

THE UTAH ARM 3

Quick Set-Up Guide

Doc. No. 1910023 Rev. C
September 2005

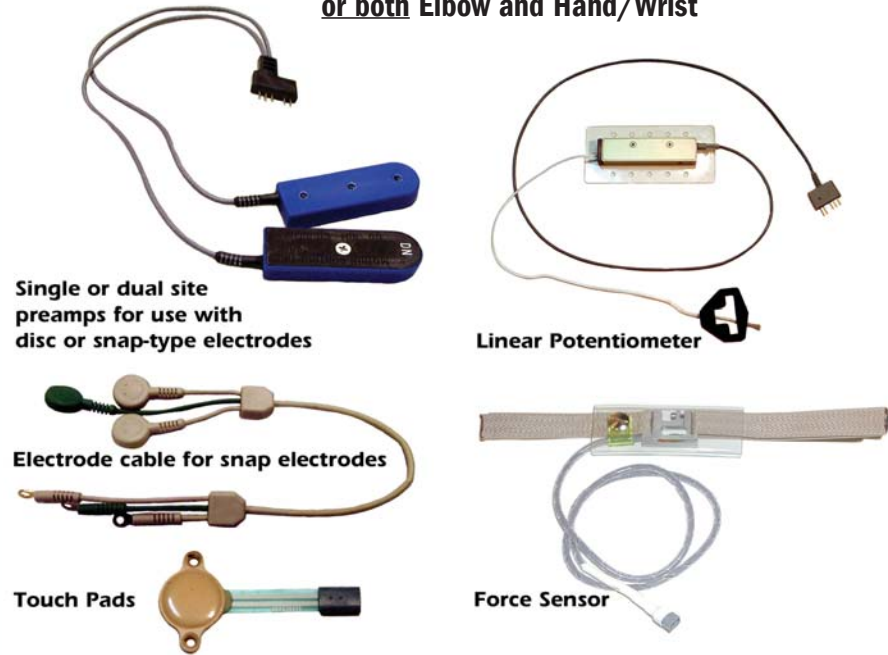
*Refer to the Utah Arm 3 Instruction Manual for more detailed explanations of all operations and adjustments.

Hardware Requirements:

The Utah Arm 3 uses windows-based software and operates on any Windows OS, including XP.

U3 Inputs

Any of these inputs may be used for either or both Elbow and Hand/Wrist



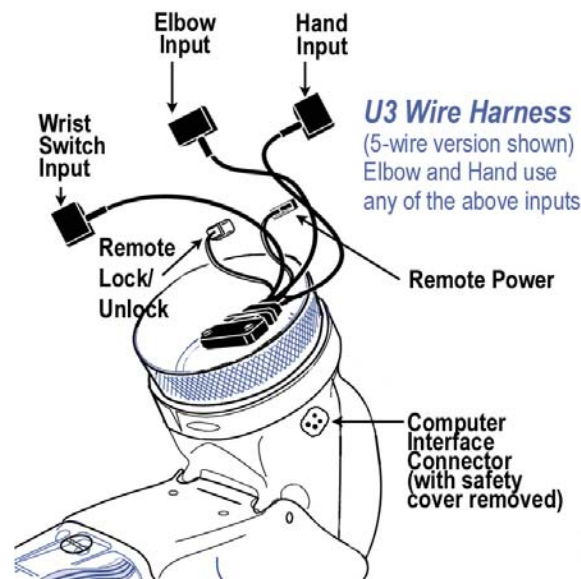
Step 1. Connect the Utah Arm Parts

To connect the parts :

Per the diagram, connections may be made via the 1-, 3-, or 5- wire harness. (5-wire shown)

To make adjustments using your computer, connect the Computer Interface Cable on the left side of the elbow, as shown, and the 9-pin connector to the back of your computer.

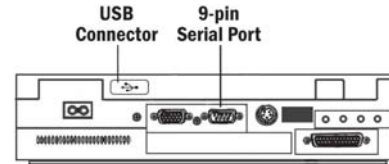
For Switch Options, refer to the Utah Arm parts catalog on reverse side.



Check www.UtahArm.com for updates to these instructions

Step 2. Connect the Computer Interface

1. Remove the safety cover for the Computer Interface connector on the U3 elbow.
2. Plug in the 4-pin connector from the Computer Interface.
3. Plug the Computer Interface into the 9-pin serial port of your computer. If your computer does not have a serial port, you may need a USB-serial port adaptor. Order part #1800075 from Motion Control.



Step 3. Load the Software

1. Insert CD or 3.5" floppy disk into your PC and double-click on the file "U3PC2inst.exe." A window will open asking if you want to install the program; click **YES**. The program will automatically load on your "C" drive when you click on "Unzip," unless you specify otherwise (fig. 1).

When the self-extractor is complete, you will see a message indicating the software has loaded successfully.

2. You should now see two new icons on your desktop labeled "U3PC2" and "U3PC2 Demo." (fig. 2) Choose Demo to practice. Choose "U3&PC2" to begin using the software.

Note: If other Windows programs are running while using the User Interface software, your computer monitor may switch to a different viewing resolution. Your normal settings will return when you exit the program.

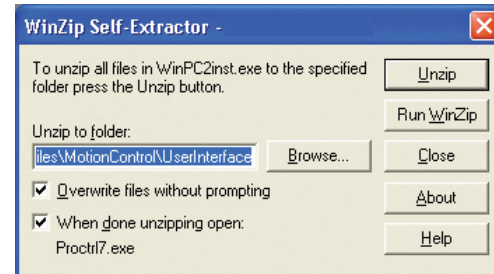


Fig. 1 WinZip self-extractor will automatically install to your hard drive. Just click "Unzip."



