

Grain and seed analyzer type Super CHTM2/25K

Instruction manual of the meter Super CHTM2/25k:

Introduction:

The meter is intended to examine and measure the moisture content in whole range of known humidity for every measured substances. Therefore the specifications shows only substance/product name, but not about the lowest or highest moisture content point.

The unit examine the moisture content with use of the high frequency impedance (also known as capacitance or dielectric) measurement method. The measured materials are not damaged, changed or affected in any way. Other material parameters as protein, oil and starch are examined with infrared absorption microspectrometer. Simultaneously the unit measure the substance temperature with infrared emission detection sensor. Built in synchronous vibration module guarantee the optimal material density and maximal repeatability of pour of the measured material. Moreover, the meter is equipped with GNSS module to mix measurement results with geographical coordinates, date and time as well.

Every measurement and data is stored in nonvolatile memory with 1000 registers. With help of Bluetooth v5.0 interface is possible to transmit all results to PC computer or connected printer. Also is possible to change, modify the unit parameters, ranges, sensitivity, and calibration data. Everything with Bluetooth is supported with free of charge software available at www.asonik.eu.

The use of the meter is supported with set of messages, names, and informations shown at the OLED display. Is possible to display substance names and commands in any requested language. The basic language is English. The repeatability error is no greater than 0,2%. The measurement readout deviation compared to relative methods strongly depends on the strength of calibration data. In case of dielectric measurements, the meter achieve the 1 metrological classification for electrical moisture meters.

The power supply provide the 4 Li-ion rechargeable battery set. The external charger and the transportation suitcase are parts in the unit set. The Small outline dimensions (61mm x 104mm x 190mm), relatively light weight about 500g. and also battery powering makes the unit fully hand held meter. The analyzer is created and manufactured in Poland.

The principle of operation:

The dielectrical measurement:

The device for measuring moisture content in grain, seed and bulky materials. The small measuring cavity with capacity about 150ccm and patented mechanical compacting method guarantee the very good measure recurrence, with error about $\pm 0.1\%$ and the measure accuracy with expected error less than $\pm 0.4\%$.

The unit is highly resistant to dust and vibrations. This factors does not affect on measurement accuracy and stability and mechanical condition as well. The measuring cavity is made from Aluminium, ABS plastic and nylon, therefore the unit does not affect or reacts with all of the measured materials. The measurement cavity meets the "Food Grade" requirements.

Every unit is equipped with InfraRed temperature sensor, the measurement resolution 0,1°C and range -25°C to 95°C. The readouts are used with moisture correction – automatic temperature compensation - and displayed on OLED as well.

Thanks to many patented technical solutions applied in our meter every unit keeps the highest accuracy and stability standards for many years with no need of frequent calibrations and service checkings. The handling of the meter is very easy, the display shows all necessary information, the user should only choose the substance name and press '%' button to get results - that's all. The result of moisture content will be displayed after few seconds as percentage of moisture content.

Measured samples of different materials are to be homogeneous, that mean material suppose not to be a mixture of different types either contain contamination. Measured samples should have natural humidity, without parasites, signs of fermentation either mould. Portions of the material shouldn't become overheated or covered with water as a reason of extended temperature difference. Not concerning over named rules may cause an incorrect results measured by the device.

Every unit is programmed with over 100 different calibrations, for example as below:

Wheat, Rye, Triticale, Barley, Oats, Rape, Maize, Vetch, Field Pea, Pea, Field Bean, Lupines, Pine, Spruce, Beech, Oak, Larch, Wild, Fir, Fir, Pinus Nigra, Corn groats, Corn flour, Wheat flour, Semolina, Wheat brans, Rye brans, Noodle groats, Noodle, Flaked Oats, Flaked Wheats, Flaked Rye, Cocoa Corn, Flaked Corn, Corn grits, Onion seeds, Green Coffee, Borage, Nigella, Thistle, Carrot seeds, Radish seeds, Parsley seeds, Powder Milk, Sawdust, Rice, Black, Tea CTC, Manna, Pumpkin seeds, Spinach seeds, Bean, Cress seeds, Lettuce seeds, Beet seeds, Scorzonera seeds, Cucurbita seeds, Sunflower seeds, Chicory seeds, Fennel seeds, Capsicum seeds, Tomato seeds, Cabbage seeds, Celery seeds, Broad Bean, Dahlia seeds, Aster seeds, Marguerite seeds, Cucumber seeds, Zinnia seeds,

Pansy seeds, Cornflower seeds, Larkspur seeds, Phacelia seeds, Radish seeds, Bean, Beet seeds, Grass seeds, Clover seeds, Alfalfa seeds, Timothy seeds, Canary grass, Millet, Barley Malt, Brewery Barley, Naked Oats, Finned Barley, Buckwheat, Groats, Chestnuts, Black Bean, Mung Bean, Okra, Vetch, Soybean, Flax, Potato Starch, Walnuts, Sorghum, Aubergine, CuSO₄, Quartz sand, TEST, etc. on request...

