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System Description - Translation

Remote I/O-Systeme

ANTARES

ATEX / IECEx

Zone 1 and Zone 21

Document no. 11-5174-7D0002

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Reservation: Technical data subject to change without notice. Changes, errors and misprints may not be used as a basis for any claim for damages.

Contents	Pages
ENGLISH	1-34

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The System Description is a constituent part of the product and must be kept in the direct vicinity of the system and be accessible at all times to the installation, operating and maintenance personnel.

It contains important information, safety instructions and test certificates that are necessary for perfect functioning when operating and handling the devices. It is addressed to technically qualified personnel.

Familiarity with and the technically perfect implementation of the safety instructions and warnings described in this manual are preconditions for safe installation and commissioning. The safety notes and warnings in this documentation are given in a general way and only qualified personnel will have the necessary specialised knowledge to interpret and implement them correctly in specific individual cases.

Safety Instructions

Only the responsible qualified personnel may install and connect the product and its components.

Any subsequent modification of the product is strictly prohibited and will exempt BARTEC from liability for defects or any further liability.

The Remote I/O systems ANTARES may be operated only if they are clean and free of damage.

The generally applicable statutory rules and other binding directives on workplace safety, accident prevention and environmental protection must be adhered to.

Danger, Warning and Note Symbols in the System Description



Non-observance leads to death or serious physical injury.
The necessary safety measures must be taken.



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



Important instructions and information on preventing disadvantageous behaviour.



Important instructions and information on effective, economical and environmentally compatible handling.

Contents

1	Special Features	5
1.1	Definition	5
1.2	Use for the Intended Purpose	5
2	Technical Data	6
2.1	Remote I/O Systems ANTARES	6
2.2	Devices and Components in the Remote I/O Systems ANTARES	7
2.2.1	RCU ANTARES	8
2.2.2	Remote I/O Modules ANTARES	9
2.2.3	Accessories in the RCU ANTARES	10
3	Construction	11
3.1	Possible Construction of the Remote I/O Systems ANTARES	12
3.1.1	RCU ANTARES and Various Remote I/O Modules ANTARES	12
3.1.2	RCU ANTARES, Redundant RCU ANTARES and various Remote I/O Modules ANTARES	13
3.1.3	RCU ANTARES (also Singly Redundant), various Remote I/O Modules ANTARES and Mounting Rail Transitional Section	14
3.2	Max. Quantity of Remote I/O Modules ANTARES	15
3.3	Determination of the temperature in and around the protective enclosure	16
3.4	Maximum Quantity of Mounting Rail Transitional Sections and Maximum Length of the Ext Bus cable and the Ext power cables	17
4	Labelling	18
5	Installing the Remote I/O Systems ANTARES	20
5.1	Operating Position	20
5.2	Earthing	20
5.3	Strain Relief for the Connection Leads	20
5.4	Installing	20
5.4.1	Installation on Mounting Rail	20
5.4.2	Mounting the ANTARES Remote I/O Systems	21
5.4.2.1	RCU ANTARES and Various ANTARES Remote I/O Modules	21
5.4.2.2	RCU ANTARES, Redundant RCU ANTARES and Various Remote I/O Modules ANTARES	22
5.4.2.3	RCU ANTARES (also Singly Redundant), various Remote I/O Modules ANTARES and Mounting Rail Transitional Section	23
5.5	Special Conditions	24
5.6	Installation in Zone 1 and Zone 2	24
5.6.1	Installation Space	25
5.6.2	Calculation of the Ambient Temperature when Fitting into an Enclosure	26
5.6.3	Examples of Compact Construction in Zone 1 and Zone 2	27
5.6.4	Examples of Single-Unit Construction in Zone 1 and Zone 2	29
5.7	Installation in Zone 21 and Zone 22	30
5.7.1	Dimensions Ex-tD / Ex-tb Enclosure	31
5.7.2	Examples of Compact Construction in Zone 21 and Zone 22	32
5.7.3	Example of Single-Unit Construction in Zone 21 and Zone 22	33
6	Installation / Commissioning	34
6.1	Additional Interfaces in the Ex e Junction Box	34
6.1.1	SD Memory Card	34
6.1.2	Passive USB Port	34
6.2	Integration of the ANTARES Remote I/O systems in a Master Control	35
6.3	HOT SWAP	35
6.3.1	Electronic Unit in the Remote I/O Modules ANTARES	35
6.3.2	Head Module ANTARES	35

1 Special Features

1.1 Definition

The Remote I/O System ANTARES consists of:

- the **Rail Control Unit (RCU) ANTARES** (power supply and CPU), also singly redundant, including the bus beginning and bus end module and a certified rail-mounted earth conductor terminal and
- various **Remote I/O Modules ANTARES** with separate certification and accessories.

They can be distributed over a maximum of 4 metal mounting rails. They can be set up either in a compact construction (1 or a maximum of 4 mounting rails with short mounting rail transitional sections) or in single-unit construction (max. 4 mounting rails with mounting rail transitional sections).

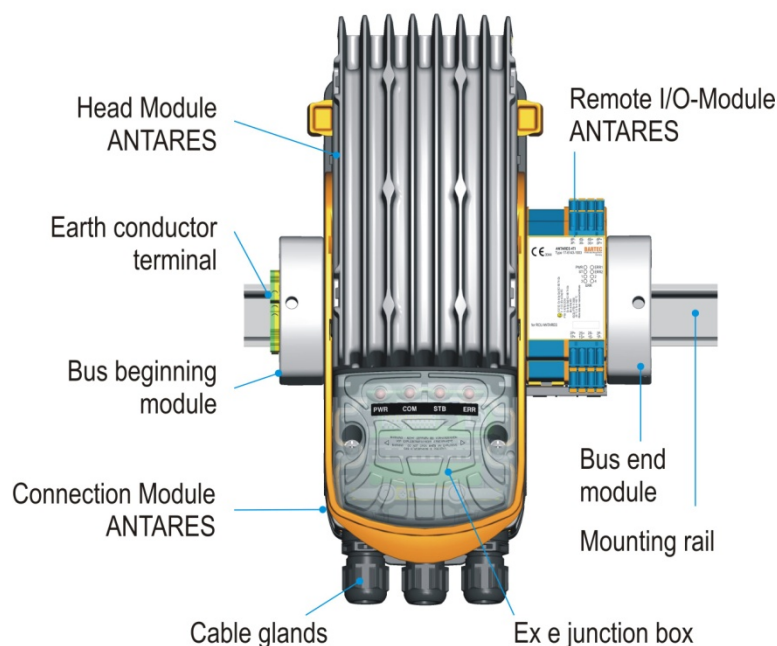


Illustration: Example of a compact construction of an Remote I/O System ANTARES in single operation, with an Remote I/O module ANTARES

1.2 Use for the Intended Purpose

The Remote I/O System ANTARES is intended for use within the explosion hazardous areas of Zones 1 and 2. It also requires protection against mechanical damage!

The Remote I/O System ANTARES type 17-5184-xxxx/xxxx is intended for use within the explosion hazardous areas of Zones 21 and 22. It requires protection by means of an enclosure with separate certification!

The Remote I/O systems ANTARES are connected by means of a communication interface with a master control (PLC) in the safe area. This does not require an additional isolating repeater. There is a choice between the following protocols: **- PROFIBUS-DP - ProfiNet - Modbus TCP - Ethernet/IP**

The Remote I/O systems ANTARES can process digital and analog process signals of intrinsically safe sensors or actuators from the explosion hazardous areas of Zone 0 or Zone 20.

Typical areas of use are the chemical process industry, pharmaceutical, refinery, off-shore, oil and gas industries with explosive gas atmospheres and machines and systems for explosive dust atmospheres.

2 Technical Data

2.1 Remote I/O Systems ANTARES



Note

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

Ex protection type ATEX Remote I/O system ANTARES	Ex II 2 (1) G Ex d e [ia IIC/IIB Ga] IIC T4 Gb
Ex protection type IECEx Remote I/O system ANTARES	Ex d e [ia IIC/IIB Ga] IIC T4 Gb
Mechanical construction	Either a protective device against mechanical damage or at least an enclosure in a good industrial quality (not subject to risks of electrostatic charging) (see chapter 5.6)

or

Ex protection type ATEX Remote I/O System ANTARES Type 17-5184-xxxx/xxxx	Ex II 2 (1) D Ex tb [ia Da] IIIC T100 °C Db oder Ex II 2 (1) D Ex tD [ia Da] A21 IP6X T100 °C
Mechanical Construction	Enclosure with separate certification: Ex II 2 D Ex tb IIIC Db or Ex II 2 D Ex tD A21 IP6X
Ex protection type IECEx Remote I/O System ANTARES Type 17-5184-xxxx/xxxx	Ex tb [ia Da] IIIC T100 °C Db oder Ex tD [ia Da] A21 IP6X T100 °C
Mechanical Construction	Ex tb IIIC Db or Ex tD A21 IP6X
Certification	PTB 11 ATEX 2009 X
	IECEx PTB 11.0051X
CE marking	CE 0044
Ambient temperature range	-20 °C to +60 °C (+50 °C) The upper ambient temperature limit depends on the Remote I/O Modules ANTARES used and the use of distance modules (see chapter 3.1.1).
Rated voltage; maximum DC voltage	DC 24 V -15 %, +25 %; Um = DC 30 V
Operating position	Vertical (e.g. on the wall, not on the floor), cable glands for the connection module ANTARES at the bottom

Communication interfaces for the RCU ANTARES <ul style="list-style-type: none"> - PROFIBUS-DP - Ethernet (100BaseT with integrated switch) 	Protocols <ul style="list-style-type: none"> - PROFIBUS-DP up to 1.5 Mbit/s - ProfiNet - Modbus TCP - Ethernet/IP
Configuration <ul style="list-style-type: none"> - Interface - Software 	<ul style="list-style-type: none"> - USB-Port (RCU ANTARES) - ANTARES Designer software
Standards in conformance to Directive 94/9/EC in conformance to Directive 2004/108/EC (EMC)	EN 60079-0:2009 EN 61241-0:2006 EN 60079-11:2007 EN 61241-11:2006 EN 60079-1:2007 EN 60079-31:2009 or EN 60079-7:2007 EN 61241-1:2004 EN 61000-6-2:2005 EN 61000-6-4:2007 EN 55011:2009
Storage and transport temperature	-25 °C to +70 °C
Relative air humidity	5 to 95 %, non-condensing
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

2.2 Devices and Components in the Remote I/O Systems ANTARES

The technical data for the devices and components in the Remote I/O systems ANTARES can be found in:

- the "Operating instructions" for the
Rail Control Unit (RCU) ANTARES
Connection Module ANTARES, type 17-5164-9xx0/xxxx,
Head Module ANTARES, type 17-5174-1x0x/xxxx
- the "Operating Instructions" for the
Remote I/O Module ANTARES ... type 17-6143-1xxx/xxxx and
- the "Installation Instructions" for the
ANTARES ExtSet 2 m / 10 m / 20 m.

The most important data are listed also in the following.

