



Modulating Exhaust and Supply Fans Reference Guide



Applications Include:

- Multi-story ventilation and bathroom exhaust shafts
- Chase exhausted clothes dryers
- Common ducted commercial clothes dryers
- Common vented boilers and water heaters

How Modulating Fans Save Energy and Reduce Costs

Instead of operating continuously at high speed, modulating fans function at low speed the majority of time and automatically speed up and down to meet varying exhaust or air supply demands.

- Power consumption can be reduced by more than 50% compared to traditional fixed speed fans.
- Reduce the volume of make-up air by automatically modulating exhaust air or supply air to meet actual demand.
- Substantially reduce costs of conditioning excessive make-up air compared to fixed speed fans.



Heart of the System

MPC-Series Modulating Pressure Controllers monitor pressure in exhaust and supply air vents and output a 1-10 VDC signal to a fan so that its performance varies to maintain a desired pressure set point as volumes change.

The model MPC1 also includes a UC1 burner circuit interlock for mechanical draft and combustion air applications. MAC-Series expansion modules are available so that multiple burner circuits can be interlocked with a single MPC1 Controller.

Both models can be used directly with ECM powered fans or in conjunction with a VFD to control the speed of 3 phase powered fans. Control pressures to within 0.01" W.C. of set point.

Application:

Multi-Story Exhaust for Temperatures up to 300° F

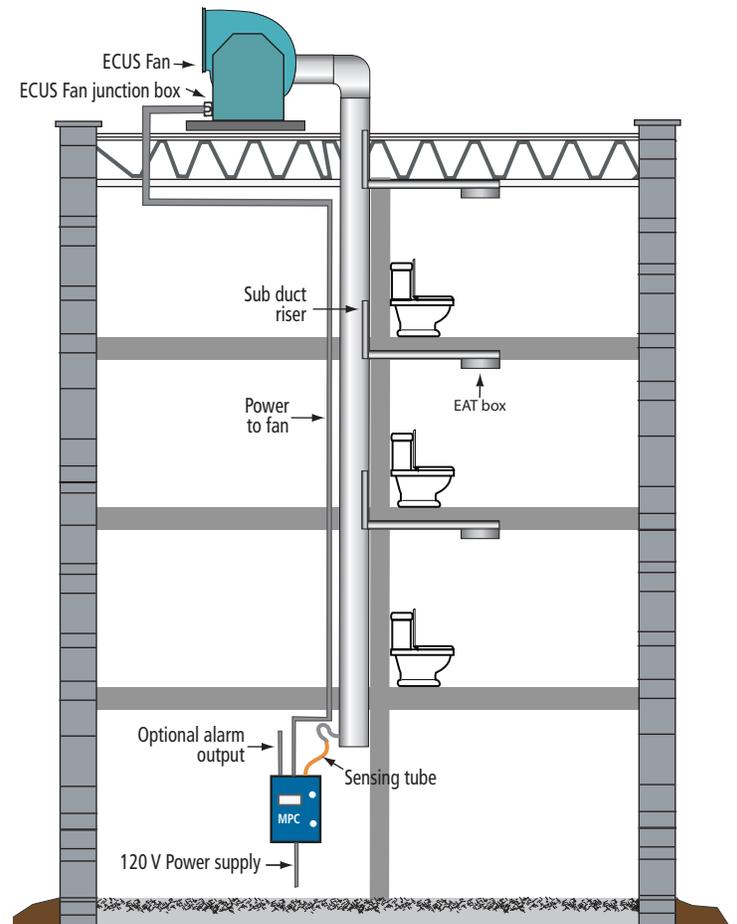
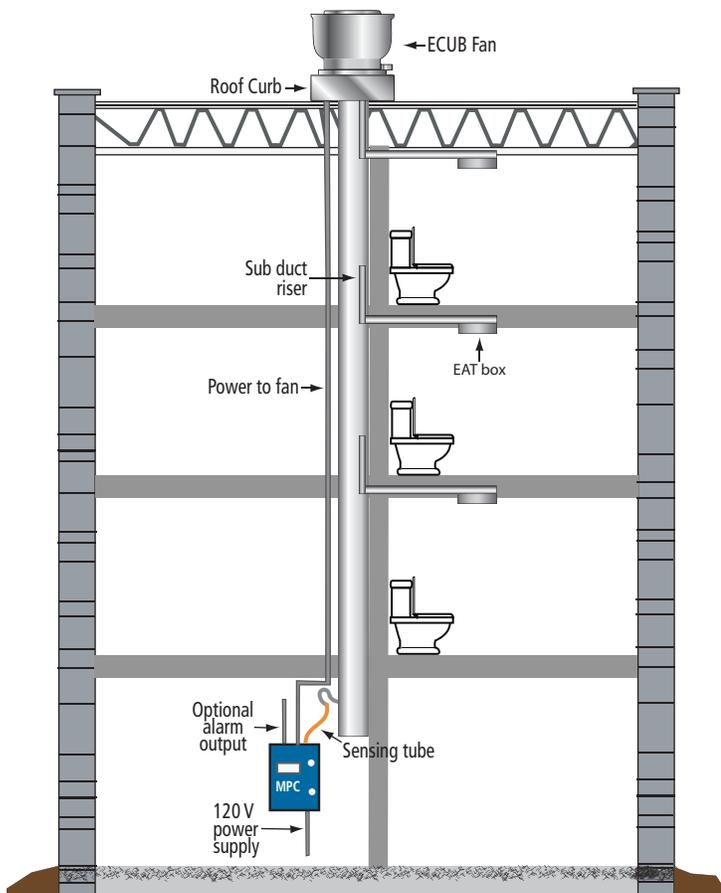
Tjernlund offers a system approach to exhausting bathrooms and kitchens in hi-rise buildings. Our EAT boxes provide a demand based connection to a central exhaust shaft. Air is exhausted only when the damper in the EAT box is activated. The constant flow regulator within the outlet balances exhaust flow regardless of which story the connection enters the shaft to eliminate the need for balancing. ESDR-Series Sub Duct Risers eliminate the need for fire dampers where ducts connect to the exhaust shaft. The MPC controller measures pressure at the bottom of the exhaust shaft to change fan speed based on the total exhaust demand, building pressure changes, stack effect and wind loading.

