Description

The Remote I/O Module ANTARES 4 Analog In/Out or 4 Analog In/Out HART is suitable for the direct connection of four intrinsically safe 2-, 3-, 4-conductor transmitters (4 to 20 mA) or for outputting 0 to 20 mA signals for analog actuators.

The Remote I/O Module ANTARES 4 Analog In/Out HART offers in addition to the analog-signal transmission, the possibility of communication with the connected HART transmitters or actuators.

Its transmission channels are connected conductively to each other.

The module is intended for connection to the RCU ANTARES and to the Remote I/O system ANTARES, which were specially developed for it (see system description).

Within explosion hazardous areas the module may be set up in Zones 1 and 2.

Explosion Protection

ATEX Ex protection type	Ⓔx II 2 (1)G Ex ib [ia IIC/IIB Ga] IIC T4 Gb Ⓔx II (1)D [Ex ia Da] IIIC
Certification	PTB 11 ATEX 2018
CE marking	CE 0044
IECEx Ex marking	Ex ib [ia IIC/IIB Ga] IIC T4 Gb [Ex ia Da] IIIC
Certification	IECEx PTB 11.0061
Ambient temperature range	-20 °C to +60 °C

Safety Data
per transmission channel

U_o = 27.5 V
I_o = 87 mA
P_o = 598 mW
C_i = 6 nF
L_i = negligibly low

Ex ia IIC:	C_o	=	79 nF	L_o	= 0.2 mH	or
	C_o	=	37 nF	L_o	= 1.7 mH	
Ex ia IIB:	C_o	=	666 nF	L_o	= 0.1 mH	or
	C_o	=	264 nF	L_o	= 16 m	

Standards
in conformance to Directive 94/9/EC

EN 60079-0:2009	EN 60079-11:2007
EN 61241-0:2006	EN 61241-11:2006
IEC 60079-0:2007-10	IEC 60079-11:2006
IEC 61241-0:2004	IEC 61241-11:2005

in conformance to Directive 2004/108/EC (EMC)

EN 61000-6-2:2005
EN 61000-6-4:2007
EN 55011:2009

Safety Instructions

The Remote I/O Module may be connected and assembled only by qualified personnel who are authorised and trained to assemble electric components in hazardous (potentially explosive) areas. Utilisation in areas other than those specified or the modification of the product by anyone other than the manufacturer will exempt BARTEC from liability for defects or any further liability. The generally applicable statutory rules and other binding directives relating to workplace safety, accident prevention and environmental protection must be adhered to. The Remote I/O Module may be operated only if it is clean and not damaged in any way.

Marking

Particularly important points in these instructions are marked with the following symbols:

Danger! — Non-observance leads to death or serious physical injury. The necessary safety precautions must be taken.

Caution! — Warning of damage to property and financial and penal disadvantages (e.g. loss of guarantee rights, liability claims etc.).

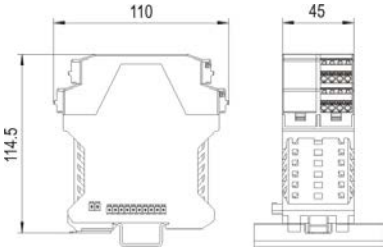
Attention! — Important instructions and information on preventing disadvantageous behaviour.

Note — Important instructions and information on effective, economic and environmentally compatible handling.

Technical Data

Note — More approvals and data are available at www.bartec-group.com

Enclosure material	Polyamide
Type of protection (EN 60 529)	
- Enclosure	IP30
- 10+2 pole plug connectors	IP30, when joined together with RCU ANTARES and its accessories or other Remote I/O Modules ANTARES (see system description for configuration)
Attachment onto mounting rail	TH 35-15 mounting rail DIN EN 60715 (metal, galvanized steel)
Electric connections	plug-in tension spring clamps; 4-pole; up to 2.5 mm²; optional coding and numbering
Dimensions (W x H x D)	45 mm x 110 mm x 114.5 mm



Weight	approx. 390 g
Storage and transport temp.	-25 °C to +85 °C
Relative humidity	5 to 95 % non-condensing
Degree of contamination	2
Vibration (EN 60068-2-6)	2 g/7 mm; 5 Hz - 200 Hz in all 3 axes
Shock (EN 60068-2-27)	15 g, 11 ms in all 3 axes ±3 shocks / direction

