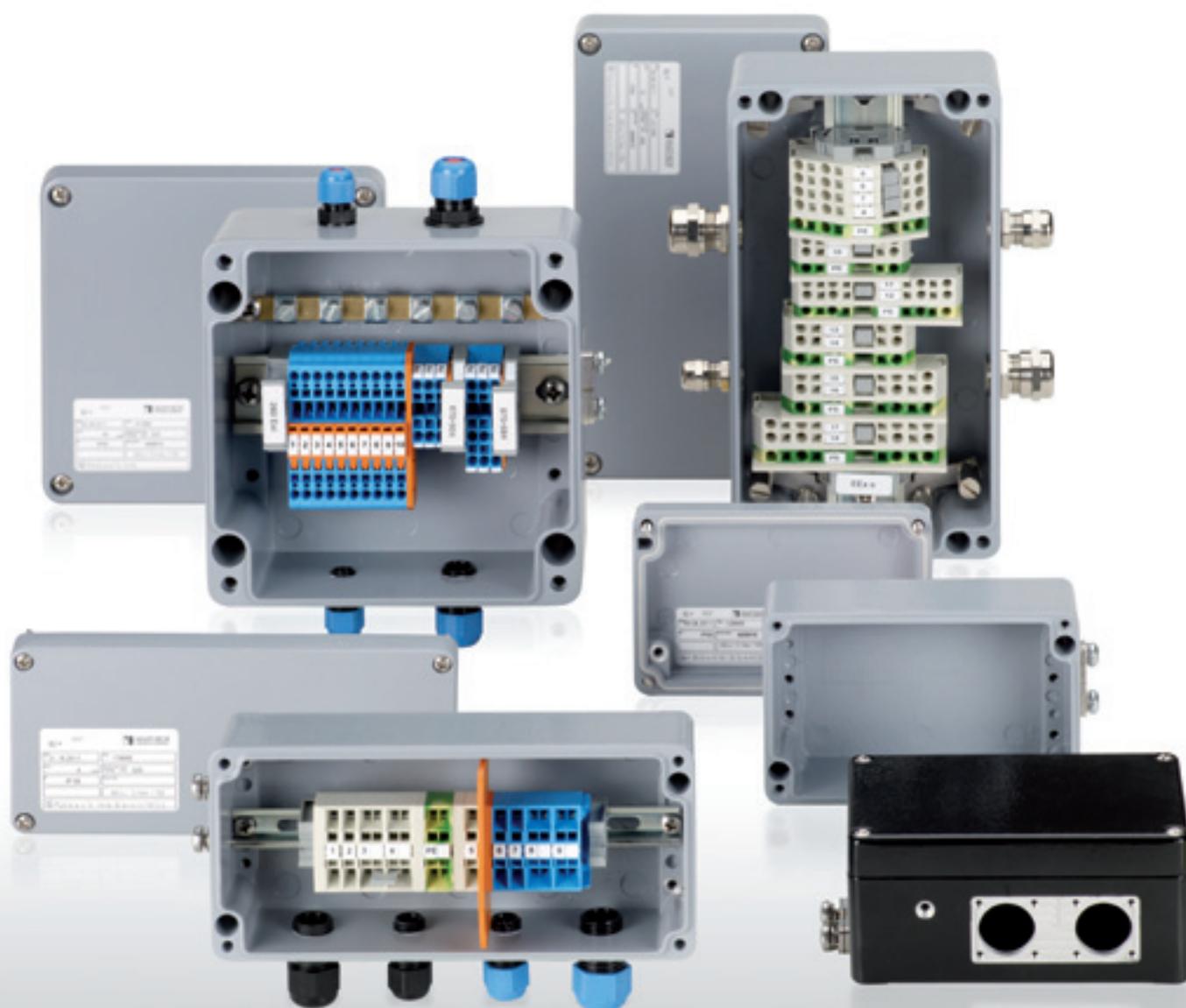




MULTI-BOX
THE BOX COMPANY



Ex-Enclosures

Overview & Information



IBExU 10 ATEX 1159 / 1158U

Year

Type approval number

„Atmosphère explosible“
EC Directive

Ex identification according to standard (example)