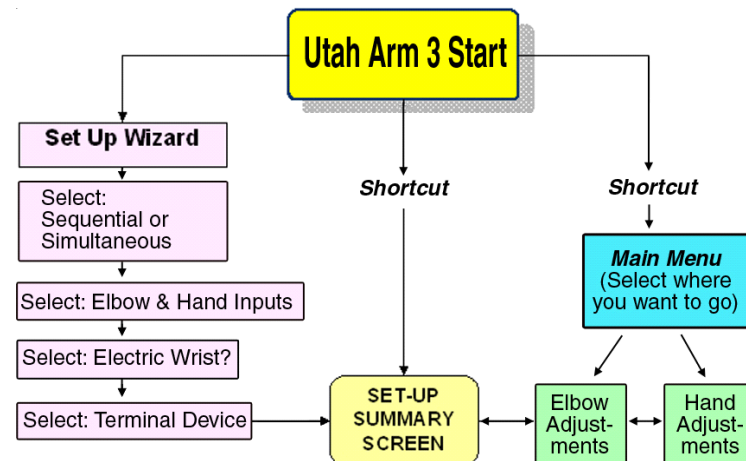
Fig. 2 Click on desktop icons to begin using software.



Click on "Utah Arm 3" and "Next" to proceed to the Set Up Wizard for U3.

How the software is organized:

Use the Set Up Wizard or take a shortcut directly to the adjustment screens.



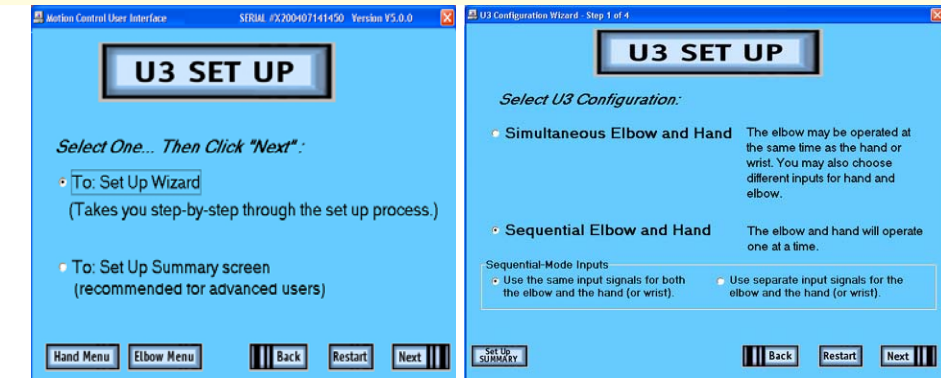
Note: If using the Otto Bock Sensor Hand, install the WHITE shorting plug, or none at all, to work with U3.

Step 4. Use the Set Up Wizard

Default Set Up:

- Sequential hand and elbow control
- Dual-site EMG (same input for Elbow & Hand)
- Using a Motion Control Hand or ETD

TO CHANGE: Use the Set-up Wizard for step by step guidance.

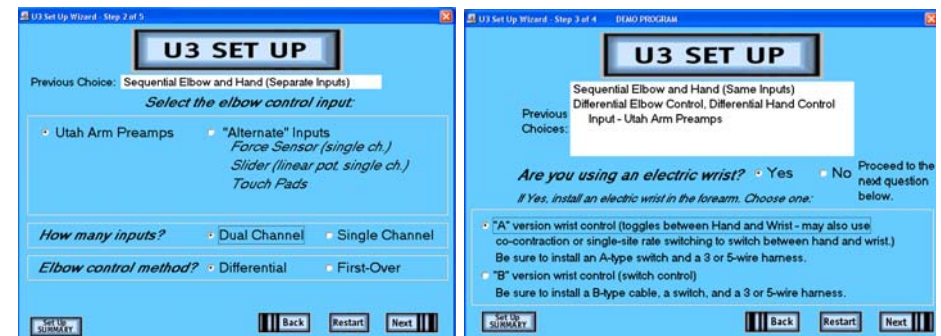


Simultaneous vs. Sequential:

Sequential control - the same as the U2- the Hand will operate when elbow is locked. Hand and elbow inputs may be the same or different.

Simultaneous control - wearer can use the elbow and hand (or wrist) at the same time. Hand and elbow inputs must be different.

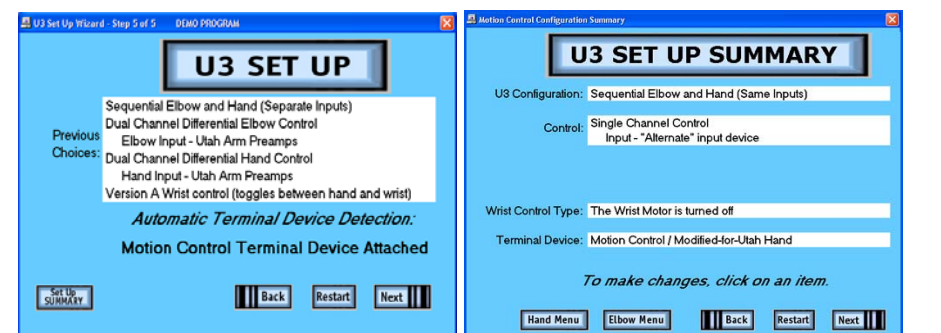
If using separate Hand and Elbow inputs, choose "Use separate input signals" and connect both inputs to the Wire Harness. If you choose "Use the same inputs," the **ELBOW** input will also be used for the Hand, when the elbow is locked.



