

# NCBC



## **Increasing the Effectiveness of a Commissioning Project**

*Al Turnbull*

# Data Loggers -- Building Automation

How You Might Use

Interface

What to Watch For

Owner Involvement

## Data Loggers -- Building Automation

Size of a Quarter to Rack Mount

Single Sensor / Multiple Sensor

Internal / External

Temperature / Humidity

DC Voltages: 0-5 v, 0-10v, -20 – 20v

Current 4-20 mA, 0-20 mA

Pressure (in. WC to psi),

Volt / Amps

## Data Loggers -- Building Automation

~~Size of a Quarter to Rack Mount~~

Analog Voltages 0-5v, 0-10v...

Current 4-20 mA, 0-20mA...

Temperature - RTDs, Thermistors...

Pressures typical pneumatic range

Pressure - in. WC

AC/DC Voltage(s)

Relay I/O – Solid State, Dry Contact

## Data Loggers -- Building Automation

Digital in Operation

Analog Signal Converted to Digital

A/D Bit Count

8 Bit	--	Resolution	one in	256
12 Bit	--	Resolution	one in	4096



# Data Loggers -- Building Automation

Digital in Operation

Analog Signal Converted to Digital

A/D Bit Count

Time Stamp

Interval

Storage, Battery Life, Data Points

Actual (Real Time)

Match Events

## Data Loggers -- Building Automation

Digital in Operation

Analog Signal Converted to Digital

A/D Bit Count

Time Stamp

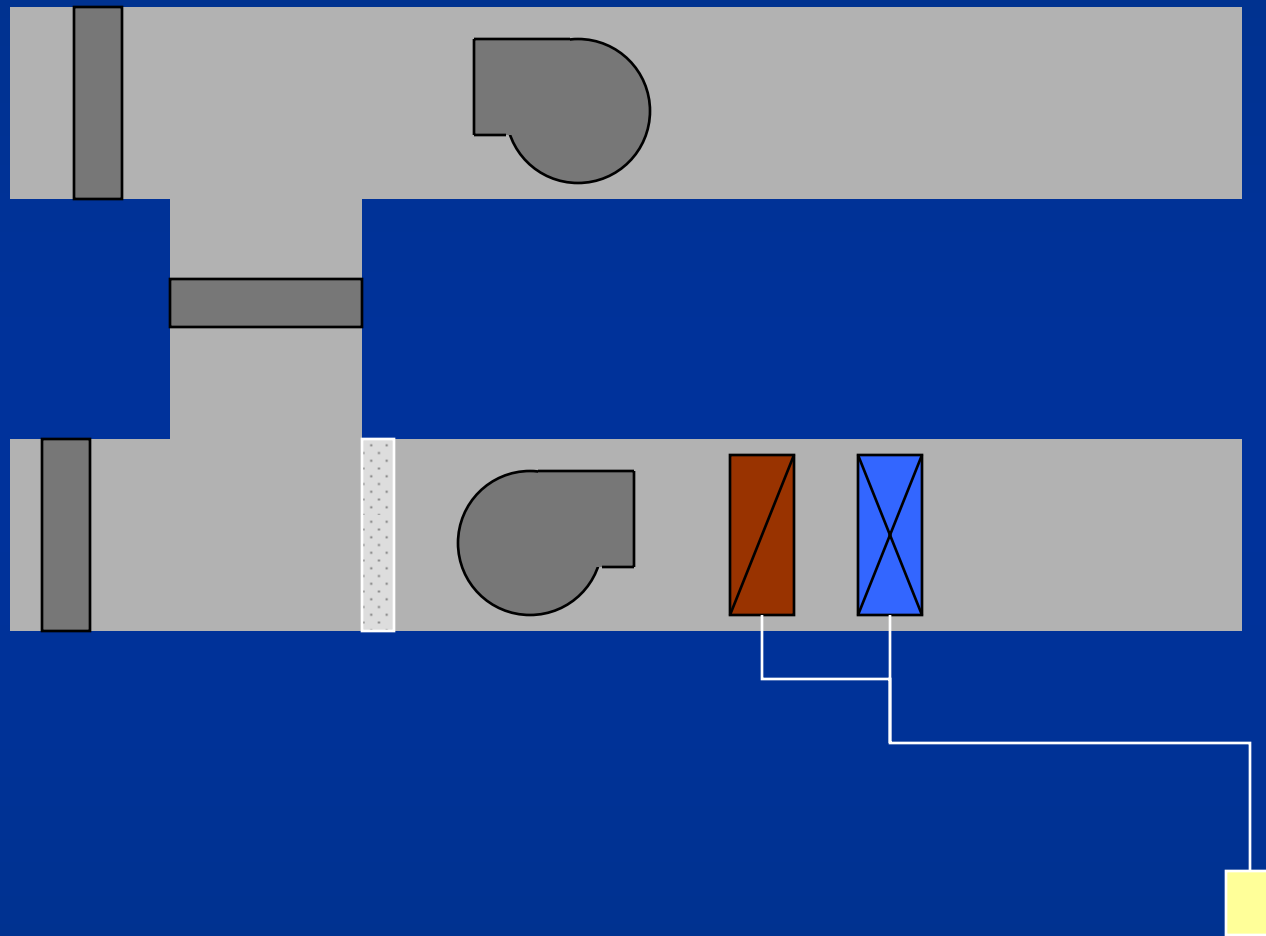
Temperature, Humidity, Voltage??

