**Feed Control Commands and Functions**

**2014-10-16, Ver 1**

Other related files may be stored in folder “Testing”.

The feed control board communicates with the Rim Box via RS-232. The board has a set of commands for monitor and control of devices in the feed. The board also passes several commands through to the Cooler Control and the Vacuum Control. Three tables of commands are shown in the pages that follow. The following notes apply.

* All commands are delivered to the Feed Control Board, but some are passed through to other controllers.
* No commands are identical among controllers. ( Ackermann, Pfeiffer, Sunpower )
* All commands to the Cooler Control Board are in upper case. ( Sunpower )
* On a functional terminal screen, after command entry, the response will appear on the next line beow.
* We may have mislabeled or forgotten some commands.
* More cooler commands are listed in the separate Sunpower controller manual. ( version etc ? )
* More vacuum commands are listed in the separate Pfeiffer controller manual. ( version etc ? )
* On some commands a 0 before decimal may be needed ????
* An o in the item column indicates a change might be needed.
* An x in the item column indicates we would like to add this command.

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| **Feed Control Board Commands** ( Ackermann, direct ) ( via RS-232 ) | | | |
| Item | Command | Response | Description ( direct to Feed Control Board )( always lower case ) |
|  | help | big list | Display a list of supported commands. ( feed control only ? ) |
|  | getfanpwm | 25 | Display fan power. ( % on time ) ( pulse width modulation ) |
|  | setfanpwm 30 | ok | Set new fan power. ( % on time ) |
|  | getfanspeed | 2420 | Display current fan speed. ( rpm ) |
| o | gettemp a0 | 21.1 | Display temperature, on control board. ( °C xx.x ) ( near ambient ) |
| o | gettemp a1 | 38.3 | Display temperature, Cooler housing. ( °C xx.x ) ( back of housing ) |
| x | gettemp a2 | 31.6 | Display temperature, Cooler rejection. ( °C xx.x ) ( near to fins ) |
|  | gd -v | 0.527 | Display LNA diode voltage. ( \_-v gives )( volts x.xxx ) ( maybe getdiode ? ) |
| x | name ( gd maybe ) | 68.0 | Display LNA temperature. ( Kelvin xx.x ) ( uses equation to calculate )  (T = -67792 X3 + 1661 X2 - 1794.7 X + 899.38 from excel ) |
| o | gv | 1.2 E-5 | Display vacuum gauge. ( change to mbar )( equation )( if gauge is present )  ( p = 10^(1.667xU-d ) ( U volts ) ( d = 11.33 for mbar ) ( 5 volts = 1.0E-3 )  Similar to p340 when using Pfeifer DCU. |
| x | name ( gr maybe ) |  | Display vacuum ratio. ( % time increasing 14 to 24w / hr )  ( function p316 watts or p310 amps) ( function may not be needed ) |
| X | name | ? | Display accelerometer data. ??? |
|  |  |  |  |
| x | name |  | Set Relay closed. ( maybe inhibit cooler)( maybe for valve ) |
| x | name |  | Set Relay open. |
| x | name |  | Return a log, time Vac system on, time cooler on, max values / whatever. |
| x | name |  | Alarm, some temp too high. ( maybe several needed ) |
| x | name |  | record max something is some time period. |
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| ? | prefix + name |  | ( Should we use a prefix to allow any Pfeifer command pass thru ) |
| ? | uppercase |  | ( always means Sunpower command pass thru ) |
|  |  |  | Image Turbo pump monitor power.png |

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| **Vacuum Control Board Commands** ( Pfeiffer, passed through Feed Control Board ) ( prefix p ) ( RS-485 ) | | | | |
| Item | Command | T | Response | Description ( always lower case ? ) |
|  | p009=111111 | 0 |  | Set acknowledge error, 1 = acknowledge, ( data type 0 for true false ) |
| x | p010=000000 | 0 |  | Set pumping station, turbo & diaphragm.  0 = off. ( setting is preserved at power down and applied at next power up )  1 = on. ( Also acknowledges or clears error ) |
| x | p023=000000 | 0 |  | Set turbo on/off, for turbo motor only. ( not the same as Station on/off )  0 = off. ( 000000 ) & 1 = on. ( 111111 ) |
| x | p024=009 | 7 |  | Set Cfg D01, Output, Diaphragm Pump speed,  9 = always 0, MVP-006 pin 8 = open, high speed, 3000 rpm.  10 = always 1, MVP-006 pin 8 = 24 VDC, low speed 1000 rpm. ( seasoned )  13 = follow backing mode. ( see p025 )( MVP-006 DIP Sw 2 set to off ) |
| x | p025=001 | 7 |  | Set operation mode backing pump.  0 = continuous. ( uses p024=9 or p024=10 )  1 = intermittent. ( assumes p024=13 ) ( uses settings p710 & p711 )  2 = delayed switch-on. ( not used for our process ) |
| x | p035=003 | 7 |  | Set Cfg Acc A1, Accessory , Diaphragm pump on,  3 = backing pump.  6 = always 0, MVP pin 3/10 = open, diaphragm pump off.  7 = always 1, MVP pin 3/10 = 24 VDC, diaphragm pump on. |
| x | p700=000120 | 1 |  | Set value run-up time. ( min ) ( 1 to 120 ) |
| x | p710=000014 | 1 |  | Set point diaphragm intermittent on. ( watts )( based on turbo power p316 ) |
| x | p711=000024 | 1 |  | Set point diaphragm intermittent off. ( watts )( based on turbo power p316 ) |
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| x | p304 | 0 | 0 | Display Excess Temp Electronics. ( 0 = no, 1 = yes ) |
| x | p305 | 0 | 0 | Display Excess Temp Turbo. ( 0 = no, 1 = yes ) |
| x | p310 | 2 | 1.83 | Display Turbo current consumption. ( amps ) ( 000183 = 1.83 ) |
| x | p311 | 1 | 85 | Display Station operation ( hours )( 0 to 65535 ) |
| x | p315 | 1 | 1500 | Display Turbo speed, nominal. ( Hz ) ( 1500 Hz = 90,000 rpm )( x6 ) |
|  | p316 | 1 | 22 | Display Turbo power consumption. ( watts )( 77 max )( 14 good ) |
|  | p326 | 1 | 34 | Display Electronics control board temperature. ( °C xx.x ) ( tenths ? ) |
| x | p330 | 1 | 35 | Display Turbo bottom temperature. ( °C xx.x ) ( tenths ? ) |
|  | p342 | 1 | 39 | Display Turbo bearing temperature. ( °C xx.x ) ( tenths ? ) |
| x | p346 | 1 | 31 | Display Turbo motor temperature. ( °C xx.x ) ( tenths ? ) |
|  | p398 | 1 | 90030 | Display Turbo speed, actual. ( rpm )( 90,000 max nominal ) |
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Data Type. ( Column “T” in the table above )

