

A-60

Marine Fire Damper



QUICK FACTS

- Designed for inclusion in air conditioning and ventilation systems, in dry filtered air, and is tested and approved for fitting to class A-0, A-15, A-30 and A-60 divisions (bulkheads and decks)
- Electrical Schischek (Atex & Non Atex options) actuators
- Pneumatic ATEX (ex) rated actuators
- Supplied with either 430 Ferritic Stainless steel blades, galvenised steel casing or 316 Austenitic Stainless steel blades, casing and drive.
- ISO 9001/14001 Certified
- DNL-GL Type approved
- Marine Equipment Directive (MED) 2014/90/EU
- Lloyds Register Approval to IMO Fire Test Procedures Code, Annex 1, Part 3, for Class A0, A15, A30 & A60 Division bulkheads and decks
- ABS (American Bureau of Shipping) approved to 2005 Steel Vessel Rules 1-14/7.7
- Certificate of Approval



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Introduction

Actionair has, for many years, been associated in the design, development and manufacture of life safety equipment, including the supply of fire damper products to the off shore and marine industry. The Actionair A-60 Marine Fire Damper has been specifically engineered to meet stringent legislation.

The A-60 Marine Fire Damper compliments the comprehensive range of automatic fire and smoke dampers and associated controls and provides the complete solution for shipboard air conditioning and ventilation systems and fire safety engineering strategies.

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-0, A-15, A-30 and A-60 divisions (bulkheads and decks), when suitably insulated (refer to insulation details).

Specification

Electrical

The Actionair direct-coupled spring return fail-safe electrical control modes are fitted with halogen free low smoke and zero halogen cable 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 Schischek (Atex & Non Atex options)

The Actionair direct-coupled spring return fail-safe Schischek electrical control modes are fitted with 1 metre of cable. They have the benefit of a universal electrical supply using any Voltage between 24-230V AC/DC, which is self adaptable.

They have variable (3 -15-30 -60-120 sec) reset and (3 -10 sec) release times, which are selectable on site. Each actuator has a Integral Safety Temperature Sensor rated at 72°C which incorporates a triple failsafe thermal fuse arrangement, 2 induct and one outside, to ensure the fail-safe control mode 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 control mode for reset and release monitoring. An Integral heater allows the unit to be operated within ambient temperatures down to -40°C.

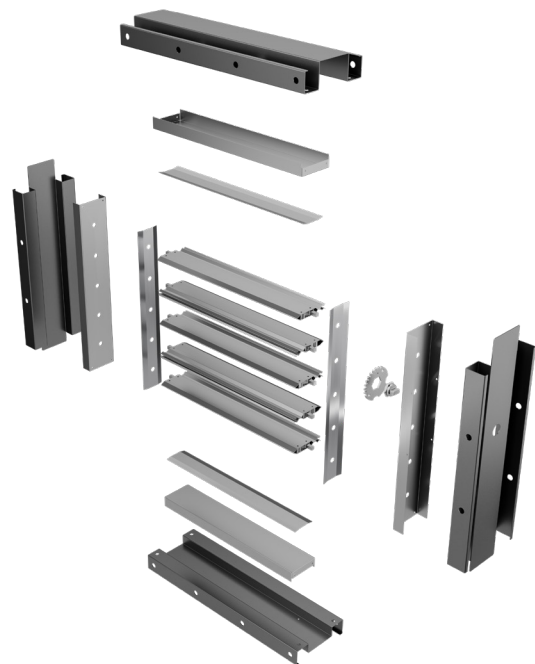
Pneumatic ATEX (Ex) rated

The Actionair direct coupled spring return fail-safe pneumatic control mode requires dry and filtered instrument air at pressure of between 5 to 8 bar (72 to 116 psi) to operate. They have 3 second reset and release time. Each control mode 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 control mode. Incorporated is a fail-safe 74 °C fusible link. When this operates, air exhausts from the control mode, permitting the spring return action to the failsafe position, thus closing the damper. Switch box and solenoid accessories are available for monitoring and control.

Casing and Blade Options

A-60 Dampers are supplied in 2 casing and blade options:-

1. 430 Stainless steel blades, galvanised steel casing.
2. 316 Stainless steel blades, casing and drive.



Testing

Two levels of testing exist.

1. Routine testing

Monthly, or in accordance with maintenance programme, release and reset damper (via control system or ETR test switch). Check remote indication or visual check of mechanical pointer as appropriate.

2. Visual check at damper

At commissioning and at least once a year, check damper operation by removing and re-applying power to actuator. (via ETR test switch). Visually check blades for damper closed and open positions. Prove remote indication if applicable.

Routine Maintenance

Depending upon environmental conditions, each damper will merit its own cleaning regime. Particularly hostile areas may require monthly cleaning and lubrication. 'Frequency of Maintenance' should be determined by collecting historical data from previous visits, and for this reason, commence maintenance programmes at very frequent intervals. Dampers in 'Dry Filtered Air' require very limited maintenance. Using a light lubricant and cloth, clean all exposed surfaces.

Remove all traces of surface staining, as this will deteriorate further causing deeper material corrosion. Pay particular attention to the blade rivets, where crevice corrosion will cause rapid failure of blades if not kept in check. If damper is stiff to operate, lubricate blade ends and open and close damper successively until the damper moves with ease (this may necessitate removal of the actuator and operating the blades manually by the drive shaft). In addition, galvanic corrosion where differing metals come in contact should be monitored. Refit actuator and retest. Clean off excessive lubricant.

Application

The A-60 dampers can be used where the maximum system pressure is up to 1500 Pa and duct velocities to 15m/s. The A60 Marine Fire Damper has been tested in accordance with EN1751:2014 and is classified; Class 3 closed blade leakage with blade seals; Class C casing leakage. 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.

Casing Features

1.2mm galvanised steel or 316 grade (type 1.4401) austenitic stainless steel flanged type casing, (optional 2mm and 3mm thick), having a single penetration for the drive control, complies to Class A & B of Eurovent 2/2 and Test Procedures for Classes A, B,

& C of the HVCA Ductwork Specification DW144. Pre-punched bolt holes are provided as standard (refer to page 11). In addition, stainless steel peripheral gasketing is included, which allows for expansion under full fire conditions. The 1.2mm casing has obvious benefits, for example being lighter in weight, allowing easier installation.

Blade Features

The damper blades are aerodynamic double skin at 75mm pitch which, when closed, interlock to form a positive fire resisting shield:- 430 grade (Type 1.4016) ferritic stainless steel with sintered steel with steam oxide and oil dipped finish blade end bearings (available with galvanised casing only). 316 grade (Type 1.4401) austenitic stainless steel with sintered 316 austenitic stainless steel blade end bearings (available with galvanised and stainless steel case). Blades are 0.5mm thick of double skin construction.



Fig 2. Casing Mounted ETR - 2mm & 3mm casing option (only on 210mm deep casing)

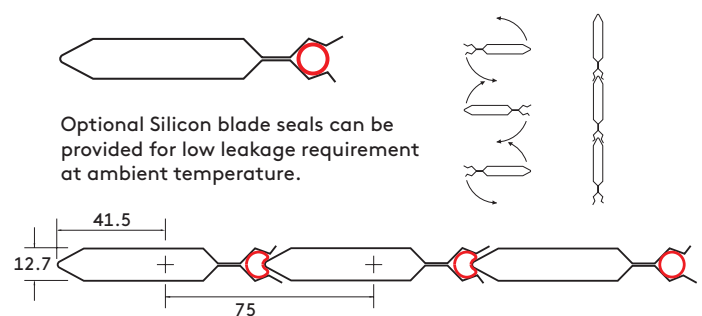
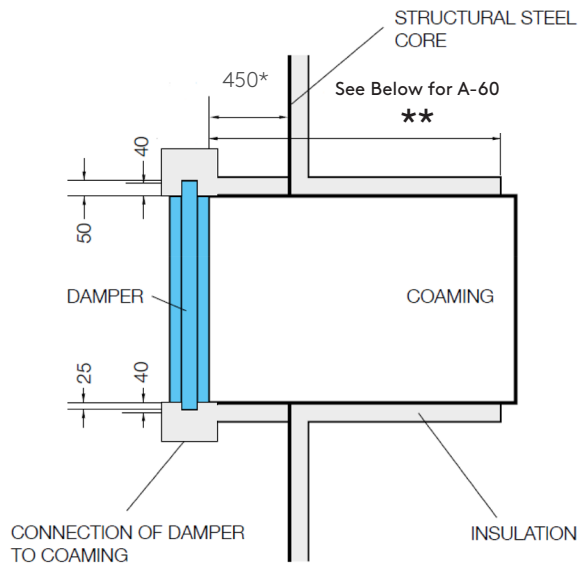


