

***Includes new casing depths and thickness***

Designed for inclusion in Marine and Offshore Projects

### Features

#### Blades

- 430 stainless steel and 316 stainless steel options.

#### Casings

- Lightweight cost effective design.
- Rectangular and circular flanges.
- Galvanised and 316 stainless steel options.
- 1.2, 2, and 3mm options.
- 150 and 210mm depths.
- Standard and customer flange drilling options.
- Visual indicator option.

#### Actuators

##### Electrical

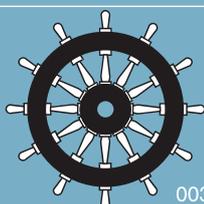
- 24, 120 and 230 volt options
- Factory fitted ETR option.

##### Pneumatic

- 3 second reset time.
- PTR release.

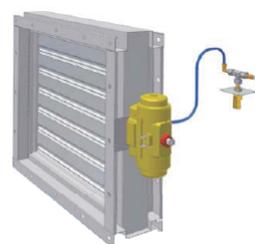
##### Atex rated

- Universal voltage 24 - 230V - 120V AD/DC.
- Factory fitted STS option.



0038/YY

YY denotes last two digits of year that Wheelmark is affixed to damper.



## Introduction

The MFD A-60 Marine Fire Damper has been specifically engineered to meet stringent legislation.

The A-60 Marine Fire Damper has been designed for inclusion in air conditioning and ventilation systems, in dry filtered air, and is tested and approved for fitting to class A-60 divisions (bulkheads and decks), when suitably insulated (refer to insulation details).

The A-60 Product Range now includes 2mm and 3mm thick casings and ATEX (Ex) rated motor options.

*LIVERANI was born in the 1950 as a manufacturer of bronze and stainless steel pumps. The long experience in pumps construction for different sectors, allows us with the nautic division, to be considered as an ideal partner for the manufacturer of yachts, merchant, fishing and military ships.*

*The company's production includes: pumps with pulley, with manual or magnetic clutch, with hydraulic motor; electric pumps, pressure boosters and electric blowers with DC and AC motors, diesel engine pumps, hand pumps. The construction materials are selected for marine use.*

*The factory covers an area of 12000 m<sup>2</sup> of which 6800 indoors, where about 30 people works in full synergy. The machineries are made with CNC machines, the assembly lines are very well organized and the spares warehouse is fully automated.*

*The engineering is developed in house, in a special R&D department.*



## Specification

The MFD A-60 Marine Fire Damper is constructed from galvanised steel 1.2mm thick, (2 and 3mm options available), 40mm flanged rectangular or circular casing, (All 316 stainless steel option available). 75mm interlocking 430 grade stainless steel aerodynamic blades, steel blade end bearings and 300 grade stainless steel peripheral gasketing. (316 grade stainless steel blade and blade end bearing available).

The totally enclosed precise movement opposed blade drive is positioned out of the airstream for protection against damage, and is hard wearing and free running.

### Electrical

The MFD direct-coupled spring return fail-safe electrical control modes are fitted with halogen free low smoke and fume electrical cable. They have a 60 second reset time and a 20 second release time. Each actuator has a 72°C rated electrical thermal release (ETR). The ETR incorporates a safety electrical interlock that only permits actuator operation when correctly fitted. A green 'Healthy' indication lamp is built into the ETR housing to give a simple and clear visual check that the actuator is receiving power, the ETR is correctly fitted, and the thermal fuse is intact. A manual test switch allowing periodic operation of the damper for testing purposes simulates actual fail-safe release under smoke/fire conditions. End switches are provided with each mode for reset and release monitoring.

### Electrical ATEX (Ex) rated.

The direct-coupled spring return fail-safe ATEX (Ex) electrical control modes are fitted with 1 metre of cable for connection inside hazardous areas. They have the benefit of a Universal electrical supply using any Voltage between 24-230 V AC/DC, which is self adaptable. They have Variable (3-15-30-60-120 sec/90°C) Reset and (3-10 sec/90°C) Release times, which are selectable on site. Each actuator has a Integral safety temperature sensor (STS) rated at 72°C. The STS incorporates a triple fail-safe

thermal fuse arrangement, 2 induct and one outside, to ensure the fail-safe actuator operates in all conditions. A manual test switch allowing periodic operation of the damper for testing purposes simulates actual fail-safe release under smoke/fire conditions. End switches are provided with each mode for reset and release monitoring. An Integral heater allows the unit to be operated within ambient temperatures down to -40°C.

### Pneumatic

The direct coupled spring return fail-safe pneumatic control mode requires an air pressure of between 5 to 8 bar (72 to 116 psi) to operate. They have 3 second reset and release time. Each actuator has a pneumatic thermal release (PTR). The PTR assembly is supplied with 500mm nylon tubing that connects to the quick fit couplings of the PTR and actuator. Incorporated is a fail-safe 74°C fusible link. When this operates, air exhausts from the actuator, permitting the spring return actuator to go to the fail-safe position, thus closing the damper. Switch box and solenoid accessories are available for monitoring and control.

### Tests and Approval list

\*Lloyds Register of Shipping Approval to IMO Fire Test Procedures Code, Annex 1, Part 3, for Class A60 bulkheads and decks.

\*Marine Equipment Directive 96 /98 /EC.

\*USCG Approved (product category 164.139).

\*Corrosion tested.

\*Vibration tested.

## Range and Application

The A-60 dampers can be used where the maximum system pressure is up to 1500 Pa and duct velocities to 15m/s.

A-60 Marine Fire Dampers are designed for applications in normal dry filtered air systems and should be subjected to a planned inspection programme, with cleaning and light oil lubrication, to the

blade and drive area, in accordance with good industry practice. When exposed to fresh air intakes and/or inclement conditions please refer to Catef Technical Sales Office.

The A-60 Marine Fire Damper is suitable for both vertical and horizontal applications, with airflow in either direction.

The dampers are normally open, and fail-safe to the closed position.