Select the elbow control input and the number of inputs you will be using. Note: if you chose "separate inputs" earlier, you will also need to indicate the Hand control inputs.

Indicate if you are using an electric wrist rotator, and if so, what type.

For more on Control Types, see other side



The U3 will "auto-detect" the type of TD connected in the 2 seconds after powerup. Turn U3 power OFF to change TDs.

Set Up Summary
Review and verify your selections. To make changes, simply click on that option.

Quick Troubleshooting Guide:

If you get the message "Unable to communicate..." check that the Arm is turned on, the computer connections are tight, and try another Comm port. If all else fails, try rebooting your computer, with the Computer cable disconnected.

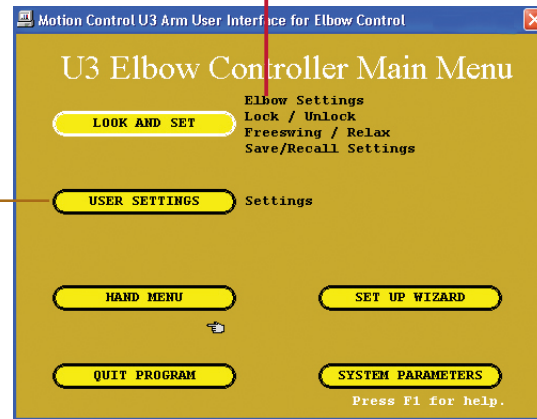
Elbow Adjustment screens

For help on any screen, press F1.

Set the forearm gains on the Arm itself to "5"

Screens available

Elbow Main Menu



User Settings

Toggle between options by clicking on the appropriate button.

- "Polarity" reverses elbow direction
- "Manual" lock/unlock - click to lock/unlock the elbow



Definition of each Control Type: (See also Step 4, other side)

1. **Dual Site EMG** - (same as the U2 Arm)- the DIFFERENCE between the A and B muscle signals controls the Elbow.
2. **Dual Site EMG First Over** - the elbow is controlled by the FIRST muscle to contract over the Threshold, NOT the difference between A and B. This is especially useful for the patient who cannot control each muscle independently. Reversing the direction of the Elbow requires the first muscle to relax below threshold.
3. **Single Site EMG** - Use when only one muscle site is available, or for initial training.
4. **Single Site Alternate Input** - (e.g., Force Sensor, Linear Potentiometer, etc.) - Used when no muscle EMG is available. Elbow (or Hand) power is proportional to the amount of input signal.

Installation of each Control Type:

(Connect to Elbow input in wire harness)

1. **Dual Site EMG/EMG First Over** - Use standard dual site preamps.
2. **Single Site EMG** - Use a Single site preamp or dual site preamps- the controller will use the "A" channel only. If you decide to use dual site control later, you can simply select it in the Set Up Wizard and both channels will be active.
3. **Single Site/Alternate Input** - Connect the Force Sensor with adaptor cable in place of preamps.
4. **Dual Site/Alternate Input** - Dual site Touch Pads are presently the only option. Connect to "elbow" input.

How "Single Site EMG" and "Single Site Alternate Input" Works:

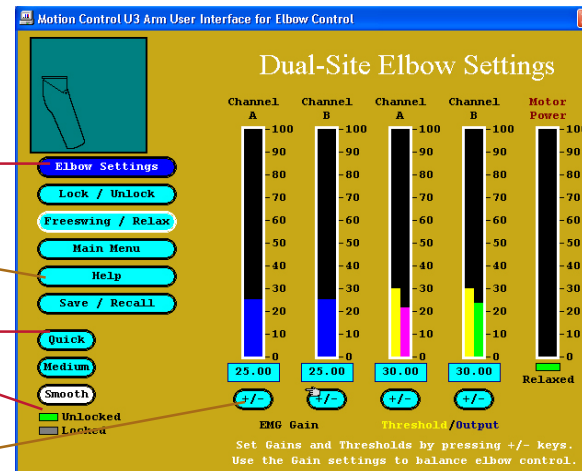
Using the Single Site control options, increasing the signal raises the elbow and decreasing the signal lowers the elbow. The power to the elbow is proportional to the level of the input, so slow and fast speed is under the control of the wearer. When the signal is relaxed fully, the elbow will go into freeswing.

Dual-site EMG inputs

Elbow Settings

For making adjustments and patient training.

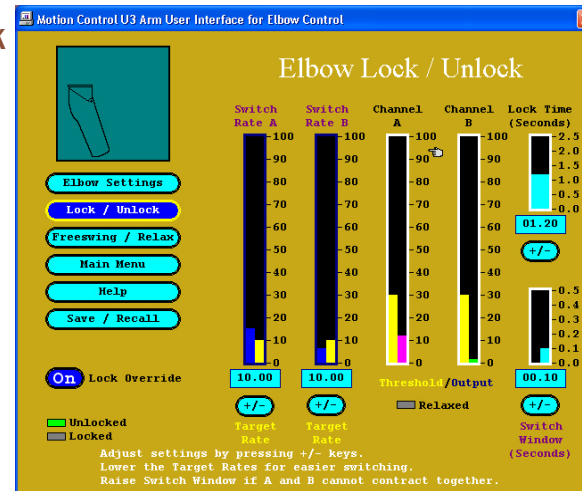
- Screen name highlighted
- To choose other screens, highlight by using the up and down arrow keys, then press <Enter>
- Quick/Smooth Setting: Select for best control of the Elbow
- Elbow locked/unlocked indicator
- To make adjustments, select one, then press "+" or "-" to change



Elbow Lock/Unlock

Use this screen to help train wearer to switch between hand and elbow. Input signals are shown to help with training.

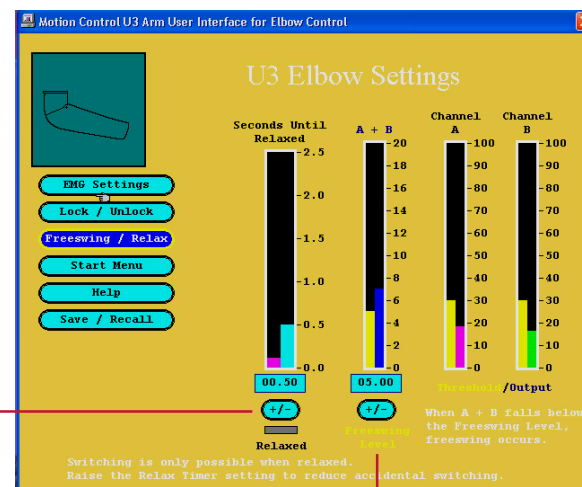
- To Unlock: First, relax until light goes on. Then co-contract so both target rates are exceeded. The border of the column flashes GREEN when co-contraction is successful.
- Switch Window: Time allowed between A & B threshold crossings.



Freeswing/Relax

Freeswing occurs when muscle signals (A&B) fall below freeswing level.

Relax Time: Prevents accidental unlock by requiring a pause before switching.

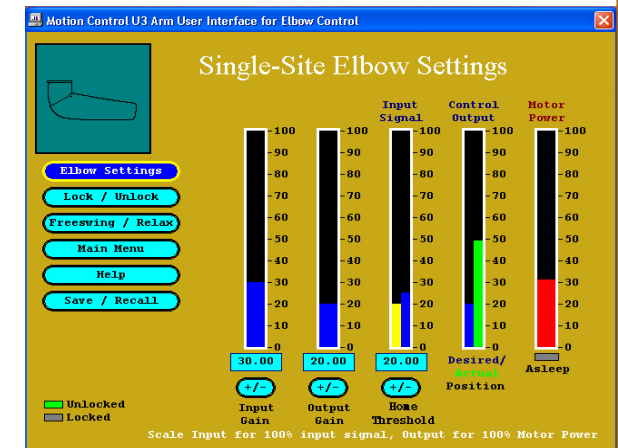


Adjust the Freeswing level so wearer can relax below it.

Single-site EMG or Alternate input

To adjust SS input:

1. Adjust "Input Gain" so that "Input Signal" reaches 100% with moderate effort.
2. Adjust "Output Gain" so that elbow control is optimized.
3. Adjust "Home Threshold" to prevent accidental motion of the elbow.

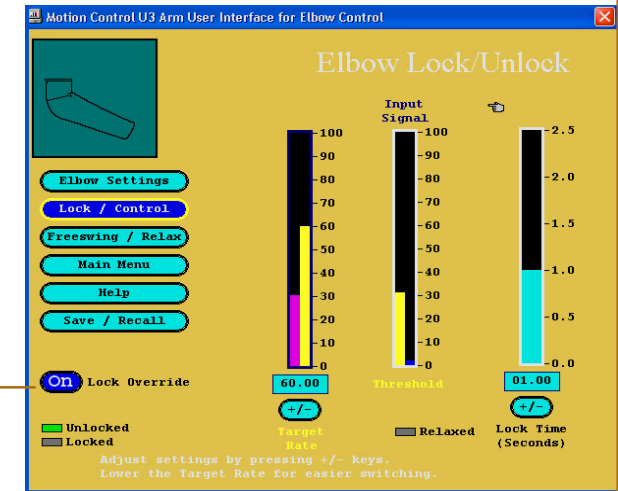


For SS Unlock:

Same as dual site unlock, except with single input.

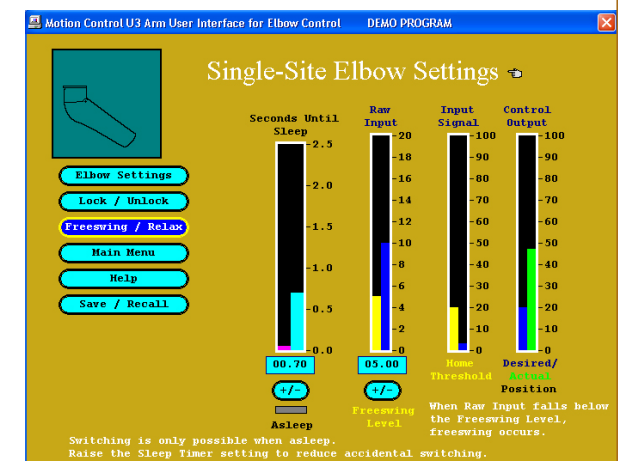
Note: Rate must be higher than Target Rate for both rising and falling signal. If difficult for the wearer, lower the Target Rate.

Lock Override: "Override" is enabled or disabled when lock override button (on the arm) is pushed.



For Single Site:

Freeswing and Relax adjustment is the same as for dual site EMG.

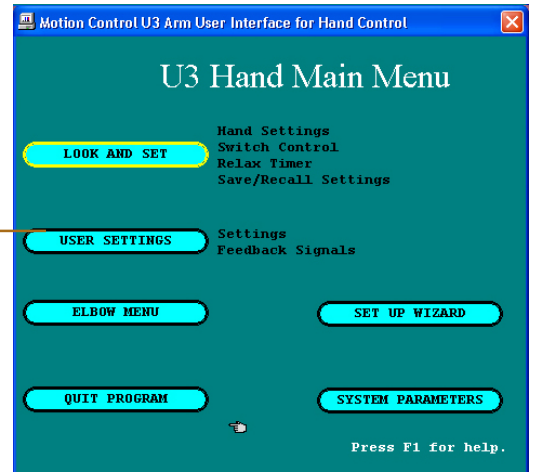


Elbow Adjustment screens

Hand Adjustment screens

For help on any screen, press F1.

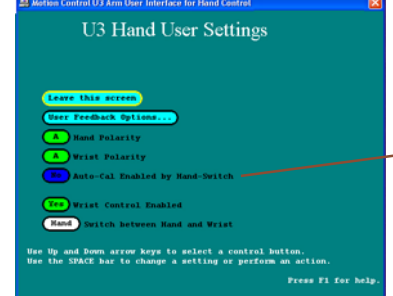
Hand Main Menu



User Settings

Toggle between options by clicking on the button.

- Reverse Hand or Wrist direction



Enable Auto-Cal on "User Settings" screen
Gains and Thresholds will readjust.

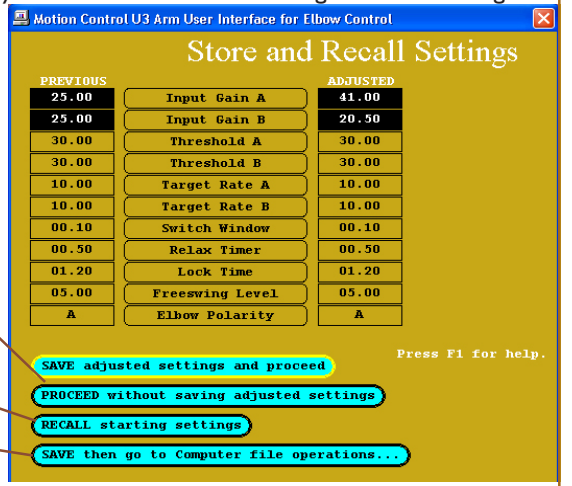
Trigger Auto-Cal by:
1. Turn power off/on twice quickly.
2. Open and close the hand several times within 7 seconds.

Store and Recall - with changes:

This screen appears automatically at screen exit whenever settings have been changed.

"Previous" settings are last saved settings.

"Adjusted" settings show any changes.



- To save and exit, click on PROCEED
- Recalls "original" settings from start of session
- To store or recall settings on the hard drive, use "Computer File Operations"

Computer File Operations:

To save adjusted settings into permanent memory on your computer. Follow on-screen directions to select a register, rename it, store settings, or retrieve settings. To retrieve settings, be sure Set Up Wizard has the same settings as when stored.

Single Site EMG or Alternate Input

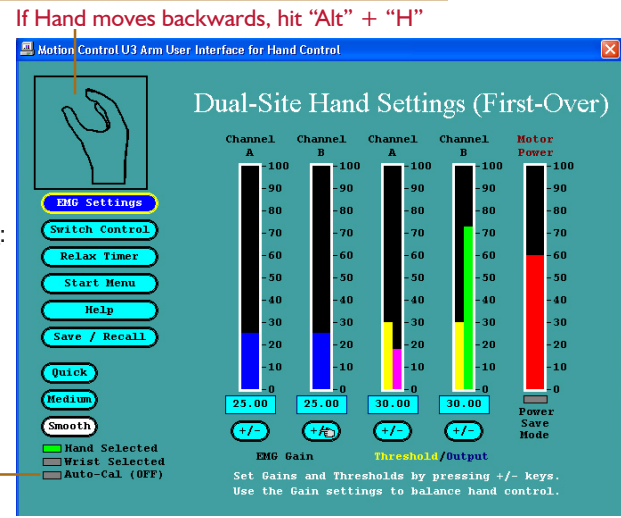
- **Home Threshold:** determines when the Hand will start running, as the Input Signal is raised. Its purpose is to prevent unwanted motion of the Hand from small fluctuations of the input.
- **Midpoint:** This value is not adjustable. It functions as the reversal point for the Hand direction. Whenever the Input is lowered, and the signal falls below the Midpoint, the Hand direction reverses.
- **Alternating Wrist Mode:** When the U3 switches to Wrist (usually by co-contraction), you have the option of using Alternating Wrist Control. When this option is enabled, the Wrist will operate in each direction alternately. The direction of Wrist Control will reverse each time the Input Signal is relaxed for as long as the Sleep Time.

Dual-site EMG inputs

Hand Settings

Default Dual Site EMG: Hand power is the difference of Channel A and B outputs.

First-Over Dual Site EMG: Hand power is output of the first muscle above threshold. To reverse direction, muscle must relax.



Enable Auto-Cal on "User Settings" screen

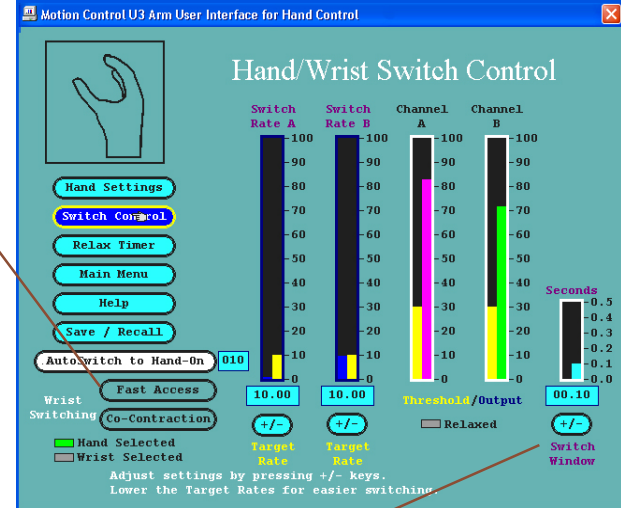
Switch Control (if wrist is installed)

Fast Access: Wrist operates when one muscle contracts, with Rate above Target Rate.

Co-Contraction: A & B Switch Rates are above Target Rates PLUS A & B cross threshold together

External Switch: (optional) See Parts Catalog

Note: A feedback "buzz" can be enabled on the User Settings screen to alert user when sleep occurs.



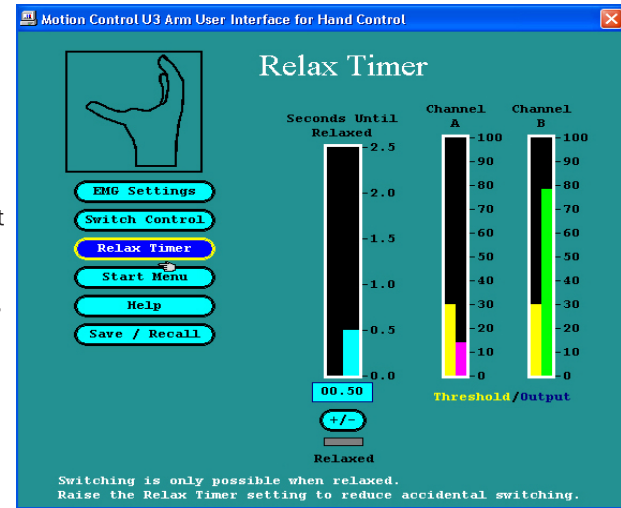
Switch Window: How close together (in seconds) muscle A & B must co-contrast

Relax Timer:

Relax Time prevents accidental switching by requiring a pause before switching.

To switch between Hand and Wrist, muscles must first relax (input signals fall below thresholds) for the length of this setting, the Relax Time.

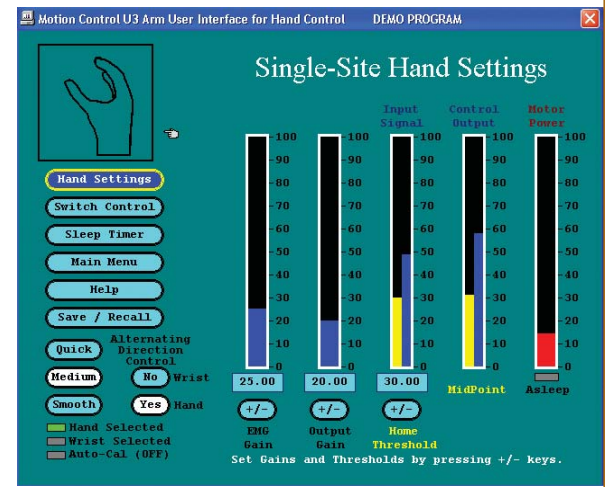
For wearers with difficulty relaxing, LOWER the time setting.



Single-site EMG or Alternate input

Steps to adjust SS input:

1. Adjust "Input Gain" so that "Input Signal" reaches 100% with moderate effort.
2. Adjust "Output Gain" so that Hand control is optimized.
3. Adjust "Home Threshold" to prevent accidental motion of the Hand.

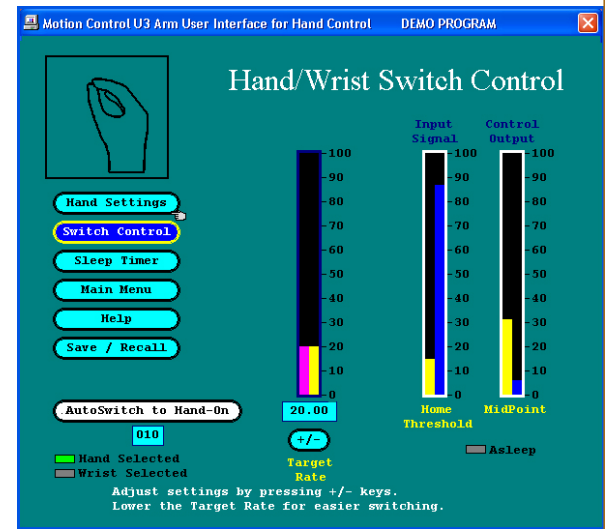


Switching with a Single Input:

Same as dual site, except with a single input.

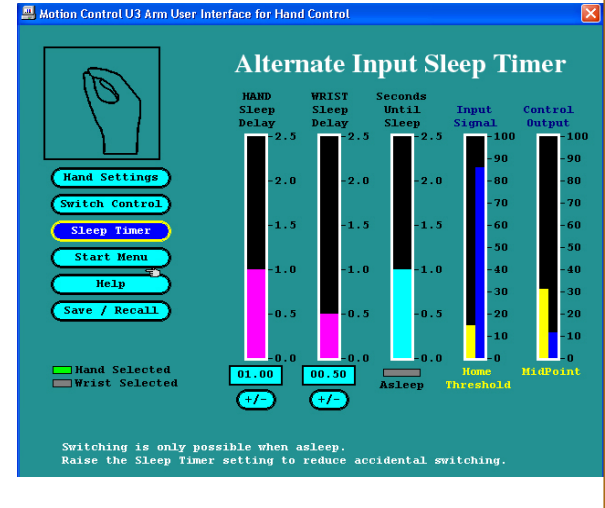
"Asleep" light must be on for switching to occur.

Note: A feedback "buzz" can be enabled on the User Settings screen to alert user when sleep occurs.



