

Dual DGC-2020 Operation to Provide Redundant Start/Stop Engine Control, Genset Metering and Protection from Different Operator Locations

Some applications require redundant genset controller operation for metering, protection, and control. Multiple DGC-2020s might be of benefit in any system where normal operation of equipment needs to occur at a different location than that of the generator's local DGC-2020. An example might be on a ship with a DGC-2020 in the engine room and a second DGC-2020 on the bridge or control cabin. Both locations should provide start/stop capability of the generator, provide full metering of engine and generator parameters, and implement system protection functions. In addition, detection and annunciation of alarms or prealarms in the system also could be achieved.

Please note that the DGC-2020 unit at the genset is denoted as the "generator local DGC-2020" and the unit in the remote location is denoted as the "remote DGC-2020" for the remainder of this document.

Redundant Off/Run/Auto control

The DGC-2020 BESTlogic Programmable Logic scheme and Programmable Input settings shown at the end of this document can be used to achieve redundant Off/Run/Auto control. Outputs 3 through 6 of each unit should be wired to Contact Inputs 3 through 6 of the other unit. Once wired, pressing OFF on either unit will place both units in OFF; pressing AUTO on either unit will place both units in AUTO; and pressing RUN on either unit will place both units in RUN.

Redundant Metering

In order to achieve redundant metering, both DGC-2020s must be wired so they both have access to all pertinent metering information. This can be implemented by:

- Parallel wiring of the Generator PTs to each DGC-2020.
- Series wiring of the Generator CTs through both DGC-2020s.
- Connecting both DGC-2020s to the engine CANbus Communications network.

Note 1: In non-CANbus applications, it is not possible to wire the senders to two DGCs, so direct metering of engine sender information cannot be implemented in the remote DGC-2020. In such systems, the remote DGC-2020 will provide start/stop capability, along with metering and protection of generator parameters. The remote DGC-2020 will not be able to meter engine parameters other than engine speed. All engine protection in the remote DGC-2020 should be disabled. In addition, the Generator Speed Source in the Remote Unit should be set to "Gen Freq" in any non-CANbus systems.

Note 2: In Volvo Penta and MTU ADEC J1939 protocol ECU implementations, the remote DGC-2020 must have its ECU CONFIG set to STANDARD since the Volvo Penta and MTU ADEC J1939

protocol ECUs do not support multiple generator set controllers. The remote unit will not meter any proprietary parameters from these ECUs, but will meter all standard J1939 parameters. The remote DGC-2020 can provide start/stop and all engine and generator protection.

Note 3: In MTU-MDEC and MTU-ADEC MCS5 protocol systems the remote unit must have CANbus disabled, because the MTU-MDEC and MTU-ADEC MCS5 protocol ECUs do not support multiple generator set controllers. In such systems, the remote DGC-2020 will provide start/stop capability, along with metering and protection of generator parameters. The remote DGC-2020 will not be able to meter engine parameters other than engine speed. All engine protection in the remote DGC-2020 should be disabled.

Redundant Protection

Since there are two DGC-2020s in the system, they can both be utilized to provide redundant protection of the generator. The generator local DGC-2020 is set up to provide the primary protection. The remote DGC-2020 should be set to less stringent protection levels than those in the generator local DGC-2020. If both units are set to the same levels it is unclear which unit would trip first on a given fault condition, leading to possible confusion. It is recommended that different levels be set in the two units so that the remote DGC-2020 provides protection only in the event that the generator local DGC-2020 fails to detect a fault condition. Thus, in normal operation, the generator local DGC-2020 provides the primary protection, resulting in repeatable and well-defined system operation.

System Alarm and Prealarm Handling and Annunciation.

As recommended above, the generator local DGC-2020 performs all primary protective functions. It will annunciate all of the alarms and prealarms it normally would in a non-redundant system. The remote unit will annunciate alarms and prealarms occurring in the generator local DGC-2020 in the following manner:

- when a prealarm occurs in the generator local unit, the remote unit will annunciate a prealarm with the message “GEN DGC PREALARM”
- when an alarm occurs in the generator local unit, the remote unit will annunciate an alarm with the message “GEN DGC ALARM “.

These strings are implemented in the example settings for the Programmable Inputs of the generator local DGC-2020 presented at the end of this document. This alerts personnel at the remote DGC-2020 location to check on the generator.

The remote DGC-2020 annunciates alarms and prealarms in a similar manner. In general, the remote DGC-2020 will generate few alarms and prealarms since it is set to less stringent levels than the generator local DGC-2020. However, when the remote DGC-2020 does encounter a prealarm, the generator local DGC-2020 will annunciate a prealarm with the message “REM DGC PREALARM”. An alarm occurring in the remote DGC-2020 will result in the generator local DGC-2020 annunciating an alarm with the message “REM DGC ALARM “. This ensures any faults annunciated by the remote DGC-2020 are not missed if all personnel are located at the generator local DGC-2020.

