PERMADUR INDUSTRIES

Computer Controlled Printing Machinery

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Hot stamping Heat Transfer Pressure.Sensitive

WHY SHOULD YOU BUY AN ELECTRIC SERVO OPERATED PRESS ?
PROS AND CONS

REASONS THAT YOU ***SHOULD NOT*** BUY AN ELECTRIC SERVO OPERATED PRESS:

1. It's more expensive to buy than an air operated press.
2. Your set-up people have enough trouble with the air operated presses that you have, you can only imagine the mess they can make with a computer controlled electric servo press.
3. You don't have anybody on staff who could understand the electronics in the machine, what if something breaks down.
4. You're probably going to have to learn some crazy programming techniques just to use the press.
5. What if you need parts - these machines probably use all custom controls and parts that take weeks to get.

REASONS THAT YOU ***SHOULD*** BUY AN ELECTRIC SERVO OPERATED PRESS:

1. It is less expensive to operate an electric press than an air operated press. That's part of why most of the newer injection molding machines are servo driven, even the really big ones. The compressed air supply in your shop may already be near maximum, you might have to buy a new compressor to accommodate the air demands of another machine. You may already have a problem with water in your air lines and unless you spend a lot of money on an after-cooler that will only get worse. Conservative calculations show that for the same force as an air operated press a servo operated press will use 58 % less energy*. If you use the press only 10 shifts a week, the difference in energy savings will offset the higher initial cost in a few years. That's going to make it a lot easier to convince the accounting department that this is good purchase especially with energy prices rising rapidly.
2. Even some of the best set-up people sometimes have trouble setting up an air operated press, even when it's a repeat job. With a servo press you can really record the set-up parameters so that you can return to the exact same settings when the job is

set up again. You may have tried writing down pneumatic flow control settings and regulator pressures but it wasn't enough. You still can't get the air operated machines to set-up the exact same way twice in a row. With the Permadur Servo operated machines ability to save all of the set-up parameters of a job that's not a problem. The machine can recall set-ups months later. Now you can be sure that you will get back to the exact same point. Even the exact stroke lengths and pressure at the die are saved so you don't have to worry about table height settings, pneumatic cylinder stop settings, valve flow control settings and special timers. Less skilled technicians can handle that kind of set-up which is going to give you a lot more flexibility and consistency in scheduling. In reality, the servo controls make set-up and change over much easier and take a lot of the "black magic" out of hot stamping or heat transfer set-up.

3. All of the Permadur machines come with an extensive documentation package and built in fault reporting on the front panel display. If the display were to fail there's an additional fault code display on the main controller. Just like some of the other equipment that you use in your shop, you don't have to understand all of the technical details of servo controls. Permadur is the expert in that and builds their experience into all of the machines. Permadur engineers have been building servo operated hot stamping machines since 1982.
4. When you saw a Permadur press in action you were probably amazed by how easy it is to change the stroke lengths, dwell times, pressures and all other parameters from the built in display. The force sensing mode is really impressive. You can print flat parts directly on the work table with very clean results using just 80 lbs of pressure. then put a 1/2 inch thick block under the part and with no adjustment to the press print the exact same clean, clear quality !
5. A servo operated press has no more moving parts than an air operated press. The head drive system is simply a lead screw with a ball-nut on it connected to the servo motor at one end with the ball-nut connected to the moving portion of the head. The electronics used in the Permadur machines are off the shelf components. Permadur always has spare parts in stock and if we don't want to buy parts from Permadur you can buy them from direct from source. The lead screw and linear components are also all off the shelf parts from Warner and Tomson. Replacement linear components are all available from the Grainger or McMaster catalogs.

Energy Calculations
2 Ton Direct Acting Air Operated Press
vs
2 Ton All Electric Servo Operated Press

Calculation data:

Stroke Length	2.00 inches
Pressure	4000 lbs
Dwell time	.5 seconds
Cycle Rate	20 cycles per minute
Operating	80 hours production per week
Energy cost	$ .12 per kilowatt hour

Air Operated:

Cylinder Diameter required at 90 psi	7.5 inches
Area of Cylinder	44 sq inches
Volume of compressed air used for one stroke.	
Down-stroke	88 cu in
Up-stroke	88 cu in
Total	176 cu in for one cycle down and up
Volume of compressed air used in one minute at 20 cycles per minute	3520 cu in/minute at 90 psi (2.03 cu ft/minute at 90 psi)
Minimum compressor size required running continuous operation with typical efficiency rating and allowing for normal line pressure drop.	3.0 hp
Compressor operating cost per hour (hp)(.7457)(power rate)(hours)/efficiency (3.0)(.7457)($.12)(1)/(.80)	$ .335 /hour
Annual operating cost without any maintenance allowance based on 90 hours per week operation. (.335)(90)(52)=	$ 1,567.80 / Year

Servo Operated:

Torque required on .100 pitch lead screw to develop 4000 lb pressure with 5 : 1 drive reduction	14.14 lb/in

Torque required on .100 pitch lead screw to lift or lower 40 lb head weight	1.4 lb/in
Typical servo motor torque constant	4.78 lb/in/amp

Power consumption per cycle at 110 vac, 80% efficiency

Total cycle time at 20 cycles/min	3 seconds
Power consumption for compressive (dwell) phase lasting .5 seconds	
14.14/4.78 = amps	2.95 amps at dwell
amps * volts = watts	324 watts at dwell
watts * seconds / 3600 = kwhr	.045 kwhr
kwhr * .12 = power cost	$.0054 each compressive dwell
Power consumption for up/down and holding torque during non compressive phases lasting 2.5 seconds	
1.4/4.78=amps	.292
amps*volts=watts	32.12
watts*seconds / 3600=kwhr	.022
kwhr * .12 = power cost	$.0026 non compressive phase
Total energy cost for one complete 3 second cycle	$.008
Operating cost per hour	
20 cpm * $.008	$.16 per hour
Annual operating cost at 80 hours per week production time.	
80 * (52) * $ .16	$ 665.60

Conclusion:

Annual air cost (without any maintenance)*	$ 1567.80
Annual servo cost (no maintenance required)	$ 665.60
Net Savings by using Servo	**$ 902.30 / year**

*air costs do not include initial equipment expenditures, after cooler costs, compressor oil changes routine compressor maintenance and any pneumatic maintenance costs on the press itself.