Introduction

The Elrepho 3000 is a stand-alone spectrophotometer intended primarily for manufacturers and users of pulp and paper products. It is a dual-beam instrument designed to report reflectance at 10nm intervals in the visible spectrum (400-700nm). The Elrepho 3000's vertical configuration and through-the-sphere sample viewer make sample presentation and alignment a simple operation.

Measurement "tasks" as defined by ISO, DIN, SCAN and TAPPI standards are supported. These include tasks for measuring brightness, whiteness, yellowness, opacity, scattering and absorption, and transparency, as well as industry standard colorimetric values.

A 2 1/2" square backlit LCD is used for displaying user prompts and measurement data. Data is input via a 5-button "soft" keypad mounted on the front panel. The LCD is used to label the keys to indicate their function, which varies from mode to mode.
An alpha-numeric keyboard for users who require it, and a printer for measurement results are standard features on the Model 3300, and optional on the Model 3100.

The Elrepho 3000 features a procedure-oriented-user-interface which guides the operator through each step of the measurement process. Procedures can be defined to specify a set of measurement made for a particular job or customer. With the Elrepho 3000, operators can begin performing measurements immediately with virtually no training.

Introduction

Features

The Elrepho 3000 supports the following features:

- d/0° Reflectance Geometry

- Specular Excluded Only (gloss component excluded)

- XLAV, SAV, and USAV viewing areas

- UV Included/Excluded

- UV Cut-off Filters at 420nm and 460nm

- A single UV calibrator position; UVCAL

- Illuminants: A, C, CWF, D50, D65, D75, TL84, U3000

- Observers: 2°, 10°

- Onboard Instrument Diagnostics

- Sample Averaging

- Data input via external keyboard(optional on Model 3100)

- Data output via external printer (optional on Model 3100)

- Support Calibration with either the white tile or 3rd party white reference standards

- User settable re-calibration time interval

- Password protection of setup data

Introduction

Elrepho Model Types

Two model types are available, which support all industry
standards for paper measurements.

Model	Description
3100	Most frequently used whiteness and brightness functions, as well as tristimulus and paper task functions. Used for the quality control of white paper.
3300	All features of Elrepho 3100 plus additional whiteness and brightness functions, together with basic colorimetric functions. Instrument used in either production or laboratory environments.

Refer to the following sections for a complete description of all Formula
Types available for each instrument:

- Colorimetrics
- Indexes
- Paper Tasks

Instrument Overview

The Elrepho 3000 is equipped with a 6-inch diameter integrating
sphere to provide measurements using d/0 geometry with the

specular component excluded. The light source used is a long-life Xenon flash lamp.

An automated filter wheel provides for measuring whiteness, brightness and other fluorescent phenomenon. It includes cutoff filters for 400nm (UVEXC), 420nm (UV420) and 460nm (UV460). The 400nm UV filter can be used as a variable UV filter (UVCAL) to provide the correct UV illumination required to perform whiteness measurements. Measurements can also be made with full UV inclusion (UVINC).

The collection optics consist of lenses and fiber optics on both the sample and reference channels. The sample channel uses a motorized zoom lens that can be set for measurement diameters of 2.5mm (USAV), 5mm (SAV) and 29mm (XLAV). The reference channel lens is fixed and collects light from the sphere wall. The use of a reference beam allows differential measurements that minimize drift and improve instrument stability.

The analyzer (MC90) is a dual-channel holographic grating based spectrometer using two custom photodiode arrays (128 diodes each); one for the sample channel and one for the reference channel. Reflectance data is measured at 3nm intervals and reported in 10nm intervals from 400 to 700nm.

Instrument Overview

Sample Viewing

The sample viewer (flashlamp automatically disabled), located just below the LCD display screen, offers a way of viewing your sample for accurate positioning. The viewer can be closed using the manual red viewer shutter to the right of the viewer.

See *Figure 1* in the *Quick Start* section.

Measure Button

The measure button is the red button on the front of the instrument to the left of the viewer. See *Figure 1* in the Quick Start section.

Aperture Plates

Three aperture plates are included: the XLAV, SAV and USAV plates allow accurate measurements of small and very small samples, while the extra large area view plate is recommended for irregular and textured sample averaging.

Aperture plates should be installed with the beveled edge facing the sphere and the side stamped with the plate size facing the sample holder.

Accessories

The standard instrument is supplied with an accessory box containing the following:

White Tile   SAV Aperture Plate
Black Trap   USAV Aperture Plate
Green Tile (for diagnostic testing)
XLAV Aperture Plate (shipped with the aperture in place)

The Model 3300 is also equipped with an external printer and keyboard as standard features; these are optional on the Model 3100..

Instrument Overview

Sample Placement

Figure 3 illustrates the position for sample placement, (and also placement of the black trap and white tile for calibration). The cylindrical, spring loaded sample holder can be depressed to position your sample; a quarter turn to the right will lock it in

place. A quarter turn of the cylinder to the left returns it to the normal position.
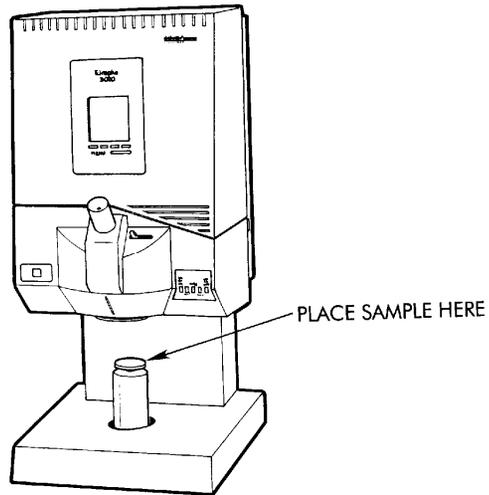

Figure 3: Sample Placement

It is important never to move a sample without releasing the tension on the cylinder.

Installation

Electrical Requirements

AC Input Power: 95 - 265vac, 45 - 65Hz, 50VA

The Elrepho needs a distortion free dedicated power line capable of carrying 10 amps. The neutral leg to earth ground must not exceed 2 volts with 0.1 ohm maximum resistance.

WARNING ⚠

The ground circuit for the power outlet must be continuous to the main power panel which must be grounded directly to an electrical earth ground. Improper grounding could result in a shock hazard.

Note also that the Elrepho does not have a user changeable fuse. It is built into the instrument, and can only be changed by Datacolor International service personnel.

Dimensions

Both the Elrepho 3100 and 3300 use vertical sample presentation and have the following dimensions:

Height	14.5"/368mm	Width	11.5"/292mm
Depth	18.5"/470mm	Weight	31 lbs/14kg

Environmental Requirements

Operating Temperatures:	5-40 degrees C
	50-105 degrees F
Relative Humidity (Non-Condensing):	20-85%

Installation

Interconnection and Power Cabling

AC Power Cable

The Elrepho is supplied with a six foot power cable. Power is applied to the rear of the unit via a three prong male connector.

Communications

Interaction between the Elrepho and a computer processor is provided via the communications cable. The six foot cable is equipped with a 9-pin male to female connector assembly. The male connector fastens to the RS-232C female connector located on top of the instrument. The remaining end of the cable connects to a computer communications connector. Also included is a 25-pin to 9-pin adapter for users with 25 pin serial port connectors on their computer. To insure proper signal connection, each assembly must be tightened securely. A description of the RS-232C connector pin assignments

9 Pin	25 Pin	Description	Direction
3	2	Transmit Data	Out (to host)
2	3	Receive Data	In (from host)
5	7	Signal Ground	------------

Table 1. **RS-232C Connector Pin Assignments**

Notes:
  1. <u>DO NOT WIRE</u> to Pins other than those listed above.
  2. The default for all unused inputs is active high

Display Mode

The Display Mode is the top level mode. When you first turn on your instrument, it will be in the Display Mode.
This mode has three menus, as shown below. Use the **MENU** key to move between the menus.
Not all keys are displayed at all times; some keys depend on the instrument's calibration status, and whether unsaved sample data is available to be saved, etc.

PRINT	SAVE	—TSK	+TSK
MEAS	JOB	SAMP	CALIB

MEAS	HOST	SETUP	CALIB

```
6/26/95            14:21:45
 JOB:    JOB 1
 SAMP:   SAMPLE 2
 TASK:   % R DATA 1
 CND:    XLAV/UVINC
 ILLM:   C/2

         % R DATA
   400  39.21     480  43.96
   410  40.05     490  44.31
   420  40.92     500  44.65
   430  41.49     510  44.91
   440  42.15     520  45.13
   450  42.63     530  45.37
   460  43.04     540  45.45
   470  43.54     550  45.63

 PRINT   SAVE    -TSK    +TSK
```

PRINT Prints data for the displayed screen. Depending on the print mode settings for the job, either the task data currently displayed will be printed, or the task data for all tasks in the job will be printed.

SAVE Saves data from the Measurement Mode which has not yet been saved.

Display Mode

-TSK Displays the measurement data for the previous task in the job's procedure.

+TSK Displays the measurement data for the next task in the job's procedure.

MEAS Enters the Measurement Mode (can also press the Measure Button). Refer to the Measurement Mode section for details.

JOB Enters Job Selection or Change Job Mode, which allows the creation of a new job, or selection of

an existing job. Refer to that section for details
on its operation.