4-20 mA,...

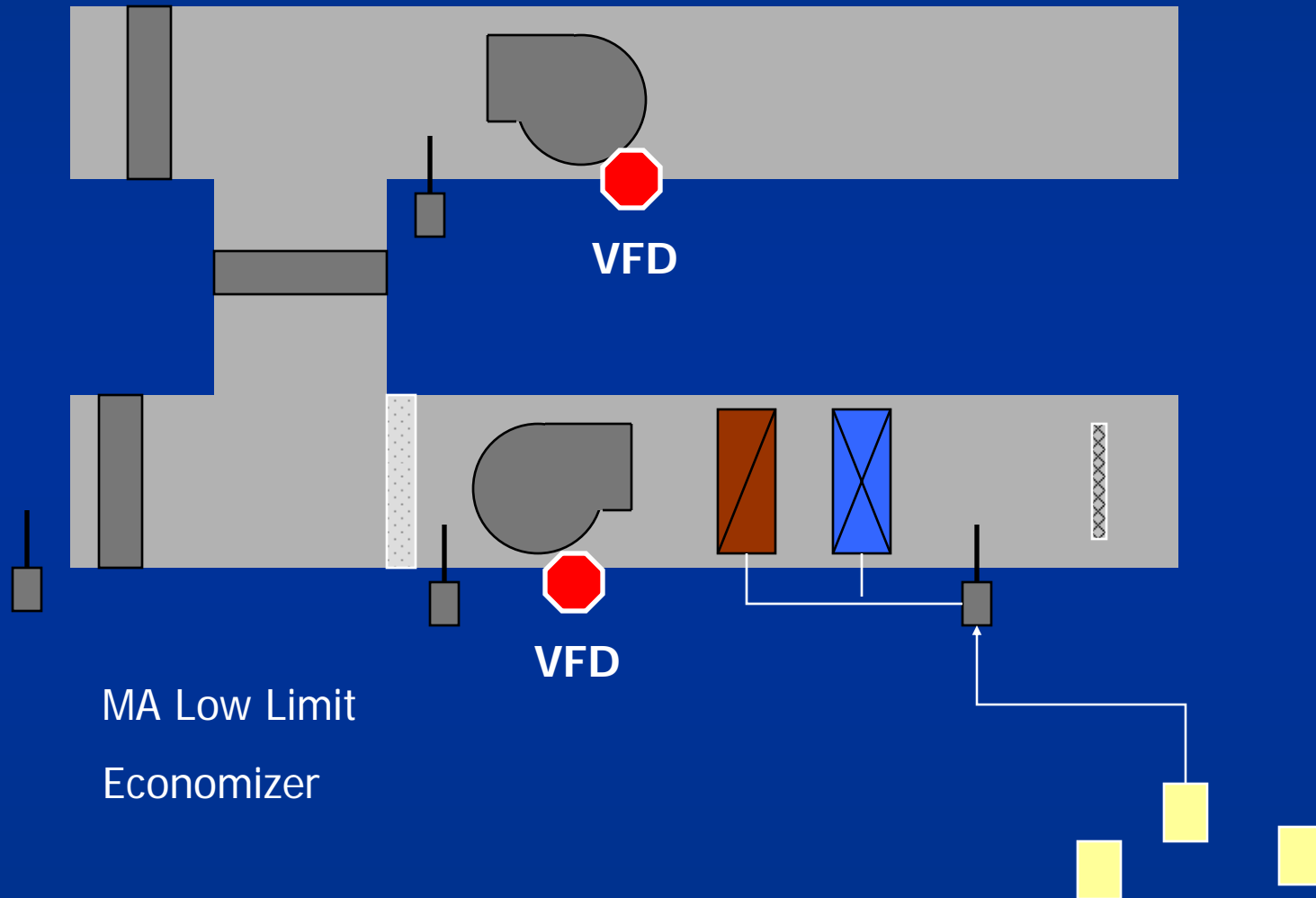
Pressure

Mounting

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Trend every 15 minutes of  
Discharge, Return, Mixed  
Temperatures

200 samples stored at  
panel level

~~7~~ Days stored at the PC

Discharge Temperature

Trend Every: 15 Min



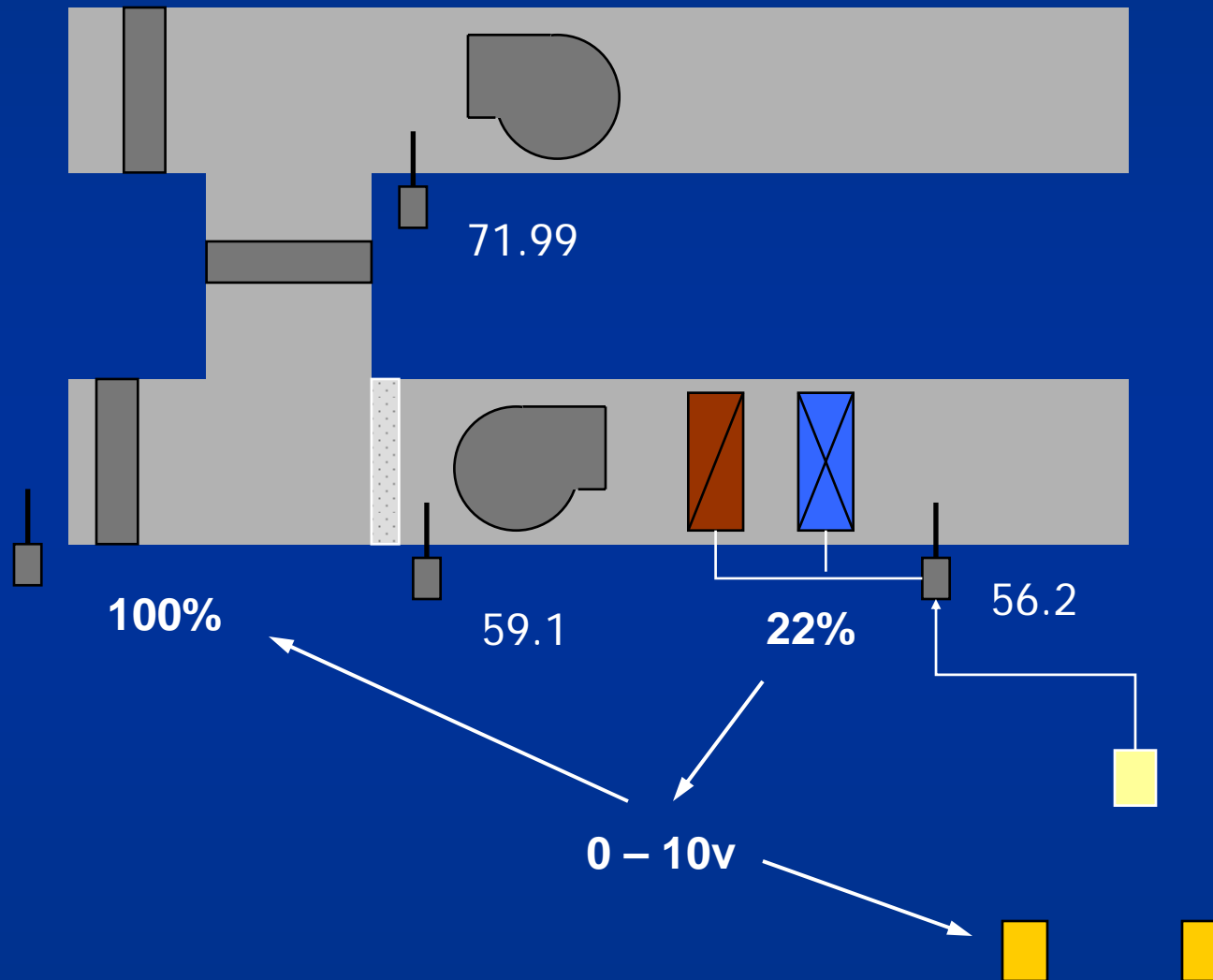
3/23/2007	8:08:17	58.4
3/23/2007	8:23:17	57.8
3/23/2007	8:38:17	58.4
3/23/2007	8:53:17	57.8
3/23/2007	9:08:17	58.1
3/23/2007	9:23:17	58.1
3/23/2007	9:38:17	58.1
3/23/2007	9:53:17	58.8
3/23/2007	10:08:17	59.4
3/23/2007	10:23:17	60
3/23/2007	10:38:17	61.3
3/23/2007	10:53:17	61
3/23/2007	11:08:17	55.6
3/23/2007	11:23:17	56.2
3/23/2007	11:38:17	56.2
3/23/2007	11:53:17	59.7
3/23/2007	12:08:17	56.9

