SERIES 3300 - 3-WAY ROTARY SHAFT TYPE

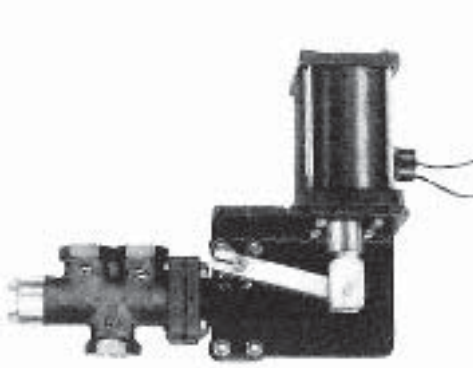
DIRECT OPERATED - POPPET TYPE

SOLENOID VALVES

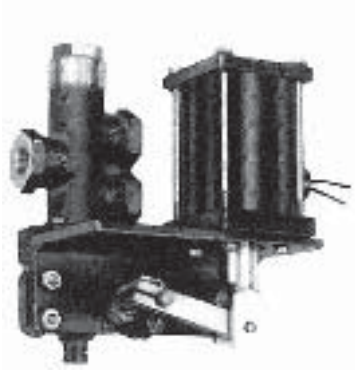
FULLY ELECTRICAL (Automatic Reset)

- **For PILOT CONTROL: Opening and Closing of Pneumatic and Hydraulic Control Valves, Devices & Systems; Safety Shutoff, Emergency Venting**
- **For DIRECTIONAL CONTROL: Diverting, By-Passing, Recirculating, Selecting, Sampling, Switching**

Series 3300



Series 3300V



Series 3300Z

ROTARY SHAFT TYPE

All valves in this bulletin are of the ROTARY SHAFT TYPE, meaning they are actuated by a slight ROTARY motion (20-30° arc) which, by way of the Rotary Teflon Shaft Seal, transmits the lifting action of the solenoid plunger and operating lever through a mechanical advantage to the valve poppets in the form of a lifting action.

Many more applications can be suitably handled, and much greater versatility and adaptability is afforded, compared with "direct-lift" packless type solenoid valves which are truly suitable only for general purpose fluids and general purpose applications.

FLOW FORMS

Each 3-Way solenoid valve is factory adjusted for a particular FLOW FORM; that is, for installation and operation according to the chart below. These are two position valves - one of the two ports is always closed while the other is open.

FOR PILOT CONTROL:

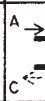
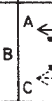
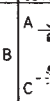
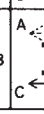
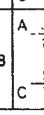
FORM "M" - Supply Normally Closed
Energize to open inlet port,
De-energize to vent

FORM "N" - Supply Normally Open
Energize to vent
De-energize to open inlet port

FOR DIRECTIONAL CONTROL:

FORM "O" - Diverting (one inlet, two outlets)
Energize to open normally closed outlet, close normally open outlet.
De-energize to reverse above action (return to normal position).

FORM "P" - Selecting (two inlets, one outlet)
Energize to open normally closed inlet, close normally open inlet.
De-energize to reverse above action (return to normal position).

	FLOW FORM "M" INLET AT "A" VENT AT "C"	FLOW FORM "N" INLET AT "C" VENT AT "A"	FLOW FORM "O" INLET AT "B" OUTLETS AT "A" & "C"	FLOW FORM "P" INLETS AT "A" & "C" OUTLET AT "B"
ACTUATED POSITION (SOLENOID ENERGIZED)				
NORMAL POSITION (SOLENOID DE-ENERGIZED)				

FEATURES

ROTARY SHAFT TYPE with ROTARY TEFLON SHAFT SEAL

Greater valve-actuation and valve-return reliability is achieved compared to customary packless type valves because of the mechanical advantage from the long external operating lever. More solenoid power is available to actuate the valve more positively and/or to handle higher pressures. Also there is power available to compress stronger internal return springs, and, if desired or required, to permit the use of an optional additional external main spring and/or a gravity-weight on the lever.

