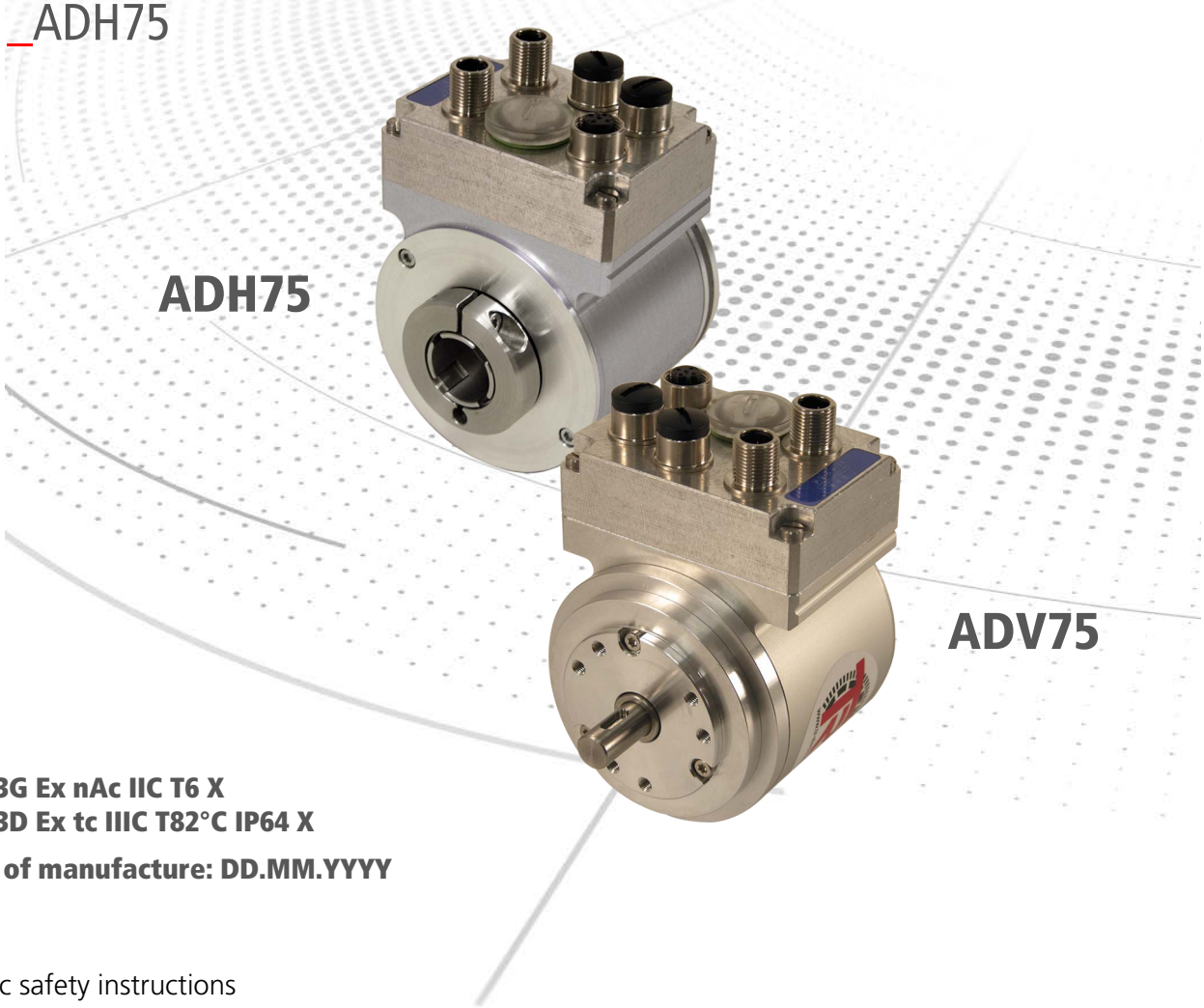
Translation of the original manual

Explosion Protection Enclosure with integrated measuring system

Explosion Protection Enclosure - Types

_ADV75

_ADH75



CE

II 3G Ex nAc IIC T6 X

II 3D Ex tc IIIC T82°C IP64 X

Date of manufacture: DD.MM.YYYY

_Basic safety instructions

_Intended use

_Product description

_Technical data

_Explosion protection characteristics

User Manual

TR - ECE - BA - GB - 0099 - 07 07/20/2016

TR-Electronic GmbH
D-78647 Trossingen
Eglishalde 6
Tel.: (0049) 07425/228-0
Fax: (0049) 07425/228-33
E-mail: info@tr-electronic.de
http://www.tr-electronic.de

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Text

Cursive or **bold** text represents the title of a document or is used for emphasis.

