DME with PROFIBUS

Installation and operating instructions

BE>THINK>INNOVATE>

GRUNDFOS
ALLDOS

DME with PROFIBUS

English (GB) Installation and operating instructions

CONTENTS

> *Prior to installation, read these installation and operating instructions. Installation and operation must comply with local regulations and accepted codes of good practice.*

1. Introduction

This document describes the functional profile for Grundfos Alldos DME dosing pumps:

- DME (2-48 l/h)
- DME (60-940 l/h).

For identification of DME model, see section *3.*

2. Connections

The DME pump is supplied with an IP 65 RS-485 M12 connector.
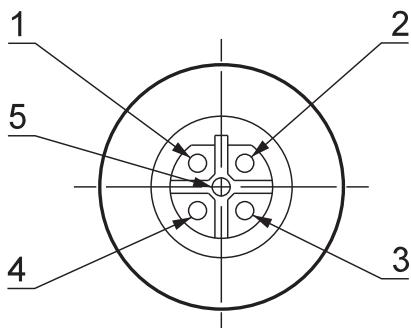
Fig. 1   M12 connector, IP 65

M12 connector		9-pin D-sub connector
Pin		**Pin**
1	VP	6
2	RxD/TxD-N	8
3	DGND	5
4	RxD/T-P	3
5	Screen	1

3. Identification of DME model

The DME model is identified by the first letter in the model number.
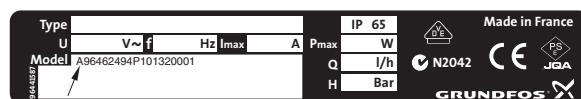

Fig. 2   Model identification

4. Device identification

The ID number is accessible by sending a diagnostic request telegram from the master.

ID numbers of DME dosing pumps:

Pump	Model		ID number Hex value
DME 2-18			
DME 8-10			
DME 12-6	DME (2-48 l/h)	C	0970
DME 19-6			
DME 48-3			
DME 60-10			
DME 150-4	DME (60-940 l/h)	A	0971
DME 375-10			
DME 940-4			

5. Addressing

The address is factory-set to a standard value (126).

The PROFIBUS address of each DME pump in the bus system must have a unique written value for the network communication to work. This can be done via the bus if the units are connected one at a time.

The PROFIBUS address can also be changed via the DME pump display. From the menu, select "SETUP" and then "NUMBER".

6. Slave diagnosis services

Via the diagnosis, the slave informs the master of its current mode. It consists at least of the information specified in the standard, in the first 6 octets, such as the status of the state machine. The user can supplement this information (user diagnosis) with process-specific information (for example wire break).

On the slave's initiative, the diagnosis can be transmitted as error message and as status message. In addition to 3 defined bits, the user also influences the application-specific diagnostic data. However, any master (not only the assigned master) can poll the current diagnostic information.

6.1 Application-specific diagnostic data

The DME dosing pump has device-related diagnostics (see IEC 50170 vol. 2 for protocol-specific information). The diagnostics consist of 3 bytes of user-specific diagnostics in the following format:

Status	DME SW. ver.	Profi SW. ver.

The user diagnostic byte *Status* has the following format:
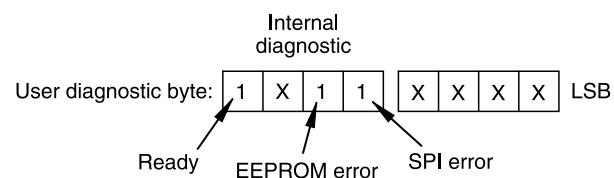
Fig. 3   Overview of the user diagnostic byte *Status*

The other two user diagnostic bytes indicate the software versions of both the DME dosing pump and the PROFIBUS add-on module.

6.2 Watchdog

The dosing pump can be configured so that it stops pumping if communication fails.

The configuration must be done in two steps:

1. Enable the communication watchdog with the commissioning tool or PLC.

2. Send the command 26 *comm_watch_e* to the dosing pump, otherwise the pump will not react to a communication watchdog timeout. The configuration is stored in non-volatile memory, e.g. EEPROM.
   To disable this feature, send the command 27 *comm_watch_d* to the dosing pump or disable the communication watchdog with the commissioning tool or PLC.

