

HUMAC2015 Sampling and Filtering

This document describes the data sampling and filtering for the HUMAC2015 program.

HUMAC32-Bit Interface – All Systems

- The HUMAC interface samples data internally at 10,000 Hz.
- The HUMAC program samples data at 100 Hz.
- The HUMAC Research Toolkit samples data at 10-2,500 Hz.

HUMAC32/64-Bit Interface – All Systems

- The HUMAC interface samples data internally at 10,000 Hz.
- The HUMAC program **FILE, PREFERENCES** command allows you to set the sampling rate from 10 to 2,500 Hz.
- The HUMAC Research Toolkit samples data at 10-2,500 Hz.

Filtering – All Systems

- All Modes: The HUMAC program implements a single pole filter with time constants from 22 to 56 msec based on limb being tested. (See table at end of this document.) This matches the original CYBEX Extremity Systems based on limb being tested.

Filtering – HUMAC NORM

- All Modes: The HUMAC Interface has an analog 2-pole Sallen-Key at 416Hz anti-aliasing filter.
- Isokinetic, CPM Mode Torque filter. The HUMAC program implements Running Average with 5.4 degree window. The filter is enabled/disabled with the **FILTER, PREFERENCES, FILTER TORQUE DATA** option.

Filtering – HUMAC System3, System 4

- The Biodex Dynamometer Control Board (DCB) returns digital data to the HUMAC Interface. Contact Biodex for their DCB anti-aliasing filter specifications.

Filter Time Constants

Pattern	Time Constant (msec)
Ankle In/Ev	22
Ankle Pl/Do Bent-Leg	22
Ankle Pl/Do Straight-Leg	22
Clockwise/Counter Clockwise	22
Elbow Ex/Fl	22
Forearm Pr/Su	22
Hip Ab/Ad	56
Hip Ex/Fl	56
Hip In/Ex Rotation	22
Knee Ex/Fl	39
Knee Extension/Flexion Prone	39
Knee In/Ex Tibial Rotation	22
PNF D1 Flexion-Abduction/Extension-Adduction	56
PNF D2 Flexion-Adduction/Extension-Abduction	56
Shoulder Ab/Ad	56
Shoulder Ab/Ad Horizontal	56
Shoulder Ex/Fl	56
Shoulder In/Ex Rot 90° Abd	39
Shoulder In/Ex Rot 90° Flex	39
Shoulder In/Ex Rot Neutral	39
Shoulder Internal/External - Seated	39
Wrist Ex/Fl	22
Wrist Ra/UL Deviation	22