

Modular Volume Dampers

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Modular Volume Dampers

Celmecc International

Leading the way in Air Control, Heating & Cooling

At Celmecc International, it is our belief that working closely with our clients aids the mutual success of both organisations and for this reason we have adopted the following mission:

“To excel in the commercial and industrial building industry by setting new standards with innovative products through leadership, first class customer service and engineering excellence.”

It is with confidence that we at Celmecc International offer our Dampers as part of our unique AirControl product range. Our Dampers are tried and proven for well over two decades.

We trust that this concise brochure will assist all users in the area of damper selection, application design and installation techniques.



Product Range

Celmecc Volume Dampers

- Modular design
- Lightweight
- Versatile
- Easy to install & handle
- Precise air control
- The economical solution to airflow control in ducting systems
- Manufactured from marine grade extruded aluminium with inherent advantages in performance and competitiveness
- Select the dampers that suit your needs from the following chart



Volume Damper - Blade Seal Design - Series 30

Max SP 1500Pa
Max Vel 8m/s
Model 30 MTA - Motorized Damper
30 SDA - Smoke Damper (High Temperature)
Include: Blade seals
Side frame seals
Top & bottom frame seals



Volume Damper - No Blade Seal Design - Series 40

Max SP 40 MLA - 500Pa
40 MTA - 1000Pa
Max Vel 8m/s
Model 40 MLA - Manual Damper, No seals
40 MTA - Motorized Damper, No blade seals
Include: Side frame seals
Top & Bottom frame seals



Non Return Damper - Series 60

Max SP 500Pa
Vel 2-8m/s
Model 60 RAA - Relief Air Damper
60 NRA - Non Return Damper
60 WNRA - Weighted Non Return Damper



Special Purpose Dampers

Max SP 1500Pa
Max Vel 8m/s
Model 20 ICA - ISOLATION CONTROL DAMPER
Tight shut-off performance
30 CRA - CLEAN ROOM DAMPER
Standard face leakage performance
Include: Fully sealed casings
Blade seals
Side frame seals
Top & bottom seals

- The versatile Celmecc Damper frame has its corners punched to match the latest industry requirement for flanging such as Ductmate, Mez, Metuangle, TDC and TDF etc.
- Should the overall damper size be difficult to manage, the damper can be installed on site in preassembled modular sections

Volume Damper - Medium Velocity

30 MTA Motorised 30 SDA Motorised - Smoke Damper

Blade Seal Design 1500Pa.

The 30 MTA & 30 SDA Dampers are designed to work in medium velocity systems with a maximum static pressure of 1500 Pa. Operating temperature range for the 30 MTA Damper 0-40°C, 30 SDA Damper 0-200°C.



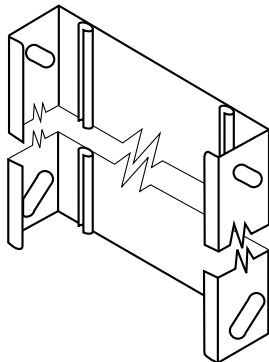
- The 30 MTA Damper is designed to regulate air flow where low air leakage is a consideration.
- The 30 SDA motorised Damper is designed to regulate air flow where low air leakage is required at elevated air temperatures such as in smoke spill applications.
- The linkage system and the opposed blade configuration provide flexibility and accurate setting.
- The Frame and Blades are extruded from high quality marine grade aluminium for corrosion protection.
- The blade tips overlap providing positive locking to produce minimal air leakage utilizing a unique blade seal.
- Special venetian side strips and top and bottom frame seals further reduce the leakage rate.
- The bearings on which the blades and drive shafts pivot are synthetic high temperature bush type.
- The series 30 Dampers are provided with an 11 mm hex shaft for adaptation to the client's powering unit.

Technical Data – 30 MTA, 30 SDA

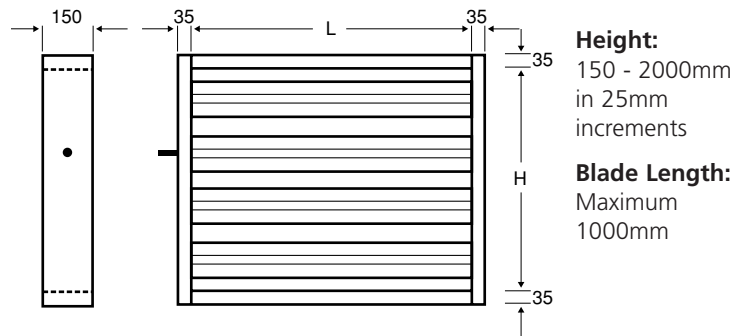
SPECIFICATIONS	30 MTA	30 SDA (motorized)
Frame	Extruded marine grade aluminium	Extruded marine grade aluminium
Blades	Extruded marine grade aluminium	Extruded marine grade aluminium
Blade Configuration	Opposed	Opposed
Blade centres	140mm	140mm
Bearings	High temperature synthetic bush	High temperature synthetic bush
Side Seals	Venetian strip	Venetian strip
Blade & stop seal	Air activated vinyl	Air activated high temperature rubber
Max Face Velocity	8m/s	8m/s
Max Static Pressure	1500Pa. (when closed)	1500Pa. (when closed)
Motor Torque	5Nm per m ² of damper face area	5Nm per m ² of damper face area
Drive Shaft	11mm Hex	11mm Hex
Max Module Width	1200mm	1200mm
Max Module Height	2000mm	2000mm
Operating Temperature	0-40°C	0-200°C

Duct Flange Connection

10mm x 25mm long slot suitable for connection to: Angle Iron Frames, Ductmate, Mez, Metu, TDC, TDF etc