3/23/2007	8:08:17	58.4
3/23/2007	8:23:17	57.8
3/23/2007	8:38:17	58.4
3/23/2007	8:53:17	57.8

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Discharge Temperature			Return Temperature		Mixed Air	
3/23/2007	10:08:17	59.4	10:15:52	72.3	10:13:58	56.5
3/23/2007	10:23:17	60	10:30:52	72.62	10:28:58	56.5
3/23/2007	10:38:17	61.3	10:45:52	72.62	10:43:58	58.1
3/23/2007	10:53:17	61	11:00:52	72.62	10:58:58	58.1
3/23/2007	11:08:17	55.6	11:15:52	71.99	11:13:58	58.4
3/23/2007	11:23:17	56.2	11:30:52	71.99	11:28:58	59.1
3/23/2007	11:38:17	56.2	11:45:52	71.99	11:43:58	60.3
3/23/2007	11:53:17	59.7	12:00:52	72.3	11:58:58	60.3
3/23/2007	12:08:17	56.9	12:15:52	71.99	12:13:58	61.3

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```
%DATA Data File
%FORMAT CSV
%VERSION 2.00.55
```

```
%BEGIN
```

```
[Device]
```

```
DeviceType Stainless
Revision REV C
Subtype &H000F5
Memory MEM64K
CommPort 0
BaudRate 2400
DeviceName Press
DeviceDescription
Status &H00000100
Address &H00000000
Readings 0
TimeZone TZNONE
LaunchDate 39078.74
StartDelay 175
StartDate 39078.74
ReadingRate R30S
SerialNumber MyDev01
UserID Temp
Channels 2
CalibrationDate 39078
CalibrationOffset(0) 0.3
CalibrationOffset(1) -0.4
