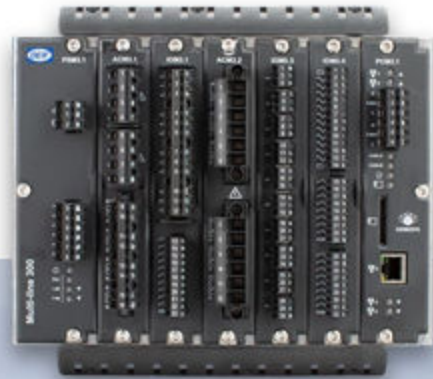


# AMC 300

Programmable Automation Controller

Data sheet



<b>1. Product description</b>	
<b>1.1 About</b>	<b>3</b>
<b>1.2 Software versions</b>	<b>3</b>
<b>1.3 Functions and features</b>	<b>3</b>
1.3.1 General functions and features	3
1.3.2 Controller hardware configuration	4
1.3.3 Extension rack hardware configuration	5
<b>2. Application</b>	
<b>2.1 Example AMC 300 application</b>	<b>8</b>
<b>2.2 Extension rack functions</b>	<b>8</b>
<b>3. Technical specifications</b>	
<b>3.1 General technical specifications</b>	<b>9</b>
3.1.1 Electrical specifications	9
3.1.2 Mechanical specifications	9
3.1.3 Environment specifications	10
3.1.4 Safety	10
3.1.5 Approvals	10
<b>3.2 Rack specifications</b>	<b>10</b>
3.2.1 Rack R4.1	10
3.2.2 Rack R7.1	11
<b>3.3 Hardware module specifications</b>	<b>12</b>
3.3.1 Power supply module PSM3.1 (Controller)	12
3.3.2 Power supply module PSM3.2 (Extension)	14
3.3.3 Alternating current module ACM3.1	16
3.3.4 Differential current module ACM3.2	17
3.3.5 Engine interface module EIM3.1	19
3.3.6 Input/output module IOM3.1	22
3.3.7 Input/output module IOM3.2	23
3.3.8 Input/output module IOM3.3	25
3.3.9 Input/output module IOM3.4	27
3.3.10 Processor and communication module PCM3.1	29
3.3.11 Blind module	30
<b>3.4 Accessory specifications</b>	<b>30</b>
3.4.1 Ethernet cable	30
<b>4. Application development</b>	
<b>4.1 IEC61131-3 programming</b>	<b>31</b>
<b>4.2 Supported software features</b>	<b>31</b>
<b>5. Ordering</b>	
<b>5.1 Modules for controller configuration</b>	<b>33</b>
<b>6. Legal information</b>	
<b>6.1 Disclaimer and copyright</b>	<b>35</b>

# 1. Product description

## 1.1 About

The AMC 300 is a programmable automation controller (PAC) designed for resilient operation, while highly serviceable. It includes CODESYS V3.5 for IEC 61131-3 development.

The AMC 300 can run both headless or with a human-machine interface (HMI). HMI is achieved by means of CODESYS web visualisation and a browser-enabled device (for example, DEIF's AGI400).

An AMC 300 control system consists of one or more base mounted racks, each with a combination of selectable power supply (Bus coupler), I/O modules and CPU module. EtherCAT is used as intermodule communication via backplane interface and inter-rack communication.



### More information

You can find additional technical documentation at [www.deif.com/documentation/amc-300/](http://www.deif.com/documentation/amc-300/)

## 1.2 Software versions

The information in this document relates to software versions:

Software	Details	Version
BSP	Board Support Package	4.0.0.x
CODESYS	CODESYS runtime	3.5.15.0 or later
CODESYS IDE	PC software for development of CODESYS applications	3.5.15.0 or later
CODESYS TSP	AMC 300 CODESYS Target Support Package (TSP)	1.0.1.0

## 1.3 Functions and features

### 1.3.1 General functions and features

Functions and features	
<b>Modular and configurable design</b>	<ul style="list-style-type: none"><li>• Configurable hardware modules (printed circuit boards)</li><li>• Hardware modules can be replaced or added in the field</li><li>• Optional I/O extension rack</li></ul>
<b>Plug and play</b>	<ul style="list-style-type: none"><li>• Automatic network configuration (uses IPv6)</li><li>• Automatic date and time synchronisation between all controllers in the system</li><li>• NTP time synchronisation with local NTP servers (Selected AMC 300)</li></ul>
<b>Communication</b>	<ul style="list-style-type: none"><li>• Internet Protocol version 6 (IPv6) with SLAAC</li><li>• Configurable Internet Protocol version 4 (IPv4)</li><li>• EtherCAT for AMC 300 / Multi-line Extension racks or third party EtherCAT devices</li><li>• OPC UA protocol</li></ul>
<b>Control</b>	<ul style="list-style-type: none"><li>• CODESYS runtime</li></ul>
<b>Network</b>	<ul style="list-style-type: none"><li>• 5 port switch with VLAN</li></ul>
<b>Security</b>	<ul style="list-style-type: none"><li>• Secure update with signed update packages</li><li>• Dual partition for safe update</li><li>• Secure boot - only signed software will run</li><li>• Re-signing tools for deployment of full application package</li></ul>

