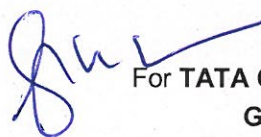


**LETTER OF TRANSMITTAL FOR VENDOR DOCUMENTS**

To, Chief Engineer (P&P) Maharashtra State Power Generation Company Ltd. (MAHAGENCO) Prakashgadh, Anant Kaneekar Marg, Bandra (East), Mumbai – 400 051	JOB NO: TCE. 6846A	Mail: 25-07-2016
	CLIENT: MAHARASHTRA STATE POWER GENERATION COMPANY LIMITED	OUR REF: TCE.6846A-ME- VDT-398-BPL
	PROJECT: EE R&M OF 210 MW UNIT-6 OF KORADI THERMAL POWER STATION.	DATE: 24-08-2016
	SUBJECT: AUTO VALVES	SH 1 OF 1

Attn: **Mr. Vikas M. Jaideo Chief Engineer (P&P)**

We are here in conveying our approval/comments on the documents listed below. Approval/comments conveyed herein neither relieves the vendor/contractor of his contractual obligations and his responsibilities for correctness of dimensions, materials of construction, weights, quantities, design details, assembly fits, performance requirements and conformity of the supplies with the Indian Statutory Laws as may be applicable, nor does it limit the purchaser's rights under the contract.



Yours faithfully
For **TATA Consulting Engineers Limited**
G.S.RAVISHANKAR
For Project Manager

CODES	
A: Document approved as submitted; proceed with fabrication/construction.	F: Correct original of the document to reflect our comments and resubmit for records.
B: Document approved subject to comments noted; proceed with fabrication/construction considering our comments.	G: Documents of this category are for information only and not for approval. Information furnished on the document is noted.
C: Our comments are noted on the enclosed marked-up print.	H: Document reviewed only against our previous comments and other revisions highlighted and identified by the vendor.
D: Our comments are noted in the memo attached to this transmittal.	I: Document returned without review.
E: Correct original of the document to reflect our comments and resubmit for approval.	J: Print not enclosed.

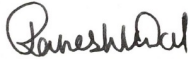
SL. NO.	VENDOR'S DOCUMENT NO.	TCE NO.	TITLE	REV NO	CODE
1.	4-726-29-40-108-A	-	GA and DS of auto valves	01	A,H
2.	4-726-29-40-108-B	-	GA and DS of auto valves	01	A,H
3.	4-726-29-40-108C		GA and DS of auto valves	00	C

MEMO

Please refer to the attached PDF / compliance sheet for comments.

TATA CONSULTING ENGINEERS LIMITED

Sheriff Centre 73/1 St Marks Road Bangalore 560 001

REV NO.	DATE	REMARKS	PRE. BY	CHK. BY	TATA CONSULTING ENGINEERS LIMITED VENDOR DOCUMENT REVIEW STATUS	
1	14-06-2016	SUBMITTED FOR APPROVAL	VA		☒ A Drawing/Document approved as submitted. Proceed with fabrication/construction.	
0	28-03-2016	SUBMITTED FOR APPROVAL	VA		☐ B Drawing/Document approved subjected to comments noted. Proceed with fabrication/construction considering our comments.	
					☐ C Our comments are noted on this marked up print. ☐ D Our comments are noted in memo attached to the forwarding transmittal letter No. TCE.6846A-I&C-BHEL(BPL)-VDT-398. Dated 24-08-2016 ☐ E Correct original of this drawing/document to reflect our comments and resubmit for approval. ☐ F Correct original of this drawing/document to reflect our comments and resubmit for records. ☐ G Drawings/Documents of this category are for information only and not for approval. Information furnished on the drawing/document is noted. ☒ H Drawing/Document reviewed against our previous comments and other revisions highlighted and identified by the vendor. ☐ I Drawing/Document returned without review. ☐ J Print not enclosed. Approval conveyed herein neither relieves the Vendor/Contractor of his contractual obligations and his responsibilities for correctness of dimensions, materials of construction, weights, quantities, design details, assembly fits, performance requirements and conformity of the supplies with the Indian Statutory Laws as may be applicable, nor does it limit the purchaser's rights under the contract. Reviewed by.....Date 24-08-2016	
APPROVED  राकेश मंडल / RAKESH MONDAL बरि. अभियंता / Sr. Engineer नवीकरण एवं आधुनिकीकरण प्रणाली समूह R & M Systems Group बी.एच.ई.एल., भोपाल / BHEL, BHOPAL			PROJECT	EE R&M, UNIT -6 (1 X 200 MW) KORADI TPS		
			END USER	KORADI THERMAL POWER STATION, MAHAGENCO		
			CONSULTANT	TATA CONSULTING ENGINEERS LTD.		
			CLIENT		BHARAT HEAVEY ELECTRICALS LTD., BHOPAL	
			CONTRACTOR		Aqua Designs India Private Ltd., Off 200 feet Road, Kolathur, Chennai - 600099	
			TITLE	GA and Data Sheet of Auto Valves		
			BHEL DOC. NO.	4-726-29-40-108-A	REV. NO. 01	
			ADIPL DOC. NO.	ADIPL-BHEL-CPU-GA&DS -007	TOTAL SHEET 3	

