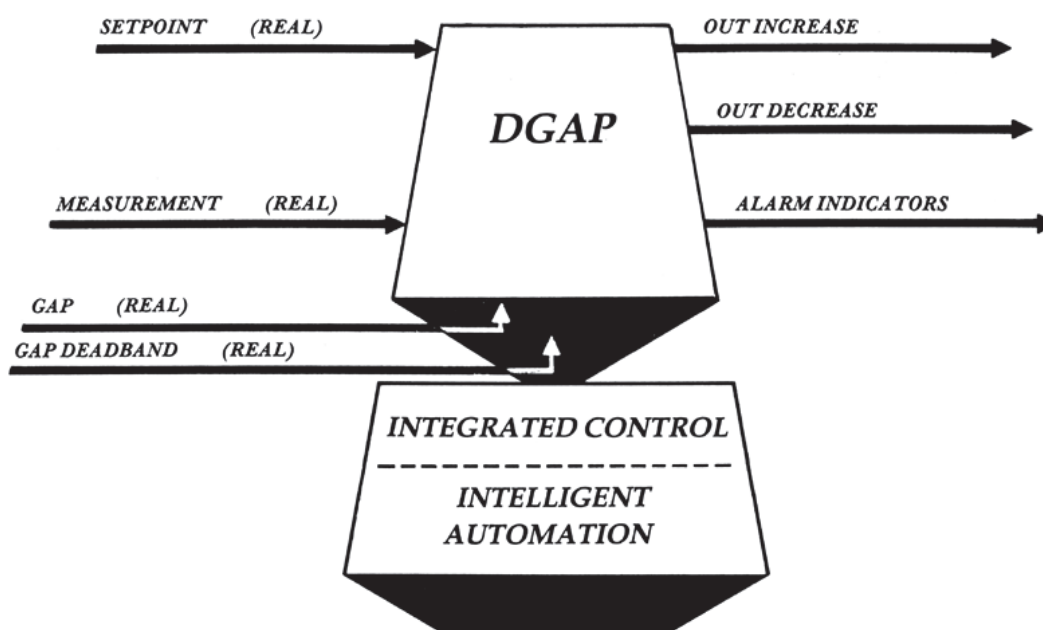


Differential Gap (DGAP) Controller Block



The DGAP Controller block is a differential gap on-off controller for controlling bi-state or tri-state control applications.

OVERVIEW

The DGAP block provides two Boolean outputs for controlling tri-state final operator devices such as dual-switch contactors, or bi-directional motor-driven actuators. Either of the two outputs can be used for bi-state control applications that require only one output for controlling devices such as solenoid valves or electric heater elements.

For tri-state applications requiring combinations of proportional, integral, and derivative control action, you can use a Proportional-Integral-Derivative (PID) block to drive the DGAP block in a cascade arrangement, with the DGAP block configured as a positioner or proportional-type controller.

The DGAP block operates in either a bi-state or tri-state on-off control mode. Figure 1 shows the input and output signals for the block.

In the bi-state mode, a single on-off differential switching band (the differential gap) controls both outputs (see Figure 2). The user specifies the size of the gap.

In the tri-state mode, each of two separate on-off differential switching bands control one of the outputs (see Figure 3). The gap creates a dead zone region, centered about zero deviation, which separates the two switching bands. The gap deadband sets the differential gap of each switch and prevents chatter. The user specifies the size of the gap and gap deadband.

STANDARD FEATURES

- ▶ Bi-state or tri-state operating mode.
- ▶ Manual/Auto control of both Boolean output control signals, which can be initiated by a host process or another block.
- ▶ Local/Remote set point source selection. In local, you can input the set point value.
- ▶ Bad inputs detection and handling in auto. Upon detecting an error, the block sets the Boolean output control signals to false and goes to a holding state. When all errors are corrected, the block resumes on-off control.
- ▶ Automatic cascade handling that includes:
 - Initialization input/output connection parameters that provide proper coordination and initialization of cascade schemes.
 - Back calculation of the set point input for the upstream block to provide bumpless cascade operation when the cascade is open loop.
- ▶ Set-point-minus-measurement (error) output signal for use by other blocks.

