

# JERGUSON®

A Division Of The Clark-Reliance Corporation

Specialists in Liquid Level Indication

Installation, Operation and Maintenance for

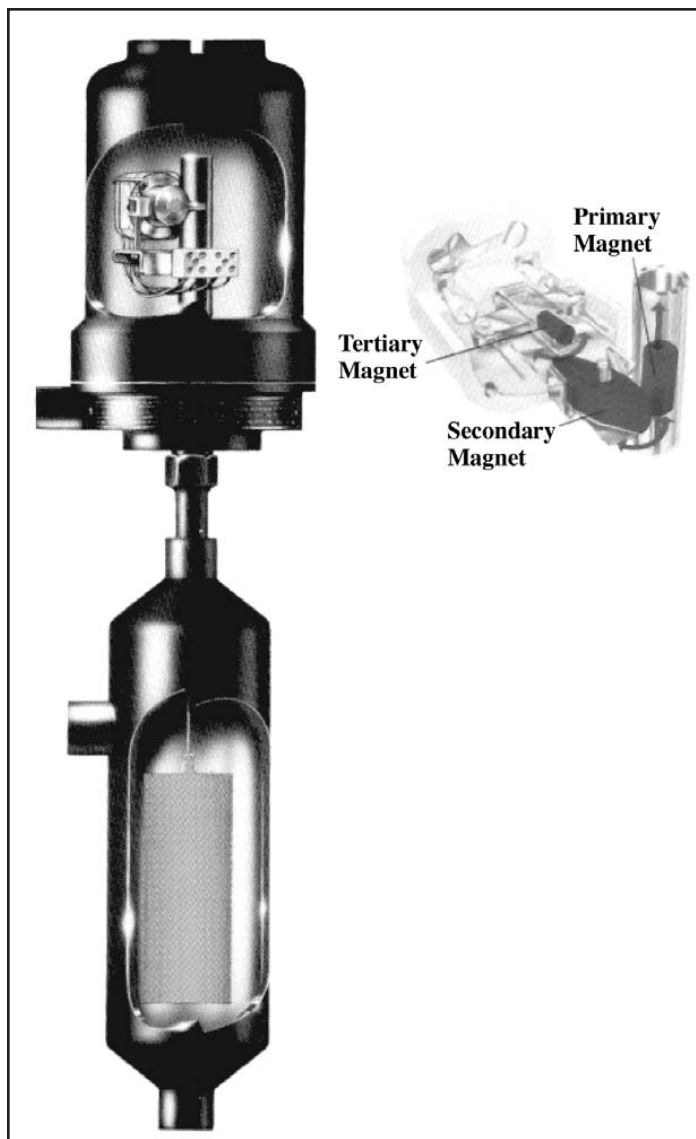
## External Cage Displacer Operated

Magnetic Level Switches

Section: JS100

Bulletin: JS100.04

Date: 10/1/04



### FEATURES

- Weatherproof
- Flameproof
- Sealed Cage
- Flanged Cage
- T316 SST Trim

### OPERATION

The displacer element is made of either 316 Stainless Steel or Ceramic, is suspended on a Stainless Steel Rod from a spring. The displacer element is always heavier than its equivalent volume of the liquid in which it is to operate, so it will extend the tension spring at all times. In free air, the spring will be extended to a known length, controlled by a mechanical stop to prevent overstressing. Attached to the spring is a rod and magnet assembly, free to move up and down as the spring extends or contracts within the pressure tube.

A switch mechanism is mounted inside the enclosure adjacent to the pressure tube.

As liquid rises to cover the displacer element, a buoyancy force is created equal to the weight of the liquid displaced. This force in effect is seen by the spring as a reduction in weight, causing the spring to contract, hence moving the magnet upwards inside the pressure tube and actuating the switch mechanism. On a falling liquid level, the displacer element is uncovered and the spring sees an increasing effective weight, causing the spring to extend and move the magnet to re-set the switch mechanism.

Switching is achieved with the unique “tri-magnet” system, giving snap-action “latch-on” switching.



