

## REPAIR / SERVICE:

Ship unit prepaid to TENTEL. Include a note stating the problem and the contact person's address and phone. An estimate will be sent to request approval to commence repair work. TENTEL shall have sole responsibility to determine warranty repair.

## LIMITED WARRANTY:

With proper care, handling and storage, your TSH-B8 Reference Plane gauge should provide years of trouble free, accurate readings. The TSH-B8 is guaranteed to be free of defects in materials and workmanship for a period of one year after delivery to the initial purchaser.

## NOTE:

The warranty does not cover damage caused by normal wear, accident, abuse, alteration, disassembly or failure to follow instruction. Tentel assumes no responsibility or liability beyond the purchase price of the unit. We believe this gauge to be the finest, most accurate gauge for measuring spindle heights and related problems available; and will continue to produce this gauge to TENTEL's own demanding specifications. The TSH-B8 Instruction Manual is intended as a helpful guide only and Tentel assumes no liability for its accuracy or from its misuse or misapplication.

**TENTEL®**

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TSH-B8 IB-603

## Use of the TENTELOMETER® Tape Tension Gauge on Betacam:

Tape tension, out in the tape path, prior to entering the scanning video head drum, is of critical importance. The TENTELOMETER allows tension measurement out in this critical area. The proper range for Betacam transports is  $45 \pm 5$  grams.

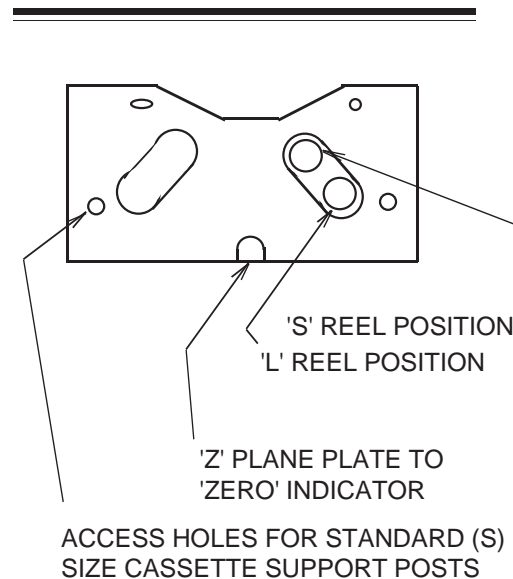
The TENTELOMETER provides more accurate set-up and repairs by measuring tape tension for various reel tape pack diameters, thus providing a functional test of the tension servo system. Additional TENTELOMETER benefits are that the calibration can easily be checked and "tweaked-up" in the field, and the gauge will not be damaged by a transport that is causing tape destruction.

## TQ - Dial Torque Gauge:

The gauge goes directly onto the reel tables. Often the gauge can be used without even removing the elevator assembly, it not only saves time but it can locate problems not detected by any other method. The motor drive unit prevents guessing about 'pulling' speed, and provides smoother more constant motion than is possible with the 'dummy' reel and spring scale method.

## HPG - Head Protrusion and Eccentricity Gauge:

The universal head protrusion gauge (HPG) allows a fast, accurate, safe measurement of the video heads to be made on virtually any VCR. The gauge reads directly in microns (millionths of a meter), and ten thousandths of an inch (.0001"). This gauge allows accurate measurement of the protrusion (tip projection) of the small fragile head tips on the video drum. This provides invaluable data to allow service technicians to accurately predict remaining head life, to take much of the guessing out of video head wear and replacement.



# TENTEL® TSH-B8 REFERENCE PLANE GAUGE

## INSTRUCTION MANUAL

The TSH-B8 series of instruments incorporate a number of new functions, not available with any other device. The TSH-B8-1 version has been designed to perform the Betacam SP - large position reference plane measurements. The TSH-B8-2 version includes BOTH the large (L) and standard (S) size plates to perform the large SP functions and the standard (S) size Betacam functions for machines that only accept the smaller size cassette.

Owners of the TSH-B7, will find it advantageous to use their TSH-B7 in conjunction with the TSH-B8-1 to be effectively equivalent to the TSH-B8-2, for both the large (L) and standard size (S) cassette positioning alignments.

**The TSH-B8-1 consists of the following items:**

1. Large SP reference plate - ground flat and parallel to exacting tolerances.
2. Indicator assembly calibrated to read directly from the 'Z' reference plane in .025mm (.001 inch) units. The indicator will read + or - dimensions from the 'Z' plane to  $\pm 0.5$ mm (approx. .020"), and will read reel table heights directly in millimeters (mm) on the outer scale to a maximum of 2.9 mm above the reference plane.

