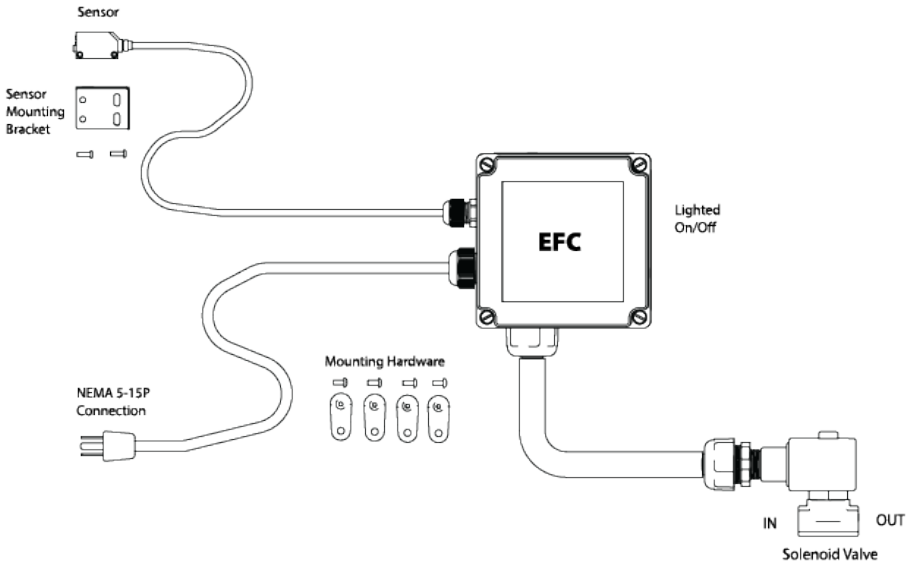
EFC™ ELECTRONIC FLOW CONTROL FOR COMPRESSED AIR
INSTALLATION AND MAINTENANCE



Power Supply Input: 85V-264 VAC, 50/60 Hz, 0.33-0.55A
Power Supply Output (to sensor): 24VDC at 1.25A
Sensor: 12-24VDC input, consumes 30 mA
Sensing Range: Diffuse retro-reflective to 1 meter
Enclosure Rating: NEMA 4, IP66
Temperature Rating: 13°F to 131°F (-25°C to 55°C)

Model 9055 (1/4 NPT) (up to 40 SCFM/ 1133 SLPM)
Model 9056 (1/2 NPT) (up to 100 SCFM/ 2832 SLPM)
Model 9057 (3/4 NPT) (up to 200 SCFM/ 5663 SLPM)
Model 9064 (1 NPT) (up to 350 SCFM/ 9911 SLPM)

Symbol	Publication	Description
⏚	IEC 60417-5019	Protective Conductor Terminal (Safety Ground)
⏻	IEC 5009	Stand-by Power Symbol

THE EFC SHOULD NOT BE USED IN AN EXPLOSIVE OR FLAMMABLE AREA. PROTECTION PROVIDED BY THE EQUIPMENT MAY BE IMPAIRED IF USED WITH ACCESSORIES NOT PROVIDED OR RECOMMENDED BY EXAIR, OR IS USED IN A MANNER NOT SPECIFIED BY EXAIR LLC.

EXAIR's EFC is an electronic flow control for compressed air that provides precise "on/off" timing control of the compressed air supplied to the EXAIR products. The EFC permits the critical timing adjustment needed to operate the EXAIR products as efficiently as possible, turning on the compressed air only when it is needed. This control system provides flexibility by sensing distance as well as providing numerous valve operating modes and timing delays. The EFC is applicable to many different manufacturing lines and environments. The sensor is compact which makes it simple to install in tight spaces. The polycarbonate enclosure of the EFC control is NEMA 4/IP66 rated which is ideal for wet locations.

INSTALLATION

1. Install EXAIR's engineered airflow product(s) such as the Super Air Knife, Air Amplifier, Air Nozzles, Spray Nozzles, etc., following the "Installation and Maintenance Sheet" that was included with that product.

2. Connect the compressed air supply to the EFC solenoid valve, paying attention to the flow direction arrow on the brass valve body (in and out). The solenoid valve should be located downstream from a filter and before the compressed air product. For ease of connecting the solenoid valve to the compressed air pipe, the electrical coil can be detached from the valve body by using a flat blade screwdriver to remove the metal clip that holds the coil to the valve body. Connect the compressed air line to the EXAIR product(s) and re-install the electrical coil, securing it to the valve using the clip. Taking care to reinstall the spring washer and retaining washer in the correct locations.

