Using the Electronic Performance Monitor (PM1)

DESCRIPTION OF DISPLAY

There is no "on" or "off" button on this monitor. Simply starting to row will cause the display to function. The RESET button will also activate the monitor if it is off. The monitor will automatically shut itself down after about 3 minutes of inactivity.

There are 4 different display areas on the Performance Monitor:

Elapsed Time - keeps track of the time of your workout.

Stroke Rate - indicates your stroke cadence in strokes per minute. This display updates each stroke at the end of the drive to show the rate of the stroke you just completed.
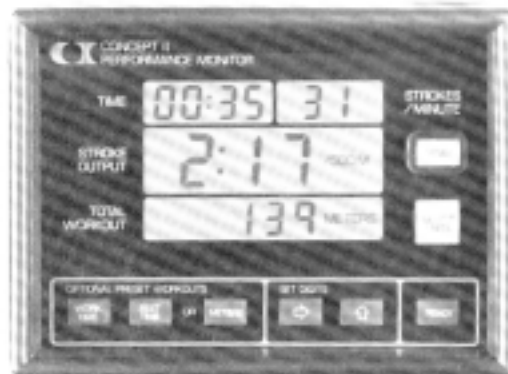
Stroke Output - gives you instant feedback on your performance each stroke. This display updates each stroke at the end of the drive to show you the value of your effort for the stroke just completed.

Total Workout - keeps an average or cumulative record of your workout.

concept 2
ROWING

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OUTPUT UNITS

SELECTION OF UNITS:

The STROKE OUTPUT and TOTAL WORKOUT displays offer you output data in a choice of three units. To change units, simply press the [SELECT UNITS] button. Each time you press it, the next choice of units will appear. Starting with watts, one push of [SELECT UNITS] will bring up the pace/meters option; another push will bring up the calories option; a third push will bring you back to watts again, and the cycle repeats.

After you finish your piece, you can look at your score in all of the unit choices by repeatedly pressing the [SELECT UNITS] button.

DESCRIPTION OF UNITS:

Watts - Watts are a unit of power. If you choose watts for your display units, you will see how much power you produce. If you row with an average power output of 100 watts, you are putting out enough power to light a 100 watt light bulb for the length of time that you row! The STROKE OUTPUT display shows how many watts you were producing during the stroke you just finished. The TOTAL WORKOUT display shows your average power production for the time you have been rowing.
    This unit choice is ideal for helping you achieve a constant work level. If you predetermine the average watt level you wish to maintain for a work piece, you can use the TOTAL WORKOUT display as a pacer. At any time, you can see if you are behind or ahead of your goal.

Pace and Meters - Pace, expressed in units of time, indicates your speed as if you were rowing on the water in a racing shell. At each stroke, it measures the time it would take to row 500 meters (500 meters = 1 mile on the old style Concept II speedometer) at that level of effort. For example, if you rowed every stroke at a pace of 2:05 for 500 meters, your elapsed time would be 2:05. (Note, however, that it is not practical to row every stroke at exactly the same pace.)
    This concept will be especially familiar to competitive on-the-water rowers who often gauge their speed by timing themselves for the 500 meter distance. This is a very useful measure of your output: as your speed increases, the pace decreases.
    The STROKE OUTPUT shows your pace, while the TOTAL WORKOUT shows your cumulative meters rowed.

Calories - in this unit selection, STROKE OUTPUT shows the
rate at which you are burning calories each stroke, in
calories per hour. TOTAL WORKOUT keeps track of cumulative
calories burned during your workout. Since every human
body is a little different in the way it metabolizes
energy, and since some people are more efficient rowers
than others, the caloric data can only be approximate. Our
formula is based on research done using the Concept II
Rowing Ergometer and is a very good approximation.
The following is the formula we use:

calories burned =
((4 x Ave.watts/1.1639)+ 300 cal/hr) x time rowed(hrs)

INITIALIZATION OF MONITOR: Every monitor is initialized
before it leaves Concept II. Occasionally shipping can
cause a monitor to lose this initialization. YOU WILL ALSO
NEED TO REINITIALIZE THE MONITOR AFTER YOU CHANGE THE
BATTERIES.

Initialization procedure: Press the [RESET] button and
keep it depressed while you press the [↑] button. Now
release [RESET] and finally release [↑].

AUTOMATIC MODE

The automatic mode is the best mode to use for warming up before a hard workout, or if you want to keep track of total calories burned, total meters rowed, or total time of a workout. As you start to row, the time display will start timing your workout and all other displays will operate as usual.

To Begin a Workout:

1) If the monitor is off, simply start rowing. (That's why we call it automatic mode.)

2) If someone has been rowing and there are numbers on the display, press RESET then start to row.

3) If you wish to look at units other than those displayed, use the SELECT UNITS button to select the desired units.

What happens if you stop rowing in the middle of your work piece in automatic mode?

