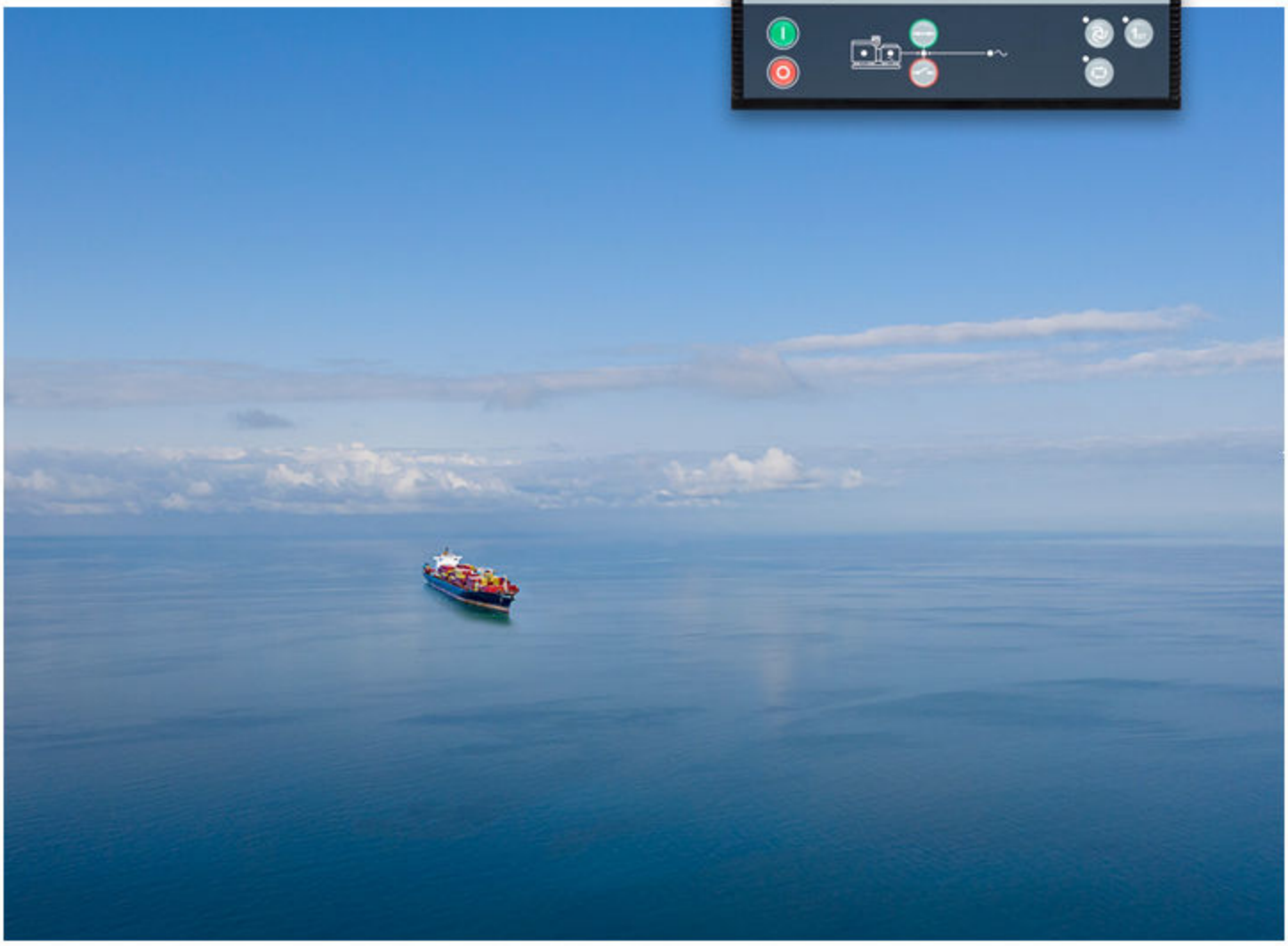
PPM 300

4189341334C

Converting PPM-3 to PPM 300

Application notes

Improve Tomorrow



1. About the Application notes

2. About the application

3. Installation and parameter configuration

1. About the Application notes

1.1 General purpose

This document includes application notes for DEIF's Multi-line 2 unit. It mainly includes examples of different applications suitable for replacement.

More information
See **Designer's reference handbook** for functional descriptions, the procedure for parameter setup, and parameters.

The general purpose of the application notes is to offer the designer information about suitable applications for the Multi-line 300.

1.2 Intended users of the Application notes

The Application notes are mainly intended for the person responsible for designing Multi-line 300 systems. In most cases, this would be a panel builder designer. Naturally, other users might also find useful information in this document.

1.3 Symbols for hazard statements

DANGER!

This shows dangerous situations.

If the guidelines are not followed, these situations will result in death, serious personal injury, and equipment damage or destruction.

WARNING

This shows potentially dangerous situations.

