Installation Instructions

Original Instructions

Allen-Bradley
by ROCKWELL AUTOMATION

FLEX I/O 4-channel Pulse Counter Module

Catalog Number 1794-IP4, Series B

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
Updated Environmental Specifications	10
Updated Certifications	11
Added Additional Resources	11

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。

包括安装、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, 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.

Prevent 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.

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.

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.

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.

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.

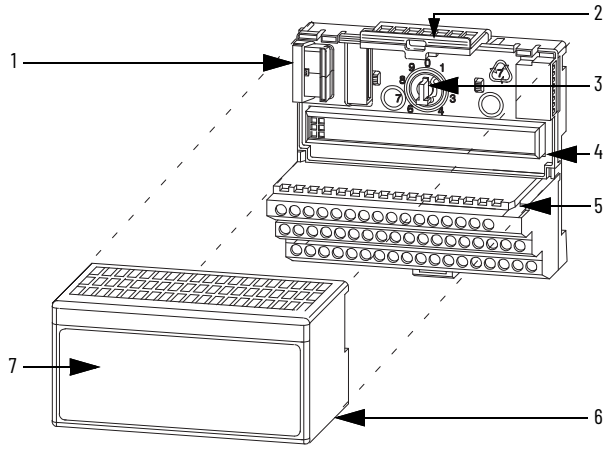
ATTENTION: If you connect or disconnect wiring while the field-side power is on, an electric arc can occur. This could cause an explosion in hazardous location installations. Be sure that power is removed or the area is nonhazardous before proceeding.

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.

WARNING: Secure any external connections that mate to this equipment by using screws, sliding latches, threaded connectors, or other means provided with this product. Do not disconnect equipment unless power has been removed or the area is known to be nonhazardous.

Overview

The FLEX™ I/O 4-channel pulse counter module mounts on a FLEX I/O terminal base.



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

Install Your Module

ATTENTION: During mounting of all devices, be sure that all debris (metal chips, wire strands, and so on) is kept from falling into the module. Debris that falls into the module could cause damage on power-up.

1. Rotate the keyswitch (3) on the terminal base (4) clockwise to position 1 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 adjacent terminal base or adapter. **You cannot install the module unless the connector is fully extended.**
3. Make sure that the pins on the bottom of the module are straight so that they 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.

Connect Wiring for 1794-IP4

Mount the 1794-IP4 module on a 1794-TB2, 1794-TB3, or 1794-TB3S terminal base.

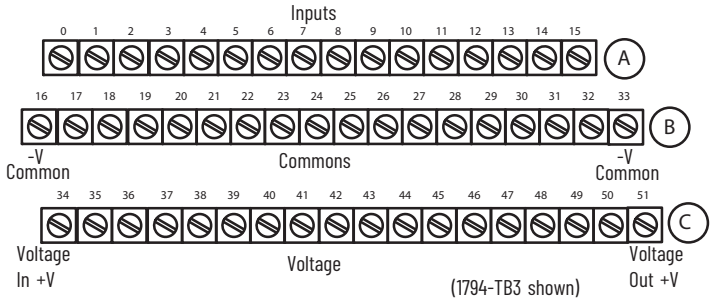
1. Connect individual input wiring (E, Ē) or (U, Ū) for each channel to the numbered terminals on the 0...15 row (A) as indicated Table 1.
2. Connect the associated input common to the corresponding terminal on the 16...33 row (B) for each input as indicated in Table 1.

ATTENTION: Do not connect maximum input voltage simultaneously to all inputs if the module ambient temperature is expected to exceed 40 °C (104 °F).
If the ambient temperature is expected to continuously exceed 40 °C (104 °F), you must limit the input voltage using an external resistor on each input. A 1 kΩ resistor effectively limits a 24V sensor signal to about 15V at the input. Do not limit the input to less than 6V.

3. Connect +V DC power to terminal 34 on the 34...51 row (C).
4. Connect DC return 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.

Figure 1 - Connect Wiring for 1794-TB2, 1794-TB3, and 1794-TB3S

-V (Supply Common) = Terminals B16 and B33
+V (Supply +Voltage) = Terminals C34 and C51
Use B-33 and C-51 for daisy chaining to next terminal base unit.



