Installation Instructions

Original Instructions

Allen-Bradley
by ROCKWELL AUTOMATION

MicroLogix 1200 RTD/Resistance Input Module

Catalog Number 1762-IR4

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
Reorganized attentions and warnings	3...4
Updated General Specifications	10
Updated Environmental Specifications	11
Updated Certifications	12

Product Overview

The 1762-IR4 MicroLogix™ 1200 expansion I/O module is suitable for use in an industrial environment when installed in accordance with these instructions. Specifically, this equipment is intended for use in clean, dry environments (Pollution degree 2[a]) and to circuits not exceeding Over Voltage Category II[b] (IEC 60664-1)[c].

The MicroLogix 1200 RTD/Resistance input module receives and stores digitally converted analog data from RTDs or other resistance inputs, such as potentiometers. The module supports connections from any combination of up to four RTDs or other resistance inputs. See Module Specifications on page 10 for supported RTD and resistance types, their associated temperature ranges, and the analog input signal ranges that each channel supports. Each of the four input channels is individually configurable for a specific input device and provides open circuit or short-circuit and overrange or underrange indication.

(a) Pollution Degree 2 is an environment where, normally, only non-conductive pollution occurs except that occasionally a temporary conductivity that is caused by condensation is expected.
(b) Over Voltage Category II is the load level section of the electrical distribution system. At this level, transient voltages are controlled and do not exceed the impulse voltage capability of the product's insulation.
(c) Pollution Degree 2 and Over Voltage Category II are International Electrotechnical Commission (IEC) designations.

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 are present and appropriately designed to help prevent personal injury resulting from accessibility to live parts. The enclosure must have suitable flame-retardant properties to help 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. • If this product contains batteries, they must only be changed in an area known to be nonhazardous.	**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. • S'assurer que l'environnement est classé non dangereux avant de changer les piles.

WARNING: Special Conditions for Safe Use

- This product must be installed in an enclosure. All cables connected to the product must remain in the enclosure or be protected by conduit or other means.
- The local programming terminal port is intended for temporary use only and must not be connected or disconnected unless the area is free of ignitable, concentrations of flammable gases or vapors.

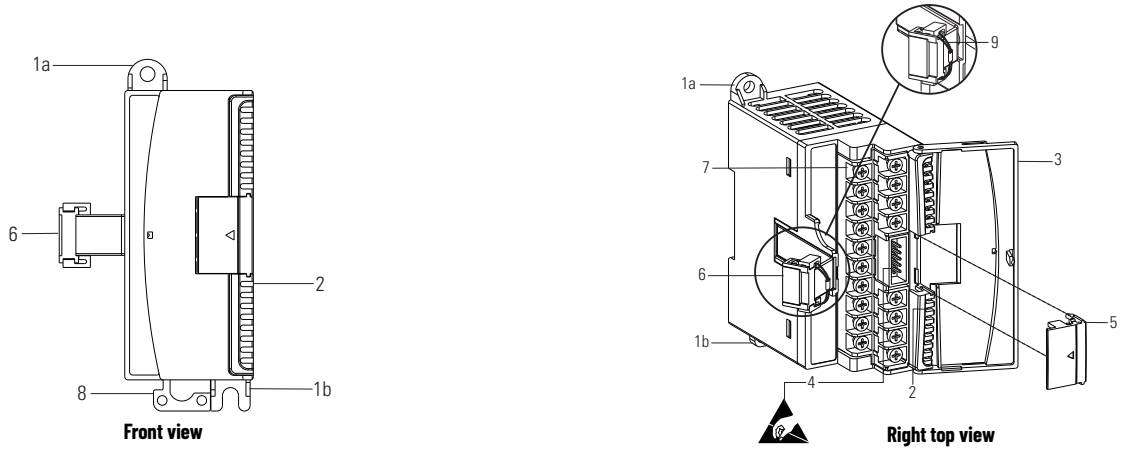
ATTENTION:
Remove power before removing or installing this module. When you remove or install a module with power applied, an electric arc may occur. An electric arc can cause personal injury or property damage by:

- Sending an erroneous signal to your system's field devices, causing unintended machine motion
- Causing an explosion in a hazardous environment
- Causing permanent damage to the module's circuitry
  Electrical electric arcing causes excessive wear to contacts on both the module and its mating connector. Worn contacts may create electrical resistance.
- Do not remove protective debris strip until after the module and all other equipment near the module is mounted and wiring is complete. Once wiring is complete and the module is free of debris, carefully remove protective debris strip. Failure to remove strip before operating can cause overheating.
- During panel or DIN rail 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 when power is applied to the module.