Corrosive, unfiltered and/or hot air and other difficult fluid media are handled safely; contained in a lower valve unit away from the magnetic and closely guided solenoid plunger.

Manual opening and manual closing is provided by the external lever; in case of emergency, for trial operation, etc.

Visual valve position indication is provided by the inherent external lever.

NO MINIMUM PRESSURE or FLOW REQUIREMENT

Opens and closes fully down to 0 PSI.

Positive, quick action at all pressures - DIRECT OPERATED (no internal pilot, no floating poppets, no suction effects as with diaphragms).

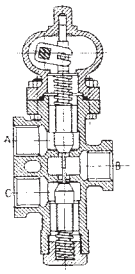
CLOSELY GUIDED VALVE INTERNAL PARTS

Prevents binding due to misalignment; consistent, lasting tight shut-off.

HEAVY-DUTY PILOT SWITCH PROVISION

Contactor-type heavy-duty limit switch(es) can be mounted readily to indicate valve position remotely or to actuate an alarm or a relay.

DIRECT OPERATED – POPPET TYPE



ADVANTAGES:

- No tiny orifices to clog with dirt or freeze up;
- No flutter, no suction effects and diaphragm hang-ups;
- Valve position not affected by change of flow direction or loss of pressure;
- No periodic replacing of worn or torn diaphragms;
- No minimum pressure requirement;

AS IN A PILOTED DIAPHRAGM 3-WAY VALVE!

- No sliding o-ring seals to wear or replace;
- No galling of metal-to-metal sliding surfaces;
- Not as susceptible to fouling from dirt;
- Not susceptible to binding from extreme ambient temperature fluctuations;

AS IN A SLIDING-SPOOL TYPE 3-WAY VALVE!

CATALOG NUMBER PREFIXES

VALVE BODY		INNER PARTS	SERIES 3300 (Horizontal Pipe Mounting)		SERIES 3300V (Vertical Pipe Mounting)	
			CATALOG NUMBER PREFIXES			
			NEMA 1 General Purpose, NEMA 2 Dripright, NEMA 3 Weatherproof, NEMA 4 Watertight, NEMA 12 Dusttight, Solenoid Enclosure	Class I, Groups A, B, C & D, Division 1 Explosion Proof Solenoid Enclosure ③ FM	NEMA 1 General Purpose, NEMA 2 Dripright, NEMA 3 Weatherproof, NEMA 4 Watertight, NEMA 12 Dusttight, Solenoid Enclosure	Class I, Groups A, B, C & D, Division 1 Explosion Proof Solenoid Enclosure ③ FM
Bronze	*ASTM B-62	Brass & S.S.	3300WA	3310	3300WAV	3310V
Bronze	B-62	Stainless Steel	3302WA	3312	3302WAV	3312V
Naval Bronze	B-61	Monel ①	3302NBMWA	3312NBM	3302NBMWAV	3312NBMV
Steel	A216 WCB	Stainless Steel	3309WA	3319	3309WAV	3319V
Stainless Steel Type 304	A351 CF8	Stainless Steel Type 303/304	3305WA	3315	3305WAV	3315V
Stainless Steel Type 316	A351 CF8M	Stainless Steel Type 316	3306WA	3316	3306WAV	3316V
Stainless Steel Alloy-20	A351 CN7M	Stainless Steel ② Alloy-20	3308WA	3318	3308WAV	3318V
Monel	FED QQ-N -288	Monel ①	3308MWA	3318M	3308MWAV	3318MV

* For purposes of identifying alloy by chemical analysis

VALVE BODIES - standard: with screwed (female NPT) connections; CLASS 250-bronze, CLASS 300 & 600-steel & stainless steel. Flanged, butt-weld, socket-weld & sil-braze ends are also available - consult factory.

