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 1794-IN092E-EN-P) 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.

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/CISPR 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 SVA, V2, V1, VO (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.
North American Hazardous Location Approval


The following information applies when operating this equipment in hazardous locations:

- Equipment marked “II, D, TV2, G A, B, C, D” are suitable for use in Class II Division 2 Groups A, B, C, D hazardous locations only. Each product is supplied with markings on the rating/identification label indicating the hazardous location temperature group and code. When combining products with a system, the most adverse temperature code of the system shall be used to determine the overall temperature code of the system. Combinations of equipment in your system are subject to investigation by the local Authority Having Jurisdiction at the time of installation.

**Explosion Hazard**

- Do not disconnect equipment unless power has been removed or the area is known to be nonhazardous.
- Do not disconnect connections to this equipment unless power has been removed or the area is known to be nonhazardous.
- Secure any external connections made to this equipment by using screws, sliding latches, threaded connectors, or other means provided with the product.
- This product contains batteries that must only be changed in an area known to be nonhazardous.

**European Hazardous Location Approval**


**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.

**WARNING**

- S'assurer que l'environnement est classé non dangereux avant de débrancher l'équipement.
- Couper le courant ou s'assurer que l'environnement est classé non dangereux avant de débrancher l'équipement.
- Fixer tous les connecteurs externes reliés à cet équipement à l'aide de vis, loquets, colliers, connecteurs filets ou autres moyens fournis avec ce produit.
- Le substitut de composants peut rendre cet équipement inadapté à une utilisation en environnement dangereux.
- Tous les produits doivent être installés dans un environnement classé non dangereux avant de les changer.

**FLEX I/O Cage-clamp Terminal Base Units**


**Description**

1. Female flexbus connector
2. Terminal base unit
3. Male flexbus connector
4. Keyswitch - set to the position required for the installed module
5. Mounting holes for panel mounting
6, 7. Input/output terminal strips for connecting inputs/output wiring, commons, power connections, customer power supplies, chassis grounds
9. Locking tab
10. Module locking latch
11. Cover plug for male flexbus connector
12. Cold-junction compensation terminals (1794-TB2, -TB3, -TB3K, -TB3S, -TB3SK only)
13. Chassis ground terminations (1794-TB2, -TB3, -TB3K, -TB3S, -TB3SK, -TB3GSK only)
16. Knife switches (1794-TBKD)

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


**FLEX I/O Terminal Base Units**


**FLEX I/O Fused Terminal Base Units**

Cat. No. 1794-TBNF, -TB2NF

**FLEX I/O Kniveswitch Terminal Base Unit**

Cat. No. 1794-TBKD
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 part 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. Gently push the flexbus connector into the side of the adapter to complete the backplane connection.

7. Refer to the installation instructions for specific wiring information for the module you are installing in this terminal base.

8. 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-TB32, -TB32S**

Inputs/Outputs

**Wiring Connections for the 1794-TB3G, -TB3GK, -TB3GS, -TB3GSK**

Inputs/Outputs

**Wiring Connections for the 1794-TB32, -TB3K, -TB3S, -TB3SK**

Inputs/Outputs

**Wiring Connections for the 1794-TB3G, -TB3GS, -TB3GSK**

Inputs/Outputs
Wiring Connections for the 1794-TBN, 1794-TBNK, 1794-TBNF, 1794-TBNFK

- **Even Numbered I/O Terminals 0 to 14**
  - +V = Terminals C-34, C-51
  - COM (V) = Terminals B-16, B-33

- **Odd Numbered I/O Terminals 1 to 15**
  - +V = Terminals C-34, C-51
  - COM (V) = Terminals B-16, B-33

**Typical Wiring Guidelines**

- Wiring when total current draw through base is less than 10 A.
  - Modules in this configuration must be all analog or all digital.

- Wiring when total current draw through base is greater than 10 A.
  - Total current draw through any base must not be greater than 10 A.

- Use separate power supplies for analog and digital modules.
  - Wiring when there is a mix of analog and digital modules.

Terminal base units are rated at 10 A.
### General

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Terminal screw</td>
<td>0.35... 0.79 Nm (0.27... 0.60 lb-in) (1794-TB3TK, -TB3G, -TB3GSK, -TB3, -TB3K, -TB3T)</td>
</tr>
<tr>
<td></td>
<td>0.3... 0.56 Nm (0.25... 0.45 lb-in) (1794-TB3SK)</td>
</tr>
<tr>
<td></td>
<td>1.4 Nm (12 lb-in) (1794-TBN, -TBNF, -TBNFK, -TBNK)</td>
</tr>
</tbody>
</table>

| Supply voltage range (max) | FLXBUS: 5V DC, 640 mA  
|                           | V/COM Terminals: 120V DC/AC, 50/60Hz, 10A (1794-TB3SK, -TB3K, -TB3S, -TB3T, -TB3TS, -TB3TSK, -TB3GK, -TB3GS, -TB3GSK)  
|                           | V/COM Terminals: 2V DC/AC, 50/60Hz, 10A (1794-TB3GK, -TB3GS, -TB3GSK)  
|                           | V/COM Terminals: 250V DC/AC, 50/60Hz, 10A (1794-TBN, -TBNF, -TBNFK, -TBNK)  |
|                           | Isolation voltage: Capable of 250V (continuous) maximum, Basic Insulation Type, Field Wiring Terminals to FLXBUS, or the lesser of the installed module. (1794-TBN, -TBNF, -TBNFK, -TBNK)  |
|                           | Isolation voltage: Capable of 125V (continuous) maximum, Basic Insulation Type, Field Wiring Terminals to FLXBUS, or the lesser of the installed module (1794-TB3GK, -TB3GS, -TB3GSK, -TB3GK, -TB3GS, -TB3GSK)  |
|                           | Isolation voltage: Capable of 50V (continuous) maximum, Basic Insulation Type, Field Wiring Terminals to FLXBUS, or the lesser of the installed module. (1794-TB3GK, -TB3GS, -TB3GSK, -TB3GK, -TB3GS, -TB3GSK)  |

| Terminal Block       | 120V AC, 50/60Hz, 10A  
|                     | Disconnecting Switch: 3A, 20mA  
|                     | Voltage rating: See Working Voltage and Isolation Voltage Ratings for nominal values  
|                    | Enclosure type rating: None (open-style)  

