FEUCHTEMESSUNG
MOISTURE MEASUREMENT

ACO – DMMS - DIGISYS
Moisture Measuring System
Operating Instructions

2020 en

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Important information:

- Please disconnect the power supply for the moisture measuring system before doing electrical maintenance (e.g. exchange the sensor).

- Installation of bus and sensor cables have to be separate to:
  - high voltage cable,
  - cable to big electrical loads or machines,
  - cable to or from frequency converters,
  - etc.

  Please use adequate cable trays or install the bus cable with separate cable conduits.
  Heavy electromagnetic impacts could interfere the communication between sensors an evaluation unit.

- Do not exit the calibration software in the screen windows “Test-Image” or “Take Sample”. Please disconnect the communication between calibration software and evaluation unit first after activate one of the following screen windows:
  - “Configuration”,
  - “Curves”
  - “Info” or
  - “Moisture/Temperature-Image”.

  The windows “Test-Image” and “Take Sample” activate the mode Test active. This mode avoids the actualisation of the temperature measuring to increase the sampling rate for moisture measuring between sensor and evaluation unit.

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1. Foreword

These operating instructions relay important information regarding safety, operation, maintenance and repair.

Every person involved with utilisation, assembly, start-up, operation and maintenance, must have read and understood these operating instructions and must retain them within their immediate proximity at all times.

In order that a safe, fault-free and cost-effective operation can be guaranteed, it is absolutely imperative that the notes on safety, operation and maintenance are strictly adhered to.

The operating instructions are to be supplemented with any existing national guidelines concerning accident-prevention and environmental protection.

The valid, relative regulations for accident-prevention in the country of utilisation, as well as on the application site and the recognised, specialist-technical laws for safe and professional operation are to be noted.

The operating instructions must be available at the application site of the measuring system at all times.

Acknowledgements

We would like to thank the company, WAGO Kontakttechnik GmbH, Minden, for the documentation material which was so kindly submitted by them.

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Document identification

Compiled by:	ACO Automation Components
Document version:	1
	Original instruction manual
Date of issue:	01. 10. 2009

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As errors may never be completely ruled out, despite every endeavour on our behalf, we are always appreciative of any comments submitted.

2. Safety

2.1 Application area of the moisture-measuring system DMMS/DIGISYS

2.1.1. Use as directed

The measuring system has been designed around state-of-the-art technology and all recognised regulations regarding technical safety. Nevertheless, even if these standards are observed, there is a possibility that the life of the user or a third party could be put at risk, or that the plant or other equipment could sustain damage.

The measuring system is to be used exclusively for measuring the water content in the bulk material and liquids or in the dry matter in water.

Only use the measuring system according to the operating instructions and as directed i.e. conscientious of safety and dangers which may occur, and only if it can be guaranteed that the system is in a technically sound condition! In particular, faults which may impede safety must be remedied immediately.

Any other use, as well as exaggerated use, is not considered use as directed. The manufacturer or supplier will not be held responsible for any damage which occurs as a result of this. The user is solely responsible.

Use as directed also includes observation of the operating instructions and adherence to the maintenance and inspection guidelines.

2.1.2. Use other than directed

The moisture-measuring D must not be operated in environments where there is a risk of explosions (ex-area).

It is not permissible to measure the water content in flammable or explosive liquids.

2.2 Meaning of danger symbols

The danger symbols in these operating instructions have the following meanings:

This is the warning sign.

It warns about potential injuries. Follow all measures indicated in this warning sign to avoid injuries or death.

DANGER indicates a dangerous situation. If the warning is not heeded, death or serious bodily injury will be the consequence.

WARNING indicates a dangerous situation. If the warning is not heeded, death or serious bodily injury may be the consequence.

CAUTION indicates a dangerous situation. If the warning is not heeded, serious bodily injury may be the consequence.

CAUTION indicates a dangerous situation. If the warning is not heeded, serious property damage may be the consequence.

Further information regarding handling and operation of the control.

2.3 Meaning of pictograms

In these operating instructions, the pictograms carry the following meanings:

Electricity flowing through body parts.

Automatic start-up

2.4 Fundamental notes on safety

2.4.1. General operational safety

Ensure that the operating instructions are on-hand in the switch cabinet, within which the evaluation and transmission module is installed, at all times!

Observe and apply any supplements to the operating instructions, general valid, legal and other obligatory regulations regarding accident-prevention (e.g. providing or wearing of personal protective equipment) and environmental protection (e.g. handling of dangerous substances)!

Supplement the operating instructions with all necessary information including duty of supervision and reporting obligations for the observance of operational particulars (e.g. work organisation, working procedures, hiring of personnel).

Refrain from all working procedures which appear dubious as regards safety!

Ensure that all personnel are aware of the location of the fire extinguishers and are familiar with their operation.

Follow the stipulated procedures for reporting and fighting fires.

Ensure safe and environmentally-friendly disposal of all fuels and lubricants, as well as replacement parts!

2.4.2. Personnel and supervision

Personnel who are actively involved with the measuring system must have read the operating instructions before beginning work, in particular the chapter concerning the notes on safety. Reading these notes "on the job" will be too late. This applies in particular to personnel working opportunely on the sensor (e.g. when carrying out maintenance).

Carry out regular checks as to whether the personnel are working conscientiously as regards safety, and are observing the operating instructions!

Ensure that only contracted personnel are actively involved with the measuring system

Employ trained or instructed personnel only. Explain responsibilities regarding operation, maintenance and repair clearly to all personnel! Ensure that the legally required minimum age is observed.

Before commencing work, inform all operating personnel of repair tasks which may be required! Nominate supervisors! Only allow repair tasks to be carried out by specialist personnel.

Tasks to the electrical equipment of the measuring system may only be carried out by electrical specialists or by trained personnel under the instruction and supervision of an electrical specialist in accordance with electro-technical regulations.

Always wear personal protective equipment when necessary or when otherwise required by the safety guidelines!

2.4.3. Operation and maintenance

Maintain all intervals for repetitive checks / inspections which may be required or specified in the operating instructions.

For all tasks which concern operation or adjustment of the measuring system, as well as the safety-relevant devices, observe the activation and deactivation procedures, as well as control displays in accordance with the operating instructions and notes for repair tasks!

All screw connections loosened for maintenance and repair tasks must be retightened!

Replacement parts must conform to the technical requirements laid down by the manufacturer. This can always be guaranteed if original replacement parts are used.

2.4.4. Assembly and repair

Before commencing work, inform all operating personnel of repair tasks which may be required! Nominate supervisors! Only allow repair tasks to be carried out by specialist personnel.

If not expressly otherwise specified, only carry out tasks to the measuring system when the voltage supply for the system has been disconnected. Always disengage the power supply prior to carrying out work on the measuring system.

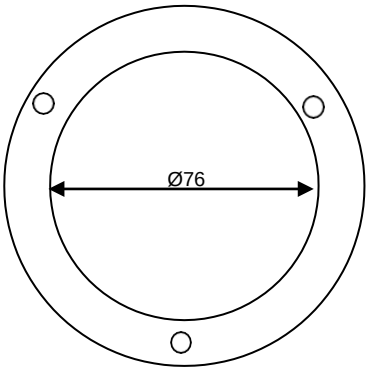
3. Technical data

3.1 DMMS Sensor

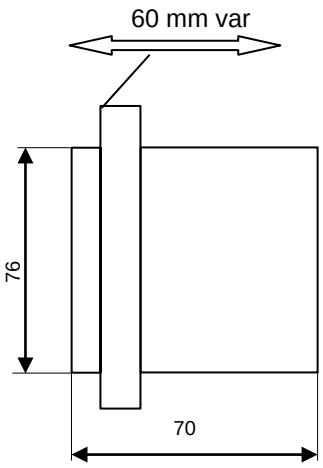
Data sheet

Physical principle	Determining capacity in the high-frequency scatter field
Measuring location	Outside of the silo, within the silo, via deflection plate, on a belt with guide shoe slides, pipes, conveyor screws
Measuring frequency	16 ... 22 MHz
Measuring range	0 %F … 100 %F (adjustable measuring window)
Dissolution of capacity	10 fF
Actualisation cycle	32.64 ms
Scanning rate average value counter	16 … 25 × 10^6
Maximum attainable measuring precision	± 0,05 %F [1.)]
Measured value transmission	digital: RS-485, multiprocessor protocol
Max. number of sensors at the bus	16
Maximum bus length	1200 m
Microprocessor	AT89C51ED2
Power supply	8 ... 30V, 0.4 VA
Measuring range temperature measurement	-10°C … 90°C
Measuring precision, temperature measurement	± 0.5°C
Operational ambient temperature	5°C … 72°C
Operating temperature, electronic	-20°C … 80°C
Storage temperature	-25°C … 80°C
Type of protection	IP68
Connection line, type	UNITRONIC ROBUST 7 x 0.14mm² shielded
Connection line, length	6m
Wear protection	ZrO2 Al2O3
Material housing / flange	V2A (1.4305)
Dimension: ∅ / height	76 / 70 mm
Weight without cable	1000 g
Weight of tensioning flange	300 g
[1].) Representative of the batch or of the time window with the continuous process, in connection with the respective evaluation unit DIGISYS, material-dependent, with ideal flow properties and with sound calibration	

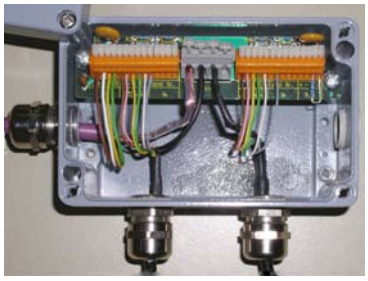
Measurement gauge



Master gauge for holes



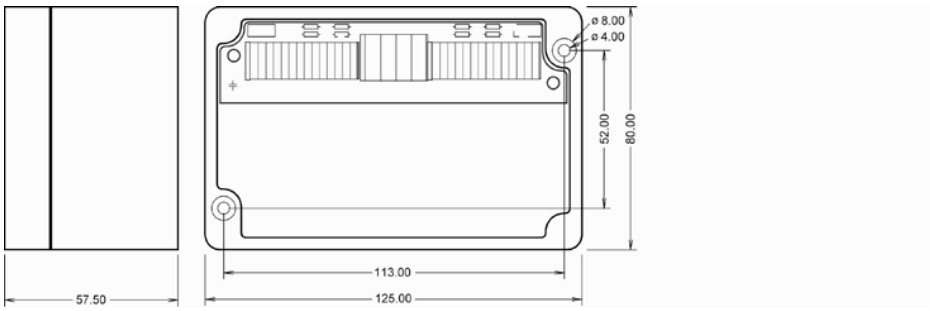
3.2 Bus connection socket



Data sheet

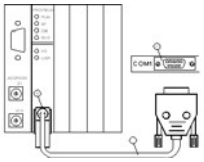
Housing material	Aluminium
Weight	200 g
Colour	Grey
Height [mm] / [inch]	57,5 mm / 2,26 in
Width [mm] / [inch]	125 mm / 4.92 in
Depth [mm] / [inch]	80 mm / 3,15 in
Operating temperature	-25 °C ... +85 °C
Storage temperature	-25 °C ... +85 °C
Relative moisture (without thawing)	95 %
Identification of conformity	CE
Vibration resistance	in accordance with IEC 60068-2-6
Shock resistance	in accordance with IEC 60068-2-27
Type of protection	IP 66
EMC interference immunity	in accordance with EN 50082-2 (96)
EMC interference emission	in accordance with EN 50081-2 (94)
Cable ports	4 x Pg 11 or M16 stainless steel
Screen clamps	4 x CAGE-CLAMP 2.5 mm²
Bus terminals	18 x CAGE-CLAMP 0.5 mm²
Cross-section from [mm²]	0,08 mm² - 0,5 mm²
Cross-section from - to [AWG]	28 AWG - 20 AWG
Stripping length [mm] / [inch]	5-6 mm / 0,236 in

Dimension illustration

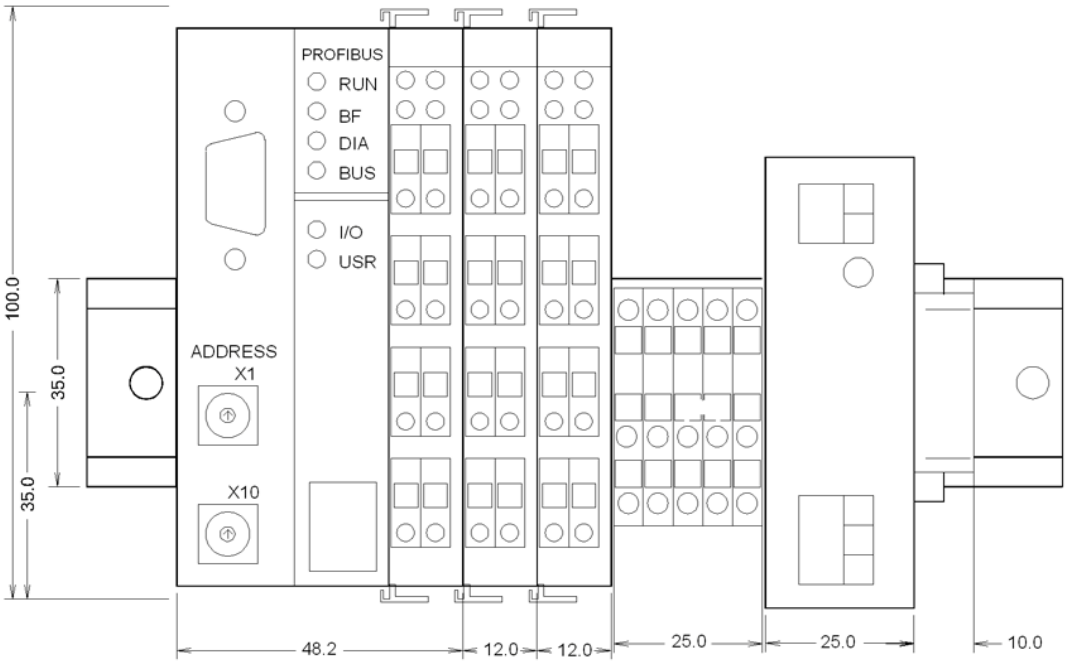


3.3 Evaluation and transmission module

These **technical data sheets** can be obtained directly from WAGO Kontakttechnik GmbH, Minden, or by way of the internet site: http://www.wago.com

WAGO 750-833 Field bus controller PROFIBUS DP/V1 with ACO/LMT Firmware		WAGO 750-550 2-channel analogue output terminal 0..10 V	
WAGO 750-402 4-channel digital input terminal 3ms		WAGO 750-513 Relay output terminal 250V AC, 30V DC, 2A AC/DC	
WAGO 750-504 4-channel digital output terminal		WAGO 750-653/000-020 Serial interface RS485	
WAGO 750-554 2-channel analogue output terminal 4..20mA		WAGO 750-600 End terminal	
Moxa NPort 5110-EU Ethernet/ RS-232 - Adapter http://www.moxa.com		WAGO 750-920 Communication cable WAGO 750-923/000-001 Communication cable USB Service Cable	
HAMA 00049262 USB / RS-232 - adapter http://www.hama.de			

Dimension illustration



3.4 Power pack (DIN rail mounting)

Data sheet

Type	787-602
Manufacturer:	Wago (Internet: www.wago.com)
Weight	0.310kg
Dimensions (B x H x D)	40 x 95 x 90 mm
Operating temperature	-10...70°C, with free convection
Overtemperature protection	yes
Input	
Mains voltage range Ue	AC 94 – 264 V, 50/60 Hz
Efficiency	81 %
Switch-on peak limitation	< 15 A peak in cold conditions
Power reduction	-3% / K from +50°C
Mains buffering	> 20 ms (with Ue = 187 VAC)
Internal fuse	2.0 A flink
Output	
Nominal voltage tolerance	+2% / -1%, at 5V + 3%
Residual ripple	< 100 mVss
Interference voltage	< 150 mVss
Temperature coefficient	0.025% / K
Enabling characteristics/disabling characteristics	No overshooting of Ua (soft-start)
Enabling delay	0.8 s
Starting time	30 ms
Overvoltage protection	< 130% from Ua nominal
Current limitation	105 – 200% / 250% I nominal,
Outlet permanently short circuit proof	yes
Operating display	Green LED
Protection	IEC 60950 / EN 60950 / VDE 0805 safety classification I UL508 listed, UL 60950, CSA 22.2 - 60950

3.5 PROFIBUS DP measuring value transmission

Data sheet

Hardware	WAGO 750-833 000-002 field bus controller
Transmission medium	Cu-cable EN50170
Bus segment length	100..1200m
Transmission rate	9600.. 12M bit/s
Bus connection	9-pin Sub-D male
Protocol	DP / DPVI
GSD - file	WAGOB756.GSD download: www.wago.com
Measuring channels	1..16
1.) input data / measuring channel(s)	(n*2+2) byte
2.) output data / measuring channel(s)	(n*6+4) byte

1.) This regards output variables where the PROFIBUS-Master is concerned.

