



FEUCHTEMESSUNG
MOISTURE MEASUREMENT

ACO DMMS-DIGISYS Feuchtemesssystem

Profibus DP-interface

Description, planning, start-up

V1.0	06.05.03	Preliminary
V1.1	17.07.02	Channel statusbit 1: "Error" new
V1.2	25.09.03	Channel statusbits 4,5 "Mean,Manu" changed
V1.3	10.12.03	Material in Channelstate, material switchover by channel control word (SV \geq 2.2)
V1.4	29.10.04	Changes in Chapter Planning/Configuration
V1.5	16.01.18	Changes GSD-file
V1.6	16.01.18	Channel statusbit 0,1 "Manu active" in documentation reversed, adapt chapter control word system

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Description

Moisture and temperature values, as well as status and error reports can be read from all 16 channels of the controller via the Profibus DP. It is also possible to initiate all control signals such as Start, Fine and Manual. This documentation supplements the DMMS-DIGISYS operating instructions.

Comments:

- The DIGISYS requires upgraded module parameters for parameterisation. Up to 244 bytes capacity of parameterisation data can be achieved depending on the module configuration. The Profibus-Master must support this parameterisation data capacity.

Process image

Data exchange between the control system and the DMMS-DIGISYS is resulted via the process image. Correct parameterisation of the DMMS-moisture measuring sensors supported by the PC-Software DMMS is prerequisite for fully-functioning moisture measurement.

Input data DMMS-DIGISYS

The DIGISYS-input variables are described as viewed from the DIGISYS. As viewed from the Profibus-Master, these variables are output variables.

Thus, control of the DMMS-DIGISYS is as follows.

Word	Byte	Data	Byte	Data
0	0	Control System High	1	Control System Low
1	2	Control Channel 1 High	3	Control Channel 1 Low
2	4	Control Channel 2 High	5	Control Channel 2 Low
3	6	Control Channel 3 High	7	Control Channel 3 Low
4	8	Control Channel 4 High	9	Control Channel 4 Low
5	10	Control Channel 5 High	11	Control Channel 5 Low
6	12	Control Channel 6 High	13	Control Channel 6 Low
7	14	Control Channel 7 High	15	Control Channel 7 Low
8	16	Control Channel 8 High	17	Control Channel 8 Low
9	18	Control Channel 9 High	19	Control Channel 9 Low
10	20	Control Channel 10 High	21	Control Channel 10 Low
11	22	Control Channel 11 High	23	Control Channel 11 Low
12	24	Control Channel 12 High	25	Control Channel 12 Low
13	26	Control Channel 13 High	27	Control Channel 13 Low
14	28	Control Channel 14 High	29	Control Channel 14 Low
15	30	Control Channel 15 High	31	Control Channel 15 Low
16	32	Control Channel 16 High	33	Control Channel 16 Low

Control word system

The control word system monitors system control of the DMMS-DIGISYS. Control of the measuring channels is resulted via the channel control words (see below).

Control System High

7	6	5	4	3	2	1	0

Control System Low

7	6	5	4	3	2	1	0
						Clear Error	Init DIGISYS

Init DIGISYS:

Restart DIGISYS: DIGISYS is re-initialised with increasing gradient (sensors are searched for, configuration data is read anew)

Clear Error:

A current error is confirmed by rising edge; the error bit in the status word is deleted. Should further errors occur, they will be signalled via the error bit.

Control word channel

The control word channel monitors control of the moisture measuring channels (1..16)

Control Channel n High

7	6	5	4	3	2	1	0
				Material^8	Material^4	Material^2	Material^1

Control Channel n Low

7	6	5	4	3	2	1	0
			Manu Moisture	Fine Channel	Start Channel	Init Channel	Disable Channel

Disable Channel:

Deactivate channel: The actual channel is deactivated, thus no measurement is resulted. The measured value outputs remain unchanged. This channel is restarted if Disable is cleared again.

