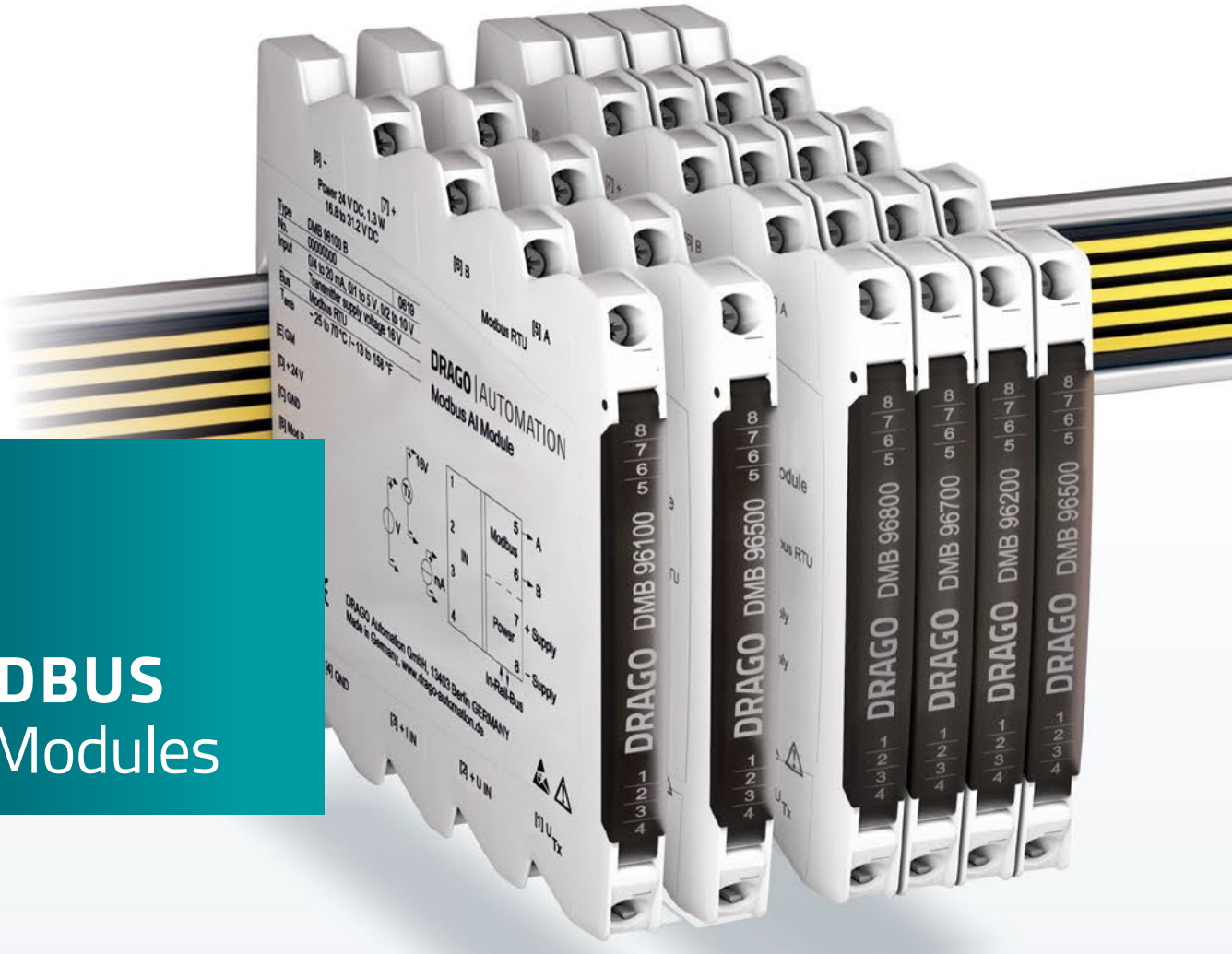
DRAGO | AUTOMATION
engineered for your success



MODBUS
I/O Modules

Modbus Manual
DMB Series

www.drago-automation.de

Before Startup

When operating the signal converter, certain parts of the module can carry dangerous voltage! Ignoring the warnings can lead to serious injury and/or cause damage!

The signal converter should only be installed and put into operation by qualified staff. The staff must have studied the warnings in these operating instructions thoroughly.

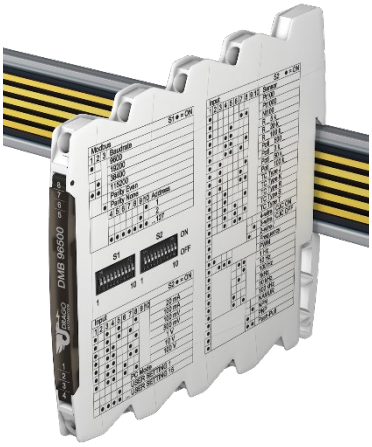
The signal converter may not be put into operation if the housing is open.

In applications with high operating voltages sufficient distance and isolation as well as shock protection must be ensured.

Safe and trouble-free operation of this device can only be guaranteed if transport, storage and installation are carried out correctly and operation and maintenance are carried out with care.

Appropriate safety measures against electrostatic discharge (ESD) should be taken during range selection and assembly on the transmitter!

Ultra-compact Modbus RTU I/O Modules



- Freely scalable up to 247 units in one Modbus segment
- Extremely slim, only 6.2 mm installation width
- Easy configurable via DIP switches or USB interface
- Highest accuracy and temperature stability
- Protective galvanic separation between all circuits, test voltage 3 kV AC
- In-Rail-Bus Connector for Power and Modbus
- Protection against overvoltage, polarity error and short circuit at all terminals
- Long service life, extremely low failure rate due to reduced selfheating
- Made in Germany, 5 Years Warranty

The DRAGO Modbus RTU I/O Modules combine complex field and control requirements such as protective galvanic isolation, maximum signal integrity and highest reliability with fast measurement data conversion and field bus provision.

Up to 4 fully isolated I/Os are available in the 6.2 mm slim modules. The configuration can be made via DIP switch or USB interface. In addition to standard signals, mA, V, mV, R, Pot, Hz, PWM and all current industrial sensors can be processed.

Power supply and bus connections are pre-wired on standard DIN rail by the In-Rail-Bus. All terminals are protected against short circuit, overvoltage and polarity reversal. The protective galvanic isolation with 3 kV test voltage permits working voltages up to 300 V. A low bus load allows up to 247 modules (988 I/Os) in one Modbus segment.

The low-power design ensures minimum self-heating for a wide temperature range. The high separation quality and short response time guarantee an economic integration in new plants and retrofit projects.

General Data

Protocol	Modbus RTU	Module Addressing: 1 ... 247
Configuration	Parity: Even, Odd, None	Response Delay: 1 ... 1000 ms
Baud Rate	300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200	
Connectivity	Up to 247 DRAGO Modbus Devices (1/8 Load)	
Test voltage	3 kV AC, 50 Hz, 1 min., I/Os against Modbus/Power	
Ambient temperature	Operation: -25 °C to +70 °C	Transport and storage: -40 °C to +85 °C
Power supply	24 V DC, voltage range 16.8 V ... 31.2 V DC	
Construction	99 x 107 x 6.2 mm (H x T x B), protection class IP 20 mounting on 35 mm DIN rail acc. to EN 60715	

DRAGO Modbus I/O Modules

DMB 96500 Universal AI Module

- High performance measuring input for all industrial sensors
- Uni-/Bipolar and TRMS capture of current and voltage
- Easy configurable by DIP switch or USB interface
- 15 User Settings, directly selectable via DIP switches
- Highest accuracy, measuring resolution up to 24 bit
- Fast measured value processing, high data rate

Input
Pt, Ni, TC, KTY, R, Pot, mV, V, mA AC/DC, Frequency, PWM

Additional functions
16 V Transmitter Supply, TRMS, NAMUR

DMB 96100 Standard Signal AI Module

- Precise capture of industrial standard signals
- Excellent EMC performance and noise suppression
- Supply of 2/3-wire transmitters
- Easy configuration, fast commissioning
- Maximum reliability and durability

Input
0/4 ... 20 mA
0/2 ... 10 V
0/1 ... 5 V

Additional functions
16 V Transmitter Supply

DMB 96200 4 Channel AI Module

- Measuring and processing of 4 industrial standard signals
- Each channel programmable as current or voltage input
- All inputs individually safely galvanically isolated
- Fast signal acquisition, short processing times
- Extremely low costs per input channel

Input
0/4 ... 20 mA
0/2 ... 10 V

Additional functions
4 DI
4 DO

DMB 96400 4 Channel 2 AI / 2 AO Module

- Measuring and processing of 4 industrial standard signals
- Each channel programmable as current or voltage input
- All inputs individually safely galvanically isolated
- Fast signal acquisition, short processing times
- Extremely low costs per input channel

Input / Output
0/4 ... 20 mA
0/2 ... 10 V

Additional functions
2 DI
4 DO

DMB 96700 4 Channel DI/DO Module

- 4 independent controllable digital I/O channels
- Each channel programmable as input or output
- Extensive programmable operating functions
- Universal Open-Collector output
- Status indication for each I/O channel

Input / Output
DI: 5 V / 12 V / 24 V
DO: Open-Collector

Additional functions
Frequency, Counter, Pulse, PWM, Limit monitoring

DMB 96800 4 Channel Relay Module

- 4 independent power relays, make or break contact
- Programmable switch-ON and switch-OFF behavior
- Extensive programmable operating functions
- Monitoring functions for operating conditions
- Status indication for each relay

Contact
AC: 250 V / 2 A
DC: 30 V / 2A

Additional functions
ON / OFF delay, Wiper contact. Power monitoring

DMB 96000 Modbus RTU Connection Module

- switchable Modbus termination network
- activity monitor LED

→ more at Accessories

1 Introduction

With the DMB series Drago Automation offers different analog and digital input options. The Modbus interface with RTU protocol on the RS485 physical layer enables robust communication in rough industrial environment. Because of their 1/8 unit load transceivers it is possible to connect 247 Drago DMB series devices as Modbus slaves with one master without the need for repeater.

This manual is mainly intended to deliver devices specific information about the DMB series. Although it covers some basics about the Modbus protocol and the RS485 standard we recommend reading the referring Modbus Protocol Specifications [1] and the Modbus Serial Line Protocol and Implementation Guide [2] which can be found here:
http://www.modbus.org/specs.php.

2 Modbus RTU over RS485

2.1 Modbus RTU Protocol

The DMB devices implement the Modbus RTU Protocol. The Modbus protocol is a single master protocol. Therefore a slave only sends answer messages to former requests of the Modbus master device. The Modbus RTU standard [1] defines a binary communication inside the Modbus Frame. A Modbus RTU message frame consists of the following parts:

Address Field 1 Byte	Function Code 1 Byte	Data 0 ... 252 Byte	CRC 2 Byte

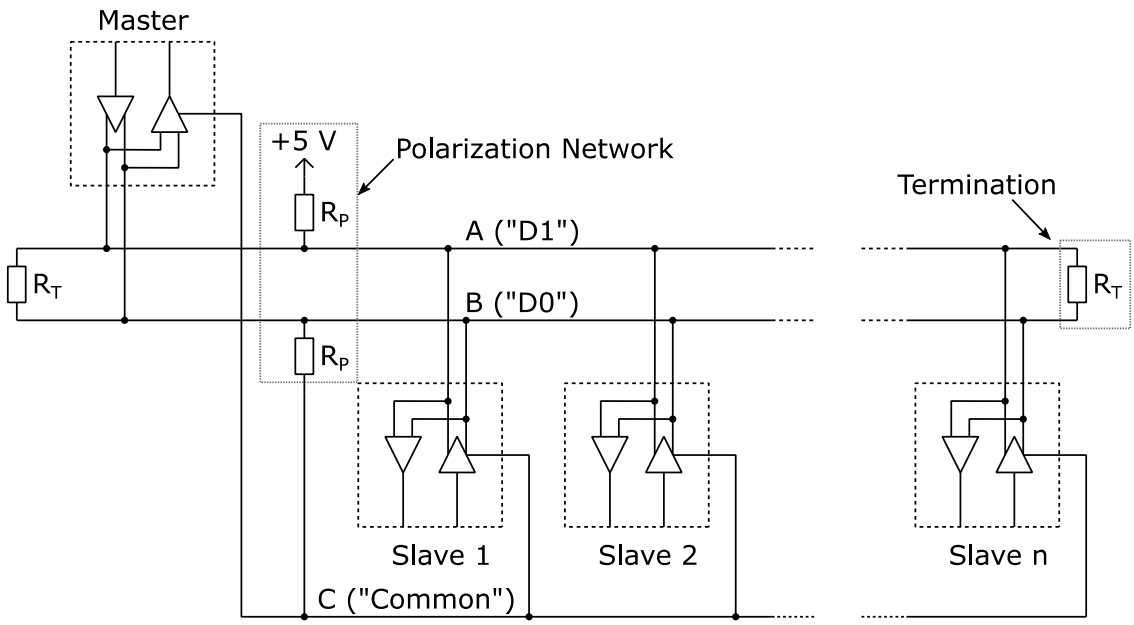
The 4 fields have the following meaning:

1. Address Field: States the address of the slave that is addressed in the actual communication. The master itself has no address. The address "0" is reserved for broadcast communication. The addresses 248 to 255 are actually restricted by the Modbus standard.
2. Function Code: A 1 Byte field that contains the command the slave has to process. The function codes are standardized for all Modbus devices. The DMB devices implement only a limited subset of function codes, depending on the devices.
3. Data: This field contents the information referring to the function code (e.g. the address of a requested register). The data needed for each function code can be found in [1].
4. CRC: The last field contains the two bytes of the CRC used to verify the data frame.

A start or an end of a Modbus RTU frame is indicated by a 3.5 Byte long pause which means that no devices on the network sends data.

2.2 RS485 Network for Modbus

The very common form of a Modbus network based on 2-wire RS485 is described detailed in [2]. The RS485 is defined in the EIA-485 (meanwhile TIA-485) standard [3]. Below the only basic structure is described:



According to the Modbus Organization the devices are connected via 2 data lines and a third functional line:

- D0 (which is referred to as "B" in the EIA/TIA-485)
- D1 (which is referred to as "A" in EIA/TIA-485)
- Common (which is referred to as "C" in EIA/TIA-485)

Note:	*Because of the greater awareness this document will use the RS485 notation (A, B, C) in the following.*

The original RS485 standard allows 32 devices each with 1 so-called unit load. Modern devices offer a unit load which is only a fraction of 1 to enable more devices on the bus. The DMB devices have a unit load of 1/8 unit load (R_{in} >= 96 kΩ) to enable up to 256 devices in a RS485 network without the need for a repeater. This number is actually limited by the Modbus address space to 247.

Note:	*The given number of 247 devices is only guaranteed limited if you only use DMB devices. If you also use third-party devices on the bus you have to ensure that these devices also feature a 1/8 unit load and accept the full Modbus address space.*

The Resistors R_T are used to minimize the reflections compared to an open ended line. The optimum value of the resistor depends on the wave impedance of the cable used. However a value of 120 Ω is a common choice.

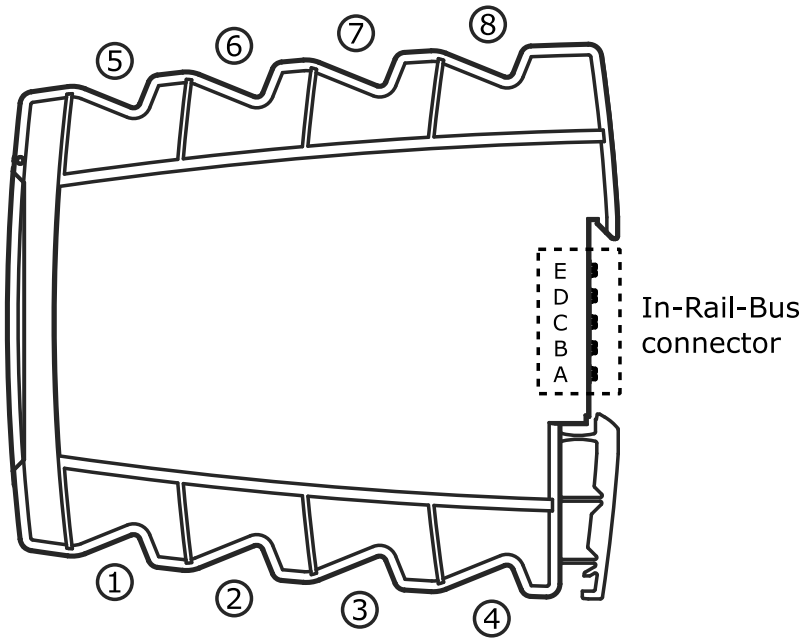
The Polarization Network is needed to ensure proper potentials when none of the devices are sending and thus the lines A and B are floating. The value of R_P depends on several things like bus load or termination resistors. The Modbus Organization suggests values from 450 Ω to 650 Ω for R_P. The use of a polarization Network is strongly suggested to obtain a robust stable network. The polarization resistors are usually integrated in the master device.

Note: Devices of the DMB series don't have internal resistors for termination or polarization.

For further details about the wiring of a Modbus RS485 network refer to [2] and [3].

2.3 Connections

The primary way to connect the DMB devices is the rear In-Rail-Bus connector (A-E). Third-party devices without the In-Rail-Connector can be connected by an In-Rail-Bus Power-Terminals (order-no.: DZU 1401; DZU 1402). Some DMB devices also internally connect the Modbus signals to the terminals 5, 6 and 8. An overview of all connections on the enclosure is shown below:



RS485 (Modbus) signal name	In-Rail-Bus connector	Optional Screw terminals	Function
A (D1)	A	5	Modbus A
B (D0)	B	6	Modbus B
C (Common)	C	8	Supply GND
-	D	7	Supply +24V
-	E	-	Fault Signal (opt.)

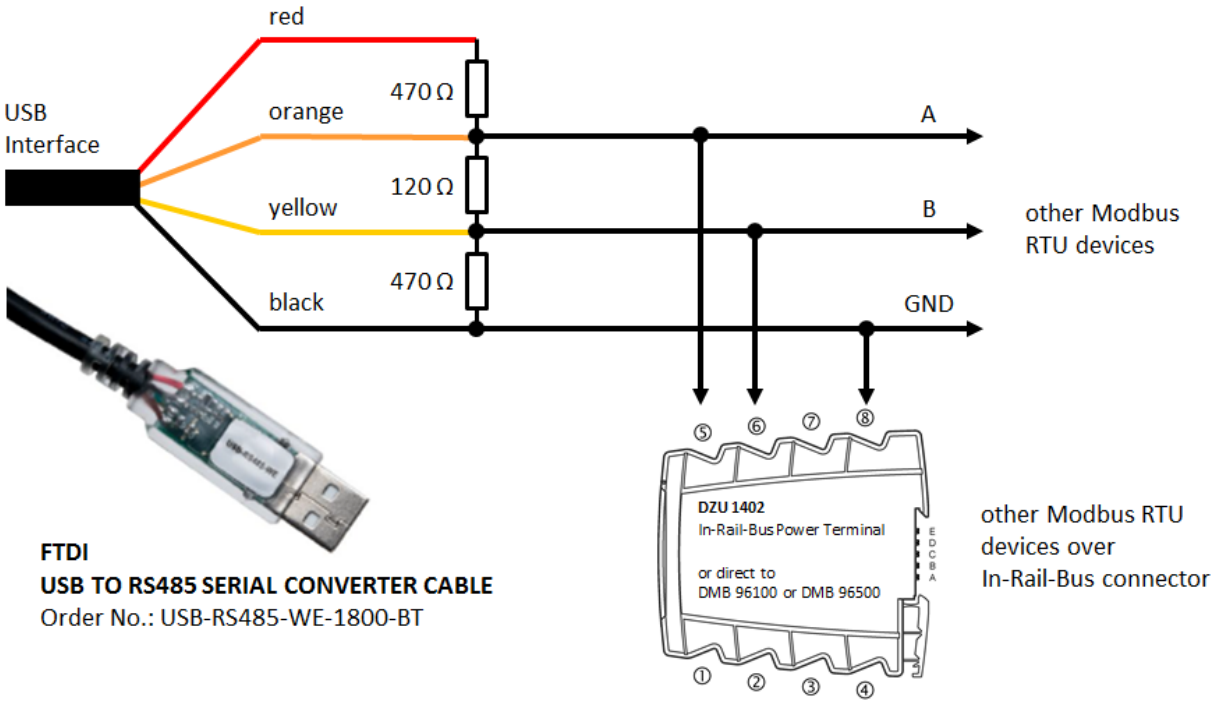
Note: Not all of the DMB devices have the Modbus signals and the power supply connected to the terminals. See user instruction of the specific device for details.

2.4 Structure of the data formats in the Modbus frame

Modbus communicates the data generally as 16-bit registers or as groups of 16-bit registers. Data register, as LONG and FLOAT values, occupy multiple contiguous registers and are transmitted in one bus telegram.
The Modbus specification not defines the register order for LONG and FLOAT in the transmission, so the order is configurable at register 45002 (factory setting is 0x0001). The green values below are valid setting is 0x0000, the configurated setting ist stored permanently.

Format	In the Modbus frame	Register order	Example
INT16 UINT16	...High-Low...		1234d = 0x04D2 = ...|04|D2|...
INT32 UINT32	...High-MedH-MedL-Low... ...MedL-Low-High-MedH...	Reg. 45002 = 0x0001 Reg. 45002 = 0x0000	1234512345d = 0x499529D9 = ...|49|95|29|D9|... 1234512345d = 0x29D94995 = ...|29|D9|49|95|...
FLOAT	...High-MedH-MedL-Low... ...MedL-Low-High-MedH...	Reg. 45002 = 0x0001 Reg. 45002 = 0x0000	1,23 = 0x3F9D70A4 = ...|3F|9D|70|A4|... 1,23 = 0x70A43F9D = ...|70|A4|3F|9D|...
16 Char	...c1-c2-c3...c14-c15-c16...		'ABCDEFGHIJKLMNOP' = ...|41|42|...|4F|50|...

