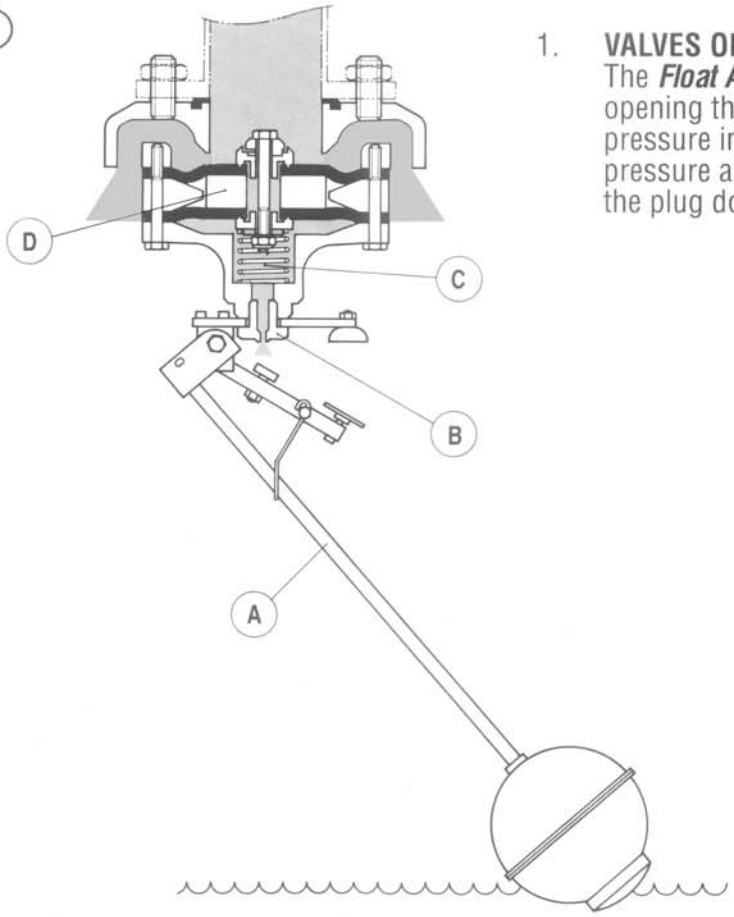
LEVEL CONTROL VALVES

LevelDex® - OPERATING PRINCIPLE

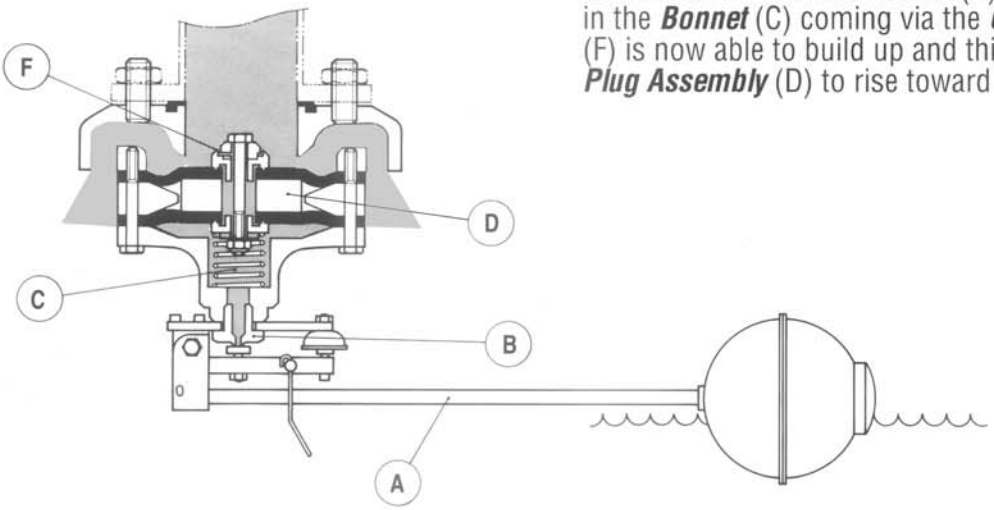
NOTE: ***LevelDex***® is a hydraulic, differential area control valve that uses upstream pressure to function. The Pilot exerts no mechanical force on the valve.

①



1. **VALVES OPENS:**
The ***Float Arm*** (A) follows the water surface down opening the ***Pilot Nozzle*** (B), allowing the pressure in the ***Bonnet*** (C) to drop, allowing the pressure above the ***Plug Assembly*** (D) to force the plug down and away from the seat.

③



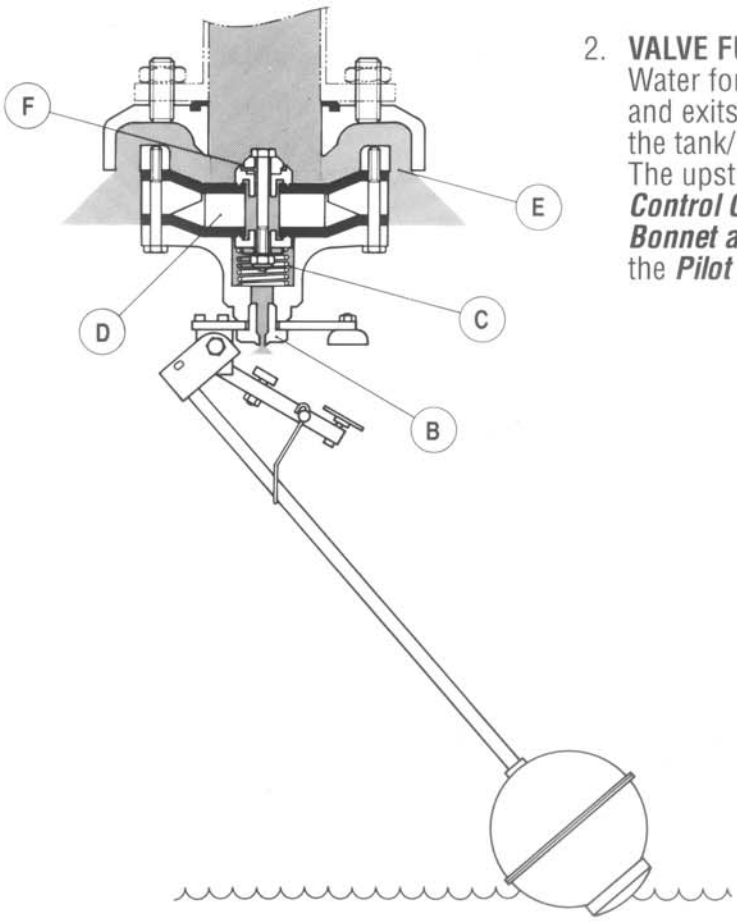
3. **VALVE BEGINS TO CLOSE:**
The ***Float Arm*** (A) follows the rising water surface and closes off the ***Pilot Nozzle*** (B). The pressure in the ***Bonnet*** (C) coming via the ***Control Orifice*** (F) is now able to build up and this forces the ***Plug Assembly*** (D) to rise toward the valve seat.

