

Fluke 125B/NA/S Considerations

This is not a full user review but rather contains miscellaneous lessons learned. It documents various problems which I have communicated to Fluke starting May 19, 2016. To that base of problems I have added other observations which might be of interest to a potential purchaser. So as you read this pdf please keep in mind that the content might switch between addressing questions/comments to Fluke and addressing comments to potential purchasers.

Some of the observations are related to deficiencies in the programming interface. Because those are of little interest to most folks, those are documented at the end of this pdf.

My overall recommendation is that each potential purchaser ensure that the 125B is functioning adequately now for what you need it to do now. The 125B has a lot of potential but not all of the instrument features and FlukeView 2 ScopeMeter (FV2) features work as advertised. Most of the screens and functionality work as one would expect but check below to determine if there is a problem with a feature which you intend to rely upon in the near future. In particular:

- o The VA, VAR, PF screen did not compute values for my test case and Fluke confirms that this is a known issue.
- o There is no TrendPlot capability and logging with FV2 is unreliable. Refer to the Logging section below.
- o Neither I nor Fluke Support knows where the DPF functionality is.

Take all of this with a grain of salt. There could be something I misunderstood or misinterpreted. There might be problems I haven't encountered/recognized.

My problem reports to Fluke have reportedly been turned over to the 120B-series development team but as June 28, 2016 I have received no communication from the development team. And as of June 28, 2016 I have been unable to locate any 125B firmware updates or FlukeView 2 ScopeMeter updates ([FV2 1.0](#) is available for download but it appears to be that same version as the CD/DVD).

Ed Elliott

Software Versions

125B firmware: 1.00.03

FlukeView 2 ScopeMeter (FV2): 1.0.0.0

Fluke Connect iOS app: 1.45

What's Included

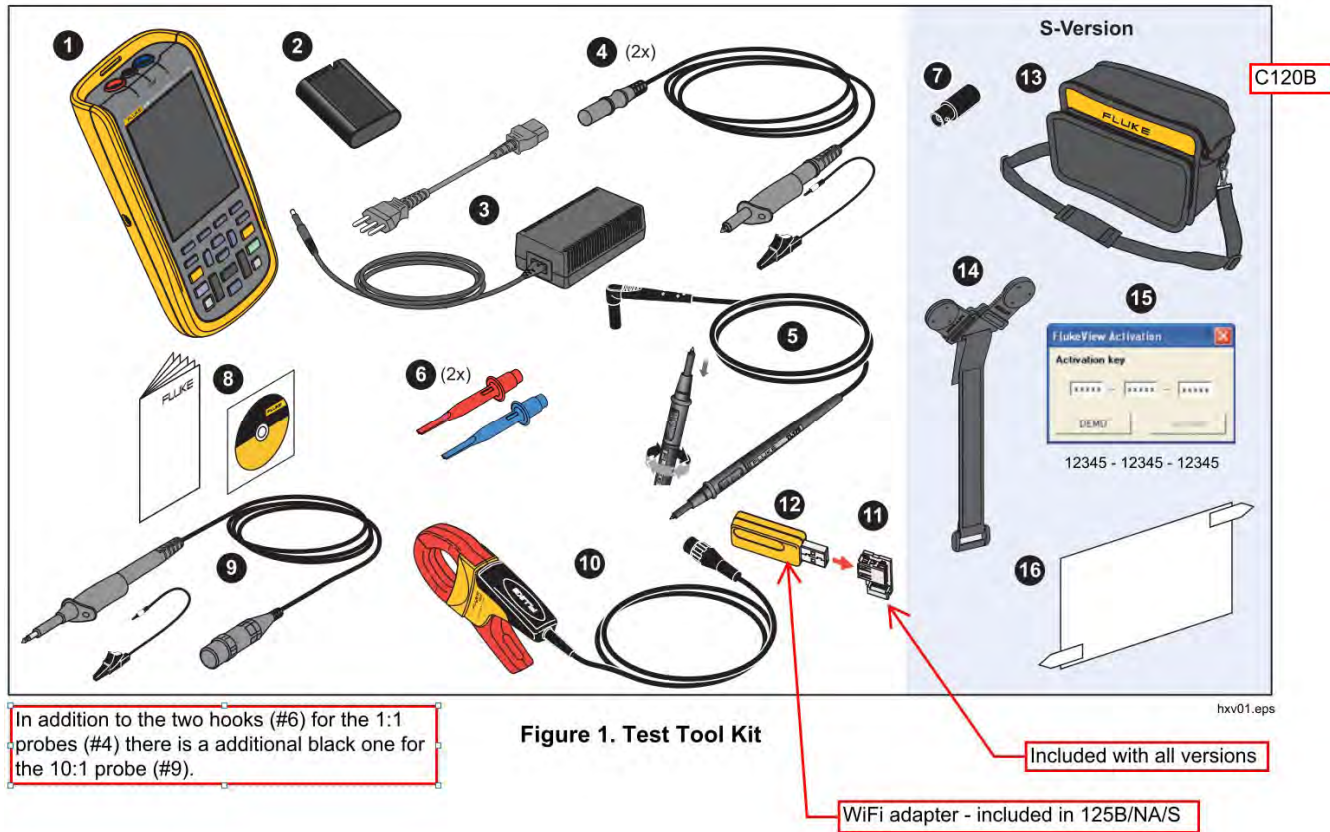
Test Tool Kit Contents

Table 2 is a list of the items included in your Test Tool kit.
Also see Figure 1.

Table 2. Packing List

Item	Description	12x-B	12x-B/S
1	Fluke Test Tool	123B, 124B or 125B	123B/S, 124B/S or 125B/S
2	Rechargeable Li-ion Battery Pack	•	•
3	Switch Mode Power Supply, Adapter/Battery Charger	•	•
4	Shielded Test Leads with Black Ground Leads	•	•
5	Test Lead Black (for Grounding)	•	•
6	Hook Clips (red, blue)	•	•
7	Banana-to-BNC Adapters (black)	• (x1)	• (x2)
8	Safety Information + CD-ROM with Users Manuals	•	•
9	10:1 Voltage Probe	124B, 125B	124B/S, 125B/S
10	i400s AC Current Clamp	125B	125B
11	USB Angled Adapter	•	•
12	WiFi USB Adapter	depends on version included in 125B/NA/S	
13	Soft Carrying Case		•
14	Magnetic Hanger		•
15	FlukeView [®] ScopeMeter [®] Software for Windows [®]		•
16	Screen Protector		•
	OC4USB Optical Cable	optional	optional

Fluke 125B/NA/S Considerations



o Wi-Fi adapter: As its name implies, it communicates via Wi-Fi rather than Bluetooth like most FC-capable instruments.

o The Wi-Fi adapter which came with my 125B/NA/S is the D-Link DWA-131 (UPC = 7 90069 32884 8; H/W Ver = E1; F/W Ver = 5.01).

o The accessories are the usual high quality one expects from Fluke.

o The AC adapter seems unnecessarily bulky. It weighs much less than one would expect given its size.

o The C120B soft case is very nice and has four interior compartments in addition to the side pouch which can be seen in the image above. Plenty of room for everything in the 125B/NA/S kit.

Fluke 125B/NA/S Considerations

o Documentation

- o The included CD contains the user manual pdf in various languages. It can also be downloaded (at least the English version) from Fluke.
- o On the CD is also a pdf for the details of BusHealth (aka FieldBus). That pdf seems to be identical (or close) to the documentation at the end of the original 120 series user manual. The 120B user manual pdf states (pdf p. 52) that this BusHealth/FieldBus data is in Appendix A but there is no Appendix A in the 120B user manual pdf itself.
- o If you are looking for a definition of terms the best starting point is probably the 43B Applications Guide pdf. The 43B Applications Guide is also a useful reference for how to set up various measurement scenarios.

o I bought the 125B/NA/S because I was looking for a portable replacement for my 196B ScopeMeter (still works great). I wanted a higher resolution color display in a somewhat smaller package. And Power Quality and Harmonics functionality. And a lithium battery. I considered the Keysight, Tek, and Chinese offerings but all came up short in one way or another (the lack of programming interface documentation being one of my concerns). The 125B display is perfect and I'm hopeful that Fluke will resolve the issues documented in this pdf.

Logging

o The Fluke Connect iOS app only sees 125B screen images, which are automatically refreshed. The user can request capture and save of a screen image. The app does not support logging 125B measurement data either standalone or in conjunction with other FC-capable instruments. This is contrary to my interpretation of the claims in the 120B datasheet:

and share. Compare and contrast test point measurement data and trends so you can better understand signal characteristics and changes over time. And, by storing

o FV2 theoretically supports logging but the present version is not reliable. Details below. FV2 is limited to a max of two data elements via Wi-Fi and four data elements via the OC4USB.

o FV2 does not presently support FFT analysis (unlike the original FlukeView for ScopeMeter software).

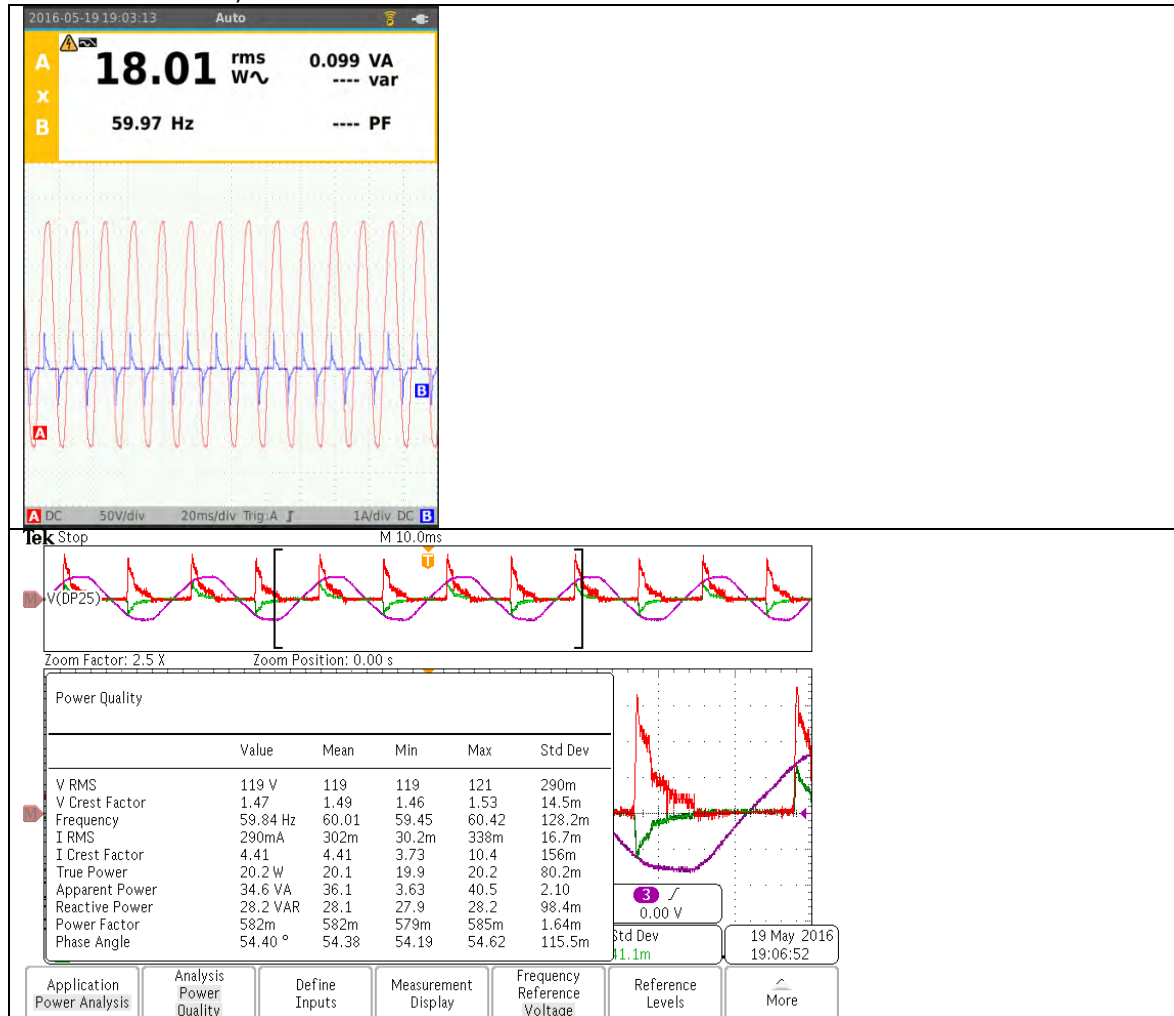
o FlukeView for ScopeMeter was due for a refresh and FV2 looks like a step in the right direction. Although you can still save to a file (.fv2, .bmp, .csv) FV2 has its own database (SQL-based I think) where you can specify some attributes such as equipment description and measurement/test description. I haven't used the database yet.

