



Exploration & Production

GENERAL SPECIFICATION

INSTRUMENTATION

GS INS 163

**Total Flow
standard function
- TOT-**

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1. Scope

The purpose of this document is to define the Standard Function for a TOTALIZED FLOW, with AVERAGE FLOW as an option.

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

The acquisition of Flow value is done through the following Standard Functions :

- AI Analogue Input
- RAI Redundant Analogue Input
- GCF Pressure and Temperature compensated Flow

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

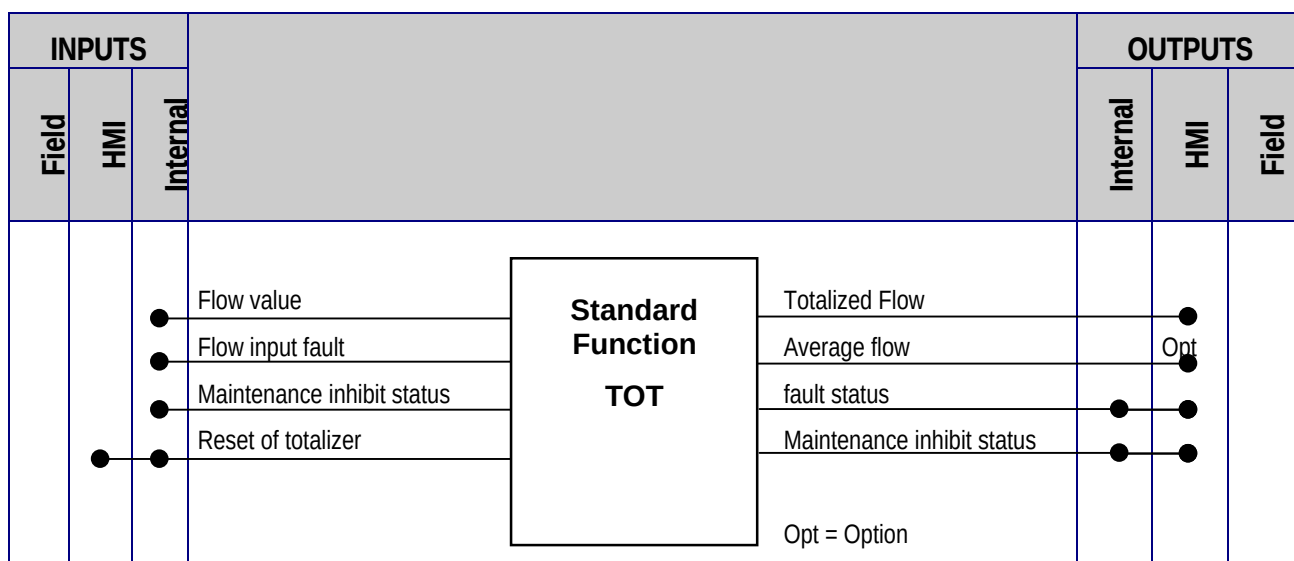
3. General description of functions

3.1 List of main functions

- Acquisition of the flow value
- Totalized flow
- Daily reset
- Input fault of associated flow measurement
- Maintenance inhibit of associated flow measurement

4. Description of interfaces

4.1 General description



5. Detailed description of functions

5.1 Totalizing formula

$$FQI_{(n)} = FI * \frac{T_s}{T_k} + FQI_{(n-1)}$$

Where:

FI = value to add up in engineering unit

FQI_(n) = current adding up value (in totalizing unit)

FQI_(n-1) = previous adding up value

T_s = sampling period (in seconds)

T_k = time scale conversion variable according to engineering unit

5.2 TOT_AV Option : average flow

The average flow formula is:

$$AV = \frac{FQI_{(n)}}{N}$$

Where:

AV = average flow

FQI_(n) = current adding up value

N = Adding up of samples

5.3 Reset of totalizer

Automatic report is performed each day and just after, the adding up value is recorded (and averaged if requested) and automatically reset.

The reset of totalizer is also available to the operator in method access level.

5.4 Maintenance inhibit

The totalized flow is considered in maintenance inhibit when the associated flow measurement is in maintenance inhibit.

5.5 Input fault

The totalized flow is considered in fault when the associated flow measure is in fault.

5.6 Maintenance inhibit or input fault handling

When the totalized flow is considered in maintenance inhibit or in fault, the last healthy value of flow and corresponding time are recorded to be restored in a daily report, the current adding up value being frozen.

During this state, the reset of adding up is still possible.

Upon next activation of the healthy status and removal of maintenance inhibit, the new healthy value of flow and corresponding time are recorded to be restored in a daily report.

6. Tuning parameters and variables

PARAMETER	ACCESS LEVEL
Reset of totalizer	Method

7. Representation and animation description (HMI)

7.1 Values to be recorded

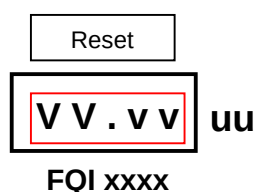
- Last healthy value of low before maintenance inhibit or fault.
- Duration of activation of maintenance inhibit or fault status
- New healthy value of flow after maintenance inhibit or fault removal.
- Time of activation of healthy status or removal of maintenance inhibit

7.2 Control display

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

7.2.1 Displayed data representation

Adding up and average current values representation are :



V V . v v = numerical value (in engineering unit),

uu = engineering unit (m^3/Km^3),

FQI xxxx = tag name (only appears on operator request)



Reset symbol is used as a target area for the display of the pop-up dedicated to the reset command

7.2.2 Analogue value display

Display description	Display	Text	Frame
Numeric value = <i>NORMAL</i> Units Label	VV.VV uu FQI xxxx	Green White White/Hidden	NA
Maintenance inhibit = INHIBITED	VV.VV uu	Yellow until reset of tolling	External frame : Steady Yellow
Input fault = Alarm (Input fault occurred before maintenance inhibit)	VV.VV uu	Red until reset of totalizer	Internal frame : Red flashing before acknowledgement Red steady after acknowledgement
Communication fault = <i>ACTIVE</i>	***** uu	White	External frame : Steady 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