LEVEL CONTROL VALVES

LevelDex® - OPERATING PRINCIPLE

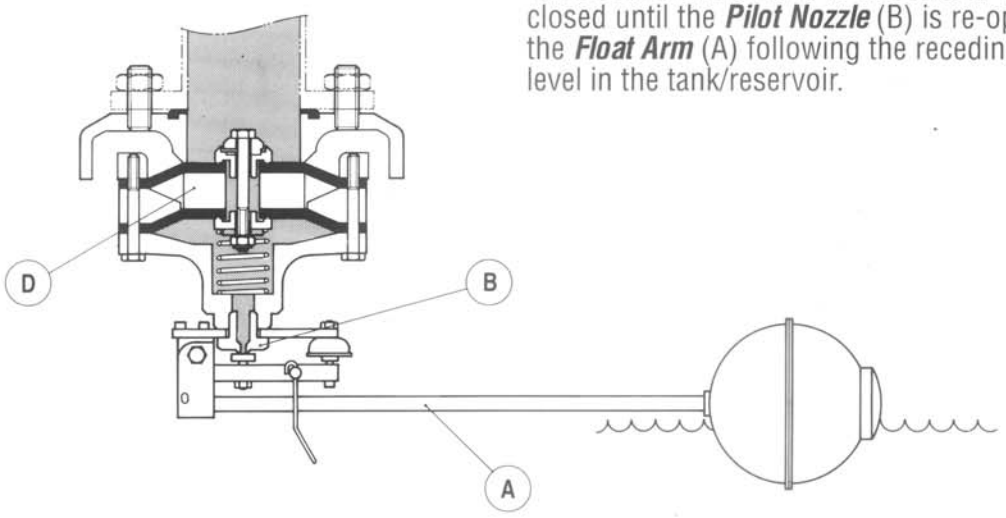
NOTE: ***Leveldex***® is a hydraulic, differential area control valve that uses upstream pressure to function. The Pilot exerts no mechanical force on the valve.

②



2. **VALVE FULLY OPEN:**
Water forces the ***Plug Assembly*** (D) down and exits via the ***Annular Outlets*** (E) into the tank/reservoir.
The upstream pressure goes into the ***Control Orifice*** (F) and down into the ***Bonnet area*** (C) and is able to exit out of the ***Pilot Nozzle*** (B) into the tank/reservoir.

④



4. **VALVE FULLY CLOSED:**
The ***Plug Assembly*** (D) is forced up against the valve seat and the valve is closed and will remain closed until the ***Pilot Nozzle*** (B) is re-opened by the ***Float Arm*** (A) following the receding water level in the tank/reservoir.

LEVEL CONTROL VALVES

LevelDex® - TECHNICAL DATA

LevelDex® Valves are available as standard, for service at Static Pressures of 160 m H_2O (232 psi) and Dynamic Pressures of 10 m H_2O (14,2 psi) for model 1601 valves and 50 m H_2O (71 psi) for model 1605 valves (see table below). Valves for service at higher static and or dynamic pressures are available on request.

	STATIC (CLOSED VALVE)		DYNAMIC (OPEN VALVE)			
Model	MAX DIFFERENTIAL m H_2O	MAX. DIFFERENTIAL psi	Max. m H_2O	Max. psi	Min. m H_2O	Min. psi
1601	160	232	10	14.2	1	1.42
1605	160	232	50	71.0	5	7.1

LevelDex® - STANDARD FLOW CHARACTERISTICS (FULLY OPEN VALVE)

Basic Formula (Kv): $Q = Kv \sqrt{\Delta H}$

Where: Q = Flow in litres/sec (ℓ/s)
ΔH = Differential Head in Meters H_2O
Kv = Flow Coefficient
(flow in ℓ/s for 1m ΔH)

Basic Formula (Cv): $Q = Cv \sqrt{\Delta P}$

Where: Q = Flow in US Gallons/min. (G.P.M.)
ΔP = Differential Pressure psi (lbs/in^2)
Cv = Flow Coefficient
(flow in G.P.M. for 1psi ΔP)

Kv/Cv TABLES

Valve Size	Kv/Cv	50 (2")	80 (3")	100 (4")	150 (6")	200 (8")	250 (10")	300 (12")
Model 1601	Kv	2. 94	8. 06	14. 93	27. 67	45. 28	69. 98	99. 96
	Cv	39. 1	106. 4	196. 6	368. 1	602. 0	930. 8	1330. 0
Model 1605	Kv	2. 75	8. 06	13. 3	26. 06	43. 96	68. 62	98. 98
	Cv	36. 64	107. 2	176. 8	346. 7	584. 7	912. 6	1316. 6

LevelDex® - RECOMMENDED MAXIMUM & MINIMUM FLOW - U.S. GALLONS/MIN

Valve Size		50 (2")	80 (3")	100 (4")	150 (6")	200 (8")	250 (10")	300 (12")
Model 1601	Max Flow	147. 3	401. 0	740. 8	1387.1	2268. 5	3507. 5	5011. 8
	Min Flow	46. 6	126. 8	234. 3	438. 6	717. 4	1109. 2	1584. 9
Model 1605	Max Flow	306. 7	903. 3	1489. 7	2921. 3	4926. 7	7689. 7	11093. 8
	Min Flow	96. 9	285. 6	471. 1	921. 9	1557. 9	2431. 7	3508. 2

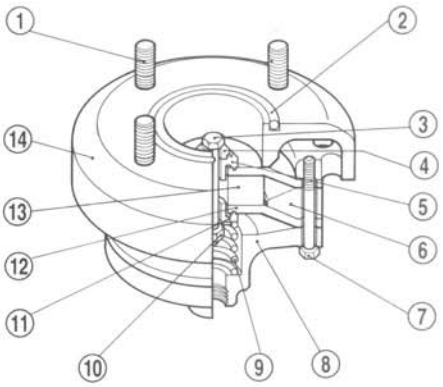
LevelDex® - RECOMMENDED MAXIMUM & MINIMUM FLOW - LITRES/SEC.

Valve Size		50 (2")	80 (3")	100 (4")	150 (6")	200 (8")	250 (10")	300 (12")
Model 1601	Max Flow	9.3	25. 4	47. 2	87. 5	143. 2	221. 3	316. 1
	Min Flow	2. 94	8. 06	14. 93	27. 67	45. 28	69. 98	99. 96
Model 1605	Max Flow	19. 4	56. 7	94. 05	184. 3	310. 8	485. 2	700. 00
	Min Flow	6. 15	17. 89	29. 74	58. 3	98. 3	153. 43	221. 33

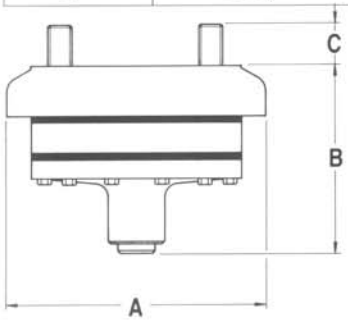
LEVEL CONTROL VALVES

LevelDex® - TECHNICAL DATA

LevelDex® MATERIALS OF CONSTRUCTION



Item No.	Description	Material Specififfication
1	Studs	Stainless Steel 304
2	O-Ring	Nitrile
3	Bolt	Stainless Steel Gr. A2
4	Restrictor	Stainless Steel 304
5	Upper Filter	Gunmetal
6	Support ring	High Density Polyethylene//cast Aluminum
7	Bolt	Stainless Steel Gr. A2
8	Bonnet	Cast Iron, Fusion Bonded Epoxy Powder Coated
9	Spring	SAE Stainless Steel/Mild Steel
10	Nut	Stainless Steel Gr. A2
11	Lower Filter	Gunmetal
12	Diaphragm	Proprietary Elastomer
13	Plug	High Density Polyethylene/Cast Aluminum
14	Body	Cast Iron, Fusion Boded Epoxy Powder Coated



LevelDex® DIMENSIONS AND WEIGHTS

NOTE 1: All **Leveldex**® Valves are supplied with stud connections suitable for alignment to flanges conforming to PN10 or PN16 ratings of BS 4504 standards or ANSI B.16.1 class 125.

NOTE 2: **Leveldex**® Valves are controlled by either a direct mounted two level magnetic latch pilot suitable for DN 50 (2") to DN 150 (6") valves (See page 5) or a remote mounted two level magnetic latch pilot suitable for DN 50 to DN 300 valves (See page 6).

