**BIOPAC Systems, Inc.** ®

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## BLOOD PRESSURE CUFF AND TRANSDUCER

- TSD120 for MP160/MP150 System
- RX120 Series Cuff for TSD120
- SS19L/LA/LB for MP3x & MP45 System
  (See table on page 4 for hardware/software compatibility)



*TSD120*

*RX120A and RX120F cuff options*

## BLOOD PRESSURE MEASUREMENT

The most common form of indirect blood pressure measurement employs a pressure cuff, pump and pressure transducer. This complete assembly is commonly referred to as a *sphygmomanometer*.

Typically, the cuff is wrapped around the upper arm and is inflated to a pressure exceeding that of the brachial artery. This amount of pressure collapses the artery and stops the flow of blood to the arm. The pressure of the cuff is slowly reduced as the pressure transducer monitors the pressure in the cuff. As the pressure drops, it will eventually match the systolic (peak) arterial pressure. At this point, the blood is able to "squirt" through the brachial artery. This squirting results in turbulence that creates the Korotkoff sounds. The cuff pressure continues to drop, and the pressure eventually matches the diastolic pressure of the artery. At that point, the Korotkoff sounds stop completely, because the blood is now flowing unrestricted through the artery.
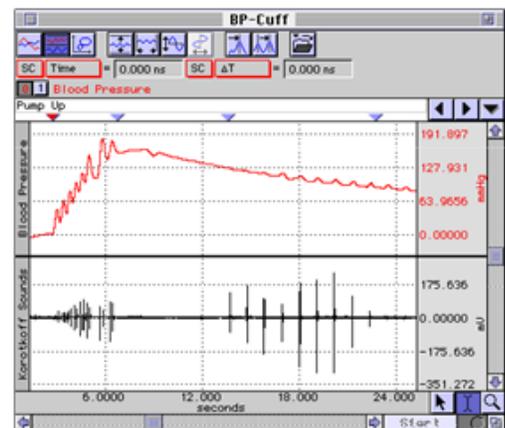
## SETUP

The graph at right illustrates a typical recording using the TSD120/SS19L.

- **TSD120:** Pressure signal is recorded via a DA100C amplifier set to DC, 10Hz LP and a gain of 200.

- **SS19L/LA/LB:** To record the pressure signal, Select SS19L/LA/LB preset from the MP3x/MP4x > Set Up Channels menu.

## RECORDING

As the cuff is wrapped around the upper arm of the subject, be sure to place the physiological sounds transducer **underneath** the blood pressure cuff, **directly over the brachial artery**. Transducer placement is very important to get the best possible recordings of Korotkoff sounds. Finish wrapping the cuff around the upper arm and secure it with the Velcro® seal. Now, start inflating the cuff with the pump bulb.

The pressure trace shows the hand pump driving the cuff pressure up to about 150 mmHg. Then the cuff pressure is slowly released by adjusting the pump bulb deflation orifice. Notice that the Korotkoff sounds begin appearing when the cuff pressure drops to about 125 mmHg (bottom trace). As the pressure continues to drop, the Korotkoff sounds eventually disappear, at about 85 mmHg. The **systolic pressure** would be identified at 125 mmHg and the **diastolic pressure** would be 85 mmHg.



*Cuff Blood Pressure Versus Korotkoff Sounds*

![BIOPAC Systems, Inc. logo]

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## CALIBRATION

### A) TSD120

The TSD120's built-in pressure transducer will require an initial calibration prior to use. To calibrate the transducer, wrap the cuff into a roll and begin to inflate the cuff slowly with the pump bulb. The pressure change will be noticeable on the mechanical indicator. Set the cuff pressure to one lower pressure (typically 20 mmHg) and then one higher pressure (typically 100 mmHg). In this manner the pressure transducer can be calibrated using the standard procedure in the SCALING dialog (in Acq*Knowledge*). To use the cuff at a future date, simply save the calibration settings in a stored file.

See also: DA100C Calibration options.

