

EC Series

DYNALCO
CONTROLS

Magnetic Pickup Powered Electronic Governors

**2-Year
Warranty**



FEATURES

- No ac or dc power required.
- Isochronous and droop speed control.
- High reliability circuits.
- Digital speed indicator output.
- Missing signal and low signal safety shutoff.
- Field-programmable.
- Proportional, integral, and derivative control action.
- Optional remote speed setpoint programming.
- Can be tuned for no overshoot for the most difficult processes.

DESCRIPTION

The speed signal is taken from a magnetic pickup which also supplies the power to the unit. *No other power source is required.* The speed signal is compared to a reference or speed set signal. The generated error signal is processed by proportional, integral, and derivative controls. A resulting mA output signal appears at terminals M & N. This output signal drives a separate current-to-pressure (I/P) converter which provides a 3-15 psig control output to an actuator or positioner controlling the fuel valve.

	OUTPUT SIGNAL	
	CURRENT OUTPUT	CURRENT LOAD
EC-303	1-5 mA	620 Ω, maximum
EC-304	1-5 mA	620 Ω, maximum
EC-420	4-20 mA	200 Ω, maximum
EC-424	4-20 mA	200 Ω, maximum



INTRINSIC SAFETY

	CSA APPROVALS		
	CSA APPROVAL LEVEL	DYNALCO PICKUP REQUIRED	DYNALCO I/P REQUIRED
EC-303	Cl. I, Div. 1, Grp. A,B,C,D	M205	IPT-107
EC-304	Cl. I, Div. 1, Grp. A,B,C,D	M205	IPT-107
EC-420	Cl. I, Div. 1, Grp. D	M208	IPT-108
EC-424	Cl. I, Div. 1, Grp. D	M208	IPT-108

SPECIFICATIONS

Isochronous Control Action: Speed, under steady-state load conditions, holds to better than 0.1% of the set speed.

Droop Control Action: Controlled speed droops with increasing load. Can be set for 0 to 25% droop. (Set with internal resistor.)

Operating Temperature Range: -20°F to +160°F (-30°C to +72°C).

Storage Temperature Range: -40°F to +185°F (-40°C to +85°C).

Power and Speed Signal Source: Dynalco M205 [EC-303 & EC-304] or M208 [EC-420 & EC-424] pickup is required.

Gear: 6 pitch or coarser.

SPECIFICATIONS — continued

Minimum Speed: 5" gear, 0.01" gap, 600 rpm

Minimum Speed: 36" gear, 0.03" gap, 160 rpm

Speedset 1: EC-303 & EC-420: 4-20 mA
EC-304 & EC-424: 3-15 psig

Speedset 2: Local or remote potentiometer

Customer Adjustments:

1. Proportional band, 0-225%
2. Reset time, 0-7 seconds/repeat
3. Rate time, 0-2 seconds
4. Speed set

Additional Adjustments and Settings:

[Under removable front panel]

1. Maximum fuel limit
2. Minimum fuel limit
3. Droop*
4. Setpoint logic (highest/lowest)*
5. Control action (direct/reverse)*
6. Setpoint action (direct/reverse)*

*Factory set

Input Circuit: Arranged for one:

M205 magnetic pickup — EC-303 & EC-304

M208 magnetic pickup — EC-420 & EC-424

Startup Method: For turbine applications, a pneumatic bypass of the I/P converter is used. With engine installations, the regular engine starter is used.

Full-Scale Input Frequency Range: 0-200 Hz to 0-15 kHz.

Minimum Controlled Frequency: 100 Hz

Setpoint Logic: Either the highest or the lowest rpm setting is automatically selected (internal jumper).

Setpoint Action (4-20 mA or 3-15 psi): Direct or reverse action is selected by a jumper. Direct action means an increase in setpoint signal increases speed.

Setpoint Calibration (Each Setpoint): Normally factory set with internal adjustments for any full or partial range required.

Controller Output and Current Setpoint Signal Connections: Negative side is at circuit common which can be earth grounded.

Control Action: Direct or reverse control is set with a jumper.

Reverse action means a decrease in speed, with fixed setpoint, increases controller output current.

NOTE

Reverse control action is most commonly used.

Speed Indicators: External digital indicators such as a DYNALCO SPD-100 or SPD-700. [Order separately]

Enclosure: High-impact, high-strength polycarbonate. Can open and reseal case without damaging watertight integrity.

O-ring sealed access holes. Case complies with NEMA Standard 250, types 3, 4, 12, 13.

Component board entirely dip-coated with moisture-repellant sealant.

IPT-107 & IPT-108 Series Current-To-Pressure (I/P)

Converters (ordered separately):

- ◆ IPT-107-X — EC-303 & EC-304
- ◆ IPT-108-X — EC-420 & EC-424

For Reverse Action with either I/P:
order the "-2" version.

