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NIRC2 Cryogenic Operations

Introduction

D82 is cooled and maintained at operating temperatures by two CTI-Cryogenics model 1050 cold heads, a single stage one to cool the radiation shield to about 100 to 150 K, and a two stage one whose first stage cools the optical bench and all of the modules on it to 50K and whose second stage cools the detector to 29K. This second stage also cools the getter. The cold heads are supplied with He gas through the telescope wrap up from a single CTI 9600 compressor in the mechanical room.

The speed of both cold head motors are controlled for several reasons. High speeds are used for rapid cool down, while low speeds are use to minimize vibration and maximize cold head life. At low cold head temperatures, lower speeds keep the helium gas consumption from the compressor within its rating. There are two CTI frequency converters in the mechanical room to individually control the speed of each cold head. The input and output of the frequency converters go through the NIRC2 Cold head Filter & Control chassis which eliminates electrical noise being introduced into the telescope systems. This chassis also controls frequency of the CTI frequency converters, either manually or by computer through the NIRC2 Filter Computer Interface. Because of the setting of the DGH modules in the controller, the system always comes up in manual mode at power up. See drawing 305017.

There are 14 temperature monitoring locations wired out of D82, 12 have sensors and 10 are monitored. All sensors are Lake Shore DT470 silicon diodes. Eight diodes in two banks of four to a plug are connected to a Lake Shore Temperature Monitor Model 218. Another bank of four to which only two diodes are presently connected can be interchanged with one of the banks plugged into the Model 218.

There are two controlled temperatures, presently the detector temperature and the 2 stage cold head first stage copper block. These temperatures are sensed by the two remaining temperature sensors, and controlled by a Lake Shore Temperature Controller model 340. This controller has two control loops: Loop 1 is connected to sensor A the detector temperature sensor and controls the detector temperature and loop 2 is connected to sensor B the cold head copper block sensor and controls the optical bench temperature.

Loop 1 directly powers the detector block resistive heaters, normally connected in series. For thermal protection each resistor has a thermal switch which opens at 90 C in series with it. Loop 2 powers two banks of heaters for the optical bench control (the 50K stage) through a Kepco ATE 100-2.5M power supply which acts as a linear power amplifier. These banks of heaters are normally connected in parallel.

There is also a getter can with two resistive heaters wired out separately. These were used in construction and normally are not to be used.

There are four thermal switches which open at 90 C, two for the 50 K stage and two for the getter can. They are wired in series and connected to the Kepco ATE 100-2.5M power supply's crowbar circuit.

The Model 340 temperature controller has the high alarm of sensor B wired out to the vacuum system controller. If the 50K stage temperature rises and triggers the alarm it latches and turns on the vacuum pumping system. The alarm is currently set at 55K

Cold head controller

Operation

The speed of the D82 cold heads are either controlled manually by switches and dial potentiometers on the NIRC2 Coldhead Filter & Control chassis or by computer RS-485 line into the associated Computer Interface box. When the switch on the putting the switch on the control chassis to manual forces manual operation. When set to remote computer control, the control chassis powers up in manual mode. Thereafter, it can be set by computer to either manual or computer control.

The algorithms for head speed are as follows:

Setting, $R = 1.2\ F = 24 + 0.06\ N = 24 + 0.012\ Vo$, $N = 16.67(R - 24)$, $Vo = 83.33\ (R - 24)$

Read back, $R = 1.2\ F = 1.2\ (100/5000)\ Vb = 0.024\ Vb$

R = speed of the motor in RPM. The range has been set to go from 20 to 84 RPM. The CTI cold heads without the controllers run at 60 Hz line frequency or 72 RPM.

F = Output frequency of the CTI frequency controller in Hz.

N = Number on the dial potentiometer having a range of 0 to 1000.

Vo = The computer interface speed setting in mV having a range 0 to 5000 mV. It is also the voltage of the monitor output Vref on the Computer Interface chassis and Monitor analog out on the Coldhead Filter & Control chassis.

Vb = The computer interface speed read back voltage in mV. The read back range is 0 to 5000 mV, while the range of an operating CTI frequency controller should be only 100 to 3500 mV approximately.

Parameter Settings

Coldhead Filter & Control Chassis Settings.

Front panel settings.

These are nominal settings that allow computer control, and bring both cold heads up at 72 RPM, the maximum they should be run during non emergency cool down. The reason for this speed is that after power downs D82 will be brought back to operating temperature at a fast rate.

Control mode - Remote

Coldhead 1 - On

Coldhead 2 - On

Coldhead 1, Speed Adj, - 800 (72 RPM) or less

Coldhead 2, Speed Adj. - 800 (72 RPM) or less

Computer Interface Settings.

The folowing are nominal settings and read backs when cold heads are on and running under computer control. Cold head 1 (single stage) is set to 30 RPM, and cold head 2 (two stage) is set to 24 RPM. Note

that the read backs are only approximate. The following are what should be read back from the computer interface.
In order to get these setting, refer to the DGH and NIRC2 software manuals.

ad 1 RS
30020144

ad 1 RAO
+00500.00

ad 2 RS
31020142

ad 3 RS
32020144

ad 3 RAO
+00000.00

ad 4 RS
33020142

sm ch1spd
ch1spd = 500.000 mvolts
sm ch1pwr
ch1pwr = 1
sm chremote
chremote = 1
sm ch1spdrbv
ch1spdrbv = 1111.000 mvolts
sm ch2spd
ch2spd = 0.000 mvolts
sm ch2pwr
ch2pwr = 1
sm ch2spdrbv
ch2spdrbv = 858.000 mvolt.

CTI Frequency Converter Settings

Note that the board in the CTI Frequency Converter is a VCD 55 variable speed drive board. These boards were made by Control Techniques in UK. Also Superior Electric Seco, Lanchester, SC, USA

SW1 01111000, SW2 00001110

Pots: Boost, Up and Down at factory settings; Max set to 70 Hz (84 RPM); Min set to 20 Hz (24 RPM). The speed setting is best done using a calibrated scope or a low pass filtered frequency counter. It is important that the frequencies not go outside this range.

Time delay relay. Factory set with switches all off except for #2 on in left bank and #1on in right bank.

Lake Shore Temperature Monitor Model 218

Operation

For normal operation Temp monitor plugs 1 (Temperature diodes DC to DF) and 2 (Temperature diodes DG to DK) are plugged into Model 218 inputs 1-4 and 5-8 respectively. The RS232 cable should also be plugged in. The only function is temperature monitoring.

Parameter Settings

Display Format

Input (1-4 and 5-8) 2.5V diode

Curve Select (1-4 and 5-8) DT470 (note: curve 10)

Math

Inputs (1 to 8)
Filter points 16
Filter window 01%

Analog Outputs

Output (1 to 8) off

Alarm

Input (1 to 8) off

Interface

IEEE Setup
Address 12
Term CR LF

Serial IO Setup
Baud 9600

Printer

Off (note: must be off for serial interface to operate.)

The following are the setting as they are read from the computer interface during normal operation. Refer to the Lake Shore Temperature Monitor Model 218 manual for their interpretation and how to set them.

ad 6 "ANALOG? 1"
0,0,1,1,+00.000,+00.000,+0.0000

ad 6 "ANALOG? 2"
0,0,1,1,+1000.0,+0.0000,+0.0000

ad 6 "AOUT? 1"
+0.0000

ad 6 "AOUT? 2"
+0.0000

ad 6 "BAUD?"
2

ad 6 "CRDG? 1"
-244.16

ad 6 "CRDG? 0"
-244.16,-271.75,-262.45,-222.30,-222.77,-222.64,-132.81,-222.66

ad 6 "CRVHDR? 1"
DT-470 ,STANDARD ,2,+475.00,1

ad 6 "CRVHDR? 2"
DT-500 ,STANDARD ,2,+365.00,1

ad 6 "CRVHDR? 3"
CTI DIODE ,STANDARD ,2,+320.00,1

ad 6 "CRVHDR? 4"
DT-470 ,STANDARD ,2,+475.00,1

ad 6 "CRVHDR? 5"
DT-470 ,STANDARD ,2,+475.00,1

ad 6 "CRVPT? 1,1"
+0.09062,+475.000

ad 6 "CRVPT? 1,10"
+0.19961,+430.000

ad 6 "DATETIME?"
10,02,01,00,18,56

ad 6 "DISPFLD? 1"
1,1

ad 6 "DISPFLD? 2"
2,1

ad 6 "DISPFLD? 3"
3,1

ad 6 "DISPFLD? 4"
4,1

ad 6 "DISPFLD? 5"
5,1

ad 6 "DISPFLD? 6"
6,1

ad 6 "DISPFLD? 7"
7,1

ad 6 "DISPFLD? 8"
8,1

ad 6 "FILTER? 1"
1,16,01

ad 6 "FILTER? 2"
1,16,01

ad 6 "FILTER? 3"
1,16,01

ad 6 "FILTER? 4"
1,16,01

ad 6 "FILTER? 5"
1,16,01

ad 6 "FILTER? 6"
1,16,01

ad 6 "FILTER? 7"
1,16,01

ad 6 "FILTER? 8"
1,16,01

ad 6 "IEEE?"
0,0,12

ad 6 "INCRV? 1"
01

ad 6 "INCRV? 2"
01

ad 6 "INCRV? 3"
01

ad 6 "INCRV? 4"
01

ad 6 "INCRV? 5"
01

ad 6 "INCRV? 6"
01

ad 6 "INCRV? 7"
01

ad 6 "INCRV? 8"
01

ad 6 "INPUT? 1"

1

ad 6 "INPUT? 2"
1

ad 6 "INPUT? 3"
1

ad 6 "INPUT? 4"
1

ad 6 "INPUT? 5"
1

ad 6 "INPUT? 6"
1

ad 6 "INPUT? 7"
1

ad 6 "INPUT? 8"
1

ad 6 "INTYPE? A"
0

ad 6 "INTYPE? B"
0

ad 6 "KEYST?"
1

ad 6 "KRDG? 1"
+28.991

ad 6 "KRDG? 0"
+28.992,+01.400,+10.756,+50.848,+50.382,+50.515,+140.32,+475.00

ad 6 "LINEAR? 1"
+0.0000,1,+0.0000

ad 6 "LINEAR? 2"
+0.0000,1,+0.0000

ad 6 "LINEAR? 3"
+0.0000,1,+0.0000

ad 6 "LINEAR? 4"
+0.0000,1,+0.0000

ad 6 "LINEAR? 5"
+0.0000,1,+0.0000

ad 6 "LINEAR? 6"
+0.0000,1,+0.0000

ad 6 "LINEAR? 7"
+0.0000,1,+0.0000

ad 6 "LINEAR? 8"
+0.0000,1,+0.0000

ad 6 "LOCK?"
0,123

ad 6 "LOG?"
1

ad 6 "LOGNUM?"
0340

ad 6 "LOGREAD? 1"
1,1

ad 6 "LOGREAD? 2"
2,1

ad 6 "LOGREAD? 3"
3,1

ad 6 "LOGREAD? 4"
4,1

ad 6 "LOGREAD? 5"
5,1

ad 6 "LOGREAD? 6"
6,1

ad 6 "LOGREAD? 7"
7,1

ad 6 "LOGREAD? 8"
8,1

ad 6 "LOGSET?"
1,1,1,3600,8

ad 6 "LOGVIEW? 1,1"
09/17/99,12:53:50,+27.775,00,1

ad 6 "LOGVIEW? 1,2"
09/17/99,12:53:50,+01.400,04,1

ad 6 "LOGVIEW? 1,3"
09/17/99,12:53:50,+10.685,00,1

ad 6 "LOGVIEW? 1,4"
09/17/99,12:53:50,+50.841,00,1

ad 6 "LOGVIEW? 1,5"
09/17/99,12:53:50,+50.393,00,1

ad 6 "LOGVIEW? 1,6"
09/17/99,12:53:50,+50.507,00,1

ad 6 "LOGVIEW? 1,7"
09/17/99,12:53:50,+141.11,00,1

ad 6 "LOGVIEW? 1,8"
09/17/99,12:53:50,+51.107,00,1

ad 6 "LOGVIEW? 10,1"
09/17/99,21:53:51,+27.800,00,1

ad 6 "LOGVIEW? 10,2"
09/17/99,21:53:51,+01.400,04,1

ad 6 "LOGVIEW? 10,3"
09/17/99,21:53:51,+10.726,00,1

ad 6 "LOGVIEW? 10,4"
09/17/99,21:53:51,+50.858,00,1

ad 6 "LOGVIEW? 10,5"
09/17/99,21:53:51,+50.410,00,1

ad 6 "LOGVIEW? 10,6"
09/17/99,21:53:51,+50.526,00,1

ad 6 "LOGVIEW? 10,7"
09/17/99,21:53:51,+140.76,00,1

ad 6 "LOGVIEW? 10,8"
09/17/99,21:53:51,+51.511,00,1

ad 6 "LRDG? 1"
+0.0000

ad 6 "LRDG? 0"
+0.0000,+0.0000,+0.0000,+0.0000,+0.0000,+0.0000,+0.0000,+0.0000

ad 6 "MNMX? 1"
1

ad 6 "MNMX? 2"
1

ad 6 "MNMX? 3"
1

ad 6 "MNMX? 4"
1

ad 6 "MNMX? 5"
1
ad 6 "MNMX? 6"
1

ad 6 "MNMX? 7"
1

ad 6 "MNMX? 8"
1

ad 6 "MNMXRDG? 1"
+20.971,+29.785

ad 6 "MNMXRDG? 2"
+01.400,+12.579

ad 6 "MNMXRDG? 3"
+09.760,+10.817

ad 6 "MNMXRDG? 4"
+45.935,+50.856

ad 6 "MNMXRDG? 5"
+45.255,+50.402

ad 6 "MNMXRDG? 6"
+45.228,+50.520

ad 6 "MNMXRDG? 7"
+140.28,+141.93

ad 6 "MNMXRDG? 8"
+47.984,+475.00

ad 6 "MODE?"
0

ad 6 "RDGST? 1"
000

ad 6 "RDGST? 2"
016

ad 6 "RDGST? 3"
000

ad 6 "RDGST? 4"
000

ad 6 "RDGST? 5"
000

ad 6 "RDGST? 6"
000

ad 6 "RDGST? 7"
000

ad 6 "RDGST? 8"

000

ad 6 "RELAY? 1"
0,1,0

ad 6 "RELAY? 2"
0,2,0

ad 6 "RELAY? 3"
0,3,0

ad 6 "RELAY? 4"
0,4,0

ad 6 "RELAY? 5"
0,5,0

ad 6 "RELAY? 6"
0,6,0

ad 6 "RELAY? 7"
0,7,0

ad 6 "RELAY? 8"
0,8,0

ad 6 "RELAYST?"
000

ad 6 "SRDG? 1"
+1.1094

ad 6 "SRDG? 0"
+1.1094,+1.7889,+1.3994,+1.0690,+1.0698,+1.0696,+0.8901,+0.0037

Lake Shore Temperature Controller Model 340

Operation

For normal operation the Model 340 Temperature Controller regulates the detector temperature through loop 1 connected to sensor A, the detector temperature sensor. The detector block heater resistors are connected in series and the power setting is 587 mW. If only one resistor is connected and the resistance value is not changed in the controller, the indicated power will be wrong (twice the actual because loop 1 sources current). The nominal temperature set point is 29 K. The temperature of the optical bench and the modules on it are regulated through loop 2 connected to sensor B on the copper block on the first stage of the two stage cold head. The nominal temperate set point is 50 K. The copper block is connected by cold straps to the optical bench. Loop 2 drives analogue out 2, which is connected to the Kepco power supply which acts as a linear amplifier. It is the power source for the heater resistors on the copper block.

In order to warm up D82, after the cold heads are turned off, the ramp setting should be at 0.1 K/min and both set point should then be set to a maximum of 300 K (about 10 K above ambient is what is needed) and the temperature be allowed to ramp up.

When warm, at the time of back filling the dewar with nitrogen gas, both of the temperatures should be set to their nominal set points and be allowed to ramp down.

The high alarm on input B is used to turn on the D82 vacuum pump automatic controller. It is set for 55K and latched mode so it does not cycle the pump unduly. It can be reset either by pushing the Alarm Reset button on the front panel of the controller or by software command.

Parameter Settings

Control Channel

Loop 1 Channel A

Loop 2 Channel B

The following are the setting as they are read from the computer interface during normal operation. Refer to the Lake Shore Temperature Controller Model 340 manual for their interpretation and how to set them.

ad 5 "ALARM? A"
0,1,+1000.00E+0,+0.00000E+0,0,0

ad 5 "ALARM? 1"
1,1,+55.0000E+0,+0.10000E+0,1,1

ad 5 "ALARM? 2"
1,1,+55.0000E+0,+0.10000E+0,1,1

ad 5 "ALARM? B"
1,1,+55.0000E+0,+0.10000E+0,1,1

ad 5 "ALARM? 3"
1,1,+55.0000E+0,+0.10000E+0,1,1

ad 5 "ALARMST? 3"
0,0

ad 5 "ALARMST? A"
0,0

ad 5 "ALARMST? B"
0,0

ad 5 "ANALOG? A"
0,0,A00,1,+0.00000E+0,+0.00000E+0,+010.0

ad 5 "ANALOG? 1"
0,0,A00,1,+0.00000E+0,+0.00000E+0,+010.0

ad 5 "ANALOG? B"
0,0,A00,1,+0.00000E+0,+0.00000E+0,+010.0

ad 5 "ANALOG? 2"
0,3,A00,1,+0.00000E+0,+0.00000E+0,+028.3

ad 5 "AOUT? 1"
+000.0

ad 5 "AOUT? 2"
+022.3

ad 5 "BEEP? 2"
0

ad 5 "BEEP?"
0

ad 5 "BEEPST?"
0

ad 5 "BUSY?"
0

ad 5 "CDISP? 1"
3,0940,2,1

ad 5 "CDISP? 2"
3,0940,2,1

ad 5 "CLIMIT? 1"
+313.000E+0,010.0,010.0,1,5

ad 5 "CLIMIT? 2"
+313.000E+0,010.0,010.0,1,5

ad 5 "CMODE? 1"
1

ad 5 "CMODE? 2"
1

ad 5 "COMM? 2"
1,5,3

ad 5 "COMM?"
1,5,3

ad 5 "CRDG? A"
-244.160E+0

ad 5 "CRDG? B"
-223.158E+0

ad 5 "CRVHDR? 1"
DT-470   ,Standard ,2,+475.000E+0,1

ad 5 "CRVHDR? 2"

DT-500-D ,Standard ,2,+365.000E+0,1

ad 5 "CRVHDR? 3"
DT-500-E1 ,Standard ,2,+330.000E+0,1

ad 5 "CRVHDR? 4"
PT-100   ,Standard ,3,+800.000E+0,2

ad 5 "CRVHDR? 5"
PT-1000   ,Standard ,3,+800.000E+0,2

ad 5 "CRVHDR? 6"
Std Blank ,Standard ,2,+999.900E+0,2

ad 5 "CRVHDR? 7"
Std Blank ,Standard ,2,+999.900E+0,2

ad 5 "CRVHDR? 8"
Std Blank ,Standard ,2,+999.900E+0,2

ad 5 "CRVHDR? 9"
Std Blank ,Standard ,2,+999.900E+0,2

ad 5 "CRVHDR? 10"
Std Blank ,Standard ,2,+999.900E+0,2

ad 5 "CRVHDR? 11"
Std Blank ,Standard ,2,+999.900E+0,2

ad 5 "CRVHDR? 12"
Std Blank ,Standard ,2,+999.900E+0,2

ad 5 "CRVHDR? 14"
Std Blank ,Standard ,2,+999.900E+0,2

ad 5 "CRVHDR? 15"
Std Blank ,Standard ,2,+999.900E+0,2

ad 5 "CRVHDR? 16"
Std Blank ,Standard ,2,+999.900E+0,2

ad 5 "CRVHDR? 17"
Std Blank ,Standard ,2,+999.900E+0,2

ad 5 "CRVHDR? 18"
Std Blank ,Standard ,2,+999.900E+0,2

ad 5 "CRVHDR? 19"
Std Blank ,Standard ,2,+999.900E+0,2

ad 5 "CRVHDR? 20"
Std Blank ,Standard ,2,+999.900E+0,2

ad 5 "CRVHDR? 21"
User 21   ,   ,2,+375.000E+0,1

ad 5 "CRVHDR? 22"
CX-1050-SD ,X07801 ,4,+400.000E+0,1

ad 5 "CRVHDR? 23"
CX-1050-SD ,X07802 ,4,+400.000E+0,1

ad 5 "CRVHDR? 24"
CX-1050-SD ,X07803 ,4,+400.000E+0,1

ad 5 "CRVHDR? 25"
CX-1050-SD ,X07804 ,4,+400.000E+0,1

ad 5 "CRVHDR? 26"
User 26 ,51004200 ,2,+475.000E+0,1

ad 5 "CRVHDR? 27"
User 27 , ,2,+375.000E+0,1

ad 5 "CRVHDR? 28"
User 28 , ,2,+375.000E+0,1

ad 5 "CRVHDR? 29"
User 29 , ,2,+375.000E+0,1

ad 5 "CRVHDR? 30"
User 30 , ,2,+375.000E+0,1

ad 5 "CRVHDR? 31"
User 31 , ,2,+375.000E+0,1

ad 5 "CRVHDR? 32"
User 32 , ,2,+375.000E+0,1

ad 5 "CRVHDR? 33"
User 33 , ,2,+375.000E+0,1

ad 5 "CRVHDR? 34"
User 34 , ,2,+375.000E+0,1

ad 5 "CRVHDR? 35"
User 35 , ,2,+375.000E+0,1

ad 5 "CRVHDR? 36"
User 36 , ,2,+375.000E+0,1

ad 5 "CRVHDR? 37"
User 37 , ,2,+375.000E+0,1

ad 5 "CRVHDR? 38"
User 38 , ,2,+375.000E+0,1

ad 5 "CRVHDR? 39"
User 39 , ,2,+375.000E+0,1

ad 5 "CRVHDR? 40"
User 40 , ,2,+375.000E+0,1

ad 5 "CRVHDR? 41"
User 41 , ,2,+375.000E+0,1

ad 5 "CRVHDR? 42"
User 42 , ,2,+375.000E+0,1

ad 5 "CRVHDR? 43"
User 43 , ,2,+375.000E+0,1

ad 5 "CRVHDR? 44"
User 44 , ,2,+375.000E+0,1

ad 5 "CRVHDR? 45"
User 45 , ,2,+375.000E+0,1

ad 5 "CRVHDR? 46"
User 46 , ,2,+375.000E+0,1

ad 5 "CRVHDR? 47"
User 47 , ,2,+375.000E+0,1

ad 5 "CRVHDR? 48"
User 48 , ,2,+375.000E+0,1

ad 5 "CRVHDR? 49"
User 49 , ,2,+375.000E+0,1

ad 5 "CRVHDR? 50"
User 50 , ,2,+375.000E+0,1

ad 5 "CRVHDR? 51"
User 51 , ,2,+375.000E+0,1

ad 5 "CRVHDR? 52"
User 52 , ,2,+375.000E+0,1

ad 5 "CRVHDR? 53"
User 53 , ,2,+375.000E+0,1

ad 5 "CRVHDR? 54"
User 54 , ,2,+375.000E+0,1

ad 5 "CRVHDR? 55"
User 55 , ,2,+375.000E+0,1

ad 5 "CRVHDR? 56"
User 56 , ,2,+375.000E+0,1

ad 5 "CRVHDR? 57"
User 57 , ,2,+375.000E+0,1

ad 5 "CRVHDR? 58"
[User 58 , ,2,+375.000E+0,1

ad 5 "CRVHDR? 59"

User 59 , ,2,+375.000E+0,1

ad 5 "CRVHDR? 60"
User 60 , ,2,+375.000E+0,1

ad 5 "CRVPT? 1,1"
+0.09062E+0,+475.000E+0

ad 5 "CRVPT? 1,10"
+0.19961E+0,+430.000E+0

ad 5 "CRVPT? 21,1"
+0.00900E+0,+475.000E+0

ad 5 "CSET? 1"
A,1,1,1

ad 5 "CSET? 2"
B,1,1,1

ad 5 "DATETIME?"
10,01,2001,22,34,31,110

ad 5 "DIOST?"
063,000

ad 5 "DISPFLD? 1"
A00,1

ad 5 "DISPFLD? 2"
B00,1

ad 5 "DISPFLD? 3"
A00,1

ad 5 "DISPFLD? 4"
A00,1

ad 5 "DISPFLD? 5"
A00,1

ad 5 "DISPFLD? 6"
A00,1

ad 5 "DISPFLD? 7"
A00,1

ad 5 "DISPFLD? 8"
A00,1

ad 5 "DISPLAY? 8"
2,056,1

ad 5 "DOUT?"
0,000

ad 5 "FILTER? A"
1,16,10

ad 5 "FILTER? B"
1,16,10

ad 5 "HTR?"
+00024.5

ad 5 "HTRST?"
00

ad 5 "IEEE?"
1,1,12

ad 5 "INCRV? A"
1

ad 5 "INCRV? B"
1

ad 5 "INSET? A"
1,0

ad 5 "INSET? B"
1,0

ad 5 "INTYPE? A"
1,1,1,06,11

ad 5 "INTYPE? B"
1,1,1,06,11

ad 5 "KEYST?"
1

ad 5 "KRDG? A"
+029.015E+0

ad 5 "KRDG? B"
+049.999E+0

ad 5 "LDAT? A"
-00.0012E+0

ad 5 "LDAT? B"
+020.998E+0

ad 5 "LDATST? A"
001

ad 5 "LDATST? B"
001

ad 5 "LINEAR? A"

2,+1.00000,1,3,+0.00000E+0

ad 5 "LINEAR? B"
2,+1.00000,1,3,+0.00000E+0

ad 5 "LOCK?"
0,123

ad 5 "MDAT? A"
+023.827E+0,+029.944E+0

ad 5 "MDAT? B"
+044.344E+0,+050.095E+0

ad 5 "MDATST? A"
000,000

ad 5 "MDATST? B"
000,000

ad 5 "MDNMX? A"

ad 5 "MNMX? A"
1,1

ad 5 "MNMX? B"
1,1
ad 5 "MODE?"
1

ad 5 "MOUT? 1"
000.00

ad 5 "MOUT? 2"
000.00

ad 5 "PGM? 1,1"
00

ad 5 "PGMMEM?"
Input failed. The error message is <askDevice (Lakeshore) for id = 1, failed >"PGMMEM?" <"">

