



CHAPTER 19A

**AERO FOIL BLADE CONSTRUCTION
DAMPERS FOR FIRE & SMOKE APPLICATIONS**

**MOTORIZED FIRE DAMPERS
MOTORIZED SMOKE DAMPERS
MOTORIZED FIRE & SMOKE DAMPERS**



TECNALCO

© Copyright reserved for TECNALCO.

"Due to continuous progress and product improvement, TECNALCO reserves the right to make changes without notice."

CERTIFICATE OF COMPLIANCE

Certificate Number: 20170811-R38322
Report Reference: R38322-20160330
Issue Date: 2017-AUGUST-11

Issued to: ALUMINIUM TECHNICAL ENGINEERING
PO Box : 73 : Umm Al Quwain
UAQ UNITED ARAB EMIRATES

This is to certify that representative samples of DAMPERS FOR FIRE BARRIER AND SMOKE APPLICATIONS
Combination Fire and Smoke Dampers Models:
1.5 Hr. Fire endurance rating, Leakage Class II, Model TSFD150-2CL-G
3 Hr. Fire endurance rating, Leakage Class II, Model TSFD300-2CL-GDS

Fire Dampers Models:
1.5 Hr. Fire endurance rating, Model TMFD150-G
3 Hr. Fire endurance rating, Model TMFD300-GDS

Smoke Dampers Models:
Leakage Class II, Model TMSD150-2CL-G
Leakage Class II, Model TMSD300-2CL-GDS

Have been investigated by UL in accordance with the Standard(s) indicated on this Certificate.

Standard(s) for Safety: UL 555, Safety for Fire Dampers
UL 555S, Smoke Dampers

Additional Information: See the UL Online Certifications Directory at www.ul.com/database for additional information

Only those products bearing the UL Certification Mark should be considered as being covered by UL's Certification and Follow-Up Service.

Look for the UL Certification Mark on the product.

Signature

UL 555

Any information and documentation relating to UL Mark holders are provided on behalf of UL, UL LLC or any authorized licensee of UL. For questions, please contact a local UL Customer Service Representative at ULCustomerService@ul.com



Page 1 of 1

Certificate of Registration

Intertek

This is to certify that the environmental management system of

Aluminium Technical Engineering Factory (TECNALCO)

Main Site: P.O.Box 73, Umm Al Quwain – Industrial Area
King Faisal Road
United Arab Emirates

has been assessed and registered by Intertek as conforming to the requirements of:

ISO 14001:2004

The environmental management system is applicable to the management of the environmental aspects related to:

MANUFACTURE OF AIR INLETS, AIR OUTLETS AND DUCT ACCESSORIES

Certificate Number: 18330
Issue Date: 18th May 2016
Original Issue Date: 28th May 2013
Expiry Date: 14th September 2018

Signature
Authorized Signature: Colin Moldovan – President, Business Assurance
Intertek Certification Limited, 104 Victory Park, Victory Road, Derby DE24 8ZF



Intertek Certification Limited is a UKAS accredited body under schedule of accreditation no. 014.

In the issuance of this certificate, Intertek assumes no liability to any party other than to the Client, and then only in accordance with the signed upon Certification Agreement. This certificate's validity is subject to the organisation maintaining their system in accordance with Intertek's requirements for systems certification. Validity may be confirmed via email at certificate.validation@intertek.com or by scanning the code to the right with a smartphone.

The certificate remains the property of Intertek, to whom it must be returned upon request.

CT ISO 14001:2004-UKAS-EN-A4-P-28 Jun 13



Certificate of Registration

Intertek

This is to certify that the occupational health and safety management system of

Aluminium Technical Engineering Factory (TECNALCO)

Main Site: P.O.Box 73, Umm Al Quwain – Industrial Area
King Faisal Road
United Arab Emirates

has been assessed and registered by Intertek as conforming to the requirements of

OHSAS 18001:2007

The occupational health and safety management system is applicable to the management of occupational health and safety risks associated with:

MANUFACTURE OF AIR INLETS, AIR OUTLETS AND DUCT ACCESSORIES

Certificate Number: 18330
Issue Date: 18th May 2016
Original Issue Date: 28th May 2013
Expiry Date: 27th May 2019



Signature

Authorized Signature: Colin Moldovan – President, Business Assurance
Intertek Certification Limited, 104 Victory Park, Victory Road, Derby DE24 8ZF

Intertek Certification Limited is a UKAS accredited body under schedule of accreditation no. 014.

In the issuance of this certificate, Intertek assumes no liability to any party other than to the Client, and then only in accordance with the signed upon Certification Agreement. This certificate's validity is subject to the organisation maintaining their system in accordance with Intertek's requirements for systems certification. Validity may be confirmed via email at certificate.validation@intertek.com or by scanning the code to the right with a smartphone.

The certificate remains the property of Intertek, to whom it must be returned upon request.

CT OHSAS 18001:2007-UKAS-EN-A4-P-20 Jun 13



Certificate of Registration

Intertek

This is to certify that the quality management system of

Aluminum Technical Engineering Factory (TECNALCO)

Building Number 31, P.O. Box 73,
Umm Al Quwain Industrial Area, King Faisal Road,
Umm Al Quwain, United Arab Emirates

has been assessed and registered by Intertek as conforming to the requirements of:

ISO 9001:2015

The quality management system is applicable to

Manufacture of air inlets, air outlets and duct accessories.

Certificate Number: QMS 18330-01
Certificate Issue Date: 18 May 2017
Original Issue Date: 28 May 2013
Certificate Expiry Date: 27 May 2019



Signature

Authorized Signature: Colin Moldovan – President, Business Assurance
Intertek Certification Limited, 104 Victory Park, Victory Road, Derby DE24 8ZF

Intertek Certification Limited is a UKAS accredited body under schedule of accreditation no. 014.

In the issuance of this certificate, Intertek assumes no liability to any party other than to the Client, and then only in accordance with the signed upon Certification Agreement. This certificate's validity is subject to the organisation maintaining their system in accordance with Intertek's requirements for systems certification. Validity may be confirmed via email at certificate.validation@intertek.com or by scanning the code to the right with a smartphone.

The certificate remains the property of Intertek, to whom it must be returned upon request.

CT-ISO 9001:2015-UKAS-EN-A4-20 AUG 16





TECNALCO

ABOUT US

Tecnalco – Aluminum Technical Engineering Factory is an ISO 9001 – 2008 certified company was established in 1981, and has made its name since amongst discerning customers as a supplier of high quality air distribution devices and ducts accessories. Located in the northern emirates of Umm Al Quwain, United Arab Emirates, TECNALCO's manufacturing facility is one of the largest and oldest in its field.

Comprising of over two hundred employees, and with more than two decades of experience, we are well equipped to handle all manner of customer request and queries. Qualified and talented manpower, including engineering professionals serve to meet the high demand for our product. We seek to continually innovate in a quest for greater customer satisfaction.

Tecnalco manufactures a wide range of Grilles & Registers, Liner bar grilles, Square diffusers, Slot diffusers, Round diffusers, Perforated diffusers, Air louvers, Exhaust valves, Door grilles, Floor grilles, Non return dampers, sound attenuators, Plenum boxes, Access doors and VAV terminals. Air Outlets that were tested by Intertek Testing Services (ITS) laboratories in New York – USA in accordance with the ASHRAE 70-1991 standards, which specifies methods for testing and rating the performance of air outlets and inlets.

Tecnalco also manufactures safety products in accordance with the latest standards set by the under writers laboratories (UL) – USA. These products include Motorized Fire Dampers, Motorized Smoke Dampers, Motorized Fire and Smoke Dampers. These Products are UL classified and carry the UL label.

CHAPTER - 19 A

INDEX

	Page No.
I General Product Overview	19A-5
(a) Types available	
Product Model & Description	19A-5
(a) TMFD300-G	
(b) TMSD300-2CL-G	
(c) TSFD300-2CL-G	
II Motorized Fire Dampers	19A-6
(a) Description	
(b) Application	
III Motorized Smoke Dampers	19A-8
(a) Description	
(b) Application	
IV Motorized Fire & Smoke Dampers	19A-10
(a) Description	
(b) Application	
V Engineering and Performance Data	19A-12
VI UL Standards	19A-14
VII Standard Installation Details	19A-16
VIII Actuator Wiring Diagram	19A-18
IX Ordering Data	19A-18



GENERAL PRODUCT OVERVIEW

In today's life safety products markets, many building code require life safety dampers to be inspected for proper operation. Motorized Fire Dampers are used to prevent transmission of flame where air ducts penetrate fire barriers. A fire barrier is a fire resistant rated vertical or horizontal assembly of materials designed to restrict the spread of fire in which openings are protected. Motorized fire dampers can also be employed in air transfer openings in walls and partitions. The purpose of a smoke damper, is to prevent the progression of smoke through the system. To be truly effective therefore, a smoke damper must have low leakage factor. A Motorized fire & smoke damper has more demanding criteria, it must maintain its physical integrity in the most demanding conditions of temperature, and throughout this period it must maintain a low leakage rate, if it is not capable of doing this, then it cannot be an effective fire & smoke damper. Compartmentalizing the building with fire-rated separations like fire walls, fire barriers, fire partitions, smoke barriers, and smoke partitions is a critical feature of the system.

