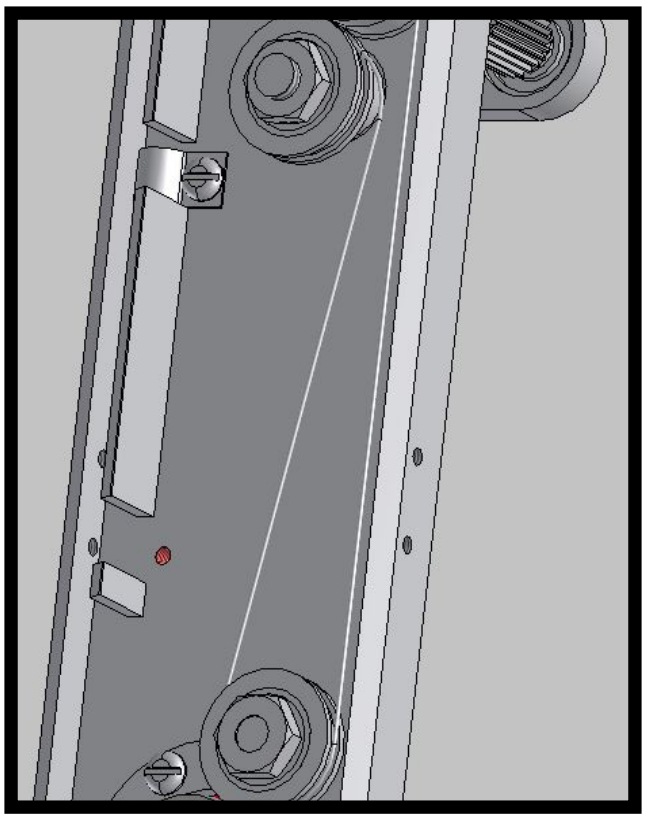
VACGEN

Assembly Guide

SH2/SH2F Drive Wire Replacement

AS0035

VGS03-02T35



Helping you make the next leap forward

www.vacgen.com

DISCLAIMER

This Assembly Guide should be used in conjunction with the owner's manual where available, and is intended as a guide only as there maybe variations between versions and therefore must be used at the Owner's Risk. For more detailed assistance, please contact our Support desk +44 (0) 1323 379 335 or support@vacgen.com.

HEALTH AND SAFETY

All repairs and services should be carried out by a qualified engineer, usinig the correct tools and procedures to carry out the repair. VACGEN are not liable for any errors within the assembly guides which may cause inconsistencies during repair.

The Goods, especially chemicals, may be dangerous if not properly used or stored and the appropriate precautions taken. The Customer accordingly agrees that it shall take all such steps as are reasonably practicable or usual to eliminate or reduce any risk to health and/or safety to which use of the Goods may give rise and acknowledges that where the Goods are manufactured to a design supplied by the Customer, the Company will not undertake any research as to the risks to health and/or safety which may arise from use or storage of the Goods. Where the Goods are manufactured to a design supplied by the Customer, the Customer shall comply with all the duties which may be implied at law on a designer and/or manufacturer of the Goods.

Revision	Date	Comment	Initials
1			
2			
3			

Unit A, Swallow Business Park
Diamond Drive, Lower Dicker
Hailsham, East Sussex
BN27 4EL, UK

SH2 / SH2F (12mm and 25mm Azimuthal travel) Drive Wire Replacement and Overhaul

The only difference with the "F" version is the longer Body and Drive Wire

Cooling If Fitted:

1. Remove the cooling arrow head by removing the three screws and lift off the Sapphire Plate.
2. Remove the cooling box from the mounting bracket.
3. Remove the four screws holding the mounting bracket.
4. Move the box out of the way taking great care of the fragile tubes.

