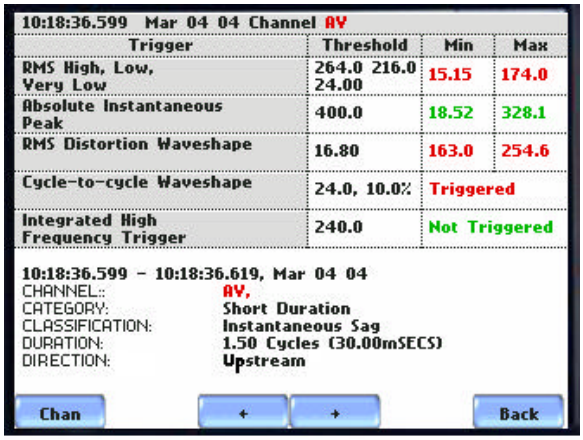
AnswerModules for PowerXplorer and PowerGuide Instruments

Sag Directivity ❋ CapSwitch ❋ Motor Quality Annunciator Panel

Furthering its commitment to continuous improvement and technology differentiation, Dranetz-BMI has added AnswerModules® to its new line of handheld power monitoring instruments. AnswerModules, developed originally for Dranetz-BMI's Signature System® continuous monitoring system, are proprietary algorithms that convert raw power quality event data into precise answers to determine the source and cause of the disturbance. These unique tools enable users to save time and improve accuracy when troubleshooting power quality problems.

Sag Directivity Module

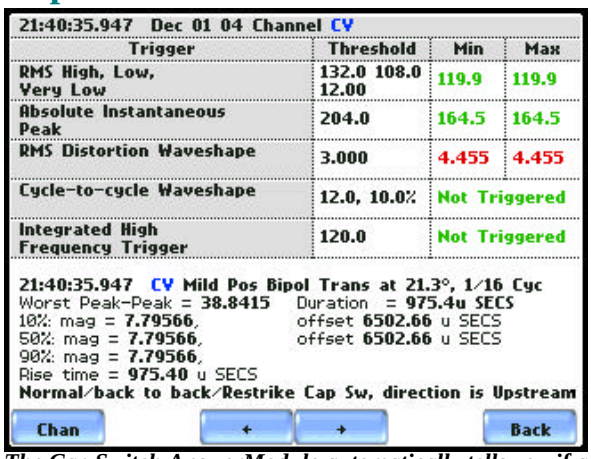
The most common type of power quality disturbances is the voltage sag. Even a small sag is capable of causing hours of downtime or a substantial loss of product or profits. Voltage sags can be caused by faults on the power system or by internal events, such as the start-up of large loads. For digital devices, a sag can be as perilous as an outage. For example, computer servers may cease functioning if electricity is lost for a mere eight milliseconds.



The RMS Voltage Sag Directivity AnswerModule identifies the severity of the sag and tells you its direction relative to the monitoring point.

The Voltage Sag Directivity AnswerModule automatically identifies a voltage sag event and determines the direction of its location relative to the monitoring point. Knowing the location of the sag, for example, generated either by the utility or inside the facility—is the starting point to resolving the problem and protecting your operation—quickly and cost-effectively.

CapSwitch Module



The Cap Switch AnswerModule automatically tells you if a capacitor switching event has occurred and provides data on its severity and location.

Power Factor Correction Capacitors provide voltage support and correct power factor on power distribution systems. Some capacitors are permanently connected, while others are switched on and off as needed, often at the same time each day.

While capacitor switching is common and normal, it can cause transients that disrupt manufacturing machinery, adjustable speed drives and process controls. Most important, PF cap switching transients can cause computer system malfunctions such as lock-up, component damage and data loss.

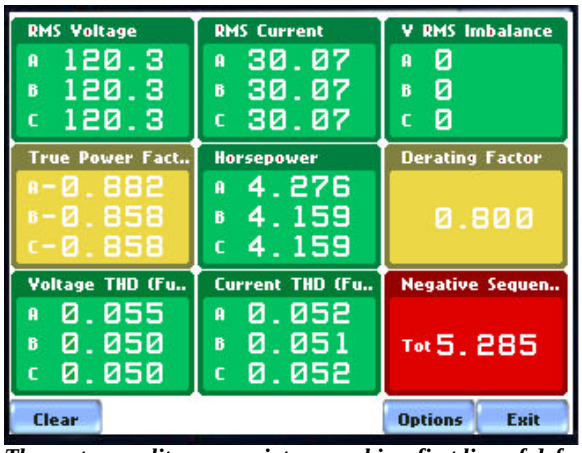
Capacitor switching transients can travel long distances through your power grid, in some cases getting magnified. The Cap Switching AnswerModule instantly identifies and characterizes the disturbance and its direction, relative to the monitoring point for rapid decision-making and mitigation.

Motor Quality Annunciator Panel

In the U.S. alone, there are 12.4 million motors greater than one horsepower. Of those motors, 2.9 million fail each year. In fact, for most motors, the initial purchase price represents just 2-5% of its lifetime costs. Clearly, improving the health and longevity of motors is a key goal of facility and maintenance managers.

There are various electrical parameters that either adversely affect the health of an electrical motor, or are an indication of the health of the motor. The Dranetz-BMI motor quality annunicator panel displays those parameters in a single color-coded screen:

- **RMS voltage** – low voltage conditions can result in increased heating of a motor. The voltage should be within the nameplate value (+/- 5% overvoltage and undervoltage).
- **RMS current** – high current conditions can also increase heating.
- **Vrms unbalance** – NEMA Standard MG-1 states that for just a 3% imbalance, the motor should be derated by 10%. In some cases, a 1% unbalance can cause problems.
- **True power factor** – any difference or change between phases may indicate winding or rotor bar problems.
- **Voltage THD** – eddy current and other losses increase as the harmonic content goes up. Some increase as the square of the harmonic number. 5% THD is a typical threshold value.
- **Current THD** – a factor of both the supplied voltage THD levels and any distortion caused by problems in the motor itself, such as a broken bar.
- **Negative Sequence Current** – negative sequence currents will try to rotate the motor in the opposite direction, increasing heat and shortening life.
- **Horsepower** – derived from watts.



The motor quality annunciator panel is a first line of defense for identifying motor problems. It simply and clearly alerts the user that something occurred or something has changed, warranting action.

The user can select limits for each of the parameters on the panel, for example, a high limit of 3% and very high limit of 6% for voltage unbalance. If the unbalance meets or exceeds 3%, the annunicator box for that parameter will turn from green to yellow. If it exceeds the very high limit of 6%, then it will turn red. Thus, the user can have a quick visual indication of which parameters could be affecting the health of the motor.

Many of the parameters displayed in the Motor Quality Annunciator Panel point toward increased heating of the motor. This in turn will decrease the life of the motor, as well as causes a derating of the operating load that the motor can carry. A single parameter within the AnswerModule panel, called Derating Factor, provides a cumulative indicator of these adverse parameters. This factor uses an algorithm that weighs each exceeded limit against the rating and loading of the motor. This factor should be used as a guide and indicator of potential electrical problems related to tested motors.

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