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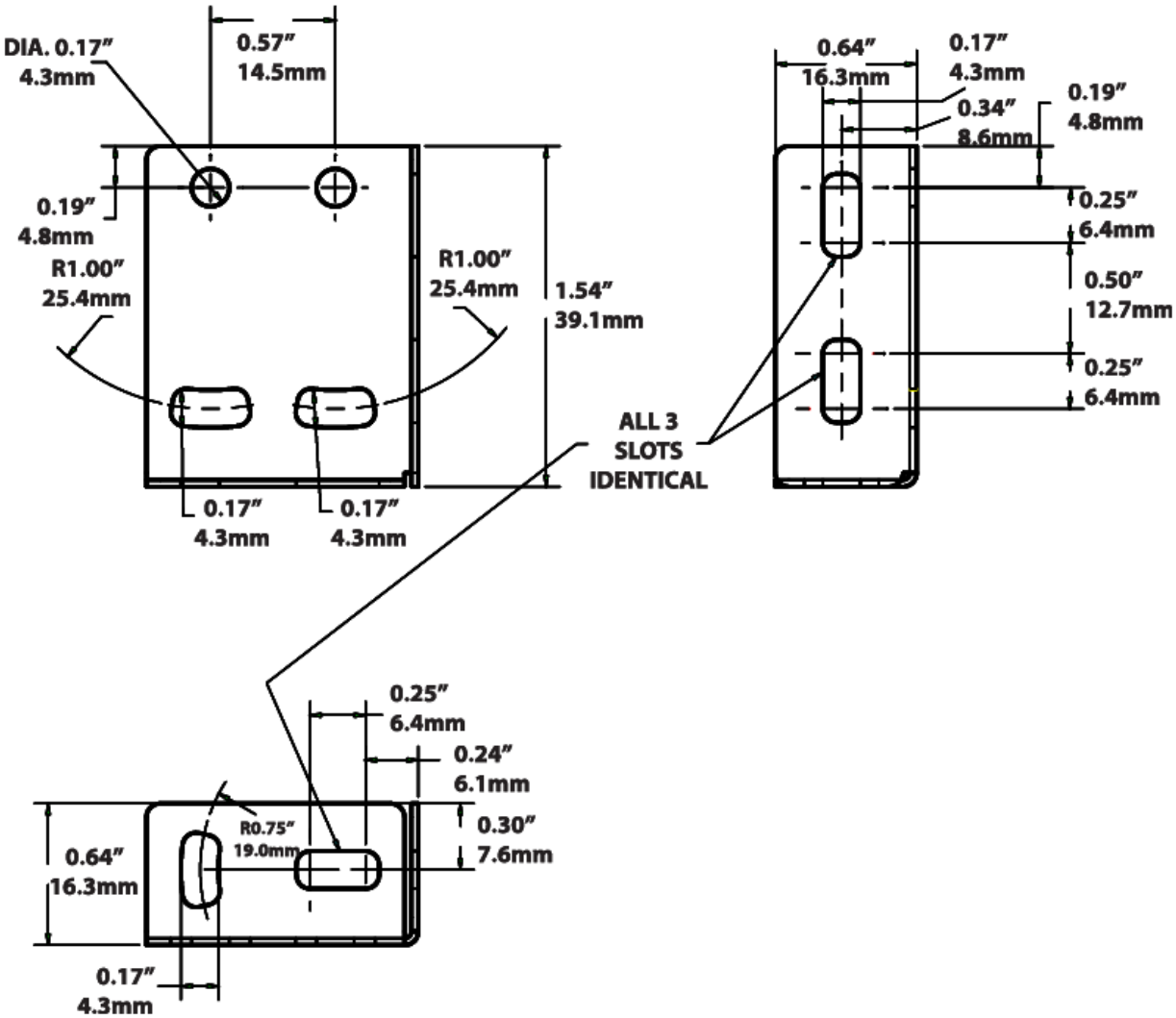
3. Prior to the electrical hook up, install the EFC timer control in a location that is convenient for adjustment of the timer settings. Do not permanently wire the EFC. Do not position the EFC in a space where it is difficult to disconnect the power cord. It should not be mounted in direct sunlight. Always consider the best location that is convenient for the installation of piping air to the EXAIR product as well as connecting the unit to a power source. To access the mounting holes of the EFC timer control box, remove the cover by turning the four screws counter-clockwise. The mounting holes are the same as those used for the cover screws. It is recommended that all four holes be used (if possible) for a secure mounting that will minimize breakage. Four mounting tabs which attach to the back of the enclosure with screws can also be used.