IMPORTANT Any illustrations, charts, sample programs, and layout examples that are shown in this publication are intended solely for the purposes of example. Since there are many variables and requirements that are associated with any particular installation, Rockwell Automation does not assume responsibility or liability for actual use based on the examples that are shown in this publication.

WARNING:
- In Class I Division 2 applications, the bus connector must be fully seated and the bus connector cover must be snapped in place.
- In Class I Division 2 applications, all modules must be mounted in direct contact with each other as shown on page 5. If DIN rail mounting is used, an end stop must be installed ahead of the controller and after the last 1762 I/O module.
- When used in a Class I Division 2, hazardous location, this equipment must be mounted in a suitable enclosure with a proper wiring method that complies with the governing electrical codes.

Figure 1 - 1762-IR4 Module Overview



Module Description

	Description		Description
1 a	Upper panel mounting tab	5	Bus connector cover
1 b	Lower panel mounting tab	6	Flat ribbon cable with bus connector (female pins)
2	I/O diagnostic status indicators	7	Terminal block
3	Module door with terminal identification label	8	DIN rail latch
4	Bus connector with male pins	9	Pull loop

This equipment is sensitive to electrostatic discharge (ESD).
Follow ESD prevention guidelines when handling this equipment.

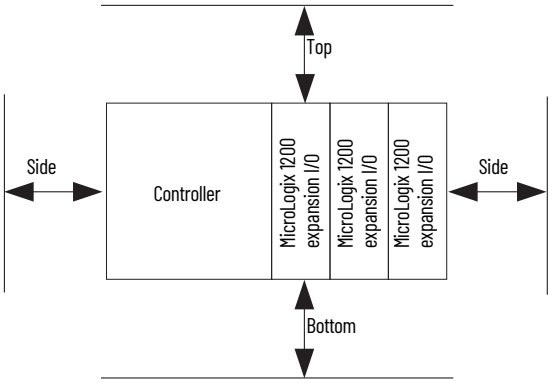
Mount the Module

For more information on proper grounding guidelines, see the Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

Module Spacing

Maintain spacing from objects such as enclosure walls, wireways, and adjacent equipment. Allow 50.8 mm (2 in.) of space on all sides for adequate ventilation, as shown in Figure 2.

Figure 2 - Mounting Dimensions and DIN Rail Mounting



IMPORTANT MicroLogix 1200 expansion I/O can be mounted horizontally only.

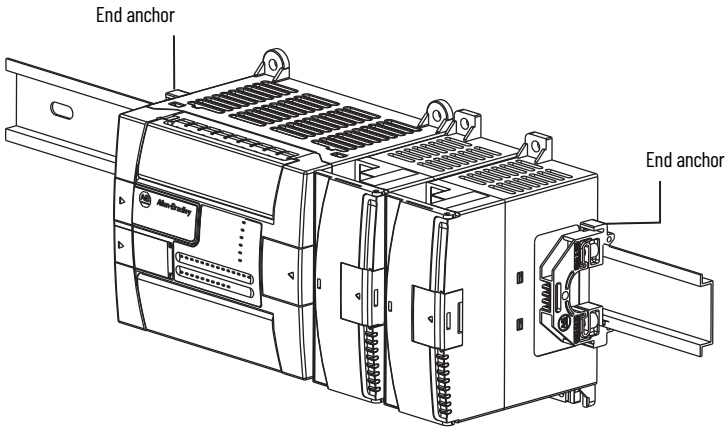
DIN Rail Mounting

The module can be mounted using the following DIN rails: 35 x 7.5 mm (EN 50 022 - 35 x 7.5) or 35 x 15 mm (EN 50 022 - 35 x 15).

For environments with greater vibration and shock concerns, use the panel mounting method, instead of DIN rail mounting.

Before mounting the module on a DIN rail, close the DIN rail latch.