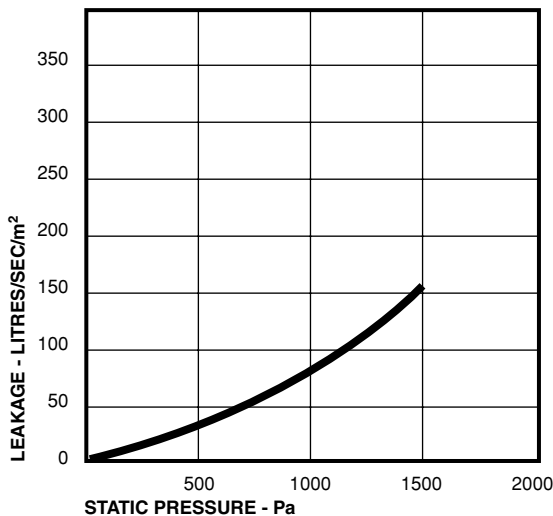


Dimensional Data



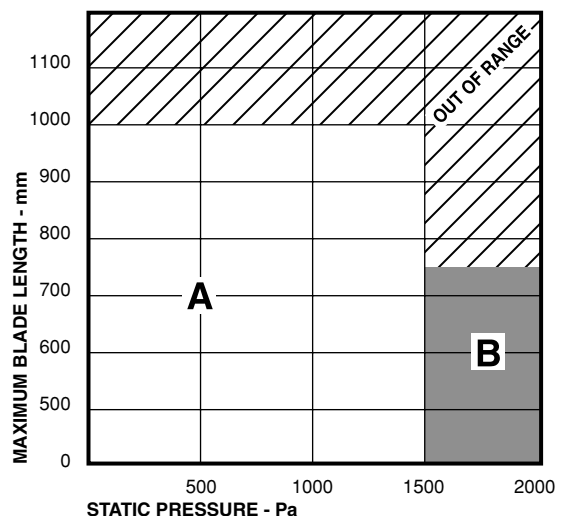
Leakage vs SP - 30 MTA, 30 SDA

Maximum module 1000 x 2000mm
 Maximum SP 1500 Pa



Blade Length vs SP - 30MTA, 30 SDA

Maximum module 1000 x 2000mm
 Maximum SP 1500 Pa



A - Standard Selection
 B - Reduced Blade Length (special request only)

Volume Damper - Low Velocity

40 MLA Manual 40 MTA Motorised

No Blade Seal Design 1000Pa.

The 40 MLA & 40 MTA Dampers are designed to work at a maximum static pressure of 500 Pa. (40 MLA) or 1000Pa. (40 MTA). Operating temperature range for series 40 dampers is 0-80°C.



- The 40 MLA Damper is designed to regulate air flow to suit most balancing applications in low to medium velocity systems (may also be motorized).
- The 40 MTA Motorized Damper is designed to regulate air flow where controlled air leakage is a consideration.
- The linkage system and the opposed blade configuration provide flexibility and accurate setting.
- The Frame and Blades are extruded from high quality marine grade aluminium for corrosion protection.
- The blades are designed to interlock in the closed position to produce minimal air leakage rates suitable for most A/C system applications.
- Motorized dampers are fitted with venetian side strips and top and bottom frame seals to further reduce the leakage rate.
- The bearings on which the blades and drive shafts pivot are synthetic bush type.
- The series 40 Dampers are provided with an 11mm hex shafts for adaptation to the client's powering unit.

Technical Data – 40 MLA, 40 MTA

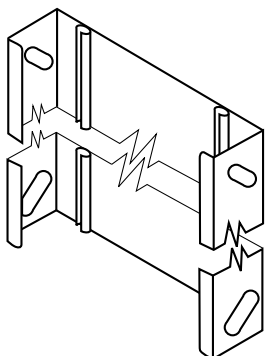
SPECIFICATIONS

40 MTA, 40 MLA

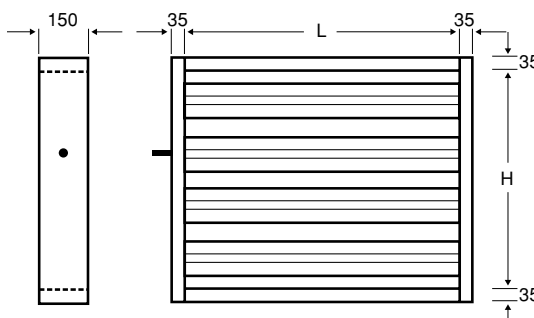
Frame	Extruded marine grade aluminium
Blades	Extruded marine grade aluminium
Blade Configuration	Opposed
Blade centres	140mm
Bearings	Synthetic bush
Side Seals	Venetian strip - 40 MTA (motorized only)
Frame stop seals	Not Applicable
Max Face Velocity	8m/s
Max Static Pressure	40 MLA 500Pa. (when closed) 40 MTA 1000Pa. (when closed)
Motor Torque	5Nm per m ² of damper face area
Drive Shaft	11mm Hex
Max Module Width	40 MLA 1200mm (manual) 40 MTA 1000mm (motorized)
Max Module Height	2000mm
Operating Temperature	0-80°C

Duct Flange Connection

10mm x 25mm long slot suitable for connection to: Angle Iron Frames, Ductmate, Mez, Metu, TDC, TDF etc



