

# APECS DPG-23XX-00X

*Digital Controllers for  
Off-Highway Vehicle Applications*



- 4 user-selectable speed modes
- Automatic calibration of remote speed potentiometer
- Isochronous speed control
- Droop operation: 0 to 10% of set speed with 1/10 percent resolution
- User friendly, operator adjustable
- Precision frequency control: 0.25%
- Superior temperature stability
- Reverse battery protection
- Input voltage range: 9–30 Vdc
- Smoke control on start up
- Remote setup
- Serial communications port

## Description

The DPG-23XX-00X digital controller is used primarily to govern diesel or gas fueled engines of off-highway vehicles. This microprocessor-based, digital controller performs across a wide speed range and allows adjustment of all controller features through the built-in user interface. Properly tuned, this controller delivers fast engine response to speed or load change while providing precise stable isochronous operation.

Separately programmable Proportional, Integral, and Derivative gains are provided for tailoring controller response to many engine applications. Other adjustments include acceleration and deceleration ramp rates, startup and torque limits.

The controller's internal FAILSAFE reacts instantly to loss of the engine speed signal or loss of remote speed potentiometer signal, allowing the actuator to return to minimum fuel.

## Actuator Compatibility

DYNA 2000	DYNA 70000	DYNA 8000	APECS 0150	EPG 512
DYNA 2500	DYNA 70025	DYNA 8200	APECS 0250	EPG 1724
	DYNA 10141	DYNA 8400	APECS 0300	

Power Flow Series Gas Valves  
APECS Linkage Free Integral Type

## Other Models Available

DPG-2100 Series – for Genset Applications  
DPG-2200 Series – for Genset Applications  
DPG-2400 Series – for EFC Applications

## Calibration Tool

DPG Calibration Kit P/N 8447-1003

## Specifications

The DPG-23XX-00X controller's main electrical and mechanical specifications are listed here along with several performance characteristics.

### Configurations

MODEL NO.	CONNECTOR STYLE OPTIONS	SPEED SENSING OPTIONS		ADJ. SET SPEEDS	MODE SELECT INPUTS (DIGITAL INPUTS)
	13-Wire Euro Style	Magnetic Pickup	Ignition Sense		
DPG-2302-00X	✓	✓		2 + Remote Speed Pot and Pedal Hold	2
DPG-2345-00X	✓		✓	2 + Remote Speed Pot and Pedal Hold	2

### Electrical

<b>Operating Voltage Range:</b>	9–30 Vdc *
<b>Rated Output Current:</b>	7 A Maximum (continuous)
<b>Maximum Surge Current:</b>	14 A (not to exceed ten seconds)
<b>Connections:</b>	Terminal strip with 13 terminals
<b>Input Signal from Magnetic Pickup:</b>	2.0 Vac RMS minimum during cranking
<b>Input signal from Engine's Ignition System</b>	40 V minimum during cranking

(\*) All cabling for this unit is limited to less than 30m (98.4').

Power cabling is limited to less than 10m (32.8') in total length.

See wiring diagram in User Manual 36527 for specific cable types required.

### Mechanical

<b>Ambient Operating Temperature:</b>	-40°F to +185°F (-40°C to +85°C)
<b>Sealing:</b>	Oil, water, and dust resistant via conformal coating and die cast enclosure
<b>Weight:</b>	0.75 lbs. (0.34 kg)
<b>Connections:</b>	13-terminal Euro-style connector

### Performance

<b>Steady State Speed Band:</b>	± .25% over ambient operating temperature range
<b>Engine Speed MPU Measurement Range:</b>	10 MPU Hertz to 14,000 MPU Hertz
<b>Governing Speed Range with MPU:</b>	500 MPU Hertz to 11,000 MPU Hertz
<b>Engine Speed Ignition Measurement Range:</b>	2 Hertz to 350 Hertz
<b>Governing Speed Range with Ignition:</b>	25 Hertz to 300 Hertz

## Parameter Reference

The table below lists each of the parameters and their default, minimum, and maximum values. Several parameters have minimum and maximum values set by other parameters. *Speed* and *Rate* values are shown as Hertz values.