Fluke 125B/NA/S Considerations

- o If you have a SW90W (original FlukeView for ScopeMeter for 190 and 120 series) license, FV5.4 reliably logs up to four data elements, two for Channel A and two for Channel B. You will need an OC4USB cable. Or the PM9080 cable will work if you already have one. My PM9080 version 1 cable works fine.
 - o RECORD on the 125B only supports recording in SCOPE/METER mode, not POWER HARMONICS mode. But FV5.4 can log in both modes.
 - o FV2 looks like it will also support this at some point but there are still bugs, e.g., FV2 did not recognize the units for the secondary measurements on Channel A and B.
 - o But FV5.4 cannot capture 125B screen images.
 - o But the 125B can be connected concurrently to FV5.4 via the OC4USB and to FV2 via Wi-Fi. Just make the OC4USB connection to FV5.4 first; otherwise FV2 will connect via the OC4USB at startup.
 - o If FV5.4 does not connect successfully using its default process, used Advanced settings to set the baud rate to 19200.
 - o Be careful to orient the optical connection correctly. The 125B has the optical LED's toward the rear whereas the 196B has the optical LED's toward the front. Based upon years of experience with the 196B I was accustomed to the Fluke label facing a certain direction but this resulted in the PM9080 being 180° out of alignment on the 125B.
- o FlukeView Forms (came with the 289 kit) does not support the 125B via the pc3000FC (or the OC4USB).
 - o Why bother to test this? Version 3.8.0003 of FV Forms is supposed to support most 3000FC-type Fluke Connect instruments. A pc3000FC is required.
- o sw3000FC. Device detection does not discover the 125B.
- o TrendPlot. The 120B series datasheet does not mention TrendPlot for good reason – it's not supported. But those experienced with the original 120 series or with the 190 series might expect the 125B to support TrendPlot. Even the much-less-expensive 289 has similar logging capabilities. And each product's corresponding FlukeView version supports retrieval of the saved TrendPlot memories (two TrendPlot measurement memories on the 196B, for example). But with the 125B, you will have to log to a PC if you want a permanent record of TrendPlot-style Meter measurements, e.g., volts and amps over an extended period (e.g., minutes, hours, days). Until FV2 is fixed, my preferred logging solution is FV5.4 via the OC4USB.

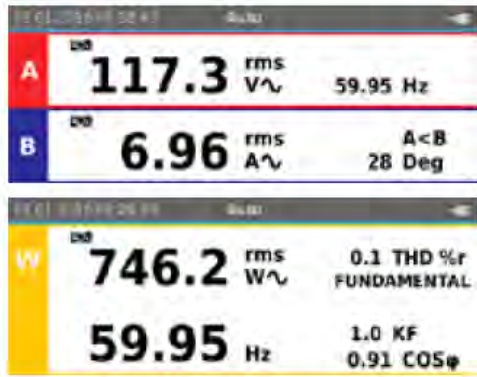
Functionality Problems Reported to Fluke (as opposed to Programming Interface Problems)

o Why can't the 125B calc VA, VAR, and PF when measuring a 40W (or 100W) compact fluorescent? The results from the Tek MDO3014 are shown below. The voltage inputs are in parallel but I had to use my second i400s for current because hooking the i400s in parallel to both scopes caused a flakey waveform on the 125B (but not the MDO3014).



Fluke's response: this is a known issue.

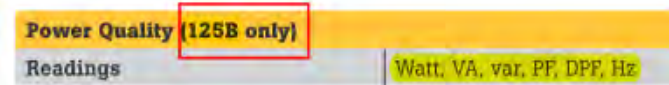
o Where is the Displacement Power Factor (DPF)?



Industrial equipment needs a reliable power supply to operate properly, use the dual input to obtain key power measurements.

For single phase or 3-phase balanced systems, the dual inputs of the Industrial ScopeMeter® 120B Series can measure ac+dc rms voltage on channel A and ac+dc rms current on channel B. The Fluke 125B can then calculate; frequency, phase angle, active power (kW), reactive power (VA or var), power factor (PF) or displacement power factor (DPF) and can also calculate the power values for a 3-phase system where all phases have equal voltage and currents. This applies to both balanced system and resistive loads.

Easily obtain key power characteristics to validate a system power.



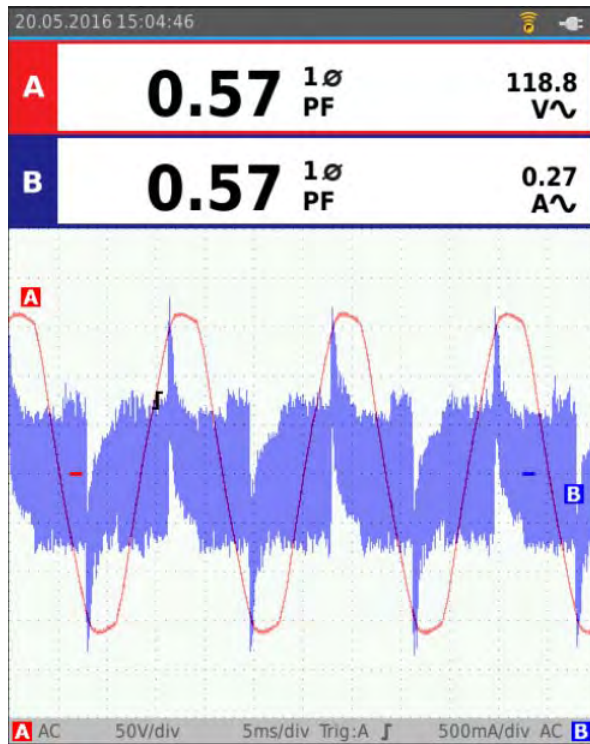
Fluke's response: this is a known issue.

o Is there an indicator for current lags/leads voltage? Like the inductor and capacitor symbols on the 43B.

Fluke's response: There is currently no lead/lag indicator

That feature was not in the spec or user manual but I thought it worth asking the question.

o Bug: The 125B crashes when Smoothing is enabled and FlukeView 2 ScopeMeter attempts to communicate. My previous attempt to grab the screen below over Wi-Fi using FlukeView 2 Scopemeter caused the 125B to crash then reboot. The image with Smoothing disabled...



This happened again on a Scope/Meter screen measuring VA for A and VAR for B. Smoothing was enabled.

o Bug: The 125B will crash while RECORD is recording and FV2 > Open > From Instrument > Active is requested.

(This comment was buried in the programming section but I put a copy here so those not interested in the programming interface would be aware.)

o Bug: The easy reset process (Hold MENU > Press and release Power > Release MENU) resets the date format.

o FlukeView 2 ScopeMeter Version 1.0.0.0

o Bug/design: Logging sometimes gets stuck on "Initializing" with no way to cancel other than Exiting the entire application. It happened a couple times but I can't recall/recreate the scenario.

o Bugs: When logging readings for both Channel A and Channel B, i.e., Log > Readings ...

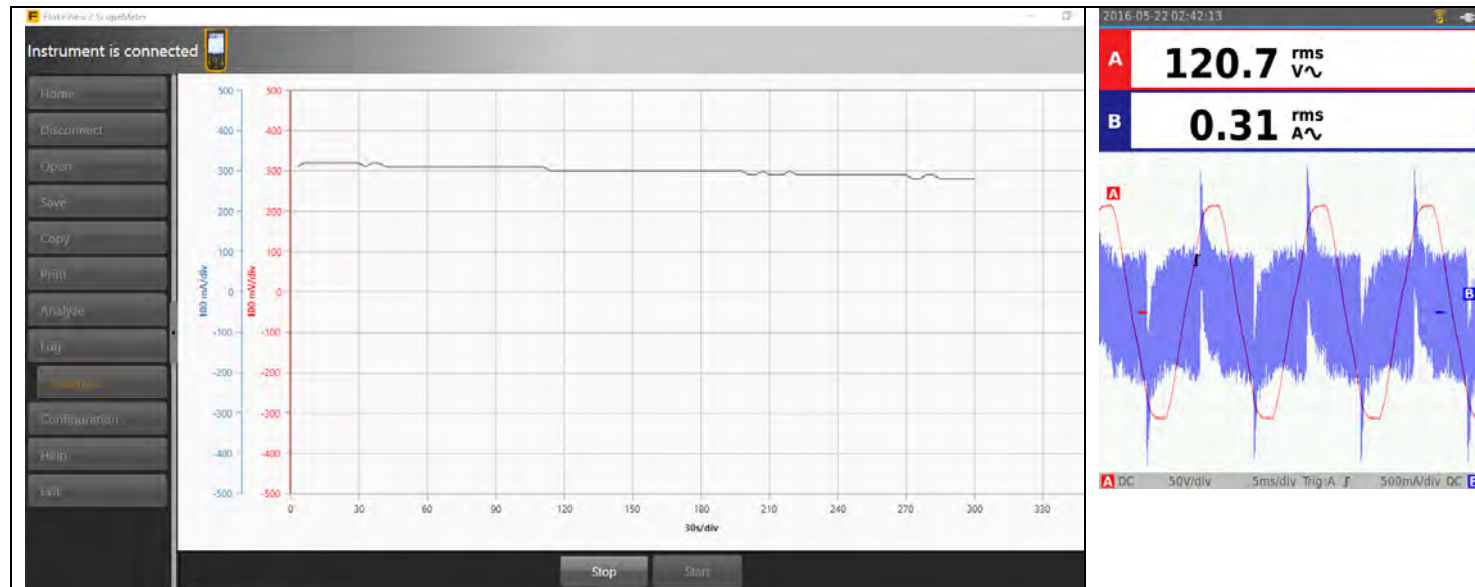
Fluke 125B/NA/S Considerations

- (1) The Channel A readings are overlaid with the values (but not units) from Channel B,
- (2) 0.0 values are erroneously recorded for a temporary period for both channels, and
- (3) the logging display stops updating but later resumes.

o The chronological progression...

