Modicon Edge I/O NTS

Discrete Modules

User Guide

Original instructions

www.se.com

Schneider Electric
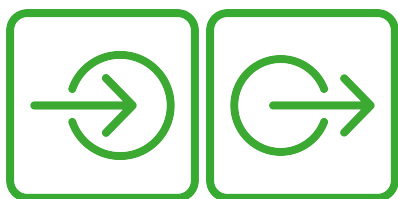
Legal Information

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 Book

Document Scope

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

Validity Note

This document has been updated for the release of Modicon Edge I/O NTS discrete modules firmware V1.0.0.

For product compliance and environmental information (RoHS, REACH, PEP, EOLI, etc.), go to www.se.com/ww/en/work/support/green-premium/.

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.

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 - Analog Modules - User Guide	EIO0000005246 (ENG)
Modicon Edge I/O NTS - Counting Modules - User Guide	EIO0000005262 (ENG)
Modicon Edge I/O NTS - Field Device Master Modules - User Guide	EIO0000005270 (ENG)

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

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.

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. General principles for design.
EN 61496-1:2020	Safety of machinery: Electro-sensitive protective equipment. 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.

General Overview

The range of Modicon Edge I/O NTS discrete modules includes:

- Discrete Input Modules, page 14
- Discrete Output Modules, page 14

NOTE: References with an H are hardened devices, suitable for harsh environments.

NOTE: The terminal blocks are purchased separately. The compatible terminal block references is printed on the front of the module.

Discrete Input Modules

The following table shows the digital input modules, with the corresponding description and terminal type:

Reference	Number of Channels	Channel Type	Voltage	Terminal Type / Pitch
NTSDDI0602, page 16	6	Sink inputs	24 Vdc	Removable screw/spring terminal block / 3.81 mm
NTSDDI0802X, page 27	8	Sink inputs	24 Vdc	Removable screw/spring terminal block / 5 mm
NTSDDI1602, page 40	16	Sink inputs	24 Vdc	Removable screw/spring terminal block / 3.81 mm
NTSDDI1602X, page 52 / NTSDDI1602XH, page 52	16	Sink inputs	24 Vdc	Removable screw/spring terminal block / 5 mm

Discrete Output Modules

The following table shows the digital output modules, with the corresponding description and terminal type:

Reference	Number of Channels	Channel Type	Voltage Current	Terminal Type / Pitch
NTSDDO0212H, page 65	2	Isolated source outputs	24 Vdc 2 A / channel	Removable screw/spring terminal block / 5 mm
NTSDDO0802, page 76	8	Source outputs	24 Vdc, external supply 2 A / channel, 8 A / module	Removable screw/spring terminal block / 5 mm
NTSDDO0802X, page 86	8	Source outputs	24 Vdc 500 mA / channel	Removable screw/spring terminal block / 5 mm
NTSDRA0615, page 96	6	Isolated normally open relay outputs	5...125 Vdc 24...250 Vac 2 A / channel	Removable screw/spring terminal block / 5 mm

Discrete Input Modules

What's in This Part

NTSDDI0602 Discrete Input Module, 6 Inputs, 24 Vdc, Sink, 1-/2-/3-wire

What's in This Chapter

NTSDDI0602 Presentation

Main Characteristics

The following table describes the main characteristics of the NTSDDI0602 input module:

Main Characteristics	Value
Product or component type	Discrete DC input module
Number of input channels	6
Groups of input channels	1 group of six channels
Nominal input voltage	24 Vdc
Input logic type	Sink
Operating mode	Synchronous and isochronous

Purchasing Information

The following figure shows the elements of the Modicon Edge I/O NTS NTSDDI0602 input module:

Number	Reference	Description
1	NTSDDI0602K	Base + Module (kit) **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	NTSDDI0602	Discrete Input Module, 6 Inputs, 24 Vdc, Sink, 1-/2-/3-wire
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 NTSDDI0602 status LEDs:

The following table describes the status of LEDs:

R (Green)	E (Red)	Channel (Green)	Description
Initialization and non-operational states			
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.
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.
ON	-	ON	Indicates that the channel is activated.
ON	-	OFF	Indicates that the channel is deactivated.
ON	Regular Flash	OFF	Indicates: • 24 Vdc field power error detection. • Sensor power supply error detection.
ON	Regular Flash	Regular Flash	Indicates: • Broken wire detection. • Short circuit detection.

This timing diagram shows the difference between the fast flash, regular flash and single flash:

NTSDDI0602 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:
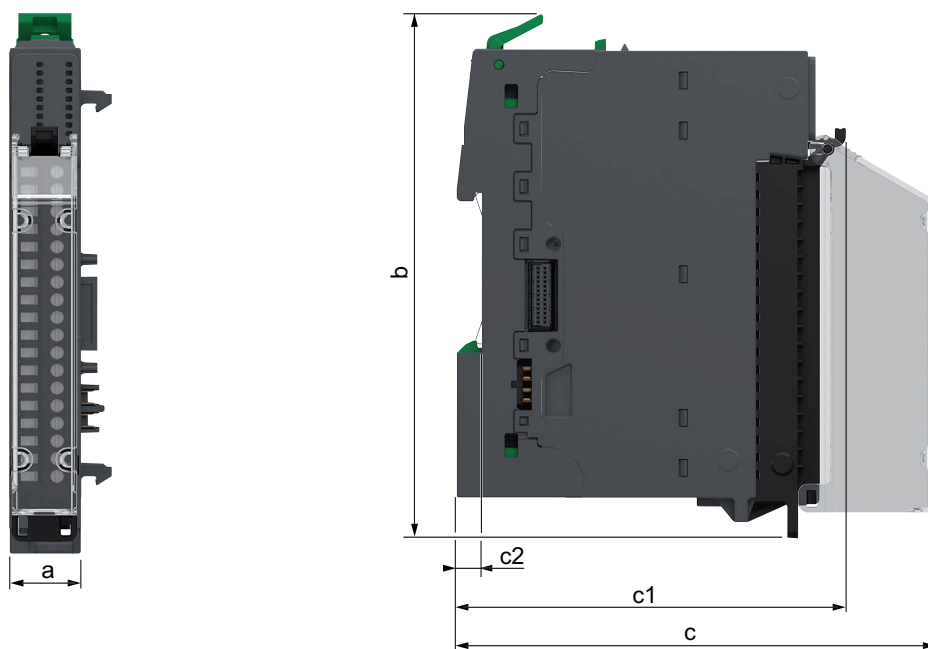
a: 15 mm (0.59 in)
b: 116.6 mm (4.57 in)
c: 107.5 mm (4.21 in)
c1: 88.2 mm (3.46 in)
c2: 5.6 mm (0.2 in)

Weight

- NTSDDI0602: 46 g (1.63 oz)
- NTSDDI0602K: 73 g (2.58 oz)

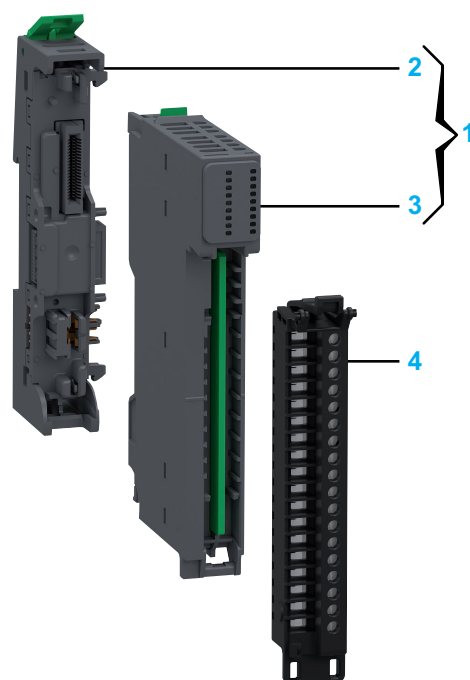# General Characteristics

The following table describes the general characteristics of the NTSDDI0602 input module:

Characteristics		Value
Input compatibility		Type 3 according to IEC 61131-2
Field power supplied voltage requirements		• From the 24 Vdc field power • From a common distribution module
Power supplied voltage range		20.4...28.8 Vdc
Bus current consumption		31.2 mA
Field current consumption for sensors, per module		510.1 mA
Power dissipation		1.40 W
Maximum cable length	Shielded	1,000 m (3,280 ft)
	Unshielded	600 m (1,968 ft)
Isolation voltage	Between channels	No
	Between groups	No
	Between channel and bus	1,500 Vac
	Between channel and functional earth ground	1,500 Vac
Hot swap supported		Yes
Operating ambient temperature derating		No derating

Input Characteristics

The table below describes the input characteristics of the NTSDDI0602 input module:

Characteristics		Value
Input wiring mode		1-/2-/3-wire
Nominal input current		2.5 mA
Input voltage	Logic state 1	11…30 Vdc
	Logic state 0	< 5 Vdc
Input current	Logic state 1	2 mA minimum
	Logic state 0	1.5 mA maximum
Input impedance		9.6 kOhm
Response time on input	Logic state 1 to logic state 0	< 125 µs
	Logic state 0 to logic state 1	< 125 µs
Input filter time	Hardware	< 100 µs
	Software	Configurable
Paralleling of inputs		Yes
Input protection		• Over voltage protection • Overcurrent protection on sensor supply • Reverse polarity protection
Input diagnostic		No
Monitoring functions		Power supply monitoring (under voltage, power absent)

NTSDDI0602 Wiring

Wiring Rules

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

Wiring Diagram

The following figure illustrates an example of 2-/3-wire connection inputs with the internal power supply:

DI0	1
24 Vout	2
0 Vout	3
DI1	4
24 Vout	5
0 Vout	6
DI2	7
24 Vout	8
0 Vout	9
DI3	10
24 Vout	11
0 Vout	12
DI4	13
24 Vout	14
0 Vout	15
DI5	16
24 Vout	17
0 Vout	18
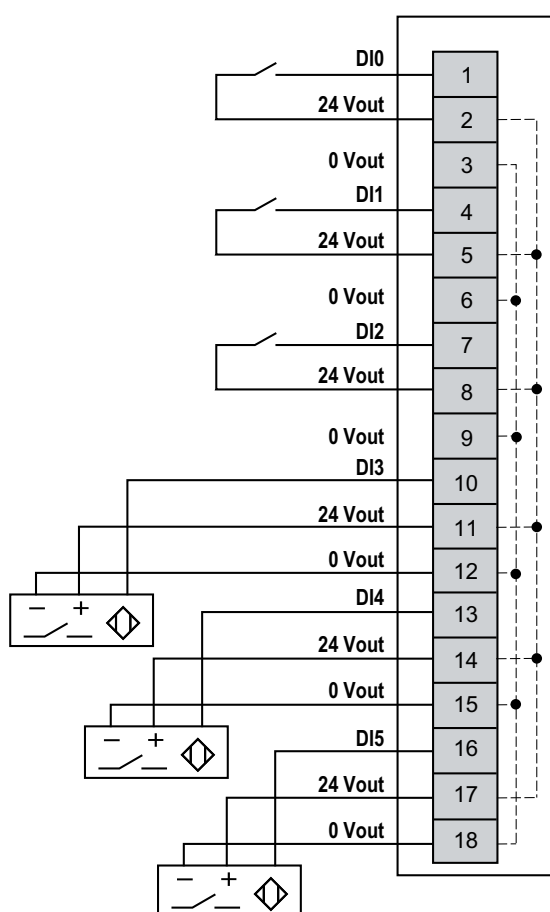
NTSDDI0602 Parameters

Parameters Description

Configurable Parameters

The following table presents the configurable parameters for the NTSDDI0602 module:

Displayed Name *Parameter Name*	Value	Data type	Description
Device Mode *DeviceMode*	0: **Normal*** 1: **Optional** 2: **Virtual reserved**	ENUM	Allows you to select the device mode: • **Normal**: The module is part of the software configuration and is physically connected on the cluster. • **Optional**: The module is part of the software configuration. A dummy module or the configured module must be physically installed on the cluster. Whether either module is present does not cause a configuration error. • **Virtual reserved**: The module is part of the software configuration. A dummy module must be physically installed on the cluster. If the virtual module is physically installed on the cluster, a configuration error is detected.
Diag Enable Sensor Power Supply *DiagEnableSensorPower-Supply*[1]	**FALSE** **TRUE***	BOOL	Enables or disables the sensor power supply diagnostics.
* Parameter default value			
[1] Online modification is allowed.			

The following table presents the configurable parameters for the channels of the NTSDDI0602 module:

Displayed Name *Parameter Name*	Value	Data type	Description
Channel Enabled *ChannelEnable*[1]	**TRUE*** **FALSE**	BOOL	Determines whether a channel is enabled or disabled.
Latch *Latch*[1]	0: **No*** 1: **Rising Edge - Automatic Acknowledge** 2: **Falling Edge - Automatic Acknowledge** 3: **Both Edges - Automatic Acknowledge** 4: **Rising Edge - Manual Acknowledge** 5: **Falling Edge - Manual Acknowledge** 6: **Both Edges - Manual Acknowledge**	ENUM	Allows incoming pulses with a pulse width shorter than the network interface module scan time to be captured and recorded. For more information, refer to Latch, page 108.
Filter *Filter*[1]	**Range: 0...20 ms** **Interval: 0.1 ms** **1.0 ms***	FLOAT	Allows reducing the effect of bounce on the input. Changes to the signal are only detected if the pulse width of the input signal is longer than the filter time.
* Parameter default value			
[1] Online modification is allowed.			

Implicit Data

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

Parameter Name	Value	Data type Size in bytes R/W	Description
GCS	0...255	BYTE 1 R/-	Group Cyclic Status Bit 0: Data quality Bit 1: General module status Bit 2: I/O status Bit 3: N/A Bit 4: N/A Bit 5: Advisory status Bit 6: N/A Bit 7: Data freshness
ChannelHealth0_7[1]	0...255	BYTE 1 R/-	Bit 0...7 = Status of channel 0...7 • Bit = FALSE: Channel is invalid or not present. • Bit = TRUE: Channel is valid or disabled.
IValue0_7	0...255	BYTE 1 R/-	Input value of the channels (Bit field) Bit 0...7 = Value of channel 0...7 **NOTE:** Unused bits are reserved.

[1] This parameter is not part of the implicit data in case of the optimized I/O profile is selected.

The following table presents the output implicit data for the module:

Parameter Name	Value	Data type Size in bytes R/W	Description
LatchAck0_7	0...255	BYTE 1 R/W	At rising edge, resets the latch value of the input on the channel 0...7. Bit 0...7 = Value of channel 0...7

Explicit Data

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

Parameter Name	Value	Data type Size in bytes R/W	Description
ChannelFault	0...255	BYTE R/-	Provides the following detected error on the channel: Bit 3: Sensor power supply error detected Bit 4: Internal power supply error detected **NOTE:** Unused bits are reserved.
IValue	TRUE = Channel is in logic state 1 FALSE = Channel is in logic state 0	BOOL R/-	Input value of the channel.
LatchAck	-	BOOL R/W	At rising edge, resets the latch value of the input on the channel.

NTSDDI0802X Discrete Input Module, 8 Inputs, 24 Vdc, Sink, 1-/2-wire

What's in This Chapter

NTSDDI0802X Presentation

Main Characteristics

The following table describes the main characteristics of the NTSDDI0802X input module:

Main Characteristics	Value
Product or component type	Discrete DC input module
Number of Input channels	8
Groups of channels	1 group of 8 channels
Nominal input voltage	24 Vdc
Input logic type	Sink
Operating mode	Synchronous and isochronous

Purchasing Information

The following figure shows the elements of the Modicon Edge I/O NTS NTSDDI0802X input modules:

Number	Reference	Description
1	NTSDDI0802XK	Base + Module (kit)
		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	NTSDDI0802X	Discrete Input Module, 8 Inputs, 24 Vdc, Sink, 1-/2-wire
4	NTSXTB18200XH	Spring Terminal Block, 18 Points, 5 mm Pitch, Without Cover, use on High Height Module (X), Hardened
	NTSXTB18201XH	Spring Terminal Block, 18 Points, 5 mm Pitch, With Cover, use on High Height Module (X), Hardened
	NTSXTB18000XH	Screw Terminal Block, 18 Points, 5 mm Pitch, Without Cover, use on High Height Module (X), Hardened
	NTSXTB18001XH	Screw Terminal Block, 18 Points, 5 mm Pitch, With Cover, use on High Height Module (X), 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 NTSDDI0802X status LEDs:

The following table describes the status of LEDs:

R (Green)	E (Red)	Channel (Green)	Description
Initialization and non-operational states			
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.
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.
ON	-	ON	Indicates that the channel is activated.
ON	-	OFF	Indicates that the channel is deactivated.
ON	Regular Flash	OFF	Indicates: • 24 Vdc field power error detection. • Sensor power supply error detection.
ON	Regular Flash	Regular Flash	Indicates: • Broken wire detection. • Short circuit detection.

