

Standard Operating Procedure

SOP201

Title: Use and maintenance of LPG GCE12000H 12 kW (15kVA) Honda GX690 Generator in the event of a power outage.

Location: CBE labs and gas pod 1

1. PURPOSE

To provide instruction on how to safely use this dual fuel generator in the event of a planned or unplanned power outage to maintain power to cold storage units.

2. SCOPE

To provide instruction on how to safely use this generator in the event of a power outage with either propane (first fuel of choice) or petrol. This SOP will also cover use of the electrical connectors for supplying power to the cold units.

3. RESPONSIBILITIES

CBE Laboratory Users

More senior members of the lab users group will be trained in using the generator.

1. Shall received appropriate training in the safe use of the generator.
2. Follow the procedure in the SOP.
3. Report any malfunction or non-conformance regarding the generator and associated equipment.

Responsible Person (RP)/Laboratory Manager (LM)

1. Shall ensure that anyone who will use the generator is trained in the safety procedures that need to be followed.
2. Shall carry out the routine maintenance which includes running the generator every 2 months for 30mins to ensure it is functioning correctly. To organize maintenance and repairs as required by trained and authorized contract / service personnel.
3. Shall act accordingly on any malfunction or non-conformities reported.

4. EQUIPMENT AND MATERIALS

LPG GCE12000H 12 kW (15kVA) Honda GX690 Generator.
Propane cylinder.
Petrol (this is to be used in event of Propane running out).
Gazebo (to be used in case of rain to shelter generator).
Leads fed from generator 32A and 16A plugs.
Extension reels, varying lengths from 50 M down to 15M.
Power cord protectors.

Version 001

Effective Date: 17.11.2022

Review 17.11.2023

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5. PROCEDURE

The back up generator will be used in the event of a power outage. Periodically there are times when Facilities Management along with Western Power organize maintenance on the power supply when we would get prior notice of an outage. There have been occasions when there have been unannounced outages but so far, they have been short power outages but we do need to be prepared for longer duration power outages.

Power Outage

The power outage will be either planned or unplanned. If planned specific times will be in place so forward plan. If unplanned would become aware of outage out of hours when temperature monitoring system starts alerting, if during hours should be obvious as lights etc. will go off.

If the power outage happens and there are people in the laboratory they need to make their work safe and leave the lab.

There should be at least two people working on this and they should be knowledgeable enough about the lab layout and electrical safety to do the work.

In the event of a power outage the following steps should be followed: -

- The lab should not have any lab work going on, users leave work in a safe state.
- A team of at least two users (experienced) should lay out extension cables from -80 freezers, -20 freezers and fridges (these are hooked up if duration longer than 2 hrs). This is in the order of importance. It is important to note the current limit on the cable that is being used and not to exceed that limit. It will be either 32 Amps or 16 Amps on the strip plug fed from the generator (see fig. 1). There is a laminated list of currents taken by units in the box with strip plugs in. The maximum current that can be drawn from the generator is approximately 47 Amps. The generator has circuit breakers built in see fig.1. A circuit breaker is an automatic switch that cuts off the electrical current if certain conditions are reached. It is used to protect people and electrical devices. In contrast to fuses, which are single-use, a circuit breaker can be reset as long as the causes that triggered it have been resolved. The circuit breaker is reset by pressing the button, see fig. 1. The plug end of the cabling should be fed out the window to the area outside gas pod 3. There are cable protectors available for use. The cables, cable protectors, gazebo, extension leads are currently stored in the office in labelled boxes. Please note when using extension reels please unwind completely to avoid overheating.
- The generator is kept in gas pod 1 (chemical gas pod) and this needs to be wheeled outside the back door (see fig.2). The propane cylinder is in gas pod 3 and needs to be attached to the generator (see fig.3 for propane connection). The bullnose should be inserted into the connector and the locking nut tightened. At this point the tap on the top of the propane cylinder can be opened. In case it is raining there is a gazebo available to use to keep the generator dry, this can be set up just outside the backdoor. The generator should be started first before power sockets are plugged in as otherwise it will trip out. If the propane runs out we would need to get petrol. There is