If the guidelines are not followed, these situations could result in death, serious personal injury, and equipment damage or destruction.

CAUTION

This shows low level risk situation.

If the guidelines are not followed, these situations could result in minor or moderate injury.

NOTICE

This shows an important notice

Make sure to read this information.

1.4 Symbols for general notes

NOTE This shows general information.

More information
This shows where you can find more information.

Example

This shows an example.

How to ...
This shows a link to a video for help and guidance.

1.5 Technical support

Technical documentation

Download the technical documentation from the DEIF website: www.deif.com/documentation/

Service and support

DEIF is committed to being available to our customers and partners 24 hours a day, seven days a week, to guarantee the highest levels of service and support.

www.deif.com/support

Training

DEIF arranges **training courses** at DEIF offices worldwide.

www.deif.com/training

Additional service

DEIF offers **service** with design, commissioning, operating and optimisation.

www.deif.com/support/local-office

1.6 Warnings and safety

Electrostatic discharge

Protect the equipment terminals from electrostatic discharge when not installed in a grounded rack. Electrostatic discharge can damage the terminals.

Factory settings

The Multi-line 2 unit is delivered from factory with certain factory settings. These are based on average values and are not necessarily the correct settings for matching the engine/generator set in question. Precautions must be taken to check the settings before running the engine/generator set.

1.7 Legal information and disclaimer

DEIF takes no responsibility for installation or operation of the generator set or switchgear. If there is any doubt about how to install or operate the engine/generator or switchgear controlled by the Multi-line 2 unit, the company responsible for the installation or the operation of the equipment must be contacted.

NOTE The Multi-line 2 unit is not to be opened by unauthorised personnel. If opened anyway, the warranty will be lost.

Disclaimer

DEIF A/S reserves the right to change any of the contents of this document without prior notice.

The English version of this document always contains the most recent and up-to-date information about the product. DEIF does not take responsibility for the accuracy of translations, and translations might not be updated at the same time as the English document. If there is a discrepancy, the English version prevails.

2. About the application

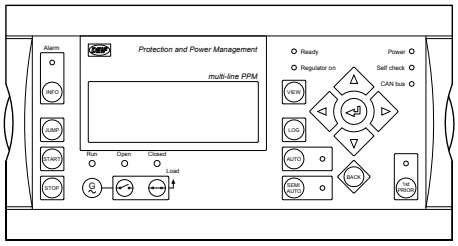
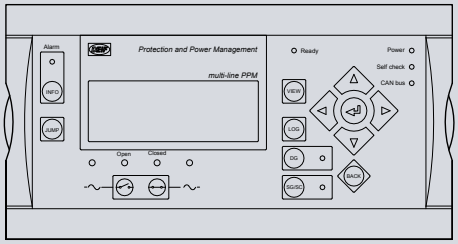
This document mainly includes general information (in point form) on how to upgrade a standard PPM-3 to a PPM 300 system, including mounting instructions and wiring descriptions, parameter and general standard conversions. Contact DEIF support for more details.

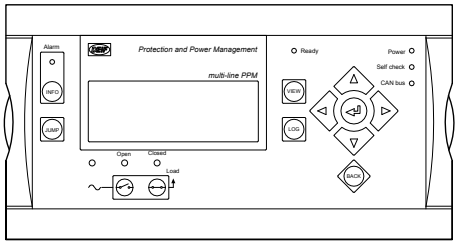
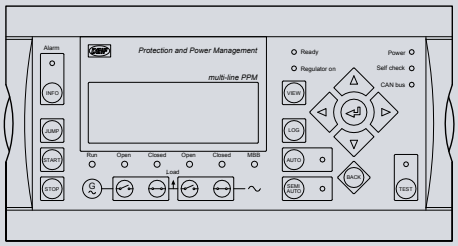
The general purpose of this document is to help the user with the first steps of upgrading a standard PPU power management system.

DEIF A/S always recommends to create a full backup parameter file before the old unit is powered down.

2.1 Converting the display

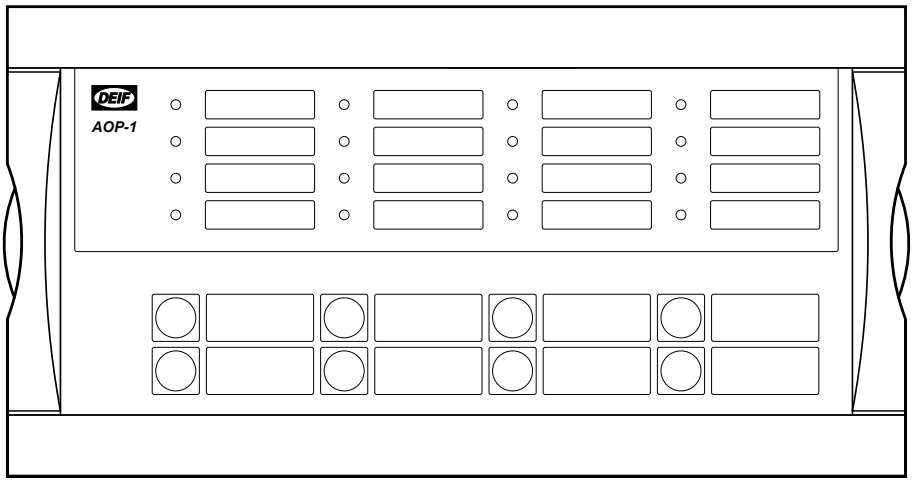
The table below shows an overview of standard displays and the options of converting the displays.

