

Operating Manual / IEC

Explosion-Proofed Junction Boxes, Aluminium



MULTI-BOX
THE BOX COMPANY

Wallücker Bahndamm 7
32278 Kirchlengern

Tel.: 05223 49107-0
Fax: 05223 49107-28

info@multi-box.com
www.multi-box.com



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I. Program Overview

312... (Spec.)	313... (Spec.)
MBA... Ex e	MBA... Ex ia
MBA 606030 Ex e	MBA 606030 Ex ia
MBA 906030 Ex e	MBA 906030 Ex ia
MBA 156030 Ex e	MBA 156030 Ex ia
MBA 708055 Ex e	MBA 708055 Ex ia
MBA 708065 Ex e	MBA 708065 Ex ia
MBA 128055 Ex e	MBA 128055 Ex ia
MBA 178055 Ex e	MBA 178055 Ex ia
MBA 258055 Ex e	MBA 258055 Ex ia
MBA 101080 Ex e	MBA 101080 Ex ia
MBA 121265 Ex e	MBA 121265 Ex ia
MBA 121280 Ex e	MBA 121280 Ex ia
MBA 121290 Ex e	MBA 121290 Ex ia
MBA 141490 Ex e	MBA 141490 Ex ia
MBA 161080 Ex e	MBA 161080 Ex ia
MBA 181490 Ex e	MBA 181490 Ex ia
MBA 201080 Ex e	MBA 201080 Ex ia
MBA 201490 Ex e	MBA 201490 Ex ia
MBA 221265 Ex e	MBA 221265 Ex ia
MBA 221280 Ex e	MBA 221280 Ex ia
MBA 221290 Ex e	MBA 221290 Ex ia
MBA 361280 Ex e	MBA 361280 Ex ia
MBA 161690 Ex e	MBA 161690 Ex ia
MBA 261665 Ex e	MBA 261665 Ex ia
MBA 261690 Ex e	MBA 261690 Ex ia
MBA 361690 Ex e	MBA 361690 Ex ia
MBA 561690 Ex e	MBA 561690 Ex ia
MBA 202311 Ex e	MBA 202311 Ex ia
MBA 282311 Ex e	MBA 282311 Ex ia
MBA 332311 Ex e	MBA 332311 Ex ia
MBA 332318 Ex e	MBA 332318 Ex ia
MBA 402311 Ex e	MBA 402311 Ex ia
MBA 403111 Ex e	MBA 403111 Ex ia
MBA 403118 Ex e	MBA 403118 Ex ia
MBA 602311 Ex e	MBA 602311 Ex ia
MBA 603111 Ex e	MBA 603111 Ex ia
MBA 603118 Ex e	MBA 603118 Ex ia

2. Safety Notes

Target group: Experienced, ex-trained electricians

These junction boxes are not suitable for the zones 0 and 20. The temperature classification and explosives group, marked on the junction boxes, must be complied with. The user must observe the requirements of IEC 60079-0:2017, IEC 60079-7:2015/A1:2017, IEC 60079-11:2011+Cor.:2012 and IEC 60079-31:2013, regarding excessive dust settlements and temperatures. Conversions or alterations to the junction box are not permitted. One exception is the fixing of additional cable and wire installations and the mounting of terminals as part of certification of the equipment, see chapters 6, 8, and 11. They must be operated in accordance with re-regulations, undamaged and in perfect condition. Only original MULTI-BOX parts must be used for replacement and repair. Repairs, which involve the explosion protection, must be carried out only by MULTI-BOX or qualified electricians, in accordance with nationally valid regulations. All foreign objects (transport stoppers for example) without an EU-prototype test certificate must be removed from the junction boxes before first use. Appropriate safety procedures must be applied according to electrostatic regulations (see chapter 7 Earthing / Protective Ground Connection). Incorrect or un-authorized operation as well as non-compliance with the instructions of this operating manual invalidates the warranty.

Observe the national safety and accident prevention regulations and the following safety instructions in the operating manual.

