



Handbuch

Manual

Manuel

**ATEX**



# **ATEX**

## **Explosion Protection Aspects**

Handbook Order No. 56 973

Version 1.1

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## Handbook Amendments / Corrections

Version	Chapter	Amendment / Correction	Date/Name
1.0		Created	03.11.05 M.H. / Gan / Ba
1.1		new module (56662)	24.03.2006 /M.H. / Gan / Wei

Notes:



# 1 About This Handbook

Since 1 July 2003 devices and protective systems for use in potentially explosive areas must comply with the new directive 94/9/EC (ATEX 95). With this directive the European Community has created a basis for binding standard design, installation and maintenance requirements with regard to the protection of systems, devices and components against explosion. In accordance with the requirements of this EC Directive an Ex document is required for the installation and operation of a system exposed to a risk of explosion. Such a document is necessary to enable selection and proper installation and operation of systems, devices and components in terms of explosion prevention.



**ATEX - European Directive for (electrical) equipment intended for use in potentially explosive environments**

Potentially explosive environments are divided into zones. Murrelektronik products are classified into zone 22 (an environment in which during normal operation a potentially explosive atmosphere in the form of a cloud consisting of combustible dust contained in the air normally does not occur, or only for short periods).

Before using the Murrelektronik product you should read the full contents of this handbook. The handbook should be kept in a location which is accessible for all users at all times.

## 1.1 Explanations of the Symbols Used

### 1.1.1 Use of Advisory Notes

Advisory notes containing or referring to important information are indicated as follows:



Note text.....

### 1.1.2 Use of Danger Warnings

Danger warnings are additionally identified with a border.



**CAUTION:**  
Non-compliance with precautionary measures can result in damage to equipment and additional material damage.



**DANGER:**  
Non-compliance with precautionary measures can result in damage to equipment and additional material damage.

### 1.1.3 Use of Numbering in Diagrams

Numbering in diagrams is indicated using white numbers in round fields with a black background.

Example:      ❶ Text 1.....  
                  ❷ Text 2.....  
                  ❸ Text 3.....

The explanations are provided in tabular form using the same number, directly after the diagram in question.

### 1.1.4 Use of Work Instructions

A work instruction describes the mandatory sequence in which a series of work steps must be performed during installation, commissioning, operation and maintenance.

The steps are numbered sequentially and in ascending order using black numbers in round fields with a white background.

Example:      ① Instruction 1.....  
                  ② Instruction 2.....  
                  ③ Instruction 3.....

### **1.1.5 Use of Footnotes**

References to additional explanatory information are identified by numbers in superscript (Example: Text <sup>1)</sup>). The associated information is provided in the form of footnotes below tables or in the case of continuous text at the bottom of the page.



## **2 ATEX for Equipment and Operating Resources**

### **2.1 Quoted Standards and Norms**

#### **EN 60079-0:2004**

**Electrical apparatus for explosive gas atmospheres**  
Part 0: General requirements

#### **EN 60079-15:2003**

**Electrical apparatus for explosive gas atmospheres**  
Part 15: Type of protection "n"

#### **EN 50281-1-1:1998**

**Electrical apparatus for use in the presence of combustible dust**  
Part 1-1: Electrical apparatus protected by enclosures

#### **EN 60079-14:2003**

**Electrical apparatus for explosive gas atmospheres**  
Part 14: Electrical installations in hazardous areas (other than mines)

#### **2.1.1 EN 60079-0:2004**

The DIN EN 60079-0:2004 norm applies to electrical apparatus protected by an enclosure with limitation of the surface temperature for use in areas in which combustible dust can exist in such quantities that it can lead to a risk of fire and explosion. **Group II** apparatus is intended for use in areas in which an explosive atmosphere resulting from raised dust is not normally to be expected but if this should nonetheless occur then in all probability only seldom and for only a short period of time (**Category 3D**). Such apparatus is designed to ensure a normal degree of safety when operating in accordance with the operating parameters specified by the manufacturer. Plugs and sockets of the apparatus for external connections are to be locked electrically or mechanically such that they can only be disconnected when no voltage is applied and such that no voltage can be applied to the contacts when they are disconnected. Plugs and sockets of the apparatus for external connections which are only assigned to and connected to one item of equipment are to be mechanically protected such that no accidental disconnection can take place and the apparatus is to be marked with the following warning label:

**“DO NOT DISCONNECT WHEN POWER IS APPLIED”**

Plugs, sockets and similar connecting elements of the apparatus for internal connections must be protected by mechanical measures against unintentional loosening and disconnection.