Type 0 for true false, 000000 or 111111.

Type 1 positive 6 place integer. 000000 to 999999

Type 2 positive 6 place integer, 001571 is 15.71 , decimal 2nd & 3rd place.

Type 4 symbol chain 6 places, TC\_400

Type 7 positive 3 place integer. 000 to 999

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| **Vacuum Control Board Commands related to DCU 002** | | | | |
|  | p794=001 | 7 |  | Set extended parameter set. ( 0 = basic, 1 = extended set, like p710 etc ) |
|  | p738=PKR2xx | 4 |  | Set type of gauge. ( PKR251 Combined Pirani & Cold Cathode )( DCU page 8 ) |
|  | p340 | 7 | 1.2 E-4 | Display pressure from gauge. ( mbar )( only from Pfeiffer DCU ) ( p738 gauge type ) |

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| **Cooler Control Board Commands** ( Sunpower, passed through Feed Control Board ) ( via RS-232 ) | | | |
| Item | Command | Response | Description ( always upper case ? ) |
|  | SET SSTOPM=1 \*1 | 1 | Set Soft Stop Mode. ( 0 = stop via SSTOP , 1 = stop via pin 5 ) |
|  | SET SSTOP=1 \*1 | 1 | Set Soft Stop. ( 0 = restart motor, 1 = stop motor ) |
|  | SET MAX=210 \*1 | 210 | Set Max user defined power. ( watts ) Not PWOUT. Factory < 240. |
|  | SET MIN=100 \*1 | 80 | Set Min user defined power. ( watts ) Not PWOUT. Factory > 70. |
|  | SET PID=0 \*1 | 000.00 | Set control to power mode. (0 = power, 2 = temp) |
|  | SET TTARGET=65 \*1 | 065.00 | Set cold-head temp target to number. ( Kelvin ) ( risk if below 60 ) |
|  | SET PWOUT=200 \*1 | 200.00 | Set power target to number. ( watts ) ( while in PID mode 0 ) |
| o | TC | 65 | Display Temperature Coldhead. ( °C xx.x ) ( risk if below 60 ) |
|  | P | 210 | Display current power. ( watts ) |
|  | E | 120  70  120 | Max allowable power. ( watts ) ( varies with cold, usually 240 )  Min allowable power. ( watts ) ( never less than 70 )  Current power. ( watts ) ( usually < 240 during regulation ) |
|  | SHOW MX | 80  210 | Display Min & Max. ( watts ) |
|  | STATE | list | Display status list of 14 commanded states. |
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|  | RESET=F | RESETTING | Resets all parameters to factory default. |
|  | ERROR | 000 001  000 010  000 100  001 000  010 000  100 000  100 001 | Display error messages. ( both LEDs are flashing repeatedly )  1 LED Flash, Over Current  2 LED Flashes, Jumper Error  3 LED Flashes, Serial Error ( Baud 4800, None, Data 8, Stop 1 )  4 LED Flashes, Non-volatile Memory Error  5 LED Flashes, Watchdog Error.  6 LED Flashes, Temperature Sensor Error.  Multiple Errors, Over Current & Temp Sensor. |
|  |  |  | \*1 To display current value for most commands,  type the command without an " =number".  Example: SET TTARGET displays 065.00 |
|  |  |  | \*2 PID means proportional, integral, differential, a control method. |

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| **Cryo Cooler Notes** | | |
|  | Operation | Cooler should start within 11 seconds of power on for SSTOP=0. |
|  | Conditions | Needs 48 VDC +/- ? Needs 6 watts minimum load. Needs 100 cu-ft/min air. achieve 1.0E-4 or better vacuum. |
|  | LED on Red | Unit in cool down mode above Set Point Temp. |
|  | LED on Green | Unit regulating within 0.5 Kelvin of Set Point Temp. ( pin 4 high ) |
|  | Inhibit motor on/off | see feed control board relay. ( maybe )( pin 10 at 5 VDC to pin 5 soft stop ) |
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