2.5 Example: PC with USB to RS485 converter



FTDI
USB TO RS485 SERIAL CONVERTER CABLE
Order No.: USB-RS485-WE-1800-BT

Distributors:
Farnell, Digikey, Mouser, RS-Online, ...

DMB 96500 Universal AI Module

- High performance measuring input for all industrial sensors
- Uni-/Bipolar and TRMS capture of current and voltage
- Easy configurable by DIP switch or USB interface
- 15 User Settings, directly selectable via DIP switches
- Highest accuracy, measuring resolution up to 24 bit
- Fast measured value processing, high data rate

Input
Pt, Ni, TC, KTY, R, Pot, mV, V, mA AC/DC, Frequency, PWM

Additional functions
16 V Transmitter Supply, TRMS, NAMUR

Supported communication features:

Baud rates:	300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200	
Formats:	Parity even,	1 stop bit
	Parity odd,	1 stop bit
	Parity none,	2 stop bits
	Parity none,	1 stop bit (not conform with specification!)

Factory setting: 19200 baud, 8 data bits, parity even, 1 stop bit, Modbus address 1

Supported function codes:

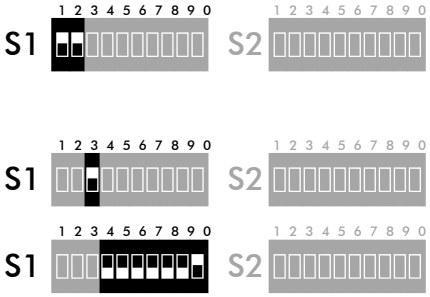
Command 3:	0x03	Read Holding Registers	
Command 4:	0x04	Read Input Registers	(Firmware 01.7.0 and later)
Command 6:	0x06	Write Single Register	
Command 16:	0x10	Write Multiple Registers	
Command 43 / 14:	0x2B / 0x0E	Read Device Identification	

Note: Command 43, subcode 14 (Read Device Identification) supported in the 'Basic' category to allow the device identification.

DMB 96500 DIP settings

Operating modes with DIP switch settings

Modbus settings



	1	2	3	4	5	6	7	8	9	0
9600 Baud	■									
19200 Baud										
38400 Baud		■								
115200 Baud	■	■								
Parity even, 1 stop bit										
Parity none, 2 stop bits			■							
Modbus address 1										■
2									■	
3									■	■
4								■		
5								■		■
... 127				■	■	■	■	■	■	■

User range settings

USER SETTINGS

In the 15 user settings, 15 ready parameter sets can be saved via the USB interface or Modbus, which can then easily be called up via DIP switches

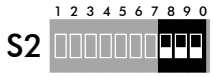
	1	2	3	4	5	6	7	8	9	0
User setting 1							■			
User setting 2						■				
User setting 3						■	■			
User setting 4					■					
User setting 5					■		■			
User setting 6					■	■				
User setting 7					■	■	■			
User setting 8				■						
User setting 9				■			■			
User setting 10				■		■				
User setting 11				■		■	■			
User setting 12				■	■					
User setting 13				■	■		■			
User setting 14				■	■	■				
User setting 15				■	■	■	■			

Input (sensor) settings

Voltage input

settings for voltage and shunt ranges

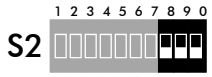
Range	1	2	3	4	5	6	7	8	9	0
± 50 mV (shunt)			■	■	■					
± 100 mV (shunt)			■	■	■		■			
± 500 mV (shunt)			■	■	■	■				
± 1 V			■							
± 10 V with transmitter supply			■				■			
± 100 V			■			■				
± 300 V			■			■	■			
DC										
Average (fast)										■
Average (normal)									■	
Average (slow)									■	■
RMS (fast)								■		
RMS (normal)								■		■
RMS (slow)								■	■	



Current input

settings for current ranges

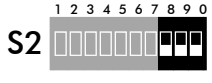
Range	1	2	3	4	5	6	7	8	9	0
± 1 mA			■	■						
± 20 mA with transmitter supply			■	■			■			
± 100 mA			■	■		■				
DC										
Average (fast)										■
Average (normal)									■	
Average (slow)									■	■
RMS (fast)								■		
RMS (normal)								■		■
RMS (slow)								■	■	
DC										



Pt input

settings for Pt sensors

Type	1	2	3	4	5	6	7	8	9	0
Pt100		■								
Pt200		■					■			
Pt500		■				■				
Pt1000		■				■	■			
Pt2000		■			■					
Pt10000		■			■		■			
JPt50		■			■	■				
JPt100		■			■	■	■			
4-wire										
3-wire										■
2-wire									■	



Ni input

settings for Ni sensors

Type	1	2	3	4	5	6	7	8	9	0
Ni100		■		■						
Ni120 (Tk6370)		■		■			■			
Ni200		■		■		■				
Ni500		■		■		■	■			
Ni1000		■		■	■					
Ni1000 (Tk6370)		■		■	■		■			
Ni1000 (Tk5000)		■		■	■	■				
4-wire										
3-wire										■
2-wire									■	

Thermocouples

settings for TC sensors

Type	1	2	3	4	5	6	7	8	9	0
TC sensor type A		■	■							
TC sensor type B		■	■				■			
TC sensor type C		■	■			■				
TC sensor type D		■	■			■	■			
TC sensor type E		■	■		■					
TC sensor type J		■	■		■		■			
TC sensor type K		■	■		■	■				
TC sensor type L		■	■		■	■	■			
TC sensor type N		■	■	■						
TC sensor type R		■	■	■			■			
TC sensor type S		■	■	■		■				
TC sensor type T		■	■	■		■	■			
TC sensor type U		■	■	■	■					
CJC internal										
external Pt100 2-wire										■
external Pt100 3-wire									■	
external Pt1000 2-wire									■	■
external Pt1000 3-wire								■		
CJC off								■		■

Resistors

settings for resistance measurment

Range	1	2	3	4	5	6	7	8	9	0
R ≤ 500 Ω	■									
R ≤ 5 kΩ	■						■			
R ≤ 20 kΩ	■					■				
R ≤ 100 kΩ	■					■	■			
4-wire										
3-wire										■
2-wire									■	

Potentiometers

settings for potentiometer measurement

Pot. resistance	1	2	3	4	5	6	7	8	9	0
R ≤ 500 Ω	■				■					
R ≤ 5 kΩ	■				■		■			
R ≤ 20 kΩ	■				■	■				
R ≤ 100 kΩ	■				■	■	■			
4-wire										
3-wire										■

DRAGO Automation GmbH, Waldstr. 86-90, 13403 Berlin, GERMANY

KTY sensors

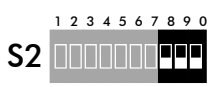
settings for KTY sensors

Type	1	2	3	4	5	6	7	8	9	0
KTY210, KTY230, KTY21-6, KTY23-6	■		■							
KTY21-5, KTY23-5	■		■				■			
KTY21-7, KTY23-7	■		■			■				
KTY81-110, KTY81-120, KTY81-150, KTY82-110, KTY82-120, KTY82-150	■		■			■	■			
KTY81-121, KTY82-121	■		■		■					
KTY81-122, KTY82-122	■		■		■		■			
KTY83-110, KTY83-120, KTY83-150	■		■		■	■				
KTY83-121	■		■		■	■	■			
KTY83-122	■		■	■						
KTY83-151	■		■	■			■			
KTY83-152	■		■	■		■				
KTY84-130, KTY84-150	■		■	■		■	■			
KTY84-151	■		■	■	■					
KTY84-152	■		■	■	■		■			
KT100, KT110, KT130, KTY10-6, KTY10-62, KTY11-6, KTY13-6, KTY16-6, KTY19-6M, KTY19-6Z, ST-13, ST-15, ST-16, ST-20M, ST-20Z	■		■	■	■	■				
KTY10-5, KTY11-5, KTY13-5	■		■	■	■	■	■			
KTY10-7, KTY11-7, KTY13-7	■	■								
KTY81-210, KTY81-220, KTY81-250, KTY82-210, KTY82-220, KTY82-250	■	■					■			
KTY81-221, KTY82-221	■	■				■				
KTY81-222, KTY82-222	■	■				■	■			
KTY81-251, KTY82-251	■	■			■					
KTY81-252, KTY82-252	■	■			■		■			
KTY82-151	■	■			■	■				
KTY82-152	■	■			■	■	■			
4-wire										
3-wire										■
2-wire									■	

Frequency

settings for frequency measurement

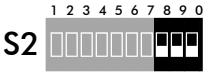
Range	1	2	3	4	5	6	7	8	9	0
1 Hz	■	■		■						
10 Hz	■	■		■			■			
100 Hz	■	■		■		■				
1 kHz	■	■		■		■	■			
10 kHz	■	■		■	■					
200 kHz	■	■		■	■		■			
NAMUR Contact										
SN / Contact										■
S0									■	
PNP									■	■
NPN								■		
Logic 5 V								■		■



PWM

settings for pulse width measurement

Range of basic frequency	1	2	3	4	5	6	7	8	9	0
1 Hz	■	■	■							
10 Hz	■	■	■				■			
100 Hz	■	■	■			■				
1 kHz	■	■	■			■	■			
10 kHz	■	■	■		■					
NAMUR Contact										
SN / Contact										■
S0									■	
PNP									■	■
NPN								■		
Logic 5 V								■		■



Setting via USB interface or Modbus commands

PC Mode

All switches in OFF position

Configuration the Modbus interface or with DRAGOmodbus software

Factory Setting

All switches in OFF position (PC Mode),
the default configuration in PC-Mode:

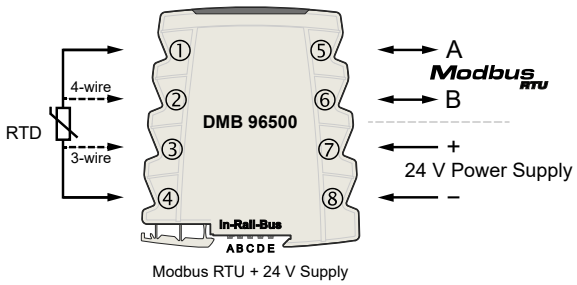
- Pt100 sensor, 4-wire
- Modbus address 1
- 19200 baud
- Parity even
- 1 stop bit

DMB 96500 Operating modes and examples

Operating modes with DIP switch settings

With the DIP switches S1-1 and S1-2 the baud rate ist selected, with S1-3 the parity bit. The DIP switches S1-4 to S1-10 defines the Modbus address of the device in range of 1 to 127. The Modbus address must be unique in the Modbus segment. For higher adresses you must use the PC mode (see below).

The universal input is configured with DIP switch S2. Select the sensor type with S2-1 to S2-7 and the sensor connection with S2-8 to S2-10.



Modbus RTU + 24 V Supply

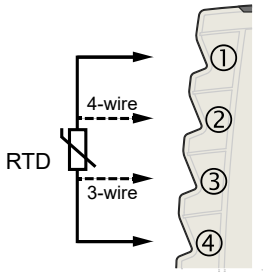
User range settings

In PC mode the device has 16 separate parameter sets. You can switch between these parameter sets programmed via PC or Modbus by means of DIP switches. In this way, you can preset a company-specific universal device with its parameters and then simply call it up using PC mode or USER SETTING 1 to USER SETTING 15.

Wiring and range-specific parameters in PC mode

a. **Pt sensors**

Holding register 42001 = 0x00xx
The exact sensor type is defined in the xx (see appendix),
connection 2-/3-/4-wire is defined in register 42002.



Measurement results (mirrored on register **300xx**):

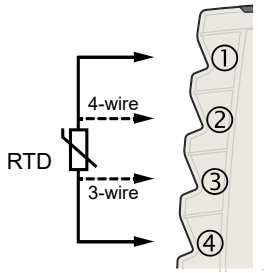
Reg. 40001 temperature as INT16 in [0.1 °C]
Reg. 40002 temperature as INT16 in [0.1 °F]
Reg. 40051 temperature as FLOAT in [°C]
Reg. 40053 temperature as FLOAT in [°F]

Related parameters:

Reg. 42009 2-wire offset for cable resistance as FLOAT in [Ω]

b. **Ni sensors**

Holding register 42001 = 0x01xx
The exact sensor type is defined in the xx (see appendix),
connection 2-/3-/4-wire is defined in register 42002.



Measurement results (mirrored on register **300xx**):

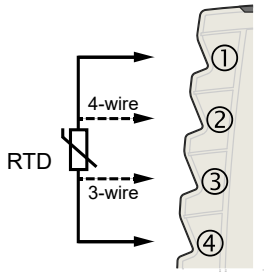
Reg. 40001 temperature as INT16 in [0.1 °C]
Reg. 40002 temperature as INT16 in [0.1 °F]
Reg. 40051 temperature as FLOAT in [°C]
Reg. 40053 temperature as FLOAT in [°F]

Related parameters:

Reg. 42009 2-wire offset for cable resistance as FLOAT in [Ω]

c. **KTY sensors**

Holding register 42001 = 0x02xx
The exact sensor type is defined in the xx (see appendix),
connection 2-/3-/4-wire is defined in register 42002.



Measurement results (mirrored on register **300xx**):

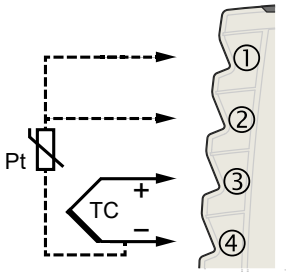
Reg. 40001 temperature as INT16 in [0.1 °C]
Reg. 40002 temperature as INT16 in [0.1 °F]
Reg. 40051 temperature as FLOAT in [°C]
Reg. 40053 temperature as FLOAT in [°F]

Related parameters:

Reg. 42009 2-wire offset for cable resistance as FLOAT in [Ω]

d. **Thermocouples**

Holding register 42001 = 0x03xx
The exact sensor type is defined in the xx (see appendix),
the temperature compensation is defined in register 42002.



Measurement results (mirrored on register **300xx**):

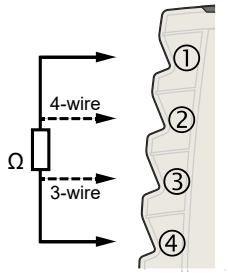
Reg. 40001 temperature as INT16 in [0.1 °C]
Reg. 40002 temperature as INT16 in [0.1 °F]
Reg. 40051 temperature as FLOAT in [°C]
Reg. 40053 temperature as FLOAT in [°F]

Related parameters:

Reg. 42007 manual value for manual temperature compensation as FLOAT in [°C]

e. **Resistance**

Holding register 42001 = 0x04xx
The sensor range is defined in the xx (see appendix),
connection 2-/3-/4-wire is defined in register 42002.

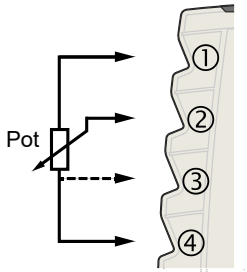


Measurement results (mirrored on register **300xx**):
Reg. 40001 resistance as INT16 (scaling see appendix)
Reg. 40051 resistance as FLOAT in [Ω]

Related parameters:
Reg. 42009 2-wire offset for cable resistance as FLOAT in [Ω]

f. **Potentiometer**

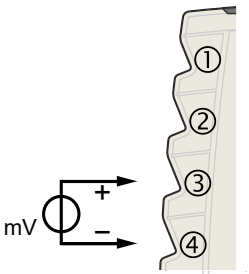
Holding register 42001 = 0x05xx
The sensor range is defined in the xx (see appendix),
connection 3-/4-wire is defined in register 42002.



Measurement results (mirrored on register **300xx**):
Reg. 40001 position as INT16 in [0.01 %]
Reg. 40051 position as FLOAT in [%]

g. **mV Shunt input**

Holding register 42001 = 0x06xx
The voltage range is defined in the xx (see appendix),
measuring method DC, AVG or RMS is defined in register 42002.



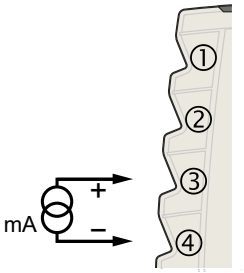
Measurement results (mirrored on register **300xx**):
Reg. 40001 voltage as INT16 (scaling see appendix)
Reg. 40051 voltage as FLOAT in [V]

h. **Current input**

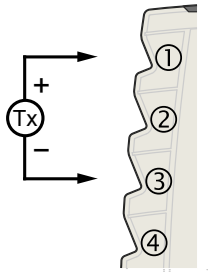
Holding register 42001 = 0x07xx
The current range is defined in the xx (see appendix), measuring method DC, Average or RMS is defined in register 42002.

In the range 0 ... 20 mA, also a 2-wire transmitter can be connected to the current input. The transmitter is supplied via terminal 1.

Current input



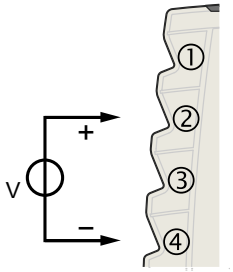
2-wire transmitter



Measurement results (mirrored on register **300xx**):
Reg. 40001 current as INT16 (scaling see appendix)
Reg. 40051 current as FLOAT in [mA]

i. **Voltage input**

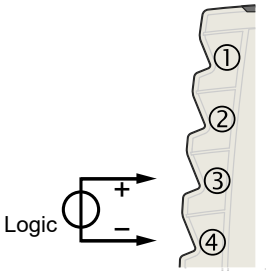
Holding register 42001 = 0x08xx
The voltage range is defined in the xx (see appendix), measuring method DC, Average or RMS is defined in register 42002.



Measurement results (mirrored on register **300xx**):
Reg. 40001 voltage as INT16 (scaling see appendix)
Reg. 40051 voltage as FLOAT in [V]

j. **Frequency input**

Holding register 42001 = 0x09xx
The frequency range and gate is defined in the xx (see appendix), the input sensor type is defined in register 42002.



Measurement results (mirrored on register **300xx**):
Reg. 40001 frequency as INT16 (scaling see appendix)
Reg. 40051 frequency as FLOAT in [Hz]

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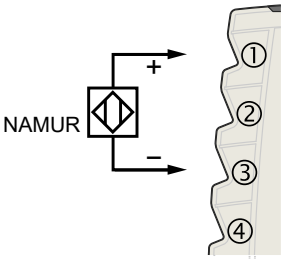
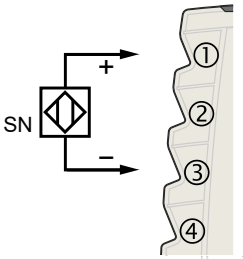
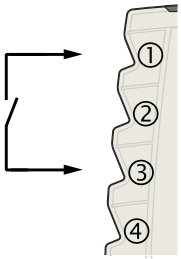


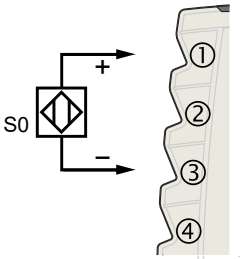
SN sensor

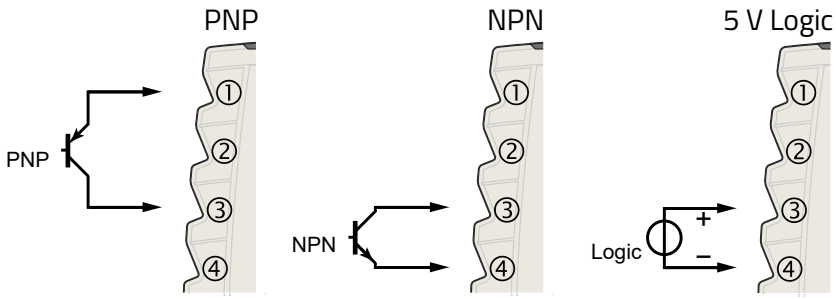


Contact



S0 sensor

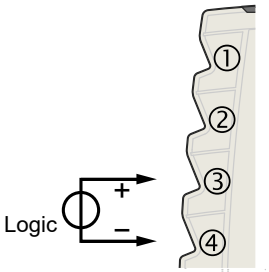




k. **PWM input**

Holding register 42001 = 0x0Axx

The frequency range and gate is defined in the xx (see appendix), the input sensor type is defined in register 42002 (see frequency).



Measurement results (mirrored on register **300xx**):

Reg. 40001 duty cycle as INT16 in [0.01 %]
Reg. 40002 frequency as INT16 in [Hz] (scaling see appendix)
Reg. 40051 duty cycle as FLOAT in [%]
Reg. 40053 frequency as FLOAT in [Hz]

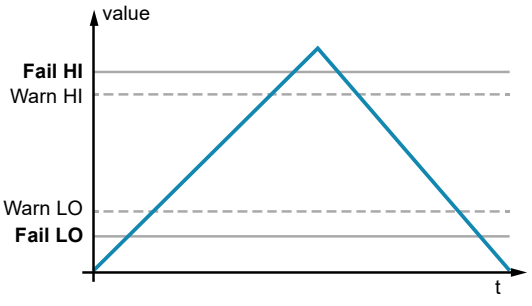
Limit Monitoring of the measured value

The device offers the possibility to monitor the primary measuring value (holding register 40051) for compliance to the programmed limits.

As usual in NAMUR applications, the device provides warning and failure limits. The warning limits are usually used as a pre-warning (preventive maintenance), the failure limits require action by the system operator.