FLANGE DRILLING DETAILS AS PER ANSI B16.5 CL. 150						
VALVE SIZE		OD MM. RATIONA- LISED	P.C.D.	NO. OF HOLES	Ø HOLE MIN.	QTY NOS
INS	DN					
1	25	115	79.4	4	16	08
1 1/2	40	135	98.4	4	16	08

E		E	
SIZE DN	A MM	B MM	ØD MM
25	510	168	127
40	520	168	159

PRESSURE DROP = 100%	
HYDRO TEST PRESSURE	
SHELL	24 BARG
SEAT	17.5 BARG
AIR PRESSURE – 4 BAR	

BODY LINING MATERIAL	HARDNESS SHORE 'D'	SPARK TEST kV
HARD RUBBER LINED	80±5	17

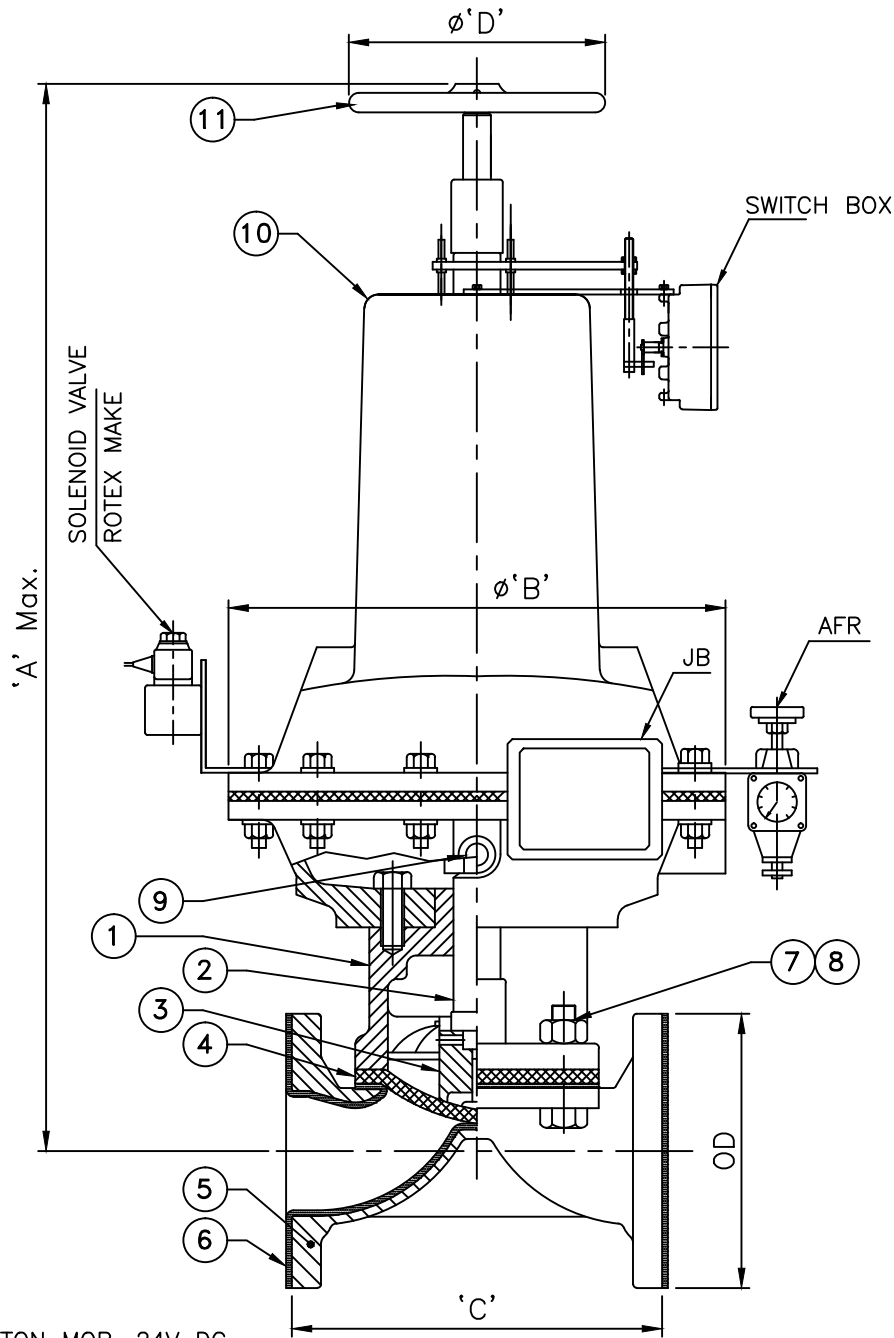
DOUBLE ACTING – AIR TO OPEN & CLOSE, AIR FAIL TO STAYPUT

- ACCESSORIES
1. KENWOOD LS BOX WITH HONEYWELL SWITCHES (MODEL V15), (2NO+2NC) 2 NO.SPDT, IP67, 1/2" CABLE ENTRY.
 2. ROTEX MAKE SOV-5/2 WAY, 1/4" NPT PNEUMATIC CONNECTION, AL BODY, PUSH BUTTON MOR, 24V DC, W-PROOF IP67, 1/2" NPT CABLE ENTRY, NON NAMUR MODEL: 51400-6-2R-M6-2R+24VDC-16
 3. NORGREN MAKE AFR MODEL B07-233-M1KG, METALLIC BOWL, 5 MICRON FILTER, MANUAL DRAIN, 0.3-7 BAR, 1/4" BSP (F), WITH PRESSURE GAUGE 0-10 BAR (18-013-212)