Sleep Timer

- **Hand Delay Timer** - Sets the length of time the Hand must stop for the Hand to "Sleep," i.e., for the Power to turn off.
 - **Wrist Delay Timer** - The Wrist will also "Sleep" after it is stopped for this Delay Time. When Alternating Wrist Control is enabled (on the Settings screen), the direction of the Wrist Control will reverse each time the Wrist goes to sleep.
- Note: A feedback "buzz" can be enabled on the User Settings screen to alert user when sleep occurs.*



Hand Adjustment screens

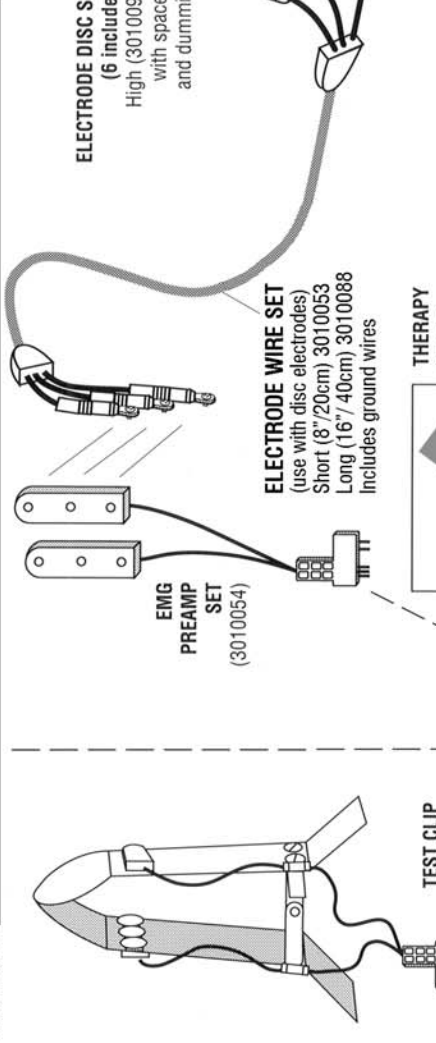
ALTERNATE U3 INPUTS:
 If using Otto Bock inputs, call for adapter information

U3 FORCE SENSOR 3010547

LINEAR POTENTIOMETER 3010546

TOUCH PAD 3010550
 1-CHANNEL TOUCH PAD CABLE 3010548
 2-CHANNEL TOUCH PAD CABLE 3010549

SNAP ELECTRODES 3010426 (set of 6)
ADAPTER CABLE FOR SNAP ELECTRODE Short (12") 5030004 Long (23") 3010503



ELECTRODE DISC SET (6 included)
 Low (3010090) with spacers and dummies
 Not shown: **ELECTRODE DISC (FIR) FOR MYOLAB II PREAMPS** (1070074)

ELECTRODE SPACER WASHER (1100004)
(SOCKET WALL)
ELECTRODE DISC MOUNTING KIT (3010200)

ELECTRODE WIRE SET (use with disc electrodes)
 Short (8", 20cm) 3010053
 Long (16", 40cm) 3010088
 Includes ground wires

EMG PREAMP SET (3010054)

THERAPY CABLE (3010228)
 For use with Myolab II

EXTENSION CABLE (EMG)
 Short 10" = 25 cm. (3010094)
 Long 6' = 1.5 m. (3010073)

The U3 "A" version switches latch electronically

VERSION A WRIST CONTROL (for U3)
 12v proportional control

MOTION CONTROL PUSH SWITCH Caucasian - (3010250) Black - (3010251)
MOTION CONTROL PULL SWITCH Ebony only - (3010259)

Also: WRIST CONTROL ADAPTOR CABLE (3010105)
 Adapts Otto Bock Switches Version A

LOCK/UNLOCK SWITCHES
MOTION CONTROL PUSH SWITCH Caucasian - (3010252) Black - (3010253)
MOTION CONTROL PULL SWITCH Black - (3010261)

Also: LOCK OVERRIDE ADAPTOR CABLE (3010107)
 Adapts Otto Bock Switches

REMOTE POWER SWITCHES
MOTION CONTROL PUSH SWITCH Caucasian - (3010254) Black - (3010255)
MOTION CONTROL PULL SWITCH Caucasian - (3010262) Black - (3010263)
MOTION CONTROL REMOTE POWER SWITCH ELECTRODE KIT (3010247)