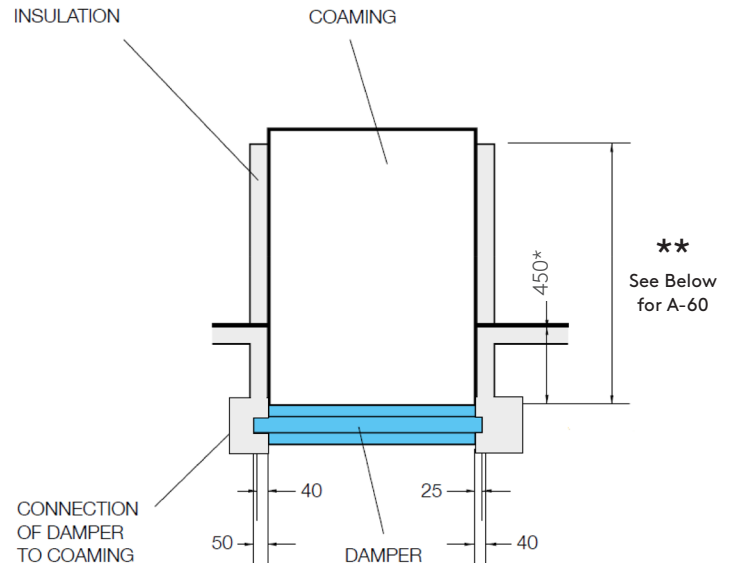
Fig 3. Blade Profile

Insulation Details

Bulkhead (Vertical)



Deck (Horizontal)



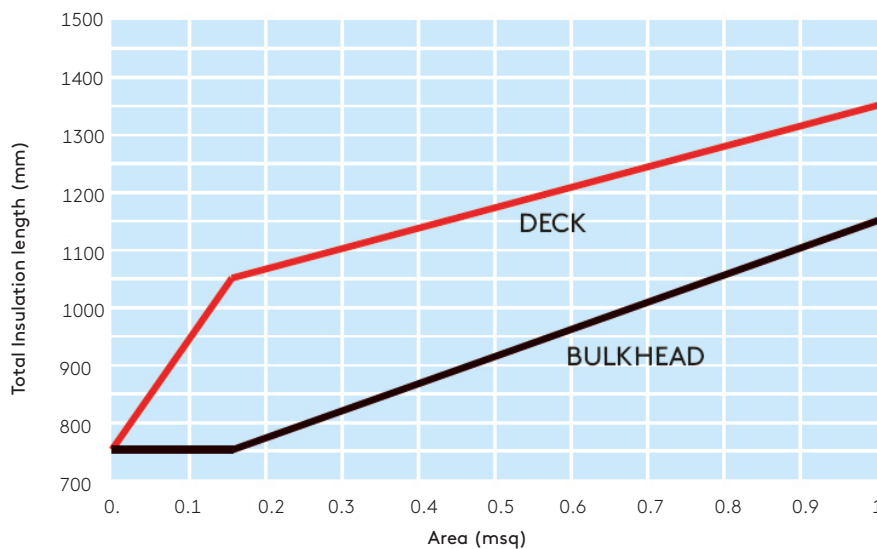
Dampers cannot be less than 200mm from either the edges of the bulkhead/deck or from another damper.

* 300mm or 240mm depends on damper depth. Total length of insulation is 450mm on exposed side, in all arrangements.

Refer to Certificate on Website

Graph showing Minimum A-60 Insulation lengths

(Applies to all approval bodies with the exception of ABS).



Coaming Insulation Example

For a damper size of 700mm x 700mm.

Area = 0.49m sq for A-60 damper.

Deck installation Insulation length = 1175mm

Bulkhead installation Insulation length = 920mm

Note: for circular, use square base damper area.

Testing

The Actionair A-60 Marine Fire Damper has undergone extensive fire testing in single and multiple arrangements. The dampers were incorporated in steel bulkheads and decks and tested to the Marine Fire Resistance Test in accordance with IMO resolution A754 (18) and Annex 1: Part 3 of IMO 2010 FTP CODE Internal code for application of Fire Test Procedures 2010 (2012 edition). Tested for a duration of 60 minutes. Changes to the originally supplied product may invalidate the certification and/or warranty.

Tests, approvals and certification

Marine Equipment Directive (MED) 2014/90/EU

- Lloyds Register Approval to IMO Fire Test Procedures Code, Annex 1, Part 3, for Class A0, A15, A30 & A60 Division bulkheads and decks. In compliance with the applicable Lloyd's Register Rules and
- Regulations and with the International Convention for the Safety Of Life At Sea (SOLAS).
- DNV-GL Type Approved. USCG (United States Coast Guard) approved (product category 164.139).
- ABS (American Bureau of Shipping) approved to 2005 Steel Vessel Rules 1-1-4/7.7
- Transport CANADA Type Approved.
- Corrosion Tested to BSEN 60068-2-52, severity 2 conditions.
- Vibration Tested to BS EN 60068-2-6 (5Hz to 350Hz @ 2g).
- Sira Certification (Ex) category 2 equipment.
- EC Type Examination (Module B) Certificate
- EC (Module D) Certificate of Conformity.
- Certificate of Fire Approval.
- ISO 9001 Certification.
- ISO 14001 Certification

Copies of all certification are available from our website.

Changes/Modifications to the original supplied product may invalidate certification and/or warranty.



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 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 depending on the damper size.

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.

Control Mode Standard Parameters

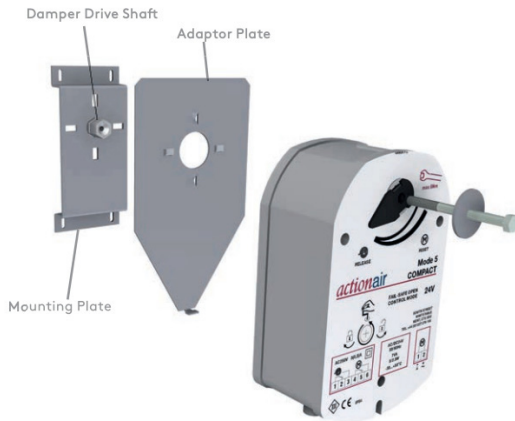
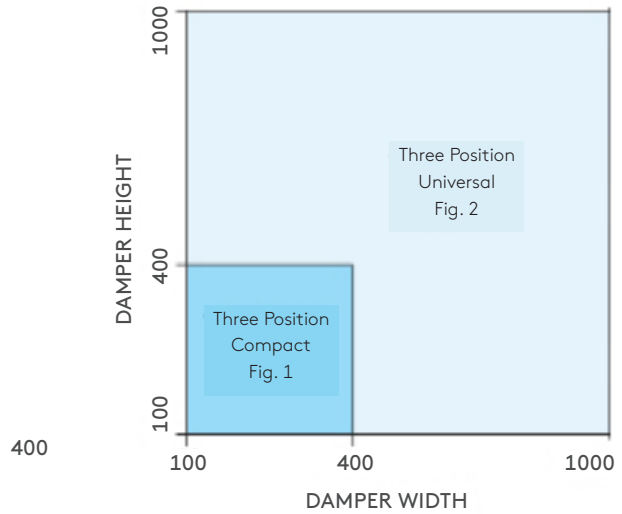


Fig.1 Three Position Compact

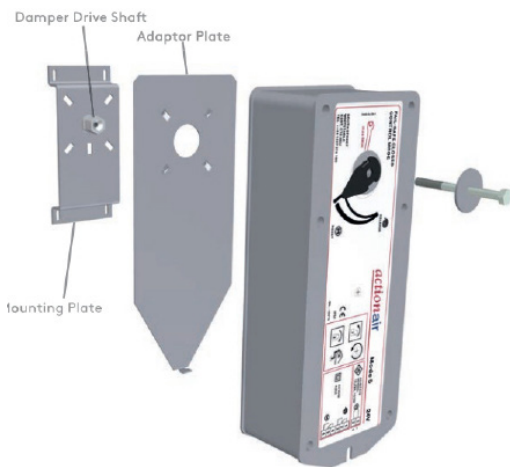
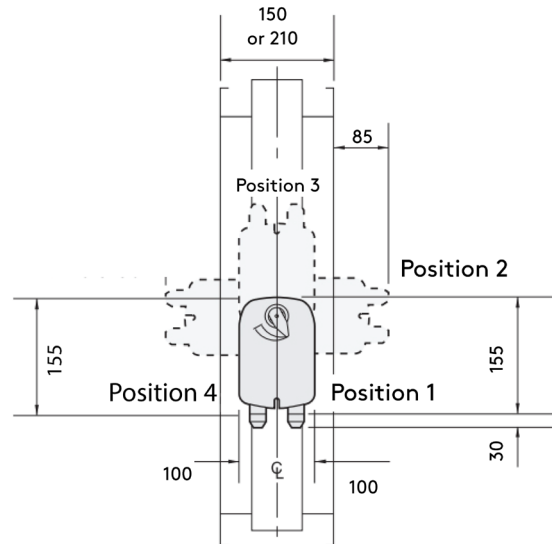
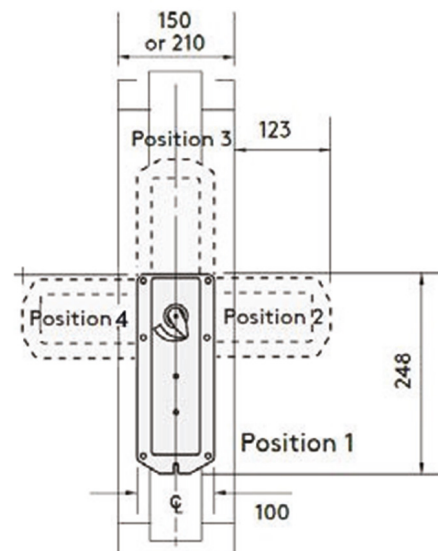


Fig.2 Three Position Universal



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 failsafe 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 24V, 120V or 230V versions.

