

# Clippard Cannons?

(An alternative to KIP solenoids)

by **Brian P. Koehler**

Submitted to TF144:

February 11, 2005



Being a cruiser captain, weight has

ALWAYS been a premium concern for all the components of my ships. This was especially true when I was rebuilding the HMS Ajax, one of the three Leander class light cruiser hulls originally built by Bart Purvis. I had (with great help from Charley Stephens) installed push buttons on my radio for cannon firing but was not totally satisfied with the response of the servos. I wanted to try using solenoids but was afraid the weight of the KIPS would be too much for such a small cruiser.

That was when I noticed the system Rob Stalnaker was testing in his DKM Tirpitz using Clippard solenoids. These solenoids are small and light but can only tolerate 100 psi maximum pressure. To avoid having to fire the cannons at a lower pressure, he used these only as “triggers” for activating Clippard PAV’s (pressure-activated valves), which were connected directly to the 150 psi main CO<sub>2</sub> line and were what actually fired the cannons (see the Figure 1).

Using small double-threaded connectors and a few 90° elbows I was able to join two solenoid-PAV systems into a small, compact block (see Photo 1). The 150 psi main is the large tubing in the middle, which splits and supplies the two PAV’s in the center. The two black solenoids

at the left are supplied by a sideline, which is dropped to 50-80 psi by an additional small regulator (also sold by Clippard). These were directly connected to the low-pressure “trigger” ports of the PAV’s using small adaptors that were threaded on both ends. The result was a small, compact unit that could fit even under the motors of the Ajax (see Photo 2).

I have been very happy with the solenoids so far. I like that the

solenoids are stock inventory items that do not require a special group order. Also, because these solenoids separate from their manifolds, they can be cleaned or replaced without having to disconnect any CO<sub>2</sub> plumping. The only disadvantage I have seen was that since I fire my sterns individually, and hence need two solenoids, the result was only slightly lighter than straight KIPs (a typical “dual” stern cruiser would save more weight). It did, at least,

