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Revision History					
00	18.07.24	Fresh Issue	B.S	V.R.E	C.S
Rev	Date	Alteration	Prepared	Reviewed	Approved

1.0 IMPORTANT NOTE TO THE BIDDER

Bidder is to take Photostat copy of control valve data sheets, Section VII and section VIII of this specification, fill it by neatly typing and submit the same along with the offer. Non-compliance of the above shall lead to rejection of the offer. Information called for in the above sections of the Technical Specification furnished in any other format shall be considered only for information.

2.0 SECTION – I : INTENT OF SPECIFICATION

1.0 This specification is intended to cover the design, engineering, manufacture, shop fabrication, assembly, tests and inspection at manufacturer's works, packing and despatch of control valves for the mentioned project.

2.0 The equipment to be supplied as per this Technical specification shall be suitable for the site conditions specified in Equipment specification (Section III)

3.0 It is not the intent to completely specify herein all aspects of design and construction of equipment. Nevertheless the equipment shall conform to all aspects of high standards of engineering , design and workmanship and shall be capable of performing in continuous commercial operation in a manner acceptable to the purchaser who will interpret the meaning of the specification, drawings and shall have right to accept or reject any work or material which in his assessment is not complete to meet the requirements of this specification and/or applicable national and/or international standards mentioned elsewhere in the specification.

3.0 SECTION – II: SCOPE OF WORK AND SUPPLY

1.0 SCOPE OF WORK: The scope of work of this specification shall include design, manufacture, testing and delivery of control valves as detailed in various sections of this specification.

2.0 SCOPE OF SUPPLY: Refer Attached project specific Datasheets

Complete accessories such as pneumatic diaphragm actuators, smart positioners, air lock valve, limit

switches, air-set (air filter with regulators and gauges), moisture separator, junction box and hand wheel etc for all control valves shall be mounted integrally, tubed and supplied.

4.0 SECTION – III: EQUIPMENT SPECIFICATION

Refer Attached project specific Datasheets

5.0 SECTION IV: GENERAL TECHNICAL REQUIREMENTS

1.0 The Control valves and accessories furnished by the bidder shall be designed, constructed and tested in accordance with the latest applicable requirements of code for power piping ASME B31.1, the ASME Boiler & Pressure vessel code, Indian Boiler Regulation (IBR), ISA, and other standards specified elsewhere as well as in accordance with all applicable requirements of the "Federal Occupational Safety and Health Standards, USA " or acceptable equal standards.

2.0 The design of all valve bodies shall meet the specification requirements and shall conform to the requirements of ASME for dimensions, material thickness and material specification for their respective pressure classes.

3.0 The valve sizing shall be suitable for obtaining maximum flow conditions and minimum flow conditions as per ***Project Specific Datasheets***. All the valves shall be capable of handling at least 120% of the required maximum flow.

While deciding the size of valves, Bidder shall ensure that velocity restriction as per ***Project Specific Datasheets.*** Bidder shall furnish the sizing calculations clearly indicating the outlet velocity achieved with the valve size selected by him as well as noise calculations, which will be subject to Owner's approval during detailed engineering.

4.0 Control valves for steam and water applications shall be designed to prevent cavitation, wire drawing, flashing on the downstream side of valve and downstream piping. Thus for cavitation /

flashing service, only valve with anti cavitation trim shall be provided. Detailed calculations to establish whether cavitation will occur or not for any given application shall be furnished.

5.0 Control valves shall have leakage rate as per ***Project Specific Datasheets.***

6.0 Noise level shall be as per ***Project Specific Datasheets.***

7.0 The characteristic of control valves shall be determined based on the application / service.

8.0 Bidder to supply SMART Positioner as specified in ***Project Specific C&I Datasheet.*** Bidder shall specifically mention the make and model number of quoted SMART Positioner.

9.0 VALVE CONSTRUCTION**:**

9.1 All valves shall be of globe body design & straightway pattern with single or double port, unless otherwise specified or recommended by the manufacturer to be of angle body type. Rotary valve may alternatively be offered when pressure and pressure drops permit.

9.2 Valves with high lift cage-guided plugs & quick-change trims shall be supplied.

9.3 Cast Iron valves are not acceptable.

9.4 Bonnet joints for all control valves shall be of flanged and bolted type. Bonnet joints of internal threaded or union type are not acceptable.

9.5 Plug shall be as per ***Project Specific Datasheets***. Plug shall be screwed and pinned to valve stems or shall be integral with the valve stems.

9.6 All valves connected to vacuum on down stream side shall be provided with packing suitable for vacuum application (e.g Double Vee type chevron packing)

9.7 Valve characteristic shall match with the process characteristics.

9.8 Extension Bonnets shall be provided if applicable as per ***Project Specific Datasheets.***

9.9 Flanged valves shall be rated at no less than ASME pressure class of 300 lbs.

10.0 VALVE ACTUATORS:

10.1 All control valves shall be furnished with pneumatic actuators. The Bidder shall be responsible for proper selection and sizing of valve actuators in accordance with the pressure drop and maximum shut off pressure and leakage class requirements. The valve actuators shall be capable of operating at 60° C continuously.

