

BC 4.2



BETEC CAD.

Tunnel Ventilation Dampers



bre



TVD-B-40C2-BG

Selected Products of the company have been Classified / Listed / Tested by various international testing authorities.



Globally Recognized. Industry Respected.



BETEC CAD.
Beyond the Comfort Air..

TUNNEL VENTILATION DAMPERS

BREAKS FIRE & SMOKE

For use in conjunction with tunnel transit systems to operate safely at 250°C/482°F for a minimum of two hours. These dampers are manufactured to block or remove toxic gases and blinding smoke in tunnels. The dampers are tested and classified according to **UL**, **BRE** and **AMCA** performance standards and are suitable for Air balancing, Fire / Smoke isolation and extraction applications.



LIFE SAFETY FOR INDUSTRIAL TUNNEL VENTILATION
Leakage Rating Class - II & Fire Rating 4 Hrs

MIDDLE EAST'S FIRST
UL CLASSIFIED
TUNNEL VENTILATION SMOKE DAMPER

For use in conjunction with tunnel transit systems to operate safely at 250°C

For more details about **BETEC CAD's** Products.

Please Contact us :
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TVD-B-40C2-BG
Leakage Rating:
Class-II as per UL-555S



TVD-SB-40-B
Fire Rating: **bre**
4Hrs V - Mount, 3 Hrs H- Mount
as per BS 476, Part 20-22
Leakage Rating:
Class-I as per UL-555S (VS)

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Tunnel Ventilation Damper

Type : Tunnel Ventilation Fire Damper
Model : TVD-GB-40-B
Fire Rating : 4 hours as per BS 476
Blade : Aerofoil Type
Construction : Galvanized Steel (GI)

BETEC CAD's Ventilation Dampers are designed to isolate sections of a ventilation system with very high level of sealing. The dampers are mounted in side of the tunnel or at tunnel ends to control the pressurized air, air intake and smoke exhaust in long tunnels without intermediate supplies.

In emergency situations , for fire and smoke control, the dampers pressurise the tunnel for safe egress of train, automobile, passengers to escape and creates a negative pressure in the area of the fire to remove smoke and gases.

BETEC CAD's Tunnel Ventilation Dampers are heavy duty and robust dampers requiring less maintenance and are suitable for high humidity, high pressure, dust laden environments making them ideal for installation and operation in Tunnels, Oil & Gas, Marine and Nuclear applications.

Damper Ratings

Fire Rating : 4 hrs vertical / 3 hrs horizontal as per BS 476
Air Velocity : 4000 fpm (20 m/sec)
Pressure : 8" water gauge (2KPa).
Max . Holding Pressure : 20" W.g (5Kpa)
Fatigue cycles : 3.5 million simulated transient pressure reversals (under process)

Standard Construction

Frame

14 gauge (2 mm) thick galvanized steel sheet with 2" (50 mm) external flanges.

Blade

Aerofoil blades of 14 gauge (2 mm) thick roll formed galvanized steel.

Blade Seals

300°C high temp, resistant Silicon rubber blade seals.

Jamb Seals

Stainless Steel.

Bearings

High temperature resistant concealed ball bearings.

Axle

3/4" (19 mm) diameter.

Actuator

Pneumatic.

Optinal Fittings

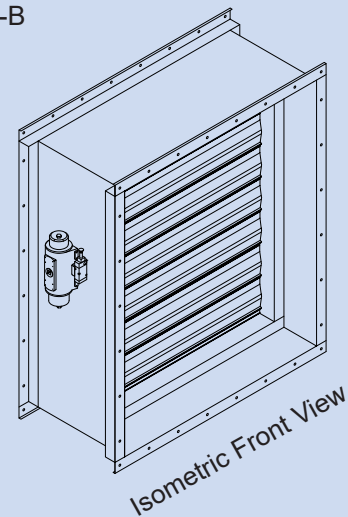
Limit Switches

For Open / Close Indication.

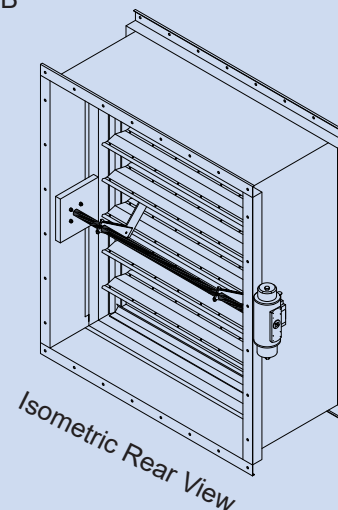
B-40 Series



TVD-GB-40-B



TVD-GB-40-B



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Tunnel Ventilation Damper

B-40 Series

Type : Tunnel Ventilation Fire / Smoke Damper

Model : TVD-GB-40-B; TVD-SB-40-B

Fire Rating : 4 hours as per BS 476

Blade : Aerofoil Type

Construction : Galvanized Steel (GI)
Stainless Steel (SS)

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Damper Ratings

Fire Rating : 4 hrs vertical / 3 hrs horizontal as per BS 476

Leakage Rating : Class I @ 350° F as per UL 555S

Operational Rating : 250° C for 2 hours. (as per HKFSD)

Air Velocity : 4000 fpm (20 m/sec)

Pressure : 8" water gauge (2KPa).

Max . Holding Pressure : 20" W.g (5Kpa)

Fatigue cycles : 3.5 million simulated transient pressure reversals (under process)

Standard Construction

Frame

14 gauge (2 mm) thick stainless steel sheet with 2" (50 mm) external flanges.