Wiring If Fitted:

1. Remove the wiring from the termination slots, noting position.
2. Remove the thermocouple from the heater and carefully pull back through the back-plate hole. NOTE: The PTFE coating on the wire is very thin and easily damaged.
3. You may need to release the screw that clamps the wires to the top of the sample holder, to gain more room.
   NOTE: Do not remove completely, as the heater will fall apart.

Removing sample Holder if Required:

1. Zero the rotary drive rotation (Primary) and lock using the thumb screw.
2. SH2 The Azimuthal (Secondary) will need to be centred.
   Turn the azimuthal thimble so that the sample holder plate is in its mid travel position. (This will help with re-assembly)
3. SH2 Undo the two M2 grub screws that hold the short rack to the Rotary Drive Push Rod. For re-assembly, it helps to measure the distance from the end of the drive to the rack.
4. Undo the clamp the holds the sample holder onto the rotary drive shaft, again noting its position and orientation.

Pulleys:

1. The pinion pulley has a ceramic sleeve, so the wire does not slip. The pulley is held on by two M2 grub screws. The next pulley is grooved to guide the wire and also acts as the tensioner roller. To tension, release the nut on the front face of the SH2 and adjust with a screwdriver in the slot provided.
2. It should be adjusted to a tension that will not allow the back plate to turn with light finger force.
3. The Drive Wire does not normally stretch owing to the material it is made of (BeCu). Note there is a joint in the wire, this must be assembled in its mid travel position, so it does not run onto a pulley, as this will beak the wire.
4. The next pulley is also grooved and this is a guide pulley, noting that the wire is in a figure of "8" at this point to increase wire contact with the back plate pulley ceramic.
5. The last pulley is part of the back-plate assembly. Again, this has a ceramic sleeve for two reasons, firstly for grip and secondary for the electrical isolation of the back-plate assembly.
   The bearings used are Sapphire which are also for electrical isolation.

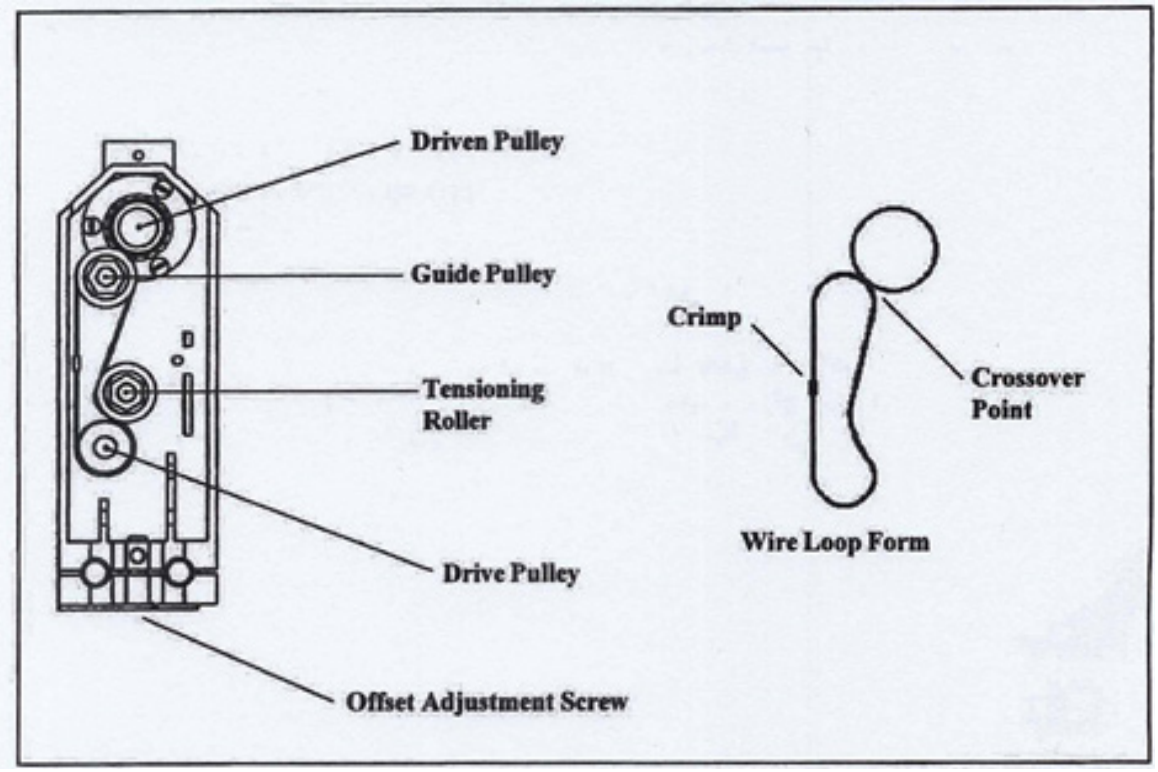
Replace Back Plate Assembly: (Broken ceramic)