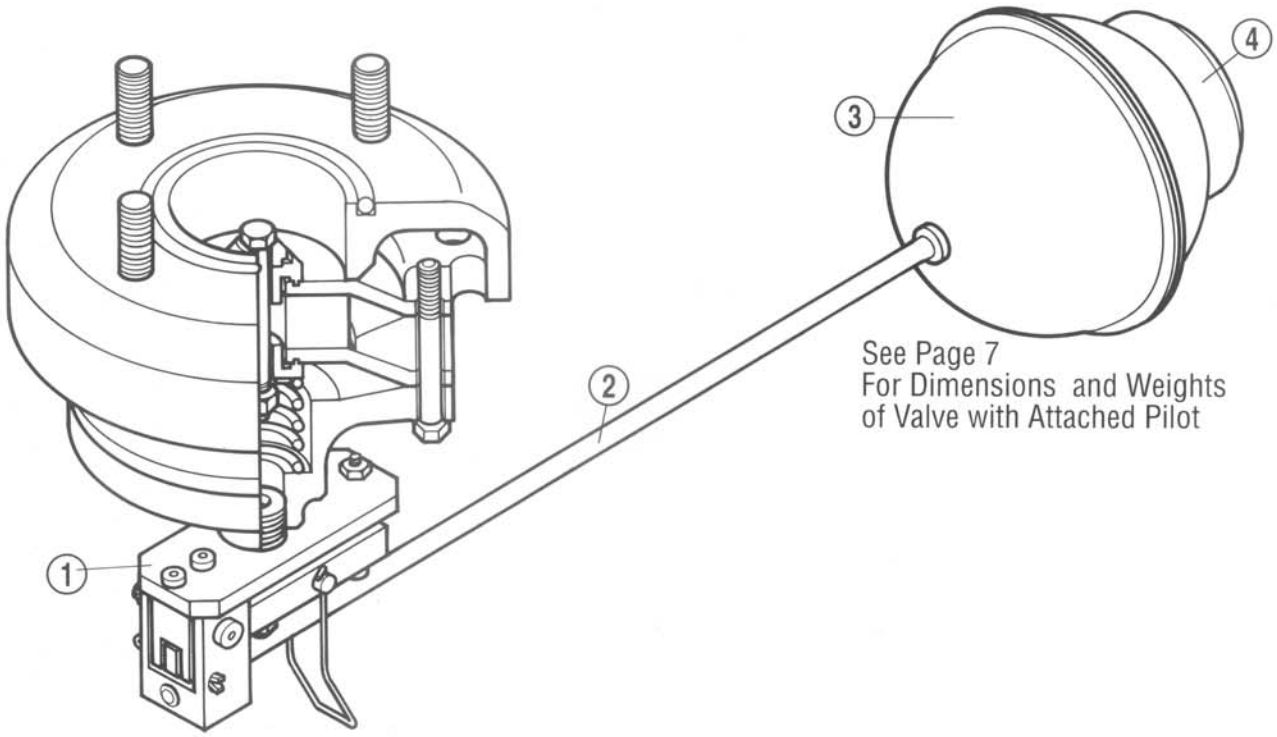
Valve Size		Valve Model No.	A		B		C		Weight	
mm	inches		mm	inches	mm	inches	mm	inches	kg.	lbs
50	(2")	1601	180	7 3/32	129	5 3/32	32	1 9/32	6	13,2
		1605	180	7 3/32	135	5 5/16	32	1 9/32	6	13,2
80	(3")	1601	212	8 11/32	144	5 11/16	32	1 9/32	10	22,1
		1605	212	8 11/32	150	5 29/32	32	1 9/32	10	22,1
100	(4")	1601	270	10 21/32	190	7 1/2	47	1 7/8	18	39,7
		1605	270	10 21/32	196	7 23/32	47	1 7/8	18	39,7
150	(6")	1601	350	13 25/32	226	8 29/32	47	1 7/8	34	77,2
		1605	350	13 25/32	232	9 1/8	47	1 7/8	34	77,2
200	(8")	1601	448	17 1/2	282	11 1/8	47	1 7/8	96	211,7
		1605	448	17 1/2	288	11 11/32	47	1 7/8	96	211,7
250	(10")	1601	546	21 1/2	366	14 13/32	55	2 3/16	190	419,0
		1605	546	21 1/2	372	14 21/32	55	2 3/16	190	419,0
300	(12")	1601	650	25 19/32	381	15	55	2 3/16	305	672,5
300		1605	650	25 19/32	387	15 1/4	55	2 3/16	305	672,5

LEVEL CONTROL VALVES

LevelDex® - TECHNICAL DATA

DIRECT MOUNTED TWO LEVEL MAGNETIC LATCH PILOT WITH SHORT DEAD BAND

Model No. LM 2500
(Recommended for DN 50 (2") to DN 150 (6") Valves)



See Page 7
For Dimensions and Weights
of Valve with Attached Pilot

1.	Main Body:	Gunmetal with Stainless Steel 304 Trim
2.	Float Arm:	Stainless Steel 304
3.	Float:	ABS Plastic
4.	Float Weight:	Cast Iron - Epoxy Powder Coated
	Fasteners:	Stainless Steel 304
	Attachment:	½" BSP/NPT Male to Valve Bonnet
	Weight:	2,5 kg. (5,5 lbs)

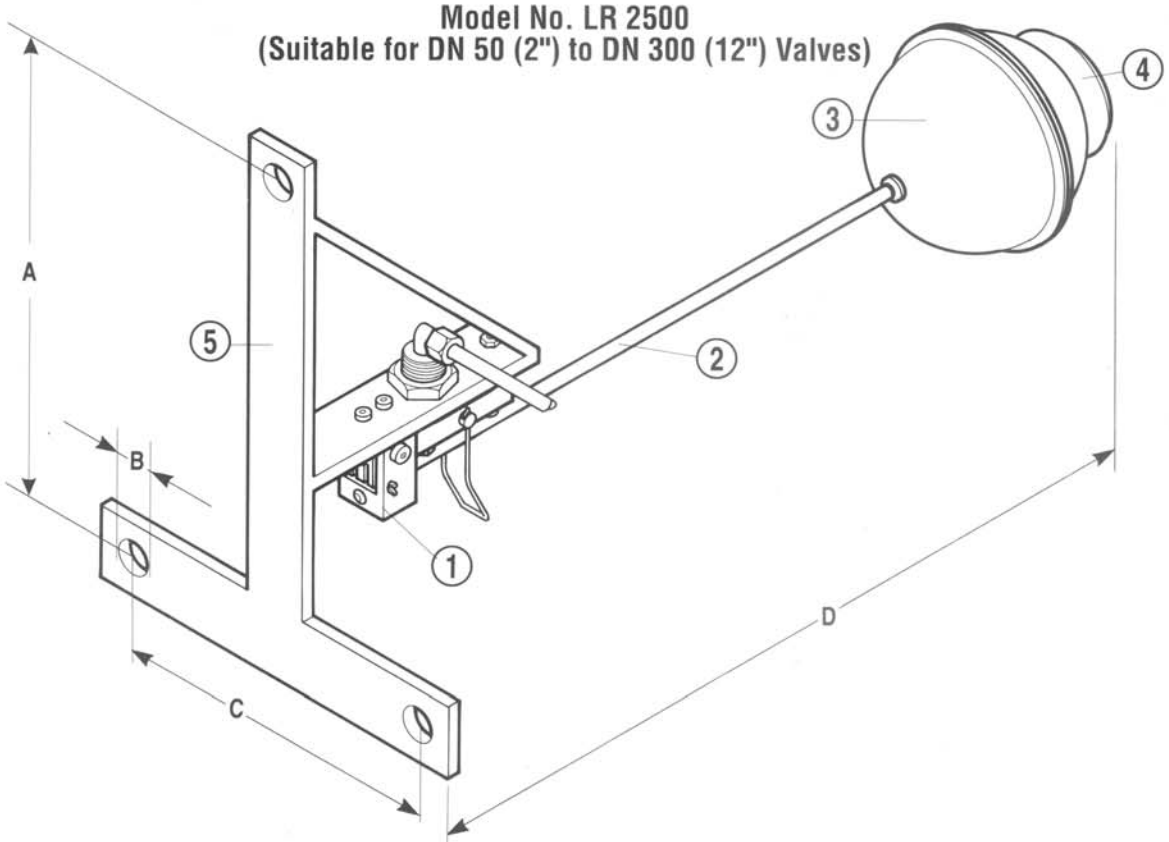
Supplied as standard on DN. 50 (2") to DN. 150 (6") ***LevelDex***® Valves.