Blade

Aerofoil blades of 14 gauge (2 mm) thick roll formed stainless steel.

Blade Seals

300°C high temp, resistant Silicon rubber blade seals.

Jamb Seals

Stainless Steel.

Bearings

High temperature resistant concealed ball bearings.

Axle

3/4" (19 mm) diameter.

Actuator

Pneumatic.

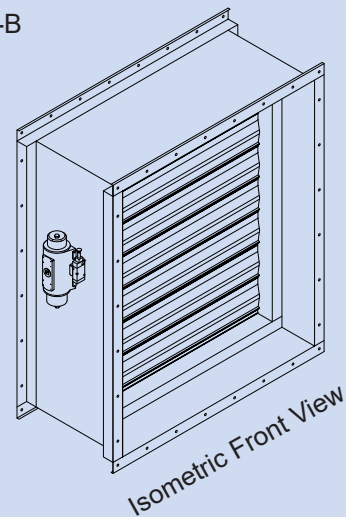
Optinal Fittings

Limit Switches

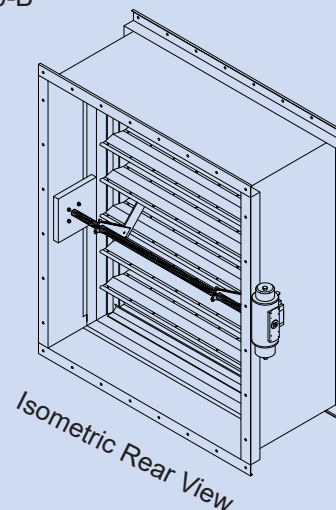
For Open / Close Indication.



TVD-SB-40-B



TVD-SB-40-B

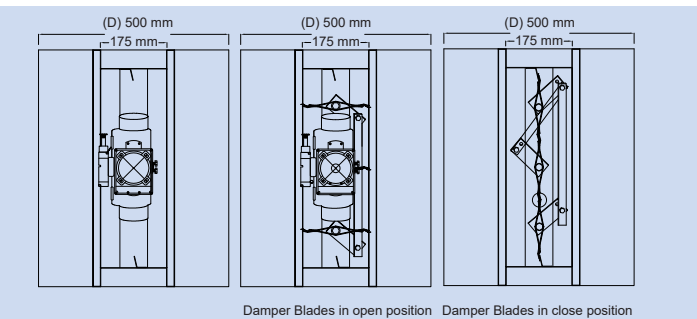
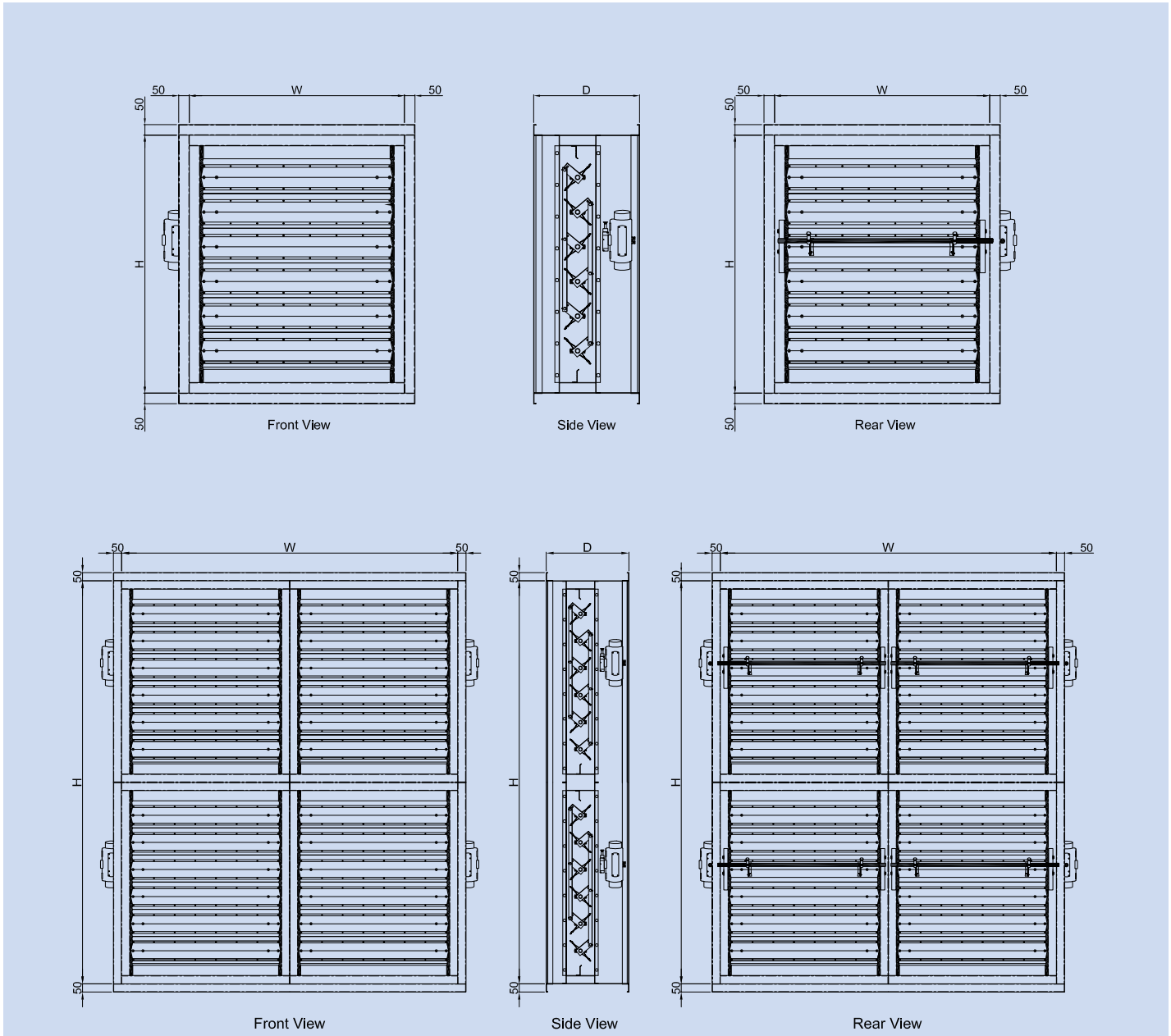


