Installation Instructions

Original Instructions

Allen-Bradley
by ROCKWELL AUTOMATION

FLEX I/O Digital Input and Output Modules with Diagnostics

Catalog Numbers 1794-IB16D, 1794-IB16DK, 1794-OB16D

Summary of Changes

This publication contains the following new or updated information. This list includes substantive updates only and is not intended to reflect all changes.

Topic	Page
Updated template	throughout
Added new K catalog 1794-IB16DK	throughout
Updated environmental specifications	11
Updated certifications	12

Rockwell Automation

ATTENTION: Read this document and the documents listed in the Additional Resources section about installation, configuration and operation of this equipment before you install, configure, operate or maintain this product. Users are required to familiarize themselves with installation and wiring instructions in addition to requirements of all applicable codes, laws, and standards.

Activities including installation, adjustments, putting into service, use, assembly, disassembly, and maintenance are required to be carried out by suitably trained personnel in accordance with applicable code of practice. If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

注意：在安装、配置、操作和维护本产品前，请阅读本文档以及 “ 其他资源 ” 部分列出的有关设备安装、配置和操作的相应文档。除了所有适用规范、法律和标准的相关要求之外，用户还必须熟悉安装和接线说明。

安装、调整、投运、使用、组装、拆卸和维护等各项操作必须由经过适当训练的专业人员按照适用的操作规范实施。

如果未按照制造商指定的方式使用该设备，则可能会损害设备提供的保护。

ATENCIÓN: Antes de instalar, configurar, poner en funcionamiento o realizar el mantenimiento de este producto, lea este documento y los documentos listados en la sección Recursos adicionales acerca de la instalación, configuración y operación de este equipo. Los usuarios deben familiarizarse con las instrucciones de instalación y cableado y con los requisitos de todos los códigos, leyes y estándares vigentes.

El personal debidamente capacitado debe realizar las actividades relacionadas a la instalación, ajustes, puesta en servicio, uso, ensamblaje, desensamblaje y mantenimiento de conformidad con el código de práctica aplicable. Si este equipo se usa de una manera no especificada por el fabricante, la protección provista por el equipo puede resultar afectada.

ATENÇÃO: Leia este e os demais documentos sobre instalação, configuração e operação do equipamento que estão na seção Recursos adicionais antes de instalar, configurar, operar ou manter este produto. Os usuários devem se familiarizar com as instruções de instalação e fiação além das especificações para todos os códigos, leis e normas aplicáveis.

É necessário que as atividades, incluindo instalação, ajustes, colocação em serviço, utilização, montagem, desmontagem e manutenção sejam realizadas por pessoal qualificado e especializado, de acordo com o código de prática aplicável.

Caso este equipamento seja utilizado de maneira não estabelecida pelo fabricante, a proteção fornecida pelo equipamento pode ficar prejudicada.

ВНИМАНИЕ: Перед тем как устанавливать, настраивать, эксплуатировать или обслуживать данное оборудование, прочитайте этот документ и документы, перечисленные в разделе «Дополнительные ресурсы». В этих документах изложены сведения об установке, настройке и эксплуатации данного оборудования. Пользователи обязаны ознакомиться с инструкциями по установке и прокладке соединений, а также с требованиями всех применимых норм, законов и стандартов.

Все действия, включая установку, наладку, ввод в эксплуатацию, использование, сборку, разборку и техническое обслуживание, должны выполняться обученным персоналом в соответствии с применимыми нормами и правилами.

Если оборудование используется не предусмотренным производителем образом, защита оборудования может быть нарушена.

注意：本製品を設置、構成、稼動または保守する前に、本書および本機器の設置、設定、操作についての参考資料の該当箇所に記載されている文書に目を通してください。ユーザは、すべての該当する条例、法律、規格の要件に加えて、設置および配線の手順に習熟している必要があります。

設置調整、運転の開始、使用、組立て、解体、保守を含む諸作業は、該当する実施規則に従って訓練を受けた適切な作業員が実行する必要があります。

本機器が製造メーカにより指定されていない方法で使用されている場合、機器により提供されている保護が損なわれる恐れがあります。

ACHTUNG: Lesen Sie dieses Dokument und die im Abschnitt „Weitere Informationen“aufgeführten Dokumente, die Informationen zu Installation, Konfiguration und Bedienung dieses Produkts enthalten, bevor Sie dieses Produkt installieren, konfigurieren, bedienen oder warten. Anwender müssen sich neben den Bestimmungen aller anwendbaren Vorschriften, Gesetze und Normen zusätzlich mit den Installations- und Verdrahtungsanweisungen vertraut machen.

Arbeiten im Rahmen der Installation, Anpassung, Inbetriebnahme, Verwendung, Montage, Demontage oder Instandhaltung dürfen nur durch ausreichend geschulte Mitarbeiter und in Übereinstimmung mit den anwendbaren Ausführungsvorschriften vorgenommen werden.

Wenn das Gerät in einer Weise verwendet wird, die vom Hersteller nicht vorgesehen ist, kann die Schutzfunktion beeinträchtigt sein.

ATTENTION : Lisez ce document et les documents listés dans la section Ressources complémentaires relatifs à l'installation, la configuration et le fonctionnement de cet équipement avant d'installer, configurer, utiliser ou entretenir ce produit. Les utilisateurs doivent se familiariser avec les instructions d'installation et de câblage en plus des exigences relatives aux codes, lois et normes en vigueur.

Les activités relatives à l'installation, le réglage, la mise en service, l'utilisation, l'assemblage, le démontage et l'entretien doivent être réalisées par des personnes formées selon le code de pratique en vigueur.