 4. TUBING & CONNECTORS

NOTE:
DOUBLE ACTING – AIR TO OPEN & CLOSE, AIR FAIL TO STAYPUT
VALVE BODY RATING – 16 BAR
VALVE SHUT OFF PRESSURE – 16 BAR

NOTE:
KENWOOD MAKE JUNCTION BOX SHALL BE PROVIDED FOR TERMINATION OF ALL ELECTRICAL CABLE ENTRIES (SHOWN FOR TENTATIVE PURPOSE, ACTUAL VIEW MAY DIFFER)

C	
TAG NOS	
DN25	ADV001,ADV002,ADV003,ADV004,ADV006,ADV010,ADV011,ADV013
DN40	ADV005,ADV007,ADV008,ADV009,ADV012,ADV014,ADV015,ADV016



DRAWING APPROVAL		CRANE	Process Flow Technologies A Crane Co. Company
IT IS THE CUSTOMER'S RESPONSIBILITY TO VERIFY THE DIMENSIONS AND INFORMATION SHOWN ON THIS DRAWING. DEVIATIONS FROM THE SPECIFICATION SHOWN ON THIS DRAWING WILL INCURE ADDITIONAL COSTS & MAY AFFECT DELIVERY. MAJOR CHANGES MAY BE SUBJECTED TO RE-QUOTE			
APPROVAL			
NAME	:	---	
SIGNATURE	:	---	
COMPANY	:	---	
DATE	:	--- / --- / ---	

