altronic

EPC-250

Engine Performance Controller for Fuel-Admitted, Spark Ignited Natural Gas Engines

■ Optimizes engine performance and efficiency

■ Provides precise control of the engine air/fuel ratio and ignition timing

■ Ideal for retrofit of existing electronic or pneumatic controls on large, integral compressor engines including Cooper-Bessemer®, Clark®, Worthington®, Ingersoll-Rand® or fuel-admitted separable compressor packages Superior® (including Endyn® models), MEP®, and others

■ Simple user configuration and adjustability from the 8.4" LCD/touch screen

■ Incorporates trending, datalogging, and remote operation

■ Drop-in replacement/upgrade for all existing Altronic EPC-200 systems

■ Supports RS-485/232 and 10/100 Ethernet communications

■ System components fully CSA certified for use in Class I, Division 2, Groups C&D hazardous areas

The Altronic Controls EPC-250 Engine Performance Controller is designed to provide continually optimized control of air/fuel ratio and ignition timing on large, fuel-admitted integral and separable compressor packages. Incorporating an 8.4" MIDAS

HMI and a purpose-built Altronic control module, the EPC-250 easily and effectively replaces both traditional pneumatic controls and legacy electronic control systems, and is also a drop-in replacement for the Altronic EPC-200.

A user-defined RPM map is used as the primary control for the 4-20mA ignition timing output. Engine air/fuel ratio is most often controlled by exhaust by-pass versus an on-board 4-20mA output mapped to engine fuel pressure. Other controller inputs, including air manifold temperature, air manifold pressure, and fuel BTU quality can be used as biasing factors for either/both control maps to provide an enhanced level of control and optimization across a wide range of engine makes, models, and application requirements. Two digital offsets are also available to account for load and detonation-related events.

In addition to air/fuel ratio and timing functions, the EPC-250 also provides six user-programmable, solid-state relay outputs to support common start/stop requirements including purge, crank, crank-disconnect, etc. A seventh discrete output provides a signal to a safety shutdown monitoring system in the event of an overspeed, overload, or on a loss of any system input.

The EPC-250 is easily configured via the system keypad and a user-friendly menu system. Full Modbus RTU TCP/IP communications are integrated into the system to allow for simple integration with other process control, monitoring, or telemetry systems.

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CSA

CERTIFIED
CLASS I, DIVISION 2,
GROUPS C&D

Typical Application

Example: Turbocharged Gas Engine with Waste Gate Controller for Air Manifold Pressure

INPUT FUNCTION	OUTPUT FUNCTION	
	Ignition Timing	Air/Fuel Ratio
RPM	X	—
Fuel Manifold Pressure	X	X
Air Manifold Pressure	—	X
Air Manifold Temperature	X	X
Pilot Manifold Temperature	—	X
Exhaust Manifold Temperature	—	X

The chart indicates the most common input variables used. The fifth input channel gives additional flexibility and capability for more sophisticated control programs.

For Ignition Timing control, the user chooses one input (for example, RPM) as the primary control factor. Other factors are used to appropriately modify the timing curves for load and temperature. For Air/Fuel Ratio control, fuel pressure is the primary control factor with air manifold temperature as a modifier. Based on a variety of inputs, the value of Fuel BTU for example, various other control strategies can be achieved.
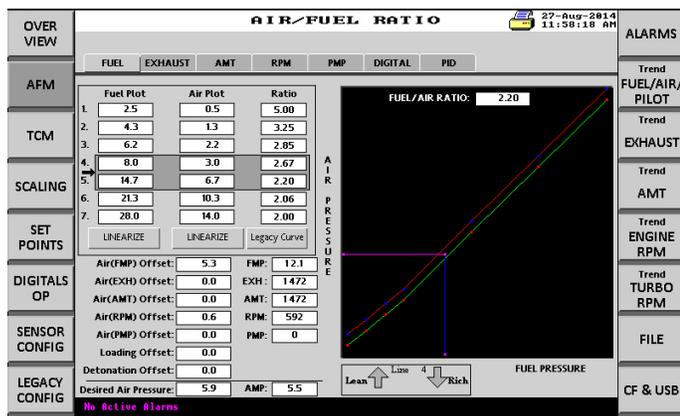
EPC-250 Features

General Operation — The EPC-250, as an electronic control system, provides the functionality of a typical pneumatic control system for a gas engine with an exhaust-driven turbocharger. The outputs are controlled by RPM and up to four other variables. Input response is controlled by entries through the EPC's touch screen display, giving the user total access to the operating parameters.

