

HYDROMETTE



H 35



EN Operating Instruction
Hydromette

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0.1 Publication Statement

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GANN Mess- u. Regeltechnik GmbH, Gerlingen, Germany.
30.08.2017

0.2 General Notes

This measuring device fulfils the requirements of the applicable European and national directives (2004/108/EC) and standards (EN61010). Appropriate declarations and documentation are held by the manufacturer. To ensure trouble-free operation of the measuring device and operational reliability, the user must carefully read the operating instructions. The measuring device may only be operated under the climatic conditions specified. These conditions can be found in Chapter 3.1 "Technical data". This measuring device may likewise only be used under the conditions and for the purposes it was designed for. Operational reliability and functionality are no longer ensured if the device is modified or adapted. Gann Mess- u. Regeltechnik GmbH is not liable for any damage arising from such modifications or adaptations. The risk is borne by the user alone.

- The device must not be stored or operated in aggressive air or air containing solvents!
- **Static charge** - at low levels of air humidity aided by external factors (friction during material transport, high insulation of the surrounding area), static electricity can build up with high voltages, which can not only lead to

strong swings in measured values or minus values, but also to the destruction of electrical components in the device. The operator of the measuring device can also, unintentionally, contribute to the build-up of static charge from his/her clothing. A significant improvement can be achieved by ensuring the operator and the measuring device remain completely still during the measurement process and by grounding (touching conducting metal, water or heating pipes, etc.).

- Frozen wood cannot be measured.
- The notes and tables in these instructions on permitted or normal humidity conditions in practice and the general definitions of terms have been taken from the specialist literature. No responsibility can therefore be taken by the manufacturer for the correctness of this information. The conclusions to be drawn from the measurement results are related to the individual conditions and the knowledge drawn from professional experience for each user.
- The measuring device may be operated in residential and commercial areas, as the stricter class B for emitted interference (EMC) has been adhered to.
- The measuring device and any accessories may only be properly used as described in these instructions. Keep the device and accessories out of the reach of children!
- Wood and other materials should not be measured on conductive surfaces.

Gann Mess- u. Regeltechnik GmbH accepts no liability for damage resulting from non-adherence to the operating instructions or by not taking proper care during transport, storage and handling of the device during operation, even if this requirement for care is not specifically addressed in the operating instructions.

0.3 WEEE Directive 2002/96/EC Law on Electrical and Electronic Equipment

Disposal of packaging, the battery and the device must be undertaken in accordance with the legal requirements at a recycling centre.

The device was manufactured after 1 October, 2009

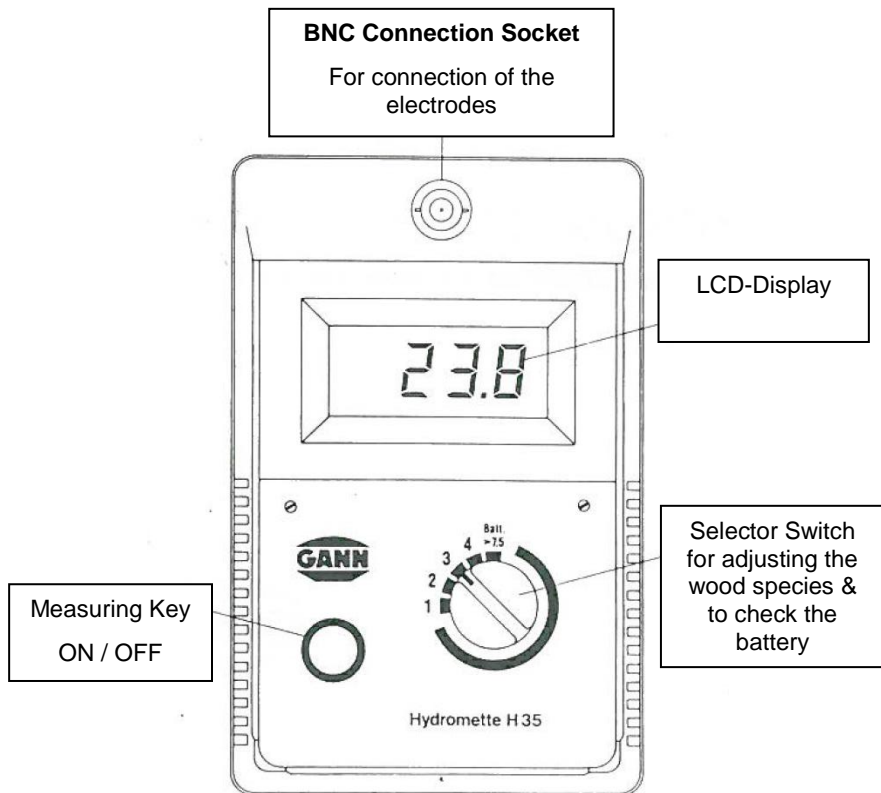
1 Introduction

1.1 Description

The H 35 is an electronic wood moisture meter based on the electric resistance measurement principle. It is designed for precise measurement of sawn timber (up to 180 mm thick), particleboards and veneers. The device is ideal for both single and series measurements before, during and after processing wood.

