



# CRITICAL POWER

APPLICATION GUIDE



# **CRITICAL POWER**

## **WHEN DOWN-TIME IS SIMPLY NOT AN OPTION**

DEIF has a strong track record in developing emergency, standby and backup power solutions for mission-critical facilities and businesses including life safety, medical, industrial process control, data centres, telecommunications, and television and radio broadcast systems.

Resilient turnkey packages, DEIF's solutions incorporate intelligent power distribution and controls, switchgear, and generator and grid protection to guarantee uninterrupted power supplies in cases of mains failure.

We design and integrate system architecture with unique standby capacities and can deliver record start-up from an impressive six seconds for multiple gensets in parallel, redundant control systems, or even an entire redundant power plant.

# **WHY RUN THE RISK?**

## **RELIABLE POWER MANAGEMENT IS CHEAPER THAN AN OUTAGE**

Did you know that the average cost of a data centre outage has steadily increased from \$505,502 in 2010 to \$740,357 today? That's an increase of 38 %!

Outages have many causes, some of which are very hard to avoid. A surprise to many, however, the root cause of a stunning 22 % of all unplanned outages is human error. Human error today is the second-largest single cause of error, only surpassed by UPS system failures.

DEIF counters this with fully automatic and redundant critical power management solutions for uninterrupted power supply.

The products and solutions we deliver undergo strict testing procedures in our own test centre. The tests are carried out by specialised engineers. Part of our ISO 9001 certified quality management system, the test centre houses some of the most advanced testing facilities in the world. They allow us to carry out all relevant tests for various classification approvals, CE marking, MED approvals, UL, etc. – under our own roof.





# REDUCE CO<sub>2</sub> AND COSTS

## HYBRID POWER PLANTS HELP REDUCE ENVIRONMENTAL IMPACT

Expected to consume three times the 416.2 terrawatt hours of electricity globally consumed by data centres in 2015 in the next decade, the world's data centres already now consume more power than the entire UK.

So reducing the environmental impact from backup solutions powered purely by diesel can really mean a difference. It also reduces your fuel costs. With the aim for data centres to be at least 80 % powered by renewable energy sources by 2020, the EU further supports this green transition.

To that end, DEIF power management solutions are capable of handling hybrid stations combining for instance solar, wind and diesel power.

See what a DEIF hybrid plant management can do for your business on page 11 or 13 or visit [deif.com/hybrid](http://deif.com/hybrid).

# Oslo hospital revives emergency power

From decentralised, fragmented system to full control

## Ullevål Sykehus

*»What you have now is a lot more control of each building. You can control the system much better. We have higher redundancy and safety in the backup power.«*

Dag Olsbakk  
Consulting Electro Engineer  
COWI

Venterom  
MR/CT S9 - S12  
MR S9 - S10 - BCT

The emergency power system at Oslo's Ullevål Hospital needed an upgrade – badly. Ullevål's century-old buildings and decentralised power infrastructure were inefficient. Medium-sized generators were located in or near the many buildings and there was little control over the load situation.

COWI and DEIF worked together with Ullevål to build the new system while keeping the hospital on-line and functioning normally – like a bypass operation of a patient.

Operations manager Michal Kjerstad's team no longer needs to go from building to building and look up at the windows for light during a power outage. *"Today we just look at a PC monitor and check up on those that have lost power and go straight to them."*

He says it also simplified Ullevål's generator testing. *"We no longer have to drive around with connecting cables. Now we stand in a heated room and touch a PC screen, testing the generators the exact way we need to. Whether it's phasing onto the grid in each building or testing to a load point. We have every option available, so that is very, very good."*

