The information provided in this documentation contains general descriptions and/or technical characteristics of the performance of the products contained herein. This documentation is not intended as a substitute for and is not to be used for determining suitability or reliability of these products for specific user applications. It is the duty of any such user or integrator to perform the appropriate and complete risk analysis, evaluation and testing of the products with respect to the relevant specific application or use thereof. Neither Schneider Electric nor any of its affiliates or subsidiaries shall be responsible or liable for misuse of the information contained herein. If you have any suggestions for improvements or amendments or have found errors in this publication, please notify us.

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All pertinent state, regional, and local safety regulations must be observed when installing and using this product. For reasons of safety and to help ensure compliance with documented system data, only the manufacturer should perform repairs to components.

When devices are used for applications with technical safety requirements, the relevant instructions must be followed.

Failure to use Schneider Electric software or approved software with our hardware products may result in injury, harm, or improper operating results.

Failure to observe this information can result in injury or equipment damage.

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Important Information

NOTICE

Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, 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 an imminently hazardous situation which, if not avoided, will result in death or serious injury.

⚠️ WARNING

WARNING indicates a potentially hazardous situation which, if not avoided, can result in death or serious injury.
CAUTION

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

CAUTION

CAUTION, used without the safety alert symbol, indicates a potentially hazardous situation which, if not avoided, can result in equipment damage.

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.

General Warnings and Cautions

DANGER

HAZARD OF ELECTRIC SHOCK, BURN OR EXPLOSION

Turn off all power before starting installation, removal, wiring, maintenance or inspection of the smart relay system.

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

WARNING

EXPLOSION HAZARD

- Substitution of components may impair suitability for Class I, Div 2 compliance.
- Do not disconnect equipment unless power has been switched off or the area is known to be non-hazardous.

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

**UNINTENDED EQUIPMENT OPERATION**

- Turn power off before installing, removing, wiring, or maintaining.
- This product is not intended for use in safety critical machine functions. Where personnel and or equipment hazards exist, use appropriate safety interlocks.
- Do not disassemble, repair, or modify the modules.
- This controller is designed for use within an enclosure.
- Install the modules in the operating environment conditions described.
- Use the sensor power supply only for supplying power to sensors connected to the module.
- For power line and output circuits, use a fuse designed to Type T standards per IEC60127. The fuse must meet the circuit voltage and current requirements. Recommended: Littelfuse® 218 Series, 5x20mm time lag (slow blow) fuses.

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

At a Glance

Document Scope
This manual provides parts descriptions, specifications, wiring diagrams, installation, setup, and troubleshooting information for Twido Discrete I/O and AS-Interface modules.

Validity Note
The information in this manual is applicable only for Twido products. This documentation is valid for TwidoSuite Version 2.3.

User Comments
We welcome your comments about this document. You can reach us by e-mail at techcomm@schneider-electric.com.
Overview for TWD Discrete I/O Modules

Introduction
This chapter provides an overview of the TWD Discrete I/O modules, their maximum configurations, and their main functions.

What’s in this Chapter?
This chapter contains the following topics:

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<tr>
<td>Main Features of the TWD Discrete I/O Modules</td>
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</tbody>
</table>
Overview for TWD Discrete I/O Modules

### About TWD Discrete I/O Modules

**Introduction**

There are 15 Discrete expansion I/O modules which can be added to Twido bases as additional I/O to these bases.

These discrete I/O modules are of three types:
- Input modules
- Output modules
- Mixed modules

#### Discrete Expansion I/O Modules

The following table lists the discrete and relay expansion I/O modules:

<table>
<thead>
<tr>
<th>Module Name</th>
<th>Reference</th>
<th>Channels</th>
<th>Channel type</th>
<th>Input/Output type</th>
<th>Terminal type</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Input modules</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8-point input</td>
<td>TWDDDI8DT</td>
<td>8</td>
<td>Inputs</td>
<td>24 VDC</td>
<td>Removable terminal block</td>
</tr>
<tr>
<td>8-point input</td>
<td>TWDDAI8DT</td>
<td>8</td>
<td>Inputs</td>
<td>120 VAC</td>
<td>Removable terminal block</td>
</tr>
<tr>
<td>16-point input</td>
<td>TWDDDI16DT</td>
<td>16</td>
<td>Inputs</td>
<td>24 VDC</td>
<td>Removable terminal block</td>
</tr>
<tr>
<td>16-point input</td>
<td>TWDDDI16DK</td>
<td>16</td>
<td>Inputs</td>
<td>24 VDC</td>
<td>Connector</td>
</tr>
<tr>
<td>32-point input</td>
<td>TWDDDI32DK</td>
<td>32</td>
<td>Inputs</td>
<td>24 VDC</td>
<td>Connector</td>
</tr>
<tr>
<td><strong>Output Modules</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8-point output</td>
<td>TWDDD08UT</td>
<td>8</td>
<td>Outputs</td>
<td>Transistor sink</td>
<td>Removable terminal block</td>
</tr>
<tr>
<td>8-point output</td>
<td>TWDDD08TT</td>
<td>8</td>
<td>Outputs</td>
<td>Transistor source</td>
<td>Removable terminal block</td>
</tr>
<tr>
<td>8-point output</td>
<td>TWDDRA8RT</td>
<td>8</td>
<td>Outputs</td>
<td>Relay</td>
<td>Removable terminal block</td>
</tr>
<tr>
<td>16-point output</td>
<td>TWDDRA16RT</td>
<td>16</td>
<td>Outputs</td>
<td>Relay</td>
<td>Removable terminal block</td>
</tr>
<tr>
<td>16-point output</td>
<td>TWDDDO16UK</td>
<td>16</td>
<td>Outputs</td>
<td>Transistor sink</td>
<td>Connector</td>
</tr>
<tr>
<td>16-point output</td>
<td>TWDDDO16TK</td>
<td>16</td>
<td>Outputs</td>
<td>Transistor source</td>
<td>Connector</td>
</tr>
<tr>
<td>32-point output</td>
<td>TWDDDO32UK</td>
<td>32</td>
<td>Outputs</td>
<td>Transistor sink</td>
<td>Connector</td>
</tr>
<tr>
<td>32-point output</td>
<td>TWDDDO32TK</td>
<td>32</td>
<td>Outputs</td>
<td>Transistor source</td>
<td>Connector</td>
</tr>
</tbody>
</table>
Overview for TWD Discrete I/O Modules

<table>
<thead>
<tr>
<th>Module Name</th>
<th>Reference</th>
<th>Channels</th>
<th>Channel type</th>
<th>Input/Output type</th>
<th>Terminal type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mixed modules</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4-point input/4-point output</td>
<td>TWDDMM8DRT</td>
<td>4</td>
<td>Inputs</td>
<td>24 VDC</td>
<td>Removable terminal block</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4</td>
<td>Outputs</td>
<td>Relay</td>
<td></td>
</tr>
<tr>
<td>16-point input/8-point output</td>
<td>TWDDMM24DRF</td>
<td>16</td>
<td>Inputs</td>
<td>24 VDC</td>
<td>Non-removable terminal block</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8</td>
<td>Outputs</td>
<td>Relay</td>
<td></td>
</tr>
</tbody>
</table>

Cables

The following table lists the cables:

<table>
<thead>
<tr>
<th>Cable name</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discrete I/O Cables</td>
<td></td>
</tr>
<tr>
<td>3 meter, connector for controller to free wire</td>
<td>TWDFCW30M</td>
</tr>
<tr>
<td>5 meter, connector for controller to free wire</td>
<td>TWDFCW50M</td>
</tr>
<tr>
<td>3 meter, connector for expansion I/O module to free wire</td>
<td>TWDFCW30K</td>
</tr>
<tr>
<td>5 meter, connector for expansion I/O module to free wire</td>
<td>TWDFCW50K</td>
</tr>
<tr>
<td>Telefast® Cables for Twido discrete I/O expansion modules</td>
<td></td>
</tr>
<tr>
<td>Cable equipped with a 20-way HE 10 connector at each end. (AWG 28 / 0.08 mm²; length: 0.5 m / 1.64 ft)</td>
<td>ABF T20E050</td>
</tr>
<tr>
<td>Cable equipped with a 20-way HE 10 connector at each end. (AWG 28 / 0.08 mm²; length: 1 m / 3.28 ft)</td>
<td>ABF T20E100</td>
</tr>
<tr>
<td>Cable equipped with a 20-way HE 10 connector at each end. (AWG 28 / 0.08 mm²; length: 2 m / 6.56 ft)</td>
<td>ABF T20E200</td>
</tr>
</tbody>
</table>
Main Features of the TWD Discrete I/O Modules

Introduction

By default all I/Os on the bases are configured as discrete I/Os.
The range of Twido I/O modules includes input modules, output modules and mixed input/output modules.

Main Features

The following table lists the main features of the discrete I/O modules by type of module:

<table>
<thead>
<tr>
<th>Type of discrete I/O module</th>
<th>Description</th>
</tr>
</thead>
</table>
| **Input modules** | There are two types of discrete input modules  
| | • one 120 VAC discrete input module  
| | • 8 channels  
| | • fitted with a removable screw terminal block  
| | • four 24 VDC discrete input modules  
| | • one 8-channel module  
| | • two 16-channel modules  
| | • one 32-channel module  
| | • equipped with either removable screw terminal blocks or HE 10 type connector  
| | • either sink modules or source modules |
| **Output modules** | There are 8 discrete output modules comprising:  
| | • two output modules with 8 and 16 relay outputs  
| | • three output modules with 8, 16 or 32-channel sink transistor outputs  
| | • three output modules with 8, 16 or 32-channel source transistor outputs  
| | • equipped with either removable screw terminal blocks or HE 10 type connector |
| **Mixed I/O modules** | There are 2 discrete mixed input and output modules comprising:  
| | • one 4-channel input / 4-channel relay output module  
| | • one 16-channel input / 8-channel relay output module  
| | • with non-removable spring terminal block |
Introduction

This chapter provides installation overall instructions for installation preparation, installation and mounting instructions for the Twido discrete I/O modules, and how to connect the power supply.