### Electrical

Fail-safe is by means of a unique and patented Electrical Thermal Release (ETR) which operates at 72 °C, or if power supply is interrupted. The ETR incorporates a safety feature, that ensures the fail-safe status of the damper if the ETR is not fitted on to the ductwork. Additionally a green LED lamp is built into the ETR housing. This gives the user a simple and clear visual check that the Actuator is receiving power, the ETR is correctly fitted, and the thermal fuse is intact.

A manual test switch allows periodic operation of the damper for testing purposes, simulating actual fail-safe release under fire conditions.

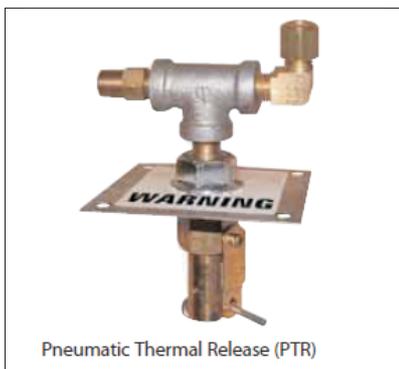
The associated electrical control Modes are available in 24 volt, 120 volt or 230 volt versions.



Electrical ATEX (Ex) rated. Fail-safe is by means of a Safety Temperature Sensor (STS) which operates at 72 °C, or if power supply is interrupted.

A manual test switch allows periodic operation of the damper for testing purposes, simulating actual fail-safe release under fire conditions.

The associated electrical control Modes are available in one Universal version with 24 – 230 volt AC/DC supply.



### Pneumatic

The special purpose design Pneumatic Thermal Release (PTR) assembly is supplied with 500mm nylon tubing that connects to the quick fit couplings of the PTR and actuator. Incorporated is a failsafe 74°C fusible link. When this activates, air exhausts from the actuator, enabling the PTR to spring return to the fail-safe position, thus closing the damper.

## Electrical Control Modes

### Standard Control Modes

The IP54 rated Control Modes, are located outside of the ductwork for ease of access and installation. Control Modes fitted to dampers up to 400mm high, can be fitted in any one of three orientations i.e. vertically down, horizontally or vertically up. Positions 1, 2, or 3). Two sizes (Compact and Universal) of Control Mode are utilised. This flexibility ensures that the smaller damper sizes and Control Mode require the minimal amount of room. For damper sizes above 400mm high the control mode is fitted vertically. Correctly sized Control Modes are designed to fit only to the relevant sized damper.

The control modes are direct coupled to the damper utilising a unique user friendly positive connection system. This allows the dampers and actuators to be supplied separately, offering shipping and storage benefits.

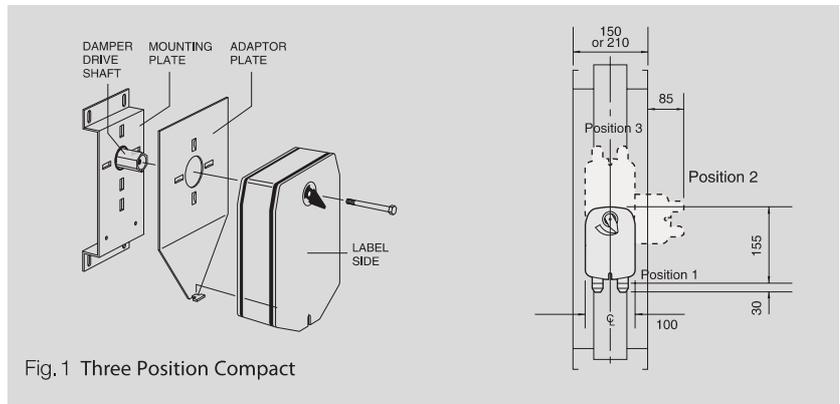


Fig. 1 Three Position Compact

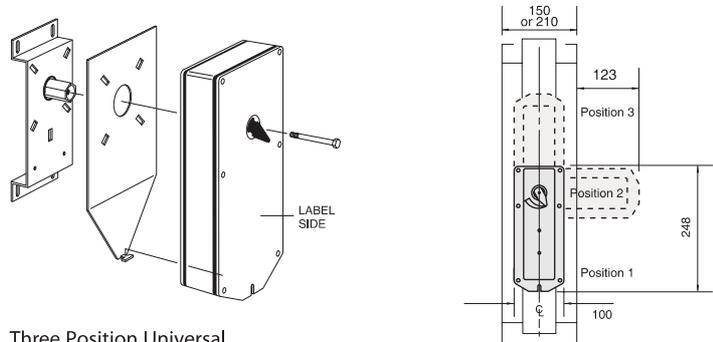


Fig. 2 Three Position Universal

### Control Mode Standard Parameters

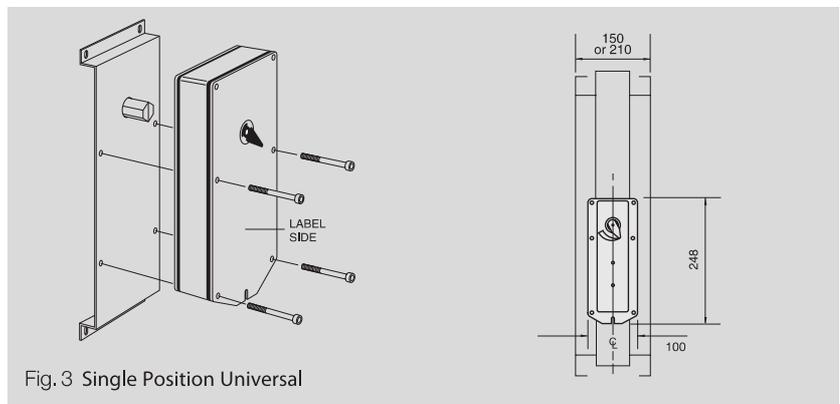
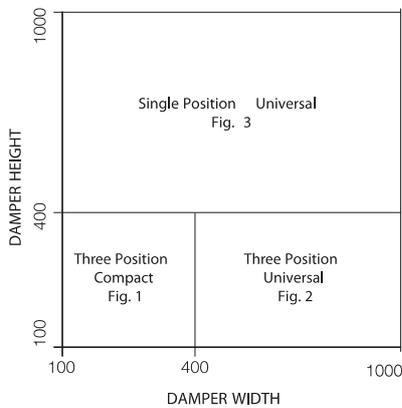
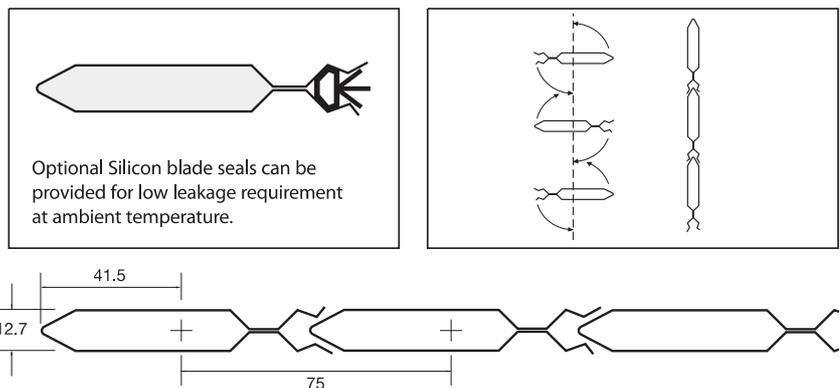


