

DFBX-G 24C352 Manufacturing Travelers

Production Floor Traveler

Date: 11/14/2003
 Time: 14:38:29

CONTROLLED DOCUMENT



Job Order 00918-0045

REV: 0 DATE: 11/14/03
 APPROVED: *[Signature]*

Part Number: OFBX-G 25I137 TP Subassy	Revision: NS	U / M	EA	Quantity: 1.00			
Start Date: 07/15/2005	Sales Order Coordinator: ECB	Ship Item: Y	Ship Early: Y	Split Ship: Y			
Call Date: 07/04/2005	Sales Order: 000750	Customer: Lawrence Berkeley National Lab					
Actual P: 05/05/2003							
Operation	Work Center	Operation Quantity	Setup Time	Pieces per Hour	Operation Time	Move Time	Elapsed Time

Description: OFBX-G 25I137 Top Plate Subassy



10 WE 1.00 0.00 0.05 20.00 0.00 20.00
 2-A WELDERS

Operation Description Detail :

1.0 Dwg 25I137 Top Plate Assembly Qty 1 (used on G 24C352)

1.1 Weld the following to the Item 7 Top Plate:

- Sht 4 Section F-F: 1x-Item 26 Tube
- Sht 4 Section D-D: 1x-Item 21 Tube
- Sht 4 Section C-C: 1x-Item 21 Tube
- Sht 3 Section E-E: 1x-Items 15 & 22 only.
- Sht 3 Section B-B: 1x-Item 4.

TED

1.2 Using 4x- 3/4-10 thread rods, suspend Item 7 Top Plate Weldment Assy from fabrication fixture. Level the Top Plate, within .010", use the spot faces surfaces to define the plane formed by Datum C. (Datum C is defined on Sheet 2).

*TED
GLENN*

1.3 Tin the 6x Item 1 HTS Chimneys and 4x Item 3 VCL Chimneys for the soft solder joint to the 40x Item 13 Tower Thermal Anchor Straps. Tin the Chimneys in a 2" wide band centered approximately 13-7/8" from the lower edge of the Chimney weldments.

DONE

1.4 Clean the Chimney Weldments per MTM-MP1030 for vacuum service.

1.5 Stage to OP20.



20 AS 1.00 0.00 0.25 4.00 0.00 4.00
 3-A ASSEMBLY

Operation Description Detail :

2.0 Dwg 25I137 Top Plate Assembly Qty 1 (used on G 24C352)

- 2.1 Install 30 layer MLI blanket over previously made Items 29/30/31 Thermal Shield Assembly.
- 2.2 Install the step 2.1 Shield assembly to the Top Plate. Use Item 20, 33 and 35. (See Section P-P). While installing the Shield Assembly to the Top Plate also install the Pipe Hanger (25M854) for the DH Pipe Spool (25I225). (See Section Q-Q).
- 2.3 Stage to OP30. *D. R.*

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Job Order 00918-0045

Part: 251137 0 251137 TP Subassy Revision: NS U/M EA Quantity: 1.00
 Date: 11/14/2005 Sales Order Coordinate: ECB Ship to: Y Ship Early: Y Split Ship: Y
 Date: 11/14/2005 Sales Order: 000750 Customer Location: Berkeley National Lab
 Actual Date: 11/14/2003

Operation	Work Center	Operation Quantity	Setup Time	Pieces per Hour	Operation Time	Move Time	Elapsed Time
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Desc: 251137 0 251137 Top Plate Subassy



30	WE	1.00	0.00	0.13	8.00	0.00	8.00
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2-A WELDERS

Operation Description Detail :

3.0 Dwg 251137 Top Plate Assembly Qty 1 (used on G 24C352)

STAMP/SCRIBE YOUR WELDS

- 3.1 Fit the 6x Item 1 HTS Chimney Assy Lower and 4x Item 3 VCL Chimney Assys through the Top Plate, from underneath, and secure out of the way.
- 3.2 Install the Item 2 Helium Tank (251111) underneath the Top Plate Subassembly. Use the Item 9 and 10 Strut Rod Assemblies to hang the LHe vessel from the Top Plate. Position and align the Helium Tank relative to the Top Plate per 251137 sheet 2 veivs, locating the Helium Tank relative to the Datum C plane formed by the spot faces on the Top Plate and the Datum A centerpoint location defined by the dowel pin hole in the Top Plate. Use the Romer Arm to confirm the true position of the End Plate bores on the Helium Tank to the datum per the print. Print out the inspection result. Secure the Helium Tank in place.
- 3.3 Install the top 10 layer MLI Blanket for the Helium Tank onto it (this blanket wraps around the Helium Tank). Cover the MLI with protective plastic.
- 3.4 Stage to OP40

GLENN WAYNE



40	WE	1.00	0.00	0.05	20.00	0.00	20.00
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2-A WELDERS

Operation Description Detail :

4.0 Dwg 251137 Top Plate Assembly Qty 1 (used on G 24C352)

STAMP/SCRIBE YOUR WELDS.

- 4.1 Reference sheet 4: Bench weld and have cold shocked and leak tested the Section F-F piping (Item 18 and 19). Complete and forward test reports to the project engineer.
- 4.2 Reference sheet 4: Bench weld and have cold shocked and leak tested the Section D-D piping (Item 16 and 28). Complete and forward test reports to the project engineer.
- 4.3 ~~Install silver tape on the Section F-F and D-D piping. Cover the pipes with 10 layer MLI blankets, interweave no more than a 5 layer thickness at the seams. See Ed Bonnema for details around the bellows.~~
- 4.4 Install the Section F-F piping and Section D-D piping. Weld to the stubs on the Helium Tank per sheet 4. Complete the exterior detail for the Section F-F and D-D piping as shown on sheet 4.

MIKE

DELETED. 211 12-4-03

4.5 Prepare the Item 8 DH Vent Pipe for welding by removing the temporary caps

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Job Order 00918-0045

Part Number	DFBX-G 25I137 TP Subassy	Revision	NS	U / M	EA	Quantity	1.00	
Quote Date	07/15/2005	Sales Order Coordinator	ECB	Ship Item	Y	Ship Early	Y	
Calc Date	07/04/2005	Sales Order	000750	Customer	Lawrence Berkeley National Lab			
Actual Date	02/05/2003	Operation	Quantity	Setup Time	Pieces per Hour	Operation Time	Move Time	Elapsed Time

Description: DFBX-G 25I137 Top Plate Subassy

from the port that will be welded in this assembly. (See Section C-C). Cover the pipe with silver tape, discuss the details for insulating around the flex hoses with Ed Bonnema. Don't use the silver tape on the flex hoses. Wrap the DH Vent Pipe in all with a 10 layer MLI blanket, interweave no more than a 5 layer thickness at the seams.

4.6 Prepare the Item 6 PHPK Check Valve for welding by disassembling the internals per the instructions provided by PHPK. Bag and tag all components. Check the end connections of the valve are the sizes correct to fit to the Item 16 bellows shown in Section H-H and the 1" OD tube end of the DH Vent Pipe as shown on dwg 25I225? If not inform Ed Bonnema. Cover the section of the valve below the vacuum jacket with silver tape. Also wrap that section with a 10 layer MLI blanket, interweave no more than a 5 layer thickness at the seams. Check the end

4.7 Install the Item 8 DH Vent Pipe in the assembly and the the Item 6 PHPK Check Valve per the Sections H-H and C-C. Install the DH Vent Pipe into the Pipe Hanger on (Section Q-Q). Provide temporary supports for the DH Vent Pipe as necessary.

4.8 Confirm fit of DH Vent Pipe (except to HTS Chimneys which are not installed) and the PHPK Check valve. Tack all connections in place. Complete the interior welds first. Then finish the exterior details shown in the sections. and weld complete. Note Conflat Flange is Item 25I225-3 and is welded on at this stage.

4.6 INSPECTION POINT:

CWI VISUAL INSPECTION OF WELDS: [Signature] Date: 1-26-04

INTERNAL INSPECTION OF PIPE: [Signature] Date: 1-26-04

(Inspect all new pipe runs and welds for internal obstructions. Direct visual inspection is possible in all cases.)

4.7 Stage to OP50.



50 AS 1.00 0.00 0.13 8.00 0.00 8.00

3-A ASSEMBLY

Operation Description Detail :

5.0 Dwg 25I137 Top Plate Assembly Qty 1 (used on G 24C352)

Forward test reports to the project engineer.

5.1 Cold shock all new welds from OP40 per MTM-MP-1040.

Production Floor Traveler



Job Order 00918-0045

Part No	QTY	DESCRIPTION	Revision	NS	U / M	EA	Quantity	1.00
		251137 TP Subassy						
Order Date	11/15/2005	Sales Order	Coordinator	ECB	Ship Term	Y	Ship Early	Y
Order Date	11/15/2005	Sales Order	000750	Customer	Lawrence		Test Site	National Lab
Order Date	11/15/2005	Operation	Setup	Pieces	Operation	Move	Elapsed	
		Quantity	Time	per Hour	Time	Time	Time	
		Work Center						

Description: 251137 Top Plate Subassy

5.2 Blank off at appropriate points and leak check per MTM-MP-1110 (acceptance criteria 1x10-9 atm-cc/sec) the: Section F-F; Section H-H; Section D-D; Section C-C welds. NOTE: THE BELLOWS IN SECTIONS F-F , H-H and D-D HAVE BEEN DESIGNED TO WITHSTAND BOTH THE TEST PRESSURE AND INTERNAL VACUUM WITH OUT EXTERNAL SQUIRM SUPPORT. HOWEVER BEFORE EVACUATING THE TEST SET UP SHOULD BE REVIEWED TO ENSURE THE END POINTS (TOP PLATE AND HELIUM TANK) OF THE BELLOWS ARE FIXED AND WON'T MOVE UNDER VACUUM LOAD.

