EVOMESURE
Measure with Passion

Scanivalve

Model ECM4000

Ethernet Control Module

FEATURES

- Ethernet communications with integrated webserver interface
- IEEE1588-2008v2 “Precision Time Protocol” compatible
- 8 configurable digital inputs
- 8 configurable digital outputs
- 3 internal pneumatic solenoids
- Status LED’s for all digital and pneumatic outs
- 9-36Vdc voltage input
- Integrated Webserver

ECM4000 - Ethernet Control Module

GENERAL DESCRIPTION

The ECM4000 was designed to support a wide range of pressure measurement system configurations. It provides a single point of communication for multiple pressure scanners as well as a simple solution for managing control pressures to the scanners. The ECM4000 is built around a core function of creating and executing scripts which can include responding to digital input signals, cycling digital outputs, cycling control pressures, sending Ethernet commands, querying pressure scanners or inserting timed delays. These basic functions can be programmed to help support a variety of needs in a pressure measurement system.

Multiple scripts can be created allowing inputs from software commands or digital input switches to initiate tasks like:

- Perform a CALZ (zero offset calibration) on all enabled pressure scanners
- Perform a purge sequence to clear debris from measurement lines
- Initiate data collection from multiple scanners, synchronized by the ECM4000’s IEEE1588 synchronization.

These scripts can be easily created and managed through the ECM4000’s integrated webserver. The webserver’s simple interface allows scripts to be quickly configured, activated, and managed providing minimum setup time and easy operation. This combination makes the ECM4000 the ideal solution for managing and operating complex pressure measurement systems.