Si cet équipement est utilisé d'une façon qui n'a pas été définie par le fabricant, la protection fournie par l'équipement peut être compromise.

주의: 본 제품 설치, 설정, 작동 또는 유지 보수하기 전에 본 문서를 포함하여 설치, 설정 및 작동에 관한 참고 자료 섹션의 문서들을 반드시 읽고 숙지하십시오. 사용자는 모든 관련 규정, 법규 및 표준에서 요구하는 사항에 대해 반드시 설치 및 배선 지침을 숙지해야 합니다 .

설치 , 조정 , 가동 , 사용 , 조립 , 분해 , 유지보수 등 모든 작업은 관련 규정에 따라 적절한 교육을 받은 사용자를 통해서만 수행해야 합니다 .

본 장비를 제조사가 명시하지 않은 방법으로 사용하면 장비의 보호 기능이 손상될 수 있습니다 .

ATTENZIONE Prima di installare, configurare ed utilizzare il prodotto, o effettuare interventi di manutenzione su di esso, leggere il presente documento ed i documenti elencati nella sezione “Altre risorse”, riguardanti l'installazione, la configurazione ed il funzionamento dell'apparecchiatura. Gli utenti devono leggere e comprendere le istruzioni di installazione e cablaggio, oltre ai requisiti previsti dalle leggi, codici e standard applicabili.

Le attività come installazione, regolazioni, utilizzo, assemblaggio, disassemblaggio e manutenzione devono essere svolte da personale adeguatamente addestrato, nel rispetto delle procedure previste.

Qualora l'apparecchio venga utilizzato con modalità diverse da quanto previsto dal produttore, la sua funzione di protezione potrebbe venire compromessa.

DİKKAT: Bu ürünün kurulumu, yapılandırılması, işletilmesi veya bakımı öncesinde bu dokümanı ve bu ekipmanın kurulumu, yapılandırılması ve işletimi ile ilgili İlave Kaynaklar bölümünde yer listelenmiş dokümanları okuyun. Kullanıcılar yürürlükteki tüm yönetmelikler, yasalar ve standartların gereksinimlerine ek olarak kurulum ve kablolama talimatlarını da öğrenmek zorundadır.

Kurulum, ayarlama, hizmete alma, kullanma, parçaları birleştirme, parçaları sökme ve bakım gibi aktiviteler sadece uygun eğitimleri almış kişiler tarafından yürürlükteki uygulama yönetmeliklerine uygun şekilde yapılabilir.

Bu ekipman üretici tarafından belirlenmiş amacın dışında kullanılırsa, ekipman tarafından sağlanan koruma bozulabilir.

注意事項：在安裝、設定、操作或維護本產品前，請先閱讀此文件以及列於 「其他資源」章節中有關安裝、設定與操作此設備的文件。使用者必須熟悉安裝和配線指示，並符合所有法規、法律和標準要求。

包括安裝、調整、交付使用、使用、組裝、拆卸和維護等動作都必須交由已經過適當訓練的人員進行，以符合適用的實作法規。

如果將設備用於非製造商指定的用途時，可能會造成設備所提供的保護功能受損。

POZOR: Než začnete instalovat, konfigurovat či provozovat tento výrobek nebo provádět jeho údržbu, přečtěte si tento dokument a dokumenty uvedené v části Dodatečné zdroje ohledně instalace, konfigurace a provozu tohoto zařízení. Uživatelé se musejí vedle požadavků všech relevantních vyhlášek, zákonů a norem nutně seznámit také s pokyny pro instalaci a elektrické zapojení.

Činnosti zahrnující instalaci, nastavení, uvedení do provozu, užívání, montáž, demontáž a údržbu musí vykonávat vhodně proškolený personál v souladu s příslušnými prováděcími předpisy.

Pokud se toto zařízení používá způsobem neodpovídajícím specifikaci výrobce, může být narušena ochrana, kterou toto zařízení poskytuje.

UWAGA: Przed instalacją, konfiguracją, użytkowaniem lub konserwacją tego produktu należy przeczytać niniejszy dokument oraz wszystkie dokumenty wymienione w sekcji Dodatkowe źródła omawiające instalację, konfigurację i procedury użytkowania tego urządzenia. Użytkownicy mają obowiązek zapoznać się z instrukcjami dotyczącymi instalacji oraz oprzewodowania, jak również z obowiązującymi kodeksami, prawem i normami.

Działania obejmujące instalację, regulację, przekazanie do użytkowania, użytkowanie, montaż, demontaż oraz konserwację muszą być wykonywane przez odpowiednio przeszkolony personel zgodnie z obowiązującym kodeksem postępowania.

Jeśli urządzenie jest użytkowane w sposób inny niż określony przez producenta, zabezpieczenie zapewniane przez urządzenie może zostać ograniczone.

OBS! Läs detta dokument samt dokumentet, som står listat i avsnittet Övriga resurser, om installation, konfigurering och drift av denna utrustning innan du installerar, konfigurerar eller börjar använda eller utföra underhållsarbete på produkten. Användare måste bekanta sig med instruktioner för installation och kabeldragning, förutom krav enligt gällande koder, lagar och standarder.

Åtgärder som installation, justering, service, användning, montering, demontering och underhållsarbete måste utföras av personal med lämplig utbildning enligt lämpligt bruk.

Om denna utrustning används på ett sätt som inte anges av tillverkaren kan det hända att utrustningens skyddsanordningar försätts ur funktion.