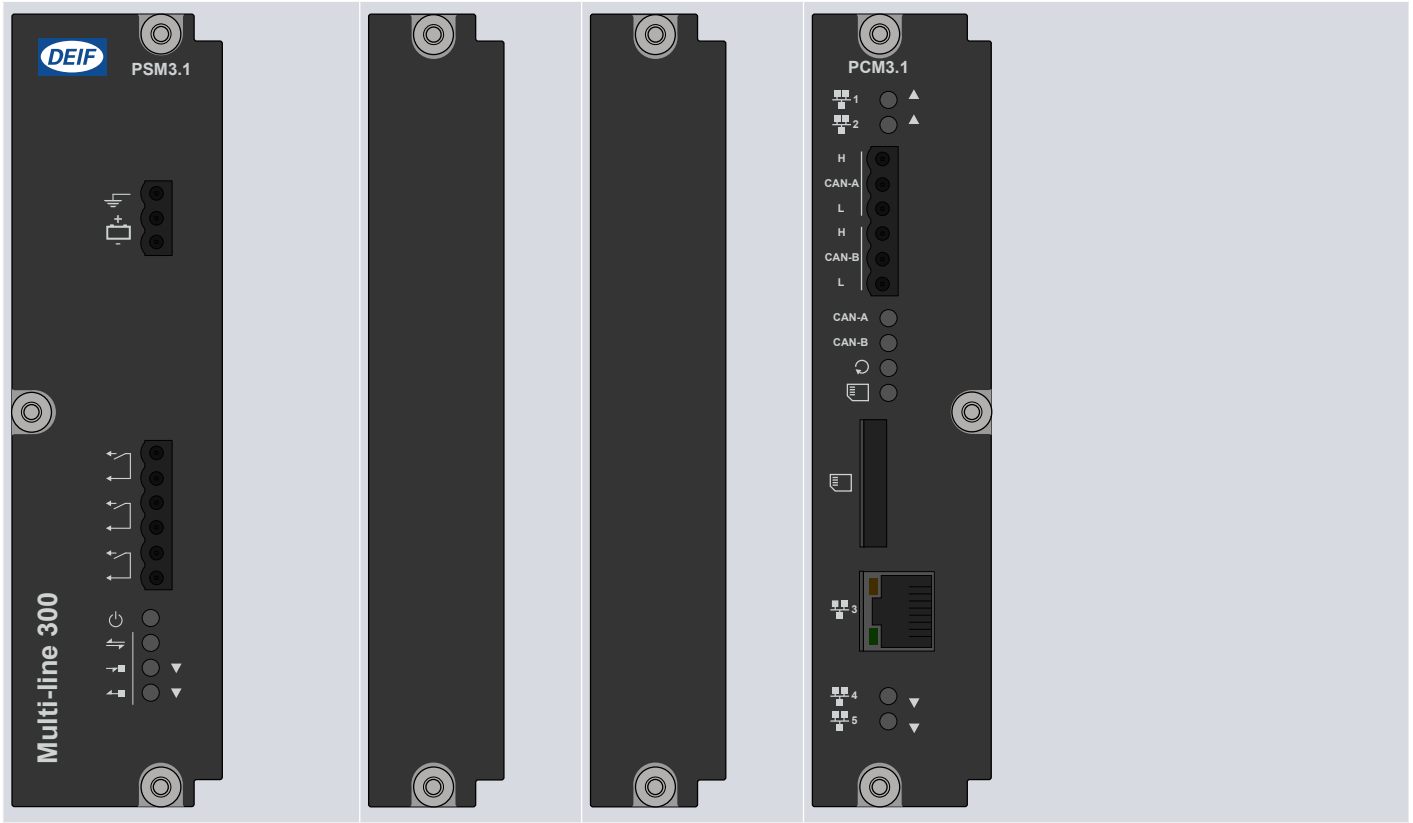


**Table 1.2** Minimum controller hardware in R4.1

Slot 1	Slot 2	Slot 3	Slot 4
PSM3.1	Blind module	Blind module	PCM3.1

Power supply module

Processor and communication module



<b>Weight</b>	R4.1 (minimum hardware): 1457 g (3.2 lb)
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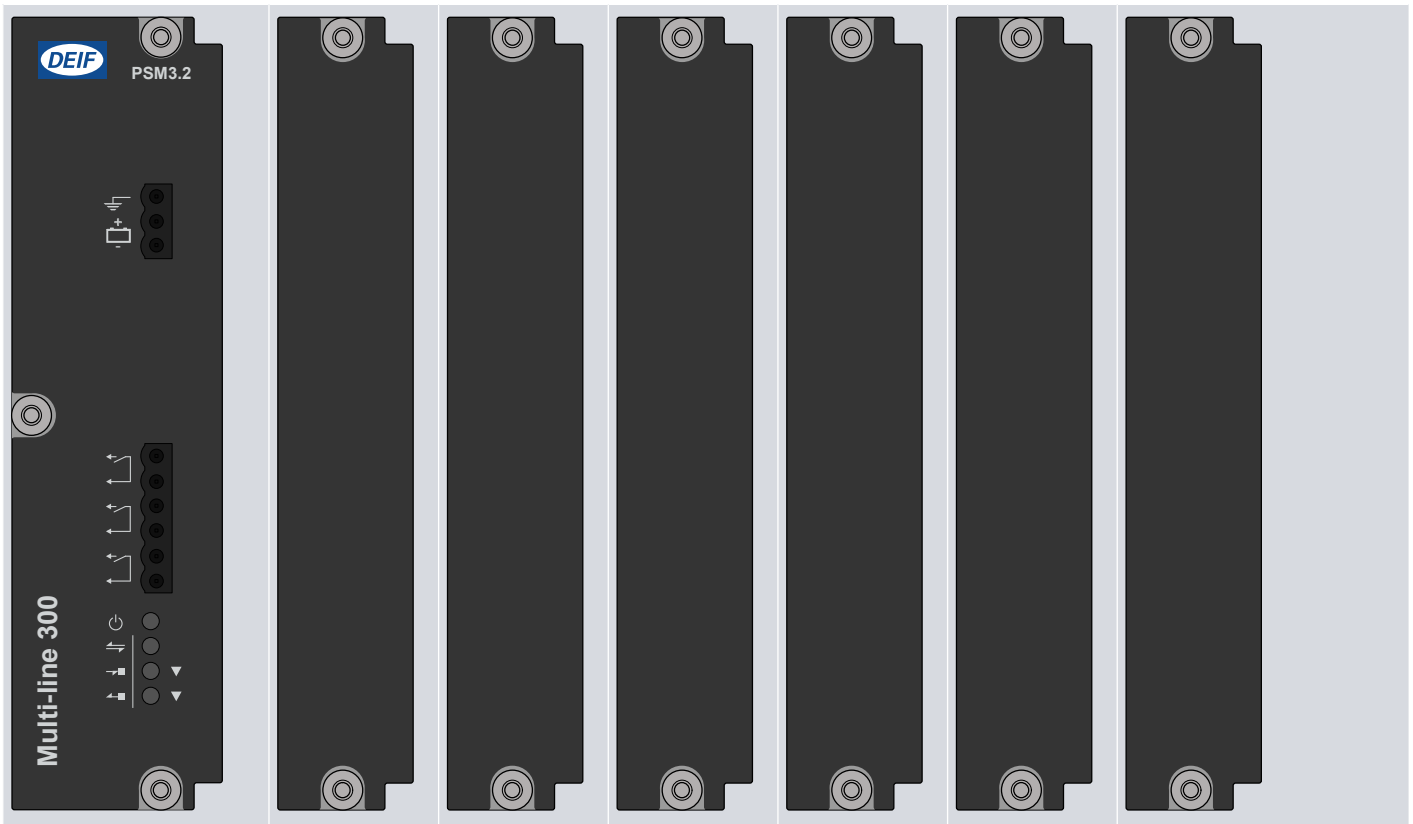
### 1.3.3 Extension rack hardware configuration

Use either a 7-slot or 4-slot rack for the controller. Additional hardware modules can be ordered and installed in the empty slots. Spare hardware modules may also be ordered for installation in the field.

**Table 1.3** Minimum extension rack hardware in R7.1

Slot 1	Slot 2	Slot 3	Slot 4	Slot 5	Slot 6	Slot 7
PSM3.2	Blind module	Blind module	Blind module	Blind module	Blind module	Blind module and blanking plate

Power supply module

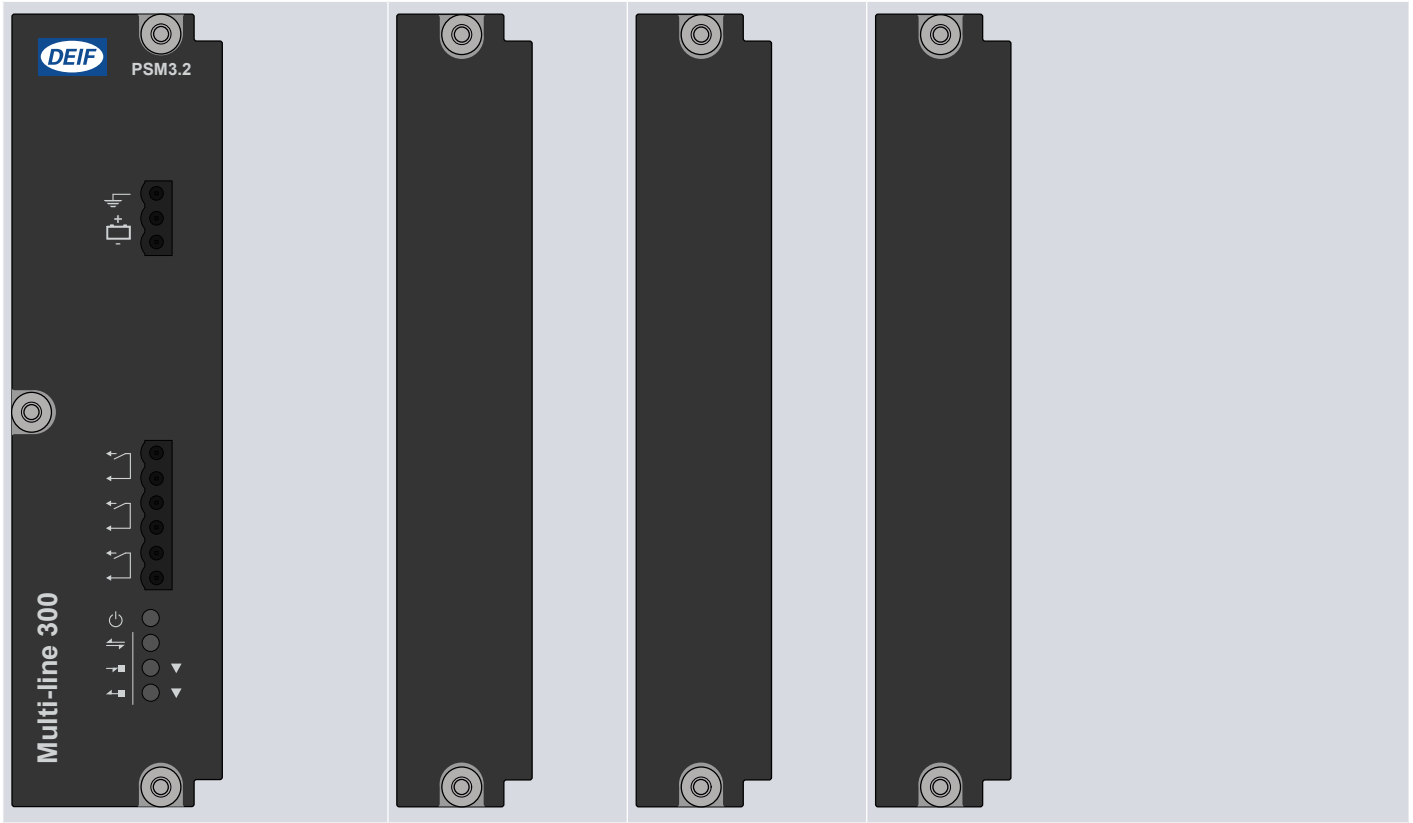


<b>Weight</b>	R7.1: Controller (minimum hardware): 2283 g (5.0 lb)
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**Table 1.4** Minimum extension rack hardware in R4.1

Slot 1	Slot 2	Slot 3	Slot 4
PSM3.2	Blind module	Blind module	Blind module and blanking plate

Power supply module

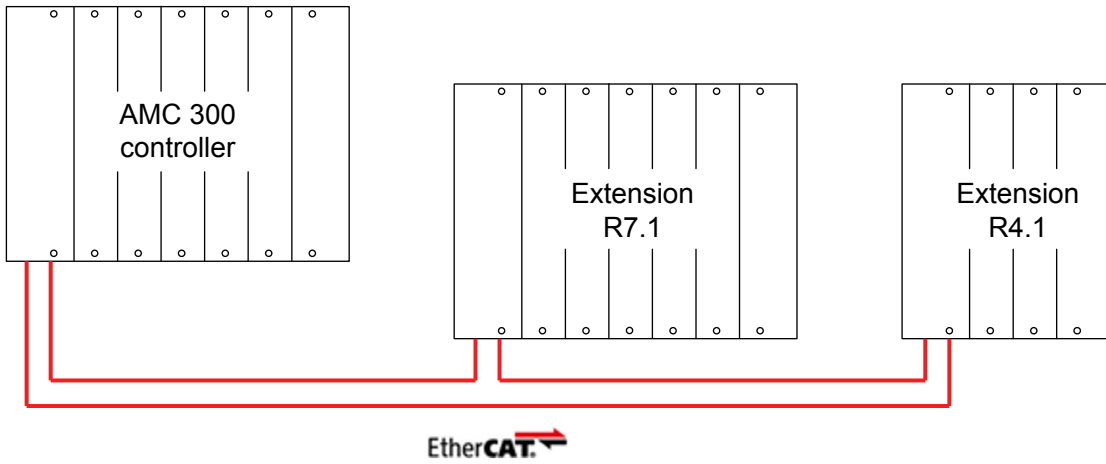


<b>Weight</b>	R4.1 (minimum hardware): 1457 g (3.2 lb)
---------------	--

## 2. Application

### 2.1 Example AMC 300 application

An AMC 300 controller with 2 extension racks connected with EtherCAT.



### 2.2 Extension rack functions

	Functions
<b>General</b>	<ul style="list-style-type: none"><li>• Extends I/O interface<ul style="list-style-type: none"><li>◦ 6 additional hardware modules in Rack7.1</li><li>◦ 3 additional hardware modules in Rack4.1</li></ul></li></ul>



## 3. Technical specifications

The general technical specifications apply to all hardware. Refer to the other sections for the specific technical specifications for specific hardware.

The specifications and approvals apply to the rack with all the hardware modules properly installed.

### 3.1 General technical specifications

#### 3.1.1 Electrical specifications

Category	Specification
<b>Safety</b>	EN 61010-1, CAT III, 600V, pollution degree 2 IEC/EN 60255-27, CAT III, 600V, pollution degree 2 UL508 UL6200 CSA C22.2 No. 14-13 CSA C22.2 No. 142 M1987
<b>Electromagnetic compatibility (EMC)</b>	EN 61000-6-3 Residential, commercial and light-industrial environments EN 61000-6-2 Industrial environments IEC/EN 60255-26 IEC 60533 power distribution zone IACS UR E10 power distribution zone for controller rack IEC 60945 for display unit
<b>Load dump</b>	ISO 7637-2 pulse 5a

#### 3.1.2 Mechanical specifications

Category	Specification
<b>Vibration</b>	Operation 3 to 8 Hz: 17 mm peak-to-peak 8 to 100 Hz: 4 g 100 to 500 Hz: 2 g
	Response 10 to 58.1 Hz: 0.15 mm peak-to-peak 58.1 to 150 Hz: 1 g
	Endurance 10 to 150 Hz: 2 g
	Seismic 3 to 8.15 Hz: 15 mm peak-to-peak 8.15 to 35 Hz: 2 g
	IEC 60068-2-6, IACS UR E10, IEC 60255-21-1 (class 2), IEC 60255-21-3 (class 2)
<b>Shock (base mounted)</b>	10 g, 11 ms, half sine IEC 60255-21-2 Response class 2 30 g, 11 ms, half sine IEC 60255-21-2 Endurance class 2 50 g, 11 ms, half sine IEC 60068-2-27
<b>Bump</b>	20 g, 16 ms, half sine IEC 60255-21-2 class 2
<b>Material</b>	All plastic materials are self-extinguishing according to UL94 (V0)

**NOTE**  $g$  = gravitational force (g-force).

### 3.1.3 Environment specifications

Category	Specification
Humidity	97 % relative humidity condensing, to IEC 60068-2-30
Operating temperature, rack and modules	-40 to 70 °C (-40 to 158 °F) UL/cUL Listed: maximum surrounding air temperature: 55 °C (131 °F)
Storage temperature, rack and modules	-40 to 80 °C (-40 to 176 °F)
Operating altitude	Up to 4,000 m (13,123 ft) Refer to the module specifications for information on altitude derating over 2,000 m (6,562 ft)

### 3.1.4 Safety

Standards
EN 61010-1, CAT III, 600V, pollution degree 2
IEC/EN 60255-27, CAT III, 600V, pollution degree 2
UL508
UL6200
CSA C22.2 No. 14-13
CSA C22.2 No. 142 M1987

### 3.1.5 Approvals

These approvals apply to the controller rack (with all the modules properly installed).

