

- ▶ J1939 / NMEA 2000 / OptiCAN Networking
- ▶ Operating Temperature -40° to 80° C
- ▶ SAE J1939, NMEA 2000
- ▶ High Current Outputs with PWM Capability
- ▶ High Speed and Quadrature Inputs
- ▶ Serial & CAN Communications
- ▶ Cellular<sup>1</sup>, Wi-Fi<sup>1</sup> and GPS Options
- ▶ Quick Disconnect Field Connections
- ▶ Real Time Clock
- ▶ Micro SD Card Support
- ▶ Sealed and Ruggedized



**HEC-P2001 Programmable Logic Controller**

### Overview:

HEC-P2000 Harsh Environment Series Controllers allow for programmable intelligence under less than ideal conditions. Features include a sealed, water-tight enclosure, digital I/O, high speed counting, TCP/IP, CAN network and serial communications including Modbus, J1939 and NMEA 2000. Based on second generation PLC on a Chip™ technology, the controller is easy to apply and program using EZ Ladder Toolkit PC based software that supports ladder diagram, function block and structured text. The HEC-P2000 Series Controllers are suitable for direct mounting on machines and is an ideal choice for mobile, marine, agriculture, mining, oil, and gas in addition to most electro-hydraulic applications. The HEC-P2000 Series Controllers offer powerful features in a robust and small footprint.

### HEC-P2000 Series Controllers

The HEC-P2000 Series Controller's on-board features include 8 digital inputs (sink/source configurable, 3 channels are high speed counter / quadrature to 100KHz), 8 digital outputs (all are PWM capable), communication ports (1 RS232, 1 RS485, CAN, , Wi-Fi<sup>1</sup> and Cellular<sup>1</sup>), Real Time Clock, micro-SD card socket and programmable LED indicator all in a small, sealed, robust package.

### HEC-P2000 Series Controller Programming

The HEC-P2000 Series Controllers program using Divebiss EZ Ladder Toolkit, a Ladder Diagram Development Platform that allows for programming in ladder diagram (LD), function block (FB) and structured text (ST). EZ Ladder software parallels the IEC-61131 standard and provides an easy to use interface.

After a ladder diagram program is developed, it can be downloaded to the controller via the programming port, or Wi-Fi (model depeent) or loaded from the microSD card socket. The program is stored on non-volatile FLASH memory and is automatically executed on power up.

### SAE J1939 / NMEA 2000 / OPTICAN / CAN Connectivity

The HEC-P2000 Series Controllers provide one Controller Area Network (CAN) port that may be configured to communicate to other devices using SAEJ1939, NMEA 2000 and OptiCAN. The HEC-P2000 Series controllers allow for user-defined SAE J1939 and NMEA 2000 messages.

When implemented in a SAE J1939 system, PGNs and SPNs may be utilized from the built-in database. In addition, custom messaging allows the definition of custom PGNs and SPNs, whether broadcast or request. Address claim functionality is now fully supported with a user defined Name field, as is a user selectable bit-rate. When needed, BAM and CM messaging may also be utilized. With these tools, it is now possible to send or request any PGN/SPN or send/receive diagnostic messages DM1, DM2, or DM3. Additional raw CAN packet communications is supported via built-in Structured Text.

### Wi-Fi, Cellular and Serial Communications

The HEC-P2000 Series Controllers supports 2 serial ports standard (1 RS232, 1 RS485). The HEC-GPS module is compatible with the serial ports connector and provides GPS (global positioning). The HEC-P2000 Series Controllers offer Wi-Fi<sup>1</sup> connectivity for Modbus TCP, Webserver and Cloud Portal Solutions and features an internal antenna with external antenna options available. The HEC-P2000 Series Controllers offer Cellular<sup>1</sup> data connectivity for Cloud Portal Solutions and features an external antenna.

### Cloud Portal Solutions:

The HEC-P2000 Series supports standard protocols for remote reporting and control via multiple communications avenues including Wi-Fi<sup>1</sup>, GPS and Cellular<sup>1</sup> data to Cloud Portals. Supported protocols include COAP and MQTT. Different Cloud Portal Solutions are available and are recommended based on number fo reporting devices, amount of data, frequency of data as well as cost considerations. Solutions can range from basic to completely custom.

### Ordering Information:

(see Specifications for complete list of features per model)

Model	Description
HEC-P2000	P2000 Base Model Controller with 8 Inputs, 8 Outputs, Counter Inputs, Serial Ports, CAN Port and Real Time Clock
HEC-P2001	P2000 Base Model Controller with 8 Inputs, 8 Outputs, Counter Inputs, Serial Ports, CAN Port, Real Time Clock and Wi-Fi
HEC-P2010	P2000 Base Model Controller with 8 Inputs, 8 Outputs, Counter Inputs, Serial Ports, CAN Port, Real Time Clock and Cellular Modem