CONFIGURATIONS

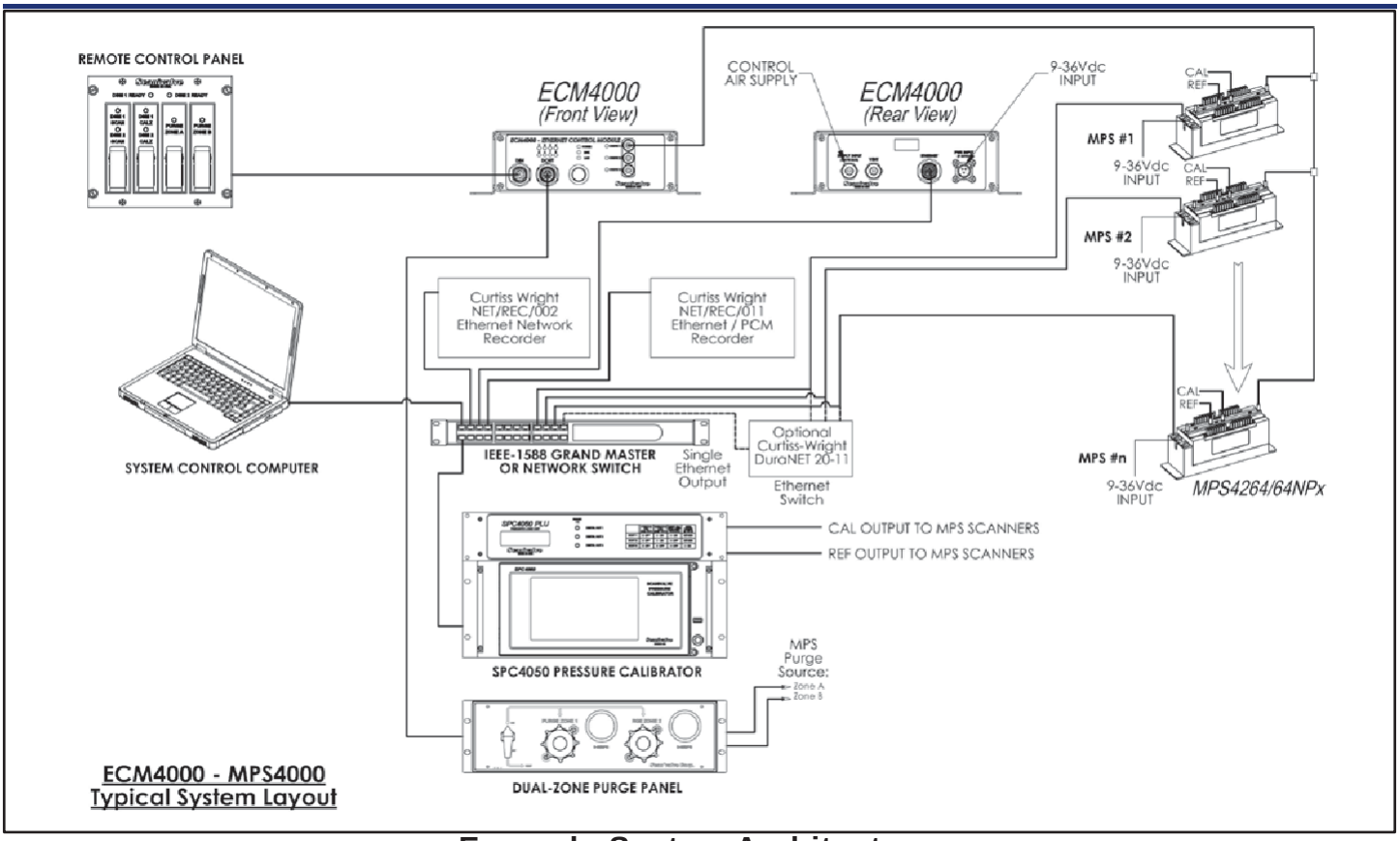
ECM4000 *(General, Wind Tunnel)*

The ECM4000’s flexible design allows it to be used for a wide variety of applications. It can be used as the ‘center’ of any Scanivalve pressure measurement system. It provides an easy interface to manage the data collection of multiple pressure scanners, automatically orchestrate control pressures to the scanners, and provide additional digital inputs and outputs to interface and manage a wide variety of inputs and outputs. The IEEE1588v2 support gives the user the option to provide accurate time-stamping for externally-sourced hardware triggers or to use the ECM4000 itself as a external trigger source to pressure scanners, all synchronized to an IEEE1588 “grand master.” The flexibility provided by the ECM4000 makes it an excellent fit in many applications.

ECM4000 - With Heater *(Flight Test)*

The ECM4000 is available with integrated heaters and a heater controller. The heaters are used to prevent the electronics and internal solenoids from dropping below 0°C. This allows the ECM4000 to be operated in an environment as cold as -40°C, and can meet most flight test application requirements. The ECM4000 has been tested for continuous operation at 50,000 ft. Additionally, the provided digital inputs and outputs can be configured to support many different types of inputs and outputs. This allows a system to be operated using simple push-button or toggle switch inputs. These features will easily simplify a complex system for flight a flight test team.

ECM4000



Example System Architecture

DIGITAL INPUTS AND OUTPUTS

The ECM4000 supports 8 digital inputs, while 8 digital outputs are available. Both inputs and outputs can be programmed by the user to operate in a wide variety of ways and support many different system configurations. Both connectors are 12 contact M12 series which are readily available from many suppliers.

The digital inputs are available to allow the user to initiate events or scripts from a hardware input. Each digital input lead is supplied with +5Vdc. Simply tying one of two common ground leads to the DIN lead triggers the DIN. The ECM's input supply power (9-36Vdc) can also be routed to the Digital Input leads to provide higher DIN voltages. Digital inputs can be setup to operate as "edge sensing" or as "high/low logic" allowing users to use either toggle switches or momentary push-buttons for inputs.

The digital outputs are available to allow the user to control other devices on the network or equipment in the system. They can be used to manage external solenoids, cycle indicator lights, or switch relays.

Four of the digital outputs can be configured to be dedicated as a frequency generator to output a waveform, which can be used as a frame trigger to the pressure scanners on the network. Up to four different frame triggers can be generated simultaneously, all at different frequencies, and up to 20kHz. If the ECM4000 is on an IEEE1588 enabled network, these trigger outputs can be synchronized to the IEEE1588 "Grandmaster."

Like the digital inputs, both +5Vdc as well as the input power (9-36Vdc) is provided at the digital output connector. This provides the user with a wide range of voltage options for the digital outputs as well as simple wiring and connection options. The status of each digital output can be displayed on the front of the ECM4000 with an indicator LED.