| | | | |
|------------------------|---|--------------------------------|-----------------|
| Relevant equipment [] | Use outside of potentially explosive areas that effects the Ex area | EN 60079-0 (2006) | [Ex ib] IIB |
| | | EN 60079-0 (as of Edition 5.0) | [Ex ib Ga] IIB |
| Equipment | Use within the potentially explosive areas | EN 60079-0 (2006) | Ex ib IIB T4 |
| | | EN 60079-0 (as of Edition 5.0) | Ex ib IIB T4 Ga |

EC type examination certificate

| Identification no. | Notified body / Official testing authority (example) | Country |
|--------------------|--|----------------|
| 0044 | TÜV Nord | Germany |
| 0102 | PTB | Germany |
| 0158 | EXAM | Germany |
| 0637 | IBExU | Germany |
| 0080 | INERIS | France |
| 0081 | LCIE | France |
| 0344 | KEMA | Netherlands |
| 0402 | SP | Sweden |
| 0163 | LOM | Spain |
| 0600 | EECS (BASEEFA) | United Kingdom |
| 0518 | SCS | United Kingdom |

Additional requirements

| Conditions | Marking |
|--|---------|
| Equipment usable without restrictions | - |
| Observe special requirements for use | X |
| Ex component with partial certification, alone not fit for use; CE conformity is certified when installed as part of a complete system | U |

CE 0637  II (2)G

Ex marking according to directive 94 / 9 / EC (ATEX)

Conditions in potentially explosive areas ATEX 94 / 9 / EC

| Combustible material | Temporary occurrence of potentially explosive material | Classification of explosion hazard areas | Marking required for usable equipment - according to CENELEC | | IEC 600079-0 (as of Edition 5.0) | |
|----------------------|--|--|--|---------------------------------------|----------------------------------|----------|
| | | | Equipment group | Category | Equipment protection level (EPL) | |
| Gas, Mist, Liquid | Continuously, long term, frequently | Zone 0 | II | 1G, (1)G | Ga, [Ga] | |
| | Occasionally | Zone 1 | II | 2G, (2)G | Gb, [Gb] | |
| | Not normally, only short term | Zone 2 | II | 3G, (3)G | Gc, [Gc] | |
| Dust | Continuously, long term, frequently | Zone 20 | II | III (IEC 600079-0, as of Edition 5.0) | 1D, (1)D | Da, [Da] |
| | Occasionally | Zone 21 | II | III (IEC 600079-0, as of Edition 5.0) | 2D, (2)D | Db, [Db] |
| | Not normally, only short term | Zone 22 | II | III (IEC 600079-0, as of Edition 5.0) | 3D, (3)D | Dc, [Dc] |
| Methane, Coal dust | Continuously | Coal mining | I | M1 | Ma | |
| Methane, Coal dust | Frequently | Coal mining | I | M2 | Mb | |

Category

| | |
|------|---|
| 1G | - |
| (1)G | X |

[Ex ia] IIC T4

Gas group / Ignition energy

| CENELEC-marking | Typical gas | Ignition energy μ J |
|-----------------|-------------|-------------------------|
| I | Methane | 280 |
| II A | Propane | > 180 |
| II B | Ethylene | 60 ... 180 |
| II C | Hydrogen | > 40 |

Dust group

IEC 60079-0 (as of Edition 5.0)

| CENELEC-marking | Typical dusts |
|-----------------|---------------------|
| III A | Combustible fluff |
| III B | Non-conductive dust |
| III C | Conductive dust |

