



## CROSSFIRE Ultra-Low Power Instrument Air Compressor

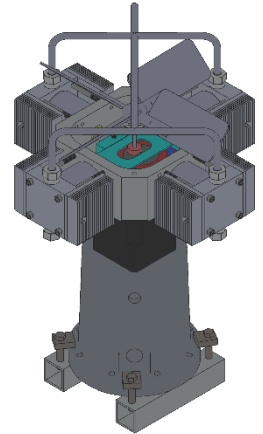
### Introduction

The LCO Technologies *CROSSFIRE* Instrument Air Compressor is an ultra-low power device that is designed to produce over 1400 Standard Cubic Feet per Day of clean, dry compressed air at 35 PSI using solar power. It is a durable, energy-efficient solution that can be sustainably powered with solar energy, even in areas with limited sunlight. It can allow users to maintain their existing standard pneumatic instrumentation in areas where the goal or requirement is to achieve zero venting.

### Features

The *CROSSFIRE* Instrument Air Compressor includes the following key features and benefits:

- Produces clean, dry, compressed air to drive low-bleed pneumatic instrumentation
  - Eliminates methane venting
- Low power consumption with no inrush
- Rated for continuous duty
- Produces over 1200 SCFD (50 SCFH) at 35 PSI
- Automatic speed modulation when used with a pressure transmitter
  - Optimize power consumption
  - Pre-set configurations at 35 psi and 50 psi
- Simple robust design with easy field serviceability
- Minimal maintenance required
- Substantially less expensive than vaporized propane



### Explosion Proof Motor Assembly

- Zone 1: Class 1, Division 1 Group CD T6 Explosion Proof Motor Assembly
- Voltage: 24 VDC
- Ambient Temperature: -40 C to +60 C
- Efficient, compact and powerful permanent rare earth magnet motor

### Planetary Gearbox

- Designed to withstand tangential force up to 400 ft/lbs
- Single stage design for optimal efficiency with high torque
- Closed casing to keep dust and contaminant free
- Lifetime lubrication, no maintenance required



## Smart Controller Features

- Field Oriented Control (FOC) used to drive 3-phase rare earth permanent magnet certified brushless DC motor for maximum torque performance and efficiency
- Sensorless design with no hall effect sensor signal required for control
- Only 3 (plus ground) standard conductor flex armour cables required to power the motor
  - Cable length: Max 60 ft (AWG 10)
- 8 LED lights included for easy system monitoring and troubleshooting

## Process Control and Programmable Logics:

- Specific programmable logic and control algorithms can be developed to meet customer needs
- Built-in process control functions, such as proportional, ratio and feedback controls
- Multiple digital and analog IO's available for advanced control
- Serial communication to a data modem, a flow computer or a HMI
- Onboard temperature sensor
- Supports standard MODBUS/RTU protocol for remote control and monitoring
  - Standard configuration on controller is RS485 MODBUS communication
  - Optional configuration to RS232 instead of RS485 is available upon request
- Built in data logging (time and date stamped)

## Automatic Pressure Control

The LCO Technologies *CROSSFIRE* Instrument Air Compressor has automation capabilities built in as a standard. When connected to a pressure transmitter on an accumulator bottle, the controller runs a reverse acting input signal to automatically adjust motor speed with changes in pressure. This minimizes power consumption as the compressor will only produce the volume of air required to maintain a set pressure and allows the compressor to run in a steady state condition, yet instantly respond to dynamic load increases when they arise.

### Recommended Pressure Transmitters:

- Pressure Range: 0-50 psi
- 1-5V or 4-20mA
- Pre-set configurations for 35 psi or 50 psi
- Example: Rosemount 2088

Note: Pressure transmitters with a span outside of 0-50 psi may be used, however special configuration will be required, and performance may be affected due to decreased resolution.



### Software Interface

LCO Technologies' *CROSSFIRE* Software Interface is a tool that allows for easy configuration and monitoring of the controller for the *CROSSFIRE* platform. Operators in the field and technicians performing more advanced setup of the controller can connect to the controller's RS232 serial port from a Windows controller to monitor and configure the device from a simple, intuitive interface. If the customer is a user of the *CROSSFIRE* chemical injection pump, he/she will be familiar with the software.

The software's password protected separation of roles between operator and technician allows the user to be presented only with the information and options required for their task. This eliminates distraction and reduces the chance of accidental misconfiguration.

A mobile version of the software is also available, allowing users of iOS and Android smartphones or tablets to connect to and configure the controller, using the RS232 Bluetooth LE adapter available for the controller.

Software requirements:

- A computer with either Windows XP/7/8.1/10 or later
- 512 MB RAM
- 50 MB hard drive space

### Hazardous Area Certifications

The *CROSSFIRE* has the following hazardous certifications:

- The Explosion Proof Motor Assembly (**Model LCOM-1000**)
  - CSA certified to Class 1 Division 1 Groups CD T6 (Zone 1)  
 Rated input 24 VDC, 9.9 Amps, 750 rpm maximum, Class B, Continuous Stall Current 11 A, Rated Output Power 190W  
 Ambient Temperature -40°C to +60°C
- The Smart Controller (Model **LCOC-1000-A** and **Model LCOC-1000-B**)
  - CSA certified to Class 1, Division 2, Groups CD T4 (Zone 2)  
 Rated Input 24 VDC, Vac, 9.9 Amps  
 Rated Output 24 VDC, 9.9 Amps  
 Ambient Temperature: -40°C to +60°C