Fig. 3 Single Position Universal

## Blade Features

The damper blades are aerodynamic double skin, Type 1.4016 (430 grade) Ferritic Stainless Steel, which are 75mm wide and when closed interlock to form a positive fire resisting shield. Incorporated in the blade are steel blade end bearings. Optional blades in Type 1.4401 (316 grade) Austenitic Stainless can be provided. Incorporated in the blade are 316 Stainless Steel blade end bearings.



## Electrical Application and Wiring

### Standard Application and Wiring

Control Mode 5     24V A.C. or D.C.  
Control Mode 6     230V A.C. 50/60Hz  
Control Mode 120   120V A.C. 50/60Hz

Power On            Damper motors open.  
Power Off         -     Damper springs closed.  
ETR Operates -     Damper springs closed.

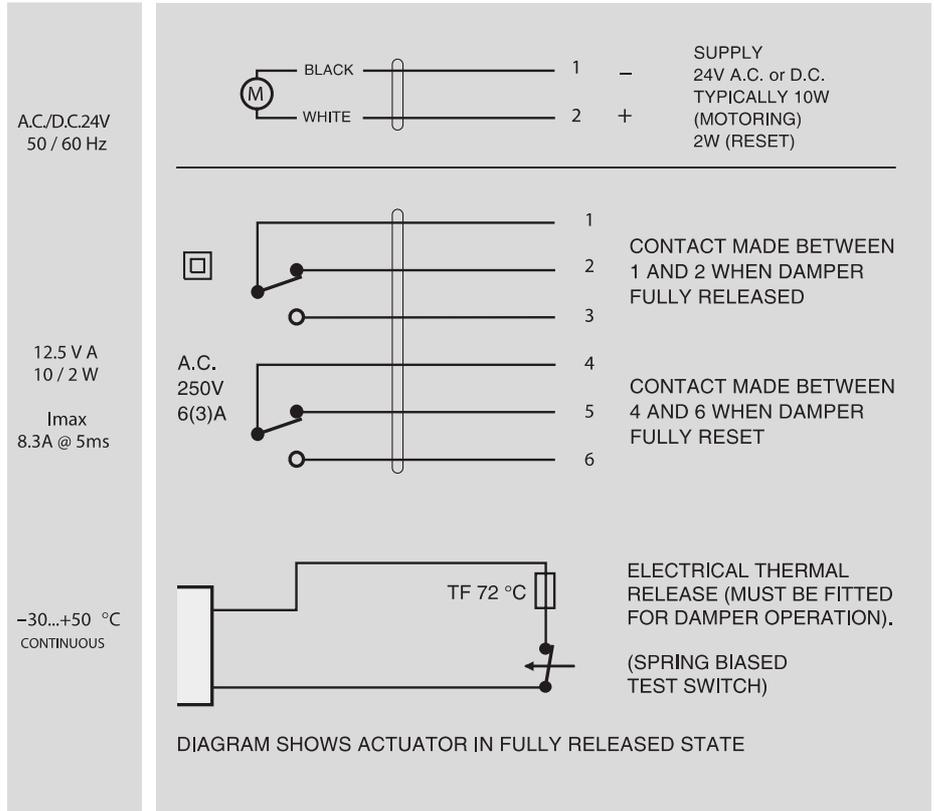
12W (Maximum Motoring).  
4W (Maximum Reset).

End Switches Rated at 250V 1.5 Amp  
(Maximum).

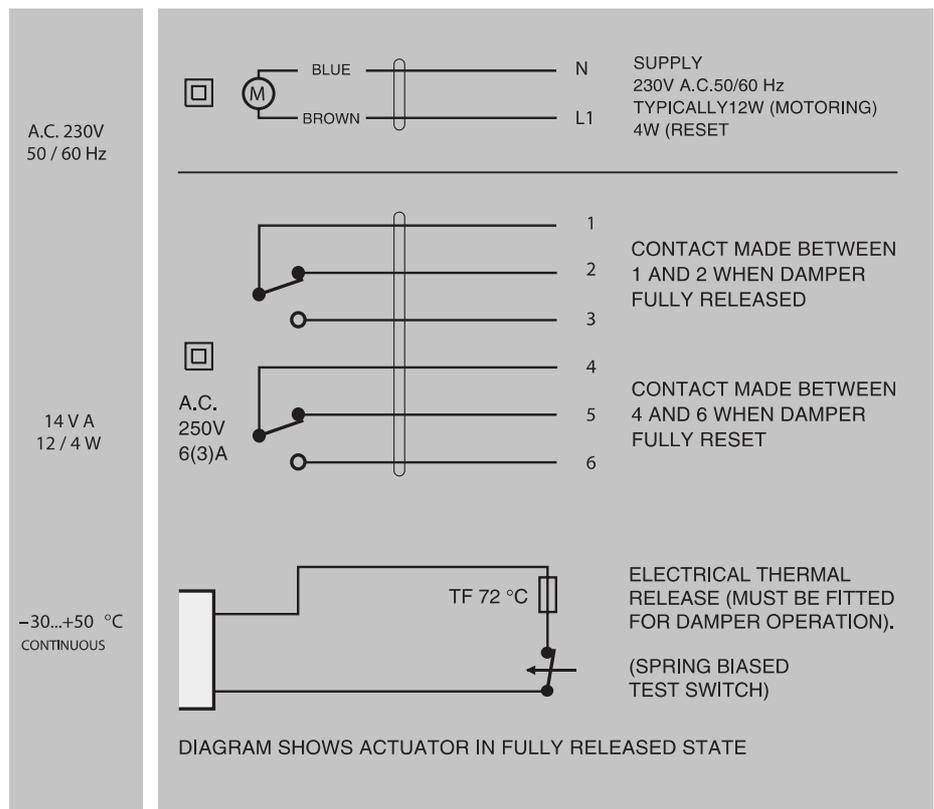
To isolate from main power supply, the system must incorporate a device, which disconnects the phase conductors, with at least 3mm contact gap.