2.) This regards input variables where the PROFIBUS-Master is concerned.

3.6 PC-software

Data sheet

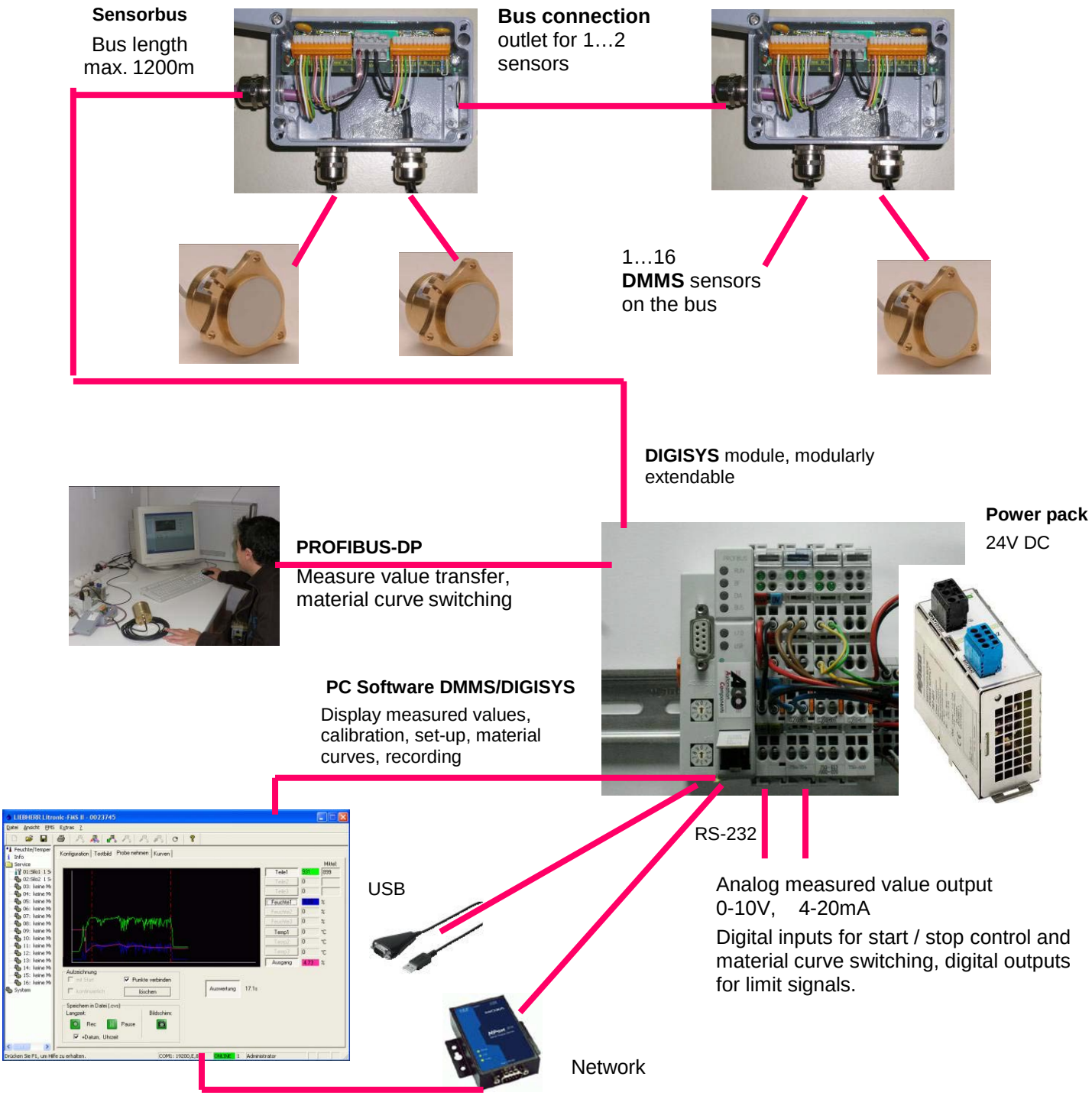
Channels visualisation moisture	16 of 16
Number of channels for simultaneous visualisation moisture	16 of 16
Manual/automatic switching	16 of 16
Graphic test value representation	1 of 16
Parameterisation	1 of 16
Calibration	1 of 16
Switching of material curves	yes
Service and diagnosis	yes
Software system prerequisite	
Operating systems	Microsoft Windows ® WIN 95/98/ME, NT4.0, 2000, XP, Vista
Documentation	Acrobat Reader
Hardware system prerequisite:	
CPU	Pentium min133MHz
RAM – memory	32MB
Fixed-disk storage free	10MB
Installation drive	CD-ROM
Interface	RS232B or USB / RS-232 adapter
if necessary, LAN connection	Ethernet 10/100 Mbit/s

4. System summary

The DIGISYS with intelligent bus sensors is an independently operating moisture-measuring system, without the necessity of installing display and operating units.

It is thus ideally suited for controls featuring a visualisation system. The evaluation and transmission module can be installed compactly in a switch cabinet.

A multitude of interfaces can be realised for the overriding systems. An easy-to-use PC-software allows a quick and precise calibration of the measuring sections.



5. DMMS moisture sensor

5.1 Short description of sensor

The DMMS sensor is a so-called "intelligent sensor". This means that the integrated µ-processor enables the entire problem to be solved in a component with an extended functionality.

- Direct digital measuring procedure
- Calibration data memory
- Linearisation
- Inspection of thresholds
- Start / Stop control
- Mean value calculation
- Temperature measuring
- Temperature compensation
- Material-specific adjustment
- Digital interface / networking
- Error report

A precise calibration at the factory allows complete reproducibility over a wide temperature range. Thus the material specific calibration can be assigned to other measurement sections.

No new calibration is necessary when the sensor is replaced.

The sensor receives a measuring task from the DIGISYS evaluation and transmission module and makes available the ready-processed measuring result at the precise required time.

The data transfer is reduced to a minimum and the resources of controls which have a higher priority are less burdened.

5.2 Safe operation

The sensor can be installed in the immediate vicinity of turning or moving system components. Therefore, when working on the sensor, neighboring system components may represent a danger. Observe the following warnings.

Before commencing work on a sensor

DANGER

Electrical voltage.

Fatalities as a result of electric shocks.

Switch off the system and secure against restarting.

Inform all persons within immediate proximity of the system.

Procedure for switching off and securing the system: observe the system operating instructions.

Whenever switching on the plant

WARNING

Drives can start up automatically.

Body parts and clothing can be drawn into machinery.

Warn all persons within immediate proximity of the plant.

Maintain a safe distance to potential sources of danger.

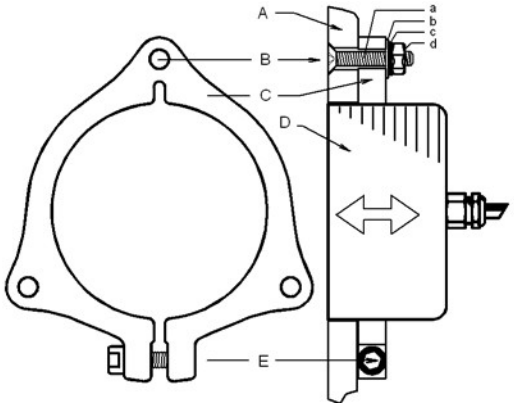
Procedure for switching on the system: observe the system operating instructions.

5.3 Install sensor

The sensor can be installed in a container, guide shoe carriage, batching table or in a material chute using the mounting flange. The sensor can be installed flush on wall thicknesses of 1 to 25 mm by shifting in the flange.

- Create installation opening. Note the master gauge for holes.
- Loosen the straining screw (E)
- Fix the mounting flange (C) with 3 countersunk screws (a) on the rear side of the wall partition, leaving the nuts (d) loose
- Adjust the sensor in the flange until it is flush with the wall partition.
- Tighten the straining screw (E) first, and then the fastening (B)
- Clamp the sensor cable to the bus connection socket and tighten the cable gland

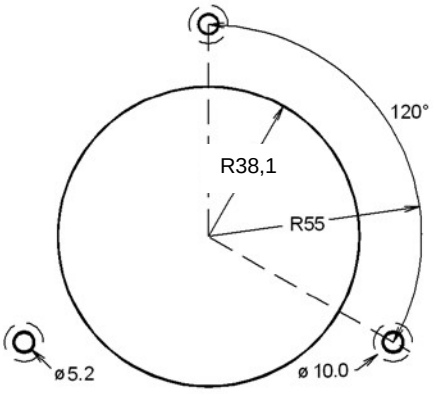
Assembly



a: Countersink screw
B: Washer
c: Spring washer
d: Nut

A: Cladding
B: Fastening
C: Wheel flange
D: Sensor
E: Tensioning screw

Master gauge



CAUTION

Observe the following instructions for handling sensors, otherwise, the sensor will be damaged.

- Do not open the cable clamp on the sensor.
- Protect the sensor against rough mechanical effects, i.e. stone chipping.
- Do not strike the ceramic surface.
- Install the sensor flush to prevent material encrustations or premature wear.
- Hot water from evaporation in the silo damages the sensor or leads to measuring discrepancies.

- The temperature inside the sensor housing may not exceed 80°C.
- The sensor may not be installed in immediate proximity to vibrating discharge aids (i.e. vibrators).
- When replacing sensors, do not cut separate away the connecting cable of the old sensor.
- When filling the silo for the first time, ensure that the sensor is protected against stone chips.
- Do not wedge the sensor in the wheel flange during installation. Otherwise, the sensor can fall out when loads are applied.
- The 3 countersink screws (a) and the tensioning screw (E) must be made of stainless steel.

5.4 Sensor servicing

5.4.1. Daily tasks

- Check the correct functioning of the measuring section(s).
- The ceramic wear shield must be examined for damage and wear
- Remove any adhesions from the wear shield.
- Check that an even flow of material with sufficient over-layer (>50mm) is present.
- The moisture measuring value must be verified through a laboratory test.

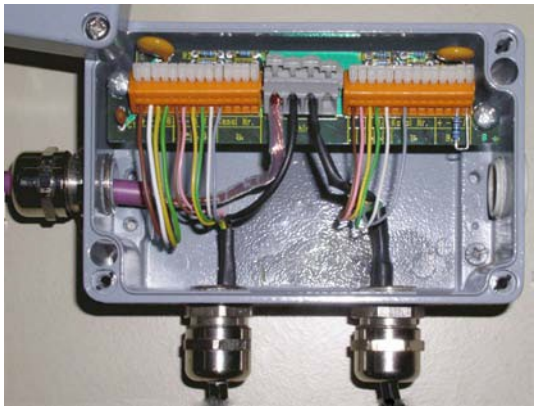
A sufficient quantity of material, representative of the mix, is extracted and at the same time the moisture measuring value or the fraction value is recorded. If the deviations are too large, the calibration curves can be adjusted (see PC software or display and parametering module).

5.5 Replacing the sensor

1. Switch off the system and measuring system and secure against starting up again.
2 Open the bus connection socket, loosen the cable clamp and unclamp the sensor cable.
3 First loosen the fastening (B) and then loosen the straining screw (E) until the mounting flange releases the sensor.
4 Install a new sensor in the mounting flange, adjust and tighten the straining screw (E).
5 Tighten the fastening (B).
6 Clamp the sensor cable, tighten the cable clamp and connect the bus connection socket.
7 Clean and dry the surface of the sensor.
8. Switch on the system and measuring system.
9 Read off the fraction value for the air and carry out an offset. New calibration of the measuring section is not required (see PC software).

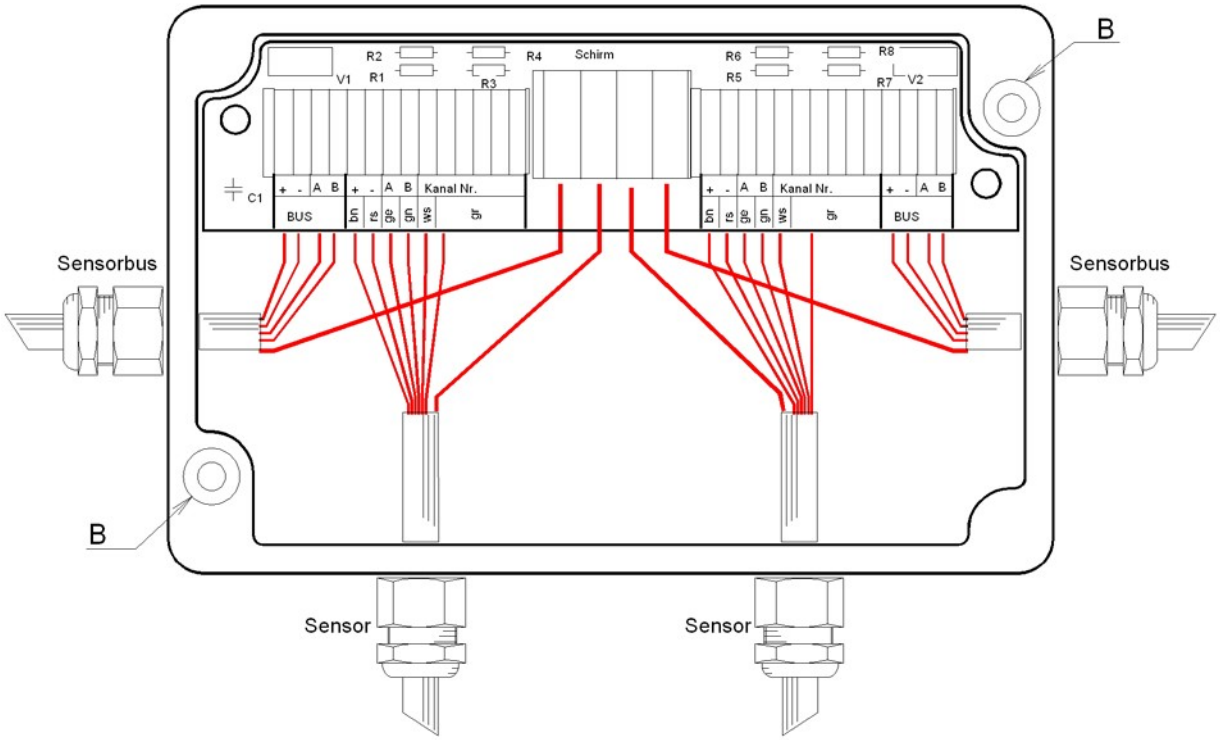
6. Bus connection socket

The ACO bus connection socket facilitates installation of the sensor bus:



- Protection type IP66
- Connection of 1 or 2 moisture sensors
- Connection of 1 or 2 bus lines
- Bus termination
- Allocation of sensor address
- Fine protection against lightning
- CAGE CLAMP connection technology
- 4 cable clamps

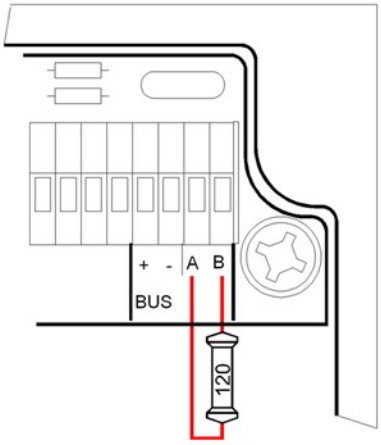
6.1 Install Bus connection socket



1 Fasten the socket using suitable screws through the holes B.

2 1..2 Connect the sensors, the white and grey wires serve to determine the sensor address.