Init Channel:

Restart channel

Start Channel:

Start batch measurement. Echo is resulted in the status word

Fine Channel:

Fine switch-over: Switch-over to fine curve.

Caution: Fine curve must be configured!

Manu Moisture:

Manual value output: The manual value deposited in the DMMS-DIGISYS is submitted in place of the measured moisture value

Material^1

Material switchover hexadecimal (SV>=2.2)

Material^2

Material^4

Material^8

Output data DMMS-DIGISYS

The DIGISYS-output variables are described as viewed from the DIGISYS. As viewed from the Profibus-Master, these variables are input variables.

Status and measured values are thus transferred to the control system.

Word	Byte	Data	Byte	Data
0	0	Status System High	1	Status System Low
1	2	Error-Nibble 1,2	3	Error-Nibble 3,4
2	4	Moist Channel 1 High	5	Moist Channel 1 Low
3	6	Status Channel 1 High	7	Status Channel 1 Low
4	8	Temperature Channel 1 High	9	Temperature Channel 1 Low
5	10	Channel 2 High	11	Channel 2 Low
6	12		13	
7	14		15	
8	16	Channel 3 High	17	Channel 3 Low
9	18		19	
10	20		21	
11	22	Channel 4 High	23	Channel 4 Low
12	24		25	
13	26		27	
14	28	Channel 5 High	29	Channel 5 Low
15	30		31	
16	32		33	
17	34	Channel 6 High	35	Channel 6 Low
18	36		37	
19	38		39	
20	40	Channel 7 High	41	Channel 7 Low
21	42		43	
22	44		45	
23	46	Channel 8 High	47	Channel 8 Low
24	48		49	
25	50		51	
26	52	Channel 9 High	53	Channel 9 Low
27	54		55	
28	56		57	
29	58	Channel 10 High	59	Channel 10 Low
30	60		61	
31	62		63	
32	64	Channel 11 High	65	Channel 11 Low
33	66		67	
34	68		69	
35	70	Channel 12 High	71	Channel 12 Low
36	72		73	
37	74		75	
38	76	Channel 13 High	77	Channel 13 Low
39	78		79	
40	80		81	
41	82	Channel 14 High	83	Channel 14 Low
42	84		85	
43	86		87	
44	88	Channel 15 High	89	Channel 15 Low
45	90		91	
46	92		93	
47	94	Channel 16 High	95	Channel 16 Low
48	96		97	
49	98		99	

Status word system

Status System High

7	6	5	4	3	2	1	0

Status System Low

7	6	5	4	3	2	1	0
						Error	Busy

Busy: System busy, e.g. when booting (sensor search)
Error: Error -> comparable with Error-Nibbles

Error word

Error-Nibble 1,2

7	6	5	4	3	2	1	0
Type				Number			

Error-Nibble 3,4

7	6	5	4	3	2	1	0
Para1				Para2			

Type: Error type
Number: Error number
Para1: Parameter 1
Para2: Parameter 2

The above values are described in the DMMS-DIGISYS operating instructions.
 It is imperative that the error parameters Para 1, 2 are submitted upwards of 0 at the Profibus interface as opposed to the flash code, thus as the parameter is submitted, the error parameter should be incremented by 1 respectively.

Moisture value

Moist Channel n

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Moist Channel n															

Moist Channel n Moisture value x 100
 Data type: UINT16 (no preceding symbol)
 Example: 14.6% -> 1460d, 0x05B4h

Channel status

Status Channel n High

7	6	5	4	3	2	1	0
Temperature active	Test active	.	.	Material ⁸	Material ⁴	Material ²	Material ¹

Status Channel n Low

7	6	5	4	3	2	1	0
Hi-Warning	Lo-Warning	Manu active	Mean active	Fine active	Start active	Error	Disabled