INNER PARTS - means ALL parts coming in contact with the fluid (solenoid magnetic parts are not wetted by the fluid).

① Springs are normally inconel. Maximum pressure listings may differ - consult factory.
② Valve bottom poppet spring is normally 316 S.S.

VALVE DISCS - standard: Teflon, except bronze body series 3300WA - Buna N (up to ½" port). Viton also available with bronze body series 3300WA (up to ½" port). Regrinding type are also available (rounded metal discs, lapped in for tight shut-off). Add "X" to Cat.No. prefix above.

VALVE SEATS - standard: integral.

VALVE BODY-BONNET FLANGE O-RING SEAL - standard: Teflon, except bronze body series 3300WA - buna N. Viton, EPR, and metal also available.

SHAFT SEAL - standard: ROTARY TEFLON SHAFT SEAL. Buna N, Viton, EPR, and lapped metal-to-metal as alternate primary seals are also available.

OPTIONAL FEATURES

POSITION SWITCH(ES) - Heavy duty, SPDT or DPDT, for remote indication of valve position or to actuate an alarm or relay; contacts rated up to 20 amps @ 115/60 AC or 10 amps @ 125 DC; for valve closed and/or valve open. Add "PS" to suffix on Page 3.

EXTERNAL LINKAGE COVER - To discourage tampering with, or tieing-up of the valve mechanism, and/or to prevent direct contact with the weather or corrosive ambient. Add "LC" to suffix on Page 3. Optionally available with lexan window.

TERMINAL BLOCK - For making solenoid connections within the solenoid enclosure. Add "TB" to suffix on Page 3.

LEVER LOCKING DEVICE - To hold or lock valve in actuated or manually-overrided position. Add "LD" to suffix on Page 3.

GRAVITY OPERATED - With a weight on external lever to assist return to normal or fail-safe position - for additional reliability from gravity. Maximum pressure capability may differ - consult factory. Add "W" to suffix on Page 3.

OVERLOAD RELAY - To prevent coil burnout should the valve not actuate when energized for any reason. Recommended with viscous or unclean liquids, or when abnormal pressure surges or voltage dips can be expected. Separate unit for panel mounting.

MATERIALS TRACEABILITY, RADIATION-RESISTING COILS & SEALS SHOCK & VIBRATION-RESISTANT CONSTRUCTIONS & CERTIFICATIONS.

SOLENOID ENCLOSURES - standard with ½" NPT conduit connection (except size T9 - 3/4" NPT).

③ MOST LAURENCE EXPLOSION PROOF ENCLOSURES ARE FM APPROVED FOR CLASS I GROUPS A, B, C & D, DIVISION 1!
Consult factory for CLASS I, GROUP C areas.

SOLENOID COILS -

	Safe Ambient Temp.	Safe Fluid Temp.
Class H insulation	215F ⑤	550F ⑥

However the safe temperatures for a specific application depend on the overall consideration of the actual max. ambient and fluid temperatures, the temperature rise of the coil to be used, range of applied voltage and nature of hazardous area, if any - consult factory for the safe temps. for your application. Also, higher temperatures can be handled in some cases.

⑤ - based on fluid temperature of 215F or less.
⑥ - based on ambient temperature of 40C (104F).

Standard coils are waterproofing-varnish dipped, vacuum impregnated and baked. Molded Class H coils for greater resistance to moisture, fungus and physical damage are available. Standard coils are for continuous duty (24-hour continuous energization, with maximum steady state coil temperature within rating of class of insulating materials used).

STANDARD VOLTAGES
A.C. - 110-120/60, 110-120/50, 220-240/60, 220-240/50, 440-460/60 Volts/hz.
D.C. - 125 and 250 volts.
Other voltages/frequencies, special electrical characteristics can be furnished (pressure listings may differ) - consult factory.