Tunnel Ventilation Damper

B-40 Series

Constructional Details

Model : TVD-GB-40-B; TVD-SB-40-B



Size Limitation		
Module	Size : Width X Height	Mounting Position
Single	Max X Max. 40" x 48"	V/H
Multiple	Max X Max 80" x 96"	V

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Tunnel Ventilation Damper Pneumatic Actuator Ratings

B-40 Series

At 250°/482°F for a minimum of two hours

Pneumatic Actuator Specification

Temperature range

Normal operation : -20°C to +120°C

No Fire : -4°F to + 248°F

Tunnel Application : -20°C to +250°C

Under Fire : for 2 hours minimum

: -4°F to / +482°F

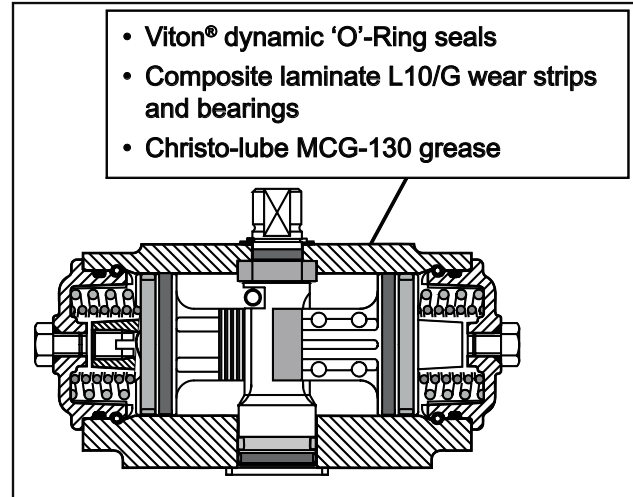
: for 2 hours minimum

Dynamic O-ring seals : Fluorocarbon Rubber 9775 (Viton®).

Static O-ring seals : Nitrile Rubber (Buna-N)

Bearing material : High temperature composite laminate L10/G

Grease : Christo-lube MCG-130



Model Number	Spring Rating	Torque from Springs		Torques from air stroke (Nm) at given operating air pressure (bar)													
				3.0 bar(g)		4.0 bar(g)		5.0 bar(g)		5.5 bar(g)		6.0 bar(g)		7.0 bar(g)		8.0 bar(g)	
		Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End
XL131	S60	38	23	26	11	42	27	58	43	66	51	75	59	91	76	107	92

Model Number	Spring Rating	Torque from Springs		Torques from air stroke (in.lbs) at given operating air pressure (PSI)															
				40 PSI		50 PSI		60 PSI		70 PSI		80 PSI		90 PSI		100 PSI		120 PSI	
		Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End		
XL131	S60	333	200	192	59	291	157	389	255	487	353	585	452	683	550	781	648	977	844

Note:

We recommend that the valve (or louvre) manufacturer supplies the maximum required torque values (Including any adjustments or suggested safety factors for valve or louvre service conditions or application). Additionally, the valve manufacturer must identify at which position(s) and direction(s) of rotation (Counter Clock Wise or Clock Wise) these maximum requirements occur.

NAMUR solenoid valves

*1/4", 3/2 - 5/2, NAMUR interface, electrically operated spool valves, with static seals, high flow, for mounting on NAMUR interface.

Coils and connectors are to be ordered separately.

Namur solenoid valves Specifications

Fluid : Compressed filtered air with or without lubrication

Pressure range: 1 ÷ 10 bar

Temperature range : -10°C ÷ +60°C

Orifice: 7 mm

Flow : 1.000 NI/min at 6 bar with ΔP 1 bar

Minimum piloting pressure: 1,5 bar

Minimum external air pressure: 1,5 bar

Mounting: In any position

Manual override: Two stable positions

Response time: Energising: De-energising:

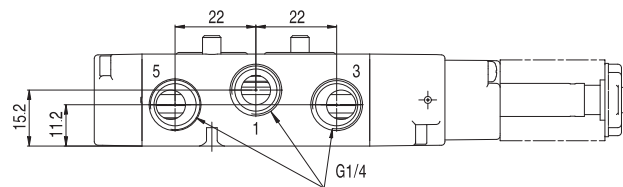
Materials : Body: Aluminium

Heads: Plastic

Spool: Chemical nickel plated aluminium

Distancers: Plastic

Seals: Nitrile rubber (NBR)



Code key

Actuation	Size	Function
NE= NAMUR electrical	1/4"	30 = 3/2 NC 32 = 3/2 solenoid/solenoid *50 = 5/2 solenoid/spring 51 = 5/2 solenoid/solenoid