SAMP   Enters "Sample Selection" mode, which allows
the selection of previously stored sample data.

CALIB   Enters the Instrument Calibration Mode. Refer to
that section for details.

HOST   Enters the Host Mode, which allows
communications with your PC.

SETUP   Enters the main level of the Setup Mode. Refer to
that section for details.

Sample Selection Mode

Press the **SAMP** key in the Display Mode to select a previously
saved sample for the current job; a list of all samples saved will be
displayed.
Not available if samples have not been saved for the current job.

Editing a Name Field

Most data in the Elrepho 3000 is referenced by name. This includes
tasks, procedures, jobs and sample measurements. All modes will
provide default names for their data, however, you may want to edit
the name to better indicate what it is.
When editing a name, the editable character in the name will be
highlighted. If the first character of the name is highlighted and the
name has not yet been edited, the name will be cleared when the
EDIT key is pressed for the first time. This provides a quick way to
erase the default name.

When a name field is highlighted, the following soft key labels will
be displayed.

→	↓	EDIT	SAVE

The function of these keys are as follows:

➔   Use to move through the characters of a name.

↓   Use to move down to the next field.

EDIT   Use to change the character currently highlighted to the next character in the alphabet.

SAVE   Use to keep settings for all fields edited on the current screen.

In addition, the following keys on the external keyboard function when editing name fields:

Home	Moves to the first character in a "name" field.
End	Moves to the last character in a "name" field.
Up Arrow	Highlights the previous option or item.
Down Arrow	Highlights the next option or item.
Left Arrow	Moves one character to the left in a "name" field.
Right Arrow	Moves one character to the right in a "name" field.

Instrument Setup

After you have used and tested the DEMO PROCEDURE and measurement tasks supplied with your system (discussed in the Quick Start section), the Elrepho 3000 should be set up to meet the requirements of your facility.
Listed below are the requirements to set up your instrument:

1. Define the *Measurement Tasks* to be used (see Data Maintenance Mode - Task Maintenance)
2. Define the *Procedures* to be used (see Data Maintenance Mode - Procedure Maintenance)
3. Establish the Calibration Setup to use and set the UV filter calibrator position (See Setup Mode - Calibration Setup)
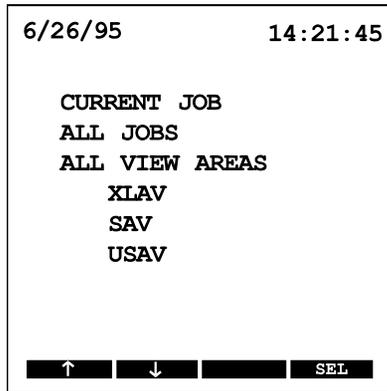4. Calibrate the instrument (see Calibration - Instrument Calibration)

5. Read the *Diagnostic Tile* (See User Diagnostics)

Once the instrument has been set up to conform to your operating environment, a *job* can be defined, and measurements can be made and displayed.

Calibration

Instrument Calibration Mode

This is accessed by selecting the **CALIB** soft key from the Display Mode (see the Quick Start section). This is where you perform routine calibration of the instrument using a black trap and user selected white calibration standard. The parameters for the white calibration standard can be set up by selecting the CALIB SETUP option in the Setup Mode.

```
6/26/95              14:21:45


   CURRENT JOB
   ALL JOBS
   ALL VIEW AREAS
      XLAV
      SAV
      USAV




   ↑      ↓             SEL
```

The following calibration options are available from this mode:

Current Job   Calibrates all measurement conditions
needed for the current job

All Jobs   Calibrates all measurement conditions defined
for all jobs currently stored in the instrument

All View Areas   Calibrates all measurement conditions for all
viewing areas

XLAV   Calibrates only the Extra Large Area view
conditions

Calibration

Instrument Calibration Mode (cont)

SAV   Calibrates only the Small Area View Conditions

USAV   Calibrates only the Ultra Small Area View
conditions

White standard and black trap measurements will be performed
with the UV filter in the UVINC, UVEXC (400nm cutoff filter),
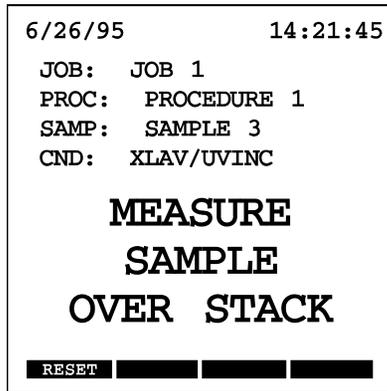
UV420 (420nm cutoff filter), UV460 (460nm cutoff filter), and UVCAL (specific UV calibrator step) positions.
Some of the UV filter positions may not be calibrated when either the "Current Job" or "All Jobs" option is selected (when jobs are defined).

Once the calibration procedure is started, prompt messages will be displayed when any actions need to be performed; i.e., position white standard or black trap, adjust mechanisms.
You can press the **MENU** key to exit the calibration procedure. The following is an example of a prompt message you will see to measure the black trap for XLAV mode. The X's indicate the name of the white reference calibration standard to be measured. See "Calibration Setup Mode".

```
 6/26/95              14:21:45


   STD: XXXXXXXXXXXX

     SETUP  XLAV
       MEASURE
        BLACK
        TRAP
```

Measurement Mode

This mode is used to measure samples for the current job. It is entered by pressing the **MEAS** key or the Measure Button while in the Display Mode.
The current job's procedure is used to determine how the sample and the instrument should be set up for each measurement required. Prompts will be displayed if any operator action is required. When prompted to perform a measurement, press the red **MEASURE** button located to the left of the sample viewer.

```
6/26/95              14:21:45

 JOB:   JOB 1
 PROC:   PROCEDURE 1
 SAMP:   SAMPLE 3
 CND:   XLAV/UVINC

        MEASURE
        SAMPLE
     OVER  STACK

 RESET ▮▮▮▮▮ ▮▮▮▮▮ ▮▮▮▮▮
```

While in the Measurement Mode, the soft keys are labeled as follows:

RESET	BACK		

RESET   Cancels all measurements made for this sample, and restarts the measurement process at the first step. You will be prompted as required to set up the instrument and perform measurements.

Measurement Mode

BACK   When displayed, it will cancel the last set of readings. If you are sample averaging, only the last sample measurement will be cancelled.

After you complete all measurements for the sample, the program will exit the Measurement Mode and enter the Display Mode. The measurement results can then be viewed and saved.

Note: Press the **MENU** key at any time to cancel current current measurement data and data collected for the current current sample.

You will then return to the Display Mode.

Measuring Paper Samples

Some formulas used by the paper industry to measure the characteristics of paper require a particular sample setup and illuminant, and may require multiple measurements. These measurements must be in accordance with the following table:

MEASUREMENT TERMINOLOGY	DESCRIPTION
MEASURE SAMPLE OVER BLACK TRAP	Measurement of a single sample over a completely black surface (hollow body, %R < 0.5%). The Elrepho will expect this measurement to be over the Black Trap.

MEASURE SAMPLE OVER STACK	Measurement of a sample over a stack of sample paper of the same quality, thick enough to insure no transmission of light through the stack
MEASURE SAMPLE OVER WHITE STANDARD	Measurement of a single sample over the white calibration standard used to calibrate the Elrepho.

If a job's procedure inlcudes a "Print Contrast Task" for coated paper, the message will instruct to MEASURE PRINTED SAMPLE........ or MEASURE UNPRINTED SAMPLE...........

There are two methods which will determine the manner in which samples will be measured.

METHOD 1	Measure a single sample over the black trap, then over a stack of white sample paper of the same quality.
METHOD 2	Measure a single sample over the black trap, then over the white calibration standard used to calibrate the instrument.

During *job setup* you can specify which method to use.
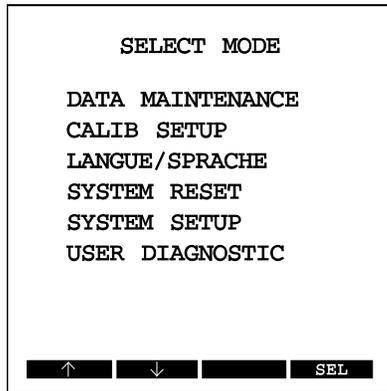
Measuring Paper Samples

If **METHOD 1** is selected (over black trap and over stack of same quality paper), and a task required a *normal* type of measurement, e.g. CIELAB DATA, that measurement will be assumed to have been made over a stack of paper and its data will be *shared* to eliminate one measurement.

Similarly, if **METHOD 2** is selected (over black trap and over white standard), the sample will be assumed to have been measured over the white tile, therefore, the data will be taken directly from the white calibration standard currently in use.

Setup Mode

The setup selection mode is entered by pressing the soft key labeled **SETUP** from the main menu. This mode will display a list of setup options as described below. To select one of these setup options, use the ↑ or ↓ key to highlight the desired mode and then press the **SEL** key.