2 x 1 metre of halogen free, low smoke and fume electric cables are included with each control mode. The ETR is also pre-wired with 0.5 metre halogen free low smoke and fume cable.

### Mode 5 24V System



### Mode 6 230V System (Also 120V Typical)

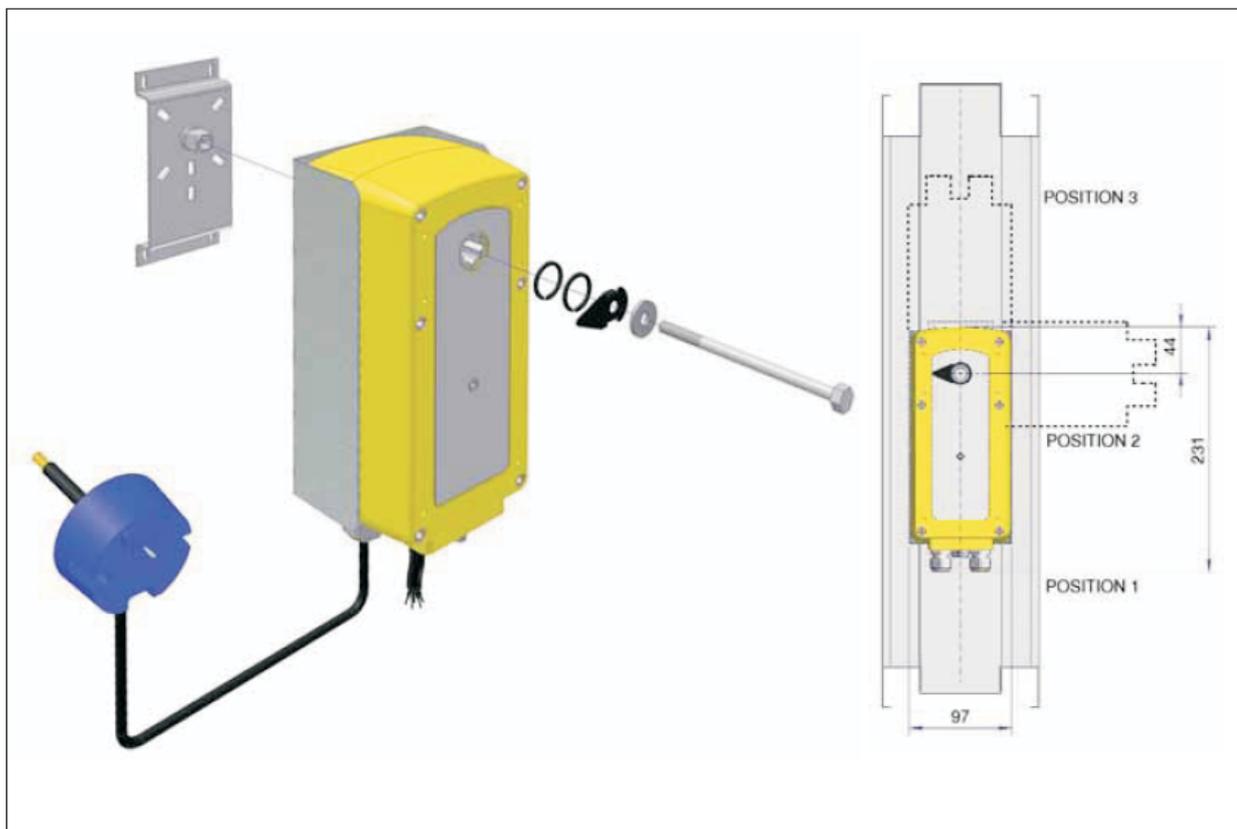
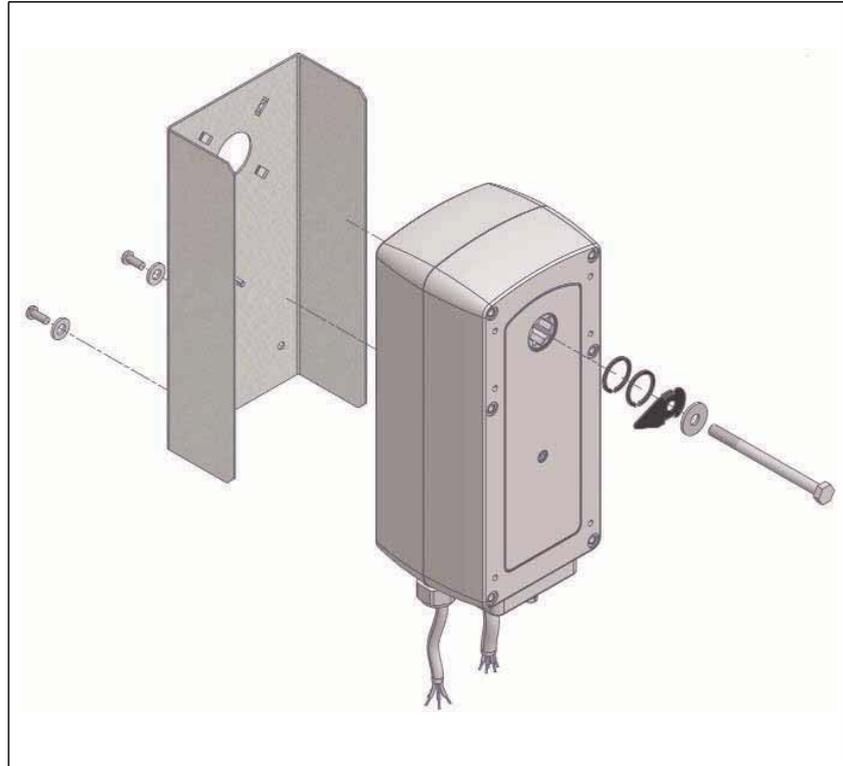


