SSF PLANT

1	8/9/2009	REVISED AS PER BHEL COMMENT	SKS	APU	AVS
0	14/8/2009	FOR APPROVAL	SKS	APU	AVS
Rev. No	Date	Description	Prepared By	Reviewed By	Released By

PROJECT	**PRAGATI-III COMBINED CYCLE POWER PROJECT 1500MW(NOMINAL).**
CUSTOMER:	**PRAGATI POWER CORPORTION LIMITED (PPCL)**
CONSULTANT:	**NTPC LIMITED, CONSULTANCY WING**
	BHARAT HEAVY ELECTRICALS LTD POWER SECTOR PROJECT ENGINEERING MANAGEMENT NOIDA
	THERMAX LIMITED PUNE

DATA SHEET FOR ROTAMETER

THERMAX DOC.NO.: WHJBA00015	BHEL DOC. NO. :PE-VO-314-156A-A116	REV. NO : 01

ROTAMETERS (VARIABLE AREA)

1	TAG NO.		FI-401	FI-402	FI-403
2	LOCATION		INLET OF AVGF - 1	INLET OF AVGF - 2	INLET OF AVGF - 3
3	QTY		1	1	1
4	TYPE		BY-PASS	BY-PASS	BY-PASS
5	PRIMARY ELEMENT		ORIFICE	ORIFICE	ORIFICE
6	FLUID		WATER	WATER	WATER
7	DENSITY OF THE MEDIUM		1	1	1
8	FLOW RATE **NOR : MAX** m^3/Hr		163 / 180	163 / 180	163 / 180
9	OPERATING PRESSURE		2 kG/CM2	2 kG/CM2	2 kG/CM2
10	OPERATING TEMP. DEG CEN		AMB	AMB	AMB
11	LINE SIZE NB	MATERIAL	200 CS	200 CS	200 CS
12	ACTUAL DIA OD	& ID mm	219.10 / 206.4	219.10 / 206.4	219.10 / 206.4
13	ACCURACY		± 2% OF FS	± 2% OF FS	± 2% OF FS
14	SCALE GRADUATION		IN M3/HR	IN M3/HR	IN M3/HR
15	LOCATION CONN. & SIZE		25 NB	25 NB	25 NB
16	CONFIGURATION -- INLET		BOTTOM	BOTTOM	BOTTOM
17	CONFIGURATION -- OUTLET		TOP	TOP	TOP
18	SCHEDULE OF PIPE		ANSI B16.9,SCH 20	ANSI B16.9,SCH 20	ANSI B16.9,SCH 20
19	FACE TO FACE DISTANCE		500 MM	500 MM	500 MM
20	TYPE OF BYPASS CONNECTION		D & D/2	D & D/2	D & D/2
21	PIPE CONNECTION		FLANGED	FLANGED	FLANGED
22	PACKING MATERIAL		PTFE	PTFE	PTFE
23	FLOW RANGE Cu.m/Hr		44 - 220	44 - 220	44 - 220
24	TUBE RATING Kg/Sq.cm (G)		20	20	20
25	SCALE MOC		ANODISED ALLUMINIUM	ANODISED ALLUMINIUM	ANODISED ALLUMINIUM
26	SCALE LENGTH		175 - 200	175 - 200	175 - 200
27	PROCESS MAX PRESS. Kg/Sq.cm		5	5	5
28	PROCESS PIPE MATERIAL		CS	CS	CS
29	MAKE		EUREKA	EUREKA	EUREKA
30	MODEL NO.		BPD-CS-200-PG-3	BPD-CS-200-PG-3	BPD-CS-200-PG-3
31	METER SIZE		25 NB	25 NB	25 NB
32	DP ACROSS ROTAMETER (at max flow)		2500 mm H2O	2500 mm H2O	2500 mm H2O
33	FLOAT		SS 316	SS 316	SS 316
34	TUBE		BORO SILICATE	BORO SILICATE	BORO SILICATE
35	FRAME		MS	MS	MS
36	ORIFICE		SS 316	SS 316	SS 316
37	FLANGE CONNECTION		ANSI B 16.5, 150#	ANSI B 16.5, 150#	ANSI B 16.5, 150#
38	HOUSING PROTECTION CLASS		IP 55	IP 55	IP 55
39	WETTED PARTS		CS	CS	CS

ROTAMETERS

1	TAG NO.		FI-404	FI-405	FI-406
2	LOCATION		INLET OF AVGF - 4	INLET OF AVGF - 5	INLET OF AVGF - 6
3	QTY		1	1	1
4	TYPE		BY-PASS	BY-PASS	BY-PASS
5	PRIMARY ELEMENT		ORIFICE	ORIFICE	ORIFICE
6	FLUID		WATER	WATER	WATER
7	DENSITY OF THE MEDIUM		1	1	1
8	FLOW RATE **NOR : MAX** m^3/Hr		163 / 180	163 / 180	163 / 180
9	OPERATING PRESSURE		2 kG/CM2	2 kG/CM2	2 kG/CM2
10	OPERATING TEMP. DEG CEN		AMB	AMB	AMB
11	LINE SIZE NB	MATERIAL	200 CS	200 CS	200 CS
12	ACTUAL DIA OD	& ID mm	219.10 / 206.4	219.10 / 206.4	219.10 / 206.4
13	ACCURACY		± 2% OF FS	± 2% OF FS	± 2% OF FS
14	SCALE GRADUATION		IN M3/HR	IN M3/HR	IN M3/HR
15	LOCATION CONN. & SIZE		25 NB	25 NB	25 NB
16	CONFIGURATION -- INLET		BOTTOM	BOTTOM	BOTTOM
17	CONFIGURATION -- OUTLET		TOP	TOP	TOP
18	SCHEDULE OF PIPE		ANSI B16.9,SCH 20	ANSI B16.9,SCH 20	ANSI B16.9,SCH 20
19	FACE TO FACE DISTANCE		500 MM	500 MM	500 MM
20	TYPE OF BYPASS CONNECTION		D & D/2	D & D/2	D & D/2
21	PIPE CONNECTION		FLANGED	FLANGED	FLANGED
22	PACKING MATERIAL		PTFE	PTFE	PTFE
23	FLOW RANGE Cu.m/Hr		44 - 220	44 - 220	44 - 220
24	TUBE RATING Kg/Sq.cm (G)		20	20	20
25	SCALE MOC		ANODISED ALLUMINIUM	ANODISED ALLUMINIUM	ANODISED ALLUMINIUM
26	SCALE LENGTH		175 - 200	175 - 200	175 - 200
27	PROCESS MAX PRESS. Kg/Sq.cm		5	5	5
28	PROCESS PIPE MATERIAL		CS	CS	CS
29	MAKE		EUREKA	EUREKA	EUREKA
30	MODEL NO.		BPD-CS-200-PG-3	BPD-CS-200-PG-3	BPD-CS-200-PG-3
31	METER SIZE		25 NB	25 NB	25 NB
32	DP ACROSS ROTAMETER (at max flow)		2500 mm H2O	2500 mm H2O	2500 mm H2O
33	FLOAT		SS 316	SS 316	SS 316
34	TUBE		BORO SILICATE	BORO SILICATE	BORO SILICATE
35	FRAME		MS	MS	MS
36	ORIFICE		SS 316	SS 316	SS 316
37	FLANGE CONNECTION		ANSI B 16.5, 150#	ANSI B 16.5, 150#	ANSI B 16.5, 150#
38	HOUSING PROTECTION CLASS		IP 55	IP 55	IP 55
38	WETTED PARTS		CS	CS	CS

ROTAMETERS

1	TAG NO.		FI-407	FI-408	FI-409
2	LOCATION		OUTLET OF AVGF - 1	OUTLET OF AVGF - 2	OUTLET OF AVGF - 3
3	QTY		1	1	1
4	TYPE		BY-PASS	BY-PASS	BY-PASS
5	PRIMARY ELEMENT		ORIFICE	ORIFICE	ORIFICE
6	FLUID		WATER	WATER	WATER
7	DENSITY OF THE MEDIUM		1	1	1
8	FLOW RATE **NOR : MAX** m^3/Hr		163 / 180	163 / 180	163 / 180
9	OPERATING PRESSURE		2 kG/CM2	2 kG/CM2	2 kG/CM2
10	OPERATING TEMP. DEG CEN		AMB	AMB	AMB
11	LINE SIZE NB	MATERIAL	250 CS	250 CS	250 CS
12	ACTUAL DIA OD	& ID mm	273.0 / 260.3	273.0 / 260.3	273.0 / 260.3
13	ACCURACY		± 2% OF FS	± 2% OF FS	± 2% OF FS
14	SCALE GRADUATION		IN M3/HR	IN M3/HR	IN M3/HR
15	LOCATION CONN. & SIZE		25 NB	25 NB	25 NB
16	CONFIGURATION -- INLET		BOTTOM	BOTTOM	BOTTOM
17	CONFIGURATION -- OUTLET		TOP	TOP	TOP
18	SCHEDULE OF PIPE		ANSI B16.9,SCH 20	ANSI B16.9,SCH 20	ANSI B16.9,SCH 20
19	FACE TO FACE DISTANCE		500 MM	500 MM	500 MM
20	TYPE OF BYPASS CONNECTION		D & D/2	D & D/2	D & D/2
21	PIPE CONNECTION		FLANGED	FLANGED	FLANGED
22	PACKING MATERIAL		PTFE	PTFE	PTFE
23	FLOW RANGE Cu.m/Hr		44 - 220	44 - 220	44 - 220
24	TUBE RATING Kg/Sq.cm (G)		20	20	20
25	SCALE MOC		ANODISED ALLUMINIUM	ANODISED ALLUMINIUM	ANODISED ALLUMINIUM
26	SCALE LENGTH		175 - 200	175 - 200	175 - 200
27	PROCESS MAX PRESS. Kg/Sq.cm		5	5	5
28	PROCESS PIPE MATERIAL		CS	CS	CS
29	MAKE		EUREKA	EUREKA	EUREKA
30	MODEL NO.		BPD-CS-250-PG-3	BPD-CS-250-PG-3	BPD-CS-250-PG-3
31	METER SIZE		25 NB	25 NB	25 NB
32	DP ACROSS ROTAMETER (at max flow)		2500 mm H20	2500 mm H20	2500 mm H20
33	FLOAT		SS 316	SS 316	SS 316
34	TUBE		BORO SILICATE	BORO SILICATE	BORO SILICATE
35	FRAME		MS	MS	MS
36	ORIFICE		SS 316	SS 316	SS 316
37	FLANGE CONNECTION		ANSI B 16.5, 150#	ANSI B 16.5, 150#	ANSI B 16.5, 150#
38	HOUSING PROTECTION CLASS		IP 55	IP 55	IP 55
38	WETTED PARTS		CS	CS	CS

ROTAMETERS

1	TAG NO.		FI-410	FI-411	FI-412
2	LOCATION		OUTLET OF AVGF - 4	OUTLET OF AVGF - 5	OUTLET OF AVGF - 6
3	QTY		1	1	1
4	TYPE		BY-PASS	BY-PASS	BY-PASS
5	PRIMARY ELEMENT		ORIFICE	ORIFICE	ORIFICE
6	FLUID		WATER	WATER	WATER
7	DENSITY OF THE MEDIUM		1	1	1
8	FLOW RATE **NOR : MAX** m^3/Hr		163 / 180	163 / 180	163 / 180
9	OPERATING PRESSURE		2 kG/CM2	2 kG/CM2	2 kG/CM2
10	OPERATING TEMP. DEG CEN		AMB	AMB	AMB
11	LINE SIZE NB	MATERIAL	250 CS	250 CS	250 CS
12	ACTUAL DIA OD	& ID mm	273.0 / 260.3	273.0 / 260.3	273.0 / 260.3
13	ACCURACY		± 2% OF FS	± 2% OF FS	± 2% OF FS
14	SCALE GRADUATION		IN M3/HR	IN M3/HR	IN M3/HR
15	LOCATION CONN. & SIZE		25 NB	25 NB	25 NB
16	CONFIGURATION -- INLET		BOTTOM	BOTTOM	BOTTOM
17	CONFIGURATION -- OUTLET		TOP	TOP	TOP
18	SCHEDULE OF PIPE		ANSI B16.9,SCH 20	ANSI B16.9,SCH 20	ANSI B16.9,SCH 20
19	FACE TO FACE DISTANCE		500 MM	500 MM	500 MM
20	TYPE OF BYPASS CONNECTION		D & D/2	D & D/2	D & D/2
21	PIPE CONNECTION		FLANGED	FLANGED	FLANGED
22	PACKING MATERIAL		PTFE	PTFE	PTFE
23	FLOW RANGE Cu.m/Hr		44 - 220	44 - 220	44 - 220
24	TUBE RATING Kg/Sq.cm (G)		20	20	20
25	SCALE MOC		ANODISED ALLUMINIUM	ANODISED ALLUMINIUM	ANODISED ALLUMINIUM
26	SCALE LENGTH		175 - 200	175 - 200	175 - 200
27	PROCESS MAX PRESS. Kg/Sq.cm		5	5	5
28	PROCESS PIPE MATERIAL		CS	CS	CS
29	MAKE		EUREKA	EUREKA	EUREKA
30	MODEL NO.		BPD-CS-250-PG-3	BPD-CS-250-PG-3	BPD-CS-250-PG-3
31	METER SIZE		25 NB	25 NB	25 NB
32	DP ACROSS ROTAMETER (at max flow)		2500 mm H20	2500 mm H20	2500 mm H20
33	FLOAT		SS 316	SS 316	SS 316
34	TUBE		BORO SILICATE	BORO SILICATE	BORO SILICATE
35	FRAME		MS	MS	MS
36	ORIFICE		SS 316	SS 316	SS 316
37	FLANGE CONNECTION		ANSI B 16.5, 150#	ANSI B 16.5, 150#	ANSI B 16.5, 150#
38	HOUSING PROTECTION CLASS		IP 55	IP 55	IP 55
38	WETTED PARTS		CS	CS	CS

EUREKA

TÜV
RWTÜV

BYE PASS ROTAMETER

For reliable flow rate indication

EUREKA INDUSTRIAL EQUIPMENTS PVT. LTD.

