

Potenziometermodul AI43EX

Weitere Unterlagen

Ergänzend zu diesem Dokument finden Sie im Internet unter www.turck.com folgende Unterlagen:

- Datenblatt
- Handbuch excom – Remote I/O für eigensichere Stromkreise
- Zulassungen
- Konformitätserklärungen (aktuelle Version)

Zu Ihrer Sicherheit

Bestimmungsgemäße Verwendung

Das Gerät ist ein Betriebsmittel der Zündschutzart „Eigensicherheit“ (IEC/EN 60079-11) und darf nur innerhalb des excom-I/O-Systems für eigensichere Stromkreise mit den zugelassenen Modulträgern MT...G (PTB 00 ATEX 2194 U bzw. IECEx PTB 13.0040 U) betrieben werden. Das 4-kanalige, analoge Potenziometermodul AI43EX dient zum Anschluss von 3- oder 4-Leiter-Potenzimetern. Widerstandsmessungen mit 2-Leiter-Potenzimetern sind nicht möglich. Die Eingänge sind untereinander galvanisch getrennt. Das Gerät ist für den Einsatz in Zone 1 geeignet. Die Zündschutzart der Eingänge ist Ex ia IIC bzw. Ex ia IIIC. Jede andere Verwendung gilt als nicht bestimmungsgemäß. Für daraus resultierende Schäden übernimmt Turck keine Haftung.

Allgemeine Sicherheitshinweise

- Nur fachlich geschultes Personal darf das Gerät montieren, installieren, betreiben, einstellen und instand halten.
- Das Gerät erfüllt die EMV-Anforderungen für den industriellen Bereich. Bei Einsatz in Wohnbereichen Maßnahmen treffen, um Funkstörungen zu vermeiden.
- Nur Geräte miteinander kombinieren, die durch ihre technischen Daten für den gemeinsamen Einsatz geeignet sind.

Hinweise zum Ex-Schutz

- Bei Einsatz des Geräts in Ex-Kreisen muss der Anwender über Kenntnisse im Explosionsschutz (IEC/EN 60079-14 etc.) verfügen.
- Nationale und internationale Vorschriften für den Explosionsschutz beachten.
- Gerät nur innerhalb der zulässigen Betriebs- und Umgebungsbedingungen (siehe Technische Daten und Vorgaben durch die Ex-Zulassung) einsetzen.

Bei Einsatz in Zone 1 und Zone 2:

- Geräte in ein separat zugelassenes Gehäuse nach IEC/EN 60079-0 mit einer Schutzart mind. IP54 nach IEC/EN 60529 montieren.

Bei Einsatz im sicheren Bereich:

- Wenn Verschmutzungsgrad 2 nicht eingehalten wird: Gerät in ein Schutzgehäuse mind. IP54 einbauen.

Produktbeschreibung

Geräteübersicht

Siehe Abb. 1: Geräteansicht, Abb. 2: Abmessungen

Funktionen und Betriebsarten

Das Modul verfügt über vier Kanäle zur Abfrage von 3- oder 4-Leiter-Potenzimetern. Die Potenziometer-Eingänge werden auf Drahtbruch überwacht. Das Gerät erkennt die Unterbrechung einer einzelnen wie auch mehrerer Anschlussleitungen eines Eingangs. Eine Kurzschlussüberwachung erfolgt nicht. Bei einem Drahtbruch wird der parametrisierte Ersatzwert ausgegeben und das Invalid-Bit des Ausgabewerts gesetzt, bis wieder gültige Messwerte vorliegen. Der analoge Wert von 0...100 % wird als Zahl auf 15 Bit mit 0,1 % pro Digit umgerechnet und an das Host-System übertragen.

Montieren

Mehrere Geräte können unmittelbar nebeneinander auf den Modulträger gesteckt werden. Ein Wechsel der Geräte ist auch während des laufenden Betriebs möglich.

- ▶ Montageort gegen Wärmestrahlung, schnelle Temperaturschwankungen, Staub, Schmutz, Feuchtigkeit und andere Umwelteinflüsse schützen.
- ▶ Gerät in die dafür vorgesehene Position auf dem Modulträger stecken und deutlich spürbar einrasten lassen.

Anschließen

Durch Aufstecken auf den Modulträger ist das Gerät mit der internen Energieversorgung und Datenkommunikation des Modulträgers verbunden. Zum Anschluss der Feldgeräte können Klemmenblöcke in Schraubanschluss- oder Federzugtechnik verwendet werden.

- ▶ Beim Anschluss von 3-Leiter-Potenzimetern: Brücke an den Anschlussklemmen des Modulträgers setzen.
- ▶ Feldgeräte gemäß „Wiring diagram“ anschließen.

In Betrieb nehmen

Nach Anschluss der Leitungen und Aufschalten der Versorgungsspannung geht das Gerät automatisch in Betrieb.

Betreiben

Das Gerät ist ein rein eigensicheres Betriebsmittel und kann daher während des laufenden Betriebs auf den Modulträger gesteckt oder gezogen werden.

LED-Anzeigen

LED	Anzeige	Bedeutung
Status	aus	keine Spannungsversorgung
	blinkt rot	Modul nicht für aktuellen Steckplatz konfiguriert
	grün	Spannungsversorgung und Kommunikation fehlerfrei
	blinkt grün (langsam: 0,5 Hz)	Modul noch nicht konfiguriert, wartet auf Konfigurationsdaten
	blinkt grün (1,0 Hz asym.)	Modul im Fail-Safe-Modus
Kanal	aus	kein Kanalfehler
1...4	rot	Kanal diagnose liegt vor

Einstellen

Das Verhalten der Eingänge wird je nach übergeordnetem Feldbusssystem über ein zugehöriges Konfigurationstool, FDT-Frame oder Webserver parametrisiert. Für jeden Kanal können u. a. folgende Parameter eingestellt werden:

- Drahtbruchüberwachung
- Ersatzwertstrategie
- Filter

Reparieren

Das Gerät ist nicht zur Reparatur durch den Benutzer vorgesehen. Sollte das Gerät defekt sein, nehmen Sie es außer Betrieb. Bei Rücksendung an Turck beachten Sie bitte unsere Rücknahmebedingungen.

Entsorgen

Die Geräte müssen fachgerecht entsorgt werden und gehören nicht in den normalen Hausmüll.