PPM-3	PPM 300	Notes
		Engine control
		Bus tie breaker

PPM-3	PPM 300	Notes
		Shaft generator / Shore connection
		Emergency generator

2.2 Convert the Additional Operator Panel (AOP)

The PPM power management unit can optionally be equipped with an additional operator panel for plant mode selection and control functions. The additional operator panel has 16 predefined text messages and 8 predefined push-buttons. The text messages for the LEDs and for the push-buttons can differ between the application types.



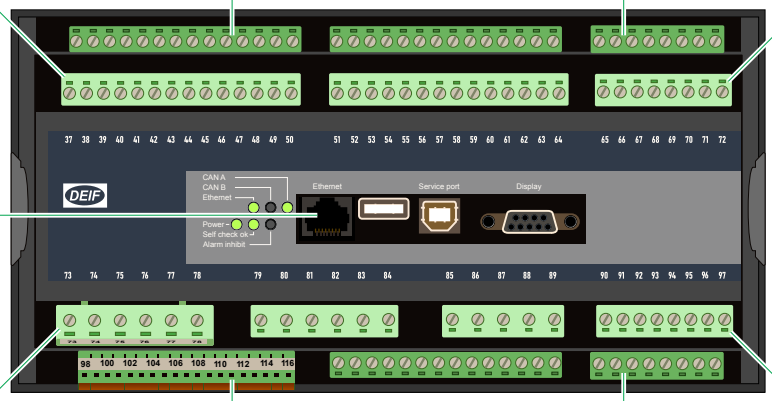
For PPM 300, the additional display is not an option.

The way to solve this is to use an AGI 410 (HMI) touch screen to handle the functions if needed.

More information
See **www.deif.com/products/agi-400** for dimensions and technical information.

2.3 Description of options

The PPM-3 unit housing is divided into board slot positions. This means that the unit consists of a number of printed circuit boards (PCBs) mounted in numbered slots - #1, 3, 4 and 5. Some of these board slots are standard and some are intended for options. The board slot positions are arranged as illustrated below.



The table below provides an overview and description of the PPM-3 options and shows which options can be converted to PPM 300

PPM-3	Description	Option type	PPM 300
Option D1	Voltage/VAr/cos phi controlQ load sharing	Software/Hardware	Standard
Option E1	+/-25 mA for speed governor +/-25 mA for AVR	Hardware	Standard
Option E2	2 x 0(4)-20 mA output	Hardware	Standard
Option EF2	+/-25 mA for speed governor 1 × 0(4) 20 mA transducer output	Hardware	Standard
Option EF4	+/-25 mA for speed governor or AVR 2 × relay outputs for speed governor or AVR	Hardware	Standard
Option EF5	1 x PWM output for governor 1 x +/-20 mA for AVR 2 x relay output	Hardware	Standard
Option F1	2 × 0(4) to 20 mA transducer out	Hardware	Standard
Option H2	Modbus communication	Hardware	N/A
Option H3	Serial communication Profibus	Hardware	N/A
Option H5	Engine communication - CAN bus J1939	Hardware	Standard
Option J1, J2 or J6	Display cable, 3, 6 or 1 m	Hardware	TCP/IP cable

PPM-3	Description	Option type	PPM 300
Option J3	PC cable for utility software (USB)	Hardware	TCP/IP cable
Option J4	PC cable for option N-programming	Hardware	TCP/IP cable
Standard	Engine control and protection (safety system)	Hardware	Standard
Option M13	7 digital inputs in slot #6 and/or slot #8	Hardware	Standard
Option M14	4 relay outputs in slot #6 and/or slot #8	Hardware	Standard
Option M15	4 analogue inputs in slot # 6 and/or slot #8	Hardware	Standard
Option N	Modbus TCP/IP	Hardware	Standard
X2	Additional standard display on CAN bus	Hardware	1 additional display (option)
X3	Additional Operator Panel (AOP-1)	Hardware	N/A
X4	Additional Operator Panel (AOP-2)	Hardware	N/A

3. Installation and parameter configuration

3.1 Wiring installation

The table below shows an overview of the terminals on PPM-3 and PPM 300.

Some input/outputs might not be available in PPM 300.

Each PPM 300 controller type is delivered with the inputs and outputs already configured according to the default configuration.