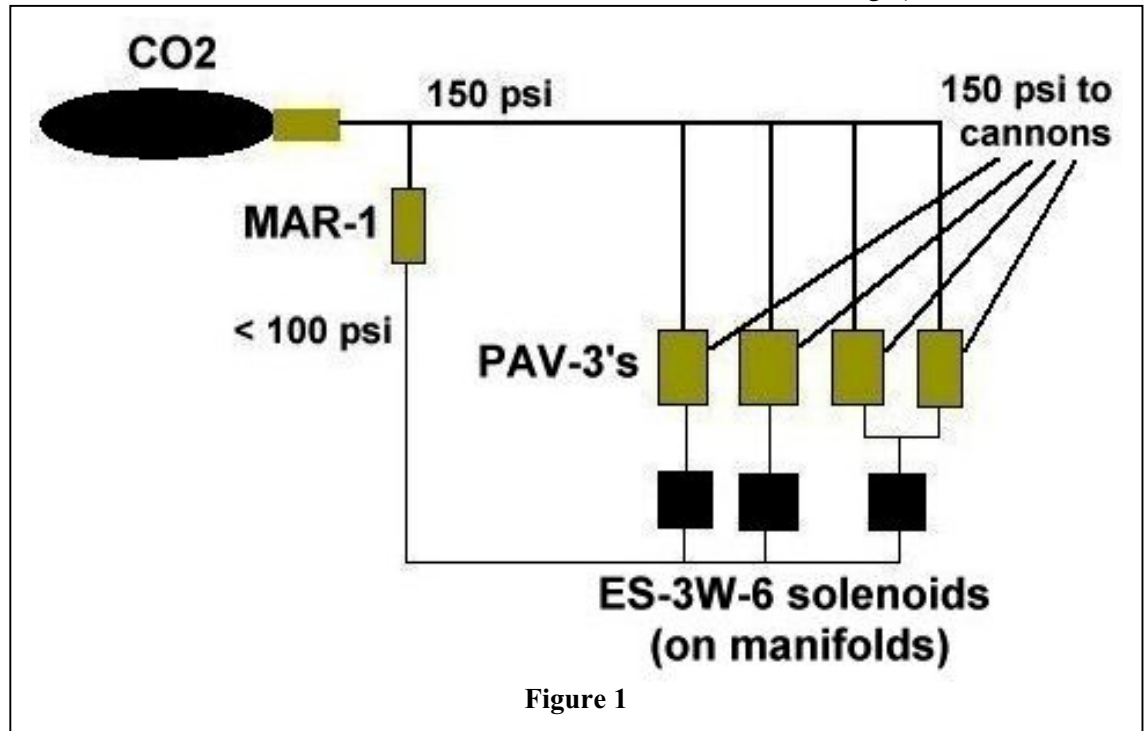


Figure 1

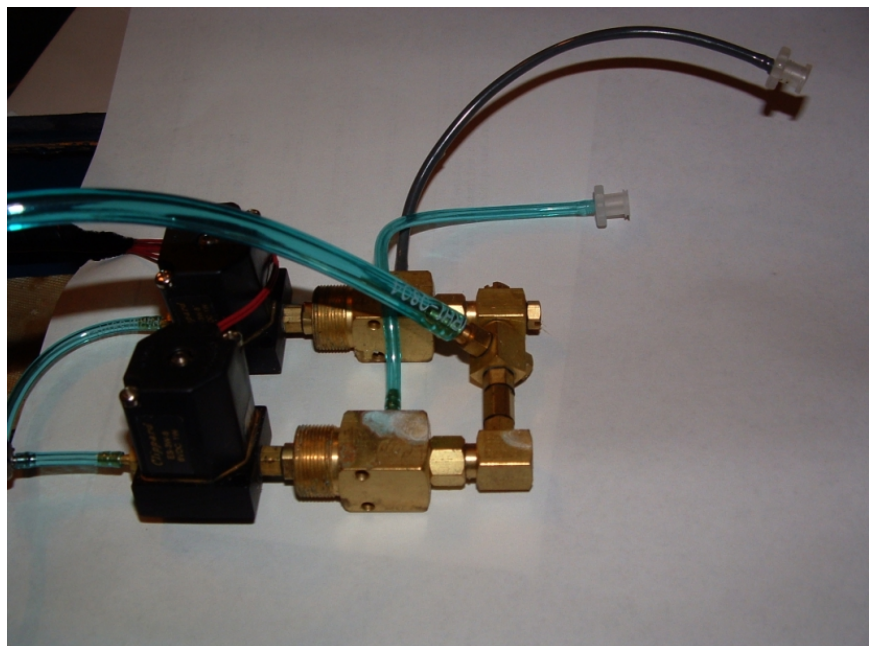


Photo 1

allow me to spread the weight around the ship a little (the extra 100 psi regulator is in the front).

For reference and comparison below is a table listing the components weights for the various cannon system options and also part numbers for the Clippard components. As you can see, the traditional servo/MAV combination is still the cheapest and lightest option (and probably the best recommendation for new captains). Also, I should note that standard servos with MAV poppet valves actually CAN be made to fire about as quickly as the solenoids if all the sources of “free play” and “flex” is removed (I later reworked Christopher’s USS Chester and am very pleased with the results). So to “sum it all up,” I don’t think old ships need to have all their cannons ripped out and replaced with solenoids to be competitive, but if you are building a new ship and plan on using solenoids, it is good to know the details of both options. I have included the total weights for a sample cannon configuration of a



Photo 2

four cannon ship (2 side mounts and 1 dual stern).



**How to set-up:** start with the MAR-1 regulator open all the way (no pressure). The solenoids need 20 psi minimum to operate, so when you fire the cannons, nothing should happen. Incrementally screw in the knob on the regulator while firing the cannons until you get a good rapid response from the solenoids (and then give a little extra turn for good measure).

### Weight Comparison Chart

<b>Clippard Solenoids</b>		<b>Servo/MAV-2</b>		<b>KIPS</b>	
<u>Part</u>	<u>Weight</u>	<u>Part</u>	<u>Weight</u>	<u>Part</u>	<u>Weight</u>
RCE-200 RC card	4.2 g	Servo	47.6 g	RCE-200 RC card	4.2 g
PAV-3	44.6 g	MAV-2	32.4 g	KIP solenoid	160.0 g
6V solenoid	49.9 g				
Manifold	13.6 g				
100psi regulator	81.6 g				

Ex. Sample Configuration (dual sterns and 2 individual cannons)

Clippard System (1 regulator, 3 RC cards, 3 solenoids, 4 PAV’s):	463.1 g
KIP System (3 RC cards & 4 solenoids):	652.6 g
Servo and MAVs (2 servos, 2 MAV-2’s, 1 MAV-3 and 2 PAVs):	281.6 g

<u>Part Description</u>	<u>Part #</u>
<i>Clippard</i> 6V compact solenoid	ES-3W-6
<i>Clippard</i> manifold	26090-1
<i>Clippard</i> 100psi variable regulator	MAR-1
<i>Clippard</i> PAV-2	PAV-2
<i>Team Delta</i> R/C switches	RCE-200(A)