AI43EX Potentiometer Module

Other documents

Besides this document the following material can be found on the Internet at www.turck.com:

- Data sheet
- excom manual — remote I/O for intrinsically safe circuits
- Approvals
- Declarations of conformity (current version)

For your safety

Intended use

The device is a piece of equipment of ignition protection type “Intrinsic safety” (IEC/EN 60079-11) and may be used only as part of the excom I/O system for intrinsically safe circuits with the approved module racks MT...G (PTB 00 ATEX 2194 U or IECEx PTB 13.0040 U). The 4-channel analog potentiometer module AI43EX is designed for the connection of 3- or 4-wire potentiometers. Resistance measurements with 2-wire potentiometers are not possible. The inputs are galvanically isolated from each other. The device is suitable for operation in zone 1. The inputs feature ignition protection type Ex ia IIC or Ex ia IIIC.

Any other use is not in accordance with the intended use. Turck accepts no liability for any resulting damage.

General safety instructions

- The device may only be mounted, installed, operated, configured and maintained by professionally trained personnel.
- The device meets the EMC requirements for the industrial sector. For residential use, take measures to prevent radio interference.
- Only combine devices for which the technical data is suitable for joint use.

Notes on explosion protection

- When using the device in Ex circuits, the user must also have knowledge of explosion protection (IEC/EN 60079-14 etc.).
- Observe national and international regulations for explosion protection.
- Only use the device within the permissible operating and ambient conditions (see technical data and Ex approval specifications).

Use of devices in Zone 1 and Zone 2:

- Mount the devices in a separately approved enclosure in accordance with IEC/EN 60079-0 with a degree of protection of at least IP54 as per IEC/EN 60529.

When used in safe areas:

- If pollution degree 2 is not complied with: Install the device in a protective housing with a degree of protection of at least IP54.

Product description

Device overview

See fig. 1: device view, fig. 2: dimensions

Functions and operating modes

The module has four channels to control 3- or 4-wire potentiometers. The potentiometer inputs are monitored for wire breaks. The device can detect breaks on a single connection cable as well as on multiple connection cables of an input. Short circuit monitoring is not carried out. In the event of a wire break, the parametrized substitute value is issued and the output value is set to “invalid-bit” until valid measured values are available again.

The 0...100% analog value is converted as a number to 15 bit with 0.1% per digit and transferred to the host system.

Installing

Multiple devices can be inserted directly next to each other in a module rack. The devices can also be changed during operation.

- ▶ Protect the installation location from radiated heat, sudden temperature fluctuations, dust, dirt, humidity and other ambient influences.
- ▶ Fit the device at the position intended for it on the rack and snap it fully into position.

Connection

When plugged into the module rack, the device is connected to the module rack's internal power supply and data communication. Screw connection terminal blocks or terminal blocks with spring technology can be used to connect the field devices.

- ▶ When connecting 3-wire potentiometers: Bridge the connection terminals on the module rack.
- ▶ Connect the field devices in accordance with the “Wiring diagram”.

Commissioning

The device is operational automatically once the cables are connected and the power supply is switched on.

Operation

The device is a piece of equipment that is purely intrinsically safe and can therefore be plugged into or unplugged from the approved module rack during operation.

LEDs

LED	Indication	Meaning
Status	Off	No power supply
	Flashing red	Module not configured for current slot
	Green	Power supply and communication fault free
	Flashing green (slow: 0.5 Hz)	Module not yet configured, waiting for configuration data
	Flashing green (1.0 Hz asym.)	Module in Failsafe mode
Channel	Off	No channel error
1...4	Red	Channel diagnostics available

Setting

The behavior of the inputs is parameterized via an associated configuration tool, FDT frame or web server, depending on the higher-level fieldbus system. The following parameters can be set for each channel:

- Wire-break monitoring
- Failsafe mode
- Filter

Repair

The device must not be repaired by the user. The device must be decommissioned if it is faulty. Observe our return acceptance conditions when returning the device to Turck.

Disposal

The devices must be disposed of correctly and must not be included in general household garbage.

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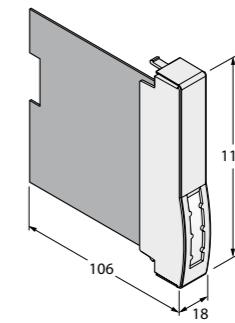


AI43EX
Potentiometer Module
Quick Start Guide
Doc. no. D301085 2205

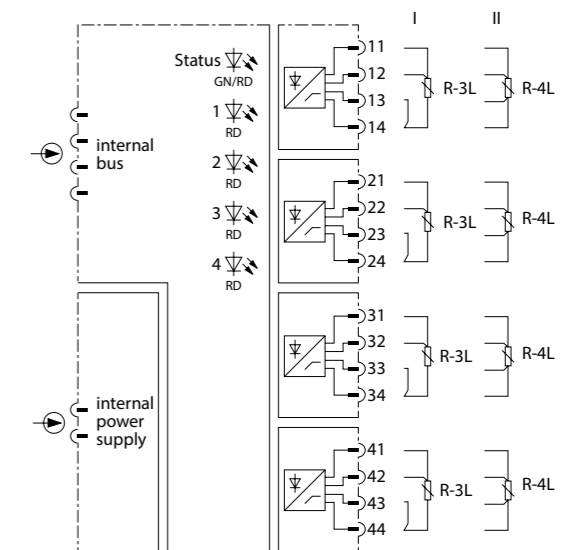
Additional information see



②



Wiring diagram



Declarations of conformity

EU-Konformitätserklärung Nr.
UK Declaration of Conformity No. 5009-2M
EU Declaration of Conformity No.:

TURCK

Wir / We Hans Turck GmbH & Co. KG
Witzlebenstr. 7, 45472 Mülheim an der Ruhr, Germany

erklären in alleiniger Verantwortung, dass das Produkt
declare under our sole responsibility that the product

Potenzimetermodul / Potentiometer Module
für das / for the: Remote – I/O – System excom®

Typ / Type: **AI43EX**

ID: **6884137**

Ex-Kennzeichnung / Ex-marking:

Gas / gas Ⓜ II 2 (1) G Ex ib [ia Ga] IIC T4 Gb
Staub / dust Ⓜ II (1) D [Ex ia Da] IIIC

auf die in der von uns in Verkehr gebrachten Ausführung sich diese Erklärung bezieht, den Anforderungen der
folgenden EU-Richtlinien und den Anforderungen der folgenden UK- Statutory Instruments durch Einhaltung der
folgenden harmonisierten / designierten Normen genügen:

to which this declaration relates in the configuration placed on the market by us, are in conformity with the requirements of
the following EU-directives and the requirements of the following UK Statutory Instruments by compliance with the following
harmonized / designated standards:

Richtlinie / Directive EMC **2014 / 30 / EU** **26. Feb. 2014**
EMC SI* and part. sign. changes** **SI 2016/1091**
EN 61326-1:2013

Richtlinie / Directive ATEX **2014 / 34 / EU** **26. Feb. 2014**
ATEX SI* and part. sign. changes** **SI 2016/1107**
EN IEC 60079-0:2018 EN 60079-11:2012