`Courier`-text shows text which is visible on the display or screen as well as software menu-selections.

″ < > ″ refers to keys on your computer keyboard (e.g. <RETURN>).

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Amendment-index

Amendment	Date	Index
First edition	04/23/13	03
Additional indications for the PROFINET variant	04/25/13	04
PROFIBUS variant: Temperature range of 0…+40 °C to -20…+60 °C modified	02/17/15	05
EU directives 2014/30/EU (EMC) and 2014/34/EU (ATEX) added	12/21/15	06
The Declarations of conformity TR-ECE-KE-GB-0322 and TR-ECE-KE-GB-0326 are replaced by common declaration of conformity TR-ECE-KE-GB-0343	07/20/16	07

1 General

This Ex-User manual contains all relevant explosion-safety information and includes the following topics:

- Basic safety instructions
- Intended use
- Product description
- Technical data
- Explosion protection characteristics

Since the documentation has a modular structure, this Ex-User manual represents a supplement to the other documentation such as for example product data sheets, dimensional drawings and leaflets etc.

The Ex-User manual is included, but can also be ordered separately.

1.1 Scope

This Ex-User manual applies exclusively to the following explosion protection enclosure series:

- Gas **II 3G Ex nAc IIC T6 X**
- Dust **II 3D Ex tc IIIC T82°C IP64 X**

The products are labelled with affixed nameplates and are components of a system.

It thus applies together with the following documentation:

- the operator's system-specific operation instructions,
- this Ex-User manual
- and the interface-specific user manual

1.2 Relevant directives and standards

The explosion protection enclosure is developed, constructed and finished under compliance with the applicable European- or International standards and directives.

EU-Directive 2014/30/EU	Electromagnetic compatibility
EU-Directive 2014/34/EU	Equipment and protective systems intended for use in potentially explosive atmospheres
EN 61000-6-2	EMC: Interference immunity
EN 61000-6-3	EMC: Interference emission
EN 60079-0	Explosive atmospheres: General requirements
DIN EN 60079-14	Explosive atmospheres: Electrical installations design, selection and erection
EN 60079-15	Explosive atmospheres: Equipment protection by type of protection "n"
EN 60079-31	Explosive atmospheres: Equipment dust ignition protection by enclosure "t"
DIN EN 60529	Degrees of protection provided by enclosures (IP code)

1.3 Used abbreviations / Terms

ADV75	Explosion protection enclosure with integrated measuring system of the CDV75 series
ADH75	Explosion protection enclosure with integrated measuring system of the CDH75 series
CDV	Absolute encoder with redundant dual scanning, solid shaft design
CDH	Absolute encoder with redundant dual scanning, hollow shaft design
EU	***E***uropean ***U***nion
EMC	***E***lectro***m***agnetic ***c***ompatibility
ESD	***E***lectro ***S***tatic ***D***ischarge
IEC	***I***nternational ***E***lectro-technical ***C***ommission
VDE	Association for Electrical, Electronic & Information Technologies

1.4 Product description

The aluminum explosion protection enclosure with built-in systems and integrated evaluation electronics serves the detection of changes in angle for fixed installations. The changes in angle are transmitted to the evaluation electronics via shaft.

The explosion protection enclosure has the ignition protection type

- "n": non-sparking operating equipment (potential gas-explosive atmosphere) and
- "t": protection by the enclosure (potential dust-explosive atmosphere)

Through its manner of construction, the types of ignition protection and additional measures, the enclosure is suitable for the incorporation of non-explosion protected installation devices such as the measuring system of the series CDV75 or CDH75.

The construction, as well as the interaction of the individual components and the housing with regards to their possibilities for use in potentially explosive areas, are tested by the company TR-Electronic GmbH and confirmed by identification with the ATEX nameplate.