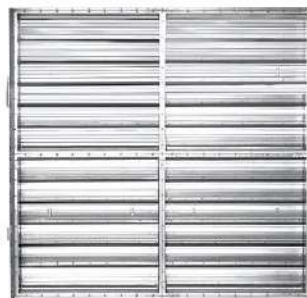
Product Model & Description

- 1) Motorized Fire Dampers
- 2) Motorized Smoke Dampers
- 3) Motorized Fire & Smoke Dampers

Motorized Fire damper (TMFD300-GD S)

Description

TECNALCO series TMFD300-G with 3 hour fire rating Motorized Fire dampers facilitate isolating compartments of Fire in Ventilation systems in the event of fire. These motorized Fire dampers block the spread of fire through ducts, partition walls or floors. This high performance fire isolating damper with actuator offer an effective barrier maintaining integrity in a fire situation. Motorized Fire damper with actuator ensures lowest resistance to airflow in HVAC systems with airflow velocity to 2000 fpm (10.2 m/sec), 4" w.g (1000Pa) installed vertically (or) horizontally and is rated for airflow and leakage in either direction. It is suitable for installation in sheet metal ductworks or in walls or ceiling slabs made from concrete, brick or light weight partition walls.



Motorized Smoke damper (TMSD300-2CL-G)

TECNALCO Series TMSD300-2CL -G CLASS II LEAKAGE Motorized Smoke Dampers facilitate isolating compartments of smoke in the event of fire in Ventilation systems. Smoke dampers are also alternatively applied as passageway for smoke extraction through shafts. Smoke dampers may be required where ducts penetrate through smoke barriers, or at other locations within an engineered smoke control system. The purpose of a smoke damper, is to prevent the progression of smoke through the system. To be truly effective therefore, a smoke damper must have low leakage factor.

Motorized Smoke Fire Damper (TSFD300-2CL-G)

TECNALCO TMSD300-2CL -G CLASS II LEAKAGE Motorized Fire & Smoke Dampers are designed to be installed in HVAC ductwork at locations that are designated as fire barrier or fire & smoke barrier. It should not be installed in a smoke extraction ductwork for smoke extraction applications. Motorized Fire & Smoke Dampers provide the ultimate in fire containment and smoke control for both static and dynamic smoke management systems. It prevents the spread of fire & smoke inside residential, commercial and industrial buildings Multi-blade Construction or single bladed, blades rotate to the open or closed position via mechanical linkages and seal against the damper case or blade to blade. The blades are mechanically connected to an electric actuator to provide opening and fail safe spring loaded closing. These dampers utilize an innovative inter-locking Single skin 3V blade design that provides a flame and smoke seal, eliminating the need for synthetic blade seals which burn out during fire conditions, and maintains its leakage class up to 2000°F (1093°C). Motorized Fire & smoke dampers with 3V groove blades and a rugged mitered corner hat channel frame design that virtually eliminates racking provides 1 ½ hour fire resistance and class 1 or 11 leakage rated damper for smoke control applications in both static or dynamic HVAC systems.



MOTORIED FIRE DAMPERS

UL 555 3 hour Fire Rated

Series :

TMFD 300-GDS 3hour fire rating



TECNALCO Series TMFD300-GDS with 3 hour fire rating Motorized Fire damper facilitate isolating compartments of Fire in Ventilation systems in the event of fire. These Fire dampers block the spread of fire through ducts, partition walls or floors. This high performance fire isolating damper with actuator offer an effective barrier maintaining integrity in a fire situation and this is combined with low leakage characteristic for smoke management. Motorized Fire damper with actuator ensures lowest resistance to airflow in HVAC systems with airflow velocity to 2000 fpm (10.2 m/sec), 4" w.g (1000Pa) installed vertically (or) horizontally and is rated for airflow and leakage in either direction. It is suitable for installation in sheet metal ductworks or in walls or ceiling slabs made from concrete, brick or light weight partition walls.

Specifications and Testing

- * UL 555 CAN/ULC-S112 Classified Motorized Fire Damper 1 3 hour label .
- * Meets NFPA 90A, 92B, 101 and 105 as well as IBC.
- * Meets SMACNA Standards.
- * Meets Building Officials and code administrators (BOCA) and International code building official (ICBO)
- * Meets Underwriters Laboratories (UL)certified.

Performance rating

UL 555 Fire Ratings	: 3 hours
Maximum Velocity	: up to 2000fpm
Maximum Pressure	: 4 Inches Water Gauge (1000 Pa)
Temperature	: 250° F (121°C)

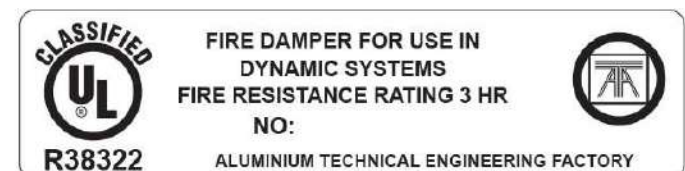
Construction Details

- * **Frame:** 150 mm deep made from 16Gauge(1.5mm) galvanized steel hat section with die formed corner Gussets for superior strength
- * **Blades:** 0.9mm thick aero-foil blade formed galvanized steel sheet 16 gauge 150mm wide with opposite blade operation.
- * **Jamb seals :** Compression type stainless steel grade 304 to close gap between blades and side frame to ensure low leakage.
- * **Blade Axel :** ½" (12mm) Square shaft , Plated steel
- * **Jackshaft :** 12mm X 12mm square galvanized jackshaft.
- * **Blade stop :** 16g (1.5mm) Galvanized steel sheet angle.
- * **TRD :** Manually resettable Thermal Responsive Device 165°F (72°C) UL listed.

Features:

- * Unique double skin blade design that achieves low leakage.
- * Closure maintained by the unique "knee-lock" mechanism which prevents blades from reopening the damper.
- * Junction box including test button that allows easy Site wire Connection.
- * For factory fitted sleeves can be easier installation.
- * For factory fitted sleeves can be easier installation

Available Model: TMFD 300-GDS



Blade seals : not required for

Linkage : External linkage Enclosed with in the frame and out of airstream. 11Gauge (3mm) plated steel

Bushes : Fire resistant Brass – Bronze Bushes (Iolite)

Actuator : UL listed Honeywell / Belimo/Siemens – spring return 24V/ 230v actuator as per customer request.

Sleeves : Manufactured from 16 gauge (1.5mm) galvanized steel sheet with 400 mm depth.

Minimum Size : 6" (152mm) Width x 6" (152mm) Height (Single Section)

Maximum Size : 72" (1828 mm) Width x 72" (1828 mm) Height (Single Section).

Largest size : manufactured in multiple sections.

Size: Dampers furnished approximately 1/4" smaller than given duct dimensions.