Disabled no measurement from this channel

Start active: Start active
Fine active: Fine active
Manu active: 0: Moisture automatic value output; 1: Moisture manual value output
Mean active: Mean value calculation active; also active with "currently measuring"

operation type

Lo-Warning: lower warning threshold reached or fallen short of (prepared)
Hi-Warning: upper warning threshold reached or fallen short of (prepared)
Material^1..8 current material 0..15 (SV>=2.2)

Test active Test operation active (e.g. test image, take sample)
Temperature active Temperature measurement authorized

Material temperature

Temperature Channel n

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Temperature Channel n															

Temperature Channel n Temperature value °C x10
Data type: INT16, Bit 15 is preceding symbol
Example: 25.2°C -> 252d, 0x00FCh

Planning/configuration

To implement the DIGISYS in a Profibus network, the nodes must be correctly configured. For further information see (German):

- **WAGO Manual 750-121 "PROFIBUS DP/FMS, PROFIBUS DP"**
- **WAGO Supplement to the manual 750-121 "PROFIBUS DPV1 750-333 / 750-833"**

or (English):

- **WAGO Manual PROFIBUS**
- **WAGO Supplement to the manual** Fieldbus Coupler 750-833, Programmable Fieldbus Controller 750-833

Obtainable under www.wago.com.

GSD-file

The GSD-file **B756_S20.GSE** or **B756_P20.GSE** (german: B756_S20.GSD / B756_P20.GSD) from WAGO is necessary for planning. Also obtainable under www.wago.com or on enclosed ACO-CD.

Configuration

The order of the terminals must be configured in accordance with the DMMS-DIGISYS operating instructions!

The configuration is accepted via a planning tool (dependent upon the Profibus-Master). The available hardware is first selected:

1.) 750-833 No PI Channel

2.) PFC 750-653 RS485-Interface (imperative that PFC 750-653 is selected, not 750-653...)

In the event that analagous outputs have been entered for example, and configured in DIGISYS, they will also be configured as PFC-module.

Should additional terminals become available which are not used by DIGISYS, they will be integrated as standard (without PFC...). It is imperative that the plugging order is noted!

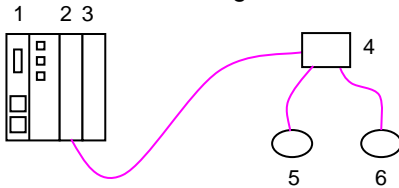
3.) The quantity of **moisture measuring data (PFC-inputs and outputs)** being transferred is then determined.

The following table gives information concerning the number of bytes to be transferred, depending on the number of moisture measuring channels:

Number of measuring channels (n)	Number of PFC-input bytes (n*2+2)	Number of PFC-output bytes (n*6+4)
1	4	10
2	6	16
3	8	22
4	10	28
5	12	34
6	14	40
7	16	46
8	18	52
9	20	58
10	22	64
11	24	70
12	26	76
13	28	82
14	30	88
15	32	94
16	34	100

Example

Moisture measuring with 2 channels.



1. Controller 750-833/000-002
2. RS485 750-653/000-020
3. Terminal clamp 750-600
4. Bus plug socket
- 5,6. ACO DMMS-sensors

Parameterisation:

750-833 No PI Channel PFC 750-653 RS485-Interface 6 Byte PFC-Inputs 16 Byte PFC-Outputs
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Start-up

For start-up of the Profibus-network, moisture measuring of the DIGISYS must be deactivated (operation type switch in middle position).

As soon as the Profibus is functioning fault-free, the DIGISYS-function can be activated (operation type switch in upper position)

Diagnosis of the input/output data can be carried out with the DMMS-DIGISYS calibration-software under *System-diagnosis*.

Tip: For start-up, the respective measuring channels can be configured to manual value output, in order that a moisture value can be made available, even without connected sensors.

To guarantee correct functioning of the DIGISYS, special attention must be paid to correct triggering of the Start/Fine signals. The test image function of the DMMS-DIGISYS calibration-software is perfectly suitable for carrying out checks.