

# GAM3.1

Governor and AVR module

Data sheet

4921240637-D



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Tomorrow



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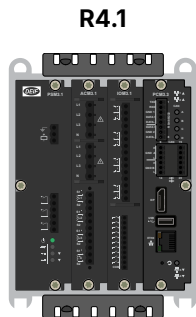
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# 1. Series 300

## 1.1 About the hardware modules

The hardware modules are printed circuit boards that slot in to either a R7.1 or R4.1 rack. Depending on the type of module, they can provide AC or other measurements, inputs, outputs and give communication indication.

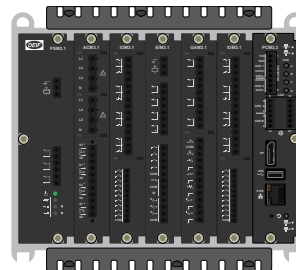
### Controller racks



**R4.1**

Modules

- 1 PSM3.1
- 2 module selection
- 1 PCM3.3

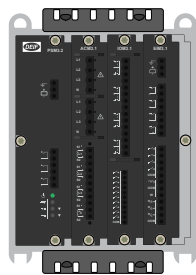


**R7.1**

Modules

- 1 PSM3.1
- 5 module selection
- 1 PCM3.3

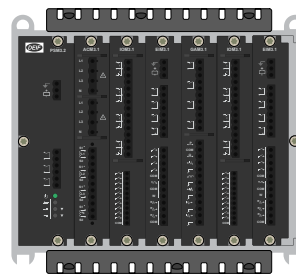
### Extension racks (EtherCAT)



**R4.1**

Modules

- 1 PSM3.2
- 3 module selection
- 1 small blind module



**R7.1**

Modules

- 1 PSM3.2
- 6 module selection
- 1 small blind module

The hardware modules feature:

- Placement flexibility in the rack.
- Add, replace, or remove on-site.
- Automatically recognised.
- Configurable input and output functions (digital and analogue):
  - Digital input functions: Commands from operators or 3rd party equipment, changing configuration, operating information.
  - Digital output functions: Alarm status, commands to 3rd party equipment, operating information.
  - Analogue input functions: External set points, operating information, supervised binary inputs.
  - Analogue output functions: Regulation \*, operating information.

**NOTE** \* Only available on certain types of controller.

All slots must be covered during operation and blind modules can be used to cover unused slots.

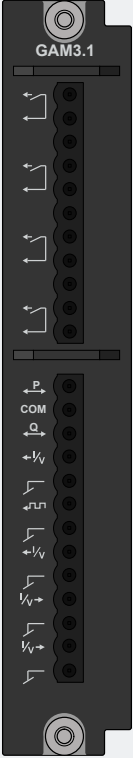






## 2. Technical specifications

### 2.1 Governor and AVR module GAM3.1





This governor and AVR module has four relay outputs, two analogue outputs and a pulse width modulation output, and two analogue inputs. These I/Os are configurable.

GAM3.1 also has terminals for analogue load sharing (future use).

#### GAM3.1 terminals

Module	Count	Symbol	Type	Name
	4		Relay output	Configurable
	1		Load sharing	Active power (P) (kW) load sharing (future use)
	1		Load sharing	Reactive power (Q) (kvar) sharing (future use)
	2		Analogue current or voltage output	GOV/AVR/configurable
	1		Pulse width modulation (PWM) output	PWM output (with PWM ground)
	2		Analogue current or voltage input	Configurable

#### GAM3.1 technical specifications

Category	Specification
<b>Relay outputs</b> 	Relay type: Electromechanical Electrical rating and UL/cUL Listed: 250 V AC or 30 V DC, and 6 A, resistive; B300, pilot duty (B300 is a power limit specification for inductive loads) Altitude derating from 2,000 to 4,000 m (6,562 to 13,123 ft): Maximum 150 V AC phase-to-phase Voltage withstand: 250 V AC
<b>Load sharing (future use)</b>  	Voltage input/output: -5 to 5 V DC Impedance: 23.5 kΩ Accuracy: 1 % of full scale, for both inputs and outputs Voltage withstand: ±36 V DC
<b>Analogue multi-functional outputs</b> 	<b>Current output</b> <ul style="list-style-type: none"> <li>-20 to 20 mA, or 0 to 20 mA, or 4 to 20 mA, or any custom range between -25 and 25 mA</li> <li>Accuracy: 1 % of the selected range (minimum range: 5 mA)</li> <li>16-bit resolution over the range -25 to 25 mA</li> <li>Active output (internal supply)</li> <li>Maximum load: 400 Ω</li> </ul> <b>Voltage output (DC)</b>