Sockets within items of apparatus into which no plugs are inserted during normal use and which are only required for maintenance and repair work are considered to be non-sparking.

Plugs and sockets are not approved individually; since the various items of apparatus can not be tested without these accessory components they form a part of the approved devices. As component parts of the approved devices plugs and sockets are subject to a type test but do not have to be explicitly identified as having been approved.

In the operating instructions for items of ATEX apparatus reference is made to the fact that the ATEX approval is only valid together with these accessory components which have also been tested.

### **2.1.2 EN 60079-15:2003**

The DIN EN 60079-15:2003 norm contains requirements in respect of the design, inspection & testing and marking of **Group II** electrical apparatus (devices and components) of protection type “n” for use in areas in which a potentially explosive atmosphere consisting of gas, vapour or mist are unlikely to occur or if this should nonetheless occur then in all probability only seldom and for only a short period of time (**Category 3G**). Such apparatus is designed to operate in accordance with the operating parameters specified by the manufacturer which ensure a normal degree of safety during normal operation.

## 2.2 General

The ATEX specification of the temperature is in the form of the maximum surface temperature in accordance with EN 50281-1-1 and the temperature class in accordance with EN 60079-15, e.g. T95°C and T5.

The temperature classes for gases and vapours in the form of an overview are as follows:

**T1 = up to max. 450°C** acetone, ammoniac, benzene, acetic acid, ethane, ethyl acetate, ethyl chloride, methane, methanol, naphthalene, phenol, propane, coal gas (illuminating gas), hydrogen

**T2 = up to max. 300°C** i-amyl acetate, n-butane, n-butyl alcohol, acetylene, ethylene, ethyl alcohol

**T3 = up to max. 200°C** benzene, diesel fuels, heating oils, n-hexane, hydrogen sulphide



**T4 = up to max. 135°C** acetyl aldehyde, ethyl ether


**T5 = up to max. 100°C** ---

**T6 = up to max. 85°C** carbon disulphide

### 2.2.1 Identification in Accordance with ATEX:

**Name of the manufacturer:** Murrelektronik  
**Manufacturer's address:** D-71570 Oppenweiler  
**Type designation:** Article number  
**ATEX marking:** as shown below by way of example:

 II 3D T90°C IP67X  
 II 3G EEx nA II T5X  
0°C ≤ Ta ≤ +55°C

 = identification in accordance with EC Directive 94/9/EC (ATEX Directive)  
II = electrical apparatus group (I for mines, II for all other locations)  
3 = category (safety: 1 = extremely high, 2 = high, 3 = normal)  
G/D = G (Gas) or D (Dust)  
E = corresponds to the EN 60079 family of norms  
EX = explosion-protected apparatus  
nA = protection type n, A non-sparking  
T90°C = highest surface temperature reached  
T5 = temperature class  
IP67 = protection class in accordance with EN 60529  
X = for special conditions  
e.g. IP67X: only with sealed screw connections,  
T5X: T5 only achieved with de-rating

Serial number: Manufacturing code

Warnings: "DO NOT DISCONNECT WHEN POWER IS APPLIED"

## 2.2.2 Explosion Protection Aspects:

### Use:

Use in Zone 22 in accordance with Device Group II and Category 3G/D (Gas and Dust).  
For the corresponding ATEX markings for modules see Table 2-1.

### Safety:

The area of application covers the currents specified in Table 2-1. In the case of higher loading it may be necessary to recheck the surface temperature.

All connectors must be provided with a hexagonal key area. If cables without a key area are to be used these must be protected against unauthorised opening.

Open cable ends must be connected in a connection room which complies with at least IP54 requirements.

Blanking plugs must be screwed into sockets which are not used.

Tightening torque:

M8	0.3 Nm
M12	0.6 Nm
7/8"	0.8 Nm

Protection class IP67 or at least IP54 must continue to be complied with when plugged in.

The addressing of the module must be performed outside the Ex zone.

"DO NOT DISCONNECT WHEN POWER IS APPLIED":

The connectors and the external supply may not be connected or disconnected when power is applied.

The protective earth conductor must have a cross-section of at least 4 mm<sup>2</sup> where a voltage in excess of SELV/PELV is used.

The devices are maintenance-free. No modifications or repairs may be made.