REGD. & HEAD OFFICE :
ROYAL CHAMBERS, PAUD ROAD,
PUNE - 411 038. INDIA
TEL. : +91-20-25443075/4004554/4004535
FAX : +91-20-25441525
E-MAIL : eurekapune@vsnl.net
INTERNET : www.eurekaflow.com

FACTORY
UNIT - I
134, S BLOCK, MIDC, BHOSARI,
PUNE - 411 026
TEL. : 27120514, 27120314, 41133756
FAX : +91-20-27120761

UNIT - II
J-501, MIDC, PIMPRI,
PUNE - 411 018.
TEL. : 27479086, 41133759

MUMBAI OFFICE :
258, KALIANDAS UDYOG BHAVAN,
PRABHADEVI, MUMBAI - 400 025.
TEL. : 24229069

BYE PASS ROTAMETER

Eureka Bye Pass Rotameters are suitable for flowrate measurement in pipe sizes 1" NB and above. The complete assembly consists of carrier rings, bye pass line and a Rotameter as indicator. Isolating valves are provided on request. The Orifice plate dimensions are based on BS / ISO specification. The instruction is simple in construction and reliable in flow rate indication.

MATERIALS OF CONSTRUCTION

Orifice Plate	: 316 Ss / Ebonite / Haste Alloy 'C'
Carrier Rings	: 316 SS / Mild Steel / C.S.
Pipe Line	: 316 SS / Mild Steel / C.S.
Wetted Parts Of	: 316 SS / Mild Steel / C.S.
The Rotameter	Or Rubbber Lined Steel / PTFE Lined Steel.

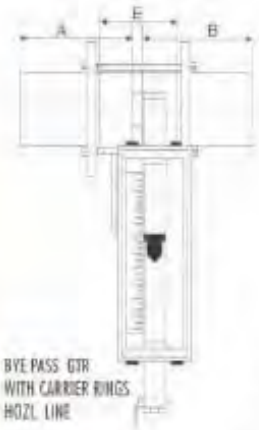
PERFORMANCE

Type of tappings	: Corner tapping (carrier ring.) Flange tapping, D and D/2 tapping.
Accuracy	: ± 2 % of full flow
Rangeability	7:1 or 5:1, 10:1 on request.
Accessories	High & Low flow alarms.

Metal tube Bye Pass rotameters are available for special applications.

STANDARD RANGE FOR WATER AT 20°C

NW	MAXIMUM FLOWRATE (M3/HR)	NW	MAXIMUM FLOWRATE (M3/HR)
25	5	225	450
40	10	250	550
50	20	275	650
80	36	300	800
100	80	350	1000
125	125	400	1200
150	150	----	----
200	320	----	----



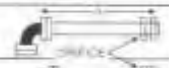
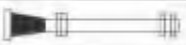
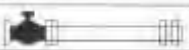
BYE PASS GTR
WITH CARRIER RINGS
HOZL LINE

BYE PASS NTR
WITH CARRIER RINGS
HOZL LINE

CARRIER RING DIMENSIONS

NW	E	NW	E
25	32	225	
40	46	250	
50		275	56
80		300	
100		350	
125	58	400	75
150			
200			

MINIMUM UPSTREAM STRAIGHT LENGTHS REQUIRED

Fittings before straight run	Piping Layout	Diameter Ratio (β)												
		0.2	0.25	0.3	0.35	0.4	0.45	0.5	0.55	0.6	0.65	0.7	0.75	0.8
Single 90° bend or Tee		10	10	10	12	14	14	14	16	18	22	28	36	46
Two or more 90° bends in the same place		14	14	16	16	16	18	20	22	28	32	36	42	50
Two or more 90° bends in the Different planes		34	34	34	36	36	38	40	44	48	54	62	70	80
Reducers or Expanders		16	16	16	16	16	18	20	20	22	24	26	28	30
Globe valve fully open		18	18	18	18	20	20	22	24	26	28	32	38	44
Gate valve fully open		12	12	12	12	12	12	12	14	14	16	20	24	30
MINIMUM DOWN STREAM STRAIGHT LENGTHS REQUIRED		4	4	5	5	5	5	5	6	7	7	7	8	8
VALUES OF THE STRAIGHT LENGTH ARE IN NO OF 'D' β = d/ D d = ORIFICE DIAMETER D = INTERNAL DIAMETER OF PIPE														

NOTE :
'A' = UPSTREAM STRAIGHT LENGTH 'B' = DOWNSTREAM STRAIGHT LENGTH

Data required for sizing :

- Name of fluid
- Sp. Gr. of fluid at Operating temperature.
- Viscosity of fluid at Operating temperature.
- Temperature.
- Pressure.
- Measuring range.
- Material of construction desired.

We reserve the right to modify the Design & Specifications without notice

EUREKA INDUSTRIAL EQUIPMENTS PVT. LTD.

CAT CODE: CC-04 R1 10.2K

All make shall be NTPC DA approved
All valve/motor rating & speed shall be as per NTPC approved.

EFFLUENT TREATMENT PLANT

NTPC Limited
(A Govt. of India Enterprise)
CONSULTANCY WING

TRANS NO.....
DATE.....

- ☐ I. APPROVED/RELEASED FOR FABRICATION/CONSTRUCTION.
- ☐ II. APPROVED/RELEASED FOR FABRICATION/CONSTRUCTION SUBJECT TO INCORPORATION OF COMMENTS/MODIFICATIONS AS NOTED RESUBMIT REVISED DRAWING/DOCUMENT.
- ☐ III. NOT APPROVED RESUBMIT REVISED DRAWING/DOCUMENT AFTER INCORPORATION OF COMMENT S/MODIFICATIONS AS NOTED.
- ☐ IV. FOR INFORMATION AND RECORDS.
- ☐ IVR. REVISE AND RESUBMIT. FOR INF. & REC.

I. APP... ...VED HERE IN NEITHER RELIVES THE CONTRACTOR OF HIS CONTRACTUAL OBLIGATION AND RESPONSIBILITIES FOR CORRECTNESS OF DIMENSIONS, MATERIAL OF CONSTRUCTION, DESIGN DETAILS ASSEMBLY, PERFORMANCE PARTICULARS AND CONFORMITY OF THE SUPPLIES WITH THE SPECIFICATIONS, APPROVED SCHEMES AND STATUTORY LAWS AND DOES IT... ...PURCHASER'S RIGHT UNDER THE CONTRACT.
II ... CHANGE ... ...VED DRAWING/DOCUMENTS IS PERMITTED WITHOUT ... CONSENT IN WRITING.

Cat IV

Max starts shall be 20 starts/hr feedback of signal is required to the AVS system.

Rev. No	Date	Description	Prepared By	Reviewed By	Released By
1	12/1/2010	REVISED AS PER NTPC COMMENTS	SKS	APU	AVS
0	2/11/2009	FOR APPROVAL	SKS	APU	AVS

PROJECT: **PRAGATI-III COMBINED CYCLE POWER PROJECT 1500MW(NOMINAL).**

CUSTOMER: **PRAGATI POWER CORPORTION LIMITED (PPCL)**

CONSULTANT: **NTPC LIMITED, CONSUTANCY WING**

BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NOIDA

THERMAX LIMITED
PUNE

BHARAT HEAVY ELECTRICALS LTD.
PROJECT ENGINEERING MANAGEMENT
This approval is subject to the terms and conditions as laid down in the contract and it shall not relieve the contractor from his contractual obligations.
APPROVED = IV
CAT I = Approved
CAT II = Approved with Comments as Noted
CAT III = Rejected
CAT IV = Returned for Information
BHEL - PEM
SIGNATURE

DATA SHEET FOR MOTORIZED VALVE

THERMAX DOC.NO.:	BHEL DOC. NO. : A-1-5	OC.NO. 630128
WHJGH00006	PE-VO-314-164-A245	REV. NO : 01

INDEX SHEET FOR MOTORIZED VALVE

EFFLUENT TREATMENT PLANT

REF.P&ID NO.WFBAA00069.

SR NO.	TAG NO.	LOCATION	PROCESS LIQUID	NOR FLOW	MAX FLOW	NOR PRESSURE	MAX PRESSURE	OUTLET PRESSURE	LINE SIZE
				IN M3/HR	IN M3/HR	IN KG/CM2	IN KG/CM2	IN KG/CM2	
1	MV-4	DISCHARGE OF P-3010A/B	EFFLUENT	5	6	2.6	4	2	50 NB CS
2	MV-6	DISCHARGE OF P-3020A/B	EFFLUENT	5	6	2.4	4	2	50 NB CS
3	MV-7	INLET OF ES-4	EFFLUENT	25	28	5.9	7	5.5	50 NB CS
4	MV-8	DISCHARGE OF P-3050A/B	EFFLUENT	25	28	5.9	7	5.5	80 NB CS
5	MV-9	INLET OF ES-5	WASTE WATER	25	28	1.6	2.5	1	50 NB CS
6	MV-10	DISCHARGE OF P-3060A/B	EFFLUENT	25	28	1.6	2.5	1	65 NB CS
7	MV-12	DISCHARGE OF P-3070A/B	EFFLUENT	15	18	4.2	5.5	3.5	65 NB CS
8	MV-14	DISCHARGE OF EFFLUENT TRANSFER PUMP P-3080 A/B	EFFLUENT	5	6	3.6	4	3	40
9	MV-15	INLET OF ES-8	WASTE WATER	10	12	7.1	8.5	6.5	40 NB CS
10	MV-16	DISCHARGE OF P-3090A/B	EFFLUENT	14	16	4.6	5.5	4	65 NB CS
11	MV-17	INLET OF ES-14	EFFLUENT	26	29	3.2	4	2.5	50 NB CS
12	MV-18	DISCHARGE OF P-3200A/B	EFFLUENT	26	29	3.2	4	2.5	80 NB CS
13	MV-19	INLET OF ES-15	EFFLUENT	26	29	3.4	4	3	50 NB CS
14	MV-20	DISCHARGE OF P-3210A/B	EFFLUENT	26	29	3.4	4	3	80 NB CS
15	MV-22	DISCHARGE OF EFFLUENT TRANSFER PUMP P-3140 A/B	EFFLUENT	8	11	4.15	5	3.5	50 NB CS
16	MV-23	DISCHARGE OF P-3030A/B	WATER	30	34	6.5	8	6	80 NB CS
17	MV-24	DISCHARGE OF P-3030A/B	WATER	30	34	6.5	8	6	80 NB CS
18	MV-25	DISCHARGE OF P-3040A/B/C	WASTE WATER	100	110	1	2.5	0.5	100 NB CS
19	MV-26	DISCHARGE OF P-3040A/B/C	WASTE WATER	100	110	1	2.5	0.5	200 NB CS
20	MV-27	INLET OF T-3030 A	WATER	25	28	1.8	2.5	1.5	50 NB CS
21	MV-28	DISCHARGE OF P-3100A/B	WATER	25	28	1.8	2.5	1.5	65 NB CS
22	MV-31	INLET OF ES-16	EFFLUENT	26	29	2.3	3.5	1.5	50 NB CS
23	MV-32	DISCHARGE OF P-3220A/B	EFFLUENT	26	29	2.3	3.5	1.5	80 NB CS
24	MV-33	INLET OF ES-17	EFFLUENT	26	29	2.6	3.5	2	50 NB CS
25	MV-34	DISCHARGE OF P-3230A/B	EFFLUENT	26	29	2.6	3.5	2	80 NB CS
26	MV-35	INLET OF CMB-II	EFFLUENT	350	390	8.2	10	7.5	500 NB CS
27	MV-36	INLET OF CMB-II	EFFLUENT	350	390	8.2	10	7.5	500 NB CS
28	MV-37	DISCHARGE OF P-3150A TO H	EFFLUENT	350	390	8.2	10	7.5	500 NB CS
29	MV-38	INLET OF ES-13	TREATED WATER	100	110	2.5	4	2	100 NB CS
30	MV-39	DISCHAREG OF P-3120A/B/C	TREATED WATER	100	110	2.5	4	2	200 NB CS
31	MV-40	DISCHARGE OF P-3190A/B	WATER	140	160	1	2	0.5	100 NB CS
32	MV-41	DISCHARGE OF P-3190A/B	WATER	140	160	1	2	0.5	150 NB CS
33	MV-42	OUTLET OF CMB-I	WATER	350	390	8.2	10	7.5	650 NB CS
34	MV-43	OUTLET OF CMB-II	WATER	350	390	8.2	10	7.5	650 NB CS
35	MV-45	DISCHARGE OF P-3310	EFFLUENT	7	10	5.4	6.5	5	50 NB CS
36	MV-47	DISCHARGE OF P-3320 A/B	WATER	3	4	3	4.5	2.5	40 NB CS
37	MV-48	INLET OF SERVICE WATER TANK	WATER	100	110	2.5	4	2	200 NB CS

QTY :- 37

PROJECT:PRAGATI -III COMBINED CYCLE POWER PROJECT 1500 MW (NOMINAL) AT BAWANA,DELHI

Rev	DATE	PREPD. BY	CHKD. BY	App by
2	12/1/2010	SKS	APU	AVS
1	2/11/2009	SKS	APU	AVS
0	1/10/2009	SKS	APU	AVS

Specification No: WH-IGH00006 | PLANT: ETP | SH NO:

THERMAX LIMITED
Water & Waste Solutions
Sai Chambers, Wakadewadi
Pune 411 003 (INDIA)

O.C NO: 630128

OWNER: PRAGATI POWER CORPORATION LTD.,DELHI

CLIENT : BHARAT HEAVY ELECTRICALS LTD

CONSULTANT:- NTPC - CONSULTANCY WING

BUTTERFLY VALVE WITH ELECTRICAL ACTUATOR

VALVE

A	GENERAL		
A.1	TYPE		WAFER LUGGED TYPE BUTTERFLY VALVE
A.2	VALVE RATING		AWWA-C-504 CLASS 150 OR BS 5155 PN 10 MIN
A.3	VALVES AS PER		MFG STD. - API 609
			TEST STD.- API 598
A.4	DESIGN TEMP.		50 DEG
A.5	END CONNECTION		SUITABLE FOR MOUNTING BETWEEN FLANGES DRILLED AS PER ANSI B 16.5 150# UPTO 650 NB & ANSI B16.47 SERIES B FOR 650 NB.
B	MOC		
B.1	BODY		SGI DIN 1693 Gr.GGG40
B.2	DISC		SGI
B.3	SHAFT		ASTM A 296 GR AISI SS 316
B.4	BODY SEAT (BONDED)		EPDM
B.7	BEARING		BEARING STEEL + PTFE
C	PROCESS PARAMETERS		
C.1	TAG NO		REFER INDEX SHEET
C.2	PROCESS LIQUID		REFER INDEX SHEET
C.3	FLOW NOR: MAX M3/HR		REFER INDEX SHEET
C.4	LINE SIZE		REFER INDEX SHEET
C.5	LOCATION		REFER INDEX SHEET
C.6	NORMAL PRESSURE		REFER INDEX SHEET
C.7	MAXIMUM PRESSURE		REFER INDEX SHEET
C.8	OUTLET PRESSURE		REFER INDEX SHEET
D	TESTING CODE		API 598
D.1	BODY (HYDRO TEST)		15 KG/CM2
D.2	SEAT (HYDRO TEST)		11 KG/CM2

QTY :- 37

THERMAX LIMITED Water & Waste Solutions Sai Chambers, Wakadewadi Pune 411 003 (INDIA)	PROJECT:PRAGATI -III COMBINED CYCLE POWER PROJECT 1500 MW (NOMINAL) AT BAWANA,DELHI	2	12/1/2010	SKS	APU	AVS
		1	2/11/2009	SKS	APU	AVS
	O.C NO: 630128	0	1/10/2009	SKS	APU	AVS
	OWNER: PRAGATI POWER CORPORATION LTD.,DELHI	Rev	DATE	PREPD. BY	CHKD. BY	App by
	CLIENT : BHARAT HEAVY ELECTRICALS LTD	Specification No		PLANT	SH NO	
	CONSULTANT:- NTPC - CONSULTANCY WING	WHJGH00006		ETP	2 OF 3	

BUTTERFLY VALVE WITH ELECTRICAL ACTUATOR

	ACTUATOR INTEGRAL STARTER		
1	TAG NO		REFER INDEX SHEET
2	VOLTAGE FOR MOTOR		415 V, 3-PH , 50 HZ
3	KW RATING		1)0.06 FOR VALVE SIZE 40 NB,50 NB,65 NB,80 NB,100 NB,150 NB. 2)0.12 FOR VALVE SIZE 200 NB 3)0.37 FOR VALVE SIZE 500NB,650 NB
4	VOLTAGE VARIATION		"+ / -" 10%
5	FREQUENCY VARIATION		"+/ -" 5%
6	COMBINED VOLTAGE & FREQUENCY VARIATION		10 % (SUM OF ABSOLUTE VALUES)
7	MOTOR INSULATION CLASS		F
8	MOTOR SPEED		1)1400 RPM FOR VALVE SIZE 40 NB,50 NB,65 NB,80 NB,100 NB,150 NB,200 NB 2)2800 RPM FOR VALVE SIZE 500 NB,650 NB
9	FULL LOAD CURRENT		1)0.29 A FOR VALVE SIZE 40 NB,50 NB,65 NB,80 NB,100 NB,150 NB 2)0.45 A FOR VALVE SIZE 200 NB 3)0.93 A FOR VALVE SIZE 500 NB,650 NB
10	STARTING CURRENT		1)1.2 A FOR VALVE SIZE 40 NB,50 NB,65 NB,80 NB,100 NB,150 NB. 2)2.3 A FOR VALVE SIZE 200 NB 3)5.5 A FOR VALVE SIZE 500 NB,650 NB
11	NOMINAL CURRENT		1)0.29 A FOR VALVE SIZE 40 NB,50 NB,65 NB,80 NB,100 NB,150 NB 2)0.45 A FOR VALVE SIZE 200 NB 3)0.93 A FOR VALVE SIZE 500 NB,650 NB
12	ENCLOSURE		IP-67
13	MOTOR TYPE		SQUIRREL CAGE
14	OPERATING TIME		1)24 sec FOR VALVE SIZE 40 NB,50 NB,65 NB,80 NB,100 NB,150 NB 2)31 sec FOR VALVE SIZE 200 NB 3)60 sec FOR VALVE SIZE 500 NB 3)144 sec FOR VALVE SIZE 650 NB
15	ACTUATOR OPERATION TYPE		ON-OFF DUTY
	ACCESSORY		
1	LIMIT SWITCHES		ONE EACH FOR OPEN ,CLOSE
2	Integral Starter Disturbed Feedback (Loss of power/control supply, Motor thermostat trip, Thermal O/L, Local/off/Remote S/S in Local or Off mode etc.)		To Be provided
3	TORQUE SWITCH		ONE EACH FOR OPEN AND CLOSE POSITION
4	TYPE & CONTACT RATING OF SWITCHES		5A @ 230 V AC RESISTIVE(WITH 2 NO + 2 NC CONTACTS)
5	VALVE POSITION INDICATOR AT LOCAL		REQD. WITH % OPENING INDICATION (LOCAL INDICATION)
6	HAND WHEEL		FOR EMERGENCY MANUAL OPERATION (MOC-MS + DA GRAY)

Item	Make	Valve size	Model No
Valve	INTERVALVE	FOR VALVE SIZE40 NB,50 NB,65 NB,80 NB, FOR VALVE SIZE 100 NB,150 NB200 NB,500 NB,650 NB	IVTLB
Gear Box	PAC	1)FOR VALVE SIZE40 NB,50 NB,65 NB,80 NB,100 NB,150 NB	PAC-0AE
		2) FOR VALVE SIZE 200 NB	PAC-02AE
		3)FOR VALVE SIZE 500 NB	PAC-04SGA41E
		4)FOR VALVE SIZE 650 NB	PAC-04SGA41E
Actuator	AUMA	1)FOR VALVE SIZE 40 NB,50 NB,65 NB,80 NB,100 NB,150 NB	SA 3 E 22
		2)FOR VALVE SIZE 200 NB	SA 6 E 22
		3)FOR VALVE SIZE 500 NB,650 NB	SA 6 E 45

QTY :- 37	PROJECT:PRAGATI -III COMBINED CYCLE POWER PROJECT 1500 MW (NOMINAL) AT BAWANA,DELHI	2	12/1/2010	SKS	APU	AVS
		1	2/11/2009	SKS	APU	AVS
THERMAX LIMITED	O.C NO: 630128	0	1/10/2009	SKS	APU	AVS
Water & Waste Solutions	OWNER: PRAGATI POWER CORPORATION LTD.,DELHI	Rev	DATE	PREPD. BY	CHKD. BY	App by
Sai Chambers, Wakadewadi	CLIENT : BHARAT HEAVY ELECTRICALS LTD	Specification No		PLANT	SH NO	
Pune 411 003 (INDIA)	CONSULTANT:- NTPC - CONSULTANCY WING	WHJGH00006		ETP	3 OF 3	

REPLIES TO COMMNETS ON ELECTRICAL ACTUATOR		
Sr.No	NTPC COMMENTS	THERMAX REPLY
1	Actuator Torque Range	Refer sr no 2 of data sheet
2	Minimum Stall Torque Nm	1.5 for SA3E22 / 3.23 for SA6E22 / 4 for SA6E45
3	Admissible Ambient Temperature	Refer sr no 18
4	Cable Gland Size for power and control cable	Refer 21A & B
5	Gear box lubrication and ratio	Lubrication : Multipurpose Grease Lubricated.
	MODEL	PAC-0AE = G/B Ratio 35 : 1
		PAC-02AE = G/B Ratio 45 : 1
		PAC-04SGA41E = G/B Ratio 180 : 1
		PAC-GS160GZ14 = G/B Ratio 432 : 1
		PAC-0AE = G/B Ratio 35 : 1
6	Position limit switches shall be 4 in nos and torque limit switch shall be 2 in nos having silver plated contact.	Refer Sr.No. 23 & 24
7	Rating of switch for Ac & Dc	Refer Sr.No. 25
8	Position Transmitter detail for inching / On Off duty	Refer 26 A from data sheet
9	Space heater detail	Refer sr no 27 of data sheet
10	Thermostat detail	Refer sr no 28 of data sheet
11	Internal Wiring Detail	Refer Sr no 29 from data sheet
12	Wiring Diagram	Refer Sr no 29 from data sheet
13	Interposing relay current consumption	5 mAMPs
14	Fault indication contacts	Yes Confirmed and Provided in actuator.
15	Frame size of motors	AM 71
16	Power Factor and full load efficiency	Refer sr no 16 & 17 from data sheet
17	Temperature raise over ambient temperature	Refer sr no 19
18	Type of starter provided	Refer Sr no 20 from data sheet
19	Reference Standard And Tolerance	Refer Sr.No 33 from data sheet
20	OLR ranges and set value	Refer Sr no 35 & 34 from data sheet
21	Motor suitable to for inching duty	As per Thermax requirement.
22	No/ of start per hour	Refer Sr.No. 32 from data sheet
23	Plug an socket details	Refer sr no 38 from data sheet
24	Paint shade	Refer Sr no 41 from data sheet
25	Approximate weight	Refer sr no 31 from data sheet
26	colour coding of cabels for 9 pin plug and socket suitable for 4 pair G type cable	Refer sr no 39 from data sheet
27	single phase protection and wrong phase sequence protection feature shall avaliable	Refer sr no 34 from data sheet

REPLIES TO MECHANICAL COMMNETS		
Sr.No	**NTPC COMMENTS**	**THERMAX REPLY**
1	CYCLE TEST	POD REPLIES SUBMITTED ALONG WITH QAP
2	PERFORMANCE TEST	AS PER QAP SAME SHALL BE OFFERED ALONG WITH DRAWING
3	SEAT LEAKGE TEST	OFFRED VALVES ARE CLASS VI AS PER API-598
4	API CODE IS USED FOR PETROLEUM PRODUCT. IS CODE MAY BE USED FOR TESTING & SAME SHOULD BE INCARPOATED IN DOCUMENT	API CODE IS UNVERSALLY ACCEPTED.API CODE IS MORE STRIGENT THAN IS CODE WHICH IMPROVES THE QUALITY OF VALVE.AS PER MANUFACTURE'S STD API DESIGN VALVES CAN BE DELIVERED FASTER THAN IS CODE SINCE IT IS STD PRODUCT.

DATASHEET

Auma make Motor Actuator for ON-OFF Duty type

VENDOR NAME : **Intervalve (India) Ltd., Pune**	**DATASHEET REV: 00 (Page 1 of 2)**
CLIENT :	**Contract No.:-**
MAIN SUPPLIER : **M/s Thermax Ltd., Pune**	
PACKAGE:	
NTPC DOCUMENT NO. :	
VALVE TYPE, Model :- **Lugged Butterfly Valve IVTLB**	
Valve sizes : 40 NB, 50 NB, 65 NB, 80 NB & 100 NB	

ACTUATOR MODEL – SA 3 E 22 RPM
(With Integral Starters version 'E-pac' , ON-OFF Duty)

Sl.No.	*DESCRIPTION*	*UNIT*	*DATA*
1	ACTUATOR MANUFACTURER		AUMA (INDIA) PVT. LTD.
2	TORQUE RANGE & RPM		20-30 Nm, 22 RPM
3	DUTY CYCLE		S2-15 mins.
4	ENCLOSURE (TENV)		IP 67
5	NOMINAL OUTPUT	KW	0.06
6	RATED VOLTAGE	V	415 V AC
7	RATED FREQUENCY	Hz	50
8	No. OF PHASE	ϕ	3
9	ADMISSIBLE VOLTAGE FLUCTUATION	%	±10
10	ADMISSIBLE FREQUENCY FLUCTUATION	%	±5
11	ADMISSIBLE VOLTAGE & FREQUENCY VARIATION	%	10 (Absolute)
12	NOMINAL CURRENT	A	0.29
13	STARTING CURRENT	A	1.2
14	FULL LOAD SPEED	RPM	1400
15	INSULATION CLASS		F (Temp. rise limited to Class B)
16	POWER FACTOR		0.6
17	FULL LOAD EFFICIENCY	%	48
18	ADMISSIBLE AMBIENT TEMPERATURE	°C	-20 TO +80
19	TEMPERATURE RAISE OVER AMBIENT TEMP 50°C	°C	70 (By resistance method)
20	TYPE OF STARTER PROVIDED		DOL / 3 PHASE / 3 WIRE
21.A	CABLE GLAND SIZE : POWER – 1 NO. (Double Compression)		¾" BSC (3C x 2.5mm^2 , CU / PVC, OD 14 ±2 mm)
21.B	CABLE GLAND SIZE : CONTROL - 1 NO (Double Compression)		¾ " BSC (8C x 0.5mm^2 , CU / PVC), Max. OD 18.5 mm
22	GEAR BOX LUBRICATION		GREASE – EP0 (SERVO GEM)
23	POSITION LIMIT SWITCHES	Nos.	2 NO + 2 NC Contacts – 4 nos.
24	TORQUE SWITCHES	Nos.	2 NO + 2 NC Contacts – 2 nos.

Contd...2

Auma make Motor Actuator for ON-OFF Duty type

Sl.No.	DESCRIPTION	UNIT	DATA
25	RATING OF SWITCHES	A	240 V AC – 5 A, 220 V DC – 0.5 A (Inductive)
26.A	POSITION TRANSMITTER – ON / OFF DUTY		NOT APPLICABLE
27	SPACE HEATER	No.	1 ϕ, 110 V AC, 50 HZ, 10W (1 no.) Space Heater supply will be derived from main power supply available within the actuator
28	THERMOSTAT	No.	3 Nos. – ONE IN EACH WINDING
29	INTERNAL WIRING		PVC 1.5 mm^2
30	CONTROL CIRCUIT DIAGRAM (with integral starters version e-pac)		3 WD/ epac/ 1.1-11231 R1
31	WEIGHT (Approx.)	Kg.	65 120
32	MOTOR SUITABLE FOR INCHING / ON-OFF		ON-OFF duty (Max. 60 starts per hr.) (Actuator will be suitable for three successive Open-Close operations or 15 Minutes which ever is higher)
33	MOTOR TYPE & REF. STANDARD		Squirrel Cage Induction Motor & Tolerance of Motor Data as per IS 325
34	OLR & SINGLE PHASING PROTECTION		Provided
35	OLR SET VALUE	A	0.29
36	AUTOMATIC PHASE CORRECTION		Provided
37	TYPE TEST		Type test is not envisaged for ordered Actuators
38	PLUG & SOCKET		2 Nos., 9-Pin Plug and Socket connector (Suitable for 4 pair 0.5mm^2 'G' type instrumentation cable; Max. OD 18.5 mm)
39	THE COLOUR CODING OF CABLES FOR 9 PIN PLUG AND SOCKET SUITABLE FOR 4 PAIR, G – TYPE CABLE		Pin No. / Cable Colour A (1) Blue B (2) Red C (3) Gray D (4) Yellow E (5) Green F (6) Brown G (7) White H (8) Black J (9) Shield
40	MATERIAL OF HANDWHEEL		Malleable Iron / SG Iron /MS Fabricated
41	PAINTING SHADE		RAL 5012 (Blue), for both Indoor & Outdoor application
42	Position Indicator		Yes, Provided. Local mechanical position indicator (Continuous Type) for 0 to 100% travel

Name & Seal of Vendor with Signature

DATASHEET

Auma make Motor Actuator for ON-OFF Duty type

VENDOR NAME : **Intervalve (India) Ltd., Pune** **DATASHEET REV: 00 (Page 1 of 2)**
CLIENT : **Contract No.:-**
MAIN SUPPLIER : **M/s Thermax Ltd., Pune**
PACKAGE:
NTPC DOCUMENT NO. :
VALVE TYPE, Model :- **Lugged Butterfly Valve IVTLB**
Valve size : 200 NB

ACTUATOR MODEL – SA 6 E 22 RPM
(With Integral Starters version 'E-pac' , ON-OFF Duty)

Sl.No.	*DESCRIPTION*	*UNIT*	*DATA*
1	ACTUATOR MANUFACTURER		AUMA (INDIA) PVT. LTD.
2	TORQUE RANGE & RPM		20-60 Nm, 22 RPM
3	DUTY CYCLE		S2-15 mins.
4	ENCLOSURE (TENV)		IP 67
5	NOMINAL OUTPUT	KW	0.12
6	RATED VOLTAGE	V	415 V AC
7	RATED FREQUENCY	Hz	50
8	No. OF PHASE	ϕ	3.
9	ADMISSIBLE VOLTAGE FLUCTUATION	%	±10
10	ADMISSIBLE FREQUENCY FLUCTUATION	%	±5
11	ADMISSIBLE VOLTAGE & FREQUENCY VARIATION	%	10 (Absolute)
12	NOMINAL CURRENT	A	0.45
13	STARTING CURRENT	A	2.3
14	FULL LOAD SPEED	RPM	1400
15	INSULATION CLASS		F (Temp. rise limited to Class B)
16	POWER FACTOR		0.62
17	FULL LOAD EFFICIENCY	%	61%
18	ADMISSIBLE AMBIENT TEMPERATURE	°C	-20 TO +80
19	TEMPERATURE RAISE OVER AMBIENT TEMP 50°C	°C	70 (By resistance method)
20	TYPE OF STARTER PROVIDED		DOL / 3 PHASE / 3 WIRE
21.A	CABLE GLAND SIZE : POWER – 1 NO. (Double Compression)		¾" BSC (3C x 2.5mm^2 , CU / PVC, OD 14 ±2 mm)
21.B	CABLE GLAND SIZE : CONTROL - 1 NO (Double Compression)		¾" BSC (8C x 0.5mm^2 , CU / PVC), Max. OD 18.5 mm
22	GEAR BOX-LUBRICATION		GREASE – EP0 (SERVO GEM)
23	POSITION LIMIT SWITCHES	Nos.	2 NO + 2 NC Contacts – 4 nos.
24	TORQUE SWITCHES	Nos.	2 NO + 2 NC Contacts – 2 nos.

Contd...2

Auma make Motor Actuator for ON-OFF Duty type

Sl.No.	DESCRIPTION	UNIT	DATA
25	RATING OF SWITCHES	A	240 V AC – 5 A, 220 V DC – 0.5 A (Inductive)
26.A	POSITION TRANSMITTER – ON / OFF DUTY		NOT APPLICABLE
27	SPACE HEATER	No.	1 ϕ, 110 V AC, 50 HZ, 10W (1 no.) Space Heater supply will be derived from main power supply available within the actuator
28	THERMOSTAT	No.	3 Nos. – ONE IN EACH WINDING
29	INTERNAL WIRING		PVC 1.5 mm^2
30	CONTROL CIRCUIT DIAGRAM (with integral starters version e-pac)		3 WD/ epac/ 1.1-11231 R1
31	WEIGHT (Approx.)	Kg.	65
32	MOTOR SUITABLE FOR INCHING / ON-OFF		ON-OFF duty (Max. ~~60~~ 20 starts per hr.) (Actuator will be suitable for three successive Open-Close operations or 15 Minutes which ever is higher)
33	MOTOR TYPE & REF. STANDARD		Squirrel Cage Induction Motor & Tolerance of Motor Data as per IS 325
34	OLR & SINGLE PHASING PROTECTION		Provided
35	OLR SET VALUE	A	0.45
36	AUTOMATIC PHASE CORRECTION		Provided
37	TYPE TEST		Type test is not envisaged for ordered Actuators
38	PLUG & SOCKET		2 Nos., 9-Pin Plug and Socket connector (Suitable for 4 pair 0.5mm^2 'G' type instrumentation cable; Max. OD 18.5 mm)
39	THE COLOUR CODING OF CABLES FOR 9 PIN PLUG AND SOCKET SUITABLE FOR 4 PAIR, G – TYPE CABLE		Pin No. / Cable Colour A (1) Blue B (2) Red C (3) Gray D (4) Yellow E (5) Green F (6) Brown G (7) White H (8) Black J (9) Shield
40	MATERIAL OF HANDWHEEL		Malleable Iron / SG Iron /MS Fabricated
41	PAINTING SHADE		RAL 5012 (Blue), for both Indoor & Outdoor application
42	Position Indicator		Yes, Provided. Local mechanical position indicator (Continuous Type) for 0 to 100% travel

Name & Seal of Vendor with Signature

DATASHEET

Auma make Motor Actuator for ON-OFF Duty type

VENDOR NAME : **Intervalve (India) Ltd., Pune**	**DATASHEET REV: 00 (Page 1 of 2)**
CLIENT :	**Contract No.:-**
MAIN SUPPLIER : **M/s Thermax Ltd., Pune**	
PACKAGE:	
NTPC DOCUMENT NO. :	
VALVE TYPE, Model :- **Lugged Butterfly Valve IVTLB**	
Valve size : 500, 600 & 650 NB	

ACTUATOR MODEL – SA 6 E 45 RPM
(With Integral Starters version 'E-pac' , ON-OFF Duty)

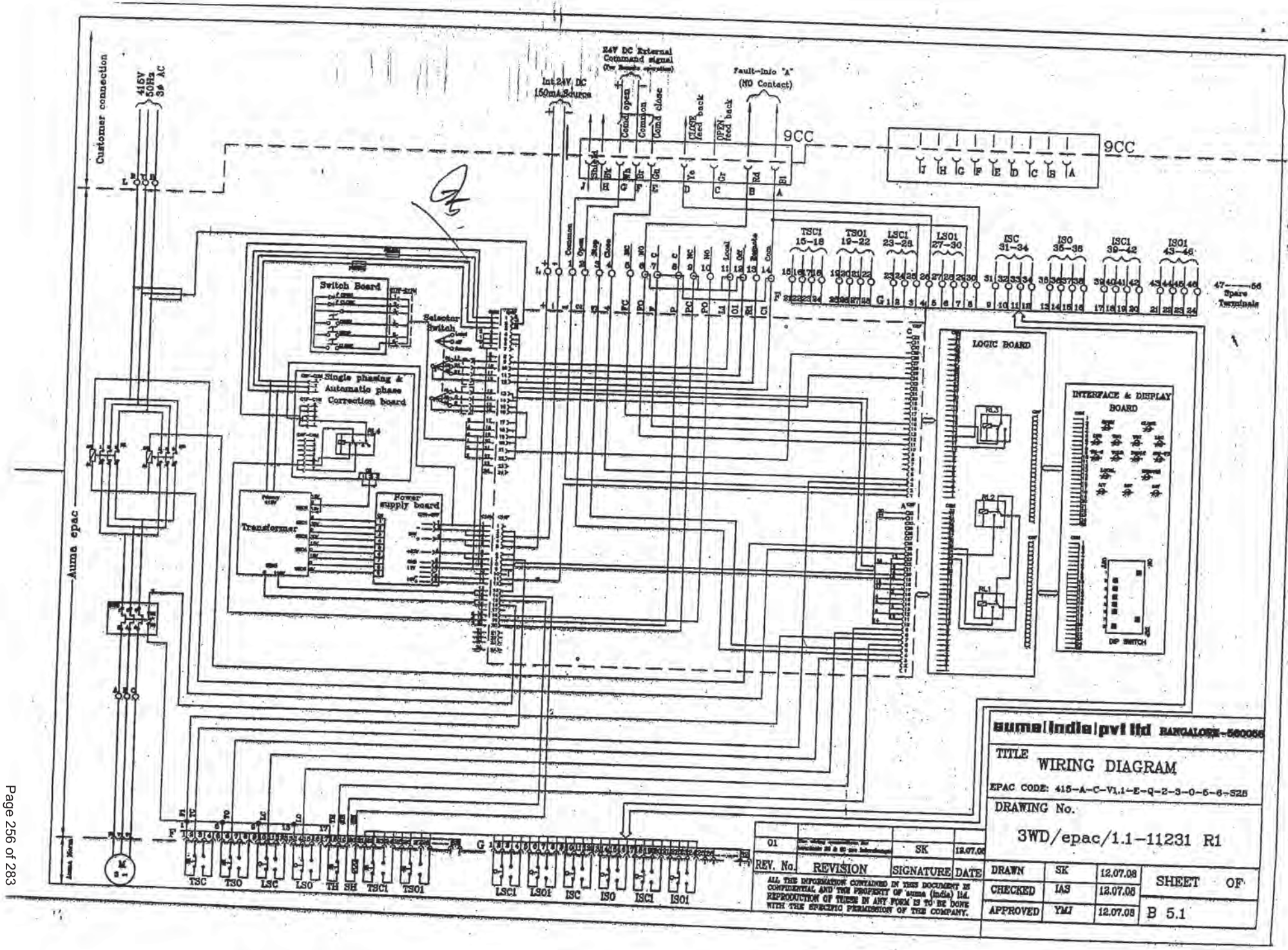
Sl.No.	*DESCRIPTION*	*UNIT*	*DATA*
1	ACTUATOR MANUFACTURER		AUMA (INDIA) PVT. LTD.
2	TORQUE RANGE & RPM		20-60 Nm, 45RPM
3	DUTY CYCLE		S2-15 mins.
4	ENCLOSURE (TENV)		IP 67
5	NOMINAL OUTPUT	KW	0.37
6	RATED VOLTAGE	V	415 V AC
7	RATED FREQUENCY	Hz	50.
8	No. OF PHASE	ϕ	3
9	ADMISSIBLE VOLTAGE FLUCTUATION	%	±10
10	ADMISSIBLE FREQUENCY FLUCTUATION	%	±5
11	ADMISSIBLE VOLTAGE & FREQUENCY VARIATION	%	10 (Absolute)
12	NOMINAL CURRENT	A	0.93
13	STARTING CURRENT	A	5.5
14	FULL LOAD SPEED	RPM	2800
15	INSULATION CLASS		F (Temp. rise limited to Class B)
16	POWER FACTOR		0.76
17	FULL LOAD EFFICIENCY	%	73%
18	ADMISSIBLE AMBIENT TEMPERATURE	°C	-20 TO +80
19	TEMPERATURE RAISE OVER AMBIENT TEMP 50°C	°C	70 (By resistance method)
20	TYPE OF STARTER PROVIDED		DOL / 3 PHASE / 3 WIRE
21.A	CABLE GLAND SIZE : POWER – 1 NO. (Double Compression)		¾" BSC (3C x 2.5mm^2 , CU / PVC, OD 14 ±2 mm)
21.B	CABLE GLAND SIZE : CONTROL - 1 NO (Double Compression)		¾" BSC (8C x 0.5mm^2 , CU / PVC), Max. OD 18.5 mm
22	GEAR BOX LUBRICATION		GREASE – EP0 (SERVO GEM)
23	POSITION LIMIT SWITCHES	Nos.	2 NO + 2 NC Contacts – 4 nos.
24	TORQUE SWITCHES	Nos.	2 NO + 2 NC Contacts – 2 nos.

