

VOLUME CONTROL & SHUT OFF DAMPERS

SERIES 400

Series 900 Volume Control And Shut Off Dampers:

Series 900 balancing and shut off dampers have been designed, engineered and tested, with smooth efficient operation as an important consideration. Series 900 shut off dampers have exceptionally low operating torque characteristics without compromising their "shut off" abilities. The immediate benefit of this feature is the ability to make small precise adjustments with ease and a dramatically reduced loading on control motors and actuating devices. All units have low profile, extruded aluminium blades with a symmetrical aerofoil section which minimize pressure loss. The operating linkages are entirely enclosed within the casing and outside the airstream and will require virtually no maintenance. Series 900 shut off dampers differ in that they are fitted with unique silicon blade edge seals ensuring ultra low leakage rates,

Available with flanged casing suitable or direct connection to proprietary flange connections or with spigoted casings for square, rectangular, round or flat oval duct connection.



Series 9CXJ Volume Control Damper, Model A

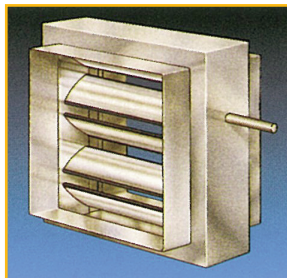
shown complete with hand controller. Other control options are available including extended shaft for connections to electric or pneumatic actuators.

- **Tested to DW 142 Class D with 'Negligible Leakage' recorded.**
- **Smooth precision operation with linkages completely outside the airstream.**
- **Unique silicone blade edges seals on shut off damper versions for ultra low leakage.**
- **Low profile extruded aluminium blades with symmetrical aerofoil section reducing pressure loss to a minimum**
- **Stainless steel jamb seals.**
- **Roll formed casing with reinforced corners for strength and rigidity.**
- **Flanged or spigoted connections.**
- **All series 9CXJ dampers are recommended to be installed with blades Running horizontally.**
- **Galvanised and stainless steel aerofoil blades available on request.**



MODEL A

For square or rectangular flange duct connections. Sizes from 100mm to 1000mm width or height.



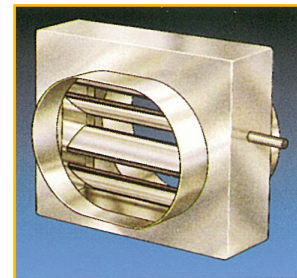
MODEL B

For square or rectangular spigot duct connections. Sizes from 100mm to 1000mm width or height.



MODEL C

For round spigot duct connections. Sizes from 100mm to 1000mm diameter.



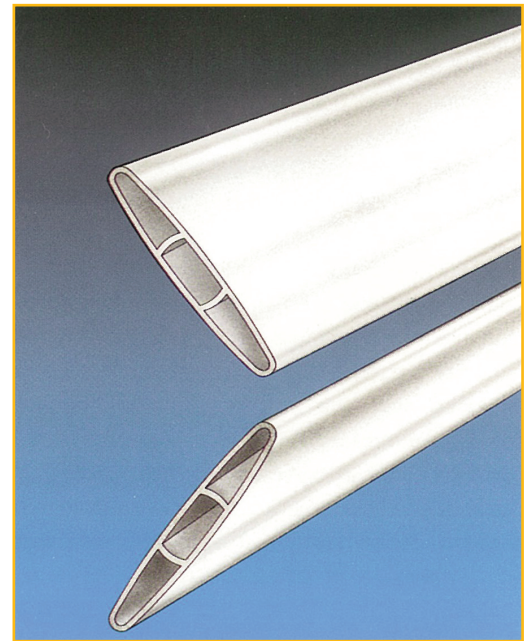
MODEL D

For flat oval spigot duct connections. Sizes from 100mm to 1000mm width or height.

