PG ENGINEERED CONTROL SOLUTIONS

IntElect™ VePIC

Description

The IntElect™ Vehicle Performance Information Center (VePIC) is an advanced digital system for vehicle operation monitoring and data collection. Along with the Information Management facilities of the IntElect ecosystem the information on the operation and location of equipment can be collected for optimization of equipment and operator performance. This device has CAN bus monitoring as well as optional inputs for four (4) speed signals, four (4) switch inputs and GPS position for the monitoring of the equipment. The operating data can be transferred over a wireless Bluetooth connection to one of the IntElect applications running on the Android or Windows operating systems. The unit has sensors for monitoring vehicle motion which can provide additional information on the operation of the equipment. This allows the IntElect VePIC to accommodate a wide range of equipment monitoring and to adapt to new requirements.

The IntElect VePIC is field programmable and provides flexibility for customization and installation.

The following contains the features and data that are available in this package. PG can customize this controller and its software to fit the needs of your application.

Features

Data Collection:
Accelerometer and Gyroscope Sensors

Up to 4 speed signal inputs to monitor Engine, Vehicle and Implement speeds

Up to 4 switch inputs to monitor operating status

CAN bus communications to other controllers on the vehicle for status and fault monitoring

Global Position Monitoring

Capability for Geofencing

Sealed water proof enclosure and connector

9 - 90 volt DC input supply

Reverse polarity protected*

Hardware selectable speed sensor (magnetic pick-up, ignition, Hall Effect)

RS-232 communication

5 VDC output for sensor power

Control Wiring

Pin No.	Pin No. CAN Only	Pin Name	Type	Description
1		FREQ 1	Speed signal	**Speed signal in, Note 1**
2		FREQ 2	Speed signal	**Speed signal in, Note 1**
3	**1**	PAIR	Input	**Bluetooth Pair Mode**
4	**2**	FLEX 1	Configurable	**Flexible reconfigurable I/O port**
5	**3**	CGND	Ground	**Communications ground**
6	**4**	DGND	Ground	**Digital/Analog signal ground/return**
7	**5**	GND	Ground	**Controller ground**
8	**6**	STANDBY POWER	Power	**DC Battery power to controller**
9		IN 1	Input	**Discrete input, Note 2**
10		IN 2	Input	**Discrete input Note 2**
11		FREQ 3	Speed signal	**Speed signal in, Note 1**
12		FREQ 4	Speed signal	**Speed signal in, Note 1**
13	**7**	CANL	CAN	**CAN bus low port**
14	**8**	CANH	CAN	**CAN bus high port**
15	**9**	SCI TX	Serial	**Serial out RS-232 capable (DB-9 pin 2)**
16	**10**	V+5 OUT	Output Supply	**5 Volt sensor supply**
17	**11**	SCI RX	Serial	**Serial in RS-232 capable (DB-9 pin 3)**
18	**12**	POWER	Power	**DC power to controller**
19		IN 3	Input	**Discrete input, Note 2**
20		IN 4	Input	**Discrete input, Note 2**

Control Pin Layout

1	2	3	4	5	6	7	8	9	10
FREQ 1	FREQ 2	PAIR	FLEX 1	CGND	DGND	GND	STANDBY POWER	IN 1	IN 2
FREQ 3	FREQ 4	CANL	CANH	SCI TX	+5V OUT	SCI RX	POWER	IN 3	IN 4
11	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**

Control Pin Layout CAN Only

1	2	3	4	5	6
PAIR	FLEX 1	CGND	DGND	GND	STANDBY POWER
CANL	CANH	SCI TX	+5V OUT	SCI RX	POWER
7	**8**	**9**	**10**	**11**	**12**

Notes:

1.) The Part Number of the units will be different depending on the frequency input sensor type (FREQ 1, FREQ 2, FREQ 3, FREQ 4).

2.) The Part Number of the units will be different depending on the active configuration of the switch inputs (IN 1, IN 2, IN 3, IN 4). Part Number will be different for active state of switch closed to Battery or to Ground.

Specifications

Mechanical

Operating temp	-40 to 85°C -40 to 185°F
Weight	1lb
Vibration	6 G, 40 to 2000 Hz 8 hours per axis
Sealing	IP65, 66, 67, 69K
	+/-100 V AC/DC
Speed Sensors	0-15 kHz
Switch Inputs	0-Battery VDC

Control

Inputs

Power supply	9-90 VDC
Flex Analog Range	0-80 VDC (100V max)
Flex Digital	0-Battery VDC

Outputs

FLEX current max	1.5A
+5V rail max current	100mA

Communication

RS-232	57600 baud 8 data bits No parity 1 stop bit No flow control
CAN bus	J-1939 protocol Up to 1M baud Custom commands