Display Entry by User — Operating curves are entered in (x,y) coordinate format: other data is entered and displayed in common engineering units (RPM, psi, degrees F., etc.). All sensor calibrations are entered via touch screen. Each input signal can be scaled to any of the 10 available units as needed.

Diagnostics — On screen diagnostic messages warn of various abnormal conditions while the engine is in operation or the first-out fault cause for the error output, which can be used to alarm or shut down the engine. Loss of any specific input or out-of-range conditions are examples of specifically annunciated factors.

Communications — Communications are provided for interfacing to process control computers. The data on any channel—including ignition timing and waste gate position values—can be read. All setpoints can be read and/or altered remotely via Ethernet. In addition, all data logging and critical data can be downloaded via web server when connected to a network.

4-20mA Outputs — The two major control outputs, Ignition Timing Retard and Waste Gate Position, output as 4-20mA (1-5V) signals. The user controls the Proportional Band and Reset Time Response values which determine how the EPC-250 responds to changes in input data. The device performs the functions of a typical pneumatic control system for a gas engine with exhaust-driven turbocharger. The outputs are controlled by RPM and up to five other variables. Response to the inputs is controlled by entries through the touchscreen or front panel keypad.

Visual Indication of Air/Fuel Curve Point and Offset Indication — The EPC-250 visually represents the air/fuel curve, which is an indication of the analog signal to the waste gate depicted on a 7-segment linear curve. This tool helps the user to understand the response of the engine at the particular line segment and to make adjustments based on the indication. This function also displays a curve of the total offset of the air/fuel curve.

Trending, Datalogging, and Remote Operation — The trend viewer displays information from the Data Logger. The user can zoom in and out of the trend and also scroll back in time. The Data Logger records certain tag values to a SD Memory card. The data is stored in industry-standard, comma-separated variable (CSV) files which can easily be imported into applications such as Excel.

Using an FTP Server allows remote connection to the EPC-250 in order to download logs and access the configuration parameters.

Report Generation and Printing — A list of each air/fuel configuration can be generated and displayed in .TXT format. If required, hard data of each input is also available, and when connected to a local printer, the configured data can be printed.

Language Flexibility — The EPC-250 can support multilingual operation. Any string presented to the user is capable of being displayed in one of many different languages.

Web Server and Screen Shot Capture Capability — The web server provides remote access via a custom website using a third-party HTML editor, or by enabling the remote access and control feature which allows viewing the device's display and controlling its keyboard within a web browser. The web server can also be used to access CSV files from the data logger. Screen shots can be captured and stored in the SD Memory card.