For Direct Action with either I/P:
order the "-1" version.

NOTE: Direct action I/Ps are typically used.

I/P converters require clean, dry, regulated instrument air at 20 psig, minimum.

Natural gas may be used as a pressure supply in place of air when the tapped exhaust version of a DYNALCO I/P is used.

A pressure regulator should be used to lower and regulate air pressure supplies up to 200 psig.

A DYNALCO series booster valve may be required on the output of an I/P converter when a valve positioner is not used.

IPT-107 Series I/P

IPT-107: 1-5 mA input, 3-15 psig output.

IPT-107E: 1-5 mA input, 3-15 psig output. Tapped exhaust.

IPT-107EP: The pneumatic startup push button has proportioning characteristics, and can be used to bring the turbine slowly up to governor energizing speed. This button, when fully depressed, will cause full steam valve opening. (Note: An orifice on the I/P exhaust line will prevent full valve opening.)

IPT-108 Series I/P

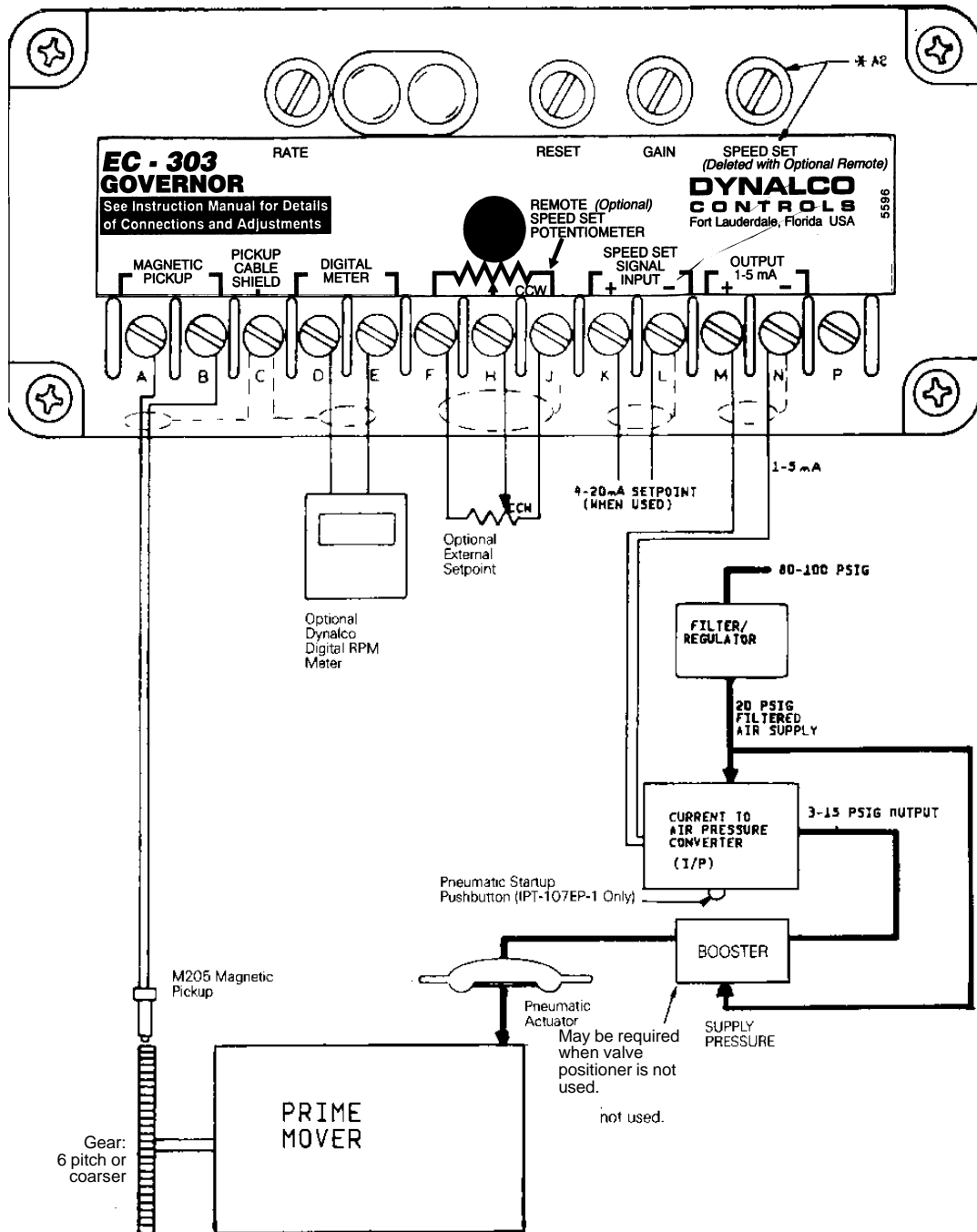
IPT-108: 4-20 mA input, 3-15 psig output.