Contd...2

Auma make Motor Actuator for ON-OFF Duty type

Sl.No.	DESCRIPTION	UNIT	DATA
25	RATING OF SWITCHES	A	240 V AC – 5 A, 220 V DC – 0.5 A (Inductive)
26.A	POSITION TRANSMITTER – ON / OFF DUTY		NOT APPLICABLE
27	SPACE HEATER	No.	1 ϕ, 110 V AC, 50 HZ, 10W (1 no.) Space Heater supply will be derived from main power supply available within the actuator
28	THERMOSTAT	No.	3 Nos. – ONE IN EACH WINDING
29	INTERNAL WIRING		PVC 1.5 mm^2
30	CONTROL CIRCUIT DIAGRAM (with integral starters version e-pac)		3 WD/ epac/ 1.1-11231 R1
31	WEIGHT (Approx.)	Kg.	65
32	MOTOR SUITABLE FOR INCHING / ON-OFF		ON-OFF duty (Max. ~~60~~ 120 starts per hr.) (Actuator will be suitable for three successive Open-Close operations or 15 Minutes which ever is higher)
33	MOTOR TYPE & REF. STANDARD		Squirrel Cage Induction Motor & Tolerance of Motor Data as per IS 325
34	OLR & SINGLE PHASING PROTECTION		Provided
35	OLR SET VALUE	A	0.93
36	AUTOMATIC PHASE CORRECTION		Provided
37	TYPE TEST		Type test is not envisaged for ordered Actuators
38	PLUG & SOCKET		2 Nos., 9-Pin Plug and Socket connector (Suitable for 4 pair 0.5mm^2 'G' type instrumentation cable; Max. OD 18.5 mm)
39	THE COLOUR CODING OF CABLES FOR 9 PIN PLUG AND SOCKET SUITABLE FOR 4 PAIR, G – TYPE CABLE		Pin No. / Cable Colour A (1) Blue B (2) Red C (3) Gray D (4) Yellow E (5) Green F (6) Brown G (7) White H (8) Black J (9) Shield
40	MATERIAL OF HANDWHEEL		Malleable Iron / SG Iron /MS Fabricated
41	PAINTING SHADE		RAL 5012 (Blue), for both Indoor & Outdoor application
42	Position Indicator		Yes, Provided. Local mechanical position indicator (Continuous Type) for 0 to 100% travel

Name & Seal of Vendor with Signature



01		SK	12.07.08
REV. No.	REVISION	SIGNATURE	DATE

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auma|india|pvt ltd BANGALORE-560058

TITLE
WIRING DIAGRAM

EPAC CODE: 415-A-C-V1.1-E-Q-2-3-0-6-6-S28

DRAWING No.
3WD/epac/1.1-11231 R1

DRAWN	SK	12.07.08	SHEET OF
CHECKED	IAS	12.07.08	
APPROVED	YMJ	12.07.08	B 5.1

Information –A

Collective fault indication (NO Contact) for
- Thermoswitch trip
- Torque switch trip
- Thermal over load relay trip
- Power supply failure/Single phasing
- Actuator in Local/Off mode

Legend

K1	– Open Contactor (Coil voltage 110V AC)
K2	– Close Contactor (Coil valatge 110V AC)
Th	– Thermoswitch
RL1	– 24V DC,6A Relay for OPEN Contactor
RL2	– 24V DC,6A Relay for CLOSE Contactor
RL3	– 24V DC,6A Relay for Collective Fault Annunciation
RL4	– 24V DC Relay for power supply failure Annunciation
M	– Motor 3Ph, 415V, 50Hz.
TSC	– Torque switch close
TSO	– Torque switch open
LSC	– Limit switch close
LSO	– Limit switch open
ISC	– Intermediate limit switch –CLOSE
ISO	– Intermediate limit switch –OPEN
TSC1/TSO1	– Torque switch in tandem operation with TSC/TSO
LSC1/LSO1	– Limit switch in tandem operation with LSC/LSO
ISC1/ISO1	– Intermediate limit switch in tandem operation with ISC/ISO
F, G	– Plug in type terminals between basic actuator(Norm) and Integral starter(epac)
Th	– Thermoswitch
9CC	– 9 Pin plug/socket connector with one set spare
TOLR	– Thermal over load relay
L–R,Y,B	– Main supply 415V,3ø,50Hz AC
L 1–56	– Terminals for customer connection
L 47–56	– Spare terminals
SH	– Space heater

DISPLAY BOARD LEGEND:–

Symbol	Type	Description	Symbol	Type	Description
OPEN	Status	Actuator in open direction	TSO	Fault	Torque switch open
Close	Status	Actuator in Close direction	TSC	Fault	Torque switch close
LSO	Status	Limit switch open	TH–S	Fault	Thermoswitch trip
LSC	Status	Limit switch close	TOLR	Fault	Thermal overload relay trip
LOCAL	Status	Actuator in local mode	FAULT	Fault	Fault indication
REMOTE	Status	Actuator in remote mode	SUY–FS	Fault	Single phasing
11V	Status	11V internal power supply	24V	Status	24V DC For Customer's use
23V	Status	23V internal power supply			

DIP SWITCH PARTICULARS: –

Switch No	Switch position–OFF	Switch position–ON	Applicable for version
1	Inching operation in Local mode (non self retaining)	Non–inching operation in Local mode (self retaining)	Applicable
2	–	Emergency shut down to Open	Not–Applicable
3	–	Emergency shut down to Close	Not–Applicable
4	L S O BY PASS		Applicable
5	–	Inhibit Open direction	Not–Applicable
6	–	Inhibit Close direction	Not–Applicable
7	Inching operation in Remote mode (non self retaining)	Non–inching operation in Remote mode (self retaining)	Applicable
8	Limit switch close bypass (Closing by torque switch Close) (Torque Seating)	Limit Seating	Applicable

Contact development:–

CONTACT	PARTICULARS	FULL CLOSED	VALVE TRAVEL	FULL OPEN
*	TSO			
L 19–22	TSO1			
*	TSC			
L 15–18	TSC1			
*	LSO			
L 27–30	LSO1			
*	LSC			
L 23–26	LSC1			
L 35–38	ISO			
L 43–46	ISO1			
L 31–34	ISC			
L 39–42	ISC1			

* For internal use

Note:–

Torque switches are bypassed in both the end positions with other end Limit switches in the PCB for a duration of 4 seconds

REV. No.	REVISION	SIGNATURE	DATE

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auma(india)pvt ltd BANGALORE–560058

TITLE: INDEX

DRAWING No.: 3WD/epac/1.1–11231 R1

DRAWN	SK	12.07.08	SHEET OF
CHECKED	IAS	12.07.08	
APPROVED	YMJ	12.07.08	B 5.1

VALVE SIZE	øA	B	C	D	E	F	øG	H	J	K	QTY	**ACT.MODEL+GEAR BOX	OPERATING TIME	PCD	N	ød
40	40	33	68	103	478	73	250	350	166	570	02	SA3E22+PAC0AE	24 SEC	98.5	15.7	4
50	50	43	73	113	488	73	250	350	166	570	17	SA3E22+PAC0AE	24 SEC	120.7	19.1	4
65	65	46	80	121	496	73	250	350	166	570	04	SA3E22+PAC0AE	24 SEC	139.7	19.1	4
80	80	46	88	128	503	73	250	350	166	570	09	SA3E22+PAC0AE	24 SEC	152.4	19.1	4
100	100	52	104	146	521	73	250	350	166	570	03	SA3E22+PAC0AE	24 SEC	190.5	19.1	8
150	150	56	138	174	549	73	250	350	166	570	01	SA3E22+PAC0AE	24 SEC	241.3	22.4	8
200	200	60	163	198	590	134	250	417	131	603	02	SA3E22+PAC02AE	31 SEC	298.5	22.4	8

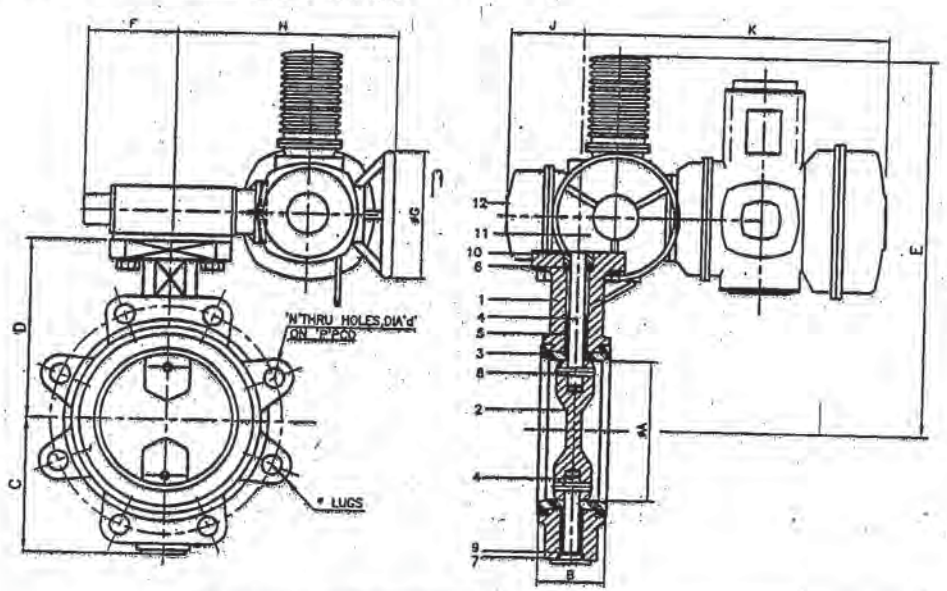
VALVE SIZE	TAG NO
40	MV15, 14, 47
50	MV 4, 6, 7, 9, 22, 45, 19, 27, 31, 33,17, 45
65	MV 10, 28, 12, 16
80	MV 8, 18, 20, 23, 24, 32, 34
100	MV25,38,40
150	MV41
200	MV26,39, 48

SPECIFICATIONS :

FLANGE DRILLING STD:- ANSI B16.5 #150
PRESSURE RATING--PN10
MFG STD - API 609
TEST STD- API 598
HYD TEST PRESS-1) BODY 15 KG/CM2
2) SEAT 11 KG/CM2
SEAT LEAKAGE : CLASS VI
FLOW DIRECTION : BIDIRECTIONAL

⚠ CAUTION

1) DO NOT USE FLANGE GASKETS DURING VALVE INSTALLATION.
2) ALL DIMENSIONS ARE INDICATIVE EXCEPT FACE TO FACE DIM.
3) CLOCKWISE TO CLOSE & ANTICLOCKWISE TO OPEN.
4) NO.OF LUGS ARE SHOWN FOR INDICATIVE PURPOSE.



NO	DESCRIPTION	QTY	MATL./MAKE
** 12	ELECT. ACTUATOR(ON/OFF)	1	AUMA/INTEGRAL STARTER
** 11	GEAR BOX	1	STD/PAC
10	TOP BUSHING	1	POLYACETAL
9	PLUG	1	C 15
8	TAPER PIN	2	AISI 316
7	O RING PLUG	1	EPDM
6	O RING SHAFT	1	EPDM
5	BEARING	2	STEEL+PTFE
4	SHAFT	1	AISI 316
3	BONDED SEAT	1	EPDM
2	DISC	1	SGI DIN1693 GGG40+EPOXY
1	BODY	1	CI IS210 FG260+EPOXY

IV NO:-941594
TQ.NO-
APPD / DT.
IVTLB BUTTERLY VALVE WITH WITH ELECT.ACTUATOR
CHKD / DT.
DRG.NO. PD31209/MDS016
DRN. / DT. SHP 26.10.09

