MAN01-04 – CRYO STAGE 02 (CS02) 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]	CS02_Interface-drawings.pdf (JPE)
[5]	CS02_Brochure.pdf (JPE)

DOCUMENT HISTORY

JPE	2019-06-20	R01. Creation.
JPE	2021-02-01	R02. Update.
JPE	2021-07-08	R03. Update.

DEFINITIONS

ABBREVIATIONS

1. INTRODUCTION

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

This *User Manual* describes the handling and use of Cryo Stage 02 (CS02), from here on described as *stage*).

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Please note that all content in this document is superseded by any new versions of this document.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) 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

Stages will be delivered in a white-colored (membrane) polypropylene box (one stage per box). The stage is fixed onto the inner part of the polypropylene using fasteners. The inner part can be taken out and bend in such way that the stage can be easily unpacked.

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

Unpacking stages require a bit more attention as it can be easy to damage cabling (flex PCB) or connectors.

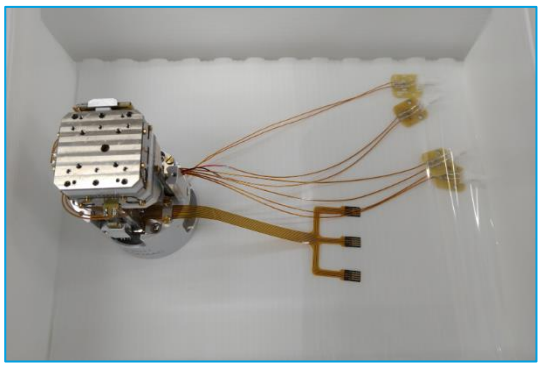

Figure 1: Example packaging with 1x CS021-RLS

3. MOUNTING INSTRUCTIONS

Consult the Interface Drawing for detailed dimensions and mounting interfaces.

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 stage in the customer setup. All connectors must be mounted properly prior to connecting the stage to the electronics!

An optional reference frame (I1-CS021) is also available. If ordered, this reference frame will be delivered pre-mounted on the CS021(-RLS). However, the frame can also be removed by the customer if desired.

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 in the stage 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.

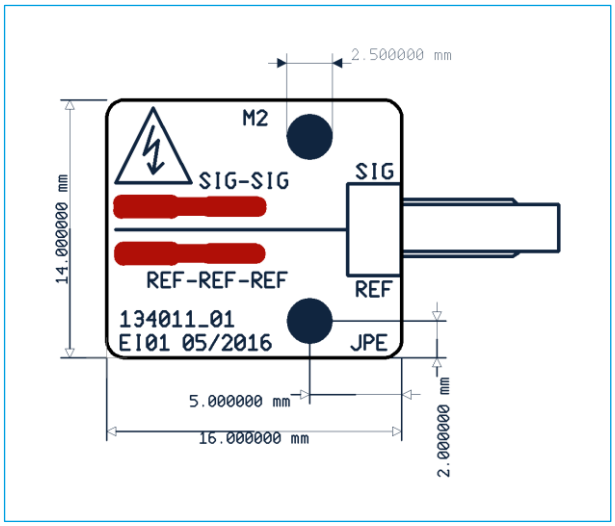

Figure 2: Connector Interface PCB (top view)

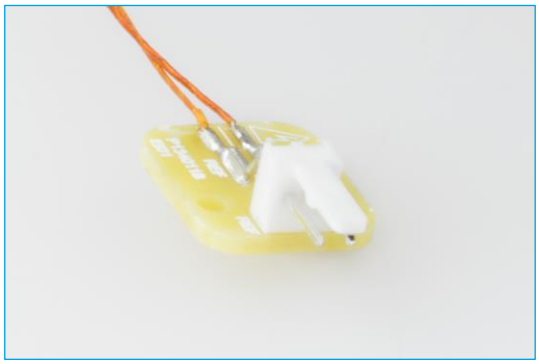

Figure 3: Connector Interface PCB

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).

Please consult the Interface Drawing to determine which Connector Interface PCB corresponds to which positioner (X-axis, Y-axis, Z-axis or Z-scan) since all PCBs are identical.

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 positioners!

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 positioners in the stage are equipped with Resistive Linear Sensors (product type option –RLS), the stage is 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).

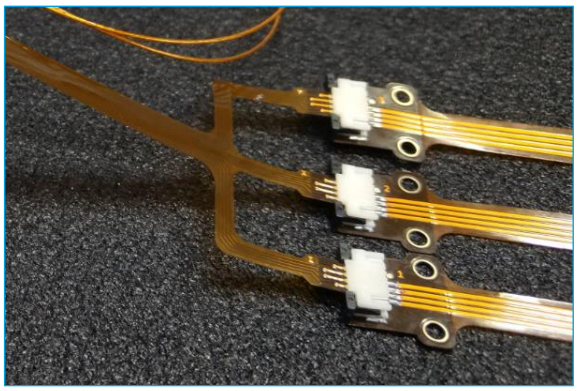

Figure 4: FPC (for 3 axis) connected to CCR (right)

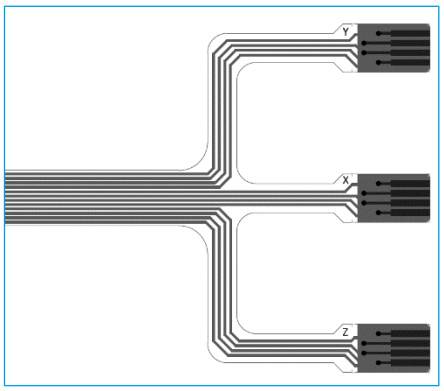

Figure 5: RLS X- / Y- / Z-axis reference (PFC top view)

Pin configuration (for each axis)		
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 [1]		
	Module	Slot #
CS02 (X)	CADM2 Output	1
CS02 (Y)	CADM2 Output	2
CS02 (Z)	CADM2 Output	3
CS02 (Z-scan)	CADM2 Output or PSM Output A	4
CS02-RLS (X)	CADM2 Output	1
CS02-RLS (Y)	CADM2 Output	2
CS02-RLS (Z)	CADM2 Output	3

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

CS02-RLS (X)	RSM Input A	4
CS02-RLS (Y)	RSM Input B	
CS02-RLS (Z)	RSM Input C	
CS02(-RLS) (Z scanning)	CADM2 Output or PSM Output A	5

5. SENSOR CALIBRATION

If the stage is equipped with Resistive Linear Sensors (product type option –RLS), the device will be delivered pre-calibrated. This calibration is done 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 also possible to do a manual calibration. This involves moving the positioners through their ranges (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 Stage 02 (CS02)**
Product Description : **Orthogonal xyz positioning with high load capacity, fitting a 50mm bore.**
Product Number : **C181103**

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, 20 June 2019

Ir. H. Janssen
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