Permitted surface temp. according to IEC 505

| Ignition temperature of gas | | Group II |
|-----------------------------|--------|-------------|
| Ammonia | 630 °C | T1 = 450 °C |
| Methane | 595 °C | T2 = 300 °C |
| Hydrogen | 560 °C | T3 = 200 °C |
| Propane | 470 °C | T4 = 135 °C |
| Ethylene | 425 °C | T5 = 100 °C |
| Butane | 365 °C | T6 = 85 °C |
| Acetylene | 305 °C | |
| Cyclohexane | 259 °C | |
| Diethylether | 170 °C | |
| Carbon disulphide | 95 °C | |

| Gas | Conditions | Group I |
|---------|--------------------------------------|---|
| Methane | Explosion hazard mines (coal mining) | 150 °C With deposits of coal dust on equipment |
| | | 450 °C Without deposits of coal dust on equipment |

Intrinsic safety, simple electrical equipment

| Passive components | Energy storage devices | Energy sources* |
|--|---|---|
| Pt 100  | Capacitors  | Thermocouples  |
| Switches  | Coils  | Photocells  |
| Distribution boxes  | | * Specifications $U \leq 1,5 V$; $I \leq 100 mA$; $P \leq 25 mW$ |
| Resistors  | Values must be determined exactly and taken into account when determining the whole safety of the system. | |

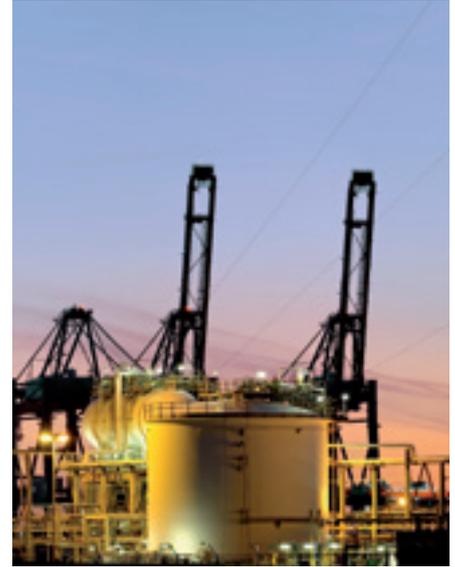
Ignition protection type

| Ignition protection type for electrical equipment in explosion hazardous areas | | Protection principle | Zone | Standard | | | Class / Zone | Application |
|--|----------------------------------|---|---|-------------------|-------------|--------------|--------------|---|
| | | | | EN | IEC | UL | | |
| o | Oil immersion encapsulation |  | Exclusion of Ex atmosphere | 1 or 2 | EN 60079-6 | IEC 60079-6 | UL 60079-6 | Transformers, starting resistors, switching devices |
| q | Powder filling encapsulation |  | Sparking prevention | 1 or 2 | EN 60079-5 | IEC 60079-5 | UL 60079-5 | Class I, Zone I Transformers, relays, equipment fuses, switches |
| ma mb | Grouting encapsulation |  | Exclusion of Ex atmosphere | 0,1,2 1,2 | EN 60079-18 | IEC 60079-18 | UL 60079-18 | Relays, sensors, solenoid valves |
| px py pz | Excess-pressure encapsulation |  | Exclusion of Ex atmosphere | 0,1,2 1,2 2 | EN 60079-2 | IEC 60079-2 | UL 60079-2 | Class I, Div. 1/2 Switch and control cabinets |
| d | Pressure-resistant encapsulation |  | Dispersal prevention | 1 or 2 | EN 60079-1 | IEC 60079-1 | UL 60079-1 | Switch and command systems, heating equipment, light fittings |
| e | Increased safety |  | Sparking prevention | 1 or 2 | EN 60079-7 | IEC 60079-7 | UL 60079-7 | Class I, Zone I Terminal and connection boxes, casings, terminals |
| ia ib ic | Intrinsic safety |  | Ignition energy limitation | 0,1,2 1,2 2 | EN 60079-11 | IEC 60079-11 | UL 60079-11 | Class I, Div. 1 Instrumentation and control systems, sensors and actuators |
| | | | | | EN 60079-25 | IEC 60079-25 | UL 60079-25 | Intrinsically safe systems |
| | | | | | EN 60079-27 | IEC 60079-27 | UL 60079-27 | Intrinsically safe field bus systems (FISCO) |
| nA | Non-sparking equipment | | Analogous to Ex e | 2 | | | | |
| nC | Sparking equipment |  | Analogous to Ex d | 2 | EN 60079-15 | IEC 60079-15 | UL 60079-15 | Class I, Zone 2 Approved for Zone 2 |
| nR | Vapour-proof equipment | | Casing protection | 2 | | | | |
| op is op pr op sh | Optical radiation |  | Intrinsically safe Protected Closed off " | 1 2 3 | EN 60079-28 | IEC 60079-28 | UL 60079-28 | Optoelectronic devices |

