From: Peter Stolcs <PeterS@data-tech.co.za>
Subject: **RE: power valve motor speed**
Date: September 30, 2003 11:09:12 AM CDT
To: "'O'Hara, Timothy'" <Timothy.Ohara@kla-tencor.com>
Cc: "Gamma List (E-mail)" <gammalist@edj.net>
Reply-To: PeterS@data-tech.co.za

Hi Tim,

Re: Greg and I really thought we observed that they go faster when the engine is running, however mine barely goes at all at this point. Also I think there is a time-out on the motor to keep it from smoking the controller.

Once I'd sorted out the cable routing / location problem and replaced the controller, a manual test (Pink and Grey to the battery etc.) gets the valves to change position very rapidly ... easily less than 1 second.

I did the same test with the motor running and the valves rotate just as fast ... i.e. no degradation in speed of operation.

Re: On mine I think it is a friction issue. Even with the cables disconnected it takes quite a bit of torque to turn the valves by hand. I'm trying to get new cables and I'm planning to change the lube.

My AEC valves don't require much effort to rotate.

I lub'ed my AEC cables with chain lube and one of those neat little cable lube adapter thingies. Chain lube is perhaps not the best choice because it gets quite thick, but I reckon it will last longer (and be more effective) when the cables get warm from the motor. Chain lube did make the cables more ... ummmm ... ummmm sticky?? ... but the Servo motor has enough torque to not make a diff.

Re: There is a sort of honey like oily substance on the valve shafts. It adds a lot of turning resistance X 4 it's more than the motor can pull.

???????

This does not sound good. Have you ever used Castrol "R" (castor oil) as a premix oil?

If so, you can expect castor oil to cause a "gummy" like build-up. Castor oil gets thick and will even jam piston rings in their ring lands. If you have run castor oil through the motor, clean everything spotless.

The resistance sounds drastic and could wipe out the power transistors in the AEC controller, beware!!!

If you find the time, hook up a DVM / multimeter and check the current draw (amps) of a free running (cables and stoppers removed / disconnected, even the gears) AEC servo motor. Whatever amperage reading you get will indicate

"running current" of the motor. Log a reading, now put a small load on the motors shaft and watch the current draw climb.

In-rush current that the AEC Servo motor will draw can be anything from 20 - 100 times the running current. The in-rush occurs the instant you apply power and just before the motor starts to rotate, this is because the motor looks almost like a dead short across the supply until it begins to rotate . Once the motor begins to turn, the current drops, if you load the motor the current will rise.

The AEC Controller has 4 power transistors, 2 NPN and 2 PNP darlingtons. I think they are rated at 6 - 8 amps per device. (assuming the heat sink is ideal ... which it is NOT)

4 transistors are used, 1 x PNP and 1 x NPN in each supply leg (+12 and GND) to reverse the polarity and thus forward / reverse the AEC Servo. The benefit here is that the load is divided across 2 transistors (1 PNP and 1 NPN for either direction) but this does not mean that the transistors / AEC Controller will switch 12 - 16 Amps.

Re: Do they really want the shafts dry? If so, where do they get their lubrication from oil mist carried in the exhaust gases? Any ideas? What lube would you recommend? How about a few drops of two stroke oil? I know another lister (David Rae) recommended an anti seize grease which could take the heat for sure. What have you used? Any help would be appreciated. Thanks.

I can't comment ... I have not removed the AEC valves or even looked to deep into the manual at what Suzuki recommends.

The valves are steel, the housing is aluminium. My first thought is that the Aluminium will (perhaps) expand quicker than steel ... perhaps more so than the steel AEC valve. (Jay!!!) ...

If this is the case, then I don't see a problem mounting / running the valves as Suzuki recommend in the manual. High temp anti-seize grease may work ... but what happens to the grease if it's temp range is exceeded?

The upper pipe heat shields (on the header section) on my RG were corroded. The fibreglass / asbestos insulation had at some point, retained water. The result is that the inside wall's of the heat shields were rusted and in some places, there were holes.

I removes the rust and used lead to build up the surface and fill the holes. I then had my mate copper / cadmium plate the heat shields. I reassembled the shields and used 25mm thick ceramic wool as an insulator.

