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**SPECIFICATIONS, INSTALLATION INSTRUCTIONS AND
TROUBLE-SHOOTING GUIDE FOR STACK PACK
MOTORIZED VENT DAMPER SERIES SL89
FOR USE ON OIL/GAS FIRED SYSTEMS ONLY.**

(Information about THERMAL dampers for gas-fired
appliances available on request.)

WARNING

- THIS DEVICE MUST BE INSTALLED ONLY ON AN AUTOMATICALLY OPERATED OIL-FIRED APPLIANCE EMPLOYING AN ATOMIZING TYPE BURNER.
- ALL WIRING MUST BE IN ACCORDANCE WITH NATIONAL ELECTRICAL CODES, CLASS 1 (REMOTE CONTROL AND SIGNALLING CIRCUITS), AND MUST ALSO COMPLY WITH APPLICABLE LOCAL ELECTRICAL ORDINANCES, CODES AND REGULATIONS. "HOT LEG" MUST HAVE A COMMON DISCONNECT AND MUST BE CONNECTED WITH CORRECT POLARITY. FAILURE TO OBSERVE THIS CAUTION MAY LEAD TO ELECTRICAL SHOCK AND/OR EQUIPMENT DAMAGE OR MALFUNCTION.
- CLEARANCES OF NOT LESS THAN 18 INCHES (457.2 MM) MUST BE MAINTAINED FROM COMBUSTIBLE MATERIALS, WITH PROVISIONS FOR ACCESS.
- THIS DEVICE MUST BE INSTALLED IN A VENTING SYSTEM OR SECTION OF A VENTING SYSTEM SO THAT IT SERVES ONLY THE SINGLE APPLIANCE FOR WHICH IT IS INSTALLED.
- INSTALLATION OF THIS DEVICE SHOULD BE PERFORMED BY A QUALIFIED INSTALLING AGENCY IN COMPLIANCE WITH ALL LOCAL, STATE AND FEDERAL CODES.
- DO NOT REDUCE VENT PIPE SIZE TO ACCOMMODATE THE STACK DAMPER. STACK DAMPER SIZE MUST BE AT LEAST THE SAME SIZE AS OR LARGER THAN ORIGINAL VENT PIPE.
- DEVIATION FROM THESE INSTRUCTIONS IN INSTALLATION OR USE MAY LEAD TO A DANGEROUS CONDITION.

SHOULD INSTALLATION PROBLEMS ARISE, CONSULT THE TROUBLE-SHOOTING GUIDE ON REAR COVER.
IF PROBLEMS PERSIST, CALL OUR TECHNICAL SUPPORT LINE AT (516) 234-3600.

I. INTRODUCTION

This product is an automatic, motorized stack damper that has been developed to increase the efficiency of heating systems by reducing standby losses from the heating apparatus and the conditioned air space surrounding it. The damper closes the chimney vent when the burner is off and fully opens it again when combustion is required. The concept is similar to the opening and closing of a fireplace flue, except that the operation is completely automatic. A safety interlock has been added, which prevents burner operation unless the damper is in an open position. A closed damper substantially reduces standby losses on boilers, furnaces and water heaters. Motorized stack dampers are not to be installed on sealed combustion systems or on oil fired appliances having a constant burning pilot. Motorized dampers do not "Reclaim Wasted Heat". Motorized dampers prevent heat from being wasted by the natural draft of the chimney when the burner is off.

II. DESCRIPTION

The damper should be mounted on the vent pipe directly after, on the chimney side of, the barometric damper—for oil systems only. (This is the recommended location for maximum efficiency. If installation difficulties arise, the damper may be installed between the appliance and the barometric damper, resulting in a loss of efficiency.) When the damper is in the closed position, it will prevent residual heat in the heating appliance from being drawn up the chimney vent by its natural draft. A closed damper will also prevent conditioned air from being pulled through the barometric damper and up the chimney by the same stack effect. When combustion is required, the damper will rotate to its open position BEFORE an integral end switch activates the burner circuit. If the damper does not rotate to its open position, the burner circuit will not be activated. If installed properly, the electrical circuits in this product are designed not to override existing limit controls. When the combustion requirement has been satisfied, the burner will go off immediately, and after a three-minute time delay (optional), the damper will slowly rotate to its fully closed position. This delay has been designed to provide a post-purge which reduces nozzle "coking" and eliminates annoying combustion odors. The damper is spring loaded and will return to an open position on power failure. This feature enables the normal stack draft to effectively vent any unburned fumes that may accumulate during the power outage. Aluminum die cast vent section construction allows for close tolerance manufacture and a tight fitting damper blade which gives maximum system efficiency.