7. References

Reference	Document title	Document file
/1/	PROFIBUS Protocol Specification	EN 50170 vol. 2

8. Mode control and status

A DME pump has the mode scheme shown below.

By means of the commands - also shown below - a DME pump can be set to operate as required. This corresponds to operating it via the buttons on the front panel.
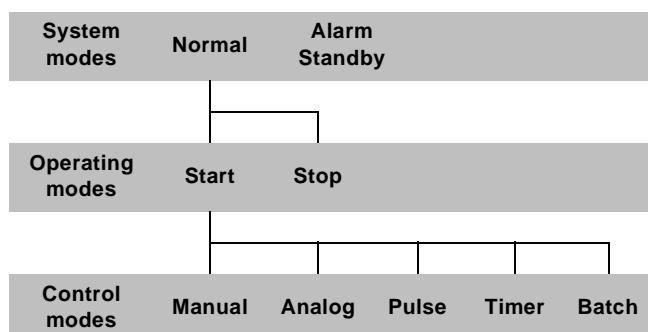
9. Modes of the DME

The tables below show the data items holding information about the actual operating mode of the DME pump.

act_mode1 (I,54) – actual mode status no. 1

Bit no.	Description
2-0	Operating modes (user modes): 000: Start 001: Stop 010: – 011: Max.
5-3	Control modes: 000: Manual 001: Pulse 010: Analog 011: Timer 100: Batch
6	Anti-cavitation: 0: Disabled 1: Enabled
7[+]	Auto restart after alarm: 0: Disabled 1: Enabled

[+] Only DME (60-940 l/h)

act_mode2 (I,55) – actual mode status no. 2

Bit no.	Description
6	Communication watchdog: 0: Disabled 1: Enabled

act_mode3 (I,56) – actual mode status no. 3

This byte is not influenced by the setup status. It contains information about modes for which no setup exists. These modes are typically generated by the system itself.

Bit no.	Description
2-0	System modes: 000: Normal 011: Survive 100: Alarm Standby
3	Pending alarm: 0: No alarm 1: Alarm
5	Calibration mode: 0: Disabled 1: Enabled
6	Bleeding: 0: Disabled 1: Enabled

10. DME inputs

The tables below show the data items holding information about how the inputs of the DME pump are configured.

input_setup1 (I,62) – mode of configurable inputs

Bit no.	Description
1-0	External stop: 01: Normally open 10: Normally closed
3-2	Level modes: 00: Monitor function* 01: Normally open 10: Normally closed
6-4	Analog modes: 000: 4-20 mA 001: 20-4 mA 010: 0-20 mA 011: 20-0 mA
7	-

* Only DME (2-48 l/h)

input_setup2 (I,65)[+] – mode of configurable inputs

Bit no.	Description
0	Diaphragm input: 0: Normally open 1: Normally closed
1	Monitor input: 0: Disabled 1: Enabled

[+] Only DME (60-940 l/h)

11. DME display unit

The table below shows the data items holding information about how the DME pump is configured to show units in the display.

scaling_setup (I,63) – display mode

Bit no.	Description
1-0	Unit in display: 00: Metric (litre) 01: US (gallon)

12. Anti-cavitation

The table below shows the data items holding information about how much the max. capacity is reduced to avoid cavitation.

Note:

- Only DME (60-940 l/h).
- Remember to enable anti-cavitation, see section *9. Modes of the DME* for further information.

Bit no.	Description
2-0	Capacity reduction: 000: Max. capacity reduced to 75 % 001: Max. capacity reduced to 50 % 010: Max. capacity reduced to 25 %

13. Status of pump LEDs

The status of the pump LEDs can be requested via the data item *led_contr* defined below.

Note that the relay status follows the ON condition of the red LED.

Using 'NC' terminal at the relay means that active equals an open relay.

