

Title: Calibration of Ultrasonic Flaw Detectors

1 Scope

Work Instruction for the calibration of Network Rail approved ultrasonic flaw detectors block. To be used in the absence of a manufacturers calibration instruction.

2 Preparation

The calibration shall be carried out using the minimum of Category 'A' Master instruments.

Equipment required:

- Oscilloscope with a minimum 100MHz bandwidth
- 100dB Attenuator with minimum 1dB step ($< 0.3\text{dB}$ in any 10dB span)
- Pulse/Function generator
- 50Ω Non-reactive resistor
- Frequency Counter
- Digital Multimeter
- Variable DC Power supply

All equipment shall have the appropriate certificate of calibration traceable through United Kingdom Accreditation Service and shall be rechecked at intervals of no more than 1 year.

3 Method

3.1 Calibration shall be conducted in accordance with BS EN 12668-1:2010 by an approved Network Rail calibration body. Performance requirements are either contained in the manufacturer's specification or in BS EN 12668-1:2010.

3.2 Record serial numbers and check general condition and record results.

3.3 Check all stability after warm up and record results.

3.4 Check display jitter and record results.

3.5 Check stability against voltage variation and record results.

3.6 Check transmitter pulse parameters and record results.

3.7 Check amplifier frequency response and record results.

3.8 Check noise levels and record results.

3.9 Check accuracy of calibrated attenuator and record results.

3.10 Check linearity of vertical display and record results.

3.11 Check linearity of timebase range and record results.

3.12 Check linearity of timebase range and record results.

3.13 Check signal monitors for operation: activation levels (variable on digital sets), +ve operation monitor 1 & -ve operation monitor 2, measure delay period for -ve monitor (0.6 seconds ± 0.1 seconds) and measure output voltage (12v $\pm 10\%$)

3.14 Make final checks and record results.

3.15 Report the summary condition of instrument and highlight deficiencies that have been corrected.

Title: Calibration of Ultrasonic Flaw Detectors

Appendix A. Flaw Detector Calibration Result Sheet

Flaw Detector Type:		Case Number:		Chassis Number:	
Date last checked:		Next check due:			
Master Equipment Used:					
Oscilloscope:		100dB Attenuator:			
Pulse/Function Generator:		50Ω Non-reactive resistor:			
Frequency Counter:		Digital Multimeter:			
Variable DC Power supply:					

General Checks		
Check condition of:	Checked	Remarks
1. Handle		
2. Bezel		
3. Graticule		
4. Front Panel		
5. Printed Circuit Boards		
6. Knobs & Buttons		
7. All plugs and sockets		

1. Stability after warm up	Test Limits	Readings			Pass	Fail	Comments
		10 Min	20 Min	30 Min			
Echo Amplitude Stability	<±2% FSH						
Echo Timebase Stability	<±1% FSW						