### B) SS19L

The built-in pressure transducer of the SS19L/LA/LB requires an initial calibration prior to use. To calibrate the transducer, wrap the cuff into a roll and begin to inflate the cuff slowly with the pump bulb. Notice the pressure change on the mechanical indicator. Set the cuff pressure to one lower pressure (typically 20 mmHg) and then one higher pressure (typically 100 mmHg). In this manner the pressure transducer can be calibrated using the standard procedure in the Scaling dialog box of the BSL *PRO* software. To use the cuff at a future date, simply save the calibration settings as a New Channel Preset or in a graph template or data file.

### C) SS19LA/LB

**SS19LA/LB** uses an on-screen gauge display only and does not include a physical gauge. Gauge color can be set under Lesson Preferences.

**NOTE:** The SS19LB is only compatible with BSL 4.1 and higher.

#### BSL 3.7.7

1. With **cuff deflated**, connect the SS19LA to the desired MP unit input channel.
2. Set the input channel preset to Blood Pressure Cuff SS19LA (MP > Set Up Channels > SS19LA preset)
3. Click on "View/Change Parameters" > "Scaling."
4. Click the CAL 1 button
5. Add the CAL 1 input value to the CAL 2 input value.
6. Click OK and close dialogs.

#### BSL 4

1. Repeat steps 1 and 2 from above.
2. Click "Setup" > "Scaling."
3. Click the CAL 2 button
4. Add the CAL 2 input value to the CAL 1 input value and click OK.
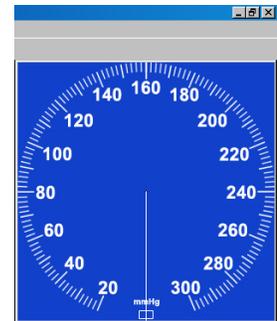


**NOTE**: *The SS19LA/LB is **not** compatible with MP45 Systems (USB chip conflict). Use SS19L with MP45 Systems.*

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**Example in BSL 4** – initial scaling dialog (SS19LA):     Clicking **CAL 2** results in an Input value of 0.071 mV.
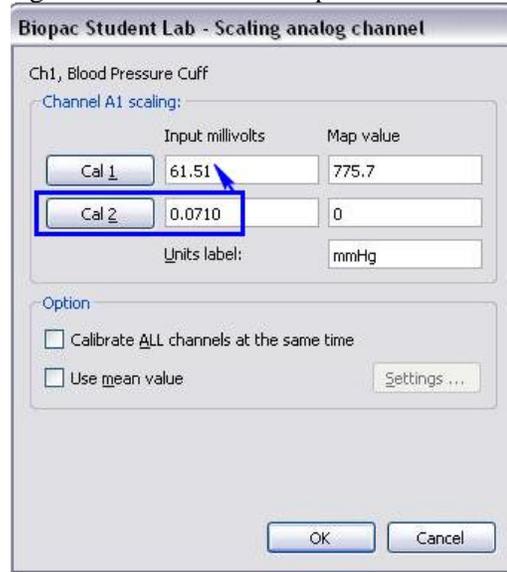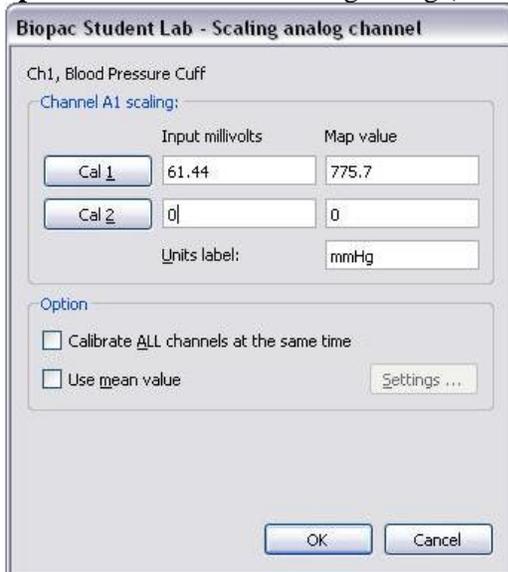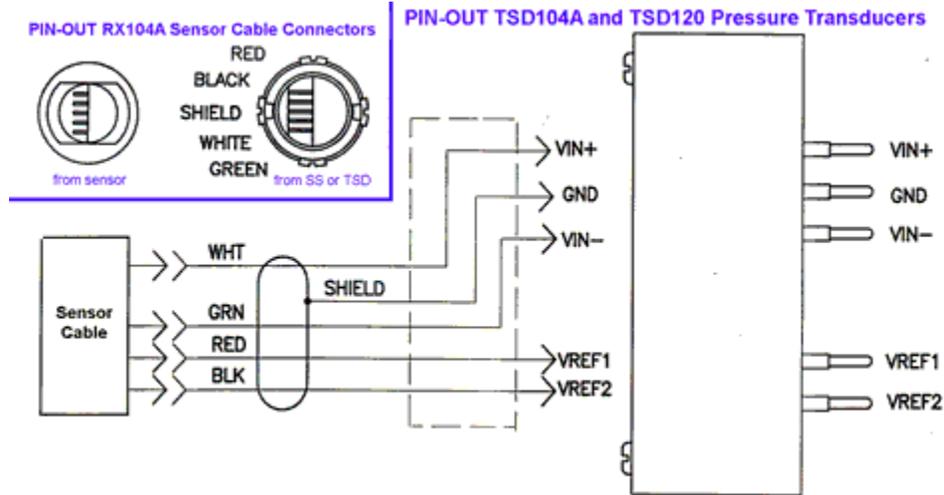