### Working Voltage and Isolation Voltage Ratings

<table>
<thead>
<tr>
<th>Terminal Base 1794-</th>
<th>24V</th>
<th>120V</th>
<th>230V</th>
<th>Isolation Voltage</th>
</tr>
</thead>
</table>
| TBN, TBNK, TBNF, TBNFK | AC/DC | AC/DC | AC/DC | Depends upon installed module - refer to individual installation instructions for your specific module.  
| TB3, TB3G, TB3GS, TB3SK | AC/DC | AC/DC | AC/DC |  
| TB3T, TB3TS, TB3TSK, TB3GSK | AC/DC | AC/DC | AC/DC |  
| TB3G, TB3GS, TB3GSK | AC/DC | AC/DC | AC/DC |  
| TB32, TB32S | AC/DC | AC/DC | AC/DC |  
| TBKD | DC | AC | AC |  

### General

- **Dimensions, approx.:** 94 x 94 x 69 mm (3.7 x 3.7 x 2.7 in.) (with module installed in terminal base)  

### Environmental

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Value</th>
</tr>
</thead>
</table>
| Operating temperature | IEC 60068-2-1 (Test Ad, Operating Cold), IEC 60068-2-2 (Test Bd, Operating Dry Heat), IEC 60068-2-14 (Test Na, Unpacking Operating Thermal Shock)  
|                     | -0... 55 °C (32... 131 °F) (1794-TB3TK)  
|                     | -20... 55 °C (4... 131 °F) (1794-TBN, -TBNF, -TBNFK, -TBNK)  
| Non-operating temperature | IEC 60068-2-1 (Test Ab, Unpacking Non-operating Cold), IEC 60068-2-2 (Test Bd, Unpacking Non-operating Dry Heat), IEC 60068-2-14 (Test Na, Unpacking Non-operating Thermal Shock)  
|                     | -40... 85 °C (-40... 185 °F) (1794-TB3)  
|                     | 0... 55 °C (32... 131 °F) (1794-TB3TK)  
| Non-operating shock | IEC 60068-2-20 (Test Db, Unpacking Damp Heat)  
|                     | 5... 5% noncondensing  
| Vibration           | IEC 60068-2-6 (Test Fc, Operating)  
|                     | 5 g @ 10... 550 Hz  
| Operating shock     | IEC 60068-2-27 (Test Ea, Unpacking Shock)  
|                     | 30 g (Except for 1794-TBKD)  
| Non-operating shock | IEC 60068-2-23 (Test Ea, Unpacking Shock)  
|                     | 50 g (Except for 1794-TBKD)  

### Certifications (when product is marked)(1)

<table>
<thead>
<tr>
<th>Attribute</th>
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</tr>
</thead>
</table>
| UL                 | (1794-TB3) - UL Listed Industrial Control Equipment. See UL File E65584.  
|                   | UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E65584.  
|                   | (1794-TBKD, -TBNF, -TBNFK, -TBNK) - UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E65584.  
|                   | CSA Certified Process Control Equipment. See CSA File LR46608C.  
|                   | CSA Certified Process Control Equipment for Class I, Division 2 Group A,B,C,D Hazardous Locations. See CSA File LR46608C.  
|                   | (1794-TBN, -TBNFK) - CSA Certified Process Control Equipment. See CSA File LR46608C.  
| CE                 | European Union 2004/10/EC EMC Directive, compliant with:  
|                   | EN 61326-1: Max. Control/Bus, Industrial Requirements  
|                   | EN 61000-6-2: Industrial Immunity  
|                   | EN 61000-6-4: Industrial Emissions  
|                   | EN 61131-2: Programmable Controllers (Clause 8, Zone A & B)  
|                   | European Union 2008/95/EC LVD, compliant with:  
|                   | EN 61131-2: Programmable Controllers (Clause 11)  

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(1) Use this Conductor Category Information for planning conductor routing. Refer to Industrial Automation Wiring and Sourcing Guidelines, publication 1794-IN092E-EN-P.
Certifications (when product is marked)(1)

| C-Tick | Australian Radiocommunications Act, compliant with: AS/NZS CISPR 11; Industrial Emissions |

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)
EN 60079-15; Potentially Explosive Atmospheres, Protection "n" (II 3 G Ex nA IIC T6 X) EN 60079-0; General Requirements (Zone 2)

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

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Terminal Base (1794-TB3 shown)</td>
<td>Terminal Base (1794-TB3S shown)</td>
<td>Terminal Base (1794-TB3 shown)</td>
</tr>
<tr>
<td>94 x 94 x 69 (3.7 x 3.7 x 2.7)</td>
<td>94 x 94 x 69 (3.7 x 3.7 x 2.7)</td>
<td>94 x 94 x 69 (3.7 x 3.7 x 2.7)</td>
</tr>
</tbody>
</table>

Secure DIN rail approximately every 200 mm (7.87 in.).
Maintain at least 25.4 (1.0) air space around your FLEX I/O system installation.
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).

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

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