2 Basic safety instructions

2.1 Symbol- and note definition

⚠ WARNING	means that death or serious injury can occur if the required precautions are not met.
⚠ CAUTION	means that minor injuries can occur if the required precautions are not met.
NOTICE	means that damage to property can occur if the required precautions are not met.
	indicates important information or features and application tips for the product used.

2.2 General dangers with the use of this product

The product, hereafter referred to as ***equipment*** is manufactured using the latest technology and according to recognized safety regulations. ***Nevertheless, non-intended use can cause danger to life and limb of the user or third parties or cause damage to the equipment and other property!***

Only use the equipment for its intended use, with safety- and danger awareness and in compliance with the Ex-***user manual*** and the ***interface specific user manual***!

The operator of an electrical system in a potentially explosive environment should keep the equipment in a proper condition, it should be properly operated and monitored and maintenance- as well as repairs are to be performed. This also includes inspection of the equipment for possible transport damage prior to commissioning.
Power connections may not be connected or disconnected with the power engaged. The equipment may not be used in case of defects, as a basic principle it may not be opened and dust deposits > 5 mm must be removed.

2.3 Intended use

The equipment is a fixed-installation device for use in the Ex-Zone 2 (potentially gas-explosive areas, II 3 G, device protection level Gc) or 22 (areas with combustible dust II 3 D, device protection level Dc).

The assembly is to be made exclusive by the specifications of the interface specific user manual.

The electrical data provided on the nameplates for the device and ATEX, as well as the device category, temperature class etc. for the place of use are to be observed. The operating temperature range of the equipment is -20°C to +60°C.

Intended use also includes:

- observation of all instructions contained in this Ex-User manual and in the interface-specific user manual,
- observation of the nameplates and possible prohibition- or instruction labels,
- observation of the supplementary documentation e.g. the accompanying product sheet, connector assignments etc.,
- observation of the machine- or system manufacturer's operating manual,
- operating of the equipment within the limits indicated in the technical data (Ex-User manual/interface-specific user manual).

2.4 Non-intended use

Risk of death, bodily injury or damage resulting from non-intended use of the equipment!

⚠ WARNING

NOTICE

➢ The following uses are especially prohibited:

- in environments with an explosive atmosphere of the Zones 0, 1, 20 and 21
- for medical aims
- commissioning of the equipment if the nameplates are no longer readable or are completely missing.

2.5 Warranty and liability

The "General terms and conditions" (“Allgemeine Geschäftsbedingungen”) of the company TR-Electronic GmbH apply in general. This will be available to the operator with the contract confirmation or –conclusion at the latest. Warranty- or liability claims with regards to personal- and property damage are excluded, if they are the result of one or more of the following causes:

- Non-intended use of the equipment.
- Improper assembly, installation, commissioning, maintenance or dismantling of the equipment.
- Improperly executed work on the equipment by unqualified personnel.
- Operating of the equipment in the presence of technical defects.
- The performance of unauthorized mechanical or electrical modifications of the equipment.
- The performance of unauthorized repairs
- Catastrophic incidents caused by external forces or acts of God.

2.6 Organizational measures

- The Ex-User manual must always be kept within reach in the equipment's operating location.
- In addition to the Ex-User manual, the generally applicable legal regulations and other mandatory directives for work safety, accident prevention and environmental conservation are to be observed and conveyed.
- The applicable national-, site- and system-specific provisions and requirements are to be observed and conveyed.
- The operator has the obligation to point out any special operational features and requirements to the personnel.
- Before starting work, the personnel responsible for work on or with the equipment must have read and understood the Ex-User manual, in particular the chapter on “Basic safety instructions”.
- The nameplates and possible affixed prohibition- or instruction labels must be kept in a readable condition.
- Do not perform any mechanical or electrical modifications to the equipment, except those which are specifically described in this Ex-User manual.
- Repairs may only be performed by the manufacturer, or by a person or body who carries the manufacturer's authorization.

2.7 Personnel selection and -qualification; basic obligations

2.7.1 Electrical installations design, device selection and erection

The project development of electrical systems, the selection of the devices and the installation in potentially explosive atmospheres may only be performed by persons whose training includes instruction in various types of ignition and installation techniques, applicable regulations and prescriptions as well as general principles of the Zone-classification. The persons must have the relevant competence for the type of work to be performed.

The personnel must regularly undergo corresponding further training or courses.