Monitored value:

Register 40051 / 30051 – Primary value



Limit parameters (FLOAT):

Register 42015 – Failure limit low
Register 42017 – Warning limit low
Register 42019 – Warning limit high
Register 42021 – Failure limit high

Limit results:

Register 40005 or 40059 – Device status bits 0 to 3 mirrored on 30005 or 30059

Scaling of primary value

for Firmware 01.6.0 and higher:

In register **40051** (mirrored on register **30051**), a scaled measured value is available as FLOAT number. Please define the SCALE parameters for input range and the output range in registers 42003, 42005 and 42011, 42013. The scaling is available for any sensor in every range, also in the User Settings.

Example:

At the input we have 4 to 20 mA from a transmitter, the output should indicate the value as 0 to 80 litres. This output value in register 40051 (30051) is a float number with decimal places.

Set the SCALE parameters as follows:		Register
▪ SCALE measured value (start) = 4000	(4000 µA = 4 mA)	42003
▪ SCALE measured value (end) = 20000	(20000 µA = 20 mA)	42005
▪ SCALE output range (start) = 0		42011
▪ SCALE output range (end) = 80		42013

Structure of User Settings

In PC mode the device has 16 separate parameter sets, the pc mode settings and 15 user settings. You can switch between these parameter sets programmed via PC or Modbus by means of DIP switches. In this way, you can preset a company-specific universal device with its parameters and then simply call it up using PC mode or USER SETTING 1 to USER SETTING 15.

Each parameter set consists of 32 Modbus registers, in the first parameter set (PC mode) parameters can be read and written individually, but also as a complete block of 32 registers. The structure of a parameter set can be seen in the holding register map.

The user settings 1 to 15 can only be read and written as a block. Each parameter set also contains a description (in ASCII) to give the parameter set a name.

DMB 96500 input register map

Firmware 01.7.0 and later:
All dynamic measured value registers can be read out with Modbus command 3 as holding register **400xx**, but also with Modbus command 4 as input register **300xx**.

Reg No.	Addr Dec	Addr Hex	Description	No. Reg.	Format	Access	Remarks
Measured Values as one input register (scaled integer value)							
30001	0	0000	Primary Value	1	INT16	R	Primary Value (look at input configuration for the scaling)
30002	1	0001	Secondary Value	1	INT16	R	Secondary Value (look at input configuration for the scaling)
30003	2	0002	Tertiary Value	1	INT16	R	Tertiary Value
30004	3	0003	Quaternary Value	1	INT16	R	Quaternary Value
30005	4	0004	Status	1	BINARY	R	Device status Bit 0 FAIL limit LO active Bit 1 WARN limit LO active Bit 2 WARN limit HI active Bit 3 FAIL limit HI active Bit 4 Error in Primary Value Bit 5 Error in Secondary Value Bit 6 Error in Tertiary Value Bit 7 Error in Quaternary Value Bit 8..13 *undefined* Bit 14 Configuration error Bit 15 System error
Measured Values as float value (2 registers)							
30051	50	0032	Primary Value	2	FLOAT	R	Primary Value (for Firmware 01.6.0 and later: may be scaled by SCALE parameters at Reg. 42003, 42005 and 42011, 42013) at Voltage measurement units are [V] at Current measurement units are [A] at Resistance meas. units are [Ω] at Temperature meas. units are [°C] at Potentiometer meas. units are [%] at Frequency meas. units are [Hz] at PWM measurement units are [%]
30053	52	0034	Secondary Value	2	FLOAT	R	Secondary Value
30055	54	0036	Tertiary Value	2	FLOAT	R	Tertiary Value
30057	56	0038	Quaternary Value	2	FLOAT	R	Quaternary Value
30059	58	003A	Status	1	BINARY	R	Device status (look at 30005 for description)

DMB 96500 holding register map

Reg No.	Addr Dec	Addr Hex	Description	No. Reg.	Format	Access	Remarks
Measured Values as one holding register (scaled integer value)							
40001	0	0000	Primary Value	1	INT16	R	Primary Value (look at input configuration for the scaling)
40002	1	0001	Secondary Value	1	INT16	R	Secondary Value (look at input configuration for the scaling)
40003	2	0002	Tertiary Value	1	INT16	R	Tertiary Value
40004	3	0003	Quaternary Value	1	INT16	R	Quaternary Value
40005	4	0004	Status	1	BINARY	R	Device status Bit 0 FAIL limit LO active Bit 1 WARN limit LO active Bit 2 WARN limit HI active Bit 3 FAIL limit HI active Bit 4 Error in Primary Value Bit 5 Error in Secondary Value Bit 6 Error in Tertiary Value Bit 7 Error in Quaternary Value Bit 8..13 *undefined* Bit 14 Configuration error Bit 15 System error
Measured Values as float value (2 registers)							
40051	50	0032	Primary Value	2	FLOAT	R	Primary Value (for Firmware 01.6.0 and higher: may be scaled by SCALE parameters at Reg. 42003, 42005 and 42011, 42013) at Voltage measurement units are [V] at Current measurement units are [A] at Resistance meas. units are [Ω] at Temperature meas. units are [°C] at Potentiometer meas. units are [%] at Frequency meas. units are [Hz] at PWM measurement units are [%]
40053	52	0034	Secondary Value	2	FLOAT	R	Secondary Value
40055	54	0036	Tertiary Value	2	FLOAT	R	Tertiary Value
40057	56	0038	Quaternary Value	2	FLOAT	R	Quaternary Value

Reg No.	Addr		Description	No. Reg.	Format	Access	Remarks
	Dec	Hex					
40059	58	003A	Status	1	BINARY	R	Device status Bit 0 FAIL limit LO active Bit 1 WARN limit LO active Bit 2 WARN limit HI active Bit 3 FAIL limit HI active Bit 4 Error in Primary Value Bit 5 Error in Secondary Value Bit 6 Error in Tertiary Value Bit 7 Error in Quaternary Value Bit 8..13 *undefined* Bit 14 Configuration error Bit 15 System error
40101	100	0064	current DIP switches	2	UINT32	R	Current DIP switches Bit 0 S1-1 Modbus settings : : Bit 9 S1-10 Bit 10 S2-1 Input settings : : Bit 19 S2-10 Bit 20..31 *undefined*
40103	102	0066	current configuration set	1	UINT16	R	currently used configuration set depending on DIP switches 0x0000 PC setting 0x0001 User setting 1 : : 0x000F User setting 15 0x0010 DIP setting
Auxiliary and diagnosis functions							
41201	1200	04B0	"Here I am"	1	UINT16	W	"Here I am" – Set timer with time in seconds Sets a flashing signal on the green LED for the written timeperiod to detect the position of the device in the cabinet
41202	1201	04B1	Reset counter	1	UINT16	W	Reset of diagnostic counter Write: 0x0000
41211	1210	04BA	Telegram count	1	UINT16	R	Count of all telegram frames on Modbus Counter overflow continues at 0
41212	1211	04BB	MyTelegram count	1	UNIT16	R	Request count for telegram frames on Modbus with own device address Counter overflow continues at 0
41213	1212	04BC	Error count	1	UINT16	R	Error count of frames with error Counter overflow continues at 0

Reg No.	Addr		Description	No. Reg.	Format	Access	Remarks
	Dec	Hex					
Device data							
43001	3000	0BB8	Device identifier	1	UINT16	R	Device identifier: 0x0006
43002	3001	0BB9	Hardware version	1	UINT16	R	Hardware version: 0x0042 (B)
43005	3004	0BBC	RFID identifier	8	16 Char	R	Unique identifier
43029	3028	0BD4	Firmware version	1	UINT16	R	0x0100 – Example for version 01.0.0
45151	5150	141E	Point of measuring	8	16 Char	RW	Point of measuring in ASCII (Tag)
Settings (CONF)							
42001	2000	07D0	**Configuration Set: PC mode** sensor type	1	UINT16	RW	Input type setting (programmed by PC) for further informations see table 01 0x00xx – Pt sensors 0x01xx – Ni sensors 0x02xx – KTY sensors 0x03xx – Thermocouples 0x04xx – Resistance 0x05xx – Potentiometer 0x06xx – mV shunt input 0x07xx – Current input 0x08xx – Voltage input 0x09xx – Frequency 0x0Axx – PWM input other: *undefined*
42002	2001	07D1	Connection, compensation	1	UINT16	RW	Settings for connection or compensation depending on sensor type, see table 02
42003	2002	07D2	SCALE measured value star t	2	FLOAT	RW	Firmware 01.6.0 and higher: Input SCALE-Parameter: Input range e.g. 4000 ... 20000 µA
42005	2004	07D4	end	2	FLOAT	RW	
42007	2006	07D6	Manual temperature	2	FLOAT	RW	Manual temperature for TC compensation
42009	2008	07D8	2-wire offset	2	FLOAT	RW	2-wire offset for cable resistance (sum of resistance of both cables)
42011	2010	07DA	SCALE output range star t	2	FLOAT	RW	Firmware 01.6.0 and higher: Output SCALE-Parameter: Output range e.g. 0 ... 80 litre
42013	2012	07DC	end	2	FLOAT	RW	
42015	2014	07DE	FAIL Limit_Low	2	FLOAT	RW	FAIL limit LO
42017	2016	07E0	WARN Limit_Low	2	FLOAT	RW	WARN limit LO
42019	2018	07E2	WARN Limit_High	2	FLOAT	RW	WARN limit HI
42021	2020	07E4	FAIL Limit_High	2	FLOAT	RW	FAIL limit HI

Reg No.	Addr		Description	No. Reg.	Format	Access	Remarks
	Dec	Hex					
42023	2022	07E6		2		RW	Returns NULL bytes when reading, write has no effect. Thus, the registers of configuration set can be read and write in a block.
42025	2024	07E8	Description	8	16 Char	RW	Name of configuration set
42033	2032	07F0	**Conf. Set: User setting 1**	32	BLOB	RW	Complete User Configuration set 1 Structure according registers 42001 to 42032, read an write as complete set only!
42065	2064	0810	**Conf. Set: User setting 2**	32	BLOB	RW	Complete User Configuration set 2 Structure according registers 42001 to 42032, read an write as complete set only!
42097	2096	0830	**Conf. Set: User setting 3**	32	BLOB	RW	Complete User Configuration set 3 Structure according registers 42001 to 42032, read an write as complete set only!
42129	2128	0850	**Conf. Set: User setting 4**	32	BLOB	RW	Complete User Configuration set 4 Structure according registers 42001 to 42032, read an write as complete set only!
42161	2160	0870	**Conf. Set: User setting 5**	32	BLOB	RW	Complete User Configuration set 5 Structure according registers 42001 to 42032, read an write as complete set only!
42193	2192	0890	**Conf. Set: User setting 6**	32	BLOB	RW	Complete User Configuration set 6 Structure according registers 42001 to 42032, read an write as complete set only!
42225	2224	08B0	**Conf. Set: User setting 7**	32	BLOB	RW	Complete User Configuration set 7 Structure according registers 42001 to 42032, read an write as complete set only!
42257	2256	08D0	**Conf. Set: User setting 8**	32	BLOB	RW	Complete User Configuration set 8 Structure according registers 42001 to 42032, read an write as complete set only!
42289	2288	08F0	**Conf. Set: User setting 9**	32	BLOB	RW	Complete User Configuration set 9 Structure according registers 42001 to 42032, read an write as complete set only!
42321	2320	0910	**Conf. Set: User setting 10**	32	BLOB	RW	Complete User Configuration set 10 Structure according registers 42001 to 42032, read an write as complete set only!
42353	2352	0930	**Conf. Set: User setting 11**	32	BLOB	RW	Complete User Configuration set 11 Structure according registers 42001 to 42032, read an write as complete set only!
42385	2384	0950	**Conf. Set: User setting 12**	32	BLOB	RW	Complete User Configuration set 12 Structure according registers 42001 to 42032, read an write as complete set only!

Reg No.	Addr		Description	No. Reg.	Format	Access	Remarks
	Dec	Hex					
42417	2416	0970	**Conf. Set: User setting 13**	32	BLOB	RW	Complete User Configuration set 13 Structure according registers 42001 to 42032, read an write as complete set only!
42449	2448	0990	**Conf. Set: User setting 14**	32	BLOB	RW	Complete User Configuration set 14 Structure according registers 42001 to 42032, read an write as complete set only!
42481	2480	09B0	**Conf. Set: User setting 15**	32	BLOB	RW	Complete User Configuration set 15 Structure according registers 42001 to 42032, read an write as complete set only!
42513	2512	09D0	**Conf. Set: DIP mode** sensor type	1	UINT16	R	Input type setting (programmed by PC) for further informations see table 01 0x00xx – Pt sensors 0x01xx – Ni sensors 0x02xx – KTY sensors 0x03xx – Thermocouples 0x04xx – Resistance 0x05xx – Potentiometer 0x06xx – mV shunt input 0x07xx – Current input 0x08xx – Voltage input 0x09xx – Frequency 0x0Axx – PWM input other: *undefined*
42514	2513	09D1	Connection, compensation	1	UINT16	R	Settings for connection or compensation depending on sensor type, see table 02
42537	2536	09E8	Description	8	16 Char	R	Name of configuration set
45001	5000	1388	Configuration counter	1	UINT16	R	Counter is incremented internally each write of Conf parameters. The Modbus master can remember this value. As long as the counter has the same value, the configuration is unchanged.
45002	5001	1389	Register order	1	UINT16	RW	Order of registers at LONG or FLOAT values <> 0 - HH-HL-LH-LL (default) == 0 - LH-LL-HH-HL
45003	5002	138A	Date of last modification	2	UINT32	RW	Date (UNIX_TIMESTAMP) last change (Not managed by the device)
45005	5004	138C	Overrange at error	1	UINT16	RW	Overrange at measuring error 0x0000 OFF (User must check statusbits) **0x0001** ON (default)
45010	5009	1391	Modbus: Address (in PC Mode)	1	UINT16	RW	Modbus address: **1** ... 247 (default = 1)

Reg No.	Addr		Description	No. Reg.	Format	Access	Remarks
	Dec	Hex					
45011	5010	1392	Baud rate (in PC Mode)	1	UINT16	RW	Baud rate: 0x0000 - 300 0x0001 - 600 0x0002 - 1200 0x0003 - 2400 0x0004 - 4800 0x0005 - 9600 0x0006 - **19200** (default) 0x0007 - 38400 0x0008 - 57600 0x0009 - 115200 other: *undefined*
45012	5011	1393	Parity/Stop bits (in PC Mode)	1	UINT16	RW	Parity: 0x0000 - **Even, 1 Stop bit** (default) 0x0001 - Odd, 1 Stop bit 0x0002 - None, 2 Stop bits 0x0003 - None, 1 Stop bit (no Spec!) (from Firmware 01.4.0) other: *undefined*
45013	5012	1394	Response delay (in PC Mode)	1	UINT16	RW	Delay: **1** ... 1000 ms (default = 1)
45020	5019	139B	Modbus: Address (in DIP Mode)	1	UINT16	R	Modbus address: 1 ... 127
45021	5020	139C	Baud rate (in DIP Mode)	1	UINT16	R	Baud rate: 0x0005 - 9600 0x0006 - 19200 0x0007 - 38400 0x0009 - 115200
45022	5021	139D	Parity/Stop bits (in DIP Mode)	1	UINT16	R	Parity: 0x0000 - Even, 1 Stop bit 0x0002 - None, 2 Stop bits
45023	5022	139E	Response delay (in DIP Mode)	1	UINT16	R	Delay: 1 ms at 115200 Baud 3 ms at 38400 Baud 5 ms at 19200 Baud 10 ms at 9600 Baud
48213	8212	2014	Save settings	1	UINT16	W	0x0043 Speeds up the save procedure of settings. Without this command the device saves changes approx. 5 seconds after the last write of a configuration parameter.

Appendix

Table 01 – Measuring ranges

Sensor, **Reg. 42001** Decimal	Hex	Sensor Type	Range	Scaling for INT16 values
Pt sensors				
0	0x0000	Pt 100	-200 ... +850 °C	XXXX.X °C / XXXX °F
1	0x0001	Pt 200	-200 ... +850 °C	XXXX.X °C / XXXX °F
2	0x0002	Pt 500	-200 ... +850 °C	XXXX.X °C / XXXX °F
3	0x0003	Pt 1000	-200 ... +850 °C	XXXX.X °C / XXXX °F
4	0x0004	Pt 2000	-200 ... +850 °C	XXXX.X °C / XXXX °F
5	0x0005	Pt 10000	-200 ... +850 °C	XXXX.X °C / XXXX °F
6	0x0006	JPt 50	-200 ... +650 °C	XXXX.X °C / XXXX °F
7	0x0007	JPt 100	-200 ... +510 °C	XXXX.X °C / XXXX °F
Ni sensors				
256	0x0100	Ni 100	-60 ... +250 °C	XXXX.X °C / XXXX °F
257	0x0101	Ni 120 (TC. 6370)	-80 ... +260 °C	XXXX.X °C / XXXX °F
258	0x0102	Ni 200	-60 ... +250 °C	XXXX.X °C / XXXX °F
259	0x0103	Ni 500	-60 ... +250 °C	XXXX.X °C / XXXX °F
260	0x0104	Ni 1000	-60 ... +250 °C	XXXX.X °C / XXXX °F
261	0x0105	Ni 1000 (TC. 6370)	-60 ... +200 °C	XXXX.X °C / XXXX °F
262	0x0106	Ni 1000 (TC. 5000)	-60 ... +150 °C	XXXX.X °C / XXXX °F
KTY sensors				
512	0x0200	KT210, KT230, KTY21-6, KTY23-6	-50 ... +150 °C	XXXX.X °C / XXXX °F
513	0x0201	KTY21-5, KTY23-5	-50 ... +150 °C	XXXX.X °C / XXXX °F
514	0x0202	KTY21-7, KTY23-7	-50 ... +150 °C	XXXX.X °C / XXXX °F
515	0x0203	KTY81-110, KTY81-120, KTY81-150, KTY82-110, KTY82-120, KTY82-150	-55 ... +150 °C	XXXX.X °C / XXXX °F
516	0x0204	KTY81-121, KTY82-121	-55 ... +150 °C	XXXX.X °C / XXXX °F
517	0x0205	KTY81-122, KTY82-122	-55 ... +150 °C	XXXX.X °C / XXXX °F
518	0x0206	KTY83-110, KTY83-120, KTY83-150	-55 ... +175 °C	XXXX.X °C / XXXX °F
519	0x0207	KTY83-121	-55 ... +175 °C	XXXX.X °C / XXXX °F
520	0x0208	KTY83-122	-55 ... +175 °C	XXXX.X °C / XXXX °F
521	0x0209	KTY83-151	-55 ... +175 °C	XXXX.X °C / XXXX °F
522	0x020A	KTY83-152	-55 ... +175 °C	XXXX.X °C / XXXX °F
523	0x020B	KTY84-130, KTY84-150	-40 ... +300 °C	XXXX.X °C / XXXX °F
524	0x020C	KTY84-151	-40 ... +300 °C	XXXX.X °C / XXXX °F
525	0x020D	KTY84-152	-40 ... +300 °C	XXXX.X °C / XXXX °F
526	0x020E	KT100, KT110, KT130, KTY10-6, KTY10-62, KTY11-6, KTY13-6, KTY16-6, KTY19-6M, KTY19-6Z, ST-13, ST-15, ST-16, ST-20M, ST-20Z	-50 ... +150 °C	XXXX.X °C / XXXX °F
527	0x020F	KTY10-5, KTY11-5, KTY13-5	-50 ... +150 °C	XXXX.X °C / XXXX °F

Sensor, **Reg. 42001**		Sensor Type		Scaling
Decimal	Hex		Range	for INT16 values
528	0x0210	KTY10-7, KTY11-7, KTY13-7	-50 ... +150 °C	XXXX.X °C / XXXX °F
529	0x0211	KTY81-210, KTY81-220, KTY81-250, KTY82-210, KTY82-220, KTY82-250	-55 ... +150 °C	XXXX.X °C / XXXX °F
530	0x0212	KTY81-221, KTY82-221	-55 ... +150 °C	XXXX.X °C / XXXX °F
531	0x0213	KTY81-222, KTY82-222	-55 ... +150 °C	XXXX.X °C / XXXX °F
532	0x0214	KTY81-251, KTY82-251	-55 ... +150 °C	XXXX.X °C / XXXX °F
533	0x0215	KTY81-252, KTY82-252	-55 ... +150 °C	XXXX.X °C / XXXX °F
534	0x0216	KTY82-151	-55 ... +150 °C	XXXX.X °C / XXXX °F
535	0x0217	KTY82-152	-55 ... +150 °C	XXXX.X °C / XXXX °F
Thermocouples				
768	0x0300	Thermocouple type A	0 ... +2500 °C	XXXX.X °C / XXXX °F
769	0x0301	Thermocouple type B	250 ... +1820 °C	XXXX.X °C / XXXX °F
770	0x0302	Thermocouple type C	0 ... +2315 °C	XXXX.X °C / XXXX °F
771	0x0303	Thermocouple type D	0 ... +2315 °C	XXXX.X °C / XXXX °F
772	0x0304	Thermocouple type E	-270 ... +1000 °C	XXXX.X °C / XXXX °F
773	0x0305	Thermocouple type J	-210 ... +1200 °C	XXXX.X °C / XXXX °F
774	0x0306	Thermocouple type K	-270 ... +1372 °C	XXXX.X °C / XXXX °F
775	0x0307	Thermocouple type L	-200 ... +900 °C	XXXX.X °C / XXXX °F
776	0x0308	Thermocouple type N	-270 ... +1300 °C	XXXX.X °C / XXXX °F
777	0x0309	Thermocouple type R	-50 ... +1768 °C	XXXX.X °C / XXXX °F
778	0x030A	Thermocouple type S	-50 ... +1768 °C	XXXX.X °C / XXXX °F
779	0x030B	Thermocouple type T	-270 ... +400 °C	XXXX.X °C / XXXX °F
780	0x030C	Thermocouple type U	-200 ... +600 °C	XXXX.X °C / XXXX °F
Resistance				
1024	0x0400	Resistance ≤ 500 Ω		500.0
1025	0x0401	Resistance ≤ 5 kΩ		5.000
1026	0x0402	Resistance ≤ 20 kΩ		20.000
1027	0x0403	Resistance ≤ 100 kΩ		100.00
Potentiometer				
1280	0x0500	Potentiometer Resistance ≤ 500 Ω,	Position 0 ... 100 %	0.00 ... 100.00
1281	0x0501	Potentiometer Resistance ≤ 5 kΩ,	Position 0 ... 100 %	0.00 ... 100.00
1282	0x0502	Potentiometer Resistance ≤ 20 kΩ,	Position 0 ... 100 %	0.00 ... 100.00
1283	0x0503	Potentiometer Resistance ≤ 100 kΩ,	Position 0 ... 100 %	0.00 ... 100.00
mV Shunt Input				
1536	0x0600	Input Voltage ± 50 mV		50.00
1537	0x0601	Input Voltage ± 100 mV		100.00
1538	0x0602	Input Voltage ± 500 mV		500.0