Note: If password protection is enabled, you have to enter the enter the password before you can access the Setup Mode. Mode.

```
┌─────────────────────────────┐
│                             │
│       SELECT MODE           │
│                             │
│     DATA MAINTENANCE        │
│     CALIB SETUP             │
│     LANGUE/SPRACHE          │
│     SYSTEM RESET            │
│     SYSTEM SETUP            │
│     USER DIAGNOSTIC         │
│                             │
│                             │
│  ┌───┬───┬───┬─────┐        │
│  │ ↑ │ ↓ │   │ SEL │        │
│  └───┴───┴───┴─────┘        │
└─────────────────────────────┘
```

Data Maintenance   For creating, editing, and deleting measurement tasks, procedures, jobs and standard and sample data.

Calib Setup   For setting up calibration parameters such as the UVCAL filter position, recalibration interval, and Ganz/Griesser parameters.

Langue/Sprache   For setting the language for all displays and printouts.

Setup Mode

System Reset   For resetting the instrument to the factory default conditions.

System Setup   For setting instrument level data such as the date/time, active illuminant, formulas and LCD sleep time. Also for setting the keyboard and printer parameters.

User Diagnostic   For performing routine diagnostics.

Data Maintenance Mode

This mode provides access to several Data Maintenance modes, which are used to create, edit and delete *Jobs, Sample Data, Standards*, *Procedures* and *Tasks*. This mode also provides a way to delete *all* job and sample data stored in memory.
When this mode is entered, the quantity of each data type currently stored in memory will be displayed.

```
6/26/95           14:21:45
  ENTRIES AVAIL       462
  EXISTING
     JOBS:              3
     STANDARDS:         2
     PROCEDURES:        2
     TASKS:            14

     SAMPLES:           3
     MEASUREMENTS:     14

  DELETE
     ALL JOBS & SAMPLES
     ALL SAMPLES
    ┌──────┬──────┬──────┬──────┐
    │  ↑   │  ↓   │      │ SEL  │
    └──────┴──────┴──────┴──────┘
```

Use the ↑ or ↓ key to highlight the desired data type.

Press the **SEL** key on one of the options at the top of the screen to enter the Data Maintenance mode to create, edit or delete that particular type of data.

When you are on one of the options below the "DELETE" label, press **DEL** to delete all data of that type. Both "Delete" options erase all sample and measurement data in memory. The first "Delete" option also deletes all job data stored in memory.
To prevent accidental deletions, you must press the **DEL** key twice before data is actually deleted.

The fields for *samples* and *measurements* are informational only; they cannot be selected. This data can be deleted in the Job Edit mode.

Data Maintenance Mode

Task Maintenance Mode

This mode is used to:

- Create new tasks or edit tasks not currently used by jobs (**Task Setup Mode**)

- View or print existing tasks **(Task View Mode)**

To create a new task:

1. From the main menu press **SETUP,** then **SEL** to select "DATA MAINTENANCE " from the Setup Menu.

2. Use the arrow keys to TASKS option. Press **SEL** to enter the Task Maintenance Mode.

3. Press **SEL** again to select "NEW TASK".

4. Press **SEL** and/or **EDIT** (when displayed) each time to choose the Formula Type, Task Name, Illuminant and Filter. (See Task Setup Mode).

5. Press **SAVE** when complete.

Refer to "Using the Keypad" in the Quick Start section, and "Editing a name field" for instructions on how to select and enter data using the arrow keys and other soft keys.

AFTER YOU HAVE CREATED A TASK(S), YOU CAN CREATE YOUR OWN PROCEDURES.
REFER TO "PROCEDURE MAINTENANCE MODE".

Data Maintenance Mode

Task Maintenance Mode (cont)

Task View Mode

Use this to examine and print the setup of an existing task. Also, you can edit or delete tasks not currently in use by any procedures.

To view an existing task, follow steps 1 and 2 on the previous page, then use the arrow keys to move through the list of existing tasks, then press **SEL** to enter the Task View Moe when the task you want to view is highlighted.

When in this mode, the following soft key labels will be displayed:

PRINT	DEL	EDIT	EXIT

PRINT   Prints the task setup information

DEL   Deletes the task. (press twice to delete) Not available if the task is used by a procedure.

EDIT   Enters the Task Setup Mode. Refer to the next section (not available if used by a procedure)

EXIT   Exits the Task View Mode

Data Maintenance Mode

Task Maintenance Mode (cont)

Task Setup Mode

Use this mode to create a new task or edit an existing task.
Tasks that are currently in use by a procedure cannot be edited.
This screen will display the following data:

- Formula Type (Index, Colorimetric, Paper Task)
- Task Name

- Illuminant/Observer
- UV Filter Setting

If the selected formula type requires specific settings or conditions, only the data which can be modified will be able to be edited.
Use the **EDIT** key to change the Viewing Area and UV Filter Setting.
Use the **SEL** key to edit any of the other fields. You will enter the corresponding mode to perform the edit.
Press the **SAVE** key to keep the task setup information.

Formula Selection Mode

Use this mode to select the formula to use with the task you are currently editing.
There are three types of formulas; **Colorimetric, Index and Paper Task Formulas**.
Some formula types require specific settings. If this is the case, the setup for the task being edited will inherit the appropriate settings when the formula is selected.
Use the arrow keys to move up and down the list of formulas to select.
Press the **PAGE** key and then the ↑ or ↓ key to display the next or previous screen of data.

Use the **SEL** key to select a highlighted formula, which will then become part of the task.

Data Maintenance Mode

Illuminant Selection Mode

Use this mode to select a new Illuminant/Observer combination to use with the task you are editing.

Use the arrow keys to move up and down the list of conditions.

Press the **PAGE** key to advance beyond one screen of data.

Use the **SEL** key to select a highlighted Illuminant/Observer combination which will be used by the task being edited.

Data Maintenance Mode

Procedure Maintenance Mode

This mode is used to:

- Create new procedures or edit procedures not currently used by jobs (**Procedure Setup Mode**)

- View or print existing procedures **(Procedure View Mode)**

To create a new procedure:

1. From the main menu, press **SETUP,** then **SEL** to select "Data Maintenance" from the Setup menu.

2. Press **SEL** again to select "PROCEDURES".

3. Press **SEL** again to select "NEW PROCEDURE".

4. Press the ↓ key to accept the default procedure name, or press **EDIT** then use the arrow keys to enter a name.

5. Press **ADD** to include a task in the procedure, or use the arrow keys to move down the list.

6. Press **SAVE** when complete.

AFTER YOU HAVE CREATED TASKS AND A PROCEDURE, YOU CAN BEGIN TO CREATE JOBS. REFER TO JOB/SAMPLE MAINTENANCE MODE.

Data Maintenance Mode

Procedure View Mode

This mode is used to view and print the setup of an existing procedure. Procedures that are not currently in use by any jobs can also be edited or deleted from this mode.

To view an existing procedure, follow steps 1 and 2 on the previous page, then use the arrow keys to move through the list of existing procedures, then press **SEL** to enter the Procedure View Mode.

The current setup for the procedure will be displayed along with the procedure name and all tasks listed in the order in which they will be displayed.

PRINT	DEL	EDIT	SCROLL

PRINT   Prints procedure setup data and task setup data for all tasks used by the procedure

DEL   Deletes the procedure (press twice to delete)

EDIT   Enters Procedure Setup Mode. Refer to the next section.

SCROLL   Displays the next screen of data

Data Maintenance Mode

Procedure Setup Mode

Used to create a new procedure or edit an existing procedure not currently used by any jobs.

For a new procedure, you can edit the procedure name, the tasks to be used and the order in which they are to be displayed. The name cannot be edited if the procedure is an existing one. Refer to "Editing A Name Field" for details on this procedure.

You can use **ADD** or **REM** to add or remove tasks used by the procedure. The task order number is adjusted accordingly.

Data Maintenance Mode

Job/Sample Maintenance Mode

This mode is used to:

- Create new jobs, edit settings for existing jobs, delete jobs and samples associated with jobs (**Job Edit Mode**)

- View or print existing jobs (**Job View Mode)**

To create a new job:

1. From the main menu, press **SETUP,** then **SEL** to select "Data Maintenance" from the Setup menu.

2. Press **SEL** again to select "JOBS".

3. Press **SEL** again to select "NEW JOB".

4. Press the ↓ key to accept the defaults displayed, or press **EDIT** then use the arrow keys to enter new data. Refer to the Job Edit Mode for a description of all fields.

5. Press **SAVE** when complete.

Job View Mode

This Mode displays the job's settings. It also allows you to print, or edit the job.
This mode is entered by pressing the **SEL** key while on the name of an existing job in the Job Setup Mode.

Data Maintenance Mode

Job Edit Mode

This mode is used to create new jobs or edit the settings for an existing job.
If an existing job is selected, all sample names saved for the job will be displayed. If the job name is highlighted, the program will enter the Job View Mode. Refer to the previous page.

Use the **DEL** key (when available) to delete the entire job or individual samples. You will have to press the key twice to delete, and once deleted, the data cannot be recovered.

```
6/26/95              14:21:45

 NAME:   JOB 1
 SEED NAME:   JOB 1
 SEED NUMBER:   0001
 SAMPLE NAME:   AUTO
 PRINT MODE:   ALL TASKS
 VIEW AREA:   XLAV
 # AVG RDGS:   1
 SAMPLE OVER:   STACK
 PROC:   DEMO PROCEDURE


    →        ↓      EDIT    SAVE
```

The data displayed will vary according to the requirements of the tasks contained in the job's procedure.