For definitions on the knowledge, expertise and competence of the "responsible persons", "manual workers" and "planners", the IEC 60079-14 or DIN EN 60079-14 standards are to be additionally consulted [suppliers e.g. Beuth Verlag GmbH, VDE-Verlag GmbH].

2.7.2 Inspection, maintenance and repair

The inspection, maintenance and repair of electrical systems in potentially explosive environments may only be performed by experienced personnel who have also gained knowledge on the various types of ignition and installation procedures, the requirements of the IEC / DIN EN 60079-17 standard, relevant national provisions and company regulations for the system as well as on the general principles of the Zone-classification during their training.

Personnel are to undergo appropriate further training or instruction regularly. Proof of the relevant experience and completed training must be available.

For definitions on the knowledge, expertise and competence of the "responsible persons", "expert person with leadership functions" and the "performing personnel", the IEC 60079-17 or DIN EN 60079-17 standards are to be additionally consulted [suppliers e.g. Beuth Verlag (publishers) GmbH, VDE-Verlag GmbH].

2.8 First commissioning / Commissioning

Prior to the first commissioning the equipment is to be checked regarding its suitability in the respective zone according to its labeling. The values indicated on the nameplates are not to be exceeded. With use of the equipment in areas which are potentially explosive because of dust, a deposit of dust on the top-side which is more than 5 mm thick is not permissible. Here the installation of an additional covering may be required in circumstances where the deposit of dust cannot be reliably avoided.

The operational safety of the equipment and the correct functional arrangement of the equipment inside the plant must be checked before commissioning. It may only be used in a clean and undamaged condition.

2.9 Assembly, installation and dismantling

With installation and operation of the explosion protective equipment, one should consider protection against hazardous environmental influences which limit the intended use of the equipment. This could be protection against aggressive fluids or weather protection for example. During installation, the IEC 60079-14 and DIN EN 60079-14 as well as other national standards and regulations applicable at the installation site are to be adhered to.

The information on the nameplates must be complied with.

The assembly is to be performed according to the specifications in the interface-specific user manual.
The coupling required for the mechanical connection of the ADV75 model's shaft to the drive must comply with the given specifications according to the interface-specific user manual as well as be approved for use in potentially explosive areas. The requirements for this are defined in the chapter "Technical data", starting on page 14. Here the manufacturer's installation instructions are to be adhered to.

In potentially explosive areas, the equipment's power supply lines with mating connector are to be routed in such a way that they are protected from damages and mechanical failure. The maximum connection information on the device nameplate must be complied with.

For metal enclosures in potentially explosive areas an equipotential line with at least 4 mm^2 is required.

Wiring work, opening and closing of electrical connections may only be performed with the power switched off.

2.10 Inspection, maintenance and repair

The operator of an electrical system in a potentially explosive environment must keep the equipment in an good condition, operate it properly, monitor it and maintenance and repair work must be performed, also see IEC 60079-17 and DIN EN 60079-17 in this respect.

Maintenance work and defect repairs may only be performed by trained professionals. Before the maintenance or repair, the specified safety precautions are to be observed. The warning notes on the equipment and in the Ex-User manual and the interface-specific user manual are to be adhered to!
The applicable laws and directives are complied with before recommissioning.

- The equipment does not require any maintenance by the operator. Nevertheless, inspections must be performed at regular intervals:
  - Visual inspection
    - of the enclosure for damages
    - of the supply lines for external damages
    - for dust deposits
  - Checking of the connection plug for a tight fit
- In case of damages, the equipment is to be taken out of service immediately and to be repaired by the manufacturer!

2.11 Special conditions for safe use, marking "X"

The "X" symbol in the labeling of the equipment is used to indicate special application conditions:

The equipment's installation location and -manner are generally to be selected in such a way that it is protected from external mechanical influences and in a way that no function limitations can result.

Misappropriations of the equipment as
- support
- tread plank
- stirrup
- …

are prohibited.

Unused connection plugs must be provided with mating connectors which are appropriately licensed for the applicable device category. All mating connectors must be secured against accidental disconnection through the use of a screw locking device.