Optional & Standard Supply

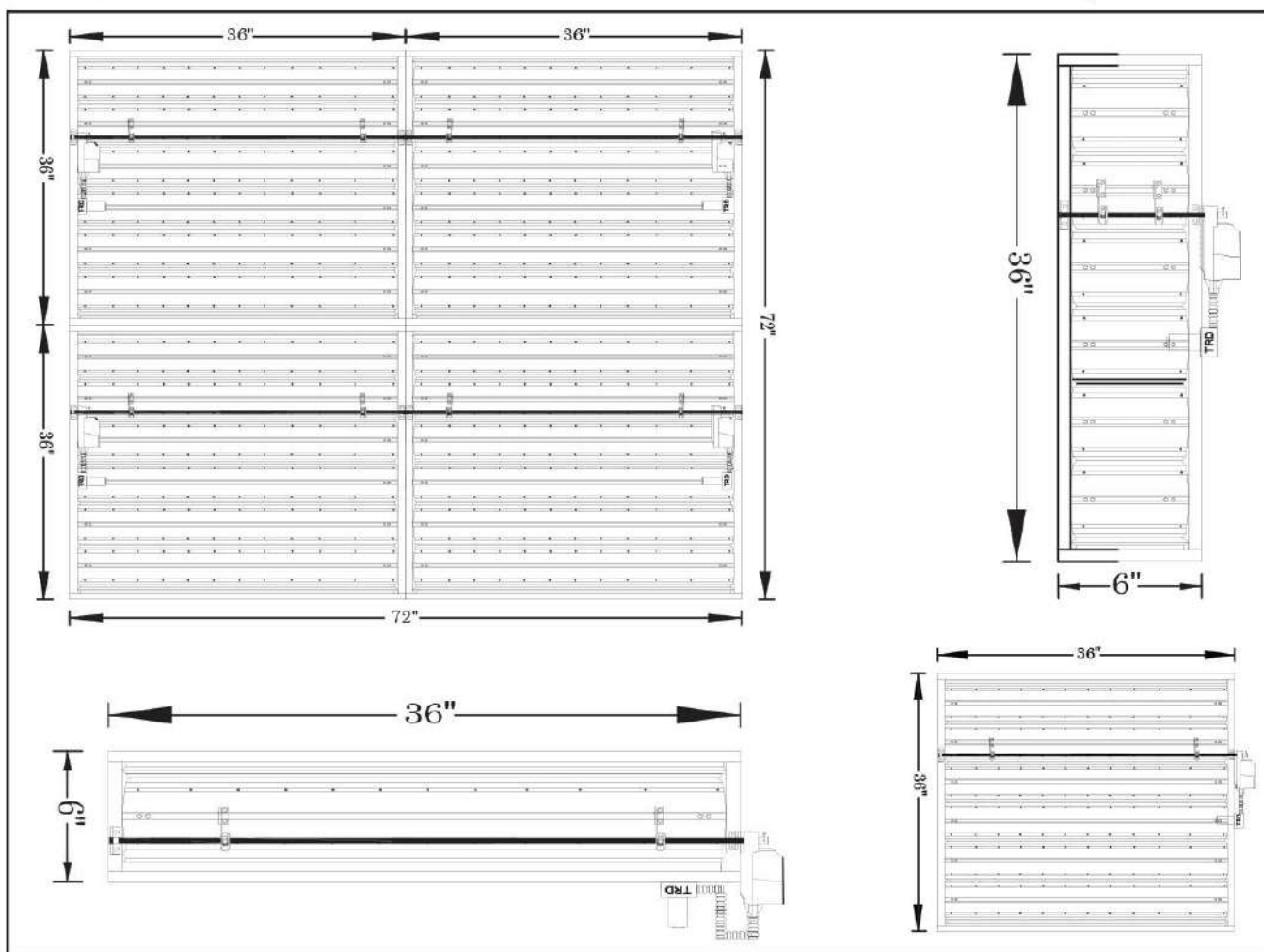
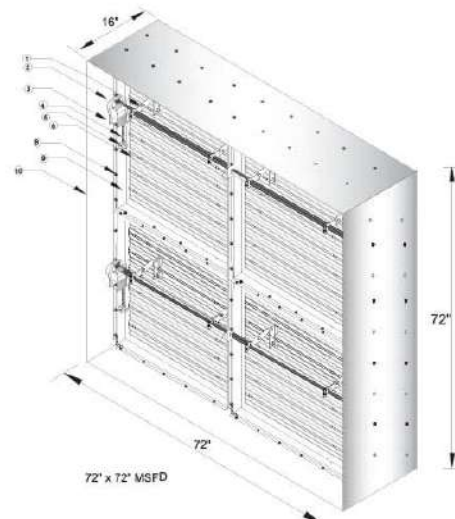
FC - Fail Close – Standard
Left side Actuator – Standard
Right or Inside - Optional

Actuator Standards - Single / Multiple

MS4609F1010/B 9NM 230V w/o auxiliary switches
MS4609F1210/B 9NM 230V with auxiliary switches
MS8109F1210/B 9NM 24V with auxiliary switches
MS8109F1010/B 9NM 24V w/o auxiliary switches

Description

- 1 Link arm
- 2 Jackshaft Supporting
- 3 Honeywell actuator
- 4 Conduit
- 5 Thermal Resistive Device (TRD)
- 6 Aerofoil Blade
- 7 Nut and Bolt
- 8 Frame
- 9 Damper Sleeve



AVAILABLE SIZES (mm)

W	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	1000	1100	1200	1300	1400	1500	1600	1700	1800
H	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	1000	1100	1200	1300	1400	1500	1600	1700	1800

Any combination of W x H. For non-standard sizes on request

MOTORIZED SMOKE DAMPERS

UL 555S CLASS II Leakage

Series :
TMSD300-2CL-G class II leakage



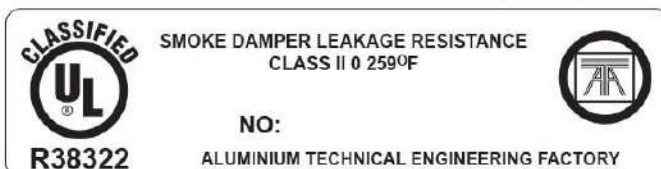
TECNALCO Series TMSD 300-2CL -G Class II Leakage Motorized Smoke damper facilitate isolating compartments of Smoke in the event of fire in Ventilation systems. These motorized smoke dampers are also alternatively applied as passageway for smoke extraction through shafts. Motorized Smoke Dampers maybe required where ducts penetrate through smoke barriers or at other locations with in an engineered smoke control system. The purpose of a motorized smoke damper, is to prevent the progression of smoke through the system. To be truly effective therefore, a smoke damper must have low leakage factor. Motorized Smoke damper with actuator ensures lowest resistance to airflow in HVAC systems with velocity/Pressure rating of 2000 fpm (10.2 m/sec) @ 4" w.g (1000Pa) installed vertically (or) horizontally and is rated for airflow and leakage in both sides. It is suitable for installation in sheet metal ductworks or in walls or ceiling slabs made from concrete, brick or light weight partition walls.

Specifications and Testing

- * UL 555S Classified Motorized Smoke Damper Leakage Class II at 250D F Elevated Temperature.
- * Meets NFPA 90A, 92B, 101 and 105 as well as IBC.
- * Meets SMACNA Standards.
- * Meets Building Officials and code administrators (BOCA) and International code building officials (ICBO).
- * Meets Underwriters Laboratories (UL) certified.

Performance rating

Leakage rating : Class II
Maximum Velocity : up to 2000fpm
Maximum Static Pressure : 4 Inches Water Gauge (1000 Pa) : 250° F (121°C)



Temperature Construction Details

- * Frame: 150 mm deep made from 16Gauge(1.5mm) galvanized steel hat section with die formed corner Gussets for superior strength
- * Blades: 0.9mm thick aero-foil blade formed galvanized steel sheet 16 gauge 150mm wide with opposite blade operation.
- * Jamb seals : Compression type stainless steel grade 304 to close gap between blades and side frame to ensure low leakage.
- * Blade Axel: 1/4" (12mm) Square shaft, Plated steel
- * Jackshaft :12mm X 12mm square galvanized jackshaft.
- * Blade stop :16g (1.5mm) Galvanized steel sheet angle.
- * TRD : Manually resettable Thermal Responsive Device 165°F (72°C) UL listed.

Features:

- * Unique Double skin blade design that achieves low leakage.
- * Closure maintained by the unique "knee-lock" mechanism which prevents blades from reopening the damper..
- * Junction box including test button that allows easy Site wire Connection.
- * For factory fitted sleeves can be easier installation.
- * For factory fitted sleeves can be easier installation.

Options *Factory fitted sleeves in customer length gauges and round/oval/Rectangular transition styles with UL installation requirement,* Limit Switches: For BMS open close indication,* Retaining Angles : minimum 40 x 40 x 3mm available on request.* Flanges: Damper flanges as per customer request.* Indicator: Externally mounted open-close operation.* TRD : 250F available as optional. * Internal Mount Actuator available on request
Blade seals : Heat resistance 250°C silicon blade edge seals.

Linkage : External linkage Enclosed with in the frame and out of airstream. 11 Gauge (3mm) plated steel
Bushes : Fire resistant Brass - Bronze Bushes (Iolite)
Actuator : UL listed Honeywell / Belimo/Siemens -spring return 24V/ 230v actuator as per customer request.

Sleeves : Manufactured from 16 gauge (1.5mm) galvanized steel sheet with 400 mm depth.