### Ullevål Hospital

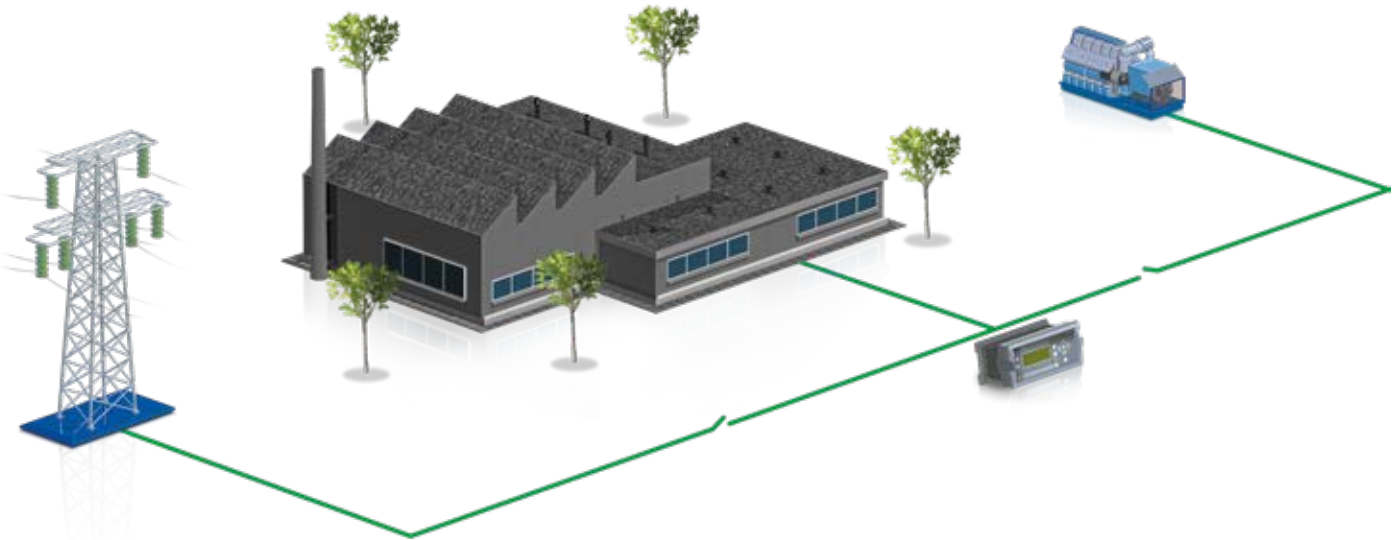
Established in 1887 in the St. Hanshaugen area of Oslo, Norway, Ullevål is one of the largest hospitals in Northern Europe. Today it is a part of the University Hospital of Oslo.

Read the full  
case story



# Grid connection

## With or without synchronisation



### Automatic Mains Failure (AMF) applications

In the event of a significant loss of mains power or total blackout, Automatic Mains Failure (AMF) performs an automated power switch to emergency standby generators, preventing possible data loss and potential damage to electrical equipment.

### AMF with synchronisation

With synchronisation preventing at least one blackout when switching from generator to mains supply, this is the most common AMF variant.

Select immediate opening of breaker, or with load across before opening.

You can also select overlap to make short-time parallel of generator to grid possible for, for instance, 0.1 second.

Controllers: AGC-4 / AGC 200

### AMF without synchronisation

This application is mainly used for simple systems intended only for AMF control. In both cases, switching from mains to generator supply and back is performed with a short-term blackout.

Controllers: AGC 100/GC-1F/CGC 400

### Relevant controllers



AGC-4



AGC 200

### Also consider these products



DBC-1



ASK



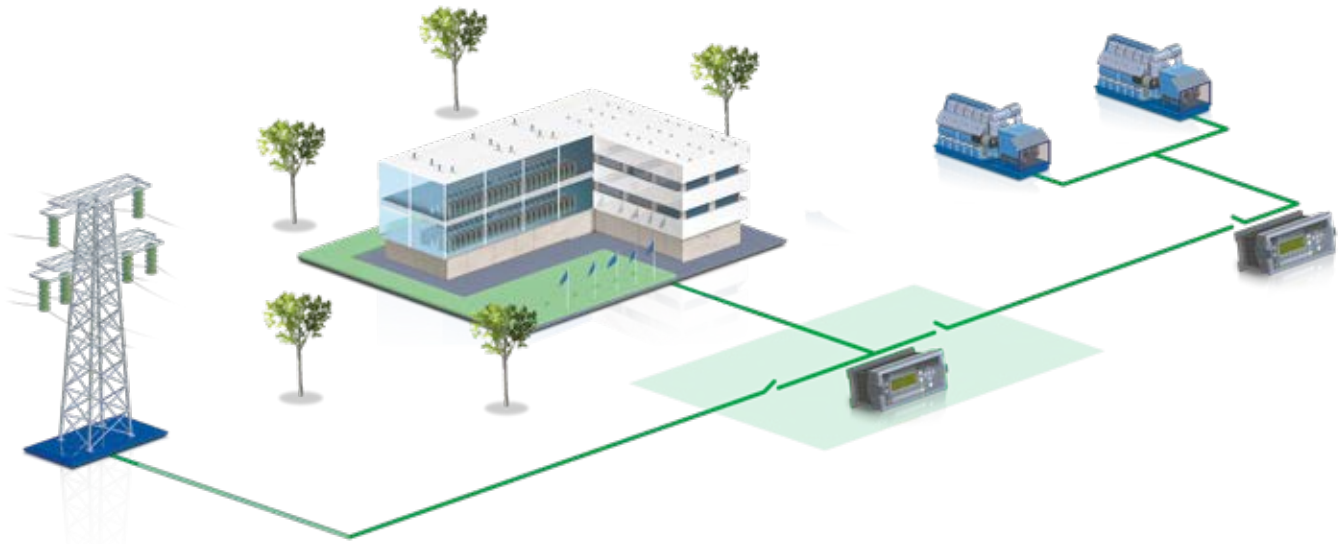
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TDU 107

# Parallel to grid

## Multiple generator sets



### Combined power plant and parallel to grid system; up to 56 breakers in one plant

Plant management parallel to grid typically runs in semi-automated and fully automated modes, using priority routines like fuel optimisation, running hours, multi-master, and plant modes like AMF, peak shaving, mains power export.