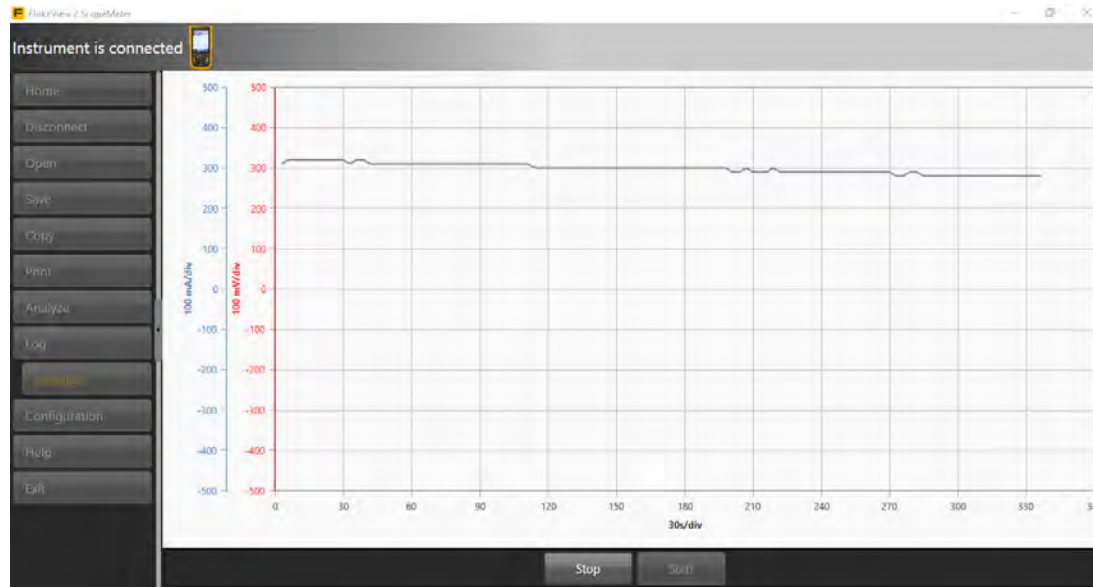
o The color is gray not red or blue (which, it turns out, means that the channels are overlaying each other).

o The 300 mV is not in the ballpark of the Channel A (120V) but 300 mA is reasonable for Channel B..



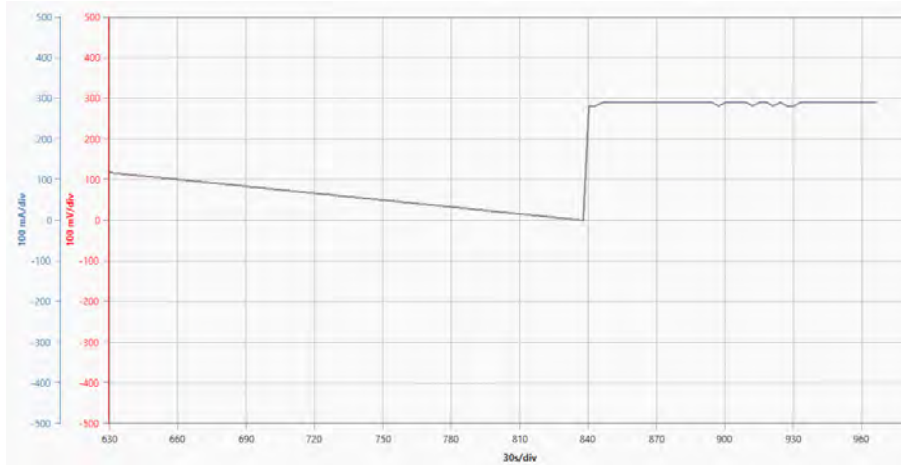
Fluke 125B/NA/S Considerations

- o The logging appeared to hang at about 340 seconds (in another test this happened around 90 seconds) ...

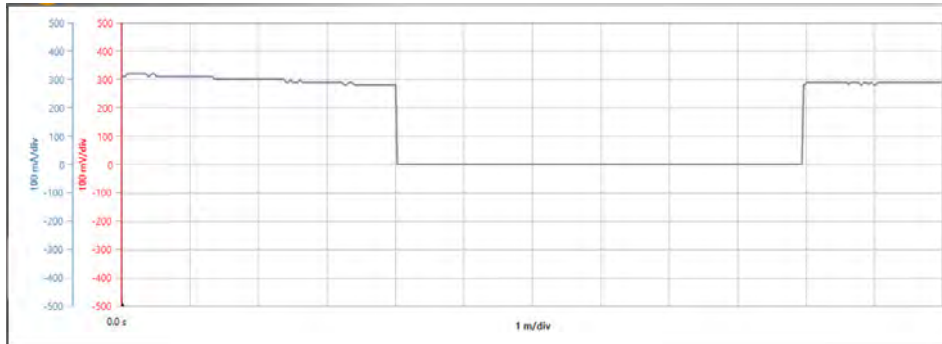


Fluke 125B/NA/S Considerations

... but was actually proceeding. What are we measuring???

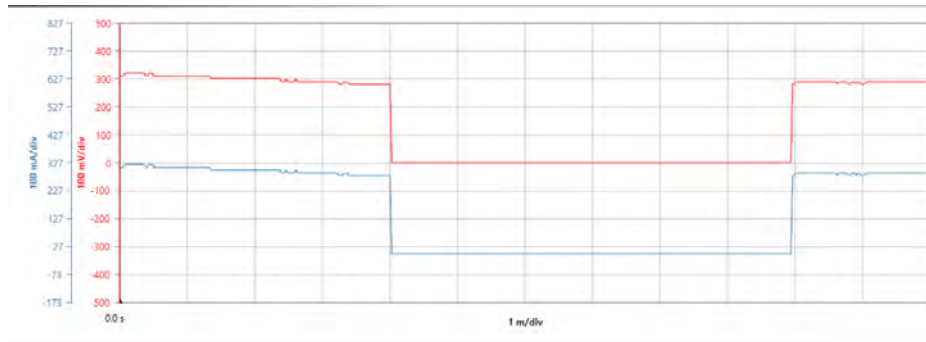


It's not possible to navigate while logging (e.g., what happened prior to 630 seconds?) so I stopped the logging, which leaves this result:



Fluke 125B/NA/S Considerations

By dragging the scales on the left it's possible to separate the channels...



Note that during the entire logging session Channel A was around 120 V and Channel B was around 0.3 A. It seems that the Channel B reading is being used for both channels while the unit (V vs A) is correct for each channel.

And why the temporary drop from 0.3 to 0.0? Lost communication? If data points are missing there should be no data points graphed during that period (just like the old FlukeView would do).

o RECORD

o There appears to be no way to save a RECORD session to memory on the 125B or to retrieve it with FlukeView 2 ScopeMeter. Only the last RECORDER session is available. That last session might be either a Meter Recording or a Scope Recording; there is only one not one of each. I am surprised and disappointed that saving is not supported. My expectations were based upon (a) my 196B which has two permanent TrendPlot memories (which can be retrieved by SW90W) and one Scope Record memory and (b) my 289 which can save multiple recordings on the instrument and those memories can be retrieved by FlukeView Forms.

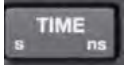
o "Save" is grayed out after pressing MENU while in RECORDER mode. Is this by design?

o "Save" is grayed after pressing MENU in POWER HARMONICS mode. . Is this by design?

But I must confess that for the 196B I use FlukeView-controlled logging directly to the PC rather than saving TrendPlot's on the 196 then retrieving them in FlukeView. But it would be nice to have the standalone capability in case the PC is not available/convenient/safe. Still, if FlukeView 2 ScopeMeter logging worked reliably (it does not), I could live with that alone. Particularly if FlukeView 2 ScopeMeter supported Spectrum analysis as does FlukeView ScopeMeter.

o The design makes it unnecessarily tedious to zoom in on an area of interest. (continued on next page)

(The following points which I make are still valid but after sending this to Fluke I concluded that the workaround is to stay in Normal view, use

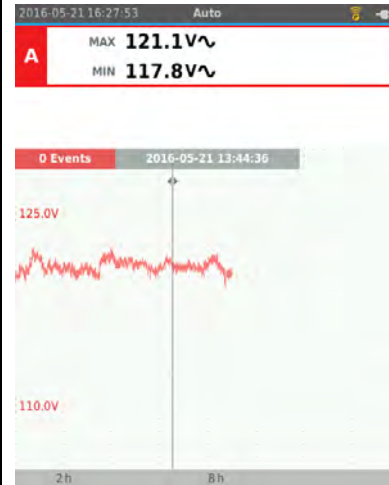
the  button to adjust the scale, and use the cursor keys to navigate.)

Fluke 125B/NA/S Considerations

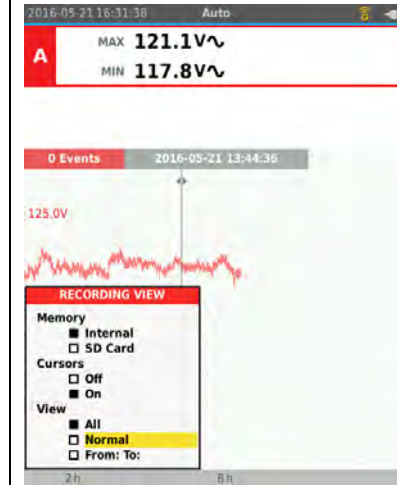
Let's examine that Min. Presently the View = All so the plan is to position the Cursor over the Min then switch to View = Normal to zoom in.



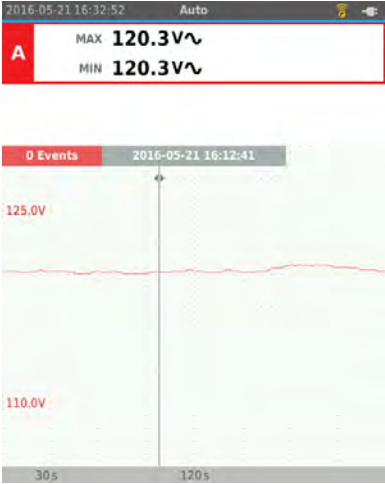
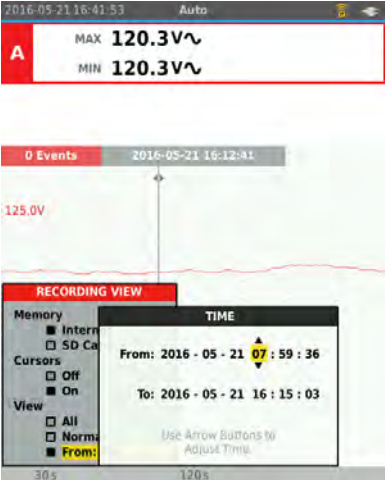
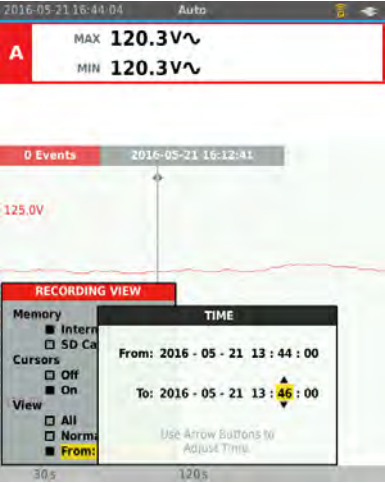
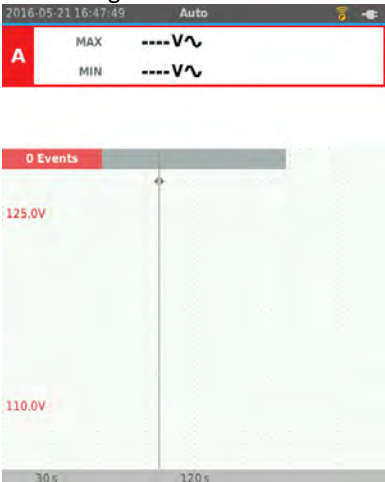
So we position the Cursor over the Min at 13:44:36.



We attempt to zoom in by using View > View = Normal.

