ABC RIPPLE/NOISE MEASUREMENT KIT 219-0532

1. DESCRIPTION

Kepco Kit 219-0532 provides a low-noise cable and scope probe adapter used to measure ripple and noise, respectively, of ABC Series power supplies. The guidelines provided in this instructions sheet supplement the procedures found in the ABC Service Manual for Ripple Measurement and Noise Measurement. These guidelines help the user to replicate the methods used by Kepco to measure ripple and noise of ABC power supplies. This procedure should only be performed after the unit has been fully calibrated and passed all other performance tests specified in the applicable ABC Service Manual.

2. MATERIAL REQUIRED (SEE TABLE 1.)

TABLE 1. MATERIAL REQUIRED

MATERIAL	KEPCO PART NUMBER	LOCATION	QUANTITY
• Ripple Measurement Cable	25422	Provided in this Kit	1
• Noise Measurement Scope Probe Adapter	25423	Provided in this Kit	1
• 60MHz Oscilloscope, Tektronix 2215A [1]	n/a	Not supplied	1
• Tektronix Passive Probe Model P6109B (10X 100MHz)[1]	n/a	Not supplied	1
• Instruction Sheet	228-1642	Provided in this Kit	1

1. Kepco strongly recommends using the models specified to ensure measurements are equivalent to those made at the factory. The user is encouraged to contact Kepco Applications Engineeringfor guidance on the use of equivalents.

3. MEASUREMENT GUIDELINES

1. The ABC Unit Under Test (UUT) must be fully calibrated and have passed all other performance tests as detailed in the applicable ABC Service Manual.

2. Follow the steps for Noise Measurement contained in the ABC Service Manual except as noted below

   a. All connections must be made at the rear panel.

   b. Use oscilloscope and probe listed in Table 1. Set oscilloscope bandwidth to 60MHz.

   c. When making source and switching frequency ripple measurements, connect the Ripple Measurement Cable, Kepco Model No. 25422, directly between the oscilloscope and the UUT.

   d. When making spike noise measurements, first install Kepco Scope Probe Adapter Model No. 25423 directly to the rear terminals of the UUT, then connect the scope probe to the probe jack on the adapter having first removed the probe end cap and ground lead (see Figure 6-3 of the ABC Service Manual).

3. Make separate measurements for low frequency (2 x source frequency) ripple, switching frequency ripple and noise (commutation spikes).

   a. Table 2 lists the maximum specified value for A: 2 X Source Frequency Ripple, B: Switching Frequency Ripple, and C: Spike Noise.

   b. Table 2 also lists a corresponding model-specific illustration with oscillosgraphs of the three measurements that show how the measured values appear on the oscilloscope.

   c. Each illustration is accompanied by specific horizontal and vertical settings for the oscilloscope.

TABLE 2. RIPPLE AND NOISE SPECIFICATIONS

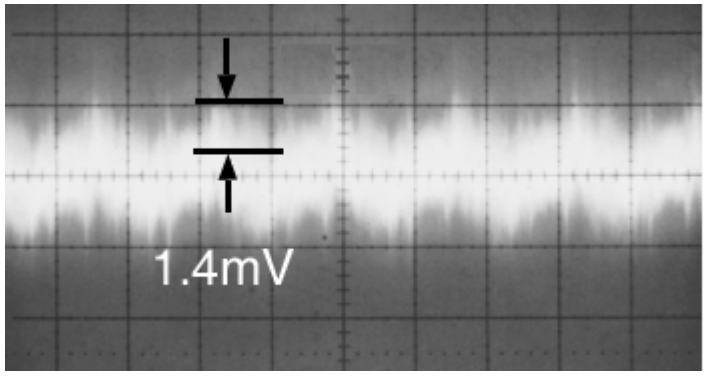
Model	Measurement Figure	Maximum Specification Values		
		2× Source frequency (See Detail A of Measurement Figure	Switching frequency See Detail B of Measurement Figure	Spike (50MHz) See Detail C of Measurement Figure
ABC 10-10 DM	See Figure 1.	4 mVp-p max	5 mVp-p max	20 mVp-p max
ABC 15-7 DM	See Figure 2.	7 mVp-p max	8 mVp-p max	20 mVp-p max
ABC 25-4 DM	See Figure 3.	10 mVp-p max	10 mVp-p max	20 mVp-p max
ABC 36-3 DM	See Figure 4.	15 mVp-p max	15 mVp-p max	20 mVp-p max
ABC 60-2DM	See Figure 5.	24 mVp-p max	24 mVp-p max	24 mVp-p max
ABC 125-1 DM	See Figure 6.	50 mVp-p max	50 mVp-p max	50 mVp-p