What’s in this Chapter?

This chapter contains the following sections:

<table>
<thead>
<tr>
<th>Section</th>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1</td>
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</tr>
<tr>
<td>2.2</td>
<td>Installation of TWD Discrete I/O Modules</td>
<td>28</td>
</tr>
</tbody>
</table>
2.1 Installation Overall Instructions

Introduction

This section provides information for installation preparation, how to assemble and disassemble discrete I/O modules, and minimum clearances for discrete I/O modules.

What’s in this Section?

This section contains the following topics:

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation Guidelines</td>
<td>17</td>
</tr>
<tr>
<td>Installation Preparation</td>
<td>20</td>
</tr>
<tr>
<td>Compact and Modular Bases Mounting Positions</td>
<td>21</td>
</tr>
<tr>
<td>Assembling an Expansion I/O module to a Base</td>
<td>23</td>
</tr>
<tr>
<td>Disassembling an Expansion I/O Module from a Base</td>
<td>25</td>
</tr>
<tr>
<td>Minimum Clearances for Bases and Expansion I/O Modules in a Control Panel</td>
<td>26</td>
</tr>
</tbody>
</table>
Installation Guidelines

NOTICE

Electrical equipment should be serviced only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material. This document is not intended as an instruction manual for untrained persons.

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Additional Information

Those responsible for the application, implementation or use of this product must ensure that the necessary design considerations have been incorporated into each application, completely adhering to applicable laws, performance and safety requirements, regulations, codes and standards.

General 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 unit.
- 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**

**EXPLOSION HAZARD**
- This equipment is suitable for use in Class 1, Division 2, Groups A, B, C and D or non-hazardous locations only.
- Substitution of components may impair suitability for Class I, Division 2 compliance.
- Do not disconnect equipment unless power has been switched off or the area is known to be non-hazardous.

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

**WARNING**

**UNINTENDED EQUIPMENT OPERATION**
- This product is not intended for use in safety critical machine functions. Where personnel and or equipment hazards exist, use appropriate safety interlocks.
- Do not disassemble, repair, or modify the modules.
- This controller is designed for use within an enclosure appropriately rated for its intended environment.
- Install the modules in the operating environment conditions described.
- Use the sensor power supply only for supplying power to sensors connected to the module.
- For power line and output circuits, use a fuse in compliance with local and national requirements for the circuit voltage and current requirements.
  Recommended: Littelfuse® 218 Series, 5x20 mm time lag (slow blow) fuses.

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

LOSS OF CONTROL

- The designer of any control scheme must consider the potential failure modes of control paths and, for certain critical control functions, provide a means to achieve a safe state during and after a path failure. Examples of critical control functions are emergency stop and overtravel stop.
- Separate or redundant control paths must be provided for critical control functions.
- System control paths may include communication links. Consideration must be given to the implications of unanticipated transmission delays or failures of the link.
- Each implementation of the Twido Programmable Controller must be individually and thoroughly tested for proper operation before being placed into service.

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

CAUTION

EQUIPMENT DAMAGE

Before adding/removing any module or adapter, turn off the power to the controller. Otherwise, the module, adapter, or controller may be damaged, or the controller may not operate correctly.

Failure to follow these instructions can result in injury or equipment damage.

NOTE: All options and expansion I/O modules are to be assembled before installing the control system on a DIN rail, onto a mounting plate, or in a control panel. Remove the Twido System from a DIN rail, a mounting plate, or a control panel before disassembling the expansion I/O modules.
Installation

Installation Preparation

Introduction

The following section provides information on preparation for discrete I/O modules.

Before Starting

Before installing any of the TwidoSuite products read the safety information at the beginning of this book.

<table>
<thead>
<tr>
<th>CAUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>EQUIPMENT DAMAGE</td>
</tr>
</tbody>
</table>

Before adding/removing any module or adapter, turn off the power to the base. Otherwise, the module, adapter, or base may be damaged, or the base may not operate correctly.

Failure to follow these instructions can result in injury or equipment damage.

NOTE: All options and discrete I/O modules are to be assembled before installing a Twido system on a DIN rail, onto a mounting plate, or in a control panel. It should be removed from a DIN rail, a mounting plate, or a control panel before disassembling the modules.
Compact and Modular Bases Mounting Positions

Introduction

This section shows the correct and incorrect mounting positions for all bases.

**NOTE:** Keep adequate spacing for proper ventilation and to maintain an ambient temperature between 0°C (32°F) and 55°C (131°F).

<table>
<thead>
<tr>
<th>CAUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>OVERHEATING HAZARD</strong></td>
</tr>
<tr>
<td>Do not place heat generating devices such as transformers and power supplies underneath the controllers or expansion I/O modules.</td>
</tr>
<tr>
<td>Failure to follow these instructions can result in injury or equipment damage.</td>
</tr>
</tbody>
</table>

Correct Mounting Position for all Bases

Compact and Modular bases must be mounted horizontally on a vertical plane as shown in the figures below.
Correct and Incorrect Mounting Positions for Compact Bases

A Compact base should only be positioned as shown in "Correct Mounting Position for all Bases" figure. When the ambient temperature is 35°C (95°F) or below, the Compact base can also be mounted upright on a horizontal plane as shown in (1). When the ambient temperature is 40°C (104°F) or below, the Compact base can also be mounted sideways on a vertical place as shown in figure (2). Figure (3) shows an incorrect mounting position.

Incorrect Mounting Positions for Modular Bases

A Modular base should only be positioned as shown in "Correct Mounting Position for all Bases" figure. The figures below show the incorrect mounting positions for all Modular bases.
Assembling an Expansion I/O module to a Base

Introduction

This section shows how to assemble an expansion I/O module to a base. This procedure is for both Compact and Modular bases. Your base and expansion I/O module may differ from the illustrations in this procedure.

⚠️ WARNING

UNEXPECTED EQUIPMENT OPERATION

Update the software each time you change the hardware configuration of the I/O expansion bus. Otherwise, the expansion bus will no longer operate while the local base inputs and outputs will continue to operate.

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

Assembling an Expansion I/O Module to a Base.

The following procedure shows how to assemble a base and an expansion I/O module together.

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Remove the expansion connector cover from the base.</td>
</tr>
<tr>
<td>2</td>
<td>Verify that the black latch button on the I/O module is in the up position.</td>
</tr>
</tbody>
</table>
### Installation

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Align the connector on the left side of the Expansion I/O module with the connector on the right side of the base.</td>
</tr>
<tr>
<td>4</td>
<td>Press the expansion I/O module to the base until it &quot;clicks&quot; into place.</td>
</tr>
<tr>
<td>5</td>
<td>Push down the black latch button on the top of the expansion I/O module to lock the module to the base.</td>
</tr>
</tbody>
</table>
Disassembling an Expansion I/O Module from a Base

Introduction

This section describes how to disassemble an expansion I/O module from a base. This procedure is for both Compact and Modular bases. Your base and expansion I/O module may differ from the illustrations in these procedures but the basic mechanism procedures are still applicable.

Disassembling an Expansion I/O Module from a Base.

The following procedure describes how to disassemble an expansion I/O module from a base.

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Remove the assembled base and module from the DIN rail before disassembling them, see The DIN Rail, page 91.</td>
</tr>
<tr>
<td>2</td>
<td>Push up the black latch from the bottom of the expansion I/O module to disengage it from the base.</td>
</tr>
<tr>
<td>3</td>
<td>Pull apart the base and module.</td>
</tr>
</tbody>
</table>
Minimum Clearances for Bases and Expansion I/O Modules in a Control Panel

Introduction

This section provides the minimum clearances for bases and expansion I/O modules in a control panel.

Minimum Clearances for a Compact Base and Expansion I/O Modules

In order to maintain a natural circulation of air around the Compact base and expansion I/O modules in a control panel, observe the minimum clearances shown in the figures below.
Minimum Clearances for a Modular Base and Expansion I/O Modules

In order to maintain a natural circulation of air around the Modular base and expansion I/O modules in a control panel, observe the minimum clearances shown in the figures below.
2.2 Installation of TWD Discrete I/O Modules

Introduction

This section provides information about installing the TWD Discrete I/O modules.

What's in this Section?

This section contains the following topics:

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
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</thead>
<tbody>
<tr>
<td>Dimensions for TWD Discrete I/O Modules</td>
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<td>How to Directly Mount a TWD Discrete I/O Module on a Panel Surface</td>
<td>32</td>
</tr>
<tr>
<td>How to Install and Remove a TWD Discrete I/O Module from a DIN Rail</td>
<td>34</td>
</tr>
</tbody>
</table>
Dimensions for TWD Discrete I/O Modules

Introduction

The following section shows the dimensions for all TWD discrete I/O modules.

Discrete I/O Modules (8 In and/or Out)

The following diagrams show the dimensions for the 8 input and/or output discrete modules: TWDDDI8DT, TWDDAI8DT, TWDDRA8RT, TWDDDO8TT, TWDDDO8UT, TWDDMM8DRT.

Illustrations showing a TWDDDI8DT or a TWDDAI8DT module:

NOTE: * 8.5 mm (0.33 in) when the clamp is pulled out.
Discrete I/O Modules (16 In or Out with a Terminal Block)

The following diagrams show the dimensions for the TWDDDI16DT and TWDDRRA16RT discrete I/O modules.

Illustrations showing a TWDDDI16DT module:

NOTE: * 8.5 mm (0.33 in) when the clamp is pulled out.

Discrete I/O Module (16 In and 8 Out)

The following diagrams show the dimensions for the TWDDMM24DRF discrete I/O module.

NOTE: * 8.5 mm (0.33 in) when the clamp is pulled out.
Discrete I/O Modules (16 In or Out with a Connector)

The following diagrams show the dimensions for the TWDDDI16DK, TWDDDO16TK, and TWDDDO16UK discrete I/O modules.

Illustrations showing a TWDDDI16DK module:

NOTE: * 8.5 mm (0.33 in) when the clamp is pulled out.

