

# MCS/5 FIVE-CHANNEL SWIVEL

## 1. Introduction

The MCS/5 series of swivels allow five independent fluid channels to be connected to a freely-moving animal. The seals on these channels are so tight that the swivel would be impossible to turn manually. Therefore, the swivel's rotation is assisted by a motor, amplifying the animal's torque by a factor of 150 and resulting in a swivel that's as easy to turn as Instech's single channel models.



## Specifications

Model	Channel				
	1 ●	2 ●	3 ●	4 ●	5 ●
MCS/5A	μD	μD	μD	μD	22ga
MCS/5B	22ga	22ga	22ga	22ga	22ga
MCS/5C	μD	μD	22ga	22ga	22ga

Number of channels	5
Dead volume - μD channels	6-7 μl
Dead volume - 22ga channels	15-20 μl
ID - μD channels	0.009in (0.2mm)
ID - 22ga channels	0.015in (0.4mm)
OD - all channels	0.028in (0.7mm) - 22ga
Materials in fluid path	Titanium, polyimide, Teflon®
Rotational activity output	Analog signal, ±2V maximum
Lever arm length	5.75in (14.6cm)
Swivel dimensions (L x Dia)	7in x 0.6in (18x1.5cm)
Swivel weight	95 gms (counterbalanced)

## 2. Warnings

- △ When attaching or removing tubing do not apply excessive force to the inlets (see Connect Fluid Lines below).
- △ Clean channels after every use to prevent clogs (see Maintenance below). Most clogs cannot be repaired.
- △ Do not attempt to rotate this swivel manually by grasping the body and twisting the outlet assembly, with or without power. Use the action of the swivel, when powered, to position the outlet assembly.
- △ The rotation of the blue body should not be restricted and should not be touched as this is part of the rotation sensing system.
- △ If swivel is powered up with nothing attached to the tether, continuous rotation is probable and normal. Hold the tether and rotation should stop.
- △ Some “ticking” may be heard when animal is stationary; this is normal.
- △ Power must always be on when animal is attached.

### 3. Assembly

#### Included Items

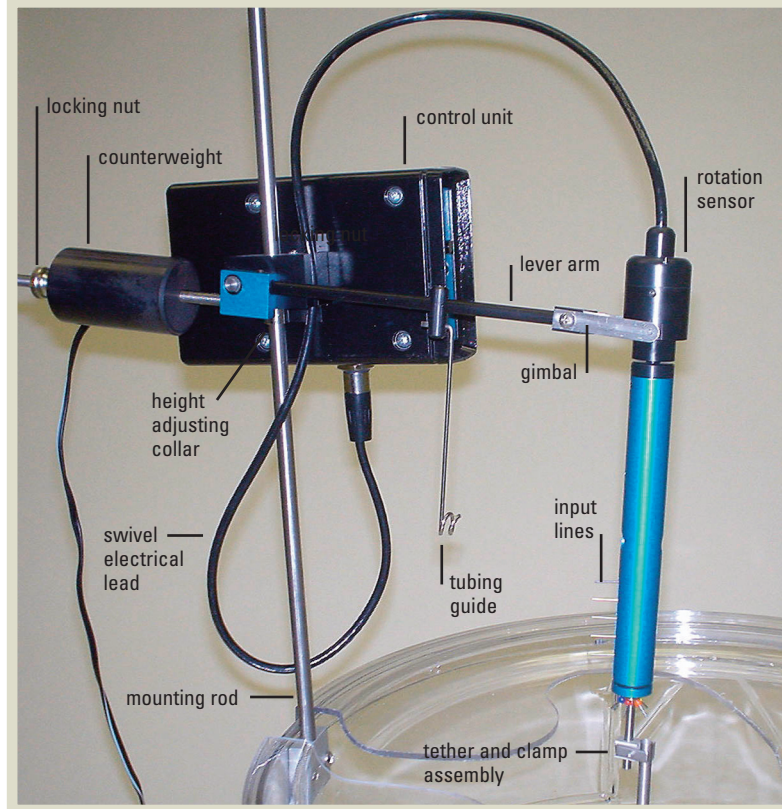
- Powered swivel assembly (blue) with tether clamp
- Vertical mounting rod
- Counterbalance arm
- Electronic control unit
- Phono plug for analog output
- .050in and .035in allen wrenches
- Power supply (15VDC out, 100-240VAC in) with multiple socket adapters