2.2.1 RCU ANTARES

consisting of:

Connection Module ANTARES

type 17-5164-9xx0

and

Head Module ANTARES

type 17-5174-1x00



ATEX Ex protection type	Ⓔ II 2 G Ex d e [ib] IIC T4 Gb
IECEx Ex protection type	Ex d e [ib] IIC T4 Gb
Certification	PTB 11 ATEX 2009 X
	IECEx PTB 11.0051X
CE marking	CE 0044
Ambient temperature range	-20 °C to +60 °C
Rated voltage; maximum DC voltage	DC 24 V -15 %, +25 %; Um = DC 30 V
Protection class (EN 60529) 10+2-pole connectors	IP54, IP30 (joined to the RCU ANTARES, Remote I/O Module ANTARES or accessories)
Over voltage category to EN 60664-1	II
Contamination level	2
Installation on mounting rail	Metal, TH 35-15, DIN EN 60715
with earth conductor terminal	Ⓔ II 2 G Ex eb IIC (with separate certification) Rated connection capacity: 4 mm²
Max. power dissipation	
- Single operation	15 W
- Redundant operation	15 W + 7 W (Master + Slave) = 21 W

2.2.2 Remote I/O Modules ANTARES



ATEX Ex protection type		II 2 (1) G Ex ib [ia IIC/IIB Ga] IIC T4 Gb and II (1) D [Ex ia Da] IIIC
IECEx Ex protection type		Ex ib [ia IIC/IIB Ga] IIC T4 Gb [Ex ia Da] IIIC
Certification		
Type 17-6143-1001/00xx	8DO	PTB 11 ATEX 2014
Type 17-6143-1010/00xx	8DO SCL	IECEx PTB 11.0054
Type 17-6143-1002/00xx	8DI-N	PTB 11 ATEX 2015
Type 17-6143-1008/00xx	16DI-N	IECEx PTB 11.0055
Type 17-6143-1003/00xx	4TI	PTB 11 ATEX 2016 IECEx PTB 11.0058
Type 17-6143-1004/00xx	8AI	PTB 11 ATEX 2017
Type 17-6143-1005/00xx	8AIH	IECEx PTB 11.0059
Type 17-6143-1006/00xx	4AIO	PTB 11 ATEX 2018
Type 17-6143-1007/00xx	4AIOH	IECEx PTB 11.0061
CE marking		0044
Ambient temperature range		-20 °C to +60 °C (with distance module) without restriction for 8DI-N and 16DI-N, 4TI with restriction (see chapter 3.1.1) for 8DO and 8DO SCL, 8AI and 8AIH, 4AIO and 4AIOH -20°C to +50°C (without distance module) without restriction for all Remote I/O Modules ANTARES
Protection class (EN 60529)		IP30 (in the ANTARES system construction)
Snapping onto mounting rail		Metal, TH 35-15, DIN EN 60715
Accessories for the Remote I/O Modules ANTARES:		
- Distance module, art. no. 05-0078-0106 Protection class (EN 60529)		IP 30 (in the ANTARES system construction)

2.2.3 Accessories in the RCU ANTARES

System components		
Earth connector terminal	Art. no. 03-7112-0017	To connect the local equipotential bonding conductor
Mounting rail TH 35-15	Art. no. 02-2010-0012	Length: 2 m, steel unperforated
Bus beginning module	Art. no. 05-0078-0084	For mechanically fastening the modules onto the mounting rail and for connecting the internal databus
Bus end module	Art. no. 05-0078-0085	
End plug	Art. no. 05-0078-0087	Supplied as standard with connection module, single operation
Connector bridge	Art. Nr. 05-0078-0086	for constructing a system in the redundancy operation
Distance module	Art. no. 05-0078-0106	in the Remote I/O Modules 8DO and 8DO SCL, 8AI and 8AIH, 4AIO and 4AIOH for the temperature range -20 °C to +60 °C

Mounting rail transition section (ExtSet)		
Rail beginning module	Art. no. 05-0041-0319	Modules for extending the Remote I/O systems
Rail end module	Art. no. 05-0041-0320	
Extension module	Art. no. 05-0078-0123	
Ext power cable 1	(max. 20 m)	ÖLFLEX® Classic 100, 8 x 1.5 mm², pre-assembled
Ext power cable 2	(max. 20 m)	ÖLFLEX® Classic 100, 4 x 1.5 mm², pre-assembled
Ext bus cable	(max. 20 m)	UNITRONIC® BUS CAN, 2 x 2 x 0.34 mm², pre-assembled
Shortening set	Art. no. 05-0091-0164	for shortening the Ext power cable and ext bus cable
Strain relief set	Art. no. 05-0005-0067	
Split ferrite bead	Art. no. 03-8388-0003	To reduce the interference voltage with Ethernet (cable diameter: 4.5 to 8 mm)
Label holder	Art. no. 05-0705-0010	As base for the marking label

Further Accessories		
SD card	Type 17-28BE-F006/0002	For saving the RCU configuration data
Designer software	Type 17-28TF-0074	For configuring the Remote I/O System ANTARES

Protection class (EN 60529)	IP 30 (in the ANTARES system construction)
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3 Construction

The central unit in the Remote I/O systems ANTARES is the Rail Control Unit (RCU) ANTARES. In these systems, it may be available at most in a singly redundant form: (both devices) directly beside each other on a common metal mounting rail.

**Danger!**

Two RCUs ANTARES (redundancy operation in the PROFIBUS-DP) must always be aligned on a common mounting rail!

The **RCU ANTARES** consists of:

- Connection Module ANTARES type 17-5164-9xx0 and
- Head Module ANTARES type 17-5174-1x0x

**Attention!**

The connection module ANTARES and head module ANTARES must have the same communication interface (see type label).

Must include:

- TH35-15 mounting rail made of metal, DIN EN 60715
- separately certified Earth connector terminal - 1 for each mounting rail in the system - to connect the local equipotential bonding conductor
- Bus beginning module and bus end module

Remote I/O Module ANTARES type 17-6143-1xxx/00xx

The Remote I/O Modules ANTARES must be fastened either onto the RCU ANTARES metal mounting rail or onto up to 4 other metal mounting rails (with mounting rail transitional section).

**Danger!**

Inside explosion hazardous areas. It is not permissible to expose the various separately certified Remote I/O Modules ANTARES type 17-6143-1xxx/00xx to processes that generate high charge levels or to flowing particles.

Mounting rail transition section (ExtSet)

The mounting rail transition section is produced of 2 extension modules, a strain-relieved Ext bus cable for each, Ext power cable 1 and Ext power cable 2, a separately certified earth connector terminal, and 1 rail end module and 1 rail beginning module.

**Danger!**

An equipotential bonding conductor must be connected to each mounting rail!

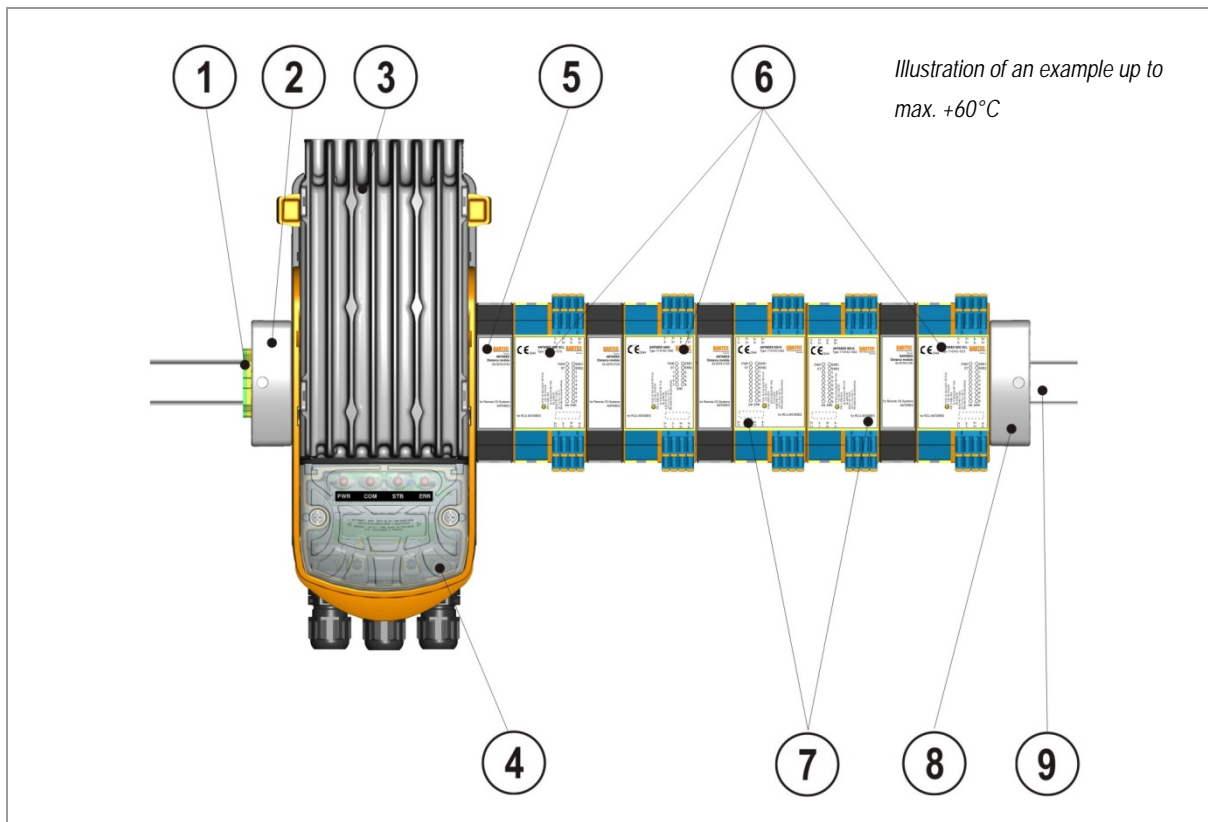
RCU ANTARES, Remote I/O Modules ANTARES and extension module have 10+2-pole connectors (to supply energy and transfer data), which must be connected firmly and directly to each other and to the 10-pole plug connectors of the bus beginning module, bus end module, rail beginning module or rail end module in order to obtain an enclosure unit satisfying protection class IP30.

**Danger!**

If there is a possibility of an explosive gas atmosphere, if it is not permissible the voltage supply must be switched off before the 10+2-pole and 10-pole plugs are connected or disconnected.

3.1 Possible Construction of the Remote I/O Systems ANTARES

3.1.1 RCU ANTARES and Various Remote I/O Modules ANTARES



Item	Quantity	Designation	Art. no.
1	1 x	Earth connector terminal	03-7112-0017
2	1 x	Bus beginning module	05-0078-0084
3	1 x	Head module	Type 17-5174-1x0x
4	1 x	Connection module	Type 17-5164-9xx0
5	x	Distance module	05-0078-0106
6	x	Remote I/O Module 8DO or 8DO SCL, 8AI or 8AIH, 4AIO or 4AIOH	Type 17-6143-1xxx/0000
7	x	Remote I/O Module 8DI-N, 16DI-N, 4TI,	Type 17-6143-1xxx/0000
8	1 x	Bus end module	05-0078-0085
9	1x	TH 35-15 mounting rail	02-2010-001x



Danger!

A distance module art. no. 05-0078-0106 must be installed on the left and right of the ANTARES Remote I/O modules: 8DO and 8DO SCL, 8AI and 8AIH, 4AIO and 4AIOH!



