AGC-4 Mk II

Genset, Mains, BTB, Group, and Plant controller

Data sheet

DEIF Improve Tomorrow

1. Overview

1. Overview

1.1   AGC-4 Mk II

The AGC-4 Mk II is a configurable controller that can be used in a wide range of applications. The controller contains the 3-phase measuring circuits and all the functions required to protect and control a genset. The controllers can also be used to protect and control mains connections, tie breakers, and bus tie breakers.

You can use the AGC-4 Mk II as a single controller for one genset. You can have a number of AGC-4 Mk II single controllers working together using CANshare or PMS lite.

In a power management system, you can connect up to 40 AGC-4 Mk II controllers. In power management systems, the AGC-4 Mk II can also be combined with AGC-4, iE 150 and/or AGC 150 (up to 32), ASC 150 (Solar and/or Storage), ASC-4 (Solar and/or Battery), and/or ALC-4 (Automatic Load Controller).

With extended power management, a system can manage up to 992 gensets (each controlled by AGC-4 Mk II and/or AGC-4).

AGC-4 Mk II controller	Application type	Option	Breakers that can be controlled*
Genset	Single genset	-	GB only, or GB & MB**
Genset	Power management	G5	GB only
Mains	Power management	G5	MB only, or MB & TB, or TB only
BTB	Power management	G5	BTB only
Group	Extended power management	G7	TB only
Plant	Extended power management	G7	MB only

NOTE * GB = Generator breaker; MB = Mains breaker; TB = Tie breaker; BTB = Bus tie breaker.
NOTE ** For CANshare and PMS lite, the genset controller can only control the generator breaker (GB).

Modes	Single genset	Power management
Island operation	Synchronising or a stand-alone genset. Can also be used in critical power applications.	Power plant with synchronising gensets or a stand-alone genset. Can also be used in critical power plants with a start signal from an external (ATS) controller.
Automatic Mains Failure	Emergency standby genset, black start genset.	Critical power, emergency standby plants, black start genset.
Fixed power	Genset with fixed kW set point (including building load).	Power plant with fixed kW set point (including building load).
Peak shaving	Genset supplies peak load demand paralleled to the mains.	Power plant where genset(s) supply peak load demand paralleled to the mains.
Load takeover	The load is moved from mains to genset, for example, peak demand periods or periods with risk of power outages.	The load is moved from mains to the genset(s), for example, peak demand periods or periods with risk of power outages.
Mains power export	Genset with fixed kW set point (excluding building load), paralleled to the mains.	Power plant with fixed kW set point (excluding building load).
Remote maintenance	The genset has to supply the load while a distribution transformer needs to be disconnected for service.	Island power management, with up to 32 gensets. This requires a DEIF RMB box (separate product), a set of cables (option J8), and RMB with multiple gensets (option T4).

Modes	Single genset	Power management
	Remote maintenance requires a DEIF RMB box (separate product) and a set of cables (option J8).	

The plant modes are configurable, and it is possible to change the plant mode on the fly. All modes can be combined with Automatic Mains Failure mode (AMF).

Each controller can be controlled from the TDU touch screen or the DU-2 LCD display. An HMI/SCADA system can be implemented using one of the communication options.

1.2 Single-line application diagrams

1.2.1 Single genset

Fixed power (or base load), and/or automatic mains failure

Diesel generator set

Island operation

Diesel generator set
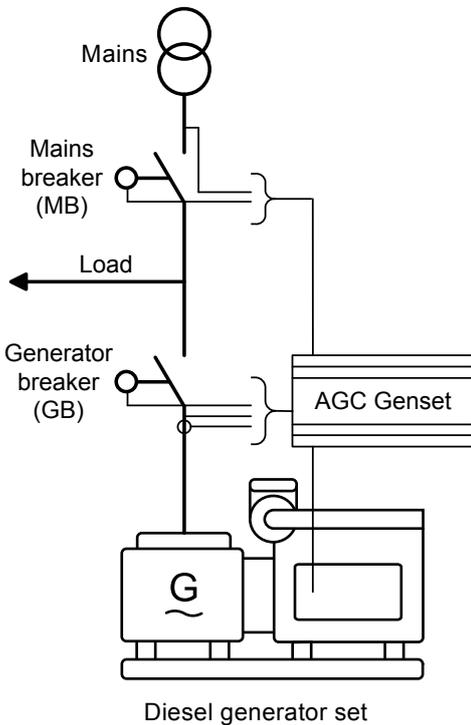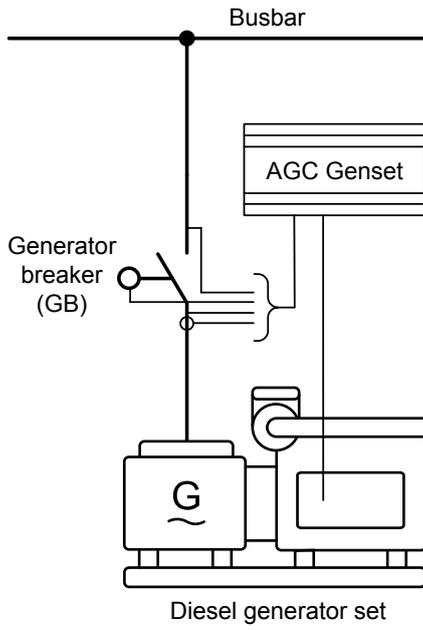
Peak shaving, load takeover and/or mains power export

Diesel generator set
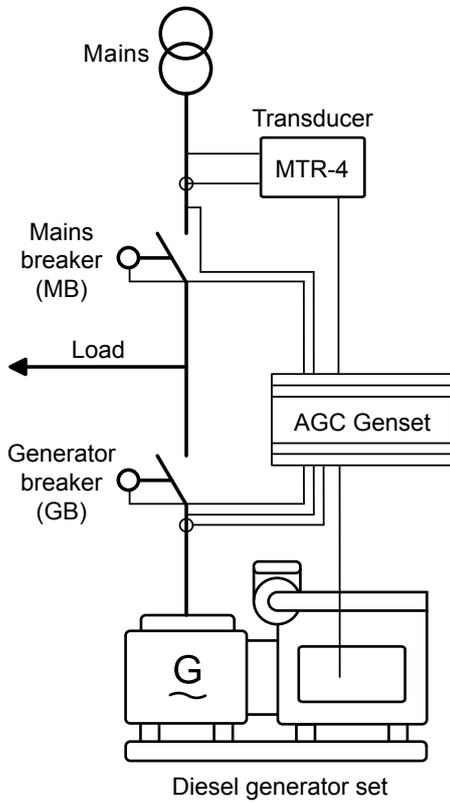
Multiple single gensets, with analogue load sharing

Diesel generator set 1   Diesel generator set 2
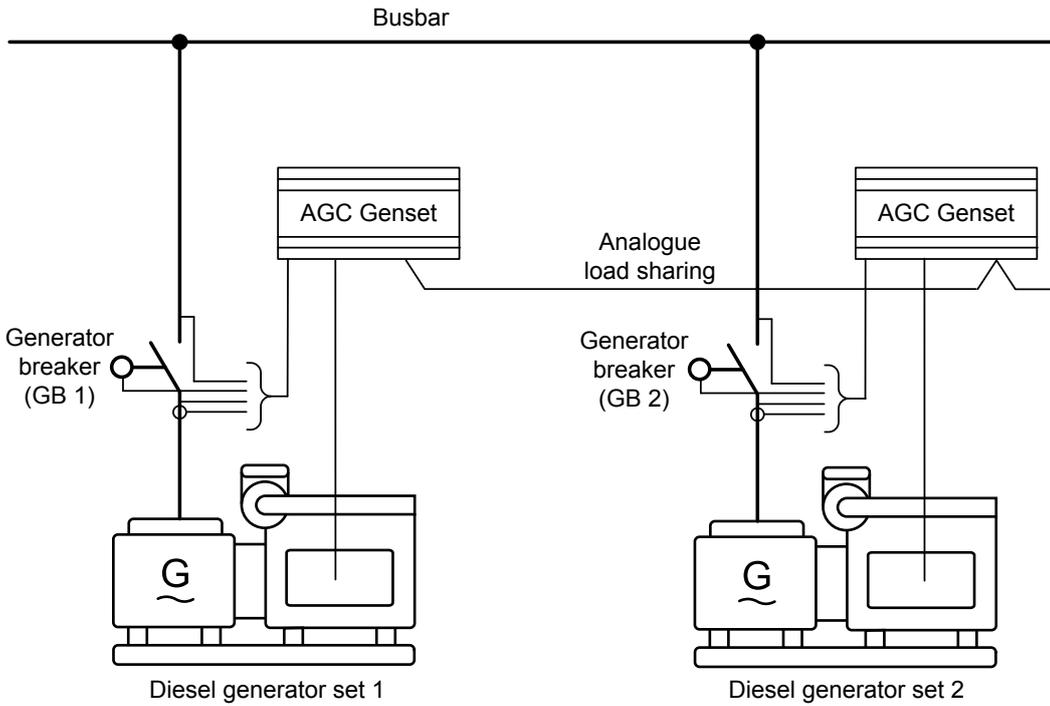
For analogue load sharing, you can have a mix of AGC-4 Mk II and any other controllers with suitable load sharing hardware.

Multiple single gensets, with CANshare digital load sharing
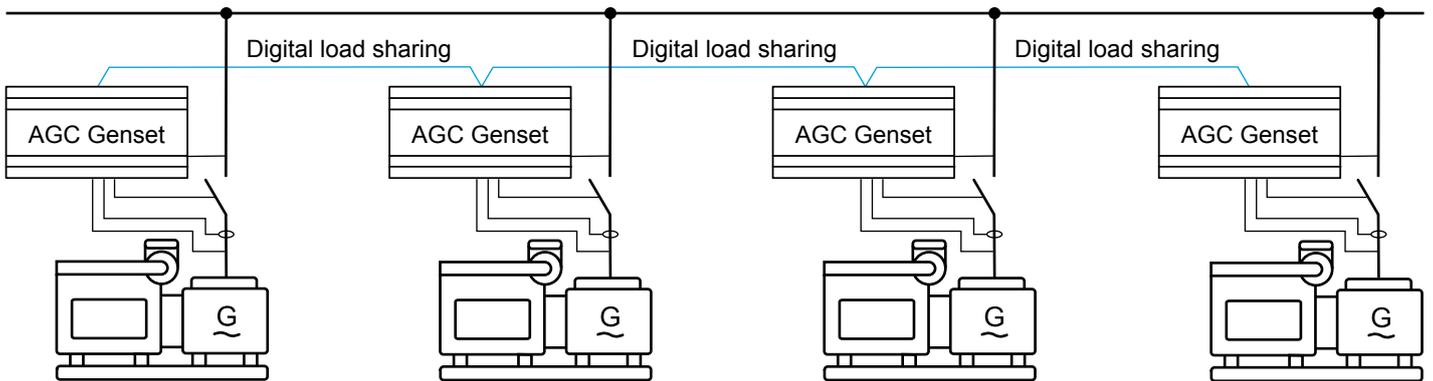
For CANshare, you can have a mix of AGC-4 Mk II, iE 150, and AGC 150 generator controllers.

Multiple single gensets, with third party digital load sharing
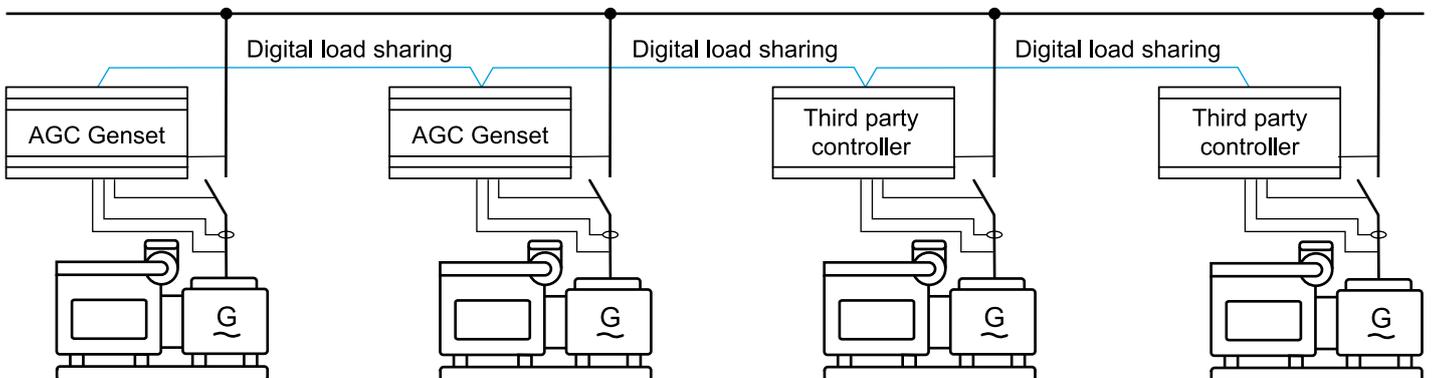
You can have up to 32 AGC-4 Mk II and third party generator controllers. Each AGC-4 Mk II must have option H12.

Compatible third party controllers:

- ComAp
- DeepSea MSC7
- SmartGen

PMS lite, with up to 254 single gensets and/or bus tie breakers
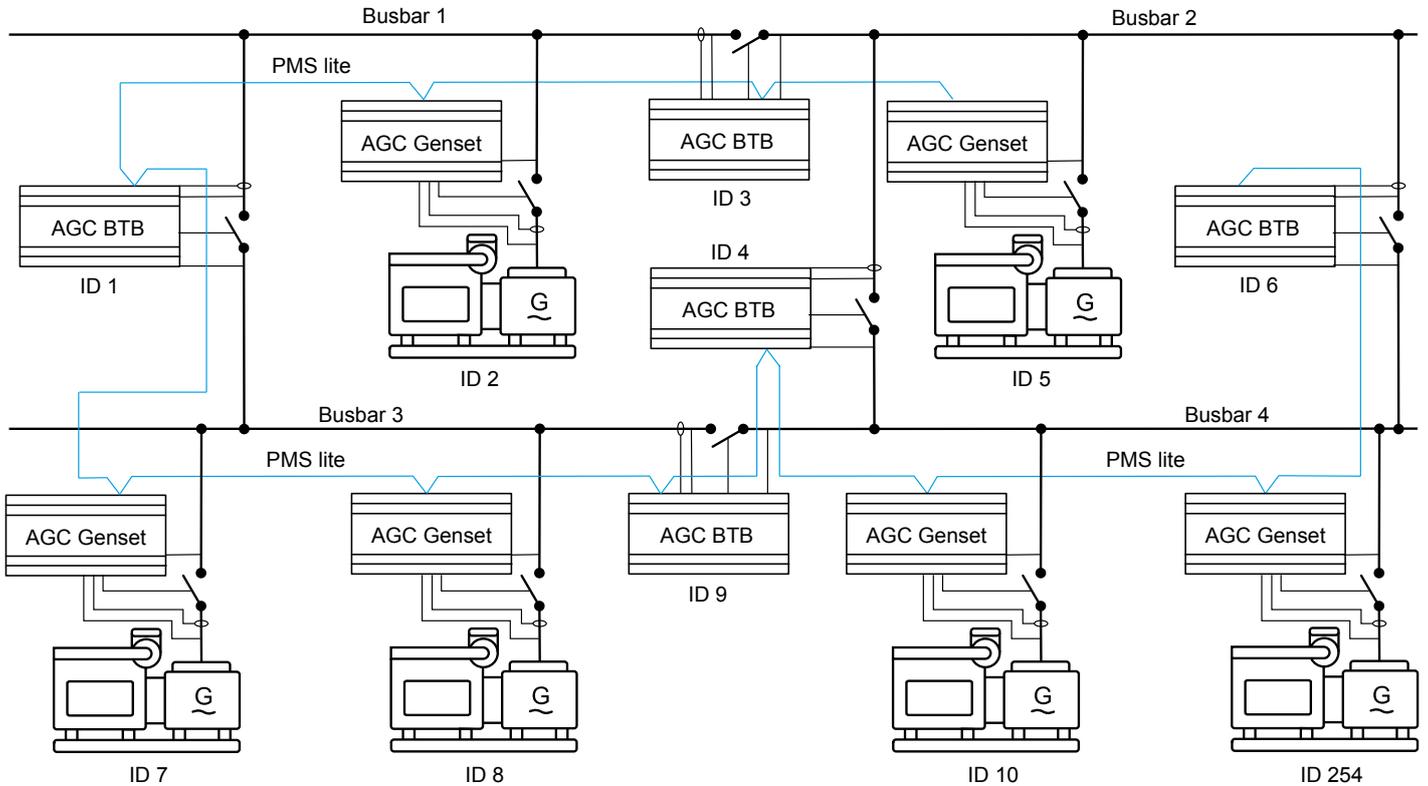
For PMS lite, you can have a mix of AGC-4 Mk II, iE 150, and AGC 150 generator and bus tie breaker controllers.