ABC 10-10DM

A

2 × SOURCE FREQUENCY
RIPPLE: 1.4mVP-P

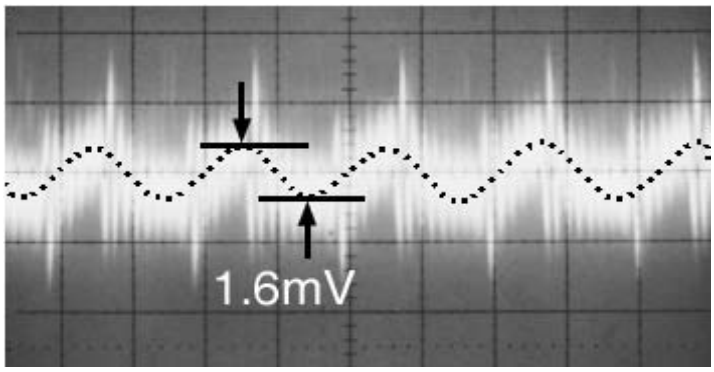
VERTICAL 2 mV/DIV
HORIZONTAL 5 mS/DIV



B

SWITCHING FREQUENCY
RIPPLE: 1.6mVP-P

VERTICAL 2 mV/DIV
HORIZONTAL 5 µS/DIV



C

SPIKE NOISE
14mVP-P

VERTICAL 20 mV/DIV
HORIZONTAL 2 µS/DIV
(Scope set to 2 mV/DIV)