Using 'NO' terminal means that active equals a closed relay.

led_contr (I,44) – LED indication

Bit no.	Description
1-0	00: LED 1 (green) off 01: LED 1 (green) on 10: LED 1 (green) flashing 11: –
3-2	00: LED 2 (red) off 01: LED 2 (red) on 10: LED 2 (red) flashing 11: –

Green LED	Red LED	Cause	Alarm relay*
Off	Off	Power off or fault in mains connection	–
On	Off	System mode Normal, operating mode Start	–
Flashing	Off	System mode Normal, operating mode Stop	–
On	On	System mode Survive, operating mode Start (pump keeps dosing despite warning)	Active
Flashing	On	System mode Survive, operating mode Stop	Active
Off	On	System mode Alarm Standby	Active

*Add-on feature, not available on DME 2-48 pumps with PROFIBUS

Interpretation of LEDs and status of the alarm relay.

Note that the relay status follows the ON condition of the red LED.

Using 'NC' terminal at the relay means that active equals an open relay.

Using 'NO' terminal means that active equals a closed relay.

14. Alarm status

alarm_code (I,59)

Alarms are recorded in *alarm_code.* All alarms result in the DME entering the Alarm Standby mode.

In this mode, the green LED on the pump is switched off and the red LED is switched on. The value of *alarm_code* is kept and not updated (cleared) until restarting is attempted. An automatic restart will occur if the cause of the alarm disappears.
The *alarm_code* will then be cleared and the green LED will be switched on again.

The table below shows supported alarms:

Code	Alarm cause	Automatic restarting	Description/action
19[+]	Diaphragm break	No	The alarm must always be acknowledged by a *reset_alarm* command which also clears pending alarm bit.
48[+]	Overload (maximum pressure exceeded)		
57	Dry running (low liquid level)	Configurable*	Can be configured to "Enabled" or "Disabled" in DME (60-940 l/h).
64	Overtemperature		
76**	Internal communication fault	Yes	The PROFIBUS module always clears the alarm when communication is restored with the DME. *reset_alarm* command clears pending alarm bit.
83	Parameter area verification error (EEPROM)	Pump stopped	The alarm cannot be cleared. DME must be re-powered.
88	Sensor fault (analog input)	Yes	The alarm is always cleared by the DME auto restart function. *reset_alarm* command clears pending alarm bit.
154[+]	Display communication fault		
174[+]	Origo sensor fault	Pump stopped	The alarm cannot be cleared. DME must be re-powered.
173[+]	Hall sensor fault		

[+] Only DME (60-940 l/h)

* Not configurable in DME (2-48 l/h), but always set to "Yes"

** Generated by PROFIBUS module

- *act_mode3*, bits 0-2, (see section *9.*) holds information about the pump being in Alarm Standby or not and
- *act_mode3*, bit 3, holds information about the presence of an unacknowledged (pending) alarm.

reset_alarm will acknowledge (clear) the alarms that can be cleared.

alarm_code_disp (I,57)

This data item is identical to *alarm_code.*

warning_code (I,58)

Warnings are recorded in *warning_code*. A warning does not lead to any action of the DME pump, but both red and green LEDs are switched on. When the cause of the warning disappears, the code is cleared.

The table below shows supported warnings:

Code	Warning cause
17	Max. flow (exceeds max. capacity in pulse mode)
48[+]	Overload (maximum pressure exceeded)
57	Low liquid level
59	No flow

[+] Only DME (60-940 l/h)

15. Dosing control

Figure 4 shows the data items used in the five control modes.
For all control modes, the data item *max_dosing_flow* will limit the actual capacity to this value.

For the control mode Manual, it is not possible to select a value higher than this limit.
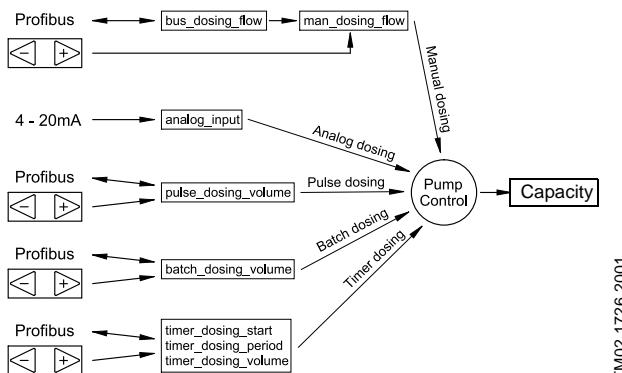
Fig. 4 The five control modes and the data items used for generating the actual capacity

16. Commands (output)

Via the module definition "Commands Buffer" in the GSD file, it is possible to use the 8 defined output bytes of the module to send commands to the DME dosing pump.