#### Assemble System

1. Attach the mounting rod to your cage.
2. Drop the ¼in ID height adjusting collar over the rod and roughly position it.
3. Drop the lever arm assembly over rod.
4. Insert the swivel into the gimbal by loosening the one of the side screws so that the pins can engage the holes in the swivel. Retighten screw to secure.
5. Note that the swivel insertion into the hanger should be made so that the input lines, on the side of the swivel body, face the mounting rod.
6. Attach the typical tether and animal attachment device (harness etc.) to the clamp on the outlet rod of the swivel.
7. Fit the control unit onto the arm assembly.
8. Attach the swivel electrical lead to the control unit and secure loop in slot (see photo).
9. Adjust counterweight until a very slight upward pull exists on the tether. Secure locking nut.
10. Set height adjusting collar position.
11. Plug in wall mounted adapter to power the controller.
12. Turn power on only when swivel is freely suspended.

#### Connect Fluid Lines

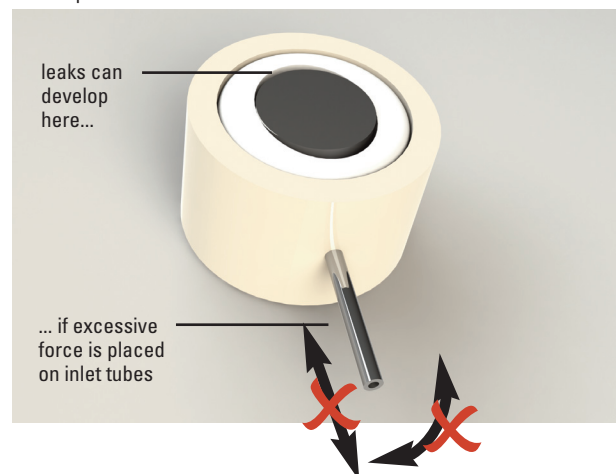
The five non-moving inlets on the side of the swivel match with the moving outlets on the bottom of the



swivel according to the color coded beads. Route non-moving tubing through the tubing guide. Route tubing to the animal through a connected spring tether.

*Take great care when attaching or removing tubing.* This is a critical step in insuring leak-free operation. There are 10 small internal seals made of soft hollow Teflon rings with internal springs in each to insure constant contact with the center core of the swivel. They are susceptible to temporary deformation when stressed.

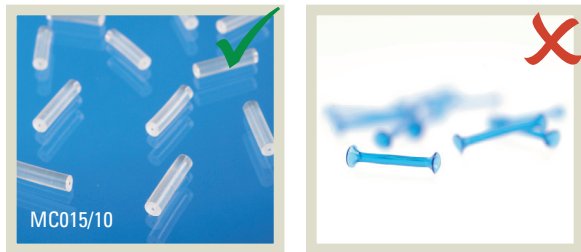
Close up of distorted seal



Side channel tubes can be pulled out or seals damaged if excessive forces are applied during tubing installation or removal. Rocking up and down can also distort the seals and should be avoided.

We have found that the “blue widgets” normally used for microdialysis tubing attachment can cause many problems, especially when removing them due to the tight fit that results when the alcohol evaporates. We do not recommend their use.

Instead, use the soft silicone coupling sleeves that we provide with the MCS5 to butt join the FEP tubing to the side channel input lines. Additional couplers can be purchased; part number MC015/10. These have the added advantage that they will act as a pressure relief if the core becomes blocked. It will leak outside of the swivel, rather than blow by the seals and damage the inside of the swivel. Syringe pumps can develop very high pressures.



### 3. Maintenance

Since the internal diameters in this device are typically 150 microns (twice the size of a human hair), it is essential that no salts be allowed to accumulate or precipitate in the fluid paths.

Users have found that rinsing with a constant flow of DI water, at the normal microdialysis rate of ~2 uL/min, for the duration between experiments has proven very effective in keeping the lines patent.

If the device is to be out of use for an extended period of time, rinse for several hours and then pull air back through each line. Alcohol rinse is ineffective.

If blockages do occur, it is usually in the core section which cannot be repaired; replacement of the core and new seals are typically required at a minimum.

To request factory repair, please visit:  
[www.instechlabs.com/Support/returns/](http://www.instechlabs.com/Support/returns/)

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