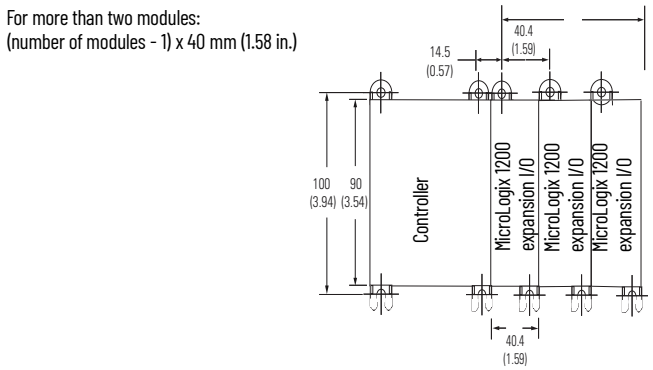
1. Press the DIN rail mounting area of the module against the DIN rail. The latch opens momentarily and locks into place.
2. Use DIN rail end anchors (Allen-Bradley® part number 1492-EA35 or 1492-EAH35) for vibration or shock environments.



Panel Mounting

Use the dimensional template shown in Figure 3 to mount the module. The preferred mounting method is to use two M4 or #8 pan head screws per module. You can also use M3.5 or #6 pan head screws, but you may need a washer to achieve a good ground current. Mounting screws are required on every module.

Figure 3 - Dimensional Template

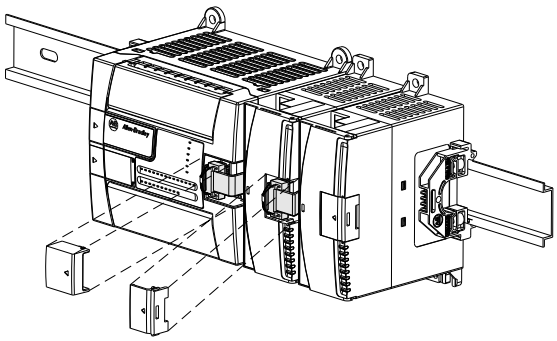


NOTE: All dimensions are in mm (inches). Hole spacing tolerance: ±0.4 mm (0.016 in.).

System Assembly

The expansion I/O module is attached to the controller or another I/O module with a flat ribbon cable after mounting as shown in Figure 4.

Figure 4 - Expansion I/O Assembly



Use the pull loop on the connector to disconnect modules. Do not pull on the ribbon cable.

Field Wiring Connections

This product is intended to be mounted to a well-grounded mounting surface such as a metal panel. Additional grounding connections from the module's mounting tabs or DIN rail (if used) are not required unless the mounting surface cannot be grounded. See the Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1 for additional information.

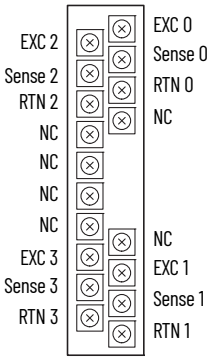
Wire the Module

ATTENTION: The grounded or exposed thermocouples can become shorted to a potential greater than the potential of the thermocouple itself. Be careful when wiring these types of thermocouples to avoid possible shock hazard.

Consider the following when wiring your system:

- Do not use the module's NC terminals as connection points.
- Use Belden shielded, twisted-pair wire to achieve proper operation and high immunity to electrical noise.
- To limit noise, locate the RTD and resistance device signal wires as far away as possible from power lines, load lines, and other sources of electrical noise, such as hard-contact switches, relays, and AC motor drives.
- Locate the RTD modules away from other modules that generate a significant amount of heat.
- Under normal conditions, connect the drain wire and shield junction to earth ground, via a panel or DIN rail mounting screw at the 1762-IR4 module end.
- For millivolt inputs, always use Belden™ 8761 (shielded, twisted-pair) or equivalent wire to achieve proper operation and high immunity to electrical noise.
- If multiple power supplies are used with millivolt analog inputs, the power supply commons must be connected.
- Keep the shield connection to a ground as short as possible.
- To achieve optimum accuracy, limit overall cable impedance by keeping your cable as short as possible. Locate the I/O system as close to your sensors or actuators as your application permits. See Table 1 on page 6.

Figure 5 - Terminal Block Layout



NC terminals are not intended for use as connection points.
Do not connect any wires to the NC terminals.

RTD Wiring Considerations

Since the operating principle of the RTD module is based on the measurement of resistance, take special care when selecting your input cable. For 2-wire or 3-wire configurations, select a cable that has a consistent impedance throughout its entire length.