The Hydromette H 35 is especially applicable for carpentries, parquet layers and painters.

1.2 Device Layout and Button Assignment



2 Basic Functions

2.1 Switch position

Selector Switch „1-4“

Set selector switch to position stated in the enclosed table for the species of wood to be tested. Connect the measuring electrode to the BNC connection socket by using the measuring cable MK 8. Drive-in, stick-in or press the electrode on the timber to be measured.

Press the measuring key and read off result displayed by digital LCD read-out as soon as the reading has stabilized. Do not press the measuring key more than three seconds.

Selector Switch „Batt.“

Battery Check

Execution: Press the measuring key. The value now displayed should be higher than 7.5. If it is 7.5 or lower, the battery is exhausted and must be replaced or recharged.

A list of battery types that can be used can be found in the "Technical data" chapter.

2.2 Temperature Compensation

The result obtained is referred to a timber temperature of 20 °C. In the event of significant temperature deviations, the readings must be corrected as per table attached.

		Reading													
		4	5	6	7	8	9	10	11	12	13	14	15	16	17
°C wood temperature	-10	7.0	8.5	9.5	11.0	12.0	13.5	14.5	16.0	17.0	18.5	19.5	20.5	22.0	23.0
	- 5	6.5	7.5	9.0	10.0	11.0	12.5	13.5	15.0	16.0	17.5	18.5	19.5	20.5	22.0
	0	6.0	7.0	8.5	9.5	10.5	11.5	13.0	14.0	15.0	16.5	17.5	18.5	19.5	21.0
	+ 5	5.5	6.5	7.5	8.5	9.5	11.0	12.0	13.0	14.0	15.0	16.5	17.5	18.5	20.0
	+10	5.0	6.0	7.0	8.0	9.0	10.5	11.5	12.0	13.0	14.0	15.5	16.5	17.5	19.0
	+15	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5	16.5	18.0
	+20	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0
	+25	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5	16.0
	+30	3.0	4.0	5.0	6.0	7.0	8.0	9.0	9.5	10.5	11.5	12.5	13.5	14.5	15.5
	+35	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.0	10.0	11.0	12.0	13.0	14.0	15.0
	+40	2.5	3.5	4.0	5.0	6.0	7.0	7.5	8.5	9.5	10.5	11.5	12.0	13.0	14.0
	+45	2.0	3.0	3.5	4.5	5.5	6.5	7.5	8.0	9.0	10.0	11.0	11.5	12.5	13.0
	+50	2.0	2.5	3.0	4.0	5.0	6.0	7.0	7.5	8.5	9.5	10.5	11.0	12.0	12.5
	+55	1.5	2.5	3.0	4.0	5.0	5.5	6.5	7.0	8.0	9.0	9.5	10.5	11.5	12.0
+60	1.0	2.0	2.5	3.5	4.5	5.0	6.0	6.5	7.5	8.5	9.0	10.0	10.5	11.5	
actual timber moisture content in %															

		Reading												
		18	19	20	21	22	23	24	25	26	27	28	29	30
°C wood temperature	-10	24.5	25.5	27.0	28.0	29.5	30.5	32.0	33.0	34.5	35.5	36.5	38.0	39.0
	- 5	23.0	24.0	25.5	26.5	28.0	29.0	30.5	31.5	32.5	34.0	35.0	36.0	37.0
	0	22.0	23.0	24.5	25.5	26.5	27.5	29.0	30.0	31.0	32.5	33.5	34.5	35.5
	+ 5	20.5	21.5	23.0	24.0	25.0	26.0	27.5	28.5	29.5	31.0	32.0	33.0	34.0
	+10	19.5	20.5	22.0	23.0	24.0	25.0	26.0	27.0	28.0	29.5	30.5	31.5	32.5
	+15	19.0	20.0	21.0	22.0	23.0	24.0	25.0	26.0	27.0	28.0	29.0	30.0	31.0
	+20	18.0	19.0	20.0	21.0	22.0	23.0	24.0	25.0	26.0	27.0	28.0	29.0	30.0
	+25	17.0	18.0	19.0	20.0	21.0	22.0	23.0	24.0	25.0	26.0	27.0	27.5	29.0
	+30	16.5	17.0	18.0	19.0	20.0	21.0	22.0	23.0	24.0	25.0	25.5	26.5	27.5
	+35	16.0	16.5	17.5	18.0	19.0	20.0	21.0	22.0	23.0	24.0	24.5	25.5	26.5
	+40	15.0	15.5	16.5	17.5	18.5	19.5	20.0	21.0	22.0	23.0	23.5	24.5	25.5
	+45	14.0	15.0	15.5	16.5	17.5	18.5	19.0	20.0	21.0	22.0	22.5	23.5	24.5
	+50	13.5	14.5	15.0	16.0	17.0	18.0	18.5	19.5	20.5	21.0	22.0	22.5	23.5
	+55	13.0	13.5	14.5	15.0	16.0	17.0	17.5	18.5	19.5	20.0	21.0	21.5	22.5
+60	12.5	13.0	14.0	14.5	15.5	16.5	17.0	18.0	19.0	19.5	20.5	21.0	22.0	
actual timber moisture content in %														