Potential fuel savings can vary from 10% to greater than 40% based on the following factors:

1. geographical location of dwelling;
2. the size of heating plant relative to heat loss of dwelling;
3. location of heating plant within dwelling;
4. diameter of venting system;
5. total height of chimney above heating plant;
6. outdoor temperature and sustained wind velocities over a given period of time;
7. settings of operating and limit controls on heating plant;
8. type of heating plant used (furnace, boiler or hot water heater);
9. source of domestic hot water, temperature of water, and amount used;
10. room thermostat settings;
11. infiltration factors of dwelling;
12. number of heating zones;
13. day/night thermostat being used, and the hours and degrees of setback;
14. chimney vent friction;
15. type and model of stack damper used.

Motorized dampers for oil fired equipment are available through all normal heating distribution channels. Although we have attempted to make field installation simple and safe, a faulty mechanical installation or improper electrical wiring can make the damper inoperative or potentially dangerous. IT IS FOR THIS REASON THAT WE STRONGLY RECOMMEND INSTALLATION BY TRAINED, QUALIFIED HEATING CONTRACTORS OR OIL BURNER SERVICEMEN. When properly installed, the unit is maintenance-free. It is designed to provide many years of dependable service, giving both comfort and economy.

III. GENERAL INFORMATION

VENT SIZE	VENT SECTION MATERIAL	DAMPER VANE MATERIAL	SHIPPING WEIGHT
4"	sand cast aluminum	.062 aluminum	2.9 lbs
5"	die cast aluminum	.062 aluminum	3.2 lbs
6"	die cast aluminum	.062 aluminum	3.5 lbs
7"	die cast aluminum	.062 aluminum	3.8 lbs
8"	die cast aluminum	.062 aluminum	4.1 lbs
9"	sand cast aluminum	.062 aluminum	5.2 lbs
10"	sand cast aluminum	.062 aluminum	5.9 lbs
12"	sand cast aluminum	.062 aluminum	7.3 lbs

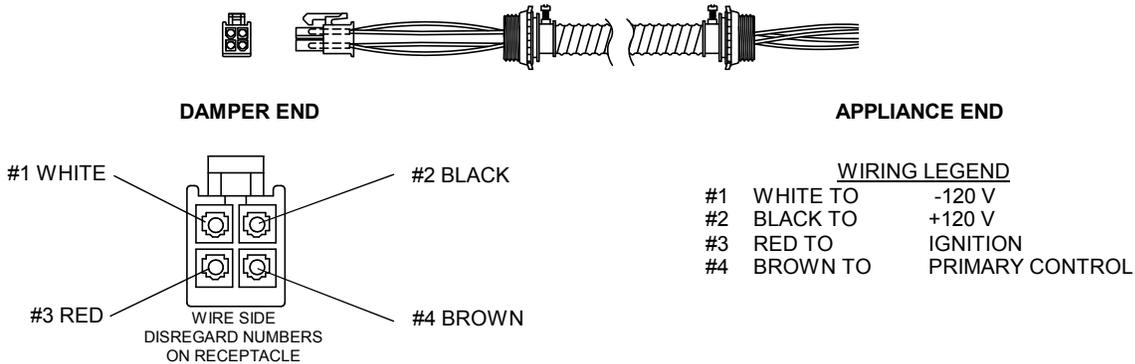
IV. ELECTRICAL

Provide common 110/120 VAC power supply to damper actuator and heating plant, and provide common disconnect means with overload protection as required.

Thermostat Anticipator Setting. Set for normal system requirement. Settings do not change with addition of vent damper.

