Product sheet

AGC 150 Hybrid controller

DEIF

General description

The AGC 150 Hybrid is a variant of the well-known and easy-to-use controller, AGC 150. All technical information on this variant is found in the AGC 150 documentation on deif.com.

The AGC 150 Hybrid comes with all the necessary functions for protection and control of a hybrid installation with PV and genset. It can be used as a single unit for PV and up to 2 gensets for synchronising projects, in island or parallel to the mains modes.

The AGC 150 Hybrid handles the power production from PV and genset to give the highest PV penetration and the lowest CO_2 emission, and to ensure safe power production to support the load.

The AGC 150 Hybrid can be used as:

- Hybrid controller mounted directly on the genset with full control of PV, genset and mains
- PV integration controller with power measurement and breaker feedback from existing controller.

The AGC 150 contains all necessary 3-phase measuring circuits. All values and alarms are presented on the sun proof LCD display.

Applications

The AGC 150 is a compact all-in-one unit designed for the following hybrid PV and genset applications:

Plant mode	Application
Island mode	Plant with PV inverters and synchronizing generators or a stand-alone generator.
Automatic Mains Failure	Plant with PV inverters, genset(s) and mains. Black start generator
Fixed power	Plant with fixed kW set point for PV inverters.
Peak shaving	Plant with PV inverters, where a generator supplies peak load demand paralleled to the mains.
Load take-over	Plant with PV inverters, where the rest load is moved from mains to generator.
Mains power export	Plant with fixed kW set points for PV inverters and mains.

Main hybrid features

Minimum genset load
- Eliminate the risk of reverse power caused by low load

Perfect for Rooftop installations
- Rebuild your genset with AGC 150 benefits and get PV for free

Load calculation in terms of solar power

Automatic genset start/stop
- Based on threshold set points for PV production and mains import/export

PV included in modes
- MPE (Mains power export/import), AMF (Automatic mains failure), LTO (Load take-over), Fixed power, and Peak shaving

PV inverter communication support
- Support of morePV inverter communication protocols, including Sunspec

Mains voltage and current measurement
- One CT/Phase for balanced load

PV Power emulation
- Try and test the Hybrid functions without a PV plant

Other PV features:
- Energy Counters, Curtailment
- Inverter monitoring
- POA and BOM for calculating P max
- Weather data presentation

Other features

Easy and user-friendly interface
- Adaptive mimic with easy switching between applications
- Only buttons relevant for a function are visible to the user

New design - Easy to mount
- Compact design making it suitable for all applications

Three user levels
- With configurable passwords for each parameter, only relevant parameters are shown

Shortcut menu
- Easy access to frequently used functions (configurable)

PLC functions
- Programmable and user-friendly functions (M-Logic)

Alarm and Event logging
- Up to 500 alarms and 500 events

Graphical Display
- Important information is shown on the easy-to-read display

Built-in analogue AVR and GOV control
- Eliminates the need for external equipment (voltage and PWM)

CIO support
- Support of CANbus based I/Os, increases the number of I/Os

Stage V and Tier 4 Final
- AGC 150 can be used with the latest electrical Tier 4 Final engines and show values requested by Stage V.

Key functions and features

- PV power control
- PV active/reactive power counters
- Inverter monitoring
- Weather station support
- Engine start sequences
- Engine and generator protections
- Engine communication via CANbus
- Run coil and crank configurable when using electric engine
- Tier 4 Final support with clear alarm indications
- Diesel and gas genset support
- 3-phase generator and busbar sensoring
- Phase compensation for D/Y transformer
- Four current sensing inputs
- Integrated governor and AVR outputs for control
- State-of-the-art synchronisation and load sharing
- Synchroscope and sync check
- Digital voltage regulation support for different DVR
- Voltage and frequency matching
- Three synchronisation methods: Dynamic, Static and Close before excitation
- 12 digital outputs (configurable)
- 12 digital inputs (configurable)
- Two analogue outputs (-10 to 10 V)
- Four multi-inputs:
  - Resistor, 0 to 4000 Ω
  - Voltage, 0 to 10 V
  - Current, 4 to 20 mA
  - Digital input
- Deadbus sensoring
- Ground relay
- Mains support for stand-alone system (AMF)
- Analogue load sharing with external box
- ROCOF and Vector jump protection
- Fuel usage monitoring
- Maintenance alarms
- Grid support
- Ethernet interface as standard
- PV inverter communication (Modbus Master) on RS-485 port 2

Digital AVR support

Together with DEIF's DVC 310 or DVC 550 digital voltage controllers, the AGC 150 supports features such as Engine AID (for the rental market) and fast and secure CBE critical power start-up (run-up syncing).

