<br>4: The device is in OPERATE state.<br>5: C/Q is configured as input.<br>6: C/Q is configured as output.<br>254: L+ is de-energized.<br>255: *PortStatusInfo* is not available. | ENUM<br><br>1 | Port status information |
| *RevisionId* | 0: No active communication at that port<br>1...255 | BYTE<br><br>1 | Revision ID of the connected IO-Link device<br>• 00 hex: No device connected<br>• 10 hex: V1.0<br>• 11 hex: V1.1 |
| *SerialNumber* | - | STRING<br><br>0...32 | Serial number of the connected IO-Link device |
| *TransmissionRate* | 0: No communication at that port<br>1: COM1 (4.8 kbit/s)<br>2: COM2 (38.4 kbit/s)<br>3: COM3 (230.4 kbit/s) | ENUM<br><br>1 | Transmission rate of the connected device |
| *VendorId* | 0...FFFF hex | UINT16<br><br>2 | Vendor ID of the connected IO-Link device |

# IO-Link Field Device Master Module Appendices

## What's in This Chapter



# EventQualifier Description

The following table presents the structure of the EventQualifier bitfield:

| Bits | Value | Description |
|---|---|---|
| Bits 0...2<br>INSTANCE | • 0: Indeterminable<br>• 1...3: Reserved<br>• 4: Application<br>• 5...7: Reserved | These bits indicate the instance of an event. |
| Bit 3<br>SOURCE | • 0: Device (remote)<br>• 1: Master/Port (local) | This bit indicates the source of the event. |
| Bits 4...5<br>TYPE | • 0: Reserved<br>• 1: Notification<br>• 2: Advisory<br>• 3: Error | These bits indicate the type of the event. |
| Bits 6...7<br>MODE | • 0: Reserved<br>• 1: Event single shot<br>• 2: Event disappears<br>• 3: Event appears | These bits indicate the mode of the event. |

# Port Mode, Validation and Backup Parameters Description

The following table presents the **Validation and Backup** parameter when the **Port Mode and CQ behavior** is set to **Manual Mode**:

**NOTE: Port Mode and CQ behavior** parameter can only be set to **Manual Mode** when an IODD is selected for the channel, see IO-Link Device IODD Import and Selection, page 24.

| Value | Validation | Offline Configuration | Datastorage |
|---|---|---|---|
| **0***: No device verification | None | No | No |
| **1**: Compatible with IO-Link V1.0 | Vendor ID, Device ID and IO-Link revision V1.0 | Yes. Always write into device during startup. | No |
| **2**: Compatible with IO-Link V1.1, without datastorage | Vendor ID, Device ID and IO-Link revision V1.1 | Yes. Always write into device during startup. | No |
| **3**: Compatible with IO-Link V1.1, datastorage set as backup and restore | Vendor ID, Device ID and IO-Link revision V1.1 | No | Yes (Backup parameters modifications in Master (e.g. Teaching, Upload-Request). Restore parameters of new device with previously backed up parameters) |
| **4**: Compatible with IO-Link V1.1, datastorage set as restore only | Vendor ID, Device ID and IO-Link revision V1.1 | No | Yes (Restore modified parameters of the device with previously backed up parameters) |

**NOTE:** Selecting an incorrect IO-Link version may lead to an invalid communication state. Restart the connected device to initialize the communication.

# Master Cycle Time Description

The **Master cycle time** bit field defines the cycle time of the data transmission between the IO-Link master and the IO-Link device at the port.

All bits at 0: The IO-Link master uses the computed fastest master cycle time.

Master cycle time selection:

- Bits 0...5: These bits represent a six-bits multiplier for the calculation of the cycle time (0...63).
- Bits 6...7: These bits specify the time base for the calculation of the cycle time.

The following table presents the permissible time base encoding and the corresponding cycle time ranges:

| Time base encoding | Time base value | Calculation | Cycle time range |
|---|---|---|---|
| 00 | 0.1 ms | Mulitplier x Time base | 0.4(1)...6.3 ms |
| 01 | 0.4 ms | 6.4 ms + Mulitplier x Time base | 6.4...31.6 ms |
| 10 | 1.6 ms | 32.0 ms + Mulitplier x Time base | 32.0...132.8 ms |
| 11 | Reserved | Reserved | Reserved |
| (1) The value 0.4 ms is the minimum cycle time at a transmission rate of 230.4 kbit/s. | | | |

# Serial Line Field Device Master Module

## What's in This Part

# NTSFMB0120/NTSFMB0120H Field Device Master Module, Serial, Modbus RTU, ASCII, Client, 115 Kbps, Standard/Hardened

### What's in This Chapter



# NTSFMB0120/NTSFMB0120H Presentation

## Overview

This section provides a presentation of the NTSFMB0120/NTSFMB0120H modules.

