# INSTRUCTIONS

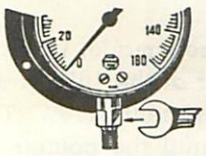
## FOR INSTALLATION, USE, REPAIR AND RECALIBRATION OF

# *The Helicoid Gage*

## INSTALLATION

Helicoid Gages are designed for stem mounting with bottom connection, or surface mounting with bottom or back connection, or flush mounting on panel with back connection. The case is made with or without a flange for stem mounting, with a back flange for surface mounting and with a front flange for flush mounting. Standard connections are ¼" and ½" N.P.T.

The Bourdon tube is phosphor bronze, alloy steel, stainless steel (type 316) or K Monel. The right kind of tube should be selected for the service. A bronze tube should not be used at temperatures over 300F° or for working pressures over 600 p.s.i. A steel tube should be used for Ammonia. A K Monel tube should be used for sour oil or gas. For oxygen or hydrogen peroxide, the gage must be free from oil — otherwise an explosion may result. Hence, oxygen gages should be specified as such, and supplied with a Lucite lens and safety blow-out discs. These gages should be bronze, K Monel or Stainless Steel — never alloy steel. Use the right gage for the service.



USE WRENCH

A suitable pipe compound should be applied to the connection threads. The gage should then be turned into the fitting with a suitable wrench.

Never tighten gage connection by gage case.

When the piping to the gage vibrates excessively, the gage should be mounted on a rigid support and the connection made through a flexible metallic hose. This type of connection will provide longer, more useful life of gage.

Gages subject to violently pulsating pressures should be installed with a needle valve or a Helicoid Cartridge Snubber. The valve may be partly closed to provide pressure damping, whereas the snubber will automatically perform this service. A water-filled siphon must be installed below any gage for steam service.

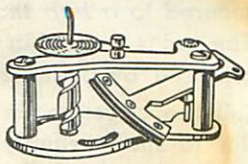
## OPERATION

The normal operating range of pressure gages is the middle third of the scale. Although all Helicoid gages have been subjected to 50% over-pressure before calibration, for longest life they should not be operated

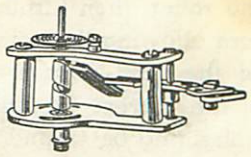
## OPERATION (Cont'd)

continually at more than two-thirds of the maximum dial graduation.

If a gage might be subjected to pressures beyond the maximum dial graduation, a Helicoid gage with a right-hand roller movement should be used because the cam releases from the roller at slightly beyond the maximum dial pressure. This is a feature exclusive with the Helicoid movement. Usually, such a gage can withstand about 50% over-pressure without damage to the Bourdon tube.


RIGHT HAND ROLLER

If a pressure gage is to be subjected to vacuum, or sudden reductions in pressure, as in hydraulic press service, a left-hand roller movement is used because the cam releases from the roller at slightly below zero. This prevents the gage pointer from slamming against the dial stop pin. The Helicoid vacuum gage is made so that the cam releases from the roller if the gage is subjected to pressure. It is the only vacuum gage thus protected. A compound gage should be used for indicating both pressure and vacuum.


LEFT HAND ROLLER

Any pressure gage is a fine instrument. It should be handled as you would a watch.

## REPAIRS

To remove the pressure system from the case, pry the snap ring out of its groove by means of a knife or screw driver. The glass and gasket can then be lifted out. Removal of the three screws at back will allow the entire system, with dial and pointer attached, to be removed as a unit. A Helicoid Gage can then be calibrated without removing the pointer or dial.

If it is necessary to remove the dial for cleaning of parts, first lift off the pointer with a handijack and then remove the three dial screws.

The link is attached to the slotted extension of the cam by a shoulder nut, washer and screw. When reassembling, be sure that washer is placed between link and cam extension.

When a new movement is installed in a gage, be sure that the movement cam lines up in the same plane as the tip of the tube so the link does not bind. The link must have sufficient side play to prevent friction.

The disassembly and assembly of all other parts is obvious.

If movement has been disassembled, examine bearings for roughness and wipe clean if needed. Do not oil any moving parts. Oil attracts dust. If any moving parts appear worn or galled, replace complete movement.