Discrete I/O Modules (32 In or Out)

The following diagrams show the dimensions for the TWDDDI32DK, TWDDDO32TK, and TWDDDO32UK discrete I/O modules.

Illustrations showing a TWDDDI32DK module:

NOTE: * 8.5 mm (0.33 in) when the clamp is pulled out.
How to Directly Mount a TWD Discrete I/O Module on a Panel Surface

Introduction
This section shows how to install mounting strips directly on discrete I/O modules. This section also provides mounting hole layouts for each module. Your module may differ from the illustrations in these procedures but the basic mechanism procedures are applicable.

Installing a Mounting Strip
The following procedure shows how to install a mounting strip.

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Remove the clamp from the back side of the module by pushing the clamp inward.</td>
</tr>
<tr>
<td>2</td>
<td>Insert the mounting strip, with the hook entering last, into the slot where the clamp was removed.</td>
</tr>
<tr>
<td>3</td>
<td>Slide the mounting strip into the slot until the hook enters into the recess in the module.</td>
</tr>
</tbody>
</table>
Mounting Hole Layout for Discrete I/O Modules

The following diagram shows the mounting hole layout for the discrete I/O modules.
How to Install and Remove a TWD Discrete I/O Module from a DIN Rail

Introduction

This section describes how to install and remove discrete I/O modules from a DIN rail. The device you want to install or remove may differ from the illustrations in these procedures but the basic mechanism procedures are applicable.

**NOTE:** When mounting discrete I/O modules on a DIN rail, use two end stops, type AB1-AB8P35 or equivalent.

For additional information, refer DIN rail (see page 91).

How to Install a Discrete I/O Module on a DIN Rail

The following procedure shows how to install a discrete I/O module on a DIN rail.

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Fasten the DIN rail to a panel using screws.</td>
</tr>
<tr>
<td>2</td>
<td>Pull out the clamp at the bottom of the base and module assembly.</td>
</tr>
<tr>
<td>3</td>
<td>Put the top groove of the compact base and module on the DIN rail and press the modules toward the DIN rail.</td>
</tr>
</tbody>
</table>
How to Remove a Discrete I/O Module from a DIN Rail

The following procedure shows how to remove a discrete I/O module from a DIN rail.

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Insert a flat screwdriver into the slot in the clamp.</td>
</tr>
<tr>
<td>2</td>
<td>Pull out the clamp.</td>
</tr>
<tr>
<td>3</td>
<td>Pull the compact base and the associated module off the DIN rail from the bottom.</td>
</tr>
</tbody>
</table>

Step Action

4 Push the clamp into the DIN rail.
5 Place mounting clips on both sides of the modules to keep the system from moving sideways.
Description of TWD Discrete I/O Modules

Introduction

This chapter provides descriptions, overviews, parts, specifications, wiring rules and recommendations, and wiring schematics for the Twido Discrete I/O modules.

What’s in this Chapter?

This chapter contains the following sections:

<table>
<thead>
<tr>
<th>Section</th>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1</td>
<td>TWD Discrete I/O Modules Description</td>
<td>38</td>
</tr>
<tr>
<td>3.2</td>
<td>Wiring Rules and Recommendations for TWD Discrete I/O Modules</td>
<td>44</td>
</tr>
<tr>
<td>3.3</td>
<td>Specifications and Wiring Diagrams for TWD Discrete Input Modules</td>
<td>49</td>
</tr>
<tr>
<td>3.4</td>
<td>Specifications and Wiring Diagrams for TWD Relay Output Modules</td>
<td>62</td>
</tr>
<tr>
<td>3.5</td>
<td>Specifications and Wiring Diagrams for TWD Transistor Output Modules</td>
<td>69</td>
</tr>
<tr>
<td>3.6</td>
<td>Specifications and Wiring Diagrams for TWD Discrete Mixed I/O Modules</td>
<td>79</td>
</tr>
</tbody>
</table>
3.1  TWD Discrete I/O Modules Description

Introduction

This section provides an overview and a parts description of the TWD Discrete I/O modules.

What’s in this Section?

This section contains the following topics:

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overview of TWD Discrete I/O Modules</td>
<td>39</td>
</tr>
<tr>
<td>Parts Description of TWD Discrete I/O Modules</td>
<td>42</td>
</tr>
</tbody>
</table>
Overview of TWD Discrete I/O Modules

Introduction

The following section provides an overview of the TWD discrete I/O modules.

Illustrations

The following illustrations are the discrete input, output, and mixed I/O modules.

<table>
<thead>
<tr>
<th>Model Type</th>
<th>Illustration</th>
</tr>
</thead>
<tbody>
<tr>
<td>There are 5 discrete input modules:</td>
<td>![Illustration Image]</td>
</tr>
<tr>
<td>• 8-point module with a terminal block (TWDDDI8DT)</td>
<td>TWDDDI8DT TWDDDI16DT</td>
</tr>
<tr>
<td>• 16-point module with a terminal block (TWDDDI16DT)</td>
<td>TWDDDI16DK</td>
</tr>
<tr>
<td>• 16-point module with a connector (TWDDDI16DK)</td>
<td>TWDDDI16DT</td>
</tr>
<tr>
<td>• 32-point module with a connector (TWDDDI32DK)</td>
<td>TWDDDI32DK</td>
</tr>
<tr>
<td>• 8-point, 120 VAC input module with a terminal block (TWDDAI8DT)</td>
<td>TWDDAI8DT</td>
</tr>
</tbody>
</table>

These modules can be attached to any controller except the Compact 10 I/O and 16 I/O controllers.
There are 8 discrete output modules:
- 8-point relay output module with a terminal block (TWDDRA8RT)
- 16-point relay output module with a terminal block (TWDDRA16RT)
- 8-point transistor sink module with a connector (TWDDDO8UT)
- 16-point transistor sink module with a connector (TWDDDO16UK)
- 32-point transistor sink module with a connector (TWDDDO32UK)
- 8-point transistor source module with a terminal block (TWDDDO8TT)
- 16-point transistor source module with a connector (TWDDDO16TK)
- 32-point transistor source module with a connector (TWDDDO32TK)

These modules can be attached to any controller except the Compact 10 I/O and 16 I/O controllers.

<table>
<thead>
<tr>
<th>Model Type</th>
<th>Illustration</th>
</tr>
</thead>
<tbody>
<tr>
<td>8-point relay output module</td>
<td><img src="TWDDRA8RT.png" alt="Illustration" /></td>
</tr>
<tr>
<td>16-point relay output module</td>
<td><img src="TWDDRA16RT.png" alt="Illustration" /></td>
</tr>
<tr>
<td>8-point transistor sink module</td>
<td><img src="TWDDDO8UT.png" alt="Illustration" /></td>
</tr>
<tr>
<td>16-point transistor sink module</td>
<td><img src="TWDDDO16UK.png" alt="Illustration" /></td>
</tr>
<tr>
<td>32-point transistor sink module</td>
<td><img src="TWDDDO32UK.png" alt="Illustration" /></td>
</tr>
<tr>
<td>8-point transistor source module</td>
<td><img src="TWDDDO8TT.png" alt="Illustration" /></td>
</tr>
<tr>
<td>16-point transistor source module</td>
<td><img src="TWDDDO16TK.png" alt="Illustration" /></td>
</tr>
<tr>
<td>32-point transistor source module</td>
<td><img src="TWDDDO32TK.png" alt="Illustration" /></td>
</tr>
</tbody>
</table>
There are 2 discrete mixed input and output modules:
- 4-point input/4-point output module with a terminal block (TWDDMM8RT)
- 16-point input/8-point output module with a wire-clamp terminal block (TWDDMM24DRF)

These modules can be attached to any controller except the Compact 10 I/O and 16 I/O controllers.

<table>
<thead>
<tr>
<th>Model Type</th>
<th>Illustration</th>
</tr>
</thead>
<tbody>
<tr>
<td>There are 2 discrete mixed input and output modules:</td>
<td></td>
</tr>
<tr>
<td>- 4-point input/4-point output module with a terminal block (TWDDMM8RT)</td>
<td></td>
</tr>
<tr>
<td>- 16-point input/8-point output module with a wire-clamp terminal block (TWDDMM24DRF)</td>
<td></td>
</tr>
</tbody>
</table>

These modules can be attached to any controller except the Compact 10 I/O and 16 I/O controllers.
Description of TWD Discrete I/O Modules

Parts Description of TWD Discrete I/O Modules

Introduction

The following section describes the parts of a discrete I/O module with a terminal block and with a connector. Your I/O module may differ from the illustrations but the parts will be the same.

Parts Description of a Discrete I/O Module with a Terminal Block

The following picture shows the parts of a discrete I/O module with a terminal block. This figure is the TWDDDI8DT module.

Caption

<table>
<thead>
<tr>
<th>Label</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Expansion connector - one on each side, right side not shown</td>
</tr>
<tr>
<td>2</td>
<td>Terminal block</td>
</tr>
<tr>
<td>3</td>
<td>Latch button</td>
</tr>
<tr>
<td>4</td>
<td>LEDs</td>
</tr>
<tr>
<td>5</td>
<td>Clamp</td>
</tr>
</tbody>
</table>
Parts Description of a Discrete I/O Module with a Connector

The following picture shows the parts of a discrete I/O module with a connector. This figure is the TWDDDO16TK module.

<table>
<thead>
<tr>
<th>Label</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Expansion connector - one on each side, right side not shown</td>
</tr>
<tr>
<td>2</td>
<td>Connector</td>
</tr>
<tr>
<td>3</td>
<td>Latch button</td>
</tr>
<tr>
<td>4</td>
<td>LEDs</td>
</tr>
<tr>
<td>5</td>
<td>Clamp</td>
</tr>
</tbody>
</table>
3.2 Wiring Rules and Recommendations for TWD Discrete I/O Modules

Wiring Rules and Recommendations for Discrete I/O Modules

Introduction

There are several rules that must be followed when wiring a discrete I/O module. Recommendations, when needed, are provided on how to comply with the rules.