IPT-108E: 4-20 mA input, 3-15 psig output. Tapped exhaust.

IPT-108EP: The pneumatic startup push button has proportioning characteristics, and can be used to bring the turbine slowly up to governor energizing speed. This button, when fully depressed, will cause full steam valve opening. (Note: An orifice on the I/P exhaust line will prevent full valve opening.)

TYPICAL CONNECTION

{An EC-303 setup is shown in this example.}



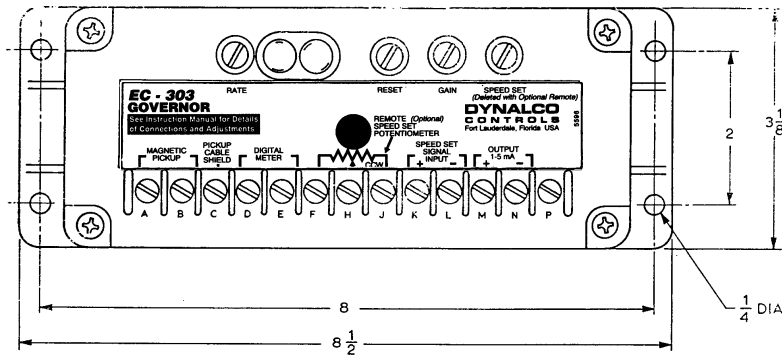
A compatible Current-to-Air Pressure Converter (I/P) is ordered separately.

NOTE

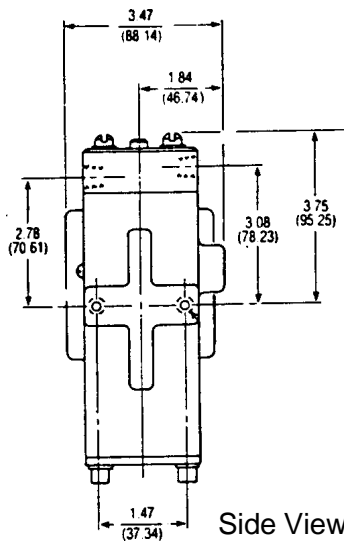
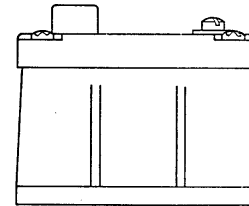
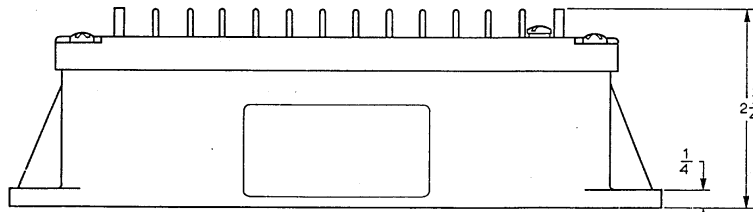
The prime mover should be equipped with a separate, independent overspeed shutdown device in the event the control system is rendered inoperative.

OUTLINE DRAWING

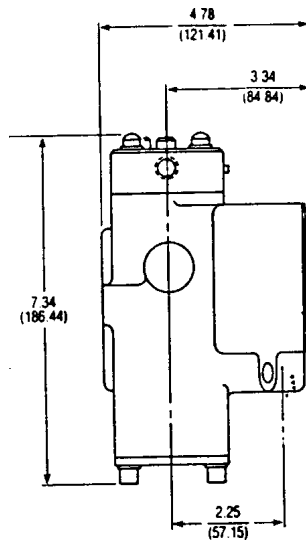
EC Series Governors [EC-303 shown]



Dimensions are identical for all EC Series versions.



Side View



Rear View

OUTLINE DRAWING

Current-to-Air Pressure Converter (I/P)

[IPT-107 shown]

HOW TO ORDER

Select EC-303 EC-304 EC-420 EC-424:

1. Full-Scale Speed _____ rpm
Full-Scale Frequency _____ Hz
2. Digital Meter _____ (Optional)
3. Setpoint 1 Range _____ rpm to _____ rpm
Setpoint 1 Range _____ Hz to _____ Hz
 4-20 mA Direct Reverse
 3-15 psig Direct Reverse
4. Setpoint 2 Range _____ rpm to _____ rpm
Setpoint 2 Range _____ Hz to _____ Hz
Potentiometer: Local Remote

5. Setpoint Logic: Highest Lowest
(See *Specifications*).

6. Control Action (See *Specifications*):
 Direct Action Reverse Action

Comments: