

LEADER
FOR PROFESSIONALS WHO KNOW
THE DIFFERENCE

WOW & FLUTTER CALIBRATION CD
LFM-39A CALIBRATION PROCEDURE

NOTICE: Though true and accurate, the contents of this disc are not NIST traceable. It is recommend that supporting equipment, a universal counter, low frequency spectrum analyzer, etc. be used in conjunction with this disc.

Equipment required:

Leader Wow & Flutter Calibration CD
Dc Voltmeter
Oscilloscope
Frequency Counter
Frequency Generator

- 1.0 Set Up
 - 1.1 Connect the voltmeter to the Emitter of Q42 and adjust VR18 for +15vdc.
 - 1.2 Connect the voltmeter to the Emitter of Q51 and adjust VR19 for -15vdc.
 - 1.3 Turn off the LFM-39A and mechanically zero the meters.
 - 1.4 Connect the frequency counter to the 'Osc Out' terminals. The frequency should be 3000 Hz +/- 1.5Hz. There is no adjustment, if the unit is out of specification the oscillator module (SL-01) must be replaced.
 - 1.5 Connect the oscilloscope to the 'Osc Out' terminals and adjust VR0 (in the osc. module) for 0.27-0.33 Vrms as displayed on the oscilloscope.

2.0 Frequency Comparator

LFM-39A	Indication:	JIS
	0 Adj. Knob:	Midrange
	Wow & Flutter%:	1%
	Mode:	W & F
	Input Terminal:	CD Track 1

- 2.1 Connect the oscilloscope to IC3 pin 3 and adjust VR2 for a 50% duty cycle as displayed on the oscilloscope.

3.0 Minimum Input Level

LFM-39A	Indication:	JIS
	0 Adj. Knob:	Midrange
	Wow & Flutter:	1%
	Mode:	W & F
	Input Terminal:	Frequency Generator; Sine wave, 3kHz

- 3.1 The Input Monitor Lamp should be on with an input of 13mV rms or greater. Adjust VR1 such that the lamp is off with an input voltage below 13mV.

4.0 Drift Meter Zero

4.1 JIS, CCIR

LFM-39A	Indication:	JIS
	0 Adj. Knob:	Midrange
	Wow & Flutter:	1%
	Mode:	W & F
	Input Terminal:	CD Track 1

- 4.2 Adjust VR4 for a 0% reading on the Drift Meter.

4.3 DIN

LFM-39A	Indication:	DIN
	0 Adj. Knob:	Midrange
	Wow & Flutter:	1%
	Mode:	W & F
	Input Terminal:	CD Track 4

- 4.4 Adjust VR3 for a 0% reading on the Drift Meter.

- 5.0 Drift Full Scale, JIS
 LFM-39A Indication: JIS
 0 Adj. Knob: Midrange
 Wow & Flutter: 1%
 Mode: W & F
 Input Terminal: CD Track 2 & 3
- 5.1 Adjust VR5 for a drift reading of +/- 5%
- 5.2 Drift Full Scale, DIN
 LFM-39A Indication: JIS
 0 Adj. Knob: Midrange
 Wow & Flutter: 1%
 Mode: W & F
 Input Terminal: CD Track 5 & 6
- 5.3 Verify a drift reading of +/- 5%. No adjustment for DIN
- 5.4 An alternate method for checking drift utilizing the frequency generator and frequency counter may be preferred. Connect the generator to the input terminal and adjust the frequency for a full scale reading. For JIS the frequency should be 3150 Hz +/- 15 Hz.
- 6.0 'To Scope' Output Level
 LFM-39A Indication: JIS
 0 Adj. Knob: Midrange
 Wow & Flutter: 1%
 Mode: W & F
 Input Terminal: CD Track 55
- 6.1 Connect the oscilloscope to the 'To Scope' terminal and adjust VR8 for 2.8V p-p as displayed on the oscilloscope.
- 7.0 Full Scale JIS
 LFM-39A Indication: JIS
 0 Adj. Knob: Midrange
 Wow & Flutter: 1%
 Mode: W & F
 Input Terminal: CD Track 7
- 7.1 Adjust VR15 for a full scale reading.
- 7.2 Full Scale CCIR
 LFM-39A Indication: JIS
 0 Adj. Knob: Midrange
 Wow & Flutter: 1%
 Mode: W & F
 Input Terminal: CD Track 11
- 7.3 Adjust VR11 for a full scale reading.
- 7.4 Full Scale DIN
 LFM-39A Indication: JIS
 0 Adj. Knob: Midrange
 Wow & Flutter: 1%
 Mode: W & F
 Input Terminal: CD Track 16
- 7.5 Adjust VR20 for a full scale reading.