📖 **More information**
See PMS lite for details.

1.2.2   Power management

Island operation

Parallel with mains

Mains

AGC Mains

Mains
breaker
(MB)

Load

Tie
breaker
(TB)

Busbar

CAN bus PMS

AGC Genset

AGC Genset

Generator
breaker
(GB 1)

Generator
breaker
(GB 2)

G

G

Diesel generator set 1

Diesel generator set 2
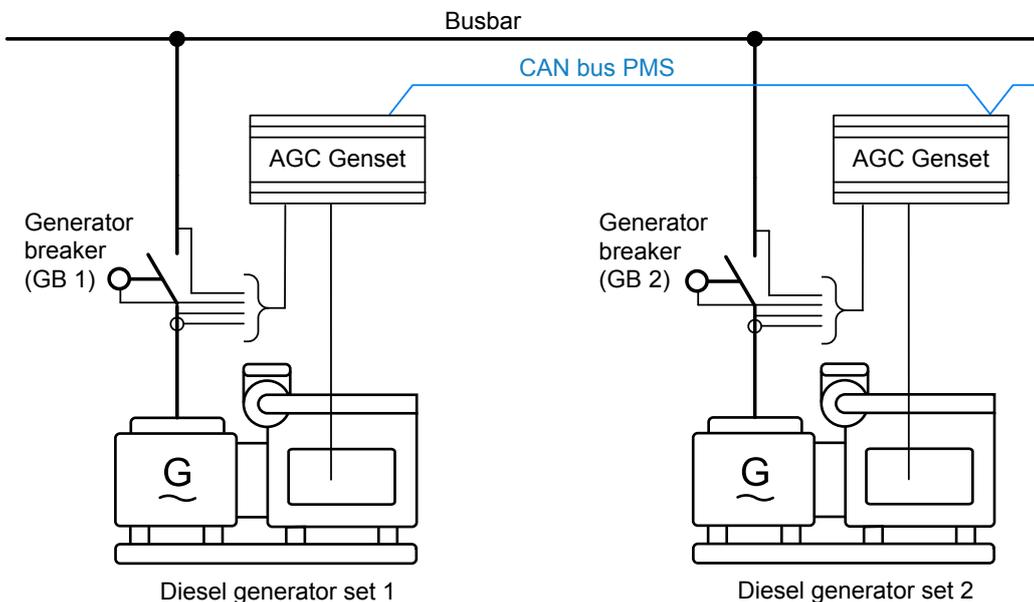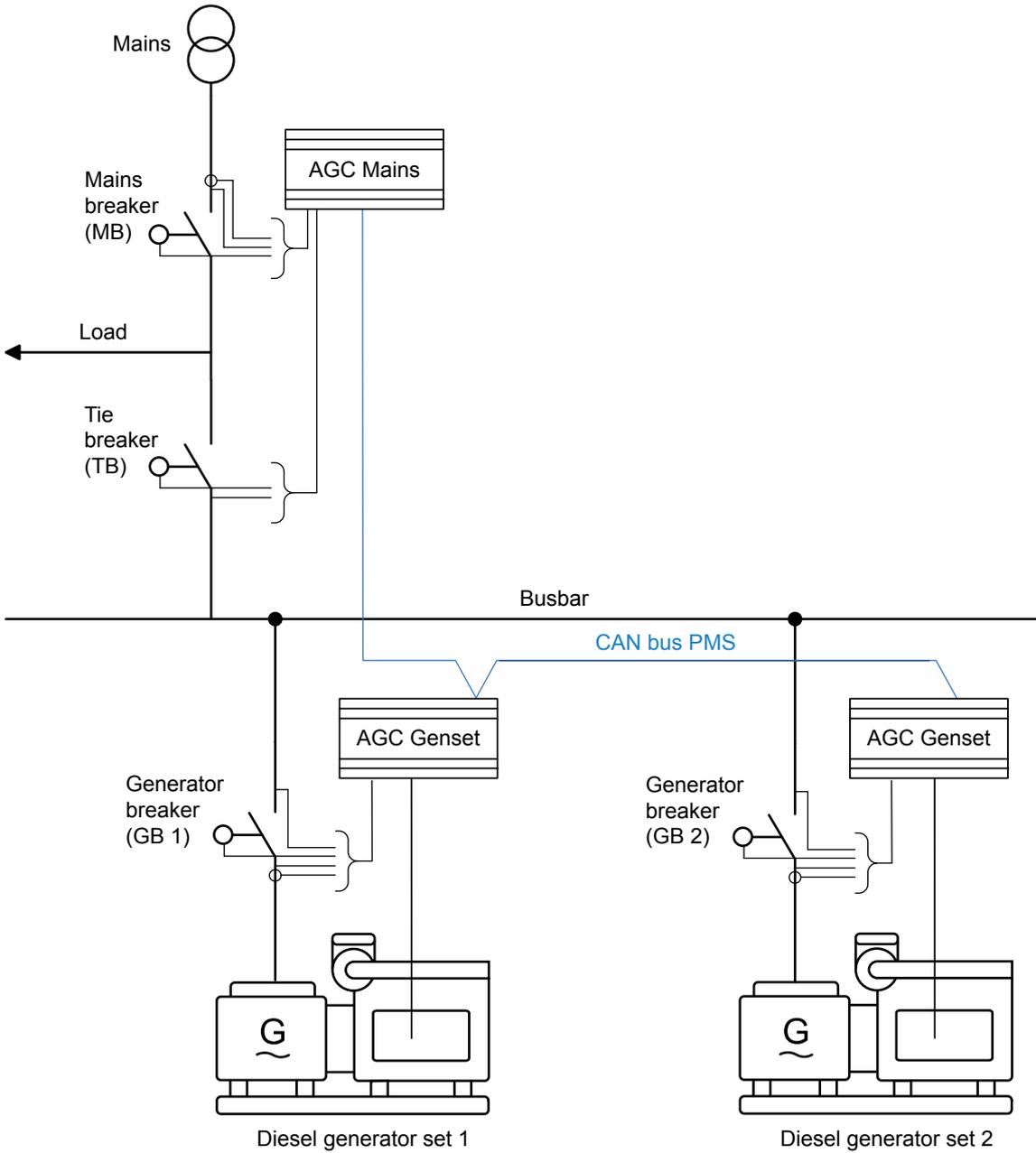
Main - tie - main application

Mains 1

Mains 2

Mains 3

Mains 4

Mains
breaker 1

AGC Mains

Mains
breaker 2

AGC Mains

Mains
breaker 3

AGC Mains

Mains
breaker 4

AGC Mains

CAN bus PMS

CAN bus PMS

Load

Load

Load

Load

Tie
breaker 3

Tie
breaker 4

Bus tie
breaker 1

Bus tie
breaker 2

CAN bus PMS

Bus tie
breaker 3

Bus tie
breaker 4

AGC BTB

AGC BTB

AGC Genset

AGC BTB

CAN bus PMS

AGC BTB

CAN bus
PMS

G
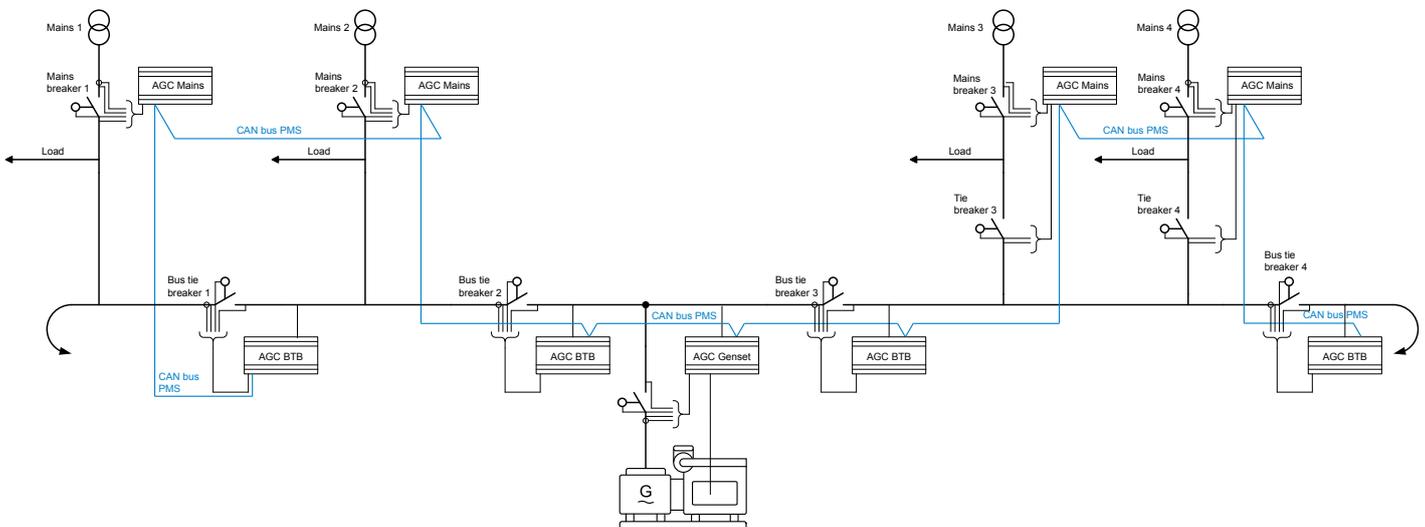
NOTE Power management with a ring busbar is possible.

H-coupling

Mains 17   AGC Mains

Mains breaker (MB 17)

Load

Tie breaker (TB 17)

Mains 18   AGC Mains

Mains breaker (MB 18)

Load

Tie breaker (TB 18)

Bus tie breaker (BTB 33)

Busbar   CAN bus PMS   Busbar   CAN bus PMS

AGC Genset   AGC Genset   AGC BTB   AGC Genset   AGC Genset

Generator breaker (GB 1)

Generator breaker (GB 2)

Generator breaker (GB 3)

Generator breaker (GB 4)

G   G   G   G

Diesel generator set 1   Diesel generator set 2   Diesel generator set 3   Diesel generator set 4

A bus tie breaker can be present without an AGC controller, however, the open and closed feedbacks must be connected to an AGC.

Multiple mains and one genset

Mains 17   Mains 18   Mains 19   Mains 20   Mains 21

AGC Mains   AGC Mains   AGC Mains   AGC Mains   AGC Mains

Mains breaker (MB 17)

Mains breaker (MB 18)

Mains breaker (MB 19)

Mains breaker (MB 20)

Mains breaker (MB 21)

CAN bus PMS   CAN bus PMS

Load   Load   Load   Load   Load

Tie breaker (TB 17)

Tie breaker (TB 18)

Tie breaker (TB 19)

Tie breaker (TB 20)

Tie breaker (TB 21)

Busbar

CAN bus PMS

AGC Genset

Generator breaker (GB 1)

G

Hybrid power management system

AGC Mains

CAN bus PMS

ALC

| 1 | 2 | 3 | 4 |
| 5 | 6 | 7 | 8 |

ASC Solar

CAN bus PMS

AGC Genset

ASC Battery

G

1.2.3 Extended power management

Group and plant controllers
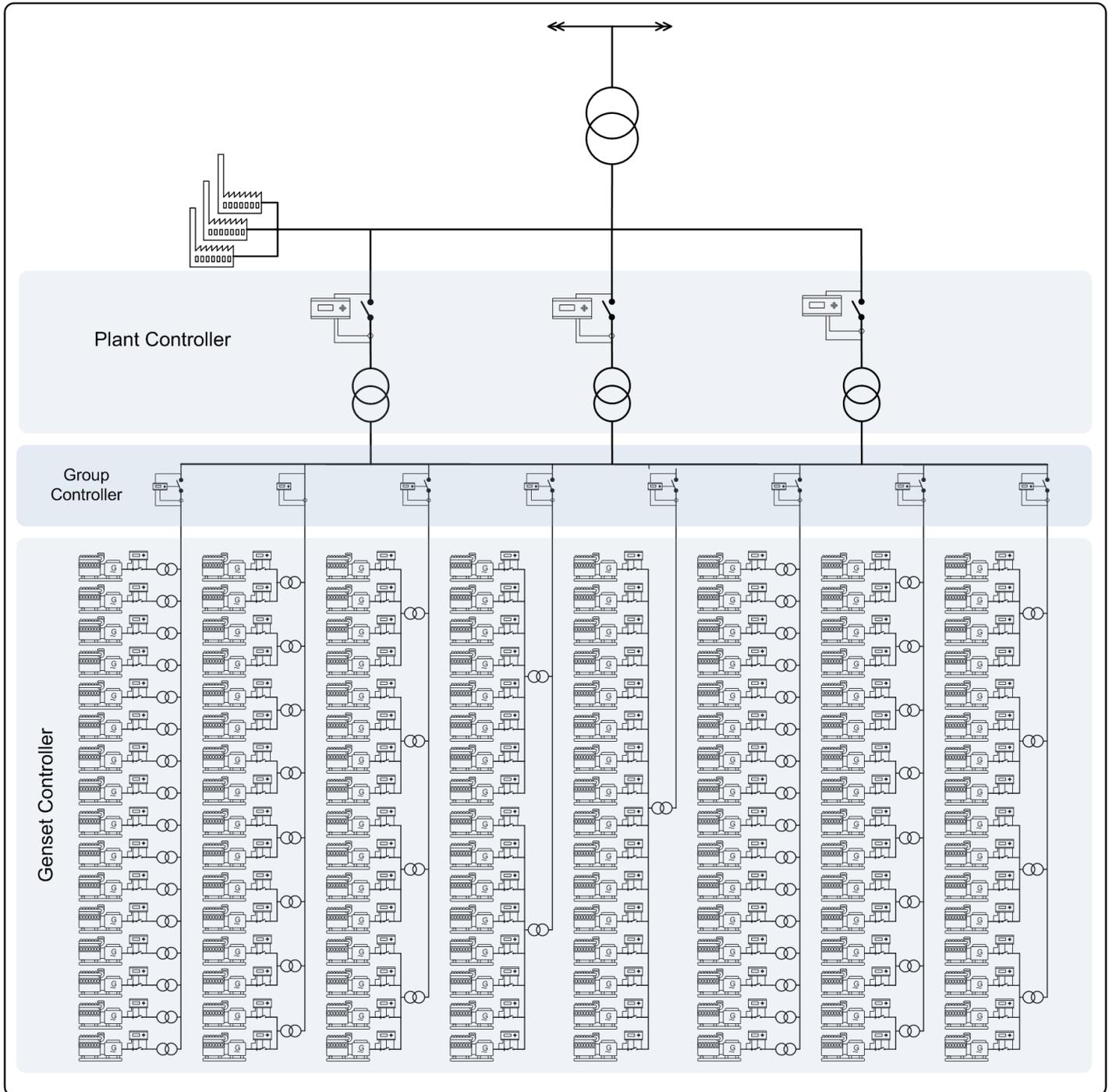
1.3 General functions