Standards
CE
UL/cUL Listed to UL508 - Industrial Control Equipment, and CSA C22.2 No. 142 M1987 - Process Control Equipment
UL/cUL Recognised to UL6200 - Controls for stationary engine driven assemblies, and CSA C22.2 No. 14-13 - Industrial Control Equipment

## 3.2 Rack specifications

### 3.2.1 Rack R4.1

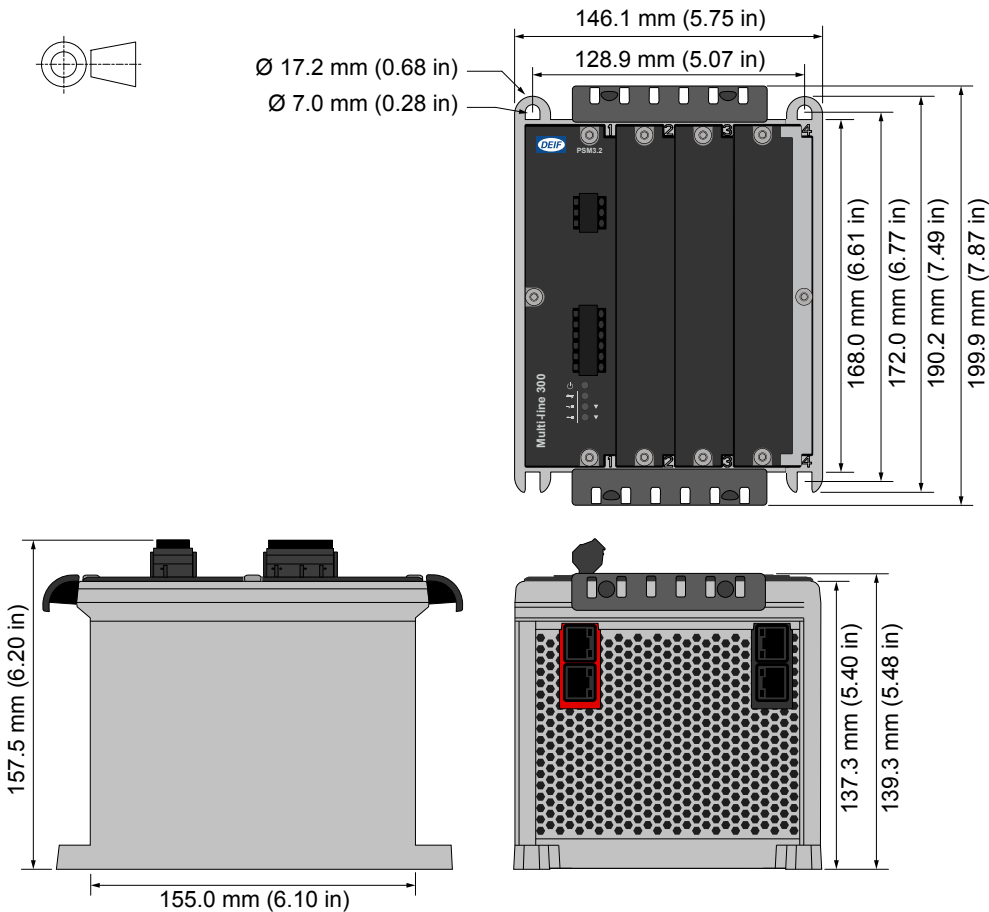
#### Rack R4.1 technical specifications

Category	Specification
Ingress protection	IP20 (all slots must have modules or blind modules mounted) according to IEC/EN 60529
UL/cUL Listed	Type Complete Device, Open Type 1
Material	Rack frame: Aluminium  Base mount, using four M6 bolts with self-locking washers (or self-locking screws).
Mounting	The bolts and self-locking washers (or self-locking screws) are not included with the rack.  UL/cUL Listed: For use on a flat surface of a type 1 enclosure

Category	Specification
	UL/cUL Listed: To be installed in accordance with the NEC (US) or the CEC (Canada)
<b>Tightening torque</b>	Mounting bolts: 4 N·m (35 lb-in)

### Rack 4.1 dimension and weight specifications

Category	Specification
<b>Dimensions</b>	L 146.1 mm x H 199.9 mm x D 157.5 mm (5.75 in x 7.87 in x 6.20 in) (outer frame, includes cable strain relief plates)
<b>Weight</b>	Without any hardware modules: 994 g (2.2 lb)



### 3.2.2 Rack R7.1

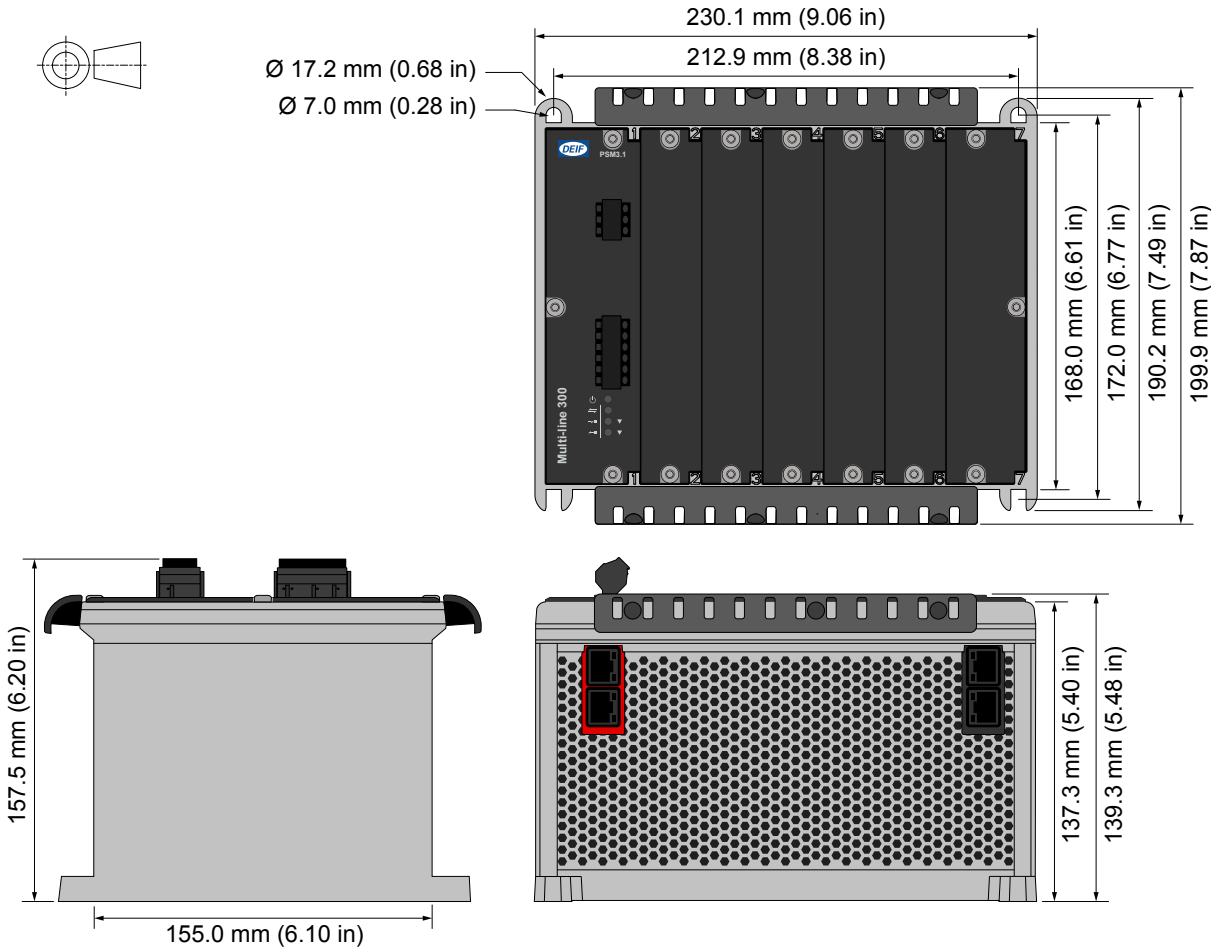
#### Rack 7.1 technical specifications

Category	Specification
<b>Ingress protection</b>	IP20 (all slots must have modules or blind modules mounted) according to IEC/EN 60529
<b>UL/cUL Listed</b>	Type Complete Device, Open Type 1
<b>Material</b>	Rack frame: Aluminium Base mount, using four M6 bolts with self-locking washers (or self-locking screws).
<b>Mounting</b>	The bolts and self-locking washers (or self-locking screws) are not included with the rack. UL/cUL Listed: For use on a flat surface of a type 1 enclosure

Category	Specification
	UL/cUL Listed: To be installed in accordance with the NEC (US) or the CEC (Canada)
<b>Tightening torque</b>	Mounting bolts: 4 N·m (35 lb-in)

### Rack 7.1 dimensions and weight specifications

Category	Specification
<b>Dimensions</b>	L 230.1 mm x H 199.9 mm x D 157.5 mm (9.06 in x 7.87 in x 6.20 in) (outer frame, includes cable strain relief plates)
<b>Weight</b>	Without any hardware modules: 1330 g (2.9 lb)



## 3.3 Hardware module specifications

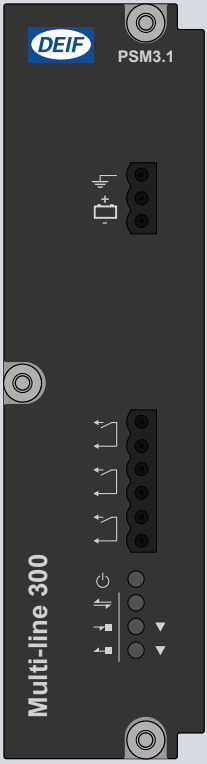







### 3.3.1 Power supply module PSM3.1 (Controller)

The power supply module provides power to all hardware modules in the rack. The rack status and alarms activate the three relay outputs. There are two ports for internal communication (EtherCAT) only with extension racks.




The PSM3.1 must to be powered by a power supply with Power Boost function.