Connect Wiring for 1794-IP4

Mount the 1794-IP4 module on a 1794-TBN terminal base.

1. Connect individual input wiring (E, Ē) or (U, Ū) for each channel to the even-numbered terminals on the 16...33 row (B) as indicated Table 1.
2. Connect the associated input common to the corresponding odd-numbered terminal on the 34...51 row (C) for each input as indicated in Table 1.

ATTENTION: Do not connect maximum input voltage simultaneously to all inputs if the module ambient temperature is expected to exceed 40 °C (104 °F).
If the ambient temperature is expected to continuously exceed 40 °C (104 °F), you must limit the input voltage using an external resistor on each input. A 1 kΩ resistor effectively limits a 24V sensor signal to about 15V at the input. Do not limit the input to less than 6V.

3. Connect +V DC power to terminal 34 on the 34...51 row (C).
4. Connect DC return 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.

Figure 2 - Connect Wiring for 1794-TBN

-V (Supply Common) = Terminals B16 and B33
+V (Supply +Voltage) = Terminals C34 and C51
Use B-33 and C-51 for daisy chaining to next terminal base unit.

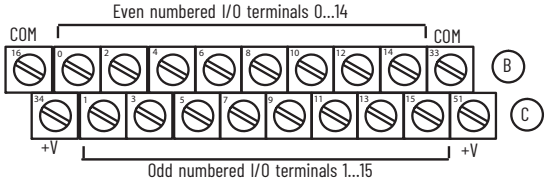


Table 1 - Wiring Connections for the 1794-IP4 Module

Channel	Signal Name[1]	1794-TB2, 1794-TB3, 1794-TB3S			1794-TBN[2]
		Signal	0V DC COM	12...24V DC	Signal
16-bit Period Time Measurement					
0	E	A-0	B-17	C-35	B-0
	Ē	A-1	B-18	C-36	B-1
1	E	A-2	B-19	C-37	B-2
	Ē	A-3	B-20	C-38	B-3
2	E	A-4	B-21	C-39	B-4
	Ē	A-5	B-22	C-40	B-5
3	E	A-6	B-23	C-41	B-6
	Ē	A-7	B-24	C-42	B-7
32-bit Period Time Measurement					
0	U	A-8	B-25	C-43	B-8
	Ū	A-9	B-26	C-44	B-9
1	U	A-10	B-27	C-45	B-10
	Ū	A-11	B-28	C-46	B-11
2	U	A-12	B-29	C-47	B-12
	Ū	A-13	B-30	C-48	B-13
3	U	A-14	B-31	C-49	B-14
	Ū	A-15	B-32	C-50	B-15
	0V DC	Terminals 16...33 (1794-TB2, 1794-TB3, 1794-TB3S)			Terminals 16 and 33
	12/24V DC	Terminals 34 and 51 (1794-TB2) Terminals 34...51 (1794-TB3, 1794-TB3S)			Terminals 34 and 51

(1) Any unused signals have to be connected to the associated common.
(2) Auxiliary terminal blocks are required when using these terminal base units.

Figure 3 - Example of 16-bit Period Time Measurement and 16-bit Accumulating Pulse Counter Wiring (4-channels)

