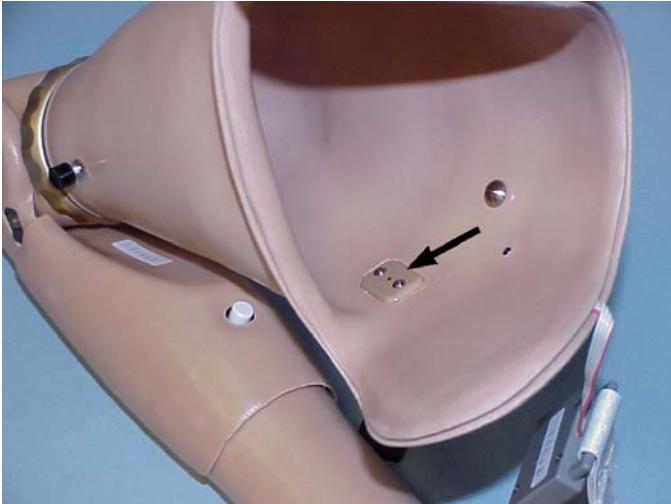


Input Devices



LTI In-Socket Myoelectrode-Amplifier

- **In-Socket Myoelectrodes (shown)**
- **Touch Pads™**
- **Linear Transducers**
- **Switches**
- **Proportional Control**
- **Remote Myoelectrodes**

Input devices are like translators that communicate the user's wishes to the motors of the prosthesis. We offer a variety of input devices, because different users have different abilities. Myoelectrodes pick up the signals generated by muscle contractions, whereas Touch Pads, Servo Transducers, and Switches are all actuated by movement of the residual limb. The choice of input device depends not only on the user's abilities, but also on the device being controlled, and the type of control circuit.

In many cases, the user may be able to use more than one input device. If this is true, then the convenience of the patient should be the deciding factor. For example, if the residual limb has good muscle sites, myoelectrodes are often the best choice because they are convenient and usually require less training. If the limb does not have good muscle sites, one of the other input devices might better suit the patient's needs.

Switches, a more basic option, are available in various styles. Switches command the prosthesis motors to operate in one direction or the other at a fixed speed. Switches do not provide proportional control; they simply turn the motors on or off. Dual action switches control motion in two directions. With a simple switch to do device selection a dual action switch can be used to operate multiple devices. Switches are usually incorporated into the harness, but each mounting configuration is slightly different.

Touch Pads™ are pressure-sensitive pads that adhere to the inside of the socket. As their name implies, Touch Pads are operated by touch. The user simply moves the residual limb to push lightly on the Touch Pad to operate the prostheses. These input devices are a cost-effective alternative to myoelectrodes. Like myoelectrodes, Touch Pads provide proportional speed control, since the amount of pressure applied determines the speed of the prosthesis. Touch Pads are normally supplied in a ¾" diameter, but are also available in smaller and larger sizes.

LTI Linear Transducer Linear Transducers turn relative body motion into electrical signals. The LTI Transducer generates an electric voltage that increases from zero to maximum as the cord on the unit is pulled either a half inch (13mm) or an inch (26mm). The voltage looks the same as the varying voltage from a typical electrode amplifier and can be used in the same way. However, the preferred use is with a positional servo circuit. With it the user controls the position of the prosthetic joint by controlling how far the transducer is pulled. Thus body motion translates directly into prosthetic joint motion. If the users pulls the transducer a half-inch (full excursion), the prosthesis goes through its full range of motion. A smaller movement of the transducer produces a smaller movement of the prosthesis. The user's abilities determine what body movement is used to actuate the Linear Transducer. A typical arrangement is to mount the Linear Transducer into the prosthetic support harness, so that chest expansion moves the transducer and results in movement of the prosthesis. Users can accurately position the prosthesis with these transducers. The circuits used with these transducers usually contain a sleep circuit. By pausing, the user can leave the prosthesis in a fixed position. Linear Transducers provide proportional speed control.

Myoelectrodes can regulate both the speed and the direction of the prosthesis. The speed is directly proportional to the strength of the input muscle signal. Proportional speed gives the most precise control of a prosthesis.

Input Devices

LTI In-socket Myoelectrode-Amplifiers

LTI offers myoelectrode-amplifiers and metal electrodes in three styles without gain adjustments. The LTI In-Socket Myoelectrode is the smallest in the industry. Remote Myoelectrode-Amplifiers are available for use with individual metal electrodes. For details on the plugs for the electrodes below see Section 1 for the Boston Digital Arm part numbers that begin with "BE". See the VariGrip™ Control section later in this section for part numbers that begin "VGC". If you need a gain adjustment with either a remote or sleeve electrode, we can add the shielded cables to a Bock 13E68 Electrode that you supply to us.



BE326 Myoelectrode-Amplifier w/cable

For use with the Boston Digital Elbow. An auxiliary wire exits the back to go to a reference ground electrode.



BE327 Myoelectrode Housing Kit

Two housings and dummies are supplied, one for the check socket and one for the definitive. Order 1 Kit per Myoelectrode-Amplifier above.

LTI Metal Electrodes

These Metal Electrodes have a recess on the back allowing the inner socket material to deform into this space. When mounted into an inner socket in this way, the Metal Electrodes below and their two nuts add less than a tenth of an inch (2.5mm) on the outside. This results in a more cosmetically attractive socket and provides a better seal for perspiration.



