**FLEX I/O Terminal Base Units**


(Modules with a K in the last position of the catalog number are conformally coated to meet noxious gas requirements of ISA/ANSI-71.040 1985 Class G3 Environment.)

**Important User Information**

Solid state equipment has operational characteristics differing from those of electromechanical equipment. Safety Guidelines for the Application, Installation and Maintenance of Solid State Controls (Publication 550-11 available from your local Rockwell Automation sales office or online at http://www.literature.rockwellautomation.com/) describes some important differences between solid state equipment and hard-wired electromechanical devices. Because of this difference, and also because of the wide variety of uses for solid state equipment, all persons responsible for applying this equipment must satisfy themselves that each intended application of this equipment is acceptable.

In no event will Rockwell Automation, Inc. be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment.

The examples and diagrams in this manual are included solely for illustrative purposes. Because of the many variables and requirements associated with any particular installation, Rockwell Automation, Inc. cannot assume responsibility or liability for actual use based on the examples and diagrams. No patent liability is assumed by Rockwell Automation, Inc. with respect to use of information, circuits, equipment, or software described in this manual.

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Throughout this manual we use notes to make you aware of safety considerations.

### WARNING

Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.

### IMPORTANT

Identifies information that is critical for successful application and understanding of the product.

### ATTENTION

Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. Attention helps you identify a hazard, avoid a hazard, or recognize the consequence.

### Environment and Enclosure

This equipment is intended for use in a Pollution Degree 2 industrial environment, in overvoltage Category II applications (as defined in IEC 60664-1), at altitudes up to 2000 m (6562 ft) without derating. This equipment is considered Group 1, Class A industrial equipment according to IEC/CSWR 11. Without appropriate precautions, there may be difficulties with electromagnetic compatibility in residential and other environments due to conducted and radiated disturbances.

This equipment is supplied as open-type equipment. It must be mounted within an enclosure that is suitably designed for those specific environmental conditions that will be present and appropriately designed to prevent personal injury resulting from accessibility to live parts. The enclosure must have suitable flame-retardant properties to prevent or minimize the spread of flame, complying with a flame spread rating of S1A, V2, V1, V0 (or equivalent) if non-metallic. The interior of the enclosure must be accessible only by the use of a tool. Subsequent sections of this publication may contain additional information regarding specific enclosure type ratings that are required to comply with certain product safety certifications. In addition to this publication, see:

- Industrial Automation Wiring and Grounding Guidelines, Rockwell Automation publication 1770-4.1, for additional installation requirements.
- NEMA Standards 250 and IEC 60529, as applicable, for explanations of the degrees of protection provided by different types of enclosure.

### Installation Instructions

<table>
<thead>
<tr>
<th>WARNING</th>
<th>When you insert or remove the module while backplane power is on, an electrical arc can occur. This could cause an explosion in hazardous location installations. Be sure that power is removed or the area is nonhazardous before proceeding.</th>
</tr>
</thead>
<tbody>
<tr>
<td>WARNING</td>
<td>If you connect or disconnect wiring while the field-side power is on, an electrical arc can occur. This could cause an explosion in hazardous location installations. Be sure that power is removed or the area is nonhazardous before proceeding.</td>
</tr>
<tr>
<td>ATTENTION</td>
<td>FLEX I/O systems are grounded through the DIN rail to chassis ground. Use zinc plated yellow-chromate steel DIN rail to assure proper grounding. The use of other DIN rail materials (for example, aluminum or plastic) that can corrode, oxidize, or are poor conductors, can result in improper or intermittent grounding. Secure DIN rail to mounting surface approximately every 200 mm (7.8 in.) and use end-anchors appropriately.</td>
</tr>
<tr>
<td>ATTENTION</td>
<td>Prevent Electrostatic Discharge</td>
</tr>
</tbody>
</table>

This equipment is sensitive to electrostatic discharge, which can cause internal damage and affect normal operation. Follow these guidelines when you handle this equipment:

- Touch a grounded object to discharge potential static.
- Wear an approved grounding wriststrap.
- Do not touch connectors or pins on component boards.
- Do not touch circuit components inside the equipment.
- Use a static-safe workstation, if available.
- Store the equipment in appropriate static-safe packaging when not in use.