Table 1 - Recommended Cables

Configuration	Recommended Cable
2-wire	Belden 9501 or equivalent
3-wire – less than 30.48 m (100 ft.)	Belden 9533 or equivalent
3-wire – greater than 30.48 m (100 ft.) or high humidity conditions	Belden 83503 or equivalent

IMPORTANT The RTD module requires three wires to compensate for lead resistance error. We recommend that you do not use 2-wire RTDs if you need long cable runs, as it reduces the accuracy of the system. However, if you need a two-wire configuration, reduce the effect of the lead wire resistance by using a lower gauge wire for the cable (for example, use AWG #16 instead of AWG #24). The module terminal block accepts two AWG #14 gauge wires.

When using a 3-wire configuration, the module compensates for resistance error due to lead wire length. For example, in a 3-wire configuration, the module reads the resistance due to the length of one of the wires and assumes that the resistance of the other wire is equal. If the resistances of the individual lead wires are much different, an error may exist. The closer the resistance values are to each other, the greater the amount of error is minimized.

IMPORTANT To ensure temperature or resistance value accuracy, the resistance difference of the cable lead wires must be equal to or less than 0.01 Ω.

To make sure that the lead values match as closely as possible:

- Keep lead resistance as small as possible and less than 25 Ω.
- Use quality cable that has a small tolerance impedance rating.

- Use a heavy-gauge lead wire that has less resistance per foot.

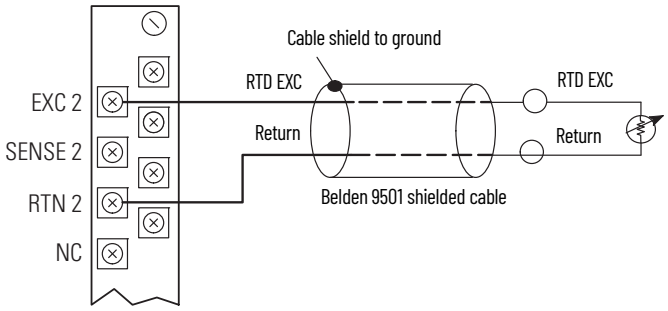
RTD Wiring Configurations

For a 3-wire configuration, the module can compensate for a maximum cable length that is associated with an overall cable impedance of 25 Ω.

You can connect three configurations of RTDs to the 1762-IR4 module:

- 2-wire RTD, which is composed of an RTD EXC (excitation) lead wire and an RTN (return) lead wire.
- 3-wire RTD, which is composed of a Sense and two RTD lead wires (RTD EXC and RTN).
- 4-wire RTD, which is composed of a Sense and two RTD lead wires (RTD EXC and RTN). The second sense wire of a 4-wire RTD is left open.

Figure 6 - 2-wire RTD Configuration



When using an ungrounded thermocouple, you must connect the shield to a ground at the module end.

IMPORTANT 2-wire configurations do not permit the module to compensate for resistance error to do lead wire length. The resulting analog data includes the effect of this uncompensated lead wire resistance. The module continues to place the uncompensated analog data in the input data file, but the open circuit status bit (0Cx) is set in word 4 of the input data file for any enabled channel with a 2-wire configuration. These status bits may be used in the control program to indicate that the analog data includes errors due to uncompensated lead wires. See I/O Memory Mapping on page 9 for more information on open circuit status bits.

Figure 7 - 3-wire RTD Configuration

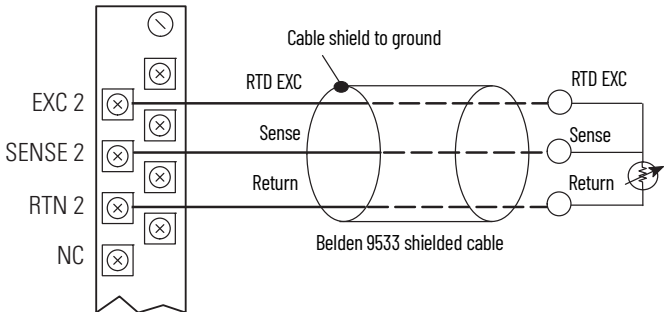
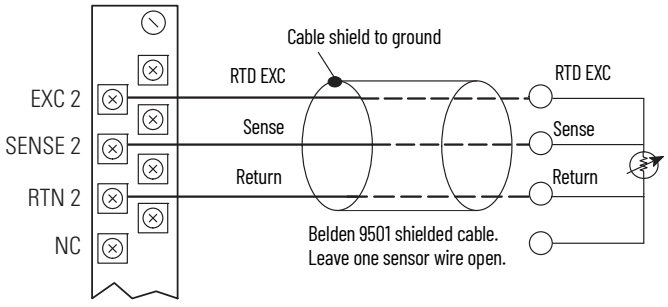