5.3 Insulate the exposed pipe areas with silver tape and 10 layers of MLI.

5.4 Stage to OP60.



60	WE	1.00	0.00	0.02	43.00	0.00	43.00
	2-A WELDERS						

Operation Description Detail :

0 Dwg 251137 Top Plate Assembly Qty 1 (used on G 24C352)

STAMP/SCRIBE YOUR WELDS.

Note: Lead chimney straightness requirement: < 1mm. (.079) EKC
Lead chimney bellows offset < 0.5mm. (.019) EKC

6.1 Fit the 6x Item 1 HTS Chimney Assy Lower and 4x Item 3 VCL Chimney Assys installed and secured out of the way in OP30 with the matching Weldment Rings on the Helium Tank. Fit the Chimneys from the Helium Tank up through the Top Plate, setting them at the proper orientation and height. Slip the Item 25 Chimney Tube, Weld Flanges over the OD of each Chimney atop the Top Plate.

6.2 Reference 251137 Sheet 2 Side View, Sheet 3 Section A-A and 24C352 Sheet 5 Section A-A. Use the ROMER Portable CMM to confirm alignment, do not force alignment by overstressing or deforming the bellows. (Lead chimney straightness requirement: < 1mm. Lead chimney bellows allowable offset < 0.5mm.)

6.3 With the Chimneys aligned and in place, tack weld ONLY in place the Item 25 Chimney Tube, Weld Flanges to the Top Plate Detail G and J). This leaves the tubes free to float. Weld each HTS Chimney per Section A-A Zone A7 to the Helium Tank. Weld each VCL Chimney per Section A-A Zone A6 to the Helium Tank.

6.4 Weld the Detail G and J Item 25 to Chimney welds. DO NOT WELD THE ITEM 25 TO THE TOP PLATE!

6.5 Soft solder the Item 30 Chimney Thermal Anchors to the Chimneys (4 per Chimney). Clean for vacuum service per MTM-MP-1030.

6.6 Confirm alignment with the ROMER Portable CMM.

6.7 Fit and weld the 4x Item 251175-3 Conflat flanges to the VCL Chimneys.

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Job Order 00918-0045

Part No: G 25I137 TP Subassy	Revision: NS	U/M: EA	Quantity: 1.00				
Est. Date: 07/17/2005	Sales Order Coordinator: ECB	Ship Item: Y	Ship Early: Y				
Calc Ref Date: 07/04/2005	Sales Order: 000750	Customer: Lawrence Berkeley National Lab					
Actual Fl. Date: 05/05/2003							
Operation	Work Center	Operation Quantity	Setup Time	Pieces per Hour	Operation Time	Move Time	Elapsed Time

Description: DFBN G 25I137 Top Plate Subassy

- 6.8 Fit and weld the 6x Item 5 HTS Chimney Top to the HTS Chimneys.
- 6.9 Fit and weld the 6x-Item 8 DH Vent Pipe connections to the Item 1 HTS Chimneys.
- 6.10 Confirm the alignment of the completed Chimneys per print and acceptance criteria above. Forward the inspection report to the project engineer.
- 6.11 INSPECTION POINT:

CWI VISUAL INSPECTION OF WELDS: *(Signature)* Date: *1-27-04*

	70 AS	1.00	0.00	0.13	8.00	0.00	8.00
3-A ASSEMBLY							

Operation Description Detail :

- 7.0 Dwg 25I137 Top Plate Assembly Qty 1 (used on G 24C352)
- 7.1 Install the Item 14,15,16 & 17 Threaded Rods to the Top Plate.
- 7.2 Re-assemble the internals of the PHPK Check valve per the provided instructions.
- 7.3 Stage to OP80.

D.K WAYNE 1-28-04

	80 AS	1.00	0.00	0.06	16.00	0.00	16.00
3-A ASSEMBLY							

Operation Description Detail :

- 8.0 Dwg 25I137 Top Plate Assembly Qty 1 (used on G 24C352)
- Forward test reports to project engineer.
- 8.1 Restrain the LHe Tank to the support fixture so that the Chimney bellows are restrained. Install external restraints to prevent squirm. CONSULT WITH THE PROJECT ENGINEER TO DETERMINE IF OTHER BELLOWS OR PIPES REQUIRE RESTRAINT. *D.K 3/15/04*
- 8.2 Cold shock all new welds from OP60 per MTM-MP-1040.
- 8.3 Blank off all openings and leak test per MTM-MP-1110 all the new piping connected to the LHe vessel. (Acceptance criteria 1x10⁻⁹ atm-cc/sec helium.)
- 8.4 Remove blank-offs and restraints.
- 8.5 Insulate the 10x Chimney Tubes with 10 layers of MLI. Interweave no more than a 5 layer thickness at the seams. See Ed Bonnema for details around the bellows.
- 8.6 Stage to subjob-0044 G 24C352 Feed Box Assembly. *D.K D-T*

Production Floor Traveler



Job Order 00918-0045

Part Number DFBX-G 251137 TP Subassy Revision NS U / M EA Quantity 1.00

Due Date 07/15/2005

Calc Re-Date 07/04/2005

Actual Re-Date 05/05/2003

Operation	Work Center	Operation Quantity	Setup Time	Pieces per Hour	Operation Time	Move Time	Elapsed Time
		Total Times	0.00		127.00	0.00	127.00

End Of Report

* Represents Sub-Contract days, these days are not included in the column total.

Production Floor Traveler

Date: 03/17/2004
 Time: 13:38:26

CONTROLLED DOCUMENT



Job Order 00918-0044

REV: 0 DATE: 3/18/04 # 1
 APPROVED: EB

DFBX-G 24C352 FB Assy

Reference: NS

Quantity: 1.00

Quantity: 1.00

Start Date: 06/14/2005

Sales Order Coordinator: ECB

Part Number: 24C352

Part Name: FB Assy

Part Description: FB Assy

Start Date: 04/14/2005

Sales Order: 000750

Customer: Lawrence Berkeley National Lab

Start Date: 05/05/2003

Operation	Work Center	Operation Quantity	Setup Time	Pieces per Hour	Operation Time	Move Time	Engage Time
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DFBX-G 24C352 Feed Box Assembl



10 AS

1.00 0.00

1.00 1.00

0.00

1.00

3-A ASSEMBLY

Operation Description Detail :

1.0 Dwg 24C352 G Feed Box Assembly- Piping Assemblies Dwg 25I226

1.1 Pull the piping assemblies shown on 25I226 (From subjob-0048).

1.2 Stage to OP20.



20 WE

1.00 0.00

1.00 1.00

0.00

1.00

2-A WELDERS

Operation Description Detail :

2.0 Dwg 25I218 (25I226-11) Pipe, CC1

Reference: Dwg 24C352; 25I226; 25I218; 25I137; 25I111

2.1 Install the 25I218 Pipe, CC1 in the Feed Box Assy. NOTE THIS IS ALREADY COMPLETE.

2.2 Stage to OP30.



30 AS

1.00 0.00

1.00 1.00

0.00

1.00

3-A ASSEMBLY

Operation Description Detail :

3.0 Dwg 25I218 (25I226-11) Pipe, CC1

NOTE THIS IS ALREADY COMPLETE.



40 WE

1.00 0.00

0.08 12.00

0.00

12.00

2-A WELDERS

Operation Description Detail :

4.0 Dwg 24C352 G Feed Box Assembly- Bus Duct Q3 End Dwg 25M857

CUSTOMER WITNESS POINT.

Reference: Specification M994; Dwg 25C352; 25I226 Sht 10; ~~25M857~~; 25H400

Bus Duct 25I857 assembles to the Q3 End of the LHe Tank. (THIS IS THE END FACING EAST IN OUR FIXTURE.)

4.1 Remove the 25M857 MQX1 Pipe from the crate.

4.2 Enter the serial number of the ~~25I857~~ Bus Assembly below:

25M857

SN 25I448-6 By: ECB Date: 3-22-04

4.3 Remove the protective pipe (Item 3) cover from the conductors. Remove the protective Teflon tube (Item 9) from the conductors.

