

MAN01-03 – CRYO BEARING STAGE (CBS) USER MANUAL

## CRYO & NANO PRODUCTS

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### RELEVANT DOCUMENTATION

Ref	Title, Author
[1]	CNP_MAN00_Rxx_Getting-Started.pdf (JPE)
[2]	CNP_MAN02_Rxx_Software-User-Manual.pdf (JPE)
[3]	CNP_APN01_Rxx_Connection-Overview.pdf (JPE)
[4]	CBS_Interface-drawings.pdf (JPE)
[5]	CBS_Brochure.pdf (JPE)

### DOCUMENT HISTORY

JPE	2019-06-20	R01. Creation.
JPE	2021-02-01	R02. Update.
JPE	2021-07-05	R03. Update.
JPE	2024-03-15	R04. Adding stack and sensor calibration information.

### DEFINITIONS



### ABBREVIATIONS

## 1. INTRODUCTION

Thank you for using JPE's Cryo & Nano Products!

This *User Manual* describes the handling and use of Cryo Bearing Stage (CBS), from here on described as *positioner*).



*Please read this document carefully prior to installation and (initial) operation of the controller, (stand-alone) positioners, actuators and stages. Failure to observe the safety regulations results in a risk of electric shock and/or damage to the controller(s), positioner(s), actuator(s) and/or stage(s)!*

*JPE shall not be liable for damage or injury resulting from misuse of the controller(s), positioner(s), actuator(s) and/or stage(s) or unauthorized alterations to either of those.*

**All products mentioned in this manual are intended for use in a laboratory and/or scientific research environment only** and may only be installed, maintained and used by higher educated, technical skilled personnel (from here on described as *operators*).

Please note that all content in this document is superseded by any new versions of this document. Visit the JPE website ([www.jpe-innovations.com](http://www.jpe-innovations.com)) to obtain the most recent version. All images in this document are for illustrative purposes only.

### 1.1 Prerequisites

*Before continuing with this user manual, please make sure to read and understand the contents of the (latest version of the) Cryo & Nano Positioning Products Getting Started Guide (MANoo).*

## 2. INSIDE THE BOX

Positioners will be delivered in a white-colored (membrane) polypropylene box (can be one or more positioner(s) per box). The inner part of the polypropylene box can be taken out and bend in such way that the positioner(s) can be easily unpacked.

*Do not cut the membrane plastic. Keep the box in case products need to be returned.*

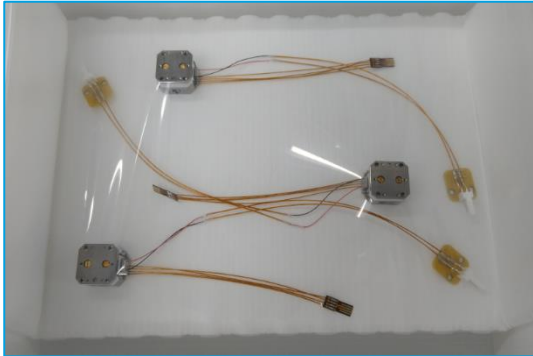


Figure 1: Example packaging with 3x CBS5-RLS

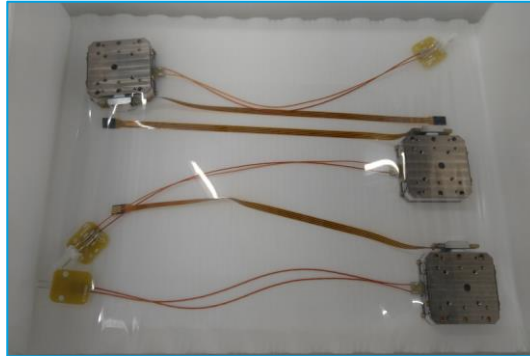


Figure 2: Example packaging with 3x CBS10-RLS

*Unpacking positioners with a sensor (-RLS option) require a bit more attention as it can be easy to damage the flex-PCB cabling or connectors.*

### 3. MOUNTING INSTRUCTIONS

*Consult the Interface Drawing for detailed dimensions and mounting interfaces.*

*Note that the moving sample table must be at the end of the stroke to be able to have access to most mounting holes. With care, the sample table can be moved by hand.*

Make sure the wiring to the Connector Interface PCB and/or Sensor (product type option -RLS) does not get damaged or stuck in the setup when mounting the positioner in the customer setup. All connectors must be mounted properly prior to connecting the positioner to the electronics!