### Controller & Motor Product Specifications:

Communications		
Ports	COM 1	3-wire RS232 for data modem or HMI. Maximum cable length: 130 ft.
	COM 2	RS232 DB9 connector  Supports operator interface via a serial cable or Bluetooth dongle Maximum cable length: 25 ft. Maximum Bluetooth range: 50 ft.
	Modbus COM	2 or 3-wire RS485 for FB107/SCADA, Maximum cable length: 4000 ft.
Protocols	Serial Modbus/RTU slave support on the RS485 port (or optional RS232 upon request) Serial communication on COM1 and COM2	



**LED**

8 LED's to indicate system status, digital IO's and COM port traffic

**Reset Button**

1 reset button to reboot controller (press with a pin)

**IO Specs**

Controller 2 Digital Inputs, 2 Digital Outputs, 3 Analog Inputs

All Digital Inputs are discrete  
All Digital Outputs are discrete

Digital Inputs	Input Type	Discrete level
	Isolation	Each channel ground is individually isolated
	Voltage	10-36 Vdc
	Scan Rate	100 ms for discrete level. 400 us interrupt for pulses
	Loop Power	Externally sourced
	Input Resistance	20,000 (20K) Ohm

Digital Outputs	Output Type	Dry contact
	Isolation	Each channel ground is individually isolated
	Voltage	10 – 36 Vdc
	Scan Rate	100 ms for discrete level
	Loop Power	Externally sourced
	Output Current	Max 1.0 A at 24 Vdc

Analog Inputs	Input Type	4-20 mA on 250 Ohm resistor or 0 - 5 V direct, software selectable
	Isolation	All analog channels share the same ground
	Scan Rate	100 ms
	Loop Power	Externally sourced

**Power**

External DC Power Supply Required: 24 Vdc, however will function within 18 – 30 Vdc range  
Controller Power consumption: 35 mA @ 24 Vdc  
Real-Time Clock battery: 3V Lithium button type CR2032

**Physical**

Construction	Fibre glass base plate and top cover
Mounting	Bolt down to panel backplane with 4 screws or mount with 2 DIN-rail clips
Dimensions	145 mm W by 240 mm L by 27.6 mm
Weight	470 g
Wiring	24 Vdc power supply: size 10 AWG, Max 60 ft Motor power lines: size 10 AWG, Max 60 ft Digital and Analog I/O: size 24 to 20 AWG
Wiring Access	Easy access from the top



**Environmental**

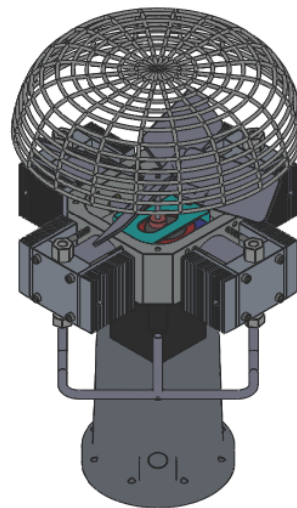
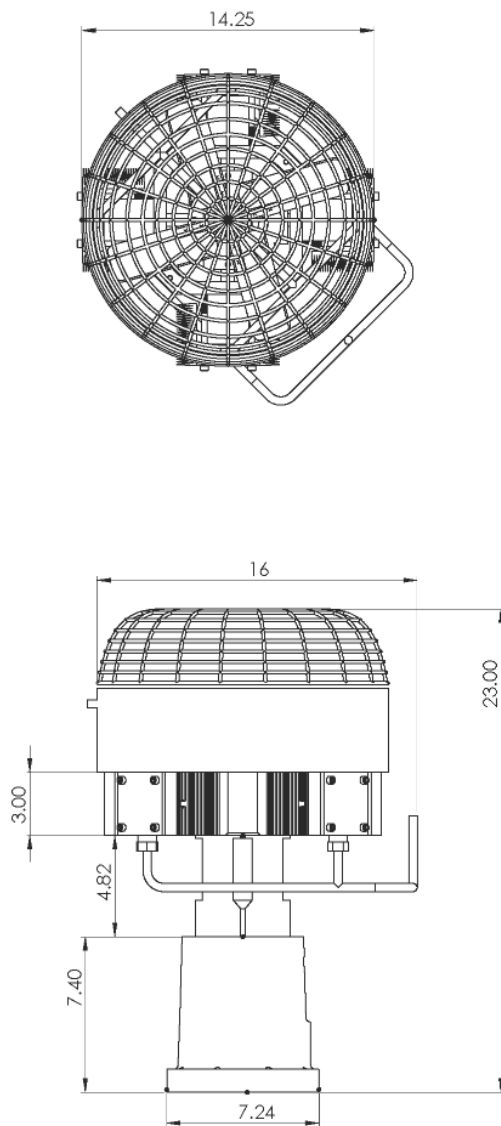
Operating Temperature: -40 C to +60 C  
Storage Temperature: -50 C to +85 C  
Operating Humidity: 5 to 95%, non-condensing

**Regulatory Approvals for Hazardous Locations**

CSA Certification

Controller            Class 1, Division 2, Groups CD T4  
Motor Assembly    Class 1, Division 1, Groups CD T6

**Dimensional Drawing:**



Overall Dimensions:

H: 23 in  
W: 16 in  
L: 16 in