Minimum Size : 6" (152mm) Width x6" (152mm) Height (Single Section)

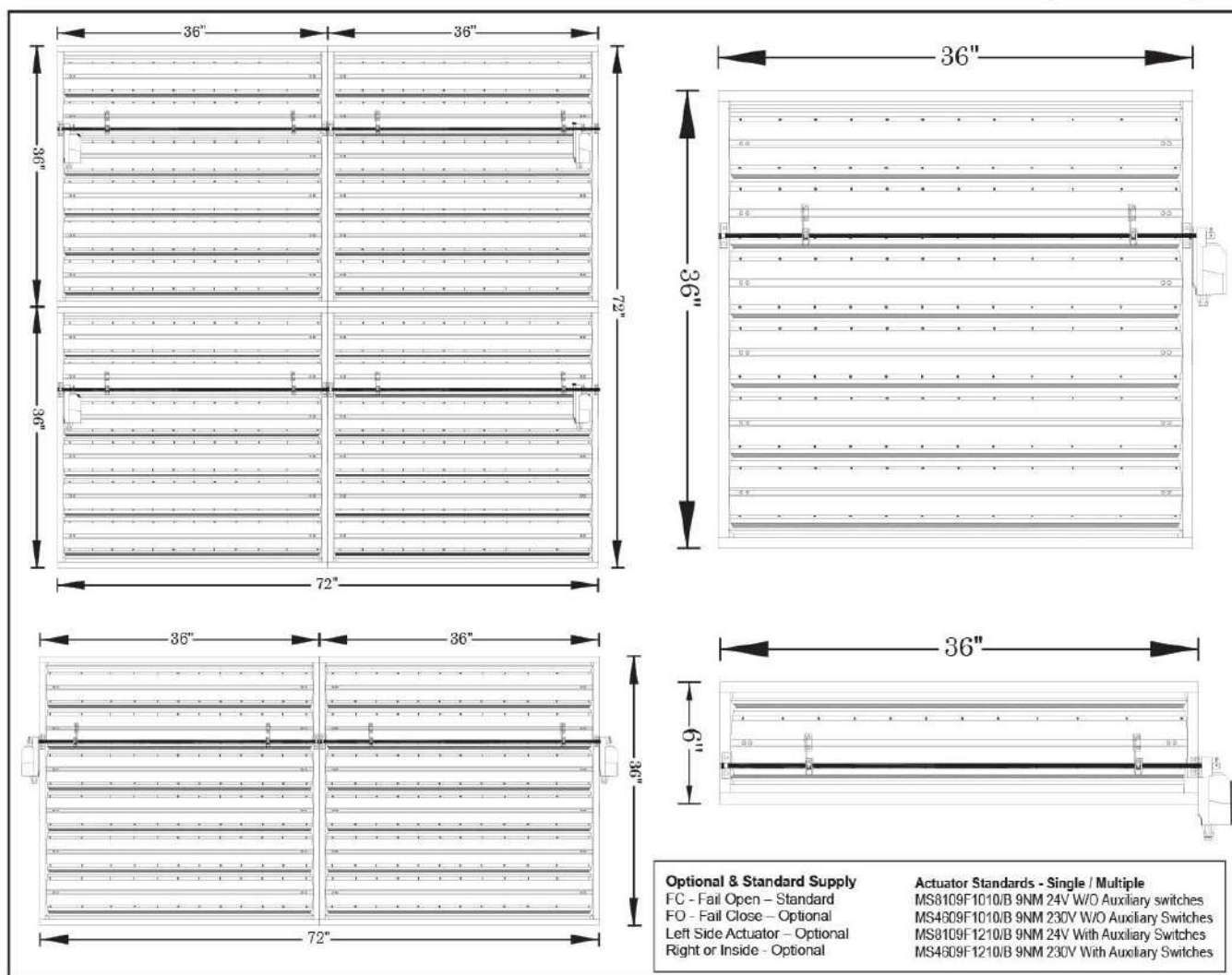
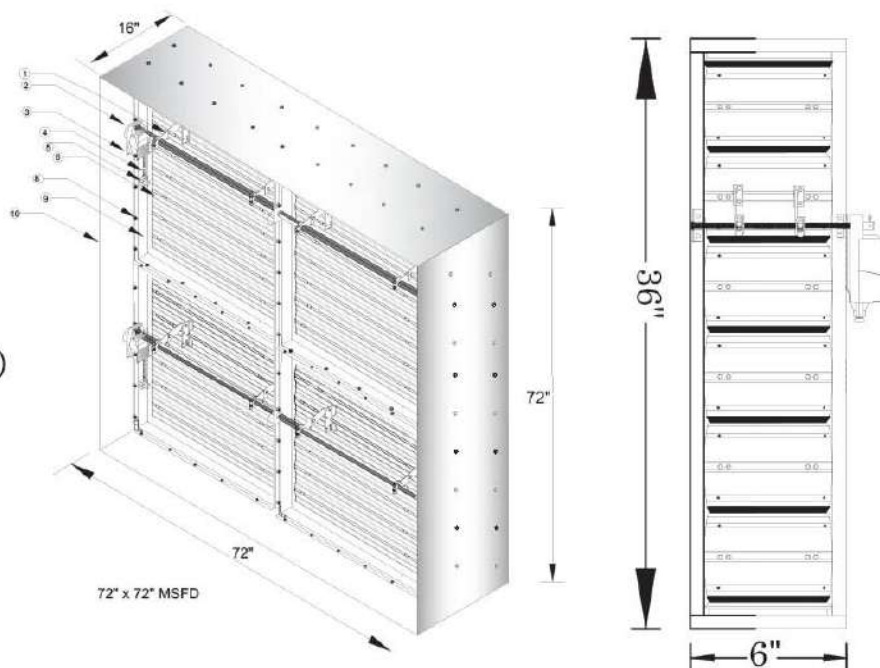
Maximum Size : 72" (1828 mm) Wdth x72" (1828 mm) Height (Single Section).Largest size : manufactured in multiple sections.

Size: Dampers furnished approximately 1/4" smaller than given duct dimensions.



Description

- 1 Link arm
- 2 Jackshaft Supporting
- 3 Honeywell actuator
- 4 Conduit
- 5 Thermal Resistive Device (TRD)
- 6 Aerofoil Blade
- 7 Nut and Bolt
- 8 Frame
- 9 Damper Sleeve



AVAILABLE SIZES (mm)

W	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	1000	1100	1200	1300	1400	1500	1600	1700	1800
H	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	1000	1100	1200	1300	1400	1500	1600	1700	1800

Any combination of W x H. For non-standard sizes on request

MOTORIZED FIRE & SMOKE DAMPER

UL 555 3Hour Fire Rated
UL 555S Class II Leakage @ 250°F
UL 555 / UL555S Classified Motorized fire & Smoke damper.

Series :

TSFD300-2CL-G 3hour fire rating and class II leakage



TECNALCO Series TSFD300-2CL-G Series Motorized Fire/Smoke damper facilitate isolating compartments of Fire in Ventilation systems in the event of fire. These Fire dampers block the spread of fire through ducts, partition walls or floors. This high performance fire isolating damper with actuator offer an effective barrier maintaining integrity in a fire situation and this is combined with low leakage characteristic for smoke management. Motorized Smoke damper with actuator ensures lowest resistance to airflow in HVAC systems with airflow velocity to 2000 fpm (10.2 m/sec), 4" w.g (1000Pa) installed vertically (or) horizontally and is rated for airflow and leakage in either direction. It is suitable for installation in sheet metal ductworks or in walls or ceiling slabs made from concrete, brick or light weight partition walls.

Specifications and Testing

- * UL 555 CAN/ULC-S112 Classified Motorized Fire Damper 1 3 hour label .
- * UL 555S Classified Motorized Smoke Damper Leakage Class II at 250°F Elevated Temperature
- * Meets NFPA 90A, 92B, 101 and 105 as well as IBC.
- * Meets SMACNA Standards.
- * Meets Building Officials and code administrators (BOCA) and International code building officials (ICBO).
- * Meets Underwriters Laboratories (UL) certified.

Performance rating:

UL 555 Fire Ratings : 3 Hour leakage rating
Leakage rating : Class II
Maximum Velocity : up to 2000fpm
Maximum Pressure : 4Inches Water Gauge(1000Pa)
Temperature : 2500 F (121°C)

Construction Details

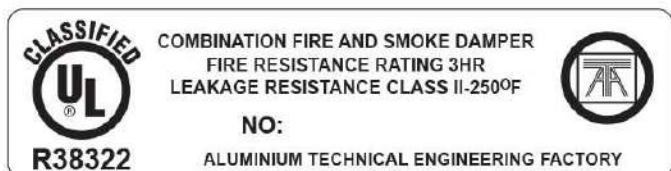
- * **Frame:** 150 mm deep made from 16Gauge(1.5mm) galvanized steel hat section with die formed corner Gussets for superior strength
- * **Blades:** 0.9mm thick aero-foil blade formed galvanized steel sheet 16 gauge 150mm wide with opposite blade operation.
- * **Jamb seals :** Compression type stainless steel grade 304 to close gap between blades and side frame to ensure low leakage.
- * **Blade Axel :** ½" (12mm) Square shaft , Plated steel
- * **Jackshaft:** 12mm X 12mm square galvanized jackshaft.
- * **Blade stop :** 16g (1.5mm) Galvanized steel sheet angle.
- * **TRD :** Manually resettable Thermal Responsive Device 165°F (72°C) UL listed.

Features:

- * Unique double skin blade design that achieves low leakage.
- * Closure maintained by the unique "knee-lock" mechanism which prevents blades from reopening the damper.
- * Junction box including test button that allows easy Site wire Connection.
- * For factory fitted sleeves can be easier installation.
- * For factory fitted sleeves can be easier installation.

Available Models:

TSFD300-2CL-GD



Blade seals : Heat resistance 250°C silicon blade edge seals.