| Ignition protection type for electrical equipment in areas with combustible dust | | Protection principle | Zone | Standard | | | Class / Zone | Application |
|--|-------------------------------|---|--|--------------|-------------|--------------|--------------|--|
| | | | | EN | IEC | UL | | |
| tD | Protection using enclosure |  | Exclusion of explosive atmosphere | 21 or 22 | EN 61241-1 | IEC 61241-1 | | Class II, Div. 1 Terminal and connection boxes, switching devices and switching systems, light fittings |
| iaD, ibD | Intrinsic safety |  | Energy limitation of sparks and temperatures | 20, 21 or 22 | EN 61241-11 | IEC 61241-11 | UL 913 | Class II, Div. 1 Instrumentation and control systems, sensors, actuators |
| pD | Excess-pressure encapsulation |  | Exclusion of explosive atmosphere | 21 or 22 | EN 61241-4 | IEC 61241-4 | NFPA 496 | Class II, Div. 1/2 Switch, control cabinets, motors |
| maD, mbD | Grouting encapsulation |  | Exclusion of explosive atmosphere | 20, 21 or 22 | EN 61241-18 | IEC 61241-18 | | Command, message and display systems, sensors |

Ex-Enclosures

Types and Dimensions



| Dimensions Enclosure | | | MBA Ex-empty | | MBA Ex-e | | MBA Ex-i | |
|----------------------|--------|--------|--------------------|-------------|-----------------|-------------|-----------------|-------------|
| L (mm) | B (mm) | H (mm) | TYPE | Article No. | TYPE | Article No. | TYPE | Article No. |
| 58 | 64 | 34 | MBA-Ex leer 606030 | 3111100200 | MBA-Ex e 606030 | 3121100200 | MBA-Ex i 606030 | 3131100200 |
| 98 | 64 | 35 | MBA-Ex leer 906030 | 3111100400 | MBA-Ex e 906030 | 3121100400 | MBA-Ex i 906030 | 3131100400 |
| 150 | 64 | 34 | MBA-Ex leer 156030 | 3111100600 | MBA-Ex e 156030 | 3121100600 | MBA-Ex i 156030 | 3131100600 |
| 75 | 80 | 57 | MBA-Ex leer 708055 | 3111100900 | MBA-Ex e 708055 | 3121100900 | MBA-Ex i 708055 | 3131100900 |
| 125 | 80 | 57 | MBA-Ex leer 128055 | 3111101100 | MBA-Ex e 128055 | 3121101100 | MBA-Ex i 128055 | 3131101100 |
| 175 | 80 | 57 | MBA-Ex leer 178055 | 3111101300 | MBA-Ex e 178055 | 3121101300 | MBA-Ex i 178055 | 3131101300 |
| 250 | 80 | 54 | MBA-Ex leer 258055 | 3111101400 | MBA-Ex e 258055 | 3121101400 | MBA-Ex i 258055 | 3131101400 |
| 100 | 100 | 80 | MBA-Ex leer 101080 | 3111105500 | MBA-Ex e 101080 | 3121105500 | MBA-Ex i 101080 | 3131105500 |
| 122 | 120 | 65 | MBA-Ex leer 121265 | 3111101600 | MBA-Ex e 121265 | 3121101600 | MBA-Ex i 121265 | 3131101600 |