The "Commands Buffer" module is mandatory and the first module when configuring a DME PROFIBUS slave on the network.

The first byte is used to indicate the command, and the following 3 bytes are for future use ("don't care" at the moment). The next 4 bytes are used to represent the data item which can be from 8 bits to 32 bits. Some commands do not have a data item, and the value of the 4 data bytes is "don't care".

Example 1

To start, the DME dosing pump must receive command number 3 (0x03).

The 8 outputs will look like this to start the pump:

0x03	0x00	0x00	0x00	0x00	0x00	0x00	0x00

Example 2

The pulse dosing volume is to be set to
0.975 ml/p $\Rightarrow$ 975 000 nl/p.

The data format for pulse dosing volume is a 32-bit data item, hence 975,000 is 00 0E E0 98 in hexadecimal.

The command for setting the pulse dosing volume is number 17 (0x11).

The 8 outputs will look like this to set the pulse dosing volume to 0.975 ml/p:

0x11	0x00	0x00	0x00	0x00	0x0E	0xE0	0x98

Example 3

The timer dosing period is to be set to 1 day, 2 hours and 45 minutes.

The data format for the timer dosing period is a 16-bit data item, hence 1 day, 2 hours and 45 minutes are 1605 minutes and 00 00 06 45 in hexadecimal.

The command for setting the timer dosing period is number 20 (0x14).

The 8 outputs will look like this to set the timer dosing period to 1 day, 2 hours and 45 minutes:

0x14	0x00	0x00	0x00	0x06	0x45	0x00	0x00

For acknowledge purpose indicating that the command is executed in the DME dosing pump, the command is returned from the DME dosing pump to the PROFIBUS master via the "Command Ack" module which defines 1 input byte in the GSD file.

If the command is executed successfully, the value of the command is returned in *command_ack*.

If, for some reason, the command is not executed (e.g. a pump fault), the value 0xFF is returned in *command_ack*. The master must then send the idle command (0x00) or another command before sending the failed command again.

Note: To get this acknowledge feature, it is important to add the module in the parameterization, the "Command Ack" module must be added, when configuring the DME PROFIBUS slave on the network.

Example 1 without error

To stop, the DME dosing pump must receive command number 4 (0x04).

The 8 outputs will look like this to stop the pump:

0x04	0x00	0x00	0x00	0x00	0x00	0x00	0x00

The *Data_Exchange* cycles will look like this for the first output and the *command_ack*:

Cycle no.	Command output 0	Command_ack (I,0)
1	0x00	0x00
2	0x04	0x00
3	0x04	0x04

Example 2 with error

To stop, the DME dosing pump must receive command number 4 (0x04).

The 8 outputs will look like this to stop the pump:

0x04	0x00	0x00	0x00	0x00	0x00	0x00	0x00

The *Data_Exchange* cycles will look like this for the first output and the *command_ack*:

Cycle no.	Command output 0	Command_ack (I,0)
1	0x00	0x00
2	0x04	0x00
3	0x04	0xFF
4	0x00	0xFF
5	0x00	0x00
6	0x04	0x00
7	0x04	0x04

