ELSTER Jeavons

Catalogue and Performance Literature for

J48

Gas Pressure Regulators

2½" – 6" Sizes

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December 2004

J48 LOW PRESSURE REGULATOR

2½”– 6”

The J48 is a highly versatile proven range of Industrial Low Pressure Regulators, suitable for a wide range of pressure reduction applications. The J48 is available in sizes from ½" to 6", the smaller sized units (up to 2”) being described in a separate leaflet.

APPLICATION

The J48 is a service and appliance regulator suitable for a wide range of domestic, commercial and industrial applications. All units are designed for natural, liquid petroleum and manufactured gases.

The J48 can be installed in both horizontal and vertical pipelines, with certain sizes available with angled connections for meter services applications.

The J48 has positive lock up, and has been designed for high efficiency and sensitivity with maximum flow and minimum pressure loss.

PRESSURE

Maximum Inlet Pressure:	350mb (5 psig)
Maximum Outlet Pressure:	150mb (60"wg) 2½” – 3”
	345mb (5 psig) 4” – 6”

SPECIAL VERSIONS

The J48 can also be supplied in two special versions, the J48Z Zero Regulator and the J48P Proportionator.

The J48Z is suitable for use where burner train design creates a negative pressure on the downstream side of the regulator and thus very low outlet pressures (-0.75 to +0.25mb) are required.

The J48P is utilized to control gas pressures in a burner train, relative to the air supply.

Further details on the operation of the J48Z and J48P are given in a separate datasheet.

TEMPERATURE

The J48 range is suitable for operation in a wide range of temperatures from -20° C to +70° C.

SIZE

2½", 3”, 65mm, 80mm 100mm and 150mm
(For details of smaller sizes please refer separate datasheet)

CONTROL

A comprehensive range of springs is available, as described overleaf. The outlet pressure can be easily and accurately adjusted by turning the spring adjustment unit located under the top cap.
If required the units can be supplied factory set with a security seal at extra cost.

CONNECTIONS

The 2½” and 3” sized J48 can be supplied with a tapered screwed thread to BS21 (ISO7) or flanged to BS EN 1092-2 NP16. Sizes above this are flanged only. Other thread and flange specifications may be available upon request.

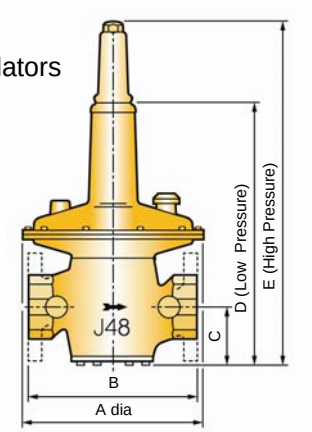
SERVICING

The J48 has been designed for ease of access, inspection and servicing of all internal components. A standard soft spares kit is available for all sizes.

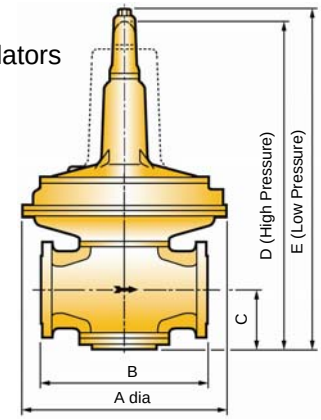
2½ " and 3”	SK4811-01
4” (Po up to 75mb)	SK4812-01
(Po above 75mb)	SK4812-05
6” (Po up to 75mb)	SK4814-01
(Po above 75mb)	SK4814-05

J48 LOW PRESSURE REGULATOR

2½" & 3"
J48 regulators



4" & 6"
J48 regulators



DIMENSIONS

SIZE	A	B	C	D	E	Weight (Kg)
2½"	335	310	107	482	678	12.0
3"	335	310	107	482	678	12.0
4"	470	381	136	753	771	29.0
6"	533	482	181	873	895	47.6

MATERIAL SPECIFICATION

A summary of the material specification for the J48 is given for reference. All material has been selected to provide maximum durability and reliability in service.

COMPONENTS	SPECIFICATION
Body, diaphragm case, top cover, top cap, base plate, valve disc holder, valve disc clamping washer.	Aluminium Alloy
Spring holder*	Brass
Valve spindle, spring adjusting screw, diaphragm spacer, diaphragm plates, reinforcing plate, spring holder+, secondary diaphragm washer.	Mild steel
Main diaphragm, secondary diaphragm.	Fabric reinforced Nitrile (Buna)
Valve discs, "O" rings	Nitrile (Buna)
Springs	Carbon Steel

+ 100 – 150mm units only * 2½" – 3" units only

PERFORMANCE

Detailed performance data is provided on separate technical datasheets.