Sensor, **Reg. 42001** Decimal	Hex	Sensor Type Range			Scaling for INT16 values
Current Input					
1792	0x0700	Input Current ± 1 mA			1.0000
1793	0x0701	Input Current ± 20 mA with transmitter supply			20.000
1794	0x0702	Input Current ± 100 mA			100.00
Voltage Input					
2048	0x0800	Input Voltage ± 1 V			1.0000
2049	0x0801	Input Voltage ± 10 V with transmitter supply			10.000
2050	0x0802	Input Voltage ± 100 V			100.00
2051	0x0803	Input Voltage ± 300 V			300.00
Frequency Input					
2304	0x0900	Frequency ≤ 200 kHz,	Gate time 10 ms,	Resolution 100 Hz	200.0
2305	0x0901	Frequency ≤ 10 kHz,	Gate time 100 ms,	Resolution 10 Hz	10.00
2306	0x0902	Frequency ≤ 1 kHz,	Gate time 1 s,	Resolution 1 Hz	1.000
2307	0x0903	Frequency ≤ 100 Hz,	Gate time 10 s,	Resolution 0.1 Hz	100.0
2308	0x0904	Frequency ≤ 10 Hz,	Gate time 100 s,	Resolution 0.01 Hz	10.00
2309	0x0905	Frequency ≤ 1 Hz,	Gate time 1000 s,	Resolution 0.001 Hz	1.000
PWM Input					
2560	0x0A00	Frequency ≤ 10 kHz,	Gate time 100 ms,	Duty Cycle 1 ... 99 %	1.00 ... 99.00
2561	0x0A01	Frequency ≤ 1 kHz,	Gate time 1 s,	Duty Cycle 1 ... 99 %	1.00 ... 99.00
2562	0x0A02	Frequency ≤ 100 Hz,	Gate time 10 s,	Duty Cycle 1 ... 99 %	1.00 ... 99.00
2563	0x0A03	Frequency ≤ 10 Hz,	Gate time 100 s,	Duty Cycle 1 ... 99 %	1.00 ... 99.00
2564	0x0A04	Frequency ≤ 1 Hz,	Gate time 1000 s,	Duty Cycle 1 ... 99 %	1.00 ... 99.00

Table 02 – Connection / Compensation

Reg. 42002 Decimal	Hex	RTD / Poti	TC CJC	U / I	F / PWM
0	0x0000	4-wire	intern	DC	NAMUR Contact
1	0x0001	3-wire	ext. Pt100 2-wire	AC AVG (fast)	SN / Contact
2	0x0002	2-wire	ext. Pt100 3-wire	AC AVG (normal)	S0
3	0x0003		ext. Pt1000 2-wire	AC AVG (slow)	PNP
4	0x0004		ext. Pt1000 3-wire	AC RMS (fast)	NPN
5	0x0005		OFF	AC RMS (normal)	5 V Logic + TX
6	0x0006		manual	AC RMS (slow)	
7	0x0007				

DMB 96100 Standard Signal AI Module

- Precise capture of industrial standard signals
- Excellent EMC performance and noise suppression
- Supply of 2/3-wire transmitters
- Easy configuration, fast commissioning
- Maximum reliability and durability

Input
0/4 ... 20 mA
0/2 ... 10 V
0/1 ... 5 V

Additional functions
16 V Transmitter Supply

Supported communication features:

Baud rates:	300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200	
Formats:	Parity even,	1 stop bit
	Parity odd,	1 stop bit
	Parity none,	2 stop bits
	Parity none,	1 stop bit (not conform with specification!)

Factory setting: 19200 baud, 8 data bits, parity even, 1 stop bit, Modbus address 1

Supported function codes:

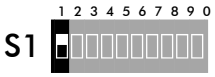
Command 3:	0x03	Read Holding Registers	
Command 4:	0x04	Read Input Registers	(Firmware 01.7.0 and later)
Command 6:	0x06	Write Single Register	
Command 16:	0x10	Write Multiple Registers	
Command 43 / 14:	0x2B / 0x0E	Read Device Identification	

Note:	*Command 43, subcode 14 (Read Device Identification) supported in the 'Basic' category to allow the device identification.*

DMB 96100 DIP settings

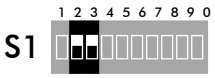
Operating modes with DIP switch settings

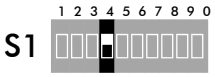
Input settings

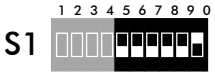


	1	2	3	4	5	6	7	8	9	0
Input 0 to 20 mA										
Input 0 to 10 V	■									

Modbus settings

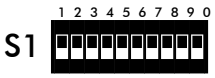






	1	2	3	4	5	6	7	8	9	0
9600 Baud		■								
19200 Baud										
38400 Baud			■							
115200 Baud		■	■							
Parity even, 1 stop bit										
Parity none, 2 stop bits				■						
Modbus address 1										■
2									■	
3									■	■
4								■		
5								■		■
... 63					■	■	■	■	■	■

Setting via USB interface or Modbus commands



PC Mode

All switches in OFF position

Configuration the Modbus interface or with DRAGOmodbus software

Factory Setting

All switches in OFF position (PC Mode),
the default configuration in PC-Mode:

- Input 0 to 20 mA
- Modbus address 1
- 19200 baud
- Parity even
- 1 stop bit

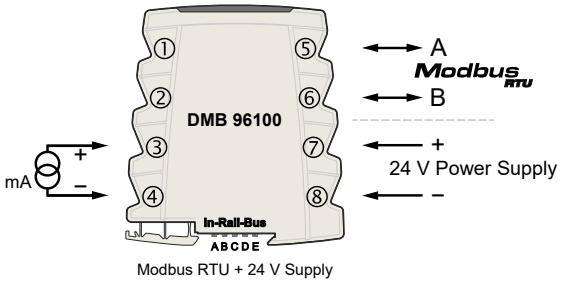
DMB 96100 Operating modes and examples

Operating modes with DIP switch settings

DIP switch S1-1 switches between voltage input 0 to 10 V and current input 0 to 20 mA.
With the DIP switches S1-2 and S1-3 the baud rate ist selected, with S1-4 the parity bit. The DIP switches S1-5 to S1-10 defines the Modbus address of the device in range of 1 to 63. The Modbus address must be unique in the Modbus segment. For higher adresses you must use the PC mode (see below).

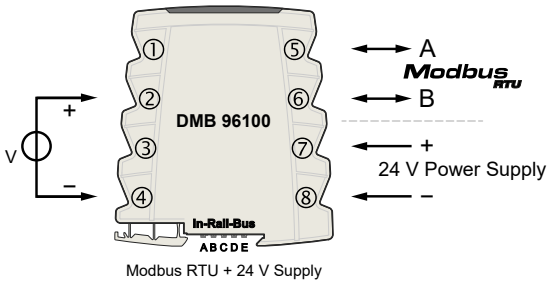
a. Current Input

DIP switch S1-1 is OFF.
The current measuring sets the measured values into holding registers. The **register 40001** (mirrored on **30001**) represents the input current in [µA] and the **register 40002** (**30002**) represents the value as percent [0.1 %] of the input range 0 to 20 mA.



b. **Voltage Input**

DIP switch S1-1 is ON.
The voltage measuring sets the measured values into holding registers. The **register 40001** (mirrored on **30001**) represents the input voltage in [mV] and the **register 40002** (**30002**) represents the value as percent [0.1 %] of the input range 0 to 10 V.



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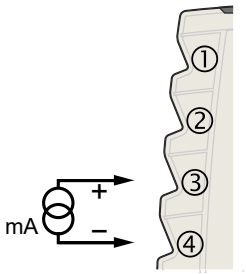
Operating modes with PC mode

All DIP switches must be OFF. Modbus address and all device parameters are set via the Modbus interface or the front USB connector in the holding registers (see holding register map).

a. Current input 0 ... 20 mA

Holding register 42001 = 0x0000



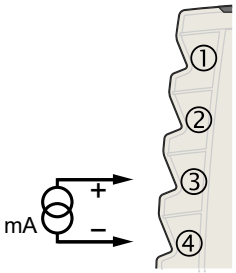
The current measuring sets the measured values into holding registers. The **register 40001** (mirrored on **30001**) represents the input current in [µA] and the **register 40002** (**30002**) represents the value as percent [0.1 %] of the input range 0 to 20 mA.

Firmware 01.6.0 and later:
In register **40051** (**30051**), a scaled measured value is available as FLOAT number. Please define the SCALE parameters for input range and the output range in registers 42007 to 42013.

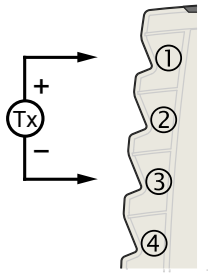
b. Current input 4 ... 20 mA

Holding register 42001 = 0x0001

Current input



2-wire transmitter



The current measuring sets the measured values into holding registers. The **register 40001** (mirrored on **30001**) represents the input current in [µA] and the **register 40002** (**30002**) represents the value as percent [0.1 %] of the input range 4 to 20 mA.

Firmware 01.6.0 and later:
In register **40051** (**30051**), a scaled measured value is available as FLOAT number. Please define the SCALE parameters for input range and the output range in registers 42007 to 42013.

Example for	Input 4 mA:	0.0 %	value = 0
Reg. 40002:	Input 12 mA:	50.0 %	value = 500
	Input 20 mA:	100.0 %	value = 1000

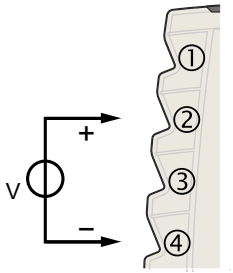
Example for scaling the primary value:

At the input we have 4 to 20 mA from a transmitter, the output should indicate the value as 0 to 80 litres. This output value in register 40051 is a float number with decimal places.

Set the SCALE parameters as follows:		Register
▪ SCALE measured value (start) = 4000	(4000 µA = 4 mA)	42007

▪ SCALE measured value (end) = 20000	(20000 µA = 20 mA)	42009
▪ SCALE output range (start) = 0		42011
▪ SCALE output range (end) = 80		42013

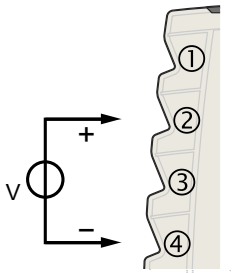
c. **Voltage input 0 ... 5/10 V (Auto range)**
Holding register 42001 = 0x0100



The voltage measuring sets the measured values into holding registers. The **register 40001** (mirrored on **30001**) represents the input voltage in [mV] and the **register 40002** (**30002**) represents the value as percent
[0.1 %] of the input range 0 to 10 V. With the autoranging, a higher resolution is achieved below 5 V than in the 10 V fixed range.

Firmware 01.6.0 and later:
A scaled measured value ist available at register **40051** (**30051**), use the SCALE parameters in registers 42007 to 42013.

d. **Voltage input 0 ... 10 V**
Holding register 42001 = 0x0101



The **register 40001** (mirrored on **30001**) represents the input voltage in [mV] and the **register 40002** (**30002**) represents the value as percent [0.1 %] of the input range 0 to 10 V.

Firmware 01.6.0 and later:
A scaled measured value ist available at register **40051** (**30051**), use the SCALE parameters in registers 42007 to 42013.

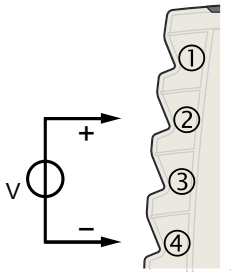
e. **Voltage input 2 ... 10 V**
Holding register 42001 = 0x0102

The **register 40001** (mirrored on **30001**) represents the input voltage in [mV] and the **register 40002** (**30002**) represents the value as percent [0.1 %] of the input range 2 to 10 V.

Firmware 01.6.0 and later:
A scaled measured value ist available at register **40051** (**30051**), use the SCALE parameters in registers 42007 to 42013.

Example for	Input 2 V:	0.0 %	value = 0
Reg. 40002:	Input 6 V:	50.0 %	value = 500
	Input 10 V:	100.0 %	value = 1000

f. **Voltage input 0 ... 5 V**
Holding register 42001 = 0x0103



The **register 40001** (mirrored on **30001**) represents the input voltage in [mV] and the **register 40002** (**30002**) represents the value as percent [0.1 %] of the input range 0 to 5 V.

Firmware 01.6.0 and later:
A scaled measured value ist available at register **40051** (**30051**), use the SCALE parameters in registers 42007 to 42013.

g. **Voltage input 1 ... 5 V**
Holding register 42001 = 0x0104

The **register 40001** (mirrored on **30001**) represents the input voltage in [mV] and the **register 40002** (**30002**) represents the value as percent [0.1 %] of the input range 1 to 5 V.

Firmware 01.6.0 and later:
A scaled measured value ist available at register **40051** (**30051**), use the SCALE parameters in registers 42007 to 42013.

DMB 96100 input register map

Firmware 01.7.0 and later:
All dynamic measured value registers can be read out with Modbus command 3 as holding register **400xx**, but also with Modbus command 4 as input register **300xx**.

Reg No.	Addr		Description	No. Reg.	Format	Access	Remarks
	Dec	Hex					
Measured Values							
30001	0	0000	Primary Value	1	INT16	R	Primary Value at Voltage: measurement units are [mV] at Current: measurement units are [µA]
30002	1	0001	Secondary Value	1	INT16	R	Secondary Value ([0.1%] of range) **Example:** Range in Reg. 42001 is 4 ... 20 mA (0x0001) Input 4 mA: 0.0 % value = 0 Input 12 mA: 50.0% value = 500 Input 20 mA: 100.0% value = 1000
30005	4	0004	Status	1	BINARY	R	Device status Bit 0 FAIL limit LO active Bit 1 WARN limit LO active Bit 2 WARN limit HI active Bit 3 FAIL limit HI active Bit 4 Error in Primary Value Bit 5 Error in Secondary Value Bit 6 Error in Tertiary Value Bit 7 Error in Quaternary Value Bit 8 Simulation active Bit 9..13 *undefined* Bit 14 Configuration error Bit 15 System error
30051	50	0032	Scaled Primary Value	2	FLOAT	R	Firmware 01.6.0 and later: Primary Value scaled with the SCALE parameters at Reg. 42007 to 42013 Float value range according to IEEE 754

DMB 96100 holding register map

Reg No.	Addr		Description	No. Reg.	Format	Access	Remarks
	Dec	Hex					
Measured Values							
40001	0	0000	Primary Value	1	INT16	R	Primary Value at Voltage: measurement units are [mV] at Current: measurement units are [µA]
40002	1	0001	Secondary Value	1	INT16	R	Secondary Value ([0.1%] of range) **Example:** Range in Reg. 42001 is 4 ... 20 mA (0x0001) Input 4 mA: 0.0 % value = 0 Input 12 mA: 50.0% value = 500 Input 20 mA: 100.0% value = 1000
40003	2	0002	Tertiary Value	1	INT16	R	Tertiary Value (at DMB96100 not used)
40004	3	0003	Quaternary Value	1	INT16	R	Quaternary Value (at DMB96100 not used)
40005	4	0004	Status	1	BINARY	R	Device status Bit 0 FAIL limit LO active Bit 1 WARN limit LO active Bit 2 WARN limit HI active Bit 3 FAIL limit HI active Bit 4 Error in Primary Value Bit 5 Error in Secondary Value Bit 6 Error in Tertiary Value Bit 7 Error in Quaternary Value Bit 8 Simulation active Bit 9..13 *undefined* Bit 14 Configuration error Bit 15 System error
40051	50	0032	Scaled Primary Value	2	FLOAT	R	Firmware 01.6.0 and higher: Primary Value scaled with the SCALE parameters at Reg. 42007 to 42013 Float value range according to IEEE 754
40101	100	0064	current DIP switches	2	UINT32	R	Current DIP switches Bit 0..9 *not used* Bit 10 S1-1 : : Bit 19 S1-10 Bit 20..31 *undefined*
40103	102	0066	current configuration set	1	UINT16	R	currently used configuration set 0x0000 PC setting 0x0010 DIP setting

Reg No.	Addr		Description	No. Reg.	Format	Access	Remarks
	Dec	Hex					
Auxiliary and diagnosis functions							
41201	1200	0480	"Here I am"	1	UINT16	W	"Here I am" – Set timer with time in seconds Sets a flashing signal on the green LED for the written timeperiod to find the device in the system
41202	1201	04B1	Reset counter	1	UINT16	W	Reset of diagnostic counter
41211	1210	04BA	Telegram count	1	UINT16	R	Count of all telegram frames on Modbus
41212	1211	04BB	MyTelegram count	1	UNIT16	R	Request count for telegram frames on Modbus with own device address
41213	1212	04BC	Error count	1	UINT16	R	Error count of frames with error
Device data							
43001	3000	0BB8	Device identifier	1	UINT16	R	Device identifier: 0x0106
43002	3001	0BB9	Hardware version	1	UINT16	R	Hardware version: 0x0041 (A)
43005	3004	0BBC	RFID identifier	8	16 Char	R	Unique identifier
43029	3028	0BD4	Firmware version	1	UINT16	R	0x0100 – Example for version 01.0.0
45151	5150	141E	Point of measuring	8	16 Char	RW	Point of measuring in ASCII (Tag)
Settings (CONF)							
42001	2000	07D0	PC Mode	1	UINT16	RW	Input type setting (programmed by PC) 0x0000 – 0 ... 20 mA 0x0001 – 4 ... 20 mA 0x0100 – 0 ... 5/10 V (Auto range) 0x0101 – 0 ... 10 V 0x0102 – 2 ... 10 V 0x0103 – 0 ... 5 V 0x0104 – 1 ... 5 V other: *undefined*
42003	2002	07D2	FAIL Limit_Low	1	INT16	RW	FAIL limit LO
42004	2003	07D3	WARN Limit_Low	1	INT16	RW	WARN limit LO
42005	2004	07D4	WARN Limit_High	1	INT16	RW	WARN limit HI
42006	2005	07D5	FAIL Limit_High	1	INT16	RW	FAIL limit HI
42007	2006	07D6	SCALE measured value start	2	FLOAT	RW	Firmware 01.6.0 and higher: Input SCALE-Parameter: Input range e.g. 4000 ... 20000 µA
42009	2008	07D8	end	2	FLOAT	RW	
42011	2010	07DA	SCALE output range start	2	FLOAT	RW	Firmware 01.6.0 and higher: Output SCALE-Parameter: Output range e.g. 0 ... 80 litre
42013	2012	07DC	end	2	FLOAT	RW	

Reg No.	Addr		Description	No. Reg.	Format	Access	Remarks
	Dec	Hex					
42513	2512	09D0	DIP Mode	1	UINT16	R	Input type setting (DIP switches) 0x0000 – 0 ... 20 mA 0x0100 – 0 ... 10 V other: *undefined*
45001	5000	1388	Configuration counter	1	UINT16	R	Counter is incremented internally each write of Conf parameters. The Modbus master can remember this value. As long as the counter has the same value, the configuration is unchanged.
45002	5001	1389	Register order	1	UINT16	RW	Order of registers at LONG or FLOAT values <> 0 - HH-HL-LH-LL (default) == 0 - LH-LL-HH-HL
45003	5002	138A	Date of last modification	2	UINT32	RW	Date (UNIX_TIMESTAMP) last change (Not managed by the device)
45010	5009	1391	Modbus: Address (in PC Mode)	1	UINT16	RW	Modbus address: **1** ... 247 (default = 1)
45011	5010	1392	Baud rate (in PC Mode)	1	UINT16	RW	Baud rate: 0x0000 - 300 0x0001 - 600 0x0002 - 1200 0x0003 - 2400 0x0004 - 4800 0x0005 - 9600 0x0006 - **19200** (default) 0x0007 - 38400 0x0008 - 57600 0x0009 - 115200 other: *undefined*
45012	5011	1393	Parity/Stop bits (in PC Mode)	1	UINT16	RW	Parity: 0x0000 - **Even, 1 Stop bit** (default) 0x0001 - Odd, 1 Stop bit 0x0002 - None, 2 Stop bits 0x0003 - None, 1 Stop bit (no Spec !) (from Firmware 01.4.0) other: *undefined*
45013	5012	1394	Response delay (in PC Mode)	1	UINT16	RW	Delay: **1** ... 1000 ms (default = 1)
45020	5019	139B	Modbus: Address (in DIP Mode)	1	UINT16	R	Modbus address: 1 ... 63

Reg No.	Addr		Description	No. Reg.	Format	Access	Remarks
	Dec	Hex					
45021	5020	139C	Baud rate (in DIP Mode)	1	UINT16	R	Baud rate: 0x0005 - 9600 0x0006 - 19200 0x0007 - 38400 0x0009 - 115200
45022	5021	139D	Parity/Stop bits (in DIP Mode)	1	UINT16	R	Parity: 0x0000 - Even, 1 Stop bit 0x0002 - None, 2 Stop bits
45023	5022	139E	Response delay (in DIP Mode)	1	UINT16	R	Delay: 1 ms at 115200 Baud 3 ms at 38400 Baud 5 ms at 19200 Baud 10 ms at 9600 Baud
48213	8212	2014	Save settings	1	UINT16	W	0x0043 Speeds up the save procedure of settings. Without this command the device saves changes approx. 5 seconds after the last write of a configuration parameter.