This timing diagram shows the difference between the fast flash, regular flash and single flash:

NTSDDI0802X Characteristics

Overview

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

<table>
<tr><td align="center">⚠ WARNING</td></tr>
<tr><td>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.</td></tr>
</table>

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:
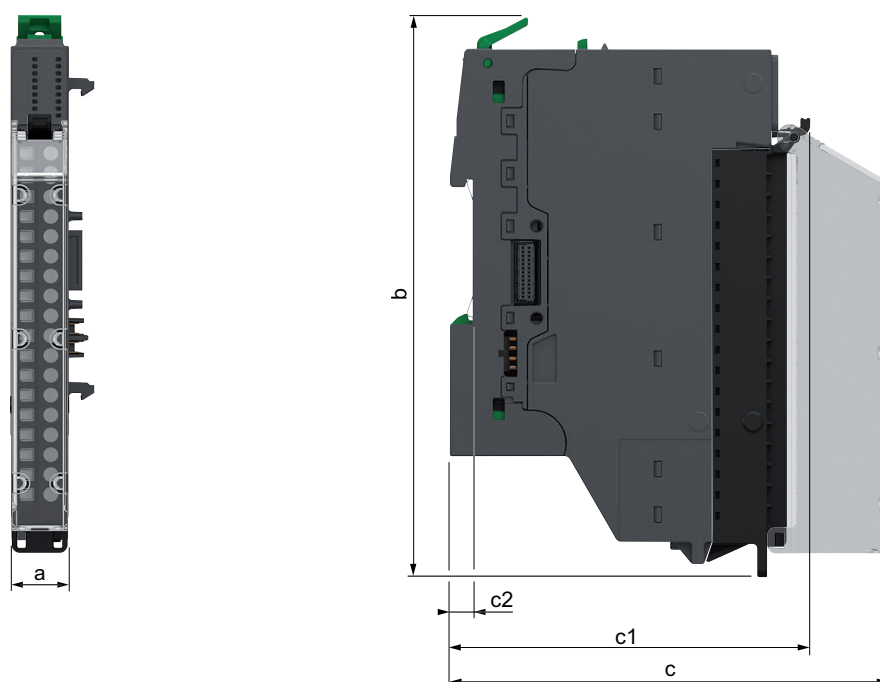
a: 15 mm (0.59 in)
b: 137.6 mm (5.39 in)
c: 107.5 mm (4.21 in)
c1: 88.2 mm (3.46 in)
c2: 5.6 mm (0.2 in)

Weight

- NTSDDI0802X: 49 g (1.73 oz)
- NTSDDI0802XK: 77 g (2.72 oz)

General Characteristics

The following table describes the general characteristics of the NTSDDI0802X input module:

Characteristics		Value
Input compatibility		Type 3 according to IEC 61131-2
Field power supplied voltage requirements		• From the 24 Vdc field power • From a common distribution module
Power supplied voltage range		20.4...28.8 Vdc
Bus current consumption		32.4 mA
Field current consumption for sensors, per module		210.1 mA
Power dissipation		1.60 W
Maximum cable length	Shielded	1,000 m (3,280 ft)
	Unshielded	600 m (1,968 ft)
Isolation voltage	Between channels	No
	Between groups	No
	Between channel and bus	1,500 Vac
	Between channel and functional earth ground	1,500 Vac
Hot swap supported		Yes
Operating ambient temperature derating		No derating

Input Characteristics

The table below describes the input characteristics of the NTSDDI0802X input module:

Characteristics		Value
Input wiring mode		1-wire, 2-wire
Nominal input current		2.5 mA
Input voltage	Logic state 1	11…30 Vdc
	Logic state 0	< 5 Vdc
Input current	Logic state 1	2 mA minimum
	Logic state 0	1.5 mA maximum
Input impedance		9.6 kOhm
Response time on input	Logic state 1 to logic state 0	< 60 µs
	Logic state 0 to logic state 1	< 90 µs
Input filter time	Hardware	< 100 µs
	Software	Configurable
Paralleling of inputs		Yes
Input protection		• Over voltage protection • Overcurrent protection on sensor supply • Reverse polarity protection
Input diagnostic		No
Monitoring functions		Power supply monitoring (under voltage, power absent)

NTSDDI0802X Wiring

Wiring Rules

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

Wiring Diagram

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.

The following figure illustrates an example of 1-wire connection inputs with common module NTSPCM1600H:

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 an example of 2-wire connection inputs with the internal power supply:

Pin	Label
1	24 Vout
2	DI0
3	24 Vout
4	DI1
5	24 Vout
6	DI2
7	24 Vout
8	DI3
9	24 Vout
10	DI4
11	24 Vout
12	DI5
13	24 Vout
14	DI6
15	24 Vout
16	DI7
17	0 Vout
18	0 Vout

NTSDDI0802X Parameters

Parameters Description

Configurable Parameters

The following table presents the configurable parameters for the NTSDDI0802X module:

Displayed Name / Parameter Name	Value	Data type	Description
Device Mode / *DeviceMode*	0: **Normal*** 1: **Optional** 2: **Virtual reserved**	ENUM	Allows you to select the device mode: • **Normal**: The module is part of the software configuration and is physically connected on the cluster. • **Optional**: The module is part of the software configuration. A dummy module or the configured module must be physically installed on the cluster. Whether either module is present does not cause a configuration error. • **Virtual reserved**: The module is part of the software configuration. A dummy module must be physically installed on the cluster. If the virtual module is physically installed on the cluster, a configuration error is detected.
Diag Enable Sensor Power Supply / *DiagEnableSensorPower-Supply*[1]	**FALSE** **TRUE***	BOOL	Enables or disables the sensor power supply diagnostics.
* Parameter default value		
[1] Online modification is allowed.		

The following table presents the configurable parameters for the channels of the NTSDDI0802X module:

Displayed Name / Parameter Name	Value	Data type	Description
Channel Enabled / *ChannelEnable*[1]	**TRUE*** **FALSE**	BOOL	Determines whether a channel is enabled or disabled.
Latch / *Latch*[1]	0: **No*** 1: **Rising Edge - Automatic Acknowledge** 2: **Falling Edge - Automatic Acknowledge** 3: **Both Edges - Automatic Acknowledge** 4: **Rising Edge - Manual Acknowledge** 5: **Falling Edge - Manual Acknowledge** 6: **Both Edges - Manual Acknowledge**	ENUM	Allows incoming pulses with a pulse width shorter than the network interface module scan time to be captured and recorded. For more information, refer to Latch, page 108.
Filter / *Filter*[1]	**Range: 0...20 ms** **Interval: 0.1 ms** **1.0 ms***	FLOAT	Allows reducing the effect of bounce on the input. Changes to the signal are only detected if the pulse width of the input signal is longer than the filter time.
* Parameter default value		
[1] Online modification is allowed.		

Implicit Data

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

Parameter Name	Value	Data type Size in bytes R/W	Description
GCS	0...255	BYTE 1 R/-	Group Cyclic Status Bit 0: Data quality Bit 1: General module status Bit 2: I/O status Bit 3: N/A Bit 4: N/A Bit 5: Advisory status Bit 6: N/A Bit 7: Data freshness
ChannelHealth0_7[1]	0...255	BYTE 1 R/-	Bit 0...7 = Status of channel 0...7 • Bit = FALSE: Channel is invalid or not present. • Bit = TRUE: Channel is valid or disabled.
IValue0_7	0...255	BYTE 1 R/-	Input value of the channels (Bit field) Bit 0...7 = Value of channel 0...7 **NOTE:** Unused bits are reserved.
[1] This parameter is not part of the implicit data in case of the optimized I/O profile is selected.			

The following table presents the output implicit data for the module:

Parameter Name	Value	Data type Size in bytes R/W	Description
LatchAck0_7	0...255	BYTE 1 R/W	At rising edge, resets the latch value of the input on the channel 0...7. Bit 0...7 = Value of channel 0...7

Explicit Data

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

Parameter Name	Value	Data type Size in bytes R/W	Description
ChannelFault	0...255	BYTE R/-	Provides the following detected error on the channel: Bit 3: Sensor power supply error detected Bit 4: Internal power supply error detected **NOTE:** Unused bits are reserved.
IValue	TRUE = Channel is in logic state 1 FALSE = Channel is in logic state 0	BOOL R/-	Input value of the channel.
LatchAck	–	BOOL R/W	At rising edge, resets the latch value of the input on the channel.

NTSDDI1602 Discrete Input Module, 16 Inputs, 24 Vdc, Sink, 1-wire

What's in This Chapter

NTSDDI1602 Presentation

Main Characteristics

The following table describes the main characteristics of the NTSDDI1602 input module :

Main Characteristics	Value
Product or component type	Discrete DC input module
Number of Input channels	16
Groups of channels	1 group of 16 channels
Nominal input voltage	24 Vdc
Input logic type	Sink
Operating mode	Synchronous and isochronous

Purchasing Information

The following figure shows the elements of the Modicon Edge I/O NTS
NTSDDI1602 input module:
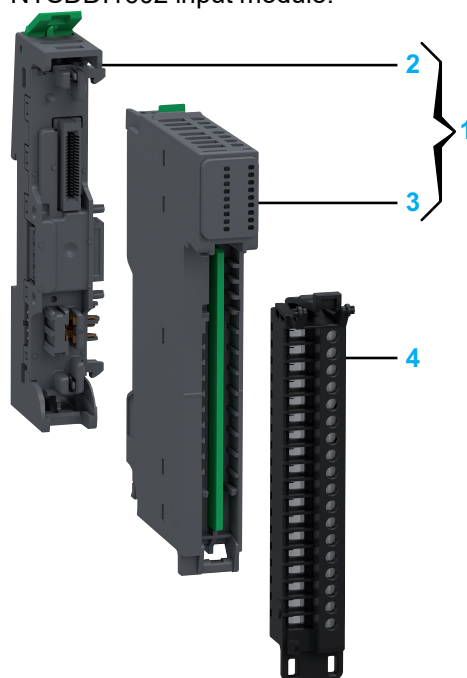
Number	Reference	Description
1	NTSDDI1602K	Base + Module (kit) **NOTE:** The module and its corresponding base can be purchased as a kit.
2	NTSXBA0100H	Spare Base, 1 Slot, for Input/Output Common or Expert Module, Hardened
3	NTSDDI1602	Discrete Input Module, 16 Inputs, 24 Vdc, Sink, 1-wire
4	NTSXTB18200H	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 NTSDDI1602 status LEDs:

The following table describes the status of LEDs:

R (Green)	E (Red)	Channel (Green)	Description
Initialization and non-operational states			
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.
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.
ON	-	ON	Indicates that the channel is activated.
ON	-	OFF	Indicates that the channel is deactivated.
ON	Regular Flash	OFF	Indicates: • 24 Vdc field power error detection. • Sensor power supply error detection.

This timing diagram shows the difference between the fast flash, regular flash and single flash:

NTSDDI1602 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:
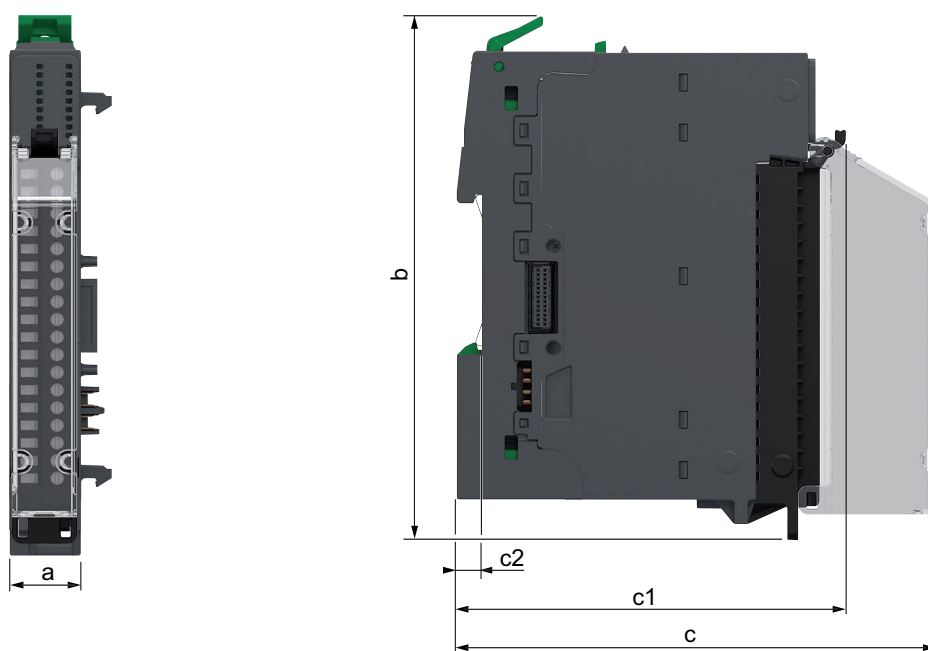
a: 15 mm (0.59 in)
b: 116.6 mm (4.57 in)
c: 107.5 mm (4.21 in)
c1: 88.2 mm (3.46 in)
c2: 5.6 mm (0.2 in)

Weight

- NTSDDI1602: 46 g (1.63 oz)
- NTSDDI1602K: 73 g (2.58 oz)

General Characteristics

The following table describes the general characteristics of the NTSDDI1602 input module:

Characteristics		Value	
Input compatibility		Type 3 according to IEC 61131-2	
Field power supplied voltage requirements		- From a common distribution module - From an external power supply (0 Vdc connected to the field power 0 Vdc).	
Power supplied voltage range		20.4...28.8 Vdc	
Bus current consumption		40.8 mA	
Field current consumption for sensors, per module		2.9 mA	
Power dissipation		2.20 W	
Maximum cable length	Shielded	1,000 m (3,280 ft)	
	Unshielded	600 m (1,968 ft)	
Isolation voltage	Between channels	No	
	Between groups	No	
	Between channel and bus	1,500 Vac	
	Between channel and functional earth ground	1,500 Vac	
Hot swap supported		Yes	
Operating ambient temperature derating	Nominal voltage 24 Vdc	Correct mounting position[1]	16 channels: up to 55 °C (131 °F) 12 channels: 55...60 °C (131...140 °F)
		Accepted mounting position[1]	16 channels: up to 50 °C (122 °F) 12 channels: 50...55 °C (122...131 °F)
	Nominal voltage 28.8 Vdc	Correct mounting position[1]	16 channels: up to 50 °C (122 °F) 12 channels: 50...55 °C (122...131 °F) 8 channels: 55...60 °C (131...140 °F)
		Accepted mounting position[1]	16 channels: up to 45 °C (113 °F) 12 channels: 45...50 °C (113...122 °F) 8 channels: 50...55 °C (122...131 °F)
[1] For information about mounting positions, refer to Modicon Edge I/O - System Planning and Installation Guide.			

Input Characteristics

The table below describes the input characteristics of the NTSDDI1602 input module:

Characteristics		Value
Input wiring mode		1-wire
Nominal input current		2.5 mA
Input voltage	Logic state 1	11…30 Vdc
	Logic state 0	< 5 Vdc
Input current	Logic state 1	2 mA minimum
	Logic state 0	1.5 mA maximum
Input impedance		9.6 kOhm
Response time on input	Logic state 1 to logic state 0	< 125 µs
	Logic state 0 to logic state 1	< 125 µs
Input filter time	Hardware	< 100 µs
	Software	Configurable
Paralleling of inputs		Yes
Input protection		• Over voltage protection • Overcurrent protection on sensor supply • Reverse polarity protection
Input diagnostic		No
Monitoring functions		Power supply monitoring (under voltage, power absent)

NTSDDI1602 Wiring

Wiring Rules

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

Wiring Diagram

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.