Both digital input and digital outputs are designed to operate as part of 'scripts' that are created by the user. Digital inputs can be used as triggers to initiate or stop various scripts, and digital outputs can be use as parts of the scripts to operate various aspects of the system such as cycle valves or manage indicators.

In addition to the external digital inputs and outputs, the ECM4000 also includes 3 internal solenoids. These are operated through separate, dedicated digital outputs. These can be controlled manually/directly or configured to operate as part of a user-created script.

COMMUNICATIONS

The ECM4000 communicates via Ethernet. Commands can be sent and received via TCP/IP. This simple method of communications makes interfacing the ECM4000 to control or manage data acquisition systems easy. While the ECM4000 can command/control multiple pressure scanners, it does not attempt to be part of the data collection process. All existing data collection methods from the pressure scanners are still supported. This means that the ECM4000 can initiate or stop the data collection from the pressure scanners while allowing the scanners to send data directly to the desired destination. This architecture minimizes complications in the system setup and eliminates the possibility of the ECM4000 loosing or corrupting any data.

In addition to the direct Ethernet interface, the ECM4000 boasts an integrated webserver. This provides a simple and clear graphical interface for communicating with ECM4000. Through this interface the operator can query the status of the ECM, configure the ECM, configure the system topology, create scripts, and operate the system. For users that do not already have a high-level data acquisition system, the ECM4000's webserver provides an easy user interface. The webserver does not require any software to be installed on a host computer and can be run from any host computer with a web browser. This also makes it completely independent of the operating system running on the host computer.

Scripts

One of the features of the ECM4000 is the ability to write and execute scripts. Scripts can be used to orchestrate multiple functions of the ECM4000 into a single process. Many of the commands are supported when running a script. Scripts can easily be created using the integrated webserver, or can be created manually in a text file and uploaded to the ECM. Scripts can be executed by command, from a digital input, from a running script, or on power up.

Here is an example of a script:

```
BEGIN Test1          // The script name is Test1
DOUT 1 1             // Enables digital out 1
POUT # 111           // Enables all pneumatic outs
WAIT 5               // Waits for 5 seconds
POUT # 000           // Disables all pneumatic outs
DOUT 1 0             // Disables digital out 1
TCPOUT *SCAN         // Sends a SCAN command to
                        all enabled TCP devices
WAIT 60              // Waits for 60 seconds
END                  // Ends script process
```

ACCESSORIES

The ECM4000 is provided with most accessories required for operation: a mating connector is provided for the power connector (1), 1m long cables with flying leads are provided for the digital input (2) and digital output (3) connectors, a 1m long Ethernet cable (4) is provided for communication, and a stainless steel mounting strap (5) is provided to secure the ECM4000. Power requirements are wide (9-36Vdc) so most DC power sources will work to power the ECM4000.

ECM4000 & Supplied Accessories*

In addition to the accessories that are provided, Scanivalve offers several supporting accessories including:

- PDM1500 AC/DC Power Supply
- Power cables in lengths up to 200 ft (61m)
- Ethernet cables in lengths up to 100 ft (30m)
- Digital Input cables with flying leads in lengths up to 32 ft (10m)
- Digital Input cables with mating connectors** in lengths up to 32 ft (10m)
- Digital Output cables with flying leads in lengths up to 32 ft (10m)
- Digital Output cables with mating connectors** in lengths up to 32 ft (10m)

These accessories can be purchased from Scanivalve to enable quick and easy setup of the system.

** Supplied accessories may differ in color or appearance*
*** Consult factory for mating connector options*

ECM4000

SPECIFICATIONS

Power Requirements: 9-36Vdc, 6.5W
18-36Vdc, 65W (with heater)

Power Mating Connector: Amphenol PT06A-3S

Digital In Mating Connector: M12, 12 contact, A-code, Pin

Digital Out Mating Connector: M12, 12 contact, A-code, Socket

Digital Out Voltages: +5Vdc
+9 - 36Vdc (based on ECM power)

Ethernet Connector: M12, 4 contact, D-code, Male

Ethernet Connection: 100baseT, MDIX auto-crossing

Communication Protocol: Ethernet TCP/IP

Pneumatic Connector(s):

