

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



**On/Off position detection
ATEX for zone 22 (Dust)**

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 quarter-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

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

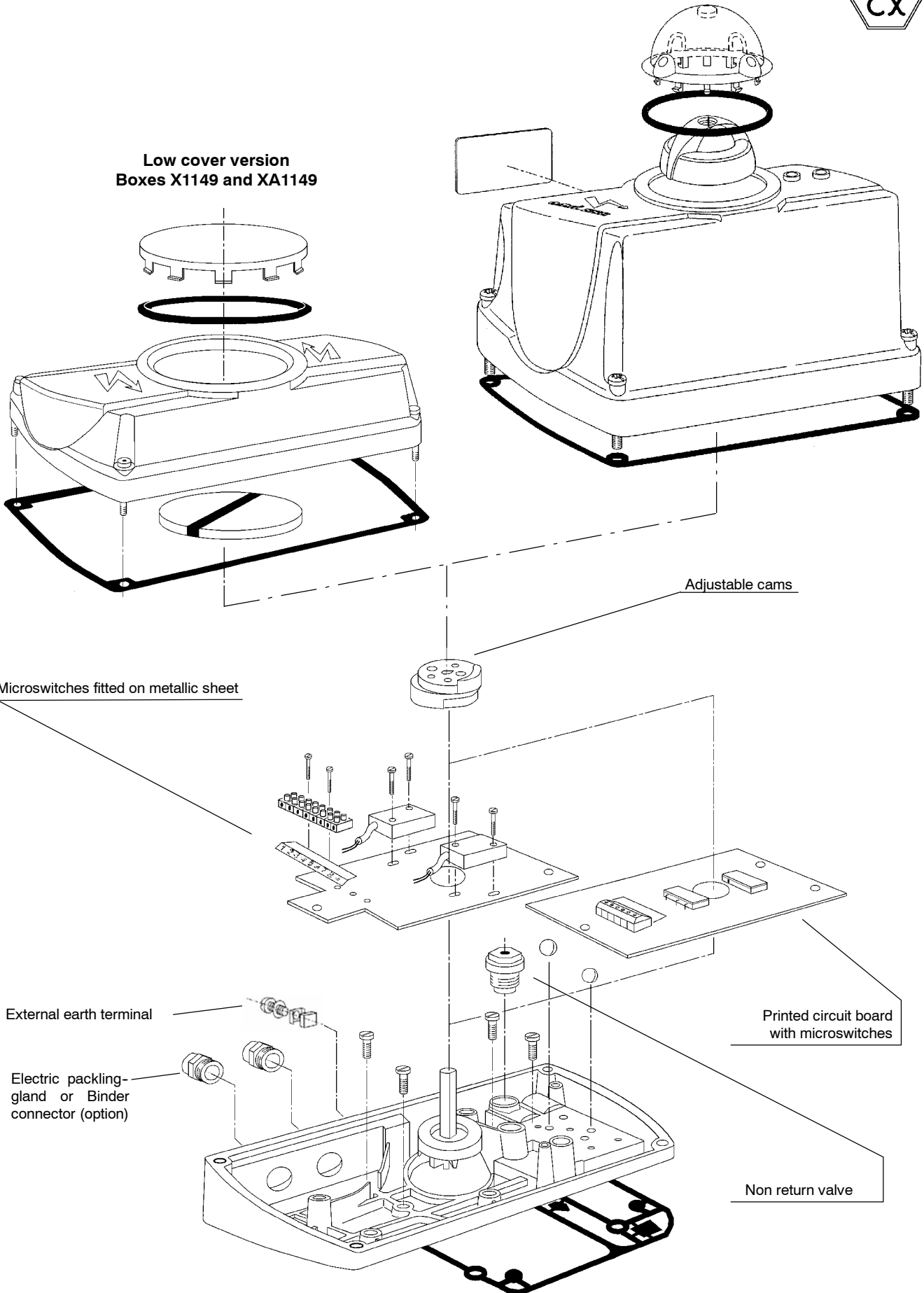
- Low cover version: X1149 and XA 1149
- High cover version: X1140 and XA 1140