4.4 Clean for welding with acetone and isopropyl alcohol the end of the weld neck.

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Job Order 00918-0044

Job Order: DFBX-G 24C352 FB Assy Revision: NS U / M EA Quantity: 1.00
 Date: 05/14/2005 Sales Order Coordinator: ECB Ship Item: Y Ship Early: Y Split Ship: Y
 Date: 01/11/2005 Sales Order: 000750 Customer: Lawrence Berkeley National Lab
 Date: 03/05/2000

Operation	Work Center	Operation Quantity	Setup Time	Pieces per Hour	Operation Time	Move Time	Elapsed Time
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Operation: DFBX-G 24C352 Feed Box Assembl

- flange on the Bus Duct and the area on the LHe Tank end plate. ✓
- 4.5 Place a protective plastic sleeve in the LHe Tank end plate hole. ✓
- 4.6 Carefully insert the conductors through the LHe Tank end plate hole, feeding the bus conductors through the Cable Looms to their intended splice location. Reference ~~25C352~~ ^{24C352} sht 10 Detail N. (Note MTM assumes that the bus conductors are individually identified by LBNL.) Leave slack in the assembly so the piping portion of the Bus Duct can be fit to the LHe Vessel.
- 4.7 Fit the Bus Duct to the LHe vessel. Move the Tie Down Ring back out of the way. Assemble the Lambda Plug Flange to the LHe Tank end plate by using 4 clamps in the end plate bolt circle to clamp the Lambda Plug Flange to the LHe Tank. Bolts may be lubricated with a small amount of Krytox or Apiezon vacuum grease. Note the horizontal run of the Bus Duct must be supported during and after this assembly. Remove the plastic sleeve from the end plate hole. ✓
- 4.8 After assembly confirm that the Bus Duct is in positional location and level to the Top Plate per 24C352 sht 8. Record locations: (Use Romer Portable CMM or other suitable means.)

X: OK
 Y: OK
 Z: OK

By: ECB Date: _____

- 4.9 Complete the assembly of the bus conductors in the Cable Looms and confirm that the conductors are all long enough to reach and complete their splices.

Confirmed By: D.K. Date: _____

4.10 Stage to OP50.



50 WE

2-A WELDERS

1.00 0.00 0.25 4.00 0.00 4.00

Operation Description Detail :

5.0 Dwg 24C352 G Feed Box Assembly- Bus Duct Q3 End Dwg 25M857

CUSTOMER WITNESS POINT.

Reference: Specification M994; Dwg 25C352; 25I226 Sht 10; 25M587; 25H400

Bus Duct 25I857 assembles to the Q3 End of the LHe Tank.

STAMP YOUR WELDS.

- 5.1 From the inside of the LHe Tank, attach 4x-Omeagalabel BU-100/38 temperature monitors on the Lambda Plate Housing at 4 equally spaced locations. These are for LBNL record. Attach thermocouple wire to the same area and bring the readout outside the LHe Tank where it can be monitored during welding.

5.2 Reference Dwg 24C352 Sht 4 Zone A3 for weld detail.

Production Floor Traveler

Date: 03/17/2004

Time - 13:38:20

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Job Order 00918-0044

Operation	Work Center	Operation Quantity	Setup Time	Pieces per Hour	Operation Time	Move Time	Elapsed Time
DFBX-G 24C352 Feed Box Assembl							

5.3 From the outside of the LHe Tank, proceed to weld the Lambda Plug Flange to the LHe Tank end plate in the following manner.

5.3.1 WPS GTAW-SS/LT. Monitor the temperature indicators at all times. Temperature not to exceed 40C (104F).

AUG. 58, 64° OVER 1/4" WELD

5.3.2 Tack weld the Flange at 4 equally spaced locations, 1" long x .06" fillet leg. Allow 4 tacks to cool to room temperature before proceeding. Check alignment.

5.3.3 Repeat step 5.3.2 for 4 more fillet tacks. Move clamps as needed. Check alignment.

5.3.4 Repeat step 5.3.2 for 4 more fillet tacks. Move clamps as needed. Check alignment.

5.3.5 Remove clamps and confirm that the Ring can be installed.

5.3.6 Complete the welding by repeating step 5.3.2 until the weld is complete.

5.3.7 Check alignment.

5.3.8 Install the Retaining Ring, tighten the 12 bolts in a star pattern to 25 ft-lb torque. Bolts may be lubricated with a small amount of Krytox or Apiezon vacuum grease

5.3.9 Tack weld the bolt heads to the Retaining Ring to prevent their loosening.

5.3.10 Remove the Omegalable temperature monitors and forward them to the project engineer for inclusion in the data package.

5.3.11 Remove the thermocouple wire.

5.4 Confirm that the Bus Duct is in positional location and level to the Top Plate per 24C352 sht 8. Record locations: (Use Romer Portable CMM or other suitable means.)

X: OK

Y: OK

Z: OK

By: ACIL Date: 5-31

5.5 Stage to OP60.



60 AS 1.00 0.00 1.00 1.00 0.00 1.00
 3-A ASSEMBLY

Operation Description Detail :

6.0 Dwg 24C352 G Feed Box Assembly- Bus Duct Q3 End Dwg 25M857

NOTE THIS ON HOLD AND WE PROBABLY WON'T DO THIS.

CUSTOMER WITNESS POINT.

REPORT RESULTS ON TEST REPORT.

Production Floor Traveler

Date: 03/17/2004
 Time - 13:38:20
 Page # 4



Job Order 00918-0044

Operation	Work Center	Operation Quantity	Setup Time	Pieces per Hour	Operation Time	Move Time	Elapsed Time
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00918-0044 DFBX-G 24C352 Feed Box Assembl

6.1 Check the rate of rise through the Lambda Plate, from the LHe Tank into the Bus Duct.

RATE OF RISE

- 6.1.1 Remove Item 7 from 25M857 Pipe, Weldment MQX1. Attach KF spool tee with Cold Cathode gauge and vacuum valve to KF port on Pipe. Connect via vacuum valve to the leak detector and vacuum pump cart. Evacuate the MQX1 Pipe. Spray MQX1 Pipe to leak check per MTM-MP-1110.
- 6.1.2 Evacuate the MQX1 Pipe to TBD torr. Close of valve to leak detector and vacuum pump cart. Perform rate of rise test for TBD minutes, record initial cold cathode pressure reading and final reading on a test report.
- 6.1.3 Back fill with dry nitrogen gas. Disassemble test equipment. Reseal KF port.

6.2 Stage to OP70.



70 WE	1.00	0.00	0.08	12.00	0.00	12.00
2-A WELDERS						

Operation Description Detail :

7.0 Dwg 24C352 G Feed Box Assembly- Bus Duct D1 End Dwg 25M859
 CUSTOMER WITNESS POINT.

Reference: Specification M994; Dwg 25C352; 25I226 Sht 10; 25M859;25H400
 Bus Duct 25M859 assembles to the D1 End of the LHe Tank.

- 7.1 Remove the 25M858 MBX1 Pipe from the crate. Lift around the long horizontal
- 7.2 Enter the serial number of the 25I589 Bus Assembly below:

SN 25I448-1 By: [Signature] Date: 3-22-04

- 7.3 Remove the protective pipe cover from the conductors. Remove the protective Teflon tube form the conductors.
- 7.4 Clean for welding with acetone and isopropyl alcohol the end of the weld neck flange on the Bus Duct and the area on the LHe Tank end plate.
- 7.5 Place a protective plastic sleeve in the LHe Tank end plate hole.
- 7.6 Carefully insert the conductors through the LHe Tank end plate hole, feeding the bus conductors though the Cable Looms to their intended splice location. Reference 25C352 sht 10 Detail N. (Note MTM assumes that the bus conductors are individually identified by LBNL.) Leave slack in the assembly so the piping portion of the Bus Duct can be fit to the LHe Vessel.
- 7.7 Fit the Bus Duct to the LHe vessel. Move the Tie Down Ring back out of the way. Assemble the Lambda Plug Flange to the LHe Tank end plate by using 4 clamps in the end plate bolt circle to clamp the Lambda Plug Flange to the LHe Tank. Bolts may be lubricated with a small amount of Krytox or Apiezon vacuum

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Job Order 00918-0044

Part Description: DFBX-G 24C352 Feed Box Assy
 Revision: 06/14/2005
 Date: 04/14/2005
 Date: 05/05/2003

Plant: 0000NS
 Sales Order Coordinator: ECB
 Sales Order: 000750
 Customer: Lawrence Berkeley National Lab

Material: EA
 Ship Item: Y
 Ship Date: Y
 Split Ship: Y

Operation	Work Center	Operation Quantity	Setup Time	Pieces per Hour	Operation Time	Move Time	Elapsed Time
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Operation: DFBX-G 24C352 Feed Box Assembl

grease. Note the horizontal run of the Bus Duct must be supported during and after this assembly. Remove the protective plastic sleeve from the LHe Tank.
 7.8 After assembly confirm that the Bus Duct is in positional location and level to the Top Plate per 24C352 sht 8. Record locations: (Use Romer Portable CMM or other suitable means.)

X: OK
 Y: OK
 Z: OK

By: ECK Date: 5-31

7.9 Complete the assembly of the bus conductors in the Cable Looms and confirm that the conductors are all long enough to reach and complete their splices.

Confirmed By: AK Date: 4/15/04

7.10 Stage to OP80.



80 WE	1.00	0.00	0.25	4.00	0.00	4.00
2-A WELDERS						

Operation Description Detail :

8.0 Dwg 24C352 G Feed Box Assembly- Bus Duct D1 End Dwg 25M859
 CUSTOMER WITNESS POINT.

Reference: Specification M994; Dwg 25C352; 25I226 Sht 10; 25M589;25H400
 Bus Duct 25M859 assembles to the D1 End of the LHe Tank.
 STAMP YOUR WELDS.

