



Exploration & Production

GENERAL SPECIFICATION

INSTRUMENTATION

GS INS 151

**Digital Input
standard function
- DI -**

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1. Scope

The purpose of this document is to define the Standard Function for a digital input to the PCS and PSS system, with alarm detection in option.

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

This Standard Function is a fundamental building block. It may either be used standalone, e.g. for monitoring an equipment status, or integrated with other standard functions to create a more complex function, e.g. with the Safety Bar Standard Function.

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 Context

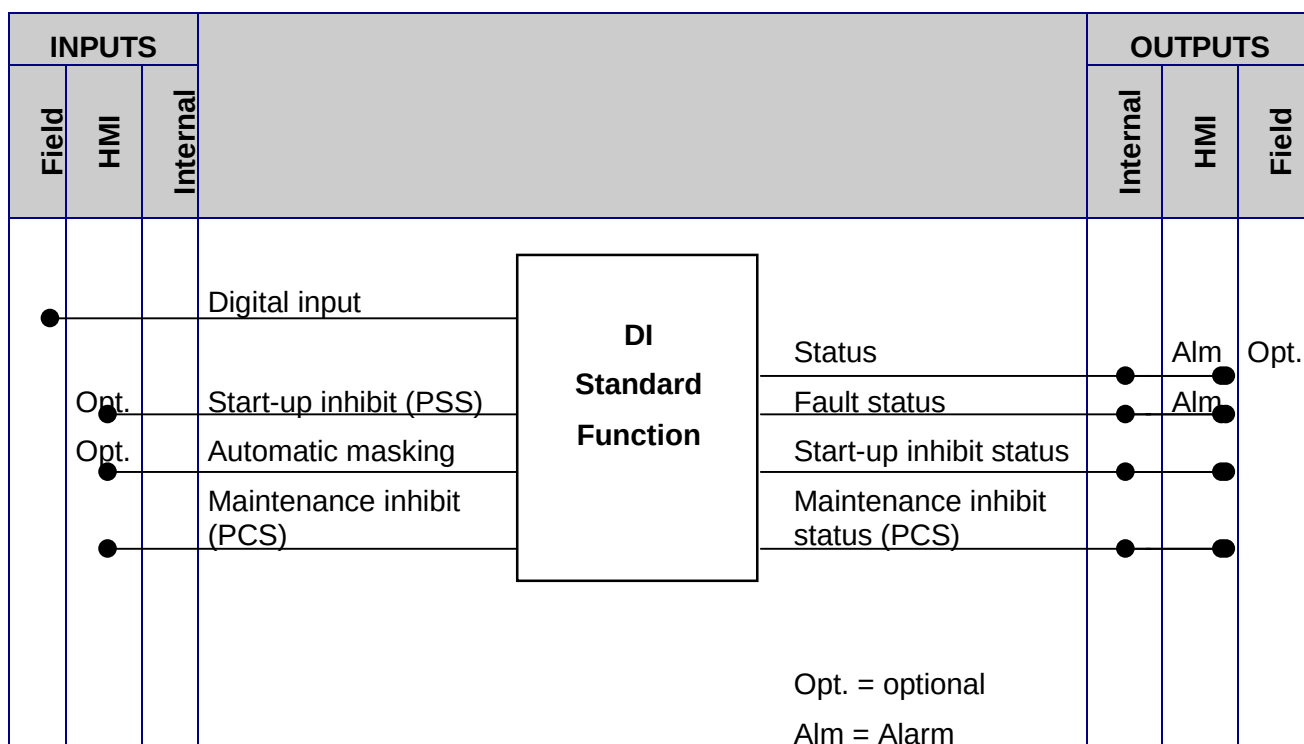
This document describes functions to be performed by the digital input logic.

Digital inputs concern field switches and inter-system hardwired data.

3.2 List of main functions

- ON / OFF signal acquisition,
- Alarm detection (option DI_AL)
- Fault detection(Input card fault)
- Maintenance inhibit (PCS)

4. Description of Interfaces



5. Detailed Description of Functions

There are two field wiring principles possible, each with its own associated software treatment :

DI-D = "De-energised to trip" principle :

Switch OFF (loop electrical status = "0") → *ACTIVE* or *ALARM* status

Switch ON (loop electrical status = "1") → *INACTIVE* or *NORMAL* status

DI-E = "Energised to trip" principle :

Switch ON (loop electrical status = "1") → *ACTIVE* or *ALARM* status

Switch OFF (loop electrical status = "0") → *INACTIVE* or *NORMAL* status

5.1 Automatic masking

Each individual alarm can be masked by an external event (see [GS INS 150](#)). When the automatic masking is active, no input alarm nor fault alarm shall be generated.

5.2 Start-up inhibit (PSS)

When a start-up inhibit is active the input status is forced to its healthy state and the input alarm is masked.

