

XQ1475 With AGC4 Controller

Quick Start Guide XQ1475 GAS IPP UNITS

ENGLISH-ORIGINAL TRANSLATION

SINGLE UNIT



Prior to running:

- Verify and match frequency and voltage requirements.

Running:

See 'Common Start/Stop Instructions' lower RH corner

Application Notes:

- In single unit mode, the unit will operate similar to a standard genset.

ISLAND MODE



Prior to running:

- Interconnect signal wiring (Plant CAN BUS) between units. Located at terminal strip on street side. If more than two units, the end unit require 120 Ohm resistor on the Plant CAN bus, all other CAN resistors shall be removed.

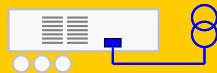
Running:

See 'Common Start/Stop Instructions' lower RH corner

Application Notes:

- In island mode, AGC4 (paralleling controller) performs real (kW) and reactive (kVar) load sharing with like units using Plant CAN network. AGC4 is backwards compatible with Woodward/GCP units for real power (kW) sharing.
- Reactive (kVar) load sharing should be disabled when paralleling with Woodward/GPC units. The factory default setting in the AGC4 is set to 'disabled'. Analog KW/KVar is available for use with SPM-D systems.

UTILITY PARALLEL



Prior to running:

- Verify AGC4 detects live buss before starting engine.

Running:

See 'Common Start/Stop Instructions' lower RH corner

Application Notes:

- Baseload level or AGC4 Fixed Power, ramp rate and pf control are controlled by set points in the AGC4.
- In utility parallel mode, AGC4 will perform sync-check to permit generator breaker closure and protects system from faults when in parallel.



EMCP 4.2 CONTROL

Common Start/Stop Instructions

In **RUN** mode, operator can run the engine at rated speed or idle but the breaker cannot be closed. Used for initial set-up or general maintenance only.

In **AUTO** mode, breaker is controlled via the AGC4. AGC4 automatically adjusts voltage and frequency.

Pressing **STOP**: 'Single Unit', 'Island' and 'Utility' modes; breaker will open immediately and engine goes into cooldown.

GENERAL NOTES:

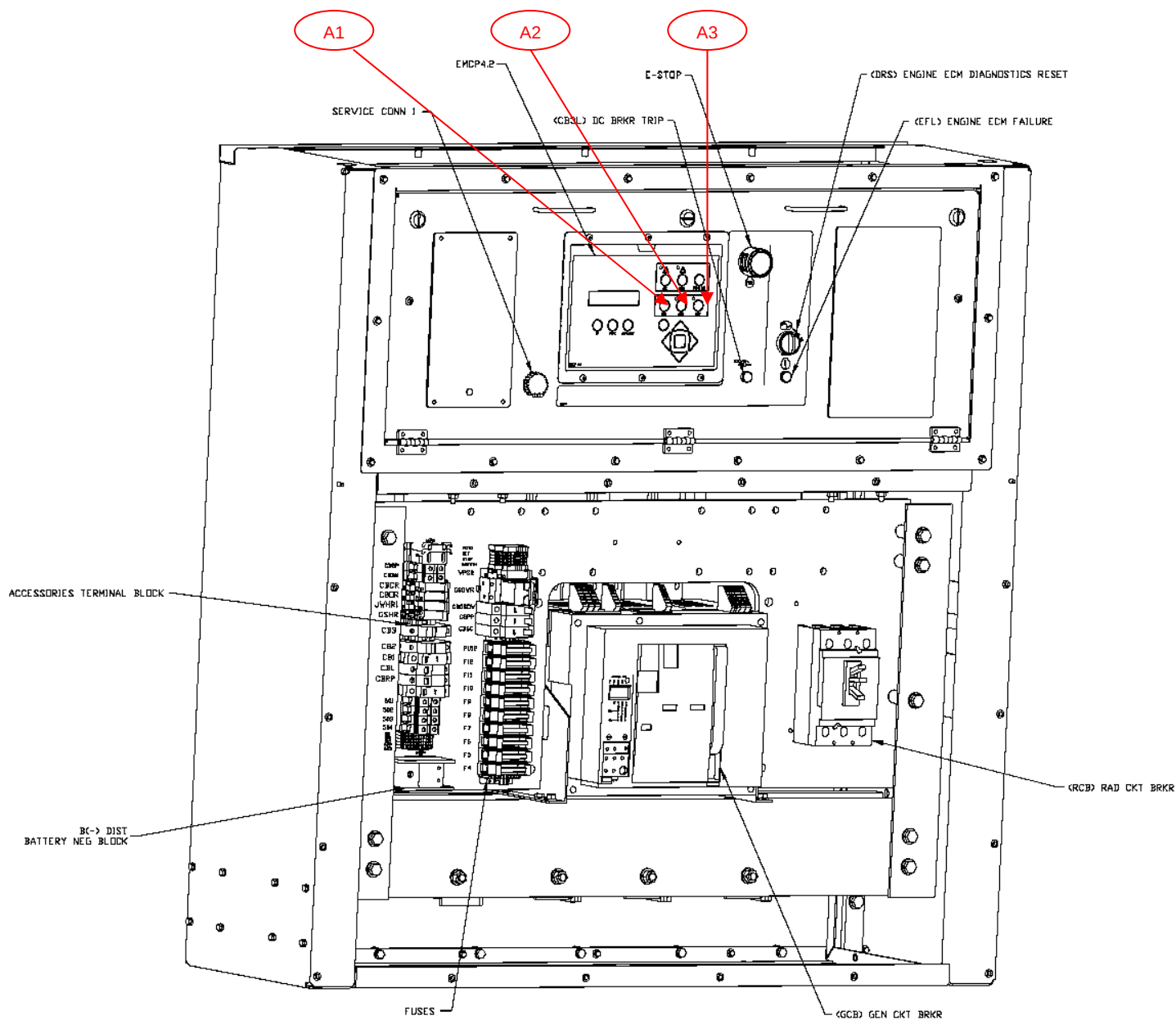
- Pressing EMCP 4.2 'STOP' button is not the recommended way of stopping the engine when running on any mode.

GENERATOR PARALLELING CONTROLLER (AGC4)



1. "ALARM" lamp – This LED is lit when any active alarms are present. LED flashes on new alarms.
2. "INFO" pushbutton – This button gives the user a more detailed description of alarms that are present.
3. "JUMP" pushbutton – This button allows the user to scroll to specific parameters with the use of the cursor arrows.
4. "START" pushbutton– This button starts the genset when the EMCP4.2 is in AUTO.
5. "STOP" pushbutton– This button stops the genset when the EMCP4.2 is in AUTO.
6. "CLOSE GCB" – This button close the GCB when pressed. A second press on this button will open the GCB.
"GEN CB CLOSED" lamp – This LED is lit when the generator breaker is closed.
7. "LOCAL" pushbutton – This button initiates the LOCAL mode of the controller.
"LOCAL" lamp – This LED is lit when LOCAL mode is selected.
8. "BACK"- This button returns the screen to the previous selection.
9. "REMOTE" pushbutton – This button initiates the REMOTE mode of the controller.
"REMOTE" lamp – This LED is lit when REMOTE mode is selected.
10. "LOG" pushbutton – This button displays the events that have occurred and recorded in the history.
11. "SEL" and "ARROWS" – These buttons are used to maneuver through the user menus and screens.
12. "VIEW" – Allows user to select views on the display screen.
13. "Self check ok" – Watchdog status, indicates AGC4's hardware and software is functioning correctly.
14. Bus Available LED – LED is lit when bus Voltage/Frequency is within setting limits.
15. "Red Alarm" – Indicates when Engine ECM transmits a shutdown condition over J1939 CAN1 bus.
16. "Red Alarm" – Indicates when Engine ECM transmits an alarm condition over J1939 CAN1 bus.
17. "PM CAN - Indicates when AGC4 is connected to Plant management CAN bus.
18. "Power" - Indicates when AGC4 power supply input is within tolerance.

