SGC

Turbine Start & Generator Controller

Features

- Smart digital generator control unit (GCU)
- Better control over starter-generator, bus and batteries
- Supports many starter-generator types, makes & models
- Accommodates all battery types – lead-acid, lithium, etc.
- Addresses lithium battery recharge current safety issue
- Allows phased voltage regulation – bulk, absorb & float
- Models with engine start assistance & boosting available
- Built-in primary & backup protection for failsafe operation
- Fully solid-state GCU – no internal relays or moving parts
- Permits supervisory monitoring & control via CAN bus
- Hookup to PC for maintenance support & troubleshoot
- Common pin-assignment and form factor for all models
- Compact size for easy fitment within MCU boxes

New Design

We designed the SGC from the ground up to be both digital and solid-state. A digital microprocessor enables advanced functionality but also multiple configurable settings for tailoring it to almost any application, including for the support of different starter-generator types, makes and models. Digital also facilitates good communication of valuable information to and from the SGC.

Whereas most GCUs use at least one internal relay, typically one to stimulate generator voltage build-up, the SGC do not use any such or similar moving part. Its design reduces, if not removes, the risk of these less reliable parts failing and causing an over-voltage or loss of operation.

Power Generation

The primary function of the SGC is to control the generator to power the aircraft's electrical bus and all loads on that bus, including the temporary load to recharge onboard batteries. The SGC can provide power generation geared for better battery recharging. Whereas other GCUs crudely force a constant voltage onto the bus and battery, the SGC has phased voltage regulation that introduces a steady battery charging current phase (bulk) and two set voltage phases (absorb & float). Specifically, the ability to set a fixed charging current allows lithium battery use with peace of mind but also improved longevity for all types of batteries.

Lithium Battery Use

Lithium batteries have many advantages for use on aircraft. They start engines better, are lightweight, last longer and do not self-discharge as fast. However, their main drawback when fitted to turbine-engine aircraft is their max charging current limitation, which constitutes a safety issue. The SGC, as described, addresses this concern directly and efficiently.

Engine Start Functionality

Unlike most GCUs that only provide generator control, the SGC goes beyond to also offer start control functionality. During starter activation, it will provide shunt field weakening to shunt-only or series-shunt starter-generators.

Specific SGC models also offer engine start assistance, such as automatic starter cutout at speed, parallel-series battery starter boosting, and automatic start ignition management dependent on either “start” or “motor” cycle selection.

System Insight

The SGC allows you insight into the heart of your aircraft's electrical system. By hooking up a laptop or tablet PC, you can view real time system parameters, perform diagnostic tests, make recordings, configure settings, and if needed, update the SGC's firmware.

This capability allows you to understand and troubleshoot the system on your own, or in collaboration with others. Should you need outside assistance, you can simply send an email with the relevant recording files attached.

Model Functionality

FUNCTIONALITY	SGC-1	SGC-2	SGC-3	SGC-4
Generator Control	X	X	X	X
Battery Recharge Control	X	X	X	X
Starter Shunt Field Weakening	X	X		X
Auto-Start Starter Control		X	X	X
Auto-Start Ignition Control				X
Parallel-Series Battery Control			X	
Tach-Generator Speed Sensing		X	X	X

General Specifications

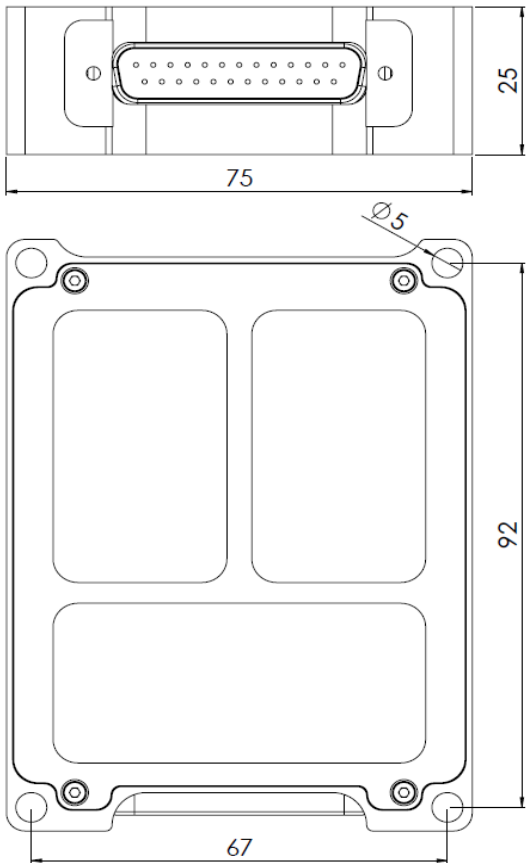
Field Switching Frequency	1000 ± 50 Hz
Generator Set Voltage Range (absorb & float)	27.0 – 29.0 V
Generator Set Recharge Current Range (bulk)	20 – 500 A
Backup Over-voltage Trip Point (steady state)	32.5 ± 0.5 V
Backup Over-voltage Trip Time (step 28 – 36 V)	0.03 – 0.05 sec
Operating Temperature Range	-40 to +85 °C
Max. Operating Altitude	55,000 feet
Dimensions	100 x 75 x 25mm
Weight	180 g (0.4 lb)

Pin-Assignment

PIN	FUNCTION	DESCRIPTION
1	BUS-PWR	BUS POWER INPUT (BUS SENSE)
2***	IGN-OUT	IGNITION OUTPUT
3**	BAT2-C	SECOND BATTERY CONTACTOR
4**	PAR2-C	PARALLEL SWITCHING CONTACTOR
5	SHUNT-	REMOTE CURRENT SENSE SHUNT NEGATIVE INPUT
6	SHUNT+	REMOTE CURRENT SENSE SHUNT POSITIVE INPUT
7	START-PWR	START POWER INPUT
8**	SER2-C	SERIES SWITCHING CONTACTOR
9*	START-C	STARTER CONTACTOR
10	GEN-C	GENERATOR CONTACTOR
11	D-SENSE	D SENSE INPUT (WIRED TO TERMINAL D ON S/G)
12	FIELD	FIELD OUTPUT (WIRED TO TERMINAL A ON S/G)
13	GEN-PWR	GENERATOR CONTROL POWER INPUT
14	SIG-GND	SIGNAL GROUND
15	TRIG	TRIGGER INPUT
16***	MOTOR	MOTORING INITIATION INPUT
17*	TACH	SPEED INPUT (WIRED TO TACH-GEN)
18	CAN-L	CAN BUS INTERFACE LOW
19	CAN-H	CAN BUS INTERFACE HIGH
20	RX232	RS232 INTERFACE INPUT
21	TX232	RS232 INTERFACE OUTPUT
22	START-LT	START LIGHT INDICATOR
23	GEN-LT	GEN FAIL LIGHT INDICATOR
24	POR	POINT OF REGULATION (GEN SENSE)

* used by SGC-2, SGC-3 and SGC-4
** used by SGC-3
*** used by SGC-4

Connector & Mounting



1. The SGC uses a 25-pin DSUB (M24308 series) male connector. The recommended mating receptacle (female) for it is the M24308/2-3
2. The unit is secured through four 5mm holes on each corner accepting AN3 bolts