Richtlinie / Directive RoHS **2011 / 65 / EU** **08. Jun. 2011**
RoHS SI* and part. sign. changes **SI 2012/3032** **and SI 2019/188**
EN IEC 63000:2018

*: SI = Statutory Instrument **: SI 2019/696, SI 2020/1460

Weitere Normen, Bemerkungen / additional standards, remarks:

Die aufgeführten benannten Stellen haben die Konformitätsbewertung durchgeführt und Zertifikate ausgestellt.
The listed notified bodies have carried out conformity assessment and issued certificates:

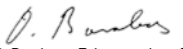
EU-Baumusterprüfbescheinigung (Modul B) / EU-type examination certificate (module B): **PTB 06 ATEX 2026**
ausgestellt von / issued by: Physikalisch Technische Bundesanstalt, Kenn-Nr. / ID no.: 0102
Bundesallee 100, 38116 Braunschweig, Germany

Zertifizierung des QS-Systems (Modul D) / Certification of the QS-system (module D):
ausgestellt von / issued by: Physikalisch Technische Bundesanstalt, Kenn-Nr. / ID no.: 0102
Bundesallee 100, 38116 Braunschweig, Germany

UK-Baumusterprüfbescheinigung / UK-type examination certificate : **TÜV 21UKEX7057**
ausgestellt von / issued by: TÜV Rheinland Industrie Service GmbH, Kenn-Nr. / ID no.: 0035
Alfredstraße 81, 45130 Essen, Germany

UK Erklärung zur Qualitätssicherung / UKCA Quality Assurance Notification:
ausgestellt von / issued by: Eurofins ESE CML Limited, Kenn-Nr. / ID no.: 2503,
New Port Road, Ellesmere Port CH65 4LZ, United Kingdom

Mülheim, den 02.05.2022


i.V. O. Barabas, Zulassungsbeauftragter /
Certification Representative

Ort und Datum der Ausstellung /
Place and date of issue



Name, Funktion und Unterschrift des Befugten /
Name, function and signature of authorized person

FM 7.3-12

09.11.21

Certification data | Technical data

Approvals and markings

Approvals	Marking parts in acc. with	
	ATEX directive	IEC/EN 60079-0/ -11
	UK Statutory Instruments (SI)	
ATEX Certificate number:	Ⓜ II 2 (1) G	Ex ib [ia Ga] IIC T4 Gb
PTB 06 ATEX 2026	Ⓜ II (1) D	[Ex ia Da] IIIC
UKEX Certificate number:		
TÜV 21 UKEX 7057		
 		

Permissible ambient temperature range T_{amb} : -20...+70 °C

Electrical data

Max. output voltage U_0	6.6 V		
Max. output current I_0	25 mA		
Max. output power P_0	42 mW		
Characteristic	Linear		
Internal inductance L_i / Internal capacitance C_i	Negligibly small/ 150 nF		
External inductance L_0 / Capacitance C_0 C_i is considered		IIC	IIB
	L_0	C_0	C_0
	5 mH	1.45 μ F	8.35 μ F
	2 mH	1.75 μ F	9.85 μ F
	1 mH	2.05 μ F	11.85 μ F
	0.5 mH	2.45 μ F	14.85 μ F
	0.2 mH	3.15 μ F	18.85 μ F

Technical data

Type designation	AI43Ex
ID	6884137
Supply voltage	Via module rack, central power supply
Power consumption	\leq 1.5 W
Galvanic isolation	Complete galvanic isolation acc. to IEC/EN 60079-11
Number of channels	4-channel
Input circuits	3-/4-wire potentiometer 0 %...100 % Intrinsically safe acc. to IEC/EN 60079-11
Nominal resistance	400 Ω ...12 k Ω
Wire-fault	< 400 Ω ; >12 k Ω
Resolution	0.1 %
Reference temperature	25 °C
Linearity deviation	\leq 0.1 % full range at 25 °C
Temperature drift	\leq 0.005 % of full range
Rise time/fall time	\leq 50 ms (10...90 %)
Max. measurement inaccuracy under EMC influence	\leq 0.1 % with shielded signal cable \leq 1 % with unshielded signal cable
Connection mode	Module, plugged on rack
Protection class	IP20
Relative humidity	\leq 93 % at 40 °C acc. to EN 60068-2-78
EMC	Acc. EN 61326-1 Acc. to Namur NE21

Module de potentiomètre AI43EX

Documents supplémentaires

Vous trouverez les documents suivants contenant des informations complémentaires à la présente notice sur notre site Web www.turck.com :

- Fiche technique
- Manuel de l'excom – Système E/S déporté pour circuits à sécurité électrique intrinsèque
- Homologations
- Déclarations de conformité (version actuelle)

Pour votre sécurité

Utilisation conforme

L'appareil est un équipement appartenant au mode de protection « sécurité intrinsèque » (CEI/EN 60079-11) et ne peut être exploité qu'au sein du système E/S excom pour des circuits électriques à sécurité intrinsèque avec les supports de modules autorisés MT...G (PTB 00 ATEX 2194 U ou IECEx PTB 13.0040 U). Le module de potentiomètre AI43EX analogique 4 canaux sert à connecter des potentiomètres en technique 3 ou 4 fils. Les mesures de résistance avec des potentiomètres à 2 fils ne sont pas possibles. Les entrées sont séparées galvaniquement l'une de l'autre. L'appareil est destiné à une utilisation en zone 1. Le mode de protection des entrées est de Ex ia IIC ou Ex ia IIIC.

Toute autre utilisation est considérée comme non conforme. La société Turck décline toute responsabilité en cas de dommages causés par une utilisation non conforme.

Consignes de sécurité générales

- Seul un personnel qualifié est habilité à monter, installer, utiliser, configurer et entretenir l'appareil.
- L'appareil répond aux exigences CEM pour le domaine industriel. Lorsqu'il est utilisé dans des zones résidentielles, prenez des mesures pour éviter les interférences radio.
- Ne raccordez des appareils entre eux que si leurs caractéristiques techniques le permettent.

Indications relatives à la protection contre les explosions

- En cas d'utilisation de l'appareil dans des zones à risque d'explosion, vous devez en outre disposer des connaissances requises en matière de protection contre les explosions (CEI/EN 60079-14, etc.).
- Respectez les consignes nationales et internationales relatives à la protection contre les explosions.
- Utilisez l'appareil uniquement dans un environnement et dans les conditions de fonctionnement autorisés (voir les caractéristiques techniques et les directives imposées par l'homologation Ex).

Utilisation en zone 1 et en zone 2 :

- Montez les appareils dans un boîtier séparé homologué conformément à la norme CEI/EN 60079-0 et avec un indice de protection IP54 minimum, conformément à la norme CEI/EN 60529.