Doghouse & Wall-Mount Components Layout



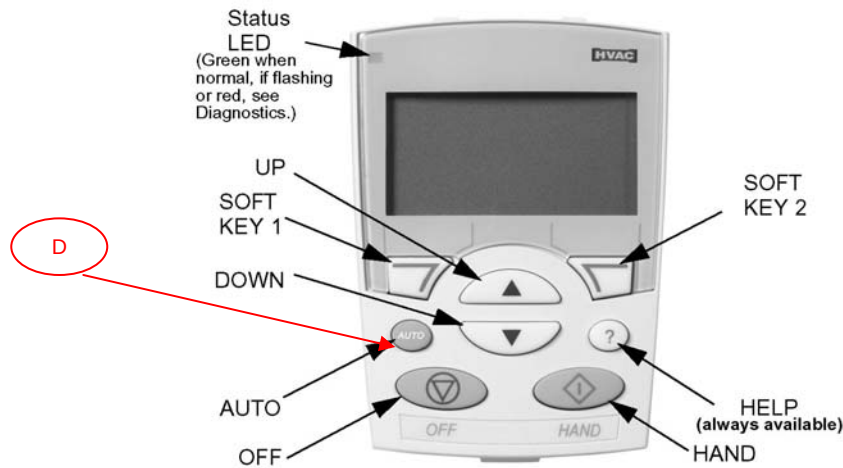
EMCP 4.2

A1: RUN

A2: AUTO

A3: STOP

Radiator VFD Interface Panel



VFD Modes of Operation

When the HAND key is pressed, the drive starts and pressing the UP/DOWN keys can modify the reference frequency. The HAND (keypad) control mode is indicated.

When the OFF key is pressed, the drive stops and the OFF control mode is indicated.

When the AUTO key is pressed, the AUTO control mode is indicated. The drive can be started and stopped using whichever remote start/stop command has been configured, a contact closure applied to the start/stop input. In AUTO mode the drive speed is controlled by the external speed reference input from AGC4.

If the HAND key is pressed while the drive is running in the AUTO control mode, the drive continues to run without changing speed, but ceases to respond to external input or PID speed reference changes. Pressing the UP/DOWN keys can modify the reference frequency.

If the AUTO key is pressed while the drive is running in the HAND control mode and an external start command is present, the drive continues to run and follows the acceleration or deceleration control ramp to the speed set by the external input coming from the AGC4.

The green LED indicates that the power is on and the drive is operating normally. The red LED indicates a fault. A blinking green LED indicates an alarm condition. A blinking red LED indicates a fault that requires power to be cycled off and on to reset the drive.

Note: Unless there is an issue in maintaining or correctly controlling the proper engine coolant temperature, VFD should always be set in AUTO mode.

ENGINE MONITORING PANEL



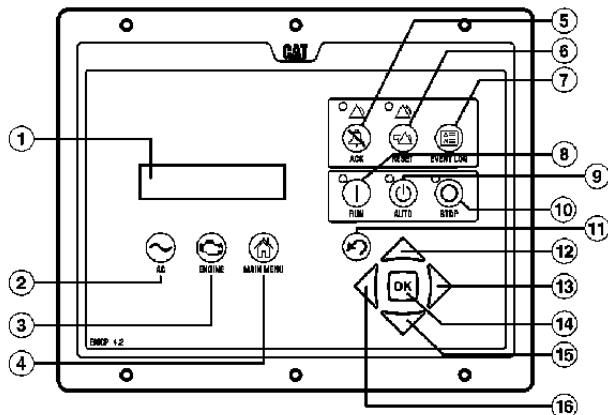
1. "ENGINE FAULT" red lamp – Engine has a fault signal (Shutdown).
2. "ACTIVE ALARM" amber lamp – Engine have an active alarm.
3. "ENGINE ON" green lamp – Engine is running.
4. "Spare" lamp – Not program.
5. "Spare" lamp – Not program.
6. "RIGHT/LEFT" pushbutton – Press this key to navigate left or right through the menu on the screen.
7. "UP/DOWN" pushbutton – Press this key to navigate up or down through the menu on the screen.
8. "BACK" pushbutton – Press this key to navigate one screen back through the menu on the screen
9. "HOME" pushbutton– Press this key to go back to the main menu or display.
10. "OK" pushbutton – Press this key to select highlighted options on the display.

