



Engineering Note

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Title:	Moisture sensor output impedance characteristics
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Summary:	An output impedance change in production moisture sensor may have side effects in some installations. This note describes the changes and the effects which these may cause.

Introduction

The output impedance of Hydronix moisture sensors has for some time been approximately 4K7 Ohm. This high value was originally incorporated to provide some degree of protection for the output amplifier in the sensor. Since the sensor output is essentially a voltage source a high output impedance is undesirable although when connected to Hydronix instruments such as the moisture interface unit and the Hydro-View this generally caused no side effects.

Introduction of the EMC Directive in January this year has forced a reduction in the input impedance of both the Hydro-View (model HV02) and Hydro-Control IV (revision letter D) units to reduce the effects of noise coupled onto incoming cables. The input impedance of these devices is now about 20K Ohm which will load the output of the existing moisture sensor. To prevent this occurring, a corresponding reduction has now been effected in the sensor output impedance.

What has been changed?

The output impedance of the moisture sensor has been reduced from 4K7 to 100R.

Which units have been affected?

All moisture sensors manufactured with serial numbers higher than **11052** will have a reduced output impedance.

What are the side-effects?

The most noticeable side-effect will be if a sensor manufactured prior to this change is replaced with a new sensor in an installation involving either a Hydro-View model HV02 (any revision) or Hydro-Control IV revision letter D or above. These two instruments both have a low input impedance of about 20K Ohm. With an older sensor, the instruments would load the sensor output and so the sensor output voltage measured with the sensor connected to the instrument would be about 20% lower than that measured with it disconnected.

With the revised sensor, this loading effect will be only about 0.5%. The most important consequence of this is to move any calibration values already programmed into the instruments. It will normally not be necessary to perform a re-calibration of the sensors in this situation since it is possible to calculate the required change in calibration using the formula...

$$U = U_0 - 4.12$$

where...

U is the new unscaled input value to enter into the calibration table.

U₀ is the corresponding unscaled input value used in the original calibration table.

Third party instrumentation

Where Hydronix moisture sensors have been used with instrumentation not manufactured by Hydronix, the change in output impedance may or may not have any side effects, depending on the

instrument design. In most cases the change to the sensor design will be beneficial, but you should check with your instrument supplier if in doubt. Hydronix cannot accept any responsibility for the use of its moisture sensors with third party equipment.