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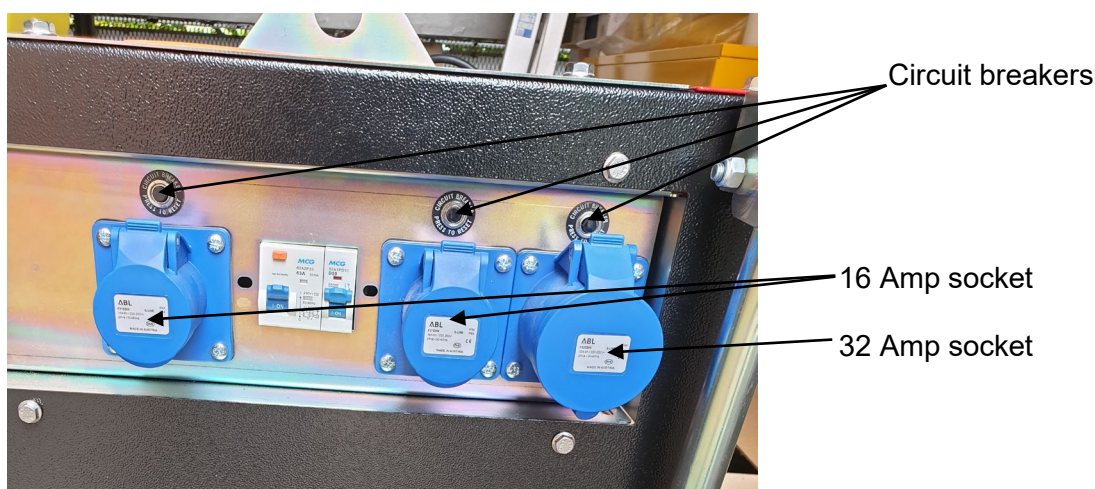
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a 20L petrol cannister which can be removed from the generator and filled as required. Use of petrol should be avoided if possible as propane is cleaner to use and doesn't require the draining of the generator after use. The generator should be allowed to cool down for 15mins before refilling with petrol.

- To switch between fuels. If the propane runs out – this will be obvious as the generator will cut out. Close the cylinder tap and unhook the hose, ensure that lab management is informed that the propane cylinder is now empty and to order a replacement. The petrol cannister should have petrol in and the hose inserted. Before starting up the engine make sure that the ignition is switched off first and then switched back on again. If you want to switch from petrol to propane remove the hose from the petrol tank and allow the engine cut out, this is important as this will remove any residual petrol from the lines. Then hook up the propane cylinder and restart the ignition. Important to note that if the generator runs on petrol and propane at the same time it will be noisy but should not damage the generator. There is a supplementary information sheet on running the generator on LPG fuel which is kept with the motor manual.
- Propane consumption is 3.9 kg/hr (propane cylinder capacity varies) and petrol consumption is 6.2 L/hr @75 % total output (petrol can is 20 L capacity). Petrol is not stored in the gas pod, if petrol is required the petrol cannister needs to be unhooked and filled at the petrol station (BP garage on Ashby Rd nr Snell's Nook Lane is open 24 hours, on the road to M1).
- The startup procedure for the generator. Ignition key is kept on one of the handles for moving the generator. There is also a spare key in the key cabinet in the lab, lab managers have access to this cupboard. The key should be placed in the ignition and turned to the start point (see fig.2 below). When doing this the choke should be pulled out, once the generator has started the choke needs pushing back in. The generator should be allowed to warm up for 3 mins. This is the point when the connectors can be plugged in. Please note that the generator is noisy, there are ear plugs available on the shelves in first change to protect your hearing.

