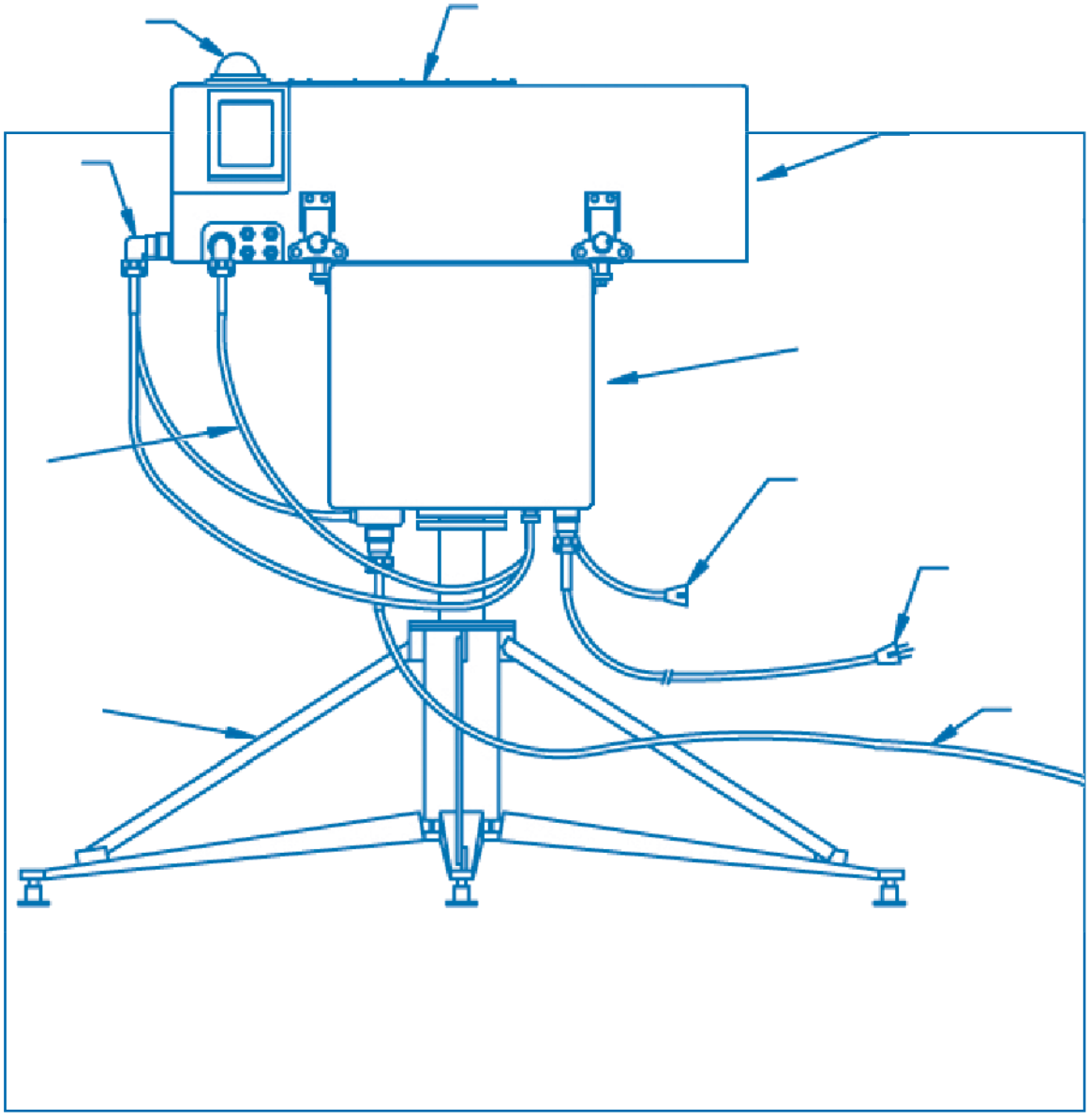
Kipp & Zonen

SERVICE MANUAL

Mk IV

BREWER

SPECTROPHOTOMETER



MM-BA-C230/B

BREWER MKIV

SPECTROPHOTOMETER

SERVICE MANUAL
MM-BA-C230/B REV A, Oct. 29, 2007

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PREFACE

This document has been developed to aid an operator when a Brewer Spectrophotometer stops operating or when initial operating characteristics have changed since leaving KIPP & ZONEN B.V.. It has been developed from the experience of KIPP & ZONEN and present users of the Brewer. The most likely electronic failures and ones which can be repaired in the field have been documented.

1 PURPOSE AND APPLICATION

The purpose of this manual is to help the operator diagnose problems with a Brewer Spectrophotometer to an assembly level. Component level diagnostics will not be covered since the replacement of many components may require instrument realignment or re-calibration. Potentiometers should not be adjusted nor set screws removed without completely defining the problem area. If the information in this document is not sufficient, it is recommended that the user contact KIPP & ZONEN before dismantling of any assemblies beyond what is called for in this manual.
In several cases the operator will be asked to replace components that are not included in spares kits. In these cases please contact KIPP & ZONEN for information on obtaining the component.

2 EQUIPMENT REQUIRED

1) Volt-Ohmmeter, capable of measuring from 1 mV to 2000 volts DC.

2). A clip on or in-line current meter.

3). In place of the above items, a digital Volt-Ohmmeter, such as the one contained in the KIPP & ZONEN UV Stability Kit is adequate except for Voltage readings of greater than 1000V.

4) An oscilloscope may be useful (1 millivolt; 20 megahertz bandwidth).

5) An external UVB lamp may be useful when the internal quartz-halogen lamp appears at fault.

6) If the control computer is suspect, a second computer with Brewer software loaded may be needed.

7) A terminal communications program such as Telix, Procomm, Xtalk or Windows HyperTerminal.

3 MAJOR EQUIPMENT FAILURES

A major equipment failure is defined as a condition where there is no communication between the Brewer Spectrophotometer (Brewer) and the external control computer (PC). Symptoms are that no commands go to the Brewer, and no information is received by the PC. This is a "no operation" condition.

3.1 "NO OPERATION" - NO POWER INDICATION

1. Reset the Brewer
If any problem is fixed at any point in this trouble shooting procedure attempt to launch the Brewer Software.
When the Brewer Software is launched the Brewer should send the following message to the PC:

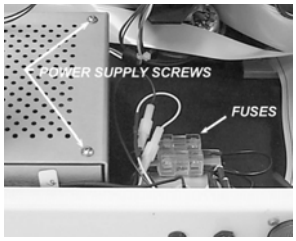
```
BREWER OZONE SPECTROPHOTOMETER

#nnnnn

AES SCI-TEC

CANADA

VERSION 1 Jan 01, 1998
```

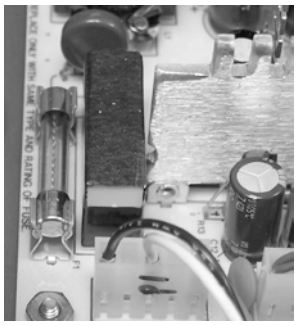
If this message is received then communications has been established between the Brewer and the control computer.
If the instrument does not reset (as seen by motors initializing), the problem is probably in the Brewer, but may also be in the communications cable, the PC or the software.
A fresh set of software can be loaded onto the Computer from the original discs to eliminate it as a potential problem. Ensure that the Brewer configuration files are preserved as they contain important operating information such as the COM: port number. Check the configuration files to ensure that none of the files have been corrupted.

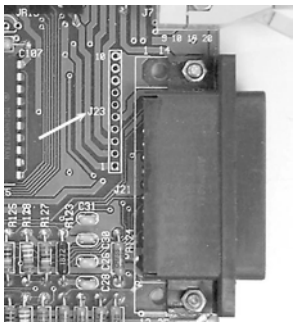
2. Check Power
If the GREEN LED on the Brewer is illuminated, then there is power to the instrument, and the Main Power Supply is producing 5V. If the LED is not illuminated, then the AC power source should be checked at the AC outlet and the end to end continuity of the Power Cable tested. The AC power should then be connected directly to the Brewer, bypassing the Tracker.
If there is still a no-power indication, then the Brewer top cover should be removed and the MAIN power supply checked to see if it feels warmer than ambient.

3. Check Power Switch and Fuses
If the cover is not warm, then perhaps the Power Switch is defective, or a fuse requires replacement. With power disconnected, use an Ohmmeter to confirm that the Switch is functional, and check the two fuses next to the power supply cover as indicated in the photograph. If a fuse needs changing, ensure that AC power is disconnected, and replace the fuse with the appropriate spare.
To check the fuse inside the power supply, disconnect AC power from the Brewer, remove the Main Power Supply cover (four 6-32 screws) and measure or visually inspect the fuse and replace it if necessary. When re-installing the cover, ensure that the Power Supply connectors remain connected.

If the power supply appears to be normal, then the LED may be defective, or there may be a faulty connection.







4. Measure Voltages
The main power supply voltages can be checked at the test points on J23 of the Main Electronics board. (Refer to the chart for correct voltages).

Connector J23 Monitor points	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9	Pin 10
	5v	5v	-5v	12v	12v	-12v	24v	2.5v	4.5v	Gnd

3.2 TROUBLE SHOOTING SEQUENCE FOR "NO OPERATION" CONDITION

It has been established that there is Power, motors reset, but that there is absolutely no communication between the PC and the Brewer.

1. Reset
A software reset should be attempted after the "Brewer Failed to Respond" message appears on the PC monitor, or the PC has tried a number of times to establish contact with the Brewer. The software reset is done by pressing e key on the PC following the error message, or launching the Brewer software from the DOS prompt. If this fails to establish communications, the PC should be given a 'cold' boot (power OFF/ON).

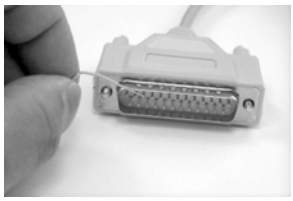
2. Check cables
If there is still no response, the cables should be inspected to ensure that a connector has not been inadvertently removed or pulled out of place. The Communications cable to the Brewer from the PC, as well as the power cable to the Brewer should be checked. All cables involving the linking of peripherals should be checked to ensure that they are plugged in as well. After this has been done another software reset can be tried.

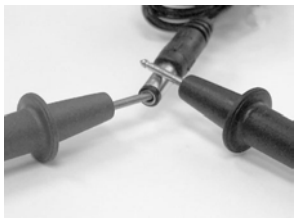
3. Test serial port
Check that the computer serial port is operating correctly by running a serial communications program such as Telix, Procomm, or Windows Hyper Terminal. Make sure the serial communications program is set to 1200 baud, is in full duplex mode, and the correct serial port has been selected. Refer to the communications program documentation for correct operation. Remove the RS422 adapter from the back of the computer and connect pins 2 and 3 of the computer serial port together. While running the communications program in full Duplex mode, characters typed should be seen echoing to the monitor. Disconnecting the jumper wire should stop the echo-back. This test confirms that the computer serial port is operating correctly. If the computer did not echo the characters change the Brewer's configuration to use another port (see section 3.6 in the Operator's Manual) or have the defective serial port repaired before doing any further tests.

4. Test RS422 adapter

The RS422 adapter at the computer can be tested by removing the communications cable from the adapter, connecting pins 1-3, plugging the adapter into the Computer COM: port, and checking for echo-back as in step 3. Now switch connections to pins 2-4 and test again. The RS422 adapter is operating correctly if characters echo back. If a fault is indicated, then either the adapter or the power module is defective.

The power module output should be approximately +13V DC with no load or +9V with a load (the centre pin is positive.) If the voltage is normal, then replace the RS422 adapter and test again.





5. Test communications cable

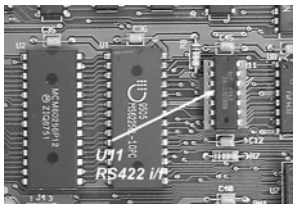
If the tests have passed to this point, the communications cable between the Brewer and the computer can be tested. Reconnect the cable to the RS422 adapter and connect it back to the computer. Remove the communications cable from the Tracker surge suppressor box and connect a wire jumper to connect pins C-B. Test the cable by sending characters from the computer as in step 3; move the jumper to connect pins I-J and test it again.

Reconnect the communication cable to the tracker and disconnect the communications cable at the Brewer. Short pins C-B and then pins I-J and test as in step 4. If the test passes, reconnect the cable to the Brewer and open the cover of the Brewer. Turn the power off and disconnect the IDC connector (the IDC connector, J7, is the connector attached to the shielded ribbon cable shown in the picture below) Use a small wire jumper to connect pins 2-8, and then pins 4-6, using the echo-back test each time. (The IDC pins begin from 1 at the triangle stamped on the side of the connector and increment in odd numbers on the same row - 1, 3, 5, 7, 9 on the first row and 2, 4, 6, 8, 10 on the next row, in the same direction). If the test fails at any point of this cable test procedure the faulty connection should be repaired before proceeding to the next test. If all of these procedures have positive results, then the problem lies in the Brewer Main Electronics Board. Reconnect all the cabling to the instrument and continue to the next test.

As an alternative for testing cables, each line can be tested for continuity by measuring point to point with an ohmmeter, using the appropriate schematic as a guide. The resistance through the surge arrestor is 10 ohms so that a typical resistance should be 12 ohms from the RS422 adapter to the IDC connector at the Brewer Main Electronics board.

6. Line Driver

If the reset of the motors is heard and seen, but there is no message sent to the PC, then there may be a problem with the line driver on the Main Electronics board. Ensure that power is turned off and remove the Main Electronics cover plate and replace IC U11, (on a socket 5cm up and 5cm to the left of the LED). Make sure to use proper grounding precautions before touching the electronics board. Leave the cover plate off and turn on the instrument. The motors should be observed to reset and if the computer was left in the serial communications program, the Brewer reset message will be displayed on the screen. Exit the communications program and launch the Brewer operating program. Normal Brewer commands can be used for checking correct operation.



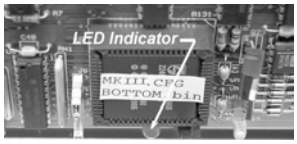
7. Check Mode of Microprocessor

If there is still no operation, there may be a firmware problem, or a problem on the Main Electronics Board, so the functionality of this board should be tested.

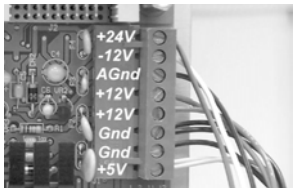
There is a Red status LED located near the bottom left hand side of the board - it should be flashing slowly in 'Cosmac mode' as per the following table. If the Brewer is in some other mode change back to the Cosmac mode (step 10).

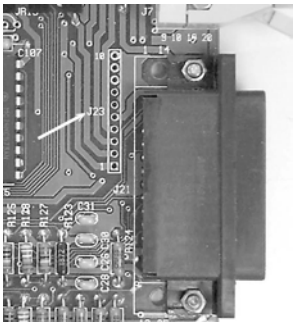
LED Mode indication	¼sec	¼sec	¼sec	¼sec	¼sec	¼sec	¼sec	¼sec
Cosmac mode normal operation	**On**	Off	Off	Off	**On**	**On**	**On**	Off
Cosmac mode with configuration missing	**On**	Off	Off	Off	**On**	Off	**On**	Off
Loadmode waiting for code to be downloaded	**On**	Off	**On**	Off	**On**	Off	**On**	Off
Loadmode with bad flash memory	**On**	**On**	**On**	**On**	Off	Off	Off	Off
Loadmode with good flash memory	**On**	**On**	**On**	**On**	**On**	**On**	**On**	Off
Opmode with configuration present	**On**	**On**	Off	Off	**On**	**On**	Off	Off
Opmode without configuration present	**On**	**On**	Off	Off	**On**	Off	**On**	Off
Checking Flash memory	**On**	Off	**On**	Off	Off	Of	Off	Off
Changing from load to cosmac or load mode	**On**	**On**	**On**	**On**	**On**	**On**	**On**	**On**

8. Check Voltages
If the LED is not flashing, then the correct voltages should be confirmed for the power supply on the Main Electronics board J23, as per section 3.1.

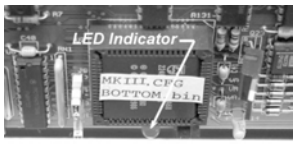


9. Test Main Power Supply
If the power supply values have changed, the power connections should be checked. If they appear normal, and the voltages are still not at proper levels, replacement should be considered. However, there may be a short circuit in one of the assemblies causing the power supply to be loaded. Shut the power off and disconnect the power connector J1 from the Main Electronics board and from the J4 Lamp control board. Repeat the voltage measurements at the connector and see if all the voltages are present. If the voltages are correct then determine which assembly is at fault by installing the connectors one at a time. Replace the main power supply if necessary, and ensure when first turned on that the assemblies are disconnected to allow setup of voltages to correct values. The main 5 volts monitored at the main board should be set to 5.0 volts with the single potentiometer on the main power supply.





10. Restore Brewer to Cosmac Mode
If the flashing LED on the Main Electronics board indicates that it is not in the cosmac mode, and the software has not been successful in correcting it during the Reset sequence, then the following procedure should be followed:



A. Exit the serial communications program and change to the subdirectory c:\bdata\nnn.

B. Type **BREWCMD** e , and observe that the instrument has responded and note which mode is indicated. The program should display the same mode as the mode observed on the status LED.

C. If the mode is 'cosmac mode' then type **loadmode** e , and the display should return indicating 'loadmode'. Now type **opmode** e and within a few seconds the Brewer will be in opmode.

D. Type **`readlog`** e to display past error history, each line displayed will be a possible clue to the problem that caused the failure. If motor failures have occurred, the status will tell you which motor and what the failure is. Usually it is a sensor problem or a wiring problem that prevents the motor from resetting. If no problems are displayed, then the system can be placed back into cosmac mode for further testing.

E. Type **`loadmode`** e and following the return of the prompt, type **`cosmacmode`** e . The motors will reset and within a minute the system will display the status that it is in cosmac mode.

F. Quit the Brewcmd program by typing **`quit`** e .

11. Run Brewer Software.

Run the Brewer operating program by typing **`BREWER`** e to check the correct operation of the instrument. Select routines that you are familiar with and ensure that all functions and data appear normal.

12. Replace Main Electronics Board

If no communications return when running Brewcmd then there may be a problem with the Main Electronics Board.
Replace the Main Electronics board with a spare board, ensuring that all cables are reconnected to the original connectors. Normally the spare Main Electronics board is preloaded with the same parameters as those that came with the instrument. Therefore no reprogramming or uploading of the configuration parameters are needed. If the configuration parameters have changed, then refer to the procedure to upload new firmware and configuration data to the board, section 8.

13. Contact KIPP & ZONEN

If you have followed this procedure and not located the problem contact KIPP & ZONEN for further assistance.
Webpage: www.kippzonen.com
Email: info.holland@kippzonen.com

4 OPERATING TEST FAILURES

In the Brewer Spectrophotometer, most of the operating tests are done using either the mercury lamp or the quartz-halogen lamp. If any of the other tests fail, the user should proceed immediately to a mercury lamp test (HG) or a standard lamp test (SL).
Mercury lamp test failures and standard lamp test failures are two major problems which can occur. In both cases calibration of the instrument may have been compromised. For the purpose of troubleshooting, these two sections have been separated from the main part of the instrument.
The Light Detection System is made up of the zenith prism, foreoptics, spectrometer, slitmask, PMT, High Voltage Circuitry, High Speed Amplifier, interconnecting harnesses, and the Main Electronics board which houses the photon counting circuits. Without this section being operational, no testing, or measuring, can be done.
There are a few points to remember in the event there is a major failure somewhere in the system, whether it is the Mercury Lamp, Standard Lamp, or Light Detection System.
The error message "**`lamp not on test terminated`**" is an indication of a failure, either in the lamps or in the Light Detection System.
Changes in dark count may be symptomatic of a number of problems which may occur in the Brewer.
If Dark Count begins to increase or becomes erratic, the slitmask may be at fault. Note that it is normal for Dark Count to increase with temperature.
Dark Count changes may also indicate motor power supply problems, PMT performance problems, or High Speed Amplifier problems.
If the dark count changes, there may be a changing optical condition in the Light Detection System. A higher dark count can also be the result of a poor ground somewhere in the system or high humidity inside the instrument. Grounding connections should be checked, especially between the PMT housing and the Main Electronics.
The desiccant should be changed more frequently in higher humidity locations.

4.1 MERCURY LAMP CIRCUIT

The Mercury lamp circuitry (Fig 10-4.2) is a constant current source designed to keep the lamp current constant throughout the temperature range of the instrument. A voltage regulator, connected to a specially selected resistance wire, regulates the lamp current.

4.2 TROUBLE SHOOTING A MERCURY LAMP TEST FAILURE

The Mercury lamp test fails, and software responds with "**`lamp not on test terminated`**".

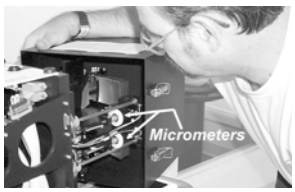
1. Check Motor Positions
Retry the test and look through each Viewing Port to see if the lamp turns on. Ensure that the zenith prism and the filter wheels are in the correct position.

2. Check Temperature
Observe the temperature of instrument (TE). If the Brewer temperature is less than 0 degrees Celsius, the lamp may be too cold and may not fire. If this is the case, the Standard Lamp may be turned on for a few minutes to warm the Mercury lamp.

3. Check Lamp Voltage and Current
There is the possibility of a lamp failure. Perform an AP (A/D voltages printout) test. If the Mercury Lamp current is 0.0, and the Mercury Lamp Voltage is near 15 volts, then the lamp is probably bad. Measure the voltage across the lamp, pins 6 and 9 on P111. (Reference Figure 10.5-2.2). It should be approximately 0 volts with the lamp off (B0) and 13 volts with the lamp on (B1).

4. Mercury Lamp Replacement
To replace the bulb, loosen the two thumb screws (item 6, Figure 10.5-2.2) and carefully withdraw the lamp holder. Take care not to touch the new lamp with bare hands. Ensure the lamp is tight in its socket and cleaned with isopropyl alcohol after replacement.
The quartz-halogen lamp should also be checked at this time, as blackening of the glass could reduce the amount of HG light which is passing through it to the foreoptics. Re-assemble the HG lamp by reversing the above steps and test the lamp with B1 and HG commands.

5. Check Micrometer Position
If the lamp is working fine, and light can be seen in the Viewing Ports, then the position of the micrometer should be checked. Remove the “Spectrometer” cover and check to see that the micrometer is in the correct position as indicated in the Final Test Record, and on the Log Sheet taped to the Spectrometer cover. If the Micrometer is not where the Log Sheet indicates, it should be adjusted manually and an HG test attempted again.



6. Attempt a Standard Lamp Test
If the test still fails, the problem could be in a misalignment of a component in the Spectrometer, a problem in the slit mask, or a fault in the PMT or counting circuitry.
Attempt a standard lamp test. The standard lamp has a much higher intensity and does not depend on the position of the micrometer and slitmask as much as the mercury lamp test.
If the standard lamp test operates correctly, the SL printout should be examined carefully to see if any characteristics have changed. If the dark count has increased significantly, this may be an indication that the alignment has changed and may require a mirror adjustment. Check to see if any of the intensities or ratios have changed, which may indicate that the optics have deteriorated, or the PMT performance or counting has degraded. If the standard lamp test results appear to be normal, then KIPP & ZONEN should be contacted before proceeding.

7. Measure High Voltage
If the standard lamp test is not operational, then it can be assumed that there is an optical failure, or a PMT failure. If the mercury lamp test is normal while the standard lamp has failed, this usually indicates a problem with the lamp or the circuitry that controls the lamp.
The high voltage should be measured using a voltmeter and looking at test point E16 on the Main Electronics board. There should be a voltage between 2.5 volts and 5 volts, which has been factory set (see final test record for the setting), and should not be adjusted. This voltage is equal

to the actual high voltage divided by 409. There may be a variation of a volt or two of the high voltage, but the voltage at testpoint should be very close to the final test record value. If it is significantly different, the high voltage circuit may have failed. This will require a skilled technician for repair or KIPP & ZONEN should be contacted.

8. Check Light Detection System
If the high voltage appears to be normal from the test point reading, then there is a possibility that something has failed in the Light Detection System, reference Section 4.7.

4.3 STANDARD LAMP CIRCUIT

The standard lamp current regulator is similar to the Mercury lamp circuit except the resistance wire is chosen to regulate the supply current with less variation than the mercury lamp. The circuit maintains the operating current within 3 milliamps over a range of -20 to + 40 degrees C, and is even more stable in the operating range of 10 to 30 degrees.

4.4 STANDARD LAMP FAILURE

The quartz-halogen (Standard) lamp is the lamp most frequently used in self diagnostics of the Brewer. With it, calibration can be monitored, and correct operation of many systems can be inferred.
The software for the standard lamp tests has been designed to give an error message in the event of a failure. The message is "Lamp not on test terminated". The message may be somewhat misleading in that there are many conditions which can make it appear that the Lamp is not on. These conditions include PMT performance, filterwheel positioning, Zenith prism position, photon counting electronics, and the I/O electronics used to turn the lamp on and off.

4.5 TROUBLE-SHOOTING STANDARD LAMP TEST FAILURE

Error message, "Lamp not on test terminated".

1. Check if Lamp is Burned Out
Retry the test and if the lamp is on, it will be seen through the viewing ports if the Filter Wheels, iris, and the Zenith Prism have moved into the proper position. Perform an AP (A/D voltages printout) test and compare results with previous tests, paying particular attention to standard lamp current and voltage. The current, channel 14, will be approximately zero and the voltage, channel 15, will exceed 14 volts if the lamp is unplugged or burnt out.

2. Attempt HG Test
If the test continues to fail, a mercury lamp test should be attempted. If the mercury lamp test operates correctly, then the Light Detection System is probably operating correctly. If so, a mercury lamp calibration should be done and the Standard Lamp test should be repeated.

3. Observe Slitmask Performance.
If the mercury lamp test is normal, the spectrometer cover should be removed and another standard lamp test done while observing the slitmask. If the standard lamp fails again while the slitmask is operating correctly, KIPP & ZONEN should be consulted.

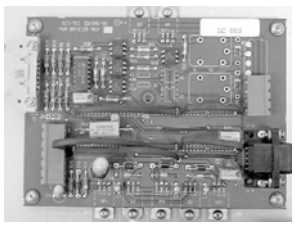
4. Photon Counting Circuitry
If the mercury lamp test is not normal, there is probably a failure in the photon counting circuitry and section 4.9 of this manual should be consulted.

5. Replace Standard Lamp
Before starting disassembly, it should be confirmed that the lamp filament is open circuit by checking with an ohmmeter across pins 1 and 5 of J111 (lamp connector). Reference fig. 10.5.2-2. The Standard Lamp is located above the mercury lamp and is attached to a removable plate. Remove the two screws holding the plate. Replace the bulb with a new one, taking care not to touch it with bare fingers- use a tissue or soft cloth and clean the lamp with isopropyl alcohol after installation. If the bulb is blackened, it should be replaced regardless whether or not it is operational. Replace the connector assembly and test the lamp with the B2 command. Be sure to use B0 to turn the lamp off.
Another standard lamp test should now be tried. If there is no success, there is a possibility of circuit failure on the Lamp Control board, or the Main Electronics board.

6. Check Main Electronics Board
Send the command to turn the Standard Lamp circuit on (B2), and measure the voltage at pin15 of U14 on the Main Electronics Board. The voltage should be +5 volts when the lamp is off and 0 volts when the lamp is on.
If this voltage does not change, the Main Electronics board should be replaced, or KIPP & ZONEN consulted.

7. Check Cable
If there was an indication of a 0 to 5V voltage swing at pin 15 of U14, but still no lamp operation, the cable that connects the Main Electronics board to the Lamp Control board should be checked.

8. Test Lamp Control Board
If the cable it is good, the Lamp Control Board should be tested for correct operation. The lamp control for the standard lamp is very simple - Q1 pin 2 supplies power to the current regulator VR2 (both components are on the bottom edge of the Lamp Control Board). Measure Q1 pin 2, and when the standard lamp is commanded on, it should go to 17 volts. VR2 pin 2 should be 10 volts. If it this point does not go to 10 volts, then the current regulator circuitry is faulty and must be repaired or the complete board must be replaced. Refer to the lamp control board schematic Fig 10.4-2.



9. Test Lamp Cable
If the voltage at VR2 does change on command, then the lamp cable should be tested for continuity.

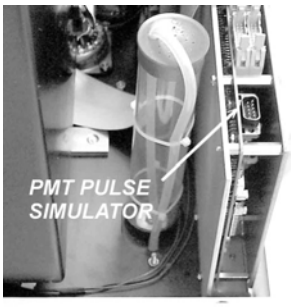
4.6 LIGHT DETECTION SYSTEM FAILURE

A Light Detection System failure may show up in any or all of the diagnostic or measurement tests of the Brewer. In Lamp diagnostics it will usually be shown on the Computer Display as "Lamp Not On .. test terminated" message. In a measurement (DS for example), the counts may simply go to zero, or some other incorrect number, depending on the nature of the failure. Results of Lamp tests are predictable so an HG and/or SL should be attempted if there is any suspicion of a Light Detection problem.
The Light Detection System is comprised of the foreoptics, spectrometer, micrometer, slit mask, and the PMT (including the high speed amplifier). Adjustments of any of these assemblies should be done with extreme caution, unless they are specified in this manual, as Instrument calibration may be affected.

4.7 TROUBLE-SHOOTING THE LIGHT DETECTION SYSTEM

1. Confirm Motor Positions are Correct
If Lamp tests fail and the message "Lamp not on test terminated" is displayed, the `SL` command should be issued. With the lamp on, the correct positions of the zenith prism, filterwheels, and iris should be confirmed. The correct positions are printed to the screen when the SL command is issued. Light from the lamp should be seen in both view tubes.

2. Test Photon Counting Circuit
If the SL test fails the photon counting circuitry should be tested. From the Main Menu enter the Teletype command, TT.
Turn off the power, remove the ribbon cable from the PMT output, and plug it into J22 of the Main Electronics Board. This connector is the output of a 1MHz Pulse Simulator (see picture).
Turn on the Brewer power. At the teletype prompt, enter the command `R,0,7,20;O`. The display should show 8 numbers, each being approximately 2,280,140 counts. Exit TT by pressing the Home key, turn off Brewer power, replace the PMT cable, and turn power back on.
If the test is normal, the Counting System is operating correctly.
Now check components in the Spectrometer.



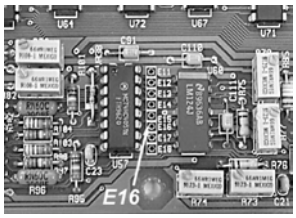
3. Check Micrometer Position
In a low light level and dry room, remove the Brewer cover and the Spectrometer cover. Confirm that the micrometer is in the correct position as indicated on the 'Micrometer Position' log sheet that is taped to the Spectrometer cover.

4. Check Mirror and Grating
Check that the spherical mirror and the grating appear to be in place, and that their mounting assemblies appear normal. ** TAKE CARE NOT TO TOUCH THE SURFACES OF EITHER THE MIRROR OR THE GRATING AS PERMANENT DAMAGE MAY OCCUR **** .

5. Test Slitmask
Slitmask operation can be confirmed by returning to Telytype operation (TT), sending the `R,0,7,20` command, and noting that the slitmask moves back and forth pausing briefly at each of the 8 slitmask positions.
Commands R,X,X,20 (where X =0 to 7) can be sent in sequence. After each command a slot in the slit mask should line up with a slot in the slit plate EXCEPT on command `R,1,1,20`, which is the Dark Count position. If the slitmask does not move, or appears to move incorrectly, then the I/O cable, Motor, or the motor control micro or motor driver IC on the Main Electronics board may be faulty. The Main Electronics board should be replaced and another test attempted.

6.Check Dark Count
If the slitmask appears to be functioning correctly note what the count values are when the command `R,0,7,20;O` is issued in Teletype. There is a very important difference between a count rate of zero and a count rate near zero. A high count rate indicates correct operation. A low count rate indicates that only dark count (a function of the PMT) is being measured and the light coming through the slit mask is not being measured. A zero count rate indicates a problem with the PMT or the counting electronics.

7. Measure High Voltage Test Point
Replace the Spectrometer cover, and remove the cover from the Main Electronics board.
Measure the high voltage test point E16 on the main electronics board (see picture), if it is not the same as the value given in the Final Test Record, section 5.0, then adjust R4 on the high voltage control board.



8. Check High Voltage Cable
If the test point voltage cannot be achieved, there may be a short circuit in the high voltage line somewhere between the HV module and the actual PMT dynode chain. Care should be taken when inspecting this area because there can be as much as 1800 volts at the connection points. Check the high voltage cable for continuity.

9. Measure High Voltage at PMT
The rear cover of the PMT housing can be removed (turn CCW) and the actual high voltage measured on the internal connector. This measurement must be done with a voltmeter rated for 2000 volts or by using a high voltage probe.
If the high voltage is still not as indicated on the Final Test Records, then contact KIPP & ZONEN.

10. Test High Speed Amp Board
If high voltage is correct, there may be a failure in the high speed amp board. TP1 on the high speed amplifier board (inside the PMT housing) should read -10 millivolts (referenced to the HV connector shield) or the value recorded in the Final Test Record, section 4.0. If the value of this test point is incorrect, an adjustment of the on-board potentiometer can be attempted. If this test fails, replace the high speed amplifier board.
If this test point is normal, the photon counter cable should be inspected to ensure that all connections and wires are intact. Finally, an oscilloscope can be used to monitor testpoint TP4 on the high speed amp board, and then pins 1,2,3,4, and 12,13,14, 15 of the IC, SN75114N. There should be clean square waves, the frequency of which should vary with light intensity.

If these signals are normal, consult KIPP & ZONEN before proceeding further. If any of the signals are missing or are not clean square waves, replace this board.

11. Contact KIPP & ZONEN
If all of these tests fail, there is a probable fault in the PMT, and KIPP & ZONEN should be contacted before proceeding.

4.8 STEPPING MOTOR CONTROL

The stepping motor control circuitry provides for the control of each stepping motor through individual motor microprocessors and stepping motor driver integrated circuits. This type of motor control allows the system to move the motors simultaneously, and to monitor the sensors very efficiently. All of the motor microprocessors are controlled by the main processor through a serial "I2C" bus. Each motor is optimized for speed and taylored to each function in the Brewer. The configuration file is included with the control software to allow changes and updates to the system. The configuration file is optimized for each instrument and normally does not require operator modifications unless recommended by KIPP & ZONEN.

4.9 PHOTON COUNTER CIRCUITRY

A schematic diagram of the photon counter circuitry is given in figure 10.4-1. The photomultiplier signal which has been amplified and divided by a line driver on the pulse amplifier board is received by a line receiver on the Main Electronics board. This signal is fed to a pair of binary counters. The outputs of the 2 counters are compared and if they differ by more then a set amount the second counter is disabled and a “PMT counter failure” message is generated in the Firmware Log. The counters are each connected to output ports which are connected to the data bus of the system microprocessor.

The main gate is generated by an electronic circuit that provides a very precise gating signal to enable counting for a specific length of time. The microprocessor decides when the pulse counting circuitry is initiated and the circuitry then triggers the gate to allow counting of the photons.

4.10 HIGH SPEED AMP BOARD

The photomultiplier, and pulse amplifier board are enclosed inside the photomultiplier subassembly. The sub assembly is designed to allow access to the pulse amplifying circuitry without upsetting the alignment of the PMT or the optics.
The photomultiplier is an EMI 9125UVA type. It is enclosed in a magnetic shield at the high voltage potential of the photo cathode. A small area on the shield is open to allow light to fall on the cathode. A high voltage power supply provides stepped voltages to the photomultiplier through a resistor divider circuit at the base of the tube. Since differential thermal expansion between the photomultiplier glass and the teflon base may cause tube breakage under extreme temperature conditions, it is recommended that the photomultiplier housing never be subjected to temperatures of less than -50C or greater than +60C.
The pulse amplifier board is located directly behind the base of the photomultiplier tube. This circuitry accepts the photon pulse signals from the photomultiplier, amplifies them, discriminates the signal level from current leakage, divides the amplified photon pulses by four, and finally outputs the pulses on a line driver. Since the circuitry is extremely sensitive to feedback and RF noise, it is located in close proximity to the photomultiplier.

4.11 RATEMETER

The ratemeter circuit provides a voltage output of the photon count rate. It consists of a two-transistor charge pump on the high speed amp board, and an integrator-amplifier on the Main Electronics board. A transistor is connected as a current pump and driven by one of the outputs of a J-K flip flop on the high speed amplifier board. The pulses from the flip flop are integrated by an RC network, then scaled by an op-amp.

4.12 TEMPERATURE MONITOR

The temperature monitor is a temperature sensitive bridge using YSI linearized thermistors. The bridge output is amplified to produce a suitable scale for the A/D convertor. There are six thermistor circuits available, one of which is located in a hole drilled in the side of the front flange of the PMT housing. The other five are used to measure temperature at points around the instrument as status information. One of the sensors monitors outside temperature.

4.13 HIGH VOLTAGE CIRCUITS

The high voltage (600-1600 volts) for the photomultiplier (PMT) is provided by a DC-DC converter / high voltage control circuit board.

4.14 CLOCK / CALANDAR

The real time clock/calendar circuit is a battery backed up clock with integral static random access memory. A lithium battery is used to keep the clock operating when there is no power applied to the Brewer. The clock is year 2000 compatible.

4.15 A/D CONVERTER

The A/D converter has a 10 bit conversion resolution and is built into the microprocessor. Analog multiplexers are utilized to select the channel to monitor. The AP routine is the main routine that accesses the data and displays the information on the PC monitor, saves it to a file, or prints it on the printer.

4.16 BREATHER DESICCANT CARTRIDGE

The breather desiccant cartridge allows the Brewer to compensate for normal pressure changes, while preventing the influx of moist air. Breather desiccant is housed in a plastic container with a breathing tube placed at the bottom of the cartridge. The other end of the tube is connected to a port at the bottom on the underside of the Brewer and is exposed to the outside air. As the air is drawn in from the outside, the air is dried as it passes the desiccant. Reference figure 10.8. Note that the breather desiccant does not remove moisture from the Brewer. Extra desiccant is needed to remove moisture from inside the instrument.

4.17 HUMIDITY SENSOR (OPTIONAL)

The optional humidity sensor is a monolithic IC sensor that provides a voltage output proportional to relative humidity. The sensor is buffered by an operational amplifier and the output is connected to one of the analog input channels of the A/D converter. A temperature sensor is located near the humidity sensor to provide temperature compensation for the device. The two measured values, relative humidity and temperature allow the absolute moisture to be calculated. The absolute humidity (grams/m^3) value is displayed on the PC screen along with a numerical “moisture index” value. Refer to Figure 10.4-5 for the sensor specifications and Figure 10.4-6 schematic for the humidity sensor assembly.

FILTER WHEEL #3 (FW#3) - ORDER SELECTION ASSEMBLY

Following dispersion by the spectrometer, and wavelength selection by the Slit Mask, radiation passes through the “order selection” filters (located in the FW#3 assembly). After order selection the intensity is measured by the photomultiplier and the counting circuitry.
Problems in the FW#3 assembly may result in large changes in lamp intensity, failures of HG and SL tests, errors in the FR test and incorrect observation results.

1. Run FR command
When the FR command is sent the micrometer is reset then FW#3 is reset. FW#3 should be heard as it rotates. Alternately the inspection cover on the top of the filter wheel assembly can be removed and the movement of the wheel can be observed.
If there is no movement the problem may be the electronics board, the interconnecting cable or the motor.
In the O3 mode FW#3 should always be found at step 242, while in N2 mode FW#3 should be found at step 178. If these values are not returned the problem may be in the electronics, interconnecting cables, the FW#3 motor, the reference detector or the filter wheel mechanical assembly.
If the error “reference diode not found” is observed then the filter wheel is stuck and can not turn or the reference circuitry is not functioning. If this message is observed KIPP & ZONEN should be consulted before opening the FW#3 housing.

2. Test cable and motor
Connect the cable from FW#3 to FW#2. When the FR command is sent FW#2 should be observed to move (after the micrometer resets).
If FW#2 does not move the electronics board or the cables are suspect. The cables can be checked by interchanging the cables at the electronics board connectors.
If FW#2 does move then the problem is probably the FW#3 motor.
3. Contact KIPP & ZONEN
If FW#3 motor appears to be trying to move, FW#3 should be inspected to ensure that it rotates freely. With the inspection cover open use a small screwdriver to gently rotate the filter wheel. If any obstruction is detected KIPP & ZONEN should be contacted. If the FW#3 assembly is obstructed the filter wheel housing may need to be opened; opening the housing is not recommended without first consulting KIPP & ZONEN.
If it is determined that the electronics board, interconnecting cable, and motor are functional then the problem is probably in the filter wheel assembly and KIPP & ZONEN should be contacted.

5 TEST RESULTS OUT OF SPECIFICATION

Whenever any diagnostic tests are out of specification, (SL, HG,DT,RS,) the following should be done or considered.

1. If the deadtime has increased or decreased significantly, the High Speed Amplifier board may be defective, the slitmask may have become misaligned, or a ground in the instrument wiring may have become resistive. High moisture levels inside the instrument may also cause abnormal deadtime results.

2. A test lamp may have deteriorated to the point where tests are affected, and the lamps may require replacement. They can be inspected as mentioned in the previous sections, and replaced if necessary.

3. The optical surfaces within the zenith prism may have become smudged with a fingerprint or may have become dusty over a period of time. The prism should be cleaned, referring to section 6.2.

4. The micrometer may be "sticking" and not in its exact location after a measurement or a test. It should be inspected and the drive mechanism carefully cleaned with tissue and isopropyl alcohol.

5. Dark count is a convenient characteristic to monitor as it is printed out in many tests and measurements. Dark count changes may be the result of moisture, changes in the slit mask, PMT, high Voltage, or counting circuitry.

6. When the dark count of an instrument changes, or becomes erratic, a slitmask Run-Stop test should be done to see if there are any changes in the slitmask circuitry. If this does not give any indication of the problem, there may be a ground somewhere which has become resistive, and it should be checked.

7. The High voltage test can be done, and the results compared to those in the Final Test Records.

8. Generally speaking PMT problems are not field repairable.

9. Desiccant should be changed at regular intervals. The frequency of desiccant change depends on the climate. Desiccant will require changing much more frequently in humid environments. Alternately the humidity indicator can be used to indicate that desiccant needs changing – desiccant should be changed if the moisture index provided be the electronic humidity sensor is greater then 10 or if the paper indicator for 40% humidity is no longer blue. Desiccant can be removed and dried overnight at approximately 60 degrees C if necessary.

If these checks fail to locate the problem, KIPP & ZONEN should be consulted as to further investigation.

6 OPTICS CARE AND CLEANING

6.1 OPTICS CARE

- Never touch the polished surface of optics.
- Hold an optic only by its edges.
- Reduce the need for cleaning optics as much as possible.

6.2 OPTICS CLEANING

- Use latex gloves when handling or cleaning optics.
- Do not reuse cleaning materials.

SPECTROMETER MIRROR, ND FILTERS, QUARTZ PRISMS AND LENSES: In the event of dust, blow off with rubber hand pump (avoid using your breath) or use bottled dry nitrogen to remove particles. In the event of grease or fingerprints, dampen a very soft cloth with methyl ethyl alcohol and wipe gently. NOTE: Wipe marks will almost certainly remain. To remove the wipe marks, dampen a soft tissue with a mixture of ether and isopropyl alcohol and wipe gently. The tissue should be dampened to the extent that while wiping, the mixture evaporates one to two millimeters behind the tissue.

QUARTZ DOME AND EXTERIOR QUARTZ WINDOW: Spray with window cleaner and wipe clean with a soft cloth.

LAMPS: Dampen a soft cloth with methyl or ethyl alcohol and wipe gently.

POLARIZING FILTER: Use only a soft, dry cloth or tissue to remove dirt and finger marks. The filter should always be wiped gently to avoid marring the finish.

DIFFRACTION GRATING: Do NOT touch or attempt to clean.

7 AZIMUTH TRACKER

Problems in the Azimuth Tracker affect the Brewer's ability to track the sun, and thus any measurement that depends on direct solar radiation may be in jeopardy.
Regardless of the problem, it usually manifests itself as frequent failures of the Solar Siting test (SI), or the Steps per Revolution test (SR).
The Main Electronics Board sends motion commands to the Tracker, and receives sensor indications from the Tracker via the Azimuth Tracker connector on the front of the Brewer base.
Indirect problems can affect Brewer power and communications since both of these cables pass through the Tracker housing assembly. Communications is routed through a surge suppressor assembly mounted on the bottom of the Tracker, and Power is supplied to the Brewer via the Tracker enclosure where a set of power line surge suppressors are located.
If the surge suppressors in the communications line are faulty, a no-communications condition can exist. The communication cable from the Computer can be connected to bypass the Tracker as a troubleshooting aid in determining if the surge suppressor assembly is at fault.
Similarly, power can be connected directly to the Power Connector on the Brewer in the event that a "no power" problem exists in the Brewer.
The Power switch on the Tracker will not affect power to the Brewer, but a failure of the fuse in the Tracker will interrupt both Brewer and Tracker power.
Tracker problems can be either mechanical or electrical.

7.1 BREWER POWER PROBLEMS.

Power for the Brewer passes through the Tracker Case where it is connected to a set of MOV surge suppressors. In the event of large transient voltages on the power cable, one or more of these components may conduct, and subsequently result in an AC power short circuit which will cause the fuse to open circuit and may affect power to both the Brewer and the Tracker. Connecting the AC power directly to the Brewer and observing if operation is restored is a method of troubleshooting this subassembly. An ohmmeter can then be used to determine the specific component at fault.
Power connections in the Tracker, including the fuse, can also be checked in the event of power problems in the Brewer.

7.2 BEWER COMMUNICATIONS PROBLEMS

A failure in the surge suppressor in the communications link can be checked by connecting the communication cable from the Computer directly into the Brewer. If Brewer/Computer communications are restored, the surge suppressor subassembly is likely at fault.

7.3 TRACKER ELECTRICAL PROBLEMS

Electrical problems include AC power, power supply, motor driver board, stepper motor, and sensor/blocker assembly.

7.3.1 Sensor Problems

The tracker is prevented from travelling past the zero (or North) position by a sensor that is attached to the aluminum drive plate. A blocking device which rotates with the Tracker body interrupts a light beam in the sensor and the resulting change in sensor voltage output is detected by the electronics. If it is observed that there is frequent wrapping of the power and communications cable, or activation of the safety switch, the sensor and its wiring should be tested.

1 With a DC voltmeter, monitor the sensor voltage at U3, pin 13 on the Main Electronics Board.

2 Pass a piece of paper (or other opaque material) through the sensor, and the voltage should go from +5 volts in the blocked state to 0 volts in the non-blocked state.

3 At the Tracker, pin 5 of J201 should go between 0V and 5V as the sensor is unblocked and then blocked.

4 Replace the sensor assembly and cables as necessary.

5 If the above tests shows the sensor and cables are good, then confirm that the blocker passes through the sensor as the Tracked rotates.

6 If all of the tests are good, there could be a problem on the Main Electronics Board sensor detecting circuitry, in which case KIPP & ZONEN should be consulted.

7.3.2 No Tracker Operation.

If the Green Power Indicator indicates no Tracker power, but the Brewer functions normally, a problem in the Tracker is indicated.
The Tracker covers should be removed and the AC power to the Power Supply confirmed. If AC is present then the +5 V output of the power supply should be measured. If no +5V is found, then the Power supply is at fault and should be replaced.
If the Power supply is normal, then the safety switch should be inspected to confirm that it has not been tripped by an over-travel condition. The switch should be in the toggle position away from the Tracker centre pedestal.
If the Power Supply and safety switch are both normal, and there is still no motor motion, then it should be confirmed that the Brewer is outputting drive pulses to the Tracker.

1 Tracker movement pulses can be found on the cable going to the Tracker Driver Board BA-C99, connector P201, pin 1. Square pulses, 0-5V in amplitude may be observed with an oscilloscope, or an AC reading indication of 2 Volts can be seen with a Voltmeter in the AC measurement mode.

2 Connect an Oscilloscope or Voltmeter to pin 1 of Connector P201 of the Board BA-C99 in the Tracker. (lower left of the BA-C99)

3 From the Brewer Main Menu, go to the TT (TeleType) mode.

4 Send the Command `M,2,1000` and pulses should be observed.

5 If no pulses are seen at the Tracker, then look on pin 4, J17T on the Main Electronics board

This pin is the 2nd from the left on the top row of solder connections just behind J17T when facing the removable plate of the Main Board. .

6 If there are still no pulses, then remove the connector at the BA-C99 end and try again – this will test for a short circuit in the cable

7 If the test fails again, then a fault is indicated in the motor driver circuitry on the Main Electronics Board, and this board should be replaced.

8 If it is confirmed that pulses are going to the Tracker and if the Tracker Power Supply and Safety Switch are both normal, and there is still no motor motion, then the motor Driver board in the Tracker should be replaced.

9 Failure of the motor to move under command at this point indicates a possible motor failure, or a failure of interconnecting cables. All interconnections should be inspected.

7.4 TRACKER MECHANICAL PROBLEMS

If the Tracker stepping motor is observed to rotate, but the Tracker does not turn, or turns erratically, this is an indication of a mechanical problem.

The first check should be for cleanliness of the aluminum drive plate, and particles jamming between drive gears.

A rare mechanical problem is the seizing of the main bearings, which can be checked by turning Tracker power off and attempting to rotate the Tracker by hand. If the Tracker does not turn freely, then KIPP & ZONEN should be consulted.

If the Tracker turns freely with no power, and the motor turns when an AZ or SR command is issued, then a mechanical problem exists between the motor and the main drive plate.

Check the small motor gear and confirm that it is turning with the motor, and is not slipping on the gear with which it is meshing. Also check for slippage between the stainless steel drive rod and the large aluminum drive plate.

If the motor gear does not turn with the motor, then check the set screw which holds the gear to the motor shaft. If the motor gear turns, then the spring tensions that provide drive friction between the gears, the drive shaft, and the drive plate may require adjustment. (Ref Figure 7.1 and Section 5.4 of the Operator's Manual).

A spring scale can be used at the top and bottom of the shaft and the tension adjustments set to 4kg at the top, and 9kg at the bottom tension point.
If the Tracker still does not turn, or gives inconsistent SR results, then KIPP & ZONEN should be contacted for assistance.

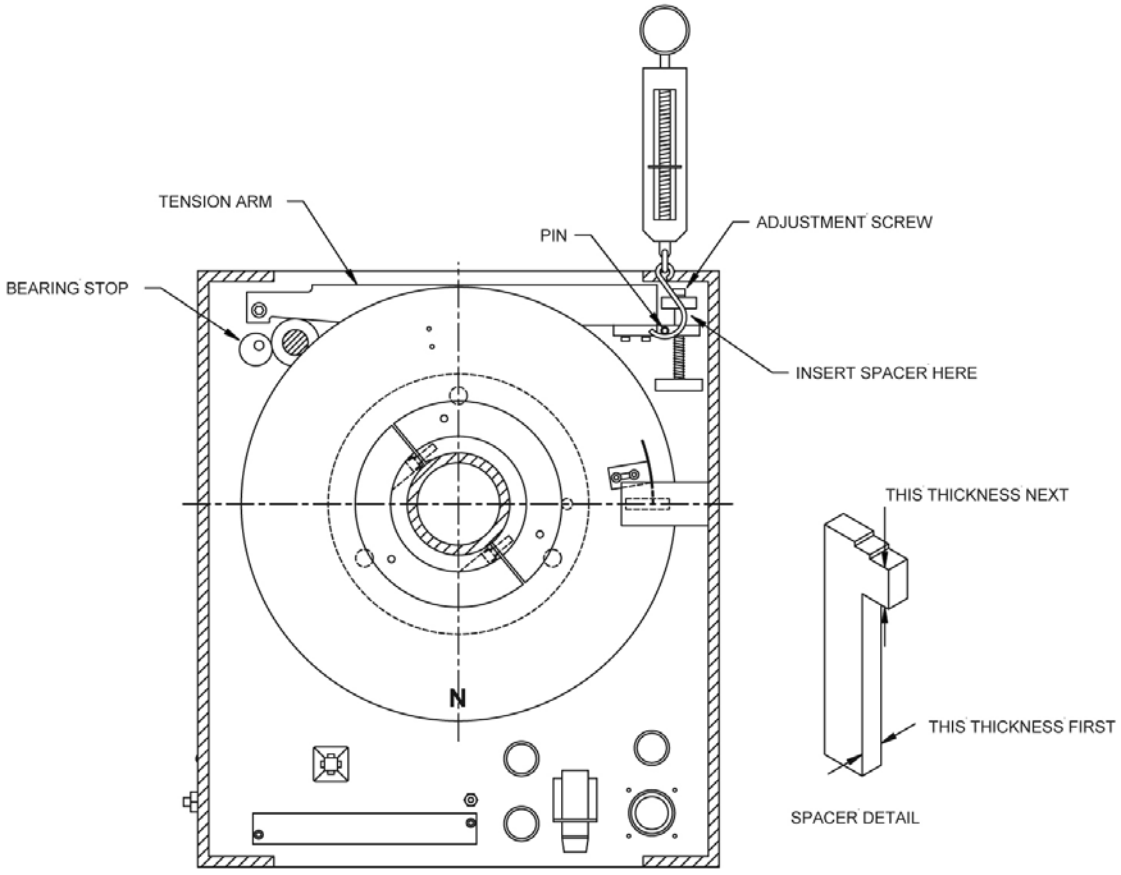


Figure 7.1 Tracker Drive Mechanism

8 MAIN ELECTRONICS FIRMWARE / CONFIGURATION LOADING PROCEDURES

This procedure is used to upload new firmware for the BREWER Electronics or to update the configuration files stored in flash memory. The only time this procedure is required is if the firmware has been corrupted due to electrical surges or the memory had been replaced or if the configuration has changed due to some physical changes to the sensor settings or position stops.

8.1 INSTALLATION OF BREWCMD SOFTWARE

Before using any of the procedures in this section the Brewcmd software must be installed and properly configured.
Exit out of the BREWER operating program to DOS.
Take the supplied configuration disk and put it into the computer used to reconfigure the BREWER.
Copy the files from the floppy disk **`a:\bdata\nnn`** to the **`c:\bdata\nnn`** subdirectory using the command
`copy a:\bdata\nnn\*.* c:\bdata\nnn` e
Edit the file c:\bdata\nnn\brewcmd.ini. Ensure that the com port setting indicated matches the comport setting for your Brewer.

8.2 RESTORE BACK TO COSMAC MODE

In certain circumstances where the signal line is placed in a permanent Break signal condition, the BREWER will continually try to reset but eventually it has determined that there is a problem and it will halt trying to reset and go into Loadmode. This fault can happen when the RS422 cable has been incorrectly wired or has shorted together to simulate a break condition. To confirm that the processor is actually in loadmode, remove the weatherproof cover of the BREWER and look down into the Main electronics board between the cover plate and the microprocessor board. You should see a flashing LED light and if it is in loadmode, it will be flashing quickly in 1/4 second intervals.
The procedure to restore the system back to the Cosmac mode of operation is as follows:

Change to the directory c:\bdata\nnn by typing the command
`cd \bdata\nnn` e

Run the program Brewcmd.exe by typing **`brewcmd`** e This program is a utility to allow the user to communicate to the BREWER Microprocessor and change operating modes or upload files.
If all the connections are correct, the display will reply that BREWER responded and at what baud rate it is communicating at. **`[Using load mode at 9600 baud, on com 1; tracing is off]`**
It is expected that it will be in Loadmode but it could be in Opmode as well.
To return it to its normal operating mode, type **`cosmacmode`** e
The instrument will reset itself by resetting all of its motors and the display will display the following with other status information.
`Motors Initializing`.
When the instrument has completed resetting all of the motors, the display will now respond to low level commands.

Exit out of the Brewcmd program by typing **quit** e and the computer will have returned to the dos prompt.
Run the BREWER operating program and then ensure the time and date is correct.

8.3 NEW CONFIGURATION UPLOAD

If hardware changes have been made such as removing the zenith drive gear or adjusting the micrometer drive sensor mask, then correct values for zero offset and other parameters must be uploaded to the instrument for it to operate correctly. The procedure to upload the new configuration file is listed below:
The configuration file that describes the characteristics of the instrument is named BREWnnn.cfg. The nnn will be the instrument number. This file is an ASCII text file that describes all the technical parameters of this particular instrument. This very same file should be uploaded to any replacement BREWER Main Electronics board following the physical installation of the board. A spare BREWER Main Electronics board will normally be sent with the latest configuration file stored at KIPP & ZONEN. If the customer has changed any parameters in the field, it will not be configured into that board and the customer will have to upload the latest file as described below:

Change to the directory c:\bdata\nnn by typing the command
cd \bdata\nnn e
Run Brewcmd.exe by typing **brewcmd** e
[using cosmac mode at 1200 baud, on com 1: tracing is off]should be displayed
Type **loadmode** e to change modes.
Waiting for the mode change to complete and when complete, the display will display **[using load mode at 1200 baud, on 1: tracing is off]**
Go into Opmode by typing **opmode 9600** e
Trying Operating mode at 9600 baud is displayed until the display will display **[using operating mode at 9600 baud; on port 1; tracing is off]**
Send the configuration file to the microprocessor by typing **putcfg brewnnn.cfg** e (nnn is the instrument number)
Wait approximately one minute to transfer
Type **readlog** e to clear the log buffer
Type **useconfig** e motors should now reset
When complete **readlog** e to see if errors were encountered. Contact KIPP & ZONEN if the log displays a problem.
Type **save** e a number should appear. This tells you how many configuration writes you have left.
If the number is '**1**' then the next time a configuration is sent, the top firmware must be written to Flash memory and the configuration area is cleared to allow another 4 blocks of configuration files.
Go to Load mode by typing **loadmode** e
Waiting for mode change to complete and
Trying load mode at 9600 baud is displayed until the display will display [using load mode at 9600 baud, on com 1: tracing is off]
Go into Cosmac mode by typing cosmacmode e
Reading Cosmac mode reset message
Waiting for mode change to complete
Trying Cosmac mode at 1200 baud
Motors Initializing

These are some of the messages seen while going into the Cosmac mode.
Motors should reset and it is ready to run the BREWER operating program
Type quit e to get out of Brewcmd
To run the BREWER operating program type BREWER e

8.4 UPLOADING NEW FIRMWARE AND CONFIGURATION FILES

As KIPP & ZONEN develops new firmware and features, it is now possible for the customer to upgrade the firmware without having to open the cover to the BREWER. The New Electronics has incorporated Flash electrically erasable program memory and the system is capable of being updated from the PC. The procedure below will provide a step by step process to upload the firmware and also upload the configuration file which is erased when the new firmware is loaded. This disk is supplied with the instrument when first delivered or will be sent out to the customer when firmware updates are done.
Copy the new top.bin or topv#r#.bin firmware file received from KIPP & ZONEN to the **`c:\bdata\nnn`** subdirectory.