10.2 Valve actuators and stems shall be adequate to handle the unbalanced forces occurring under the specified flow conditions or the maximum differential pressure specified. An adequate allowance for stem force, at least 0.15 Kg/cm^2 per linear millimetre of seating surface, shall be provided in the selection of actuator to ensure tight seating unless otherwise specified.

10.3 The travel time for the actuators shall as per ***Project Specific Datasheets.***

11.0 CONTROL VALVE ACCESSORY DEVICES:

11.1 All control valve accessories such as air locks, limit switches, smart positioners, volume booster, moisture separators, tubing and air sets and junction boxes etc. shall be provided as specified in ***Project Specific Datasheet.***

12.0 NAME PLATE:

12.1 Name plate shall be of engraved chromium plate or label with engraving filled with enamel. Nameplate data shall be inscribed on the plate in such a manner that it cannot erode or peel off. Name Plate inscriptions shall be bilingual in Hindi followed by English. Alternatively two separate plates one with Hindi and other with English inscriptions may be provided.

12.2 Name plate shall be marked in accordance with MSS standard SP-25 and ASME B16.34 asa minimum.

12.3 Valves shall be identified by owner's tag no. on a metal tag permanently attached to a non pressure part, such as the yoke by a stainless steel wire.

12.4 All exposed steel surfaces are to be painted before despatch as per applicable QP.

6.0 SECTION-V: MANDATORY SPARES

1.0 Mandatory spares

Mandatory spares are those spares, which are considered essential by the purchaser for normal operation of the plant. If such spares are indicated, bidder shall indicate the price for each and every item in the schedule of mandatory spares whether or not the Bidder considers it necessary for the purchaser to have it. If the bidder fails to comply with the above or fails to quote the price of any mandatory spares the cost of such spares shall be deemed to be included in the contract price.

2.0 Bidder shall identify the Spares in the cross-sectional drawing or in the catalogue for easy reference.

3.0 All spares supplied under this contract shall be strictly interchangeable with the parts for which they are intended for replacements. The spares shall be treated and packed for long storage under the

climatic conditions prevailing at the site. eg. Small Items shall be packed in sealed transparent plastic bags with dissector packs as necessary.

4.0 Each spare shall be clearly marked or labelled on the outside of the packing with its description. When more than one spare part is packed in a single case a general description of the contents shall be indicated on the outside of such cases and a detailed list enclosed. All cases, containers and other package must be suitably marked and numbered for the purpose of identification.

5.0 All spare parts furnished shall be new and unused. The contractor shall guarantee that in the event of any of the spares offered goes out of production notice shall be given to the owner sufficiently in advance to enable him to order this requirement of spares in one lot, if he so desires.

6.0 Bidder shall indicate the service expectancy period for the spare parts under normal operating conditions before the replacement is necessary.

7.0 Complete manufacturing drawings of items shall be given to the owner as and when any spare parts is discontinued from manufacturing.

8.0 Requirement of Mandatory Spares as per customer tender specification are indicated separately in Table V-A.

7.0 SECTION-VI: QUALITY ASSURANCE, INSPECTION AND TESTING:

Manufacturing Quality requirements shall be inline with BHEL Standard Quality plan.
Type test shall be as per ***Project Specific Datasheet***

9.0 SECTION-VII: DOCUMENTS TO BE SUBMITTED ALONG WITH THE OFFER

Note: a) All documents shall be in ENGLISH language only
b) Only units followed in this specification are to be used.

Sl.no	Description	To be filled by the bidder. Bidder's drawing or document reference (if not furnished "not furnished" with reason)
1.0	General arrangement drawing of the valves with actuators and other special accessories indicating clearly a) Overall Dimensions b) Weight of valve, actuator & special accessories c) Model no. d) Make & Country of Manufacture e) Rating/Design code f) Type g) End connection details h) Type of actuator i) Make of actuator and Model No. j) Valve Tag nos.	
2.0	Cross sectional drawing of the valve with actuators and special accessories indicating minimum the following: i) Names of all parts ii) Material of construction of all parts (Material specification shall not be in general terms like carbon steel, Alloy steel etc. Material specification shall conform to International standards. In case of Material specification other than ASTM, equivalent ASTM material specification to be indicated. No part of the valve to be left in the Tabulation). Minimum the following parts to be covered if applicable a. Body b. Bonnet, Cap c. Disc d. Stem e. Plug f. Disc seat g. Stem guide h. Gasket	

	i. Gland packing j. Bolts & studs k. Nuts l. Hand wheel iii) Weight of all parts iv) Mandatory spares identification in cross sectional GA Drg along with their quantity. v) Weight of valve & actuator separately-total weight and flooded weight vi) Class rating as per ASME B16.34 vii) Make & Country of Manufacture a. Actuator Make & Type b. End connection details Relevant catalogues for the valves	
3.0 4.0	List of Tender deviations (It will be presumed that the bidder has no tender deviations in case bidder failing to furnish the same).	

