



Exploration & Production

GENERAL SPECIFICATION

HVAC

GS EP HVA 290

Shut-off Damper Electrical Actuator(s)

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1. Scope

The purpose of this document is to define the minimum requirements for design, construction and supply of shut-off damper electrical actuator(s).

The words and expressions in CAPITAL CHARACTERS AND *ITALIC* are defined inside the general specification **GS EP HVA 801**.

When other words require a definition only for using in the present document, then the definition is given in a dedicated paragraph of the present document and the defined word, when used, is marked in small and *italic* letters.

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.

Documents order of precedence is defined in **GS EP HVA 100**.

Notes:

- In case of discrepancy between documents (whatever the documents and / or whatever origins), the most expensive solution must be quoted by the *BIDDER*. During the studies (Basic Engineering and / or Detailed Engineering) *CONTRACTOR(s)* shall raise the discrepancy noted to the *COMPANY's HVAC SPECIALIST*. This last shall review and shall cut short.
- The *HVAC VENDOR* or *CONTRACTOR* may propose proven improvements to the reference documents but must obtain written approval of the *COMPANY* prior to implementation.
- An International Standard is a good "engineering practice" which shall be recognised and taken into consideration by *VENDOR*, *SUPPLIER*, *MANUFACTURER* and/or *CONTRACTOR*. If required, the translation of the standards must be included into *HVAC* scope.
- The latest revision of Standards, codes, regulations and the published errata if any must be used and applied by *VENDOR*, *SUPPLIER*, *MANUFACTURER* and *CONTRACTOR*.

Standards

Reference	Title
EN 10204	Metallic materials - Types of inspection documents
IEC 60335-1	Household and similar electrical appliances - Safety - Part 1: General requirements
IEC 60529	Degrees of protection provided by enclosures

Professional Documents

Reference	Title
Not applicable	

Regulations

Reference	Title
Directive 94/9/EC, referred to a ATEX 100a / 95	Directive of the European parliament and the council on the approximation of the laws of the member states concerning equipment and protective systems intended for use in potentially explosives atmospheres
Directive 1999/92/EC, referred to a ATEX 118 / 137	Directive of the European parliament and the council on minimum requirements for improving the safety and health protection of workers potentially at risk from explosives atmospheres

Codes

Statutory by law or recognised professional body approved by COMPANY.

Reference	Title
Not applicable	

Other documents

Reference	Title
Not applicable	

Total General Specifications

Reference	Title
GS EP COR 350	External protection of offshore and coastal structures and equipment by painting
GS EP ELE 079	Electrical apparatus for potentially explosive gas atmospheres
GS EP HVA 000	List of HVAC specifications
GS EP HVA 010	Selection of Stainless Steel Grade for HVAC Equipment
GS EP HVA 100	Basis of design
GS EP HVA 801	Terminology, definitions, abbreviations

3. Definitions

Position switch: device equipped with a mechanical switch to monitor the position of one component of a piece of equipment. A change in a component position drives a shaft displacement which induces a modification of switch status.

4. Construction

For stainless steel selection, refer to General Specification **GS EP HVA 010**.

General note: when equipment has to be in accordance with ATEX directives, only certification by Notified Body is accepted by *COMPANY* (auto-certification / self certification by *MANUFACTURER* is not allowed, even when this auto-certification is recorded by Notified Body).

The actuator housing must be chosen according to its location on the *HVAC* plant:

Location	Housing
Outside of building	Stainless steel
Inside the building and out of an air flow	Aluminium
Inside an air handling unit, without outdoor air (ODA)	Aluminium
Inside an air handling unit, with a part of outdoor air (ODA)	Stainless steel

All berthing, bearings, brackets shall be supported by the stationary part of the actuator housing (crankcase). The removable cover of the housing shall not support any components.

Housing must be antistatic and IP66. It must be provided with an external earthing connection of 4 mm².

ATEX actuator certification, when required, must be II2G EEx d[ia] IIC T6, zone 1 and 2.

The housing dimensions (width, length, height) must be identical for all actuators operating with a torque from 5 to 15 N.m.

The shaft connection must be provided with an universal clamp for square and round shafts, allowing a connection of 12 to 16 mm round or square shafts.