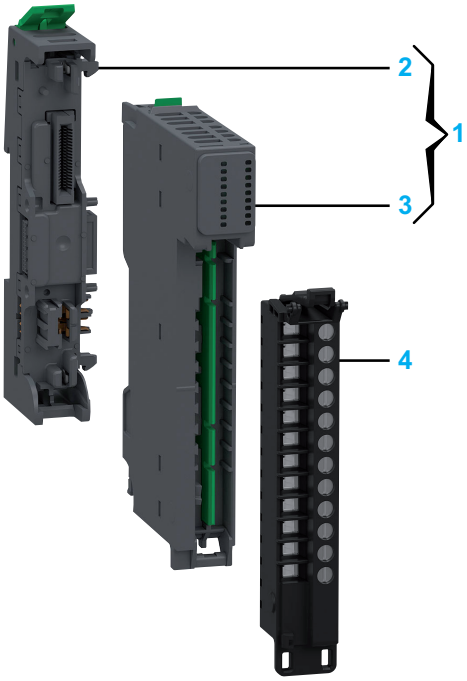
## Main Characteristics

The following table describes the main characteristics of the NTSFMB0120/ NTSFMB0120H modules:

| Main Characteristics | Value |
|---|---|
| Product or component type | Serial line module |
| Serial line types | Serial 2-wire and 4-wire RS-422/RS-485 |
| Supported communication protocols | • Modbus RTU<br>• Modbus ASCII<br>• ASCII |
| Number of channels | 1 serial line<br>Up to 32 Modbus devices can be addressed. |
| Operating mode | Asynchronous |

# Purchasing Information

The following figure presents the elements of the NTSFMB0120/NTSFMB0120H modules:

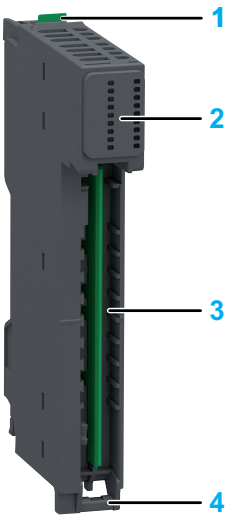



| Number | Reference | Description |
|---|---|---|
| 1 | NTSFMB0120K/ NTSFMB0120HK | Base + Module (kit)<br>**NOTE:** The module and its corresponding base can be purchased as a kit. |
| 2 | NTSXBA0100H | Spare Base, 1 Slot, for Input/Output Common or Expert Module, Hardened |
| 3 | NTSFMB0120 | Field Device Master Module, Serial, Modbus RTU, ASCII, Client, 115 Kbps |
| | NTSFMB0120H | Field Device Master Module, Serial, Modbus RTU, ASCII, Client, 115 Kbps, Hardened |
| 4 | NTSXTB12200H | Spring Terminal Block, 12 Points, 5 mm Pitch, Without Cover, use on Low Height Module, Hardened |
| | NTSXTB12201H | Spring Terminal Block, 12 Points, 5 mm Pitch, With Cover, use on Low Height Module, Hardened |
| | NTSXTB12000H | Screw Terminal Block, 12 Points, 5 mm Pitch, Without Cover, use on Low Height Module, Hardened |
| | NTSXTB12001H | Screw Terminal Block, 12 Points, 5 mm Pitch, With cover, use on Low Height Module, Hardened |
| | | **NOTE:** The terminal blocks are purchased separately. |

**NOTE:** For more information on accessories and spare parts, refer to Modicon Edge I/O - System Planning and Installation Guide.

# Physical Description

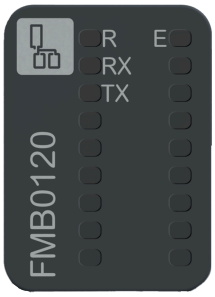
The following figure presents the elements of the module:




**1**: Release button for disengaging the module from the base
**2**: Status LEDs
**3**: Slot for the terminal block
**4**: Hinge for the terminal block installation

# Status LEDs

The following figure presents the NTSFMB0120/NTSFMB0120H status LEDs:

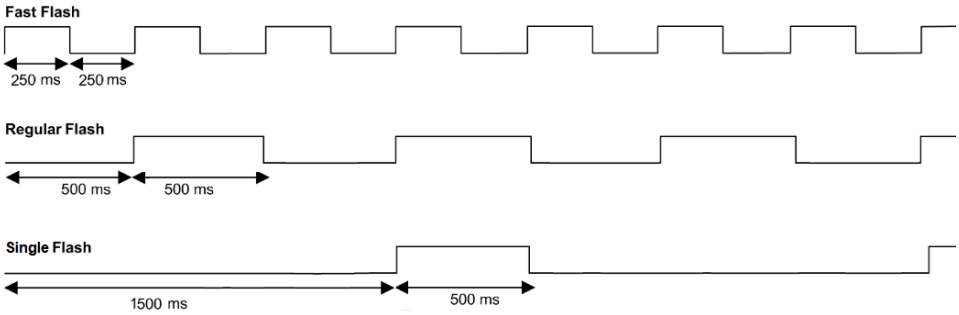



The following table describes the status of LEDs:

| R (Green) | E (Red) | RX, TX (Green) | Description |
|---|---|---|---|
| **Initialization and non-operational states** | | | |
| OFF | OFF | OFF | Indicates that the module is not energized. |
| OFF | ON | - | Indicates that the module has detected a system error. |
| Regular Flash | OFF | - | Indicates that the firmware is being updated. |
| Regular Flash | ON | - | Indicates that a module mismatch is detected. |
| Single Flash | OFF | - | Indicates that the module is energized and not configured. |
| **Operational state** | | | |
| ON | OFF | - | Indicates that the module is energized, configured and operational. |
| Fast Flash | - | - | Indicates that the Modbus I/O scanner is stopped. |
| ON | Regular Flash | - | Indicates an advisory detection. |
| ON | Regular Flash | OFF | Indicates that a 24 Vdc field power error is detected. |
| ON | Regular Flash | Regular Flash | Indicates that the module is in fallback state. |
| ON | ON | - | Indicates that a module-related error is detected. |
| ON | OFF | Fast Flash | Indicates an activity on the serial line port:<br>• RX: receive<br>• TX: transmit |

**NOTE:** For an extended diagnostic, refer to the Modicon Edge I/O - Diagnostic Data - User Guide

The following graphic shows the system status of LEDs during module operation:



# NTSFMB0120/NTSFMB0120H Characteristics

## Overview

This section provides a general description of the characteristics of the module.

**⚠WARNING**

**UNINTENDED EQUIPMENT OPERATION**

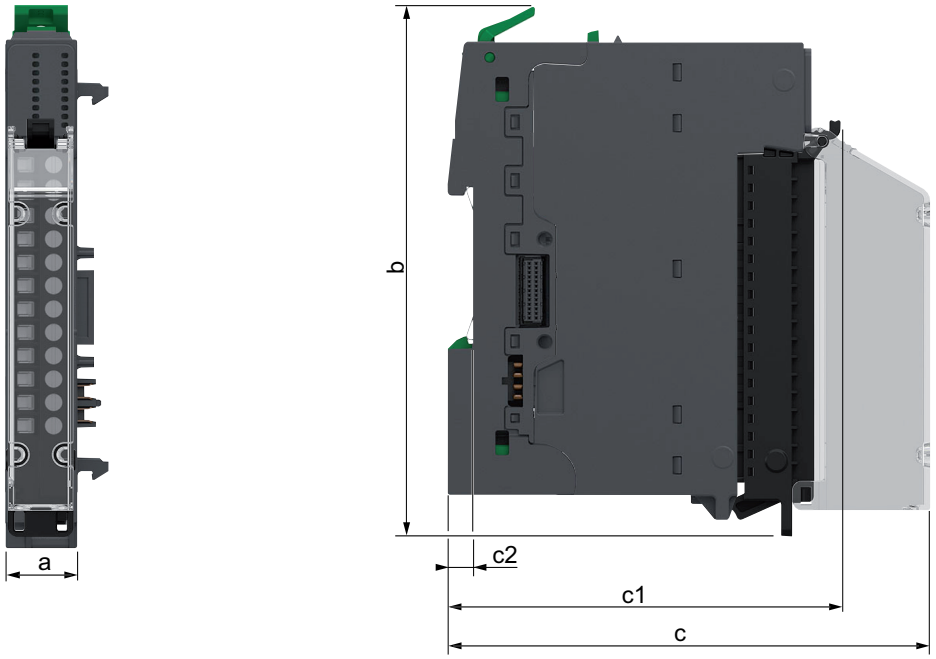
Do not exceed any of the rated values specified in the environmental and electrical characteristics tables.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

For more information on environmental characteristics, refer to Modicon Edge I/O - System Planning and Installation Guide.