The status of the input shall always been displayed.

However, the fault detection logic remains active. A fault alarm will therefore be generated upon card fault detection

Upon removal of the start-up inhibit (inhibit time out), the input alarm is not regenerated even if the input trip is still active. First fault detection will help to identify the trip condition.

5.3 Maintenance inhibit (PCS)

One maintenance inhibit command is required for DIs treated by the PCS.

When the maintenance inhibit is active, yCH/L or yAH/L is forced to its healthy state and the alarm is masked. In addition the loop fault alarm is also masked. However, the status of the input is still available and displayed.

6. Representation and Animation (HMI)

Events to be recorded

- Alarm (option DI_AL),
- Fault status,
- Maintenance inhibit (PCS).

6.1 Alarm handling

Alarm Description	Priority
PCS input alarm	level 1
PSS input alarm	level 2
PCS Fault alarm	level 1
PSS Fault alarm	level 2

6.2 Control display

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

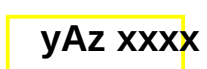
6.2.1 PCS digital input without alarm for process mimic

yCz xxxx : Tag name of signal (e.g. position switch).

Internal data	Display	Text	Frame
Input status = <i>INACTIVE</i>		Hidden	NA
Input status = <i>ACTIVE</i>	yCz	Green	NA
Maintenance inhibit = <i>INHIBITED</i>	yCz	White	Yellow (external frame)
Fault status = <i>ACTIVE</i> Alarm unacknowledged	yCz xxxx	White	Flashing red (internal frame)
Fault status = <i>ACTIVE</i> Alarm acknowledged	yCz	White	Steady red (internal frame)
Communication fault = <i>ACTIVE</i>	yCz	White	Magenta (external frame)

6.2.2 PCS digital input with alarm (option DI_AL) for process mimic

yAz xxxx : Tag name of signal (e.g. digital alarm).

Internal data	Display	Text	Frame
Inputstatus = <i>NORMAL</i>		Hidden (process displays)	NA
Input status = <i>ALARM</i> Alarm unacknowledged		Flashing colour (colour depends on alarm priority level)	NA
Input status = <i>ALARM</i> Alarm acknowledged		Colour steady (colour depends on alarm priority level)	NA
Maintenance inhibit = <i>INHIBITED</i>		If Input Status = <i>ALARM</i> then as above If Input status = <i>NORMAL</i> then white	Yellow (external frame)
Fault status = <i>ACTIVE</i> Alarm unacknowledged		Flashing colour or white	Flashing red (internal frame)
Fault status = <i>ACTIVE</i> Alarm acknowledged		White	Steady red (internal frame)
Communication fault = <i>ACTIVE</i>		White	Magenta (external frame)

6.2.3 PSS digital input with alarm (option DI_AL) for process mimic

ySzz xxxx : Tag name of signal (e.g. an Safety bar input)

Internal data	Display	Text	Frame
Inputstatus = <i>NORMAL</i>		Hidden (process displays)	NA
Input status = <i>ALARM</i> Alarm unacknowledged		Flashing colour (colour depends on alarm priority level)	NA
Input status = <i>ALARM</i> Alarm acknowledged		Colour steady (colour depends on alarm priority level)	NA
Corresponding bar input Maintenance inhibit active		as above	Yellow (external frame)
Corresponding bar input start-up inhibit active		Colour steady or white	Yellow (external frame)
Fault status = <i>ACTIVE</i> Alarm unacknowledged		Flashing colour or white	Flashing red (internal frame)
Fault status = <i>ACTIVE</i> Alarm acknowledged		White	Steady red (internal frame)
Communication fault = <i>ACTIVE</i>		White	Magenta (external frame)

6.2.4 PSS digital input with alarm (option DI_AL) for a safety mimic

ySzz xxxx : Tag name of signal (example for a Safety bar input),

Internal data	Display	Text	Frame
Input status = <i>NORMAL</i>	ySzz xxxx	Blue	NA
Input status = <i>ALARM</i> Alarm unacknowledged	ySzz xxxx	Flashing red	NA
Input status = <i>ALARM</i> Alarm acknowledged	ySzz xxxx	Steady red	NA
Corresponding bar input Maintenance inhibit active	ySzz xxxx	as above	Yellow (external frame)
Corresponding bar input Start-up inhibit active	ySzz xxxx	as above	Yellow (external frame)
Fault status = <i>ACTIVE</i> Alarm unacknowledged	ySzz xxxx	Flashing red or Blue	Flashing red (internal frame)
Fault status = <i>ACTIVE</i> Alarm acknowledged	ySzz xxxx	Blue	Steady red (internal frame)
Communication fault = <i>ACTIVE</i>	ySzz xxxx	White	Magenta (external frame)