Fig. 1



Version 001

Effective Date: 17.11.2022

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Fig. 2

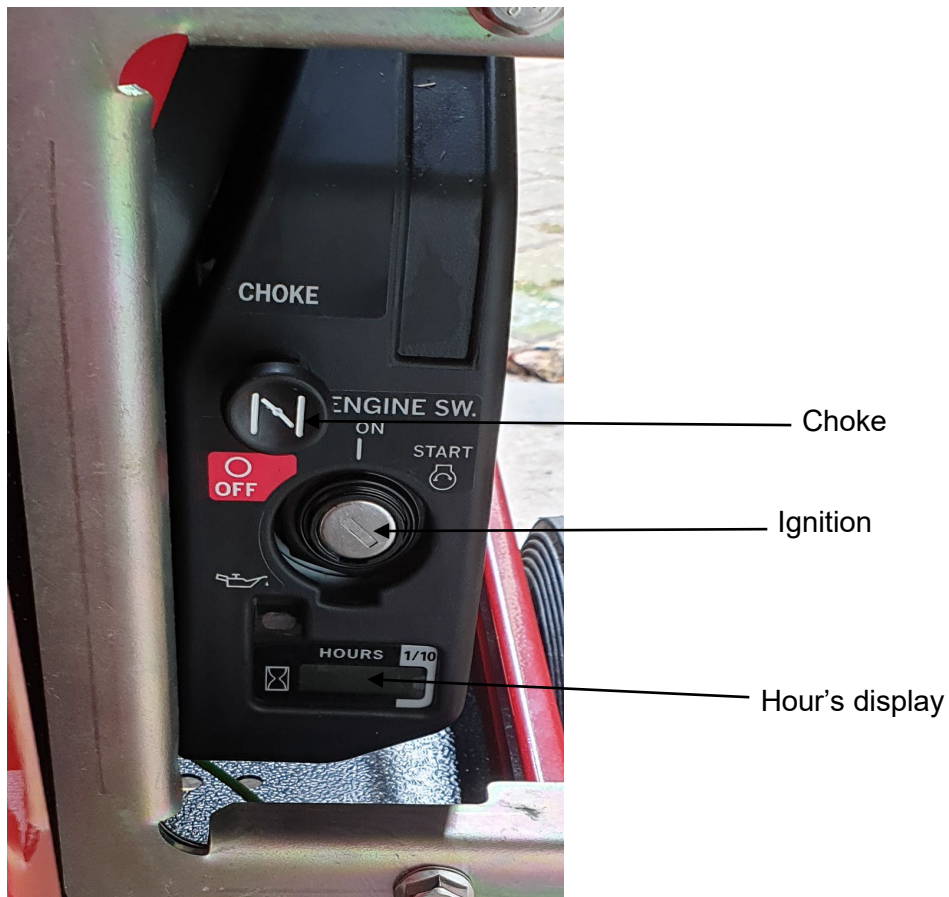


Fig. 3



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- Once the power has been restored the shutdown procedure can begin. Firstly in order of importance unplug the units and plug them back into the mains taking care to ensure that they are powered up and working. Then switch the generator off using the key and switch off the propane cylinder and detach from the generator. Unplug cabling and reel up and pack away. If the generator is running on petrol remove the petrol hose from the cannister while the generator is running and allow it to cut out and then proceed to pack away cabling etc. This will clear the generator of any residual petrol so the lines are clear. If the gazebo has been used pack this away, allowing it to dry first in the office area if necessary.

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Maintenance.

The table below has been taken from the engine manual and refers to pages in the manual. To see this manual please follow this link [GX690 - Owner's Manual | Honda \(hondapps.com\)](http://GX690 - Owner's Manual | Honda (hondapps.com))

REGULAR SERVICE PERIOD (3) Perform at every indicated month or operating hour interval, whichever comes first.		Each Use	First Month or 20 Hrs	Every 6 Months or 100 Hrs	Every Year or 300 Hrs	Every 2 Years or 500 Hrs	Refer to Page
ITEM							
Engine oil	Check level	o					8
	Change		o	o			8
Engine oil filter	Replace		Every 200 Hrs.				9
Air cleaner	Check	o					9
	Clean			o (1)			9
	Replace					o *	
Spark plug	Check-adjust			o			10
	Replace				o		
Spark arrester (applicable types)	Clean			o (4)			11
Idle speed	Check-adjust				o (2)		**
Valve clearance	Check-adjust				o (2)		**
Combustion chamber	Clean		After every 1000 Hrs. (2)				**
Fuel filter	Replace				o (2)		**
Fuel tube	Check		Every 2 years (Replace if necessary) (2)				**

* Replace the paper filter element only.
** Refer to the Shop Manual.

(1) Service more frequently when used in dusty areas.
(2) These items should be serviced by your servicing dealer, unless you have the proper tools and are mechanically proficient. Refer to the Honda shop manual for service procedures.
(3) For commercial use, log hours of operation to determine proper maintenance intervals.
(4) In Europe and other countries where the machinery directive 2006/42/EC is enforced, this cleaning should be done by your servicing dealer.

Failure to follow this maintenance schedule could result in non-warrantable failures.

6. DOCUMENTATION

Log sheet for use of generator.
List of cold storage units.
Maintenance log sheet for generator.

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7. REFERENCES

Manual for Honda GX690 engine.
Supplementary sheet for LPG converted generator (kept with hard copy of engine manual in office).
Both of the above can be found on the CBE Learn page under equipment manuals.

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List of Cold storage units.

Equipment	Location	Power (Watts)	Current (Amps)
Freezer	H09	230	1
Fridge	H09	310	1.35
Fridge/Freezer	H11	250	1.1
Chest Freezer	H14 - CTMF Storeroom	150	0.65
Freezer	H14 - CTMF Storeroom	140	0.6
LEC Freezer	H18 - Internal storeroom	138	0.6
lab cold Freezer	H18 - Internal storeroom	150	0.7
liebherr freezer	H18 - Internal storeroom	230	1
Fridge	H21	310	1.35
Lec Fridge	H23	150	0.65
Fridge	H23	100	0.43
Freezer	H23	90	0.4
Freezer	H25	290	1.3
Fridge	H25	90	0.4
Fridge /Freezer	H27	202	1.3
Fridge	H29	60	0.26
Freezer	H29	65	0.3
LEC freezer	H30	138	0.6
Bush Fridge/Freezer	H34	95	0.4
Liebherr freezer	H34	230	1
Liebherr freezer	H34	230	1
Liebherr freezer	H34	230	1
New Brunswick -80	H34	1150	5
Thermo Fisher Z-Drive	H34	920	4
Revco -80	H34	200	0.87
Totals		6148	27.26

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Maintenance log sheet for LPG DUEL FUEL GCE12000H 12kW (15kVA) Honda GX690 Generator.