This leaflet is also to be used as a start-up guide ref. 42 409 826

High cover version
Boxes X1140 and XA1140



Low cover version
Boxes X1149 and XA1149





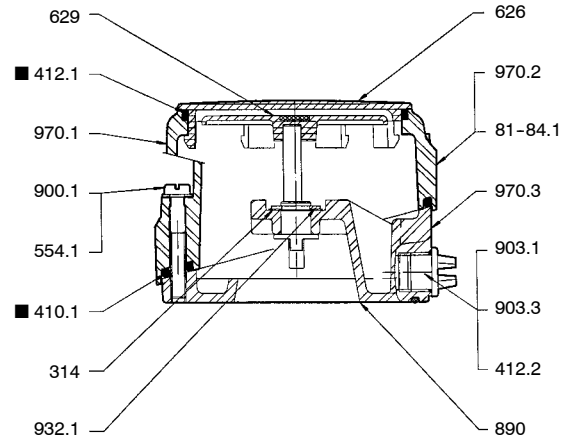
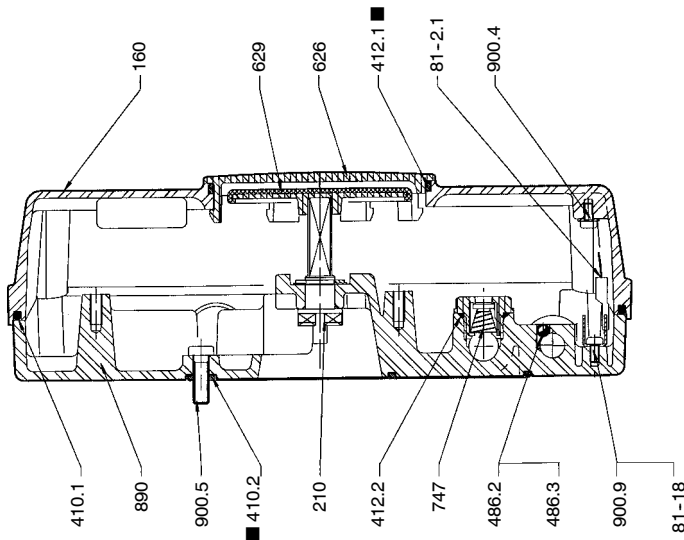
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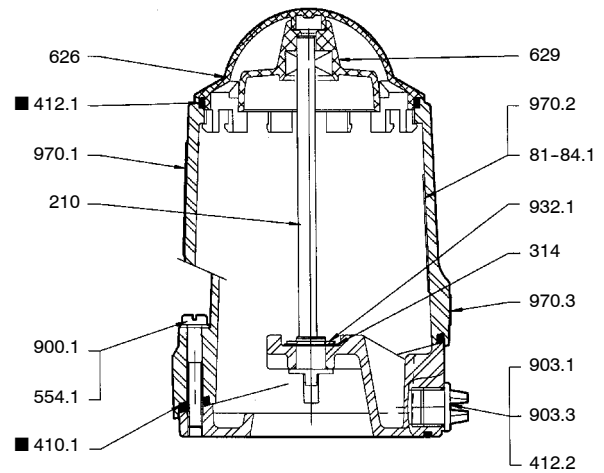
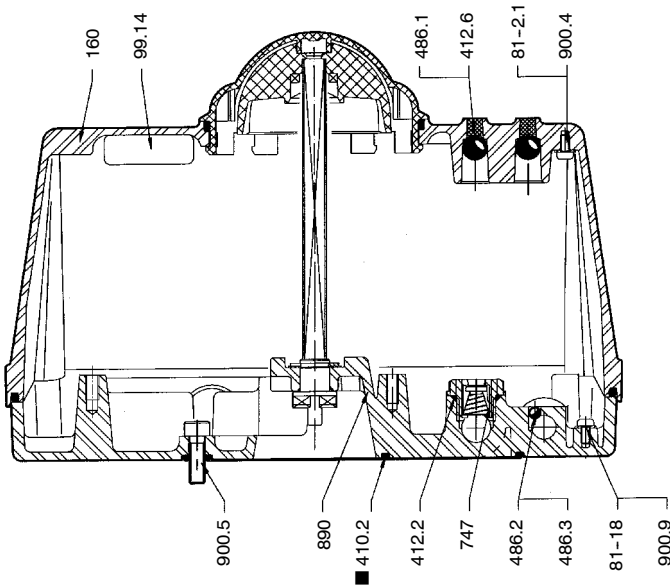
Common parts