1. Remove the drive wire by releasing the tension on the Tension Roller.
2. Undo the three screws that holds the plate of the Driven Pulley. Use a container below to catch the 17 sapphire balls, also noting there is a set of shims under the plate.
3. Check the bearing race for damage, if there is any damage, then the body will need replacing.
4. Place the new back plate on a bench and adjust the height of the body by hand, so the groove in the Driven Pulley and the bearing race are aligned.
5. Load the 17 sapphire balls into the race and you now can raise the body and the balls will hold the back plate in place.
6. Fit the original shims and retaining ring (Chamfer facing the balls) with the three screws, BUT DO NOT OVERTIGHTEN. Check the rotation as you tighten, making sure the rotation does not seize, i.e. not enough shims. If this happens, then the correct thickness shim will need to be fitted by "trial and error". Also, the same if it is too loose, less shimming is required. Shims (0.025", 0.05" & 0.1") will need to be changed until the adjustment of the rotation, rotates freely, but without play.
7. If by shimming this point cannot be found, then the body faces are damaged and a new sample holder will be required.
8. Fit drive wire

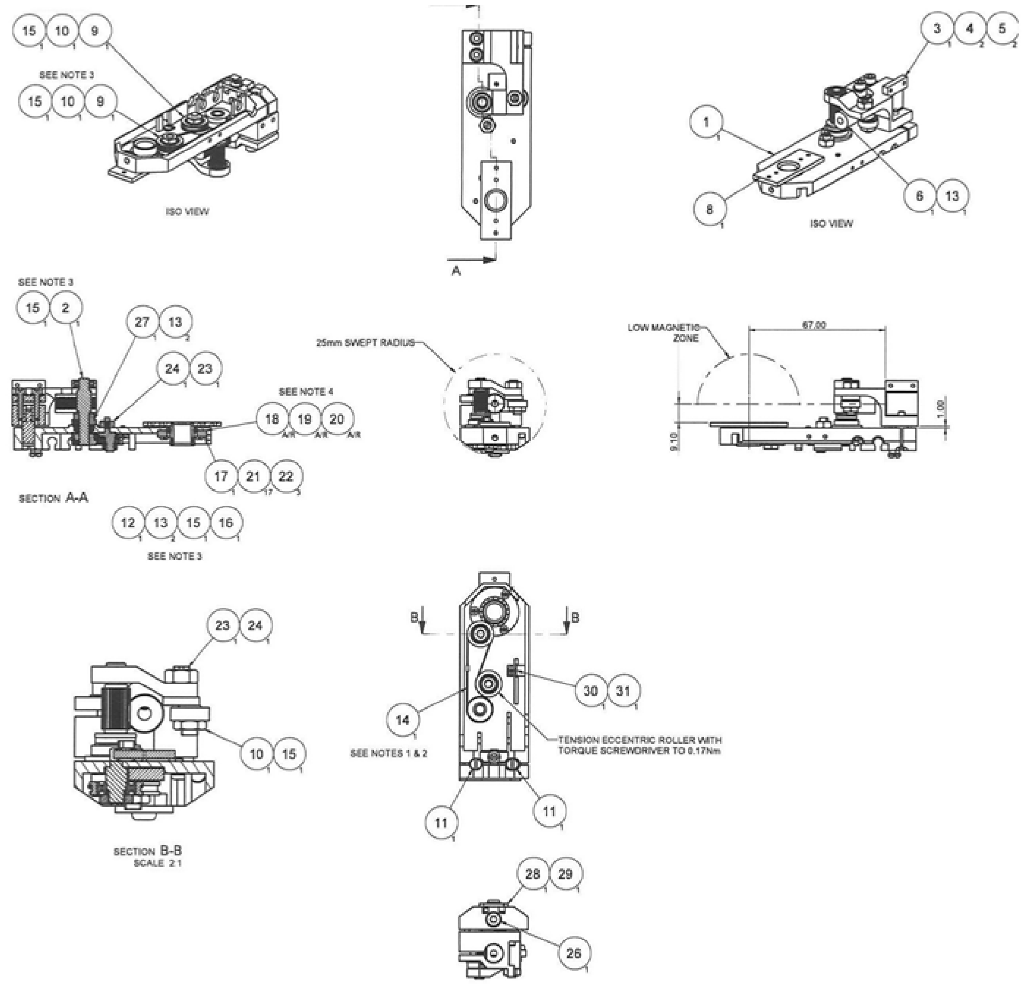
Fitting Drive Wire:

1. If fitted, any power/thermocouple wiring passing through the Driven Pulley will need to be removed.
2. Loosen the Tension Roller and fit wire in a figure of "8" between the Driven Pulley and the guide pulley. NOTE: The Wire Crimp MUST be in the centre of its travel.
3. To tension, release the nut on the front face of the SH2 and adjust with a screwdriver in the slot provided.
   It should be adjusted to a tension that will not allow the back plate to turn with light finger force.

Correct Routing of Drive Wire on Pulleys



Overview of the SH2

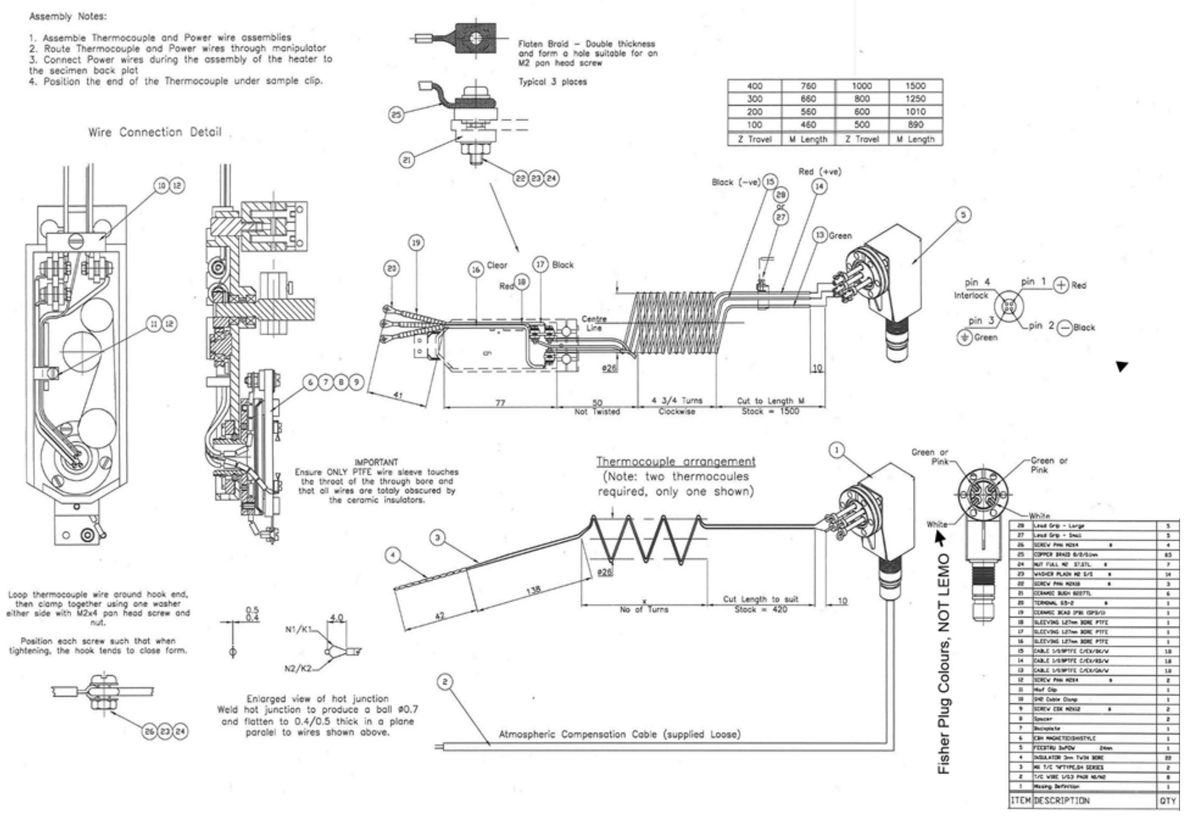


ASSEMBLY NOTES

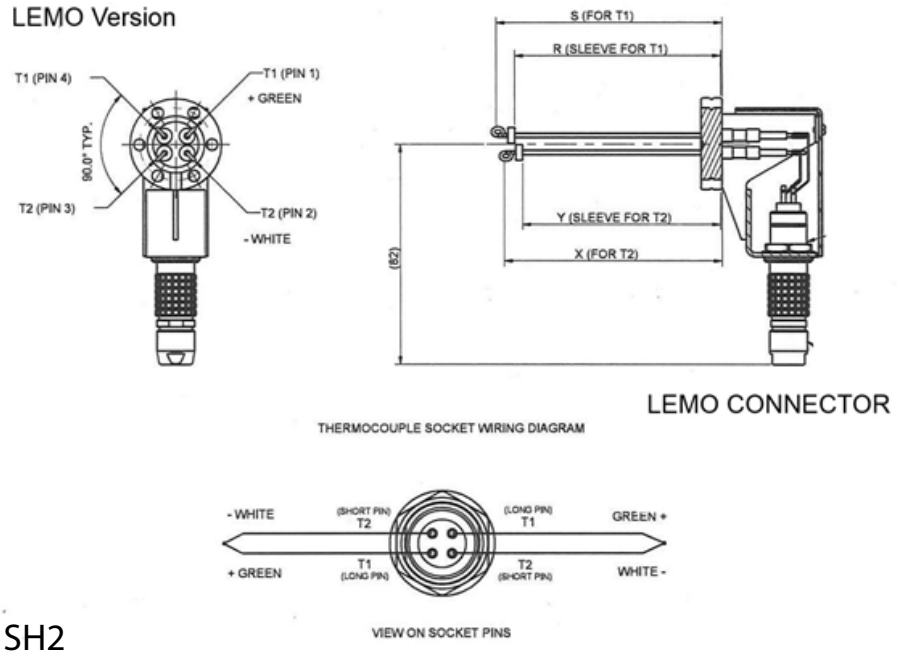
1. WIRE TENSION.
IT IS VITAL THAT THE CONTROL WIRE (ITEM 14) IS TENSIONED CORRECTLY OR EITHER THE DRIVE SYSTEM WILL SLIP OR DAMAGE WILL OCCUR.
2. WIRE CARE
THE CONTROL WIRE (ITEM 14) MUST BE INSPECTED FOR ANY SIGNS OF DAMAGE. IF ANY BENDS OR NICKS ARE APPARENT THEN THAT WIRE MUST NOT BE USED.
3. BEARINGS
4 OFF XBEA106 (ITEM 15) MUST BE BONDED IN PLACE ON THIER OD'S USING A SMALL AMOUNT OF LOCTITE 648 (ITEM 32).
4. SAPHIRE BEARING.
WHEN ASSEMBLING THE SAPHIRE BEARING (ITEM 21) THE FREE PLAY SHOULD BE ADJUSTED TO A MINIMUM BY FITTING THE APPROPRIATE SH2 ETCHED SPACERS. IT IS IMPORTANT TO HAVE A SMALL AMOUNT OF FREE PLAY OR SEIZURES WILL OCCUR.
5. REFER TO WORK INSTRUCTION VGWI 4.9.154 DURING ALL STAGES OF ASSEMBLY.