Tunnel Ventilation Damper

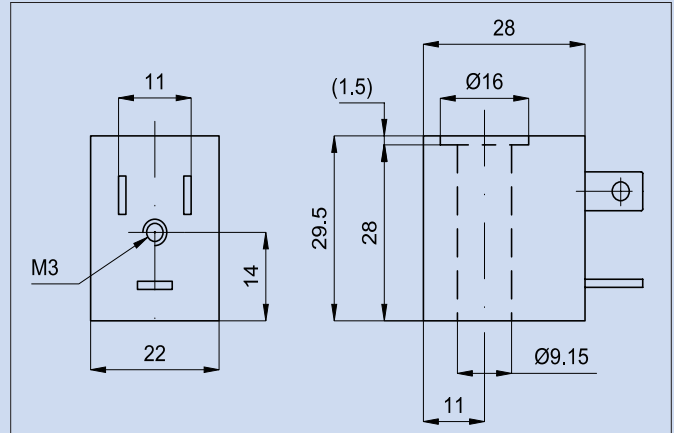
B-40 Series

NAMUR solenoid valve Accessories

Coils

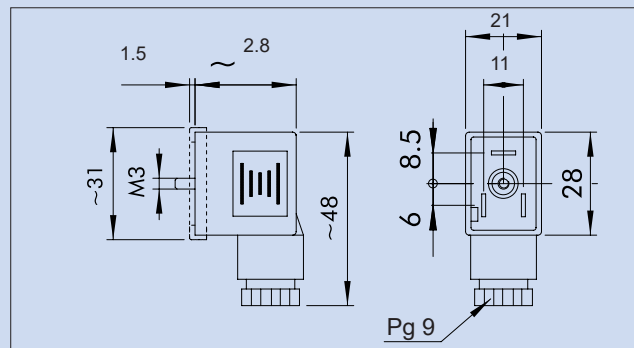
Coils with low electrical consumption conforming to EN 60204.1 and VDE 0580 standards, class F

Technical data	Direct current	Alternating current
Voltage tolerance	± 10%	± 10%
Frequency tolerance	-	± 5%
Electrical consumption	3 W	4,2 VA
Voltage	12 e 24 V	12, 24, 48, 110, *230V 50/60HZ
Duty cycle	100% ED	
Class protection	IP 65 (with connector already mounted)	
Temperature range	-20 °C + + 50 °C	
Response time	10 ms	



Coil Connectors

Tipo	Colour	Ø Cable
Standard	Black	PG9
LED 24V	Transparent	PG9
LED 110V	Transparent	PG9
LED 220V	Transparent	PG9
LED + VDR24V	Transparent	PG9
LED + VDR110V	Transparent	PG9
LED + VDR220V	Transparent	PG9



Limit Switches

Model	LS710 (Weather Proof)	ALS30 (Explosion Proof)
Enclosure	Weather Proof, IP67	Ex d IIC T6, IP66
Mechanical Switch	2 SPDT	2 SPDT
Electrical Ratings	15A 125V/250V AC 0.6A 125V DC 0.3A 250V DC	15A 125V/250V AC 0.6A 125V DC 0.3A 250V DC
Terminal Strip	8 Contacts	8 Contacts
Temp. Ratings	-20° ~ 85°	-20° ~ 85°
Conduit Entries	2-PF 1/2"	2-PF3/4"



ALS30
Explosion Proof

LS710
Weather Proof

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Tunnel Ventilation Damper

B-40 Series

Type : Tunnel Ventilation Smoke Damper
Model : TVD-B-40C2-BG
Leakage Rating : Class II as per UL555S
Blade : Aerofoil Type
Construction : Galvanized Steel (GI)

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Damper Ratings

Leakage Rating : Class II @ 350° F as per UL 555S
Air Velocity : 3000 fpm (15.2 m/sec)
Pressure : 6" water gauge (1.5 KPa)

Additional Test Ratings

Operational Rating : 250° C for 1 hours. (as per HKFSD)
Fatigue Cycles : 30 pressure reversal cycles @ 3Kpa
Max . Holding Pressure : 20" W.g (5Kpa)

UL Verification Service

Air Velocity : 4400 fpm @ ambient
Pressure : 12" water gauge (3 KPa) @ ambient
Leakage Rating : Class I as per UL 555S

Standard Construction

Frame

14 gauge (2 mm) thick galvanized steel sheet with 2" (50 mm) external flanges.

Blade

Aerofoil blades of 14 gauge (2 mm) thick roll formed galvanized steel.

Blade Seals

300°C high temp, resistant Silicon rubber blade seals.

Jamb Seals

Stainless Steel.