Dimensional Data

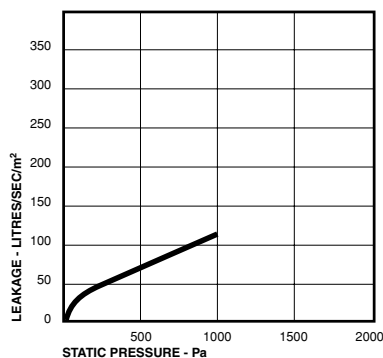


Height:
150 - 2000mm
in 25mm increments

Blade Length:
Max - 40 MLA
1200mm (manual)
Max - 40 MTA
1000mm (motorized)

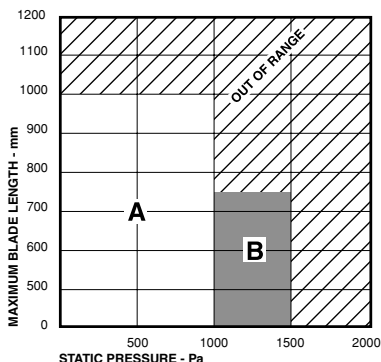
Leakage vs SP Motorized Volume Dampers

Maximum module 1000 x 2000mm
Max SP 1000 Pa



Blade Length vs SP Motorized Volume Dampers

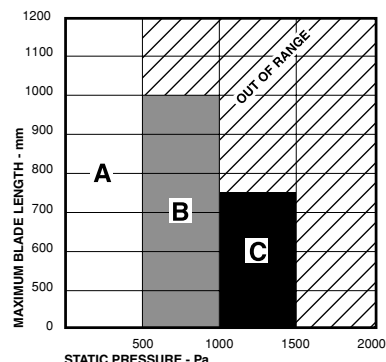
Max module 1000 x 2000mm
Max SP 1000 Pa



A - Standard Selection
B - Reduced Blade Length
(special request only)

Blade Length vs SP Manual Volume Dampers

Max module 1200 x 2000mm
Max SP 500 Pa



A - Standard Selection
B & C - Reduced Blade Length
(special request only)

Non Return Damper - Low Velocity

60 RAA Relief Air

60 NRA Non Return

60 WNRA Weighted Non Return

Series 60 Non Return Dampers are designed to work in a laminar air flow environment between 2m/s - 8m/s and maximum static pressure of 500Pa.

The operating temperature range for series 60 dampers is 0-80°C.



- The 60 RAA Relief Air Damper is designed to relieve pressure from unduly pressurized compartments (blades not ganged).
- The 60 NRA Non Return Damper is designed to be used in ductwork where direction of air flow is to be controlled (blades ganged together)
- The 60 WNRA Weighted Non Return Damper enables site adjustment of the Pressure Drop requirement across the Non Return Damper (all blades are ganged and weighted by an adjustable weight on a counter lever arm).
- All Series 60 Non Return Dampers are manufactured from high quality marine grade aluminium for corrosion protection.
- Aluminium blades are supported on 6mm shafts and synthetic bush bearings.
- Model 60 WNRA is supplied with an adjustable weight on a counter lever arm mounted outside the damper frame.

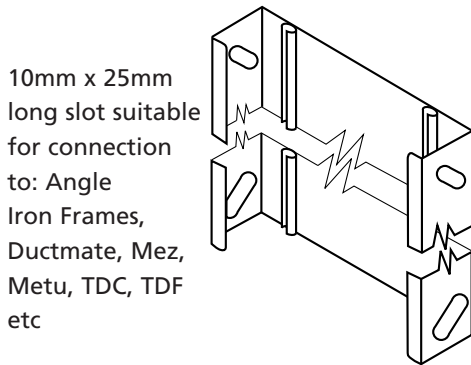
Technical Data – 60 RAA, 60 NRA, 60 WNRA

SPECIFICATIONS

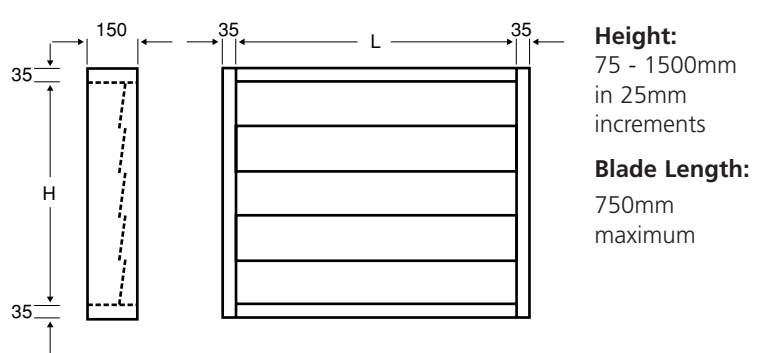
60 RAA, 60 NRA, 60 WNRA

Frame	Extruded marine grade aluminium
Blades	Light duty marine grade aluminium
Blade Configuration	Parallel
Blade centres	75mm
Bearings	Synthetic bush
Max Face Velocity	8m/s
Min Face Velocity	4m/s RAA 2m/s NRA, WNRA
Max Static Pressure	500Pa. (when closed)
Max Module Width	750mm
Max Module Height	1500mm
Operating Temperature	0-80°C

Duct Flange Connection



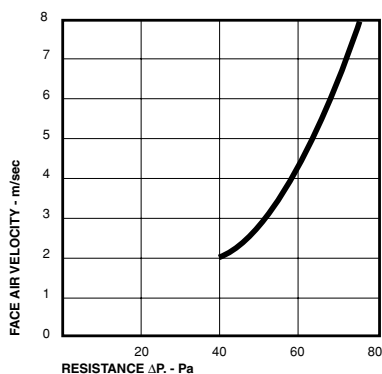
Dimensional Data



NOTE: DO NOT FIT DAMPER NEAR FAN DISCHARGE OR IN OTHER TURBULENT AREAS.