Fan Choices:

- 3 Phase VSVS Variable Speed Ventilators from 3,000 to 12,000 CFM
- ECM ECUB Up Blast Fans from 500 to 4,800 CFM
- ECM ECUS Utility Set Fans from 650 to 5,200 CFM

Accessories:

- EAT-Series Exhaust Air Terminal Boxes
- ESDR-Series Sub Duct Risers
- Grease Collector Boxes
- Factory Matched Variable Frequency Drives



ECUB Up Blast Fans

All aluminum construction. Good for grease laden air. Direct interface with MPC Series controllers, no VFD necessary. Requires square roof curb. Optional grease collector boxes. Use ESDR-Series Sub Duct Risers to eliminate need for fire dampers. Use EAT-Series boxes to control exhaust and balance flow.

ECUS Utility Fans

Heavy gauge galvanized steel construction. Good for grease laden air. Direct interface with MPC Series controllers, no VFD necessary. Discharge rotates 180°. Round inlet connection. Use ESDR-Series Sub Duct Risers to eliminate need for fire dampers. Use EAT-Series boxes to control exhaust and balance flow.

Application: Multi-Story Exhaust Shafts for Clothes Dryers

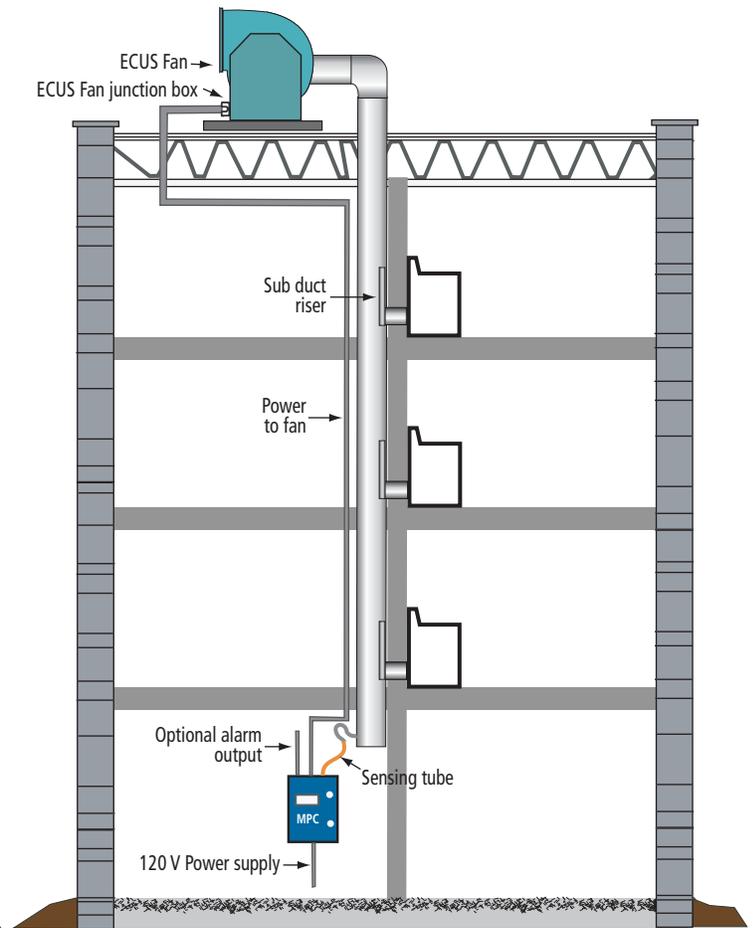
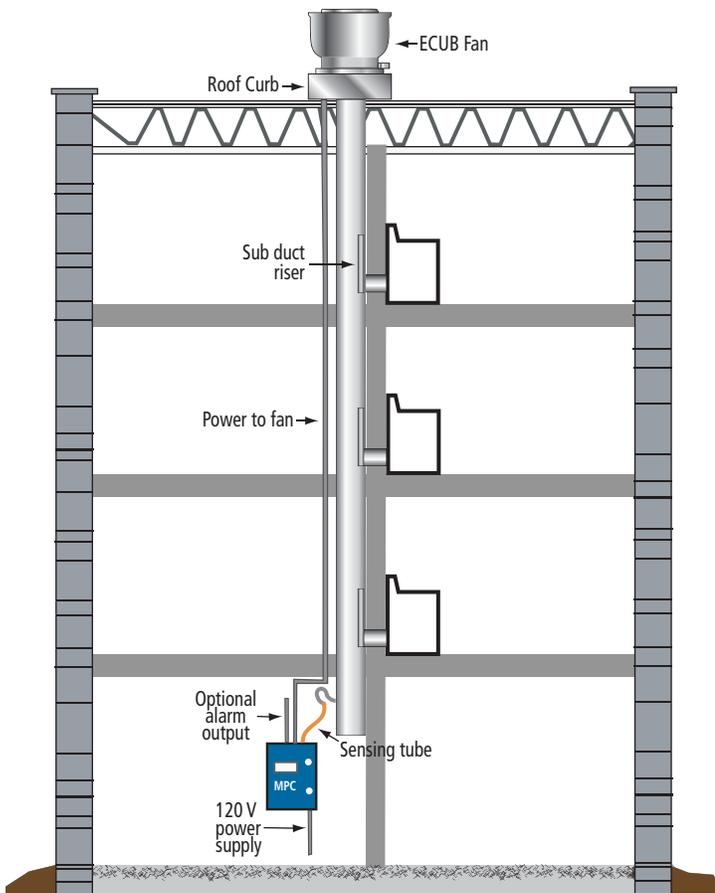
Fan Choices:

- ECM ECUB Up Blast Fans from 500 to 4,800 CFM
- ECM ECUS Utility Set Fans from 650 to 5,200 CFM
- 3 Phase VSVS Variable Speed Ventilators from 3,000 to 12,000 CFM
- 3 Phase VSUB Indoor/Outdoor Fans from 900 to 5,900 CFM

Accessories:

- ESDR-Series Sub Duct Risers
- Factory Matched Variable Frequency Drives

Exhaust velocity is key to effectively exhausting clothes dryers. Keep lint suspended in the exhaust stream by maintaining a minimum velocity of 1,200 FPM. Size the common duct or shaft so that the maximum velocity does not exceed 2,000 FPM. All fans listed below have backward inclined wheels to reduce lint loading. Clothes dryer exhaust shafts should have a clean-out at the bottom. Install ESDR-Series Sub Duct Risers for individual connections to exhaust shaft.



ECUB Up Blast Fans

All aluminum construction. Good for lint laden air. Direct interface with MPC Series controllers, no VFD necessary. Requires square roof curb. Use ESDR-Series Sub Duct Risers to eliminate need for fire dampers.

ECUS Utility Fans

Heavy gauge galvanized steel construction. Good for lint laden air. Direct interface with MPC Series controllers, no VFD necessary. Discharge rotates 180°. Round inlet connection. Indoor or outdoor mount. Use ESDR-Series Sub Duct Risers to eliminate need for fire dampers.

Application: Multi-Dryer Laundry Rooms and Laundromats

Exhaust velocity is key to effectively exhausting clothes dryers. Keep lint suspended in the exhaust stream by maintaining a minimum velocity of 1,200 FPM. Size the common duct or shaft so that the maximum velocity does not exceed 2,000 FPM. All fans listed below have backward inclined wheels to reduce lint loading.

Fan Choices:

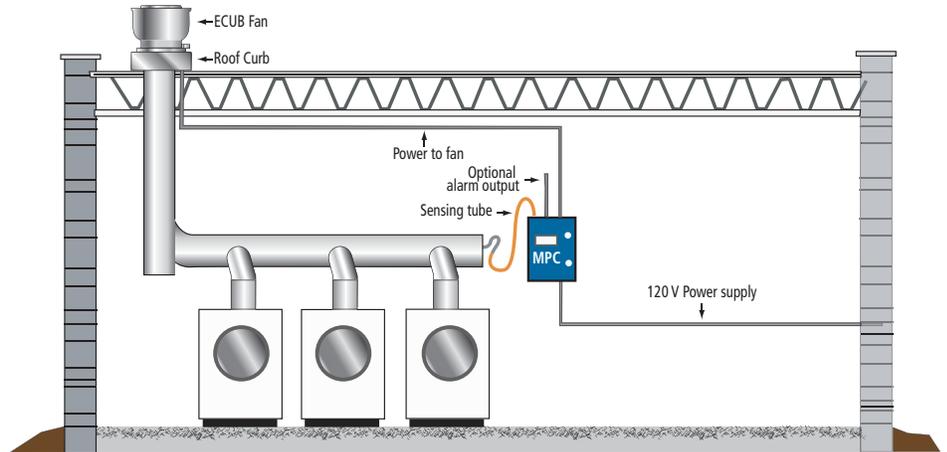
- ECM ECUB Up Blast Fans from 500 to 4,800 CFM
- ECM ECUS Utility Set Fans from 650 to 5,200 CFM
- 3 Phase VSVS Variable Speed Ventilators from 3,000 to 12,000 CFM
- 3 Phase VSUB Indoor/Outdoor Fans from 900 to 5,900 CFM

Accessories:

- Factory Matched Variable Frequency Drives

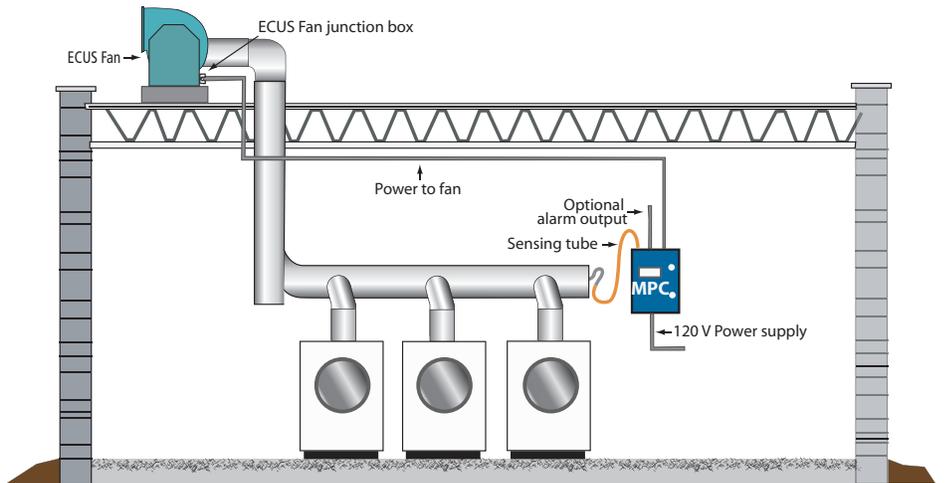
ECUB Up Blast Fans

All aluminum construction. Good for lint laden air. Direct interface with MPC Series controllers, no VFD necessary. Requires square roof curb.



