

MAN01-02 – CRYO POSITIONING SYSTEMS HIGH RESONANCE (CPSHR) USER MANUAL

CRYO & NANO PRODUCTS

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Filename: CNP_MAN01-02_R02_CPSHR.docx

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Last update: 2021-02-01

Revision: 02

Doc status: Released

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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]	CPSHR_Interface-drawings.pdf (JPE)
[4]	CPSHR_Brochure.pdf (JPE)
[5]	

DOCUMENT HISTORY

JPE	2019-06-20	Ro1. Creation.
JPE	2021-02-01	Ro2. Update.

DEFINITIONS

ABBREVIATIONS

1. INTRODUCTION

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

This *User Manual* describes the handling and use of Cryo Positioning Systems High Resonance (CPSHR), from here on described as system).



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

JPE shall not be liable for damage or injury resulting from misuse of the controller system(s), actuator(s) and/or device(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Please note that all content in this document is superseded by any new versions of this document.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) 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 (MAN00).

2. INSIDE THE BOX

Systems will be delivered in a white-colored (membrane) polypropylene box (one stage per box). The inner part of the polypropylene box can be taken out and bend in such way that the actuators and/or systems can be easily unpacked.

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

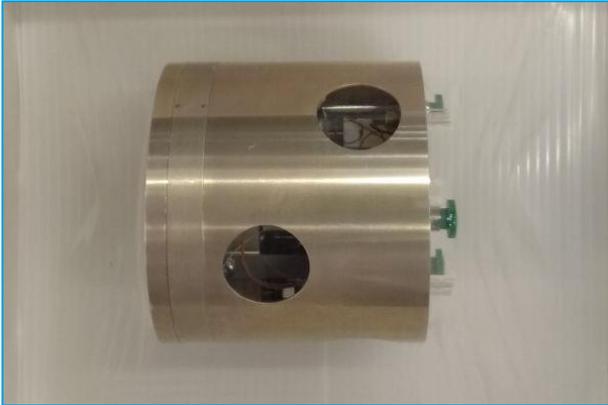


Figure 1: Example packaging with 1x CPSHR₃

In some cases, when the CPSHR is mounted on a custom setup for example, the system is fixed onto the inner part of the polypropylene box using fasteners instead of locked underneath the membrane plastic.

Unpacking these systems require a bit more attention as it is easy to damage the cabling when not being careful.

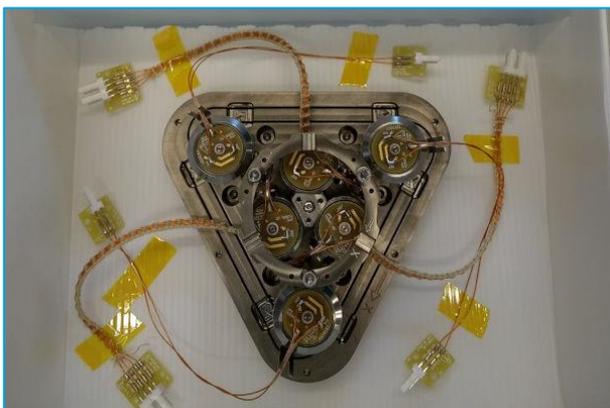


Figure 2: Example packaging with 1x CPSHR_{1-S} on a Custom Stage

3. MOUNTING INSTRUCTIONS

View the Interface Drawing for detailed dimensions and mounting interfaces.

Make sure the wiring to the Connector Interface PCBs do not get damaged or stuck in the setup when mounting the CPSHR1-S. The Connector Interface PCBs must be mounted properly prior to driving the CPSHR1-S electrically!

When the CPSHR2 / CPSHR3 is delivered with a Cryo Optical Encoder (product type option –COE), make sure not to damage the optical fibers, especially when working near the moving sample table.

4. ELECTRICAL CONNECTIONS

4.1 CPSHR1-S

The default CPSHR1-S with Scanner piezo (product type option -S) is assembled with (3x) ~150[mm] Kapton coated 4-way ribbon cables and a Connector Interface PCB at the end with (2x) 2-pin 2.54mm pitch headers mounted (*Molex KK 22-05-7028*). For each axis there is one Connector Interface PCB. There are two mounting holes available for M2 bolts.