8.1 From the inside of the LHe Tank, attach 4x-Omeagalabel BU-100/38 temperature monitors on the Lambda Plate Housing at 4 equally spaced locations. These are for LBNL record. Attach thermocouple wire to the same area and bring the readout outside the LHe Tank where it can be monitored during welding.

8.2 Reference Dwg 24C352 Sht 4 Zone A3 for weld detail.

8.3 From the outside of the LHe Tank, proceed to weld the Lambda Plug Flange to the LHe Tank end plate in the following manner.

8.3.1 WPS GTAW-SS/LT. Monitor the temperature indicators at all times.

Temperature not to exceed 40C (104F).

8.3.2 Tack weld the Flange at 4 equally spaced locations, 1" long x .06" fillet leg. Allow 4 tacks to cool to room temperature before proceeding. Check alignment.

8.3.3 Repeat step 5.3.2 for 4 more fillet tacks. Move clamps as needed. Check alignment.

8.3.4 Repeat step 5.3.2 for 4 more fillet tacks. Move clamps as needed. Check

Production Floor Traveler



Job Order 00918-0044

Part Number DFBX-G 24C352 FB Assy Revision NS U/M EA Quantity 1.00
 Issue Date 06/14/2005 Sales Order Coordinator ECB Ship Item Y Ship Party Y Split Ship Y
 Release Date 04/14/2005 Sales Order 000750 Customer Lawrence Berkeley National Lab.
 Effective Date 03/04/2003

Operation	Work Center	Operation Quantity	Setup Time	Pieces per Hour	Operation Time	Move Time	Elapsed Time
90	AS	1.00	0.00	1.00	1.00	0.00	1.00

Description 90 DFBX-G 24C352 Feed Box Assembly

alignment.

- 8.3.5 Remove clamps and confirm that the Ring can be installed.
- 8.3.6 Complete the welding by repeating step 5.3.2 until the weld is complete.
- 8.3.7 Check alignment.
- 8.3.8 Install the Retaining Ring, tighten the 12 bolts in a star pattern to 25 ft-lb torque. Bolts may be lubricated with a small amount of Krytox or Apiezon vacuum grease
- 8.3.9 Tack weld the bolt heads to the Retaining Ring to prevent their loosening.
- 8.3.10 Remove the Omegalable temperature monitors and forward them to the project engineer for inclusion in the data package.
- 8.3.11 Remove the thermocouple wire.
- 8.4 Confirm that the Bus Duct is in positional location and level to the Top Plate per 24C352 sht 8. Record locations: (Use Romer Portable CMM or other suitable means.)

X: OK
 Y: OK
 Z: OK

By: ECK Date: _____

8.5 Stage to OP90.



90 AS 1.00 0.00 1.00 1.00 0.00 1.00
 3-A ASSEMBLY

Operation Description Detail :

9.0 Dwg 24C352 G Feed Box Assembly- Bus Duct D1 End Dwg 25M859

ON HOLD THIS WILL PROBABLY BE DELETED.
 CUSTOMER WITNESS POINT.

9.1 Check the rate of rise through the Lambda Plate, from the LHe Tank into the Bus Duct.

- 9.1.1 Remove Item 7 from 25M859 Pipe, Weldment MBX1. Attach KF spool tee with Cold Cathode gauge and vacuum valve to KF port on Pipe. Connect via vacuum valve to the leak detector and vacuum pump cart. Evacuate the MBX1 Pipe. Spray MBX1 Pipe to leak check per MTM-MP-1110.
- 9.1.2 Evacuate the MBX1 Pipe to TBD torr. Close of valve to leak detector and vacuum pump cart. Perform rate of rise test for TBD minutes, record initial cold cathode pressure reading and final reading on a test report.
- 9.1.3 Back fill with dry nitrogen gas. Disassemble test equipment. Reseal KF

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Job Order 00918-0044

Order Date 04/14/2005 Sales Order 000750 Customer Lawrence Berkeley National Lab
 Order Ref Date 05/05/2003

Operation	Work Center	Operation Quantity	Setup Time	Pieces per Hour	Operation Time	Move Time	Elapsed Time
DFBX-G 24C352 Feed Box Assembl							

port.
 9.2 Stage to OP100.



100	AS	1.00	0.00	0.04	24.00	0.00	24.00
3-A ASSEMBLY							

Operation Description Detail :

10.0 Dwg 24C352 G Feed Box Assembly- Item 11 120 Amp VC Lead Splicing & Testing
 CUSTOMER WITNESS POINT.

Reference: Specification M983; Dwg 25C352; 25C322; 25I864

Read and follow the M983 procedure with the Traveler. Drawing 25I864 gives an overview of the position of the components 24C352 Sht 10 Detail N gives an overview of the conductor locations.

10.1 Install Item 11 the 120 AMP VC Power Lead in the Feed Box. Lubricate the M8 bolts for the CF flange with vacuum grease. Torque to standard CF flange seal value.

10.2 Cover the bottom of the LHe Vessel with a plastic sheet.

10.3 Follow procedure steps 1 through 3 for all ten 120 AMP leads. (Reference 25I615 Detail 2 for wire layout)

Wire Layout Completed: Alvin Kovachy Date: 8/27/04

Confirmed Correct: Alvin Kovachy Date: 8/27/04

10.4 Follow procedure steps 4 thorough 11 for all 10 leads.

10.5 Step 12 . Perform a electrical continuity test to verify that the correct bus wire has been connected to the correct lead. (Reference 25I615 Detail 2)

Continuity Test: Pass/Fail By: S. K. Date: 8/27/04

10.6 Follow procedure steps 13 through 15.

Completed By: S. K. R.H. Date: 8/27/04

10.7 Perform the HiPot Electrical Performance Test per the Procedure. Make sure that the free ends of the Voltage Tap wires are not grounded.

TAPE OFF THE AREA AND PUT UP HIGH VOLTAGE SIGNS.

INFORM THE AREA SUPERVISOR THAT THE TEST IS TAKING PLACE.

Complete the test per the procedure for each of 10 leads in the 120 AMP Power Lead.

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Job Order 00918-0044

Part: DFBX-G 24C352 FB Assy Revision: NS U/M: EA
 Date: 06/14/2005 Sales Order: Coordinator: ECB Ship Item: Y Ship Early: Y
 Date: 04/14/2005 Sales Order: 000750 Customer: Lawrence Berkeley National Lab
 Date: 05/05/2003

Operation	Work Center	Operation Quantity	Setup Time	Pieces per Hour	Operation Time	Move Time	Elapsed Time
10.8	DFBX-G 24C352 Feed Box Assembl						

Lead#1 Reading: 1.0Ω Lead#2 Reading: 1.0Ω Lead#3 Reading: 1.0Ω

Lead#4 Reading: 1.0Ω Lead#5 Reading: 1.0Ω Lead#6 Reading: 1.0Ω

Lead#7 Reading: 1.0Ω Lead#8 Reading: 1.0Ω Lead#9 Reading: 1.0Ω

Lead#10 Reading: 1.0Ω

Completed By: J. K. Date: 8/27/04

10.8 Stage to OP110.



110 AS	1.00	0.00	0.10	10.00	0.00	10.00
3-A ASSEMBLY						

Operation Description Detail :

11.0 Dwg 24C352 G Feed Box Assembly- Item 18 600 Amp 2-Lead Assy Splicing & Testing
 CUSTOMER WITNESS POINT.

Reference: Specification M982; Dwg 25C352; 25I164; 25I864

Read and follow the M982 procedure with the Traveler. Drawing 25I864 gives an overview of the position of the components 24C352 Sht 10 Detail N gives an overview of the conductor locations.

11.1 Install Item 18 the 600 AMP 2-Lead Power Lead in the Feed Box. Lubricate the M8 bolts for the CF flange with vacuum grease. Torque to standard CF flange seal value.

11.2 Cover the bottom of the LHe Vessel with a plastic sheet.

11.3 Follow procedure steps 1 through 3 for the 2 leads. (Reference 251615 Detail 1 for wire layout)

Wire Layout Completed: J. K. Date: 8/27/04

Confirmed Correct: DJC Date: 8/27/04

11.4 Follow procedure steps 4 thorough 11 for both leads.

11.5 Step 12 . Perform a electrical continuity test to verify that the correct bus wire has been connected to the correct lead. (Reference 251615 Detail 1)

Continuity Test Pass/Fail By: R. H Date: 8/27/04

11.6 Follow procedure steps 13 through 15.

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Job Order 00918-0044

DFBX-G 24C352 FB Assy Revision NS Item EA
 08/14/2005
 04/14/2005 Sales Order 000750
 05/05/2003 Lawrence Berkeley National Lab

Operation	Work Center	Operation Quantity	Setup Time	Pieces per Hour	Operation Time	Move Time	Elapsed Time
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DFBX-G 24C352 Feed Box Assembl

Completed By: GK Date: 8/27/04

11.7 Perform the HiPot Electrical Performance Test per the Procedure. Make sure that the free ends of the Voltage Tap wires are not grounded.
 TAPE OFF THE AREA AND PUT UP HIGH VOLTAGE SIGNS.
 INFORM THE AREA SUPERVISOR THAT THE TEST IS TAKING PLACE.
 Complete the test per the procedure for each of leads in the 600 AMP Power Lead.