## Dimensions

The following figure presents the external dimensions of the assembled module:




**a**: 15 mm (0.59 in)
**b**: 116.6 mm (4.57 in)
**c**: 107.5 mm (4.21 in)
**c1**: 88.2 mm (3.46 in)
**c2**: 5.6 mm (0.2 in)

## Weight

- NTSFMB0120: 49 g (1.73 oz)
- NTSFMB0120K: 76 g (2.68 oz)
- NTSFMB0120H: 49 g (1.73 oz)
- NTSFMB0120HK: 76 g (2.68 oz)

## General Characteristics

The following table describes the general characteristics of the module:

| Characteristics | Value |
|---|---|
| Rated supplied voltage | 24 Vdc |
| Power supply source | Connected to the 24 Vdc field power segment |
| Power supplied voltage range | 20.4...28.8Vdc |
| 24 Vdc I/O segment current draw | 28.8 mA |
| Power dissipation | 1.44 W |
| Maximum cable length | 1,200 m (3,937 ft) |
| Isolation between field power and bus | 1,000 Vac |
| Isolation between field power and serial port | 1,500 Vac |

## Serial Line Characteristics

| Characteristics | Value |
|---|---|
| Line polarization | The line polarization is embedded into the module and can be enabled with the **Serial line type** parameter. |
| Line termination | The line termination resistor can be externally connected to the LTA/B and LTY/Z pins of the terminal block. |

# NTSFMB0120/NTSFMB0120H Wiring

## Overview

This section provides the wiring diagram of the NTSFMB0120/NTSFMB0120H modules.

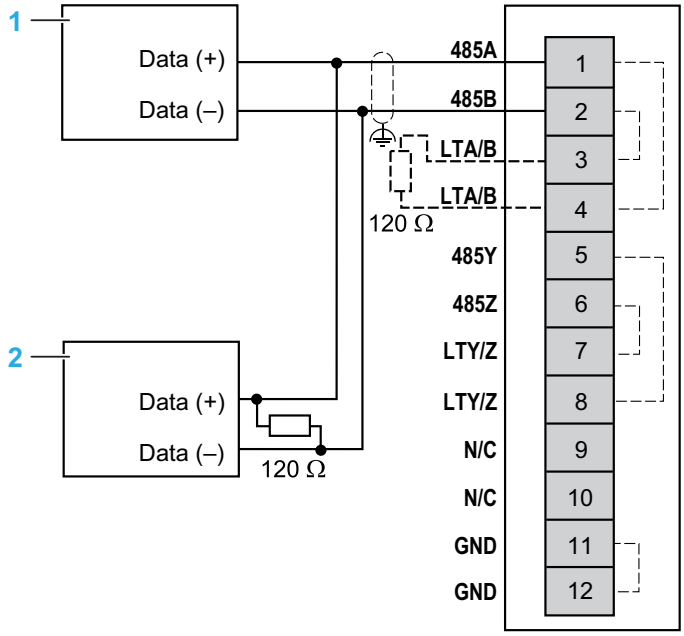
## Wiring Rules

For more information on the wiring, refer to Modicon Edge I/O - System Planning and Installation Guide.

# Wiring Diagrams

## RS-422/RS-485 2-Wire Wiring Diagrams

The following figure illustrates the connections of the RS-485 2-wire devices:




**1, 2**: RS-485 2-wire devices
**N/C**: No Connection

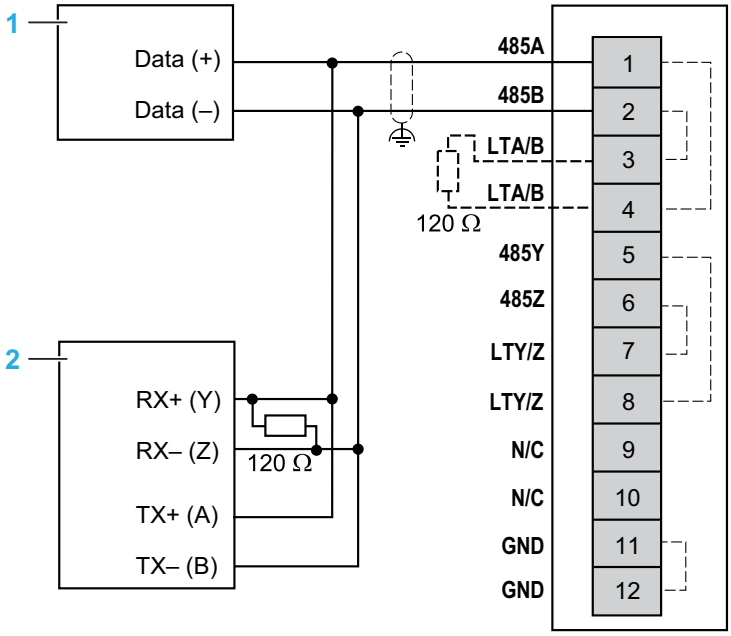
**⚠WARNING**

**UNINTENDED EQUIPMENT OPERATION**

Do not connect wires to unused terminals and/or terminals indicated as “No Connection (N/C)”.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

The following figure illustrates the connections of the RS-422/RS-485 2-/4-wire devices:




**1**: RS-485 2-wire device
**2**: RS-422 4-wire device
**N/C**: No Connection

## ⚠WARNING

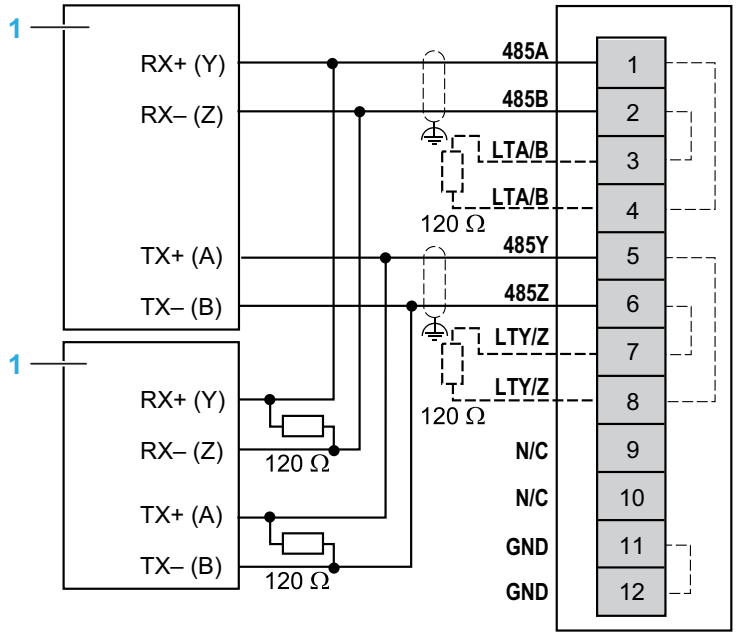
**UNINTENDED EQUIPMENT OPERATION**

Do not connect wires to unused terminals and/or terminals indicated as “No Connection (N/C)”.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

## RS-422/RS-485 4-Wire Wiring Diagrams

The following figure illustrates the connections of the RS-422 4-wire devices:




**1**: RS-422 4-wire device
**N/C**: No Connection

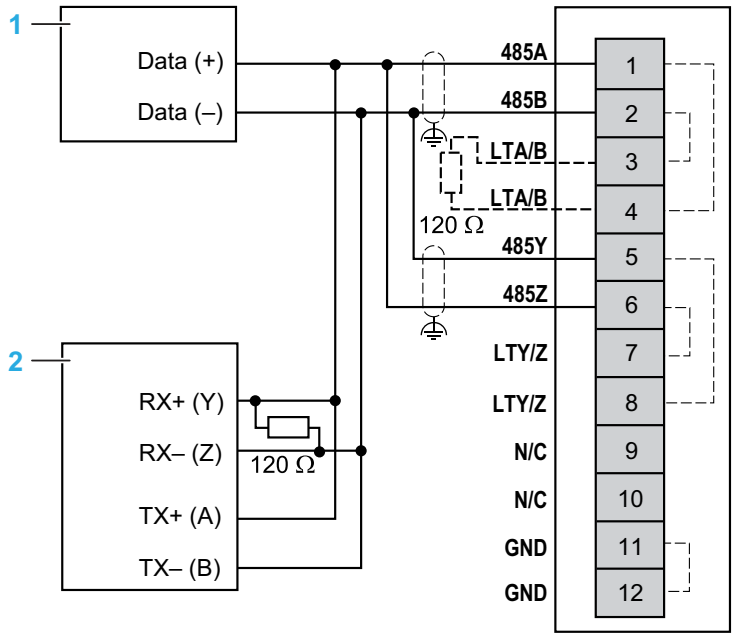
**⚠WARNING**

**UNINTENDED EQUIPMENT OPERATION**

Do not connect wires to unused terminals and/or terminals indicated as “No Connection (N/C)”.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

The following figure illustrates the connections of the RS422/RS-485 2-/4-wire devices:




**1**: RS-485 2-wire device
**2**: RS-422 4-wire device
**N/C**: No Connection

**⚠WARNING**

**UNINTENDED EQUIPMENT OPERATION**

Do not connect wires to unused terminals and/or terminals indicated as “No Connection (N/C)”.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

# NTSFMB0120/NTSFMB0120H Parameters

## Overview

This section presents the user parameters of the NTSFMB0120/NTSFMB0120H modules.

## Generic Fieldbus Device

### Overview

The Modicon Edge I/O Configurator software and the embedded Modicon Edge I/O NTS Web Interface allow you to import a generic fieldbus device in your configuration.

## Add a Fieldbus Device

The following table describes the steps to add a generic Modbus serial device in your configuration:

| Step | Action |
|---|---|
| 1 | In the **Island Configuration**, select the serial line module. |
| 2 | In the **Island Configuration**, click **+ Add Module**. |
| 3 | Click **Add a Fieldbus Device**. |
| 4 | Confirm using the **Add Modbus Serial Device** button. |

**NOTE:** You can add up to 32 fieldbus devices per serial line module.

## Device Configuration

After the fieldbus device is added, configure the parameters of the serial device.