Air Velocity vs ΔP Non Return Dampers

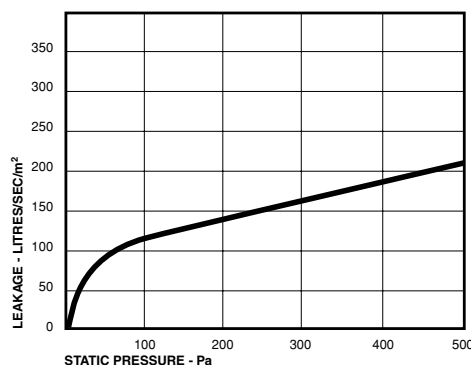
Max module 750 x 1500mm
Max velocity 8m/s



Note: Tested with NRD blades in vertical plane, discharge duct fitted.

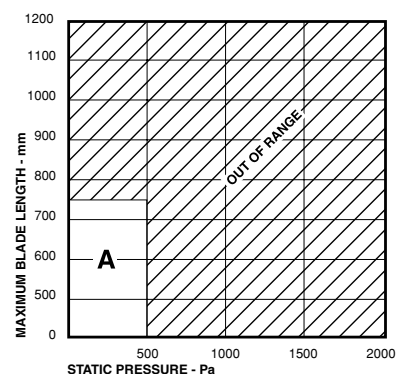
Leakage vs SP Non Return Dampers

Max module 750 x 1500mm
Max SP 500 Pa



Blade Length vs SP Non Return Dampers

Max module 750 x 1500mm
Max SP 500 Pa



A - Standard Selection

Isolation Control Damper - Medium Velocity

20 ICA Manual or Motorised

Blade Seal Design 1500Pa.

20 ICA are tight shut-off dampers, designed to work in medium velocity systems with a maximum static pressure of 1500 Pa.
Operating temperature range 0 - 80° C.



- The 20 ICA Damper is designed to provide tight shut-off to facilitate servicing, fumigation and HEPA filter replacement associated with clean room ventilation and air conditioning systems.
- The casing is fully sealed to prevent external leakage and to conceal the linkage system for protection and ease of cleaning.
- Linkage components are out of the air stream.
- The Linkage system and the opposed blade configuration provide operational flexibility and accurate setting.
- The frame and blades are extruded from high quality marine grade aluminium for corrosion protection. Optional anodized finishes available.
- The blade tips overlap, providing positive locking to produce tight shut-off utilizing blade tip seals together with side strip seals and top and bottom frame seals.
- The bearings on which the blades and drive shafts pivot are non-corrosive, synthetic high temperature bush type.
- The series 20 Dampers are provided with an 11mm hex shaft for adaption to an actuator, or a manual quadrant can be factory installed.

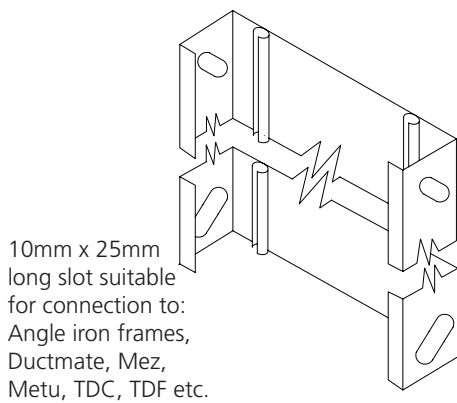
TECHNICAL DATA - 20 ICA

SPECIFICATIONS

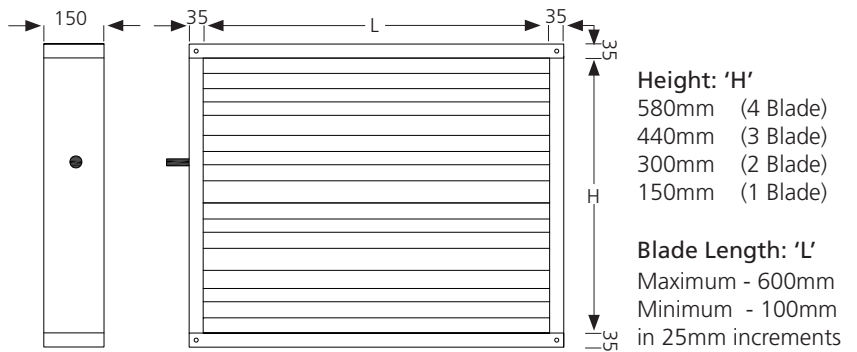
20 ICA

Frame	Extruded marine grade aluminium
Casing	Fully sealed (tested to 1500 Pa)
Blades	Extruded marine grade aluminium
Blades Configuration	Opposed
Blade Centres	140mm
Bearings	High temperature synthetic bush
Side Seals	Contained Twin Leaf strip
Blade & Stop Seals	High temperature rubber
Max Face Velocity	8m/s
Max Static Pressure	1500Pa. (when closed)
Motor Torque	5Nm
Drive Shaft	11mm Hex
Max Module Width	600mm
Max Module Height	580mm
Operating Temperature	0 - 80 C