LET OP: Lees dit document en de documenten die genoemd worden in de paragraaf Aanvullende informatie over de installatie, configuratie en bediening van deze apparatuur voordat u dit product installeert, configureert, bediend of onderhoudt. Gebruikers moeten zich vertrouwd maken met de installatie en de bedradingsinstructies, naast de vereisten van alle toepasselijke regels, wetten en normen.

Activiteiten zoals het installeren, afstellen, in gebruik stellen, gebruiken, monteren, demonteren en het uitvoeren van onderhoud mogen uitsluitend worden uitgevoerd door hiervoor opgeleid personeel en in overeenstemming met de geldende praktijkregels.

Indien de apparatuur wordt gebruikt op een wijze die niet is gespecificeerd door de fabrikant, dan bestaat het gevaar dat de beveiliging van de apparatuur niet goed werkt.

Environment and Enclosure

ATTENTION: This equipment is intended for use in a Pollution Degree 2 industrial environment, in overvoltage Category II applications (as defined in EN/IEC 60664-1), at altitudes up to 2000 m (6562 ft) without derating.
This equipment is not intended for use in residential environments and may not provide adequate protection to radio communication services in such environments.

This equipment is supplied as open-type equipment for indoor use. 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 5VA or be approved for the application if nonmetallic. The interior of the enclosure must be accessible only by the use of a tool. Subsequent sections of this publication may contain more information regarding specific enclosure type ratings that are required to comply with certain product safety certifications.

In addition to this publication, see the following:

- Industrial Automation Wiring and Grounding Guidelines, Rockwell Automation® publication 1770-4.1, for more installation requirements.
- NEMA Standard 250 and EN/IEC 60529, as applicable, for explanations of the degrees of protection provided by enclosures.

Preventing Electrostatic Discharge

ATTENTION: 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: This product is grounded through the DIN rail to chassis ground. Use zinc plated chromate-passivated 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. Be sure to ground the DIN rail properly. See the Industrial Automation Wiring and Grounding Guidelines, Rockwell Automation, publication 1770-4.1, for more information.

ATTENTION: If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Special Conditions for Safe Use

ATTENTION:

- If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.
- Read this document and the documents listed in the Additional Resources section about installation, configuration, and operation of this equipment before you install, configure, operate, or maintain this product. Users are required to familiarize themselves with installation and wiring instructions in addition to requirements of all applicable codes, laws, and standards.
- Installation, adjustments, putting into service, use, assembly, disassembly, and maintenance are required to be carried out by suitably trained personnel in accordance with applicable code of practice.
- In case of malfunction or damage, no attempts at repair should be made. The module should be returned to the manufacturer for repair. Do not dismantle the module.
- Use only a soft dry anti-static cloth to wipe down equipment. Do not use any cleaning agents.

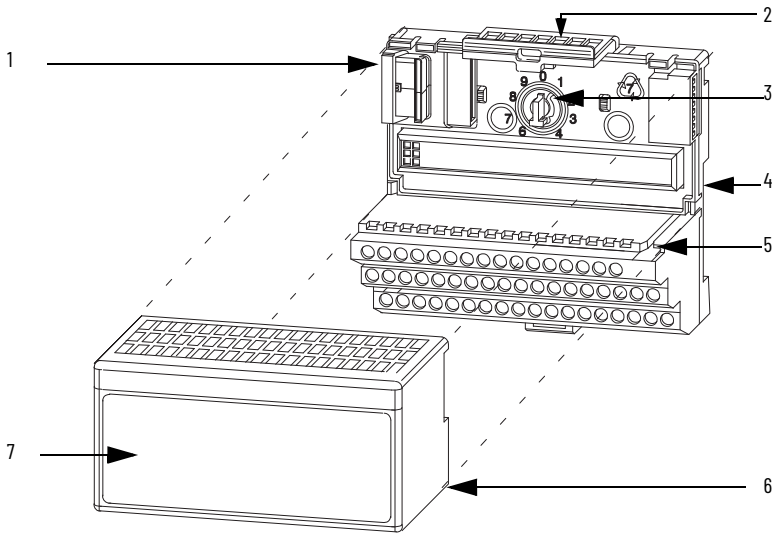
WARNING: When you insert or remove the module while backplane power is on, an electric arc can occur. This could cause an explosion in hazardous location installations.
Be sure that power is removed or the area is nonhazardous before proceeding. Repeated electric arcing causes excessive wear to contacts on both the module and its mating connector. Worn contacts may create electrical resistance that can affect module operation.

WARNING: If you insert or remove the module while backplane power is on, an electric 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.

North American Hazardous Location Approval

The Following Information Applies When Operating This Equipment In Hazardous Locations.	Informations sur l'utilisation de cet équipement en environnements dangereux.
Products marked "CL I, DIV 2, GP A, B, C, D" are suitable for use in Class I Division 2 Groups A, B, C, D, Hazardous Locations and nonhazardous locations only. Each product is supplied with markings on the rating nameplate indicating the hazardous location temperature code. When combining products within a system, the most adverse temperature code (lowest "T" number) may be used to help 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.	Les produits marqués "CL I, DIV 2, GP A, B, C, D" ne conviennent qu'à une utilisation en environnements de Classe I Division 2 Groupes A, B, C, D dangereux et non dangereux. Chaque produit est livré avec des marquages sur sa plaque d'identification qui indiquent le code de température pour les environnements dangereux. Lorsque plusieurs produits sont combinés dans un système, le code de température le plus défavorable (code de température le plus faible) peut être utilisé pour déterminer le code de température global du système. Les combinaisons d'équipements dans le système sont sujettes à inspection par les autorités locales qualifiées au moment de l'installation.
WARNING: **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 that mate to this equipment by using screws, sliding latches, threaded connectors, or other means provided with this product. • Substitution of components may impair suitability for Class I, Division 2.	**AVERTISSEMENT:** **Risque d'Explosion –** • Couper le courant ou 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 les connecteurs. Fixer tous les connecteurs externes reliés à cet équipement à l'aide de vis, loquets coulissants, connecteurs filetés ou autres moyens fournis avec ce produit. • La substitution de composants peut rendre cet équipement inadapté à une utilisation en environnement de Classe I, Division 2.