REV.	MOD.NO.	DATE	SIGN

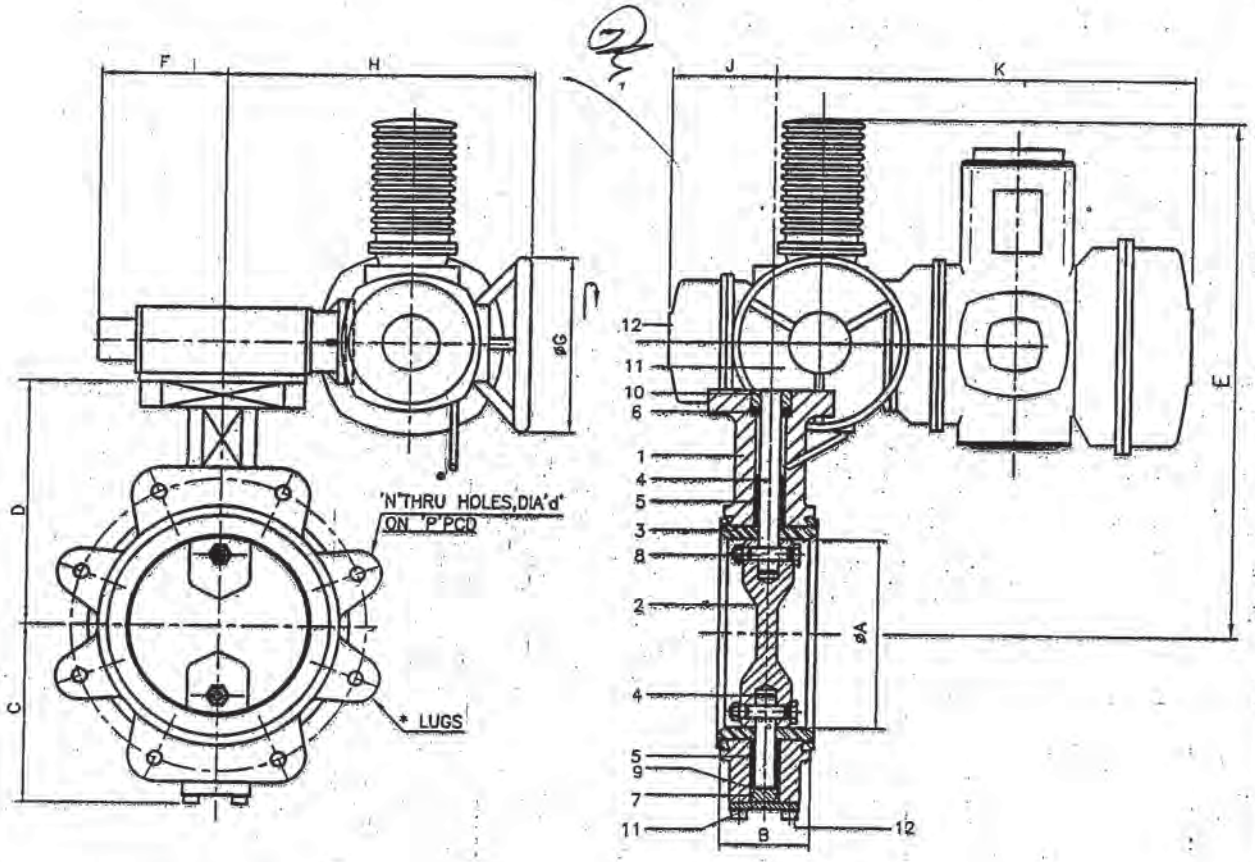
IF IN DOUBT. ASK.
SCALE N.T.S.

PROJECT:- PRAGATI POWER CORPORATION LIMITED.
CLIENT:- BHEL, NOIDA. CONSULTANT:- M/s NTPC NEW DELHI
CUSTOMER- THERMAX LIMITED. WWS DIVISION.
P.O. NO:- E-MAIL LOI DT:- 23/10/2009

INTERVALVE(INDIA)

VALVE DIMENSIONS											QTY	LUG DRILLING DETAILS			OPERATING TIME
VALVE SIZE	øA	B	C	D	E	F	øG	H	J	K		PCD	N	ød	
500	486	127	355	410	824	218	250	665	124	635	05	635	31.8	20	60 SEC

TAG NO:– MV35,36,37



SPECIFICATIONS :

FLANGE DRILLING STD:– ANSI B16.5 #150
PRESSURE RATING–PN10
MFG STD – API 609
TEST STD– API 598
HYD TEST PRESS–1) BODY 15 KG/CM2
2) SEAT 11 KG/CM2
SEAT LEAKAGE : CLASS VI
FLOW DIRECTION : BIDIRECTIONAL

⚠ CAUTION

1) DO NOT USE FLANGE GASKETS DURING VALVE INSTALLATION.
2) ALL DIMENSIONS ARE INDICATIVE EXCEPT FACE TO FACE DIM.
3) CLOCKWISE TO CLOSE & ANTICLOCKWISE TO OPEN.
4) NO.OF LUGS ARE SHOWN FOR INDICATIVE PURPOSE.

NO	DESCRIPTION	QTY	MATL.
14	ELECT. ACTUATOR(ON/OFF)	1	AUMA/SA65E45/INTEGRAL STARTER
13	GEAR BOX	1	STD/PAC04SGA41E
12	SOC CAP SCREW	4	AISI 304
11	BOTTOM COVER	1	MS+EPOXY
10	TOP BUSHING	1	POLYACETAL
9	THRUST PAD	1	AL.BRONZE
8	CYLINDRICAL PIN	2	AISI 316
7	O RING THRUST PAD	1	EPDM
6	O RING SHAFT	1	EPDM
5	BEARING	2	STEEL+PTFE
4	SHAFT	2	AISI 316
3	BONDED SEAT	1	EPDM
2	DISC	1	SGI DIN1693 GGG40+EPOXY
1	BODY	1	SGI DIN1693 GGG40+EPOXY

IV NO:–941594
TQ.NO–
APPD / DT.
IVTLB BUTTERFLY VALVE WITH WITH ELECT.ACTUATOR
CHKD / DT.
DRG.NO. PD31210/MDS016
DRN. / DT.
SHP 26.10.09

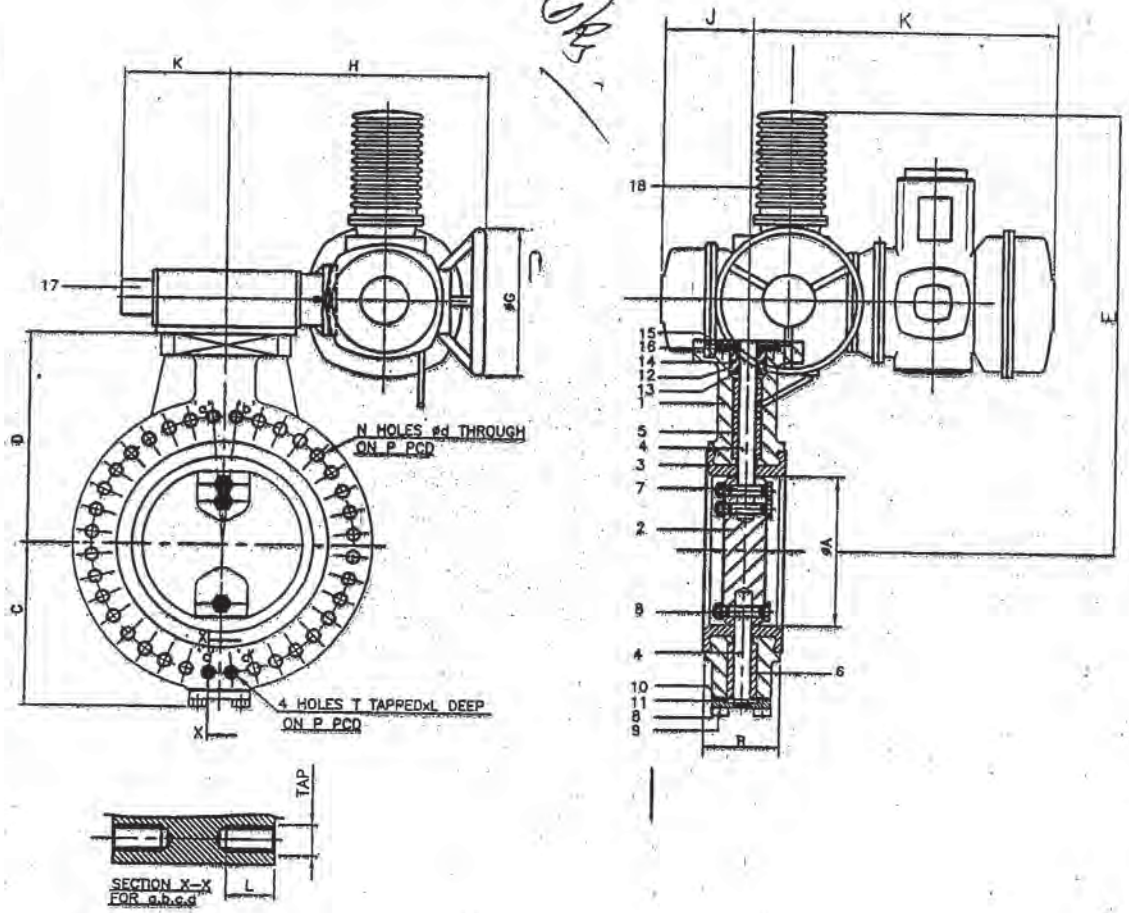
REV.	MOD.NO.	DATE	SIGN

IF IN DOUBT, ASK.
SCALE N.T.S.

PROJECT:– PRAGATI POWER CORPORATION LIMITED.
CLIENT:– BHEL, NOIDA. CONSULTANT:– M/s NTPC NEW DELHI
CUSTOMER– THERMAX LIMITED. WWS DIVISION.
P.O. NO:– E–MAIL LOI DT:– 23/10/2009

INTERVALVE(INDIA)

VALVE DIMENSIONS												LUG DRILLING DETAILS				OPERATING TIME	TAG NO
VALVE SIZE	A	B	C	D	E	F	G	H	J	K	QTY	P	ød	N	T x L		
650	636	165	485	525	950	340	250	410	173	680	02	744.5	22.35	32	3/4"-10 UNCx30	144 SEC	MV 42,43



SPECIFICATIONS :

FLANGE DRILLING STD:- ANSI B16.47 SERIES B
PRESSURE RATING-PN10
MFG STD - API 609
TEST STD- API 598
HYD TEST PRESS- 1) BODY 15 KG/CM2
2) SEAT 11 KG/CM2
SEAT LEAKAGE : CLASS VI
FLOW DIRECTION : BIDIRECTIONAL

⚠ CAUTION

1) DO NOT USE FLANGE GASKETS DURING VALVE INSTALLATION.
2) ALL DIMENSIONS ARE INDICATIVE EXCEPT FACE TO FACE DIM.
3) CLOCKWISE TO CLOSE & ANTICLOCKWISE TO OPEN.
4) NO.OF HOLES ARE SHOWN FOR INDICATIVE PURPOSE

NO	DESCRIPTION	QTY	MATL
18	ELECT.ACTUATOR(ON/OFF)	1	AUMA/SA6E45/INTEGRAL STARTER
17	GEAR BOX	1	AUMA/GS160 GZ14
16	GUIDE BUSH	1	AL.BRONZE
15	TOP COVER	1	AISI 304
14	O RING BODY	1	EPDM
13	O RING SHAFT	2	EPDM
12	O RING HOLDER	1	AISI 304
11	THRUST BEARING	1	AL.BRONZE
10	GASKET	1	CAF
9	SOC.HD.CAP SCREW	4	AISI 304
8	COVER	1	MS+EPOXY
7	CYLINDRICAL PIN	3	AISI 316
6	BOTTOM BEARING	2	STEEL+PTFE
5	TOP BEARING	2	STEEL+PTFE
4	SHAFT	2	AISI 316
3	BONDED SEAT	1	EPDM
2	DISC	1	SGI DIN1693 GGG40+EPOXY
1	BODY	1	SGI DIN1693 GGG40+EPOXY

IV NO:- 941594

APPD / DT.

TITLE: IVIL BUTTERFLY VALVE WITH AUMA ELECTRICAL ACTUATOR.

CHD / DT.

DRG.NO. PD31211/MDS036

DRN. / DT. SHP 26.10.09

PROJECT:- PRAGATI POWER CORPORATION LIMITED.
CLIENT:- BHEL, NOIDA. CONSULTANT:- M/s NTPC NEW DELHI
CUSTOMER- THERMAX LIMITED. WWS DIVISION.
P.O. NO:- E-MAIL LOI DT:- 23/10/2009

REV.	MOD.NO.	DATE	SIGN

IF IN DOUBT. ASK..

SCALE N.T.S.

INTERVALVE (INDIA)

INTERVIVE (INDIA) LTD.
(WITH DUTCH TECHNOLOGY)

General Purpose Rubber Lined Butterfly Valve With Lugged Body

Yet another real workhorse from the IV stables, IVTL model Butterfly valve incorporates the optimum design features to provide long trouble free service in the field. This general purpose soft seated Butterfly valve has a fully rubber lined single piece body with a centric disc construction and is available in wafer lugged style body pattern to ensure precise location in pipeline.

The body liner which also functions as the soft seat, come either in a replaceable version or an integrally moulded (bonded) version and offers 100 % bi-directional sealing against vaccum to rated pressures of PN 10 orPN16.

The lugged version with threaded holes can be used as end of line valves or terminal end valves.