Certified that all the information called for is available in the document or drawing indicated above.

Certified that our supply of valves will be in line with the Technical specification except the deviations furnished in the list of Tender deviations enclosed if any.

(Signature of the bidder)

9.0 SECTION VIII: DOCUMENTS TO BE SUBMITTED AFTER AWARD OF THE CONTRACT

Note:
a) All documents shall be in ENGLISH language only
b) Only units followed in this specification are to be used.
c) All documents shall contain the project name
d) Applicable valve tag nos.

S.no	Description	Ref. Drawing	No of days reqd. To submit for approval after LOA / TOA or to resubmit for approval after BHEL comments.	No. of copies to be sent for approval.	No of days to furnish final drg after final approval.	No of copies to be furnished after final approval.
1.0	General arrangement drawing as per point 1 , section VII.		15	5	5	15
2.0	Cross sectional drawing as per point 2 , section VII		15	5	5	15
3.0	Technical Datasheets for each valve					
4.0	Cv sizing calculation sheet					
5.0	Manual sample Cv calculation					
6.0	Manual noise level calculation					
7.0	Manual velocity calculation					
8.0	Manual valve thrust / actuator thrust sizing calculation.					
9.0	Characterisitic curve					
10.0	Pneumatic hook-up and wiring diagram for control valve.					
11.0	Catalogue for the offered smart positioner					
12.0	Catalogue for the offered control valve model.					
13.0	Applicable catalogue of valve.		15	5	5	15

S.no	Description	Ref. Drawing	No of days reqd. To submit for approval after LOA / TOA or to resubmit for approval after BHEL comments.	No. of copies to be sent for approval.	No of days to furnish final drg after final approval.	No of copies to be furnished after final approval.
14.0	Erection, commissioning, operation and maintenance manual		LATER	5	5	15
15.0	1) General arrgt. & cross sectional arrgt. drawings as per point 1&2 of section VII respectively		15	5	5	15
	2) Actuator data sheet and wiring diagram of actuators.					
	3) List of ball & roller bearing schedule.					
	4) List of lubrication oil schedule					
	5) Do's and Do not's for valves & actuators.					
	6) Erection procedure & precautions to be taken.					
	7) Commissioning procedure & precautions to be taken.					
	8) Operating & maintenance instructions.					
16.0	List of Mandatory Spares as per Table V-A along with individual part drawings of each spare items for easy identification and storage at site					
17.0	Part drawing for each item covered under Mandatory Spares					
18.0	Test certificates.		Not Applicable.	Nil	45	15
	1) Type Test report: Cv test as per ISA 75.02					
	2) Functional test reports					

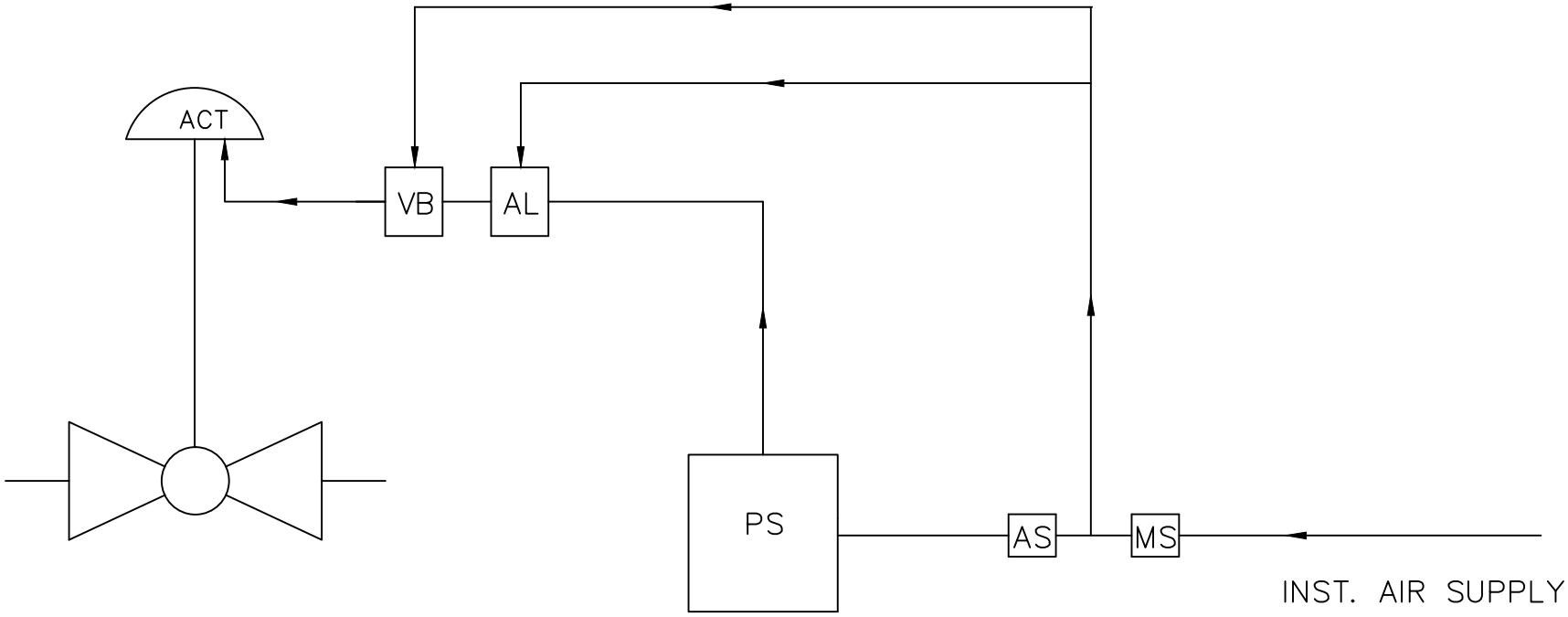
S.no	Description	Ref. Drawing	No of days reqd. To submit for approval after LOA / TOA or to resubmit for approval after BHEL comments.	No. of copies to be sent for approval.	No of days to furnish final drg after final approval.	No of copies to be furnished after final approval.
	3) Actuator leak test reports					
	4) Dimensional test reports					
	5) Raw material test certificates (chemical & mechanical)					
	6) Hydro test certificates.					
	7) Seat test certificates					
	8) Back seat test certificates					
	9) NDT & other test certificates as per ASME B 31.1					
19.0	IBR and other mandatory requirements if required.		Not Applicable	Nil	45	15
20.0	Drawings in sl no: 1.0 to 19.0 recorded in CD.		Not Applicable	Nil	60	15