Bearings

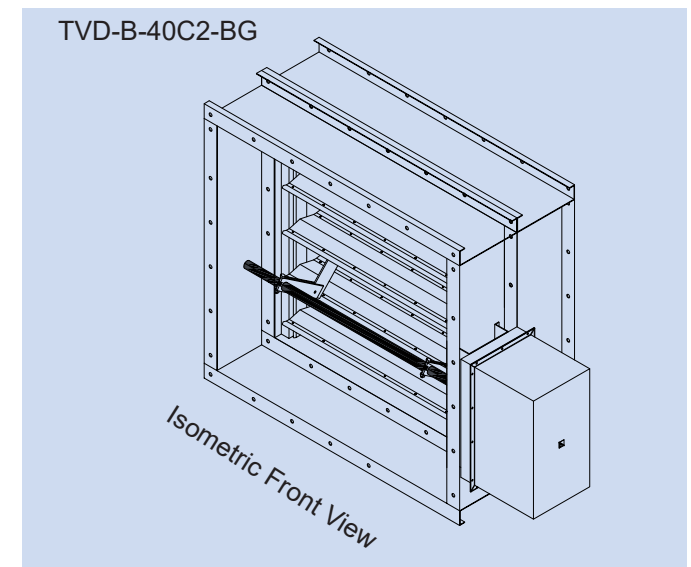
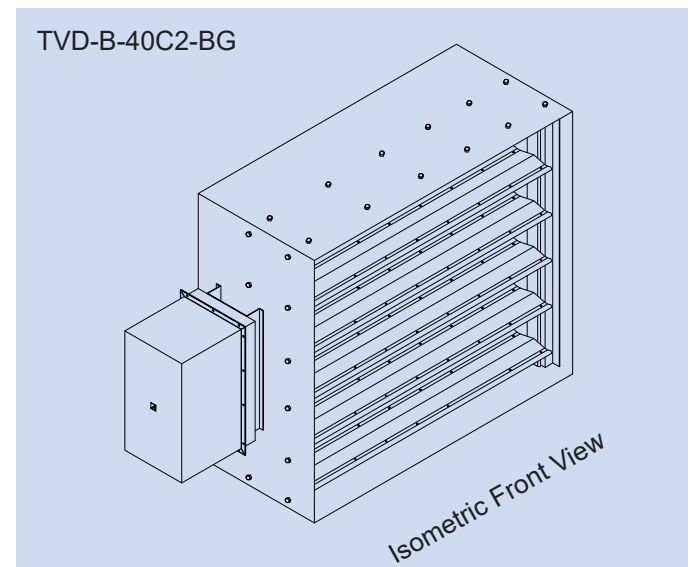
High temperature resistant concealed SS ball bearings.

Axle

3/4" (19 mm) diameter.

Actuator

Electric spring return type with inbuilt limit switches.

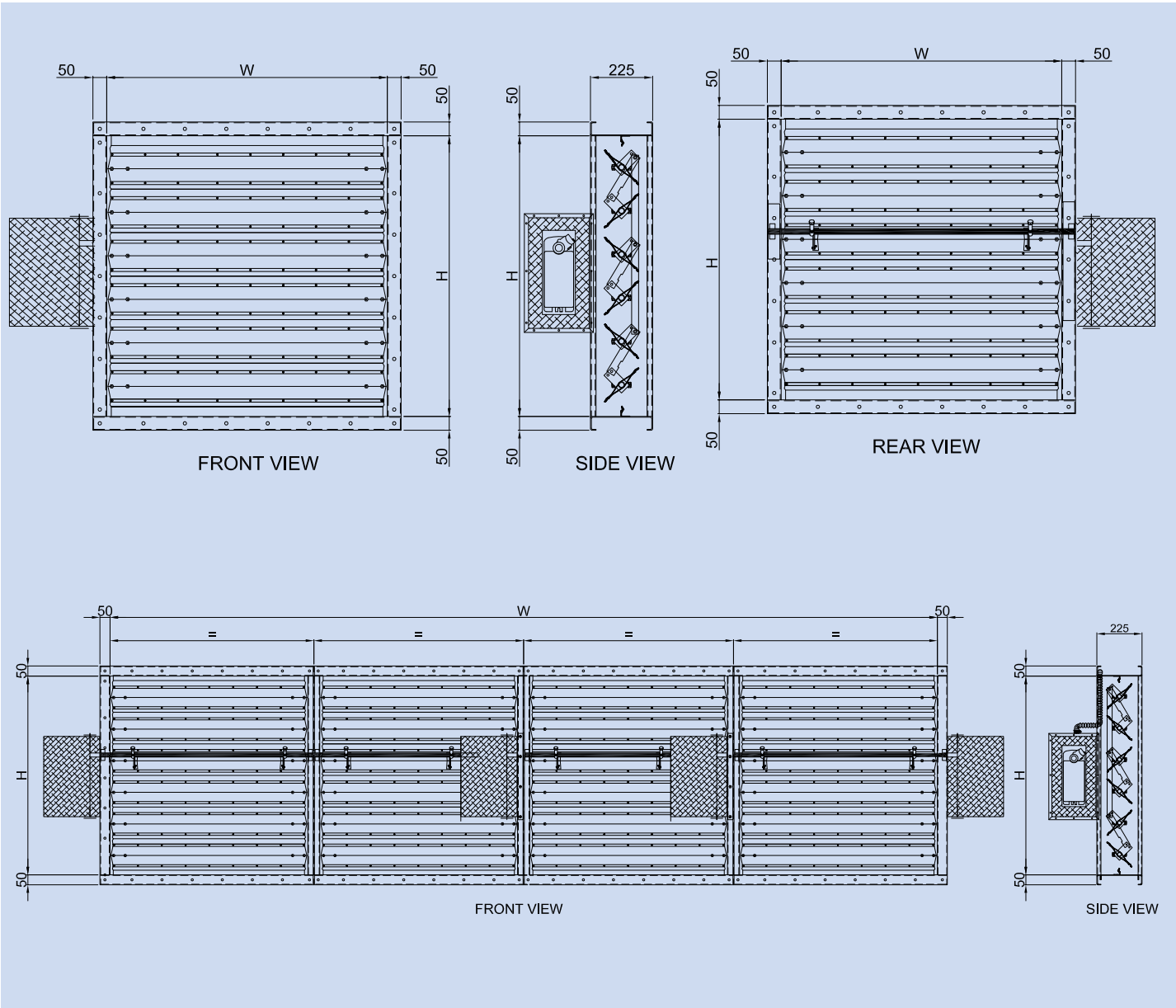


Tunnel Ventilation Damper

B-40 Series

Constructional Details

Model : TVD-B-40C2-BG



Size Limitation		
Module	Size : Width X Height	Mounting Position
Single	Max X Max.40" x 48"	V/H
Multiple	Max X Max 160" x 48"	V/H