Conformity to codes and standards :

General design and manufacturing	:	API 609 category A/BS 5155/MSS SP-67
Valve face to face dimensions	:	Short wafer or Wafer lugged as per ISO 5752 Tab 5 & API 609 category A
Top flange drilling	:	ISO 5211 part II
Valve inspection and testing	:	API 598
Flange standard conformity	:	ANSI 150, DIN PN6/PN10/PN16, JIS 5K /10 K BS 10 Tab D & E, IS 6392 NP 0.6/1.0/1.6 For sizes ≥ 650 ANSI B16.47 Class 150 Series A / BS 3293 Class 150 and Series B / API 605

Technical specifications :

1. Valve type	:	Centric Disc Design Butterfly valve with a single piece Rubber lined body
2. Body type	:	Wafer lugged (IVTL)
3. Seat type	:	Replaceable for sizes 50 NB to 600 NB ≤ PN 10 rating. Bonded seat for sizes 40 to 1200 NB for all ratings.
4. End connection	:	Wafer lugged
5. Size range	:	40 NB to 1200 NB
6. Pressure rating	:	40 NB to 600 NB-PN 16 (max). 650 NB to 1200 NB-PN 10 (max).
7. Operating temperature range	:	-25 C to 200 C (depending on MOC)
8. Seat leakage	:	Tight shut off
9. Operation	:	Handlever for sizes from 40 NB to 250 NB Worm gear boxes for sizes from 40 NB to 1200 NB Pneumatic / Electric actuator operation-optional
10. Standard Material of Construction (MOC)		
Body	:	CI / SGI / WCB / CF8 / CF8M
Disc	:	SGI / WCB / CF8 / CF8M
Seat	:	EPDM / Viton / Nitrile / Neoprene / Hypalon / Silicon
Shaft	:	AISI 410 / SS 316 SH

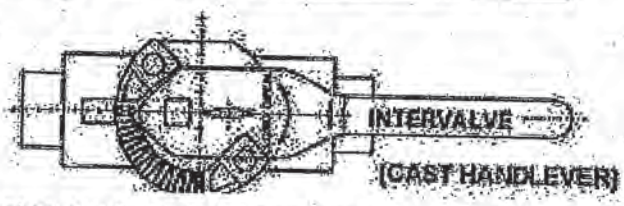
CE

DIMENSIONS (In mm.) with Pressed Steel Handlever

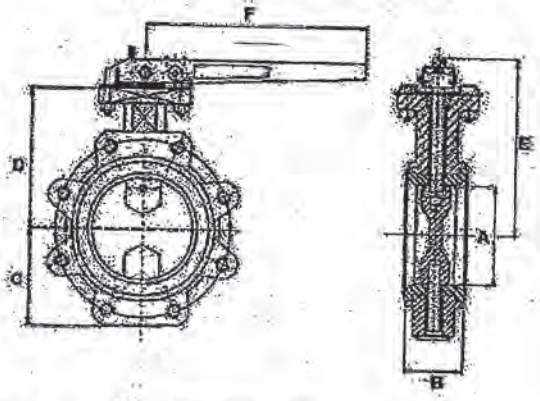
40	33	68	103	150	195	5.0
50	43	73	113	160	195	5.5
65	46	80	121	170	195	6.0
80	46	88	128	175	195	7.5
100	52	104	146	195	250	10.5
125	56	116	158	205	250	13.5
150	56	138	174	230	300	15.0

MTL BUTTERFLY VALVE WITH HANDLEVER

(Pressed Steel Handlever)



(CAST HANDLEVER)



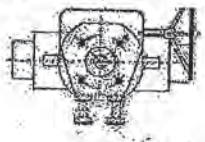
DIMENSIONS (in mm.) with Cast Handlever

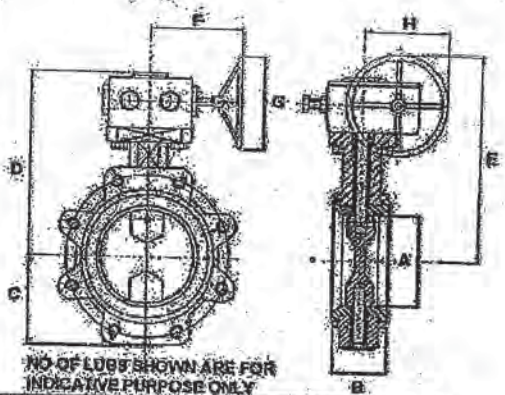
200	60	163	198	255	500	18.0
250	68	203	245	300	500	29.0

* Valve Rating up to PN6 only.

DIMENSIONS (in mm.) for PN10 & PN16 with Worm Gear

40	33	68	103	230	195	175	127	9.5
50	43	73	113	240	195	175	127	11.0
65	46	80	121	248	195	175	127	11.5
80	46	88	128	255	195	175	127	13.0
100	52	104	146	273	195	175	127	16.0
125	56	116	158	285	195	175	127	19.0
150	56	138	174	340	242	250	182	22.5
200	60	163	198	365	242	250	182	25.5
250	68	203	245	410	242	250	182	36.5
300	78	228	270	486	285	350	252	52.0
336	78	265	312	528	285	350	252	62.0
386	102	305	360	705	320	600	388	93.5





DIMENSIONS (in mm.) for PN10 with Worm Gear

436	114	330	390	735	320	600	388	108.5
486	127	355	410	755	320	600	388	158.5
586	154	435	490	810	395	500	445	242.0

DIMENSIONS (in mm.) for PN16 with Worm Gear

436	114	330	390	765	320	600	432	137.0
486	127	355	410	730	395	500	445	182.0
586	154	435	490	825	420	500	500	296.0

NO OF LUGS SHOWN ARE FOR INDICATIVE PURPOSE ONLY

Key features :

- Unique triple sealing system for shaft sealing, eliminates any fugitive emission or secondary leakage.
- Self lubricated PTFE lined bearings for both drive end and non-drive end shaft ensures minimum bearing friction torque.
- Seat liner extending on to the flange contact faces, eliminates the need for separate flange gaskets during installation.
- Controlled compression of the gasket face to offer optimum sealing & prevent gasket face crushing failure.
- Bi-directional valve with tight shut off sealing capability to hold vaccum to rated pressure in either direction.
- Excellent adaptability for actuated operation through standardised top flange mounting dimensions for actuator fitment.
- Suitability for ON /OFF as well as throttling duties.
- Choice of seat and disc materials to suit media conditions and service requirements.
- The lugged wafer pattern ensures precise self centering of valve between mating flanges.
- Possibility of lower seat rating to obtain reduced operating torque and extended seat life for low operating pressures.

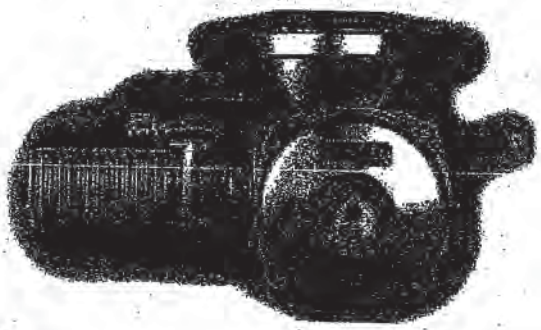
INTEGRAL STARTER AND ACTUATOR CONTROLS

FOR ACTUATORS OF TYPE SA AND SAR

auma

Contents

auma
An Introduction



Auma India Limited in collaboration with Werner Riester GmbH Co. KG of Germany, leaders in the field of valve and damper automation manufacture Actuators for ON-OFF & MODULATING duty with integral Starters.

Auma India is an ISO 9001 company.

Auma India has a full fledged manufacturing base in Bangalore backed by Sales & Service setup through out India.

Auma India offers integral Starters in Different version to suit various needs of the market. Auma India Integral Starters are supplied both in hard wired & PLC control version as per customer's

AUMA

Integral Starter

Auma India Basic Actuator can house the Motor with three thermostats for protection against burn-out, Drive arrangement, Main gearing for transmission of torque, Valve attachment, Drive system for position sensing devices, Position transmitting devices, Local Position Indicator, End position limit switches, Torque switches in both direction, Space Heaters, Terminal compartment, Handwheel for manual operation, Cable glands for conduit entries, etc.

An Integral control box housing the required reversing contactors wired to the motor of the Actuator, can be attached to the Basic Actuator.

Auma India Integral Starter
the required ele
the entire Integra
protection class
temperature of
Actuators : -20°C

The Reversing
Mechanically In
like Selector S
transformers. F
Thermal overlo
boards, Phase
protection device
Dip switches for
housed in the Int

Plug in type c
between the bas
unit for ease o
optional feature.

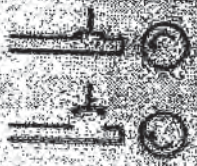
3

Control

Emergency Shut Down

The closing of Emergency Shut Down contact at the Remote Command Center (RCC) will enable the actuator to move in OPEN / CLOSE direction (as programmed locally) over ridding any existing REMOTE or LOCAL signals.

2 - Wire Make / Break



The Remote Command Signal will be through 2 wires. The Make (NO) of these wires will operate the actuator in OPEN / CLOSE direction and the Break (NC) of these wires will operate the actuator in CLOSE / OPEN direction. The required direction of rotation shall be programmed locally.

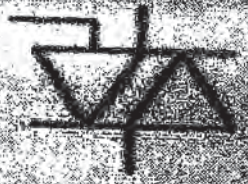
Timer Board

With this option, it will be possible to run the actuator for a pre-defined travel in ON-OFF steps. The ON-OFF intervals shall be adjustable from 1 - 30 seconds for both directions independently. This feature is useful in increasing the operating time in large Butterfly valves to prevent water hammer effect.

Inhibit Open / Close

Two wires will be drawn to the Remote Control Center from the actuator. The 'Make' of these wires will prevent the actuator from Opening / Closing selection of direction to be inhibited shall be possible at the actuator.

Thrristor Reversing Unit



The integral starter unit can be provided with Solid State Starter (Thyristors) for regulation duty application. The Thyristor control comes with inhibit rugged protection circuits.

Negative Switching

Absence of 24V DC remote signal from Remote Command Center will make the actuator run in the required direction. Retaining (Inching) / Non-Retaining (Non-Inching) mode will be field configurable.

Options

4

The actuator starter unit can be provided in a wall mountable version in which case, the controls of the actuator alone can be mounted on a nearby wall or bracket to meet certain site requirements.

Wall Mountable Controls

Individual relay contacts can be provided for remote annunciation for facilities like Actuator running in Open, Actuator running in close, Open torque switch tripped, Close torque switch tripped, Thermoswitch / Thermal overload relay trip etc.,

Remote Annunciation Relays

In case of a Power supply failure, an annunciation to indicate the same can be provided.

Power failure annunciation

Integral to the actuator are DIP switches the programming of which offers a wide range of options to the customer and the customer or site can configure the actuator to satisfy his requirements like selecting direction of rotation for Emergency shut down, selecting direction of rotation for 2-wire make and break, selecting direction of rotation that needs to be inhibited, selection of inching or non-inching mode for the actuator, Limit switch by-pass (negate seating) for gate valve application etc.

DIP Switch Programming

Positioner with PWM Control

Regulation duty actuators can be offered with Positioner with Pulse Width Control.

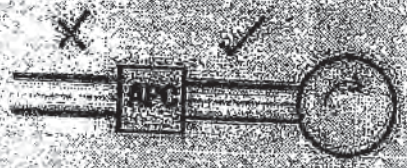
The actuator with this feature, enables the user to stop the actuator by operating the local stop push button even when the actuator is in remote mode.

Local Stop

5

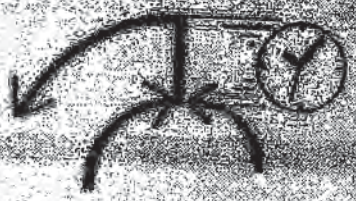
Safety

Automatic Phase Correction



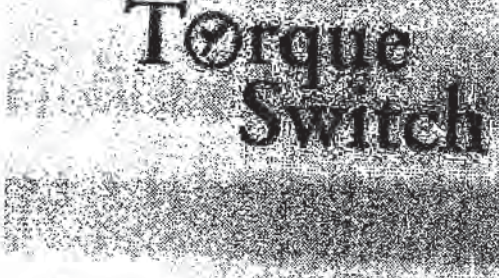
The actuator with Automatic Phase corrector in-built, will check the phase sequence of the supply and correct it, in case wrong sequence is provided. This will set the customer free from wrong sequence connection hassles.

Instantaneous Reversal Protection



This feature ensures that the motor does not get an instantaneous reversal signal. Even if an instantaneous reversal signal is given to the actuator, a time delay of 150 mSec is built-in to prevent instantaneous reversal of the motor direction and assures the safety of the motor and the driven equipment.

Smart Torque Switch



The torque switches play an important role in protecting the actuator, motor and the valve. In addition to its role of tripping the actuator under abnormal torque requirements, certain special features can also be built-in and the torque switches act smart during the valve unseating process and prevents nuisance tripping. If the actuator is tripped by the torque switch in a particular direction, it will not allow the actuator to run again in that direction (Anti-Hammer Protection).

Opto - Isolation of Input Signals

All the remote control inputs (OPEN - STOP - CLOSE) to the actuator are isolated optically from the actuator internal electronics to ensure perfect isolation between customer controls and actuator controls.

Features

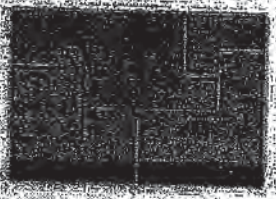
In addition to a thermo switch embedded in each of the windings, this feature protects the actuator motor by cutting off the supply instantaneously to it in case of single phasing of power supply.

Single Phasing Protection

General

The integral starter in electronic control version, is modular in design, i.e., the integral starter is made up of 'sub-modules' and all the 'sub-modules' are with plug-in type connection which helps the user in replacement, maintenance and trouble shooting. The whole Actuator Starter is again a module with plug-in type connectors for connection to the basic actuator this also helps the user in replacement, maintenance and trouble shooting.

Modular Design



The integral starter in electronic control version, is self-diagnostic with Local green coloured LEDs for status and red coloured LEDs for fault annunciation. This ensure better trouble shooting. These LEDs can be viewed through a view port provided on the Actuator.

Self-Diagnostic

The integral starter can house a control transformer which shall convert the three phase power to single phase and feed it to the cards which generates 24V DC for internal use and 24V DC I solated I is also provided for the customer for his use.

24V DC

Aumo India has the required expertise and facilities to take up challenging jobs in the filed of valve and damper automation and in addition to products with the above features, customized products to meet the special requirement of customers are also produced.

And . . .