Example Logic and Programmable Input Settings

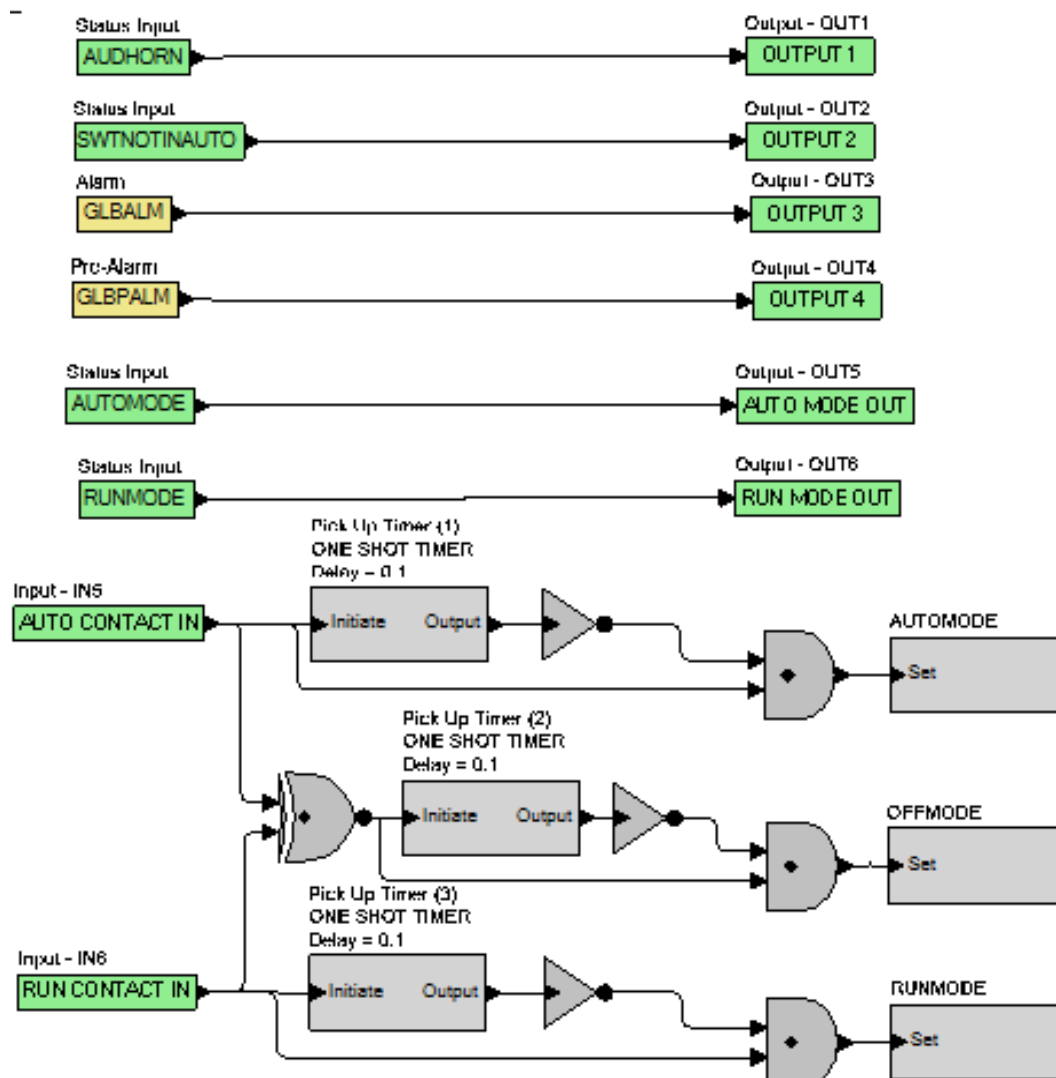


Figure 1: Logic for the Generator Local DGC-2020

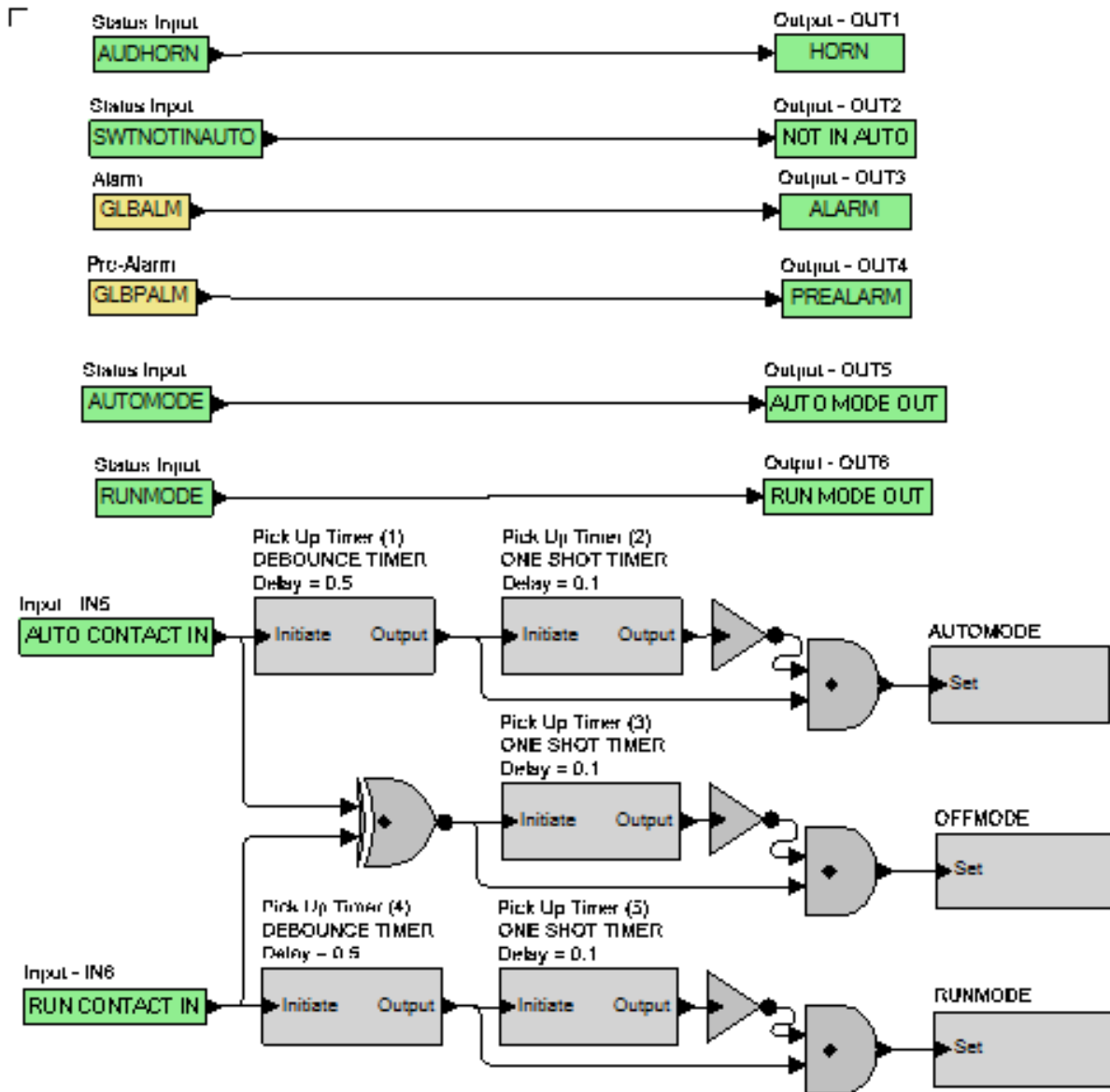


Figure 2: Logic for the Remote DGC-2020

Programmable Input Settings for both the Generator Local DGC-2020 and the Remote DGC-2020

Programmable Inputs 1 and 2: These can be fully configured by the user as desired.

Programmable Input 3:

Alarm Configuration: Alarm
 Activation Delay: 0
 Label Text: REM DGC ALARM (in generator local DGC-2020)
 GEN DGC ALARM (in remote DGC-2020)
 Contact Recognition: Always

Programmable Input 4

Alarm Configuration: PreAlarm
 Activation Delay: 0
 Label Text: REM DGC PREALARM (in generator local DGC-2020)
 GEN DGC PREALARM (in remote DGC-2020)
 Contact Recognition: Always

Programmable Input 5:

Alarm Configuration: None
 Activation Delay: 0
 Label Text: AUTO CONTACT IN (in both DGC-2020s)
 Contact Recognition: Always

Programmable Input 6:

Alarm Configuration: None
 Activation Delay: 0
 Label Text: RUN CONTACT IN (in both DGC-2020s)
 Contact Recognition: Always

Programmable Inputs 7-12: These can be fully configured by the user as desired.

For more information on the DGC-2020, consult the Basler factory at 618/654-2341 or visit www.basler.com.



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