MINIMUM WIRING REQUIREMENTS	18 GAUGE, 90°C. COPPER WIRE
DAMPER DRIVE MOTOR	
POWER DRAW REQUIREMENT	5 WATTS AT 115 VAC WHEN CLOSED OR CLOSING
TORQUE (RUNNING)	20 IN./OZ. MINIMUM AT 97.8 VOLTS
TIMING	TO CLOSE, 15 SECONDS (PLUS 3 MINUTE TIME DELAY); TO OPEN, 5 SECONDS (NOM.)
CHARACTERISTICS	POWER CLOSE, SPRING OPEN
TYPE	SYNCHRONOUS
SWITCHING	2 PRECISION SNAP ACTING SWITCHES, 10.1 AMP RES., 3 AMP IND. AT 125 VAC, 250 VAC
P.C. BOARD	2 OZ./FT ² ONE SIDE COPPER, HEAT RESISTANT, FLAME RETARDANT

V. HARNESS



VI. MECHANICAL

Damper vane	.062 thick aluminum
Drive rod-actuator	stainless steel
Mounting plate	galvanized steel, 14 gauge
Actuator cover	plastic
Maximum allowable stack temperature	930° F above ambient

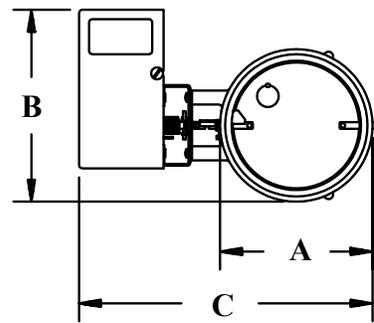
VII. FEATURES

Damper opens on power failure - No required change in wiring of existing limit controls - 100,000 trouble-free operations in life cycle test at 1,000° F - Aluminum die cast construction of vent pipe section - 90% open before burner "ON" signal - Three-minute closing delay after burner "OFF" (optional) - Burner "OFF" before start of damper close - Normal burner operations with damper disabled open - No burner operation with damper disabled closed - External damper position indicator - Direct drive, no-linkage end switch for proving damper open - Damper safety circuit disables damper to the open position if damper interlock switch malfunctions closed while maintaining normal burner operation - Free-wheeling lost motion clutch permits free rotation of vane during installation without gear damage - Actuator assembly is replaceable - 5 seconds open does not cause lockout with timed safety controls - Compatible with all cad cell primary controls.

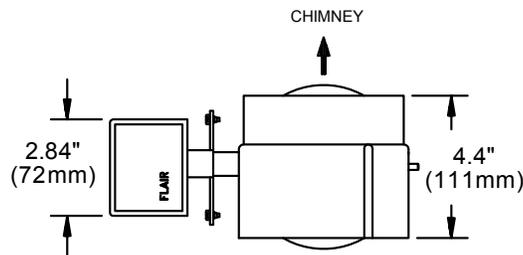
VIII. DIMENSIONS

Vent Size	A		B		C	
	in	mm	in	mm	in	mm
4"	4.3"	109	6.2"	158	9.3"	235
5"	5.3"	134	6.7"	170	10.3"	260
6"	6.3"	160	7.2"	183	11.3"	286
7"	7.3"	185	7.7"	196	12.3"	311
8"	8.3"	211	8.2"	208	13.3"	337
9"	9.3"	236	8.7"	221	14.3"	362
10"	10.3"	261	9.2"	234	15.3"	387
12"	12.3"	312	10.2"	259	17.3"	438

TOP VIEW
DAMPER SHOWN IN CLOSED POSITION



SIDE VIEW
DAMPER SHOWN IN OPEN POSITION



IX. INSTALLATION INSTRUCTIONS

A. BEFORE YOU START TO INSTALL:

1. Read cautions as listed on cover page.
2. System should be visibly checked for defects such as rusting vent pipe, poor burner adjustment, and oil leaks. Problems should be corrected before proceeding.
3. Turn off electrical power and wait for the system to cool.
4. Select a safe, convenient location allowing a minimum of 18 inches (457.2mm) of clearance between the stack damper and walls, ceilings, floor, or combustible material. (See Fig. 2, 3 and 4). (Installation BETWEEN barometric damper and heating appliance is allowable but will reduce fuel saving efficiency.)
5. Carefully unpack the unit. The damper is spring loaded and should drive to an open position when it is removed from the packing. **DO NOT FORCE IT CLOSED!** Forcing the damper may damage the gear train and void the warranty.

