



PPM 300 with DU 300 display

## Main features

- PMS with ring communication
- Automatic synchronise and deload breaker
- Fast load reduction of less than 100 ms
- Engine communication, read from an Engine Control Unit
- Advanced heavy consumer control
- Advanced fuel optimisation feature
- Idle run start and stop, with configurable extra warm-up or cooldown periods
- Advanced blackout prevention and recovery
- Broadcast of software
- Emulation and supervision
- High resolution 5" colour graphic display with push-buttons
- Flexible and modular input/output with metal rack
- Plug & play, auto-configure I/O modules and network
- Integrated 5x RJ45 ports with auto-detected multi-function (e.g. display, PC Tool, Modbus TCP)
- All network controllers accessible through one Ethernet connection
- Event and alarm log, with real-time clock
- Pre-defined control settings
- User-friendly logic configuration tool
- Password-protected, with customisable permission
- 3-phase AC measurement up to 690 V AC directly, class 0.5
- Easy-to-use PC tool (PICUS)
- Advanced alarm handling with latch and shelve functionality
- Network storm protected

## Controller types

### GENSET controller

- Controls and protects a diesel engine, a generator, and the generator breaker.

### EMERGENCY genset controller

- Controls and protects an emergency generator, the emergency generator breaker, and the emergency busbar tie breaker.

### HYBRID controller

- Controls and protects an inverter with battery storage, and the inverter breaker.

### SHAFT generator controller

- Controls and protects the system when a shaft generator is connected.

### SHORE connection controller

- Controls and protects the system and the shore connection breaker when a shore connection is connected.

### BUS TIE breaker controller

- Each BUS TIE breaker controller controls one bus tie breaker.

## General description

PPM 300 solution is a versatile, intelligent controller platform, designed for applications in the marine and offshore industry.

With an extensive range of control, protection and supervision functions, PPM 300 applications range from genset control and protection to engineered power management solutions developed for diesel generators (including emergency diesel generators), battery energy storage, shaft generators, shore connections, and bus tie breakers.

PPM 300 power management systems control and monitor applications, meet and maintain set power requirements and guarantee stable operation. PPM 300 power management systems also incorporate market-leading fuel optimisation technology.

In multi-master solutions, the integrated PPM 300 controllers connect and communicate as a closed circuit to eradicate single point failures. In cases of unit fall-out, the master functionality automatically moves to another host to keep the system not just operational but safe and reliable at all times.

Built as a sturdy piece of market-leading quality hardware, the PPM 300 features the latest processor technology and long-life adaptability.

Uniquely, the PPM 300's modular build supports on-site replacement of processor, communication, measurement and input-output modules with comprehensive class approvals. Changes to the unit at sea or in the field are assisted with automatic recognition functionality facilitating fast, easy and cost saving service, repairs, and upgrades.

The controller display unit includes a 5" colour graphic screen with intuitive sequences and icons for fast readout of live data, and easy access to alarms handling and controller setup. Functionality is defined and targeted according to user permission levels.

# Functions and features

## Key functions and features

### Modular and configurable design

- Compact, all-in-one controller
- Configurable hardware modules
- Configurable input and output functions (digital and analogue)
- Up to 4 sets of nominal settings
- Configurable parameters for controller functions
- Several ways to start controller sequences

### Plug and play

- Automatic network configuration (uses static IPv6)
- Default parameter and input/output configuration
- Automatic date/time synchronisation of controllers in a system
- NTP time synchronisation with NTP servers

### Display unit

- Up to 2 display units (with interlock) per controller
- Intuitive, one-touch operator-initiated sequences
- 5-inch colour graphic display
- Supports multiple languages

### Advanced troubleshooting

- Controller hardware self-test
- Event and alarm log, with real-time clock
- Access to 24-hour service and support

### PICUS utility software

- Free-of-charge PC software to connect to controllers
- Single-line diagram tool for design, configuration and broadcast
- Flexible application drawing, multiple ring connections
- Manage permissions and passwords for groups and users
- Application emulation and supervision
- I/O status and record trending trace values
- Manage controller and display unit software
- Supports multiple controller languages

### CustomLogic

- User-friendly logic configuration tool
- Up to 20 selectable input events and 20 output commands per controller
- Inter-controller communication, up to 16 inputs and 16 outputs per controller
- Up to 20 Modbus signals (inputs and/or outputs) per controller
- CustomLogic input/output added to Flexible Modbus

### Communication

- Static Internet Protocol version 6 (IPv6)
- Configurable Internet Protocol version 4 (IPv4)
- Configurable Ethernet port settings on PCM3.1
- CAN bus communication to an Engine Control Unit (ECU)
- DEIF network
- Internal communication (extension racks)
- Network (PICUS and Modbus)
- Controllers connected in a ring for communication redundancy
- Authentication (other equipment cannot disrupt communication)
- Password protection (customisable)

### Modbus

- Supports multiple Modbus protocols
- Convert data units and scaling
- Configure Modbus server settings

### Breaker control

- Synchronisation and breaker closing
- De-load before opening
- Operator-initiated synchronisation and de-loading possible
- Breaker types: Pulse breaker, Compact breaker, Continuous breaker
- Breaker position detection and alarms

### Advanced blackout prevention

- Run with a closed bus tie breaker during critical operations
- If a genset governor or AVR fails, the bus tie breaker trips and disconnects the genset

### Redundancy

- True multi-master control
- Busbar can have a ring connection
- DEIF network ring connection
- Internal communication ring connection
- Controller commands and operation using the display unit, inputs, PICUS, and/or Modbus
- Redundant breaker feedback on bus tie breakers and externally controlled breakers