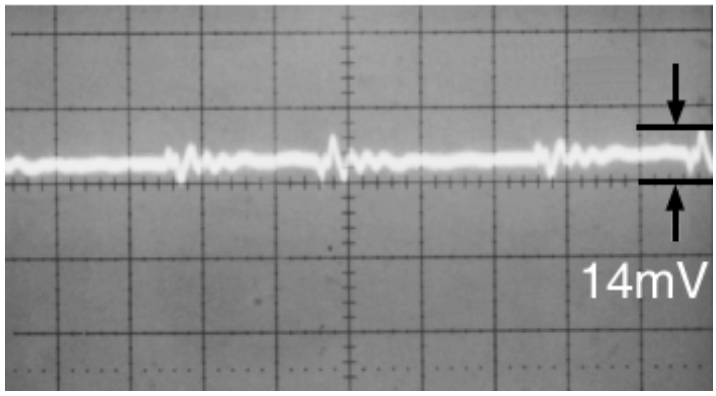


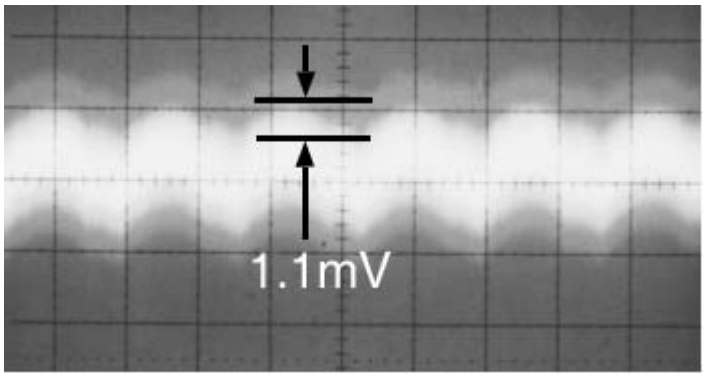
FIGURE 1. ABC 10-10DM MEASUREMENT DATA

ABC 15-7DM

A

2 × SOURCE FREQUENCY
RIPPLE: 1.1mVP-P

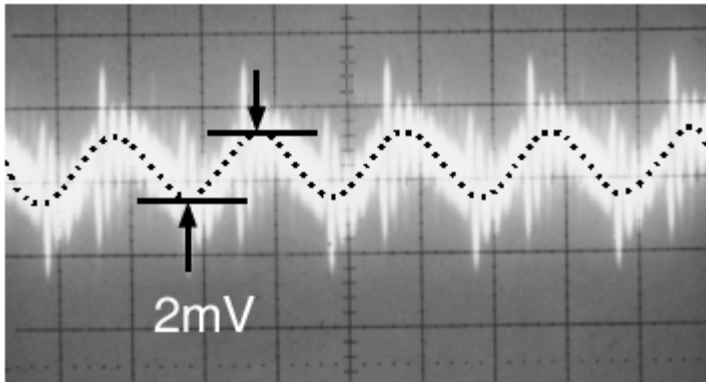
VERTICAL 2 mV/DIV
HORIZONTAL 5 mS/DIV



B

SWITCHING FREQUENCY
RIPPLE: 2mVP-P

VERTICAL 2 mV/DIV
HORIZONTAL 5 µS/DIV



C

SPIKE NOISE
15mVP-P

VERTICAL 20 mV/DIV
HORIZONTAL 2 µS/DIV
(Scope set to 2 mV/DIV)