## ATEX (Ex) Rated Control Modes

The ATEX rated Control Modes are located outside of the ductwork for ease of access and installation.

Control Modes can be fitted in any one of three orientations i.e. vertically down, horizontally or vertically up. Positions 1, 2, or 3).

The control modes are direct coupled to the damper utilising a unique user friendly positive connection system. This allows the dampers and actuators to be supplied separately, offering shipping and storage benefits.



## ATEX (Ex) rated Application and Wiring

### Atex (Ex) Rated Electrical Control Modes

Universal supply unit from 24 to 230V-AC/DC.

Power On - Damper motors open.  
 Power Off /- Damper springs closed.  
 STS Operates - Damper springs closed.  
 20W (Maximum Blocking),

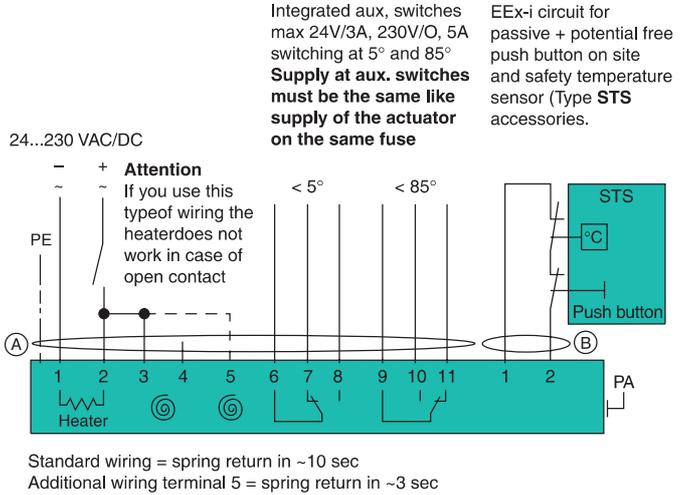
16W (Heater).

End Switches Rated at 250V 1.5 Amp (Maximum).

To isolate from main power supply, the system must incorporate a device, which disconnects the phase conductors, with at least 3mm contact gap.

A metre of halogen free, low smoke and fume electric cable is included with each control mode. The STS is also prewired with a metre of halogen free low smoke and fume cable.

### On-off 1-wire-spring return + EEx-i circuit

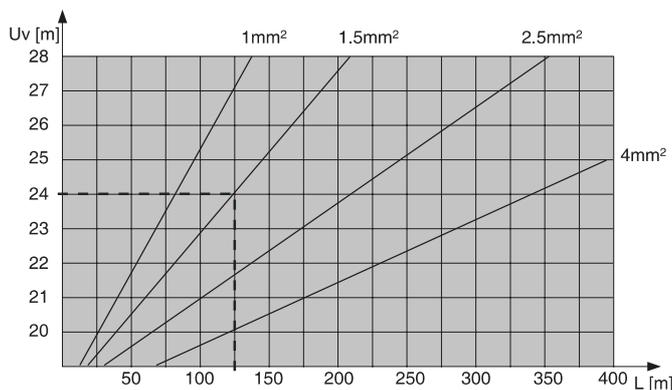


### Power input depending on supply voltage

#### Power supply design

The design of the on-site supply, depends on the selected motor running time and selected supply voltage. Accompanying values are "about values", since there can be construction unit dispersions within electronics. The power consumption in the blocking position is run time independently with max 20W. The power consumption for the heater is approximately 16W. The heading is running only if the motor is in idle position. The initial starting supply voltage required by the actuators power supply unit is around 2.0A for about 1 sec. (Please consider this while conceiving the cross section of the supply line.)

Voltage	Current	Rated current in acc. with motor running time				
		3/7,5s	15s	30s	60s	120s
230V	I <sub>rated</sub>	0.5A	0.3A	0.15A	0.10A	0.10A
120V	I <sub>rated</sub>	0.75A	0.4A	0.3A	0.25A	0.25A
48V	I <sub>rated</sub>	2.0A	0.5A	0.3A	0.2A	0.2A
24V	I <sub>rated</sub>	4.7A	1.45A	0.52A	0.4A	0.4A



Example :  
24V power supply with diameter 1.5mm<sup>2</sup> = 126m

### Dimensioning of the line cross section with 24....48 Volt AC/DC supply voltages

#### Dimensioning / Design of the supply line

On long distances between voltage and drive, voltage drops occur due to line resistances. As a consequence with 24V AC/DC the actuator receives a too low tension and does not start. In order to prevent this, the cross section of the inlet line is to be designed/dimensioned accordingly. The accompanying formula allows the calculation of the necessary line cross section, perhaps provides the maximally conduit length utilising the existing line cross section. Alternatively the secondary voltage can be increased by selecting a transformer.