Utilisation en zone sécurisée :

- Si le degré de pollution 2 n'est pas respecté : Installez l'appareil dans un boîtier de protection d'indice IP54 minimum.

Description du produit

Aperçu de l'appareil

Voir fig. 1 : Vue de l'appareil, fig. 2 : Dimensions

Fonctions et modes de fonctionnement

Le module dispose de quatre canaux pour le contrôle à l'aide de potentiomètres en technique 3 ou 4 fils. Les entrées des potentiomètres sont surveillées pour détecter les ruptures de câble. L'appareil est capable de détecter la rupture d'un ou plusieurs câbles de raccordement d'une sortie. Il n'y a pas de surveillance des courts-circuits. En cas de rupture de câble, la valeur de remplacement paramétrée est émise et la valeur numérique de type « Invalid-Bit » (bits non valides) de la valeur de sortie est activée jusqu'à ce que des valeurs de mesures valides soient à nouveau obtenues.

La valeur analogique de 0...100 % est convertie sous forme d'une valeur numérique de 15 bits avec 0,1 % par chiffre et transmise au système hôte.

Montage

Plusieurs appareils peuvent être branchés directement en parallèle sur le support de module. Un changement d'appareils est également possible pendant le fonctionnement.

- ▶ Protégez la zone de montage contre les rayonnements thermiques, les variations rapides de température, la poussière, l'humidité et d'autres facteurs ambiants.
- ▶ Branchez l'appareil dans la position prévue à cet effet sur le support de module et emboîtez-le jusqu'à enclenchement.

Raccordement

Lors de sa fixation sur le support de module, l'appareil est connecté à l'alimentation interne et à la communication de données du support de module. Pour le raccordement des appareils de terrain, des borniers de raccordement à vis ou à ressort peuvent être employés.

- ▶ Lors du raccordement de potentiomètres en technique 3 fils : Installez un pont au niveau des bornes de connexion de support de module.
- ▶ Raccordez les appareils de terrain conformément au schéma de câblage (« Wiring diagram »).

Mise en service

L'appareil se met automatiquement en marche après le raccordement des câbles et l'activation de la tension d'alimentation.

Fonctionnement

L'appareil est un pur dispositif à sécurité intrinsèque et peut donc être branché ou débranché du support de module en cours de fonctionnement.

Affichage LED

LED	Indication	Signification
Status	Éteinte	Pas d'alimentation en tension
	Clignote rouge	Module non configuré pour l'emplacement actuel
	Vert	Alimentation en tension et communication sans défaut
	Clignote vert (lent : 0,5 Hz)	Module pas encore configuré, en attente des données de configuration
	Clignote vert (1,0 Hz asym.)	Module en mode Failsafe
Canaux 1...4	Éteinte	Pas d'erreur au niveau du canal
	Rouge	Diagnostic des canaux effectué

Módulo do potenciômetro AI43EX

Outros documentos

Além deste documento, o seguinte material pode ser encontrado na Internet em www.turck.com:

- Folha de dados
- manual do excom – terminais de E/S remotos para circuitos intrinsecamente seguros
- Homologações
- Declarações de conformidade (versão atual)

Para sua segurança

Finalidade de uso

O dispositivo é um equipamento da categoria de proteção contra explosões "Segurança intrínseca" (IEC/EN 60079-11) e deve ser usado apenas como parte do sistema de E/S excom para circuitos intrinsecamente seguros com os racks de módulo aprovados MT...G (PTB 00 ATEX 2194 U ou IECEx PTB 13.0040 U). O módulo de potenciômetro analógico de 4 canais AI43EX foi projetado para a conexão de potenciômetros de 3 ou 4 fios. Medições de resistência com potenciômetros de 2 fios não são possíveis. As entradas são galvanicamente isoladas umas das outras. O dispositivo também é adequado para uso na Zona 1. As entradas possuem tipo de proteção contra ignição Ex ia IIC ou Ex ia IIIC. Qualquer outro uso está fora de concordância com o uso pretendido. A Turck se exime de qualquer responsabilidade por danos resultantes.

Instruções gerais de segurança

- O dispositivo só pode ser montado, instalado, operado, configurado e mantido por pessoal profissionalmente treinado.
- O dispositivo atende aos requisitos de EMC para a área industrial. Para uso residencial, tome medidas para evitar interferência de rádio.
- Somente combine dispositivos nos quais os dados técnicos são adequados para uso conjunto.

Notas de proteção contra explosão

- Ao usar o dispositivo em circuitos Ex, o usuário deverá ter conhecimento prático sobre proteção contra explosões (IEC/EN 60079-14, etc.).
- Observe os regulamentos nacionais e internacionais para proteção contra explosão.
- Use o dispositivo somente em condições ambientais e de operação permitidas (consulte os dados técnicos e os requisitos de homologação Ex).

Uso dos dispositivos nas Zonas 1 e 2:

- Monte os dispositivos em um gabinete separado aprovado de acordo com a IEC/EN 60079-0, com um grau de proteção de, pelo menos, IP54 de acordo com a IEC/EN 60529. Quando usado em áreas seguras:
- Se o grau de poluição 2 não estiver em conformidade com: Instale o dispositivo em um gabinete com um tipo de proteção de pelo menos IP54.

Descrição do produto

Visão geral do produto

Veja a fig. 1: Visão do dispositivo, fig. 2: Dimensões

Funções e modos de operação

O módulo possui quatro canais para controlar os potenciômetros de 3 ou 4 fios. As entradas do potenciômetro são monitoradas quanto a ruptura de fios. O dispositivo pode detectar interrupções em um único cabo de conexão, bem como em vários cabos de conexão de uma entrada. O monitoramento de curtos-circuitos não é executado. No caso de uma quebra de fio, o valor substituto parametrizado será emitido e o valor de saída será definido como "bit inválido" até que valores medidos válidos estejam disponíveis novamente.

O valor analógico de 0 a 100% é convertido como um número para 15 bits com 0,1% por dígito e transferido para o sistema host.

Instalação

Vários dispositivos podem ser inseridos diretamente um ao lado do outro em um rack de módulo. Também é possível alterar os dispositivos durante a operação.

- ▶ Proteja o local de instalação contra irradiação de calor, alterações de temperatura repentinas, poeira, sujeira, umidade e outras influências ambientais.
- ▶ Insira o dispositivo na posição designada no rack, e encaixe-o totalmente na posição.

Conexão

Quando conectado ao rack de módulo, o dispositivo é conectado à alimentação e aos dados internos do rack de módulo. É possível usar blocos terminais de conexão por parafusos ou blocos terminais com tecnologia de mola para conectar os dispositivos de campo.