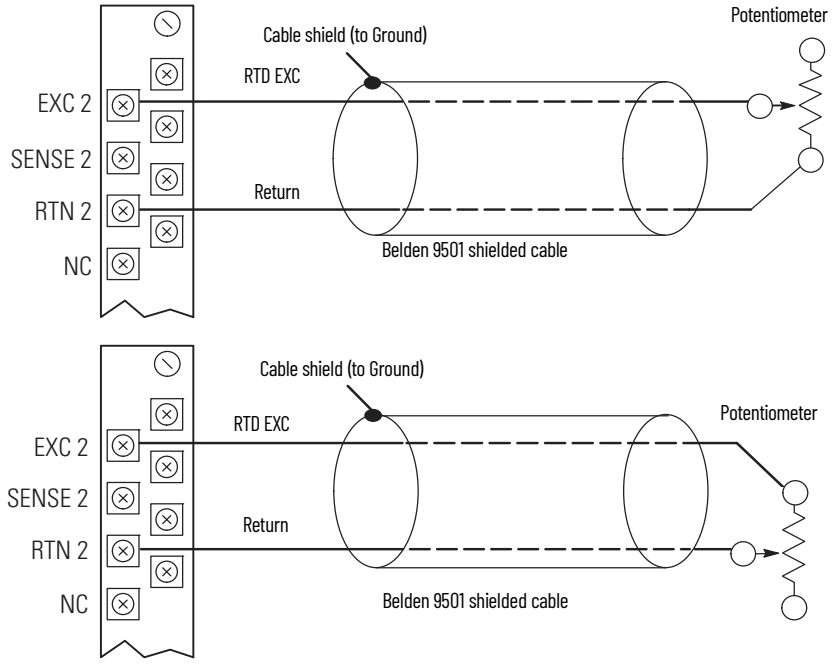
Figure 8 - 4-wire RTD Configuration



Wiring Resistance Devices (Potentiometers)

Potentiometer wiring requires the same type of cable as that for the RTD described in Table 1 on page 6. Potentiometers can be connected to the module as a 2-wire or 3-wire connection as shown in Figure 9 on page 8.

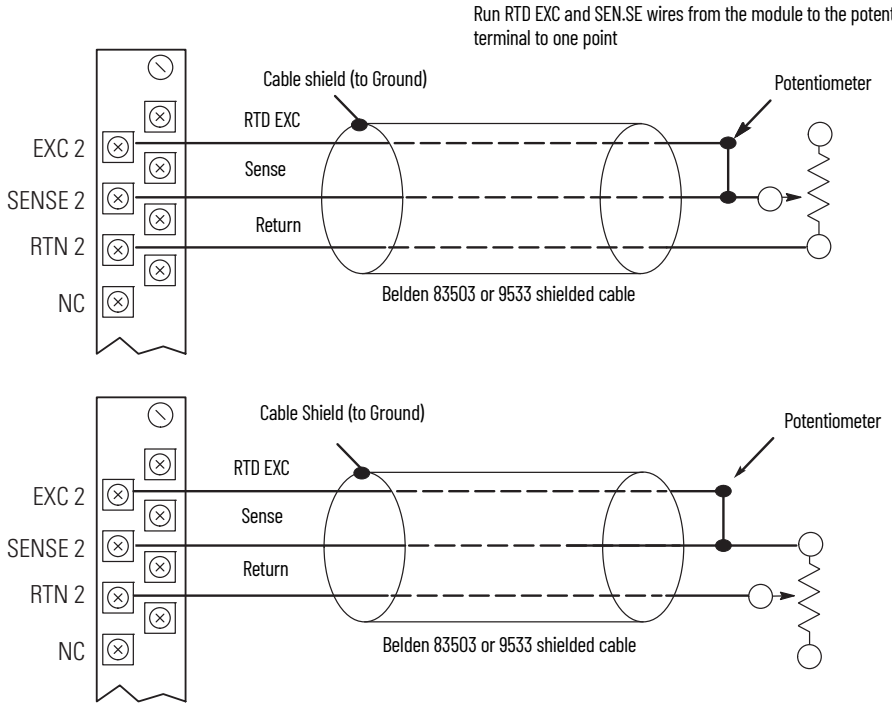
Figure 9 - 2-wire Potentiometer Interconnection



The potentiometer wiper arm can be connected to either the EXC or return terminal, depending on whether you want increasing or decreasing resistance.