System I/O, Display and Configuration

Display Capability

- Display setpoint/calibration value of all analog input signals
- Display the output value for ignition timing, air manifold pressure and waste gate position along with offset values
- Display trending and logging values
- Display PI response parameters
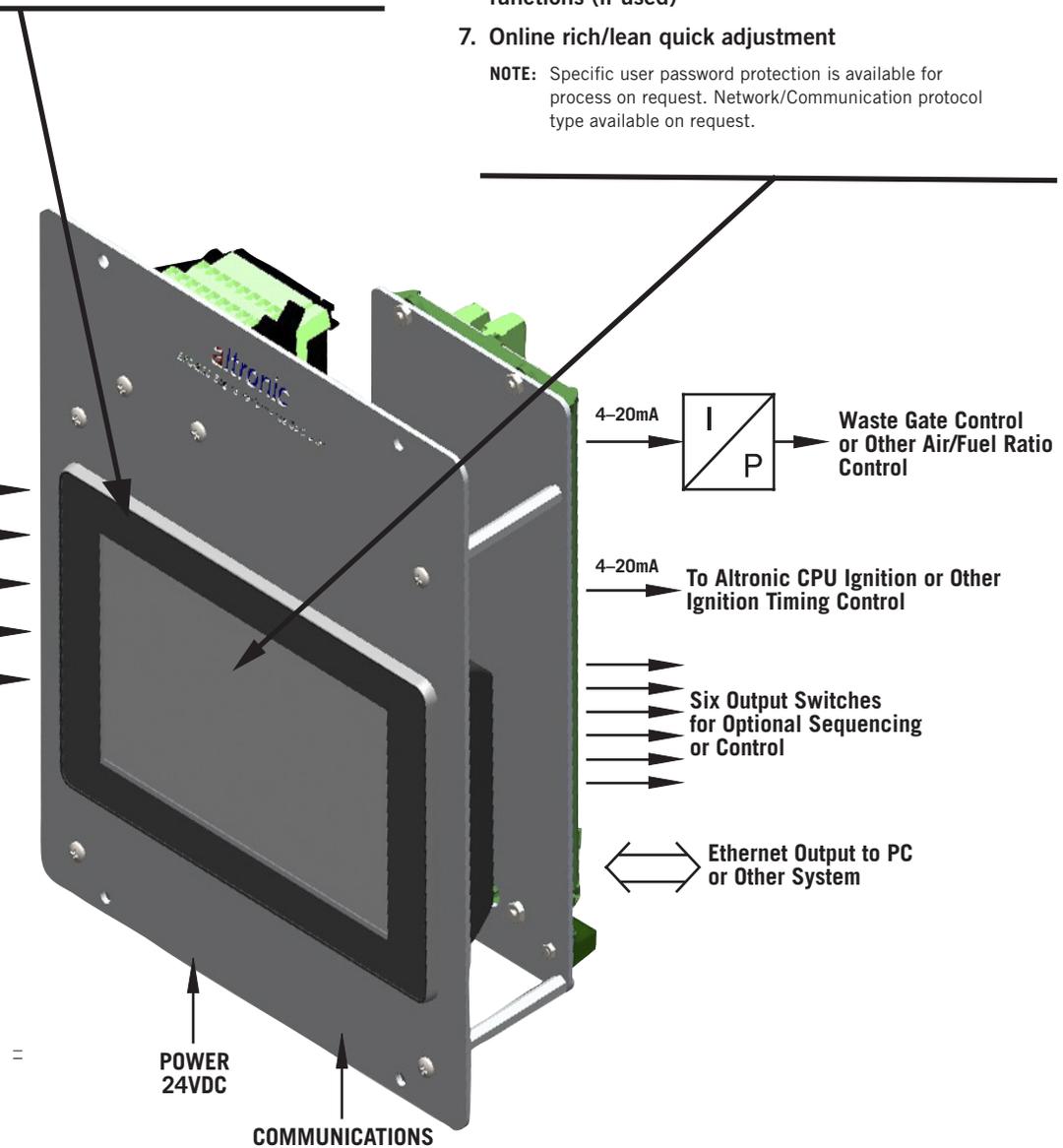- On-screen pop-up alarm/diagnostic for every channel and control variable

Data Entered by User

1. Scale input channels for specific transducers used
2. Enter overriding constant values such as start-up retard, full advance timing, default values, etc.
3. The (x,y) coordinates for ignition timing curves
4. The (x,y) coordinates for air/fuel ratio curves
5. The PI response characteristics for the 4–20mA control outputs
6. The specific values controlling the 7 discrete output functions (if used)
7. Online rich/lean quick adjustment

   NOTE: Specific user password protection is available for process on request. Network/Communication protocol type available on request.

Typical Inputs

Engine Speed

Fuel Manifold Press.

Air Manifold Press.

Air Manifold Temp.

