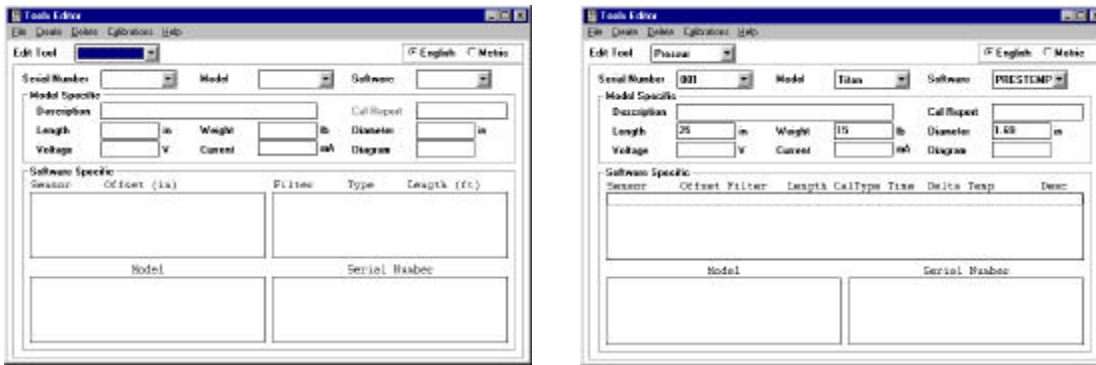


Pressure Temperature Tools

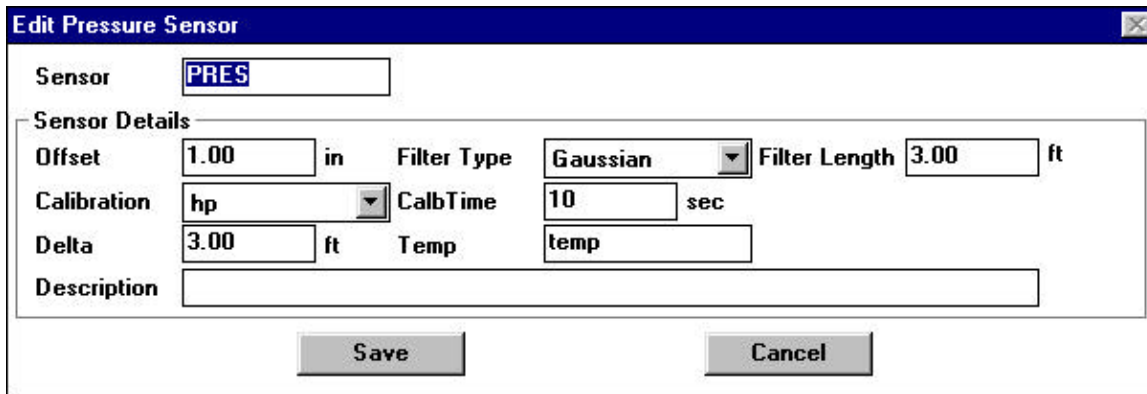
The Pressure/Temperature software allows for down hole pressure readings to be temperature corrected. The temperature and corrected pressure may then be recorded.

The Tool Editor may be accessed through the Warrior Utilities – Edit Logging Tool Details to enter the tool information that the Warrior software needs to set up recording parameters.

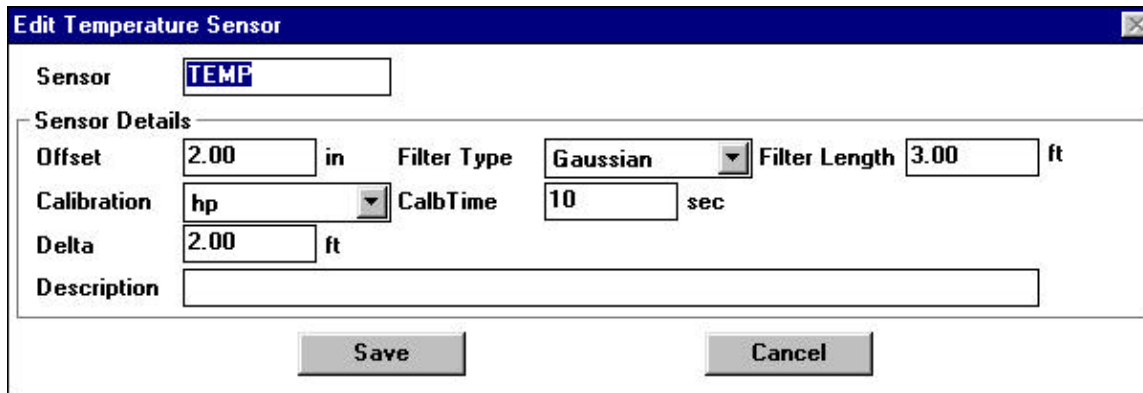
If there are no pressure tools in the drop down list of editable tools, then they will have to be created (Additional information is available on how to create tools).