The open position of damper must be done by an electrical actuator. The closing of damper shall be fail safe and must be obtained by a return spring accommodated within the actuator housing. The minimum return spring torque must be 15 N.m. The maximum closing time must be 1 second after the power supply shortage.

The return spring must be fail safe function to guarantee that no jamming of movement from open to closed position may happen.

The operating direction must be selected by left / right mounting on fire damper shaft. It means that actuator housing must be of designed to allow a reverse mounting.

The actuator housing must include an automatic power adaptor allowing an external power supply from 24 to 230 VAC/VDC, without need to select the power supply voltage. The electrical part of actuator must be protected against overload. The maximum power consumption of actuator must be limited to 20 W when the damper is maintained in open position.

The open position must be maintained until tripping of power supply, except is case of operating failure (refer to hereafter table).

In case of power supply shortage, motion of damper from closed to open position of damper must be possible by manual action by mean of a tool. This manual operation shall be made possible without any cover or actuator removal.

A complete manual on/off cycle in less than 1 minute must be guaranteed by the *MANUFACTURER*.

The actuator shall be sized 40% above the required damper closing torque.

An internal temperature sensor must shut-down operations when temperature inside actuator is above the maximum specified ambient temperature. In such a case, the fire damper must be moved or maintained in closed position (blades in closed position).

The actuator must be equipped with:

- Internal controlled heater
- Direct connection of temperature trigger
- Selectable operating time (from closed to open position of fire damper blades): 3, 15, 30, 60, 120 seconds for opening cycle
- *LED* for status indication: green for normal operating and red for fault. The following faults must be shown by *LED* lighting:

Status of actuator	Status of <i>LED</i>
No power supply	<i>LED</i> does not light
The actuator is operated above the maximum specified ambient temperature and the internal temperature sensor fail safe the actuator to the closed position.	
Power supply to actuator is lower than required. Actuator does not operate.	<i>LED</i> flashes randomly
Actuator is operated with a too high ambient temperature.	<i>LED</i> lights red
Actuator is not operating. Actuator is power supplied but the ambient temperature is too low and actuator cannot reach his internal operating temperature.	<i>LED</i> is red blinking
Actuator does not operate and required torque is greater than actuator torque.	<i>LED</i> lights green
Actuator is clocked with more than 20 pulses lower than 0.5 s and therefore must be therefore maintained in fail safe position.	
Control wires are not connected or wrongly connected.	

The adjustment of operating time (from closed to open position of fire damper blades) must be able even without power supply.

The initial current required when actuator power supply is switched-on must be limited to 2.0 A during 1 second, whatever the selected operating time.

The maximum absorbed current from the closed to the open position of fire damper must be as follow:

Operating time (s)	3	15	30	60	120
Maximum absorbed current (A)	5	1,5	0,6	0,5	0,5

The design of actuator must be done to operate with power supply cables dimensioned accordingly to the following formulae:

$$I = 90 \times S$$

With: S = section of cores (mm^2)

l = length of cable, from power supply to actuator (m)

Cycles up/down, overheating, and heater operating data must be stored in internal EPROM readable by the actuator *MANUFACTURER*. This data must be used for analysis in case of fire damper malfunction.

Actuator must be supplied with a power supply cable length of 1 meter. Cable outer diameter must be lower than 10 mm.

Actuator must be maintenance free.

Actuator must be provided with two auxiliary position switches:

- One change-over switch actuated after a shaft rotation of 5° (from de-energized position)
- One change-over switch actuated after a shaft rotation of 85° (from de-energized position).

Position switches must have a minimum capacity of 3A / 24 VDC

Actuator and position switches must be classified in accordance with the Area classification where they are installed:

Area classification	Performance
Non hazardous area	Non classified equipment
Hazardous area (until otherwise)	EEx II B T 4 + ATEX
Battery room	EEx II C T 3 + ATEX (refer to GS EP ELE 079)

The storage temperature range of actuator, including position switches must be from -40°C to 70°C .

The ambient operating temperature must be:

- From -40°C to 40°C (T6 classification)
- From -40°C to 50°C (T5 to T3 classifications).

The maximum actuator closure time must be 3 seconds.