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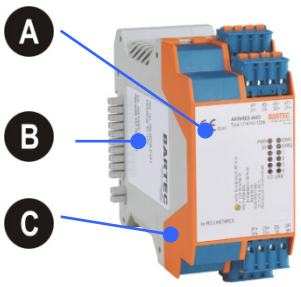
Electric Data

Quantity of channels	4 inputs or outputs Ex i or 4 inputs or outputs Ex i HART (short-circuit-proof); inputs active/passive
Galvanic isolation	between inputs or outputs and internal bus
Line break/short-circuit	adjustable for each channel with ANTARES Designer Software
Data input channels	
Signal range	0 to 20 mA or 4 to 20 mA
Signal	min. 0 mA max. 21 mA
Short-circuit current	max. 21.3 mA
Input resistance	Ri = 10 Ω
Resolution	16-bit (15-bit + sign)
Tolerance	±0.1 % of the measuring range final value at +25 °C
Influence of the ambient - temperature	±0.01 %/K of the measuring range final value
Minimum voltage at 20 mA	16 V
Data output channels	
Signal range	0 to 20 mA or 4 to 20 mA
Signal	min. 0 mA max. 21 mA
Short-circuit current	max. 21.3 mA
Load	max. 750 Ω
Resolution	14-bit
Tolerance	±0.1 % of the measuring range final value at +25 °C
Influence of the ambient - temperature	±0.01 %/K of the measuring range final value

Note

The ANTARES Remote I/O modules 4AOI and 4AIOH are for passive and active sensors. The signal range can be switched over. The 0 to 20 mA signal is not possible with open-circuit monitoring. If the HART function is activated, a HART sensor/actuator can respond. The ANTARES system takes on the function of a HART gateway.

Product Marking Remote I/O Module



A Type Label and Ex Protection, e.g. 4AIO

B Module Housing

C Serial Number

Accessories: Distance module, Art. no. 05-0078-0106

Danger!

A distance module (05-0078-0106) is needed on the left and right of the Remote I/O Modules ANTARES 4AIO and 4AIOH!

Note

- Exception: it is not necessary to have any distance module between the Remote I/O Modules ANTARES 4AIO and 4AIOH and a bus end module or an extension module.
- The Remote I/O Modules ANTARES 4AIO and 4AIOH may be operated without a distance module in the ambient temperature range -20°C to +50°C also.

Technical Data Distance module

The distance module does not have any electronic unit. However, the (mechanical) technical data correspond to those of the Remote I/O modules:

Dimensions (W x H x D)
22.5 mm x 110 mm x 114.5 mm

Weight
approx. ca. 70 g

Without plug-in spring clamps for the electric connection.

Installation and Commissioning

Danger!

If the modules are used in explosion hazardous areas, it is necessary to rule out processes that generate high charge levels or flowing particles in the environment.

Danger!

The ANTARES Remote I/O system must be set up in a Pollution Degree 2 or better environment under DIN EN 60664-1. Make sure there is no condensation on the remote I/O module before installing or operating it.

Caution!

Any work on explosion-protected operating equipment may be done only by authorised persons. Use original parts from BARTEC GmbH always.

Note

When working on electrical systems, the relevant installation and operating regulations must be complied with, such as e.g. Directive 1999/92/EC, Directive 94/9/EC, German Industrial Health and Safety Ordinance (BetrSichV), EN 60079-14, the DIN VDE 0100 series or other applicable national standards and ordinances. The operator of an electrical system in a hazardous environment must keep it in good condition, operate and monitor it properly and do maintenance and repairs.

The Remote I/O Modules ANTARES 4AIO and 4AIOH must be placed on the mounting rail with a side spacing of approximately 10 mm from the neighbouring module as shown in Fig. 1. Position the device onto the edge of the DIN rail with upper holding keyway and snap it on the mounting rail. Align it side by side, almost seamlessly, with the neighbouring modules.

The Remote I/O Modules ANTARES 4AIO and 4AIOH is connected to the mounting rail by means of a spring-mounted functional ground contact in order to dissipate ESD.

BARTEC GmbH Max-Eyth-Straße 16 97980 Bad Mergentheim Germany
Phone: +49 7931 597-0 Fax: +49 7931 597-119
info@bartec.de www.bartec-group.com

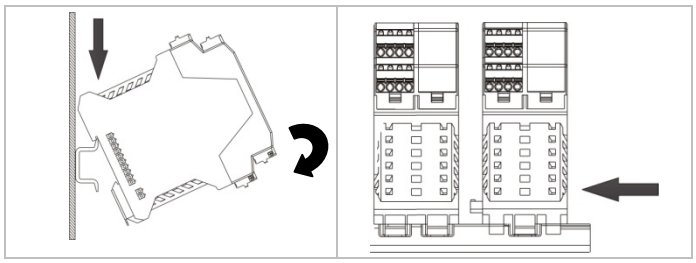


Figure 1

Note

It is essential to select a connection lead that satisfies the thermal and mechanical requirements of the area of application.

