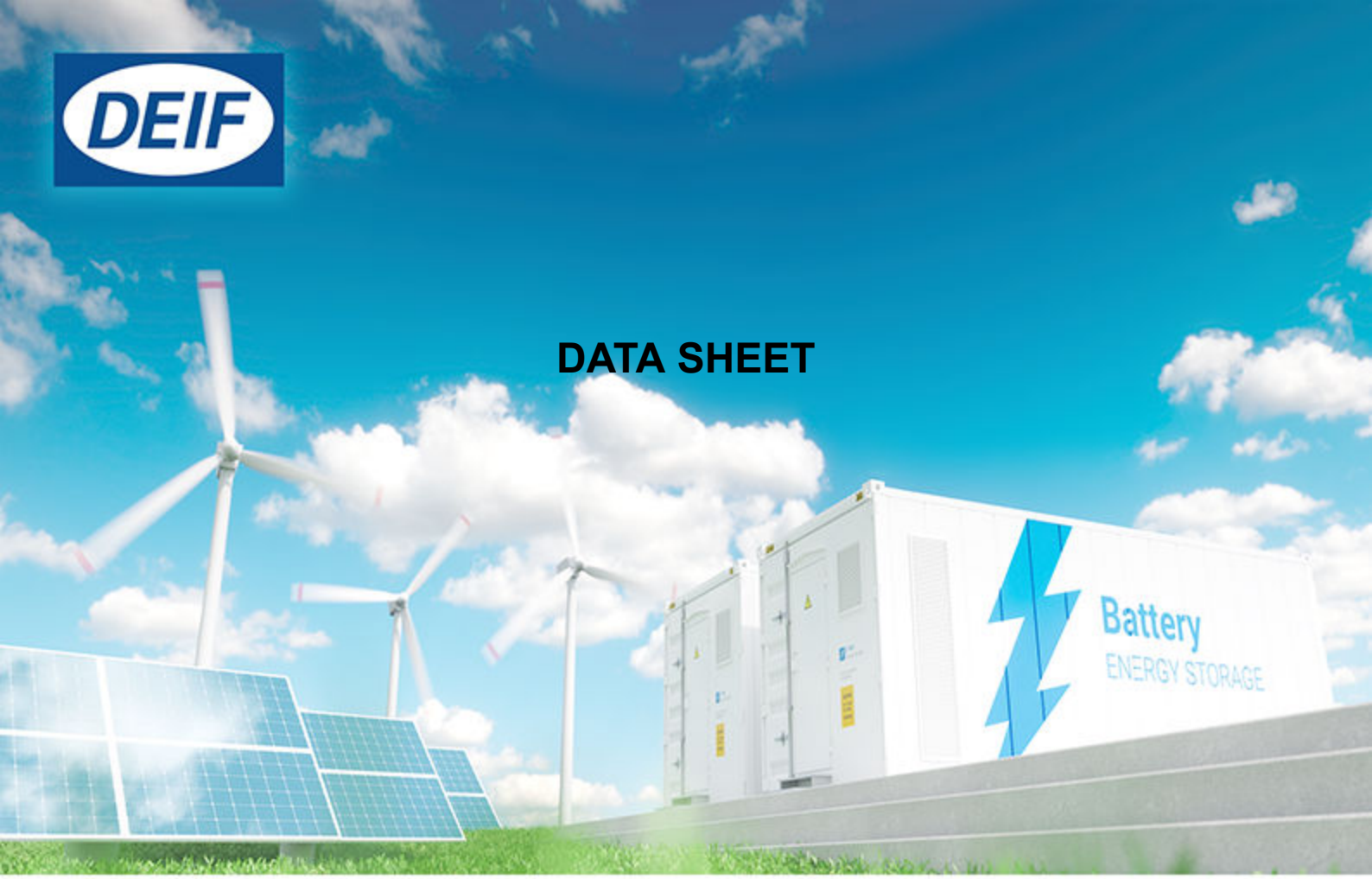


DATA SHEET

ASC-4 Battery

Automatic Sustainable Controller

1. ASC-4 Battery

1.1 About

The ASC-4 Battery controller can be used as a single controller to add a storage system to an existing site, or with other DEIF controllers in a power/energy management system. The ASC-4 Battery controller controls and protects an energy storage system (ESS) with communication to a BCU, PCS, PDS and BMS. The ASC-4 Battery controller can instruct all gensets to stop, and supply the load from battery alone or in combination with sustainable power production.

In an energy management system, the controller is designed for seamless integration of electrical storage with other power sources. You can prioritise the energy sources for supplying the load, and recharging the battery. The ASC-4 Battery controller includes a configurable charge scheme (charge/discharge levels).

The controller has built-in AC measurements. There are two sets of voltage measurements (three phases, and (optional) the neutral phase), and one set of current measurements (three phases).

Operators can easily control the system from the display unit. Alternatively, use the communication options to connect to an HMI/SCADA system.

1.1.1 Key features

	Single battery controller	Power management systems
Applications	Brownfield	Greenfield
Storage integration in hybrid systems (including microgrids)	•	•
Applications with sustainable power plants	-	Up to 16 power plants
Communicates with BCU, PCS, PDS and BMS over Modbus • Monitor and troubleshoot the Modbus communication from the ASC-4 display unit	•	•
Configurable charge scheme	•	•
Charging/discharging based on SOC or automatic timers	•	•
Controls functions, energy source or power source	•	•
Grid-forming (V/f mode) Grid-following (P/Q mode) Droop mode (P/f and Q/V) (like a virtual synchronous generator)	•	•
Ideal for self-consumption applications	•	•
Control of ESS breaker (optional)	•	•
AC- and DC-coupled storage systems	•	•
Frequency response	•	•
Using ASC-4 Battery with gensets		
Connect to gensets for storage-diesel	Up to 16 gensets (requires power meters)	Up to 32 gensets (with AGC-4 Mk II/AGC 150)

	Single battery controller	Power management systems
Power meter interfacing	●	Not required
Optimal genset load constraint	●	●
Minimum genset load constraint	●	●
Load-dependent genset start/stop	By digital output	By PMS
SOC-dependent genset start/stop	By digital output	By PMS
Easy to use		
Simple graphical configuration with the free PC tool	●	●
Highly customisable with user-friendly M-Logic tool	●	●
Effective commissioning with DEIF emulation (use and verify the functions of the real system for design, production and testing)	●	●
Optimal operation		
Define and change the priorities of connected power sources	-	●
Uptime guaranteed through spinning reserve	-	●
Maximised sustainable power production	*	●

NOTE * The single battery controller aims for maximum sustainable power production. However, power management systems can better maximise sustainable power production.

Scalable and flexible

You can easily add controllers to an application, rearrange applications, and move controllers from single controller applications to PMS (or the other way around).