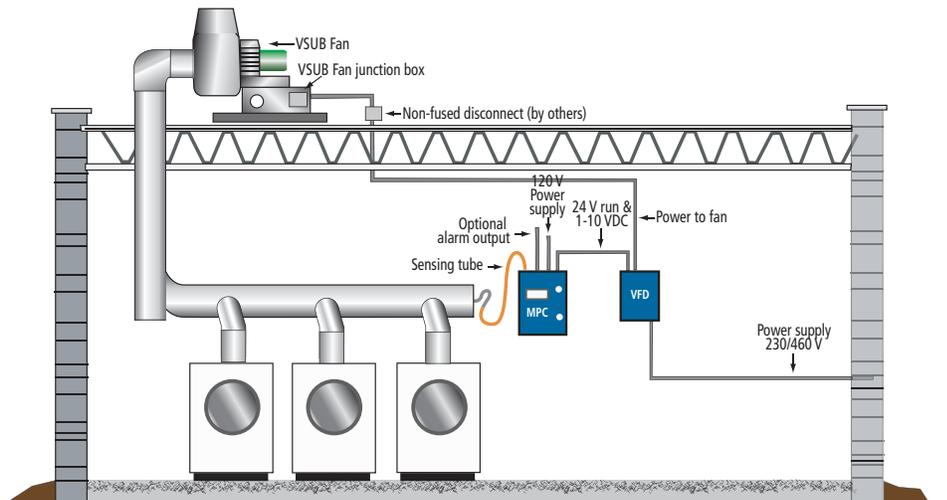
ECUS Utility Sets

Heavy gauge galvanized steel construction. Good for lint laden air. Direct interface with MPC Series controllers, no VFD necessary. Discharge rotates 180°. Round inlet connection. Indoor or outdoor mount.



VSUB Utility Fans

316 stainless steel housing for corrosion resistance. Good for lint laden air. Indoor or outdoor installation. Motor and wheel slide out of housing for easy servicing. Artic duty rated motor. Discharge rotates 180°. Condensate drain. Includes SS round outlet adapter. Use ESDR-Series Sub Duct Risers to eliminate need for fire dampers. Requires matched Tjernlund VFD.

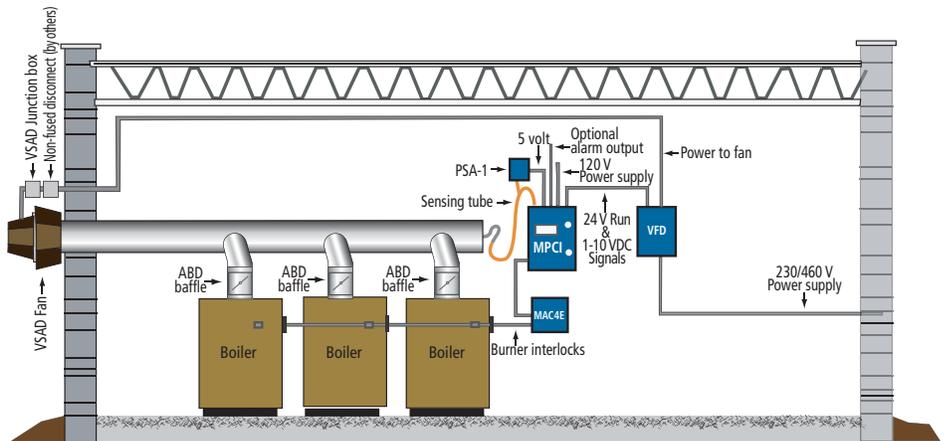
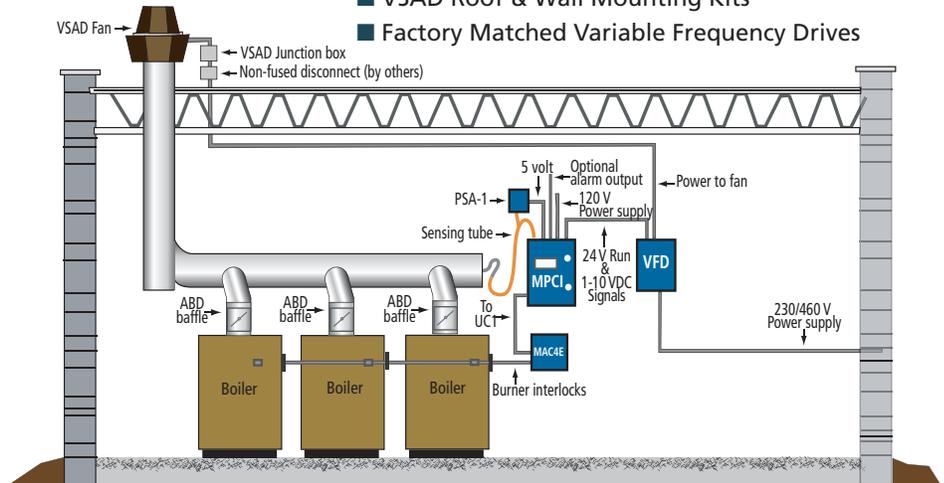


Common Vented Boiler & Water Heater Exhaust for Temperatures up to 575° F

Boilers and water heaters that are exhausted into a common vent don't always maintain the desired draft without the help of an induced draft fan. Traditional chimneys can't grow and shrink on demand. Modulating burners can be even more of a challenge when vented into a chimney sized large enough to handle the maximum design firing rate. Tjernlund's MPC1 controller maintains a constant pressure by modulating the draft inducer to maintain a consistent draft as flue gas volume changes and mechanical room pressure, stack effect and wind conditions vary. Each vent connection into the common manifold should include a balancing damper so that the draft pressure can be adjusted for that particular heater. All heaters being exhausted must be interlocked with the MPC1 controller.