1.3.1 Functions

Control functions	Genset GB & MB	Genset GB only	Mains	BTB/Group/ Plant
Synchronising (static/dynamic)	●	●	●	●
Number of breakers/contactors controlled	2	1	2 or 1	1

Genset functions	Genset
Start/stop sequences	●
Run coil, or stop coil with wire break	●
Relay outputs, analogue output, or engine communication for speed and/or AVR control	●
Close before excitation (fast synchronisation)	●
Temperature-dependent cooling down Time-based cooling down Emergency cooling down	●
Engine running hours counter, emergency, normal Start attempt counter Maintenance counter	●
Power ramp up and power ramp down	●
Power derate	●
Nominal settings for rental gensets	●
Lube oil renewal	●
Fan control of 4 fans	●
Fuel usage monitoring; Fuel pump logic and refill	●
Diesel exhaust fluid monitoring; Diesel exhaust fluid logic and refill	●
Generic fluid monitoring; Generic fluid logic and refill	●
Engine block heater control	●
Dynamic frequency response (for handling excessive PV power in single genset applications)	●
Communication with KWG ISO5 isolation monitor (CAN bus)	●
Single genset controller load sharing: Analogue load sharing Load sharing, with bus tie breakers (CANshare) (up to 127 generators)	● ●

Mains functions	Genset GB & MB	Mains
Short time parallel	●	●
Mains support (frequency and voltage)	●	●

General functions	All controllers
Selectable AC configuration	●
Step-up transformer (with phase angle compensation)	●
Modbus TCP/IP	●
Six configurable general PID regulators	●
Controller type can be changed	●
Breaker operation counter	●
Pulse input counters	●
Current thermal demands	●
kWh meter Day/week/month/total	●
kvarh meter Day/week/month/total	●

General functions	All controllers
Battery test, crank or asymmetry	●
Event log with real-time clock Alarm log with real-time clock Battery crank test log with real-time clock	●
Command timers	●
Master clock	●
Network time protocol (NTP)	●

Utility software functions	All controllers
USB interface to PC	●
Free PC utility SW (Windows)	●
Permission settings in PC utility SW for limited SCADA access	●
Password-protected setup	●
Customisable display views	●

M-Logic	All controllers
Logic configuration tool for plant customising	●
Selectable input events, for example, plant status	●
Selectable output events, for example, plant commands	●

1.3.2   PMS lite

PMS lite is for off-grid plants with up to 254 generators and/or bus tie breakers. PMS lite is only for generators - no other power sources are possible. Each genset controller protects and controls a genset, and the genset breaker. Each bus tie breaker is controlled by a bus tie breaker controller. The operator can easily configure the plant from the display, without needing to use a PC with utility software.

PMS lite makes sure that generators are started or stopped according to the load and priority. PMS lite makes sure that the generators share the load equally. The plant set up is quick because the controllers use the CAN bus connections to automatically detect each other and assign IDs. To have the CAN bus connections required for PMS lite, each AGC-4 Mk II controller must have hardware option H12.2 or H12.8.

PMS lite can only be used in a system where all the controllers use PMS lite. For PMS lite, you can have a mix of AGC-4 Mk II, iE 150, and AGC 150 controllers. PMS lite cannot be used in a standard power management system.

NOTE   For up to 254 gensets and/or bus tie breakers, all controllers must have software version 6.23 or later. For older software (versions 6.11 to 6.22), the limit is 127 gensets. For older software, bus tie breakers are not possible. Older software is not compatible with software version 6.23 or later.

PMS lite plant
Automatic detection and ID assignment • The operator can use the display to manually assign IDs
PMS lite settings • Different settings in each controller supported • Supports sharing the PMS lite configuration between controllers
Configurable baud rate for PMS lite communication (125/250 kbps)
PMS lite load sharing • Equal load sharing for active (P) and reactive (Q) power

PMS lite plant
Generator priority • Assigned automatically • Assigned manually (multiple controllers can have the same priority) • Based on running hours
Select the gensets to start (for example, after a blackout)
Start timer (suspend load-dependent start and stop while the timer runs)
Busbar section management

Load-dependent start and stop (LDSS)
Automatically start the next generator for high load
Automatically stop the next generator for low load
Manual start and stop available
Select the minimum number of running generators
PLC start-stop • Disable load-dependent start and stop • PLC controls start and stop using digital inputs, Modbus and/or M-Logic

1.3.3 Protections

AC and ANSI protections according to IEC 60255-1

	Alarms	ANSI	Operate time*	All controllers
Over-voltage (according to IEC 60255-127)	2	59P	<200 ms	●
Under-voltage (according to IEC 60255-127)	3	27P	<200 ms	●
Over-frequency (according to IEC 60255-181)	3	81O	<200 ms	●
Under-frequency (according to IEC 60255-181)	3	81U	<200 ms	●
Unbalanced voltage	1	47	<200 ms	●
Unbalanced current	1	46	<200 ms	●
Under-excitation or var import	1	32RV	<200 ms	●
Over-excitation or var export	1	32FV	<200 ms	●
Over-current	4	51	<200 ms	●
Voltage-dependent over-current	1	50V	<200 ms	●
Fast over-current (Short circuit)	2	50P	<40 ms	●
IEC/IEEE inverse time over-current	1	51	-	●
Directional over-current	2	67	<100 ms	●
Negative sequence current	1	$46I_2$	<200 ms	●
Negative sequence voltage	1	47	<200 ms	●
Zero sequence current	1	$50I_0$	<200 ms	●
Zero sequence voltage	1	$59U_0$	<200 ms	●
Busbar/mains over-voltage	3	59P	<50 ms	●
Busbar/mains under-voltage	4	27P	<50 ms	●
Busbar/mains over-frequency	4	81O	<50 ms	●
Busbar/mains under-frequency	5	81U	<50 ms	●

	Alarms	ANSI	Operate time*	All controllers
Reverse power	2	32R	<200 ms	●
Overload**	5	32F	<200 ms	●
Phase sequence error	1	47	-	●
Load shed, three groups via current via busbar frequency via overload via fast overload	1/group 1/group 1/group 1/group	51 81 32 32	-	●*** ●*** ●*** ●***
Emergency stop	1		<200 ms	●
Low auxiliary supply	1	27DC	-	●
High auxiliary supply	1	59DC	-	●
Breaker external trip	1/breaker		-	●
Synchronisation failure alarms	1/breaker		-	●
Breaker open failure	1/breaker	52BF	-	●
Breaker close failure	1/breaker	52BF	-	●
Breaker position failure	1/breaker	52BF	-	●
Not in Auto	1		-	●

NOTE *Delay set to minimum. For mains protections, only if the genset controller controls the mains breaker.
NOTE **You can configure these protections for overload or reverse power.
NOTE ***Not in BTB controller.

	Alarms	ANSI	Operate time*	Genset
Power-dependent reactive power	1	40	<300 ms	●
Overspeed	2	12	<500 ms	●
Close before excitation failure	1		-	●
Deload error	1		-	●
Crank failure	1	48	-	●
Running feedback error	1		-	●
Start failure	1	48	-	●
Hz/V failure	1		-	●
Stop failure	1		-	●
Stop coil, wire break alarm	1		-	●
Engine heater	1	26	-	●

Advanced AC protections for mains connections

	Alarms	ANSI	Operate time
ROCOF (df/dt)	1	81R	<160 ms (4 periods)
Vector shift	1	78	<40 ms
Positive sequence	1	27pos	<60 ms
Time-dependent under-voltage (Low Voltage Ride Through), $U_t<$	2	27t	<55 ms
Time-dependent under-voltage (Low Voltage Ride Through) if SYM or ASYM detection is chosen, $U_t<$			<70 ms

	Alarms	ANSI	Operate time
Time-dependent over-voltage (High Voltage Ride Through), $U_t>$	1	59AVG	<55 ms
Under-voltage and reactive power low, $U_Q<$	2	27Q	<200 ms

Other protections

|	Alarms	Operate time	Genset	Other controllers
Multi-config. inputs with wire break alarms, three inputs	2	<800 ms	●	●
Digital inputs (option-dependent)	1	<250 ms	●	●
Max. ventilation/radiator fan	2		●	●
MPU wire break	1	<600 ms	●	
Battery test alarm	1		●	
Fuel fill check	1		●	

Shutdown override

For generator controllers, the protections have a configurable shutdown override inhibit.

1.3.4 Application emulation

Use the emulation tool to verify and test the functionality. The emulation tool makes it possible to test most of the functions, for example, plant modes and logics, breaker handling, mains and generator operation. Emulation only requires a DC supply and CAN bus between the controllers.

Application emulation is useful for training, customising plant requirements, and testing basic functionality.

In a power management system, the entire plant can be controlled using the PC Utility Software tool, if there is a TCP/IP connection to one of the controllers.
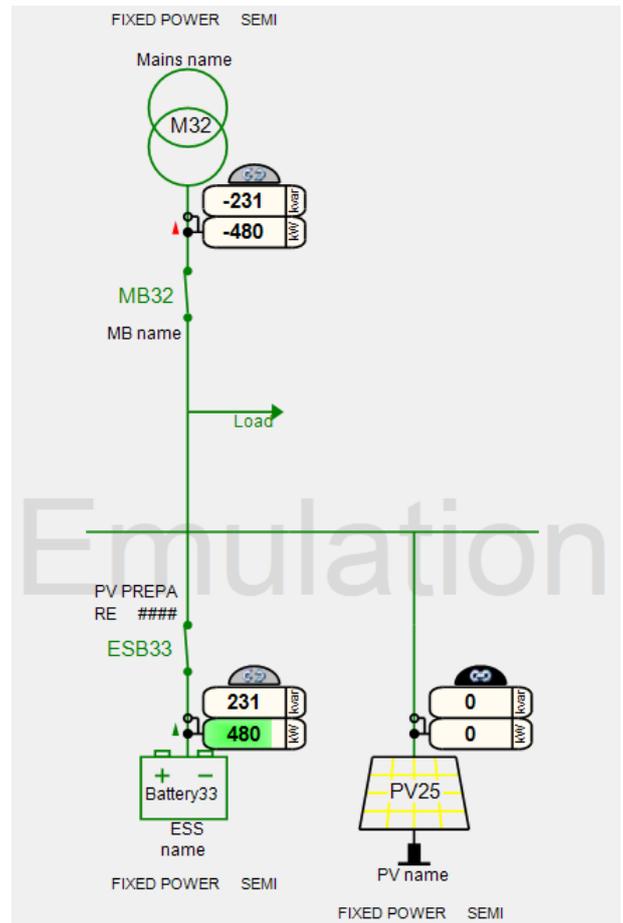
1.4 Power management

The power management system ensures that the controllers work together to control all power sources and breakers. Power management can ensure safety, fuel optimisation, easy implementation of plant logic, and so on.

1.4.1 Power management features

Multi-master system

The power management system is designed as a multi-master system for increased reliability. In a multi-master system all vital data is transmitted between the controllers, giving all controllers knowledge of the present power management status (calculations and position) in the application. This makes the application immune to failing master controllers and makes the controllers suitable for all types of applications, including emergency standby, and critical power applications.

Redundant CAN bus

In critical power and emergency standby applications requiring extra operation reliability, redundant CAN bus communication lines can be used. This ensures reliable CAN bus communication for power management if one of the CAN lines is damaged.

Redundant controller

With the Critical Power option (T1) it is possible to have redundant controllers in the application. The redundant controller is connected on the CAN line as a hot standby unit and is therefore always updated with the system status and ready to become the primary controller.

1.4.2 Applications

The AGC can include power management (option G5) and extended power management (option G7). With power management, the AGC can handle simple or advanced applications for a variety of power plant projects. Applications include synchronising gensets, critical power, emergency standby, and power production.

For power management (option G5), the following can be controlled:

- 32 gensets/mains with breakers (ID 1 to 32)
  - These can be AGC-4 Mk II, iE 150, and/or AGC 150 controllers.
- 8 bus tie breakers on the generator bus or load bus (ID 33 to 40)
  - These can be AGC-4 Mk II, iE 150, and/or AGC 150 controllers.
- 16 automatic sustainable controllers (ID 25 to 40)
  - iE 150 battery and/or solar
  - ASC 150 storage and/or solar
  - ASC-4 battery and/or solar (SW 4.10.0 or greater)
- 8 automatic load controllers ALC-4 (ID 25 to 40, ALC SW 4.10.0 or greater)

ID 1 to 24	ID 25 to 32	ID 33 to 40
Genset (1 to 32)		
Mains (1 to 32)		
	Solar (25 to 40)	
	Battery/Storage (25 to 40)	
	ALC-4 (25 to 40)	
		BTB (33-40)
		External BTB (33-40)

For extended power management (option G7), the following can be controlled:

- 992 gensets*
- 31 groups and/or ASC-4 solar
- 1 plant

The complete power management system can easily be monitored from the PC utility SW through a graphical supervision page. Running status, hours in operation, breaker status, condition of mains and busbars, and fuel consumption are just some of the values that are presented.

NOTE   * For each ASC-4 solar controller(s) in the application, the maximum number of gensets is reduced by 32.

1.4.3   Plant modes

The plant can be divided by one to eight bus tie breakers. This makes it possible to run the plant with different plant modes. For example, for test purposes, or when splitting up the load in primary and secondary loads.