Certified that the drawings / documents will be submitted / furnished as per the above Table.

(Signature of the Bidder)

HOOKUP DIAGRAM FOR CONTROL VALVES

(TYPICAL)



PS – SMART POSITIONER
AS – AIR SET
AL – AIR LOCK

MS – MOISTURE SEPARATOR
VB – VOLUME BOOSTER
ACT – ACTUATOR

PREPARED:	B.S
CHECKED:	V.R.E
APPROVED:	V.R.E

Controls & Instrumentation/Fossil Boilers
E, C&I input for Control Valve accessories

Project: ADANI 800 MW Boilers

CI: ADANI: ECI:CV, Rev. 00
Dt: 16-12-2024

Sl no	Description
1	**SMART positioner: -** Vendor to supply SMART positioner as per the requirements indicated in the Technical specification TCI:317/Rev. 07. **Additional requirements: -** • Positioners shall have integral non-contact type position transmitter, input and output gauges, local keypad & display and 4-20 mA DC output for position indication in Control Room. • Positioners shall be capable of functioning under hot, humid and vibrating conditions. • SMART positioner casings shall be dust tight, weather proof and corrosion resistant. • SMART positioner shall be compatible for Remote Calibration and Online diagnostics using HART management system. Necessary provisions shall be taken care of. • Offered Positioner shall communicate with the control system in the form of analog signal 4 – 20 mA DC along with superimposed digital signal through HART protocol to facilitate configuration, zero adjust, calibration and diagnostic from remote station.
2	**Integral Junction Box: -** All the valve accessories shall be wired suitably and shall be terminated in an integral junction box. The terminal blocks in the junction box shall be of cage clamp type suitable for 2.5 sq.mm. cable. Junction box shall meet the requirements of the protection class of IP - 65. Material of Integral Junction Box shall be 3 mm Sheet steel or better.
3	**Method of Termination of external cables to the integral junction box (i.e. Command & Feedback signals and Open & Close Limit Switches from external control system): -** 4 Nos. of Double compression type, Brass with Nickel plated, weather proof cable glands shall be provided suitable for the termination of cable of OD 16 mm.
5	**Limit Switch Type & Contact Rating: -** Limit switches shall be of high conductivity and non-corrosive type with either 1 No. of DPDT (2 NO + 2 NC contacts) or 2 Nos. of SPDT (2 NO + 2 NC contacts). Contact Rating: 3A at 240 V AC and 0.1 A at 220 V DC.
6	**Make of Smart Positioner:** EMERSON / YOKOGAWA / ABB / MOORE / MTL / FORBES MARSHALL/ SIEMENS

Note to Vendor:

- Taking care of the above indicated technical requirements in full, vendor to submit signed & sealed copy of Sub-delivery enquiry deviation (SDED)/NIL Deviation format sent along with the purchase enquiry, without any deviations, quoting the document reference.
- Any deviation in the technical requirements has to be indicated only in the SDED format/ NIL Deviation. Other than the SDED format/ NIL Deviation, hidden deviations indicated elsewhere in the offer will not be considered.