Install the Isolated Analog Output Module



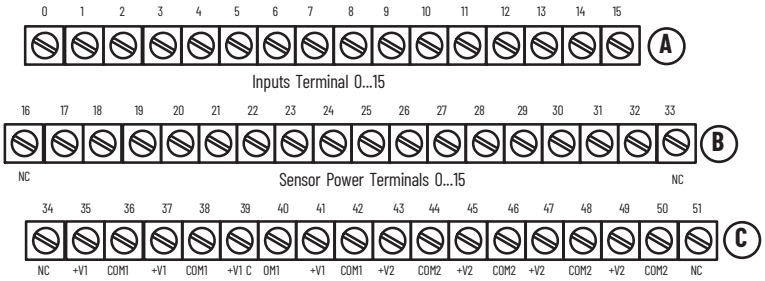
Component Identification

	Description		Description
1	Flexbus connectors	5	Groove
2	Latching mechanism	6	Alignment bar
3	Keyswitch	7	Module
4	Terminal base		

The input module mounts on a 1794-TB32 or 1794-TB32S terminal base unit. The output module mounts on a 1794-TB2, 1794-TB3, or 1794-TB3S terminal base unit.

1. Rotate the keyswitch (3) on the terminal base (4) clockwise to position 4 as required for this type of module.
2. Make sure the Flexbus connector (1) is pushed all the way to the left to connect with the neighboring terminal base/adapter.
   You cannot install the module unless the connector is fully extended.
3. Make sure the pins on the bottom of the module are straight so they will align properly with the connector in the terminal base.
4. Position the module (7) with its alignment bar (6) aligned with the groove (5) on the terminal base.
5. Press firmly and evenly to seat the module in the terminal base unit. The module is seated when the latching mechanism (2) is locked into the module.

1794-TB32, 1794-TB32K, 1794-TB32S, and 1794-TB32SK Terminal Base Wiring for 1794-IB16D and 1794-IB16DK



(1794-TB32 shown)

+V2 = Terminals 43, 45, 47, and 49
Voltage applied to Inputs 0...15 and Sensor power 0...15
COM1, COM2 = Terminals 36, 38, 40, 42, 44, 46, 48, and 50
NC = No connections (terminals 16, 33, 34, and 51)
+V1 = Terminals 35, 37, 39, and 41 (not used)

Wiring Connections for the 1794-IB16 Module

Input	Input Terminal	Sensor Power Terminal	Common	Supply[1]
IN 00	A-0	B-17	-V common connected to terminals 36, 38, 40, 42, 44, 46, 48, and 50	+V2 connected to terminals 43, 45, 47, and 49
IN 01	A-1	B-18		
IN 02	A-2	B-19		
IN 03	A-3	B-20		
IN 04	A-4	B-21		
IN 05	A-5	B-22		
IN 06	A-6	B-23		
IN 07	A-7	B-24		
IN 08	A-8	B-25		
IN 09	A-9	B-26		
IN 10	A-10	B-27		
IN 11	A-11	B-28		
IN 12	A-12	B-29		
IN 13	A-13	B-30		
IN 14	A-14	B-31		
IN 15	A-15	B-32		
+V2 DC power	Power terminals 43, 45, 47 and 49 (power terminals are internally connected together in the module)			
COM DC return	Common terminals 36, 38, 40, 42, 44, 46, 48 and 50 (common terminals are internally connected together in the module)			

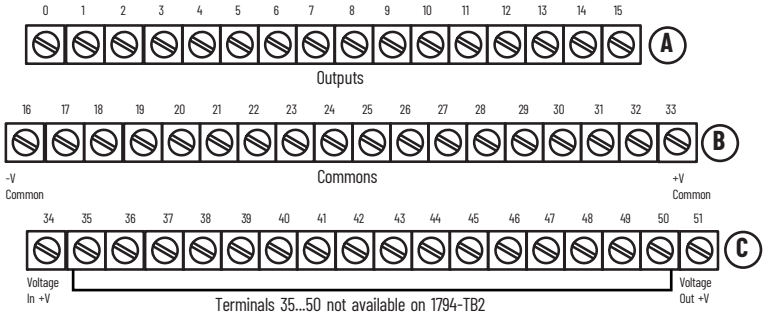
(1) 3-wire devices only. 2-wire devices use input and sensor power terminals; 3-wire devices use input, sensor power and common terminals.

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.

Connect Wiring for the 1794-OB16D Module

1. Connect individual output wiring to numbered terminals on the 0...15 row (A) as indicated in the Wiring Connections for 1794-OB16D table.
2. Connect the associated common for each output to the corresponding terminal on the 16...33 row (B) as indicated in the Wiring Connections for 1794-OB16D table. The common terminals of row (B) are internally connected together.
3. Connect +V DC power to terminal 34 on the 34...51 row (C). The power terminals of row (C) are internally connected together.
4. Connect DC common (COM) to terminal 16 on the 16...33 row (B).
5. If daisy chaining power to the next terminal base, connect a jumper from terminal 51 (+V DC) on this base unit to terminal 34 on the next base unit.
6. If continuing DC common to the next base unit, connect a jumper from terminal 33 (common) on this base unit to terminal 16 on the next base unit.