| 122 | 120 | 80 | MBA-Ex leer 121280 | 3111101800 | MBA-Ex e 121280 | 3121101800 | MBA-Ex i 121280 | 3131101800 |
| 122 | 120 | 90 | MBA-Ex leer 121290 | 3111101900 | MBA-Ex e 121290 | 3121101900 | MBA-Ex i 121290 | 3131101900 |
| 220 | 120 | 65 | MBA-Ex leer 221265 | 3111102000 | MBA-Ex e 221265 | 3121102000 | MBA-Ex i 221265 | 3131102000 |
| 220 | 120 | 80 | MBA-Ex leer 221280 | 3111102200 | MBA-Ex e 221280 | 3121102200 | MBA-Ex i 221280 | 3131102200 |
| 220 | 120 | 90 | MBA-Ex leer 221290 | 3111102300 | MBA-Ex e 221290 | 3121102300 | MBA-Ex i 221290 | 3131102300 |
| 360 | 122 | 80 | MBA-Ex leer 361280 | 3111102400 | MBA-Ex e 361280 | 3121102400 | MBA-Ex i 361280 | 3131102400 |
| 140 | 140 | 90 | MBA-Ex leer 141490 | 3111104500 | MBA-Ex e 141490 | 3121104500 | MBA-Ex i 141490 | 3131104500 |
| 160 | 160 | 90 | MBA-Ex leer 161690 | 3111102500 | MBA-Ex e 161690 | 3121102500 | MBA-Ex i 161690 | 3131102500 |
| 260 | 160 | 65 | MBA-Ex leer 261665 | 3111104000 | MBA-Ex e 261665 | 3121104000 | MBA-Ex i 261665 | 3131104000 |
| 260 | 160 | 90 | MBA-Ex leer 261690 | 3111102600 | MBA-Ex e 261690 | 3121102600 | MBA-Ex i 261690 | 3131102600 |
| 360 | 160 | 90 | MBA-Ex leer 361690 | 3111102800 | MBA-Ex e 361690 | 3121102800 | MBA-Ex i 361690 | 3131102800 |
| 560 | 160 | 90 | MBA-Ex leer 561690 | 3111029000 | MBA-Ex e 561690 | 3121029000 | MBA-Ex i 561690 | 3131029000 |
| 200 | 230 | 110 | MBA-Ex leer 202311 | 3111103000 | MBA-Ex e 202311 | 3121103000 | MBA-Ex i 202311 | 3131103000 |
| 280 | 230 | 110 | MBA-Ex leer 282311 | 3111103100 | MBA-Ex e 282311 | 3121103100 | MBA-Ex i 282311 | 3131103100 |
| 330 | 230 | 110 | MBA-Ex leer 332311 | 3111103202 | MBA-Ex e 332311 | 3121103202 | MBA-Ex i 332311 | 3131103202 |
| 330 | 230 | 180 | MBA-Ex leer 332318 | 3111103300 | MBA-Ex e 332318 | 3121103300 | MBA-Ex i 332318 | 3131103300 |
| 400 | 230 | 110 | MBA-Ex leer 402311 | 3111103400 | MBA-Ex e 402311 | 3121103400 | MBA-Ex i 402311 | 3131103400 |
| 400 | 310 | 110 | MBA-Ex leer 403111 | 3111103500 | MBA-Ex e 403111 | 3121103500 | MBA-Ex i 403111 | 3131103500 |
| 400 | 310 | 180 | MBA-Ex leer 403118 | 3111103600 | MBA-Ex e 403118 | 3121103600 | MBA-Ex i 403118 | 3131103600 |
| 600 | 230 | 110 | MBA-Ex leer 602311 | 3111103700 | MBA-Ex e 602311 | 3121103700 | MBA-Ex i 602311 | 3131103700 |
| 600 | 310 | 110 | MBA-Ex leer 603111 | 3111103800 | MBA-Ex e 603111 | 3121103800 | MBA-Ex i 603111 | 3131103800 |
| 600 | 310 | 180 | MBA-Ex leer 603118 | 3111103900 | MBA-Ex e 603118 | 3121103900 | MBA-Ex i 603118 | 3131103900 |

