



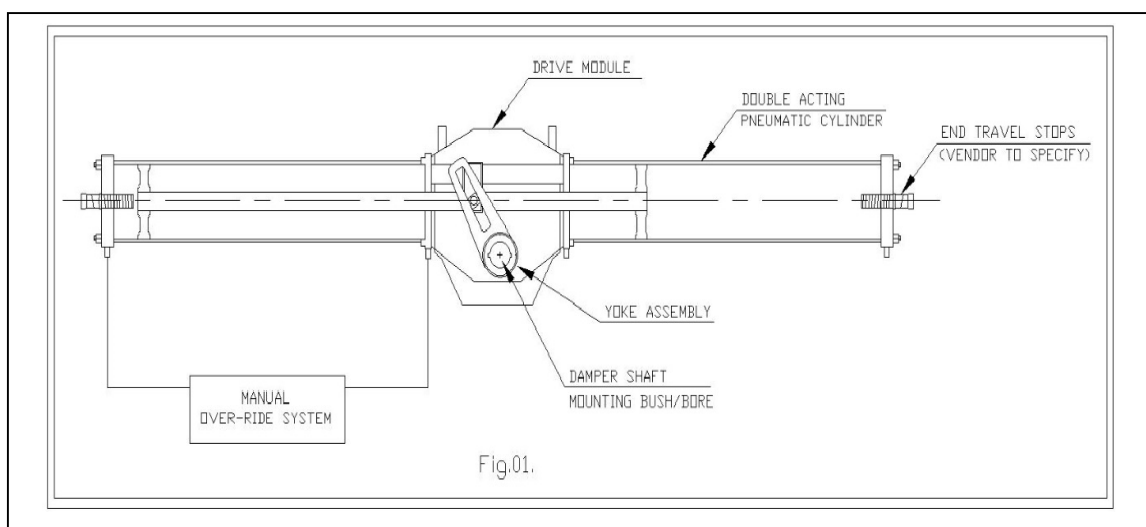
1	Item	Scotch-Yoke type Pneumatic Actuator	Vendor / Acceptance / Comments
2	Scope of supply	Scotch-Yoke type Pneumatic Quarter-Turn Actuator along with Manual Over ride, Wiring, Junction box, pneumatic circuit & Mounting Bolts	
	Type	a) Heavy duty, Double acting; 100% Fail safe (Refer Fig.01.) b) <u>Tandem air cylinders design NOT ACCEPTABLE.</u>	
3	Application	For Dampers: a) Regulation (4-20mA), and b) Open/Close (within 10 seconds)	
	Actuator & Circuit box Mounting Orientation & Layout	Refer purchase enquiry along with 3-57-999-26495/Latest Rev.	
4	Pneumatic/electric connection between Circuit Box & Actuator	a) LAYOUT-1 of 3-57-999-26495/Latest Rev (Refer purchase enquiry) SS304 tubing. b) Suitable sized metallic galvanized flexible conduit to be provided for cables outside the circuit box.	
		c) LAYOUT-2 & 3 of 3-57-999-26495/Latest Rev (Refer purchase enquiry) Double Braided SS304 Flexible hoses with minimum 3 meters length. d) Suitable sized metallic galvanized flexible conduit to be provided for cables outside the circuit box.	
5	RH/LH & Open/Close Directions of Actuator	Refer Fig.02-A & 02-B. Refer purchase enquiry.	
6	Operating Medium	Instrument air (Compressed Air) 4 kg/cm ² filtered & lubricated.	
7	Working Environment	Dusty, corrosive & highly polluted. Temperature may go up to 150° C.	
8	Output Torque required, kgm	Refer purchase enquiry. Factor of Safety (FOS) is included. Vendor shall NOT consider additional FOS.	
9	Actuator output Bore dia, mm	a) Actuator output bore shall have FOUR key-ways 90-deg apart (TO SUIT HORIZONTAL/VERTICAL MOUNTING). b) Bore dia, mm to be specified by Vendor during Enquiry Stage.	
10	Actuator Model Number & Volume, liters	Vendor to specify.	
11	Actuator Material (Vendor to specify)	a) Actuator Body b) Self-Lubricating Bearings (Location & Type/Make) c) Scotch, Yoke & Yoke Pin d) Sliding Block e) Seals (VITON)	
12	Cylinder ID plating Thickness	a) Type of coating, vendor to specify. b) Thickness of coating, vendor to specify.	