1794-TB32, 1794-TB32K, 1794-TB32S, and 1794-TB32SK Terminal Base Wiring for 1794-OB16D



(1794-TB32 shown)

+V2 = Terminals 43, 45, 47, and 49
Voltage applied to Inputs 0...15 and Sensor power 0...15
COM1, COM2 = Terminals 36, 38, 40, 42, 44, 46, 48, and 50
NC = No connections (terminals 16, 33, 34, and 51)
+V1 = Terminals 35, 37, 39, and 41 (not used)

Wiring Connections for the 1794-OB16D Output Module

Output	Output Terminal	Common Terminal
Output 00	A-0	B-17
Output 01	A-1	B-18
Output 02	A-2	B-19
Output 03	A-3	B-20
Output 04	A-4	B-21
Output 05	A-5	B-22
Output 06	A-6	B-23
Output 07	A-7	B-24
Output 08	A-8	B-25
Output 09	A-9	B-26
Output 10	A-10	B-27
Output 11	A-11	B-28
Output 12	A-12	B-29
Output 13	A-13	B-30
Output 14	A-14	B-31
Output 15	A-15	B-32
-V DC	C-34 and C-51 (1794-TB2). Power Terminals are internally connected in the terminal base unit. C-34...C-51 (1794-TB3, 1794-TB3S). Power terminals are internally connected in the terminal base unit.	
Common	B-16...B-33. Common terminals are internally connected in the terminal base unit.	

Diagnostics

See the following configuration for location of diagnostic bits.

Note: Each unused sensor port requires a dummy resistor to mask the channel diagnostic function.

Table 1 - Diagnostic Functions for 1794-IB16D and 1794-IB16DK

Ext. Power	Wiring	Input Status	Channel LED Status	Open Wire Error Bit	Short Error Bit	Rev. Error Bit	Module Error Bit/ LED
OFF	Open	Off	Off	0	0	0	0/OFF
		On	Off	0	0	0	0/OFF
	Short	Off	Off	0	0	0	0/OFF
		On	Off	0	0	0	0/OFF
	Normal	Off	Off	0	0	0	0/OFF
		On	Off	0	0	0	0/OFF

Table 1 - Diagnostic Functions for 1794-IB16D and 1794-IB16DK (Continued)

Ext. Power	Wiring	Input Status	Channel LED Status	Open Wire Error Bit	Short Error Bit	Rev. Error Bit	Module Error Bit/ LED
ON	Open	Off	RED	1	0	0	1/RED
		On	RED/YEL	1	0	0	1/RED
	Short	Off	RED	0	1	0	1/RED
		On	RED/YEL	0	1	0	1/RED
	Normal	Off	Off	0	0	0	0/OFF
		On	YEL	0	0	0	0/OFF
REV	Open	Off	Off	0	0	1	1/RED
		On	Off	0	0	1	1/RED
	Short	Off	Off	0	0	1	1/RED
		On	Off	0	0	1	1/RED
	Normal	Off	Off	0	0	1	1/RED
		On	Off	0	0	1	1/RED

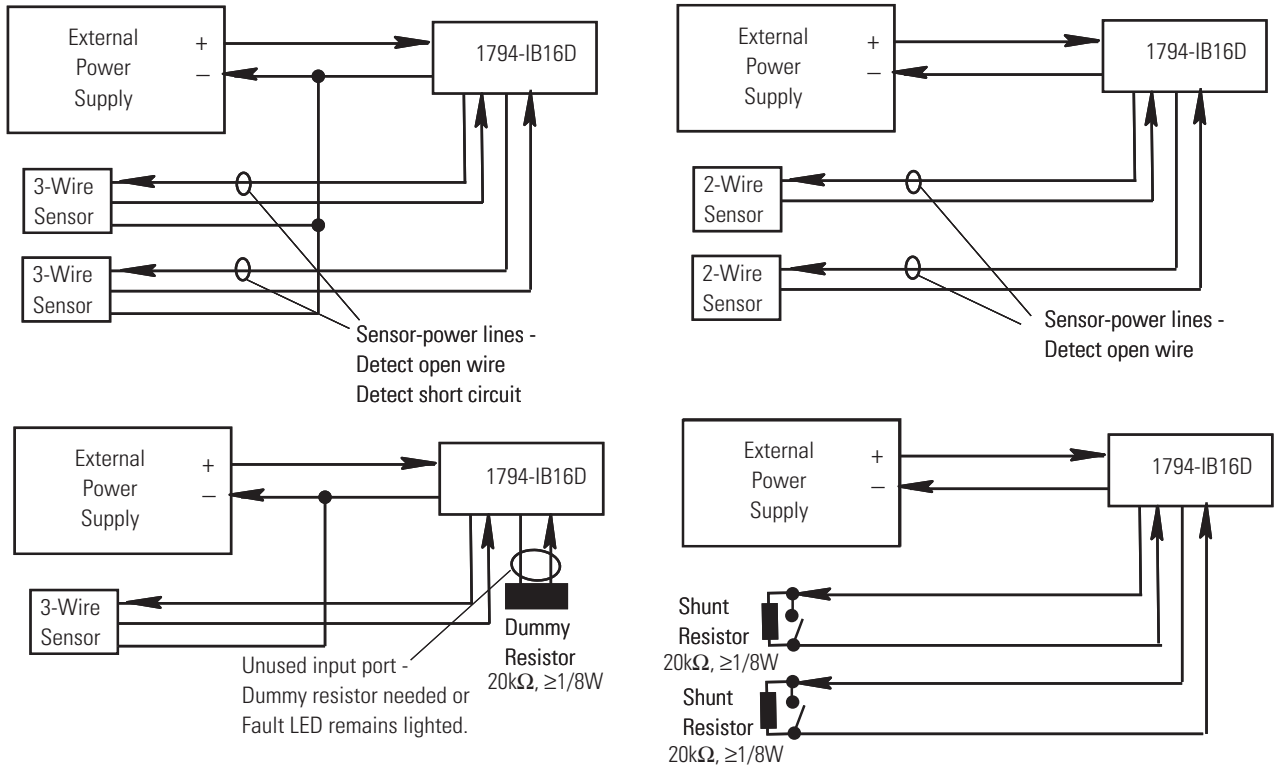
The module monitors each sensor-power port for current and voltage. It turns on the channel red LED and sets (1) the error bit when 1) the module detects a short circuit (no voltage at the sensor-port, and 2) the module detects an open wire (no current at the sensor-port.