Note

Exception: it is not necessary to install a distance module between the ANTARES Remote I/O modules 8DO and 8DO SCL, 8AI and 8AIH, 4AIO and 4AIOH and a bus end module or an extension module.

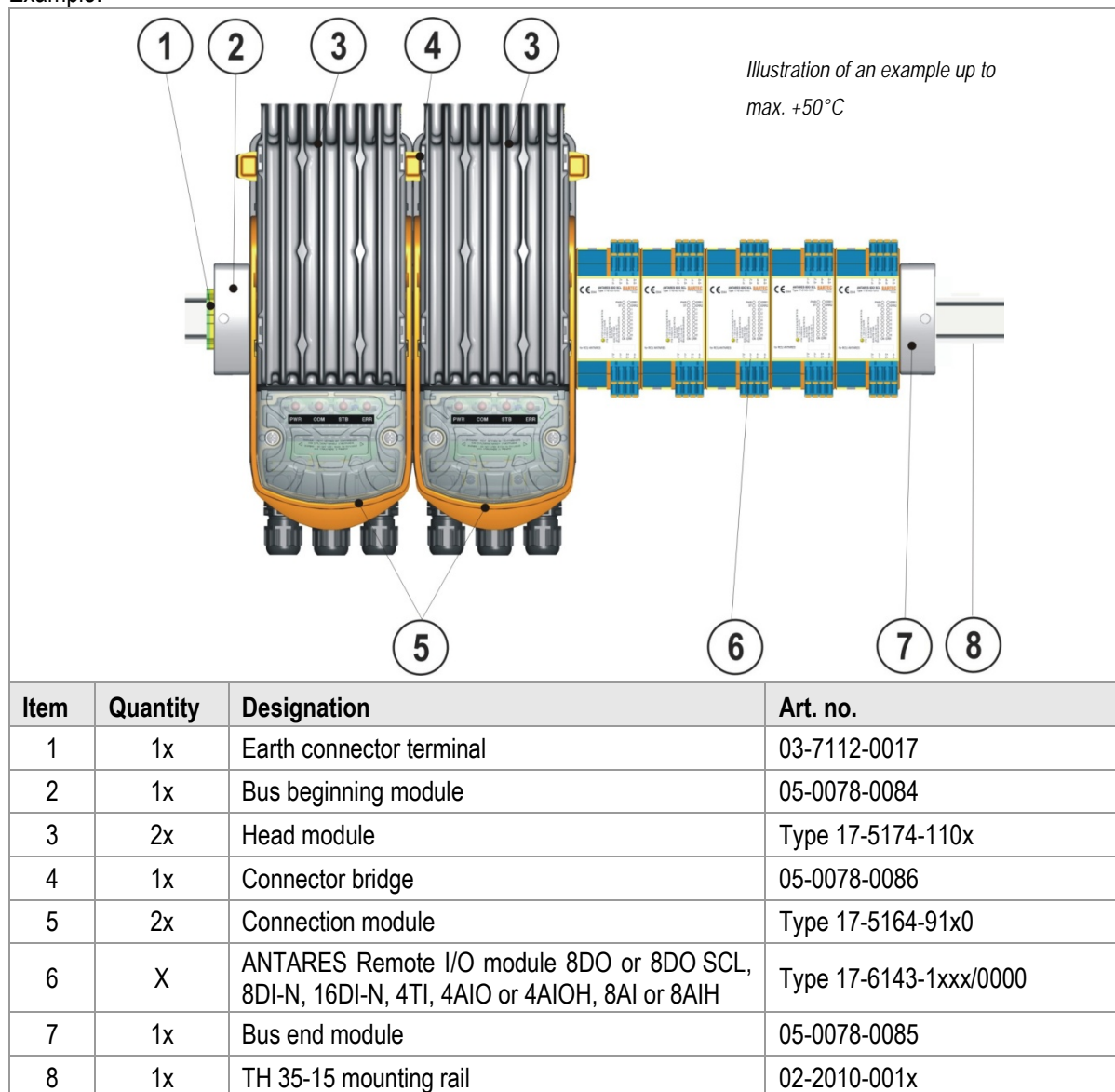


Note

In the ambient temperature range -20°C to +50°C, it is also permissible to operate the ANTARES Remote I/O modules 8DO and 8DO SCL, 8AI and 8AIH, 4AIO and 4AIOH without distance modules.

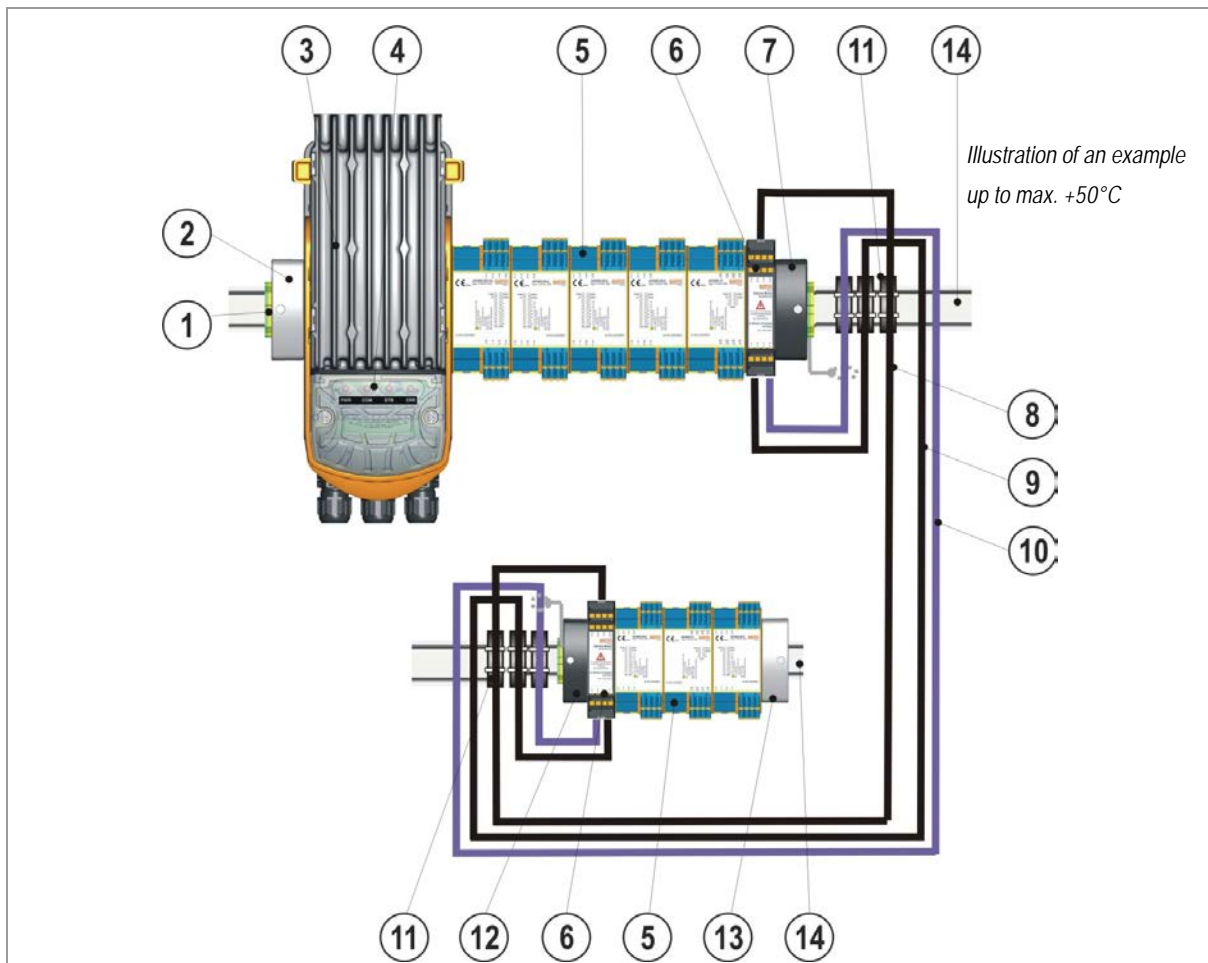
3.1.2 RCU ANTARES, Redundant RCU ANTARES and various Remote I/O Modules ANTARES

Example:



3.1.3 RCU ANTARES (also Singly Redundant), various Remote I/O Modules ANTARES and Mounting Rail Transitional Section

Example:

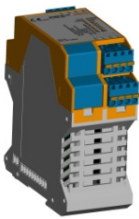


Item	Quantity	Designation	Art. no.
1	3x	Earth connector terminal	03-7112-0017
2	1x	Bus beginning module	05-0078-0084
3	1x	Head module	Type 17-5174-1x0x
4	1x	Connection module	Type 17-5164-9xx0
5	X	ANTARES Remote I/O module 8DO or 8DO SCL, 8DI-N, 16DI-N, 4TI, 4AIO or 4AIOH, 8AI or 8AIH	Type 17-6143-1xxx/0000
6	2x	Extension module	05-0078-0123
7	1x	Rail end module	05-0041-0320
8	1x	Ext power cable 1	05-0061-046x
9	1x	Ext power cable 2	05-0061-046x
10	1x	Ext bus cable	05-0061-046x
11	1x	Strain relief set	05-0005-0067
12	1x	Rail beginning module	05-0041-0319
13	1x	Bus end module	05-0078-0085
14	2x	TH 35-15 mounting rail	02-2010-001x

3.2 Max. Quantity of Remote I/O Modules ANTARES

The RCU ANTARES (single or redundancy operation) is able to manage **up to 32 Remote I/O Modules ANTARES** and provides a **max. 74 W** of power for these. The table below lists the total power consumption of various Remote I/O Modules ANTARES. The max. possible quantity of the I/O Modules can be calculated by adding the total power consumption of the fitted I/O Modules.

A choice of 9 various Remote I/O Modules ANTARES is available:



Designation	Type	P _{Module} [W]	P _{VModule} [W]
8DI-N (8 Digital In NAMUR)	17-6143-1002	1.8	1.5
16DI-N (16 Digital In NAMUR)	17-6143-1008	2.4	2.2
8DO (8 Digital Out, 24 V)	17-6143-1001	6.5	3.5
8DO SCL (8 Digital Out, single current limit)	17-6143-1010	6.6	3.5
8AI (8 Analog in)	17-6143-1004	6.4	3.5
8AIH (8 Analog in HART)	17-6143-1005	6.5	3.5
4AIO (4 Analog in/Out)	17-6143-1006	4.0	2.5
4AIOH (4 Analog in/Out HART)	17-6143-1007	4.0	2.5
4TI (4 Temperature in)	17-6143-1003	1.6	1.5

P_{Module} [W] = Total power consumption, P_{V Module} [W] = Power dissipation

$$\Sigma P_{\text{Module}} \leq 74 \text{ W}$$



Note

The order in which various Remote I/O Modules ANTARES are installed is not important.

3.3 Determination of the temperature in and around the protective enclosure



Caution!

The user must him/herself calculate and ensure the appropriate difference between the temperature in the protective enclosure and that around it, depending on the particular protective enclosure being used.

The maximum temperature allowed outside the protective enclosure should be about 10°C lower than the maximum ambient temperature inside the protective enclosure. This must be checked by the person installing the system.

