AMTROBOX ATEX for zone 22 (Dust)

Limit switch box for pneumatic actuators ACTAIR NG and DYNACTAIR NG, and manual actuators MR

Applications
- Explosive atmospheres.
- All sectors of Water, Energy and Industry markets.

General information
- AMTROBOX ATEX for zone 22 (Dust) is specially designed for the ACTAIR NG series of double acting pneumatic actuators and DYNACTAIR NG series of spring return pneumatic actuators, and the manual actuators MR.
- This box integrates the On/Off position detection function by microswitches (IP 67 and gold plated) in standard.
- Its adjustable cams device for position detection makes it very reliable and easy to adjust.
- The electrical connections are made by packing-gland or debrochable connector.
- It is equipped with a bicolor visual pointer large size allowing the visualisation of the quater-turn valve position.
- Use is restricted to zone 22: potentially explosible atmosphere due to infrequently or over short periods presence of flammable dusts.
- AMTROBOX ATEX Dust is marked:

![ATEX Ex II 3 D Ex tc IIIA T 80 °C - 10 °C ≤ Ta ≤ 60 °C Dc IP 67]

Protection
- Protection level: IP 67
- Its cataphoresis coating ensures a good resistance in corrosive environments.

Temperature range
- From –10 °C to +60 °C

Materials
- Cover: Aluminium
- Base: Aluminium

Standard variantes
- Low cover version: X1149 and XA 1149
- High cover version: X1140 and XA 1140

This leaflet is also to be used as a start-up guide ref. 42409826
AMTROBOX ATEX for zone 22 (Dust)

High cover version
Boxes X1140 and XA1140

Low cover version
Boxes X1149 and XA1149

Adjustable cams

Microswitches fitted on metallic sheet

External earth terminal

Electric packing-gland or Binder connector (option)

Printed circuit board with microswitches

Non return valve
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Common parts

Low cover version
Boxes X1149 and XA1149

High cover version
Boxes X1140 and XA1140

■ Parts included in the spare parts kit
# AMTROBOX ATEX for zone 22 (Dust)

## Common parts

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<tr>
<th>Item</th>
<th>Designation</th>
<th>Materials</th>
</tr>
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<tbody>
<tr>
<td>160</td>
<td>Cover</td>
<td>Light alloy with cataphoresis coating</td>
</tr>
<tr>
<td>210</td>
<td>Shaft</td>
<td>Acetal + 30% fiberglass</td>
</tr>
<tr>
<td>314</td>
<td>Thrust washer</td>
<td>304 type stainless steel</td>
</tr>
<tr>
<td>410.1</td>
<td>Cover gasket</td>
<td>Nitrile</td>
</tr>
<tr>
<td>410.2</td>
<td>Base plate cover</td>
<td>Nitrile</td>
</tr>
<tr>
<td>412.1</td>
<td>O-Ring</td>
<td>Nitrile</td>
</tr>
<tr>
<td>412.2</td>
<td>O-Ring</td>
<td>Nitrile</td>
</tr>
<tr>
<td>412.6</td>
<td>Rope (High cover version)</td>
<td>Nitrile</td>
</tr>
<tr>
<td>486.1</td>
<td>Ball (High cover version)</td>
<td>Stainless steel</td>
</tr>
<tr>
<td>486.2</td>
<td>Ball</td>
<td>Steel</td>
</tr>
<tr>
<td>486.3</td>
<td>Ball</td>
<td>Steel</td>
</tr>
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<td>554.1</td>
<td>Plain washer</td>
<td>A2-70 stainless steel</td>
</tr>
<tr>
<td>626</td>
<td>Sight glass</td>
<td>Transparent polycarbonate</td>
</tr>
<tr>
<td>629</td>
<td>Pointer</td>
<td>Polyamide</td>
</tr>
<tr>
<td>747</td>
<td>Non return valve sub-assembly</td>
<td>--------</td>
</tr>
<tr>
<td>81-18</td>
<td>Faston snap</td>
<td>--------</td>
</tr>
<tr>
<td>81-2.1</td>
<td>Ground wire</td>
<td>Copper</td>
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<td>81-84.1</td>
<td>Wiring diagram</td>
<td>--------</td>
</tr>
<tr>
<td>890</td>
<td>Base</td>
<td>Light alloy with cataphoresis coating</td>
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<td>900.1</td>
<td>Cheese-head screw</td>
<td>A2-70 stainless steel</td>
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<tr>
<td>900.4</td>
<td>Sel-cutting screw</td>
<td>Zinc coated steel cl.8-8</td>
</tr>
<tr>
<td>900.5</td>
<td>Cheese-head screw</td>
<td>Stainless steel</td>
</tr>
<tr>
<td>900.9</td>
<td>Pozidriv screw</td>
<td>Zinc coated steel cl.8-8</td>
</tr>
<tr>
<td>903.1</td>
<td>1/4” Gas threaded plug</td>
<td>Polyamide 6-6</td>
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<tr>
<td>903.3</td>
<td>Bored plug</td>
<td>--------</td>
</tr>
<tr>
<td>932.1</td>
<td>Spring retaining ring</td>
<td>Steel</td>
</tr>
<tr>
<td>970.1</td>
<td>Identity plate</td>
<td>Adhesive polyester</td>
</tr>
<tr>
<td>970.2</td>
<td>Instruction notice</td>
<td>Untearable paper</td>
</tr>
<tr>
<td>970.3</td>
<td>“No Air” sticker</td>
<td>Adhesive polyester</td>
</tr>
</tbody>
</table>