Duct Flange Connection

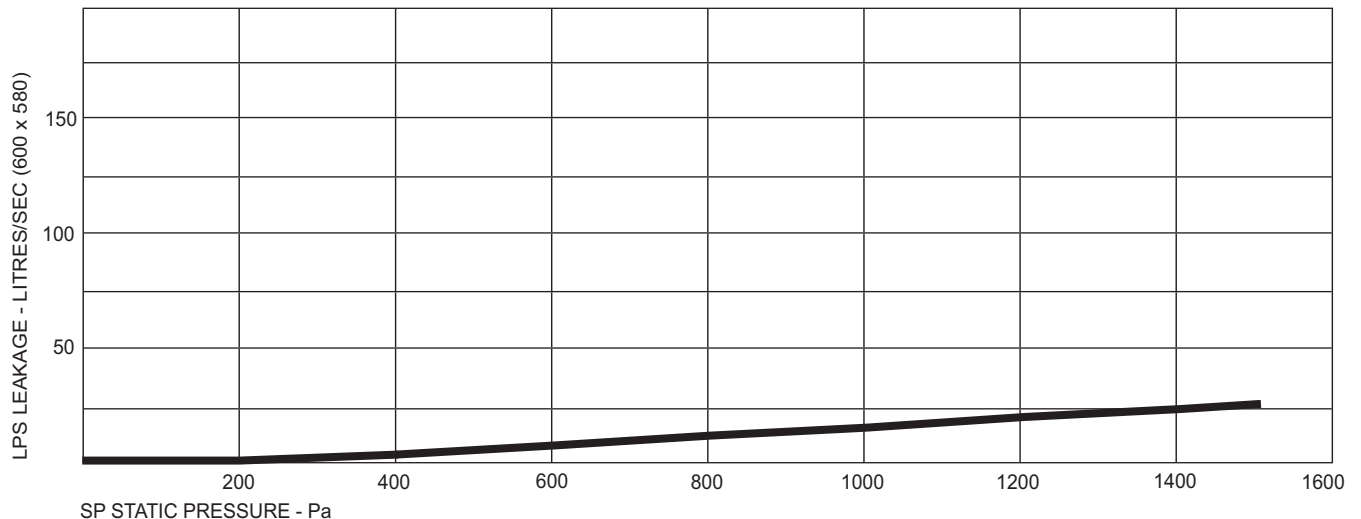


Dimensional Data



Face Leakage vs SP - 20 ICA

Maximum size 600 x 580mm
 LPS (other sizes) by calculation = $m^2/0.3 \times \text{LPS graph}$
 Maximum SP 1500 Pa.



Clean Room Damper - Medium Velocity

30 CRA Manual or Motorised

Blade Seal Design 1500Pa.

30 CRA dampers are designed to work in medium velocity systems with a maximum static pressure of 1500 Pa.
Operating temperature range 0 - 80° C.



- The 30 CRA Damper is designed to regulate air flow where low leakage is a consideration.
- The casing is fully sealed to prevent external leakage and to conceal the linkage system for protection and ease of cleaning.
- Linkage components are out of the air stream.
- The Linkage system and the opposed blade configuration provide operational flexibility and accurate setting.
- The frame and blades are extruded from high quality marine grade aluminium for corrosion protection.
- The blade tips overlap, providing positive locking to produce minimal air leakage utilizing blade tip seals together with side strip seals and top and bottom frame seals.
- The bearings on which the blades and drive shafts pivot are non-corrosive, synthetic high temperature bush type.
- The series 30 Dampers are provided with an 11mm hex shaft for adaption to an actuator, or a manual quadrant can be factory installed.

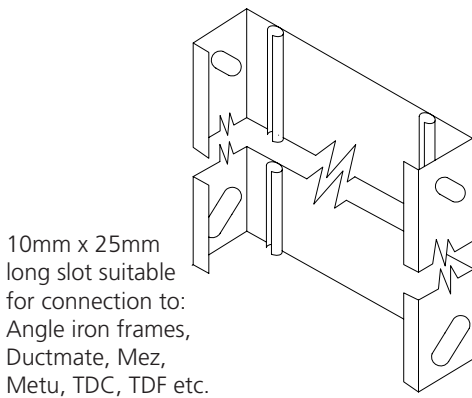
TECHNICAL DATA - 30 CRA

SPECIFICATIONS

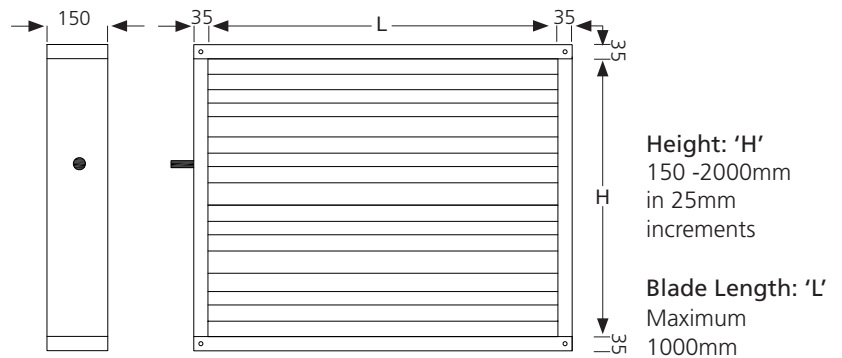
30 CRA

Frame	Extruded marine grade aluminium
Casing	Fully sealed (tested to 1500 Pa)
Blades	Extruded marine grade aluminium
Blades Configuration	Opposed
Blade Centres	140mm
Bearings	High temperature synthetic bush
Side Seals	Venetian strip
Blade & Stop Seals	High temperature rubber
Max Face Velocity	8m/s
Max Static Pressure	1500Pa. (when closed)
Motor Torque	5Nm per m ² of damper face area
Drive Shaft	11mm Hex
Max Module Width	1000mm
Max Module Height	2000mm
Operating Temperature	0 - 80° C