QUALITY

Elster Jeavons is committed to a programme of continuous quality enhancement. All equipment designed and manufactured by Elster Jeavons benefits from the company's quality assurance standards which are approved to BS EN ISO9001:1994.

Elster Jeavons has a programme of continuous product development and improvement and in consequence the information in this leaflet may be subject to change or modification without notice.

SPRINGS

	Spring Range mbar	Spring Range "wg"	2½" & 3"	4"	6"
Low Pressure	6 – 15	2.6 – 6	J4811-020 White / Yellow		
	10 – 18	4 – 7		J3312-026 Black / Dark Green	J3314-019 Brown / Gold
	12.5 – 25	5 - 10	J4811-021 White / Black	J3312-027 Black / Dark Blue	J3314-020 Brown / Light Green
	23 – 38	9 – 15	J4811-022 White / Orange		
	25 – 50	10 - 20		J3314-027 Brown / Silver	J3314-036 Brown / Orange
	50 – 75	20 – 30		J3314-036 Brown / Orange	J3314-035 Brown / Light Blue
	35 – 50	14 – 20	J4811-028 White / Brown		
	45 – 75	18 - 30	J4811-029 White		
High Pressure	70 – 100	28 - 40	J4811-030 White / Red	J8112-058 White / Light Blue	J8114-056 Grey / Light Blue
	100 – 150	40 – 60	J4811-031 White / Grey	J8111-059 Yellow / Light Green	J8112-059 White / Brown
	138 – 207	2 - 3 PSI		J8112-059 White / Brown	J8112-081 White / Light Green
	138 - 345	2 – 5 PSI		J8112-082 White / Dark Blue	J8112-082 White / Dark Blue

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REGULATING CAPACITIES

All capacities in SCMH 0.64 s.g.

REGULATOR SIZE: 2½”

Setting flow rate: 19.5 SCMH

OUTLET PRESSURE SETTING (mbar / DROOP (%)

	10		17.5		20		27.5		50		86	
	10%	20%	10%	20%	10%	20%	10%	20%	10%	20%	10%	20%
Pin mbar												
15	83	139	-	-	-	-	-	-	-	-	-	-
20	85	141	104	179	-	-	-	-	-	-	-	-
25	95	156	110	203	118	220	-	-	-	-	-	-
35	98	164	133	220	139	241	130	248	-	-	-	-
53	114	173	154	239	159	249	166	284	174	295	-	-
70	118	189	168	255	173	268	183	298	195	351	-	-
105	136	175	171	265	179	276	193	311	208	393	253	523
140	153	180	176	293	183	294	200	316	218	276	283	594
210	184	204	190	236	193	303	170	330	246	416	344	605
350	234	239	220	301	246	281	258	283	268	444	373	613

REGULATOR SIZE: 3”

Setting flow rate: 19.5 SCMH

OUTLET PRESSURE SETTING (mbar / DROOP (%)

	10		17.5		20		27.5		50		86	
	10%	20%	10%	20%	10%	20%	10%	20%	10%	20%	10%	20%
Pin mbar												
15	93	156	-	-	-	-	-	-	-	-	-	-
20	106	169	115	213	-	-	-	-	-	-	-	-
25	129	183	150	263	153	294	-	-	-	-	-	-
35	165	234	200	275	206	319	143	331	-	-	-	-
53	219	268	281	344	335	605	213	350	139	315	-	-
70	275	331	325	409	419	638	288	370	205	469	-	-
105	325	388	431	519	531	556	323	423	281	544	253	606
140	400	444	575	613	594	631	420	456	329	605	369	700
210	238	338	635	724	461	596	513	585	276	580	450	725
350	238	275	675	794	666	743	656	725	619	731	369	709

The tests on the previous page are performed with the regulator set at a constant inlet pressure, a predetermined flow rate and the required outlet pressure. The flow rate is then increased whilst keeping the inlet pressure constant. The capacities are recorded when the outlet pressure has fallen by 10% and 20% from the set point.