Table 2 - Diagnostic Functions for the 1794-OB16D

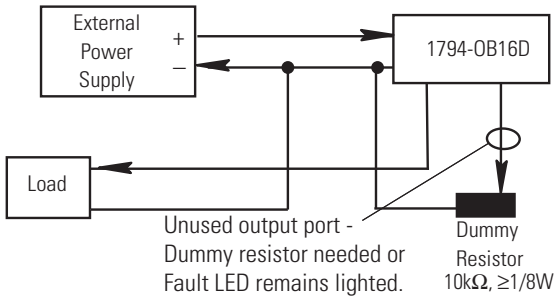
Ext. Power	Wiring	Input Status	Channel LED Status	Open Wire Error Bit	Short Error Bit	Rev. Error Bit	Module Error Bit/ LED
OFF	Open	Off	Off	0	0	0	0/OFF
		On	Off	0	0	0	0/OFF
	Short	Off	Off	0	0	0	0/OFF
		On	Off	0	0	0	0/OFF
	Normal	Off	Off	0	0	0	0/OFF
		On	Off	0	0	0	0/OFF
ON	Open	Off	RED	1	0	0	1/RED
		On	YEL	0	0	0	0/OFF
	Short	Off	Off	0	0	0	0/OFF
		On	RED	0	1	0	1/RED
	Normal	Off	Off	0	0	0	0/OFF
		On	YEL	0	0	0	0/OFF
REV	Open	Off	Off	0	0	1	1/RED
		On	Off	0	0	1	1/RED
	Short	Off	Off	0	0	1	1/RED
		On	Off	0	0	1	1/RED
	Normal	Off	Off	0	0	1	1/RED
		On	Off	0	0	1	1/RED

The module monitors each output channel. It turns on the channel red LED and sets (1) the error bit when 1) the module detects a short circuit (the output signal is active at a channel and the corresponding output voltage is low, and 2) the module detects an open wire (the output signal is inactive at a channel and the corresponding output voltage is high.

Sensor Diagram for the 1794-IB16D and 1794-IB16DK Modules



Sensor Diagram for the 1794-OB16D Module



Configuration

Configuring Your 1794-IB16D and 1794-IB16DK Input Modules

Configure your FLEX™ I/O digital input modules by setting bits in the configuration word (word 3). These modules are compatible with the Remote I/O network with 1794-ASB series E or later, DeviceNet® network, and the ControlNet® network. You must use the Module Connection when used in a ControlNet system.

Table 3 - Image Table Memory Map for 1794-IB16D and 1794-IB16DK Modules

Dec	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Oct	**17**	**16**	**15**	**14**	**13**	**12**	**11**	**10**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Read 1	I15	I14	I13	I12	I11	I10	I9	I8	I7	I6	I5	I4	I3	I2	I1	I0
Read 2													Read Diagnostic Status			
Write 3	Not Used					Input Filter FT 0...15			Not Used							
Where	I = Input status FT = Filter Time															
Diagnostic Status	Bit 00 = Module error; Bit 01 = External power reverse polarity error; Bit 02 = Sensor power short error; Bit 03 = Sensor power open wire error															

Setting the Input Filter Time

To set the input filter time, set the associated bits in the output image (complementary word) for the module.

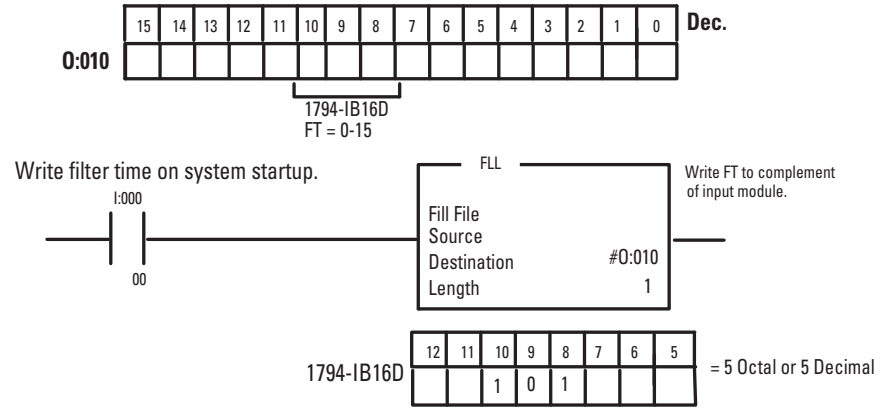


Table 4 - Input Filter Time

Bits			Description	Filter Time
10	**09**	**08**	**Filter Time for inputs 0...15**	**Off to On /On to Off**
0	0	0	Filter Time 0 (Default)	0.25 ms
0	0	1	Filter Time 1	0.5 ms
0	1	0	Filter Time 2	1 ms
0	1	1	Filter Time 3	2 ms
1	0	1	Filter Time 4	4 ms
1	0	1	Filter Time 5	8 ms
1	1	0	Filter Time 6	16 ms
1	1	1	Filter Time 7	32 ms

Configuring Your 1794-OB16D Output Module

Configure your output module by setting bits in the configuration word (word 3). This module is compatibility with the Remote I/O network, with 1794-ASB series D or later, DeviceNet network, and the ControlNet network. You can use the Module Connection or Rack Connection when used in a ControlNet system.