Change to the directory c:\bdata\nnn by typing the command
`cd \bdata\nnn` e
Run Brewcmd.exe by typing **`brewcmd`** e
Eventually the following statement is displayed:
`[using cosmac mode at 1200 baud, on com 1; tracing is off ]`should be displayed. If the command **`help`** e is entered, a list of available commands will be displayed.
Type **`loadmode`** e to change modes.
Eventually the following statement is displayed:
`[using loadmode at 1200 baud, on com 1: tracing is off]`
Type **`loadmode 4800`** e
Eventually the following statement is displayed:
`[using loadmode at 4800 baud, on com 1: tracing is off]`
Type **`load top.bin`** or **`topv#r#.bin`** e
(# will depend on the version number of the firmware.)
Wait until this task is completed (this will take a few minutes).
The display will display some messages below:
`Erasing Flash memory`
`Writing file top.bin to flash` ……
The display will show 112 moving dots to show its progress
Turn off the power of the instrument for approximately 10 seconds and turn it back on.
Go into Opmode by typing **`opmode 9600`** e
`Waiting for mode change to complete` is displayed and eventually the fan turns on if the heater option is ordered and the display will eventually display **`[using operating mode at 9600 baud, on com 1: tracing is off ]`**
Type **`readlog`** e to display any errors encountered.
Send the configuration file to the microprocessor by typing **`putcfg brewnnn.cfg`** e
Wait a 1.5 minutes to transfer
Type **`readlog`** e to clear the log buffer and see if any errors occurred during the configuration installation.
Type **`useconfig`** e motors should now initialize.
When complete **`readlog`** e to confirm everything is ok

Type **save** e a number should appear. This tell you how many configuration writes you had left when the save command was issued. The number of configuration writes left is one less then the number displayed..
The number is '**4**' should be displayed.
Go to Load mode by typing **loadmode** e
The display will eventually display [using load mode at 9600 baud, on com 1: tracing is off]
Go into Cosmac mode by typing **cosmacmode** e
A number of messages will appear and eventually the motors should initialize and it is ready to run the BREWER operating program and display [using cosmac mode at 1200 baud, on com 1: tracing is off]
type quit e to get out of Brewcmd
To run the BREWER operating program type BREWER e

8.5 MAIN BOARD FLAT CABLE CONNECTIONS

The main board has a number of flat cables attached to it. The followings lists the connectors for the flat cables and the electronics they are connected with. "Top" (at the front) stands for pins 1-16. "Bottom" (at the back) are pins 17-32:

J2 top	BA-W77/A	Lamp Board
J2 bottom	BA-W77/B	J1 on hv module
J13 top	BA-W76/B	iris
J13 bottom	BA-W76/A	zenith
J14 top	BA-W76/B	fw #1
J14 bottom	BA-W76/B	fw#2
J15 top	BA-W76/A	micrometer #2 (MKIII only)
J15 bottom	BA-W76/A	micrometer #1
J16 bottom	BA-W76/C	fw#3 (MK IV only}
J17 top	BA-W76/B	slitmask (shutter)
J17 bottom	BA-W76/A	azimuth
J12 top	BA-W76/A	control switch's
J7 top		Communication
J7 bottom		humidity sensor

9 WARRANTY

MANUFACTURER'S GUARANTEE / WARRANTY CERTIFICATE
NEW PRODUCT WARRANTY AND LIMITATION OF LIABILITY

KIPP & ZONEN hereby warrants to its products to be free from defects in material and workmanship for a period of one year from date of purchase.

KIPP & ZONEN's obligation under this warranty is strictly and exclusively limited to repairing or replacing, at KIPP & ZONEN's discretion, any such equipment and / or parts thereof which have failed under normal use and service. Expressly this warranty does not apply to any equipment and / or parts which have been improperly installed, been subject to abuse, neglect and / or accident.

The foregoing warranty is in lieu of any other warranties, expressed or implied, including without limitation, any implied warranty of merchantability or fitness for a particular purpose, and of any other obligations of liabilities whatsoever in any event for payment of any incidental or consequential damages, including, without limitation damages or injury to a person or property.

An authorization must be obtained from KIPP & ZONEN prior to the return of any equipment or parts thereof. Returned material is to be turned to the factory, or other location as may be directed by KIPP & ZONEN, freight prepaid and will be returned freight prepaid. KIPP & ZONEN is not responsible for any transportation, insurance, demurrage, brokerage, duties, or councillor charges, etc.

This warranty is given to the original purchaser and may not be transferred without direct written consent of KIPP & ZONEN.

Should an extended warranty be purchased, then the warranty statements in its entirety is applicable for the entire period of time covered by the extended warranty.

In the absence of another prior agreement, this standard warranty statement will apply.

10 BREWER REFERENCE DOCUMENTATION

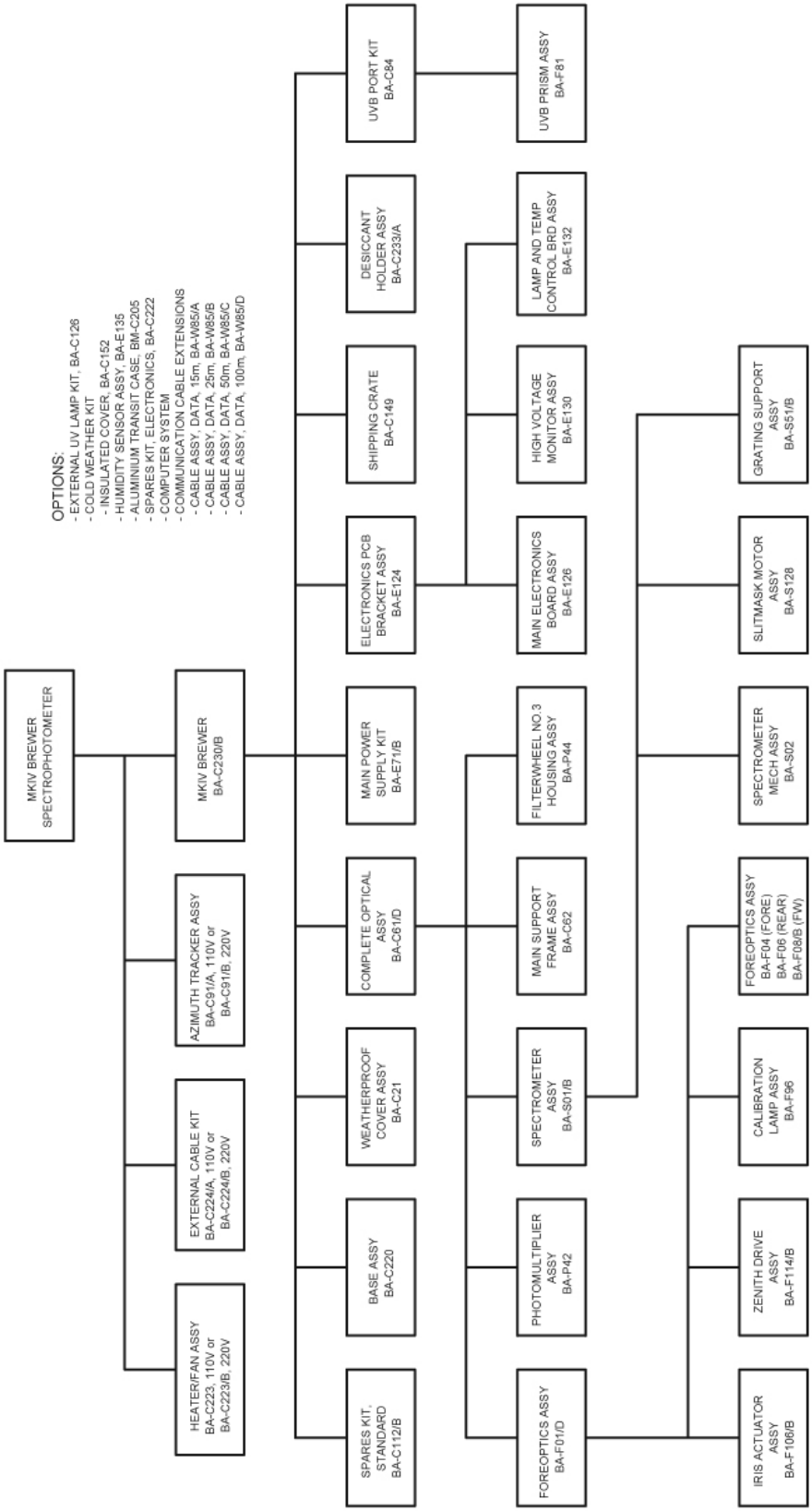
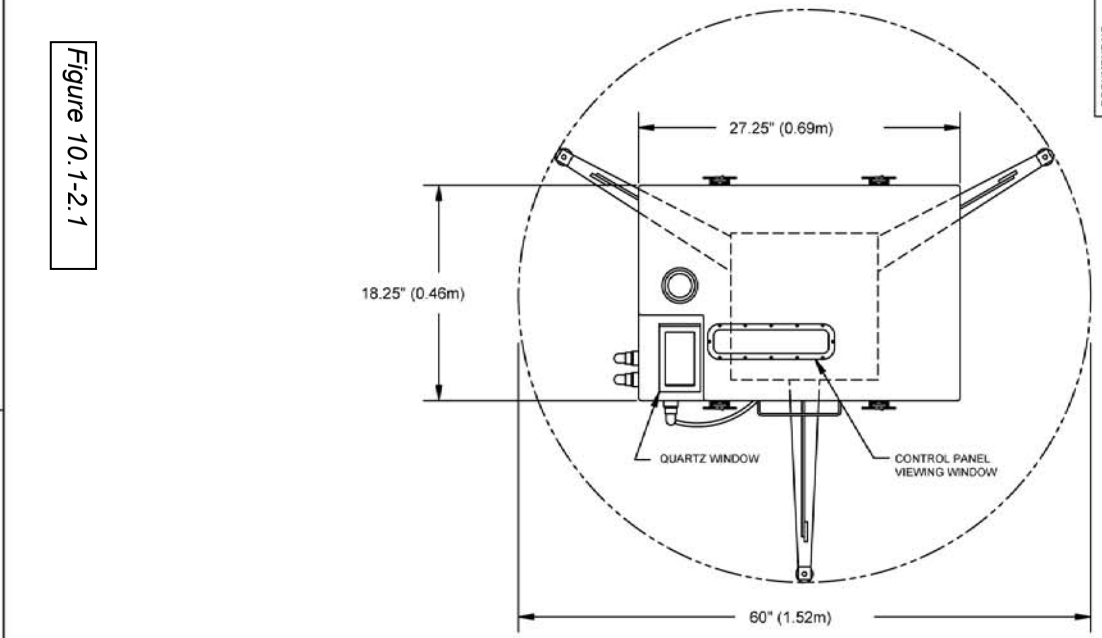
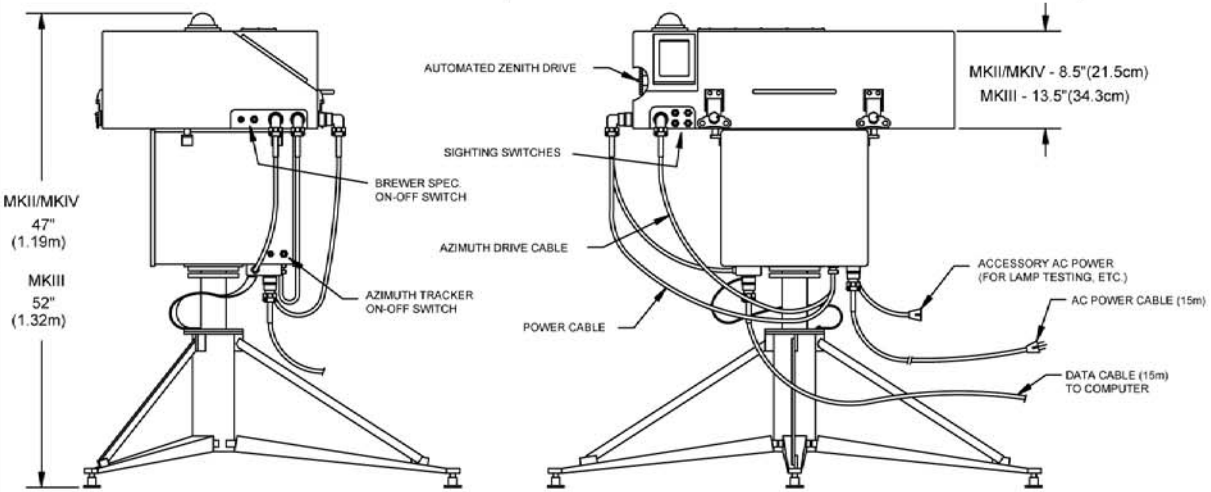


Figure 10.1-1.1

Figure 10.1-2.1





DOCUMENT NO. BS-C1000

REV	DESCRIPTION	DCN NUMBER	DATE	DWN.	CHKD.
1	FIRST ISSUE		88.9.20	CW	AM
2	ADD UVB EXT LAMP; SHIPPING CRATES	481	90.07.03	FV	KL
3	SEE DCR	487	90.09.12	FV	KL
4	CHG OPTION D: UPDATE SHT 2	530	91.03.19	FV	KL
5	CHG OPTION B FR BA-C83 TO BA-C91	562	92.03.17	FV	KL
6	CHG OPTION H TO ONE STANDARD KIT	581	92.09.03	FV	KL
7	MAKE UVB KIT PART OF OPTION A	618	92.12.03	FV	KL
8	ADD LDDS KIT (BA-C204)	655	93.06.23	FV	KL
9	MAKE STD SPARES KIT PART OF OPTION A	662	94.01.10	FV	KL
10	ADD MKII FW OPTION, MKIII INFO (TRANSIT CASE, MANUALS KIT, OUTSIDE DIM'S)	677	94.04.12	DM	DS
11	REMOVE AZ TRACKER SHIPPING CRATES	712	94.09.01	FV	DS
12	ADD 220V VERSION OF LDDS (BA-C204/B)	749	95.08.11	FV	DJS
13	REMOVE ALL OPTIONS REF	868	99.08.09	MSB	TKLL

NOTES:

1. DIMENSIONS SHOWN FOR REFERENCE PURPOSES ONLY.
2. ALL NECESSARY DOCUMENTATION, SOFTWARE AND MANUALS INCLUDED WITH BREWER SPECTROPHOTOMETER.

COMPUTER GENERATED DRAWING
FILENAME: BS-C1000.DWG

SCALE		NEXT ASSY:	
DATE	88.08.05	DIMENSIONS IN IF DUAL DIMS:	
DWN	CW		
CHKD	RKF	Tolerances (unless otherwise specified)	
APPD	AM	INCHES	MM
FINISH		.xxx ± .005 .xx ± .01 ANGLES ± 1 ° FRACTIONS ± 1/32	.xx ± 0.15 .x ± 0.25 ANGLES ± 1 °

SCI-TEC INSTRUMENTS INC.

TITLE: BREWER SYSTEMS

SIZE	SHEET	DOCUMENT NUMBER	REV.
C	1 OF 1	BS-C1000	13

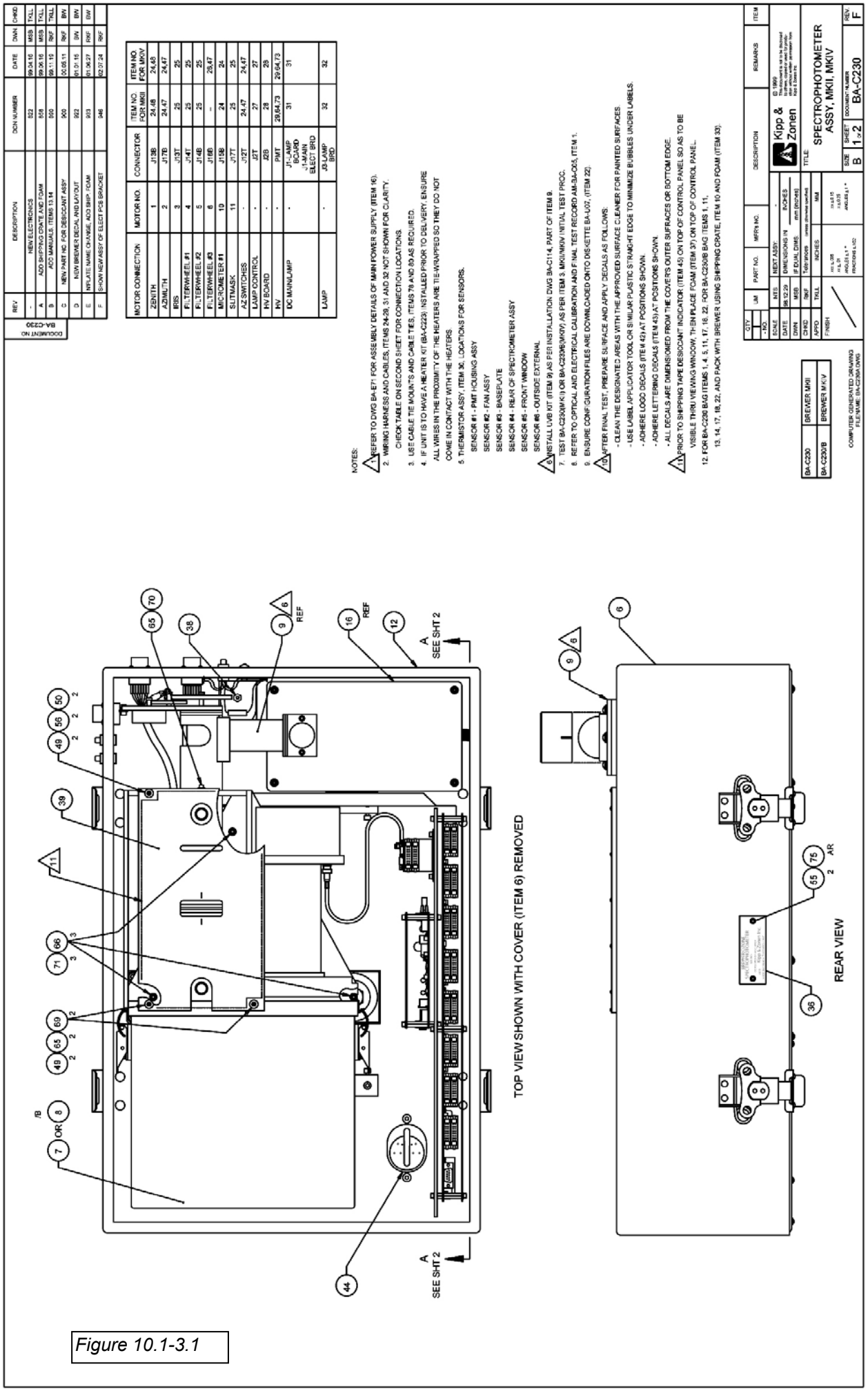


Figure 10.1-3.1

DOCUMENT NO. BA-C230

REV	DESCRIPTION	DCN NUMBER	DATE	DWN.	CHKD.
-	NEW ELECTRONICS	822	99.04.16	MSB	TKLL
A	ADD SHIPPING CRATE AND FOAM	858	99.06.16	MSB	TKLL
B	ADD MANUALS, ITEMS 13,14	890	99.11.19	RKF	TKLL
C	NEW PART NO. FOR DESICCANT ASSY	900	00.05.11	RKF	BW
D	NEW BREWER DECAL AND LAYOUT	922	01.01.15	BW	BW
E	N'PLATE NAME CHANGE, ADD SHIP. FOAM	933	01.06.27	RKF	BW
F	SHOW NEW ASSY OF ELECT PCB BRACKET	946	02.07.24	RKF	

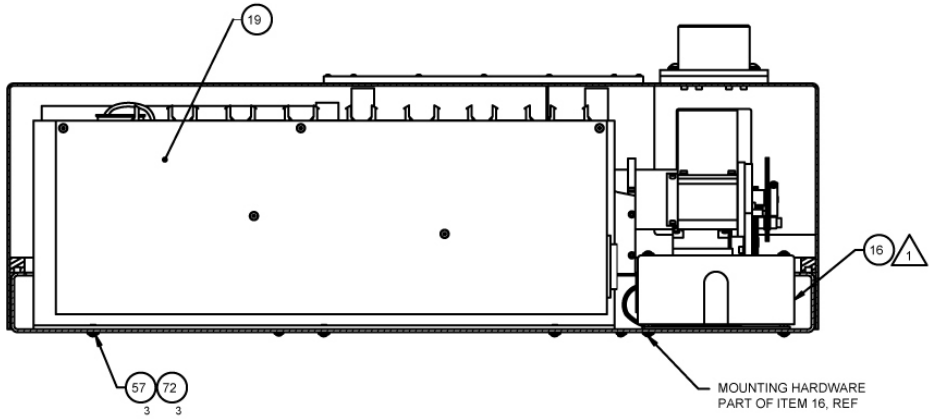
MOTOR CONNECTION	MOTOR NO.	CONNECTOR	ITEM NO. FOR MKII	ITEM NO. FOR MKIV
ZENITH	1	J13B	24,48	24,48
AZIMUTH	2	J17B	24,47	24,47
IRIS	3	J13T	25	25
FILTERWHEEL #1	4	J14T	25	25
FILTERWHEEL #2	5	J14B	25	25
FILTERWHEEL #3	6	J16B	–	26,47
MICROMETER #1	10	J15B	24	24
SLITMASK	11	J17T	25	25
AZ SWITCHES	-	J12T	24,47	24,47
LAMP CONTROL	-	J2T	27	27
HV BOARD	-	J2B	28	28
HV	-	PMT	29,64,73	29,64,73
DC MAIN/LAMP	-	J1-LAMP BOARD J1-MAIN ELECT BRD	31	31
LAMP	-	J3-LAMP BRD	32	32

NOTES:

1. REFER TO DWG BA-E71 FOR ASSEMBLY DETAILS OF MAIN POWER SUPPLY (ITEM 16).
2. WIRING HARNESS AND CABLES, ITEMS 24-29, 31 AND 32 NOT SHOWN FOR CLARITY.
   CHECK TABLE ON SECOND SHEET FOR CONNECTION LOCATIONS.
3. USE CABLE TIE MOUNTS AND CABLE TIES, ITEMS 78 AND 80 AS REQUIRED.
4. IF UNIT IS TO HAVE A HEATER KIT (BA-C223) INSTALLED PRIOR TO DELIVERY, ENSURE ALL WIRES IN THE PROXIMITY OF THE HEATERS ARE TIE-WRAPPED SO THEY DO NOT COME IN CONTACT WITH THE HEATERS.
5. THERMISTOR ASSY, ITEM 30, LOCATIONS FOR SENSORS.
   SENSOR #1 - PMT HOUSING ASSY
   SENSOR #2 - FAN ASSY
   SENSOR #3 - BASEPLATE
   SENSOR #4 - REAR OF SPECTROMETER ASSY
   SENSOR #5 - FRONT WINDOW
   SENSOR #6 - OUTSIDE EXTERNAL
6. INSTALL UVB KIT (ITEM 9) AS PER INSTALLATION DWG BA-C114, PART OF ITEM 9.
7. TEST BA-C230(MKII) OR BA-C230/B(MKIV) AS PER ITEM 3, MKII/MKIV INITIAL TEST PROC.
8. REFER TO OPTICAL AND ELECTRICAL CALIBRATION AND FINAL TEST RECORD AM-BA-C05, ITEM 1.
9. ENSURE CONFIGURATION FILES ARE DOWNLOADED ONTO DISKETTE BA-U07, (ITEM 22).
10. AFTER FINAL TEST, PREPARE SURFACE AND APPLY DECALS AS FOLLOWS:
   - CLEAN THE DESIGNATED AREAS WITH THE APPROVED SURFACE CLEANER FOR PAINTED SURFACES.
   - USE LABEL APPLICATOR TOOL OR SIMILAR PLASTIC STRAIGHT EDGE TO MINIMIZE BUBBLES UNDER LABELS.
   - ADHERE LOGO DECALS (ITEM 42) AT POSITIONS SHOWN.
   - ADHERE LETTERING DECALS (ITEM 43) AT POSITIONS SHOWN.
   - ALL DECALS ARE DIMENSIONED FROM THE COVER'S OUTER SUFRACES OR BOTTOM EDGE.
11. PRIOR TO SHIPPING TAPE DESICCANT INDICATOR (ITEM 45) ON TOP OF CONTROL PANEL SO AS TO BE VISIBLE THRU VIEWING WINDOW, THEN PLACE FOAM (ITEM 37) ON TOP OF CONTROL PANEL.
12. FOR BA-C230 BAG ITEMS 1, 4, 5, 11, 17, 18, 22, FOR BA-C230/B BAG ITEMS 1, 11, 13, 14, 17, 18, 22, AND PACK WITH BREWER USING SHIPPING CRATE, ITEM 10 AND FOAM (ITEM 33).

Figure 10.1-3.2

DOCUMENT NO. BA-C230	REV	DESCRIPTION	DCN NUMBER	DATE	DWN.	CHKD.
	-	NEW BREWER ELECTRONICS	822	99.04.16	MSB	TKLL
	A	ADD SHIPPING CRATE AND FOAM	858	99.06.16	MSB	TKLL



SECTION A-A
SOME HARDWARE NOT SHOWN FOR CLARITY

QTY. NO.	UM	PART NO.	MFR's NO.	DESCRIPTION	REMARKS	ITEM

SCALE	NTS	NEXT ASSY:	-
DATE	98.12.29	DIMENSIONS IN	INCHES
DWN	MSB	IF DUAL DIMS:	mm (inches)
CHKD	RKF	Tolerances (unless otherwise specified)	
APPD	TKLL	INCHES	MM
FINISH		.xxx ± .005 .xx ± .01 ANGLES ± 1 ° FRACTIONS ± 1/32	.xx ± 0.10 .x ± 0.25 ANGLES ± 1 °

Kipp & Zonen

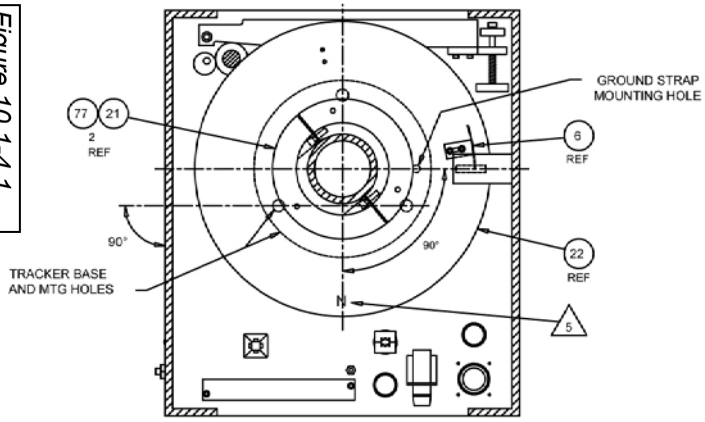
TITLE:
SPECTROPHOTOMETER
ASSY, MKII, MKIV

SIZE	SHEET	DOCUMENT NUMBER	REV.
B	2 of 2	BA-C230	F

COMPUTER GENERATED DRAWING
FILENAME: BA-C230B.DWG

Item no.	BA-C230 Part No.	BREWER MKIV Description	Qty.
1	AM-BA-C05	BREWER FINAL TEST RECORD	--
3	IT-BA-C230	BREW MKII,MKIV INITIAL TEST	--
4	OM-BA-C230/B	SPECT OPER MAN, MKIV	1.00
5	MM-BA-C230/B	SPECT MAINT MAN, MKIV	1.00
6	BA-C21	WEATHERPROOF COVER ASSY	1.00
7	BA-C61/C	COMPL OPTICAL ASSY MKII	--
8	BA-C61/D	COMPL OPTICAL ASSY, MKIV	1.00
9	BA-C84	OPTION C KIT, UVB	1.00
10	BA-C149	MKII/MKIV SHIPPING CRATE	1.00
11	BA-C112/B	SPARES KIT, STD, NEW ELECT	1.00
12	BA-C220	BASE ASSY, MKII,IV, NEW ELECT	1.00
16	BA-E71/B	MAIN POWER SUPPLY KIT, W/O DESIC	1.00
17	BA-E116	BREWER OPERATING S/W	1.00
18	BA-E118	BREWER UTILITIES S/W	1.00
19	BA-E124	ELECTRONIC PCB BRKT ASSY	1.00
22	BA-U07	F/W, MAIN BRD, DOWNLOADABLE	1.00
24	BA-W76/A	CABLE ASSY,MAIN TO MTR, 29	4.00
25	BA-W76/B	CABLE ASSY,MAIN TO MTR, 27	4.00
26	BA-W76/C	CABLE ASSY,MAIN TO MTR, 20	1.00
27	BA-W77/A	CABLE ASSY,MAIN TO LMP, 11	1.00
28	BA-W77/B	CABLE ASSY,MAIN TO HV, 16	1.00
29	BA-W78	CABLE ASSY,HV BRD TO PMT	1.00
30	BA-W79	CABLE ASSY,THERM TEMP PROBE	1.00
31	BA-W82	CABLE ASSY,DC MAIN/LAMP	1.00
32	BA-W83	CABLE ASSY, LAMP	1.00
33	BM-C162	FOAM, HIGH DENSITY, 27X19X4	6.00
36	BM-C105	NAMEPLATE,ALTERED	1.00
37	BM-C202	SHIPPING FOAM,CNTRL PANEL	1.00
38	BM-C218	MODF'D SCREW,EXT TMP SNSR	1.00
39	BM-C82	CONTROL PANEL	1.00
42	12103081	DECAL, SCI-TEC LOGO	1.00
44	12501365-2	DESICCANT HOLDER ASSY	1.00
47	81-90-620	LOCK, CONN SLIDE POST	3.00
48	81-90-630	LOCK, CONN SL RET (15)	1.00
49	83-30-450	BUMPER RUBBR 1/8 HOLE, 3/	4.00
50	83-40-485	NUT 4-40 SL RG HX THIN SS	2.00
55	83-51-752	SCREW 2-56 X 1/4 BUTTON HD	2.00
56	83-51-762	SCREW 4-40 X 5/16 BUTTON H	2.00
57	83-51-804	SCREW,8-32 X 1/2 BUTTON H	3.00
64	83-79-048	SCREW 4-40 X 5/16 HSC SS	2.00
65	83-79-049	SCREW 4-40 X 3/8 HSC SS	3.00
66	83-79-152	SCREW 1/4-28 X 1/2 HSC SS	3.00
69	83-95-604	WASHER #4, INT TOOTH LOCK,SS	2.00
70	83-95-008	WASHER #4 FLAT NYLON	1.00
71	83-95-609	WASHER, 1/4 LOCK INT TH S	3.00
72	83-95-786	WASHER, #8 SCREW 3/8 OD X	3.00
73	83-95-748	WASHER, #4, SPLIT LOCKS	2.00
75	85-10-145	ADHESIVE, SEALANT LOCTITE	0.50
78	85-80-440	CABLE-TIE MOUNT,3/4"SQ	4.00
80	85-80-450	CABLE-TIE 4-1/8X.1 NYL 18	6.00

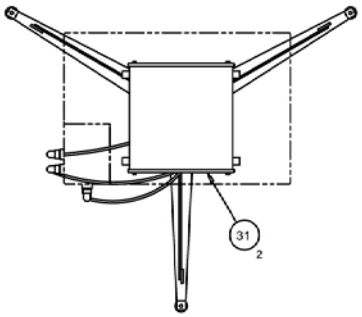
Figure 10.1-4.1

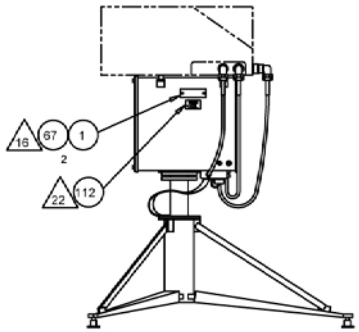


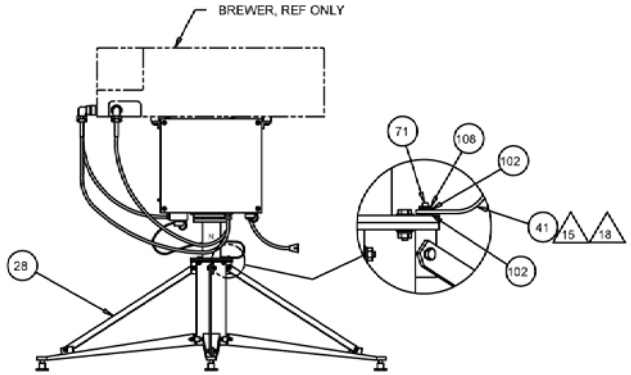
SECTION W-W

SEE SHEET 2

DRIVE PLATE MOUNTING HUB POSITIONING
SEE SECTION V-V ALSO







DOCUMENT NO. BA-C91	REV	DESCRIPTION	DCN NUMBER	DATE	DWN.	CHKD.
	5	REDRAWN/REVISED	8597-DCN-255	85.07.01	DF	RA
	6	DWG CORRECTIONS	8705-DCN-335	87.05.01	DF	RA
	7	P/L UPDATE	DCN373	88.04.08	CW	RA
	8	P/L UPDATE	DCN459	89.07.21	FV	TKL
	9	ADD NEW POW SUP & MTG H/W	DCN489, 509	90.09.05	FV	RP
	10	ADD SURGE SUPP, TERM BLK & H/W	DCN521	91.02.27	FV	RP
	11	ADD ITEM 39	DCN533	91.03.27	FV	KL
	12	CHG FUSE (IT 40) FR 1A TO 2A	DCN535	91.08.30	FV	KL
	13	ADD GND STRAP/REDRAWN	DCN562	92.03.19	FV	KL
	14	ADD TORQUE SPEC TO NOTE 5	DCN592	92.05.21	FV	RP
	15	ADD ITEMS 51, 70 & 99, NOTE 17	DCN609	92.08.06	FV	RP
	16	ADD IT. 51 CLARIFY GND STRAP MNTG	DCN648	93.05.04	FV	RP
	17	ADD SHIPPING CRATE (ITEM 44)	DCN712	94.09.01	FV	DS
	18	CHG NOTE 1, ADD NOTE 19	DCN738, 739	95.08.01	FV	DJS
	19	ADD ITEMS 111& 113; NOTES 20 & 21	DCN804	97.01.15	MF	TKLL
	20	CHG OF ITEM 7	822	99.04.06	MSS	TKLL
	21	ADD SHIPPING CRATE AND FOAM	858	99.06.16	MSS	TKLL
	22	ADD PAINT SPEC	879	99.13.13	RKF	TKLL
	23	NOTE 23 ADDED	884	99.11.01	RKF	

NOTES:

1. INSERT CONTROL CABLE (ITEM 12) THRU BUSHING AND TAPPED HOLE. COAT BUSHING THREADS WITH ITEM 60 AND TIGHTEN.
2. INSERT POWER CABLE (ITEM 17 OR 35) THRU BUSHING (ITEM 55) PRIOR TO CONNECTING TO TERMINAL BLOCK. COAT BUSHING THREADS WITH ITEM 60 AND TIGHTEN IN THREADED HOLE.
3. DO NOT CLAMP SAFETY SWITCH CABLE (PART OF ITEM 13). TO BE DONE AT SYSTEM TEST LEVEL.
4. SECURE ALL UNLOCKED HARDWARE WITH LOCTITE 242 (ITEM 58).
5. WITH MOUNTING HUB (ITEM 21) FIXED TO DRIVE PLATE (ITEM 22), AND LED SENSORS BLOCKED WITH COUNTER BRACKET (ITEM 9), ORIENTATE BOX SO THE SIDES ARE PERPENDICULAR TO THE 2 MOUNTING HOLES ON THE TRACKER BASE AS SHOWN (SEE NOTE 16 ALSO). SECURE MOUNTING HUB (ITEM 21) TO SPINDLE (ITEM 18) BY ADDING ITEM 58 TO SCREWS (ITEM 77) AND TIGHTENING TO 80 IN/LB's. ENSURE DRIVE PLATE IS FLUSH AGAINST SPACER (ITEM 23) PRIOR TO TIGHTENING SCREWS. INDICATE 'N' NORTH POSITION ON DRIVE PLATE AS SHOWN.
6. 90° FROM COUNTER BRACKET. MARK A SIMILAR 'N' ON THE SPINDLE AND TRACKER BASE AFTER PAINTING.
7. ADHERE "ON" LABEL UNDER POWER INDICATOR ASSY (ITEM 15).
8. WIRE ASSY AS PER SCHEMATIC DIAGRAM SS-C91, (ITEM 2).
9. INSTALL ITEMS 88 AND 90 BEFORE INSTALLING SPINDLE (ITEM 18). COAT THREADS AND UNDERSIDE OF NUT WITH ITEM 57 PRIOR TO ASSY. ENSURE SEALANT DOES NOT ADHERE TO OUTSIDE SURFACE OF BOX.
10. PREPARE FINISHED ASSY FOR PAINTING BY USING MASKING TAPE TO COVER CONNECTORS, ETC. COVER OPENINGS WITH SPECIAL MASKING BOARDS. REFER TO ASSEMBLY PROCEDURE AP-BA-C91. IF ITEM 5 (4 ANGLE BRACKETS) ARE NOT PAINTED THEY MUST BE INCLUDED WITH FINISHED ASSY FOR PAINTING. PAINT ALL SURFACES GLOSS WHITE AS PER DOCUMENT 1184008-3.
11. PLACE FUSE (ITEM 40) AND 10-32 x 5/8 CAP SCREWS, QTY 4 (ITEM 80) INTO CLEAN PLASTIC BAGS, LABEL WITH PART NO. AND ATTACH TO INSIDE WALL OF BOX WITH TAPE.
12. INSTALL GND TERMINAL FROM BA-W19 (ITEM 12) ONTO BOTTOM BAR (ITEM 25) USING ITEMS 72 AND 100.
13. ADHERE 'DC' & "AC" LABELS AS SHOWN ON TERMINAL BLOCK COVER (ITEM 32).
14. ADJUST LEVELLING SCREWS TO POSITION 4 RUBBER BUMPERS ON BREWER BASE TO CLEAR ANGLE BRACKETS (ITEM 5) BY 1/8 IN. MAX AND TIGHTEN JAMB NUTS. IF PROPER TRACKER/BREWER ALIGNMENT IS NOT ACHIEVED, RE-CHECK PRISM ALIGNMENTS IN FOREOPTICS ASSY.
15. INSERT ACCESSORY POWER CABLE (ITEM 34) THRU BUSHING (ITEM 55) PRIOR TO CONNECTING TO TERMINAL BLOCK. COAT BUSHING THREADS WITH ITEM 60 AND TIGHTEN IN TAPPED HOLE.
16. WITH TRACKER IN 'NORTH' POSITION (0 STEPS), ENSURE THE GND STRAP (ITEM 41) PASSES BEHIND SPINDLE PRIOR TO ATTACHING TO TRACKER BASE.
17. ENSURE DOUBLE-SIDED TAPE IS UNDER NAMEPLATE. APPLY RTV (ITEM 58) TO SCREW HEADS.
18. REMOVE AND DISCARD EXISTING SCREW FROM TERMINAL "V2". MOUNT SHIELD (ITEM 43) WITH ITEMS 79 AND 99 IN OPEN TERMINAL.
19. ENSURE THAT THE GROUND STRAP MOUNTING HOLE IN THE BASE IS 1/4 OF A TURN CCW FROM NORTH.
20. SEAL MOUNTING SURFACE OF LED ASSY (ITEM 15) WITH RTV (ITEM 58).
21. TEST FINAL ASSY AS PER PROCEDURE TP-BA-C91 (ITEM 114).
22. INSTALL FERRITE CORE (ITEM 111) AT THE ENTRANCE OF THE TRACKER DRIVE CABLE JUST INSIDE THE BOX. MAKE SURE THE FERRITE IS A SNUG 90° AGAINST THE SIDE OF THE TRACKER BOX.
23. CLEAN METAL SURFACE THOROUGHLY WITH ALCOHOL PRIOR TO ADHERRING LABEL AS PER THE FOLLOWING:
    - PEEL CE LABEL OFF SHEET AND ADHERE IN APPROX POSN
    - PEEL CLEAR OVERLAMINATE OFF SHEET AND ADHERE OVER TOP OF LABEL
    - ENSURE LABEL IS COMPLETELY COVERED WITH OVERLAMINATE
24. USE CABLE TIES (ITEM 117) AS REQUIRED.
25. USE SHIPPING CRATE (ITEM 44) AND PACKING FOAM (ITEMS 120-122) FOR CRATING AZIMUTH TRACKER. PLACE FOAM, PART NO. BM-C161/C IN BOTTOM OF CRATE.

QTY /S /A - NO.	UM	PART NO.	MFR's NO.	DESCRIPTION	REMARKS	ITEM
SCALE	1:2	NEXT ASSY				
DATE	85.07.01	DIMENSIONS IN IF DUAL DIMS	mm (inches)			
DWN	DF					
CHKD	RA	Tolerances (unless otherwise specified)				
APPD	TKL	INCHES	MM			
FINISH		.xx ±.005 .x ±.01 ANGLES ±.1° FRACTIONS ±1/32	.xx ±0.13 .x ±0.25 ANGLES ±1°			

SCI-TEC INSTRUMENTS INC.

TITLE: AZIMUTH TRACKER ASSY

SIZE	SHEET	DOCUMENT NUMBER	REV.
D	1 of 2	BA-C91	23

COMPUTER GENERATED DRAWING
FILENAME: BA-C91A.DWG

DOCUMENT NO. BA-C91

REV	DESCRIPTION	DCN NUMBER	DATE	DWN.	CHKD.
5	REDRAWN/REVISED	8507-DCN-256	85.07.01	DF	RA
6	DWG CORRECTIONS	8705-DCN-335	87.05.01	DF	RA
7	P/L UPDATE	DCN373	88.04.08	CW	RA
8	P/L UPDATE	DCN459	89.07.21	FV	TKL
9	ADD NEW POW SUP & MTG H/W	DCN489, 509	90.09.05	FV	RP
10	ADD SURGE SUPP, TERM BLK & H/W	DCN521	91.02.27	FV	RP
11	ADD ITEM 39	DCN533	91.03.27	FV	KL
12	CHG FUSE (IT 40) FR 1A TO 2A	DCN535	91.08.30	FV	KL
13	ADD GND STRAP/REDRAWN	DCN562	92.03.19	FV	KL
14	ADD TORQUE SPEC TO NOTE 5	DCN592	92.05.21	FV	RP
15	ADD ITEMS 51, 70 & 99; NOTE 17	DCN609	92.08.06	FV	RP
16	ADD IT. 61; CLARIFY GND STRAP MNTG	DCN648	93.05.04	FV	RP
17	ADD SHIPPING CRATE (ITEM 44)	DCN712	94.09.01	FV	DS
18	CHG NOTE 1, ADD NOTE 19	DCN738, 739	95.08.01	FV	DJS
19	ADD ITEMS 110& 111; NOTES 20 & 21	DCN804	97.01.15	MF	TKLL
20	CHG OF ITEM 7	822	99.04.06	MSB	TKLL
21	ADD SHIPPING CRATE AND FOAM	858	99.06.16	MSB	TKLL
22	ADD PAINT SPEC	879	99.10.13	RKF	TKLL
23	NOTE 23 ADDED	884	99.11.01	RKF	

NOTES:

1. INSERT CONTROL CABLE (ITEM 12) THRU BUSHING AND TAPPED HOLE. COAT BUSHING THREADS WITH ITEM 60 AND TIGHTEN.
2. INSERT POWER CABLE (ITEM 17 OR 35) THRU BUSHING (ITEM 55) PRIOR TO CONNECTING TO TERMINAL BLOCK. COAT BUSHING THREADS WITH ITEM 60 AND TIGHTEN IN THREADED HOLE.
3. DO NOT CLAMP SAFETY SWITCH CABLE (PART OF ITEM 13). TO BE DONE AT SYSTEM TEST LEVEL.
4. SECURE ALL UNLOCKED HARDWARE WITH LOCTITE 242 (ITEM 58).
5. WITH MOUNTING HUB (ITEM 21) FIXED TO DRIVE PLATE (ITEM 22), AND LED SENSORS BLOCKED WITH COUNTER BRACKET (ITEM 6), ORIENTATE BOX SO THE SIDES ARE PERPENDICULAR TO THE 2 MOUNTING HOLES ON THE TRACKER BASE AS SHOWN (SEE NOTE 18 ALSO). SECURE MOUNTING HUB (ITEM 21) TO SPINDLE (ITEM 18) BY ADDING ITEM 58 TO SCREWS (ITEM 77) AND TIGHTENING TO 80 IN/LB's. ENSURE DRIVE PLATE IS FLUSH AGAINST SPACER (ITEM 23) PRIOR TO TIGHTENING SCREWS. INDICATE 'N' NORTH POSITION ON DRIVE PLATE AS SHOWN, 90° FROM COUNTER BRACKET. MARK A SIMILAR 'N' ON THE SPINDLE AND TRACKER BASE AFTER PAINTING.
6. ADHERE 'ON' LABEL UNDER POWER INDICATOR ASSY (ITEM 15).
7. WIRE ASSY AS PER SCHEMATIC DIAGRAM BS-C91, (ITEM 2).
8. INSTALL ITEMS 88 AND 90 BEFORE INSTALLING SPINDLE (ITEM 18). COAT THREADS AND UNDERSIDE OF NUT WITH ITEM 57 PRIOR TO ASSY. ENSURE SEALANT DOES NOT ADHERE TO OUTSIDE SURFACE OF BOX.
9. PREPARE FINISHED ASSY FOR PAINTING BY USING MASKING TAPE TO COVER CONNECTORS, ETC. COVER OPENINGS WITH SPECIAL MASKING BOARDS, REFER TO ASSEMBLY PROCEDURE AP-BA-C91. IF ITEM 5 (4 ANGLE BRACKETS) ARE NOT PAINTED THEY MUST BE INCLUDED WITH FINISHED ASSY FOR PAINTING. PAINT ALL SURFACES GLOSS WHITE AS PER DOCUMENT 11840008-3.
10. PLACE FUSE (ITEM 40) AND 10-32 x 5/8 CAP SCREWS, QTY 4 (ITEM 80) INTO CLEAN PLASTIC BAGS, LABEL WITH PART NO. AND ATTACH TO INSIDE WALL OF BOX WITH TAPE.
11. INSTALL GND TERMINAL FROM BA-W19 (ITEM 12) ONTO BOTTOM BAR (ITEM 26) USING ITEMS 72 AND 100.
12. ADHERE 'DC' & 'AC' LABELS AS SHOWN ON TERMINAL BLOCK COVER (ITEM 32).
13. ADJUST LEVELLING SCREWS TO POSITION 4 RUBBER BUMPERS ON BREWER BASE TO CLEAR ANGLE BRACKETS (ITEM 5) BY 1/8 IN. MAX AND TIGHTEN JAMB NUTS. IF PROPER TRACKER/BREWER ALIGNMENT IS NOT ACHIEVED, RE-CHECK PRISM ALIGNMENTS IN FOREOPTICS ASSY.
14. INSERT ACCESSORY POWER CABLE (ITEM 34) THRU BUSHING (ITEM 55) PRIOR TO CONNECTING TO TERMINAL BLOCK. COAT BUSHING THREADS WITH ITEM 60 AND TIGHTEN IN TAPPED HOLE.
15. WITH TRACKER IN 'NORTH' POSITION (0 STEPS), ENSURE THE GND STRAP (ITEM 41) PASSES BEHIND SPINDLE PRIOR TO ATTACHING TO TRACKER BASE.
16. ENSURE DOUBLE-SIDED TAPE IS UNDER NAMEPLATE. APPLY RTV (ITEM 56) TO SCREW HEADS.
17. REMOVE AND DISCARD EXISTING SCREW FROM TERMINAL "V2". MOUNT SHIELD (ITEM 43) WITH ITEMS 70 AND 99 IN OPEN TERMINAL.
18. ENSURE THAT THE GROUND STRAP MOUNTING HOLE IN THE BASE IS 1/4 OF A TURN CCW FROM NORTH.
19. SEAL MOUNTING SURFACE OF LED ASSY (ITEM 15) WITH RTV (ITEM 56).
20. TEST FINAL ASSY AS PER PROCEDURE TP-BA-C91,(ITEM 114).
21. INSTALL FERRITE CORE (ITEM 111) AT THE ENTRANCE OF THE TRACKER DRIVE CABLE JUST INSIDE THE BOX. MAKE SURE THE FERRITE IS A SNUG 90° AGAINST THE SIDE OF THE TRACKER BOX.
22. CLEAN METAL SURFACE THOROUGHLY WITH ALCOHOL PRIOR TO ADHERRING LABEL AS PER THE FOLLOWING:
    - PEEL CE LABEL OFF SHEET AND ADHERE IN APPROX POS'N
    - PEEL CLEAR OVERLAMINATE OFF SHEET AND ADHERE OVER TOP OF LABEL
    - ENSURE LABEL IS COMPLETELY COVERED WITH OVERLAMINATE
23. USE CABLE TIES (ITEM 117) AS REQUIRED.
24. USE SHIPPING CRATE (ITEM 44) AND PACKING FOAM (ITEMS 120-122) FOR CRATING AZIMUTH TRACKER. PLACE FOAM, PART NO. BM-C161/C IN BOTTOM OF CRATE.