05	24.01.2020	Sl.no.4,8,14,31 revised	Suresh	Ashwin Dhinakar
REV	DATE	DESCRIPTION	PREPARED	APPROVED

SL. NO	Particulars	Description	Vendor / Acceptance / Comments
13	Manual Over Ride & Type	a) To be provided; Hand-wheel operated gear box. <u>(FOR ACTUATOR OUTPUT TORQUE UPTO 10,000 Nm.)</u> b) Gear Ratio, vendor to specify. c) Type & grade of grease, vendor to specify.	
		d) To be provided; Hydraulic without spring return. <u>(FOR ACTUATOR OUTPUT TORQUE GREATER THAN 10,000 Nm.)</u> e) Oil reservoir orientation shall be based on actuator orientation Sl.no.03. f) Type & Grade of oil, Volume in liters-Vendor to specify.	
14	Smart Positioner	To be provided as per specification GDRS:029/ Latest Rev.	
15	Type of Yoke	Symmetric/Canted (Vendor to specify). Also vendor to furnish Torque Characteristic curve during Enquiry Stage.	
16	Smart Positioner Make & Model number	Vendor to specify.	
17	Pneumatic Hook Up Diagram	Refer 2-57-999-25089/ Latest Rev. Vendor's pneumatic circuit diagram along with circuit write-up to be submitted during Enquiry Stage. (THIS IS TECHNICAL EVALUATION CRITERIA)	
18	Sizing Calculations (Considering 4kg/sqcm at Air filter inlet)	a) Vendor to submit Actuator selection with Torque sizing calculation during Enquiry Stage. b) Vendor to submit pneumatic sizing calculations to meet below Timing requirements (Sl.no.19), during Enquiry Stage.	
19	Control Logics/Fail Safe Conditions	Open/Close – Less than 10 seconds	
		Air Failure – Quick Open (Less than 10 seconds)	
		Power Failure – Quick Open (Less than 10 seconds)	
		Signal Failure (4-20mA) – Quick Open (Less than 10 seconds)	
		Emergency Signal – Quick Open (Less than 10 seconds)	
20	Tie Rods	a) Internal or External, vendor to specify. b) Material of tie rods, vendor to specify. c) Type of coating with thickness, vendor to specify.	
21	Enclosure for Smart Positioner	Metallic enclosure to protect from dust and water shall be provided for Smart Positioner.	
22	Enclosure for pneumatic circuit, junction box	a) Completely closed box-type enclosure with 180deg Swing door; gaskets and Lock to be provided. b) Material: SS304 (min. 3mm thickness). c) Final protection class of enclosure shall be IP55. d) For Layout-2 & 3 of 3-57-999-26495/Latest Rev, suitable Channels to be provided by vendor as ROBUST Base of the Circuit box. Also mounting bolts are vendor scope of supply.	
23	Protection Class of Actuator	IP 67	