## Modbus Serial Device Settings

The following table presents the **DEVICE PARAMETERS** settings for the Modbus serial device:

| Displayed Name | Value | Data type | Description |
|---|---|---|---|
| **Device Address** | 1*...247 | BYTE | Sets the address of the Modbus device. |
| * Parameter default value | | | |

The following table presents the **INITIALIZATION COMMANDS** settings for the Modbus serial device:

| Displayed Name | Value | Data type | Description |
|---|---|---|---|
| **Access Type** | **Write Single Coil (Function Code 05)***<br>**Write Single Register (Function Code 06)**<br>**Write Multiple Coils (Function Code 15)**<br>**Write Multiple Register (Function Code 16)** | ENUM | Selects the access type. |
| **Register Offset** | 0 hex*...FFFF hex | UINT16 | Sets the register offset. |
| **Length** | 1* for function codes 05 and 06<br>1*...1,968 for function code 15<br>1*...123 for function code 16 | UINT16 | Sets the number of objects to write:<br>• For function codes 05 and 15: number of bits.<br>• For function codes 06 and 16: number of registers. |
| **Initialization Value** | 0*...1 for function codes 05, 15<br>0*...65,535 for function codes 06, 16 | UINT16 | Sets the initialization value of the command.<br>For function codes 15 and 16, the same initialization value applies to each object. |
| * Parameter default value | | | |

Click **Add an Initialization Command** to add up to 10 commands. Drag and drop the commands in the list to modify the order of execution.

Initialization commands are executed when the serial line module is started or when a configured device is restarted.

The following table presents the **MODBUS CHANNELS** settings for the Modbus serial device:

| Displayed Name | Value | Data type | Description |
|---|---|---|---|
| **Name** | - | STRING | Sets the Modbus channel name. |
| **Access Type** | **Read Coils (Function Code 01)**<br>**Read Discrete Inputs (Function Code 02)**<br>**Read Holding Registers (Function Code 03)**<br>**Read Input Registers (Function Code 04)**<br>**Write Single Coil (Function Code 05)**<br>**Write Single Register (Function Code 06)**<br>**Write Multiple Coils (Function Code 15)**<br>**Write Multiple Register (Function Code 16)**<br>**Read/Write Multiple Register (Function Code 23)*** | ENUM | Selects the access type. |
| **Trigger** | Cyclic* | BYTE | Selects the trigger type (fixed value) for command execution. |
| **Cycle Time (in ms)** | 1...65,535<br>100* | UINT16 | Sets the cycle time for command. execution |
| **Read Offset** | 0 hex*...FFFF hex | UINT16 | Sets the read offset.<br>**NOTE:** This parameter is editable for function codes 01, 02, 03, 04, and 23. |
| **Read Length** | 1*...2,000 for function codes 01 and 02<br>1*...125 for function codes 03, 04, and 23 | BYTE | Sets the number of objects to read:<br>• For function codes 01 and 02: number of bits.<br>• For function codes 03, 04, and 23: number of registers.<br>**NOTE:** This parameter is editable for function codes 01, 02, 03, 04, and 23. |
| **Error Handling** | **Keep last value***<br>**Set to zero** | ENUM | Selects the reaction to a detected error.<br>**NOTE:** This parameter is editable for function codes 01, 02, 03, 04, and 23. |
| **Write Offset** | 0 hex*...FFFF hex | UINT16 | Sets the write offset.<br>**NOTE:** This parameter is editable for function codes 05, 06, 15, 16, and 23. |
| **Write Length** | 1* for function codes 05 and 06<br>1*...1,920 for function code 15,<br>1*...120 for function codes 16 and 23 | BYTE | Sets the number of objects to write:<br>• For function codes 05 and 15: number of bits.<br>• For function codes 06, 16, and 23: number of registers.<br>**NOTE:** This parameter is editable for function codes 15, 16, and 23. This parameter is forced to 1 for function codes 05 and 06. |
| * Parameter default value | | | |

Click **Add a Modbus Channel** to add up to 5 Modbus channels. Drag and drop the Modbus channels in the list to modify the order of execution.

Modbus channels are executed cyclically after the device is started and initialization commands are executed.

Input and output implicit process data allocation:

- Function codes 03, 04, 06, 16, and 23: 2 bytes per register are allocated in the implicit process data.

  The number of registers is set by the **Read Length** and **Write Length** parameters.

  Register values are accessible in the *IProcessData* and *QProcessData* implicit parameters.
- Function codes 01, 02, and 15: (Number of bits + 7) / 8 bytes are allocated in the implicit process data.

  The number of bits is set by the **Read Length** and **Write Length** parameters.

  Discrete input or coil values are accessible on the corresponding bit in the *IProcessData* and *QProcessData* implicit parameters.
- Function code 05: 1 byte is allocated in the output implicit process data.