■ Parts included in the spare parts kit

## Technical data

### Environment
- Housing material: molded light alloy AS9U3
- Coating: black cataphoresis
- Protection level: IP 67 with output via packing-gland, IP 65 with output via 12-pin connector
- Resistance to impacts: IK 10
- Resistance to vibrations: according to IEC 60068-2-6 Test Fc. Frequency: 5 to 100 Hz. Displacement: ± 1 mm. Acceleration: ± 0.7 g
- Electromagnetic compatibility: EN61000-6-2; EN 61000-6-4
- Test standards: EN 55011; EN 61000-4-2; EN 61000-4-3; EN 61000-4-4; EN 61000-4-5; EN 61000-4-6
- Working temperature: from -10 °C up to +60 °C

### Electric connection
- Two packing-gland M 20 metallic (for wire dia. 7 to 12) or one Binder connector (only for ACTAIR NG and DYNACTAIR NG).

### Overall dimensions (mm) and weight (kg)

- **Low cover version**
  - Weight: 1.1 kg
  - View from F

- **High cover version**
  - Weight: 1.5 kg
  - View from F

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KSB amri

AMTROBOX ATEX for zone 22 (Dust)
Position detection by microswitches on printed circuit board - Boxes X 1140 and X 1149

- Detection by 2 microswitches: 1 sur opening and 1 on closing, changeover function, trigger action adjustable by cam on each microswitch.

**AMTROBOX X 1149**

**AMTROBOX X 1140**

<table>
<thead>
<tr>
<th>Item</th>
<th>Designation</th>
<th>Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>191.1</td>
<td>Support of printed circuit board (AMTROBOX X1140)</td>
<td>Acetal</td>
</tr>
<tr>
<td>191.2</td>
<td>Support of printed circuit board</td>
<td>Polyamide 6-6</td>
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<tr>
<td>554.2</td>
<td>Plain washer</td>
<td>Stainless steel</td>
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<tr>
<td>62-2</td>
<td>3 cams sub-assembly</td>
<td>Acetal + 30% fibreglass</td>
</tr>
<tr>
<td>81-2.3</td>
<td>Round cable terminal (AMTROBOX X1149)</td>
<td>----------------</td>
</tr>
<tr>
<td>82-2.1</td>
<td>Printed circuit board with 2 microswitches</td>
<td>----------------</td>
</tr>
<tr>
<td>900.2</td>
<td>Cheese-head screw</td>
<td>A2-70 stainless steel</td>
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<tr>
<td>900.3</td>
<td>Cheese-head screw</td>
<td>A2-70 stainless steel</td>
</tr>
<tr>
<td>970.5</td>
<td>Item sticker</td>
<td>Adhesive aluminium</td>
</tr>
<tr>
<td>970.6</td>
<td>Item sticker</td>
<td>Adhesive aluminium</td>
</tr>
<tr>
<td>970.7</td>
<td>Item sticker</td>
<td>Adhesive aluminium</td>
</tr>
</tbody>
</table>