AMMENDMENT			
ISSUE	DESCRIPTION	DATE	APPROVAL
A	FIRST ISSUE	18.03.16	RP
B	REVISED AS PER CUSTOMER COMMENTS	25.03.16	RP
C	TAG NOS ADDED	03.05.16	RP
D	REVISED AS MARKED	19.05.16	RP
E	MOR ADDED	02.06.16	RP
F	NOTE ADDED FOR JUNCTION BOX	14.06.16	SV

ALL DIMENSIONS IN mm UNLESS OTHERWISE STATED			
11	HANDWHEEL	:GREY CAST IRON BS EN 1561 GR. EN-GJL-250	1
10	ACTUATOR	:SAUNDERS MAKE MODEL ESD54 DOUBLE ACTING WITH MOR AIR TO OPEN & AIR TO CLOSE	1
9	CYLINDER PLUG	:1/8" BSP	2
8	BODY/BONNET NUT	:IS 1367 GR. 8.0	4
7	BODY/BONNET BOLT	:IS 1367 GR. 8.8	4
6	BODY LINING	:HARD RUBBER LINED	—
5	BODY	:GREY CAST IRON BS EN 1561 GR. EN-GJL-250	1
4	LINE DIAPHRAGM	: 'HT' NEOPRENE	1
3	COMPRESSOR	:ASTM A351 GR. CF8M (SS316)	1
2	SPINDLE	:ASTM A276 TYPE 304	1
1	BONNET	:GREY CAST IRON BS EN 1561 GR. EN-GJL-250	1
ITEM	DESCRIPTION		QTY
		Part No. Sales Code	

- General Notes
1. DESIGN STANDARD – BS EN 13397:2002 (EX- BS 5156)
 2. FACE TO FACE DIMENSIONS – DIN EN 558-1:2008 SERIES 7 (EX- BS 5156)
 3. VALVE INSPECTION – BS EN 12266-1:2003 & EN 12266-2:2002 (EX- BS 6755 PART-1)
 4. FLANGE FACE WILL BE FLAT FACE
 5. LINING THICKNESS 3mm MINIMUM AT WEIR AND BORE.
 6. OVERALL DIMENSIONS ARE INDICATIVE EXCEPT FACE TO FACE
 7. VALVE SHALL BE OF LEAKAGE CLASS VI

Customer Name AQUA DESIGN	Body Material
Customer Order No. 1516LPLA-81	Mainline End Spec.
CPFT Order No. AWAIED	Additional End Spec.
Customer Drawing No.	Diaphragm Grade
Valve Assembly Weight.	Valve Body Weight.

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Crane Process Flow Technologies

CRANE		Process Flow Technologies A Crane Co. Company		Saunders The Science Inside	
Title GENERAL ARRANGEMENT OF DN25 TYPE A DOUBLE ACTING ACTUATED (ESD54) DIAPHRAGM VALVE					
Drawn RP		Date 18.03.16		First Angle Projection Method E	
Checked SK		Date 18.03.16		Project GEN ARRANGEMENT	
PED Signature A.B.S				Library CGA NOS	
				Scale NTS	
Solid Model No.				Drawing No. CGA-6153	
				Issue F	

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IT.NO.	COMPONENT	MATERIAL
1	BODY	GREY CAST IRON BS EN 1561 GR. EN-GJL-250
2	DISC	ASTM A351 Gr.CF8M
3	SEAT	EPDM-H
4	LONG SPINDLE	SS ASTM A276 TYPE 420
5	ROLL PIN	STEEL
6	BUSHING	PTFE LINED
7	SNAP RING	STEEL
8	HEX. BOLT	IS 1367 CL. 8.8
9	ACTUATOR	REVO MAKE DOUBLE ACTING
10	SHORT SPINDLE	SS ASTM A276 TYPE 420

SIZE IN mm	DN50	DN65
A	510	530
B	74	80
C	130	146
D	200	200
E	76	76
øF	100	100
G	105	105
J	95	104
L	43.8	46.8
øM	120.7	139.7
ACTUATOR MODEL	DA RD7 006	DA RD7 006
QTY NOS	06	01