MOUNTING - All valves must be mounted with the solenoid in a vertical, upright position. Horizontal pipe mounting is standard and should be utilized whenever possible. For vertical pipe mounting (Series 3300V), such as mounting directly on top of a diaphragm cage, see above; or for limited headroom add "Z" to horizontal pipe mounting prefix above for inverted valve body (Series 3300Z).

CATALOG NUMBER SUFFIXES

CATALOG NUMBER SUFFIXES		PIPE SIZE	C_V FLOW FACTOR	SOLENOID SIZE		MAXIMUM OPERATING PRESSURE DIFFERENTIAL (PSI)			
						FLOW FORMS M, N & P		FLOW FORM O	
A.C.	D.C.			A.C.	D.C.	A.C. VOLTAGES	D.C. VOLTAGES	A.C. VOLTAGES	D.C. VOLTAGES
24	24DC	1/4"	1.4	CI	C	100	35	60	--
26	26DC			DI	D	140	125	85	75
262	262DC			EI	E	175	155	105	95
32	32DC	3/8"	1.4	CI	C	100	35	60	--
34	34DC			DI	D	140	125	85	75
342	342DC			EI	E	175	155	105	95
37	37DC	3/8"	1.7	CI	C	70	25	40	--
39	39DC			DI	D	100	90	60	55
392	392DC			EI	E	125	110	75	65
42	42DC	3/8"	2.0	CI	C	40	15	25	--
44	44DC			DI	D	60	55	35	30
442	442DC			EI	E	80	70	50	45
50	50DC	1/2"	1.4	CI	C	90	30	55	50
52	52DC			DI	D	180	160	105	95
54	54DC			EI	E	250	225	150	135
542	542DC			T7	T7DC	600 (1)	600 (1)	350	350
57	57DC	1/2"	1.8	CI	C	60	20	35	30
59	59DC			DI	D	125	110	75	65
61	61DC			EI	E	180	160	105	95
612	612DC			T7	T7DC	400	400	250	250
64	64DC	1/2"	2.3	CI	C	40	15	25	20
66	66DC			DI	D	90	80	55	50
68	68DC			EI	E	125	110	75	65
682	682DC			T7	T7DC	300	300	180	180
70	-	1/2"	3.0	CI	-	25	-	15	-
72	72DC			DI	D	55	50	30	25
74	74DC			EI	E	90	80	55	50
742	742DC			T7	T7DC	180	180	105	105
762	762DC	3/4"	1.4	CI	C	90	30	55	--
764	764DC			DI	D	180	160	105	95
766	766DC			EI	E	250	225	150	135
768	768DC			T7	T7DC	600 (1)	600 (1)	350	350
782	782DC	3/4"	1.8	CI	C	60	20	35	--
784	784DC			DI	D	125	110	75	65
786	786DC			EI	E	180	160	105	95
788	788DC			T7	T7DC	400	400	250	250
80	80DC	3/4"	2.3	CI	C	40	15	25	--
82	82DC			DI	D	90	80	55	50
84	84DC			EI	E	125	110	75	65
842	842DC			T7	T7DC	300	300	180	180
87	-	3/4"	3.0	CI	-	25	-	15	--
89	89DC			DI	D	55	50	30	25
91	91DC			EI	E	90	80	55	50
912	912DC			T7	T7DC	180	180	105	105
95	95DC	3/4"	4.5	DI	D	35	30	20	15
97	97DC			EI	E	50	45	30	25
972	972DC			T7	T7DC	125	125	75	75
1064	-	1"	2.6	EI	-	100	-	60	--
1066	1066DC			T7	T7DC	400	400	250	250
1068	1068DC			T9	T9DC	500 (1)	500 (1)	300	300
1122	-	1"	3.3	EI	-	60	-	35	--
1124	1124DC			T7	T7DC	250	250	150	150
1126	1126DC			T9	T9DC	300	300	180	180
1132	-	1"	5.0	EI	-	40	-	25	--
1134	1134DC			T7	T7DC	160	160	95	95
1136	1136DC			T9	T9DC	200	200	120	120
1162	-	1"	8.0	EI	-	25	-	15	--
1164	1164DC			T7	T7DC	110	110	65	65
1166	1166DC			T9	T9DC	135	135	80	80
1204	1204DC	1"	10.5	T7	T7DC	75	75	45	45
1206	1206DC			T9	T9DC	85	85	50	50