SL. NO	Particulars	Description	Vendor / Acceptance / Comments
24	Junction Box & Wiring	a) Junction box to be placed inside the pneumatic circuit box. b) One termination Junction box (JB) to be provided with 2 Rows & 12 Nos of terminals. All wirings are to be terminated into JB with brass cable glands. c) Wiring Diagram to be submitted by Vendor during GA drawing approval stage. d) Wiring to be done with proper crimping lug & identification ferrules. e) Suitable cable glands shall be used at junction box (1619+1611 Commet) to ensure water & dust proof wiring. f) Finally wired JB has to meet IP55. g) Extra 05 nos. cable glands & 10 cable lugs to be supplied along with the junction box.	
		Material: FRP	
25	Number of and Location of End Travel Stopper Bolts.	Vendor to specify	
26	Standard Travel Adjustment Range	Vendor to specify	
27	Inspection	a) 100 percent inspection by BHEL or BHEL approved agency. b) The Inspection shall be carried out for 05 times operation, and recorded as per attached Inspection Report (SCOTCHYOKE:TEST/Latest Rev).	
28	Pressure Test	During testing, the piston shall operate smoothly at the given Minimum working pressure.	
29	Name plate	Two name plates are to be fastened at the front end of scotch-yoke body and another on the circuit box. It has to contain the following details. 1) Manufacturers name 2) Min/Max working pressures (kg/cm²) 3) Mounting Bore diameter (mm) 4) Actuator torque (kgm) 5) BHEL material code (Indent No / P.O.Ref.) 6) Year and month of manufacture and serial number. 7) Actuator weight in kgs	
30	Painting for Actuator body & Circuit box	Surface preparation– Blast cleaning of SA 2 1/2 to a surface profile of 35 to 50 micron. Epoxy primer-as per IS 13238 with film thickness of 30 micron. Epoxy finish paint as per is 14209 with film thickness of 30 micron. a) Shade of actuator shall be HR Aluminum to IS-13183 Gr.3. b) Shade of circuit box shall be HR Aluminum to IS-13183 Gr.3. Total DFT=60 micron.	
31	Packing	Actuator & circuit box assembly – BOTH Wrapped in polythene paper and packed in wooden crate to prevent water/dust ingress.	

SL. NO	Particulars	Description	Vendor / Acceptance / Comments
32	Documents during Enquiry	The following details shall be furnished by the supplier during offer itself; without this the offer will not be considered. a) Point wise acceptance /comment for specification GDRS:028(Refer latest rev) to be submitted along with offer. b) General Arrangement drawing with sectional view & material specification. c) Spares recommended for commissioning d) Spares recommended for two years trouble free operation. e) Seal Kit model no & make. f) Catalogue, if any	
33	Drawing for approval	Approval to be obtained for detailed drawing with BOM & Spare kit BOM before manufacturing.	
34	Documents during Supply	The following documents shall be submitted by the supplier along with supply of Air cylinder a) Material test certificate. b) Operational test certificate. c) Operation and Maintenance manual-indicating assembly, dismantling, operation, maintenance, instruction and spare kit make & model details.	
35	Notes	All sharp corners & edges are to be rounded off (Approximately R2)	
36	End connections	SS304 dummy plugs to be suitably provided in Pneumatic circuit end connections.	