**JERGUSON® GAGE AND VALVE**

A Division of The Clark • Reliance® Corporation  
16633 Foltz Industrial Parkway • Strongsville, OH 44149 USA  
Telephone: (440) 572-1500 • Fax: (440) 238-8828

# ORDERING INFORMATION

## EXTERNAL CAGE SPECIFICATIONS

Model	JBC			JXC			
	Min. S.G.	Disp. Mat'l.	Pressure Rating 100°F / 400°F	Model	Min. S.G.	Disp. Mat'l.	Pressure Rating 100°F / 400°F
JBC1D	.50	316SST	350	JXC1D	.50	316SST	285
JBC2D	.65	Ceramic	1000	JXC2D	.65	Ceramic	285
JBC3D	.40	316SST	1000	JXC3D	.40	316SST	780
JBC4D	.40	316SST	1640	JXC4D	.40	316SST	1480
JBC5D	.40	316SST	2560	JXC5D	.40	316SST	2220
JBC6D	.40	316SST	3980	JXC6D	.40	316SST	3705
JBC7D	.40	316SST	5300	JXC7D	.40	316SST	5300

## ENCLOSURE TYPES

Duty	Material of cover	Material of base	Material of pressure tube	Material of screwed union	Maximum number of switches
SA7 Explosion-proof	Aluminum Alloy	Aluminum Alloy	316 Stainless	To match chamber material	2 x four contact or 2 x eight contact
S17	Cast Iron	Cast Iron	Steel	Steel	
SA4 Weather-proof	Drawn Steel	Aluminum Alloy	Steel	Steel	

## INTERNATIONAL APPROVALS

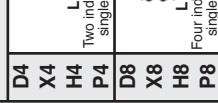
U Underwriters Laboratories	Class I: Groups C, D
C Canadian Standards Association	Class I: Groups C, D
B BASEEFA/CENELEC	E Exd IIC T6; BS5501: Pts 1 & 5
S Standards Association of Australia	Zone I: E Exd IIC T6; AS2480
N Weatherproof to NEMA 4X/IP66	U.L. CSA

## NUMBER OF SWITCH MECHANISMS

Refer to details in enclosure types above

## SWITCH MECHANISM TYPES

Temp Wet-side °F	AC max. values		DC max. values	
	VA	Amps	Volts	Watts
750	2000	440	5	50
480	2000	440	10	50
480	2000	440	10	50
750	6	250	0.25	3.6
750	2000	440	5	50
480	2000	440	10	50
480	2000	440	10	50
750	6	250	0.25	3.6



## TYPICAL MODEL

JBC 3D SA4 N 1 D4 / C 27

Cage

Enclosure

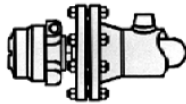
Approval

No. of Switches

Switch Mechanism

## CHAMBER TYPE & MATERIAL OF CONSTRUCTION

Carbon Steel	Stainless Steel	Carbon Steel	Stainless Steel
JBC	JBS	JXC	JXS



Displacer is sealed inside chamber during manufacturing. Not removable.

Displacer may be removed from chamber for routine maintenance, cleaning or inspection.

## PROCESS CONNECTION CONFIGURATION & RATING

Side & Bottom	1	Side & Side with drain	2

Process Connection Style	1	2
0	1"	N.P.T. (Socket Weld Connection Use Code "s")
1	1"	Class 150 R.F. A.N.S.I. B 16.5/B.S. 1560
2	1"	Class 300 R.F. A.N.S.I. B 16.5/B.S. 1560
3	1"	Class 600 R.F. A.N.S.I. B 16.5/B.S. 1560
4	1 1/2"	Class 150 R.F. A.N.S.I. B 16.5/B.S. 1560
5	1 1/2"	Class 300 R.F. A.N.S.I. B 16.5/B.S. 1560
6	1 1/2"	Class 600 R.F. A.N.S.I. B 16.5/B.S. 1560
7	2"	Class 150 R.F. A.N.S.I. B 16.5/B.S. 1560
8	2"	Class 300 R.F. A.N.S.I. B 16.5/B.S. 1560
9	2"	Class 600 R.F. A.N.S.I. B 16.5/B.S. 1560

Flange faces are raised face with serrated concentric or serrated spiral groove finish.

