SKYNDEX™

SYSTEM 1

Professional Skinfold Caliper

Instruction Manual

v1.1

FORMULA(S): _____

SERIAL #: _____

Congratulations

Congratulations on your purchase of the SKYNDEX SYSTEM I Professional Skinfold Caliper.

The SKYNDEX SYSTEM I is the fastest and easiest to use skinfold caliper on the market today. By using the newest technology for efficient body composition assessment, the SYSTEM 1 has become an industry standard. SYSTEM I internally records skinfold measurements, automatically computes data in its microprocessor and then accurately displays the percent body fat on the LCD. The SYSTEM I is so advanced that the entire process takes as little as 45 seconds; a pioneering advancement in Assessment Technology.

We are sure you will find the SYSTEM I to be an invaluable tool in your profession. A foam-lined carrying case has been provided to protect your SKYNDEX SYSTEM I for years to come. If you have comments, questions or suggestions on any aspect of body composition assessment, please contact us.

IMPORTANT!
Register your device at
www.skyndex.com/register

WELLTEC, LLC.
8100 Wyoming Blvd. NE,
Suite M4-130
Albuquerque, NM 87113
www.skyndex.com
TOLL FREE 855-SKYNDEX
855-759-6339

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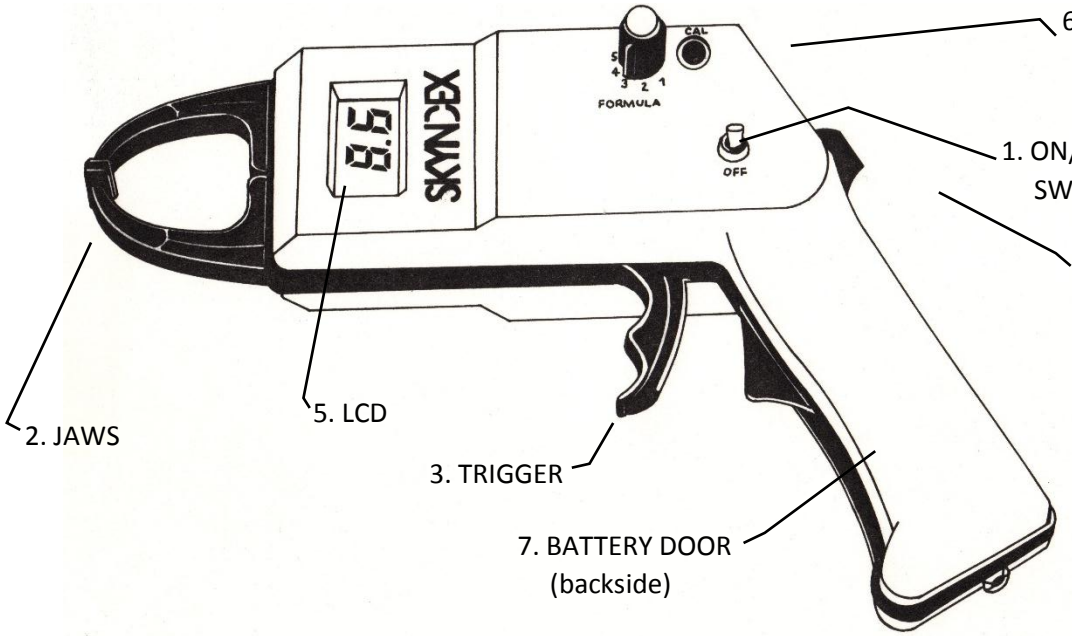
Introducing the SKYNDEX SYSTEM I

SKYNDEX SYSTEM I is the fastest and easiest to use skinfold caliper on the market today. It automatically computes and displays percent body fat following a defined series of skinfold measurements. Familiarize yourself with all the working parts of the SKYNDEX SYSTEM I as described below and pictured on the following page.

1. **ON-OFF TOGGLE SWITCH** on the front panel. Keep this switch OFF when not in use to avoid unnecessary battery drain.
2. The **JAWS** are the plastic ends which are placed on the skinfold. They are opened and closed by the **TRIGGER**.
3. The **TRIGGER** is used to open the jaws and has a double grip to assist the operator.
4. The **PUSH-BUTTON ROCKER** switch is above and behind the handle and should be operated with the thumb of the same hand holding the unit. This switch should be pressed when you wish to enter the value of the skinfold display on the **LCD**.
5. The **LIQUID CRYSTAL DISPLAY (LCD)** is located just below the jaws and displays values to the nearest 0.1mm of skinfold thickness or percent body fat.
6. The **CALIBRATION DIAL** is located to the right of the formula switch. It is used to allow slight adjustments to the measurements using the **CALIBRATION DOWEL** provided.
7. The **BATTERY DOOR** is located on the reverse side of the instrument, at the bottom of the handle.
8. The **FORMULA DIAL** is located next to the **CALIBRATION DIAL** and is used to select the appropriate formula for the subject being tested.


6. CALIBRATION DIAL
1. ON/OFF SWITCH
4. ROCKER SWITCH
2. JAWS
5. LCD
3. TRIGGER
7. BATTERY DOOR (backside)
CAL
FORMULA
OFF
SKYNDEX

About Body Fat and Your SKYNDEX SYSTEM I

Body fat measurement is considered an important factor of health and level of fitness for athletes and the general population. Body fat is much more meaningful than height/weight ratios since the BMI norms do not take into account body composition. For example, many athletes have high muscle mass and low fat levels, yet they can be classified as obese using BMI alone. Conversely, a person with a normal BMI level, may be in the 'Normal' range due to low muscle mass, yet may still have a high percent fat.

While there are many ways by which to estimate body composition, the procedure of underwater (hydrostatic) weighing is generally accepted as the standard against which other methods, including skinfold values, are compared. However, underwater weighing is time consuming, expensive and does not lend itself to mass screening applications. Skinfold measurements represent a viable alternative.

The skinfold equations used in your SKYNDEX I calipers were derived by taking measurements from a large group of subjects. These data were analyzed to determine the particular skinfold sites and their mathematical relationship which would result in the best estimate of the hydrostatic percent body fat value.

You can use the norm chart on the following page to determine your subject's results (ACSM 2009):

Body Composition Norms

* MEN	20-29	30-39	40-49	50-59	60-69	70-79
Very Lean	6.3	9.9	12.8	14.4	15.5	15.2
Excellent	10.5	14.5	17.4	19.1	19.7	20.4
Good	14.8	18.2	20.6	22.1	22.6	23.1
Fair	18.6	21.3	23.4	24.6	25.2	24.8
Poor	23.1	24.9	26.6	27.8	28.4	27.6
Very Poor	33.3	34.3	35	36.4	36.8	35.5
*WOMEN	20-29	30-39	40-49	50-59	60-69	70-79
Very Lean	13.6	14	15.6	17.2	17.7	16.6
Excellent	16.5	17.4	19.8	22.5	23.2	24
Good	19.4	20.8	23.8	27	27.9	28.6
Fair	22.7	24.6	27.6	30.4	31.3	31.8
Poor	27.1	29.1	31.9	34.5	35.4	36
Very Poor	38.9	39.4	39.8	40.4	40.8	40.5

**American College of Sports Medicine, Eighth Edition, 2009.*

How to Take a Skinfold

Techniques of the Pinch

A "Pinch" is a fold of skin (skinfold) and underlying fat that is grasped by the thumb and forefinger (FIGURES 1 and 2). The greatest error in assessing body fat using skinfolds is the human error in the way the skinfold pinch is made. To ensure a valid skinfold measurement, certain precise techniques must be consistently used.

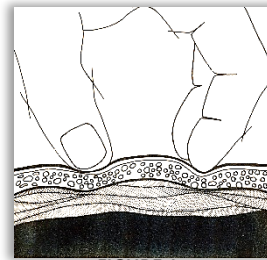


FIGURE 1

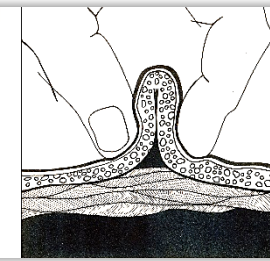


FIGURE 2

Amount of Skin to be Pinched

The amount of skin to be pinched will depend upon the specific site, the thickness of the skin and the underlying tissue. The skinfold should be taken with moderate pressure between the thumb and forefinger to prevent slippage. The force applied to the skinfold should not cause extreme compression of the underlying fat tissue (See FIGURE 1). None of the subjects' muscle should be included in the skinfold (See FIGURE 2). If you are unsure of the presence of muscle tissue, ask the subject to momentarily contract the muscle. This will assist in separating the tissue and ensure that only the skin and underlying fat is being pinched.

Correct Placement of Thumb and Forefinger

The thumb and forefinger should be placed vertically on most folds (with the exception of the Iliac Crest and Sub-Scapula, which require 45 degree angles). Note: A greater angle will be required for obese individuals. A fold is best created by using the thumb and forefinger as a "C" Clamp. (See FIGURE 1 and 2).

How to Take a Skinfold Measurement with a SKYNDEX SYSTEM I

Placement of the Caliper Jaws

Place the caliper approximately 1 cm from the fold created by your thumb and forefinger with the LCD display facing upward (See FIGURE 4). The jaws should be placed directly over the fold (See FIGURE 3). If placed too deep on the underlying tissue, or too high on the crest of the fold, an inaccurately high or low reading will occur. After placing the tips over the fold, allow the numbers on the display to settle down to a constant number or until the variation is less than 0.1mm per second. At this time, press the rocker switch on the rear of the caliper to enter the value into the caliper memory. You do not need to record this measurement. Your SKYNDEX SYSTEM I automatically records and calculates all skinfold information.

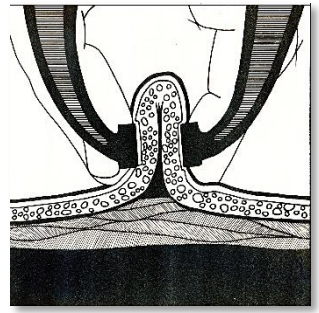
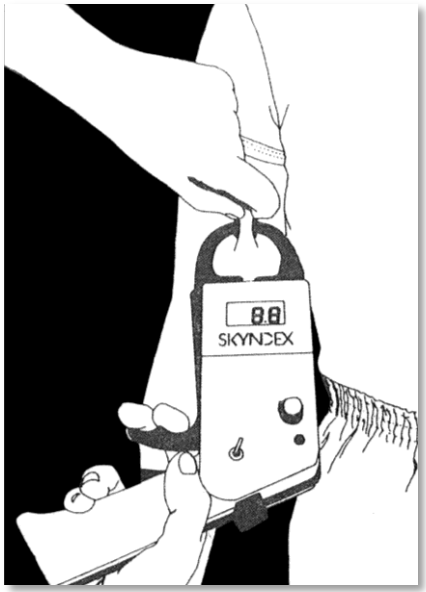


FIGURE 3

Where to Pinch

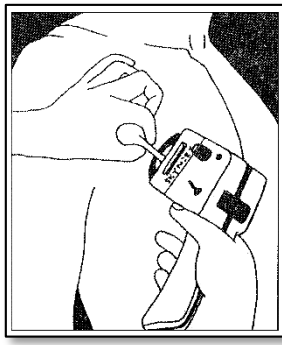
A skinfold site must be precisely located. Refer to following pages for illustrations of those sites which correspond to the body fat formula contained in your SKYNDEX I.



Notice that the caliper tips are approximately 1cm below the thumb and finger.

FIGURE 4

Skinfold Site Descriptions



CHEST

Measure at a 45° angle halfway between the nipple and the axilla (armpit) as high as possible on anterior axillary fold.

BICEPS

Measure vertically over the mid-point of the muscle, at the level marked for the Biceps.

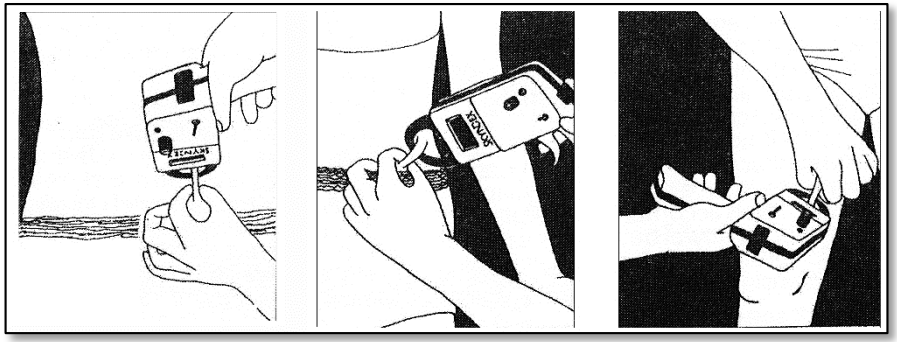
TRICEPS

Measure vertically on back of arm midway between top of shoulder point (Acromial Process) and elbow (Olecranon Process).

SUBSCAPULAR

Measure at a 45° angle just below the tip of the Scapula.

Skinfold Site Descriptions



ABDOMEN
Measure 3cm to the side and 1cm below the umbilicus (navel)

SUPRAILIAC
Measure at a 45° angle directly on top of the hip point (Iliac Crest).

THIGH
Measure vertically on front of thigh halfway between patella (kneecap) and inguinal crease (hip fold).

Calibrating the SKYNDEX SYSTEM I

Your SKYNDEX SYSTEM I Caliper has been calibrated at the factory and should not require frequent readjustment. However, if you suspect that it is in-correctly displaying skinfold thickness values, the calibration can be easily checked and corrected.

In calibrating the instrument, you are verifying that the millimeter thickness displayed is, in fact, equal to the caliper opening. This is accomplished by placing the calibrating dowel between the caliper tips and adjusting the instrument until that dimension is displayed.

To check the calibration:

A. With the tips closed, switch the SKYNDEX on. A 0.0mm reading should be displayed, if not, turn the unit OFF and ON again.

B. Next, place the diameter of the calibrating dowel between the jaws and then release the trigger.
IMPORTANT! Do not clamp the flat ends of the dowel (this is 25.4mm in length).

C. The display should show a reading of 15.8 to 16.0mm. If it does not, open and close the jaws on the dowel several times. If you still do not observe these values, readjustment of the internal calibration will be necessary.
To readjust the internal calibration:

D. Slightly turn the calibration adjustment screw until the display reads 15.9mm with the dowel clamped between the caliper jaws.

E. If correctly calibrated, your SKYNDEX will display 0.0mm with calipers closed and 15.8-16.0mm with dowel inserted. Repeat steps A through C to check the calibration.

F. Calibration is now completed. Close the caliper jaws, switch SKYNDEX OFF and return the dowel to its storage location.

Calibrating the SKYNDEX SYSTEM I

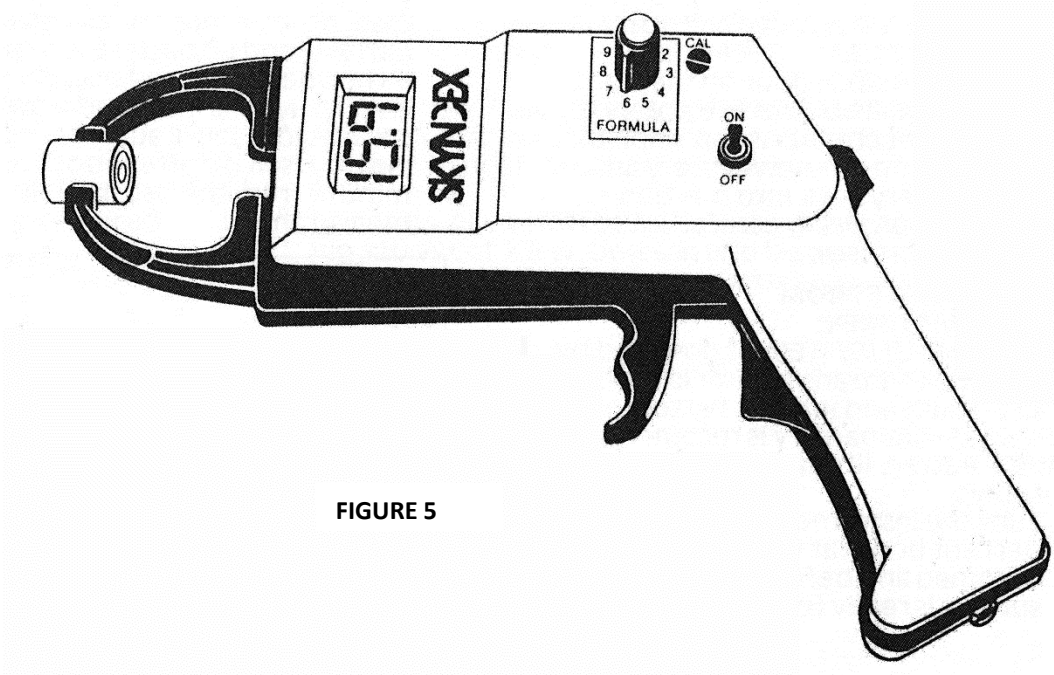


FIGURE 5

SKYNDEX SYSTEM I Battery Information

To replace the battery:

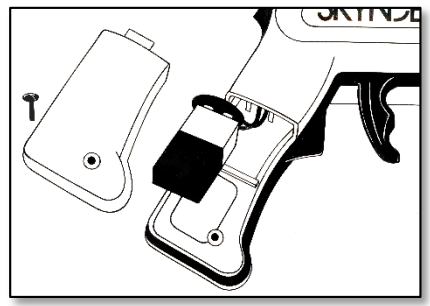
1. With a Phillips screwdriver, remove the screw at the lower right rear of the caliper. Do not remove any other screws on the SYSTEM I. (See Figure 6)

2. Lift out the small door on the right side. Carefully pull out the battery and lift off the connector at its top. Replace the connector on the new battery and insert the battery back into position. Replace the door and screw, being careful not to over-tighten the screw.

IMPORTANT NOTE FROM THE MANUFACTURER:

Your SKYNDEX SYSTEM I is powered by an ordinary 9-volt battery. For best results and longest battery life, an alkaline 90vold battery is recommended. Battery life can be extended in three ways:

1. Turn the instrument OFF between subjects.
2. Use the AC adapter provided with your SKYNDEX. In this case, no demands are placed on the battery, and no battery is required if the adapter is used exclusively.
3. If you leave the instrument switched ON, but idle, it will automatically switch itself off after about one minute.



JACKSON-POLLOCK FORMULA SPECIFICATION

This section is specifically for your SKYNDEX SYSTEM I programed with the Jackson-Pollock formula. The Jackson-Pollock is named after the authors of the original research study. Each formula was developed from the results of underwater weighing and skinfold data taken from several hundred individuals over a wide range of age, body structure, body composition and exercise habits. Specifically, the formulas are (BD=Body Density):

1. **Men**
   BD = 1.10938 – 0.0008267(Y) + 0.0000016(Y^2) – 0.0002574(Age)
   where Y= sum of Chest, Abdominal and Thigh skinfolds in mm
2. **Women**
   BD=1.0994291 – 0.0009929(Z) + 0.0000023(Z^2) – 0.0001392(Age)
   where Z = sum of Triceps, Thigh and Suprailliac skinfolds in mm.

JACKSON-POLLOCK
Formula Switch Settings

MEN	AGE	WOMEN
1	18-26	6
2	27-35	7
3	36-44	8
4	45-53	9
5	54-62	10

SKINFOLD SITES (Any Order):
MEN: Chest, Abdomen, Thigh
WOMEN: Triceps, Thigh, Iliac Crest

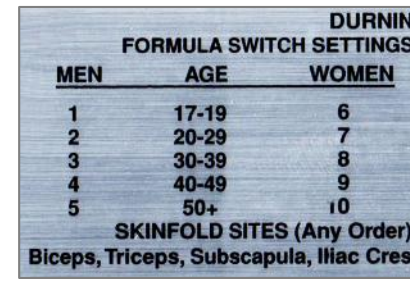
In order to be able to quickly input the age and gender into the SKYNDEX I, the formula total age span is divided into five age ranges, with the midpoint of each range actually used in the formula. For example, for age range 18-26, age 22 is used in the determination of BD.

- *Jackson, A.S. and Pollock, M.L. Generalized equations for predicting body density of men. Br.J.Nutr., vol 40:497-504, 1978. (MEN)*
- *Jackson, A.S. and Pollock, M.L. and Ward, A. Generalized equations for predicting body density of women. Medicine and Science in Sports vol 12:175-182, 1980.* (WOMEN)

DURNIN FORMULA SPECIFICATION

This section is specifically for your SKYNDEX SYSTEM I programed with the Durnin formula. The Durnin is named after the authors of the original research study. Each formula was developed from the results of underwater weighing and skinfold data taken from several hundred individuals over a wide range of age, body structure, body composition and exercise habits. Specifically, the formulas are (BD=Body Density):

1.	Men 17-19	BD=1.1620 – 0.0630 log (SF)
2.	Men 20-29	BD=1.1631 – 0.0632 log (SF)
3.	Men 30-39	BD=1.1422 – 0.0544 log (SF)
4.	Men 40-49	BD=1.1620 – 0.0700 log (SF)
5.	Men 50+	BD=1.1715 – 0.0779 log (SF)
6.	Women 16-19	BD=1.1549 – 0.0678 log (SF)
7.	Women 20-29	BD=1.1599 – 0.0717 log (SF)
8.	Women 30-39	BD=1.1423 – 0.0632 log (SF)
9.	Women 40-49	BD=1.1333 – 0.0612 log (SF)
10.	Women 50+	BD=1.1339 – 0.0645 log (SF)



Where SF = Sum of Biceps, Triceps, Subscapular and Iliac Crest skinfold thicknesses in mm.
The body fat % is calculated from: % Body Fat = 495/BD – 450

- Durnin, J.V.G.A. and Wormersley, J. Body fat assessed from total body density and its estimation from skinfold thickness measurements on 481 men and women aged 16-72 years. Br. J. Nutri., vol. 32:77-97, 1974.

SLAUGHTER-LOHMAN FORMULA SPECIFICATION

This section is specifically for your SKYNDEX SYSTEM I programed with the Slaughter-Lohman formula. The Slaughter-Lohman is named after the authors of the original research study. Each formula was developed from the results of underwater weighing and skinfold data taken from several hundred individuals over a wide range of age, body structure, body composition and exercise habits. The skinfold equations shown below are used to predict body fat in children 8-18 years of age:

CALF
Inside (medial) of the right lower leg at the greatest calf girth.

TRICEPS
Measure vertically on back of arm midway between top of shoulder point (Acromial Process) and elbow (Olecranon Process).

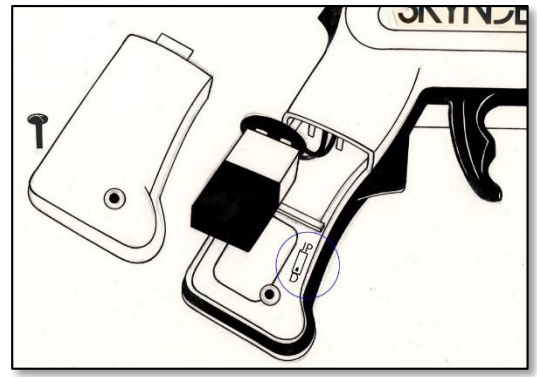
Position 1 (OR 11 if multi-formula unit)
Boys % Body Fat = 0.735 (Triceps + Calf) + 1.0

Position 2 (OR 12 if multi-formula unit)
Girls % Body Fat = 0.610 (Triceps + Calf) + 5.1

JACKSON-POLLOCK / DURNIN COMBINATION UNIT

The Jackson-Pollock / Durnin Combination unit includes 2 formulas. To select which formula to use, a switch is located inside the battery door labeled JP for Jackson-Pollock and D for Durnin. The default formula set at the factory is the Durnin. To use the Jackson-Pollock formula, perform the following steps:

1. Turn the power switch OFF.
2. Remove the battery door from the lower right side of the unit with a Phillips screwdriver.
3. Place the switch in the JP (UP) Position.
4. Replace the battery door.
5. Refer to the Jackson/Pollock label or see page 17 for age and gender dial settings and skinfold sites.



Refer to the appropriate switch settings table for the correct formula for age and gender.

SKYNDEX SYSTEM I Specifications

Tip pressure:	$10g/mm^2$
Linearity:	+/- 0.5%FS
Display:	0.5 inch digit, Liquid Crystal Display 0.1mm resolution
Controls:	POWER ON-OFF toggle switch; FORMULA select switch; COMMAND rocker switch for all other functions. Design permits right or left handed operation.
Power Required:	Unit is supplied with UL listed wall plug-in AC adapter requiring 120VAC at 2.5W. Unit can also be operated from 9v battery with an approximate current drain of 15ma.
Outside Dimensions:	10 ½" x 7 ½" x 2 ¾" (26.7 x 19.1 x 7.0mm)
Weight:	14oz (398 grams)

Questions & Answers

1. **What should appear in the display after the SKYNDEX is turned ON with the calipers closed?**
   88.88 should appear as a check to show that all numerical segments are functioning properly. After about one second, 0.0 should appear.
2. **What should you do if the display remains blank after the power is turned ON?**
   If the display remains blank, it is likely that the battery has become discharged. Plug the power plug into the receptacle located at the bottom of the handle and the adapter into a "live" 120 volt outlet. Turn the power ON. If display still does not show 88.8, followed by 0.0, double check to see if the outlet is "live". If the outlet is operational, the unit is not functioning properly and must be returned for repair.
3. **What might cause the display to show an "E" reading?**
   The display will show an "E" reading if you applied even the slightest pressure on the trigger as the unit is powered ON. If this occurs, turn the unit OFF and ON again, without holding the trigger.
4. **After the SKYNDEX is turned ON, and the display is reading properly, what do you do next?**
   Turn the FORMULA knob to the number which corresponds to the age and sex of the person you are measuring.
5. **How do you determine which FORMULA number to use?**
   The proper age and sex is determined from the label on the side of the SKYNDEX.

6. **What do you do if you have used the wrong formula?**
   Turn the SKYNDEX OFF, then select the proper formula number.
7. **If you make an error at any one site, how do you go about cancelling the erroneous reading and obtaining a new one it its place?**
   Press the rocker switch a second time while the erroneous skinfold value is being displayed. The display will then indicate the number of sites recorded, followed by two dashes. After about two seconds, the display again indicates the current caliper opening. Now retake the same site.
8. **What does it mean if the numbers fade?**
   This merely means that the battery is discharged. You may use the instrument with the wall adapter until you install a new battery.
9. **What does it mean when the numbers flash indicating percent body fat before the final skinfold is taken?**
   The rocker switch was accidentally pressed one extra time as each skinfold was being assessed. The SKYNDEX will record a 0.0 reading if the rocker switch is depressed while the caliper jaws are closed. Turn the unit OFF and ON again and then retake all the skinfolds.

If you still need assistance or additional information,
please call WELLTEC at 855-SKYNDEX (759-6339),
email info@skyndex.com or visit www.skyndex.com

SKYNDEX SYSTEM I WARRANTY

WELLTEC warrants for a period of one year after delivery to the original user-purchaser that this SKYNDEX product is free of defects on workmanship and material with normal use and service. The obligation of WELLTEC, under this warranty is limited to replacement or repair, at the option of WELLTEC, without charge for material or labor, of any part found defective.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, AND ANY REPRESENTATIONS OR PROMISES INCONSISTENT WITH OR IN ADDITION TO THIS WARRANTY ARE UNAUTHORIZED AND SHALL NOT BE BINDING UPON WELLTEC. IN NO EVENT SHALL WELLTEC BE LIABLE FOR ANY SPECIAL OR CONSEQUENTIAL DAMAGES, WHETHER OR NOT FORESEEABLE.

This warranty shall be void if the product has been subjected to misuse or damaged by negligence or accident, or if it has been repaired or altered by other than authorized agents of WELLTEC.

IMPORTANT

If warranty service should become necessary your device must have been registered. Please visit www.skyndex.com/register to register your device and for repair information.

WELLTEC, LLC.
8100 Wyoming Blvd. NE,
Suite M4-130
Albuquerque, NM 87113

855-SKYNDEX
855-759-6339
info@skyndex.com
www.skyndex.com