

TECHNICAL APPENDIX

Pneumatic Clamping Technology

End position sensing of pneumatic clamps for automated production.



Model 807-S with 2 integral groove mounted sensors (order separately)

Exerting Force vs. Holding Capacity

Due to the nature of the toggle action within the clamping mechanism combined with the line pressure of the cylinder, care should be taken in setting up Pneumatic Toggle Clamps.

The clamping force of a given pneumatic toggle clamp is determined by two factors - adjustment of the clamping spindle and the line pressure in the cylinder. If the line pressure remains constant, then the clamping force is solely determined by the vertical adjustment of the spindle. If the spindle is improperly adjusted, the clamp is capable of creating a clamping force that exceeds the rated holding capacity.

As a result of this condition care must be taken by properly adjusting the spindle OR by regulating the inlet pressure to the cylinder in order to insure the clamp does not exert a force higher than it's rated holding capacity.

Please consult the table and formulae on the next page. The Max M.A. is the highest mechanical advantage the clamp can create at the optimum spindle height while still toggle-locking.

Remote control and end position sensing

A particularly interesting advantage of DESTACO power clamps is the fact that they may be mounted on rather inaccessible places of clamping fixtures and they may be operated simultaneously while being controlled by a control valve. Power clamps with an end position sensing system allow fully automated operation with in controlled manufacturing processes.

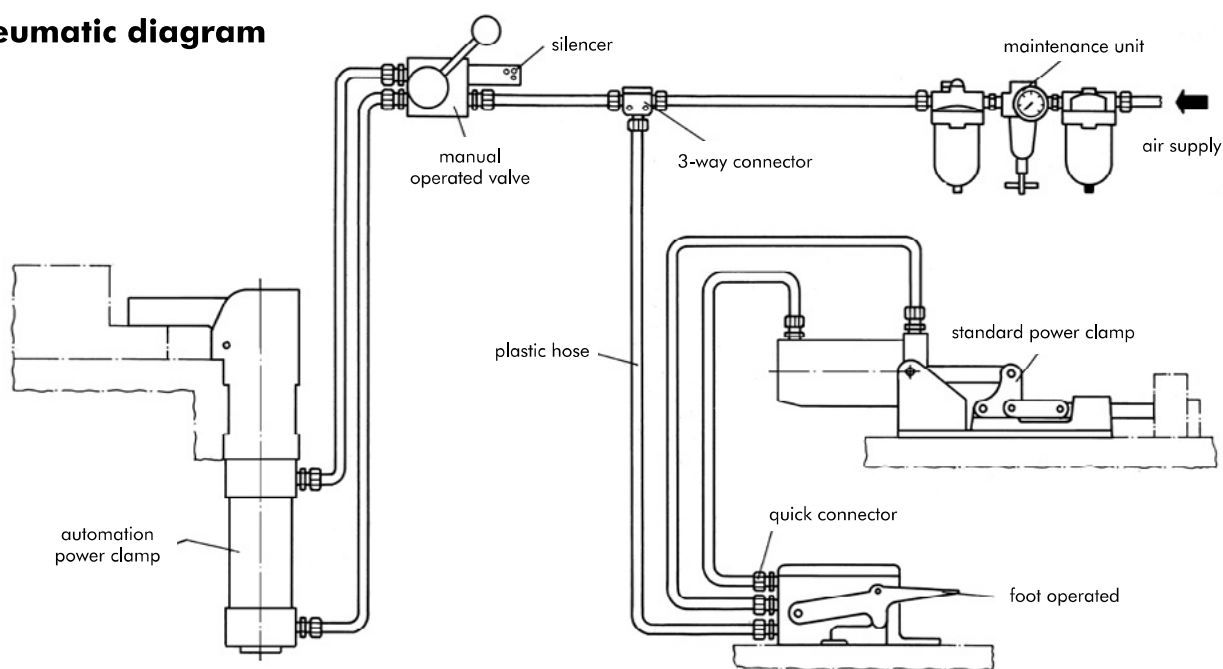
Safety

DESTACO power clamps are based on the toggle action principle (exceptions will be mentioned separately) and offer the same safety advantages as DESTACO manual clamps: no risk of accidental opening of the clamp arm - even in case of a sudden pressure drop.

