APPENDIX-J

**THE TECHNICAL SPECIFICATIONS OF DATA LOGGERS**

APPENDIX-H

TECHNICAL SPECIFICATIONS OF DATA LOGGERS

Average Value Calculations

Calculating Average Values is easy with ACR TrendReader Software – the Compound Line function makes it simple to determine the running average or the arithmetic mean for a time interval.

Average values are often used when a signal is fluctuating such that it is hard to determine the overall picture of what is actually occurring. A running average takes into account large transgressions as it moves along the data set so every previous reading affects the latest value calculated on a weighted basis. The arithmetic mean is finite as it can be calculated on a fixed interval of data. Alternatively, the entire data set can be acted on using the sum divided by the size as Mean Average in the Statistics given for the graph in TrendReader.

Building 230
Unoccupied Space
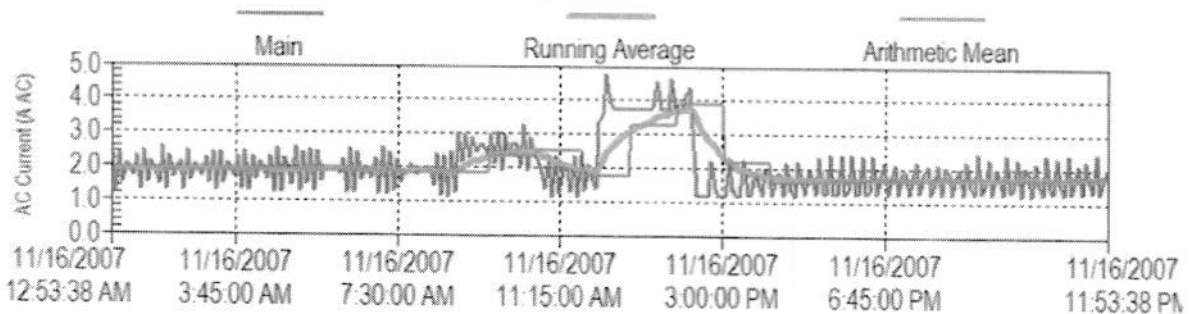
In the graph above, both the Running Average and Arithmetic Mean tend to end up at the same value if there are an equal number of data points of the same relative magnitude above and below the resultant value. Within an Arithmetic averaged period, the magnitude of a excursion and its duration are delayed by the data interval sampled while in the Running Average, the lag is seen as natural rise and decay. Both methods have merit in in smoothing the overall picture to eliminate anomalies and but also skew the time when actual events that have occurred.
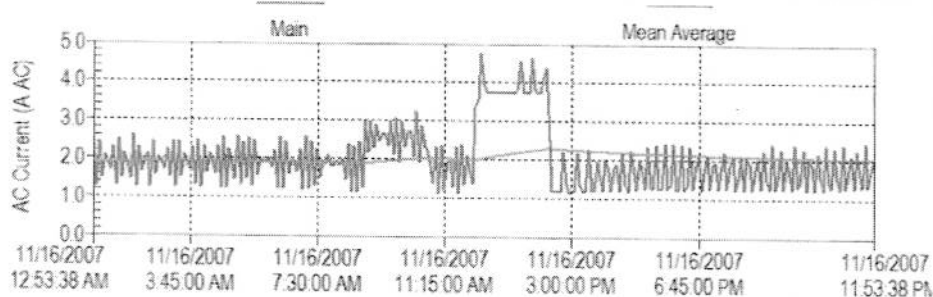
Mean Average applied to entire data set

Solution:

Create new Compound Line equation in TrendReader 2 – Equations->Compound Line for:

Description: Mean Average

Available Parameters <<

```
1 answer1 = answer1 + source0
2 answer2 = answer2 + 1
3 answer0 = answer1 / answer2
```

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Page 1/2 Revision -

Solution Cont.

Likewise, create new Compound Line equation in TrendReader 2 – Equations->Compound Line for:

Edit Equation

Description: | Running Average

Available Parameters | << |

```
1 If answer1 = 0 Then answer1 = source0
2 answer1 = answer1 * 0.9 + source0 * 0.1
3 answer0 = answer1
```

In the above formula, the fraction 0.9 weights the previous result then adds the current value weighted 0.1 times – when changing the weighting factor both fractions must add up to 1.