PREPARED	CHECKED	APPROVED
(T. KEERTHI)	(S. RAMSANKAR)	(D. KAVITHA)

Bidder Sign and Seal:

Bharat Heavy Electricals Limited
High Pressure Boiler Plant, Tiruchirappalli-620 014.

TECHNICAL DELIVERY CONDITIONS

FOR SUB - DELIVERY COMPONENTS OF

CONTROLS AND INSTRUMENTATION

Technical specification

Of

SMART POSITIONER

Rev. No.	Date	Description	Prepared	Reviewed	Approved
			M. Muruga Prabu	M. Muruga Prabu	D. Kavitha
00 – 06	17-10-19	Initial Release	-sd-	-sd-	-sd-
06	19-04-22	Revised after revisit	-sd-	-sd-	-sd-

Sl. No	Technical Description/Requirement	
1	SITE CONDITIONS: - Altitude above Sea Level Atmosphere Relative humidity Operating temperature	 500 Meters Tropical, Dusty, Windy & Heavily polluted atmosphere 100 % -30 to 80 degree Celsius
2	Input demand signal	4-20 mA demand signal from DCS.
3	Power Supply	2 wire system, Loop powered from output card of DCS.
4	Operational signal range	4-20 mA. Split range operation shall also be possible if required as per the application.
5	Air Supply	Shall match with the requirement of the control valve/damper application, as indicated in the valve datasheet. Shall be suitable to work with instrument air of quality - Class 2 or Class 3 meeting the requirements of the standard ISO 8573.1
6	Type of Action (Direct/Reverse)	Shall match with the requirement of the Control Valve/damper application.
7	Flow Characterization	Shall match with valve characteristics, Linear/Equal percentage etc.
8	Stroke time	Shall match with the requirement of the Control Valve/damper application.
9	Single/Double Acting	Shall match with the requirement of the Control Valve/damper application.
10	Pneumatic Process Connection	Shall match with the requirement of the Control Valve/damper application.
11	Communication by Hart Protocol	SMART positioner shall be compatible for Remote calibration & Diagnostics using HART protocol.

Sl. No	Technical Description/Requirement	
12	Calibration	SMART positioner shall be compatible for Auto Start with self-calibration, Remote calibration using Hart protocol & local/manual calibration using push buttons available on the positioner.
13	Position feedback Sensing & Transmitter	Position Feedback Sensing shall be integral to the SMART positioner and output shall be provided in the form of 4-20 mA hardwired current signal to control system.
14	Electrical Cable entry	Side or bottom entry to avoid water ingress.
15	Protection Class	IP 65
16	Action required during failure of 4 to 20 mA control signal.	Shall be configured for the fail safe position as per the requirement of Control Valve/damper application.
17	Characteristic Deviation	≤ 0.5% of span or better.
18	Influence of temperature rise on positioner	≤ 0.01% per degree Celsius.
19	Accessories	Pressure Gauge Block:- For Supply & output pressure, pressure gauges shall be provided on the positioner. Operator panel:- The positioner shall have a display with push buttons for configuration and for read out. Valve Mounting accessories:- Required mounting accessories & fasteners for mounting the positioner on valve actuators shall be taken care of by the valve vendor.
20	Electro Magnetic Compatibility	SMART positioner shall conform to EMC requirements as per the relevant international standards IEC/EN.

Sl. No	Technical Description/Requirement	
21	Hardwired Digital Output Signals from positioner.	• Fault signal output.
22	Diagnostic Features	Positioner shall be provided with diagnostic features for monitoring.
23	Test reports & Catalogues	1. Test Certificates as per Manufacturer's Standard. 2. SMART positioner catalogues & O&M manuals.

CONTROL VALVE DATASHEET
(IN ACCORDANCE WITH I.S.A FROM S20.51)

PROJECT: APL KAWAI 2x800 MW PHASE-III ULTRA SUPER CRITICAL THERMAL POWER PROJECT,KAWAI, RAJASTHAN

CUST: 1852-1853

GENERAL

1.	Valve tag No:	ASS-7, ASS-2	5.	Total Qty Required:	4 Nos
2.	Service:	SECONDARY SCAPH A&B FLOW CONTROL VALVE	6.	Manufacturer:	*
3.	KKS Tag No:	LBG73 AA101 & LBG74 AA101			
4.	Qty Required per unit:	2 Nos	7.	Model No:	*

BODY

8.	Type:	Thru	☑	3Way	☐		
		Z Type	☐	Angle	☐		
9.	Form:	Globe	☑	Ball	☐		
		Butterfly	☐				
10.	Size:	*					
11.	Port Size:	*					
12.	Connecting Pipe Size:	Inlet: OD219.1x8.18(Gr.B)					
		Outlet: OD219.1x8.18(Gr.B)					
13.	Body Rating:	ASME Cl.300					
14.	Flow Direction:	HORIZONTAL					
15.	Bonnet Type:	Standard	☐	Finned	☑		
		Extended	☑	Pr.Seal	☐		