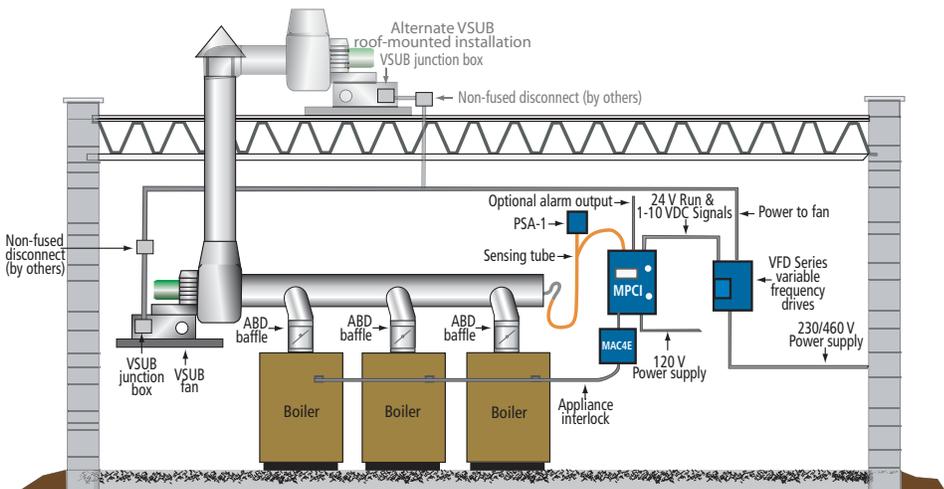
VSAD Rooftop and Wall Mount Fans

Heavy gauge 5052 aluminum construction coated with Ryton PPS for the ultimate in corrosion resistance. 304 stainless steel backward curved impellers. Auxiliary motor cooling system for high temps or low speed operation. Hinged clamshell housing for easy installation and servicing. May be installed on roof or side wall. Use MPC1 controller which includes UC1 burner interlock along with MAC-series burner interlock expansion modules. Requires matched Tjernlund VFD.



VSUB Utility Fans

316 stainless steel housing for corrosion resistance. Backward curved blower wheel. Indoor or outdoor installation. Motor and wheel slide out of housing for easy servicing. Artic duty rated motor. Discharge rotates 180°. Condensate drain. Includes SS round outlet adapter. Use MPC1 controller which includes UC1 burner interlock along with MAC-series burner interlock expansion modules. Requires matched Tjernlund VFD. Indoor vent pipe after discharge must be pressure rated.



Fan Choices:

- 3 Phase VSAD Rooftop or Sidewall Fans from 800 to 3,000 CFM
- 3 Phase VSUB Indoor/Outdoor Fans from 900 to 5,900 CFM

Accessories:

- MAC-Series Burner Interface Expansion Modules
- VSAD Roof & Wall Mounting Kits
- Factory Matched Variable Frequency Drives

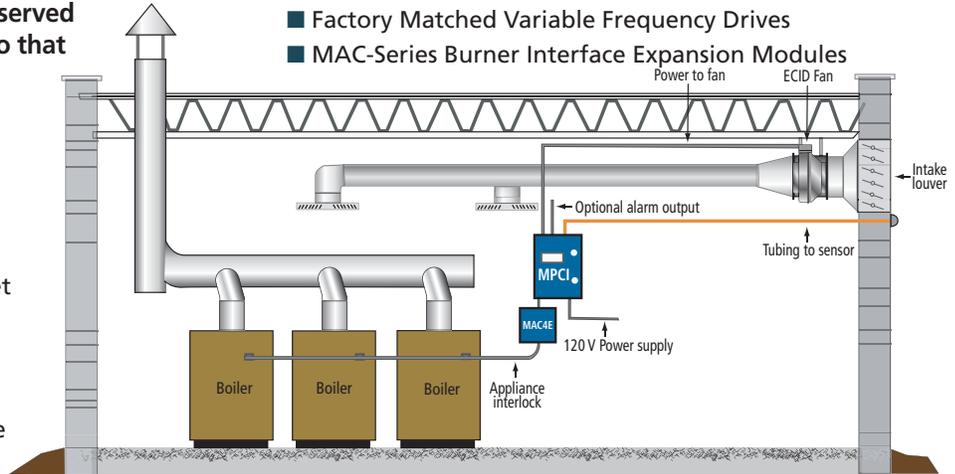
Application:

Make-up and Combustion Air

Providing make-up or combustion air through a passive louver can result in unregulated air volumes due to wind effects on the exterior wall. Cross winds pull air out of the space and direct winds push in more air than desired. MPC and MPCl controllers maintain a neutral pressure, speeding up the fan when needed and slowing it down or stopping it when not. Combustion air applications require the MPCl controller so that all heaters being served can be interlocked. It's best to reference pressure in an adjacent space, since outdoor winds will affect the accuracy of the reference pressure reading. Make sure the room being served is reasonably sealed to adjacent spaces so that the desired pressure can be maintained.