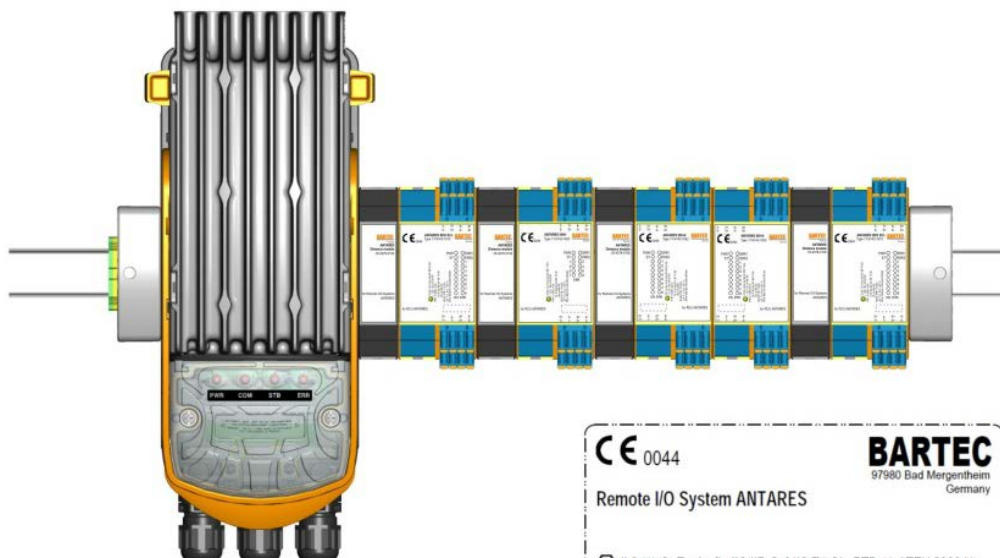
Example:

The maximum ambient temperature around the ANTARES head module is e.g. 60 °C.

See also the “ANTARES Designer” user manual” and the “System designer” software.

In this example, the external temperature around the protective enclosure must not exceed 50 °C. This temperature specification must be entered into the system type label which is to be affixed to the protective enclosure.

The system type label must be designed with the ANTARES Designer software, see also chapter 4.



3.4 Maximum Quantity of Mounting Rail Transitional Sections and Maximum Length of the Ext Bus cable and the Ext power cables

**Danger!**

The length of the Ext Bus cable and the Ext power cables may not exceed more than max. 20 m in total!
A max. of 3 mounting rail transitions is permissible!

**Attention!**

Only the Ext power cable 1, Ext power cable 2 and Ext bus cable offered by the BARTEC GmbH has to be used to connect the extension modules!

4 Labelling

Each installed Remote I/O System ANTARES must be labelled, whereby a distinction is made between installing in Zones 1 and 2 and in Zones 21 and 22 in accordance with EN 60079-31 and installing in Zones 21 and 22 in accordance with EN 61241-1.

The corresponding marking label must be stuck on in a visible position in the direct vicinity of the installed Remote I/O-Systems ANTARES. The type label for the system must be procured from BARTEC. See accessories for the order numbers.

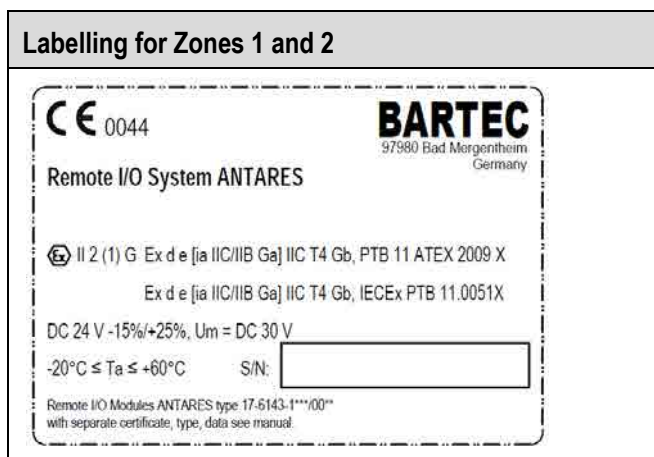


Note

A system type label corresponding to the temperature range must be designed with the ANTARES Designer software and affixed to the protective enclosure. The ANTARES Designer software can be procured from BARTEC.

The following must be taken into account when selecting the type label for the system:

- Installation for Zones 1 and 2 or for Zones 21 and 22
- Max. permissible ambient temperature



The Remote I/O systems ANTARES may be operated only in the specified ambient temperature range.

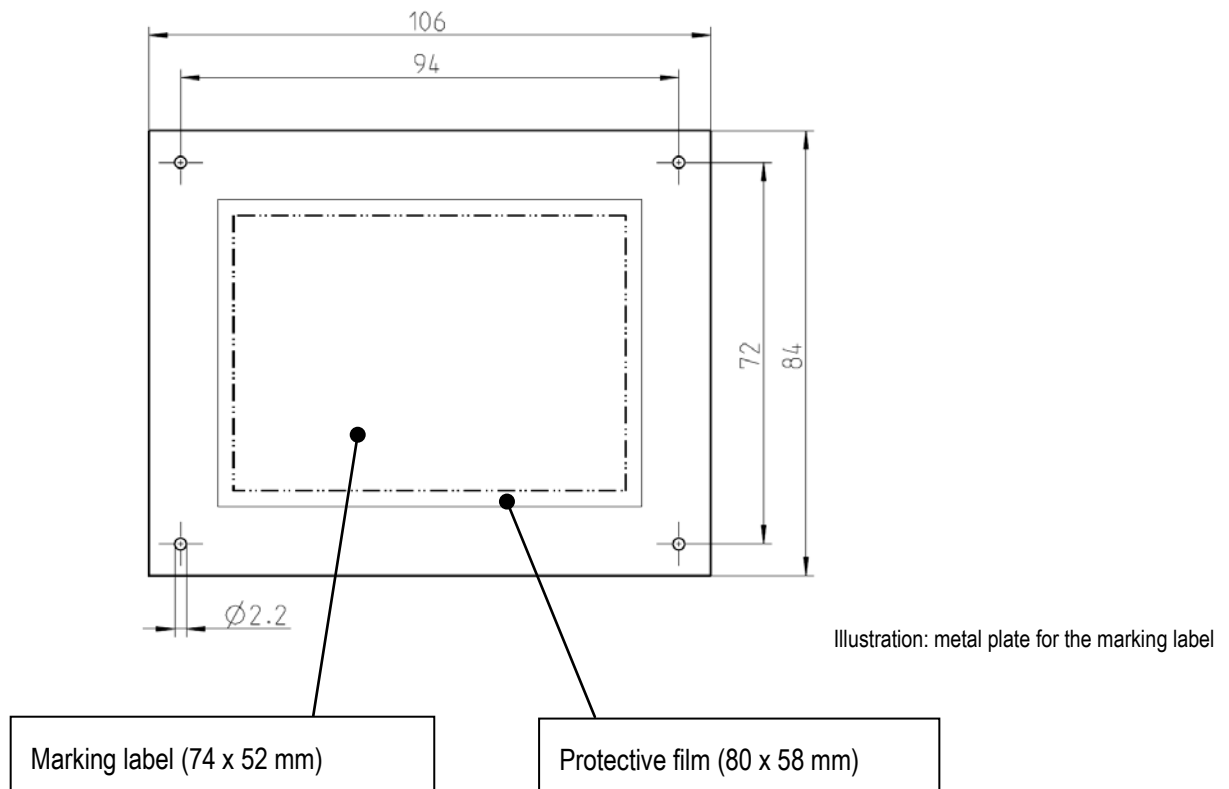
This ensures that each device and each component in the Remote I/O-System ANTARES is operated within its permissible ambient temperature range.

Examples: labelling for Remote I/O systems ANTARES with the permissible ambient temperature of -20°C to +60°C

Labelling for Zones 21 and 22	
in conformance to EN 60079-31	in conformance to EN 61241-1

If the **Remote I/O-System ANTARES** is in single-unit construction, it is necessary to attach further marking labels if the associated system is not clearly recognisable. (Extension by means of the ExtSet in the separate enclosure).

The marking label is an adhesive label made of polyester. This must be stuck onto a suitable even, clean and grease-free surface. Suitable surfaces are: aluminium, stainless steel, smooth powder coating, brushed stainless steel. If these requirements cannot be adhered to, BARTEC will on request supply a label holder (Art no. 05-0705-0010) as a surface on which it is possible to stick the adhesive label. The label holder can be affixed with, for example, rivets, grooved pins or cable ties in the direct vicinity of the installed Remote I/O system ANTARES.



Serial number

When installing the ANTARES Remote I/O System, the serial number for the system configuration must be added on the system's type label. The serial number must be written with a suitable, lightfast pen (e.g. STAEDLER Lumocolor black) and the supplied protective film is stuck over it then.

The serial number is composed of the following:

P or E for PROFIBUS or Ethernet variant + serial number of connection module + year of installation.

For example: P0200/2011

The actual Remote I/O System ANTARES configuration must be documented. The relevant "Remote I/O System ANTARES configuration form" is provided in the annex. The form is a constituent part of the system and must be kept in the direct vicinity and be accessible at all times.

5 Installing the Remote I/O Systems ANTARES



Note

Pursuant to EN 60079-17 only personnel with the relevant qualifications and extensive knowledge in handling explosion-protected equipment may do any of the installation, commissioning, maintenance, repair and conversion work. Only original spare parts may be used. Please consult BARTEC GmbH if you have any questions.

5.1 Operating Position

The Remote I/O systems ANTARES must be mounted in a vertical position (e.g. on the wall, not on the floor) and with downward pointing cable glands (on the RCU ANTARES).

5.2 Earthing

The equipotential bonding must be connected with a 4-mm² conductor cross-section to the mounting rails' earth connector terminals.

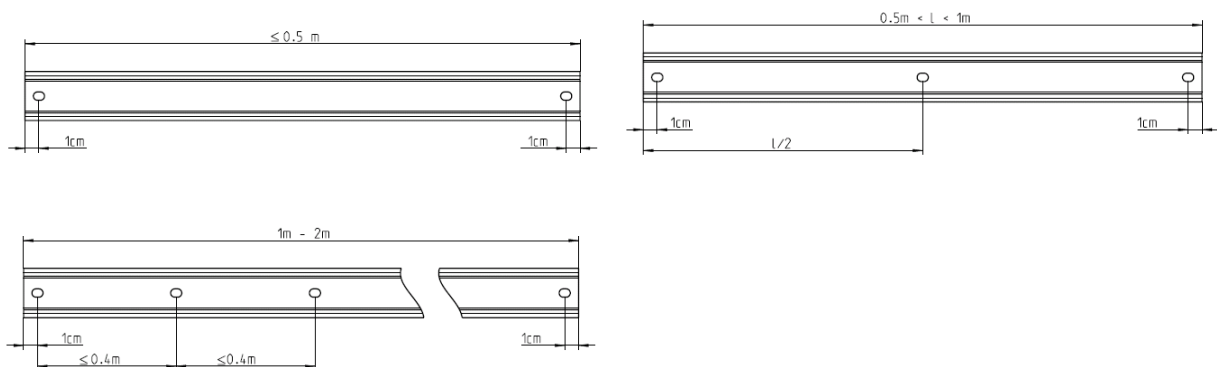
5.3 Strain Relief for the Connection Leads

The equipotential bonding connection must be secured by means of strain relief. Strain relief for the supply line and data lines for connecting to the RCU ANTARES is provided by the cable glands on the connection module ANTARES.