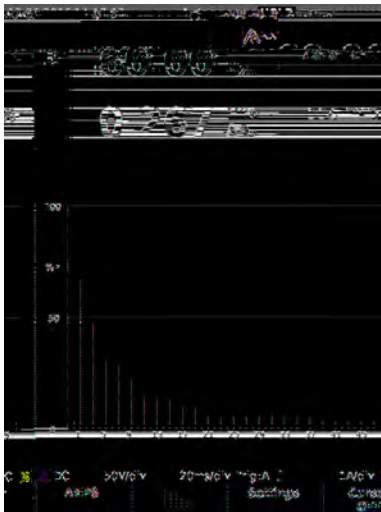


Fluke 125B/NA/S Considerations

<p>Whoops. The Normal view has its own Cursor with its own date/time so we're zoomed in at 16:12:41 rather than 13:44:36.</p> 	<p>So maybe we can use the View = From: To:. It's tedious compounded by the fact the scrolling the seconds field (59->00 or 00->59) will change the minutes and similarly scrolling the minutes will change the hour (unlike most other UI's these days).</p> 	<p>Did you remember to write down that 13:44:36? So we've set a time range which we think might work.</p> 
<p>After all of this unnecessarily complicated effort we get... ????</p> 	<p>A friendlier UI, for example, might use the up/down arrow buttons (they are available) to zoom in/out while keeping the Cursor at the same date/time.</p>	

Fluke 125B/NA/S Considerations

- o Bug: Cycling the 125B power off/on resets Power Harmonics settings to %r and FUNDAMENTAL.
 - o Even a reset leaves these settings unchanged, which is probably the behavior preferred by most users.
- o Disappointment: FV2 communication via the OC4USB seems slow.
 - o FV2 sets the speed to 19200 rather than 57600. Even my old 196B works fine at 38400; the 289 at 115200.
- o Disappointment: 125B does not support 57600 baud.
 - o "PC 57600" command is rejected. "PC 38400" works. OC4USB Rev II.
- o Bug: FV2 Open > From Instrument > Active via OC4USB sometimes captures the screen like this:



- o When this occurs it is usually the first capture after starting FV2.
- o I just encountered a different problem where FV2 would not connect with the 125B via OC4USB. Rebooting the 125B did not solve the problem. Rebooting the PC did not solve the problem. Doing a reset of the 125B resolved the problem.

Programming Interface Issues Communicated to Fluke (as opposed to functionality issues, which most folks are more likely to care about)

(In this section are some screen grabs of Excel. The custom Ribbon buttons which appear in those screen grabs are part of my custom programming for Excel 2007 and Word 2007. This custom program started off as a simple insertion of the volt and/or amp readings from some of my instruments and has grown more sophisticated over time.)

o Is a programming manual available? Presently I'm using the programming manual from the old 120 series but am not sure how accurate it is. Also, it does not document how to query harmonics. ~~For the 43B this would be the QH command but the 125B seems to be expecting different parameters.~~ (Further programming and testing showed that the 125B's QH command works as described in the 43B programming manual.)

Fluke's response: There is no programming manual, and the manual for the 120 series (and the 43B) is not accurate for the new 120B series.

- I managed to accomplish most of what I wanted through experimentation in conjunction with:
- o the original 120 series programming manual ,
 - o the QH (Query Harmonics) documentation in the 43B programming manual,
 - o my past experience programming the 190 series interface.

o Is an updated firmware available (presently V1.00.03)? Firmware bug: the WD (Write Date) command does not work. WT (Write Time) works correctly.



```
id
0
FLUKE 125B;default;;English,French,German,Dutch,Spanish,Portugese,Italian,Japane
se,Korean,Chinese
wd 2016,5,19
2
```

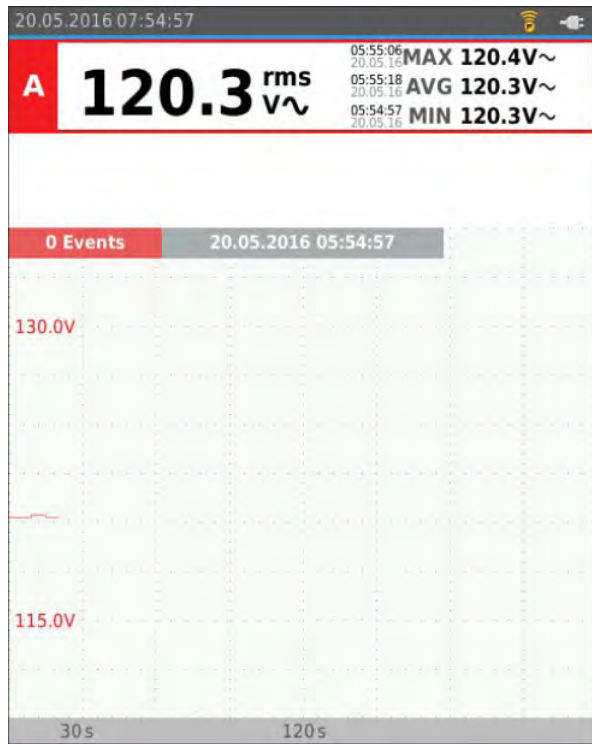
The '2' response means Execution Error.

Also, note that the firmware version and serial number are missing from the response to the ID command.

Fluke's response: no firmware update was available as of May 19, 2016.

o Most times the QM command (without parameters) will crash the 125B when on the RECORD screen reviewing a previous or stopped recording. The QM command is acknowledged ("0") as a valid command but there is no other response from the 125B. After 25 seconds the 125B goes black then reboots. This has the symptoms of an infinite loop which terminates when memory is exhausted. My SD card is 32GB if that makes a difference to the timing.

Fluke 125B/NA/S Considerations



The crash also occurs while Record is recording and FlukeView 2 ScopeMeter > Open > From Instrument > Active is requested.

However, my QM command while recording does not crash the 125B:

```
WriteCommandSucceeded(QM, 300)
Acknowledge(False, 300): buffer[0]=0x30 buffer[1]=0x0d
ReadResponse():
11, 1, 1, 1, 2, 4, 0. 1E+00, 12, 1, 1, 1, 1, 4, 0. 1E+00, 13, 1, 1, 1, 2, 4, 0. 1E+00, 14, 1, 1, 1, 2, 4, 0. 1E+00, 15, 1, 1, 1, 2, 4, 0. 1E+00, 16, 1, 1, 7, 0, 0. 1E+00,
17, 1, 1, 7, 0, 0. 1E+00, 18, 1, 1, 7, 0, 0. 1E+00, 21, 1, 2, 2, 2, 4, 0. 01E+00, 22, 0, 2, 0, 0, 0. 000E+03, 23, 1, 2, 2, 2, 4, 0. 01E+00, 24, 1, 2, 2, 2, 4, 0. 01E+00,
25, 1, 2, 2, 2, 4, 0. 01E+00, 26, 1, 2, 7, 0, 0, 0. 01E+00, 27, 1, 2, 7, 0, 0, 0. 01E+00, 28, 1, 2, 7, 0, 0, 0. 01E+00
GetReading() No[11] Valid[1] Source[1(FLUKE 125B: Channel A)] Unit[1(V)] Type[2(RMS (ac only))] Pres[4(Absolute(4))]
GetReading() No[12] Valid[1] Source[1(FLUKE 125B: Channel A)] Unit[1(V)] Type[1(dc)] Pres[4(Absolute(4))]
GetReading() No[13] Valid[1] Source[1(FLUKE 125B: Channel A)] Unit[1(V)] Type[2(RMS (ac only))] Pres[4(Absolute(4))]
GetReading() No[14] Valid[1] Source[1(FLUKE 125B: Channel A)] Unit[1(V)] Type[2(RMS (ac only))] Pres[4(Absolute(4))]
GetReading() No[15] Valid[1] Source[1(FLUKE 125B: Channel A)] Unit[1(V)] Type[2(RMS (ac only))] Pres[4(Absolute(4))]
GetReading() No[16] Valid[1] Source[1(FLUKE 125B: Channel A)] Unit[7(s)] Type[0(None)] Pres[0(Timestamp)]
GetReading() No[17] Valid[1] Source[1(FLUKE 125B: Channel A)] Unit[7(s)] Type[0(None)] Pres[0(Timestamp)]
GetReading() No[18] Valid[1] Source[1(FLUKE 125B: Channel A)] Unit[7(s)] Type[0(None)] Pres[0(Timestamp)]
GetReading() No[21] Valid[1] Source[2(FLUKE 125B: Channel B)] Unit[2(A)] Type[2(RMS (ac only))] Pres[4(Absolute(4))]
GetReading() No[22] Valid[0] Source[2(FLUKE 125B: Channel B)] Unit[0(None)] Type[0(None)] Pres[0(Timestamp)]
GetReading() No[23] Valid[1] Source[2(FLUKE 125B: Channel B)] Unit[2(A)] Type[2(RMS (ac only))] Pres[4(Absolute(4))]
```

Fluke 125B/NA/S Considerations

```
GetReading() No[24] Valid[1] Source[2(FLUKE 125B: Channel B)] Unit[2(A)] Type[2(RMS (ac only))] Pres[4(Absolute(4))]  
GetReading() No[25] Valid[1] Source[2(FLUKE 125B: Channel B)] Unit[2(A)] Type[2(RMS (ac only))] Pres[4(Absolute(4))]  
GetReading() No[26] Valid[1] Source[2(FLUKE 125B: Channel B)] Unit[7(s)] Type[0(None)] Pres[0(Timestamp)]  
GetReading() No[27] Valid[1] Source[2(FLUKE 125B: Channel B)] Unit[7(s)] Type[0(None)] Pres[0(Timestamp)]  
GetReading() No[28] Valid[1] Source[2(FLUKE 125B: Channel B)] Unit[7(s)] Type[0(None)] Pres[0(Timestamp)]  
WriteCommandSucceeded(QM 11, 200)  
Acknowledge(False, 200): buffer[0]=0x30 buffer[1]=0x0d  
ReadResponse(): 120.2E+00  
WriteCommandSucceeded(QM 12, 200)  
Acknowledge(False, 200): buffer[0]=0x30 buffer[1]=0x0d  
ReadResponse(): 0.1E+00  
WriteCommandSucceeded(QM 13, 200)  
Acknowledge(False, 200): buffer[0]=0x30 buffer[1]=0x0d  
ReadResponse(): 120.6E+00  
WriteCommandSucceeded(QM 14, 200)  
Acknowledge(False, 200): buffer[0]=0x30 buffer[1]=0x0d  
ReadResponse(): 120.2E+00  
WriteCommandSucceeded(QM 15, 200)  
Acknowledge(False, 200): buffer[0]=0x30 buffer[1]=0x0d  
ReadResponse(): 119.7E+00  
WriteCommandSucceeded(QM 16, 200)  
Acknowledge(False, 200): buffer[0]=0x30 buffer[1]=0x0d  
ReadResponse(): 958.8E+06  
WriteCommandSucceeded(QM 17, 200)  
Acknowledge(False, 200): buffer[0]=0x30 buffer[1]=0x0d  
ReadResponse(): 958.8E+06  
WriteCommandSucceeded(QM 18, 200)  
Acknowledge(False, 200): buffer[0]=0x30 buffer[1]=0x0d  
ReadResponse(): 958.8E+06  
WriteCommandSucceeded(QM 21, 200)  
Acknowledge(False, 200): buffer[0]=0x30 buffer[1]=0x0d  
ReadResponse(): 0.28E+00  
WriteCommandSucceeded(QM 23, 200)  
Acknowledge(False, 200): buffer[0]=0x30 buffer[1]=0x0d  
ReadResponse(): 0.28E+00  
WriteCommandSucceeded(QM 24, 200)  
Acknowledge(False, 200): buffer[0]=0x30 buffer[1]=0x0d  
ReadResponse(): 0.28E+00  
WriteCommandSucceeded(QM 25, 200)  
Acknowledge(False, 200): buffer[0]=0x30 buffer[1]=0x0d  
ReadResponse(): 0.27E+00  
WriteCommandSucceeded(QM 26, 200)  
Acknowledge(False, 200): buffer[0]=0x30 buffer[1]=0x0d  
ReadResponse(): 958.8E+06  
WriteCommandSucceeded(QM 27, 200)  
Acknowledge(False, 200): buffer[0]=0x30 buffer[1]=0x0d  
ReadResponse(): 958.8E+06  
WriteCommandSucceeded(QM 28, 200)  
Acknowledge(False, 200): buffer[0]=0x30 buffer[1]=0x0d  
ReadResponse(): 958.8E+06
```