16.1 PROFIBUS commands available

Identifier	Command	Data item	Description
RESET_ALARM	1	Don't care	Clears a possible pending alarm.
FACT_BOOT	2	Don't care	All configuration parameters are returned to the factory setting.
START	3	Don't care	Starts the pump (operating mode Start). Updates the *act_mode1*, bits 0-2, accordingly.
STOP	4	Don't care	Stops the pump (operating mode Stop). Updates the *act_mode1*, bits 0-2, accordingly.
MANUAL	5	Don't care	Sets the pump to control mode Manual dosing. The dosing setpoint *man_dosing_flow* can now be controlled via the + and – buttons and from the PROFIBUS via *bus_dosing_flow*. Updates the *act_mode1*, bits 3-5, accordingly.
PULSE	6	Don't care	Sets the pump to control mode Pulse dosing. The pump will dose *pulse_dosing_volume* for each external electrical pulse input. Updates the *act_mode1*, bits 3-5, accordingly.
ANALOG	7	Don't care	Sets the pump to control mode Analog dosing. The dosing setpoint (flow) can now be controlled from the analog input (4-20 mA). Updates the *act_mode1*, bits 3-5, accordingly.
TIMER	8	Don't care	Sets the pump to control mode Timer dosing. The pump will dose *timer_dosing_volume* for every *timer_dosing_period*. Updates the *act_mode1*, bits 3-5, accordingly.
BATCH	9	Don't care	Sets the pump to control mode Batch dosing. The pump will dose *batch_dosing_volume* with maximum capacity for each external electrical pulse input. Updates the *act_mode1*, bits 3-5, accordingly.
ANTI_CAVITATE_E	10	Don't care	Enables the DME anti-cavitation mechanism (prolonged suction).
ANTI_CAVITATE_D	11	Don't care	Disables the DME anti-cavitation mechanism.
DOSE_BATCH	12	Don't care	The pump doses a batch in control mode Batch dosing.
START_BLEED	13	Don't care	The pump starts bleeding (pressing 100 % button).
STOP_BLEED	14	Don't care	The pump stops bleeding (releasing 100 % button).
LOCK_KEYS	15	Don't care	Locks the + and – buttons on the pump.
UNLOCK_KEYS	16	Don't care	Unlocks the + and – buttons on the pump.
PULSE_DOSING_VOLUME	17	hi, lo1, lo2, lo3	Sets the dosing volume to be used in control mode Pulse dosing.
BATCH_DOSING_VOLUME	18	hi, lo1, lo2, lo3	Sets the dosing volume to be used in control mode Batch dosing.
TIMER_DOSING_VOLUME	19	hi, lo1, lo2, lo3	Sets the dosing volume to be used in control mode Timer dosing.
TIMER_DOSING_PERIOD	20	hi, lo	Sets the period of time between dosing in control mode Timer dosing.
TIMER_DOSING_START	21	hi, lo	Sets the start time of first dosing in control mode Timer dosing.
MAX_DOSING_FLOW	22	hi, lo1, lo2, lo3	Sets the pump's maximum allowed flow.
CALIBRATION_VOLUME	23	hi, lo1, lo2, lo3	Sets the calibration value of the pump.
LANGUAGE	24	hi	Sets the language to be used in menus.
BUS_DOSING_FLOW	25	hi, lo1, lo2, lo3	Sets the dosing capacity to be used in control mode Manual dosing.
COMM_WATCH_E	26	Don't care	Enables the communication watchdog which will stop the pump if communication fails.
COMM_WATCH_D	27	Don't care	Disables the communication watchdog.
AUTO_RESTART_E[+]	28	Don't care	Enables auto restart after alarm.
AUTO_RESTART_D[+]	29	Don't care	Disables auto restart after alarm.
INPUT_SETUP1^{+}	30	hi	Set up of inputs 1, see section *10.*
SCALING_SETUP[+]	31	hi	Set up of unit, see section *11.*
ANTI_CAVI_SETUP[+]	32	hi	Set up of anti-cavitation function, see section *12.*
INPUT_SETUP2^{+}	33	hi	Set up of inputs 2, see section *10.*

[+] Only DME (60-940 l/h)

17. Data item overview (inputs)

Abbreviations used:

unsca.:	The data item is unscaled (e.g. a number, a counter, etc.).
lo:	This is the low-order byte to a 16/32-bit value. Scaling follows high order.
bits:	The data item is bit-interpreted. The bit interpretation is explained in the next sections.
<unit>:	The data item has this unit (with a possible prefix and factor) as its fixed scaling.

The table below shows all possible inputs (parameters) in bytes from the DME pump.