3. Connect the cable from the sensor bus.



For the last connection socket, set a resistance with 120 ohms between clamps A and B .

4. Connect the shielded braid from the cable on the shielded clamps.

5 Tighten the cable fittings.

6. Mount the connection socket cover.

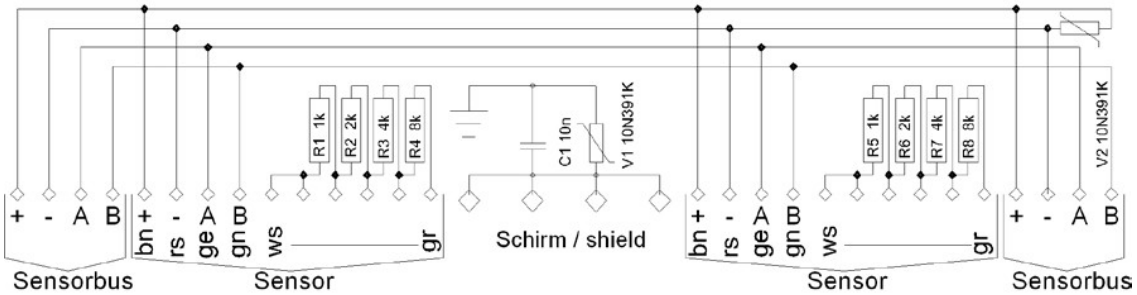
Short symbols	Colour
bn	brown
rs	pink
ge	yellow
gn	green
ws	white
gr	grey
o----o	bridge

Sensor address	Sensor cable connection									
	+	-	A	B	Channel no.					
1	bn	rs	ge	gn	ws	gr				
2	bn	rs	ge	gn		ws	gr			
3	bn	rs	ge	gn			ws	gr		
4	bn	rs	ge	gn		ws		gr		
5	bn	rs	ge	gn				ws	gr	
6	bn	rs	ge	gn		ws	o----o		gr	
7	bn	rs	ge	gn			ws		gr	
8	bn	rs	ge	gn		ws			gr	
9	bn	rs	ge	gn					ws	gr
10	bn	rs	ge	gn		ws	o-------o			gr
11	bn	rs	ge	gn			ws	o----o		gr
12	bn	rs	ge	gn		ws		o----o		gr
13	bn	rs	ge	gn				ws		gr
14	bn	rs	ge	gn		ws	o----o			gr
15	bn	rs	ge	gn			ws			gr
16	bn	rs	ge	gn		ws				gr

Do not set any double sensor addresses.

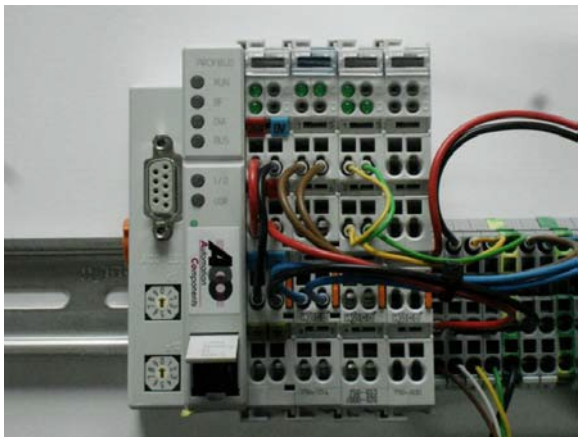
Sensor cable length: maximum 6m.

Circuit diagram



7. DIGISYS evaluation and transmission module

The DIGISYS evaluation and transmission module is comprised of a WAGO - I/O - SYSTEM 750. A detailed description of all components can be obtained from the company, WAGO Kontakttechnik GmbH, Minden, or alternatively, from the internet site from WAGO Kontakttechnik GmbH: http://www.wago.com.



The field bus controller 750-833000-002 includes ACO-specific Firmware, comprising the complete ACO-DIGISYS - approach:

- Communication with overriding system (PROFIBUS)
- Issue of measured values via diverse interfaces
- Start-Stop control mean value calculator
- Distribute measuring orders
- Storage of measuring section configuration, curves, thresholds etc.
- Summarization of measured values from several sensors
- Switching of material curves
- Error report

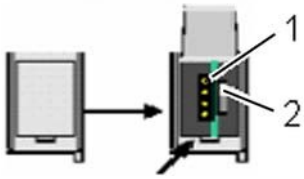
7.1 Measuring operation

Moisture measuring is initiated automatically following activation of the DIGISYS

No operation is necessary in this operating mode.

This operation is not discontinued, even within the service functions, thus the measurement continues to run in the background.

7.2 Configuration and programming interface



The configuration and programming interface is located behind the cover flap. It is used for communication with the PC-software, the display and parameterisation module and for transmission of the firmware. The communication cable is connected to the 4-pin port (1).

The switch for the operation mode (2) is also located behind the cover flap. The switch (2) is a push-slide switch featuring three positions and a key function.

7.2.1. Operating type switch functions

Operation mode switch (2)	Function
From the middle to the upper position	Activate program processing (RUN)
From the upper to the middle position	Stop program processing (STOP)
Lower position	Not required for users.
Press down (i.e. using a screwdriver)	Hardware-Reset All outputs and flags are reset; Variables are set to 0 or to FALSE or to an initial value. The Hardware - Reset can be initiated with STOP, as well as with RUN in each position of the operation mode switch!

A change in operation mode occurs internally at the end of a PFC-cycle.

7.3 PROFIBUS DP (option)

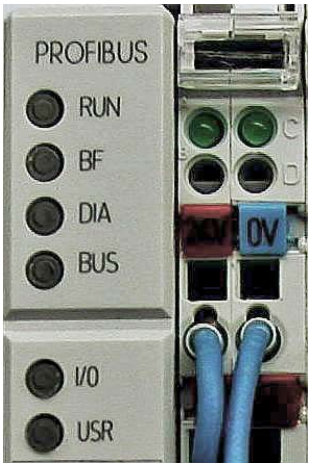
Moisture and temperature values, status and error reports from all 16 channels can be read from the controller via the PROFIBUS DP, and all control signals such as Start, Fine and Manual can be set.

The Profibus DP-interface is described in an own document. This document is stored as a separate file on the CD-ROM. If the paper version is required, please request it from ACO Automation Components.

Detailed description 750-121 and a supplement for 750-333/-833 PROFIBUScan be obtained from the WAGO Kontakttechnik GmbH company in Minden, or on their internet site:http://www.wago.com**.**

All documentation regarding the PROFIBUS is available on the PROFIBUS user organisation internet page: **www.PROFIBUS.com**.

7.4 LED-signalisation



LED	Colour	Explanation
A B C D	green	Operating voltage available
RUN	green	The field bus was efficiently initialised.
BF	(flashing) red	Communication via the PROFIBUS is not functioning.
DIA	red	An external diagnosis is being performed.
BUS	flashing code	Projection error
I/O	off	Missing data cycle on the node.
	It is blinking red	Incorrect operation of the PROFIBUS node.
	green	Normal operation of the PROFIBUS node.
	orange	Flash-access to the machine-firmware
USR	red	Initiate system start
	off	Boot
	flashing green/orange	Sensors on the sensor bus are being searched for or occurrence, evaluation and transmission module
	green	System running
	orange	System running with display and parameterisation module
	red flashing code	DMMS -error, see error - flashing code

7.4.1. Error - flashing code Error signalisation

First wait until the LED begins to flicker red, then a flashing sequ. is resulted 4 times.e.g. error code = 2 5 1 4

The most important codes and their meanings:

Code				Description	Remedy
2	3	#	$	Measuring channel: # S-Adr.: $ - overrun mean value calculator	Start signal too long, adapt CMW-pause
2	4	#	$		
2	5	#	$	Measuring channel: # S-Adr.: $ - TO measuring value processing	Eliminate sensor error (sequence error)
3	1	$	1	Sensor S-Adr.: $ - used, however, not found	Check cabling and addressing
3	2	$	1	Sensor S-Adr.: $ - not used, however, found	Check addressing, register sensor $
3	3	#	$	Sensor channel: # S-Adr.: $ - data transfer error	Cabling, check power supply
3	4	#	$	Sensor channel: # S-Adr.: $ - no answer	
3	5	#	$	Sensor channel: # S-Adr.: $ - incorrect answer	
3	6	#	$	Sensor channel: # S-Adr.: $ - error report	
3	11	$	1	Sensor S-Adr.: $ - found twice	Cabling, check addressing
7	6	1	1	WAGO RS-485 module unavailable	Install WAGO I/O module or remove module from the configuration
7	7	1	1	WAGO digital input module unavailable	
7	8	1	1	WAGO digital output module unavailable	
7	9	1	1	WAGO relay module unavailable	
7	10	1	1	WAGO analogue output module unavailable	
7	11	1	1	WAGO incorrect amount digital-input modules	
7	12	1	1	WAGO incorrect amount digital-output modules	
7	13	1	1	WAGO incorrect amount relay modules	
7	14	1	1	WAGO incorrect amount digital-input modules	
# = Channel number 1..16				*$ = Sensor address 1..16*	

7.5 Connection / wiring

DANGER

Electrical voltage.

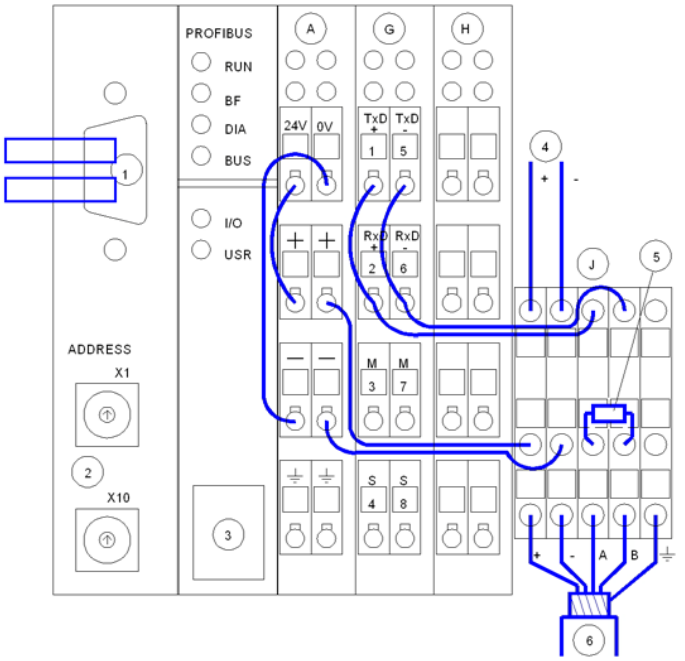
Fatalities as a result of electric shocks.

All work on the electrical system must be carried out by an electrical specialist.

The I/O modules must be inserted in a determined sequence on a carrier rail (35x7.5 mm):

	Amount	WAGO	Module type
	1	750-833	Field bus controller PROFIBUS DP / V1 with ACO/LMT software
	0 to 4	750-402	4-channel digital input terminal 3ms
	0 to 4	750-504	4-channel digital output terminal
	0 to 8	750-554 750-550	2-channel analogue output terminal 4..20mA or 2-channel analogue output terminal 0..10 V
	0 to 8	750-513	Relay output terminal 250V AC, 30V DC, 2A AC/DC
	1	750-653 000-020	Serial interface RS-485 with ACO/LMT sensor bus
	1	750-600	End terminal

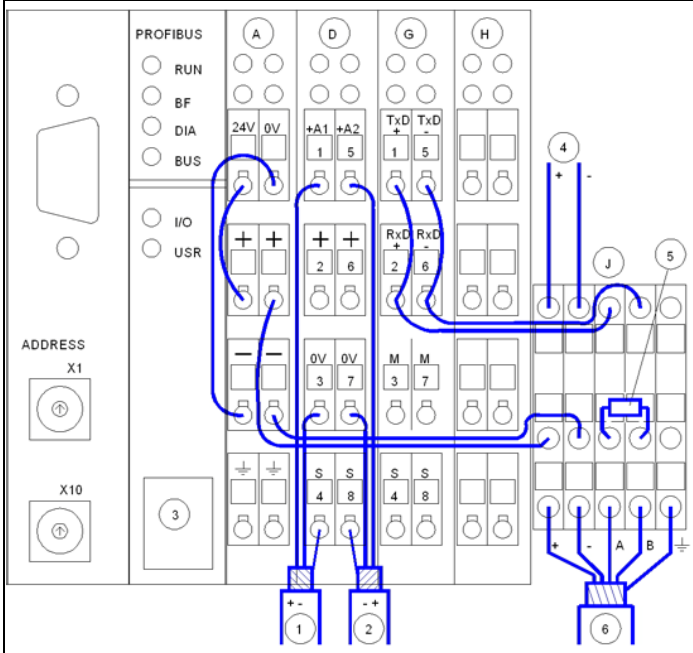
Wiring examples



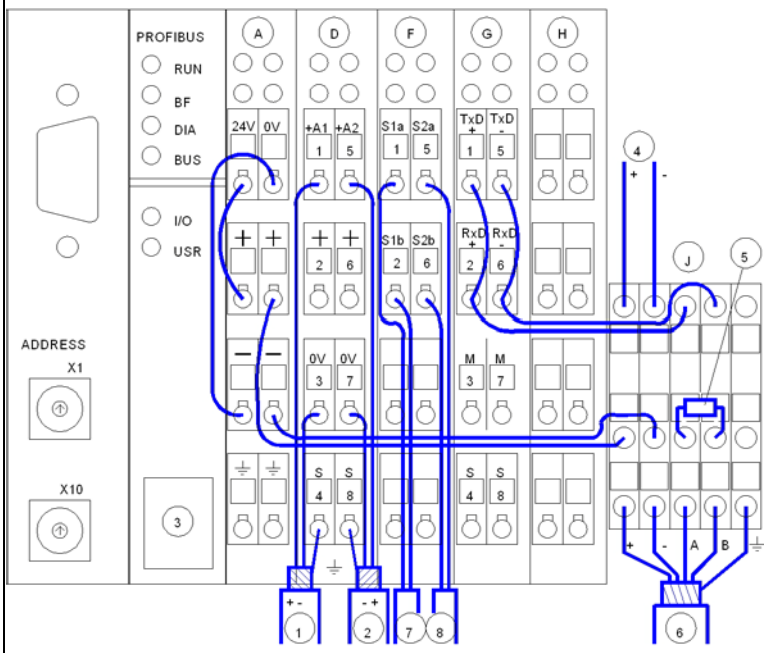
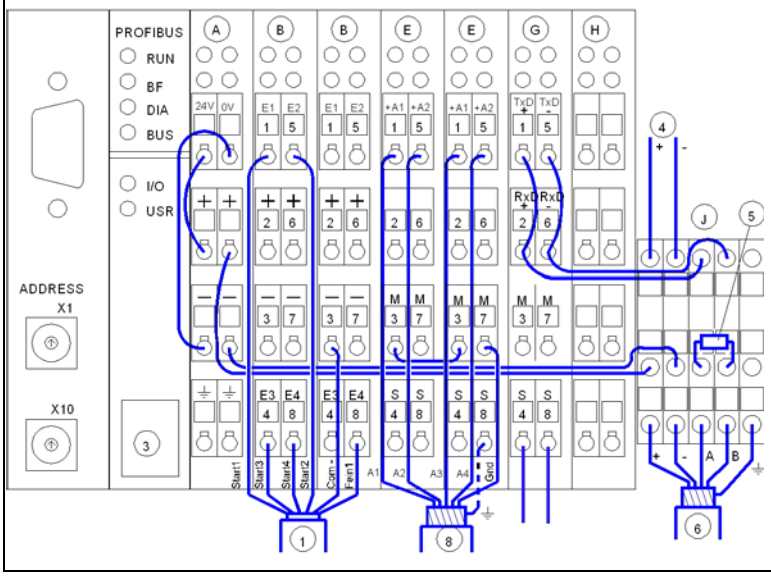
PROFIBUS DP
A controller PROFIBUS DP
G RS485 interface
H end terminal
J terminal block