Hardware

DEIF-developed platform, manufactured in Denmark. Flexible configuration.

1.1.2 Grid-forming or grid-following

These modes are controlled by the ASC-4 Battery controller using the PCS and BCU.

Grid-forming

Grid-forming is also called island, or V/f mode. For grid-forming mode, the ASC-4 Battery controller can act as the only energy source. The battery can provide the grid-forming power in island operation, and work together with non-grid-forming sources, like solar and wind.

If the system includes gensets, these are stopped if the load level, battery capacity, and state of charge conditions are fulfilled. When the battery is discharged or the load increases beyond the battery capacity, the gensets are reconnected. The controller can also suppress genset starts from solar controller spinning reserve requests.

Grid-following

Grid-following is also called parallel, or P/Q mode. For grid-following mode, the ASC-4 Battery controller is always connected to another grid-forming source, like a mains or genset. The battery can be used as power buffer, providing spinning reserve and peak shaving. The battery can also be used for time of use (TOU) applications.

Droop mode/VSG mode

If the ESS supports this, the ASC-4 Battery controller can run the ESS in droop mode for both Grid-forming and Grid-following. The controller controls the storage charge and discharge using V/f or P/Q set points from the configured droop curve (that is, like a virtual synchronous generator (VSG)).

1.1.3 Energy source or power source

The energy and power source functions determine the source priority. The source functions are not directly related to grid-forming and grid-following.

Energy source

For the energy source function, the ASC-4 Battery controller prioritises battery power over genset power. As a result, the system uses as much battery power as possible before starting any genset.

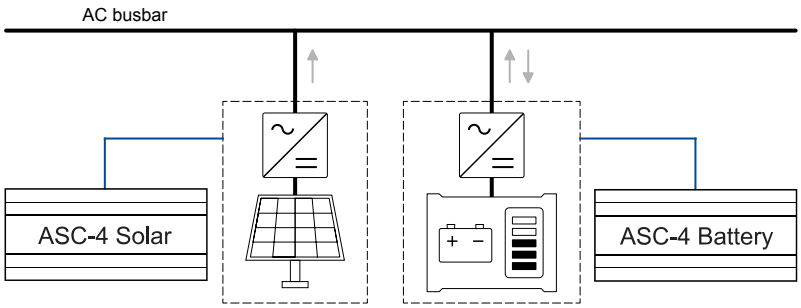
Power source

For the power source function, the ASC-4 Battery controller operates parallel to other sources. Genset power is prioritised over battery power. This mode is used to ensure that spinning reserve requirements are met

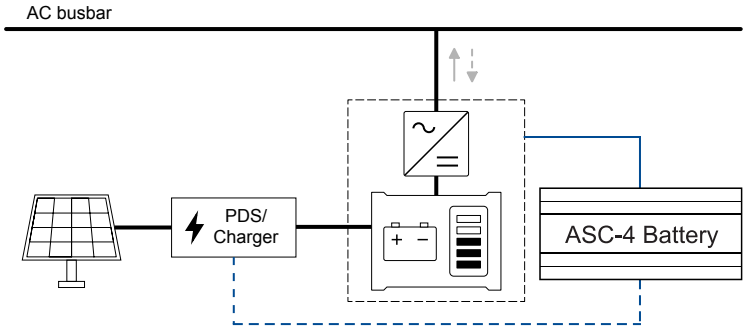
1.1.4 AC- or DC-coupled PV

The ASC-4 Battery controller can be used for both AC- and DC-coupled PV applications.

For AC-coupled systems, you can define battery charging and discharging scheme. Using the charge scheme, in DEIF power management, you'll also be able to define the energy sources (gensets, PV or mains) that you allow for charging purposes.



For DC-coupled systems, the battery is charged directly by a DC/DC inverter (PDS). Depending on the PV-Battery system and supplier, the ASC-4 Battery controller can communicate with the PV inverter (PDS). For a high SOC, the ASC-4 can then limit the charging current from the PV.



1.2 Single controller applications

1.2.1 Single battery controller

The ASC-4 Battery can operate as a single controller, that is, without power management communication to other controllers. Single controllers are particularly useful for brownfield applications. Single controllers can also be used in greenfield applications.

The single controller must get the power measurements and breaker positions for the power sources in the rest of the application. You can use transducers, power meters, or a PLC.

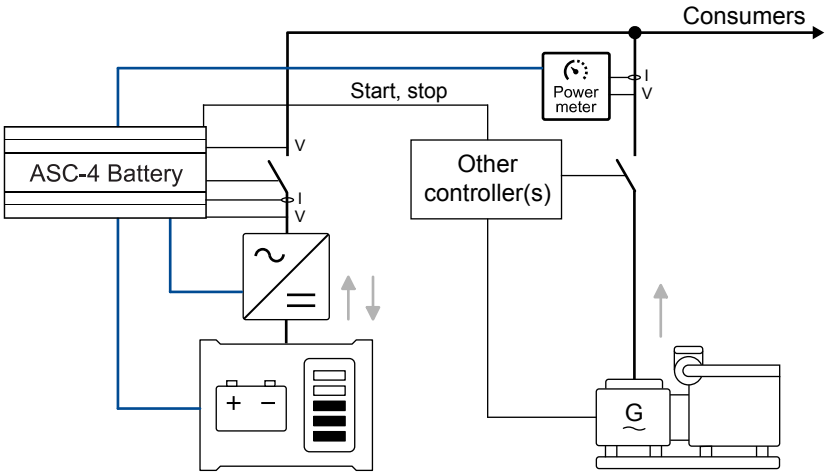
The ASC-4 Battery controller calculates the charging and discharging set points. The set points are determined by:

- The operating mode
- The system load and configuration
- The state of charge in the storage
- The power readings from the other power source(s)
- The breaker position(s) of the other power source(s)

Features

Single battery controller	
External gensets	16
External mains	16
Energy storage breaker (ESB) control (optional)	●
Mains breaker position feedback (paralleling)	●
External power source (for example, genset) start and stop by an external relay, based on: • State of charge (SOC) • System load	●
Optimal load point for the genset(s)	●

Single battery controller with genset(s)

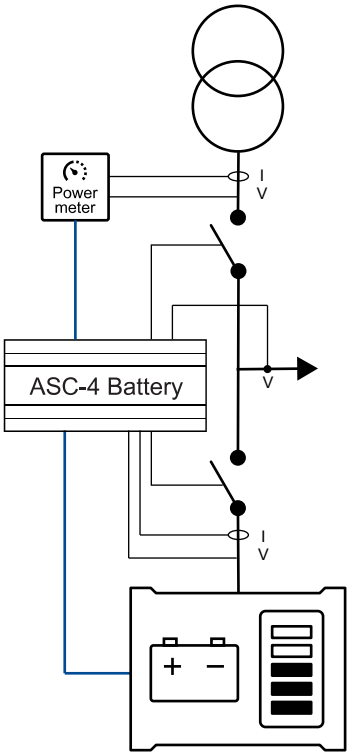


The ASC-4 Battery controller can support the load, so that the genset can run at its optimal load point.

