



Exploration & Production

GENERAL SPECIFICATION

INSTRUMENTATION

GS INS 159

**Digital Output
standard function
- DO -**

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Rev.	Date	Notes



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1. Scope

The purpose of this document is to define the Standard Function of a Digital Output.

In order to assist in understanding, this document should be read in conjunction with **GS INS 150**, Design Method for System Configuration Standard Functions.

This standard has only to be considered for standalone digital outputs and not those that are part of other standards (e.g. safety valves, motors, fire extinguishing standards).

Such outputs are dedicated for instance to ESD /F&G matrix panels, public address interface, electrical distribution, etc.

2. Reference documents

The reference documents listed below form an integral part of this General Specification. Unless otherwise stipulated, the applicable version of these documents, including relevant appendices and supplements, is the latest revision published at the EFFECTIVE DATE of the CONTRACT.

Standards

Reference	Title
Not applicable	

Professional Documents

Reference	Title
Not applicable	

Regulations

Reference	Title
Not applicable	

Codes

Reference	Title
Not applicable	

Other documents

Reference	Title
Not applicable	

Total General Specifications

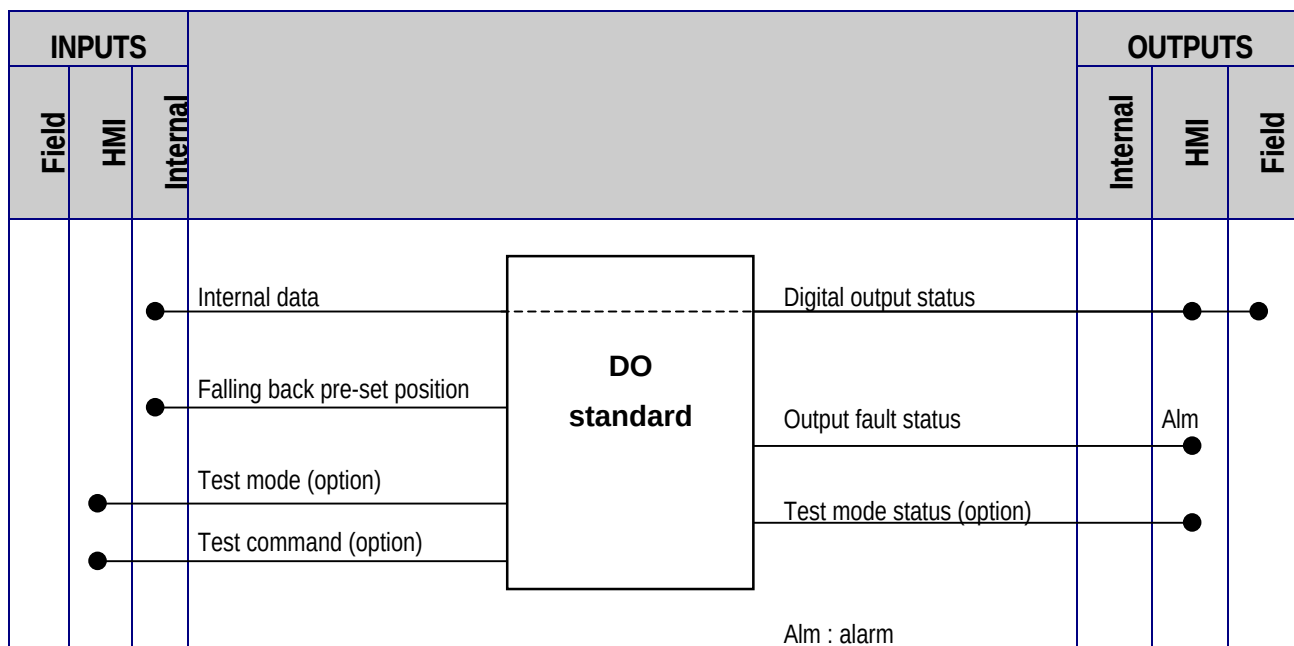
Reference	Title
GS INS 150	Design Method for System Configuration Standard Functions

3. General description of functions

3.1 List of main functions

- Digital output (DO_E / DO_D)
- Output fault
- Test (optional)

4. Interfaces description



5. Detailed description of functions

5.1 Digital output treatment

Each digital output shall be used as ON / OFF contact.