DMB 96200 4 Channel AI Module

- Measuring and processing of 4 industrial standard signals
- Each channel programmable as current or voltage input
- All inputs individually safely galvanically isolated
- Fast signal acquisition, short processing times
- Extremely low costs per input channel

Input
0/4 ... 20 mA
0/2 ... 10 V

Additional functions
4 DI
4 DO

Supported communication features:

Baud rates:	300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200	
Formats:	Parity even,	1 stop bit
	Parity odd,	1 stop bit
	Parity none,	2 stop bits
	Parity none,	1 stop bit (not conform with specification!)

Factory setting: 19200 baud, 8 data bits, parity even, 1 stop bit, Modbus address 1

Supported function codes:

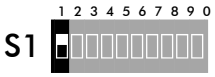
Command 1:	0x01	Read Coils	
Command 2:	0x02	Read Discrete Input	
Command 3:	0x03	Read Holding Registers	
Command 4:	0x04	Read Input Registers	(Firmware 01.1.0 and later)
Command 5:	0x05	Write Single Coil	
Command 6:	0x06	Write Single Register	
Command 15:	0x0F	Write Multiple Coils	
Command 16:	0x10	Write Multiple Registers	
Command 43 / 14:	0x2B / 0x0E	Read Device Identification	

Note: Command 43, subcode 14 (Read Device Identification) supported in the 'Basic' category to allow the device identification.

DMB 96200 DIP settings

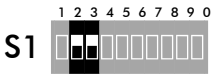
Operating modes with DIP switch settings

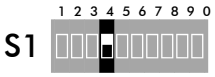
Input settings

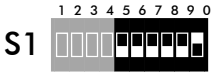


	1	2	3	4	5	6	7	8	9	0
All channels voltage input										
All channels current input	■									

Modbus settings

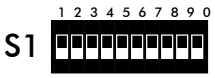






	1	2	3	4	5	6	7	8	9	0
9600 Baud		■								
19200 Baud										
38400 Baud			■							
115200 Baud		■	■							
Parity even, 1 stop bit										
Parity none, 2 stop bits				■						
Modbus address 1										■
2									■	
3									■	■
4								■		
5								■		■
... 63					■	■	■	■	■	■

Setting via USB interface or Modbus commands



PC Mode

All switches in OFF position

Configuration the Modbus interface or with DRAGOmodbus software

Factory Setting

All switches in OFF position (PC Mode),
the default configuration in PC-Mode:

- All channels voltage input
- Modbus address 1
- 19200 baud
- Parity even
- 1 stop bit

DMB 96200 Operating modes and examples

Operating modes with DIP switch settings

DIP switch S1-1 switches between 4x voltage input 0 to 10 V and 4x current input 0 to 20 mA. With the DIP switches S1-2 and S1-3 the baud rate ist selected, with S1-4 the parity bit. The DIP switches S1-5 to S1-10 defines the Modbus address of the device in range of 1 to 63.

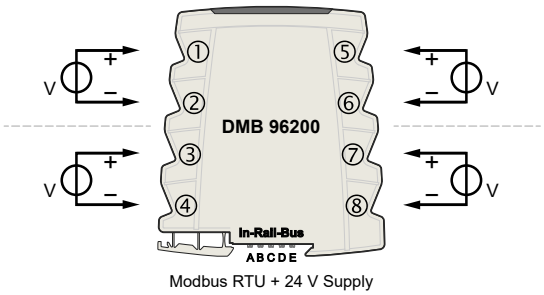
The Modbus address must be unique in the Modbus segment. For higher adresses you must use the PC mode (see below).

a. **Voltage Input**

DIP switch S1-1 is OFF.

The voltage measuring sets the measured values into holding registers **40001** to **40004** (mirrored on **30001** to **30004**). The register represents the input voltage in [mV].

In registers **40051** to **40057** (**30051** to **30057**), the measured values are also available as FLOAT numbers in [V].

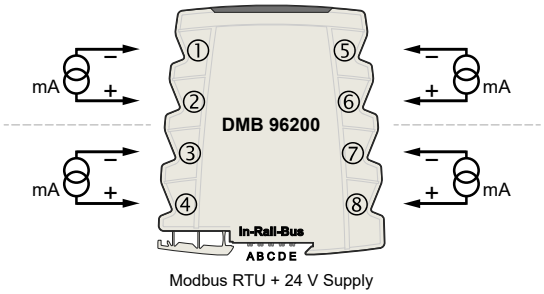


b. Current Input

DIP switch S1-1 is ON.

The current measuring sets the measured values into holding registers **40001** to **40004** (mirrored on **30001** to **30004**). The register represents the input current in [µA].

In registers **40051** to **40057** (**30051** to **30057**), the measured values are also available as FLOAT numbers in [mA].



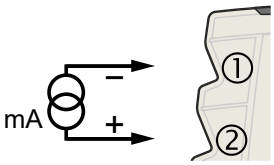
Operating modes with PC mode

All DIP switches must be OFF. Modbus address and all device parameters are set via the Modbus interface or the front USB connector in the holding registers (see holding register map). In PC mode, different functions can be defined for the individual channels. The wiring examples shows channel 1.

[1] The register addresses always refer to channel 1

a. Current input 0 ... 20 mA

Holding register 42001[1] = 0x0000
(other channels: 42101[2]/42201[3]/42301[4])



The current measuring sets the measured value into **holding register 40001**[1] (mirrored on **30001**).
The register represents the input current in [µA] as a INT16 number.
In **register 40051** (**30051**), the measured values are also available as FLOAT numbers in [mA]. This measured value can be converted via the SCALE parameters in registers 42003[1] to 42009[1].

For scaling the input range and the output range must be specified in the SCALE parameters.

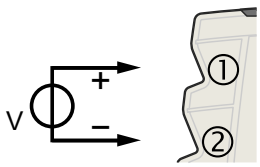
Example: At the input we have 4 to 20 mA from a transmitter, the output should indicate the value as 0 to 80 litres. This output value in **register 40051**[1] (**30051**) is a float number with decimal places.

Set the SCALE parameters as follows:

- SCALE measured value (start) = 4000 (4000 µA = 4 mA)
- SCALE measured value (end) = 20000 (20000 µA = 20 mA)
- SCALE output range (start) = 0
- SCALE output range (end) = 80

b. **Voltage input 0 ... 10 V**

Holding register 42001[1] = 0x0100
(other channels: 42101[2]/42201[3]/42301[4])

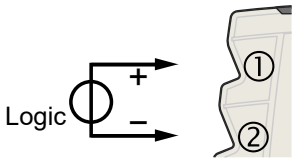


The voltage measuring sets the measured value into **holding register 40001**[1] (mirrored on **30001**). The register represents the input voltage in [mV] as a INT16 number.
In **register 40051** (**30051**), the measured values are also available as FLOAT numbers in [V]. This measured value can be converted via the SCALE parameters in registers 42003[1] to 42009[1].

For scaling see the example at current input above.

c. Binary input (switch input)

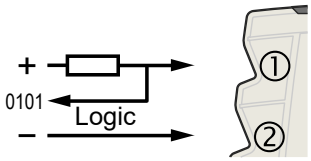
Holding register 42001[1] = 0x0200
(other channels: 42101[2]/42201[3]/42301[4])



The input level is set in **register 42031**[1] for 5 V- or 12 V/24 V systems. The binary input signal sets the **coil 1**[1] and the corresponding bit in **holding register 40011** as 0 or 1 (mirrored on **30011**).

d. Binary output (switching output)

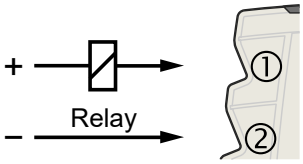
Holding register 42001[1] = 0x0300
(other channels: 42101[2]/42201[3]/42301[4])



Write **coil 1**[1] or the corresponding bit in **holding register 40011** via Modbus.
The output will follow to 0 or 1.

e. Limit monitoring of channel 1

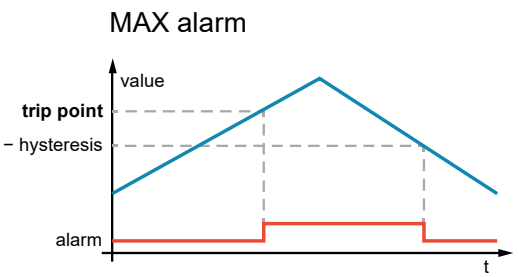
Holding register 42001[1] = 0x0400
(other channels: 42101[2]/42201[3]/42301[4])

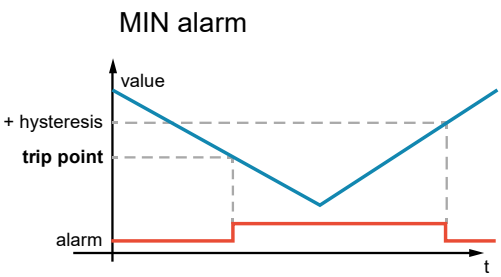


The channel is an output for limit monitoring. The measured value channel 1 (register 40001) is monitored for MIN or MAX alarm.
The monitored channel must be configured as analog input (voltage or current input), otherwise a configuration error will be reported.

Parameters for limit monitoring:

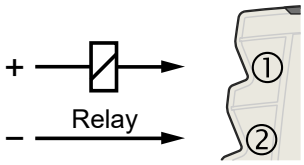
- Trip point in register 42021[1]
- Hysteresis in register 42022[1]
- Monitoring direction MIN or MAX in register 42023[1]
- The alarm state can be inverted via register 42024[1]
- In register 42025[1] you define whether an alarm should additionally activate the group message (pin E).





f. Limit monitoring of channel 2

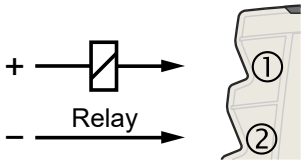
Holding register 42001[1] = 0x0401
(other channels: 42101[2]/42201[3]/42301[4])



The channel is an output for limit monitoring. The measured value channel 2 (register 40002) is monitored for MIN or MAX alarm (see parameters above).
The monitored channel must be configured as analog input (voltage or current input), otherwise a configuration error will be reported.

g. Limit monitoring of channel 3

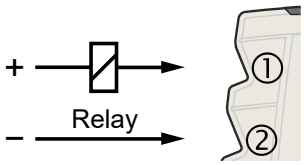
Holding register 42001[1] = 0x0402
(other channels: 42101[2]/42201[3]/42301[4])



The channel is an output for limit monitoring. The measured value channel 3 (register 40003) is monitored for MIN or MAX alarm (see parameters above).
The monitored channel must be configured as analog input (voltage or current input), otherwise a configuration error will be reported.

h. Limit monitoring of channel 4

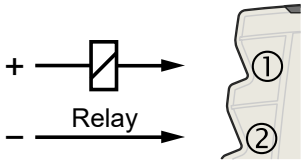
Holding register 42001[1] = 0x0403
(other channels: 42101[2]/42201[3]/42301[4])



The channel is an output for limit monitoring. The measured value channel 4 (register 40004) is monitored for MIN or MAX alarm (see parameters above).
The monitored channel must be configured as analog input (voltage or current input), otherwise a configuration error will be reported.

i. Limit monitoring an external value

Holding register 42001[1] = 0x0404
(other channels: 42101[2]/42201[3]/42301[4])



The channel is an output for limit monitoring. The monitored value will be written periodically via Modbus to **register 40001** (if set channel 1) to **register 40004** (if set channel 4). The external value is monitored for MIN or MAX alarm (see parameters above).

[1] The specified register addresses apply to channel 1. At channel 2: +100, channel 3: +200 and channel 4: +300

DMB 96200 coil map

Coil	Addr	Description	Access	Remarks
Discrete inputs/outputs				
1	0	Input/Output 1	RW	Binary signal at Input/ Output 1
2	1	Input/Output 2	RW	Binary signal at Input/ Output 2
3	2	Input/Output 3	RW	Binary signal at Input/ Output 3
4	3	Input/Output 4	RW	Binary signal at Input/ Output 4

DMB 96200 input register map

Firmware 01.1.0 and later:
All dynamic measured value registers can be read out with Modbus command 3 as holding register **400xx**, but also with Modbus command 4 as input register **300xx**.

Reg No.	Addr		Description	No. Reg.	Format	Access	Remarks
	Dec	Hex					
Measured Values							
30001	0	0000	Primary Value	1	INT16	R	Read: Measured value of channel 1 Voltage in [mV], Current in [µA]
30002	1	0001	Secondary Value	1	INT16	R	Channel 2 (for Description see Channel 1)
30003	2	0002	Tertiary Value	1	INT16	R	Channel 3 (for Description see Channel 1)
30004	3	0003	Quaternary Value	1	INT16	R	Channel 4 (for Description see Channel 1)
30005	4	0004	Status	1	BINARY	R	Status of values Bit 0 Channel 1 – Range error Bit 1 Channel 2 – Range error Bit 2 Channel 3 – Range error Bit 3 Channel 4 – Range error Bit 4...7 n.c. Bit 8 Ch 1 – Configuration error Bit 9 Ch 2 – Configuration error Bit 10 Ch 3 – Configuration error Bit 11 Ch 4 – Configuration error Bit 12 n.c. Bit 13 Colletive message active Bit 14 n.c. Bit 15 Configuration error (total)

Reg No.	Addr		Description	No. Reg.	Format	Access	Remarks
	Dec	Hex					
30011	10	000A	Discrete Input/Output	1	UINT16	R	Operation modes: Binary input Bit 0 Input 1 Bit 1 Input 2 Bit 2 Input 3 Bit 3 Input 4 inactive = 0, active = 1
30051	50	0032	Primary Value	2	FLOAT	R	Operation modes: Voltage or current input Measured value channel 1 as [V] or [mA], scaled with the SCALE-Parameter at Reg. 42003-42010 Float value range according to IEEE 754
30053	52	0034	Secondary Value	2	FLOAT	R	Channel 2 (for Description see Channel 1)
30055	54	0036	Tertiary Value	2	FLOAT	R	Channel 3 (for Description see Channel 1)
30057	56	0038	Quaternary Value	2	FLOAT	R	Channel 4 (for Description see Channel 1)
30059	58	003A	Status	1	UINT16	R	Status of values (see 30005 for description)

DMB 96200 holding register map

Reg No.	Addr		Description	No. Reg.	Format	Access	Remarks
	Dec	Hex					
Measured Values							
40001	0	0000	Primary Value	1	INT16	RW	Read: Measured value of channel 1 Voltage in [mV], Current in [µA] Write: Value for limit monitoring channel 1
40002	1	0001	Secondary Value	1	INT16	RW	Channel 2 (for Description see Channel 1)
40003	2	0002	Tertiary Value	1	INT16	RW	Channel 3 (for Description see Channel 1)
40004	3	0003	Quaternary Value	1	INT16	RW	Channel 4 (for Description see Channel 1)

Reg No.	Addr		Description	No. Reg.	Format	Access	Remarks
	Dec	Hex					
40005	4	0004	Status	1	BINARY	R	Status of values Bit 0 Channel 1 – Range error Bit 1 Channel 2 – Range error Bit 2 Channel 3 – Range error Bit 3 Channel 4 – Range error Bit 4...7 n.c. Bit 8 Ch 1 – Configuration error Bit 9 Ch 2 – Configuration error Bit 10 Ch 3 – Configuration error Bit 11 Ch 4 – Configuration error Bit 12 n.c. Bit 13 Colletive message active Bit 14 n.c. Bit 15 Configuration error (total)
40011	10	000A	Discrete Input/Output	1	UINT16	RW	Operation modes: Binary input/output Bit 0 Input/Output 1 Bit 1 Input/Output 2 Bit 2 Input/Output 3 Bit 3 Input/Output 4 inactive = 0, active = 1
40051	50	0032	Primary Value	2	FLOAT	R	Operation modes: Voltage or current input Measured value channel 1 as [V] or [mA], scaled with the SCALE-Parameter at Reg. 42003-42010 Float value range according to IEEE 754
40053	52	0034	Secondary Value	2	FLOAT	R	Channel 2 (for Description see Channel 1)
40055	54	0036	Tertiary Value	2	FLOAT	R	Channel 3 (for Description see Channel 1)
40057	56	0038	Quaternary Value	2	FLOAT	R	Channel 4 (for Description see Channel 1)
40059	58	003A	Status	1	UINT16	R	Status of values Bit 0 Channel 1 – Range error Bit 1 Channel 2 – Range error Bit 2 Channel 3 – Range error Bit 3 Channel 4 – Range error Bit 4...7 n.c. Bit 8 Ch 1 – Configuration error Bit 9 Ch 2 – Configuration error Bit 10 Ch 3 – Configuration error Bit 11 Ch 4 – Configuration error Bit 12 n.c. Bit 13 Colletive message active Bit 14 n.c. Bit 15 Configuration error (total)

Reg No.	Addr		Description	No. Reg.	Format	Access	Remarks
	Dec	Hex					
40101	100	0064	current DIP switches	2	UINT32	R	Current DIP switch setting **Input setting** Bit 0 S1-1 off = 4x Voltage on = 4x Current **Modbus setting** Bit 1/2 S1-2/-3 on/off = 9600 off/off = 19200 off/on = 38400 on/on = 115200 Bit 3 S1-4 off = Parity even on = Parity none Bit 4 S1-5 Modbus address : : 1 to 63 Bit 9 S1-10 all DIPs off: PC mode, settings via Modbus
40103	102	0066	current configuration set	1	UINT16	R	currently used configuration set 0x0000 PC setting 0x0001 DIP setting
Auxiliary and diagnosis functions							
41201	1200	04B0	"Here I am"	1	UINT16	W	"Here I am" – Set timer with time in seconds Sets a flashing signal on the green LED for the written timeperiod to find the device in the system
41202	1201	04B1	Reset counter	1	UINT16	W	Reset of diagnostic counter
41211	1210	04BA	Telegram count	1	UINT16	R	Count of all telegram frames on Modbus
41212	1211	04BB	MyTelegram count	1	UNIT16	R	Request count for telegram frames on Modbus with own device address
41213	1212	04BC	Error count	1	UINT16	R	Error count of frames with error
Device data							
43001	3000	0BB8	Device identifier	1	UINT16	R	Device identifier: 0x0008
43002	3001	0BB9	Hardware version	1	UINT16	R	Hardware version: e.g. 0x0041 (A)
43005	3004	0BBC	RFID identifier	8	16 Char	R	Unique identifier
43029	3028	0BD4	Firmware version	1	UINT16	R	0x0100 – Ex. for version 01.0.0
45151	5150	141E	Point of measuring	8	16 Char	RW	Point of measuring in ASCII (Tag)

Reg No.	Addr		Description	No. Reg.	Format	Access	Remarks
	Dec	Hex					
Settings (CONF)							
42001	2000	07D0	mode	1	UINT16	RW	Operation mode **channel 1** 0x0000 – Current input 0...20mA 0x0100 – Voltage input 0...10V 0x0200 – Input binary 0x0300 – Output binary 0x0400 – Limit monitoring of channel 1 0x0401 – Limit monitoring ch 2 0x0402 – Limit monitoring ch 3 0x0403 – Limit monitoring ch 4 0x0404 – Limit monitoring ext. value written at Reg. 40001
42002	2001	07D1	Input filter	1	INT16	RW	Input filter / Resolution AI 0x0000 – 50 Hz (restless, fast) 0x0001 – 10 Hz (normal) 0x0002 – 2 Hz (quiet, slow)
42003	2002	07D2	SCALE measured value start	2	FLOAT	RW	Input SCALE-Parameter: Input range e.g. 4000 ... 20000 µA
42005	2004	07D4	end	2	FLOAT	RW	
42007	2006	07D6	SCALE output range start	2	FLOAT	RW	Output SCALE-Parameter: Output range e.g. 0 ... 80 litre
42009	2008	07D8	end	2	FLOAT	RW	
42021	2020	07E4	Trip point	1	INT16	RW	Trip point for limit monitoring channel 1
42022	2021	07E5	Hysteresis	1	INT!6	RW	Hysteresis for limit monitoring channel 1
42023	2022	07E6	Working direction	1	INT16	RW	Limit monitoring ch 1 Min/Max 0x0000 – MIN 0x0001 – MAX
42024	2023	07E7	Inversion	1	INT16	RW	Inverting the alarm state of channel 1 0x0000 – normal (not inverted) 0x0001 – inverted
42025	2024	07E8	Group message	1	INT16	RW	Activate the group message (pin E) in case of alarm at channel 1 0x0000 – Off 0x0001 – On
42031	2030	07EE	Input level	1	INT16	RW	Input level for discrete input at channel 1 0x0000 5 V (<1.5 V >3.5 V) 0x0001 12 V/24 V (<2.0 V >8.4 V)