If the monitor counts 6 seconds without a stroke being taken, it automatically backs up the ELAPSED TIME 6 seconds to the time of your last stroke and waits for you to start rowing again. If no rowing occurs for 2 1/2 minutes (and no buttons are pushed), the monitor will automatically turn itself off. This means you can rest or strip warm clothes for up to 2 1/2 minutes without losing the data from the first part of your piece.

Similarly, at the end of your piece, the display of your performance will remain on the monitor for 2 1/2 minutes, before automatically turning off. This allows plenty of time to record your score. The display can be extended indefinitely by pushing the SELECT UNITS button more often than every 2 1/2 minutes.

SAMPLE WORKOUT: 30 minute row including warmup
(Note: This is not suitable for a first-time row. Build up to it gradually.)

Get on the ergometer and start rowing very easily. After rowing for 5 minutes easily (at your limbering up pace), gradually start to increase your effort, keeping an eye on the STROKE OUTPUT display. Do not increase your effort too much too soon as you will want to build your effort to a maximum over the next 20 minutes. After 25 minutes of rowing, decrease your effort to something close to your warmup pace. Row at this level as a warmdown and stop when the time reaches 30 minutes. Record your total workout score.
Physiologically: 20 minutes of aerobic exercise 3 times a week is often cited as the minimum exercise needed to maintain fitness.

SETTING UP WORKOUTS, SAMPLE WORKOUTS

PRESET TIMED WORKOUT

This mode allows you to preset the length of time you want
to row. As soon as you start to row, the ELAPSED TIME
display will start to count down toward 0, always showing
you how much time is left in your workout. The STROKE
RATE, STROKE OUTPUT, and TOTAL WORKOUT displays will
operate as described previously. When your workout time is
up, the displays will freeze for 2 1/2 minutes, allowing
you to record your performance. The monitor will then
revert to automatic mode. You can preserve your score for
an additional 2 1/2 minutes by pressing the |SELECT UNITS|
button.

This type of workout lets you structure the time of your
work piece, and precisely shows your output for that
predetermined time.

To Set Up a Workout:

1) Press |RESET|.

2) Press the button labeled |WORK TIME| in the lower left
hand corner of the monitor. One digit of the ELAPSED TIME
display will begin to flash. (If you get strange figures in
the display the first time you try this or after you change
the batteries, please see Troubleshooting).

3) Set the desired elapsed time for your workout by using
the |SET DIGITS| buttons as follows:
      * The arrow pointing right |—→| selects the digit
that you are going to change. Each time you push it, it
causes one digit to the right in the time display to flash.
      * The arrow pointing up |↑| increases the value of
the blinking digit by 1 each time it is pushed.

NOTE: The maximum work time that you can set is 59:59 (59
minutes and 59 seconds. The minimum is 00:10 (10 seconds).

4) When the desired elapsed time is displayed, press |READY|.
The ELAPSED TIME display should stop blinking, and you are
ready to row.

5) If you prefer other digits than are currently displayed,
use the |SELECT UNITS| button to select the desired units.

Your current workout will remain in the monitor's memory
until another workout is set up - even if the monitor is
turned off.

SAMPLE WORKOUT: 20 minute row
     After your usual warmup, set the work time for 20
minutes, and start to row. See what average watt output
you can maintain or how many meters or calories you have
accumulated by the end of the 20 minutes. Record these
numbers as your score for the workout. Repeat the workout
every few weeks to monitor your training progress.
Physiologically: This workout achieves the minimum
effective workout of 20 minutes, and also gives you a score
to keep in your records to help monitor your progress.

PRESET TIMED INTERVALS

This mode is designed to lead you through interval
training. It allows you to preset a work time interval and
a rest time interval. As soon as you start to row, the
ELAPSED TIME display counts down your work time to 0. When
the work time is up, all displays freeze except the ELAPSED
TIME display, which counts down your rest time to 0. When
the rest time is up, the work time is again counted down
and the work output displays begin to show the work done in
the next work interval. The process repeats itself until
you have done the desired number of repetitions.
Interval training can be a very effective conditioning
tool. Some sample workouts will be given below.

To Set Up a Workout:

1) Press the [RESET] button.

2) Press the button labeled [WORK TIME]. One digit of the
ELAPSED TIME display will begin to flash.

3) Set the desired work time using the SET DIGITS buttons
as follows:
     * the arrow pointing right [→] selects the digit
that you are going to change. Each time you push it, it
causes one digit to the right in the time display to flash.
     * the arrow pointing up [↑] increases the value of the
flashing digit by 1 each time it is pushed.
When the desired work time is displayed, go on to step 4.
(Do NOT push [READY]).
NOTE: the maximum work time that you can set is 59:59. The
minimum is :10.

4) Press the button labeled [REST TIME]. The ELAPSED TIME
display will still be flashing, but now it indicates the
rest time.

5) Set the desired rest time using the [SET DIGITS] buttons
again as described above.
Note: The maximum rest time you can set is 9:59 (9 minutes
and 59 seconds). The minimum is 00:10 (10 seconds).