General description	Terminal PPM-3	Terminal description	Terminal PPM 300	Terminal description	Notes
Power supply	1	24 V DC (+)	PSM3.1 term.1	24 V DC (+)	Power supply module
Power supply	2	0 V DC (-)	PSM3.1 term.2	0 V DC (-)	Power supply module
Status	3+4	relay	PSM3.1 term. 3+4	Relay output	`Alarm > Status OK`
Alarm horn	5 + 6	Relay 1 (NO)	PSM3.1 term. 5+6	Relay output	`Alarm > Any alarm Common` (Configurable)
Configurable	8+9	Relay 2 (NO)		Configurable Digital output	
Configurable	11 + 12	Relay 3 (NO)	PSM3.1 term. 5+6	Configurable Digital output	
CB OFF Open breaker	14 + 15	Relay 4 (NO)	IOM3.1 term.1+2+3	Relay output	`[Breaker] > Control > [Open]` (Configurable)
CB ON sync.	17 + 18	Relay Output (NO)	IOM3.1 term.4+5+6	Relay output	`[Breaker] > Control > [Close]` (Configurable)
Configurable (Relay 20)	20	Transistor output		Configurable Digital output	
Configurable (Relay 21)	21	Transistor output		Configurable Digital output	
COMMON (TERM.20-21)	22	COMMON	IOM3.1 term.23	COMMON (TERM.13-22)	
SWBD control	23	Binary optocoupler input	IOM3.1 term.22	Configurable Digital input	
Configurable	24	Binary optocoupler input		Configurable Digital input	
Configurable	25	Binary optocoupler input		Configurable Digital input	
GB open	26	Binary optocoupler input	IOM3.1 term.13	Digital input	`[Breaker] > Feedback > [Open]` (Configurable)

General description	Terminal PPM-3	Terminal description	Terminal PPM 300	Terminal description	Notes
GB closed	27	Binary optocoupler input	IOM3.1 term.14	Digital input	`[Breaker] > Feedback > [Closed]` (Configurable)
Common for terminals 23-27	28	Common			
Modbus RTU RS-485 (option)	29 30 31	DATA + DATA GND DATA -		N/A	Modbus is only available on TCP/IP
Profibus DP (option)	29 30 31	DATA + (B) DATA GND DATA – (A)		N/A	
Load sharing	37 38 39	Active (P)load sharing Common Reactive (Q)load sharing		N/A	
kW/Hz setpoint Common PF/var/V setpoint	40 41 42	External setpoints		N/A	
Shore connection ON/Configurable	43	Binary optocoupler input		Configurable Digital input	
Man. GOV up/ Configurable	44	Binary optocoupler input		Configurable Digital input	
Man. GOV down/ Configurable	45	Binary optocoupler input		Configurable Digital input	
Man. AVR up/ Configurable	46	Binary optocoupler input		Configurable Digital input	
Man. AVR down/ Configurable	47	Binary optocoupler input		Configurable Digital input	
HC 1 request/ Configurable	48	Binary optocoupler input		Configurable Digital input	
HC 2 request/ Configurable	49	Binary optocoupler input		Configurable Digital input	
HC1 fixed load feedback/ Configurable	50	Binary optocoupler input		Configurable Digital input	
HC 2 fixed load feedback/ Configurable	51	Binary optocoupler input		Configurable Digital input	
CB short circuit/ Configurable	52	Binary optocoupler input		Configurable Digital input	
Configurable	53	Binary optocoupler input		Configurable Digital input	
Alarm inhibit 1/ Configurable	54	Binary optocoupler input		Configurable Digital input	
Alarm inhibit 2/ Configurable	55	Binary optocoupler input		Configurable Digital input	
COMMON (TERM.	56	Common			