EL01 Metal Electrode, High Domed

0.56" (14.3mm) dia. dome rises 0.19" (4.8mm) with 4-40 threaded stud for attaching a ring terminal. Supplied with two small profile 4-40 nuts.



EL02 Metal Electrode, Medium Domed

0.56" (14.3mm) dia. Disc rises only 0.12" (3mm) with 4-40 threaded stud for attaching a ring terminal. Supplied with two small profile 4-40 nuts.

Input Devices

LTI Remote Myoelectrode-Amplifiers

These Myoelectric-Amplifiers are suitable for use with Boston Digital Arm Systems only. For LTI VariGrip III applications, use the Remote **DC** Myoelectric-Amplifiers shown below (VGC6XX). For other applications with Otto Bock components, use the Remote **DC** Myoelectric-Amplifiers shown below (DC125)



BE328 Remote Myoelectrode-Amplifier, 3 Rings
Separate Ring terminals are supplied for use with 4-40 studs on EL01 or EL02 metal electrodes. For use with Boston Arm Systems only.



The ring terminals on LTI's Remote Myoelectrode-Amplifiers accept the 4-40 studs on the EL01 or EL02 Metal Electrodes above. These three ring terminals are only 0.35" (9mm) wide and are just a tenth of an inch thick (2.5mm).

LTI Remote DC Myoelectrode-Amplifiers

The output of these DC Myoelectric-Amplifiers is similar to a Bock (13E125) Electrode with a fixed gain set at mid-level. If necessary, additional gain can be obtained through the controller. These Myoelectric-Amplifiers are equipped with a plug to interface with LTI's Programmable VariGrip prosthetic controllers (PVGXX) or to a Bock controller.



VGC625 One Remote Myoelectrode-Amplifier for VG III
VGC626 Two Remote Myoelectrode-Amplifiers for VG III
Separate Ring terminals are supplied for use with 4-40 studs on EL01 or EL02 metal electrodes.



The ring terminals on LTI's Remote Myoelectrode-Amplifiers accept the 4-40 studs on the EL01 or EL02 Metal Electrodes above. These three ring terminals are only 0.35" (9mm) wide and are just a tenth of an inch thick (2.5mm).



DC125-1 One Remote Myoelectrode-Amplifier, Bock Connector
DC125-2 Two Remote Myoelectrode-Amplifiers, Bock Connector
Separate Ring terminals are supplied for use with 4-40 studs on EL01 or EL02 metal electrodes.



The ring terminals on LTI's Remote Myoelectrode-Amplifiers accept the 4-40 studs on the EL01 or EL02 Metal Electrodes above. These three ring terminals are only 0.35" (9mm) wide and are just a tenth of an inch thick (2.5mm).

Input Devices

LTI Touch Pads™

Touch Pads are force sensing resistors. They should be mounted on a hard flat surface, but foam pads can be placed over them. All Touch pads are shipped with detailed instructions to insure correct installation.



TP01 Touch Pad Kit - 3 Pads ($\frac{3}{4}$ " diameter), 4 covers



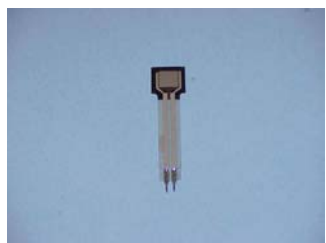
TP02 Single $\frac{3}{4}$ " diameter Touch Pad



TP03 Single 1" diameter Touch Pad



TP04 Single $\frac{1}{4}$ " diameter Touch Pad with solder tabs, no connector



TP08 Single Touch Pad .4" x .4" with solder tabs, no connector

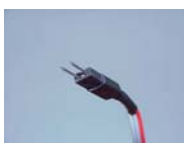
Input Devices



TP05 Cable, Touch Pad, Bock QD 250mm long
When used with an Otto Bock hand, the Touch Pad output voltage will be similar to the output of a Bock electrode.



TP06 Cable, Touch Pad, Bock QD 500mm long
When used with an Otto Bock hand, the Touch Pad output voltage will be similar to the output of a Bock electrode.



Switches

The switches listed below are generally stocked for customer convenience.



9X14 Otto Bock dual-action control switch (shown)

Other switches (not shown):

9X25 Otto Bock dual-action rocker switch

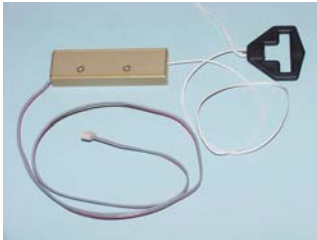
9X37 Otto Bock dual-action push switch

9E185=50 Otto Bock 50mm extension cable for switches

Input Devices

LTI Linear Transducers

The Linear Transducer is a three-wire device. The output line delivers a voltage that varies from the zero voltage of the negative side of the battery to the full voltage on the positive input line as the cord on the transducer is pulled out. The resulting signal is proportional and easily controlled by relative body motion. The cord can be set to move either ½" or 1" (13 or 26mm). A separate return spring inside the housing can be adjusted until the user feels the "right" tension.



BE235 – Linear Transducer with cable

For position servo control of the Elbow or quick-slow proportional control of some other device.

LT01 – Linear Transducer, Bock QD, 250mm (shown)

LT02 – Linear Transducer, Bock QD, 500mm



BE238 – Cable, Servo Transducer for Steeper Hand

Requires an SC23 Servo Transducer



SC23 – Servo Transducer for Steeper Hand

Plugs into BE238 above