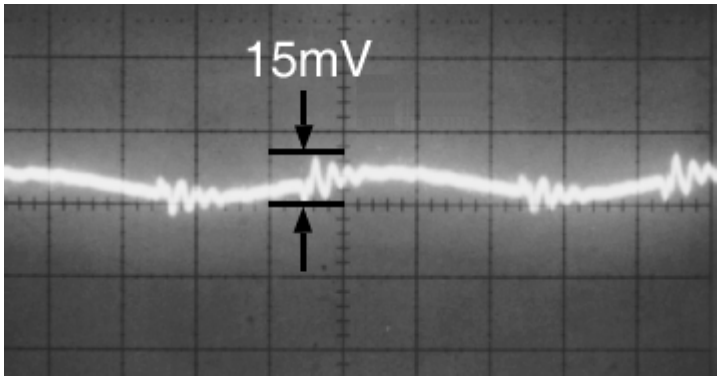


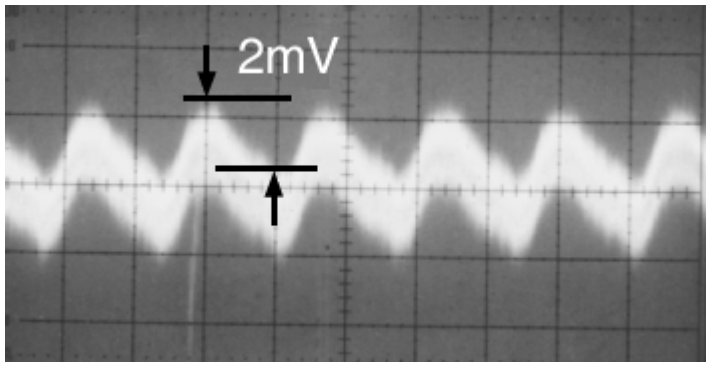
FIGURE 2. ABC 15-7DM MEASUREMENT DATA

ABC 25-4DM

A

2 × SOURCE FREQUENCY
RIPPLE: 2mVP-P

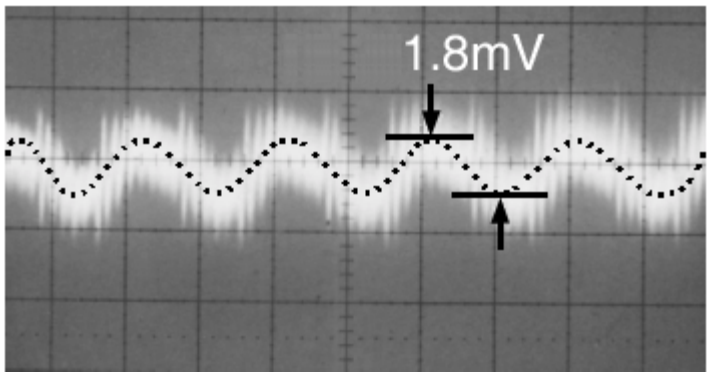
VERTICAL 2 mV/DIV
HORIZONTAL 5 mS/DIV



B

SWITCHING FREQUENCY
RIPPLE: 1.8mVP-P

VERTICAL 2 mV/DIV
HORIZONTAL 5 µS/DIV



C

SPIKE NOISE
12mVP-P

VERTICAL 20 mV/DIV
HORIZONTAL 2 µS/DIV
(Scope set to 2 mV/DIV)

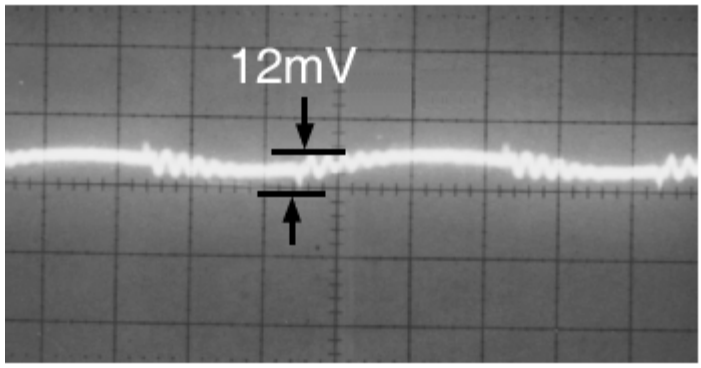


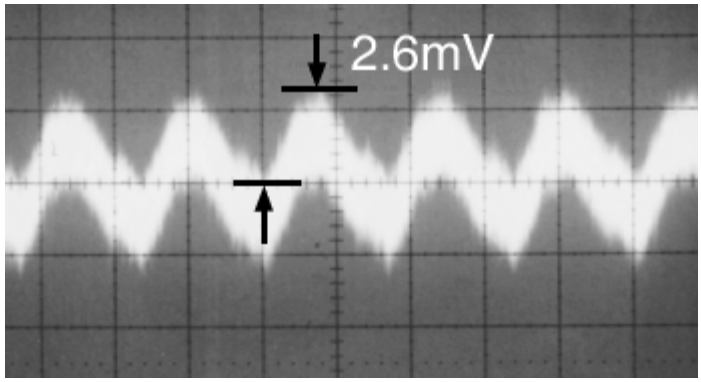
FIGURE 3. ABC 25-4DM MEASUREMENT DATA

ABC 36-3DM

A

2 × SOURCE FREQUENCY
RIPPLE: 2.6mVP-P

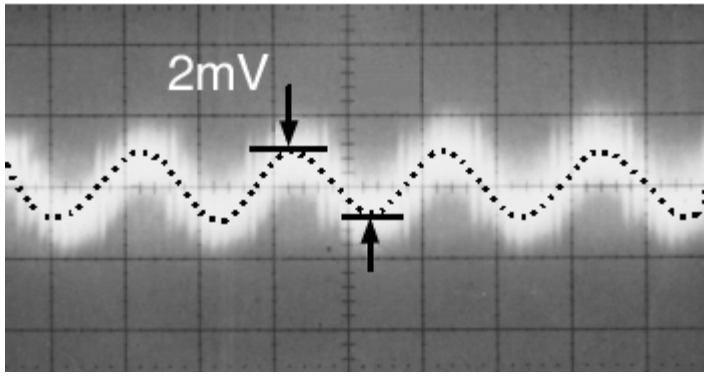
VERTICAL 2 mV/DIV
HORIZONTAL 5 mS/DIV



B

SWITCHING FREQUENCY
RIPPLE: 2mVP-P

VERTICAL 2 mV/DIV
HORIZONTAL 5 µS/DIV



C

SPIKE NOISE
13mVP-P

VERTICAL 20 mV/DIV
HORIZONTAL 2 µS/DIV
(Scope set to 2 mV/DIV)

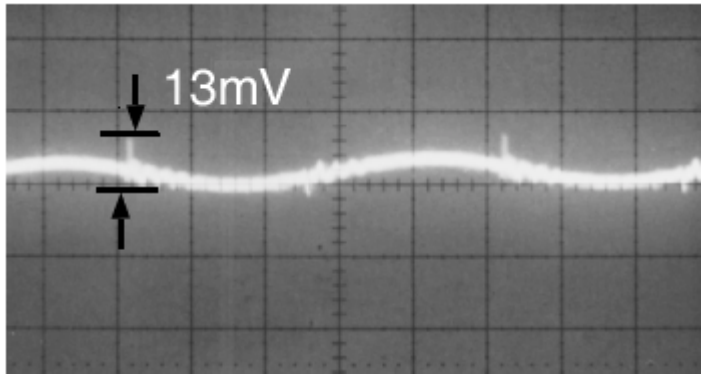


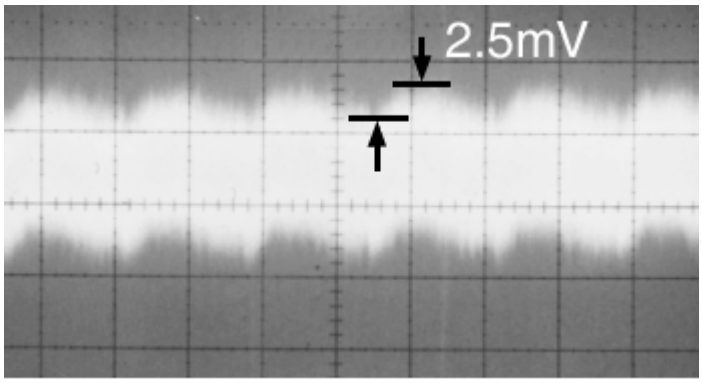
FIGURE 4. ABC 36-3DM MEASUREMENT DATA

ABC 60-2DM

A

2 × SOURCE FREQUENCY
RIPPLE:2.5 mVP-P

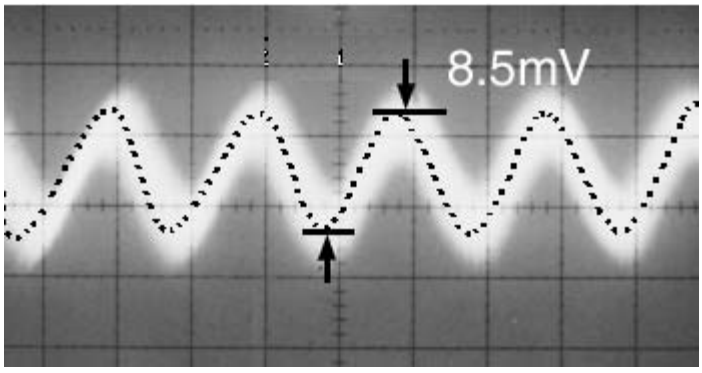
VERTICAL 5 mV/DIV
HORIZONTAL 5 mS/DIV



B

SWITCHING FREQUENCY
RIPPLE:8.5 mVP-P

VERTICAL 5 mV/DIV
HORIZONTAL 5 µS/DIV



C

SPIKE NOISE
10mVP-P

VERTICAL 20 mV/DIV
HORIZONTAL 2 µS/DIV
(Scope set to 2 mV/DIV)