PARAMETER NAME		DEFAULT	MINIMUM	MAXIMUM
1. No. of Flywheel Teeth or Pulses Per Revolution	-001	0	0	0
	-002	0	0	572
2. Remote Speed Min *		1000 (25)	10 (2)	Remote Speed Max
3. Remote Speed Max *		1000 (25)	Remote Speed Min	11,000 (300)
<b>4. Set Speed A *</b>		<b>1000 (25)</b>	<b>Set Speed A Min</b>	<b>Set Speed A Max</b>
5. Set Speed B *		1000 (25)	Set Speed B Min	Set Speed B Max
<b>6. Proportional</b>		<b>25</b>	<b>1</b>	<b>99</b>
<b>7. Integral</b>		<b>50</b>	<b>0</b>	<b>99</b>
<b>8. Derivative</b>		<b>25</b>	<b>0</b>	<b>99</b>
9. OVG @ Remote Speed Min		20	1	99
10. OVG @ Remote Speed Max		0	0	99
<b>11. OVG @ Set Speed A</b>		<b>20</b>	<b>1</b>	<b>99</b>
12. OVG @ Set Speed B		20	1	99
<b>13. Gain Factor</b>		<b>20</b>	<b>1</b>	<b>99</b>
<b>14. Speed Filter</b>		<b>16</b>	<b>1</b>	<b>24</b>
15. Accel Rate *		1000 (3000)	1	9999
16. Decel Rate *		1000 (3000)	1	9999
17. Startup Rate *		1000 (3000)	1	9999
18. Startup Limit		1000	1	1000
19. Torque Limit		1000	0	1000
20. Integral Low Limit		0	0	Integral High Limit
21. Integral High Limit		99	Integral Low Limit	99
22. Password		0	0	99
23. Over Speed Limit	-001	100	0	100
	-002*	15000 (450)	10(2)	15000 (450)
24. Set Speed A Min*		10 (2)	10 (2)	Set Speed A
25. Set Speed A Max *		11000 (300)	Set Speed A	11000 (300)
26. Set Speed B Min *		10 (2)	10 (2)	Set Speed B
27. Set Speed B Max *		11000 (300)	Set Speed B	11000 (300)
28. Duty Cycle Limit		95	5	95
29. Input Polarity		0	0	1
30. E1 Handler Select		0	0	1
<b>31. Startup Speed *</b>		<b>1000 (25)</b>	<b>10 (2)</b>	<b>11000 (300)</b>
32. Startup Duty Cycle		30	5	95
33. Speed Pot Action		0	0	1
<b>Parameters 4, 6, 7, 8, 11, 13, 14, and 31 require adjustment, while adjustments to the other parameters are optional.</b>				

### NOTICE

Parameters marked with an asterisk (\*) are displayed as RPM values when the No. of Flywheel Teeth is greater than zero. These parameters can be changed with PST max by 100 (MPU input) or 10 (IGNITION input) at once when engine is running.

## European Compliance for CE Marking

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### EMC DIRECTIVE

Declared to 89/336/EEC COUNCIL DIRECTIVE of 03 May 1989 on the approximation of the laws of the Member States relating to electromagnetic compatibility. See the Declaration of Conformity in Manual 36527.

### EMC LIMITATIONS

#### Cabling

All cabling for this unit is limited to less than 30m (98.4').

Power cabling is limited to less than 10m (32.8') in total length from its source; power is intended to be from a local bus structure. The control is not intended to have a power bus that is derived from a plant-wide distribution system, remote source, or similar "mains" type distribution systems. The power to the control should also be a dedicated circuit, directly to the battery or source via a power and return wire that are routed together.

See Manual 36527 for additional regulatory information, limitations, and wiring diagrams with specific, required cable types.

#### Power Bus

The power bus is intended to be a local bus and to have inductive load kickback events suppressed. Therefore, the control's power input is not designed to withstand a charging system load dump, heavy inductive kickbacks, or heavy surge type pulses. If the control is installed outside its intended usage, as described in this manual, centralized voltage pulse suppression should be implemented to help protect the control and other components on the bus. (See the installation instructions in User Manual 36526.)

#### COMM Port

The COMM port is intended to be a service port, with only temporary connection during service or initial configuration. The COMM port is susceptible to some EMC phenomena and possible unintentional battery return currents.

1. Battery return (B-) is also the communication signal common; typically PCs connect the communication signal's common to protective earth. The PC grounding can provide an unintended return path for B-currents. If B- and the PC are grounded to protective earth, a communication isolator should be used between the PC and the control. Damage to the PC or control, and/or unintended operation may result from a broken battery return wire or the parallel path.
2. The pins inside the COMM port plug are susceptible to damage by ESD discharges, static electricity arcs. Care should be taken not to touch them with tools or put fingers into the port. Always touch your hand or tool to a grounded piece of metal (discharge ESD) before coming in contact with the COMM port.
3. The input is susceptible to RF noise such as switching transients and transmitter signals coupled into the communication cable. Cable orientation and short cable length may be used to eliminate these issues, depending on the severity of the environment.

## Related Documentation

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Manual 36527



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