Reg No.	Addr		Description	No. Reg.	Format	Access	Remarks
	Dec	Hex					
42101	2100	0834	mode	1	UINT16	RW	Operation mode **channel 2** 0x0000 – Current input 0...20mA 0x0100 – Voltage input 0...10V 0x0200 – Input binary 0x0300 – Output binary 0x0400 – Limit monitoring ch 1 0x0401 – Limit monitoring ch 2 0x0402 – Limit monitoring ch 3 0x0403 – Limit monitoring ch 4 0x0404 – Limit monitoring ext. value written at Reg. 40002
42102	2101	0835	Input filter	1	INT16	RW	Input filter / Resolution AI 0x0000 – 50 Hz (restless, fast) 0x0001 – 10 Hz (normal) 0x0002 – 2 Hz (quiet, slow)
42103	2102	0836	SCALE measured value start	2	FLOAT	RW	Input SCALE-Parameter: Input range e.g. 4000 ... 20000 µA
42105	2104	0838	end	2	FLOAT	RW	
42107	2106	083A	SCALE output range start	2	FLOAT	RW	Output SCALE-Parameter: Output range e.g. 0 ... 80 litre
42109	2108	083C	end	2	FLOAT	RW	
42121	2120	0848	Trip point	1	INT16	RW	Trip point for limit monitoring ch 2
42122	2121	0849	Hysteresis	1	INT!6	RW	Hysteresis for limit monitoring ch 2
42123	2122	084A	Working direction	1	INT16	RW	Limit monitoring ch 2 Min/Max 0x0000 – MIN 0x0001 – MAX
42124	2123	084B	Inversion	1	INT16	RW	Inverting the alarm state of ch 2 0x0000 – normal (not inverted) 0x0001 – inverted
42125	2124	084C	Group message	1	INT16	RW	Activate the group message (pin E) in case of alarm at channel 2 0x0000 – Off 0x0001 – On
42131	2130	0852	Input level	1	INT16	RW	Input level for discrete input at ch 2 0x0000 5 V (<1.5 V >3.5 V) 0x0001 12 V/24 V (<2.0 V >8.4 V)

Reg No.	Addr		Description	No. Reg.	Format	Access	Remarks
	Dec	Hex					
42201	2200	0898	mode	1	UINT16	RW	Operation mode **channel 3** 0x0000 – Current input 0...20mA 0x0100 – Voltage input 0... 10V 0x0200 – Input binary 0x0300 – Output binary 0x0400 – Limit monitoring ch 1 0x0401 – Limit monitoring ch 2 0x0402 – Limit monitoring ch 3 0x0403 – Limit monitoring ch 4 0x0404 – Limit monitoring ext. value written at Reg. 40003
42202	2201	0899	Input filter	1	INT16	RW	Input filter / Resolution AI 0x0000 – 50 Hz (restless, fast) 0x0001 – 10 Hz (normal) 0x0002 – 2 Hz (quiet, slow)
42203	2202	089A	SCALE measured value start	2	FLOAT	RW	Input SCALE-Parameter: Input range e.g. 4000 ... 20000 µA
42205	2204	089C	end	2	FLOAT	RW	
42207	2206	089E	SCALE output range start	2	FLOAT	RW	Output SCALE-Parameter: Output range e.g. 0 ... 80 litre
42209	2208	08A0	end	2	FLOAT	RW	
42221	2220	08AC	Trip point	1	INT16	RW	Trip point for limit monitoring channel 3
42222	2221	08AD	Hysteresis	1	INT!6	RW	Hysteresis for limit monitoring channel 3
42223	2222	08AE	Working direction	1	INT16	RW	Limit monitoring ch 3 Min/Max 0x0000 – MIN 0x0001 – MAX
42224	2223	08AF	Inversion	1	INT16	RW	Inverting the alarm state of ch 3 0x0000 – normal (not inverted) 0x0001 – inverted
42225	2224	08B0	Group message	1	INT16	RW	Activate the group message (pin E) in case of alarm at channel 3 0x0000 – Off 0x0001 – On
42231	2230	08B6	Input level	1	INT16	RW	Input level for discrete input at ch 3 0x0000 5 V (<1.5 V >3.5 V) 0x0001 12 V/24 V (<2.0 V >8.4 V)

Reg No.	Addr		Description	No. Reg.	Format	Access	Remarks
	Dec	Hex					
42301	2300	08FC	mode	1	UINT16	RW	Operation mode **channel 4** 0x0000 – Current input 0...20mA 0x0100 – Voltage input 0...10V 0x0200 – Input binary 0x0300 – Output binary 0x0400 – Limit monitoring ch 1 0x0401 – Limit monitoring ch 2 0x0402 – Limit monitoring ch 3 0x0403 – Limit monitoring ch 4 0x0404 – Limit monitoring ext. value written at Reg. 40004
42302	2301	08FD	Input filter	1	INT16	RW	Input filter / Resolution AI 0x0000 – 50 Hz (restless, fast) 0x0001 – 10 Hz (normal) 0x0002 – 2 Hz (quiet, slow)
42303	2302	08FE	SCALE measured value start	2	FLOAT	RW	Input SCALE-Parameter: Input range e.g. 4000 ... 20000 µA
42305	2304	0900	end	2	FLOAT	RW	
42307	2306	0902	SCALE output range start	2	FLOAT	RW	Output SCALE-Parameter: Output range e.g. 0 ... 80 litre
42309	2308	0904	end	2	FLOAT	RW	
42321	2320	0910	Trip point	1	INT16	RW	Trip point for limit monitoring ch 4
42322	2321	0911	Hysteresis	1	INT16	RW	Hysteresis for limit monitoring ch 4
42323	2322	0912	Working direction	1	INT16	RW	Limit monitoring channel 4 Min/Max 0x0000 – MIN 0x0001 – MAX
42324	2323	0913	Inversion	1	INT16	RW	Inverting the alarm state of ch 4 0x0000 – normal (not inverted) 0x0001 – inverted
42325	2324	0914	Group message	1	INT16	RW	Activate the group message (pin E) in case of alarm at channel 4 0x0000 – Off 0x0001 – On
42331	2330	091A	Input level	1	INT16	RW	Input level for discrete input at ch 4 0x0000 5 V (<1.5 V >3.5 V) 0x0001 12 V/24 V (<2.0 V >8.4 V)
42902	2901	0B55	Group message ON delay	1	INT16	RW	Response delay of group message in units of [100 ms] default: 0x0005 0.5 s
42903	2902	0B56	Group message minTime	1	INT16	RW	Minimum activation time of group message in units of [100 ms] default: 0x0005 0.5 s

Reg No.	Addr		Description	No. Reg.	Format	Access	Remarks
	Dec	Hex					
45001	5000	1388	Configuration counter	1	UINT16	R	Counter is incremented internally each write of Conf parameters. The Modbus master can remember this value as long as the counter same value, the configuration is unchanged.
45002	5001	1389	Register order	1	UINT16	RW	Order of registers at LONG or FLOAT values <> 0 - HH-HL-LH-LL (default) == 0 - LH-LL-HH-HL
45003	5002	138A	Date of last modification	2	UINT32	RW	Date (UNIX_TIMESTAMP) last change (Not managed by the device)
45010	5009	1391	Modbus: Address (in PC Mode)	1	UINT16	RW	Modbus address: **1** ... 247 (default = 1)
45011	5010	1392	Baud rate	1	UINT16	RW	Baud rate: 0x0000 - 300 0x0001 - 600 0x0002 - 1200 0x0003 - 2400 0x0004 - 4800 0x0005 - 9600 0x0006 - **19200** (default) 0x0007 - 38400 0x0008 - 57600 0x0009 - 115200 other: *undefined*
45012	5011	1393	Parity/Stop bits	1	UINT16	RW	Parity: 0x0000 - **Even, 1 Stop bit** (default) 0x0001 - Odd, 1 Stop bit 0x0002 - None, 2 Stop bits 0x0003 - None, 1 Stop bit (no Spec!) (from Firmware 01.4.0) other: *undefined*
45013	5012	1394	Response delay	1	UINT16	RW	Delay: **1** ... 1000 ms (default = 1)
45020	5019	139B	Modbus: Address (in DIP Mode)	1	UINT16	R	Modbus address: 1 ... 63
45021	5020	139C	Baud rate	1	UINT16	R	Baud rate: 0x0005 - 9600 0x0006 - 19200 0x0007 - 38400 0x0009 - 115200
45022	5021	139D	Parity/Stop bits	1	UINT16	R	Parity: 0x0000 - Even, 1 Stop bit 0x0002 - None, 2 Stop bits

Reg No.	Addr		Description	No. Reg.	Format	Access	Remarks
	Dec	Hex					
45023	5022	139E	Response delay	1	UINT16	R	Delay: 1 ms at 115200 Baud 3 ms at 38400 Baud 5 ms at 19200 Baud 10 ms at 9600 Baud
48213	8212	2014	Save settings	1	UINT16	W	0x0043 Speeds up the save procedure of settings. Without this command the device saves changes approx. 5 seconds after the last write of a configuration parameter.

DMB 96400 4 Channel 2 AI / 2 AO Module

- Measuring and processing of 4 industrial standard signals
- Each channel programmable as current or voltage input
- All inputs individually safely galvanically isolated
- Fast signal acquisition, short processing times
- Extremely low costs per input channel

Input / Output
0/4 ... 20 mA
0/2 ... 10 V

Additional functions
2 DI
4 DO

Supported communication features:

Baud rates:	300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200	
Formats:	Parity even,	1 stop bit
	Parity odd,	1 stop bit
	Parity none,	2 stop bits
	Parity none,	1 stop bit (not conform with specification!)

Factory setting: 19200 baud, 8 data bits, parity even, 1 stop bit, Modbus address 1

Supported function codes:

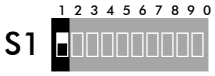
Command 1:	0x01	Read Coils	
Command 2:	0x02	Read Discrete Input	
Command 3:	0x03	Read Holding Registers	
Command 4:	0x04	Read Input Registers	(Firmware 01.1.0 and later)
Command 5:	0x05	Write Single Coil	
Command 6:	0x06	Write Single Register	
Command 15:	0x0F	Write Multiple Coils	
Command 16:	0x10	Write Multiple Registers	
Command 43 / 14:	0x2B / 0x0E	Read Device Identification	

Note: Command 43, subcode 14 (Read Device Identification) supported in the 'Basic' category to allow the device identification.

DMB 96400 DIP settings

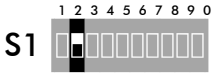
Operating modes with DIP switch settings

Input settings for AI 1 and AI 2



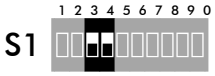
	1	2	3	4	5	6	7	8	9	0
Both channels voltage inputs										
Both channels current inputs	■									

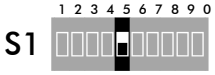
Output settings for AO 1 and AO 2

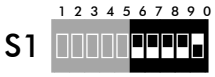


	1	2	3	4	5	6	7	8	9	0
Both channels voltage outputs										
Both channels current outputs		■								

Modbus settings

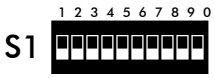






	1	2	3	4	5	6	7	8	9	0
9600 Baud			■							
19200 Baud										
38400 Baud				■						
115200 Baud			■	■						
Parity even, 1 stop bit										
Parity none, 2 stop bits					■					
Modbus address 1										■
2									■	
3									■	■
4								■		
5								■		■
... 31						■	■	■	■	■

Setting via USB interface or Modbus commands



PC Mode

All switches in OFF position

Configuration the Modbus interface or with DRAGOmodbus software

Factory Setting

All switches in OFF position (PC Mode),
the default configuration in PC-Mode:

- Voltage inputs
- Voltage outputs
- Modbus address 1
- 19200 baud
- Parity even
- 1 stop bit

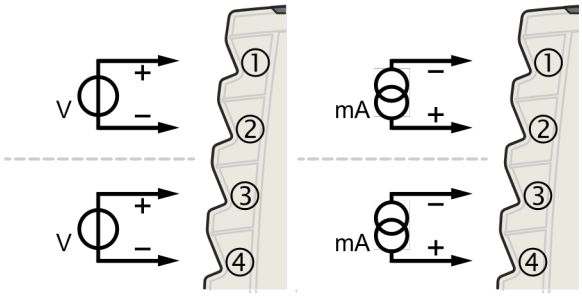
DMB 96400 Operating modes and examples

Operating modes with DIP switch settings

DIP switch S1-1 switches between 2x voltage input 0 to 10 V and 2x current input 0 to 20 mA. DIP switch S1-2 switches between 2x voltage output 0 to 10 V and 2x current output 0 to 20 mA. With the DIP switches S1-3 and S1-4 the baud rate ist selected, with S1-5 the parity bit. The DIP switches S1-6 to S1-10 defines the Modbus address of the device in range of 1 to 31. The Modbus address must be unique in the Modbus segment. For higher adresses you must use the PC mode (see below).

a. **Voltage or Current Inputs**

DIP switch S1-1 is OFF for voltage inputs and ON for current inputs. The measuring sets the 2 measured values into **holding registers 40001** (mirrored on **30001**) and **40002** (**30002**).



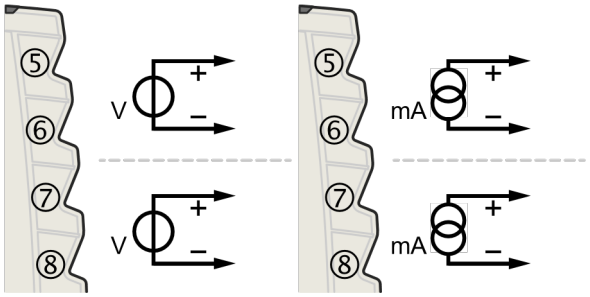
The register represents the input voltage in [mV] or the input current in [µA].

In **registers 40051** and **40053** (**30051** and **30053**), the measured values are also available as FLOAT numbers in [V] or [mA].

Be aware of the reversed polarity of the voltage and current inputs!

b. Voltage or Current Outputs

DIP switch S1-2 is OFF for voltage outputs and ON for current outputs. The output follows the value in the **holding registers 40003** and **40004**. The register represents the output in [mV], [µA] or [0.01 %].



Operating modes with PC mode

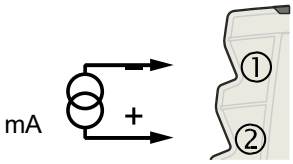
All DIP switches must be OFF. Modbus address and all device parameters are set via the Modbus interface or the front USB connector in the holding registers (see holding register map). In PC mode, different functions can be defined for the individual channels. The wiring examples shows channel 1 of input or output.

[1] The register addresses always refer to channel 1

Input channels

a. Current input 0 ... 20 mA

Holding register 42001[1] = 0x0000
(other channel: 42101[2])



The current measuring sets the measured value into **holding register 40001**[1] (mirrored on **30001**). The register represents the input current in [µA] as a INT16 number.
In **register 40051** (**30051**), the measured values are also available as FLOAT numbers in [mA]. This measured value can be converted via the SCALE parameters in registers 42003[1] to 42009[1].

For scaling the input range and the output range must be specified in the SCALE parameters.

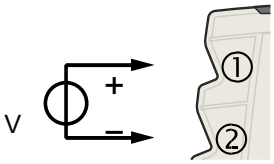
Example: At the input we have 4 to 20 mA from a transmitter, the output should indicate the value as 0 to 80 litres. This output value in **register 40051**[1] (**30051**) is a float number with decimal places.

Set the SCALE parameters as follows:

- SCALE measured value (start) = 4000 (4000 µA = 4 mA)
- SCALE measured value (end) = 20000 (20000 µA = 20 mA)
- SCALE output range (start) = 0
- SCALE output range (end) = 80

b. **Voltage input 0 ... 10 V**

Holding register 42001[1] = 0x0100
(other channel: 42101[2])



The voltage measuring sets the measured value into **holding register 40001**[1] (mirrored on **30001**). The register represents the input voltage in [mV] as a INT16 number.

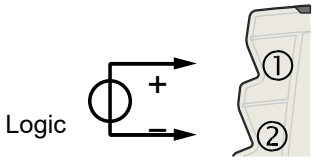
In **register 40051** (**30051**), the measured values are also available as FLOAT numbers in [V]. This measured value can be converted via the SCALE parameters in registers 42003[1] to 42009[1].

For scaling see the example at current input above.

c. Binary input (switch input)

Holding register 42001[1] = 0x0200

(other channel: 42101[2])

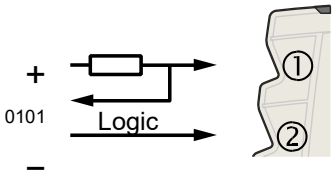


The input level is set in **register 42031**[1] for 5 V- or 12 V/24 V systems. The binary input signal sets the **coil 1**[1] and the corresponding bit in **holding register 40011** as 0 or 1 (mirrored on **30011**).

d. Binary output (switching output)

Holding register 42001[1] = 0x0300

(other channel: 42101)

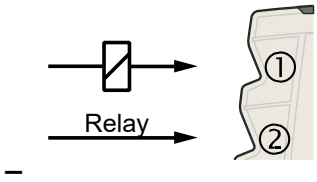


Write **coil 1**[1] or the corresponding bit in **holding register 40011** via Modbus. The output will follow to 0 or 1.

e. Limit monitoring of AI channel

Holding register 42001[1] = 0x0400 for monitoring channel AI 1 +

0x0401 for monitoring channel AI 2



(other channel: 42101)

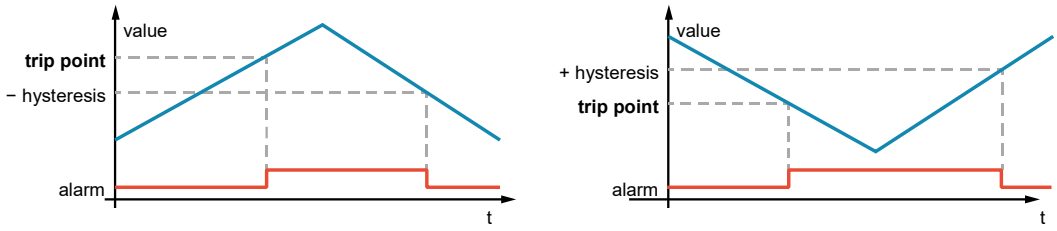
The channel is an output for limit monitoring. The measured value channel 1 (register 40001) is monitored for MIN or MAX alarm.

The monitored channel must be configured as analog input (voltage or current input), otherwise a configuration error will be reported.

Parameters for limit monitoring:

- Trip point in register 42021[1]
- Hysteresis in register 42022[1]
- Monitoring direction MIN or MAX in register 42023[1]
- The alarm state can be inverted via register 42024[1]
- In register 42025[1] you define whether an alarm should additionally activate the group message (pin E).

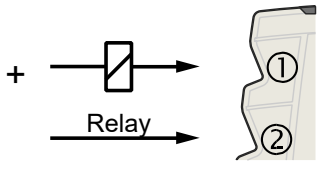
MAX alarm MIN alarm



f. Limit monitoring an external value

Holding register 42001[1] = 0x0404

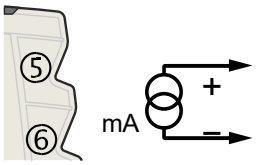
(other channel: 42101)



The channel is an output for limit monitoring. The monitored value will be written periodically via Modbus to **register 40001** (if set channel AI 1) to **register 40002** (if set channel AI 2). The external value is monitored for MIN or MAX alarm (see parameters above).

Output channels

a. Current output 0 ... 20 mA



Holding register 42401[1] = 0x0000 for INT16 values in [µA]

0x0001 for INT16 values in [0.01 %]

0x0010 for FLOAT values in [mA]

0x0011 for FLOAT values in [%]

(other channel: 42501[2])

The current output follows the INT16 value into **holding register 40003**[1] or the FLOAT value into register **40055**[1]. The holding register is set via Modbus in [µA] or [0.01 %] as a INT16 number or alternatively as FLOAT value in [mA] or [%].

A timeout monitoring can be activated for each output. After an adjustable time without receiving a new output value, the output is reset to a programmable init value:

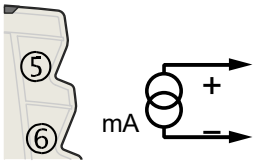
Timeout defined in **holding register 42402**[1]:

0 – Timeout OFF, the output value remains until it is overwritten

1 ... – Timeout in steps of [100 ms]

The **init value** in **holding register 42403**[1] is set at device startup and if the timeout elapsed. Set the init value as FLOAT in [mA] or [%].

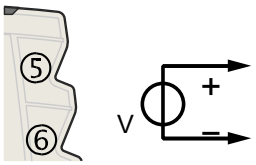
b. Current output of AI input value



Holding register 42401[1] = 0x0020 values from channel AI 1
0x0021 values from channel AI 2
(other channel: 42501[2])

The current output directly follows the AI input channel of the device. No Modbus communications are required. The input measured value can be read via Modbus.

c. Voltage output 0 ... 10 V



Holding register 42401[1] = 0x0100 for INT16 values in [mV]
0x0101 for INT16 values in [0.01 %]
0x0110 for FLOAT values in [V]
0x0111 for FLOAT values in [%]
(other channel: 42501[2])

The voltage output follows the INT16 value into **holding register 40003**[1] or the FLOAT value into register **40055**[1]. The holding register is set via Modbus in [mV] or [0.01 %] as a INT16 number or alternatively as FLOAT value in [V] or [%].