Use DEIF's free-of-charge PC Utility Software to construct the specifics of your plant layout within the AGC system.

The software is simple to use with explanatory graphic presentation.

The position of generators and bus tie breakers in the system can be selected freely.

Communication between the controllers is made using a single or double (redundant) CAN bus.

### Relevant controllers



AGC-4



AGC 200

### Also consider these products



DVC 310



AGI 400



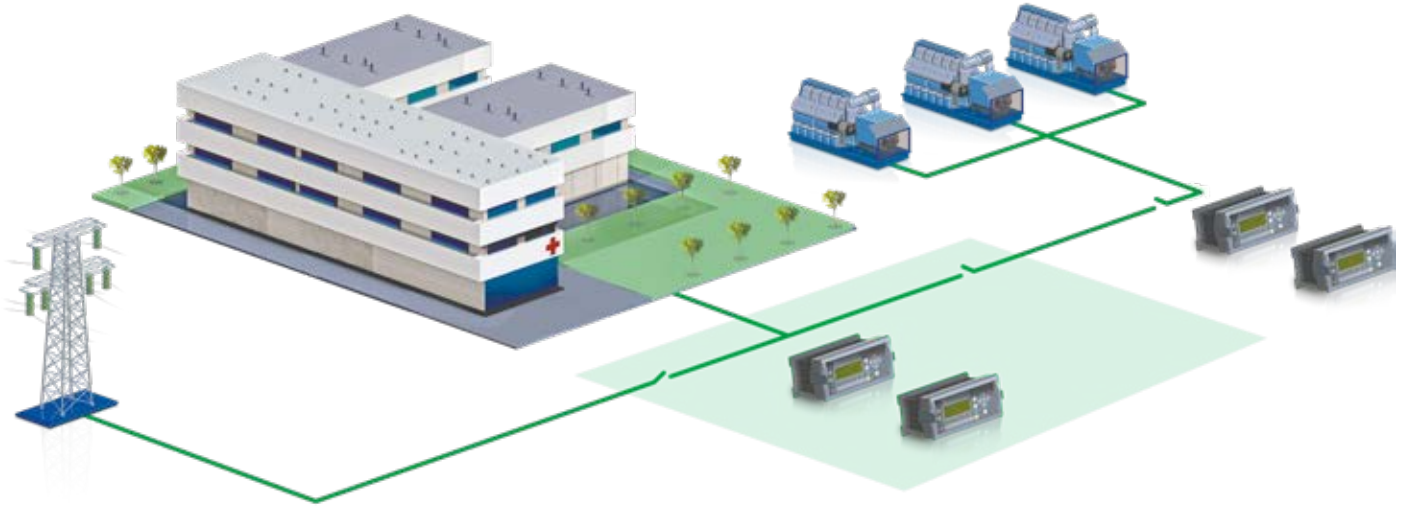
TDU 107



CIO

# Redundant systems

## Hot standby controllers



### Combined power plant and parallel to grid system, fully redundant control system

Mix of 32 transformers and generators.

On top of the grid, bus tie and generator controls, the DEIF AGC-4 controllers carry out full power management, eliminating the need for PLCs.

DEIF's AGC-4-based power management systems also offer the option of having doubled (redundant) controllers on all positions. In case of failure from a master controller, Hot Standby kicks in immediately, protecting the rest of the system from interference.