#### 3.1 Multiple-axis stacks

CBS positioners can be stacked into an XY or XYZ configuration. An XY configuration is possible without the use of additional parts, apart from a couple of fasteners. For X(Y)Z-configurations, additional Z-brackets can be purchased.

##### 3.1.1 Mounting sequence

- 1 Start with the bottom (X-axis) positioner

*In case of a CBS<sub>5</sub> stack it is important to mount the X-axis positioner onto the customer setup first, before stacking the Y-axis positioner on top. Otherwise it is not possible to access one of the mounting holes of the X-axis positioner.*

- 2 Next mount the Y-axis positioner
- 3 (If applicable) Mount the Z-bracket on top of the X- or Y-axis
- 4 Mount the Z-axis positioner onto the Z-bracket

*In case of a CBS<sub>5</sub> stack, an additional Tabletop bracket can be purchased to mount onto the Z-axis positioner, for horizontal positioning of customer parts.*

Review the interface drawings for required fasteners. Screws to mount Y on X and/or Z(-bracket) on X or Y are supplied in the delivery.

## 4. CONNECTING TO THE CONTROLLER

*Consult the Connection Overview application note for a simple and clear overview on how to connect positioners to the controller.*

### 4.1 Drive signal

All positioners are assembled with ~150[mm] Kapton coated wire and a Connector Interface PCB at the end with a 2-pin 2.54mm pitch header mounted (*Molex KK 22-05-7028*). There are two mounting holes available for M2 bolts.

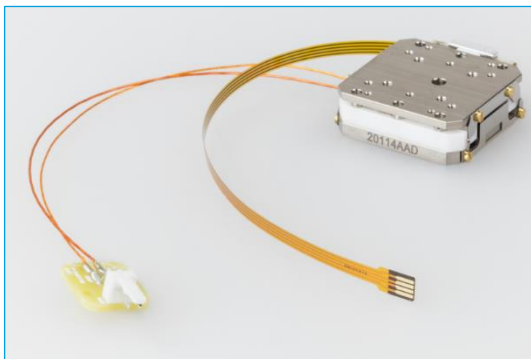


Figure 3: Connector Interface PCB (left) on a CBS10-RLS

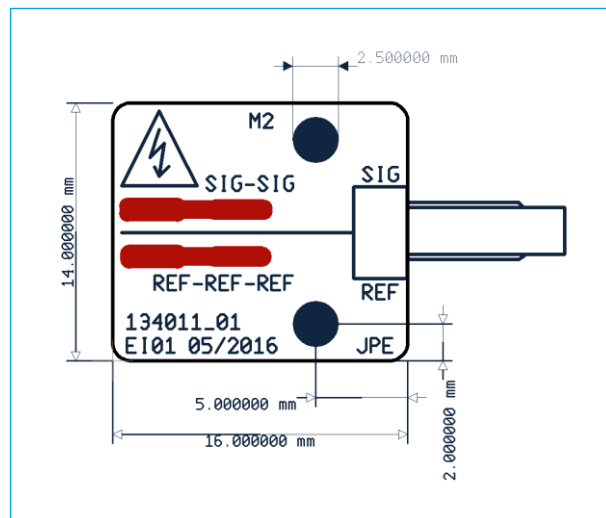


Figure 4: Connector Interface PCB (top view)

The Ambient Cable (ACL) or Cryostat Cable (CCL) can be connected directly to the Connector Interface PCB. If any custom cabling is required, please consult the Getting Started Guide (MAN00) or the Connection Overview application note (APN01).

Pin configuration		
Pin	Name	Note
1	(Piezo) Signal	Routes to the pad labeled "S" or "SIG" on the positioner
2	(Piezo) REF	Routes to the pad labeled "R" or "REF" on the positioner

*Make sure that there is no force applied to the wires connected to the positioner!*

*Please note that (Piezo) REF is NOT the same as (system) GND or PE, so do not connect these to each other and do not use standard oscilloscope probes!*

*Because of design constraints, open voltage contacts are present!*

## 4.2 Position sensor signal

If the positioner is equipped with a Resistive Linear Sensor (product type option –RLS), the positioner will be assembled with an additional ~150[mm] Kapton FPC (flexible PCB) that can connect directly to the Cryostat Cable for RLS (CCR) or Ambient Connector Kit for RSM (I1-RSM).