## WELDING SPECIFICATIONS

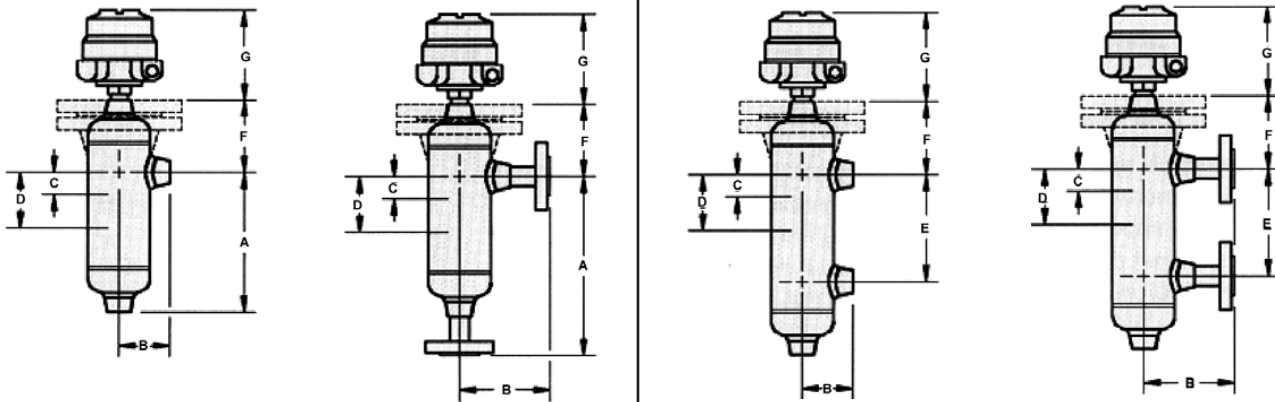
Welding

Standard on all chambers unless otherwise specified.

Circumferential and process connection welds are full penetration single-V butt welds. All body flanges are weld neck. Process flanges are slip on type.

Welders qualified to A.S.M.E. IX. P.W.H.T. available on request.

## DIMENSIONAL AND OPERATING LEVEL DATA



	A		B		C	D	E	F	
	NPT or S/W	Flanged	NPT or S/W	Flanged	Hi Alarm	Lo Alarm	C-C	Chamber Type B	Chamber Type X
JBC1D & JXC1D	8 1/2"	16"	3 1/4"	6"	2"	4"	14"	5 1/2"	5 3/4"
JBC2D & JXC2D	14"	16"	3 1/4"	6"	2 7/8"	7 1/4"	14"	10 1/2"	9 1/4"
JBC3D & JXC3D	14"	16"	3 1/4"	6"	2 7/8"	7 1/4"	14"	10 1/2"	9 3/4"
JBC4D & JXC4D	14"	16"	3 1/4"	6"	2 7/8"	7 1/4"	14"	10 1/2"	10 1/2"
JBC5D & JXC4D	14"	16"	3 1/4"	6"	2 7/8"	7 1/4"	14"	10 1/2"	11 1/2"
JBC6D & JXC6D	14"	16"	4"	7"	2 1/4"	6 1/4"	14"	11 1/2"	11 1/2"
JBC7D & JXC7D	14"	16"	4"	7"	2 1/4"	6 1/4"	14"	11 1/2"	14 1/2"

Notes: 1) Flanged dimensions apply for R.F. process connections up to 2" - 600#. 2) Switch actuation levels are at minimum S.G. 3) C = Highest operating liquid level 4) D = Reset level 5) D-C = Switching Differential (Max.)

All dimensions in inches. Dimensions are for reference only, and must be certified upon order.

## ENCLOSURE DIMENSIONAL DATA

Type	Duty	Height G	Conduit Thread	Switch Adjustment	Weatherproof Rating
SA7, S17	Explosionproof	13 3/4"	1" NPT	3 3/8"	NEMA 4x & 7
SA4	Weatherproof	12"	1" NPT	3 3/8"	NEMA 4x

## MATERIALS OF CONSTRUCTION

Technical Specification	Designed in accordance with the requirements of B313	Pressure tested to 1.5 x maximum working pressures.
Materials of Construction	Carbon Steel Chamber	Stainless Steel Chamber
Chamber Tube	ASTM A106 GrB/BS3602 HFS410	ASTM A312 T316/BS3605-316-514
Top/Bottom Caps	ASTM A234/BS1504-161-430A	ASTM A403 WP-316
Flanges/Fittings	ASTM A105/BS1503-221-430E	ASTM A182F316/BS1503-316-513
Studs	ASTM A193-B7/BS1506-621A-B7	ASTM Z193-B7/BS1506-621A-B7
Nuts	ASTM A194-2H/BS1506-162-2H	ASTM A194-2H/BS1506-162-2H
Displacer	T316 SST (Ceramic on Model 2D)	T316 SST (Ceramic on Model 2D)
Spring/Trim	Iconel 625/T316 SST	Iconel 625/T316 SST

### Options:

- Low temperature carbon steel chambers • Controls to meet N.A.C.E. requirements • A comprehensive N.D.T. package