LEVEL CONTROL VALVES

LevelDex® - TECHNICAL DATA

REMOTE MOUNTED TWO LEVEL MAGNETIC LATCH PILOT WITH SHORT DEAD BAND

Model No. LR 2500
(Suitable for DN 50 (2") to DN 300 (12") Valves)



1. Main Body: Gunmetal with Stainless Steel Trim
2. Float Arm: Stainless Steel 304
3. Float: ABS Plastic
4. Float Weight: Cast Iron - Epoxy Powder Coated
5. Bracket: Galvanized Mild Steel

Attachment: ¼" Tube to Valve Bonnet
Weight:: 4 kg. (8,8 lbs)

Supplied as standard on DN 200 (8") to DN 300 (12") ***LevelDex***® Valves.

A		B 3 x ∅		C		D	
mm	inches	mm	inches	mm	inches	mm	inches
292	11 1/2	∅ 17,5	∅ 11/16	156	6 5/32	930	36 5/8

NOTE:
Supplied as standard on all DN200 (8") to DN300 (12") ***LevelDex***® valves but can be used on the whole range.

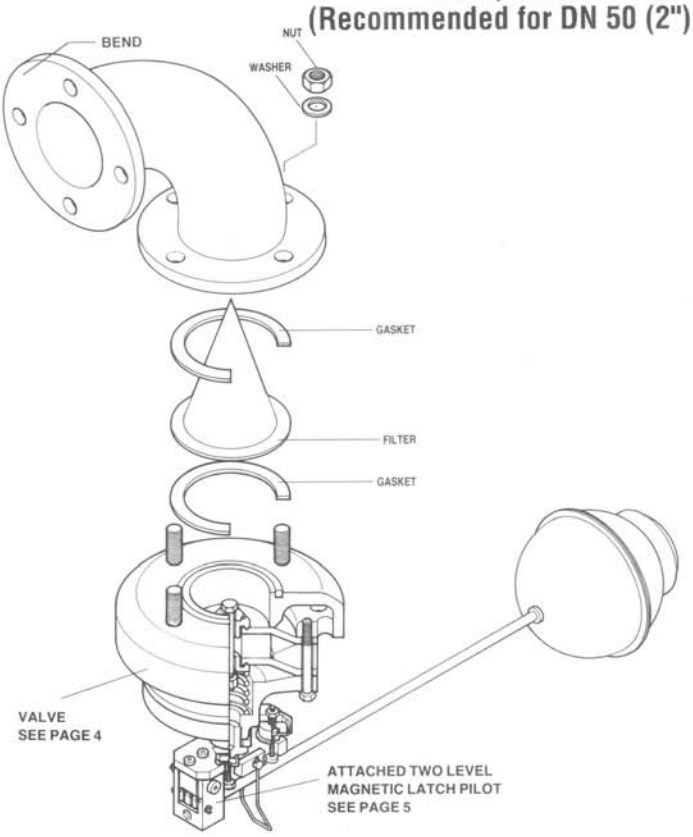
LEVEL CONTROL VALVES

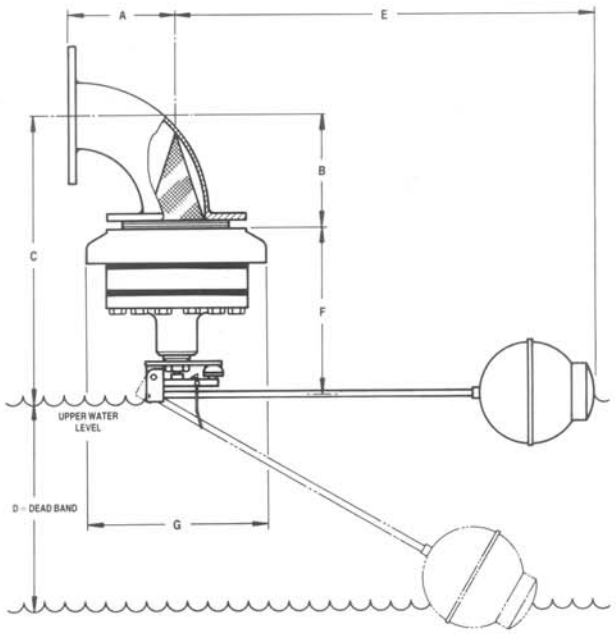
LevelDex® - TECHNICAL DATA

LevelDex® OVERALL DIMENSIONS AND PRE-FILTRATION OPTION

All control valves are succeptable to malfunction or damage caused by debris in the pipeline. An optional strainer protects the **LevelDex®** from malfunction or damage. The strainer is easily accessible for the purpose of cleaning.*(*Note: *Pre filtration may reduce valve performance)*

Bend/Attached Pilot Arrangement
(Recommended for DN 50 (2") to DN 150 (6") Valves)





Valve Size		Valve Model No.	A		B		C		D		E		F		G		Weight	
mm	in		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	kg	lbs
50	2"	050 LX 1601	130	5 1/8	139	5 1/2	318	12 9/16	305	12	660	26	179	7 1/16	180	7 1/8	15	33,1
		050 LX 1605	130	5 1/8	139	5 1/2	324	12 3/4	305	12	660	26	185	7 5/16	180	7 1/8	15	33,1
80	3"	080 LX 1601	114	4 1/2	123	4 7/8	317	12 1/2	305	12	660	26	194	7 11/16	212	8 3/8	20	44,1
		080 LX 1605	114	4 1/2	123	4 7/8	323	12 3/4	305	12	660	26	200	7 7/8	212	8 3/8	20	44,1
100	4"	100 LX 1601	152	6	161	6 3/8	401	15 13/16	305	12	660	26	240	9 7/16	270	10 5/8	29	64,0
		100 LX 1605	152	6	161	6 3/8	407	16 1/32	305	12	660	26	246	9 11/16	270	10 5/8	29	64,0
150	6"	150 LX 1601	229	9 1/32	238	9 3/8	512	20 1/8	375	14 3/4	810	31 7/8	274	10 13/16	350	13 13/16	53	117,0
		150 LX 1605	229	9 1/32	238	9 3/8	518	20 13/16	375	14 3/4	810	31 7/8	280	11 1/32	350	13 13/16	53	117,0

Note 1: The bend shown can be supplied but this is not always the case (model 'LD' denotes inclusion of bend. Refer to ordering guide on page 13.)