<table>
<thead>
<tr>
<th>DANGER</th>
</tr>
</thead>
<tbody>
<tr>
<td>HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH</td>
</tr>
<tr>
<td>• 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.</td>
</tr>
<tr>
<td>• Always use a properly rated voltage sensing device to confirm the power is off where and when indicated.</td>
</tr>
<tr>
<td>• Replace and secure all covers, accessories, hardware, cables, and wires and confirm that a proper ground connection exists before applying power to the unit.</td>
</tr>
<tr>
<td>• Use only the specified voltage when operating this equipment and any associated products.</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>WARNING</th>
</tr>
</thead>
<tbody>
<tr>
<td>MALFUNCTION OF OUTPUTS</td>
</tr>
<tr>
<td>Use appropriate safety interlocks where personal and/or equipment hazards exist. Outputs can malfunction and remain ON or OFF.</td>
</tr>
</tbody>
</table>

Failure to follow these instructions can result in death, serious injury, or equipment damage.
Description of TWD Discrete I/O Modules

Rules

- Each terminal accepts up to two 18 AWG (0.82 mm²) through 28 AWG (0.08 mm²) fitted with cable ends or tags.
- The power supply wire are to be between 18 AWG (0.82 mm²) and 22 AWG (0.33 mm²). Use the shortest wire length possible.
- The grounding wire is to be 16 AWG (1.30 mm²).
- Power supply wires routed inside the panel must be kept separate from power wires, I/O wiring and communication wiring. Route wiring in separate cable ducting.
- Verify that the operating conditions and environments are within the specification values.
- Use proper wire size to meet voltage and current requirements.

Terminal Tightening Torque

Recommended tightening torque of terminal blocks is listed for all products on the product label.

Input Operating Range

The input operating range of the Type 1 (IEC 61131-2) input module is shown below.
Description of TWD Discrete I/O Modules

Input Internal Circuit

The input internal circuit is shown below.

**Contact Protection Circuit for Relay and Transistor Outputs**

---

**CAUTION**

**POTENTIAL MODULE DAMAGE**

Inductive loads are capable of inducing high voltages that can damage or reduce the operating life of modules outputs. When driving inductive loads one of the following protective circuits must be used. Ensure by calculation, simulation or test that the circuit chosen is capable of absorbing the inductive energy without exceeding the module ratings.

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

Depending on the load, a protection circuit may be needed for the relay output on the bases. Choose a protection circuit, from the following diagrams, according to the power supply. Connect the protection circuit to the outside of the base or relay output module.

Protective circuit A: this protection circuit can be used when the load impedance is smaller than the RC impedance in an AC load power circuit.

- C represents a value from 0.1 to 1 μF.
- R represents a resistor of approximately the same resistance value as the load.
Protective circuit B: this protection circuit can be used for both AC and DC load power circuits.

![Diagram of Protective Circuit B]

- C represents a value from 0.1 to 1 μF.
- R represents a resistor of approximately the same resistance value as the load.

Protective circuit C: this protection circuit can be used for DC load power circuits.

![Diagram of Protective Circuit C]

Use a diode with the following ratings:

- Reverse withstand voltage: power voltage of the load circuit x 10.
- Forward current: more than the load current.

Protective circuit D: this protection circuit can be used for both AC and DC load power circuits.

![Diagram of Protective Circuit D]
Explanation of Source Inputs/Sink Outputs

NOTE: Sink corresponds to the sensors' common on the (+) terminal of the power supply.

Input side COM field terminal connects to the "*" terminal or common of the field power supply. Output side COM field terminal connects to +24V field power supply.

Explanation of Sink Inputs/Source Outputs

NOTE: Source corresponds to the sensors' common on the (-) terminal of the power supply.

Input side COM field terminal connects to +24V field power supply. Output side COM field terminal connects to the "*" terminal or common of the field power supply.
3.3 Specifications and Wiring Diagrams for TWD Discrete Input Modules

Introduction

This section provides general, electrical, input and functional specifications, and wiring diagrams description for TWD Discrete Input modules.

What’s in this Section?

This section contains the following topics:

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Specifications for the TWD Discrete Input Modules</td>
<td>50</td>
</tr>
<tr>
<td>Electrical Specifications for the TWD Discrete Input Modules</td>
<td>51</td>
</tr>
<tr>
<td>Input Specifications for the TWD Discrete Input Modules</td>
<td>52</td>
</tr>
<tr>
<td>TWD Discrete Input Modules Wiring Diagrams</td>
<td>55</td>
</tr>
</tbody>
</table>
Description of TWD Discrete I/O Modules

General Specifications for the TWD Discrete Input Modules

Introduction

This section presents the general specifications for the TWD discrete input modules.

TWDDI8DT, TWDDI16DT, TWDDI16DK, TWDDI32DK and TWDDAI8DT Normal Operating Specifications

<table>
<thead>
<tr>
<th>WARNING</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>UNINTENDED EQUIPMENT OPERATION</strong></td>
</tr>
<tr>
<td>Do not exceed any of the rated values specified below.</td>
</tr>
<tr>
<td>Failure to follow these instructions can result in death, serious injury, or equipment damage.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Reference number</th>
<th>Discrete Input Modules</th>
</tr>
</thead>
<tbody>
<tr>
<td>TWDDI8DT</td>
<td>TWDDI16DT</td>
</tr>
<tr>
<td>Ambient operating temperature</td>
<td>°C to 55°C (32°F to 131°F)</td>
</tr>
<tr>
<td>Storage temperature (°C)</td>
<td>-25°C to +70°C (-13°F to +158°F)</td>
</tr>
<tr>
<td>Relative humidity</td>
<td>30 to 95% (non-condensing)</td>
</tr>
<tr>
<td>Degree of pollution</td>
<td>2 (IEC60066)</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 20</td>
</tr>
<tr>
<td>Corrosion immunity</td>
<td>Free from corrosive gases</td>
</tr>
<tr>
<td>Altitude</td>
<td>Operation: 0 to 2,000 m (0 to 6,560 ft)</td>
</tr>
<tr>
<td></td>
<td>Transport: 0 to 3,000 m (0 to 9,840 ft)</td>
</tr>
<tr>
<td>Resistance to vibration</td>
<td>When mounted on a DIN rail: 10 to 57 Hz, amplitude 0.075 mm, 57 to 150 Hz, acceleration 9.8 m/s² (1G)</td>
</tr>
<tr>
<td></td>
<td>When mounted on a panel surface: 2 to 25 Hz, amplitude 1.6 mm, 25 to 100 Hz, acceleration 39.2 m/s² (4G)</td>
</tr>
<tr>
<td>Impact strength</td>
<td>147 m/s² (15G) for 11ms duration</td>
</tr>
<tr>
<td>Weight</td>
<td>85 g (3 oz)</td>
</tr>
</tbody>
</table>
Electrical Specifications for the TWD Discrete Input Modules

Introduction

This section presents the electrical specifications for the TWD discrete input modules.

TWDDDI8DT, TWDDDI16DT, TWDDDI16DK, TWDDDI32DK and TWDDAI8DT Electrical Specifications

<table>
<thead>
<tr>
<th>Reference number</th>
<th>Discrete Input Modules</th>
</tr>
</thead>
<tbody>
<tr>
<td>TWDDDI8DT</td>
<td>TWDDDI16DT</td>
</tr>
<tr>
<td>Isolation</td>
<td></td>
</tr>
<tr>
<td>Between input terminals and internal circuit: photocoupler isolated (isolation protection up to 500 V)</td>
<td>Between input terminals: not isolated</td>
</tr>
<tr>
<td>Connector insertion/removal durability</td>
<td>100 times minimum</td>
</tr>
<tr>
<td>Internal current draw - all inputs on</td>
<td>25 mA (5 VDC)</td>
</tr>
<tr>
<td>0 mA (24 VDC)</td>
<td>0 mA (24 VDC)</td>
</tr>
<tr>
<td>Internal current draw - all inputs off</td>
<td>5 mA (5 VDC)</td>
</tr>
<tr>
<td>0 mA (24 VDC)</td>
<td>0 mA (24 VDC)</td>
</tr>
</tbody>
</table>

WARNING

UNINTENDED EQUIPMENT OPERATION

Do not exceed any of the rated values specified below.

Failure to follow these instructions can result in death, serious injury, or equipment damage.
Description of TWD Discrete I/O Modules

Input Specifications for the TWD Discrete Input Modules

Introduction

This section presents the input specifications for the TWD discrete input modules.

TWDDDI8DT, TWDDDI16DT, TWDDDI16DK, TWDDDI32DK and TWDDAI8DT Specifications

⚠️ WARNING

UNINTENDED EQUIPMENT OPERATION
Do not exceed any of the rated values specified below.
Failure to follow these instructions can result in death, serious injury, or equipment damage.