ITEM	DESCRIPTION	QTY
1	SH2 SERIES WELDING ASSEMBLY	1
2	SH2 PINON	1
3	SH2 CLAMP BODY	1
4	M3 CAP HEAD SCREW 12 LONG	2
5	STAINLESS STEEL M3 WASHER 7OD x 3.3ID x 0.5THK	2
6	SH2 RACK	1
8	SH2 SPINDLE ASSEMBLY	1
9	SH2 ROLLER	2
10	NUT, HALF, ST.STEEL, M4	3
11	SH2 SHORT PILLAR	2
12	SH2 COATED PULLY	1
13	SCREW SET M2 X 3 LONG	5
14	SH2 CONTROL WIRE	1
15	BEARING, RADIAL, BeCu, MPB N6316C7P25LD	5
16	SH2 SPACER .	1
17	SH2 BEARING PLATE	1
18	SH2 ETCHED SPACER 0.0025 THK	A/R
19	SH2 ETCHED SPACER 0.05 THK	A/R
20	SH2 ETCHED SPACER 0.1 THK	A/R
21	BALL SAPHIRE 3/32" DIA	17
22	SCREW M2 PAN HD 5 LONG	3
23	SH2 ECCENTRIC SPINDLE	2
24	NUT, FULL, ST.STEEL, M4	2
26	SCREW, CAP HEAD, M4 x 10 ST.STEEL	1
27	SH2 PULLEY	1
28	SH2 CABLE CLAMP	1
29	SCREW, PAN HD M3 x 4L	1
30	HALF CLIP	1
31	SCREW M2 PAN HD 4 LONG	1
32	LOCTITE 648	A/R

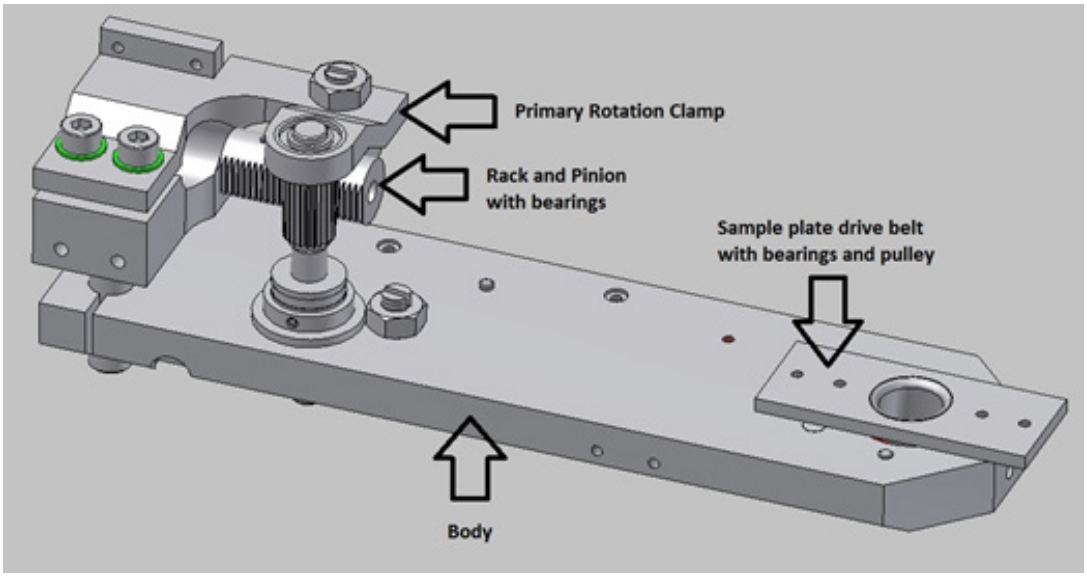
Guide to Wiring (3 power wires for EBH and Resistive 2 power wires)