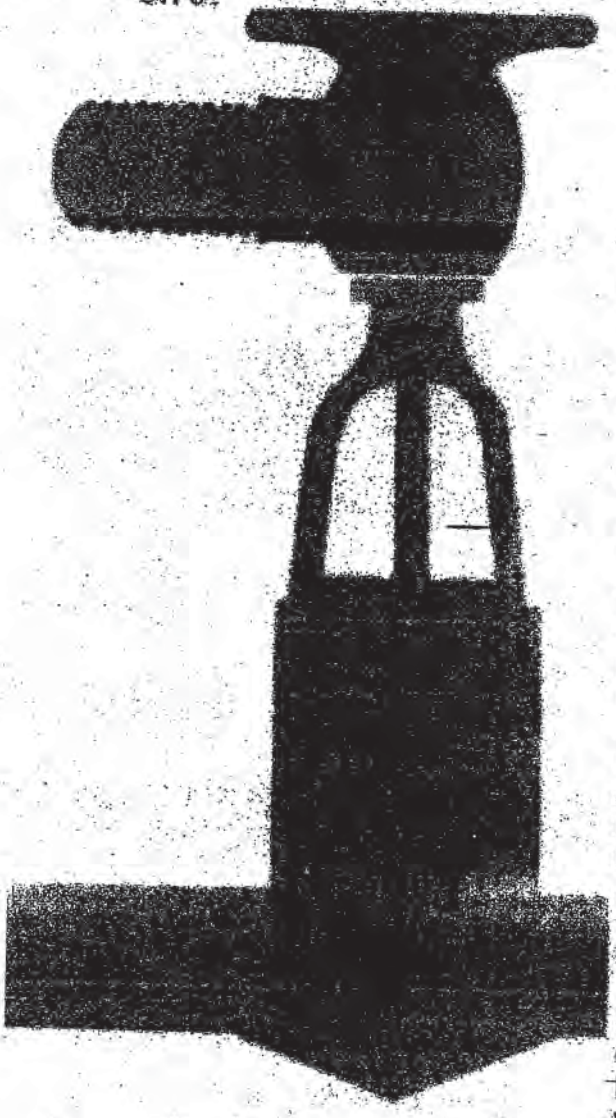
7

AUMA

About electronic version of the Integral Starter

The Electronic version of Auma India Integral starters are modular in construction. The Electronic version of the Integral starter unit consists of the power module, the control module and the starter module.

This modular approach enable easy maintenance and interchangeability at site.



The printed circuit board used CMOS ICs which ensures high noise immunity and low power consumption. Each PCB is a functional unit and is of plug in design, which enables replaceability of a particular functional unit at site.

Availability of DIP switch programming makes it possible to customize the Actuator to meet the requirements easily at site.

Provision of opto-couplers and annunciation relays enables the Integral Starter unit to interface input and output signals with customer controls.

Opto-couplers ensure isolation of customer command signals from Actuator Electronics while consuming very less power. Similarly fault annunciation relays are provided for both common fault optionally for individual faults.

Local LEDs are provided for both status and fault annunciation to ensure better trouble shooting. These LEDs can be viewed through a view port provided on the Actuator.

The Integral Starter unit can also be easily detached from the basic Actuator by the virtue of its unique plug in design. This also ensures good maintainability and interchangeability at site.

Auma India Integral Starter unit provides many protection features with optionals, like Automatic phase correction, instantaneous reversal protection, anti-hammer protection, single phasing protection, thermo switch tripped, thermal overload relay trip, etc.

Integral Starter unit can also be provided with solid state starters (thyristors) for regulation duty application. The thyristor control comes with in built rugged protection circuit which are well suited for Indian conditions.

Auma India strives to offer complete solution for valve & damper automation needs of customer. Other special requirement can also be accommodated after a detail discussion.

Note:

Applicable wiring diagrams, terminal plan, contact development diagram, etc., will be furnished on request.

	TECHNICAL SPECIFICATIONS/ DATA SHEET	DS No.	WPP09-007-000-058/BOI
		Rev.No.	5
		Date	13-Feb-10

ITEM **COMPUTER**
MAKE **HP/DELL**

SPECIFICATIONS

Configuration

Intel Pentium Processor
2 GB RAM
160 GB HDD
2.8 GHz
48 X DVD Read & Write drive
3 1/2" Floppy Drive
Optical Mouse.
104 keys standard keyboard.
2 Ethernet ports
2 Serial port
1 Parallel port
6 USB ports
Operating System : Latest windows professional & Antivirus
MONITOR as per below specification

CONSULTANT	NTPC LIMITED, CONSUTANCY WING		
CUSTOMER	M/s. BHARAT HEAVY ELECTRICALS LTD		
END USER	M/s. PRAGATI POWER CORPORATION LIMITED (PPCL)		
PROJECT	PRAGATI-III COMBINED CYCLE POWER PROJECT 1500MW(NOMINAL)		
PREPARED	SHAN	**CHKD & APPD**	KS

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ITEM **MONITOR-22 INCH**
MAKE **DELL**

SPECIFICATIONS

Display Type	Flat panel display / TFT active matrix

Display

Diagonal Size	22 in - Widescreen
Viewable Size	22 in
Max Resolution	1680 x 1050
Max Sync Rate (V x H)	75 Hz x 83 KHz
Video Bandwidth	146 MHz
Response Time	5 ms
Display Pos. Adjustments	Tilt
Signal Input	DVI-D, VGA
Features	HDCP

Video Input

Analog video signal	RGB
Digital video standard	Digital Visual Interface (DVI)

Power

Input Voltage	100-240VAC
Power consumption	90VA

CONSULTANT	NTPC LIMITED, CONSUTANCY WING		
CUSTOMER	M/s. BHARAT HEAVY ELECTRICALS LTD		
END USER	M/s. PRAGATI POWER CORPORATION LIMITED (PPCL)		
PROJECT	PRAGATI-III COMBINED CYCLE POWER PROJECT 1500MW(NOMINAL)		
PREPARED	SHAN	**CHKD & APPD**	KS

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MODULE CAT No. **IC693PWR331**
MODULE NAME **POWER SUPPLY MODULE**

Module Specifications

	IC693PWR331
Product Name	Power Supply, 24 VDC
Module Type	Power Supply
Power Source	24 VDC
High Capacity	Yes
Output Source	30 watts total; 30 watts 5 V; 15 watts 24 V relay; 20 watts 24 V isolated
Number of Redundant Power Supplies Supported	N/A
Cable Length to Redundant Power Supply Adapter	N/A
Redundant Power Supply Adapter Rack Compatibility	N/A
24 VDC Output Current Capacity	0.8 A

CONSULTANT	NTPC LIMITED, CONSUTANCY WING		
CUSTOMER	M/s. BHARAT HEAVY ELECTRICALS LTD		
END USER	M/s. PRAGATI POWER CORPORATION LIMITED (PPCL)		
PROJECT	PRAGATI-III COMBINED CYCLE POWER PROJECT 1500MW(NOMINAL)		
PREPARED	SHAN	**CHKD & APPD**	KS

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Video Input

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Digital video standard	Digital Visual Interface (DVI)

Power

Input Voltage	100-240VAC
Power consumption	90VA

CONSULTANT	NTPC LIMITED, CONSUTANCY WING		
CUSTOMER	M/s. BHARAT HEAVY ELECTRICALS LTD		
END USER	M/s. PRAGATI POWER CORPORATION LIMITED (PPCL)		
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PREPARED	SHAN	**CHKD & APPD**	KS

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ITEM **A3 COLOUR INKJET PRINTER**
MAKE **HP**

SPECIFICATIONS

Print speed	Draft: up to 21 ppm; laser quality: 6 ppm; Best: up to 3.7 ppm
Resolution	up to 4800 by 1200-optimized dpi color printing on premium photo papers
Processor	256 MHz
Duty cycle	Up to 6,250 pages per month
Sizes	Width: 3 to 13 in (76 to 330 mm); length: 5 to 100 in (127 to 2540 mm)
Types	Paper (plain, inkjet, photo), envelopes, transparencies, labels, cards (index, greeting)
Connectivity	USB 2.0 full speed port, IEEE 1284-compliant parallel port, built-in Ethernet connectivity
Client operating systems	Microsoft® 2000, XP

CONSULTANT	NTPC LIMITED, CONSUTANCY WING		
CUSTOMER	M/s. BHARAT HEAVY ELECTRICALS LTD		
END USER	M/s. PRAGATI POWER CORPORATION LIMITED (PPCL)		
PROJECT	PRAGATI-III COMBINED CYCLE POWER PROJECT 1500MW(NOMINAL)		
PREPARED	SHAN	**CHKD & APPD**	KS

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VOLUME III

LIST OF DOCUMENTS TO BE SUBMITTED ALONG WITH BID

- Technical pre-bid clarification if any strictly in the enclosed Schedule of pre bid clarifications only with mention of specification clause for which clarification is being asked. (Stamped & Signed).
- Technical Deviation if any strictly in the enclosed Schedule of deviation with cost of withdrawal only with mention of specification clause for which deviation is being asked. (Stamped & Signed).
- No deviation in attached “Schedule of technical deviation and cost of withdrawal” format. (Stamped & Signed).
- Compliance cum confirmation certificate (Stamped & Signed).
- Un Price Schedule duly filled as “Quoted” in each column (Stamped & Signed).

COMPLIANCE CUM CONFIRMATION CERTIFICATE

The bidder shall confirm compliance with following by signing/ stamping this compliance certificate and furnishing same with the offer:

1. The scope of supply, technical details, construction features, design parameters etc. shall be as per technical specification & there are no exclusions/ deviations with regard to same.
2. There are no other deviations with respect to specification other than those furnished in the 'Schedule of Deviations'.
3. The offered materials shall be either equivalent or superior to those specified. Also for components where material is not specified it shall be suitable for intended duty, materials shall be subject to approval in the event of order.
4. All sub vendors shall be subject to BHEL/CUSTOMER approval.

PRE BID CLARIFICATION SCHEDULE

All clarification from the Technical Specification shall be filled in by the BIDDER clause by clause in this format only.

VOLUME	SECTION	CLAUSE NO.	PAGE NO.	SPECIFICATION REQUIREMENT	CLARIFICATION	REASONS FOR CLARIFICATION

SCHEDULE OF TECHNICAL DEVIATIONS WITH COST OF WITHDRAWAL

PROJECT:-1500 MW PRAGATI – III CCPP

MANDATORY SPARES FOR PRETREATMENT PLANT, CW TREATMENT PLANT, CHLORINE DIOXIDE SYSTEM, EFFLUENT TREATMENT PLANT, CHLORINATION PLANT, SIDE STREAM FILTRATION & SEWAGE TREATMENT PLANT

TENDER ENQUIRY REFERENCE:-

NAME OF VENDOR:-

SL NO	VOULME/ SECTION	PAGE NO.	CLAUSE NO.	TECHNICAL SPECIFICATION/ TENDER DOCUMENT	COMPLETE DESCRIPTION OF DEVIATION	COST OF withdrawal OF DEVIATION	REFERENCE OF PRICE SCHEDULE ON WHICH COST OF withdrawal OF DEVIATION IS APPLICABLE	NATURE OF COST OF withdrawal OF DEVIATION (POSITIVE/ NEGATIVE)	REASON FOR QUOTING DEVIATION
TECHNICAL DEVIATIONS									
COMMERCIAL DEVIATIONS									

PARTICULARS OF BIDDERS/ AUTHORISED REPRESENTATIVE

NAME	**DESIGNATIONS**	**SIGN & DATE**	

NOTES:

1. For self manufactured items of bidder, cost of withdrawal of deviation will be applicable on the basic price (i.e. excluding taxes, duties & freight) only.
2. For directly dispatchable items, cost of withdrawal of deviation will be applicable on the basic price including taxes, duties & freight.
3. All the bidders have to list out all their Technical & Commercial Deviations (if any) in detail in the above format.
4. Any deviation not mentioned above and shown separately or found hidden in offer, will not be taken cognizance of.
5. Bidder shall submit duly filled unpriced copy of above format indicating "quoted" in "cost of withdrawal of deviation" column of the schedule above along with their Techno-commercial offer, wherever applicable.
6. Bidder shall furnish price copy of above format along with price bid.
7. The final decision of acceptance/ rejection of the deviations quoted by the bidder shall be at discretion of the Purchaser.
8. Bidders to note that any deviation (technical/commercial) not listed in above and asked after Part-I opening shall not be considered.
9. For deviations w.r.t. Payment terms, Liquidated damages, Firm prices and submission of E1/ E2 forms before claiming 10% payment, if a bidder chooses not to give any cost of withdrawal of deviation loading as per Annexure-VIII of GCC, Rev-06 will apply. For any other deviation mentioned in un-priced copy of this format submitted with Part-I bid but not mentioned in priced copy of this format submitted with Priced bid, the cost of withdrawal of deviation shall be taken as NIL.
10. Any deviation mentioned in priced copy of this format, but not mentioned in the un-priced copy, shall not be accepted.
11. All techno-commercial terms and conditions of NIT shall be deemed to have been accepted by the bidder, other than those listed in unpriced copy of this format.
12. Cost of withdrawal is to be given seperately for each deviation. In no event bidder should club cost of withdrawal of more than one deviation else cost of withdrawal of such deviations which have been clubbed together shall be considered as NIL.
13. In case nature of cost of withdrawal (positive/negative) is not specified it shall be assumed as positive.
14. In case of descrepancy in the nature of impact (positive/ negative), positive will be considered for evaluation and negative for ordering.

* SCHEDULE OF DECLARATIONS

*** Bidder shall include this schedule both in technical and Price offers**

DECLARATION

I ……..……certify that all the technical data and information pertaining to this specification are correct and are true representation of the equipment/system covered by our format proposal number Dated ……. and there is no deviation to the specification.

I hereby certify that I am duly authorized representative of the Bidder's company whose name appears above my signature.

Bidders Company Name …….

Authorised representative's Signature ……..

Name …….

Bidder's Name

The bidder hereby agrees to fully comply with the requirements and intent of this specification for the price indicated

PARTICULARS OF BIDDER / AUTHORISED REPRESENTATIVE				
NAME	DESIGNATION	SIGNATURE	DATE	COMPANY SEAL