The capacities on the previous page are given in SCMH of natural gas (0.64 SG).
For other gases multiply the capacity by:

$$\sqrt{\frac{0.64}{\text{gas sg}}}$$

GAS	SG
Air	1.00
Towns Gas	0.50
Propane	1.53
Propane / Air	1.20

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REGULATING CAPACITIES

All capacities in SCMH 0.64 s.g.

REGULATOR SIZE: 4”

Setting flow rate: 30 SCMH

OUTLET PRESSURE SETTING (mbar / DROOP (%)

	10		17.5		20		27.5		50		86	
	10%	20%	10%	20%	10%	20%	10%	20%	10%	20%	10%	20%
Pin mbar												
15	235	268	-	-	-	-	-	-	-	-	-	-
20	333	381	182	208	-	-	-	-	-	-	-	-
25	409	467	298	340	235	269	-	-	-	-	-	-
35	525	600	408	466	408	466	298	340	-	-	-	-
53	671	767	578	650	580	662	525	600	182	208	-	-
70	829	948	777	888	759	867	701	801	484	553	-	-
105	1052	1202	1012	1156	998	1140	954	1090	809	924	492	562
140	1241	1418	1207	1379	1195	1366	1159	1325	1042	1191	822	939
210	1564	1787	1537	1757	1528	1746	1500	1714	1411	1613	1258	1437
350	2102	2402	2082	2379	2075	2371	2055	2348	1991	2275	1886	2155

REGULATOR SIZE: 6”

Setting flow rate: 50 SCMH

OUTLET PRESSURE SETTING (mbar / DROOP (%)

	10		17.5		20		27.5		50		86	
	10%	20%	10%	20%	10%	20%	10%	20%	10%	20%	10%	20%
Pin mbar												
15	534	610	-	-	-	-	-	-	-	-	-	-
20	757	865	414	473	-	-	-	-	-	-	-	-
25	928	1061	677	773	534	611	-	-	-	-	-	-
35	1190	1360	1072	1225	928	1061	677	773	-	-	-	-
53	1525	1742	1310	1500	1300	1450	1190	1360	413	472	-	-
70	1885	2154	1767	2019	1725	1971	1593	1821	1099	1256	-	-
105	2392	2734	2300	2628	2268	2592	2169	2479	1837	2099	1117	1277
140	2821	3224	2743	3134	2716	3104	2635	3011	2369	2707	1867	2134
210	3555	4062	3493	3992	3472	3968	3408	3895	3207	3666	2859	3267
350	4777	5459	4731	5407	4716	5390	4669	5336	4524	5170	4286	4898

The tests on the previous page are performed with the regulator set at a constant inlet pressure, a predetermined flow rate and the required outlet pressure. The flow rate is then increased whilst keeping the inlet pressure constant. The capacities are recorded when the outlet pressure has fallen by 10% and 20% from the set point.

The capacities on the previous page are given in SCMH of natural gas (0.64 SG).
For other gases multiply the capacity by:

$$\sqrt{\frac{0.64}{\text{gas sg}}}$$

GAS	SG
Air	1.00
Towns Gas	0.50
Propane	1.53
Propane / Air	1.20

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J48 LOW PRESSURE REGULATOR

FULL OPEN CAPACITY

All capacities in SCMH 0.64 s.g.

REGULATOR SIZE: ¾” “K” Factor = 0.174

	OUTLET PRESSURE (mbar)				
	10	17.5	20	28	50
Pin mbar					
15	18	-	-	-	-
20	25	13	-	-	-
25	31	22	18	-	-
35	40	33	31	22	-
53	52	48	46	40	14
70	62	58	57	52	36
105	79	76	74	71	60
140	93	90	89	87	78
210	117	115	114	112	105
350	157	155	155	153	149

REGULATOR SIZE: 1” “K” Factor = 0.235

	OUTLET PRESSURE (mbar)				
	10	17.5	20	28	50
Pin mbar					
15	24	-	-	-	-
20	34	17	-	-	-
25	41	29	24	-	-
35	53	45	42	29	-
53	70	64	62	54	19
70	84	78	76	71	49
105	106	102	100	96	81
140	125	122	120	117	105
210	157	155	154	151	142
350	212	210	209	207	200

REGULATOR SIZE: 1¼” “K” Factor = 0.437

	OUTLET PRESSURE (mbar)				
	10	17.5	20	28	50
Pin mbar					
15	44	-	-	-	-
20	63	31	-	-	-
25	77	54	45	-	-
35	100	83	77	5	-
53	131	119	115	101	35
70	156	146	142	131	91
105	197	190	187	179	152
140	233	226	224	217	195
210	293	288	286	281	265
350	394	390	389	385	373