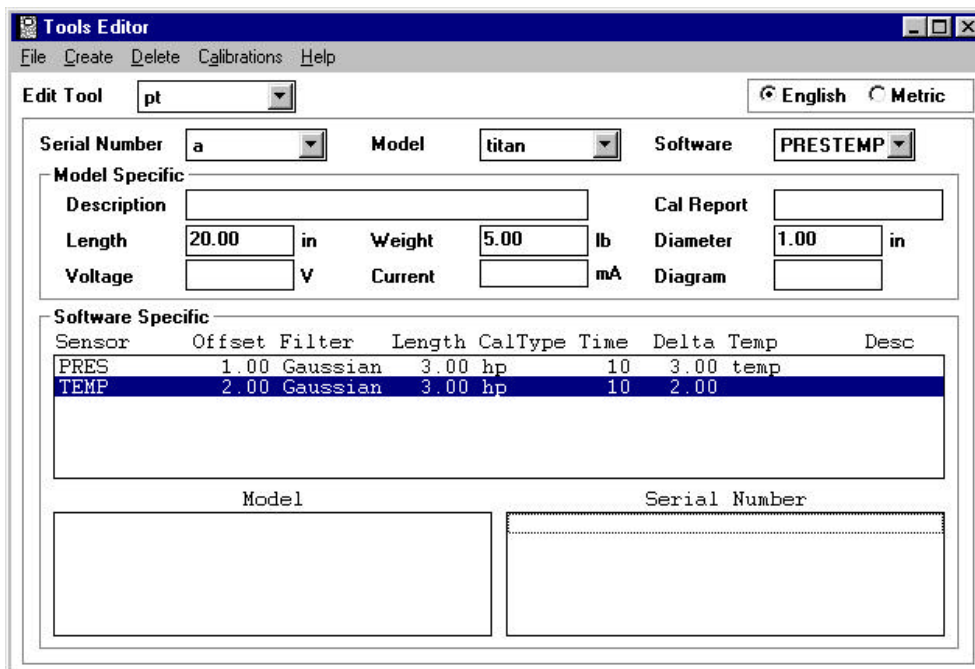
Once the dimensions have been entered, you will need to create two sensors. The first is the pressure and the second is the temperature.



Shown above is a typical sensor created that reads a HP coefficient file to compute the pressure and specifies the name for the temperature correction as Temp.



Shown above is a typical sensor for the temperature that will read a QD coefficient file. Below is a typical tool set up to read pressure and temperature coefficients from QD type files



Once the tool and sensors have been created and the file saved, you will need to edit the file Tools.INI (new software may allow you to do this in the tool editor). Search the file (probably near the end) for the tool and serial number followed by the model. You will need to add two lines to declare the coefficient file names.

```
[Pressur-001]      <- Original line in Tools.ini
Model=Titan        <- Original line in Tools.ini
Pres1Serial=xxx    <- Line added for pressure coefficient file
Temp1Serial=yyy    <- Line added for temperature coefficient file
```