The PSM3.1 manages the hardware module self-checks for the rack and includes a power LED. The power supply terminals include circuit protection against load dump transients and JEM177 surge transients (rugged design). These terminals also include battery voltage measurement.

## PSM3.1 terminals

Module	Count	Symbol	Type/Info	Name
	1		Ground	Frame ground
	1		12 or 24 V	Power supply
	3		Relay output	1 × Status OK (fixed) 2 × configurable
	1		<ul style="list-style-type: none"> <li>● <b>Off</b> : No power supply</li> <li>● <b>Red flash</b> : PSM is starting or module failure</li> <li>● <b>Green</b> : Power supply</li> <li>● <b>Green flash</b> : Controller identification</li> </ul>	Power supply indication
	1		<ul style="list-style-type: none"> <li>● <b>Off</b> : No EtherCAT communication</li> <li>● <b>Green</b> : EtherCAT Communication</li> </ul>	EtherCAT communication connections (to connect to extension racks).  LEDs are on the module front, connections are at the module bottom.
	1		EtherCAT communication (RJ45) input <ul style="list-style-type: none"> <li>● <b>Off</b> : No communication</li> <li>● <b>Green</b> : Communication connected</li> <li>● <b>Green flash</b> : Active communication</li> </ul>	
	1		EtherCAT communication (RJ45) output <ul style="list-style-type: none"> <li>● <b>Off</b> : No communication</li> <li>● <b>Green</b> : Communication connected</li> <li>● <b>Green flash</b> : Active communication</li> </ul>	

## PSM3.1 technical specifications

Category	Specification
<b>Frame ground</b> 	Voltage withstand: ±36 V DC to the power supply positive (terminal 1) and negative (terminal 2)
<b>Controller power supply</b> 	Input voltage: 12 or 24 V DC nominal (8 to 36 V DC continuously) UL/cUL Listed: 10 to 32.5 V DC 0 V DC for 50 ms when coming from at least 8 V DC (cranking dropout) Consumption: Typical 20 W, maximum 35 W Voltage measurement accuracy: 0 to 30 V: ±1 V; 30 to 36 V: +1/-2 V Internal protection: 12 A fuse (not replaceable) (fuse size determined by load dump requirements) Voltage withstand: ±36 V DC Load dump protected by TVS diodes  <b>Start current</b> <ul style="list-style-type: none"> <li>• Power supply current limiter               <ul style="list-style-type: none"> <li>◦ 24 V: 4 A minimum</li> <li>◦ 12 V: 8 A minimum</li> </ul> </li> <li>• Battery: No limit</li> </ul>
<b>Relay outputs</b> 	Relay type: Solid state Electrical rating and UL/cUL Listed: 30 V DC and 1 A, resistive Voltage withstand: ±36 V DC
<b>Terminal connections</b>	<b>Frame ground and power supply:</b> <ul style="list-style-type: none"> <li>• Terminals: Standard 45° plug, 2.5 mm<sup>2</sup></li> <li>• Wiring: 1.5 to 2.5 mm<sup>2</sup> (16 to 12 AWG), multi-stranded</li> </ul> <b>Other connections:</b>

Category	Specification
	<ul style="list-style-type: none"> <li>Terminals: Standard 45° plug, 2.5 mm<sup>2</sup></li> <li>Wiring: 0.5 to 2.5 mm<sup>2</sup> (22 to 12 AWG), multi-stranded</li> </ul>
<b>Communication connections</b>	EtherCAT communication: RJ45. Use an Ethernet cable that meets or exceeds the SF/UTP CAT5e specifications
<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 power supply and other I/Os: 600 V, 50 Hz for 60 s Between relay groups and other I/Os: 600 V, 50 Hz for 60 s Between internal communication ports and other I/Os: 600 V, 50 Hz for 60 s
<b>Ingress protection</b>	Unmounted: No protection rating Mounted in rack: IP20 according to IEC/EN 60529
<b>Dimensions</b>	L×H×D: 43.3 × 162 × 150 mm (1.5 × 6.4 × 5.9 in)
<b>Weight</b>	331 g (0.7 lb)

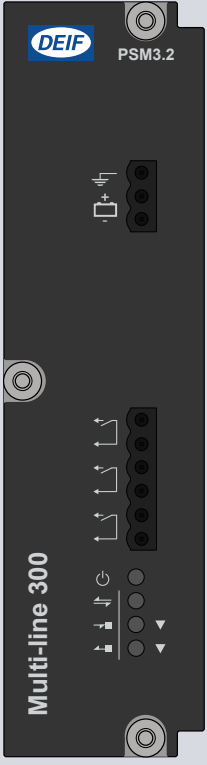







### 3.3.2 Power supply module PSM3.2 (Extension)

The power supply module provides power to all hardware modules in the extension rack. There are two ports for internal communication with the main controller. The internal communication (EtherCAT) connections are only used to communicate with the main controller. The rack status and alarms activate the three relay outputs.




The PSM3.2 must to be powered by a power supply with Power Boost function.

The PSM3.2 manages the hardware module self-checks for the rack and includes a power LED. The power supply terminals include circuit protection against load dump transients and JEM177 surge transients (rugged design). These terminals also include battery voltage measurement.

## PSM3.2 terminals

Module	Count	Symbol	Type/Info	Name
	1		Ground	Frame ground
	1		12 or 24 V	Power supply
	3		Relay output	1 × Status OK (fixed) 2 × configurable
	1		<ul style="list-style-type: none"> <li>● <b>Off</b> : No power supply</li> <li>🔴 <b>Red flash</b> : PSM is starting or module failure</li> <li>● <b>Green</b> : Power supply</li> <li>🟢 <b>Green flash</b> : Rack identification</li> </ul>	Power supply indication
	1		<ul style="list-style-type: none"> <li>● <b>Off</b> : No EtherCAT communication</li> <li>● <b>Green</b> : EtherCAT Communication</li> </ul>	EtherCAT communication connections (to connect to the racks). LEDs are on the module front, connections are at the module bottom.
	1		EtherCAT communication (RJ45) input <ul style="list-style-type: none"> <li>● <b>Off</b> : No communication</li> <li>● <b>Green</b> : Communication connected</li> <li>🟢 <b>Green flash</b> : Active communication</li> </ul>	
	1		EtherCAT communication (RJ45) output <ul style="list-style-type: none"> <li>● <b>Off</b> : No communication</li> <li>● <b>Green</b> : Communication connected</li> <li>🟢 <b>Green flash</b> : Active communication</li> </ul>	

## PSM3.2 technical specifications

Category	Specification
<b>Frame ground</b> 	Voltage withstand: ±36 V DC to the power supply positive (terminal 1) and negative (terminal 2)
<b>Controller power supply</b> 	Input voltage: 12 or 24 V DC nominal (8 to 36 V DC continuously) UL/cUL Listed: 10 to 32.5 V DC 0 V DC for 50 ms when coming from at least 8 V DC (cranking dropout) Consumption: Typical 20 W, maximum 35 W Voltage measurement accuracy: 0 to 30 V: ±1 V; 30 to 36 V: +1/-2 V Internal protection: 12 A fuse (not replaceable) (fuse size determined by load dump requirements) Voltage withstand: ±36 V DC Load dump protected by TVS diodes  <b>Start current</b> <ul style="list-style-type: none"> <li>• Power supply current limiter               <ul style="list-style-type: none"> <li>◦ 24 V: 4 A minimum</li> <li>◦ 12 V: 8 A minimum</li> </ul> </li> <li>• Battery: No limit</li> </ul>
<b>Relay outputs</b> 	Relay type: Solid state Electrical rating and UL/cUL Listed: 30 V DC and 1 A, resistive Voltage withstand: ±36 V DC
<b>Terminal connections</b>	<b>Frame ground and power supply:</b> <ul style="list-style-type: none"> <li>• Terminals: Standard 45° plug, 2.5 mm<sup>2</sup></li> <li>• Wiring: 1.5 to 2.5 mm<sup>2</sup> (16 to 12 AWG), multi-stranded</li> </ul> <b>Other connections:</b>

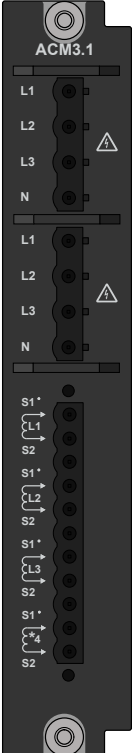


Category	Specification
	<ul style="list-style-type: none"> <li>Terminals: Standard 45° plug, 2.5 mm<sup>2</sup></li> <li>Wiring: 0.5 to 2.5 mm<sup>2</sup> (22 to 12 AWG), multi-stranded</li> </ul>
<b>Communication connections</b>	EtherCAT communication: RJ45. Use an Ethernet cable that meets or exceeds the SF/UTP CAT5e specifications
<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 power supply and other I/Os: 600 V, 50 Hz for 60 s Between relay groups and other I/Os: 600 V, 50 Hz for 60 s Between internal communication ports and other I/Os: 600 V, 50 Hz for 60 s
<b>Ingress protection</b>	Unmounted: No protection rating Mounted in rack: IP20 according to IEC/EN 60529
<b>Dimensions</b>	L×H×D: 43.3 × 162 × 150 mm (1.5 × 6.4 × 5.9 in)
<b>Weight</b>	331 g (0.7 lb)

### 3.3.3 Alternating current module ACM3.1

The alternating current module ACM3.1 measures the voltage and current on one side of a breaker, and the voltage on the other side. The hardware module responds when the measurements exceed the AC alarm parameters.

ACM3.1 provides robust frequency detection in environments with electrical noise. ACM3.1 allows extended measurement bandwidth up to 40 times the nominal frequency. ACM3.1 includes a configurable 4th current measurement.