3. Conformity to Standards

This equipment is tested for use in explosive areas and certified according to:

- ▶ Regulation 2014/34/EU
- ▶ DIN VDE 0100
- ▶ IEC 60079-0:2017, IEC 60079-7:2015/A1:2017, IEC 60079-11:2011+Cor.:2012 and IEC 60079-31:2013

When installing and operating explosion-proof electrical equipment, the recognised DIN/VDE-regulations and the statutory order for electrical installations in explosive spaces must be observed. The junction boxes are certified for use in explosive areas

4. Technical Data

Manufacturer	MULTI-BOX GmbH Wallücker Bahndamm 7 D- 32278 Kirchlengern
Explosion Protection:	Empty Boxes II 2G Ex eb IIC Gb, II 2D Ex tb IIIC Db Junction Box II 2G Ex eb IIC T6 or T5 Gb, II 2G Ex ia IIC T6 or T5 Db II 2D Ex tb IIIC T85°C or T100°C Db
Prototype Examination Certificate:	Aluminium: IBExU..... / IBExU.....
Box material:	Aluminium
Rated voltage:	max. 1500 V (depending on components)
max. conductor diameter:	max. 120 mm ² (depending on components)
Protective conductor diameter:	max. 70 mm ² (depending on components)
Protection classification:	IP66 according to EN/IEC 60529

Temperature in operation area: according to each installation, for aluminium: a maximum of -55°C to + 100°C

Permitted ambient temperature: -20°C bis +40°C (conform to T6 = 85°C) or -55°C to +40°C with special identification and appropriate installation and attachment parts.

Identification: CE 0637 II 2 G Ex eb IIC Gb, II 2 D Ex tb IIIC Db
 CE 0637 II 2 G Ex eb IIC T6 or T5 Gb, II 2 G Ex ia IIIC T6 or T5 Db
 CE 0637 D Ex tb IIIC T85°C oder T100°C Db

5. Commissioning Terminals

Before starting up the following must be noted:

- ▶ only EC-prototype tested and certified terminals
- ▶ max. nominal diameter
- ▶ max. electricity
- ▶ max. voltage

When exchanging or adding terminals, the same type of terminal must be used.

When repairing the box, such as when changing seals, the same components must be ordered from MULTI-BOX, otherwise the operating license becomes void.

6. Assembly Options

Because of contact resistance at the clamping points and because of the connectors housed in the box, heat is produced, which must not exceed the maximum permissible temperature of the junction box. The electric load to the power circuit in the junction box must be adjusted accordingly.

The maximum permissible number of connectors for each junction box, depending on electric load and connector diameter, can be seen in the layout diagram housed in each box (Example see **Table 1**).

Current Amp.	Terminal-Diameter mm ²										
	1,5	2,5	4	6	10	16	25	35	50	70	95
6											
10	53										
16	18	35	138								
20	7	20	40								
25		9	22	43							
35			6	17	42						
50				2	14	35					
63					4	16	58				
80						6	18	65			
100							7	17			
125								7			
160											
200											
225											
max. terminals	69	56	47	35	24	20	18	17			

Table 1: Assembly plan for enclosure MBA 361690 Ex e (exemplarily)

Explanations to Table 1:

1. A conductor is any implemented and any connecting conductor; protective conductors and bridges do not count.
2. Non-critical Section **(1)**
This part of the table is not critical with respect to the box heating up. In this section the maximum amount of terminals may be assembled in the box, provided the instructions are observed and specified installation sizes of clamps are used.
3. Critical Section **(2)**
This section of the table shows the maximum permissible number of conductors with regard to their conductor diameter and the continuous currents, which load the conductors.
Mixed assemblies are possible with power circuits of differing diameters and currents; here, the percentage load share of each individual power circuit must be considered. (See calculation example)

4. Danger Section **(3)**

This table section is not permitted with regards to heating of the box. Components, which are referred to in this section, must not be used.

5. Calculation Example for Mixed Assembly.

Example for enclosure MBA 361690 Ex-e/ID:

Diameter	Power in A	Number	Load
2,5 mm ²	16	10 (of 35)	29%
16 mm ²	50	12 (of 35)	34%
25 mm ²	63	10 (of 58)	17%
Total			80% < 100%

In case of mixed assemblies Ex e/Ex ia, the necessary minimum distances according to IEC 60079-11 must be applied.

7. Earthing / Protective Ground Connec-

Ex boxes must be earthed according to the specifications of IEC 60079. For electrical earthing it must always be ensured that all earthing diameters are appropriately dimensioned according to the actual diameter of the connection. Metal flanges, covers, metal plates and metal screw connections must be included in the potential compensation. When busbars are used for protective connectors, each clamping bracket may hold 2 conductors up to 6 mm². If only 1 conductor is connected, it must be bent into a loop, to achieve consistent contact pressure via the bracket.

8. Cable and Wire Installation, Sealing Plugs

According to IEC 60079-0 Ed. 6, only IEC-prototype tested and certified cable and wire installations and sealing plugs must be used. Only permanently fixed cables and wires must be installed. The operator must ensure appropriate strain relief.

When used in areas where there is flammable dust, only ex-tested cables and wire installations and sealing plugs may be used. The minimum protection class is IP6X. Distance to drilling must be observed according to **Table 2**. For delivery, the box was examined for its conformity to valid ex-regulations.