For hp type pressure files, the coefficient file name must be of the form XXX.hpp where the XXX is 8 character or less DOS compliant file name.
Shown below the contents of a typical HP type pressure file.

```
73325-01
Pressure
psi
3
1
1
0
3
1
1
0
[COEFFICIENTS]
G0= 420.751960762
G1=-8.8518208907
G2= .0482314381713
G3=-8.04290537217E-5
H0= 4.16023195435
H1=-.00319635464461
H2= 1.81586145325E-5
H3=-3.20509628192E-8
I0= 5.43386107335E-6
I1=-1.3475368181E-7
I2= 5.80346201738E-10
I3=-7.53674140144E-13
J0=-1.2205051291E-9
J1= 2.05389986988E-11
J2=-9.66625422716E-14
J3= 1.3697476335E-16

T0= 21.7703381509
T1= .138027925057
T2= 5.67255606835E-5
T3=-1.82216462605E-8

1
0
100
345
1000
15000
15 MAY 2002
SLAP
```

Normally Clark measurements sends a packet of files. The .TF file and the .f16 file will need to be used to create the hpp file in the format shown above.

Clark Oilfield Measurement, Inc.
Nine South 109th East Place
Tulsa, OK 74128-1624
Ph: (918)438-7272 Fx: (918)438-7274
Email: Clark@clarkoilfield.com
Website: www.clarkoilfield.com

CoefFile.txt - Coefficient File Format and Computation Algorithms
for Hewlett Packard Style Coefficients Transducers
15 March 2000

The coefficient file names distinguish which coefficients are in the file
(i.e. xxx.f16 = 16 Coefs. 'F, xxx.c20 = 20 Coefs. 'C, xxx.r16 = 16 Coefs RTD and
xxx.tf = Temperature Coefs. 'F when applicable).

The transducer coefficient files are ASCII text with the following format:

Serial Number
Coefficient type (PRESSURE or TEMPERATURE)
units (default is psi, 'F or 'C)
nt - Polynomial order in ft (temperature)
pt - ft Prescale Algorithm (default 1)
mt - Scaling factor (default 72)
ft0 - Offset Frequency (default 0)
np - Polynomial order in fp (pressure)
pp - fp prescale algorithm (default 1)
mp - Scaling factor (default 72)
fp0 - Offset Frequency (default 0)
G0 - coefficients
G1 -
G2 -
G3 -
G4 or H0 - G4 if 20 coefficients H0 if 16 coefficients
.
.
xx - The number of coefficients is $(np + 1) * (nt + 1)$
span - used for changing units or adjusting span (default 1)
zero - used to adjust offset (default 0)
tmin - minimum calibrated temperature
tmax - maximum calibrated temperature

pmin - minimum calibrated pressure
pmax - maximum calibrated pressure
calibration date
model number

Pressure with 16 Coefficients is computed

$$P(F,T) = G(T) + F*(H(T) + F*(I(T) + F * J(T)))$$

where: P is in the range pmin to pmax
T is in the range tmin to tmax 'F or 'C or 'RTD
F is line frequency in Hz times mt (Usually 72)

the coefficients are given by a cubic in temperature:

$$\begin{aligned}G(T) &= G0 + T*(G1 + T*(G2 + T * G3)) \\H(T) &= H0 + T*(H1 + T*(H2 + T * H3)) \\I(T) &= I0 + T*(I1 + T*(I2 + T * I3)) \\J(T) &= J0 + T*(J1 + T*(J2 + T * J3))\end{aligned}$$

Pressure with 20 Coefficients is computed:

$$F(P,T) = G(T) + P*(H(T) + P*(I(T) + P * J(T)))$$

where: P is in the range pmin to pmax
T is in the range tmin to tmax 'F or 'C or 'RTD
F is line frequency in Hz times mt (Usually 72)

the coefficients are given by a cubic in temperature:

$$\begin{aligned}G(T) &= G0 + T*(G1 + T*(G2 + T *(G3 + T * G4))) \\H(T) &= H0 + T*(H1 + T*(H2 + T *(H3 + T * H4))) \\I(T) &= I0 + T*(I1 + T*(I2 + T *(I3 + T * I4))) \\J(T) &= J0 + T*(J1 + T*(J2 + T *(J3 + T * J4)))\end{aligned}$$

Temperature is computed:

$$T(F) = T0 + F*(T1 + F*(T2 + F * T3))$$

where: F is line frequency in Hz times mt (Usually 72)