B. NOW, PROCEED AS FOLLOWS:

1. Separate the vent pipe at the selected installation point and insert the casting. The arrow on the open damper should point in direction of vent gas flow (towards chimney).
2. Reassemble the vent piping. Be sure the casting is well seated. (See Fig. 5 if support or "screw-together" assembly is required).
3. Wire the system as shown in the diagrams and in accord with local codes (see diagrams).
4. Restore electrical power.

C. AFTER INSTALLATION

1. Operate system through (3) complete cycles to check for opening and closing in proper sequence, and proper hi-limit control of burner operation. (See Fig. 6 for Position Indicator.) **REMEMBER, THERE IS A NORMAL THREE MINUTE DAMPER CLOSING DELAY AFTER THE BURNER GOES OFF** (optional).
2. If the damper does not come to the fully open or fully closed positions, check for interference by the vent pipe. (See Fig. 6).
3. Check the "trouble-shooting guide" if problems arise with the installation.

IMPORTANT

- THE STEP-BY-STEP INSPECTION AND INSTALLATION PROCEDURES AS SPECIFIED IN EXHIBITS A AND B MUST BE FOLLOWED
- THE QUALIFIED INSTALLER MUST FILL IN LABEL ON THE SIDE OF THE OPERATOR
 - AN ADEQUATE ELECTRICAL SUPPLY MUST BE PROVIDED

EXHIBIT A PROCEDURE FOR SAFETY INSPECTION OF AN EXISTING APPLIANCE INSTALLATION

The following procedure is intended as a guide to aid in determining that an appliance is properly installed and is in a safe condition for continuing use.

This procedure is predicated on central furnace, boiler and water heater installations, and it should be recognized that generalized procedures cannot anticipate all situations. Accordingly, in some cases deviation from this procedure may be necessary to determine safe operation of the equipment:

- (a) This procedure shall be performed prior to installation of the automatic vent damper device.
- (b) If it is determined there is a condition which could result in unsafe operation, the appliance should be shut off and the owner advised of the unsafe condition. Do not install the automatic vent damper device until the unsafe condition has been corrected.

The following steps are to be followed in making the safety inspection:

1. Conduct a gas leakage test of the appliance piping and control system downstream of the shut off valve in the supply line to the appliance.
2. Visually inspect the venting system for proper size, horizontal pitch and vent termination, and determine there is no blockage or restriction, leakage, corrosion and other deficiencies which could cause an unsafe condition.
3. Determine that the chimney or vent is acceptable to the authority having jurisdiction.
4. Shut off all gas to the appliance and shut off any other fuel-gas burning appliance within the same room. Use the shut off valve in the supply line to each appliance.
5. Inspect burners and crossovers for blockage and corrosion.
6. Applicable only to furnaces - inspect heat exchanger for cracks, openings or excessive corrosion.
7. Applicable only to boilers - inspect for evidence of water or combustion product leaks.
8. Insofar as is practical, close all building doors and windows and all doors between the space in which the appliance is located and other spaces of the building. Turn on clothes dryers. Turn on any exhaust fans, such as range hoods and bathroom exhausts, so they will operate at maximum speed. Do not operate a summer exhaust fan. Close fireplace dampers. If, after completing Steps 9 through 14, it is believed sufficient combustion air is not available, refer to local codes, or in the absence of local codes, to the National Fuel Gas Code, ANSI Z223.1-(most current edition) (NFPA 54), for guidance.
9. Place in operation the appliance being inspected. Follow the lighting instructions. Adjust thermostat so appliance will operate continuously.
10. Determine that the pilot(s), when provided, is burning properly and that main burner ignition is satisfactory by interrupting and reestablishing the electrical supply to the appliance in any convenient manner.

If the appliance is equipped with a continuous pilot(s), test the pilot safety device(s) to determine if it is operating properly by extinguishing the pilot(s) when the main burner (s) is off and determining, after 3 minutes, that the main burner gas does not flow upon a call for heat.

If the appliance is not provided with a pilot(s), test for proper operation of the ignition system in accordance with the appliance manufacturer's lighting and operating instructions.