The above translates to:

Fluke 125B/NA/S Considerations

<input type="checkbox"/> Only Primary values and units <input type="checkbox"/> All readings but minimal attributes <input checked="" type="checkbox"/> All readings and all attributes Settings						
Insert 125B Reading Fluke Insert 289 Reading Fluke Insert 196 Reading Fluke Insert U1461A Reading Keysight						
D24 fx						
	A	B	C	D	E	F
1	120.2 V		FLUKE 125B: Channel A	RMS (ac only)	Channel A Main	Absolute(4)
2	0.1 V		FLUKE 125B: Channel A	dc	Channel A Sub	Absolute(4)
3	120.6 V		FLUKE 125B: Channel A	RMS (ac only)	Channel A Max	Absolute(4)
4	120.2 V		FLUKE 125B: Channel A	RMS (ac only)	Channel A Avg	Absolute(4)
5	119.7 V		FLUKE 125B: Channel A	RMS (ac only)	Channel A Min	Absolute(4)
6	958800000 s		FLUKE 125B: Channel A	None	Channel A Max Timestamp 20000520 052000	Timestamp
7	958800000 s		FLUKE 125B: Channel A	None	Channel A Avg Timestamp 20000520 052000	Timestamp
8	958800000 s		FLUKE 125B: Channel A	None	Channel A Min Timestamp 20000520 052000	Timestamp
9	0.28 A		FLUKE 125B: Channel B	RMS (ac only)	Channel B Main	Absolute(4)
10	0.28 A		FLUKE 125B: Channel B	RMS (ac only)	Channel B Max	Absolute(4)
11	0.28 A		FLUKE 125B: Channel B	RMS (ac only)	Channel B Avg	Absolute(4)
12	0.27 A		FLUKE 125B: Channel B	RMS (ac only)	Channel B Min	Absolute(4)
13	958800000 s		FLUKE 125B: Channel B	None	Channel B Max Timestamp 20000520 052000	Timestamp
14	958800000 s		FLUKE 125B: Channel B	None	Channel B Avg Timestamp 20000520 052000	Timestamp
15	958800000 s		FLUKE 125B: Channel B	None	Channel B Min Timestamp 20000520 052000	Timestamp

Note the bug that all of the Timestamp values are the same.

- o There should be multiple values for A vs B and Max vs Avg vs Min (just like the 289).

- o If 958800000 is Unix time, the date/time is 20000520 052000. Because the current date is 5/20 it appears that MMDD is correct but the year and time are incorrect.

Fluke 125B/NA/S Considerations

o QM does not return a measurement record for any of the cursor measurements.

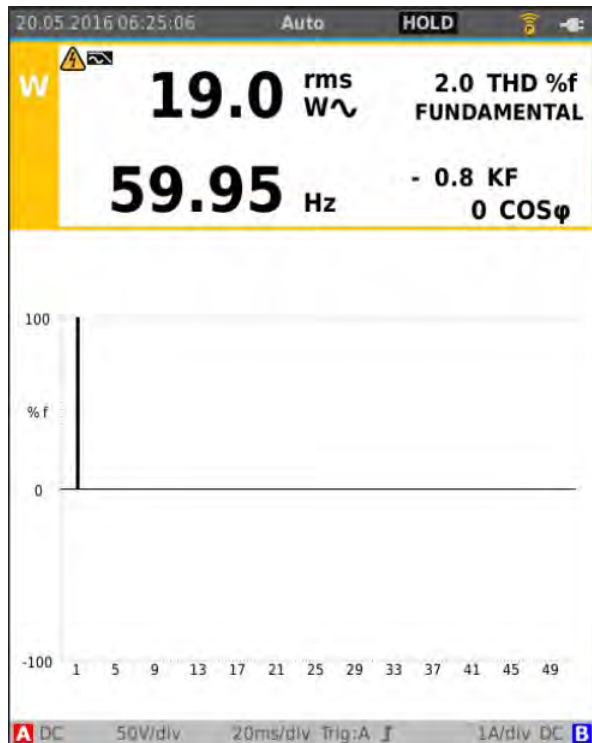
QM responds as if cursors do not exist. Below are the results for the various types of cursors (|, ||, =, rising, falling).

	A	B	C	D	E	F
1						
2	120.5 V	FLUKE 125B: Channel A	RMS (ac only)	Channel A Main	Absolute	
3	0 V	FLUKE 125B: Channel A	dc	Channel A Sub	Absolute	
4	0.27 A	FLUKE 125B: Channel B	RMS (ac only)	Channel B Main	Absolute	
5						
6						
7	120.5 V	FLUKE 125B: Channel A	RMS (ac only)	Channel A Main	Absolute	
8	0 V	FLUKE 125B: Channel A	dc	Channel A Sub	Absolute	
9	0.3 A	FLUKE 125B: Channel B	RMS (ac only)	Channel B Main	Absolute	
10						
11	=					
12	120.4 V	FLUKE 125B: Channel A	RMS (ac only)	Channel A Main	Absolute	
13	0.1 V	FLUKE 125B: Channel A	dc	Channel A Sub	Absolute	
14	0.29 A	FLUKE 125B: Channel B	RMS (ac only)	Channel B Main	Absolute	
15						
16	rising					
17	120.9 V	FLUKE 125B: Channel A	RMS (ac only)	Channel A Main	Absolute	
18	0 V	FLUKE 125B: Channel A	dc	Channel A Sub	Absolute	
19	0.29 A	FLUKE 125B: Channel B	RMS (ac only)	Channel B Main	Absolute	
20						
21	falling					
22	120.4 V	FLUKE 125B: Channel A	RMS (ac only)	Channel A Main	Absolute	
23	0 V	FLUKE 125B: Channel A	dc	Channel A Sub	Absolute	
24	0.28 A	FLUKE 125B: Channel B	RMS (ac only)	Channel B Main	Absolute	
25						

```
WriteCommandSucceeded(QM, 300)
Acknowledge(False, 300): buffer[0]=0x30 buffer[1]=0x0d
ReadResponse(): 11, 1, 1, 1, 2, 4, 0.1E+00, 12, 1, 1, 1, 4, 0.1E+00, 21, 1, 2, 2, 2, 4, 0.01E+00, 22, 0, 2, 0, 0, 0.000E+03
GetReading() No[11] Valid[1] Source[1(FLUKE 125B: Channel A)] Unit[1(V)] Type[2(RMS (ac only))] Pres[4(Absolute)]
GetReading() No[12] Valid[1] Source[1(FLUKE 125B: Channel A)] Unit[1(V)] Type[1(dc)] Pres[4(Absolute)]
GetReading() No[21] Valid[1] Source[2(FLUKE 125B: Channel B)] Unit[2(A)] Type[2(RMS (ac only))] Pres[4(Absolute)]
GetReading() No[22] Valid[0] Source[2(FLUKE 125B: Channel B)] Unit[0(None)] Type[0(None)] Pres[0(Timestamp)]
```

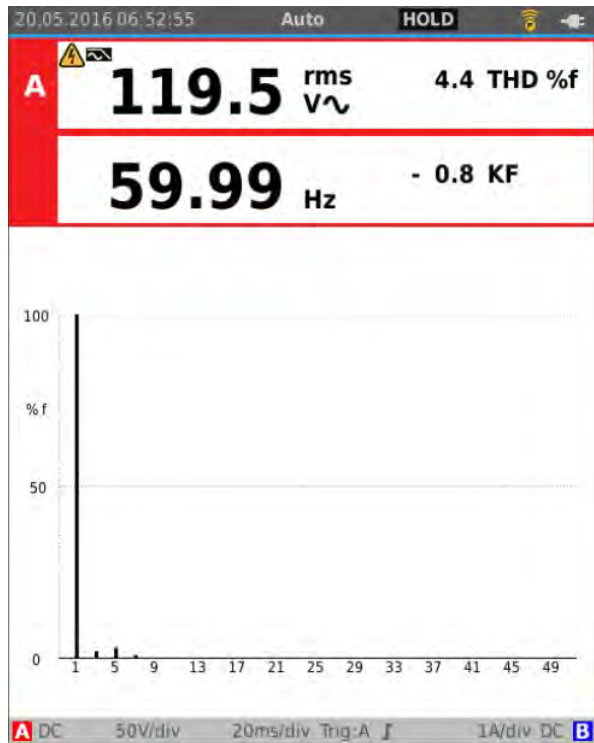
(In contrast to the 125B, the 196B responds correctly to the QM command when cursor measurements are active – for the most part. The 196B response has one bug where the No 71 measurement record (Cursor ΔX) will be missing under certain conditions. Other than that, it works perfectly.)

o QM on Watts/Harmonics screen does not return a measurement record for COSφ.



```
WriteCommandSucceeded(QM, 300)
Acknowledge(Fal se, 300): buffer[0]=0x30 buffer[1]=0x0d
ReadResponse():
11, 1, 1, 4, 21, 4, 0, 1E+00, 12, 1, 1, 25, 0, 4, 0, 1E+00, 21, 1, 2, 10, 11, 4, 0, 01E+00, 22, 1, 2, 24, 0, 4, 0, 1E+00, 81, 0, 1, 0, 0, 0, 9, 91E+37, 82, 0, 1, 0, 0, 0, 9, 91E+37, 91, 0, 1, 0, 0, 0, 9, 91E+37, 92, 0, 1, 0, 0, 0, 9, 91E+37
GetReading() No[11] Valid[1] Source[1(FLUKE 125B: Channel A)] Unit[4(W)] Type[21(Real Power)] Pres[4(Absolute(4))]
GetReading() No[12] Valid[1] Source[1(FLUKE 125B: Channel A)] Unit[25(% THD)] Type[0(None)] Pres[4(Absolute(4))]
GetReading() No[21] Valid[1] Source[2(FLUKE 125B: Channel B)] Unit[10(Hz)] Type[11(Freq)] Pres[4(Absolute(4))]
GetReading() No[22] Valid[1] Source[2(FLUKE 125B: Channel B)] Unit[24(KF)] Type[0(None)] Pres[4(Absolute(4))]
GetReading() No[81] Valid[0] Source[1(FLUKE 125B: Channel A)] Unit[0(None)] Type[0(None)] Pres[0(Absolute(0))]
GetReading() No[82] Valid[0] Source[1(FLUKE 125B: Channel A)] Unit[0(None)] Type[0(None)] Pres[0(Absolute(0))]
GetReading() No[91] Valid[0] Source[1(FLUKE 125B: Channel A)] Unit[0(None)] Type[0(None)] Pres[0(Absolute(0))]
GetReading() No[92] Valid[0] Source[1(FLUKE 125B: Channel A)] Unit[0(None)] Type[0(None)] Pres[0(Absolute(0))]
```

o QM on Volts/Harmonics screen does not return a measurement record for KF.