1 PROFIBUS cable/plug
2 PROFIBUS address
3 configuration interfaces
4 connection power pack 24V DC
5 terminating resistor 120 ohm

6 bus cable sensor bus
+ - power supply sensors
A B data signal
⏚ shield



with output 2 x 4..20mA
A controller PROFIBUS DP
D output terminal 4..20mA
G RS485 interface
H end terminal
J terminal block
1 cable 4..20mA channel 1
2 cable 4..20mA channel 2
3 configuration interfaces
4 connection power pack 24V DC
5 terminating resistor 120 ohm
6 bus cable sensor bus
+ - power supply sensors
A B data signal sensor bus
⏚ shield

	**2x 4..20 mA, 2x relay contact** A controller PROFIBUS DP D output terminal 4..20mA F relay output terminal G RS485 interface H end terminal J terminal block 1 cable 4..20mA channel 1 2 cable 4..20mA channel 2 3 configuration interfaces 4 connection power pack 24V DC 5 terminating resistor 120 ohm 6 bus cable sensor bus 7 connection contact 1 8 connection contact 2 ⏚ shield
	**4 x output 0..10V** **4 x start input, 1x fine input** A controller PROFIBUS DP B input terminals E analogue output terminals G RS485 interface H end terminal J terminal block 1 control cable start and fine signal 3 configuration interfaces 4 connection power pack 24V DC 5 terminating resistor 120 ohm 6 bus cable sensor bus 7 connection contact 1 8 cable analogue outputs, ⏚ shield

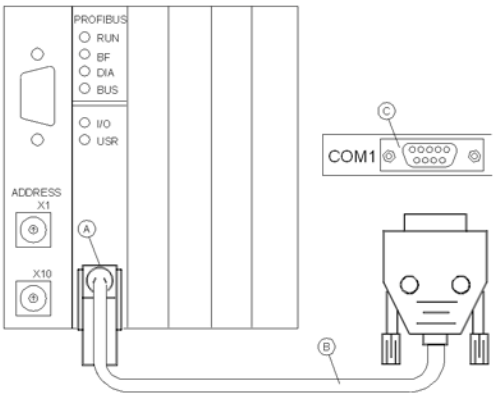
8. PC-software DMMS/DIGISYS

The multi-lingual DMMS/DIGISYS PC software allows the possibility of connection to the evaluation and transmission module. Configuration interface A is connected with the communication cable B to serial interface C of a PC/notebook.

If the PC does not have a serial interface, use the adapter „USB RS232 serial adapter“.

Refer to the operating instructions of the manufacturer.

8.1 Functionality



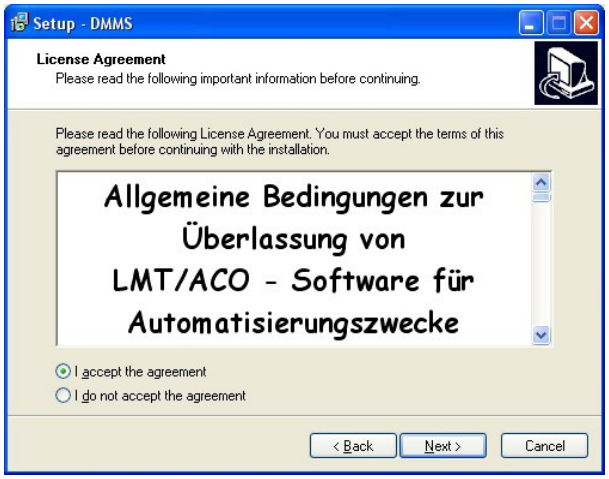
Use the USB adapter if necessary

- Measured value display 16 channels
- Configuration of the measuring channels
- Calibrating device
- Measured value simulation
- Material switching
- Record measured values
- Network connection
- Diagnosis

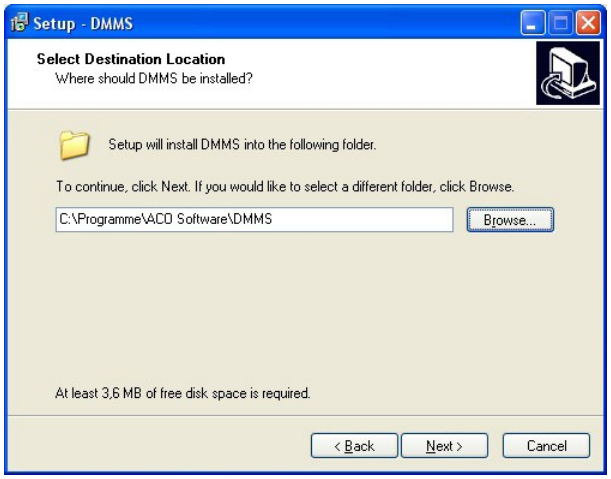
8.2 Installation

Start the English language version installation program „setupXXX.exe“ on the CD-ROM.

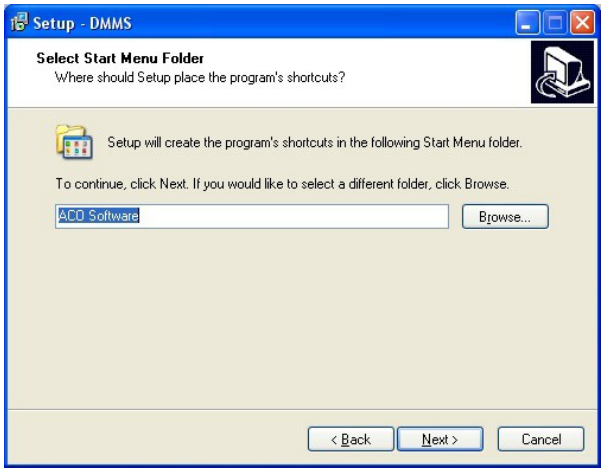
Set-up has been initiated - click „next“



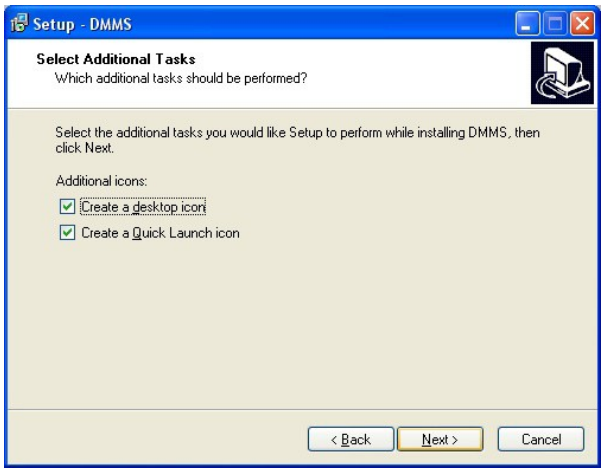
Select „I accept the agreement“



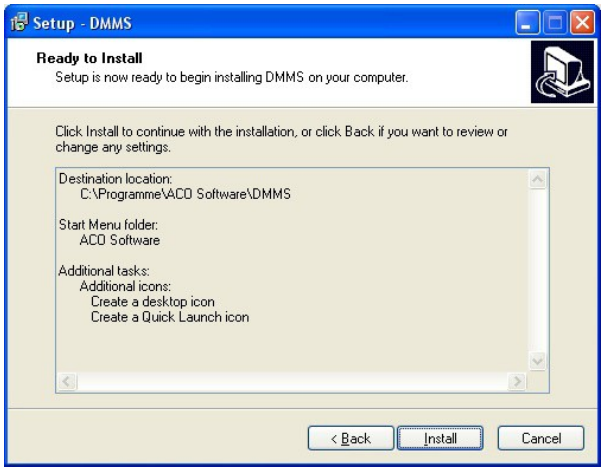
Select target drive / directory



Select entry in the start menu



Optional quick-start links



Details correct? - Click on „install“

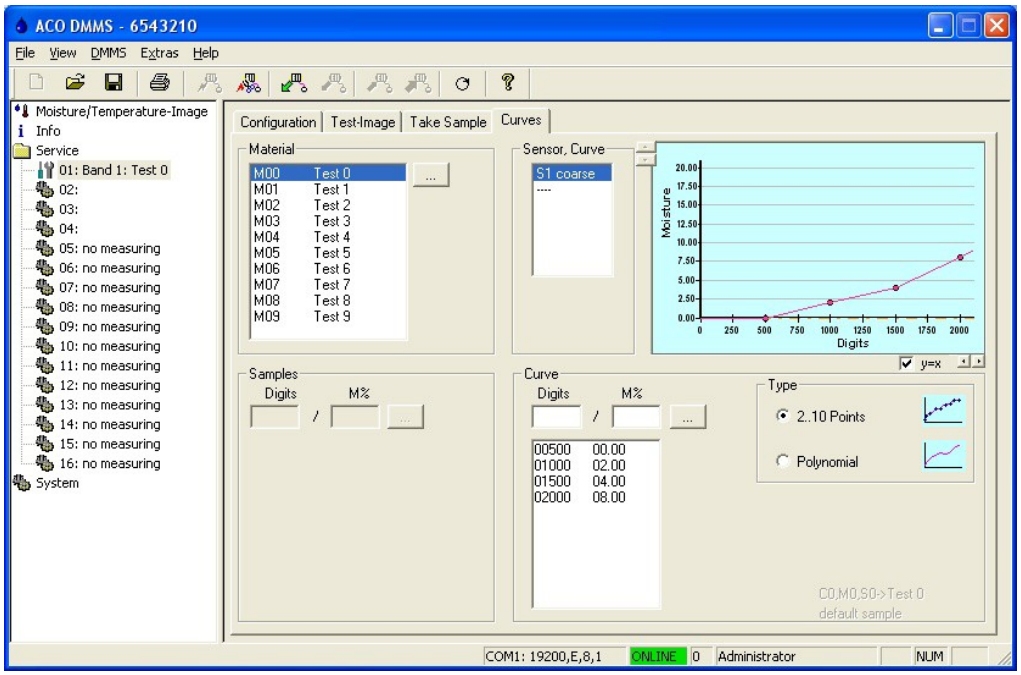
The software is then installed on the PC.

8.2.1. Start the program

The program can now be started from the start menu or via the links on the „desktop“.
The user name „administrator“ is to be entered following installation.
No password is assumed, simply click on „OK“.

8.3 General notes on operation

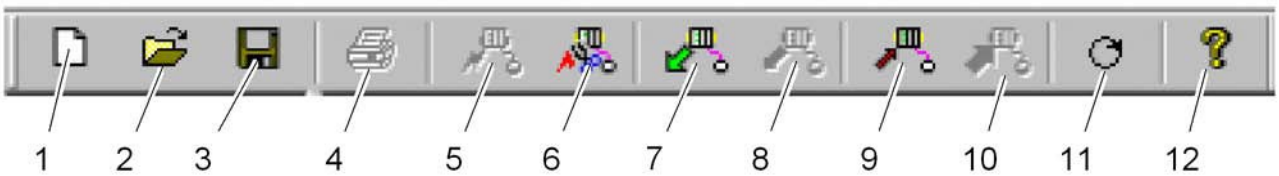
8.3.1. Window



Left-hand selection window	Right-hand application window
Moisture/temperature screen	Measured value display and simulation
Info:	Information regarding the DMMS, the connected sensors and the system
Service	-
01: Name ... 16: Name	4 Register to set up the measuring channels: configuration, testscreen, take sample, curves
System	3 Register for hardware-configuration and test: settings, diagnosis, memory

8.3.2. Symbol list

Allows quick access to the following menu functions:



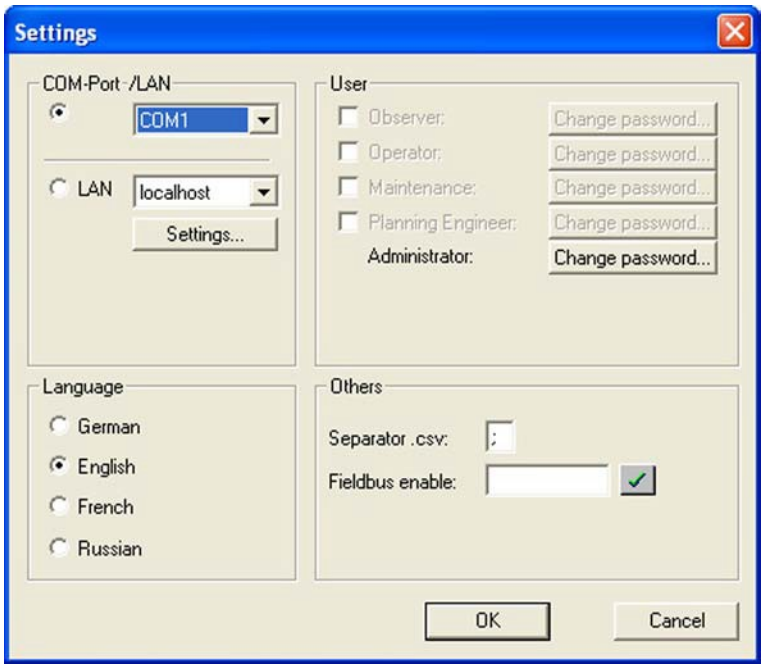
1	New	5	Connect	9	Write
2	Open	6	Disconnect	10	Write all
3	Store	7	Read	11	Reset
4	Print	8	Read all	12	Program info

8.3.3. Menu structure

File	New	Creates a new file with DMMS- settings
	Open	Opens a file with equipment - settings
	Store	All equipment - store settings on the PC
	Save as	All equipment - store settings on the PC under a different name
	Print	Protocol print of the equipment - settings in a text file
View	Symbol list	On and off
	Status list	On and off
	Partitioning	Partitioning of the selection and application windows.
DMMS	Connect	Establish connection between DIGISYS and PC
	Disconnect	Disconnect connection between DIGISYS and PC
	Read all	All data is read from the DIGISYS
	Read	Read off the configuration from the DIGISYS.
	Write all	All data is loaded into the DIGISYS
	Write	The configuration loaded into the DIGISYS
	Reset	Restart DIGISYS.
Extras	Settings	Settings for PC software
	Calculator	Windows computer
?		Program info PC software, operating instructions, help

8.4 Extras / Settings

Applies to the settings for the PC-software and not the DIGISYS evaluation and transmission module.