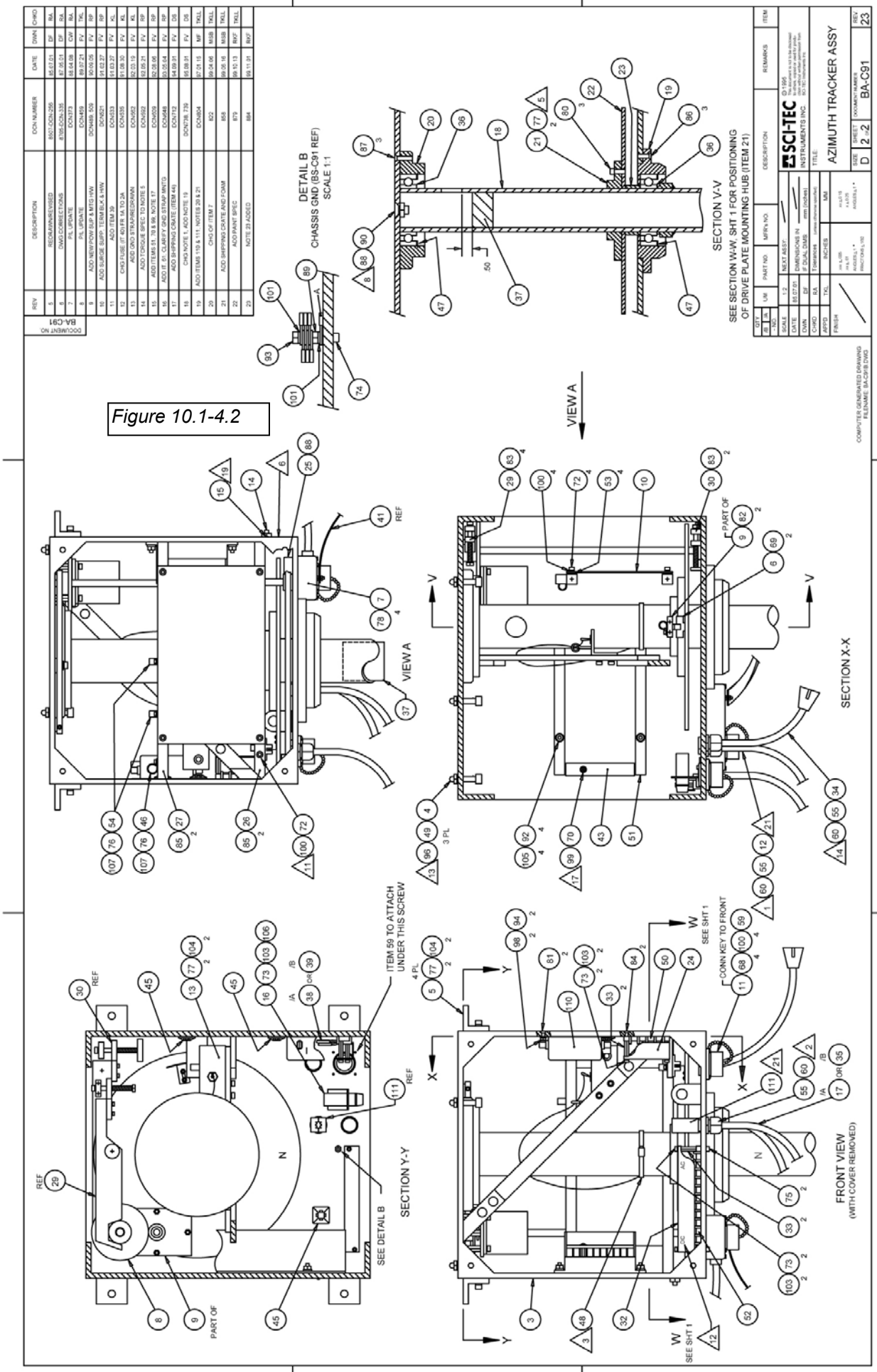


Figure 10.1-4.2

DOCUMENT NO. BA-C91

REV	DESCRIPTION	DCN NUMBER	DATE	DWN.	CHKD.
5	REDRAWN/REVISED	8507-DCN-256	85.07.01	DF	RA
6	DWG CORRECTIONS	8705-DCN-335	87.05.01	DF	RA
7	P/L UPDATE	DCN373	88.04.08	CW	RA
8	P/L UPDATE	DCN459	89.07.21	FV	TKL
9	ADD NEW POW SUP & MTG H/W	DCN489, 509	90.09.05	FV	RP
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11	ADD ITEM 39	DCN533	91.03.27	FV	KL
12	CHG FUSE (IT 40) FR 1A TO 2A	DCN535	91.08.30	FV	KL
13	ADD GND STRAP/REDRAWN	DCN562	92.03.19	FV	KL
14	ADD TORQUE SPEC TO NOTE 5	DCN592	92.05.21	FV	RP
15	ADD ITEMS 51, 70 & 99; NOTE 17	DCN609	92.08.06	FV	RP
16	ADD IT. 61; CLARIFY GND STRAP MNTG	DCN648	93.05.04	FV	RP
17	ADD SHIPPING CRATE (ITEM 44)	DCN712	94.09.01	FV	DS
18	CHG NOTE 1, ADD NOTE 19	DCN738, 739	95.08.01	FV	DS
19	ADD ITEMS 110 & 111; NOTES 20 & 21	DCN804	97.01.15	MF	TKLL
20	CHG OF ITEM 7	822	99.04.06	MSB	TKLL
21	ADD SHIPPING CRATE AND FOAM	858	99.06.16	MSB	TKLL
22	ADD PAINT SPEC	879	99.10.13	RKF	TKLL
23	NOTE 23 ADDED	884	99.11.01	RKF	

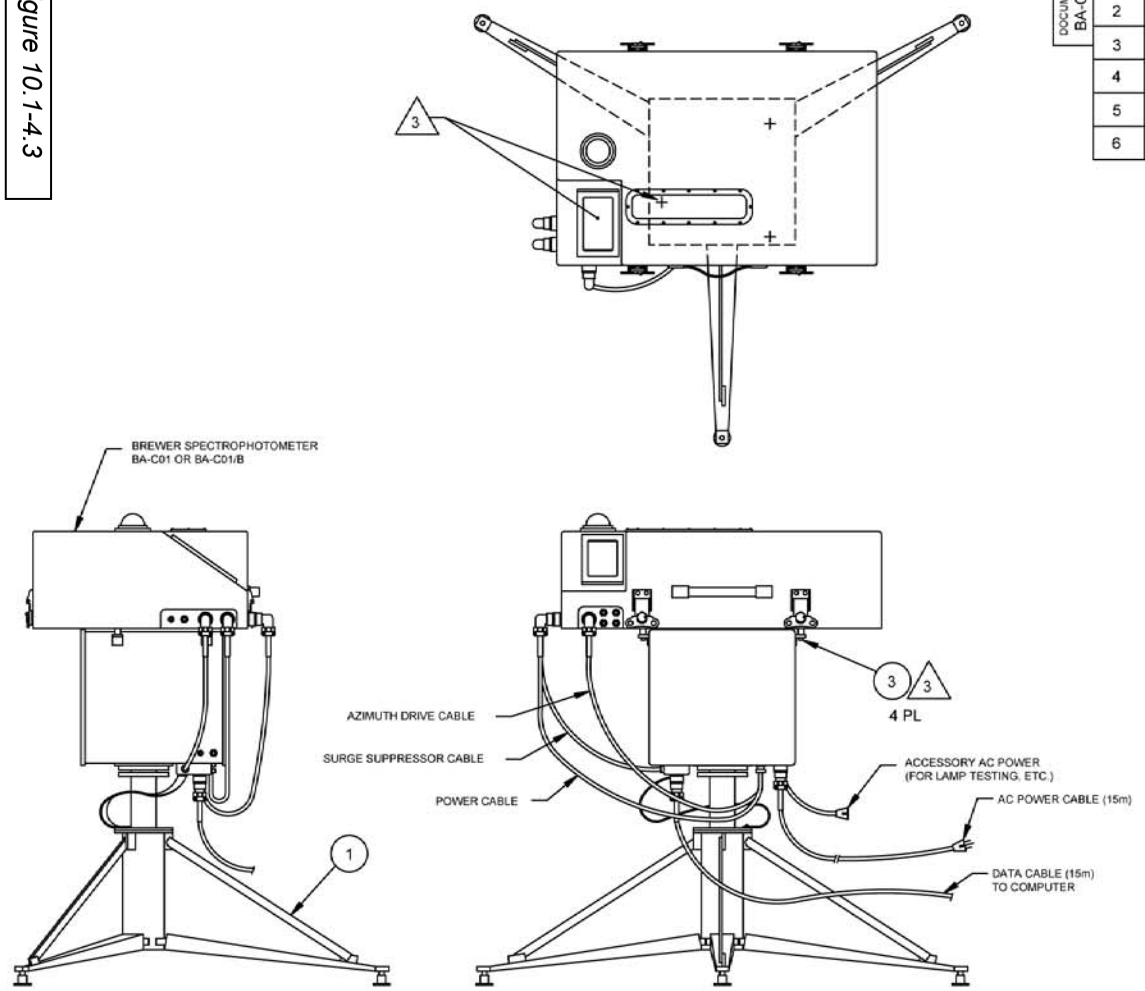
BA-C91 Azimuth Tracker Assembly

Item No.	Part Number	Description	120V Qty	230V Qty
1	BM-C100	Nameplate, Altered, Azimuth Tracker	1.00	1.00
2	BS-C91	Azimuth Tracker Unit Schematic	--	--
3	BM-C92	Azimuth Tracker Box	1.00	1.00
4	BM-C93	Adjusting Screw	3.00	3.00
5	BM-C94	Angle Bracket	4.00	4.00
6	BM-C95	Counter Bracket	1.00	1.00
7	BA-W67	Surge Supp Enc Assy, RS422	1.00	1.00
8	BA-C97	Drive Shaft Assy Az/Cosmos Tracker	1.00	1.00
9	BA-C98	Drive Motor Assy	1.00	1.00
10	BA-C99	Azimuth Tracker Brd Assy	1.00	1.00
11	BA-W18	Power Connector Assy	1.00	1.00
12	BA-W19	Control Cable Assy	1.00	1.00
13	BA-W21	Safety Switch Assy	1.00	1.00
14	BA-W22	Power Switch Assy	1.00	1.00
15	BA-W23	Power Indicator Assy	1.00	1.00
16	BA-W24	Fuse Holder Assy	1.00	1.00
17	BA-W30/A	Power Cable, Azimuth Tracker, 110V	1.00	--
18	D2-1030-002	Azimuth Spindle	1.00	1.00
19	C2-1030-005	Bearing Housing, External	1.00	1.00
20	C2-1030-006	Bearing Housing, Internal	1.00	1.00
21	B2-1030-007/A	Plate Mounting Hub	1.00	1.00
22	C2-1030-008	Drive Plate	1.00	1.00
23	B2-1030-015	Spacer Ring, Short	1.00	1.00
24	BM-C88/B	AC Power Shield, 2.25 Long	1.00	1.00
25	A2-1030-019	Drive Bearing Stop	1.00	1.00
26	B2-1030-028	Bottom Bar, PCB	1.00	1.00
27	B2-1030-029	Top Bar, PCB	1.00	1.00
28	D1-1030-045	Tracker Stand Assy	1.00	1.00
29	C1-1030-080/A	Short Tension Arm Assy, Azimuth Drive	1.00	1.00
30	C1-1030-081/A	Long Tension Arm Assy, Azimuth Drive	1.00	1.00
31	C1-1030-084	Cover Assy	2.00	2.00
32	BM-C88	AC Power Shield, 5.25 Long	1.00	1.00
33	83-09-220	Spacer, Hex, 6-32 x 3/4" Lg	4.00	4.00
34	BA-W58	Accessory Power Cable Assy	1.00	1.00
35	BA-W30/B	Power Cable, Azimuth Tracker, 220V	--	1.00
36	B2-1030-101	Bearing, Altered	2.00	2.00
37	BM-C225	Foam Disc Insert	1.00	1.00
38	BA-C166	AZ Tracker MOV Assy, 110V	1.00	--
39	BA-C166/B	AZ Tracker MOV Assy, 220V	--	1.00
40	91-15-257	Fuse, 2A, 250V, Slow-Blow	1.00	1.00
41	BM-C174	Azimuth Tracker Ground Strap	1.00	1.00
42	BA-C113	Option 'B' Kit Installation	--	--
43	BM-C188	Terminal Shield, Azimuth Tracker P/S	1.00	1.00
44	BA-C150	Azimuth Tracker Shipping Crate	1.00	1.00
45	85-80-440	Mount, Cable-Tie, Adhesive Back	3.00	3.00
46	82-20-383	Clamp, 'P', 1/2" x 1/2" x #10	1.00	1.00
47	88-99-780	Retaining Ring, Internal, Spiral Snap	2.00	2.00
48	76-99-445	Hose Clamp, 2-1/2" OD	1.00	1.00
49	83-10-651	O-Ring, 3/8"ID x 9/16"OD x 3/32"Thk	3.00	3.00
50	82-10-470	Terminal Strip, 4 Contact	1.00	1.00
51	87-50-088	Power Supply, Switching, 5VDC, 10A	1.00	1.00
52	82-10-450	Terminal Strip, 12 Contact	1.00	1.00
53	83-09-413	Spacer, 1/4"OD x 1/8"ID x 1/8"LG, AL	4.00	4.00
54	82-20-356	Clamp, 'P', 1/4" x 1/2" x 13/32"	2.00	2.00
55	83-08-100	Bushing, Strain Relief, Liq-Tite	3.00	3.00
56	85-10-150	Adhesive, Sealant (RTV 3145)	1.00	1.00

Item No.	Part Number	Description	120V Qty	230V Qty
57	85-10-148	Adhesive, Sealant Silicone, BLK	2.00	2.00
58	85-10-145	Adhesive, Sealant (Loctite 242)	2.00	2.00
59	81-15-154	Cap & Chain, For #18 Receptacle	1.00	1.00
60	85-10-147	Adhesive Sealant, Pipe Thread	1.00	1.00
61	82-10-484	Jumper, Terminal Block	5.00	5.00
62	83-25-890	Term, Ring Tongue, #18-22AWG, #6, Insul	16.00	16.00
63	99-31-483	Wire, Hookup, #18AWG, IRR PVC, Red	1.00	1.00
64	99-31-482	Wire, Hookup, #18AWG, IRR PVC, Black	3.40	3.40
65	99-31-484	Wire, Hookup, #18AWG, IRR PVC, Green	2.00	2.00
66	99-31-481	Wire, Hookup, #18AWG, IRR PVC, White	2.25	2.25
67	83-51-752	Screw, 2-56 x 1/4"Lg, Btn Hd, Hex, SS	2.00	2.00
68	83-51-763	Screw, 4-40 x 3/8"Lg, Btn Hd, Hex, SS	4.00	4.00
69	83-51-762	Screw, 4-40 x 5/16"Lg, Btn Hd, Hex, SS	2.00	2.00
70	83-51-765	Screw, 4-40 x 1/2"Lg, Btn Hd, Hex, SS	1.00	1.00
71	83-79-152	Screw, 1/4-28 x 1/2"Lg, Skt Hd, Cap, SS	1.00	1.00
72	83-79-051	Screw, 4-40 x 1/2"Lg, Skt Hd, Cap, SS	5.00	5.00
73	83-79-068	Screw, 6-32 x 3/8"Lg, Skt Hd, Cap, SS	5.00	5.00
74	83-79-075	Screw, 6-32 x 1"Lg, Skt Hd, Cap, SS	1.00	1.00
75	83-79-073	Screw, 6-32 x 3/4"Lg, Skt Hd, Cap, SS	2.00	2.00
76	83-79-082	Screw, 8-32 x 3/8"Lg, Skt Hd, Cap, SS	3.00	3.00
77	83-79-114	Screw, 10-32 x 1/2"Lg, Skt Hd, Cap, SS	12.00	12.00
78	83-79-077	Screw, 6-32 x 1-1/4"Lg, Skt Hd, Cap, SS	4.00	4.00
80	83-79-116	Screw, 10-32 x 5/8"Lg, Skt Hd, Cap, SS	7.00	7.00
81	83-87-194	Screw, 8-32x1/2"Lg. Flt Hd, Hex, SS	2.00	2.00
82	83-87-165	Screw, 4-40 x 1/2"Lg, Flt Hd, Hex, SS	2.00	2.00
83	83-87-181	Screw, 6-32 x 5/8"Lg, Flt Hd, Hex, SS	4.00	4.00
84	83-87-182	Screw, 6-32 x 3/4"Lg, Flt Hd, Hex, SS	2.00	2.00
85	83-87-209	Screw, 10-32 x 1/2"Lg, Flt Hd, Hex, SS	4.00	4.00
86	83-87-211	Screw, 10-32 x 5/8"Lg, Flt Hd, Hex, SS	3.00	3.00
87	83-87-214	Screw, 10-32 x 1"Lg, Flt Hd, Hex, SS	3.00	3.00
88	83-87-233	Screw, 1/4-28 x 5/8"Lg, Flt Hd, Hex, SS	2.00	2.00
89	83-40-261	Nut, 6-32 x 5/16, Hex, Steel Plated	1.00	1.00
90	83-40-326	Nut, 1/4-28 x 7/16, Hex, Steel Plated	1.00	1.00
92	83-40-278	Nut, 8-32 x 1/4 x 3/32 Thk, Hex, SS	4.00	4.00
93	83-40-486	Nut, 6-32, Self Locking, Hex, SS	1.00	1.00
94	83-40-283	Nut, 8-32 Std. Hex Pattern, SS	2.00	2.00
96	BM-C121	Jamb Nut, Altered	3.00	3.00
98	83-95-606	Washer, #8, Internal Tooth Lock, SS	2.00	2.00
99	83-95-626	Washer, #4, External Tooth Lock, SS	1.00	1.00
100	83-95-604	Washer, #4, Internal Tooth Lock, SS	9.00	9.00
101	83-95-605	Washer, #6, Internal Tooth Lock, SS	2.00	2.00
102	83-95-631	Washer, 1/4, External Tooth Lock	2.00	2.00
103	83-95-749	Washer, #6, Split Lock, SS	5.00	5.00
104	83-95-752	Washer, #10, Split Lock, SS	10.00	10.00
105	83-95-750	Washer, #8, Split Lock, SS	4.00	4.00
106	83-95-013	Washer, #6, Flat, SS	1.00	1.00
107	83-95-019	Washer, #8, Flat, SS	3.00	3.00
108	83-95-028	Washer, 1/4, Flat, SS	1.00	1.00
109	83-25-996	Terminal, Female Disc, Red	4.00	4.00
110	76-05-005	Filter, Interference, Power Line EMI	1.00	1.00
111	88-99-224	Ferrrite, Split, EMI Suppression	1.00	1.00
112	BM-C212	Label, CE Approval, EMC Directives	1.00	1.00
113	AP-BA-C91	Azimuth Tracker Paint Masking Procedure	-	-
114	TP-BA-C91	Az Tracker Assy Adjustment/Test Procedure	-	-
120	BM-C161/A	Foam, High Den 17-1/4X14X2	2.00	2.00
121	BM-C161/B	Foam, HD 17-1/4X16-1/4X2	3.00	3.00
122	BM-C161/C	Foam, SuperBlu 18X16-1/4X1	1.00	1.00

Figure 10.1-4.3

DOCUMENT NO. BA-C113	REV	DESCRIPTION	DCN NUMBER	DATE	DWN	APPD
	1	FIRST ISSUE		88.9.20	CW	AM
	2	REMOVED NOTE 6	DCN450	90.07.03	FV	KL
	3	REMOVE FIG. 2, ZEN DRIVE KIT	DCN487	90.09.12	FV	KL
	4	ADD SURGE SUPP	DCN538	91.03.19	FV	KL
	5	REMOVE LOCK-WASHERS (ITEM 4)	DCN558	91.10.29	FV	KL
	6	REMOVE REFERENCE TO BA-C83	DCN562	92.03.17	FV	



NOTES:

1. REFER TO PARTS LIST BA-C113 FOR ITEMS LISTED ABOVE, OR MENTIONED IN THESE NOTES. ITEMS TO BE INSTALLED ARE LISTED FOR REFERENCE PURPOSES ONLY AND ARE PART OF OPTION B KIT, DWG NO. BA-C91.

2. REFER TO ACCEPTANCE MANUAL AM-BA-C05 PRIOR TO ASSEMBLY.

3. POSITION SPECTROPHOTOMETER ON TO AZIMUTH TRACKER AS SHOWN AND SECURE USING (4) #10 CAP SCREWS. NOTE THAT THE SPECTROPHOTOMETER IS POSITIONED SUCH THAT THE SIDE WITH THE QUARTZ WINDOW GOES TO THE SIDE OF THE AZIMUTH TRACKER WITH ONLY ONE ROUNDED 3/8" SCREW.

4. CONNECT ALL CABLES TO AZIMUTH TRACKER AND SPECTROPHOTOMETER AS SHOWN.

COMPUTER GENERATED DRAWING
FILENAME: BA-C113.DWG

QTY -1 - NO.	UM	PART NO.	MFR's NO.	DESCRIPTION	REMARKS	ITEM
SCALE		NEXT ASSY: BA-C91				
DATE	88.08.08	DIMENSIONS IN				
DWN	CW	IF DUAL DIMS:	mm (inches)			
CHKD	RA	Tolerances (unless otherwise specified)				
APPD	RA	INCHES	MM			
FINISH		xxx ± .005 xx ± .01 ANGLES ± 1° FRACTIONS ± 1/32	.xx ± 0.15 .x ± 0.25 ANGLES ± 1°			

SCI-TEC INSTRUMENTS INC.

TITLE:
OPTION B KIT
INSTALLATION

SHEET	DOCUMENT NUMBER	REV.
1 OF 1	BA-C113	6

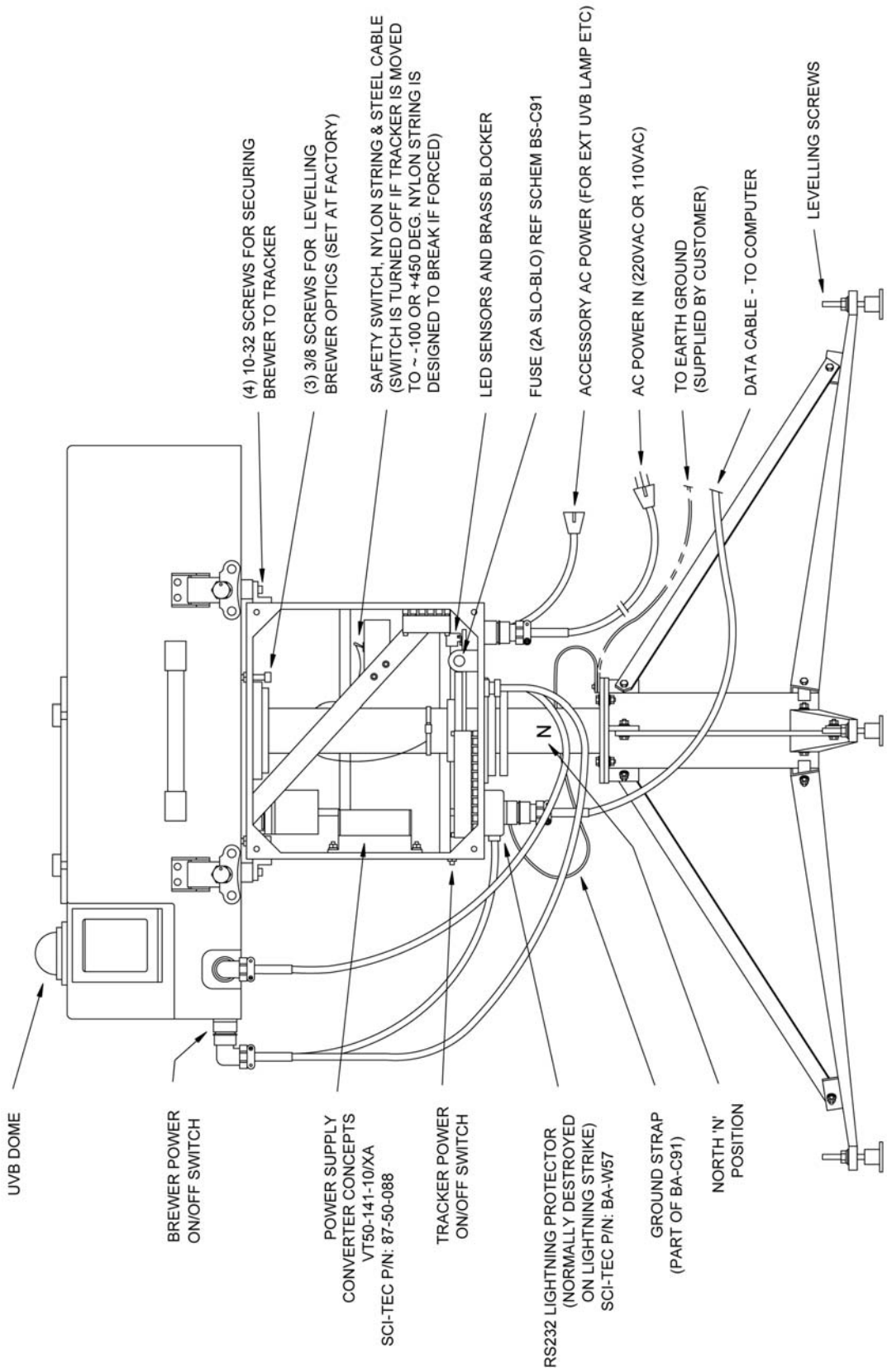


Figure 10.1-4.4

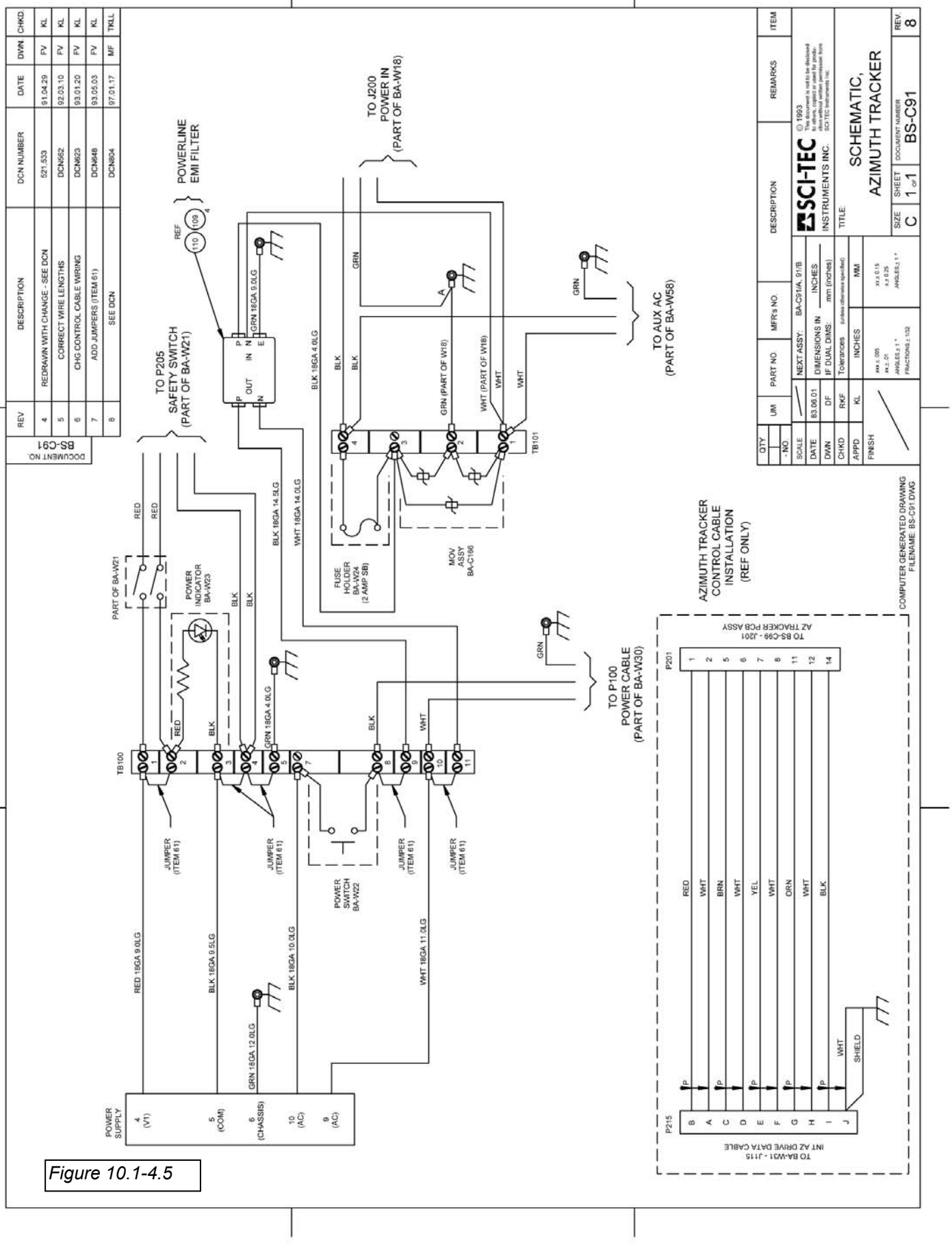


Figure 10.1-4.5

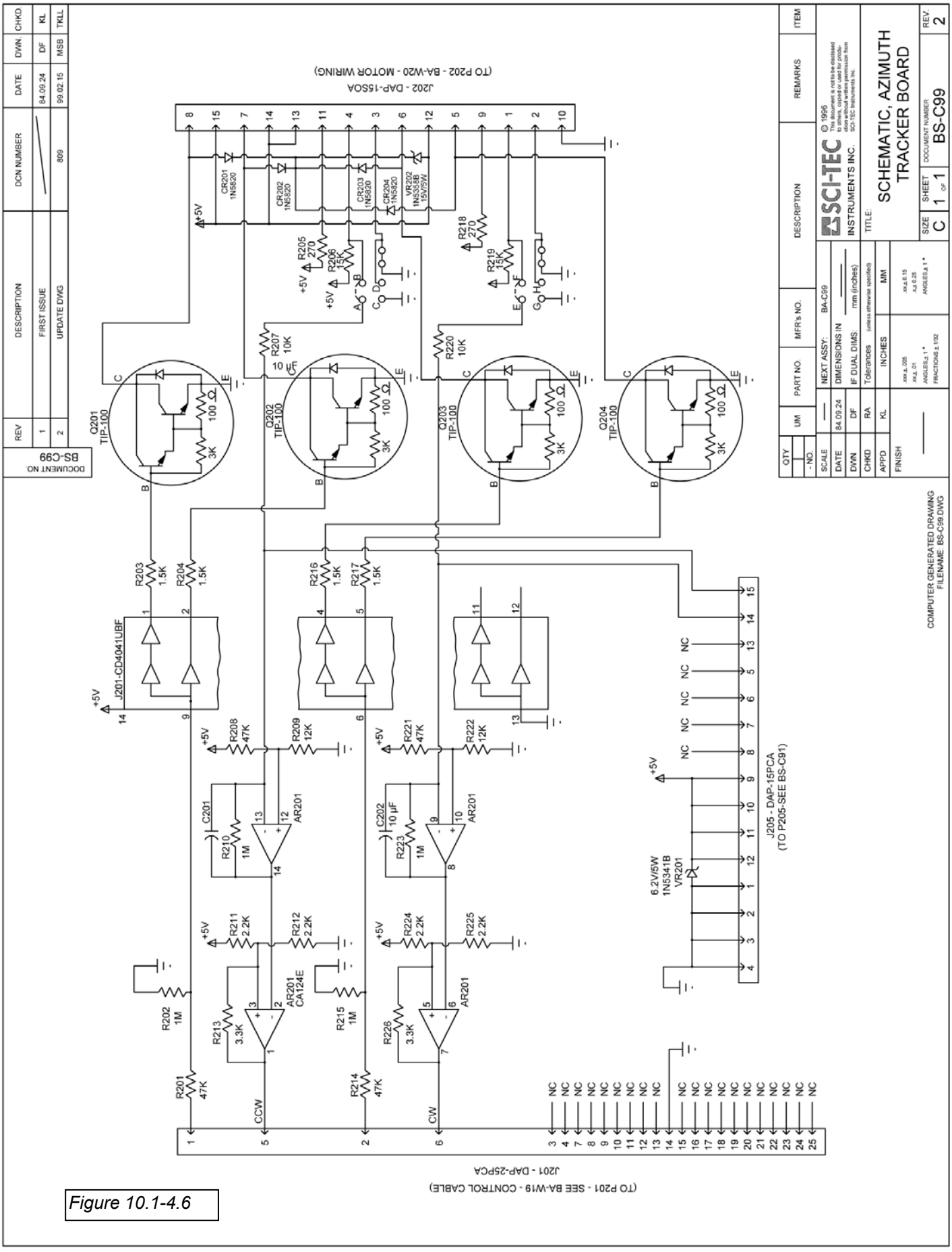


Figure 10.1-4.6

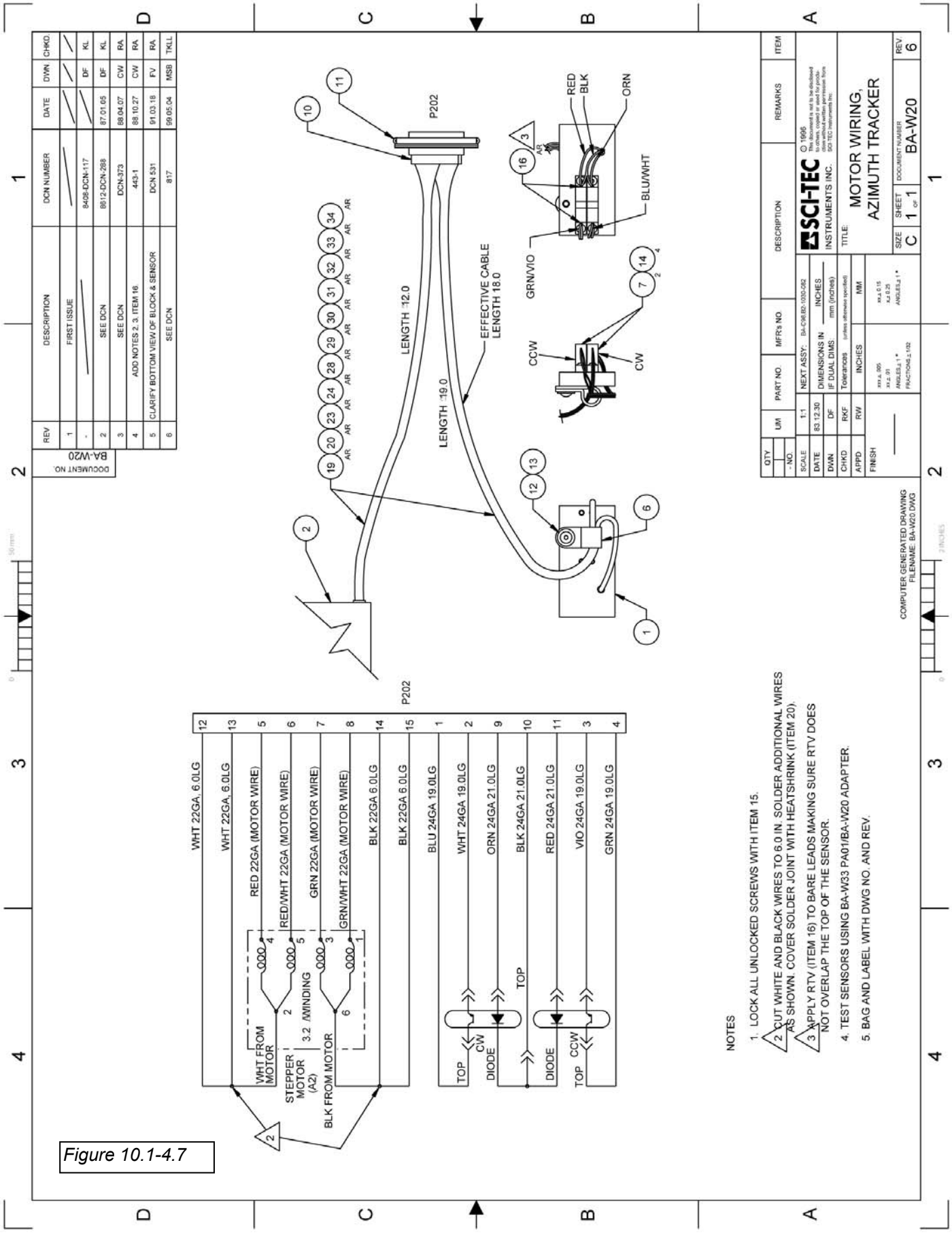


Figure 10.1-4.7

IDEAS THAT POWER TECHNOLOGY

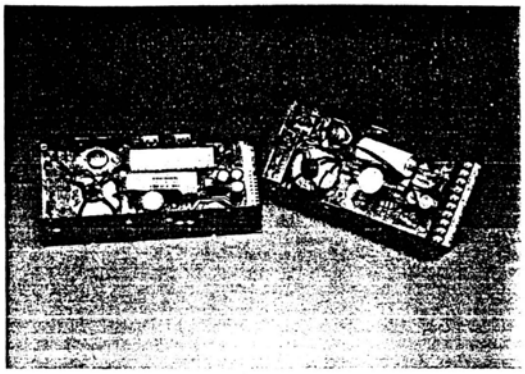
VT 50/VX 50
TECHNICAL DATA

CONVERTER CONCEPTS INC

SCI-TEC # 87-50-088
(VT50-141-10/XA)

FEATURES

- 50 Watt Switching Power Supply
- Single, Dual and Triple Output
- AC/DC or DC/DC Models Available
- Best Low DC Input-High Power Output Ratio
- Overvoltage Limit Protection
- UL Recognized



SPECIFICATIONS

Efficiency AC Input:
Single Output: 75% Typical 70% Min.
Multiple Output: 70% Typical 65% Min.
Efficiency DC Input:
Single Output: 75% Typical 55% Min.
Multiple Output: 70% Typical 50% Min.
Turn-On Overshoot: None
Turn-On Surge Current: Limited by active soft-start to 5A 1st cycle
Turn-On Time: 100 msec.
Hold-Up Time: 90 VAC Input (low line) 12 msec.
115 VAC Input (nominal line) 20 msec.
250 VAC Input 180 msec.
Ripple: 20 mV pk-pk Max.
Switching Noise: 2 MHz @ 20 kHz Rep. Rate; 100 mV pk-pk or 1%
Transient Response: 0.5V excursion for 50% to 100% or 100% to 50% load change with return to regulation in 2 msec. Load change 1 A/μ sec.
Operating Temp: −20°C to +80°C Base Plate Full Load. −20°C to +55°C Free Air Full Load. Derate linearly to 50% output at 80°C
Temperature Coefficient: 0.02%/°C
Storage Temp: −55°C to +85°C
Isolation:

	Input	
Hipot	AC	DC
Input to Output	1.5kVAC	250 VDC
Input to Case	1.5kVAC	250 VDC
Output to Case	250 VDC	250 VDC

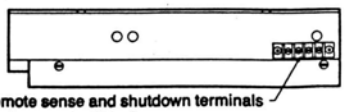
Shock & Vibration: Designed to withstand normal commercial shock and vibration conditions.
Short Circuit Protection: Current limited for overload and short circuit protection.
Multiple Output Regulation Specifications:
Regulation: Line, All Outputs: .3%
Regulation: Load, Output No. 1: 20% Load—Full Load 1%
Regulation: Load, All Other Outputs: 50 ma—Full Load 1.5%

	% of Full Load Current				
Output #1 load current	20	35	50	75	100
Each Auxiliary load current	50	75	100	100	100

Size: VT 50 2.063" x 4.187" x 8.063" (52.4 x 106.4 x 204.8 mm)
Size: VX 50 2.125" x 3.581" x 8.000" (54.0 x 91.0 x 203.2 mm)
Weight: 2.0 lbs. (0.91 kg)

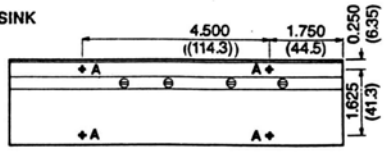
MECHANICAL DIMENSIONS

VT 50 OPEN FRAME & ENCLOSED MODULES
Four No. 8 mounting screws recommended

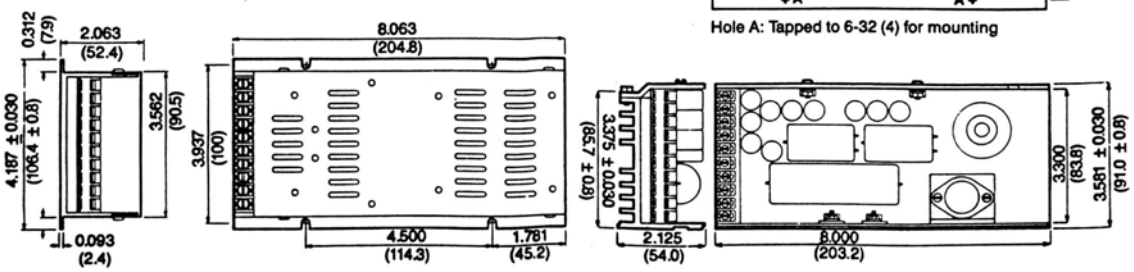


Optional remote sense and shutdown terminals
2–56 spade lug terminal block

VX 50 HEATSINK MODULES



Hole A: Tapped to 6-32 (4) for mounting



Dimensions shown in inches. Dimensions in parentheses ( ) indicate millimeters. Tolerance ±0.010 (0.3 mm) unless otherwise noted.

Figure 10.1-4.8

Kipp & Zonen

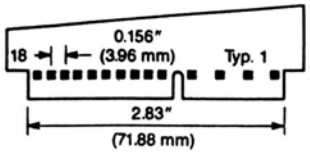
VT 50/VX 50

CONVERTER CONCEPTS
Industrial Parkway • Pardeeville, WI 53954
(608) 429-2144 • TWX: 910-280-2630
Toll-Free 800/253-5227

TERMINATION OPTIONS

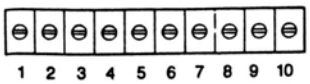
SCI-TEC #87-50-088 (VT50-141-10/XA)

SQUARE PINS (OPTIONAL)



18. V3 Output	9. Chassis
17. V4 Output	8. Keyslot
16. V4 Output	7. −V Input
15. V2 Output	6. NC
14. V2 Output	5. +V Input
13. V1 Output	4. NC
12. V1 Output	3. AC Input
11. Ground	2. NC
10. Ground	1. AC Input

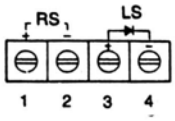
4-40 TERMINAL BLOCK (STANDARD)



TYPICAL

1. V3 Output	6. Chassis
2. V4 Output	7. −DC Input
3. V2 Output	8. +DC Input
4. V1 Output	9. AC Input
5. Return	10. AC Input

REMOTE SENSE AND LOGIC SHUTDOWN



1. RS +
2. RS −
3. LS +
4. LS −

Caution:
Shutdown Current 20mA max.

INPUT AND OUTPUT RANGES

INPUT VOLTAGE RANGE (SERIES SPECIFIC)

Input Option	Input Voltage Range AC	Input Voltage Range DC	Frequency in Hz	Input Fuse (User Provided)
1	90-250	100-350	44-440	1.0A Slow Blow Fuse
2		10-40		10.0A Slow Blow Fuse
3		20-60		5.0A Slow Blow Fuse

OUTPUT RANGE (SERIES SPECIFIC)

Model No.	Output	Volts	Amps	Adjustment
14	V1	+5	0-10	±10%
16	V1	+12	0-5	±10%
17	V1	+15	0-4	±10%
18	V1	+28	0-2	±10%
22	V1 V3	+5 −5	1.8-9 .05-1	±10% ±5% Fixed

Model No.	Output	Volts	Amps	Adjustment
24	V1 V2	+5 +12	1.6-8 .05-1	±10% ±5% Fixed
26	V1 V3	+12 −12	.6-3 .05-1	±10% ±5% Fixed
27	V1 V3	+15 −15	.4-2 .05-1	±10% ±5% Fixed
32	V1 V2 V3	+5 +12 −5	1.2-6 .05-1 .05-1	±10% ±5% Fixed ±5% Fixed
34	V1 V2 V3	+5 +12 −12	1-5 .05-1 .05-1	±10% ±5% Fixed ±5% Fixed
37	V1 V2 V3	+5 +15 −15	1-5 .05-.8 .05-.8	±10% ±5% Fixed ±5% Fixed

SELECTING A UNIT: VT 50/VX 50

Series	Total Power	—	No. of Outputs	Output Range	Input	—	Package	Termination	/	Group 1 Options	Group 2 Options
X	X	—	X	X	X	—	X	X	/	X	X
VT Standard VX Heat Sink (open frame only)	50		1 2 3	2 4 6 7 8 See series specific output range	1 2 3 See series specific input range		0 Open Frame 1 Enclosed 2 P.C. Board	0 Terminal Block 1 Square Pin 2 Wire Holes Only		A B C D E F G H I J K See group 1 chart	A B C D E F G See group 2 chart

GROUP 1 OPTIONS	Remote Sense	Logic Shut-down	Overvoltage Shutdown/ Protection	Power Fail Detect
A	•			
B		•		
C			•	
D				•
E	•	•		
F	•		•	
G	•			•
H		•	•	
I		•		•
J	•	•	•	
K	•	•		•
X	No Options			

GROUP 2 OPTIONS	Regulated	Reverse Polarity Protection	Thermal Shut-down
A	•		
B		•	
C			•
D	•	•	
E	•		•
F		•	•
G	•	•	•
X	No Options		

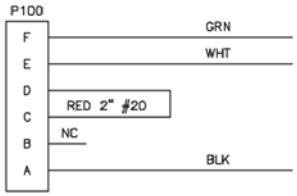
For all U.L. recognized products, the application criteria is available at customer request. This material will give additional guidelines for installation and operation as per Underwriters Laboratory.

Item No.	BA-C113 Part No.	Azumuth Tracker Installation Kit Description	Qty
1	BA-C91	Azimuth Tracker Assy	1.00
3	83-79-116	Screw, 10-32 x 5/8"Lg, Skt Hd, Cap, SS	4.00

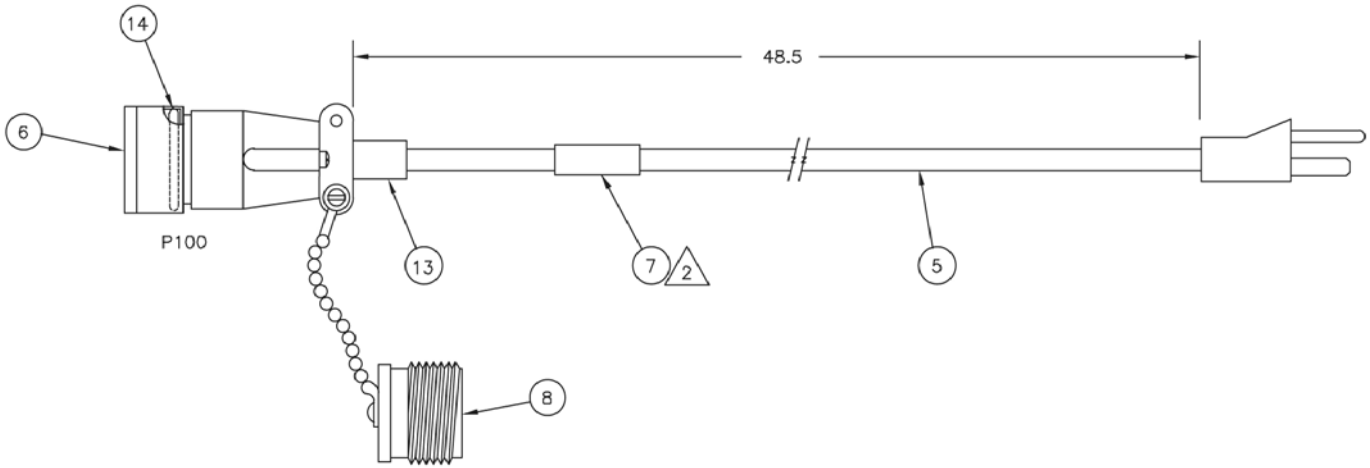
Item No.	BA-C224 Part No.	External Cable Kit Assy Description	120 V Qty	230 V Qty
1	BA-W12	Power Cable Assy	1.00	1.00
2	BA-W68	Data Cable Assy, RS422	1.00	1.00
3	94-38-020	XFormer, AC WL PLG, 220V/9V	--	1.00
4	BA-W85/A	Cable Assy, Data, 15M	1.00	1.00
8	20-10-060	Conn Adapter, F25P-F25P	1.00	1.00
9	20-10-075	Intrface Conn, RS232-RS422	1.00	1.00
10	20-10-083	Cable, Serial, 10FT, 25M-9F	1.00	1.00

Figure 10.1-5.1

DOCUMENT NO. BA–W14	REV	DESCRIPTION	DCN NUMBER	DATE	DWN.	APPD.
	1	INITIAL RELEASE	8502–DCN–216	83.03.01	DF	
	2	SEE DCN	362		CW	
	3	SEE DCN	489		CW	RA
	4	REMOVE SMALL BUSHING (ITEM 14)	685	94.05.06	FV	DS



SCHEMATIC DIAGRAM
BA–W12



NOTES:

1. REMOVE THE RUBBER INSULATOR FROM THE INSIDE OF ITEM 6 & DISCARD. AFTER THE WIRES ARE SOLDERED TO THE CONNECTOR, USE ITEM 15 AND SEAL AROUND ALL THE SOLDER CUPS. THEN INSTALL THE PLASTIC SHELL OVER IT.

2 MARK CABLE WITH PART NO. WHERE SHOWN.

COMPUTER GENERATED DRAWING
FILENAME: BA–W12.DWG

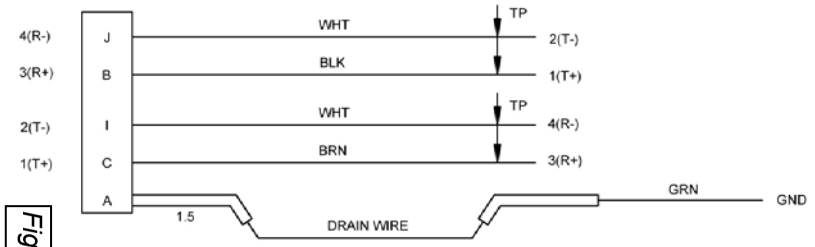
QTY –1 – NO.	UM	PART NO.	MFR's NO.	DESCRIPTION	REMARKS	ITEM

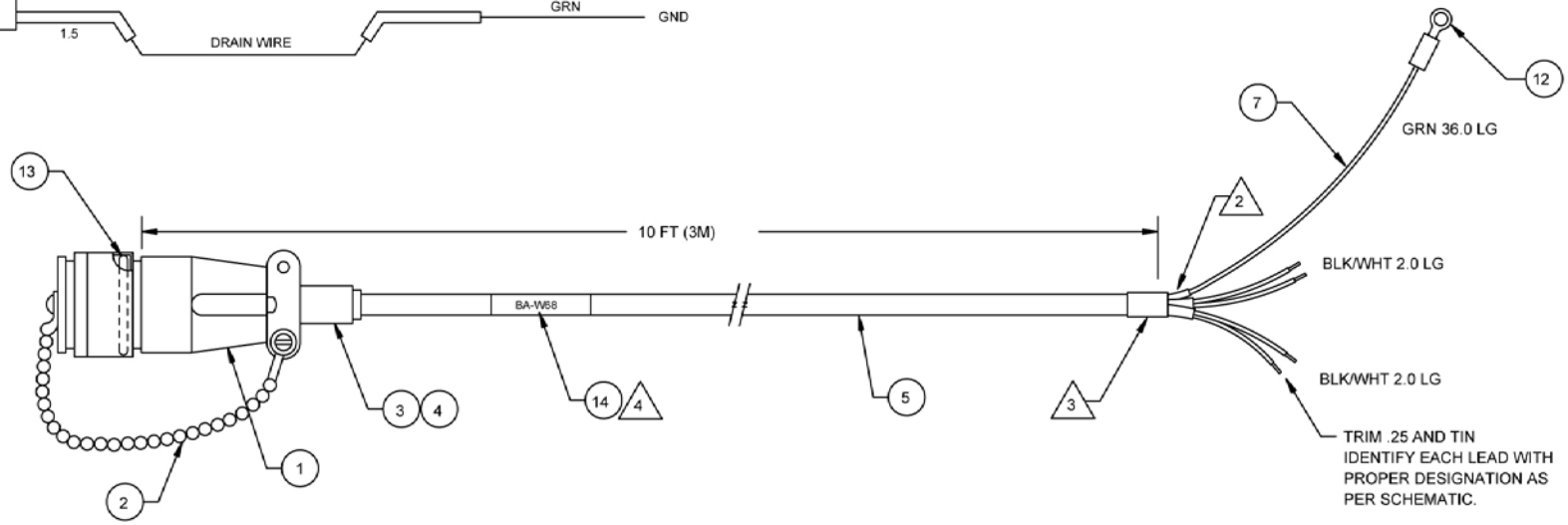
SCALE	1:1	NEXT ASSY:	BA–C01
DATE	83.03.01	DIMENSIONS IN	FEET
DWN	DF	IF DUAL DIMS:	mm (inches)
CHKD	DW	Tolerances (unless otherwise specified)	
APPD	KL	INCHES	MM
FINISH		.xxx ± .005 .xx ± .01 ANGLES ± 1° FRACTIONS ± 1/32	.xx ± 0.15 .x ± 0.25 ANGLES ± 1°

SCI-TEC INSTRUMENTS INC.

TITLE: POWER CABLE ASSY, BREWER

SHEET	DOCUMENT NUMBER	REV.
1 OF 1	BA–W12	4





DOCUMENT NO. BA-W68	REV	DESCRIPTION	DCN NUMBER	DATE	DWN	CHKD
	1	INITIAL RELEASE		93.06.09	FV	KL
	2	I.D. DATA CABLE ENDS	668	94.04.11	DM	DS
	3	RE-LABEL WIRES FOR NEW DATA SET	704	94.07.26	FV	DS
	4	HEATSHRINK OVER DRAIN WIRE	848	99.03.19	MSB	TKLL
	5	ITEM 11 PART NO. CHANGE	884	99.11.01	RKF	TKLL

NOTES:

1. ASSEMBLE CONNECTOR (ITEM 1) TO CABLE (ITEM 5) AS FOLLOWS:
   - SLIP BACKSHELL CLAMP ONTO CABLE, THEN NYLON SHELL & RUBBER TELESCOPING BUSHINGS (ITEMS 3,4) AND STRIP WIRES. DELETE THE RUBBER GLAND AND SOLDER TO PINS.
   - BEFORE ASSEMBLYING CABLE TO CONNECTORS CLAMP, HANG CABLE WITH CONNECTOR DOWNWARD. FILL AROUND WIRES WITH RTV 3145 (ITEM 6).
   - WHEN RTV HAS SKINNED OVER, ASSEMBLE THE TELESCOPING BUSHINGS & NYLON SHELL AND SCREW THE BACKSHELL TIGHTLY TO THE CONNECTOR BY HOLDING THE SHELL IN PLACE WITH A MATING CONNECTOR SHELL.
   - TIGHTEN CABLE CLAMP. NOTE, CLAMP MUST BE OVER CABLE JACKET END A MIN OF .125 IN.
2. SOLDER DRAIN WIRE TO A 36.0 IN. PIECE OF GRN WIRE (ITEM 7). COVER WITH 1.0 IN. PIECE OF HEATSHRINK (ITEM 8).
3. SHRINK A .25 IN. PIECE OF HEATSHRINK (ITEM 9) OVER EACH TWISTED PAIR AND COVER END OF CABLE JACKET WITH A .50 IN. PIECE OF HEATSHRINK (ITEM 11).
4. MARK CABLE WITH PART NO. AS SHOWN.

PART NO.	NEXT ASSY
BA-W68	BA-C204, BA-C204/B, BA-C224, BA-C224/B

COMPUTER GENERATED DRAWING
FILENAME: BA-W68.DWG

QTY - NO.	UM	PART NO.	MFR's NO.	DESCRIPTION	REMARKS	ITEM

SCALE	1:1	NEXT ASSY:	SEE TABLE
DATE	93.06.09	DIMENSIONS IN	INCHES
DWN	FV	IF DUAL DIMS:	mm (inches)
CHKD	GM	Tolerances	(unless otherwise specified)
APPD	KL	INCHES	MM
FINISH		.xxx ± .005 .xx ± .01 ANGLES ± 1 ° FRACTIONS ± 1/32	.xx ± 0.15 .x ± 0.25 ANGLES ± 1 °

SCI-TEC INSTRUMENTS INC.

TITLE: DATA CABLE ASSY, RS422

SIZE	SHEET	DOCUMENT NUMBER	REV.
C	1 OF 1	BA-W68	5

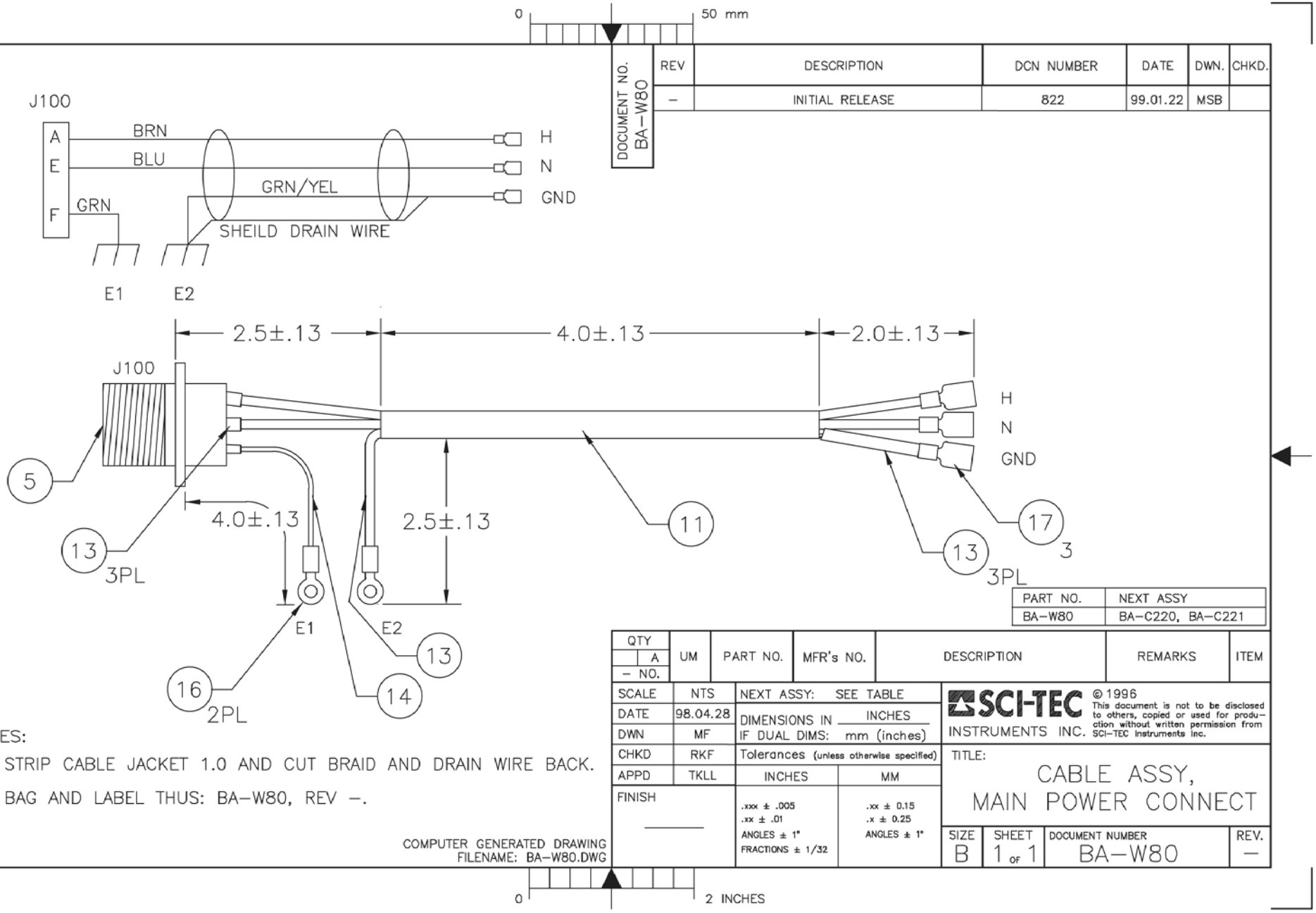
Item No.	BA-C222 Part No.	Brewer Electronics Spares Kit Description	Qty
2	BA-C99	Azimuth Tracker Board Assy	1.00
3	BA-E103/B	Power Supply Assy, 12V	1.00
4	BA-E124	Electronic PCB Brkt Assy	1.00
5	BA-P23	High Speed Amp Board Assy	1.00
6	BA-W76/A	CABLE ASSY, MAIN TO MOTOR, 29.0	1.00
7	BA-W76/B	CABLE ASSY, MAIN TO MOTOR, 27.0	1.00
8	BA-W76/C	CABLE ASSY, MAIN TO MOTOR, 20.0	1.00
9	BA-W77/B	CABLE ASSY, MAIN TO HV, 16.0	1.00
10	BA-W78	CABLE ASSY, HV BRD TO PMT	1.00
11	70-10-020	Silica Gel Indicating	2.00
12	93-70-401	Standard Lamp	3.00
13	93-70-406	Lamp, HG Germicidal	3.00
14	87-50-088	Power Supply, Switching, 5VDC, 10A	1.00
15	70-10-015	Desiccant Bag	6.00
16	75-01-020	Battery, Lithium, 3V, 1AH	1.00

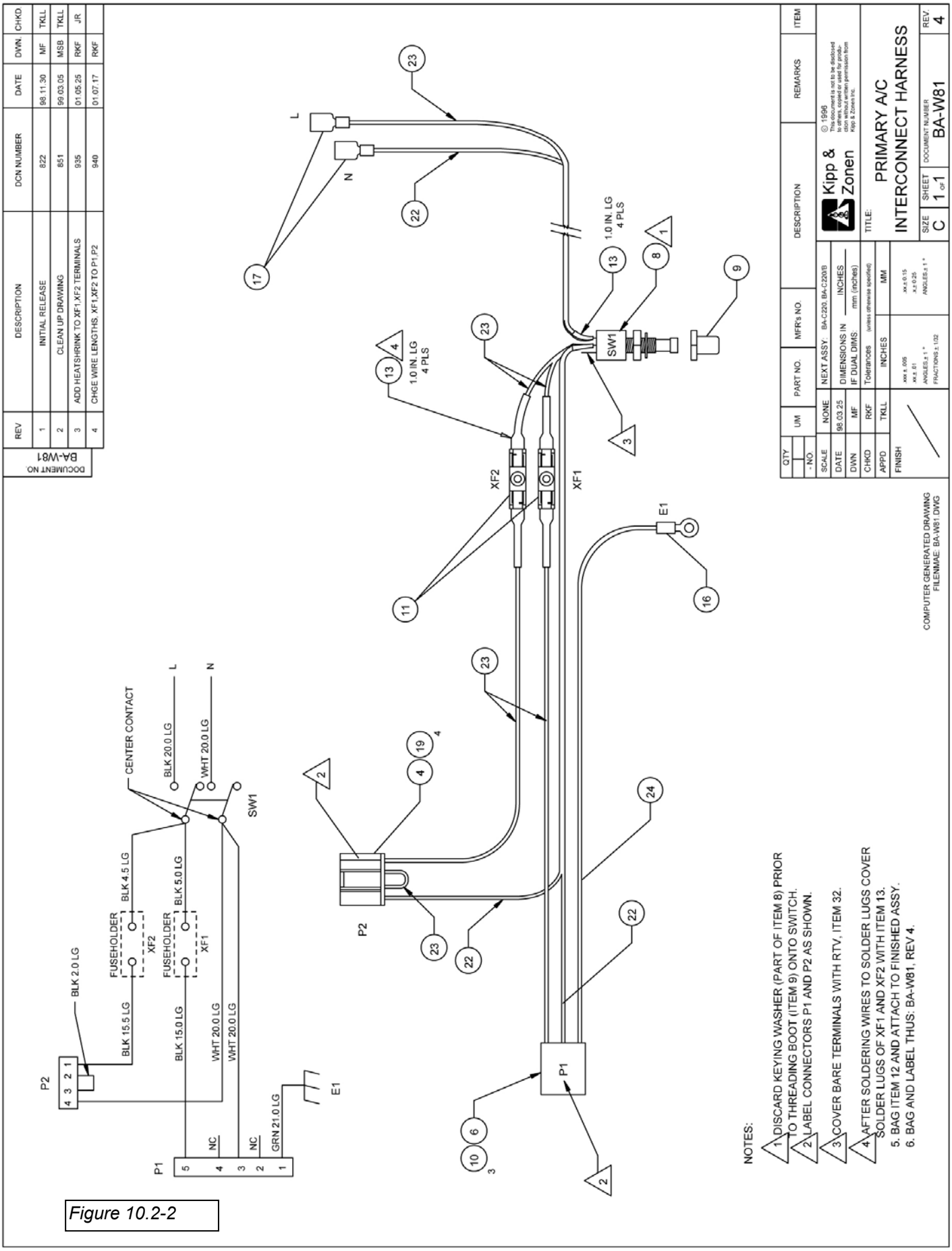
Item No.	BA-C112/B Part No.	BREWER Standard Spares Kit Description	Qty
1	12501365-2	Desiccant Holder Assy	1.00
2	70-10-014	Desiccant Cartridge	--
3	70-10-013	Desiccant Humidity Indicator	2.00
4	70-10-015	Desiccant, 4 Unit, Type II, TYVEK Bag	3.00
5	93-70-401	Lamp, Tungsten, Halogen, 20W, 12V	2.00
6	93-70-406	Lamp, HG Germicidal (GTL3)	2.00
7	91-15-217	Fuse, 5A, 250V, Fast-Blow	2.00
8	91-15-257	Fuse, 2A, 125V, Slow-Blow	--
9	91-15-220	Fuse, 1A, 250V, FB, 5X20MM	2.00
10	91-15-834	Fuse, 2A, 250V, SB 5X20MM	2.00
11	91-15-223	Fuse, 2A, 250V, FB, 5X20MM	2.00
12	91-15-280	Fuse, 4A, 125V, SB, 5X20MM	2.00
13	92-90-002	Tool, Hex Key, .035"	1.00
14	92-90-020	Allen Wrench Kit, Ball Point	1.00
15	83-79-116	Screw, #10-32 x 5/8"Lg, Skt Hd Cap, SS	4.00
16	92-22-050	Insertion/Extraction Tool, 'D' Connector	1.00

BREWER REFERENCE DOCUMENTATION

Section 10.2 Power Supply and Harness	**Figure**
- Main Power Connect Cable Assembly BA-W80	10.2-1
- Primary AC power Interconnect Harness Assembly BA-W81	10.2-2
- Power Supply Assembly BA-E103/B	10.2-2.1
- Power Supply data sheet	10.2-2.2
	10.2-2.3

Figure 10.2-1


0
50 mm
DOCUMENT NO. BA-W80
REV | DESCRIPTION | DCN NUMBER | DATE | DWN. | CHKD.
– | INITIAL RELEASE | 822 | 99.01.22 | MSB |
J100
A
E
F
BRN
BLU
GRN/YEL
GRN
SHEILD DRAIN WIRE
H
N
GND
E1
E2
2.5±.13
4.0±.13
2.0±.13
J100
5
13
3PL
4.0±.13
2.5±.13
11
17
3
13
3PL
H
N
GND
E1
E2
13
16
2PL
14
PART NO. | NEXT ASSY
BA-W80 | BA-C220, BA-C221
QTY A – NO. | UM | PART NO. | MFR's NO. | DESCRIPTION | REMARKS | ITEM
SCALE NTS
DATE 98.04.28
DWN MF
CHKD RKF
APPD TKLL
FINISH
NEXT ASSY: SEE TABLE
DIMENSIONS IN INCHES
IF DUAL DIMS: mm (inches)
Tolerances (unless otherwise specified)
INCHES: .xxx ± .005, .xx ± .01, ANGLES ± 1°, FRACTIONS ± 1/32
MM: .xx ± 0.15, .x ± 0.25, ANGLES ± 1°
SCI-TEC INSTRUMENTS INC.
© 1996 This document is not to be disclosed to others, copied or used for production without written permission from SCI-TEC Instruments Inc.
TITLE:
CABLE ASSY, MAIN POWER CONNECT
SIZE B | SHEET 1 OF 1 | DOCUMENT NUMBER BA-W80 | REV. –
NOTES:
1. STRIP CABLE JACKET 1.0 AND CUT BRAID AND DRAIN WIRE BACK.
2. BAG AND LABEL THUS: BA-W80, REV –.
COMPUTER GENERATED DRAWING
FILENAME: BA-W80.DWG
0
2 INCHES


DOCUMENT NO.
BA-W81
REV. | DESCRIPTION | DCN NUMBER | DATE | DWN. | CHKD.
1 | INITIAL RELEASE | 822 | 98.11.30 | MF | TKLL
2 | CLEAN UP DRAWING | 851 | 99.03.05 | MSB | TKLL
3 | ADD HEATSHRINK TO XF1,XF2 TERMINALS | 935 | 01.05.25 | RKF | JR
4 | CHGE WIRE LENGTHS, XF1,XF2 TO P1,P2 | 940 | 01.07.17 | RKF |
QTY - NO. | U/M | PART NO. | MFR's NO. | DESCRIPTION | REMARKS | ITEM
SCALE NONE | NEXT ASSY: BA-C220, BA-C220B
DATE 98.03.25 | DIMENSIONS IN INCHES
DWN MF | IF DUAL DIMS: mm (inches)
CHKD RKF | Tolerances (unless otherwise specified) MM
APPD TKLL | INCHES
FINISH
xxx ± .005 xx ± .01 ANGLES ± 1 ° FRACTIONS ± 1/32
xx ± 0.15 x ± 0.25 ANGLES ± 1 °
Kipp & Zonen
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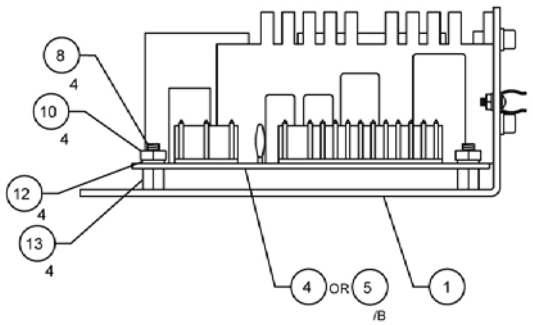
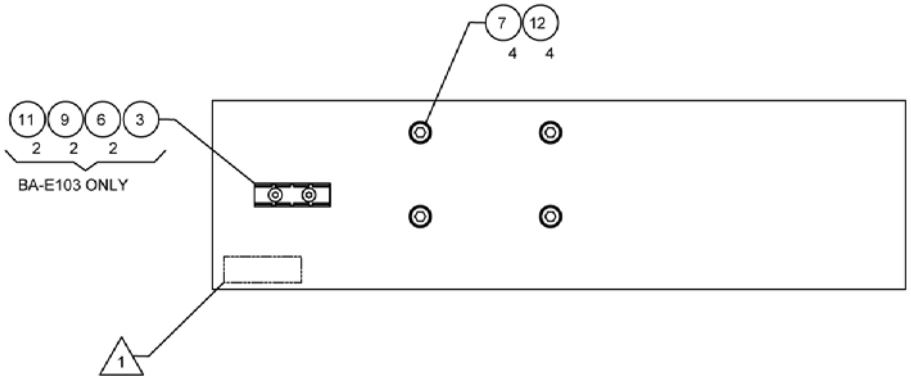
TITLE:
PRIMARY A/C INTERCONNECT HARNESS
SIZE C | SHEET 1 of 1 | DOCUMENT NUMBER BA-W81 | REV. 4
COMPUTER GENERATED DRAWING
FILENAME: BA-W81.DWG
NOTES:
1. DISCARD KEYING WASHER (PART OF ITEM 8) PRIOR TO THREADING BOOT (ITEM 9) ONTO SWITCH.
2. LABEL CONNECTORS P1 AND P2 AS SHOWN.
3. COVER BARE TERMINALS WITH RTV, ITEM 32.
4. AFTER SOLDERING WIRES TO SOLDER LUGS COVER SOLDER LUGS OF XF1 AND XF2 WITH ITEM 13.
5. BAG ITEM 12 AND ATTACH TO FINISHED ASSY.
6. BAG AND LABEL THUS: BA-W81, REV 4.
P2
4 3 2 1
BLK 2.0 LG
BLK 15.5 LG
FUSEHOLDER
XF2
BLK 4.5 LG
BLK 15.0 LG
FUSEHOLDER
XF1
BLK 5.0 LG
WHT 20.0 LG
WHT 20.0 LG
P1
5 4 3 2 1
NC
NC
GRN 21.0 LG
E1
CENTER CONTACT
BLK 20.0 LG
WHT 20.0 LG
SW1
L
N
1.0 IN. LG 4 PLS
XF2
XF1
P2
P1
E1
SW1

Figure 10.2-2

Figure 10.2-2.1

DOCUMENT NO. BA-E103	REV	DESCRIPTION	DCN NUMBER	DATE	DWN	CHKD
	1	INITIAL RELEASE	REF DCN672	94.01.27	FV	DJS
	2	OPTION /B, BREWER NEW ELECTRONICS	822	98.11.30	MF	TKLL
	3	UPDATE REDLINES	852	99.03.25	MSB	TKLL
	4	ADD NOTE 4 AND ITEM 2	896	00.04.07	RKF	JR





NOTES:

1. LABEL WITH PART NO. AND REV.
2. BAG USING ITEM 2 AND LABEL WITH PART NO. AND REV.

PART NO.	NEXT ASSY	APPL.
BA-E103	BA-C122/D, BA-C122/E, BA-E104, BA-E71	15V
BA-E103/B	BA-C222, BA-E71/B	12V

COMPUTER GENERATED DRAWING
FILENAME: BA-E103.DWG

QTY - NO.	UM	PART NO.	MFR's NO.	DESCRIPTION	REMARKS	ITEM

SCALE	1:1	NEXT ASSY:	SEE TABLE
DATE	94.01.27	DIMENSIONS IN	INCHES
DWN	FV	IF DUAL DIMS:	mm (inches)
CHKD	GM	Tolerances (unless otherwise specified)	
APPD	DJS	INCHES	MM
FINISH		.xxx ± .005 .xx ± .01 ANGLES ± 1 ° FRACTIONS ± 1/32	.xx ± 0.15 .x ± 0.25 ANGLES ± 1 °

SCI-TEC INSTRUMENTS INC.

TITLE: POWER SUPPLY ASSY

SIZE	SHEET	DOCUMENT NUMBER	REV.
C	1 OF 1	BA-E103	4

Item No.	BA-E103/B Part No.	Power Supply Assembly Description	Qty
1	BM-E102	Mounting Bracket, Main Power Supply	1.00
3	89-90-220	Mounting Clip, Axial Lead Resistor	--
4	87-50-098	Power Supply, 80W, O/P,Switch,+-15V	--
5	87-50-099	Power Supply, 80W, O/P,Switch,+-12V	1.00
6	83-51-752	Screw, #2-56 x 1/4"Lg, Btn Hd Hex, SS	--
7	83-79-068	Screw, #6-32 x 3/8"Lg, Skt Hd Hex	4.00
8	83-85-724	Screw, #6-32 x 5/8"Lg, Flt Hd, 100Deg, SS	4.00
9	83-40-219	Nut, #2-56 x 3/16", Hex, SS	--
10	83-40-261	Nut, #6-32 x 5/16", Hex, SS	4.00
11	83-95-603	Washer, #2, Internal Tooth Lock, SS	--
12	83-95-605	Washer, #6, Internal Tooth Lock, SS	8.00
13	83-09-210	Spacer, Threaded, #6-32 x 1/4"Lg, Hex	4.00

Item No.	BA-E71/B Part No.	Main Power Supply Kit Assembly Description	Qty
1	BA-E103	Power Supply Assy, 15V	--
2	BA-E103/B	Power Supply Assy, 12V	1.00
4	BM-E79	Cover, Main Power Supply	1.00
6	83-09-050	Spacer, Threaded, #6-32 x 2-1/4"Lg, Hex	4.00
8	77-22-074	Rivet, Dome Hd, 5/32 Dia x 1/4"Lg, Alum	--
10	83-95-785	Washer, #6, Sealing, 3/8 OD	4.00
11	83-95-605	Washer, #6, Internal Tooth Lock, SS	4.00
13	83-30-110	Grommet, Edging, Flexible, Nylon	4.10
15	85-10-143	Adhesive (Loctite Prism 401)	0.10
16	83-51-780	Screw, #6-32 x 1/4"Lg, Btn Hd Hex, SS	4.00
17	83-51-784	Screw, #6-32 x 1/2"Lg, Btn Hd Hex, SS	4.00
19	70-10-014	Dessicant Cartridge	--
20	89-90-250	Clip, Steel, Nickel Plated, 1.437-1.687 Dia	--

NFS80 SERIES
80 Watt Universal Input Switching Power Supplies

- Balanced-current auxiliary outputs
- Universal input voltage
- Overvoltage protection
- Short circuit protection with auto-recovery
- 80 watts continuous, 110 watts peak output power
- Two year warranty
- Recommended for new designs

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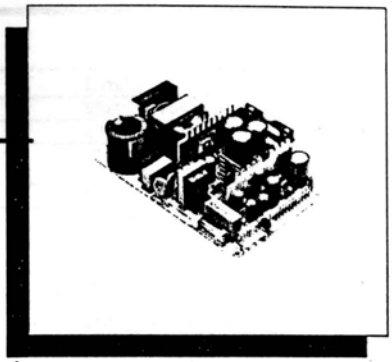
NEW!



The NFS80 series consist of universal input, four output switching power supplies useful in motor or line driver applications. The equally rated or "balanced" outputs will each deliver up to 3A continuous and 6A peak output current. Furthermore, these supplies will deliver 80 total continuous watts with natural convection cooling, or 110 watts with forced air cooling. For starting loads such as disk drives, they will deliver 110 peak watts.

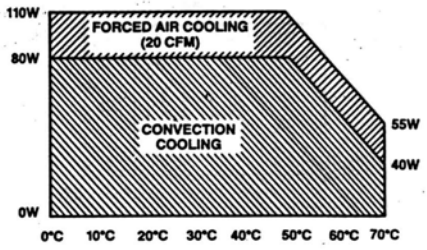
Universal input allows the supply to operate from any line voltage throughout the world without a switch or jumper setting. The NFS80 series is approved by UL, CSA and VDE, and its built-in line filter reduces conducted noise below FCC and VDE limit B.

Model Number	Output Voltage(1)	Minimum	Output Currents Maximum(2)	Maximum(3)	Peak(4)	Ripple P-P(5)	Total Regulation(6)
NFS80-7602	+5V (A)	1A	8A	1.2A	20A	50mV	±2%
	+24V (B)	0A	2A	2.5A	3A	240 mV	+10%-5%
	+12V (C)	0A	2.5A	3A	6A	120mV	±3%
	12V (D)	0A	2.5A	3A	6A	120mV	±3%
NFS80-7606	+5V (A)	1A	8A	12A	20A	50mV	±2%
	+24V (B)	0A	2A	2.5A	3A	240mV	+10%-5%
	+15V (C)	0A	2.5A	3A	6A	150mV	±3%
	15V (D)	0A	2.5A	3A	6A	150mV	±3%

Notes:
(1) The floating fourth output (D) can be referenced as either positive or negative.
(2) Natural convection cooling.
(3) Forced air cooling, 20 CFM @ 1 atmosphere.
(4) Peak output current lasting less than 60 seconds with duty cycle ≤ 10%. During peak loading, outputs may exceed total regulation limits.
(5) 50 MHz bandwidth, peak-to-peak, measured differentially.
(6) Total regulation is defined as the static output regulation at 25°C, including initial tolerance, line voltage within stated limits, load currents within stated limits, and output voltages adjusted to their factory settings. Also, for stated regulation on the +24V output, I(A)/I(B) ≤ 5.

Operating Temperature Limits and Output Power Range

For optimum reliability, no part of the heatsink should exceed 110°C, and no semiconductor case temperature should exceed 115°C. CAUTION: make primary circuit thermal measurements approximately one second after disconnecting line power to minimize shock hazard and damage to thermal measurement equipment.



COMPUTER PRODUCTS A

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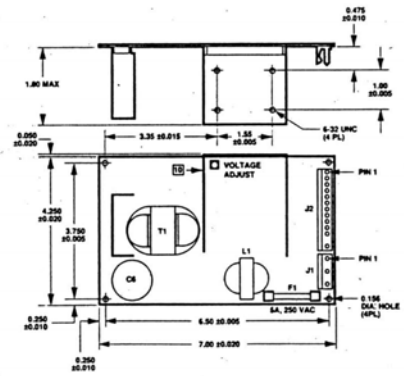
Figure 10.2-2.2

SPECIFICATIONS

Parameter	Condition	Limits
Input Voltage		85VAC to 264VAC
Input Frequency Range		47Hz to 440Hz
Input Surge Current	Cold start 115VAC 230VAC	17A max 34A max
Conducted RFI		FCC limit B, VDE limit B
Safety Ground Leakage Current	110VAC, 60Hz 233VAC, 50Hz	0.2 mA maximum 0.4 mA maximum
Line Regulation	Low line to high line, full load	±0.1% max
Overshoot/Undershoot	Turn-on	None
Transient Response	+5V output, 2.5A to 5A load change	150mV transient, setting to 1% in 1mS
Temperature Coefficient	All outputs	0.02%/C
Overvoltage Protection Threshold	+5V output	6.25V ±0.75V
Output Voltage Adjustability	+5V output	±3%
Total Output Power	50°C ambient temperature Continuous, convection cooling forced air cooling Peak	 80 watts 110 watts 110 watts
Holdup Time	 220VAC input 180VAC input 115VAC input 90VAC input	80W 110W 140mS 100mS 80mS 50mS 35mS 17mS 12mS 8mS
Efficiency	115VAC input, 80W	70% typical
Operating Frequency	0W, 90 to 264VAC 110W, 90 to 264VAC	100 to 250 kHz 20 to 70 kHz
Altitude	Operating Non-operating	10,000 feet max 40,000 feet max
Temperature	Operating Non-operating	0°C to 50°C −40°C to +85°C
Relative Humidity	Non-condensing	5% to 95%
Vibration	Three orthogonal axes, random vibration, 10 minute test for each axis	2.4G rms (appx) 5Hz to 500Hz
MTBF	MIL-HDBK 217E, 25°C	125,000 hr
Weight		1.3 lb (0.6 Kg)

PIN CHART — CONNECTOR

J1			
Pin 1	AC Ground	AC Ground	Molex 09-50-3051 with second and fourth pins removed
Pin 2	AC Neutral	AC Neutral	
Pin 3	AC Hot	AC Hot	
J2			
Pin 1	+5.1V	+5.1V	Molex 09-50-3131 Mating connector: Molex 2139 series housing with 2878 series crimp terminal.
Pin 2	+5.1V	+5.1V	
Pin 3	+5.1V	+5.1V	
Pin 4	Return	Return	
Pin 5	Return	Return	
Pin 6	Return	Return	
Pin 7	Return	Return	
Pin 8	+12V	+15V	
Pin 9	+12V	+15V	
Pin 10	−12V Ret	−15V Ret	
Pin 11	−12V	−15V	
Pin 12	Removed for key		
Pin 13	+24V	+24V	



(7) Pins 10 and 11 are a floating output, which can be referenced as either positive or negative. Pin 10 is positive with respect to pin 11. Either pin 10 or 11 must be connected to Return (pins 4-7) for proper operation.
(8) All dimensions are in inches and (mm).
(9) Either metallic or non-metallic standoffs can be used in all four mounting holes without affecting VDE safety approval. The diameter of metal standoffs, if used, must not exceed 0.212".
(10) This heat sink is grounded, and allows system grounding when mechanically connected to the system chassis. Alternatively, the ground pad encircling the mounting hole near J1 allows system grounding through a metal standoff to the system chassis.
(11) It is always advisable to attach the power supply heat sink to another thermal dissipator (such as a chassis, a finned heat sink, etc.). The resulting temperature decrease of heat sink-mounted components will improve power supply lifetime.
(12) The supply must be mechanically supported using the PCB mounting holes, and may be additionally supported by the heat sink mounting holes.

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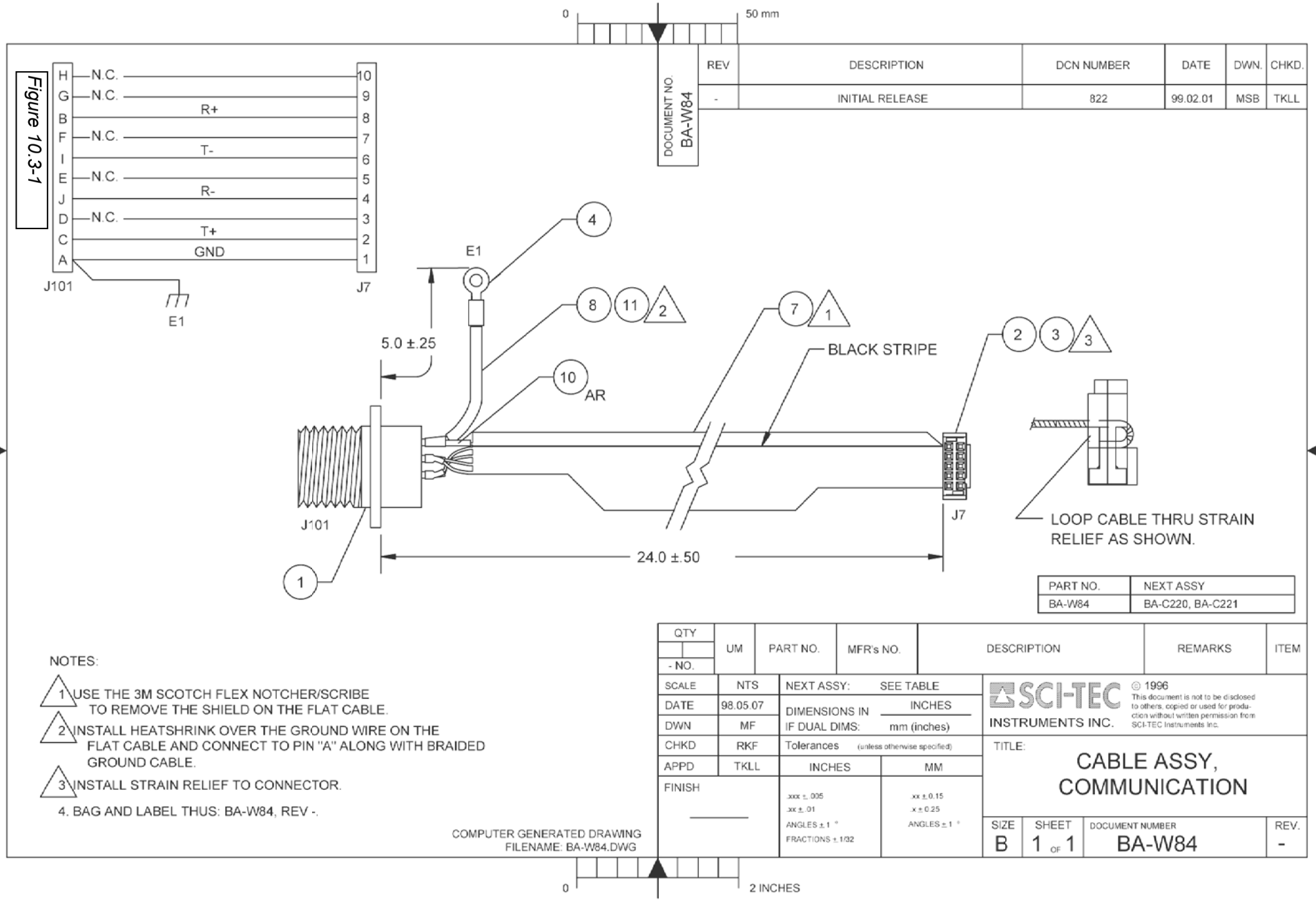
Figure 10.2-2.3

BREWER REFERENCE DOCUMENTATION

Section 10.3 Internal Cabling	**Figure**
- Communication Cable Assembly BA-W84	10.3-1
- Internal Azimuth Drive Cable Assembly BA-W31	10.3-2
- DC to main & lamp Cable Interconnect Harness BA-W82	10.3-3
- Control Switch Cable assembly BA-W55	10.3-4
- Lamp Cable assembly BA-W83	10.3-5
- Motor Connectors Cable assembly BA-W76	10.3.6
- Main Lamp and HV Cable assembly BA-W77	10.3.7
- Hv board to PMT Cable assembly BA-W78	10.3.8

Item No.	BA-C220 Part No.	Base Assembly Description	Qty
3	BM-C215	Baseplate, Electronics, Weatherproof	1.00
4	BM-C13	Tapped Spacer	3.00
5	BM-C216	Plate, Fuse Holder	1.00
6	BM-C15	Rubr Bumpr Attachmnt Scrw	4.00
7	BM-C16	Shock Mnt V-Screw	3.00
8	BM-C17	Rubber Bumper, Mod	4.00
9	BM-C18	Locking Plate	4.00
10	BA-W84	Cable Assy, Communication	1.00
11	BA-W80	Cable Assy, Main Pwr Conn	1.00
12	BA-W31/B	Internl Az Dr Data Cable	1.00
13	BA-W55/B	Control Switch Cable Assy	1.00
14	BA-W81	Prim A/C Intrconnect Harn	1.00
16	BM-C08	Weatherproof Gasket	3.00
17	BA-W56	Power Indicator Assy, Brew	1.00
18	BM-C173	Connector Gasket	3.00
20	85-10-174	Adhesive, Sealant (Loctite 262)	1.00
22	76-05-005	Filter, Interf Pwrline 3A	1.00
23	91-15-223	Fuse, 2A, 250V, FB, 5MMx20MM	1.00
26	82-30-415	Mount Anti-Vib 14lb	--
27	82-30-416	Mount Anti-Vib 12lb	3.00
28	81-15-154	Cap + Chain for #18 Rec	3.00
29	83-79-070	Screw, 6-32 x 1/2 HSC, SS	4.00
31	83-79-047	Screw, 4-40 x 1/4 HSC SS	2.00
32	83-56-141	Screw, Set 6-32 x 1/8 Cup	2.00
33	83-51-765	Screw, 4-40 x 1/2 Button HD	12.00
34	83-51-782	Screw, 6-32 x 3/8 Button H	4.00
35	83-51-834	Screw, 10-32 x 1/2 Button H	12.00
36	83-51-130	Screw, 6-32 x 3/4, Pan, Sealing	1.00
37	83-51-804	Screw, 8-32 x 1/2 Button HD	2.00
38	83-40-487	Nut 8-32 SL RG HX Thin SS	2.00
39	83-40-485	Nut 4-40 SL RG HX Thin SS	12.00
40	83-40-489	Nut 10-32 SL RG HX Thin SS	12.00
41	83-95-605	Washer #6 Int Tooth LK SS	2.00
42	83-95-786	Washer, #8 Screw 3/8 OD X	2.00
43	83-95-785	Washer, #6, Screw 3/8 OD X	4.00
44	83-95-787	Washer, #10 Screw 7/16 OD	12.00
45	83-40-261	Nut, 6-32 x 5/16 HX SS ST	1.00
46	83-95-748	Washer, #4 Split Lock SS	2.00
49	82-20-383	Clamp 'P' 1/2 x 1/2 #10	1.00
50	83-40-486	Nut 6-32 SL RG HX Thin SS	1.00
51	50-10-090	Whstrp, 1/4 Thkx1" W.CL Cell	0.17
55	85-10-150	Adhesive, Sealant RTV	1.00

Figure 10.3-1



DOCUMENT NO. BA-W84

REV	DESCRIPTION	DCN NUMBER	DATE	DWN.	CHKD.
-	INITIAL RELEASE	822	99.02.01	MSB	TKLL

PART NO.	NEXT ASSY
BA-W84	BA-C220, BA-C221

QTY - NO.	UM	PART NO.	MFR's NO.	DESCRIPTION	REMARKS	ITEM

NOTES:

1. USE THE 3M SCOTCH FLEX NOTCHER/SCRIBE TO REMOVE THE SHIELD ON THE FLAT CABLE.
2. INSTALL HEATSHRINK OVER THE GROUND WIRE ON THE FLAT CABLE AND CONNECT TO PIN "A" ALONG WITH BRAIDED GROUND CABLE.
3. INSTALL STRAIN RELIEF TO CONNECTOR.
4. BAG AND LABEL THUS: BA-W84, REV -.

COMPUTER GENERATED DRAWING
FILENAME: BA-W84.DWG

SCALE	NTS
DATE	98.05.07
DWN	MF
CHKD	RKF
APPD	TKLL
FINISH	

NEXT ASSY: SEE TABLE
DIMENSIONS IN INCHES
IF DUAL DIMS: mm (inches)
Tolerances (unless otherwise specified)

INCHES	MM
.xxx ±.005	.xx ±0.15
.xx ±.01	.x ±0.25
ANGLES ± 1 °	ANGLES ± 1 °
FRACTIONS ± 1/32	

SCI-TEC INSTRUMENTS INC.

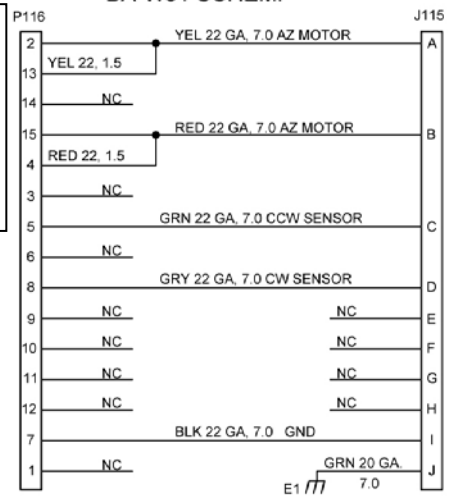
TITLE: CABLE ASSY, COMMUNICATION

SIZE	SHEET	DOCUMENT NUMBER	REV.
B	1 OF 1	BA-W84	-

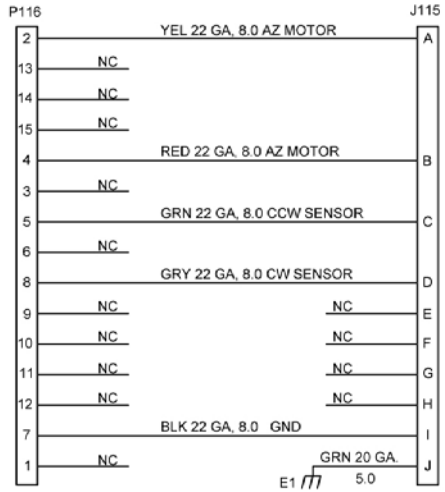
0 2 INCHES

Figure 10.3-2

BA-W31 SCHEM.



BA-W31/B SCHEM.



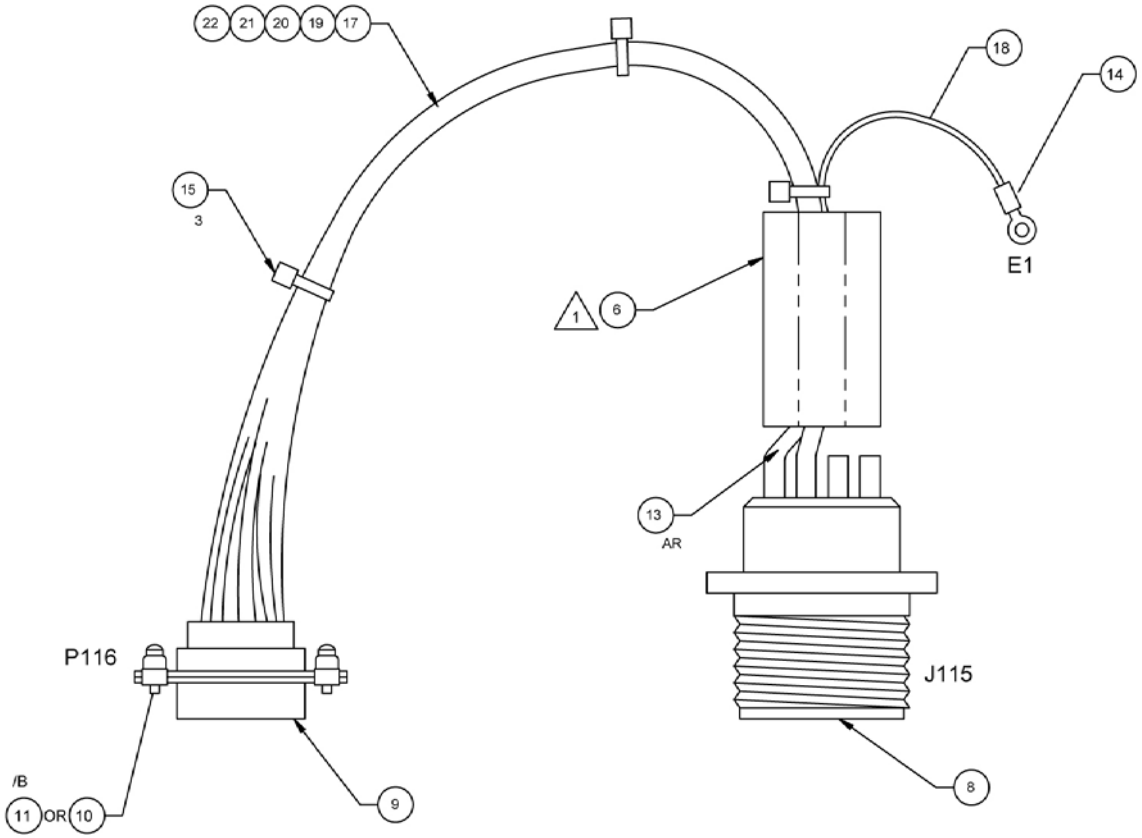
NOTES:

1. CLIP ITEM 6 OVER CABLE ASSSEMBLY FOLLOWING COMPLETION OF CABLE.
2. BAG AND LABEL THUS: BA-W31, REV 5.

PART NO.	NEXT ASSY
BA-W31	BA-C11, BA-C209
BA-W31/B	BA-C220, BA-C220/B

COMPUTER GENERATED DRAWING
FILENAME: BA-W31.DWG

DOCUMENT NO. BA-W31	REV	DESCRIPTION	DCN NUMBER	DATE	DWN.	CHKD.
	1	FIRST ISSUE		84.03.01	DF	KL
	2	ADD ITEM 7, CHG QTY ITEM'S 19, 21	DCN-373	88.02.18	CW	RA
	3	CHG WIRE LENGTH'S & P116 PIN OUT	DCN-622	93.01.20	FV	RA
	4	ADD FERRITE CORE TO ASSY	DCN-804	96.12.17	CF	TKLL
	5	ADD ASSY BA-W31/B	822	99.01.22	MSB	TKLL



QTY - NO.	UM	PART NO.	MFR's NO.	DESCRIPTION	REMARKS	ITEM

SCALE	2:1	NEXT ASSY:	SEE TABLE
DATE	84.03.01	DIMENSIONS IN	INCHES
DWN	DF	IF DUAL DIMS:	mm (inches)
CHKD	MF	Tolerances (unless otherwise specified)	
APPD	KL	INCHES	MM
FINISH		.xx ± 0.005 .x ± 0.01 ANGLES ± 1° FRACTIONS ± 1/32	.xx ± 0.15 .x ± 0.25 ANGLES ± 1 °

SCI-TEC INSTRUMENTS INC.

TITLE:
INTERNAL AZIMUTH DRIVE
DATA CABLE ASSY

SIZE	SHEET	DOCUMENT NUMBER	REV.
C	1 OF 1	BA-W31	5

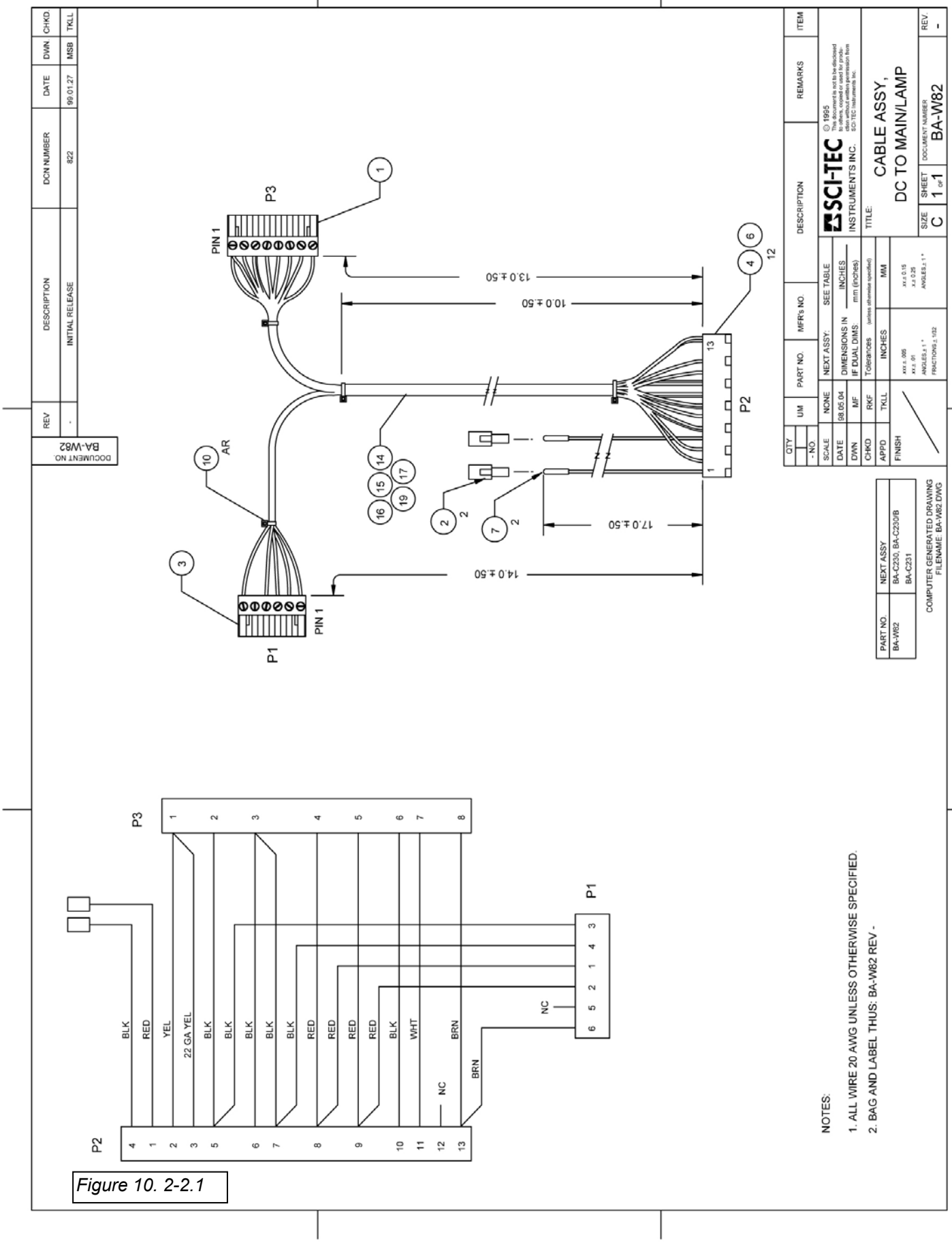
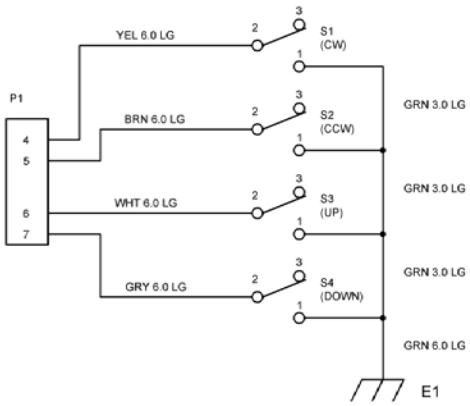


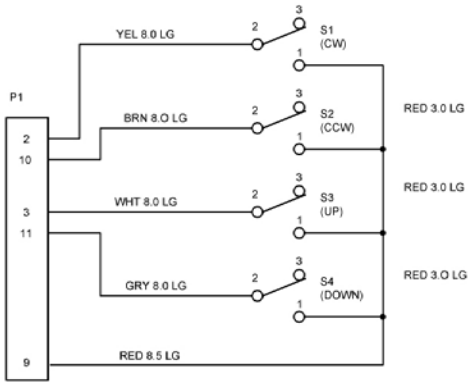
Figure 10. 2-2.1

Figure 10.3-4

BA-W55 SCHEMATIC



BA-W55/B SCHEMATIC

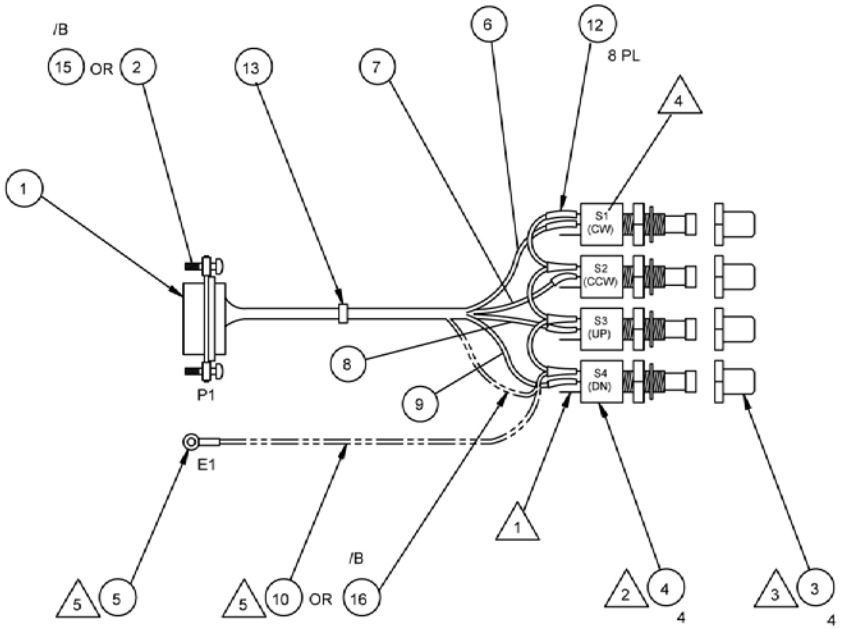


NOTES:

1. COVER ALL UNUSED TERMINALS WITH RTV (ITEM 11).
2. REMOVE AND DISCARD KEYING WASHER (PART OF ITEM 4) FROM SWITCH.
3. FINGER TIGHTEN BOOT (ITEM 3) ONTO SWITCH.
4. LABEL SWITCH WITH DESIGNATIONS AS SHOWN.
5. FOR BA-W55 ASSY: ITEM 16 NOT USED.
   FOR BA-W55/B ASSY: ITEMS 5 AND 10 NOT USED.
6. BAG AND LABEL WITH PART NO. AND REV.

PART NO.	NEXT ASSY
BA-W55	BA-C11, BA-C209
BA-W55/B	BA-C220, BA-C221

COMPUTER GENERATED DRAWING
FILENAME: BA-W55.DWG



DOCUMENT NO. BA-W55	REV	DESCRIPTION	DCN NUMBER	DATE	DWN.	CHKD.
	1	INITIAL RELEASE	487	90.09.26	FV	KL
	2	ADD ASSY BA-W55/B	822	99.01.22	MSB	TKLL

QTY - NO.	UM	PART NO.	MFR's NO.	DESCRIPTION	REMARKS	ITEM

SCALE	2:1	NEXT ASSY:	SEE TABLE
DATE	90.08.29	DIMENSIONS IN IF DUAL DIMS:	INCHES mm (inches)
DWN	FV		
CHKD	RA	Tolerances (unless otherwise specified)	
APPD	KL	INCHES	MM
FINISH		.xx ± 0.005 .x ± 0.01 ANGLES ± 1° FRACTIONS ± 1/32	.xx ± 0.15 .x ± 0.25 ANGLES ± 1 °

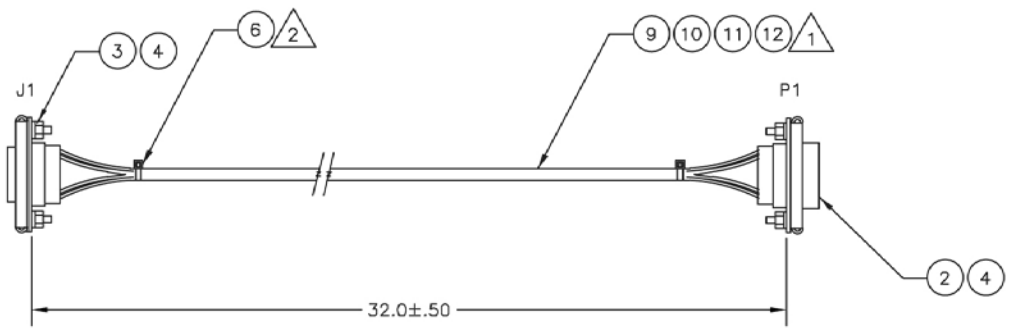
SCI-TEC INSTRUMENTS INC.

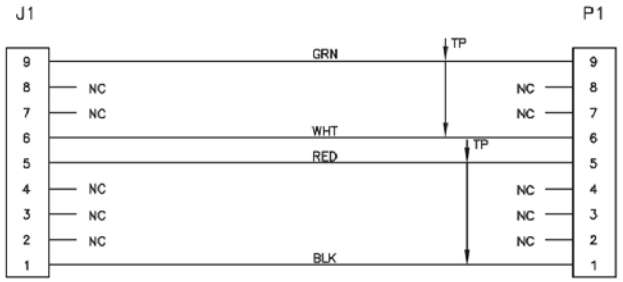
TITLE: CONTROL SWITCH CABLE ASSY

SIZE	SHEET	DOCUMENT NUMBER	REV.
C	1 OF 1	BA-W55	2

Figure 10.3-5

DOCUMENT NO. BA–W83	REV	DESCRIPTION	DCN NUMBER	DATE	DWN.	CHKD.
	–	INITIAL RELEASE	822	99.02.01	MSB	





NOTES:

1. MAKE TWISTED PAIRS OF BLK/RED & WHT/GRN AS SHOWN.
2. USE TIE–WRAPS, APPROXIMATELY EVERY 4.0 IN.
3. BAG AND LABEL THUS: BA–W83, REV –.

PART NO.	NEXT ASSY
BA–W83	BA–C230, BA–C230/B, BA–C231

QTY – NO.	UM	PART NO.	MFR's NO.	DESCRIPTION	REMARKS	ITEM
A						

SCALE	NTS	NEXT ASSY:	SEE TABLE
DATE	98.05.04	DIMENSIONS IN	INCHES
DWN	MF	IF DUAL DIMS:	mm (inches)
CHKD	RKF	Tolerances (unless otherwise specified)	
APPD	TKLL	INCHES	MM
FINISH		.xxx ± .005 .xx ± .01 ANGLES ± 1° FRACTIONS ± 1/32	.xx ± 0.15 .x ± 0.25 ANGLES ± 1°

SCI-TEC INSTRUMENTS INC.

TITLE: CABLE ASSY, LAMP

SIZE	SHEET	DOCUMENT NUMBER	REV.
C	1 OF 1	BA–W83	–

COMPUTER GENERATED DRAWING
FILENAME: BA–W83.DWG

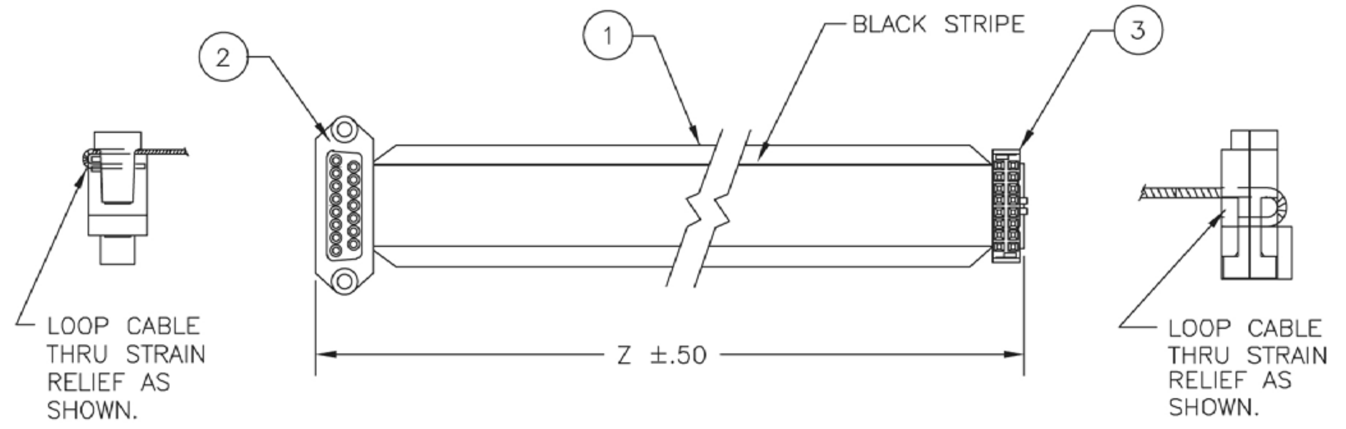
PART NO.	DIM Z	NEXT ASSY
BA-W76/A	29.0	BA-C222,BA-C230,BA-C230/B,BA-C231
BA-W76/B	27.0	BA-C222,BA-C230,BA-C230/B,BA-C231
BA-W76/C	20.0	BA-C222,BA-C230/B

DOCUMENT NO. BA-W76

REV	DESCRIPTION	DCN NUMBER	DATE	DWN.	CHKD.
–	INITIAL RELEASE	822	98.11.30	MSB	TKLL
A	UPDATE REDLINES	852	99.04.06	MSB	

Figure 10.3-6

CONNECTOR LOCATIONS	
15 PIN	IDC
1	2
2	4
3	6
4	8
5	10
6	12
7	14
8	16
9	3
10	5
11	7
12	9
13	11
14	13
15	15



QTY /C	QTY /B	QTY /A	UM	PART NO.	MFR's NO.	DESCRIPTION	REMARKS	ITEM
1	1	1	EA	81-52-616		IDC WIREMOUNT SOCKET		3
1	1	1	EA	81-48-113		15 PIN D-CONNECTOR		2
1.7	2.3	2.5	FT	99-12-050		RIBBON CABLE		1

– NO.

NOTES:

1. ON D-CONNECTOR END TRIM GROUND WIRE AND USE CONDUCTORS 2 TO 16.
2. LABEL PART NUMBER ON GROUND SIDE OF CABLE WITH PERMANENT MARKER.
3. DURING INSPECTION USE CABLE TESTER AND TEST 100% OF CABLES.
4. BAG AND LABEL WITH PART NO. AND REV.

SCALE	1:1
DATE	98.08.24
DWN	MSB
CHKD	RKF
APPD	TKLL
FINISH	———

NEXT ASSY: SEE TABLE

DIMENSIONS IN INCHES

IF DUAL DIMS: mm (inches)

Tolerances (unless otherwise specified)

INCHES	MM
.xxx ± .005 .xx ± .01 ANGLES ± 1° FRACTIONS ± 1/32	.xx ± 0.15 .x ± 0.25 ANGLES ± 1°

SCI-TEC INSTRUMENTS INC.

TITLE: CABLE ASSY, MOTOR CONNECTORS

SIZE B | SHEET 1 OF 1 | DOCUMENT NUMBER BA-W76 | REV. A

COMPUTER GENERATED DRAWING
FILENAME: BA-W76.DWG

0 — 50 mm

0 — 2 INCHES

0 50 mm

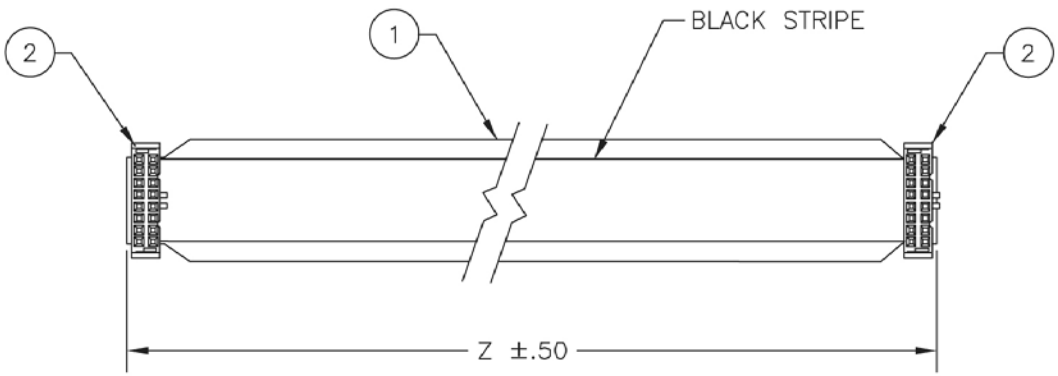
PART NO.	DIM Z	NEXT ASSY
BA-W77/A	11.0	BA-C230,BA-C230/B,BA-C231
BA-W77/B	16.0	BA-C230,BA-C230/B,BA-C231,BA-C222

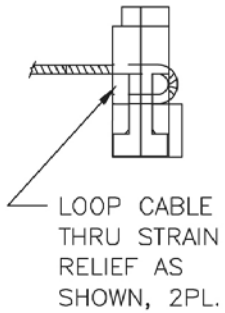
DOCUMENT NO. BA-W77

REV	DESCRIPTION	DCN NUMBER	DATE	DWN.	CHKD.
–	INITIAL RELEASE	822	98.11.30	MSB	TKLL
A	UPDATE REDLINES	852	99.04.06	MSB	

Figure 10.3-7

CONNECTOR LOCATIONS	
IDC	IDC
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10
11	11
12	12
13	13
14	14
15	15
16	16





NOTES:

1. LABEL PART NUMBER ON GROUND SIDE OF CABLE WITH PERMANENT MARKER.
2. DURING INSPECTION USE CABLE TESTER AND TEST 100% OF CABLES.
3. BAG AND LABEL WITH PART NO. AND REV.

COMPUTER GENERATED DRAWING
FILENAME: BA-W77.DWG

QTY /B	QTY /A	QTY – NO.	UM	PART NO.	MFR's NO.	DESCRIPTION	REMARKS	ITEM
2	2		EA	81-52-616		IDC WIREMOUNT SOCKET		2
1.4	1.0		FT	99-12-050		RIBBON CABLE		1

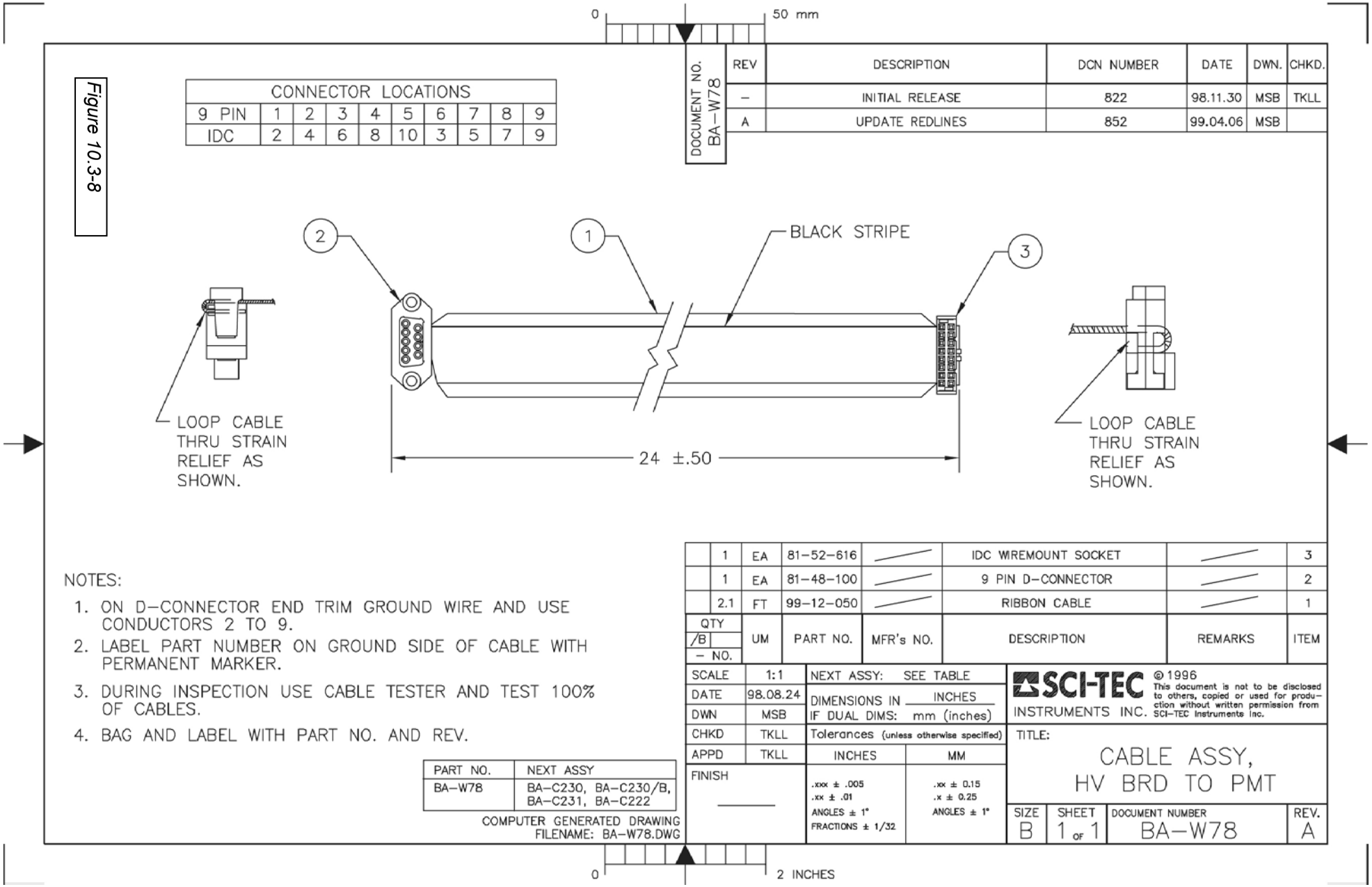
SCALE	1:1	NEXT ASSY: SEE TABLE	
DATE	98.08.25	DIMENSIONS IN INCHES	
DWN	MSB	IF DUAL DIMS: mm (inches)	
CHKD	RKF	Tolerances (unless otherwise specified)	
APPD	TKLL	INCHES	MM
FINISH		.xxx ± .005 .xx ± .01 ANGLES ± 1° FRACTIONS ± 1/32	.xx ± 0.15 .x ± 0.25 ANGLES ± 1°

TITLE: CABLE ASSY, MAIN TO LAMP & HV

SIZE	SHEET	DOCUMENT NUMBER	REV.
B	1 OF 1	BA-W77	A

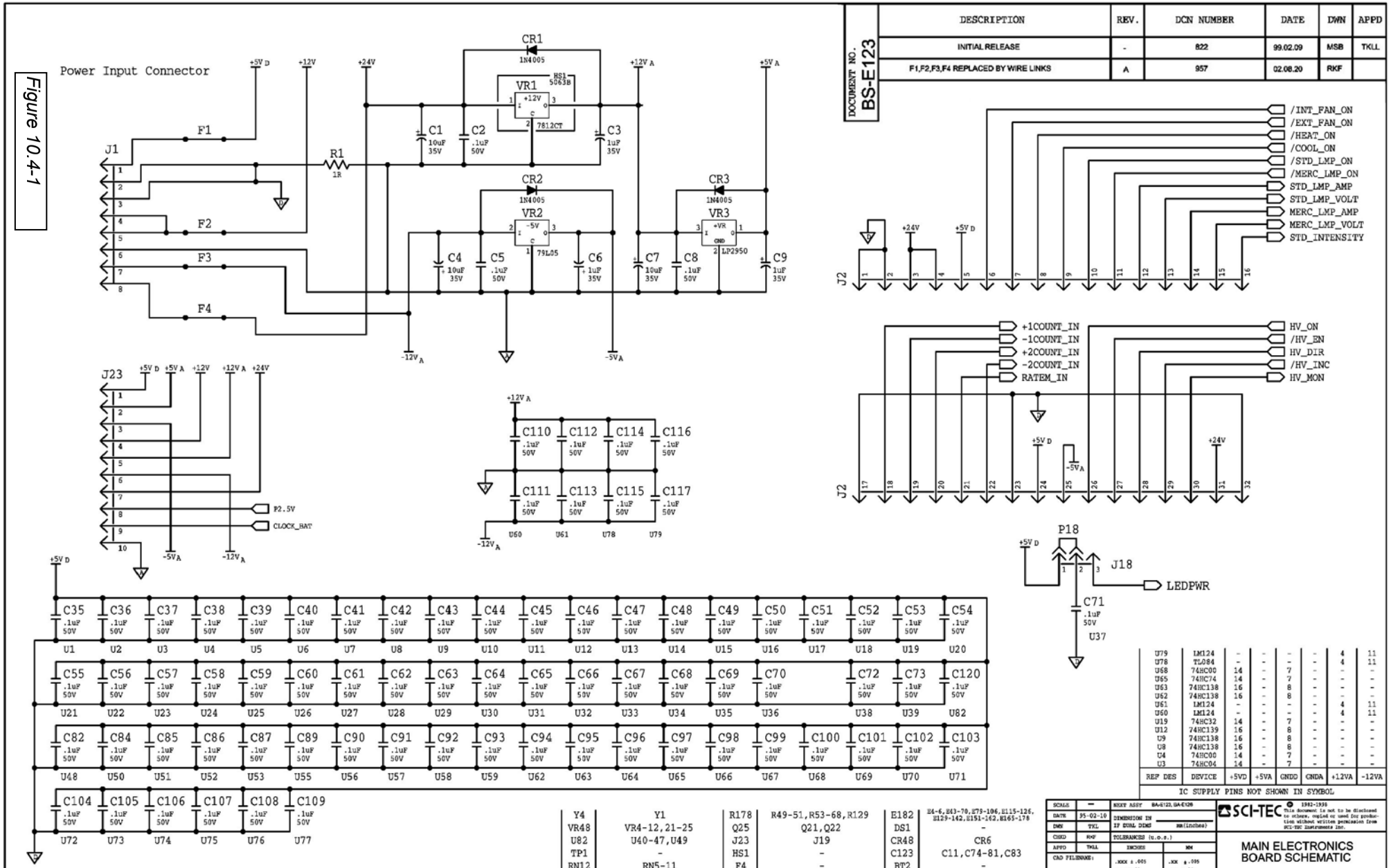
0 2 INCHES

Figure 10.3-8


0
50 mm
DOCUMENT NO. BA–W78
REV | DESCRIPTION | DCN NUMBER | DATE | DWN. | CHKD.
– | INITIAL RELEASE | 822 | 98.11.30 | MSB | TKLL
A | UPDATE REDLINES | 852 | 99.04.06 | MSB |
CONNECTOR LOCATIONS
9 PIN | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9
IDC | 2 | 4 | 6 | 8 | 10 | 3 | 5 | 7 | 9
2
1
BLACK STRIPE
3
LOOP CABLE THRU STRAIN RELIEF AS SHOWN.
24 ±.50
LOOP CABLE THRU STRAIN RELIEF AS SHOWN.
NOTES:
1. ON D–CONNECTOR END TRIM GROUND WIRE AND USE CONDUCTORS 2 TO 9.
2. LABEL PART NUMBER ON GROUND SIDE OF CABLE WITH PERMANENT MARKER.
3. DURING INSPECTION USE CABLE TESTER AND TEST 100% OF CABLES.
4. BAG AND LABEL WITH PART NO. AND REV.
PART NO. | NEXT ASSY
BA–W78 | BA–C230, BA–C230/B, BA–C231, BA–C222
COMPUTER GENERATED DRAWING
FILENAME: BA–W78.DWG
1 | EA | 81–52–616 | IDC WIREMOUNT SOCKET | 3
1 | EA | 81–48–100 | 9 PIN D–CONNECTOR | 2
2.1 | FT | 99–12–050 | RIBBON CABLE | 1
QTY /B – NO. | UM | PART NO. | MFR's NO. | DESCRIPTION | REMARKS | ITEM
SCALE 1:1
DATE 98.08.24
DWN MSB
CHKD TKLL
APPD TKLL
FINISH
NEXT ASSY: SEE TABLE
DIMENSIONS IN INCHES
IF DUAL DIMS: mm (inches)
Tolerances (unless otherwise specified)
INCHES: .xxx ± .005, .xx ± .01, ANGLES ± 1°, FRACTIONS ± 1/32
MM: .xx ± 0.15, .x ± 0.25, ANGLES ± 1°
SCI-TEC INSTRUMENTS INC.
© 1996 This document is not to be disclosed to others, copied or used for production without written permission from SCI-TEC Instruments Inc.
TITLE:
CABLE ASSY, HV BRD TO PMT
SIZE B | SHEET 1 OF 1 | DOCUMENT NUMBER BA–W78 | REV. A
0
2 INCHES

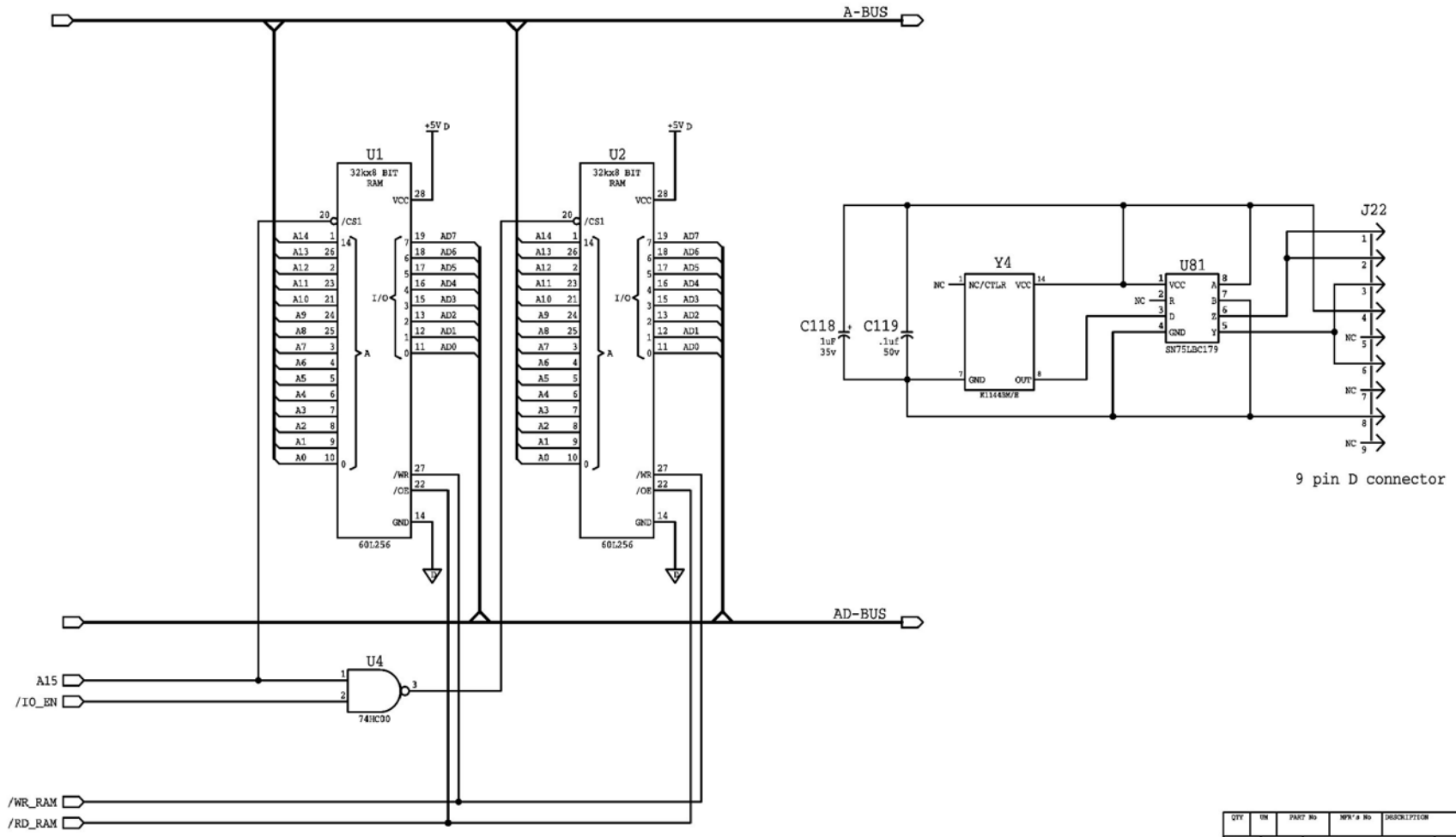
BREWER REFERENCE DOCUMENTATION

Figure 10.4-1


Power Input Connector
DOCUMENT NO. BS-E123
DESCRIPTION | REV. | DCN NUMBER | DATE | DWN | APPD
INITIAL RELEASE | - | 822 | 99.02.09 | MSB | TKLL
F1,F2,F3,F4 REPLACED BY WIRE LINKS | A | 957 | 02.08.20 | RKF |
/INT_FAN_ON
/EXT_FAN_ON
/HEAT_ON
/COOL_ON
/STD_LMP_ON
/MERC_LMP_ON
STD_LMP_AMP
STD_LMP_VOLT
MERC_LMP_AMP
MERC_LMP_VOLT
STD_INTENSITY
+1COUNT_IN
-1COUNT_IN
+2COUNT_IN
-2COUNT_IN
RATEM_IN
HV_ON
/HV_EN
HV_DIR
/HV_INC
HV_MON
P2.5V
CLOCK_BAT
LEDPWR
IC SUPPLY PINS NOT SHOWN IN SYMBOL
MAIN ELECTRONICS BOARD SCHEMATIC
BS-E123
SCI-TEC

DOCUMENT NO. BS-E123

DESCRIPTION	REV.	DCN NUMBER	DATE	DWN	APPD
INITIAL RELEASE	-	822	99.02.09	MSB	TKLL
SEE SHEET 1	A	957	02.08.20	RKF	



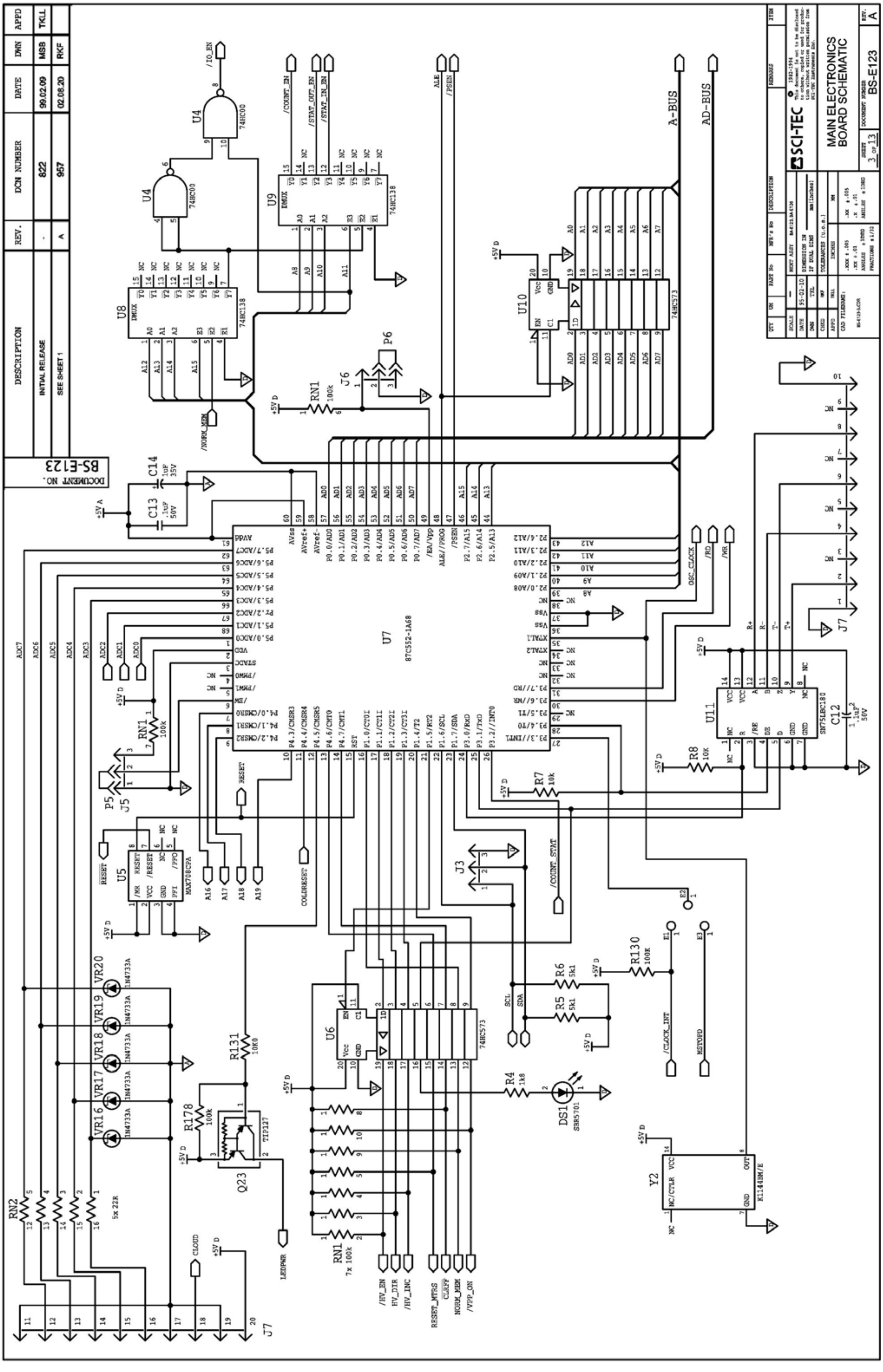
QTY	UM	PART No	MFR'S No	DESCRIPTION	REMARKS	ITEM

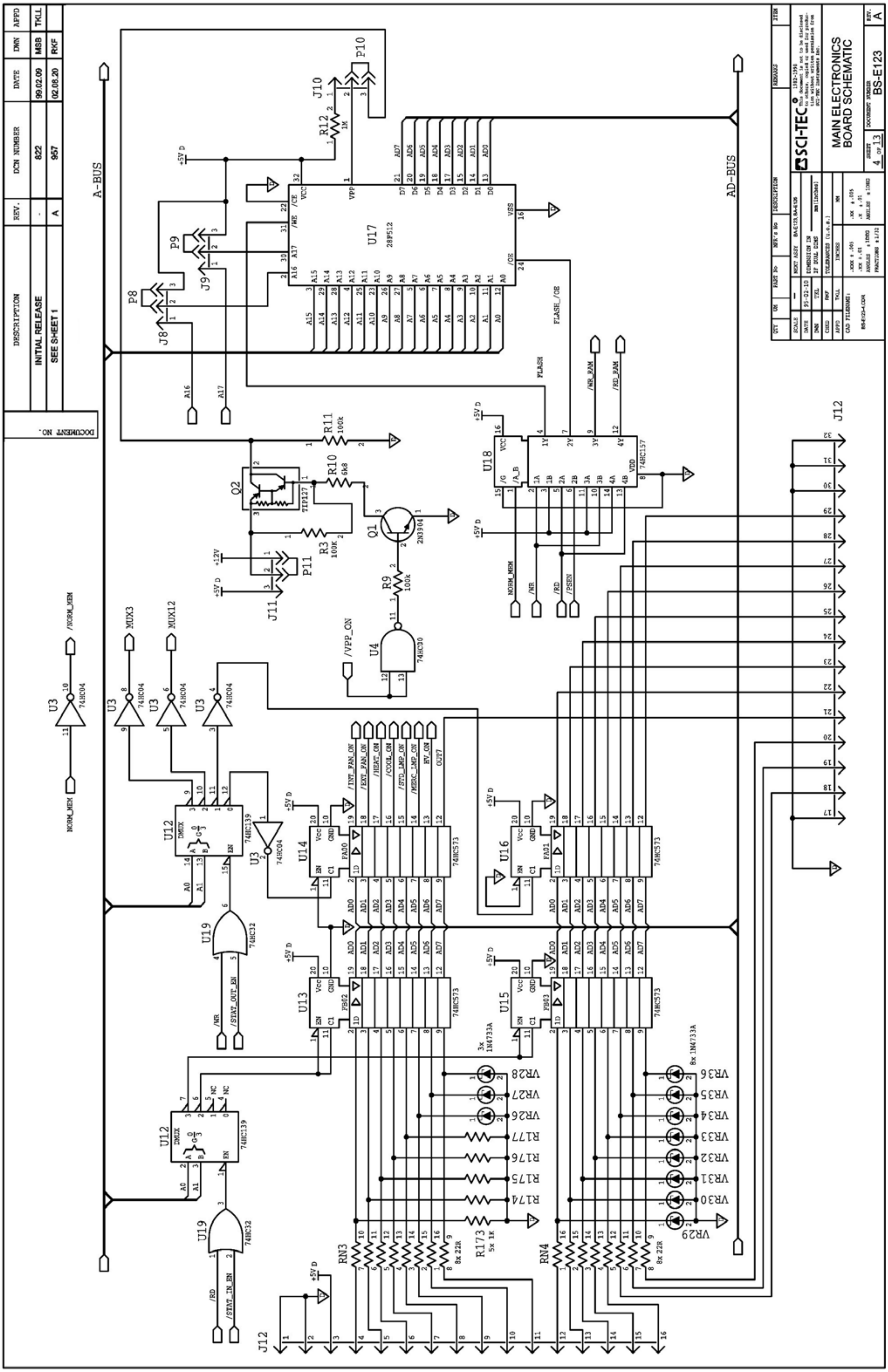
SCALE	—	NEXT ASSY	BA-E123, BA-E326
DATE	95-02-10	DIMENSION IN	
DWN	TKL	IF DUAL DIMS	MM (Inches)
CHKD	RKF	TOLERANCES (u.o.s.)	
APPD	TKLL	INCHES	MM
CAD FILENAME: BS-E123-2.CDR		.XXX ± .005 .XX ± .01 ANGLES ± 1DEG FRACTIONS ± 1/32	.XX ± .005 .X ± .01 ANGLES ± 1DEG

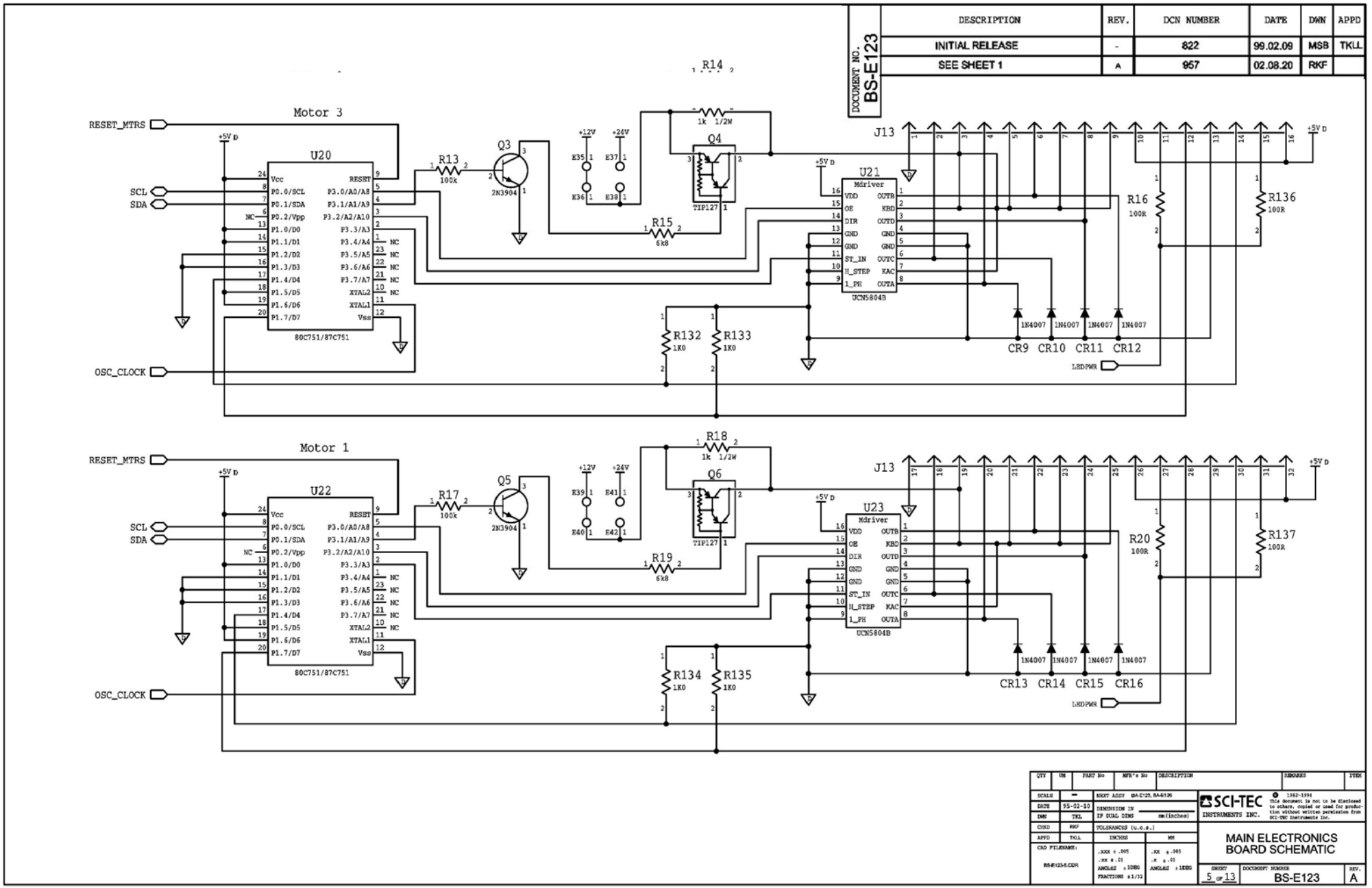
SCI-TEC

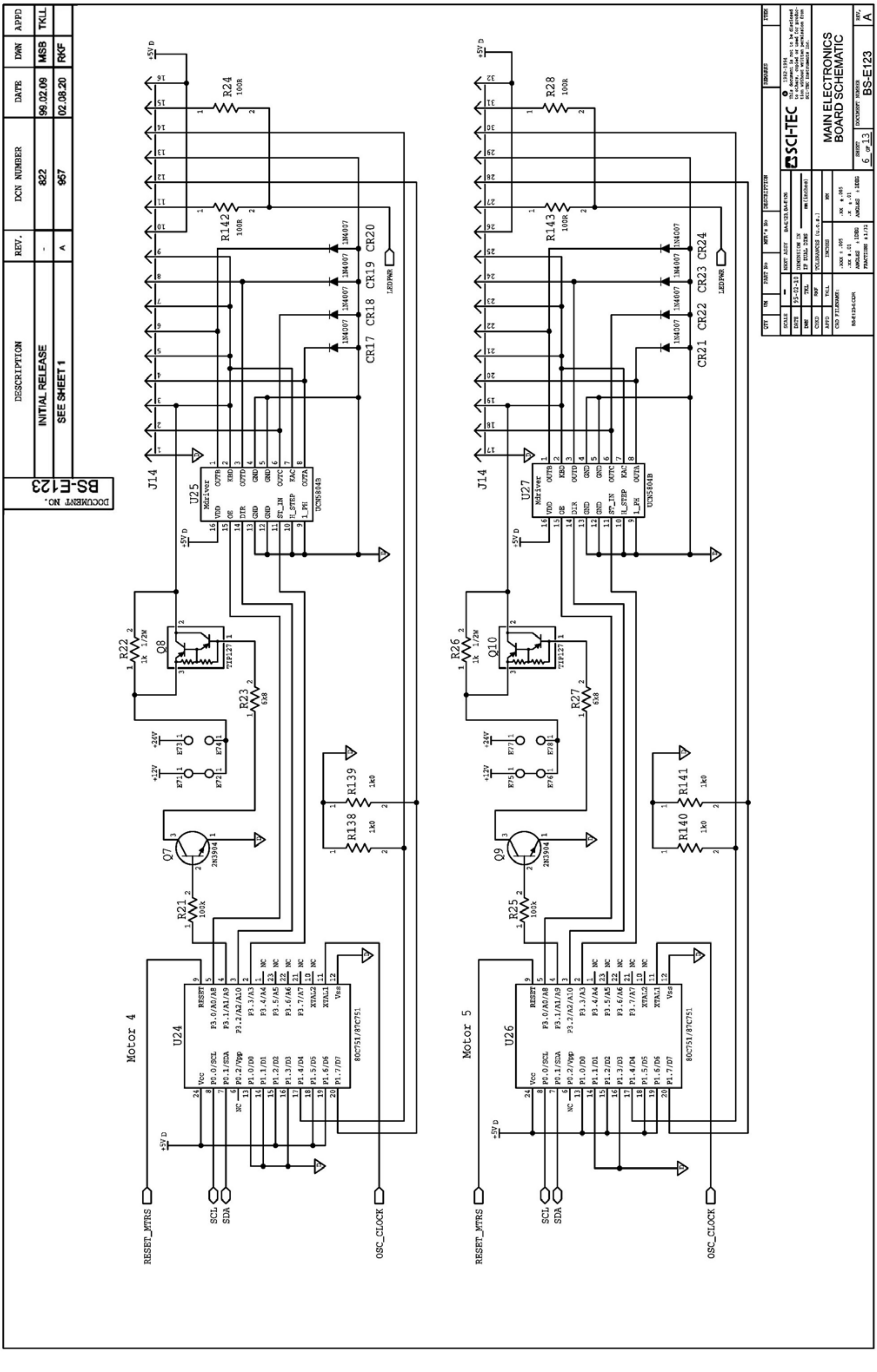
MAIN ELECTRONICS BOARD SCHEMATIC

SHEET	DOCUMENT NUMBER	REV.
2 OF 13	BS-E123	A

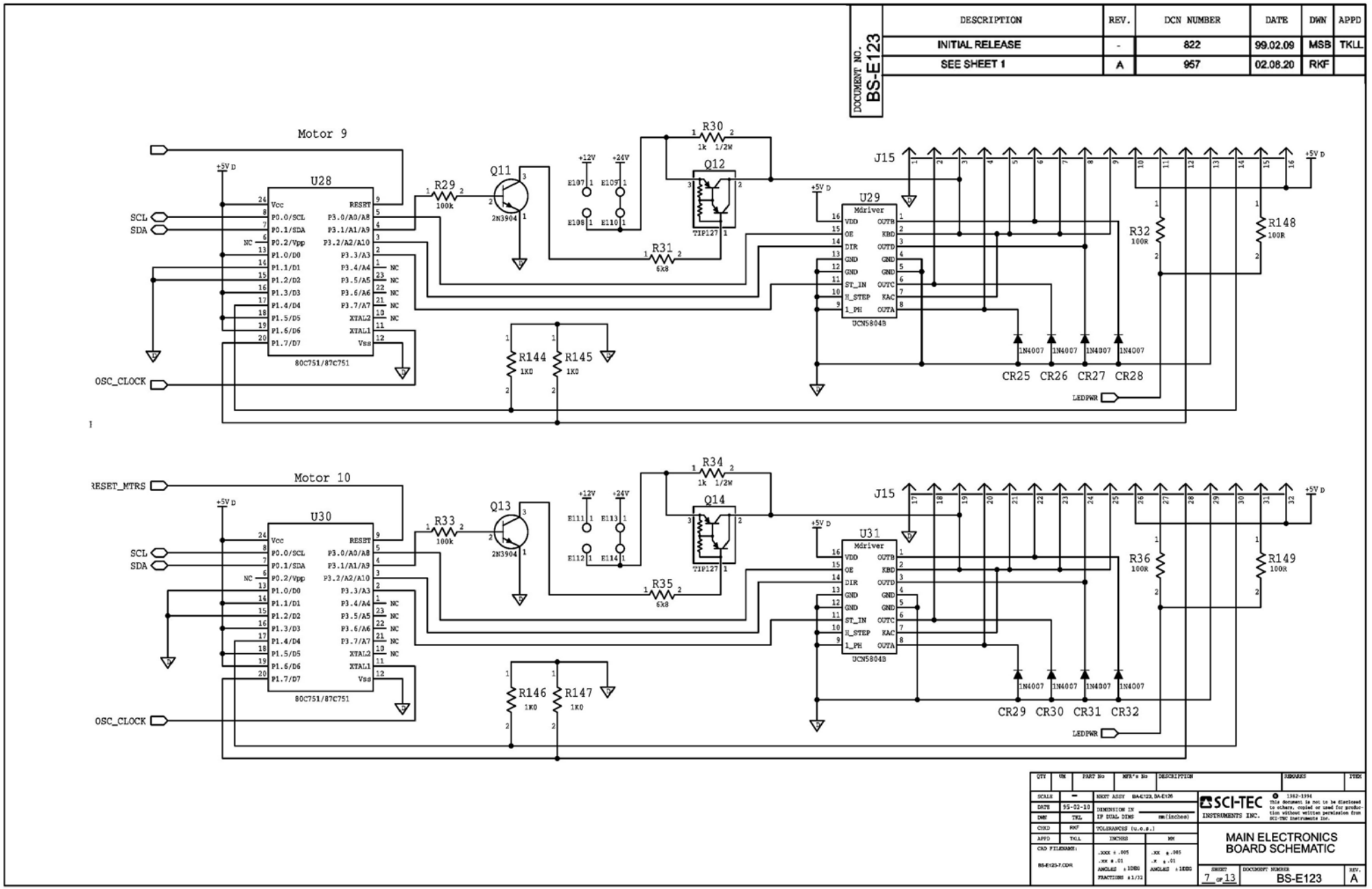

MAIN ELECTRONICS BOARD SCHEMATIC
SCI-TEC
DOCUMENT NUMBER BS-E123
REV. A
SHEET 3 OF 13
DOCUMENT NO. BS-E123
REV. | DESCRIPTION | DCN NUMBER | DATE | DWN | APPD
- | INITIAL RELEASE | 822 | 99.02.09 | MSB | TKLL
A | SEE SHEET 1 | 957 | 02.08.20 | RKF
U7 87C552-1A68
U4 74HC00
U8 74HC138
U9 74HC138
U10 74HC573
U6 74HC573
U5 MAX708CPA
U11 SN75LBC180
Y2 K1144BM/E
Q23 TIP127
DS1 SBR5701
A-BUS
AD-BUS


SCI-TEC
MAIN ELECTRONICS
BOARD SCHEMATIC
BS-E123
A-BUS
AD-BUS
INITIAL RELEASE
SEE SHEET 1
DOCUMENT NO.

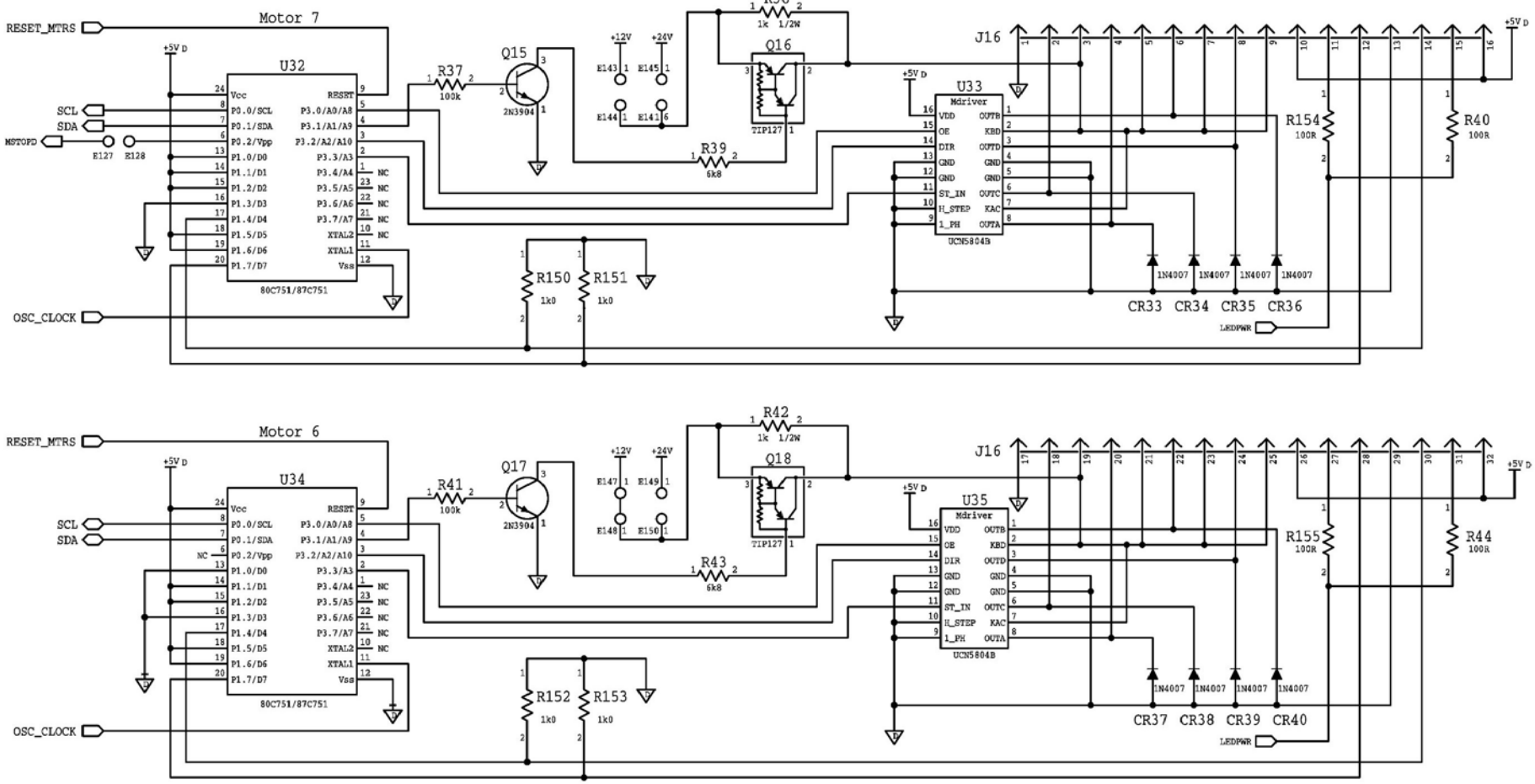

DOCUMENT NO. BS-E123
DESCRIPTION | REV. | DCN NUMBER | DATE | DWN | APPD
INITIAL RELEASE | - | 822 | 99.02.09 | MSB | TKLL
SEE SHEET 1 | A | 957 | 02.08.20 | RKF |
Motor 3
Motor 1
RESET_MTRS
SCL
SDA
OSC_CLOCK
U20
U22
80C751/87C751
U21
U23
UCN5804B
Mdriver
Q3
Q4
Q5
Q6
2N3904
TIP127
R13
R14
R15
R16
R17
R18
R19
R20
R132
R133
R134
R135
R136
R137
1k 1/2W
100k
6k8
100R
1K0
J13
+5V D
+12V
+24V
E35
E36
E37
E38
E39
E40
E41
E42
1N4007
CR9
CR10
CR11
CR12
CR13
CR14
CR15
CR16
LEDPWR
SCI-TEC INSTRUMENTS INC.
MAIN ELECTRONICS BOARD SCHEMATIC
SHEET 5 OF 13
DOCUMENT NUMBER BS-E123
REV. A



DESCRIPTION
INITIAL RELEASE
SEE SHEET 1
DCN NUMBER
822
957
REV.
-
A
DATE
99.02.09
02.08.20
DWN
MSB
RKF
APPD
TKLL
DOCUMENT NO.
BS-E123
Motor 4
Motor 5
U24
U25
U26
U27
J14
80C751/87C751
UCN5804B
Mdriver
TIP127
2N3904
1N4007
LEDPWR
RESET_MTRS
SCL
SDA
OSC_CLOCK
+5V D
+12V
+24V
SCI-TEC
MAIN ELECTRONICS
BOARD SCHEMATIC
BS-E123
6 OF 13


DOCUMENT NO. BS-E123
DESCRIPTION | REV. | DCN NUMBER | DATE | DWN | APPD
INITIAL RELEASE | - | 822 | 99.02.09 | MSB | TKLL
SEE SHEET 1 | A | 957 | 02.08.20 | RKF |
Motor 9
U28
80C751/87C751
R29 100k
Q11 2N3904
R30 1k 1/2W
Q12 TIP127
R31 6K8
R144 1K0
R145 1K0
U29 UCN5804B
J15
R32 100R
R148 100R
CR25 CR26 CR27 CR28 1N4007
LEDPWR
OSC_CLOCK
SCL
SDA
+5V D
+12V
+24V
Motor 10
RESET_MTRS
U30
R33 100k
Q13 2N3904
R34 1k 1/2W
Q14 TIP127
R35 6K8
R146 1K0
R147 1K0
U31 UCN5804B
R36 100R
R149 100R
CR29 CR30 CR31 CR32 1N4007
SCI-TEC INSTRUMENTS INC.
MAIN ELECTRONICS BOARD SCHEMATIC
SHEET 7 OF 13
DOCUMENT NUMBER BS-E123
REV. A

DOCUMENT NO. BS-E123	DESCRIPTION	REV.	DCN NUMBER	DATE	DWN	APPD
	INITIAL RELEASE	-	822	99.02.09	MSB	TKLL
	SEE SHEET 1	A	957	02.08.20	RKF	



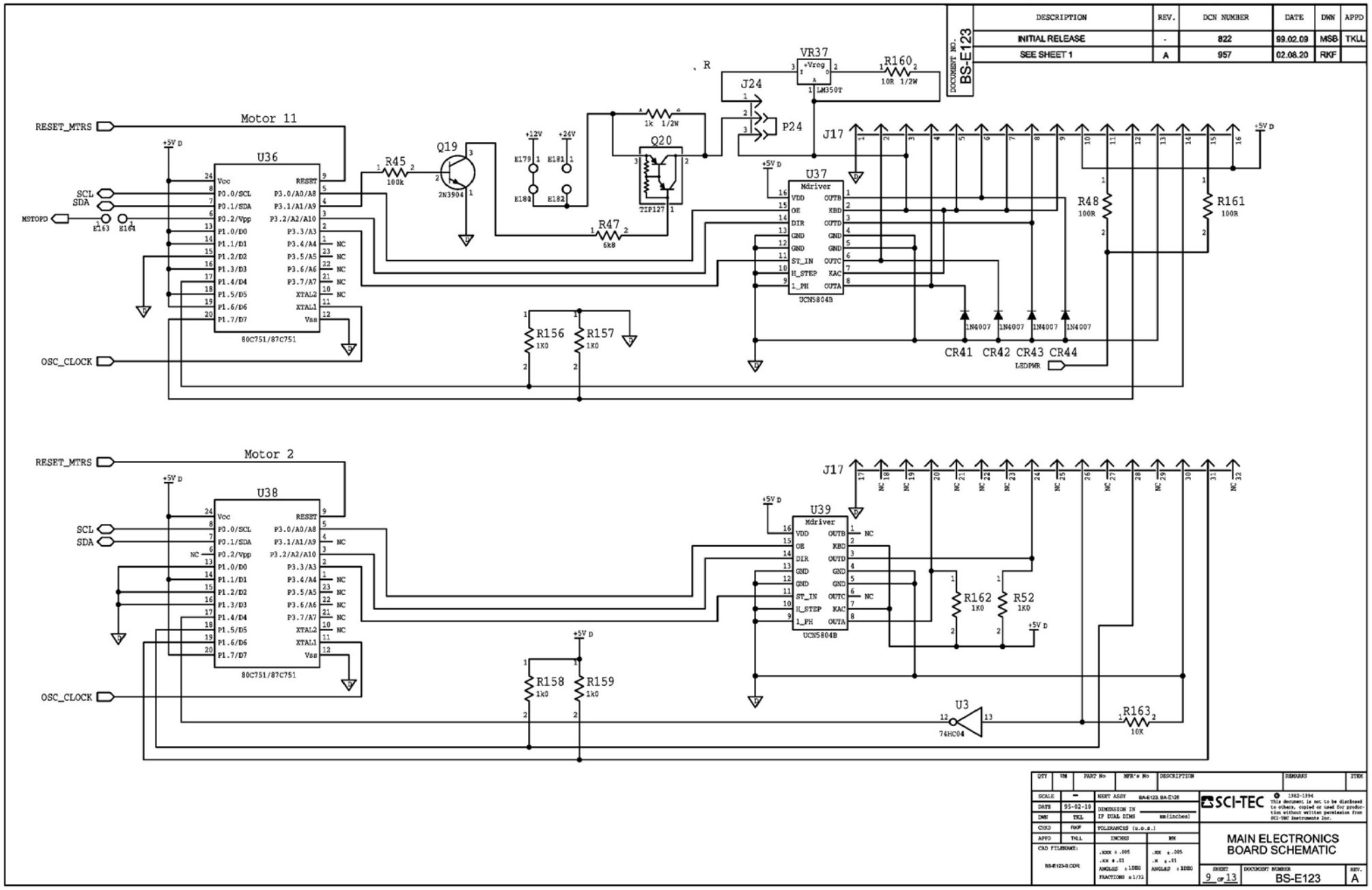
QTY	UN	PART No	MFR's No	DESCRIPTION	REMARKS	ITEM

SCALE	-	NEXT ASSY	BA-E125, BA-E126
DATE	95-02-10	DIMENSION IN	
DRN	TKL	IF DUAL DIMS	mm (Inches)
CHKD	RKF	TOLERANCES (u.o.s.)	
APPD	TKLL	INCHES	MM
CAD FILENAME:	BS-E123-8.CDR	.XXX ± .005 .XX ± .01 ANGLES ± 1DEG FRACTIONS ± 1/32	.XX ± .005 .X ± .01 ANGLES ± 1DEG

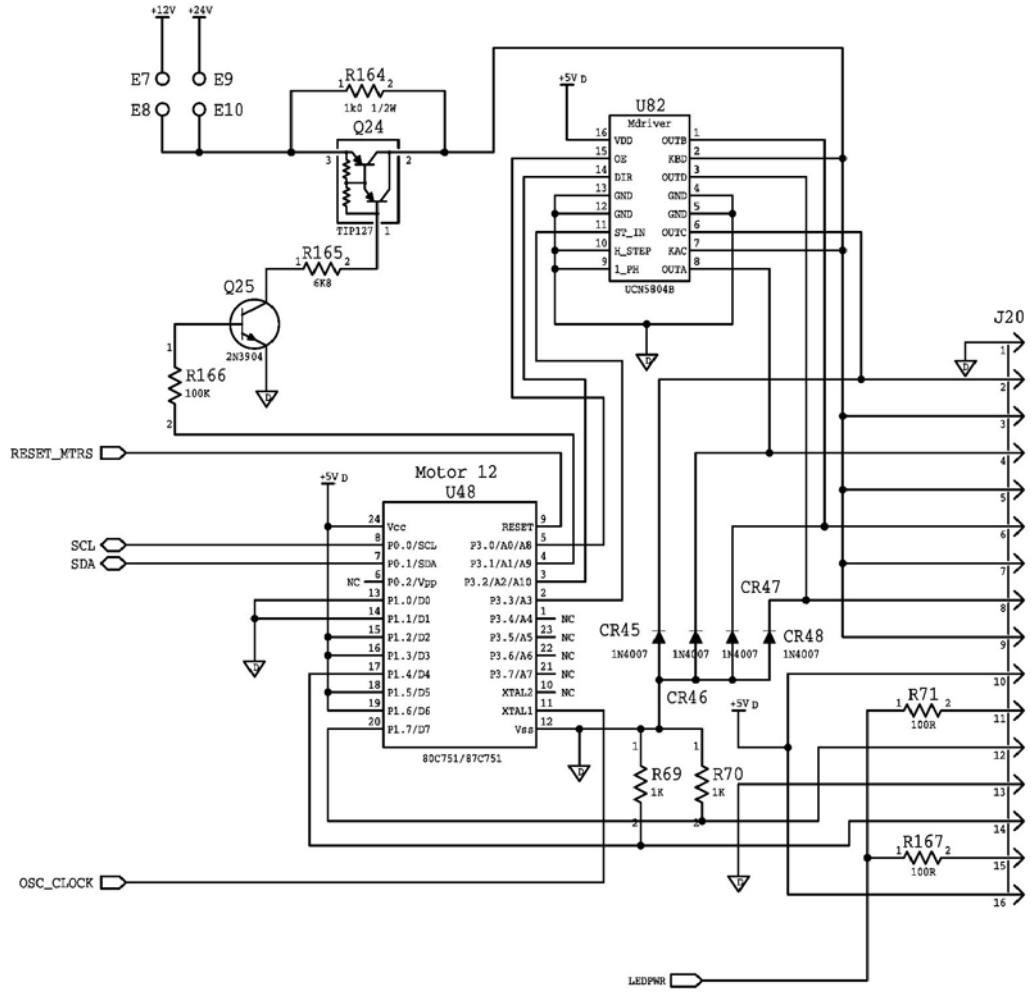
SCI-TEC

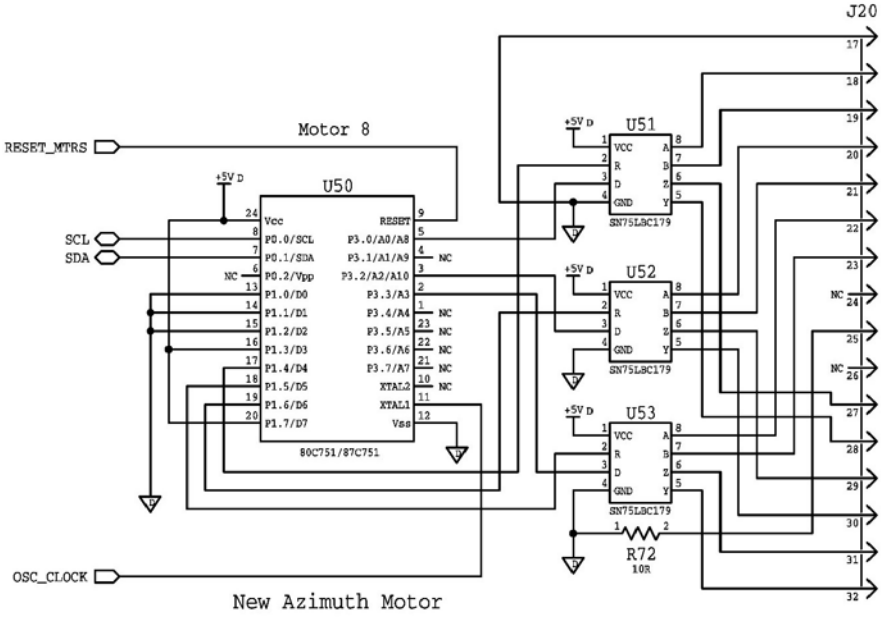
MAIN ELECTRONICS BOARD SCHEMATIC

SHEET	DOCUMENT NUMBER	REV.
8 OF 13	BS-E123	A


DOCUMENT NO. BS-E123
DESCRIPTION | REV. | DCN NUMBER | DATE | DWN | APPD
INITIAL RELEASE | - | 822 | 99.02.09 | MSB | TKLL
SEE SHEET 1 | A | 957 | 02.08.20 | RKF |
Motor 11
Motor 2
RESET_MTRS
SCL
SDA
MSTOPD
OSC_CLOCK
U36
U37
U38
U39
80C751/87C751
UCN5804B
Mdriver
VR37
LM350T
R160 10R 1/2W
J24
P24
J17
Q19
2N3904
Q20
TIP127
R45 100k
R47 6k8
1k 1/2W
R48 100R
R161 100R
R156 1K0
R157 1K0
R158 1k0
R159 1k0
R162 1K0
R52 1K0
R163 10K
U3
74HC04
1N4007
CR41 CR42 CR43 CR44
LEDPWR
+5V D
+12V
+24V
E179 E181 E180 E182 E163 E164
SCI-TEC
MAIN ELECTRONICS BOARD SCHEMATIC
SHEET 9 OF 13
DOCUMENT NUMBER BS-E123
REV. A

DOCUMENT NO. BS-E123	DESCRIPTION	REV.	DCN NUMBER	DATE	DWN	APPD
	INITIAL RELEASE	-	822	99.02.09	MSB	TKLL
	SEE SHEET 1	A	957	02.08.20	RKF	





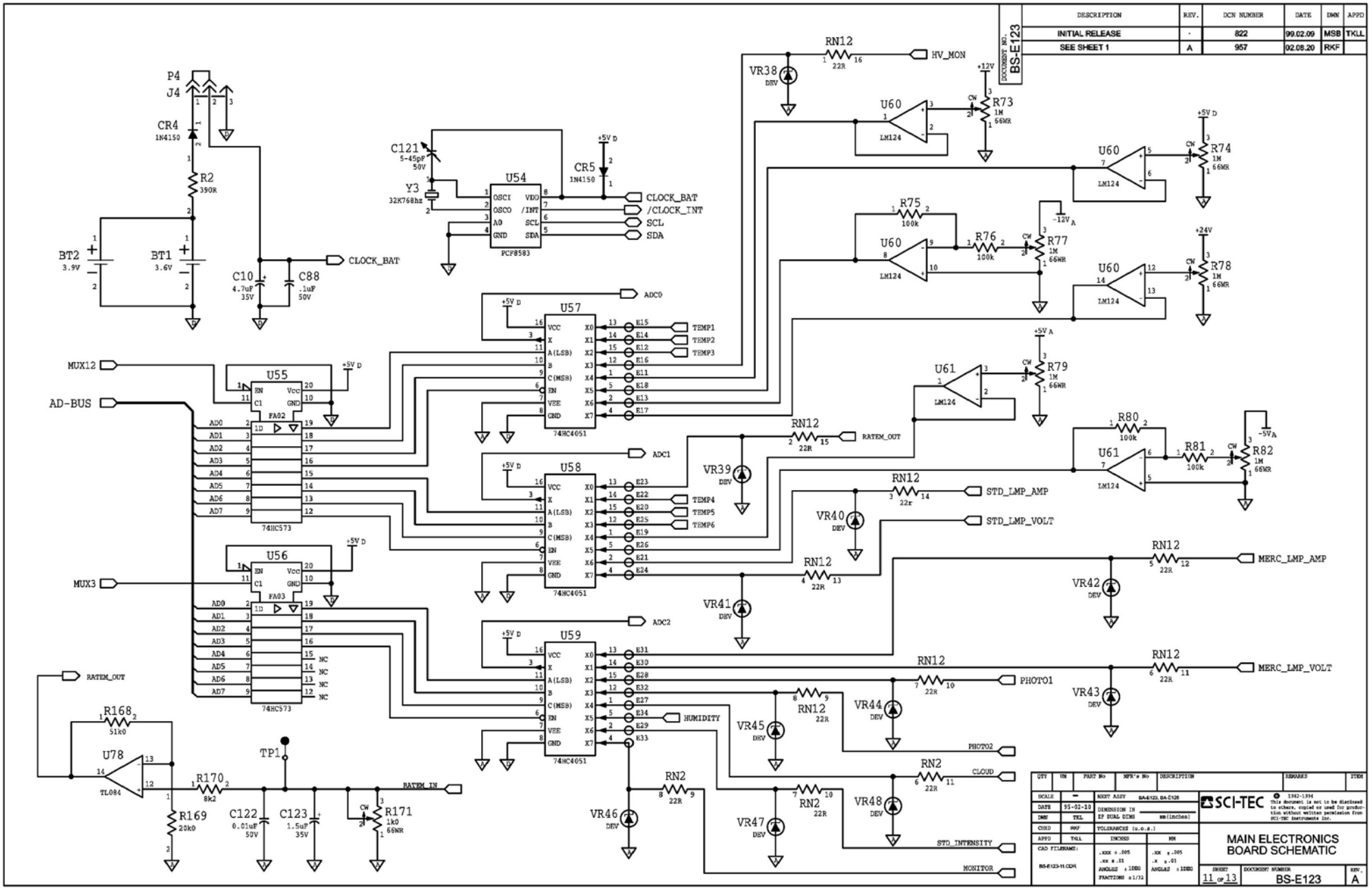
QTY	UM	PART No	MFR's No	DESCRIPTION	REMARKS	ITEM

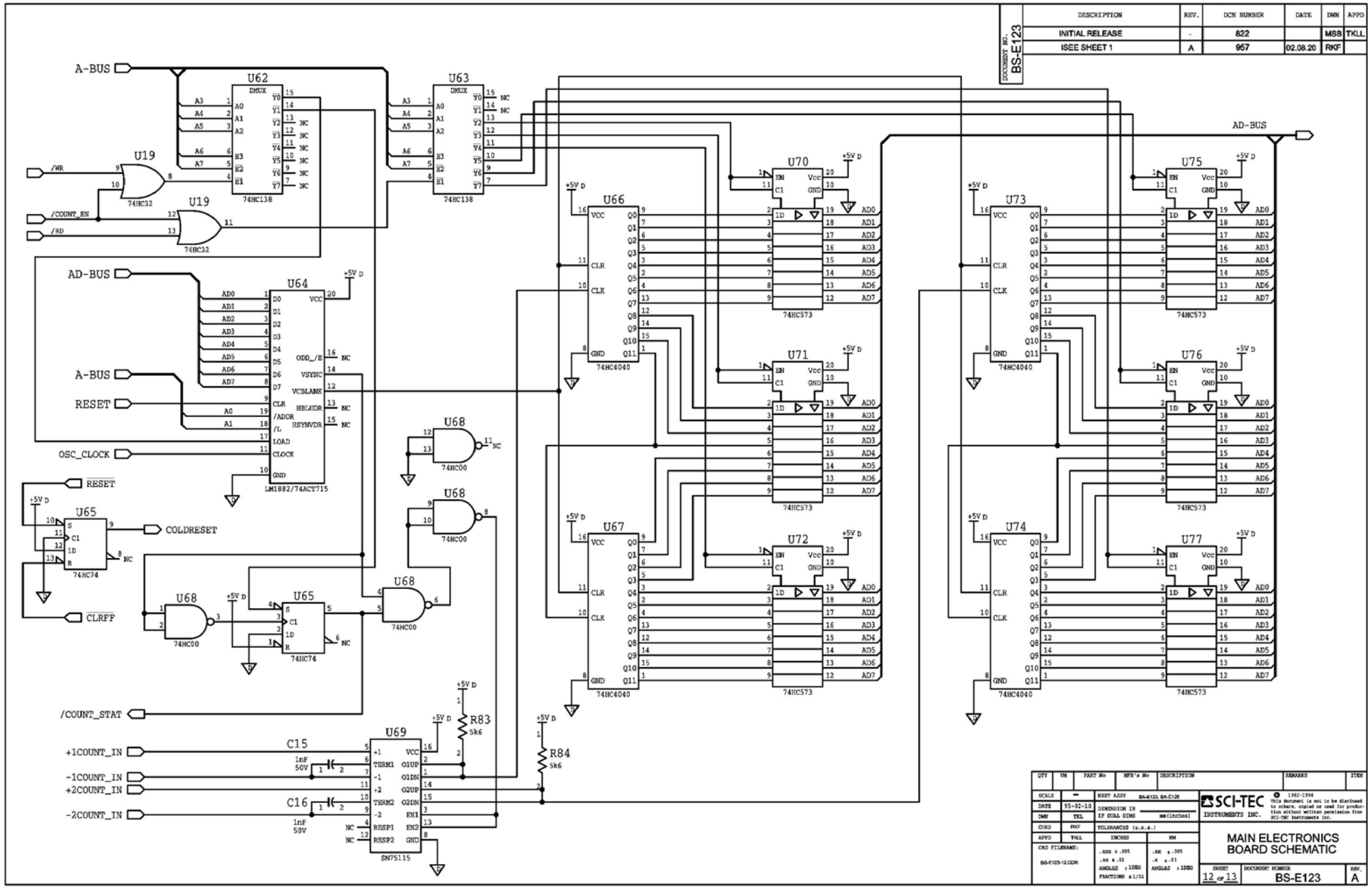
SCALE	—	NEXT ASSY	BA-E123, BA-E126
DATE	95-02-10	DIMENSION IN IF DUAL DIMS	MM [Inches]
DWN	TKL		
CHKD	RKF	TOLERANCES (u.o.s.)	
APPD	TKLL	INCHES	MM
CAD FILENAME: BS-E123-10.CDR		.XXX ± .005 .XX ± .01 ANGLES ± 1DEG FRACTIONS ± 1/32	.XX ± .005 .X ± .01 ANGLES ± 1DEG

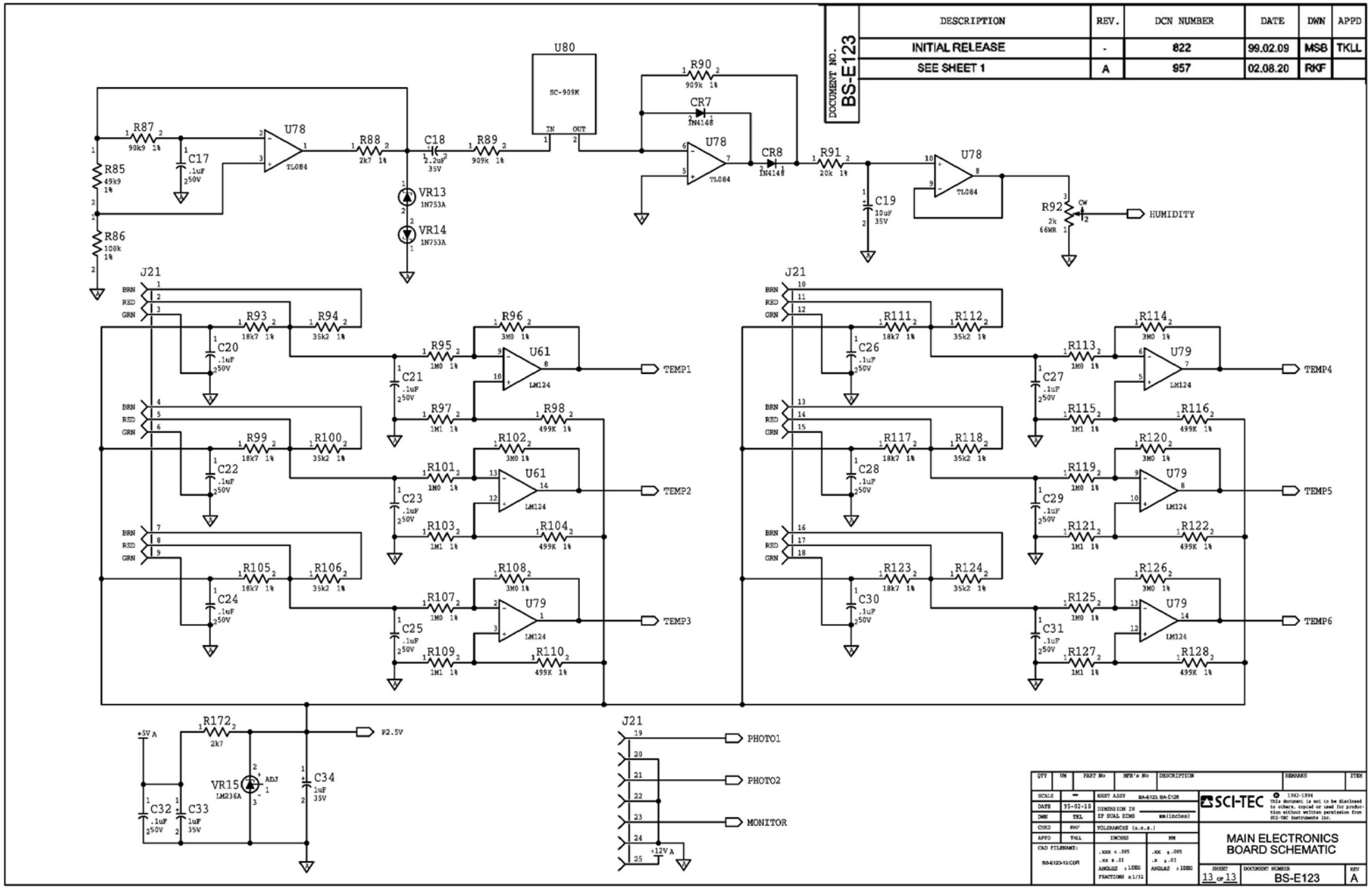
SCI-TEC INSTRUMENTS INC.