For calculation purposes, following characteristics are essential:

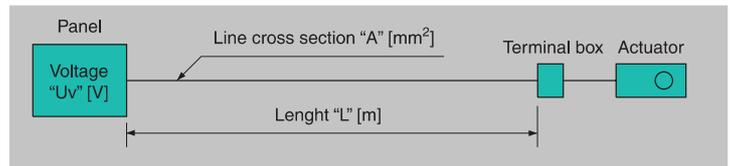
UV = supply voltage in [V]

A = line cross section in [mm<sup>2</sup>]

L = conduit length in [m]

Factor 0.0714 = drive-specific factor

[Vmm<sup>2</sup>/m] 9 based on the electrical conductivity of electrolytic copper with a coefficient of 56/Wmm<sup>2</sup>)



Formula for maximum cable length "L" at cable cross section "A"

$$L = A \cdot (U_v - 18V) : 0.0714$$

Example:

A = 1.5mm<sup>2</sup>, U<sub>v</sub> = 24V  
Length of cable L = 126m

Formula of needed cable cross section "A" at a cable length of "L"

$$A = 0.0714 \cdot L : (U_v - 18V)$$

Example:

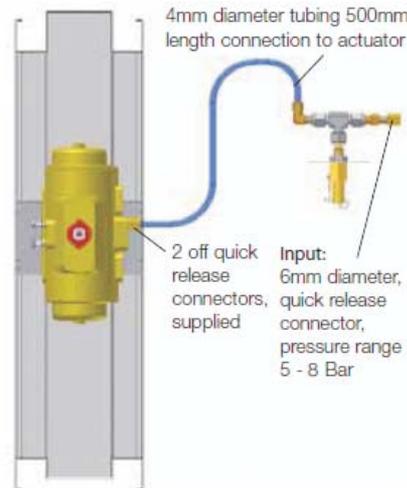
L = 250m, U<sub>v</sub> = 30V  
Cross section of A = 1.5mm<sup>2</sup>

Pneumatic Control Mode

All dimension are in millimetres



Pneumatic Thermal Release (PTR)



Pneumatic Operation

Air On - Damper opens.  
Air Off - Spring closure.

Release time ≈ 2 - 4 secs.  
Reset time ≈ 2 - 4 secs.

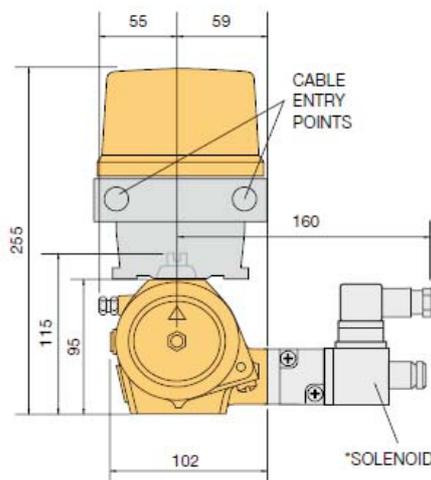
Air inlet 6mm dia. quick fit coupling.  
74 °C Pneumatic Thermal Release (PTR).

Air consumption to reset @ 5.5 bar = 535cc.

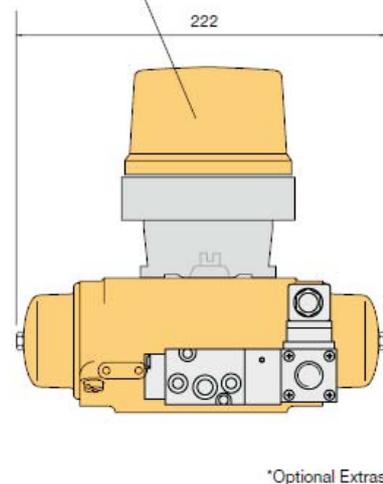
External mechanical position indicator.  
Test operation by removing fusible link element.

Dimensional Data

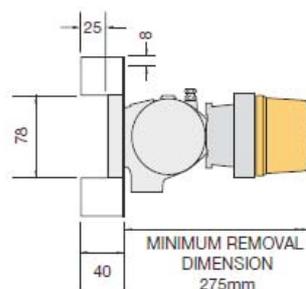
Pneumatic Spring Return Actuator



\*SWITCHBOX / STATUS BEACON



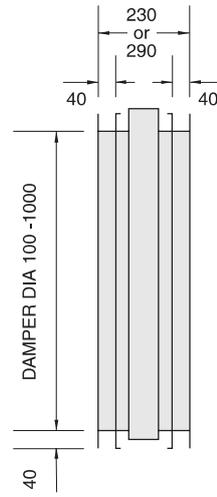
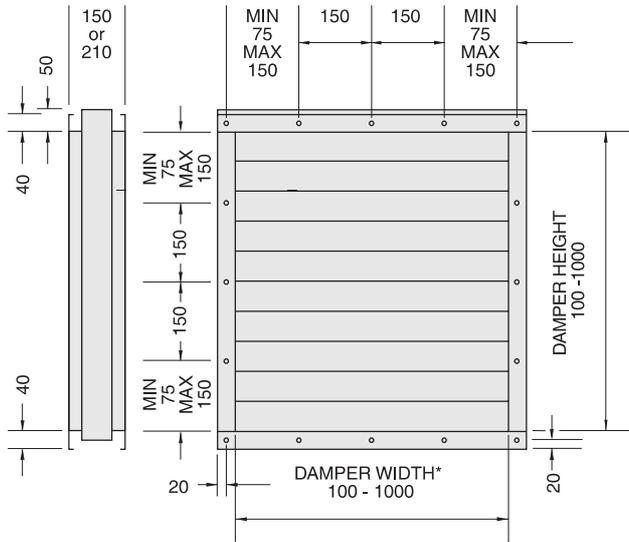
Pneumatic Actuator



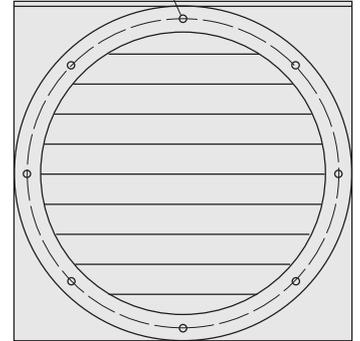
Plan view cross section showing Control Mode dimensions

Square and Rectangular  
(A-60 RECT)

Circular  
(A-60 CIRC)



SEE TABLE BELOW FOR NUMBER OF HOLES, TO BE EQUALLY SPACED ON PCD  
ALIGNMENT OF HOLES TAKEN FROM CENTRE LINE OF SQUARE SECTION PLATE

