

## Basic Methods

One can use the following ways for acquiring moisture data, depending on whether a PC is available or not. Refer to the User's Guide and to the **AK30, AK30Mini, ATOM and IRMA7Basic** programs' User's Guides for details of each method. If more than one meter is connected to a local area network (LAN), all the data acquisition commands will affect all meters (refer to **Advanced** and **Profiler** programs). All data collected will be saved automatically, each channel into its own file whose name depends on time, date and channel. Each file has two headers indicating precisely the starting and ending times, meter serial number and all other important information including a few user accessible text lines. The possibilities explained in this document can be directly applied to model AK40 and especially **MK30R**.

### A PC is Available (IRMA7Basic program):

- **The Acquire** measurement is started with a press of a button. One can collect data via the serial port in real-time. Any standard serial port is used in this operation limiting the throughput of data to about 20 samples / second. The meter's own rate of 5 Hz is a limiting factor too for any significantly changed data. The data collection is stopped explicitly with the same button. The collected data is saved into an archive file for future use, either for this program or for any spreadsheet program. The maximum length of the series is 4096 samples. If the series is completed before one stops the acquisition, the samples are saved to a file and collection is restarted. This will continue until stopped. It is possible to limit the number of samples to be taken with a preset counter. For more details, refer to the user's guide for this program. AK30 and AK30Mini are simpler in this respect.

- **The Memory Bank Method** functions in such a way that you set up the Autotimer in the meter with its own keyboard and display. Match your requirements of time interval and Batch size. One then starts the Autotimer by using the buttons on the Memory Banks page or by using the meter's own keys. After the preset number of samples have been collected, the Autotimer is stopped automatically (or manually if in Continuous mode). To download data, press the button on the Memory Banks page. The autotimer can be started also at the meter's own keyboard (the "+" key). The data is saved similarly as all other data files in this program.

The number of samples is 1 to 500 points for any bank. If a higher batch size is set up, data collection will stop at 500 anyway. The shortest time interval is 200 ms or 0.2 s. It is recommended to use the **Batch** mode for collection as the autotimer will turn itself off after having the preset number of samples collected. One can also store single events with 64 points to a bank by pressing the **Save** key on the meter's panel.

This method is most suitable for recording moisture transients in field conditions.

- **The Frequency Analysis** method works just like the memory bank method. After downloading and saving the bank data, one performs the frequency analysis (press the Bank selector button on the Frequency Analysis page) to find out any regular variations (frequencies) in the moisture signals. The spectrum of the signal shows them usually very clearly. The data windowing for the Fourier analysis can be selected before the operation. Any of the memory banks can be used in this method.

The analysis can be performed also on the data collected via the serial port if the slower and more imprecise sampling interval is not significant. To see both the moisture data and its spectrum on the display, it is wise to set the scaling first. No data is lost, post-scaling is possible. The time interval of the display scale must be correct for an accurate study of the spectrum. One can analyze frequencies up to 2.5 Hz if a 5 Hz sampling is used in the autotimer. Slower phenomena can be studied just as easily by lengthening the interval for better frequency

range. This is a special feature not available presently with any other competitor's portable meters due to their slowness in sampling and lack of features. This method is most suitable for troubleshooting and fault analysis of paper machine rollers and felts when low frequencies are apparent in the final paper product. Visilab's fast on-line meter model D is able to sample at 400 Hz allowing thus a highly advanced frequency analysis of fast oscillations.

**A PC is not Available:**

o **The Manual** method is performed with the keyboard alone. The display shows both the moisture and values and one can collect data to the memory banks, calculate statistics or just make notes of these values. It is highly recommended to check the time and date of the AK30 before starting measurements since the internal clock will be ticking during the session and the time stamp is always added to the memory bank. This method is most useful in field conditions when there is no PC available.

**A Comparison Table for the Methods**

Find on the following pages tables for comparing the features of each method described in this Technical Note.

