BHARAT HEAVY ELECTRICALS LIMITED,

RANIPET- 632 406.

TECHNICAL SPECIFICATION

FOR

PNEUMATIC FLOW CONTROL

ON-OFF ACTUATOR

&

ELECTRIC ACTUATOR

Ref.		Revisions:	Prepared :	Checked :	Approved:	Date :
		Rev 03	AJV	MKV	VNS	22.06.18
		Rev 02	AJV	MKV	VNS	25.05.18
		Rev 01	AJV	MKV	VNS	09.05.18
		Rev 00	AJV	MKV	VNS	20.11.17

CONTENTS

1. SCOPE

This specification is intended to cover the design, manufacture, assembly, testing at manufacturer's works/testing laboratories, supply & delivery, properly packed for pneumatic actuator complete with all fittings, accessories and auxiliary equipment for efficient and trouble-free operation.

The scope of supply shall include all required accessories and tubing for valves, actuator and accessories as a single complete assembly and not limited to accessories mentioned here.

2. PNEUMATIC ACTUATOR & ACCESSORIES FOR ON-OFF VALVE

(a)	Quantity	01 No. for each Pneumatic Operated Valve (POV)
(b)	Type	Pneumatic Rotary (Rack & Pinion) Double acting(Air to Open & Air to Close)
(c)	Pressure	4-7 Kg /sq. cm
(d)	Air Connection	¼" NPT(F) copper tube
(e)	Hand wheel for manual operation	Required
(f)	State of driven equipment on air failure	Stay put
(g)	Torque capacity	Vendor to select to suit torque requirement of valve type,size & rating.
(h)	Limit Switch	One for Open & one for Close position for each POV with 2 NO+2NC potential free contacts in each limit switch. Contact rating shall be 5A,240V AC , 0.5A, 220 V DC. Enclosure shall be weather proof IP 55. All NO contacts terminals shall be brought out in a nine pin plug in connector .
(i)	Quick Exhaust	02 No. for each Pneumatic Operated Valve (POV)

3. PNEUMATIC ACTUATOR & ACCESSORIES FOR FLOW CONTROL VALVES

1.1.	Quantity	01 No. for each Pneumatic Operated Valve (POV)
1.2.	Type	Pneumatic Rotary (Rack & Pinion) Double acting
1.3.	Air Connection	¼" NPT(F) copper/SS tube
1.4.	Hand wheel for manual operation	Required
1.5.	Torque capacity	Vendor to select to suit torque requirement of valve type,size & rating.
1.6.	Positioner	Smart type with HART communication protocol, With regulating input as 2 wire 4-20 mA(24 V). Housed in cast aluminium casing (with polyurethane paint); IP65 degree of protection for enclosure. Material of accessories shall be SS. The allowable drift rate will be +2% of set point/ hour maximum. The positioner shall be mounted on the actuator.
1.7.	Valve position transmitter	Required with output indicating position of valve as 2 wire 4-20 mA(24 V).
1.8.	Air Filter Regulator	Type: Manual Drain Inlet :4 – 7 Kg / sq. cm Filtering particles: > 5 microns Filter Element: Sintered bronze/Phosphor Bronze/Polypropylene Output pressure: 0 – 7 Kg / sq. cm

		Output Gauge Range : 0-10 Kg/sq.cm Output Pressure Gauge dial: min 40mm Blow down valve: To be provided Air connection Inlet : suitable end fittings to be provided for ¼" SS/copper tube .

4. LIMIT SWITCHES FOR MANUAL VALVES

Provide one for Open & one for Close position for each valve with 2 NO+2NC potential free contacts in each limit switch. Contact rating shall be 5A,240V AC , 0.5A, 220 V DC. Enclosure shall be weather proof IP 55. Both NO contacts of each limit switch terminals shall be brought out in a five pin plug in connector.

5. ELECTRIC ACTUATORS WITH INTEGRAL STARTERS (MOTORISED ACTUATOR)

03

5.1. **TYPE**

Binary Drive (ON-OFF)

The actuators shall have integral starters along with over load relays with built in SPP (Single Phasing Preventer). Alternatively Smart non-intrusive actuators are also acceptable. A 415, 3 phase 3 wire power supply shall be given to the actuator from switch board as applicable through a switch fuse unit. Control voltage of the motor starter shall be 110 V AC / 24 V DC, derived suitably from 415V power supply.

In case supplier's standard control voltage for Open/Close contactors is 110V AC, the same is acceptable if suitable Opto Isolation circuit is provided with coupling relays for 24 V DC command inputs.