COM port/ LAN	Select the COM-port (serial interface): select COM1..8 or LAN - connection to evaluation and transmission module.
Language	Select language
Users	Determine user level and establish passwords for program start:
Other	
Seperation tags .csv:	Tags for table values in *.csv text file for „record take sample“ Common separation tags are commas (,) or semicolons (;).
Activate Profibus:	License code for activating **PROFIBUS**

User levels

1= Observer
2= User
3= Service-personnel
4= Planning engineer
5= Administrator

Privileges	**User level**				
	1	**2**	**3**	**4**	**5**
View configuration	X	X	X	X	X
Manual / automatic switching		X	X	X	X
Material-specific adjustment			X	X	X
Modulating the measuring range			X	X	X
Establish measuring section				X	X
User and passwords					X

8.4.1. Menu / connect

The configuration interface must be connected with the communication cable and the serial interface (COM-port) of the PC.

Click menu connect or .

When connection has been established, read the configuration DMMS by clicking on „yes“.

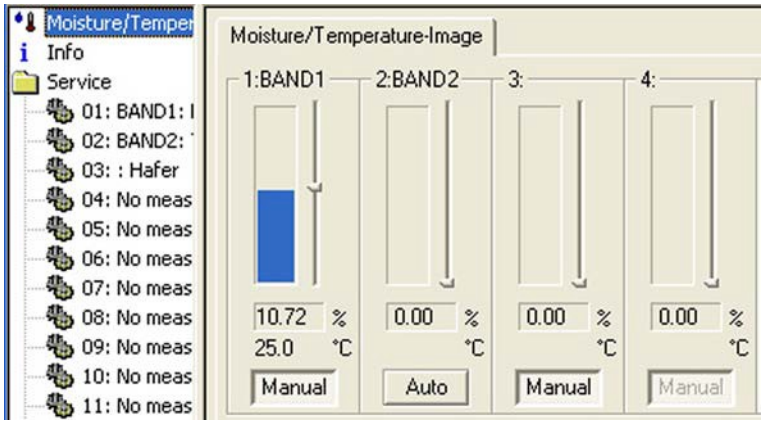
8.4.2. Menu / write

Modifications to the configuration only become effective if they are written in the DIGISYS evaluation and transmission module.

Click menu write or “.

Confirm the writing by clicking on „yes“.

8.5 Moisture screen / temperature screen



Representation of the measured values and the back-up measured values entered „manually“ (channel 1..16).

Auto

The registered measured values are ready for output.

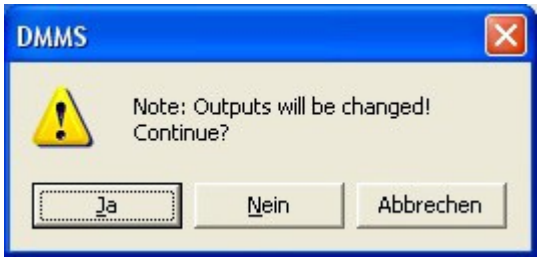
Hand

The manual value can be adjusted using the sliding regulators.

The back-up measured values serve simulation of the measured values and are issued in place of the measured value by pressing the „manual“ key. The manual value is independent from the measured value.

Manual/automatic switching

Click field manual / auto.

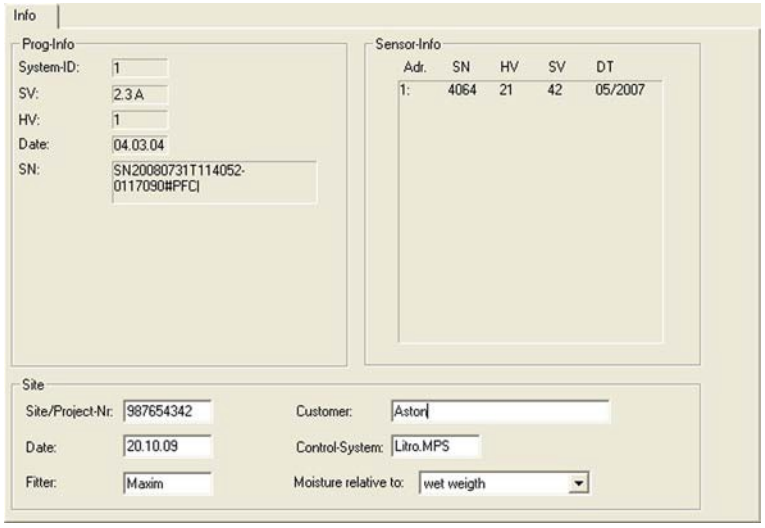


Confirm message with „yes“.

As an option, the material temperature (°C) can also be displayed.

For batch measurements, the represented measured values are only actualised during the batching procedure, so that the last measured value is displayed following batching.

8.6 Info



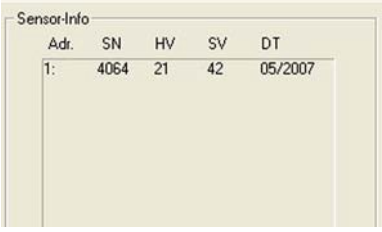
Prog. info

Evaluation and transmission module

System ID:	Identification
SV:	Software version
HV:	Hardware version
Date:	Program date
SN:	Serial number

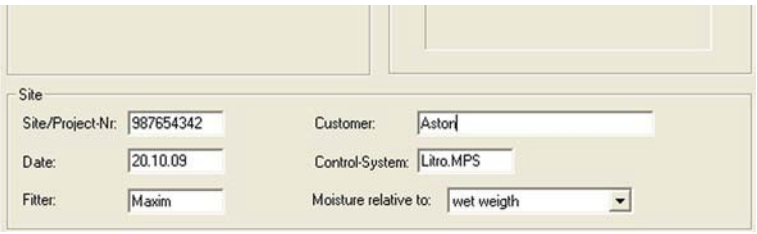
Sensor info

All recognised sensors 1..16



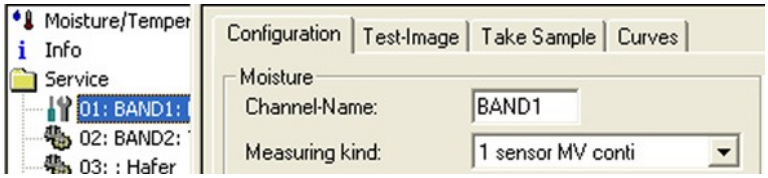
Addr.:	Sensor bus address
SN:	Serial number
HV:	Hardware version
SV:	Software version
DT:	Date factory calibration

System



Storage of system-specific information. The entries have no influence on the measurements.

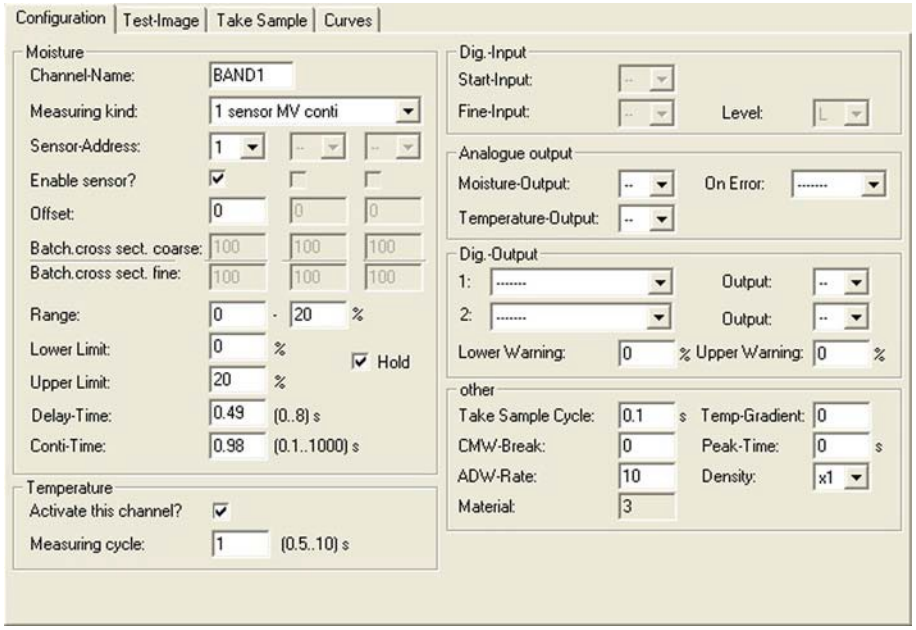
8.7 Service



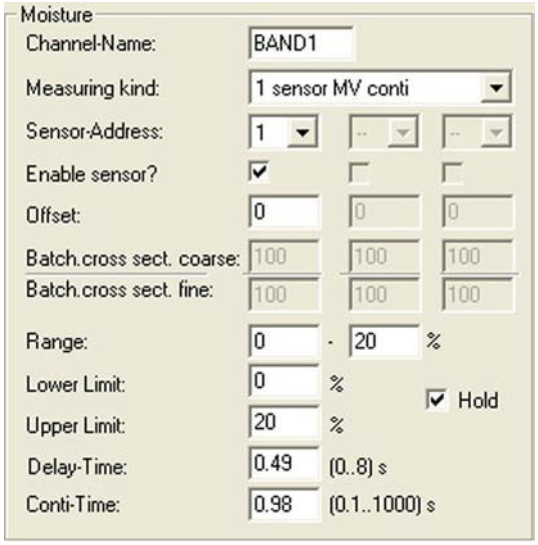
Summary of all functions for arrangement and maintenance of the measuring sections.

The measuring channel is first selected, and then the required register: Configuration, test screen, taking a sample or curves.

8.7.1. Configuration



Moisture



Channel name:	Clear text description which is then displayed in the moisture screen.
Measuring mode:	Select a measuring mode in the selection window.
Sensor address:	Addresses which have been recognised upon activation of the equipment and have not been allocated to other channels are available for

	selection. If a sensor address in brackets (n) is selected, no measurement is initiated. Measuring channels without sensor can thus be preconfigured.
Activate sensor?	The sensor can be deactivated if a malfunction occurs. The settings remain stored.
Offset:	The fraction value of the sensors in the air is trimmed to 100 units and allows the sensors to be replaced without having to recalibrate. The sensor must be dry and may not come into contact with any material (only air). The fraction value of the sensor is then read off in the test screen. The difference to 100 yields the offset. Example: Offset = 0 testscreen shows 112, Offset = -12 testscreen shows 100
Batching cross-section:	Allows weighted mean value calculation, as well as a curve switching with fine batching.
Measuring range:	Range for the issue of measured values and display in whole percent units!
Lower threshold / upper threshold:	The thresholds concern the working range of the mean value calculator. A stray value or an interruption in the material flow is therefore not included in the mean value. In the „..MW continuous“ measuring mode, this halt function can be deactivated as required. „hold“ will then not be reset.
Delay time:	The mean value calculation is initiated when the measured value is within the thresholds and a delay time has elapsed. The material flow may undergo „transient oscillation“ during the delay time. The duration of the required delay time can be established via "take sample".
Continuous time:	Memory of the continuous mean value calculation. A larger value effects a stabilisation of the measuring value, however also a signal delay in the measuring modes „..MW continuous“. Set the value as low as possible!
Hold:	This parameter is the default and may not be changed without consulting ACO.

Select measuring mode

Select one of the following measuring modes in the selection window:

No measurement	Measuring channel is deactivated	
1 sensor MW batch	Batch measurement Mean value calculator featuring start-stop control and delayed time	1 sensor
2 sensors MW batch		2 sensors which are summarised
3 sensors MW batch		3 sensors which are summarised
1 sensor MW continuous	Continuous measuring with signal stabilisation (continuous time)	1 sensor
2 sensors MW continuous		2 sensors which are summarised
3 sensors MW continuous		3 sensors which are summarised
1 sensor running	Ongoing measurement without mean value calculator with 1 sensor	
Issue of manual value	No measurement, simulation of measured value only	

Batch cross-sections

Allows weighted mean value calculation, as well as a curve switching with fine batching.

Coarse flow = fine flow	No curve switching
Fine flow = 0	Discontinuation of the measurement with fine signal, only the coarse flow is measured
Coarse flow > fine flow	Curve switching with fine batching, the fine flow delivers a different measuring signal

Examples:

Batch.cross sect. coarse: 100 100 0 Batch.cross sect. fine: 100 100 0	One sensor, no coarse-fine switching:
Batch.cross sect. coarse: 100 100 0 Batch.cross sect. fine: 50 100 0	One sensor, coarse-fine switching via material flow reduction (1/2-open position):
Batch.cross sect. coarse: 100 100 0 Batch.cross sect. fine: 0 100 0	Sensor1 only measures coarse flow, both sensors no curve switching.
Batch.cross sect. coarse: 100 100 0 Batch.cross sect. fine: 0 50 0	Sensor1 measures coarse flow only, Sensor2 features curve switching with fine batching as the fine flow is reduced by the 1/2-open position.

A pulsating fine batching can not be measured.

Temperature

Activate this channel?	If no check mark is ticked, no temperature is measured.
Measuring cycle	Standard value 1.

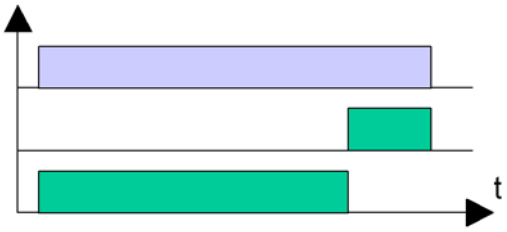
Digital input

The function of a digital input must be defined prior to utilisation. Undefined input numbers are indicated in brackets.

In „system/settings“ for start-stop control of the „start“ mean value calculator, select „fine“ for curve switching during fine batching. Type either Mx^1, Mx^2, Mx^4 or Mx^8 for material curve switching.

For measuring modes „.. MW batch“, the start signals and fine signals are conveyed via the PROFIBUS or via digital inputs.

The start signal must be present throughout the entire batching procedure.



Start signal:

(Level = H) the fine signal is present during the fine batching procedure:

(Level = L) the fine signal is not present during the fine batching procedure:

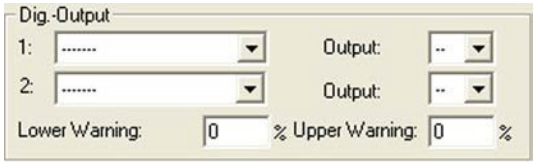
Analogue output

A measured value is transferred via an analogue output (0-10V or 4..20mA) to another system.

Moisture output:	analogue output number for moisture measuring value
If an error occurs:	behaviour of the output with the occurrence of an error ---- / 0V / 10V
Temperature output:	analogue output number for temperature value
	-10°C = 0V or 4mA +90°C = 10V or 20mA

Digital output

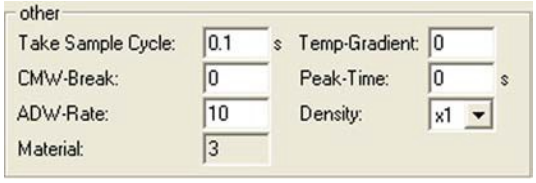
A max. 2 conditions per measuring channel can be signalised via a digital output.