**5 YEAR  
MECHANICAL  
WARRANTY**

## JERGUSON® GAGE AND VALVE

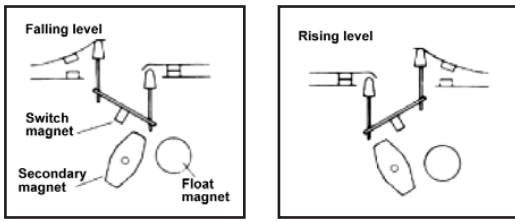
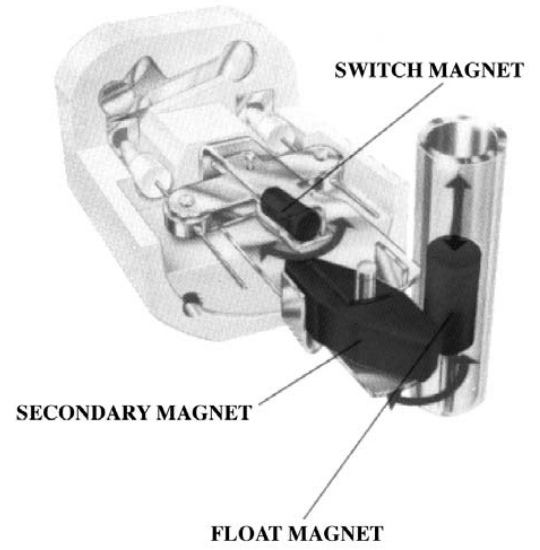
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# JERGUSON LEVEL SWITCHES

## THE SWITCH MECHANISM

### Principle of Operation

The switch mechanism is based on a unique three-dimensional magnet design where the snap action is accomplished by the utilization of magnetic repulsion. The magnet mounted on the float rod causes the secondary magnet to rotate as it passes up and down. The switch magnet is repelled by the secondary and snaps to the opposite side. This causes the cradle to pivot, moving the push rods which operated the switch contacts. The result is positive snap action interlock switching...**no springs...no spring problems.**



Schematic showing three-magnet system

Choice of Switch Mechanisms	
Type	Application
X4, X8	<b>General purpose</b> – 10 amp mechanisms for general purpose duties up to 480°F
D4, D8	<b>High temperature</b> – 750°F mechanisms for high temperature applications up to 5 amps
H4, H8	<b>Hermetically sealed</b> – Suitable for low temperature duties, contaminated atmosphere environments and intrinsically safe circuits. All moving parts and contacts enclosed in an inert gas filled stainless steel enclosure.
P4, P8	<b>Low current</b> – Gold-plated contact switch mechanism for use in intrinsically safe or low power circuits up to 750°F

4 Contact Type D4, X4, P4, H4	
2 x S.P.S.T. AA Make on Rise BB Make on Fall	
Link for SPDT/SPCO	
8 Contact Type D8, X8, P8, H8	
D.P.D.T. 4 x S.P.S.T. AA Make on Rise BB Make on Fall	
Link for DPDT/DPCO	

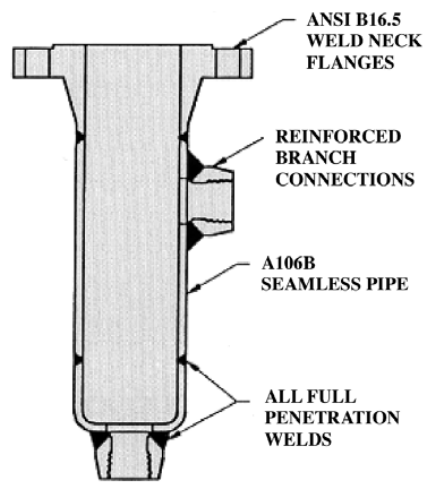
## THE FLOAT CHAMBER

### Applications

The flanged chamber construction of this X series range of vertical controls makes them a very serviceable level control solution for petrochemical, power generation and OEM applications.

The unique three-magnet memory latching system provides reliable switching for applications such as level alarm, safety shutdown and pump control in product storage tanks, gas scrubbers, process vessels, and high pressure steam generators.