Ideal for ESS rental applications

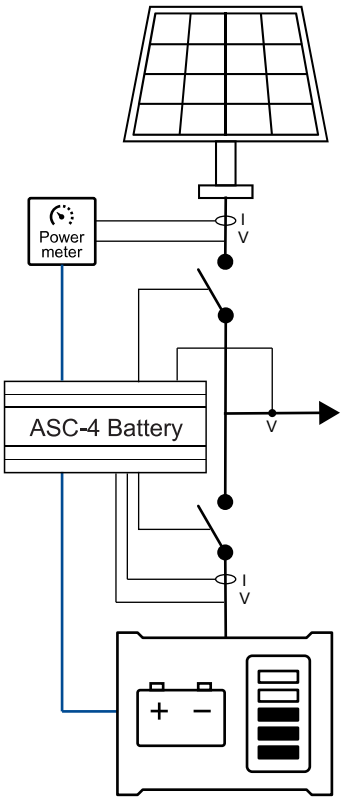
You can use the ASC-4 Battery single controller for emission-free power rental solutions with a single ESS. The controller provides full communication with the ESS. The controller can communicate with a BCU (battery control unit) or directly with a BMS (battery management system) and PCS (power control system) over Modbus. You can use the ASC-4 Battery controller with a wide range of energy storage systems (ESS), and in any rental application.

Single battery controller with one mains



- **Peak shaving**: The storage supplies the peak load demand and runs parallel to mains.
- **Load take-over**: The load is moved from mains to storage, for example, during peak demand periods or periods with a risk of power outages.
- **Mains power export**: The ASC continuously adjusts the ESS so that the power through the mains breaker is at the fixed power set point. Both import and export are possible.

Single battery controller with PV



1.3 Power management system applications

1.3.1 Grid-tied

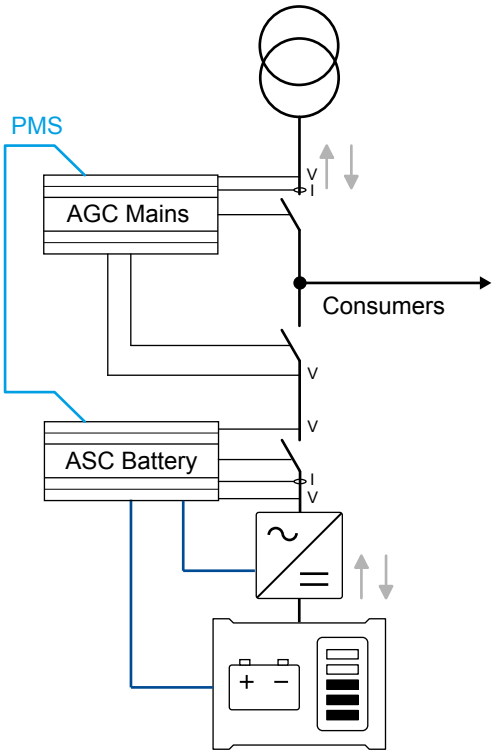
The ASC-4 Battery controllers can integrate seamlessly into grid-tied applications. This includes power management applications with other DEIF controllers using CAN bus communication.

The ASC-4 Battery can control an ESS to take peak loads, provide mains power export, provide fixed power. If there is a mains failure, the controller can run in island mode. The ASC-4 Battery can also provide the spinning reserve for a PV plant, thereby improving the green energy penetration to the grid.

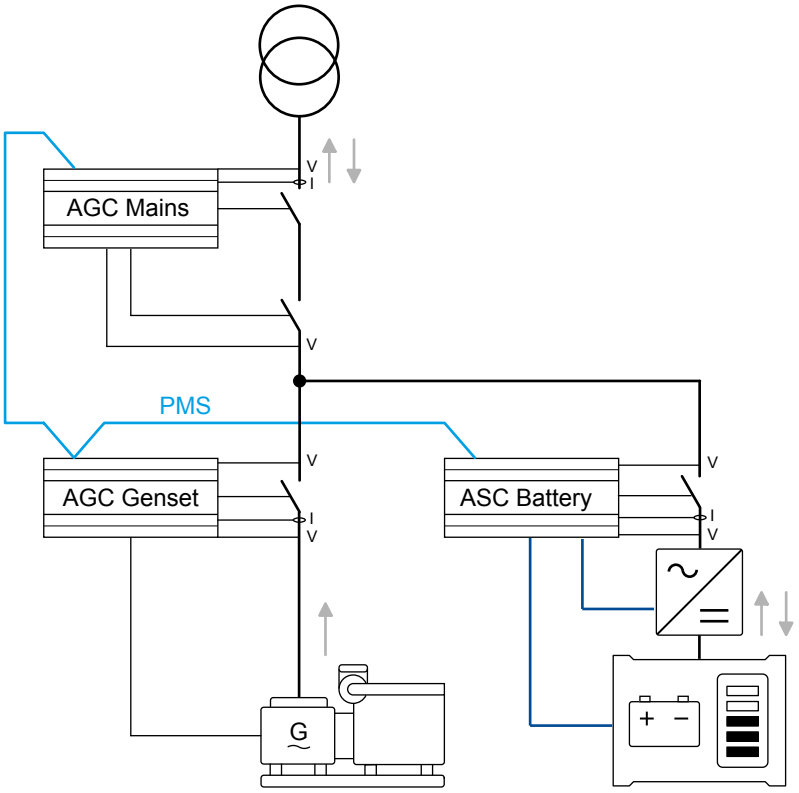
These controller configurations can be used in greenfield applications.

To use these configurations at existing sites, all the genset, mains, battery and solar controllers must be replaced with DEIF controllers. Existing BTB controllers can be replaced, or treated as externally controlled BTBs.