Probe section only available as a spare replacement part.



Electrical Application and Wiring

Standard Application and Wiring

Control Mode 5 24V AC or DC

Control Mode 6 230V AC 50/60Hz

Control Mode 120 120V AC 50/60Hz

24V - AC - 50/60Hz

AC 19.2 - 28.8V

DC 21.6 - 28.8V

230V 196 - 264V

120V 96 - 132V

Supply On - Damper motors open

Supply Off - Damper springs closed

ETR Operates - Damper springs closed

12W (Maximum Motoring)

4W (Maximum Reset)

End Switches

2 x SPDT 6(3)A, AC 250V

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 prewired with 0.5 metre halogen free low smoke and fume cable

Mode 5 24V System

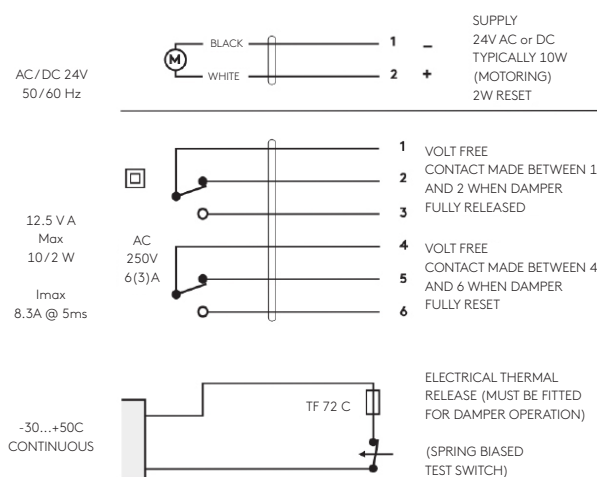
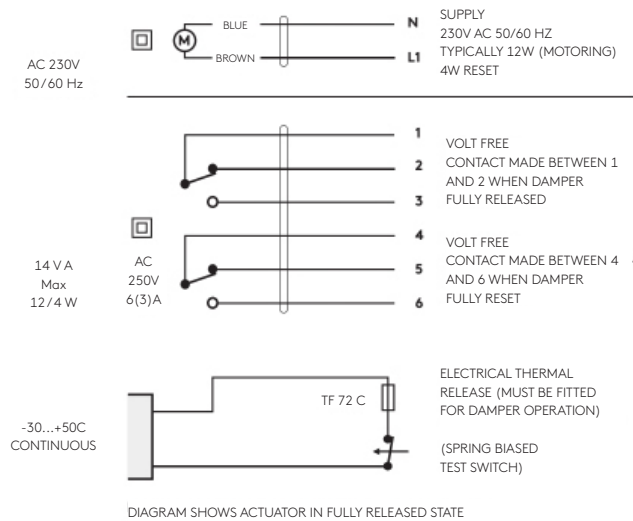


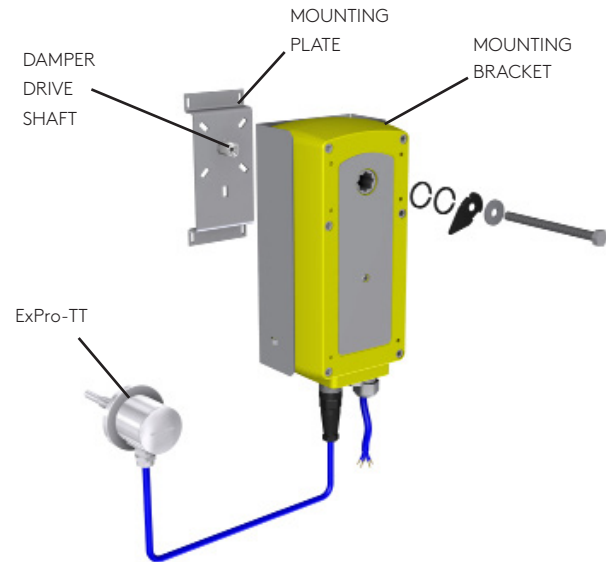
DIAGRAM SHOWS ACTUATOR IN FULLY RELEASED STATE

Mode 6 230V System (Also 120V Typical)



Electrical ATEX (Ex) rated

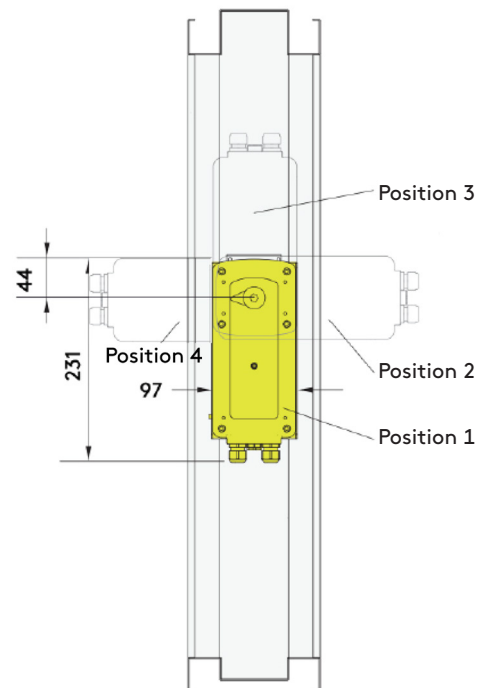
Fail-safe is by means of a ExPro-TT which operates at 72 °C, or if power supply is interrupted. A manual test switch allows periodic operation of the damper for testing purposes, simulating actual failsafe release under fire conditions. The associated electrical control modes are available in one Universal version with 24 – 230V AC/DC supply.



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 control modes to be supplied separately, off ering shipping and storage benefits.



Schischek Sizing

Damper Size	Actuator(s)	FailSafe	Torque
100x100mm up to 400x 400mm	Schischek 5.10 BF (BF-A45.9Lb) ExMax, RedMax, InMax, VAS, CTS, BF1	ExPro-TT Thermal Trigger	5 or 10Nm
401x401mm up to 1000x1000mm	Schischek 15 BF (BF-A135Lb) ExMax, RedMax, InMax, VAS, CTS, BF1	ExPro-TT Thermal Trigger	15Nm



ATEX (Ex) Rated Actuator, Application and Wiring

Atex (Ex) Rated Electrical Control Modes

Universal supply unit from 24 to 230V-AC/DC, 50/60 Hz.

Supply On - Damper motors open.

Supply Off - Damper springs closed.

ExPro-TT Operates - Damper springs closed

20W (Maximum Blocking)

16W (Heater).

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

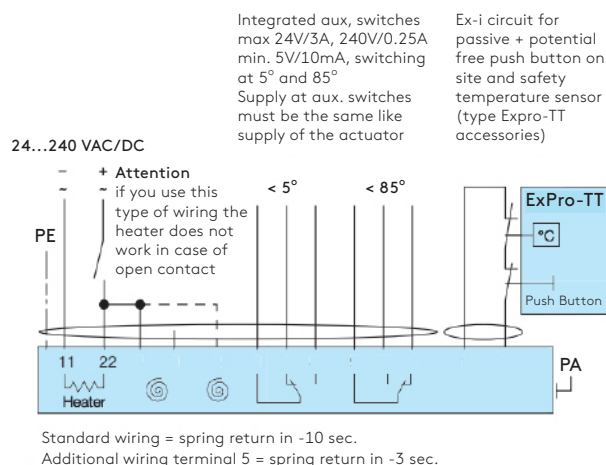
To isolate from main power supply, the system must incorporate a device, which disconnects the phase conductors, with at least 3mm contact gap.

A metre of Low Smoke, Zero Hologen (LSZH) and fume electric cable is included with each control mode. The ExPro-TT is also prewired with a metre of halogen free low smoke and fume cable.

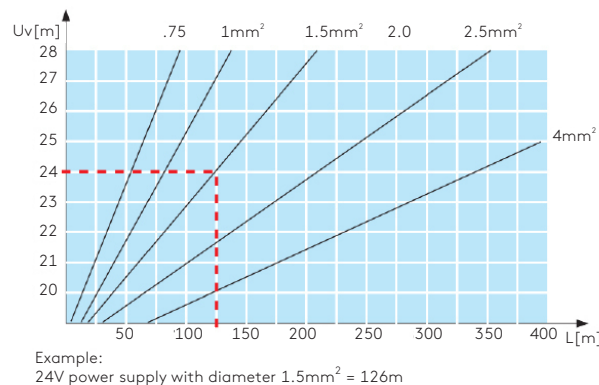
On-off 1-wire-spring return + Ex-i circuit

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 heating is running only if the motor is in idle position. The initial starting supply current required by the actuators power supply unit is around 2.0A for about 1 sec. (Please consider this while calculating the cross section area of the supply line).



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



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

Dimensioning / Design of the supply line

On long distances between supply and actuator, voltage drop occurs due to line resistances. On 24V AC/DC systems the actuator receives a low voltage 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 required line cross section area and indicates the maximum length utilising an existing line. Alternatively the secondary voltage can be increased by selecting a transformer to overcome the loss.