1.4.4   Power management functions

	Genset (G5)	Mains (G5)	BTB (G5)	Group (G7)	Plant (G7)
Multi-master system	●	●	●	●	●
Redundant CAN bus	●	●	●	●	●
Load management	●	●	●	●	●
Load-dependent start/stop	●			●	
• Manual priority • Running hours priority • Running hours priority • Fuel optimisation priority	Absolute/relative Absolute/relative Total/trip/load profiled ●			Absolute Absolute	
Neutral earth relay (Ground relay)	●			●	
Safety stop of genset	●				
N + X (Secured mode)	1-8 extra gensets			1 extra group	
• Equal load sharing • Asymmetric load sharing	● ●			● ●	
Base load running for maintenance (island plants)	●				
Analogue load sharing for backup	●				
Easy connect (for genset application setup)	●				
Short-time parallel	– *	●**			
ATS control		●			●
Plant PF control		●			●
Mains feeder control, feeders paralleled		●			●
Mains feeder control, main-tie-main for critical power		●			●
Section power control			●		

NOTE   * For a genset controller, short-time parallel is only possible in a single genset application (that is, without power management). The genset controller must control the GB and MB.
NOTE   ** For a mains controller, short-time parallel is only possible if the controller controls the TB and MB.

1.4.5 Easy configuration of single-line diagrams

The application setup is easily configured using a PC and the DEIF PC utility software.

The basic plant control is set up by a few basic plant conditions, including mains feeder handling and operation of the generators.

1.5 Hardware

1.5.1 Inputs and outputs

The number of inputs and outputs in the AGC depend on the option selection. This table includes the number of I/Os in the genset controller (with no options). The four outputs of the governor/AVR card in slot #4 are not included.

Input/outputs	Fixed (not configurable)	Configurable
Multi-selectable inputs	0	3
Digital inputs	2 for breaker ON/OFF feedbacks*, 1 E-stop If MB is used: 4 for breaker ON/OFF feedbacks*, 1 E-stop	9 If MB is used: 7
RPM (MPU)	1	0
Relays for engine control	4 (Start prepare, Crank, Stop, Run)	0
Relays for breaker control	2 If MB is used: 4	2 If MB is used: 0
Relay	1 (Status/watchdog)	1
Open collector outputs	0	2

NOTE   * If any of these are moved to multi-inputs (for wire break detection), the corresponding digital inputs are configurable.

1.5.2 Typical wiring for generator controller
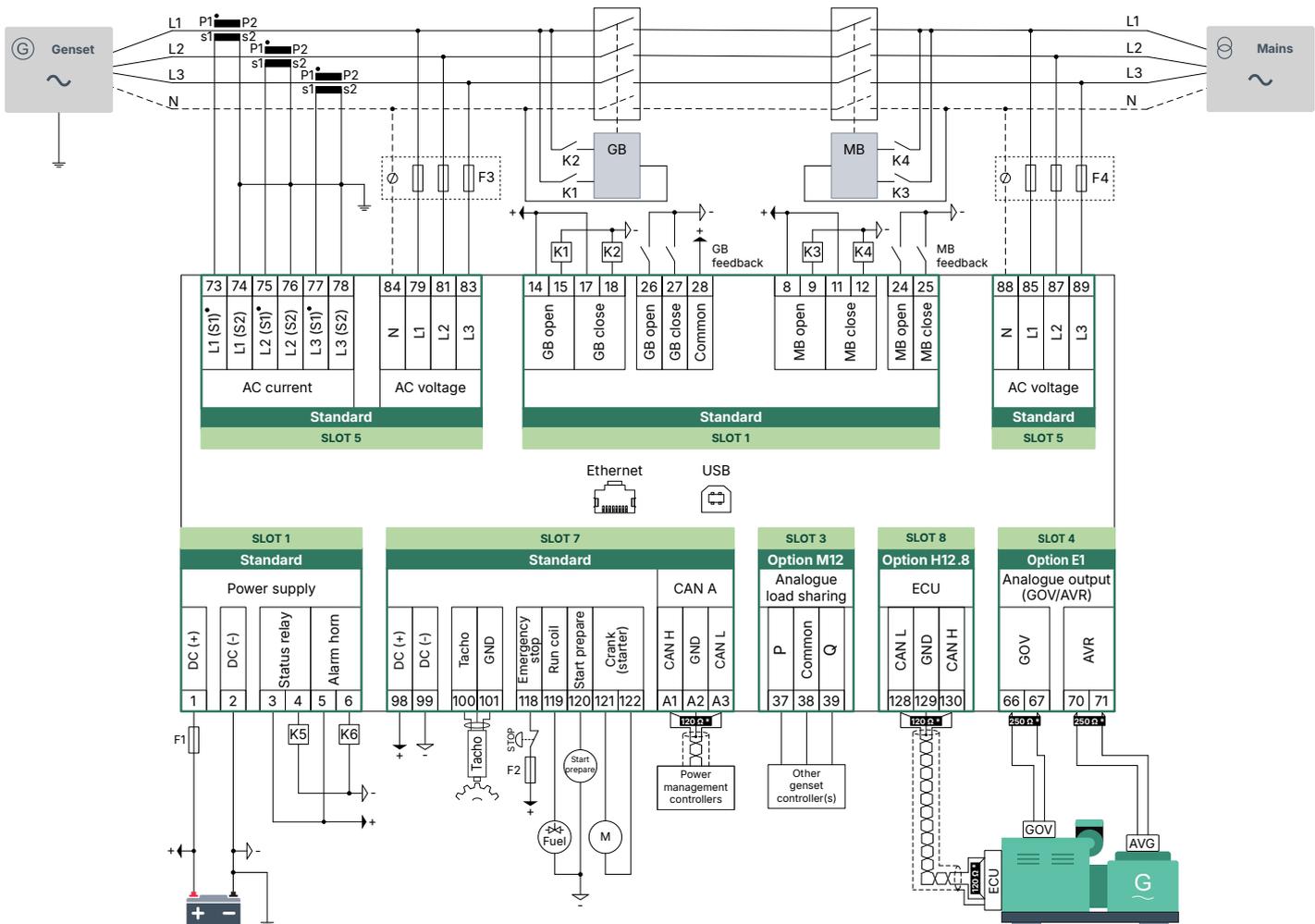
Fuses

- F1: 2 A DC max. time-delay fuse/MCB, c-curve
- F2: 6 A AC max. time-delay fuse/MCB, c-curve
- F3, F4: 2 A AC max. time-delay fuse/MCB, c-curve

1.5.3   Typical wiring for mains controller
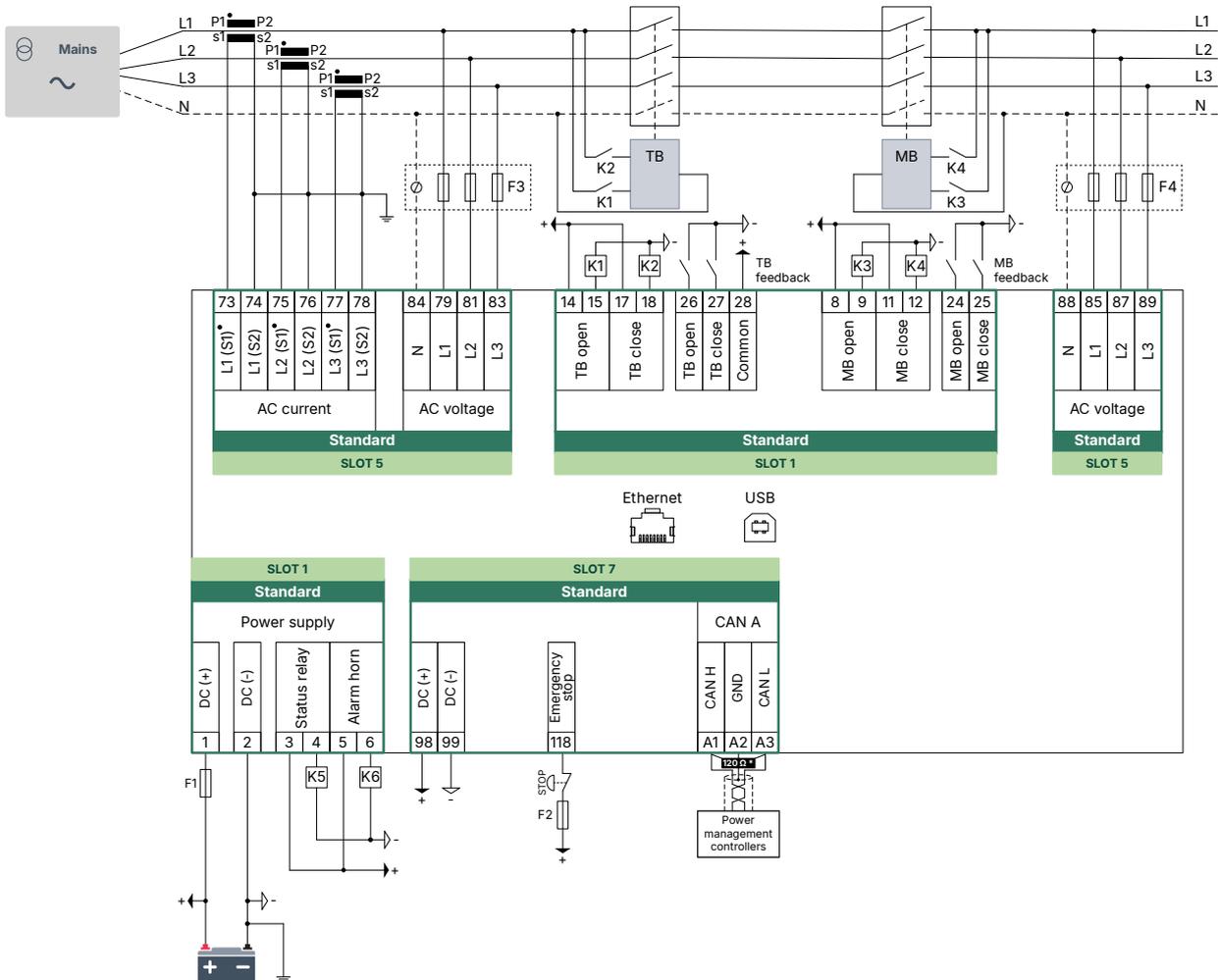
Fuses

- F1: 2 A DC max. time-delay fuse/MCB, c-curve
- F2: 4 A DC max. time-delay fuse/MCB, b-curve
- F3, F4: 2 A AC max. time-delay fuse/MCB, c-curve

1.5.4 Typical wiring for BTB controller
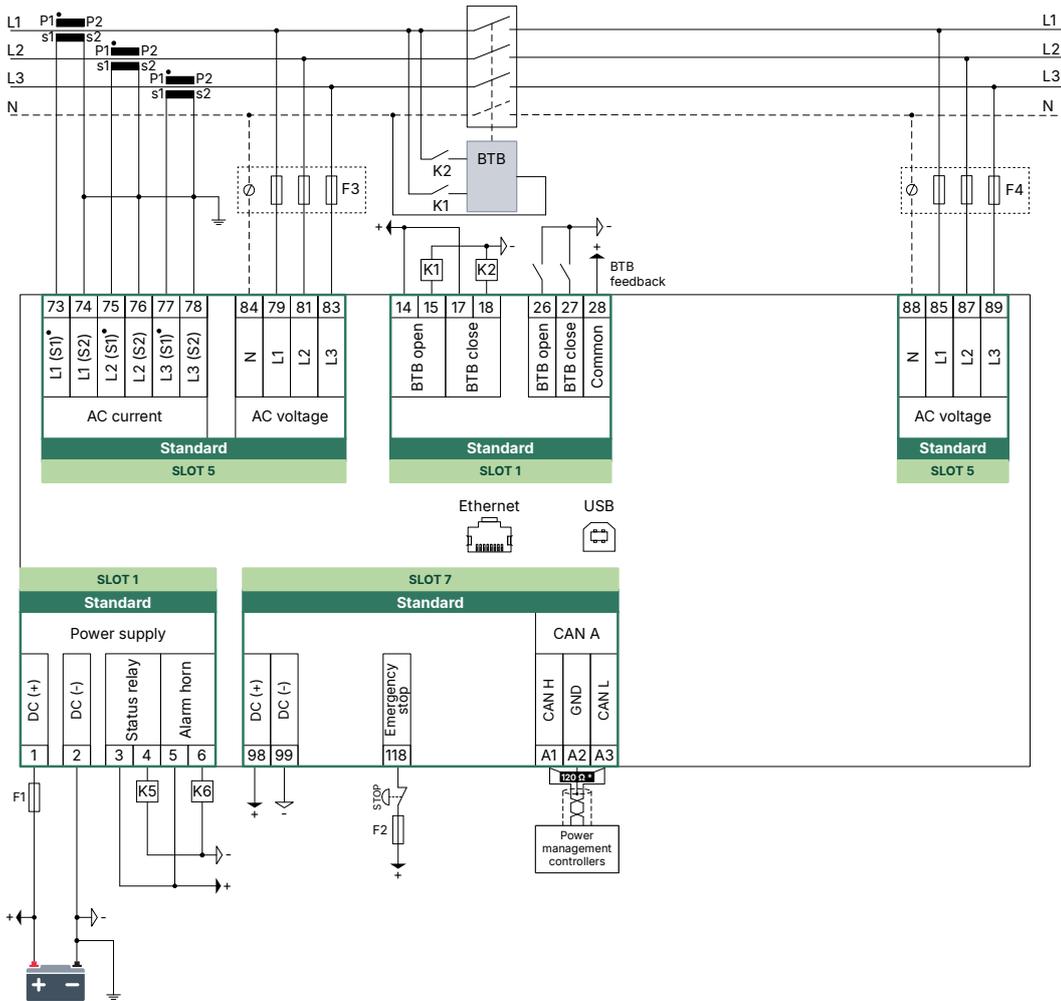
Fuses

- F1: 2 A DC max. time-delay fuse/MCB, c-curve
- F2: 2 A DC max. time-delay fuse/MCB, b-curve
- F3, F4: 2 A AC max. time-delay fuse/MCB, c-curve