Name	The default name will be "JOB #" (the # = the number of jobs already stored plus one). This field is not editable for an existing job.

Data Maintenance Mode

Job Edit Mode (cont)

Seed Name   This is the name used to create names for the sample measured for this job. The Seed Name can be up to 12 characters long. The default will be the first 12 characters of the job name. See "Sample Name" for details.

Seed Number   The beginning number to be appended to the seed name when measuring samples for this job. This will be incremented by one for each sample saved for this job.

Sample Name   Used to determine the method to be used to name samples saved for this job.
AUTO will use the name "SAMPLE", plus the number of jobs stored; SAMPLE1, SAMPLE2, etc.

SEED will use the seed name (see above) with a number appended. The starting number will be the seed number (see above), which will be incremented by one after each sample is saved. For example, if the seed name is WHITE, and the root number is 0001, the first sample saved will be WHITE 1, the second WHITE 2, etc.

UNIQUE requires that you enter the full sample name whenever a sample is saved.

Data Maintenance Mode

Job Edit Mode (cont)

 # Avg. Reads   Sets the number of readings to make and average for each measurement. This value can be between 1 and 30.

Print Mode   When active, press **PRINT** once to print all task data in a job's procedure.

View Area   The measurement condition under which samples will be measured.

Paper Basis   Sets the paper basis weight used by the scattering and absorption formula. This value is specified in grams/meter^2 and must be greater than zero. The $\rightarrow$ key is used to move through the digits.

Proc   Used to select the procedure to use for this job. When this field is highlighted and the **SEL** key is pressed, a list of available procedures will be displayed. Select the desired procedure and press the **SEL** key.

Job Standard   Only displayed if the current procedure contains tasks which require that measurement data be compared to a standard.
When this field is highlighted and the **SEL** key is pressed, a list of available procedures will be displayed. Select the desired procedure and press the **SEL** key.

Data Maintenance Mode

Job Edit Mode (cont)

Sample Over   Used to select how samples will be
                         measured; either over a stack of paper or
                         over the white calibration standard.
                         Use the **EDIT** key to toggle between
the   two selections. This setting cannot be
                         changed once samples are stored for the
                         job.
                         *See Measuring Paper Samples for
          details.

NOTE: Procedures and tasks **cannot** be modified while they
while they are in use by an existing job. Press the **MENU** key
MENU key to abort editing and return to the previous mode.
previous mode.

Calibration Setup Mode

This mode is accessed by pressing the soft key labeled **CALIB SETUP** in the Setup Mode. The following functions are available from this mode:

- Select/Edit/Add white standard to use for calibration
- Setting of the recalibration time interval
- Whiteness/UVCAL Setup

Current Calibration Standard

The field labelled STD indicates the name of the white standard currently used for calibration. This name will be displayed on the calibration mode screen to indicate the standard to be used during calibration.
Press **SEL** to select or add a different calibration standard.
If the desired standard name is not displayed during calibration, you should not continue with the calibration procedure, and you should enter the current Calibration Standard Selection Mode to select a different calibration standard or setup a new calibration standard.

Current Calibration Standard Selection Mode
This mode is entered by pressing **SEL** while in the Calibration Setup Mode and the "STD" option is highlighted. When this mode is entered, a list of currently defined calibration standards are listed. The Elrepho 3000 series instruments provide support for storing up to five calibration standards.

Select Standard - To select a calibration standard as the "current" calibration standard, move the highlight bar to the desired calibration standard's "name" and press **SEL.**

Calibration Setup Mode

Current Calibration Standard Selection Mode (cont)

Edit Standard - To edit data for an existing calibration standard, move the highlight bar to the desired calibration standard's name and press **EDIT.** The Calibration Standard Edit Mode will then be entered. This mode is described below. The data for an existing calibration can be deleted by pressing **DEL** while the highlight bar is on the name of the standard.

Add New Standard - To define a new calibration standard, move the highlight bar to the "NEW STANDARD" option and press **ADD.** The Calibration Standard Edit Mode will then be entered. This mode is described below.
.

Calibration Standard Edit Mode
This mode allows data for a new or existing calibration standard to be edited. You may specify the name for the calibration standard whether the reflectance values for the standard will be specified in 10 or 20nm bandwidths, and the actual reflectance values for the standard. The reflectances may either be entered by manually editing the values or measuring the actual calibration standard.

The standard name is edited in the same manner as other name fields on the Elrepho. You should make sure the standard name is meaningful to identify it when the name is displayed. If it is the wrong standard, you can select the appropriate standard using the Current Calibration Standard Selection Mode.

To store the reflectance values by measuring, you must first calibrate the instrument using an appropriate calibration standard, which is already defined. Once you have calibrated, position the standard on the sample holder and press the Measure Button. After the measurement, the reflectance values will be displayed.

Calibration Setup Mode

Press **SAVE** to save the calibration standard's setup data. Note the pressing **SAVE** does not automatically select this standard as the "current" standard.

Recalibration Time Interval

This interval can range between 1 hour and 999 hours. If you request a measurement after this time is exceeded, a message will tell you the instrument is no longer calibrated. If the interval is set to zero, no time limit is placed on the calibration status. The factory recommendation is 8 hours.

Whiteness/UVCAL Setup

This mode allows manual entry of the UVCAL step number. If the instrument model supports Ganz/Griesser Whiteness, the Ganz/Griesser Parameters can be manually edited and, if calibrated, measurements can be performed using the current UVCAL step position and the current viewing area. The resulting CIE Whiteness using the D65/10° illuminant will be displayed. If supported, the resulting Ganz/Griesser Whiteness using the D65/10° illuminant will be displayed.

The following soft keys will be displayed while in the Whiteness/UVCAL Setup Mode.

CIE	GANZ	EDIT	

Calibration Setup Mode

Whiteness/UVCAL Setup (cont)

If you press **CIE** you will access the Illuminant Checker Calibration Mode, which allows manual entry of Illuminant Checker's CIE Whiteness value. Once the correct CIE Whiteness value for the Illuminant Checker is displayed, the UVCAL step number which produces the displayed CIE Whiteness value can be determined by pressing the MEASURE button. Once determined, the Illuminant Checker's CIE Whiteness and UVCAL step number can be saved. The Illuminant Checker Calibration Mode requires calibration in a UVINC measurement mode.

The **GANZ** key will only be displayed for instrument models which support Ganz/Griesser Whiteness. If this key is pressed, the Ganz/Griesser Parameter Calibration Mode is entered. This mode allows the measurement of between 4 and 12 Ganz/Griesser Whiteness Standards. You will be prompted for each standard's Ganz/Griesser Whiteness value. Once the correct Whiteness is entered for a standard, press the Measure key to perform a measurement using the current UVCAL step position. Note that the Ganz/Griesser Parameter Calibration mode requires the instrument be calibrated in a UVINC measurement condition.

Repeat this process for each standard. After the 4th standard has been measured, one soft key will be labeled **COMP**. Press this key to compute the Ganz/Griesser parameters at the current UVCAL step position. After the parameters are computed, they are displayed in the Whiteness/UVCAL Setup Mode. If the parameters are acceptable they can be saved. If not acceptable, the UVCAL step position must be changed and the Ganz/Griesser parameter calibration performed again.
If a new position is determined for UVCAL, you must recalibrate. This applies to both CIE and GANZ/GRIESSER.

Language Selection

Use this mode to select the language to use for both displays and printouts.

Press **SEL** in the Setup Mode "Langue/Sprache" option to access this option.
Use the arrow keys to move up and down the list of languages supported by your instrument.

Use the **SEL** key to select a highlighted language.

N**OTE:** Press the **MENU** key to exit without changing the changing the language selection and return to the Setup Mode. Setup Mode.

System Reset

This mode is used to reset the data stored in the instrument. There are 2 types of data: Setup data and User data.

Setup Data includes such things as serial communications parameters, LCD backlight sleep time, and default setup information for jobs.

User Data includes task, procedures, jobs, standards, diagnostic tile data, and white calibration standards.

Pressing **SETUP** initializes only the Setup data.
Pressing **DATA** initializes only the User data.
Pressing **BOTH** initializes the Setup data and the User data.

Press the **MENU** key to exit without making any changes.

PLEASE USE CAUTION WITH THIS OPTION !

System Setup

This mode provides options to configure the following settings:

- Keyboard/printer settings
- Enable/Disable Illuminants to display

- Enable/Disable Formulas to display
- LCD backlight "sleep time"
- System Date, Time and date format
- System information display

```
6/26/95              14:21:45


    PRINT/KEYBD SET
    ILLUMINANTS
    FORMULAS
    SLEEP MODE TIME
    DATE/TIME
    SYSTEM INFO



    ↑        ↓              SEL
```
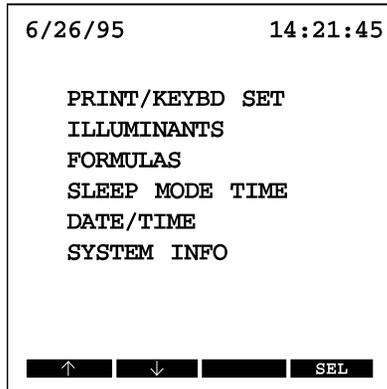
System Setup

Printer/Keyboard Setup

This is used for the setup of communications parameters. Both the keyboard and the printer will operate on the same serial port, therefore, all settings are the same for both devices.

