



Exploration & Production

GENERAL SPECIFICATION

INSTRUMENTATION

GS INS 181

**Open Path Gas Detector
standard function
- GDB -**

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1. Scope

The purpose of this document is to define the Standard Function for an Open Path Gas Detector Standard (GDB).

This type of detector is based on infra-red beam technology, measuring the absorption of IR radiation in a specific volume of gas.

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 may be used in relationship with the 200N standard.

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**

- 4-20 mA signal acquisition,
- Conversion in engineering unit (LEL. m)
- Signal fault (Open & Short circuit),
- 1st high threshold gas detection
- 2nd high threshold gas detection
- Status handling : calibration, "blocked beam ", saturated
- Maintenance input trip command

4. Interface description

4.1 General description

INPUTS				OUTPUTS		
Field	HMI	Internal		Internal	HMI	Field
			GDB Standard	Analogue input		
				Gas concentration value		
				Maintenance input trip command		
				fault detection	Alm	
				Calibration status		
				“beam block” status		
				1 st threshold gas detection	Alm	
				2 nd threshold gas detection	Alm	
				Saturated status	Alm	
				Alm = Alarm		

4.2 Field interface description

Analog signal characteristics: (values to be checked with the Vendor)

- Signal = 0 mA detector in fault,
- 1,5 mA detector in calibration mode,
- 2 mA “Blocked beam ” status (set points are locally adjustable),
- 4 mA 0 LEL. m
- 20 mA 5 LEL. m (note 1)
- signal > 20 mA detector in over range

Note 1: such value, given for information, has to be confirmed by the Vendor; in function of the purpose, scale can also be selected in ppm.m.

For information, the “blocked beam” signal is only *ACTIVE* during a specific locally adjustable timer. Beyond this timer, the detector switches to fault status (0 mA).

5. Detailed description of functions

5.1 Status conditions

Values to be checked with the Vendor

Internal data	Calculation rules	status
1 st threshold gas detection	Signal > 1 st threshold (for DCS alarming and/or FGS logic)	ACTIVE
2 nd threshold gas detection	Signal > 2 nd threshold (for DCS alarming and/or FGS logic)	ACTIVE
Fault detection	Signal is below 2.3 mA or maintenance input trip command = ACTIVE (for DCS alarming and/or FGS logic)	ACTIVE
Calibration status	Signal is between 1 and 1,7 mA (for DCS animation only)	ACTIVE
“blocked beam” status	Signal is between 1,75 and 2.3 mA (for DCS animation only)	ACTIVE

5.2 Functional standard behaviour

When ACTIVE, calibration and “blocked beam” statuses are not considered as alarms, but only as specific status.

The maintenance input trip command will force the activation of the fault status.

6. Tuning parameters and variables

PARAMETERS	ACCESS LEVEL
Min scale pre-set value	Engineer
Max scale pre-set value	Engineer
1 st high threshold pre-set value	Engineer
2 nd high threshold pre-set value	Engineer

7. Representation and animation description (HMI)

7.1 Events and values to be recorded

7.1.1 Events

- 1st threshold gas detection
- 2nd threshold gas detection
- Fault detection
- Saturated status
- Maintenance input trip command
- “Blocked beam” status
- Calibration status

7.1.2 Analogue values

- Gas concentration value (LEL . m)

7.2 Alarm handling

Alarm Description	Priority
1 st threshold gas detection	Level 3
2 nd threshold gas detection	Level 3
Fault detection	Level 3
Saturated status	Level 3

7.3 Control display

The hereafter description gives examples of representation. However, they may be amended dependant on the DCS features.

Site layout animation with detector symbols



GDB xxxx = detector tag name (black / hidden)

H = gas 1st thresh. (red + flashing)

HH = gas 2nd thresh. (red + flashing)

SAT = saturated status alarm (red + flashing)

OPT = "blocked beam status (red)

CA = calibration status (yellow)

Internal data	Display	Symbol	Frame
All alarms = INACTIVE		Green	NA
Gas 1 st thresh. = ACTIVE and unacknowledged		Flashing red	NA
Gas 1 st thresh. = ACTIVE and acknowledged		Red steady	NA
Gas 2 nd thresh. = ACTIVE and unacknowledged		Flashing red	NA
Gas 2 nd thresh. = ACTIVE and acknowledged		Red steady	NA
Saturated status alarm = ACTIVE and unacknowledged		Red steady (SAT = flashing red)	NA
Saturated status alarm = ACTIVE and acknowledged		Red steady (SAT = red steady)	NA
Saturated status alarm = INACTIVE		(SAT = hidden)	NA

Internal data	Display	Symbol	Frame
Beam block = ACTIVE (with fault detection)	OPT 	(OPT = red steady)	As per AIS Standard Function
Beam block = INACTIVE		(OPT = hidden)	
Calibration = ACTIVE (with fault detection)	CA 	(CA = yellow steady)	As per AIS Standard Function
Calibration = INACTIVE		(CA = hidden)	
Inhibition of the result of the associated voting logic		Green Red or Yellow	Yellow

Upon communication fault or fault, frame animation will be as defined within AI standard.