Ex-Empty Enclosures



MULTI-BOX Ex empty enclosures made of aluminium conform to all requirements for installation sectors where explosive concentrations of gases, steams and dusts can appear (zones 1 and 2 as well as 21 and 22).

MBA-Ex-enclosures have a components certificate confirming constructive security to the mechanical component 'enclosure'. Thus, the enclosure

specific parameter does not have to be retested and reapproved when registering a new Ex-product which simplifies the approval process considerably.

After installing approved electrical and electrotechnical components into the enclosure, the complete unit has to be retested followed by a proof of heating.

Data and Facts:

- Test report no. : IB-10-3-248 according to ATEX for zones 1 and 2 as well as 21 and 22
- EC-Prototype Examination Certificate IBExU 10 ATEX 1158U according to directive 94/9/EC
- Continuous operation temperature from -55°C up to +135°C
- Protection classification IP 66 according to EN 60529
- Examinations and standards EN60079-0, EN60079-7 and EN60079-31

Standard equipment:

- Lid screws made of 1.4301 which cannot be lost
- Silicone lid seal glued as o-ring
- Exterior earthing connection from 2,5 mm² up to 120 mm²
- Earthing connection points in the interior
- Type plate on the inner side of the lid marked with a «U» standing for incomplete equipment
- Markings Ex II 2G Exe II C Gb and Ex II 2D Ex tb III C Db
- Powder-coating similar to RAL 7001

Accessories on demand:

- Earthing busbars and earthing bolts
- Mounting plates made of galvanised steel sheet
- Wall mounting brackets made of steel
- External hinges for the lid made of aluminium
- Ex-tested cable glands and sealing plugs made of steel, brass or polyamide

Processing on demand:

- All metric threads, PG-threads and special threads (with a minimum distance of 2-5 mm up to the sealing edge of the enclosure in order not to impact the stability of the enclosure construction)
- Pass drillings, cavities and millings (with a minimum distance of 2-5 mm up to the sealing edge of the enclosure in order not to impact the stability of the enclosure construction)
- Recesses and millings for inspection glasses in the enclosure lid
- Deepening and recesses for foils and film keypads
- Special colours and markings in silk-screen printing or pad printing

Exe Enclosures



MULTI-BOX Ex e-junction boxes conform to all requirements for installation sectors where explosive concentrations of gases, steams and dusts can appear (zones 1 and 2 as well as 21 and 22).

MBA-Exe-enclosures can be used in the temperature classes T4 up to T6.

Temperature class 6 signifies that – even in case of the maximum assembly of terminals – the maximum temperature does not exceed 85°C neither inside nor outside the enclosure.

Thus, combustible gases, steams and dusts cannot be fired.

By the exterior earthing, the enclosures are included in the potential compensation. This completely avoids electrostatic charging and sparks resulting from it.

If the premises permit, the Ex-junction boxes of protection type increased safety « e » can be combined with intrinsically safe « i » power circuits. The minimum clearance and creepage distance between the terminals of both power circuits must then be 50 mm. Even in this case there is no heating of the intrinsically safe power circuit.