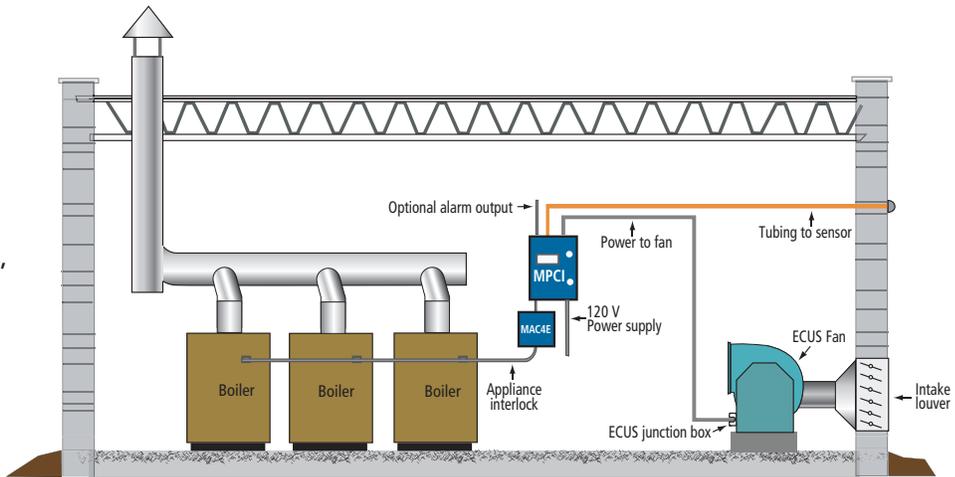
ECID & ECMF In-line Fans

Galvanized steel construction. The most economical option for supply air. Direct interface with MPC Series controllers, no VFD necessary. Backward inclined wheel and external rotor EC motors. Round inlet/outlet connects easily to ducting. Indoor mount only. For combustion air applications use MPCl controller which includes UC1 burner interlock along with MAC-Series burner interlock expansion modules. Pair with intake louver rated for fan's CFM capacity.



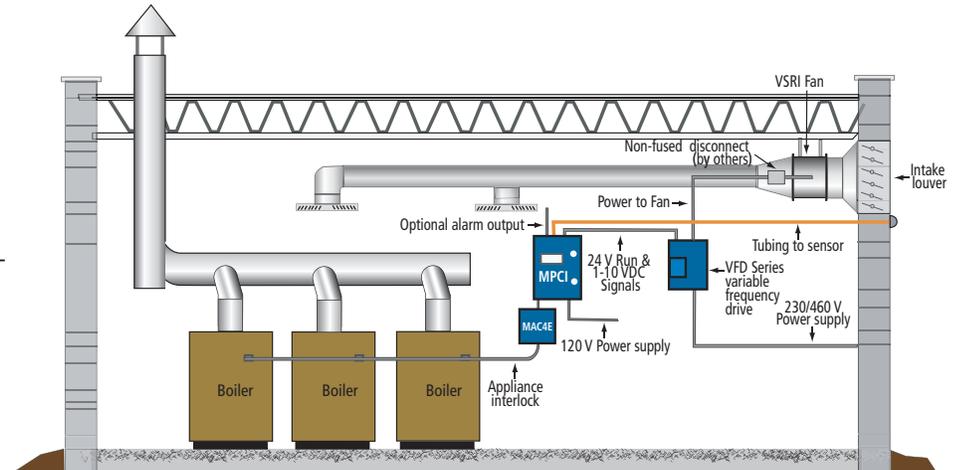
ECUS Utility Fans

Heavy gauge galvanized steel construction. Direct interface with MPC Series controllers, no VFD necessary. Discharge rotates 180°. Round inlet connection. For combustion air applications use MPCl controller which includes UC1 burner interlock along with MAC-Series burner interlock expansion modules. Pair with intake louver rated for fan's CFM capacity.



VSRI Round In-line Fans

Enamel coated steel construction. For applications for higher capacity CFM requirements. For combustion air applications use MPCl controller which includes UC1 burner interlock along with MAC-Series burner interlock expansion modules. Requires matched Tjernlund VFD. Pair with intake louver rated for fan's CFM capacity.



Fan Choices:

- ECM ECID & ECMF In-line Fans from 150 to 5,700 CFM
- ECM ECUS Utility Set Fans from 650 to 5,200 CFM
- 3 Phase VSRI Round In-line Fans from 500 to 30,000 CFM
- 3 Phase VSVS Variable Speed Ventilators from 3,000 to 12,000 CFM

Accessories:

- IPS-1 Decorative Pressure Sensing Cover
- FFP-1 Freeze and Fire Protection Switches
- Factory Matched Variable Frequency Drives
- MAC-Series Burner Interface Expansion Modules

ECUB Up Blast Fans



Up-blast ventilators are designed for continuous operation to exhaust lint-laden air, foul air, smoke, fumes, odors and grease-laden vapors from range hoods and commercial cooking appliances. Ventilators are designed for installation in industrial, institutional and commercial kitchen applications.

ECUB-Series feature energy saving EC motors, which are ideal for applications requiring demand control ventilation, for example, apartment buildings, multi-story dryer venting, multi-purpose rooms with differing rates of ventilation, hi-rise buildings - single fan on riser exhausting multiple spaces or restaurant applications with grease laden air.

Housing Construction: 5052 Aluminum

Impeller: Aluminum wheel statically and dynamically balanced.

Listing: UL 705, UL 762

Max Temperature: 300° F (150° C)

Capacity: Models Up to 4,800 CFM

ECUS Utility Set Fans



Utility Sets are designed for continuous operation to exhaust Lint-laden air, foul air, fumes, odors. Utility sets are also an excellent choice for general exhaust and supply requirements of commercial and light industrial applications. ECUS-Series feature energy saving EC motors, which are ideal for applications requiring demand control ventilation; examples: apartment buildings, multi-story dryer venting, multi-purpose rooms with differing rates of ventilation, hi-rise buildings and single fan on riser exhausting multiple spaces.

If constant (reduced) speed operation is desired, the fan's speed can be manually adjusted and set via the integral potentiometer located in the electrical enclosure. The potentiometer permits the system balancer to dial in the necessary air flow rate. Motor protection is integrated in the electronics of the motor.

Housing: Rotatable 180° and made from heavy gauge galvanized steel.

Impeller: Aluminum wheel statically and dynamically balanced.

Standard Equipment: Motor mounted speed control, weather cover, access door, drain w/plug.

Listing: UL 705, UL 762

Max Temperature: 300° F (150° C)

Capacity: Models Up to 5,200 CFM

ECID & ECMF In-line Fans

The ECID & ECMF-Series are designed for installation in ducts. These fans are known for their economical use of energy and ease of control. They can be varied in speed to match an application's demand, and operate at high efficiency levels. For the same air volume, they consume considerably less energy than a standard fan with an AC motor. The housing is manufactured from galvanized sheet metal with the seams folded to give the fan an air tight casing. All fans have a minimum 1" long connection collar.