General description	Terminal PPM-3	Terminal description	Terminal PPM 300	Terminal description	Notes
43-55)					
Start ACKN. HC 1/ Configurable	57 + 58	Relay 57 (NO)		Configurable Digital output	
Start ACKN. HC 2/ Configurable	59 + 60	Relay 59 (NO)		Configurable Digital output	
Configurable	61 + 62	Relay 61 (NO)		Configurable Digital output	
Trip NEL 1/ Configurable	63 + 64	Relay 9 (NO)		Configurable Digital output	
SPEED Raise	65 + 66	relay ouput	GAM3.1 term. 1+2	Relay output	`Regulators > Governor > GOV increase` (Configurable)
SPEED Lower	67 + 68	relay output	GAM3.1 term. 3+4	Relay output	`Regulators > Governor > GOV decrease` (Configurable)
Configurable (Relay 69)/ Raise U (Option D)	69 + 70	relay output		Configurable Digital output	
Configurable (Relay 71)/ Lower U (Option D)	71 + 72	relay output		Configurable Digital output	
I1	73 + 74	Current meas.	ACM3.1 term.9+10	Current meas.	`[Source] L1`
I2	75 + 76	Current meas.	ACM3.1 term. 11+12	Current meas.	`[Source] L2`
I3	77 + 78	Current meas.	ACM3.1 term.13+14	Current meas.	`[Source] L3`
U1	79	Volt. meas. Gen	ACM3.1 term. 5	Volt. meas. Gen	`[Source] L1`
U2	81	Volt. meas. Gen	ACM3.1 term.6	Volt. meas. Gen	`[Source] L2`
U3	83	Volt. meas. Gen	ACM3.1 term.7	Volt. meas. Gen	`[Source] L3`
U1	85	Volt. meas. BB	ACM3.1 term.1	Volt. meas. BB	`[Busbar] L1`
U2	87	Volt. meas. BB	ACM3.1 term.2	Volt. meas. BB	`[Busbar] L2`
U3	89	Volt. meas. BB	ACM3.1 term.3	Volt. meas. BB	`[Busbar] L3`
Option(s)	90-97			Configurable	Dependent on PPM-3 option
Power supply	98	24 V DC (+)	EIM3.1 term.1	24 V DC (+)	
Power supply	99	0 V DC (-)	EIM3.1 term.2	0 V DC (-)	
MPU input	100	MPU	EIM3.1 term.16	MPU input	
MPU Gnd	101	MPU	EIM3.1 term. 17	MPU common	
Multi-input 1	102	Terminal A	Configurable multi-input		
Multi-input 1	103	Terminal B	Configurable multi-input		
Multi-input 1	104	Terminal C	Configurable multi-input		

General description	Terminal PPM-3	Terminal description	Terminal PPM 300	Terminal description	Notes
Multi-input 2	105	Terminal A	Configurable multi-input		
Multi-input 2	106	Terminal B	Configurable multi-input		
Multi-input 2	107	Terminal C	Configurable multi-input		
Multi-input 3	108	Terminal A	Configurable multi-input		
Multi-input 3	109	Terminal B	Configurable multi-input		
Multi-input 3	110	Terminal C	Configurable multi-input		
Com.	111	Common for terminals 112-117			
Remote start + sync/ configurabæe	112	Binary optocoupler input		Configurable Digital input	
Remote deload + stop/configurable	113	Binary optocoupler input		Configurable Digital input	
Configurable	114	Binary optocoupler input		Configurable Digital input	
Start enable	115	Binary optocoupler input		EIM3.1 terminal 11/ term. 15 com.	`....> Start enable`
Running feedback/ configurable	116	Binary optocoupler input		Configurable Digital input	
Configurable	117	Binary optocoupler input		Configurable Digital input	
Emergency stop	118	Binary input/ Common for 119 and 120	EIM3.1	Configurable Digital input	
Run coil	119	Relay output	EIM3.1	Configurable relay output	
Start prepare	120	Relay output		Configurable Digital output	
Crank (starter)	121+122	Relay output	EIM3.1 terminal 3+4	Relay output	`...>Crank`
Stop coil w. wire break	123+124	Relay output with wirebreak	EIM3.1 terminal 9-10	Relay output with wirebreak	`...> Stop coil`
CAN load sharing	A1	CAN A	TCP/IP port		CAN load share not available
CAN load sharing	A2	CAN A	TCP/IP port		CAN load share not available
CAN load sharing	A3	CAN A	TCP/IP port		CAN load share not available
CAN load sharing	B1	CAN B	TCP/IP port		CAN load share not available
CAN load sharing	B2	CAN B	TCP/IP port		CAN load share not available

General description	Terminal PPM-3	Terminal description	Terminal PPM 300	Terminal description	Notes
CAN load sharing	B3	CAN B	TCP/IP port		CAN load share not available
CAN bus interface #1	128	CAN-L	PCM3.1 terminal 3	CAN-L	For CAN J1939 engine communication
CAN bus interface #1	130	CAN-H	PCM3.1 terminal 1	CAN-H	For CAN J1939 engine communication
CAN bus interface #2	131	CAN-L		N/A	
CAN bus interface #2	133	CAN-H		N/A	
Option(s)	126-133			Configurable	Dependent on PPM-3 option

3.2 Parameter settings

3.2.1 System Nominal settings

The PC utility software is a software program that can be used for configuration of the Multi-line products.

There are two versions, USW 3.x for PPM-3 and PICUS for PPM 300.

The utility software can be downloaded at www.deif.com.

More information
See **PICUS manual** for downloading, installing, and using PICUS.

The table below shows a direct conversion of the parameters that include nominal settings.

To edit parameters with PICUS, use `Configure > Parameters`.