Category	Specification
	<ul style="list-style-type: none"> <li>-10 to 10 V, 0 to 10 V, 0 to 5 V, -5 to 5 V, 0 to 3 V, -3 to 3 V, or 0 to 1 V, or any custom range between -10 and 10 V</li> <li>Accuracy: 1 % of the selected range (minimum range: 1 V)</li> <li>16-bit resolution over the range -10 to 10 V</li> <li>Minimum load: 600 Ω. Voltage output internal resistance: &lt; 1 Ω</li> </ul> Voltage withstand: ±36 V DC Controller power off: Internal resistance > 10 MΩ
<b>Pulse width modulation (PWM) output</b> ↔	Frequency: 500 Hz ±50 Hz Resolution: 43,200 levels Voltage: <ul style="list-style-type: none"> <li>Low level: &lt; 0.5 V</li> <li>High level: &gt; 5.5 V</li> <li>Maximum: 6.85 V</li> </ul> Output impedance: 100 Ω Nominal temperature range: -40 to 70 °C (-40 to 158 °F) Reference temperature range: 15 to 30 °C (59 to 86 °F) Duty cycle accuracy (5 to 95 %): 0.25 % within reference temperature range 0.2 % of full scale additional error per 10 °C (18 °F) outside the reference range Example: At 70 °C (158 °F) the accuracy of the PWM output is 0.25 % + 4 × 0.2 % = 1.05 % Voltage withstand: ±30 V DC
<b>Analogue multi-functional inputs</b> ↔	<b>Current inputs</b> <ul style="list-style-type: none"> <li>From active transmitter: 0 to 20 mA, 4 to 20 mA, or any custom range between 0 and 24 mA</li> <li>Accuracy: 1 % of selected range</li> </ul> <b>Voltage inputs (DC)</b> <ul style="list-style-type: none"> <li>-10 to 10 V, 0 to 10 V, or any custom range between -10 and 10 V</li> <li>Accuracy: 1 % of selected range</li> </ul> Voltage withstand: ±36 V DC
<b>Terminal connections</b>	Terminals: Standard 45° plug, 2.5 mm <sup>2</sup> Wiring: 0.5 to 2.5 mm <sup>2</sup> (22 to 12 AWG), multi-stranded
<b>Torques and terminals</b>	Module faceplate screws: 0.5 N·m (4.4 lb-in) Connection of wiring to terminals: 0.5 N·m (4.4 lb-in) UL/cUL Listed: Wiring must be minimum 90 °C (194 °F) copper conductors only
<b>Galvanic isolation</b>	Between individual relays and other I/Os: 2210 V, 50 Hz for 60 s Between load sharing and other I/Os: 600 V, 50 Hz for 60 s Between terminals 12 to 15 (analogue output 1, PWM output), and other I/Os: 600 V, 50 Hz for 60 s <ul style="list-style-type: none"> <li>Analogue output 1 and the PWM output are galvanically connected</li> </ul> Between terminals 16, 17 (analogue output 2) and other I/Os: 600 V, 50 Hz for 60 s Between terminals 18 to 21 (analogue inputs) and other I/Os: 600 V, 50 Hz for 60 s <ul style="list-style-type: none"> <li>Analogue inputs 1 and 2 are galvanically connected</li> </ul>
<b>Ingress protection</b>	Unmounted: No protection rating Mounted in rack: IP20 according to IEC/EN 60529
<b>Dimensions</b>	L×H×D: 28 × 162 × 150 mm (1.1 × 6.4 × 5.9 in)
<b>Weight</b>	224 g (0.5 lb)

## 3. Legal information

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