Adding 0.071 to the initial value of 61.44 results in an adjusted **CAL 1** value of 61.51 mV. (Your result may vary slightly from the example).

**NOTE: For the SS19LB,** the default initial scaling values are: **CAL1 = 40.96, Map value = 258.57**

**IMPORTANT**: CAL 1 and CAL 2 values are reversed between BSL 3.7.7 and BSL 4.

## BLOOD PRESSURE CUFF SPECIFICATIONS



| | |
|---|---|
| Pressure range: | 20 mmHg to 300 mmHg |
| Manometer accuracy: | ±3 mmHg |
| Output: | 5 µV/mmHg (normalized to 1 V excitation) |
| Cuff circumference range: | 25.4 cm to 40.6 cm (as shipped with RX120 d; cuff is switchable) |
| Cuff Dimensions: | 14.5 cm (wide) x 54 cm (long) |
| Weight: | 350 grams |
| Cable Length: | 3 meters, shielded |
| Interface: | |
|     TSD120 | DA100C |
|     SS19L/LA/LB | MP3x/4x (see following page for specific compatibility) |

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## BLOOD PRESSURE CUFF COMPATIBILITY

| Cuff | Gauge Type | MP Unit | Software |
|------|-----------|---------|----------|
| SS19LB | onscreen | MP36/MP36R | BSL 4.1 or above; Acq*Knowledge* 4.1 or above |
| SS19LA | onscreen | MP36/MP35 | BSL 3.7.7 or above |
| SS19L | mechanical | MP36/MP35 | BSL 3.7.3 or above |
| | | MP45 | BSL 3.7.5 or above |

## RX120 SERIES BLOOD PRESSURE CUFFS

The RX120 series are optional blood pressure cuffs, of varying sizes, which can be quickly and easily swapped in and out of the noninvasive blood pressure cuff transducer. Use a single transducer and substitute one cuff for another to accommodate a wide range in limb circumferences.

## RX120 SPECIFICATIONS

| Cuff | Circumference Range (cm) | Width (cm) | Length (cm) |
|------|--------------------------|------------|-------------|
| RX120A | 9.5-13.5 | 5.2 | 18.5 |
| RX120B | 13.0-19.0 | 7.5 | 26.1 |
| RX120C | 18.4-26.7 | 10.5 | 34.2 |
| RX120D | 25.4-40.6 | 14.5 | 54.0 |
| RX120E | 34.3-50.8 | 17.6 | 63.3 |
| RX120F | 40.6-66.0 | 21.0 | 82.5 |