



DSM-5 **NEW!**

FEATURES:

- Battery Powered
- Large 5 Digit Sunlight Readable LCD
- 0.00° to 359.99° Range
- $\pm 0.03^\circ$ Degree Accuracy
- 47 to 440Hz Reference frequency Range
- 20 to 130V Reference Voltage Range
- 11.8V L-L or 90V L-L Stator Inputs
- No Reference or Stator Loading
- Synthesized Reference

APPLICATIONS:

- Synchro Zeroing
- Field Testing
- Troubleshooting
- Synchro System Alignment

DESCRIPTION

The DSM-5 is the industries first 5 digit hand-held digital synchro meter. This synchro meter allows the user to conveniently align and checkout synchro systems on the assembly line or in the field. The meter comes complete with rugged carrying case, test leads and battery.

The meter is designed to measure and accurately display the output angle of the most common synchros. The DSM-5 accepts reference inputs of 20-130VRMS at 47-440Hz. Stator inputs of either 11.8V L-L or 90V L-L are accepted via switch selection.

A large sunlight readable LCD display is used to read the synchro angle over a range of 0.00° to 359.99° to an accuracy of 0.03°. The display features a low battery indicator that minimizes the possibility of any false readings.

The DSM-5 uses a ratiometric conversion technique and employs a type II tracking loop with a synthesized reference that insures high noise immunity and flicker free operation. High stator input impedances virtually eliminate loading effects on the synchro system under test.

OPERATING THE DSM-5

When the instrument is received, the battery is not installed. A 9V alkaline battery is found in a pouch in the carrying case. Follow the procedure below for installing or replacing the battery:

1. Place screwdriver blade into slot in the battery cover and pry open.
2. Remove battery strap and snap on new battery.
3. Place battery into battery compartment.
4. Replace battery cover.

When battery replacement is necessary, replace with either 9V alkaline or 9V lithium battery. The meter will operate for an average of 20 hours continuous using an alkaline battery or 40 hours continuous using a lithium battery. When the low battery indication (flashing colon) appears, there is approximately 20 minutes of battery life remaining.

OPERATING THE DSM-5

To connect the test leads to the DSM-5, insert the appropriate lead plug into the DSM-5 input jacks as indicated below:

TEST LEAD		DSM-5 INPUT JACK
MARKING	COLOR	MARKING
R1	RED	R1 (H)
R2	BLACK	R2 (C)
S1	BLUE	S1 (X)
S2	BLACK	S2 (Z)
S3	YELLOW	S3 (Y)

Connect the DSM-5 to a synchro as follows. Connect R1 and R2 leads to the corresponding rotor terminals R1, R2. Connect S1, S2 and S3 leads to the corresponding stator terminals S1, S2 and S3.

To turn on the DSM-5, set slide switch to either HI or LO range position depending on which stator voltage to be measured. LO position is used to measure 11.8V_{L-L} voltages, HI position is used to measure 90V_{L-L} voltages. The meter will not be damaged by the application of an over-voltage.

The meter does not contain an internal reference excitation supply, therefore the synchro rotor voltage (R1-R2) must be supplied from an external excitation source.

THEORY OF OPERATION

The heart of the DSM-5 is a 16 bit synchro to digital converter. The reference input (R1-R2) and synchro stator (S1-S2-S3) signals are combined creating a synthesized reference signal that is in-phase with the stator signals. The synchro stator signals are converted to sine and cosine voltages via a solid state Scott-T circuit with high input impedance and is insensitive to voltage and frequency variations. The sine and cosine voltages are ratiometrically multiplied producing an error signal that is demodulated using the synthesized reference signal, allowing for up to $\pm 45^\circ$ of rotor to stator phase shift without any degradation of accuracy. The demodulated error signal is fed to an analog integrator, VCO and 16 bit binary up/down counter that is fed back to the sine/cosine multipliers creating a type II servo loop. The 16 bit binary angle is converted to a 5 decade BCD angle and displayed on a 5 digit LCD display.

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SPECIFICATIONS

Reference Input (R1-R2)

Voltage Range	20 to 130V _{RMS}
Frequency Range	47 to 440Hz
Input Impedance	800K Ω

Stator Input (S1-S2-S3) (Consult factory for custom voltages)

Voltage Select	Slide Switch
Voltage Input	
Lo Range	11.8V L-L $\pm 10\%$
Hi Range	90.0V L-L $\pm 10\%$
Impedance	450K Ω L-L
Rotor/Stator Phase Shift	$\pm 45^\circ$ max.

Display

Type	0.4 inch LCD, sunlight readable
Range	0.00 $^\circ$ to 359.99 $^\circ$
Resolution	0.01 $^\circ$
Accuracy	$\pm 0.03^\circ$
Lo Battery Indication	Flashing colon

Battery

Type	9V alkaline (supplied) or 9V lithium
Operating Life	20 hours (alkaline)

Temperature Range

Operating	0 $^\circ$ to +50 $^\circ$ C
Storage	-40 $^\circ$ to +85 $^\circ$ C

Humidity

80% RH non-condensing

Physical

Dimensions	6.0" x 3.12" x 0.81"
Weight	8.0 oz
Material	ABS plastic
Color	Yellow

ACCESSORIES

The DSM-5 comes complete with the following accessories:

- (1) Soft carrying case
- (2) Test leads
- (3) 9V alkaline battery

CALIBRATION

The DSM-5 comes calibrated with a Certificate of Conformance. It is recommended that the meter calibration be checked once per year. A Calibration Test Procedure will be furnished upon request. Meters may be returned to CSI, postage pre-paid, for calibration and certification at a nominal charge. The meter contains no user adjustment controls. If the meter is found to be out of calibration, it must be returned to CSI, postage pre-paid, for servicing.

WARRANTY

All units warranted against defects in materials and workmanship for 1 year from date of shipment. Liability is expressly limited to servicing, adjusting, or replacing any CSI product returned to our factory with delivery charges prepaid. In no case shall our liability exceed the original purchase price.