

## ELECTROPHYSIOLOGY COMPATIBILITY SHEET

Stable pipette positioning is critical for the success in patch clamp experiments. Premature loss of recording often stems from thermal drift or pipette tip vibration deriving from the head-stage cable and/or suction tubing movements.

We have designed an intermediate cable solution that tackles these stability compromising issues, which is recommended for mounting larger headstages (validated not to add significant noise; see backside):



| Manufacturer    | Head-stage   | Load option | Mounting & adapter                |
|-----------------|--------------|-------------|-----------------------------------|
| npi Electronics | miniature    | 0-70 g      | Direct mounting & HSA-LO/ST       |
|                 | other models | 0-70 g      | contact support@sensapex.com      |
| HEKA            | all models   | 0-70 g      | IM-BNC & ELH10-LO/ST (in picture) |
| Axon            | all models   | 0-70 g      | IM-SMB & ELH7-LO/ST               |

If above recommendations are not feasible for your experiments, please select the correct load version and adapter for the direct head-stage mounting using table below.

| Manufacturer    | Amplifier              | Load option* | Mounting & adapter             |
|-----------------|------------------------|--------------|--------------------------------|
| npi Electronics | BA, ELC, EXT           | 70-120 g     | HSA-LO                         |
|                 | EXB-02B, ION-01M, MVCS | 70-120 g     | HSA-LO                         |
|                 | EXT-16DX               | 0-70 g       | HSA-LO/ST                      |
|                 | SEC, TEC, VA-10        | 0-70 g       | NPI EH-03 holder & ELH10-LO/ST |
| HEKA            | EPC-10                 | 70-120 g     | HSA-LO                         |
|                 | discontinued models    |              | contact support@sensapex.com   |
| Axon            | all current models     | 70-120 g     | HSA-LO                         |
|                 | discontinued models    |              | contact support@sensapex.com   |

\*Note that 70-120 g option requires minimum load of 70 g for correct performance.

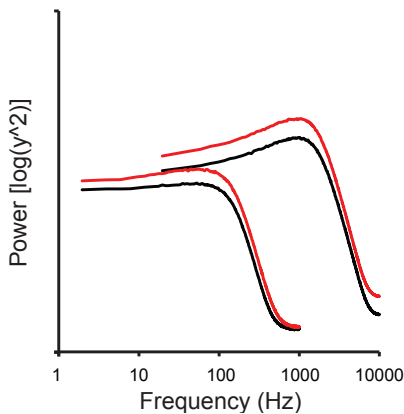
### Recommended options for the microelectrode and -pipette holders

0-70 g load option with ELH electrode holder adapters enable directly attaching typical microelectrode- or pipette holders, as well as any rod like tool holder to the micromanipulators (please select 3-7 mm or 6-10 mm version according to the holder diameter). Please contact support@sensapex.com for recommendations if you have any questions regarding the compatibility and product configuration options.

# INTERMEDIATE CABLE PERFORMANCE TEST

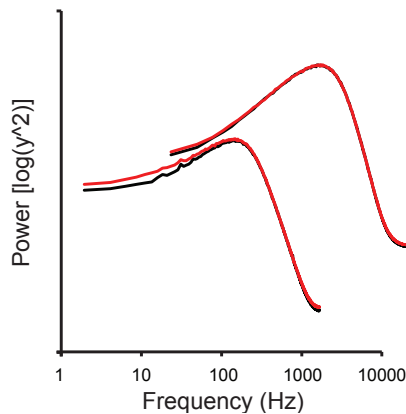
Noise measurements were done in co-operation with HEKA to determine if using the intermediate cable will introduce additional noise to the patch-clamp experiments. Noise was measured using a HEKA EPC 10 USB patch clamp amplifier with and without the Sensapex intermediate cable between the head-stage and model cell.

A) Shielded headstage



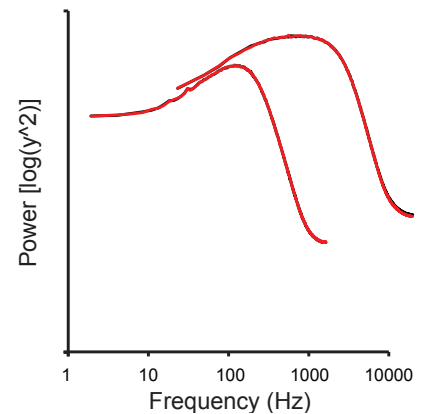
| Bandwidth | No cable | With cable |
|-----------|----------|------------|
| 1 kHz     | 32 fA    | 49 fA      |
| 10 kHz    | 252 fA   | 416 fA     |

B) Model cell: cell-attached



| No cable | With cable |
|----------|------------|
| 117 fA   | 122 fA     |
| 1.6 pA   | 2.7 pA     |

C) Model cell: whole-cell



| No cable | With cable |
|----------|------------|
| 802 fA   | 802 fA     |
| 5.6 pA   | 5.6 pA     |

Noise power spectra are shown in logarithmic scale for the 1 kHz and 10 kHz bandwidths in black (without) and red (with the intermediate cable.) Table shows corresponding RMS current noise. A) Amplifier gain 200 mV/pA;  $C_{fast} = 0.9$  pF. Increase in the noise is observed; note that the data reflects amplifier instrumentation noise level that is not achievable in practical experiments. B) Amplifier gain 200 mV/pA;  $C_{fast} = 5.8$  pF. Minor increase in the noise is observed with the intermediate cable; note the extremely small total noise level. C) Amplifier gain 50 mV/pA;  $R_m = 500$  M $\Omega$  and  $C_{slow} = 22$  pF. No measurable difference in the noise.

The results show that the intermediate cable does not add any significant noise to the whole cell patch-clamp recordings. Because of the expected improvements in the recording stability, we recommend testing the intermediate cable solution as an alternative for direct head-stage mounting also in the single channel recordings.

Micromanipulator demonstration systems with both the intermediate cable and direct mounting options are readily available for test use. Please contact us at [info@sensapex.com](mailto:info@sensapex.com) to schedule a test use in your laboratory.



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