These settings include:

- Baud Rate
- Number of Data Bits
- Number of Stop Bits
- Parity Type
- Carriage Return Delay (printer only)
- Auto Line Feed Setting (printer only)

The Carriage Return Delay Setting is the amount of time the instrument waits between sending each line of data.

The Auto Line Feed determines whether both a carriage return and a line feed should be sent (enabled) or just a carriage return (disabled).

NOTE: Press **MENU** key to abort any changes and return to return to
the System Setup Mode.

System Setup

Illuminant Enable/Disable

This mode is used to *enable* or *disable* illuminants.   Only *enabled* illuminants will be available when creating and editing tasks. This mode also determines the order in which the illuminants are displayed when selecting them during task creation.
When the instrument is first set up, all illuminants are enabled.

Use the arrow keys to move up and down the list of illuminants.

Use **ADD** and **REM** to add or remove illuminants. The numbers which indicate the order are adjusted accordingly.

Formula Enable/Disable

This mode is used to *enable* or *disable* formulas. Only *enabled* formulas will be available when creating and editing tasks. This mode also determines the order in which the formulas are displayed when selecting them during task creation.
When the instrument is first set up, three default formulas are enabled:

- CIE LAB VALUES
- CIE WHITENESS
- R457 BRIGHTNESS

Use **ADD** and **REM** to add or delete formulas from the list you will see displayed. The numbers that indicate the order are adjusted accordingly.

System Setup

Sleep Mode Time

This mode sets the time that the LCD back light will remain on. To extend the life of the back light panel, it will automatically turn off after the instrument has not been used for the amount of time you specify in this mode.
The back light will turn on again when any soft key is pressed, the measure button is pressed, the viewer shutter is opened or closed, or when data is received from the host PC. We suggest that you toggle the shutter viewer to turn on the back light.

Use the **-** and **+** keys to change the highlighted field, then press **SAVE** to keep the change.
You can press **DFLT** to accept the displayed number of minutes.

Date/Time

This mode allows the month, day, year, hour, minute and second format to be adjusted. When this mode is selected, the current date and time are displayed, and those values are used as the defaults for the edit fields.

Use the plus and minus keys to change the highlighted field values.

Use the **SAVE** key to save the changes.

NOTE: Press the **MENU** key not to save any changes and and return to the System Setup Mode.

System Setup

System Info

The information displayed in this mode is for reference only and cannot be changed. This information includes:

- Instrument model type
- ROM version
- Elrepho 3000 application version
- Instrument serial number
- MC90 serial number
- White tile number (of the standard in use)

Press the **EXIT** or **MENU** key to return to the System Setup Mode. Press the **PRINT** key, if available, to print this data.

User Diagnostics

The Elrepho 3000 supports three tests to verify that your instrument is working properly.

- The *drift test* is used to verify the short-term stability of the instrument.

- The *diagnostic tile test* is used to verify that the instrument's measuring characteristics haven't changed significantly from the time that it was installed.

- The *Reflectance/XYZ test* allows you to measure a sample and display or print results without having to specify a job.

We suggest that you perform the first two tests weekly.

Drift Test

This test uses values you define to determine the number of measurements to perform and the time between measurements.
The first measurement is used as the reference value.
The test displays X, Y,Z and DE data for measurements performed during the test.

To perform this test:

1. Press **SEL** to select the Drift test from the Setup menu.

2. Press **SETUP** to specify the frequency and number of reads, read time, viewing area and UV filter.

3. Press the **MENU** key to save these parameters.

4. Position your sample and press **RUN**.

User Diagnostics

Diagnostic Tile Test

This test performs 10 readings using the diagnostic tile XYZ values
as a reference.
The Test displays X, Y, Z, and DE data for measurement performed
during the test.

To perform this test:

1. Press **SEL** to select the Tile test from the Setup menu.

2. Press **SETUP**, then press **EDIT** to change the displayed viewing
    area.

3. Press **MENU**, position your diagnostic tile, then press **RUN**.

Reflectance/XYZ Test

Measures a sample of your choice and displays the resulting %R
and tristimulus data.

To perform this test:

1. Press **SEL** to select the test from the Setup menu.

2. Press the appropriate keys to select the viewing area, UV filter
    and illuminant.

3. Position your sample and press the **MEASURE** button.

4. When the results are displayed, press **PRINT** to send the results
    to the printer (if available).

Colorimetrics

Tristimulus X, Y, Z, x, y (3100 and 3300 models)

These values can be computed with any of the supported illuminants and observers. When tristimulus data is specified to be used for a task, you enter the illuminants/observer combination at that time. A single measurement is required for tristimulus output.

Reflectance Data (3300 model)

Reflectance data output is supported either digitally or graphically. **NOTE**: Both models will support the output of just the samples reflectance data, or the difference between the sample and a standard.

CIE LabCh Data (3300 model)

Several kinds of *tasks* are supported to produce the exact data desired.
CIE Lab and Lch data for the sample and standard can be output, or just the difference between the two. In addition, the difference can be accompanied by verbal descriptors.

Hunter Lab Data (3300 model)

Several kinds of *tasks* are supported to produce the exact data desired.
Hunter Lab data for the sample and standard can be output, or just the difference between the two. In addition, the Hunter Lab task computation supports all illuminants supported by the instrument.

Indexes

Berger Whiteness Index (3300 model)

Berger Whiteness computations are supported for the following illuminants: C/2°, C/10°, A/2°, A/10°, D65/2°, D65/10°, D75/2°, or D75/10°. The value will be displayed as "W". The computation for this index required measurement data for one measurement.

CIE Whiteness (3100 and 3300 models)

This Whiteness Index is always computed with the D65 illuminant and 10° observer.
The Whiteness value will be labeled with a "W" and the tint value with a "T" when they are displayed.
A single measurement is required for CIE Whiteness output.

E313 Whiteness (3300 model)

This Whiteness Index is always computed with the C illuminant and 2° observer.
The Whiteness value will be displayed as "W".
A single measurement is required to compute E313 Whiteness values.

Ganz/Griesser Whiteness (3300 model)

This computation is always performed using the D65 illuminant and 10° observer.
The Whiteness value will be displayed as "W", the tint value as "TV", and the tint deviation as "TD".
A single measurement is required to compute Ganz/Griesser Whiteness.

Indexes (cont)

Harrison Whiteness (3300 model)

This Index supports all illuminants, and the computed whiteness value will be displayed as "W".
A single measurement is required to compute Harrison Whiteness.

Hunter Whiteness (3300 model)

This Index supports all illuminants and observers, and the computed whiteness value will be displayed as "W".
A single measurement is required to compute Harrison Whiteness.

Stensby Whiteness (3300 model)

This Index supports all illuminants and observers, and the computed whiteness value will be displayed as "W".
A single measurement is required to compute Harrison Whiteness.

Stephansen Whiteness (3300 model)

This Index supports all illuminants and observers, and the computed whiteness value will be displayed as "W".
A single measurement is required to compute Harrison Whiteness.

E313 Yellowness (3100 and 3300 models)

This Yellowness Index is always computed with the C illuminant and 2° observer.
The Yellowness value will be labeled with "YI".
A single measurement is required to compute E313 Yellowness.

Indexes (cont)

D1925 Yellowness (3100 and 3300 models)

This index is always computed with the C illuminant and 2°
observer.
The yellowness value will be labeled with "YI".
A single measurement is required to compute D1925 Yellowness.

DIN6167 Yellowness (3100 and 3300 models)

This index can be computed with either D65/2°, D65/10°, or C/2°
illuminant/observer combinations.
The yellowness value will be labeled with "G" .
A single measurement is required to compute DIN6167 Yellowness.

Additive Metamerism Index (3300 model)

This index supports all illuminants and the computed value will be
displayed as "MI".
Measurement of both a standard and sample are required to
compute Additive Metamerism Index.

Multiplicative Metamerism Index (3300 model)

This index supports all illuminants and the computed value will be
displayed as "MI".
Measurement of both a standard and sample are required to
compute Multiplicative Metamerism Index.

Paper Tasks

DIN53140 Reflectance Factors (Rx, Ry, Rz) (3100 and 3300 models)

Values for this task can be computed with any of the following illuminant/observer combinations: A/2°, A/10°, C/2°, C/10°, D50/2°, D50/10°, D65/2°, D65/10°, D70/2°, or D70/10°.
The reflectance factors will be labeled Rx, Ry, Rz.
A single measurement is required to compute DIN53140 reflectance.

ISO Brightness R457 (TAPPI 525, SCAN-P3:75) (3100 and 3300 models)

The computed value will be labeled "R457".
A single measurement is required to compute ISO Brightness R457.

ISO Brightness Difference Δ R457 (3100 and 3300 models)

The computed Difference will be labeled ΔR457.
A single measurement with the UV radiation included and one measurement with the 420nm UV cutoff filter in position.

Paper Tasks(cont)

Diffuse Opacity (DIN 53146, TAPPI 519) (3100 and 3300 models)

Diffuse Opacity can be computed with any of the illuminant/observer combinations supported by the DIN53140 reflectance factor computations.
The results will be labeled "O" when displayed.