VOLUME CONTROL & SHUT OFF DAMPERS APPLICATIONS

Volume Control Dampers

Volume Control dampers are needed to balance even the most carefully designed air handling systems. It is important, however, to select balancing dampers with low pressure drop characteristics to avoid excessive duct system pressure losses. **Grada UK** balancing dampers incorporate an extremely low profile aerofoil blade to minimize pressure drop. Series 900 volume control dampers have been designed and developed to provide both simple and precise control for all balancing applications. Generally, jamb seals are not required. The series 900 dampers are available with a locking hand controller and other options.



Aerofoil blades may be set in a fixed position for balancing application: i.e. not for full shut-off or automatic operation.

Shut Off Dampers

Shut off dampers differ from volume control dampers in that they are intended for full shut off and automatic operation. For these reasons, **Grada UK** have developed a unique pressure sensitive blade edge seal. This silicone rubber blade edge seal provides an extremely tight air seal which is assisted by the build up of air pressure after the damper has closed. However, its low friction design means

that there is very little breakaway torque required to reopen the damper. Since tight sealing characteristics are desirable, stainless steel jamb seals are standard. Series 900 Shut off dampers are available with an extended shaft and support bracket for connection to a variety of electric motors or pneumatic actuators.

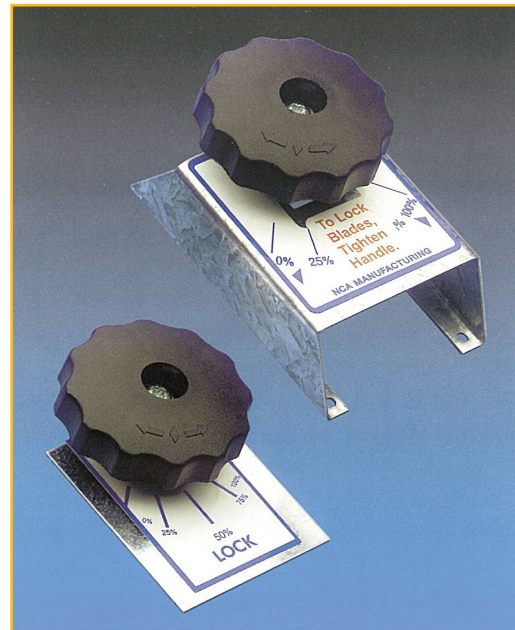


Aerofoil blades complete with silicone rubber, pressure sensitive blade edge seals. May be used for full shut off and automatic control applications.

VOLUME CONTROL & SHUT OFF DAMPERS ACCESSORIES

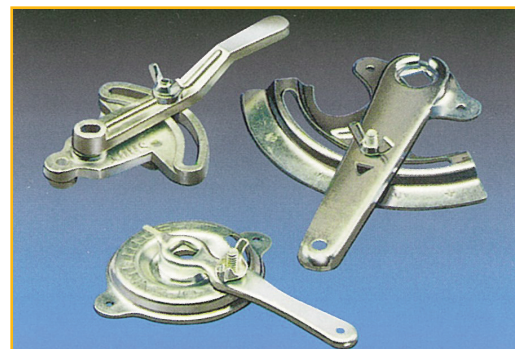
Hand Controller

Grada UK Series 900 volume control dampers are available with a hand controller which enables the system balancing contractor to easily select the appropriate blade positions and then lock the blades in place. The controller handle incorporates an arrow indicator which allows for a quick check of the damper blade position. The locking mechanism is incorporated in the handle for ease and simplicity of operation. The hand controller may be fitted to all sizes of series 900 volume control dampers.



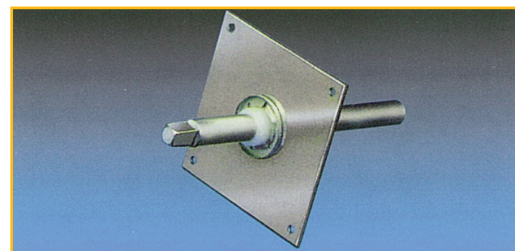
Locking Quadrants

Locking quadrants are available for use with series 900 volume control dampers.