### Relevant controllers



AGC-4



AGC 200

### Also consider these products



DVC 310



AGI 400



CIO

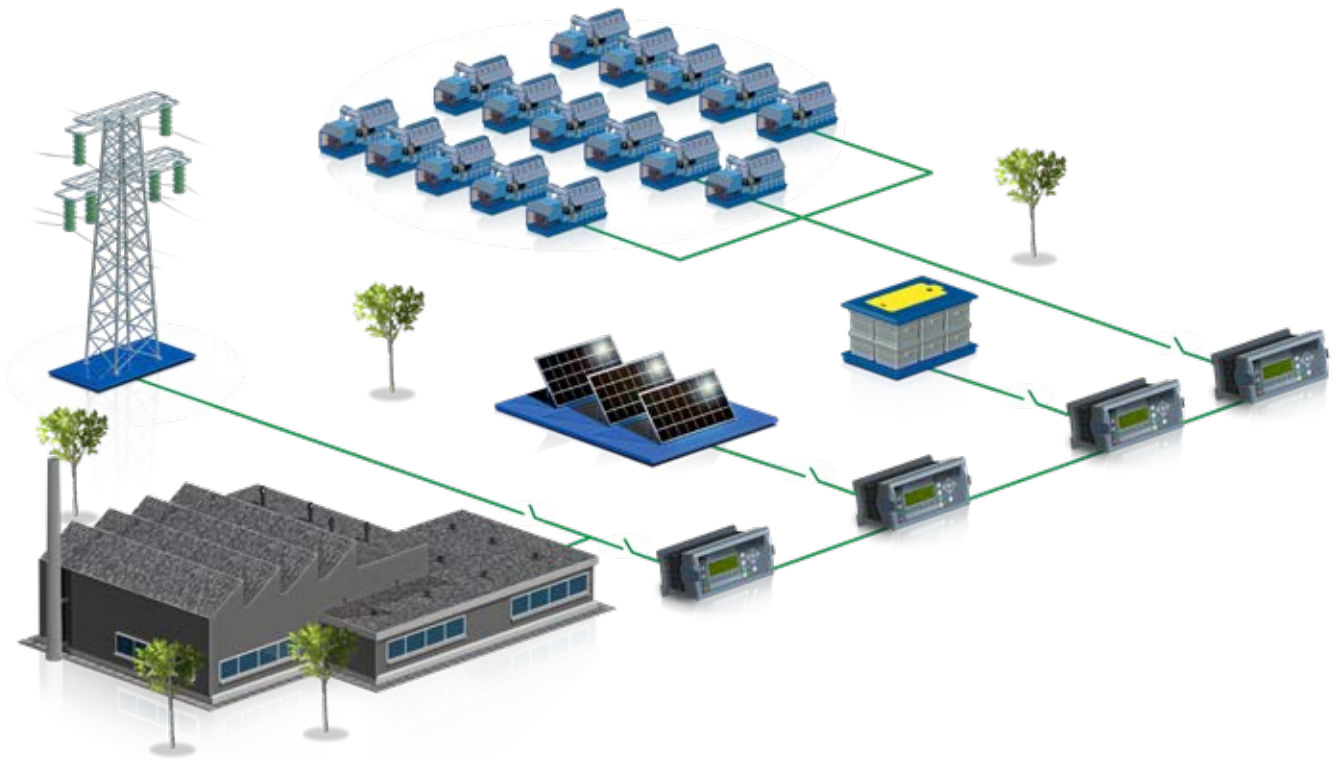


TDU 107



# Combination

## Automatic change-overs between grid-tied & off-grid - Energy management



### Off-grid/Grid-tied

In combination applications, the system incorporates features and functionalities of both our off-grid and grid-tied technology, automatically adjusting power and reactive power references with grid support if frequency or voltage drops, or rotating the genset to automatically ensure the most fuel-optimised running mode through various load demands.

Supporting fuel-saving in grid-tied operations, all gensets can be stopped to maximise the penetration from sustainable sources if no spinning reserve is needed. Automatic change-overs between grid-tied and off-grid are possible during operation. Island modes include island, Automatic Mains Failure, and load take-over.

### Integrated solution

- ▶ ASC-4 applicable with AGC-4/AGC 200 controls up to 16 gensets and 16 utilities
- ▶ Applications up to 8 sustainable power plants
- ▶ Minimum genset load for optimal performance
- ▶ Spinning reserve to ensure uptime
- ▶ Maximise sustainable power penetration in all operation modes

### Relevant products



ASC-4 (Solar)



AGI 400



AGC-4



AGC 200

### Add-on solution

- ▶ Applicable with all genset controls for up to 16 gensets
- ▶ Maximum 1 utility
- ▶ Maximum 1 sustainable power plant
- ▶ Minimum genset load for optimal performance

# Reliable power is central to business

Putting DEIF critical power to the test



*»We know it works,  
because we test it  
the hard way.«*

Tore Heide Villund,  
GlobalConnect

## Mission-critical solutions

DEIF's critical power solution is central to GlobalConnect's business case because the company's customer portfolio includes server hosting for critical business institutions like banks and media organisations demanding comprehensive redundancy and tier classifications.

When customers ask, if they can be sure GlobalConnect's back-up power systems work, Senior Group Manager Tore Heide Villund's confident reply owes a great deal to his faith in DEIF's power management system: *"We know it works, because we test it the hard way."*

*"As well as monitoring operation rigorously and performing and documenting simulation tests, we put the entire system to the ultimate test twice a month by cutting our connection to the grid. As the UPSs kick in and the gensets start up, synchronising and identifying a reliable, quality power production level for our premises, you can't get greater certainty, and that is the level we maintain."*

Read the full case story



## GlobalConnect

Is Denmark's leading alternative provider of fibre network, data centres and cloud solutions.

# Emergency power at salmon farm

Millions of dollars at stake for the Faroe Islands salmon farm

**BAKKA  
FROST**

*»If we don't have power in this plant for perhaps half an hour, then all the fish will die. That's a catastrophe.«*

*Jógvan Hansen*  
Technical Manager  
BAKKAFROST

## Sharing the load

Emergency power is critical for any fish farm, but on the Faroes, it is part of the foundation for a successful, growing industry. Bakkafrost and other salmon producers on the Faroes turn out some of the world's highest quality salmon, and global demand has been booming for this product since 2014. Bakkafrost has been expanding to meet that demand. But it must be able to deal with the regular blackouts.