(Bonnet joints of the internal threaded or union type will not be acceptable. Extension bonnets shall be provided when the max. temperature of flowing liquid is greater than 280 deg C)

16. Material: Body: ASTM 217Gr.WC9(CASTINGS)
Packing: GRAFOIL
Bolting: *

17. Suitable Matching pieces of P11/F11 material to match with pipe size specified shall be offered

18. Type of end connections: Screwed ☐ BW ☑ SW ☐ Flanged ☐

Valve Edge preparation shall be as per attached drawing:3-80-300-19825 Style 'D'; d1=202.8mm

TRIM

19.	No.of Ports:	*	23.	Stem Material:	SS316 STELLITED
20.	Type :	Balanced	24.	Plug Material:	17-4 PH SS
21.	Plug Characteristics:	L/LV/EP/MOD.PARABOLIC	25.	Seat Material:	17-4 PH SS
			26.	Disc Material:	17-4 PH SS
22.	Guiding:	Cage ☑ Port ☐	27.	Stem guide Material:	SS316 STELLITED
		Top ☐ Bottom ☐	28.	Quick change trim:	Yes ☑ No ☐

ACTUATOR

29.	Type: (A)	Electric ☐ Pneumatic ☑	33.	Diaphragm/Cylinder Pressure at Valve full open: Valve full close:	*
		Hydraulic ☐			
	(B)	~~DA~~/RA(AIR TO OPEN)	34.	Force required for process & Force required at Actuator:	*
30.	Size:	*	35.	Actuator Sizing ΔP:	*
31.	Supply Pressure:	5-8 kg/sqcm(a)			
	Shut off Pressure:	8 kg/sqcm(a)	36.	If actuator electric fill in data sheet as per annexure furnished and shall comply with annexure-I specification:	NAPL
32.	Failsafe Position of valve:	Stayput ☑ Full Open ☐			
		Full Close ☐			

						DRG NO : 4-01-306-00121	00
00	13.12.24	FRESH ISSUE	B.S	VRE	VRE	Page 1 of 4	
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POSITIONER

37. Type: Pneumatic ☐ Electronic ☐

ACCESSORIES

38. Hand wheel: Yes ☑ Side ☑ Top ☐

39. Air Filter: Yes ☑ No ☐

Filter Size: 5 Micron ☑ 25 Micron ☐

Filter element Material: Phosphor Bronze/Sintered Bronze

40. Limit Switches: Yes ☑ No ☐

Qty: 1 at full open & 1 at full close

Rating: Refer C&I Data Sheet

No.of Contacts per switch:

41. Vol. Booster: Bidder to decide based on travel time specified in S.no:42

42. Travel Time: < 10 sec

43. Installation: Indoor ☐ Outdoor ☑

44. All accessories enclosure: IP65$

45. Junction Box: Refer C&I Data Sheet

46. Air Lock: Yes ☑ No ☐

Function: TO EFFECT STAYPUT

Type * 3 way single acting ☐

3 way double acting ☐

47. Ambience: Dusty Corrosive ☑

Toxic Hazardous ☐

MISCELLANEOUS

48. Seat Leakage: FCI 70.2 Class IV$ ☑

ISA ☐

49. Approx. Weight(total) : *

50. Space req. for online service: *

51. Valve sizing as per ISA 75.01: Yes ☑ No ☐

51.1 Moisture Separator: As per tender specification

52. Hookup Diagram: As per enclosed

53. Noise Level: Less than 85DBA at 1m from valve and piping system. The noise abatement shall be by valve body, trim design and not by use of silencers and external thermal insulation.

CONTROL VALVE DATASHEET
(IN ACCORDANCE WITH I.S.A FROM S20.51)

PROJECT: APL KAWAI 2x800 MW PHASE-III ULTRA SUPER CRITICAL THERMAL POWER PROJECT,KAWAI, RAJASTHAN

CUST: 1852-1853

VALVE SIZING DATA

54. Medium: SH Steam ☑ Sat. Steam ☐ Water (saturated) ☐
55. Flow rate: T/Hr
56. Operating inlet pressure: kg/cm^2 (a)
57. Operating inlet temperature: °C
58. Outlet Pressure: kg/cm^2 (a)
59. Viscosity: --
60. Operating (required.) Cv:
61. Operating noise level at 1 m from valve surface
62. Outlet Velocity: m/s

CONDITION		
1 (MAX)	2(NOR)	3(MIN)
25.05	15.5	8.5
16	16	16
290	290	290
15	15	15
REFER STANDARD TABLE		
*	*	*
<85dBA	<85dBA	<85dBA
*	*	*

DESIGN DATA

63. Design Pressure, kg/cm^2 (g): 20
64. Design Temperature, °C: 350
65. Velocity restriction: 8 m/s for liquid service; 150 m/s for steam service
66. Rated Selected Cv of valve: *
67. Operating lift restriction: 10 to 85 %$^{\$}$
68. Lift at various operating conditions mentioned in slno.55 to 62: *
69. Downstream limitations: *
70. Upstream limitations: *
71. Increase in signal: Air: To open the valve