1.5.5 Typical wiring for group controller
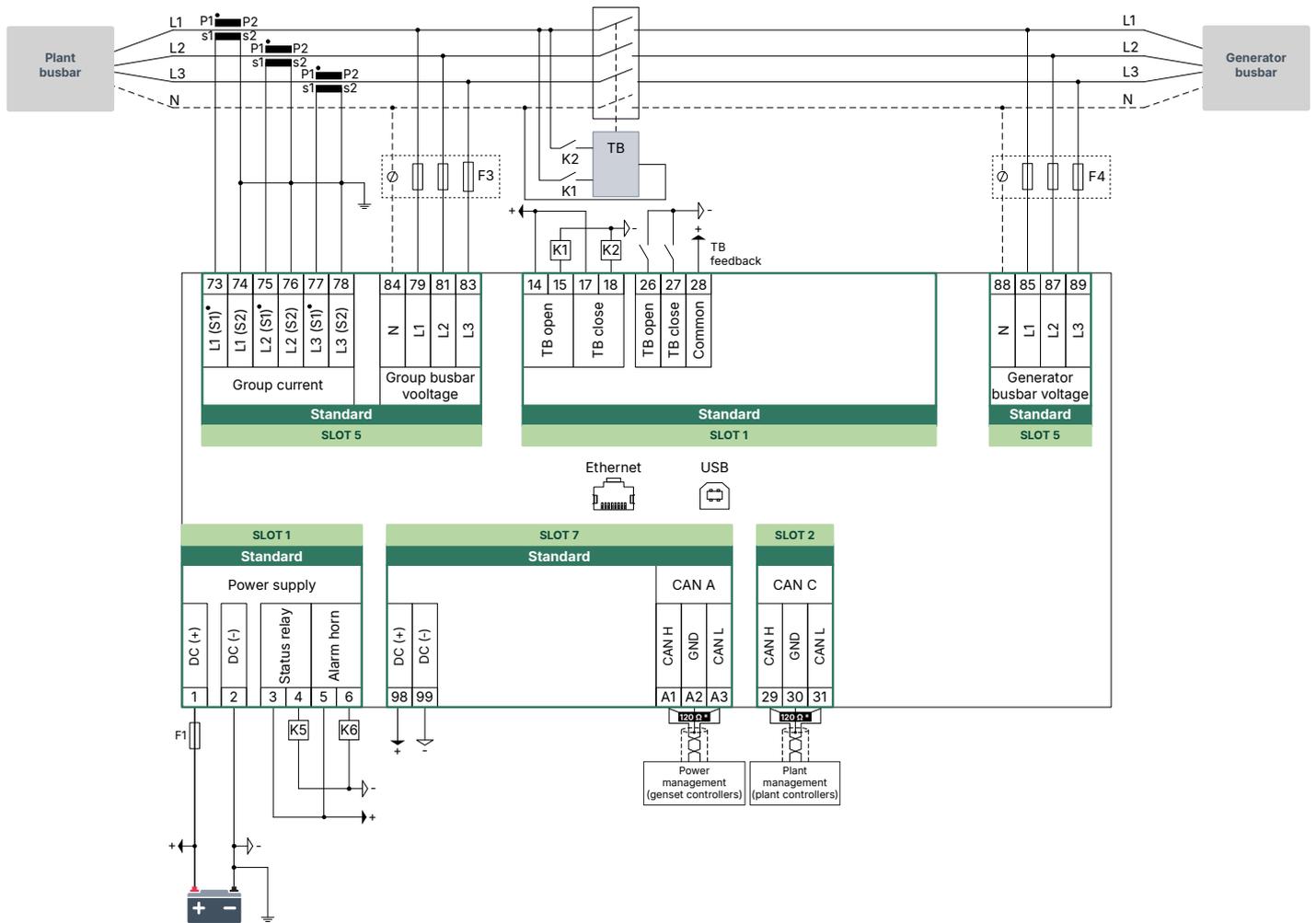
Fuses

- F1: 2 A DC max. time-delay fuse/MCB, c-curve
- F3, F4: 2 A AC max. time-delay fuse/MCB, c-curve

1.5.6 Typical wiring for plant controller
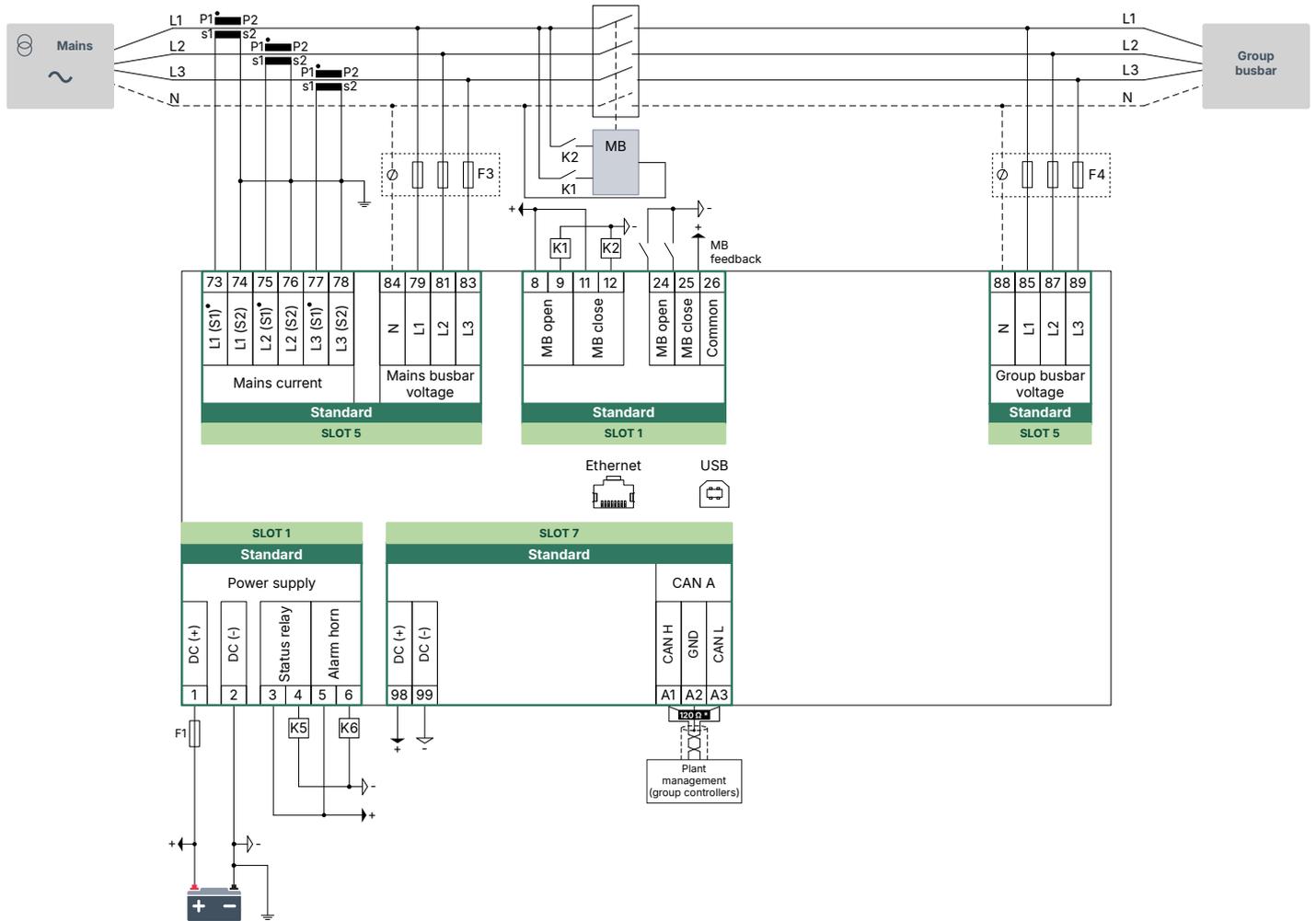
Fuses

- F1: 2 A DC max. time-delay fuse/MCB, c-curve
- F3, F4: 2 A AC max. time-delay fuse/MCB, c-curve

2. Hardware and software

2.1 Standard hardware

Controller slot numbers and terminals
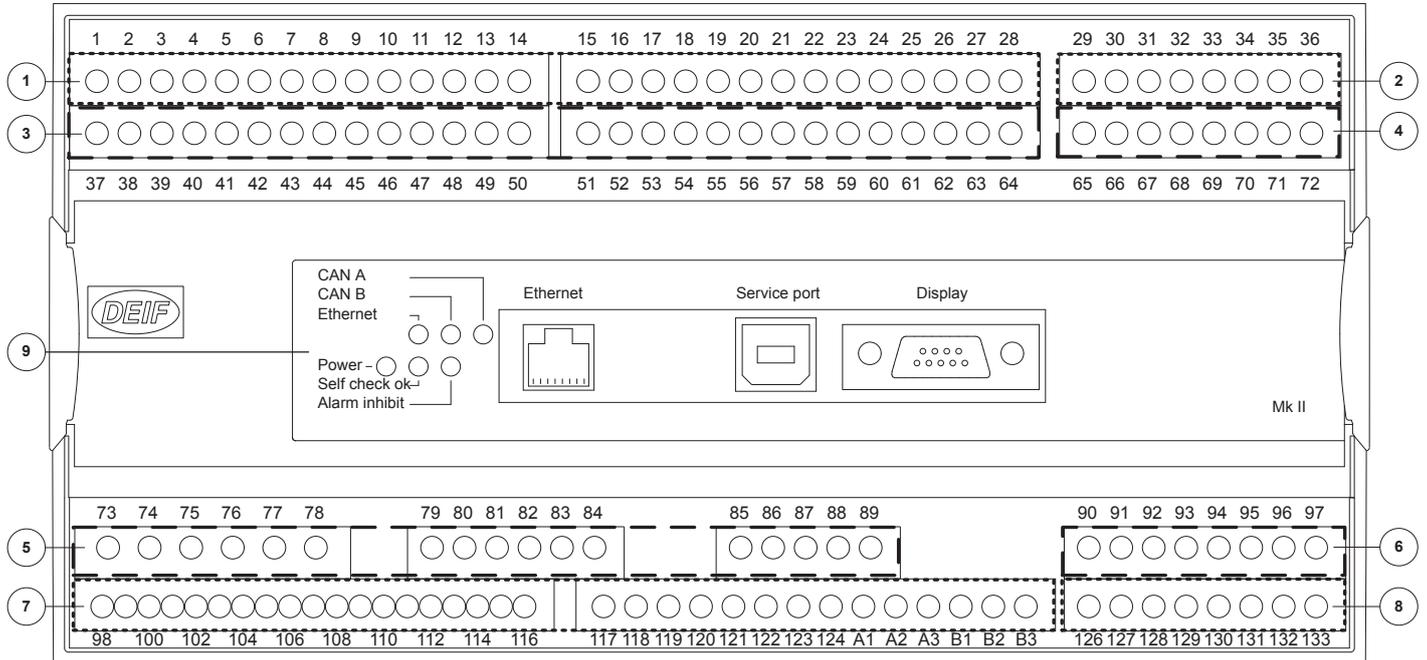
| Slot #	Option	Description
1	Standard	**Terminal 1-28, power supply**
2	See hardware options	**Terminal 29-36, communication**
3	See hardware options	**Terminal 37-64, in-/outputs/load sharing**
4	See hardware options	**Terminal 65-72, governor, AVR, in-/outputs**
5	Standard, including Q1 (Class 0.5)	**Terminal 73-89, AC measuring**
6	See hardware options	**Terminal 90-97, in-/outputs**
7	Standard	**Terminal 98-124, A1-A3, B1-B3, engine I/F**
8	See hardware options	**Terminal 126-133, engine communication, in-/outputs**
9	Standard	**LED I/F and Ethernet**

2.2 Hardware options

There can only be one hardware option in each slot. For example, it is not possible to select option H2 and option H3 at the same time, because both options require a PCB in slot #2.

Slot #	Option	Description
1	Standard	**Terminal 1-28, power supply** 8 to 36 V DC supply, 11 W; 1 x status output relay; 5 x relay outputs; 2 x pulse outputs (kWh, kvarh or configurable open collector outputs); 5 x digital inputs
2		**Terminal 29-36, communication**
	H2	Modbus RTU (RS-485)
	H3	Profibus DP

Slot #	Option	Description
	H9	Modbus RS-232 for modem
	H12.2*	CAN bus C and CAN bus D (dual CAN): • Engine communication ○ DVC 550/350/310 and/or external IOs (CIOs/IOMs) and/or KWG ISO5 isolation monitor in series • DVC 550/350/310 ○ External IOs (CIOs/IOMs) in series • CANshare communication • Load sharing with third party controllers • PMS lite communication • Group controller: Extended power management
	M13.2	7 x binary inputs
	M14.2	4 x relay outputs
3		**Terminal 37-64, in-/outputs/load sharing**
	M12	13 x digital inputs 4 x relay outputs Analogue load sharing: • 1 x active power load sharing • 1 x reactive power load sharing • 1 x f/P set point transducer • 1 x U/Q set point transducer
4		**Terminal 65-72, governor, AVR, in-/outputs**
	Standard	4 x relay
	EF5	1 x +/-25 mA out; 1 x PWM out; 2 x relay
	EF6	2 x +/-25 mA out; 1 x PWM out
5		**Terminal 73-89, AC measuring**
	Standard	3 x generator voltage + N; 3 x generator current; 3 x busbar/mains voltage + N
	Q2	Extended temperature reference range for voltage measurement: -25 to 60 °C (-13 to 140 °F)
6		**Terminal 90-97, in-/outputs**
	F1	2 x 0(4) to 20 mA out, transducer
	M13.6	7 x digital inputs
	M14.6	4 x relay outputs
	M15.6	4 x 4 to 20 mA inputs
	M16.6	4 x Multi-inputs (4 to 20 mA or 0 to 5 V or Pt100)
7	Standard	**Terminal 98-125, engine I/F** 8 to 36 V DC supply, 5 W 1 x magnetic pickup (MPU) 3 x multi-inputs 7 x digital inputs 4 x relay outputs CAN bus A and CAN bus B: • Power management communication
8		**Terminal 126-133, engine communication, in-/outputs**
	H6	Modbus RTU, RS-485 (Cummins GCS)
	H12.8*	CAN bus E and CAN bus F (dual CAN): • Engine communication

Slot #	Option	Description
		◦ DVC 550/350/310 and/or external IOs (CIOs/IOMs) and/or KWG ISO5 isolation monitor in series • DVC 550/350/310 ◦ External IOs (CIOs/IOMs) in series • CANshare communication • Load sharing with third party controllers • PMS lite communication • Group controller: Extended power management
	H13	MTU ADEC M.501 (without SAM module) + J1939 engine comm. and MTU (ADEC/MDEC)
	M13.8	7 x digital inputs
	M14.8	4 x relay outputs
	M15.8	4 x 4 to 20 mA inputs
	M16.8	4 x Multi-inputs (4 to 20 mA or 0 to 5 V or Pt100)
9	Standard	**LED I/F and Ethernet**

NOTE   * It is only possible to select one of the options: H12.2 or H12.8.