Lead#1 Reading: _____ Lead#2 Reading: _____ *SEE REPORTS*

Completed By: GK Date: 8/27/04

11.8 Stage to OP120.

	120 AS	1.00	0.00	0.03	30.00	0.00	30.00
3-A ASSEMBLY							

Operation Description Detail :

12.0 Dwg 24C352 G Feed Box Assembly- Item 12 Qty 2 600 Amp 6-Lead Assy Splicing & Testing
 CUSTOMER WITNESS POINT.

Reference: Specification M982; Dwg 25C352; 24C353; 251864
 Read and follow the M982 procedure with the Traveler. Drawing 251864 gives an overview of the position of the components 24C352 Sht 10 Detail N gives an overview of the conductor locations.

12.1 Install Item 12 the 600 AMP 6-Lead Power Lead in the Feed Box. Lubricate the M8 bolts for the CF flange with vacuum grease. Torque to standard CF flange seal value.

12.2 Cover the bottom of the LHe Vessel with a plastic sheet.

12.3 Follow procedure steps 1 through 3 for the 2 leads. (Reference 251615 Detail 1 for wire layout)

Wire Layout Completed: Alan Grady Date: 4/12/04

Confirmed Correct: D. Christie Date: 4/13/04

12.4 Follow procedure steps 4 through 11 for both leads.

12.5 Step 12 . Perform a electrical continuity test to verify that the correct bus wire has been connected to the correct lead. (Reference 251615 Detail 1)

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Job Order 00918-0044

Part Number: DFBX-G 24C352 FB Assy Revision: NS UTM EA
 Date: 06/14/2005 Sales Order Coordinator: ECB Ship Item: Y
 Date: 04/14/2005 Sales Order: 000750 Customer: Lawrence Berkeley National Lab
 Date: 05/05/2003

Operation	Work Center	Operation Quantity	Setup Time	Pieces per Hour	Operation Time	Move Time	Elapsed Time
Operation: DFBX-G 24C352 Feed Box Assembl							

Continuity Test: Pass/Fail By: DJC/GK Date: 4/13/04

12.6 Follow procedure steps 13 through 15.

Completed By: GK Date: 4/13/04

12.7 Perform the HiPot Electrical Performance Test per the Procedure. Make sure that the free ends of the Voltage Tap wires are not grounded.
 TAPE OFF THE AREA AND PUT UP HIGH VOLTAGE SIGNS.
 INFORM THE AREA SUPERVISOR THAT THE TEST IS TAKING PLACE.
 Complete the test per the procedure for each of leads in the 600 AMP Power Lead.

Lead#1 Reading: 45Ω Lead#2 Reading: 0.4Ω Lead#3 Reading: 0.4Ω

Lead#4 Reading: 0.5Ω Lead#5 Reading: 0.5Ω Lead#6 Reading: 0.5Ω

Completed By: R.H. Date: 8/30/04

12.8 Repeat for second item 13.

12.9 Wire Layout Confirmation

Wire Layout Completed: R.H. Date: 8/30/04

Confirmed Correct: D.K. Date: 8/30/04

12.10 Continuity Test

Continuity Test: Pass/Fail By: D.K. Date: 8/30/04

12.11 HiPot Test

Lead#1 Reading: _____ Lead#2 Reading: _____ Lead#3 Reading: _____

Lead#4 Reading: _____ Lead#5 Reading: _____ Lead#6 Reading: _____

Completed By: GK Date: 8/30/04

SEE REPORTS

12.12 Stage to OP130.



130 AS 1.00 0.00 0.03 30.00 0.00 30.00
 3-A ASSEMBLY

Operation Description Detail :

13.0 Dwg 24C352 G Feed Box Assembly- Item 8 Qty 6 HTS Leads Assy Splicing & Testing
 CUSTOMER WITNESS POINT.

Production Floor Traveler



Job Order 00918-0044

Part Name: DFBX-G 24C352 FB Assy Revision: NS U / M: EA Qty: 1,000
 Date: 05/13/2005 Sales Order Coordinator: ECB Ship Item: Y Ship Assy: Y
 Date: 04/14/2005 Sales Order: 000750 Customer: Lawrence Berkeley National Lab
 Date: 05/05/2003

Operation	Work Center	Operation Quantity	Setup Time	Pieces per Hour	Operation Time	Move Time	Elapsed Time
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Operation: DFBX-G 24C352 Feed Box Assembl

Reference: Specification M985; Dwg 25C352; 25I156; 25I864
 Read and follow the M982 procedure with the Traveler. Drawing 25I864 gives an overview of the position of the components 24C352 Sht 10 Detail N gives an overview of the conductor locations.

- 13.1 Install Item 8 the HTS-Lead Power Lead in the Feed Box. Lubricate the Threaded Rods bolts for the CF flange with vacuum grease. Torque to drawing requirements.
- 13.2 Cover the bottom of the LHe Vessel with a plastic sheet.
- 13.3 Follow procedure steps 1 through 3 for the leads. (Reference 25I615 Detail 8 for wire layout)

Wire Layout Completed: D. X. Date: 9/1/04
 Confirmed Correct: DJC Date: 9/1/04

- 13.4 Follow procedure steps 4 through 11.

Completed By: D. X. Date: 9/1/04

- 13.5 Repeat for the remaining 5 Leads.

Completed By: D. X. Date: 9/1/04
 Completed By: D. X. Date: _____
 Completed By: D. X. Date: _____
 Completed By: D. X. Date: _____
 Completed By: D. X. Date: _____

- 13.6 Note the HiPot Test of the HTS Leads is to be performed in a Nitrogen atmosphere. Blank off all ports of the LHe Tank. Evacuate the LHe Tank and back fill with Nitrogen prior to performing the test.

- 13.7 Perform the HiPot Electrical Performance Test per the Procedure. Make sure that the free ends of the Voltage Tap wires are not grounded.
TAPE OFF THE AREA AND PUT UP HIGH VOLTAGE SIGNS.
INFORM THE AREA SUPERVISOR THAT THE TEST IS TAKING PLACE.
 Complete the test per the procedure for each HTS Power Leads.

HTS#1 Reading: _____ HTS#2 Reading: _____ HTS#3 Reading: _____
 HTS#4 Reading: _____ HTS#5 Reading: _____ HTS#6 Reading: _____

SEE Reports

Production Floor Traveler

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Job Order 00918-0044

Part Name: DFBX-G 24C352 FB Assy Revision: NS U/M EA Quantity: 1.00
 Date: 06/14/2005 Sales Order Coordinator: ECB Ship Item: Y
 Date: 04/14/2005 Sales Order: 000750 Customer: Lawrence
 Date: 05/05/2005 Supplier: National U.S.

Description	Operation	Work Center	Operation Quantity	Setup Time	Pieces per Hour	Operation Time	Move Time	Elapsed Time
DFBX-G 24C352 Feed Box Assembl								

Completed By: GK Date: 9-1-04 SEE REPORTS

13.8 Perform the HiPot Electrical Performance Test per the Procedure. Make sure that the free ends of the Voltage Tap wires are not grounded.
 TAPE OFF THE AREA AND PUT UP HIGH VOLTAGE SIGNS.
 INFORM THE AREA SUPERVISOR THAT THE TEST IS TAKING PLACE.
 Complete the test per the procedure for each HTS Power Leads Heater (2x per HTS).

HTS#1A Reading: _____ HTS#1B Reading: _____
 HTS#2A Reading: _____ HTS#2B Reading: _____
 HTS#3A Reading: _____ HTS#3B Reading: _____
 HTS#4A Reading: _____ HTS#4B Reading: _____
 HTS#5A Reading: _____ HTS#5B Reading: _____
 HTS#6A Reading: _____ HTS#6B Reading: _____

SEE REPORTS

13.9 Completed By: GK Date: 9-1-04

13.10 Disassemble the covers from the LHe Vessel.

13.11 Stage to OP140.

	140 AS	1.00	0.00	0.13	8.00	0.00	8.00
3-A ASSEMBLY							

Operation Description Detail :

14.0 Dwg 24C352 G Feed Box Assembly

Forward test reports to the project engineer.

14.1 Clean the interior of the LHe Tank for cryogenic service.

14.2 Install Item 6 251162 LHe Diagnostic Assembly.

14.3 Re-confirm the continuity of all Power Lead splices.

14.4 Re-confirm the continuity of all Voltage Taps for all Power Leads.

14.5 Measure and record the electrical resistance of the temperature sensors on the six (6) HTS Leads (3 per lead).

14.6 Measure and record electrical resistance of Level Sensor installed on 251162.

14.7 Stage to OP150.

Completed: CLD 9-14-04 By: CLD

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Job Order 00918-0044

DESCRIPTION: DFBX-G 24C352 FB Assy
 Revision: 1.00
 Date: 06/14/2005
 Sales Order: 000750
 Date: 04/14/2005
 Sales Order: 000750
 Date: 05/05/2003
 Customer: Lawrence Berkeley National Lab

Operation	Work Center	Operation Quantity	Setup Time	Pieces per Hour	Operation Time	Move Time	Elapsed Time
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DFBX-G 24C352 Feed Box Assembl



150	WE	1.00	0.00	0.08	12.00	0.00	12.00
2-A WELDERS							

Operation Description Detail :

- 15.0 Dwg 24C352 G Feed Box Assembly-Dwg 25111 LHe Tank
STAMP YOUR WELDS. GTAW-SS/LT root passes/FCAW-SS/LT covers.
- 15.1 Fit Item 31 and Item 32 Cover Plates to the LHe Tank. Reference 24C352 Sht 5 for weld details.
- 15.2 Root pass both Cover Plates.
- 15.3 Dye penetrant test the root pass of the Cover Plates. Forward test report to project engineer. (DYE PEN BY CONAM.)
Completed By: _____ Date: _____
- 15.4 Complete the Cover Plate welding.
- 15.5 Dye penetrant test the cover pass of the Cover Plates. Forward test report to project engineer. (DYE PEN BY CONAM.)
Completed By: Date: 9-16-04
- 15.6 Stage to OP160.