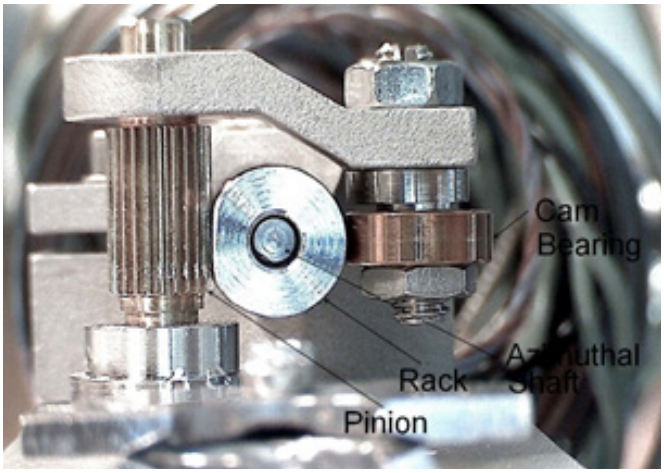


LEMO Wiring Setup

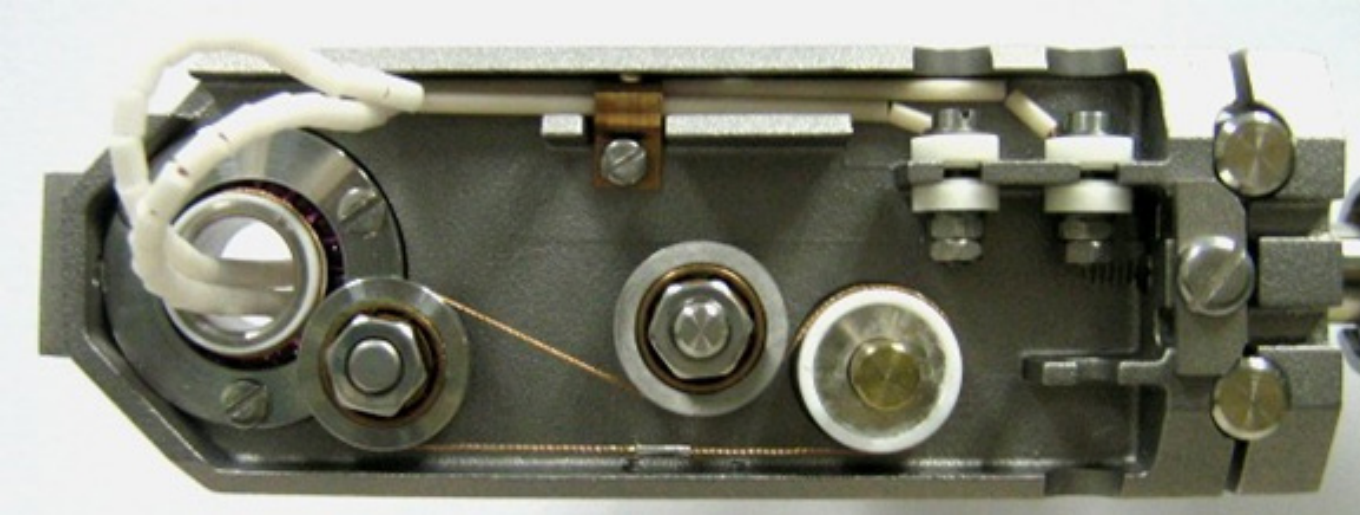


Overview of the SH2

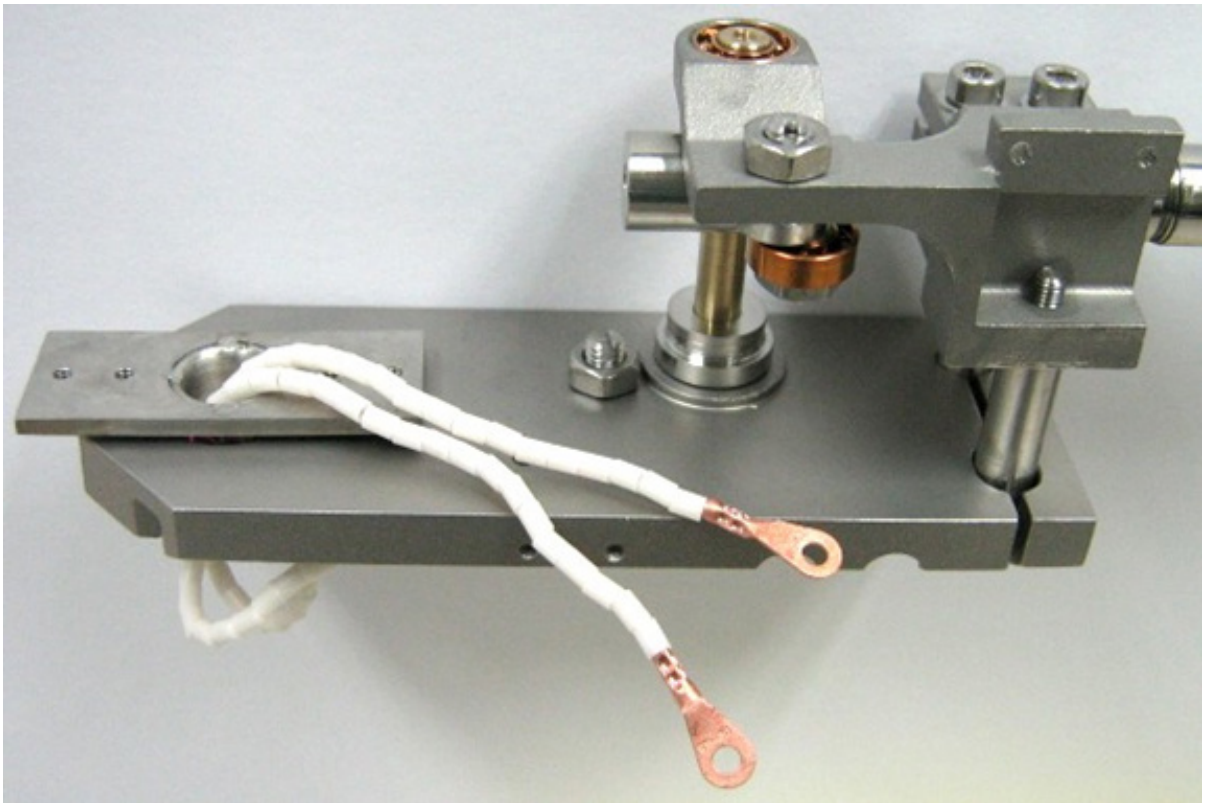




Back View of Sample Holder



Showing the Setup of the “E” version with the greater sample



Spares:

BeCu Bearing Kit	SH2BCBK
Ceramic Pinion Pulley	SH2CP
Sapphire Bearing Kit	SH2SBK
Spindle Back Plate Assembly with Ceramic Pulley	SH2SBPK
Power Wiring Kit	SH2WK
Sample Holder Wire Drive Belt x3 SH2 ± 110	ZSH2WDB
Sample Holder Wire Drive Belt x3 SH2F ± 180	ZSH2FWDB