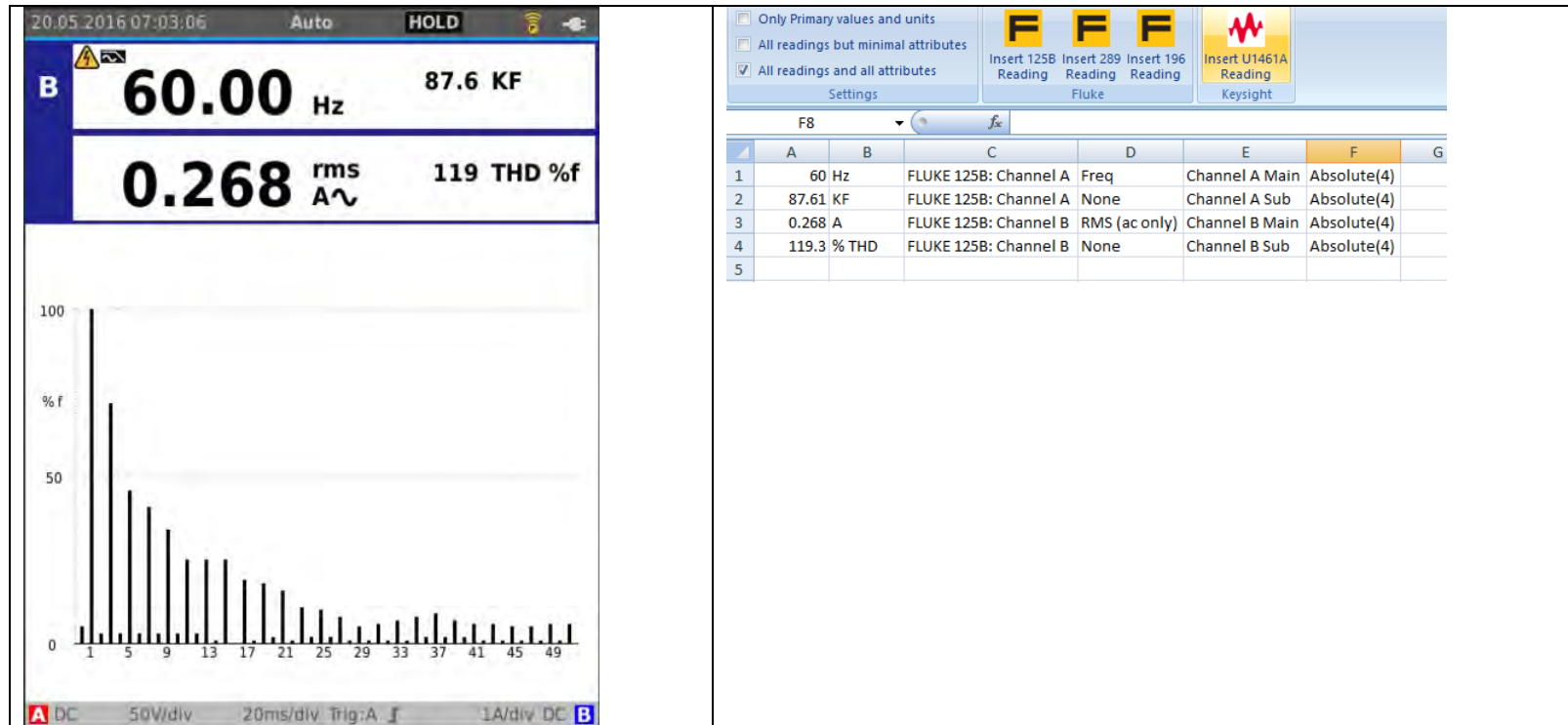


```

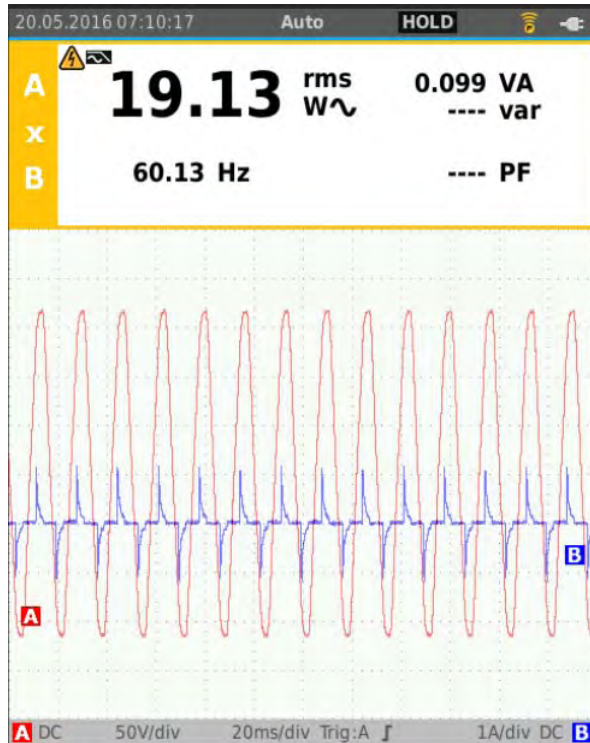
WriteCommandSucceeded(QM, 300)
Acknowledge(False, 300): buffer[0]=0x30 buffer[1]=0x0d
ReadResponse():
11, 1, 1, 1, 2, 4, 0. 1E+00, 12, 1, 1, 25, 0, 4, 0. 1E+00, 21, 1, 2, 10, 11, 4, 0. 01E+00, 22, 0, 2, 0, 0, 0, 0. 000E+03, 81, 0, 1, 0, 0, 0, 9. 91E+37, 82, 0, 1, 0, 0, 0, 9
. 91E+37, 91, 0, 1, 0, 0, 0, 9. 91E+37, 92, 0, 1, 0, 0, 0, 9. 91E+37
GetReading() No[11] Valid[1] Source[1(FLUKE 125B: Channel A)] Unit[1(V)] Type[2(RMS (ac only))] Pres[4(Absolute(4))]
GetReading() No[12] Valid[1] Source[1(FLUKE 125B: Channel A)] Unit[25(% THD)] Type[0(None)] Pres[4(Absolute(4))]
GetReading() No[21] Valid[1] Source[2(FLUKE 125B: Channel B)] Unit[10(Hz)] Type[11(Freq)] Pres[4(Absolute(4))]
GetReading() No[22] Valid[0] Source[2(FLUKE 125B: Channel B)] Unit[0(None)] Type[0(None)] Pres[0(Absolute(0))]
GetReading() No[81] Valid[0] Source[1(FLUKE 125B: Channel A)] Unit[0(None)] Type[0(None)] Pres[0(Absolute(0))]
GetReading() No[82] Valid[0] Source[1(FLUKE 125B: Channel A)] Unit[0(None)] Type[0(None)] Pres[0(Absolute(0))]
GetReading() No[91] Valid[0] Source[1(FLUKE 125B: Channel A)] Unit[0(None)] Type[0(None)] Pres[0(Absolute(0))]
GetReading() No[92] Valid[0] Source[1(FLUKE 125B: Channel A)] Unit[0(None)] Type[0(None)] Pres[0(Absolute(0))]
    
```

Fluke 125B/NA/S Considerations

o QM on Amps/Harmonics screen is OK.



o QM on Watts/Waveform screen does not return a measurement record for VA.

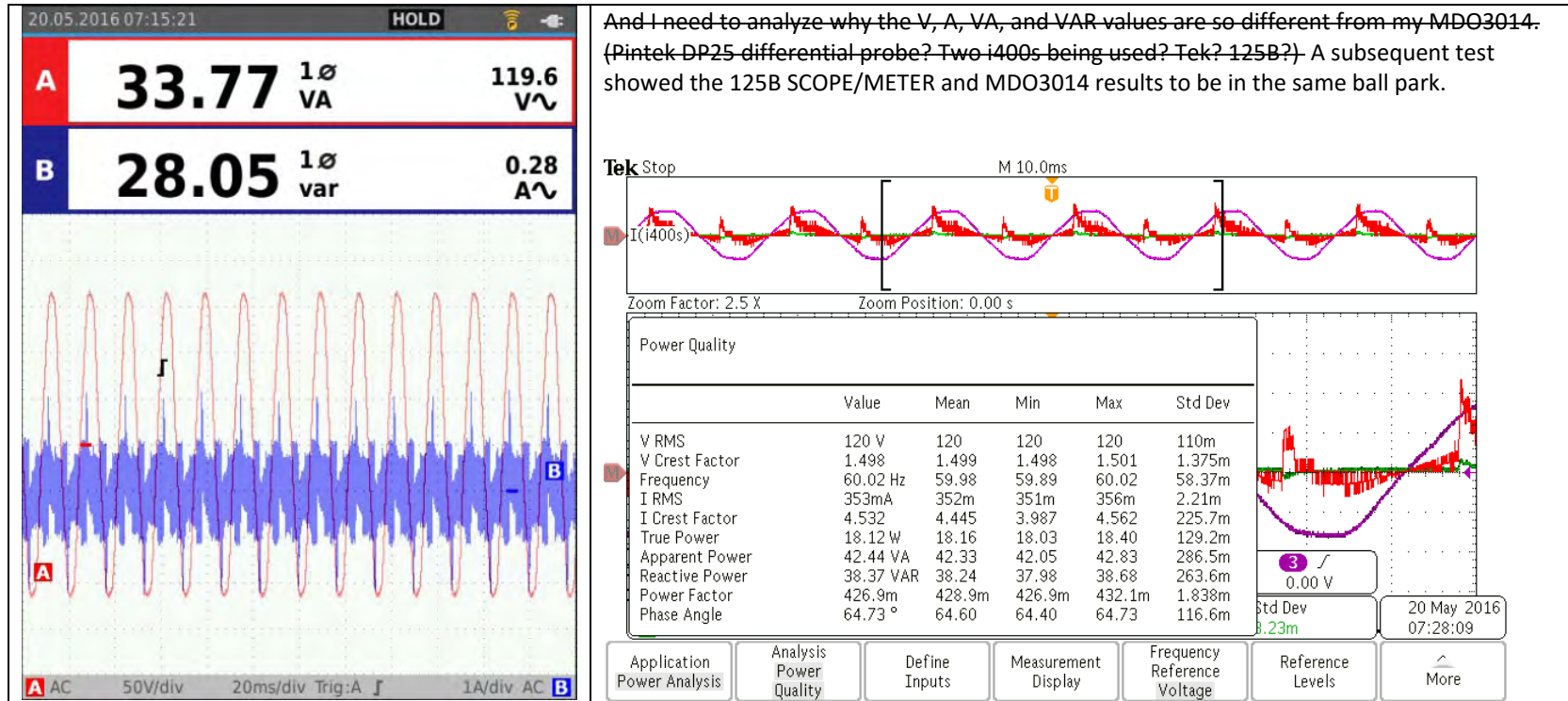


```

WriteCommandSucceeded(QM, 300)
Acknowledge(False, 300): buffer[0]=0x30 buffer[1]=0x0d
ReadResponse(): 11, 1, 1, 4, 21, 4, 0.01E+00, 12, 1, 1, 21, 19, 4, 0.01E+00, 21, 1, 2, 10, 11, 4, 0.01E+00, 22, 1, 2, 20, 22, 4, 0.01E+00
GetReading() No[11] Valid[1] Source[1(FLUKE 125B: Channel A)] Unit[4(W)] Type[21(Real Power)] Pres[4(Absolute(4))]
GetReading() No[12] Valid[1] Source[1(FLUKE 125B: Channel A)] Unit[21(VAR)] Type[19(Reactive Power)] Pres[4(Absolute(4))]
GetReading() No[21] Valid[1] Source[2(FLUKE 125B: Channel B)] Unit[10(Hz)] Type[11(Freq)] Pres[4(Absolute(4))]
GetReading() No[22] Valid[1] Source[2(FLUKE 125B: Channel B)] Unit[20(None(PF))] Type[22(Power Factor)] Pres[4(Absolute(4))]
    
```