160	WE	1.00	0.00	0.25	4.00	0.00	4.00
2-A WELDERS							

Operation Description Detail :

- 16.0 24C352 G Feed Box Assembly-Dwg 25111 LHe Tank
- 16.1 Assemble the 251905 Center Pipe Support to the LHe Tank.
- 16.2 Install the 251855 V Pipe & Jacket Assy and the 25M858 LD3 Cross Over Pipe and fit the Cross Over Pipe to the Bus Ducts per 251891 and the V Pipe & Jacket Assy per 251226. Weld complete.
- 16.3 Stage to OP170.



170	AS	1.00	0.00	0.25	4.00	0.00	4.00
3-A ASSEMBLY							

Operation Description Detail :

- 17.0 24C352 G Feed Box Assembly-Dwg 25111 LHe Tank
Forward test reports to the project engineer.
- 17.1 Cold shock per MTM-MP-1040 the new welds from OP150 and OP160.
- 17.2 Secure the 25M857, 25M858, 25M859 pipes and the LHe Tank for pressure test.
Constrain the system to protect all bellows.
- 17.3 Check lead chimney straightness and bellows offsets. Complete inspection report.

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DFBX-G 24C352 FB Assy

Division NS

U/M EA

Dept 11 1100

03/19/2005

Sales Order 000750

ECB

Supp Item Y

Reg 1100

03/17/2005

Sales Order 000750

ECB

Supp Item Y

Reg 1100

03/05/2003

Sales Order 000750

ECB

Supp Item Y

Reg 1100

Lawrence Berkeley National Lab

Operation	Work Center	Operation Quantity	Setup Time	Pieces per Hour	Operation Time	Move Time	Elapsed Time
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DFBX-G 24C352 Feed Box Assembl

engineer.

19.9 Stage to OP200.



200 AS

1.00

0.00

0.05

20.00

0.00

20.00

3-A ASSEMBLY

Operation Description Detail :

20.0 24C352 G Feed Box Assembly-Dwg 251111 LHe Tank

CUSTOMER WITNESS POINT

20.0 Deleted.

20.1 Insulate the LHe Tank, Lead Chimneys, LD3 and Bus Duct Pipes with 10 layers of MLI. Reference Specification M-990. NOTE: In locations where pipes pass through support assemblies the insulation is to be wrapped with kapton tape for protection from abrasion during thermal cycling.

20.2 Insulate Bellows on Chimneys, and all piping per Specification M-990 6.7b.

20.3 Stage to OP210.



210 AS

1.00

0.00

0.03

32.00

0.00

32.00

3-A ASSEMBLY

Operation Description Detail :

21.0 24C352 G Feed Box Assembly-Piping Dwg 251226

NOTE: In locations where pipes pass through support assemblies the insulation is to be wrapped with kapton tape for protection from abrasion during thermal cycling.

21.1 Install the following pipes in the assembly. Insulate with MLI all bellows per Specification M-990 6.7b prior to installing. Use temporary supports as necessary until the Item 251226-16 thru 251226-19 Supports are in place.

21.2 Following procedure To Be supplied by LBNL install the Cernox temperature sensors on the following pipes: 3x on 251890 Pipe, XB; 1x 251215 Pipe, CY2; Also attach 1x to 251225.

21.3 Temporarily support pipes as necessary.

21.4 Install 251226-1 (251890 Pipe, XB)

21.5 Install 251226-12 (251223 Pipe, LD1)

21.6 Install 251226-8 (251216 Pipe, CC2).

21.7 Customer Witness Point. Install 251226-11 (251219 Pipe, MBX2). Weld to Top Plate at LQX port (24C362 Section F-F). Be careful of instrumentation wires.

Follow M996 procedure up to step 4.2.7.

Record SN: CG02 By: ELK Date: _____

21.8 Customer Witness Point. Install 251226-14 (251301 Pipe, MQX2). Weld to Top

SEE ED FOR THIS

Production Floor Traveler



Job Order 00918-0044

Operation	Work Center	Operation Quantity	Setup Time	Pieces per Hour	Operation Time	Move Time	Elapsed Time
Description: DFBX-G 24C352 Feed Box Assembly							

Continuity Check: Pass/Fail? By: J. QC Date: _____

- 23.5 Solder the wires to the connector pins per wiring diagram 251619 Item 6.
- 23.6 Perform a continuity check of wires. Complete a test report and forward to the project engineer.
- Continuity Check: Pass/Fail? By: J. QC Date: 8/6/04
- Wiring Correct Confirmed by: W. J. Date: 8/6/04
- 23.7 Mix a small batch of Stycast 2850MT. De-gas by placing in container and with quartz window, evacuate. The Stycast is de-gassed when it stops bubbling.
- 23.8 Encapsulate the soldered connections in the de-gassed Stycast 285MT(blue). Pour into a cut out paper cup surrounding the pins. Allow the epoxy to cure.
- 23.9 Perform a continuity check of wires to check received condition. Complete a test report and forward to the project engineer.
- 23.10 Continuity Check: Pass/Fail? By: J. QC Date: _____
- 23.11 Weld Top Plate with connectors to Body.
- 23.12 Stage to OP240.



240	WE	1.00	0.00	0.03	30.00	0.00	30.00
2-A WELDERS							

Operation Description Detail :

- 24.0 24C352 G Feed Box Assembly- (Weld and Assembly)
 Customer Witness Point.
 Reference Specification M996; Dwg 251226 sheet 3; 24C352
- 24.1 Pull the instrumentation wires from 251226-14 (24C362 Section F-F up through the Top Plate. Pull the staged kit for 251831. Fit the Item 251831-5 and 251831-7 the Top Plate. Protect wires from high frequency. Wind the bundles for feedthru holes A through L counterclockwise 4 twists and insert the bundles through the appropriate hole in the LQX Diagnostic Assy.
- 24.2 Perform a continuity check of wires to check received condition.
 Continuity Check: Pass/Fail? By: J. QC Date: 8/5/04
- 24.3 Perform weld to Top Plate and between 251831-5 and 251831-7 per Section F-F.
- 24.4 Perform a continuity check of wires.
 Continuity Check: Pass/Fail? By: J. QC Date: 8/5/04
- 24.5 Solder the wires to the connector pins per wiring diagram 251619 Item 7.
- 24.6 Perform a continuity check of wires. Complete a test report and forward to the project engineer.
 Continuity Check: Pass/Fail? By: J. QC Date: 8/5/04
- Wiring Correct Confirmed by: J. QC Date: 8/6/04
- 24.7 Mix a batch of Stycast 2850MT. De-gas by placing in container and with

Production Floor Traveler



Job Order 00918-0044

DEBY G 24C352 FB Assy Revision: NS U/M: EA Qty: 1.00
 Date: 06/14/2005 Sales Order Coordinate: ECB Ship to: Y Ship from: Y Ship to: Y
 Date: 04/14/2005 Sales Order: 000750 Customer: Lawrence Berkeley National Lab
 Date: 05/05/2003

Operation	Work Center	Operation Quantity	Setup Time	Pieces per Hour	Operation Time	Move Time	Elapsed Time
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DEBY G 24C352 Feed Box Assembl

- quartz window, evacuate. The Stycast is de-gassed when it stops bubbling.
- 24.8 Encapsulate the soldered connections in the de-gassed Stycast 285MT(blue). Pour it into a cut out paper cup surrounding the pins. Allow the epoxy to cure.
- 24.9 Perform a continuity check of wires. Complete a test report and forward to the project engineer. *A.K.*
- Continuity Check: Pass/Fail? By: *M.J.* Date: _____
- 24.10 Fit the 12 feedthrus to the LQX Purcupine. Tack to position and weld complete.
- 24.11 Install the 25I831-5 on the Purcupine.
- 24.12 Fit and weld the 25I831-6 Connector to the Purcupine.
- 24.13 Stage to OP250.



250	AS	1.00	0.00	0.14	7.00	0.00	7.00
3-A ASSEMBLY							

Operation Description Detail :

25.0 24C352 G Feed Box Assembly-Instrumentation Duct Testing

Customer Witness Point.