### Operation:

Ambient temperature in accordance with EN 60079-14/EN 60079-15 and EN 60079-0:  
For the corresponding ATEX markings for modules see Table 2-1.

### Norms:

EN 60079-0:2004 (General requirements for gas protection)  
EN 60079-15:2003 (Type of protection "n")  
EN 50281-1-1:1998 (Dust protection via an enclosure)






















## 2.2.3 Declaration of EC Conformity:









Reference to norms as specified under Explosion Protection Aspects. The CE symbol thus also covers Directive 94/9/EC where the apparatus is appropriately marked.

## 2.3 ATEX Identification & Marking Table

Table 2-1: Overview of ATEX Identification and Markings

Item No.	Designation	ATEX Marking	Ambient Temperature	Load
<b>Masi</b>				
56400	MASI67 DI4 AB	 II 3G EEx nA II T5  II 3D T90°C IP67X	$-20^{\circ}\text{C} \leq T_a \leq +40^{\circ}\text{C}$	Sensor: 0.17A
56401	MASI67 DI8 AB	 II 3G EEx nA II T5  II 3D T90°C IP67X	$-20^{\circ}\text{C} \leq T_a \leq +40^{\circ}\text{C}$	Sensor: 0.18A
56402	MASI67 DI4 DO3 AB	 II 3G EEx nA II T4  II 3D T125°C IP67X	$-20^{\circ}\text{C} \leq T_a \leq +40^{\circ}\text{C}$	Actuator: 3 x 2.0A Sensor: 0.17A
56403	MASI67 DI4 DO4	 II 3G EEx nA II T4  II 3D T125°C IP67X	$-20^{\circ}\text{C} \leq T_a \leq +40^{\circ}\text{C}$	Actuator: 4 x 2.0A Sensor: 0.17A
56404	MASI67 DI4 DO4	 II 3G EEx nA II T4X  II 3D T125°C IP67X	$-20^{\circ}\text{C} \leq T_a \leq +40^{\circ}\text{C}$	Actuator: 4 x 1.8A Sensor: 1.0A
<b>Cube67</b>				
56501	Cube67 BN-P	 II 3G EEx nA II T5X  II 3D T95°C IP67X	$0^{\circ}\text{C} \leq T_a \leq +55^{\circ}\text{C}$	Actuator: 4 x 2A Sensor: 4 x 2A
56502	Cube67 BN-DN	 II 3G EEx nA II T5X  II 3D T95°C IP67X	$0^{\circ}\text{C} \leq T_a \leq +55^{\circ}\text{C}$	Actuator: 4 x 2A Sensor: 4 x 2A
56504	Cube67 BN-C	 II 3G EEx nA II T4  II 3D T130°C IP67X	$0^{\circ}\text{C} \leq T_a \leq +55^{\circ}\text{C}$	Actuator: 2 x 4A Sensor: 2 x 4A
56600	Cube67 DIO16 C 8xM12	 II 3G EEx nA II T5X  II 3D T95°C IP67X	$0^{\circ}\text{C} \leq T_a \leq +55^{\circ}\text{C}$	Actuator: 16 x 0.15A Sensor: 8 x 0.1A
56601	Cube67 DIO16 E 8xM12	 II 3G EEx nA II T5X  II 3D T95°C IP67X	$0^{\circ}\text{C} \leq T_a \leq +55^{\circ}\text{C}$	Actuator: 16 x 0.15A Sensor: 8 x 0.1A
56602	Cube67 DI16 C 8xM12	 II 3G EEx nA II T6  II 3D T80°C IP67X	$0^{\circ}\text{C} \leq T_a \leq +55^{\circ}\text{C}$	Sensor: 8 x 0.2A
56603	Cube67 DI16 E 8xM12	 II 3G EEx nA II T6  II 3D T80°C IP67X	$0^{\circ}\text{C} \leq T_a \leq +55^{\circ}\text{C}$	Sensor: 8 x 0.2A
56610	Cube67 DIO8 C 4xM12	 II 3G EEx nA II T5X  II 3D T95°C IP67X	$0^{\circ}\text{C} \leq T_a \leq +55^{\circ}\text{C}$	Actuator: 8 x 0.2A Sensor: 4 x 0.1A
56611	Cube67 DIO8 E 4xM12	 II 3G EEx nA II T5X  II 3D T95°C IP67X	$0^{\circ}\text{C} \leq T_a \leq +55^{\circ}\text{C}$	Actuator: 8 x 0.2A Sensor: 4 x 0.1A
56612	Cube67 DI8 C 4xM12	 II 3G EEx nA II T6  II 3D T75°C IP67X	$0^{\circ}\text{C} \leq T_a \leq +55^{\circ}\text{C}$	Sensor: 4 x 0.2A
56613	Cube67 DI8 E 4xM12	 II 3G EEx nA II T6  II 3D T70°C IP67X	$0^{\circ}\text{C} \leq T_a \leq +55^{\circ}\text{C}$	Sensor: 4 x 0.2A
56620	Cube67 DIO8 C 8xM8	 II 3G EEx nA II T5X  II 3D T95°C IP67X	$0^{\circ}\text{C} \leq T_a \leq +55^{\circ}\text{C}$	Actuator: 8 x 0.2A Sensor: 8 x 0.1A
56621	Cube67 DIO8 E 8xM8	 II 3G EEx nA II T5X  II 3D T95°C IP67X	$0^{\circ}\text{C} \leq T_a \leq +55^{\circ}\text{C}$	Actuator: 8 x 0.2A Sensor: 8 x 0.1A
56622	Cube67 DI8 C 8xM8	 II 3G EEx nA II T6  II 3D T80°C IP67X	$0^{\circ}\text{C} \leq T_a \leq +55^{\circ}\text{C}$	Sensor: 8 x 0.2A
56623	Cube67 DI8 E 8xM8	 II 3G EEx nA II T6  II 3D T80°C IP67X	$0^{\circ}\text{C} \leq T_a \leq +55^{\circ}\text{C}$	Sensor: 8 x 0.2A