DOGHOUSE PANEL



1. EMCP4.2 – Engine monitoring control panel 4.2, see below for detailed key function.
2. “ESPB” pushbutton – Emergency pushbutton stops the engine, close the gas shut-off valve and trips the generator breaker
3. “Reset” switch – Turning this switch and holding it for 3 seconds will reset the Engine Monitoring panel and the ADEM.
4. “CBL3” lamp – Indicates lost of 24VDC power.
5. “EFL” lamp – Engine fault light, indicates ECM shutdown/fault. When the fault is clear, turn reset switch above to reset the system. Note: EMCP4.2 should be in “STOP” before resetting the system.
6. “CONN1” connector – CAN 1 service connector port.
7. “CONN2” connector – CAN 2 service connector port.

EMCP4.2 DETAILED KEY FUNCTION



Function Button Sequence

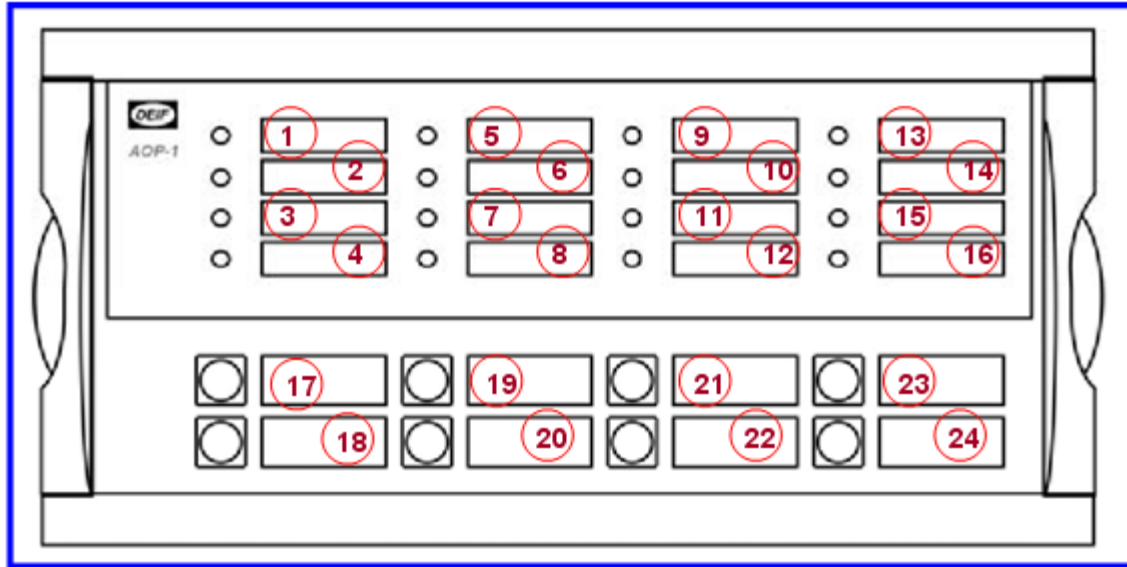
- Start**.....Press RUN (8)
- Place in AUTO Mode**....Press AUTO (9)
- Stop**.....Press STOP (10)
- Cool Down*/Stop**.....Press STOP (10) once to initiate cool down cycle. Once cool down cycle is complete, engine will stop.
(Press/Hold STOP (10) for 5 sec. to bypass cool down cycle. Confirm on Display Screen (1) by pressing OK (14).
- View Warning/Shutdown Events**.....Press EVENT LOG (7).
Individual event logs are shown below "Active Events [total number]".
Select event logs with number greater than zero and search for active or present events using UP (12) / DOWN (15) Keys
- Reset All Active/Shutdown Events**..... Place in STOP mode (10)
Press/Hold EVENT RESET (6) for 5 seconds.
Display Screen (1) will ask "RESET ALL EVENTS?".
Press OK (14) to reset the events.

