

# Using External Control Devices with a DGC-2020/LSM-2020 system

Some applications may require an interface with an external device, such as an automatic synchronizer, with the DGC-2020/LSM-2020 system where the LSM-2020 controls the bias inputs to the automatic voltage regulator (AVR) and Governor (GOV). This can be accomplished by several methods. Two methods are discussed below.

## Method 1

In some cases, it may be necessary to interface an external device, such as a synchronizer, to a DGC-2020 - LSM-2020 system where the LSM-2020 controls the analog bias inputs to the AVR and governor. If an external synchronizer is used in conjunction with the LSM-2020 to drive the governor analog speed bias signal, contacts that indicate generator breaker status can be used to switch the analog speed bias signal between the two devices as shown in

### NOTE:

Any relay contacts which are used to switch load share lines, governor analog speed bias signals, or voltage regulator analog voltage bias signals must use a relay intended for low voltage, low current applications to preserve signal integrity. Signal relays, not power relays, must be used for this application.

### Figure1.

The "A" contact is a normally open contact which is open when the generator breaker is open, and is closed when the generator breaker is closed. The "B" contact is a normally-closed contact that is closed when the generator breaker is open, and is open when the generator is closed. The contact arrangement shown in *Figure1* gives the external device control of the analog speed bias signal when the generator breaker is open, and the LSM-2020 has control when the generator breaker is closed.



Figure1: External Control Device with DGC-2020 - LSM-2020 System, Method 1

#### Method 2

An alternate method of interfacing the DGC-2020 and an external device to drive the governor bias voltage involves placing the bias output of the LSM-2020 and the bias output of the external device in series. If the output of the LSM-2020 is connected in series with the bias output of the external synchronizer, as shown in Figure 2, both devices will be allowed to exercise control over the bias input of the governor.

Be sure the LSM and the external device are never in a situation where they oppose each other. Both devices should not be trying to exercise dynamic control at the same time. For example, an external synchronizer should only be used with a DGC-2020 that does not have the synchronizer option, or has the synchronizer function disabled.

In addition, be sure the analog voltage range limits of the governor or AVR inputs are not exceeded. Exceeding these limits may result in undesired system operation, or force a device into an error or fault state.

If it is desired to have raise/lower inputs to control speed, use a motor operated potentiometer, as the external device. Note that if speed trim is enabled in the DGC-2020 and the generator's breaker is closed, the DGC-2020 will drive the system to the speed trim setpoint regardless of the presence of the external device. When the generator breaker is open, speed trim is disabled, and the external device will control machine speed.

A similar arrangement may be used for the bias input of an AVR if an external device is required for voltage control.



Figure2: External Control Device with DGC-2020 - LSM-2020 System, Method 2

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



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