HYDRO TEST PRESSURE	
SHELL	15 BARG
SEAT	11 BARG

DA = DOUBLE ACTING

TAG NOS	
DN50	ABFV-007, ABFV-009, ABFV-020, ABFV-022, ABFV-003
	ABFV-006.
DN65	ABFV-023

AIR TO OPEN, AIR TO CLOSE, AIR FAIL TO STAYPUT

ACCESSORIES :-

1. LIMIT SWITCH BOX:- KENWOOD MAKE SW. BOX WITH HONEYWELL V15 SWITCHES (2NO+2NC) 2 NO'S, IP67, 1/2" CABLE ENTRY
2. SOLENOID VALVE:- ROTEX MAKE, 5/2 WAY, 24 VDC, AL. BODY, 1/4" BSP, W-PROOF IP67, 1/2" CABLE ENTRY, NAMUR, MODEL: 51424-6-2R-M6-24VDC-16.
3. NORGREN MAKE AFR MODEL B07-233-M1KG, METALLIC BOWL, 5 MICRON FILTER, MANUAL DRAIN, 0.3-7 BAR, 1/4" BSP (F), WITH PRESSURE GAUGE 0-10 BAR (18-013-212)
4. TUBING & CONNECTORS

NOTE :-

1. DESIGN STANDARD - BS EN 593:2004 (EX- BS 5155)
2. FACE TO FACE DIMENSIONS - DIN EN 558-1:2008 SEREIS 20 (EX- BS 5155)
3. TESTING STANDARD - BS EN 12266-1:2003 (EX- BS 6755 PART-1)
4. PRESSURE RATING = PN10
5. SUITABLE TO MOUNT BETWEEN ANSI B16.5 #150 FLANGES
6. OVERALL DIMENSIONS ARE INDICATIVE EXCEPT FACE TO FACE
7. LEAKAGE CLASS VI, TIGHT SHUT OFF.
8. VALVE SHUT OFF PRESSURE - 10 BAR
9. MIN INLET AIR PRESSURE - 4 BAR

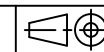
F	REVISED AS MARKED	25.05.16
E	MOR ADDED	19.05.16
D	TAG NOS ADDED	03.05.16
C	REVISED AS MARKED	25.03.16
B	QTY REVISED FOR DN50	22.03.16
REV.	DESCRIPTION	DATE