Edit Equation

Description: | Arithmetic Mean

Available Parameters | << |

```
1 If answer1 < 12 Then
2     answer1 = answer1 + 1
3     answer2 = answer2 + source0
4 Else
5     answer3 = answer2/answer1
6     answer1 = 0
7     answer2 = 0
8 End If
9 answer0 = answer3
```

In the above formula, the number 12 represents the number of data points averaged which at a 5 min (300 second) sample interval multiplies out to 60 min (1 hour).

Operation:

In TrendReader 2, follow these steps to apply the compound line function:

1. Backup data logger… Graph appears

2. Select from pull down menu Graph->Compound Lines->Add Compound Line...

3. Select Average Equation from pull down list and type <caption> in Line Name

4. Choose the temperature channel <OK>

Compound Line Equation:
Running Average

Line Name:
Average Value

Type in a constant number or assign a graph line to each SOURCE variable:

| SOURCE0 | Logger 56091 - Channel 1 - Main |

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SmartReader 8

8-CHANNEL TEMPERATURE DATA LOGGER

The SmartReader 8 data logger can measure temperature in eight different locations simultaneously using ACR's ET series thermistor probes. Monitor and record high temperature, low temperature, pipe surface, skin surface, or a variety of other temperatures

Specifications

Accessories	ACR ET Series Temperature Probes or any NTC thermistor probe

ACR ET Series Thermistor Probes

(SmartReader 8 works with any NTC thermistor probe)

General Purpose	-35 to 95°C (-30 to 200°F)
Low Temperature	-60 to 55°C (-75 to 130°F)
Low Temp Penetration	-60 to 55°C (-75 to 130°F)
High Temperature	10 to 170°C (50 to 335°F)
Oven Temperature	70 to 255°C (155 to 490°F)
Skin Surface Temperature	20 to 40°C (68 to 104°F)
Pipe Surface Temperature	-35 to 95°C (-30 to 200°F)
Waterproof Temperature	-40 to 105°C (-40 to 221°F)

Ordering Information

Model	Memory	Catalog #
SR-008	32 KB	01-0036

More information

Product specifications

Common specifications

Related Articles

▌ Calculating Average Values
Using a Compound Line to Apply Average Value Calculations

▌ Calculating Mean Kinetic Temperature
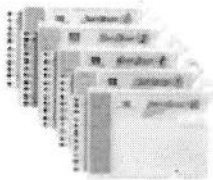
Applying MKT as a Compound Line

Related FAQ

General FAQ
Frequently Asked Questions

SR1/SR8 and SRP1/SRP8 FAQ
Frequently Asked Questions for SmartReader 1 and 8, and SmartReader Plus 1 and 8

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SmartReader

MULTI-CHANNEL CONFIGURABLE DATA LOGGERS

ACR SmartReader data loggers are multi-channel, user configurable data loggers that are able to monitor a variety of parameters. Durability is assured with a 3-year logger warranty and 10-year battery life.

Common Specifications

Size	107 mm x 74 mm x 22 mm (4.2" x 2.9" x 0.9")
Weight	110 g (3.75 oz)
Case Material	Noryl® plastic
Operating Limits	-40 to 70°C (-40 to 158°F) and 0 to 95% RH (non-condensing)
Clock Accuracy	+/- 2 seconds per day
Battery	3.6 volt Lithium, 1 Amp-Hour
Power Consumption	5 to 10 microamps (continuous)
Battery Life	10 years under normal use (factory replaceable)
Mounting	Magnetic backing or locking eyelet
Memory Size	32 K (32,768 readings)
Sampling Method	1. Continuous (First-in, First-out) 2. Stop when full (Fill-then-stop)
Sampling Rate	User selectable rates between 8 seconds to once every 5 days
Resolution	8-bit (1 part in 256)
External Connector	Removable screw-type terminal strip with Common (-) connection
PC Requirements	IBM PC or 100% compatible with at least 2MB RAM, 2MB of hard drive disk spac and one free serial port
Software Requirements	TrendReader® 2 (compatible with Windows® 2000, XP and Vista 32bit)
Internal Temperature Sensor Type	NTC thermistor (10,000 ohms @ 25°C [77°F])
Internal Temperature	-40 to 70°C (-40 to 158°F)

Sensor Range	
Internal Temperature Sensor Accuracy	+/- 0.2°C over the range: 0 to 70°C (+/- 0.3°F over the range: 32 to 158°F)
Internal Temperature Sensor Resolution	0.4°C (0.7°F) @ 25°C; better than 1°C (1.8°F) between -25 and 70°C (-13° and 158°F); better than 2.0°C (3.6°F) between -40 and -25°C (-40°F and -13°F)