PRESSURES

Above listings are intended to indicate our current maximum capability. The pressure "rating" of a given suffix number will depend on the overall consideration of the actual pressures, actual temperatures, materials selection, flow form, ambient temperatures (for DC voltages), and other application specifics. In other words, all valves with the same suffix number are not necessarily "rated" at the figure shown. Therefore ALWAYS ADVISE or SPECIFY YOUR ACTUAL pressures and temperature conditions and consult factory for the pressure rating for your application.

For FLOW FORM "O" - if higher pressures and/or larger sizes are needed see Bulletin Series 3350.

For FLOW FORM "P" - The above figures mean the maximum differential between the two inlet pressures. Therefore both the minimum and the maximum pressure that could possibly exist at each inlet must be specified. Also specify which inlet pressure is to be normally closed and which is to be normally open.

TEMPERATURES - Standard max. fluid temperature: 550F;
Standard min. fluid temperature: -50F;
although variations are made in the standard construction for temperatures within this range. Therefore ALWAYS SPECIFY YOUR ACTUAL TEMPERATURE CONDITIONS. Valves for cryogenics and higher temperatures are available - consult factory.

C_V FLOW FACTORS - are the real measure of valve flow capacity, not port diameter! The greater the C_V the faster your cylinder or diaphragm will actuate and vent. See Bulletin 500 or 600 for flow formulas. The above listings are approximate, for estimating only.

SOLENOID SIZE - is for comparison purposes, factory application, and pricing of options. It need not be specified.

CURRENT DRAW - Inrush and holding currents depend on valve size, solenoid size, ambient temperature (D.C. Voltages), voltage/frequency, and other electrical characteristics of the coil selected. Consult factory for specific data.

TO SPECIFY A CATALOG NUMBER - Combine the catalog number prefix from Page 2 with the catalog number suffix from above, e.g. 3300WA24, 331024, 3300WAV24PS, 3310V24LCTB.

ORDERING DATA

Full catalog number (prefix + suffix + option adders)
Pipe size & C_V
Flow Form (see Page 1)
ACTUAL maximum inlet pressure and/or ACTUAL max. operating pressure differential (diff. between open and closed ports) (see notes on this page for Form "P".)
Fluid handled
ACTUAL Fluid and ambient temperatures
Flow rate and allowable pressure drop, if important
Viscosity, specific gravity, concentration, etc. if applicable
Valve body and inner parts materials desired
Type of connections
Horizontal or vertical pipe mounting
Type of solenoid enclosure (if explosion proof specify Class & Group and/or nature of hazard)
Voltage and frequency
Max. time on and frequency of operation
Solenoid coil insulation class
Summary of application and/or sketch of system
Optional of special features

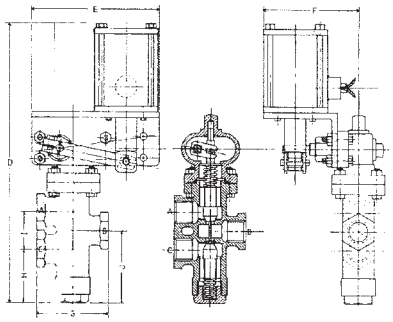
For your convenience, use OUR Solenoid Valve Data Sheet for compiling the above information.

(1) - For stainless steel & steel body only. Max. pressure for bronze body limited by ANSI B16.15.