DEIF supplied a full switchboard delivery consisting of four AGC mains, one AGC BTB and four AGC DG, as well as one AGI 315, in addition to commissioning and training.

So, when Bakkafrost loses mains power, emergency gensets fitted with a control solution from DEIF brings it back.

*"Now, if we lose power, it's back in the plant within 23 seconds precisely, and everything is up and running," says Jógvan Hansen. "I'm convinced we have a good and secure system – one that we can trust."*

## BAKKAFROST

Bakkafrost is a leading producer of top-quality salmon from the Faroe Islands. Its facility on Vidareidi covers the first part of the salmon production chain. It develops eggs into smolts, then transfers them into sea pens for final development.

Read the full case story



# Automatic Genset Controller, AGC-4

The world's most comprehensive & robust genset controller



DEIF's Automatic Genset Controller (AGC-4) is the most comprehensive and flexible power management and protection unit on the market today. A further development of DEIF's AGC-3, the new generation controller is fully compatible with its predecessor and has been designed to allow for easy, intuitive, and smooth switch-overs for those looking to upgrade.

Suitable for a wide range of applications, the AGC-4's standard sequences include back-up power, start/stop, synchronisation, and load sharing.

The AGC-4 is simple to incorporate into both new and existing designs, customising the application to fit your needs, for instance dedicating specific functions or logic conditions to different inputs and outputs.

Technologically sophisticated, the AGC-4 is also the world's most robust power management controller, successfully tested to maintain reliability and durability in extreme weather and hazardous conditions. Approvals include TÜV and UL.

## Patent-pending Emulation

A standard in the Automatic Genset Controller, AGC-4, using DEIF's Emulation Solution, all you need to do to perform a complete test of your Power Management Systems is turn on your controller and connect communications.

The Emulations Solution's focus on exact reproduction of behaviour improves your planning, commissioning and training. It is all done in a safe environment without the costly and excessive need of gensets and switchgear and without the risk of equipment damage and human injury. The innovative solution gives you a critical market advantage and guarantees your customers a cutting-edge, finished result.

## Remote communication and control

The AGC-4 supports serial communication protocols including Modbus (RS-485, USB, and TCP/IP) and Profibus. This feature allows you to supervise and control your genset/plant from a remote location and minimise downtime or take immediate action on genset alarms or warnings.

## AGC-4 features

- ▶ Multiple operating modes in one software
- ▶ Synchronisation of up to 56 breakers in one plant
- ▶ Multi-master power management
- ▶ Load-dependent start and stop
- ▶ Load management
- ▶ Emulation for fast training and I/O test
- ▶ Hot Standby – change to backup genset controller on the fly
- ▶ Close Before Excitation – synchronisation in less than 10 seconds

## AGC-4 type approvals



# Advanced Genset Controller, AGC 200

Cost-effective & scalable controller platform



DEIF Advanced Genset Controller, AGC 200, meets and surpasses OEM needs for synchronisation. A cost-effective, compact, scalable and all-in-one product, the AGC 200 comes in several variants.

The advanced controller series integrates all necessary functions for genset protection and control, stands out for its reliability and operator-friendliness, and features patent-pending DEIF Emulation to speed up design, testing and commissioning, saving man hours and costs.

Applying asymmetric load sharing to ensure optimal load on the genset, the AGC 200 also cuts operating costs and reduces harmful emissions. With temperature-dependent cooling, the AGC 200 arrests cooling at pre-programmed cool-down temperatures and features automatic priority selection, setting the optimum combination of gensets for optimised fuel consumption.

## AGC 200 options

- ▶ AGC 212: single genset in island operation
- ▶ AGC 213: single genset for automatic mains failure operation
- ▶ AGC 222: multiple genset with advanced power management in plants up to 16 generators (limited I/O)
- ▶ AGC 232: multiple genset in island applications with digital load sharing
- ▶ AGC 233: single genset for automatic mains failure, peak shaving, load take over and mains power export operation
- ▶ AGC 242: multiple genset with advanced power management in plants up to 16 generators
- ▶ AGC 243: control of single or multiple gensets
- ▶ AGC 244: bus tie breaker
- ▶ AGC 245: mains breaker control
- ▶ AGC 246: mains and tie breaker
- ▶ AGC 252: multiple gensets with advanced power management in plants up to 256 generators
- ▶ IOM 200: analogue interface for AGC 200 family