The default Ambient Cable (ACL) can be connected directly to the Connector Interface PCB. If any custom cabling is required, please consult the Getting Started Guide (MAN00).

Pin configuration (for each axis)	
Pin	Name
1	Piezo Scanner Signal (PS SIG)
2	Piezo Scanner REF (PS REF)
3	Cryo Actuator Signal (CA SIG)
4	Cryo Actuator REF (CA REF)

On each PCB there are 3 “marking” holes (indicated with “#” next to it). These are ‘soldered’ to indicate the Axis number:

Axis marking	
Axis	Soldered hole
1	1 hole filled with solder
2	2 holes filled with solder
3	3 holes filled with solder

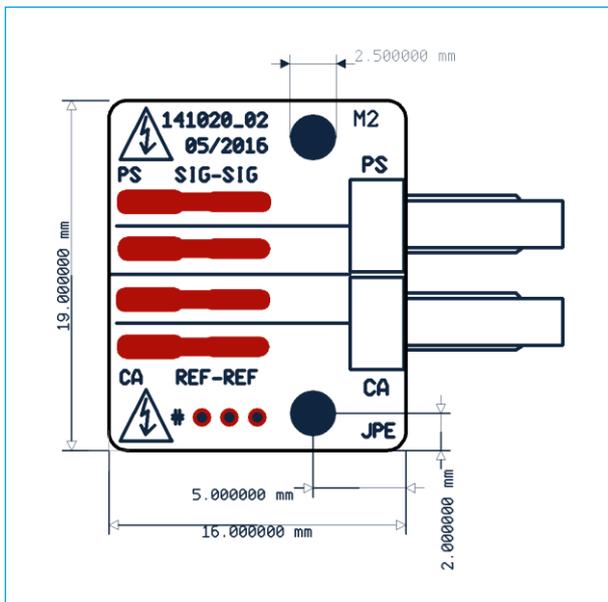


Figure 3: CPSHR1 Connector Interface PCB (top view)

Make sure that there is no force applied to the Kapton coated wires connected to the system!

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 CPSHR2 & CPSHR3

The default CPSHR2 or CPSHR3 is assembled with a fixed Connector Interface PCB with 2.54mm pitch headers mounted (*Molex KK 22-27-2021*). If the stage is equipped with a Cryo Optical Encoder (product type option -COE), this interface also houses fiber feedthrough adapters (see chapter 5)

The default Ambient Cable (ACL) can be connected directly to the Connector Interface PCB. If any custom cabling is required, please consult the Getting Started Guide (MAN00).