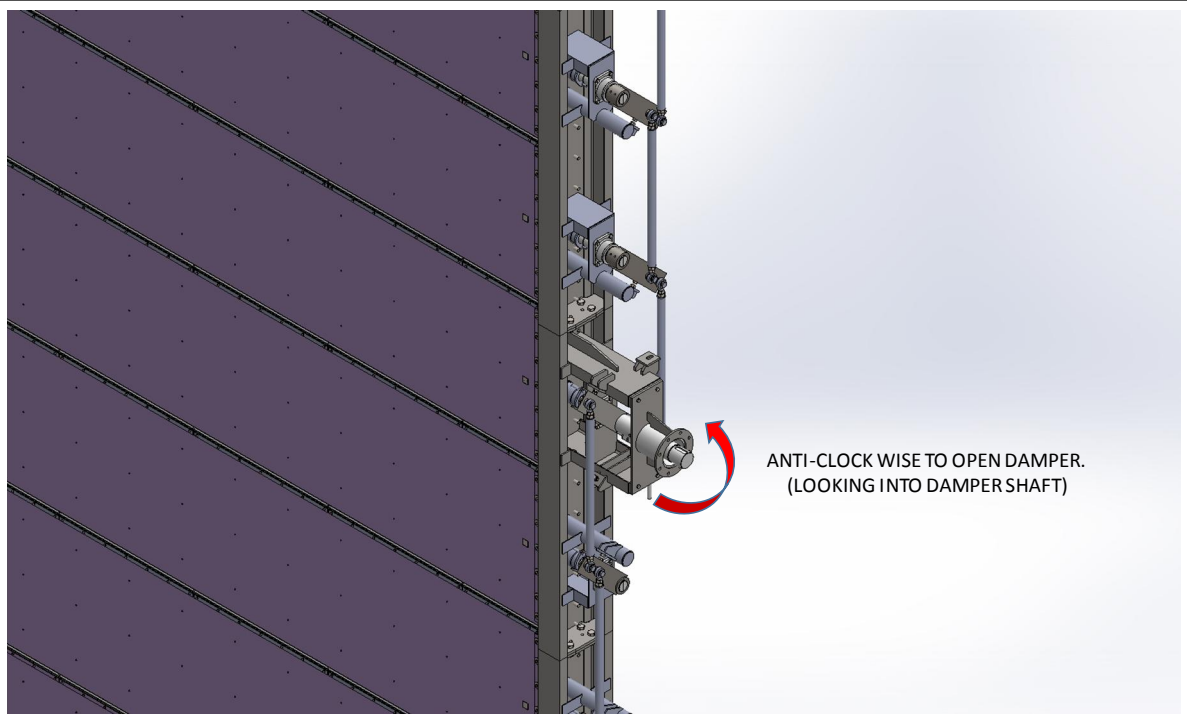


Fig.02-A. Open/Close Directions for RH-Damper.

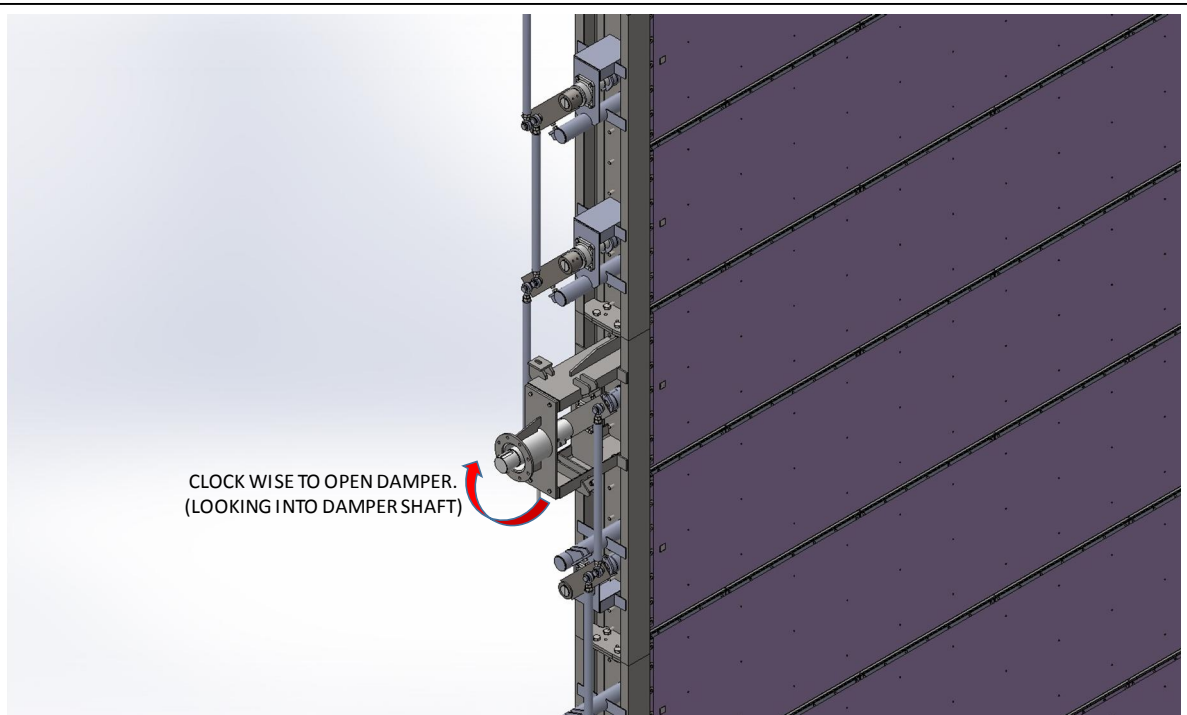


Fig.02-B. Open/Close Directions for LH-Damper.