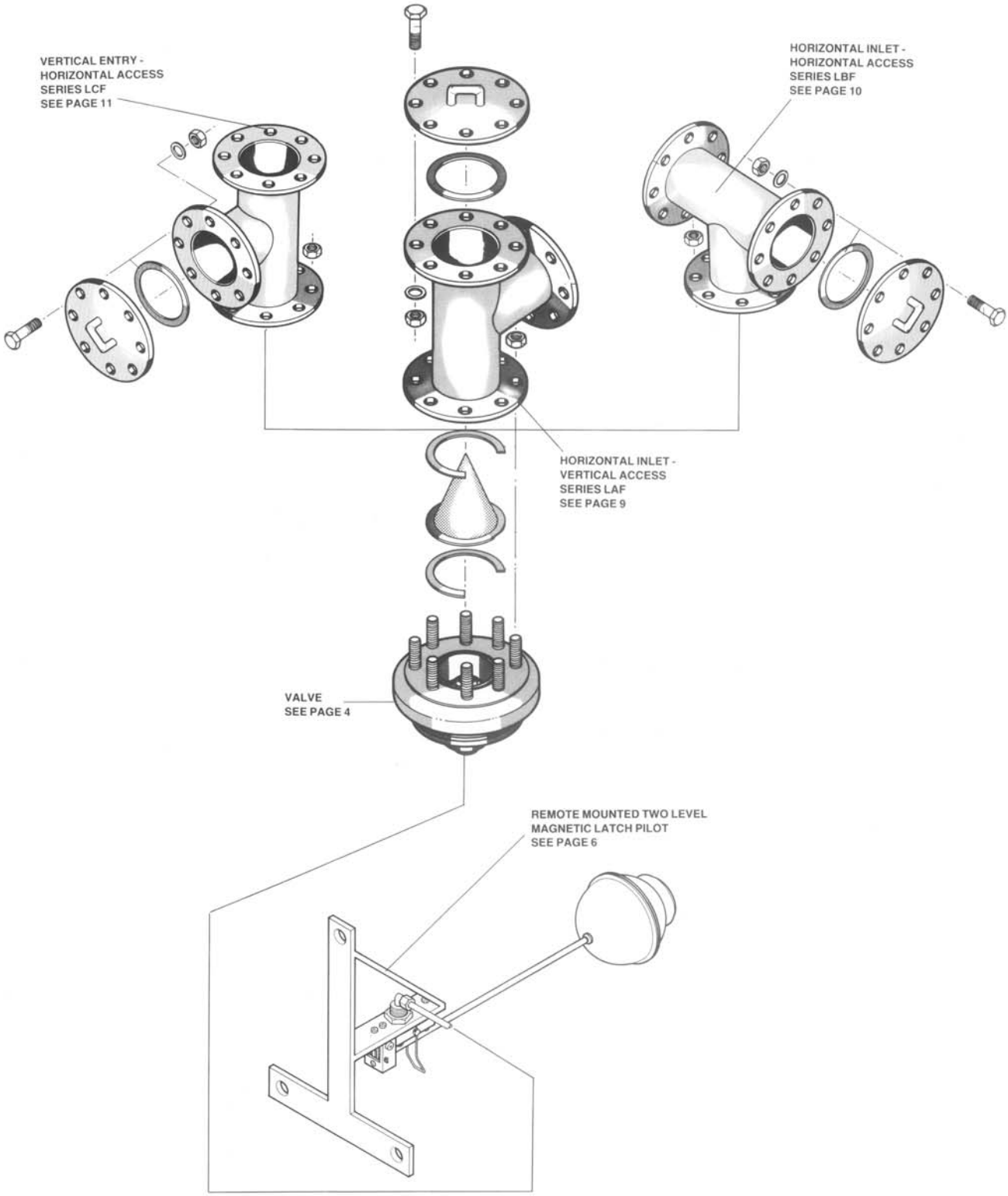
Note 2: The weights given exclude the bend.

LEVEL CONTROL VALVES

LevelDex® - TECHNICAL DATA

LevelDex® PRE-FILTRATION OPTIONS

Filter Box/Remote Pilot Arrangements
(Recommended for DN 150 (6") to DN 300 (12") Valves)

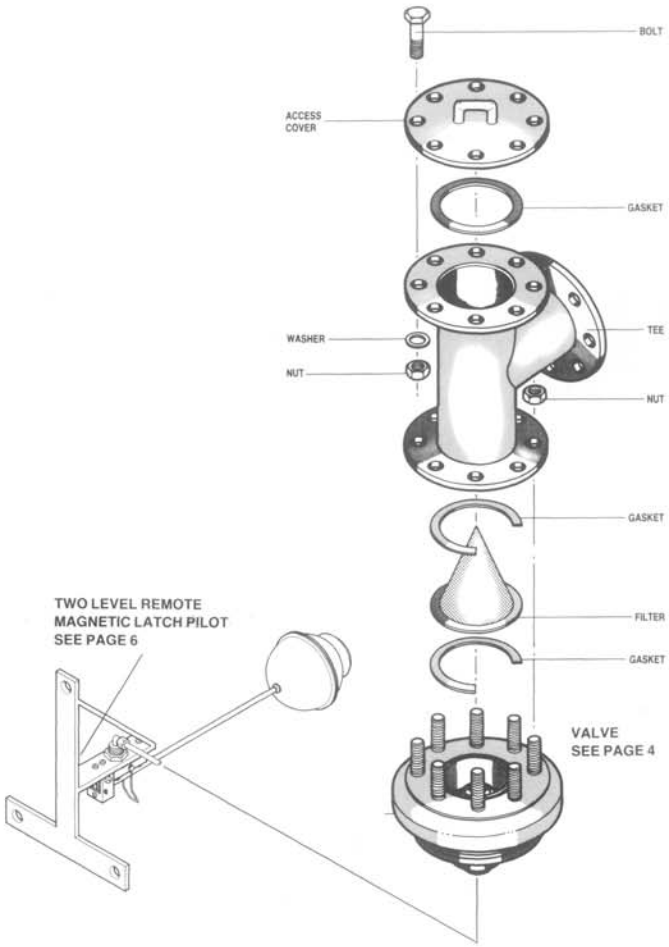


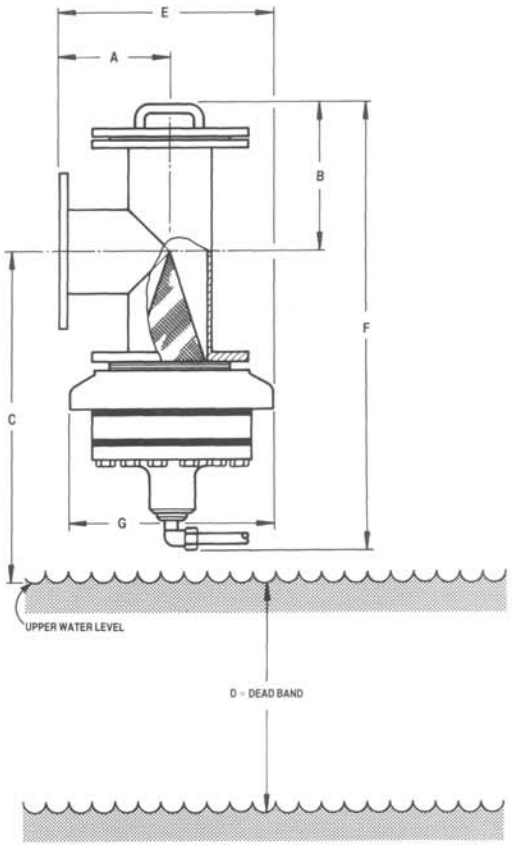
LEVEL CONTROL VALVES

LevelDex® - TECHNICAL DATA

LevelDex® OVERALL DIMENSIONS AND PRE-FILTRATION OPTIONS

Horizontal Inlet - Vertical Filter Access
Series LAFR
(Recommended for DN 150 (6") TO DN 300 (12") Valves)