Duct Flange Connection

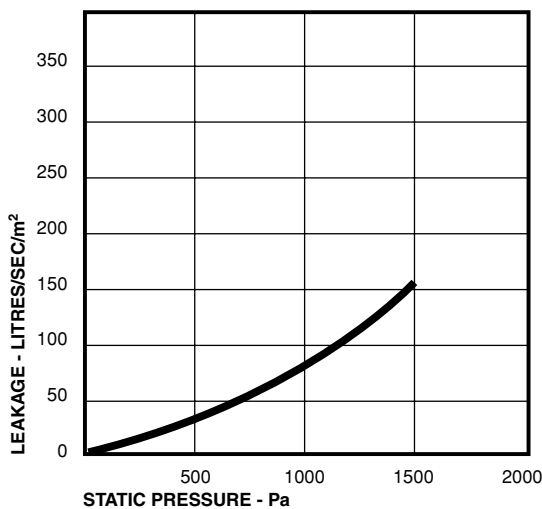


Dimensional Data



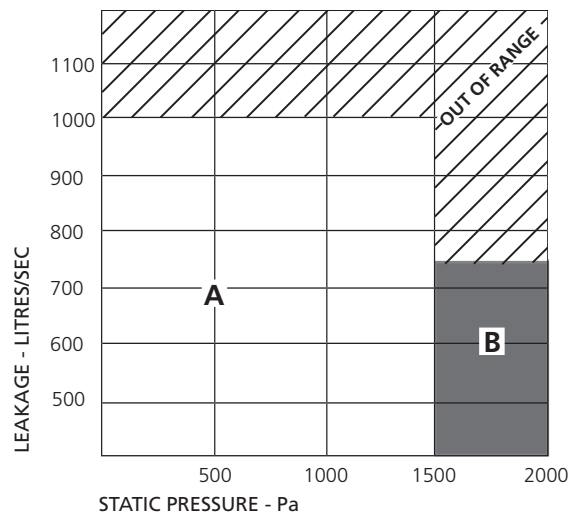
Face Leakage vs SP - 30 CRA

Maximum module 1000 x 2000mm
Maximum SP 1500 Pa.



Blade Length vs SP - 30 CRA

Maximum module 1000 x 2000mm
Maximum SP 1500 Pa.



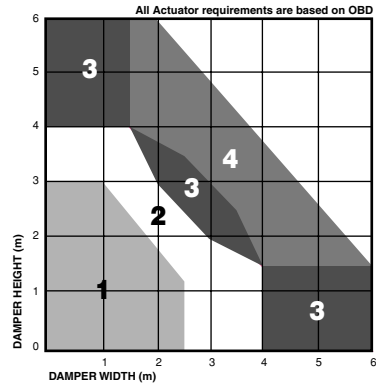
Damper Motors

Motor Application Guide

The Modular Damper System is based on motor selection of up to 15Nm torque output.

The following graph may be used to determine the minimum number of damper actuators required for each damper.

Suggested torque requirement for low to medium velocity systems is 5Nm per 1.0m² of damper face area.



Damper Drive Examples

Over 2.5m wide - Fig. 1

Over 3.0m high - Fig. 2

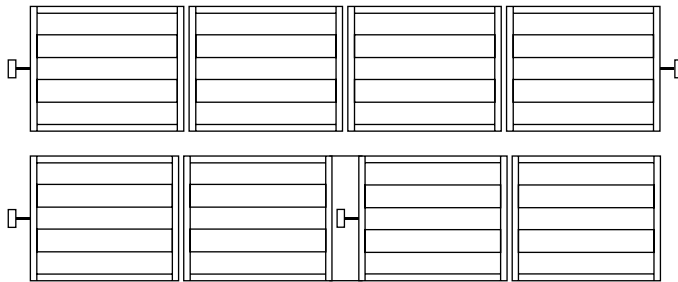


Fig. 1

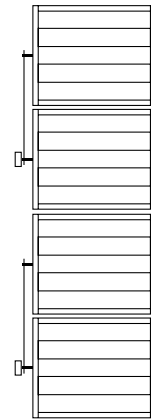
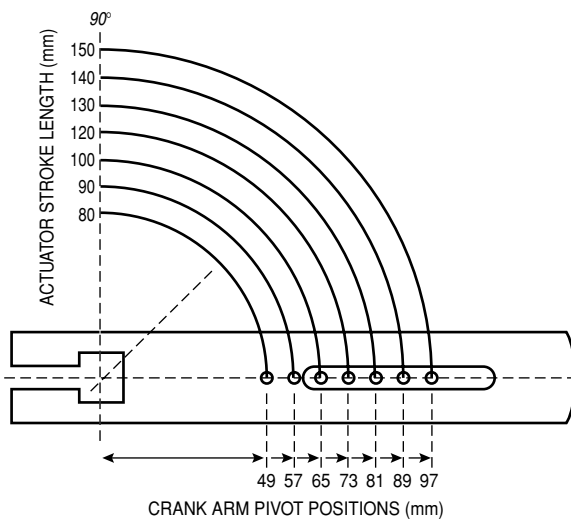


Fig. 2

Motor Stroke

WARNING: STROKE ALL DAMPERS FROM CLOSED POSITION TO AVOID OVERDRIVING

1. Lineal Action Actuator Stroke vs Pivot Point



Note: For pivot positions not accommodated in the crank arm slot, drill 7mmØ hole to suit.

2. Lineal Actuator Stroke Length

For Pneumatic Actuators allow 10mm for spring tension at the appropriate end of stroke/ i.e. 100mm stroke actuator- use 90mm dim.

For Electric Actuators allow full stroke/ i.e. 100mm stroke actuator- use 100mm dim.