Easy overview

- Remote monitoring support with Insight
- Weekly scheduler
- Emulation for testing and frontload commissioning
- Built-in *Guided experience* to help the user
- PV and engine alarms in clear text on the display
- Graphical display:
  - LCD, back-lit
  - High resolution, 240 x 120 pixels
  - Six lines
  - Operating temperature from -40 to +70 °C (-40 to +158 °F)
- Five-key navigation menu
- Event log with 500 entries (can be exported to a CSV file)
- Alarm log with 500 entries (can be exported to a CSV file)

Highly configurable

- Controller configuration from the front panel (PIN code protected) or with free PC tool via USB, Ethernet & RS485
- PC tool with trending and wizards helping the user with configuration
- 20 configurable display views
- Four fully configurable PID controllers
- CAN flags between controllers
- CANbus based extension module for Inputs/Outputs
- Real time clock
- User configurable logic (lite PLC)
- Ethernet communication for PLC, SCADA or BMS
- Multi-language support (incl. Chinese, Russian and other languages)

Four software packages

The AGC 150 can be equipped with four different software packages:

- **Stand-alone:** Non-sync application
- **Core:** Simple paralleling, like rental and contructions
- **Extended:** Standby power, like simple backup power stations
- **Premium:** Small CHP or similar medium complex sites

Note: The Hybrid functions are only supported by **Stand-alone**, **Core** and **Extended** software packages.