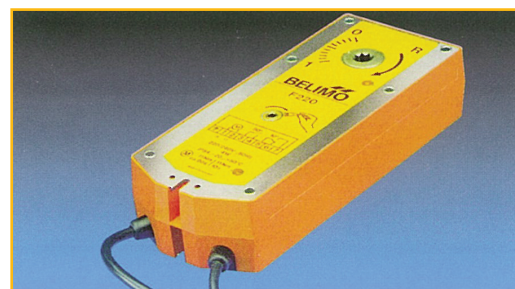
Extended Shaft

We will provide an extended operating shaft complete with an external support bracket for easy connection to a variety of electric and pneumatic actuators.



Motors/Actuators

Series 900 shut off dampers are available with a wide range of electric motors (open/close, spring return or modulating). Also shut off dampers may be fitted with a range of pneumatic actuators.



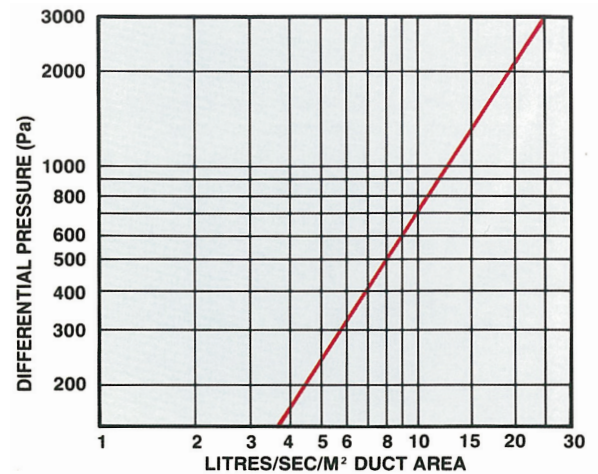
VOLUME CONTROL & SHUT OFF DAMPERS PERFORMANCE

Leakage

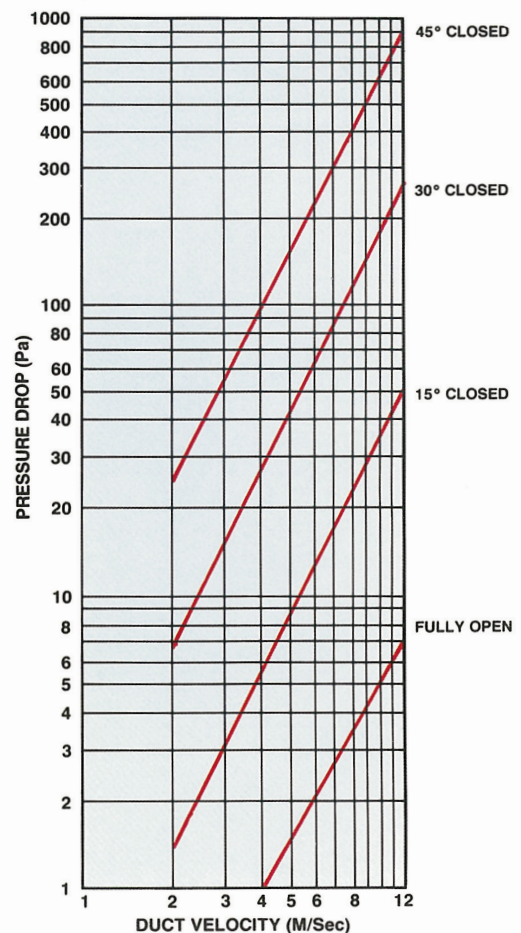
Excessive damper leakage can be a significant factor affecting the energy costs of an air handling system. It is very important, therefore, that the system designer selects dampers that are well designed and constructed to tight sealing characteristics. Series 900 shut off dampers have been designed and tested to provide extremely low leakage. All shut off dampers incorporate stainless steel jamb seals and unique pressure sensitive blade edge seal. Additionally, **Grada UK** spigot casings are welded to prevent leakage. Many damper manufacturers attempt to solve their leakage problems by equipping damper blades with soft rubber, hollow profile blade seals that meet edge on with the adjacent blades (ie: "draw bridge action"). While this may achieve a relatively tight sealing damper, such damper seals create so much friction that the damper may be extremely difficult to open (or require an oversized motor). This type of sealing causes as many problems as it solves. Series 900 shut off dampers overcome this problem by utilizing an overlapping, low friction solid seal. This blade edge seal is extremely air tight but easy to breakaway and reopen the damper.