2.2.1 Variants

Variant	Name	Includes standard options
01	AGC-4 Mk II Genset controller	A1, A4, A5, C2, D1, I1, N, Q1, T2
02	AGC-4 Mk II Mains controller	A1, A4, A5, C2, G5, I1, N, Q1
03	AGC-4 Mk II BTB controller	A1, A4, A5, C2, G5, I1, N, Q1
04	AGC-4 Mk II Group controller	A1, A4, A5, C2, G7, I1, N, Q1
05	AGC-4 Mk II Plant controller	A1, A4, A5, C2, G7, I1, N, Q1

2.2.2 Accessories

Accessory		Description	Option type	Note
J		**Cables**		
	J1	DU-2 display cable with plugs, 3 m. UL94 (V1) approved	Other	
	J2	DU-2 display cable with plugs, 6 m. UL94 (V1) approved	Other	
	J4	PC Ethernet cable crossed, 3 m. UL94 (V1) approved	Other	
	J6	DU-2 display cable with plugs, 1 m. UL94 (V1) approved	Other	
	J7	PC cable for utility software (USB), 3 m. UL94 (V1) approved	Other	
	J8	Display CAN cable for DU-2 connection and 2 x plugs for cables for the Remote Maintenance Box	Other	RMB connector kit
L		**DU-2 or AOP display gasket for IP54**	Other	Standard is IP40
X		**Additional displays**		
	X2	Additional standard display (DU-2). CAN bus comm.	Other	Two options X2 can be ordered for each controller.
	X3	Additional operator panel (AOP-1): 16 configurable LEDs and 8 configurable push-buttons	Other	

Accessory	Description	Option type	Note
X4	Additional operator panel (AOP-2): 16 configurable LEDs, 8 configurable buttons and 1 status relay. CAN bus comm.	Other	Five options X4 can be ordered for each controller.
Y	**DU-2 display layout**	Hardware	
Y1	Engine and generator breaker control (island)	Other	For AGC Genset controller
Y3	Generator breaker and mains breaker control	Other	For AGC Genset controller
Y4	Tie breaker and mains breaker control	Other	For AGC Mains controller
Y5	Bus tie breaker control	Other	For AGC BTB controller
Y8	Group control	Other	For AGC Group controller
Y9	Plant control	Other	For AGC Plant controller

2.3   Standard software and software options

Option	Standard/optional	Description*
A		**Mains protection package**
A1	Standard	Time-dependent under-voltage (27t) Under-voltage and reactive power low (27Q) Vector shift (78) ROCOF (df/dt) (81R) Average busbar over-voltage protection
A4	Standard	Positive sequence (mains voltage low) (27pos)
A5	Standard	Directional over-current (67)
A10	Genset & Mains: Optional	Advanced protections and grid code support • VDE AR-N 4110 compliant • VDE AR-N 4105 compliant • ENA EREC G99 compliant • EN 50549-1:2019 compliant
A20	Genset: Optional	Advanced protections and grid code support • IEEE std. 1547™-2018 (Category A, and Category I and II) compliant Option Q2 (Extended temperature range for AC voltage measurements) is included if a controller is ordered with option A20.
C2	Standard	Negative sequence voltage high (47) Negative sequence current high ($46I_2$) Zero sequence voltage high ($59U_0$) Zero sequence current high ($50I_0$) Power-dependent reactive power (40) Inverse time over-current (51) (according to IEC 60255-151)
D		**Voltage/var/cos phi control**
D1	Genset: Standard	Constant voltage control (stand-alone) Constant reactive power control (parallel with mains) Constant power factor control (parallel with mains) Reactive load sharing (island paralleling with other generators)

Option	Standard/optional	Description*
G		**Load sharing and power management**
G3	Genset: Standard	Load sharing with analogue lines External analogue set points (requires hardware option M12)
G5	Genset: Optional Mains & BTB: Standard	Power management: Up to 32 gensets/mains, 8 bus tie breakers, 16 ASC-4/ASC 150, 8 ALC-4
G7	Group & Plant: Standard Genset: Optional	Extended power management: Up to 992 gensets, 31 groups and/or ASC-4 Solar controllers, a plant
H		**Serial communication**
H12 (dual CAN)	Genset: Optional Group: Standard	For EIC protocols, see Supported controllers and engines.
H13	Genset: Optional	MTU ADEC M.501 + same engine types as H12 (H13 includes H12)
I		**Application emulation**
I1	Standard	Emulation, PC-controlled emulation of your application
T		**Special applications**
T1	Optional	Critical power, redundant controller, short-circuit limitation (requires option G5)
T2	Genset: Standard	CAN bus communication with DEIF digital AVRs DVC 550, DVC 350, DVC 310, and Nidec D510 (requires option H12)
T3	Genset: Optional	CAN bus communication with Nidec digital AVR D550 (requires option H12)
T4	Genset: Optional	Remote maintenance box with multiple gensets
		Language variants
CYD	Optional	Cyrillic DU-2 display (to display Russian characters)
V0108	Optional	German DU-2 display (for AGC-4 Mk II GER)

NOTE   * ANSI number as per IEEE Std C37.2-1996 (R2001) in parenthesis.

2.4   Supported ECUs and engines

With option H12, the controller can communicate with the following ECUs and engines.

Manufacturer	ECUs	Engines	Tier 4/Stage V	Controller setting *Engine I/F [7561]*
Generic J1939	Any ECU that uses J1939	Any engine that uses J1939	●	Generic J1939
Baudouin	CPCB IV	-	-	Baudouin CPCB IV
Baudouin	WOODWARD PG+	-	-	Baudouin Gas
Baudouin	Wise 10B	-	-	Baudouin Wise10B
Baudouin	Wise 15	-	●	Baudouin Wise15
Bosch	EDC17	-	-	Bosch EDC17CV54TMTL
Caterpillar	ADEM3	C4.4, C6.6, C9, C15, C18, C32, 3500, 3600	-	Caterpillar ADEM3
Caterpillar	ADEM4	C4.4, C6.6, C9, C15, C18, C32, 3500, 3600	-	Caterpillar ADEM4

Manufacturer	ECUs	Engines	Tier 4/Stage V	Controller setting *Engine I/F [7561]*
Caterpillar	ADEM5	-	-	Caterpillar ADEM5
Caterpillar	ADEM6	-	-	Caterpillar ADEM6
Caterpillar	ADEM3, ADEM4	C4.4, C6.6, C9, C15, C18, C32, 3500, 3600	-	Caterpillar generic*
Cummins	CM 500	QSL, QSB5, QSX15 and 7, QSM11, QSK	-	Cummins CM500
Cummins	CM 558	QSL, QSB5, QSX15 and 7, QSM11, QSK	-	Cummins CM558
Cummins	CM 570	QSL, QSB5, QSX15 and 7, QSM11, QSK	-	Cummins CM570
Cummins	CM 570 Industrial	-	●	Cummins 570 Industrial
Cummins	CM 850	QSL, QSB5, QSX15 and 7, QSM11, QSK	-	Cummins CM850
Cummins	CM 2150	QSL, QSB5, QSX15 and 7, QSM11, QSK	●	Cummins CM2150
Cummins	CM 2250	QSL, QSB5, QSX15 and 7, QSM11, QSK	●	Cummins CM2250
Cummins	CM 2350	-	●	Cummins CM2350
Cummins	CM 2350 Industrial	-	●	Cummins CM2350 Industrial
Cummins	CM 2358	-	-	Cummins CM2358
Cummins	CM 2850	-	●	Cummins CM2850
Cummins	CM 2880	-	●	Cummins CM2880
Cummins	CM 2880 Industrial	-	●	Cummins CM2880 Industrial
Cummins	CM 500, CM 558, CM 570, CM 805, CM 2150, CM 2250	QSL, QSB5, QSX15 and 7, QSM11, QSK	●**	Cummins generic*
Cummins	-	Industrial	-	Cummins generic Industrial
Cummins	-	KTA19	-	Cummins KTA19
Cummins	PGI	-	●	Cummins PGI
Cummins				Cummins QSK78
Detroit Diesel	DDEC III, DDEC IV	Series 50, 60 and 2000	-	DDEC generic*
Detroit Diesel	DDEC III	Series 50, 60 and 2000	-	DDEC III
Detroit Diesel	DDEC IV	Series 50, 60 and 2000	-	DDEC IV
Deutz	EMR2	-	-	Deutz EMR 2
Deutz	EMR3	-	-	Deutz EMR 3
Deutz	EMR4	-	-	Deutz EMR 4
Deutz	EMR4 Stage V	-	●	Deutz EMR 4 Stage V
Deutz	EMR5	-	-	Deutz EMR 5
Deutz	EMR5 Stage V	-	●	Deutz EMR 5 Stage V
Deutz	EMR2, EMR3	-	-	Deutz EMR generic*
Doosan	EDC17	-	-	Doosan G2 EDC17
Doosan	MD1	-	●	Doosan MD1

Manufacturer	ECUs	Engines	Tier 4/Stage V	Controller setting Engine I/F [7561]
Doosan	G2 EDC17	-	●	Doosan stage 5
FPT Industrial	EDC17	-	-	FPT EDC17CV41
FPT Industrial	Bosch MD1	-	●	FPT stage V
Guascor	GCS-e ECU	-	-	Guascor GCS
Hatz Diesel	-	3/4H50 TICD	●	HATZ
Isuzu	ECM	4JJ1X, 4JJ1T, 6WG1X FT-4	-	Isuzu
Iveco	CURSOR	-	-	Iveco CURSOR
Iveco	EDC7 (Bosch MS6.2)	-	●	Iveco EDC7
Iveco	CURSOR, NEF, EDC7, VECTOR 8	-	●**	Iveco generic*
Iveco	NEF	-	-	Iveco NEF
Iveco	Bosch MD1	-	●	Iveco Stage V
Iveco	NEF67	-	●	Iveco Stage V NEF67
Iveco	VECTOR 8	-	-	Iveco Vector8
John Deere	JDEC	PowerTech M, E and Plus	●	John Deere
John Deere	FOCUS controls (version 2.1)	-	●	John Deere Stage V
Kingbang			●	Kingbang
Kohler	ECU2-HD	KD62V12	●	Kohler KD62V12
Kohler	-	KDI 3404	-	Kohler KDI 3404
Kubota	KORD3	-	●	Kubota Stage V
MAN	EDC17	-	-	MAN EDC17
MAN	EMC 2.0	-	-	MAN EMC Step 2.0
MAN	EMC 2.5	-	-	MAN EMC Step 2.5
MAN	EMC 2.0, EMC 2.5	-	-	MAN generic*
MTU	MDEC module M.201	-	-	MDEC 2000/4000 M.201
MTU	MDEC module M.302	Series 2000 and 4000	-	MDEC 2000/4000 M.302
MTU	MDEC module M.303	Series 2000 and 4000	-	MDEC 2000/4000 M.303
MTU	MDEC module M.304	-	-	MDEC 2000/4000 M.304
MTU	ADEC	Series 2000 and 4000 (ECU7), MTU PX	-	MTU ADEC
MTU	ECU7 with SAM module	Series 2000 and 4000	-	MTU ECU7 with SAM
MTU	ECU8	-	-	MTU ECU8
MTU	ECU9	-	●	MTU ECU9
MTU	J1939 Smart Connect, ECU8, ECU9	Series 1600	● (ECU9 or later)	MTU J1939 Smart Connect
NPS Hydrogen	-	-	-	NPS Hydrogen
Perkins	ADEM3	-	-	Perkins ADEM 3
Perkins	ADEM4	-	-	Perkins ADEM 4

Manufacturer	ECUs	Engines	Tier 4/Stage V	Controller setting Engine I/F [7561]
Perkins	EDC17	-	-	Perkins EDC17C49
Perkins	ADEM3, ADEM4	Series 850, 1100, 1200, 1300, 2300, 2500, and 2800	-	Perkins generic*
Perkins	-	Series 400 and 1200	●	Perkins Stage V
Perkins	-	Series 400 Model IQ IR IW IY IF	●	Perkins StV 400
Perkins	-	Series 1200F Model MT, MU, MV, MW, BM, and BN	●	Perkins StV 1200
Perkins	-	Series 1200J Model SU, VM	●	Perkins StV 120xJ (SU/VM)
PSI/Power Solutions	-	PSI/Power Solutions	●	PSI/Power Solutions
Scania	EMS	-	-	Scania EMS
Scania	EMS S6 (KWP2000)	Dx9x, Dx12x, Dx16x	-	Scania EMS2 S6
Scania	EMS 2 S8	DC9, DC13, DC16	●	Scania EMS2 S8
Scania	EMS S6 (KWP2000)	Dx9x, Dx12x, Dx16x industrial engines	-	Scania S6 Industrial
Scania	EMS 2 S8	DC9, DC13, DC16 industrial engines	●	Scania S8 Industrial
SDEC	F20	-	-	SDEC F20
SDEC	F31	-	-	SDEC F31
SDEC	F36	-	-	SDEC F36
SDEC	F45	-	-	SDEC F45
Steyr	EDC17	-	-	Steyr EDC17
Volvo Penta	D12 marine	-	-	Volvo Penta D12
Volvo Penta	EDC3	-	-	Volvo Penta EDC3
Volvo Penta	EDC4	-	-	Volvo Penta EDC4
Volvo Penta	EMS, EMS2.0 to EMS2.3	D6, D7, D9, D12, D16 (GE and AUX variants only)	● (ECU v 2.3 or later)	Volvo Penta EMS2
Volvo Penta	EMS2.3	-	●	Volvo Penta EMS2.3
Volvo Penta	EMS2.4	-	●	Volvo Penta EMS2.4
Volvo Penta	EDC3, EDC4	TAD4x, TAD5x, TAD6x, TAD7x	-	Volvo Penta generic*
Weichai	-	-	-	Weichai Baudouin E6 Gas
Weichai	WOODWARD PG+	Diesel	●	Weichai Diesel
Weichai	WOODWARD PG+	Gas	●	Weichai Gas
Weichai	Wise 10B	-	●	Weichai Wise10B
Weichai	Wise 15	-	●	Weichai Wise15
Weichai	Wise 13	-	-	Wise13
Weichai	Wise 18B	-	●	Wise18B
Xichai	-	-	●	Xichai Gas

| Manufacturer	ECUs	Engines	Tier 4/Stage V	Controller setting Engine I/F [7561]
YANMAR	EDC17	-	-	YANMAR EDC17
YANMAR	-	Gas 4G	-	Yanmar gas 4G
YANMAR	Stage V	-	-	YANMAR stage V
YANMAR	X11			YANMAR X11
Yuchai United	YC-ECU-A	-	-	YC-ECU-A
Yuchai United	YCGCU (Version 4.2)	Diesel	●	Yuchai United Diesel
Yuchai United	YCGCU (Version 4.2)	Gas	●	Yuchai United Gas
Yuchai United	YC-BCR	-	-	Yuchai YC-BCR***
Yuchai United	YC-ECU	-	-	Yuchai YC-ECU

NOTE * Generic protocols are included for backward compatibility.
NOTE ** If supported by the ECU and engine.
NOTE *** Previously *Yuchai United EDC17*.

Other EIC protocols: Contact DEIF.