If any custom cabling is required, please consult the Getting Started Guide (MAN00) or the Connection Overview application note (APN01).

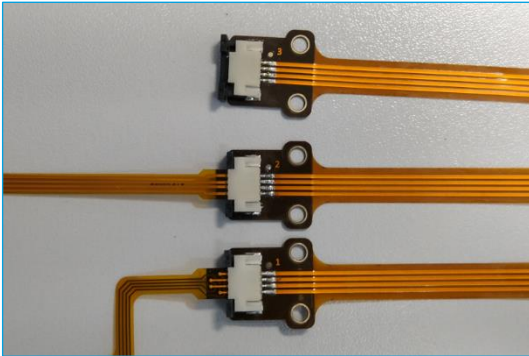


Figure 5: FPC (left) connected to ZIF connectors on the CCR

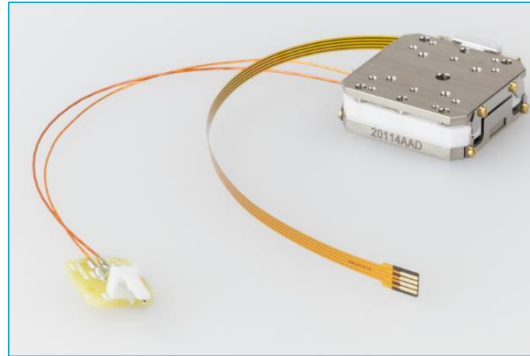


Figure 6: CBS10-RLS FPC can be seen on the right

Pin configuration		
Pin	Name	RLS PCB Reference
1	Wiper Negative	A
2	Excitation Positive	B
3	Wiper Positive	C
4	Excitation Negative	D

*Make sure that there is no force applied to the FPC connected to the sensor! The FPC is designed for easy connection at (re-)installation; however, it's recommended to disconnect or reconnect only when required.*

## 4.3 Connecting to Controller

Controller with Plug-in Modules <sup>1</sup>		
	Module	Slot #
<b>CBSx(-RLS)</b>	CADM2 Output	1
<b>CBSx-RLS</b>	RSM Input A	2
<b>CBSx(-RLS) XY – (X)</b>	CADM2 Output	1
<b>CBSx(-RLS) XY – (Y)</b>	CADM2 Output	2
<b>CBSx-RLS XY – (X)</b>	RSM Input A	3
<b>CBSx-RLS XY – (Y)</b>	RSM Input B	
<b>CBSx(-RLS) XYZ – (X)</b>	CADM2 Output	1

<sup>1</sup> For available Modules see CNP-Products MAN01-09 (CPSC).



<b>CBSx(-RLS) XYZ – (Y)</b>	CADM <sub>2</sub> Output	2
<b>CBSx(-RLS) XYZ – (Z)</b>	CADM <sub>2</sub> Output	3
<b>CBSx-RLS XYZ – (X)</b>	RSM Input A	4
<b>CBSx-RLS XYZ – (Y)</b>	RSM Input B	
<b>CBSx-RLS XYZ – (Z)</b>	RSM Input C	

## 5. SENSOR CALIBRATION

If the positioner is equipped with a Resistive Linear Sensor (product type option –RLS), the device needs to be calibrated after delivery and installation in the customer setup. This calibration is required to determine the (maximum) stroke the sensor can measure as well as the center (nominal) position.

*Calibration is done in cooperation with the Resistive Sensor Module (RSM). This means that the calibration settings for a specific RLS will be stored for a specific input channel of the RSM.*

For that reason, or for a re-calibration, it is possible to do a (manual) calibration. This involves moving the positioner through its range (free movement required) and storing measurement calibration values. This can all be done with the user software, please read the Software User Manual (MAN02) on how to do this.

## 6. DECLARATION OF CONFORMITY

Manufacturer : JPE B.V.  
Address : Aziëlaan 12  
6199 AG Maastricht-Airport  
The Netherlands

The manufacturer hereby declares that the product:

Product Name : **Cryo Bearing Stage (CBS)**  
Product Description : **Linear stage for allround applications in a vacuum and cryogenic environment.**  
Product Number : **C181046**

Complies with the following European directives:

**2014/35/EU Low Voltage Directive**  
**2014/30/EU EMC Directive**  
**2011/65/EU RoHS**

A copy of the Technical file for this equipment is available at JPE.

Maastricht-Airport, 29 June 2018



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