GAM3.1

4921240637B

Governor and AVR module

Data sheet

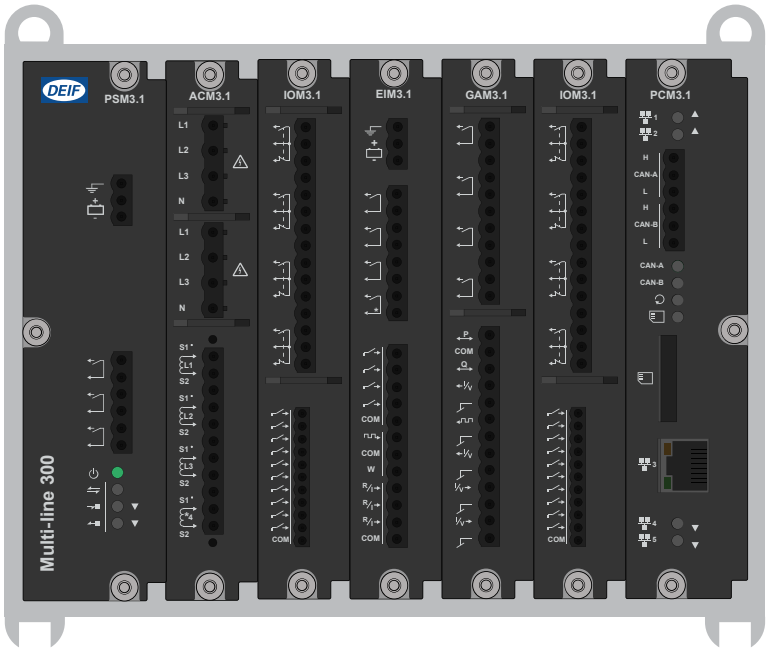
DEIF Improve Tomorrow

1. Multi-line 300

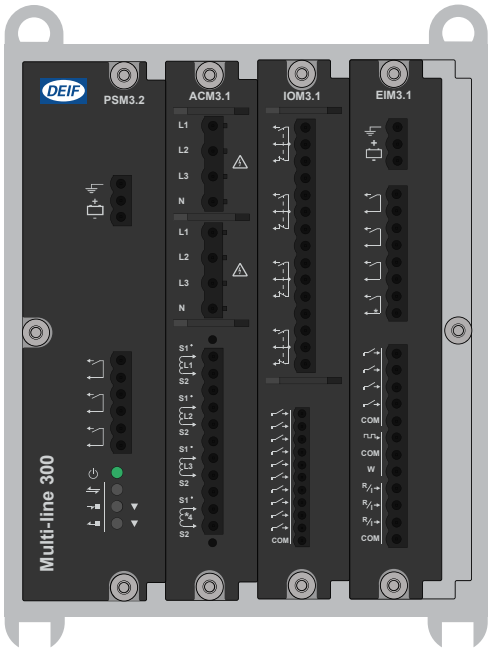
1.1 About the hardware modules

The Multi-line 300 (ML 300) hardware modules are printed circuit boards that slot in to either a rack R7.1 or rack R4.1. Depending on the type of module, they can provide measurement connections, inputs, and outputs.

Example rack R7.1



Example rack R4.1



The hardware modules feature:

- Placement flexibility in the rack.
- Remove, replace, or add 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.

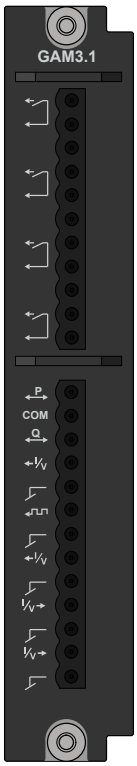
2. Technical specifications

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	P	Load sharing	Active power (P) (kW) load sharing (future use)
	1	Q	Load sharing	Reactive power (Q) (kvar) sharing (future use)
	2	I/V	Analogue current or voltage output	GOV/AVR/configurable
	1		Pulse width modulation (PWM) output	PWM output (with PWM ground)
	2	I/V	Analogue current or voltage input	Configurable

GAM3.1 technical specifications

Category	Specification
Relay outputs	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
Load sharing (future use) P Q	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
Analogue multi-functional outputs I/V	**Current output** • -20 to 20 mA, or 0 to 20 mA, or 4 to 20 mA, or any custom range between -25 and 25 mA • Accuracy: 1 % of the selected range (minimum range: 5 mA) • 16-bit resolution over the range -25 to 25 mA • Active output (internal supply) • Maximum load: 400 Ω **Voltage output (DC)**

Category	Specification
	• -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 • Accuracy: 1 % of the selected range (minimum range: 1 V) • 16-bit resolution over the range -10 to 10 V • Minimum load: 600 Ω. Voltage output internal resistance: < 1 Ω Voltage withstand: ±36 V DC Controller power off: Internal resistance > 10 MΩ
Pulse width modulation (PWM) output	Frequency: 500 Hz ±50 Hz Resolution: 43,200 levels Voltage: • Low level: < 0.5 V • High level: > 5.5 V • Maximum: 6.85 V 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
Analogue multi-functional inputs	**Current inputs** • From active transmitter: 0 to 20 mA, 4 to 20 mA, or any custom range between 0 and 24 mA • Accuracy: 1 % of selected range **Voltage inputs (DC)** • -10 to 10 V, 0 to 10 V, or any custom range between -10 and 10 V • Accuracy: 1 % of selected range Voltage withstand: ±36 V DC
Terminal connections	Terminals: Standard 45° plug, 2.5 mm^2 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) 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
Galvanic isolation	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 • Analogue output 1 and the PWM output are galvanically connected 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 • Analogue inputs 1 and 2 are galvanically connected
Ingress protection	Unmounted: No protection rating 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	224 g (0.5 lb)

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