Nominal settings

Parameter PPM-3	Description	Value	Parameter PPM 300	Description	Value
6001	Nom. frequency	Hz	`Generator Nominal settings`	Nom. f (1)	Hz
6002	Nom. power	kW	`Generator Nominal settings`	Nom. P (1)	kW
6003	Nom. current	A	`Generator Nominal settings`	Nom. I (1)	A
6004	Nom. voltage	V	`Generator Nominal settings`	Nom. U (1)	V

Parameter PPM-3	Description	Value	Parameter PPM 300	Description	Value
6005	Nom. RPM		Engine > Nominal settings	Nom. RPM (1)	RPM
6041	Volt. prim. GEN	V	Configure > Parameters > Generator > AC setup	G primary U	V
6042	Volt. sec. GEN	V	Generator > AC setup	G secondary U	V
6043	Current prim.	A	Generator > AC setup	G primary I	A
6044	Current sec.	A	Generator > AC setup	G secondary I	A
6051	Volt. prim. BUS	V	Busbar > AC setup	BB primary U1	V
6052	Volt. sec. BUS	V	Busbar > AC setup	BB secondary U1	V
N/A			Busbar > AC setup	BB nominal U1	V

3.2.2 Regulator governor

The table below illustrates the differences in the regulator parameter setup.

In PPM 300, the possibility to adjust the differential band in the regulator has been added.

Parameter setup digital (relay) regulator for governor

The parameters for PPM-3 and PPM 300 are different. PPM-3 settings are Kp and deadband (the zone where no relay activation takes place):

Parameter PPM-3	Description
2571	Freq. control deadband
2572	Freq. control Kp
2581	Power control deadband
2582	Power control Kp

PPM 300 includes settings for integrator time:

Parameter PPM 300	Description
Regulators > Governor: Relay output settings > Frequency regulation	f Kp
Regulators > Governor: Relay output settings > Frequency regulation	f Ti
Regulators > Governor: Relay output settings > Power regulation	P Kp
Regulators > Governor: Relay output settings > Power regulation	f Ti

3.2.3 Relay or analogue governor

In PPM 300, it is possible to change between relay and analogue governor setup.

You must assign these outputs under `Configure > Input/output`. Select the hardware module, then select a digital output to configure.

Most of the controller inputs and outputs can be assigned any function. Functions are not restricted to specific hardware modules. For example, governor and AVR control functions can use any inputs and outputs, and do not have to use the inputs and outputs on the Governor and AVR module (GAM3.1).

The 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.

Standard/default: The PPM 300 is set up using relay regulation.

If PPM-3 is using analogue regulation, it requires an analogue option card.

Parameter setup relay or analogue governor

Controller	Parameter	Description	Address	Set point
PPM-3	N/A	Option dependent	N/A	N/A
PPM 300	`Configure > Input/output`	Reg. output GOV		Relay or analogue

3.2.4 Governor relay

The PPM-3 standard unit controls the governor (relay output terminals 65-68, slot #4. It is possible to use analogue outputs, but this is unusual in marine use.

The PPM 300 standard unit controls the governor on relay output GAM3.1, slot 5 terminal 1-4. These are fully configurable.

The table below shows the differences in the standard parameter settings.

Parameter setup governor relay

Controller	Parameter	Description
PPM-3	2601	GOV Min ON time
PPM-3	2602	GOV period time
PPM 300	`Regulator Governor: Relay output settings`	Minimum ON time
PPM 300	`Regulator Governor: Relay output settings`	Period time

3.2.5 Synchronisation setup

The table below shows which parameters that are to be configured when setting the synchronisation.

Parameter PPM-3	Description	Parameter PPM 300	Description
2021	Sync. dfMax	Breakers > Generator breaker	Delta frequency max.
2022	Sync. dfMin	Breakers > Generator breaker	Delta frequency min.
2023	Sync. duMax	Breakers > Generator breaker	Delta voltage max.
2024	Sync. t CB	Breakers > Generator breaker	Breaker close time
2111	Blackout dfMax	AC configuration >[Source] > Voltage and frequency OK (blackout start)	Minimum OK frequency
2112	Blackout duMax	AC configuration > [Source] > Voltage and frequency OK (blackout start)	Maximum OK frequency
N/A			Sync. blackout enable