The following figure illustrates an example of 1-wire connection inputs with an external power supply:

External Fuse: Type F, 0.5 A, 24 Vdc is mandatory and must be chosen in compliance with IEC60269 standard.

The following figure illustrates an example of 1-wire conection inputs with common module NTSPCM1600H:
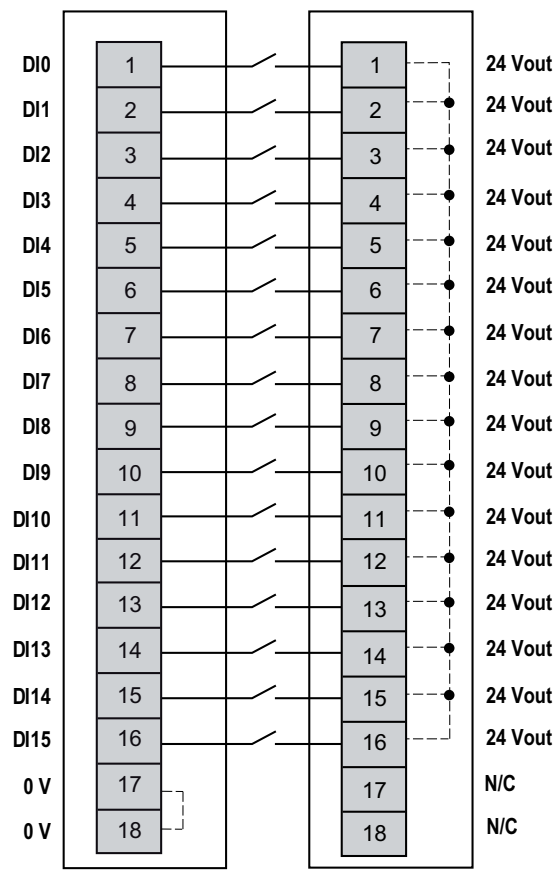
DI0	1		1	24 Vout
DI1	2		2	24 Vout
DI2	3		3	24 Vout
DI3	4		4	24 Vout
DI4	5		5	24 Vout
DI5	6		6	24 Vout
DI6	7		7	24 Vout
DI7	8		8	24 Vout
DI8	9		9	24 Vout
DI9	10		10	24 Vout
DI10	11		11	24 Vout
DI11	12		12	24 Vout
DI12	13		13	24 Vout
DI13	14		14	24 Vout
DI14	15		15	24 Vout
DI15	16		16	24 Vout
0 V	17		17	N/C
0 V	18		18	N/C

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.

NTSDDI1602 Parameters

Parameters Description

Configurable Parameters

The following table presents the configurable parameters for the NTSDDI1602 module:

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

The following table presents the configurable parameters for the channels of the NTSDDI1602 module:

Displayed Name *Parameter Name*	Value	Data type	Description
Channel Enabled *ChannelEnable*[1]	**TRUE*** **FALSE**	BOOL	Determines whether a channel is enabled or disabled.
Latch *Latch*[1]	0: **No*** 1: **Rising Edge - Automatic Acknowledge** 2: **Falling Edge - Automatic Acknowledge** 3: **Both Edges - Automatic Acknowledge** 4: **Rising Edge - Manual Acknowledge** 5: **Falling Edge - Manual Acknowledge** 6: **Both Edges - Manual Acknowledge**	ENUM	Allows incoming pulses with a pulse width shorter than the network interface module scan time to be captured and recorded. For more information, refer to Latch, page 108.
Filter *Filter*[1]	**Range: 0...20 ms** **Interval: 0.1 ms** **1.0 ms***	FLOAT	Allows reducing the effect of bounce on the input. Changes to the signal are only detected if the pulse width of the input signal is longer than the filter time.
* Parameter default value			
[1] Online modification is allowed.			

Implicit Data

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

Parameter Name	Value	Data type Size in bytes R/W	Description
GCS	0...255	BYTE 1 R/-	Group Cyclic Status Bit 0: Data quality Bit 1: General module status Bit 2: I/O status Bit 3: N/A Bit 4: N/A Bit 5: Advisory status Bit 6: N/A Bit 7: Data freshness
ChannelHealth0_7[1]	0...255	BYTE 1 R/-	Bit 0...7 = Status of channel 0...7 • Bit = FALSE: Channel is invalid or not present. • Bit = TRUE: Channel is valid or disabled.
ChannelHealth8_15[1]	0...255	BYTE 1 R/-	Bit 0...7 = Status of channel 8...15 • Bit = FALSE: Channel is invalid or not present. • Bit = TRUE: Channel is valid or disabled.
IValue0_7	0...255	BYTE 1 R/-	Input value of the channels (Bit field) Bit 0...7 = Value of channel 0...7 **NOTE:** Unused bits are reserved.
IValue8_15	0...255	BYTE 1 R/-	Input value of the channels (Bit field) Bit 0...7 = Value of channel 8...15 **NOTE:** Unused bits are reserved.
[1] This parameter is not part of the implicit data in case of the optimized I/O profile is selected.			

The following table presents the output implicit data for the module:

Parameter Name	Value	Data type Size in bytes R/W	Description
LatchAck0_7	0...255	BYTE 1 R/W	At rising edge, resets the latch value of the input on the channel 0...7. Bit 0...7 = Value of channel 0...7

Explicit Data

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

Parameter Name	Value	Data type Size in bytes R/W	Description
ChannelFault	0...255	BYTE R/-	Provides the following detected error on the channel: Bit 4: Internal power supply error detected **NOTE:** Unused bits are reserved.
IValue	TRUE = Channel is in logic state 1 FALSE = Channel is in logic state 0	BOOL R/-	Input value of the channel.
LatchAck	–	BOOL R/W	At rising edge, resets the latch value of the input on the channel.

NTSDDI1602X/NTSDDI1602XH Discrete Input Module, 16 Inputs, 24 Vdc, Sink, 1-/2-/3-wire, Standard/Hardened

What's in This Chapter

NTSDDI1602X/NTSDDI1602XH Presentation

Main Characteristics
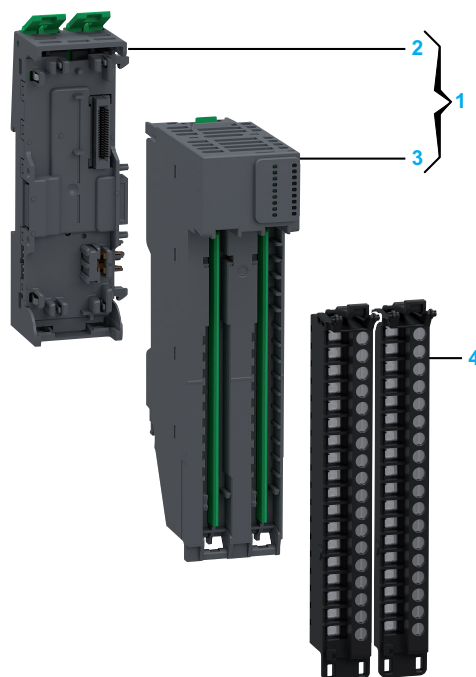
The following table describes the main characteristics of the NTSDDI1602X/ NTSDDI1602XH input modules:

Main Characteristics	Value
Product or component type	Discrete DC input module
Number of Input channels	16
Groups of channels	4 group of 4 channels
Nominal input voltage	24 Vdc
Input logic type	Sink
Operating mode	Synchronous and isochronous

Purchasing Information

The following figure shows the elements of the Modicon Edge I/O NTS
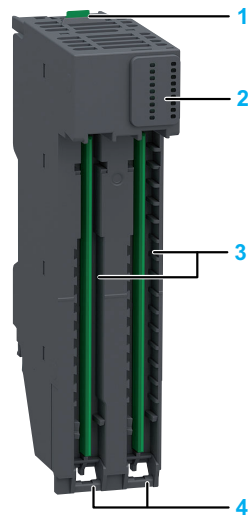NTSDDI1602X/NTSDDI1602XH input modules:

Number	Reference	Description
1	NTSDDI1602XK	Base + Module (kit)
	NTSDDI1602XHK	**NOTE:** The module and its corresponding base can be purchased as a kit.
2	NTSXBA0200H	Spare Base, 2 Slots, for Input/Output Common/Expert/Safety Module, Hardened
3	NTSDDI1602X	Discrete Input Module, 16 Inputs, 24 Vdc, Sink, 1-/2-/3-wire
	NTSDDI1602XH	Discrete Input Module, 16 Inputs, 24 Vdc, Sink, 1-/2-/3-wire, Hardened
4	NTSXTB18200XH	Spring Terminal Block, 18 Points, 5 mm Pitch, Without Cover, use on High Height Module (X), Hardened
	NTSXTB18201XH	Spring Terminal Block, 18 Points, 5 mm Pitch, With Cover, use on High Height Module (X), Hardened
	NTSXTB18000XH	Screw Terminal Block, 18 Points, 5 mm Pitch, Without Cover, use on High Height Module (X), Hardened
	NTSXTB18001XH	Screw Terminal Block, 18 Points, 5 mm Pitch, With Cover, use on High Height Module (X), 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.

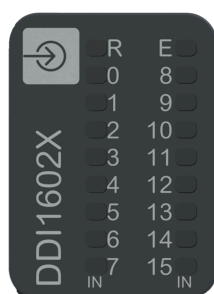# Physical Description

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
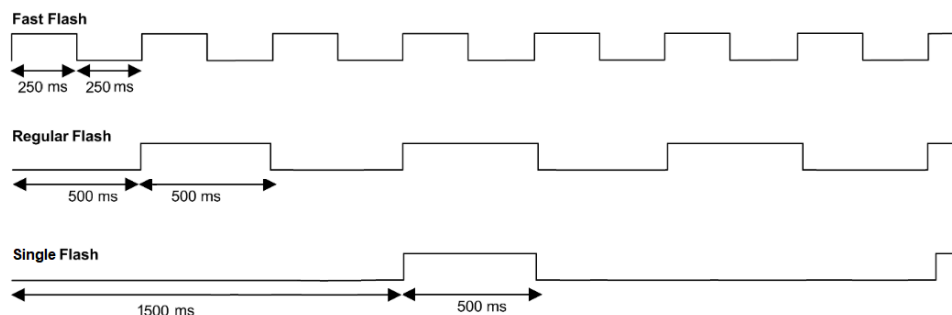**4**: Hinge for the terminal block installation

Status LEDs

The following figure presents the NTSDDI1602X/NTSDDI1602XH status LEDs:

The following table describes the status of LEDs:

R (Green)	E (Red)	Channel (Green)	Description
Initialization and non-operational states			
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.
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.
ON	-	ON	Indicates that the channel is activated.
ON	-	OFF	Indicates that the channel is deactivated.
ON	Regular Flash	OFF	Indicates: • 24 Vdc field power error detection. • Sensor power supply error detection.

This timing diagram shows the difference between the fast flash, regular flash and single flash:

NTSDDI1602X/NTSDDI1602XH 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:
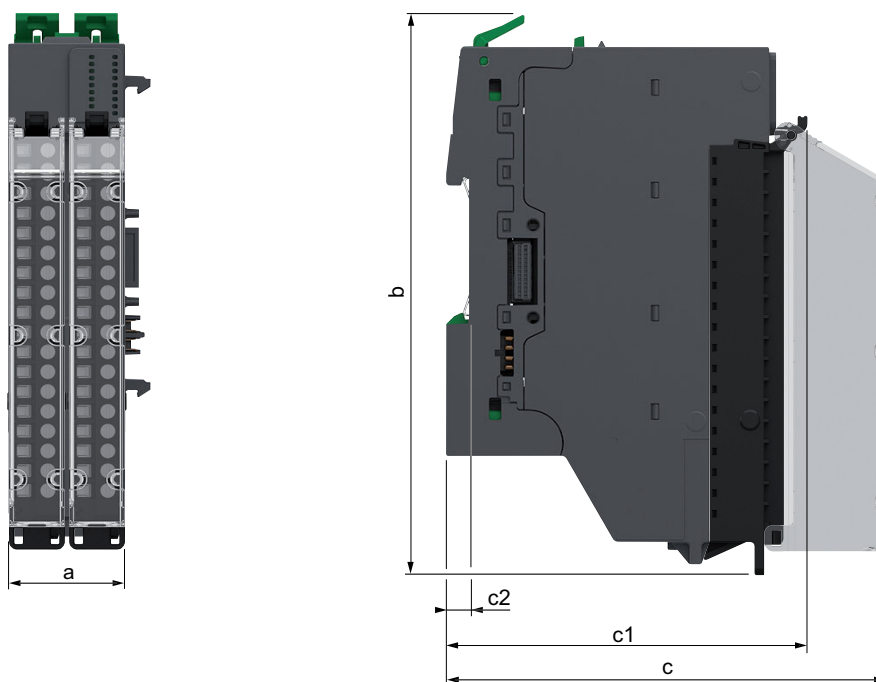
a: 30 mm (1.18 in)
b: 137.6 mm (5.39 in)
c: 107.5 mm (4.21 in)
c1: 88.2 mm (3.46 in)
c2: 5.6 mm (0.2 in)

Weight

- NTSDDI1602X: 84 g (2.97 oz)
- NTSDDI1602XK: 130 g (4.59 oz)
- NTSDDI1602XH: 85 g (3 oz)
- NTSDDI1602XHK: 133 g (4.7 oz)

General Characteristics

The following table describes the general characteristics of the NTSDDI1602X/ NTSDDI1602XH input modules:

Characteristics		Value
Input compatibility		Type 3 according to IEC 61131-2
Field power supplied voltage requirements		• From the 24 Vdc field power • From a common distribution module • From an external power supply (0 Vdc connected to the field power 0 Vdc)
Power supplied voltage range		20.4...28.8 Vdc
Bus current consumption		40.8 mA
Field current consumption for sensors, per module		517.3 mA
Power dissipation		2.52 W
Maximum cable length	Shielded	600 m (1,968 ft)
	Unshielded	600 m (1,968 ft)
Isolation voltage	Between channels	No
	Between groups	No
	Between channel and bus	1,500 Vac
	Between channel and functional earth ground	1,500 Vac
Hot swap supported		Yes
Operating ambient temperature derating		No derating

Input Characteristics

The table below describes the input characteristics of the NTSDDI1602X/
NTSDDI1602XH input modules:

Characteristics		Value
Input wiring mode		1-/2-/3-wire
Nominal input current		2.5 mA
Input voltage	Logic state 1	11…30 Vdc
	Logic state 0	< 5 Vdc
Input current	Logic state 1	2 mA minimum
	Logic state 0	1.5 mA maximum
Input impedance		9.6 kOhm
Response time on input	Logic state 1 to logic state 0	< 60 µs
	Logic state 0 to logic state 1	< 90 µs
Input filter time	Hardware	< 100 µs
	Software	Configurable
Paralleling of inputs		Yes
Input protection		Over voltage protection
Input diagnostic		No
Monitoring functions		Power supply monitoring (under voltage, power absent)

NTSDDI1602X/NTSDDI1602XH Wiring

Wiring Rules

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

Wiring Diagram

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.

This module can support one 3-wire sensor per group of 4 channels (up to 4 3-wire sensors).