Linkage : External linkage Enclosed with in the frame and out of airstream. 11Gauge (3mm) plated steel

Bushes : Fire resistant Brass – Bronze Bushes (Iolite)

Actuator : UL listed Honeywell / Belimo/Siemens –spring return 24V/ 230v actuator as per customer request.

Sleeves : Manufactured from 16 gauge (1.5mm) galvanized steel sheet with 400 mm depth.

Minimum Size : 6" (152mm) Width x 6" (152mm) Height (Single Section)

Maximum Size : 72" (1828 mm) Width x 72" (1828 mm) Height (Single Section).

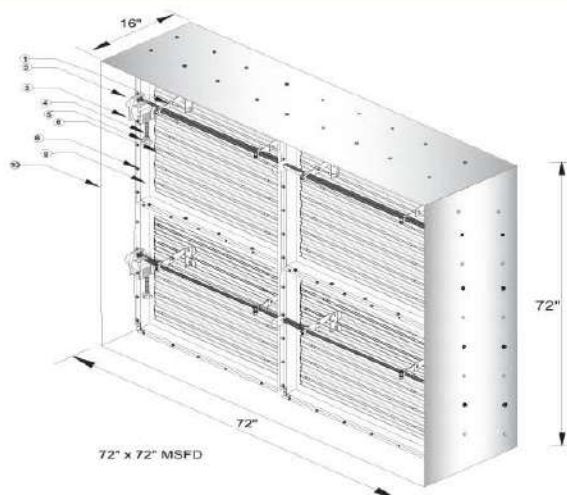
Largest size : manufactured in multiple sections.

Size: Dampers furnished approximately 1/4" smaller than given duct dimensions.



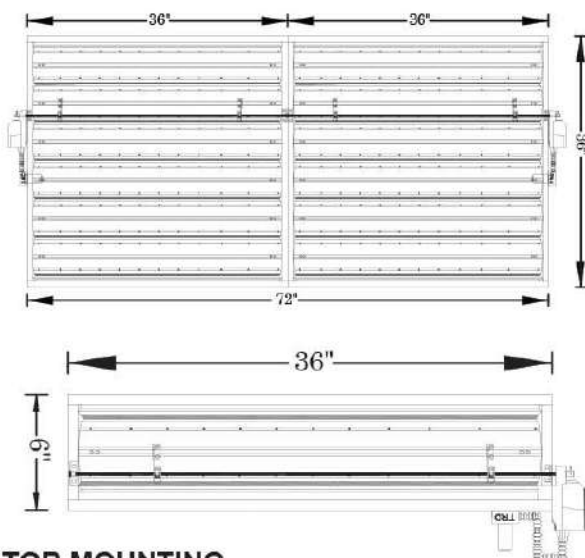
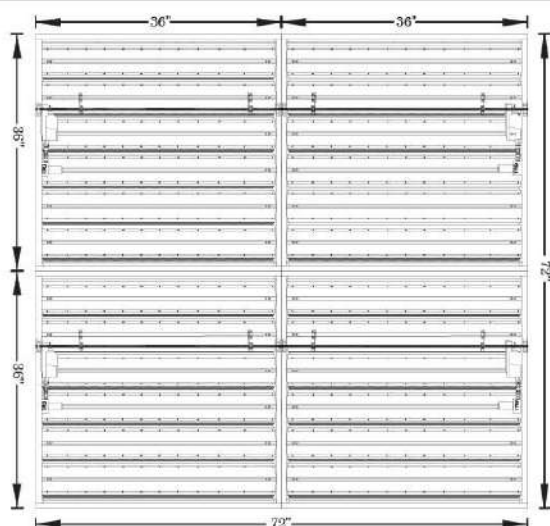
Description

- 1 Link arm
- 2 Jackshaft Supporting
- 3 Honeywell actuator
- 4 Conduit
- 5 Thermal Resistive Device (TRD)
- 6 Aerofoil Blade
- 7 Nut and Bolt
- 8 Damper inside Frame
- 9 Damper Sleeve
- 10 Jamseal

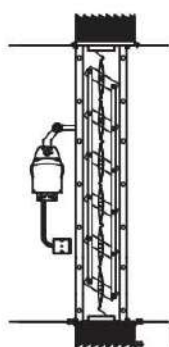


Actuator Standards - Single / Multiple

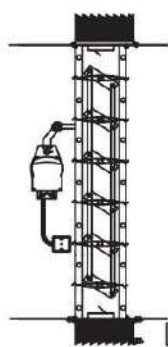
MS4609F1010/B 9NM 230V w/o auxiliary switches
 MS4609F1210/B 9NM 230V with auxiliary switches
 MS8109F1210/B 9NM 24V with auxiliary switches
 MS8109F1010/B 9NM 24V w/o auxiliary switches



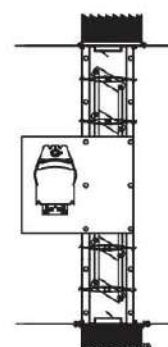
TYPICAL ACTUATOR MOUNTING



EXTERNAL MOUNTING ACTUATOR



INTERNAL MOUNTING ACTUATOR



SINGLE SECTION WITH SIDE HEAD

AVAILABLE SIZES (mm)

W	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	1000	1100	1200	1300	1400	1500	1600	1700	1800
H	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	1000	1100	1200	1300	1400	1500	1600	1700	1800

Any combination of W x H. For non-standard sizes on request

Engineering and Performance Data

UL STANDARDS FOR MOTORIZED FIRE & SMOKE DAMPERS

Galvanized Steel Construction Class II Construction Pressure Drop Data

This pressure drop testing was conducted in accordance with AMCA Standard 500-D using the three configurations shown. All data has been corrected to represent standard air at a density of .075 lb/ft³ (1.201 kg/m³).

Actual pressure drop found in any HVAC system is a combination of many factors. This pressure drop information along with an analysis of other system influences should be used to estimate actual pressure losses for a damper installed in a given HVAC System.

AMCA illustrates a ducted damper exhausting air into an open area. This configuration has a lower pressure drop than illustrates a fully ducted damper. This configuration has the lowest pressure drop of the three test configurations because entrance and exit losses are minimized by straight duct runs upstream and downstream of the damper. because entrance losses are minimized by a straight duct run upstream of the damper. Illustrates a plenum mounted damper. This configuration has the highest pressure drop because of extremely high entrance and exit losses due to the sudden changes of area in the system.

Motorized Fire & Smoke Dampers

UL-555 / 555S Classified Test Standards:

Fire Endurance Test and Hose Stream Test (UL 555) Dampers are exposed to a standard test fire for a period of either 1 1/2 or 3 hours. This standard test fire is controlled to follow the time temperature curve illustrated. Immediately after conclusion of this fire test, the dampers are subjected to a high pressure hose stream test during which water, at a nozzle pressure of 30 psi (207 kPa) for 1 1/2 hour dampers and 45 psi (310 kPa) for 3 hour dampers, is applied to the dampers from a distance of 20 feet (6 meters). The hose stream test provides an extreme shock that ensures the dampers are structurally strong enough to withstand the rigors of the severest fire conditions.

Operational Reliability Cycle Test (UL 555S)

Fire Smoke Dampers intended for operation by gravity or spring force (not driven by an actuator) must be cycled open and closed 250 times. Fire Smoke Dampers that are driven by an electric or pneumatic actuator must be cycled open and closed (by their actuator) 20,000 times. In addition to the 20,000 full stroke cycles, if the Fire Smoke Damper is also intended for use as a Volume control damper, it must be cycled open and closed (by its modulating actuator) 100,000 repositioning cycles. These operational cycling tests are accomplished prior to the temperature degradation and leakage tests



Fire Endurance Test



Hosestream Test



Salt Spray Exposure Test (UL 555 & UL 555S)

A damper sample is exposed to salt spray in a test chamber for a period of 120 hours. After this exposure, the damper must close (and latch if a latch is provided). This test demonstrates a damper's ability to function after a more severe fouling than the damper is likely to experience during its intended application.