GENERAL ARRANGEMENT OF WAFER TYPE BUTTERFLY VALVE WITH PNEUMATIC QUARTER TURN DOUBLE ACTING ACTUATOR

CUSTOMER NAME :-
AQUA DESIGN

CUSTOMER PO NO. :-
1516LPLA-81

CRANE OA NO. :-
AWAIED



SCALE :
NTS

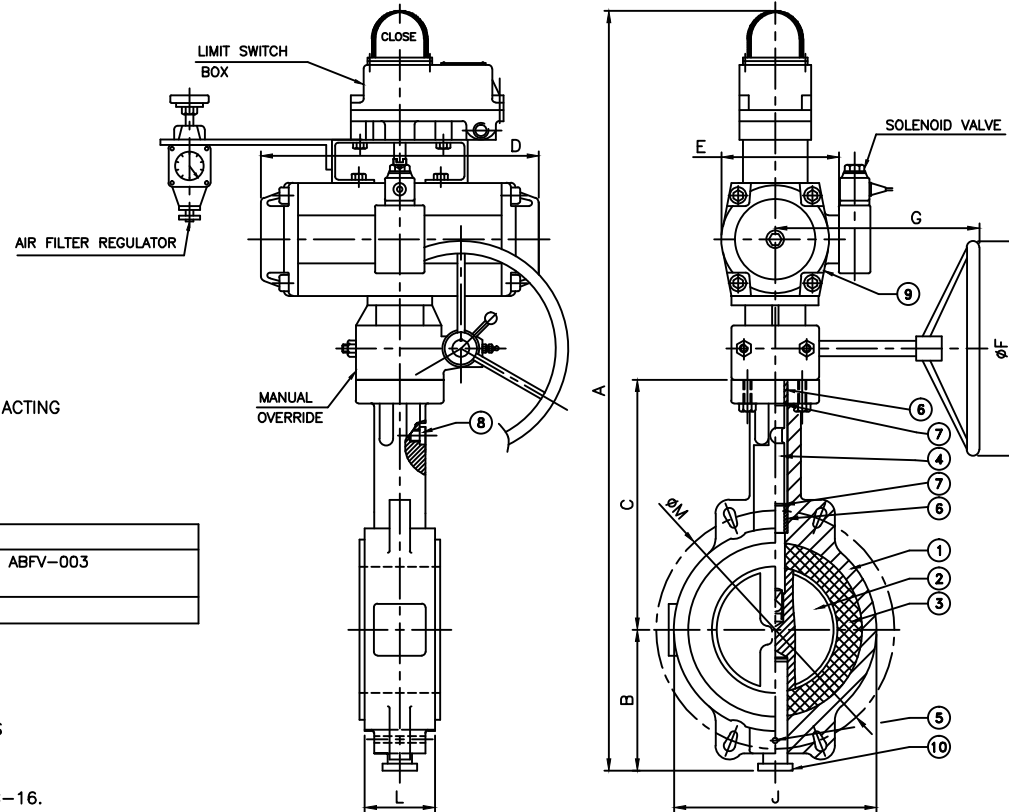
CAD FILE :
IDR-1373-03-04

CRANE CRANE PROCESS FLOW TECHNOLOGIES (I) LTD.
PUNE INDIA

	NAME	SIGN	DATE
DRN	RP		18.03.16
CHKD	KS		18.03.16
APRD	SK		18.03.16

DRAWING NO. IDR-1373-03-04
REV. F

ALL DIMENSIONS ARE IN mm



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IT.NO.	COMPONENT	MATERIAL
1	BODY	ASTM A351 Gr.CF8M
2	DISC	ASTM A351 Gr.CF8M
3	SEAT	EPDM-H
4	LONG SPINDLE	SS ASTM A276 TYPE 420
5	ROLL PIN	STEEL
6	BUSHING	PTFE LINED
7	SNAP RING	STEEL
8	HEX. BOLT	IS 1367 CL. 8.8
9	ACTUATOR	REVO MAKE DOUBLE ACTING
10	SHORT SPINDLE	SS ASTM A276 TYPE 420

SIZE IN mm	DN50	DN65
A	510	530
B	74	80
C	130	146
D	200	200
E	76	76
øF	100	100
G	105	105
J	95	104
L	43.8	46.8
øM	120.7	139.7
ACTUATOR MODEL	DA RD7 006	DA RD7 006
QTY NOS	11	06

HYDRO TEST PRESSURE	
SHELL	15 BARG
SEAT	11 BARG

DA = DOUBLE ACTING

TAG NOS	
DN50	ABFV-024, ABFV-025, ABFV-001, ABFV-004, ABFV-008, ABFV-010 ABFV-017, ABFV-018, ABFV-019, ABFV-021, ABFV-026
DN65	ABFV-002, ABFV-005, ABFV-012, ABFV-014, ABFV-015, ABFV-016

