Purchase Requisition No. 1000011951 (SRM/RFX No. 6100000193)

Technical Specifications of Motorized Stages with Integrated Controllers

1. Linear motor stage, 110mm travel, built-in controller, analog linear encoder, integrated IO
   
   **Purpose**: Fiber pulling
   **Quantity required**: 2
   **Specifications**: Linear translational stage
   - Accuracy: 1 um (or better)
   - Travel range: 100 mm (or higher)
   - Velocity achievable: 0.2 mm/s (or higher)
   - Acceleration achievable: 1 mm/s² (or higher)
   - Built-in encoder with repeatability of 80 nm (or lower)
   - Centered load: 100N (or higher)
   - Built-in controller preferred

2. Linear motor stage, 0150 mm travel, built-in controller, analog linear encoder, with IO with Accessory kit
   
   **Purpose**: Flame translation (bottom-most stage)
   **Quantity required**: 1
   **Specifications**: Linear translational stage
   - Accuracy: 1.5 um (or better)
   - Travel range: 100 mm (or higher)
   - Velocity achievable: 4 mm/s (or higher)
   - Acceleration achievable: 800 mm/s² (or higher)
   - Centered load: 250N (or higher)
   - Built-in controller preferred

3. Motorized stage, integrated encoder and controller, 200mm travel, fine resolution, with manual control
   
   **Purpose**: Flame positioning
   **Quantity required**: 1
Specifications: Stepper motorized translational stage
  Accuracy - 50 um (or better)
  Travel range - 150 mm (or higher)
  Velocity achievable - 50mm/s (or higher)
  Centered load - 100N (or higher)
  Built-in controller preferred

4. Adaptor plate, bottom compatible with linear stage, anodized
   Quantity required: 2

5. Adaptor plates, top compatible with motorized stage, anodized
   Quantity required: 1

6. Data cable 2 feet
   Quantity required: 1

7. Data cable 6 feet
   Quantity required: 1

8. Data cable 2 feet, comms only and no power
   Quantity required: 1

NOTE:

- Mount compatibility between each of the stages is mandatory
- Interface and adapter cables to be included
- Power cords and supply needs to be compatible with Indian standard
- Power cords need to be portable with the Indian socket standards for 7A/15A
- Controlling software for all stages should be provided for Windows 7 or higher
- All the above mentioned stages are required to use a unique protocol that uses a command-reply model, such that:
  ➔ The user must initiate all communication by sending a device a command.
  ➔ Unless explicitly disabled, a device always responds with one reply immediately after a command has been received
  ➔ Unless explicitly enabled, a device never sends a message unless in response to a command
  ➔ The unique command protocol should be inclusive of the following:
    1. **Message type**: The message type for a command has to be a required field and always be the same, eg: ‘/’.
    2. **Device address**: The address indicates which device number should perform the command
    3. **Axis number**: The axis number indicates which axis within a device should perform the command
4. **Command**: The command message data contains the command information

5. **Command Parameters**: This message data contains command parameters and data. The contents need to be space-delimited and case-sensitive.

6. **Message checksum**: The message checksum causes a device to reject a message that has been corrupted during transmission.

7. **Message Footer**: The footer indicates end-of-message

8. **Message ID**: It causes responses (including reply and info responses) to the command to include the same message ID

The reply protocol should be inclusive of the following:

1. **Message type**: The message type for a reply should always be the same.

2. **Device address**: The device address contains the address of the device sending the reply and should always be formatted in a fixed number of digits.

3. **Axis number**: The axis number limits the scope of the reply

4. **Reply flag**: The reply flag indicates if the message was accepted or rejected

5. **Status**: The status contains different states when the axis is moving and otherwise

6. **Warning Flag**: The warning flag contains the highest priority warning currently active for the device or axis

7. **Message Checksum**: A reply checksum provides a method for error detection

8. **Message Footer**: Indicates the end of reply