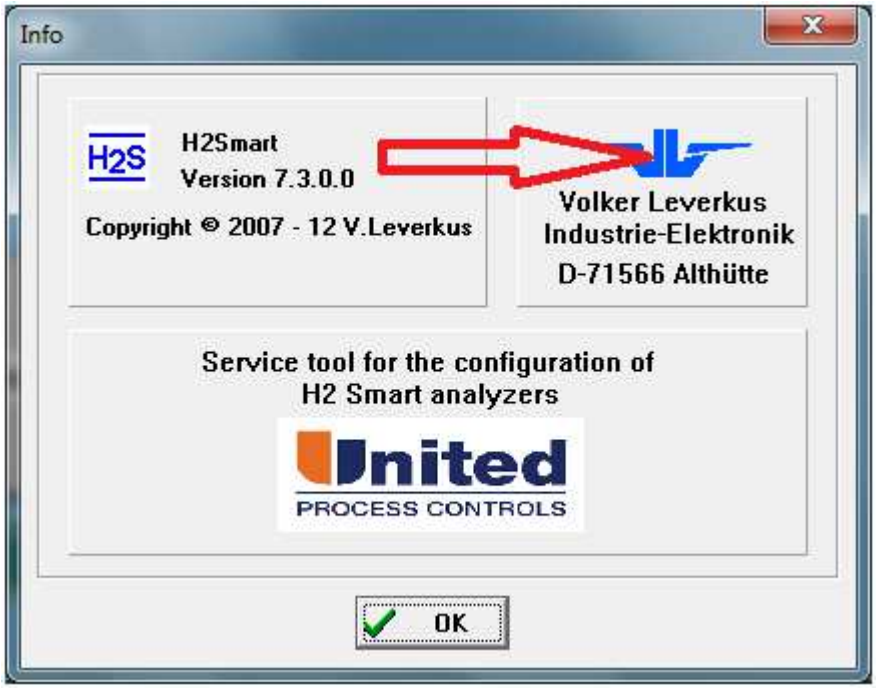
Ri Test Alarm

The „Ri Test Alarm“ occurs because there is a impedance measurement active which should be switched off.

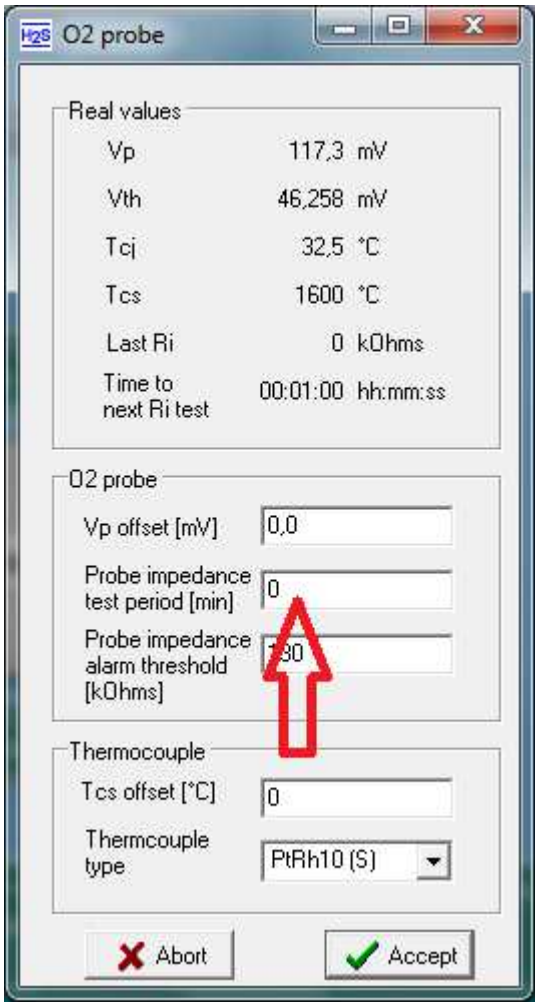
Please do following to switch this measurement off:

1. Start H2Smart Configuration Software
2. Connect to the instrument
3. Select the “?” in the main menu
4. Doublclick the Logo of Volker Leverkus Elektronik



5. Then you get a input where you enter “1973” as password.

6. Now you have more possibilities in the H2Smart Configuration Software.
7. Select “Configuration”->”O2Probe” from menu
8. Now you get a dialog like this:



9. Please enter here a “0” for Probe impedance test period. And confirm with Accept.

Kn Value

There is two ways to calculate Kn implemented in the H2Smart.