## AGC 200 features

- ▶ Multiple operating modes in one software
- ▶ Synchronisation of up to 56 breakers in one plant
- ▶ Multi-master power management
- ▶ Load-dependent start and stop
- ▶ Load management
- ▶ Priority selection (manual, relative running hours, absolute running hours, fuel optimisation)
- ▶ Compatible with your existing AGC-3 and AGC-4 gensets
- ▶ User-programmable logic (M-Logic)
- ▶ Configurable inputs/outputs
- ▶ Engine, generator and load protection
- ▶ Voltage measuring range: 50 to 690 V AC (UL/cUL Listed 50 to 600 V AC)
- ▶ J1939 engine communication, supporting 11 different engine brands with the ability to easily handle other engine brands
- ▶ Readout of engine diagnostics in clear text
- ▶ Remote control via high speed TCP/IP, RS-485 Modbus or GSM modem
- ▶ High speed USB connection
- ▶ Multi-language interface
- ▶ -40°C operation temperature
- ▶ IP66 protection
- ▶ Lifetime logging stored on SD card

## AGC 200 type approvals



# Automatic Sustainable Controller, ASC-4

## A new link between PV & genset power plants



Serving as a link between photovoltaic (PV) power plants and genset power plants, DEIF's Automatic Sustainable Controller (ASC-4) is a safe and reliable control solution for PV/genset hybrid plants.

### Stand-alone and Power Management applications

In stand-alone applications, the ASC-4 knows little about the surrounding environment in which it is placed. Based on transducer power readings and hardwired feedbacks alone, the ASC-4 determines the PV plant power references. This approach is applicable for integrating PV power in already commissioned genset plants with or without DEIF controllers. Stand-alone applications support applications containing up to six gensets.

The DEIF Power Management system fully integrates the PV plant and the genset plant into a unity. The ASC-4 is connected to the CAN bus constituting the internal DEIF Power Management communication link. This requires your genset plant to be equipped with AGC controllers from DEIF.

### Maximising PV penetration

The ASC-4 Plant Management automatically maximises PV penetration in all operation modes according to the total genset/PV hybrid's load demand without compromising constraints such as minimum genset load demand.

### Minimum genset load in island operation

Minimum genset load constraint applies to island operation only. It causes the PV penetration to decrease if compromised. This secures a certain amount of load on the gensets, eliminating the risk of reverse power situations and impure combustion and exhaust problems.

### Spinning reserve

Defined as a percentage of the PV plant power production, the spinning reserve ensures sufficient genset plant reserves to compensate for potential PV production decreases. Available for power management applications only.

### ASC-4 features

- ▶ Maximising PV penetration
- ▶ Spinning reserve demand
- ▶ Minimum genset load requirement
- ▶ Suitable for self-consumption and IPP applications
- ▶ Support of SunSpec and other relevant protocols
- ▶ Monitoring and supervision
- ▶ Meteorological measurements
- ▶ Fully integratable in AGC Power Management applications
- ▶ Simple graphical configuration
- ▶ Record time commissioning with DEIF Emulation – uses and verifies the functions of the real system for test, production and design

# Automatic Sustainable Controller, ASC-4 Solar

Ideally suited for hybrid power plants



Designed specifically to serve as a reliable, fully integrated and optimising link between sustainable power plants and genset power plants, DEIF's automatic sustainable controller, ASC-4 Solar, is a renowned, market-leading solution for the industry.

## Maximising sustainable power penetration

The ASC-4 Solar will in any operation mode automatically maximise sustainable power penetration, depending on the total load demand to the hybrid without compromising constraints such as minimum genset load demand.

## Minimum genset load in island operation

Minimum genset load constraint is available in the ASC-4 Solar. The constraint applies in island operation only. This constraint will cause the sustainable power penetration to decrease in case it is compromised. This is to secure a certain amount of load on the gensets, eliminating the risk of reverse power situations and impure combustion and exhaust problems.

## Spinning reserve

The ASC-4 Solar offers spinning reserve support as a percentage of the produced power, as part of an existing superior system (for instance an existing PLC system) or by means of short-term cloud detection functionality, depending on your application and requirements.

## Ideal for self-consumption applications

While in grid parallel mode, the ASC-4 Solar is capable of feeding surplus PV energy to the grid and generate profit in accordance with grid operator feed-in tariffs. Alternatively, the ASC-4 Solar can regulate the PV production to match the self-consumption, thereby preventing any feed-in of PV power to the grid if prohibited by grid operator regulations.

## Power management applications

DEIF's Power Management system fully integrates the sustainable power plant and the genset plant into a unity. The ASC-4 is connected to the CAN bus constituting the internal DEIF Power Management communication link. For that reason, this approach is only applicable for plants equipped with AGC-4 or AGC 200 controllers.