#### ACM3.1 terminals

Module	Count	Symbol	Type	Name
	2 × (L1, L2, L3 and N)	L1/L2/L3/N	Voltage	3-phase voltage measurements
	1 × (L1, L2, L3 and 4th)	 	Current	3-phase current measurement
				4th current measurement



## ACM3.1 technical specifications

Category	Specification
<b>Voltage measurements</b>	Nominal value: 100 to 690 V AC phase-to-phase Measurement range: 2 to 897 V AC phase-to-phase Accuracy: Class 0.2 Phase angle accuracy: 0.1° (within nominal voltage range and nominal frequency range) Altitude derating from 2,000 to 4,000 m (6,562 to 13,123 ft): 100 to 480 V AC phase-to-phase UL/cUL Listed: 100 to 600 V AC phase-to-phase Load on external voltage transformer: Maximum 0.2 VA/phase Voltage withstand: 1.2 × Nominal voltage continuously; 1.3 × Nominal voltage for 10 s
<b>Current measurements</b>	Nominal value: 1 or 5 A AC from current transformer Measurement range: 0.02 to 17.5 A AC from current transformer; Truncation level: 11 mA Accuracy: Class 0.2 Earth current: 18 dB attenuation of third harmonic of the nominal frequency UL/cUL Listed: From listed or R/C (XODW2.8) current transformers 1 or 5 A Load on external current transformer: Maximum 0.3 VA/phase Current withstand: 10 A continuously; 17.5 A for 60 s; 100 A for 10 s; 250 A for 1 s
<b>Frequency measurements</b>	Nominal value: 50 Hz or 60 Hz Measurement range: 35 to 78 Hz Accuracy: Class 0.1 of nominal value (35 to 78 Hz) (-40 to 70 °C) (-40 to 158 °F) Class 0.02 of nominal value (40 to 70 Hz) (15 to 30 °C) (59 to 86 °F)
<b>Power measurements</b>	Accuracy: Class 0.5
<b>Accuracy and temperature</b>	Unless otherwise specified for the above measurements: Nominal range: -40 to 70 °C (-40 to 158 °F) Reference range: 15 to 30 °C (59 to 86 °F) Accuracy: Measurement type specific within reference range Additional 0.2 % error of full scale per 10 °C (18 °F) outside reference range
<b>Torques and terminals</b>	Module faceplate screws: 0.5 N·m (4.4 lb-in) Secure the current measurement terminal block to the module faceplate: 0.25 N·m (2.2 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>Terminal connections</b>	AC voltage and current terminals: Standard 45° plugs, 2.5 mm <sup>2</sup> Wiring: 2.5 mm <sup>2</sup> (13 AWG), multi-stranded
<b>Galvanic isolation</b>	Between AC voltage and other I/Os: 3310 V, 50 Hz for 60 s Between AC current and other I/Os: 2210 V, 50 Hz for 60 s
<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>Accessories (included)</b>	<ul style="list-style-type: none"> <li>One roundel with 6 J-shaped voltage encoding pins (for the hardware module)</li> <li>One roundel with 6 flat voltage encoding pins (for the voltage terminal blocks)</li> </ul>
<b>Weight</b>	232 g (0.5 lb)

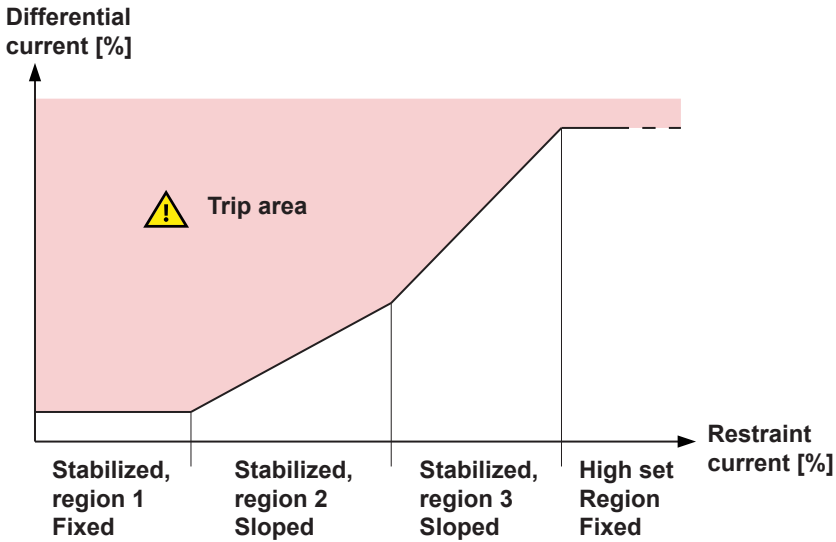
### 3.3.4 Differential current module ACM3.2

The differential current module ACM3.2 measures the generator outgoing 3-phase currents (consumer side) and star point 3-phase currents. The ACM3.2 uses the measurements to detect phase-to-phase faults or phase-to-earth faults (star point earthed generator stator only) in the generator stator, and dependent on the mounting of the CT's on the outgoing side, possibly also the cable between the generator and the main switchboard.

The protection consists of:

- A stabilised stage that uses a fixed + 2 × sloped operating characteristic. This current restraint approach is also known as biased differential protection.

- A high set fixed differential stage (non-stabilised).



### ACM3.2 terminals

Module	Count	Symbol	Type	Name
	1 × (L1, L2 and L3)		Current	3-phase current measurement - Consumer side
	1 × (L1, L2 and L3)		Current	3-phase current measurement - Neutral side

### ACM3.2 technical specifications

Category	Specification
<b>Nominal, reference and operating values</b>	Current: Nominal value: 1 or 5 A AC from current transformer Frequency: <ul style="list-style-type: none"> <li>• Nominal value: 50 or 60 Hz</li> <li>• Reference range: 40 to 70 Hz</li> <li>• Operating range: 20 to 78 Hz</li> </ul> Temperature: <ul style="list-style-type: none"> <li>• Reference range: 15 to 30 °C (59 to 86 °F)</li> </ul>

Category	Specification
	<ul style="list-style-type: none"> <li>Operating range: -40 to 70 °C (-40 to 158 °F)</li> </ul>
<b>Current measurements</b>	Measurement range: 0.025 to 250 A AC. Truncation level: 20 mA Accuracy: <ul style="list-style-type: none"> <li>0.025 to 20 A: ±1 % or ±10 mA of measured current (whichever is greater)</li> <li>20 to 250 A: ±1.5 % of measured current</li> </ul> UL/cUL Listed: From listed or R/C (XODW2.8) current transformers 1 or 5 A Load on external current transformer: < 4 mΩ, including the terminal block Current withstand: <ul style="list-style-type: none"> <li>20 A continuously</li> <li>100 A for 10 s</li> <li>400 A for 1 s</li> <li>1250 A for 10 ms (half wave)</li> </ul>
<b>Frequency measurement</b>	Accuracy (within operating range): > 0.1 A: ±0.1 % of actual frequency
<b>Temperature</b>	Current measurement accuracy temperature coefficient: ±0.25 %, or ±2.5 mA per 10 °C (18 °F) outside reference range (whichever is greater)
<b>Torques and terminals</b>	Module faceplate screws: 0.5 N·m (4.4 lb-in) Secure the current measurement terminal block to the module faceplate: 0.25 N·m (2.2 lb-in) Connection of wiring to terminals: <ul style="list-style-type: none"> <li>≤ 4 mm<sup>2</sup>: 0.5 N·m (4.4 lb-in) to 0.6 N·m (5.3 lb-in)</li> <li>&gt; 4 mm<sup>2</sup>: 0.7 N·m (6.2 lb-in) to 0.8 N·m (7.1 lb-in)</li> </ul> UL/cUL Listed: Wiring must be minimum 90 °C (194 °F) copper conductors only
<b>Terminal connections</b>	AC current terminals: Standard 0° plugs, 6 mm <sup>2</sup> with securing screws Wiring: 2.5 to 6 mm <sup>2</sup> (13 to 10 AWG), multi-stranded
<b>Galvanic isolation</b>	Between AC current and other I/Os: 2210 V, 50 Hz for 60 s
<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 mm × 152 mm (1.1 × 6.4 × 5.9 in)
<b>Weight</b>	230 g (0.5 lb) (including terminal blocks)
<b>Accessories (included)</b>	One roundel with 6 encoding pins (for the hardware module and terminal block)

### 3.3.5 Engine interface module EIM3.1

The engine interface module has its own power supply and a tacho input to measure speed. It also has four relay outputs, four digital inputs, and three analogue inputs. These I/Os are configurable.

The power supply terminals include circuit protection against load dump transients and JEM177 surge transients (rugged design). These terminals also include battery voltage measurement.

EIM3.1 has its own microprocessor. If the rack power supply fails, or connection to the application is lost, the EIM3.1 can continue to operate independent of the application.

## EIM3.1 terminals

Module	Count	Symbol	Type	Name
	1		Ground	Frame ground
	1		12 or 24 V DC	Power supply
	3		Relay output	Configurable
	1		Relay output (with wire break detection)	Configurable
	4		Digital input	Configurable
	1		MPU input (with wire break detection)*	Magnetic pickup
	1	<b>w</b>	W input (no wire break detection)*	Generator tacho output or NPN/PNP sensor
	3	$R_I \rightarrow$	Analogue current or resistance measurement input (RMI)	Configurable

**NOTE** \*These inputs cannot both be used at the same time.

## EIM3.1 technical specifications

Category	Specification
<b>Frame ground</b>	Voltage withstand: $\pm 36$ V DC to the power supply positive (terminal 1) and negative (terminal 2)  Input voltage: 12 or 24 V DC nominal (8 to 36 V DC continuously) UL/cUL Listed: 10 to 32.5 V DC 0 V DC for 50 ms when coming from at least 8 V DC (cranking dropout) Consumption: Typical 3 W, maximum 5 W Internal protection: by 12 A fuse (not replaceable) (fuse size determined by load dump requirements)
<b>Auxiliary power supply</b> 	Voltage withstand: $\pm 36$ V DC Load dump protected by TVS diodes  <b>Start current</b> <ul style="list-style-type: none"> <li>Power supply current limiter               <ul style="list-style-type: none"> <li>24 V: 0.6 A minimum</li> <li>12 V: 1.2 A minimum</li> </ul> </li> <li>Battery: No limit</li> </ul>
<b>Relay outputs</b> 	Relay type: Electromechanical Electrical rating and UL/cUL Listed: 30 V DC and 6 A, resistive Voltage withstand: $\pm 36$ V DC
<b>Relay output with wire break detection</b> 	Relay type: Electromechanical Electrical rating and UL/cUL Listed: 30 V DC and 6 A, resistive Includes wire break detection Voltage withstand: $\pm 36$ V DC
<b>Magnetic pickup</b> 	Voltage: 3 to 70 V AC peak Frequency: 2 to 20,000 Hz