Function Keys

- ① **Display Screen**
Displays information and parameters about the generator set.
- ② **AC Overview Key**
Press this key to view information about the generator output.
Use the DOWN (15) key to view additional AC parameters.
- ③ **Engine Overview Key**
Press this key to view information about the engine output.
Use the DOWN (15) key to view additional engine parameters.
- ④ **Main Menu/Home Key**
Press this key to go back to the main menu directly.
- ⑤ **Alarm Acknowledge/Silence Key with Yellow Warning Lamp**
Press to acknowledge any active warning or shutdown events.
It will also turn off horn relay output and silence the horn.
- ⑥ **Event Reset Key with Red Shutdown Lamp**
Press to clear all inactive fault conditions.
- ⑦ **Event Log Key**
Press to view the list of all event logs.
- ⑧ **RUN Key**
Press this key to start and run the generator.
- ⑨ **AUTO Key**
Press this key to set generator up to be started automatically.
- ⑩ **STOP Key**
Press this key to cause the generator set to stop.
- ⑪ **ESCAPE Key**
Press this key to move out a level in the menu on the display.
- ⑫ (UP), ⑬ (RIGHT), ⑮ (DOWN), ⑯ (LEFT) **Display Navigation**
Press these keys to navigate through the menus on the display.
- ⑭ **OK Key**
Press this key to select highlighted options on the display.

*Cool down feature maybe disable in the EMCP panel consult you OMM.

GENERATOR PARALLELING CONTROLLER INTERFACE PANEL (AOP1)



- 1.) "GEN AVAILABLE" lamp – Generator ready to run (Green)
- 2.) "OVERCURRENT" lamp – Generator trip on overcurrent.
- 3.) "EXT FAULT" lamp – Plant trip and remote E-Stop Trip.
- 4.) "BATT ALARM" lamp – Battery charger alarm/fault.
- 5.) "DELTA AIR FILTER" lamp – Delta pressure across the air filter.
- 6.) "DELTA FUEL FILTER" lamp – Delta pressure across the fuel filter on the fuel tank.
- 7.) "DELTA OIL FILTER" lamp – Delta pressure across the oil filter in the engine. Not configured at this time.
- 8.) "OIL ALARM" light – Make-up oil tank alarm.
- 9.) "EMCP NOT AUTO" lamp – EMCP is not in auto mode.
- 10.) "EMCP ALARM" lamp – EMCP has an alarm/fault..
- 11.) "NO FUEL" lamp – Low fuel alarm/shutdown.
- 12.) "FUEL VALVE ON" lamp – Fuel valve is open and will allow fuel to come-in the fuel tank.
- 13.) "RDTR ALARM" lamp – Activates because one of the following occurred, radiator breaker trip, auto lube pump failed or VFD failed.
- 14.) "COOLANT ALARM" lamp – Activates because one of the following occurred, coolant level is low or coolant temperature is high.
- 15.) "FIXED POWER" lamp – Unit is in fixed power mode.
- 16.) "MANUAL" lamp – Unit is in manual control mode. Speed/KW and voltage/KVar can be manually control by the operator.

- 17.) "RESET" pushbutton – Acknowledge AGC4 alarms/shutdown and resets VFD fault.
- 18.) "DATA VIEW" pushbutton – Allows user to move to View 1 screen right away.
- 19.) "RPM UP" pushbutton – Allows user to increase generator speed (when breaker is open)/ KW (when breaker is close) when in manual mode is ON.
- 20.) "RPM DOWN" pushbutton – Allows user to decrease generator speed (when breaker is open)/ KW (when breaker is close) when in manual mode is ON.
- 21.) "VOLTAGE UP" pushbutton – Allows user to increase generator voltage (when breaker is open)/ KVar (when breaker is close) when in manual mode is ON.
- 22.) "VOLTAGE DOWN" pushbutton – Allows user to decrease generator voltage (when breaker is open)/ KVar (when breaker is close) when in manual mode is ON.
- 23.) "FIXED POWER ON/OFF" pushbutton – Fixed power mode ON/OFF toggle.
- 24.) "MANUAL ON/OFF" pushbutton – Manual mode ON/OFF toggle.