### AC measurement averaging

- Use averaging filters (200 ms and 800 ms) to reduce the value fluctuations from the high performance of the measurement cards
- Averaging filter can be applied selectively to different types of measurements
- AC measurement averaging affects data displayed by DU 300, PICUS, trending, CustomLogic, CODESYS, and Modbus
- AC measurement averaging does not affect protections and regulation values

### Engine interface safety shutdown

- EIM3.1 can be used as a safety shutdown module
- EIM3.1 can run the engine in stand-alone mode should it no longer be able to communicate with main processor card

### Engine interface communication

- Generic J1939 protocol
- Read information from an Engine Control Unit (ECU)

### Additional features

- Power supply voltage measurement diode offset
- Relay configuration (function, coil state)
- Analogue input sensor failure (below and above range)
- Analogue input pre-configured curves, plus up to 20 customisable curves
- Analogue output pre-configured curves, plus up to 20 customisable curves
- Display unit lamp test

# Power management and protections

## Power management functions

### Reliable power

- Blackout prevention
- Fast load-reduction
- Configurable recovery after blackout

### Efficient operation

- Intelligent load calculations
- Advanced load-dependent start and stop calculations
- Advanced (individually configurable) asymmetrical load sharing
- Secured operation (power reservation)

### Load control

- Load transfer (for synchronisation, de-loading and load sharing)
- Load-dependent start (two sets of parameters available)
- Load-dependent stop (two sets of parameters available)
- Power management system calculates control set points
- External analogue inputs as control set points

### Genset priority selection

- Manual
- Dynamic (first genset to connect has the highest priority)
- Running hours

### Heavy consumer management

- Up to 4 fixed and/or variable heavy consumers per controller
- Pre-programmed heavy consumer management sequence (with configurable parameters)
- Digital or analogue feedback from the heavy consumer

### Busbar section management

- Configurable power management rules for each section
- Up to 4 externally-controlled breakers per controller (bus tie breakers and/or shore connection breakers)
- Multiple ring busbars possible

### Load sharing

- Active power (kW) load sharing (GOV)
- Reactive power (kvar) sharing (AVR)
- Load sharing between gensets (over the DEIF network)
- Load sharing options for each busbar section:
- Equal load sharing (symmetrical)
  - Asymmetric P load sharing for gensets
  - Asymmetric Q load sharing for gensets
  - Shaft generator base load, with asymmetric load sharing for the gensets
  - Shore connection base load, with asymmetric load sharing for the gensets
  - One genset base load, with asymmetric load sharing for the other gensets
- Asymmetric load sharing
  - New asymmetric load sharing optional mode allows asymmetric gensets to automatically re-calculate their set points when the maximum asymmetry is exceeded
  - Option to start the next genset when the asymmetric load sharing limit is exceeded

## Protections

AC protections for the source	Alarms	ANSI
Over-voltage	2	59
Under-voltage	2	27
Voltage unbalance	1	47
Negative sequence voltage	1	47
Zero sequence voltage	1	59N
Over-current	2	51
Fast over-current (short circuit)	2	50/51
Current unbalance	2	46
Inverse time over-current	1	51
Directional over-current	2	67
Negative sequence current	1	46
Zero sequence current	1	51N
Over-frequency	2	81O
Under-frequency	2	81U
Overload	2	32
Reverse power	2	32R
Overload reverse power *	1	32R
Over-excitation (reactive power export)	2	40O
Under-excitation (reactive power import/loss of excitation)	2	40U
Synchronisation check (including blackout close)	-	25
Stabilized differential current protection **	1	87G
High set differential current protection **	1	87G

\* Only HYBRID controller when running PTI mode

\*\* Available with Differential Current module ACM3.2

AC protections for the busbar	Alarms	ANSI
Over-voltage	2	59
Under-voltage	2	27
Voltage unbalance	1	47
Over-frequency	2	81O
Under-frequency	2	81U

Other AC protections	Alarms	ANSI
Lockout relay	1	86
Earth inverse time over-current	1	51G
Neutral inverse time over-current	1	51N

# Technical specifications

## General information

The technical specifications apply to all hardware.  
Refer to the *PPM 300 data sheet* for the technical specifications for specific hardware.

## Electrical specifications

### Safety

- 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

### Electromagnetic compatibility (EMC)

- 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

### Load dump

- ISO 7637-2 pulse 5a

## Environmental specifications

### Humidity

- 97 % relative humidity, to IEC 60068-2-30

### Operating temperature

- Rack and modules: -40 to 70 °C (-40 to 158 °F)
- Display unit: -20 to 70 °C (-4 to 158 °F)
- UL/cUL Listed: max. surrounding air temp.: 55 °C (131 °F)

### Storage temperature

- Rack and modules: -40 to 80 °C (-40 to 176 °F)
- Display unit: -30 to 80 °C (-22 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).

## Mechanical specifications

### Vibration

- 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: 58 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)

### Shock (base mounted)

- 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

### Bump

- 20 g, 16 ms, half sine IEC 60255-21-2 (class 2)

### Material

- All plastic materials are self-extinguishing according to UL94 (V0)

Note: g refers to gravitational force (g-force).

## Approvals

- 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

## Maritime Classification Societies approvals

Refer to [www.deif.com](http://www.deif.com) for the most recent approvals.

### For more information, please contact:

DEIF A/S · Frisenborgvej 33 · DK-7800 Skive · Denmark  
Tel.: +45 9614 9614 · Fax: +45 9614 9615 · [info@deif.com](mailto:info@deif.com) · [www.deif.com](http://www.deif.com)