(i) Stem travel range from min. to max. flow shall not be less than 50% of the total valve stem travel

TESTING/INSPECTION: (AS PER APPROVED QP)

72. Hydraulic test report: Yes ☑ No ☐
73. Radiography: Critical parts ☑ Total ☐ Not required ☐
74. IBR Test report Required : Yes ☑ No ☐
75. Type test: *
    Cv test as per ISA 75.02 : Required
    (i) At 100% of rated valve travel
    (ii) At each 10%(0-100%) of rated valve travel
    *Type test to be done atleast for one no. on this consignment
76. Valve functional test: Yes ☑ No ☐
77. Accessories functional test: Yes ☑ No ☐
78. Seat Leakage Test: Yes ☑ No ☐
79. Material test report: Yes ☑ No ☐
80. Customer Inspection:
    In process: Yes ☐ No ☐
    Final: Yes ☑ No ☐
81. Third party inspection: Yes ☐ No ☐

DOCUMENTATION (REQUIRED)

82 With Bid (3 sets)

C.V.HOOK UP DIAGRAM	Yes ☑	No ☐
J.B WIRING DIAGRAM	Yes ☑	No ☐
Catalogues	Yes ☑	No ☐
Dimension drawing	Yes ☑	No ☐
All data sheets	Yes ☑	No ☐
Recommendations/ Limitations	Yes ☑	No ☐
Contrary Report	Yes ☑	No ☐
Deviation List	Yes ☑	No ☐
Confirmatory report	Yes ☑	No ☐

83. Quality Plan(Enclosed): Yes ☑ No ☐

SPARES

94. Mandatory Spares: As per Table V-A	

OTHERS

NOTES

1.* DENOTES BIDDER TO SPECIFY

2.$ AS PER TENDER SPECIFICATION

3. # AFTER INSPECTION, SMART POSITIONER TO BE PACKED SEPERATELY ALONG WITH THE CONTROL VALVE AND MOUNTING ACCESSORIES.THE SAME WILL BE OPENED AND INSTALLED ONLY DURING COMMISSIONING.

TABLE-V-A

APL KAWAI 2x800 MW PHASE-II ULTRA SUPER CRITICAL THERMAL POWER PROJECT, KAWAI, RAJASTHAN

MANDATORY SPARES

Vendor to work out quantity of spare as per logic specified by customer in the below table. Duplicate items should not be quoted as mandatory spare.

CL NO:	CONTROL VALVES, ACTUATORS & ACCESSORIES (Following items shall be provided under this clause for all modulating control valves being supplied under this package even if one or more of these items are also specified elsewhere under mandatory spares)	QUANTITY
1	Valve Trim (including cage, plug, stem, seat rings, guide bushings etc.) for each of Control Valve as offered	1 set of each type
2	Pneumatic and electro hydraulic actuator assembly	10 % of each type / model/ rating
3	Diaphragms, 'O' rings seal etc. of all types , make	10 % of each type / model/ rating
4	Pneumatic Air Filters / Regulators of each type, make, rating	5 % of each type / model/ rating
5	Positioner Unit	10 % of each type (If position feedback unit is separate, 10% of each type to be considered)

The flow meter shall meet or exceed the following requirement:

(a) Output: 4-20 mA DC Isolated output
(b) Accuracy: ± 0.5% of calibrated span or better
(c) Repeatability: ± 0.2% of calibrated span or better
(d) Power Supply: 240V AC ± 10%, 50 HZ ± 5%/ 24 V DC.
(f) Protection class: IP-67
(e) Flow tube SS304
(f) Liner Hard Rubber

The flow meter shall provide local indication for instantaneous flow. It should also be possible to get local display for daily and monthly discharge. The flow meter shall indicate totalizer/ integrator to get the daily and monthly discharge as stated above.

6.2 CONTROL VALVES, ACTUATORS & ACCESSORIES

General Technical Guidelines for the Control Valves shall be as follows:

a) Bidder shall exercise extreme caution in selecting severe service control valves like BFP recirculation valves, HP & LP bypass valves, superheater & reheater attemperator valves, PRDS valves for Boiler & Turbine, Soot blower steam pressure control valve, control valves whose downstream are connected to condenser and in vacuum such as HP/LP heater emergency level control, GSC minimum flow, gland sealing control, condensate spill to condensate storage tank, Deaerator drain to condenser Hotwell, condenser make up water control valve and CEP minimum flow control valve. For such critical applications, Bidder shall offer valves which are proven for similar application for not less than 2 years of continuous service in power plant environment. All the above valves shall have leakage class equal or better than class-V with metal-to-metal seating. These valves shall be of multi-stage, multi-path trim design to eliminate vibration, erosion, and noise effects. All other control valves shall not be inferior to leakage class IV.

b) Wherever, steam conditioning calls for Pressure reducing & desuperheating as well, combined PRDS type valves shall be offered.

c) Bidder shall provide redundant control valves for Main condensate flow control, Superheat attemperation control and Reheat attemperation control as a minimum. For other application, if the availability criteria for the plant cannot be met even with the best established product, redundant control valves shall be provided.

d) All control valves shall be located near floor or platform for ease of access with adequate clearances for maintenance and lay-down and shall be placed as station with upstream motorized isolating valve, down-stream isolating valve, inching duty motorized bypass valve and manual drain valves as per P&ID. Each redundant control valve shall have its upstream and downstream motorized isolating valves.

e) For detail technical specification of control valve, kindly refer Mechanical section.