Table 5 - Image Table Memory Map for the 1794-OB16D Module

Dec	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Oct	**17**	**16**	**15**	**14**	**13**	**12**	**11**	**10**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Read 1	Not used												Read Diagnostic Status			
Write 2	015	014	013	012	011	010	09	08	07	06	05	04	03	02	01	00
Where	0 = Output															
Diagnostic Status	Bit 00 = Module error; Bit 01 = External power reverse polarity error; Bit 02 = Output short error; Bit 03 = Output open wire error															

Specifications

Specifications – 16 Input Module w/ Diagnostics, 1794-IB16D and 1794-IB16DK Meets IEC 3 24V DC input specifications

Attribute	Value
Number of inputs	16, current, sinking
Recommended terminal base unit	1794-TB32, 1794-TB32S, 1794-TB62DS, 1794-TB62EXD4X15
On-state voltage, min	10V DC
On-state voltage, nom	24V DC
On-state voltage, max	31.2V DC
On-state current, min	2.0 mA
On-state current, max	12.1 mA
Off-state voltage, max	5.0V DC
Off-state current, max	1.5 mA
Nominal input impedance	3.1 kΩ
Isolation voltage	50V (continuous), Basic Insulation Type type tested @ 2121V DC for 2 s, between field side and system No isolation between individual channels
Input filter time(1) Off to On On to Off	See Setting the Input Filter Time table.
Flexbus current	30 mA @ 5V DC
Power dissipation, max	8.5 W @ 31.2V DC
Thermal dissipation, max	29 BTU/hr @ 31.2V DC
Sensor power, voltage drop, max	2.2V DC
Sensor power, current, max	50 mA
Sensor power line, short detect circuit, min	1.0 A (in 10 s)
Sensor power line, open wire detect, max	50 µA
Detect reverse polarity voltage	Min 10V: Module must detect if the reverse polarity external power supply voltage is greater than the value.

(1) Input off-to-on filter time is the time from a valid input signal to recognition by the module. Input on-to-off filter time is time from the input signal dropping below the valid level to recognition by the module.

Specifications – 16 Output Module w/ Diagnostics, 1794-OB16D

Attribute	Value
Number of outputs	16, current, sourcing
Recommended terminal base unit	1794-TB2, 1794-TB3, 1794-TB3S
Output voltage, min	10V DC
Output voltage, nom	24V DC
Output voltage, max	31.2V DC
Output current rating	8.0 A (16 outputs @ 0.5 A)
On-state current, min	1.0 mA per channel
On-state current, max	500 mA per channel
Surge current	2 A for 50 ms each, repeatable every 2 s
Off-state leakage, max	0.5 mA
Isolation voltage	50V (continuous), Basic Insulation Type type tested at 850V DC for 60 s, between field side and system No isolation between individual channels
Output signal delay(1) Off to On On to Off	 0.5 ms 0.5 ms
Flexbus current	60 mA @ 5V DC
Power dissipation, max	4.8 W @ 31.2V DC
Thermal dissipation, max	16.4 BTU/hr @ 31.2V DC

Specifications – 16 Output Module w/ Diagnostics, 1794-OB16D

Attribute	Value
Short circuit protect and detection	Thermal shutdown (auto reset) Detection condition: when external power active, output signal active, and output port voltage less than 2V.
Open wire detect off-state leakage current	0.1 mA – When external power active and output signal inactive.
Detect reverse polarity voltage	Min 10V: Module must detect if the reverse polarity external power supply voltage is greater than the value.

(1) Delay time is the time from the receipt of an output on or off command to the output actually turning on or off.

General Specifications

Attribute	Value
Terminal base screw torque	Determined by installed terminal base
Dimensions, approx. (H x W x D)	45.7 x 94 x 53.3 mm (1.8 x 3.7 x 2.1 in.) – 1794-IB16D, 1794-IB16DK 94 x 94 x 91 mm (3.7 x 3.7 x 3.6 in.) – 1794-OB16D
Weight, approx.	90 g (3.17 oz.) – 1794-IB16D, 1794-IB16DK 95 g (3.35 oz.) – 1794-OB16D
Indicators (field side)	16 yellow ON/OFF status indicators 16 red diagnostic status indicators 1 red module fault indicator
External DC power supply voltage, nom	24V DC
External DC power voltage range	10...31.2V DC (includes 5% AC ripple)
North American temp code	T3C
Keyswitch position	2
Enclosure type rating	None (open-style)
Wire size	Determined by installed terminal base
Wiring category[1]	2 - on signal ports

(1) Use this conductor category information for planning conductor routing as described in Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