If there are certain unfavourable conditions, the cable screw connections and sealing plugs could become loose during transport. You, as the installer, are therefore obliged to examine the screw connections and sealing plugs appropriately, according to statutory regulations and to tighten them, if necessary, when the equipment is being installed.

M	PG	Distance	M	PG	Distance	M	PG	Distance
12	7	20 mm	12+16	7+9	21 mm	16+20	9+11	24 mm
16	9	22 mm	12+20	7+11	23 mm	16+20	9+13,5	25 mm
20	11	26 mm	12+20	7+13,5	24 mm	16+25	9+16	27 mm
20	13,5	27 mm	12+25	7+16	26 mm	16+32	9+21	32 mm
25	16	32 mm	12+32	7+21	31 mm	16+40	9+29	37 mm
32	21	42 mm	12+40	7+29	37 mm	16+50	9+36	43 mm
40	29	53 mm	12+50	7+36	42 mm	16+63	9+42	46 mm
50	36	63 mm	12+63	7+42	46 mm	16+63	9+48	49 mm
63	42	70 mm	12+63	7+48	48 mm			
63	48	75 mm						

M	PG	Distance	M	PG	Distance	M	PG	Distance
20+20	11+13,5	27 mm	20+25	13,5+16	30 mm	25+32	16+21	37 mm
20+25	11+16	29 mm	20+32	13,5+21	35 mm	25+40	16+29	43 mm
20+32	11+21	34 mm	20+40	13,5+29	41 mm	25+50	16+36	48 mm
20+40	11+29	40 mm	20+50	13,5+36	46 mm	25+63	16+42	51 mm
20+50	11+36	45 mm	20+63	13,5+42	49 mm	25+63	16+48	54 mm
20+63	11+42	48 mm	20+63	13,5+48	52 mm			
20+63	11+48	51 mm						

M	PG	Distance	M	PG	Distance	M	PG	Distance
32+40	21+29	50 mm	40+50	29+36	61 mm	50+63	36+42	69 mm
32+50	21+36	55 mm	40+63	29+42	64 mm	50+63	36+48	72 mm
25+63	21+42	58 mm	40+63	29+48	67 mm			
25+63	21+48	61 mm						

M	PG	Distance
63+63	42+48	73 mm

Table 2: Drilling Distance for Cable Glands

9. Installation

The relevant IEC standards and national regulations of the equipment safety legislation as well as generally acknowledged technological standards are binding for installation and operation IEC 60079-14:2013. When installing, a conductive or dissipative connection to the earth must be ensured. Before the box is opened, you must make sure that there is no voltage or the appropriate safety measures are applied.

For an IP suitable, protective installation only Original MULTI-BOX assembly materials must be used.

CAUTION: Boxes must not be damaged, as the tested, technical features are no longer maintained in this case. The operator must handle empty boxes only, when all relevant standards are observed. Improper installation and operation of the junction boxes result in the loss of the certification and guarantee.

10. Maintenance

IEC standards and national regulations, which apply to the maintenance of electrical equipment in explosive areas, must be observed.

Absence of voltage must be ensured before opening the box.

It is permitted to work on intrinsically safe circuits when they are under voltage.

11. Not Fully Assembled Ex-Junction Boxes

Due to the fact that you, as the customer of MULTI-BOX, receive an incomplete piece of equipment, which is tested and certificated according to IEC 60079-0:2017, IEC 60079-7:2015/A1:2017, IEC 60079-11:2011+Cor.:2012 and IEC 60079-31:2013, you are obliged to carry out individual testing according to specified IBEXU examined manufacturing details when add-ons take place:

- ▶ max. diameter
- ▶ max. voltage
- ▶ EC-prototype tested and certificated cable and wire installation as well as sealing plugs
- ▶ Secure fastening of cable glands / wire installations and sealing plugs
- ▶ Earthing methods / protective ground connection as well as potential compensation according to IEC 60079-0
- ▶ Air - and creeping distance according to IEC 60079-7
- ▶ EC-prototype tested and certificated terminals, whereby assembly and permanent current must be adhered to according to each individual assembly plan.
- ▶ Connecting components, connections and connecting clamps from intrinsic safety ignition protection type „i“ must comply with the specifications of IEC 60079-11.

As MULTI-BOX is responsible for manufacture and individual testing, it is compulsory that the points referring to IEC 60079-0 and IEC 60079-7 are observed, as the approved EC-prototype test certificate is otherwise valid.

The current versions of ATEX and IEC operating instructions are available on the MULTI-BOX website for download.

Technical changes reserved.

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