DIMENSIONS (in.) (AC voltage only)

CATALOG NUMBER SUFFIX	PIPE SIZE	SOLENOID SIZE	NEMA 1 GENERAL PURPOSE, NEMA 2 DRIPTIGHT, NEMA 3 WEATHERPROOF, NEMA 4 WATERTIGHT, NEMA 12 DUSTTIGHT, SOLENOID ENCLOSURE				"FM" APPROVED, CLASS I, GROUPS A, B, C, & D, DIVISION 1, EXPLOSION PROOF, SOLENOID ENCLOSURE			
			D	E	F	NET WT. (LB)	D	E	F	NET WT. (LB)
24 26 262	1/4"	CI DI EI	11-1/4 12 13	6-1/4 6-1/4 6-3/4	4-3/4 4-3/4 5-1/4	12 14 20	12 13-1/4 13-3/4	6-1/4 6-3/4 7	4-3/4 6 5-1/2	14 18 25
32 34 342	3/8"	CI DI EI	11-1/4 12 13	6-1/4 6-1/4 6-3/4	4-3/4 4-3/4 5-1/4	12 14 20	12 13-1/4 13-3/4	6-1/4 6-3/4 7	4-3/4 6 5-1/2	14 18 25
37 39 392	3/8"	CI DI EI	11-1/4 12 13	6-1/4 6-1/4 6-3/4	4-3/4 4-3/4 5-1/4	12 14 20	12 13-1/4 13-3/4	6-1/4 6-3/4 7	4-3/4 6 5-1/2	14 18 25
42 44 442	3/8"	CI DI EI	11-1/4 12 13	6-1/4 6-1/4 6-3/4	4-3/4 4-3/4 5-1/4	12 14 20	12 13-1/4 13-3/4	6-1/4 6-3/4 7	4-3/4 6 5-1/2	14 18 25
50 52 54 542	1/2"	CI DI EI T7	13 13-3/4 14-3/4 17-1/4	6-1/4 6-1/4 6-3/4 8	4-3/4 4-3/4 5-1/4 6-3/4	15 17 23 31	13-3/4 15 15-1/2 18-3/4	6-1/4 6-/34 7 8	4-3/4 5-1/4 5-1/2 6-3/4	17 20 28 36
57 59 61 612	1/2"	CI DI EI T7	13 13-3/4 14-3/4 17-1/4	6-1/4 6-1/4 6-3/4 8	4-3/4 4-3/4 5-1/4 6-3/4	15 17 23 31	13-3/4 15 15-1/2 18-3/4	6-1/4 6-3/4 7 8	4-3/4 5-1/4 5-1/2 6-3/4	17 20 28 36
64 66 68 682	1/2"	CI DI EI T7	13 13-3/4 14-3/4 17-1/4	6-1/4 6-1/4 6-3/4 8	4-3/4 4-3/4 5-1/4 6-3/4	15 17 23 31	13-3/4 15 15-1/2 18-3/4	6-1/4 6-3/4 7 8	4-3/4 5-1/4 5-1/2 6-3/4	17 20 28 36
70 72 74 742	1/2"	CI DI EI T7	13 13-3/4 14-3/4 17-1/4	6-1/4 6-1/4 6-3/4 8	4-3/4 4-3/4 5-1/4 6-3/4	15 17 23 31	13-3/4 15 15-1/2 18-3/4	6-1/4 6-3/4 7 8	4-3/4 5-1/4 5-1/2 6-3/4	17 20 28 36
762 764 766 768	3/4"	CI DI EI T7	13 13-3/4 14-3/4 17-1/4	6-1/4 6-1/4 6-3/4 8	4-3/4 4-3/4 5-1/4 6-3/4	14 16 22 30	13-3/4 15 15-1/2 18-3/4	6-1/4 6-3/4 7 8	4-3/4 5-1/4 5-1/2 6-3/4	16 19 27 35
782 784 786 788	3/4"	CI DI EI T7	13 13-3/4 14-3/4 17-1/4	6-1/4 6-1/4 6-3/4 8	4-3/4 4-3/4 5-1/4 6-3/4	14 16 22 30	13-3/4 15 15-1/2 18-3/4	6-1/4 6-3/4 7 8	4-3/4 5-1/4 5-1/2 6-3/4	16 19 27 35
80 82 84 842	3/4"	CI DI EI T7	13 13-3/4 14-3/4 17-1/4	6-1/4 6-1/4 6-3/4 8	4-3/4 4-3/4 5-1/4 6-3/4	14 16 22 30	13-3/4 15 15-1/2 18-3/4	6-1/4 6-3/4 7 8	4-3/4 5-1/4 5-1/2 6-3/4	16 19 27 35