*(over)*

## THE HAIRSPRING

The function of the hairspring is to keep the roller groove surface in contact with the surface of the cam facing. The cam in the Helicoid movement can release from the roller and contact again without loss of calibration.

The hairspring is stainless steel. It will not corrode. It should not need replacing unless damaged. It is located at an accessible place above the top plate. It is secured to a hub that is pressed on the pointer shaft. The end is peened in a groove around a post. It is easily replaced by peening at a new location in the groove.

If the gage pointer jumps the stop pin on the dial due to shock, simply return it to the other side of the pin and the gage will be in correct calibration.

If the hairspring becomes unwound due to rough handling, it may be rewound by pressing on the end of the Bourdon tube sufficiently to release the cam from the roller, then turning the pointer one revolution before allowing the cam to contact the roller. The surface of the cam *nearest the movement-mounting* screws is the correct bearing edge. It is important that the hairspring be wound so that one end of the cam enters and leaves the roller without interference, yet develops tension when the cam enters the roller.

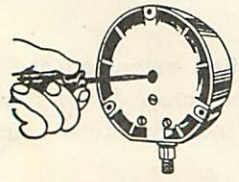
To adjust the tension in the hairspring, the hub on the pointer shaft may be rotated.

## RECALIBRATION

To recalibrate, remove the complete system assembly from the case, with dial and pointer attached, and mount on a dead-weight tester or a test pump with an accurate test gage.

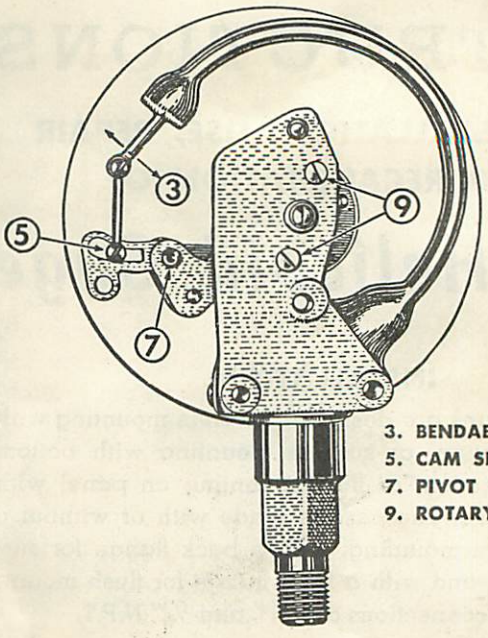
If intended for oxygen or hydrogen peroxide service the gage must be free of oil. Such gages should be tested with clean air or water.

It should be noted that the rear adjustment screw is for pointer setting; the cam slide adjustment (5) is to correct for variance of pointer travel; and adjustment of the rotary movement (9) is for positioning the cam in the roller.

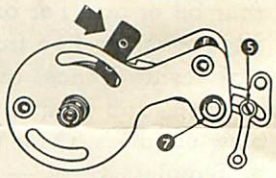


REAR ADJUSTMENT SCREW

1. Subject the gage to a pressure of 10% of total scale. Example: for a 100 lb. gage, run pressure up to 10 lbs. If the pointer does not indicate correctly, reset it by the rear adjustment screw. If pointer has been removed, press it on the staff to indicate at or near the 10% mark and reset exactly by rear adjustment screw.




3. BENDABLE TIP
5. CAM SLIDE ADJUSTMENT
7. PIVOT
9. ROTARY MOVEMENT




2. Increase the pressure to full range. The pointer may indicate high or low, in which case lengthen or shorten distance of slide nut (5) from pivot (7). This is done by loosening the link screw (in slide nut 5) and sliding the link in or out. Retighten screw securely after this adjustment.

3. After this adjustment has been made, it may be necessary again to set the pointer at the 10% graduation by means of the rear adjustment screw. These adjustments must be continued until the pointer indicates correctly at the 10% graduation and at full scale.

4. With a pressure equivalent to half scale, note the pointer position. If pointer is high at half scale, bend the tip outward. If pointer is low at half scale, bend the tip inward. Caution: See that link does not bind at tip screw.

5. With pressure gradually increasing, note the position of the pointer at all major graduations. Should the pointer indicate correctly, recalibration has been completed; if not, continue as outlined under the preceding paragraphs.

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