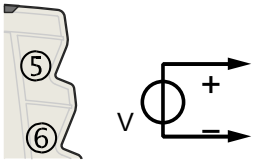
A timeout monitoring can be activated for each output. After an adjustable time without receiving a new output value, the output is reset to a programmable init value:

Timeout defined in **holding register 42402**[1]:

0 – Timeout OFF, the output value remains until it is overwritten
1 ... – Timeout in steps of [100 ms]

The **init value** in **holding register 42403**[1] is set at device startup and if the timeout elapsed. Set the init value as FLOAT in [V] or [%].

d. Voltage output of AI input value



Holding register 42401[1] = 0x0120 values from channel AI 1
0x0121 values from channel AI 2
(other channel: 42501[2])

[1] The specified register addresses apply to channel AI 1. At channel AI 2: +100

The voltage output directly follows the AI input channel of the device. No Modbus communications are required. The input measured value can be read via Modbus.

DMB 96400 coil map

Coil	Addr	Description	Access	Remarks
Discrete outputs				
1	0	Output 1	RW	Binary signal at Output 1
2	1	Output 2	RW	Binary signal at Output 2

DMB 96400 input register map

Firmware 01.1.0 and later:
All dynamic measured value registers can be read out with Modbus command 3 as holding register **400xx**, but also with Modbus command 4 as input register **300xx**.

Reg No.	Addr		Description	No. Reg.	Format	Access	Remarks
	Dec	Hex					
Measured Values							
30001	0	0000	Primary Value	1	INT16	R	Read: Measured value of channel AI 1 Voltage in [mV], Current in [µA]
30002	1	0001	Secondary Value	1	INT16	R	Measured value of channel AI 2 (for Description see Channel 1)
30005	4	0004	Status	1	BINARY	R	Status of values Bit 0 Channel 1 – Range error Bit 1 Channel 2 – Range error Bit 2…3 n.c. Bit 4 Timeout AO 1 Bit 5 Timeout AO 2 Bit 6…7 n.c. Bit 8 Ch AI 1 – Configuration error Bit 9 Ch AI 2 – Configuration error Bit 10 Ch AO 1 – Configuration error Bit 11 Ch AO 2 – Configuration error Bit 12 n.c. Bit 13 Colletive message active Bit 14 n.c. Bit 15 Configuration error (total)
30011	10	000A	Discrete Input/Output	1	UINT16	R	Operation modes: Binary input Bit 0 Input 1 Bit 1 Input 2 inactive = 0, active = 1 The bits have only effect, if the channel is set as a binary output (0x0300)

Reg No.	Addr		Description	No. Reg.	Format	Access	Remarks
	Dec	Hex					
30051	50	0032	Primary Value	2	FLOAT	R	Measured value channel AI 1 as [V] or [mA], scaled with the SCALE-Parameter at Reg. 42003-42010 Float value range according to IEEE 754
30053	52	0034	Secondary Value	2	FLOAT	R	Measured value channel AI 2 (for Description see channel AI 1)
30059	58	003A	Status	1	UINT16	R	Status of values (see 30005 for description)

DMB 96400 holding register map

Reg No.	Addr		Description	No. Reg.	Format	Access	Remarks
	Dec	Hex					
Measured Values							
40001	0	0000	Primary Value	1	INT16	RW	Read: Measured value of channel AI 1 Voltage in [mV], Current in [µA] Write: Value for limit monitoring channel 1 for external signals
40002	1	0001	Secondary Value	1	INT16	RW	Measured value of channel AI 2 (for Description see Channel 1)
40003	2	0002	Tertiary Value	1	INT16	RW	Output channel AO 1 Write: Output value Voltage in [mV], Current in [µA], percent [0.01 %]
40004	3	0003	Quaternary Value	1	INT16	RW	Output channel AO 2 (for Description see channel AO 1)
40005	4	0004	Status	1	BINARY	R	Status of values Bit 0 Channel 1 – Range error Bit 1 Channel 2 – Range error Bit 2…3 n.c. Bit 4 Timeout AO 1 Bit 5 Timeout AO 2 Bit 6…7 n.c. Bit 8 Ch AI 1 – Configuration error Bit 9 Ch AI 2 – Configuration error Bit 10 Ch AO 1 – Configuration error Bit 11 Ch AO 2 – Configuration error Bit 12 n.c. Bit 13 Colletive message active Bit 14 n.c. Bit 15 Configuration error (total)

Reg No.	Addr		Description	No. Reg.	Format	Access	Remarks
	Dec	Hex					
40011	10	000A	Discrete Input/Output	1	UINT16	RW	Operation modes: Binary input/output Bit 0 Input/Output 1 Bit 1 Input/Output 2 inactive = 0, active = 1 The bits have only effect, if the channel is set as a binary output (0x0300)
40051	50	0032	Primary Value	2	FLOAT	R	Measured value channel AI 1 as [V] or [mA], scaled with the SCALE-Parameter at Reg. 42003-42010 Float value range according to IEEE 754
40053	52	0034	Secondary Value	2	FLOAT	R	Measured value channel AI 2 (for Description see channel AI 1)
40055	54	0036	Tertiary Value	2	FLOAT	RW	Output channel AO 1 Write output value Voltage in [V], Current in [mA], percent [%]
40057	56	0038	Quaternary Value	2	FLOAT	RW	Output channel AO 2 (for Description see channel AO 1)
40059	58	003A	Status	1	UINT16	R	Status of values (see 40005 for description)
40101	100	0064	current DIP switches	2	UINT32	R	Current DIP switch setting Bit 0 S1-1 off = 2x Voltage input on = 2x Current input Bit 1 S1-2 off = 2x Voltage output on = 2x Current output Bit 2/3 S1-3/-4 on/off = 9600 baud off/off = 19200 baud off/on = 38400 baud on/on = 115200 baud Bit 4 S1-5 off = Parity even on = Parity none Bit 5 S1-6 Modbus address : : 1 to 31 Bit 9 S1-10 all DIPs off: PC mode, settings via Modbus
40103	102	0066	current configuration set	1	UINT16	R	currently used configuration set 0x0000 PC setting 0x0001 DIP setting
Auxiliary and diagnosis functions							
41201	1200	04B0	"Here I am"	1	UINT16	W	"Here I am" – Set timer with time in seconds Sets a flashing signal on the green LED for the written timeperiod to find the device in the system

Reg No.	Addr		Description	No. Reg.	Format	Access	Remarks
	Dec	Hex					
41202	1201	04B1	Reset counter	1	UINT16	W	Reset of diagnostic counter
41211	1210	04BA	Telegram count	1	UINT16	R	Count of all telegram frames on Modbus
41212	1211	04BB	MyTelegram count	1	UNIT16	R	Request count for telegram frames on Modbus with own device address
41213	1212	04BC	Error count	1	UINT16	R	Error count of frames with error
Device data							
43001	3000	0BB8	Device identifier	1	UINT16	R	Device identifier: 0x000D
43002	3001	0BB9	Hardware version	1	UINT16	R	Hardware version: e.g. 0x0041 (A)
43005	3004	0BBC	RFID identifier	8	16 Char	R	Unique identifier
43029	3028	0BD4	Firmware version	1	UINT16	R	0x0100 – Example for version 01.0.0
45151	5150	141E	Point of measuring	8	16 Char	RW	Point of measuring in ASCII (Tag)
Settings (CONF)							
42001	2000	07D0	mode	1	UINT16	RW	Operation mode **channel AI 1** 0x0000 – Current input 0 ... 20 mA 0x0100 – Voltage input 0 ... 10 V 0x0200 – Input binary 0x0300 – Output binary 0x0400 – Limit monitoring channel AI 1 0x0401 – Limit monitoring channel AI 2 0x0404 – Limit monitoring of external value written at Reg. 40001
42002	2001	07D1	Input filter	1	INT16	RW	Input filter / Resolution AI 1 0x0000 – 50 Hz (restless, fast) 0x0001 – 10 Hz (normal) 0x0002 – 2 Hz (quiet, slow)
42003	2002	07D2	SCALE measured value start	2	FLOAT	RW	Input AI 1 SCALE-Parameter: Input range e.g. 4000 ... 20000 µA
42005	2004	07D4	end	2	FLOAT	RW	
42007	2006	07D6	SCALE output range start	2	FLOAT	RW	Output AI 1 SCALE-Parameter: Output range e.g. 0 ... 80 litre
42009	2008	07D8	end	2	FLOAT	RW	
42021	2020	07E4	Trip point	1	INT16	RW	Trip point for limit monitoring channel AI 1
42022	2021	07E5	Hysteresis	1	INT!6	RW	Hysteresis for limit monitoring ch AI 1
42023	2022	07E6	Working direction	1	INT16	RW	Limit monitoring channel AI 1 Min/Max 0x0000 – MIN 0x0001 – MAX

Reg No.	Addr		Description	No. Reg.	Format	Access	Remarks
	Dec	Hex					
42024	2023	07E7	Inversion	1	INT16	RW	Inverting the alarm state of channel AI 1 0x0000 – normal (not inverted) 0x0001 – inverted
42025	2024	07E8	Group message	1	INT16	RW	Activate the group message (pin E) in case of alarm at channel AI 1 0x0000 – Off 0x0001 – On
42031	2030	07EE	Input level	1	INT16	RW	Input level for discrete input at ch AI 1 0x0000 5 V (<1.5 V >3.5 V) 0x0001 12 V/24 V (<2.0 V >8.4 V)
42101	2100	0834	mode	1	UINT16	RW	Operation mode **channel AI 2** 0x0000 – Current input 0 ... 20 mA 0x0100 – Voltage input 0 ... 10 V 0x0200 – Input binary 0x0300 – Output binary 0x0400 – Limit monitoring channel AI 1 0x0401 – Limit monitoring channel AI 2 0x0404 – Limit monitoring of external value written at Reg. 40002
42102	2101	0835	Input filter	1	INT16	RW	Input filter / Resolution AI 2 0x0000 – 50 Hz (restless, fast) 0x0001 – 10 Hz (normal) 0x0002 – 2 Hz (quiet, slow)
42103	2102	0836	SCALE measured value start	2	FLOAT	RW	Input AI 2 SCALE-Parameter: Input range e.g. 4000 ... 20000 µA
42105	2104	0838	end	2	FLOAT	RW	
42107	2106	083A	SCALE output range start	2	FLOAT	RW	Output AI 2 SCALE-Parameter: Output range e.g. 0 ... 80 litre
42109	2108	083C	end	2	FLOAT	RW	
42121	2120	0848	Trip point	1	INT16	RW	Trip point for limit monitoring channel AI 2
42122	2121	0849	Hysteresis	1	INT!6	RW	Hysteresis for limit monitoring ch AI 2
42123	2122	084A	Working direction	1	INT16	RW	Limit monitoring channel AI 2 Min/Max 0x0000 – MIN 0x0001 – MAX
42124	2123	084B	Inversion	1	INT16	RW	Inverting the alarm state of channel AI 2 0x0000 – normal (not inverted) 0x0001 – inverted
42125	2124	084C	Group message	1	INT16	RW	Activate the group message (pin E) in case of alarm at channel AI 2 0x0000 – Off 0x0001 – On
42131	2130	0852	Input level	1	INT16	RW	Input level for discrete input at ch AI 2 0x0000 5 V (<1.5 V >3.5 V) 0x0001 12 V/24 V (<2.0 V >8.4 V)

Reg No.	Addr		Description	No. Reg.	Format	Access	Remarks
	Dec	Hex					
42401	2400	0960	mode	1	UINT16	RW	Operation mode **channel AO 1** Reg. Range 0x0000 – Current 40003 0...20000 µA 0x0001 – 40003 0...10000 % 0x0010 – 40055 0...20.0 mA 0x0011 – 40055 0...100.0 % 0x0020 – Output from AI 1 0x0021 – Output from AI 2 0x0100 – Voltage 40003 0...10000 mV 0x0101 – 40003 0...10000 % 0x0110 – 40055 0...10.0 V 0x0111 – 40055 0...100.0 % 0x0120 – Output from AI 1 0x0121 – Output from AI 2
42402	2401	0961	timeout1	1	INT16	RW	Timeout for AI 1, sets the output to the init value after the time has elapsed without new value. 0 – Tineout OFF 1 ... – Timeout xxx [0.1 s]
42403	2402	0962	out_init1	2	FLOAT	RW	Init value for the output AO 1, is set after device start and after the timeout has elapsed. [%] or [V]/[mA] depending on mode
42501	2500	09C4	mode	1	UINT16	RW	Operation mode **channel AO 2** Reg. Range 0x0000 – Current 40003 0...20000 µA 0x0001 – 40003 0...10000 % 0x0010 – 40055 0...20.0 mA 0x0011 – 40055 0...100.0 % 0x0020 – Output from AI 1 0x0021 – Output from AI 2 0x0100 – Voltage 40003 0...10000 mV 0x0101 – 40003 0...10000 % 0x0110 – 40055 0...10.0 V 0x0111 – 40055 0...100.0 % 0x0120 – Output from AI 1 0x0121 – Output from AI 2
42502	2501	09C5	timeout2	1	INT16	RW	Timeout for AI 2, sets the output to the init value after the time has elapsed without new value. 0 – Tineout OFF 1 ... – Timeout xxx [0.1 s]
42503	2502	09C6	out_init2	2	FLOAT	RW	Init value for the output AO 2, is set after device start and after the timeout has elapsed. [%] or [V]/[mA] depending on mode

Reg No.	Addr		Description	No. Reg.	Format	Access	Remarks
	Dec	Hex					
42901	2900	0B54	Fault mask	1	UINT16	RW	Group message bit mask Bit 0 – limit AI 1 (set 42025) Bit 1 – limit AI 2 (set 42125) Bit 2 – timeout AO 1 (set 42402) Bit 3 – timeout AO 2 (set 42502) **Bit 4 – no supply (always active)** Bit 5 – n.c. **Bit 6 – device error** **Bit 7 – invalid DIP setting** **Bit 8 – configuration error** Bit 9...15 – n.c. default: 0x01D0
42902	2901	0B55	Group message ON delay	1	INT16	RW	Response delay of group message in units of [100 ms] default: 0x0005 0.5 s
42903	2902	0B56	Group message minTime	1	INT16	RW	Minimum activation time of group message in units of [100 ms] default: 0x0005 0.5 s
45001	5000	1388	Configuration counter	1	UINT16	R	Counter is incremented internally each write of Conf parameters. The Modbus master can remember this value as long as the counter same value, the configuration is unchanged.
45002	5001	1389	Register order	1	UINT16	RW	Order of registers at LONG or FLOAT values <> 0 - HH-HL-LH-LL (default) == 0 - LH-LL-HH-HL
45003	5002	138A	Date of last modification	2	UINT32	RW	Date (UNIX_TIMESTAMP) last change (Not managed by the device)
45010	5009	1391	Modbus: Address (in PC Mode)	1	UINT16	RW	Modbus address: **1** ... 247 (default = 1)
45011	5010	1392	Baud rate	1	UINT16	RW	Baud rate: 0x0000 - 300 0x0001 - 600 0x0002 - 1200 0x0003 - 2400 0x0004 - 4800 0x0005 - 9600 0x0006 - **19200** (default) 0x0007 - 38400 0x0008 - 57600 0x0009 - 115200 other: *undefined*

Reg No.	Addr		Description	No. Reg.	Format	Access	Remarks
	Dec	Hex					
45012	5011	1393	Parity/Stop bits	1	UINT16	RW	Parity: 0x0000 - **Even, 1 Stop bit** (default) 0x0001 - Odd, 1 Stop bit 0x0002 - None, 2 Stop bits 0x0003 - None, 1 Stop bit (no Spec !) (from Firmware 01.4.0) other: *undefined*
45013	5012	1394	Response delay	1	UINT16	RW	Delay: **1** ... 1000 ms (default = 1)
45020	5019	139B	Modbus: Address (in DIP Mode)	1	UINT16	R	Modbus address: 1 ... 63
45021	5020	139C	Baud rate	1	UINT16	R	Baud rate: 0x0005 - 9600 0x0006 - 19200 0x0007 - 38400 0x0009 - 115200
45022	5021	139D	Parity/Stop bits	1	UINT16	R	Parity: 0x0000 - Even, 1 Stop bit 0x0002 - None, 2 Stop bits
45023	5022	139E	Response delay	1	UINT16	R	Delay: 1 ms at 115200 Baud 3 ms at 38400 Baud 5 ms at 19200 Baud 10 ms at 9600 Baud
48213	8212	2014	Save settings	1	UINT16	W	0x0043 Speeds up the save procedure of settings. Without this command the device saves changes approx. 5 seconds after the last write of a configuration parameter.

DMB 96700 4 Channel DI/DO Module

- 4 independent controllable digital I/O channels
- Each channel programmable as input or output
- Extensive programmable operating functions
- Universal Open-Collector output
- Status indication for each I/O channel

Input / Output
DI: 5 V / 12 V / 24 V
DO: Open-Collector

Additional functions
Frequency, Counter, Pulse, PWM, Limit monitoring

Supported communication features:

Baud rates:	300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200	
Formats:	Parity even,	1 stop bit
	Parity odd,	1 stop bit
	Parity none,	2 stop bits
	Parity none,	1 stop bit (not conform with specification!)

Factory setting: 19200 baud, 8 data bits, parity even, 1 stop bit, Modbus address 1

Supported function codes:

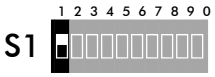
Command 1:	0x01	Read Coils	
Command 2:	0x02	Read Discrete Input	
Command 3:	0x03	Read Holding Registers	
Command 4:	0x04	Read Input Registers	(Firmware 01.1.0 and later)
Command 5:	0x05	Write Single Coil	
Command 6:	0x06	Write Single Register	
Command 15:	0x0F	Write Multiple Coils	
Command 16:	0x10	Write Multiple Registers	
Command 43 / 14:	0x2B / 0x0E	Read Device Identification	

Note: Command 43, subcode 14 (Read Device Identification) supported in the 'Basic' category to allow the device identification.

DMB 96700 DIP settings

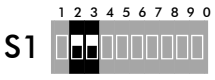
Operating modes with DIP switch settings

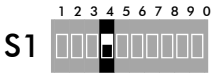
Input settings

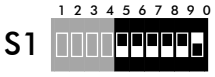


	1	2	3	4	5	6	7	8	9	0
All channels discrete input, 24 V										
All channels discrete output, open-collector	■									

Modbus settings

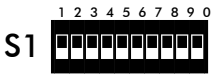






	1	2	3	4	5	6	7	8	9	0
9600 Baud		■								
19200 Baud										
38400 Baud			■							
115200 Baud		■	■							
Parity even, 1 stop bit										
Parity none, 2 stop bits				■						
Modbus address 1										■
2									■	
3									■	■
4								■		
5								■		■
... 63					■	■	■	■	■	■

Setting via USB interface or Modbus commands



PC Mode
All switches in OFF position
Configuration the Modbus interface or with DRAGOmodbus software

Factory Setting

All switches in OFF position (PC Mode),
the default configuration in PC-Mode:

- All channels discrete input, 24 V
- Modbus address 1
- 19200 baud
- Parity even
- 1 stop bit

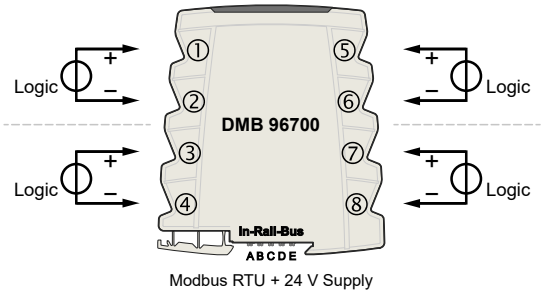
DMB 96700 Operating modes and examples

Operating modes with DIP switch settings

DIP switch S1-1 switches between 4x direct binary input and 4x direct binary output.
With the DIP switches S1-2 and S1-3 the baud rate ist selected, with S1-4 the parity bit.
The DIP switches S1-5 to S1-10 defines the Modbus address of the device in range of 1 to 63.
The Modbus address must be unique in the Modbus segment. For higher adresses you must use the PC mode (see below).

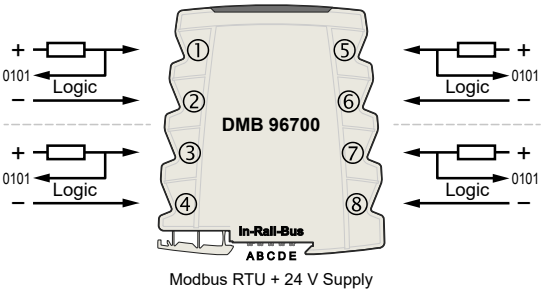
a. Input

The binary input signal sets the **coils** and the **holding register 40011** (mirrored on **30011**) bit as 0 or 1. The input level is detected for 24 V systems, it can be reconfigured to 5 V- or 12 V level systems.



b. Output

Write **coil** or the **holding register 40011** via Modbus. The output will direct follow to 0 or 1.



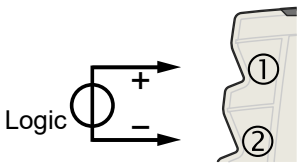
Operating modes with PC mode

All DIP switches must be OFF. Modbus address and all device parameters are set via the Modbus interface or the front USB connector in the holding registers (see holding register map).
In PC mode, different functions can be defined for the individual channels. The wiring examples shows channel 1.