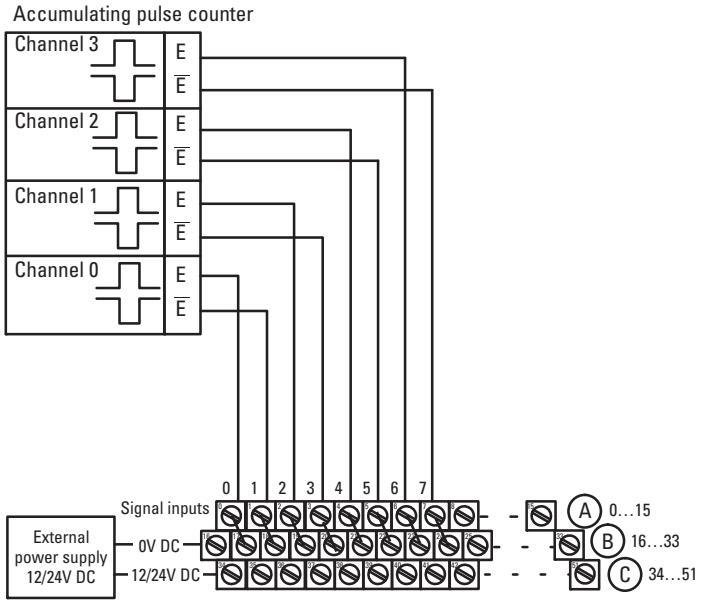
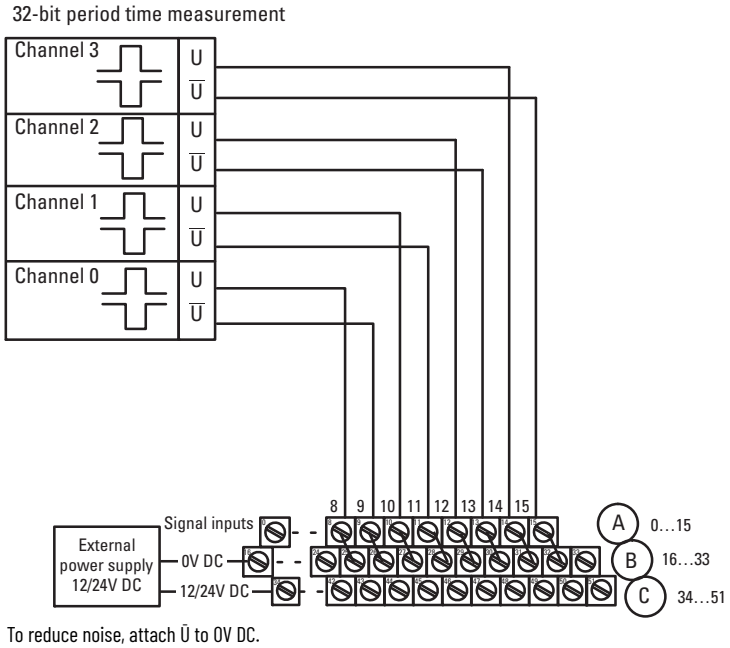


Figure 4 - Example of 32-bit Period Time Measurement Wiring (4-channels)



To reduce noise, attach Ū to 0V DC.

Configure Your Module

Table 2 - Input (Read) Image

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**
0	Reserved															
1	Counter 00 – 16-bit period measurement for channel 0															
2	Counter 01 – Pulse counter for channel 0 – 16-bit pulse counting															
1	32-bit period measurement for channel 0															
2	32-bit period measurement for channel 0															
3	Counter 10 – 16-bit period measurement for channel 1															
4	Counter 11 – Pulse counter for channel 1 – 16-bit pulse counting															
3	32-bit period measurement for channel 1															

Table 2 - Input (Read) Image (Continued)

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
4	32-bit period measurement for channel 1															
5	Counter 20 – 16-bit period measurement for channel 2															
6	Counter 21 – Pulse counter for channel 2 – 16-bit pulse counting															
5	32-bit period measurement for channel 2															
6	32-bit period measurement for channel 2															
7	Counter 30 – 16-bit period measurement for channel 3															
8	Counter 31 – Pulse counter for channel 3 – 16-bit pulse counting															
7	32-bit period measurement for channel 3															
8	32-bit period measurement for channel 3															
9	Readback of Control Word 2															
	Reserved								RD3	RD2	RD1	RD0	M3	M2	M1	M0
10	Revision read - Software version code															
Where:	M = Measurement ready bit – Positive edge measurement ready for the respective channel RD = Reset done															

Table 3 - Output/Configuration Image

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
0	Control Word 0 – Selects the measure function															
1	Control Word 1 – Sets the clock frequency and period multiple															
2	Control Word 2 – Sets the start of a new measurement															
3	Not used															