6.2.1 Valve Actuators

Spring diaphragm type actuators shall generally be used. Piston type actuators shall be offered in case of high shut-off pressure & quick response requirement. Bidder shall provide piston type actuators for the following services as a minimum requirement.

a) Auxiliary Pressure reducing & De-super heating stations (excluding spray valves if spray is considered from condensate discharge).
b) Superheat and Reheat Spray Control Valves.
c) Main condensate flow control valve.

The actuator shall be designed for 150% thrust required for the valve (at shut-off pressure) at an airline supply pressure of 5.5 Kg/Sq. cm.

All the actuators shall be supplied mounted on the valve with all the accessories integrally mounted. Diaphragms shall be designed for 200% maximum operating pressure.

Nylon reinforced neoprene shall be used as diaphragm material.

Valve actuators shall be capable of operating at 80 Deg. C ambient, continuously.

Entire actuator assembly shall be painted with corrosion inhibiting paint.

Air connection size shall be 1/4" NPT (F) unless otherwise dictated by process response time. Integral tubing shall be of stainless steel construction.

Bidder shall indicate the stroking time of the valve assemblies with positioner.

All actuators shall be of failsafe design signifying that the spring direction will tend to move the valve (open or close) in a direction safe for the process. "Failure to Open" or "Failure to Close" shall be marked on the actuator.

6.2.2 Valve Positioners

All regulating service valves shall be offered with HART protocol based Smart Electro Pneumatic Positioners to ensure accuracy and repeatability of response. Positioners shall have integral non-contact type position transmitter, input and output gauges, local keypad & display and 4-20 mA DC output for position indication in CCR. Positioners shall be capable of functioning under hot, humid and vibrating conditions. Positioner casings shall be dust tight, corrosion resistant and weatherproof.

In general, positioner shall operate at signal range 4 – 20 mA DC for the full travel of the valve. Split range operation in few cases may be required. Remote calibration from control room shall be possible through HART management station.

6.2.3 Valve Accessories

The accessories of the valves shall include side mounted hand wheels, limit switches, junction boxes, airlock relays etc.. ~~Solenoid valve wherever required shall be furnished.~~

6.3 CONTROL DESK / PANEL / RACK

Detail of control desk / panel including dimensions, material, construction details arrangement etc. shall be as per the actual requirement and shall be finalized during detailed engineering. Convenient and logical approach to operational interfaces and to enhance aesthetics in the overall view of the panel /desk shall be considered.

For items susceptible to vibration, suitable rubber gaskets or padding shall be provided to prevent damage or malfunction.
All items like MCB, Terminals, instruments, lamps etc. inside the panels/cabinets shall be neatly arranged with easy access/ maintenance approach to avoid undue disturbing the wiring.

Power supply feeders shall be double so that a single failure shall not affect the operation of the unit. Required isolation & protection through MCB shall be provided in all cases. Alarm shall be provided against failure of a single power supply.

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PRE-QUALIFYING REQUIREMENTS (PQR)- SCAPH CONTROL VALVES

1. The bidder should have supplied globe type control valves with size **4-inch** (NB100) or higher for a minimum flow capacity of **100 t/hr**. and pressure class rating of **300** or above. The valves should have been commissioned in at least one thermal power plant or in similar applications and are in successful operation for a period of not less than 1 year as on the date of techno-commercial bid opening.

2. Bidder should design, engineer and manufacture control valves for boiler application in conformance to applicable Indian/International Standards OR The bidder can offer and supply such equipment with collaboration or valid licensing agreement for design, engineering, manufacture, supply of such equipment in India provided the collaborator meets the above pre-qualification requirement (cl. no 1).

3. The supplier has to submit any of the following supporting documents meeting above mentioned above pre-qualification requirement (cl. no 1).

3.1. Copy of minimum one (1) performance certificate in English from end user along with copy of related PO/LOI/LOA/WO specifying that the product / equipment is running successfully for one (1) year from date of commissioning meeting the pre-qualification requirement.

OR

3.2. Minimum two PO/LOI/LOA/WO placed with a minimum gap of one (1) year from same purchaser meeting the pre-qualification requirement.

OR

3.3. Minimum three customer's/ third party's inspection reports/ test certificates/ commissioning certificates meeting the pre-qualification requirement.

ABBREVIATION:

(PO) - Purchase order, (LOI) letter of intent, (LOA) letter of award, (WO) work order