For calculation purposes, following characteristics are essential:

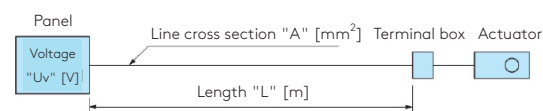
UV = supply voltage in [V]

A = line cross section in [mm²]

L = line length in [m]

Factor 0.0714 = drive-specific factor

[Vmm²/m] 9 based on the electrical conductivity of copper with a coefficient of 56/Wmm²)



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

$$L = A (U_v - 18V) 0.07414$$

Example:

A = 1.5mm², Uv = 24V
Length of cable L = 126mm

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

$$A = 0.07414 L (U_v - 18V)$$

Example:

L=250m, Uv = 30V
Cross section of A = 1.5mm²

HYTORK Actuators and Accessories

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 control mode. Incorporated is a failsafe 74°C fusible link. When this activates, air exhausts from the control mode, enabling the PTR to spring return to the fail-safe position, thus closing the damper. The control modes are coupled to the damper using a friendly connection system. This allows the damper actuator and the PTR to be supplied separately, offering shipping and storage benefits.

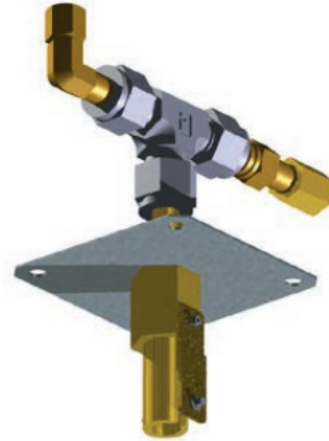
Pneumatic Operation

Air On - Damper opens.
Air Off - Spring closure.
Release time $\approx$ 2 - 4 secs.
Reset time $\approx$ 2 - 4 secs.
Air inlet 6mm dia. quick fit coupling.

74 °C Pneumatic Thermal Release (PTR).
Air pressure = 5.5 - 8.0 Bar.
External mechanical position indicator.
Test operation by removing fusible link element.

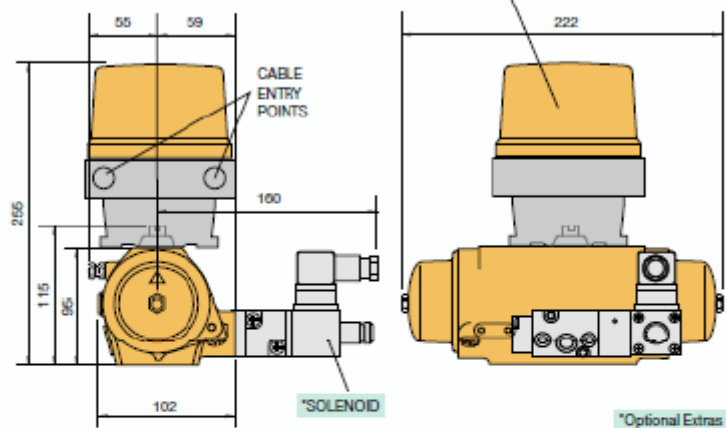
Pneumatic Thermal Release (PTR)

(Supplied loose for site installation)

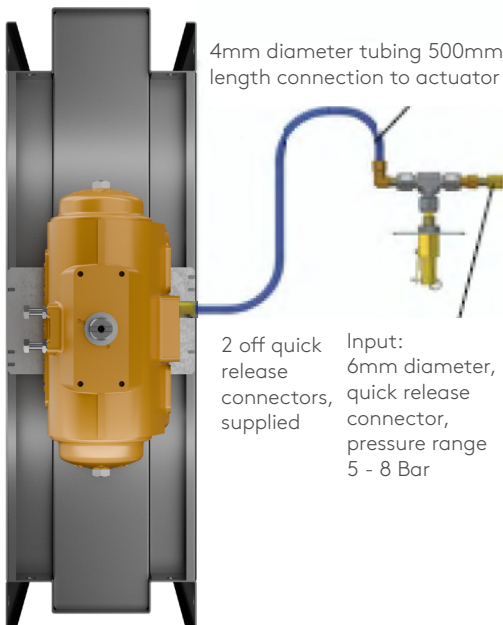
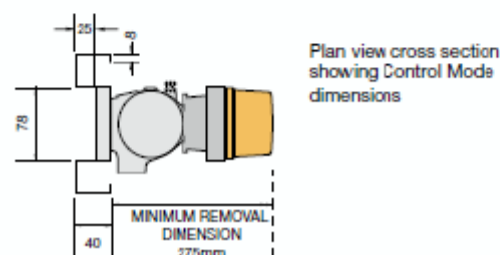


Dimensional Data

Pneumatic Spring Return Actuator



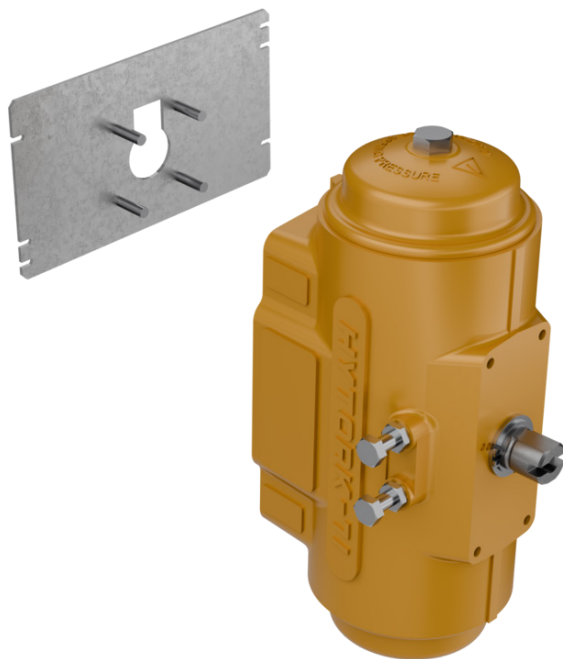
Pneumatic Actuator



Dimensional Data

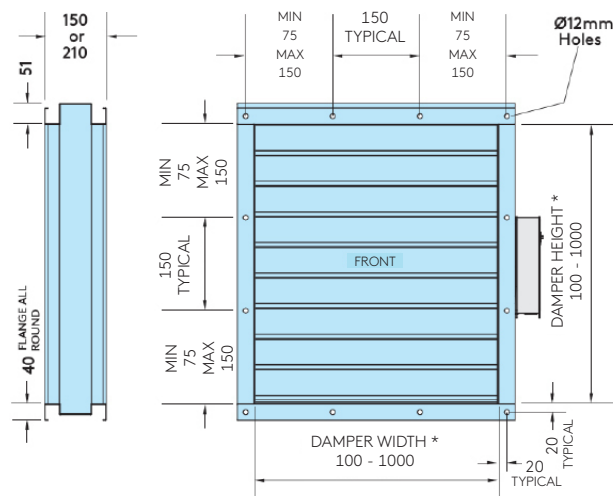
HYTORK Actuator with Solenoid and Status Beacon

PTR (not shown) is supplied loose for connection by others.

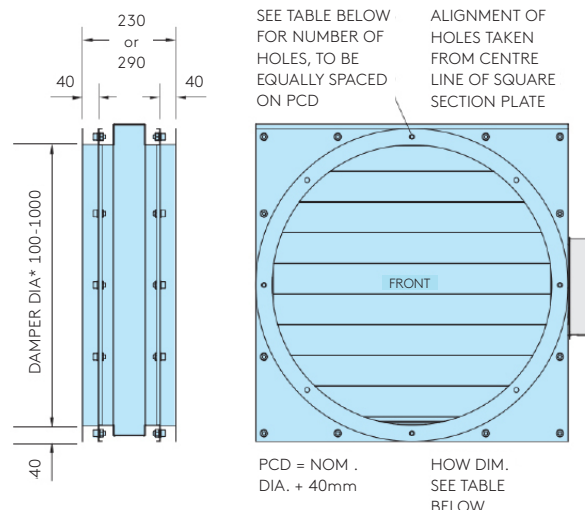


Square and Rectangular (A-60 RECT)