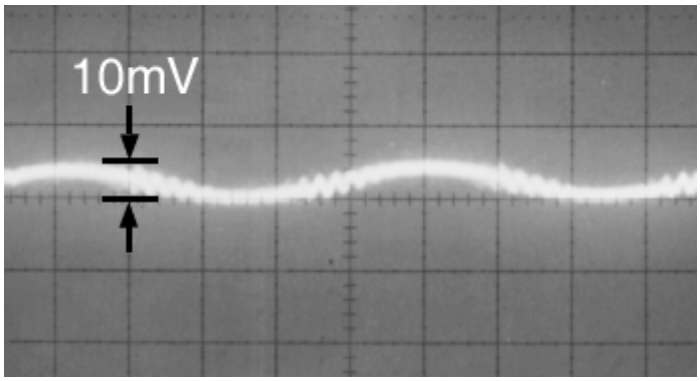


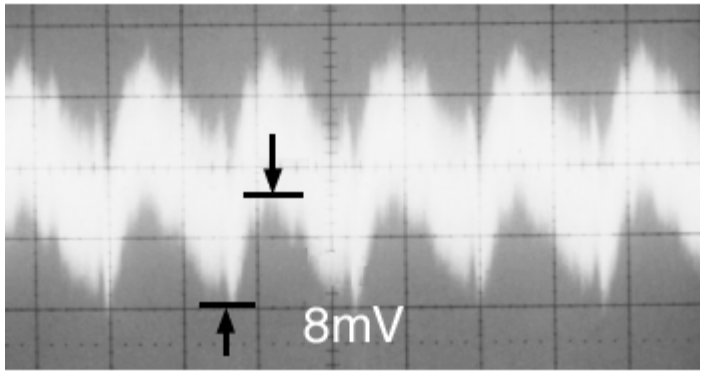
FIGURE 5. ABC 60-2DM MEASUREMENT DATA

ABC 125-1DM

A

2 × SOURCE FREQUENCY
RIPPLE: 8mVP-P

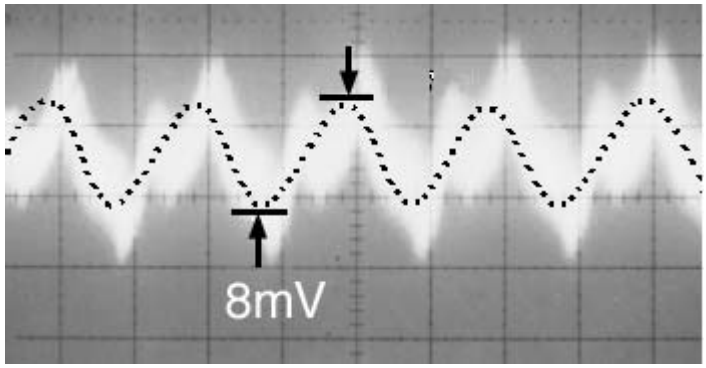
VERTICAL 5 mV/DIV
HORIZONTAL 5 mS/DIV



B

SWITCHING FREQUENCY
RIPPLE: 8mVP-P

VERTICAL 5 mV/DIV
HORIZONTAL 5 µS/DIV



C

SPIKE NOISE
4mVP-P

VERTICAL 20 mV/DIV
HORIZONTAL 2 µS/DIV
(Scope set to 2 mV/DIV)

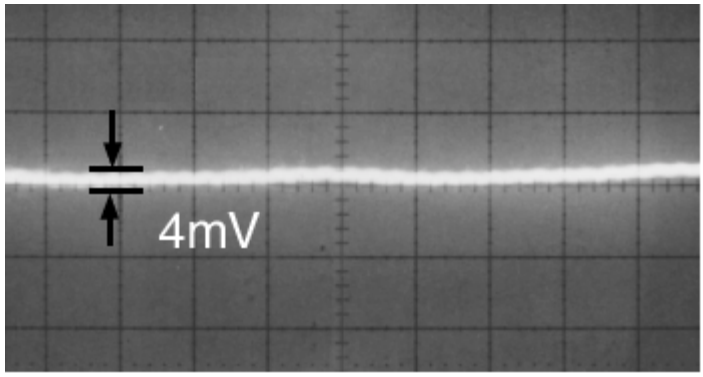


FIGURE 6. ABC 125-1DM MEASUREMENT DATA