Low cover version
Boxes X1149 and XA1149



High cover version
Boxes X1140 and XA1140



■ Parts included in the spare parts kit



Common parts

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

■ Parts included in the spare parts kit

Technical data

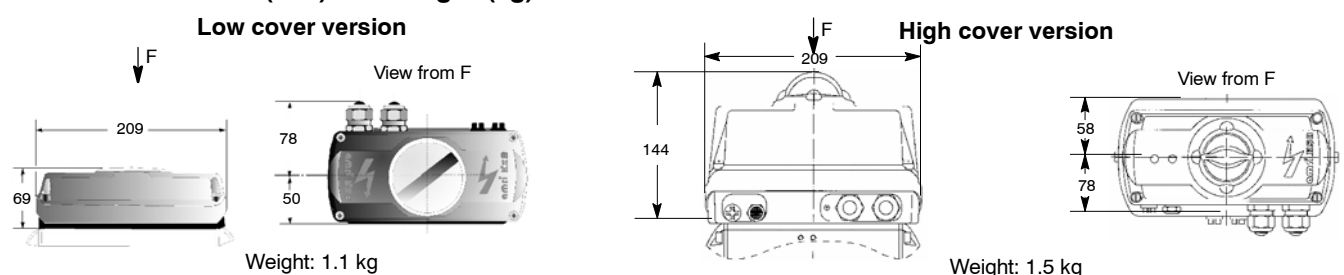
Environment

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: EN 61000-6-2; 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)

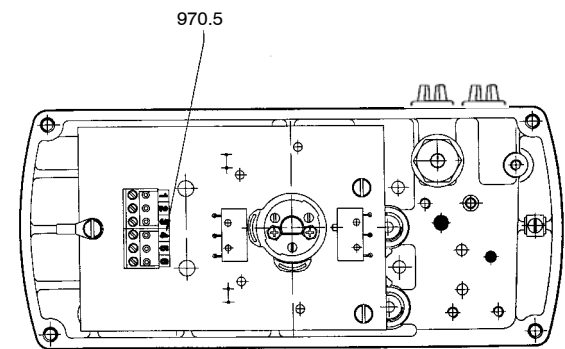
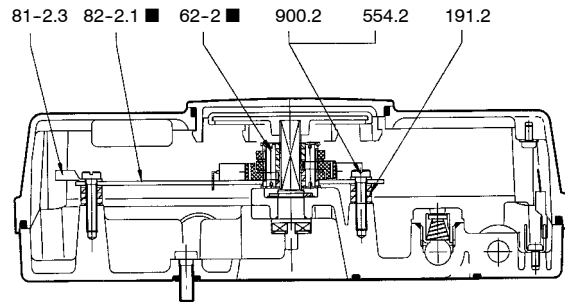




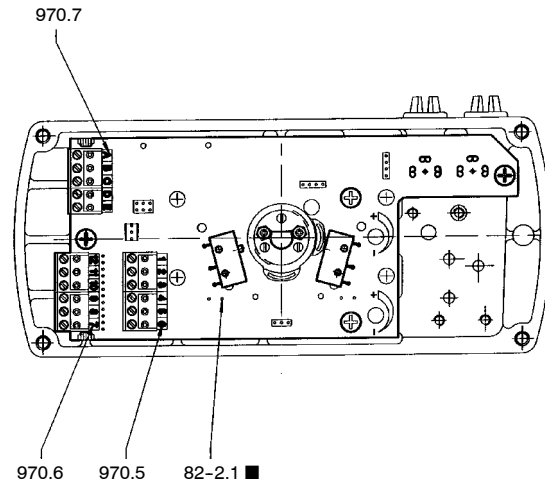
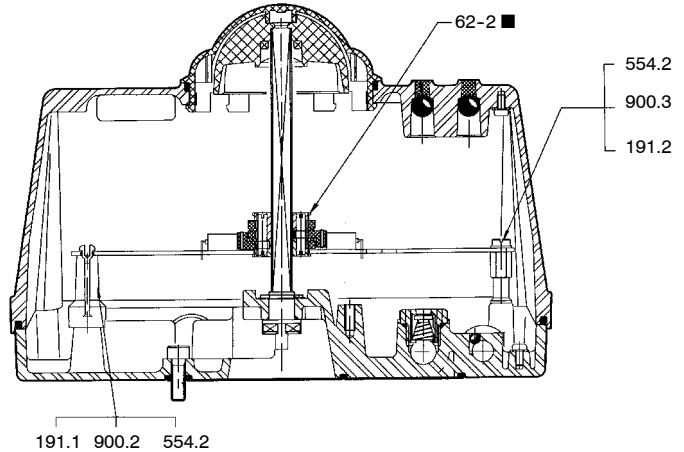
Position detection by microswitches on printed circuit board - Boxes X 1140 and X 1149