11. (a) Visually determine that main burner gas is burning properly; i.e., no floating, lifting or flash-back. Adjust the primary air shutter(s) as required.
(b) If the appliance is equipped with high and low flame controlling or flame modulation, check for proper main burner operation at low flame.
12. Test for spillage at the draft hood relief opening after 5 minutes of main burner operation. Use the flame of a match or candle, or smoke from a cigarette, cigar or pipe.
13. Turn on all other fuel-burning appliances within the same room so they will operate at their full inputs. Follow lighting instructions for each appliance.
14. Repeat Steps 11 and 12 on the appliance being inspected.
15. Return doors, windows, exhaust fans, fireplace dampers and any other fuel-gas burning appliances to their previous conditions of use.
16. Applicable only to furnaces - Check both the limit control and the fan control for proper operation. Limit control operation can be checked by blocking the circulating air inlet or temporarily disconnecting the electrical supply to the blower motor and determining that the limit control acts to shut off the main burner gas.
17. Applicable only to boilers -
 - (a) Determine that the water pumps are in operating condition.
 - (b) Test low water cutoffs, automatic feed controls, pressure and temperature limit controls, and relief valves in accordance with the manufacturer's recommendations to determine they are in operating condition.

EXHIBIT B PROCEDURE FOR INSTALLING ELECTRICALLY OPERATED AND MECHANICALLY ACTUATED AUTOMATIC VENT DAMPER DEVICES ON EXISTING APPLIANCES

This procedure is intended as a guide to aid in safely installing an electrically operated or mechanically actuated automatic vent damper device on an existing appliance. This procedure is based on the assumption that the history of the specific appliance has been one of safe and satisfactory operation. This procedure is predicated on central furnace, boiler and water heater installations, and it should be recognized that generalized procedures cannot anticipate all situations. Accordingly, in some cases deviation from this procedure may be necessary to determine safe operation of the equipment.

The following steps are to be followed in making the modifications:

1. Perform a safety inspection of the existing appliance installation. See Exhibit A for the recommended procedure for such a safety inspection.
2. Shut off all gas and electricity to the appliance. To shut off gas use the shut off valve in the supply line to the appliance.
3. Install the automatic vent damper device in strict accordance with the manufacturer's installation instructions. Make certain the device is not located in that portion of the venting system which serves any appliance other than the one for which the damper is installed.
4. Make certain wiring connections are tight and wires are positioned and secured so they will not be able to contact high temperature locations.
5. When an additional automatic valve has been incorporated or an existing gas control replaced, conduct a gas leakage test of the appliance piping and control system downstream of the shut off valve in the supply line to the appliance.
6. Visually inspect the modified venting system for proper horizontal pitch.
7. Check that the damper and gas valve(s) are in the correct operating sequence.
 - (a) The damper must be in the full open position before the gas valve(s) opens.
 - (b) The damper must remain in the full open position while the gas valve(s) is open.
 - (c) The gas valve(s) must be closed before the damper begins its return to the closed position.
 - (d) The damper shall remain in the closed position during the off cycle of the appliance.
8. Determine the amperage draw of the gas control circuit and damper device.
 - (a) Check appliance transformer for adequate capacity.
 - (b) Check heat anticipator in comfort thermostat to determine it is properly adjusted.
9. Sequence the appliance through at least three normal operating cycles.
10. Insofar as is practical, close all building doors and windows and all doors between the space in which the appliance is located and other spaces of the building. Turn on clothes dryers. Turn on any exhaust fans, such as range hoods and bathroom exhausts, so they will operate at maximum speed. Do not operate a summer exhaust fan. Close fireplace dampers.
11. Place appliance in operation. Follow the lighting instructions. Adjust thermostat so appliance will operate continuously.
12. Test for spillage at the draft hood relief opening after 5 minutes of main burner operation. Use the flame of a match or candle or smoke from a cigarette, cigar or pipe.
13. (a) Visually determine that main burner gas is burning properly; i.e., no floating, lifting or flashback. Adjust the primary air shutter(s) as required.
(b) If the appliance is equipped with high and low flame controlling or flame modulation, check for proper main burner operation at low flame.
14. Determine that the pilot(s), when provided, is burning properly and that main burner ignition is satisfactory by interrupting and reestablishing the electrical supply to the appliance in any convenient manner. If the appliance is equipped with a continuous pilot(s), test the pilot safety device(s) to determine if it is operating properly by extinguishing the pilot(s) when the main burner(s) is off and determining, after 3 minutes, that the main burner gas does not flow upon a call for heat. If the appliance is not provided with a pilot(s), test for proper operation of the ignition system in accordance with the appliance manufacturer's lighting and operating instructions.
15. Applicable only to furnaces - Check both the limit control and the fan control for proper operation. Limit control operation can be checked by blocking the circulating air inlet or temporarily disconnecting the electrical supply to the blower motor and determining that the limit control acts to shut off the main burner gas.
16. Applicable only to boilers -
 - (a) Determine that the water pumps are in operating condition.
 - (b) Test low water cutoffs, automatic feed controls, pressure and temperature limit controls, and relief valves in accordance with the manufacturer's recommendations to determine they are in operating condition.
17. Label the damper device (see 1.7.5) with information as to:
 - (a) Name of qualified agency responsible for damper installation.
 - (b) Date of installation.