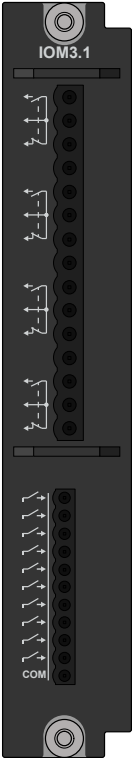


Category	Specification
	Accuracy: 2 to 99 Hz: 0.5 Hz; 100 to 20,000 Hz: $\pm 0.5$ % of measurement Cable supervision: Resistance maximum 100 k $\Omega$ Includes wire break detection Voltage withstand: 70 V AC
<b>Generator tachometer (W)</b>	Voltage: 8 to 36 V DC Frequency: 2 to 20,000 Hz Accuracy: 2 to 99 Hz: 0.5 Hz; 100 to 20,000 Hz: $\pm 0.5$ % of measurement No wire break detection Voltage withstand: $\pm 36$ V DC
<b>NPN/PNP</b>	Voltage: 8 to 36 V DC Frequency: 2 to 20,000 Hz Accuracy: 2 to 99 Hz: 0.5 Hz; 100 to 20,000 Hz: $\pm 0.5$ % of measurement No wire break detection Voltage withstand: $\pm 36$ V DC
<b>Digital inputs</b>	Bipolar inputs <ul style="list-style-type: none"> <li>ON: -36 to -8 V DC, and 8 to 36 V DC</li> <li>OFF: -2 to 2 V DC</li> </ul> Minimum pulse length: 50 ms Impedance: 4.7 k $\Omega$ Voltage withstand: $\pm 36$ V DC
<b>Analogue multi-functional inputs</b>	<b>Current input</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 25 mA</li> <li>Accuracy: 1 % of selected range</li> </ul> <b>Pt100/1000</b> <ul style="list-style-type: none"> <li>-40 to 250 °C (-40 to 482 °F)</li> <li>Accuracy: 1 % of full scale (to IEC/EN60751)</li> <li>Maximum sensor self-heating: 0.5 °C/mW (1 °F/mW)</li> </ul> <b>Resistance measurement</b> <ul style="list-style-type: none"> <li>Any custom range between 0 and 2.5 k<math>\Omega</math></li> <li>Accuracy: 1 % over ranges: 0 to 200 <math>\Omega</math>, 0 to 300 <math>\Omega</math>, 0 to 500 <math>\Omega</math>, 0 to 1000 <math>\Omega</math>, and 0 to 2500 <math>\Omega</math></li> </ul> <b>Digital input</b> <ul style="list-style-type: none"> <li>Dry contact with cable supervision</li> <li>Maximum circuit resistance: 330 <math>\Omega</math></li> <li>Minimum current rating for the connected relay: 2.5 mA</li> </ul> Voltage withstand: $\pm 36$ V DC All analogue multi-functional inputs for EIM3.1 have a common ground
<b>Terminal connections</b>	<b>Frame ground and power supply</b> <ul style="list-style-type: none"> <li>Terminals: Standard 45° plug, 2.5 mm<sup>2</sup></li> <li>Wiring: 1.5 to 2.5 mm<sup>2</sup> (16 to 12 AWG), multi-stranded</li> </ul> <b>Other connections</b> <ul style="list-style-type: none"> <li>Terminals: Standard 45° plug, 2.5 mm<sup>2</sup></li> <li>Wiring: 0.5 to 2.5 mm<sup>2</sup> (22 to 12 AWG), multi-stranded</li> </ul>
<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 relay groups and other I/Os: 600 V, 50 Hz for 60 s Between digital input groups and other I/Os: 600 V, 50 Hz for 60 s Between MPU and W inputs and other I/Os: 600 V, 50 Hz for 60 s Between analogue inputs and other I/Os: 600 V, 50 Hz for 60 s

Category	Specification
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	250 g (0.5 lb)



### 3.3.6 Input/output module IOM3.1

The input output module has 4 changeover relay outputs, and 10 digital inputs. These I/Os are all configurable.

#### IOM3.1 terminals

Module	Count	Symbol	Type	Name
	4		Relay output	Configurable
	10		Digital input	Configurable

#### IOM3.1 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 3,000 to 4,000 m (9,842 to 13,123 ft): Maximum 150 V AC phase-to-phase Voltage withstand: 250 V AC
<b>Digital inputs</b> 	Bipolar inputs <ul style="list-style-type: none"> <li>ON: -36 to -8 V DC, and 8 to 36 V DC</li> <li>OFF: -2 to 2 V DC</li> </ul> Minimum pulse length: 50 ms Impedance: 4.7 kΩ Voltage withstand: ±36 V DC
<b>Terminal connections</b>	<b>Relay outputs:</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>Digital inputs:</b> Terminals: Standard 45° plug, 1.5 mm <sup>2</sup>

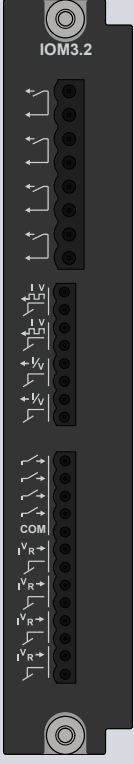





Category	Specification
	Wiring: 0.1 to 1.5 mm <sup>2</sup> (28 to 16 AWG), multi-stranded
<b>Torques and terminals</b>	Module faceplate screws: 0.5 N·m (4.4 lb-in) Connection of wiring to relay output terminals: 0.5 N·m (4.4 lb-in) Connection of wiring to digital input terminals: 0.25 N·m (2.2 lb-in) UL/cUL Listed: Wiring must be minimum 90 °C (194 °F) copper conductors only
<b>Galvanic isolation</b>	Between relay groups and other I/Os: 2210 V, 50 Hz for 60 s Between digital input groups and other I/Os: 600 V, 50 Hz for 60 s
<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>	196 g (0.4 lb)

### 3.3.7 Input/output module IOM3.2


The input output module has 4 relay outputs, 4 analogue multifunctional outputs (including 2 pulse width modulation PWM outputs), 4 digital inputs, and 4 analogue multifunctional inputs. These I/Os are all configurable.

Internal cold junction compensation is not available on IOM3.2

#### IOM3.2 terminals

Module	Count	Symbol	Type	Name
	4		Relay output	Configurable
	2		Analogue multifunctional output (mA, V DC, PWM)	Configurable
	2		Analogue multifunctional output (mA, V DC)	Configurable
	4		Digital input	Configurable
	4		Analogue multifunctional input (mA, V DC, RMI)	Configurable

#### IOM3.2 technical specifications

Category	Specification
<b>Relay outputs</b> 	Relay type: Solidstate relay Electrical rating and UL/cUL Listed: 30 V DC, and 6 A, resistive; B300, pilot duty (B300 is a power limit specification for inductive loads)

Category	Specification
	Voltage withstand: $\pm 36$ V DC
<b>Analogue multifunctional outputs</b> ← I/V	<p><b>Current output:</b></p> <ul style="list-style-type: none"> <li>• Range: Any custom range between -25 to 25 mA DC</li> <li>• Accuracy: 1 % of range</li> <li>• Resolution: 16 bits (<math>&lt; 2</math> uA / bit)</li> <li>• Type: Active output (internal supply)</li> <li>• Load: Maximum <math>\pm 25</math> mA <math>\rightarrow</math> 400 <math>\Omega</math></li> </ul> <p><b>Voltage output:</b></p> <ul style="list-style-type: none"> <li>• Range: Any custom range between -10 to 10 V DC</li> <li>• Accuracy: 1 % of range</li> <li>• Resolution: 16 bits (<math>&lt; 0,7</math> mV / bit)</li> <li>• Load: Minimum <math>\pm 10</math>V <math>\rightarrow</math> 600 <math>\Omega</math></li> <li>• Internal resistance, power ON: <math>&lt; 1</math> <math>\Omega</math></li> <li>• Internal resistance, power OFF: <math>&gt; 10</math> M<math>\Omega</math></li> </ul> <p><b>General information for all outputs:</b></p> <ul style="list-style-type: none"> <li>• Refresh rate (max): 50ms (input to output)</li> <li>• Voltage withstand: <math>\pm 36</math> V DC</li> </ul>
<b>Analogue multifunctional PWM outputs</b> ← I/V	<p><b>PWM output:</b></p> <ul style="list-style-type: none"> <li>• Frequency range: 1 to 2500 Hz <math>\pm 5</math> Hz</li> <li>• Duty cycle accuracy (5 to 95 %): 0.5 % within reference temperature range</li> <li>• Resolution: 12 bits (4096 steps)</li> <li>• Voltage: Low level: <math>&lt; 0.5</math> V. High level: <math>&gt;</math> adjustable 1 to 10 V. Maximum: 10.2 V</li> <li>• Output impedance: 25 <math>\Omega</math></li> </ul> <p><b>General information for all outputs:</b></p> <ul style="list-style-type: none"> <li>• Refresh rate (max): 50 ms (input to output)</li> <li>• Voltage withstand: <math>\pm 36</math> V DC</li> </ul>
<b>Digital inputs</b> ↗	<p>Bipolar inputs</p> <ul style="list-style-type: none"> <li>• ON: -36 to -8 V DC, and 8 to 36 V DC</li> <li>• OFF: -2 to 2 V DC</li> </ul> <p>Minimum pulse length: 50 ms Impedance: 3.9 k<math>\Omega</math> Voltage withstand: <math>\pm 36</math> V DC</p>
<b>Analogue multifunctional inputs</b> I/V $\rightarrow$	<p><b>Digital inputs with wire break detection:</b></p> <ul style="list-style-type: none"> <li>• Dry contact inputs, 3 V DC internal supply</li> <li>• Wire-break detection with maximum resistance for ON detection: 100 <math>\Omega</math> to 400 <math>\Omega</math></li> </ul> <p><b>Current inputs:</b></p> <ul style="list-style-type: none"> <li>• From active transmitter: 0 to 20 mA, or 4 to 20 mA</li> <li>• Accuracy: <math>\pm 10</math> uA <math>\pm 0.25</math> % of actual reading</li> </ul> <p><b>Voltage inputs (DC):</b></p> <ul style="list-style-type: none"> <li>• Range: <math>\pm 10</math> V DC / 0 to 10 V DC</li> <li>• Accuracy: <math>\pm 10</math> mV <math>\pm 0.25</math> % of actual reading</li> </ul> <p><b>Resistance measurement inputs, 2 wire (RMI):</b></p> <ul style="list-style-type: none"> <li>• Resistance measurement: 0 to 4.5 k<math>\Omega</math></li> <li>• Accuracy: <math>\pm 1</math> <math>\Omega</math> <math>\pm 0.25</math> % of actual reading</li> </ul> <p><b>Resistance measurement inputs, 1 wire (RMI):</b></p> <ul style="list-style-type: none"> <li>• Resistance measurement: 0 to 4.5 k<math>\Omega</math></li> <li>• Accuracy: <math>\pm 2</math> <math>\Omega</math> <math>\pm 0.25</math> % of actual reading</li> </ul> <p><b>Pt100:</b></p>