4. The EFC is shipped with a standard 120V power cord for easy hook up. The end plug can be removed for other voltages (the green wire with yellow stripe is ground). The EFC is easy to use throughout the world as it accepts input voltages from 85V-264 VAC, and frequency of 50/60 Hz without having to change any internal connections of the control. Always follow all necessary wiring codes along with the lockout and tagging procedure of your facility.

For European installation, use a power cord that is Agency Certified and marked by VDE, HAR or equivalent Agency for 6A, 250 VAC, 65ºC, PVC, VW-1 or FV-1 Flame Rating, Type H05VVF or equivalent, 3 x 0.75^2 mm wire size, 6-12mm Cable OD. Use a Male Plug Type CEE 7/7 or Agency Certified equivalent plug for other countries.

ALWAYS CONNECT THE POWER CORD PLUG TO A GROUNDED OUTLET.
ALWAYS DISCONNECT THE POWER PRIOR TO REMOVING THE COVER.

5. The sensor has a 16.5’ (5m) cable. Use a wire tie wrap (not supplied) to neatly bundle any excess cable. The sensor should be mounted in a location best suited for sensing the product, container, etc. A mounting bracket is provided.



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Sensor/Timer Setup:
Sensor

Top of Sensor

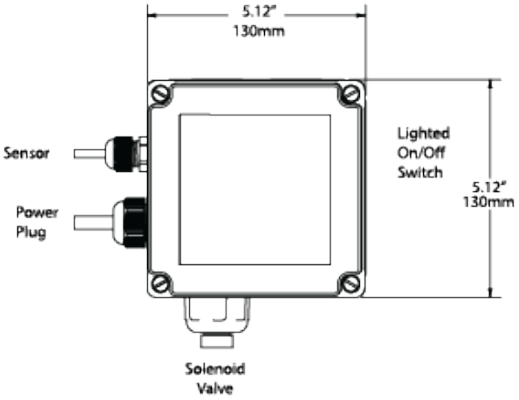
Sensitivity Adjuster

Operation Selector

Stability Indicator (Green) & Operation Indicator (Red)

Back of Sensor

1. The operation selector screw is factory set to the "L" position ("D" for "dark sensing" and "L" for "light sensing"). "L" is used for the majority of the applications.
2. With the EFC timer control mounted and cover on, plug the unit into the ac power source, then push the power button (button lights up when "on"). The green light on the sensor indicates power. The orange light indicates the sensing of an object. The sensor distance has been factory set at 12″ (305mm). To change the sensing distance (from sensor to part), put the part in its normal location, in front of the sensor. Adjust the distance by turning the sensitivity adjustment screw (- / +.).



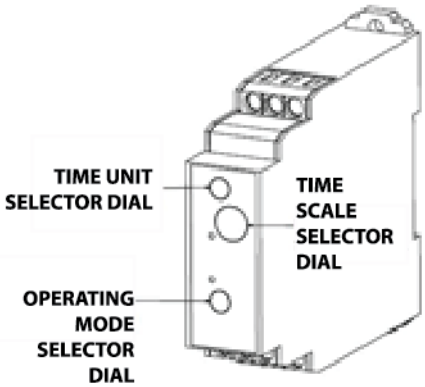
Timer

WARNING – To prevent shock hazard, all adjustments to the EFC timer control must be made with the unit unplugged. Following adjustment, the cover must be installed before restoring power.

There are 3 dials on the controller. The Time Unit Selector Dial, Time Scale Selector, and Operating Mode Selector. The selectors can be turned clockwise and counterclockwise (using a Phillips screwdriver) to select the desired time unit, time scale, and operating mode. The time scale selector dial and operating mode selector dial have a snap mechanism that secures the selector at a given position. Set each of these at a position at which it is secured. Do not set it midway between two securing positions or a malfunction could result from improper setting.

1. Determine the Operating Mode that suits your application.
The operating mode selector can be set to any one of the seven operating modes.

Turn the operating mode selector (bottom dial) with a screwdriver until the arrow is pointing to the desired mode.



NOTE: The EFC factory setting is "OFF" Delay (R).

The following describes all of the available modes:

E ("ON" Delay): The solenoid valve will open when the EFC is powered on. The solenoid valve will then close when the sensor detects an object. When the object is detected the solenoid valve will close. The solenoid valve will remain closed until the sensor no longer detects the object. When the object moves out of the sensor's range the sensor will wait for the time set on the timer before opening the solenoid again. Note: If the sensor detects multiple parts within the interval setting, nothing will happen until the first interval timer cycle is finished.