The toggle action principle with over-center locking guarantees safety during operation and protects the parts from damage. (Provided that the power clamps are mounted correctly and the air supply is reliable.)

Note: Most pneumatic products are now supplied with a magnetic ring on the piston as a standard feature for sensing the position of the cylinder (open/closed).

Pneumatic diagram



Dimensions and technical information are subject to change without notice

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Specifications

Model no.	Cylinder Bore		Rod Diameter		Cylinder Area (Clamping Stroke)		Cylinder Area (Opening Stroke)		Max. Mechanical Advantage (M.A.)		Distance From Pivot				Holding Capacity				Max Inlet Pressure at Max M.A*				Max. Clamping Force at 5 bar [72 psij]			
											A		B		A		B		A		B		A		B	
	(in)	(mm)	(in)	(mm)	(in ²)	(mm ²)	(in ²)	(mm ²)	A	B	(in)	(mm)	(in)	(mm)	(lbf.)	(N)	(lbf.)	(N)	(PSIG)	(bar)	(PSIG)	(bar)	(lbf.)	(N)	(lbf.)	(N)

Hold DownClamps

802-U	1.26	32	0.47	12	1.25	804	1.07	691	5.0	2.6	1.25	31.8	2.25	57.2	200	890	110	489	32	2.2	34	2.3	450	2010	234	1045
807-S	1.26	32	0.47	12	1.25	804	1.07	691	6.0	2.0	2.00	50.8	5.00	127.0	500	2220	260	1160	67	4.6	104	7.2	540	2412	180	804
807-U	1.26	32	0.47	12	1.25	804	1.07	691	6.4	3.3	2.00	50.8	3.75	95.3	375	1670	275	1220	47	3.2	67	4.6	576	2573	297	1327
810-S	1.57	40	0.63	16.0	1.95	1257	1.64	1056	5.0	2.9	2.38	60.5	5.31	134.9	750	3340	500	2220	77	5.3	89	6.1	702	3143	407	1823
810-U	1.57	40	0.63	16.0	1.95	1257	1.64	1056	6.1	2.9	2.38	60.3	4.88	123.8	600	2670	290	1290	50	3.5	51	3.5	856	3834	407	1823
812-U	0.75	19	0.25	6.4	0.4	258	0.39	253	4.3	2.9	1.25	31.8	2.25	57.2	100	440	55	245	53	3.6	43	3.0	136	613	92	413
846	1.57	40	0.63	16.0	1.95	1257	1.64	1056	5.6	3.5	2.25	57.2	3.25	82.6	750	3340	520	2310	69	4.7	76	5.3	786	3520	491	2200
847-S	2.05	50	0.63	16.0	3.29	2124	2.98	1923	4.0	1.8	3.25	82.6	6.50	165.1	1000	1118	650	2890	76	5.2	110	7.6	948	4248	426	1912
847-U	2.05	50	0.63	16.0	3.29	2124	2.98	1923	4.0	1.9	3.25	82.6	6.25	158.8	1000	4450	480	2135	76	5.2	77	5.3	948	4248	450	2018
858	2.48	63	0.98	25.0	4.83	3117	4.07	2626	4.4	2.3	3.00	76.2	7.00	177.8	4000	17800	2000	8900	145**	10.0**	145**	10.0**	1530	6857	800	3585
8021	1.26	32	0.47	12.0	1.07	691	1.25	8.4	2.2	1.3	1.70	43.2	2.60	66.0	390	1735	255	1135	145**	10.0**	145**	10.0**	169	760	100	449
8071	1.57	40	0.63	16.0	1.64	1056	1.95	1257	4.2	2.4	2.25	57.2	3.25	82.6	450	2000	310	1380	65	4.5	79	5.4	496	2218	283	1267
8101	2.05	50	0.63	16.0	2.98	1923	3.29	2124	2.3	1.2	2.35	59.7	4.45	113.0	700	3110	370	1645	103	7.1	105	7.3	491	2202	253	1135
817-S	1.26	32	0.47	12.0	1.25	804	1.07	691	4	2.25	2.75	69.9	4.94	125.5	450	2000	200	890	90	6.2	64	4.4	360	1608	225	1005
817-U	1.26	32	0.47	12.0	1.25	804	1.07	691	4.1	2.5	2.75	69.9	5.00	127.0	375	1670	200	890	73	5.1	64	4.4	369	1648	225	1005
827-S	1.57	40	0.63	16.0	1.95	1257	1.64	1056	3.5	2	2.50	63.5	5.30	134.6	700	3110	330	1470	103	7.1	85	5.8	491	2200	281	1257
827-U	1.57	40	0.63	16.0	1.95	1257	1.64	1026	3.5	2.2	2.13	54.1	3.25	82.6	600	2670	390	1735	88	6.1	91	6.3	491	2200	309	1383
868	2.48	63	0.98	25.0	4.83	3117	4.07	2626	4.9	2.3	5.00	127.0	8.25	209.6	4000	17800	2400	10675	145**	10.0**	145**	10.0**	1704	7637	800	3585