The first and easier way is the so called “substitute KN”

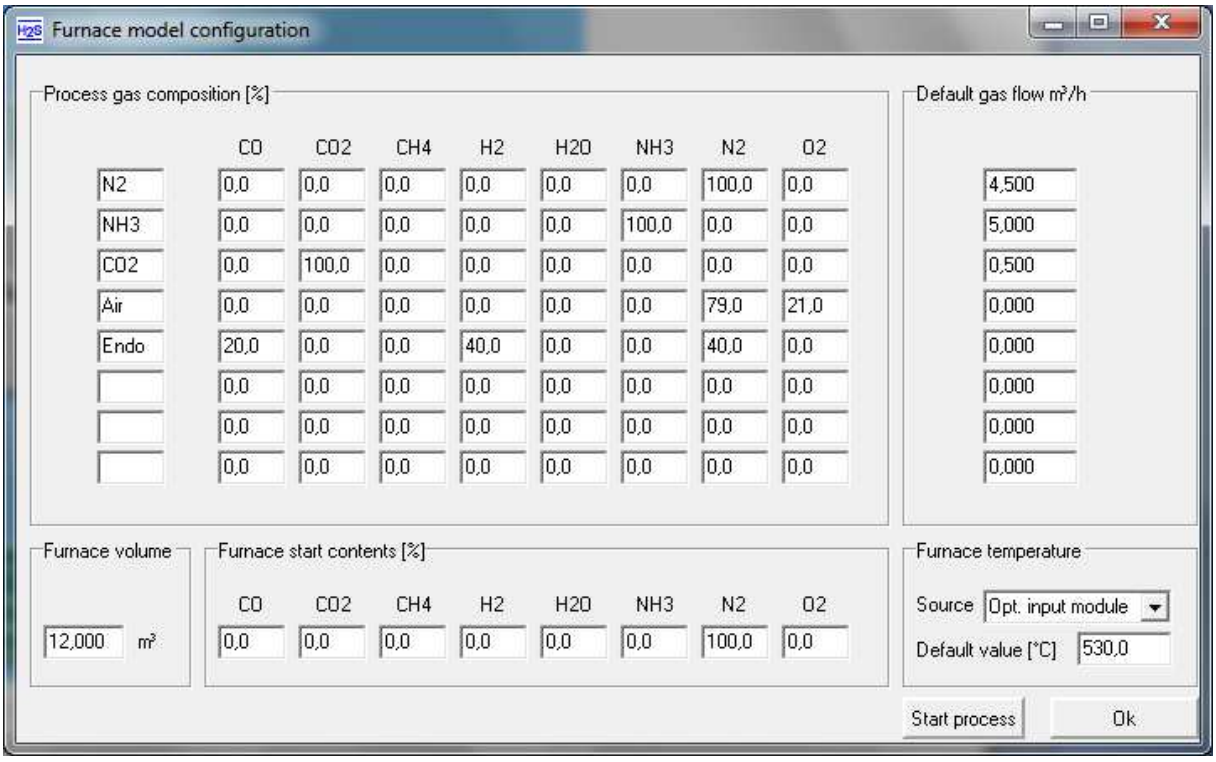
This calculation is based on the assumption that only Ammonia or pre dissociated ammonia is used as furnace inlet gases.

If you have also other gases which you lead to the furnace you will get a failure. As long as the other gases are only a small amount of the complete gas flow to the furnace this failure is very small and could be accepted. For example if you use NH3 but in a mixture with 3% CO2 the failure will be very small.

But if you have a mixture of for example 50% NH3, 47% N2 and 3% CO2 the failure will be too big. Then you need to take the second way of calculation KN.

The second way of calculation KN is based on a mathematic model called “furnace model”. Here we use the sensor readings: H2%, mV of oxygen probe and temp measurement of oxygen probe. But we also need all the flows to the furnace. This means you need to transfer the **current** gas flows to the furnace by using a bus system. You can also enter these values in the configuration software but this is not possible for the whole process.

To use this calculation as first you configure it. The configuration for the model you get with “configuration”->”furnace model configuration”.