### ATTENTION

Do not remove or replace a Terminal Base unit while power is applied. Interruption of the backplane can result in unintentional operation or machine motion.

### ATTENTION

Do not wire more than 1 conductor on any single terminal.

### ATTENTION

Personal responsible for the application of safety-related Programmable Electronic Systems (PES) shall be aware of the safety requirements in the application of the system and shall be trained in using the system.
### North American Hazardous Location Approval


<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Female flexbus connector</td>
</tr>
<tr>
<td>2</td>
<td>Terminal base unit</td>
</tr>
<tr>
<td>3</td>
<td>Male flexbus connector</td>
</tr>
<tr>
<td>4</td>
<td>Keyswitch – set to the position required for the installed module</td>
</tr>
<tr>
<td>5</td>
<td>Mounting holes for panel mounting</td>
</tr>
<tr>
<td>6</td>
<td>Input/output terminal strips for connecting inputs/output wiring, commons, power connections, customer power supplies, chassis grounds</td>
</tr>
<tr>
<td>7</td>
<td>Locking tab</td>
</tr>
<tr>
<td>8</td>
<td>Module locking latch</td>
</tr>
<tr>
<td>9</td>
<td>Cover plug for male flexbus connector</td>
</tr>
<tr>
<td>10</td>
<td>Cold-junction compensation terminals (1794-TB3, -TB3K, -TB3S, -TB3SK only)</td>
</tr>
<tr>
<td>11</td>
<td>Chassis ground terminations (1794-TB3, -TB3S, -TB3SK, -TB3G, -TB3GSK only)</td>
</tr>
<tr>
<td>12</td>
<td>Fuses – eight 5x20 mm (1794-TBNF, -TBNFK only)</td>
</tr>
<tr>
<td>13</td>
<td>Terminal strip cover (1794-TBN, -TBNK, -TBNF, -TBNFK only)</td>
</tr>
<tr>
<td>14</td>
<td>Knife switches (1794-TB3K, -TB3GK, -TB3SK, -TB3GSK only)</td>
</tr>
</tbody>
</table>

### European Hazardous Location Approval

The following adapters are European Zone 2 approved: 1794-TBN, -TBNK, -TB2, -TB3, -TB3K, -TB3SK, -TB3G, -TB3GK, -TB3GS, -TB3GSK, -TB3T, -TB3TK.

<table>
<thead>
<tr>
<th>Description</th>
<th>Cat. No. 1794-TBNF, -TBNFK</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Female flexbus connector</td>
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<td>3</td>
<td>Male flexbus connector</td>
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### European Zone 2 Certification (The following applies when the product bears the Ex or EEx Marking)

This equipment is intended for use in potentially explosive atmospheres as defined by European Union Directive 94/9/EC and has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of Category 3 equipment intended for use in potentially explosive atmospheres, given in Annex II to this Directive. Compliance with the Essential Health and Safety Requirements has been assured by compliance with EN 60079-15 and EN 60079-0.

### FLEX I/O Terminal Base Units

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</tr>
<tr>
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<td>Chassis ground terminations (1794-TB3, -TB3S, -TB3SK, -TB3G, -TB3GSK only)</td>
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<tr>
<td>13</td>
<td>Fuses – eight 5x20 mm (1794-TBNF, -TBNFK only)</td>
</tr>
<tr>
<td>14</td>
<td>Terminal strip cover (1794-TBN, -TBNK, -TBNF, -TBNFK only)</td>
</tr>
<tr>
<td>15</td>
<td>Knife switches (1794-TB3K, -TB3GK, -TB3SK, -TB3GSK only)</td>
</tr>
</tbody>
</table>