Each parameter is defined as a module in the GSD file. The modules contain 1 to 4 bytes of input depending on the actual parameter size. Each module also contains a definition of up to 4 user parameters, which are the actual input number according to the table below. It is thus possible to add the modules in random order.

The benefit from defining each parameter as a module in the GSD file is that the PROFIBUS network only has to read the number of inputs defined by the modules added by the network designer. For instance, it is not necessary to read *timer_dosing_volume*, which occupies 4 bytes of input, if the pump is only used in manual control mode.

Example

The module "Pulse Dosing Volume" defines 4 bytes of input containing:

- pulse_dosing_volume_hi
- pulse_dosing_volume_lo1
- *pulse_dosing_volume_lo2*
- *pulse_dosing_volume_lo3*

where *pulse_dosing_volume_hi* is the most significant byte and *pulse_dosing_volume_lo3* is the least significant byte.

No.	Parameter name	Byte weight	Parameter description	Scaling	Factory setting	Range	Changes during operation	Con-version index	Data type
0	Command Ack		Command to pump is returned as an acknowledge				Yes	0	5
1	Pulse Dosing Volume	Hi	Dosing volume to be used in control mode "Pulse" dosing	1 nl/P			Yes	0	7
2		Lo1							
3		Lo2							
4		Lo3							
5	Batch Dosing Volume	Hi	Dosing volume to be used in control mode "Batch" dosing	0.1 ml			Yes	−3	7
6		Lo1							
7		Lo2							
8		Lo3							
9	Timer Dosing Volume	Hi	Dosing volume to be used in control mode "Timer" dosing	0.1 ml			Yes	−3	7
10		Lo1							
11		Lo2							
12		Lo3							
13	Timer Dosing Period	Hi	Dosing period to be used in control mode "Timer" dosing	1 minute			Yes	0	6
14		Lo							
15	Timer Dosing Start	Hi	Dosing start time to be used in control mode "Timer" dosing	1 minute			Yes	0	6
16		Lo							
17	Max. Dosing Flow	Hi	Maximum allowed dosing flow	0.1 ml/h			Yes	−3	7
18		Lo1							
19		Lo2							
20		Lo3							
21	Calibration Volume	Hi	Value used when calibrating the pump	0.1 ml		See table below	Yes	−3	7
22		Lo1							
23		Lo2							
24		Lo3							
25	Language		Code for pump display: 0: English 1: German 2: French 3: Dutch 4: Spanish 5: Italian 6: Portuguese 7: Danish 8: Swedish 9: Finnish 10: Czech 11: Slovak 12: Polish 13: Russian		0: English	0-13	Yes	0	5

No.	Parameter name	Byte weight	Parameter description	Scaling	Factory setting	Range	Changes during operation	Con-version index	Data type
26		Hi				See table below	Yes	−3	7
27	Bus Dosing Flow	Lo1	Dosing setpoint from PROFIBUS	0.1 ml/h					
28		Lo2							
29		Lo3							
30	Hours	Hi	Two-hour counter	2 hours		0-65535	Yes	0	6
31		Lo							
32	Temperature		Temperature in motor/pump	1°C		0-90	Yes	0	2
33		Hi							
34	Manual Dosing Flow	Lo1	Dosing flow used in control mode "Manual" dosing	0.1 ml/h			Yes	−3	7
35		Lo2							
36		Lo3							
37		Hi							
38	Actual Dosing Flow	Lo1	Actual dosing flow, regardless of control mode	0.1 ml/h			Yes	−3	7
39		Lo2							
40		Lo3							
41	Max. Pump Flow	Hi	Maximum pump flow	0.5 l/h	DME 2-18: 5 DME 4-15: 8 DME 8-10: 15 DME 12-6: 24 DME 19-6: 37 DME 48-3: 96 DME 60-10: 120 DME 150-4: 300 DME 375-10: 752 DME 940-4: 1280	Fixed	No	0	6
42		Lo							
43	Max. Pump Pressure		Maximum pump pressure (head)	0.1 bar	DME 2-18: 180 DME 4-15: 150 DME 8-10: 100 DME 12-6: 60 DME 19-6: 62 DME 48-3: 26 DME 60-10: 100 DME 150-4: 40 DME 375-10: 100 DME 940-4: 40	Fixed	No	−1	5
44	LED Control		Status of green and red LEDs		If no alarm: Bits 1-0: Green LED 10: Flashing Bits 3-2: Red LED 00: Off	8 bits	Yes	0	5
45	Power On Counter	Hi	Number of times the pump has been powered on	1		0-65535	Yes	0	6
46		Lo							
47		Hi							
48	Stroke Counter	Lo1	Pump stroke counter	1		0-999.999.999	Yes	0	7
49		Lo2							
50		Lo3							
51	Analog Input	Hi	Value from the analog input	0-20 mA: 4.9 uA	If no input signal, the bit will read 0	0-4095	Yes	0	6
52		Lo		4-20 mA: 3.9 uA					
53	Digital Inputs		Logical value of the digital level inputs: Bit 0: Level alarm input Bit 1: Level warning input Bit 2: External stop input+ Bit 3: Monitor input+ Bit 4: Leakage/diaphragm input+ Bit 5: Pulse input+		If no input signal, the bit will read 0	8 bits	Yes	0	5