Item No.	Designation	ATEX Marking	Ambient Temperature	Load
56631	Cube67 DIO8 E 4xM12 1A	 II 3G EEx nA II T5X  II 3D T95°C IP67X	0°C ≤ T <sub>a</sub> ≤ +55°C	Actuator: 8 x 0.51A Sensor: 4 x 0.1A
56640	Cube67 DIO16 C 8xM12 1.6A	 II 3G EEx nA II T5X  II 3D T95°C IP67X	0°C ≤ T <sub>a</sub> ≤ +55°C	Actuator: 16 x 0.51A Sensor: 8 x 0.15A
56650	Cube67 DO16 C Valve K3	 II 3G EEx nA II T4  II 3D T110°C IP67X	0°C ≤ T <sub>a</sub> ≤ +55°C	Actuator: 16 x 0.5A
56651	Cube67 DO16 E Valve	 II 3G EEx nA II T6  II 3D T85°C IP67X	0°C ≤ T <sub>a</sub> ≤ +55°C	Actuator: 16 x 0.062A
56655	Cube67 DO8 E Valve	 II 3G EEx nA II T6  II 3D T75°C IP67X	0°C ≤ T <sub>a</sub> ≤ +55°C	Actuator: 8 x 0.062A
56656	Cube67 DO32 E Valve	 II 3G EEx nA II T6  II 3D T85°C IP67X	0°C ≤ T <sub>a</sub> ≤ +55°C	Actuator: 32 x 0.5A
56661	Cube67 DIO8 E Cable	 II 3G EEx nA II T5  II 3D T90°C IP67X	0°C ≤ T <sub>a</sub> ≤ +55°C	Actuator: 8 x 0.062A Sensor: 1.6A
56662	Cube67 DIO16 E Cable 0,5A	 II 3G EEx nA II T4  II 3D T110°C IP67X	0°C ≤ T <sub>a</sub> ≤ +55°C	Actuator: 16 x 0,5A Sensor: 0,5A
56663	Cube67 DIO8 E M16 0.5A	 II 3G EEx nA II T4  II 3D T120°C IP67X	0°C ≤ T <sub>a</sub> ≤ +55°C	Actuator: 8 x 0.5A Sensor: 0.15A
56700	Cube67 AI4 C 4xM12 (U)	 II 3G EEx nA II T6  II 3D T75°C IP67X	0°C ≤ T <sub>a</sub> ≤ +55°C	Sensor: 0.2A
56720	Cube67 AO4 C 4xM12 (I)	 II 3G EEx nA II T5  II 3D T85°C IP67X	0°C ≤ T <sub>a</sub> ≤ +55°C	Sensor: 2 x 1.6A
56730	Cube67 AI4 C 4xM12	 II 3G EEx nA II T6  II 3D T75°C IP67X	0°C ≤ T <sub>a</sub> ≤ +55°C	Sensor: 4 x 0.2A
56740	Cube67 AI4 C 4xM12 RTD	 II 3G EEx nA II T6  II 3D T75°C IP67X	0°C ≤ T <sub>a</sub> ≤ +55°C	---
56748	Cube67 AI8 C 4xM12 TH	 II 3G EEx nA II T6  II 3D T75°C IP67X	0°C ≤ T <sub>a</sub> ≤ +55°C	---
56750	Cube67 CNT2 C 4xM12	 II 3G EEx nA II T6  II 3D T85°C IP67X	0°C ≤ T <sub>a</sub> ≤ +55°C	Sensor: 4 x 0.2A 2x1,6A
56760	Cube67 DIO4 RS485 E 3xM12	 II 3G EEx nA II T4  II 3D T110°C IP67X	0°C ≤ T <sub>a</sub> ≤ +55°C	Actuator: 4 x 0.5A Sensor: 3 x 0.2A
56771	Cube67 Logic E 4xM12	 II 3G EEx nA II T5  II 3D T95°C IP67X	0°C ≤ T <sub>a</sub> ≤ +55°C	Actuator: 2 x 0.5A Sensor: 4 x 0.2A
56955	Cube67 PD 7/8"	 II 3G EEx nA II T5  II 3D T100°C IP67X	0°C ≤ T <sub>a</sub> ≤ +55°C	Actuator: 2 x 4A Sensor: 2 x 4A
56960	Cube67 R-P M12	 II 3G EEx nA II T6  II 3D T75°C IP67X	0°C ≤ T <sub>a</sub> ≤ +55°C	---