Valve Size		Valve Model No.	A		B		C		D		E		F		G		Weight	
mm	in		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	kg	lbs
150	6"	150 LAFR 1601	229	9 1/32	315	12 7/16	492	19 3/8	375	14 3/4	404	15 29/32	807	31 13/16	350	13 13/16	70	154,3
		150 LAFR 1605	229	9 1/32	315	12 7/16	498	19 5/8	375	14 3/4	404	15 29/32	813	32	350	13 13/16	70	154,3
200	8"	200 LAFR 1601	305	12	397	15 5/8	620	24 7/16	375	14 3/4	529	20 27/32	1017	40 1/16	448	17 21/32	150	331,0
		200 LAFR 1605	305	12	397	15 5/8	626	24 21/32	375	14 3/4	529	20 27/32	1023	40 5/16	448	17 21/32	150	331,0
250	10"	250 LAFR 1601	381	15	473	18 5/8	780	30 3/4	375	14 3/4	654	25 3/4	1253	49 3/8	546	21 1/2	275	606,4
		250 LAFR 1605	381	15	473	18 5/18	786	31	375	14 3/4	654	25 3/4	1259	49 9/16	546	21 1/2	275	606,4
300	12"	300 LAFR 1601	457	18	549	21 5/8	869	34 1/4	375	14 3/4	782	30 13/16	1418	55 27/32	650	25 19/32	420	926,1
		300 LAFR 1605	457	18	549	21 5/8	875	34 7/16	375	14 3/4	782	30 13/16	1424	56 1/16	650	25 19/32	420	926,1

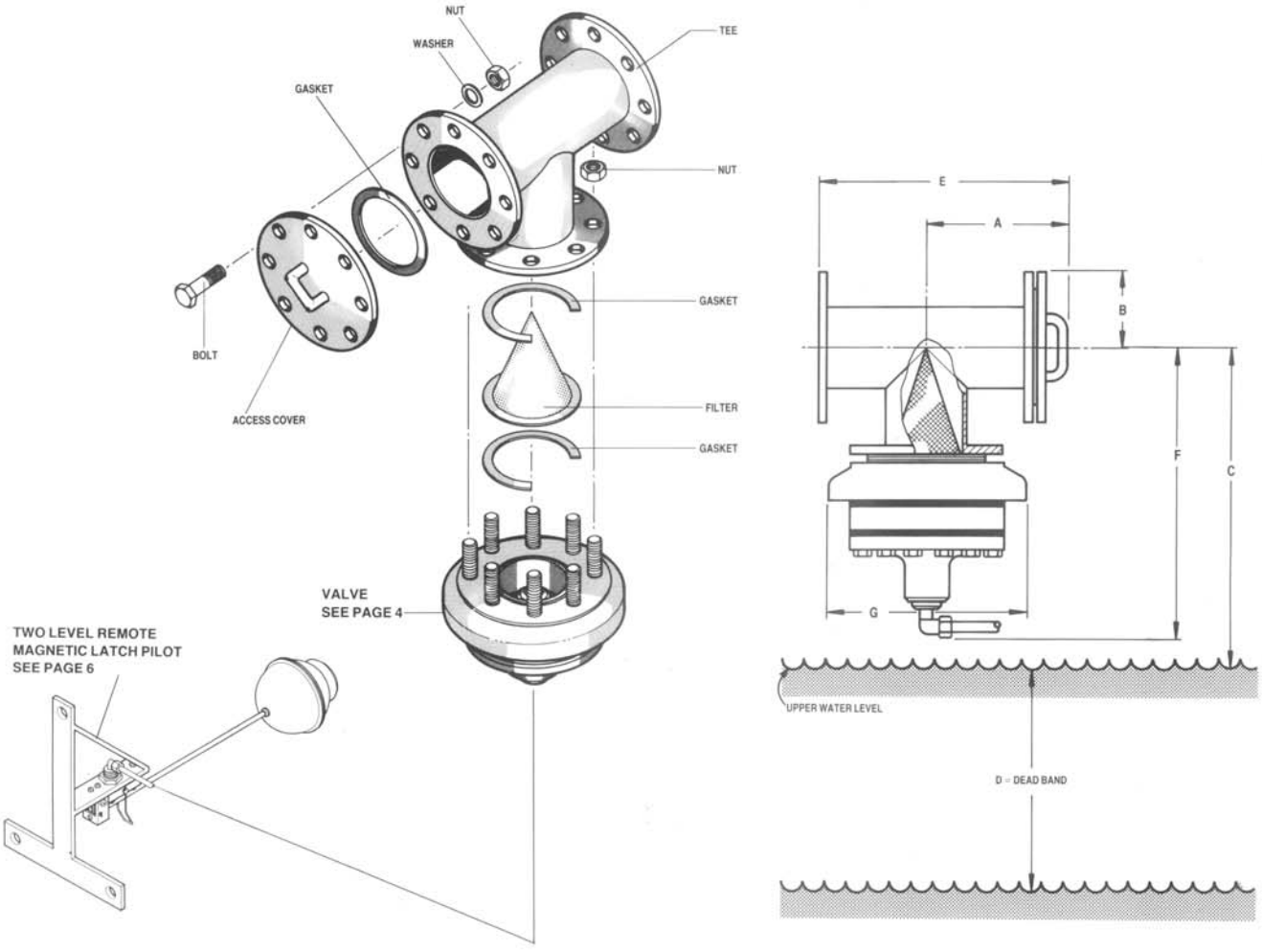
Note 1: Valve comes complete with remote pilot, model LR 2500 unless an alternative is specified.

LEVEL CONTROL VALVES

LevelDex® - TECHNICAL DATA

LevelDex® OVERALL DIMENSIONS AND PRE-FILTRATION OPTIONS

Horizontal Inlet - Vertical Filter Access
Series LBFR
(Recommended for DN 150 (6") TO DN 300 (12") Valves)



Valve Size		Valve Model No.	A		B		C		D		E		F		G		Weight	
mm	in		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	kg	lbs
150	6"	150 LBFR 1601	315	12 13/32	143	5 21/32	492	19 3/8	375	14 3/4	544	21 13/32	492	19 3/8	350	13 13/16	70	154,3
		150 LBFR 1605	315	12 13/32	143	5 21/32	498	19 5/8	375	14 3/4	544	21 13/32	498	19 5/8	350	13 13/16	70	154,3
200	8"	200 LBFR 1601	398	15 11/16	170	6 11/16	620	24 13/32	375	14 3/4	703	27 11/16	620	24 13/32	448	17 21/32	150	331,0
		200 LBFR 1605	398	15 11/16	170	6 11/16	626	24 21/32	375	14 3/4	703	27 11/16	626	24 21/32	448	17 21/32	150	331,0
250	10"	250 LBFR 1601	473	18 5/8	204	8 1/32	780	30 23/32	375	14 3/4	854	33 5/8	780	30 23/32	546	21 1/2	275	606,4
		250 LBFR 1605	473	18 5/8	204	8 1/32	786	30 31/32	375	14 3/4	854	33 5/8	786	30 31/32	546	21 1/2	275	606,4
300	12"	300 LBFR 1601	549	21 5/8	230	9 1/16	869	34 7/32	375	14 3/4	1006	39 5/8	869	34 7/32	650	25 19/32	420	926,1
		300 LAFR 1605	549	21 5/8	230	9 1/16	875	34 7/16	375	14 3/4	1006	39 5/8	875	34 7/16	650	25 19/32	420	926,1