- 25.1 Perform a continuity check of wires. Complete a test report and forward to the project engineer. *A.K.*
- Continuity Check: Pass/Fail? By: *A.K.* Date: _____
- 25.2 Pressure test the LBX circuit to 362.3 psig. Hold for 10 minutes. Forward a test report to the project engineer.
- 25.3 Evacuate the LBX circuit. Leak test per MTM-MP-1110 the new welds. Back fill with helium gas. Forward test report to the project engineer.
- 25.4 Hipot per M989 2.3.3.2. Forward test report to the project engineer.
 TAPE OFF THE AREA AND PUT UP HIGH VOLTAGE SIGNS.
 INFORM THE AREA SUPERVISOR THAT THE TEST IS TAKING PLACE.
- 25.5 Pressure test the LQX circuit to 362.3 psig. Hold for 10 minutes. Forward a test report to the project engineer.
- 25.6 Evacuate the LQX circuit. Leak test per MTM-MP-1110 the new welds. Back fill with helium gas. Forward test report to the project engineer.
- 25.7 Hipot per M989 2.3.3.2. Forward test report to the project engineer.
 TAPE OFF THE AREA AND PUT UP HIGH VOLTAGE SIGNS.
 INFORM THE AREA SUPERVISOR THAT THE TEST IS TAKING PLACE.
 Voltage tap leads 1.4 kV, I<15 microamps
 Quench heater leads 1.4 kV, I<15 microamps
 Warm up heater leads 650 V, I<7 microamps
 Temperature Senor leads 200 V, I<2 microamps

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Job Order 00918-0044

24C352 G 24C352 FB Assy

REVISIONS

H. M. EA

2003-11-10

06/14/2005

Sales Order Coordinator: ECB

Ship to: Y

Ship to: Y

04/14/2005

Sales Order: 000750

Customer:

Lawrence Berkeley National Lab

05/05/2003

Operation	Work Center	Operation Quantity	Setup Time	Pieces per Hour	Operation Time	Move Time	Elapsed Time
24C352 G 24C352 Feed Box Assembl							

27.7 Stage to OP280.



280 AS

1.00

0.00

0.13

8.00

0.00

8.00

3-A ASSEMBLY

Operation Description Detail :

28.0 24C352 G Feed Box Assembly

28.1 Wrap a 10 layer MLI blanket (slit for thermal straps) around the piping assemblies that will be within the Shield Assembly. Pull the thermal straps out through the blanket.

28.2 Stage to OP290.



290 AS

1.00

0.00

0.02

60.00

0.00

60.00

3-A ASSEMBLY

Operation Description Detail :

29.0 24C352 G Feed Box Assembly

29.1 Pull 25I858 Base Plate Assy kit. Pull the 25I079 Thermal Shield Assy kit.

29.2 Reference 25I858. Assemble the 4x-Stantions loosely to the Bottom Plate.

29.3 Reference 25I079. Insulate the Shield Bottom Cover with a 30 layer MLI blanket. Assemble the Shield Bottom Cover over the Bottom Plate. Patch around the Stantions areas to prevent shine through.

29.4 Install the assembly under the LHe Tank on the bottom assembly plate. Position the Bottom Plate correctly in relation to the Feed Box Assy. Feed the two 25I858-1 Support Rods through the Stantions and the LHe Tank brackets. Install the hex nuts and loosely position everything. Shim the Stantions to level as necessary. Tighten all fasteners and nuts on the Support Rods.

29.5 Reference 25I079: Install the 4 side covers of the Thermal Shield Assembly to the Feed Box Assy. Pull all the thermal straps through the slits in the shield components to the outside of the shield. Note the thermal straps include all straps on piping assemblies. Rivet the straps to the shield to hold them in place.

29.6 Assemble the 2x Shield Access Covers to the Shield Assy.

29.7 Reference 25I226-3 Pipe, EX. Install the Pipe, EX assembly to the Shield assembly, positioning location to 24C352. Rivet the thermal straps to the shield to hold them in place.

29.8 Cover the Bottom MLI blanket with plastic.

29.9 Soft solder all thermal straps to the Shield Assy.

Production Floor Traveler

Date: 03/17/2004
Time - 13:38:23
Page # 21



Job Order 00918-0044

Part Name: DFBX-G 24C352 FB Assy Revision: NS U / M EA Quantity: 1.00

03/14/2005

Sales Order Coordinator: ECB

04/14/2005

Sales Order: 00075C

05/05/2003

Operation	Work Center	Operation Quantity	Setup Time	Pieces per Hour	Operation Time	Move Time	Elapsed Time
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Description: DFBX-G 24C352 Feed Box Assembl

29.10 Clean per MTM-MP-1030 for vacuum service. Remove the plastic and redo the MLI as necessary.

29.11 Stage to OP300.



300	AS	1.00	0.00	0.03	32.00	0.00	32.00
3-A ASSEMBLY							

Operation Description Detail :

30.0 24C352 G Feed Box Assembly

30.1 Reference Specification M990. Insulate the Thermal Shield.

30.2 Stage to OP310.



310	WE	1.00	0.00	0.01	94.00	0.00	94.00
2-A WELDERS							

Operation Description Detail :

31.0 24C352 G Feed Box Assembly

CUSTOMER WITNESS POINT

STAMP YOUR WELDS

31.1 Fit the four sides of the Feed Box Vacuum Vessel to the Vacuum Vessel Top Plate and Bottom Plate. Fit the Side Plate Cover into Vacuum Vessel Side, tack in place.

31.2 Tack the Bottom Plate to the bottom assembly plate (which is bolted to the floor).

31.3 Use the Romer Portable CMM to confirm the position and perpendicularity/parallelism of the Vacuum Vessel Components.

31.4 Set up machinist indicators of the assembly frame on the Top Plate and Sides to monitor movement during welding. (May have to use Romer Portable CMM if vibration from stress relief system make indicators useless.)

31.5 Set up the Bonal Vibratory Stress Relief System to the Feed Box, follow the manual instructions to run for stress relief during welding.

31.6 Install Test Cans to Jumpers and End Plates to seal off the openings on the Vacuum Vessel. The Pipes must fit through the Test Cans for access for testing on the Jumpers. Weld the pipes to the Test Cans. An extension of the Pipe, EX must fit through the Q3 End Test Can for access for testing.

31.7 Set up the O2 analyzer and purge the Vacuum vessel with pure Argon gas off a dewar.

31.8 GTAW-SS/LT, no filler fuse weld only to seal all around. Use two welders working together. Sequence welding to limit heating of vessel and cause opposing distortions.

Production Floor Traveler

Date: 03/17/2004
 Time - 13:38:24
 Page # 22



Job Order 00918-0044

DI BX G 24C352 FB Assy Revision NS U/M EA Quantity 1.00
 06/14/2005 Sales Order Coordinator ECB Ship Item Y Ship Early Y
 04/14/2005 Sales Order 009750 Customer Lawrence Berkeley National Lab
 05/05/2003

Operation	Work Center	Operation Quantity	Setup Time	Pieces per Hour	Operation Time	Move Time	Elapsed Time
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24C352 Feed Box Assembl

- 31.9 Continuously monitor movement. Review results upon completion of seal pass.
- 31.10 Repeat this time adding filler metal approx. 1/8" pass.
- 31.11 Continuously monitor movement. Review results upon completion of seal pass.
- 31.12 Stage to OP320.



320 AS	1.00	0.00	0.04	24.00	0.00	24.00
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3-A ASSEMBLY

Operation Description Detail :

32.0 24C352 G Feed Box Assembly

- 32.1 With the Vacuum Vessel seal welded, blank off openings and evacuate the Vacuum Vessel.
- 32.2 Leak check the Vacuum Vessel per MTM-MP-1110. Forward test report to the project engineer.
- 32.3 Pressurize the LHe Tank and Bus Ducts with helium gas to 3 psig. Forward a test report to the project engineer.
- 32.4 Pressurize the piping assemblies individually one at a time with helium gas to 3 psig. Forward test reports the project engineer.
- 32.5 Back fill the Vacuum Vessel with Argon gas.
- 32.6 Stage to OP330.

NOT DONE AT THIS STEP
EB
12/50/04



330 WE	1.00	0.00	0.01	70.00	0.00	70.00
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2-A WELDERS

Operation Description Detail :

33.0 24C352 G Feed Box Assembly

CUSTOMER WITNESS POINT
 STAMP YOUR WELDS

- 33.1 FCAW-SS/LT. Use two welders working together. Sequence welding to limit heating of vessel and to cause opposing distortions. Continue use of Vibratory Stress Relief System.
- 33.2 Continuously monitor movement.
- 33.4 Stage to OP340.

Production Floor Traveler

Date: 03/17/2004
 Time - 13:38:24
 Page # 23



Job Order 00918-0044

Part: DFBX-G 24C352 FB Assy Revision: NS U / M EA Quantity: 1.00
 Date: 06/14/2005 Sales Order Coordinator: ECB Ship Item: Y Ship Early: Y Split Ship: Y
 Date: 04/14/2005 Sales Order: 000750 Customer: Lawrence Berkeley National Lab
 Date: 09/2003

Operation	Work Center	Operation Quantity	Setup Time	Pieces per Hour	Operation Time	Move Time	Elapsed Time
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DFBX-G 24C352 Feed Box Assembl



340 WE

1.00

0.00

0.04

24.00

0.00

24.00

2-A WELDERS

Operation Description Detail :

34.0 24C352 G Feed Box Assembly

- 34.1 Remove Test Cans.
- 34.2 Fit 25I129-4 Q3 Flange to Vessel.
- 34.3 Fit 25I133-2 D1 Flange to Vessel.
- 34.4 Check dimensional requirements per Sheet 4 Section D-D.
- 34.5 Weld complete.
- 34.6 Recheck dimensional requirements. Record on inspection report and forward to the project engineer.
- 34.7 Stage to OP350.