No.	Parameter name	Byte weight	Parameter description	Scaling	Factory setting	Range	Changes during operation	Con-version index	Data type
54	Actual Mode 1		Actual mode status no. 1		Bits 2-0: Operating mode: 001: Stop Bits 5-3: Control mode: 000: Manual dosing Bit 6: Anti-cavitation: 0: Disabled Bit 7: Auto restart after alarm: 0: Disabled	8 bits	Yes	0	5
55	Actual Mode 2		Actual mode status no. 2		Bit 5: Button status: 0: Unlocked Bit 6: Communication watchdog: 0: Disabled	8 bits	Yes	0	5
56	Actual Mode 3		Actual mode status no. 3		If no alarm: Bits 2-0: System mode: 000: Normal Bit 3: Pending alarm: 0: No alarm Bit 5: Calibration mode: 0: Disabled Bit 6: Bleeding 0: Disabled	8 bits	Yes	0	5
57	Alarm Code Disp		Identical to alarm code		If no alarm: 0	0-255	Yes	0	5
58	Warning Code		Actual warning code		If no warning: 0	0-255	Yes	0	5
59	Alarm Code		Actual alarm code		If no alarm: 0	0-255	Yes	0	5
60	DME SW Version		DME software version		160	0-255	No	−2	5
61	PROFIBUS SW Version		PROFIBUS software version		140	0-255	No	−2	5
62	Input Setup1*		Setup of inputs		Bits 1-0: External stop: 01: Normally open Bits 3-2: Level mode: 01: Normally open Bits 6-4: Analog mode: 000: 4-20 mA	8 bits	Yes	0	5
63	Scaling Setup*		Unit to appear in DME display		Bits 1-0: Unit in display: 00: Metric (litre)	8 bits	Yes	0	5
64	Anti Cavitation Setup+		Setup of anti-cavitation function		Bits 2-0: Capacity reduction: 000: 0 (max. capacity reduced to 75%)	8 bits	Yes	0	5
65	Input Setup2+		Setup of inputs		Bit 0: Diaphragm input: 0: Normally open Bit 1: Monitor input: 0: Disabled	8 bits	Yes	0	5

* Only DME (0-48 l/h)

+ Only DME (60-940 l/h)