  The number of objects is forced to 1 in the **Write Length** parameter.

  The coil value is accessible in the *QProcessData* implicit parameter.

  Any value other than 0 is considered as setting the coil to value 1.

# Parameters Description

## Configurable Parameters

The following table presents the configurable parameters for the NTSFMB0120/ NTSFMB0120H modules:

| **Displayed Name**<br>***Parameter Name*** | **Value** | **Data type** | **Description** |
|---|---|---|---|
| **Device Mode**<br>*DeviceMode* | 0: **Normal***<br>1: **Optional**<br>2: **Virtual reserved** | ENUM | Allows you to select the device mode:<br>• **Normal**: The module is part of the software configuration and is physically connected in the cluster.<br>• **Optional**: The module is part of the software configuration. A dummy module or the configured module must be physically installed in the cluster. Whether either module is present does not cause a configuration error to be detected.<br>• **Virtual reserved**: The module is part of the software configuration. A dummy module must be physically installed in the cluster. If the virtual module is physically installed in the cluster, a configuration error is detected. |
| * Parameter default value | | | |

The following table presents the configurable parameters for the Modbus serial devices connected to the NTSFMB0120/NTSFMB0120H modules:

| **Displayed Name**<br>***Parameter Name*** | **Value** | **Data type** | **Description** |
|---|---|---|---|
| **Serial line type**<br>*Bus_Type* | 0*: **RS485/RS422 2-wire - line polarization enabled**<br>1: **RS485/RS422 2-wire - line polarization disabled**<br>2: **RS485/RS422 4-wire - line polarization enabled on A/B & Y/Z)**<br>3: **RS485/RS422 4-wire - line polarization disabled on A/B & Y/Z)** | ENUM | Selects the serial line type. |
| **Baud rate**<br>*Baudrate* | 1,200: **1200**<br>2,400: **2400**<br>4,800: **4800**<br>9,600: **9600**<br>19,200: **19200**<br>38,400: **38400**<br>57,600: **57600**<br>115,200*: **115200** | ENUM | Selects the baud rate in bauds. |
| **Parity**<br>*Parity* | 0: **None**<br>1: **Odd**<br>2*: **Even** | ENUM | Selects the parity. |
| **Data bits**<br>*Databits* | 7: **7**<br>8*: **8** | ENUM | Selects the number of data bits:<br>**NOTE:**<br>• Always 7 if the selected **Protocol mode** is **Modbus ASCII**.<br>• Always 8 if the selected **Protocol mode** is **Modbus RTU**. |
| **Stop bits**<br>*Stopbits* | 1*: **1 Stopbit**<br>2: **2 Stopbits** | ENUM | Selects the number of stop bits. |
| **Protocol mode**<br>*Protocol mode* | 0*: **Modbus RTU**<br>1: **Modbus ASCII**<br>2: **ASCII** | ENUM | Selects the protocol. |
| **Time between frames**<br>*Interframe_time*(2) | 1...65,535<br>10* | UINT16 | Sets the minimum time in ms between frames sent by the module.<br>**NOTE:** The minimum value depends on the selected **Baud rate** value. |
| **Response timeout**<br>*Response_timeout*(2) | 1...65,535<br>500* | UINT16 | Sets the timeout in ms for a cyclic request. |
| **Transaction timeout**<br>*Transactiontimeout* | 1...65,535<br>5,000* | UINT32 | Sets the timeout in ms for a transaction request. |
| **Start/Stop scanner**<br>*Start_Stop_Scanner*(1)(2) | FALSE<br>TRUE* | BOOLEAN | Selects whether the scanner is enabled or disabled:<br>• FALSE: The scanner is enabled.<br>• TRUE: The scanner is disabled. |

| **Displayed Name**<br>***Parameter Name*** | **Value** | **Data type** | **Description** |
|---|---|---|---|
| **Start/Stop channels**<br>*Start_Stop_Channels*(1)(2) | 0...4,294,967,295* | UINT32 | Sets whether the Modbus serial devices are enabled or disabled.<br>Bit 0...31 = Status of the devices 0...31:<br>• Bit = FALSE: The device is enabled.<br>• Bit = TRUE: The device is disabled. |

* Parameter default value

(1) Online modification is allowed.

(2) Parameter not available if the selected **Protocol mode** is **ASCII**.