Wiring

The following figure illustrates an example of 2-/3-wire connection inputs with the internal powers supply or common module NTSPCM1600H:
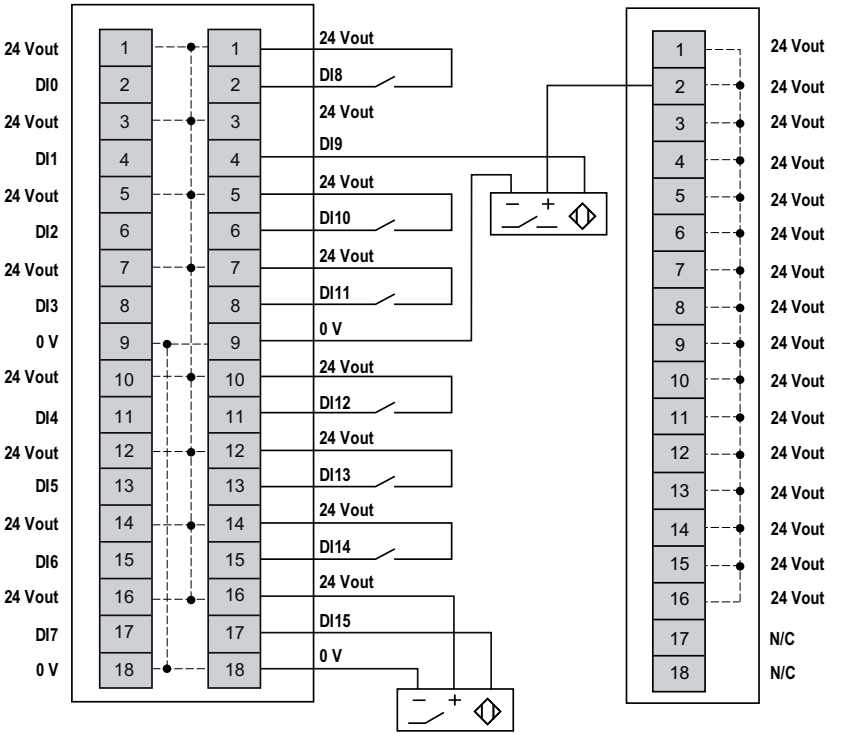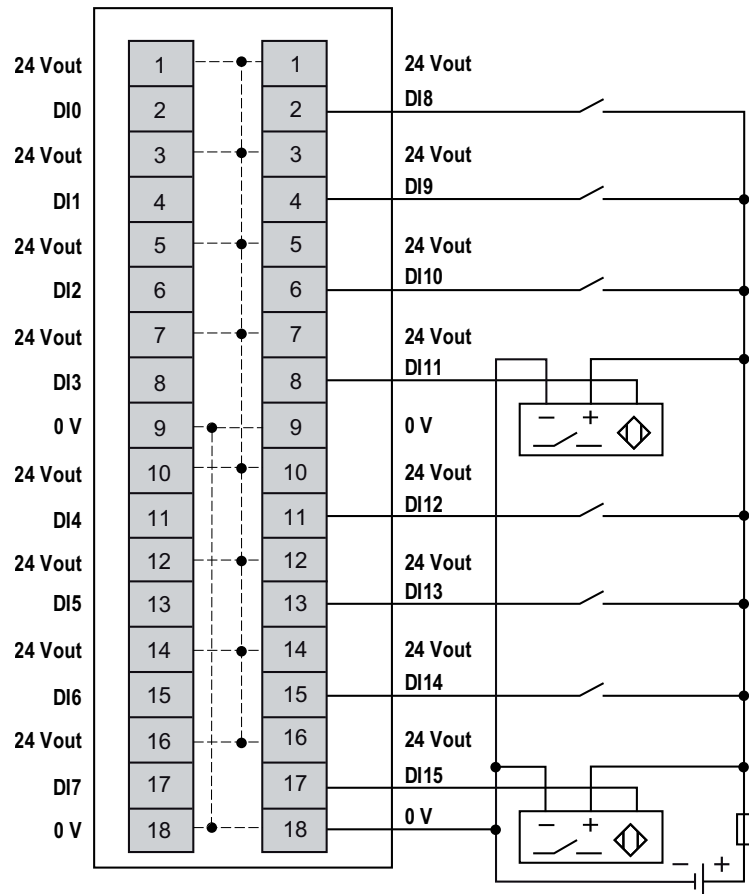

N/C: No connection

⚠ 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 an example of 2-wire connection inputs with an external power supply:

External Fuse: Type F, 0.5 A, 24 Vdc is mandatory and must be chosen in compliance with IEC60269 standard.

NTSDDI1602X/NTSDDI1602XH Parameters

Parameters Description

Configurable Parameters

The following table presents the configurable parameters for the NTSDDI1602X/ NTSDDI1602XH modules:

Displayed Name *Parameter Name*	Value	Data type	Description
Device Mode *DeviceMode*	0: **Normal*** 1: **Optional** 2: **Virtual reserved**	ENUM	Allows you to select the device mode: • **Normal**: The module is part of the software configuration and is physically connected on the cluster. • **Optional**: The module is part of the software configuration. A dummy module or the configured module must be physically installed on the cluster. Whether either module is present does not cause a configuration error. • **Virtual reserved**: The module is part of the software configuration. A dummy module must be physically installed on the cluster. If the virtual module is physically installed on the cluster, a configuration error is detected.
Diag Enable Sensor Power Supply *DiagEnableSensorPower-Supply*(1)	**FALSE** **TRUE***	BOOL	Enables or disables the sensor power supply diagnostics.
* Parameter default value			
(1) Online modification is allowed.			

The following table presents the configurable parameters for the channels of the NTSDDI1602X/NTSDDI1602XH modules:

Displayed Name *Parameter Name*	Value	Data type	Description
Channel Enabled *ChannelEnable*(1)	**TRUE*** **FALSE**	BOOL	Determines whether a channel is enabled or disabled.
Latch *Latch*(1)	0: **No*** 1: **Rising Edge - Automatic Acknowledge** 2: **Falling Edge - Automatic Acknowledge** 3: **Both Edges - Automatic Acknowledge** 4: **Rising Edge - Manual Acknowledge** 5: **Falling Edge - Manual Acknowledge** 6: **Both Edges - Manual Acknowledge**	ENUM	Allows incoming pulses with a pulse width shorter than the network interface module scan time to be captured and recorded. For more information, refer to Latch, page 108.
Filter *Filter*(1)	**Range: 0...20 ms** **Interval: 0.1 ms** **1.0 ms***	FLOAT	Allows reducing the effect of bounce on the input. Changes to the signal are only detected if the pulse width of the input signal is longer than the filter time.
* Parameter default value			
(1) Online modification is allowed.			

Implicit Data

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

Parameter Name	Value	Data type Size in bytes R/W	Description
GCS	0...255	BYTE 1 R/-	Group Cyclic Status Bit 0: Data quality Bit 1: General module status Bit 2: I/O status Bit 3: N/A Bit 4: N/A Bit 5: Advisory status Bit 6: N/A Bit 7: Data freshness
ChannelHealth0_7[1]	0...255	BYTE 1 R/-	Bit 0...7 = Status of channel 0...7 • Bit = FALSE: Channel is invalid or not present. • Bit = TRUE: Channel is valid or disabled.
ChannelHealth8_15[1]	0...255	BYTE 1 R/-	Bit 0...7 = Status of channel 8...15 • Bit = 0: Channel is invalid • Bit = 1: Channel is valid
IValue0_7	0...255	BYTE 1 R/-	Input value of the channels (Bit field) Bit 0...7 = Value of channel 0...7 NOTE: Unused bits are reserved.
IValue8_15	0...255	BYTE 1 R/-	Input value of the channels (Bit field) Bit 0...7 = Value of channel 8...15 NOTE: Unused bits are reserved.
[1] This parameter is not part of the implicit data in case of the optimized I/O profile is selected.			

The following table presents the output implicit data for the module:

Parameter Name	Value	Data type Size in bytes R/W	Description
LatchAck0_7	0...255	BYTE 1 R/W	At rising edge, resets the latch value of the input on the channel 0...7. Bit 0...7 = Value of channel 0...7
LatchAck8_15	0...255	BYTE 1 R/W	At rising edge, resets the latch value of the input on the channel 8...15. Bit 8...15 = Value of channel 8...15

Explicit Data

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

Parameter Name	Value	Data type Size in bytes R/W	Description
ChannelFault	0...255	BYTE R/-	Provides the following detected error on the channel: Bit 3: Sensor power supply error detected Bit 4: Internal power supply error detected **NOTE:** Unused bits are reserved.
IValue	TRUE = Channel is in logic state 1 FALSE = Channel is in logic state 0	BOOL R/-	Input value of the channel.
LatchAck	–	BOOL R/W	At rising edge, resets the latch value of the input on the channel.

Discrete Output Modules

What's in This Part

NTSDDO0212H Discrete Output Module, 2 Isolated Outputs, 24 Vdc, 2 A, Source, Protected, 1-/2-/3-wire, Hardened

What's in This Chapter

NTSDDO0212H Presentation

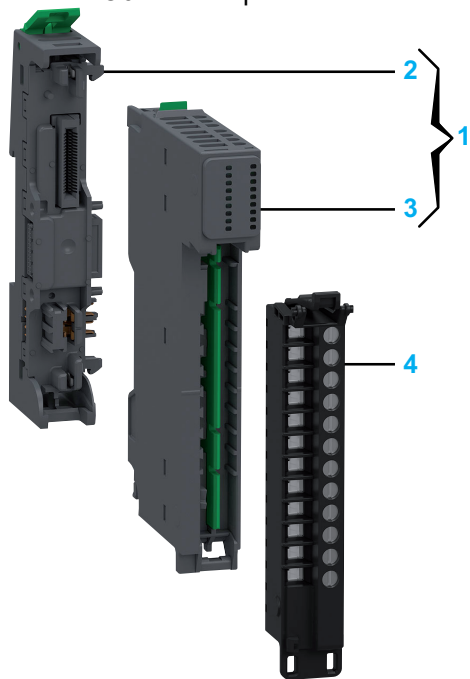## Main Characteristics

The following table describes the main characteristics of the NTSDDO0212H output module:

Main Characteristics	Value
Product or component type	Discrete DC output module
Number of output channels	2
Groups of output channels	2 groups of 1 channel isolated (if externally supplied) or 1 group of 2 channels non isolated (if powered by internal field power supply)
Output logic type	Source
Output voltage	24 Vdc
Operating mode	Synchronous and isochronous

Purchasing Information

The following figure shows the elements of the Modicon Edge I/O NTS
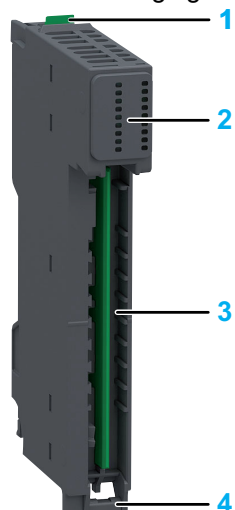NTSDDO0212H output module:

Number	Reference	Description
1	NTSDDO0212HK	Base + Module (kit) **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	NTSDDO0212H	Discrete Output Module, 2 Isolated Outputs, 24 Vdc, 2 A, Source, Protected, 1-/2-/3-wire, 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.
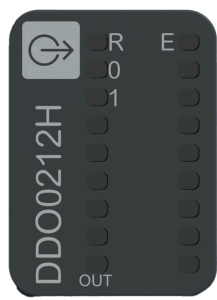
Physical Description

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
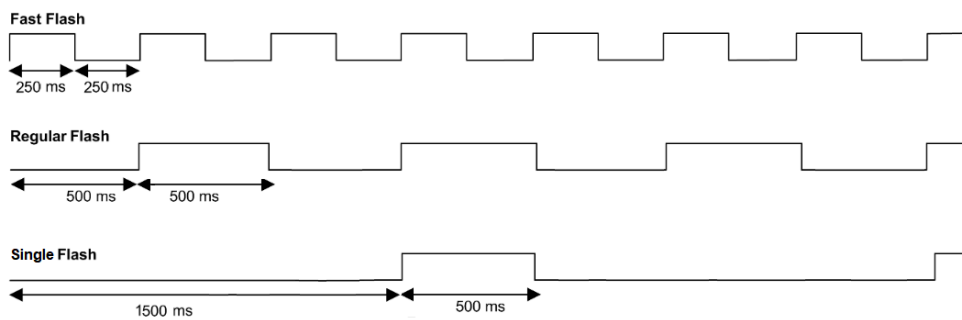**4**: Hinge for the terminal block installation

Status LEDs

The following figure presents the NTSDDO0212H status LEDs:

The following table describes the status of LEDs:

R (Green)	E (Red)	Channel (Green)	Description
Initialization and non-operational states			
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.
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.
ON	-	ON	Indicates that the channel is activated.
ON	-	OFF	Indicates that the channel is deactivated.
ON	Regular Flash	OFF	Indicates: • 24 Vdc field power error detection. • Sensor power supply error detection.
ON	Regular Flash	Regular Flash	Indicates that a short circuit error is detected.

This timing diagram shows the difference between the fast flash, regular flash and single flash:

NTSDDO0212H 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:
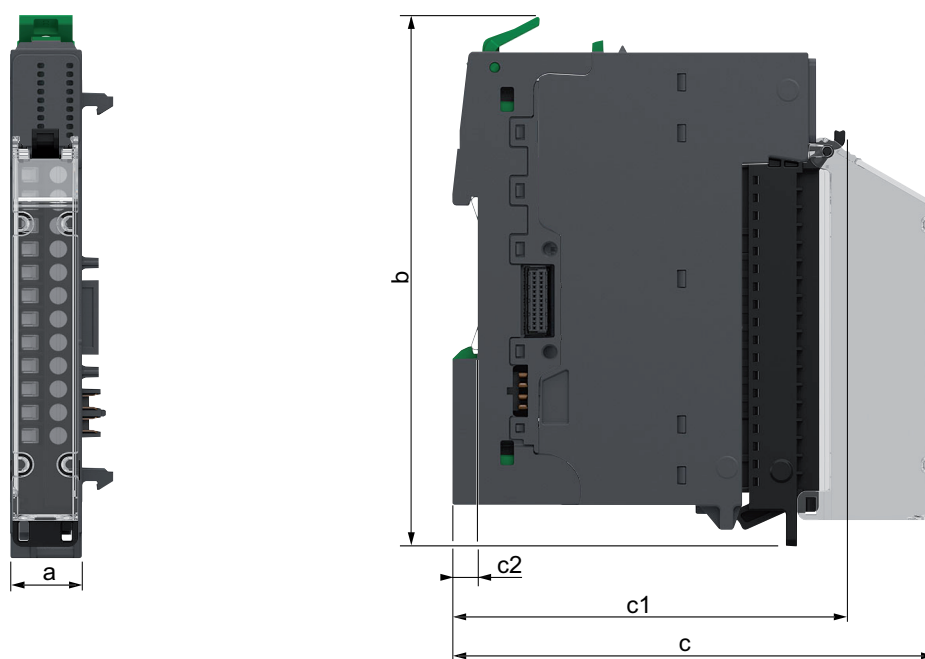
a: 15 mm (0.59 in)
b: 116.6 mm (4.57 in)
c: 107.5 mm (4.21 in)
c1: 88.2 mm (3.46 in)
c2: 5.6 mm (0.2 in)

Weight

- NTSDDO0212H: 48 g (1.69 oz)
- NTSDDO0212HK: 72 g (2.54 oz)

General Characteristics

The following table describes the general characteristics of the NTSDDO0212H output module:

Characteristics		Value
Output compatibility		1-/2-/3-wire
Field power supplied voltage requirements		• From the 24 Vdc field power • From an external power supply
Power supplied voltage range		20.4...28.8 Vdc
Bus current consumption		27.6 mA
Field current consumption for actuators, per module		4 A
Power dissipation		1.32 W
Maximum cable length	Shielded	50 m (164 ft)
	Unshielded	50 m (164 ft)
Isolation voltage	Between channels	500 Vac (with external power supply)
	Between groups	-
	Between channel and bus	1,500 Vac
	Between channel and functional earth ground	1,500 Vac
Hot swap supported		Yes
Operating ambient temperature derating	Correct mounting position[1]	4 A per module: up to 65 °C (149 °F)
		3 A per module: 65...70 °C (149...158 °F)
	Accepted mounting position[1]	4 A per module: up to 50 °C (122 °F)
		3.5 A per module: 50...55 °C (122...131 °F)
		3 A per module: 55...60 °C (131...140 °F)
[1] For information about mounting positions, refer to Modicon Edge I/O - System Planning and Installation Guide.		