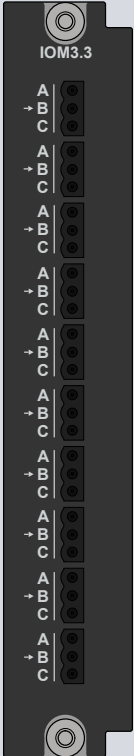


Category	Specification
	<ul style="list-style-type: none"> <li>• Range: -200 to 850 °C</li> <li>• Accuracy: <math>\pm 1</math> °C <math>\pm 0.25</math> % of actual reading</li> </ul> <p><b>Pt1000:</b></p> <ul style="list-style-type: none"> <li>• Range: -200 to 850 °C</li> <li>• Accuracy: <math>\pm 0.5</math> °C <math>\pm 0.25</math> % of actual reading</li> </ul> <p><b>Thermocouple type, range and accuracy:</b></p> <ul style="list-style-type: none"> <li>• E: -200 to 1000 °C ( <math>\pm 2</math> °C <math>\pm 0.25</math> % of actual reading)</li> <li>• J: -210 to 1200 °C ( <math>\pm 2</math> °C <math>\pm 0.25</math> % of actual reading)</li> <li>• K: -200 to 1372 °C ( <math>\pm 2</math> °C <math>\pm 0.25</math> % of actual reading)</li> <li>• N: -200 to 1300 °C ( <math>\pm 2</math> °C <math>\pm 0.25</math> % of actual reading)</li> <li>• R: -50 to 1768 °C ( <math>\pm 2</math> °C <math>\pm 0.25</math> % of actual reading)</li> <li>• S: -50 to 1768 °C ( <math>\pm 2</math> °C <math>\pm 0.25</math> % of actual reading)</li> <li>• T: -200 to 400 °C ( <math>\pm 2</math> °C <math>\pm 0.25</math> % of actual reading)</li> </ul> <p><b>Note:</b> Twisted pair and shielded cable is recommended to achieve specification and optimisation of noise immunity.</p> <p><b>General information for all outputs:</b></p> <ul style="list-style-type: none"> <li>• Refresh rate (max): 50 ms (input to output)</li> <li>• Voltage withstand: <math>\pm 36</math> V DC</li> <li>• All analogue multi-functional inputs have a common ground</li> </ul>
<b>Terminal connections</b>	<p><b>Relay outputs:</b> Terminals: Standard 45° plug, 2.5 mm<sup>2</sup> Wiring: 0.5 to 2.5 mm<sup>2</sup> (22 to 14 AWG), multi-stranded</p> <p><b>Other inputs:</b> Terminals: Standard 45° plug, 1.5 mm<sup>2</sup> Wiring: 0.1 to 1.5 mm<sup>2</sup> (28 to 16 AWG), multi-stranded</p>
<b>Torques and terminals</b>	<p>Module faceplate screws: 0.5 N·m (4.4 lb-in)            Connection of wiring to relay output terminals: 0.5 N·m (4.4 lb-in)            Connection of wiring to digital input terminals: 0.25 N·m (2.2 lb-in)            UL/cUL Listed: Wiring must be minimum 90 °C (194 °F) copper conductors only</p>
<b>Galvanic isolation</b>	<p>Between relay groups and other I/Os: 2210 V, 50 Hz for 60 s            Between other input groups and other I/Os: 600 V, 50 Hz for 60 s</p>
<b>Ingress protection</b>	<p>Unmounted: No protection rating            Mounted in rack: IP20 according to IEC/EN 60529</p>
<b>Dimensions</b>	L×H×D: 28 × 162 × 150 mm (1.1 × 6.4 × 5.9 in)
<b>Weight</b>	188 g (0.4 lb)

### 3.3.8 Input/output module IOM3.3

The input output module has 10 analogue multifunctional inputs. These I/Os are all configurable.

### IOM3.3 terminals

Module	Count	Symbol	Type	Name
	10	<b>A</b> <b>→ B</b> <b>C</b>	Analogue multifunctional inputs (mA, V DC, RMI)	Configurable

### IOM3.3 technical specifications

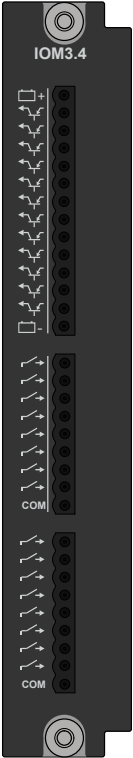


Category	Specification
<b>Analogue multifunctional inputs</b> <b>A</b> <b>→ B</b> <b>C</b>	<p><b>Digital inputs with wire break detection:</b></p> <ul style="list-style-type: none"> <li>• Dry contact inputs, 3 V DC internal supply</li> <li>• Wire-break detection with maximum resistance for ON detection: 100 Ω to 400 Ω</li> </ul> <p><b>Current inputs:</b></p> <ul style="list-style-type: none"> <li>• From active transmitter: 0 to 20 mA, or 4 to 20 mA</li> <li>• Accuracy: ±10 uA ±0.25 % of actual reading</li> </ul> <p><b>Voltage inputs (DC):</b></p> <ul style="list-style-type: none"> <li>• Range: ±10 V DC / 0 to 10 V DC</li> <li>• Accuracy: ±10 mA ±0.25 % of actual reading</li> </ul> <p><b>Resistance measurement inputs, 2 or 3 wire (RMI):</b></p> <ul style="list-style-type: none"> <li>• Resistance measurement: 0 to 4.5 kΩ</li> <li>• Accuracy: ±1 Ω ±0.25 % of actual reading *</li> </ul> <p><b>Resistance measurement inputs, 1 wire (RMI):</b></p> <ul style="list-style-type: none"> <li>• Resistance measurement: 0 to 4.5 kΩ</li> <li>• Accuracy: ±2 Ω ±0.25 % of actual reading</li> </ul> <p><b>Pt100:</b></p> <ul style="list-style-type: none"> <li>• Range: -200 to 850 °C</li> <li>• Accuracy: ±1 °C ±0.25 % of actual reading</li> </ul> <p><b>Pt1000:</b></p> <ul style="list-style-type: none"> <li>• Range: -200 to 850 °C</li> <li>• Accuracy: ±0.5 °C ±0.25 % of actual reading</li> </ul> <p><b>Thermocouple type, range and accuracy:</b></p> <ul style="list-style-type: none"> <li>• E: -200 to 1000 °C ( ±2 °C ±0.25 % of actual reading)</li> <li>• J: -210 to 1200 °C ( ±2 °C ±0.25 % of actual reading)</li> </ul>

Category	Specification
Internal cold junction compensation (CJC)	<ul style="list-style-type: none"> <li>• K: -200 to 1372 °C ( ±2 °C ±0.25 % of actual reading)</li> <li>• N: -200 to 1300 °C ( ±2 °C ±0.25 % of actual reading)</li> <li>• R: -50 to 1768 °C ( ±2 °C ±0.25 % of actual reading)</li> <li>• S: -50 to 1768 °C ( ±2 °C ±0.25 % of actual reading)</li> <li>• T: -200 to 400 °C ( ±2 °C ±0.25 % of actual reading)</li> </ul> <p><b>Note:</b> Twisted pair and shielded cable is recommended to achieve specification and optimisation of noise immunity.</p> <p><b>General information for all inputs:</b></p> <ul style="list-style-type: none"> <li>• Voltage withstand: ±36 V DC</li> </ul>
	<p><b>Internal temperature sensor:</b></p> <ul style="list-style-type: none"> <li>• Range: 0 to 70 °C <ul style="list-style-type: none"> <li>◦ Accuracy: ±1.0 °C</li> </ul> </li> <li>• Range: -40 to 0 °C <ul style="list-style-type: none"> <li>◦ Accuracy: ±2.0 °C</li> </ul> </li> </ul> <p><b>Mathematical compensation:</b></p> <ul style="list-style-type: none"> <li>• If non channels are configured as 4-20 mA <ul style="list-style-type: none"> <li>◦ Accuracy: ±1.0 °C</li> </ul> </li> <li>• If any channels are configured as 4-20 mA <ul style="list-style-type: none"> <li>◦ Accuracy: ±1.5 °C</li> </ul> </li> </ul> <p>If it is needed to have 4-20 mA channels on the same card, it is recommended to use the top channels for 4-20 mA and the lower channels for TC's</p> <p><b>Internal cold junction accuracy:</b></p> <ul style="list-style-type: none"> <li>• Heat dissipated by nearby heat sources can cause errors in thermocouple measurements by heating the IOM3.3 terminals to a different temperature than the cold-junction compensation sensor. Thermal gradient across the terminals can cause the terminals of different IOM3.3 channels to be at different temperatures, which creates accuracy errors and affects the relative accuracy between channels.</li> <li>• The temperature measurement accuracy specifications include errors caused by the thermal gradient across the IOM3.3 terminals for configurations with the IOM3.3 terminals facing forward or upward.</li> </ul>
Terminal connections	Terminals: Standard 45° plug, 1.5 mm <sup>2</sup> Wiring: 0.1 to 1.5 mm <sup>2</sup> (28 to 16 AWG), multi-stranded
Torques and terminals	Module faceplate screws: 0.5 N·m (4.4 lb-in) Connection of wiring to relay output terminals: 0.5 N·m (4.4 lb-in) Connection of wiring to input terminals: 0.25 N·m (2.2 lb-in) UL/cUL Listed: Wiring must be minimum 90 °C (194 °F) copper conductors only
Galvanic isolation	All 10 multi inputs have a common ground Galvanic isolation from rack: 600 V, 50 Hz for 60 s
Dimensions	L×H×D: 28 × 162 × 150 mm (1.1 × 6.4 × 5.9 in)
Weight	164 g (0.4 lb)



### 3.3.9 Input/output module IOM3.4

The input output module has 12 digital outputs, and 16 digital inputs. These I/Os are all configurable.

### IOM3.4 terminals

Module	Count	Symbol	Type	Name
	12		Digital output	Configurable
	16		Digital input	Configurable

### IOM3.4 technical specifications

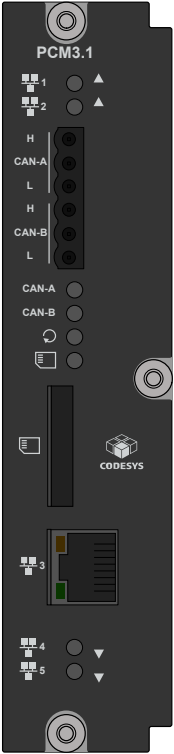



Category	Specification
<b>Digital outputs</b> 	Transistor type: PNP Supply voltage: 12 or 24 V DC nominal, maximum 36 V DC (relative to common) Maximum current (per output): < 55 °C: 250 mA; > 55 °C: 200 mA Leak current: Typical 1 µA, maximum 100 µA (temperature-dependent) Saturation voltage: Maximum 0.5 V Non-replaceable 4 A fuse Voltage withstand: ±36 V DC Load dump protected by TVS diodes Short circuit protection Reverse polarity protection Internal freewheeling diode
<b>Digital inputs</b> 	Bipolar inputs <ul style="list-style-type: none"> <li>ON: -36 to -8 V DC, and 8 to 36 V DC</li> <li>OFF: -2 to 2 V DC</li> </ul> Minimum pulse length: 50 ms Impedance: 4.7 kΩ Voltage withstand: ±36 V DC
<b>Terminal connections</b>	Terminals: Standard 45° plug, 1.5 mm <sup>2</sup> Wiring: 0.1 to 1.5 mm <sup>2</sup> (28 to 16 AWG), multi-stranded
<b>Torques and terminals</b>	Module faceplate screws: 0.5 N·m (4.4 lb-in) Connection of wiring to terminals: 0.25 N·m (2.2 lb-in) UL/cUL Listed: Wiring must be minimum 90 °C (194 °F) copper conductors only
<b>Galvanic isolation</b>	Between groups: 600 V, 50 Hz for 60 s
<b>Ingress protection</b>	Unmounted: No protection rating Mounted in rack: IP20 according to IEC/EN 60529

Category	Specification
Dimensions	L×H×D: 28 × 162 × 150 mm (1.1 × 6.4 × 5.9 in)
Weight	175 g (0.4 lb)

### 3.3.10 Processor and communication module PCM3.1

The processor and communication module has the controller's main microprocessor, which contains and runs the controller application software. It includes the Ethernet switch to manage the controller Ethernet connections, with five 100BASE-TX Ethernet connections. It has a *Self-check OK* LED. It also has two sets of CAN bus terminals and SD card. The PCM3.1 performs time synchronisation with an NTP server.