Detailed Specification

Power

Spec	Description	Range
Voltage	Voltage to controller reverse polarity protected	8 to 90 Volts
Power	Power consumption of device	Standby: 0.5mA (typ) Main: 80mA (14.5v, typ)
5V Rail	5 volt source for power sensors or other peripherals. Short circuit protected.	Output Voltage - 5V Max Current - 100mA

Inputs and Outputs

Item	#	Description	Specs
Discrete Inputs	0 - 5	There are four discrete inputs which may be triggered by battery voltage or by grounding depending on unit part number. FLEX 1 can also be configured by part number to be active when triggered by battery voltage or by grounding of the pin.	0 - 5 switch to battery 0 - 5 switch to ground
FLEX 1 Analog Input	0 - 1	Analog input capable of providing source as well if needed to power certain sensors. Thresholds may be set to trigger certain actions based on readings. Use DGND for reference to analog input.	Max Voltage – 100V Full Scale – 0 to 60V
FLEX 1 Output	0 - 1	Low-side controller output. May be sunk to ground on a given condition or input. Short circuit, overload, and over temperature protected.	Max Current – 1.5A
Speed Sensor	0 - 4	Speed signal input which may be used to measure engine speed from multiple sources such as a magnetic pickup, ignition source, hall sensor, or transformer.	Max Voltage - ±100 AC/DC Max frequency - 15 kHz

Communications

Type	#	Description	Settings/Defaults
RS-232	1	Used to interface to a PC or other peripheral. The serial port is typically used to show data coming from the controller and may also be used to reprogram the device in the field.	57.6K baud (or Auto) 8 data bits No parity/flow control 1 stop bit
CAN Bus	1	The CAN bus is used to communicate to other devices on the bus using the J-1939 standard protocol. Custom commands and actions may be added by PG if needed.	Customizable J-1939 Protocol Up to 1MHz

***Reverse Polarity Protection:**

FLEX 1 as output: The output device will activate during application of reverse polarity. If the connected load contains a flyback diode, a series diode is required for reverse polarity protection.

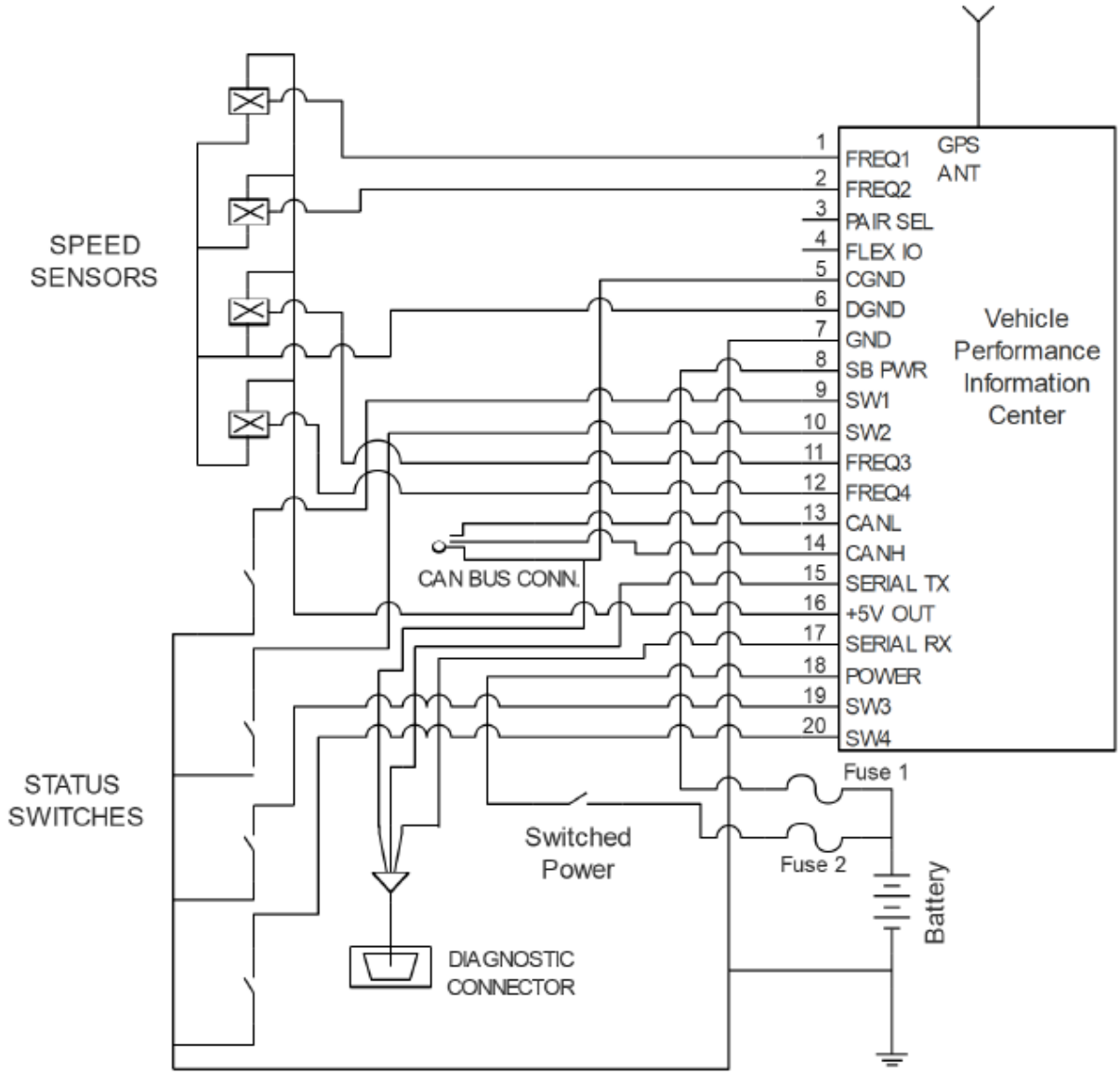
FLEX 1 pin: When used as analog or discrete input: if the flex pins are or may be connected to a +DC power source through a circuit with resistance that limits the current to less than 1 Amp, the circuit should incorporate a series diode (1 amp such as 1N4001) in series from the power source.