Operational Performance Test (UL 555& UL555S)

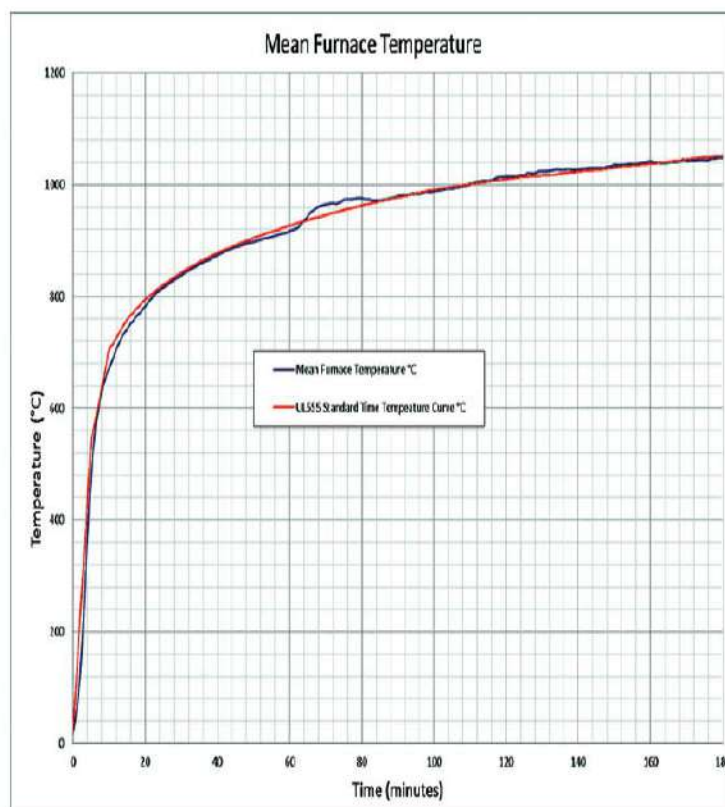
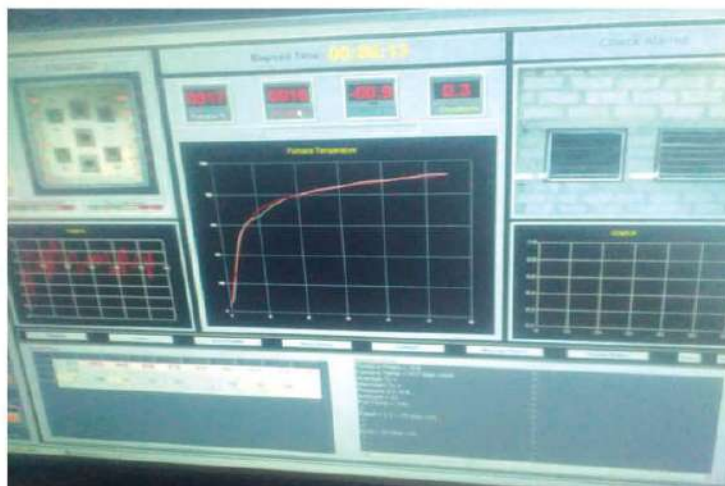
A damper is subjected to airflows and pressures and must demonstrate its ability to operate in the manner expected by its configuration and intended application. Smoke and combination fire smoke damper actuators must operate the dampers open and close three times and combination fire smoke dampers must also close as they would if their heat responsive device would operate. A damper model's airflow velocity and differential pressure ratings are based on the velocity and pressure conditions against which the damper demonstrates its ability to operate.

Temperature Degradation and Cycling Test (UL 555 & UL 555S)

A damper with an actuator that has previously been subjected to the OPERATIONAL RELIABILITY CYCLE TEST (described above) is exposed to an elevated temperature of 250°F (121°C) minimum (or higher in multiples of 100°F (38°C) for a period of 30 minutes. After this 30 minutes exposure and while still at the elevated temperature, the damper actuator must operate the damper open and closed three times. Time of operation cannot exceed 75 seconds for any of the open or close operations.

Leakage Test (UL 555S)

At least three damper sizes of each model being tested (minimum width by maximum height, maximum width by minimum height, and maximum width by maximum height) that have previously been subjected to both the operational reliability cycle test and the temperature degradation and cycling test. must be tested for leakage. The minimum airflow and pressure ratings of dampers shall be 2000 fpm(10.2 m/s) and 4 in.wg. (1 kPa). Ratings shall be set in 1000 fpm (5 m/s) increments from the minimum pressure. Leakage testing must be conducted at 400 fpm (2 m/s) higher than the rated airflow and .5 in. wg (.1 kPa) higher than the rated pressure. A damper's leakage rating is based on the worst case performance of the three damper sizes tested.



UL Standards

Standard for Fire Dampers UL 555

1.1 These requirements cover fire dampers that are intended for use where air ducts penetrate or terminate at openings in walls or partitions; in air transfer openings in partitions; and where air ducts extend through floors as specified in the Standard for Installation of Air-Conditioning and Ventilating Systems, NFPA 90A. Fire dampers are intended for installation in accordance with codes such as the BOCA National Mechanical Code, SBCCI Standard Mechanical Code, ICBO Uniform Mechanical Code, and the International Mechanical Code.

1.2 Fire dampers are evaluated for use as either:

- a) Fire Dampers for Static Systems - For HVAC systems that are automatically shut down in the event of a fire or for air transfer openings in walls or partitions,
- b) Fire Dampers for Dynamic Systems - For HVAC systems that are operational in the event of a fire,
- c) Combination Fire and Smoke Dampers - For locations in HVAC systems where a fire damper and a smoke damper are required at a single location, or
- d) Corridor Dampers - For locations in HVAC Systems where air ducts penetrate or terminate at openings in the ceilings of interior corridors when permitted by authority having jurisdiction.

1.3 Under these requirements a fire damper is subjected to a standard fire exposure, controlled to achieve specified temperatures throughout a specified time period, followed by the application of a specified standard hose stream. This exposure by itself is not representative of all fire conditions; conditions vary with changes in the amount, nature, and distribution of fire loading, ventilation, compartment size and configuration, and heat sink characteristics of the compartment. These requirements provide a relative measure of fire performance of fire damper assemblies under these specified fire exposure conditions. Any variation from the construction or conditions that are tested such as method of installation and materials has the potential to substantially change the performance characteristics of the fire damper assembly.

1.4 Fire dampers for static systems (no air flow through the damper) are intended to close automatically upon the detection of heat by a heat responsive device.

1.5 Under these requirements combination fire and smoke dampers, corridor dampers and fire dampers for dynamic systems are exposed to standardized heat and airflow conditions and are evaluated for dynamic closure under these conditions. □

1.6 Combination fire and smoke dampers and corridor dampers shall also comply with the applicable requirements in the Standard for Smoke Dampers, UL 555S. □

1.7 Fire dampers for dynamic systems are intended for use where the airflow is operational at the time of fire, such as in a smoke control system, or from other situations in which the fan system is operational at the time of a fire.

1.8 Where fire dampers are required in ducts that penetrate fire barriers and where the duct is also used as part of a smoke control system, the system designer shall ascertain which type of fire damper is appropriate for the application. Fire dampers for dynamic systems are evaluated only for dynamic closure under heated airflow conditions. Combination fire and smoke dampers and corridor dampers that have an elevated temperature rating are evaluated for dynamic closure under heated airflow conditions and they are also evaluated to operate under heated air conditions.

1.9 Tests conducted in accordance with these requirements are intended to demonstrate the performance of fire dampers during the period of fire test exposure and are not intended to determine acceptability of fire dampers for use after exposure to fire.

1.10 It is the intent that tests conducted in accordance with the test methods described herein develop data to enable regulatory authorities to determine the acceptability of fire damper assemblies for use in locations where fire resistance of a specified duration is required.

1.11 Fire dampers are intended to close automatically upon the detection of heat by the use of a fusible link or other heat responsive device.

1.12 These requirements do not cover:

- a) Performance of the fire damper assembly in walls, partitions, or floors constructed of materials other than those tested.
- b) The performance of the fire damper assembly when installed using methods other than those fire tested.
- c) Measurement of heat transmission through a fire damper assembly.
- d) Measurement of the degree of control or limitation of the passage of smoke or products of combustion through the fire damper assembly.

UL 555S

Standard for Smoke Dampers

1.1 These requirements cover smoke dampers intended for use in heating, ventilating, and air conditioning (HVAC) systems. Smoke dampers are intended:

- a) To restrict the spread of smoke in HVAC systems that are designed to be automatically shut down in the event of a fire, or
- b) To assist with the control of pressure differentials across smoke barriers when the HVAC system is part of an engineered smoke control system.

1.2 Dampers covered by these requirements are evaluated for use as either:

- a) Smoke Dampers - For use in HVAC systems where ducts pass through smoke barriers.
- b) Combination Fire and Smoke Dampers - For locations in HVAC systems where a fire damper and a smoke damper are required at a single location, or
- c) Corridor Dampers - For locations in HVAC Systems where air ducts penetrate or terminate at openings in the ceilings of interior corridors when permitted by authority having jurisdiction.

1.3 Smoke dampers are used for the protection of openings in smoke barriers or in engineered smoke control systems in accordance with the Standard for Installation of Air Conditioning and Ventilating Systems, NFPA 90A. These damper assemblies are intended for installation in accordance with codes such as the BOCA National Mechanical Code, the SBCCI Standard Mechanical Code, the ICBO Uniform Mechanical Code, and the International Mechanical Code.

1.4 Combination fire and smoke dampers and corridor dampers shall also comply with the applicable requirements in the Standard for Fire Dampers, UL 555.