Output Characteristics

The table below describes the output characteristics of the NTSDDO0212H ouput module:

Characteristics		Value
Output type		Transistor
Output wiring mode		1-/2-/3-wire
Output current	Channel current	2 A
	Module current	4 A
Minimum switching current		None
Maximum switching frequency		1 kHz for resistive load, 0.5 / LI^2 Hz
Response time on output	Logic state 1 to logic state 0	120 µs maximum
	Logic state 0 to logic state 1	75 µs maximum
OFF-state leakage/channel		< 0.1 µA
ON-state drop/channel		• < 0.25 Vdc maximum from external power supply • < 0.35 Vdc from power distribution module
Paralleling of outputs	For redundant control of load	Yes if powered from same source
Output protection	Overload	Yes, per channel
	Reverse polarity	Yes, transient-voltage-suppression on output (with external fast blow fuse 5 A)
	Short-circuit	Yes, per channel
Output diagnostic		• Power supply monitoring (under voltage, power absent) • Short-circuit

NTSDDO0212H Wiring

Wiring Rules

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

Wiring Diagram

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

To maintain the isolation between channels, use 2 independent power supplies.
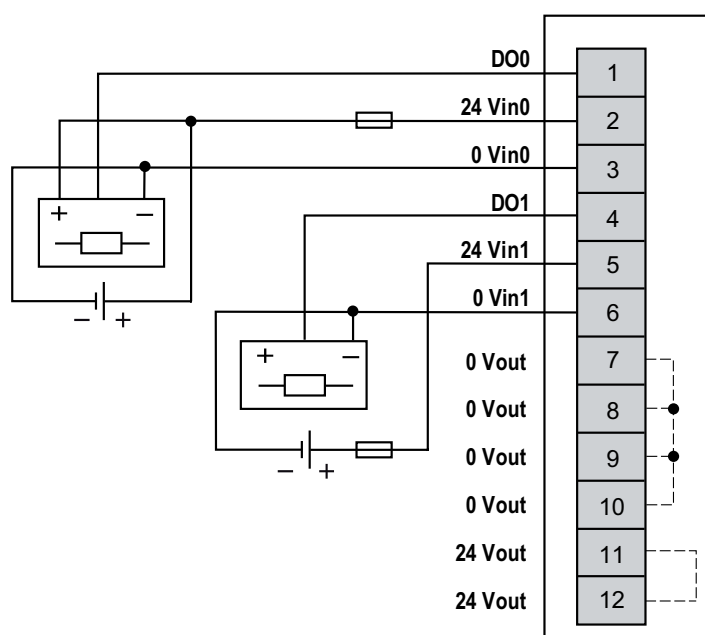

⚠ **WARNING**

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.

The following figure illustrates an example of 2-wire connection outputs with the internal power supply without isolation between channels:
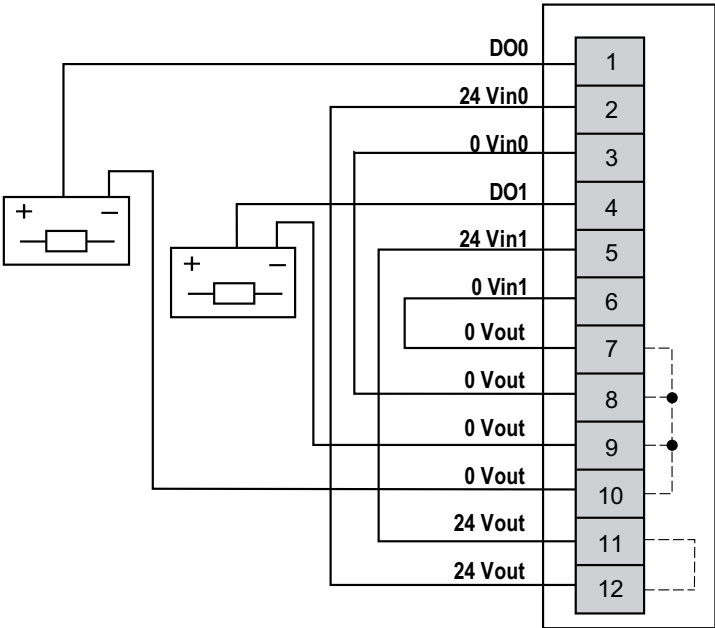
The following figure illustrates an example of 2-/3-wire connection outputs with an external power supply and isolation between channels:

DO0	1
24 Vin0	2
0 Vin0	3
DO1	4
24 Vin1	5
0 Vin1	6
0 Vout	7
0 Vout	8
0 Vout	9
0 Vout	10
24 Vout	11
24 Vout	12

External Fuse: Type F, 5 A, 24 Vdc is mandatory and must be chosen in compliance with IEC60269 standard.

NTSDDO0212H Parameters

Parameters Description

Configurable Parameters

The following table presents the configurable parameters for the NTSDDO0212H module:

Displayed Name *Parameter Name*	Value	Data type	Description
Device Mode *DeviceMode*	0: **Normal*** 1: **Optional** 2: **Virtual reserved**	ENUM	Allows you to select the device mode: • **Normal**: The module is part of the software configuration and is physically connected on the cluster. • **Optional**: The module is part of the software configuration. A dummy module or the configured module must be physically installed on the cluster. Whether either module is present does not cause a configuration error. • **Virtual reserved**: The module is part of the software configuration. A dummy module must be physically installed on the cluster. If the virtual module is physically installed on the cluster, a configuration error is detected.
Rearming Output Mode *RearmOutputMode*	0: **Latched Off** 1: **Auto Recovery***	ENUM	Allows you to select the rearming mode for an output channel who are latched off due to a detected error. Two modes are available: • **Latched Off**: The channel is rearmed if the cause of the error is no longer present, and a rising edge on **RearmOutputCmd** is applied. • **Auto Recovery**: The output channel is rearmed automatically if the cause of the error is no longer present for a predefined delay.
Diag Enable internal field power supply *DiagEnablePDM*[1]	**FALSE** **TRUE***	BOOL	Enables or disables the field power supply diagnostics.
* Parameter default value [1] Online modification is allowed.			

The following table presents the configurable parameters for the channels of the NTSDDO0212H module:

Displayed Name *Parameter Name*	Value	Data type	Description
Channel Enabled *ChannelEnable*[1]	**TRUE*** **FALSE**	BOOL	Determines whether a channel is enabled or disabled.
Fallback Mode *OutputFallbackMode*	0: **Fallback Value*** 1: **Maintain**	ENUM	Allows you to select the behavior for the output in case of a communication interruption: • **Fallback Value**: Sets the output at the configured **Predefined Fallback Value** value. • **Maintain**: The output remains in its actual state.
Predefined Fallback Value *OutputFallbackValue*	**0*** **1**	ENUM	Determines the state for the output in case of a communication interruption and **Fallback Mode** parameter is set to **Predefined Fallback Value**.
* Parameter default value [1] Online modification is allowed.			

Implicit Data

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

Parameter Name	Value	Data type Size in bytes R/W	Description
GCS	0...255	BYTE 1 R/-	Group Cyclic Status Bit 0: Data quality Bit 1: General module status Bit 2: I/O status Bit 3: Receive status Bit 4: Output status Bit 5: Advisory status Bit 6: N/A Bit 7: Data freshness
ChannelHealth0_7[1]	0...255	BYTE 1 R/-	Bit 0...7 = Status of channel 0...7 • Bit = FALSE: Channel is invalid or not present. • Bit = TRUE: Channel is valid or disabled.
[1] This parameter is not part of the implicit data in case of the optimized I/O profile is selected.			

The following table presents the output implicit data for the module:

Parameter Name	Value	Data type Size in bytes R/W	Description
RearmOutputCmd	TRUE FALSE	BOOL R/W	If the **Rearming Output Mode** parameter is set to **Latched Off** and the cause of the detected error is no longer present, then on a rising edge, it rearms the output channels.
QValue0_7	0...255	BYTE 1 R/W	Output value of the channels (Bit field) Bit 0...7 = Value of channel 0...7 **NOTE:** Unused bits are reserved.

Explicit Data

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

Parameter Name	Value	Data type Size in bytes R/W	Description
ChannelFault	0...255	BYTE R/-	Provides the following detected error on the channel: Bit 1: Short circuit error detected Bit 2: External power supply error detected Bit 4: Internal power supply error detected **NOTE:** Unused bits are reserved.
QValue	TRUE = Channel is in logic state 1 FALSE = Channel is in logic state 0	BOOL R/W	Output value of the channel.

NTSDDO0802 Discrete Output Module, 8 Outputs, 24 Vdc, 2 A, Source, Protected, External Supply, 1-wire

What's in This Chapter

NTSDDO0802 Presentation

### Main Characteristics

The following table describes the main characteristics of the NTSDDO0802 module:

Main Characteristics	Value
Product or component type	Discrete DC output module
Number of output channels	8
Groups of output channels	2 groups of 4 channels non isolated
Output logic type	Source
Output voltage	24 Vdc
Operating mode	Synchronous and isochronous

Purchasing Information

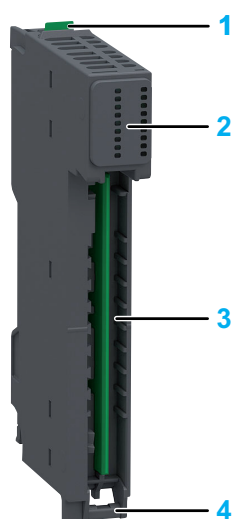The following figure shows the elements of the Modicon Edge I/O NTS NTSDDO0802 output module:
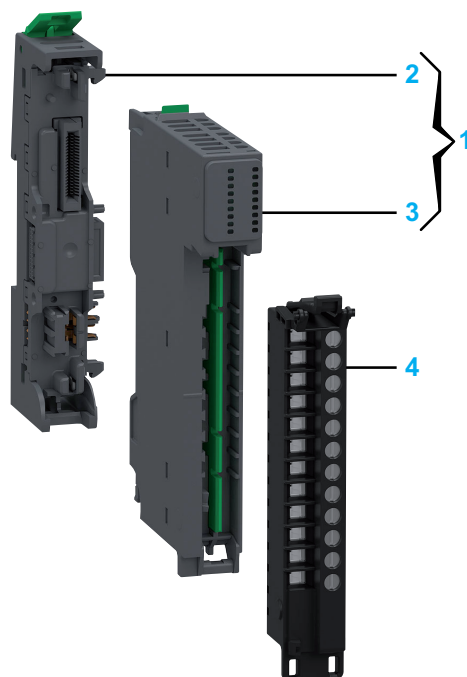
Number	Reference	Description
1	NTSDDO0802K	Base + Module (kit) **NOTE:** The module and its corresponding base can be purchased as a kit.
2	NTSXBA0100H	Spare Base, 1 Slot, for Input/Output Common or Expert Module, Hardened
3	NTSDDO0802	Discrete Output Module, 8 Outputs, 24 Vdc, 2 A, Source, Protected, External Supply, 1-wire
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.
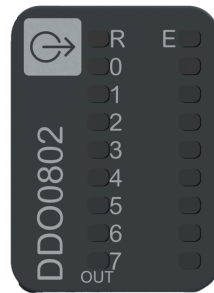
Physical Description

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
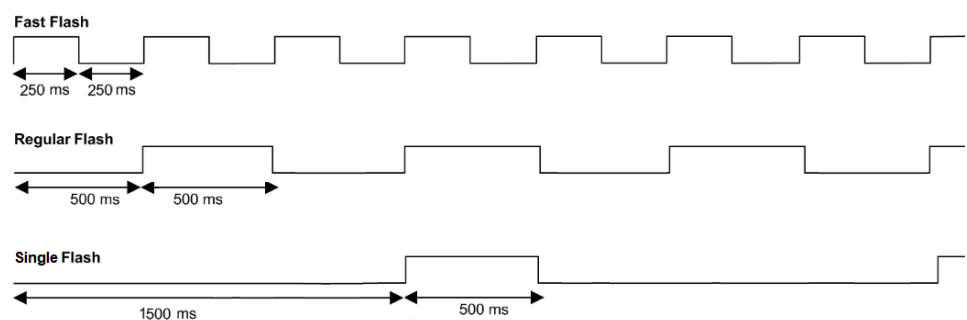**4**: Hinge for the terminal block installation

Status LEDs

The following figure presents the NTSDDO0802 status LEDs:

The following table describes the status of LEDs:

R (Green)	E (Red)	Channel (Green)	Description
Initialization and non-operational states			
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.
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.
ON	-	ON	Indicates that the channel is activated.
ON	-	OFF	Indicates that the channel is deactivated.
ON	Regular Flash	OFF	Indicates: • 24 Vdc field power error detection. • Sensor power supply error detection.
ON	Regular Flash	Regular Flash	Indicates that a short circuit error is detected.

This timing diagram shows the difference between the fast flash, regular flash and single flash:

NTSDDO0802 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:
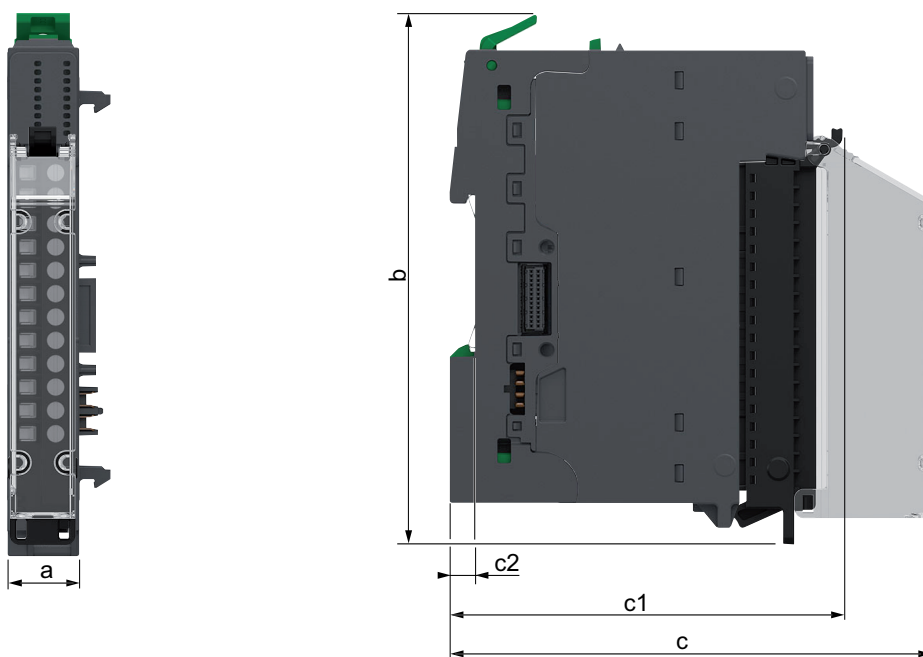
a: 15 mm (0.59 in)
b: 116.6 mm (4.57 in)
c: 107.5 mm (4.21 in)
c1: 88.2 mm (3.46 in)
c2: 5.6 mm (0.2 in)

Weight

- NTSDDO0802: 48 g (1.69 oz)
- NTSDDO0802K: 72 g (2.54 oz)

General Characteristics

The following table describes the general characteristics of the NTSDDO0802 output module:

Characteristics		Value
Output compatibility		1-wire
Field power supplied voltage requirements		From a 24 Vdc external power supply
Power supplied voltage range		20.4...28.8 Vdc
Bus current consumption		33.6 mA
Field current consumption for actuators, per module		0 mA
Power dissipation		1.67 W
Maximum cable length	Shielded	1,000 m (3,280 ft)
	Unshielded	600 m (1,968 ft)
Isolation voltage	Between channels	-
	Between groups	-
	Between channel and bus	1,500 Vac
	Between channel and functional earth ground	1,500 Vac
Hot swap supported		Yes
Operating ambient temperature derating		No derating

Output Characteristics

The table below describes the output characteristics of the NTSDDO0802 output module:

| Characteristics		Value
Output type		Transistor
Output wiring mode		1-wire
Output current	Channel current	2 A
	Group current	4 A
	Module current	8 A
Minimum switching current		-
Maximum switching frequency		1 kHz for resistive load, $0.5 / LI^2$ Hz
Response time on output	Logic state 1 to logic state 0	110 μs maximum
	Logic state 0 to logic state 1	90 μs maximum
OFF-state leakage/channel		< 0.1 μA
ON-state drop/channel		< 0.25 Vdc
Paralleling of outputs	For redundant control of load	Yes (maximum 2)
Output protection	Overload	Yes, per channel
	Reverse polarity	Yes, transient-voltage-suppression on output
	Short-circuit	Yes, per channel
Output diagnostic		• Power supply monitoring (under voltage, power absent) • Over current

NTSDDO0802 Wiring

Wiring Rules

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

Wiring Diagram

Each group of inputs requires an external 24 Vdc power supply with a 4 A fuse.