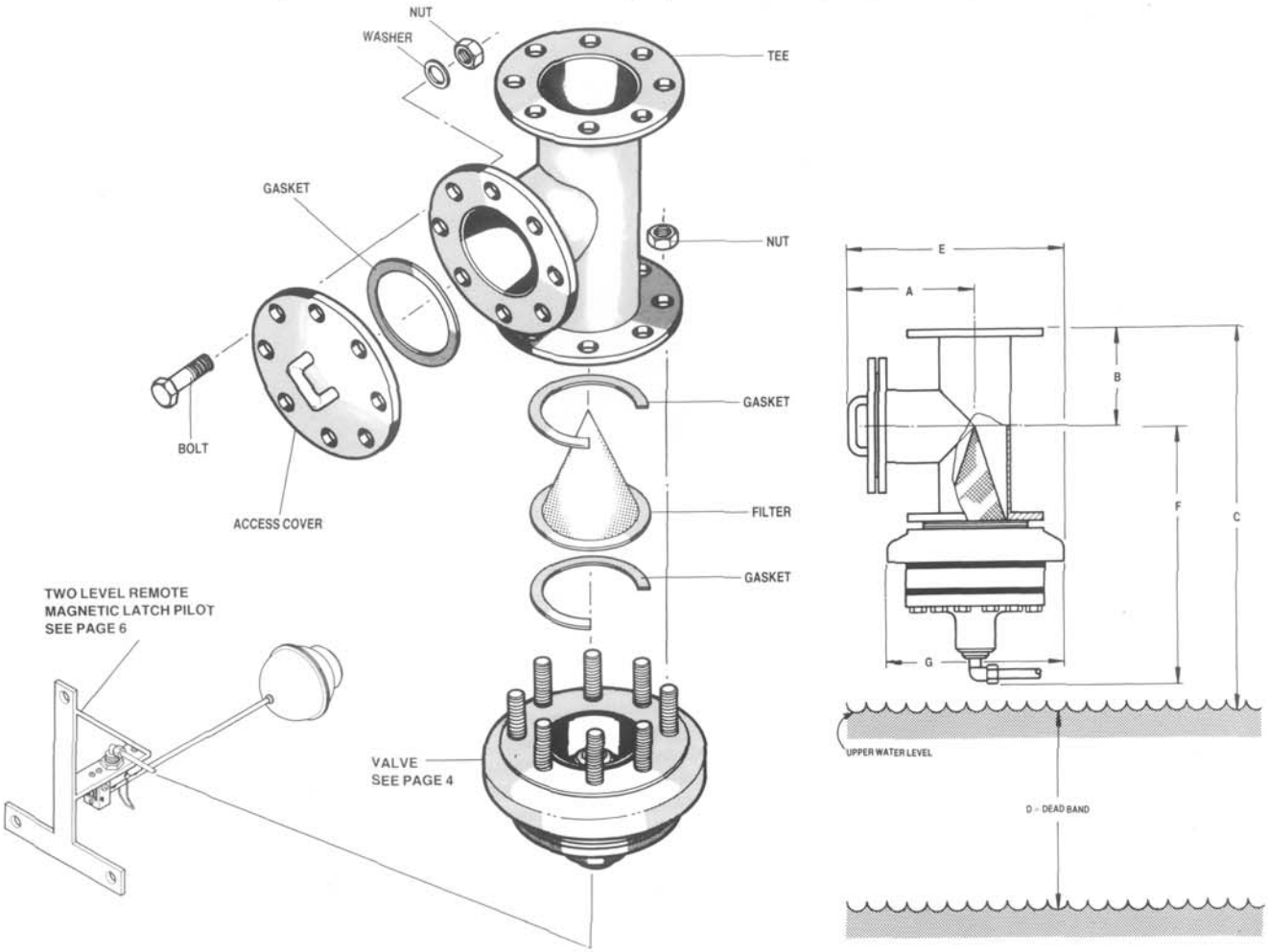
Note 1: Valve comes complete with remote pilot, model LR 2500 unless an alternative is specified.

LEVEL CONTROL VALVES

LevelDex® - TECHNICAL DATA

LevelDex® OVERALL DIMENSIONS AND PRE-FILTRATION OPTIONS

Vertical Inlet - Horizontal Filter Access
Series LCFR
(Recommended for DN 150 (6") TO DN 300 (12") Valves)



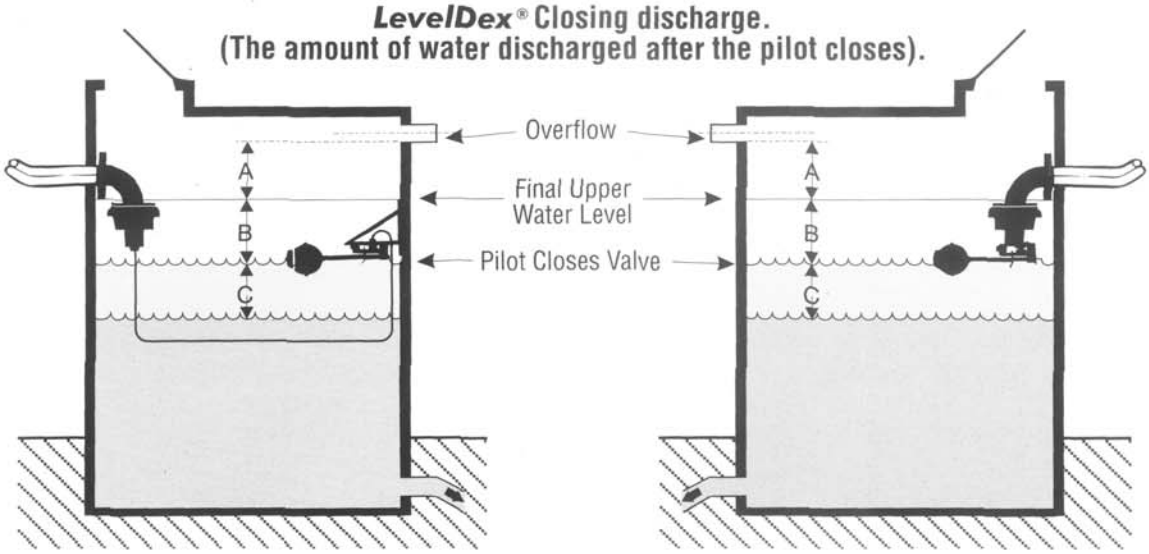
Valve Size		Valve Model No.	A		B		C		D		E		F		G		Weight	
mm	in		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	kg	lbs
150	6"	150 LCFR 1601	315	12 13/32	229	9 1/32	721	28 3/8	375	14 3/4	490	19 5/16	492	19 3/8	350	13 13/16	70	154,3
		150 LCFR 1605	315	12 13/32	229	9 1/32	727	28 5/8	375	14 3/4	490	19 5/16	498	19 5/8	350	13 13/16	70	154,3
200	8"	200 LCFR 1601	398	15 11/16	305	12 1/32	925	36 7/16	375	14 3/4	622	24 1/2	620	24 13/32	448	17 21/32	150	331,0
		200 LCFR 1605	398	15 11/16	305	12 1/32	931	36 21/32	375	14 3/4	622	24 1/2	626	24 21/32	448	17 21/32	150	331,0
250	10"	250 LCFR 1601	473	18 5/8	381	15	1161	45 23/32	375	14 3/4	746	29 1/8	780	30 23/32	546	21 1/2	275	606,4
		250 LCFR 1605	473	18 5/8	381	15	1167	45 31/32	375	14 3/4	746	29 1/8	786	30 31/32	546	21 1/2	275	606,4
300	12"	300 LCFR 1601	549	21 5/8	457	18	1326	52 7/32	375	14 3/4	874	34 13/32	869	34 7/32	650	25 19/32	420	926,1
		300 LCFR 1605	549	21 5/8	457	18	1332	52 7/16	375	14 3/4	874	34 13/32	875	34 7/16	650	25 19/32	420	926,1

Note 1: Valve comes complete with remote pilot, model LR 2500 unless an alternative is specified.

LEVEL CONTROL VALVES

LevelDex® - TECHNICAL DATA

LevelDex® Closing discharge.
(The amount of water discharged after the pilot closes).



NOTE: **Valve is indicated with an attached bend (Series LD) but the discharge is true for all *LevelDex*® valve types.**
The discharge value is according to the flow rate through the valve.
The calculations are given at an estimated closing time of 300 seconds (5 minutes).
The placement of the remote pilot in a remote pilot application will decide the final water level.

DIMENSION A: Allow a space between the bottom of the overflow and the final water level for surface turbulence.

DIMENSION B: Decide on the final system flow in ℓ/s (U.S. gallons/min.) and insert into the calculation below.