UL Test Standard

Old UL Test Standard	New UL Test Standard
* No minimum airflow requirement * No safety factor built into ratings	* Airflow Ratings: 2,000, 3,000, and 4,000 fpm (UL 555 & UL 555S) * Minimum test requirements: 2,400, 3,400, and 4,400 fpm (UL 555 & UL 555S)
* No minimum pressure requirement	* Pressure ratings: 4, 6, and 8 in. wg (UL 555 & UL 555S) * Min. test requirements: 4.5, 6.5, and 8.5 in. wg (UL 555 & UL 555S)
* Unidirectional air flow ratings	* Bidirectional air flow testing (UL 555 & UL 555S)
* Two position actuators - 5,000 cycles	* Two position actuators – 20,000 cycles (UL 555S)
* Tested with airflow at ambient temperature * Actuators may be field mounted	* Tested with airflow at rated temperature (UL 555S) * Actuators must be factory installed (effective 6/2000) (UL 555S)
* Leakage tested at ambient w/ a unit that has not been exposed to the Operation and/or Dynamic Closure Test	* Leakage tested at rated temperature after Operation Test and/or Dynamic Closure Test (UL 555S)
* Four leakage classifications	* 4th leakage classification eliminated (UL 555S)
* No actuation required	* Test with actuator holding damper closed (UL 555S)

Standard Installation Details - Motorized Fire & Smoke Dampers

1. Opening Clearance

The opening in the wall or floor shall be larger than the damper/ sleeve assembly to permit installation or expansion. The opening shall be a minimum of 1/8" per foot (3 per 305) larger than the overall size of the damper/sleeve assembly. The maximum opening size shall not exceed 1/8" per foot (3 per 305) plus 2" (51), nor shall the opening be less than 1/4" (6) larger than the damper/sleeve assembly.

2. Damper Sleeve

Secure Damper to Sleeve on 6" centers (150mm) with 1/2" (12 mm) long welds, 1/4" (6 mm) bolts and nuts or No. 10 Sheet Metal Screws. Sleeve thickness must be equal to or thicker than the duct connected to it. Sleeve gauge requirements are listed in the SMACNA Fire and Smoke Radiation Damper installation guide for HVAC systems and in NFPA 90. Damper sleeve shall not extend more than 6" beyond the fire wall or partition unless damper is equipped with an actuator and / or a factory installed access door. Sleeve may extend up to 16" beyond the fire wall or partition on sides equipped with actuator and or factory installed access door.

3. Damper Sleeve attachment

Fastening the damper in positioned required for attaching the fire damper and sleeve is 6mm galvanized steel nut and bolt, spacing at an interval of 6" distance and 1" from the edges distance.

The damper and the perimeter of the retaining angle mounting the fasteners of minimum 6mm nut and bolts and are positioned at 6" distance

4. Damper Orientation

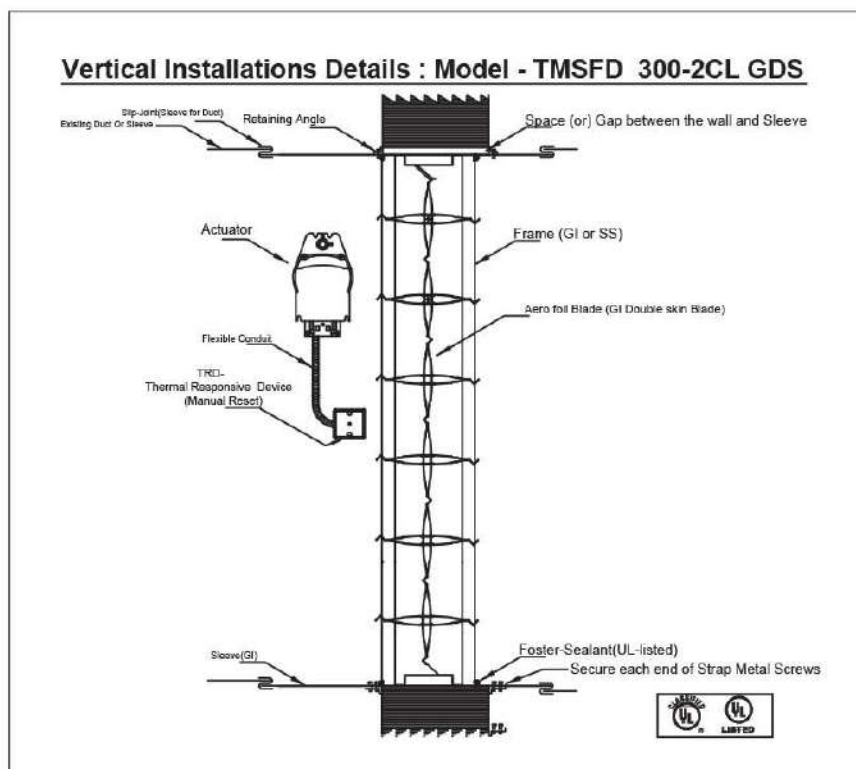
Damper is designed to operate with blades running Vertical and must be installed with center line of damper frame within the wall or floor when they are in the closed position. Use "Mount With Arrow Up" label as a guide for proper damper orientation. Vertical mount dampers must be installed with actuator above the floor and temperature release device below the floor.

5. Retaining Angles

Retaining angles is of generally galvanized steel dimensions minimum of 40 x 40 x 1.5mm installed on both sides of the partition and attached only to the sleeve. Retaining angles must overlap the partition a minimum of 1" (25). Do not weld or fasten angles together at corners of dampers.

6. Retaining Angle Fastened to Sleeve

Secure retaining angles to sleeve only on 8" centers and 1" from the both side edges with 6mm bolts and nuts. Installing damper assembly in wall and floor openings – installations options for securing the damper to wall or floor openings depend on the factors. Model size mounting orientation and wall or floor construction. Single side or two sides retaining angle options are available.





Duct/Sleeve Connections

a. Break-away Duct/Sleeve Connections

Rectangular ducts must use one or more of the connections depicted below:

A maximum of two #10 (M5) sheet metal screws on each side and the bottom, located in the center of the slip pocket and penetrating both sides of the slip pocket may be used. Connections using these slip joints on the top and bottom with flat drive slips up to 20" (508) long on the sides may also be used.

b. Round and Oval Break-away Connections

Round and flat oval break-away connections must use either a 4" (102) wide drawband or #10 (M5) sheet metal screws spaced equally around the circumference of the duct as follows:

- Duct diameters 22" (559) and smaller – maximum 3 screws.
- Duct diameters over 22" (559) and including 36" (914) – maximum 5 screws.
- Duct diameters over 36" (914) and up to and including 191" (4851) total perimeter – maximum 8 screws.

For flat oval ducts, the diameter is considered the largest (major) dimension of the duct. These connections are depicted in the SMACNA Fire, Smoke, and Radiation Damper Installation Guide.

Note: When optional sealing of these joints is desired, the following sealants may be applied in accordance with the sealant manufacturer's instructions

Design Polymeric – DP 1010

Precision – PA2084T Hard cast, Inc. – Iron Grip 601

Eco Duct Seal 44-52

c. Flanged Break-away Style Duct/Sleeve Connections.

Flanged connection systems manufactured by Ductmate, Nexus or Ward are approved break-away when installed as shown on the Flanged Systems Breakaway Connections Supplement.

TDC and TDF roll-formed flanged connections using 3/8" (10) steel bolts and nuts, and metal cleats, as tested by SMACNA, are approved break-away connections when installed as shown on the Flanged Systems Breakaway Connections Supplement.

d. Non-Break-away Duct/Sleeve Connections

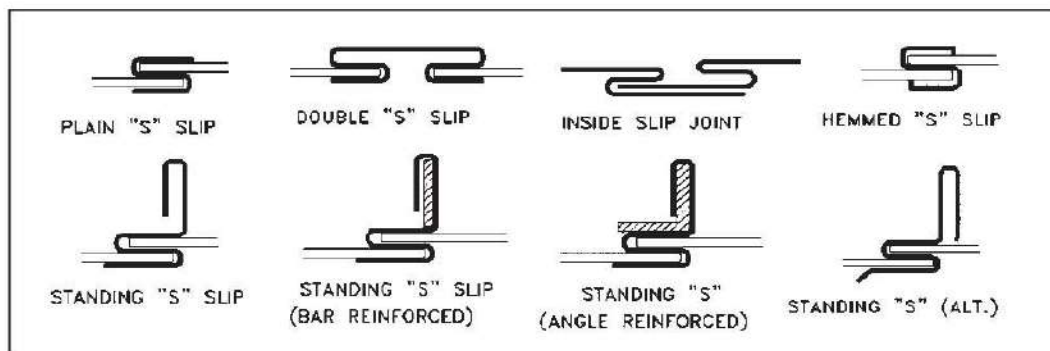
If other duct/sleeve connections are used, the sleeve shall be a minimum of 16 gage (1.6) for dampers up to 36" (914) wide x 24" (610) high and 14 gage (2.0) for dampers 36" (914) wide x 24" (610) high.