5.4 Installing

5.4.1 Installation on Mounting Rail

The system is designed for fitting onto a metal TH 35-15 mounting rail accordance with EN 60715 up to a maximum length of 2 metres. As of a length of 1 m, the mounting rail must be mechanically secured by means of a screw every 40 cm (see illustration).



Attention!

The system must always be fitted onto a metal TH 35-15 mounting rail in conformance to EN 60715!

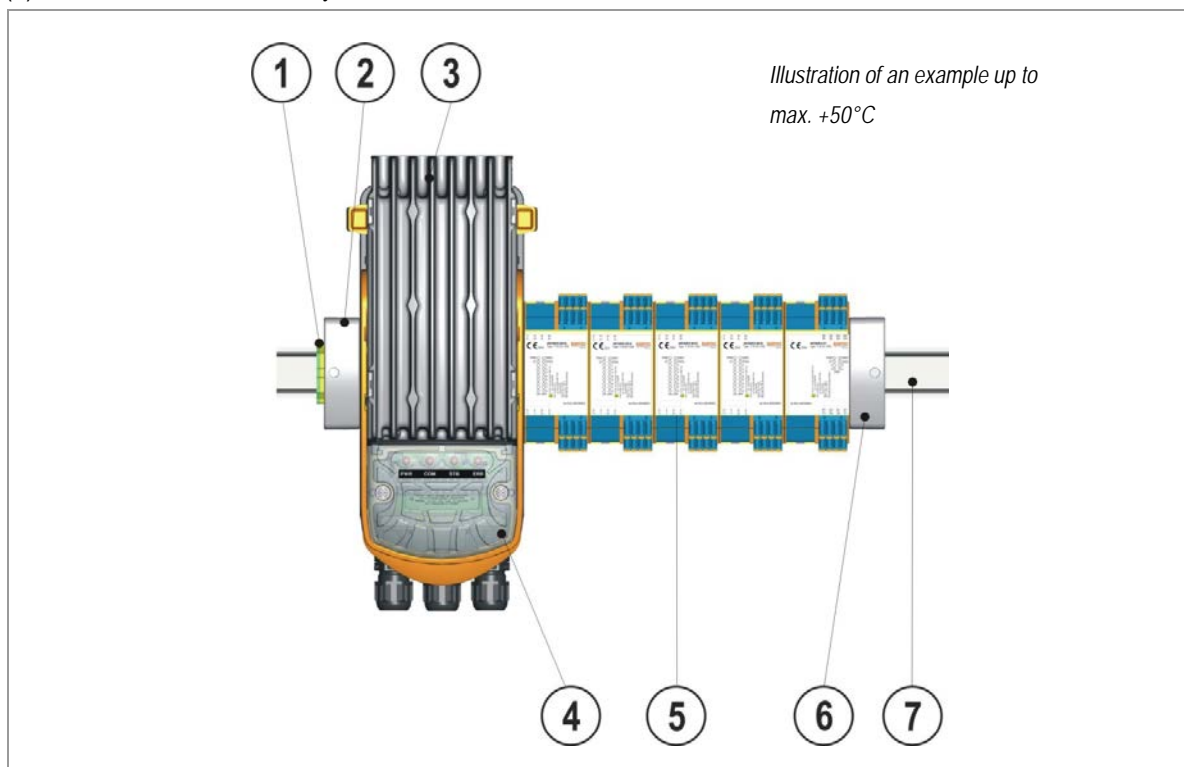
5.4.2 Mounting the ANTARES Remote I/O Systems

**Note**

See also the “Operating instructions for the Rail Control Unit (RCU) ANTARES, Connection Module ANTARES type 17-5164-9xx0/xxxx”, Head Module ANTARES type 17-5174-1x0x/xxxx” and “Operating Instructions for the Remote I/O Module ANTARES ...Type 17-6143-1xxx/xxxx”1

5.4.2.1 RCU ANTARES and Various ANTARES Remote I/O Modules

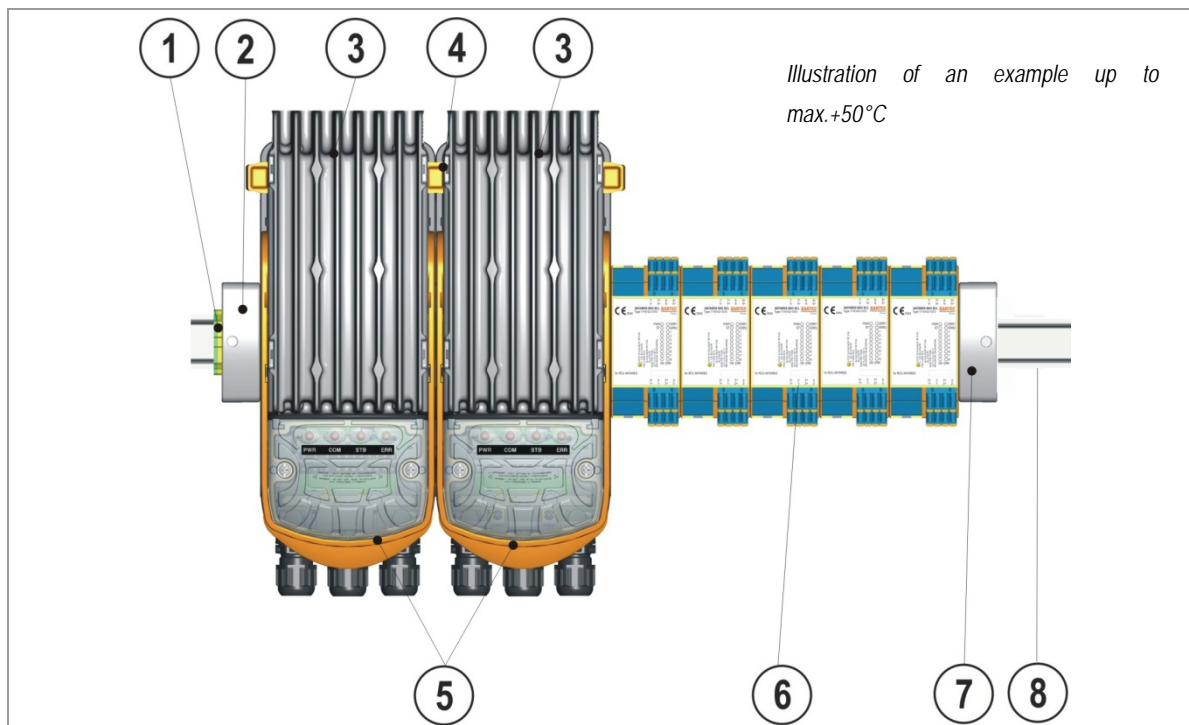
- (1) Fit the RCU ANTARES onto the mounting rail (at least 50 mm from the left end of the mounting rail).
- (2) Put the bus beginning module onto the left-hand side of the RCU ANTARES, join the two 10-pole connectors together (align in a row and push to the limit point) and screw the bus beginning module securely in place.
- (3) Mount the equipotential terminal (Earth connector terminal) onto the left-hand side of the bus beginning module.
- (4) Align the Remote I/O Modules ANTARES (and any spacer modules) in a row on the right-hand side of the RCU ANTARES.
- (5) End the Remote I/O System ANTARES row with the bus end module.



Item	Quantity	Designation	Art. no.
1	1x	Earth connector terminal	03-7112-0017
2	1x	Bus beginning module	05-0078-0084
3	1x	Head module	Type 17-5174-1x0x
4	1x	Connection module	Type 17-5164-9xx0
5	x	Remote I/O Module	Type 17-6143-1xxx/0000
6	1x	Bus end module	05-0078-0085
7	1x	TH 35-15 mounting rail	02-2010-001x

5.4.2.2 RCU ANTARES, Redundant RCU ANTARES and Various Remote I/O Modules ANTARES

- (1) Put the two RCUs ANTARES including plug bridge onto the mounting rail (at least 50 mm from the left end of the mounting rail).
- (2) Put the bus beginning module onto the left-hand side of the RCU ANTARES on the left, join the two 10-pole connectors together (align in a row and push to the limit point) and screw the bus beginning module securely in place.
- (3) Mount the equipotential terminal (Earth connector terminal) onto the left-hand side of the bus beginning module.
- (4) Align the Remote I/O Modules ANTARES (and any spacer modules) on the right-hand side of the RCU ANTARES on the right.
- (5) End the Remote I/O System ANTARES row with the bus end module.



Item	Quantity	Designation	Art. no.
1	1x	Earth connector terminal	03-7112-0017
2	1x	Bus beginning module	05-0078-0084
3	2x	ANTARES head module	Type 17-5174-110x
4	1x	Plug bridge	05-0078-0086
5	2x	ANTARES connection module	Type 17-5164-91x0
6	X	ANTARES Remote I/O Module	Type 17-6143-1xxx/0000
7	1x	Bus end module	05-0078-0085
8	1x	TH 35-15 mounting rail	02-2010-001x

5.4.2.3 RCU ANTARES (also Singly Redundant), various Remote I/O Modules ANTARES and Mounting Rail Transitional Section

Points (1) – (4) see 5.4.2.1 or for singly redundant configuration see 5.4.2.2

(5) Mount the ANTARES ExtSet – see “Installation Instructions for the ANTARES ExtSet 2 m / 10 m / 20 m”