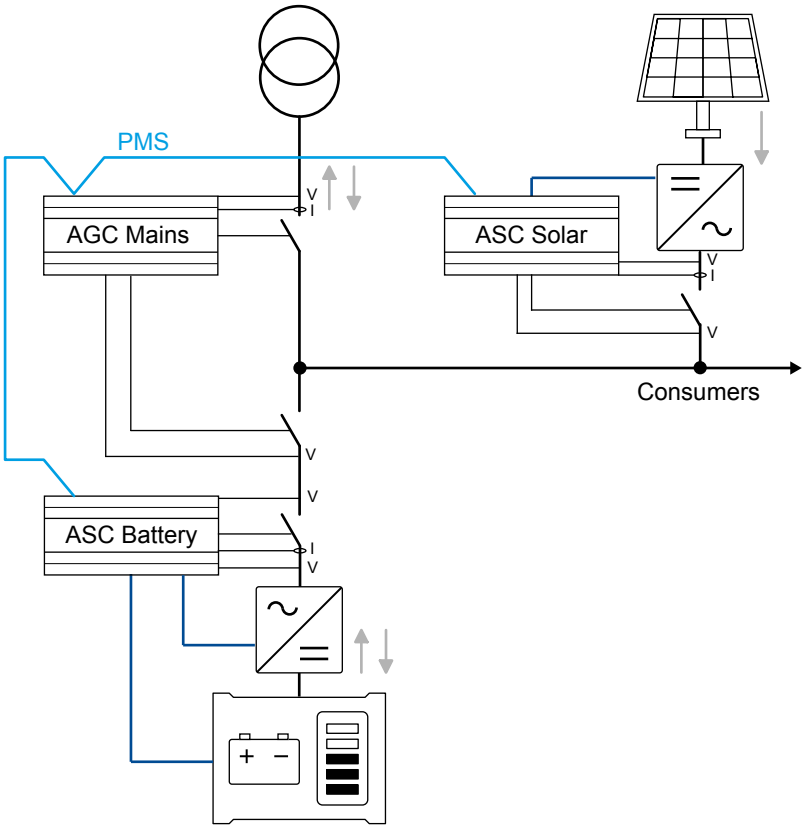
Grid-tied battery



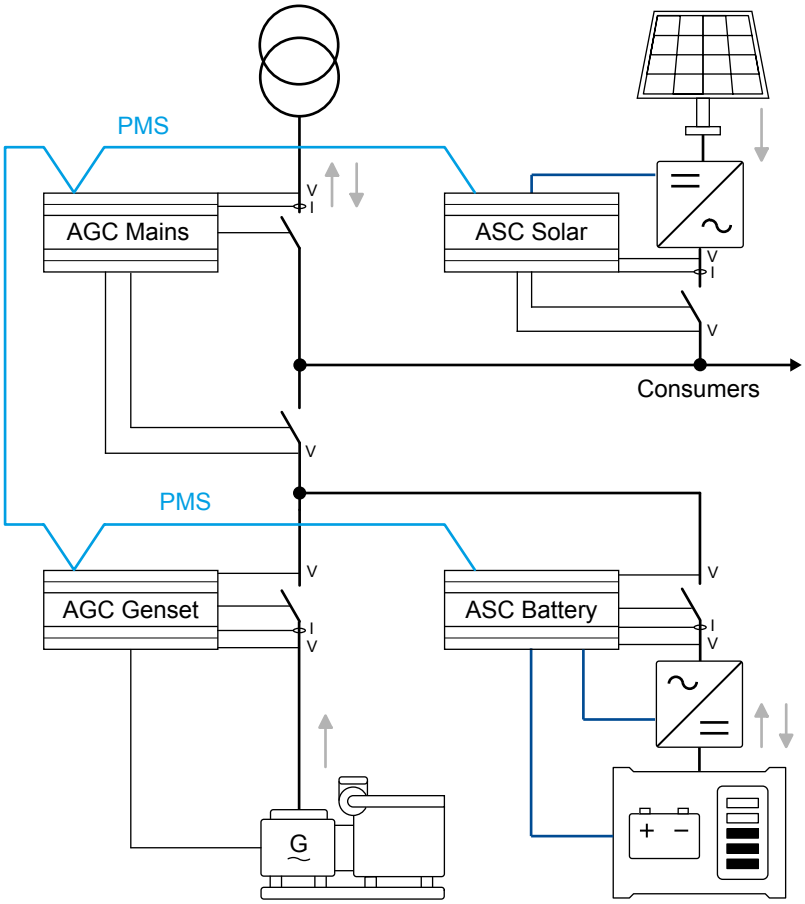
Grid-tied hybrid genset-battery



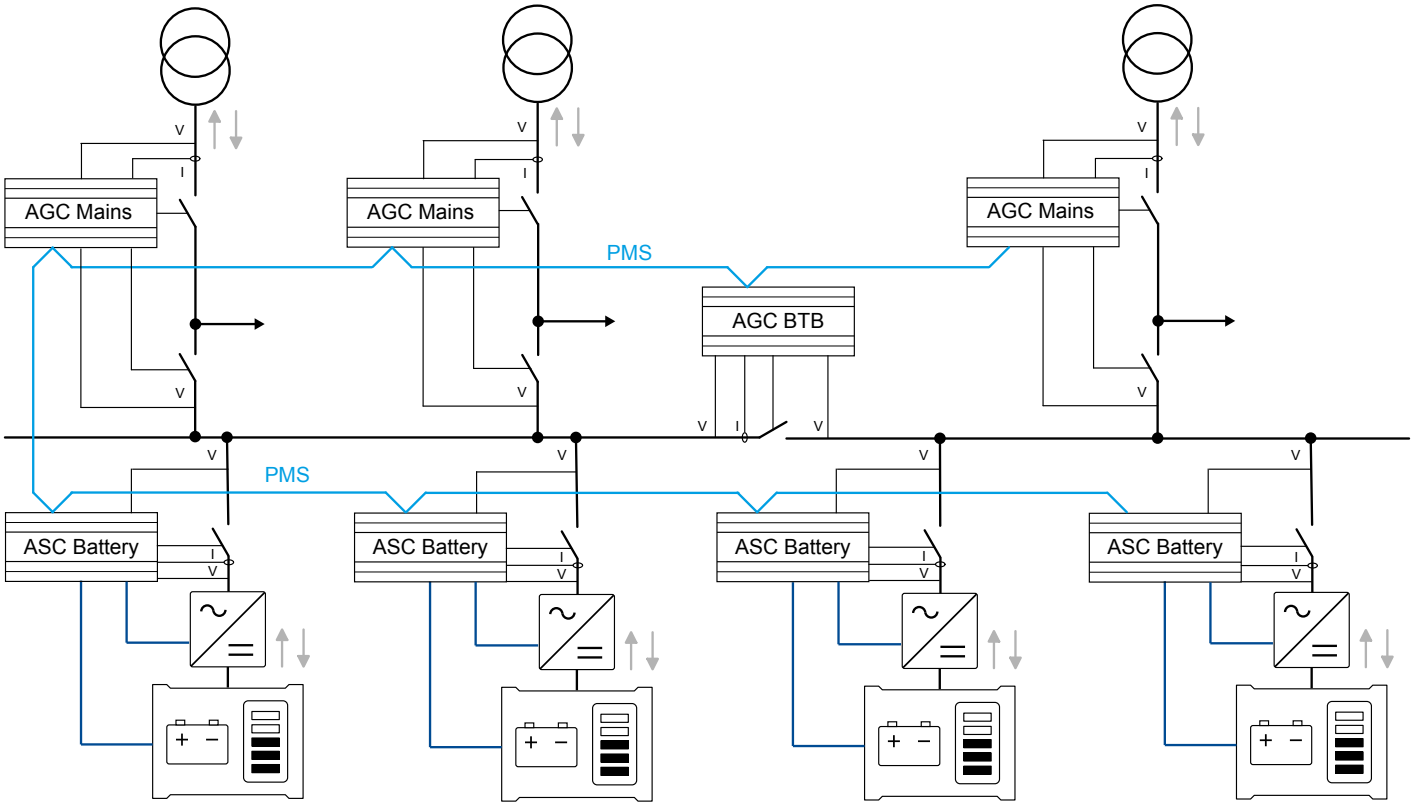
Grid-tied hybrid solar-battery



Grid-tied hybrid solar-genset-battery



Multi-mains with battery



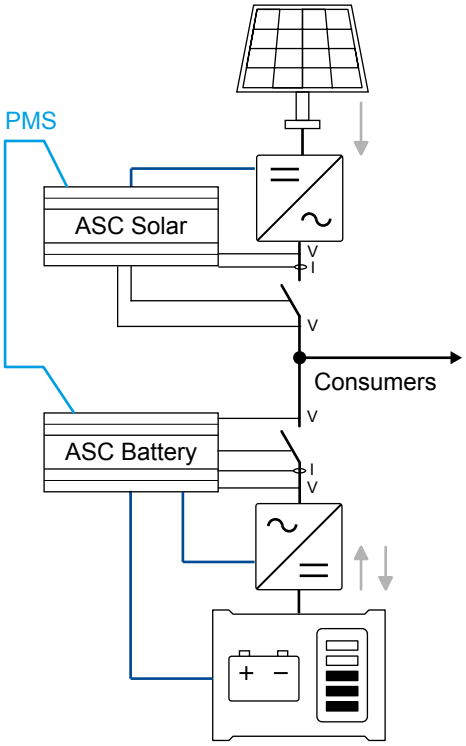
1.3.2 Off-grid

The ASC-4 Battery controllers provide flexibility for off-grid applications.

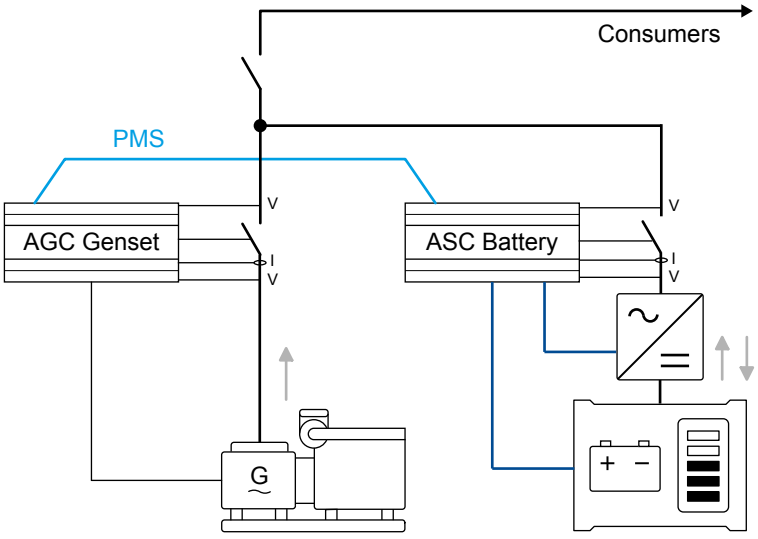
These controller configurations can be used in greenfield applications.

To use these configurations at existing sites, all the genset, battery and solar controllers must be replaced with DEIF controllers. Existing BTB controllers can be replaced, or treated as externally controlled BTBs.