■ Parts included in the spare parts kit
Microswitches characteristics

- Manufacturer: CROUZET
- Material:
  - Housing: Polyester UL94V0
  - Button: Polyester
  - Contact: Ag/Ni gold plated
  - Membrane: Silicone
- Rating: Cut-off capacity 6 A under 24 VDC and 250 VAC
- Life:
  - Electrical:
    - under I = 5 A: $7 \times 10^4$ operating cycles
    - under I = 1 A: $3 \times 10^5$ operating cycles
    - under I = 0.2 A: $10^6$ operating cycles
  - Mechanical: $2 \times 10^6$ operating cycles
- Resistance to vibrations: CEI 60068-2-6 standard / 3 axis / 50g from 10 to 500 Hz
- Electromagnetic compatibility: EN 61000-6-2; EN 61000-6-4
- Electric connection: Welded on circuit
- Protection level: IP 67

<table>
<thead>
<tr>
<th>I (A)</th>
<th>AC-12</th>
<th>AC-13</th>
<th>AC-14</th>
<th>AC-15</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>24 V</td>
<td>48 V</td>
<td>127 V</td>
<td>230 V</td>
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<td>AC-12</td>
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<td>1</td>
</tr>
<tr>
<td>AC-14</td>
<td></td>
<td></td>
<td>≤ 72 VA</td>
<td></td>
</tr>
<tr>
<td>AC-15</td>
<td>2</td>
<td>1,5</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>I (A)</th>
<th>DC-12</th>
<th>DC-13</th>
<th>DC-14</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>24 V</td>
<td>48 V</td>
<td>115 V</td>
</tr>
<tr>
<td>DC-12</td>
<td>6</td>
<td>2</td>
<td>0,4</td>
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<tr>
<td>DC-13</td>
<td>3</td>
<td>1</td>
<td>0,2</td>
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<tr>
<td>DC-14</td>
<td>0,6</td>
<td>0,15</td>
<td>0,02</td>
</tr>
</tbody>
</table>

I (A) : Allowable maximum intensity (A)

According to IEC 60947-5-1 standard:
- AC-12: Control of resistive loads and solid state loads with isolation by optocouplers
- AC-13: Control of solid state loads with transformer isolation
- AC-14: Control of small electromagnetic loads (≤ 72 VA)
- AC-15: Control of electromagnetic loads (≥ 72 VA)
- DC-12: Control of resistive loads and solid state loads with isolation by optocouplers
- DC-13: Control of electromagnets
- DC-14: Control of electromagnetic loads having economy resistors in circuit

This microswitch is designed to operate indifferently on circuits of bi-level type: low intensity (1 mA, 4 V minimum) or medium intensity (6 A maximum). However, a microswitch must change over only one and same type of PCB during its all use.
Option: Intermediate detection position by third microswitch on printed circuit card
Box ref. X1140
One third switch, identical to the two other ones, can be added to detect any point of the valve travel (adjustable on 90°).

Internal wiring diagram: Connection by packing-gland

Connection diagram by Binder connector

Position detection by microswitches fitted on metallic sheet
AMTROBOX XA1140 and XA1149
Various types of microswitches or inductive proximity detectors can be fitted on a metallic sheet in the AMTROBOX for extreme positions indication (opening and closing).
Connection is done via:
- two metallic packing-gland,
- one debrochable connector (mounting on ACTAIR NG and DYNACTAIR NG).