REGULATOR SIZE: 1½” “K” Factor = 0.477

	OUTLET PRESSURE (mbar)				
	10	17.5	20	28	50
Pin mbar					
15	48	-	-	-	-
20	68	34	-	-	-
25	84	59	49	-	-
35	109	91	84	60	-
53	143	130	126	111	38
70	170	159	155	143	99
105	215	207	204	195	165
140	254	247	244	237	213
210	320	314	313	307	289
350	430	426	424	420	407

REGULATOR SIZE: 2” “K” Factor = 0.856

	OUTLET PRESSURE (mbar)				
	10	17.5	20	28	50
Pin mbar					
15	87	-	-	-	-
20	123	61	-	-	-
25	151	107	87	-	-
35	195	163	151	107	-
53	257	234	225	198	68
70	304	285	278	257	17
105	386	371	366	350	297
140	455	443	438	425	382
210	574	564	560	550	518
350	771	764	761	754	730

REGULATOR SIZE: 2½” “K” Factor = 1.894

	OUTLET PRESSURE (mbar)				
	10	17.5	20	28	50
Pin mbar					
15	192	-	-	-	-
20	272	136	-	-	-
25	333	236	193	-	-
35	431	361	335	237	-
53	568	517	499	439	151
70	673	631	616	569	392
105	854	821	810	775	656
140	1007	980	970	941	846
210	1270	1248	1240	1217	1146
350	1706	1684	1684	1668	1616

J48 LOW PRESSURE REGULATOR

All capacities in SCMH 0.64 s.g.

REGULATOR SIZE: 3" "K" Factor = 2.083

	OUTLET PRESSURE (mbar)				
	10	17.5	20	28	50
Pin mbar					
15	211	-	-	-	-
20	299	150	-	-	-
25	366	260	212	-	-
35	474	397	368	261	-
53	624	568	548	483	167
70	741	694	678	626	432
105	940	903	891	852	722
140	1108	1078	1067	1035	930
210	1396	1372	1364	1339	1260
350	1877	1859	1853	1834	1777

REGULATOR SIZE: 4" "K" Factor = 3.333

	OUTLET PRESSURE (mbar)				
	10	17.5	20	28	50
Pin mbar					
15	338	-	-	-	-
20	478	239	-	-	-
25	586	415	339	-	-
35	759	636	589	417	-
53	999	909	877	773	266
70	1185	1110	1084	1001	691
105	1503	1445	1425	1363	1155
140	1773	1724	1707	1656	1489
210	2234	2196	2183	2143	2016
350	3003	2974	2964	2935	2844

REGULATOR SIZE: 6" "K" Factor = 7.575

	OUTLET PRESSURE (mbar)				
	10	17.5	20	28	50
Pin mbar					
15	767	-	-	-	-
20	1086	544	-	-	-
25	1332	944	771	-	-
35	1724	1445	1339	948	-
53	2271	2067	1994	1756	605
70	2693	2524	2464	2276	1570
105	3417	3285	3240	3099	2624
140	4030	3918	3880	3764	3384
210	5078	4990	4960	4869	4582
350	6824	6759	6737	6670	6463

GAS	SG
Air	1.00
Towns Gas	0.50
Propane	1.53
Propane / Air	1.20

The above capacities are for natural gas (0.64 SG).
For other gases multiply the capacity by:

$$\sqrt{\frac{0.64}{\text{gas sg}}}$$

The tables above were produced by physically holding the regulator fully open, setting the inlet and outlet pressures to the values stated in the tables and then recording the flow rate.

If the tables above do not provide sufficient information a formula is provided to calculate the fully open capacity for all sizes of regulator at any pressure drop. It is not possible to provide formula for calculating the regulating capacity as this data relates to a dynamic condition which can only be provided by actual test. Regulating capacity tables are available on another data sheet.

The full open formula is: $Q = K\sqrt{(Pi^2 - Po^2)}$

Where:
- Q = Flow rate corrected to standard pressure and temperature conditions (SCMH).
- Pi = Inlet Pressure (mbar absolute units)
- Po = Outlet Pressure (mbar absolute units)
- K = Flow constant for each size of regulator (see table).

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FULL OPEN CAPACITY

All capacities in SCMH 0.64 sg

FLOW RATE VERSUS PRESSURE DROP

For the data below the regulator was physically held open. With the outlet pressure at atmospheric the listed full open capacities were set through and the pressure drop recorded.