87 89 91 912	3/4"	CI DI EI T7	13 13-3/4 14-3/4 17-1/4	6-1/4 6-1/4 6-3/4 8	4-3/4 4-3/4 5-1/4 6-3/4	14 16 22 30	13-3/4 15 15-1/2 18-3/4	6-1/4 6-3/4 7 8	4-3/4 5-1/4 5-1/2 6-3/4	16 19 27 35
95 97 972	3/4"	DI EI T7	13-3/4 14-3/4 17-1/4	6-1/4 6-3/4 8	4-3/4 5-1/4 6-3/4	16 22 30	15 15-1/2 18-3/4	6-3/4 7 8	5-1/4 5-1/2 6-3/4	19 27 35
1064 1066 1068	1"	EI T7 T9	19 21-1/2 24-3/4	6-3/4 8 8-1/4	5-1/4 6-3/4 8-3/4	30 39 75	19-3/4 23 25-3/4	7 8 8-3/4	5-1/2 6-3/4 8-1/4	36 43 81
1122 1124 1126	1"	EI T7 T9	19 21-1/2 24-3/4	6-3/4 8 8-1/4	5-1/4 6-3/4 8-3/4	30 39 75	19-3/4 23 25-3/4	7 8 8-3/4	5-1/2 6-3/4 8-1/4	36 43 81
1132 1134 1136	1"	EI T7 T9	19 21-1/2 24-3/4	6-3/4 8 8-1/4	5-1/4 6-3/4 8-3/4	30 39 75	19-3/4 23 25-3/4	7 8 8-3/4	5-1/2 6-3/4 8-1/4	36 43 81
1162 1164 1166	1"	EI T7 T9	19 21-1/2 24-3/4	6-3/4 8 8-1/4	5-1/4 6-3/4 8-3/4	30 39 75	19-3/4 23 25-3/4	7 8 8-3/4	5-1/2 6-3/4 8-1/4	36 43 81
1204 1206	1"	T7 T9	21-1/2 24-3/4	8 8-1/4	6-3/4 8-3/4	39 75	23 25-3/4	8 8-3/4	6-3/4 8-1/4	43 81

- All dimensions and weights shown here are approximate for estimating purposes only.
- For dimensions for D.C. voltages - consult factory. As an approximation, above dimensions for D.C. are about 10% greater than corresponding A.C. dimensions in some cases.
- For Series 3300, valve bodies can be rotated 90º to four positions, to facilitate mounting for direction of flow. Specify with order if body orientation is to be different than standard shown below.
- For Series 3300V dimensions - consult factory. Specify whether “B” connection should be facing up or down.
- For Series 3300Z dimensions - consult factory. Specify direction “B” connection should be facing.



PIPE SIZE	G	H	I	J
1/4",3/8"	2-1/2	1-7/8	1-1/8	2-3/8
1/2",3/4"	3-3/8	2-1/2	1-3/4	3-3/8
1"	4-7/8	3-5/8	1-9/16	3-3/8

– 1/2" NPT conduit connection is standard on all valves (except solenoid size T9 & T9DC - 3/4" NPT). Other sizes and types are available. Location of the conduit connection varies depending on the type of solenoid enclosure, size of solenoid and whether A.C. or D.C.

– On all valves additional headroom should be allowed for removal of the solenoid enclosure/coil. Consult factory for details.