ECID-Series have backward inclined blades and external rotor EC motors. The fan is delivered with a pre-wired potentiometer (0-10V) to fine tune desired speed. The fan motor can also be controlled via a 0-10Vdc signal.

ECMF-Series have a mixed flow impeller and external rotor EC motors. The motor provides a +10V reference that can be used by a remotely-mounted potentiometer (such as MTP 10). The fan motor can also be controlled via a 0-10Vdc signal.

Housing Construction: Galvanized

Max Temperature: ECID-Series 140° F (60° C)
ECMF-Series 104° F (40° C)

Listing: UL/ULC

Capacity: Models Up to 5,700 CFM



3 Phase VSRI Round In-line Fans

The VSRI-Series are suitable for combustion and make-up air or ambient air exhaust in commercial and light industrial applications. They feature direct drive motors and heavy duty motor supports designed not to impede airflow. All models include an externally mounted electrical junction box. May be vertically or horizontally mounted.

Housing Construction: Continuously welded, heavy gauge, enamel coated steel. Pre-punched flange mounting holes.

Impeller: Cast aluminum propeller and hub. Dynamically balanced.

Max Temperature: 120° F (49° C)

Listing: UL/ULC 705

Capacity: Models up to 30,000 CFM



3 Phase VSVS Utility Fans



The VSVS-Series are suitable for general exhaust including bathroom and clothes dryer chases and for combustion and make-up air. Belt driven with weather proof cover for motor, bearings and drive shaft. Rectangular to round outlet transition included. Rotatable for multiple discharge positions.

Housing Construction: Continuously welded, heavy gauge, polyester powder coated.

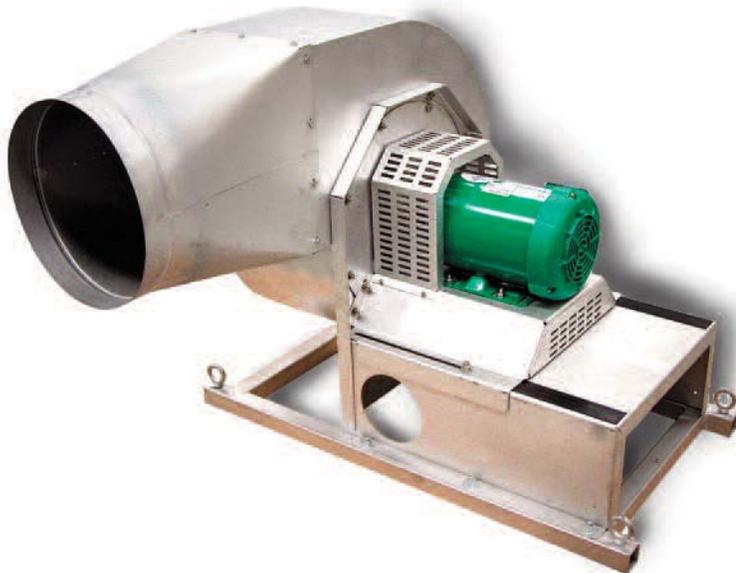
Impeller: Aluminum, backward inclined, non-overloading. Dynamically balanced.

Max Temperature: 300° F (150° C)

Listing: UL 705 & UL 762

Capacity: Models Up to 12,000 CFM

3 Phase VSUB Stainless Steel Housing Utility Fans



The VSUB-Series fans are suitable for sidewall or vertical exhaust of non-condensing boilers, water heaters and ovens or applications that require corrosion resistant blower construction. Condensing equipment applications require the VSUBSS-Series fan that features a stainless steel impeller.

The blower housings may be rotated for a left hand, right hand or vertical discharge. A rectangular to round discharge transition is included with each fan. Direct drive fans feature EPACT high efficiency motors rated for artic duty, thermally overload protected, with permanently lubricated sealed ball bearings. Blowers may be installed indoors or outdoors.

Housing Construction: Continuously welded 14-gauge type 316L stainless steel. Motor and impeller slide away and out of housing for easy service.

Impeller: Backward inclined, high temperature coated CRS, class1. Dynamically and statically balanced with permanently attached balancing weights. (Model VSUB8 includes SS impeller as standard) Stainless steel impellers constructed of 300-series stainless steel. Order VSUBXX-SS for larger models

Max Temperature: 575° F (300° C)

Listing: ETL C/US: UL378, UL705, CSA-CAN3-B255-M81

Capacity: Models Up to 5,900 CFM

3 Phase VSAD Ryton Coated Centrifugal Up-blast Fans

Outdoor mounted VSAD-Series are suitable for sidewall or vertical exhaust of non-condensing and condensing boilers, water heaters and ovens or applications that require corrosion resistant fan construction. Assures a negative pressure throughout exhaust vent system.

Features a hinged housing with removable hinge pins for ease of installation and service. Thermally actuated motor cooling system for extended motor life.

Housing Construction: 5/32" 5052 aluminum coated with high temperature, corrosion resistant Ryton PPS.

Impeller: Backward inclined, 304 stainless steel. Dynamically balanced.