Off-grid with solar and battery

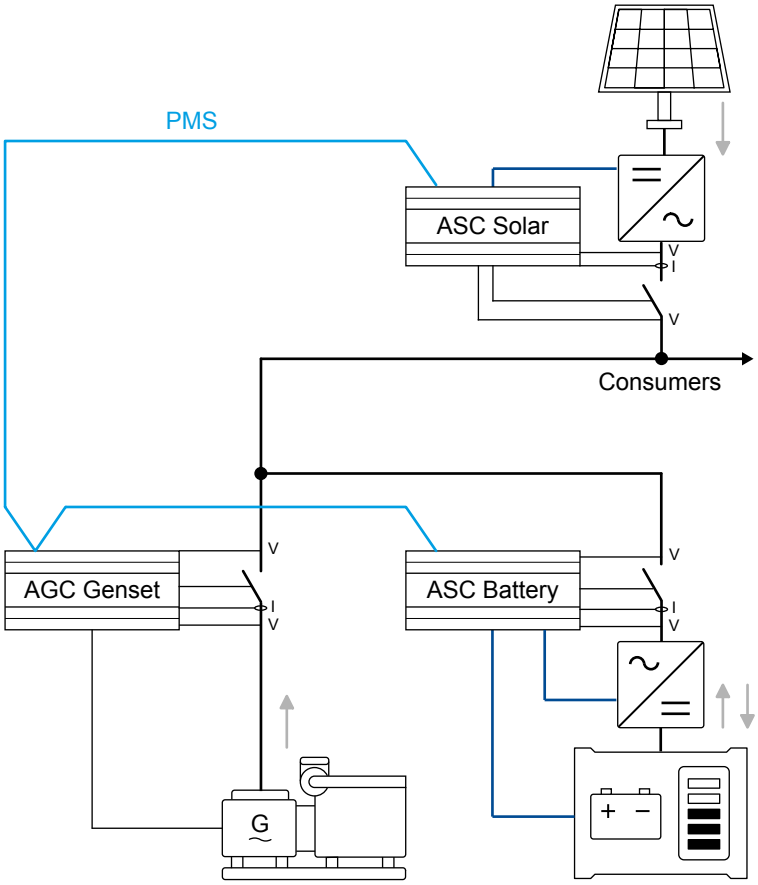


Off-grid with genset(s) and battery



To improve power quality, the ASC-4 Battery can supply peak loads while gensets start. The ASC-4 Battery controller can support the load, so that the genset can run at its optimal load point. If the ESS is designed to supply the busbar load, the ESS can be the only source connected to the busbar.

Off-grid with genset(s), solar and battery



1.4 Communication protocols

1.4.1 Compatibility and compliance

DEIF hybrid controllers are compatible with battery systems from a wide range of manufacturers.