DIMENSION C: (Pilot Deadband)
Attached Pilot: DN50 (2") to DN100 (4") = 305mm (12") Attached Pilot: DN150 (6") = 375mm (14 3/4").
Remote Pilot: All Valve Sizes = 375mm (14 3/4").

HOW TO CALCULATE DIMENSION B:

1. Square or Rectangular Tank:

Discharge: $\left(\frac{\ell/s}{6,6}\right)$ + Area of Tank (metres) = Dimension B Discharge

1. Square or Rectangular Tank:

Discharge: $\left(\frac{\text{U.S. Gallons/min.}}{2,968}\right)$ ÷ Area of Tank (feet) = Dimension B

EXAMPLE: A Valve Discharges at 120 ℓ/s (1902 U.S. Gallon/min.) into a Tank 15 metres (49,2 feet) in length by 5 metres (16,4 feet) in breadth, calculate dimension B.

Discharge: $\left(\frac{120\ \ell/s}{6,6}\right)$ + Area of Tank (15m x 5m) = 0,242m

2. Round Tank:

Discharge: $\left(\frac{\ell/s}{6,6}\right)$ + $\left(\text{Diameter of Tank}^2 \times \frac{\pi}{4}\right)$ = Dimension B

3. Any Other Shape Tank:

Discharge: $\left(\frac{\ell/s}{6,6}\right)$ + Surface Area of Tank in m = Dimension B in m.

Discharge: $\left(\frac{1902\ \text{U.S. Gallons/min.}}{2,968}\right)$ ÷ Area of Tank (49,2' x 16,4') = 0,794 ft

2. Round Tank:

Discharge: $\left(\frac{\text{U.S. Gallons/min.}}{2,968}\right)$ ÷ $\left(\text{Diameter of Tank}^2 \times \frac{\pi}{4}\right)$ = Dimen. B

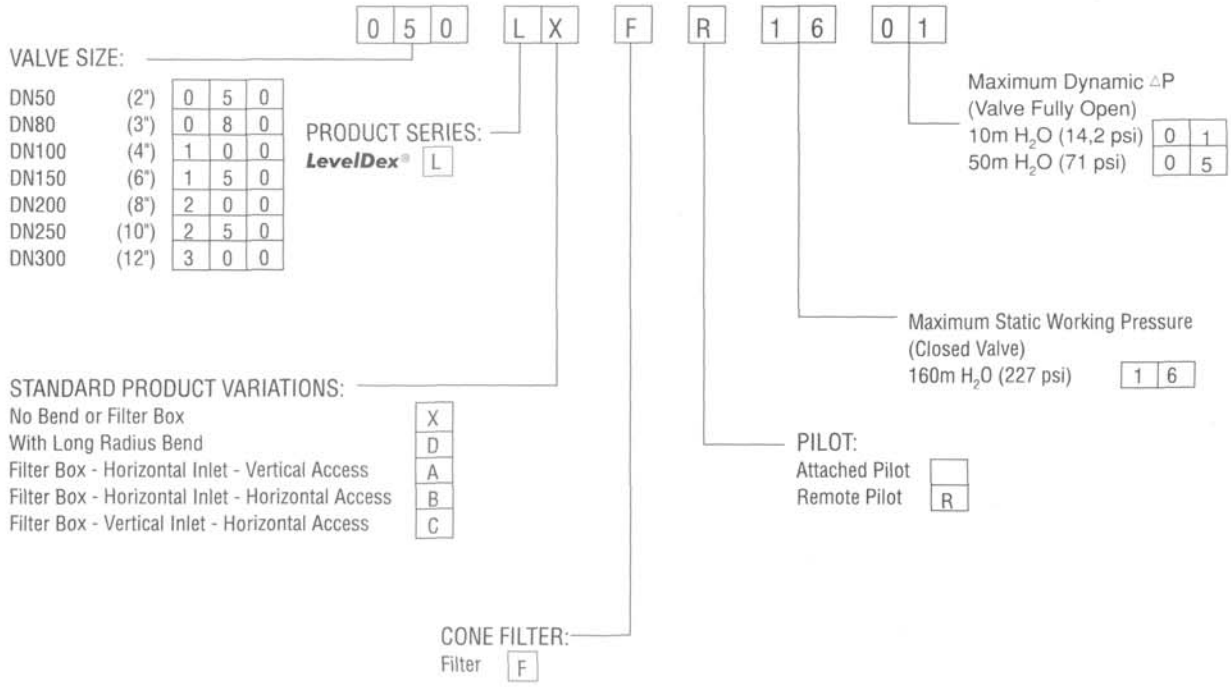
3. Any Other Shape Tank:

Discharge: $\left(\frac{\text{U.S. Gallons/min}}{2,968}\right)$ + Surface Area of Tank in ft = Dimen. B in ft

LEVEL CONTROL VALVES

LevelDex® ORDERING GUIDE

Model No. Key



ADD ON FEATURES TO BASIC *LevelDex*® VALVES

ADD ON FEATURES	VALVE SIZE	50 (2")	80 (3")	100 (4")	150 (6")	200 (8")	250 (10")	300 (12")
	LONG RADIUS BEND							
	FILTER BOX - HORIZONTAL INLET - VERTICAL ACCESS							
	FILTER BOX - HORIZONTAL INLET - HORIZONTAL ACCESS							
	FILTER BOX - VERTICAL INLET - HORIZONTAL ACCESS							
	FILTER							
	ATTACHED TWO LEVEL MAGNETIC LATCH PILOT							
	REMOTE TWO LEVEL MAGNETIC LATCH PILOT							

NOTE: This key refers to popular valve configurations and is not an indication of the limit of available variations, should there be a requirement which does not appear in the key please enquire.

WHEN ORDERING PLEASE SPECIFY:

* Valve Size
* Desired Flange Alignment
* Static (Working) & Dynamic (Valve Fully Open) Pressure.
* Desired Flow Rate

LEVEL CONTROL VALVES

APPLICATION PROBLEMS	*LevelDex*® SOLUTION
1. Water surface turbulence influence many valves, sometimes causing unacceptably high pressure surges in a system.	A unique magnetic latch differential pilot ensures that the ***LevelDex***® will close/open positively even when operating in severely turbulent applications.
2. Inherent in all end line level control valve applications is the problem of cavitation due to the necessary dissipation of excess energy. Generally valves have a limited capacity in this regard and maximum pressure drops quoted are in the region of 4m H_2O (5,7 psi) for mechanical valves and 20 m H_2O (28,4 psi) for hydraulic types.	The ***LevelDex***® design prevents internal cavitation and the consequent damage to sealing components by discharging through the specially dimensioned ports relative to the annular flow area between seat and disc. This causes cavitation to occur outside the valve at comparatively high dynamic differential pressures of up to 50m H_2O (71 psi) for standard valves.
3. Surges caused by the closing characteristic of mechanical valves and hydraulic valves without sophisticated closing speed or relief controls can be damaging to the piping system.	A characteristic whereby deceleration of the closing rate occurs in the critical period just before the valve closure, and an operating feature whereby the valve will hesitate during the closing cycle if the rate of dynamic differential pressure increase is too steep, causes the ***LevelDex***® to dampen out severe surges.
4. On pumping systems modulating or mechanical valves increasingly throttle against the pump as the reservoir level rises and, consequently, the additional pumping energy required can be significant in terms of electricity and maintenance costs.	The ***LevelDex***® does not throttle due to the rising or lowering of a reservoir level and, apart from the relatively short closing or opening cycles, is always either open or closed.
5. All control valves including the ***LevelDex***® are susceptible to malfunction or damage caused by debris in the pipeline.	An optional cone strainer protects the ***LevelDex***® from malfunction or damage. The strainer is easily accessible for the purpose of cleaning.
6. End line level control valves are generally large, weighty and difficult to service.	***LevelDex***® valves are comparatively light, compact and extremely simple to service without any special tools or lifting equipment.