5.2. **INTERFACES**

Open/Close command termination logic with position & torque Limit Switches, positioner circuit shall be suitably built in the PCB inside the actuator.

Open/Close command & status thereof and disturbance monitoring signal (common contact for Overload, Thermostat, control supply failure, L/R selector switch at local & other protections operated) shall be provided.

Interface with the control system shall be through hardware signal only. Inter posing relays provided (with coil burden 2.5 VA) in the actuator shall be energized to initiate opening and closing, by 24V DC signal from the external control system.

Open/close command termination logic shall be suitably built inside actuator.

5.3. **RATING :**

(a) Supply Voltage & frequency: 415V +/- 10%, 3 Phase, 3 Wire 50HZ +/-5%.
(b) Sizing:- Open/Close at rated speed against designed differential pressure at 90% of rated voltage.Three successive open-close operations or 15 mins, whichever is higher.

5.4. **CONSTRUCTION:**

(a) Enclosure:
Totally enclosed weatherproof minimum IP-55 degree of protection.

(b) Gear Train :
Metal (Fibre gears are not acceptable)) self-locking to prevent drift under torque switch (where ever applicable) spring pressure when motor is deenergized.

(c) Manual Wheel:
Shall disengage automatically during motor operation.

5.5. **MOTOR :**

(a) Type :
Squirrel cage induction motor suitable for Direct On Line (DOL)starting.
(b) Enclosure:
Totally enclosed, self ventilated IP-55 degree of protection.
(c) Insulation
Class B or better. Temperature rise 70 Deg C. over 50 Deg C ambient
(d) Bearings:
Double shielded, grease lubricated antifriction.
(e) Earth Terminals:
Two
(f) Protection:
Single Phasing Protection, Over heating protection through Thermostat (as applicable) and wrong phase sequence protection shall be provided over and above other protection features standard to bidder's design Suitable means shall be provided to diagnose the type of fault locally

5.6. **POSITION/TORQUE SWITCHES:**

Four nos. (2 each in open and close position) position limit switches/contacts and two nos. (one in open and other in close direction) torque switches/contacts each having two nos. NO and two nos. NC contacts shall be provided.
Torque switches/contacts shall be bypassed in both the end positions with the other end Limit switches/contacts.

Limit switches/contacts
Limit switches shall be Silver plated with high conductivity and non –corrosive type. Contact rating shall be sufficient to meet the requirement of Control System subject to a minimum of 60 V, 6 VA rating. Protection class shall be IP-55.

Limit switch/contacts and disturbance signals shall be available to DCS/PLC even when the power supply to the actuators is not available.

5.7. **LOCAL OPERATION:**

It shall be possible to operate the actuator locally also. Lockable local/remote selection shall be provided on the actuator.

5.8. **POSITION INDICATOR :**

To be provided for 0 to 100% travel.

5.9. **WIRING :**

Suitable voltage grade copper wire.

5.10. **TERMINAL BOX :**

(a) 9 pin plug and socket (1 no. per actuator to suit 4 pair 0.5 sq.mm. copper overall shielded (16 mm OD), instrumentation cable) suitably mounted in the starter box itself to terminate open/close command and status feedback signals with external control systems.
(b) Necessary glands for power cables shall be provided. Cable sizes shall be informed after oder.

5.11. **TERMINAL BLOCK :**

650V grade. For power cables.

5.12. **SPACE HEATER :**

Space heater of suitable rating. The supply shall be derived from the main power supply available in the actuator.

5.13. **TYPICAL WIRING :**

Following terminals shall be brought out with a nine pin plug in connector

(a) Disturbance
(b) Open Limit Switch
(c) Close Limit Switch
(d) Open Torque Limit switch
(e) Close Torque Limit switch
(f) Open Command
(g) Close Command

6. DRAWINGS & DOCUMENTS TO BE SUBMITTED

6.1. **Along with offer**
Datasheet and/or catalog with selected model number for

(a) Pneumatic Actuator
(b) Limit switch
(c) Positioner and Position Transmitter
(d) Air Filter Regulator
(e) Motorised actuator catalog with selected model number

6.2. **Documentation after placing of Purchase Order**

(a) GA drawing of the complete valve-actuator-accessories arrangement
(b) Datasheet ,wiring diagram & O&M manual of actuator with accessories
(c) BOM of all fitments, accessories
(d) Cable termination details
(e) Quality assurance plan
(f) Test certificates/test reports(Including Cv test report)
(g) Any other relevant drawings, documents or data necessary for satisfactory installation, operation and maintenance