Testing

Many battery system makers use the same protocol for a wide range of their products. New battery systems often comply with the older protocol. If a specific battery management system is not listed, but the maker is listed, there is a good chance that the DEIF controller is compatible.

If your battery system is not listed, DEIF can help to confirm compliance using the Modbus protocol documentation.

Implementing new protocols

Since new battery systems are launched every year, DEIF developers continuously implement new protocols. If your system is not listed, please contact DEIF. We can work with you to quickly implement the required protocol.

1.4.2 List of supported protocols

The ASC-4 Battery supports a wide range of power meters, power measurements from genset controllers, and BCU, PCS, PDS, BMS, and ESS protocols.

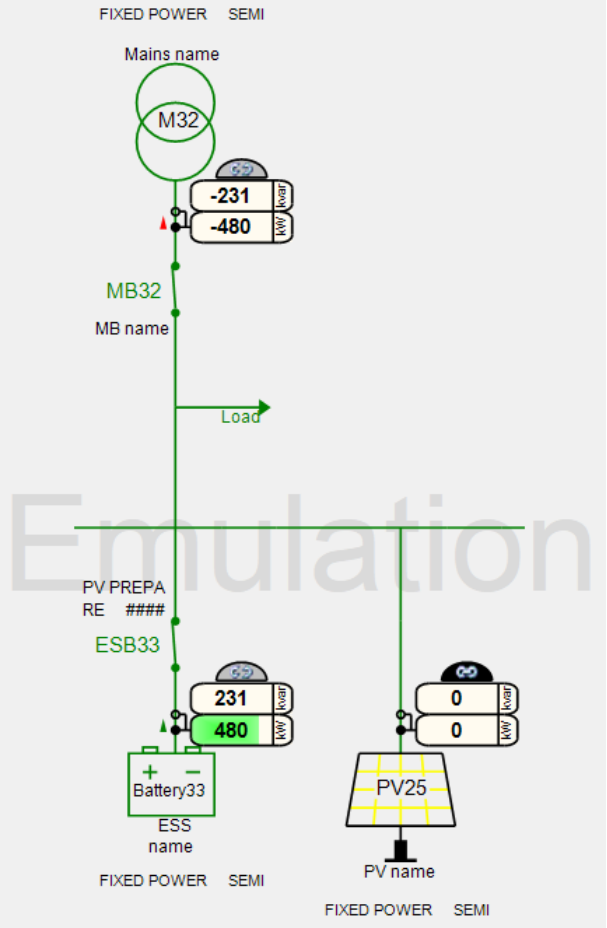
More information
See the **Application note, DEIF hybrid controller compatibility**.

1.5 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.



1.6 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.

1.6.1 Safe power management

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.

1.6.2 Applications

The ASC can include power management (option G5). Extended power management (option G7) is not available in the ASC yet.

With power management, the controllers 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 and/or mains with breakers (ID 1 to 32)
- 8 bus tie breakers on the generator bus or load bus (ID 33 to 40)
- 16 automatic sustainable controllers ASC-4 (solar and/or battery) (ID 25 to 40, ASC SW 4.10.0 or greater)
- 8 automatic load controllers ALC-4 (ID 25 to 40, ALC SW 4.10.0 or greater)

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.

1.6.3 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.

1.6.4 Power management functions

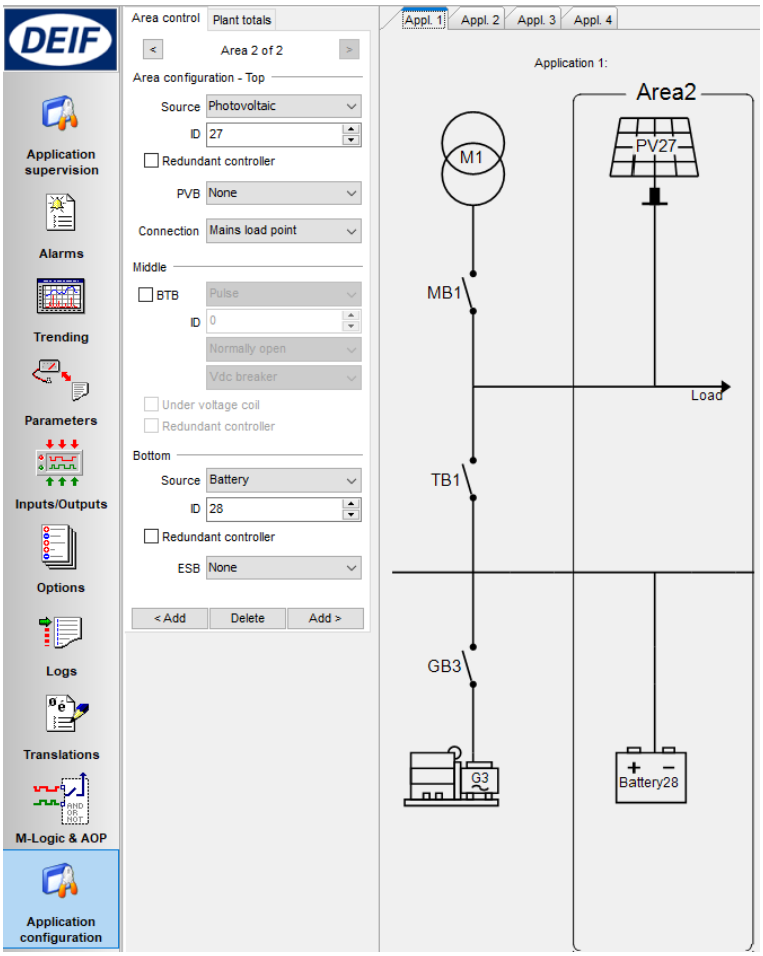
	Genset (G5)	Mains (G5)	BTB (G5)	Group (G7)	Plant (G7)
Multi-master system	●	●	●	●	●
Redundant CAN bus	●	●	●	●	●
Load management	●	●	●	●	●
Load-dependent start/stop	●			●	
• Manual priority • Running hours priority • Running hours priority • Fuel optimisation priority	• Absolute/relative • Absolute/relative • 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	
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.