IMPORTANT 2-wire configurations do not permit the module to compensate for resistance error to do lead wire length. The resulting analog data includes the effect of this uncompensated lead wire resistance. The module continues to place the uncompensated analog data in the input data file, but the open circuit status bit (0Cx) is set in word 4 of the input data file for any enabled channel with a 2-wire configuration. These status bits may be used in the control program to indicate that the analog data includes errors due to uncompensated lead wires. See I/O Memory Mapping on page 9 for more information on open circuit status bits.

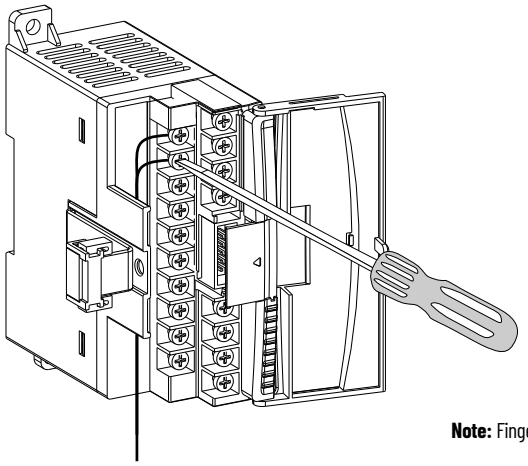
Figure 10 - 3-wire Potentiometer Interconnection



The potentiometer wiper arm can be connected to either the EXC or return terminal depending on whether you want increasing or decreasing resistance.

A write-on label is provided with the module. Mark the identification of each terminal with permanent ink, and slide the label back into the door.

Wire the Fingersafe Terminal Block



Note: Fingersafe cover not shown.

When wiring the terminal block, keep the fingersafe cover in place.

1. Route the wire under the terminal pressure plate. You can use the stripped end of the wire or a spade lug. The terminals accept a 6.35 mm (0.25 in.) spade lug.
2. Tighten the terminal screw making sure that the pressure plate secures the wire. Recommended torque for terminal screws is 0.904 N•m (8 lb•in).

If you must remove the fingersafe cover, insert a screwdriver into one of the square wiring holes and gently pry the cover off. If you wire the terminal block with the fingersafe cover removed, you cannot put it back on the terminal block because the wires are in the way.

Wire Input Devices to the RTD module

Use the shielded thermocouple extension cable that is recommended for the type of thermocouple that you are using, or Belden 8761 for non-thermocouple applications.

To wire your sensor to the module, follow these steps:

1. At each end of the cable, strip some casing to expose the individual wires.
2. Trim the signal wires to 2-in. lengths. Strip about 5 mm (3/16 in.) of insulation away to expose the end of the wire.
3. At one end of the cable, twist the drain wire and foil shield together, bend them away from the cable, and apply shrink wrap. Then earth ground at the preferred location based on the type of sensor that you are using.
4. At the other end of the cable, cut the drain wire and foil shield back to the cable and apply shrink wrap.
5. Connect the signal wires to the module terminal block and input.

Repeat steps 1...5 for each channel on the module.

I/O Memory Mapping

For each module, slot x, words 0...3 contain the analog values of the inputs. Words 4 and 5 provide sensor/channel status feedback. The input data file for each configuration is shown in Table 2.

Table 2 - Input Data File

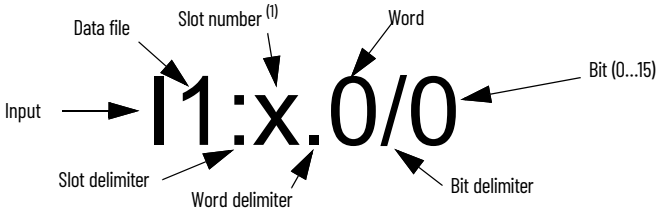
	Bit Position															
Words	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
0	RTD/Resistance Input Data Channel 0															
1	RTD/Resistance Input Data Channel 1															
2	RTD/Resistance Input Data Channel 2															
3	RTD/Resistance Input Data Channel 3															
4	Reserved				OC3	OC2	OC1	OC0	Reserved				S3	S2	S1	S0
5	U0	O0	U1	O1	U2	O2	U3	O3	Reserved							