For continued safe operation, the homeowner should check all flue product carrying areas of the appliance, its vent system, and the damper device at least once a year. Particular attention should be given to the replacement of parts deteriorated by corrosion or other sources. Such replacement must be done by a qualified installing agency, who shall carry out an annual inspection of the appliance-device combination.

TROUBLE-SHOOTING GUIDE (listed in order of probability)

SYMPTOM	POSSIBLE CAUSE	REMEDY
Heating required and burner will not operate. Damper closed.	Thermostat is set wrong.	Reset room thermostat to call for heat.
Heating required and burner will not operate. Damper open.	No electrical power to damper.	Turn on switch, replace fuse, reset circuit breaker or repair wiring.
	Improper wiring.	Recheck and correct any wiring errors.
	Stack switch or cad cell malfunction.	Check reset button; repair or replace control.
	Defective burner components.	Check, repair or replace burner components.
	Damaged or defective damper actuator.	Replace damper actuator.
Burner operates normally, damper will not close.	Time delay (optional) in normal operation.	Wait at least 3 minutes for damper to close, before checking further.
	Damper is blocked open.	Check for free damper movement and remove blockage.
	Improper wiring.	Recheck and correct any wiring errors.
	Damaged or defective time delay relay.	Replace actuator.
Time delay relay chatters (optional).	Incompatible solid state oil burner primary control. Robertshaw SJ4000 series.	The Robertshaw line of solid state primary controls (SJ400 series) are not compatible. Consult factory for wiring modification.
	Damaged or defective time delay.	Replace damper actuator.
Burner will not operate. Damper closed and will not open.	No call for heat.	Reset thermostat (heat or hot water) to call for heating.
	Damper is blocked closed.	Check for free damper movement and remove blockage.
	Improper wiring.	Recheck and correct any wiring errors in line and low voltage circuits.
	Broken return spring.	Replace actuator.
Burner will not operate. Damper operates normally.	Improper wiring.	Recheck and correct any wiring errors.
	Stack switch or cad cell malfunction.	Check reset button; repair or replace control.
	Defective burner components.	Check, repair or replace burner components.
Burner and damper operate normally. Bad odor is detectable.	Insufficient draft over fire.	Clean clogged flue passages and readjust barometric damper.
	Normal time delay insufficient for system.	Open vent pipe and remove two knock-outs from damper vane. Be careful not to damage or distort vane.
Burner operates before damper opens.	Improper wiring.	Recheck and correct any wiring errors.
Damper vane stops in other than fully open or fully closed position.	Damper is blocked.	Check for maximum 95° damper movement. If less than 90°, remove blockage. Check and correct badly fitting vent piping.
	Broken return spring.	Inspect under mounting plate for broken return spring. Replace actuator.
Intermittent burner operation. Damper operates normally.	Loose or broken wires.	Recheck and correct any wiring errors in line voltage circuit.
	Damaged or defective switch.	Replace damper actuator.
Burner operates with damper closed.	Improper wiring.	Recheck and correct any wiring errors.
	Boiler equipped with tankless coil or low limit and not wired properly.	Consult factory for required wiring modifications.

INSTALLATION AND SERVICE SHOULD BE PERFORMED BY A QUALIFIED INSTALLING OR SERVICE AGENCY.

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STACK PACK SL89 SERIES

FLAIR INTERNATIONAL CORPORATION