Pressure Loss

It is important for system designers to calculate pressure losses of individual pieces of equipment in the duct system to arrive at a value for total system pressure loss in order to select the proper fan. The air performance of a damper may be described by the pressure drop across the damper for a given air flow rate through the face area of the damper. This performance is expressed as velocity through the damper face area versus measured pressure drop. The most important factor effecting damper pressure loss is the percentage of duct area blocked by intrusions, this is minimised by removing the casing from the airstream (flange or spigot mount), concealing the blade linkage in the casing and by utilizing low profile aerofoil blades.



The above graph shows the values for a typical (1:1 aspect ratio) series 900 shut off damper complete with blade edge and jamb seals.

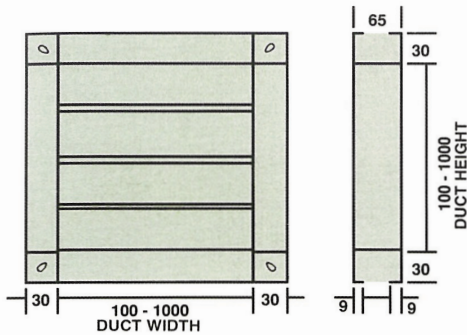


Pressure loss values depend on duct area blockage and vary with damper sizes. The graph is for a typical size damper of 600mm x 600mm. Individual damper losses may vary somewhat from this size.

VOLUME CONTROL & SHUT OFF DAMPERS

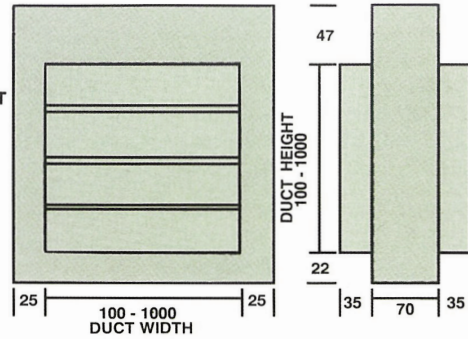
DIMENSIONAL DATA : 900 SERIES

Model A

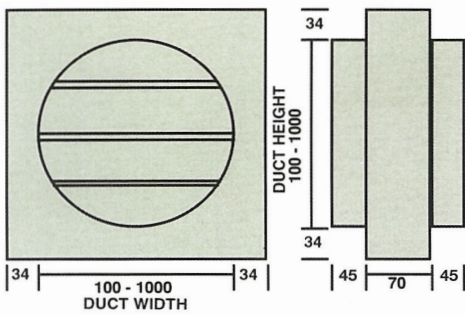


Model B

MODEL B
DAMPER SPIGOT
SUPPLIED - 6mm
UNDER DUCT HEIGHT
AND WIDTH

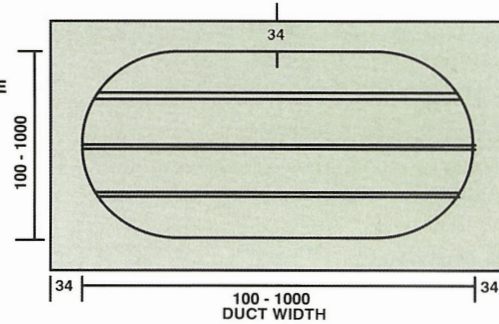


Model C



Model D

MODEL C AND D
DAMPER SPIGOT
SUPPLIED - 3mm
UNDER DUCT SIZE



Weight Chart (Kg) - Model A - Flange Mount

Height mm	Width mm									
	100	200	300	400	500	600	700	800	900	1000
100	2	2	3	3	4	4	4	5	5	6
200	2	3	3	4	4	5	5	6	6	7
300	3	3	4	4	5	6	6	7	7	8
400	3	4	4	5	6	6	7	8	8	9
500	4	4	5	6	7	7	8	9	10	10
600	4	5	6	6	7	8	9	10	11	12
700	4	5	6	7	8	9	10	11	12	13
800	5	6	7	8	9	10	11	12	13	14
900	5	6	7	8	10	11	12	13	14	15
1000	6	7	8	9	10	12	13	14	15	16