MAIN ELECTRONICS BOARD SCHEMATIC

SHEET	DOCUMENT NUMBER	REV
10 OF 13	BS-E123	A


DOCUMENT NO. BS-E123
DESCRIPTION | REV. | DCN NUMBER | DATE | DWN | APPD
INITIAL RELEASE | - | 822 | 99.02.09 | MSB | TKLL
SEE SHEET 1 | A | 957 | 02.08.20 | RKF |
P4
J4
CR4
1N4150
R2
390R
BT2
3.9V
BT1
3.6V
C10
4.7uF
35V
C88
.1uF
50V
CLOCK_BAT
C121
5-45pF
50V
Y3
32K768hz
U54
PCF8583
OSCI
OSCO
A0
GND
VDD
/INT
SCL
SDA
CR5
1N4150
CLOCK_BAT
/CLOCK_INT
SCL
SDA
+5V D
RN12
22R
HV_MON
VR38
DEV
U60
LM124
+12V
R73
1M
66WR
R74
R75
100k
R76
R77
R78
-12V A
+24V
U61
+5V A
R79
R80
R81
R82
-5V A
MUX12
MUX3
AD-BUS
U55
U56
U57
U58
U59
74HC573
74HC4051
FA02
FA03
ADC0
ADC1
ADC2
TEMP1
TEMP2
TEMP3
TEMP4
TEMP5
TEMP6
HUMIDITY
RATEM_OUT
STD_LMP_AMP
STD_LMP_VOLT
MERC_LMP_AMP
MERC_LMP_VOLT
PHOTO1
PHOTO2
CLOUD
STD_INTENSITY
MONITOR
VR39
VR40
VR41
VR42
VR43
VR44
VR45
VR46
VR47
VR48
RN2
R168
51k0
U78
TL084
TP1
R170
8k2
R169
20k0
C122
0.01uF
50V
C123
1.5uF
35V
R171
1k0
66WR
RATEM_IN
SCI-TEC
MAIN ELECTRONICS
BOARD SCHEMATIC
BS-E123
SHEET 11 OF 13
REV. A


DOCUMENT NO. BS-E123
DESCRIPTION | REV. | DCN NUMBER | DATE | DWN | APPD
INITIAL RELEASE | - | 822 | | MSB | TKLL
ISEE SHEET 1 | A | 957 | 02.08.20 | RKF |
A-BUS
AD-BUS
U62
U63
U64
U65
U66
U67
U68
U69
U70
U71
U72
U73
U74
U75
U76
U77
U19
74HC138
74HC32
74HC573
74HC4040
74HC74
74HC00
LM1882/74ACT715
SN75115
/WR
/COUNT_EN
/RD
RESET
OSC_CLOCK
COLDRESET
CLRFF
/COUNT_STAT
+1COUNT_IN
-1COUNT_IN
+2COUNT_IN
-2COUNT_IN
C15
C16
1nF 50V
R83
R84
5k6
+5V D
SCI-TEC INSTRUMENTS INC.
MAIN ELECTRONICS BOARD SCHEMATIC
BS-E123
SHEET 12 OF 13
REV. A


DOCUMENT NO. BS-E123
DESCRIPTION | REV. | DCN NUMBER | DATE | DWN | APPD
INITIAL RELEASE | - | 822 | 99.02.09 | MSB | TKLL
SEE SHEET 1 | A | 957 | 02.08.20 | RKF |
U80
SC-909K
IN OUT
R87 90k9 1%
C17 .1uF 50V
U78 TL084
R88 2k7 1%
C18 2.2uF 35V
R89 909k 1%
R85 49k9 1%
R86 100k 1%
VR13 1N753A
VR14 1N753A
R90 909k 1%
CR7 1N4148
CR8 1N4148
R91 20k 1%
C19 10uF 35V
R92 2k 66WR CW
HUMIDITY
J21
BRN RED GRN
R93 18k7 1%
R94 35k2 1%
C20 .1uF 50V
R95 1M0 1%
R96 3M0 1%
U61 LM124
TEMP1
C21 .1uF 50V
R97 1M1 1%
R98 499K 1%
R99 18k7 1%
R100 35k2 1%
C22 .1uF 50V
R101 1M0 1%
R102 3M0 1%
TEMP2
C23 .1uF 50V
R103 1M1 1%
R104 499K 1%
R105 18k7 1%
R106 35k2 1%
C24 .1uF 50V
R107 1M0 1%
R108 3M0 1%
U79 LM124
TEMP3
C25 .1uF 50V
R109 1M1 1%
R110 499K 1%
J21
BRN RED GRN
R111 18k7 1%
R112 35k2 1%
C26 .1uF 50V
R113 1M0 1%
R114 3M0 1%
U79 LM124
TEMP4
C27 .1uF 50V
R115 1M1 1%
R116 499K 1%
R117 18k7 1%
R118 35k2 1%
C28 .1uF 50V
R119 1M0 1%
R120 3M0 1%
TEMP5
C29 .1uF 50V
R121 1M1 1%
R122 499K 1%
R123 18k7 1%
R124 35k2 1%
C30 .1uF 50V
R125 1M0 1%
R126 3M0 1%
TEMP6
C31 .1uF 50V
R127 1M1 1%
R128 499K 1%
+5V A
R172 2k7
P2.5V
VR15 LM236A ADJ
C32 .1uF 50V
C33 1uF 35V
C34 1uF 35V
J21
PHOTO1
PHOTO2
MONITOR
+12V A
QTY | UM | PART No | MFR's No | DESCRIPTION | REMARKS | ITEM
SCALE —
DATE 95-02-10
DWN TKL
CHKD RKF
APPD TKLL
NEXT ASSY BA-6123,BA-D126
DIMENSION IN IF DUAL DIMS MM(inches)
TOLERANCES (u.o.s.)
INCHES .XXX ±.005 .XX ±.01 ANGLES ±1DEG FRACTIONS ±1/32
MM .XX ±.005 .X ±.01 ANGLES ±1DEG
CAD FILENAME: BS-6123-13.CDR
SCI-TEC
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MAIN ELECTRONICS BOARD SCHEMATIC
SHEET 13 OF 13
DOCUMENT NUMBER BS-E123
REV A

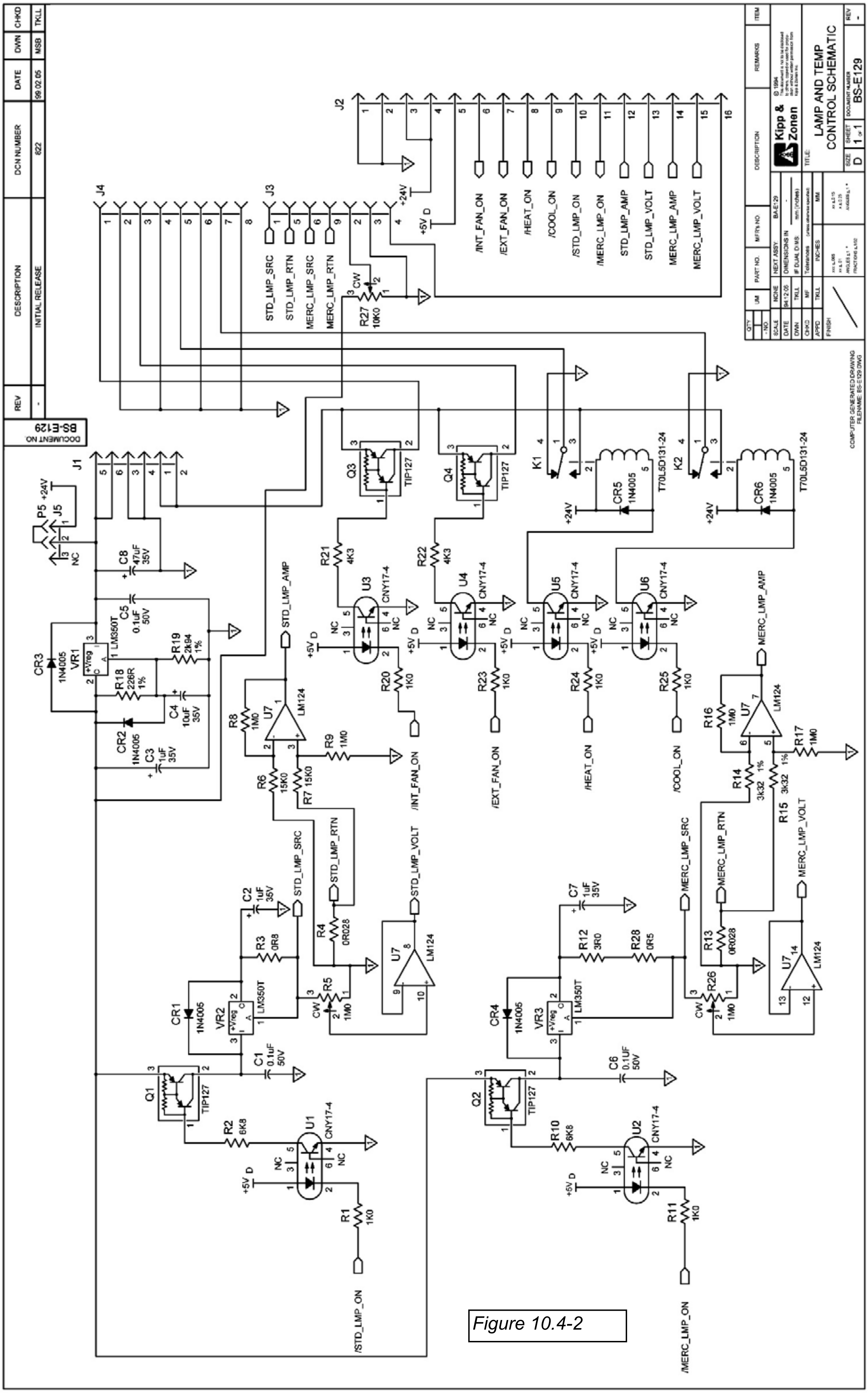

LAMP AND TEMP
CONTROL SCHEMATIC
BS-E129
Kipp & Zonen
INITIAL RELEASE
COMPUTER GENERATED DRAWING

Figure 10.4-2

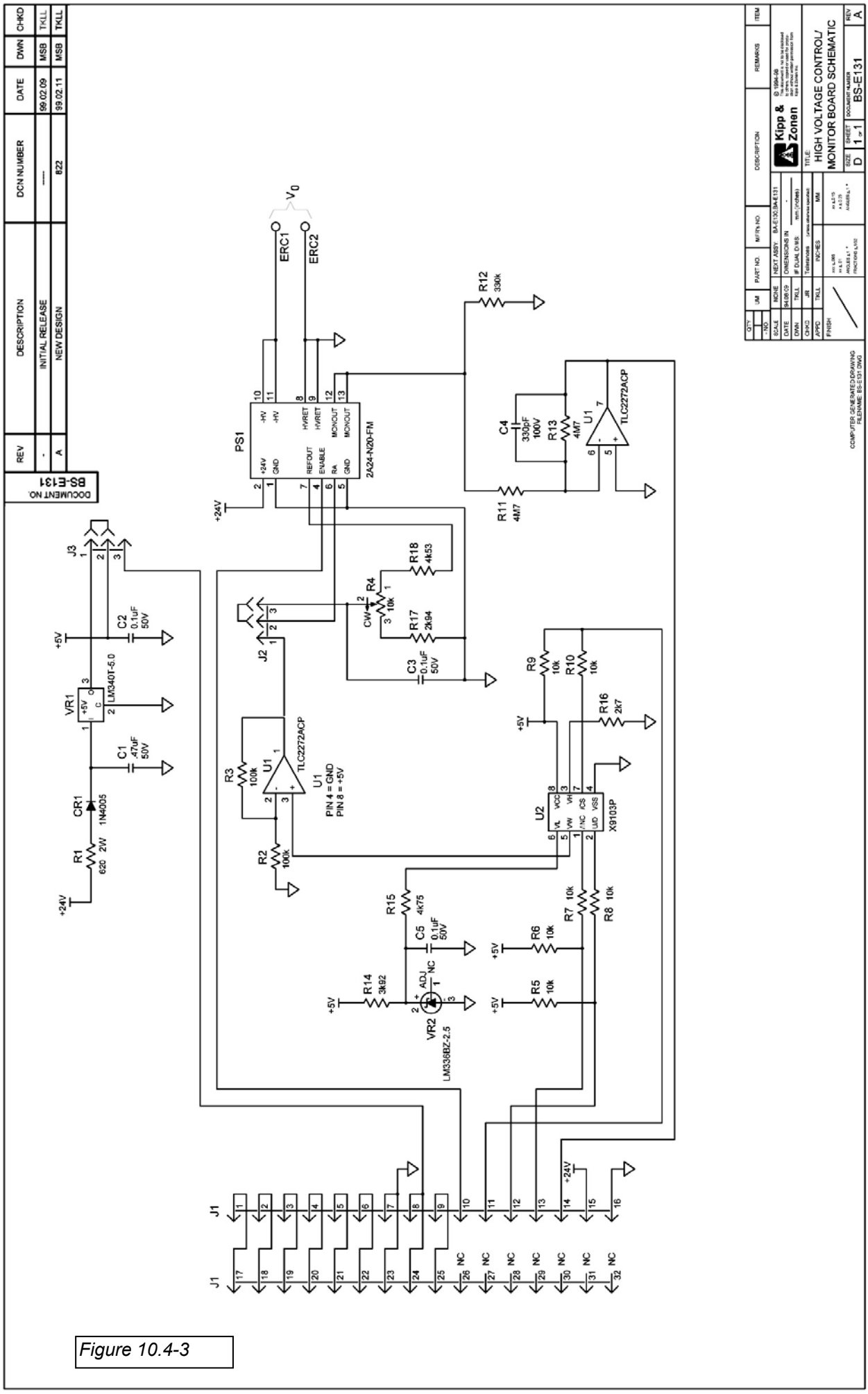

DOCUMENT NO. BS-E131
REV | DESCRIPTION | DCN NUMBER | DATE | DWN | CHKD
- | INITIAL RELEASE | ---- | 99.02.09 | MSB | TKLL
A | NEW DESIGN | 822 | 99.02.11 | MSB | TKLL
HIGH VOLTAGE CONTROL/ MONITOR BOARD SCHEMATIC
Kipp & Zonen
BS-E131
SIZE D
SHEET 1 of 1
REV A
COMPUTER GENERATED DRAWING
FILENAME: BS-E131.DWG
PS1
2A24-N20-FM
U1
TLC2272ACP
U2
X9103P
VR1
LM340T-5.0
VR2
LM336BZ-2.5
CR1
1N4005
ERC1
ERC2
J1
J2
J3
R1 620 2W
R2 100k
R3 100k
R4 10k
R5 10k
R6 10k
R7 10k
R8 10k
R9 10k
R10 10k
R11 4M7
R12 330k
R13 4M7
R14 3k92
R15 4k75
R16 2k7
R17 2k94
R18 4k53
C1 .47uF 50V
C2 0.1uF 50V
C3 0.1uF 50V
C4 330pF 100V
C5 0.1uF 50V
+5V
+24V
V_0

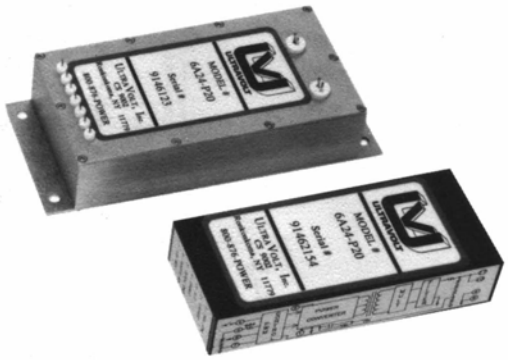
Figure 10.4-3

Kipp & Zonen

"F" SERIES

HIGH VOLTAGE POWER SUPPLY ACCESSORY

- Output Ripple Filter
- Output Test Point
- Optional Flying Lead
- Mates with "A" Series Power Supplies



GENERAL INFORMATION:

The "F" Series of Ripple Stripper™ Output Filters provide significant ripple reduction, While adding only 4000 pF of output capacitance and increasing output impedance by < 650 ohms, output ripple is reduced > 100 time's! Also included is an Output Test Point and an Output Current Moinitor feature. A High Voltage Shielded output cable is available as an optional feature.

HIGH VOLTAGE OUTPUT FILTER:

Strips the output ripple on Mu-Metal Shielded "A" Series High Voltage Power Supplies down to :

2A12	2Kv	4WATT	< 0.001%Vp-p
2A24	2Kv	20WATT	< 0.002%Vp-p
4A12	4Kv	4WATT	< 0.0005%Vp-p
4A24	4Kv	20WATT	< 0.0015%Vp-p
6A12	6Kv	4WATT	< 0.0015%Vp-p
6A24	6Kv	20WATT	< 0.0015%Vp-p

HIGH VOLTAGE OUTPUT:

Square .025" pins are used for high voltage output and high voltage return. These pins can be used for PCB mounting or direct wiring. An optional High Voltage Output Flying Lead is available.

HIGH VOLTAGE TEST POINT:

A 100 megohm divider provides a 100:1 test point output on a 2 pin header. This test point has an output impedance of 1.11 megohm and is calibrated for use with a 10 megohm input impedance meter. Overall accuracy is ± 2.5% with a temperature coefficient of ± 200 ppm per ^{O}C.

For applications requiring a different scale factor, such as a DAC compatible design, an external impedance may be added in parallel with the output.

OUTPUT CURRENT MONITOR:

The "F" Series have a feature where the output current of the high voltage multiplier can be monitored by reading the voltage appearing between Output Monitor pin 3 and Signal Ground pin 5. Detailed information is described on applications note "AP-13".

SHIELDING:

All models are available with optional wrap-around Mu-Metal Shielding. This shielding attenuates magnetic and electrostatic emissions, while shielding ripple reduction circuitry from outside noise.

MECHANICAL:

The "F" Series accessories are designed to be added to the basic "A" module at the factory prior to encapsulation. The combined package is 6.35 In^{3}. As always, a Chassis Mount metal package is also available.

ENVIRONMENT:

The "F" Series meets all environmental specifications for temperature, shock & vibration as the "A" series.

ULTRAVOLT

C S 9002
RONKONKOMA, NY 11779

800-876-POWER
FAX 516-363-2423

"Making High Voltage Easier"

Figure 10.4-4

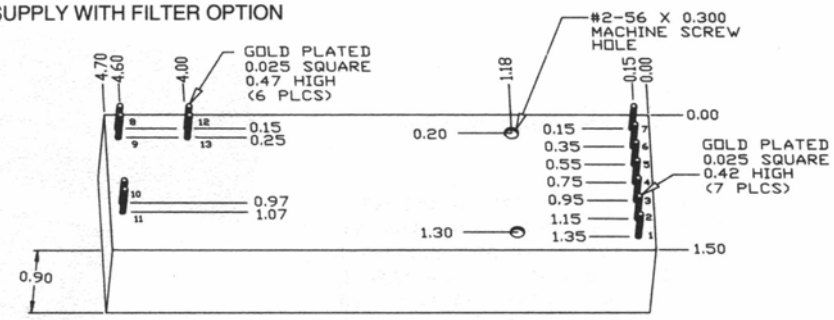
"F" SERIES

HIGH VOLTAGE POWER SUPPLY ACCESSORY

PLASTIC CASE: POWER SUPPLY WITH FILTER OPTION

CONSTRUCTION:
Epoxy Filled DAP Box
Certified to MIL-M-14F
SDG-F

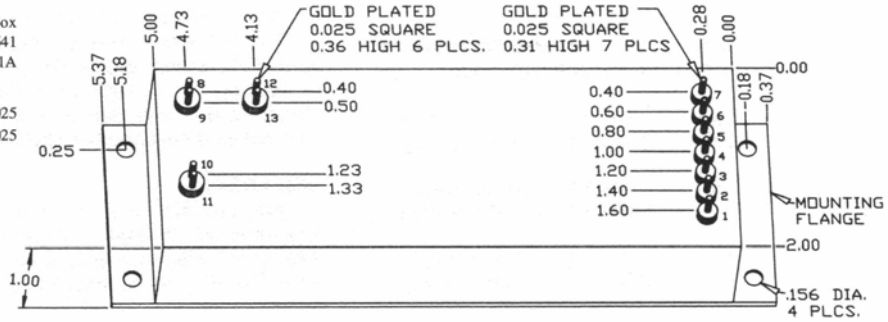
TOLERANCE:
Overall ± 0.050
Pin to Pin ± 0.025



METAL CASE: POWER SUPPLY WITH FILTER OPTION

CONSTRUCTION:
Epoxy Filled Aluminum Box
Chem Film per MIL-C-5541
Class 1A

TOLERANCE:
Overall ± 0.025
Pin to Pin ± 0.025



Connections

1 - Input PWR Return
2 - Positive PWR Input
3 - Output Current Monitor
4 - Enable
5 - Signal Return
6 - Remote Adjust
7 - Reference
8 & 9 - H.V. Return
10 & 11 - H.V. Output
12 & 13 - Output Test Point
All grounds joined internally. Power supply mounting points isolated from internal grounds by >100KΩ /.01uF 50V (Max)

Ordering Information

Case:	Plastic Case - Diallyl Phthalate	Std
	Aluminum Case	- C
Shield:	Mu Metal shield	- M

Example: 2A12–P4–F–C

Option (Case)

Ripple Stripper™ Filter

"Making High Voltage Easier"

CS 9002, Ronkonkoma, NY 11779

Kipp & Zonen

Humidity Sensors
Relative Humidity

HIH Series

FEATURES
- Linear voltage output vs % RH
- Laser trimmed interchangeability
- Low power design
- High accuracy
- Fast response time
- Stable, low drift performance
- Chemically resistant

TYPICAL APPLICATIONS
- Refrigeration
- Drying
- Meteorology
- Battery-powered systems
- OEM assemblies

GENERAL INFORMATION

The HIH-3605 monolithic IC (Integrated Circuit) humidity sensor is designed specifically for high volume OEM (Original Equipment Manufacturer) users. Direct input to a controller or other device is made possible by this sensor's linear voltage output. With a typical current draw of only 200 µA, the HIH-3605 is ideally suited for low drain, battery powered systems.

The HIH-3605 delivers instrumentation quality RH sensing performance in a low cost, solderable SIP (Single In-line Package). Available in two lead spacing configurations, the RH sensor is a laser trimmed thermoset polymer capacitive sensing element with on-chip integrated signal conditioning.

ORDER GUIDE

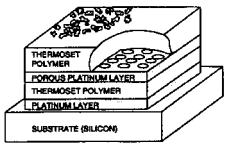
Catalog Listing	Description
HIH-3605-A	Integrated circuit humidity sensor, 0.100 in. lead pitch SIP
HIH-3605-A-CP	Integrated circuit humidity sensor, 0.100 in. lead pitch SIP with calibration and data printout
HIH-3605-B	Integrated circuit humidity sensor, 0.050 in. lead pitch SIP
HIH-3605-B-CP	Integrated circuit humidity sensor, 0.050 in. lead pitch SIP with calibration and data printout.

NIST CALIBRATION

HIH-3605 sensors may be ordered with a NIST calibration and sensor specific data printout. Append "–CP" to the model number to order.

RH SENSOR CONSTRUCTION

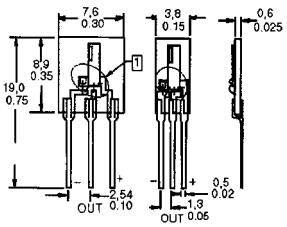
Sensor construction consists of a planar capacitor with a second polymer layer to protect against dirt, dust, oils and other hazards.



CAUTION
PRODUCT DAMAGE
The inherent design of this component causes it to be sensitive to electrostatic discharge (ESD). To prevent ESD-induced damage and/or degradation, take normal ESD precautions when handling this product.

MOUNTING DIMENSIONS (for reference only)

HIH-3605-A HIH-3605-B



Humidity Sensors
Relative Humidity

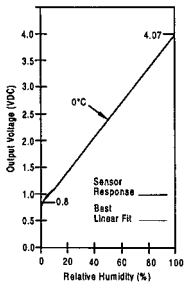
HIH Series

PERFORMANCE SPECIFICATIONS

Parameter	Conditions
RH Accuracy[1]	±2% RH, 0-100% RH non-condensing, 25°C, V_{supply} = 5 VDC
RH Interchangeability	±5% RH, 0-60% RH; ±8% @ 90% RH typical
RH Linearity	±0.5% RH typical
RH Hysteresis	±1.2% of RH span maximum
RH Repeatability	±0.5% RH
RH Response Time, 1/e	15 sec in slowly moving air at 25°C
RH Stability	±1% RH typical at 50% RH in 5 years
Power Requirements	
Voltage Supply	4 to 5.8 VDC, sensor calibrated at 5 VDC
Current Supply	200 µA at 5 VDC, 2 mA typical at 9 VDC
Voltage Output	V_{out} = V_{supply} (0.0062 (Sensor RH) +0.16), typical @ 25°C
	(Data printout provides a similar, but sensor specific, equation at 25°C.)
V_{supply} = 5 VDC	0.8 to 3.9 VDC output @ 25°C typical
Drive Limits	Push/pull symmetric; 50 µA typical, 20 µA minimum, 100 µA maximum
	Turn-on ≤0.1 second
Temp. Compensation	True RH = (Sensor RH)/(1.093-.0012T), T in °F
	True RH = (Sensor RH)/(1.0546-0.00216T), T in °C
Effect @ 0% RH	±0.007% RH/°C (negligible)
Effect @ 100% RH	–0.22% RH/°C (<1% RH effect typical in occupied space systems above 15°C (59°F))
Humidity Range	
Operating	0 to 100% RH, non-condensing[2]
Storage	0 to 90% RH, non-condensing
Temperature Range	
Operating	–40° to 85°C (–40° to 185°F)
Storage	–51° to 125°C (–60° to 257°F)
Package[2]	Three pin solderable ceramic SIP
Handling	Static sensitive diode protected to 15 kV maximum

Notes:
1. Extended exposure to ≥90% RH causes a reversible shift of 3% RH.
2. This sensor is light sensitive. For best results, shield the sensor from bright light.

OUTPUT VOLTAGE VS RELATIVE HUMIDITY (at 0°C)



OUTPUT VOLTAGE VS RELATIVE HUMIDITY (at 0°C, 25°C, and 85°C)

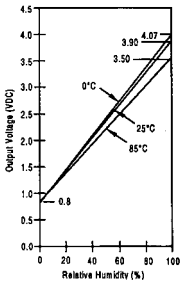
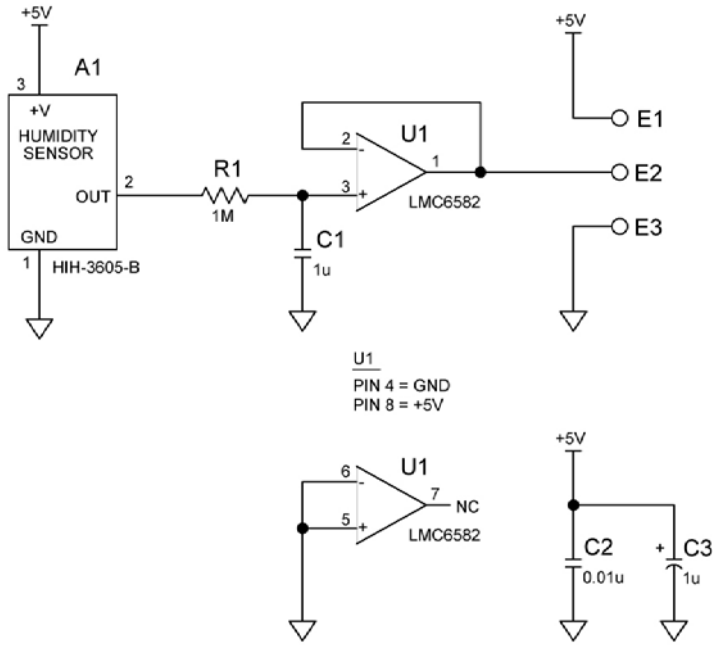


Figure 10.4-5

Figure 10.4-6



DOCUMENT NO. BS-E134	REV	DESCRIPTION	DCN NUMBER	DATE	DWN.	CHKD.
	-	INTIAL RELEASE	856	99.04.22	GB	TKLL

QTY - NO.	UM	PART NO.	MFR's NO.	DESCRIPTION	REMARKS	ITEM

SCALE	NTS	NEXT ASSY:	BA-E134
DATE	99.04.22	DIMENSIONS IN	-
DWN	GB	IF DUAL DIMS:	mm (inches)
CHKD	RKF	Tolerances (unless otherwise specified)	
APPD	TKLL	INCHES	MM
FINISH		.xxx ±.005 .xx ±.01 ANGLES ±1 ° FRACTIONS ±1/32	.xx ±0.15 .x ±0.25 ANGLES ±1 °

SCI-TEC INSTRUMENTS INC.

TITLE: HUMIDITY SENSOR BOARD SCHEMATIC

SIZE	SHEET	DOCUMENT NUMBER	REV.
B	1 OF 1	BS-E134	-

U1	-
R1	-
C3	-
A1	-
LAST USED	NOT USED

COMPUTER GENERATED DRAWING
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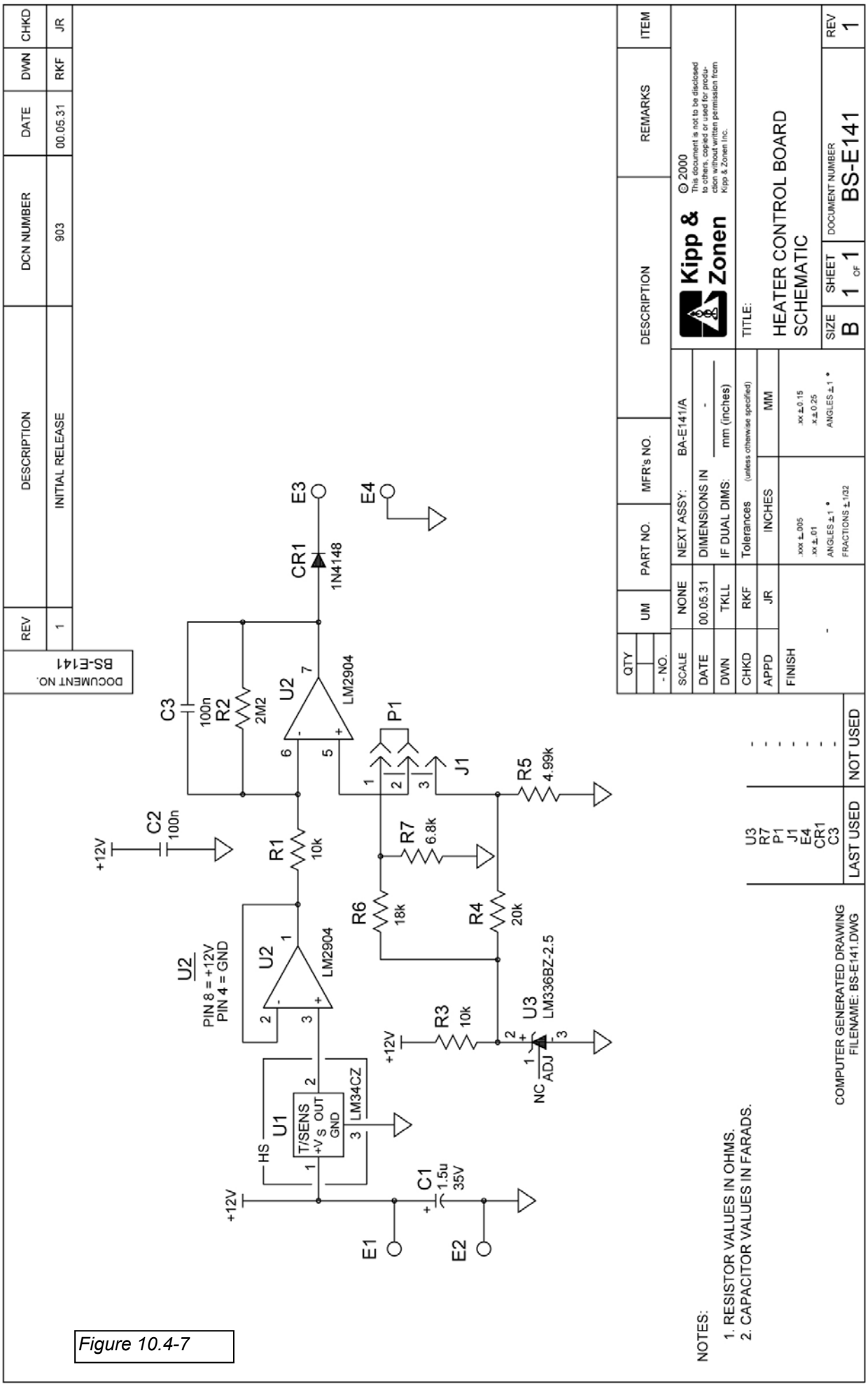
DOCUMENT NO.
BS-E141
REV
DESCRIPTION
DCN NUMBER
DATE
DWN
CHKD
1
INITIAL RELEASE
903
00.05.31
RKF
JR
+12V
C2
100n
C3
100n
R2
2M2
U2
LM2904
CR1
1N4148
E3
E4
P1
J1
R5
4.99k
R1
10k
R7
6.8k
R6
18k
R4
20k
R3
10k
U3
LM336BZ-2.5
NC
ADJ
U2
PIN 8 = +12V
PIN 4 = GND
U1
LM34CZ
T/SENS
+V S
OUT
GND
HS
C1
1.5u
35V
E1
E2
NOTES:
1. RESISTOR VALUES IN OHMS.
2. CAPACITOR VALUES IN FARADS.
COMPUTER GENERATED DRAWING
FILENAME: BS-E141.DWG
LAST USED
NOT USED
U3
R7
P1
J1
E4
CR1
C3
QTY
UM
PART NO.
MFR's NO.
DESCRIPTION
REMARKS
ITEM
- NO.
SCALE
NONE
NEXT ASSY:
BA-E141/A
DATE
00.05.31
DIMENSIONS IN
-
DWN
TKLL
IF DUAL DIMS:
mm (inches)
CHKD
RKF
Tolerances
(unless otherwise specified)
APPD
JR
INCHES
MM
FINISH
.xxx ±.005
.xx ±.01
ANGLES ±1 °
FRACTIONS ±1/32
.xx ±0.15
.x ±0.25
ANGLES ±1 °
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TITLE:
HEATER CONTROL BOARD
SCHEMATIC
SIZE
B
SHEET
1 OF 1
DOCUMENT NUMBER
BS-E141
REV
1

Figure 10.4-7

BREWER REFERENCE DOCUMENTATION

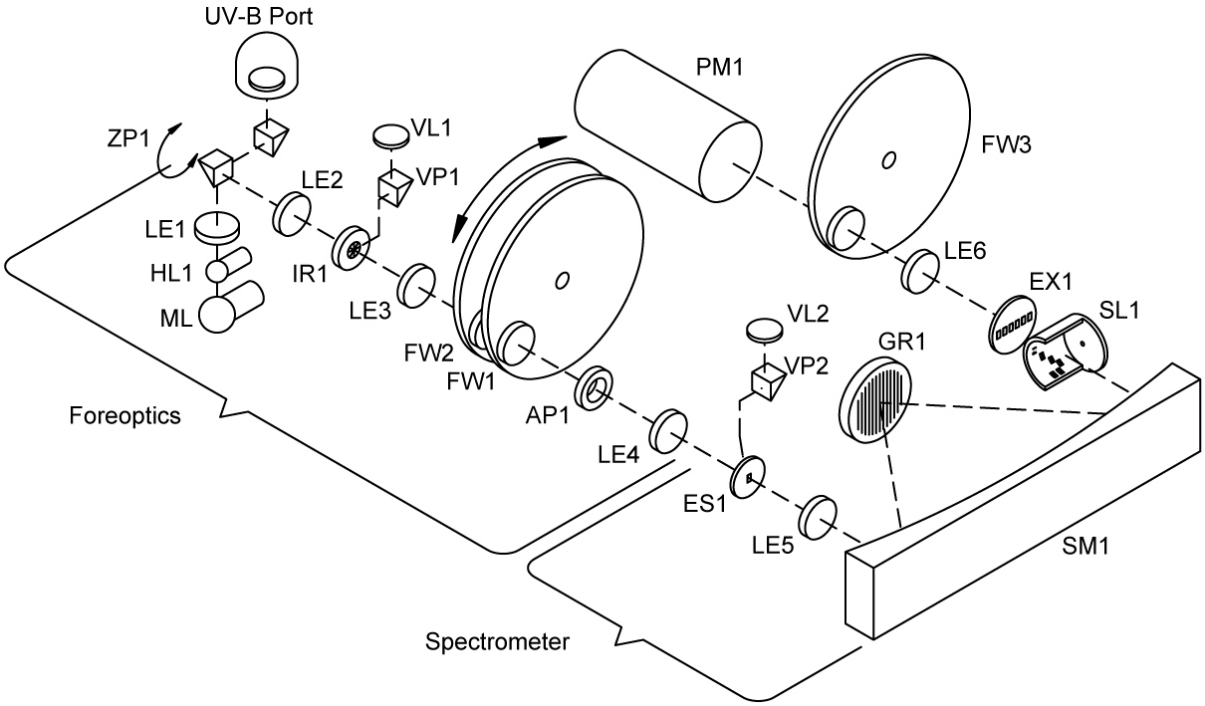
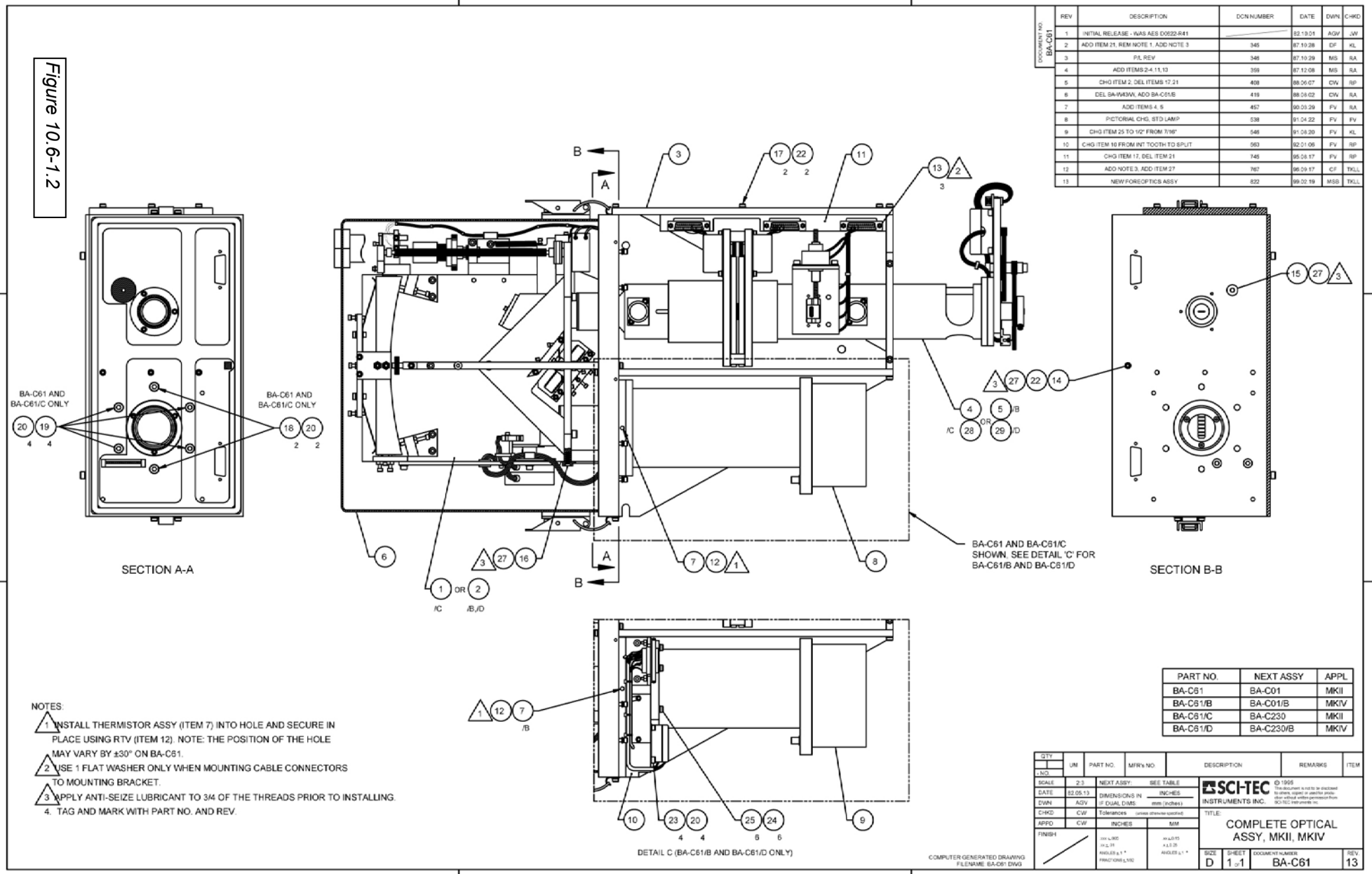


Figure 10.6-1.1

Figure 10.6-1.2



DOCUMENT NO. BA-C61

REV	DESCRIPTION	DCN NUMBER	DATE	DWN.	CHKD.
1	INITIAL RELEASE - WAS AES D0622-R41		82.10.01	AGV	JW
2	ADD ITEM 21, REM NOTE 1, ADD NOTE 3	345	87.10.28	DF	KL
3	P/L REV	346	87.10.29	MS	RA
4	ADD ITEMS 2-4,11,13	359	87.12.08	MS	RA
5	CHG ITEM 2, DEL ITEMS 17,21	408	88.06.07	CW	RP
6	DEL BA-W43/W, ADD BA-C61/B	419	88.08.02	CW	RA
7	ADD ITEMS 4, 5	457	90.03.29	FV	RA
8	PICTORIAL CHG, STD LAMP	538	91.04.22	FV	FV
9	CHG ITEM 25 TO 1/2" FROM 7/16"	546	91.08.20	FV	KL
10	CHG ITEM 10 FROM INT TOOTH TO SPLIT	563	92.01.06	FV	RP
11	CHG ITEM 17, DEL ITEM 21	745	95.08.17	FV	RP
12	ADD NOTE 3, ADD ITEM 27	767	96.09.17	CF	TKLL
13	NEW FOREOPTICS ASSY	822	99.02.19	MSB	TKLL

Item No.	BA-C61/D Part No.	BREWER Complete Optical Assy Description	Qty
1	BA-S01	Spectrometer Assy, MKII	--
2	BA-S01/B	Spectrometer Assy, MKIV	1.00
3	BA-C62	Main Support Frame Assy	1.00
4	BA-F01	Foreoptics Assy, MKII	--
5	BA-F01/B	Foreoptics Assy, MKIV	--
6	BA-C71	Light Cover Assy	1.00
7	BA-W52	Thermistor Assy	--
8	BA-P01	Photomultiplier Housing Assy, MKII	--
9	BA-P42	Photomultiplier Housing Assy, MKIV	1.00
10	BA-P44	Filterwheel #3 Housing Assy	1.00
11	BM-C70	Options Connector Bracket	1.00
12	85-10-150	Adhesive, Sealant, RTV	--
13	81-90-620	Connector Slide Lock Post	3.00
14	83-79-072	Screw, 6-32 x 5/8"Lg, Skt Hd Cap, SS	1.00
15	83-87-211	Screw, Mach 10-32 x 5/8 FH H	1.00
16	83-87-194	Screw, 8-32 x 1/2 Fl Hd Hs, SS	1.00
17	83-79-070	Scrw 6-32 x 1/2 HSC SS	2.00
18	83-79-114	Screw, 10-32 x 1/2"Lg, Skt Hd Cap, SS	--
19	83-79-119	Screw, 10-32 x 1"Lg, Skt Hd Cap, SS	--
20	83-95-607	Washer, #10, Internal Tooth Lock, SS	4.00
22	83-95-749	Washer, #6, Split Lock, SS	3.00
23	83-79-122	Screw, 10-32 x 1-1/2"Lg, Skt Hd Cap, SS	4.00
24	83-95-750	Washer, #8, Split Lock, SS	6.00
25	83-79-084	Screw, 8-32 x 1/2"Lg, Skt Hd Cap, Hex, SS	6.00
27	85-10-905	Anti-seize Lubricant	2.00
28	BA-F01/C	Foreoptics Assy New MKII	--
29	BA-F01/D	Foreoptics Assy New MKIII, MKIV	1.00

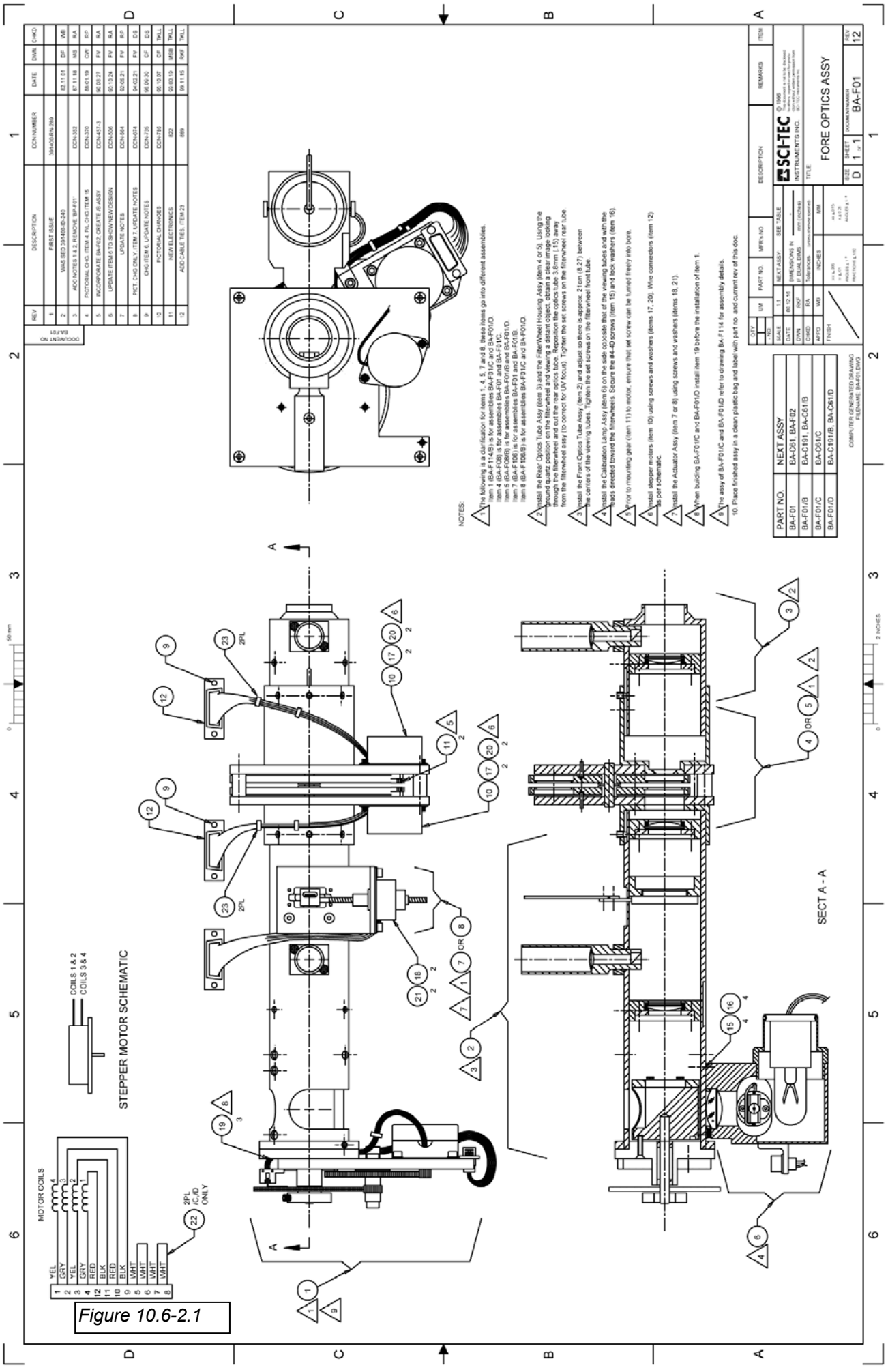


Figure 10.6-2.1

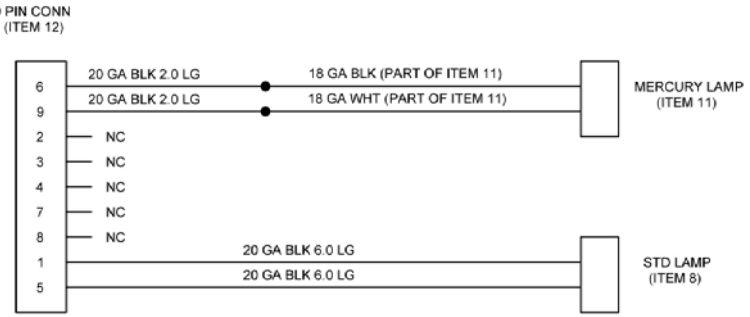
DOCUMENT NO. BA-F01

REV	DESCRIPTION	DCN NUMBER	DATE	DWN.	CHKD.
1	FIRST ISSUE	391400-RN-289			
2	WAS SED 391400-ID-240		82.11.01	DF	WB
3	ADD NOTES 1 & 2, REMOVE 'BP-F01'	DCN-352	87.11.18	MS	RA
4	PICTORIAL CHG. ITEM 4, P/L CHG ITEM 15	DCN-370	88.01.19	CW	RP
5	INCORPORATE BA-F02; CREATE /B ASSY	DCN-457-3	90.03.27	FV	RA
6	UPDATE ITEM 6 TO SHOW NEW DESIGN	DCN-506	90.10.24	FV	RA
7	UPDATE NOTES	DCN-564	92.05.21	FV	RP
8	PICT. CHG ONLY, ITEM 7, UPDATE NOTES	DCN-674	94.02.21	FV	DS
9	CHG ITEM 6, UPDATE NOTES	DCN-735	96.09.30	CF	DS
10	PICTORIAL CHANGES	DCN-785	96.10.07	CF	TKLL
11	NEW ELECTRONICS	822	99.03.19	MSB	TKLL
12	ADD CABLE TIES, ITEM 23	889	99.11.15	RKF	TKLL

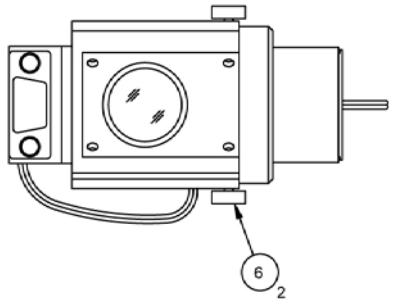
NOTES:

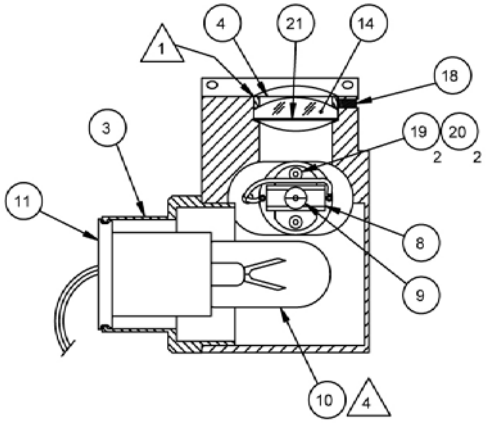
1. The following is a clarification for items 1, 4, 5, 7 and 8, these items go into different assemblies.
   Item 1 (BA-F114/B) is for assemblies BA-F01/C and BA-F01/D.
   Item 4 (BA-F08) is for assemblies BA-F01 and BA-F01/C.
   Item 5 (BA-F08/B) is for assemblies BA-F01/B and BA-F01/D.
   Item 7 (BA-F106) is for assemblies BA-F01 and BA-F01/B.
   Item 8 (BA-F106/B) is for assemblies BA-F01/C and BA-F01/D.
2. Install the Rear Optics Tube Assy (item 3) and the FilterWheel Housing Assy (item 4 or 5). Using the ground quartz position on the filterwheel and viewing a distant object, obtain a clear image looking through the filterwheel and out the rear optics tube. Reposition the optics tube 3.8mm (.15) away from the filterwheel assy (to correct for UV focus). Tighten the set screws on the filterwheel rear tube.
3. Install the Front Optics Tube Assy (item 2) and adjust so there is approx. 21cm (8.27) between the centers of the viewing tubes. Tighten the set screws on the filterwheel front tube.
4. Install the Calibration Lamp Assy (item 6) on the side opposite that of the viewing tubes and with the leads directed toward the filterwheels. Secure the #4-40 screws (item 15) and lock washers (item 16).
5. Prior to mounting gear (item 11) to motor, ensure that set screw can be turned freely into bore.
6. Install stepper motors (item 10) using screws and washers (items 17, 20). Wire connectors (item 12) as per schematic.
7. Install the Actuator Assy (item 7 or 8) using screws and washers (items 18, 21).
8. When building BA-F01/C and BA-F01/D install item 19 before the installation of item 1.
9. The assy of BA-F01/C and BA-F01/D refer to drawing BA-F114 for assembly details.
10. Place finished assy in a clean plastic bag and label with part no. and current rev of this doc.