<table>
<thead>
<tr>
<th>Reference number</th>
<th>Discrete Input Modules</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TWDDDI8DT</td>
</tr>
<tr>
<td>Input points</td>
<td>8</td>
</tr>
<tr>
<td>Common lines</td>
<td>1</td>
</tr>
<tr>
<td>Rated input voltage</td>
<td>24 VDC source/sink input signal</td>
</tr>
<tr>
<td>Input voltage range</td>
<td>from 20.4 to 28.8 VDC</td>
</tr>
<tr>
<td>Rated input current</td>
<td>7 mA/input (24 VDC)</td>
</tr>
<tr>
<td>Input impedance</td>
<td>3.4 kΩ</td>
</tr>
<tr>
<td>Turn on time</td>
<td>8 ms (24 VDC)</td>
</tr>
<tr>
<td>Turn off time</td>
<td>8 ms (24 VDC)</td>
</tr>
<tr>
<td>Isolation</td>
<td>Between input terminals and internal circuit: photocoupler isolated (isolation protection up to 500 VAC)</td>
</tr>
<tr>
<td>External load for I/O interconnection</td>
<td>Not needed</td>
</tr>
<tr>
<td>Signal determination method</td>
<td>Static</td>
</tr>
<tr>
<td>Input signals type</td>
<td>The input signals can be both sink and source.</td>
</tr>
<tr>
<td>Cable length</td>
<td>3m (9.84 ft.)</td>
</tr>
</tbody>
</table>
## Description of TWD Discrete I/O Modules

<table>
<thead>
<tr>
<th>Reference number</th>
<th>TWDDDI8DT</th>
<th>TWDDDI16DT</th>
<th>TWDDDI16DK</th>
<th>TWDDDI32DK</th>
<th>TWDDAI8DT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connector insertion/removal durability</td>
<td>100 times minimum</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Internal current draw - all inputs on</td>
<td>25 mA (5 VDC)</td>
<td>40 mA (5 VDC)</td>
<td>35 mA (5 VDC)</td>
<td>65 mA (5 VDC)</td>
<td>55 mA (5 VDC)</td>
</tr>
<tr>
<td></td>
<td>0 mA (24 VDC)</td>
<td>0 mA (24 VDC)</td>
<td>0 mA (24 VDC)</td>
<td>0 mA (24 VDC)</td>
<td>0 mA (24 VDC)</td>
</tr>
<tr>
<td>Internal current draw - all inputs off</td>
<td>5 mA (5 VDC)</td>
<td>5 mA (5 VDC)</td>
<td>5 mA (5 VDC)</td>
<td>10 mA (5 VDC)</td>
<td>25 mA (5 VDC)</td>
</tr>
<tr>
<td></td>
<td>0 mA (24 VDC)</td>
<td>0 mA (24 VDC)</td>
<td>0 mA (24 VDC)</td>
<td>0 mA (24 VDC)</td>
<td>0 mA (24 VDC)</td>
</tr>
<tr>
<td>Weight</td>
<td>85 g (3 oz)</td>
<td>100 g (3.5 oz)</td>
<td>65 g (2.3 oz)</td>
<td>100 g (3.5 oz)</td>
<td>81 g (2.9 oz)</td>
</tr>
</tbody>
</table>

### TWDDDI8DT, TWDDDI16DT, TWDDDI16DK, TWDDDI32DK and TWDDAI8DT Internal Circuit

The input internal circuit is shown below.

**Standard Sink or Source Input**

TWDDDI8DT and TWDDDI16DT

**Input**

3.3 kΩ

COMO

Internal Circuit

TWDDDI8DT and TWDDDI16DK

**Input**

4.3 kΩ

COMO

Internal Circuit

TWDDDI16DK and TWDDDI32DK

**Input**

11 kΩ

COMO

Internal Circuit
TWDDI8DT, TWDDI16DT, TWDDI16DK, TWDDI32DK and TWDDAI8DT Usage Limits

When using TWDDI16DT at 55°C (131°F) in the normal mounting direction, limit the inputs which turn on simultaneously along line (1). At 45°C (113°F), all inputs can be turned on simultaneously at 28.8 VDC as indicated with line (2).

When using TWDDI16DK and TWDDI32DK at 55°C (131°F), limit the inputs which turn on simultaneously on each connector along line (3). This limitation applies per connector. At 30°C (86°F), all inputs can be turned on simultaneously at 28.8 VDC as indicated with line (4).

When using TWDDI8DT, all inputs can be turned on simultaneously at 55°C (131°F), input voltage 28.8 VDC.
TWD Discrete Input Modules Wiring Diagrams

Introduction

This section shows examples of wiring diagrams for the TWD discrete input modules. Symbols used in the following diagrams are explained in the Glossary of Symbols (see page 93) in the appendix.

**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 unit.
- 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.

**NOTE:** These diagrams are for external wiring only.

**NOTE:** The shaded boxes are markings on the discrete input modules. The I and Q numbers are the input and output points.
TWDDI8DT Wiring Diagram

This diagram is for the TWDDI8DT module.

- The two COM terminals are connected together internally.
- Both sink and source input wiring are supported
- A is the sink wiring (positive logic).
- B is the source wiring (negative logic).

TWDDAI8DT Wiring Diagram

⚠️ 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 unit.
- 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.
The two COM terminals are not connected together internally.
TWDDI16DT Wiring Diagram

This diagram is for the TWDDI16DT module.

- The four COM terminals are connected together internally.
- Both sink and source input wiring are supported
- A is the sink wiring (positive logic).
- B is the source wiring (negative logic).
TWDDI16DK Wiring Diagram

This diagram is for the TWDDI16DK module.

- The two COM terminals are connected together internally.
- Both sink and source input wiring are supported
- A is the sink wiring (positive logic).
- B is the source wiring (negative logic).
TWDDDI32DK Wiring Diagram

This diagram is for the TWDDDI32DK module.

- The COM0 terminals are connected together internally.
- The COM1 terminals are connected together internally.
- The COM0 and COM1 terminals are not connected together internally.
- Both sink and source input wiring are supported.
- A is the sink wiring (positive logic).
- B is the source wiring (negative logic).
TWDDDI8DT, TWDDDI16DT, TWDDDI16DK, TWDDDI32DK and TWDDAI8DT Operating Range

The operating range of the Type 1 (IEC 61131-2) input module is shown below.
3.4 Specifications and Wiring Diagrams for TWD Relay Output Modules

Introduction

This section provides general, electrical, relay output, and functional specifications for TWD Relay Output modules.

What's in this Section?

This section contains the following topics:

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<th>Page</th>
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</thead>
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</tr>
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<td>Electrical Specifications for the TWD Relay Output Modules</td>
<td>64</td>
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<tr>
<td>Output Specifications for the TWD Relay Output Modules</td>
<td>65</td>
</tr>
<tr>
<td>TWD Relay Output Modules Wiring Diagrams</td>
<td>66</td>
</tr>
</tbody>
</table>
General Specifications for the TWD Relay Output Modules

Introduction
This section presents the general specifications for the TWD relay output modules.

TWDDRA8RT and TWDDRA16RT Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>TWDDRA8RT</th>
<th>TWDDRA16RT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reference number</td>
<td>Reference number Relay Output Modules</td>
<td>Reference number Relay Output Modules</td>
</tr>
<tr>
<td>Ambient operating temperature</td>
<td>0°C to 55°C (32°F to 131°F)</td>
<td>0°C to 55°C (32°F to 131°F)</td>
</tr>
<tr>
<td>Storage temperature (°C)</td>
<td>-25°C to +70°C (-13°F to +158°F)</td>
<td>-25°C to +70°C (-13°F to +158°F)</td>
</tr>
<tr>
<td>Relative humidity</td>
<td>30 to 95% (non-condensing)</td>
<td>30 to 95% (non-condensing)</td>
</tr>
<tr>
<td>Degree of pollution</td>
<td>2 (IEC60664)</td>
<td>2 (IEC60664)</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 20</td>
<td>IP 20</td>
</tr>
<tr>
<td>Corrosion immunity</td>
<td>Free from corrosives gases</td>
<td>Free from corrosives gases</td>
</tr>
<tr>
<td>Altitude</td>
<td>Operation: 0 to 2,000 m (0 to 6,560 ft)</td>
<td>Operation: 0 to 2,000 m (0 to 6,560 ft)</td>
</tr>
<tr>
<td></td>
<td>Transport: 0 to 3,000 m (0 to 9,840 ft)</td>
<td>Transport: 0 to 3,000 m (0 to 9,840 ft)</td>
</tr>
<tr>
<td>Resistance to vibration</td>
<td>When mounted on a DIN rail:</td>
<td>When mounted on a DIN rail:</td>
</tr>
<tr>
<td></td>
<td>10 to 57 Hz, amplitude 0.075 mm, 57 to 150 Hz, acceleration 9.8 m/s² (1G)</td>
<td>57 to 150 Hz, amplitude 0.075 mm, 20 Hz to 60 Hz, acceleration 10 m/s² (1G)</td>
</tr>
<tr>
<td></td>
<td>When mounted on a panel surface:</td>
<td>When mounted on a panel surface:</td>
</tr>
<tr>
<td></td>
<td>2 to 25 Hz, amplitude 1.6 mm, 25 to 100 Hz, acceleration 39.2 m/s² (4G)</td>
<td>25 to 100 Hz, amplitude 1.6 mm, 25 to 100 Hz, acceleration 39.2 m/s² (4G)</td>
</tr>
<tr>
<td>Impact strength</td>
<td>147 m/s² (15G) for 11 ms duration</td>
<td>147 m/s² (15G) for 11 ms duration</td>
</tr>
<tr>
<td>Weight</td>
<td>110 g (3.9 oz)</td>
<td>145 g (5.1 oz)</td>
</tr>
</tbody>
</table>
Description of TWD Discrete I/O Modules

Electrical Specifications for the TWD Relay Output Modules

Introduction

This section presents the electrical specifications for the TWD relay output modules.

TWDDRA8RT and TWDDRA16RT Specifications

<table>
<thead>
<tr>
<th>Reference number</th>
<th>Relay Output Modules</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TWDDRA8RT</td>
</tr>
<tr>
<td>Connector insertion/removal durability</td>
<td>100 times minimum</td>
</tr>
<tr>
<td>Internal current draw - all outputs on</td>
<td>30 mA (5 VDC)</td>
</tr>
<tr>
<td></td>
<td>40 mA (24 VDC)</td>
</tr>
<tr>
<td>Internal current draw - all outputs off</td>
<td>5 mA (5 VDC)</td>
</tr>
<tr>
<td></td>
<td>0 mA (24 VDC)</td>
</tr>
<tr>
<td>Weight</td>
<td>110 g (3.9 oz)</td>
</tr>
</tbody>
</table>

Relay Output Contact

The relay output contact is shown below.

[Diagram of relay output contact]
Output Specifications for the TWD Relay Output Modules

Introduction

This section presents the output specifications for the TWD relay output modules.