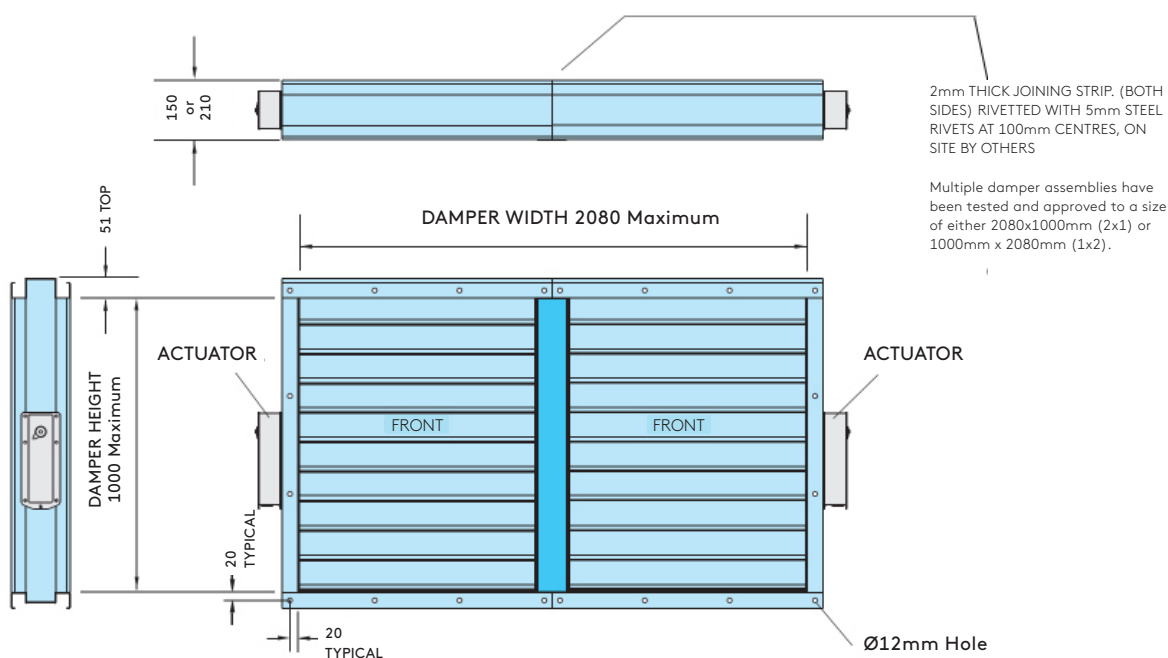
*Width, height and diameters available in 1mm increments



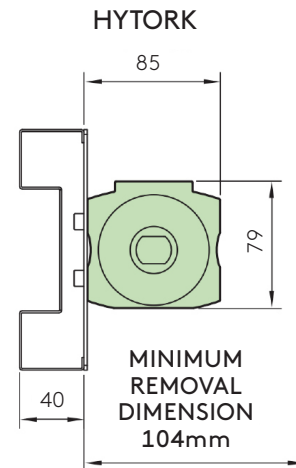
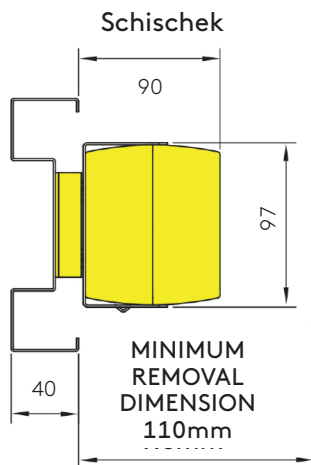
Circular (A-60 CIRC)



Multiple Assemblies



Atex Actuators



Option for Circular Flange on front or rear only.
Option to remove flange return from either or both sides.

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



Please note:
ES dampers must be installed
with blades running horizontal.

Mass

1.2mm Galvanised Casings, 150mm Deep

Weights (kg) of A-60 Rectangular (Excluding Actuator)											Weights (kg) of A-60 Rectangular (Excluding Actuator)			
	100	200	300	400	500	600	700	800	900	1000				
100	3.0	3.8	4.6	5.5	6.3	7.1	8	8.8	9.7	10.5	100	Dia. 4.6	Compact	1.85kg
200	4.1	5.0	5.9	6.9	7.8	8.7	9.6	10.5	11.4	12.3	200	Dia. 8.1	Universal	3.00kg
300	5.3	6.4	7.4	8.4	9.5	10.5	11.5	12.6	13.6	14.7	300	Dia. 12.0	Pneumatic	3.00KG
400	6.2	7.3	8.4	9.5	10.6	11.7	12.8	13.9	15.0	16.1	400	Dia. 15.4	Electrical Atex	3.50kg
500	7.4	8.6	9.7	10.9	12.1	13.3	14.4	15.6	16.8	18.0	500	Dia. 19.8	Note: Weights include adapter plate.	
600	8.6	9.9	11.2	12.5	13.8	15.1	16.4	17.7	19.0	20.4	600	Dia. 24.6		
700	9.5	10.9	12.2	13.6	15.0	16.3	17.7	19.1	20.5	21.8	700	Dia. 28.9		
800	10.3	11.8	13.2	14.7	16.1	17.5	19.0	20.4	21.9	23.3	800	Dia. 33.6		
900	11.5	13.1	14.7	16.3	17.8	19.4	21.0	22.6	24.1	25.7	900	Dia. 39.4		
1000	12.4	14.1	15.7	17.4	19.0	20.6	22.3	23.9	25.6	27.2	1000	Dia. 44.5		

2mm Galvanised Casings, 150mm Deep

Weights (kg) of A-60 Rectangular (Excluding Actuator)											Weights (kg) of A-60 Rectangular (Excluding Actuator)			
	100	200	300	400	500	600	700	800	900	1000				
100	4.1	5.3	6.4	7.6	8.8	10.0	11.1	12.3	13.5	14.7	100	Dia. 6.1	Compact	1.85kg
200	5.6	6.8	8.1	9.3	10.5	11.8	13.0	14.3	15.5	16.7	200	Dia. 10.7	Universal	3.00kg
300	7.1	8.4	9.8	11.2	12.6	13.9	15.3	16.7	18.0	19.4	300	Dia. 15.6	Pneumatic	3.00KG
400	8.2	9.7	11.1	12.5	14.0	15.4	16.9	18.3	19.7	21.2	400	Dia. 20.1	Electrical Atex	3.50kg
500	9.8	11.3	12.8	14.3	15.8	17.3	18.8	20.3	21.8	23.3	500	Dia. 25.6	Note: Weights include adapter plate.	
600	11.3	12.9	14.5	16.2	17.8	19.5	21.1	22.8	24.4	26.0	600	Dia. 31.6		
700	12.4	14.2	15.9	17.6	19.3	21.0	22.7	24.4	26.1	27.8	700	Dia. 37.0		
800	13.6	15.4	17.2	18.9	20.7	22.5	24.3	26.1	27.8	29.6	800	Dia. 43.0		
900	15.1	17.0	18.9	20.9	22.8	24.7	26.6	28.5	30.4	32.3	900	Dia. 50.1		
1000	16.3	18.3	20.3	22.2	24.2	26.2	28.2	30.2	32.1	34.1	1000	Dia. 56.4		

3mm Galvanised Casings, 150mm Deep

Weights (kg) of A-60 Rectangular (Excluding Actuator)											Weights (kg) of A-60 Rectangular (Excluding Actuator)			
	100	200	300	400	500	600	700	800	900	1000				
100	5.5	7.1	8.7	10.3	11.9	13.5	15.1	16.7	18.3	19.9	100	Dia. 8.4	Compact	1.85kg
200	7.4	9.1	10.7	12.4	14.0	15.7	17.4	19.0	20.7	22.4	200	Dia. 14.5	Universal	3.00kg
300	9.3	11.1	12.9	14.7	16.5	18.2	20.1	21.8	23.6	25.4	300	Dia. 21.1	Pneumatic	3.00KG
400	10.8	12.7	14.5	16.4	18.3	20.1	22.0	23.9	25.7	27.6	400	Dia. 27.3	Electrical Atex	3.50kg
500	12.7	14.7	16.6	18.5	20.5	22.4	24.3	26.3	28.2	30.1	500	Dia. 34.5	Note: Weights include adapter plate.	
600	14.6	16.7	18.7	20.8	22.9	24.9	27.0	29.1	31.1	33.2	600	Dia. 42.4		
700	16.2	18.3	20.4	22.6	24.7	26.8	29.0	31.1	33.3	35.4	700	Dia. 49.7		
800	17.7	19.9	22.1	24.3	26.5	28.7	31.0	33.1	35.3	37.6	800	Dia. 57.6		
900	19.6	22.0	24.3	26.6	29.0	31.3	33.6	36.0	38.3	40.7	900	Dia. 66.7		
1000	21.2	23.6	26.0	28.4	30.8	33.2	35.6	38.0	40.4	42.8	1000	Dia. 75.1		

Mass

1.2mm 316 Stainless Steel Casings, 150mm Deep

Weights (kg) of A-60 Rectangular (Excluding Actuator)											Weights (kg) of A-60 Rectangular (Excluding Actuator)			
	100	200	300	400	500	600	700	800	900	1000				
100	3.0	3.9	4.7	5.6	6.4	7.3	8.1	9.0	9.8	10.7	100	Dia. 4.7	Compact	1.85kg
200	4.2	5.1	6.0	7.0	7.9	8.8	9.7	10.6	11.6	12.5	200	Dia. 8.2	Universal	3.00kg
300	5.4	6.4	7.5	8.6	9.6	10.7	11.8	12.8	13.9	15.0	300	Dia. 12.2	Pneumatic	3.00KG
400	6.2	7.4	8.5	9.7	10.8	11.9	13.1	14.2	15.3	16.5	400	Dia. 15.7	Electrical Atex	3.50kg
500	7.5	8.7	9.9	11.1	12.3	13.5	14.7	15.9	17.1	18.4	500	Dia. 20.1	Note: Weights include adapter plate.	
600	8.7	10.1	11.4	12.8	14.1	15.5	16.8	18.2	19.5	20.9	600	Dia. 25.1		
700	9.6	11.0	12.4	13.9	15.3	16.7	18.1	19.5	21.0	22.4	700	Dia. 29.5		
800	10.5	12.0	13.5	15.0	16.4	17.9	19.4	20.9	22.4	23.9	800	Dia. 34.3		
900	11.7	13.3	15.0	16.6	18.2	19.9	21.5	23.1	24.8	26.4	900	Dia. 40.4		
1000	12.6	14.3	16.0	17.7	19.4	21.1	22.8	24.5	26.2	27.9	1000	Dia. 45.5		

