Installation Instructions

Limit Rods and Control Rods

1. Assemble expansion joint between pipe flanges in its manufactured face-to-face length.

2. Assemble control rod plates behind pipe flanges as shown in figures 1, 2 or 3. Flange bolts or all-thread studs through the control rod plate must be longer to accommodate the plate thickness. Control rod plates should be equally spaced around the flange. Depending upon the size and pressure rating of the system, 2, 3, 4, or more control/limit rods may be required. Refer to Maximum Surge or Test Pressure Table or to the Fluid Sealing Association's Technical Handbook for control rod pressure ratings.

3. Insert control/limit rods through top plate holes. Steel flat washers are to be positioned at outer plate surface.

4. If a single nut per unit is furnished, position this nut so that there is a gap between the nut and the steel flat washer. This gap is equal to the joint's maximum extension (commencing with the nominal face-to-face length) for anchored systems. To lock this nut in position, either "stake" the thread in two places or tack weld the nut to the rod. If two nuts are supplied, the nuts will create a "jamming" effect to prevent loosening. (Nuts should be snug against the flat washer and control rod plate when piping system is un-anchored.)

Note: Consult the manufacturer if there are any questions as to the rated compression and elongation. These two dimensions are critical in setting the nuts and sizing the compression pipe sleeve (if supplied).

5. If there is a requirement for compression pipe sleeve, an ordinary pipe may be used, sized in length to allow the joint to be compressed to its normal limit.

6. If there is a requirement for optional spherical washers, these washers are to be positioned at the inner and/or outer plate surface and backed up by movable double nuts.

Maximum Surge or Test Pressure of the System

Nominal Pipe Size Expansion Joint I.D. Inch /(mm)		Number of Control Rods Recommended			
		2	4	6	8
2	(51)	661	•	•	•
4	(102)	311	622	•	•
6	(152)	186	371	•	•
8	(203)	163	326	•	•
10	(254)	163	325	488	•
12	(305)	160	320	481	•
14	(356)	112	223	335	•
16	(406)	113	227	340	453
18	(457)	94	187	281	375
20	(508)	79	158	236	315
22	(559)	85	171	256	342
24	(610)	74	147	221	294
26	(660)	62	124	186	248
28	(711)	65	130	195	261
30	(762)	70	141	211	281
32	(813)	63	125	188	251
34	(864)	72	143	215	286
36	(914)	69	138	207	276
38	(965)	63	125	188	251
40	(1016)	42	85	127	169
42	(1067)	48	96	144	192
44	(1118)	44	88	133	177
46	(1168)	41	82	122	163
48	(1219)	40	81	141	161
50	(1270)	37	75	112	150
52	(1321)	35	70	105	140
54	(1372)	43	86	128	171
56	(1422)	40	80	120	160
58	(1473)	38	75	113	150
60	(1524)	35	71	106	141
62	(1575)	33	66	100	133
66	(1676)	30	59	89	119
72	(1829)	25	50	75	101
78	(1981)	28	56	84	112
84	(2134)	24	49	73	98
90	(2286)	26	53	79	106
98	(2489)	29	58	86	115
102	(2591)	25	51	76	102
108	(2743)	23	46	75	92
120	(3048)	18	37	56	75

Note:
Pressures listed in Table 1 do not relate to the actual design pressure of the expansion joint products, but are the maximum surge or test pressure for a specific control rod nominal pipe size.

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Use of Control Units with Rubber Expansion Joints

Definition

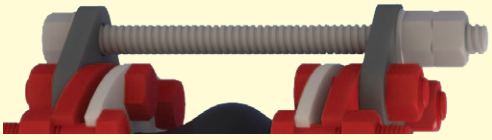
A control unit assembly is a system of two or more control rod units (limit rods, tie rods or compression sleeves) placed across an expansion joint from flange to flange to minimize possible damage caused by excessive motion of a pipeline. The control unit assemblies can be set at the maximum allowable expansion and/or contraction of the rubber expansion joint. When used in this manner, control units are an additional safety factor and can minimize possible damage to adjacent equipment.