Supply Input and Vent: 1/4" Swagelok Compression

Pneumatic outs: Push-in style for 3/16" OD tube

Pneumatic Supply: 120psi max

ECM4000 Rear Input Panel

Dimensions (WxHxD): 6.63" x 2.15" x 8.03"
(168.3mm) X (54.6mm) X (204.1mm)

Weight: 2.31 lbs. (1.05kg)
2.43 lbs. (1.10kg) (with heater)

Operating Temperature Range: 0°C - 70°C
-40°C - 70°C (with heater)

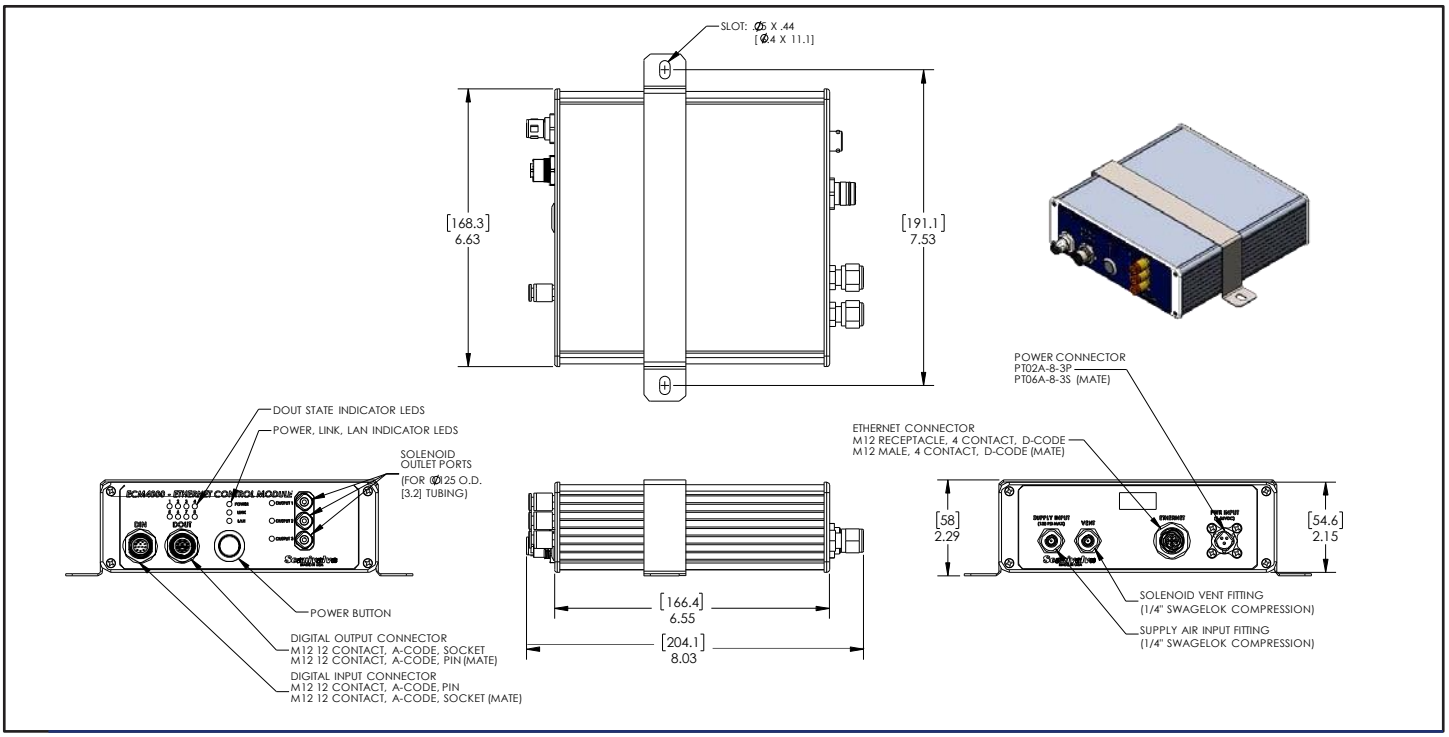
ORDERING INFORMATION

ECM4000 - WITH HEATER

ECM4000 (MODEL)

Blank (NO HEATER)
With Heater (HEATER VERSION)

DIMENSIONS Inches [mm]



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