+5 VDC output: This should not be connected to a +DC power source through any external components.

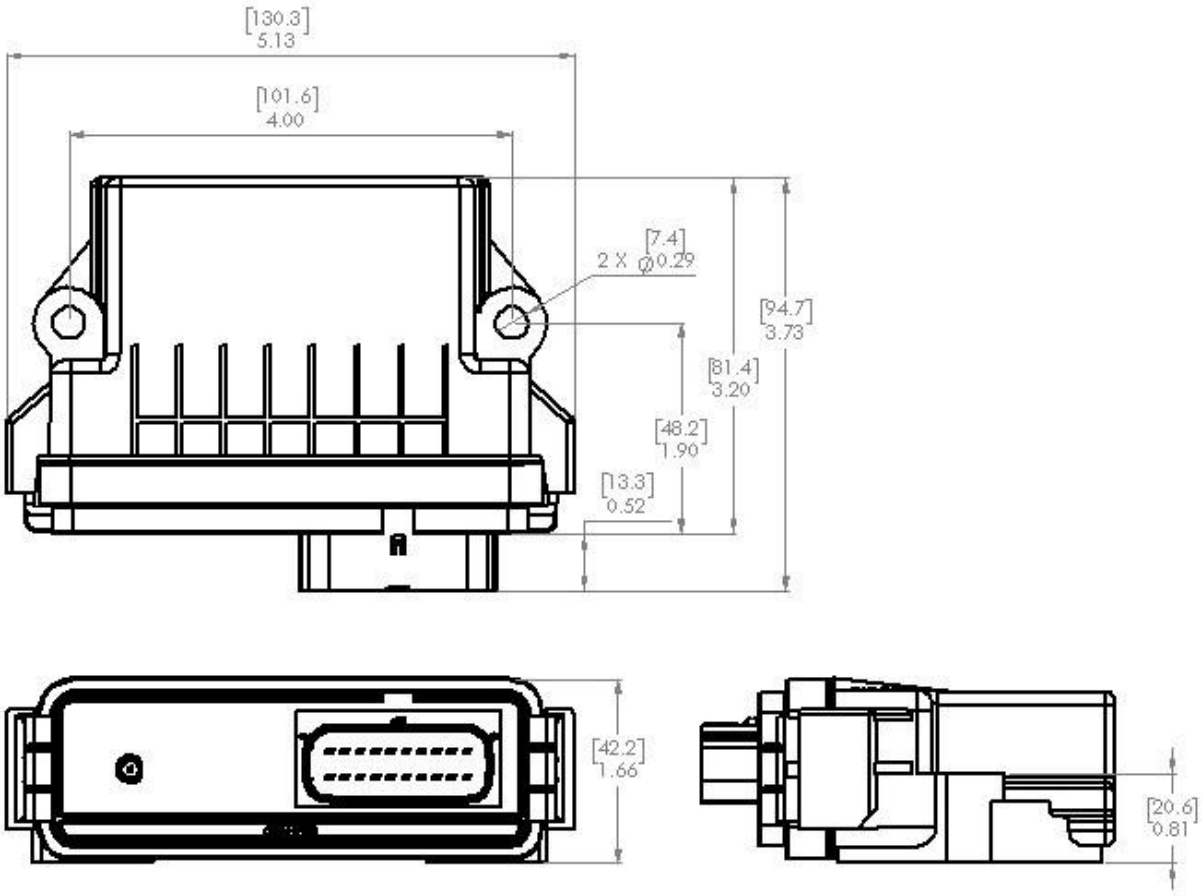
All other pins are fully protected against application of reverse polarity and will not draw excessive current.