2mm 316 Stainless Steel Casings, 150mm Deep

Weights (kg) of A-60 Rectangular (Excluding Actuator)											Weights (kg) of A-60 Rectangular (Excluding Actuator)			
	100	200	300	400	500	600	700	800	900	1000				
100	4.2	5.3	6.5	7.7	8.9	10.1	11.3	12.5	13.7	14.9	100	Dia. 6.2	Compact	1.85kg
200	5.6	6.9	8.2	9.4	10.7	12.0	13.2	14.5	15.7	17.0	200	Dia. 10.8	Universal	3.00kg
300	7.2	8.6	10.0	11.4	12.8	14.2	15.6	17.0	18.4	19.8	300	Dia. 15.9	Pneumatic	3.00KG
400	8.3	9.8	11.3	12.8	14.2	15.7	17.2	18.7	20.1	21.6	400	Dia. 20.5	Electrical Atex	3.50kg
500	9.9	11.4	13.0	14.5	16.1	17.6	19.2	20.7	22.3	23.8	500	Dia. 26.0	Note: Weights include adapter plate.	
600	11.4	13.1	14.8	16.5	18.2	19.8	21.5	23.2	24.9	26.6	600	Dia. 32.2		
700	12.6	14.4	16.1	17.9	19.6	21.4	23.2	24.9	26.7	28.5	700	Dia. 37.8		
800	13.8	15.6	17.4	19.3	21.1	22.9	24.8	26.6	28.4	30.3	800	Dia. 43.8		
900	15.3	17.3	19.3	21.2	23.2	25.2	27.2	29.1	31.1	33.1	900	Dia. 51.1		
1000	16.5	18.5	20.6	22.6	24.7	26.7	28.8	30.8	32.9	34.9	1000	Dia. 57.6		

3mm 316 Stainless Steel Casings, 150mm Deep

Weights (kg) of A-60 Rectangular (Excluding Actuator)											Weights (kg) of A-60 Rectangular (Excluding Actuator)			
	100	200	300	400	500	600	700	800	900	1000				
100	5.6	7.2	8.8	10.4	12.0	13.7	15.3	16.9	18.5	20.1	100	Dia. 8.5	Compact	1.85kg
200	7.5	9.1	10.8	12.5	14.2	15.9	17.6	19.3	20.9	22.6	200	Dia. 14.7	Universal	3.00kg
300	9.3	11.2	13.0	14.8	16.7	18.5	20.3	22.2	24.0	25.8	300	Dia. 21.4	Pneumatic	3.00KG
400	10.9	12.8	14.7	16.6	18.5	20.4	22.3	24.2	26.1	28.0	400	Dia. 27.7	Electrical Atex	3.50kg
500	12.8	14.8	16.8	18.8	20.7	22.7	24.7	26.6	28.6	30.6	500	Dia. 35.0	Note: Weights include adapter plate.	
600	14.7	16.9	19.0	21.1	23.2	25.3	27.4	29.5	31.7	33.8	600	Dia. 43.1		
700	16.3	18.5	20.7	22.9	25.1	27.3	29.4	31.6	33.8	36.0	700	Dia. 50.5		
800	17.9	20.2	22.4	24.7	26.9	29.2	31.4	33.7	36.0	38.2	800	Dia. 58.6		
900	19.8	22.2	24.6	27.0	29.4	31.8	34.2	36.6	39.0	41.4	900	Dia. 67.9		
1000	21.4	23.9	26.3	28.8	31.3	33.7	36.2	38.7	41.2	43.6	1000	Dia. 76.5		

Mass

2mm Galvanised Casings, 210mm Deep

Weights (kg) of A-60 Rectangular (Excluding Actuator)											Weights (kg) of A-60 Rectangular (Excluding Actuator)			
	100	200	300	400	500	600	700	800	900	1000				
100	4.8	6.1	7.5	8.9	10.2	11.6	12.9	14.3	15.7	17.0	100	Dia. 6.8	Compact	1.85kg
200	6.4	7.9	9.3	10.7	12.1	13.6	15.0	16.4	17.9	19.3	200	Dia. 11.7	Universal	3.00kg
300	8.1	9.7	11.2	12.8	14.4	15.9	17.5	19.0	20.6	22.2	300	Dia. 17.0	Pneumatic	3.00KG
400	9.5	11.1	12.7	14.3	16.0	17.6	19.2	20.9	22.5	24.1	400	Dia. 21.9	Electrical Atex	3.50kg
500	11.2	12.9	14.6	16.3	18.0	19.7	21.4	23.1	24.7	26.5	500	Dia. 27.8	Note: Weights include adapter plate.	
600	12.9	14.7	16.5	18.4	20.2	22.0	23.9	25.7	27.5	29.4	600	Dia. 34.2		
700	14.2	16.1	18.0	19.9	21.8	23.7	25.6	27.5	29.4	31.3	700	Dia. 40.0		
800	15.6	17.6	19.5	21.5	23.5	25.4	27.4	29.4	31.3	33.3	800	Dia. 46.3		
900	17.3	19.4	21.5	23.6	25.7	27.8	29.9	32.0	34.1	36.2	900	Dia. 53.8		
1000	18.7	20.8	23.0	25.2	27.3	29.5	31.7	33.8	36.0	38.2	1000	Dia. 60.4		

3mm Galvanised Casings, 210mm Deep

Weights (kg) of A-60 Rectangular (Excluding Actuator)											Weights (kg) of A-60 Rectangular (Excluding Actuator)			
	100	200	300	400	500	600	700	800	900	1000				
100	6.5	8.4	10.3	12.2	14.0	15.9	17.8	19.7	21.6	23.4	100	Dia. 9.4	Compact	1.85kg
200	8.7	10.6	12.6	14.5	16.5	18.4	20.4	22.3	24.2	26.2	200	Dia. 16.1	Universal	3.00kg
300	10.8	12.9	15.0	17.1	19.2	21.2	23.3	25.4	27.5	29.6	300	Dia. 23.2	Pneumatic	3.00KG
400	12.7	14.8	16.9	19.1	21.2	23.4	25.5	27.7	29.8	32.0	400	Dia. 30.0	Electrical Atex	3.50kg
500	14.9	17.1	19.3	21.5	23.7	25.9	28.2	30.4	32.6	34.8	500	Dia. 37.8	Note: Weights include adapter plate.	
600	17.0	19.4	21.7	24.1	26.4	28.8	31.1	33.5	35.8	38.2	600	Dia. 46.2		
700	18.9	21.3	23.7	26.1	28.5	31.0	33.4	35.8	38.2	40.6	700	Dia. 54.1		
800	20.7	23.2	25.7	28.2	30.7	33.1	35.6	38.1	40.6	43.1	800	Dia. 62.5		
900	22.9	25.5	28.1	30.8	33.4	36.0	38.6	41.2	43.8	46.5	900	Dia. 72.2		
1000	24.7	27.4	30.1	32.8	35.5	38.2	40.9	43.5	46.2	48.9	1000	Dia. 81.2		

2mm 316 Stainless Steel Casings, 210mm Deep

Weights (kg) of A-60 Rectangular (Excluding Actuator)											Weights (kg) of A-60 Rectangular (Excluding Actuator)			
	100	200	300	400	500	600	700	800	900	1000				
100	4.8	6.2	7.6	9.0	10.4	11.7	13.1	14.5	15.9	17.3	100	Dia. 6.9	Compact	1.85kg
200	6.5	8.0	9.4	10.9	12.3	13.8	15.2	16.7	18.2	19.6	200	Dia. 11.9	Universal	3.00kg
300	8.2	9.8	11.4	13.0	14.6	16.2	17.8	19.4	21.0	22.6	300	Dia. 17.3	Pneumatic	3.00KG
400	9.6	11.2	12.9	14.6	16.2	17.9	19.6	21.3	22.9	24.6	400	Dia. 22.3	Electrical Atex	3.50kg
500	11.3	13.1	14.8	16.5	18.3	20.0	21.8	23.5	25.2	27.0	500	Dia. 28.3	Note: Weights include adapter plate.	
600	13.0	14.9	16.8	18.7	20.6	22.4	24.3	26.2	28.1	30.0	600	Dia. 34.8		
700	14.4	16.4	18.3	20.3	22.2	24.2	26.2	28.1	30.1	32.0	700	Dia. 40.7		
800	15.8	17.8	19.8	21.9	23.9	25.9	28.0	30.0	32.0	34.0	800	Dia. 47.2		
900	17.5	19.7	21.8	24.0	26.2	28.4	30.5	32.7	34.9	37.0	900	Dia. 55.9		
1000	18.9	21.1	23.4	25.6	27.9	30.1	32.3	34.6	36.8	39.1	1000	Dia. 61.7		