- Sx = General status bits for input channels 0...3 (O0...O3).
- This bit is set (1) when an error (overrange, underrange, open circuit, or input data not valid) exists for that channel. An input data not valid condition is determined by the user program. See the 1762-IR4 RTD/Resistance Input Module User Manual, publication 1762-UM003 for additional details.
- OCx = Open circuit indication for channels 0...3 (O0...O3), with either RTD or resistance inputs. Short-circuit detection for RTD inputs only. Short-circuit detection for resistance inputs is not indicated because 0 is a valid number.
- Ox = Overrange flag bits for channels 0...3 (O0... O3) with either RTD or resistance inputs. These bits can be used in the control program for error detection.
- Ux = Underrange flag bits for channels 0...3 (U0...U3) with RTD inputs only. These bits can be used in the control program for error detection. Underrange detection for direct resistance inputs is not indicated because 0 is a valid number.

Addressing

The addressing scheme for MicroLogix 1200 expansion I/O is shown in Figure 11.

Figure 11 - Addressing Scheme



(1) I/O on the controller (embedded I/O) is slot 0. I/O added to the controller (expansion I/O) begins with slot 1.

Module Specifications

General Specifications

Attribute	Value
Dimensions HxWxD	**Without mounting tabs:** 90 x 40 x 87 mm (3.54 x 1.57 x 3.42 in.) **With mounting tabs:** 90 x 40 x 110 mm (3.54 x 1.57 x 4.33 in.)
Shipping weight, approx.	260 g (7.17 oz)
Voltage range, operating	5V...265V AC 5V...125V DC
Bus current draw, max	40 mA @ 5V DC 50 mA @ 24V DC
Enclosure type rating	None (open-style)
Wire size	See nested table below
Terminal screw torque	0.90 N•m (8 lb•in)(1)
Status indicators	1 green health indicator 4 red error indicators

Wire Type	Wire Size		Wire Type
	Min	Max	
Solid	0.33 mm^2 (22 AWG)	2.08 mm^2 (14 AWG)	Copper wire rated @ 90 °C (194 °F)
Stranded		1.31 mm^2 (16 AWG)	

(1) Tighten RTB hold down screws by hand. Do not tighten the screws with a power tool.

Input Specifications

Attribute	Value
Number of inputs	4
Number of commons	1
Voltage category	24V DC
Operating voltage range	20.4...26.4V DC
Input types	100 Ω Platinum 385 200 Ω Platinum 385 500 Ω Platinum 385 1000 Ω Platinum 385 100 Ω Platinum 3916 200 Ω Platinum 3916 500 Ω Platinum 3916 1000 Ω Platinum 3916 10 Ω Copper 426 120 Ω Nickel 672 120 Ω Nickel 618 604 Ω Nickel-iron 518 0...150 Ω 0...500 Ω 0...1,000 Ω 0...3,000 Ω
Converter type	Sigma-Delta
Channel to channel isolation	±10V DC
Resolution	Input filter and configuration dependent. See the 1762-IR4 RTD/Resistance Input Module User Manual, publication 1762-UM003, for more information.
Common mode rejection, min	110 dB @ 50 Hz with the 10 Hz or 50 Hz filter selected 110 dB @ 60 Hz with the 10 Hz or 60 Hz filter selected
Normal mode rejection ratio, min	70 dB @ 50 Hz with the 10 Hz or 50 Hz filter selected 70 dB @ 60 Hz with the 10 Hz or 60 Hz filter selected
Non-linearity (in percent full-scale)	±0.05%
Input group to system isolation	30V AC/30V DC rated working voltage (N.E.C. Class 2 required) (IEC Class 2 reinforced insulation) type test: 500V AC or 707V DC for 1 minute

Input Specifications (Continued)