AIR TO OPEN, AIR TO CLOSE, AIR FAIL TO STAYPUT

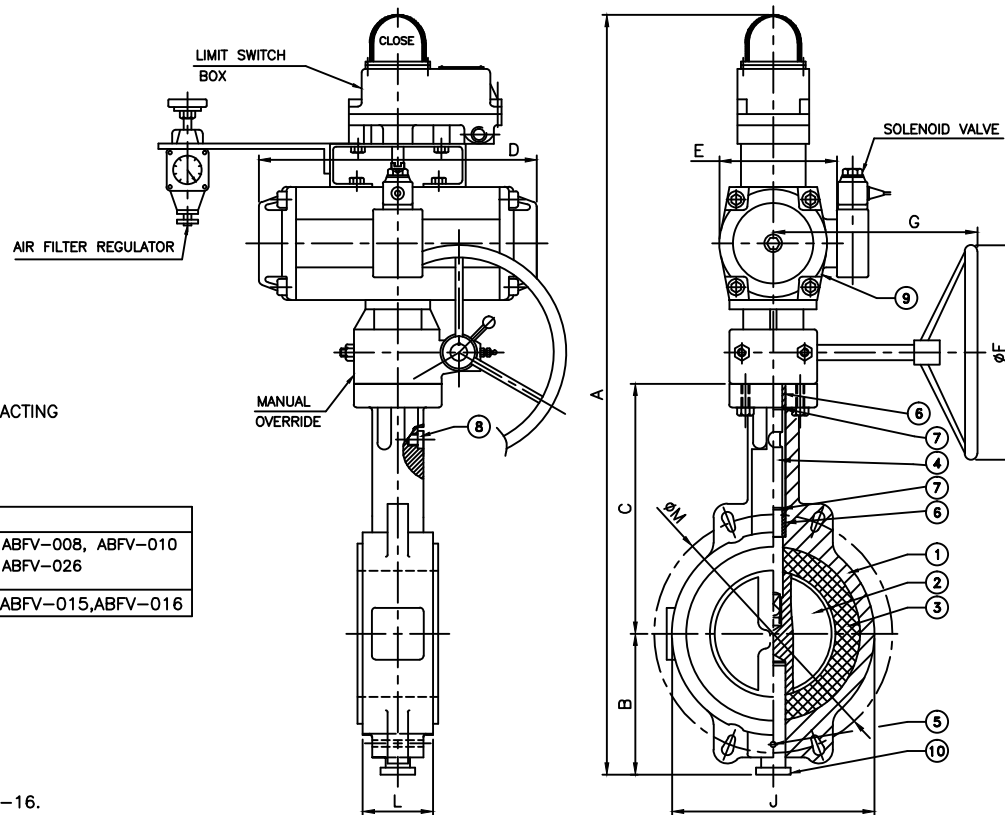
ACCESSORIES :-

1. LIMIT SWITCH BOX:- KENWOOD MAKE SW. BOX WITH HONEYWELL V15 SWITCHES (2NO+2NC) 2 NO'S, IP67, 1/2" CABLE ENTRY
2. SOLENOID VALVE:- ROTEX MAKE, 5/2 WAY, 24 VDC, AL. BODY, 1/4" BSP, W-PROOF IP67, 1/2" CABLE ENTRY, NAMUR, MODEL: 51424-6-2R-M6-24VDC-16.
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4. TUBING & CONNECTORS

NOTE :-

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2. FACE TO FACE DIMENSIONS - DIN EN 558-1:2008 SEREIS 20 (EX- BS 5155)
3. TESTING STANDARD - BS EN 12266-1:2003 (EX- BS 6755 PART-1)
4. PRESSURE RATING = PN10
5. SUITABLE TO MOUNT BETWEEN ANSI B16.5 #150 FLANGES
6. OVERALL DIMENSIONS ARE INDICATIVE EXCEPT FACE TO FACE
7. LEAKAGE CLASS VI, TIGHT SHUT OFF.
8. VALVE SHUT OFF PRESSURE - 10 BAR
9. MIN INLET AIR PRESSURE - 4 BAR

D	REVISED AS MARKED	25.05.16
C	MOR ADDED	19.05.16
B	TAG NOS ADDED	03.05.16
REV.	DESCRIPTION	DATE



GENERAL ARRANGEMENT OF WAFER TYPE BUTTERFLY VALVE WITH PNEUMATIC QUARTER TURN DOUBLE ACTING ACTUATOR

CUSTOMER NAME :- AQUA DESIGN	SCALE : NTS
CUSTOMER PO NO. :- 1516LPLA-81	CAD FILE : IDR-1373-02-04
CRANE OA NO. :- AWAITED	

CRANE CRANE PROCESS FLOW TECHNOLOGIES (I) LTD. PUNE INDIA

	NAME	SIGN	DATE
DRN	RP		18.03.16
CHKD	KS		18.03.16
APRD	SK		18.03.16
DRAWING NO.			REV.
IDR-1373-02-04			D
ALL DIMENSIONS ARE IN mm			