Mass

3mm 316 Stainless Steel Casings, 210mm Deep

Weights (kg) of A-60 Rectangular (Excluding Actuator)											Weights (kg) of A-60 Rectangular (Excluding Actuator)			
	100	200	300	400	500	600	700	800	900	1000				
100	6.6	8.5	10.4	12.3	14.2	16.1	18.0	19.9	21.8	23.7	100	Dia. 9.6	Compact	1.85kg
200	8.8	10.7	12.7	14.7	16.7	18.6	20.6	22.6	24.6	26.5	200	Dia. 16.3	Universal	3.00kg
300	10.9	13.1	15.2	17.3	19.4	21.5	23.6	25.8	27.9	30.0	300	Dia. 23.5	Pneumatic	3.00KG
400	12.8	15.0	17.2	19.4	21.5	23.7	25.9	28.1	30.3	32.5	400	Dia. 30.4	Electrical Atex	3.50kg
500	15.0	17.3	19.5	21.8	24.0	26.3	28.6	30.8	33.1	35.3	500	Dia. 38.4	Note: Weights include adapter plate.	
600	17.2	19.6	22.0	24.4	26.8	29.2	31.6	34.0	36.4	38.8	600	Dia. 47.0		
700	19.1	21.5	24.0	26.5	29.0	31.4	33.9	36.4	38.9	41.3	700	Dia. 55.0		
800	20.9	23.5	26.0	28.6	31.1	33.7	36.2	38.7	41.3	43.8	800	Dia. 63.6		
900	23.1	25.8	28.5	31.2	33.9	36.6	39.3	41.9	44.6	47.3	900	Dia. 73.5		
1000	25.0	27.7	30.5	33.3	36.0	38.8	41.6	44.3	47.1	49.8	1000	Dia. 82.7		

Damper Release and Indication Module (DRIM)

This is designed for control and monitoring of the electrically operated A-60 Marine Fire Dampers. It will operate from 24V, 120V or 230V supplies, 50 or 60 Hz. Selection of the operating voltage is by use of internal links on the PCB, prior to installation and connection of actuator and supply. The DRIM may be used singly to provide local damper control, or in pairs to provide control from either side of a damper. It can also operate 2 actuators when dampers are provided in 2 multiple sections LED position and operation indication is provided.

Operation is by push button to close and twist to re-open damper.

Tested to BS EN 61010 -1: 2001 and is CE compliant. IP44 rated.

Operating range 5 - 40 °C.



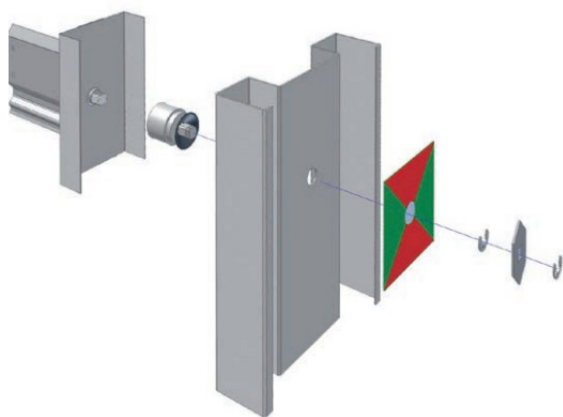
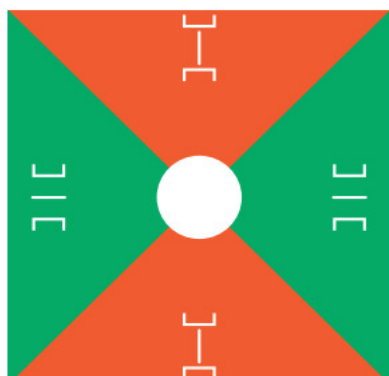
Visual Indication

Visual indication non drive side

Option to have drive blade visual indication, non drive side only.

Red indicates damper closed Green indicates damper open.

This can only be used on single section dampers.



Acoustic Data

The data presented is from the Laboratory Determination of Acoustic and Aerodynamic Performance of A-60 Marine Fire Dampers.

A programme of extensive tests was carried out by an independent test facility, approved under the UKAS Scheme, in accordance with BRITISH STANDARDS Nos. 4196, 4773, 4856, 4857 and 4954.

From the selection of a duct velocity within the operational parameters of the damper a resultant pressure drop from Table 1 can be determined and the sum of these two components applied to the Velocity x Pressure Drop Vs Sound Power Level Graph. (Table 2).

The graph is the result of a full range of acoustic tests with the blades set in the fully open position.

The Spectrum Correction Data is applied to the number obtained from the graph and a complete Sound Spectrum of Flow

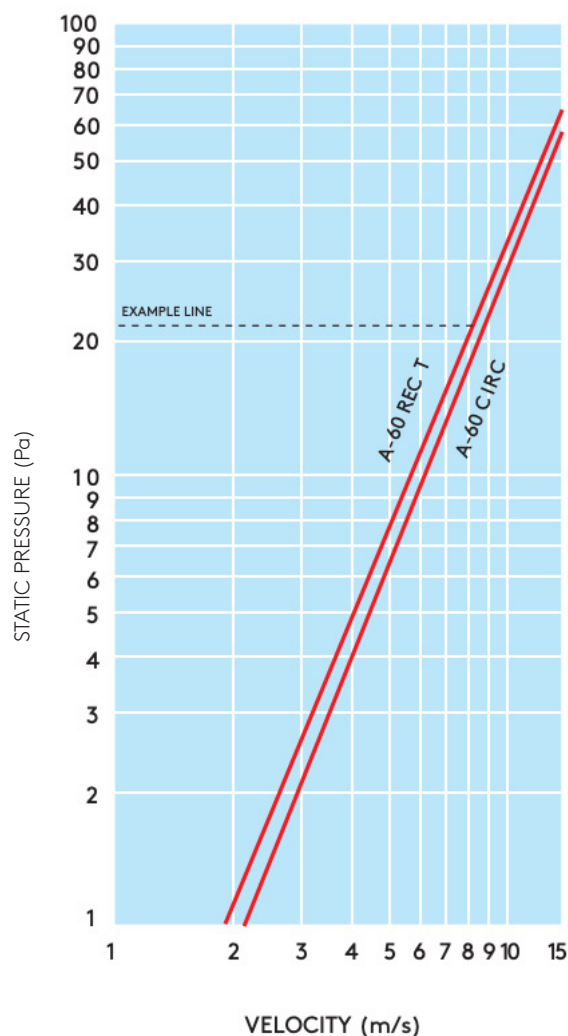
Generated Noise for both Outlet (in duct) and Breakout (casing radiated) is obtained.

Example:

Duct with a design velocity of 8 m/sec and the A-60 Marine Fire Damper RECT damper blades in the fully open position. Pressure Drop = 22 Pa (Table 1). Multiply Velocity x Pressure Drop $8 \times 22 = 176$.

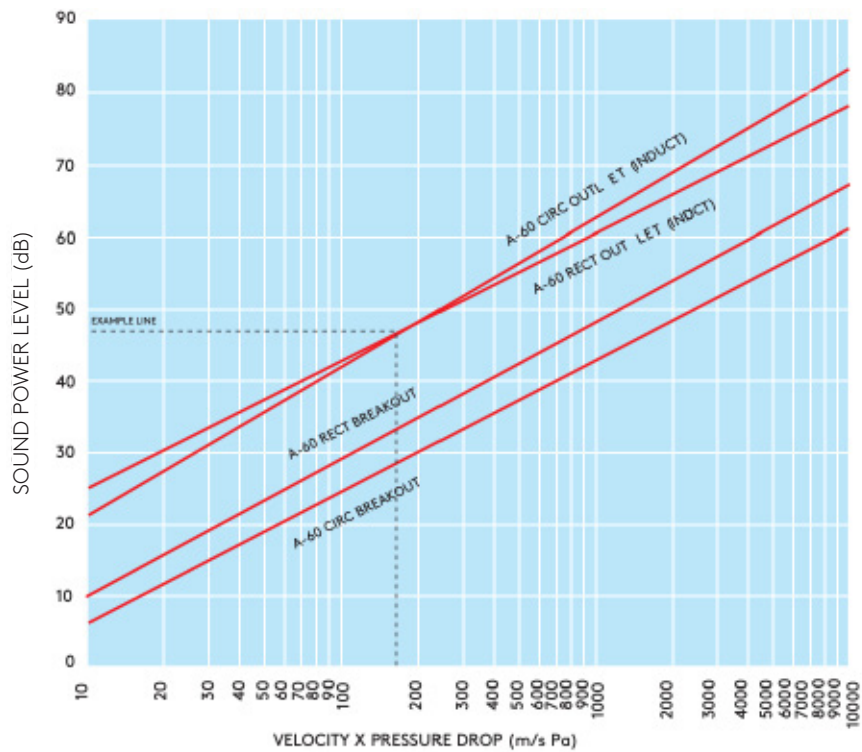
From Sound Power Graph (Table 2) plot

176 on horizontal Velocity/Pressure axis against the A-60 Marine Fire Damper RECT outlet (induct) graph to obtain 47dBW on Vertical Sound Power Level Axis. Add or subtract corrections to the 47 dBW to provide full spectrum analysis.