I thought that the lead and ceramic wool would handle the heat. The wool is OK ... but I've found droplets of lead on the motor..... In other words ... it gets bloody hot .... perhaps not as hot as the AEC valve which is in closer to the flame front than the section of pipe where the heat shields are.

Not much help ... just some observations from this side of the pond.

Cheers
Pete

The South African RG500 Web Site
http://www.data-tech.co.za/rg500

-----Original Message-----
From: O'Hara, Timothy [mailto:Timothy.Ohara@kla-tencor.com]
Sent: 30 September 2003 16:46:
To: 'PeterS@data-tech.co.za'; 'keith dickinson'
Cc: Gamma List (E-mail)
Subject: RE: power valve motor speed

Hi Peter,

Interesting to hear of others having problems. Greg and I really thought we observed that they go faster when the engine is running, however mine barely goes at all at this point. Also I think there is a time-out on the motor to keep it from smoking the controller.

On mine I think it is a friction issue. Even with the cables disconnected it takes quite a bit of torque to turn the valves by hand. I'm trying to get new cables and I'm planning to change the lube.

There is a sort of honey like oily substance on the valve shafts. It adds a lot of turning resistance X 4 it's more than the motor can pull. The manual says just grease the seals. Do they really want the shafts dry? If so, where do they get their lubrication from oil mist carried in the exhaust gases? Any ideas? What lube would you recommend? How about a few drops of two stroke oil?

I know another lister (David Rae) recommended an anti seize grease which could take the heat for sure. What have you used? Any help would be appreciated. Thanks.

Tim O'Hara, Prowler (2360) GSS Product Engineer
KLA-Tencor (408) 875-2859

-----Original Message-----
From: Peter Stolcs [mailto:PeterS@data-tech.co.za]
Sent: Tuesday, September 30, 2003 12:17 AM
To: 'keith dickinson'
Cc: Gamma List (E-mail)
Subject: RE: power valve motor speed

Hi Keith,

Re: The PV motor then opened the valves OK but it was quite slow (about 2 to 3 seconds). The last time I checked the operation (with the engine running) the valve instantly 'snapped' open and closed at the 7k mark. Do I have a problem or are the electronics in the control box clever enough to know the engine is not running?

NO.... the AEC Servo motor should rotate the valves in either direction in less than 1 second.

Chances are good that the power transistors in the AEC Controller will cook themselves if it takes 2 - 3 seconds to rotate the valves

Check for damaged / binding cables, check the markings (each are numbered) on the cables, the cable guides on the Servo motor side and also the drum on the AEC valves ... the 1-3 and 2-4 cables may be in the wrong locations. I'm not sure (from memory) if the cables are numbered as per the cylinder ... or as per the cable guide on the servo motor housing, there may be a difference.

Pink and Grey wires (+12V and GND / 0V) will forward / reverse the AEC Servo motor without the need to run the motor, make sure your battery is 100% charged and in good condition, the AEC Servo motor draws a lot of current (in-rush).

While you are checking things out ... it may be a good idea to check that the hall effect transistors (blue and yellow wires) are working. They drop power to the Servo motor when the cable drum has reached the home position.

My AEC controller had exactly the same problem that you describe - fast to open - slow to close. The result was blown power transistors in the AEC controller. (the valves would rotate to the closed position but would not return to the open position)

Cheers
Pete

The South African RG500 Web Site
http://www.data-tech.co.za/rg500

-----Original Message-----
From: keith dickinson [mailto:dickinsonk@ntlworld.com]
Sent: 29 September 2003 17:27:
To: Gamma List
Subject: power valve motor speed

Hi all,

Nearly got the bike back together but I'm unsure if my powervalve system is OK. The engine is not ready to run yet but I checked the PV operation by

turning the ignition on (fully charged good battery) with the valves set in the closed position. The PV motor then opened the valves OK but it was quite slow (about 2 to 3 seconds). The last time I checked the operation (with the engine running) the valve instantly 'snapped' open and closed at the 7k mark. Do I have a problem or are the electronics in the control box clever enough to know the engine is not running?

Thanks,

Keith