2.5   TDU touch display unit

Ethernet connection
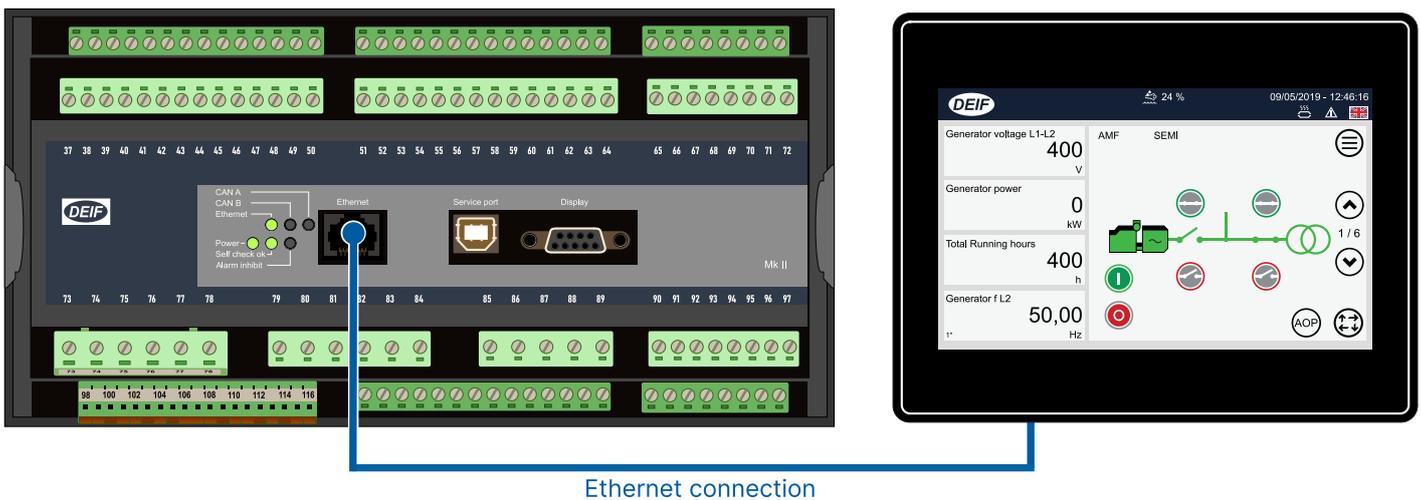
2.5.1   Overall description

The Touch Display Unit (TDU) is a plug-and-play touch screen for DEIF's iE 150, ASC 150, AGC 150, AGC-4 Mk II, AGC-4 and/or ASC-4 controllers. The TDU uses an Ethernet port to connect to these controllers.

TDUs provide operator-friendly touch screen control, visualisation, and graphical overviews. The TDU has a high quality display that is easily readable even at sharp angles.

The operator can use the TDU in supervision mode or asset mode. The operator can change from one mode to the other as needed.

Supervision mode
The TDU shows the power management plant. This overview is dynamic and immediately shows any change in the setup. The operator can see real-time information from all the controllers.

The operator can use the TDU to start and stop assets, and open and close breakers. The operator can also use the TDU to explore each asset's operation.

To reduce the risk of mistakes, the operator cannot change asset parameters from supervision mode. However, the operator can select an asset and change from plant supervision mode to asset mode.

NOTE   Supervision mode is only available with TDU Extended.

Asset mode

Asset mode shows the real-time operation for the selected asset. The colour graphic screen shows status and info messages. The operator can see live data and manage alarms. An advanced event log page allows filtering and merging of log events. If the operator has authorisation, the operator can also check and/or change the input/output and parameter configuration. Asset mode includes an overview of the power management system.

To customise the display, start and stop buttons and breaker commands can be shown or hidden. TDU 110 and TDU 115 extended models have a fully programmable operator and readout panel. TDU models integrate a HMI display with 6 AOPs (Additional Operator Panel) on one device. The simple HMI and icons provide fast access and configurable instrument pages.

The TDU provides Tier 4 final/Stage V support for genset controllers.

Tier 4 final/Stage V support

- Tier 4/Stage V icons on dashboard.
- DM-1 and DM-2 pages.
- Extended dialogue texts including number of occurrences.
- Jumps to the exhaust after-treatment dashboard for any status change.

Display choices

The TDU is available in four versions:

TDU 107 Core

- Screen size 7 inch.
- Operating temperature range 0 °C to +50 °C (vertical installation).
- Resistive touch screen.
- Only asset mode.

TDU 107 Extended

- Screen size 7 inch.
- Operating temperature range -20 °C to +60 °C (vertical installation).
- Capacitive touch screen.
- VNC support (Remote access).
- Ethernet switch (Bridged between 2 ports).
- Asset or supervision mode.

TDU 110 Extended

- Screen size 10 inch.
- Operating temperature range -20 °C to +60 °C (vertical installation).
- Capacitive touch screen.
- VNC support (Remote access).
- Ethernet switch (Bridged between 2 ports).
- Includes extended Operator panel and Read out panel.
- Larger scrollable area for list information.
- Asset or supervision mode.

TDU 115 Extended

- Screen size 15 inch.
- Operating temperature range -20 °C to +60 °C (vertical installation).

- Capacitive touch screen.
- VNC support (Remote access).
- Ethernet switch (Bridged between 2 ports).
- Includes extended Operator panel and Read out panel.
- Larger scrollable area for list information.
- Asset or supervision mode.

2.6 DU-2 display unit

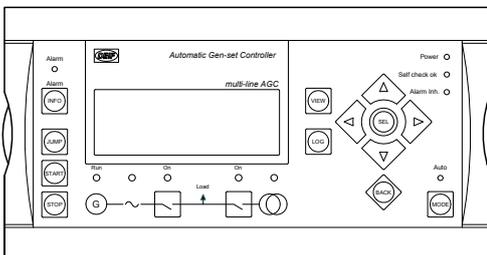See the German data sheet for the AGC-4 Mk II GER display unit folios.

2.6.1 Option Y1 (Island engine and GB control)

For AGC Genset controllers in island applications and for synchronising gensets.
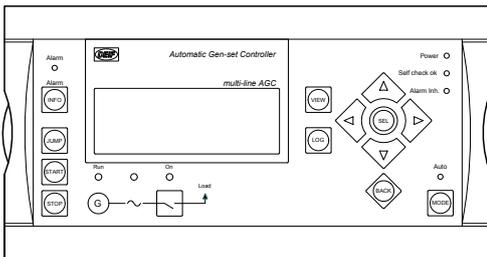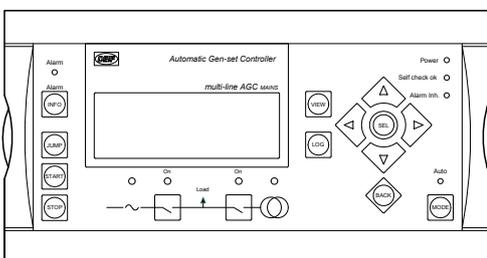

2.6.2 Option Y3 (Engine, GB and MB control)

For AGC Genset controllers. Typically used by rental companies or for single genset applications with one mains.
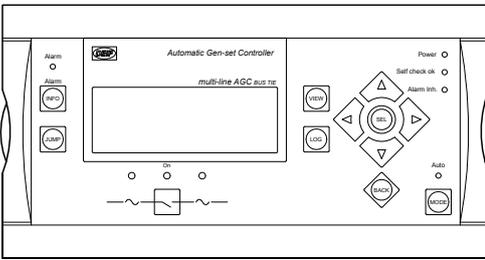

2.6.3 Option Y4 (TB and MB control)

For AGC Mains controllers.

2.6.4 Option Y5 (Bus tie breaker control)

For AGC BTB controllers.

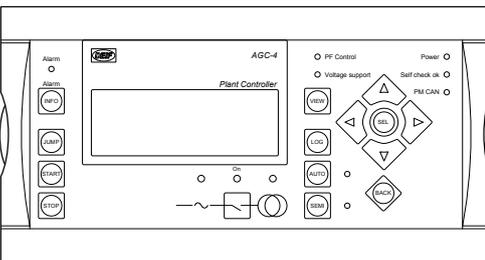### 2.6.5 Option Y8 (Group control)
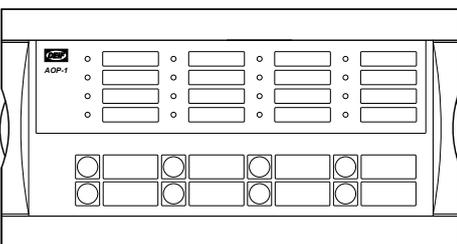
For AGC Group controllers.
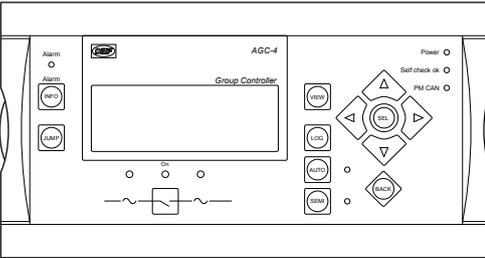
2.6.6 Option Y9 (Plant control)

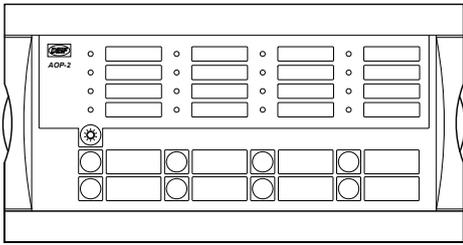For AGC Plant controllers.

2.6.7 Option X3 (AOP-1)

Additional operator panel for plant and/or genset control and status/alarm indication.

2.6.8 Option X4 (AOP-2)

Additional operator panel for plant and/or genset control and status/alarm indication (maximum five per AGC).

3. Compatible products

3.1 Touch display unit: TDU

TDU is a pre-programmed touch screen display (www.deif.com/products/tdu-series). The TDU can be used for these controllers:

- iE 150 Generator, Mains, BTB, Battery and Solar
- AGC 150 Generator, Mains and BTB
- ASC 150 Solar and Storage
- AGC-4 Mk II Generator, Mains and BTB
- ASC-4 Solar and Battery
- AGC-4 Generator, Mains and BTB

3.2 Remote monitoring service: Insight

Insight is a responsive remote monitoring service (www.deif.com/products/insight). It includes real-time genset data, a customisable dashboard, GPS tracking, equipment and user management, email and/or SMS alerts, and cloud data management.

3.3 Digital voltage controllers

DVC 350 is a digital AVR designed for alternators with SHUNT, AREP or PMG excitation. The DVC 350 monitors and regulates the alternator output voltage. The AGC-4 Mk II can control the DVC 350 features and receive fault information directly with the CAN bus communication. For more information, see www.deif.com/products/dvc-350

DVC 550 is an advanced digital AVR designed for alternators with SHUNT, AREP or PMG excitation. The DVC 550 monitors and regulates the alternator output voltage. AGC-4 Mk II can control all the DVC 550 features and receive fault information directly with the CAN bus communication. The AGC-4 Mk II integration with DVC 550 includes Power System Stabiliser (PSS) support. For more information, see www.deif.com/products/dvc-550

3.4 Additional inputs and outputs

The CIO and IOM modules communicate with AGC-4 Mk II over CAN bus. For CIO modules, you can use up to 5 modules for each type.

CIO 116 is a remote input expansion module. For more information, see www.deif.com/products/cio-116

CIO 208 is a remote output expansion module. For more information, see www.deif.com/products/cio-208

CIO 308 is a remote I/O module. For more information, see www.deif.com/products/cio-308

IOM 220 and **IOM 230** each have two analogue outputs that can be used for:

- Governor and/or AVR regulation
- General PID control
- **IOM 230 only**: P and Q load sharing

> **More information**
> See the **IOM 200 Data sheet** (www.deif.com/documentation/iom-200/).

3.5 Power management

You can use these controllers together in a power management system:

- **iE 150 Generator, Mains, BTB, Battery and Solar** (www.deif.com/products/ie-150)
- **AGC 150 Generator** (www.deif.com/products/agc-150-generator)
- **AGC 150 Mains** (www.deif.com/products/agc-150-mains)
- **AGC 150 BTB** (www.deif.com/products/agc-150-btb)
- **ASC 150 Solar** (www.deif.com/products/asc-150-solar)
- **ASC 150 Storage** (www.deif.com/products/asc-150-storage)
- **AGC-4 Mk II Genset, Mains, BTB, Group, and Plant** (www.deif.com/products/agc-4-mk-ii)
- **AGC-4 Genset, Mains, BTB, Group, and Plant** (www.deif.com/products/agc-4)
- **ASC-4 Solar** (www.deif.com/products/asc-4-solar)
- **ASC-4 Battery** (www.deif.com/products/asc-4-battery)
- **ALC-4 (Automatic Load Controller)** (www.deif.com/products/alc-4)

3.6   Remote maintenance box (RMB)

The Remote Maintenance Box (RMB) is a remote management tool for safe utilities maintenance. It can be used at transformer substations or other electrical installations when the operator panel must be close to the connection points. For more information, see www.deif.com/products/rmb

3.7   Other equipment

DEIF has a wide variety of other equipment that is compatible. Here are some examples:

- **Synchroscopes**
  - **CSQ-3** (www.deif.com/products/csq-3)
- **Battery chargers/power supplies**
  - **DBC-1** (www.deif.com/products/dbc-1)
- **Current transformers**
  - **ASK** (www.deif.com/products/ask-asr)
  - **KBU** (www.deif.com/products/kbu)
- **Transducers**
  - **MTR-4** (www.deif.com/products/mtr-4)

4. Technical information

4.1 Technical specifications

AC measurements and protections
The controller measures the voltage and current on one side of a breaker, and the voltage on the other side.

Voltage measurements: All voltages are phase-to-phase AC voltages. There are specifications for **Low** and **High** voltage ranges. The voltage range is determined by U_n. For terminals 79 to 84, U_n is the voltage transformer secondary in parameter 6042. For terminals 85 to 89, U_n is the voltage transformer secondary in parameters 6052/6062. For voltages below the truncation level, 0 V is shown.

Current measurements: All currents are AC currents. There are specifications for **Low** and **High** current ranges. The current range is determined by I_N, the current transformer secondary in parameter 6044. For currents below the truncation level, 0 A is shown.

The voltage range is independent of the current range, and vice versa.

All specifications are within the reference conditions, unless otherwise mentioned.