Table 4 - Description of Control Word 0

Bit	Description			
00	Pulse counting and period time measurement selection, channel 0 0 = Pulse counting and period time measurement selected – 16-bit 1 = Period time measurement selected – 32-bit			
01	Pulse counting and period time measurement selection, channel 1 0 = Pulse counting and period time measurement selected – 16-bit 1 = Period time measurement selected – 32-bit			
02	Pulse counting and period time measurement selection, channel 2 0 = Pulse counting and period time measurement selected – 16-bit 1 = Period time measurement selected – 32-bit			
03	Pulse counting and period time measurement selection, channel 3 0 = Pulse counting and period time measurement selected – 16-bit 1 = Period time measurement selected – 32-bit			
04	Channel 0 – 0 = Filter disabled; 1 = Filter enabled[1]			
05	Channel 1 – 0 = Filter disabled; 1 = Filter enabled[1]			
06	Channel 2 – 0 = Filter disabled; 1 = Filter enabled[1]			
07	Channel 3 – 0 = Filter disabled; 1 = Filter enabled[1]			
08...09	09	08	Filter sample clock frequency and period (common to all channels)	
	0	0	625 kHz	1.6 µs
	0	1	312.5 kHz	3.2 µs
	1	0	104.17 kHz	9.6 µs
	1	1	7.8125 kHz	128 µs
10...15	Reserved			

(1) Use filter when the input waveform has slow rise/fall time or has high frequency noise on the input waveform.

Filter Function Description

Use the filter in either 16-bit or 32-bit mode. Enable filter to use a triangular shape waveform of frequencies as low as 1 Hz. If the filter is not enabled, the module only functions properly with input waveform of square shape.

ATTENTION: Do not enable the filter with frequencies greater than 90 kHz. A loss of counts may result.

Table 5 - Description of Control Word 1

Bit	Description			
00	Clock frequency for period time measurement, channel 0 0 = Period time measurement with 10 MHz internal clock selected 1 = Period time measurement with 1 MHz internal clock selected			
01...03	03	02	01	Number of periods for measurement – Channel 0
	0	0	0	1 period
	0	0	1	2 periods
	0	1	0	4 periods
	0	1	1	8 periods
	1	0	0	16 periods
	1	0	1	32 periods
	1	1	0	64 periods
	1	1	1	128 periods
04	Clock frequency for period time measurement, channel 1 – See bit 00			
05...07	Selection of number of periods for measurement, channel 1 – See bits 01...03			
08	Clock frequency for period time measurement, channel 2 – See bit 00			
09...11	Selection of number of periods for measurement, channel 2 – See bits 01...03			
12	Clock frequency for period time measurement, channel 3 – See bit 00			
13...15	Selection of number of periods for measurement, channel 3 – See bits 01...03			

Table 6 - Description of Control Word 2

Bit	Description
00	Start new measurement, channel 0 – When set, start new measurement on positive edge.
01	Start new measurement, channel 1 – When set, start new measurement on positive edge.
02	Start new measurement, channel 2 – When set, start new measurement on positive edge.
03	Start new measurement, channel 3 – When set, start new measurement on positive edge.
04	Reset counter, channel 0 – A positive edge on this bit resets counter 01.
05	Reset counter, channel 1 – A positive edge on this bit resets counter 11.
06	Reset counter, channel 2 – A positive edge on this bit resets counter 21.
07	Reset counter, channel 3 – A positive edge on this bit resets counter 31.
08...15	Reserved for factory use

Table 7 - Description of Control Word 2 Readback

Bit	Description
00	Positive edge, channel 0 – Measurement ready
01	Positive edge, channel 1 – Measurement ready
02	Positive edge, channel 2 – Measurement ready
03	Positive edge, channel 3 – Measurement ready
04	Reset counter, channel 0 – A positive edge on this bit indicates that counter 01 reset is done.
05	Reset counter, channel 1 – A positive edge on this bit indicates that counter 11 reset is done.
06	Reset counter, channel 2 – A positive edge on this bit indicates that counter 21 reset is done.
07	Reset counter, channel 3 – A positive edge on this bit indicates that counter 31 reset is done.
08...15	Reserved for factory use