Figure 10.6-2.2



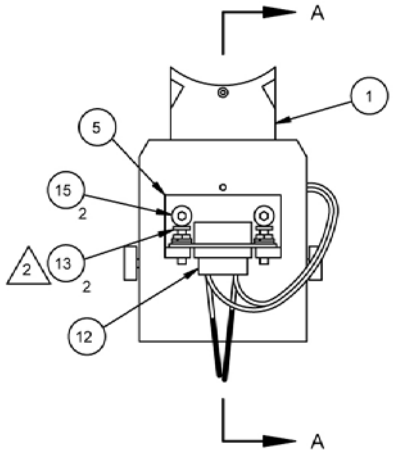
DOCUMENT NO. BA-F96	REV	DESCRIPTION	DCN NUMBER	DATE	DWN.	CHKD.
	1	INITIAL RELEASE		90.11.06	FV	KL
	2	CHG NOTE 2	597	92.06.09	FV	KL
	3	CHG ITEM 10, UPDATE P/L	785	97.03.26	CF	TKLL

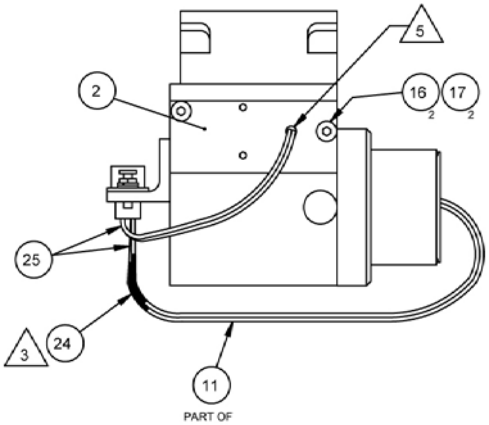




PARTIAL SECTION A-A

SOME HARDWARE NOT
SHOWN FOR CLARITY





NOTES:

1. ENSURE LENS RETAINER (ITEM 4) IS INSTALLED WITH CHAMFERED EDGE TOWARDS LENS AND TOP SIDE FLUSH WITH BOTTOM OF CURVED SURFACE OF ITEM 1. THIS CAN BE ACCOMPLISHED BY USING JIG BA-F81 PA01 BY PLACING THE TUBE ON ON TOP OF THE CURVED SURFACE ON ITEM 1 AND ADJUSTING THE SET SCREW (ITEM 18).
2. INSTALL POSTS (ITEM 13) WITH ONE FLATWASHER AND ONE LOCKWASHER AS SHOWN. DISCARD OTHER HARDWARE.
3. SPLICE 2-2.0 IN. PIECES OF WIRE (ITEM 25) TO ENDS OF WIRES OF LAMP HOLDER (ITEM 11) AND COVER WITH HEATSHRINK (ITEM 24) PRIOR TO INSTALLING IN CONN.
4. ENSURE MERCURY LAMP IS ROTATED SO THAT IT'S FILAMENTS ARE PERPENDICULAR TO THE STANDARD LAMP (ITEM 9).
5. AFTER ASSY, SECURE WIRES IN HOLE USING RTV (ITEM 23). APPLY RTV FROM OUTSIDE OF THE HOUSING.
6. ENSURE LENS AND LAMPS (ITEMS 9,10 AND 21) ARE FREE OF FINGERPRINTS AFTER ASSY. (CLEAN WITH ALCOHOL AND Q-TIP)

COMPUTER GENERATED DRAWING
FILENAME: BA-F96.DWG

QTY - NO.	UM	PART NO.	MFR's NO.	DESCRIPTION	REMARKS	ITEM

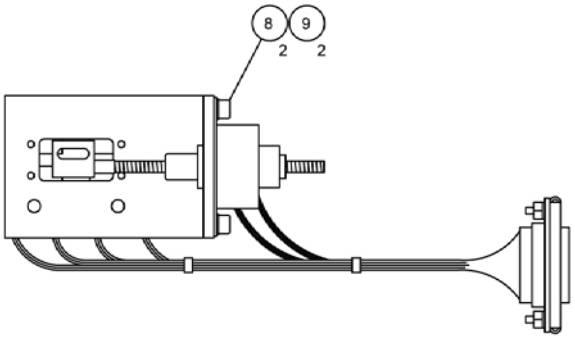
SCALE	1:1	NEXT ASSY:	BA-F01
DATE	90.10.11	DIMENSIONS IN IF DUAL DIMS:	mm (inches)
DWN	FV	Tolerances (unless otherwise specified)	
CHKD	RA	INCHES	MM
APPD	KL	.xxx ± .005 .xx ± .01 ANGLES ± 1 ° FRACTIONS ± 1/32	xx ± 0.15 x ± 0.25 ANGLES ± 1 °
FINISH			

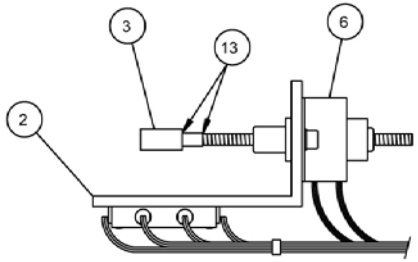
TITLE: CALIBRATION LAMP ASSY

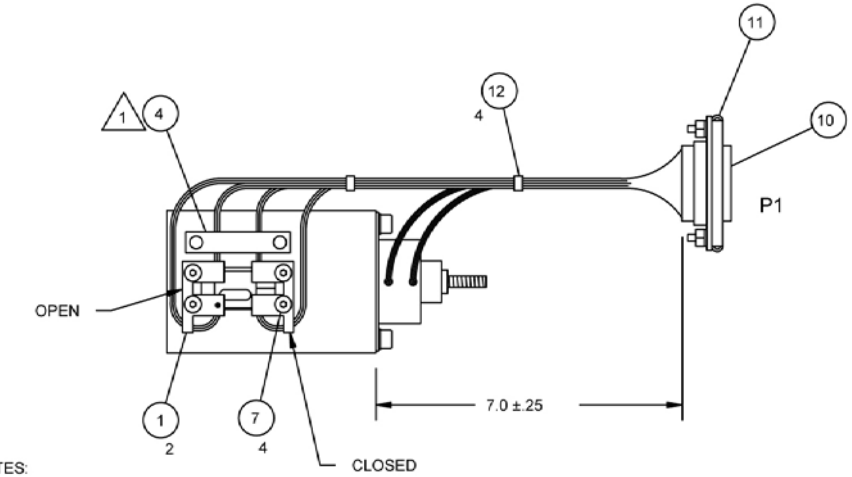
SIZE	SHEET	DOCUMENT NUMBER	REV.
C	1 OF 1	BA-F96	3

Item No.	BA-F01/D Part No.	FORE OPTICS ASSY Description	Qty
1	BA-F114/B	Zenith Drive Assy	1.00
2	BA-F04	Front Optics Tube Assy	1.00
3	BA-F06	Rear Optics Tube Assy	1.00
4	BA-F08	Filterwheel Housing Assy	--
5	BA-F08/B	Filterwheel Housing Assy	1.00
6	BA-F96	Calibration Lamp Assy	1.00
7	BA-F106	Iris Actuator Assy	--
8	BA-F106/B	Iris Actuator Assy	1.00
9	81-90-630	Lock, Conn Sl Ret	2.00
10	50-10-030	Motor Stepper PPS-0-380 1	2.00
11	88-85-653	Gear, 24T, 48P, 1/8F, 1/8B, NY	2.00
12	81-46-124	Conn 'D' 15 Cir M Crimp B	2.00
15	83-79-048	Screw, Mach 4-40 x 5/16 HX	4.00
16	83-95-748	Washer, #4, Split Lock, SS	4.00
17	83-79-047	Screw 4-40 x 1/4 HSC SS	4.00
18	83-51-786	Screw 6-32 x 5/8 Button HD	2.00
19	83-56-143	Screw, Set 6-32 x 1/4 Cup	3.00
20	83-95-604	Washer, #4, Internal Tooth Lock, SS	4.00
21	83-95-605	Washer, #6, Internal Tooth Lock, SS	2.00
22	99-31-441	Wire Hookup, 20AWG IRR PV	0.20

Figure 10.6-2.3

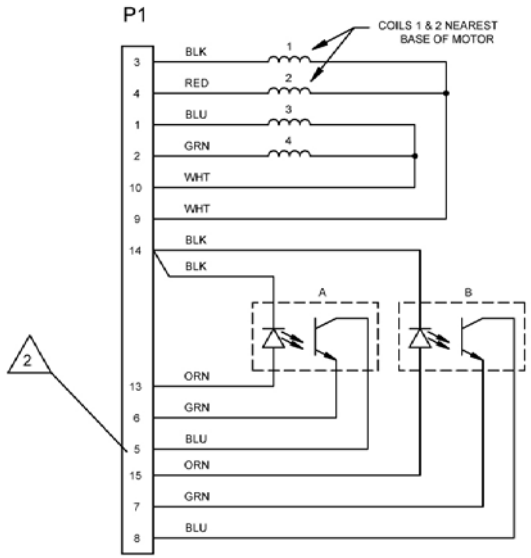






NOTES:

1. PASS SENSOR WIRES THRU HOLES IN SPACER BAR AS SHOWN PRIOR TO ASSEMBLING TO CONNECTOR AND TIE-WRAPPING WIRES.
2. FOR BA-F106 EXCHANGE THE LOCATIONS OF PIN 6 FOR PIN 7 AND EXCHANGE THE LOCATIONS OF PIN 5 FOR PIN 8.
3. TAG AND LABEL WITH PART NO. AND REV.



SCHEMATIC FOR BA-F106/B

PART NO.	NEXT ASSY	A	B
BA-F106	BA-F01, BA-F01/B	CLOSED	OPEN
BA-F106/B	BA-F01/C, BA-F01/D	OPEN	CLOSED

DOCUMENT NO. BA-F106	REV	DESCRIPTION	DCN NUMBER	DATE	DWN.	CHKD.
	1	FIRST ISSUE	REF DCN674	94.02.14	DF	DJS
	2	CREATION OF BA-F106/B	822	99.03.19	MSB	TKLL

QTY - NO.	UM	PART NO.	MFR's NO.	DESCRIPTION	REMARKS	ITEM

SCALE	1:1	NEXT ASSY:	SEE TABLE
DATE	94.02.14	DIMENSIONS IN IF DUAL DIMS:	INCHES mm (inches)
DWN	FV	Tolerances (unless otherwise specified)	
CHKD	RKF	INCHES	MM
APPD	TKL	.xxx ± .005 .xx ± .01 ANGLES ± 1 ° FRACTIONS ± 1/32	xx ± 0.15 x ± 0.25 ANGLES ± 1 °
FINISH			

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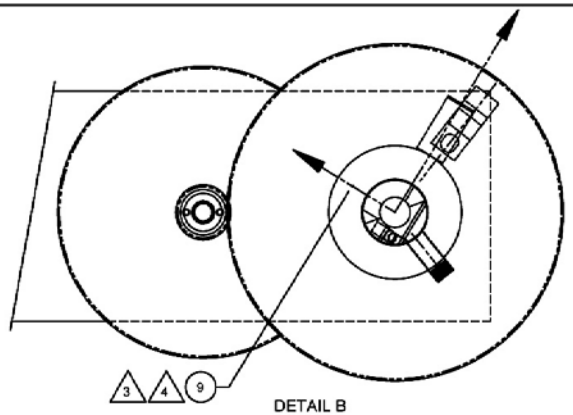
TITLE: IRIS ACTUATOR ASSY

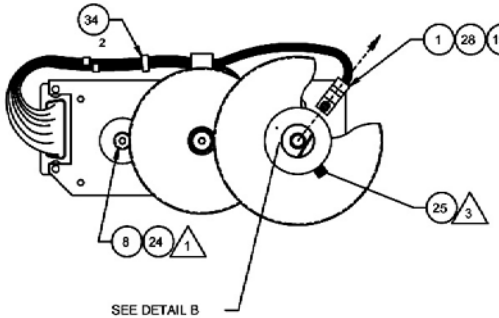
SIZE	SHEET	DOCUMENT NUMBER	REV.
C	1 OF 1	BA-F106	2

COMPUTER GENERATED DRAWING
FILENAME: BA-F106.DWG

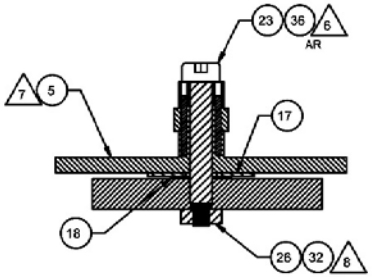
Figure 10.6-2.4



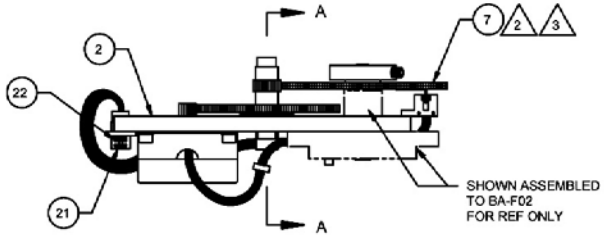
DETAIL B
2:1



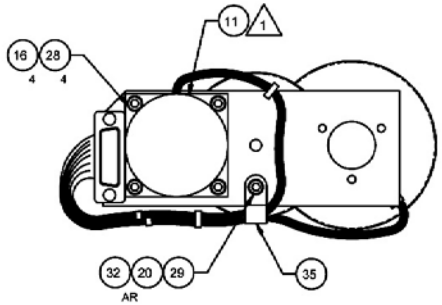
SEE DETAIL B

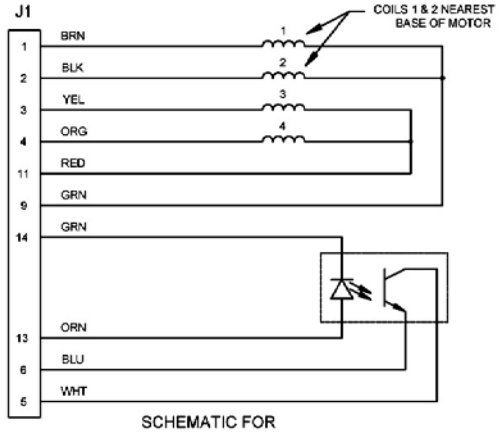


SECTION A-A
SCALE 2:1

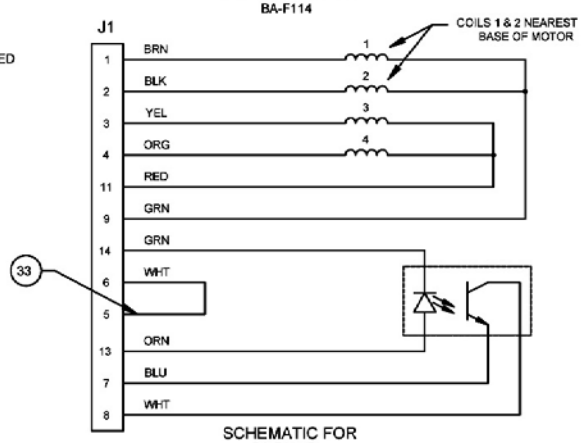


SHOWN ASSEMBLED
TO BA-F02
FOR REF ONLY





SCHEMATIC FOR
BA-F114



SCHEMATIC FOR
BA-F114/B

NOTES:

1. INSTALL GEAR (ITEM 8) TO MOTOR (ITEM 11) WITH A .01 GAP BETWEEN BUSHING AND GEAR, PRIOR TO MOUNTING TO PLATE.
2. COMPRESS SPRINGS ON GEAR (ITEM 7) TO REMOVE GEAR BACKLASH, TO ENABLE IT TO MESH WITH ITEM 5. MINIMUM ROTATION OF TWO FULL TEETH.
3. BAG ITEMS 7, 30, 9, AND 25 AND ATTACH TO THIS ASS'Y. THESE ITEMS TO BE INSTALLED AT NEXT ASS'Y LEVEL AS SHOWN.
4. ALIGNMENT DOT ON COLLAR (ITEMS 9) TO BE INSTALLED IN POSITION AS SHOWN (PARALLEL TO CUT LINE). THIS ALIGNMENT DOES NOT REQUIRE POSITION ACCURACY NOW, IT WILL BE DONE AT NEXT ASSY LEVEL.
5. ALIGN SENSOR (ITEM 1) STRAIGHT OUT FROM THE CENTRE OF IT'S ATTACHMENT HOLE, INTERSECTING THE CORNER OF THE PLATE AND SHAFT CENTER (AS PER ARROW). DO NOT OVERTIGHTEN.
6. COTTON SWAB SCREW WITH LUBRICANT AND LUBRICATE INSIDE OF THE IDLER ASSY USING ITEM 36. REMOVE EXCESS AT THE EXTERIOR SURFACES.
7. PRE-ASSEMBLE IDLER ASS'Y (ITEM 5) TO THE MOUNTING PLATE AS SHOWN DO NOT TIGHTEN SHOULDER BOLT AT THIS ASS'Y LEVEL.
8. AT NEXT LEVEL (FINAL ASS'Y) INSTALL LOCTITE ON SHOULDER BOLT THREADS OR NUT, THEN TIGHTEN THE SHOULDER SCREW TO TORQUE VALUE 5 TO 7 IN/LBS. DO NOT OVERTIGHTEN.
9. BAG AND LABEL WITH PART NO. AND REV.

PART NO.	NEXT ASSY
BA-F114	BA-CO1, BA-C01/B, BA-C190
BA-F114/B	BA-F01/C, BA-F01/D

DOCUMENT NO. BA-F114	REV	DESCRIPTION	DCN NUMBER	DATE	DWN	CHKD
	1	INITIAL RELEASE	747	96.11.13	CF	TKLL
	2	ADD ITEM 9, 25, & 36	834	97.07.04	MF	TKLL
	3	CREATION OF BA-F114/B	822	99.02.18	MSB	TKLL
	4	CLEANUP OF REDLINES	864	99.08.18	MSB	TKLL
	5	CHG PART NO. OF LUBRICANT, ITEM 36	905	00.05.23	RKF	BW
	6	ADD DETAIL B, REWRITE NOTE 4	949	02.03.08	BW	

QTY	UM	PART NO.	MFR's NO.	DESCRIPTION	REMARKS	ITEM NO.

SCALE	1:1	NEXT ASSY	SEE TABLE
DATE	96.11.13	DIMENSIONS IN	INCHES
DWN	CF	IF DUAL DIMS	mm (inches)
CHKD	MF	*tolerances (unless otherwise specified)	
APPD	TKLL	INCHES	MM
FINISH		xx ±.005 x ±.01 ANGLES ±1 ° FRACTIONS ±1/32	xx ±0.13 x ±0.25 ANGLES ±1 °

Kipp & Zonen

TITLE:

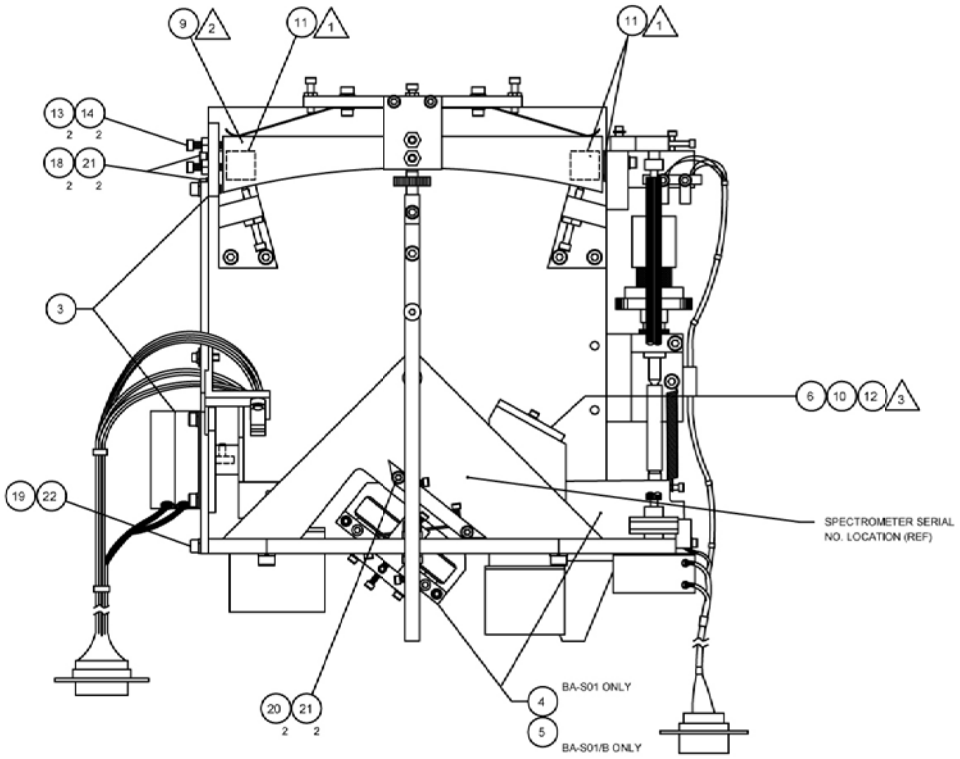
ZENITH DRIVE ASSY/KIT

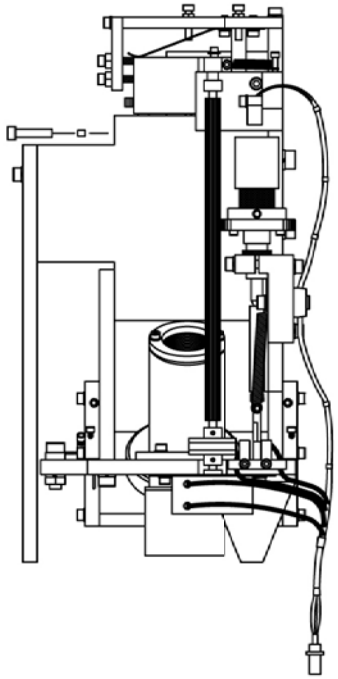
SIZE	SHEET	DOCUMENT NUMBER	REV
D	1 of 1	BA-F114	6

COMPUTER GENERATED DRAWING
FILENAME: BA-F114.DWG

Figure 10.6-3.1

DOCUMENT NO. BA-S01	REV	DESCRIPTION	DCN NUMBER	DATE	DWN.	CHKD.
	1	INITIAL RELEASE	3716	-	-	-
	2	WAS AES DO622-R42 PARTS=BP-S01		82.10.01	DF	KL
	3	SEE DCN	6701-DCN-299	87.11	DF	FH
	4	REDRAW MICROMETER ASSY	347	87.11.16	DF	RA
	5	CREATION OF BA-S01/B	419-2	88.07.13	CW	RA
	6	ADD TORQUE NOTE FOR OPTICAL	524	91.02.21	CW	RP
	7	PICTORIAL CHG ONLY (ITEM 6)	652	93.05.21	CW	RA
	8	NEOPRENE WASHER	771	98.08.20	MSB	TKLL
	9	CHANGE OF SLITMASK MOTOR	838	98.08.20	MSB	TKLL





NOTES:

1. FROM ITEM 11, CUT 3 PIECES AS FOLLOWS: 1 PIECE 1.0 X .50, 2 PIECES .50 X .50
2. INSTALL MIRROR AS SHOWN (WITH SIDE SIDE TOWARDS TOP OF FRAME) USING CUT PIECES FROM ITEM 11 LOCATED AS SHOWN.
3. TO INSTALL CORRECTION LENS, FIRST INSTALL NEOPRENE WASHER (ITEM 10), THEN LENS (ITEM 6), THEN NYLON WASHER (ITEM 12). SCRIBE MARK IN LENS SHOULD INITIALLY BE ALIGNED WITH THE SCRIBE MARK ON THE LENS MOUNT. INSTALL LENS WITH CONCAVE SURFACE FACING ENTRANCE SLIT.
4. ADJUST AND ALIGN OPTICS AND FRAME AS DESCRIBED IN AP-BA-S01 (OPTICAL FRAME ALIGNMENT PROC.)
5. PERFORM ACCEPTANCE TEST PROCEDURE PER TP-BA-S01 (SPECTROMETER ACCEPTANCE TEST RECORD).
6. INSTALL THE PUSH ROD AND SPRING TO GRATING SUPPORT ASSY AT THIS LEVEL.

PART NO.	NEXT ASSY	USED ON	REMARKS
BA-S01	BA-C61/A, BA-C61/C	MKII	θ_M 1800 LINE GRATING
BA-S01/B	BA-C61/B, BA-C61/D	MKIV	θ_M 1200 LINE GRATING

COMPUTER GENERATED DRAWING
FILENAME: BA-S01.DWG

QTY - NO.	U/M	PART NO.	MFR's NO.	DESCRIPTION	REMARKS	ITEM
SCALE	1:1	NEXT ASSY:	SEE TABLE			
DATE	82.05.13	DIMENSIONS IN				
DWN	RR	IF DUAL DIMS:	mm (inches)			
CHKD	RP	Tolerances: (unless otherwise specified)				
APP'D	KL	INCHES	MM			
FINISH		.xx ±.005 .x ±.01 ANGLES ±.1 ° FRACTIONS ±1/32	.xx ±0.15 .x ±0.25 ANGLES ±.1 °			

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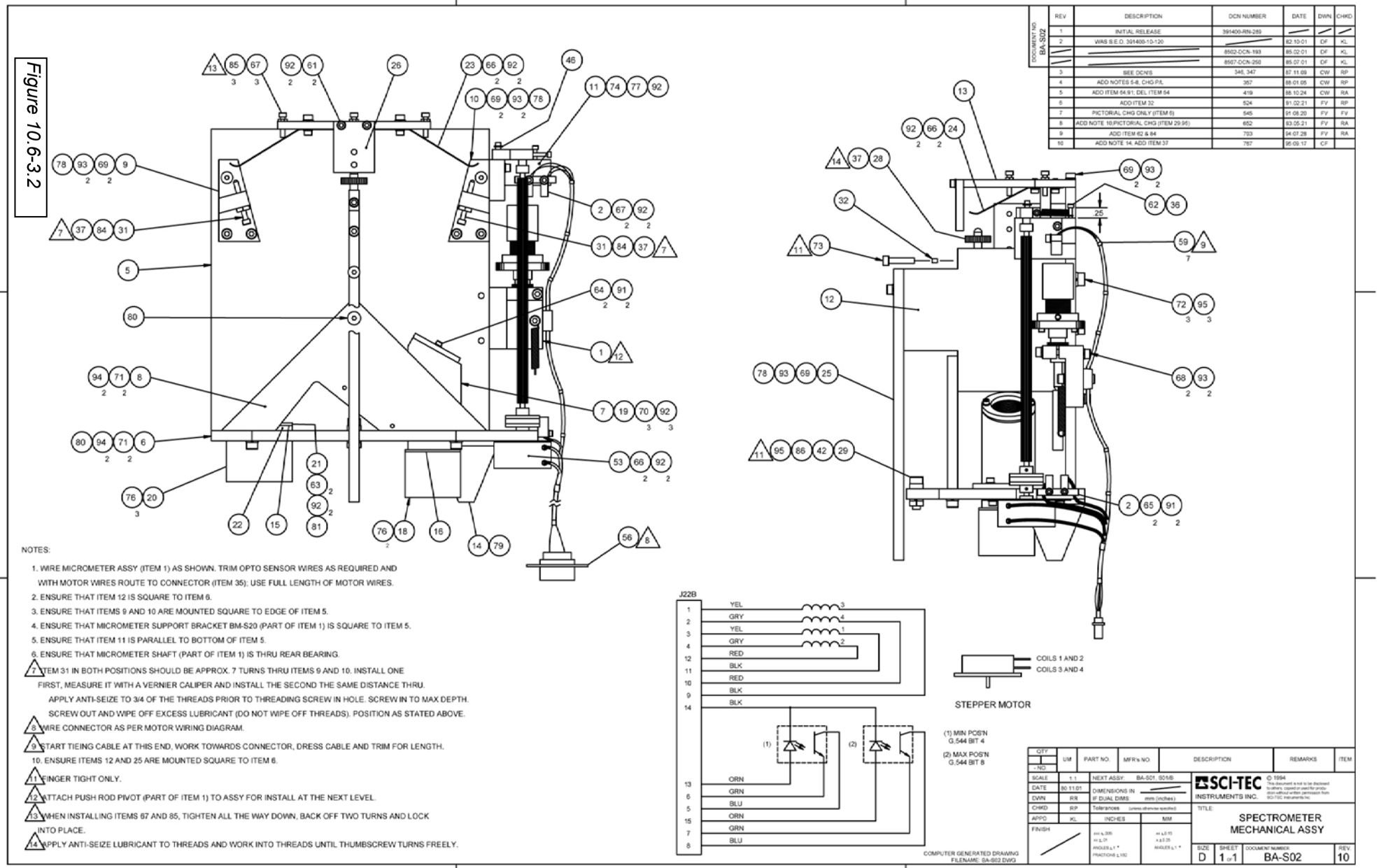
TITLE: SPECTROMETER ASSY

SIZE	SHEET	DOCUMENT NUMBER	REV.
D	1 of 1	BA-S01	9

Figure 10.6-3.2



DOCUMENT NO. BA-S02

REV	DESCRIPTION	DCN NUMBER	DATE	DWN.	CHKD.
1	INITIAL RELEASE	391400-RN-289			
2	WAS S.E.D. 391400-10-120		82.10.01	DF	KL
		8502-DCN-193	85.02.01	DF	KL
		8507-DCN-250	85.07.01	DF	KL
3	SEE DCN'S	346, 347	87.11.09	CW	RP
4	ADD NOTES 5-8, CHG P/L	357	88.01.05	CW	RP
5	ADD ITEM 64,91; DEL ITEM 54	419	88.10.24	CW	RA
6	ADD ITEM 32	524	91.02.21	FV	RP
7	PICTORIAL CHG ONLY (ITEM 6)	545	91.08.20	FV	FV
8	ADD NOTE 10,PICTORIAL CHG (ITEM 29,95)	652	93.05.21	FV	RA
9	ADD ITEM 62 & 84	703	94.07.28	FV	RA
10	ADD NOTE 14, ADD ITEM 37	767	96.09.17	CF	

Item No.	BA-S01/B Part No.	SPECTROMETER ASSEMBLY Description	Qty
1	BA-S02	Spectrometer Mechanical Assy	1.00
3	BA-S128	Shutter Motor Assy	1.00
4	BA-S51	Grating Support Assy, 1800 Line	--
5	BA-S51/B	Grating Support Assy, 1200 Line	1.00
6	BM-S42	Correction Lens	1.00
7	TP-BA-S01	Acceptance Test Record, Spect Assy	--
8	LP-BA-S01	Optical Frame Alignment Proc, Spect	--
9	BM-S47	Spherical Mirror	1.00
10	BM-S121	Washer, Correction Lens	1.00
11	98-10-010	Sheet, Closed Cell Neoprene, 1/16", Adh	1.50
12	83-95-830	Washer, Flat,1"OD x 3/16"ID x .015"Thk	1.00
13	83-78-022	Screw, #4-40 x 1/2"Lg,Skt Hd Cap,Nylon	4.00
14	83-40-237	Nut, #4-40, Hex, Nylon	4.00
18	83-79-049	Screw, #4-40 x 3/8"Lg, Skt Hd Cap, SS	2.00
19	83-79-068	Screw, #6-32 x 3/8"Lg, Skt Hd Cap, SS	1.00
20	83-79-051	Screw, #4-40 x 1/2"Lg, Skt Hd Cap, SS	4.00
21	83-95-748	Washer, #4, Split-Lock, SS	6.00
22	83-95-605	Washer, #6, Internal Tooth, SS	1.00

Item No.	BA-S02 Part No.	SPECTROMETER MECHANICAL ASSEMBLY Description	Qty
1	BA-S21	Micrometer Assy	1.00
2	BA-W33/B	Opto Electronic Encoder Assy	2.00
5	BM-S24	Main Baseplate	1.00
6	BM-S25	Front Entrance & Exit Plate	1.00
7	BM-S26	Entrance Slit & Lens Holder	1.00
8	BM-S27	Triangular Top Plate	1.00
9	BM-S28/A	Mirror Mount	1.00
10	BM-S28/B	Mirror Mount	1.00
11	BM-S29	Micrometer Sensor Mount	1.00
12	BM-S30	Central Vertical Plate	1.00
13	BM-S31	Spring Holder Plate	1.00
14	BM-S32	Frame Support Cone	1.00
15	BM-S46	Exit Slit Plate	1.00
16	BM-S45	Entrance Slit PLate	1.00
18	BM-S33	Entrance Slit Light Trap	1.00
19	BM-S34	Entrance Lens Retainer	1.00
20	BM-S35	Exit Slit Light Trap	1.00
21	BM-S36	Exit Slit Mount #1	1.00
22	BM-S37	Exit Slit Mount #2	1.00
23	BM-S38	Leaf Spring #1	1.00
24	BM-S39	Leaf Spring #2	1.00
25	BM-S40	Support Bar #3	1.00
26	BM-S41	Retainer Plate, Mirror	1.00
28	BM-S43	Knurled Thumb Screw	1.00
29	BM-S44	Drilled Screw	1.00

Item No.	BA-S02 Part No.	SPECTROMETER MECHANICAL ASSEMBLY Description	Qty
31	BM-S69	Special Screw	2.00
32	BM-S95	Nylon Slug	1.00
36	85-10-145	Adhesive Sealant (Loctite 242)	1.00
37	85-10-905	Aniti-seize Lubricant	2.00
42	88-99-125	Shaft Spacer, 3/16"Dia, 1/8"Lg	1.00
46	88-99-580	Retaining Ring, External, 1/8" Shaft	1.00
53	50-10-030	Stepper Motor, PPS-0-380	1.00
56	81-46-124	Connector, "D", 15 Pin, Male	1.00
59	85-80-450	Cable-Tie, 4-1/8 x .10, Nylon	7.00
61	83-79-049	Screw, #4-40 x 3/8"Lg, Skt Hd Cap, SS	2.00
62	83-79-031	Screw, #2-56 x 1/2"Lg, Skt Hd Cap, SS	1.00
63	83-51-763	Screw, #4-40 x 3/8"Lg, Btn Hd Hex, SS	2.00
64	83-79-027	Screw, #2-56 x 1/4"Lg, Skt Hd Cap, SS	2.00
65	83-79-029	Screw, #2-56 x 3/8"Lg, Skt Hd Cap, SS	2.00
66	83-79-047	Screw, #4-40 x 1/4"Lg, Skt Hd Cap, SS	6.00
67	83-79-051	Screw, #4-40 x 1/2"Lg, Skt Hd Cap, SS	5.00
68	83-79-068	Screw, #6-32 x 3/8"Lg, Skt Hd Cap, SS	2.00
69	83-79-070	Screw, #6-32 x 1/2"Lg, Skt Hd Cap, SS	7.00
70	83-79-048	Screw, Mach #4-40 x 5/16"Lg, Hex	3.00
71	83-79-084	Screw, #8-32 x 1/2"Lg, Skt Hd Cap, SS	4.00
72	83-79-116	Screw, #10-32 x 5/8"Lg, Skt Hd Cap, SS	3.00
73	83-79-072	Screw, #6-32 x 5/8"Lg, Skt Hd Cap, SS	1.00
74	83-79-053	Screw, #4-40 x 5/8"Lg, Skt Hd Cap, SS	1.00
76	83-87-161	Screw, #4-40 x 1/4"Lg, Flt Hd Hex, SS	5.00
77	83-87-167	Screw, #4-40 x 5/8"Lg, Flt Hd Hex, SS	1.00
78	83-87-179	Screw, #6-32 x 1/2"Lg, Flt Hd Hex, SS	3.00
79	83-87-211	Screw, #10-32 x 5/8"Lg, Flt Hd Hex, SS	1.00
80	83-87-194	Screw, #8-32 x 1/2"Lg, Flt Hd Hex, SS	2.00
81	83-87-163	Screw, #4-40 x 3/8"Lg, Flt Hd Hex, SS	1.00
84	83-40-241	Nut, #4-40 x 1/4"Hex x 3/32"Thk, SS	2.00
85	83-40-239	Nut, #4-40 x 1/4"Hex x 3/16"Thk, SS	3.00
86	83-40-301	Nut, #10-32 x 5/16"Hex x 7/16"Thk, SS	1.00
89	85-10-905	Anti-seize Lubricant	--
91	83-95-747	Washer, #2, Split-Lock, SS	4.00
92	83-95-748	Washer, #4, Split-Lock, SS	16.00
93	83-95-749	Washer, #6, Split-Lock, SS	9.00
94	83-95-750	Washer, #8, Split-Lock, SS	4.00
95	83-95-752	Washer, #10, Split-Lock, SS	4.00

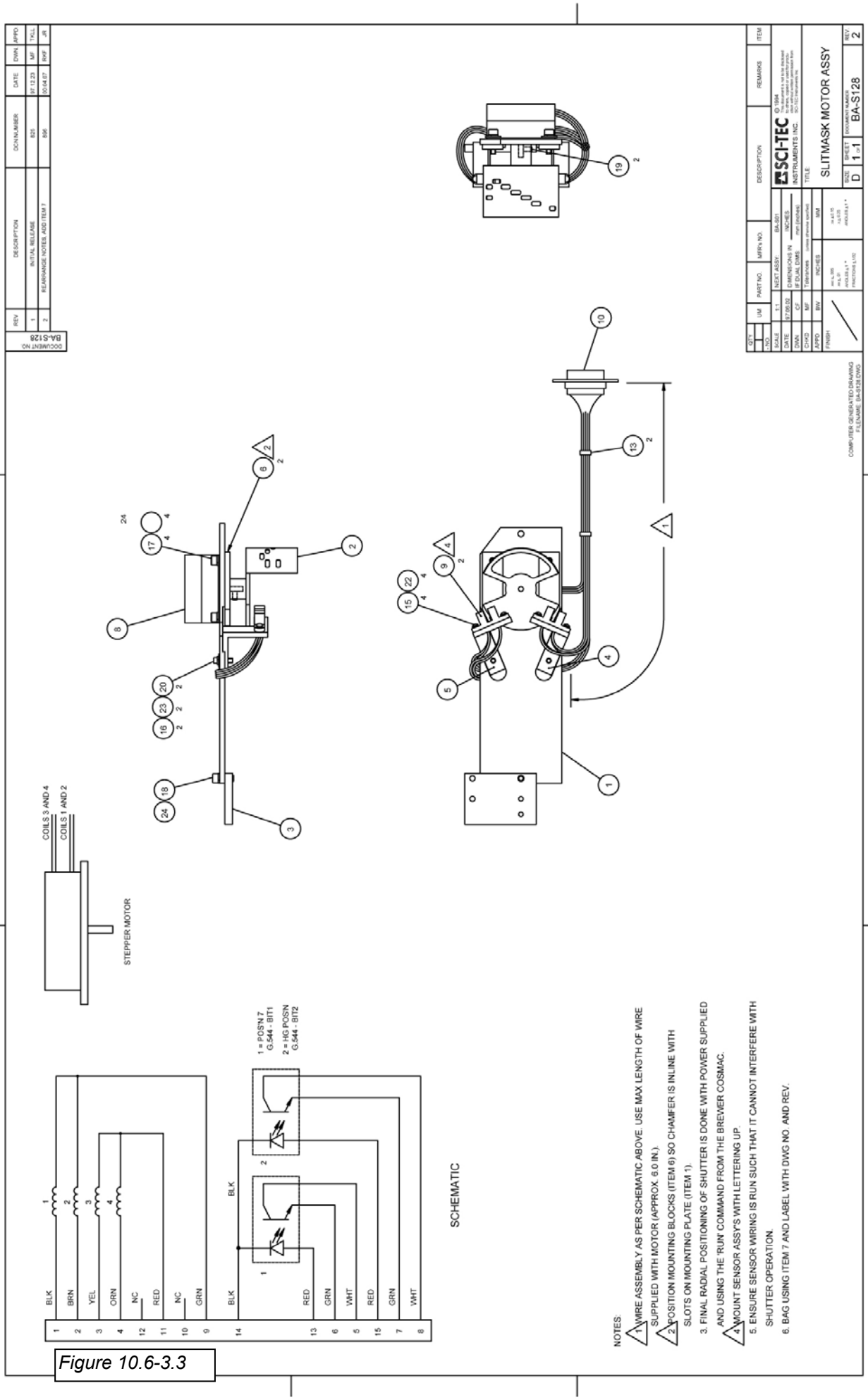
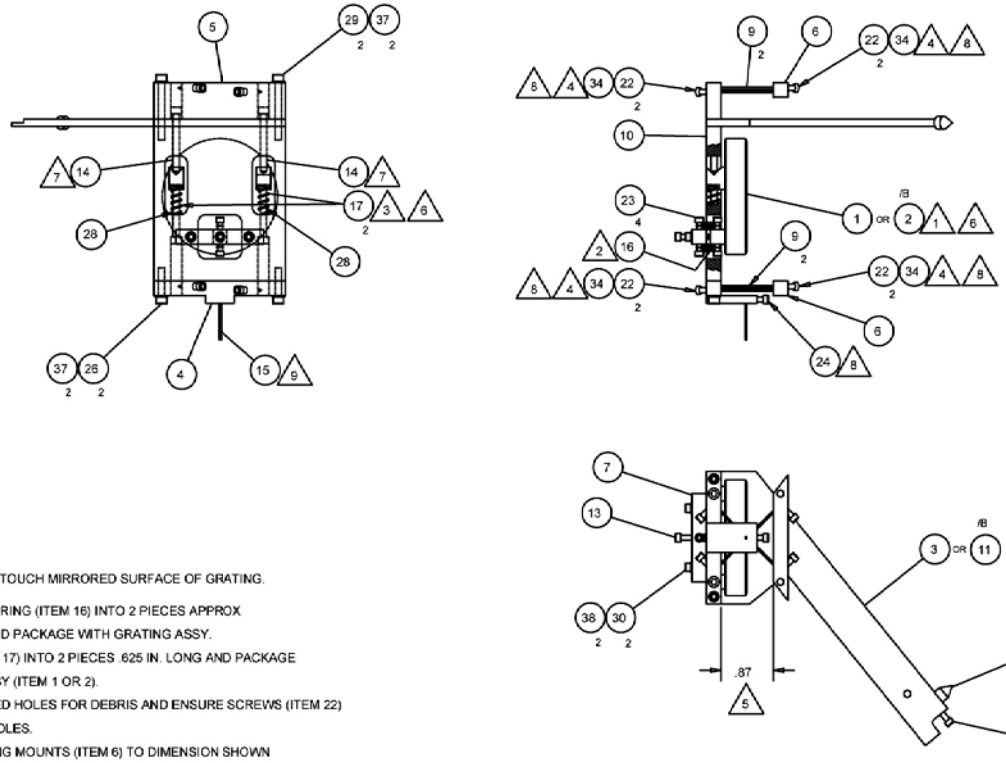


Figure 10.6-3.3

Item No.	BA-S128 Part No.	SLITMASK MOTOR ASSEMBLY Description	Qty
1	BM-S126	Slitmask Motor Mounting Plate	1.00
2	BM-S125	Exit Slitmask	1.00
3	BM-S12	Support Plate, Slitmask Motor	1.00
4	BM-S123	Slitmask Sensor Holder, Left	1.00
5	BM-S124	Slitmask Sensor Holder, Right	1.00
6	BM-S127	Slitmask Motor Mounting Block	2.00
8	50-10-033	Motor, Stepper, 12V, 48 Step	1.00
9	89-70-024	Optical Sensor, SW,Slotted	2.00
10	81-46-124	Connector, 'D', 15 Pin, Male	1.00
13	85-80-450	Cable-Tie, 4-1/8 x .10, Nylon	2.00
15	83-51-752	Screw, #2-56 x 1/4"Lg, Button Head	4.00
16	83-79-049	Screw, #4-40 x 3/8"Lg, Skt Hd Cap, SS	2.00
17	83-79-067	Screw, #6-32 x 5/16"Lg, Skt Hd Cap, SS	4.00
18	83-79-068	Screw, #6-32 x 3/8"Lg, Skt Hd Cap, SS	1.00
19	83-56-016	Set Screw, #4-40 x 3/16"Lg, Cup Point, SS	2.00
20	83-95-011	Washer, #4, Flat, SS	2.00
22	83-95-747	Washer, #2, Split Lock, SS	4.00
23	83-95-748	Washer, #4 Split Lock, SS	2.00
24	83-95-749	Washer, #6, Split Lock, SS	5.00

Figure 10.6-3.4



NOTES:

1. CAUTION: DO NOT TOUCH MIRRORED SURFACE OF GRATING.
2. CUT AND FORM SPRING (ITEM 16) INTO 2 PIECES APPROX .125 IN. LONG AND PACKAGE WITH GRATING ASSY.
3. CUT SPRING (ITEM 17) INTO 2 PIECES .625 IN. LONG AND PACKAGE WITH GRATING ASSY (ITEM 1 OR 2).
4. INSPECT THREADED HOLES FOR DEBRIS AND ENSURE SCREWS (ITEM 22) TURN FREELY IN HOLES.
5. POSITION 'X' SPRING MOUNTS (ITEM 6) TO DIMENSION SHOWN USING JIG BA-S51PA03 (BA-S51PA02 FOR INSPECTION ONLY).
6. GRATING ASSY (ITEM 1 OR 2) TO BE PACKAGED SEPARATELY AND INSTALLED AT NEXT ASSY.
7. APPLY ANTI-SEIZE LUBRICANT (ITEM 35) TO 3/4 OF THE THREADS PRIOR TO THREADING SCREW INTO HOLE. SCREW IN TO FULL DEPTH. SCREW OUT AND WIPE OFF EXCESS LUBRICATION (DO NOT WIPE OFF THREADS). SCREW BACK IN TO OPERATING DEPTH.
8. TORQUE TO 8 IN-LB.
9. PACKAGE ITEM 15 SEPARATELY AND INSTALL AT NEXT LEVEL.

DOCUMENT NO. BA-S51

REV	DESCRIPTION	DCN NUMBER	DATE	DWN.	CHKD.
1	INITIAL RELEASE	391400-RN-289			
2	WAS SED 391400-1C-150	6302-DCN-055	82.10.01	DF	KL
3	CHG NOTE 3, ADD NOTE 5, REDRAW ITEM 3	350	87.11.10	MS	RP
4	GRATING BLOCKS TO SUB-ASSY BA-S74	419	88.07.13	CW	RP
5	UPDATES NOTES	635	93.03.03	FV	RP
6	CHG ITEM 2 FROM /B TO /C	645	93.04.28	FV	RA
7	ADD 39° ARM TO /B ASSY	666	94.01.03	FV	KL
8	ADD ITEM 22, CHG ITEM 34	731	95.08.15	FV	KL
9	ADD NOTES 7 AND 8	767	96.09.17	CF	TKLL

PART NO.	NEXT ASSY	APPLICATION
BA-S51	BA-S01	MKII SPECTROMETER (1800 LINE GRATING)
BA-S51/B	BA-S01/B	MKIV SPECTROMETERV (1200 LINE GRATING)

COMPUTER GENERATED DRAWING
FILENAME: BA-S51.DWG

QTY. / NO.	U/M	PART NO.	MFR's NO.	DESCRIPTION	REMARKS	ITEM
SCALE	1:1	NEXT ASSY	SEE TABLE			
DATE	80.11.01	DIMENSIONS IN	INCHES			
DWN	RR	IF DUAL DIMS:	mm (inches)			
CHKD	RP	Tolerances (unless otherwise specified)				
APPD	KL	INCHES	MM			
FINISH		.xx ±.005 .xx ± .01 ANGLES ± 1 ° FRACTIONS ± 1/32	.x ±0.13 .x ± 0.25 ANGLES ± 1 °			

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TITLE: GRATING SUPPORT ASSY, BREWER MKII/MKIV

SIZE	SHEET	DOCUMENT NUMBER	REV
D	1 of 1	BA-S51	9

Item No.	BA-S51/B Part No.	GRATING SUPPORT ASSEMBLY Description	Qty
1	BA-S74/A	Grating/Mount Assy, 1800 Line (Holographic)	--
2	BA-S74/C	Grating/Mount Assy, 1200 Line (Holographic)	1.00
3	BM-S52	Grating Arm, 35 Degrees	--
4	BM-S54	Spring Mount Block #1	1.00
5	BM-S55	Spring Mount Block #2	1.00
6	BM-S56	`X' Spring Mount	2.00
7	BM-S57	Grating Control Spring Mount	1.00
8	BM-S58	Push Rod Cone	1.00
9	BM-S66	Wire Spring, Horizontal	4.00
10	BM-S53	Grating Support Plate	1.00
11	BM-S116	Grating Arm, 39 Degrees	1.00
13	BM-S68	Special Screw	1.00
14	BM-S69	Special Screw	2.00
15	BM-S67	Wire Spring, Vertical	1.00
16	78-10-234	Spring, Ext, 3/32"OD x 3/8" x .010" SS Wire	1.00
17	78-10-504	Spring, Comp, 3/16"OD x 2-1/2" x .022" SS Wire	1.00
22	83-79-028	Screw, #2-56 x 5/16"Lg, Skt Hd Cap, SS	8.00
23	83-79-026	Screw, #2-56 x 3/16"Lg, Skt Hd Cap, SS	4.00
24	83-79-027	Screw, #2-56 x 1/4"Lg, Skt Hd Cap, SS	1.00
25	83-79-029	Screw, #2-56 x 3/8"Lg, Skt Hd Cap, SS	1.00
26	83-79-051	Screw, #4-40 x 1/2"Lg, Skt Hd Cap, SS	2.00
28	83-79-054	Screw, #4-40 x 3/4"Lg, Skt Hd Cap, SS	2.00
29	83-79-056	Screw, #4-40 x 1"Lg, Skt Hd Cap, SS	2.00
30	83-79-031	Screw, #2-56 x 1/2"Lg, Skt Hd Cap, SS	2.00
34	85-10-145	ADHESIVE, SEALANT (LOCTITE 242)	0.10
35	85-10-905	ANTI-SEIZE LUBRICANT	2.00
37	83-95-748	Washer, #4, Split Lock, SS	4.00
38	83-95-603	Washer, #2, Internal Tooth Lock, SS	2.00

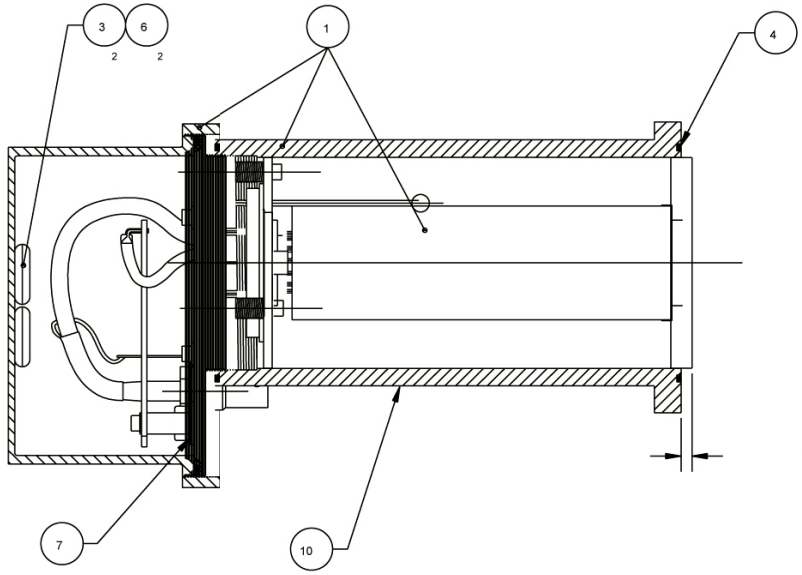
Figure 10.6-4.1

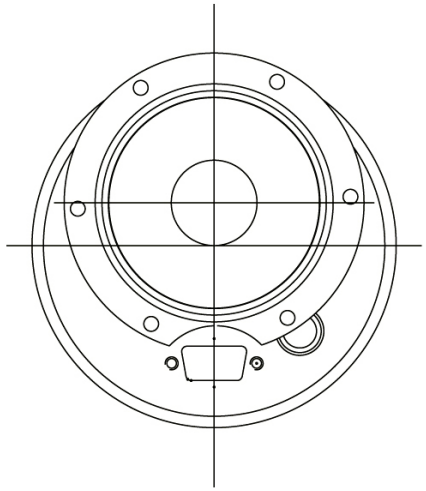
PROCEDURES:

1. WHEN HANDLING PMT ASSEMBLY, BE CAREFUL NOT TO JAR ASSEMBLY; DO NOT TOUCH TOP OF PMT.
2. TIGHTEN HOUSING ON PMT BASEPLATE UNTIL NOTCH IN FLANGE IS ALIGNED WITH THE 9 PIN CONNECTOR AS PER DRAWING.
3. INSTALL O-RING (ITEM 4) COVER OPEN END OF ASSEMBLY TO PROTECT PMT AND SECURE O-RING.
4. REMOVE BASEPLATE COVER FROM PMT ASSEMBLY AND USING ITEM 3 ATTACH ITEM 6 TO INSIDE OF COVER.
5. SEAL AROUND 9 PIN CONNECTOR FLANGE WITH RTV (ITEM 7). RE-INSTALL PMT COVER.
6. ATTACH ADHESIVE LABEL (ITEM 10) INDICATING PMT SERIAL NO. WHERE SHOWN.

DOCUMENT NO. BA-P42

REV	DESCRIPTION	DCN NUMBER	DATE	DWN.	CHKD.
1	FIRST ISSUE		88.09.27	CW	SM
2	SEE DCN	DCN 810	97.04.12	CF	TKLL
3	REPLACEMENT OF PMT	845	99.01.18	MSB	TKLL
4	CHGE ITEM 7 PART NO. (SEALANT)	944	01.09.24	RKF	





NOTES:

1. AFTER THE PROCEDURES HAVE BEEN COMPLETED PLACE FINISHED ASSY IN A CONTAINED BOX. LABEL WITH PART NO. AND REV.

PART NO.	NEXT ASSY
BA-P42	BA-C120, BA-C61/B AND BA-C61/D

COMPUTER GENERATED DRAWING
FILENAME: BA-P42.DWG

QTY - NO.	UM	PART NO.	MFR's NO.	DESCRIPTION	REMARKS	ITEM

SCALE	1:1	NEXT ASSY:	SEE TABLE
DATE	97.04.21	DIMENSIONS IN	INCHES
DWN	CW	IF DUAL DIMS:	mm (inches)
CHKD	RP	Tolerances	(unless otherwise specified)
APPD	SM	INCHES	MM
FINISH		xxx ±.005 xx ±.01 ANGLES ±.1 ° FRACTIONS ±1/32	xx.x ±0.15 x.x ±0.25 ANGLES ±.1 °

SCI-TEC INSTRUMENTS INC.