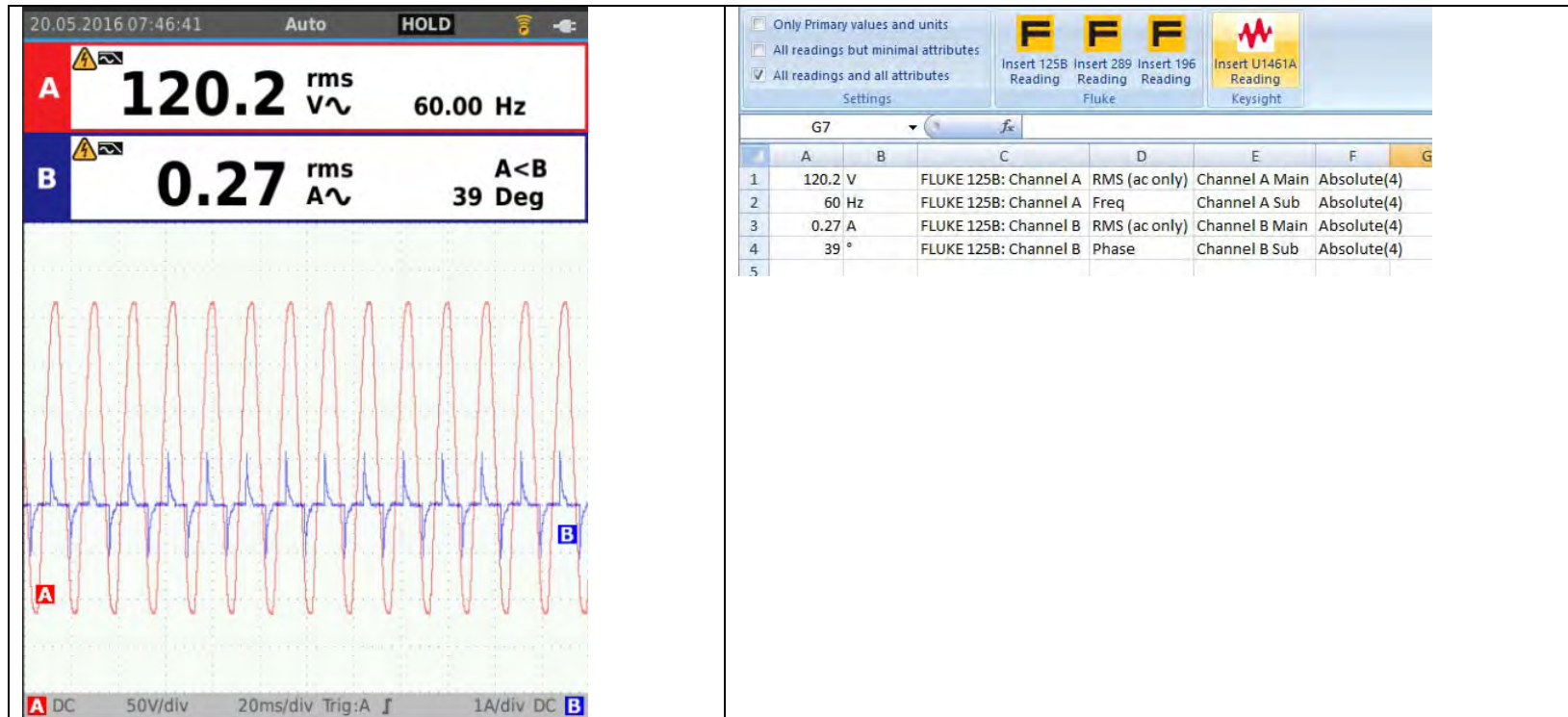
Fluke 125B/NA/S Considerations

This lack of a VA measurement record (previous page) is in addition to the fact that VA, VAR, and PF are incorrect. Note that these values do produce readings (below) when measured in SCOPE/METER mode for the same test case (40W compact fluorescent):



Fluke 125B/NA/S Considerations

o QM on Volts/Amps/Waveform screen is OK.



Fluke 125B/NA/S Considerations

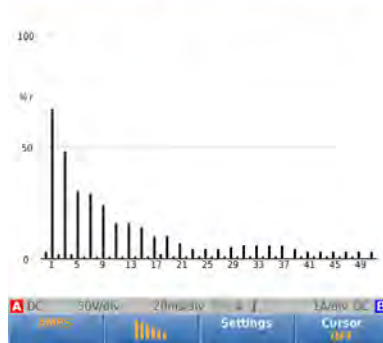
- o QM command is OK on Scope/Meter (just so you know what I verified):
 - o V ac
 - o V dc
 - o V ac + dc
 - o V pwm
 - o Hz
 - o RPM
 - o A ac
 - o A dc
 - o A ac + dc
 - o Power
 - o PF
 - o Watts
 - o VA
 - o VAR
 - o Pulse
 - o Pulse Width
 - o Duty Cycle
 - o Peak
 - o Peak Max-Min
 - o Peak Max
 - o Peak Min
 - o Crest (but did not produce a value for current in the example which I tested)
 - o dBV
 - o Temperature
 - o Ohm
 - o Continuity
 - o Diode
 - o Capacitance

- o QM command for Relative measurements also works correctly.

Fluke 125B/NA/S Considerations

o Bug: The QM response for harmonic THD returns Type of '0' (None) when it should return a Type of 27 for THD %r or a Type of 28 for THD %f. Without the correct type, there is no way to programmatically determine whether the setting is %r or %f. 27 and 28 would maintain consistency with the 43B programming manual for Type (pdf p. 52):

- 27 Total Harmonic Distortion
- 28 Total Harmonic Distortion with respect to Fundamental



```
WriteCommandSucceeded(QM, 300)
Acknowledge(False, 300): buffer[0]=0x30 buffer[1]=0x0d
ReadResponse():
11, 1, 1, 10, 11, 4, 0.01E+00, 12, 1, 1, 24, 0, 4, 0.001E+00, 21, 1, 2, 2, 2, 4, 0.001E+00, 22, 1, 2, 25, 0, 4, 0.001E+00, 81, 0, 1, 0, 0, 0, 9.91E+37, 82, 0, 1, 0,
0, 0, 9.91E+37, 91, 0, 1, 0, 0, 0, 9.91E+37, 92, 0, 1, 0, 0, 0, 9.91E+37
GetReading() No[11] Valid[1] Source[1(FLUKE 125B: Channel A)] Unit[10(Hz)] Type[11(Freq)] Pres[4(Absolute)]
GetReading() No[12] Valid[1] Source[1(FLUKE 125B: Channel A)] Unit[24(KF)] Type[0(None)] Pres[4(Absolute)]
GetReading() No[21] Valid[1] Source[2(FLUKE 125B: Channel B)] Unit[2(A)] Type[2(RMS (ac only))] Pres[4(Absolute)]
GetReading() No[22] Valid[1] Source[2(FLUKE 125B: Channel B)] Unit[25(% THD)] Type[0(None)] Pres[4(Absolute)]
GetReading() No[81] Valid[0] Source[1(FLUKE 125B: Channel A)] Unit[0(None)] Type[0(None)] Pres[0(Time)]
GetReading() No[82] Valid[0] Source[1(FLUKE 125B: Channel A)] Unit[0(None)] Type[0(None)] Pres[0(Time)]
GetReading() No[91] Valid[0] Source[1(FLUKE 125B: Channel A)] Unit[0(None)] Type[0(None)] Pres[0(Time)]
GetReading() No[92] Valid[0] Source[1(FLUKE 125B: Channel A)] Unit[0(None)] Type[0(None)] Pres[0(Time)]
```

Another bug is that the Type for the K factor is also incorrect (see above example). From the 43B manual for Type (pdf p. 52):

- 29 K Factor (European definition)
- 30 K Factor (US definition)

Fluke 125B/NA/S Considerations

o Bug: The Query Harmonics command ('QH 10', 'QH 21', and 'QH 32') should return 303 bytes but usually returns fewer bytes.

o While it's possible that my code (.NET Framework 4) is the problem, it seems more likely that it is a 125B firmware problem because this less-than-303-bytes problem also occurs with the generic National Instruments NI-MAX console:

1: Write Operation (qh\s21)

Return Count: 5 bytes

2: Read Operation

Return Count: 2 bytes

30 0D

3: Read Operation

Return Count: 301 bytes

```
23 30 80 00 1B 00 01 02 0B 1E 6B F9 00 01 00 17 6F FE 32 30 30 30
30 36 31 31 30 35 34 37 35 33 D7 2C 23 30 81 01 06 00 34 00 00 00
00 01 41 00 00 00 00 0B 00 05 9A 00 E9 00 06 D8 00 09 00 FC D2 00
9F 00 00 9B 00 09 00 02 B3 00 9B 00 FA 76 00 07 00 FB 66 00 8A 00
01 DE 00 07 00 02 C2 00 66 00 FB 9A 00 05 00 FB BC 00 5F 00 03 A9
00 07 00 01 04 00 56 00 FD 38 00 07 00 05 E6 00 43 00 05 03 00 07
00 FE 28 00 3C 00 FF 01 00 07 00 04 28 00 31 00 06 99 00 06 00 FD
74 00 20 00 00 B7 00 05 00 03 C6 00 1D 00 FB 1A 00 04 00 FC C0 00
18 00 03 2D 00 05 00 03 12 00 16 00 FE 0A 00 05 00 FB 54 00 1D 00
06 2A 00 07 00 00 EE 00 1D 00 00 00 07 00 05 7E 00 1E 00 FA 35 00
06 00 FE CA 00 22 00 01 BD 00 06 00 05 D4 00 1E 00 FB 4E 00 06 00
FD A5 00 19 00 03 31 00 06 00 04 68 00 16 00 FC F3 00 03 00 FD 62
00 10 00 04 CD 00 04 00 03 B4 00 0E 00 FF 5C 00 06 00 FC 48 00 0F
00 F9 D9 00 04 00 03 52 00 0F 00 01 FF F3 0D
```

Extensive testing trying to resolve this issue revealed that the lost bytes occur randomly in the middle of the block. In the example above note that the terminating 0x0D is present as the last byte of the block.

o Similar optical/serial .NET Framework 4 code works reliably with the 196B and 289, including with the 289's QDDA block (300 bytes when Min/Max is enabled).

o Some of the things I have tried:

o Different USB ports

o Different PC's

o PM9080 cable (version 1) instead of OC4USB version 2

o Adjusting FTDI serial port latency and buffer sizes

Fluke 125B/NA/S Considerations

- o Different baud rates down to 1200 baud
 - o QH 10 vs QH 21 vs QH 32. All are unreliable.
 - o Setting the 125B to HOLD state. (The 125B appears to do that automatically for the QH nn command.)
- o So my workaround is a loop, which repeats the QH nn query until the response is exactly 303 bytes.

```
GetHarmonics(): Attempt 1. Bytes read 300.  
GetHarmonics(): Attempt 2. Bytes read 300.  
GetHarmonics(): Attempt 3. Bytes read 300.  
GetHarmonics(): Attempt 4. Bytes read 302.  
GetHarmonics(): Attempt 5. Bytes read 301.  
GetHarmonics(): Attempt 6. Bytes read 301.  
GetHarmonics(): Attempt 7. Bytes read 301.  
GetHarmonics(): Attempt 8. Bytes read 302.  
GetHarmonics(): Attempt 9. Bytes read 300.  
GetHarmonics(): Attempt 10. Bytes read 298.  
GetHarmonics(): Attempt 11. Bytes read 302.  
GetHarmonics(): Attempt 12. Bytes read 301.  
GetHarmonics(): Attempt 13. Bytes read 302.  
GetHarmonics(): Attempt 14. Bytes read 298.  
GetHarmonics(): Attempt 15. Bytes read 298.  
GetHarmonics(): Attempt 16. Bytes read 299.  
GetHarmonics(): Attempt 17. Bytes read 300.  
GetHarmonics(): Attempt 18. Bytes read 302.  
GetHarmonics(): Attempt 19. Bytes read 299.  
GetHarmonics(): Attempt 20. Bytes read 302.  
GetHarmonics(): Attempt 21. Bytes read 300.  
GetHarmonics(): Attempt 22. Bytes read 300.  
GetHarmonics(): Attempt 23. Bytes read 296.  
GetHarmonics(): Attempt 24. Bytes read 300.  
GetHarmonics(): Attempt 25. Bytes read 301.  
  
.  
.  
.
```

Fluke 125B/NA/S Considerations

o If there are a lot of failed attempts (e.g., 25 failed attempts) it seems that toggling the 125B's HOLD button on then off again causes the 125B to finally send 303 bytes soon thereafter. Or perhaps the 125B would have done it correctly anyway without my intervention.