Specifications

Specifications – FLEX I/O 4-channel Pulse Counter Module

Attribute	Value
Number of inputs	4
Number of inputs per counter	2 groups of 2
Recommended terminal base unit	1794-TB2, 1794-TB3, 1794-TB3S, 1794-TBN, 1794-TBKD
Input pulse width	Each signal condition must be stable for at least 2 µs to be recognized
Counting frequency, max	100 kHz
On-state voltage, min	6V DC
On-state voltage, max	26.4V DC (24V DC +10%)
On-state current, min	3 mA @ 6V DC
On-state current, nom	9 mA @ 12V DC
On-state current, max	15 mA @ 24V DC
Off-state voltage, min	-26.4V DC
Off-state voltage, max	3V DC
Isolation voltage	Tested @ 500V AC for 60 s
Flexbus current	5 mA @ 5V DC
Power dissipation, max	5 W @ 26.4V DC
Thermal dissipation, max	17.1 BTU/hr @ 26.4V DC
Terminal base screw torque	Determined by the installed terminal base
Dimensions, approx. (H x W x D)	46 x 94 x 53 mm (1.8 x 3.7 x 2.1 in.)
Indicators (field side)	1 green/red power/status indicator 8 yellow status indicators
External power supply voltage range	12...24V DC (+10%)
Current consumption from external power supply	150 mA @ 12V DC 75 mA @ 24V DC
North American temperature code	T4
Keyswitch position	1
Enclosure type rating	None (open-style)
Wire size	Belden 8761, 304.8 m (1000 ft)
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...55 °C (32...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 30...1000 MHz

Environmental Specifications (Continued)

Attribute	Value
EFT/B immunity	IEC 61000-4-4: ±2 kV @ 5 kHz on signal ports
Surge transient immunity	IEC 61000-4-5: ±1 kV line-earth(CM) on shielded 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 E65584. UL Listed for Class I Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E193170.
UK and CE	UK Statutory Instrument 2016 No. 1091 and European Union 2014/30/EU EMC Directive, compliant with: EN 61326-1; Meas./Control/Lab., Industrial Requirements EN 61000-6-2; Industrial Immunity EN 61131-2; Programmable Controllers (Clause 8, Zone A & B) EN 61000-6-4; Industrial Emissions UK Statutory Instrument 2012 No. 3032 and European Union 2011/65/EU RoHS, compliant with: EN 63000; Technical documentation
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: Article 58-2 of Radio Waves Act, Clause 3
RCM	Australian Radiocommunications Act, compliant with: AS/NZS CISPR 11; Industrial Emissions

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

Additional Resources

For more information on the products that are described in this publication, use these resources. You can view or download publications at rok.auto/literature.

Resources	Description
FLEX I/O and FLEX I/O-XT Selection Guide, publication 1794-SG002	Provides information on how to select FLEX I/O and FLEX I/O-XT™ adapters, terminal bases, I/O modules, and accessories.
FLEX I/O 4 Channel Pulse Counter Module User Manual, publication 1794-UM016	Describes how to install, program, and troubleshoot the FLEX I/O 4 channel pulse counter module.
Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1	Provides general guidelines for installing a Rockwell Automation industrial system.
Product Certifications website, rok.auto/certifications	Provides declarations of conformity, certificates, and other certification details.

Rockwell Automation Support

Use these resources to access support information.

Technical Support Center	Find help with how-to videos, FAQs, chat, user forums, Knowledgebase, and product notification updates.	rok.auto/support
Local Technical Support Phone Numbers	Locate the telephone number for your country.	rok.auto/phonesupport
Technical Documentation Center	Quickly access and download technical specifications, installation instructions, and user manuals.	rok.auto/techdocs
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

Documentation Feedback

Your comments help us serve your documentation needs better. If you have any suggestions on how to improve our content, complete the form at rok.auto/docfeedback.

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

Connect with us.

rockwellautomation.com — expanding **human possibility**®

AMERICAS: Rockwell Automation, 1201 South Second Street, Milwaukee, WI 53204-2496 USA, Tel: (1) 414.382.2000
EUROPE/MIDDLE EAST/AFRICA: Rockwell Automation NV, Pegasus Park, De Kleetlaan 12a, 1831 Diegem, Belgium, Tel: (32) 2663 0600
ASIA PACIFIC: Rockwell Automation SEA Pte Ltd, 2 Corporation Road, #04-05, Main Lobby, Corporation Place, Singapore 618494, Tel: (65) 6510 6608
UNITED KINGDOM: Rockwell Automation Ltd., Pitfield, Kiln Farm, Milton Keynes, MK11 3DR, United Kingdom, Tel: (44)(1908) 838-800

Publication 1794-IN064F-EN-P - June 2024 | Supersedes Publication 1794-IN064E-EN-P - August 2015