Rubber expansion joints should be installed between two fixed anchor points in a piping system. The pipe system must be rigidly anchored on both sides of the expansion joint to control expansion or contraction of the line. Piping anchors must be capable of withstanding the line thrusts generated by internal pressure or wide temperature fluctuations.

When proper anchoring cannot be provided, **CONTROL UNITS ARE REQUIRED**. For un-anchored piping systems nuts shall be tightened snug against rod plate to prevent over-extension due to pressure thrust created by expansion joint. Please also see Maximum Surge or Test Pressure Table for number of control rods recommended based on maximum surge or test pressure of the system.

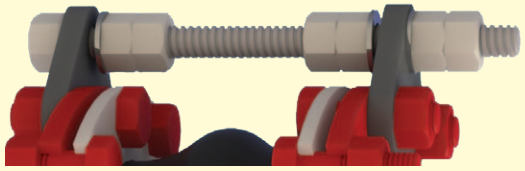
Listed are three (3) control unit configurations supplied by PROCO and are commonly used with rubber expansion joints in piping systems.

Figure 1



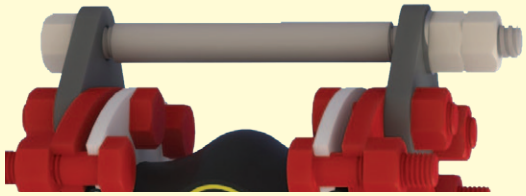
Known as a **LIMIT ROD**, this control unit configuration will allow an expansion joint to extend to a predetermined extension setting. Nuts shall be field-set to no more than the maximum allowable extension movement of a rubber expansion joint (unless used in an un-anchored system). Spherical washers can also be furnished (upon request) to combat any "nut-to-plate" binding during offset. ***Consult the systems engineer for proper nut settings prior to system operation.***

Figure 2



Known as a **LIMIT/ CONTROL ROD**, this control unit configuration is used to allow specified pipe expansion (expansion joint axial compression) and pipe contraction (expansion joint axial extension) movements. Nuts shall be field set to no more than the maximum allowable extension (unless used in an un-anchored pipe system) or compression of a rubber expansion joint. Internal and external nuts can also be field-set to allow for no movement in the horizontal plane. This setting will allow the rubber to move laterally while keeping expansion joint thrust forces low on adjacent equipment. Spherical washers can also be furnished (upon request) to combat any potential "nut-to-plate" binding during offset. ***Limit/Control rods with internal nuts must be specified at the time of inquiry. Consult the systems engineer for proper nut settings prior to system operation.***

Figure 3



Known as a **COMPRESSION SLEEVE**, this configuration is used to allow for specified pipe expansion (expansion joint axial compression) and pipe contraction (expansion joint extension) movements. Nuts shall be field-set to no more than the maximum allowable extension (unless used in an un-anchored pipe system) of a rubber expansion joint. PROCO will manufacture each compression sleeve to allow for no axial movement unless otherwise specified by the purchaser. Compression sleeves shall be field-trimmed to meet required allowable axial movement as set forth by system requirements. Spherical washers can also be furnished (upon request) to combat any potential "nut-to-plate" binding during offset. ***Consult the systems engineer for proper sleeve lengths prior to system operation.***

Important Control Unit Considerations

The number of rods, control rod diameters and control rod plate thicknesses are important considerations when specifying control units for an application. As a minimum, specifying engineers or purchasers shall follow the guidelines as set forth in Appendix C of the Fluid Sealing Association's Technical Handbook. PROCO engineers its control unit assemblies to system requirements. Our designs incorporate an allowable stress of 65% of material yield for each rod and plate (rod and plate material to be specified by purchaser). Therefore, it is important to provide pressure and temperature ratings to PROCO when requesting control units for rubber expansion joints. It is also important to provide adjacent mating flange thickness or mating specifications to ensure correct rod lengths are provided.

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