Diffuse Opacity requires measurements for either Method 1 (over black trap, then over stack), or Method 2 (over black trap, then over white standard).

Scattering & Absorption Coefficients & Powers (3100 and 3300 models)

This paper measurement task (ISO TC6/SC2/WGI 1979) can be computed with any illuminant/observer combination supported by the DIN 53140 reflectance factors.
The computed Scattering Coefficient "S", Scattering Power "SX", Absorption Coefficient "K", and Absorption Power "KX" will be displayed.
These computations require measurements for either Method 1,(over black trap, then over stack), or Method 2 (over black trap, then over white standard).

DIN 53147 Transparency (3100 and 3300 models)

These values can be computed with any illuminant/observer combination supported by the DIN53140 reflectance factors.
The results will be labeled "T" when displayed.
These computations require measurements for either Method 1, (over black trap, then over stack), or Method 2 (over black trap, then over white standard).
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Paper Tasks(cont)

Helmholtz Coordinates (3100 and 3300 models)

The Helmholtz coordinates for newsprint is always performed with the C illuminant and 2° observer.
The computed Dominant Wavelength will be labeled "DW" when it is displayed, and the computed Excitation Purity will be labeled "PE".

A single measurement is required to compute Helmholtz Coordinates.

Print Contrast (3100 and 3300 models)

A measure of how well a coating binds to a substrate. Measurements of a printed and unprinted sample will be taken. Print contrast is the difference between the Y value for each sample, divided by the Y value for the unprinted sample.

Default Illuminants

This list contains the recommended illuminants which will be retrieved and used as the default each time a new formula type is selected.

To maintain industry compatibility, these defaults are the same as those used with the Elrepho 2000.

FORMULA TYPE	DEFAULT
Tristimulus X,Y,Z,x,y	D65/10°
Reflectance Data	Selectable

CIE LabCh Data	D65/10°
Hunter Lab Data	C/2°
Berger Whiteness Index	C/2°
CIE Whiteness Index	D65/10°
E313 Whiteness Index	C/2°
Ganz/Griesser Whiteness Index	D65/10°
Harrison Whiteness Index	D65/10°
Hunter Whiteness Index	C/2°
Stensby Whiteness Index	C/2°
Stephansen Whiteness Index	C/2°
E313 Yellowness Index	C/2°
D1925 Yellowness Index	C/2°
DIN 6167 Yellowness Index	D65/10°
Additive Metamerism Index	A/2 °
Multiplicative Metamerism Index	A/2 °
DIN 53140 Reflectance Factors Rx, Ry, Rz	C/2°
ISO Brightness R457 (TAPPI 525, SCAN-P3:75	
ISO Brightness Difference Δ R457	
Diffuse Opacity (DIN 53146, TAPPI 519)	C/2°
Scattering and Absorption Coefficients & Powers	C/2°
DIN 53147 Transparency	C/2°
Helmholtz Coordinates	C/2°
Print Contrast	D65/10°

Host Mode

This mode allows you to run various Datacolor International software programs on your Personal Computer (Host PC) and access a connected Elrepho instrument as the measurement method for samples.

Error Messages

Refer to this section if any error/status messages are displayed while using the Elrepho 3000 series instruments.

NO JOB SELECTED

Displayed when the instrument is first turned on. This indicates that no job has been selected as the *current job*. The *current job* may be selected while in the Display Mode by pressing the soft key labeled JOB and then selecting the desired job from the list of existing jobs.

MEAS COND NOT CALIBRATED

Displayed whenever a measurement is requested using a measurement condition which is not calibrated. Either select a

different measurement condition setup which is calibrated or calibrate the desired measurement condition.

MODE NOT AVAILABLE UNTIL A ...(condition description)... CONDITION CALIBRATED

Displayed whenever a measurement is requested using a measurement condition which is not calibrated or not appropriate for the operation being performed. Calibrate the measurement condition specified in the message.

DIAGNOSTIC MEAS COND NOT CALIBRATED

Displayed while in any of the diagnostic test modes whenever a measurement is requested using a measurement condition which is not calibrated. Either select a different measurement condition setup which is calibrated or calibrate the desired measurement condition.

JOB NOT CALIBRATED

Displayed when asked to enter the Measure Mode and the *current job* is not calibrated. This means that all the measurements required for the job's procedure can not be performed until more measurement conditions are calibrated. The Calibration Mode provides an option to calibrate the *current job*. Perform calibration and then try again.

REMEASURE BLACK TRAP - UNSTABLE READING

This warning will be displayed during the black trap calibration if there is too much variation in the reflectance of the first and second measurements.

REMEASURE BLACK TRAP - TOO LIGHT

This warning will be displayed during the black trap calibration if the measured black trap is too light. This usually indicates that something other than the black trap is in position and was measured. Check to ensure the black trap is positioned correctly.

REMEASURE WHITE TILE - UNSTABLE READING

This warning will be displayed during the white standard calibration if there is too much variation in the reflectance of the first and second measurements.

REMEASURE WHITE TILE - TOO DARK

This warning will be displayed during the white standard calibration if the measured white standard is too dark. This usually indicates that something other than the white standard is in position and was measured. Check to ensure the white standard is positioned correctly.

CLOSE VIEWER BEFORE MEASURING

This message is displayed if a measurement is attempted while the viewer is in the "open" position. Close the viewer.

FLASH LAMP ERROR

This message indicates a possible instrument malfunction. Either the flash lamp capacitor failed to charge or the lamp did not flash when instructed. Please contact your Datacolor International Service representative for further instructions.

LOW LIGHT LEVEL ERROR

This message indicates a possible instrument malfunction. The energy detected on the reference channel was below the required minimum. Please contact your Datacolor International Service representative for further instructions.

ERROR SETTING UP MEASURE CONDITION

This message indicates an error occurred setting up a measurement condition. This usually indicates a possible instrument malfunction. Please contact your Datacolor International Service representative for further details.

INVALID ILLUMINANT

This message indicates the illuminant to use by a task's formula is invalid. Many formulas are restricted in the illuminant/observer combinations which can be used. When a task is setup, the illuminant is checked to verify it is supported by the task's formula, therefore this error should not occur. If it does, report this problem to your Datacolor International Service representative.

DIVISION BY ZERO

This message indicates the measurement data passed to the task's formula resulted in values which would result in division by zero.

To prevent the system from "crashing", no result is computed and this message is displayed.

SQUARE ROOT OF NEGATIVE

This message indicates the measurement data passed to the task's formula resulted in values which would result in the performing of a square root operation on a negative number. To prevent the system from "crashing", no result is computed and this message is displayed.

HELMHOLTZ DOMINANT WAVELENGTH RANGE ERR

This message indicates the measurement data passed to the Helmholtz formula resulted in a dominant wavelength which is outside of the valid range of 570nm - 585nm.

TASK COMPUTE ERROR

This message indicates the measurement data passed to the task's formula resulted in some type of miscellaneous error. To prevent the system from "crashing", no result is computed and this message is displayed.

UNKNOWN SYSTEM ERROR

This message will be displayed if some type of miscellaneous error occurs during the power up procedure. This may indicate a possible instrument malfunction. Please contact your Datacolor International Service representative for further instructions.

WHITE TILE DATA NOT LOADED

This message will be displayed if the instrument's white tile data is not found during the power up procedure. This condition could occur if the white tile data was not loaded with the application program, or deleted. Please contact your Datacolor International Service representative for further instructions.

TASK DATA NOT LOADED

This message will be displayed if the instrument's task data is not found during the power up procedure. This condition could occur if the task data was not loaded with the application program, or

deleted. Please contact your Datacolor International Service representative for further instructions.

INSTRUMENT DATA NOT LOADED

This message will be displayed if the instrument specific data is not found during the power up procedure. This condition could occur if this data was not loaded with the application program, or deleted. Please contact your Datacolor International Service representative for further instructions.

ILLUMINANT DATA NOT LOADED

This message will be displayed if the instrument's illuminant data is not found during the power up procedure. This condition could occur if the illuminant data was not loaded with the application program, or deleted. Please contact your Datacolor International Service representative for further instructions.

MODEL DATA NOT LOADED

This message will be displayed if the instrument's model data is not found during the power up procedure. This condition could occur if the model data was not loaded with the application program, or deleted. Please contact your Datacolor International Service representative for further instructions.

WARNING WHITENESS CAL SETUP INVALID - DEFAULTS LOADED
INSTRUMENT SPECIFIC DATA MUST BE LOADED - PERFORM CAL SETUP

This message will be displayed if the instrument's Whiteness data is not found or determined to be corrupted during the power up procedure. This condition could occur if this data was not stored at the factory or somehow became corrupted. Since this data is instrument specific, you must be sure to load this data into the instrument or else improper measurement results could result. Default data is loaded so that the system can continue to function. Once the default data has been loaded, no further messages will be displayed to remind you this data needs to be updated, therefore you should load the instrument specific data shipped with the instrument as soon as possible. Please contact your Datacolor International Service representative for further instructions.

NO SPACE TO STORE NEW xxx
(Where xxx = TASK, PROCEDURE, JOB, SAMPLE, STANDARD)

This message will be displayed when there is an attempt to create or save new data, and there is no room in memory to store it. The maximum is 500 records. Use the "Data Maintenance" option on your Setup Menu to delete unnecessary data to make room for new data.

NAME ALREADY EXISTS

This message will be displayed when there is an attempt to create a new task, procedure, job, sample, or standard and there is already the same type of data stored in memory with the same name. Enter a different name for the data.

INVALID NAME

This message will be displayed when there is an attempt to create a new task, procedure, job, sample, or standard and the name entered is invalid. An example of an invalid name is one which is all spaces. Enter a different name for the data.

UNABLE TO PRINT xxx
(Where xxx = TASK, PROCEDURE, JOB, SAMPLE, STANDARD)

This message will be displayed if for some reason the data can not be printed. This error message should not be displayed. It will only be displayed if the exact reason can not be determined and displayed.

MUST SELECT PROCEDURE BEFORE SAVING

This message will be displayed when attempting to save a job before a procedure has been selected. All job's must have a procedure associated with them. Select the procedure which should be used with the job.

CAN NOT CREATE JOB NO PROCEDURES EXIST

This message will be displayed when attempting to create a new job before any procedures has been defined. All job's must have a procedure associated with them. Define a procedure before attempting to create new jobs.

MUST SELECT STANDARD BEFORE SAVING

> This message will be displayed when attempting to save a job
> before a standard has been selected. Standards are not required by
> all jobs. If the procedure contains task's which require comparison
> to a standard, then one must be selected for the job before it can be
> saved. Select the standard which should be used with the job.

BASIS WEIGHT MUST BE GREATER THAN ZERO

> This message will be displayed when attempting to save a job with
> a paper basis weight of zero. Enter a weight which is greater than
> zero.

CAN NOT SAVE WITHOUT ANY TASKS

> This message will be displayed when attempting to save a
> procedure with no tasks associated with it. All procedure's must
> have at least one task associated with them. Select at least one task
> to use with the procedure before attempting to save the procedure.

MAX TASKS ADDED

> This message will be displayed when attempting to create a
> procedure after there have already been 20 stored in the file system.
> Due to limitations in the memory system, a maximum of 20
> procedures can be stored at any one time. Use the "Data
> Maintenance" option on your Setup Menu to delete unnecessary
> procedures to make room for new procedures.

CAN NOT CREATE PROCEDURE NO TASKS EXIST

> This message will be displayed when attempting to create a
> procedure before any tasks has been defined. All procedure's must
> have at least one task associated with them. Define tasks before
> attempting to create new procedures.

PLEASE STANDBY INITIALIZING SYSTEM

> This message is displayed when the instrument is first powered on.
> It remains on the screen while several hardware devices are
> initialized. This message is for informational purposes only and
> does not indicate any problems with the instrument.

MAX ILLUMS ACTIVE

This message will be displayed if you attempt to activate more than 20 illuminants at a time. Due to limits in the memory system, a maximum of 20 illuminant/observer combinations may be active at a time.

MAX FORMULAS ACTIVE

This message will be displayed if you attempt to activate too many illuminants at a time. Due to limits in the memory system, a maximum number of illuminant/observer combinations may be active at a time.

CANNOT REMOVE ALL

This message will be displayed if you attempt to disable all illuminants or all formulas. These types of data require that at least one of each type be enabled.

INVALID DATE

This message indicates an invalid date has been entered as the system date. Modify the date to reflect a valid date.

CHECKER TILE VALUE OUT OF RANGE

This message indicates the value entered as the Illuminant Checker's CIE Whiteness value is out of range. The value must be greater than zero and less than 999.99. Check the value and enter it again.

UVCAL STEP OUT OF RANGE

This message indicates the UVCAL step position is invalid. The minimum step number for the UVCAL position is four. The maximum step number depends on the motor used to control the UV filter position. If entering the step position manually, input a different number. If performing an operation which determines the UVCAL step position automatically, this may indicate a possible instrument malfunction and your Datacolor International Service representative should be contacted for further details.

UNABLE TO DETERMINE UVCAL STEP

This message indicates the UVCAL step position could not be determined by performing measurements on the Illuminant Checker. The minimum step number for the UVCAL position is four. The maximum step number depends on the motor used to control the UV filter position. Check that the Illuminant Checker's CIE Whiteness value is correct and that its surface is clean. If this error still persists, this may indicate a possible instrument malfunction and your Datacolor International Service representative should be contacted for further details.

MUST SAVE AT LEAST ONE STD

This message will be displayed if you attempt to delete all white calibration standards from memory. The system requires that at least one be enabled so that calibration can be performed.

WHITENESS LESS THAN PREVIOUS STANDARDS

This message will be displayed when performing the Ganz/Griesser Parameter Calibration and the nominal whiteness value entered for the standard is less than the previous standard's whiteness value. The standards must be measured in increasing order.

WHITENESS VALUE MUST BE GREATER THAN ZERO

This message will be displayed when performing the Ganz/Griesser Parameter Calibration and the nominal whiteness value entered for the standard is set to zero when the Measure Button is pressed. The standard's must all have a whiteness value greater than zero.

RECAL INTERVAL INVALID

This message will be displayed if the recalibration time interval is set to an invalid value. The interval must be set to some value between zero and 999. Modify the setting to a value in the acceptable range.

Technical Data* - Elrepho 3000

Measurement

Geometry   d/0 degree, dual beam, barium sulfate coated sphere

Measurement Principle   Proprietary MC90 dual beam spectrometer with dual
                         128 pixel custom diode arrays

Aperture Sizes   XLAV - 29mm measured; 33mm illuminated

                         SAV -   5mm measured, 9mm illuminated

                         USAV - 2.5mm measured; 6.5mm illuminated

Spectral Factor   Excluded

Spectral Range   380 nm to 720 nm measured

                         400 nm to 700 nm reported every 10nm

Bandwidth   10 nm

% Reflectance   0 to 200%

Light Source   Pulsed xenon, filtered to D65

Measurement Time   1 sec

Performance

Repeatability   0.01 CMC on white

| Reproducibility | ΔE ≤ 0.25 CMC maximum |
| | ΔE ≤ 0.15 CMC average |

Physical/Electrical

Automatic UV control:	400nm, 420nm, 460nm cutoff filters:
	automatic UV calibrator for measurement of
	fluorescent samples
Power	95 to 265VAC, 45 to 65Hz, 50 VA
Environment	5 to 40° C, 20 to 85% RH, non-condensing
Interface	RS-232 300/57,600 baud

*   Specifications subject to change without notice.

Appendix A

Definitions

Reflectance factor , R - The ratio of the radiation reflected by a body to that reflected by the perfect reflecting diffuser under the same conditions of irradiation and viewing.

Intrinsic reflectance factor, R - The reflectance factor of a layer of material of such a thickness that there is no change in reflectance factor when the thickness is doubled.

Luminous reflectance factor - The reflectance factor, when determined under conditions that simulate the spectral sensitivity of the normal eye at daylight.

Y value - The luminous reflectance factor of a layer of material of such a thickness that there is no change in the reflectance factor when the thickness is doubled. (This quantity is also designated the *intrinsic luminous reflectance factor).*

ISO brightness - The intrinsic reflectance factor measured at an effective wavelength of 457nm under the conditions specified in SCAN-P3, (for ISO brightness, the term *diffuse blue reflectance factor* is also used).

D65 brightness - The intrinsic reflectance factor measured at an effective wavelength of 457nm under the conditions specified in SCAN-P3 when the UV-content of the illumination has been adjusted to conform to the D65-illuminant as specified in SCAN-P 66.

Light-scattering coefficient - A measure of the ability of the material to scatter light.

Light-absorption coefficient - A measure of the ability of the material to absorb light.

Appendix A

Definitions (cont)

Colour (C/2) - The L*, a* and b* values of the sample according to the CIELAB 1976 system, corresponding to the CIE 1931 standard observer and the CIE illuminant C, determined by measurement under the conditions specified in SCAN-P 133X.

Colour (D65/10) - The L*, a* and b* values of the sample according to the CIELAB 1976 system, corresponding to the CIE 1964 standard observer and the CIE illuminant D65, determined by measurement under the conditions specified in SCAN-P 136X.

Helmholtz Coordinate - (Newsprint shade) The L*, a* and b* values of the sample according to the CIELAB 1976 system, or alternatively, the Y-value, dominant wavelength and excitation purity of the sample, corresponding to the CIE 1931 standard observer and the CIE illuminant C, determined by measurement under the conditions specified in SCAN-P 133X.

CIE-whiteness - A measure of the whiteness derived from the CIE tristimulus values, corresponding to the CIE 1964 standard observer and the CIE illuminant D65, determined under the conditions specified in SCAN-P 66.

Green/red tint - A measure of the deviation from the whiteness of the material towards the red or green region determined under the conditions specified in SCAN-P 66.

Fluorescence component (of whiteness) - A measure of the extent to which the whiteness of the material is affected by excitation of added fluorescent whitening agent (FWA).

Metamerism index - The Delta E difference in colour between two samples in one illumination when they have the same color in another illumination.

Appendix B: Password Protection

NOTE: This section can be removed and placed elsewhere if you intend to use password protection and want to restrict entry into password protected areas.

Password Protection Overview

You can now configure the Setup Mode with password protection to secure important Setup data. If you use this feature, a password must be entered before access is granted.

The Password consists of a sequence of "digits" which is defined by pressing the three leftmost soft keys in the desired sequence. Each of these three keys are assigned a number 1, 2, or 3. The password sequence can consist of between one and ten digits. When password protection is enabled, the password will need to be entered before access to the Setup Mode is granted. Password protection wil be disabled by default.

The addition of this feature will require three new modes:

- Password Setup Mode
- Password Setup Verification Mode
- Password Verificatio Mode

Password Setup Mode

This mode is used for the following functions:

- Enabling a password
- Disabling a password
- Setting the password

Appendix B: Password Protection

Password Setup Mode (cont)

You enter the mode by starting the instrument while holding down the second key from the right. Once in this mode, the screen will indicate the current status, i.e., whether or not password protection is currently enabled. A prompt message will be displayed indicating that a new password should be entered.

While in this mode, the rightmost key label will change depending on how many password keys have been pressed. Before any password keys are pressed, the key will be labeled to indicate that pressing the key will disable password protection.
Once you press any password "digit" key, the key will be re-labeled to indicate that when you press the key the password will be saved and you enter the *Password Setup Verification Mode.* This method allows the number of characters to vary.
You can press the **MENU** key at any time to exit the Password Setup Mode without saving changes.

Password Setup Verification Mode

This mode will require that you re-enter the new password to verify that it has been properly defined. When you enter this mode, a prompt message will be displayed indicating that the password must be re-entered for verification purposes.

The rightmost soft key will be labeled to indicate that if you press it, you will save the password. Once pressed, the "verification" password is checked to see whether it matches the "setup" password. A message is briefly displayed to indicate whether they match. If they match, you will automatically exit the mode. If they do not match, or if the **MENU** at any time, control is returned back to the Password Setup Mode.

Appendix B: Password Protection

Password Verification Mode

If password protection is enabled, this mode will require that you enter the password before allowing access to the Setup Mode. When this mode is entered, a message will be displayed informing the user that the selected option is password protected. The rightmost soft key label will indicate that pressing the key will check the password.

If the password is correct, you can enter the Setup Mode. If it is not correct, an error message is displayed and entry into the Setup Mode is denied.

Appendix C: Software Version Updates

Version 1.10

- Support added for up to five different languages.
- Added Print Contrast task support.
- External keyboard support enhanced. Keys supported include A-Z, 0-9, +, -, Home, End, Page Up, Page Down, Up Arrow, Down Arrow, Left Arrow, Right Arrow, and the Enter key (↵).
- Printer speed improved by about 50%.
- Password protection support added to the Setup Mode.
- Display Mode soft key functions changed to provide quicker access to the Measurement Mode and quicker access to the print soft key.
- Measurement Mode modified to allow the entry into the Display Mode as soon as all measurements for the sample are completed. Previously the **VIEW** soft key would need to be pressed to allow viewing of the measurement's results.
- Modified the manner in which the **BACK** key functions in the Measurement Mode. If a job's setup indicates more than one measurement is to be taken for each sample reading, the **BACK** key results in canceling only the last measurement, not all the measurements as did the original version.
- Added ability to print the Ganz/Griesser parameters, the Whiteness/UVCAL setup settings, the system information (software version, serial number, MC90 number, model).
- Added ability to delete all jobs and all samples to the Data Maintenance Mode.
- Fixed bug in Ganz/Griesser Parameter Calibration Mode which prevented the values of the whiteness standards from being saved. Now the values are stored and will be offered as the default value when prompted to measure the whiteness standards.

- Original Version
- English only language supported

Appendix D: Printer Installation Instructions

Follow these instructions to install the Elrepho 3000 printer and keyboard options **(S/N below 978).**
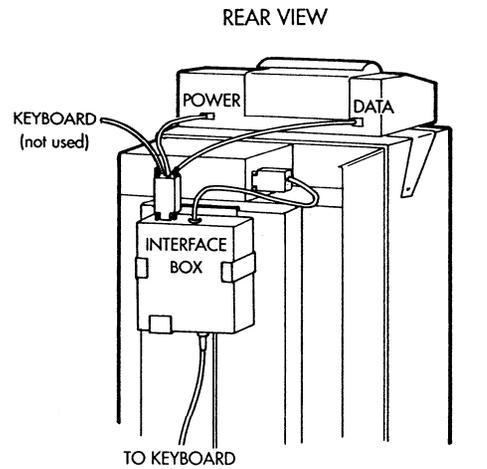
Figure 1

1. Remove the two upper screws holding the cover on the Elrepho 3000. These are located on the sides of the instrument. Refer to *Figure 1*.

2. Place the printer tray on the top of the Elrepho 3000 and mount the tray to the instrument using the two (2) new screws supplied. (The original screws are too short).

3. Plug the power and data connectors of the printer cable into the printer.

Appendix D: Printer Installation Instructions
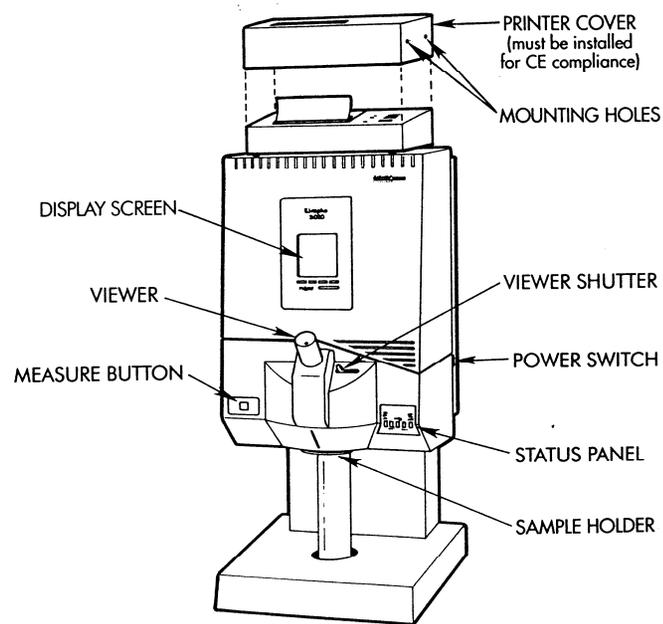
Figure 2

4. Place the printer into the printer tray. Note: The printer fits tightly; use pressure, but to avoid cracking the printer cover, do not force.

5. Install the printer cover as shown in *Figure 2*, and attach with the four (4) screws.

6. If your instrument also has a keyboard option, proceed to step 1 of the keyboard installation instructions. If you don't have the keyboard option, plug the printer into the connector on top of the Elrepho 3000 that is marked "PRINTER/KEYBD".

Appendix D: Keyboard Installation Instructions

1. Slide the **KEYBOARD INTERFACE** box into its mounting bracket with the panel containing the Datacolor logo facing out.

2. Plug the keyboard cable into the connector on the interface box labeled "KEYBOARD". Note: do not plug the keyboard into the connector printer cable, or the keyboard will not operate.

3. Slide the lip of the mounting bracket over the edge of the vertical stand located on the back of the Elrepho 3000.

4. If your instrument also has the printer option plug the printer cable into the connector on the interface box labeled "PRINTER".

5. Plug the cable labeled "INSTRUMENT" into the connector on the top of the Elrepho 3000 labeled "PRINTER/KEYBD".

Appendix D: Printer Installation Instructions

Follow these instructions to install the Elrepho 3000 printer and keyboard options **(S/N 978 and above).**

REAR VIEW

E3000 KEYBOARD/PRINTER CONNECTIONS
(S/N 978 AND ABOVE)
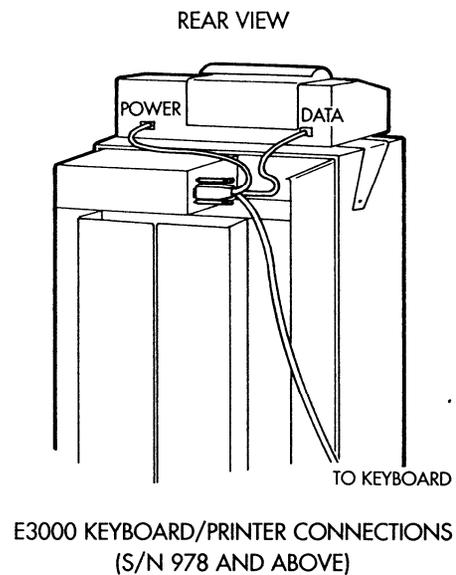
Figure 3

1. Remove the two upper screws holding the rear cover (with the LCD display). Refer to *Figure 3*.

2. Place the printer tray on top of the Elrepho and attach with the two (2) new screws supplied. (The original screws are too short).

3. Plug the power and data connectors into the printer.

Appendix D: Printer Installation Instructions

4. Place the printer into the tray. Note: the printer fits tightly; use pressure, but to avoid cracking the printer cover, do not force.

5. Install the printer cover as shown and mount with the four (4) screws supplied.

6. If the keyboard option was also purchased, connect to the keyboard connector on the cable.

7. Connect the other end of the cable to the port on the Elrepho labeled "Printer/Keybd".

ELREPHO 3000 Series
Instrument

Operators Manual
Version 1.10

Part No. 4230-0312

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