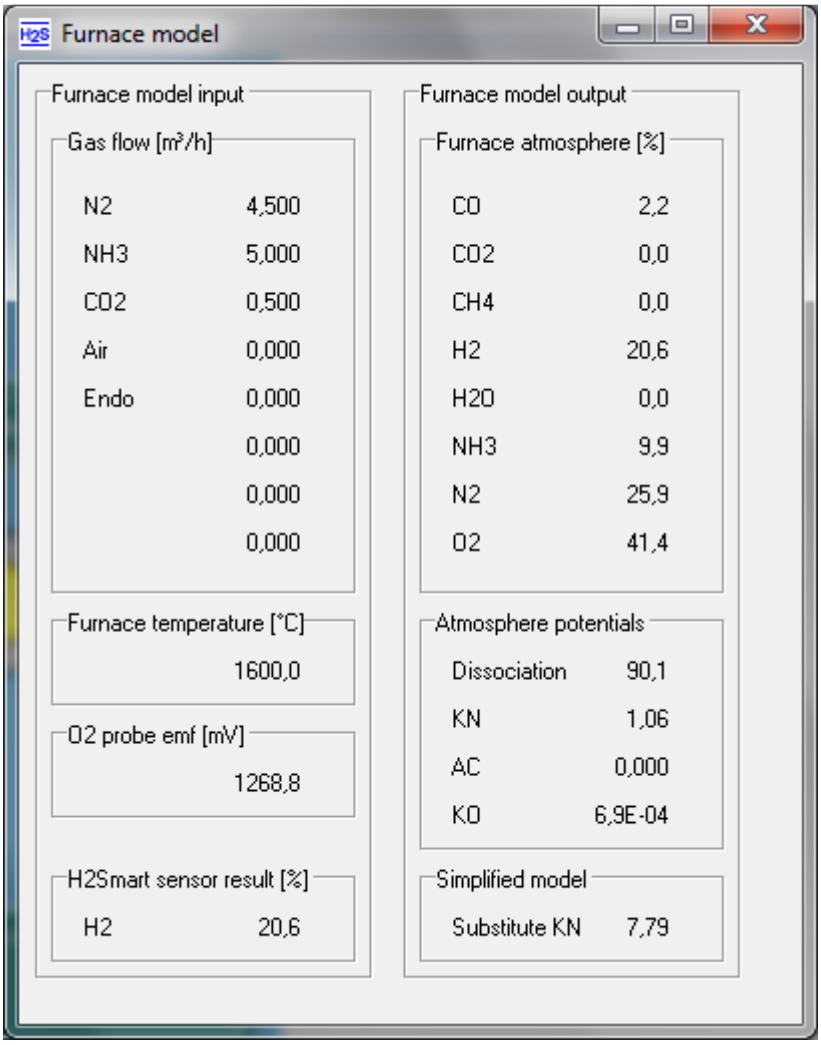


Here a example were I defined different gases: N2, NH3, CO2,Air and Endo as a example on the left side as “Process gas composition”.

And I entered also flows on the right side under Default gas flow. There is 4,5 m³/h N2, 5 m³/h NH3 and 0,5 m³/h CO2.

You also must enter here the volume size of the furnace.

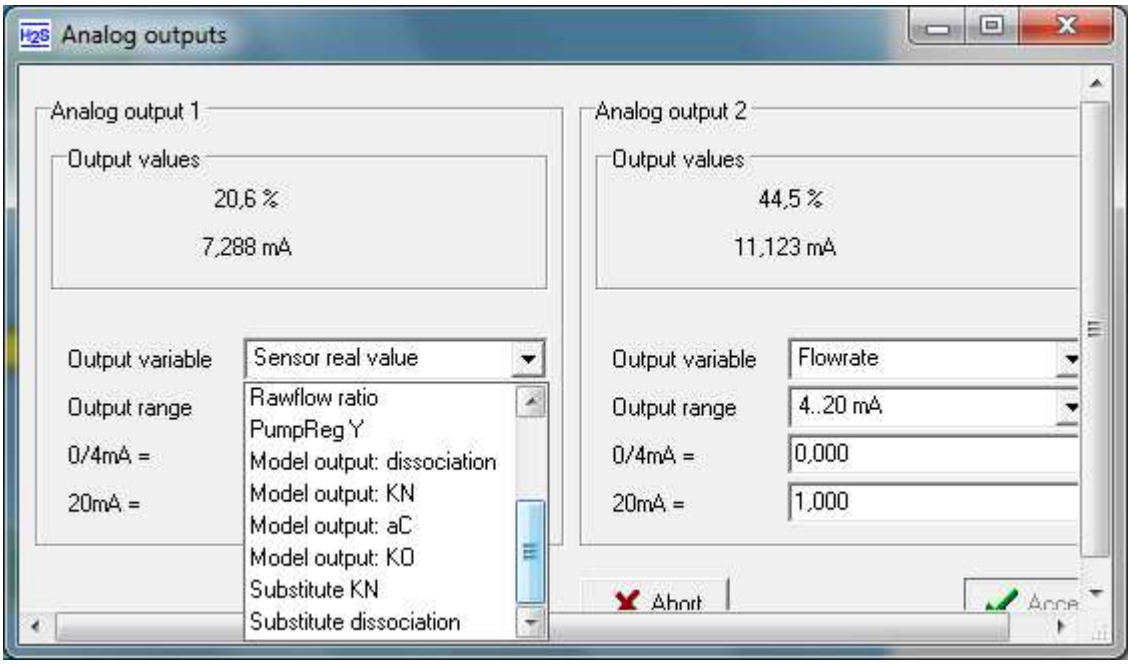
This will result in following calculation results:



But to get a proper calculation within the process you need to send the flow values for the gases by a fieldbus to the H2Smart.

Assignment of analogue outputs

Under “Configuration”->”Analog Outputs” you can define which value you will get on the two analog outputs.



KN control

You can increase the Kn value by leading a higher amount of NH3 to the furnace. And you can lower the Kn by decreasing the NH3 flow to the furnace.

If you need very low Kn values it might be not enough only to lower the NH3 flow. Because you need a certain flow to hold the furnace pressure. In that case you would lead a mixture of NH3 and H2 or NH3 and dissociated NH3 to the furnace. To increase Kn you would need to go with higher NH3 and lower H2 or predissociated NH3. To decrease Kn you would go with more lower NH3 flow but higher H2 or predissociated NH3 flow.

Which value of KN you need for your process

For this question you will find answers in literature about nitriding and nitrocarburizing. The proper process setup depends very much of the material, the pretreatment of the material and of the needed specification of the treated parts.