TWDDRA8RT and TWDDRA16RT Specifications

<table>
<thead>
<tr>
<th>Reference number</th>
<th>Relay Output Modules</th>
</tr>
</thead>
<tbody>
<tr>
<td>TWDDRA8RT</td>
<td>TWDDRA16RT</td>
</tr>
<tr>
<td>Output points and common lines</td>
<td>8 NO contacts in 2 common lines 16 NO contacts in 2 common lines</td>
</tr>
<tr>
<td>Maximum load current</td>
<td>2 A per output 7 A per common line 8 A per common line</td>
</tr>
<tr>
<td>Minimum switching load</td>
<td>0.1 mA/0.1 VDC (reference value)</td>
</tr>
<tr>
<td>Initial contact resistance</td>
<td>30 mΩ maximum</td>
</tr>
<tr>
<td>Electrical life</td>
<td>100,000 operations minimum (rated resistive load 1,800 operations/h)</td>
</tr>
<tr>
<td>Mechanical life</td>
<td>20,000,000 operations minimum (no load 18,000 operations/h)</td>
</tr>
<tr>
<td>Rated load (resistive/inductive)</td>
<td>240 VAC/2 A, 30 VDC/2 A</td>
</tr>
<tr>
<td>Dielectric strength</td>
<td>Between output to terminals: 1500 VAC, 1 minute</td>
</tr>
<tr>
<td></td>
<td>Between output terminal and internal circuit: 1500 VAC, 1 minute</td>
</tr>
<tr>
<td></td>
<td>Between output groups: 1500 VAC, 1 minute</td>
</tr>
</tbody>
</table>

TWDDRA8RT and TWDDRA16RT Delay

The output delay is shown below.

DANGER

FIRE HAZARDS
Possible current overload; size wire accordingly.
Failure to follow these instructions will result in death or serious injury.

Command

Output

Relay Status

ON

OFF

ON

OFF

OFF delay: 10 ms maximum
Contact bounce: 6 ms maximum
ON delay: 6 ms maximum
TWD Relay Output Modules Wiring Diagrams

Introduction

This section shows examples of wiring diagrams for the TWD relay output modules. Symbols used in the following diagrams are explained in the Glossary of Symbols (see page 93) in the appendix.

**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 unit.
- 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**

UNINTENDED EQUIPMENT OPERATION

Use appropriate safety interlocks where personal and/or equipment hazards exist.

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

**NOTE:** These diagrams are for external wiring only.

**NOTE:** The shaded boxes are markings on the discrete I/O modules. The I and Q numbers are the input and output points.
TWDDRA8RT Wiring Diagram

This diagram is for the TWDDRA8RT module.

- The COM0 and COM1 terminals are not connected together internally.
- Connect an appropriate fuse for the load.
- (1) is the protection for inductive load.
TWDDRA16RT Wiring Diagram

This diagram is for the TWDDRA16RT module.

- The COM0 terminals are connected together internally.
- The COM1 terminals are connected together internally.
- The COM0 and COM1 terminals are not connected together internally.
- Connect an appropriate fuse for the load.
- (1) is the protection for inductive load.
3.5 Specifications and Wiring Diagrams for TWD Transistor Output Modules

Introduction

This section provides general, electrical, output, and functional specifications for TWD Transistor Output modules.

What’s in this Section?

This section contains the following topics:

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<td>TWD Transistor Output Module Wiring Diagrams</td>
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# General Specifications for the TWD Transistor Output Modules

## Introduction

This section presents the general specifications for the TWD transistor output modules.

**TWDDDO8UT, TWDDDO16UK, TWDDDO32UK, TWDDDO8TT, TWDDDO16TK, and TWDDDO32TK**

## Specifications

<table>
<thead>
<tr>
<th>Reference number</th>
<th>TWDDDO8UT</th>
<th>TWDDDO16UK</th>
<th>TWDDDO32UK</th>
</tr>
</thead>
<tbody>
<tr>
<td>TWDDDO8UT</td>
<td>TWDDDO8TT</td>
<td>TWDDDO16TK</td>
<td>TWDDDO32TK</td>
</tr>
<tr>
<td>Output type</td>
<td>TWDDDO8UT, TWDDDO16UK and TWDDDO32UK are transistor sink outputs</td>
<td>TWDDDO8TT, TWDDDO16TK and TWDDDO32TK are transistor source outputs</td>
<td></td>
</tr>
<tr>
<td>Ambient operating temperature</td>
<td>0°C to 55°C (32°F to 131°F)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Storage temperature</td>
<td>-25°C to +70°C (-13°F to +158°F)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relative humidity</td>
<td>30 to 95% (non-condensing)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Degree of pollution</td>
<td>2 (IEC60664)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corrosion immunity</td>
<td>Free from corrosive gases</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Altitude | Operation: 0 to 2,000 m (0 to 6,560 ft)  
Transport: 0 to 3,000 m (0 to 9,840 ft) |
| Resistance to vibration | When mounted on a DIN rail:  
10 to 57 Hz, amplitude 0.075 mm, 57 to 150 Hz, acceleration 9.8 m/s² (1G)  
When mounted on a panel surface:  
2 to 25 Hz, amplitude 1.6 mm, 25 to 100 Hz, acceleration 39.2 m/s² (4G) |
| Impact strength | 147 m/s² (15G) for 11ms duration |
| Weight | 85 g (3 oz)  
70 g (2.5 oz)  
105 g (3.7 oz) |
Electrical Specifications for the TWD Transistor Output Modules

Introduction

This section presents the electrical specifications for the TWD transistor output modules.

**TWDDDO8UT, TWDDDO16UK, TWDDDO32UK, TWDDDO8TT, TWDDDO16TK, and TWDDDO32TK**

**Electrical Specifications**

<table>
<thead>
<tr>
<th>Reference number</th>
<th>TWDDDO8UT</th>
<th>TWDDDO16UK</th>
<th>TWDDDO32UK</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TWDDDO8TT</td>
<td>TWDDDO16TK</td>
<td>TWDDDO32TK</td>
</tr>
<tr>
<td>Output type</td>
<td>TWDDDO8UT, TWDDDO16UK and TWDDDO32UK are transistor sink outputs</td>
<td>TWDDDO8TT, TWDDDO16TK and TWDDDO32TK are transistor source outputs</td>
<td></td>
</tr>
<tr>
<td>Connector insertion/removal durability</td>
<td>100 times minimum</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Internal current draw - all outputs on</td>
<td>10 mA (5 VDC)</td>
<td>10 mA (5 VDC)</td>
<td>20 mA (5 VDC)</td>
</tr>
<tr>
<td></td>
<td>20 mA (24 VDC)</td>
<td>40mA (24 VDC)</td>
<td>70 mA (24 VDC)</td>
</tr>
<tr>
<td>Internal current draw - all outputs off</td>
<td>5 mA (5 VDC)</td>
<td>5 mA (5VDC)</td>
<td>10 mA (5 VDC)</td>
</tr>
<tr>
<td></td>
<td>0 mA (24 VDC)</td>
<td>0 mA (24VDC)</td>
<td>0 mA (24 VDC)</td>
</tr>
</tbody>
</table>

**Transistor Source Output Contact**

The transistor source output contact is shown below.

![Transistor Source Output Contact Diagram](image)

**Transistor Sink Output Contact**

The transistor sink output contact is shown below.

![Transistor Sink Output Contact Diagram](image)
## Output Specifications for the TWD Transistor Output Modules

### Introduction

This section presents the output specifications for the TWD transistor output modules.

**TWDDDO8UT, TWDDDO16UK, TWDDDO32UK, TWDDDO8TT, TWDDDO16TK, and TWDDDO32TK**

### Output Specifications

**DANGER**

**FIRE HAZARDS**

Possible current overload; size wire accordingly.

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

<table>
<thead>
<tr>
<th>Reference number</th>
<th>TWDDDO8UT</th>
<th>TWDDDO16UK</th>
<th>TWDDDO32UK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output type</td>
<td>TWDDDO8UT, TWDDDO16UK and TWDDDO32UK are transistor sink outputs TWDDDO8TT, TWDDDO16TK and TWDDDO32TK are transistor source outputs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output points per common Line</td>
<td>8 points in 1 common line</td>
<td>16 points in 1 common line</td>
<td>32 points in 2 common lines</td>
</tr>
<tr>
<td>Rated load voltage</td>
<td>24 VDC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating load voltage range</td>
<td>from 20.4 to 28.8 VDC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated load current</td>
<td>0.3 A per output</td>
<td>0.1 A per output</td>
<td></td>
</tr>
<tr>
<td>Maximum load current</td>
<td>0.36 A per output at maximum load (0.3 A at nominal load) 3 A per common line</td>
<td>0.12 A per output at maximum load (0.1 A at nominal load) 1 A per common line</td>
<td></td>
</tr>
<tr>
<td>Voltage drop (on voltage)</td>
<td>1 V maximum (voltage between COM and output terminals when output is on)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inrush current</td>
<td>1 A maximum</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leakage current</td>
<td>0.1 mA maximum</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clamping voltage</td>
<td>39 V +/-1 V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum lamp load</td>
<td>8 W</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inductive load</td>
<td>L/R = 10 ms (28.8 VDC, 1 Hz)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>External current draw</td>
<td>100 mA maximum, 24 VDC (power voltage at the +V terminal)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Description of TWD Discrete I/O Modules

<table>
<thead>
<tr>
<th>Reference number</th>
<th>TWDDDO8UT</th>
<th>TWDDDO8TT</th>
<th>TWDDDO16UK</th>
<th>TWDDDO16TK</th>
<th>TWDDDO32UK</th>
<th>TWDDDO32TK</th>
</tr>
</thead>
</table>
| **Isolation**    | Between output terminal and internal circuit: photocoupler isolated (isolation protection up to 500 VAC)  
|                  | Between output terminals: not isolated |
| **Output delay** | Turn on time: 300 μs maximum  
|                  | Turn off time: 300 μs maximum |
TWD Transistor Output Module Wiring Diagrams

Introduction

This section shows examples of wiring diagrams for the TWD transistor output modules. Symbols used in the following diagrams are explained in the Glossary of Symbols (see page 93) in the appendix.

**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 unit.
- 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**

MALFUNCTION OF OUTPUTS

Use appropriate safety interlocks where personal and/or equipment hazards exist. Outputs can malfunction and remain ON or OFF.