See the data sheet for a more detailed description of each package.
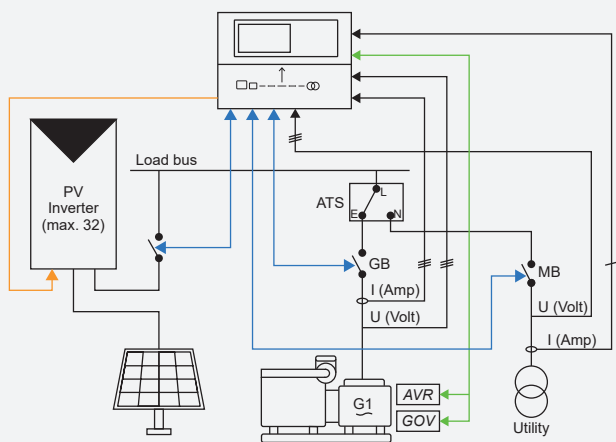
Typical wiring
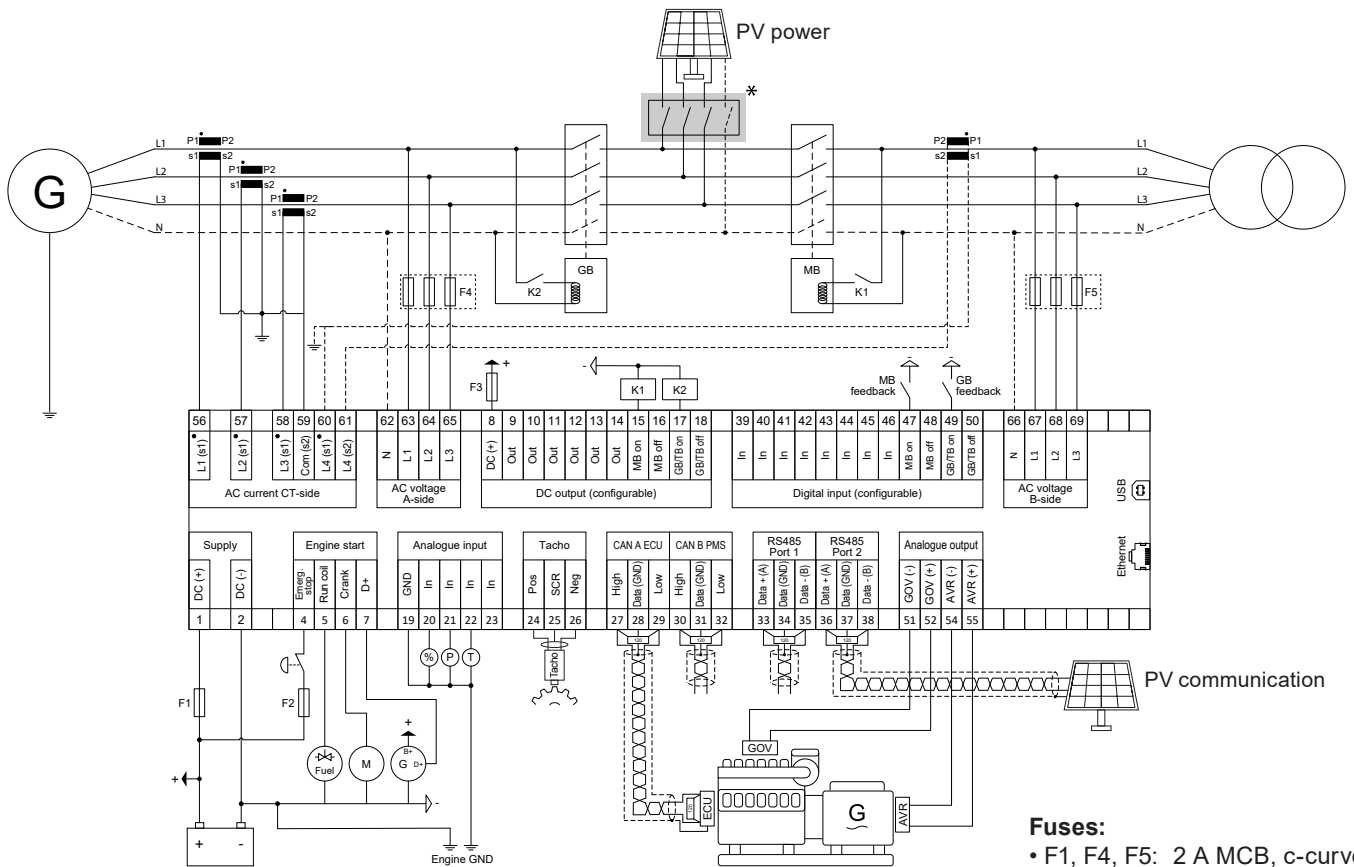
Optional PV breaker

Fuses:
- F1, F4, F5: 2 A MCB, c-curve
- F2: 6 A MCB, c-curve
- F3: 4 A MCB, b-curve

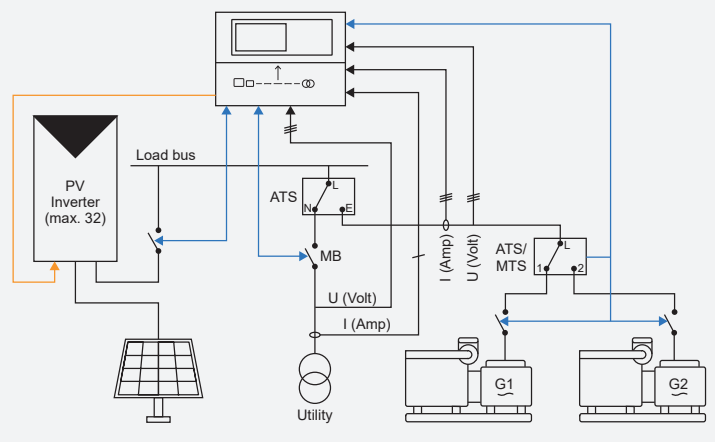## Application examples

Application with PV inverters and a single generator

— Breaker feedback and control   — Inverter control   — J1939 Engine control

Full hybrid controller functions

Application with PV inverters and non-synchronising gensets

— Breaker feedback and control   — Inverter control

Full hybrid controller functions

Designed and made in Denmark.