1: / 2:	Select condition: warning below warning above, warning below + above manual, error
Warning below:	Limit value for warning
Warning above:	Limit value for warning
Output:	Output number

Other

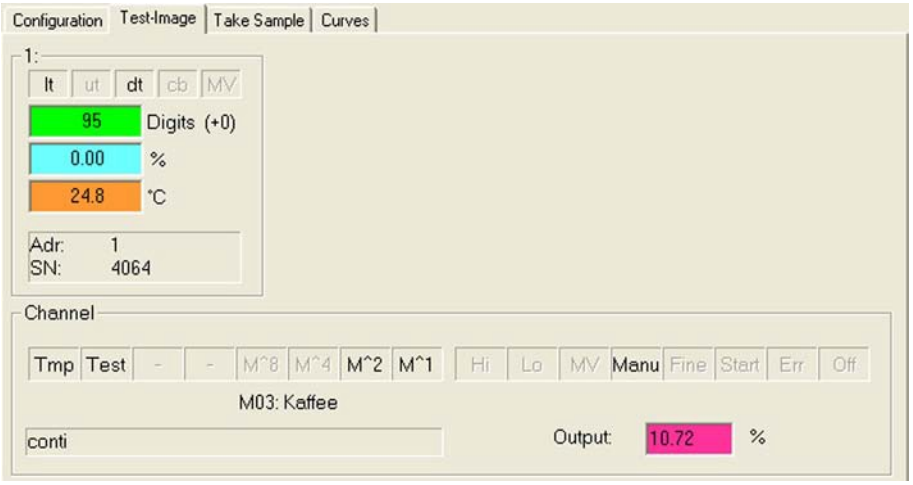
Entry fields for special functions:



Function	Description	Range	Default
Take cycle sample	Sampling rate (values / seconds) in the function. "Take sample".	0.1-10s	0.1 s
CMW pause	Number of pauses during median value calculation, to prevent overflow. Batch processes lasting longer than 15 min or loading. The delay time and the peak time are also then extended!	0..255	0
ADW- rate	Setting AD- conversion sensor. For test purposes only - do not modify!	0..255	10
Temperature gradient	The measured value of certain materials is temperature-dependent. An entry in measured parts per Kelvin (°C) can compensate for this.	127..128 T/K	0 T/K
Peak time	Peak value within the peak time during measuring mode „..MW continuous“ i.e. for interfering air bubbles in the material. (0 = off	0..8s	off
Sensitivity	x1= normal, x2 = double resolution, x10 = 10-time resolution Caution: overflow during 32768 measuring parts, 2..10-time offset.	x1, x2 ,x10	x1
Material	Display of the material number → curves		0

8.7.2. Test screen

Display of the measured value and status of the measuring channel and their sensors. Between 1 and 3 sensors are represented depending on the measuring mode.



Sensors

1: (2:) (3:)

Sensor status

gu =	limit value below
go =	limit value above
vz =	delay time running
kb =	curve B active (fine curve)
MW =	median value calculation running

Measured values

Parts =	measuring parts (+/- offset)
% =	moisture value of the sensor above the current calibration curve
°C =	material temperature

Info

Addr: =	sensor bus address
SN: =	sensor serial number

Channel display measuring channel status

The channel condition (green) or error messages (red) are displayed clearly.

Output: moisture measuring value of the measuring channel

8.7.3. Take sample

To obtain a material-specific balance, it is necessary to take samples from the flowing material as the measured parts are being recorded. The weight moistures of the samples are determined in the laboratory by drying or via „Karl Fischer Titration“. When creating the calibration curves, the measured parts are allocated to the laboratory samples.

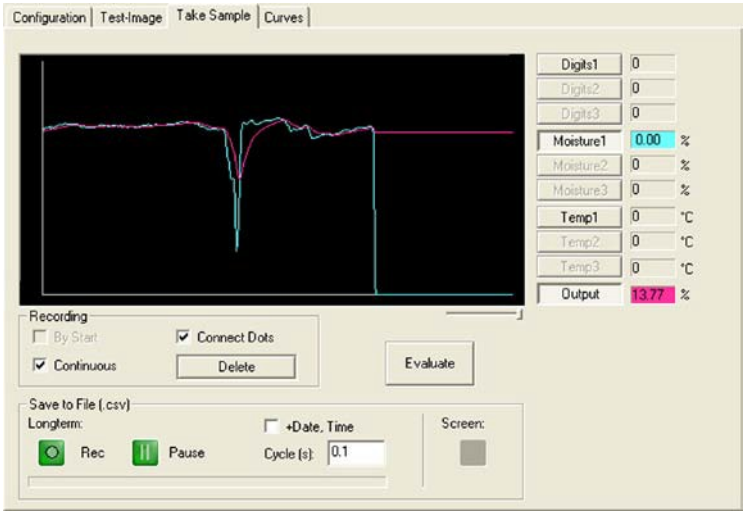
WARNING

Drives start up automatically.

Body parts and clothing are drawn into machinery.

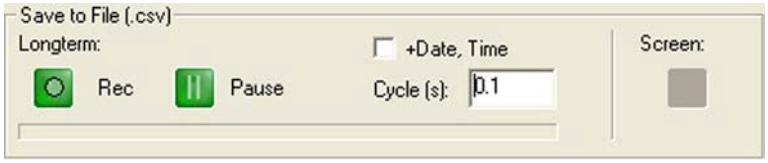
The samples, in most cases, must be taken in immediate proximity of the running machine parts.

Use suitable aids to pull the samples. Keep sufficient safety distance.



Recording with Start	The next batching procedure is recorded in the „..MW batch“ measuring mode.
Continuous recording	The recording is stopped or started immediately.
Joining the points	The measuring points in the graph are connected with lines.
Deleting	The recording is deleted via an additional confirmation.
Selecting signals	Using the switches for parts, moisture, temperature and output, the representation of the signals in the graph can be switched on and off. When creating the calibration curves, only the measured parts (parts 1.. 3) need to be switched on.
Evaluation	The quality of the recorded sample can be read off at the curve gradient. If this can be guaranteed, the range of the sample can be limited using both red dashed indicators. The mean value of all fraction values between the indicators is displayed and yields the fraction value of a sample. This value is to be noted (copy into the clipboard) and allocated to the laboratory value of the sample in the "curves" register. The sampling rate can be determined under „configuration / take cycle sample“.

Save to file



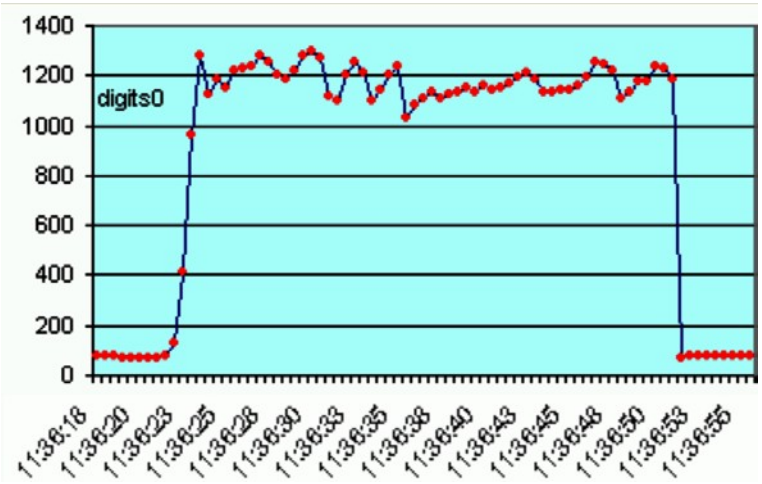
Display screen	Using the display screen key, all measured values which are currently being displayed in the graph can be stored in a text file (*.csv).
Buttons rec and pause	The keys Rec and Pause allow a long-term recording of the measured values in a text file, optionally with +date and time. A window featuring „save file as“ opens so that a file name can be designated. The data can be evaluated with another program, e.g.: with MS-EXCEL.
Cycle (s)	The recording cycle can be set between 0,1 and 600 seconds. The shorter the cycle time, the more accurate the measurement result.

Excel representation

Example:

	digits0	digits1	digits2	moist0	moist1	moist2	temp0	temp1	temp2	output
11:36:18	77	0	0	1.57	0	0	26.4	0	0	0
11:36:18	77	0	0	1.57	0	0	26.4	0	0	0
11:36:19	76	0	0	1.56	0	0	26.4	0	0	0
11:36:19	71	0	0	1.53	0	0	26.4	0	0	0
11:36:20	70	0	0	1.51	0	0	26.3	0	0	0
11:36:20	70	0	0	1.52	0	0	26.3	0	0	0
11:36:21	69	0	0	1.51	0	0	26.4	0	0	0

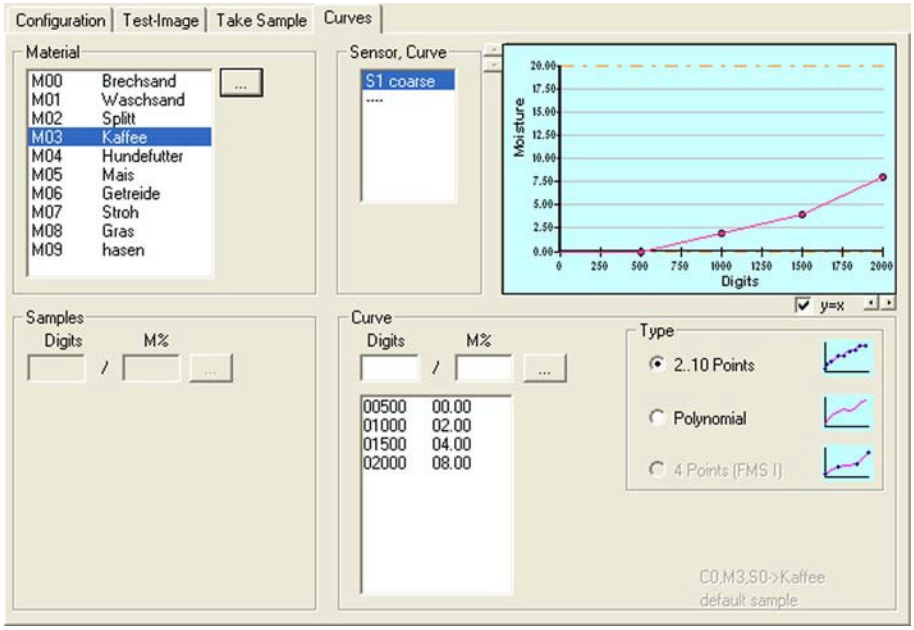
Text file with time, parts, moisture and temperature.



Graphic evaluation with MS Excel.

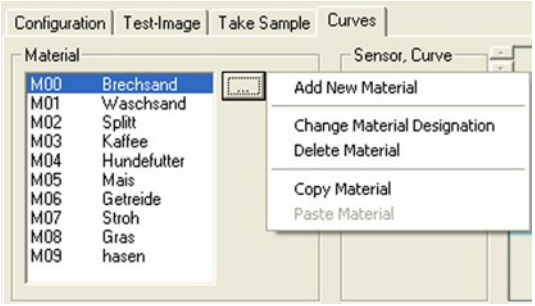
8.7.4. Curves

The "curves" feature provides a simple means of creating a suitable calibration curve from the established samples.



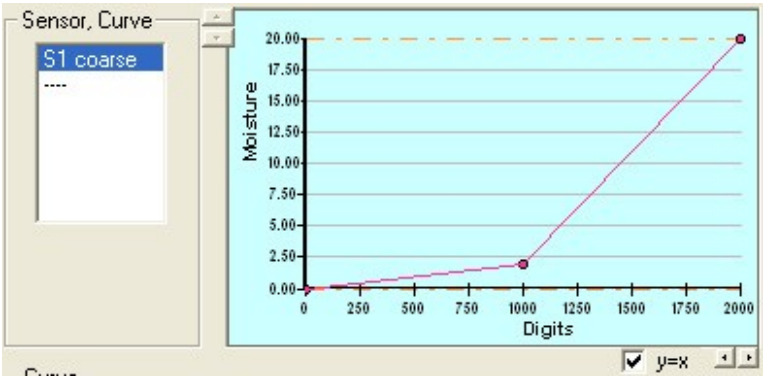
Material

Curves for different materials can be deposited in each measuring channel. Every material name represents its own set of curves. The materials can be administered via the "**...**" switch:



Set new material:	Determine the name, create a new curve set with default values and open
Change the material description	Only the material name is changed
Delete the material:	Delete material name and curve set
Copy the material:	Copy curve set into the clipboard
Insert the material:	Insert curve set

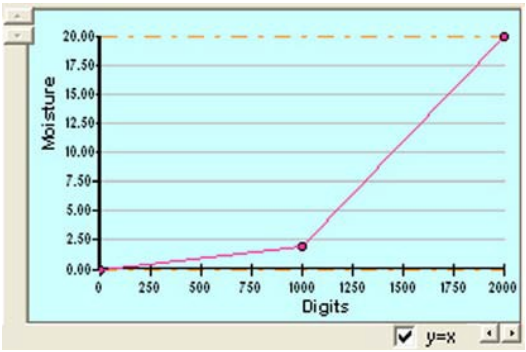
Sensor, curve

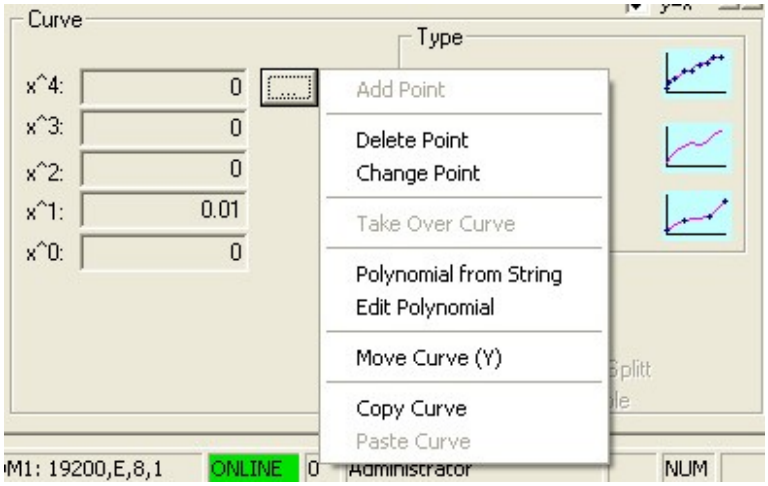


S1..S3 coarse S1..S3 fine	Selection and display of the curve in the curve set. 1 to 6 curves can be selected depending on the configuration.
Arrow keys	Graphic display area.
y= x	Set scaling of the y-axis automatically to 1/100 of the x-axis.

Curve, type 2..10 points

Evaluation of the samples is resulted on graph paper or via a table calculation system (e.g.: MS EXCEL). 2 data points (straight) or several data points can then be entered. The point list of the curve can be administrated via the "**...**" switch:

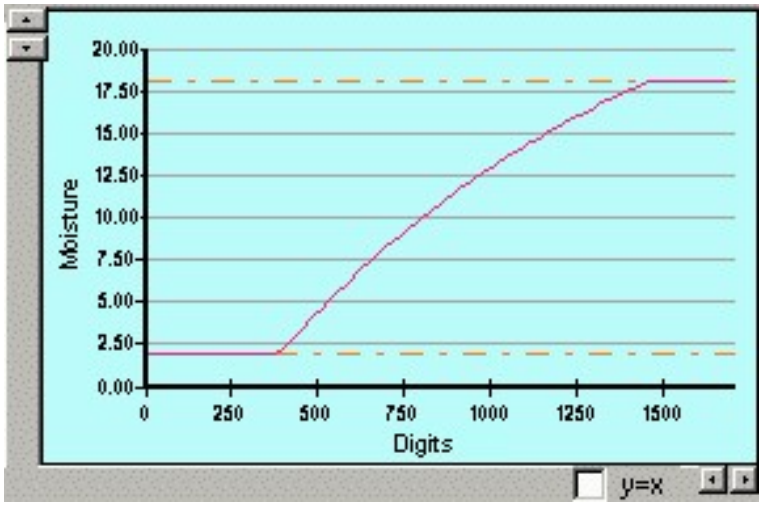


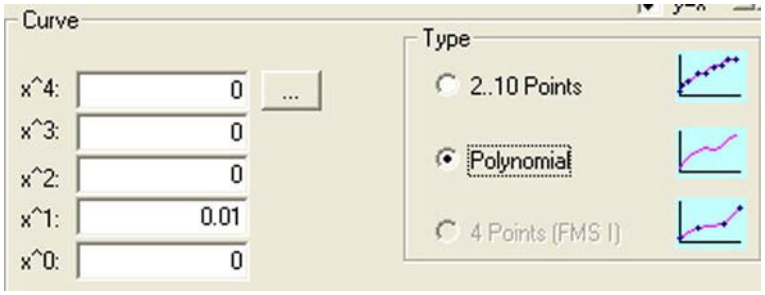


Insert point	Parts / F% are entered in the list and the resulting curve is displayed in the graphic
Delete point	Mark the point in the list, "... delete point
Modify point	Mark the point, "... modify point", modify parts and F%, then"... modify point" once again.
Adopt curve	Adopt the curve resulted from the points, also displayed in the graphic
Shift curve	Shift the curve by +/- 0..5 %F. Small deviations in the measurement can thus be corrected quickly and efficiently, then "...adopt curve"
Copy curve Insert curve	Copying the curve into intermediate storage and inserting the curve from intermediate storage allows simple transferral of a curve into another measuring channel.

Curve, type polynomial

The mathematic correlation between measured parts and moisture values can be ascertained using a table calculation system (e.g.: MS EXCEL). This correlation is represented by the digits 2 to 5 (coefficients). These coefficients can then be entered as a curve via the "**...**" switch.





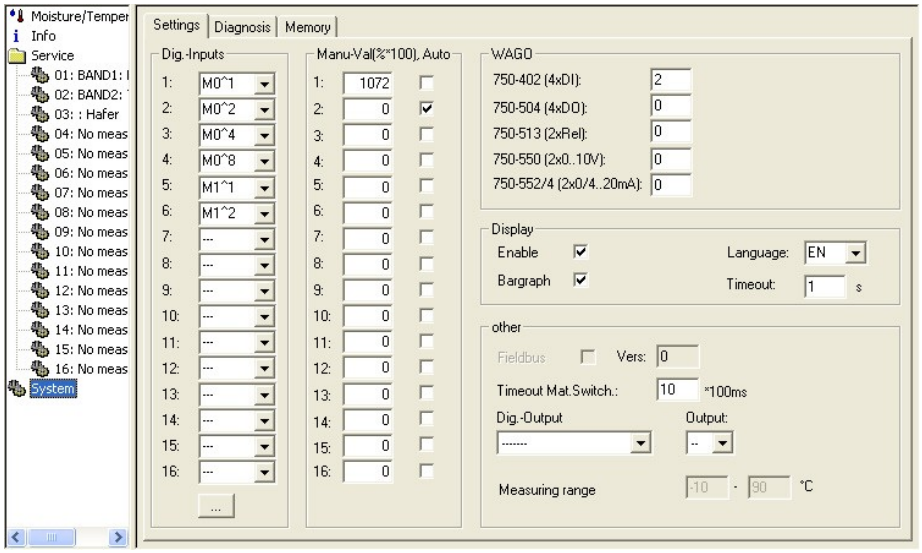
Adopt curve:	Adopt the curve resulted from the points, also displayed in the graphic
Edit polynomial	„...Edit polynomial“, modify coefficients, then „... Edit polynomial“ once again
Shift curve	Shift the curve by +/- 0..5 %F. Small deviations in the measurement can thus be corrected quickly and efficiently, then "...adopt curve"
Polynomial from symbol order	A polynomial can be imported via the MS-WINDOWS intermediate storage.
Copy curve Insert curve	Copying the curve into intermediate storage and inserting the curve from intermediate storage allows simple transferral of a curve into another measuring channel.

Polynomial as character string with MS-EXCEL

Process step	**Command entry**
Create and mark table with measurement parts and la- boratory samples	Insert / diagram / point (xy)
Mark data set in the diagram	Mark in the data stream diagram - diagram /insert trend line/ type: polynomial 3rd order
Mark trend line	Format / marked trend line / options / represent formula in the diagram.
Mark formula	Mark formula – formula / marked data label / digits / science / decimal places: 5
Mark the formula text	Edit / copy.
Polynomial is represented as a character string in the intermediate storage.	

8.8 System

8.8.1. Settings



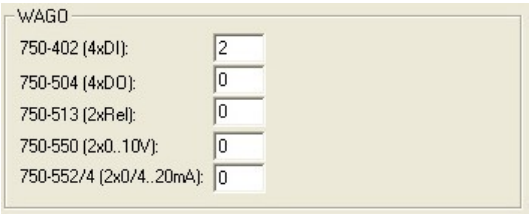
Digital inputs (mode of operation)

---	no function
Start	mean value start/stop
Fine	coarse-fine-curve switching

Manual value (%*100), auto

A manual value can be entered for each measurement channel. In the „auto“ operating mode the measured value is transmitted to the overriding system and a fixed value in the "manual" operating mode (simulation). Following activation, the manual value is transmitted until a measured value has been obtained.

WAGO



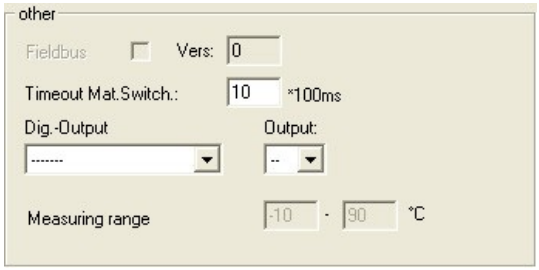
Number of individual WAGO I/O modules.

The parameters are factory set and are only adjusted for extensions.

Display/parameterisation module:

Release user terminal.

Other



Field bus	Activate PROFIBUS, (see - activation code in extras / settings / enable PROFIBUS) ***Once Profibus has been activated, material selection via Profibus gains priority over the external material switching.***
Timeout mat. switch.:	Material switching via selector switch, switching only becomes effective after 0.1..5s
Digital output:	Error signal through digital output.

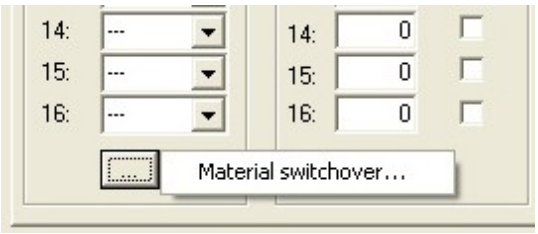
8.8.2. External material switching (through digital inputs)

A maximum of 16 materials can be switched within a channel through the DIGISYS. Only the first 8 channels can be switched externally.

Prerequisite

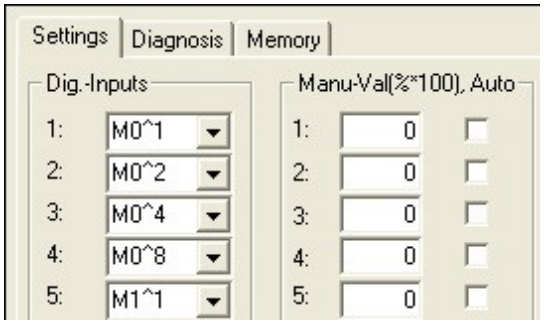
- The materials must already be set.
- A sufficient number of digital inputs must be available (WAGO 750-402).

Once Profibus has been activated, material selection via Profibus gains priority over the external material switching.



- Click field „material switching“.

- Select channel
- Determine number of materials.
- Confirm settings with „OK“.



The assignment of the digital inputs is shown on the monitor.

Binary code representation

Assignment Digital inputs				Material-number
Mn^8	Mn^4	Mn^2	Mn^1	
0	0	0	0	M00
0	0	0	1	M01
0	0	1	0	M02
0	0	1	1	M03
0	1	0	0	M04
0	1	0	1	M05
0	1	1	0	M06
0	1	1	1	M07
⋮	⋮	⋮	⋮	⋮

n = channel -1
0 = 0 V
1 = 24 V

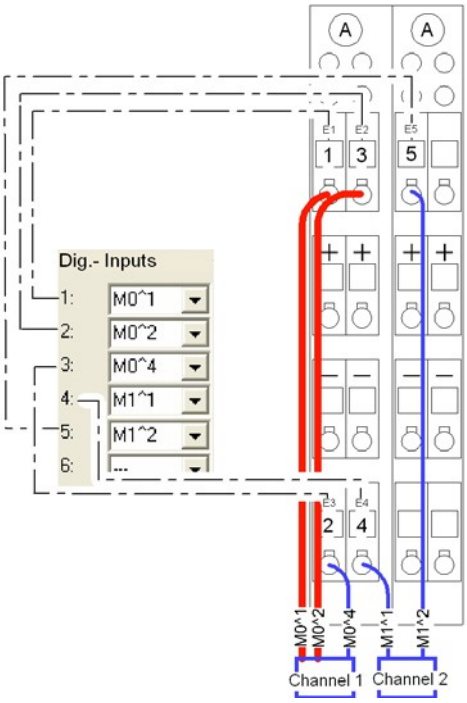
8.8.3. Example configuration

Channel 1: 6 various materials.

The digital inputs 1 to 3 are assigned to switch between the materials M00 and M05 from channel 1.

Channel 2: 3 various materials.

The digital inputs 4 to 5 are assigned to switch between the materials M00 and M02 from channel 2.

Channel 1			**Assignment of the digital inputs**
Material number	**Material**	**Number of materials**	
M00	Tea	6	
M01	Wood chips		
M02	Cat food		
M03	Wheat		
M04	Barley		
M05	Oats		
Channel 2			
Material number	**Material**	**Number of materials**	
M00	Rye	3	
M01	Corn		
M02	Soy		

A: WAGO 750- 402

Settings example

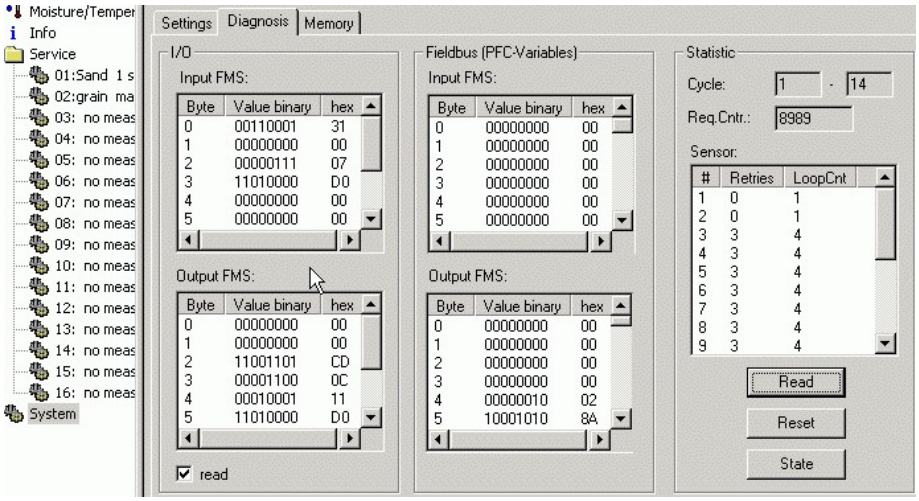
Inputs 1 and 2 are live. See red cable guide (wide cable).

The material M03, wheat, is set on channel 1.

The material M00, rye, is set on channel 2.

8.8.4. Diagnosis

Tools for start-up



I/O = condition of the WAGO I/O modules

Read = query conditions

Field bus (PFC-variables) = condition of the PROFIBUS PFC variables

Statistics (access to bus sensors):

Retries = retries without responses

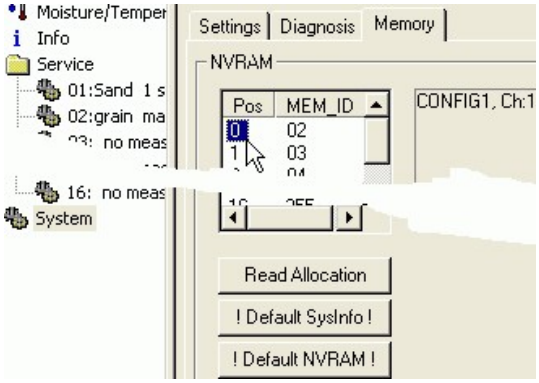
LoopCnt = number of attempts

Read = read statistics

Reset = reset statistics

Status = show channel status

8.8.5. Memory



Read assignment = display storage assignment NVRAM

Default SysInfo = only resets the system settings to the factory values. The configuration and curve memory are not deleted.

Default NVRAM = resets the entire memory of the evaluation and transfer module to the factory values.

Physical damage to the system!

The specific configuration and all curves are then deleted.

9. Set up measuring section / Calibration manual DMMS DIGISYS

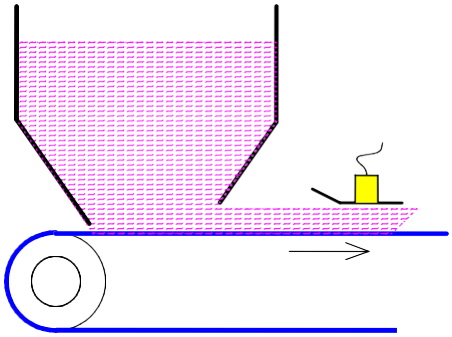
9.1 Measuring section

Sand is transported via a belt feeder from silo to the production.

The height of the material on belt feeder is constant. The on-line moisture measuring will be realised with ACO moisture measuring sensor and slide. The moisture measuring sensor is integrated into the slide. They are on top on the sand and both slides over/through the sand.

The moisture measuring sensor has the bus address “1”.

The 1st analogue output should be 4…20mA for a measuring range from 0…20% moisture.

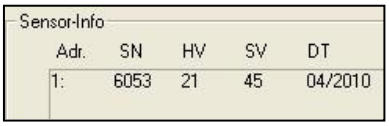


9.2 Commissioning

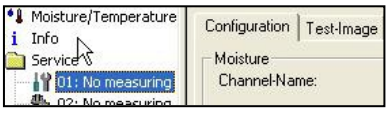
1. At first you have to plug the delivered WAGO Service Cable (750-920) or WAGO USB Service Cable (750-923/000-001) between evaluation unit DIGISYS and PC/laptop for getting a connection.

2. Start the DIGISYS program and click on "Connect" in the icon bar.

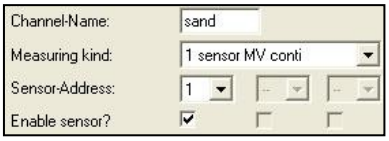
3. If the module is recognised, click on „YES“



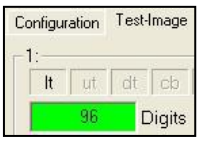
4. Click on „Info“. All sensors on the bus must be recognised.



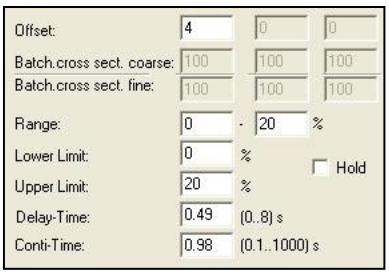
5. Select measuring channel 1: click in the selection window under Service "01:...." and select the "Configuration" register card.



6. Designate a channel name, select measuring kind "1 sensor MV conti" and enter the bus addresses of sensors"1". Enable the sensor (ticks).