Pressure Drop Vs Velocity Chart 1

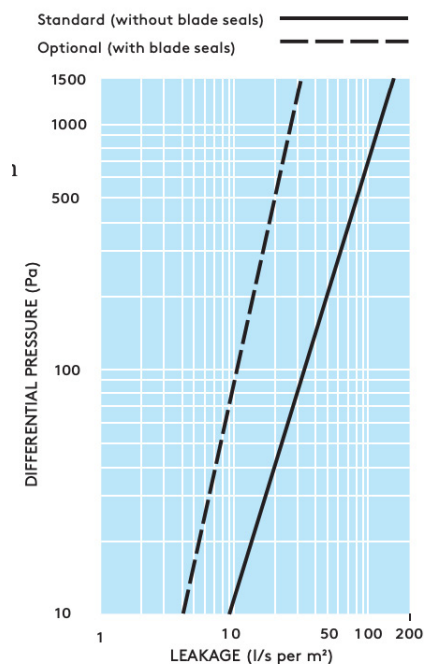
Velocity (m/s) X Pressure Drop (Pa) Vs Sound



Power Level (dB) Chart 2

VELOCITY X PRESSURE DROP (m/s Pa)

		Outlet (Induct) Spectrum Corrections								Breakout Spectrum Corrections								
Octave Band	Centre Frequency	63	125	250	500	1K	2K	4K	8K	63	125	250	500	1K	2K	4K	8K	HZ
A-60	RECT	5	4	5	5	3	1	-3	-5	8	11	9	6	-3	-6	-14	-17	DB
A-60	CIRC	9	4	4	5	3	1	-3	-6	6	10	8	4	-3	-3	-11	-14	DB



Damper Leakage Chart 3

A-60 Marine Fire Damper closed blade leakage.

Standard Ordering Procedure

A-60 RECT(Galv)	A-60 CIRC(GALV)	A-60 RECT (316)	A-60 CIRC (316)
A-60 Marine Fire Damper	A-60 Marine Fire Damper	A-60 Marine Fire Damper	A-60 Marine Fire Damper
430 Ferritic stainless steel blades. (316 stainless steel blades available as an option)	430 Ferritic stainless steel blades. (316 stainless steel blades available as an option)	316 Austenitic stainless steel blades	316 Austenitic stainless steel blades
Square or rectangular flanges	Circular flanged	Square or rectangular flanges	Circular flanged
Galvanised 150mm Deepcasing	Galvanised 230mm deep standard casing	316 stainless steel 150mm deep casing	316 stainless steel 230mm deep standard casing
1.2mm, 2mm or 3mm case thickness (210mm deep casing available in 2mm and 3mm options)	1.2mm, 2mm or 3mm case thickness (210mm deep casing available in 2mm and 3mm options)	1.2mm, 2mm or 3mm case thickness (210mm deep casing available in 2mm and 3mm options)	1.2mm, 2mm or 3mm case thickness (210mm deep casing available in 2mm and 3mm options)

Control Modes

Electric Control Mode 5	24V AC or DC
Electric Control Mode 6	230V AC 50/60Hz
Electric Control Mode 120	120V AC 50/60Hz
Pneumatic	5 - 8 Bar Air Supply
Schischek - Atex & non Atex options	Universal 24V - 230V AC/DC 50/60Hz

Blade Seals

Standard	(without blade seals)
Optional	(with blade seals)

Flange Holes

Standard	(with holes)
Optional	(Customert own pattern assessed on application)

Wind Driven Rain Performance

Test size is 1m x 1m core area (1.04m x 1.12m nominal).

Normal weather conditions

29 mph (75 mm/h) wind and 76mm per hour rain conditions

Core Velocity m/s	Airflow m ³ /min	Free area Velocity m/s	Effectiveness Ratio	Class
0	0	0	99.9	A
0.7	40.2	2.0	99.9	A
1.0	60.0	2.6	99.9	A
1.4	86.9	3.7	99.9	A
1.9	114.1	4.98	99.9	A
2.4	143.8	6.1	99.3	A
3.0	177.7	7.6	97.1	B
3.5	208.8	8.9	96.1	B

Extreme weather conditions

50 mph (202 mm/h) wind and 203mm per hour rain conditions

Core Velocity m/s	Airflow m ³ /min	Free area Velocity m/s	Effectiveness Ratio	Class
0	0	0	99.9	A
0.7	40.2	2.0	99.9	A
1.0	60.0	2.6	99.9	A
1.4	86.9	3.7	99.9	A
1.9	114.1	4.98	99.9	A
2.4	143.8	6.1	99.3	A
3.0	177.7	7.6	97.1	B
3.5	208.8	8.9	96.1	B

Notes

1. Core area is the open area of the louvre face (face area less louvre frames). Cores velocity is the airflow velocity through the core area of the louvre (1m x 1m).
2. Free area of test size is calculated per AMCA standard 500-L.
3. Wind Driven Rain Penetration Classes:

Class Effectiveness

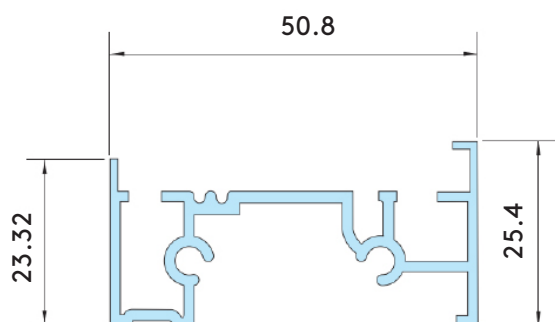
A 1 to .99

B 0.989 to 0.95

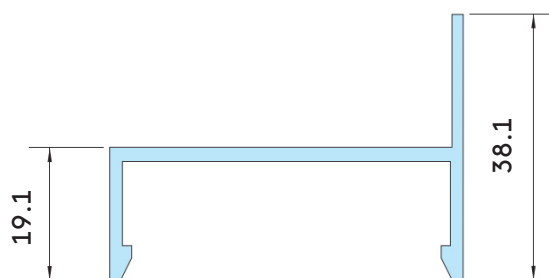
C 0.949 to 0.80

D Below 0.8

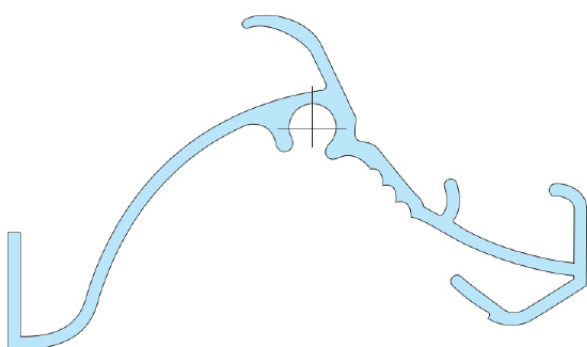
Jamb Section



Head and Cill Section



Blade Section



A-60 Marine Fire Damper

4. Intake Discharge Loss Class 2 Discharge Loss Coefficient is calculated by dividing a louvers' actual airflow rate vs. a theoretical airflow for the opening.

It provides an indication of the louvers' airflow characteristics.

Discharge Loss Classes:

Class Discharge Loss Coefficient

1 0.4 and above

2 0.3 to 0.399

3 0.2 to 0.299

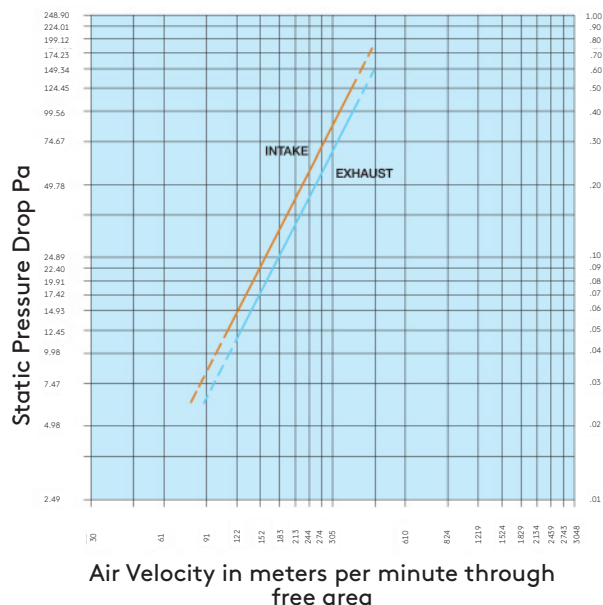
4 0.199 and below

(The higher the coefficient, the less resistance to airflow.)

5. The AMCA Wind Driven Rain Test is performed in a laboratory environment and incorporates controlled wind, water and system airflow effects. In actual field installations, storms may create conditions not considered by the AMCA test. Penthouse and similar applications where wind can pass through multiple louvers in an enclosure is another condition that is not simulated by AMCA tests. These applications can create elevated water penetration rates through any louver. Because of these uncontrolled situations, it is recommended that provisions to manage water penetration through louvers be included in the design.

Pressure Drop

Pressure drop testing performed on 1219 x 121mm unit.



Ratings do not include the effect of a bird screen