- ▶ Ao conectar potenciômetros de três fios: Faça uma ponte nos terminais de conexão no rack do módulo.
- ▶ Conecte os dispositivos de campo de acordo com o "Wiring diagram".

Comissionamento

O dispositivo fica automaticamente operacional assim que os cabos são conectados e a fonte de alimentação ligada.

Operação

O dispositivo é um equipamento que é puro e intrinsecamente seguro e, logo, pode ser conectado ou desconectado do rack de módulo aprovado durante a operação.

LEDs

LED	Indicação	Significado
Status	Desligado	Sem alimentação de energia
	Piscando em vermelho	Módulo não configurado para a porta atual
	Verde	Fonte de alimentação e comunicação livres de erros
	Verde piscando (lento: 0,5 Hz)	Módulo ainda não configurado, aguardando dados de configuração
	Verde piscando (1,0 Hz assim.)	Módulo em modo Failsafe
Canais 1...4	Desligado	Sem erro de canal
	Vermelho	Diagnóstico de canal disponível

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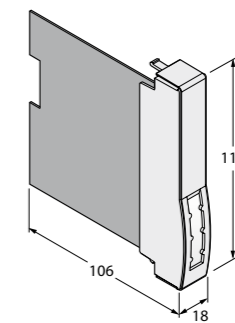


AI43EX
Potentiometer Module
Quick Start Guide
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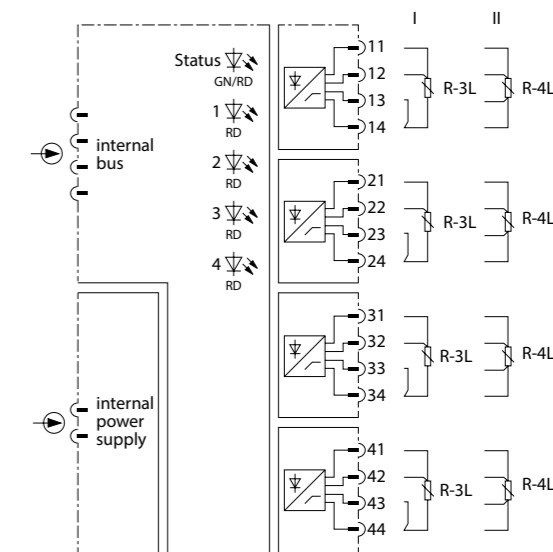
Additional information see



②



Wiring diagram



FR Guide d'utilisation rapide

Réglages

Selon le système de bus de terrain de niveau supérieur, le comportement des entrées est paramétré à l'aide d'un outil de configuration associé, d'un cadre FDT ou d'un serveur Web. Pour chaque canal, les paramètres suivants peuvent, entre autres, être réglés :

- Surveillance de rupture de câble
- Stratégie de valeur de remplacement
- Filtre

Réparation

L'appareil ne peut pas être réparé par l'utilisateur. En cas de dysfonctionnement, mettez l'appareil hors tension. En cas de retour à Turck, veuillez respecter les conditions de reprise.

Mise au rebut

Les appareils doivent être mis au rebut de manière appropriée et ne doivent pas être éliminés avec les ordures ménagères.

PT Guia de Início Rápido

Configuração

O comportamento das entradas é parametrizado por meio de uma ferramenta de configuração associada, FDT frame ou servidor web, dependendo do sistema fieldbus de nível superior. Os seguintes parâmetros podem ser definidos para cada canal:

- Monitoramento de ruptura de fio
- Estratégia de valor substituto
- Filtro

Reparo

O dispositivo não deve ser reparado pelo usuário. O dispositivo deverá ser desativado caso esteja com defeito. Observe nossas condições para aceitação de devolução ao devolver o dispositivo à Turck.

Descarte

Os dispositivos devem ser descartados corretamente e não em um lixo doméstico normal.

Declarations of conformity

EU-Konformitätserklärung Nr.
UK Declaration of Conformity No. 5009-2M
 EU Declaration of Conformity No.:

Wir / We Hans Turck GmbH & Co. KG
 Witzlebenstr. 7, 45472 Mülheim an der Ruhr, Germany

erklären in alleiniger Verantwortung, dass das Produkt
 declare under our sole responsibility that the product

Potenzimetermodul / Potentiometer Module
 für das / for the: Remote – I/O – System excom®

Typ / Type: **AI43EX**
 ID: **6884137**

Ex-Kennzeichnung / Ex-marking:
 Gas / gas Ⓜ II 2 (1) G Ex ib [ia Ga] IIC T4 Gb
 Staub / dust Ⓜ II (1) D [Ex ia Da] IIIC

auf die in der von uns in Verkehr gebrachten Ausführung sich diese Erklärung bezieht, den Anforderungen der folgenden EU-Richtlinien und den Anforderungen der folgenden UK- Statutory Instruments durch Einhaltung der folgenden harmonisierten / designierten Normen genügen:

to which this declaration relates in the configuration placed on the market by us, are in conformity with the requirements of the following EU-directives and the requirements of the following UK Statutory Instruments by compliance with the following harmonized / designated standards:

Richtlinie / Directive EMC **2014 / 30 / EU** **26. Feb. 2014**
EMC SI* and part. sign. changes**
SI 2016/1091
 EN 61326-1:2013

Richtlinie / Directive ATEX **2014 / 34 / EU** **26. Feb. 2014**
ATEX SI* and part. sign. changes**
SI 2016/1107
 EN IEC 60079-0:2018 EN 60079-11:2012

Richtlinie / Directive RoHS **2011 / 65 / EU** **08. Jun. 2011**
RoHS SI* and part. sign. changes
SI 2012/3032
 EN IEC 63000:2018

*: SI = Statutory Instrument **: SI 2019/696, SI 2020/1460

Weitere Normen, Bemerkungen / additional standards, remarks:

Die aufgeführten benannten Stellen haben die Konformitätsbewertung durchgeführt und Zertifikate ausgestellt:
 The listed notified bodies have carried out conformity assessment and issued certificates:

EU-Baumusterprüfbescheinigung (Modul B) / EU-type examination certificate (module B): **PTB 06 ATEX 2026**
 ausgestellt von / issued by: Physikalisch Technische Bundesanstalt, Kenn-Nr. / ID no.: 0102
 Bundesallee 100, 38116 Braunschweig, Germany

Zertifizierung des QS-Systems (Modul D) / Certification of the QS-system (module D):
 ausgestellt von / issued by: Physikalisch Technische Bundesanstalt, Kenn-Nr. / ID no.: 0102
 Bundesallee 100, 38116 Braunschweig, Germany

UK-Baumusterprüfbescheinigung / UK-type examination certificate : **TÜV 21UKEX7057**
 ausgestellt von / issued by: TÜV Rheinland Industrie Service GmbH, Kenn-Nr. / ID no.: 0035
 Altfredstraße 81, 45130 Essen, Germany