Rated connection capacity of the spring clamps

Permissible core cross-sections	
Clamping range single-wire	0.2 mm² - 2.5 mm²
Clamping range fine-stranded	0.2 mm² - 2.5 mm²
Clamping fine-stranded with wire-end ferrule acc. to DIN 46228-1 or DIN 46228-4	0.25 mm² - 2.5 mm²

Supply circuits

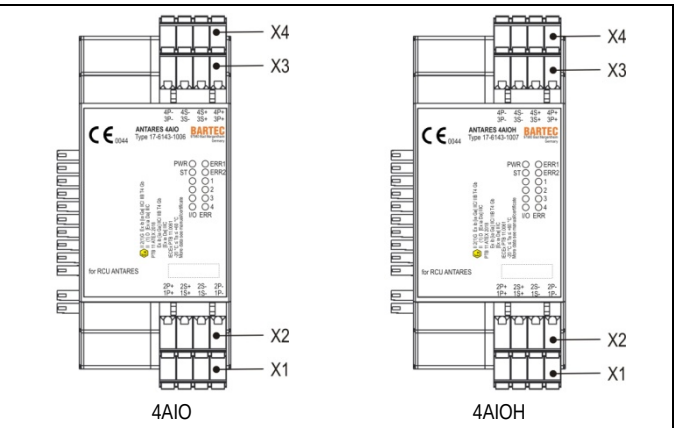
The separately certified ANTARES RCU supplies power to the 10+2-pole plug connector on the side of the Remote I/O Module ANTARES 4AIO and 4AIOH.

Terminals for conductors from external circuits

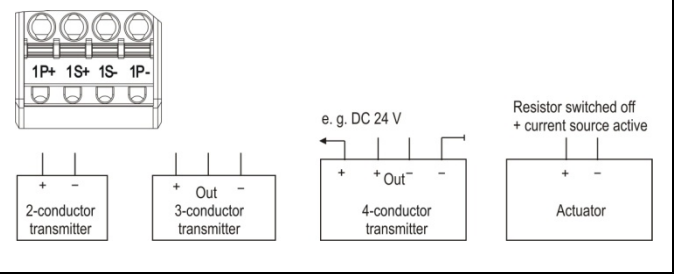
In the GasEx area, the EN 60079-14 "Explosive atmospheres - Part 14: Electrical installations design, selection and erection" must be observed when connecting the external conductors to the terminals.

In the DustEx area the EN 61241-14 "Electrical apparatus for use in the presence of combustible dust - Part 14: Selection and Installation" must be observed.

The conductors must be connected in accordance with the terminal connection diagram.



Connection examples



Terminal	Terminal block	Passive Sensors 2-conductor transmitter		Passive Sensors 3-conductor transmitter	
X4	4P-	-		-	
	4S-	-		Minus	Channel 4
	4S+	Input	Channel 4	Input	Channel 4
	4P+	Supply	Channel 4	Supply	Channel 4
X3	3P-	-		-	
	3S-	-		Minus	Channel 3
	3S+	Input	Channel 3	Input	Channel 3
	3P+	Supply	Channel 3	Supply	Channel 3
X2	2P+	Supply	Channel 2	Supply	Channel 2
	2S+	Input	Channel 2	Input	Channel 2
	2S-	-		Minus	Channel 2
	2P-	-		-	
X1	1P+	Supply	Channel 1	Supply	Channel 1
	1S+	Input	Channel 1	Input	Channel 1
	1S-	-		Minus	Channel 1
	1P-	-		-	
Terminal	Terminal block	Active sensors 4-conductor transmitter		Analog outputs 2-conductor transmitter	
X4	4P-	-		-	
	4S-	Minus	Channel 4	Minus	Channel 4
	4S+	Input	Channel 4	Ausgang	Channel 4
	4P+	-		-	
X3	3P-	-		-	
	3S-	Minus	Channel 3	Minus	Channel 3
	3S+	Input	Channel 3	Ausgang	Channel 3
	3P+	-		-	
X2	2P+	-		-	
	2S+	Input	Channel 2	Ausgang	Channel 2
	2S-	Minus	Channel 2	Minus	Channel 2
	2P-	-		-	
X1	1P+	-		-	
	1S+	Input	Channel 1	Ausgang	Channel 1
	1S-	Minus	Channel 1	Minus	Channel 1
	1P-	-		-	
The Remote I/O Module inputs/outputs have a common ground potential					

Shielding for the conductors from the external circuits

Attention!