### FLEX I/O Spring-clamp Terminal Base Units

<table>
<thead>
<tr>
<th>Description</th>
<th>Cat. No. 1794-TB3S, -TB3SK, -TB3TS, -TB3G, -TB3GSK, -TB3TK</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Female flexbus connector</td>
</tr>
<tr>
<td>2</td>
<td>Terminal base unit</td>
</tr>
<tr>
<td>3</td>
<td>Male flexbus connector</td>
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<tr>
<td>4</td>
<td>Keyswitch – set to the position required for the installed module</td>
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<td>Mounting holes for panel mounting</td>
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<td>Cold-junction compensation terminals (1794-TB3, -TB3K, -TB3S, -TB3SK only)</td>
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<td>8</td>
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</tr>
<tr>
<td>9</td>
<td>Terminal strip cover (1794-TBN, -TBNK, -TBNF, -TBNFK only)</td>
</tr>
<tr>
<td>10</td>
<td>Knife switches (1794-TB3K, -TB3GK, -TB3SK, -TB3GSK only)</td>
</tr>
</tbody>
</table>
Mount the Terminal Base Unit on a DIN Rail

**ATTENTION**

During mounting of all devices, be sure that all debris (such as metal chips or wire strands) is kept from falling into the module. Debris that falls into the module could cause damage upon application of power.

1. Remove the cover plug (if used) in the male connector of the unit to which you are connecting this terminal base unit.
2. Check to make sure the 16 pins in the male connector on the adjacent device are straight and in line so that the mating female connector on this terminal base unit will mate correctly.
3. Make certain the female connector (B) is fully retracted.
4. Position the terminal base unit on the 35 x 7.5 DIN rail (A) (A-B pt no. 199-DR1).

**ATTENTION**

Do not force the terminal base into the adjacent base/adapter. Forcing the units together can bend or break the hook and allow the units to separate and break communication over the backplane.

5. Rotate the terminal base onto the DIN rail with the top of the rail hooked under the lip on the rear of the terminal base. Use caution to make sure that the female flexbus connector does not strike any of the pins in the mating connector.

6. Refer to the installation instructions for specific wiring information for the module you are installing in this terminal base.
7. Repeat the above steps to install the next terminal base.

**ATTENTION**

When using FLEX I/O modules in a high-vibration installation, especially when mounting the DIN rail vertically, use DIN-rail locks (A-B part number 1492-EA35) to prevent accidental separation of the terminal block units.

Wire Connections for the Terminal Base Units

Wiring Connections for the 1794-TB2, -TB32S

<table>
<thead>
<tr>
<th>Inputs/Outputs</th>
<th>1794-TB2, -TB32S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common A</td>
<td>Common B</td>
</tr>
<tr>
<td>* +24V dc</td>
<td>* +24V dc</td>
</tr>
<tr>
<td>* Chassis</td>
<td>* Ground</td>
</tr>
<tr>
<td>* 240V dc</td>
<td>* 240V dc</td>
</tr>
<tr>
<td>* Common A</td>
<td>* Common B</td>
</tr>
</tbody>
</table>

Wiring Connections for the 1794-TB3G, 1794-TB3GK, 1794-TB3GS

<table>
<thead>
<tr>
<th>Inputs/Outputs</th>
<th>1794-TB3G, -TB3GK, -TB3GS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common A</td>
<td>Common B</td>
</tr>
<tr>
<td>* +24V dc</td>
<td>* +24V dc</td>
</tr>
<tr>
<td>* Chassis</td>
<td>* Ground</td>
</tr>
<tr>
<td>* 240V dc</td>
<td>* 240V dc</td>
</tr>
<tr>
<td>* Common A</td>
<td>* Common B</td>
</tr>
</tbody>
</table>

Wiring Connections for the 1794-TB32, -TB3SK, -TB3S, TB3SK

<table>
<thead>
<tr>
<th>Inputs/Outputs</th>
<th>1794-TB32, -TB3SK, -TB3S, TB3SK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common A</td>
<td>Common B</td>
</tr>
<tr>
<td>* +24V dc</td>
<td>* +24V dc</td>
</tr>
<tr>
<td>* Chassis</td>
<td>* Ground</td>
</tr>
<tr>
<td>* 240V dc</td>
<td>* 240V dc</td>
</tr>
<tr>
<td>* Common A</td>
<td>* Common B</td>
</tr>
</tbody>
</table>