The measurement method with IR absorption:

The measurement process takes 9s. At once, the measured substance is overexposed with few different infrared laser beams. The technical possibilities and firmware lets to figure out, for given material, up to 4 different measured volume. The basis is protein, oil, starch.

Preparation of the substance:

Measured samples of different materials are to be homogeneous, that means material supposed not to be a mixture of different types either contain contamination.

Preparation for the measure:

Device is ready to work just after placing batteries in to the container at the bottom of the meter. Pushing any button causes wake up of device, what is signalled by number of recent used range shown on OLED.

The device turns off automatically:

- after 10 seconds of inactivity
- after 5 just after moisture identification or calibration.

Calibration of the device:

Calibration is a precondition of proper using of Super CHTM2. This is necessary procedure to keep expected precision of measuring results. Calibration eliminates deviation in measuring caused by grimy measuring cavity, getting older of the device, different atmospheric conditions. Calibration has to be performed **always with empty** measuring cavity. To calibrate the device, just measure the humidity of **empty** measuring cavity.

The moisture measurement:

1. Arrange a portion of material - full cavity,
2. Calibrate device – if last calibration was proceeded more than half hour ago,
3. Fill up the measuring cavity with measured material,
4. Select the actual range of measured material [$<$] or [$>$],
5. Start measurement process [%],
6. Read out the measured moisture value from OLED.

The substance analyze with NIR method:

The measure ranges connected with infrared procedures are tabbed of first letters of Protein, Oil, Starch, Water. Future calibration data, will broad the set of substances and parameters and will be available for any existing unit.

The measuring cavity should be filled with overflow. After start the measurement, the unit takes dielectric measure, next the temperature measure and finally IR absorption of 4 different laser beams. The dielectric measurement takes 2 sec., the NIR measurement takes 7 sec. Before starting measurements, the unit condense the substance with vibration generator. The procedure is repeated few times in 3 sec. duration. The readouts appear at OLED display sequentially tabbed with "P,O,S,W" letters. During the calibration procedure with NIR option, essential is to block the LED, mercury-vapour lamp or fluorescent lamp light fall on the measuring cavity. The IR calibration is marked with yellow-green light inside the measuring cavity.

25K - Super CHTM2 measuring ranges:

- 1 1 Wheat *Triticum* Pszenica Full volume
- 2 2 Rye *Secale* Żyto Full volume
- 3 3 Triticale *Triticosecale* Pszenżyto Full volume
- 4 4 Barley *Hordeum* Jęczmień niesortowany Full volume
- 5 5 Oats *Avena* Owies Full volume
- 6 6 Rape *Brassica napus* Rzepak Full volume
- 7 7 Maize *Zea Mays* Kukurydza Full volume
- 8 8 Vetch *Vicia sativa* Wyka Full volume
- 9 9 Field Pea *Pisum sativum* Peluszką Full volume
- 10 10 Pea *Pisum* Groch Full volume
- 11 11 Field Bean *Vicia faba* Bobik Full volume
- 12 12 Lupines *Lupinus* Łubin Full volume
- 13 13 Pine *Pinus* Sosna pospolita Full volume
- 14 14 Spruce *Picea* Świerk pospolity Full volume
- 15 15 Beech *Fagus* Buk Full volume
- 16 16 Oak *Quercus* Dąb Full volume
- 17 17 Larch *Larix* Modrzew europejski Full volume
- 18 18 Douglas Fir *Pseudotsuga* Jedlica, Daglezja Full volume
- 19 19 Fir *Abies* Jodła Full volume
- 20 20 Black Pine *Pinus Nigra* Sosna czarna Full volume
- 21 44 Cocoa Corn *Cacahuatl** (*Forastero*) Ziarno Kakao Full volume
- 22 46 Corn grits, Grys kukurydziany Full volume
- 23 48 Green Coffee, Coffee bean *Coffea arabica* Kawa surowa (zielona) Full volume
- 24 49 Borage *Borago officinalis* Ogórecznik Full volume
- 25 50 Nigella *Nigella sativa* Czarnuszka siewna Full volume
- 26 51 Thistle *Silybum marianum* Ostropest plamisty Full volume
- 27 52 Carrot seeds *Daucus carota* Nasiona marchwi Full volume
- 28 58 Black Tea CTC *Camellia* Herbata czarna granulowana "CTC" 30 Gram
- 29 86 Phacelia seeds *Phacelia* Nasiona facelii Full volume
- 30 87 Radish seeds *Raphanus sativus* Nasiona rzodkwi Full volume
- 31 88 Bean *Phaseolus* Nasiona fasoli Full volume
- 32 89 Lettuce seeds *Lactuca* Nasiona sałaty Full volume
- 33 90 Beet seeds *Beta vulgaris* Nasiona buraka Full volume
- 34 91 Cabbage seeds *Brassica* Nasiona kapusty Full volume
- 35 92 Tomato seeds *Lycopersicon* Nasiona pomidora Full volume