6) When the desired work and rest times have been set, press the [READY] button.

7) If you wish to watch other units than the ones currently displayed, use the [SELECT UNITS] button to select the desired units. You are now ready to row.

8) On newer monitors, the number of intervals you have rowed will be displayed in the STROKE OUTPUT display during the rest interval.

This workout will remain in the monitor's memory until another workout is set up, even if it is turned off.

SAMPLE WORKOUTS:

Short Rest Intervals: 40 seconds work/20 seconds rest
      Set the work time for 00:40 and the rest time for 00:20. Perform these intervals for around 20 minutes, rowing at 80%-90% effort during the work time and very easily during the rest time. At the end of each work interval, read your score in the TOTAL WORKOUT display. Try to keep improving.
Physiologically: The short rest should be just long enough to refresh you psychologically for the next hard piece, yet it won't be long enough to let your heart rate drop significantly.

Power Poppers: 20 seconds work/1:40 rest
      Set the work time for 00:20 and the rest time for 01:40. Be sure that you are well warmed up before you start. Row as intensely as you can for the work interval, and note your score at the end. Enjoy the long rest, then try to beat your score on the next piece! Do just 8 repetitions, keeping the quality high. You may wish to do this workout with a heavier resistance than usual.
Physiologically: This workout combines strength training and cardiovascular conditioning.

PRESET DISTANCE WORKOUT

This mode allows you to preset the distance for which you intend to row. As soon as you start to row, the distance in meters will be counted down to 0 in the TOTAL WORKOUT display. The other displays will operate as usual. At the end of your workout, the elapsed time will be displayed to the nearest tenth of a second. Your time will be displayed

To Set Up a Workout:

1) Press RESET

2) Press the button labeled METERS at the bottom of the monitor. One digit of the TOTAL WORKOUT display will begin to flash in meter mode; and the monitor will automatically display the pace/meters units. (If strange figures appear in the display when you try this for the first time, please see Troubleshooting).

3) Set the distance to be rowed using the SET DIGITS buttons as follows:
    * the arrow pointing right →| selects the digit that you are going to change. Each time you push it, it causes one digit to the right in the meters display to flash.
    * the arrow pointing up ↑ increases the value of the flashing digit by 1 each time it is pushed.
Note: the maximum distance that you can set is 9999 meters. The minimum is 10 meters. Remember that 500 meters is the equivalent of 1 mile on the old Concept II odometer.

4) When the desired distance is displayed, press the READY button. You are ready to row.

5) When your distance is completed your time will be displayed to the nearest tenth of a second as follows: the minutes and seconds will be displayed in the usual place; and the additional accuracy of tenths of a second will be shown in the stroke rate display area. This feature was designed specifically for ergometer races.

6) If you don't complete a preset distance workout, press the RESET button to insure that the monitor powers down.

SAMPLE WORKOUT:
    2500 meter piece (5 mile piece on the old Concept II odometer) - this is the distance usually rowed in the increasing number of winter indoor rowing regattas! It is a good way to see how you compare to ergometer rowers across the country.
    Set the distance for 2500 meters. Be sure you're well warmed up. Row as well as you can. Record your time, including tenths of a second. Watch the Ergo Update for results of the Ergometer races, and compare your score. Physiologically: This length piece makes a very good test piece because your performance will reflect your current aerobic capacity.

HOW THE PERFORMANCE MONITOR WORKS

Discussion of Power Calculation and Accuracy

The accuracy of the Performance Monitor makes it possible to compare results on all ergometers regardless of resistance settings. The power output as measured and displayed by the monitor is not affected by local factors such as proximity to walls or other ergometers, local air currents, or altitude. All Concept II Ergometer scores computed by the monitor may be directly compared even if they are rowed under different conditions.

The monitor precisely measures the flywheel speed and acceleration. It uses this information plus the moment of inertia of the flywheel to calculate the power applied to the wheel.

Comparison of Watts and Pace/Meters Units

The monitor calculates watts by measuring the work done during the drive and dividing by the time of the full stroke cycle (recovery and drive). Pace and meters are calculated from the power dissipated throughout the full stroke cycle using formulas which account for the effect of water drag on a boat.

You will notice this difference particularly in the first few strokes. The watts and calories will appear quite high, reflecting the large amount of energy required to get the flywheel moving. The pace will be quite slow, reflecting the fact that it takes a few strokes to get "the boat" moving.

Truncation of Pace Display

In pace/meters units, the STROKE OUTPUT is a truncated number. In other words, a pace reading of 1:57 means that your actual calculated pace lies between 1:57 and 1:57.99. If your target pace is 1:57, you should aim for 1:56, especially considering the slower pace readings of the first few strokes.

Stroke Rate

The stroke rate display may indicate an artificially high stroke rate on the first stroke of both the work interval and the rest interval in a pre-set interval workout, depending on where you are in the stroke cycle when the timing begins.