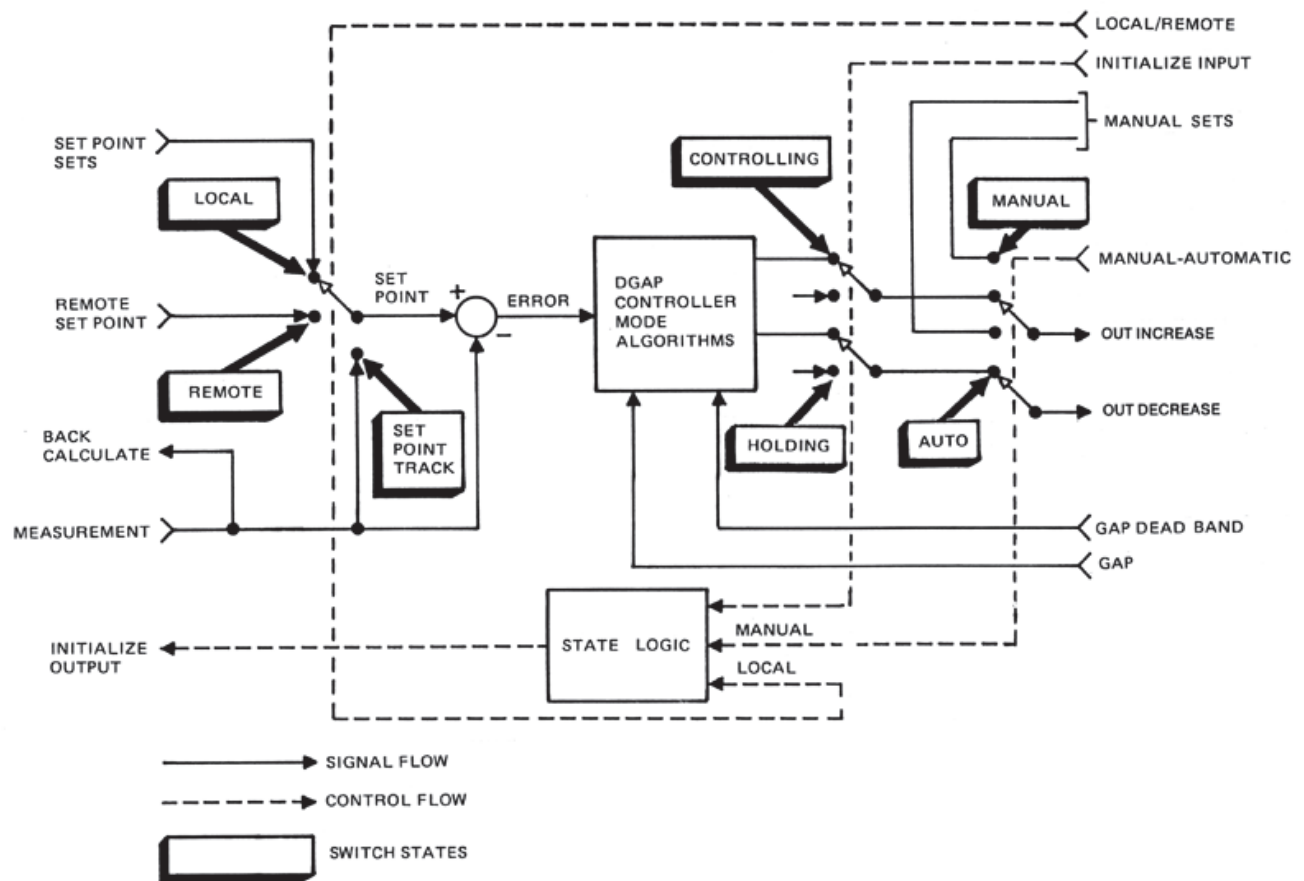


Figure 1. DGAP Simplified Signal Flow Diagram

EXTENDED FEATURES

- ▶ Set-point tracking of the measurement signal allows bumpless return to automatic control when the DGAP or any downstream block returns to closed-loop operation.
- ▶ Manual override forces the block to manual if the measurement is off scan, disconnected, or bad. Return to automatic control requires external intervention.
- ▶ Hold mode for holding the output control signals at their last computed value.
- ▶ High and low absolute alarming of the measurement. The outputs include alarm indicator signals and user-defined alarm messages.
- ▶ High and low deviation alarming of the set-point-minus-measurement (error) signal. The outputs include alarm indicator signals and user-defined alarm messages.
- ▶ Inhibiting of block alarm messages.
- ▶ Manual alarming allows all configured alarm options to be operational in manual.
- ▶ Indication of the alarm level (1 to 5) and alarm type of the highest-priority active alarm for the block.