UK Erklärung zur Qualitätssicherung / UKCA Quality Assurance Notification:
 ausgestellt von / issued by: Eurofins ESE CML Limited, Kenn-Nr. / ID no.: 2503,
 New Port Road, Ellesmere Port CH65 4LZ, United Kingdom

Mülheim, den 02.05.2022

i.V. O. Barabas, Zulassungsbeauftragter /
 Certification Representative

Ort und Datum der Ausstellung /
 Place and date of issue

Name, Funktion und Unterschrift des Befugten /
 Name, function and signature of authorized person

FM 7.3-12

09.11.21

Certification data | Technical data
Approvals and markings

Approvals	Marking parts in acc. with	
	ATEX directive	IEC/EN 60079-0/ -11
	UK Statutory Instruments (SI)	
ATEX Certificate number: PTB 06 ATEX 2026	Ⓜ II 2 (1) G	Ex ib [ia Ga] IIC T4 Gb
UKEX Certificate number: TÜV 21 UKEX 7057	Ⓜ II (1) D	[Ex ia Da] IIIC

Permissible ambient temperature range T_{amb}: -20...+70 °C

Electrical data

Max. output voltage U ₀	6.6 V		
Max. output current I ₀	25 mA		
Max. output power P ₀	42 mW		
Characteristic	Linear		
Internal inductance L _i /	Negligibly small/		
Internal capacitance C _i	150 nF		
External inductance L ₀ /	IIC	IIB	
Capacitance C ₀	C₀	C₀	
C _i is considered	L ₀	C ₀	C ₀
	5 mH	1.45 µF	8.35 µF
	2 mH	1.75 µF	9.85 µF
	1 mH	2.05 µF	11.85 µF
	0.5 mH	2.45 µF	14.85 µF
	0.2 mH	3.15 µF	18.85 µF

Technical data

Type designation	AI43Ex
ID	6884137
Supply voltage	Via module rack, central power supply
Power consumption	≤ 1.5 W
Galvanic isolation	Complete galvanic isolation acc. to IEC/EN 60079-11
Number of channels	4-channel
Input circuits	3-/4-wire potentiometer 0 %...100 % Intrinsically safe acc. to IEC/EN 60079-11
Nominal resistance	400 Ω... 12 kΩ
Wire-fault	< 400 Ω; >12 kΩ
Resolution	0.1 %
Reference temperature	25 °C
Linearity deviation	≤ 0.1 % full range at 25 °C
Temperature drift	≤ 0.005 % of full range
Rise time/fall time	≤ 50 ms (10...90 %)
Max. measurement inaccuracy under EMC influence	≤ 0.1 % with shielded signal cable ≤ 1 % with unshielded signal cable
Connection mode	Module, plugged on rack
Protection class	IP20
Relative humidity	≤ 93 % at 40 °C acc. to EN 60068-2-78
EMC	Acc. EN 61326-1 Acc. to Namur NE21

ZH 快速入门指南

AI43EX电位器模块

其他文档

除了本文档之外,还可在www.turck.com网站上查看以下资料:

- 数据表
- excom手册 — 本安电路的远程I/O
- 认证
- 合规声明(最新版本)

安全须知

预期用途

该装置是一款防燃型“本安”设备(IEC/EN 60079-11),仅作为excom I/O系统的一部分与经认证的模块机架MT...-

...G(PTB 00 ATEX 2194 U或IECEX PTB 13.0040 U)一起用于本安电路。4通道模拟量电位器模块AI43EX用于连接3线或4线电位器。不能使用2线电位器测量电阻。输入回路之间彼此电隔离。该装置适合在危险1区中使用。输入回路防燃类型为Ex ia IIC或Ex ia IIIC。

任何其他用途都不属于预期用途。图尔克公司对于由此导致的任何损坏概不承担责任。

一般安全须知

- 该装置的组装、安装、操作、配置和维护只能由经过专业培训的人员执行。
- 该装置符合工业领域的EMC要求。在住宅区使用时,请采取相应的措施以防止无线电干扰。
- 仅当技术数据支持该装置联用时,才能组合使用该装置。

防爆说明

- 将该装置应用到防爆电路时,用户还必须掌握防爆知识(IEC/EN 60079-14等)。
- 请遵守国内和国际防爆法规。
- 只可在允许的工作条件和环境条件下使用该装置(参见技术数据和防爆认证规格)。

在危险1区和2区中使用该装置:

- 将该装置安装在经过单独认证(符合IEC/EN 60079-0标准)且防护等级至少为IP54(依据IEC/EN 60529标准)的外壳中。

在安全区域中使用时:

- 如果不符合污染等级2:应将该装置安装在防护等级至少为IP54的保护外壳内。

产品描述

装置概览

见图1:装置视图,图2:尺寸

功能和工作模式

该模块有4个通道,可控制3线或4线电位器。该装置会监测电位器输入回路是否存在断路。该装置可以检测输入回路的单根连接线缆以及多根连接线缆的断路情况。不进行短路监测。如果发生断路,将发出参数化的替代值,并将输出值设置为“无效位”,直至再次获得有效测量值。将0...100%模拟值转换为一个15位数字,每个数位为0.1%,并传输至主机系统。

安装

可将多个装置直接毗邻安装在一个模块机架中。也可在运行过程中更换该装置。

- ▶ 应确保安装位置免受辐射热、温度骤变、灰尘、污垢、潮湿和其他环境因素的影响。
- ▶ 将该装置安装在机架上的预期位置,然后将其完全卡入到位。

连接

插入模块机架中时,该装置将连接至模块机架的内部电源和数据通信部分。螺钉连接式或弹簧式接线板可用于连接现场设备。

- ▶ 连接3线电位器时:桥接模块机架上的连接端子。
- ▶ 按照“Wiring diagram”连接现场设备。

调试

一旦接好线缆并接通电源,该装置将自动运行。

运行

该装置是一款纯本安设备,因此可在运行期间在经认证的模块机架上进行热插拔。

LED

LED	指示	含义
Status	熄灭	无电源
	红灯闪烁	未针对当前插槽配置模块
	绿灯	电源和通信正常
	绿灯闪烁(缓慢:0.5 Hz)	模块尚未配置,正在等待配置数据
	绿灯闪烁(1.0 Hz非对称)	模块处于故障安全模式
通道	熄灭	无通道错误
1...4	红灯	通道诊断可用

设置


根据不同的更高级别现场总线系统,通过相关的配置工具、FDT帧或Web服务器对输入行为进行参数设定。可为每条通道设置以下参数:

- 断路监测
- 替代值策略
- 滤波器

维修

用户不得维修该装置。如果出现故障,必须停用该装置。如果要将该装置退回给图尔克,请遵守我们的退回验收条件。

废弃处理

 必须正确地弃置该装置,不得混入普通生活垃圾中丢弃。

KO 빠른 시작 가이드

AI43EX 포텐서미터 모듈

추가 문서

이 문서 외에도 다음과 같은 자료를 인터넷(www.turck.com)에서 확인할 수 있습니다.