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Tunnel Ventilation Damper

B-40 Series

Electric Actuator Data sheet

Honeywell

Model : MS4620F

FEATURES

- 175 lb-in. (20 Nm) minimum driving torque at 350°F (176°C).
- Reversible mounting facilitates use in either clockwise (cw) or counterclockwise (ccw) spring rotation.
- Integral spring return ensures level of return torque.
- Stainless steel internal spring.
- Fifteen-second spring return timing.
- No special cycling required during long-term holding. (See Operation section.)
- No audible noise during holding.
- Models available for 24, 120, and 230 Vac applications.
- Ninety-five degree angle of rotation.
- Actuator holds rated torque at reduced power level.
- Die-cast aluminum housing.
- Housing design allows flush mounting to damper.
- Patented Self-Centering Shaft Adapter (SCSA).
- Patent Number: US 6,505,991
- Designed to operate reliably in smoke control systems requiring Underwriter's Laboratories Inc. UL555S ratings up to 350°F.
- Non-UL marked models available.
- 5 year warranty from date of installation.

S2024-F, S20230-F, MS4620S, MS8120S

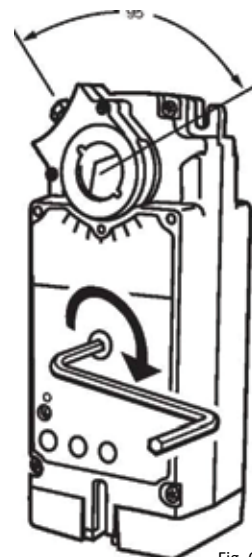
- Double-insulation rating.
- High-temperature, halogen-free, silicone-free leadwires.
- Models available with integral high temperature (350°F) SPDT position-indicating switches (7°, 85° stroke).

The actuator can be operated with no power present. Use this feature during installation or to move and lock the damper or valve shaft position when there is no power.

To operate the manual positioning:

1. If the power is on, turn it off.
2. Insert supplied hex wrench (key) as shown in Fig. 6
3. Rotate key in the direction indicated on the cover.
4. Once the desired position is reached, hold the key to prevent the spring return from moving the actuator.

NOTE: No detente for fire and smoke actuators. If key is released, actuator will return to spring closed position



ROTATING

M32268

Fig. 6. Manual positioning.

Tunnel Ventilation Damper

B-40 Series

Electric Actuator Data sheet

RCEL Series Actuators

Remote Control RCEL Series Electric Actuators are engineered to provide efficient, high performance automation of quarter turn valves. The RCEL Series has improved reliability incorporating all the best features.

FEATURES

- Standard enclosure IP-67, NEMA 4, 4x
- Squirrel cage, totally enclosed motor
- Standardized and color-coded wiring
- Manual override hand/auto declutch lever, automatic reset when motor is energized
- Handwheel designed for safe, efficient operation
- Mounting standardized to ISO-5211; removable drive bushing can be machined to match valve stem
- Wormgear drive for longer life and low maximum noise level of 50dB
- Indicator top mounted for continuous visual indication of valve position
- 20 watt internal heater to minimize condensation due to temperature and humidity changes
- Cam actuated, end of travel limit switches are easily adjusted to de-energize actuator for precise valve position
- Torque switch is cam actuated and factory set to provide over torque protection for valves, available in size RCEL-15 thru RCEL-250
- Mechanical limit stops designed to prevent over-travel of quarter turn applications
- Valve backdrive is prevented by a rolled steel wormgear and aluminum bronze wormwheel
- CSA C/US Approval on 120 VAC only

STANDARD SPECIFICATIONS

Enclosure : Watertight IP67, Nema 4, 4x
 Ambient Temp. : From -20° to +158° Fahrenheit
 300° Fahrenheit for 1 hour
 Power Supply : 120/220VAC 1-Phase, 380/440VAC 3-Phase
 Control Power : 110/220VAC 1-Phase, 50/50Hz
 Torque Switches: (2) Open/Close (RCEL-15 thru RCEL-250)
 Limit Switches : (2) Open/Close, 250 VAC 16A Rating
 Stall Protection : Internal Thermal Protection Open
 300°F/Close 207°F
 Travel Angle : 90° ± 5°
 Indicator : Continuous Position Indicator
 Manual Override: HAND/AUTO Declutching Mechanism
 Self Locking : Provided by means of Worm Gearing
 Mechanical Stops: External Adjustable Screws
 Space Heater : 20Watt (24/120/220 VAC and 24 VDC)
 Anti-Condensation
 Conduit Entries : Two 3/4" NPT.
 Materials : Steel, Aluminum Alloy, Aluminum Bronze
 Surface Treatment: Anodizing
 External Coating: Dry Powder, Epoxy-Polyester