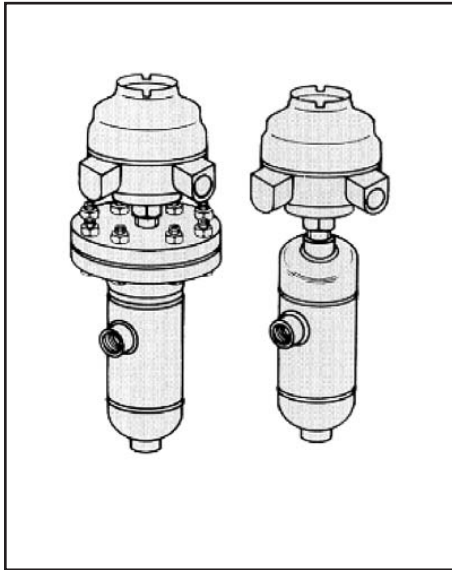
Single or multi-switch models are available. Chambers are designed to ANSI B31.1 Power Piping Code and ANSI B31.3 Chemical Plant and Petroleum Refinery Piping Code.



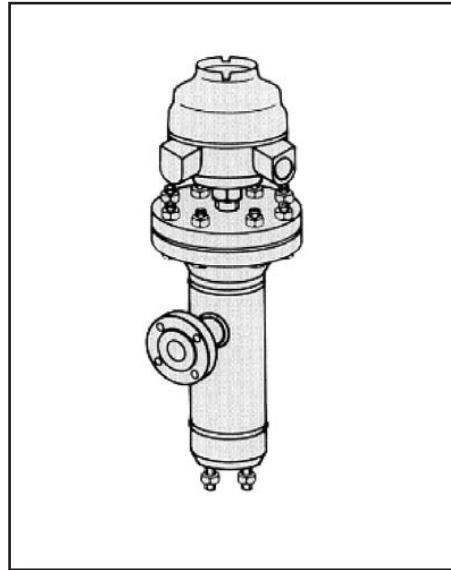
### Options

- Stainless steel chamber
- Low temperature chamber below -35°F
- Certified to B31.3 or B31.1
- Non-destructive testing – radiographic, ultrasonic, magnetic particle, dye penetrant
- Epoxy paint finish
- Extended NEMA 4 switch enclosure housing up to 6 SPDT switch mechanisms or 3 DPDT switch mechanisms
- Vent connection
- Specific gravity below .35
- NACE specification MR-01-75 Rev. 02
- CL. 1: Group B enclosures

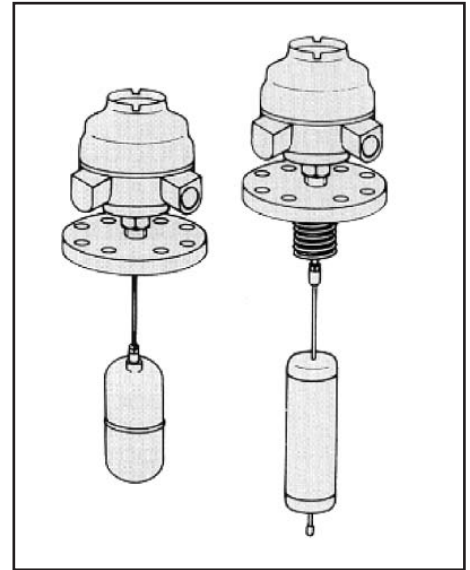
## JERGUSON "FIT & FORGET" PRODUCTS PROVIDE THE SOLUTION TO YOUR LIQUID LEVEL CONTROL PROBLEMS



Medium Pressures  
ANSI Class 150, 300, 600  
SG 0.4



High Pressures  
ANSI Class 900, 1500, 2500  
SG 0.40



Direct Mounting  
ANSI Class 150, 300, 600  
SG 0.4

### You can rely on us

The Jerguson range of liquid level controls is designed for operation in a wide variety of applications

#### Typical Applications

Separators	Water Sumps
Compressors	Scrubbers
Knock-out Pots	Fractioning Columns
Condensers	Process Vessels
De-actuators	Condensate Tanks
Storage Tanks	Drainpots
Service Tanks	Accumulators
Header Tanks	Flash Vessels
Effluent Sumps & Tanks	Fuel Tanks
Heat Exchanger	Feedwater Heaters
Lube Oil Tanks	Surge Drums

Jerguson level switches are used for the control of liquids by companies all over the world.

Shell	Bechtel
Exxon	Bellili
Amoco	Ontario Hydro
Fluor	Nissaci-Sangyo
Hyundai	Foster Wheeler
Hitachi	Siemens
British Petroleum	Mannesmann-Demag
Mobil	Catalytic
Texaco	Techni
Ingersoll Rand	Technipetrol
Compair	Nuovo Pignone
Honeywell	Dresser



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