Fluke 125B/NA/S Considerations

o So why do I care about the QH command? Here is my custom output derived from the QH nn response (starting at Excel row 9) when 303 bytes are returned...

o Example for Amps

	A	B	C	D	E	F
1					warning: 125B firmware bug prevents detecting whether setting is %r rather than %f.	
2	59.99	Hz	FLUKE 125B: Harmonics	Freq	Harmonics Reading 1 Main	Absolute
3	74.24	KF	FLUKE 125B: Harmonics	None	Harmonics Reading 1 Sub	Absolute
4	0.255	A	FLUKE 125B: Harmonics	RMS (ac only)	Harmonics Reading 2 Main	Absolute
5	116.3	% THD	FLUKE 125B: Harmonics	None	Harmonics Reading 2 Sub	Absolute
6					definition: dPF (Distortion Power Factor) = dPFI * dPFV = (1/(1 + THD_F1^2)) * (1/(1 + THD_FV^2))	
7					If voltage is sinusoidal, i.e., not distorted (no harmonics), then dPFV = 1, and, therefore, dPF = dPFI.	
8					dPFI[0.6520] (= 1/(1 + THD_F1^2) = 1/(1 + 1.1630^2))	
9	0.01102521	A	Fluke 125B: Amp harmonics Channel B	0 0 0 DC	0.0° 6.5%	Absolute
10	0.169237	A	Fluke 125B: Amp harmonics Channel B	1 1 + Fund	0.0° 100%	Absolute
11	0.006063865	A	Fluke 125B: Amp harmonics Channel B	2 2 - Even	132.5° 3.6%	Absolute
12	0.1212773	A	Fluke 125B: Amp harmonics Channel B	3 3 0 Trip	174.0° 71.7%	Absolute
13	0.005512605	A	Fluke 125B: Amp harmonics Channel B	4 4 + Even	-61.3° 3.3%	Absolute
14	0.07717647	A	Fluke 125B: Amp harmonics Channel B	5 5 - Odd	14.3° 45.6%	Absolute
15	0.004410084	A	Fluke 125B: Amp harmonics Channel B	6 6 0 Even	112.0° 2.6%	Absolute
16	0.07442017	A	Fluke 125B: Amp harmonics Channel B	7 7 + Odd	-140.4° 44%	Absolute
17	0.003858823	A	Fluke 125B: Amp harmonics Channel B	8 8 - Even	-55.2° 2.3%	Absolute
18	0.06174117	A	Fluke 125B: Amp harmonics Channel B	9 9 0 Trip	51.0° 36.5%	Absolute
19	0.00307563	A	Fluke 125B: Amp harmonics Channel B	10 10 + Even	92.6° 2%	Absolute
20	0.04410084	A	Fluke 125B: Amp harmonics Channel B	11 11 - Odd	-105.4° 26.1%	Absolute
21	0.002756302	A	Fluke 125B: Amp harmonics Channel B	12 12 0 Even	-82.8° 1.6%	Absolute
22	0.0418958	A	Fluke 125B: Amp harmonics Channel B	13 13 + Odd	104.2° 24.8%	Absolute
23	0.003858823	A	Fluke 125B: Amp harmonics Channel B	14 14 - Even	20.0° 2.3%	Absolute
24	0.0352808	A	Fluke 125B: Amp harmonics Channel B	15 15 0 Trip	-62.3° 20.8%	Absolute
25	0.003858823	A	Fluke 125B: Amp harmonics Channel B	16 16 + Even	-155.4° 2.3%	Absolute
26	0.0253798	A	Fluke 125B: Amp harmonics Channel B	17 17 - Odd	147.6° 15%	Absolute
27	0.003858823	A	Fluke 125B: Amp harmonics Channel B	18 18 0 Even	-7.6° 2.3%	Absolute
28	0.0237042	A	Fluke 125B: Amp harmonics Channel B	19 19 + Odd	-4.7° 14%	Absolute
29	0.00307563	A	Fluke 125B: Amp harmonics Channel B	20 20 - Even	177.0° 2%	Absolute
30	0.0181916	A	Fluke 125B: Amp harmonics Channel B	21 21 0 Trip	-162.8° 10.7%	Absolute
31	0.00307563	A	Fluke 125B: Amp harmonics Channel B	22 22 + Even	1.6° 2%	Absolute
32	0.01212773	A	Fluke 125B: Amp harmonics Channel B	23 23 - Odd	62.5° 7.2%	Absolute
33	0.002756302	A	Fluke 125B: Amp harmonics Channel B	24 24 0 Even	149.4° 1.6%	Absolute
34	0.01323025	A	Fluke 125B: Amp harmonics Channel B	25 25 + Odd	-87.3° 7.8%	Absolute
35	0.002205042	A	Fluke 125B: Amp harmonics Channel B	26 26 - Even	-44.4° 1.3%	Absolute
36	0.01157647	A	Fluke 125B: Amp harmonics Channel B	27 27 0 Trip	122.8° 6.8%	Absolute
37	0.002756302	A	Fluke 125B: Amp harmonics Channel B	28 28 + Even	121.8° 1.6%	Absolute
38	0.01267899	A	Fluke 125B: Amp harmonics Channel B	29 29 - Odd	-9.8° 7.5%	Absolute
39	0.002756302	A	Fluke 125B: Amp harmonics Channel B	30 30 0 Even	-117.0° 1.6%	Absolute
40	0.01488403	A	Fluke 125B: Amp harmonics Channel B	31 31 + Odd	-168.9° 8.8%	Absolute
41	0.003858823	A	Fluke 125B: Amp harmonics Channel B	32 32 - Even	67.6° 2.3%	Absolute
42	0.01378151	A	Fluke 125B: Amp harmonics Channel B	33 33 0 Trip	35.2° 8.1%	Absolute
43	0.00307563	A	Fluke 125B: Amp harmonics Channel B	34 34 + Even	-99.6° 2%	Absolute
44	0.01543529	A	Fluke 125B: Amp harmonics Channel B	35 35 - Odd	-122.0° 9.1%	Absolute
45	0.003858823	A	Fluke 125B: Amp harmonics Channel B	36 36 0 Even	48.2° 2.3%	Absolute
46	0.01433277	A	Fluke 125B: Amp harmonics Channel B	37 37 + Odd	72.9° 8.5%	Absolute
47	0.003858823	A	Fluke 125B: Amp harmonics Channel B	38 38 - Even	-127.2° 2.3%	Absolute
48	0.01102521	A	Fluke 125B: Amp harmonics Channel B	39 39 0 Trip	-80.1° 6.5%	Absolute
49	0.00307563	A	Fluke 125B: Amp harmonics Channel B	40 40 + Even	39.0° 2%	Absolute
50	0.009922689	A	Fluke 125B: Amp harmonics Channel B	41 41 - Odd	136.2° 5.9%	Absolute
51	0.002756302	A	Fluke 125B: Amp harmonics Channel B	42 42 0 Even	-154.8° 1.6%	Absolute
52	0.008268908	A	Fluke 125B: Amp harmonics Channel B	43 43 + Odd	-18.5° 4.9%	Absolute
53	0.002205042	A	Fluke 125B: Amp harmonics Channel B	44 44 - Even	29.8° 1.3%	Absolute
54	0.008268908	A	Fluke 125B: Amp harmonics Channel B	45 45 0 Trip	-166.5° 4.9%	Absolute
55	0.001653781	A	Fluke 125B: Amp harmonics Channel B	46 46 + Even	132.6° 1%	Absolute
56	0.00717647	A	Fluke 125B: Amp harmonics Channel B	47 47 - Odd	44.4° 4.6%	Absolute
57	0.002205042	A	Fluke 125B: Amp harmonics Channel B	48 48 0 Even	-16.2° 1.3%	Absolute
58	0.006615126	A	Fluke 125B: Amp harmonics Channel B	49 49 + Odd	-101.8° 3.9%	Absolute
59	0.00307563	A	Fluke 125B: Amp harmonics Channel B	50 50 - Even	150.0° 2%	Absolute
60	0.00717647	A	Fluke 125B: Amp harmonics Channel B	51 51 0 Trip	116.5° 4.6%	Absolute
61						
62					=====Distortion=====	
63					DRMS HD% WRMS WHD%	
64					Sqrt(I(rms^2)) DRMS/rmsH1 Sqrt(I(n*rms^2)) WRMS/rmsH1	where weighting factor, n, is the harmonic number
65					Distortion + H4-H49 93.10755mA 55.01607 % 313.1285mA 185.0237 %	
66					Distortion - H3-H50 96.83059mA 57.21597 % 296.4382mA 175.1615 %	
67					Distortion 0 H3-H51 144.0615mA 85.12415 % 356.0459mA 210.3830 %	
68					Distortion Even H2-H50 17.65755mA 10.43362 % 79.88903mA 47.20541 %	
69					Distortion Odd H3-H51 196.1813mA 115.9210 % 553.4542mA 327.0291 %	
70					Distortion Triplens H3-H51 143.7680mA 84.95072 % 353.2620mA 208.7380 %	
71					All Distortion Harmonics H2-H51 196.9744mA 116.3896 % 550.1903mA 330.4185 % HD% is THD%	
72					Partial weighted (PWH0) H14-H40 67.34182mA 39.79143 % 318.4243mA 188.1529 % WHD% is PWH0 (defined by IEC to consider H14-H40)	

Fluke 125B/NA/S Considerations

- o Feature Request: Create a Type to distinguish between Real Power FUNDAMENTAL and Real Power FULL.

- o Presently there is only Type 21 for Real Power. So there is no way to detect/document the FUNDAMENTAL vs FULL power setting.

- (One could envision doing a QH 32 and examining the power for Harmonic 1 but this is unnecessarily cumbersome if the user just wants to document the Real Power value without documenting the detail of the harmonics or without doing a screen grab.)

- o Adding a Type should only affect the firmware because, as far as I know, there is no Fluke application which presently uses the QM command on the 125B Power Harmonics > Watts screen or which presently uses the QM command on the 125B Scope/Meter > Measure > Power > Watts screen.

Fluke 125B/NA/S Considerations

o FYI: Part of the response to a QH nn query is the <amplitude_resolution> (43B programming manual (pdf p. 48)). This is a scaling factor which, supposedly, must be applied to the <harm_amplitude> of each harmonic to convert it to its true amplitude.

```
<amplitude_resolution> = <float>
    This field contains the scale value
    for all amplitude samples.
```

However, the way the 125B calculates <amplitude_resolution> depends upon the unit (V vs A vs W), which means that <amplitude_resolution> cannot simply be multiplied times <harm_amplitude>. The following logic is mandatory:

```
float amplitudeScaling = 1;
switch (harmAdmin.AmplitudeUnit)
{
    case 1: amplitudeScaling = harmAdmin.AmplitudeResolution * 1.414213562f / 2; break; // volts: * sqrt(2) / 2
    case 2: amplitudeScaling = harmAdmin.AmplitudeResolution / 1.414213562f; break; // amps: / sqrt(2)
    case 4: amplitudeScaling = harmAdmin.AmplitudeResolution / 2; break; // watts: / 2
}
```

So then `float trueAmplitude = harmSamples.HarmSample[harmonic].Amplitude * amplitudeScaling;`

o This will produce an amplitude which matches that displayed on the 125B (albeit with more digits).

Similar functionality is probably contained in SW43W but documenting it in the 43B programming manual would have saved some work.

o I also communicated to Fluke some programming interface issues related to the QM command on Harmonics screens.