CalibrationGain(0) 1
CalibrationGain(1) 0.99036
Unit(0) UNITDEGREESC
Unit(1) UNITPSIG
UnitType(0) UTYPTEMPERATURE
UnitType(1) UTYPGAGEPRESSURE
[End Device]
```

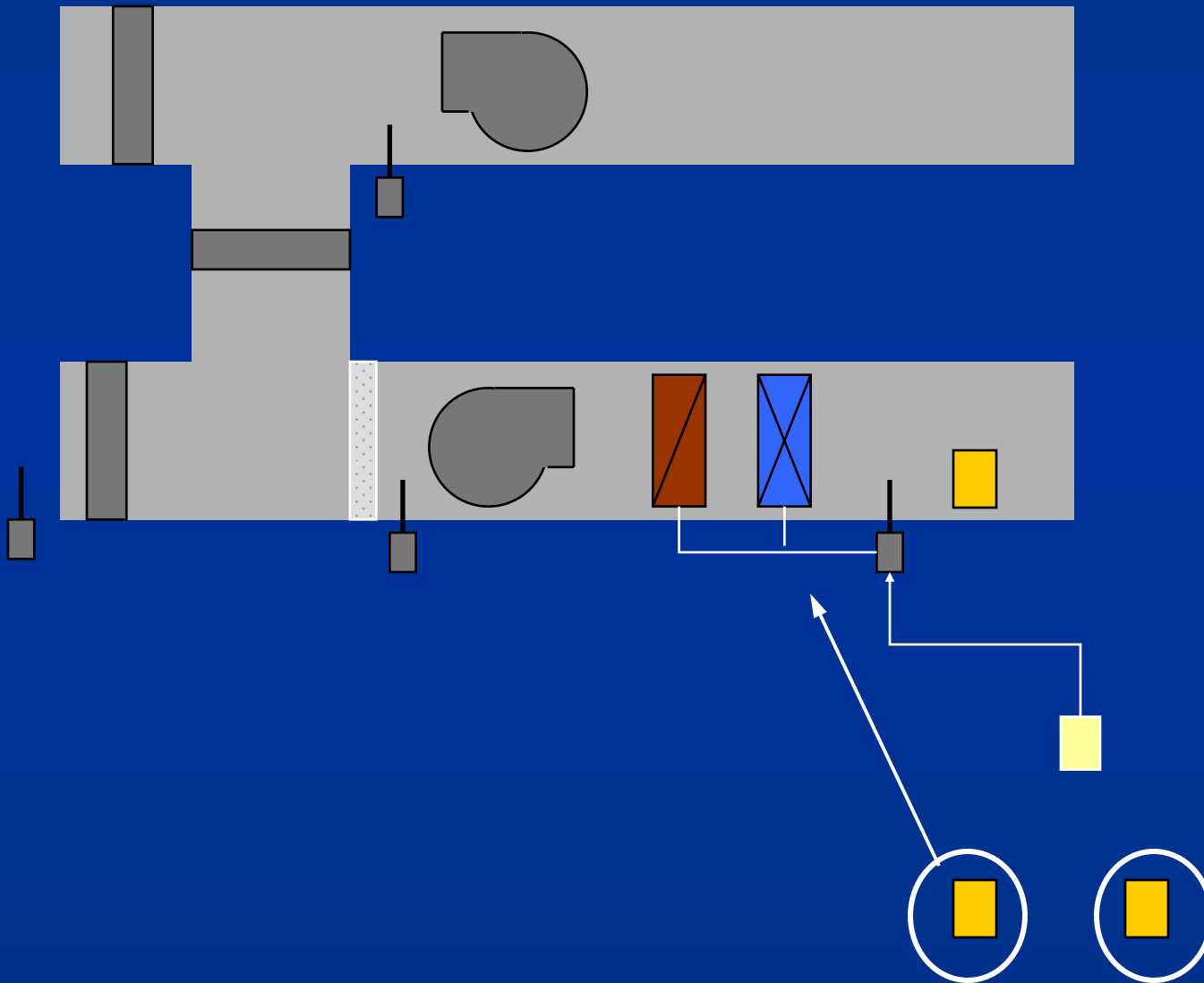
ID	DateTime	(°C)	(PSIG)
0	39091.77	27.3	0.02
1	39091.77	27.3	0.02
2	39091.77	27.3	0.02
3	39091.77	27.3	0.02
4	39091.77	27.4	0.04
5	39091.77	27.5	-0.02
6	39091.77	27.6	0.02
7	39091.77	27.6	-0.02
8	39091.77	27.7	0.02
9	39091.77	27.8	0
10	39091.77	27.8	0.02



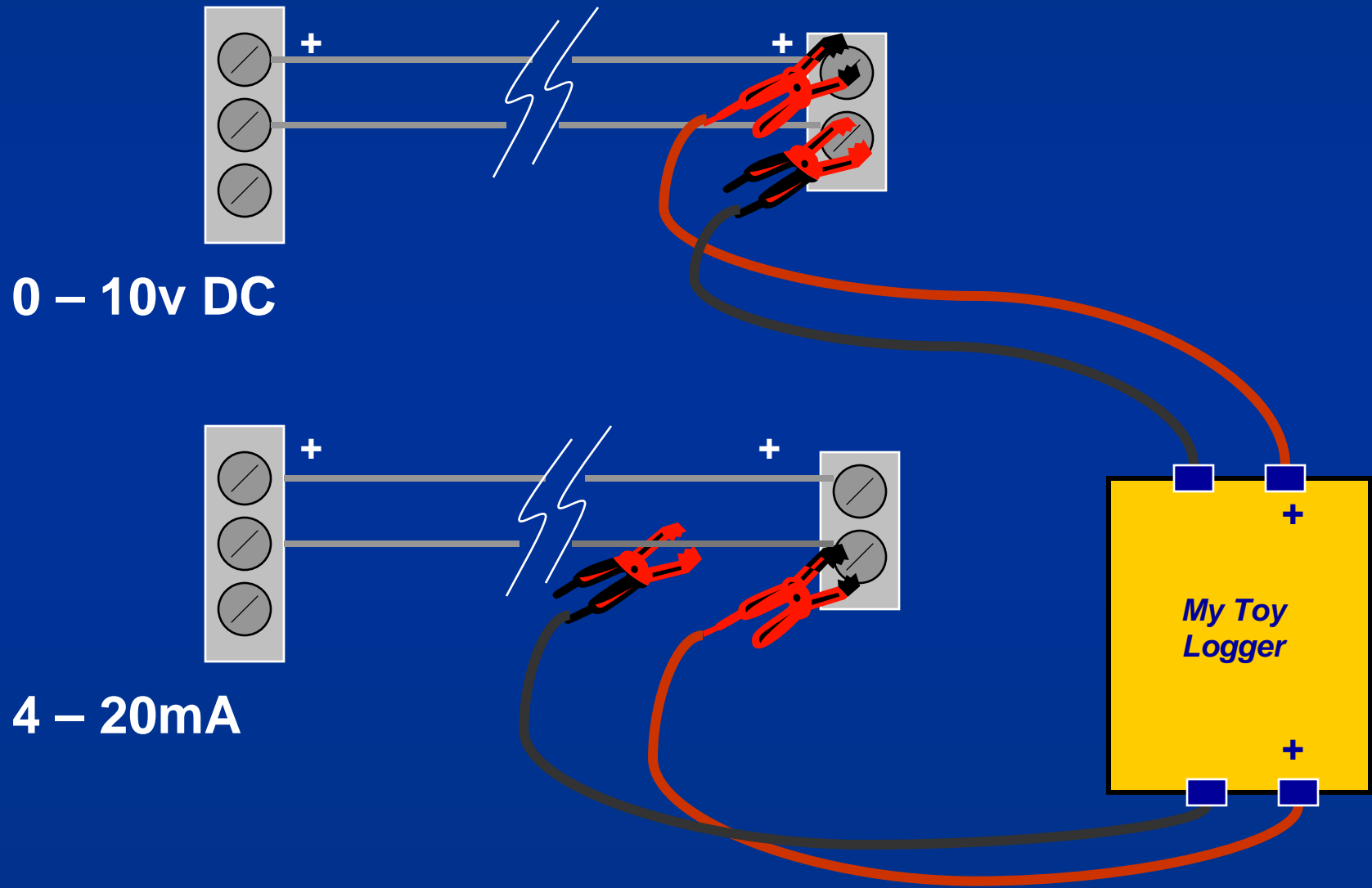
39091.772349537

1/9/2007 6:31:16 PM

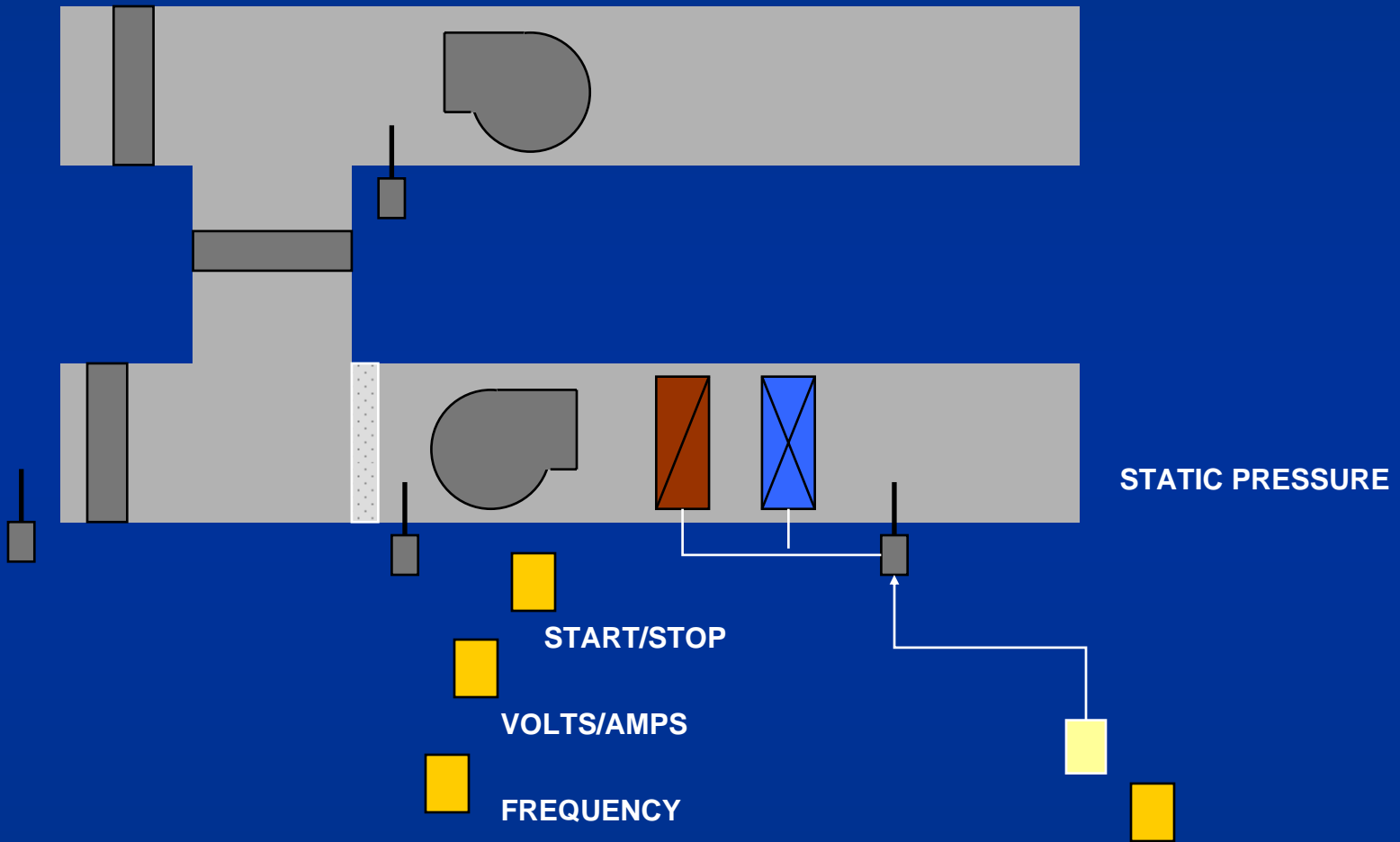