Please refer to user manual for detailed information on how to perform generator maintenance. Lab management will lead the maintenance of the generator referring to more suitably experienced colleagues or service engineers as required.

Date maintenance performed	Hrs generator used (see log sheet)	List maintenance completed (please refer to the manual for engine and the maintenance table in SOP)

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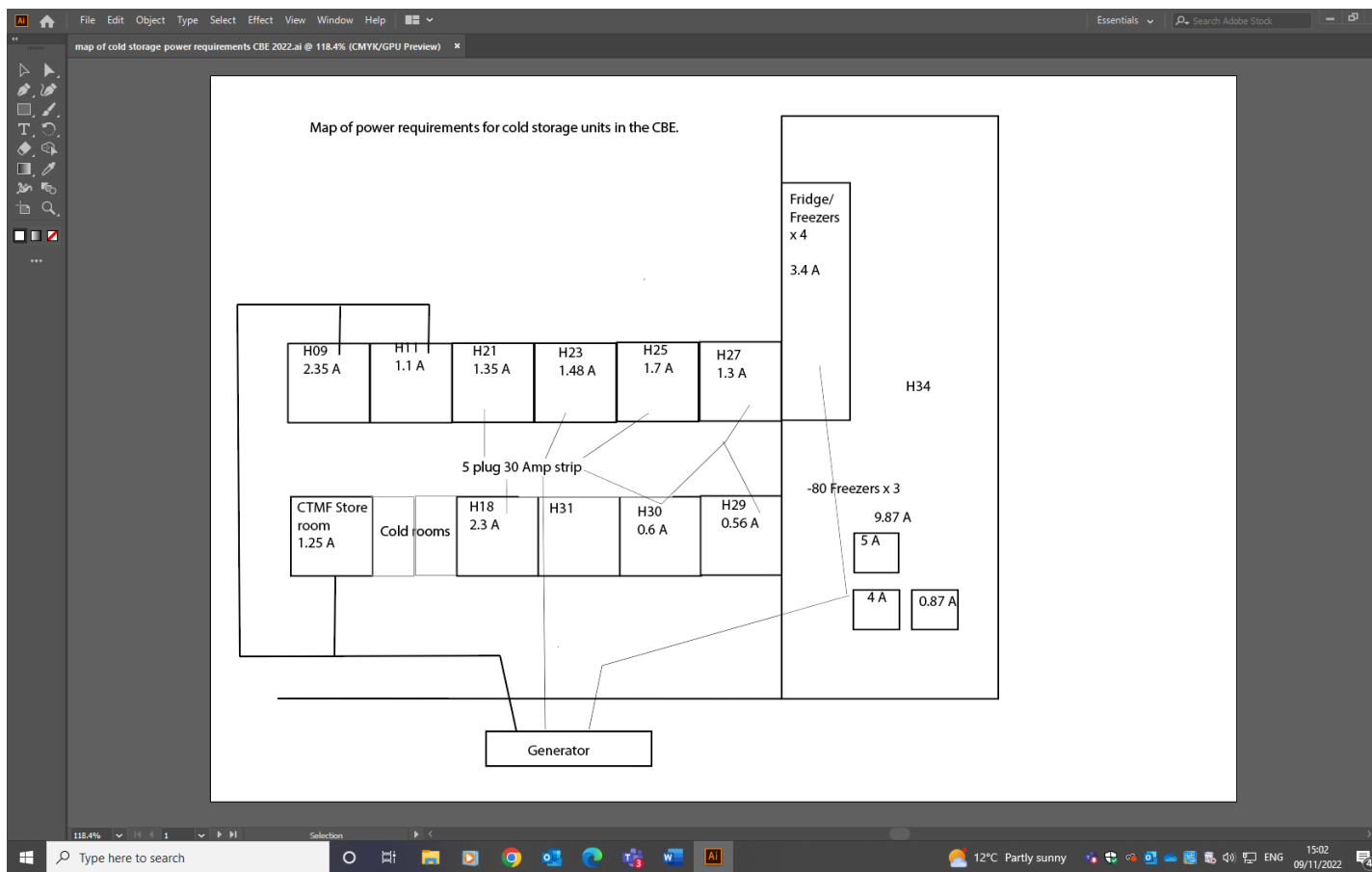
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Map of power requirements for cold storage units in the CBE.



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SOP Version History

Version Reviewed	Date Revised/ Reviewed	Revision Summary	New Version Number
		[Insert specific changes from previous SOP] < e.g. changes in accountabilities, process steps, deviation actions, or records >.	

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