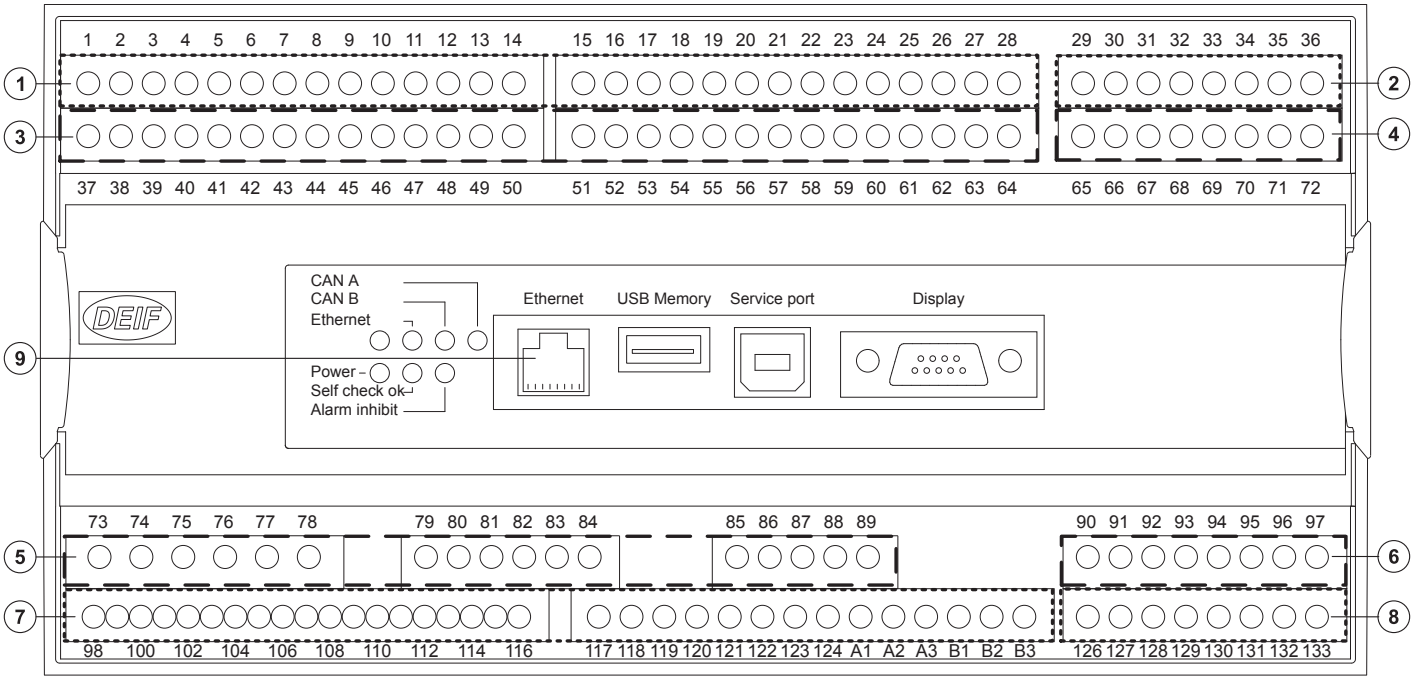
1.6.5 Easy configuration of single-line diagrams

You can easily configure the application using a PC and the DEIF PC utility software. You can then set up the plant control, by using a few basic plant conditions.



2. Hardware and software

2.1 Overview and options



(1) : The numbers in the drawing above refer to the slot numbers shown in the table below.

Slot #	Option/standard	Description
1		**Terminal 1-28, power supply**
	Standard	8 to 36 V DC supply, 11 W; 1 × status output relay; 5 × relay outputs; 2 × pulse outputs (kWh, kvarh or configurable open collector outputs); 5 × digital inputs
2		**Terminal 29-36, communication**
	Standard (H2.2)	Modbus RTU (RS-485)
3		**Terminal 37-64, inputs/outputs**
	M12	13 × digital inputs; 4 × relay outputs
4		**Terminal 65-72, inputs/outputs**
	E2	2 × 0(4) to 20 mA outputs, transducer
	M13.4	7 × binary inputs
	M14.4	4 × relay outputs
5		**Terminal 73-89, AC measuring**
	Standard	3 × ESS current; 3 × ESS voltage + N; 3 × busbar voltage + N
6		**Terminal 90-97, inputs/outputs**

Slot #	Option/standard	Description
	F1	2 × 0(4) to 20 mA outputs, transducer
	M13.6	7 × digital inputs
	M14.6	4 × relay outputs
	M15.6	4 × 4 to 20 mA inputs
7		**Terminal 98-124-A1-A3-B1-B3, communication, inputs/outputs**
	M4	8 to 36 V DC supply; 3 × multi-inputs; 7 × digital inputs; 4 × relay outputs Power management communication, CAN port A and B
8		**Terminal 126-133, inputs/outputs**
	H2.8	Modbus RTU (RS-485). Can work as slave or as master for power meter communication.
	M13.8	7 × digital inputs
	M14.8	4 × relay outputs
	M15.8	4 × 4 to 20 mA inputs
9		**LED I/F**
	N	Modbus TCP/IP
Accessories		
		AOP-1
		DU-2
Additional hardware options		
	Q1	Class 0.5 calibration
	W1	One-year extended warranty
	W2	Two-year extended warranty
	W3	Three-year extended warranty
Software options		
	G5	Power management
	I1	System emulation
	T1	Critical power (includes redundant controllers)

NOTE There can only be one hardware option in each slot. For example, it is not possible to select option H2.8 and option M13.8 at the same time, because both options require a PCB in slot 8.

3. Compatible products

3.1 Power management

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

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

3.2 Remote monitoring service: Insight

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

3.3 Additional operator panel, AOP-2

The controller uses CAN bus communication to the additional operator panel (AOP-2). Configure the controller using M-Logic. On the AOP-2, the operator can then:

- Use the buttons to send commands to the controller.
- See LEDs light up to show statuses and/or alarms.

3.4 Other equipment

DEIF has a wide variety of other equipment that is compatible. This includes synchroscopes, meters, transducers, current transformers, power supplies, and battery chargers. See www.deif.com