2.3 Species of Wood

The species selector switch enabled to set one of four different calibrations to be chosen according to the varying electrical resistance of the various species of wood. Therefore, correction tabled are not required. For setting the species selector switch (position 1 to 4), consult table attached.

2.4 Testing non-classified Species of Wood

First take a sample of the species of wood in question, with moisture content equalized as well as possible, and take a reading at all four positions of the selector switch. Then determine its actual moisture content by an oven test. The setting at which the meter reading shows the smallest deviation from the result obtained by the oven test now served for all future measurement.

The oven test should be run at 100 - 105 °C until constant weight. The actual moisture content in percent is then calculated by the formula:

$$\frac{(\text{Initial Weight (wet)} - \text{Dry Weight}) \times 100}{\text{Dry Weight}}$$

If an oven test cannot be made for any reason, we recommend to set selector switch to position 3 for all species not contained in the attached table.

2.5 Connection of the Electrodes

The meter can be used with different types of electrodes. The electrodes are connected to the meter socket by using the measuring cable MK 8. On the meter side, this cable is fitted with a BNC plug. Turn clockwise to lock it in. To disconnect, turn notched fastening ring anti-clockwise.

Do not use force and not pull on the cable.

3 Specifications

3.1 Technical Data

Operating conditions:	0 to + 50° C - 10 to + 60° C (short-term)
Storage conditions:	+ 5 to + 40° C - 10 to + 60° C (short-term)
Power supply:	9 V block battery
Approved types :	type 6LR61 or type 6F22
Dimensions:	140 x 90 x 50 (L x W x H) mm
Weight:	approx. 230 g

3.2 Prohibited Environmental Conditions

- Condensation, air humidity continuously too high (> 85 %) and damp
- Permanent presence of dust and combustible gases, fumes and solutions
- Ambient temperatures continuously too high (> +40° C)
- Ambient temperatures continuously too low (< +5° C)

3.3 Measuring Ranges

Wood moisture:

4 to 30 %

If the moisture content of the timber to be tested is higher than 30 % respectively, the LCD readout displays the figure „1“. This means that the measured value exceeds the measuring capacity of the meter.

4 Application Instructions

4.1 General Information on Timber Moisture Measurement

4.1.1 Introduction

The working principle of the Hydromette H 35 is based on the electrical resistance or conductivity measuring method, well known for many years. This method is based on the fact that the electrical resistance is dictated to a large extent by the timber moisture content, showing an almost linear relationship in the moisture range between 4 and 30 % (i.e. below fibre saturation point).

The conductivity of bone-dry timber is very poor and its resistance very high so that no current worth mentioning can flow. The conductivity of wood increases with its moisture content, and its resistance decreases.

In the range above the fibre saturation point (about 30 % m.c.) readings become progressively less accurate, depending on the moisture content of the timber to be measured, its specific weight and temperature and the species of wood.

With European conifers and exotic timbers, such as Meranti/Lauan, greater measuring errors must be expected in the range above 40

% m.c. whereas relatively accurate readings can be obtained with oak, beech, White Afara etc. up to 60 & m.c.

To achieve as accurate readings as possible, the samples selected should be measured at several spots. It should always be observed that the minimum penetration depth of the electrode needles, driven into the timber across the grain, is 1/4 and the maximum depth 1/3 of timber thickness.

Testing frozen timber should be avoided.

4.1.2 Drive-in Electrode M 20

The electrode is hammered into the wood to be measured with the needles across the fibre direction (electrode body is made of impact resistant plastic). When removing, light sideways movements at right angles to the fibres can be used to loosen the needles.