UTILITY MUTI-PROTECTION RELAY (UMR)-OPTIONAL

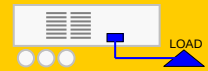


- 1.) "DISPLAY" screen – Allows the relay to replace local indication and control functions such as panel metering, alarm annunciation and control switches.
- 2.) "NAVIGATION" pushbutton – Provides a means to navigate through the menu tree.
- 3.) "EDIT" pushbutton- Provides access to change parameters and registers. In Edit mode, the navigation pushbutton provides data entry selections. Edit mode is indicated by an Edit LED on the Edit pushbutton.
- 4.) "RESET" pushbutton – Provided access to reset targets and alarms.
- 5.) LED indicators – Indicates relay power status, Relay trouble alarm, Minor alarm, Major Alarm and Relay trip indicator.

NOTE: See UMR instruction manual for a more in-depth information on its function and operation.

Modes of Operation

Single Unit Mode - Manual Operation



Setup:

- Verify and match voltage and frequency requirements.

Startup:

- Put the AGC4 in "Local" (7)
- On the AGC4, press Jump then Arrow to Menu 9160. Select AP1. Password is 2000.
- Repeat and on Menu 6070, select Island Mode.
- Repeat and on Menu 6006, Mode 2 for "60 Hz" and Mode 1 for "50 Hz."
- JW Heater and shore power transformer require changing with frequency and voltage changes. Refer to 50/60Hz conversion procedure.
- Press AUTO on EMCP4.2 (A2), and then Start (4) on the AGC4, AGC4 should be in LOCAL (7).
- After engine is running at normal speed, observe generator voltage and frequency on EMCP4.2 and AGC4 screens.
- Close generator breaker, when desired, press (6) on the AGC4.

Running:

- Observe engine and generator parameters on EMCP4.2, AOP1 and AGC4 screen to verify normal operating conditions
- Note: Radiator VFD should be in AUTO mode to maximize fuel efficiency (D).

Shutdown:

- Press STOP (5) on AGC4 (generator breaker will open immediately, engine will continue to run in cooldown mode until cooldown time is elapsed)

Single Unit Mode - Automatic Operation



Setup:

- Install wiring (C) to remote run request contact (i.e. Automatic Transfer Switch)

Startup:

- Put the AGC4 in "Local" (7)
- On the AGC4, press Jump then Arrow to Menu 9160. Select AP1. Password is 2000.
- Repeat and on Menu 6070, select Island Mode.
- Repeat and on Menu 6006, Mode 2 for "60 Hz" and Mode 1 for "50 Hz."
- JW Heater and shore power transformer require changing with frequency and voltage changes. Refer to 50/60Hz conversion procedure.
- Press AUTO (A2) on EMCP4.2
- Start engine by closing the remote run request contact (C), AGC4 should be in REMOTE (9).
- After engine is running at normal speed, generator breaker will close automatically to a dead bus

Running:

- Observe engine and generator parameters on EMCP4.2, AOP1 and AGC4 screen to verify normal operating conditions
- Note: Radiator VFD should be in AUTO mode to maximize fuel efficiency (D).

Shutdown:

- Shutdown by opening the remote run request contact will cause generator breaker to open immediately, engine will continue to run in cooldown mode until cooldown time is elapsed:
- Shutdown, by any means, will cause generator breaker to open and the engine to stop immediately.

Modes of Operation

Island Paralleling Mode - Automatic Operation



CAUTION: Verify phase rotation of generator matches that of the bus connection prior to paralleling units. Failure to do so may result in damage to equipment.

All paralleling units equipped with AGC4 Auto Paralleling controls:

- Install CANBUS lines interconnected between units (C) utilizing proper CAN Type cabling.
- AGC4 should be in local, all should be set to AP2-Menu 9160, Power Management-Menu 6070.
- AGC4 plant addresses should be set sequentially in Menu 7531. i.e. (P01, P02...)
- Match voltages and frequencies.

Startup in LOCAL:

- At each unit, press AUTO on EMCP4.2 (A2), AGC4 should be in LOCAL (7).
- Start each engine by local start using the AGC4 (4),
- After lead/first unit is running at normal speed, manually close GCB to dead bus by pressing (6) on the AGC4.
- Synchronize all other units will using the same sequence. AGC4 will auto-sync and close to the live bus when the close breaker command is press.