4. Technical information

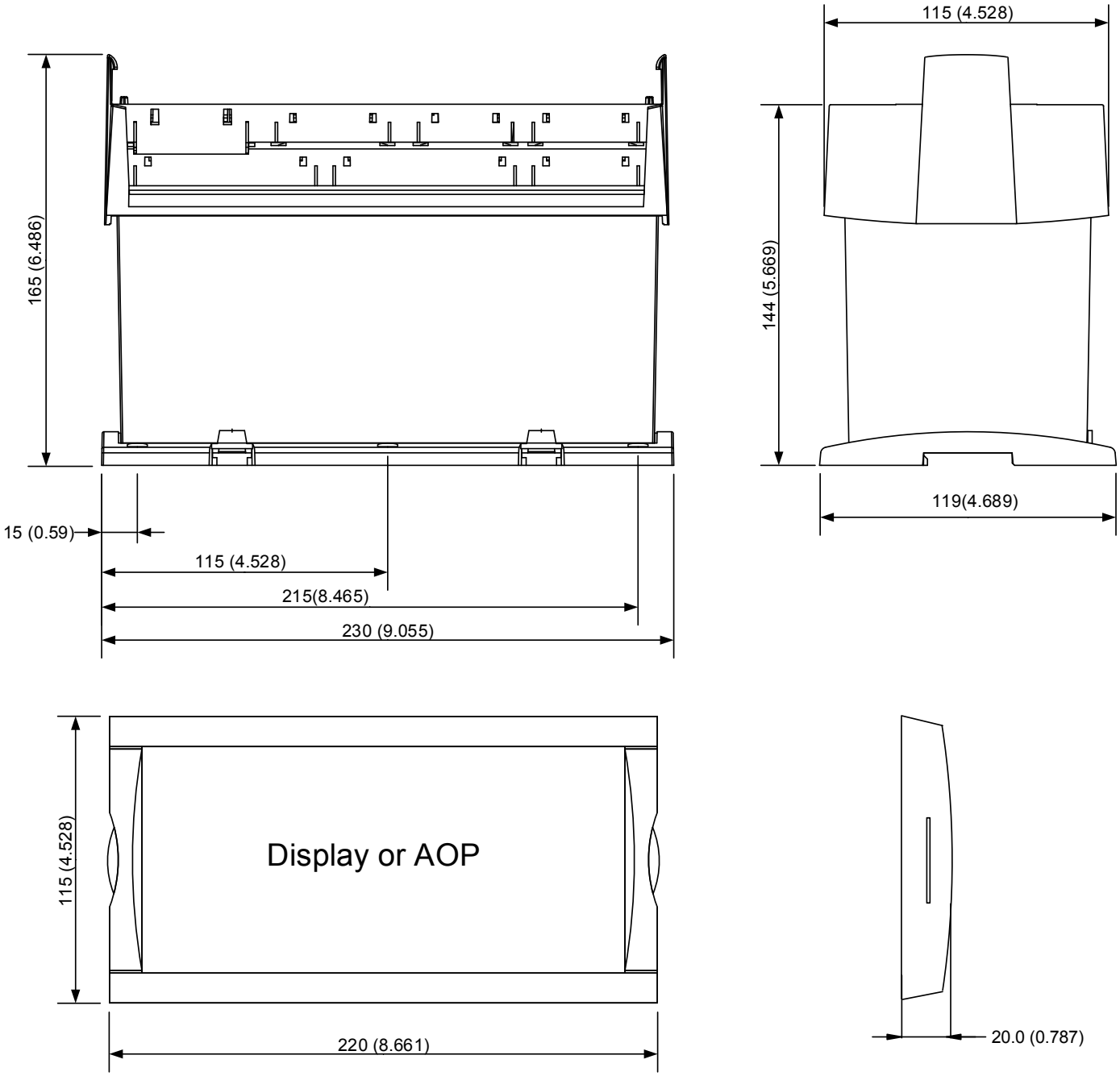
4.1 Technical specifications

Accuracy	Class 1.0 -25 to 15 to 30 to 70 °C Temperature coefficient: ±0.2 % of full scale per 10 °C Class 0.5 with option Q1 Averaged frequency: +/-10 mHz, 15 to 30 °C, 45 to 65 Hz Positive, negative and zero sequence alarms: Class 1 within 5 % voltage unbalance Class 1.0 for negative sequence current Fast over-current: 3 % of 350 %*In Analogue outputs: Class 1.0 according to total range Option EF4/EF5: Class 4.0 according to total range To IEC/EN 60688
Operating temperature (including DU-2 display and AOP)	-25 to 70 °C (-13 to 158 °F) -25 to 60 °C (-13 to 140 °F) if Modbus TCP/IP (option N) is available in the controller 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
Operating altitude	0 to 4000 m above sea level Derating 2001 to 4000 m above sea level: Max. 480 V AC phase-phase 3W4 measuring voltage Max. 690 V AC phase-phase 3W3 measuring voltage
Measuring voltage	Nominal value (U_n): 100 to 690 V AC, ±20 % UL/cUL Listed: 600 V AC phase-phase Consumption: Max. 0.25 VA/phase
Voltage withstand	U_n + 35 % continuously U_n + 45 % for 10 seconds
Measuring current	Nominal value (I_N): **Low**: 1 A AC from current transformer **High**: 5 A AC from current transformer UL/cUL Listed: From listed or R/C (XODW2.8) current transformers 1 or 5 A Consumption: Maximum 0.3 VA/phase
Current overload	4 × I_N continuously 20 × I_N, 10 sec (max. 75 A) 80 × I_N, 1 sec (max. 300 A)
Measuring frequency	30 to 70 Hz
Aux. supply	Terminals 1 and 2: 12/24 V DC nominal (8 to 36 V DC operational). Max. 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). Max. 5 W consumption 0 V DC for 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 (M12) 0(4) to 20 mA: Impedance 50 Ω. Not galvanically separated (M15.X)
Multi-inputs	0(4) to 20 mA: 0 to 20 mA, ±1 %. Not galvanically separated Digital: Max. resistance for ON detection: 100 Ω. Not galvanically separated Pt100/1000: -40 to 250 °C, ±1 %. Not galvanically separated. To IEC/EN60751 RMI: 0 to 1700 Ω, ±2 %. Not galvanically separated V DC: 0 to 40 V DC, ±1 %. 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, max. 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
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
Response times (delay set to min.)	**Mains/Busbar** Over-/under-voltage: <50 ms Over-/under-frequency: <50 ms **Inverter/Power converter** Over-current: <250 ms Over-/under-voltage: <250 ms Over-/under-frequency: <350 ms Overload: <250 ms **Other** Digital inputs: <250 ms Emergency stop: <200 ms Multi-inputs: 800 ms Wire failure: <600 ms
Mounting	DIN rail mount or base mount with six M4 screws Tightening torque: 1.5 Nm for the six M4 screws (countersunk screws are not to be used)
Safety	To EN 61010-1, installation category (over-voltage category) III, 600 V, pollution degree 2 To UL 508 and CSA 22.2 no. 14-05, over-voltage category III, 600 V, pollution degree 2
EMC/CE	To EN 61000-6-2, EN 61000-6-4, 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 mmpp. 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)
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
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
Approvals	UL/cUL Listed to UL508 Applies to VDE-AR-N 4105 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 a 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.)

4.2 Unit dimensions in mm (inches)



5. Ordering information

5.1 Order specifications

Variants

Type	Options specification				
Type	**Option**	**Option**	**Option**	**Option**	**Option**

Example:

Type	Options specification				
Type	**Option**	**Option**	**Option**	**Option**	**Option**
ASC-4 Battery	M14.4	M13.6	M15.8		

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 ASC-4 software version 4.22.