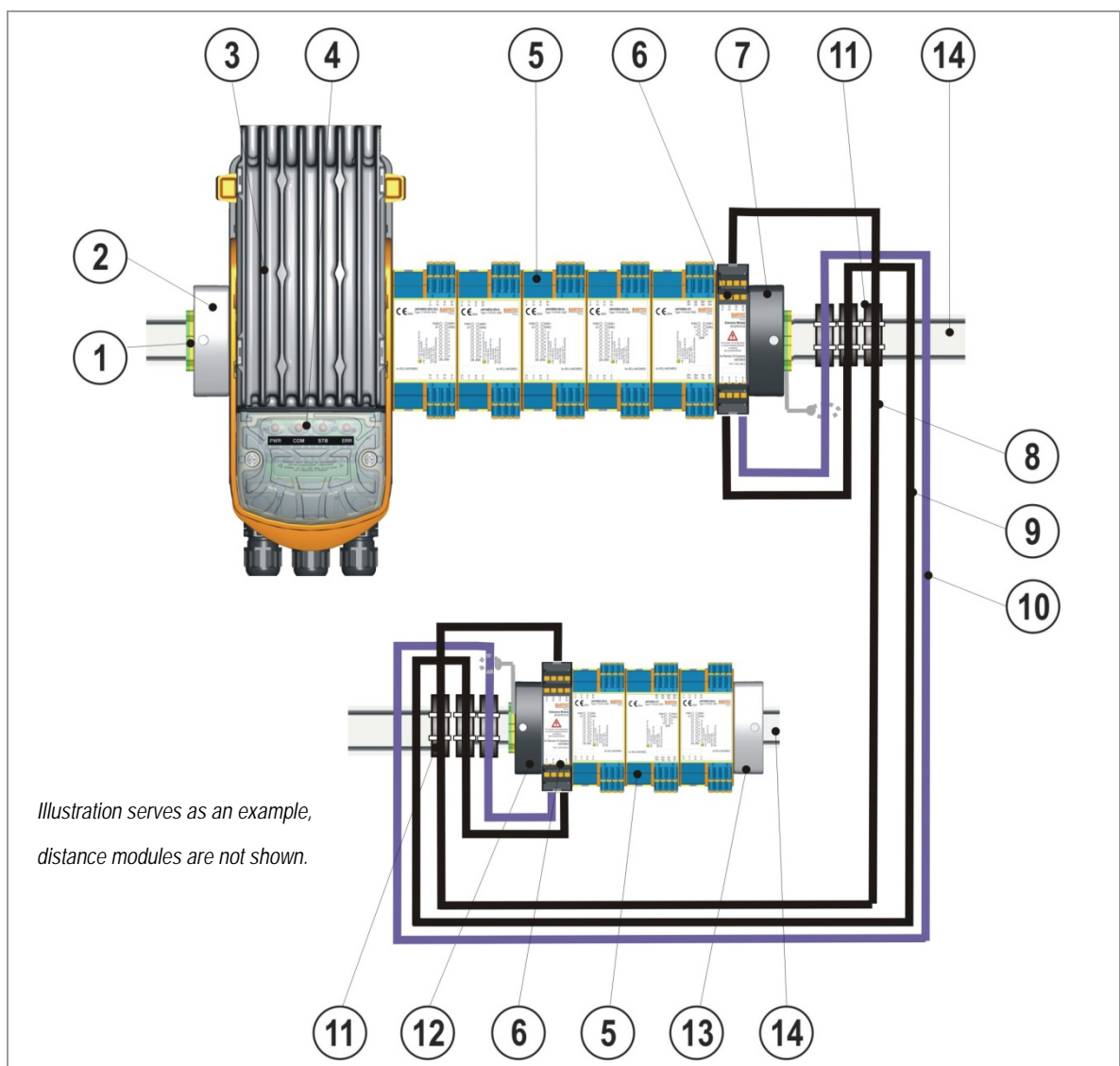


Danger!

The Ext power cable 1, Ext power cable 2 and Ext bus cable must be laid securely, protected from light and mechanical damage, and stabilised on both sides by means of the strain relief included in the scope of supply. Both ends of the Ext bus cable shield must be connected to an Earth connector terminal.

The specified ambient conditions must be observed. It is important to maintain the necessary distance from heat sources.

- (6) Align further Remote I/O Modules ANTARES (and any spacer modules) in a row on the right-hand side of the extension module (beside the rail beginning module).
- (7) End the Remote I/O System ANTARES row with the bus end module.



Item	Quantity	Designation	Art. no.
1	3x	Earth connector terminal	03-7112-0017
2	1x	Bus beginning module	05-0078-0084
3	1x	Head module	Type 17-5174-1x0x
4	1x	Connection module	Type 17-5164-9xx0
5	X	Remote I/O Module	17-6143-1xxx/0000
6	2x	Extension module	05-0078-0123
7	1x	Rail end module	05-0041-0320
8	1x	Ext power cable 1	05-0061-046x
9	1x	Ext power cable 2	05-0061-046x
10	1x	Ext bus cable	05-0061-046x
11	1x	Strain relief set	05-0005-0067
12	1x	Rail beginning module	05-0041-0319
13	1x	Bus end module	05-0078-0085
14	2x	TH 35-15 mounting rail	02-2010-001x

5.5 Special Conditions

- 1) Make sure there is no obstacle to the natural convection from the devices and components.
- 2) The Remote I/O systems ANTARES must be connected to the local equipotential bonding conductor.
- 3) The RCU ANTARES and accordingly the Remote I/O systems ANTARES are classified under overvoltage category II in conformance to IEC 60664-1 and therefore intended for connection to a fixed installation.
- 4) The grounding plate of the connection module type 17-5164-**2*/**** for the RCU ANTARES (with cable entries made of metal) must be incorporated into the local equipotential bonding. Two RCUs ANTARES (for max. 1+1-redundancy) must always be installed on a common DIN mounting rail made of metal.

5.6 Installation in Zone 1 and Zone 2

An Ex e enclosure is not necessary for installing the Remote I/O systems ANTARES in Zone 1 or Zone 2 but a protective device is required to rule out the risk of mechanical danger for Group II in accordance with 26.4.2, table 12, EN-60079-0. This protective device can e.g. be a grid hood or an enclosure (without the risk of electrostatic charging). Compliance with Contamination Level 2 in conformance to IEC 60664-1 must be ensured.

5.6.1 Installation Space

The mechanical protective device must have the following internal dimensions at least to accommodate all of the devices and components in the Remote I/O system ANTARES:

Minimum width A	$W * 105 \text{ mm} + X1 * 45 \text{ mm} + Y1 * 22.5 \text{ mm} + Z1 * 100 \text{ mm} + 160 \text{ mm}$
-----------------	---

W = 1 for an RCU ANTARES or 2 for singly redundant RCU ANTARES, 105 mm = width of an RCU ANTARES

X1 = Quantity of the Remote I/O Modules ANTARES on the RCU ANTARES mounting rail, 45 mm = width of an ANTARES Remote I/O Module

Y1 = Quantity of the spacer modules on the RCU ANTARES mounting rail, 22.5 mm = width of a spacer module

Z1 = 0 for Remote I/O System ANTARES with only one mounting rail or 1 for Remote I/O System ANTARES with 2 to max. 4 mounting rails

160 mm corresponds to the sum of the widths of the bus beginning module, bus end module and Earth connector terminal (= 60 mm) plus a side spacing from the enclosure wall of 50 mm in each case.

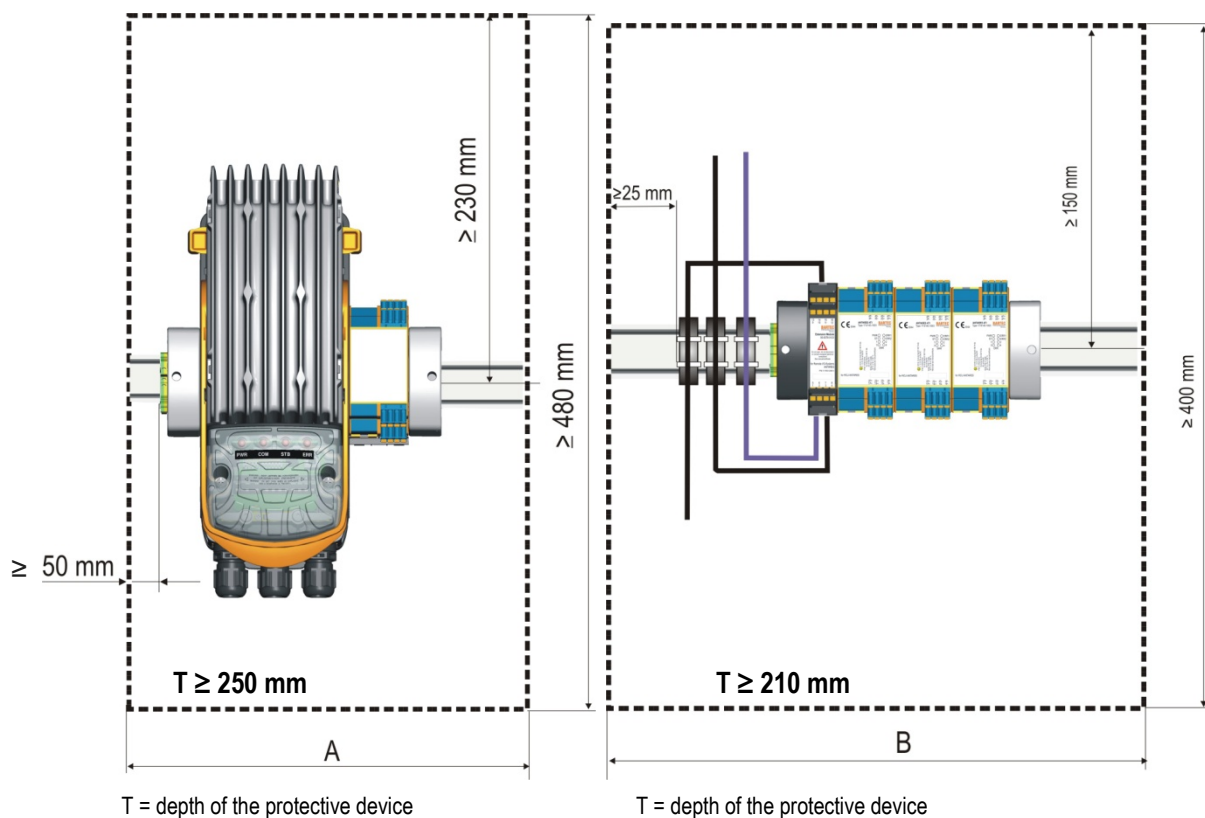
Minimum width B	$X2 * 45 \text{ mm} + Y2 * 22.5 \text{ mm} + Z2 * 75 \text{ mm} + 175 \text{ mm}$
-----------------	---

X2 = Quantity of Remote I/O Modules ANTARES on a mounting rail without RCU ANTARES

Y2 = Quantity of spacer modules on a mounting rail without RCU ANTARES

Z2 = 0 for no further mounting rail transition section or 1 for another mounting rail transitional section

175 mm corresponds to the sum of the widths of the extension module, rail beginning module, Earth connector terminal, 3x end clamps for strain relief, a bus end module (=125 mm) plus a side distance of 25 mm in each case from the enclosure wall.



T = depth of the protective device

T = depth of the protective device

Note: * Height of the RCU with closed locking clamp (in operation): 200 mm,
max. height of the RCU when the locking clamp is opened: 290 mm

5.6.2 Calculation of the Ambient Temperature when Fitting into an Enclosure

The ANTARES system is designed for an ambient temperature of a max. +60° C. When fitting into an enclosure, consideration must be given to the self-heating. The following levels apply to the calculation of the power dissipation:

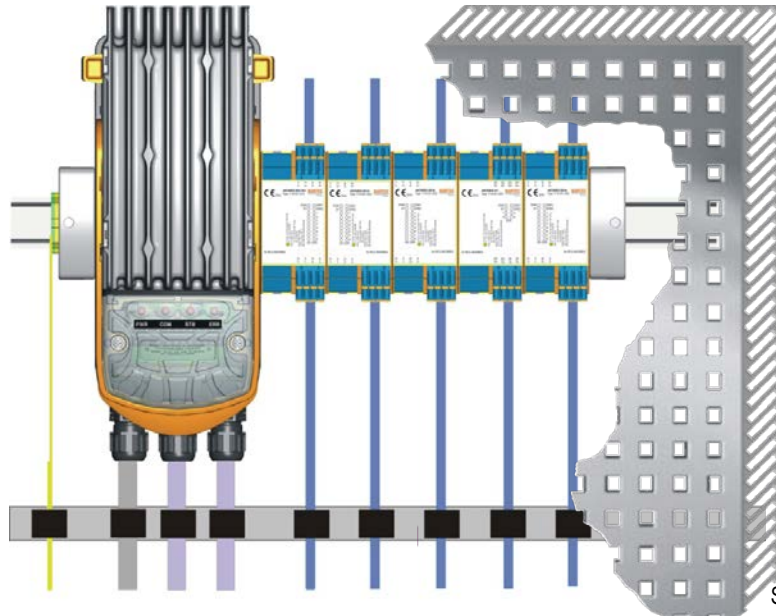
Calculation table, in the RCU with DC 24 V		Remote I/O Module	P _{Module} [W]	P _{V Module} [W]
Single operation $P_{V \text{ Total}} = 15 \text{ W (1 x RCU)} + \Sigma P_{V \text{ Module}}$		4TI	1.8	1.5
		8AI	2.4	2.2
		8AIH	6.5	3.5
		4AIO	6.6	3.5
Redundancy (only with the PROFIBUS) $P_{V \text{ Total}} = 21 \text{ W (2 x RCU)} + \Sigma P_{V \text{ Module}}$		4AIOH	6.4	3.5
		8DO	6.5	3.5
		8DO SCL	4.0	2.5
		8DI	4.0	2.5
		16DI	1.6	1.5