Max Temperature: 500° F U.S., 300° C (575° F) Canada

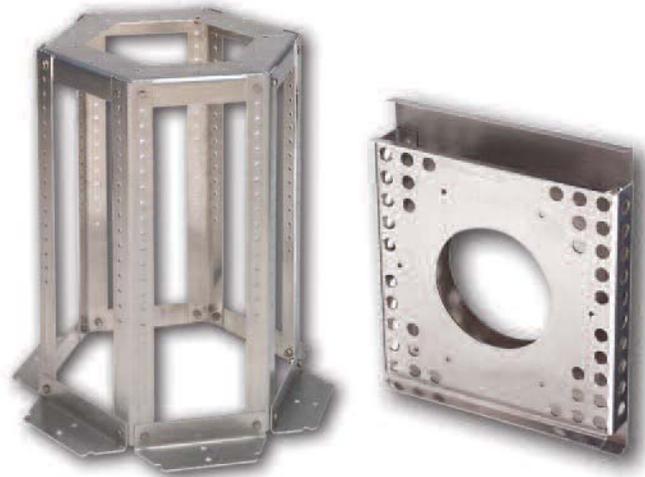
Listing: ETL to UL 378 & CSA B255-M81

Capacity: Models Up to 3,000 CFM



RMK & WMK Mounting Kits For VSAD Fans

- RMK-8, 10 & 12 roof mount kits adjust from 9" to 24" in height.
- WMK-8, 10 & 12 wall mount kits simplify inducer mounting & reduce clearances from exterior combustible wall surfaces.
- Heavy duty 5052 aluminum



MPC and MPC1 Demand-Based Exhaust and Supply Fan Speed Controllers

MPC-Series controllers maintain desired system pressure set points by monitoring changing system pressure and outputting a 1-10 VDC signal to adjust fan speed. Fan speed is automatically modulated to match varying exhaust or supply air volume requirements. Includes controller with integral pressure transducer and field wiring ready terminal strips.

Factory presets fit a majority of applications and can be easily adjusted with two button interface. Activation status and alarm lights with audible alarm. Auxiliary alarm contacts. Model MPC1 also includes UC1 burner interlock for mechanical draft and combustion air applications.

Construction: 18-gauge galvanized steel electrical enclosure with hinged access door.

Listings: ETL C/US to UL508 and CSA C22.2



See MPC-Series Lit

EAT Exhaust Air Terminals

Exhaust air terminals are comprised of a ceiling grille housing with an integrated motorized damper and duct connector. They are used to control exhaust flow into a chase/shaft being served by a single exhaust fan. The opening of the damper is typically triggered by a light switch, occupancy or humidity sensor. Adjustable butterfly shutter on damper allows for continuous exhaust if desired. Industrial closed cell foam damper face eliminates unwanted exhaust bypass and noise. Ultra quiet damper actuator can be serviced by removing grille.

EAT-Series boxes include Automatic Airflow Balancers installed in the exhaust duct connection collar. They can be set to closely regulate CFM by automatically changing the open area of the regulator. Neoprene gasket flange secures airflow balancer in place while sealing duct for accurate flow regulation. The Airflow Balancers can be removed through installed EAT box damper/duct section. Also included are white powder coated grilles with fixed horizontal blades set at 45° angle. Blades are spaced 2/3" on center.

Housing Construction: 20-gauge G90 galvanized steel.

Actuator: Spring return synchronous motor with Whisper Motion air break. 115 volts, 50/60 Hz. 6-watt motor.



MAC Burner Interlock Expansion Modules

Expand the number of burners that can be interlocked with the MPCI Control. Use MAC1E for one additional heater or MAC4E for up to four additional heaters.

Construction: 18-gauge galvanized steel electrical enclosure.



GC Grease Collectors

Fastens to base of ECUB up-blast fans. Protects roof surface by collecting residual grease. Key hole mounting slots for easy removal and cleaning.

Housing Construction: Heavy gauge galvanized steel.



ESDR Sub Duct Risers

Sub Duct Risers are used to replace smoke dampers for exhaust connections into a chase/shaft. Low profile riser hugs wall of chase/shaft and angled bottom aerodynamically directs exhaust flow. Sub Duct Risers attach to inside wall of chase/shaft and extend up to 22" to meet International Building Code requirements for smoke damper alternatives.

Housing Construction: 24-gauge galvanized steel. Sealed hem locked seams with pre-punched mounting holes.

Listings: Complies with 2018 IBC Sub Duct Riser requirements for clothes dryer, bath and kitchen exhaust.



VFD's for 3 Phase Fans

Yaskawa variable frequency drives factory mounted in a hinged cover junction box. Includes factory installed actuation relay and wire connection terminal strip.

Housing Construction: 18-gauge galvanized steel. NEMA class 1 construction.

Listings: UL, ULC and CE compliant.



Also available from Tjernlund.....

COP2-Series Demand Based Controlled CDB8, RT750 and RT1500 Exhaust Fans

Use the In-Line CDB8 or rooftop mounted RT-Series fans for smaller commercial clothes dryer exhaust applications. Pair the CDB8 fan with the COP2DB modulating controller. Pair the RT-Series fans with the COP2 modulating controller. For applications between 400 and 1500 CFM.



See Dryer Booster Ref. Guide



See Rooftop Inducer Lit

LB2 Dryer Duct Booster® Fan

When condo/apartment units have clothes dryers that are individually vented it is very common that the required duct lengths exceed what the dryers are rated for. The model LB2 Dryer Duct Booster works on all gas or electric residential dryers and automatically operates in sync with the dryer's operation. The no clog booster fan extends duct lengths up to 150 equiv. feet.

Meets IRC-2015 requirements for dryer booster fans. Listed to UL 705 DEDPV safety standard.



See Dryer Booster Video



AS1 and AS2 AireShare™ Room-to-Room Transfer Fans

Extend the comfort of mini-splits and PTAC's by installing quiet operating AireShare transfer fans to move conditioned air into adjacent rooms. Transfer fans install within the stud wall cavity and include attractive intake grilles and a low profile slot diffuser. Effectively heat and cool adjacent rooms, even with doors closed. For rooms up to 275 ft².



See AireShare Lit



TJERNLUND PRODUCTS, INC.

1601 Ninth Street White Bear Lake, MN 55110-6794
 Phone: 651.426.2993 800.255.4208 Fax: 651.426.9547
 Visit our web site: tjernlund.com

Copyright © 2018 Tjernlund Products, Inc. All rights reserved. P/N 8500736