**TABLE 8 - 1 Comparison of various measuring methods for AK30/AK40/MK30R. The methods relying on the IRMA7Basic program but other software, like AK30, AK30Mini, ATOM and Advanced will work with similar features. The Profiler is a lean version of Advanced but has some very scanner-specific features, available only in this program.**

method:	max. sampling speed	temporal accuracy small scale	temporal accuracy large scale	trigger for the autotimer
<b>Acquisition</b>	low 5 Hz	good	good	-
<b>Memory Bank</b>	low 0 - 5 Hz	good	good	Key or SW required
<b>Frequency Analysis</b>	low 0 - 5 Hz	good	good	Key or SW required
<b>Manual</b>	on display: low 1 Hz to banks: low 0 - 5 Hz	fair good	good good	- Key or SW required

  

method:	amount of data saved	starting of collection	stopping of collection	
<b>Acquisition</b>	small to large	button	button or automatic if the preset count is used	
<b>Memory Bank</b>	small	manual or SW	automatic in <b>Batch</b> mode	-
<b>Frequency Analysis</b>	medium	manual or SW	automatic in <b>Batch</b> mode	only as a post-operation via archives
<b>Manual</b>	on display: none to banks: none unless downloaded Use the <b>Save</b> key for a 64 data point snapshot	- manual or SW	- manual or automatic in Batch mode	one available as installed

Note that the AK30 program family has now the feature of automatic memory bank fetching with a single button press. Press it down (on the Fetch Banks page) and go measuring with the meter, making sure the Bluetooth communication link is active all the time. The program checks frequently for any new banks saved and transports them to the PC for archiving.

The MK30R meter has a powerful extra feature for acquiring accurate reel moisture profiles. It applies an integral travel sensor for making measurements every 20mm. Thus the profile will be accurately positioned every time. When the travel sensor is disabled, it can be used just like an AK30.

**TABLE 8 - 2 Comparison of various measuring methods for AK30. The methods relying on the IRMA7Basic program. Other available software will work in a similar way. For multislave operation, use the Advanced program.**

<b>method:</b>	<b>PC required</b>	<b>multiple slaves supported</b>	<b>saved data format</b>	<b>trend display</b>
<b>Acquisition</b>	yes	yes	archiving & spreadsheet Active-X, LVM, Datalog	yes
<b>Memory Bank</b>	yes	yes	archiving & spreadsheet Active-X, LVM, Datalog	afterwards
<b>Frequency Analysis</b>	yes	primary slave only	archiving & spreadsheet Active-X, LVM, Datalog	yes
<b>Manual</b>	integral keyboard and display	no	none	latest value only

Simple HTML reporting is also available for all data loaded to the program with excellent graphics quality.

<b>method:</b>	<b>adjust display scales while running</b>	<b>maximum size of the data series</b>	<b>way to interrupt</b>	<b>on-line filtering of channels</b>
<b>Acquisition</b>	yes	4096 samples	button to stop	Moisture
<b>Memory Bank</b>	yes	4096 samples	turn off the autotimer -	
<b>Frequency Analysis</b>	yes	4096 samples	turn the autotimer off -	
<b>Manual</b>	-	4096 samples when using memory banks	turn the autotimer off -	

No postfiltering available in the IRMA7Basic program. The Advanced program has various filtering options, like averaging, staircasing, clearing. They are managed with two cursors.

**TABLE 8 - 3 Comparison of various measuring methods for AK30/AK40/MK30R. The methods relying on AK30, AK30Mini, ATOM and IRMA7Basic programs.**

**SIMULTANEOUS USE:**

method:	Acquisition	Memory Bank	Freq. Analysis	Manual
Acquisition	-	X	X	X
Mem. Bank	X	-	X	X
Freq. Analysis	X	X	-	X
Manual	X	X	X	-

**LEGEND:**

**X = ALLOWED**

**- = IDEM**

**EMPTY = NOT ALLOWED**