PRESSURE DROP (mbar)

Size / FLOWRATE (SCMH)	¾"	1"	1¼"	1½"	2"	2½"	3"	4"	6"
"K" Factor	0.174	0.235	0.437	0.477	0.856	1.894	2.083	3.333	7.575
5	0.41	0.22	0.06	0.05	0.02	-	-	-	-
10	1.63	0.89	0.26	0.22	0.07	0.01	0.01	-	-
20	6.49	3.57	1.03	0.87	0.27	0.06	0.05	0.02	-
30	14.54	8.01	2.32	1.95	0.61	0.12	0.10	0.04	-
40	25.70	14.20	4.12	3.46	1.08	0.22	0.18	0.07	0.01
60	-	31.69	9.24	7.77	2.42	0.50	0.41	0.16	0.03
80	-	-	16.37	13.77	4.30	0.88	0.73	0.28	0.06
100	-	-	25.47	21.43	6.71	1.37	1.14	0.44	0.09
120	-	-	-	30.73	9.65	1.98	1.64	0.64	0.12
140	-	-	-	-	13.11	2.69	2.23	0.87	0.17
160	-	-	-	-	17.10	3.52	2.91	1.14	0.22
180	-	-	-	-	21.59	4.45	3.68	1.44	0.28
200	-	-	-	-	26.59	5.49	4.54	1.77	0.34
250	-	-	-	-	-	8.56	7.08	2.77	0.54
300	-	-	-	-	-	12.31	10.18	3.99	0.77
350	-	-	-	-	-	16.71	13.83	5.43	1.05
400	-	-	-	-	-	21.78	18.03	7.08	1.37
450	-	-	-	-	-	27.48	22.77	8.95	1.74
500	-	-	-	-	-	-	28.03	11.04	2.15
550	-	-	-	-	-	-	-	13.35	2.60
600						-	-	15.86	3.09
700						-	-	21.53	4.20
800						-	-	28.04	5.49

PRESSURE DROP VERSUS FLOW RATE

For the data below the regulator was physically held open. With the outlet pressure at atmospheric the listed pressure drops were set through and the full open capacities recorded.

CAPACITY (SCMH)

Size / PRESSURE DROP (SCMH)	¾"	1"	1¼"	1½"	2"	2½"	3"	4"	6"
"K" Factor	0.174	0.235	0.437	0.477	0.856	1.894	2.083	3.333	7.575
1.0	7.8	10.6	19.7	21.5	38.5	85.3	93.8	150.1	341.1
3.0	13.6	18.3	34.1	37.5	66.8	147.8	162.6	260.1	591.1
5.0	17.6	23.7	44.1	48.1	86.3	190.9	210.0	335.9	763.5
8.0	22.2	30.0	55.8	60.9	109.2	241.6	265.8	425.3	966.5
10.0	24.9	33.5	62.4	68.1	122.2	270.3	297.3	475.7	1081.1
15.0	30.5	41.1	76.6	83.5	149.8	331.4	364.6	583.3	1325.7
20.0	35.2	47.5	88.5	96.6	173.2	383.2	421.5	674.4	1532.6
30.0	43.3	58.4	108.7	118.6	212.6	470.4	517.5	827.9	1881.7
40.0	50.1	67.6	125.8	137.2	246.1	544.5	599.0	958.3	2178.0

The above capacities are for natural gas (0.64 SG).
For other gases multiply the capacity by:

$$\sqrt{\frac{0.64}{\text{gas sg}}}$$

GAS	SG
Air	1.00
Towns Gas	0.50
Propane	1.53
Propane / Air	1.20

If the tables above do not provide sufficient information a formula is provided to calculate the fully open capacity for all sizes of regulator at any pressure drop. It is not possible to provide formula for calculating the regulating capacity as this data relates to a dynamic condition which can only be provided by actual test. Regulating capacity tables are available on another data sheet.

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Where:
- Q = Flow rate corrected to standard pressure and temperature conditions (SCMH).
- Pi = Inlet Pressure (mbar absolute units)
- Po = Outlet Pressure (mbar absolute units)
- K = Flow constant for each size of regulator (see table).

PRESSURE DROP
The natural loss of pressure from the inlet to the outlet of a regulator due to friction in the full open condition.

PRESSURE DIFFERENTIAL
The difference between the working inlet pressure to a regulator and the working outlet pressure from a regulator.

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