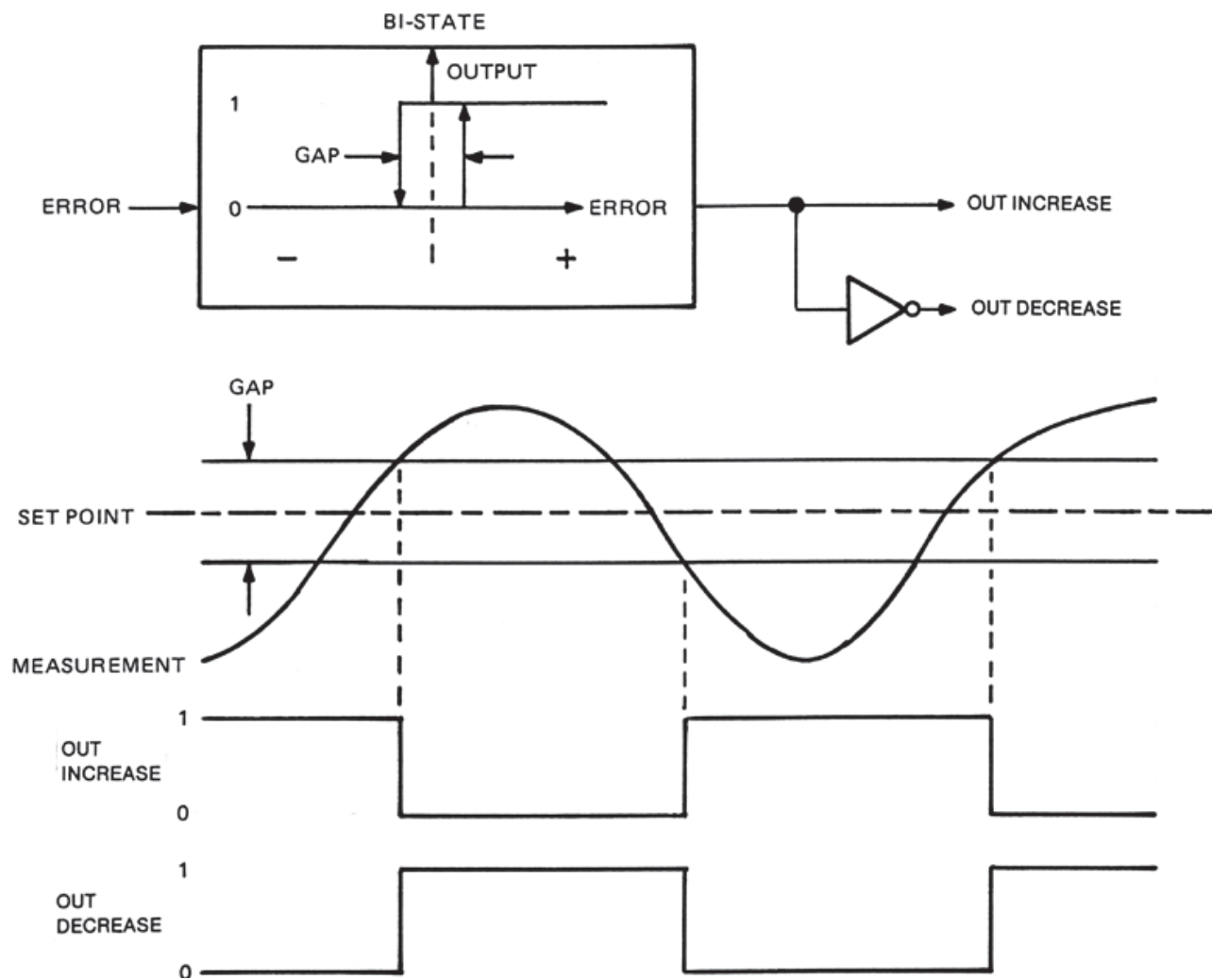


Figure 2. DGAP Bi-State Controller Mode, Timing Diagram

PRINCIPAL INPUT/OUTPUT PARAMETERS

Inputs:

- ▶ Measurement (real)
- ▶ Local/Remote set point switching (Boolean)
- ▶ Set point (real)
- ▶ Remote set point (real)
- ▶ Bi-state/tri-state controller mode switching (Boolean)
- ▶ Gap (real)

- ▶ Gap deadband (real)
- ▶ Manual/Auto control mode switching (Boolean)
- ▶ Block initialization (Boolean)

Outputs:

- ▶ 2 control signals (Boolean)
- ▶ 4 alarm indicators (Boolean)

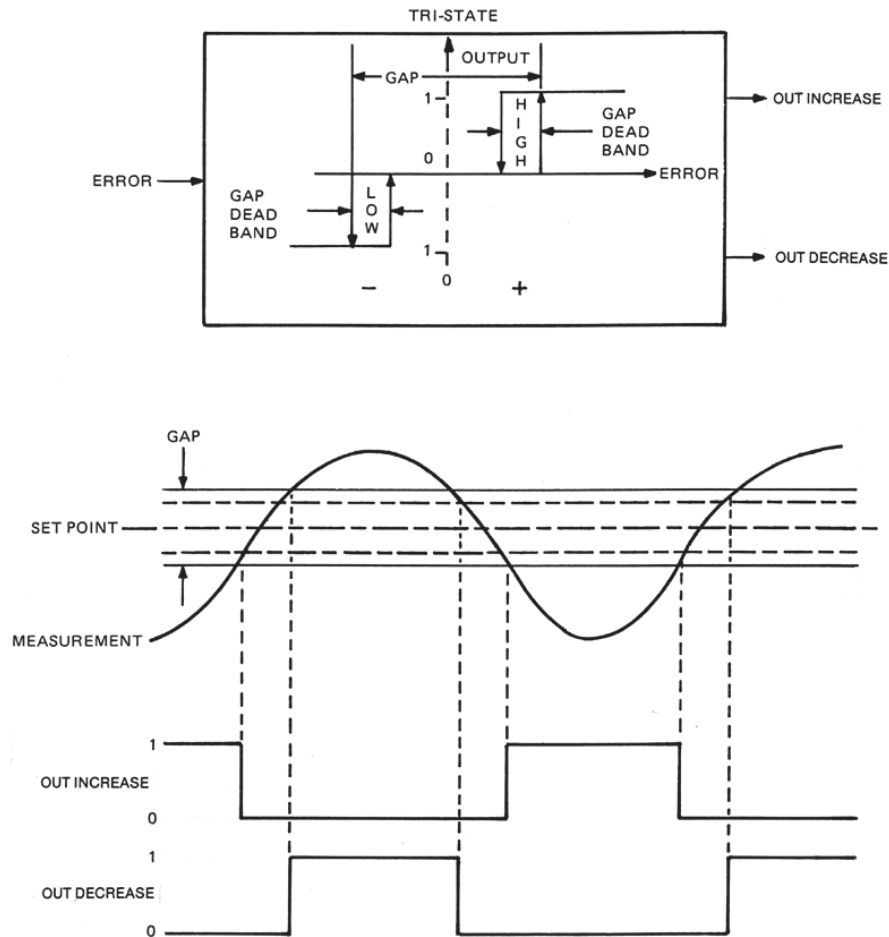


Figure 3. DGAP Tri-State Controller Mode, Timing Diagram

ADDITIONAL FEATURES

- ▶ Delayed alarming. A configurable timer delays alarm detection or return-to-normal messages for a specific alarm to reduce the number of alarm messages generated when a block parameter crosses back and forth over an alarm limit.
- ▶ Quality Status output parameter provides a single source for the block's value record status, block status, and alarm status.



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