Model no.	Cylinder Bore		Rod Diameter		Cylinder Area (Clamping Stroke)		Cylinder Area (Opening Stroke)		Max. Mechanical Advantage (M.A.)	Holding Capacity				Max Inlet Pressure at Max M.A			
	(in)	(mm)	(in)	(mm)	(in ²)	(mm ²)	(in ²)	(mm ²)		(lbf.)	(N)	(PSIG)	(bar)	(lbf.)	(N)	(PSIG)	(bar)

Straight Line Action Clamps

803	1.26	32.0	0.47	12.0	1.25	804	1.07	691.2	7.5					600	2670	64	4.4	675	3015
816	0.75	19.1	0.25	6.4	0.44	285	0.39	253.4	7.7					100	400	30	2.0	244	1097
830	1.57	40.0	0.63	16.0	1.95	1257	1.64	1055.6	5.7					2500	11100	145**	10.0**	800	3582
850	2.05	52.0	0.63	16.0	3.29	2124	2.98	1922.7	5.2					16000	71200	145**	10.0**	1232	5522
8031	1.13	28.6	0.38	9.5	0.99	641	0.88	570.0	10.25					2000	890	145**	10.0**	731	3285

* Maximum cylinder pressure is 145 PSIG (10 bar). Never exceed this value

**Maximum inlet pressure in conjunction with maximum mechanical advantage does not exceed holding capacity. Do not exceed maximum cylinder pressure

Formula for calculating maximum allowable inlet pressure:

$$\text{Maximum Line Pressure} = \text{Holding Capacity} \div (\text{Cylinder Area} \times \text{Mechanical Advantage})$$

Formula for calculating max. exerting force:

$$\text{Exerting Force} = \text{Inlet Pressure} \times \text{Mechanical Advantage} \times \text{Cylinder Area}$$

Example for Model 830

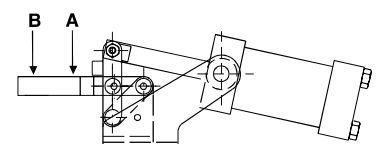
Holding Capacity = 11100N [2500lbf.]

Inlet Pressure 5bar (0,5 N/mm²) [72psig]

Cylinder Area = 1257mm² [1.95in²]

Maximum Line Pressure = 11100 ÷ (1257 X 5.7) = 1,5 N/mm² = 15bar

NOTE: This exceeds the maximum allowable cylinder pressure of 10bar



Spindle position to determine mechanical advantage.