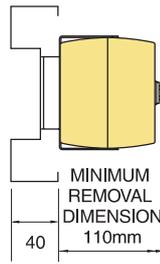
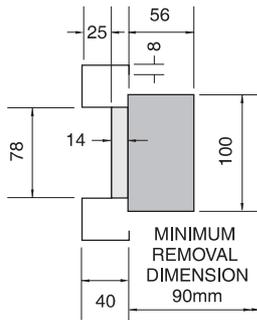


PCD = NOM .  
DIA. + 40mm

HOLE DIM.  
SEE TABLE  
BELOW

Electrical Actuator

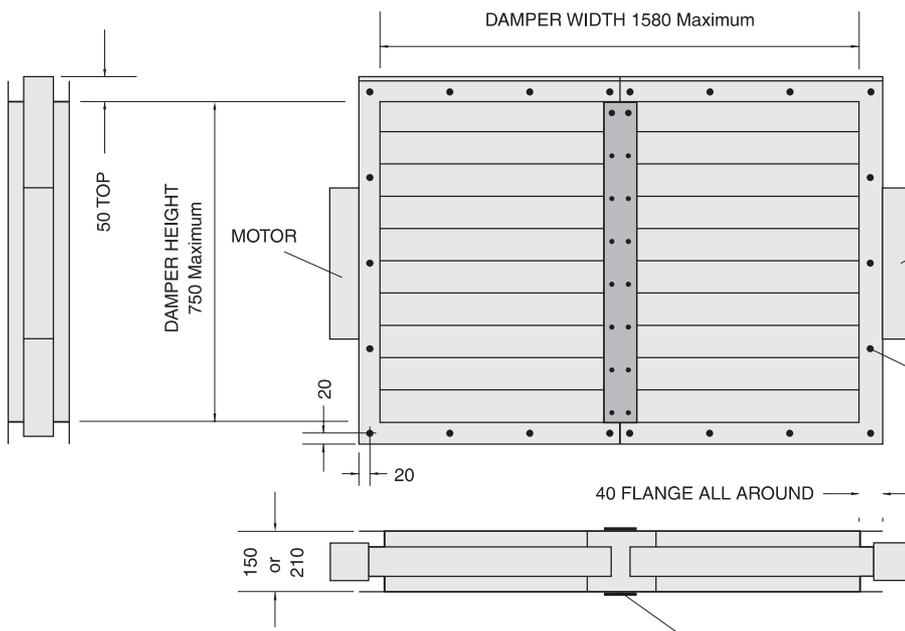
Atex Electrical



**Circular Damper Fixing Hole Details**

Damper Dia.	No. of Holes	Hole Dia.
100 - 250	4 off	7.0
251 - 500	8 off	10.0
501 - 750	12 off	12.0
751 - 1000	16 off	12.0

**Multiple Assemblies**



Multiple width assemblies (2 x 1) have been tested and approved to a size of 1580mm wide x 750mm high.

MOTOR

12mm DIA. HOLES IN EACH CORNER AND EQUALLY SPACED AT 150mm MAX. CENTRES BOTH SIDES OF FLANGES ON EACH INDIVIDUAL DAMPER

75mm WIDE JOINING STRIP. (BOTH SIDES) RIVETTED WITH 3.2mm STEEL RIVETS AT 100mm CENTRES, ON SITE BY OTHERS

Weights 1.2mm Galvanised Casings, 150mm Deep

	Calculated Weights (Kg) of A-60 Rectangular (Excluding Actuator)																			Calculated Weights (Kg) of A-60 Circular (Excluding Actuator) <input type="checkbox"/>	
	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000	100 Dia.	150 Dia.
100	3.0	3.4	3.8	4.2	4.6	5.1	5.5	5.9	6.3	6.7	7.1	7.6	8.0	8.4	8.8	9.2	9.7	10.1	10.5	4.6	6.8
150	3.9	4.3	4.8	5.2	5.7	6.1	6.6	7.0	7.5	7.9	8.4	8.8	9.3	9.7	10.2	10.6	11.1	11.5	12.0	8.1	9.8
200	4.1	4.6	5.0	5.5	5.9	6.4	6.9	7.3	7.8	8.2	8.7	9.1	9.6	10.0	10.5	10.9	11.4	11.8	12.3	12.0	13.4
250	4.7	5.2	5.7	6.2	6.7	7.2	7.6	8.1	8.6	9.1	9.6	10.1	10.5	11.0	11.5	12.0	12.5	13.0	13.5	14.1	15.4
300	5.3	5.8	6.4	6.9	7.4	7.9	8.4	8.9	9.5	10.0	10.5	11.0	11.5	12.1	12.6	13.1	13.6	14.1	14.7	15.4	18.2
350	5.6	6.1	6.6	7.2	7.7	8.2	8.7	9.2	9.7	10.3	10.8	11.3	11.8	12.3	12.9	13.4	13.9	14.4	14.9	15.4	19.8
400	6.2	6.7	7.3	7.8	8.4	8.9	9.5	10.0	10.6	11.1	11.7	12.2	12.8	13.3	13.9	14.5	15.0	15.6	16.1	16.1	22.0
450	7.1	7.7	8.3	8.9	9.5	10.1	10.6	11.2	11.8	12.4	13.0	13.6	14.2	14.7	15.3	15.9	16.5	17.1	17.7	17.7	26.4
500	7.4	8.0	8.6	9.2	9.7	10.3	10.9	11.5	12.1	12.7	13.3	13.8	14.4	15.0	15.6	16.2	16.8	17.4	18.0	18.0	28.9
550	8.0	8.6	9.2	9.9	10.5	11.1	11.7	12.3	13.0	13.6	14.2	14.8	15.4	16.1	16.7	17.3	17.9	18.5	19.2	19.2	31.7
600	8.6	9.3	9.9	10.6	11.2	11.9	12.5	13.2	13.8	14.5	15.1	15.8	16.4	17.1	17.7	18.4	19.0	19.7	20.4	20.4	33.6
650	8.9	9.5	10.2	10.8	11.5	12.1	12.8	13.4	14.1	14.8	15.4	16.1	16.7	17.4	18.0	18.7	19.3	20.0	20.6	20.6	36.3
700	9.5	10.2	10.9	11.5	12.2	12.9	13.6	14.3	15.0	15.7	16.3	17.0	17.7	18.4	19.1	19.8	20.5	21.2	21.8	21.8	39.4
750	10.1	10.8	11.5	12.2	13.0	13.7	14.4	15.1	15.8	16.6	17.3	18.0	18.7	19.4	20.2	20.9	21.6	22.3	23.0	23.0	41.5
800	10.3	11.1	11.8	12.5	13.2	13.9	14.7	15.4	16.1	16.8	17.5	18.3	19.0	19.7	20.4	21.2	21.9	22.6	23.3	23.3	44.5
850	11.0	11.7	12.5	13.2	14.0	14.7	15.5	16.2	17.0	17.7	18.5	19.2	20.0	20.7	21.5	22.3	23.0	23.8	24.5	24.5	
900	11.5	12.3	13.1	13.9	14.7	15.5	16.3	17.1	17.8	18.6	19.4	20.2	21.0	21.8	22.6	23.4	24.1	24.9	25.7	25.7	
950	11.8	12.6	13.4	14.2	15.0	15.8	16.5	17.3	18.1	18.9	19.7	20.5	21.3	22.1	22.8	23.6	24.4	25.2	26.0	26.0	
1000	12.4	13.2	14.1	14.9	15.7	16.5	17.4	18.2	19.0	19.8	20.6	21.5	22.3	23.1	23.9	24.7	25.6	26.4	27.2	27.2	