#### PCM3.1 terminals

Module	Count	Symbol	LED	Type	Name
	5		<ul style="list-style-type: none"> <li>● <b>Off</b> : No communication</li> <li>● <b>Green</b> : Communication connected</li> <li>● <b>Green flash</b> : Active communication</li> </ul>	Ethernet (RJ45)	External network and DEIF network LEDs on the front of the hardware module. Two connections at the top of the hardware module, one on the front, and two at the bottom.
	2	H, CAN-A, L H, CAN-B, L	<ul style="list-style-type: none"> <li>● <b>Off</b> : No communication</li> <li>● <b>Green</b> : CAN connected</li> <li>● <b>Green flash</b> : Active CAN communication</li> </ul>	CAN bus connection	CAN bus
	1		<ul style="list-style-type: none"> <li>● <b>Off</b> : Self-check not OK</li> <li>● <b>Green</b> : Self-check OK</li> <li>● <b>Green flash</b> : In service mode</li> </ul>		
	1		<ul style="list-style-type: none"> <li>● <b>Off</b> : No access</li> <li>● <b>Green flash</b> : Read or write to SD card</li> </ul>	SD card (industrial grade) *	External memory

**NOTE** \* To meet the temperature and EMC specifications, you must use an industrial grade SD card.

#### PCM3.1 technical specifications

Category	Specification
CAN terminals	Voltage withstand: ±24 V DC
Galvanic isolation	Between CAN A and other I/Os: 600 V, 50 Hz for 60 s Between CAN B and other I/Os: 600 V, 50 Hz for 60 s Between Ethernet ports and other I/Os: 600 V, 50 Hz for 60 s
RTC	Real time clock with replaceable lithium battery (replacement recommended every 5 years).
Communication connections	CAN communication terminals: Standard 45° plug, 1.5 mm <sup>2</sup> Wiring: 0.5 to 1.5 mm <sup>2</sup> (28 to 16 AWG), multi-stranded DEIF network: RJ45. Use an Ethernet cable that meets or exceeds the SF/UTP CAT5e specifications. 100BASE-TX.
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

Category	Specification
Processor	400 MHz 32-bit PowerPC CPU
Memory	256 MB
Storage	512 MB
Ingress protection	Unmounted: No protection rating Mounted in rack: IP20 according to IEC/EN 60529
Dimensions	L×H×D: 36.8 × 162 × 150 mm (1.4 × 6.4 × 5.9 in)
Weight	214 g (0.5 lb)

### 3.3.11 Blind module

A blind module must be used to close off each empty slot in the rack.

#### Blind module technical specifications

Category	Specification
Tightening torque	Module faceplate screws: 0.5 N·m (4.4 lb-in)
Dimensions	L×H×D: 28 × 162 × 18 mm (1.1 × 6.4 × 0.7 in)
Weight	44 g (0.1 lb)

## 3.4 Accessory specifications

### 3.4.1 Ethernet cable

The Ethernet cable connects the display unit to the controller, or connects controllers to one another. The Ethernet cable from DEIF meets the technical specifications below.

Category	Specification
Cable type	Shielded patch cable SF/UTP CAT5e
Temperature	Fixed installation: -40 to 80 °C (-40 to 176 °F) Flexible installation: -20 to 80 °C (-4 to 176 °F)
Minimum bending radius (recommended)	Fixed installation: 25.6 mm (1.01 in) Flexible installation: 51.2 mm (2.02 in)
Length	2 m (6.6 ft)
Weight	~110 g (4 oz)

## 4. Application development

### 4.1 IEC61131-3 programming

#### IEC61131-3 PLC-programmed based on CODESYS V3

Programming languages:

- Sequential Function Chart (SFC).
- Function Block Diagram (FBD).
- Structured Text (ST).
- Ladder Diagram (LD).
- ANSI C/C++ (via AMC 300 Windows and Linux SDK) - available on request.
- Multi-language help in Chinese, German and English.
- Programmed via Ethernet connection (TCP/IP).
- Download of boot projects and source code.
- Integrated PLC and task configuration.
- Web visualisation on PanelPC or remote via Secure communication (HTTPS).
- Online debugging and sampling.
- Trace-integrated simulation.

#### AMC 300 CODESYS package



- CODESYS V3.5 IDE
- DEIF AMC 300 TSP (Target Support Package) with EtherCAT device description files.

### 4.2 Supported software features

Software	AMC 300 CODESYS (with Web visualization)
PLC runtime	<ul style="list-style-type: none"><li>• CODESYS V3.5 SP15+</li></ul>
Programming	<p>IEC61131-3:</p> <ul style="list-style-type: none"><li>• LD, SFC, FBD, ST</li><li>• CODESYS V3.5 SP15+ IDE</li></ul>
Network protocols	<ul style="list-style-type: none"><li>• File Transfer Protocol (FTP), server and client</li><li>• Secure/SSH File Transfer Protocol (SFTP), server</li><li>• Trivial File Transfer Protocol (TFTP), client</li><li>• Secure Copy (SCP), server and client</li><li>• Secure Shell (SSH), version 2, server and client</li><li>• Network Time Protocol (NTP), client</li><li>• Dynamic Host Configuration Protocol (DHCP), client</li><li>• Access to cUrl from Linux OS</li></ul>
Visualisation	<ul style="list-style-type: none"><li>• CODESYS Web visualisation</li></ul>
System Configuration	<ul style="list-style-type: none"><li>• Web-based system configuration for IP address (static/dynamic), host name, change root, operator, admin, service user passwords, system information, and more</li><li>• Device handling: CODESYS Device handling (EtherCAT Master, CANOpen Manager, Modbus)</li></ul>

Software	AMC 300 CODESYS (with Web visualization)
<b>Configuration</b>	<ul style="list-style-type: none"> <li>• Visualisation designer: CODESYS V3.5 visualisation</li> <li>• Scope/trace</li> </ul>
<b>HMI visualisation tool</b>	<ul style="list-style-type: none"> <li>• CODESYS web visualisation</li> <li>• Panel PC and remote HMI client (communication via HTTPS). Requires a browser with HTML5/JavaScript support (for example, Chrome, Firefox, Safari, Edge).</li> </ul>

### Communication protocols

Software	AMC 300 CODESYS (with Web visualization)
OPC-DA	Yes - OPC DA via CODESYS Gateway and CODESYS OPC Server
OPC-UA Server	Yes - Via Open62541
Modbus TCP Server (Slave)	Yes - CODESYS Modbus TCP Slave and libModbus
Modbus TCP Client (Master)	Yes - CODESYS Modbus TCP Master and libModbus
Modbus RTU Master	Yes - Via libModbus
Modbus RTU Slave	Yes - Via libModbus
EtherCAT Master	Yes - CODESYS EtherCAT master
CAN Layer II	Yes
CANopen Master	Yes - CODESYS CANopen Master
CANopen Slave	Yes - CODESYS CANopen Slave
Others	Available on request
J1939	Available on request



## 5. Ordering

### 5.1 Modules for controller configuration

You can configure your controller and/or extension rack with these modules. The *item. no* listed below is for the individual modules as spare parts. Contact DEIF for full configured racks with your order.

Module	Terminals	Comment	Item no.
R7.1	-	7-slot rack for use as controller or extension rack.	2912990240.09
R4.1	-	4-slot rack for use as controller or extension rack.	2912990240.41
PSM3.1	<b>Power Supply Module (main rack)</b> <ul style="list-style-type: none"> <li>1 × Power supply</li> <li>3 × Relay outputs (2 x configurable)</li> <li>2 × RJ45 EtherCAT communication ports</li> </ul>	For use in controller rack.	2912990240.07
PSM3.2	<b>Power Supply Module (extension rack)</b> <ul style="list-style-type: none"> <li>1 × Power supply</li> <li>3 × Relay outputs (2 x configurable)</li> <li>2 × RJ45 EtherCAT communication ports</li> </ul>	For use in extension racks.	2912990240.42
ACM3.1	<b>AC voltage and current module</b> <ul style="list-style-type: none"> <li>2 × 3-phase voltage measurements</li> <li>1 × 3-phase and 4th current measurements</li> </ul>		2912990240.03
ACM3.2	<b>Differential current module</b> <ul style="list-style-type: none"> <li>1 x 3-phase current measurement - Consumer side</li> <li>1 x 3-phase current measurement - Neutral side</li> </ul>		2912990240.40
IOM3.1	<b>Input Output Module</b> <ul style="list-style-type: none"> <li>4 × Changeover relays</li> <li>10 × Digital inputs</li> </ul>		2912990240.05
IOM3.2	<b>Input Output Module</b> <ul style="list-style-type: none"> <li>4 × Relay outputs</li> <li>2 × Analogue multifunctional outputs (mA, V DC, PWM)</li> <li>2 × Analogue multifunctional outputs (mA, V DC)</li> <li>4 x Digital inputs</li> <li>4 x Analogue multifunctional inputs (mA, V DC, RMI)</li> </ul>		2912990240.44
IOM3.3	<b>Input Output Module</b> <ul style="list-style-type: none"> <li>10 x Analogue multifunctional inputs (mA, V DC, RMI)</li> </ul>		2912990240.45
IOM3.4	<b>Input Output Module</b> <ul style="list-style-type: none"> <li>12 × Transistor outputs</li> <li>16 × Digital inputs</li> </ul>		2912990240.25
EIM3.1	<b>Engine Interface Module</b> <ul style="list-style-type: none"> <li>1 × Power supply</li> <li>4 × Relay outputs (1 with wire break detection)</li> <li>4 × Digital inputs</li> <li>1 × MPU input</li> <li>1 × W input</li> <li>3 × Current/resistance analogue inputs</li> </ul>		2912990240.04

Module	Terminals	Comment	Item no.
<b>Processor and Communication Module</b>			
PCM3.1	<ul style="list-style-type: none"> <li>• 5 × Ethernet communication ports</li> <li>• 2 × CAN bus connections</li> <li>• 1 × SD card slot</li> </ul>		2912990240.4 6
Blind	Blind module	Not allowed between PSM3.1 and the optional modules.	2912990240.0 8
Blind small	Small blind module	One needed for extension rack	2912990240.4 3
Shielded patch cable	-	SF/UTP CAT5e	2912990240.1 4

## 6. Legal information

### 6.1 Disclaimer and copyright

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