

**Title: SPECIFICATION FOR BAKEOUT PLC/T/C SYSTEM INTERFACE SOFTWARE  
FUNCTIONALITY BAKEOUT CONTROL SYSTEM**

**SPECIFICATION FOR  
BAKEOUT PLC-T/C SYSTEM INTERFACE SOFTWARE FUNCTIONALITY BAKEOUT  
CONTROL SYSTEM**

**FOR  
LIGO VACUUM EQUIPMENT**

Hanford, Washington  
and  
Livingston, Louisiana

Job No. V59049

**CONTROL:**

*[Signature]*

**ELECTRICAL:**

*[Signature]*

**PROJECT:**

*D.A. Mueller*

**PROJECT MANAGER:**

*[Signature]*

Information contained in this specification and its attachments is proprietary in nature and shall be kept confidential. It shall be used only as required to respond to the specification requirements, and shall not be disclosed to any other party.

| REV | LTR. | BY-DATE     | APPD. DATE      | DESCRIPTION OF CHANGE        |
|-----|------|-------------|-----------------|------------------------------|
| 2   |      | PPS 4/16/96 | D. MULL 4-17-96 | ISSUED FOR Design DFO # 0125 |
| 1   |      | PPS 3/16/96 | D. MULL 3-22-96 | ISSUED FOR Design DFO # 0085 |
| 0   |      | PPS 2/21/96 | D. MULL 2-21-96 | ISSUED FOR Design DFO # 068  |

|  |          |         |          |                      |                          |
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| <b>PROCESS SYSTEMS INTERNATIONAL, INC.</b> |          |         |          | <b>SPECIFICATION</b> |                          |
| INITIAL APPROVALS                          | PREPARED | DATE    | APPROVED | DATE                 | Number <b>V049-2-053</b> |
|  | PPS      | 8/31/96 | D. MULL  | 2-22-96              | LIGO-E960076-02-V        |
|  |          |         |          |                      | Rev. <i>2</i>            |

## 1.0 BAKEOUT CO-PROCESSOR T/C SOFTWARE FUNCTIONALITY

The Control Co-Processor software shall request T/C information from the TempScan1000A unit via RS-232 (9600 baud) every X seconds (derived from system variable SP\_133). The Co-Processor shall receive this T/C information (192 values), range check it and send the T/C information, T/C range alarming information and system alarm information/heartbeat to the Bakeout PLC.

The Control Co-Processor Module (Allen-Bradley #1771-DMC) is directly wired to the Bakeout PLC (Allen-Bradley #1785-L30B PLC 5/30) Co-Processor expansion port and shall utilize PLC-5 interface routines called in the C-Code software to directly access any registers in the Bakeout PLC. The PLC-5 interface routines are contained with-in the development software (Allen-Bradley #1771-PCB)

### 1.1 T/C Value Transfer, Range Checking, Clamping And Alarming

The TempScan1000A shall process a total of 192 T/C values. Expansion capabilities of adding an additional 32 are available (TI-077A/B through TI-092A/B).

#### 1.1.1 Blanket Control T/C's

152 T/C's will be Blanket Control T/C's tagged TI-001A through TI-076A and TI-001B through TI-076B. See Attach-A for a listing.

Each Blanket Control T/C value shall be range checked to verify that it is a correct Type-J T/C value. The T/C range shall be defined as follows (See Attach-A for more details):

- a) Blanket Control T/C low range SP\_130L (Variable range of 0 to 1200 Deg C)
- b) Blanket Control T/C hi range SP\_130H (Variable range of 0 to 1200 Deg C)

NOTE: The low and hi range variables are verified by the Co-Processor passing the variable values into indication points.

The low range SP\_130L has a verification of SP\_130LI.

The hi range SP\_130H has a verification of SP\_130HI.

Each Blanket Control T/C has a range check alarm point of TA-001A through TA-076A and TA-001B through TA-076B. The following shall occur for each Blanket Control T/C range check alarm :

- a) T/C falls with-in the low and hi-range the Alarm is OK (bit set to 0)
- b) T/C falls out of the low and hi range the Alarm is active (bit set to 1)

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This range check is performed each time new T/C information is received from the TempScan1000A and prior to sending T/C values to the Bakeout PLC. See Attach-A for a listing of alarms.

All Blanket Control T/C values transferred to the Bakeout PLC shall be clamped from -32768 to 32767, a valid PLC-5 Integer value.

**1.1.2 Auxiliary Systems Control T/C's**

32 T/C's will be Auxiliary Systems Control T/C's tagged TI-093A through TI-108A and TI-093B through TI-108B. See Attach-A for a listing.

Each Auxiliary Systems Control T/C value shall be range checked to verify that it is a correct Type-J T/C value. The T/C range shall be defined as follows (See Attach-A for more details):

- a) Aux. Sys. Cont. T/C low range SP\_130L (Variable range of 0 to 1200 Deg C)
- b) Aux. Sys. Cont. T/C hi range SP\_130H (Variable range of 0 to 1200 Deg C)

NOTE: The low and hi range Variable are verified by the Co-Processor passing the variable values into indication points.

The low range variable SP\_130L has a verification of SP\_130LI.

The hi range variable SP\_130H has a verification of SP\_130HI.

Each Auxiliary Systems Control T/C has a range check alarm point of TA-093A through TA-108A and TA-093B through TA-108B. The following shall occur for each control T/C range check alarm:

- a) T/C falls with-in the low and hi-range the Alarm is OK (bit set to 0)
- b) T/C falls out of the low and hi-range the Alarm is active (bit set to 1)

This range check is performed each time new T/C information is received from the TempScan1000A and prior to sending T/C values to the Bakeout PLC. See Attach-A for a listing of alarms.

All Auxiliary Systems Control T/C values transferred to the Bakeout PLC shall be clamped from -32768 to 32767, a valid PLC-5 Integer value.

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**1.1.3 Gauge Control T/C's**

8 T/C's will be Auxiliary Systems Control T/C's tagged TI-109A through TI-112A and TI-109B through TI-112B. See Attach-A for a listing.

Each Gauge Control T/C value shall be range checked to verify that it is a correct Type-J T/C value. The T/C range shall be defined as follows (See Attach-A for more details):

- a) Gauge Cont. T/C low range SP\_131L (Variable range of 0 to 1200 Deg C)
- b) Gauge Cont. T/C hi range SP\_131H (Variable range of 0 to 1200 Deg C)

NOTE: The low and hi range Set Points are verified by the Co-Processor passing the variable values into indication points.

The low range variable SP\_131L has a verification of SP\_131LI.

The hi range variable SP\_131H has a verification of SP\_131HI.

Each Auxiliary Systems Control T/C has a range check alarm point of TA-109A through TA-112A and TA-109B through TA-112B. The following shall occur for each control T/C range check alarm:

- a) T/C falls with-in the low and hi-range the Alarm is OK (bit set to 0)
- b) T/C falls out of the low and hi-range the Alarm is active (bit set to 1)

This range check is performed each time new T/C information is received from the TempScan1000A and prior to sending T/C values to the Bakeout PLC. See Attach-A for a listing of alarms.

All Auxiliary Systems Control T/C values transferred to the Bakeout PLC shall be clamped from -32768 to 32767, a valid PLC-5 Integer value.

**1.2 System Variables, Flags And Alarms**

The data transfer interval between the Co-Processor and PLC shall be a variable (SP\_133) set from the PLC. It shall be between 10 and 60 seconds. The data transfer rate between the Co-Processor and the TempScan1000A shall be at least half of variable SP\_133 (5 to 30 seconds).

NOTE: The data transfer interval variable is verified by the Co-Processor passing the Set Point value into an indication point.

The data transfer interval variable SP\_133 has a verification of SP\_133I.

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The Co-Processor software shall set the heartbeat flag to a 1 after complete T/C and alarm information has been sent to the Bakeout PLC. This flag will not be set until all information has been passed to the Bakeout PLC. This flag will be used by the PLC to process information and be reset to a 0 when complete. This flag will also be used by the PLC as a communication alarm between the Co-Processor and PLC. An alarm will be set in the PLC if the heartbeat flag is not set by the Co-Processor every X seconds.

See Attach-A for details of XI\_134.

The Co-Processor software shall check the data integrity of the T/C information received from the TempScan1000A. The following shall occur for the Data Integrity Signal (XI\_135):

- a) Data Integrity is OK, set XI\_135 to 0
- b) Data Integrity is BAD, set XI\_135 to 1

See Attach-A for details of XI\_135. An alarm will be set in the PLC if XI\_135 is set.

The Co-Processor software shall check the RS-232 communication between the TempScan1000A and the Co-Processor. The following shall occur for the Communication Signal (XI\_136):

- a) Communication is OK, set XI\_136 to 0
- b) Communication is BAD, set XI\_136 to 1

See Attach-A for details of XI\_136. An alarm will be set in the PLC if XI\_136 is set.

## 2.0 SOFTWARE COMMUNICATION AND PROGRAM FAILURE PROTOCOL

The Co-Processor software shall start-up immediately upon power-up of the Co-Processor module, and continue to operate until power is removed.

The software shall continue to operate in the event of loss of communication to either the TempScan1000A RS-232 network or the Bakeout PLC. If communication to either or both is lost the software shall continue to operate but not communicate to the lost node. When RS-232 communications has been re-established or the Bakeout PLC is back On-Line, the software should detect this and re-establish communications to the node.

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**2.1 Documentation And Source Code Requirements**

Three (3) copies of the Co-Processor software source code shall provided on 3 1/2" DS HD (MS-DOS based) Disks.

Three (3) hard copy print-outs of the source code shall be provided.

The source code shall be fully documented with explanations of functionality and linkages through-out the source code to make the source code fully understandable and easy to follow.

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| V049-2-053 Attachment-A REV. 2   |          |   | RANGE SETTINGS |            |         | PLC LOCATION |         |
| LIGO BAKEOUT SYSTEM PLC- T/C REGISTER LISTING<br>(under "TAG STAT" ** indicates change in tag information) |          |   | LOW RANGE      | HIGH RANGE | UNITS   | DEVICE       | ADDRESS |
| SYMBOL NAME  | TAG STAT | SERVICE DESCRIPTION                       | OFF-IND.       | ON-IND.    |         |              |         |
|  |          | ABCDEFGHIJABCDEFGHIJABCDEFGHIJ - 40 CHARS | ABCDEFG        | ABCDEFG    | ABCDEFG |              |         |

|    |      |                                  |        |       |       |    |         |
|----|------|----------------------------------|--------|-------|-------|----|---------|
| TI | 001A | HEATER-001 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:001 |
| TI | 002A | HEATER-002 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:002 |
| TI | 003A | HEATER-003 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:003 |
| TI | 004A | HEATER-004 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:004 |
| TI | 005A | HEATER-005 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:005 |
| TI | 006A | HEATER-006 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:006 |
| TI | 007A | HEATER-007 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:007 |
| TI | 008A | HEATER-008 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:008 |
| TI | 009A | HEATER-009 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:009 |
| TI | 010A | HEATER-010 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:010 |
| TI | 011A | HEATER-011 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:011 |
| TI | 012A | HEATER-012 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:012 |
| TI | 013A | HEATER-013 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:013 |
| TI | 014A | HEATER-014 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:014 |
| TI | 015A | HEATER-015 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:015 |
| TI | 016A | HEATER-016 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:016 |
| TI | 017A | HEATER-017 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:017 |
| TI | 018A | HEATER-018 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:018 |
| TI | 019A | HEATER-019 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:019 |
| TI | 020A | HEATER-020 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:020 |
| TI | 021A | HEATER-021 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:021 |
| TI | 022A | HEATER-022 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:022 |
| TI | 023A | HEATER-023 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:023 |
| TI | 024A | HEATER-024 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:024 |
| TI | 025A | HEATER-025 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:025 |
| TI | 026A | HEATER-026 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:026 |
| TI | 027A | HEATER-027 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:027 |
| TI | 028A | HEATER-028 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:028 |
| TI | 029A | HEATER-029 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:029 |
| TI | 030A | HEATER-030 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:030 |
| TI | 031A | HEATER-031 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:031 |
| TI | 032A | HEATER-032 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:032 |
| TI | 033A | HEATER-033 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:033 |
| TI | 034A | HEATER-034 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:034 |
| TI | 035A | HEATER-035 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:035 |
| TI | 036A | HEATER-036 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:036 |
| TI | 037A | HEATER-037 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:037 |
| TI | 038A | HEATER-038 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:038 |
| TI | 039A | HEATER-039 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:039 |

| V049-2-053 Attachment-A REV. 2   |          |   | RANGE SETTINGS |            |         | PLC LOCATION |         |
|--|----------|---|----------------|------------|---------|--------------|---------|
| LIGO BAKEOUT SYSTEM PLC- T/C REGISTER LISTING<br>(under "TAG STAT" ** indicates change in tag information) |          |   | LOW RANGE      | HIGH RANGE | UNITS   | DEVICE       | ADDRESS |
| SYMBOL NAME  | TAG STAT | SERVICE DESCRIPTION                                 | OFF-IND.       | ON-IND.    |         |              |         |
|  |          | ABCDEFGHIJABCDEFGHIJABCDEFGHIJABCDEFGHIJ - 40 CHARS | ABCDEFG        | ABCDEFG    | ABCDEFG |              |         |

|    |      |                                  |        |       |       |    |         |
|----|------|----------------------------------|--------|-------|-------|----|---------|
| TI | 040A | HEATER-040 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:040 |
| TI | 041A | HEATER-041 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:041 |
| TI | 042A | HEATER-042 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:042 |
| TI | 043A | HEATER-043 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:043 |
| TI | 044A | HEATER-044 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:044 |
| TI | 045A | HEATER-045 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:045 |
| TI | 046A | HEATER-046 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:046 |
| TI | 047A | HEATER-047 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:047 |
| TI | 048A | HEATER-048 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:048 |
| TI | 049A | HEATER-049 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:049 |
| TI | 050A | HEATER-050 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:050 |
| TI | 051A | HEATER-051 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:051 |
| TI | 052A | HEATER-052 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:052 |
| TI | 053A | HEATER-053 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:053 |
| TI | 054A | HEATER-054 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:054 |
| TI | 055A | HEATER-055 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:055 |
| TI | 056A | HEATER-056 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:056 |
| TI | 057A | HEATER-057 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:057 |
| TI | 058A | HEATER-058 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:058 |
| TI | 059A | HEATER-059 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:059 |
| TI | 060A | HEATER-060 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:060 |
| TI | 061A | HEATER-061 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:061 |
| TI | 062A | HEATER-062 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:062 |
| TI | 063A | HEATER-063 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:063 |
| TI | 064A | HEATER-064 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:064 |
| TI | 065A | HEATER-065 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:065 |
| TI | 066A | HEATER-066 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:066 |
| TI | 067A | HEATER-067 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:067 |
| TI | 068A | HEATER-068 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:068 |
| TI | 069A | HEATER-069 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:069 |
| TI | 070A | HEATER-070 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:070 |
| TI | 071A | HEATER-071 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:071 |
| TI | 072A | HEATER-072 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:072 |
| TI | 073A | HEATER-073 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:073 |
| TI | 074A | HEATER-074 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:074 |
| TI | 075A | HEATER-075 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:075 |
| TI | 076A | HEATER-076 CHAMBER BLANKET T/C-A | -32768 | 32767 | Deg C | 01 | N12:076 |
| TI | 093A | HEATER-093 AUX. BLANKET T/C-A    | -32768 | 32767 | Deg C | 01 | N12:093 |
| TI | 094A | HEATER-094 AUX. BLANKET T/C-A    | -32768 | 32767 | Deg C | 01 | N12:094 |



| V049-2-053 Attachment-A REV. 2   |          |                     |  |  | RANGE SETTINGS |            |          | PLC LOCATION |         |
|--|----------|---------------------|--|--|----------------|------------|----------|--------------|---------|
| LIGO BAKEOUT SYSTEM PLC- T/C REGISTER LISTING<br>(under "TAG STAT" ** indicates change in tag information) |          |                     |  |  | LOW RANGE      | HIGH RANGE | UNITS    | DEVICE       | ADDRESS |
| SYMBOL NAME  | TAG STAT | SERVICE DESCRIPTION |  |  | OFF-IND.       | ON-IND.    |          |              |         |
| ABCDEF GHIJ ABCDEF GHIJ ABCDEF GHIJ ABCDEF GHIJ - 40 CHARS   |          |                     |  |  | ABCDEF G       | ABCDEF G   | ABCDEF G |              |         |

|    |      |  |                                  |  |  |        |       |       |    |         |
|----|------|--|----------------------------------|--|--|--------|-------|-------|----|---------|
| TI | 021B |  | HEATER-021 CHAMBER BLANKET T/C-B |  |  | -32768 | 32767 | Deg C | 01 | N13:021 |
| TI | 022B |  | HEATER-022 CHAMBER BLANKET T/C-B |  |  | -32768 | 32767 | Deg C | 01 | N13:022 |
| TI | 023B |  | HEATER-023 CHAMBER BLANKET T/C-B |  |  | -32768 | 32767 | Deg C | 01 | N13:023 |
| TI | 024B |  | HEATER-024 CHAMBER BLANKET T/C-B |  |  | -32768 | 32767 | Deg C | 01 | N13:024 |
| TI | 025B |  | HEATER-025 CHAMBER BLANKET T/C-B |  |  | -32768 | 32767 | Deg C | 01 | N13:025 |
| TI | 026B |  | HEATER-026 CHAMBER BLANKET T/C-B |  |  | -32768 | 32767 | Deg C | 01 | N13:026 |
| TI | 027B |  | HEATER-027 CHAMBER BLANKET T/C-B |  |  | -32768 | 32767 | Deg C | 01 | N13:027 |
| TI | 028B |  | HEATER-028 CHAMBER BLANKET T/C-B |  |  | -32768 | 32767 | Deg C | 01 | N13:028 |
| TI | 029B |  | HEATER-029 CHAMBER BLANKET T/C-B |  |  | -32768 | 32767 | Deg C | 01 | N13:029 |
| TI | 030B |  | HEATER-030 CHAMBER BLANKET T/C-B |  |  | -32768 | 32767 | Deg C | 01 | N13:030 |
| TI | 031B |  | HEATER-031 CHAMBER BLANKET T/C-B |  |  | -32768 | 32767 | Deg C | 01 | N13:031 |
| TI | 032B |  | HEATER-032 CHAMBER BLANKET T/C-B |  |  | -32768 | 32767 | Deg C | 01 | N13:032 |
| TI | 033B |  | HEATER-033 CHAMBER BLANKET T/C-B |  |  | -32768 | 32767 | Deg C | 01 | N13:033 |
| TI | 034B |  | HEATER-034 CHAMBER BLANKET T/C-B |  |  | -32768 | 32767 | Deg C | 01 | N13:034 |
| TI | 035B |  | HEATER-035 CHAMBER BLANKET T/C-B |  |  | -32768 | 32767 | Deg C | 01 | N13:035 |
| TI | 036B |  | HEATER-036 CHAMBER BLANKET T/C-B |  |  | -32768 | 32767 | Deg C | 01 | N13:036 |
| TI | 037B |  | HEATER-037 CHAMBER BLANKET T/C-B |  |  | -32768 | 32767 | Deg C | 01 | N13:037 |
| TI | 038B |  | HEATER-038 CHAMBER BLANKET T/C-B |  |  | -32768 | 32767 | Deg C | 01 | N13:038 |
| TI | 039B |  | HEATER-039 CHAMBER BLANKET T/C-B |  |  | -32768 | 32767 | Deg C | 01 | N13:039 |
| TI | 040B |  | HEATER-040 CHAMBER BLANKET T/C-B |  |  | -32768 | 32767 | Deg C | 01 | N13:040 |
| TI | 041B |  | HEATER-041 CHAMBER BLANKET T/C-B |  |  | -32768 | 32767 | Deg C | 01 | N13:041 |
| TI | 042B |  | HEATER-042 CHAMBER BLANKET T/C-B |  |  | -32768 | 32767 | Deg C | 01 | N13:042 |
| TI | 043B |  | HEATER-043 CHAMBER BLANKET T/C-B |  |  | -32768 | 32767 | Deg C | 01 | N13:043 |
| TI | 044B |  | HEATER-044 CHAMBER BLANKET T/C-B |  |  | -32768 | 32767 | Deg C | 01 | N13:044 |
| TI | 045B |  | HEATER-045 CHAMBER BLANKET T/C-B |  |  | -32768 | 32767 | Deg C | 01 | N13:045 |
| TI | 046B |  | HEATER-046 CHAMBER BLANKET T/C-B |  |  | -32768 | 32767 | Deg C | 01 | N13:046 |
| TI | 047B |  | HEATER-047 CHAMBER BLANKET T/C-B |  |  | -32768 | 32767 | Deg C | 01 | N13:047 |
| TI | 048B |  | HEATER-048 CHAMBER BLANKET T/C-B |  |  | -32768 | 32767 | Deg C | 01 | N13:048 |
| TI | 049B |  | HEATER-049 CHAMBER BLANKET T/C-B |  |  | -32768 | 32767 | Deg C | 01 | N13:049 |
| TI | 050B |  | HEATER-050 CHAMBER BLANKET T/C-B |  |  | -32768 | 32767 | Deg C | 01 | N13:050 |
| TI | 051B |  | HEATER-051 CHAMBER BLANKET T/C-B |  |  | -32768 | 32767 | Deg C | 01 | N13:051 |
| TI | 052B |  | HEATER-052 CHAMBER BLANKET T/C-B |  |  | -32768 | 32767 | Deg C | 01 | N13:052 |
| TI | 053B |  | HEATER-053 CHAMBER BLANKET T/C-B |  |  | -32768 | 32767 | Deg C | 01 | N13:053 |
| TI | 054B |  | HEATER-054 CHAMBER BLANKET T/C-B |  |  | -32768 | 32767 | Deg C | 01 | N13:054 |
| TI | 055B |  | HEATER-055 CHAMBER BLANKET T/C-B |  |  | -32768 | 32767 | Deg C | 01 | N13:055 |
| TI | 056B |  | HEATER-056 CHAMBER BLANKET T/C-B |  |  | -32768 | 32767 | Deg C | 01 | N13:056 |
| TI | 057B |  | HEATER-057 CHAMBER BLANKET T/C-B |  |  | -32768 | 32767 | Deg C | 01 | N13:057 |
| TI | 058B |  | HEATER-058 CHAMBER BLANKET T/C-B |  |  | -32768 | 32767 | Deg C | 01 | N13:058 |
| TI | 059B |  | HEATER-059 CHAMBER BLANKET T/C-B |  |  | -32768 | 32767 | Deg C | 01 | N13:059 |

| V049-2-053 Attachment-A REV. 2   |          |   |          | RANGE SETTINGS |            |       | PLC LOCATION |         |
|--|----------|---|----------|----------------|------------|-------|--------------|---------|
| LIGO BAKEOUT SYSTEM PLC- T/C REGISTER LISTING<br>(under "TAG STAT" ** indicates change in tag information) |          |   |          | LOW RANGE      | HIGH RANGE | UNITS | DEVICE       | ADDRESS |
| SYMBOL NAME  | TAG STAT | SERVICE DESCRIPTION                       | OFF-IND. | ON-IND.        |            |       |              |         |
|  |          | ABCDEFGHIJABCDEFGHIJABCDEFGHIJ - 40 CHARS | ABCDEF   | ABCDEF         | ABCDEF     |       |              |         |

|    |      |   |        |       |       |    |         |
|----|------|---|--------|-------|-------|----|---------|
| TI | 060B | HEATER-060 CHAMBER BLANKET T/C-B        | -32768 | 32767 | Deg C | 01 | N13:060 |
| TI | 061B | HEATER-061 CHAMBER BLANKET T/C-B        | -32768 | 32767 | Deg C | 01 | N13:061 |
| TI | 062B | HEATER-062 CHAMBER BLANKET T/C-B        | -32768 | 32767 | Deg C | 01 | N13:062 |
| TI | 063B | HEATER-063 CHAMBER BLANKET T/C-B        | -32768 | 32767 | Deg C | 01 | N13:063 |
| TI | 064B | HEATER-064 CHAMBER BLANKET T/C-B        | -32768 | 32767 | Deg C | 01 | N13:064 |
| TI | 065B | HEATER-065 CHAMBER BLANKET T/C-B        | -32768 | 32767 | Deg C | 01 | N13:065 |
| TI | 066B | HEATER-066 CHAMBER BLANKET T/C-B        | -32768 | 32767 | Deg C | 01 | N13:066 |
| TI | 067B | HEATER-067 CHAMBER BLANKET T/C-B        | -32768 | 32767 | Deg C | 01 | N13:067 |
| TI | 068B | HEATER-068 CHAMBER BLANKET T/C-B        | -32768 | 32767 | Deg C | 01 | N13:068 |
| TI | 069B | HEATER-069 CHAMBER BLANKET T/C-B        | -32768 | 32767 | Deg C | 01 | N13:069 |
| TI | 070B | HEATER-070 CHAMBER BLANKET T/C-B        | -32768 | 32767 | Deg C | 01 | N13:070 |
| TI | 071B | HEATER-071 CHAMBER BLANKET T/C-B        | -32768 | 32767 | Deg C | 01 | N13:071 |
| TI | 072B | HEATER-072 CHAMBER BLANKET T/C-B        | -32768 | 32767 | Deg C | 01 | N13:072 |
| TI | 073B | HEATER-073 CHAMBER BLANKET T/C-B        | -32768 | 32767 | Deg C | 01 | N13:073 |
| TI | 074B | HEATER-074 CHAMBER BLANKET T/C-B        | -32768 | 32767 | Deg C | 01 | N13:074 |
| TI | 075B | HEATER-075 CHAMBER BLANKET T/C-B        | -32768 | 32767 | Deg C | 01 | N13:075 |
| TI | 076B | HEATER-076 CHAMBER BLANKET T/C-B        | -32768 | 32767 | Deg C | 01 | N13:076 |
| TI | 093B | HEATER-093 AUX. BLANKET T/C-B           | -32768 | 32767 | Deg C | 01 | N13:093 |
| TI | 094B | HEATER-094 AUX. BLANKET T/C-B           | -32768 | 32767 | Deg C | 01 | N13:094 |
| TI | 095B | HEATER-095 AUX. BLANKET T/C-B           | -32768 | 32767 | Deg C | 01 | N13:095 |
| TI | 096B | HEATER-096 AUX. BLANKET T/C-B           | -32768 | 32767 | Deg C | 01 | N13:096 |
| TI | 097B | HEATER-097 AUX. BLANKET T/C-B           | -32768 | 32767 | Deg C | 01 | N13:097 |
| TI | 098B | HEATER-098 AUX. BLANKET T/C-B           | -32768 | 32767 | Deg C | 01 | N13:098 |
| TI | 099B | HEATER-099 AUX. BLANKET T/C-B           | -32768 | 32767 | Deg C | 01 | N13:099 |
| TI | 100B | HEATER-100 AUX. BLANKET T/C-B           | -32768 | 32767 | Deg C | 01 | N13:100 |
| TI | 101B | HEATER-101 AUX. BLANKET T/C-B           | -32768 | 32767 | Deg C | 01 | N13:101 |
| TI | 102B | HEATER-102 AUX. BLANKET T/C-B           | -32768 | 32767 | Deg C | 01 | N13:102 |
| TI | 103B | HEATER-103 AUX. BLANKET T/C-B           | -32768 | 32767 | Deg C | 01 | N13:103 |
| TI | 104B | HEATER-104 AUX. BLANKET T/C-B           | -32768 | 32767 | Deg C | 01 | N13:104 |
| TI | 105B | HEATER-105 AUX. BLANKET T/C-B           | -32768 | 32767 | Deg C | 01 | N13:105 |
| TI | 106B | HEATER-106 AUX. BLANKET T/C-B           | -32768 | 32767 | Deg C | 01 | N13:106 |
| TI | 107B | HEATER-107 AUX. BLANKET T/C-B           | -32768 | 32767 | Deg C | 01 | N13:107 |
| TI | 108B | HEATER-108 AUX. BLANKET T/C-B           | -32768 | 32767 | Deg C | 01 | N13:108 |
| TI | 109B | HEATER-109 GAUGE BLANKET T/C-B          | -32768 | 32767 | Deg C | 01 | N13:109 |
| TI | 110B | HEATER-110 GAUGE BLANKET T/C-B          | -32768 | 32767 | Deg C | 01 | N13:110 |
| TI | 111B | HEATER-111 GAUGE BLANKET T/C-B          | -32768 | 32767 | Deg C | 01 | N13:111 |
| TI | 112B | HEATER-112 GAUGE BLANKET T/C-B          | -32768 | 32767 | Deg C | 01 | N13:112 |
| SP | 130H | HEATER 1 THRU 108 T/C-A/B HIGH RANGE SP | 0      | 1200  | Deg C | 01 | N15:000 |

|  |          |   |  |  |                |            |         |              |         |
|--|----------|---|--|--|----------------|------------|---------|--------------|---------|
| V049-2-053 Attachment-A REV. 2   |          |   |  |  | RANGE SETTINGS |            |         | PLC LOCATION |         |
| LIGO BAKEOUT SYSTEM PLC- T/C REGISTER LISTING<br>(under "TAG STAT" ** indicates change in tag information) |          |   |  |  | LOW RANGE      | HIGH RANGE | UNITS   | DEVICE       | ADDRESS |
| SYMBOL NAME  | TAG STAT | SERVICE DESCRIPTION                                 |  |  | OFF-IND.       | ON-IND.    |         |              |         |
|  |          | ABCDEFGHIJABCDEFGHIJABCDEFGHIJABCDEFGHIJ - 40 CHARS |  |  | ABCDEFG        | ABCDEFG    | ABCDEFG |              |         |

|    |       |  |  |           |       |       |    |            |
|----|-------|--|--|-----------|-------|-------|----|------------|
| SP | 130HI |  | HEATER 1 THRU 108 T/C-A/B HIGH RANGE SP IND.   | 0         | 1200  | Deg C | 01 | N15:001    |
| SP | 130L  |  | HEATER 1 THRU 108 T/C-A/B LOW RANGE SP         | 0         | 1200  | Deg C | 01 | N15:002    |
| SP | 130LI |  | HEATER 1 THRU 108 T/C-A/B LOW RANGE SP IND.    | 0         | 1200  | Deg C | 01 | N15:003    |
| SP | 131HI |  | HEATER 108 THRU 112 T/C-A/B HIGH RANGE SP      | 0         | 1200  | Deg C | 01 | N15:004    |
| SP | 131HI |  | HEATER 108 THRU 112 T/C-A/B HIGH RANGE SP IND. | 0         | 1200  | Deg C | 01 | N15:005    |
| SP | 131L  |  | HEATER 108 THRU 112 T/C-A/B LOW RANGE SP       | 0         | 1200  | Deg C | 01 | N15:006    |
| SP | 131LI |  | HEATER 108 THRU 112 T/C-B LOW RANGE SP IND.    | 0         | 1200  | Deg C | 01 | N15:007    |
| SP | 133   |  | DATA TRANSFER TIME INTERVAL SP                 | 10        | 60    | SECS  | 01 | N15:008    |
| SP | 133I  |  | DATA TRANSFER TIME INTERVAL SP IND.            | 10        | 60    | SECS  | 01 | N15:009    |
| XI | 134   |  | PLC-COPRO COMMUNICATION HEARTBEAT              | HEARTBEAT | ---   | ---   | 01 | N15:010/00 |
| XI | 135   |  | OMEGA-COPRO DATA INTEGRITY ALARM               | OK        | ALARM | ---   | 01 | N15:010/01 |
| XI | 136   |  | OMEGA-COPRO COMMUNICATION ALARM                | OK        | ALARM | ---   | 01 | N15:010/02 |
| XA | 137   |  | COPRO ERROR CODE                               | 0         | 100   | ---   | 01 | N15:011    |
| XA | 138   |  | COPRO ERROR LOCATION                           | 0         | 100   | ---   | 01 | N15:012    |

|     |      |    |   |    |              |     |    |            |
|-----|------|----|---|----|--------------|-----|----|------------|
| TRS | 001A | ** | HEATER-001 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:001/00 |
| TRS | 002A | ** | HEATER-002 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:002/00 |
| TRS | 003A | ** | HEATER-003 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:003/00 |
| TRS | 004A | ** | HEATER-004 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:004/00 |
| TRS | 005A | ** | HEATER-005 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:005/00 |
| TRS | 006A | ** | HEATER-006 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:006/00 |
| TRS | 007A | ** | HEATER-007 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:007/00 |
| TRS | 008A | ** | HEATER-008 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:008/00 |
| TRS | 009A | ** | HEATER-009 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:009/00 |
| TRS | 010A | ** | HEATER-010 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:010/00 |
| TRS | 011A | ** | HEATER-011 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:011/00 |
| TRS | 012A | ** | HEATER-012 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:012/00 |
| TRS | 013A | ** | HEATER-013 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:013/00 |
| TRS | 014A | ** | HEATER-014 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:014/00 |
| TRS | 015A | ** | HEATER-015 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:015/00 |
| TRS | 016A | ** | HEATER-016 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:016/00 |
| TRS | 017A | ** | HEATER-017 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:017/00 |
| TRS | 018A | ** | HEATER-018 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:018/00 |
| TRS | 019A | ** | HEATER-019 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:019/00 |
| TRS | 020A | ** | HEATER-020 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:020/00 |
| TRS | 021A | ** | HEATER-021 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:021/00 |
| TRS | 022A | ** | HEATER-022 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:022/00 |
| TRS | 023A | ** | HEATER-023 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:023/00 |
| TRS | 024A | ** | HEATER-024 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:024/00 |

|  |          |   |                |            |        |              |         |
|--|----------|---|----------------|------------|--------|--------------|---------|
| V049-2-053 Attachment-A REV. 2   |          |   | RANGE SETTINGS |            |        | PLC LOCATION |         |
| LIGO BAKEOUT SYSTEM PLC- T/C REGISTER LISTING<br>(under "TAG STAT" ** indicates change in tag information) |          |   | LOW RANGE      | HIGH RANGE | UNITS  | DEVICE       | ADDRESS |
| SYMBOL NAME  | TAG STAT | SERVICE DESCRIPTION                                 | OFF-IND.       | ON-IND.    |        |              |         |
|  |          | ABCDEFGHIJABCDEFGHIJABCDEFGHIJABCDEFGHIJ - 40 CHARS | ABCDEF         | ABCDEF     | ABCDEF |              |         |

|     |      |    |   |    |              |     |    |            |
|-----|------|----|---|----|--------------|-----|----|------------|
| TRS | 025A | ** | HEATER-025 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:025/00 |
| TRS | 026A | ** | HEATER-026 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:026/00 |
| TRS | 027A | ** | HEATER-027 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:027/00 |
| TRS | 028A | ** | HEATER-028 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:028/00 |
| TRS | 029A | ** | HEATER-029 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:029/00 |
| TRS | 030A | ** | HEATER-030 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:030/00 |
| TRS | 031A | ** | HEATER-031 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:031/00 |
| TRS | 032A | ** | HEATER-032 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:032/00 |
| TRS | 033A | ** | HEATER-033 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:033/00 |
| TRS | 034A | ** | HEATER-034 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:034/00 |
| TRS | 035A | ** | HEATER-035 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:035/00 |
| TRS | 036A | ** | HEATER-036 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:036/00 |
| TRS | 037A | ** | HEATER-037 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:037/00 |
| TRS | 038A | ** | HEATER-038 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:038/00 |
| TRS | 039A | ** | HEATER-039 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:039/00 |
| TRS | 040A | ** | HEATER-040 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:040/00 |
| TRS | 041A | ** | HEATER-041 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:041/00 |
| TRS | 042A | ** | HEATER-042 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:042/00 |
| TRS | 043A | ** | HEATER-043 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:043/00 |
| TRS | 044A | ** | HEATER-044 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:044/00 |
| TRS | 045A | ** | HEATER-045 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:045/00 |
| TRS | 046A | ** | HEATER-046 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:046/00 |
| TRS | 047A | ** | HEATER-047 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:047/00 |
| TRS | 048A | ** | HEATER-048 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:048/00 |
| TRS | 049A | ** | HEATER-049 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:049/00 |
| TRS | 050A | ** | HEATER-050 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:050/00 |
| TRS | 051A | ** | HEATER-051 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:051/00 |
| TRS | 052A | ** | HEATER-052 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:052/00 |
| TRS | 053A | ** | HEATER-053 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:053/00 |
| TRS | 054A | ** | HEATER-054 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:054/00 |
| TRS | 055A | ** | HEATER-055 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:055/00 |
| TRS | 056A | ** | HEATER-056 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:056/00 |
| TRS | 057A | ** | HEATER-057 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:057/00 |
| TRS | 058A | ** | HEATER-058 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:058/00 |
| TRS | 059A | ** | HEATER-059 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:059/00 |
| TRS | 060A | ** | HEATER-060 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:060/00 |
| TRS | 061A | ** | HEATER-061 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:061/00 |
| TRS | 062A | ** | HEATER-062 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:062/00 |
| TRS | 063A | ** | HEATER-063 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:063/00 |

| V049-2-053 Attachment-A REV. 2            |          |  |  |  | RANGE SETTINGS |            |         | PLC LOCATION |         |
|---|----------|--|--|--|----------------|------------|---------|--------------|---------|
|   |          | LIGO BAKEOUT SYSTEM PLC- T/C REGISTER LISTING<br>(under "TAG STAT" ** indicates change in tag information) |  |  | LOW RANGE      | HIGH RANGE | UNITS   | DEVICE       | ADDRESS |
| SYMBOL NAME                               | TAG STAT | SERVICE DESCRIPTION  |  |  | OFF-IND.       | ON-IND.    |         |              |         |
| ABCDEFGHIJABCDEFGHIJABCDEFGHIJ - 40 CHARS |          |  |  |  | ABCDEFG        | ABCDEFG    | ABCDEFG |              |         |

|          |    |   |    |              |     |    |            |
|----------|----|---|----|--------------|-----|----|------------|
| TRS 064A | ** | HEATER-064 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:064/00 |
| TRS 065A | ** | HEATER-065 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:065/00 |
| TRS 066A | ** | HEATER-066 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:066/00 |
| TRS 067A | ** | HEATER-067 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:067/00 |
| TRS 068A | ** | HEATER-068 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:068/00 |
| TRS 069A | ** | HEATER-069 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:069/00 |
| TRS 070A | ** | HEATER-070 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:070/00 |
| TRS 071A | ** | HEATER-071 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:071/00 |
| TRS 072A | ** | HEATER-072 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:072/00 |
| TRS 073A | ** | HEATER-073 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:073/00 |
| TRS 074A | ** | HEATER-074 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:074/00 |
| TRS 075A | ** | HEATER-075 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:075/00 |
| TRS 076A | ** | HEATER-076 CHAMBER BLANKET T/C-A RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:076/00 |
| TRS 093A | ** | HEATER-093 AUX. BLANKET T/C-A RANGE STATUS    | OK | OUT-OF RANGE | --- | 01 | N23:093/00 |
| TRS 094A | ** | HEATER-094 AUX. BLANKET T/C-A RANGE STATUS    | OK | OUT-OF RANGE | --- | 01 | N23:094/00 |
| TRS 095A | ** | HEATER-095 AUX. BLANKET T/C-A RANGE STATUS    | OK | OUT-OF RANGE | --- | 01 | N23:095/00 |
| TRS 096A | ** | HEATER-096 AUX. BLANKET T/C-A RANGE STATUS    | OK | OUT-OF RANGE | --- | 01 | N23:096/00 |
| TRS 097A | ** | HEATER-097 AUX. BLANKET T/C-A RANGE STATUS    | OK | OUT-OF RANGE | --- | 01 | N23:097/00 |
| TRS 098A | ** | HEATER-098 AUX. BLANKET T/C-A RANGE STATUS    | OK | OUT-OF RANGE | --- | 01 | N23:098/00 |
| TRS 099A | ** | HEATER-099 AUX. BLANKET T/C-A RANGE STATUS    | OK | OUT-OF RANGE | --- | 01 | N23:099/00 |
| TRS 100A | ** | HEATER-100 AUX. BLANKET T/C-A RANGE STATUS    | OK | OUT-OF RANGE | --- | 01 | N23:100/00 |
| TRS 101A | ** | HEATER-101 AUX. BLANKET T/C-A RANGE STATUS    | OK | OUT-OF RANGE | --- | 01 | N23:101/00 |
| TRS 102A | ** | HEATER-102 AUX. BLANKET T/C-A RANGE STATUS    | OK | OUT-OF RANGE | --- | 01 | N23:102/00 |
| TRS 103A | ** | HEATER-103 AUX. BLANKET T/C-A RANGE STATUS    | OK | OUT-OF RANGE | --- | 01 | N23:103/00 |
| TRS 104A | ** | HEATER-104 AUX. BLANKET T/C-A RANGE STATUS    | OK | OUT-OF RANGE | --- | 01 | N23:104/00 |
| TRS 105A | ** | HEATER-105 AUX. BLANKET T/C-A RANGE STATUS    | OK | OUT-OF RANGE | --- | 01 | N23:105/00 |
| TRS 106A | ** | HEATER-106 AUX. BLANKET T/C-A RANGE STATUS    | OK | OUT-OF RANGE | --- | 01 | N23:106/00 |
| TRS 107A | ** | HEATER-107 AUX. BLANKET T/C-A RANGE STATUS    | OK | OUT-OF RANGE | --- | 01 | N23:107/00 |
| TRS 108A | ** | HEATER-108 AUX. BLANKET T/C-A RANGE STATUS    | OK | OUT-OF RANGE | --- | 01 | N23:108/00 |
| TRS 109A | ** | HEATER-109 GAUGE BLANKET T/C-A RANGE STATUS   | OK | OUT-OF RANGE | --- | 01 | N23:109/00 |
| TRS 110A | ** | HEATER-110 GAUGE BLANKET T/C-A RANGE STATUS   | OK | OUT-OF RANGE | --- | 01 | N23:110/00 |
| TRS 111A | ** | HEATER-111 GAUGE BLANKET T/C-A RANGE STATUS   | OK | OUT-OF RANGE | --- | 01 | N23:111/00 |
| TRS 112A | ** | HEATER-112 GAUGE BLANKET T/C-A RANGE STATUS   | OK | OUT-OF RANGE | --- | 01 | N23:112/00 |

|          |    |   |    |              |     |    |            |
|----------|----|---|----|--------------|-----|----|------------|
| TRS 001B | ** | HEATER-001 CHAMBER BLANKET T/C-B RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:001/01 |
| TRS 002B | ** | HEATER-002 CHAMBER BLANKET T/C-B RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:002/01 |
| TRS 003B | ** | HEATER-003 CHAMBER BLANKET T/C-B RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:003/01 |
| TRS 004B | ** | HEATER-004 CHAMBER BLANKET T/C-B RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:004/01 |
| TRS 005B | ** | HEATER-005 CHAMBER BLANKET T/C-B RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:005/01 |

|  |          |   |                |            |         |              |         |
|--|----------|---|----------------|------------|---------|--------------|---------|
| V049-2-053 Attachment-A REV. 2   |          |   | RANGE SETTINGS |            |         | PLC LOCATION |         |
| LIGO BAKEOUT SYSTEM PLC- T/C REGISTER LISTING<br>(under "TAG STAT" ** indicates change in tag information) |          |   | LOW RANGE      | HIGH RANGE | UNITS   | DEVICE       | ADDRESS |
| SYMBOL NAME  | TAG STAT | SERVICE DESCRIPTION                                 | OFF-IND.       | ON-IND.    |         |              |         |
|  |          | ABCDEFGHIJABCDEFGHIJABCDEFGHIJABCDEFGHIJ - 40 CHARS | ABCDEFG        | ABCDEFG    | ABCDEFG |              |         |

|     |      |    |   |    |              |     |    |            |
|-----|------|----|---|----|--------------|-----|----|------------|
| TRS | 100B | ** | HEATER-100 AUX. BLANKET T/C-B RANGE STATUS  | OK | OUT-OF RANGE | --- | 01 | N23:100/01 |
| TRS | 101B | ** | HEATER-101 AUX. BLANKET T/C-B RANGE STATUS  | OK | OUT-OF RANGE | --- | 01 | N23:101/01 |
| TRS | 102B | ** | HEATER-102 AUX. BLANKET T/C-B RANGE STATUS  | OK | OUT-OF RANGE | --- | 01 | N23:102/01 |
| TRS | 103B | ** | HEATER-103 AUX. BLANKET T/C-B RANGE STATUS  | OK | OUT-OF RANGE | --- | 01 | N23:103/01 |
| TRS | 104B | ** | HEATER-104 AUX. BLANKET T/C-B RANGE STATUS  | OK | OUT-OF RANGE | --- | 01 | N23:104/01 |
| TRS | 105B | ** | HEATER-105 AUX. BLANKET T/C-B RANGE STATUS  | OK | OUT-OF RANGE | --- | 01 | N23:105/01 |
| TRS | 106B | ** | HEATER-106 AUX. BLANKET T/C-B RANGE STATUS  | OK | OUT-OF RANGE | --- | 01 | N23:106/01 |
| TRS | 107B | ** | HEATER-107 AUX. BLANKET T/C-B RANGE STATUS  | OK | OUT-OF RANGE | --- | 01 | N23:107/01 |
| TRS | 108B | ** | HEATER-108 AUX. BLANKET T/C-B RANGE STATUS  | OK | OUT-OF RANGE | --- | 01 | N23:108/01 |
| TRS | 109B | ** | HEATER-109 GAUGE BLANKET T/C-B RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:109/01 |
| TRS | 110B | ** | HEATER-110 GAUGE BLANKET T/C-B RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:110/01 |
| TRS | 111B | ** | HEATER-111 GAUGE BLANKET T/C-B RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:111/01 |
| TRS | 112B | ** | HEATER-112 GAUGE BLANKET T/C-B RANGE STATUS | OK | OUT-OF RANGE | --- | 01 | N23:112/01 |