OPTIONS

- EXP Explosion & Water Proof Enclosure Class I C & D / Class II E, F & G
Exd IIB T4 IP67
- DCM 24 VDC Motor (RCEL-6 thru RCEL-28)
- ACM 24 VAC Motor (RCEL-6 thru RCEL-28)
- ALS Auxiliary Limit Switches 2 SPDT switches (6 aux switches max)
- EXT Extended Travel Angle 120° to 360° (RCEL-6 thru RCEL-100)
- LCU Local Control Unit (NEMA-4) local/remote selector switch open/stop/close selector switch
- LCU Local Control Unit (NEMA-4)
- KEY w/key with key lock
- PIU 1K Ohm Feedback Potentiometer
- CPT Current Position Feedback Transmitter 4-20mA DC output
- DCT VDC Position Feedback Transmitter 1-5VDC, 0-5VDC and 0-10VDC
- PCU Proportional Control Unit 4-20mA, 1-5VDC or 0-10VDC input
- IMS Integral Motor Starter includes reversing contactors and step down transformer
- CLC Repeat Cycle Timer for cycle length control
- ATS Auxiliary Torque Switches 2 SPDT switches (RCEL-15 thru RCEL-250)

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Tunnel Ventilation Damper Engineering And Performance Data

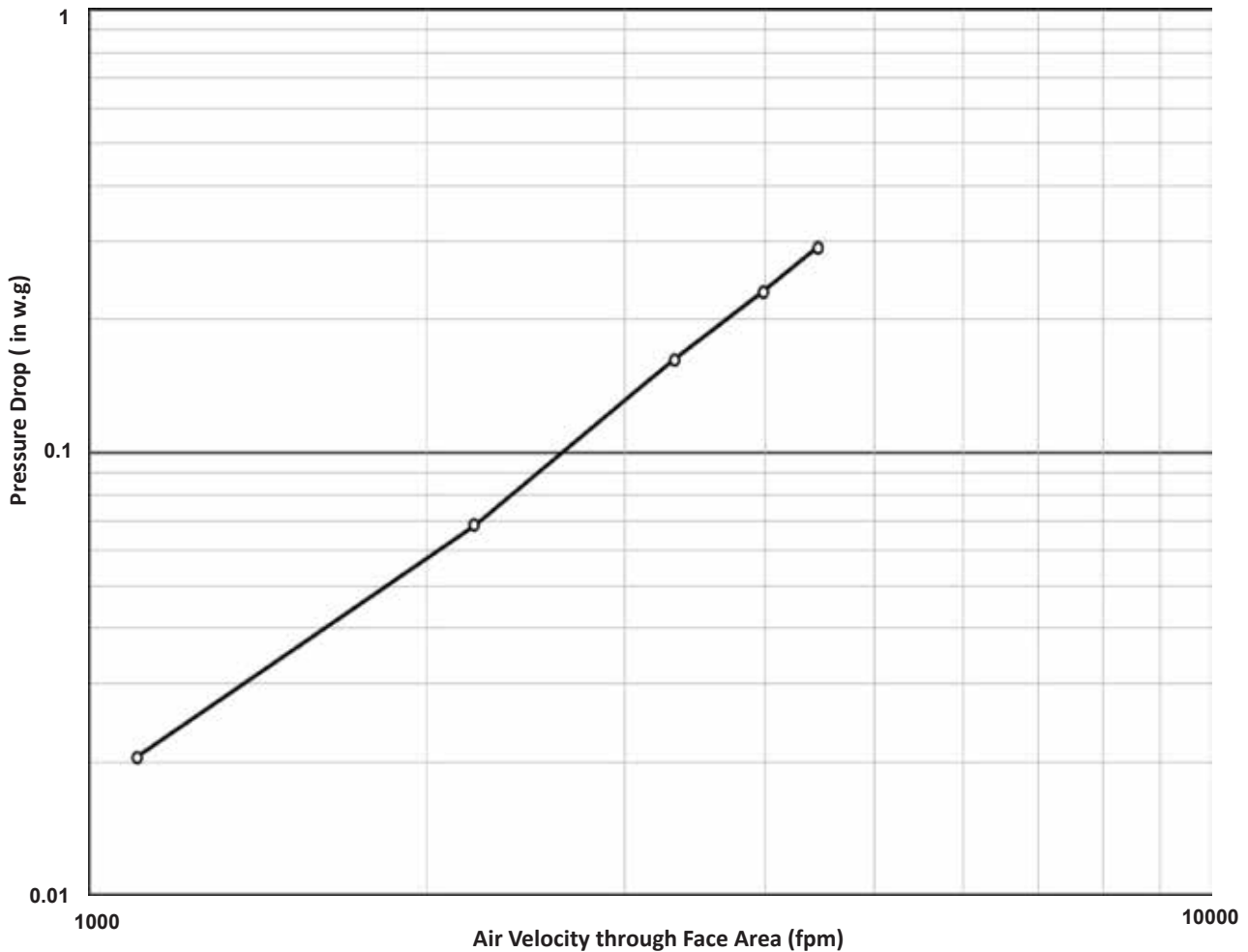
B-40 Series

Pressure drop for Dampers

- Pressure drop and resistance of multi-leaf damper is a function of airspeed and varies in relation to the system's total pressure.
- The pressure drop is indicated in graph for opposed blade damper in 100 % open position.
- The pressure drop indicated is the difference in measured pressure before and after the damper.