⚠ 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.

The following figure illustrates an example of 2-/3-wire connection outputs with and external power supply:
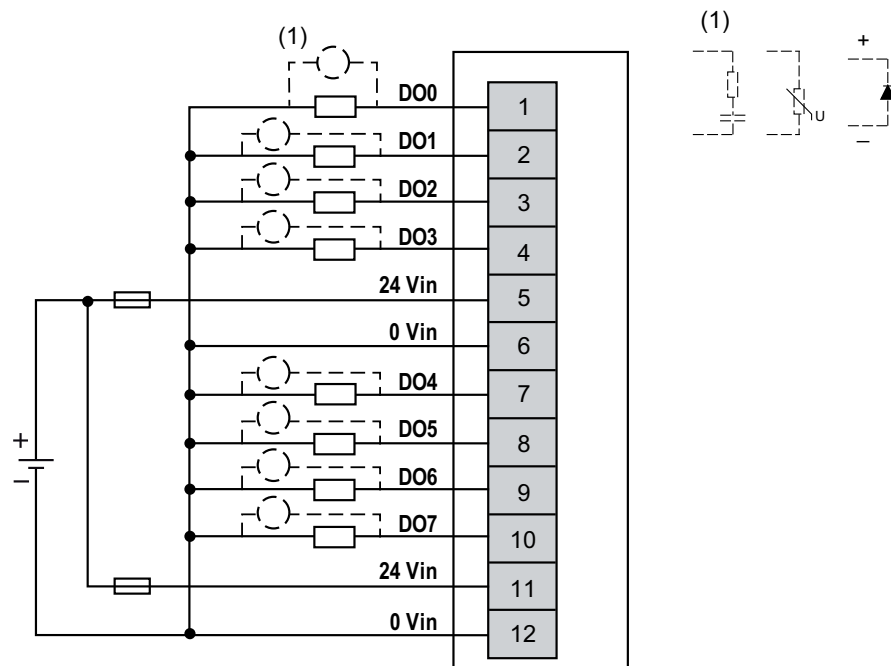
External Fuse: Type F, 4 A, 24 Vdc is mandatory and must be chosen in compliance with IEC60269 standard.

NTSDDO0802 Parameters

Parameters Description

Configurable Parameters

The following table presents the configurable parameters for the NTSDDO0802 module:

Displayed Name *Parameter Name*	Value	Data type	Description
Device Mode *DeviceMode*	0: **Normal*** 1: **Optional** 2: **Virtual reserved**	ENUM	Allows you to select the device mode: • **Normal**: The module is part of the software configuration and is physically connected on the cluster. • **Optional**: The module is part of the software configuration. A dummy module or the configured module must be physically installed on the cluster. Whether either module is present does not cause a configuration error. • **Virtual reserved**: The module is part of the software configuration. A dummy module must be physically installed on the cluster. If the virtual module is physically installed on the cluster, a configuration error is detected.
Rearming Output Mode *RearmOutputMode*	0: **Latched Off** 1: **Auto Recovery***	ENUM	Allows you to select the rearming mode for an output channel which is latched off due to a detected error. Two modes are available: • **Latched Off**: The channel is rearmed if the cause of the error is no longer present, and a rising edge on **RearmOutputCmd** is applied. • **Auto Recovery**: the output channel is rearmed automatically if the cause of the error is no longer present for a predefined delay.
* Parameter default value			

The following table presents the configurable parameters for the channels of the NTSDDO0802 module:

Displayed Name *Parameter Name*	Value	Data type	Description
Channel Enabled *ChannelEnable*[1]	**TRUE*** **FALSE**	BOOL	Determines whether a channel is enabled or disabled.
Fallback Mode *OutputFallbackMode*	0: **Fallback Value*** 1: **Maintain**	ENUM	Allows you to select the behavior for the output in case of a communication interruption: • **Fallback Value**: Sets the output at the configured **Predefined Fallback Value** value. • **Maintain**: The output remains in its actual state.
Predefined Fallback Value *OutputFallbackValue*	**0*** **1**	ENUM	Determines the state for the output in case of a communication interruption and **Fallback Mode** parameter is set to **Predefined Fallback Value**.
* Parameter default value			
[1] Online modification is allowed.			

Implicit Data

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

Parameter Name	Value	Data type Size in bytes R/W	Description
GCS	0...255	BYTE 1 R/-	Group Cyclic Status Bit 0: Data quality Bit 1: General module status Bit 2: I/O status Bit 3: Receive status Bit 4: Output status Bit 5: Advisory status Bit 6: N/A Bit 7: Data freshness
ChannelHealth0_7[1]	0...255	BYTE 1 R/-	Bit 0...7 = Status of channel 0...7 • Bit = FALSE: Channel is invalid or not present. • Bit = TRUE: Channel is valid or disabled.
[1] This parameter is not part of the implicit data in case of the optimized I/O profile is selected.			

The following table presents the output implicit data for the module:

Parameter Name	Value	Data type Size in bytes R/W	Description
RearmOutputCmd	TRUE FALSE	BOOL R/W	If the **Rearming Output Mode** parameter is set to **Latched Off** and the cause of the detected error is no longer present, then on a rising edge, it rearms the output channels.
QValue0_7	0...255	BYTE 1 R/W	Output value of the channels (Bit field) Bit 0...7 = Value of channel 0...7 **NOTE:** Unused bits are reserved.

Explicit Data

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

Parameter Name	Value	Data type Size in bytes R/W	Description
ChannelFault	0...255	BYTE R/-	Provides the following detected error on the channel: Bit 1: Short circuit error detected Bit 2: External power supply error detected **NOTE:** Unused bits are reserved.
QValue	TRUE = Channel is in logic state 1 FALSE = Channel is in logic state 0	BOOL R/W	Output value of the channel.

NTSDDO0802X Discrete Output Module, 8 Outputs, 24 Vdc, 500 mA, Source, Protected, 1-/2-wire

What's in This Chapter

NTSDDO0802X Presentation

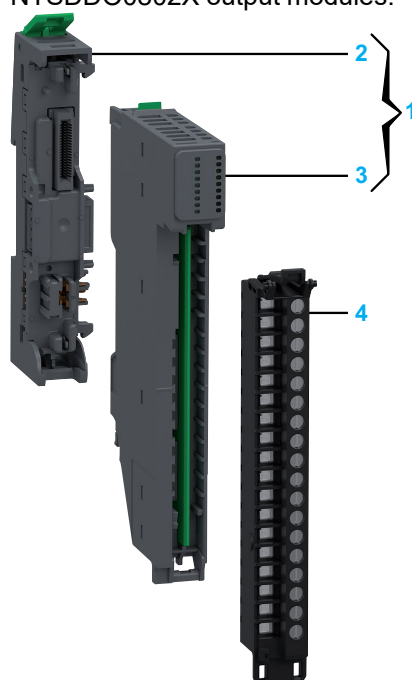## Main Characteristics

The following table describes the main characteristics of the NTSDDO0802X output module:

Main Characteristics	Value
Product or component type	Discrete DC output module
Number of output channels	8
Groups of output channels	1 group of 8 channels non isolated
Output logic type	Source
Output voltage	24 Vdc
Operating mode	Synchronous and isochronous

Purchasing Information

The following figure shows the elements of the Modicon Edge I/O NTS NTSDDO0802X output modules:

Number	Reference	Description
1	NTSDDO0802XK	Base + Module (kit) **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	NTSDDO0802X	Discrete Output Module, 8 Outputs, 24 Vdc, 500 mA, Source, Protected, 1-/2-wire
4	NTSXTB18200XH	Spring Terminal Block, 18 Points, 5 mm Pitch, Without Cover, use on High Height Module (X), Hardened
	NTSXTB18201XH	Spring Terminal Block, 18 Points, 5 mm Pitch, With Cover, use on High Height Module (X), Hardened
	NTSXTB18000XH	Screw Terminal Block, 18 Points, 5 mm Pitch, Without Cover, use on High Height Module (X), Hardened
	NTSXTB18001XH	Screw Terminal Block, 18 Points, 5 mm Pitch, With Cover, use on High Height Module (X), 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.
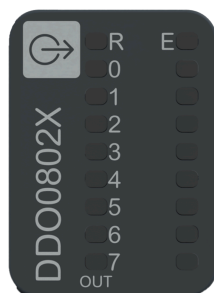
Physical Description

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
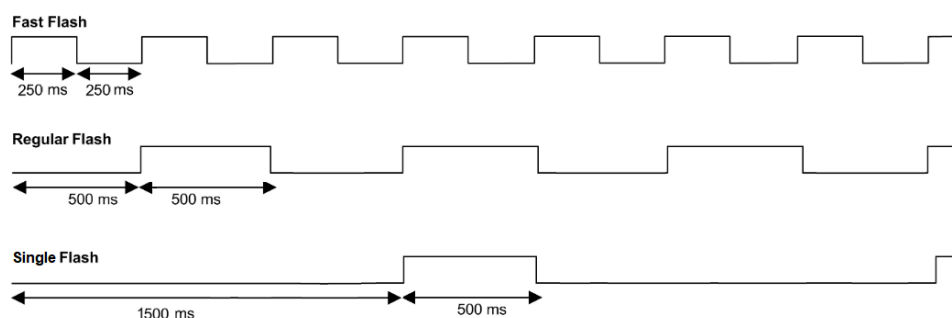
Status LEDs

The following figure presents the NTSDDO0802X status LEDs:

The following table describes the status of LEDs:

R (Green)	E (Red)	Channel (Green)	Description
Initialization and non-operational states			
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.
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.
ON	-	ON	Indicates that the channel is activated.
ON	-	OFF	Indicates that the channel is deactivated.
ON	Regular Flash	OFF	Indicates: • 24 Vdc field power error detection. • Sensor power supply error detection.
ON	Regular Flash	Regular Flash	Indicates that a short circuit error is detected.

This timing diagram shows the difference between the fast flash, regular flash and single flash:

NTSDDO0802X 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:
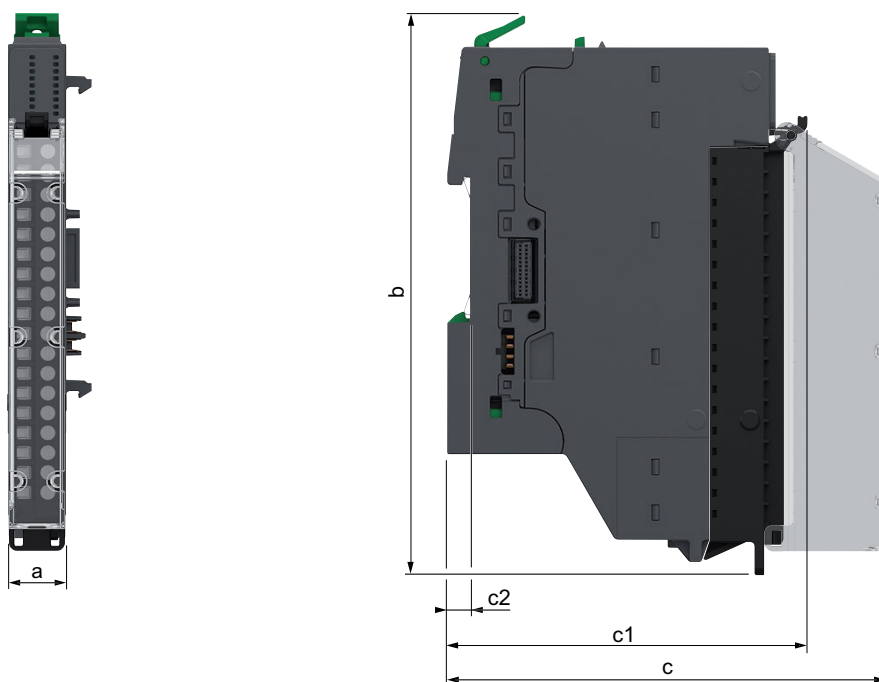
a: 15 mm (0.59 in)
b: 137.6 mm (5.39 in)
c: 107.5 mm (4.21 in)
c1: 88.2 mm (3.46 in)
c2: 5.6 mm (0.2 in)

Weight

- NTSDDO0802X: 49 g (1.73 oz)
- NTSDDO0802XK: 78 g (2.76 oz)

General Characteristics

The following table describes the general characteristics of the NTSDDO0802X output module:

Characteristics		Value
Output compatibility		1-/2-wire
Field power supplied voltage requirements		From the 24 Vdc field power
Power supplied voltage range		20.4...28.8 Vdc
Bus current consumption		33.6 mA
Field current consumption for actuators, per module		4,004.3 mA
Power dissipation		2.00 W
Maximum cable length	Shielded	600 m (1,968 ft)
	Unshielded	600 m (1,968 ft)
Isolation voltage	Between channels	-
	Between groups	-
	Between channel and bus	1,500 Vac
	Between channel and functional earth ground	1,500 Vac
Hot swap supported		Yes
Operating ambient temperature derating		No derating

Output Characteristics

The table below describes the output characteristics of the NTSDDO0802X output module:

| Characteristics		Value
Output type		Transistor
Output wiring mode		1-/2-wire
Output current	Channel current	500 mA
	Module current	4 A
Minimum switching current		None
Maximum switching frequency		1 kHz for resistive load, 0.5 / LI^2 Hz
Response time on output	Logic state 1 to logic state 0	110 µs maximum
	Logic state 0 to logic state 1	90 µs maximum
OFF-state leakage/channel		< 0.1 µA
ON-state drop/channel		< 0.1 Vdc
Paralleling of outputs	For redundant control of load	Yes (maximum 2)
Output protection	Overload	Yes, per channel
	Reverse polarity	Yes, transient-voltage-suppression on output
	Short-circuit	Yes, per channel
Output diagnostic		• Power supply monitoring (under voltage, power absent) • Over current

NTSDDO0802X Wiring

Wiring Rules

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

Wiring Diagram

The following figure illustrates an example of 2-wire connection outputs:
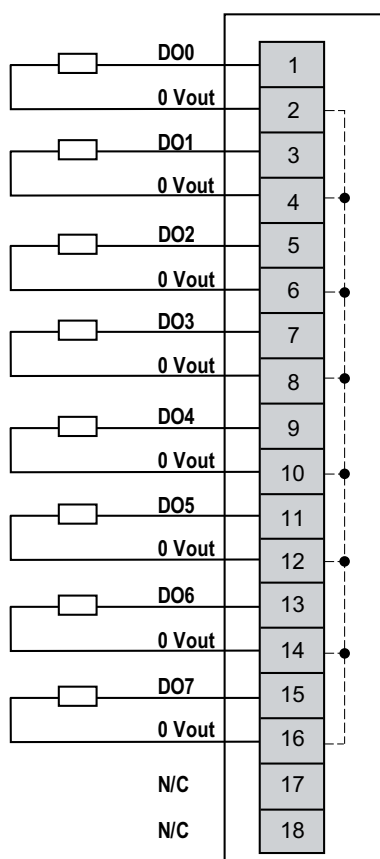
N/C: No Connection

⚠ **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.