- 데이터 시트
- excom 매뉴얼 — 본질 안전 회로용 원격 I/O
- 인증
- 적합성 선언(현재 버전)

사용자 안전 정보

사용 목적

이 장치는 점화 보호 타입 “본질 안전”(IEC/EN 60079-11) 장비이며 승인된 모듈 랙 MT...G(PTB 00 ATEX 2194 U 또는 IECEx PTB 13.0040 U)와 함께 본질 안전 회로용 excom I/O 시스템의 일부로만 사용할 수 있습니다. 4채널 아날로그 포텐서미터 모듈 AI43EX는 3선식 또는 4선식 포텐서미터 연결용으로 설계되었습니다. 2선식 포텐서미터로는 저항을 측정할 수 없습니다. 입력은 상호 간에 갈바닉 절연 처리됩니다. 이 장치는 1종 위험 지역에서 사용하기에 적합합니다. 입력은 점화 보호 타입 Ex ia IIC 또는 Ex ia IIIC입니다. 기타 다른 방식으로 사용하는 것은 사용 목적을 따르지 않는 것입니다. 터크는 그로 인한 손상에 대해 어떠한 책임도 지지 않습니다.

일반 안전 지침

- 전문적인 훈련을 받은 숙련된 기술자만이 이 장치의 조립, 설치, 작동, 구성 및 유지보수를 수행해야 합니다.
- 이 장치는 산업 부문의 EMC 요구 사항을 충족합니다. 주거 지역에서 사용하는 경우 무선 간섭을 방지하기 위한 조치를 취하십시오.
- 기술 데이터가 공동 사용에 적합한 장치만 조합하십시오.

폭발 방지 참고 사항

- 폭발 위험 회로에서 이 장치를 사용할 경우 사용자는 폭발 방지(KS C IEC 60079-14 등)에 대한 지식이 있어야 합니다.
- 폭발 방지에 관한 국내 및 국제 규정을 준수하십시오.
- 허용되는 작동 및 주변 조건 내에서만 장치를 사용하십시오(기술 데이터 및 방폭 인증서 사양 참조).

1종 및 2종 위험 지역 내 장치 사용:

- IEC/EN 60529에 따라 보호 등급이 IP54 이상인 IEC/EN 60079-0 규격의 별도 승인 외함에 장치를 설치하십시오. 안전 지역에서 사용할 경우:
- 오염도 2를 준수하지 않을 경우: IP54 이상의 보호 등급이 있는 보호 하우징에 장치를 설치하십시오.

제품 설명

장치 개요

그림 1: 장치 도면, 그림 2: 치수

기능 및 작동 모드

이 모듈에는 3선식 또는 4선식 포텐서미터를 제어하기 위한 4개의 채널이 있습니다. 포텐서미터 입력의 단선 여부가 모니터링됩니다. 이 장치는 단일 연결 케이블 및 여러 입력 연결 케이블의 단선을 감지할 수 있습니다. 단락 모니터링은 수행되지 않습니다. 단선된 경우, 매개 변수화된 대체 값이 발행되고 유효한 측정값을 다시 사용할 수 있을 때까지 출력값이 “유효하지 않은 비트”로 설정됩니다.

0...100% 아날로그 값은 1자리당 0.1%의 15 Bit 숫자로 변환되어 호스트 시스템으로 전송됩니다.

설치

여러 장치를 서로 맞닿게 모듈 랙에 삽입할 수 있습니다. 또한 작동 중에 장치를 변경할 수 있습니다.

- ▶ 설치 장소를 복사열과 갑작스러운 온도 변화, 먼지, 흙, 습도, 기타 주변 영향 요소로부터 보호하십시오.
- ▶ 장치를 랙의 의도한 위치에 장착하고 제자리에 완전히 끼우십시오.

연결

모듈 랙에 연결하면 장치가 모듈 랙의 내부 파워 서플라이 및 데이터 통신에 연결됩니다. 나사 연결 터미널 블록 또는 스프링 기술이 적용된 터미널 블록을 사용하여 필드 장치를 연결할 수 있습니다.

- ▶ 3선식 포텐서미터를 연결할 때: 모듈 랙의 연결 단자를 브릿지 연결하십시오.
- ▶ “Wiring diagram”에 따라 필드 장치를 연결하십시오.

시운전

케이블이 연결되고 파워 서플라이가 켜지면 장치가 자동으로 작동 가능해집니다.

작동

이 장치는 순수한 본질 안전 장비이므로 작동 중에 승인된 모듈 랙에 연결하거나 분리할 수 있습니다.

LED

LED	표시	의미
Status	꺼짐	파워 서플라이 없음
	적색 점멸	모듈이 현재 슬롯에 대해 구성되지 않음
	녹색	파워 서플라이 및 통신 고장 없음
	녹색 점멸	모듈이 아직 구성되지 않음, 구성(저속: 0.5 Hz) 데이터 대기 중
	녹색 점멸	페일 세이프 모드의 모듈(1.0 Hz 비대칭)
채널	꺼짐	채널 오류 없음
1...4	적색	채널 진단 있음

설정


입력 동작은 상위 레벨의 필드버스 시스템에 따라 관련 구성 도구, FDT 프레임 또는 웹 서버를 통해 매개 변수화됩니다. 다음 매개 변수는 채널별로 설정될 수 있습니다.

- 단선 모니터링
- 대체값 전략
- 필터

수리

이 장치는 사용자가 수리할 수 없습니다. 이 장치에 고장이 발생한 경우 설치 해체해야 합니다. 장치를 터크에 반품할 경우, 반품 승인 조건을 준수해 주십시오.

폐기

 이 장치는 올바른 방법으로 폐기해야 하며 일반적인 가정 폐기물과 함께 폐기해서는 안 됩니다.