Wiring

Basic Application:



Mechanical Outline

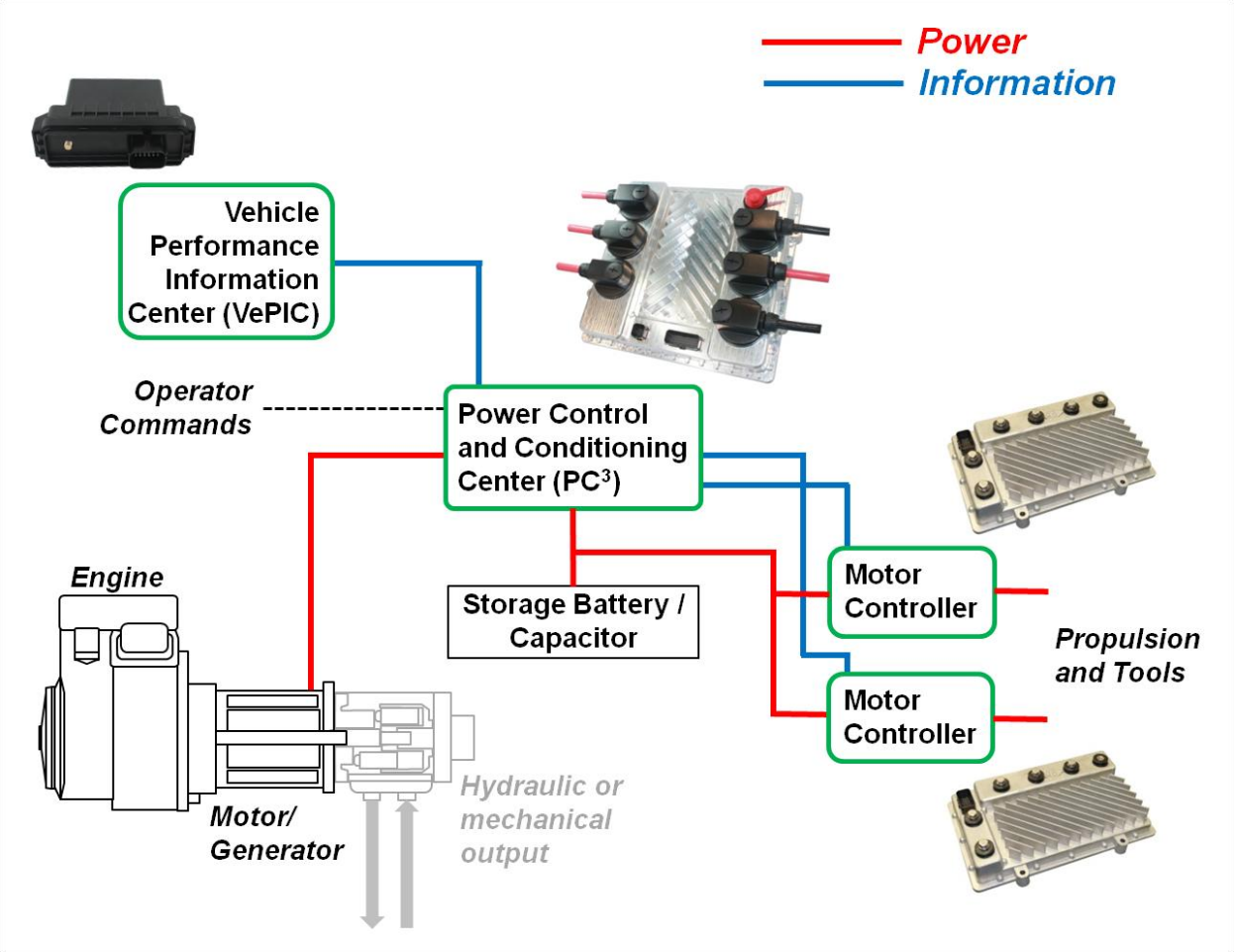


IntElect™

Intelligent Electrification

The VePIC is part of PG's IntElect™ technology initiative.

IntElect™ elements may be applied in whole, as shown in the diagram below, to fully exploit all the advantages of a networked electrified vehicle, or used independently as components in other electrified or conventional system architectures.



IntElect™ is a technology suite under development by PG Engineered Control Solutions, combining a broad range of Power and Connectivity innovations for off-highway use.

Technical data presented in this document is subject to change.