

LN3000 Calibration Fixture

LN30XX Gauge Enhancements

The LN30xx Series of Lump and Neckdown gauges has been designed to detect flaws with greater accuracy and with improved coverage compared to the previously marketed LN10xx Lump and Neckdown gauges. The LN30xx gauges have the following enhancements when compared to the LN10xx:

1. The LN30xx has three-axis coverage compared to two axes for the LN10xx gauge. This means you can see more of the flaws.
2. Minimum detectable flaw length is smaller: 0.5 mm for the LN3015 versus 0.8 mm for the LN1010.
3. Sampling rate for the LN30xx gauge is 10 times that of the LN10xx for each axis.
4. Line speed capability has increased from 1500 m/min (LN10xx) to 3000 m/min (LN30xx) due to the increased sampling rate and also the enhanced data processing capabilities built into the gauge.
5. There have been revisions to the gauge that ensure that you are detecting flaws and nothing else. Previous data processing could result in incorrectly recording a product diameter change as a flaw. In addition, periodic signals such as the peaks and valleys of twisted-pair product could also be reported as flaws. We have improved the data processing to ignore these types of false positive results. If you wish to detect diameter changes, we would recommend purchasing an AccuScan Diameter gauge. Similarly the twisted-pair periodic signals can be detected with a LayScan gauge.
6. Using the Calibration Kit GA5700-0055, calibration is now possible at the customer site without disassembly of the gauge. The entire process can be performed in around 10 minutes and is NIST traceable. The calibration fixture has a rapidly rotating double-helix pin which presents the gauge with a precise “flaw” that is 1.9 mm in height. The calibration process tunes the electronics for all three channels to precisely replicate this 1.9 mm flaw measurement for each channel.

Filtering Diameter Changes and Periodic Signals

In order to filter out the diameter changes and periodic signals, the LN30xx Series gauges incorporate an advanced algorithm. However, the calibration fixture utilizes a rapidly rotating double helix to tune the three channels which creates periodic signals (see Figure 1). Therefore, calibration is only possible by entering a special calibration mode in the LN30xx Series gauges that accounts for the periodic signals. The gauge must be set up in Calibration Mode in order to perform the calibration and also verify the calibration. Calibration Mode does not provide actual flaw count, height or length.

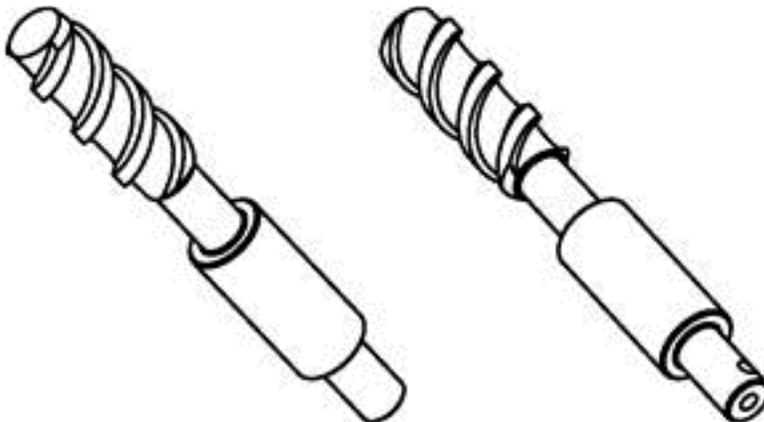


Figure 1. Rotating Double Helix on Calibration Fixture

Generating Flaw Data

Once the calibration has been completed, the gauge is rebooted and goes back into normal Operating Mode. It can then provide detailed flaw data. As stated above, the LN30xx Series gauges cannot read rapid periodic signals in Operating Mode. The following is a sample of the readout from the gauge when the calibration fixture is used to “create flaws” in Operating Mode. Flaw amplitudes are highlighted in yellow. Note that amplitudes range from 0.150 to 1.877. These values are obviously incorrect and this indicates why the fixture should not be used in this mode.

*L0/P0M=0,2,61,7,2,1660.7883,1.037,0.130,Y 8a
*L0/P0M=0,2,62,8,1,1660.7883,1.072,0.286,X 95
*L0/P0M=0,2,62,8,2,1660.7883,1.678,0.121,Z 98
*L0/P0M=0,2,62,9,2,1660.7883,1.390,0.069,Y 9a
*L0/P0M=0,2,62,9,2,1660.7883,1.728,0.078,Z a0
*L0/P0M=0,2,63,10,1,1660.7883,1.090,0.125,X b7
*L0/P0M=0,2,63,10,2,1660.7883,1.591,0.061,Y be
*L0/P0M=0,2,63,10,2,1660.7883,1.751,0.067,Z c3
*L0/P0M=0,2,63,11,2,1660.7883,1.300,0.046,X b5
*L0/P0M=0,2,63,11,2,1660.7883,1.787,0.059,Y cd
*L0/P0M=0,2,63,11,2,1660.7883,1.751,0.060,Z bd
*L0/P0M=0,2,64,12,1,1660.7883,0.150,0.049,Y bc
*L0/P0M=0,2,64,12,1,1660.7883,0.256,0.055,Z c1
*L0/P0M=0,2,64,12,2,1660.7883,1.665,0.049,X c8
*L0/P0M=0,2,64,12,2,1660.7883,1.877,0.058,Y ce

DO NOT attempt to use the calibration fixture to create sample flaws in the LN30xx gauge while in normal Operating Mode.

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Document #: C&T-APPL-SCAN-LN3000 Cal Fix-EN-2016APR12
Date of Issue: April 2016
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