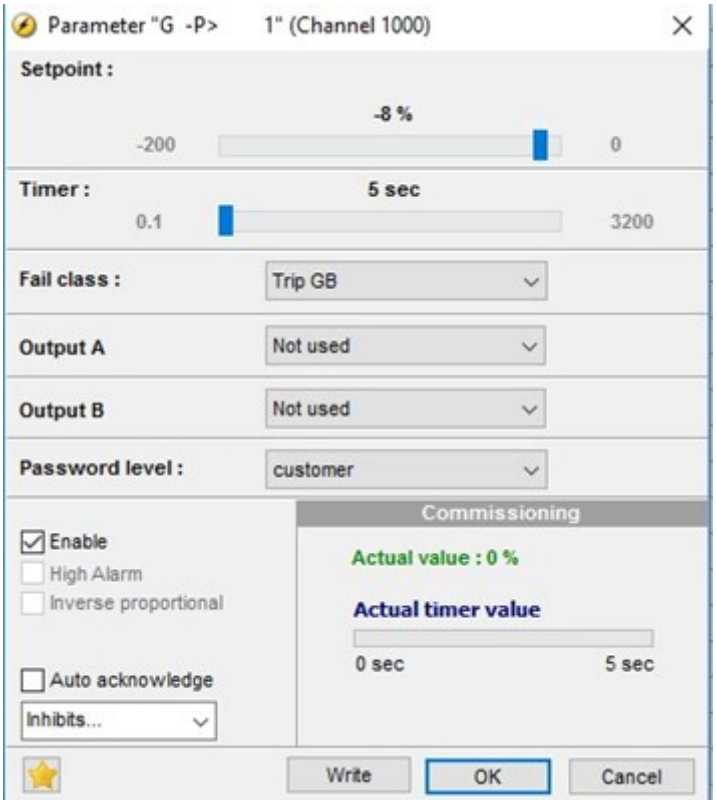
3.2.6 Protections setup

The following adjustment points are available in PPM-3:

- Set points
- Delay timer
- Fail class
- Output A or B

The protection has a commissioning window where live status is shown.

PPM-3 protection setup from USW-3



Fail classes

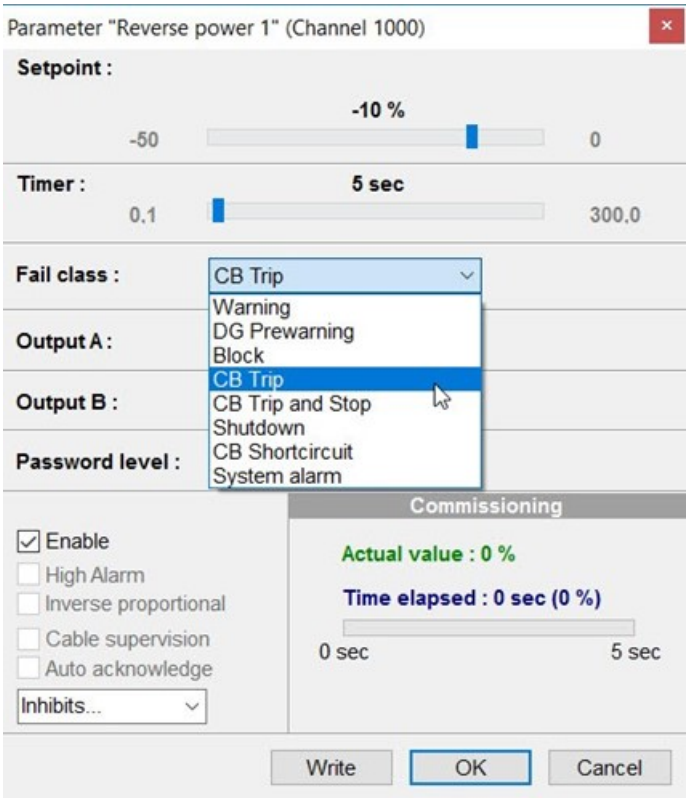
All activated alarms must be configured with a fail class. The fail classes define the category of the alarms and the subsequent alarm action.

In PPM 300, the same adjustment points are present, but "Fail class" is called "Actions".

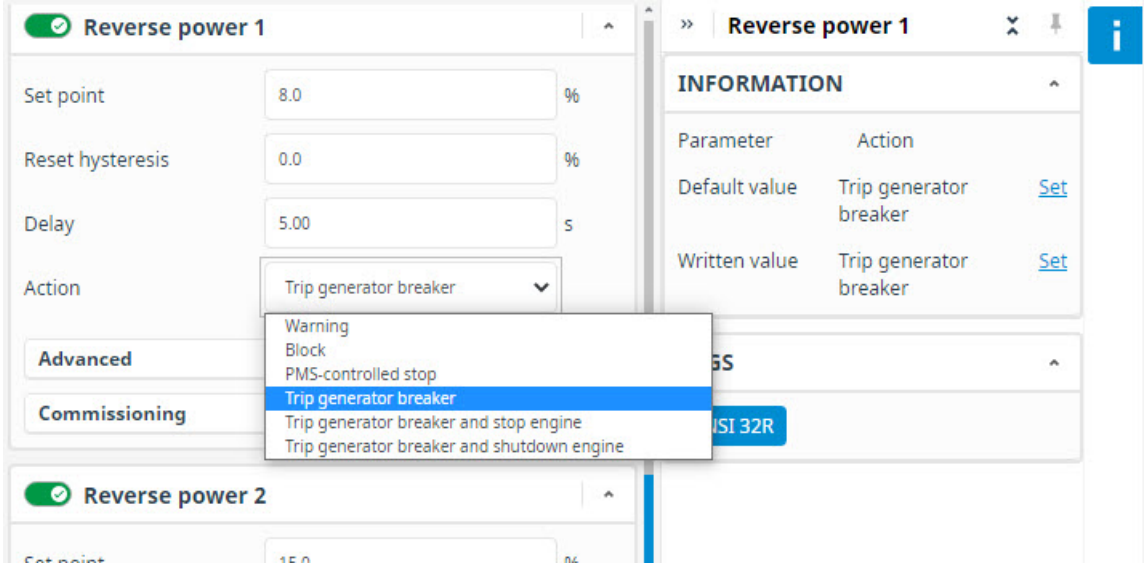
PPM-3 has eight different fail classes, compared with PPM 300 which has six different actions.