## ASC-4 Solar features

- ▶ Maximising PV penetration
- ▶ Spinning reserve demand
- ▶ Minimum genset load requirement
- ▶ Suitable for self-consumption and IPP applications
- ▶ Support of SunSpec and other relevant protocols
- ▶ Monitoring and supervision
- ▶ Meteorological measurements
- ▶ Simple graphical configuration
- ▶ Record time commissioning with DEIF Emulation – uses and verifies the functions of the real system for test, production and design
- ▶ Suitable for power management solutions fitted with AGC-4 or AGC 200 genset controllers
- ▶ Suitable for stand-alone solutions using multi-instruments such as DEIF's MIB or MIC

## Stand-alone applications

In stand-alone applications, the ASC-4 knows little about the surrounding environment in which it is placed. Based on power readings and breaker positions, the ASC-4 Solar determines the power references to the sustainable power plant. This approach is applicable for integrating sustainable power in already commissioned genset plants, whether they are equipped with DEIF controllers or not. Stand-alone applications support up to 16 gensets. The ASC-4 Solar for stand-alone applications also comes in a cost-effective version without the powerful M4 power management module.

## Plug'n'play HMI touch screen

For improved user-friendliness, we've even created a plug and play touch screen display for hybrid projects. It'll present all relevant data to you in real time, for instance power metre and inverter readings, PV penetration/performance ratio and much, much more.

Designed specifically to serve as a reliable, fully integrated and optimising link between sustainable power plants (fitted with for instance PV solar inverters and battery inverters) and diesel genset power plants, DEIF's automatic sustainable controller, ASC-4, is a new, market-leading solution for the industry.

# Touch Display Unit, TDU 107

## Preprogrammed touch screen solution for connection to DEIF's AGC-4 controllers



TDU 107 is a preprogrammed touch screen solution for connection to DEIF's AGC-4 controllers.

The displays provide user-friendly touch screen control, visualisation and graphical overviews with a quality display that is easily readable even at sharp angles.

Combines both a HMI display and 6 AOP (Additional Operator Panel) on one device. Easy to use icon driven HMI providing fast access and configurable instrument pages.

Provides Tier 4 final engines support.

The TDU 107 is available in two versions:

- **TDU 107 Core**
- **TDU 107 Extended**

### TDU 107

- ▶ Preprogrammed out of the box
- ▶ Tier 4 support
- ▶ Visual plant overview on screen
- ▶ Visual capability curve
- ▶ Merge alarms and event logs into one log
- ▶ Built in AOP ( Additional Operator Panels)

Features	Core	Extended
Tier 4 support	•	•
Resistive touch screen	•	
Capacitive touch screen		•
VNC support (remove access)		•
0°C to +50°C	•	
-20°C to +60°C		•
2 ports Ethernet switch		•



# Advanced Graphical Interface, AGI 400

## Touch screen monitoring & control of your system



### AGI features

- ▶ State-of-the-art HMI
- ▶ Unique design tool
- ▶ Control and monitor your system
- ▶ Data-logging and alarm handling
- ▶ Designed for harsh environments

The AGI 400 has been designed as an intuitive and user-friendly HMI for visualisation and active control for multiple applications and is available in 7", 10", 15" and 21" sizes with a quality screen readable even in direct sunlight and at sharp angles, making it a safe and ideal choice for bridge installations.

Featuring touch screen system control and monitoring functionalities which eliminate the need for other instruments and save you both space and wiring, the AGI 300 connects both to all DEIF Multi-line controllers and other brand controllers via standard communication protocols.

Data-sharing ability via Ethernet connections effectively enable the DEIF HMI to be used as a small SCADA system. Built-in Ethernet port switch functionality lets you connect the panels to small control systems without incurring extra costs for external switches. Connect to multiple serial devices with the multi-standard serial port or use the USB host to provide access for external storage devices.

### Application examples

- ▶ Power Management Systems – Control and Supervision: one point management, control and supervision of multiple gensets and bus tie breakers.
- ▶ Alarm – Handling and Monitoring: view historical alarm data and accept active alarms.
- ▶ Energy Monitoring System (EMS): track your energy consumption to optimise and implement the energy awareness on board your vessel.
- ▶ Graphical Interface – Mechanical and Electrical Systems: system overviews for mechanical and electrical equipment. Trend measured values to monitor operation performance or when carrying out fault-finding procedures.

# Digital Voltage Controller, DVC 310

Improve your genset performance



Designed for alternators with SHUNT, AREP or PMG excitation, DEIF's Digital Voltage Controller, DVC 310, is a digital automatic voltage regulator, which monitors and regulates the alternator output voltage. The controller can improve genset performance, delivering up to a 10 % increase of load impact capability and is suitable for any application in the critical power, IPP and rental segments. Critical power applications in particular will benefit from the improved control on the Close Before Excitation sequence, increasing safety & allowing faster start-up.

## No generator oversizing required

Due to high inrush currents during start-up, generators for electric motor starting and transformer magnetisation are often oversized by up to 200%. Featuring inductive motor starting and magnetisation boosting, DEIF's DVC 310 reduces oversizing requirements to a minimum.