ad 5 "PGMRUN?"
Input failed. The error message is <askDevice (Lakeshore) for id = 1, failed >"PGMRUN?" <"">

ad 5 "PID? 1"
0800.0,0005.0,0000

ad 5 "PID? 2"
0100.0,0005.0,0000

ad 5 "RAMP? 1"
1,000.1

ad 5 "RAMP? 2"
1,000.1

ad 5 "RAMPST? 1"
0

ad 5 "RAMPST? 2"
0

ad 5 "RANGE?"
3

ad 5 "RDGST? A"
000

ad 5 "RDGST? B"
000

ad 5 "RELAY? 1"
1,1

ad 5 "RELAY? 2"
0,0

ad 5 "RELAYST? 1"
0

ad 5 "RELAYST? 2"
0

ad 5 "REV?"
102097,01.01.09,000000,032,041497,01.01.07,0000,000000,00.00.00

ad 5 "SETP? 1"
+029.000E+0

ad 5 "SETP? 2"
+050.000E+0

ad 5 "SETTLE?"
10.0000,00000

ad 5 "SRDG? A"
+1.10945E+0

ad 5 "SRDG? B"
+1.07051E+0

ad 5 "TUNEST?"
0

ad 5 "XSCAN?"
0,01,002

ad 5 "ZONE? 1,1"
100.000,0000.0,0000.0,0000,000.00,0

ad 5 "ZONE? 1,2"
100.000,0000.0,0000.0,0000,000.00,0

ad 5 "ZONE? 1,3"
100.000,0000.0,0000.0,0000,000.00,0

ad 5 "ZONE? 1,4"
100.000,0000.0,0000.0,0000,000.00,0

ad 5 "ZONE? 1,5"
100.000,0000.0,0000.0,0000,000.00,0

ad 5 "ZONE? 1,6"
100.000,0000.0,0000.0,0000,000.00,0

ad 5 "ZONE? 1,7"
100.000,0000.0,0000.0,0000,000.00,0

ad 5 "ZONE? 1,8"
100.000,0000.0,0000.0,0000,000.00,0

ad 5 "ZONE? 1,9"
100.000,0000.0,0000.0,0000,000.00,0

ad 5 "ZONE? 1,10"
100.000,0000.0,0000.0,0000,000.00,0

ad 5 "ZONE? 2,1"
100.000,0000.0,0000.0,0000,000.00,0

ad 5 "ZONE? 2,2"
100.000,0000.0,0000.0,0000,000.00,0

ad 5 "ZONE? 2,3"
100.000,0000.0,0000.0,0000,000.00,0

ad 5 "ZONE? 2,4"
100.000,0000.0,0000.0,0000,000.00,0

ad 5 "ZONE? 2,5"
100.000,0000.0,0000.0,0000,000.00,0

ad 5 "ZONE? 2,6"
100.000,0000.0,0000.0,0000,000.00,0

ad 5 "ZONE? 2,7"
100.000,0000.0,0000.0,0000,000.00,0

ad 5 "ZONE? 2,8"
100.000,0000.0,0000.0,0000,000.00,0

ad 5 "ZONE? 2,9"
100.000,0000.0,0000.0,0000,000.00,0

ad 5 "ZONE? 2,10"
100.000,0000.0,0000.0,0000,000.00,0

Kepco Model ATE 100-2.5M Power Supply

Operation

The Model ATE 100-2.5M power supply is used as a linear power amplifier to dive the two heater banks on the copper block of the first stage of the two stage cold head on D82. These heater banks are nominally connected in parallel. The input to the supply comes from analog 2 output of the Lakes Shore Model 340 temperature controller. The crowbar of the power supply it connected to the D82 temperature switches connected in series to eliminate the possibility of overheating the detector or optics.

Parameters

The current control knob should be 2 turns CCW from full CW for more controlled heating of D82 to ambient. It can be set to full CW if the most rapid heating is necessary.

The voltage control has no function in the power supply's present configuration.