7. Actuator Connections

Electric and pneumatic actuators are to be connected in accordance with wiring and piping diagrams developed in compliance with applicable codes, ordinances and regulations.

8. Installation and Maintenance

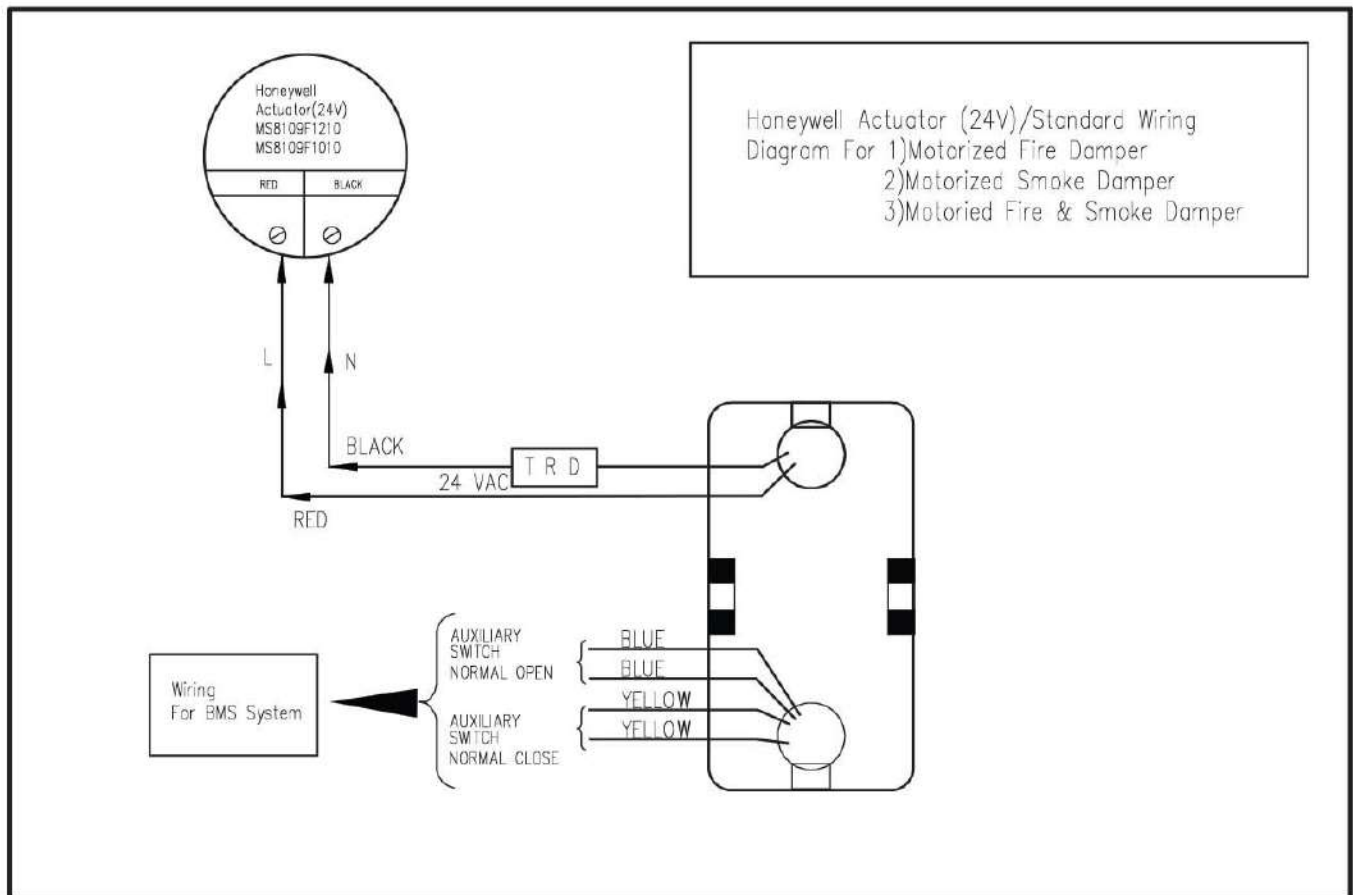
The damper must be installed so it is square and free from racking. Do not compress or stretch the damper frame into the duct or opening. Lift or handle the damper using sleeve or frame. Do not lift damper using blades or actuators. Each fire/smoke damper should be examined on a regular basis to ensure it is not rusted or blocked. In addition, each damper should be tested periodically, (NFPA recommends annually or semiannually, depending on the application) to ensure it will perform as intended. Care should be exercised to ensure that such tests are performed safely and do not cause system damage.



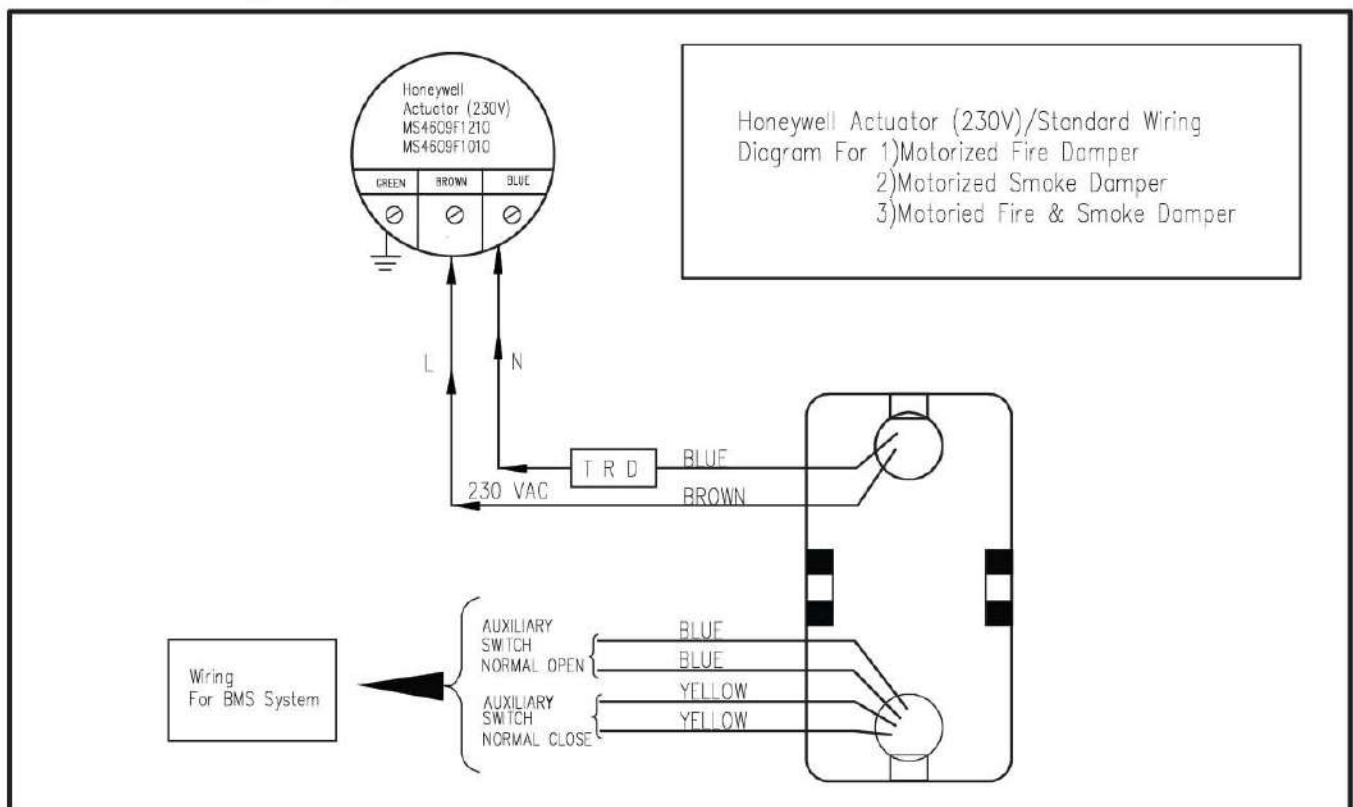
NOTE: All breakaway connections described may have duct sealant applied in accordance with SMACNA recommendations.

9. Actuator Installation: Factory installation of actuators is required by UL555S. Maintenance helps to ensure that a system can be trusted to perform its function in an emergency.

Standard Wiring Diagram For 24V



Standard Wiring Diagram For 230V



**Ordering Data :**

Series	Model Type	Actuator type	External Controls	Power Supply	Duct Size	Quantity
TSFD300-GDS-2CL	TSFD300-2CL	Honeywell	Left Hand	230 V	1800X1800	50

AVAILABLE SIZES (mm)

W	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	1000	1100	1200	1300	1400	1500	1600	1700	1800
H	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	1000	1100	1200	1300	1400	1500	1600	1700	1800

Any combination of W x H. For non-standard sizes on request