In PPM 300 it is NOT possible to set fail class to, for example: DG Pre-warning , CB short-circuit, and System alarm.

PPM-3 fail class setup



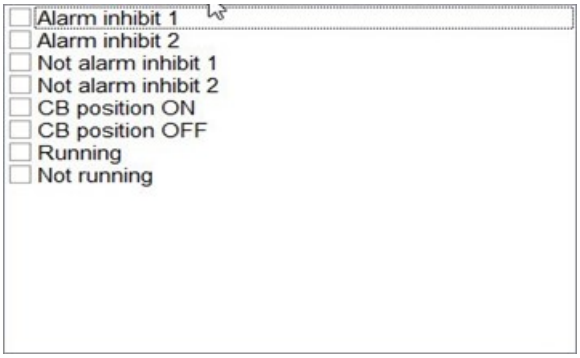
PPM 300 fail class setup



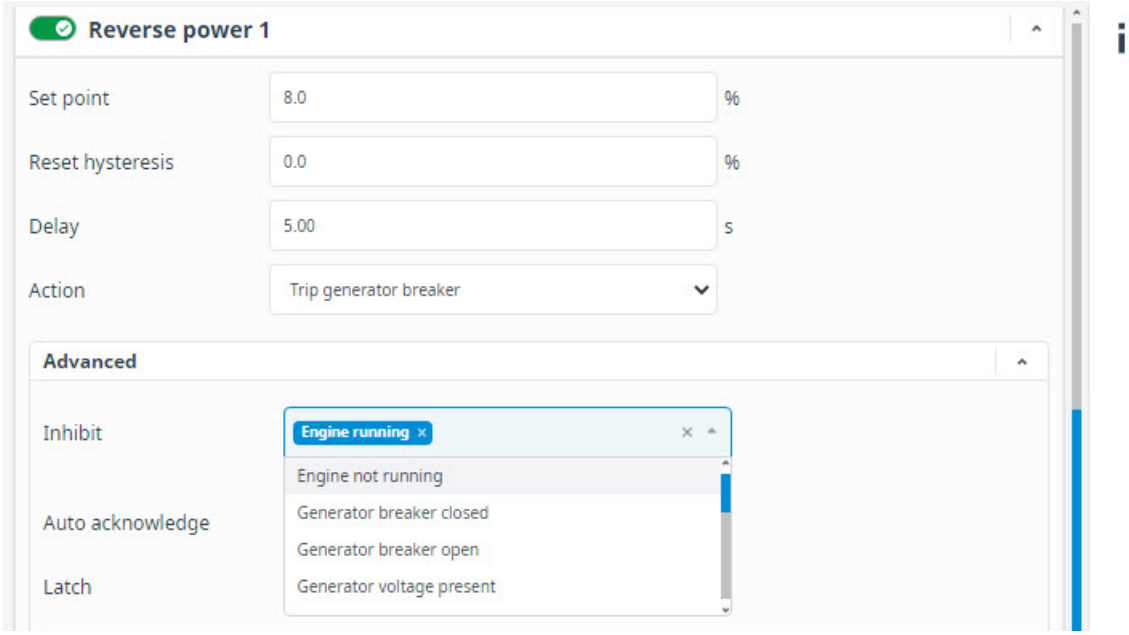
In order to select when the alarms are to be active, there is a configurable inhibit setting for every alarm. Inhibits are also different from PPM-3 to PPM 300 parameter. The inhibit functionality is only available via the PC utility software. For every

alarm there is a drop-down window where it is possible to select which signals that have to be present in order to inhibit the alarm.

PPM-3 Inhibit setup



PPM 300 Inhibit setup



More information
See **Designers Reference handbook**.

3.3 External communication with Modbus

PPM-3

This only applies to the external communication board (option H2, RS485 Modbus) located in slot #2.

The USB service port and Ethernet port (option N) also support Modbus.

The functions and readings on Modbus addresses are not the same from a PPM-3 to a PPM 300 controller.

PPM 300

The controller includes a built-in client for Modbus TCP/IP

In cases using Modbus RTU in the PPM-3, the PPM 300 controller must have an additional Modbus mapping device to fulfil the need in a retrofit project.

More information
See www.deif.com/documentation/ppm-3/ and www.deif.com/documentation/ppm-300/ to download the Modbus tables.

NOTICE

Modbus for SCADA or AMS

If Modbus is to be used for SCADA, AMS, and so on, contact DEIF DK to modify the Modbus list in PPM 300.