Feed Control Program:

When power is applied to the feed, 3 control boards become energized: Feed Control, Vacuum Control, Cooler Control. Each of these probably has some initialization process and then attempts to establish communication.

It should be assumed that the feed operation was terminated without warning by a cut in 24 and or 48 VDC.
Questions: How long has the unit been off? What is the vacuum condition? What is the cold condition?
Question: Should the Cooler power or Soft Stop pin 5 be routed through a latching type relay or logic so it can only be started if the Feed Control Board is functioning? If so, how.
Some variables are changed by loading a new program and some are changed by input via RS-232 com.
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Possible Startup Routine:
Allow vac system & cooler to self start or continue as previously programmed. (see question above)
setfanpwm=60
start thermal management program. ——————————————————————▶
getcryostartmode   Check is it okay to start this system.
Set Timer = 0   Initialize & start timer, (minutes)
Determine date & time ??   (not sure if this is possible)
p009=1   Acknowledge error. (not sure about this one, I think it is needed)(maybe same as p010=0)
p010=0   Set Pumping station Off.   (maybe pause for a moment)
p700=000020   Set Turbo runup time to 20 minutes. (not sure needed)
p023=1   Set Turbo Pump to On. (it will start when Pumping Station Starts p010=1)
p024=000   Set D Pump to High Speed for < 90% Turbo and Low for > 90% Turbo Rotation Speed Set Point.
p025=000   Set D Pump Intermittent to Off.   (we might want to turn this on much later)
p035=003   Set D Pump On/Off/Backing to Backing.
p010=1   Set Pumping Station On. (D pump will start)
If getdiode < 250 Then setsoftstop 0   Set Cooler On, Lift Soft Stop condition, or SET SSTOP=0. (preserve cold)
p023=1   Set T Pump On.   (Turbo Vac 15 minute Attempt)(Test vacuum pressure)
Timer   Wait 15 minutes.
If p316 < 20 Then setsoftstop 0 Set Cooler On, Lift Soft Stop, goto Continue. (passed Vac test) ——————▶
p023=0   Set T Pump Off. (wait for D pump to lower pressure)
setcryostop 1   Set Cooler Off. Impose Soft Stop. (feed should not be cooled further)
If getdiode < 250 Then Error (this feed has poor vacuum and is cold, maybe ice issues) ——————————▶
Timer   Wait 45 minutes. (one time thru is 60 min two times thru is 120 min)
Goto   (loop up to Turbo Vac 15 minute Test)(maybe cycle counter, maybe 4 X max)

Continue

Run program   Run other program elements.
p025=001   Set D Pump Intermittent On. (we may want to do this after some number of hours / days)
p700=000008   Set Turbo runup time to 8 minutes. (needed? would force shut down if wake with no control)

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Startup Routine description.
Assume the Feed is waking up from unexpected shut down. Get the Thermal Control part of the program working. If this is not possible, stop all devices. Ask is it okay to start this feed vacuum & cooler? If so is it cold inside? If so Keep it cooling until we know more. Can it pass a vacuum condition test with the Turbo? If so continue on with the program assuming everything is okay. If it fails the vacuum test and it is cold stop cooler and issue error, and assume icing may be a problem. If it fails vacuum and is warm this may be a first time start so turn off the Turbo and use the Diaphragm pump to lower pressure more, then try the turbo again.

Possible Thermal Control Routine:
Determine current programmed fan speed lower limit Y. (Y for user input of user defined value)
If cooler rejection temp is > X and T_2/T_1 > 1, increased fan speed by X%.
If cooler case temp > X and T_2/T_1 > 1, increased fan speed by X%.
If pump electronics temp > X and T_2/T_1 > 1, increased fan speed by X%.
If none of the above is true, reduce fan speed by X %, until low speed limit Y is reached.
(evaluate every 10 sec ??)

If cooler rejection temp exceeds X, turn off cooler and wait X minutes.
If cooler case temp exceeds X, turn off cooler and wait X minutes.
If the above is executed 3 times, stop attempts and send error message.

Other Maintenance Monitoring:
If acceleration exceeds X, send error.
If gauge has been on for more than X hours, turn off.   (relay)

Record data log for period Y in local memory.   (this would give some data to laptop without use of main lab data)
Update most recent maximums or extremes.   (when did it occur ?)
Update fraction of time over period Y that data value exceeded Y.
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