According to the internal data type (command, status, alarm, safety trip), two field wiring principles can be used to perform the digital output activation :

- “Energise for action” principle / DO_E (for commands and status)

Contact ON (closed loop) = *ACTIVE* position (*START, OPEN, ...*),

Contact OFF (open loop) = *INACTIVE* position (*STOP, CLOSE, ...*)

e.g. package start/stop, public address activation, horn start/stop, ...

- “De energise to trip” principle / DO_D (for alarms and safety trips)

Contact ON (closed loop) = *NORMAL* position (*HEALTHY, NO ALARM, ...*),

Contact OFF (open loop) = *SAFETY* position (*TRIPPED, ALARM, ...*),

e.g. circuit breakers trips, battery isolation, package safety trips, lamps on SSS & FGS matrix panels, ...

5.2 Output fault

The fault status of each card output shall be individually detected, primarily for alarming purposes.

In case of card fault, each digital output will be forced to its fall back position.

If line monitored outputs are used, the status of each loop (open circuit, short circuit) shall be included within the fault status.

5.3 Test function (option)

Digital outputs will be able to be individually tested from the HMI.

Once test mode has been selected, then the test command will only be able to be activated in method access level .

6. Representation and animation description (HMI)

6.1 Events to be recorded

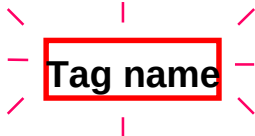
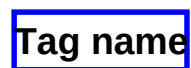
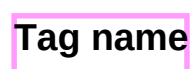
- Digital output status
- Output fault status
- Test mode status (optional)

6.2 Alarm levels handling

Data	Alarm
Output fault status (on SSS & FGS / PSS / PCS)	Level (3 / 2 / 1)

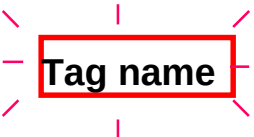
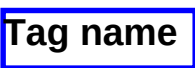
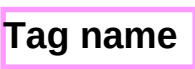
6.3 Specific animation description

6.3.1 Commands & status display

Displayed data	Animation	Text colour	Frame colour
Command = <i>START</i> or Equipment status = <i>RUNNING</i>	Tag name	Blue (or fluid colour)	NA
Command = <i>STOP</i> or Equipment status = <i>STOPPED</i>	Tag name	White	NA
Output fault status = <i>ALARM</i>	 	as above	Internal : Red flashing (before acknowledgement) Red steady (after acknowledgement)
Test mode = <i>ACTIVE</i>		(depends on test command)	External : Blue steady
Communication fault = <i>ACTIVE</i>		White	External : Magenta

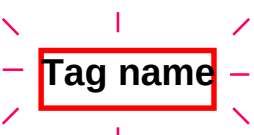
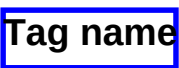
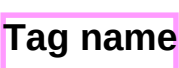
The events which drive these frame displays may not be mutually exclusive. Therefore, the precedence on the display, from most to least important, shall be : magenta, white, blue, yellow

6.3.2 Alarm display

Displayed data	Animation	Text colour	Frame colour
Alarm status = <i>ALARM</i>	Tag name	Red	NA
else	Tag name	White	NA
Output fault status = <i>ALARM</i>	 	as above	Internal : Red flashing(before acknowledgement) Red steady (after acknowledgement)
Test mode = <i>ACTIVE</i>		(depends on test command)	Blue steady
Communication fault = <i>ACTIVE</i>		White	External : Magenta

6.3.3 Safety trip display

The text animation is only depending on the associated equipment status (if available).

Displayed data	Animation	Text colour	Frame colour
Individual safety trip= <i>TRIPPED</i>		(depends on equipment status)	External : White
Output fault status = <i>ALARM</i>	 	as above	Internal : Red flashing(before acknowledgement) Red steady (after acknowledgement)
Test mode = <i>ACTIVE</i>		(depends on test command)	External : Blue steady
Communication fault = <i>ACTIVE</i>		White	External : Magenta