Pilot Manifold Press.

4–20mA → I/P → Waste Gate Control or Other Air/Fuel Ratio Control

4–20mA → To Altronic CPU Ignition or Other Ignition Timing Control

Six Output Switches for Optional Sequencing or Control

Ethernet Output to PC or Other System

POWER 24VDC

COMMUNICATIONS

General Specifications

OUTPUTS

2 analog .... Ignition Timing 4-20mA
Air/Fuel Ratio 4-20mA

7 discrete .... Solid-state relays
10–32VDC, 3A

INPUTS

1 magnetic pick-up........ Engine RPM

31 analog .... 1-5V, .5-4.5V, 4-20mA,
J/K thermocouples

1 discrete .... Start signal

DISPLAY .... 8.4" TFT, 256-color VGA, 640x480
LCD operator interface

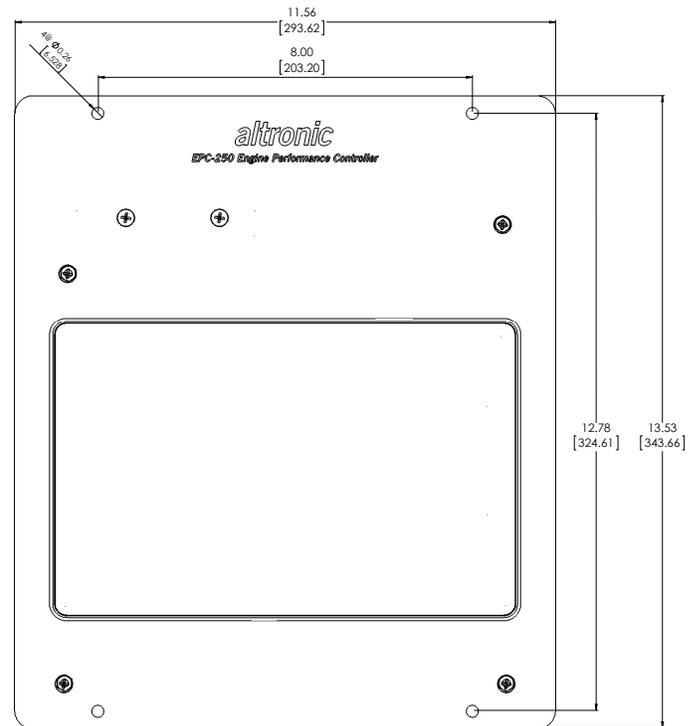**COMMUNICATIONS** .... Modbus RTU TCP/IP, 10/100
Ethernet, DH-485, RS-232/485

POWER .... 24VDC, 48watts max.

PACKAGE .... Aluminum anodized mounting plates
13.53"H x 11.56"W x 6"D

FIELD CONNECTIONS .... Plug-in terminal strip

Altronic Controls Panel Option

Altronic Controls can furnish the EPC-250 system in a complete, CSA-certified control panel inclusive of the required transducers/transmitters and other desired instruments. The system can also be furnished as part of a larger monitoring/safety shutdown system built upon the Altronic DD-NTV series annunciator, the DE-3000 series controller, or a third-party PLC. Please contact Altronic Controls at the numbers below for further details and specification support.
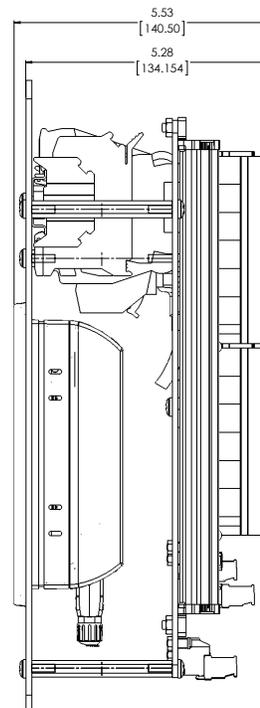
Dimensions

The EPC-250 is a drop-in replacement/upgrade for existing EPC-200 installations and features identical mounting specifications