Pump	Calibration volume			Cavitation	Profile no.	Bus dosing flow Metric (litre)			Bus dosing flow US (gallon)		
	Scaling	Min.	Max.			Scaling	Min.	Max.	Scaling	Min.	Max.
DME 2-18	0.1 ml	116	578	Off	n/a	0.1 ml/h	25	25000	0.01 mgal/h	66	66000
				On	n/a	0.1 ml/h	25	18000	0.01 mgal/h	66	47400
DME 8-10	0.1 ml	347	1388	Off	n/a	0.1 ml/h	75	75000	0.01 mgal/h	198	198000
				On	n/a	0.1 ml/h	75	56000	0.01 mgal/h	198	147000
DME 12-6	0.1 ml	556	2222	Off	n/a	0.1 ml/h	120	120000	0.01 mgal/h	316	316000
				On	n/a	0.1 ml/h	120	90000	0.01 mgal/h	316	236000
DME 19-6	0.1 ml	1019	4633	Off	n/a	0.1 ml/h	185	185000	0.01 mgal/h	488	488000
				On	n/a	0.1 ml/h	185	145000	0.01 mgal/h	488	382000
DME 48-3	0.1 ml	2639	9999	Off	n/a	0.1 ml/h	480	480000	0.01 mgal/h	1260	1260000
				On	n/a	0.1 ml/h	480	370000	0.01 mgal/h	1260	975000
DME 60-10	0.1 ml	3130	12500	Off	n/a	0.1 ml/h	750	600000	0.1 mgal/h	198	158000
				On	0	0.1 ml/h	750	450000	0.1 mgal/h	198	118000
				On	1	0.1 ml/h	750	334000	0.1 mgal/h	198	88000
				On	2	0.1 ml/h	750	161000	0.1 mgal/h	198	42400
DME 150-4	0.1 ml	7810	31250	Off	n/a	0.1 ml/h	2000	1500000	0.1 mgal/h	525	396000
				On	0	0.1 ml/h	2000	1120000	0.1 mgal/h	525	294000
				On	1	0.1 ml/h	2000	835000	0.1 mgal/h	525	220000
				On	2	0.1 ml/h	2000	404000	0.1 mgal/h	525	106000
DME 375-10	0.1 ml	19580	78330	Off	n/a	0.1 ml/h	5000	3760000	0.1 mgal/h	1320	990000
				On	0	0.1 ml/h	5000	2820000	0.1 mgal/h	1320	740000
				On	1	0.1 ml/h	5000	2100000	0.1 mgal/h	1320	550000
				On	2	0.1 ml/h	5000	1010000	0.1 mgal/h	1320	266000
DME 940-4	0.1 ml	48960	195830	Off	n/a	0.1 ml/h	12000	9400000	0.1 mgal/h	3160	2480000
				On	0	0.1 ml/h	12000	7050000	0.1 mgal/h	3160	1860000
				On	1	0.1 ml/h	12000	5250000	0.1 mgal/h	3160	1380000
				On	2	0.1 ml/h	12000	2520000	0.1 mgal/h	3160	665000

Conversion index	Conversion factor
74	0.1
2	100
1	10
0	1
−1	0.1
−2	0.01
−3	0.001
−4	0.0001

Data type	Description
2	Integer 8
3	Integer 16
4	Integer 32
5	Unsigned 8
6	Unsigned 16
7	Unsigned 32
9	Text string

18. Software overview

The GSD files mentioned below can be downloaded from the Grundfos Alldos Website **www.grundfosalldos.com** in the Download section.

18.1 GSD file (DME model C)

GSD file name: **GRUN0970.GSD**

Grundfos Alldos DME pumps with flow rates from 2.5 l/h to 48 l/h, model C with software version 1.60.

The model can be identified by the first letter in the model number "C"96xxxxxxxxxxxxxxxx. See fig. 2.

18.2 GSD file (DME model A)

GSD file name: **GRUN0971.GSD**

Grundfos Alldos DME pumps with flow rates from 60 l/h to 940 l/h, model A after week 23 year 2005.

The model and the production week appear from the model number. See fig. 2.

"A"96xxxxxxP1"0523"xxxx.

18.3 GSD file (DME model B)

GSD file name: **DME_05B0.GSD***

Grundfos Alldos DME pumps with flow rates from 2.5 l/h to 48 l/h, model B.

The model can be identified by the first letter in the model number "B"96xxxxxxxxxxxxxxxx. See fig. 2.

*For this product, please use the Profibus documentation supplied with the product.

19. Disposal

This product or parts of it must be disposed of in an environmentally sound way:

1. Use appropriate waste collection services.
2. If this is not possible, contact the nearest Grundfos or Grundfos Alldos company or service workshop.

Subject to alterations.

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