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Time - Interval / Real

Match and Multiples

Recorded Location –

Initial Reading - Time

Sit Back and Relax

Retrieve the Loggers or Data

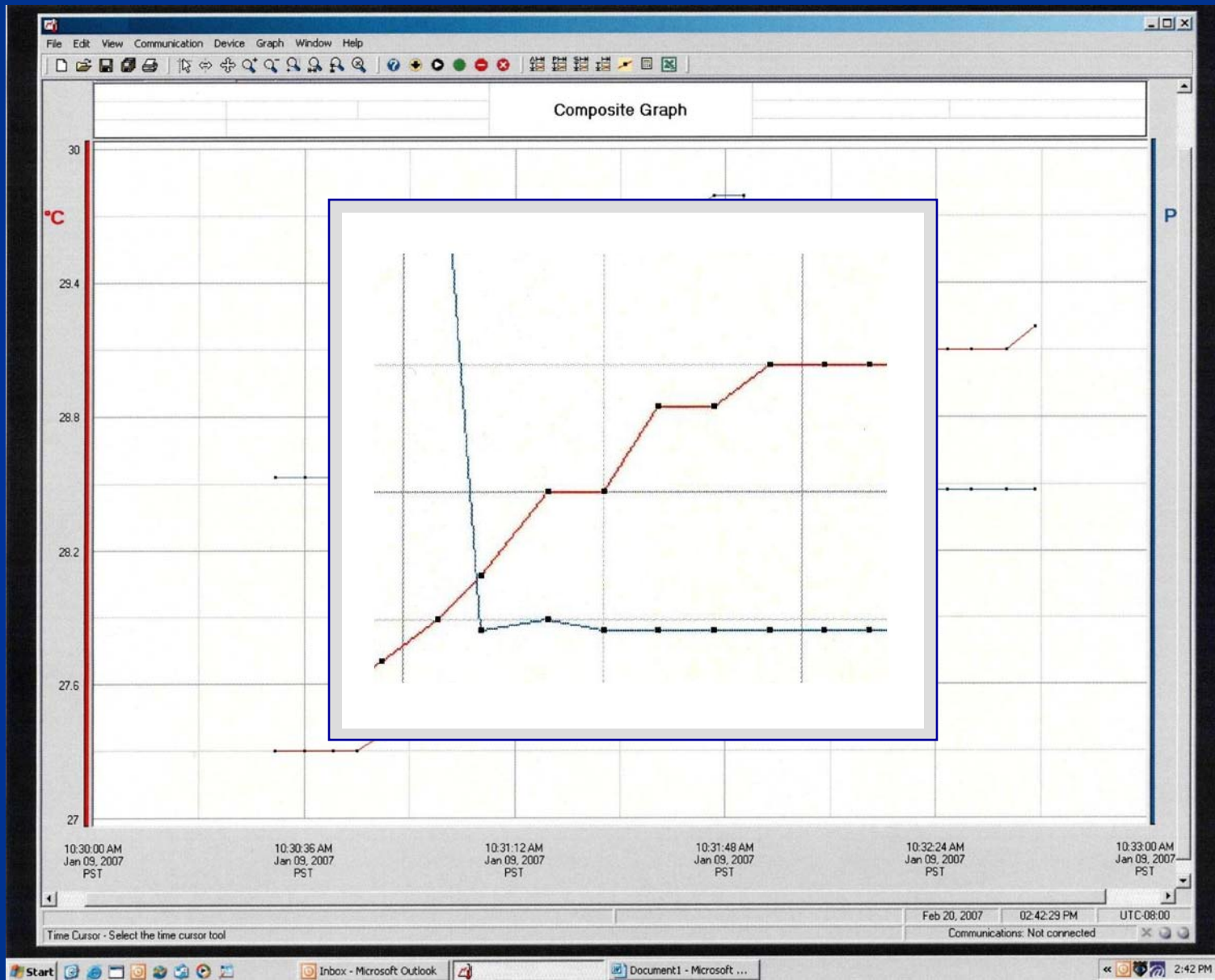
Plan Ahead of Time

Analysis

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Summary	
<b>Summary</b>	
<b><u>Statistics: Untitled Dataset</u></b>	
First Reading:	1
Last Reading:	27
Total Readings:	27
Start Time:	Jan 09, 2007 10:30:31 AM PST
End Time:	Jan 09, 2007 10:32:41 AM PST
Duration:	2 minutes 10 seconds
<b><u>Channel 1: Temperature</u></b>	
Minimum:	27.3 °C
Maximum:	29.2 °C
Average:	28.21111 °C
Standard Deviation:	0.6879922 °C
Mean Kinetic Temperature:	28.23471 °C
<b><u>Channel 2: Gage Pressure</u></b>	
Minimum:	-0.02 PSIG
Maximum:	0.86 PSIG
Average:	0.1777778 PSIG
Standard Deviation:	0.3436605 PSIG

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Owner -

New Construction - Pays the Bill

Remodel - Pays the Bill

Existing Staff – Buy Equipment

Re-Commissioning -

Train Staff – Own Equipment

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New Tools Available

Something New Everyday

Save Time / Better Product

Time Stamp

Cost

Software

Accuracy

Deployment

Batteries