3. The tape guide height block (GHB) has been precisely ground to simulate the exact width of Betacam tape.

4. A front surface mirror is provided to aid in tape guide heights and alignments.

**OPERATION SUMMARY:**

The following functions can be performed with the TSH-B8:

1. Flatness of 4 large SP support posts.
2. Perpendicularity of reel tables to 'Z' reference plane.
3. Reel table heights in both standard and large cassette positions.
4. Height of standard 'S' cassette support posts relative to large 'L' cassette plane.
5. Tape guide heights.

**OPERATION:**

1. Flatness of 4 large SP support posts.

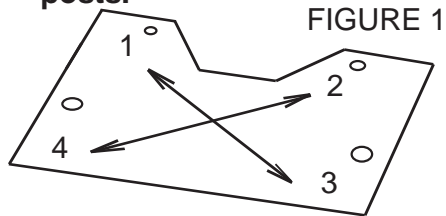


FIGURE 1

Remove the carriage assembly. Place the plate onto the support posts. Use alternating pressure diagonally across the plate to determine if the plate rocks due to the 4 posts not in a flat plane. The indicator assembly can be used to measure the actual amount of rocking by inserting the

measuring probe through either hole in the plate and measuring the deviation to the standard (S) cassette rear mounting posts. If rocking is detected, move the #4 support up or down until rocking does not occur.

**2. Perpendicularity of reel tables to 'Z' plane.**

Unlike the 'factory' gauge, It is NOT necessary to remove the reels from their shafts for this measurement. With the TSH-B8 plate seated on the 4 'SP' supporting posts, measure the height at various radial locations of the reel tables. Compare reading differences at locations 180° (half way) around the reel tables. The indicator probe measures the height of the reel table surface that supports the tape reel when a tape is placed in the machine. Readings should be taken with the reels in first the 'S' or standard position, and again with the reels in the 'L' or large position. Figure 3 shows the amount of 'out of perpendicularity' for measurement differences at 180° readings.

**Ideal specifications would be .025 mm (.001") differential, which is 1 of the small scale divisions.**

'Factory' specifications allow an error of .08° with reels in the 'L' large position (.040 mm) or an error of .25° with reels in the 'S' small position (.125mm). If adjustment is necessary, consult the factory manual for proper reel motor spacer procedure.

FIGURE 2

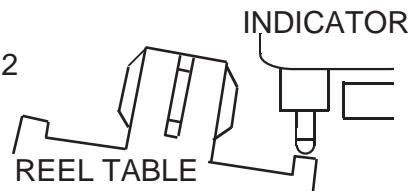


FIGURE 3

DIFFERENTIAL READING AT 180°		ERROR DEGREES
mm	inch	
.025	.001	.05°
.050	.002	.10
.075	.003	.16
.10	.004	.21
.125	.005	.26
.150	.006	.31
.175	.007	.36
.20	.008	.42
.225	.009	.47
.250	.010	.52

**3. Reel table heights.**

Reel table heights can be easily determined using the indicator assembly. Place the reels in the 'L' large cassette position. Extend the measuring probe over the 'Z' plane plate, located along the back edge and center of the TSH-B8 plate. The indicator should read 'zero' at this location. Move the indicator to a point where the measuring probe extends onto the reel table support surface. Set each reel table to 2.2mm ±.05 mm (2.15 to 2.25mm). The original Betacam specification was 1.9 to 2.2 mm and this specification is currently under review (Spring 1995), however it has been established that there are benefits to the tighter 2.15 to 2.25 mm settings. Since the gauge provides measurements directly from the 'Z' plane, any future desired settings can be read directly on this indicator.

It may be prudent to check the reel heights in the 'S' standard position also. Use the same 2.15 to 2.25 mm specification.

**4. Height of Standard (S) cassette support posts relative to Large (L) cassette plane.**

The rear mounting posts for the standard (S) cassette are mounted to the reel table assemblies. These post heights can be measured in both the 'S' and 'L' position with the indicator. Both of these posts should measure zero ±.025 (one small division) for a maximum reading when the indicator probe is moved over the surface of each support post.

**5. Tape Guide Heights.**

The metal tape guide height block 'GHB' has been ground to exacting tolerance to simulate the tape width. The reference plates of the TSH-B7, TSH-B8-1, and TSH-B8-2 have also been ground to exacting thicknesses so the top simulates the 'ideal' bottom edge of the Betacam tape. Extend the 'GHB' from any of these reference plates out into the tape path, and observe the position of each guide relative to its position. The front surface mirror is handy for this procedure.

Since some guides are 'hidden' by the video drum, it is necessary to use the front surface mirror and flashlight to observe how an actual tape is being guided. Look closely at the tape edges for any signs of distortion, which would indicate tape guide errors.

The ends and sides of the 'GHB' have been ground flat and perpendicular to allow observation of the vertical alignment of various guides and heads that are able to be reached with the Guide Height Block (GHB).