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FLEX I/O Terminal Base Units

Typical Wiring Guidelines

Wiring Connections for the 1794-TB3, -TB3K, -TB3TK, -TB3TSK

For Spring-clamp Terminal Base Units: 1794-TB3S, -TB3TS, -TB3GS, -TB3SK, -TB3TSK, -TB3GSK
- Insert a 2.54…3.05 mm (0.10…0.12 in.) wide-bladed screwdriver into the slot and lift up. Insert wire, and remove screwdriver.
- Tighten screws to 0.8 Nm (7 lb-in).
- Tighten screws to 0.53 Nm (6 lb-in).
For Knifeswitch Cage-clamp Terminal Base Unit: 1794-TBKD
- Tighten screws to 0.53 Nm (6 lb-in).
For NEMA Screw-clamp Terminal Base Units: 1794-TBN, -TBNK, -TBNF, -TBNFK
- Tighten screws to 1.02 Nm (9 lb-in).

Install or Change a Fuse in the 1794-TBNF or 1794-TBNFK Terminal Base Unit

1. Press the fuse holder down toward the terminal strip.
2. Remove the fuse from the fuse holder.
3. Insert a known good 5x20 mm fuse into the fuse holder.
4. Rotate the fuse holder back to vertical until it snaps into the locked position.

The 1794-TBNF and 1794-TBNFK terminal base units are shipped with eight 5x20 mm, 1.6 A, 250V AC slow-blow fuses, one for each even-numbered terminal (0 through 14 - row B). These fuses are suitable for use with the 1794-OA8 AC output module. Refer to the specific installation instructions for fusing recommendations for your particular module.

Use the Knifeswitch Terminal Base

The knifeswitch terminal base has 16 individual mechanical-knifeswitch circuit breakers (two for each channel). Each switch opens or closes one side (input/output and return) for a channel.

1. Place a small-bladed screwdriver into the slot of the knifeswitch of the I/O point circuit that you wish to break.
2. Rotate downward to open the circuit. This opens the path of an individual circuit.
3. To reestablish the circuit, rotate the knifeswitch back into the terminal base unit until it snaps into place.

Terminal base units are rated at 10 A.
AC/DC

IEC 60068-2-30 (Test Db, Unpackaged Damp Heat):

(1794-TB2)


(1794-TB2, -TB3, -TB3K, -TB3T, -TB3S, -TB3TS, -TB3TK, -TB3SK, -TB3TSK, -TBN,

AC/DC

Dependent upon installed

European Union 2004/108/EC EMC Directive, compliant with:

IEC 60068-2-6 (Test Fc, Operating):

24V

IEC 60068-2-27 (Test Ea, Unpackaged Shock):

AC/DC


General

Attribute

Value

Terminal screw
torque

0.56…0.79 Nm (5.7…8.6 lb-in) (1794-TB3TK, -TB3G, -TB3GK, -TB2, -TB3, -TB3K, -TB3T, -TB3TK)

0.3…0.6 Nm (3.5…5.3 lb-in) (1794-TBKD)

1.4 Nm (12 lb-in) (1794-TBN, -TB3FNK, -TB3NKB)

Supply voltage range (max)

FLXBUS: 5V DC, 640 mA

V/COM Terminals: 125V DC/AC, 50/60Hz, 10A (1794-TB3SK, -TB3TSK, -TB3GSK, -TB3GSK)


V/COM Terminals: 250V DC/AC, 50/60Hz, 10A (1794-TB3NKB, -TB3NFK, -TB3NFK)

1794-TBKD only

FLXBUS: 5V DC, 640 mA

Terminal Block: 120V AC, 50/60Hz, 10A

Disconecting Switch: 3A, 20mA

ATTENTION

A disconnecting switch does not shut off the current. Make or break a circuit only under no-load conditions.