In this version, the box can be equipped:
- either with one position detector on closing,
- or with one position detector on opening,
- or with one detector on closing and one detector on opening.
Commissioning

The installation and start-up of the electro-pneumatic actuators must be according to the best safety practices and mainly:

**Piping:**
Starting-up of a new installation requires cleaning the piping by air before connection to the actuator. This will remove any impurities impossible to eliminate during construction (fillings, flux, paste, PTFE, etc.)

**Electric wiring:**
- The electric components are “CE” marked in accordance with 2014/30/EU and 2014/34/EU european directives.
- The electric supply voltage and the electric values of the signals must be checked before connecting the components.
- An external earth terminal allows grounding of the metal parts of the control box.

*Never exceed the values stipulated in this leaflet!*
The dust thickness on the box must not exceed 5 mm.

*Do not open the box in dust atmosphere.*

*Do not clean using a compressed air gun to avoid sending dust in the atmosphere.*
To remove dust, use a duster a little bit damp.

*Never uncouple or disassemble the AMTROBOX or its accessories when pressurized or energized.*
Make sure to disconnect electrical cables before dismantling.

During the mounting and dismantling of the boxes, take care the correct installation of all sealing gaskets. Quality and integrity depends of this correct installation.

*During workshop or on-site checking, the valve associated with the actuator and its AMTRONIC EEx-ia box can be operated from full open to full closed position.*
This operation may be of a high significant risk of personal injury if the safety steps required are not taken to prevent access between the disc and the seat.

**Electric connections**
The electric connection is obtained via 2 packing-gland M20 in stainless steel (for wire dia. 7 to 12) or a Binder connector. The good tightness of the box depends on cable selection and the tightening level of the packing-gland.

**Pneumatic connection**
The pneumatic connection is done directly on the actuator or on the solenoid valve fitted on the actuator.
Open/close position detection adjustment

The limit switches or detectors are factory adjusted. It is not necessary to re-adjust before valve mounting on site. Nevertheless, if you wish to re-adjust after a maintenance operation, proceed as follows:

- Remove the cover of the box.
- Put the disc in extreme position (opening or closing).
- Unscrew the two metal screws one turn.
- Adjust triggering of the required detector by turning the coloured screw corresponding to the colour of the cam to adjust.
- Proceed in the same manner with the opposite switch.
- Each cam is adjusted independently and the adjustment does not affect in any way the adjustment of the other cam.
- When adjustments are completed, slightly tighten the two metal screws to prevent adjustments being changed.
- Replace the cover of the box.

1 - Unscrew the metallic screws  
2 - Adjust the cams  
3 - Screw the metallic screws
Declaration of Conformity

Hereby we,
KSB S.A.S.
Zone industrielle Gagnaire Fonsèche
24490 LA ROCHE CHALAIS
Registered Office: 92635 - Gennevilliers
France

declare that the automation boxes used in potentially explosive gaseous or dusty atmosphere and listed below comply with the requirements of the Directives 2014/34/EU and 2014/30/EU (EMC).

Description of automation boxes:
- AMTROBOX X1140
- AMTROBOX XA1140
- AMTROBOX X1149
- AMTROBOX XA1149

As per harmonized european standards:
Electrical equipment for potentially explosive atmosphere;
- EN 60079-0: 2012* + A11: 2013* ; EN 60079-31: 2014*
* The current harmonized standards are different from standards used for certification (EN 60079-0: 2009 ; EN 60079-31: 2009) but this have no impact on the product.

Electromagnetic compatibility;
- EN 61000-6-2 ; EN 61000-6-4

Electrical equipment suitable for:
Group II category 3 (zone 22)

Marking:
Ex tc IIIA
Ex tc IIIA
ATEX
T 80 °C
- 10 °C ≤ Ta ≤ 60 °C
Dc
IP 67

Michel Delobel
Quality Assurance
11/18 - Rev. 3

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