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

NOTE: These diagrams are for external wiring only.

NOTE: The shaded boxes are markings on the discrete I/O modules. The I and Q numbers are the input and output points.
TWDDDO8UT Wiring Diagram

This diagram is for TWDDDO8UT module.

- Connect an appropriate fuse for the load.
- A is the sink wiring (positive logic).

TWDDDO16UK Wiring Diagram

This diagram is for the TWDDDO16UK module.

- The COM(-) terminals are connected together internally.
- The +V terminals are connected together internally.
- Connect an appropriate fuse for the load.
- A is the sink wiring (positive logic).
TWDDDO32UK Wiring Diagram

This diagram is for the TWDDDO32UK module.

- Terminals on CN1 and CN2 are not connected together internally.
- The COM0(-) terminals are connected together internally.
- The COM1(-) terminals are connected together internally.
- The +V terminals are connected together internally.
- Connect an appropriate fuse for the load.
- A is the sink wiring (positive logic).
TWDDDO8TT Wiring Diagram

This diagram is for the TWDDDO8TT module.

- Connect an appropriate fuse for the load.
- B is the source wiring (negative logic).

TWDDDO16TK Wiring Diagram

This diagram is for the TWDDDO16TK module.

- The COM(+) terminals are connected together internally.
- The -V terminals are connected together internally.
- Connect an appropriate fuse for the load.
- B is the source wiring (negative logic).
TWDDDO32TK Wiring Diagram

This diagram is for the TWDDDO32TK module.

- Terminals CN1 and CN2 are **not** connected together internally.
- The COM0(+) terminals are connected together internally.
- The COM1(+) terminals are connected together internally.
- The -V terminals are connected together internally.
- Connect an appropriate fuse for the load.
- B is the source wiring (negative logic).
3.6 Specifications and Wiring Diagrams for TWD Discrete Mixed I/O Modules

Introduction

This section provides general, electrical, I/O, and functional specifications, for TWD Discrete Mixed I/O modules.

What's in this Section?

This section contains the following topics:

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<tr>
<td>Electrical Specifications for the TWD Mixed I/O Modules</td>
<td>81</td>
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<tr>
<td>I/O Specifications for the TWD Mixed I/O Modules</td>
<td>82</td>
</tr>
<tr>
<td>TWD Mixed I/O Module Wiring Diagrams</td>
<td>85</td>
</tr>
</tbody>
</table>
Description of TWD Discrete I/O Modules

General Specifications for the TWD Mixed I/O Modules

Introduction

This section presents the general specifications for the TWD mixed I/O modules.

TWDDMM8DRT and TWDDMM24DRF Input Specifications

<table>
<thead>
<tr>
<th>Reference number</th>
<th>TWDDMM8DRT</th>
<th>TWDDMM24DRF</th>
</tr>
</thead>
<tbody>
<tr>
<td>I/O points</td>
<td>4 inputs and 4 outputs</td>
<td>16 inputs and 8 outputs</td>
</tr>
<tr>
<td>Ambient operating temperature</td>
<td>0°C to 55°C (32°F to 131°F)</td>
<td></td>
</tr>
<tr>
<td>Storage temperature</td>
<td>-25°C to +70°C (-13°F to +158°F)</td>
<td></td>
</tr>
<tr>
<td>Relative humidity</td>
<td>30 to 95% (non-condensing)</td>
<td></td>
</tr>
<tr>
<td>Degree of pollution</td>
<td>2 (IEC60664)</td>
<td></td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 20</td>
<td></td>
</tr>
<tr>
<td>Corrosion immunity</td>
<td>Free from corrosive gases</td>
<td></td>
</tr>
<tr>
<td>Altitude</td>
<td>Operation: 0 to 2,000 m (0 to 6,560 ft)</td>
<td>Transport: 0 to 3,000 m (0 to 9,840 ft)</td>
</tr>
<tr>
<td>Resistance to vibration</td>
<td>When mounted on a DIN rail: 10 to 57 Hz, amplitude 0.075 mm, 57 to 150 Hz, acceleration 9.8 m/s² (1G)</td>
<td>When mounted on a panel surface: 2 to 25 Hz, amplitude 1.6 mm, 25 to 100 Hz, acceleration 39.2 m/s² (4G)</td>
</tr>
<tr>
<td>Impact strength</td>
<td>147 m/s² (15G) for 11ms duration</td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>95 g (3.3 oz)</td>
<td>140 g (4.9 oz)</td>
</tr>
</tbody>
</table>
Electrical Specifications for the TWD Mixed I/O Modules

Introduction

This section presents the electrical specifications for the TWD mixed I/O modules.

TWDDMM8DRT and TWDDMM24DRF Input Specifications

<table>
<thead>
<tr>
<th>Reference number</th>
<th>TWDDMM8DRT</th>
<th>TWDDMM24DRF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connector insertion/removal durability</td>
<td>100 times minimum</td>
<td>Not removable</td>
</tr>
<tr>
<td>Internal current draw - all I/O on</td>
<td>25 mA (5 VDC) 20 mA (24 VDC)</td>
<td>65 mA (5 VDC) 45 mA (24 VDC)</td>
</tr>
<tr>
<td>Internal current draw - all I/O off</td>
<td>5 mA (5 VDC) 0 mA (24 VDC)</td>
<td>10 mA (5 VDC) 0 mA (24 VDC)</td>
</tr>
</tbody>
</table>
Description of TWD Discrete I/O Modules

I/O Specifications for the TWD Mixed I/O Modules

Introduction

This section presents the I/O specifications for the TWD mixed I/O modules.

TWDDMM8DRT and TWDDMM24DRF Input Specifications

<table>
<thead>
<tr>
<th>Reference number</th>
<th>TWDDMM8DRT</th>
<th>TWDDMM24DRF</th>
</tr>
</thead>
<tbody>
<tr>
<td>I/O points</td>
<td>4 inputs and 4 outputs</td>
<td>16 inputs and 8 outputs</td>
</tr>
<tr>
<td>Rated input voltage</td>
<td>24 VDC source/sink input signal</td>
<td></td>
</tr>
<tr>
<td>Input voltage range</td>
<td>from 20.4 to 28.8 VDC</td>
<td></td>
</tr>
<tr>
<td>Rated input current</td>
<td>7 mA/input (24 VDC)</td>
<td></td>
</tr>
<tr>
<td>Input impedance</td>
<td>3.4 kΩ</td>
<td></td>
</tr>
<tr>
<td>Turn on time (24 VDC)</td>
<td>4 ms (24 VDC)</td>
<td></td>
</tr>
<tr>
<td>Turn off time (24 VDC)</td>
<td>4 ms (24 VDC)</td>
<td></td>
</tr>
<tr>
<td>Isolation</td>
<td>Between input terminals and internal circuit: photocoupler isolated (isolation protection up to 500 VAC)</td>
<td>Between input terminals: not isolated</td>
</tr>
<tr>
<td>External load for I/O interconnection</td>
<td>Not needed</td>
<td></td>
</tr>
<tr>
<td>Signal determination method</td>
<td>Static</td>
<td></td>
</tr>
<tr>
<td>Input signals type</td>
<td>Both sinking and sourcing input signals can be connected.</td>
<td></td>
</tr>
<tr>
<td>Cable length</td>
<td>3m (9.84 ft.)</td>
<td></td>
</tr>
</tbody>
</table>

⚠️ WARNING

UNINTENDED EQUIPMENT OPERATION
Do not exceed any of the rated values specified below. Failure to follow these instructions can result in death, serious injury, or equipment damage.
TWDDMM8DRT and TWDDMM24DRF Input Operating Range

The input operating range of the Type 1 (IEC 61131-2) input module is shown below.

TWDDMM8DRT and TWDDMM24DRF Input Internal Circuit

The input internal circuit is shown below.

TWDDMM8DRT and TWDDMM24DRF Usage Limits

When using TWDDMM24DRF at an ambient temperature of 55°C (131°F) in the normal mounting direction, limit the inputs and outputs, respectively, which turn on simultaneously along line (1). At 45°C (113°F), all inputs and outputs can be turned on simultaneously at 28.8 VDC as indicated with line (2).

When using TWDDMM8DRT, all inputs and outputs can be turned on simultaneously at 55°C (131°F), input voltage 28.8 VDC.
Description of TWD Discrete I/O Modules

TWDDMM8DRT and TWDDMM24DRF Output Specifications

<table>
<thead>
<tr>
<th>Reference number</th>
<th>TWDDMM8DRT</th>
<th>TWDDMM24DRF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output points and common lines</td>
<td>4 NO contacts in 1 common line</td>
<td>8 NO contacts in 2 common lines</td>
</tr>
<tr>
<td>Maximum load current</td>
<td>2 A per output</td>
<td>7 A per common line</td>
</tr>
<tr>
<td>Minimum switching load</td>
<td>0.1 mA/0.1 VDC (reference value)</td>
<td></td>
</tr>
<tr>
<td>Initial contact resistance</td>
<td>30 mΩ maximum</td>
<td></td>
</tr>
<tr>
<td>Electrical life</td>
<td>100,000 operations minimum (rated resistive load 1,800 operations/h)</td>
<td></td>
</tr>
<tr>
<td>Mechanical life</td>
<td>20,000,000 operations minimum (no load 18,000 operations/h)</td>
<td></td>
</tr>
<tr>
<td>Rated load (resistive/inductive)</td>
<td>240 VAC/2 A, 30 VDC/2 A</td>
<td></td>
</tr>
<tr>
<td>Dielectric strength</td>
<td>Between the output and ground terminals: 1500 VAC, 1 minute</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Between output terminal and internal circuit: 1500 VAC, 1 minute</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Between output groups: 1500 VAC, 1 minute</td>
<td></td>
</tr>
</tbody>
</table>

TWDDMM8DRT and TWDDMM24DR Output Delay

The output delay is shown below.