TITLE: PHOTOMULTIPLIER HOUSING ASSY

SIZE	SHEET	DOCUMENT NUMBER	REV.
C	1 OF 1	BA-P42	4

DOCUMENT NO. BA-P02	REV	DESCRIPTION	DCN NUMBER	DATE	DWN	CHKD.
	1	FIRST ISSUE	391400-RN-289			
	2	DWG REVISED BY A.E.S.	DCN NUMBER	82.08.06	BV	PO
	3	WAS SED 391400-1C-186	8211-DCN-006	82.11.01	DF	KL
	4	DELETE ITEM 15 P.M.T. SKT. & ASSOC. PARTS TO SUB-ASSY ITEM 2, ADD PIN'S TO P.A.	DCN-351	87.11.18	CW	RA
	5	REMOVE ITEM 16; ADD NOTE 2	DCN-584	92.03.25	FV	RP
	6	REDRAWN ON CAD; ADD PROCEDURES	DCN-799	97.04.11	CF	TKLL
	7	SEE DCN	810	98.08.10	CF	TKLL
	8	REPLACEMENT OF PMT	845	98.10.05	MSB	JR

PROCEDURE:

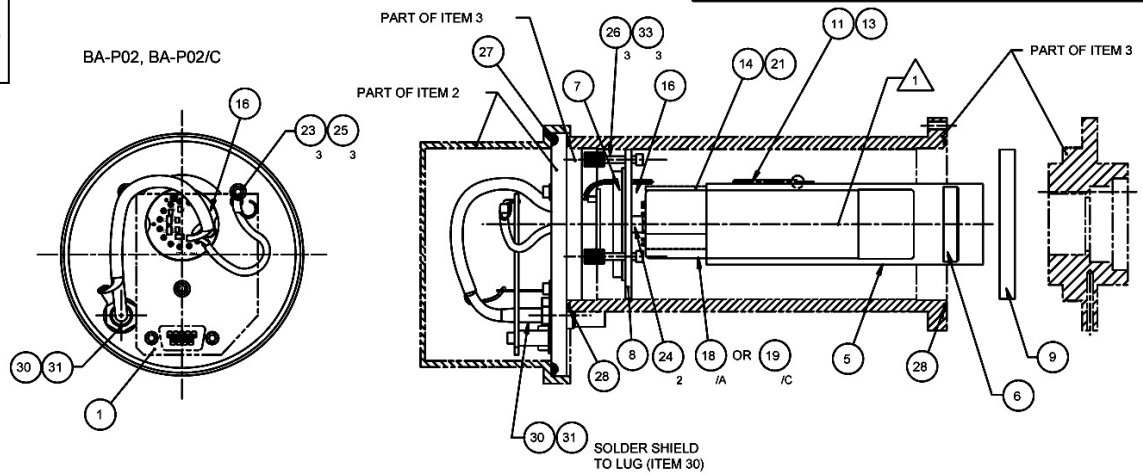
1. GATHER THE NECESSARY PARTS, TOOLS, ETC.
2. USE ITEM 21 TO ATTACH THREE 1" X 0.25" LENGTHS OF FELT (ITEM 14), 120 DEGREES APART, TO THE PMT WHERE SHOWN.
3. TRIM THE HIGH VOLTAGE (LARGER DIAMETER) COAX OF ITEM 16 TO 5-1/2 INCHES FROM THE CIRCUIT BOARD. TRIM THE SIGNAL (SMALLER DIAMETER) COAX OF ITEM 16 TO 3-3/4 INCHES FROM THE CIRCUIT BOARD. REMOVE 1 INCH OF JACKET FROM THE END OF THE HIGH VOLTAGE COAX. REMOVE 1/2 INCH OF JACKET FROM THE END OF THE SIGNAL COAX. UNBRAID THE EXPOSED SHIELD OF BOTH COAX CABLES AND TWIST EACH TO FORM A ROUND WIRE. REMOVE 1/4 INCH OF INSULATION FROM THE CENTER CONDUCTOR OF THE HIGH VOLTAGE COAX. REMOVE 1/8 INCH OF INSULATION FROM THE CENTER CONDUCTOR OF THE SIGNAL COAX. STRIP 1/8 INCH OF INUSLATION OFF EACH END OF A 24 AWG WIRE (ITEM 12), SOLDER TO THE SHIELD OF THE SIGNAL COAX AND COVER SHIELD AND SOLDER JOINT WITH HEATSHRINK (ITEM 15) AS SHOWN.
4. TRIM 1/4 INCH OF INSULATION FROM ONE END AND 1/8 INCH OF INSULATION FROM THE OTHER END OF THE 24 AWG WIRE (ITEM 11). SOLDER THE 1/4 INCH BARE END OF THE WIRE TO THE CENTER OF THE BARE PATCH ON THE SHIELD CAN (ITEM 5). A 40W OR GREATER SOLDERING PENCIL WITH A THICK TIP IS REQUIRED TO DO THIS. INSPECT THE SOLDER JOINT TO ENSURE NO COLD SOLDER OR CRACKING HAS OCCURRED. CLEAN THE SOLDER JOINT WITH APPROPRIATE SOLVENT.
5. TRIM ONE OF THE TABS OFF THE SOLDER LUG (ITEM 30) AS SHOWN. MOUNT THE HIGH VOLTAGE CONNECTOR (ITEM 31) AND SOLDER LUG TO THE ELECTRONICS BASE PLATE (PART OF ITEMS 2 & 3) MAKING SURE THE ANODIZING HAS BEEN REMOVED FROM THE BASEPLATE MOUNTING HOLE FOR GOOD ELECTRICAL CONTACT.
6. MOUNT THE PMT RETAINER (PART OF ITEM 3 ON /A AND /C, PART OF ITEM 4 ON /B) TO THE ELECTRONICS BASE PLATE USING ITEMS 25 AND 23 AND THEN ALIGN IT AS FOLLOWS: INSTALL THE O-RING (ITEM 28) IN THE PMT HOUSING AND SCREW THE PMT HOUSING ON TO THE PMT RETAINER UNTIL IT IS TIGHT AGAINST THE ELECTRONICS BASE PLATE. FOR THE /A AND /C ASSEMBLIES, INSTALL THE OTHER O-RING (ITEM 28) IN THE OTHER END OF THE PMT HOUSING THEN INSTALL THE LENS AND FILTER MOUNT AND TIGHTEN. FOR THE /B ASSEMBLY, THE "D" CONNECTOR CUTOUT IN THE ELECTRONICS BASE PLATE SHOULD BE LINED UP WITH THE CUTOUT IN THE FLANGE OF THE PMT HOUSING. FOR THE /A ASSEMBLY, FACING THE LENS AND FILTER MOUNT, THE HIGH VOLTAGE CONNECTOR CUTOUT SHOULD BE APPROXIMATELY 30 DEGREES CLOCKWISE FROM THE THERMISTOR HOLE IN THE LENS AND FILTER MOUNT. FOR THE /C ASSEMBLY, FACING THE LENS AND FILTER MOUNT, THE HIGH VOLTAGE CONNECTOR CUTOUT SHOULD BE APPROXIMATELY 90 DEGREES COUNTERCLOCWISE FROM THE THERMISTOR HOLE IN THE LENS AND FILTER MOUNT. NOTE THE POSITION OF THE PMT HOUSING RELATIVE TO WHERE IT SHOULD BE THEN LOOSEN THE PMT HOUSING, REMOVE THE THREE SCREWS AND LOCKWASHERS, ROTATE THE PMT HOUSING/PMT RETAINER THE APPROPRIATE AMOUNT AND INSTALL THE THREE SCREWS AND LOCKWASHERS AGAIN. TIGHTEN THE PMT HOUSING AGAINST THE ELECTRONICS BASEPLATE AGAIN TO VERIFY THE CORRECT POSITION THEN UNSCREW THE PMT HOUSING FROM THE PMT RETAINER AND THE LENS AND FILTER MOUNT FROM THE PMT HOUSING, IF APPLICABLE.
7. MOUNT THE PMT SOCKET/DIVIDER ASSEMBLY (ITEM 16) TO THE PMT BASE INSERT USING TWO SCREWS (ITEM 24) AND TWO FLANGE NUTS (ITEM 7) MAKING SURE THAT TERMINAL T5 ON THE DIVIDER PCB IS ADJACENT TO THE SMALL HOLE THROUGH THE PMT BASE INSERT. ENSURING IT IS ORIENTED AS SHOWN IN THE DRAWING, MOUNT THIS ASSEMBLY TO THE ELECTRONICS BASEPLATE USING THREE SCREWS (ITEM 26) WITH A SPRING (ITEM 33) ON EACH SCREW BETWEEN THE ASSEMBLY AND THE ELECTRONICS BASEPLATE. ENSURE THE THREE SCREWS BOTTOM OUT. CUT OFF THE CABLE TIE HOLDING THE HIGH VOLTAGE COAX AND THE SIGNAL COAX OF THE SOCKET/DIVIDER ASSEMBLY TOGETHER.
8. MOUNT THE HIGH SPEED AMP ASSEMBLY (ITEM 1) TO THE ELECTRONICS BASE PLATE AS SHOWN.
9. SOLDER THE HIGH VOLTAGE COAX FROM THE SOCKET/DIVIDER ASSEMBLY TO THE HIGH VOLTAGE CONNECTOR AS SHOWN, MAKING SURE THE SHIELD WRAPS AROUND THE SOLDER LUG.
10. SOLDER THE SIGNAL COAX FROM THE SOCKET/DIVIDER ASSEMBLY TO THE HIGH SPEED AMP ASSEMBLY AS SHOWN.
11. PUSH THE PMT FIRMLY INTO THE PMT SOCKET.
12. INSERT THE PMT END PROTECTOR SPACER (ITEM 6) INTO THE SHIELD CAN (ITEM 5) AS SHOWN. SLIDE THE TEFLON TUBING (ITEM 12) OVER THE WIRE SOLDERED TO THE SHIELD CAN THEN SLIDE THE SHIELD CAN FULLY OVER THE PMT AND FEED THE WIRE AND TEFLON TUBE THROUGH THE HOLE IN THE PMT BASE INSERT. SOLDER THE WIRE FROM THE SHIELD CAN TO T5 ON THE DIVIDER BOARD BEING CAREFUL NOT TO MELT THE JACKET OF THE HIGH VOLTAGE COAX WITH THE SHAFT OF THE SOLDERING PENCIL. SEE NOTE 1 BEFORE PROCEEDING.
13. INSTALL THE PMT CATHODE INSERT (ITEM 9).
14. INSTALL O-RING (ITEM 27) ON ELECTRONICS BASE PLATE THEN ATTACH PMT COVER (OTHER PART OF ITEM 2) TO FOLLOW ASSEMBLY TO NEXT LEVEL.
15. INSTALL O-RING (ITEM 28) ON PMT HOUSING THEN ATTACH PMT HOUSING (2ND PART OF ITEM 3 ON /A AND /C OR ITEM 4 ON /B) TO PMT RETAINER TO FOLLOW ASSEMBLY TO NEXT LEVEL.
16. FOR /A AND /C ONLY, INSTALL O-RING (ITEM 28) ON PMT HOUSING THEN INSTALL LENS AND FILTER MOUNT (3RD PART OF ITEM 3) IN PMT HOUSING TO FOLLOW ASSEMBLY TO NEXT LEVEL.

NOTES:

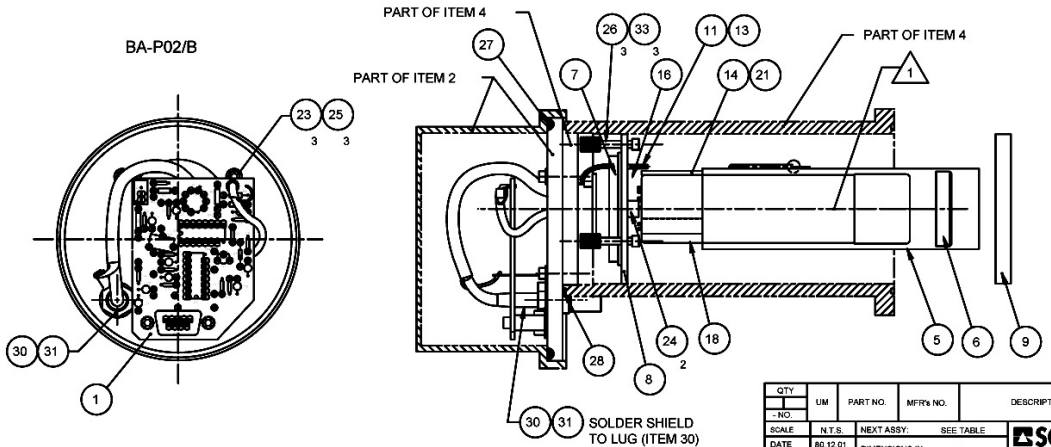
1. TYPE PMT SERIAL NUMBER ON LABEL (ITEM 22) AND APPLY AT POSITION INDICATED ON OUTSIDE OF SHIELD CAN.

Figure 10.6-4.2

BA-P02, BA-P02/C



BA-P02/B



PART NO.	NEXT ASSY	USED ON
BA-P02	BA-P01	BREWER MKII
BA-P02/B	BA-P42	BREWER MKIV
BA-P02/C	BA-P01/B	BREWER MKIII

COMPUTER GENERATED DRAWING
FILENAME: BA-P02.DWG

QTY - NO.	U/M	PART NO.	MFR's NO.	DESCRIPTION	REMARKS	ITEM
SCALE	N.T.S.	NEXT ASSY:	SEE TABLE			
DATE	80.12.01	DIMENSIONS IN IF DUAL DIMS:	- mm (inches)			
DWN	RP	Tolerances (unless otherwise specified)				
CHKD	RA	INCHES	MM			
APPD	KL	xxx ± .005 / xx ± .01 / ANGLES ± 1 / FRACTIONS ± 1/32	xx ± 0.15 / x ± 0.25 / ANGLES ± 1°			
FINISH						

SCI-TEC INSTRUMENTS INC.

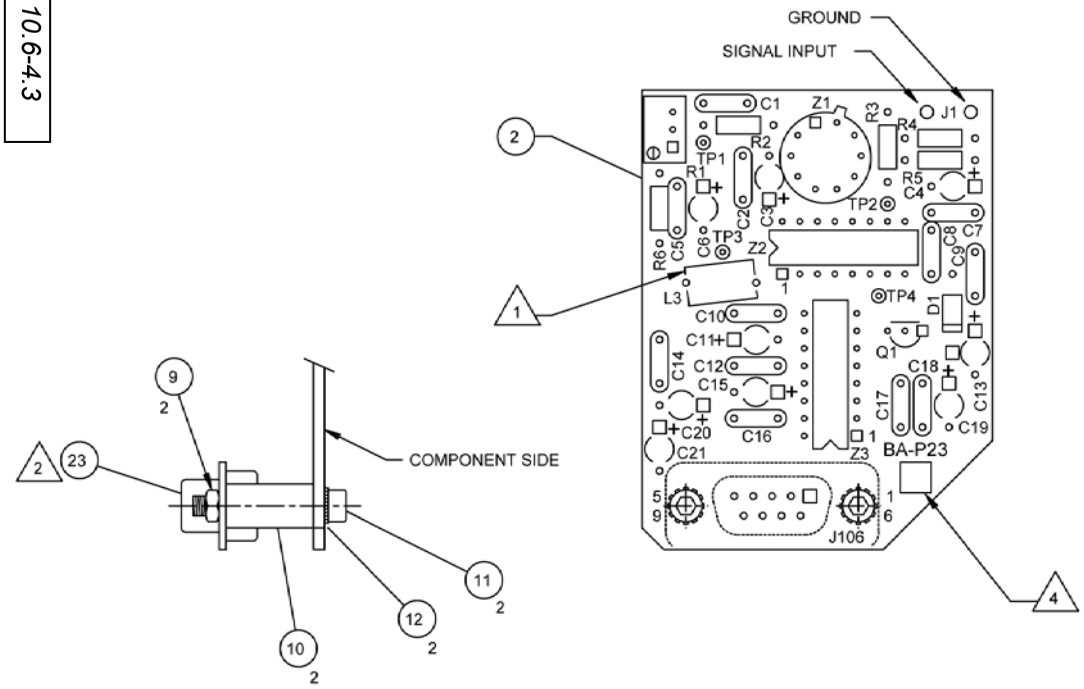
TITLE: PHOTOMULTIPLIER TUBE ASSY

SIZE	SHEET	DOCUMENT NUMBER	REV.
D	1 OF 1	BA-P02	8

	BA-P42	PHOTOMULTIPLIER HOUSING ASSY	
Item No.	Part No.	Description	Qty
1	BA-P02/B	Photomultiplier Tube Assy	1.00
3	85-80385	Adhes Transfer Tape 0.75''	3.00
4	83-10-638	O-Ring #038, 2 5/8 x 2 3/4 x 1/16 N.B.R.	1.00
6	70-10-012	Dessicant 2164 Minipax T 1.56gm – 900/gal	2.00
7	85-10-790	Sealant, Contr Volatility	0.10
10	85-41-115	Label, Adhesive, 3/8'' x 1 1/4"	1.00

	BA-P02/B	PHOTOMULTIPLIER HOUSING ASSY	
Item No.	Part No.	Description	Qty
1	BA-P23	Component Assy, High Speed Amp	1.00
2	BM-P52	Baseplate Cover Assy, PMT	1.00
3	BM-P53	Housing Cap Assy, PMT	--
4	BM-P53/B	Housing Cap Assy, PMT	1.00
5	BM-P54	Magnetic Shield, Can	1.00
6	BM-P55	Spacer, PMT End Protector	1.00
7	BM-P56	Nut, PMT Socket Flange	2.00
8	BM-P57	Insert, PMT Base	1.00
9	BM-P58	Insert, PMT Cathode	1.00
11	99-31-365	Wire Sfrd IRR PVC 24Ga YL	0.24
12	99-31-362	Wire Hookup 24 AWG IRR PV	0.125
13	99-20-291	Slev Tefn 15 Ga 0.059 ID.	0.20
14	98-45-100	Felt, Any Colour, Approx .05" Thk	0.75
15	99-20-049	Sleeving Heat Shrnk 0.187	0.06
16	95-40-082	Photomultply Skt/Vlt Dvdr	1.00
18	89-70-088	PMT 30mm UV CB>11 DC<300	1.00
19	89-70-089	PMT 30mm UV CB>11 DC<100	--
21	85-80-385	Tape, Adhesive, Transfer, 3/4" Wide	1.00
22	85-41-115	Label, Adhesive, 3/8"x1 1/4"	1.00
23	83-95-604	Washer, #4, Internal Tooth Lock, SS	3.00
24	83-79-082	Screw, 8-32 x 3/8" Hsc, SS	2.00
25	83-79-051	Screw, 4-40 x 1/2" Hsc, SS	3.00
26	83-78-023	Screw, Mach 4-40 x 3/4	3.00
27	83-10-644	O-Ring #044 - 3 3/4 x 3 7	1.00
28	83-10-638	O-Ring #038 - 2 5/8 x 2 3	1.00
30	81-90-370	Lug Connector, BNC	1.00
31	81-15-242	Bulkhead Jack, BNC	1.00
33	78-10-527	Sprng Comp,.88x.24dx.018w	3.00

Figure 10.6-4.3



NOTES:

1. ENSURE THE TURNS OF L3 DO NOT COME IN CONTACT WITH EACH OTHER OR CONTACT THE PCB.
2. ASSEMBLE CONNECTOR (ITEM 23) AND H/W AS SHOWN. TRIM PINS TO PROTRUDE .090 ON COMPONENT SIDE OF BOARD AND SOLDER IN PLACE. THE NUTS (ITEM 9) ARE TEMPORARY ONLY AND WILL BE REMOVED WHEN INSTALLED AT THE NEXT ASSEMBLY LEVEL.
3. TEST FINISHED ASSY ACCORDING TO PROCEDURE TP-BA-P23 (ITEM 1).
4. MARK CURRENT REV OF THIS DWG IN BOX PROVIDED.
5. PLACE TESTED ASSY IN ANTISTATIC BAG, ITEM 40, ATTACH LABEL AND IDENTIFY THUS: BA-P23 REV 9.

PART NO.	NEXT ASSY
BA-P23	BA-C122/D, BA-C122/E, BA-C222, BA-P02, BA-P02/B, BA-P02/C

COMPUTER GENERATED DRAWING
FILENAME: BA-P23.DWG

DOCUMENT NO. BA-P23

REV	DESCRIPTION	DCN NUMBER	DATE	DWN	CHKD
3			83.02.01	DF	KL
4		8505-DCN-239	85.05.01	DF	KL
5	P/L REVISION	331	88.01.06	CW	RA
6	REDRAWN - CHG Q1 & UPDATE NOTES	760	95.11.22	FV	RA
7	CHANGE ITEM 10 & 11	786	96.10.09	CF	TKLL
8	CHANGE TO TEST NOTES	880	99.10.14	RKF	TKLL
9	NEW BOARD LAYOUT	953	02.03.11	RKF	

QTY - NO.	UM	PART NO.	MFR's NO.	DESCRIPTION	REMARKS	ITEM

SCALE	2:1	NEXT ASSY:	SEE TABLE
DATE	83.02.01	DIMENSIONS IN	INCHES
DWN	DF	IF DUAL DIMS:	mm (inches)
CHKD	DBW	Tolerances (unless otherwise specified)	
APPD	KL	INCHES	MM
FINISH		.xxx ± .005 .xx ± .01 ANGLES ± 1° FRACTIONS ± 1/32	xx ± 0.15 x ± 0.25 ANGLES ± 1°

Kipp & Zonen

TITLE:
HIGH SPEED AMP
BOARD ASSY

SIZE	SHEET	DOCUMENT NUMBER	REV
C	1 OF 1	BA-P23	9

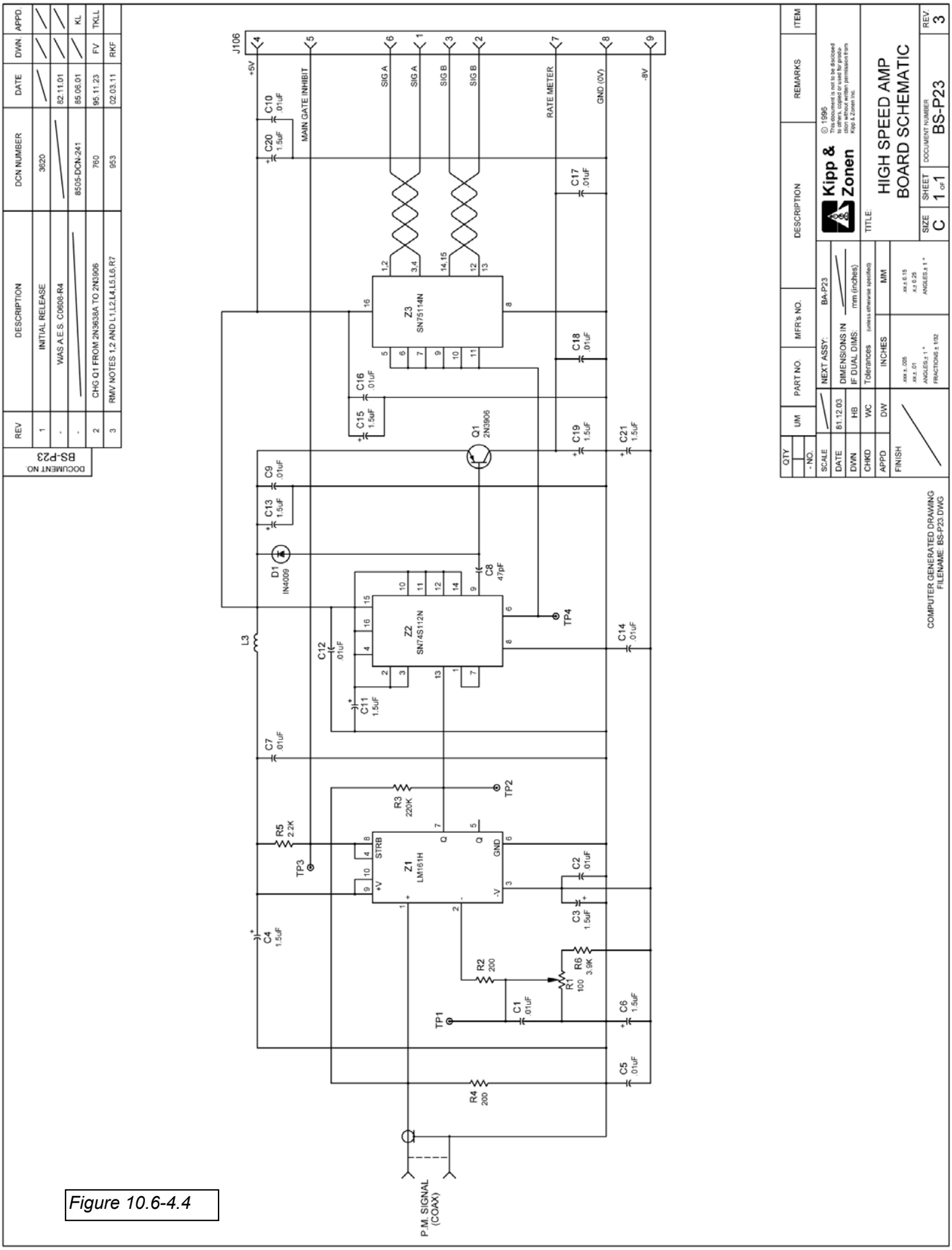
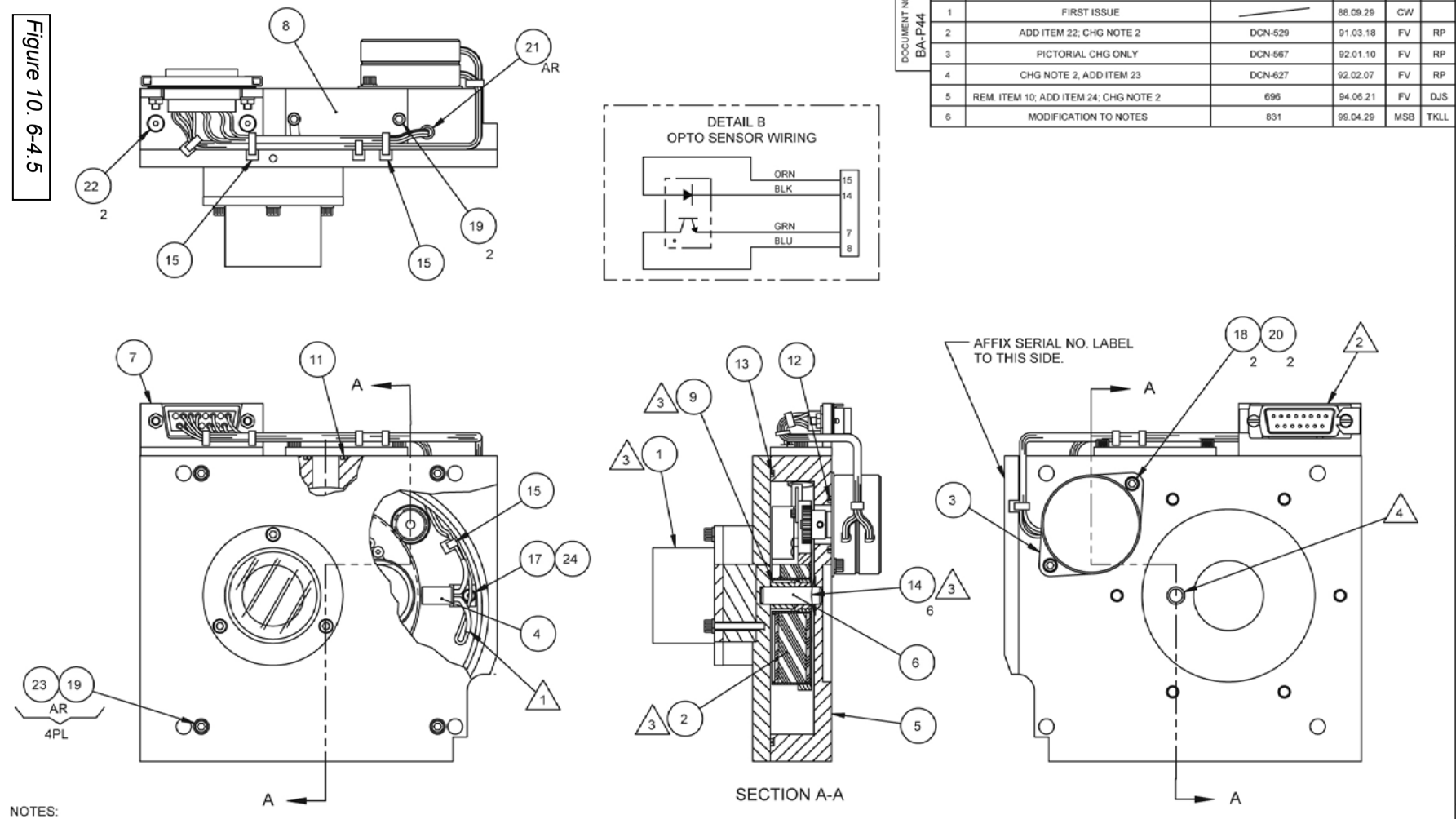


Figure 10.6-4.4

Figure 10. 6-4.5



DOCUMENT NO. BA-P44	REV	DESCRIPTION	DCN NUMBER	DATE	DWN.	CHKD.
	1	FIRST ISSUE		88.09.29	CW	
	2	ADD ITEM 22; CHG NOTE 2	DCN-529	91.03.18	FV	RP
	3	PICTORIAL CHG ONLY	DCN-567	92.01.10	FV	RP
	4	CHG NOTE 2, ADD ITEM 23	DCN-627	92.02.07	FV	RP
	5	REM. ITEM 10; ADD ITEM 24; CHG NOTE 2	696	94.06.21	FV	DJS
	6	MODIFICATION TO NOTES	831	99.04.29	MSB	TKLL

NOTES:

1. FORM WIRE LEADS ON OPTO SENSOR ASSY (ITEM 4) APPROX. AS SHOWN. FEED WIRE THRU HOLE IN ENCLOSURE (ITEM 5) AND INSTALL WIRES INTO CONNECTOR (PART OF ITEM 3).
2. INSTALL SLIDE LOCK CONNECTOR (BAGGED PART OF ITEM 3) TO WIRE ASSY (ITEM 3) AND MOUNT TO HOUSING ASSY.
3. INSTALL 6 NYLON WASHERS (ITEM 14) OVER SHAFT PRIOR TO INSTALLATION OF F.W. #3 ASSY (ITEM 2) AND SPACER (ITEM 9). INSTALL LENS/COVER ASSY (ITEM 1). TEST IN TEST BREWER TO DETERMINE IF FILTERWHEEL #3 IS OPERATING CORRECTLY. IT MAY BE NECESSARY TO REMOVE A NYLON WASHER IF THE FILTERWHEEL IS STICKING.
4. ENSURE SHAFT (ITEM 6) IS SQUARE TO SURFACE OF PLATE AND PROTRUDING .750 MAX.
5. AFTER ASSY, COVER FRONT AND BACK OPENINGS WITH CARBOARD AND/OR MASKING TAPE.
6. BAG AND LABEL WITH PART NO. AND REV.

COMPUTER GENERATED DRAWING
FILENAME: BA-P44.DWG

PART NO.	NEXT ASSY
BA-P44	BA-C61/B, BA-C61/D, BA-C120

QTY - NO.	UM	PART NO.	MFR's NO.	DESCRIPTION	REMARKS	ITEM

SCALE	1:1	NEXT ASSY:	SEE TABLE
DATE	88.07.12	DIMENSIONS IN IF DUAL DIMS:	INCHES mm (inches)
DWN	CW	Tolerances (unless otherwise specified)	
CHKD	RKF	INCHES	MM
APPD	BW	xxx ± .005 xx.± .01 ANGLES ± 1 ° FRACTIONS ± 1/32	.xx.± 0.15 .x.± 0.25 ANGLES ± 1 °
FINISH			

SCI-TEC INSTRUMENTS INC.

TITLE:

FILTERWHEEL NO.3
HOUSING ASSY

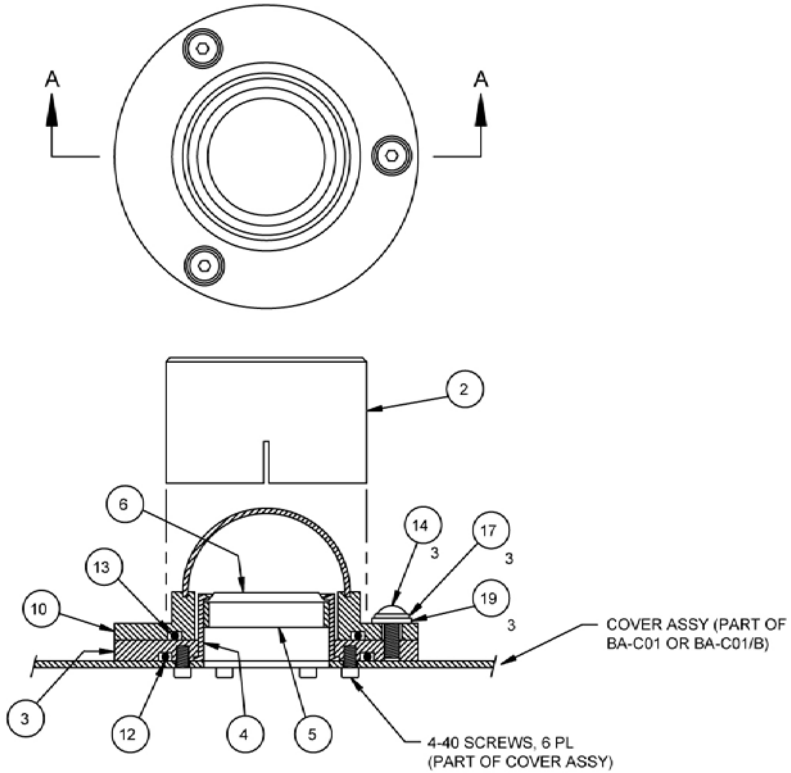
SIZE	SHEET	DOCUMENT NUMBER	REV.
C	1 OF 1	BA-P44	6

	BA-P44	Filter Wheel #3 Housing Assy	
Item No.	Part No.	Description	Qty
1	BA-P43	Lens/Cover Assy	1.00
2	BA-P38	Filterwheel #3 Assy	1.00
3	BA-P40	Motor Assy	1.00
4	BA-P41	Opto Sensor Assy	1.00
5	BM-P35	Filterwheel Enclosure	1.00
6	BM-P28	Shaft	1.00
7	BM-F73	Connector Bracket	1.00
8	BM-P31	Inspection Plate	1.00
9	BM-P26	Spacer	1.00
11	83-10-613	O-ring, #013, 7/16 x 9/16 x 1/16 NBR	1.00
12	83-10-616	O-ring, #016, 5/8 x 3/4 x 1/16 NBR	1.00
13	83-10-644	O-ring, #044, 3-3/4 x 3-7/8 x 1/16 NBR	1.00
14	83-95-030	Washer, 1/4, Flat Nylon 1/2	6.00
15	85-80-450	Cable Tie, 4-1/8 x .10, Nylon, 18lb	3.00
17	83-51-752	Screw, 2-56 x 1/4, Btn Hd Hex, SS	1.00
18	83-79-047	Screw, 4-40 x 1/4, Hex Skt Cap, SS	2.00
19	83-79-049	Screw, 4-40 x 3/8, Hex Skt Cap, SS	6.00
20	83-95-748	Washer, #4 Split Lock, SS	2.00
21	85-10-148	Adhesive, Sealant, Silicone, Black	1.00
22	83-87-163	Screw, 4-40 x 3/8, Fh Hex, SS	2.00
23	85-10-145	Adhesive, Sealant (Loctite 242)	0.01
24	83-95-603	Washer, #2, Int-Tooth, Lock, SS	1.00

BREWER REFERENCE DOCUMENTATION

Section 10.7 Brewer Options

Figure 10.7-1



SECTION A-A

FIGURE 1
UVB DOME INSTALLATION
SCALE 1:1

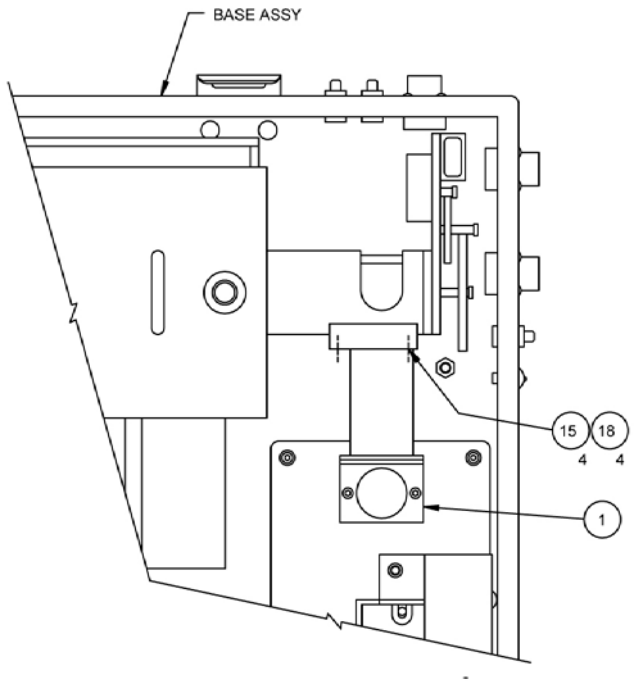


FIGURE 2
UVB PRISM INSTALLATION
SCALE 1:2

DOCUMENT NO. BA-C114	REV	DESCRIPTION	DCN NUMBER	DATE	DWN.	CHKD.
	1	INITIAL RELEASE			CW	RA
	2	CHG DOME INSTALLATION (FIG 1)	DCN568	92.01.15	FV	KL
	3	REPLACE DESICCANT WITH HEATER	822	99.02.25	MSB	

NOTES:

1. ITEMS TO BE INSTALLED ARE SHOWN FOR REFERENCE PURPOSES ONLY, AND ARE PART OF OPTION C KIT, DWG BA-C84.
2. UVB DOME INSTALLATION:
   - REFER TO FIGURE 1 (CAUTION! QUARTZ DOME IS FRAGILE)
   - REMOVE SEALING PLATE (P/N BM-C28) AND O-RING (P/N 83-10-739) FROM COVER ASSY, BA-C21 (PART OF BA-C01 OR BA-C01/B). DRILL 3, Ø.20 HOLES THRU SEALING PLATE, SPOT FROM EXISTING PILOT HOLES AND DE-BURR. BAG SEALING PLATE AND O-RING AND ATTACH TO BREWER ASSY.
   - ASSEMBLE ITEMS 4, 5 AND 6 TOGETHER AS SHOWN. THIS PART IS NOW REFERED TO AS "UVB DIFFUSER".
   - USING NEW O-RING (ITEM 12) AND 6 EXISTING 4-40 SCREWS, FASTEN UVB DIFFUSER AND ADAPTER (ITEM 3) TO COVER.
   - ASSEMBLE QUARTZ DOME (ITEM 10) AND O-RING (ITEM 13) USING ITEMS 14, 17 AND 19.
   - NOTE: PROTECTIVE CAP (ITEM 2) SHOULD ALWAYS BE USED IF COVER IS REMOVED OR UNIT IS MOVED FOR ANY REASON. ATTACH END OF CORD TO CARRYING HANDLE.
3. UVB DOME REMOVAL:
   - IF REMOVAL OF THE UVB DOME IS NECESSARY, THE SPARE SEALING PLATE AND O-RING MAY BE USED TO RE-SEAL THE THE OPENING. FASTEN THESE TO THE UVB ADAPTER (ITEM 3) USING EXISTING HARDWARE USED TO MOUNT THE QUARTZ DOME. CAREFULLY WRAP QUARTZ DOME, UVB DIFFUSER AND O-RING AND STORE FOR FUTURE USE.
4. UVB PRISM INSTALLATION:
   - REFER TO FIGURE 2. INSTALL UVB PRISM ASSY USING ITEMS 15 AND 18.

COMPUTER GENERATED DRAWING
FILENAME: BA-C114.DWG

QTY - NO.	UM	PART NO.	MFR's NO.	DESCRIPTION	REMARKS	ITEM

SCALE	1:1	NEXT ASSY:	BA-C84
DATE	88.08.08	DIMENSIONS IN	INCHES
DWN	CW	IF DUAL DIMS:	mm (inches)
CHKD	RA	Tolerances (unless otherwise specified)	
APPD	RA	INCHES	MM
FINISH		.xxx ± .005 .xx ± .01 ANGLES ± 1 ° FRACTIONS ± 1/32	xx ± 0.15 x ± 0.25 ANGLES ± 1 °

SCI-TEC INSTRUMENTS INC.

TITLE:
OPTION C KIT
INSTALLATION (UVB)

SIZE	SHEET	DOCUMENT NUMBER	REV.
C	1 OF 1	BA-C114	3

	BA-C84	UV Port Assy	
Item No.	Part No.	Description	Qty
1	BA-F81	UVB Prism Assy	1.00
2	BM-C175	UVB Dome Cap	1.00
3	BM-C37	UVB Adaptor	1.00
4	BM-C38	UVB Dome Light Diffuser Holder	1.00
5	BM-C39	UVB Retaining Ring	1.00
6	BM-C40	UVB Diffuser	1.00
10	10-15-101	Quartz Hemisphere, 50mm MTD	1.00
12	83-10-739	O-Ring, 2-1/4"ID x 2-1/2"OD x 1/8, #228	1.00
13	83-10-737	O-Ring, 2"ID x 2-1/4"OD x 1/8, #226	1.00
14	83-51-834	Screw, 10-32 x 1/2"Lg, Btn Hd Hex, SS	3.00
15	83-79-052	Screw, 4-40 x 9/16"Lg, Skt Hd Cap, SS	4.00
17	83-95-787	Washer, #10, Sealing	3.00
18	83-95-748	Washer, #4, Split Lock, SS	4.00
19	83-95-023	Washer, #10, Flat, SS	3.00

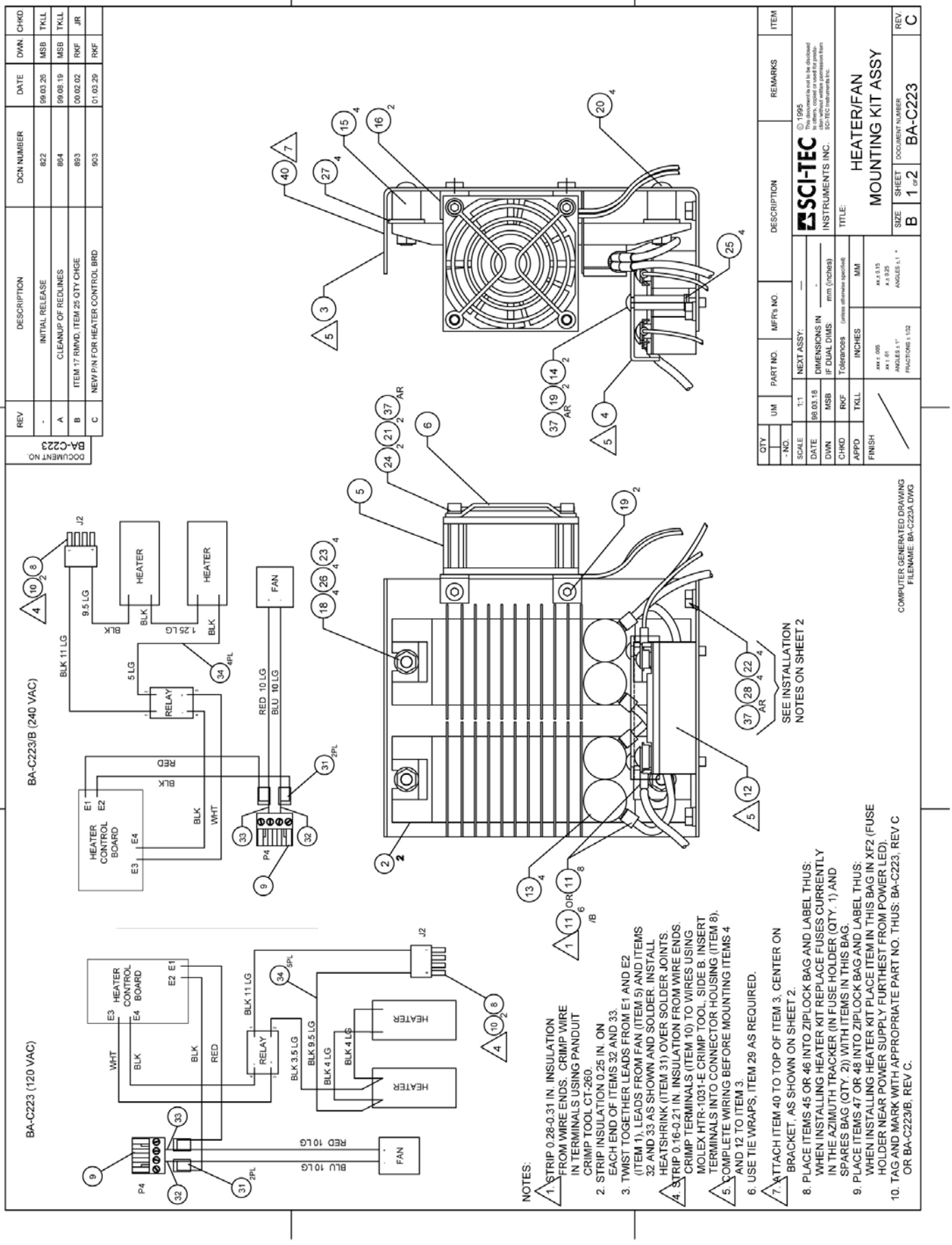
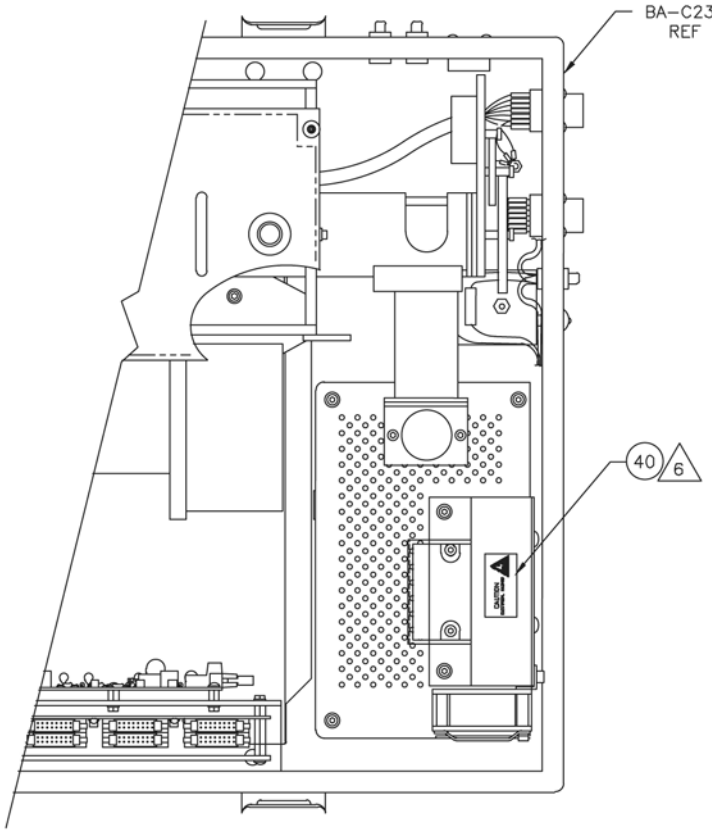


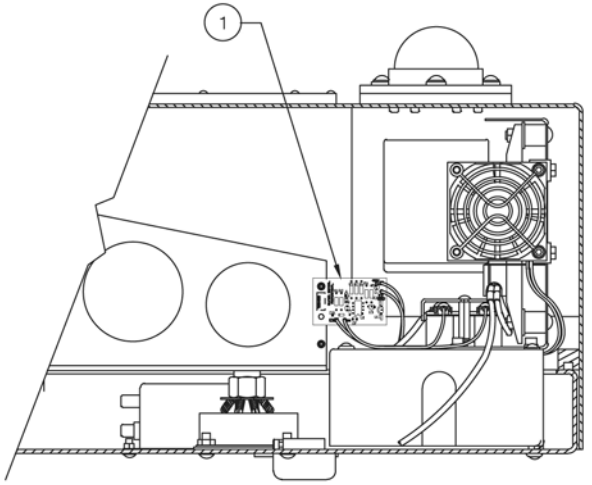
Figure 10.7-2.1

Figure 10.7-2.2

DOCUMENT NO. BA-C223	REV	DESCRIPTION	DCN NUMBER	DATE	DWN.	CHKD.
	–	INITIAL RELEASE	B22	99.03.04	MSB	



SCALE: 1:2



SCALE: 1:2

INSTALLATION NOTES:

1. REMOVE POWER SUPPLY COVER.
2. MOUNT BA-C223 TO COVER THROUGH THE FOUR TAPPED HOLES OF COVER, USING ACCOMPANYING HARDWARE, ITEMS 22, 28 AND 37. THE HEATER KIT MOUNTS WITH HEATER ELEMENTS FACING THE INTERIOR OF THE BREWER. MAKE SURE MOUNTING BRACKET SITS FLUSH TO POWER SUPPLY COVER.
3. CONNECT P4, ITEM 9 TO J4 ON LAMP BOARD. CONNECT ITEM 8 TO P4 CONNECTOR IN BREWER.
4. MOUNT HEATER CONTROL BOARD ASSEMBLY, ITEM 1 TO BA-C191 OR BA-C61 ASSEMBLIES AT LOCATION INDICATED, USING EXISTING HARDWARE.
5. RE-INSTALL POWER SUPPLY COVER.
6. SEE NOTES 7 AND 8 ON SHEET 1.

COMPUTER GENERATED DRAWING
FILENAME: BA-C223B.DWG

QTY /B – NO.	UM	PART NO.	MFR's NO.	DESCRIPTION	REMARKS	ITEM

SCALE	1:1	NEXT ASSY:	—
DATE	98.03.18	DIMENSIONS IN	–
DWN	MSB	IF DUAL DIMS:	mm (Inches)
CHKD	RKF	Tolerances (unless otherwise specified)	
APPD	TKLL	INCHES	MM
FINISH		.xxx ± .005 .xx ± .01 ANGLES ± 1° FRACTIONS ± 1/32	.xx ± 0.15 .x ± 0.25 ANGLES ± 1°

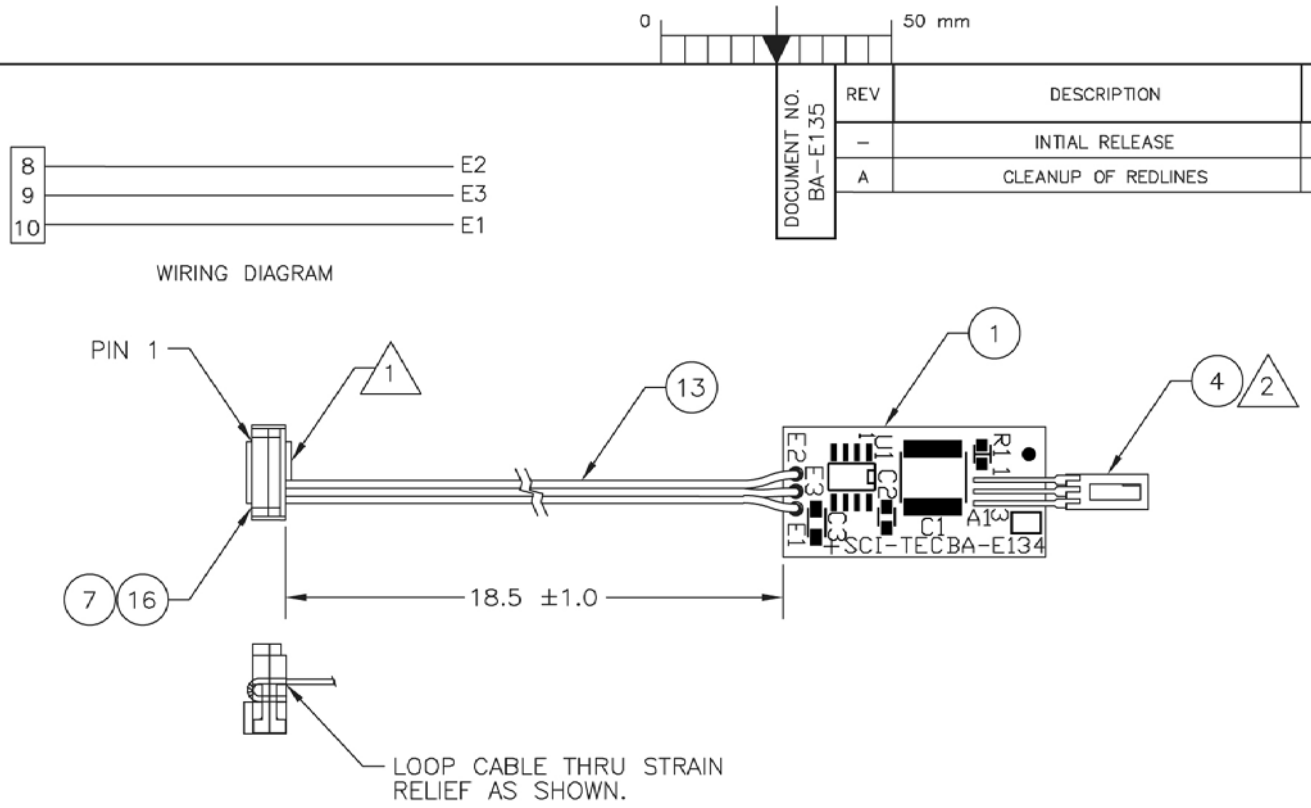
SCI-TEC INSTRUMENTS INC.

TITLE: HEATER/FAN MOUNTING KIT ASSY

SIZE	SHEET	DOCUMENT NUMBER	REV.
C	2 OF 2	BA-C223	–

Item No.	BA-C223 Part No.	HEATER/FAN ASSY Description	120V Qty	230V Qty
1	12501291-2	HEATER CONTROL BOARD ASSY	1.00	1.00
2	BM-E133	FINNED STRIP HEATER, MODIFIED	2.00	2.00
3	BM-C214	HEATER/FAN MTG BRACKET	1.00	1.00
4	BM-C232	HEATER SHIELD PLATE	1.00	1.00
5	93-10-010	FAN,AXIAL,12V,23.5CFM	1.00	1.00
6	93-10-011	FINGER GUARD,CHROME PLTD	1.00	1.00
8	81-40-192	CONNECTOR, 4 CCT, PLUG, .093	1.00	1.00
9	81-52-642	HEADER,4 SOCKET PLUG	1.00	1.00
10	83-25-024	TERMINAL, CONNECTOR,.093,18-22GA,FEM	2.00	2.00
11	83-25-882	TERM,RNG,NON IN,22-18,#10	8.00	6.00
12	87-70-065	RELAY,ANLG INPT PWR CNTRL	1.00	1.00
13	89-30-040	TERMINAL COVERS,CERAMIC	4.00	4.00
14	83-09-891	SPACER,HEX,M/F,8-32X7/8LG	2.00	2.00
15	83-09-473	SPCR,1/2"ODX1/2"L,AL,ALOD	4.00	4.00
16	83-20-110	BRCKT,CRNR,2HL,6-32,1/16T	2.00	2.00
17	83-40-283	NUT, 8-32 X HEX STD PAT SS	2.00	2.00
18	83-40-298	NUT, 10-32 X 3/8 HX SS ST	4.00	4.00
19	83-51-800	SCRW 8-32 X 1/4 BUTTON HD	4.00	4.00
20	83-51-839	SCREW,10-32 X 1 BUTTON HD	4.00	4.00
21	83-79-077	SCREW,MACH 6-32 X 1 1/4 HSC, SS	2.00	2.00
22	83-40-278	NUT, HEX, 8-32 X 1/4 X 3-32, SS	4.00	4.00
23	83-95-023	WASHER, #10 FLAT SS 7/16	4.00	4.00
24	83-95-749	WASHER #6 SPLIT LOCK SS	2.00	2.00
25	83-95-750	WASHER #8 SPLIT LOCK SS	6.00	6.00
26	83-95-752	WASHER, #10 SPLIT LOCK SS	4.00	4.00
27	83-95-860	WASHER,MICA,HEATER MNT'G	4.00	4.00
28	83-95-606	WASHER #8 INT TOOTH LK SS	4.00	4.00
29	85-80-450	TIE CABLE 4-1/8X.1 NYL 18	6.00	6.00
31	99-20-035	SLEEVING HEATSHRINK .125	0.13	0.13
32	99-31-482	WIRE STRD IRR PVC 18GA BLK	0.85	0.85
33	99-31-483	WIRE STRD IRR PVC 18GA RED	0.85	0.85
34	99-45-064	WIRE 18GA SEW-2 7-STR BLK	3.00	2.27
37	85-10-145	ADHESIVE, SEALANT LOCTITE	0.10	0.10
40	BM-C189	WARNING LABEL, ELEC HAZARD	1.00	1.00
45	91-15-252	FUSE, 2.5A, 250V, SLOW BLOW	--	3.00
46	91-15-262	FUSE, 4A, 250V, SLOW BLOW	3.00	--
47	91-15-280	FUSE, 4A, 125V, SB, 5X20MM	1.00	--
48	91-15-834	FUSE, 2A, 250V, SB 5X20MM IEC	--	1.00

Figure 10.7.3



DOCUMENT NO. BA-E135

REV	DESCRIPTION	DCN NUMBER	DATE	DWN.	CHKD.
–	INTIAL RELEASE	856	99.06.01	MSB	TKLL
A	CLEANUP OF REDLINES	864	99.08.19	MSB	

NOTES:

1. CUT OFF WIRES FOR PINS 1 THROUGH 7 APPROXIMATELY .13 IN. FROM CONNECTOR STRAIN RELIEF AS SHOWN.
2. ENSURE LEADS OF ITEM 4 LINE UP WITH PADS ON BOARD THEN SOLDER IN PLACE.
3. TEST BOARD USING TP–BA–E135 (ITEM 19).
4. WRAP ENTIRE BOARD WITH TAPE (ITEM 10), MAKING SURE TO STRETCH TAPE WHILE WRAPPING, LEAVING BODY OF ITEM 4 EXPOSED AND COVERING E1–E3 CONNECTIONS.
5. BAG USING EXISTING BAG AND RELABEL WITH DWG NO. AND REV. INSTALL LABEL WITH CHANNEL NO. ON TAPE.

COMPUTER GENERATED DRAWING
FILENAME: BA–E135.DWG

QTY /B – NO.	UM	PART NO.	MFR's NO.	DESCRIPTION	REMARKS	ITEM

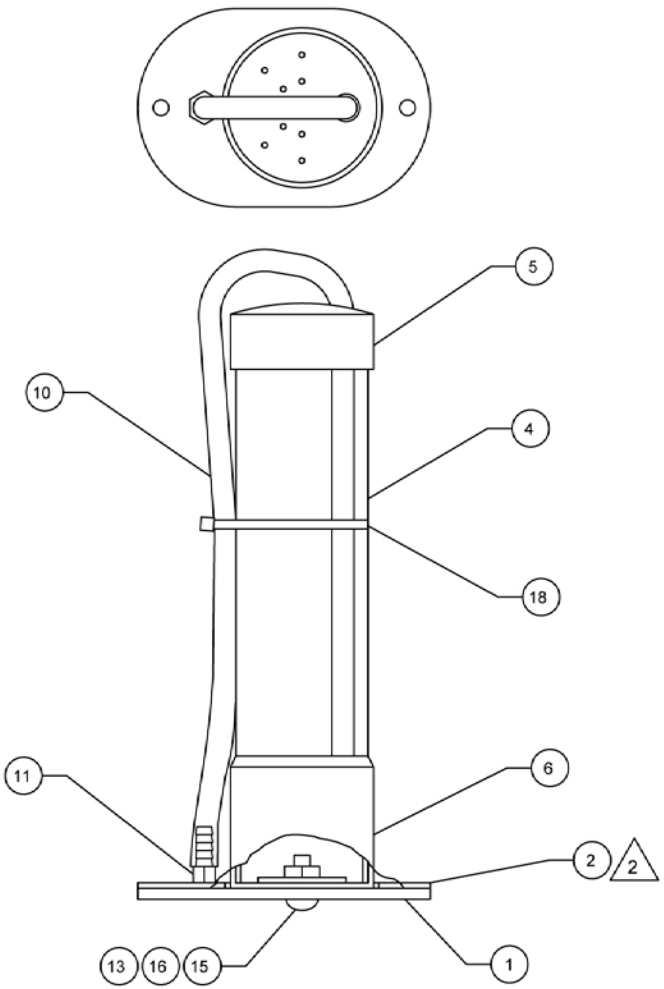
SCALE	2:1	NEXT ASSY:	–
DATE	99.04.22	DIMENSIONS IN	INCHES
DWN	MSB	IF DUAL DIMS:	mm (inches)
CHKD	RKF	Tolerances (unless otherwise specified)	
APPD		INCHES	MM
FINISH	———	.xxx ± .005 .xx ± .01 ANGLES ± 1° FRACTIONS ± 1/32	.xx ± 0.15 .x ± 0.25 ANGLES ± 1°

SCI-TEC INSTRUMENTS INC.

TITLE: HUMIDITY SENSOR FINAL ASSY

SIZE	SHEET	DOCUMENT NUMBER	REV.
B	1 OF 1	BA–E135	A

Figure 10.8



DOCUMENT NO. BA-C233	REV	DESCRIPTION	DCN NUMBER	DATE	DWN.	CHKD.
	1	INITIAL RELEASE	900	00.05.19	RKF	BW
	2	CHANGE TO BOTTOM CAP AND GASKET	939	01.07.12	RKF	BW
	3	CHANGE TO TOP AND BOTTOM CAPS	951	02.04.29	RKF	

NOTES:

1. ATTACH ITEMS 8 AND 14 TO TUBE WITH TAPE FOR INSTALLATION OF CARTRIDGE AT NEXT ASSEMBLY LEVEL.
2. REMOVE PROTECTIVE BACKING FROM GASKET AND FIT AS SHOWN.
3. BAG AND LABEL THUS: BA-C233/A R3.

PART NO.	NEXT ASSY
BA-C233/A	BA-C230, BA-C230/B BA-C231, BA-C112/B

COMPUTER GENERATED DRAWING
FILENAME: BA-C233.DWG

QTY - NO.	UM	PART NO.	MFR's NO.	DESCRIPTION	REMARKS	ITEM

SCALE	1:1	NEXT ASSY:	SEE TABLE
DATE	00.05.12	DIMENSIONS IN	———
DWN	RKF	IF DUAL DIMS:	mm (inches)
CHKD	RKF	Tolerances	(unless otherwise specified)
APPD	BW	INCHES	MM
FINISH		.xxx ± .010 .xx ± .02 ANGLES ± 1 ° FRACTIONS ± 1/32	.xx ± 0.15 .x ± 0.25 ANGLES ± 1 °

Kipp & Zonen

TITLE:
DESICCANT HOLDER ASSY

SIZE	SHEET	DOCUMENT NUMBER	REV.
C	1 OF 1	BA-C233	3