3 Technical data

3.1 General

Rated Voltage	24 V DC
Power consumption	≤ 4 W
Mechanically permissible speed	≤ 3000 min^{-1}
Ambient temperature range	-20 °C…+60 °C
[1] **Protection class**	**IP64**: Degrees of protection provided by enclosures according to DIN EN 60529
Enclosure- / Flange material	Aluminum, EN AW-AlCu6BiPb
Shaft, stainless steel	WN 1.4305, corrosion resistant

[1] Observe instructions for plug connections / mating plugs, see chapter 2.11 on page 13

3.2 Explosion protection characteristics

3.2.1 Ex-labeling, gas

II 3G Ex nAc IIC T6 X

								special conditions
							Temperature (IEC/CENELEC)	
						Subgroup (IEC/CENELEC)		
					Group (IEC/CENELEC)			
				Ignition protection type (IEC/CENELEC)				
			Labeling (IEC/CENELEC)					
		Device category (ATEX)						
	Device group (ATEX)							
Ex-labeling (ATEX)								

Device group..... **II**: potentially gas-explosive areas

Device category..... **3G**: Zone 2
adequate safety with normal operation

Ignition protection type ..... **nAc**: non-sparking equipment
Ex-Atmosphere cannot be ignited in case of defined malfunction conditions

Group..... **II**: potentially gas-explosive areas

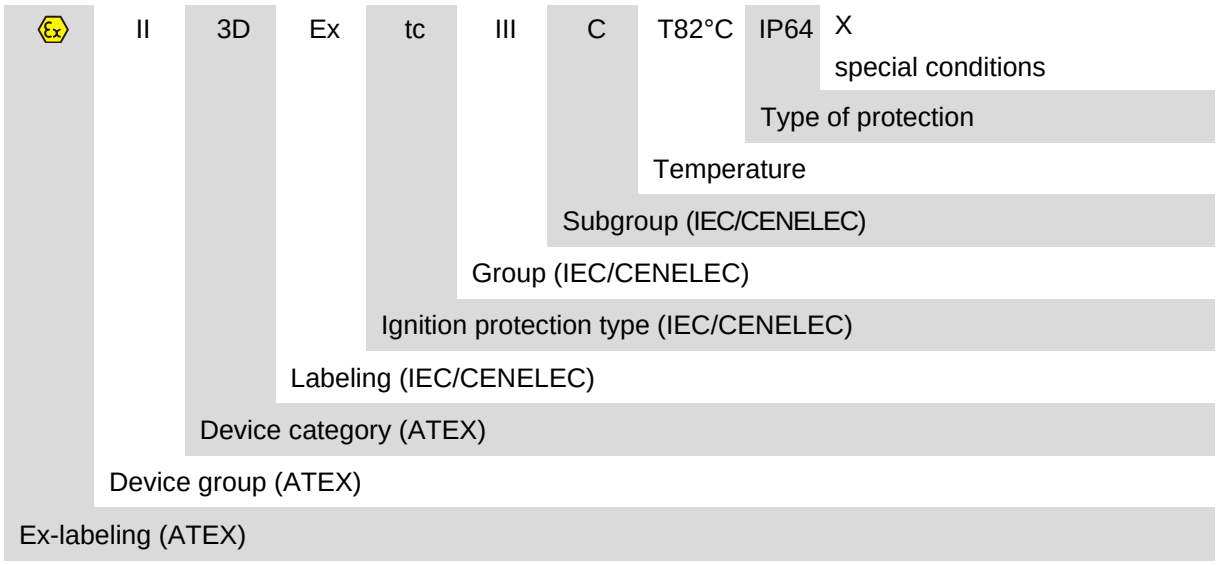
Subgroup ..... **C**: typical gas: Hydrogen, acetylene

Temperature..... **T6**: max. enclosure surface-temperature ≤ 85 °C

Special conditions..... **X**: see chapter 2.11 on page 13

3.2.2 Ex-labeling, dust

II 3D Ex tc IIIC T82°C IP64 X



Device group..... **II**: potentially dust-explosive areas

Device category..... **3D**: Zone 22
adequate safety with normal operation

Ignition protection type ..... **tc**: Protection by enclosure
with adherence to the type of protection and within the surface temperature limits, Ex-atmosphere cannot be ignited