To determine the core moisture content, the electrode pins must reach to 1/3 of the overall wood thickness.

On delivery of the measuring device with electrode M 20, 10 replacement pins each of 16 and 23 mm length are included. These are suited for measuring wood thicknesses up to a max. of 30 and 50 mm respectively.

If thicker wood is to be measured, the electrode needles can be replaced with a suitably longer version. With increasing needle length, however, increased danger of breakage or bending (particularly when pulling out) must be expected. It is therefore recommended to use the M 18 ram-in electrode for thicker or particularly hard woods.

Where possible, the hex nuts should be tightened with a spanner or pliers before beginning a measurement sequence. Loose electrode pins break easily.

4.1.3 Surface Measurement Caps M 20-OF 15

Surface measurements should only be made with wood moisture levels under 30 %. For surface measurements on workpieces that have already been processed, or for measuring veneers, both hex nuts on the M 20 electrode are unscrewed and replaced with the surface measurement caps. For the measurement, both contact surfaces are pressed onto the workpiece to be measured or onto the veneer at right angles to the fibre direction. The measurement depth is approx. 3 mm, therefore multiple sheets of veneer must be laid on top of each other for the measurement. Do not measure on metal surfaces! When measuring stacks of veneer, to unearth the measuring point, the veneer is **lifted** and **not pulled** over the remaining stack (**avoid friction: electrostatic charge!**). Wood particles adhering to the measuring surface must be regularly removed. If the elastic, plastic measurement sensor is damaged, they can be reordered (no. 4316) and glued on using standard cyanate-based instant adhesive.

4.1.4 Stick-in Electrode Pins M 20-HW 200/300

If the hex nuts with standard electrode pins on the M 20 electrode are removed, they can be replaced with the M 20-HW electrode pins. These must be fastened tightly!

For measurements in shavings and wood wool, it is advisable to compact the material to be measured a little. To do so, wood shavings should be pressed together with a weight of approx. 5 kg. No compression is necessary for balls of wood wool.

4.1.5 Ram-in Electrode M 18

Both needles of the ram-in electrode are to be hammered to the required measurement depth at right angles to the fibre direction with the slide hammer. To determine the core moisture content, the electrode pins must reach to 1/3 of the overall wood thickness.

Pulling out the needles is also done with the slide hammer with the impact direction upwards. Where possible, the hex nuts should be tightened with a spanner or pliers before beginning a measurement sequence. Loose electrode pins break easily.

Warning:

Do not completely drive in the electrode pins. There should be approx. 4 - 5 mm space between the wood surface and the hex nut. This is especially true when using Teflon-insulated pins.

When delivered, ram-in electrode M 18 is supplied with 10 replacement pins of 40 and 60 mm length (not insulated). These are suited for measuring wood thicknesses up to approx. 120 and 180 mm respectively.

If wood is to be measured with a large difference in the spread of moisture (e.g. accumulations of water), we recommend the use of Teflon-insulated electrode pins, which enable very precise measurement of zones and layers. They can be supplied in packets of 10 in lengths of 45 mm (order no. 4550) and 60 mm (order no. 4500).

4.1.6 Test Adapter for Wood Moisture Measurement

With the test adapter supplied with order no. 6070 for checking the wood moisture measuring element, the functionality of the device, measurement cable and electrodes M 18 and M 20 can be tested.

For this, the device is connected with measurement cable MK 8 and the 4-mm plug of the cable in the socket of the test adapter.

The device must be set to wood type 4. The display should show 21 %. A deviation of +/- 0.5 % is permitted.

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4.1.7 Static Charge

At low levels of air humidity aided by external factors (friction during material transport, high insulation of the surrounding area), static electricity can build up with high voltages, which can not only lead to strong swings in measured values or minus values, but also to the destruction of electronic components in the device. The operator of the measuring device can also, unintentionally, contribute to the build-up of static charge from his/her clothing. A significant improvement can be achieved by ensuring the operator and the measuring device remain completely still during the measurement process and by grounding (touching conducting metal, water or heating pipes, etc.)

4.1.8 Equilibrium Wood Moisture Content

If wood is stored in a particular climate for a long period, it takes up the moisture matching this climate, which is termed equilibrium moisture content or equilibrium wood moisture content.

On reaching the equilibrium moisture content, the wood no longer loses moisture if the surrounding conditions remain the same and also does not take up any moisture.

The equilibrium wood moisture content is between approx. 6.0 and 7.5 % wood moisture (corresponds to 30–40 % rel. humidity and 20–25 °C) in the winter months, and between approx. 10.5 and 13.0 % (corresponding to 60–70 % rel. humidity and 25 °C) in the summer months. Further values and tables can be found on the Internet.



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