## Increased performance

Compared to analog AVR's, DEIF's Digital AVR handles larger load-steps within the same frequency/voltage boundaries. Typically, the gensets will accept 10% additional nominal load. With the embedded help features, this increases performance.

## Protect your generator from humidity

Condensation build-up during idle time is a common problem in tropical climates. With its dedicated ventilation mode, the DVC 310 removes humidity in windings using the alternator fan and only allows for power generation when it is safe to do so.

## Genset control solution

The DVC 310's built-in J1939 based communication offers an exclusive communication channel to DEIF's advanced controllers. Providing a high number of alternator data for display, broadcast or predictive maintenance, this feature is unique on the market. Using CAN bus-based communication for voltage regulation reduces the potential number of failure sources. Use the DVC 310 together with our, AGC-4, AGC 200 or GPC-3 controllers to maximize your benefits.

## DVC 310 features

- ▶ Start management capability with start on threshold, soft start, and Close Before Excitation (CBE) functions
- ▶ Voltage regulation accuracy +/-0.25 %
- ▶ Optimise genset performance and size using exclusive engine help functions (load acceptance module, negative forcing, U/f, soft voltage recovery and stator current limitation)
- ▶ Exclusive drying and ventilation mode
- ▶ Voltage regulation via CAN bus
- ▶ Increase accuracy of settings
- ▶ Consistent control of regulation loops

# CAN bus-based I/O Modules

## Additional digital inputs or relay outputs for your genset controller



The CIO series is an external I/O module for DEIF's Multi-line series for those requiring a number of digital inputs or relay outputs exceeding the capacity of a range of DEIF genset controllers.

The CIO module requires a host controller to send and receive information.

Currently, the CIO series is compatible with DEIF's AGC Plant Management and AGC 200 controllers.

More controllers will be added over time – please refer to [www.deif.com](http://www.deif.com) for an updated list.

### CIO features

- ▶ CAN bus interface
- ▶ LED indication of status and input state
- ▶ 12/24 V DC supply

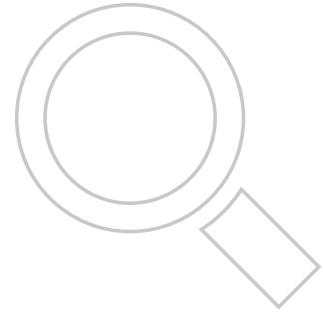
### Variants

### Features

CIO 116	16 digital inputs Positive or negative common for 2x8 inputs
CIO 208	8 relay outputs 240 V AC or 30 V DC relay contacts 8 A relay rating
CIO 308	8 multi-functional inputs Wire break detection

## FIND NEW OPPORTUNITIES

DEIF's business ethic is based on knowledge sharing and informed by environmental awareness. Working with global experience of customer needs across the full range of power management applications, collaborating with DEIF you will find new opportunities.



## WIN SUPERIOR CONTROL

20 % of DEIF's employees work in R&D. Their focus is innovation and progress for the industry as a whole, and in creating customised solutions with end-to-end system integrity. With DEIF, you win superior control thanks to our experience and expertise across multiple industries.



## SECURE MAXIMUM UPTIME

Our tried-and-tested equipment, advanced automation technology, training programmes, and 24/7 support will boost your business goals by providing steady, maximum uptime.

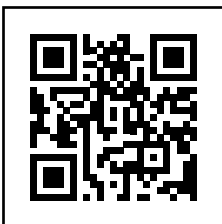


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# MORE INFO

Visit our website or social media platforms for more

DEIF.COM

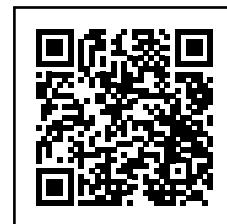


FACEBOOK



/deifgroup

LINKEDIN



/deifgroup



# SERVICE

## Electronic Components do not last forever

It is crucial to DEIF that data centre owners and their contractors remain confident and satisfied with DEIF systems. Although electronic components contain no mechanically rotating or moving parts, they do wear out over time, and thus require regular service.

Based on more than eight decades of experience in developing, manufacturing, testing and commissioning reliable and flexible engine and genset control solutions for both new and aging systems, DEIF knows how to avoid unplanned downtime. And also what it takes to keep the systems in prime condition, securing an operational and competitive fleet at all times, including when the warranty has expired.

# TRAINING

## Choose DEIF training to increase performance & efficiency

With the rapid advances in generator control and the increasingly sophisticated communication between engines themselves, it has become more necessary than ever for operators and service personnel to receive hands-on training.

Without the correct training, you run the risk of not fully utilising the features offered in your generator controllers. So, DEIF offers three different training levels globally – from basic operator level to advanced designer level.

More at [deif.com](http://deif.com)

# Contact information

## DEIF offices

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### Brazil

#### **DEIF do Brasil Comercio de Controles e Equipamentos Ltda.**



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