NTSDDO0802X Parameters

Parameters Description

Configurable Parameters

The following table presents the configurable parameters for the NTSDDO0802X module:

Displayed Name *Parameter Name*	Value	Data type	Description
Device Mode *DeviceMode*	0: **Normal*** 1: **Optional** 2: **Virtual reserved**	ENUM	Allows you to select the device mode: • **Normal**: The module is part of the software configuration and is physically connected on the cluster. • **Optional**: The module is part of the software configuration. A dummy module or the configured module must be physically installed on the cluster. Whether either module is present does not cause a configuration error. • **Virtual reserved**: The module is part of the software configuration. A dummy module must be physically installed on the cluster. If the virtual module is physically installed on the cluster, a configuration error is detected.
Rearming Output Mode *RearmOutputMode*	0: **Latched Off** 1: **Auto Recovery***	ENUM	Allows you to select the rearming mode for an output channel which is latched off due to a detected error. Two modes are available: • **Latched Off**: The channel is rearmed if the cause of the error is no longer present, and a rising edge on **RearmOutputCmd** is applied. • **Auto Recovery**: The output channel is rearmed automatically if the cause of the error is no longer present for a predefined delay.
* Parameter default value			

The following table presents the configurable parameters for the channels of the NTSDDO0802X module:

Displayed Name *Parameter Name*	Value	Data type	Description
Channel Enabled *ChannelEnable*[1]	**TRUE*** **FALSE**	BOOL	Determines whether a channel is enabled or disabled.
Fallback Mode *OutputFallbackMode*	0: **Fallback Value*** 1: **Maintain**	ENUM	Allows you to select the behavior for the output in case of a communication interruption: • **Fallback Value**: Sets the output at the configured **Predefined Fallback Value** value. • **Maintain**: The output remains in its actual state.
Predefined Fallback Value *OutputFallbackValue*	**0*** **1**	ENUM	Determines the state for the output in case of a communication interruption and **Fallback Mode** parameter is set to **Predefined Fallback Value**.
* Parameter default value			
[1] Online modification is allowed.			

Implicit Data

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

Parameter Name	Value	Data type / Size in bytes / R/W	Description
GCS	0...255	BYTE 1 R/-	Group Cyclic Status Bit 0: Data quality Bit 1: General module status Bit 2: I/O status Bit 3: Receive status Bit 4: Output status Bit 5: Advisory status Bit 6: N/A Bit 7: Data freshness
ChannelHealth0_7[1]	0...255	BYTE 1 R/-	Bit 0...7 = Status of channel 0...7 • Bit = FALSE: Channel is invalid or not present. • Bit = TRUE: Channel is valid or disabled.
[1] This parameter is not part of the implicit data in case of the optimized I/O profile is selected.			

The following table presents the output implicit data for the module:

Parameter Name	Value	Data type / Size in bytes / R/W	Description
RearmOutputCmd	TRUE FALSE	BOOL R/W	If the **Rearming Output Mode** parameter is set to **Latched Off** and the cause of the detected error is no longer present, then on a rising edge, it rearms the output channels.
QValue0_7	0...255	BYTE 1 R/W	Output value of the channels (Bit field) Bit 0...7 = Value of channel 0...7 **NOTE:** Unused bits are reserved.

Explicit Data

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

Parameter Name	Value	Data type / Size in bytes / R/W	Description
ChannelFault	0...255	BYTE R/-	Provides the following detected error on the channel: Bit 1: Short circuit error detected Bit 4: Internal power supply error detected **NOTE:** Unused bits are reserved.
QValue	TRUE = Channel is in logic state 1 FALSE = Channel is in logic state 0	BOOL R/W	Output value of the channel.

NTSDRA0615 Relay Output Module, 6 Isolated Outputs, NO, 2 A, 5...125 Vdc, 24...240 Vac
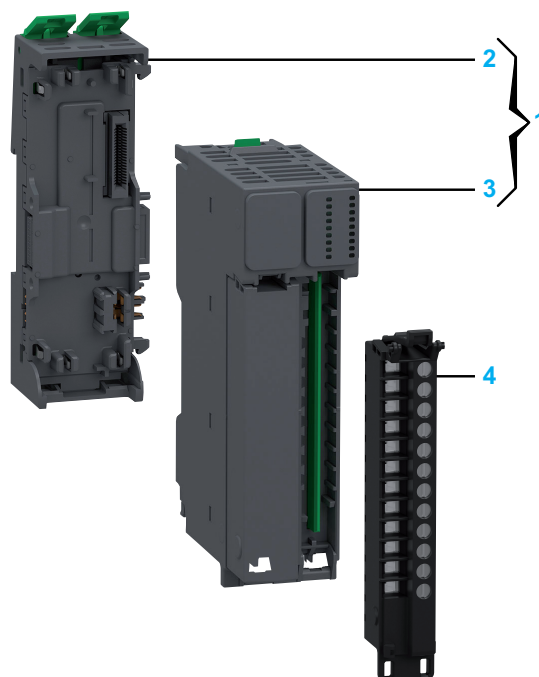
What's in This Chapter

NTSDRA0615 Presentation

Main Characteristics

The following table describes the main characteristics of the NTSDRA0615 output module:

Main Characteristics	Value
Product or component type	Discrete relay output module
Number of output channels	6
Groups of output channels	6 groups of 1 channel
Output logic type	form A Relay
Output voltage	24...250 Vac (47...63 Hz)
	5...125 Vdc
Operating mode	Asynchronous

Purchasing Information

The following figure shows the elements of the Modicon Edge I/O NTS NTSDRA0615 output module:

Number	Reference	Description
1	NTSDRA0615K	Base + Module (kit)
		NOTE: The module and its corresponding base can be purchased as a kit.
2	NTSXBA0200H	Spare Base, 2 Slots, for Input/Output Common/Expert/Safety Module, Hardened
3	NTSDRA0615	Relay Output Module, 6 Isolated Outputs, NO, 2 A, 5...125 Vdc, 24...240 Vac
4	NTSXTB12211H	Spring Terminal Block, 12 Points, 5 mm Pitch, With Cover, AC, use on Low Height Module, Hardened
	NTSXTB12011H	Screw Terminal Block, 12 Points, 5 mm Pitch, With Cover, AC, use on Low Height Module, Hardened
	NTSXTB12210H	Spring Terminal Block, 12 Points, 5 mm Pitch, Without Cover, AC, use on Low Height Module, Hardened
	NTSXTB12010H	Screw Terminal Block, 12 Points, 5 mm Pitch, Without Cover, AC, 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.
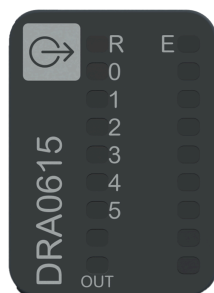
Physical Description

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
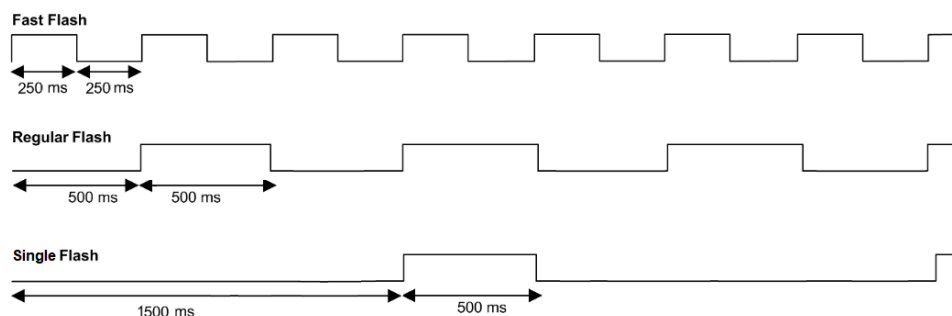**4**: Hinge for the terminal block installation

Status LEDs

The following figure presents the NTSDRA0615 status LEDs:

The following table describes the status of LEDs:

R (Green)	E (Red)	Channel (Green)	Description
Initialization and non-operational states			
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.
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.
ON	-	ON	Indicates that the channel is activated.
ON	-	OFF	Indicates that the channel is deactivated.
ON	Regular Flash	OFF	Indicates: • 24 Vdc field power error detection. • Sensor power supply error detection.
ON	Regular Flash	Regular Flash	Indicates: • Broken wire detection. • Short circuit detection.

This timing diagram shows the difference between the fast flash, regular flash and single flash:

NTSDRA0615 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:
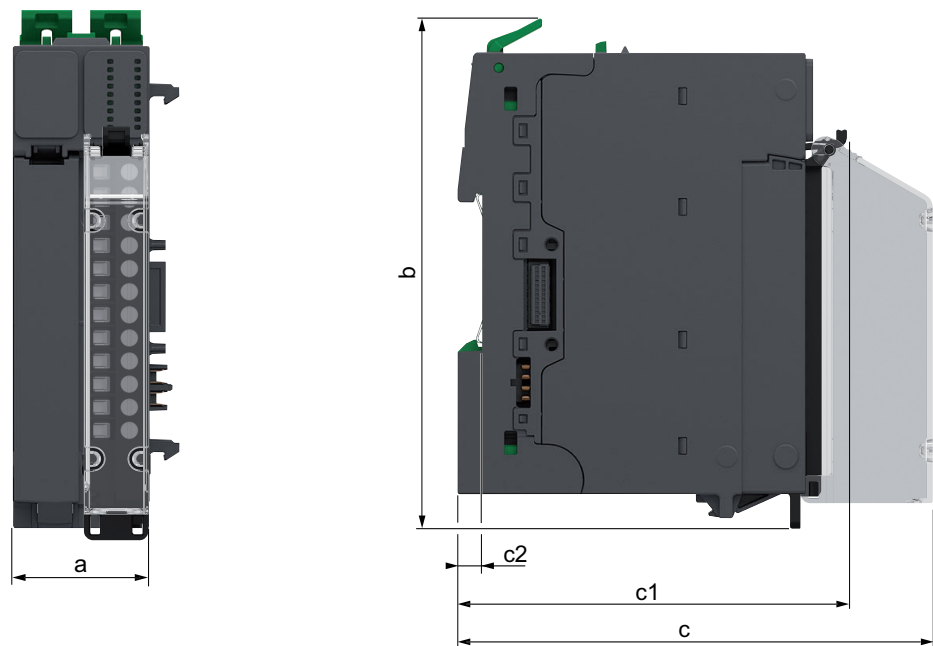
a: 30 mm (1.18 in)
b: 116.6 mm (4.57 in)
c: 107.5 mm (4.21 in)
c1: 88.2 mm (3.46 in)
c2: 5.6 mm (0.2 in)

Weight

- NTSDRA0615: 70 g (2.47 oz)
- NTSDRA0615K: 123 g (4.34 oz)

General Characteristics

The following table describes the general characteristics of the NTSDRA0615 output module:

Characteristics		Value
Output compatibility		2-wire
Field power supplied voltage requirements		From a 5...125 Vdc or a 24...250 Vac external power supply
Power supplied voltage range		20.4...28.8 Vdc
Bus current consumption		31.2 mA
Field current consumption for actuators, per module		41.4 mA
Power dissipation		2.35 W
Maximum cable length	Shielded	200 m (656 ft)
	Unshielded	200 m (656 ft)
Isolation voltage	Between channels	1,780 Vac
	Between groups	-
	Between channel and bus	3,000 Vac
	Between channel and functional earth ground	3,000 Vac
Hot swap supported		Yes
Operating ambient temperature derating		No derating

Output Characteristics

The table below describes the output characteristics of the NTSDRA0615 output module:

Characteristics		Value
Relay wiring type		NO (Form A) contacts
Output wiring mode		2-Wire
Output current	Channel current	2 A
	Module current	-
Minimum switching current		5 Vdc / 10 mA
Maximum switching frequency		2 Hz for resistive load
		0.5 Hz for inductive load
Response time on output	Logic state 1 to logic state 0	< 13 ms
	Logic state 0 to logic state 1	< 10 ms
Electrical endurance/switching cycles		With a resistive load: • 150 x 10^3 at 2 A 250 Vac / 30 Vdc • 300 x 10^3 at 1 A 250 Vac / 30 Vdc With an inductive load: • 60 x 10^3 at 2 A 250 Vac / 30 Vdc • 130 x 10^3 at 1 A 250 Vac / 30 Vdc • 6 x 10^3 at 0.2 A 125 Vdc (R150)
Paralleling of two outputs	For logic links or redundant control of load	Yes
Output protection	Over voltage	• AC: External Metal Oxide Varistor (MOV) or RC snubber • DC: External Metal Oxide Varistor (MOV) or inverse diode
	Short-circuit	External fast blow fuse

NTSDRA0615 Wiring

Wiring Rules

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

Wiring Diagram

Each channel requires an external power supply (AC or DC) with the appropriate output protection.

To maintain the isolation between channels, use independent power supplies.

> **⚠ 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.**

The following figure illustrates an example of 2-wire connection outputs with an external AC and DC power supply and isolation between channels:
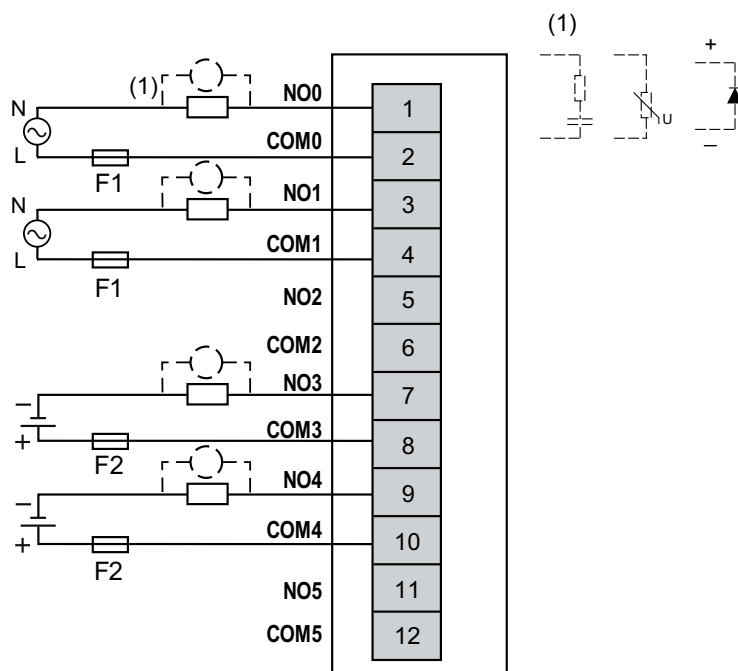
F1: External fuse type F, 2 A, 250 Vac is mandatory and must be chosen in compliance with IEC60269 standard.
F2: External fuse type F, 2 A, 125 Vdc is mandatory and must be chosen in compliance with IEC60269 standard.

The following figure illustrates an example of 3-wire connection outputs with an external AC and DC power supply and without isolation between channels:
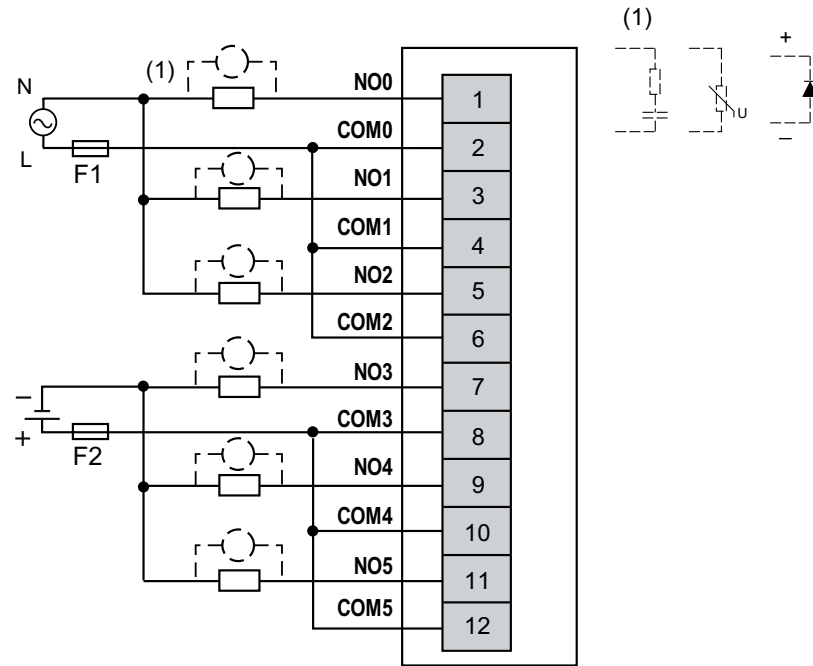
F1: External fuse type F, 2 A, 250 Vac is mandatory and must be chosen in compliance with IEC60269 standard.
F2: External fuse type F, 2 A, 125 Vdc is mandatory and must be chosen in compliance with IEC60269 standard.