Connection leads of 25 m or longer requires shielding!
See example for the shielding plan.

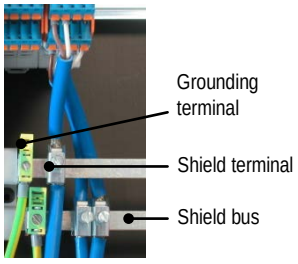


Figure 2

Example of installation:

When shielded conductors are used, one end of the shield must be connected with a large contact area to a shield bus (fig. 2) by means of shield terminals.

The shield bus is connected to the equipotential bonding by means of a grounding terminal 4 mm² (as in fig. 2).

BARTEC GmbH Max-Eyth-Straße 16 97980 Bad Mergentheim Germany
Phone: +49 7931 597-0 Fax: +49 7931 597-119
info@bartec.de www.bartec-group.com

Displays

LED	Colour	Meaning
PWR	GN	Supply ok; goes out if voltage is too low
ST	GN	Data exchange active
ERR1	RD	Communication error
ERR2	RD	Error in the module
ON 1-4	YE	Differentiation input (lightening) / output (off)
ERR 1-4	RD	Channel error break/short-circuit

Repairs

Caution!

Only authorised personnel may do any of the repairs on explosion-protected operating equipment. Use only original spare parts from BARTEC GmbH.

Replacement of the ANTARES 4AIO and 4AIOH

The ANTARES 4AIO electronic unit, type 17-6143-1006/01**, or ANTARES 4AIOH, type 17-6143-1007/01**, is a Remote I/O Module without a lower section to the enclosure. The electronic unit is fitted into the lower section of the enclosure (art. no. 05-0078-0121).

Note

The electronic unit can be replaced in an Ex atmosphere without shut down the voltage display (hot-swap see fig. 3-5)

Caution!

Only one electronic unit may be removed at a time when hot swapping, i.e. never pull out two electronic units at the same time.

A defective electronic unit must be replaced by one of the same type only.

The new electronic unit must be installed immediately. The lower section of the enclosure may not remain open!

(1) Use a screwdriver to loosen the plug-in spring clamps (fig. 3).

(2) Loosen the interlocking between the upper section and the lower section (fig. 4).

(3) Raise the electronic unit and take it out of the lower section of the enclosure (fig. 5).

The electronic unit may be touched only on the upper section of the enclosure (see fig. 5)! (ESD danger)

(4) Insert the new electronic unit, whereby the printed circuit boards are pushed into the guide tracks in the lower section of the enclosure until the electronic unit locks into place.

(5) Plug the spring clamps onto the top section of the enclosure.

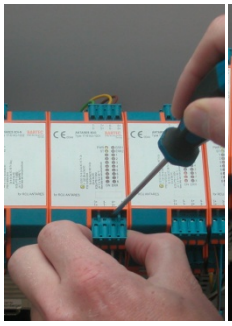


Figure 3

Figure 4

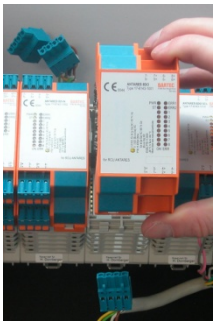


Figure 5

Figures 3-5 without distance modules.

Maintenance

No particular maintenance is required if the device is operated appropriately and the instructions relating to installation and ambient conditions are observed.

Accessories, Spare Parts

Distance module, coding pins, labels, etc. are available as accessories (see also BARTEC catalogue).

Disposal

The components in the Remote I/O Module contain metal and plastic parts and electronic components.

The statutory requirements for electrical scrap must be observed therefore (e.g. disposal by an approved disposal company).

Order Numbers

Remote I/O-Module ANTARES 4AIO

➡ Type 17-6143-1006/0000

Remote I/O-Module ANTARES 4AIOH

➡ Type 17-6143-1007/0000

Distance Module

➡ Art. no. 05-0078-0106

Service Address

BARTEC GmbH
Max-Eyth-Straße 16
97980 Bad Mergentheim
Germany

Phone +49 7931 597-0
Fax +49 7931 597-119
e-Mail: info@bartec.de
Internet: www.bartec-group.com

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