Weights 1.2mm 316 Stainless Steel Casings, 150mm Deep

	Calculated Weights (Kg) of A-60 Rectangular (Excluding Actuator)																			Calculated Weights (Kg) of A-60 Circular (Excluding Actuator) <input type="checkbox"/>	
	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000	100 Dia.	150 Dia.
100	3.0	3.4	3.9	4.3	4.7	5.1	5.6	6.0	6.4	6.8	7.3	7.7	8.1	8.5	9.0	9.4	9.8	10.2	10.7	4.7	6.9
150	3.9	4.4	4.8	5.3	5.8	6.2	6.7	7.1	7.6	8.1	8.5	9.0	9.5	9.9	10.4	10.8	11.3	11.8	12.2	8.2	10.0
200	4.2	4.6	5.1	5.6	6.0	6.5	7.0	7.4	7.9	8.3	8.8	9.3	9.7	10.2	10.6	11.1	11.6	12.0	12.5	12.0	13.4
250	4.8	5.3	5.8	6.3	6.8	7.3	7.8	8.3	8.8	9.3	9.7	10.2	10.7	11.2	11.7	12.2	12.7	13.2	13.7	14.1	15.4
300	5.4	5.9	6.4	7.0	7.5	8.0	8.6	9.1	9.6	10.2	10.7	11.2	11.8	12.3	12.8	13.4	13.9	14.4	15.0	15.4	18.2
350	5.7	6.2	6.7	7.3	7.8	8.3	8.9	9.4	9.9	10.5	11.0	11.5	12.1	12.6	13.1	13.6	14.2	14.7	15.2	15.6	19.8
400	6.2	6.8	7.4	8.0	8.5	9.1	9.7	10.2	10.8	11.4	11.9	12.5	13.1	13.6	14.2	14.8	15.3	15.9	16.5	16.9	22.0
450	7.2	7.8	8.4	9.0	9.6	10.2	10.8	11.4	12.0	12.7	13.2	13.9	14.5	15.1	15.7	16.3	16.9	17.5	18.1	18.5	26.4
500	7.5	8.1	8.7	9.3	9.9	10.5	11.1	11.7	12.3	12.9	13.5	14.1	14.7	15.3	15.9	16.5	17.1	17.8	18.4	18.8	31.7
550	8.1	8.7	9.4	10.0	10.7	11.3	11.9	12.6	13.2	13.9	14.5	15.1	15.8	16.4	17.1	17.7	18.3	19.0	19.6	19.6	33.6
600	8.7	9.4	10.1	10.7	11.4	12.1	12.8	13.4	14.1	14.8	15.5	16.1	16.8	17.5	18.2	18.8	19.5	20.2	20.9	20.9	36.3
650	9.0	9.7	10.3	11.0	11.7	12.4	13.0	13.7	14.4	15.1	15.7	16.4	17.1	17.8	18.4	19.1	19.8	20.5	21.1	21.1	39.4
700	9.6	10.3	11.0	11.7	12.4	13.1	13.9	14.6	15.3	16.0	16.7	17.4	18.1	18.8	19.5	20.3	21.0	21.7	22.4	22.4	41.5
750	10.2	10.9	11.7	12.4	13.2	13.9	14.7	15.4	16.2	16.9	17.7	18.4	19.2	19.9	20.6	21.4	22.1	22.9	23.6	23.6	44.5
800	10.5	11.2	12.0	12.7	13.5	14.2	15.0	15.7	16.4	17.2	17.9	18.7	19.4	20.2	20.9	21.7	22.4	23.2	23.9	23.9	
850	11.1	11.9	12.6	13.4	14.2	15.0	15.8	16.6	17.3	18.1	18.9	19.7	20.5	21.2	22.0	22.8	23.6	24.4	25.2	25.2	
900	11.7	12.5	13.3	14.1	15.0	15.8	16.6	17.4	18.2	19.0	19.9	20.7	21.5	22.3	23.1	24.0	24.8	25.6	26.4	26.4	
950	12.0	12.8	13.6	14.4	15.2	16.1	16.9	17.7	18.5	19.3	20.1	21.0	21.8	22.6	23.4	24.2	25.0	25.9	26.7	26.7	
1000	12.6	13.4	14.3	15.1	16.0	16.8	17.7	18.5	19.4	20.3	21.1	22.0	22.8	23.7	24.5	25.4	26.2	27.1	27.9	27.9	