5. Additional documents to provide

5.1 Submission of documents

The documents are submitted for Approval, Comment or Information. The following table lists the category of each document. Definitions of the submission class of documents are indicated below:

- Category A: document required for approval; *VENDOR* must not proceed on until receipt of the Purchaser's approval or first working day after the end of the review cycle, first coming.
- Category B: document required for comment; *VENDOR* must be allowed to proceed on before the end of the review cycle, but shall take into account at no cost/schedule impact any Purchaser's comment(s) issued within the review cycle.
- Category C: document required for information.

5.2 Documents to provide

The following documents must be provided by the *VENDOR*. These documents are a part of *FINAL DOCUMENTATION* that *HVAC CONTRACTOR* must provide to *COMPANY*:

Item	Document Title	Categ.	With Bid
INTERFACE			
INT02	Electrical & Instrumentation wiring drawings	B	
INT08	General arrangements drawings	B	Mandatory
INT16	Utility Consumption List	B	Mandatory
INT17	Power supply requirements	A	Mandatory
INT19	Earthing details	B	
RECORDS, REPORTS & CERTIFICATES			
RRC01	Material Inspection Certificate (EN 10204 , DIN 50049)	C	
RRC02	Testing Authority Approval Certificate	C	
RRC03	Hazardous Area Certificates	C	
RRC05	Conformity Certificates and Temporary Certificates	C	
RRC17	Functional Test Report/certificates	B	
INSTALLATION			
INS04	Erection/Installation & Tie-in Documentation	B	
INS05	Erection/Installation & Tie-in Drawings	B	
INS10	Packing List	C	

5.3 Quantities of documents

The hereafter indicated values are minimum. In case of more important quantity of copies required by the Contract, the values indicated hereafter must be increased as per requirement.

For Review:

- Drawings: 3 hard-copy + 1 electronic
- Documents: 3 hard-copy + 1 electronic
- *VENDOR's* Book: 2 sets + 1 electronic.

Final Submission (Certified Finals)

- Drawings: 6 hard-copy + 2 electronic (CD-Rom)
- Documents: 12 hard-copy + 2 electronic (CD-Rom)
- Data Books: 3 Original + 3 copies + 2 electronic (CD-Rom).

5.4 Format of documents

5.4.1 Electronic copy

An electronic copy of all project specific documents must be submitted in Native File Format (.doc, .xls & .dwg preferred). Standard documentation may be .pdf or .tif format. Data must be provided on CD.

5.4.2 Hard Copy

All documents must be full size based on 'A' series sizes, A0 size is not acceptable.

All documents shall be checked before submission, unchecked documents may be returned un-reviewed.

All documents submitted must be clearly marked with the Purchase Order No., Item No, *VENDOR* Job No., Equipment/Tag No. (if applicable), *VENDOR* Document No., Purchasers Document No.

All documents and technical data must be in the English language with dimensions and units in accordance with ISO.

A3 and A4 documents must be submitted with a project document front sheet, which will carry the Purchaser's review status on return to the *VENDOR*.

All document prints larger than A4 must be folded to A4 size with identification data visible at the bottom right.

Note I: The documents to provide represent an important part of the *VENDOR's* supply. If one or several documents were not delivered, the Buyer would be able to suspend his payment.

Note II: The documents provided by the *VENDOR*, correspondence between the *VENDOR* and the Buyer or between the *VENDOR* and *ENGINEERING* must be typed. Hand-written correspondence will be rejected.

6. Equipment inspection

For the actuator(s), the *COMPANY* can require an equipment inspection according to the following table:

Level 0	[x]	No inspection required
Level 1	[x ¹]	Final inspection prior to shipment and <i>FAT</i> with <i>MANUFACTURER</i> and <i>COMPANY HVAC</i> specialist (from Exploration & Production division, Technology department).
Level 2	[]	- In-progress surveillance, meetings, all witness and hold points. - Final inspection prior to shipment and <i>FAT</i> with <i>MANUFACTURER</i> and <i>COMPANY HVAC</i> specialist (from Exploration & Production division, Technology department).
Level 3	[]	- Continuous monitoring by resident inspector. - Final inspection prior to shipment and <i>FAT</i> with <i>MANUFACTURER</i> and <i>COMPANY HVAC</i> specialist (from Exploration & Production division, Technology department).

7. Data sheet

A data sheet (provided in General Specification CD-Rom) must be filled and transmitted to *COMPANY*.

¹ Applicable to *MANUFACTURER* which is not in the Company's HVAC *VENDORS* List