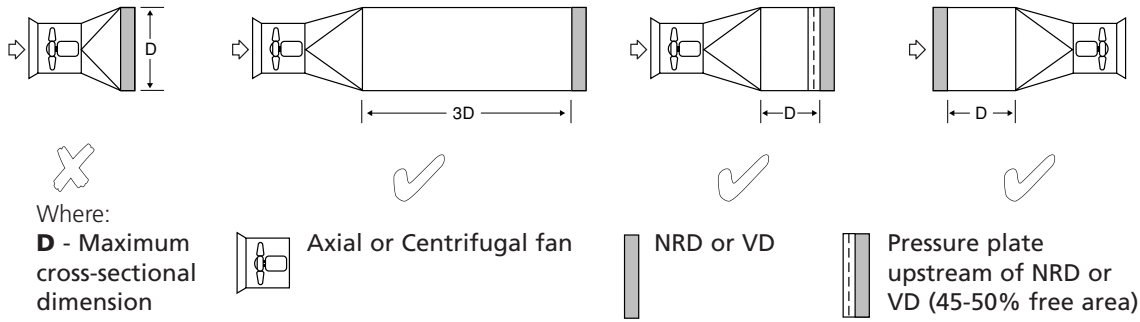
3. Rotating Actuator Pivot Ratio

Actuator Rotation	Pivot Dimension Ratio	
	Driver	Driven
45°	2	1
90°	1	1
160°	1	1.7
180°	1	2

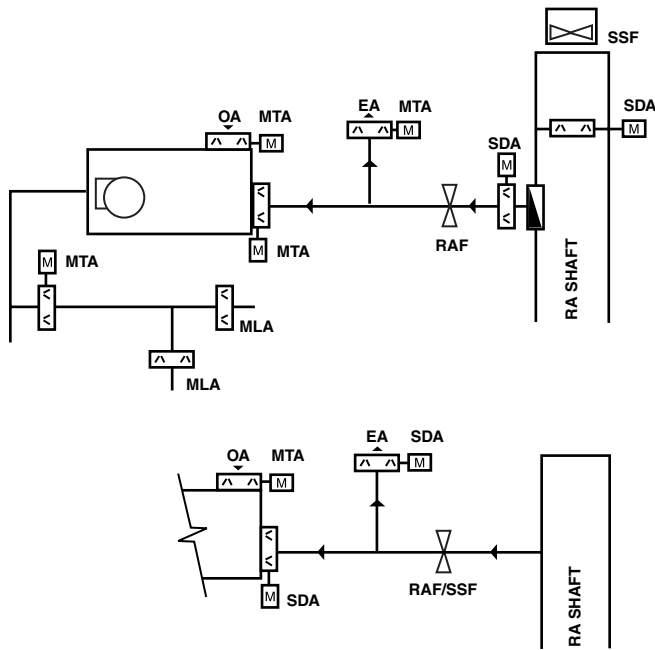
DAMPERS MUST NOT BE OVERDRIVEN IN EITHER DIRECTION

System Design

System Design

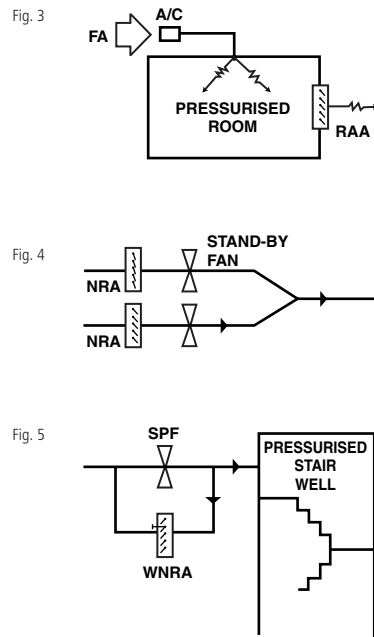


Volume Damper Applications



OA - Outside Air EA - Exhaust Air RAF - Return Air Fan SSF - Smoke Spill Fan SPF - Stair Pressurization Fan

Non Return Damper Applications



Pressure Drop

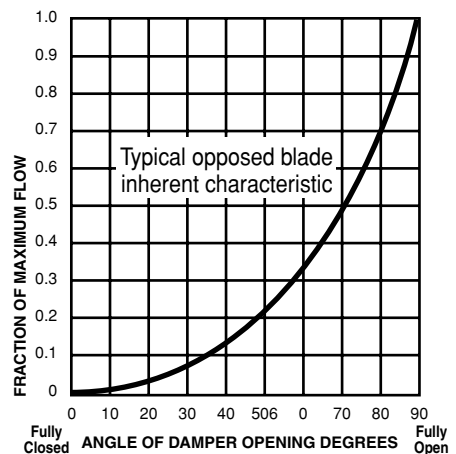
For Manual Balancing and Motorized Opposed Blade Dampers, the pressure drop will not exceed the values calculated from the 1981 SMACNA duct design tables, section 6-14F as follows.

PD Test Method	Loss Coefficient C									
	θ									
Rectangular Duct	L/R	80°	70°	60°	50°	40°	30°	20°	10°	0°
		0.3	807	284	73	21	9.0	4.1	2.1	0.8
	0.4	915	332	100	28	11	5.0	2.2	5.0	0.52
	0.5	1945	377	122	33	13	5.4	2.3	0.9	0.52
	0.6	1121	411	148	38	14	6.0	2.3	2.0	0.52
	0.8	1299	495	188	54	18	6.6	2.4	1.0	0.52
	1.0	1521	547	245	65	21	7.3	2.7	1.0	0.52
1.5	1654	677	361	107	28	9.0	3.2	1.1	0.52	

$PD = V_p \times C$
 Where:
 PD - Pressure Drop
 VP - Velocity Pressure
 C - Loss Coefficient
 $L = \frac{NW}{R} = \frac{NW}{2(H+W)}$
 Where:
 N - Number of damper blades
 W - Duct dimension parallel to blade axis
 L - Sum of damper blade lengths
 R - Perimeter of duct
 H - Duct Height

Inherent Characteristic

The inherent characteristic of Opposed Blade Dampers at varying angles of opening follow a parabolic curve as shown.