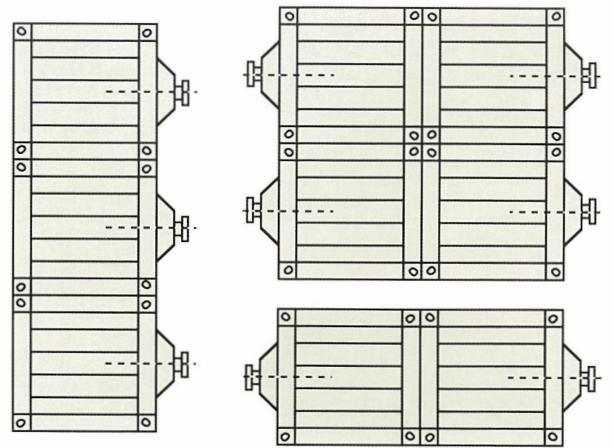
Notes:

1. The above values are approximate for estimation purposes only.
2. For Model B, Multiply chart values x 1.5.
3. For Models C&D, Multiply chart values x 1.6.

VOLUME CONTROL & SHUT OFF DAMPERS

Multiple Assemblies

Flange mount casings may be furnished as multiple assemblies for on site assembly (by others). 18msg galvanised sheet steel mullion plates are supplied to connect the various damper selections. Shown here are some of the typical damper arrangements for assemblies.



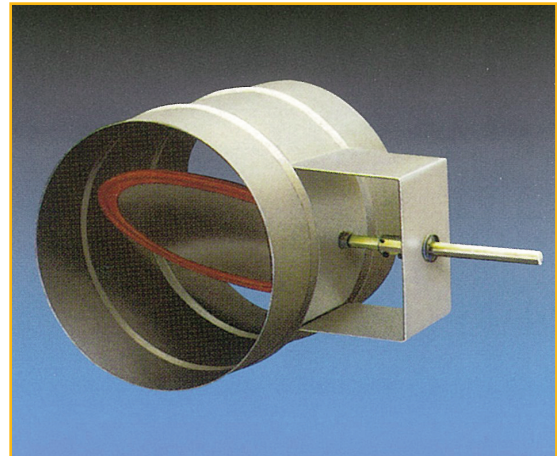
multiple assemblies

Round Shut Off Dampers

Round shut off dampers (model 900-R) are available in standard sizes (150mm to 600mm diameters). The 900-R series dampers incorporate a galvanised steel casing and galvanised steel blade complete with a tight sealing silicone rubber blade edge seal. The axle bearings are oil impregnated bronze and the axles are 9.5mm diameter and zinc bichromate plated. Subject to minimum quantity order, please enquire.

Specifications

Volume control and shut off dampers shall be series 900 or series 900-R (round dampers) as manufactured by **Grada UK**. Series 900 dampers shall have low profile aerofoil blades and concealed linkage. Shut off dampers shall have pressure sensitive, low friction blade edge seals of silicone rubber. Casings shall be of roll formed steel construction with reinforced corners. Series 900-R dampers shall have oil impregnated bronze bearings and zinc dichromate plated steel axles.



Round Shut Off Damper - Model 900-R

Ordering Information		Applications	Options	
Model	Size Range mm		Seals	Controls
A	100x100 To 1000x1000	Volume control -1	No Seals - N	Extended Shaft - 1
B	100x100 To 1000x1000		Jamb Seals - Y	Hand Operator 2
C	100Ø To 1000Ø	Shut off* - 2	Note: Jamb seals and blade edge seals are standard on all control damper applications	Extended Shaft - 1
D	100x100 To 1000x1000			Motor - Open/close - 4
				Motor - Modulating - 5
				Pneumatic Actuator - 6

*Shut off damper maximum size for single section 700mm wide x 700mm high.