AGC 150 Hybrid

Technical specifications

Power supply

- Nominal voltage: 12/24 V DC
- Operating range: 6.5 to 35 V DC
- Load dump protection (ISO16750-2)
- Measuring range: 0 to 50 V DC (35 V DC continuously)

Operating conditions

- Operating temperature: -40 to +70 °C (-40 to +158 °F)
- Storage temperature: -40 to +85 °C (-40 to +185 °F)

Environment

- Altitude: 0 to 4000 m
- Humidity: 20/55 °C at 95 % RH
- Protection degree: IP65 in panel, IP20 on terminals
- Pollution degree 2
- Self-extinguishing plastic

Measuring

- Voltage range: 100 to 690 V, phase-to-phase
- Max. measured voltage: 10 to 135 % of nominal
- Voltage accuracy: ±1 % of nominal
- Current range: 1 A and 5 A, 2 to 300 %
- Max. measured current: 3/15 A overload
- Current accuracy: ±1 % of nominal
- Frequency range: 3.5 to 75 Hz
- Power accuracy: ±1 % of nominal

Inputs/Outputs

- Digital inputs: 12 (max. +50 V, min. -24 V)
- Digital outputs: 2 (15 A inrush / 3 A continuously)
                  10 (2 A inrush / 0.5 A continuously)
- Digital common: 12/24 V DC
- Analogue inputs: 4
- Analogue outputs: 2
- CANbus 1 and 2
- RS-485 1 and 2 (PV inverter communication on 2)
- RJ-45 Ethernet
- USB (service-port)

Approvals

- CE
- cULus recognized to UL6200:2019, 1. ed. controls for stationary engine gensets

Protections

2 x Reverse power	ANSI 32R
2 x Short circuit	ANSI 50P
4 x Over-current	ANSI 51
1 x Voltage-dependent over-current	ANSI 51V
2 x Over-voltage	ANSI 59P
3 x Under-voltage	ANSI 27P
3 x Over-frequency	ANSI 81O
3 x Under-frequency	ANSI 81U
1 x Unbalanced voltage	ANSI 47
1 x Unbalanced current	ANSI 46
1 x Under-excitation or var import	ANSI 32RV
1 x Over-excitation or var import	ANSI 32FV
5 x Overload	ANSI 32F
1 x Earth current	ANSI 51G
1 x Neutral current	ANSI 51N
3 x Busbar/mains over-voltage	ANSI 59P
4 x Busbar/mains under-voltage	ANSI 27P
3 x Busbar/mains over-frequency	ANSI 81O
3 x Busbar/mains under-frequency	ANSI 81U
1 x Emergency stop	ANSI 1
2 x Overspeed	ANSI 12
1 x Low auxiliary supply	ANSI 27DC
1 x High auxiliary supply	ANSI 59DC
1 x Generator breaker external trip	ANSI 5
1 x Tie/mains breaker external trip	ANSI 5
Synchronisation failure alarms	ANSI 25
Breaker open failure	ANSI 52BF
Breaker close failure	ANSI 52BF
Breaker position failure	ANSI 52BF
1 x Close before excitation failure	ANSI 48
1 x Phase sequence error	ANSI 47
1 x De-load error	ANSI 34
1 x Crank failure	ANSI 48
1 x Running feedback error	ANSI 34
1 x MPU wire break	
1 x Start failure	ANSI 48
1 x Hz/V failure	ANSI 53
1 x Stop failure	ANSI 48
1 x Stop coil, wire break alarm	ANSI 5
1 x Engine heater	ANSI 26
2 x Max. ventilation/radiator fan	
1 x Not in Auto	ANSI 34
1 x Fuel fill check	
1 x Vector jump	ANSI 78
1 x df/dt (ROCOF)	ANSI 81R
2 x Under-voltage and reactive power, U and Q	
1 x Positive sequence (mains) voltage low	ANSI 27
2 x Directional over-current	ANSI 67
1 x Negative sequence voltage high	ANSI 47
1 x Negative sequence current high	ANSI 46
1 x Zero sequence voltage high	ANSI 59G
1 x Zero sequence current high	ANSI 50G
1 x Power-dependent reactive power	ANSI 40
1 x IEC/IEEE inverse time over-current	ANSI 51