Group..... **III**: potentially dust-explosive areas

Subgroup ..... **C**: Type of dust: conductive dust

Temperature..... **T82°C**: max. enclosure surface-temperature ≤ 82 °C

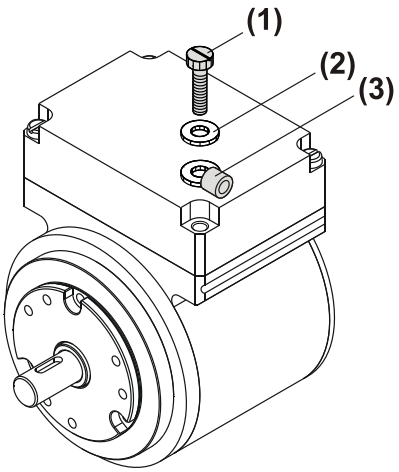
[2] Protection class..... **IP64**: Degrees of protection provided by enclosures according to DIN EN 60529

Special conditions..... **X**: see chapter 2.11 on page 13

[2] Observe instructions for plug connections / mating plugs, see chapter 2.11 on page 13

4 Equipotential bonding conductor - Connection

An equipotential is required for systems in potentially explosive areas. This is to be done through one of the four attachment screws of the connection cover and with a minimum wire diameter of 4 mm^2.



(1): M4 attachment bolt

Not included:
(2): Locking element
(3): Cable lug

Figure 1: Equipotential bonding conductor - Connection

5 Annex

5.1 EU declaration of conformity

EU Declaration of Conformity

The Rotative Measuring System Series
ADx75M SIL3 with Explosion Protection Enclosure

Type: ADV75M, ADH75M
Order-No.: ADV75M-xxxxx, ADH75M-xxxxx

was developed, designed and manufactured to comply with the EU-Directives

Electromagnetic Compatibility	**2014/30/EU**	(L 96/79)
Machinery	**2006/42/EC**	(L 157/24)
Equipment and protective systems intended for use in potentially explosive atmospheres	**2014/34/EU**	(L 96/309)

under the sole responsibility of

TR-Electronic GmbH
Eglishalde 6
D - 78647 Trossingen
Tel.: +49 7425/228-0
Fax: +49 7425/228-33
Germany

The following harmonized standards were applied:

EN 61000-6-2:2005/AC:2005 with increased test standards: DIN IEC 61326-3: 2004	Generic standards - Electromagnetic compatibility, Immunity (Industrial environments)
EN 61000-6-3:2007/A1:2011	Generic standards - Electromagnetic compatibility, Emissions (Commercial environments)
EN 61800-5-2: 2007	Adjustable speed electrical power drive systems Safety requirements - Functional
EN ISO 13849-1: 2015	Safety of machinery - Safety-related parts of control systems General principles for design
EN 60204-1: 2006/AC:2010 (in extracts)	Safety of machinery - Electrical equipment of machines General requirements
EN 62061: 2005/A2:2015	Safety of machinery - Functional safety of safety-related electrical, electronic and programmable electronic control systems
EN 60079-0: 2012/A11:2013	Explosive atmospheres Part 0: Equipment - General requirements
EN 60079-15: 2010	Explosive atmospheres Part 15: Equipment protection by type of protection "n"
EN 60079-31: 2014	Explosive atmospheres Part 31: Equipment dust ignition protection by enclosure "t"

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Other applied standards:

DIN EN 61508 Part 1-7: 2011	Functional safety of electrical/electronic/programmable electronic safety-related systems
DIN EN 60079-14: 2014	Explosive atmospheres Part 14: Electrical installations design, selection and erection
DIN EN 60529: 2014	Degrees of protection provided by enclosures (IP code)

The products are marked additionally with the following characteristics on the ATEX name plate:

II 3G Ex nAc IIC T6 X; II 3D Ex tc IIIC T82°C IP64 X

The EC type examination and certification according to the EC machinery directive as Logic Unit For Safety Functions was carried out by the notified body:

NB0035, TÜV Rheinland Industrie Service GmbH,
Alboinstr. 56,
12103 Berlin
Certificate-No.: 01/205/5518.00/16

Authorized to compile the technical file:

TR-Electronic GmbH, Eglishalde 6, 78647 Trossingen, Germany

Trossingen, 07/18/2016

Thanassakis Andreas, Business Management

5.2 Accessories

5.2.1 Interface-specific user manuals

Document-No.:	Description
TR-ECE-BA-GB-0092	Absolute Encoder Series CDx-75 with PROFIBUS-DP interface and PROFIsafe profile
TR-ECE-BA-GB-0095	Absolute Encoder Series CDx-75 with PROFINET interface and PROFIsafe profile