Voltage measurements	Nominal value (U_n): 100 to 690 V. **Low**: $100 \leq U_n \leq 240$ V **High**: $240 < U_n \leq 690$ V Reference range: **Low**: 65 to 324.0 V **High**: 156.7 to 931.5 V Measurement range: **Low**: 5.0 to 324.0 V, Truncation: 2 V **High**: 12.0 to 931.5 V, Truncation: 5 V Accuracy: **Low**: 5.0 to 324.0 V: ±0.5 % or ±0.5 V (whichever is greater) **High**: 12.0 to 931.5 V: ±0.5 % or ±1.2 V (whichever is greater) UL/cUL Listed: 600 V AC phase-phase Consumption: Maximum 0.25 VA/phase
Voltage and altitude	Operating altitude: 0 to 4000 m above sea level 2001 to 4000 m: Maximum 480 V AC phase-phase for measuring 3W4 voltage. No derating for 3W3.
Voltage withstand	U_n + 35 % continuously U_n + 45 % for 10 seconds
Current measurements	Nominal value (I_N): **Low**: 1 A AC from current transformer **High**: 5 A AC from current transformer Measurement range: **Low**: 0.005 to 4.0 A, Truncation: 4 mA **High**: 0.025 to 20.0 A, Truncation: 20 mA Accuracy: **Low**: 0.005 to 4.0 A: ±0.5 % or ±5 mA (whichever is greater) **High**: 0.025 to 20.0 A: ±0.5 % or ±25 mA (whichever is greater)

	UL/cUL Listed: From listed or R/C (XODW2.8) current transformers 1 or 5 A Consumption: Maximum 0.3 VA/phase
Current withstand	10 A continuous 20 A for 1 minute 20 x I_N for 10 seconds (maximum 75 A) 80 x I_N for 1 second (maximum 300 A)
Frequency measurements	Nominal value: 50 Hz or 60 Hz Reference range: 45 to 66 Hz Measurement range: 10 to 75 Hz **System frequencies** Accuracy: 45 to 66 Hz ±10 mHz, within the temperature operating range and the voltage range: • **Low**: 30 to 324.0 V • **High**: 72 to 931.5 V **Phase frequencies** Accuracy: 45 to 66 Hz: ±15 mHz, within the temperature operating range 10 to 75 Hz: ±50 mHz, within the temperature operating range
Phase angle (voltage) measurement	Measurement range: -179.9 to 180° Accuracy: -179.9 to 180°: 0.2°, within the temperature operating range
Power measurement	Accuracy: ±0.5 % of measured value or ±0.5 % of $U_n * I_N$, whichever is greater, within the current measurement range
Temperature and accuracy	Reference range: 15 to 30 °C (59 to 86 °F) Reference range option Q2 (AC voltage only): -25 to 60 °C (-13 to 140 °F) Operating range: -25 to 70 °C (-13 to 158 °F) Temperature-dependent accuracy outside the reference range: Voltage: Additional: ±0.2 %, or ±0.2 V (**Low**) / ±0.5 V (**High**) per 10 °C (18 °F) (whichever is greater) Current: Additional: ±0.2 %, or ±2 mA (**Low**) / ±10 mA (**High**) per 10 °C (18 °F) (whichever is greater) Power: Additional: ±0.2 %, or ±0.2 % of $U_n * I_N$ per 10 °C (18 °F) (whichever is greater)

General specifications

Aux. supply	Terminals 1 and 2: 12/24 V DC nominal (8 to 36 V DC operational). Maximum 11 W consumption Battery voltage measurement accuracy: ±0.8 V within 8 to 32 V DC, ±0.5 V within 8 to 32 V DC @ 20 °C Terminals 98 and 99: 12/24 V DC nominal (8 to 36 V DC operational). Maximum 5 W consumption 0 V DC for maximum 10 ms when coming from at least 24 V DC (cranking dropout) The aux. supply inputs are to be protected by a 2 A time-delay fuse. UL/cUL Listed: AWG 24
Digital inputs	Optocoupler, bi-directional ON: 8 to 36 V DC Impedance: 4.7 kΩ OFF: <2 V DC
Analogue inputs	-10 to +10 V DC: Not galvanically separated. Impedance: 100 kΩ (analogue load sharing lines) 0(4) to 20 mA: Impedance 50 Ω. Not galvanically separated (M15.X)
RPM	RPM (MPU): 2 to 70 V AC, 10 to 10000 Hz, maximum 50 kΩ
Multi-inputs Engine interface board slot #7	0(4) to 20 mA: 0 to 20 mA, ±1 %. Not galvanically separated Digital: Maximum resistance for ON detection: 100 Ω. Not galvanically separated Pt100/1000: -40 to 250 °C, ±1 %. Not galvanically separated. To EN/IEC60751 RMI: 0 to 1700 Ω, ±2 %. Not galvanically separated V DC: 0 to 40 V DC, ±1 %. Not galvanically separated

Multi-inputs (M16.X)	0(4) to 20 mA: 0 to 20 mA, ±2 %. Not galvanically separated Pt100: -40 to 250 °C, ±2 %. Not galvanically separated. To EN/IEC60751 V DC: 0 to 5 V DC, ±2 %. Not galvanically separated
Relay outputs	Electrical rating: 250 V AC/30 V DC, 5 A. UL/cUL Listed: 250 V AC/24 V DC, 2 A resistive load Thermal rating @ 50 °C: 2 A: Continuously. 4 A: t_{on}= 5 seconds, t_{off} = 15 seconds. (Controller status output: 1 A)
Open collector outputs	Supply: 8 to 36 V DC, maximum 10 mA (terminal 20, 21, 22 (com))
Analogue outputs	0(4) to 20 mA and ±25 mA. Galvanically separated. Active output (internal supply). Load maximum 500 Ω. UL/cUL Listed: Max. 20 mA output Update rate: Transducer output: 250 ms. Regulator output: 100 ms Accuracy: Analogue outputs: Class 1.0 according to total range Option EF5: Class 4.0 according to total range To EN/IEC60688
Load sharing lines	-5 to 0 to +5 V DC. Impedance: 23.5 kΩ
Material	All plastic materials are self-extinguishing according to UL94 V1
Plug connections	**Controller** AC current: 0.75 to 4.0 mm^2 stranded wire. UL/cUL Listed: AWG 18 AC voltage: 0.5 to 2.5 mm^2 stranded wire. UL/cUL Listed: AWG 20 Relays: UL/cUL Listed: AWG 22 Terminals 98-116: 0.2 to 1.5 mm^2 stranded wire. UL/cUL Listed: AWG 24 Other: 0.2 to 2.5 mm^2 stranded wire. UL/cUL Listed: AWG 24 Tightening torque: 0.5 N·m (5-7 lb-in) Service port: USB B Ethernet/Modbus TCP/IP connector: RJ-45 **DU-2 display** 9-pole D-sub female Tightening torque: 0.2 N·m
Governors and AVRs	Interfaces to all governors and AVRs using analogue, relay control or CAN-based J1939 communication See interfacing guide at www.deif.com
Approvals	UL/cUL Listed to UL/ULC6200:2019 1.ed See www.deif.com for the most recent approvals.
UL/cUL Listed	**Controller** A suitable type 1 (flat surface) enclosure is required: Unventilated/ventilated with filters for controlled/pollution degree 2 environment Flat surface mounting - Type 1 enclosure Installation: To be installed in accordance with the NEC (US) or the CEC (Canada) Use 90 °C copper conductors only Wire Size: AWG 30-12 Tightening torque: 5-7 lb-in. All inputs and outputs (except the AC voltage terminals): These must only be connected to limited voltage circuits from the engine starting battery protected by a 2 A DC max. time-delay fuse. Communication circuits: Only connect to communication circuits of a listed system/equipment **DU-2 Display** Flat surface mounting - Type 1 enclosure Power supply: The controller, or a separate Class 2 source

|	**AOP-2** Wiring: Use 90 °C copper conductors only Mounting: For use on a flat surface of type 1 enclosure. Main disconnect must be provided by installer. Installation: To be installed in accordance with the NEC (US) or the CEC (Canada) **DC/DC converter for AOP-2** Tightening torque: 0.5 Nm (4.4 lb-in) Wire size: AWG 22-14 Tightening torque: Panel door mounting 0.7 N·m, D-sub screw 0.2 N·m
Weight	Controller: 1.6 kg (3.5 lbs.) Option J1/J4/J6/J7: 0.2 kg (0.4 lbs.) Option J2: 0.4 kg (0.9 lbs.) Option J8: 0.3 kg (0.58 lbs.) DU-2 display or AOP: 0.4 kg (0.9 lbs.)

For the TDU technical specifications, see the **TDU Data sheet**. For more information, see www.deif.com/products/tdu-series

4.1.1 Environmental specifications

Operating temperature (including DU-2 display and AOP)	-25 to 70 °C (-13 to 158 °F) UL/cUL Listed: Max. surrounding air temperature: 55 °C (131 °F)
Storage temperature (including DU-2 display and AOP)	-40 to 70 °C (-40 to 158 °F)
Climate	97 % RH to IEC 60068-2-30
Galvanic separation	Between AC voltage and other I/Os: 3250 V, 50 Hz, 1 min. Between AC current and other I/Os: 2200 V, 50 Hz, 1 min. Between analogue outputs and other I/Os: 550 V, 50 Hz, 1 min. Between digital input groups and other I/Os: 550 V, 50 Hz, 1 min.
Mounting	DIN-rail mount or base mount with six screws Tightening torque: 1.5 N·m
Safety	To EN/IEC 61010-1, installation category (over-voltage category) III, 600 V, pollution degree 2 To EN/IEC 60255-27 over-voltage category III, 600 V, pollution degree 2 To UL/ULC 6200:2019 1.ed, over-voltage category III, 600 V, pollution degree 2
EMC	To EN/IEC 61000-6-2, EN/IEC 61000-6-4, EN/IEC 60255-26
Vibration	3 to 13.2 Hz: 2 mm$_{pp}$. 13.2 to 100 Hz: 0.7 g. To IEC 60068-2-6 & IACS UR E10 10 to 58.1 Hz: 0.15 mm$_{pp}$. 58.1 to 150 Hz: 1 g. To IEC 60255-21-1 Response (class 2) 10 to 150 Hz: 2 g. To IEC 60255-21-1 Endurance (class 2) 3 to 8.15 Hz: 15 mm$_{pp}$. 8.15 - 35 Hz 2g. To IEC 60255-21-3 Seismic (class 2)
Shock (base mount)	10 g, 11 ms, half sine. To IEC 60255-21-2 Response (class 2) 30 g, 11 ms, half sine. To IEC 60255-21-2 Endurance (class 2) 50 g, 11 ms, half sine. To IEC 60068-2-27
Bump	20 g, 16 ms, half sine. To IEC 60255-21-2 (class 2)
Protection	Controller: IP20. DU-2 display and AOP: IP40 (IP54 with gasket: Option L). UL/cUL Listed: Type Complete Device, Open Type. To EN/IEC 60529

4.2   Dimensions

AGC-4 Mk II dimensions in mm (inches)
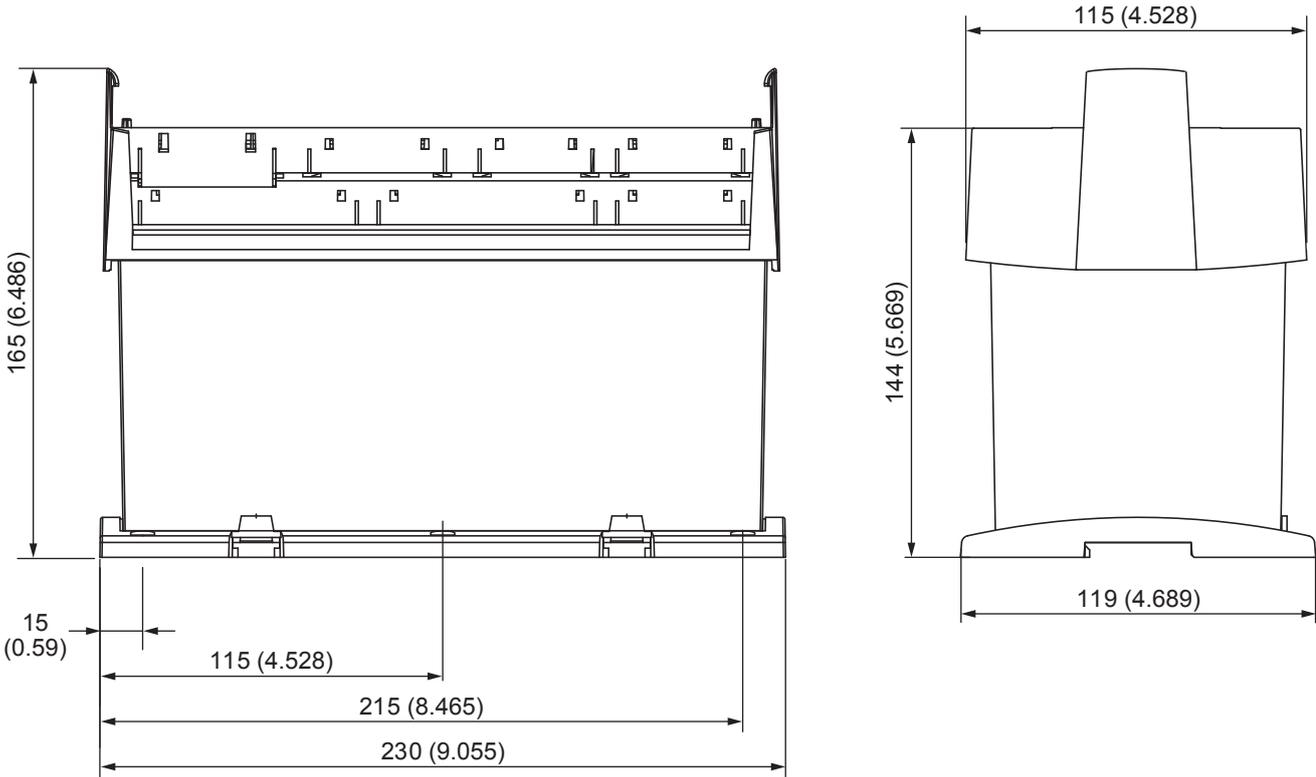
DU-2 and AOP dimensions in mm (inches)
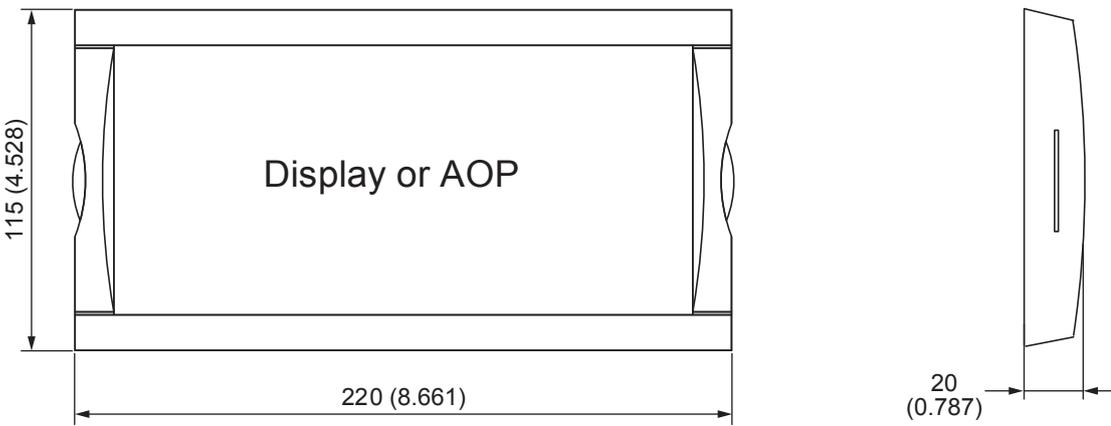
For the TDU dimensions, see the **TDU Data sheet**.

5. Ordering information

5.1   Order specifications

Variants

Mandatory information		Additional options to the standard variant				
Name*	Variant no.	Option	Option	Option	Option	Option

Example		Additional options to the standard variant				
Name*	Variant no.	Option	Option	Option	Option	Option
AGC-4 Mk II Genset controller	01	M12				

*Note: Specify the AGC controller: Genset/Mains/BTB/Group/Plant.

Accessories

Mandatory information		
Item no.	Type	Accessory

Example		
Item no.	Type	Accessory
1022040065	Accessories for AGC-4	USB cable, 3 m (J7)

5.2   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.

5.3   Software version

This document is based on AGC-4 Mk II software version 6.23.