# GAM3.2

4921240638-D

Governor and AVR module

**Data sheet**

Improve Tomorrow

# 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.

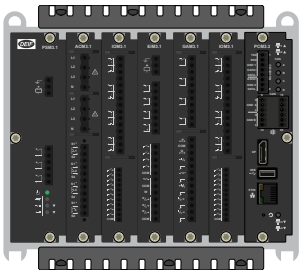
### Controller racks

**R4.1**

Modules

1 PSM3.1
2 module selection
1 PCM3.3

**R7.1**

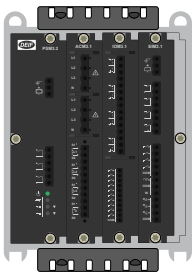


Modules

1 PSM3.1
5 module selection
1 PCM3.3

### Extension racks (EtherCAT)

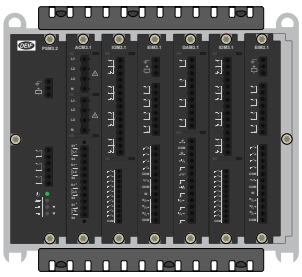
**R4.1**



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.

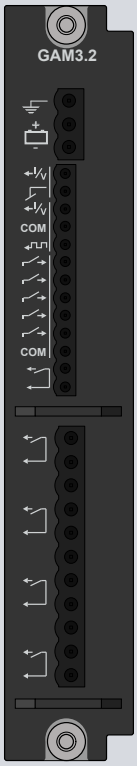
# 2. Technical specifications

## 2.1 Governor and AVR module GAM3.2

This governor and AVR module has its own power supply, two analogue outputs and a pulse width modulation output, five digital inputs, a status relay output, and four relay outputs. Apart from the status relay, all these I/Os are configurable.

GAM3.2 has its own microprocessor. If the rack power supply fails, GAM3.2 can continue to be used for manual operation if it has its own, independent power supply. The power supply terminals include circuit protection against load dump transients and JEM177 surge transients (rugged design). These terminals also include battery voltage measurement.

### GAM3.2 terminals

| Module | Count | Symbol | Type | Name |
|---|---|---|---|---|
|  | 1 | | Ground | Frame ground |
| | 1 | | 12 or 24 V | Power supply |
| | 2 | | Analogue current or voltage output | GOV/AVR/configurable |
| | 1 | | Pulse width modulation (PWM) output | PWM output |
| | 5 | | Digital input | Configurable |
| | 1 | | Relay output | GAM3.2 status |
| | 4 | | Relay output | Configurable |

### GAM3.2 technical specifications

| Category | Specification |
|---|---|
| **Auxiliary power supply** | Input voltage: 12 or 24 V DC nominal (8 to 36 V DC continuously)<br>UL/cUL Listed: 10 to 32.5 V DC<br>0 V DC for 50 ms when coming from at least 8 V DC (cranking dropout)<br>Consumption: Typical 3 W, maximum 5 W<br>Voltage measurement accuracy: ±0.1 V (measurement range 8 to 36 V DC)<br>Internally protection: 12 A fuse (not replaceable) (fuse size determined by load dump requirements)<br>Voltage withstand: ±36 V DC<br>Load dump protected by TVS diodes<br><br>**Start current**<br>• Power supply current limiter<br>◦ 24 V: 0.6 A minimum<br>◦ 12 V: 1.2 A minimum |

| Category | Specification |
|---|---|
| | • Battery: No limit |
| **Analogue multi-functional outputs** | **Current output**<br>• Any custom range between -25 and 25 mA<br>• Accuracy: 1 % of the selected range (minimum range: 5 mA)<br>• 16-bit resolution<br>• Active output (internal supply)<br>• Maximum load: 400 Ω<br>**Voltage output (DC)**<br>• Any custom range between -10 and 10 V<br>• Accuracy: 1 % of the selected range (minimum range: 1 V)<br>• 16-bit resolution<br>• Minimum load: 600 Ω. Voltage output internal resistance: < 1 Ω.<br>Voltage withstand: ±36 V DC<br>Controller power off: Internal resistance > 10 MΩ |
| **Pulse width modulation (PWM) output** | Frequency: 500 Hz ±50 Hz<br>Resolution: 43,200 levels<br>Voltage:<br>• Low level: < 0.5 V<br>• High level: > 5.5 V<br>• Maximum: 6.85 V<br>Output impedance: 100 Ω<br>Nominal temperature range: -40 to 70 °C (-40 to 158 °F)<br>Reference temperature range: 15 to 30 °C (59 to 86 °F)<br>Duty cycle accuracy (5 to 95 %): 0.25 % within reference temperature range<br>0.2 % of full scale additional error per 10 °C (18 °F) outside the reference range<br>Example: At 70 °C (158 °F) the accuracy of the PWM output is 0.25 % + 4 × 0.2 % = 1.05 %<br>Voltage withstand: ±30 V DC |
| **Digital inputs** | Bipolar inputs<br>• ON: -36 to -8 V DC, and 8 to 36 V DC<br>• OFF: -2 to 2 V DC<br>Minimum pulse length: 50 ms<br>Impedance: 4.7 kΩ<br>Voltage withstand: ±36 V DC |
| **Relay output** (GAM3.2 status) | Relay type: Solid state<br>Electrical rating and UL/cUL Listed: 30 V DC and 1 A, resistive<br>Voltage withstand: ±36 V DC |
| **Relay outputs** | Relay type: Electromechanical<br>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)<br>Altitude derating from 2,000 to 4,000 m (6,562 to 13,123 ft): Maximum 150 V AC phase-to-phase<br>Voltage withstand: 250 V AC |
| **Terminal connections** | **Frame ground and power supply**<br>• Terminals: Standard 45° plug, 2.5 $mm^2$<br>• Wiring: 1.5 to 2.5 $mm^2$ (16 to 12 AWG), multi-stranded<br>**Analogue inputs, PWM, digital inputs and the status relay**<br>• Terminals: Standard 45° plug, 1.5 $mm^2$<br>• Wiring: 0.5 to 1.5 $mm^2$ (28 to 16 AWG), multi-stranded<br>**Relay outputs**<br>• Terminals: Standard 45° plug, 2.5 $mm^2$ |

| Category | Specification |
|---|---|
| | • Wiring: 0.5 to 2.5 $mm^2$ (22 to 12 AWG), multi-stranded |
| **Torques and terminals** | Module faceplate screws: 0.5 N·m (4.4 lb-in)<br>Connection of wiring to frame ground and power supply terminals: 0.5 N·m (4.4 lb-in)<br>Connection of wiring to analogue inputs, PWM, digital inputs, and the status relay terminals: 0.25 N·m (2.2 lb-in)<br>Connection of wiring to relay output terminals: 0.5 N·m (4.4 lb-in)<br>UL/cUL Listed: Wiring must be minimum 90 °C (194 °F) copper conductors only |
| **Galvanic isolation** | Between power supply and other I/Os: 600 V, 50 Hz for 60 s<br>Between analogue inputs, PWM, digital inputs, and the status relay, and other I/Os: 600 V, 50 Hz for 60 s<br>The analogue output on terminals 5 and 6 is galvanically connected to the PWM output (terminals 6 and 7)<br>Between relay groups and other I/Os: 2210 V, 50 Hz for 60 s |
| **Ingress protection** | Unmounted: No protection rating<br>Mounted in rack: IP20 according to IEC/EN 60529 |
| **Dimensions** | L×H×D: 28 × 162 × 150 mm (1.1 × 6.4 × 5.9 in) |
| **Weight** | 246 g (0.5 lb) |

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