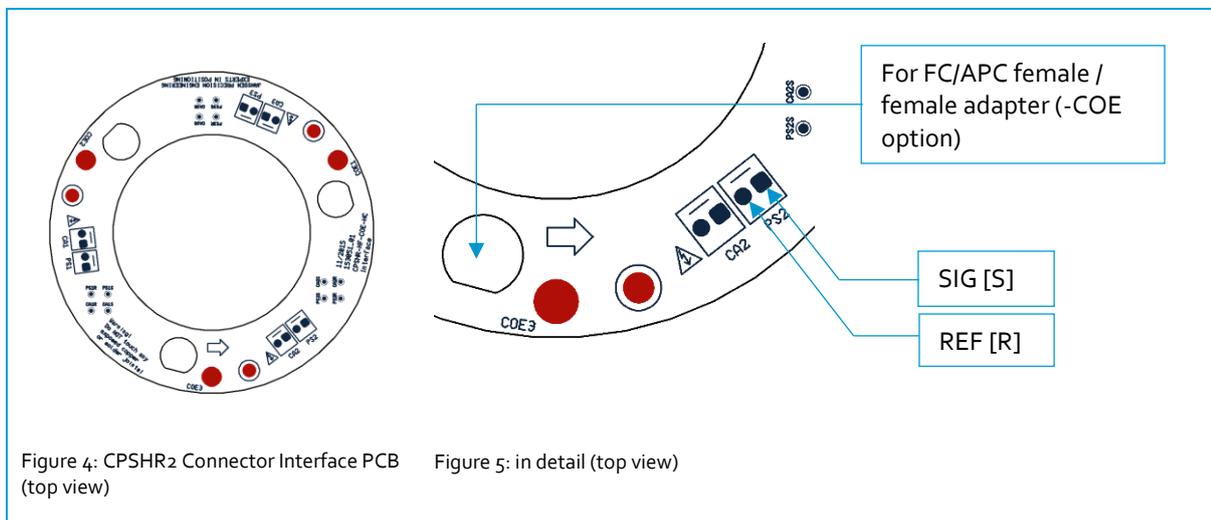


Figure 4: CPSHR2 Connector Interface PCB (top view)

Figure 5: in detail (top view)

Pin configuration (for each axis)		
Pin	Name	
PSx 1	Piezo Scanner Signal (PS SIG)	<i>For product type option -S only</i>
PSx 2	Piezo Scanner REF (PS REF)	<i>For product type option -S only</i>
CAx 1	Cryo Actuator Signal (CA SIG)	
CAx 2	Cryo Actuator REF (CA REF)	

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!

5. OPTICAL CONNECTIONS

If the CPSHR₂ or CPSHR₃ stage is equipped with a Cryo Optical Encoder (product type option –COE) an optical *FC/APC (female)* connector is mounted on the Connected Interface PCB. The default Ambient Fiber (AF5) cable can be connected directly to this connector.

If not in use, always keep (metal) screw-on cap on connectors and/or adapters. If any custom cabling is required, please consult the Getting Started Guide (MAN00).

Please note that the CPSHR₁ is not available with a Cryo Optical Encoder.

6. CONNECTING TO CONTROLLER

Controller with Plug-in Modules ¹			
	Module	Slot #1	
CA – Axis 1, Z1	CADM2 Output	1	
CA – Axis 2, Z2	CADM2 Output	2	
CA – Axis 3, Z3	CADM2 Output	3	
COE – Axis 1, Z1	OEM2 Input A	4	<i>For product type option –COE</i>
COE – Axis 2, Z2	OEM2 Input B		
COE – Axis 3, Z3	OEM2 Input C		
PS – Axis 1, Z1	PSM Output A	5	<i>For product type option –S</i>
PS – Axis 2, Z2	PSM Output B		
PS – Axis 3, Z3	PSM Output C		

¹ For available Modules see CNP MAN01-09 (CPSC).

7. SENSOR CALIBRATION

If the system is equipped with a Cryo Optical Encoder (product type option –COE), the device will be delivered pre-calibrated. This calibration is done to determine the correct optical signal levels for the encoder.

Calibration is done in cooperation with the Optical Encoder Module (OEM₂). This means that the calibration settings for a specific COE will be stored for a specific input channel of the OEM₂.

For that reason, or for a re-calibration, it is also possible to do a (manual) calibration. For this the system must be able to move freely. Re-calibration can be done with the user software, please read the *Software User Manual (MAN02)* on how to do this.

8. DECLARATION OF CONFORMITY CPSHR

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

The manufacturer hereby declares that the product:

Product Name : **Cryo Positioning Stage – High Resonance (CPSHR)**
Product Description : **A cryogenic positioning stage with nanometer accuracy and stability.**
Product Number : **C181051**

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



Ir. H. Janssen
Founder & CEO
JPE B.V.
The Netherlands

9. DECLARATION OF CONFORMITY COE

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

The manufacturer hereby declares that the product:

Product Name : **Cryo Optical Encoder (COE)**
Product Description : **Cryogenic Optical Encoder for the CLA.**
Product Number : **C181045**

Complies with the following European directives:

2006/25/EC Artificial Optical Radiation
2011/65/EU RoHS

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

Maastricht-Airport, 29 June 2018



Ir. H. Janssen
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