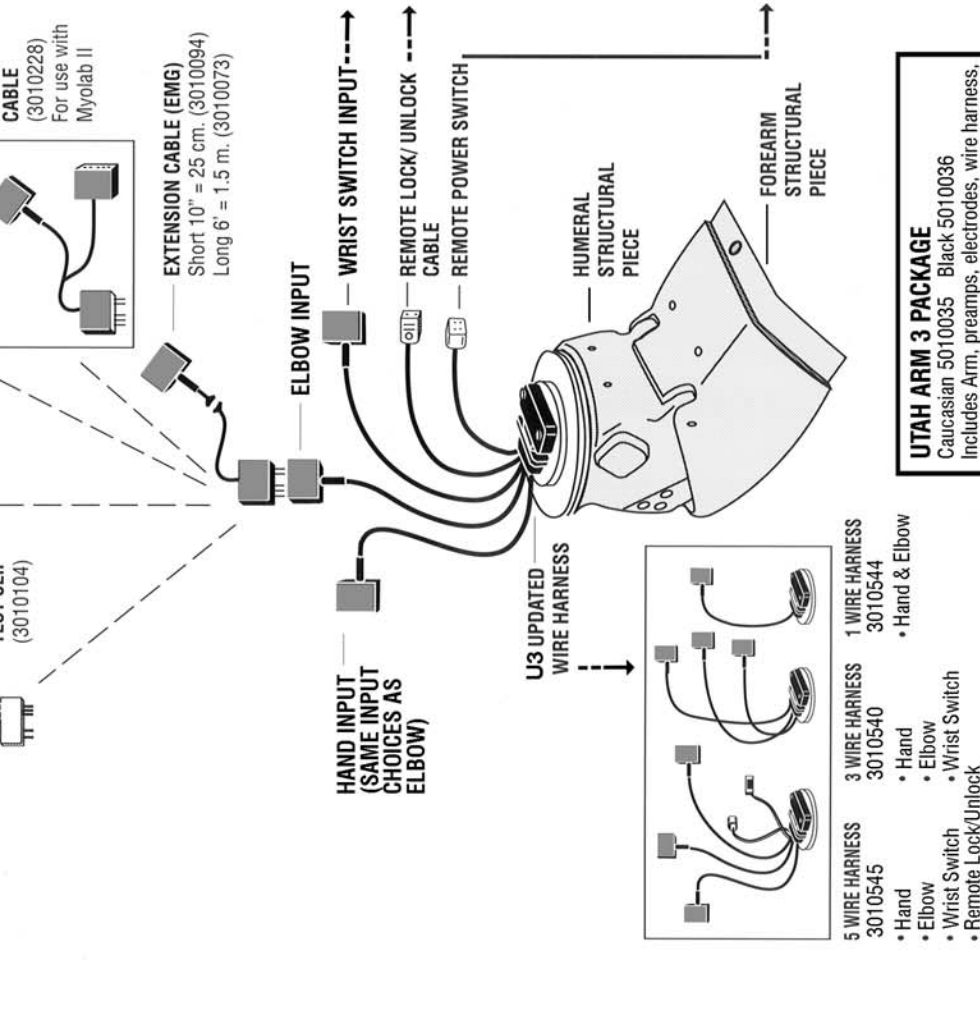
VERSION B WRIST CONTROL by on-off control

i- **CABLE PULL SWITCH** Otto Bock (1701023)
 ii- **HARNESS PULL SWITCH** Otto Bock (1701022)
 iii- **ROCKER SWITCH** Otto Bock (1701021)

Use with Wrist Control Adaptor Cable. Adapts Otto Bock Switches Version B (3010106)

MOTION CONTROL 4-PIN EXTENSION CABLE
 12" (30.5 CM) - 3010325
 24" (61 CM) - 3010326
 36" (91.5 CM) - 3010304

MYOLAB II (5030001)
 includes EMG short (1,730 cm) preamps and T-cable



COMPUTER INTERFACE MODULE (Plugs into left side of elbow) 5010021

LOAD CELL SCREW (1070009)

LOAD CELL ASSEMBLY (3010031)

FOREARM COVER SCREW (2000040)

TAMPER PROOF SCREW (1010035)

FOREARM COVER (order with)
 Caucasian standard (2000008) with training window (2000080)
 Black standard (2000009) with training window (2000081)

MOUNTING RING (3010518) not replaced separate from forearm cover

LAMINATION COLLAR (Modified Otto Bock) (2000034)

COAXIAL PLUG (Otto Bock) (1701009)

COUPLING PIECE (Otto Bock) (1701008)

MOTION CONTROL HAND (with Quick Disconnect)
 Note: hand does not come with glove
 LEFT
 7 1/4 inch 5010022
 7 3/4 inch 5010024
 8 1/4 inch 5010028
 RIGHT
 7 1/4 inch 5010023
 7 3/4 inch 5010025
 8 1/4 inch 5010029

FLEXION WRIST OPTION
 for 7 1/4 Hand 3010439
 for 7 3/4 Hand 3010440
 for 8 1/4 Hand 3010441

WRIST DISARTICULATION HAND- SPECIAL ORDER

OTTO BOCK ELECTRIC WRIST ROTATOR (Order from Otto Bock)

FOREARM COVER EXTENSION Caucasian (3010067) Black (3010068)

ON-OFF EXTENSION BUTTON (3010241)

LAMINATION COLLAR (1070004)

FRICITION BAND (1100015)

CLAMP BAND AND SCREW WITH FRICTION BAND Caucasian (3010145) Black (3010146)

BODY POWERED ELBOW ADAPTOR PLATE (1070076) Adapts Lamination Collar and Clamp Band to E 400 Hosmer Elbow

Not shown: ALLEN WRENCH-7/64" (1800036)
ADJUSTMENT SCREW-DRIVER (1700028)
HARDWARE SET
 Includes: Allen wrench, screwdriver and 2 preamp dummies (3010056)

ELBOW CAP SCREWS (1010051)

ELBOW CAP Caucasian (1100005) Black (1100018)

ELBOW CIRCUITS PC1 - 3010526 PC2 - 3010527

ARM CARRYING CASE
 Regular-20" x 7" x 15" (1800032)
 Large-28" x 20" x 10.5" (1800008) without embossed name

U3 NIMH Battery Pack Caucasian (3010541) Black (3010542)
FUSE (1370001)

UTAH ARM FAST CHARGERS
 US Adaptor Standard Caucasian (3010208) Black (3010209)
 European-Type Wall Adaptor (1390023)

TO SHORTEN FOREARM MORE THAN 1 INCH, ORDER ULTRA SHORT MODIFICATION (DONE AT MOTION CONTROL)
 3010551 - Two inch maximum

UTAH ARTIFICIAL ARM

Call for more information
 Voice 1.801.978.2622
 Toll Free 1.888.MYO.ARMS
 Fax 1.801.978.0848
 www.UtahArm.com

Note: When using Otto Bock TDs, install white shorting plug (or none) Be sure to turn power off when switching TDs.