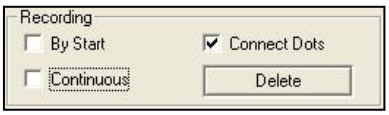
7. Switch to the "Test-Image" register card. Dry the sensors using a towel. Ascertain the digits in air, note them down and calculate the offset. (off-set = digits in air - 100).



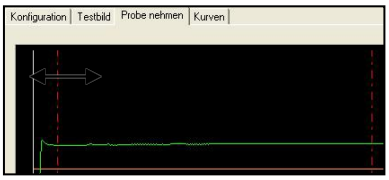
8. Enter the offset in Configuration.
9. The range for measuring value display and issue is 0...20% moisture.
10. The thresholds must be within the measuring range.

11. The moisture value is at analogue output 1 without error signalisation.

12. Switch to "Take Sample" register card and click the "continuous" box to enter a tick symbol. The measured values of the material flow are recorded. Simultaneously, take material samples from the discharge points and ascertain the moisture value in the laboratory.

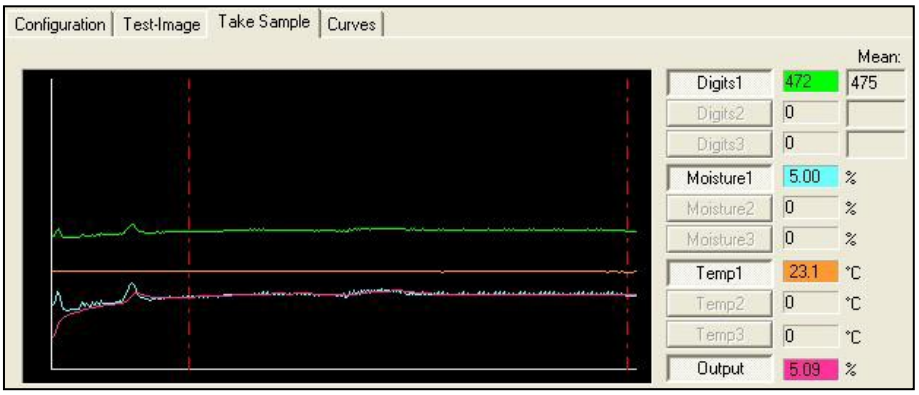


13. After batching, click out the tick symbol at "continuous".



14. Press "Evaluate" and limit the range of the sample using both red-dotted cursors. Read off the digits for sensor 1 and make a note of them (Mean:)

    (Are big fluctuations in the measuring signal are realizable the value for Konti-time in the register card „configuration“ must be increase. Thereby the analogue output will get a little bit absorbed.)



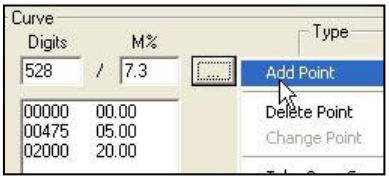
1st measuring:
mean value: 475digits

laboratory sample: 5.0%

15. As soon as further moisture values become available, repeat the "Take Sample" procedure.
    2nd measuring: mean value: 528 digits → laboratory sample: 7,3%

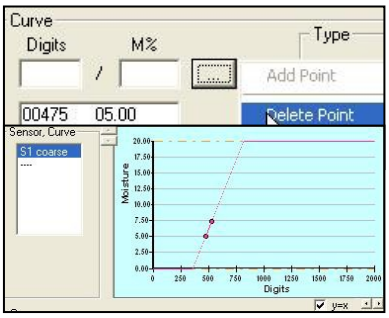
16. Switch to "Curves" register card, carry out „...Add New Material“ and designate a material name.

17. Select "Type, 2..10 points".



18. Type in the values 475 and 5.0 into the fields Digits / M% carry out "...Add Point".

19. Type in the values 528 and 7.3 into the fields „Digits“ and „M%“ carry out "...Add Point".
    You can add from 2 to 10 points to one curve.



20. Select the old points and carry out "...Delete Point" respectively.

    The new curve will also be displayed in the graphic.

21. If everything is OK, carry out "... Take Over Curve".

22. Confirm the message with "Yes".

23. Store new curve.

24. Confirm the measuring results by way of laboratory samples!

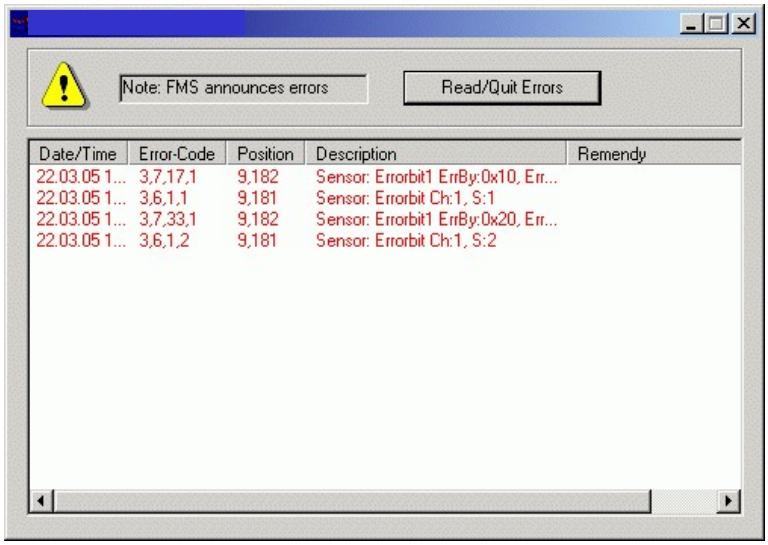
    [DMMS error signalisation]

10. Error reports

10.1.1. Incorrect entries

All errors which are recognised during operation of the DMMS/DIGISYS PC software are displayed in a separate window in clear text and must be confirmed.

10.1.2. DMMS error signalisation



Errors which are recognised by the DIGISYS evaluation and transmission module are displayed via a flashing code (error code).

See evaluation and transmission module LED-signalisation.

These errors are also listed in a separate window "DMMS error signalisation". The window then remains in the foreground and can be minimised as required.

11. Spare-parts list

Description

DMMS sensor

Mounting flange 76mm

Bus connection socket

Cable gland M16x1.5 4.5-10MM

Lock M16x1.5

Cheese-head screw ISO1207- AM 4X 12- 4.8

Lock washer DIN 128

Bus connection resistance 0.5W 120R 1% +-10

Cable sensor bus (Unitronic-bus LD 2 x 2 x 0.22)

DIGISYS evaluation and transmission module basic equipment

USB RS232 serial adapter	
Communication cable	(WAGO 750-920)
USB service cable 750-923/000-001	
Options:	
4-channel digital input terminal 3ms	(WAGO 750-402)
2-channel analogue output terminal 0..10V	(WAGO 750-550)
2-channel analogue output terminal 4-20mA	(WAGO 750-554)
Relay output terminal 250 V AC, 30V DC, 2A AC/DC	(WAGO 750-513)
4-channel digital output terminal 0.5A	(WAGO 750-504)

Ethernet/RS232 adapter

Network 24V/0,626A

Plug-in power supply 24V/0.5A

DMMS/DIGISYS PC software

12. Connect the USB adapter

- Inspect the USB adapter for damage.

Do not connect the cable to the computer yet.

Before connecting the cable to the computer, install the USB adapter driver.

12.1.1. Install the driver software

The driver software can be found on the Wago DVD.

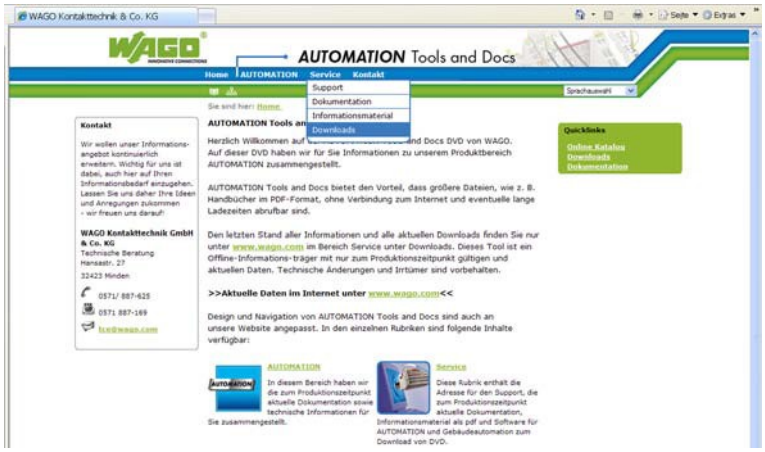
- Place the DVD in the DVD drive.

The installation software usually starts up automatically.

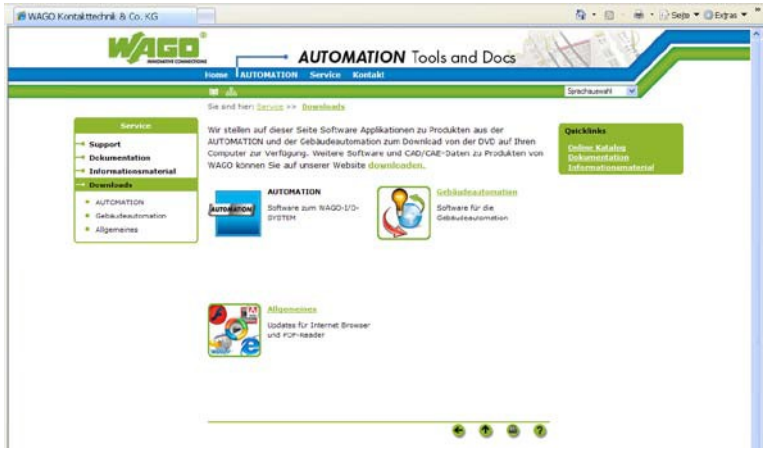
- If the installation software does not start automatically:

Start the driver installation by double clicking the file .

- Select the installation language.



- Click on "downloads" in the pulldown menu „service“.



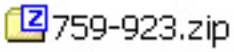
- Click on the button "automation" in the sub menu „downloads“.

- Read the general terms and conditions.

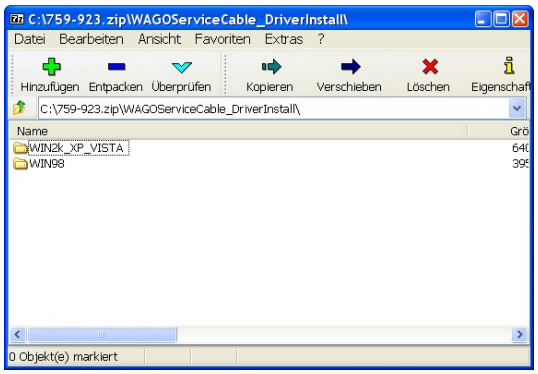
To install the necessary driver, the general terms and conditions must be accepted.

- Click the button „I agree to the general terms and conditions“.

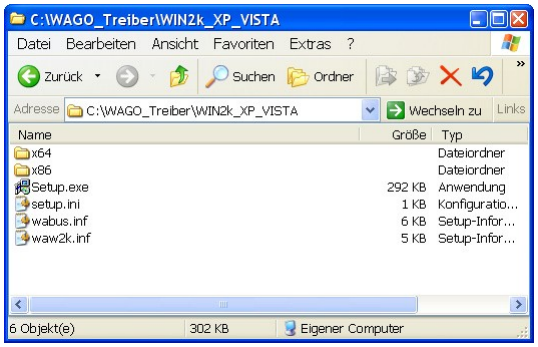
- Select driver no. 759- 923.



- Save the ZIP file to the hard drive.



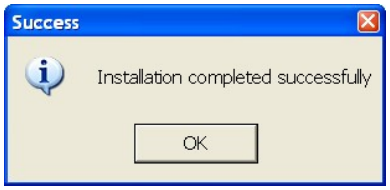
- Expand the Zip file.



- Double click "setup.exe".

- Select the installation path.

- If a warning shows up regarding the software installation, click on the button „continue installation“ (or "install now"...).



If the installation was successful, a notice will be shown.

- Complete the Installation with „OK“.
- Click on „OK“.

The software installation has been completed.

12.1.2. Connect the USB adapter

When the USB adapter driver has been installed, connect the USB adapter.

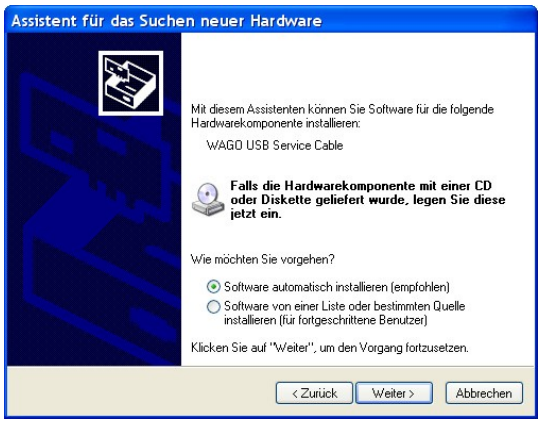
- Connect the USB adapter to an available USB slot on the computer.

The computer's hardware assistant will open.

- Determine the type of connection with Windows Update.

Select the field „yes, only once“.

- Click on the „continue“ button.

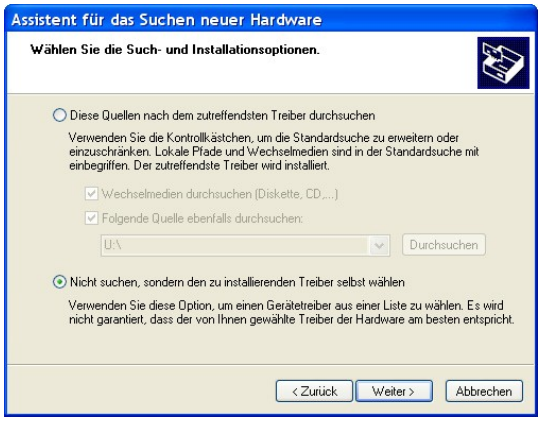


- Insert the CD.

Select the field „install software automatiically“.

- Click on the „continue“ button.

The hardware is located.



Select the field „do not find, select driver from a list“.

- Click on the „continue“ button.

- If a warning shows up regarding the hardware installation, click on the button „continue installation“ (or "install now"...).

After a few seconds, the driver is installed and the USB adapter is ready to use.

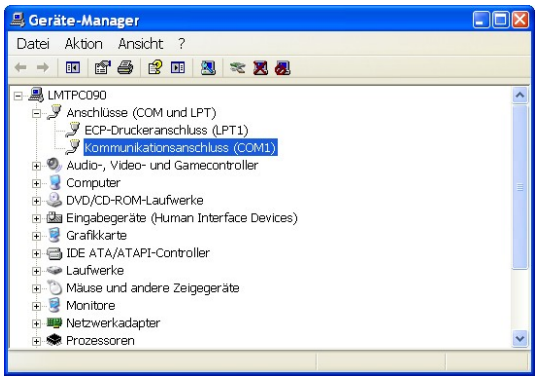
After the installation of the driver, the next available virtual COM port is reserved for the cable.

The reserved COM port in the control panel of the computer can be found in
„start\ settings\ control panel\ system\ hardware\ device manager\ connections“
.
The COM port is released again after uninstalling the driver.

12.1.3. Switch out the USB adapter

Before the USB adapter is switched out, the driver software must be uninstalled.

Uninstall the driver software



- Open the device manager.

Path: „start\ settings\ control panel\ system\ hardware\ device manager\ connections“

- Select the COM port of the USB adapter.

- Switch to the "driver" registration card.
- Click on the button „uninstall“ and uninstall the driver.

Then reinstall the driver software as described in this sub chapter.

12.1.4. Technical data

See the manufacturer's data sheet in the box.