NTSDRA0615 Parameters

Parameters Description

Configurable Parameters

The following table presents the configurable parameters for the NTSDRA0615 module:

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

The following table presents the configurable parameters for the channels of the NTSDRA0615 module:

Displayed Name *Parameter Name*	Value	Data type	Description
Channel Enabled *ChannelEnable*[1]	**TRUE*** **FALSE**	BOOL	Determines whether a channel is enabled or disabled.
Fallback Mode *OutputFallbackMode*	0: **Fallback Value*** 1: **Maintain**	ENUM	Allows you to select the behavior for the output in case of a communication interruption: • **Fallback Value**: Sets the output at the configured **Predefined Fallback Value** value. • **Maintain**: The output remains in its actual state.
Predefined Fallback Value *OutputFallbackValue*	0* 1	ENUM	Determines the state for the output in case of a communication interruption and **Fallback Mode** parameter is set to **Predefined Fallback Value**.
* Parameter default value			
[1] Online modification is allowed.			

Implicit Data

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

Parameter Name	Value	Data type Size in bytes R/W	Description
GCS	0...255	BYTE 1 R/-	Group Cyclic Status Bit 0: Data quality Bit 1: General module status Bit 2: I/O status Bit 3: Receive status Bit 4: Output status Bit 5: Advisory status Bit 6: N/A Bit 7: Data freshness
ChannelHealth0_7[1]	0...255	BYTE 1 R/-	Bit 0...7 = Status of channel 0...7 • Bit = FALSE: Channel is invalid or not present. • Bit = TRUE: Channel is valid or disabled.
[1] This parameter is not part of the implicit data in case of the optimized I/O profile is selected.			

The following table presents the output implicit data for the module:

Parameter Name	Value	Data type Size in bytes R/W	Description
QValue0_7	0...255	BYTE 1 R/W	Output value of the channels (Bit field) Bit 0...7 = Value of channel 0...7 **NOTE:** Unused bits are reserved.

Explicit Data

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

| Parameter Name	Value	Data type Size in bytes R/W	Description
ChannelFault	0...255	BYTE R/-	Provides the following detected error on the channel: Bit 4: Internal power supply error detected **NOTE:** Unused bits are reserved.
QValue	TRUE = Channel is in logic state 1 FALSE = Channel is in logic state 0	BOOL R/W	Output value of the channel.

Appendices

What's in This Part

What's in This Part

Latch

Overview

The **Latch** parameter allows incoming pulses with a pulse width shorter than the network interface module scan time to be captured and recorded as shown in the image on the following diagram:
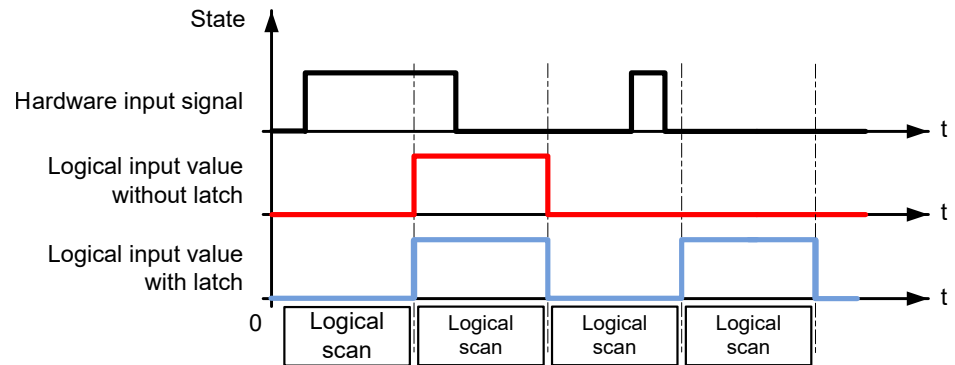
The shortest input pulse detected is determined by the bounce filter time.
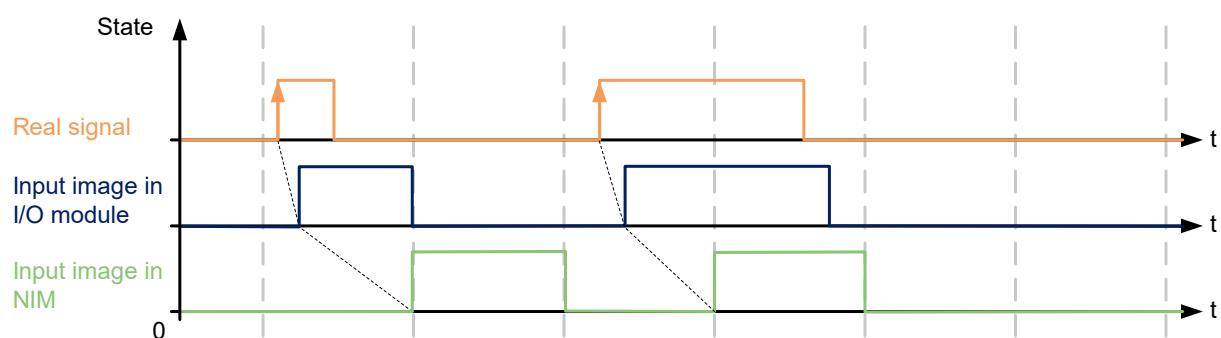
A pulse can be captured either on a rising edge, a falling edge or on both edges. An acknowledge action is necessary before a new latch value can be captured.

Automatic Acknowledge

A rising edge on the **LatchAck** is done at each I/O bus cycle.

The following diagrams shows the behavior of the input image in automatic acknowledge:

Rising Edge - Automatic Acknowledge:

Falling Edge - Automatic Acknowledge:
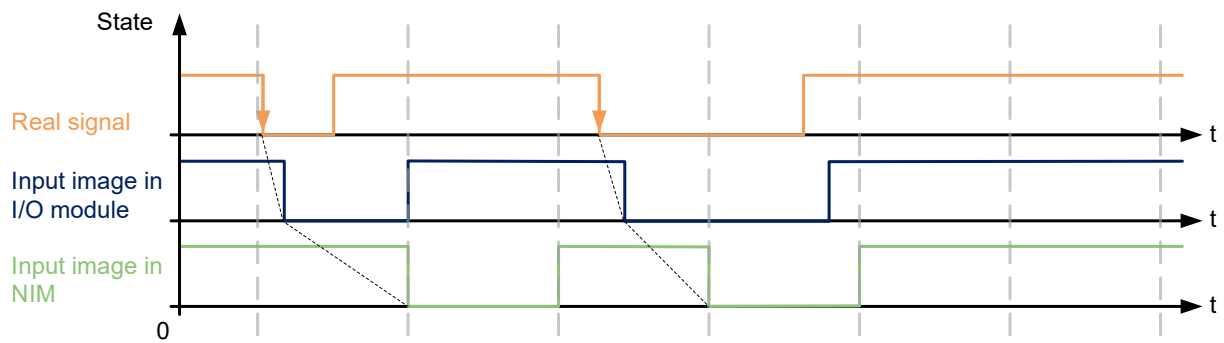

Both Edges - Automatic Acknowledge:
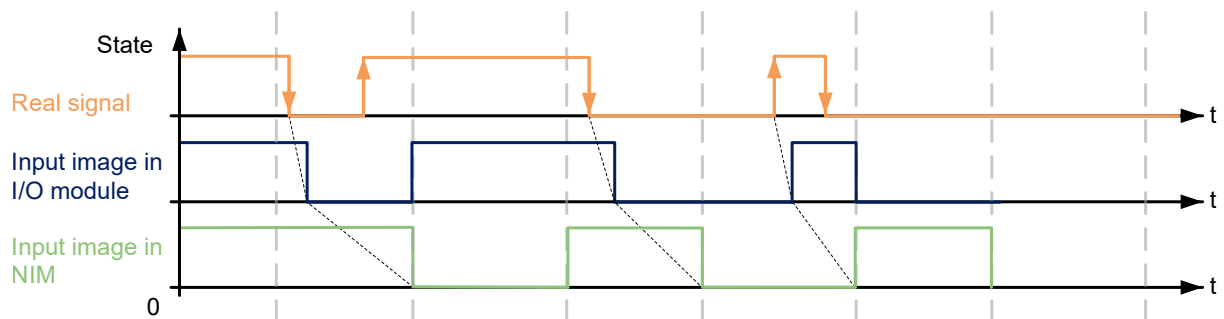
Manual Acknowledge

When an input value is latched, the input image in the I/O module is maintained at the latched value and a new value cannot be latched.

On a rising edge of the **LatchAck** bit, the input image in the I/O module is no longer maintained and a new value can be latched.

The following diagrams show the behavior of the input image in manual acknowledge:

Rising Edge - Manual Acknowledge:
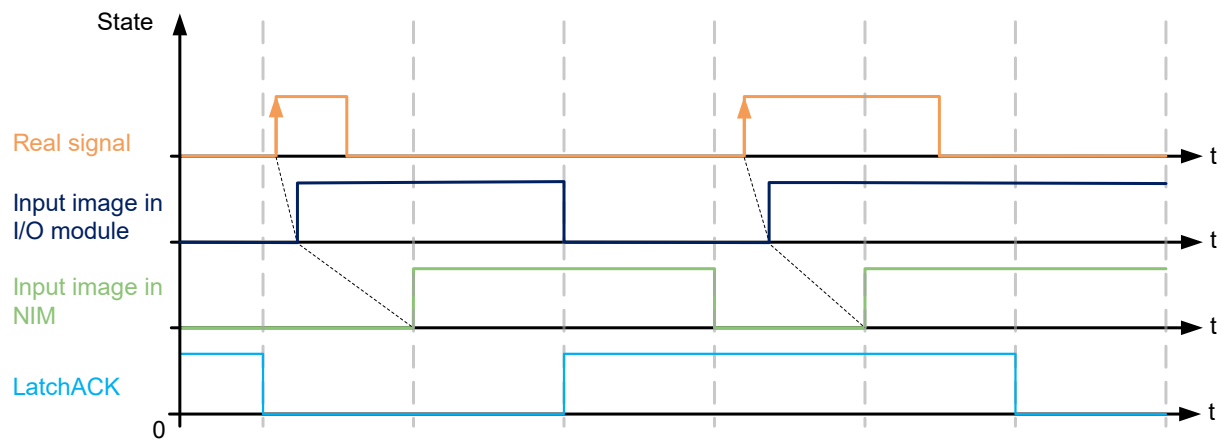
Falling Edge - Manual Acknowledge:
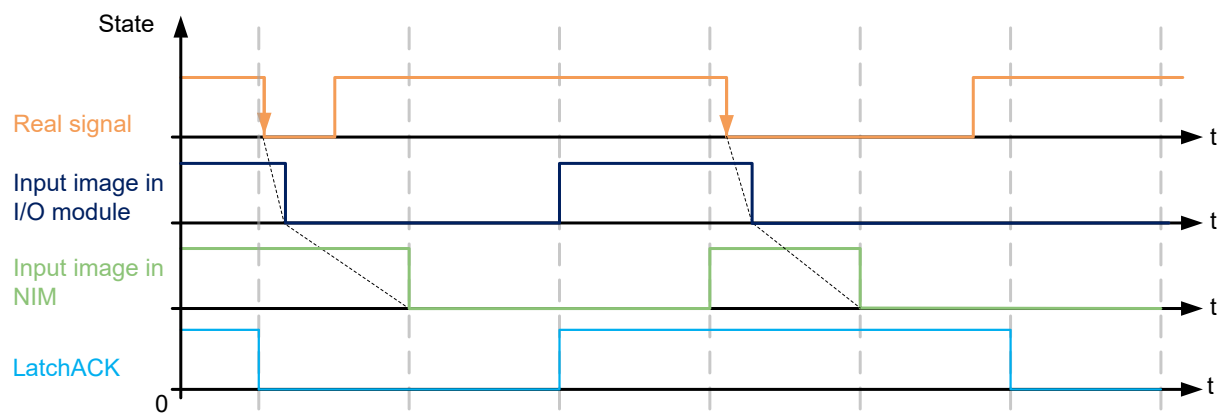
Both Edges - Manual Acknowledge:
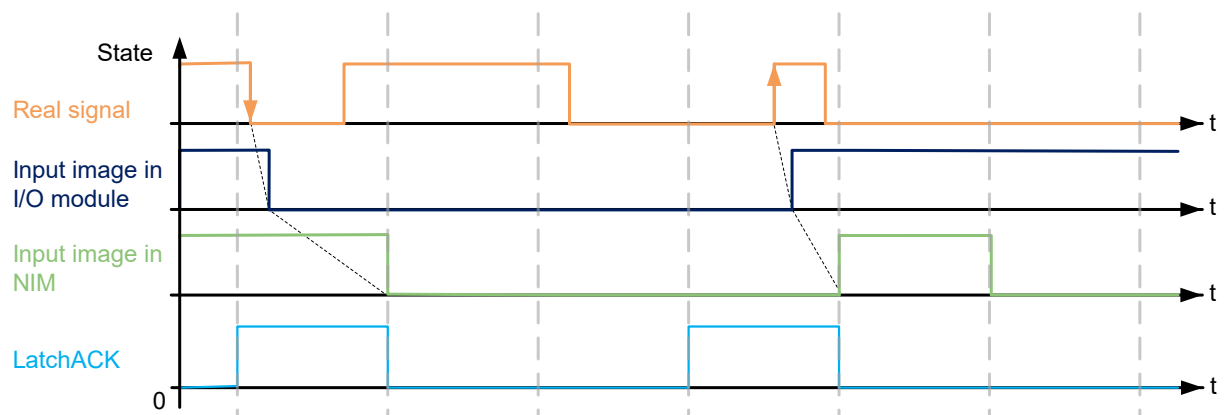
Glossary

A

application:

A program including configuration data, symbols, and documentation.

C

configuration:

The arrangement and interconnection of hardware components within a system and the hardware and software parameters that determine the operating characteristics of the system.

controller:

Automates industrial processes (also known as programmable logic controller or programmable controller).

D

derating:

A reduction in an operating specification. For devices in general, it is usually a specified reduction in nominal power to allow operation at increased ambient conditions like higher temperatures or higher altitudes.

E

electronic module:

In a programmable controller system, most electronic modules directly interface to the sensors, actuators, and external devices of the machine/process. This electronic module is the component that mounts in a bus base and provides electrical connections between the controller and the field devices. Electronic modules are offered in a variety of signal levels and capacities. (Some electronic modules are not I/O interfaces, including power distribution modules and transmitter/Extender module).

EN:

EN identifies one of many European standards maintained by CEN (*European Committee for Standardization*), CENELEC (*European Committee for Electrotechnical Standardization*), or ETSI (*European Telecommunications Standards Institute*).

F

FE:

(functional Earth) A common grounding connection to enhance or otherwise allow normal operation of electrically sensitive equipment (also referred to as functional ground in North America).

In contrast to a protective Earth (protective ground), a functional earth connection serves a purpose other than shock protection, and may normally carry current. Examples of devices that use functional earth connections include surge suppressors and electromagnetic interference filters, certain antennas, and measurement instruments.

firmware:

Represents the BIOS, data parameters, and programming instructions that constitute the operating system on a controller. The firmware is stored in non-volatile memory within the controller.

I

input/output:

The index of the ARRAY.

I/O:

(*input/output*)

ID:

(*identifier/identification*)

IEC:

(*international electrotechnical commission*) A non-profit and non-governmental international standards organization that prepares and publishes international standards for electrical, electronic, and related technologies.

IP 20:

(*ingress protection*) The protection classification according to IEC 60529 offered by an enclosure, shown by the letter IP and 2 digits. The first digit indicates 2 factors: helping protect persons and for equipment. The second digit indicates helping protect against water. IP 20 devices help protect against electric contact of objects larger than 12.5 mm, but not against water.

Island: : Group of remote or distributed clusters.

L

LED:

(*light emitting diode*) An indicator that illuminates under a low-level electrical charge.

M

ms:

(*millisecond*)

N

network:

A system of interconnected devices that share a common data path and protocol for communications.

NTS: (*Network Terminal Slice*)

S

sink input:

A wiring arrangement in which the device provides current to the input electronic module. A sink input is referenced to 0 Vdc.

source output:

A wiring arrangement in which the output electronic module provides current to the device. A source output is referenced to +24 Vdc.

Index

D

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