350 AS

1.00

0.00

0.06

16.00

0.00

16.00

3-A ASSEMBLY

Operation Description Detail :

35.0 24C352 G Feed Box Assembly

- Install the following remaining subassemblies to the Top Plate.
- 35.1 25I851 Helium Guard Assembly.
- 35.2 25I868 2x-Tooling Balls
- 35.3 25M820 Alignment Plate (Tack weld in place, see 24C352 sheet 11)
- 35.4 25I339 Helium Port Relief Valve Assembly
- 35.5 25I910 Rough Port Assembly
- 35.6 24C352-28 4x-Hoist Rings
- 35.7 Stage to subjob-0008

Total Times - 0.00 656.00 0.00 656.00

End Of Report

* Represents Sub-Contract days, these days are not included in the column total.

Production Floor Traveler

Date: 09/24/2004
 Time: 14:55:54
 Page # 1

CONTROLLED DOCUMENT



Job Order 00918-0008
 This is a reprint copy!

REV: 0 DATE: 9/27/04
 APPROVED: [Signature]

Part Number DFBX-G FB Final Insp/Test Revision NS U / M EA Quantity 1.00
 Due Date 07/13/2005 Sales Order Coordinator ECB Ship Item Y Ship Early Y Split Ship Y
 Calc Rel Date 06/14/2005 Sales Order 000750 Customer Lawrence Berkeley National Lab
 Actual Rel Date 05/05/2003

Description	Operation	Work Center	Operation Quantity	Setup Time	Pieces per Hour	Operation Time	Move Time	Elapsed Time
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Description DFBX-G Feed Box Assy Final Inspection and Test



10 AS	1.00	0.00	0.07	14.00	0.00	14.00
3-A ASSEMBLY						

Operation Description Detail :

1.0 24C352 G Feed Box Assy- Final Inspection and Test

CUSTOMER WITNESS POINT

(Test Caps have been removed.)

Critical Dimensions Reference Specification M989 3.1;24C352

1.1 Using Romer Portable CMM measure and record the following critical dimensions.

- 1.1.1 Measure and record positions (x,y,z) of the two Taylor Hobson Tooling Balls with respect to Datum Planes B, E and D respectively.
- 1.1.2 Measure and record roll angle of the top plate tooling flat about y-axis relative to datum plane D.
- 1.1.3 Verify and record Q3 interface vacuum flange and pipe positions per drawing 25C352 sheet 8. Since pipe positions are flexible, shim pipes to center of the support arc in the G-10 support spider and hold them parallel to the y-axis (box long axis) for this measurement.
- 1.1.4 Verify and record DI interface vacuum flange and pipe positions per drawing 25C352 sheet 8. Since pipe positions are flexible, shim pipes to center of the support arc in the G-10 support spider and hold them parallel to the y-axis (box long axis) for this measurement.
- 1.1.5 Verify and record JC1 interface vacuum flange and pipe positions per drawing 25C352 sheet 7. Since pipe positions are flexible, shim pipes to center of the support arc in the G-10 support spider and hold them parallel to the x-axis for this measurement.
- 1.1.6 Verify and record JC2 interface vacuum flange and pipe positions per drawing 25C352 sheet 7. Since pipe positions are flexible, shim pipes to center of the support arc in the G-10 support spider and hold them parallel to the x-axis for this measurement.

DJC
12/10/04

Other Dimensions

- 1.2 Measure and record the following dimensions.
 - 1.2.1 All external dimensions on 25C352 sheet 4.
 - 1.2.2 All external dimensions on 25C352 sheet 5.

3 w.s. / djc *12/10/04*

1.3 Stage to OP20.

Production Floor Traveler



Job Order 00918-0008

This is a reprint copy!

Part Number **DFBX-G FB Final Insp/Test** Revision **NS** U/M **EA** Quantity **1.00**
 Due Date **07/13/2005** Sales Order Coordinator **ECB** Ship Item **Y** Ship Early **Y** Split Ship **Y**
 Calc Rel Date **06/14/2005** Sales Order **000750** Customer **Lawrence Berkeley National Lab**
 Actual Rel Date **05/05/2003**

Description	Operation	Work Center	Operation Quantity	Setup Time	Pieces per Hour	Operation Time	Move Time	Elapsed Time
DFBX-G Feed Box Assy Final Inspection and Test	20	AS	1.00	0.00	0.05	20.00	0.00	20.00
		3-A ASSEMBLY						

Operation Description Detail :

2.0 24C352 G Feed Box Assy- Final Inspection and Test

CUSTOMER WITNESS POINT

Pressure and Leak Testing

2.1 Re-install test caps on Q3 Flange, D1 Flange, Jumper JC1 Flange and Jumper JC2 Flange. Note test caps are also designed to act as shipping restraints for loose piping.

2.2 Pressure test Vacuum Vessel. Pressurize with 0.14 MPa(3.5 psig) nitrogen gas. Hold for 10 minutes. Forward test report to project engineer.

2.3 Evacuate the Vacuum Vessel. Leak check the Vacuum Vessel per MTM-MP-1110 spray method. Acceptance criteria 1x10-8 atm-cc/sec HE. Forward test report to the project engineer.

2.4 With the Vacuum Vessel evacuated and connected to the HMSLD, pressurize the LHe Tank and Bus Ducts with helium gas to 3 psig. Acceptance criteria 1x10-8 stdcc/sec HE. Forward a test report to the project engineer. Vent helium.

2.5 With the Vacuum Vessel evacuated and connected to the HMSLD, Pressurize the piping assemblies (manifolded together) with helium gas to 3 psig. Forward test reports the project engineer. Vent helium.

2.6 Back fill the Vacuum Vessel with 3 psig nitrogen gas.

2.7 Back fill LHe Tank and Bus Duct with 3 psig nitrogen gas.

2.8 Back fill piping assemblies with 3 psig nitrogen gas.

Record Ambient Temperature: SEE TEST REPORT 72°F
 Record Ambient Pressure: SEE TEST REPORT 30.15 INCHES Hg

2.9 Stage to OP30.

W.S.
DJC 12/22/04

	30	AS	1.00	0.00	0.03	40.00	0.00	40.00
		3-A ASSEMBLY						

Operation Description Detail :

3.0 24C352 G Feed Box Assy- Preparation for Shipment

CUSTOMER WITNESS POINT

3.2 Pull Shipping Frame Kit from storage and stage in Feed Box Assy area.

3.1 Remove 4x supporting threaded rods, allowing Feed Box to sit on bottom fixture plate.

3.2 Remove bolted structural members from assembly fixture, allowing access for crane.

DJC / TK
1/4/05

Production Floor Traveler

Date: 09/24/2004
Time - 14:55:55
Page # 3



Job Order 00918-0008

This is a reprint copy!

Part Number	DFBX-G FB Final Insp/Test	Revision	NS	U / M	EA	Quantity	1.00	
Due Date	07/13/2005	Sales Order Coordinator	ECB	Ship Item	Y	Ship Early	Y	
Calc Rel Date	06/14/2005	Sales Order	000750	Customer	Lawrence Berkeley National Lab			
Actual Rel Date	05/05/2003							
	Operation	Work Center	Operation Quantity	Setup Time	Pieces per Hour	Operation Time	Move Time	Elapsed Time

Description DFBX-G Feed Box Assy Final Inspection and Test

- 3.3 Using properly rated slings, rig and lift Feed Box at hoist rings with overhead crane. Insert Feed Box into the Shipping Frame base.
- 3.4 Disassemble Feed Box from crane. Use crane to lift and position the Shipping Frame Upper Subassembly onto the Shipping Frame Base. Bolt the 4 uprights to the Base.
- 3.5 Stage to OP40.

*DJC/TK
1/4/05*

	40	SUBCRT	1.00*	Elapsed time	1 Days		0.00	0.00
		SUB CRATER						

Operation Description Detail :

4 0 24C352 G Feed Box Assy- Preparation for Shipment
CUSTOMER WITNESS POINT

- 4.1 Chicago Export Crating to complete crating and installation of accelerometers per Specification M986.
- 4.2 Stage to OP50.

	50	AS	1.00	0.00	0.06	16.00	0.00	16.00
		3-A ASSEMBLY						

Operation Description Detail :

5.0 24C352 G Feed Box Assy-
CUSTOMER WITNESS POINT

- 5.1 Load truck. Secure and tarp. Take photos.

*1-4-05
DJC/CHGO. EXPO. CRATING.*

	60	SUBSHP	1.00*	Elapsed time	14 Days		0.00	16.00
		SUB SHIPPING						

Operation Description Detail :

6.0 24C352 G Feed Box Assy-
Air Freight to CERN.

Total Times -	0.00	106.00	0.00	106.00
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End Of Report

* Represents Sub-Contract days, these days are not included in the column total.

Production Manager