Attribute	Value	
Typical Accuracy [Auto-calibration enabled] at 25 °C (77 °F) ambient with module operating temperature at 25 °C (77 °F)[1]	±0.5 °C (°F) for Pt 385 ±0.4 °C (°F) for Pt 3916 ±0.2 °C (°F) for Ni ±0.3 °C (°F) for NiFe ±0.6 °C (°F) for Cu	±0.15 Ω for 150 Ω range ±0.5 Ω for 500 Ω range ±1.0 Ω for 1000 Ω range ±1.5 Ω for 3000 Ω range
Typical Accuracy [Auto-calibration enabled] at 0…55 °C (32…131 °F)	±0.9 °C (°F) for Pt 385 ±0.8 °C (°F) for Pt 3916 ±0.4 °C (°F) for Ni ±0.5 °C (°F) for NiFe ±1.1 °C (°F) for Cu	±0.25 Ω for 150 Ω range ±0.8 Ω for 500 Ω range ±1.5 Ω for 1000 Ω range ±2.5 Ω for 3000 Ω range
Accuracy drift @ 0…55 °C (32…131 °F)	±0.026 °C/ °C (0.026 °F/ °F) for Pt 385 ±0.023 °C/ °C (0.026 °F/ °F) for Pt 3916 ±0.012 °C/ °C (0.026 °F/ °F) for Ni ±0.015 °C/ °C (0.026 °F/ °F) for NiFe ±0.032 °C/ °C (0.026 °F/ °F) for Cu	±0.007 Ω/ °C (0.012 Ω/ °F) for 150 Ω range ±0.023 Ω/ °C (0.041 Ω/ °F) for 500 Ω range ±0.043 Ω/ °C (0.077 Ω/ °F) for 1000 Ω range ±0.072 Ω/ °C (0.130 Ω/ °F) for 3000 Ω range
Repeatability[2]	±0.1 °C (±0.18 °F) for Ni and NiFe ±0.2 °C (±0.36 °F) for other RTD inputs ±0.04 Ω for 150 Ω resistances ±0.2 Ω for other resistances	
Excitation current source	0.5 mA and 1.0 mA selectable per channel	
Open circuit detection time[3]	6…1,212 ms	
Input impedance	>10 MΩ	
Vendor ID code	1	
Product type code	10	
Product code	65	

(1) Accuracy is dependent on the Analog/Digital converter filter rate selection, excitation current selection, data format, and input noise.

(2) Repeatability is the ability of the input module to register the same reading in successive measurements for the same input signal.

(3) Open circuit detection time is equal to channel update time for EXC and RTN leads only, Open circuit detection on Sense input is performed during cyclic lead calibration (every 5 minutes) and only on those channels where cyclic lead calibration is enabled.

Environmental Specifications

Attribute	Value
Temperature, operating	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, ambient, max	55 °C (131 °F)
Temperature, surrounding air, max	55 °C (131 °F)
Temperature, nonoperating	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 °C…+85 °C (-40 °F…+185 °F)
Relative humidity	IEC 60068-2-30 (Test Db, Unpackaged Damp Heat): 5…95% noncondensing
Vibration	IEC 60068-2-6 (Test Fc, Operating): 5 g @ 10…500 Hz
Shock, operating, panel mounted	IEC 60068-2-27 (Test Ea, Unpackaged Shock): 30 g
Shock, nonoperating	IEC 60068-2-27 (Test Ea, Unpackaged Shock): 50 g
Emissions	IEC 61000-6-4
ESD immunity	IEC 61000-4-2: 4 kV contact discharges 8 kV air discharges 4 kV indirect discharges
Radiated RF immunity	IEC 61000-4-3: 10V/m with 1 kHz sine wave 80% AM from 80…1000 MHz
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

Certification (when product is marked)[1]	Value
c-UL-us	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 61000-6-2; Industrial Immunity EN 61000-6-4; Industrial Emissions EN 61131-2; Programmable Controllers (Clause 8, Zone A & B) European Union 2014/35/EU LVD, compliant with: EN 61131-2; Programmable Controllers (Clause 11) European Union 2011/65/EU RoHS, compliant with: EN 63000; Technical documentation
RCM	Australian Radiocommunications Act, compliant with: AS/NZS CISPR 11; Industrial Emissions
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: Article 58-2 of Radio Waves Act, Clause 3
Morocco	Arrêté ministériel n° 6404-15 du 1 er muharram 1437 Arrêté ministériel n° 6404-15 du 29 ramadan 1436
UKCA	2016 No. 1091 – Electromagnetic Compatibility Regulations 2016 No. 1101 – Electrical Equipment (Safety) Regulations 2012 No. 3032 – Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations

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

Additional Resources

Resource	Description
Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1	More information on proper wiring and grounding techniques.

You can view or download publications at rok.auto/literature.

Notes:

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

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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.

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