P_{Module} [W] = Total power consumption, P_{V Module} [W] = Power dissipation

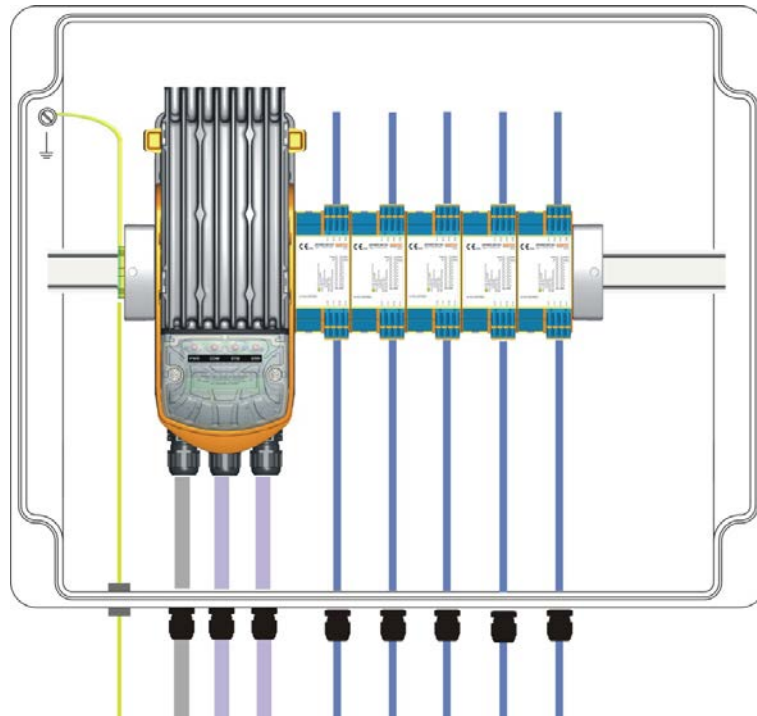
The total power dissipation determined here is used for calculating and designing the enclosure with reference to the ambient temperature.

5.6.3 Examples of Compact Construction in Zone 1 and Zone 2

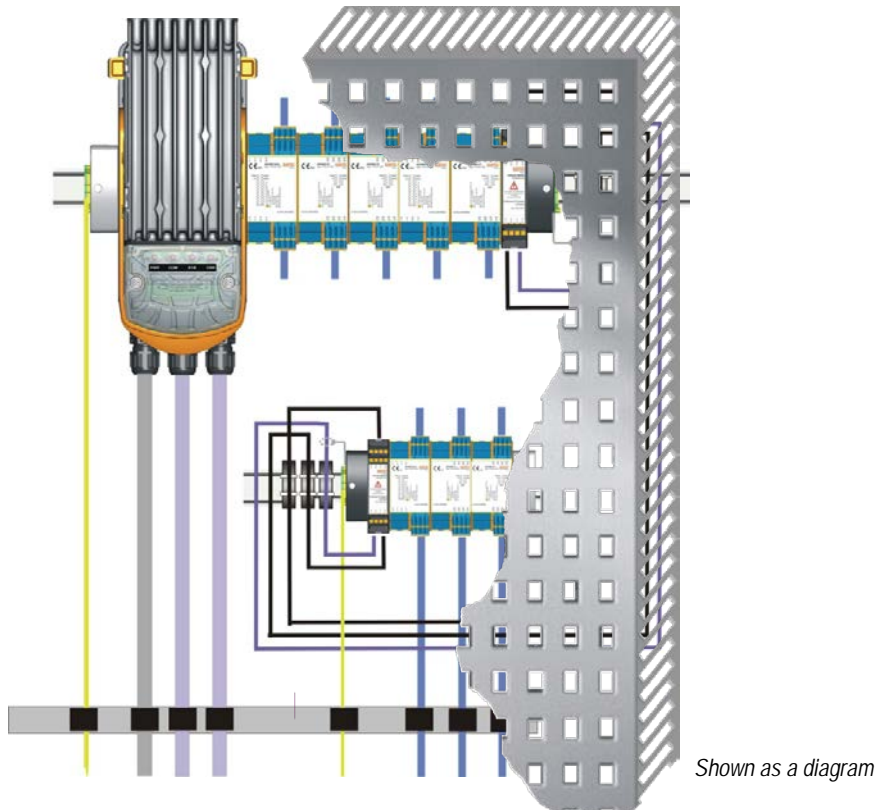
Example K1.1: Mechanical Protective Device for the Remote I/O system ANTARES



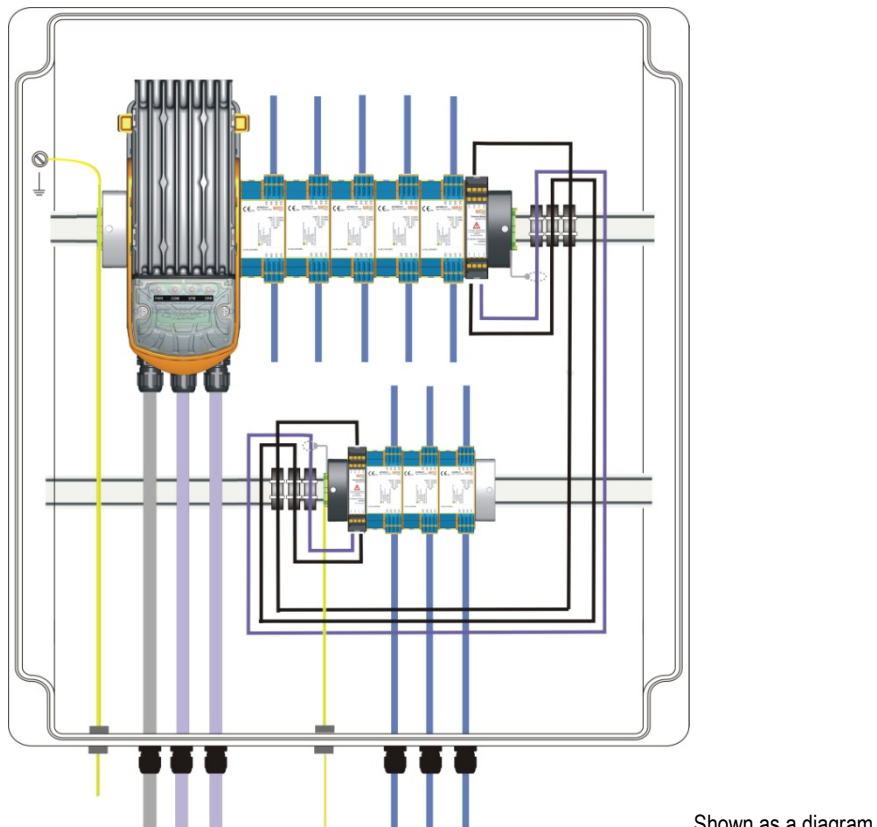
Example K1.2: Enclosure in industrial quality for the Remote I/O System ANTARES



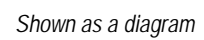
Example K1.3: Mechanical Protective Device for the Remote I/O System ANTARES with a short mounting rail transitional section



Example K1.4: Enclosure in industrial quality for the Remote I/O System ANTARES with a short mounting rail transitional section



Example E1.1: Mechanical protective device for the Remote I/O System ANTARES in single-unit construction



Shown as a diagram

5.7 Installation in Zone 21 and Zone 22

The Remote I/O System ANTARES type 17-5184-xxxx/xxxx also requires a separately certified Ex-tD / Ex-tb enclosure in the IP6X protection class (for category 2D in conformance to Directive 94/9/EC).

Additional requirements e.g. surface temperature, max. power dissipation etc. must be observed.



Note

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



Danger!

Dust deposits on and in the immediate vicinity of the enclosure must be removed at regular intervals!



Danger!

The enclosure may not be opened in a dusty atmosphere!

5.7.1 Dimensions Ex-tD / Ex-tb Enclosure

To ensure that the maximum surface temperature of 100 °C is not exceeded, it is necessary to adhere to the following internal dimensions at least for the Ex-tD / Ex-tb enclosure:

Minimum width A	$W * 105 \text{ mm} + X1 * 45 \text{ mm} + Y1 * 22.5 \text{ mm} + Z1 * 100 \text{ mm} + 160 \text{ mm}$
-----------------	---

W = 1 for an RCU ANTARES or 2 for singly redundant RCU ANTARES, 105 mm = width of an RCU ANTARES

X1 = Quantity of the Remote I/O Modules ANTARES on the RCU ANTARES mounting rail, 45 mm = width of an ANTARES Remote I/O Module

Y1 = Quantity of the spacer modules on the RCU ANTARES mounting rail, 22.5 mm = width of a spacer module

Z1 = 0 for Remote I/O System ANTARES with only one mounting rail or 1 for Remote I/O System ANTARES with 2 to max. 4 mounting rails

160 mm corresponds to the sum of the widths of the bus beginning module, bus end module and Earth connector terminal (= 60 mm) plus a side spacing of 50 mm in each case from the enclosure wall.