- 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



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

■ Parts included in the spare parts kit

Microswitches characteristics


• Manufacturer:	CROUZET	
• Material:	Housing Button Contact Membrane	Polyester UL94V0 Polyester Ag/Ni gold plated Silicone
• Rating:	Cut-off capacity 6 A under 24 VDC and 250 VAC	
• Life:	Electrical	under I = 5 A 7 x 10 ⁴ operating cycles under I = 1 A 3 x 10 ⁵ operating cycles under I = 0.2 A 10 ⁶ operating cycles
	Mechanical	2 x 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	

I (A) ↘	Alternating current (AC)				
	24 V	48 V	127 V	230 V	380 V
AC-12	6	6	6	6	5
AC-13	2	1,5	1	1	0,5
AC-14	≤ 72 VA				
AC-15	2	1,5	1	1	0,5

I (A) ↘	Direct current (DC)			
	24 V	48 V	115 V	230 V
DC-12	6	2	0,4	0,2
DC-13	3	1	0,2	0,1
DC-14	0,6	0,15	0,02	0,01

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

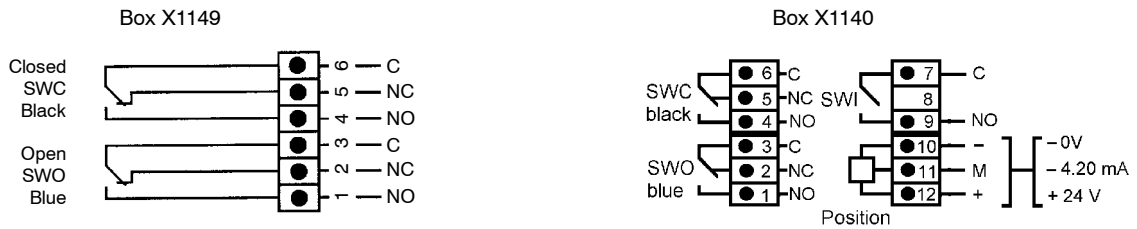
This microswitch is designed to operate indifferently on circuits of bi-level type: low intensity (1 mA, 4 V minimum) or medium intensity (6 A maximum). However, a microswitch must change over only one and same type of PCB during its all use.

Option : Intermediate detection position by third microswitch on printed circuit card

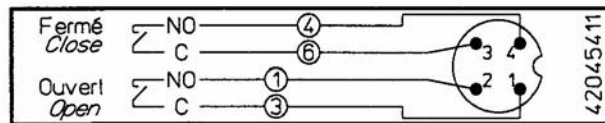
Box ref. X1140

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



CAUTION !

WARNING

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.

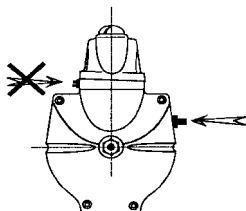
This operation may be of a high significant risk of personal injury if the safety steps required are not taken to prevent access between the disc and the seat.

Electric connections

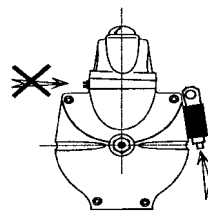
The electric connection is obtained via 2 packing-gland M20 in stainless steel (for wire dia. 7 to 12) or a Binder connector. The good tightness of the box depends on cable selection and the tightening level of the packing-gland.

Pneumatic connection

The pneumatic connection is done directly on the actuator or on the solenoid valve fitted on the actuator.



Direct connection



Connection on solenoid valve



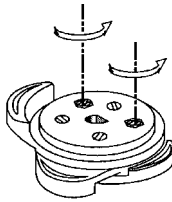
Open/close position detection adjustment

The limit switches or detectors are factory adjusted.

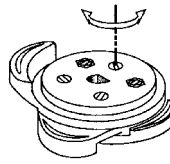
It is not necessary to re-adjust before valve mounting on site.

Nevertheless, if you wish to re-adjust after a maintenance operation, proceed as follows:

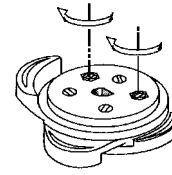
- Remove the cover of the box.
- Put the disc in extreme position (opening or closing).
- Unscrew the two metal screws one turn.
- Adjust triggering of the required detector by turning the coloured screw corresponding to the colour of the cam to adjust.
- Proceed in the same manner with the opposite 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 - Scew 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:

 ATEX	II 3 D Ex tc IIIA T 80 °C - 10 °C ≤ Ta ≤ 60 °C Dc IP 67
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Michel Delobel

Quality Assurance

11/18 - Rev. 3

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