R ("OFF" Delay): The sensor will detect the part and open the solenoid valve immediately. The solenoid valve will remain open until the set time has passed. Note: If the sensor detects multiple parts within the interval setting, the set time will restart and remain open until the new time has elapsed.

Ws (Single Shot – Rising Edge): The sensor will detect the part, open the solenoid immediately and begin the interval timer setting and close the valve per the timer setting, even if the sensor detects a new object. Note: If the sensor detects multiple parts within the interval setting, nothing will happen until the first interval timer cycle is finished, and the sensor detects a new object.

Wa (Single Shot – Falling Edge): The sensor will detect the part and do nothing. When the object leaves the beam, the solenoid will open for set interval timer setting. Note: If the sensor detects multiple parts within the interval setting, nothing will happen until the first interval timer cycle is finished, and the sensor detects an object leaving the beam.

Es ("ON" Delay with control input): The sensor will detect the part, then start the "ON" delay time interval of the timer setting. The solenoid valve will open when the time setting has elapsed. The sensor must be detecting an object the whole time setting to turn on. The solenoid valve will close immediately when the sensor no longer detects an object.

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Wu (Single Shot – Rising Edge Supply Voltage): The solenoid will immediately open when powering on the EFC (if no object is detected), and the solenoid will remain open for the set time before closing. After the elapsed time the sensor can detect an object. Once an object is detected, initially the solenoid will remain closed. When the sensor no longer detects the object, the solenoid will open for set interval timer setting.

Bp (Clock Interval): EFC will close for the set interval time when initially turned on, then open the solenoid. Solenoid stays open for the set time and then closes for the set interval time. Repeats continuously until EFC is powered off. The Sensor will stop the next cycle from starting if a part is detected, and stays in the beam for the open and close times that are set.

2. Selection of time unit and time scale. (see drawing above)

- **a.** On the top dial of the module, select the desired time unit (0.1s, 1s, 10s, 1m, 10m, 1h, 10h or 100h). Turn the time selector with a screwdriver until the arrow is pointing at the desired time unit.
- **b.** On the middle dial of the module, select the time scale (1 to 12). Turn the time scale selector with a screwdriver until the arrow is pointing at the desired scale.

TROUBLESHOOTING

If the EFC provides inconsistent timing or sensing, it might be located in an area with excess electronic noise. Under these conditions, separate the timer control unit, wiring, and sensor cable (which generates the input signals) as far as possible from the noise source(s). To further prevent electronic interference, shield the sensor cable.

If there is power to the EFC but the power switch does not light, it is possible that the internal fuse has blown. To replace the fuse, first, unplug the unit (remove power). With the cover removed, a modular plastic fuse housing is visible. The door of the housing opens to the side. The fuse holder is rated 5 amps. Replacement fuse is BUSS AGC 5A rated 250V.

The relay has a life expectancy 100,000 operations minimum. (This is based on 5A at 250VAC, with a resistive load at 360 operations/h.)

CLEANING, MAINTENANCE AND STORAGE

Periodically inspect the EFC unit, wiring and parts for damage. If any damage is observed, do not use the equipment and contact EXAIR for replacement parts as applicable.

If it becomes necessary to replace the fuse, use a ¼″ x 1-1/4″ (6.4mm x 32mm) 5A, 250V Fast Acting fuse.

Organic solvents such as paint thinner, as well as very acidic or basic solutions can damage the outer casing of the timer. Clean with a soft cloth or mild detergent.

When storing the EFC, make sure that the ambient temperature and humidity are within the rated values. If the EFC has been stored at an ambient temperature of -10°C or below, the unit must sit at room temperature for at least three hours before using it for the EFC to function properly.

EQUIPMENT ENVIRONMENTAL RATINGS

Installation Category II (Transient Over-voltage)
Pollution Degree 2 (Temporary conductivity caused by condensation)
Altitude Limit: 6,562 ft (2,000 m)
Humidity: 80% RH non-condensing
EFC is intended for indoor and outdoor use

WARRANTY

There is a one year warranty against defects in workmanship and materials. Defective products must be returned freight prepaid for repair or replacement at EXAIR's option. This warranty applies under the conditions of normal use, but does not apply to defects that result from intentional damage, negligence or unreasonable use or exposure. The EFC has no serviceable parts internally. Warranty is void if there is evidence of tampering.

If you have any questions or problems, please contact an EXAIR Application Engineer at:

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