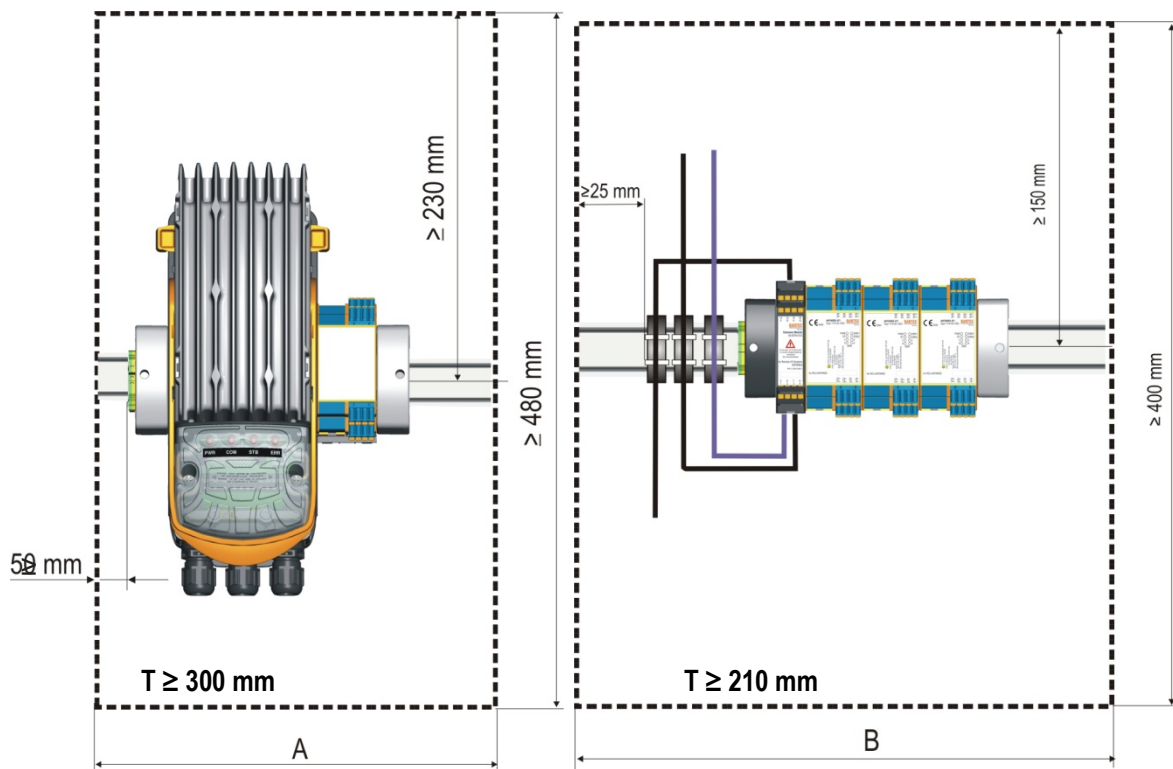
Minimum width b	$X2 * 45 \text{ mm} + Y2 * 22.5 \text{ mm} + Z2 * 75 \text{ mm} + 175 \text{ mm}$
-----------------	---

X2 = Quantity of the Remote I/O Modules ANTARES on a mounting rail without RCU ANTARES

Y2 = Quantity of the spacer modules on a mounting rail without RCU ANTARES

Z2 = 0 for no further mounting rail transitional section or 1 for another mounting rail transitional section

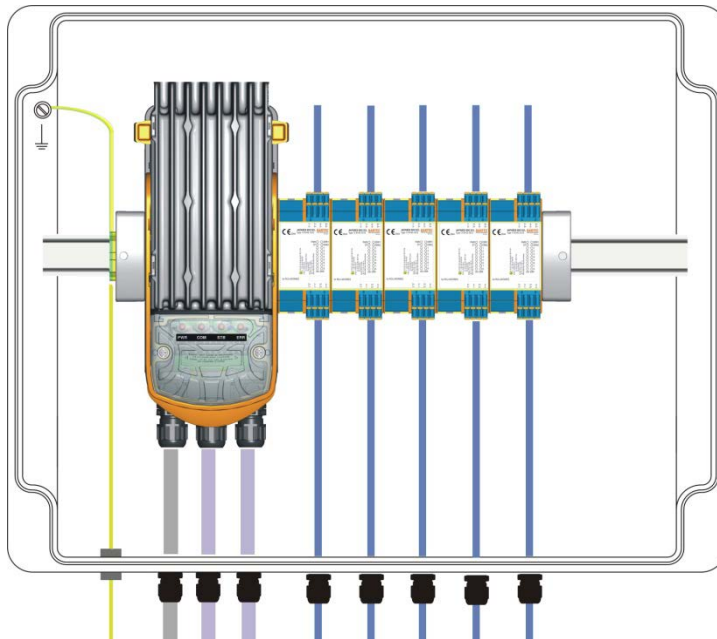
175 mm corresponds to the sum of the widths of the extension module, rail beginning module, Earth connector terminal, 3x end clamps for strain relief, a bus end module (=125 mm) plus a side distance of 25 mm in each case from the enclosure wall.



T = depth of the protective device

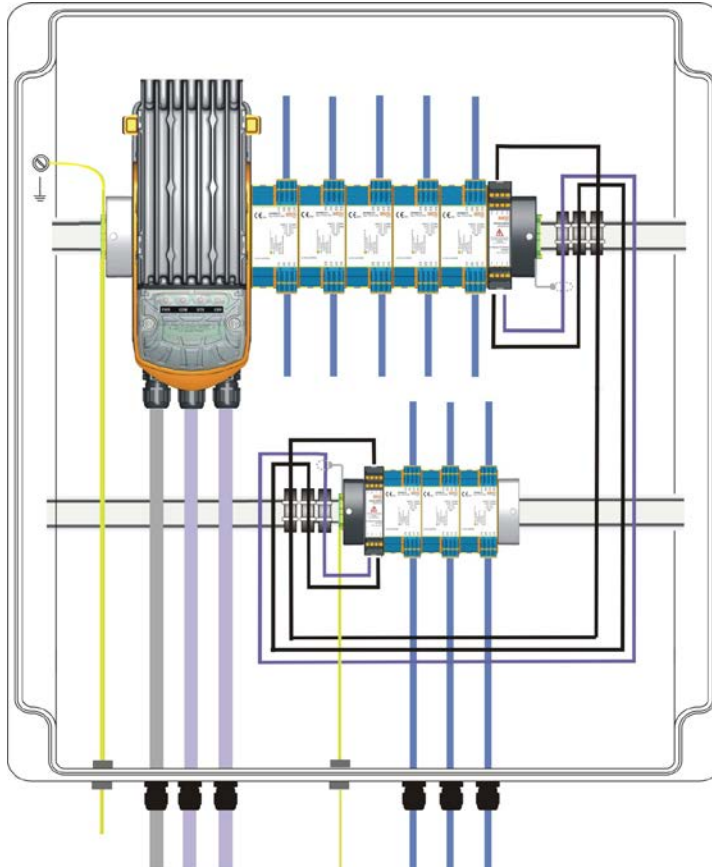
5.7.2 Examples of Compact Construction in Zone 21 and Zone 22

Example K2.1: Ex-tb / Ex-tD enclosure for the Remote I/O System ANTARES in a compact construction



Shown as a diagram

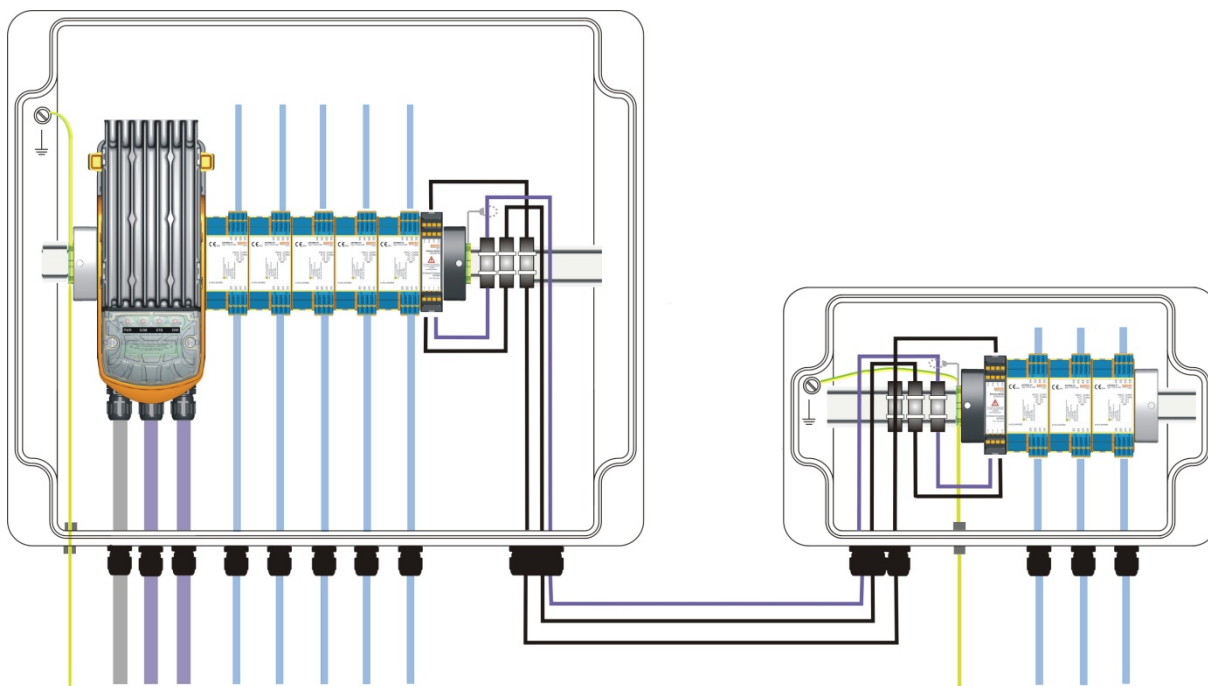
Example K2.2: Ex-tb / Ex-tD enclosure for the Remote I/O System ANTARES with a short mounting rail transitional section



Shown as a diagram

5.7.3 Example of Single-Unit Construction in Zone 21 and Zone 22

Example E2.1: Ex-tb/Ex-tD enclosure for the Remote I/O System ANTARES in Single-Unit Construction



Shown as a diagram

6 Installation / Commissioning

**Note**

The ANTARES Remote I/O systems are configured by means of the ANTARES Designer software. Please refer to the ANTARES Designer software user manual.

6.1 Additional Interfaces in the Ex e Junction Box

**Danger!**

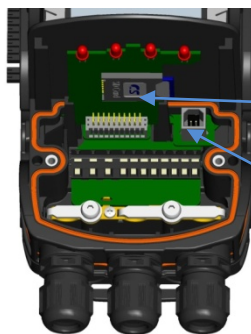
Do not open the Ex e junction box during operation if there is a possibility of an explosive gas atmosphere!

6.1.1 SD Memory Card

not contained in the basic equipment – use only type 17-28BE-F006/000x to automatically backup the CPU's configuration data!

**Attention!**

The SD card may be used only in the slot intended for it in the connection module ANTARES.



Slot for SD memory card

Passive USB port

6.1.2 Passive USB Port

Service interface – to facilitate the transfer of configuration data into the CPU: Be careful not to activate it in the presence of an explosive atmosphere.

**Note**

See the ANTARES Designer Software manual for instructions on installing the USB driver

6.2 Integration of the ANTARES Remote I/O systems in a Master Control

The system communicates by means of an interface

- PROFIBUS-DP
- ProfiNet
- Modbus TCP or
- Ethernet/IP

with a central control (PLC) in the safe area.

The Remote I/O System ANTARES functions as slave and the central control as master.



Note

See the software manual for instructions on the connection to the control.

6.3 HOT SWAP



Note

The Remote I/O Module ANTARES electronic unit and the head module ANTARES can be swapped in an Ex atmosphere without the need to disconnect from the voltage supply (see also the operating instructions for the Remote I/O Modules ANTARES and the operating instructions for the RCU ANTARES)

6.3.1 Electronic Unit in the Remote I/O Modules ANTARES



Danger!

During hot swap only one electronic unit may be removed at any time, i.e. never pull out two electronic units simultaneously. Replace a defective electronic unit only with another of the same type.

6.3.2 Head Module ANTARES



Danger!

The head module ANTARES can be hot swapped with another head module ANTARES – provided it is the same type 17-5174-1x0x – but it is essential to wait for 15 seconds after swivelling the locking clamp open before removing the head module ANTARES from the connection module ANTARES.