8.0 Meter Linearity

LFM-39A Indication: JIS, DIN
0 Adj. Knob: Midrange
Wow & Flutter: 1%
Mode: W & F
Input Terminal: CD Track 7, 16, 42-49

8.1 Verify that each meter reading corresponds with the appropriate CD track.

9.0 Wow & Flutter Frequency Response

LFM-39A Indication: See below
0 Adj. Knob: Midrange
Wow & Flutter: 1%
Mode: W & F
Input Terminal: CD Track

9.1 Adjust for a reading of 0.7% (maximum swing of the meter) as described below.

Indication	Track	Adjustment
CCIR	12	VR9
JIS	8	VR21
JIS	10	VR7
DIN	20	VR6

10.0 Wow & Flutter Full Scale For Each Mode

LFM-39A Indication: JIS
0 Adj. Knob: Midrange
Wow & Flutter: 1%
Mode: See below
Input Terminal: CD Track

10.1 Adjust for a reading of 1.0% as described below.

Mode	Track	Adjustment
WTD	7	VR202
Flutter	9	VR204
Wow	35	VR203

11.0 CCIR Dynamic Characteristic

LFM-39A Indication: CCIR
0 Adj. Knob: Midrange
Wow & Flutter: 1%
Mode: WTD
Input Terminal: CD Track

11.1 Adjust for readings as described below.

Track	Max. Meter Reading	Adjustment
38	0.96-1.04 %	VR14
39	0.84-0.96 %	VR14
40	0.56-0.68 %	VR14
41	0.18-0.45 %	VR12

12.0 Repeat step 7.0 Full Scale as necessary.

13.0 Recorder Out Level

LFM-39A	Indication:	JIS
	0 Adj. Knob:	Midrange
	Wow & Flutter:	1%
	Mode:	W & F
	Input Terminal:	CD Track 7

13.1 Connect the multimeter to the 'Recorder' output and adjust VR17 for 1Vdc as read by the multimeter.

1. DRIFT

TNO No.	1	2	3	4	5	6
PURPOSE	JIS 0%	JIS +5%	JIS -5%	DIN 0%	DIN +5%	DIN -5%
FREQUENCY	3000Hz	3150Hz	2850Hz	3150Hz	3307.5Hz	2992.5%

2. W&F 1%

TNO No.	7	8	9	10	11	12	13	14
PURPOSE	JIS-NAB	JIS-NAB	JIS-NAB	JIS-NAB	CCIR	CCIR	CCIR	CCIR
FREQUENCY	4Hz	0.5Hz	40Hz	200Hz	4Hz	0.3Hz	40Hz	200Hz
TNO No.	15	16	17	18	19	20		
PURPOSE	CCIR	DIN	DIN	DIN	DIN	DIN		
FREQUENCY	300Hz	4Hz	0.3Hz	40Hz	200Hz	300Hz		

3. WTD 1%

TNO No.	7	21	8	22	23	24	10
PURPOSE	JIS-NAB	JIS-NAB	JIS-NAB	JIS-NAB	JIS-NAB	JIS-NAB	JIS-NAB
FREQUENCY	4Hz	1Hz	0.5Hz	0.2Hz	20Hz	100Hz	200Hz
TNO No.	11	25	26	27	28	29	14
PURPOSE	CCIR	CCIR	CCIR	CCIR	CCIR	CCIR	CCIR
FREQUENCY	4Hz	1Hz	0.5Hz	0.2Hz	20Hz	100Hz	200Hz
TNO No.	16	30	31	32	33	34	19
PURPOSE	DIN	DIN	DIN	DIN	DIN	DIN	DIN
FREQUENCY	4Hz	1Hz	0.5Hz	0.2Hz	20Hz	100Hz	200Hz

4. WOW 1%

TNO No.	35	36
PURPOSE	JIS-NAB	JIS-NAB
FREQUENCY	1.5Hz	6Hz

5. FLUTTER 1%

TNO No.	37	9
PURPOSE	JIS-NAB	JIS-NAB
FREQUENCY	6Hz	40Hz

6. CCIR DAMPING RESPONSE 1% 4Hz

TNO No.	38	39	40	41
PURPOSE				
+PULSE	100ms	60ms	30ms	10ms

7. METTER LINEARITY 4Hz W & F

TNO No.	7	42	43	44	45
PURPOSE	JIS-NAB	JIS-NAB	JIS-NAB	JIS-NAB	JIS-NAB
METER	1%	0.8%	0.6%	0.4%	0.2%
TNO No.	16	46	47	48	50
PURPOSE	DIN	DIN	DIN	DIN	DIN
METER	1%	0.8%	0.6%	0.4%	0.2%

8. RANGE

4Hz W & F

TNO No.	7	50	51	52	53	54
PURPOSE	JIS-NAB	JIS-NAB	JIS-NAB	JIS-NAB	JIS-NAB	JIS-NAB
METER	1%	3%	0.3%	0.1%	0.03%	0.01%

9. SCOPE OUTPUT 10Hz W & F

ALL TRACK 50s-Signal

TNO No.	55
PURPOSE	JIS 10Hz
METER	1%