Environmental Specifications

Attribute	Value
Operating temperature	IEC 60068-2-1 (Test Ad, Operating Cold), IEC 60068-2-2 (Test Bd, Operating Dry Heat), IEC 60068-2-14 (Test Nb, Operating Thermal Shock): 0 °C < Ta < +55 °C (+32 °F < Ta < +131 °F)
Temperature, surrounding air, max	55 °C (131 °F)
Storage temperature	IEC 60068-2-1 (Test Ab, Unpackaged nonoperating Cold), IEC 60068-2-2 (Test Bb, Unpackaged nonoperating Dry Heat), IEC 60068-2-14 (Test Na, Unpackaged nonoperating Thermal Shock): -40...+85 °C (-40...+185 °F)
Relative humidity	IEC 60068-2-30 (Test Db, Unpackaged Damp Heat): 5...95% noncondensing
Vibration	IEC60068-2-6 (Test Fc, Operating): 5 g @ 10...500 Hz
Shock, operating	IEC60068-2-27 (Test Ea, Unpackaged shock): 30 g
Shock, nonoperating	IEC60068-2-27 (Test Ea, Unpackaged shock): 50 g
Emissions	IEC 61000-6-4
ESD immunity	IEC 61000-4-2: 6 kV contact discharges 8 kV air discharges
Radiated RF immunity	IEC 61000-4-3: 10V/m with 1 kHz sine-wave 80% AM from 80...2000 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 900 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 1890 MHz 1V/m with 1 kHz sine-wave 80% AM from 2000...2700 MHz

Environmental Specifications (Continued)

Attribute	Value
EFT/B immunity	IEC 61000-4-4: ±2 kV @ 5 kHz on power ports ±2 kV @ 5 kHz on signal ports
Surge transient immunity	IEC 61000-4-5: ±1 kV line-line(DM) and ±2 kV line-earth(CM) on signal ports
Conducted RF immunity	IEC 61000-4-6: 10V rms with 1 kHz sine-wave 80% AM from 150 kHz...80 MHz

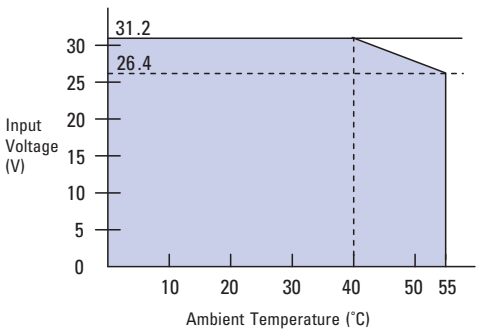
Certifications

Certifications (when product is marked)[1]	Value
c-UL-us	UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E322657. UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E334470.
CE	European Union 2014/30/EU EMC Directive, compliant with: EN 61326-1; Meas./Control/Lab., 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 2011/65/EU RoHS, compliant with: EN IEC 63000; Technical Documentation
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: Article 58-2 of Radio Waves Act, Clause 3
EAC	Russian Customs Union TR CU 020/2011 EMC Technical Regulation
RCM	Australian Radiocommunications Act, compliant with: EN 61000-6-4; Industrial Emissions
Morocco	Arrêté ministériel n° 6404-15 du 29 ramadan 1436

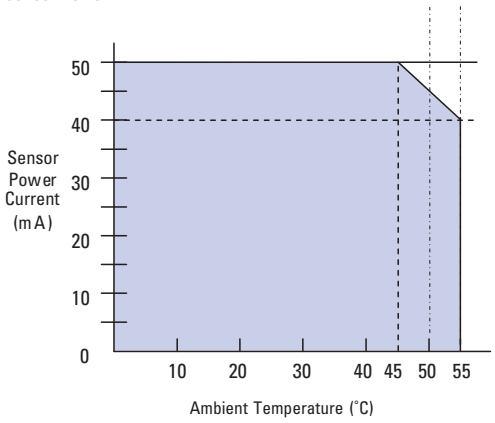
(1) See the Product Certification link at rok.auto/certifications for Declarations of Conformity, Certificates, and other certification details.

Derating Curves

1794-IB16D and 1794-IB16DK Input Voltage



Sensor Power



WARNING: When used in a Class I, Division 2, hazardous location, this equipment must be mounted in a suitable enclosure with proper wiring method that complies with the governing electrical codes.

Notes:

Rockwell Automation Support

Use these resources to access support information.

Technical Support Center	Find help with how-to videos, FAQs, chat, user forums, and product notification updates.	rok.auto/support
Knowledgebase	Access Knowledgebase articles.	rok.auto/knowledgebase
Local Technical Support Phone Numbers	Locate the telephone number for your country.	rok.auto/phonesupport
Literature Library	Find installation instructions, manuals, brochures, and technical data publications.	rok.auto/literature
Product Compatibility and Download Center (PCDC)	Download firmware, associated files (such as AOP, EDS, and DTM), and access product release notes.	rok.auto/pcdc

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Waste Electrical and Electronic Equipment (WEEE)

At the end of life, this equipment should be collected separately from any unsorted municipal waste.

Rockwell Automation maintains current product environmental compliance information on its website at rok.auto/pec.

Rockwell Otomasyon Ticaret A.Ş. Kar Plaza İş Merkezi E Blok Kat:6 34752 İçerenköy, İstanbul, Tel: +90 (216) 5698400 EEE Yönetmeliğine Uygundur

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AMERICAS: Rockwell Automation, 1201 South Second Street, Milwaukee, WI 53204-2496 USA, Tel: (1) 414.382.2000, Fax: (1) 414.382.4444
EUROPE/MIDDLE EAST/AFRICA: Rockwell Automation NV, Pegasus Park, De Kleetlaan 12a, 1831 Diegem, Belgium, Tel: (32) 2 663 0600, Fax: (32) 2 663 0640
ASIA PACIFIC: Rockwell Automation, Level 14, Core F, Cyberport 3, 100 Cyberport Road, Hong Kong, Tel: (852) 2887 4788, Fax: (852) 2508 1846

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