Isolation voltage

Capable of 250V (continuous) maximum, Basic Insulation Type, Field Wiring Terminals to FLXBUS, or the lesser of the installed module. (1794-TBN, -TB3FNK, -TB3NKB)

Capable of 125V (continuous) maximum, Basic Insulation Type, Field Wiring Terminals to FLXBUS, or the lesser of the installed module (1794-TBKD, -TB3SK, -TB3TSK, -TB3GSK, -TB3GSK)

Capable of 50V (continuous) maximum, Basic Insulation Type, Field Wiring Terminals to FLXBUS, or the lesser of the installed module. (1794-TB3G, -TB3GSK, -TB3GSK, -TB3GSK)

2580V DC/sec, Field Wiring Terminals to FLXBUS.

230V DC/sec, Field Wiring Terminals to Functional Ground. (1794-TBKD)

Voltage rating

See Working Voltage and Isolation Voltage Ratings for nominal values

Enclosure type rating

None (open-style)

Working Voltage and Isolation Voltage Ratings

General

Working Voltage and Isolation Voltage Ratings

Terminal Base 1794-

24V

120V

230V

Isolation Voltage

TBN, TB3FNK, TB3NKB

TB2, TB3, TB3K, TB3S, TB3SK

TB3T, TB3SK, TB3TS, TB3TSK

TB3G, TB3GS, TB3GSK, TB3GSK

TB32, TB32S

TBKD

AC/DC

AC/DC

AC/DC

Dependent upon installed module - refer to individual installation instructions for your specific module.

Certifications (when product is marked)XI

Attribute

Value

UL

1794-TBD

UL Listed Industrial Control Equipment. See UL File E65584.

c-UL-us


1794-TBD, -TB3G, -TB3GK, -TB3SK, -TB3TSK, -TB3GSK, -TB3GSK

TB3, -TB3K, -TB3T, -TB3TK, -TB3S, -TB3SK, -TB3TS, -TB3TSK, -TBN, -TB3NKB, -TB3NFK, -TB3NFK

UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E65584.


UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E65584.

CSA


1794-TBD, -TB3G, -TB3GK, -TB3SK, -TB3TSK, -TBN, -TB3NFK, -TB3NFK

UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E65584.

CSA Certified Process Control Equipment. See CSA File LR4688C.

CSA Certified Process Control Equipment for Class I, Division 2 Group A,B,C,D Hazardous Locations. See CSA File LR4960C.

CSA Certified Process Control Equipment. See CSA File LR4688C.

CE

European Union 2004/108/EC EMC Directive, compliant with:

EN 61326-1; Meas./Control/Lab., Industrial Requirements

EN 61000-6-2; Industrial Immunity

EN 61000-6-1; Industrial Emissions

EN 61499-2-1; Programmable Controllers (Clause 8, Zone A & B)

EN 61499-1; Programmable Controllers (Clause 11)
C-Tick Australian Radiocommunications Act, compliant with:
AS/NZS CISPR 11; Industrial Emissions

Ex
European Union 94/9/EC ATEX Directive, compliant with:
EN 60079-15; Potentially Explosive Atmospheres, Protection "n" (II 3 G Ex nA IIC T4 X)
EN 60079-0; General Requirements (Zone 2)

(1794-TB2)
European Union 94/9/EC ATEX Directive, compliant with:
EN 60079-15; Potentially Explosive Atmospheres, Protection "n" (II 3 G Ex nA IIC T6 X)
EN 60079-0; General Requirements (Zone 2)

TÜV
TÜV Certified for Functional Safety:
Capable of SIL 2

(1) See the Product Certification link at http://www.ab.com for Declaration of Conformity, Certificates, and other certification details.

Mounting Dimensions

A = Mounting hole dimensions for optional mounting kit.
B = DIN rail.
C = Operating temperature 25.4 (1.0) below each module when mounted in any position must not exceed 55 °C (131 °F).

Maintain at least 25.4 (1.0) air space around your FLEX I/O system installation.

Measure here for vertical mounting position with adapter up.
Measure here for horizontal position.

www.rockwellautomation.com

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