Pressure Loss Vs Face Velocity
Aerofoil Blade Construction



AMCA Standard 500 D -07, Fig . 5.3

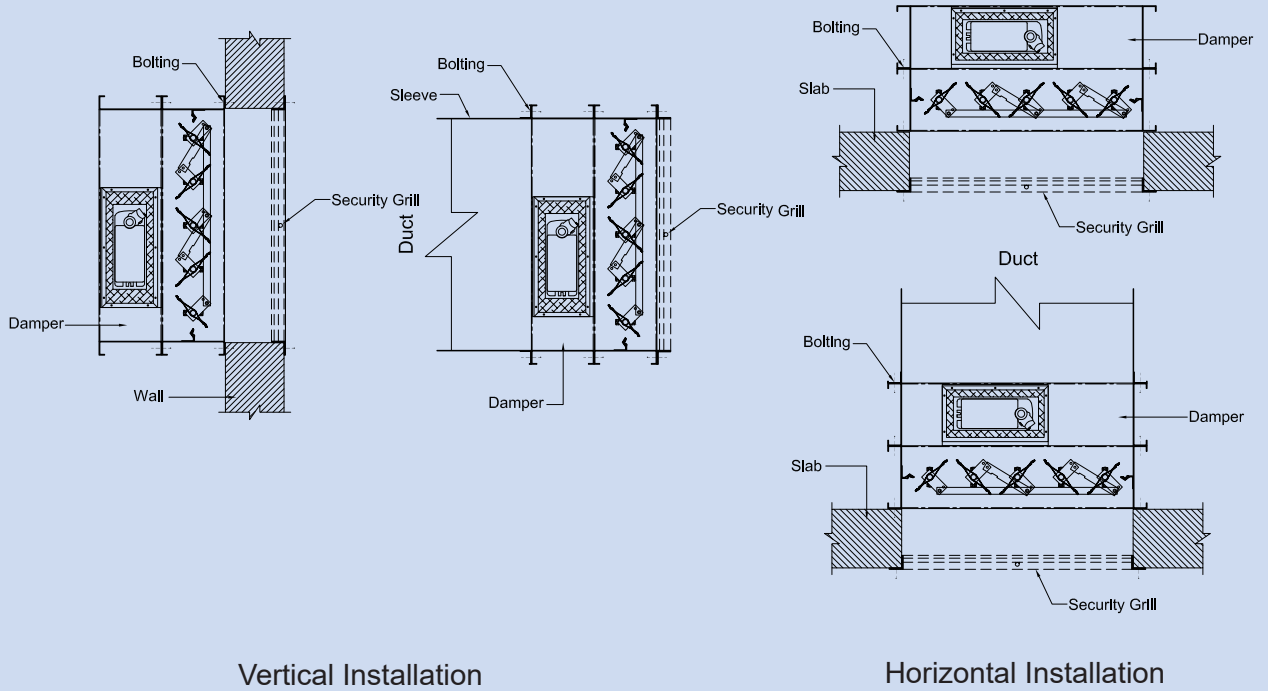
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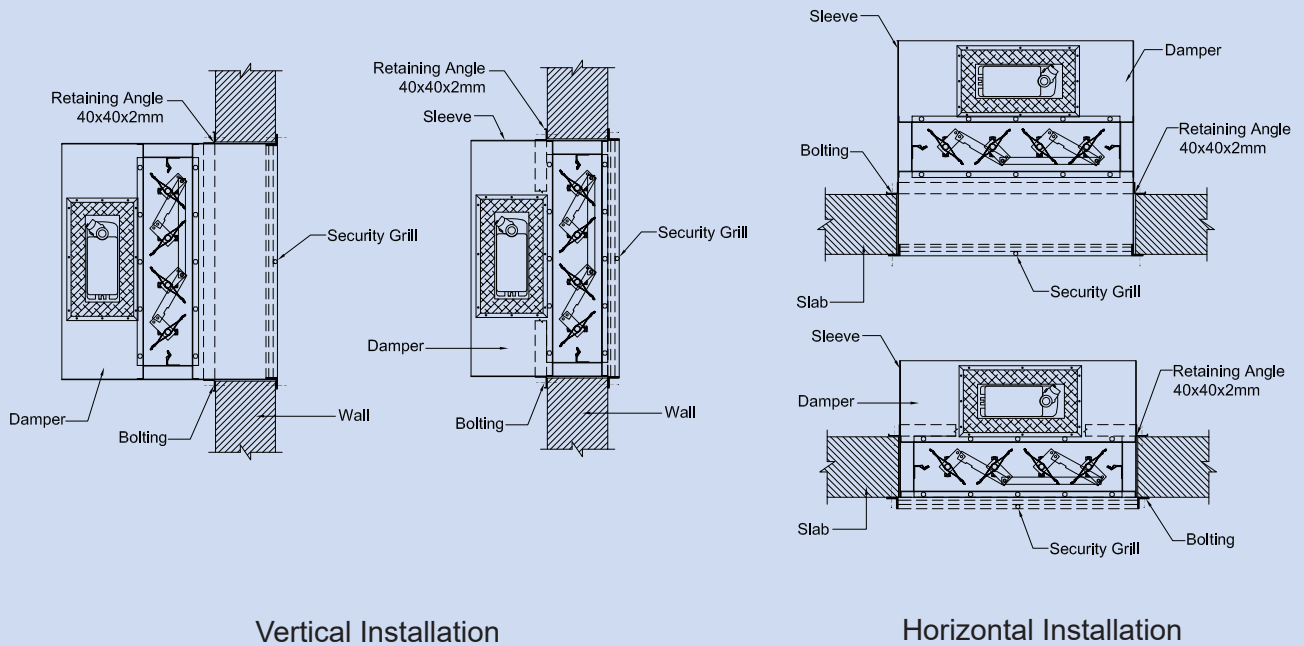
**Tunnel Ventilation Damper
Installation Details**

B-40 Series

Flange Type Dampers



Sleeve Type Dampers



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