Data and Facts:

- Test report no. : IB-10-3-248 according to ATEX for zones 1 and 2 as well as 21 and 22
- EC-Prototype Examination Certificate IBExU 10ATEX1159 according to directive 94/9/EC
- Continuous operation temperature from -55°C up to +135°C
- Protection classification IP 66 according to EN 60529
- Examinations and standards EN 60079-0:2009, EN 60079-7:2007, EN 60079-11:2007 and EN 60079-31:2009

Standard equipment:

- Lid screws made of 1.4301 which cannot be lost
- Silicone lid seal glued as o-ring
- Exterior earthing connection from 2,5 mm² up to 120 mm²
- Mounting rail TS 15/7,5 or TS 35/7,5
- Earthing connection points in the interior optionally by busbars for protective conductors, by holding angles for protective conductors or by PE-terminals
- Markings Ex II 2G Ex e II C T6 to T4 Gb or Ex II 2D Ex tb III C T 85°C Db
- Type plate on the outer side of the lid indicating the maximum voltage
- Powder-coating similar to RAL 7001

Accessories on demand:

- Certified PE-terminals and series terminals (according to acceptance)
- Ex-tested cable glands and sealing plugs made of steel, brass or polyamide
- Earthing busbars and earthing bolts
- Mounting plates made of galvanised steel sheet
- Wall mounting brackets made of steel
- External hinges for the lid made of aluminium

Processing on demand:

- All metric threads, PG-threads, pass drillings and special threads (minimum distance between the single threads and the sealing edge of the enclosure according to the certificate of acceptance)
- Special colours according to RAL-specification
- Silk-screen printing or engraving for marking the enclosure
- Description plates made of plastic



Exi Enclosures



MULTI-BOX Ex i-junction boxes conform to all requirements for installation sectors where explosive concentrations of gases, steams and dusts can appear (zones 1 and as well as 21 and 22).

MBA-Ex i-enclosures can be used in the temperature classes T4 up to T6.

The explosion protection of so-called intrinsically safe enclosures « i » is based upon the low voltage and electricity connected in the enclosure (e.g. data or telephone lines). Thanks to the limit of ignition energy, the occurrence of a spark is absolutely

impossible. Even rising the temperature or heating our Ex i-junction boxes assembled with the maximum amount of series terminals cannot cause any explosion.

By the exterior earthing, the enclosures are included in the potential compensation. This completely avoids electrostatic charging and sparks resulting from it.

In order to make visible an intrinsically safe power circuit when installing Ex i-enclosures, once has to choose blue or blue marked cable glands and blue terminals.

Data and Facts:

- Test report no. : IB-10-3-248 according to ATEX for zones 1 and 2 as well as 21 and 22
- EC-Prototype Examination Certificate IBExU 10ATEX1159 according to directive 94/9/EC
- Continuous operation temperature from -55°C up to +135°C
- Protection classification IP 66 according to EN 60529
- Examinations and standards EN 60079-0:2009, EN 60079-7:2007, EN 60079-11:2007 and EN 60079-31:2009

Standard equipment:

- Lid screws made of 1.4301 which cannot be lost
- Silicone lid seal glued as o-ring
- Exterior earthing connection from 2,5 mm² up to 120 mm²
- Mounting rail TS 15/7,5 or TS 35/7,5
- Earthing connection points in the interior optionally by busbars for protective conductors, by holding angles for protective conductors or by PE-terminals
- Markings Ex II 2G Ex ia II C T6 to T4 Gb or Ex II 2D Ex tb III C T 85°C Db
- Type plate on the outer side of the lid
- Powder-coating similar to RAL 7001

Accessories on demand:

- Certified PE-terminals and series terminals (according to acceptance)
- Ex-tested cable glands and sealing plugs made of steel, brass or polyamide
- Earthing busbars and earthing bolts
- Mounting plates made of galvanised steel sheet
- Wall mounting brackets made of steel
- External hinges for the lid made of aluminium

Processing on demand:

- All metric threads, PG-threads, pass drillings and special threads (minimum distance between the single threads and the sealing edge of the enclosure according to the certificate of acceptance)
- Special colours according to RAL-specification
- Silk-screen printing or engraving for marking the enclosure
- Description plates made of plastic



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