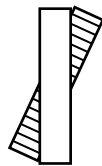


Installation Guidelines

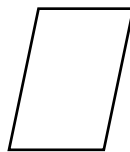
The following installation requirements must be observed to achieve the desired performance and trouble free damper operation.

1. Ensure correct ALIGNMENT with ductwork. To assist with alignment, the damper should be set in the fully-open position during installation and FREE BLADE OPERATION MUST BE CHECKED AFTER FIXING.
2. Damper must be SQUARE AND FLAT. (fig. 1)
3. SHIMS MUST BE USED to compensate for distorted ductwork or openings.
4. Fabricated penetrations must be STIFFENED OR FRAMED to provide stable aligned fixing.
5. Frame fixings MUST NOT BE OVER TIGHTENED as distortion may occur.
6. It may be necessary to SEAL AROUND FRAME to eliminate air leaks.
7. ACTUATORS MUST BE SUPPORTED RIGIDLY in line and square, off damper frame or structure.
8. Extended drive shafts must be fitted with OUTRIGGER BEARINGS.
9. Dampers MUST NOT BE OVERDRIVEN in either direction.
10. STROKE all drives from closed position.
11. Dampers EXPOSED TO THE WEATHER must have flashing over the top of the damper frame.

Fig. 1



Ensure damper is not out of flat. Out of flat blades will not fully close.



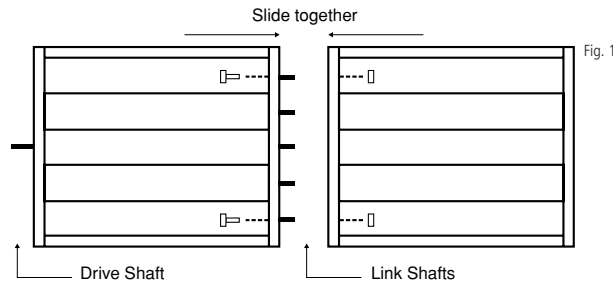
Out of square dampers will result in blades jamming against the frame.



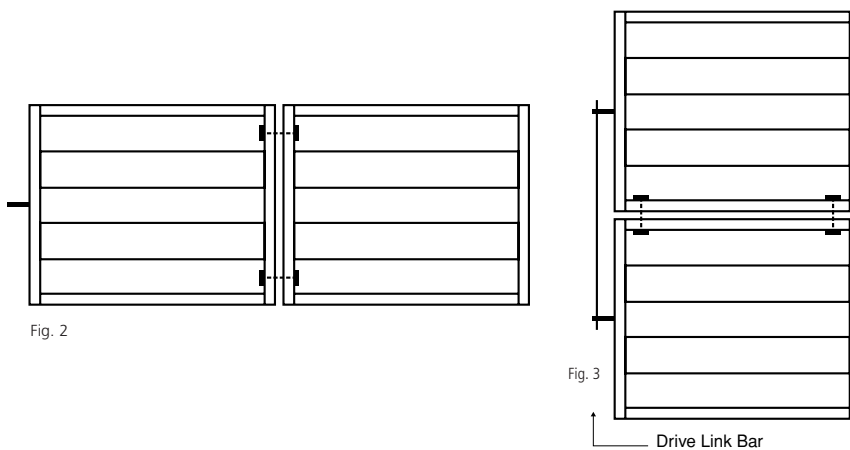
Ensure both diagonal dimensions are the same

Modular Assembly

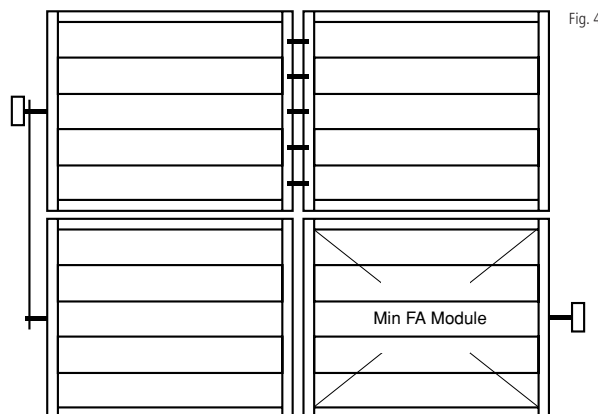
Damper Modules are assembled with tie bolts, designed to ensure accurate frame alignment and a sturdy integral damper assembly (figs. 2 & 3). The modules should be assembled prior to fixing to the opening or duct frame, however should the overall damper size be unmanageable the damper can be installed in pre-assembled sections.



Should it be required to interlink modules horizontally, this is easily achieved during assembly with interfacing Link Shafts (figs. 1 & 2). Vertical modules can be interlinked with an interfacing Drive Link Bar after installation (fig. 3).



To demonstrate the flexibility of the modular system, fig. 4 depicts a fresh air damper where three modules are driven by one actuator and a Minimum Fresh Air module is controlled independently.



Note: Overall damper face area per actuator must not exceed 3m², refer motor applications guide page 13.