![Diagram of output delay](image.png)

OFF delay: 10 ms maximum
Contact bounce: 6 ms maximum
ON delay: 6 ms maximum
TWD Mixed I/O Module Wiring Diagrams

Introduction

This section shows examples of wiring diagrams for the TWD mixed I/O modules. Symbols used in the following diagrams are explained in the Glossary of Symbols (see page 93) in the appendix.

**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 unit.
- 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**

MALFUNCTION OF OUTPUTS

Use appropriate safety interlocks where personal and/or equipment hazards exist. Outputs can malfunction and remain ON or OFF.

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

NOTE: These diagrams are for external wiring only.

NOTE: The shaded boxes are markings on the discrete I/O modules. The I and Q numbers are the input and output points.
TWDDMM8DRT Wiring Diagram

This diagram is for the TWDDMM8DRT module.

- The COM0 and COM1 terminals are **not** connected together internally.
- Both sink and source input wiring are supported
- A is the sink wiring (positive logic).
- B is the source wiring (negative logic).
- (1) is the protection for inductive load.
TWDDMM24DRF Wiring Diagram

This diagram is for the TWDDMM24DRF module.

- The COM0, COM1 and COM2 terminals are **not** connected together internally.
- Connect an appropriate fuse for the load.
- Both sink and source input wiring are supported
- A is the sink wiring (positive logic).
- B is the source wiring (negative logic).
- (1) is the protection for inductive load.
Appendices

Introduction

This appendix provides information on system diagnostic using LED’s, operator display operation, troubleshooting, the DIN rail, common IEC symbols used in this manual, and agency compliance.

What’s in this Appendix?

The appendix contains the following chapters:

<table>
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<th>Chapter</th>
<th>Chapter Name</th>
<th>Page</th>
</tr>
</thead>
<tbody>
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<td>The DIN Rail</td>
<td>91</td>
</tr>
<tr>
<td>B</td>
<td>IEC Symbols</td>
<td>93</td>
</tr>
<tr>
<td>C</td>
<td>Agency Compliance</td>
<td>95</td>
</tr>
</tbody>
</table>
The DIN Rail

Introduction
You can mount the Twido controller and its expansions on a DIN rail. A DIN rail can be attached to a smooth mounting surface or suspended from a EIA rack or in a NEMA cabinet.

Dimensions of the DIN Rail
The DIN rail measures 35 mm (1.38 in.) high and 15 mm (0.59 in.) deep, as shown below.
You can order the suitable DIN rail from Schneider Electric:

<table>
<thead>
<tr>
<th>Rail depth</th>
<th>Catalogue part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 mm (0.59 in.)</td>
<td>AM1DE200</td>
</tr>
</tbody>
</table>
IEC Symbols

Glossary of Symbols

Introduction
This section contains illustrations and definitions of common IEC symbols used in describing wiring schematics.

Symbols
Common IEC symbols are illustrated and defined in the table below:

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Fuse" /></td>
<td>Fuse</td>
</tr>
<tr>
<td><img src="image" alt="Load" /></td>
<td>Load</td>
</tr>
<tr>
<td><img src="image" alt="AC power" /></td>
<td>AC power</td>
</tr>
<tr>
<td><img src="image" alt="DC power" /></td>
<td>DC power</td>
</tr>
<tr>
<td><img src="image" alt="Discrete sensor/input" /></td>
<td>Discrete sensor/input, for example, contact, switch, initiator, light barrier, and so on.</td>
</tr>
<tr>
<td><img src="image" alt="Ground" /></td>
<td>Ground</td>
</tr>
<tr>
<td>IEC Symbols</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td></td>
</tr>
<tr>
<td><img src="image" alt="2-wire sensor symbol" /></td>
<td>2-wire sensor</td>
</tr>
<tr>
<td><img src="image" alt="Thermocouple element symbol" /></td>
<td>Thermocouple element</td>
</tr>
</tbody>
</table>
Agency Compliance

Agency Requirements

Introduction
This section provides agency standards for the Twido products.

Standards
Twido controllers comply with the main national and international standards concerning electronic industrial control devices.
The following are specific controller requirements:
• EN 61131-2 (IEC 61131-2)
• UL 508
• UL 1604 / CSA 213 Class I Division 2 Groups A, B, C, D
Glossary

A

**Analog potentiometer**
It can be used to preset a value for an analog timer. All Modular controllers and Compact 10 and 16 I/O controllers have one analog potentiometer. The Compact 24 I/O controller has two:

**Analog Voltage Input Connector**
Connects an analog voltage source of 0 through 10 VDC. The analog voltage is converted to a discrete value and is stored in a system word.

C

**CAN**
*Controller Area Network*: field bus originally developed for automobile applications which is now used in many sectors, from industrial to tertiary.

**Cartridge Connector**
A connector to attach an optional memory cartridge or an RTC.

**Catch Input**
Verify that you are receiving short input pulses (rising pulse of 40 μs or falling pulse of 150 μs minimum) from sensors without regard to the scan time.
**Glossary**

**CIA**

**CAN in Automation:** international organization of users and manufacturers of CAN products.

**COB**

**Communication OBject:** transport unit on CAN bus. A COB is identified by a unique identifier, which is coded on 11 bits, [0, 2047]. A COB contains a maximum of 8 data bytes. The priority of a COB transmission is shown by its identifier - the weaker the identifier, the more priority the associated COB has.

**Communication Adapter**

An optional cartridge that can be attached to any Compact controller or Operator Display Expansion Module to provide an optional Serial Port 2.

**Communication Expansion Module**

An optional module that can be attached to any Modular controllers communications expansion bus to provide an optional Serial Port 2.

**Controller status output**

A special function. This function is used in circuits, external to the controller, to control the power supply to the output devices or the controller power supply.

**EDS**

**Electronic Data Sheet:** description file for each CAN device (provided by the manufacturers).

**ERR LED**

An LED that illuminates when a detected error is detected in the controller.

**Expansion connector**

A connector to attach expansion I/O modules.

**Expansion Connector Cover**

A cover to protect the expansion connector.
Expansion I/O Module
Either a discrete or analog module that adds additional I/O to the base controller.

Fast Counting
A special function, it is available as a single up counter and single down counter. These functions enable up counting or down counting of pulses (rising edges) on a discrete I/O. Compact controllers can be equipped with three fast counters. Modular controllers can have two fast counters.

Free Wire
The end of a discrete I/O cable whose wires do not have a connector. This scheme provides connectivity from Modular I/O to discrete I/O points.

I/O
Input/Output.

I/O terminals
Terminals on all Modular controllers and expansion I/O modules used to connect input and output signals. The input terminals accept both sink and source DC input signals. The output terminals are either transistor source or sink or relay contacts.

IN LED
An LED that illuminates when a corresponding input is on. All modules have IN LEDs.

Input Filter
A special function that rejects input noises. This function is useful for addressing input noises and chatter in limit switches. All inputs provide a level of input filtering using the hardware. Additional filtering using the software is also configurable through TwidoSuite.
Input Simulators
An optional accessory for Compact controllers that is used for debugging. It can simulate input sensors to test application logic.

Input terminals
Terminals on the top of all Compact controllers used to connect input signals from input devices such as sensors, push buttons, and limit switches. The input terminals accept both sink and source DC input signals.

Latching input
A special function. This function is used to memorize any pulse with a duration less than the controller scan time. When a pulse is shorter than one scan and has a value greater than or equal to 100 $\mu$s, the controller latches the pulse, which is then updated in the next scan.

Memory Cartridge
An optional cartridge available in two sizes: 32 KB and 64 KB (64 KB not available on Compact). It can be added to any controller for removable backup of applications or to load an application, if certain conditions exist. The 64 KB cartridge is also used to increase program memory.

Modbus Master Mode
Allows the controller to initiate a Modbus query transmission, with a response expected from a Modbus slave.

Modbus Slave Mode
Allows the controller to respond to Modbus queries from a Modbus master and is the default communications mode if no communication is configured.
O

Operator display expansion module
An optional module that can be attached to any Modular controller to display program information.

Operator display module
An optional module that can be attached to any Compact controller to display program information.

OUT LED
An LED that illuminates when a corresponding output is on. All modules have OUT LEDs.

Output terminals
Terminals on the bottom of all Compact controllers used to connect output signals from output devices such as electromechanical relays and solenoid valves. The internal output relay contact is rated up to 240 VAC/2A or 30 VDC/2A.

P

PLS
A special function. This user-defined function block generates a signal on output %Q0.0.0 or %Q0.0.1. This signal has a variable period but has a constant duty cycle, or on to off ratio of 50% of the period.

Power Supply Terminals
The power supply is connected to these terminals to provide power to the controller. The power voltage for a Compact controller is 100-240 VAC and 24 VDC for a Modular controller.

PWM
A special function. This user-defined function block generates a signal on output %Q0.0.0 or %Q0.0.1. This signal has a constant period with the possibility of varying the duty cycle, or on to off ratio.
Glossary

PWR LED
An LED that illuminates when power is supplied to the controller.

Removable Cover
A cover on all Compact controllers that can be removed to install an optional Operator Display.

RTC
Real Time Clock.

RTD
Temperature detector of type PT100, PT1000 etc. Resistor Temperature Detector.

RUN LED
An LED that illuminates when the controller is executing a program.

Sensor power terminals
Supplies power to the sensors (24 VDC, 400 mA for -40DRF compact controllers and 250 mA for all other controllers). Output terminals are only intended for input devices and not be used as a source for driving external loads.

Serial Port 1
An EIA RS-485 connector used to download and monitor the controller operation using TwidoSuite.

Serial port 2
An optional port that can be configured as either EIA RS-232 or EIA RS-485.

STAT LED
An LED that blinks on and off to indicate a specific status of the user program.
T

Terminal cover
A cover on all Compact controllers to protect the input and output terminals.

V

Very Fast Counting
A special function available as an up/down counter, an up/down 2-phase counter, a single up counter, a single down counter, and frequency meter. The counter functions enable counting of pulses from 0 to 65,535 in single-word mode and from 0 to 4,294,967,295 in double-word mode. The frequency meter function measures the frequency of a periodic signal in Hz.
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