HEC-P2000 Series Controller Specifications / Features			
Processor / Memory / Programming	HEC-P2000	HEC-P2001	HEC-P2010
Processor / Memory / EEPROM	P-Series PLC on a Chip™ 32K RAM, 256K Flash 3500 Bytes EEPROM	P-Series PLC on a Chip™ 32K RAM, 256K Flash 3500 Bytes EEPROM	P-Series PLC on a Chip™ 32K RAM, 256K Flash 3500 Bytes EEPROM
Retentive Memory (FRAM)	480 Bytes	480 Bytes	480 Bytes
Micro SD Card	Yes, Update Programs / Kernels Data-logging, Webserver	Yes, Update Programs / Kernels Data-logging, Webserver	Yes, Update Programs / Kernels Data-logging, Webserver
Programming	Ladder Diagram / Structured Text / Function Block	Ladder Diagram / Structured Text / Function Block	Ladder Diagram / Structured Text / Function Block
<b>Digital I/O</b>			
Digital Inputs, 8-32VDC	Qty 8, Sink/Source (group of 5) NPN/PNP Individual 3 inputs	Qty 8, Sink/Source (group of 5) NPN/PNP Individual 3 inputs	Qty 8, Sink/Source (group of 5) NPN/PNP Individual 3 inputs
High Speed Counter / Timer Inputs, 8-32VDC <sup>2</sup>	Qty 3, NPN/PNP, 100KHz Max.	Qty 3, NPN/PNP, 100KHz Max.	Qty 3, NPN/PNP, 100KHz Max.
Quadrature Inputs <sup>2</sup>	Qty 3, Quadrature Inputs, A/B/Reset 100KHz Max.	Qty 3, Quadrature Inputs, A/B/Reset 100KHz Max.	Qty 3, Quadrature Inputs, A/B/Reset 100KHz Max.
Digital Outputs, 8-32VDC, PWM or On/Off	Qty 8, Sourcing, 2 Groups of 6, 2 Amp with Derating Curve	Qty 8, Sourcing, 2 Groups of 6, 2 Amp with Derating Curve	Qty 8, Sourcing, 2 Groups of 6, 2 Amp with Derating Curve
Digital Output / PWM Frequency	1.0 Hz to 1.0 KHz	1.0 Hz to 1.0 KHz	1.0 Hz to 1.0 KHz
Indicator LEDs	1 Programmable, 1 Watchdog	1 Programmable, 1 Watchdog	1 Programmable, 1 Watchdog
<b>Communications</b>			
Serial Ports	1 RS232 / 1RS485 via M12 8 Pin 1 Programming via Deutsch 'A' Connector	1 RS232 / 1RS485 via M12 8 Pin 1 Programming via Deutsch 'A' Connector	1 RS232 / 1RS485 via M12 8 Pin 1 Programming via Deutsch 'A' Connector
CAN Port	Yes, via Deutsch 'A' Connector	Yes, via Deutsch 'A' Connector	Yes, via Deutsch 'A' Connector
CAN Networks Supported	SAE J1939, NMEA 2000, OptiCAN	SAE J1939, NMEA 2000, OptiCAN	SAE J1939, NMEA 2000, OptiCAN
Wi-Fi Connectivity	No	Yes, via Internal Wi-Fi Module Programming, Modbus TCP, Webserver & Cloud Portal Solutions	No
Modbus Networking	Serial - Modbus Master / Slave	Serial - Modbus Master / Slave Modbus TCP (Client/Server)	Serial - Modbus Master / Slave
Cellular Connectivity	No	No	Via Internal Cellular Modem Cloud Portal Solutions
Supports External GPS Module	Yes	Yes	Yes
<b>Other</b>			
Input Power	9-32VDC 30mA@24VDC with no I/O or communications enabled	9-32VDC 30mA@24VDC with no I/O or communications enable	9-32VDC 30mA@24VDC with no I/O or communications enable
Real Time Clock	MM/DD/YY, Day of Week, HR/MM/SS	MM/DD/YY, Day of Week, HR/MM/SS	MM/DD/YY, Day of Week, HR/MM/SS
Style / Mounting	Sealed Enclosure / Panel Mount	Sealed Enclosure / Panel Mount	Sealed Enclosure / Panel Mount
Connections	2 Deutsch DTM Series (coded A,B) M12 Cable (8 pin)	2 Deutsch DTM Series (coded A,B) M12 Cable (8 pin)	2 Deutsch DTM Series (coded A,B) M12 Cable (8 pin)
Dimensions	4.63" x 5.24" x 1.44"	4.63" x 5.24" x 1.44"	4.63" x 5.24" x 1.44"
Operating Temperature	-40°C to +80°C	-40°C to +80°C	-40°C to +80°C

1. Model Dependent Features

2. Counter & Quadrature Inputs are included in the quantity of digital inputs. Counter inputs may be used as counter or standard digital input. Quadrature inputs may be used as quadrature counter or standard digital input.

### Common Accessories:

Model	Description
HEC-100	HEC 'A' Keyed Cable Assembly with 6ft. flying leads.
HEC-110	HEC 'B' Keyed Cable Assembly with 6ft. flying leads.
HEC-10	HEC 'A' Keyed Connector Kit with 'A' Connector and Crimp Pins (requires crimp tool).
HEC-20	HEC 'B' Keyed Connector Kit with 'A' Connector and Crimp Pins (requires crimp tool).
HEC-910	HEC DTM Connector 'A' Breakout Programming Cable (required Null Modem Cable)
126-102860	Null Modem Cable
HEC-GPS	HEC GPS Module for Serial Port, Puck Style with Magnetic Base