# Implicit Data

The following table presents the input implicit data for the NTSFMB0120/ NTSFMB0120H modules:

| ***Parameter Name*** | **Value** | **Data type**<br>**Size in bytes**<br>**R/W** | **Description** |
|---|---|---|---|
| *GCS* | 0...255 | BYTE<br>1<br>R/- | Group Cyclic Status<br>Bit 0: Data quality<br>Bit 1: General module status<br>Bit 2: I/O status<br>Bit 3: N/A<br>Bit 4: Output status<br>Bit 5: Advisory status<br>Bit 6: N/A<br>Bit 7: Data freshness<br>**NOTE:** For more information, refer to Modicon Edge I/O - Diagnostic Data - User Guide. |
| *ChannelHealth0_7*(1) | 0...255 | BYTE<br>1<br>R/- | Bit 0...7 = Status of device 0...7<br>• Bit = FALSE: The device returns invalid data or the device is not responding.<br>• Bit = TRUE: The device returns valid data or the device is not configured. |
| *ChannelHealth8_15*(1) | 0...255 | BYTE<br>1<br>R/- | Bit 0...7 = Status of device 8...15<br>• Bit = FALSE: The device returns invalid data or the device is not responding.<br>• Bit = TRUE: The device returns valid data or the device is not configured. |
| *ChannelHealth16_23*(1) | 0...255 | BYTE<br>1<br>R/- | Bit 0...7 = Status of device 16...23<br>• Bit = FALSE: The device returns invalid data or the device is not responding.<br>• Bit = TRUE: The device returns valid data or the device is not configured. |
| *ChannelHealth24_31*(1) | 0...255 | BYTE<br>1<br>R/- | Bit 0...7 = Status of device 24...31<br>• Bit = FALSE: The device returns invalid data or the device is not responding.<br>• Bit = TRUE: The device returns valid data or the device is not configured. |
| (1) This parameter is not part of the implicit data if the optimized I/O profile is selected. | | | |

The following table presents the input implicit data for the Modbus serial devices connected to the NTSFMB0120/NTSFMB0120H modules:

| ***Parameter Name*** | **Value** | **Data type**<br>**Size in bytes**<br>**R/W** | **Description** |
|---|---|---|---|
| *IProcessData* | - | BYTE<br>0...1024<br>R/- | Process data combined from the Modbus channels of a serial device |

The following table presents the output implicit data for the NTSFMB0120/ NTSFMB0120H modules:

| ***Parameter Name*** | **Value** | **Data type**<br>**Size in bytes**<br>**R/W** | **Description** |
|---|---|---|---|
| *RestartCh0_7* | 0...255 | BYTE<br>1<br>R/W | On a rising edge, restarts the communication with the Modbus serial device 0...7.<br>Bit 0...7 = Restart request of device 0...7 |
| *RestartCh8_15* | 0...255 | BYTE<br>1<br>R/W | On a rising edge, restarts the communication with the connected device 8...15.<br>Bit 0...7 = Restart request of device 8...15 |
| *RestartCh16_23* | 0...255 | BYTE<br>1<br>R/W | On a rising edge, restarts the communication with the connected device 16...23.<br>Bit 0...7 = Restart request of device 16...23 |
| *RestartCh24_31* | 0...255 | BYTE<br>1<br>R/W | On a rising edge, restarts the communication with the connected device 24...31.<br>Bit 0...7 = Restart request of device 24...31 |

The following table presents the output implicit data for the Modbus serial devices connected to the NTSFMB0120/NTSFMB0120H modules:

| ***Parameter Name*** | **Value** | **Data type**<br>**Size in bytes**<br>**R/W** | **Description** |
|---|---|---|---|
| *QProcessData* | - | BYTE<br>0...1024<br>R/W | Process data combined from the Modbus channels of a serial device |

# Explicit Data

The following table presents the explicit data for the Modbus serial devices connected to the NTSFMB0120/NTSFMB0120H modules:

| ***Parameter Name*** | **Value** | **Data type**<br>**Size in bytes**<br>**R/W** | **Description** |
|---|---|---|---|
| *Device State* | 0: Reserved<br>1: Initial state<br>2: The initialization commands are being executed.<br>3: A communication interruption occurs during initialization.<br>4: The Modbus channels are being started.<br>5: The Modbus channels are in operation.<br>6: A communication interruption occurs during operation.<br>7...255: Reserved | BYTE<br>1<br>R/- | Modbus serial device state<br>**NOTE:** In the case of *Device State* equals 6, restart the communication with the connected device by sending a rising edge on the corresponding Bit of the parameter *RestartCh0_7*, *RestartCh8_15*, *RestartCh16_23*, or *RestartCh24_31*. |
| *Start_Stop_Scanner* | FALSE<br>TRUE* | BOOLEAN<br>R/W | Selects whether the scanner is enabled or disabled:<br>• FALSE: The scanner is enabled.<br>• TRUE: The scanner is disabled. |
| *Start_Stop_Channels* | 0...4,294,967,295* | UINT32<br>R/W | Sets whether Modbus serial devices are enabled or disabled.<br>Bit 0...31 = Status of device 0...31:<br>• Bit = FALSE: The device is disabled.<br>• Bit = TRUE: The device is enabled. |
| * Parameter default value | | | |

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## I



## S

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