Startup in REMOTE (When connected to Group or Plant controller):

- At each unit, press AUTO on EMCP4.2 (A2), AGC4 should be in REMOTE (9).
- Send the remote run request contact to all gensets.
Note: Sequencing nor delaying each remote run request is not necessary for proper operation.
- First unit to build proper voltage and frequency will automatically close its breaker to a dead bus.
- AGC4 will randomly parallel the rest of the units automatically (when synchronizing parameters are met).

Running:

- Observe engine and generator parameters on EMCP4.2, AOP1 & AGC4 screen to verify normal operating conditions.
- Observe load sharing between units. Load balancing adjustment is automatic.
- Note: Radiator VFD should be in AUTO mode to maximize fuel efficiency (D).

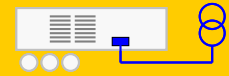
Shutdown:

- Shutdown by opening the remote run request contact will cause generator breaker to open immediately, engine will continue to run in cooldown mode until cooldown time is elapsed (Only in Remote Mode).
- Press STOP (5) on AGC4, generator breaker will open breaker immediately, engine will continue to run in cooldown mode until cooldown time is elapsed (Only in Local Mode).
- Shutdown, by any means, will cause generator breaker to open and the engine to stop immediately.

****Units equipped with AGC4 controls are capable of paralleling with GPC units please contact your CAT representative for Details.****

Modes of Operation

Utility Paralleling Mode - Automatic Operation



CAUTION: Verify phase rotation of generator matches that of the bus connection prior to paralleling units. Failure to do so may result in damage to equipment.

Setup:

- EMCP4.2 in Auto
- AGC4 should be in Local
- AGC4 Menu 9160 should be in AP3
- AGC4 Menu 6070 Fixed Power
- AGC4 Menu 7050 Enter desired percent load, power factor, Capacitive/Inductive. i.e. (25%, 0.9, inductive)

Startup (paralleling to live utility in LOCAL):

- At each unit, press AUTO on EMCP4.2 (A2), AGC4 should be in LOCAL (7).
- Start each engine by local start using the AGC4 (4).
- After lead/first unit is running at normal speed, manually close GCB to a live bus by pressing (6) on the AGC4.
- Synchronize all other units will using the same sequence. AGC4 will auto-sync and close to the live bus when the close breaker command is press.

Startup (paralleling to live utility in REMOTE when connected to Group or Plant controller):

- At each unit, press AUTO on EMCP4.2 (A2), AGC4 should be in REMOTE (9).
- Send the remote run request contact to all gensets.
Note: Sequencing nor delaying the each remote run request is not necessary for proper operation.
- First unit to build proper voltage and frequency will automatically close its breaker to a live bus.
- AGC4 will randomly parallel the rest of the units automatically (when synchronizing parameters are met).