- 36 93 Broad Bean *Vicia faba* Nasiona bobu Full volume
37 94 Cucumber seeds *Cucumis* Nasiona ogórka Full volume
38 97 Grass seeds *Lolium perenne* Życa trwała (Rajgras angielski) Full volume
39 98 Clover seeds *Trifolium pratense* Koniczyna czerwona Full volume
40 99 Alfalfa seeds *Medicago* Lucerna mieszańcowa Full volume
41 100 Millet seeds *Panicum* Proso Full volume
42 101 Timothy seeds *Phleum* Tymotka łąkowa Full volume
43 102 Canary grass *Phalaris canariensis* Kanar Full volume
44 105 Malted Barley *Hordeum brasii* Stód jęczmienny Full volume
45 106 Winter Brewery Barley *Hordeum bracino hiems* Jęczmień browarny ozimy Full volume
46 108 Ravines Brewery Barley *Hordeum bracino spring* Jęczmień browarny jary Full volume
47 110 Naked Oats *Avena Sativa nudus* Owies nieoplewiony (nagi) Full volume
48 112 Fined Barley *Hordeum purificati* Jęczmień oczyszczony Full volume
49 116 Chestnuts *Castanea* Mill. Kasztany siekane Full volume
50 117 Black bean *Phaseolus vulgaris* Fasola Czarna Full volume
51 118 Mung bean, Green Gram *Vigna radiata* Fasola Mung Full volume
52 119 Okra *Abelmoschus esculentus* Piżman jadalny Full volume
53 124 Soybean *Glycine Willd* Soja Full volume
54 125 Buckwheat *Fagopyrum esculentum* Gryka Full volume
55 127 Flax seeds *Linum usitatissimum* Len Full volume
56 130 Pechay seeds, Chinese cabbage *Brassica rapa* Kapusta Chińska Full volume
57 131 Eggplant seeds *Solanum melongena* Bakłażan, Oberżyna Full volume
58 132 Ampalaya seeds *Momordica charantia* Balsamka ogórkowata Full volume
59 133 Squash seeds *Cucurbita maxima* Dynia olbrzymia Full volume
60 134 Wheat bran pellets *Triticum bran spec.* Pelety z otrębów pszennych Full volume
61 135 Withered Tea Leaf Zielone liście Herbaty 20 Gram
62 136 Husked green Coffee Kawa zielona niełuskana Full volume
63 137 Sesame *Sesamum indicum* Sezam Full volume
64 138 Rice *Oryza* Ryż łuskany Full volume
65 139 Paddy *Oryza sativa Linnaeus* Ryż niełuskany Full volume
66 141 Marrow *Cucurbita pepo convar. giromontiina* Kabaczek Full volume
67 142 Zucchini (Courgette) *Cucurbita pepo convar. giromontiina* Cukinia Full volume
68 143 Sugar Maize *Zea mays subsp. mays Saccharata* Kukurydza cukrowa Full volume
69 144 Collard *Brassica oleracea var. sabellica* Jarmuż Full volume
70 145 Red Onion *Allium cepa 'Red Baron'* Cebula czerwona Full volume
71 146 White Mustard *Sinapis alba* Gorczyca biała Full volume
72 147 Black Mustard *Sinapis nigra* Gorczyca czarna Full volume
73 148 Leaf Mustard *Brassica juncea* Gorczyca sarepska Full volume
74 149 Willowleaf Sunflower *Helianthus salicifolius* Słonecznik ogórkowaty / wierzbolistny Full volume
75 150 Common Sunflower *Helianthus annuus* Słonecznik ogrodowy / zwyczajny Full volume
76 151 Chili *Capsicum* Papryka Full volume
77 152 Peanut *Arachis hypogaea* Orzeszki ziemne Full volume
78 153 Sorghum *Sorghum Moench* Sorgo czarne Full volume
79 154 Watermelon *Citrullus lanatus* Arbuz Full volume
80 155 Amaranth *Amaranthus* Szarłat Full volume
81 156 Black Tea ORTHODOX *Camellia* Herbata czarna liściasta "ORTHODOX" 20 Gram
82 157 Orchard Grass, "cock's-foot" *Dactylis glomerata* L Kupkówka pospolita (Rajgras niemiecki) Full volume
83 158 Evening-primrose *Oenothera* Wiesiołek Full volume
84 159 Camelina *Camelina sativa* Lnianka Full volume
85 160 Blackcurrant *Ribes nigrum* Czarna porzeczka Full volume
86 162 Maize Feed, Kukurydza paszowa Full volume
87 170 CuSO4 CuSO4 Full volume
88 172 Quartz sand Piasek kwarcowy Full volume