①

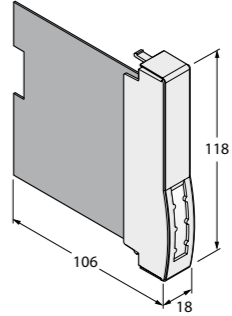


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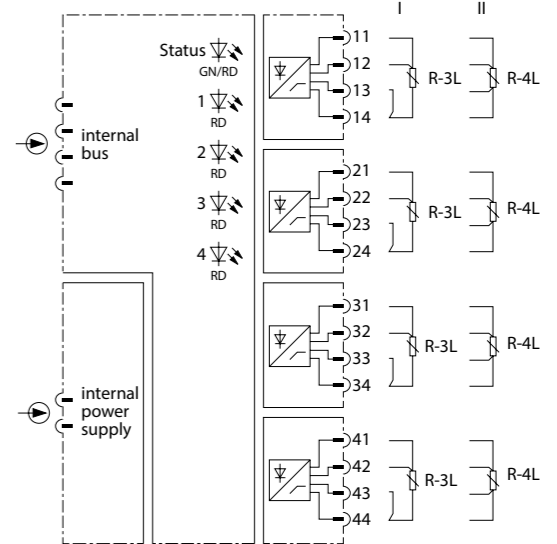
Additional information see



②



Wiring diagram



Declarations of conformity

EU-Konformitätserklärung Nr.
UK Declaration of Conformity No. 5009-2M
 EU Declaration of Conformity No.:

TURCK

Wir / We Hans Turck GmbH & Co. KG
 Witzlebenstr. 7, 45472 Mülheim an der Ruhr, Germany

erklären in alleiniger Verantwortung, dass das Produkt
 declare under our sole responsibility that the product

Potenzimetermodul / Potentiometer Module
 für das / for the: Remote – I/O – System excom®

Typ / Type: **AI43EX**

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 Gas / gas Ⓜ II 2 (1) G Ex ib [ia Ga] IIC T4 Gb
 Staub / dust Ⓜ II (1) D [Ex ia Da] IIIC

auf die in der von uns in Verkehr gebrachten Ausführung sich diese Erklärung bezieht, den Anforderungen der
 folgenden EU-Richtlinien und den Anforderungen der folgenden UK- Statutory Instruments durch Einhaltung der
 folgenden harmonisierten / designierten Normen genügen:

to which this declaration relates in the configuration placed on the market by us, are in conformity with the requirements of
 the following EU-directives and the requirements of the following UK Statutory Instruments by compliance with the following
 harmonized / designated standards:

Richtlinie / Directive EMC **2014 / 30 / EU** **26. Feb. 2014**
EMC SI* and part. sign. changes**
SI 2016/1091
 EN 61326-1:2013

Richtlinie / Directive ATEX **2014 / 34 / EU** **26. Feb. 2014**
ATEX SI* and part. sign. changes**
SI 2016/1107
 EN IEC 60079-0:2018 EN 60079-11:2012

Richtlinie / Directive RoHS **2011 / 65 / EU** **08. Jun. 2011**
RoHS SI* and part. sign. changes **SI 2012/3032** **and SI 2019/188**
 EN IEC 63000:2018

*: SI = Statutory Instrument **: SI 2019/696, SI 2020/1460

Weitere Normen, Bemerkungen / additional standards, remarks:

Die aufgeführten benannten Stellen haben die Konformitätsbewertung durchgeführt und Zertifikate ausgestellt.
 The listed notified bodies have carried out conformity assessment and issued certificates:

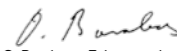
EU-Baumusterprüfbescheinigung (Modul B) / EU-type examination certificate (module B): **PTB 06 ATEX 2026**
 ausgestellt von / issued by: Physikalisch Technische Bundesanstalt, Kenn-Nr. / ID no.: 0102
 Bundesallee 100, 38116 Braunschweig, Germany

Zertifizierung des QS-Systems (Modul D) / Certification of the QS-system (module D):
 ausgestellt von / issued by: Physikalisch Technische Bundesanstalt, Kenn-Nr. / ID no.: 0102
 Bundesallee 100, 38116 Braunschweig, Germany

UK-Baumusterprüfbescheinigung / UK-type examination certificate : **TÜV 21UKEX7057**
 ausgestellt von / issued by: TÜV Rheinland Industrie Service GmbH, Kenn-Nr. / ID no.: 0035
 Alfredstraße 81, 45130 Essen, Germany

UK Erklärung zur Qualitätssicherung / UKCA Quality Assurance Notification:
 ausgestellt von / issued by: Eurofins ESE CML Limited, Kenn-Nr. / ID no.: 2503,
 New Port Road, Ellesmere Port CH65 4LZ, United Kingdom

Mülheim, den 02.05.2022


 i.V. O. Barabas, Zulassungsbeauftragter /
 Certification Representative

Ort und Datum der Ausstellung /
 Place and date of issue



Name, Funktion und Unterschrift des Befugten /
 Name, function and signature of authorized person

FM 7.3-12

09.11.21

Certification data | Technical data

Approvals and markings

Approvals	Marking parts in acc. with	
	ATEX directive	IEC/EN 60079-0/ -11
	UK Statutory Instruments (SI)	
ATEX Certificate number: PTB 06 ATEX 2026	Ⓜ II 2 (1) G	Ex ib [ia Ga] IIC T4 Gb
UKEX Certificate number: TÜV 21 UKEX 7057	Ⓜ II (1) D	[Ex ia Da] IIIC
 		

Permissible ambient temperature range T_{amb} : -20...+70 °C

Electrical data

Max. output voltage U_0	6.6 V		
Max. output current I_0	25 mA		
Max. output power P_0	42 mW		
Characteristic	Linear		
Internal inductance L_i / Internal capacitance C_i	Negligibly small/ 150 nF		
External inductance L_0 / Capacitance C_0 C_i is considered		IIC	IIB
	L_0	C_0	C_0
	5 mH	1.45 μ F	8.35 μ F
	2 mH	1.75 μ F	9.85 μ F
	1 mH	2.05 μ F	11.85 μ F
	0.5 mH	2.45 μ F	14.85 μ F
	0.2 mH	3.15 μ F	18.85 μ F

Technical data

Type designation	AI43Ex
ID	6884137
Supply voltage	Via module rack, central power supply
Power consumption	\leq 1.5 W
Galvanic isolation	Complete galvanic isolation acc. to IEC/EN 60079-11
Number of channels	4-channel
Input circuits	3-/4-wire potentiometer 0 %...100 % Intrinsically safe acc. to IEC/EN 60079-11
Nominal resistance	400 Ω ...12 k Ω
Wire-fault	< 400 Ω ; >12 k Ω
Resolution	0.1 %
Reference temperature	25 °C
Linearity deviation	\leq 0.1 % full range at 25 °C
Temperature drift	\leq 0.005 % of full range
Rise time/fall time	\leq 50 ms (10...90 %)
Max. measurement inaccuracy under EMC influence	\leq 0.1 % with shielded signal cable \leq 1 % with unshielded signal cable
Connection mode	Module, plugged on rack
Protection class	IP20
Relative humidity	\leq 93 % at 40 °C acc. to EN 60068-2-78
EMC	Acc. EN 61326-1 Acc. to Namur NE21