



# Southwestern Industries, Inc

## White Paper

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### Limit switches may shorten travel

The following is the summary of an e-mail exchange between a Southwestern Industries' Sales Rep, a Customer Service Rep, and an Engineer:

#### 1<sup>st</sup> e-mail – from the Sales Rep

...their new DPMV5 has the limit switches set 2" short of 20" travel on the Y-axis and the 40" travel on the X-axis.

This is a problem that we have encountered in the past. Is there an inspection guideline for this?

#### 2<sup>nd</sup> e-mail – reply from the service department

Thanks for advising me of this issue. Here is some information I was given by the manufacturing manager.

Without limit switches the DPM V5 has the travel as stated in our brochures, and usually a little more. When the limit switches are added, they trip before this maximum travel is reached to allow for coasting of the axis and to stop the axis from crashing. If there is an instance where the customer needs to use the full travel and the limit switches are interfering, have them use Service Code 312 to turn them off and then turn them back on later.

However, if the switches are moved, the axes may not be able to coast after the limit switches are activated and will crash.

#### 3<sup>rd</sup> e-mail – reply to the 1<sup>st</sup> e-mail - from engineering

Here is a little more background information.

All of our DPMV5 and DPMS5 have more than 20" of travel on the Y axis. I checked 4 different machines and found the following with the limit switches turned on and off. It should be noted that the DPMS5 and DPMV5 use the same iron except for the head. Casting variance leads to the differences in travel amounts.

	Max travel with limit switches off	Max travel with limit switches on
DPMV5	21	20
DPMV5	20.9	19.8
DPMS5	21.4	*
DPMS5	20.9	*

\* machines did not have limit switches installed. We probably lose 1" to 1 ½" on each end of travel for the SX style machines due to the brush axis motors. These motors take longer to come to a stop than the V type axis motors even at 150 ipm.

The V machines (both mills and lathes) need approximately ½” to stop from 250 ipm. If the limit switches are set to maximize travel, you still lose 1” overall on each V machine. It should be noted that we do not necessarily adjust the limit switches to attain the largest amount of travel during inspection, but we do verify the 20” inches of travel with the limit switches off.

We knew this fact when we launched the product and decided it made more sense to state 20” for Y travel versus 19”. From a sales standpoint, doesn't it sound better? I think we made the right call because you can still get at least 20” of travel by turning the limit switches off. If you must attain 20” of travel and the limit switches are set so you cannot, then go to service code 312 under section B of our code section to turn the switches off. This service code toggles the limit switches on and off (Note – it is currently only possible on V machines to turn the limit switches off). We feel this is a minor inconvenience for the customer who may have a job once or twice a year that requires 20”. Our new 2.0 SX software, along with a hardware change to our cable breakout box when released, will also allow the limit switches to be turned on and off. Users with the old style cable breakout box will not have this ability.

The customer should be able to adjust his limit switches without needing a service call. Our design allows for adjustment by a user. All you need is a small metric allen wrench to adjust the cam. Each cam has about 2” of travel for movement.

Note: We believe that crashing a machine at the high speeds and power produced by the brushless servo motors of the V Series may be more damaging to the machine than the brush motors of other DPMs. This warrants standard limit switches as a precaution. However, in our tests, machines have not been significantly damaged even after repeated crashes.

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