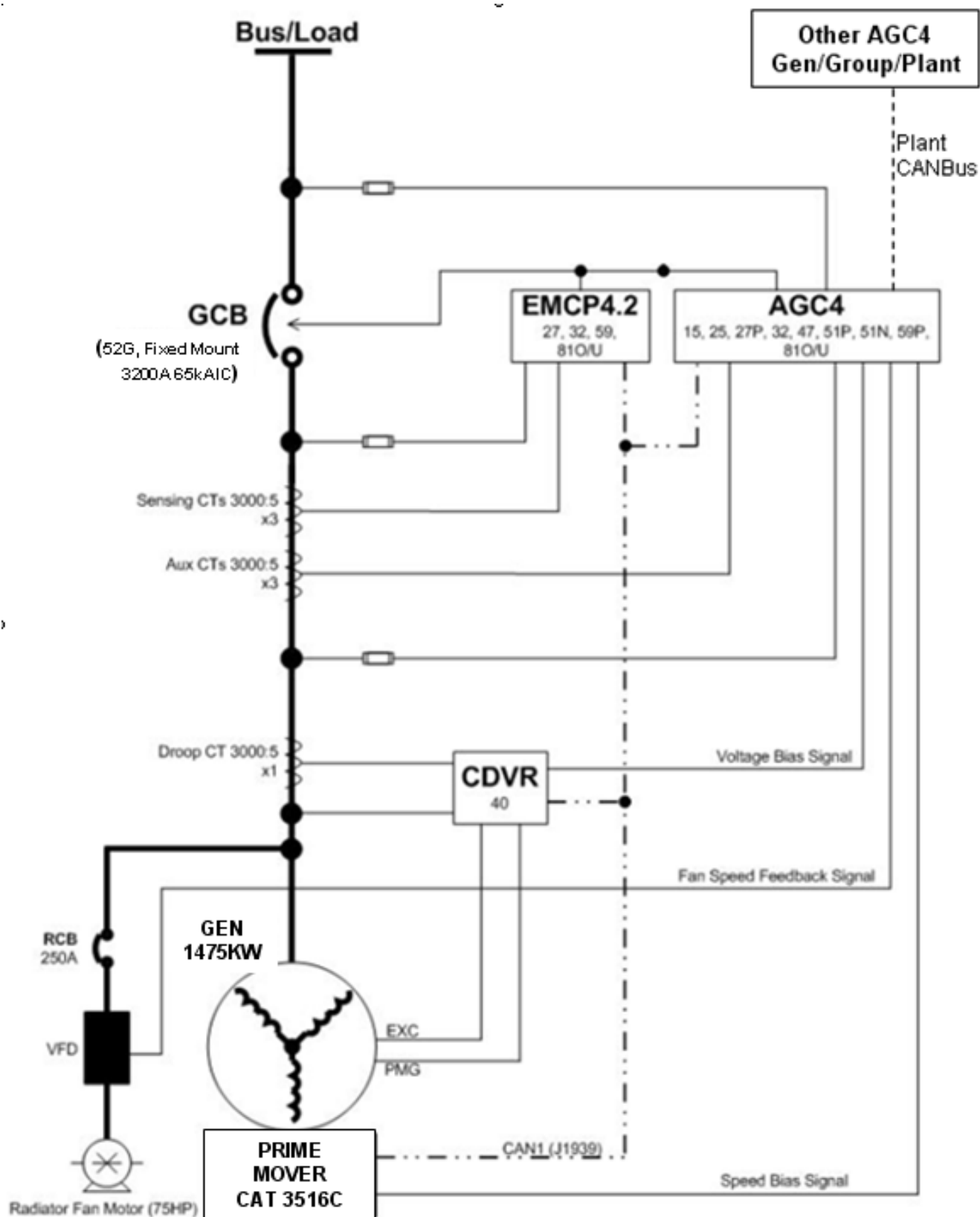
Running:

- Observe proper soft load to desired baseload level and then steady state PF and baseload control. Default controller will ramp to an intermediate setpoint 10% for 30 seconds, then will continue to fix power setting (default @ 50%).
- Observe engine and generator parameters on EMCP4.2, AOP1 and AGC4 screen to verify normal operating conditions
- Note: Radiator VFD should be in AUTO mode to maximize fuel efficiency (D).

Shutdown:

- Shutdown by opening the remote run request contact will cause generator to soft unload, generator breaker will then trip and engine will continue to run in cooldown mode until cooldown time is elapsed (Only in Remote Mode).
- Press STOP (5) on AGC4, will cause generator to soft unload, generator breaker will then trip and engine will continue to run in cooldown mode until cooldown time is elapsed (Only in Local Mode).
- Shutdown, by any means, will cause generator breaker to open and the engine to stop immediately.

System One-Line Diagram



References

 Procedure for converting 60Hz to 50Hz

 Procedure for programming AGC4 using PC interface

 XQ2000 Auto Paralleling Controls Schematic:

388-8777 – XQ1475G – IPP 50Hz only

448-9383 - XQ1475G – IPP 50/60Hz ROW

448-9384 - XQ1475G – IPP 50Hz APR

 Special Instruction REHS1438-09 Installation and initial start-up procedure for G3500C and G3500E generator set engines.