Item. No.	Designation	ATEX Marking	Ambient Temperature	Load
<b>MVC</b>				
<b>27476</b>	MVC4M-UOP3.0-XA	 II 3G EEx nA II T6  II 3D T70°C IP67X	$-20^{\circ}\text{C} \leq T_a \leq +40^{\circ}\text{C}$	Contact: 4A Total current: 12A
<b>27477</b>	MVC4M-UOP5.0-XA	 II 3G EEx nA II T6  II 3D T70°C IP67X	$-20^{\circ}\text{C} \leq T_a \leq +40^{\circ}\text{C}$	Contact: 4A Total current: 12A
<b>27478</b>	MVC4M-UOP10.0-XA	 II 3G EEx nA II T6  II 3D T70°C IP67X	$-20^{\circ}\text{C} \leq T_a \leq +40^{\circ}\text{C}$	Contact: 4A Total current: 12A
<b>27479</b>	MVC4M-UOP15.0-XA	 II 3G EEx nA II T6  II 3D T70°C IP67X	$-20^{\circ}\text{C} \leq T_a \leq +40^{\circ}\text{C}$	Contact: 4A Total current: 12A

## 2.4 Qualified Staff

The requirements on the qualified staff are based on the requirement profiles described by ZVEI (the German Central Association for Electrical Engineering and Industry) and the VDMA (the German Mechanical Engineering and Plant Engineering Association).

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60498 Frankfurt

Germany

Only electrical engineering specialists who are familiar with the content of this handbook may install and maintain the described products.

These are staff who

- as a result of their specialist training, knowledge and experience and as a result of their knowledge of the relevant norms can properly assess the work to be carried out and can recognise possible dangers involved in such work or who
- as a result of several years of involvement in a comparable area have the same level of knowledge as that provided by appropriate specialist training.

Interventions into the hardware and software of our products which are not described in this handbook may only be carried out by specialist staff of Murrelektronik.



**CAUTION:**  
**Interventions by unqualified personnel can result in serious injury or material damage.**



### 3 Limits and What Else One Can Do ...

Installation configurations are conceivable in which the requirements regarding interference emission and/or interference immunity can only be fulfilled with additional effort or can not be fulfilled at all since the EMC within the installation is dependent on the individual components, including those of other manufacturers.

- ✓ One appropriate measure for reduction of mains-borne interference is the use of mains filters.
- ✓ Various manufacturers offer fibre-optic converters. The data transmission using fibre-optics is fundamentally insensitive to EMC interference. This, however, does not apply to the electronics necessary for the conversion. The use of fibre-optics can thus not solve every EMC problem.



**Should you have further questions regarding EMC or if you require advice on ensuring compliance with the EMC Directive for your installation please contact our accredited test centre.**

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