[1] The register addresses always refer to channel 1

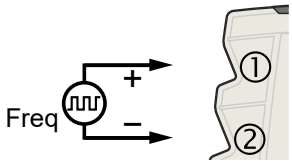
a. Binary input (switch input)

Holding register 42001[1] = 0x0000
(other channels: 42101[2]/42201[3]/42301[4])



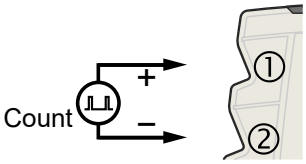
The input level is set in register 42002[1] for 5 V-, 12 V- or 24 V systems. The binary input signal sets the **coils** and the **holding register 40011** (mirrored on **30011**) bit as 0 or 1.

b. **Frequency input [Hz]**
Holding register 42001[1] = 0x0001
(other channels: 42101[2]/42201[3]/42301[4])



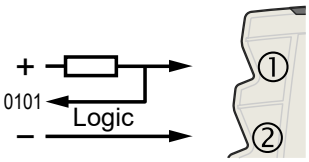
The input level is set in register 42002[1] for 5 V-, 12 V- or 24 V systems. The measured input frequency (up to 1 kHz) ist stored in the corresponding measured value registers. The update rate of the measured values ist the period duration of the input signal.
In INT16 **register 40001**[1] (mirrored on **30001**), the frequency is available with a resolution of 0.1 Hz
(frequency x10) on the Modbus.
In the FLOAT **register 40051**[1] (mirrored on **30051**), the frequency is provided in [Hz] with decimal places for the Modbus.

c. Counter input [Counts]
Holding register 42001[1] = 0x0002
(other channels: 42101[2]/42201[3]/42301[4])



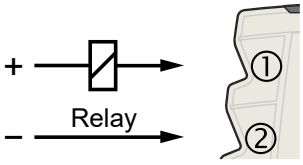
The input level is set in register 42002[1] for 5 V-, 12 V- or 24 V systems. The rising edges of the input signal are counted with a 32-bit counter. At counter overflow, the overflow bit assigned to the input is set in the measured value status register 40005/40059 (30005/40059). The counter is reset to zero during the device start-up and at every configuration change!
Using the holding register 40013, the counters can be reset via Modbus.
The counter reading can be read as UINT32 in **register 40051**[1] (**30051**), status in register 40059 (30059). The counter can also be read as 16-bit counter UINT16 via **register 40001**[1] (**30001**), status in register 40005 (30005).

d. Binary output (switching output)
Holding register 42001[1] = 0x0010
(other channels: 42101[2]/42201[3]/42301[4])



Write **coil** or the **holding register 40011** via Modbus. The output will follow to 0 or 1, with compliance with the output settings, such as min/max activation time and ON/OFF delay.

e. Binary output (INT16 limit monitoring)
Holding register 42001[1] = 0x0011
(other channels: 42101[2]/42201[3]/42301[4])



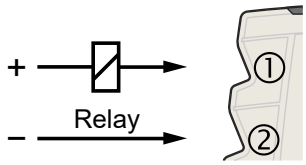
The device monitors a 16-bit integer measured value, which is supplied via Modbus in **register 40001**[1], to lower and higher limits. If the lower limit value in register 42018[1] is exceeded or the higher limit value in register 42019[1] is exceeded, the output of the channel is activated. To switch back to inactive output, the hysteresis in register 42020[1] must be passed through. This can combined with the output settings, such as min/max activation

time and ON/OFF delay.

Register 42018[1]	INT16 limit low	(–32768 to +32767, factory setting –1000)
Register 42019[1]	INT16 limit high	(–32768 to +32767, factory setting +1000)
Register 42020[1]	INT16 hysteresis	(3 to +32767, factory setting 10)

f. Binary output (INT32 limit monitoring)

Holding register 42001[1] = 0x0012
(other channels: 42101[2]/42201[3]/42301[4])

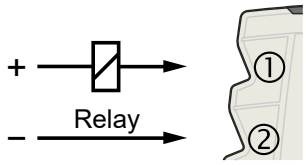


The device monitors a 32-bit integer measured value, which is supplied via Modbus in **register 40051**[1], to lower and higher limits. If the lower limit value in register 42021[1] is exceeded or the higher limit value in register 42023[1] is exceeded, the output of the channel is activated. To switch back to inactive output, the hysteresis in register 42025[1] must be passed through. This can combined with the output settings, such as min/max activation time and ON/OFF delay.

Register 42021[1]	INT32 limit low
Register 42023[1]	INT32 limit high
Register 42025[1]	INT32 hysteresis

g. Binary output (FLOAT limit monitoring)

Holding register 42001[1] = 0x0013
(other channels: 42101[2]/42201[3]/42301[4])

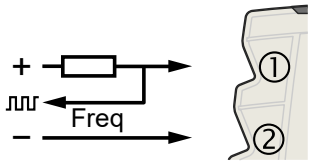


The device monitors a measured floating point value, which is supplied via Modbus in **register 40051**[1], to lower and higher limits. If the lower limit value in register 42021[1] is exceeded or the higher limit value in register 42023[1] is exceeded, the output of the channel is activated. To switch back to inactive output, the hysteresis in register 42025[1] must be passed through. This can combined with the output settings, such as min/max activation time and ON/OFF delay.

Register 42021[1]	FLOAT limit low	(factory setting: Float –1000.0)
Register 42023[1]	FLOAT limit high	(factory setting: Float +1000.0)
Register 42025[1]	FLOAT hysteresis	(factory setting: Float 10.0)

h. Frequency output [Hz]

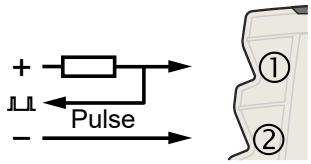
Holding register 42001[1] = 0x0014
(other channels: 42101[2]/42201[3]/42301[4])



The desired output frequency (0.1 ... 1000.0 Hz) is supplied by the Modbus in INT16 **register 40001**[1] with a resolution of 0.1 Hz (frequency x10). The generated frequency at the output terminal has a duty cycle of approximately 50:50.

i. Pulse output [1/min]

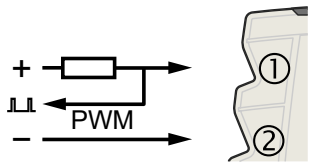
Holding register 42001[1] = 0x0015
(other channels: 42101[2]/42201[3]/42301[4])



The pulse output supplies a number of pulses (1 to 60000 / min) as an output signal. The pulse width can be set in register 42003[1]. The max. Pulse width is a halv period. For a duty cycle 50:50, the pulse width must be programmed to 30000.
The desired output value is supplied by Modbus in UINT16 **register 40001**[1].

j. PWM output [%]

Holding register 42001[1] = 0x0016
(other channels: 42101[2]/42201[3]/42301[4])



The PWM output converts the INT16 measured value transferred from Modbus to **register 40001**[1] into a PWM signal with 500 Hz and a ratio between 10 % and 90 %. The input resolution is 0.1 %.
The scaling to the output is:

0.0 %	(0)	correspond to a ratio of 10%,
100.0 %	(1000)	correspond to a ratio of 90%.

Output parameters

For all modes with binary output (binary output or limit monitoring), there are a variety of parameters to comply all output requirements:

Register **42012**[1]	**Contact type**
N/O (normally open)	with inactive output the output is open (factory setting)
N/C (normally closed)	with inactive output the output is short-circuited (if device is powered!)

Register **42013**[1] **min. activation time**

The minimum activation time is the minimum duration of a output pulse, for example, when controlling a stepping motion switch, the output pulse must not be too short. The minimum activation time is programmed in steps of [100 ms]. Factory setting is 0x0000.

Register **42014**[1] **max. activation time**

The maximum activation time is effective when the output is activated for a long time. For example, in order to avoid overloading valves, the maximum permissible operating time can be programmed in steps of [100 ms]. Factory setting is 0x0000.

Register **42015**[1] **ON delay**

The response of the output to the input signal can be influenced by a ON delay. When activated at the input, the output follows after the delay time. If the input is inactive during this time, the output remains inactive. The output follows the input signal only after the ON delay has elapsed. The ON delay can be used to tolerate short input pulses. The delay time is programmable in steps of [100 ms]. The factory setting is 0x0000 (no delay).

Register **42016**[1] **OFF delay**

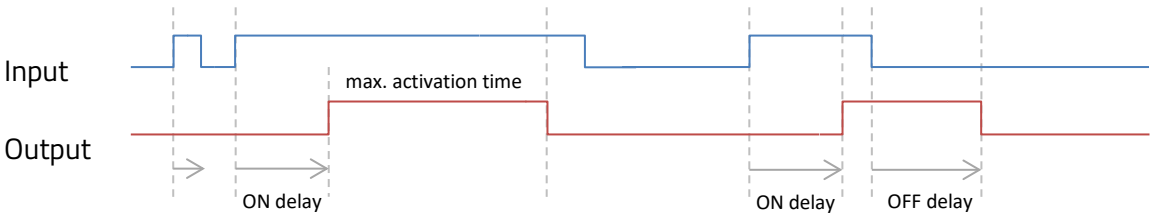
The OFF delay prevents an immediate turn-off of the output when the input is inactive. The output remains active for the programmed OFF delay. If the input is active again during this time, the delay time starts again. The delay time is programmed in steps of [100 ms]. The factory setting is 0x0000 (no delay).

A special case is the value 0xFFFF, which activates the **confirmation mode**. In confirmation mode, the output remains active until an confirmation has been received. The confirmation request is signaled by a bit in the confirmation register 40012 and can be confirmed by writing to this register. The output becomes inactive after the confirmation, if the input is inactive.

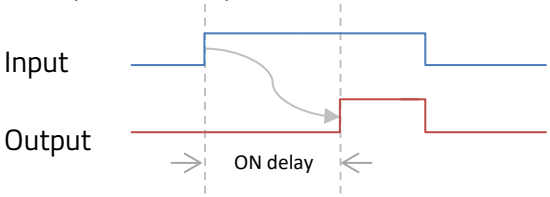
Register **42017**[1] **device power-on**

The state programmed in this register is the output level after start-up, reset or power failure. The input regularly controls the output so that the output follows the input signal shortly after the start. In confirmation mode the output would remain active until an incoming confirmation.

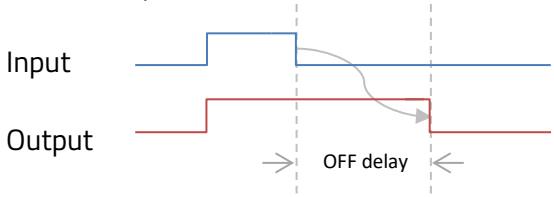
Values: 0x0000 (inactive) or 0x0001 (active), factory setting is 0x0000.



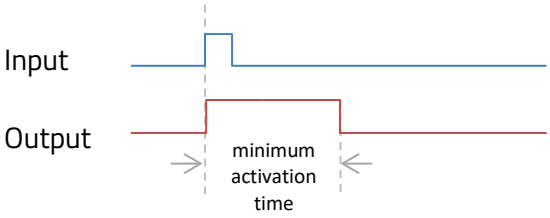
Example: ON delay (42015[1])



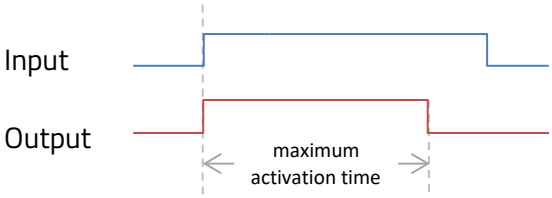
Example: OFF delay (42016[1])



Example: minimum activation time (42013[1])



Example: maximum activation time (42014[1])



[1] The specified register addresses apply to channel 1. At channel 2: +100, channel 3: +200 and channel 4: +300

DMB 96700 coil map

Coil	Addr	Description	Access	Remarks
Discrete inputs/outputs				
1	0	Input/Output 1	RW	Binary signal at Input/ Output 1
2	1	Input/Output 2	RW	Binary signal at Input/ Output 2
3	2	Input/Output 3	RW	Binary signal at Input/ Output 3
4	3	Input/Output 4	RW	Binary signal at Input/ Output 4

DMB 96700 input register map

Firmware 01.1.0 and later:
All dynamic measured value registers can be read out with Modbus command 3 as holding register **400xx**, but also with Modbus command 4 as input register **300xx**.

Reg No.	Addr		Description	No. Reg.	Format	Access	Remarks
	Dec	Hex					
Inputs and outputs							
30001	0	0000	Primary Value	1	INT16 UINT16	R	Depends on operating mode **Input mode** Frequency (0x0001): Frequency x10 (1000.0 Hz) Counter (0x0002): Counts UINT16
30002	1	0001	Secondary Value	1	INT16 UINT16	R	Channel 2 (for Description see Channel 1)
30003	2	0002	Tertiary Value	1	INT16 UNIT16	R	Channel 3 (for Description see Channel 1)
30004	3	0003	Quaternary Value	1	INT16 UINT16	R	Channel 4 (for Description see Channel 1)
30005	4	0004	Status	1	UINT16	R	Status of values Bit 0 Counter 1 overflow or Limit 1 active Bit 1 Counter 2 overflow or Limit 2 active Bit 2 Counter 3 overflow or Limit 3 active Bit 3 Counter 4 overflow or Limit 4 active

Reg No.	Addr		Description	No. Reg.	Format	Access	Remarks
	Dec	Hex					
30011	10	000A	Input/Output direct	1	UINT16	R	Operation mode: Binary signal Bit 0 Input 1 Bit 1 Input 2 Bit 2 Input 3 Bit 3 Input 4 inactive = 0, active = 1 Output channels can have programmed operation timing.
30051	50	0032	Primary Value	2	FLOAT INT32 UINT32	R	Depends on operating mode **Input mode** Frequency (0x0001): Freq. FLOAT Counter (0x0002): Counts UINT32 Float value range according to IEEE 754
30053	52	0034	Secondary Value	2	FLOAT INT32 UINT32	R	Channel 2 (for Description see Channel 1)
30055	54	0036	Tertiary Value	2	FLOAT INT32 UINT32	R	Channel 3 (for Description see Channel 1)
30057	56	0038	Quaternary Value	2	FLOAT INT32 UINT32	R	Channel 4 (for Description see Channel 1)
30059	58	003A	Status	1	UINT16	R	Status of values (see 30005 for description)

DMB 96700 holding register map

Reg No.	Addr Dec	Addr Hex	Description	No. Reg.	Format	Access	Remarks
Inputs and outputs							
40001	0	0000	Primary Value	1	INT16 UINT16	RW	Depends on operating mode **Input mode** Binary input (0x0000): – Frequency (0x0001): Frequency x10 (1000.0 Hz) Counter (0x0002): Counts UINT16 **Output mode** Binary output (0x0010): – Limit INT16 (0x0011): Set meas. value Limit INT32 (0x0012): – Limit FLOAT (0x0013): – Frequency (0x0014): Set Freq. x10 Pulse (0x0015): Set pulse rate (1 - 60000 /min) PWM (0x0016): Set duty cycle (0.0 - 100.0%)
40002	1	0001	Secondary Value	1	INT16 UINT16	RW	Channel 2 (for Description see Channel 1)
40003	2	0002	Tertiary Value	1	INT16 UNIT16	RW	Channel 3 (for Description see Channel 1)
40004	3	0003	Quaternary Value	1	INT16 UINT16	RW	Channel 4 (for Description see Channel 1)
40005	4	0004	Status	1	UINT16	R	Status of values Bit 0 Counter 1 overflow or Limit 1 active Bit 1 Counter 2 overflow or Limit 2 active Bit 2 Counter 3 overflow or Limit 3 active Bit 3 Counter 4 overflow or Limit 4 active
40011	10	000A	Input/Output direct	1	UINT16	RW	Operation mode: Binary signal Bit 0 Input/Output 1 Bit 1 Input/Output 2 Bit 2 Input/Output 3 Bit 3 Input/Output 4 inactive = 0, active = 1 Output channels can have programmed operation timing.

Reg No.	Addr		Description	No. Reg.	Format	Access	Remarks
	Dec	Hex					
40012	11	000B	Send acknowledge	1	UINT16	RW	Reset output in confirmation mode Bit 0 Output 1 confirm = 1 Bit 1 Output 2 Bit 2 Output 3 Bit 3 Output 4 Read register shows the outputs, who waits for confirmation
40013	12	000C	Reset input counter	1	UINT16	W	Resets the counter for channel 1 to 4 Bit 0 Counter 1 Reset = 1 Bit 1 Counter 2 Bit 2 Counter 3 Bit 3 Counter 4
40051	50	0032	Primary Value	2	FLOAT INT32 UINT32	RW	Depends on operating mode **Input mode** Binary input (0x0000): – Frequency (0x0001): Freq. FLOAT Counter (0x0002): Counts UINT32 **Output mode** Binary output (0x0010): – Limit INT16 (0x0011): – Limit INT32 (0x0012): Set meas. value Limit FLOAT (0x0013): Set meas. value Frequency (0x0014): – Pulse output (0x0015): – PWM (0x0016): – Float value range according to IEEE 754
40053	52	0034	Secondary Value	2	FLOAT INT32 UINT32	RW	Channel 2 (for Description see Channel 1)
40055	54	0036	Tertiary Value	2	FLOAT INT32 UINT32	RW	Channel 3 (for Description see Channel 1)
40057	56	0038	Quaternary Value	2	FLOAT INT32 UINT32	RW	Channel 4 (for Description see Channel 1)
40059	58	003A	Status	1	UINT16	R	Status of values Bit 0 Counter 1 overflow or Limit 1 active Bit 1 Counter 2 overflow or Limit 2 active Bit 2 Counter 3 overflow or Limit 3 active Bit 3 Counter 4 overflow or Limit 4 active

Reg No.	Addr		Description	No. Reg.	Format	Access	Remarks
	Dec	Hex					
40101	100	0064	current DIP switches	2	UINT32	R	Current DIP switch setting Bit 0 S1-1 off = 4x Binary input on = 4x Binary output Bit 1/2 S1-2/-3 on/off = 9600 baud off/off = 19200 baud off/on = 38400 baud on/on = 115200 baud Bit 3 S1-4 off = Parity even on = Parity none Bit 4 S1-5 Modbus address : : 1 to 63 Bit 9 S1-10 all DIPs off: PC mode, settings via Modbus
40103	102	0066	current configuration set	1	UINT16	R	currently used configuration set 0x0000 PC mode 0x0001 DIP mode
Auxiliary and diagnosis functions							
41201	1200	04B0	"Here I am"	1	UINT16	W	"Here I am" – Set timer with time [s] Sets a flashing signal on the green LED for the written timeperiod to easy find this device in the system
41202	1201	04B1	Reset counter	1	UINT16	W	Reset of diagnostic counter
41211	1210	04BA	Telegram count	1	UINT16	R	Count of all telegram frames on Modbus
41212	1211	04BB	MyTelegram count	1	UNIT16	R	Request count for telegram frames on Modbus with own device address
41213	1212	04BC	Error count	1	UINT16	R	Error count of frames with error
Device data							
43001	3000	0BB8	Device identifier	1	UINT16	R	Device identifier: 0x0007
43002	3001	0BB9	Hardware version	1	UINT16	R	Hardware version: e.g. 0x0041 (A)
43005	3004	0BBC	RFID identifier	8	16 Char	R	Unique identifier
43029	3028	0BD4	Firmware version	1	UINT16	R	0x0100 – Example for version 01.0.0
45151	5150	141E	Point of measuring	8	16 Char	RW	Point of measuring in ASCII (Tag)
Settings (CONF)							
== Channel 1 ==							

Reg No.	Addr		Description	No. Reg.	Format	Access	Remarks
	Dec	Hex					
42001	2000	07D0	Operating mode channel 1	1	UINT16	RW	Set the operating mode of **channel 1** **Input mode** 0x0000 Binary input 0x0001 Frequency measurement 0x0002 Counter input (16/32 bit) (Reset at Start / CONF changed) **Output mode** 0x0010 Binary output 0x0011 Limit monitoring INT16 0x0012 Limit monitoring INT32 0x0013 Limit monitoring FLOAT 0x0014 Frequencyoutput [Hz] 0x0015 Pulse generation [1/min] 0x0016 PWM output, Freq. = 500 Hz
42002	2001	07D1	Input level	1	UINT16	RW	Input level for channel 1 0x0000 5 V (<1.5 V >3.5 V) 0x0001 12 V (<2.0 V >8.4 V) 0x0002 24 V (<2.5 V >16.8 V)
42003	2002	07D2	Pulse width	1	UINT16	RW	Pulse width at pulse output [ms] ch 1 min. pulse width (0x0000) = 300 µs
42012	2011	07DB	Contact type	1	UINT16	RW	Contact type for channel 1 0x0000 N/O normally open 0x0001 N/C normally closed
42013	2012	07DC	min. activation time	1	UINT16	RW	Minimal activation time [100 ms] ch 1 The output stays active minimal this time. 0x0000 Function off
42014	2013	07DD	max. activation time	1	UINT16	RW	Maximal activation time [100 ms] ch 1 The active output ist limited to this time. Example: wiping contact 0x0000 Function off
42015	2014	07DE	ON delay	1	UINT16	RW	ON delay [100 ms] for ch 1 A activation signal turns on the output after this time 0x0000 Immediate turn-on
42016	2015	07DF	OFF delay	1	UINT16	RW	OFF delay [100 ms] for ch 1 At inactive signal the output turns off after this time 0x0000 Immediate turn-off 0xFFFF Turn-off only with confirm* * power-on resets the wait for confirmation
42017	2016	07E0	Initial state after power-on	1	UINT16	RW	Initial state for ch 1 0x0000 Output inactive 0x0001 Output active
42018	2017	07E1	Limit low	1	INT16	RW	INT16 value for lower limit ch 1
42019	2018	07E2	Limit high	1	INT16	RW	INT16 value for upper limit ch 1
42020	2019	07E3	Limit hysteresis	1	INT16	RW	INT16 value for limit hysteresis at ch 1

Reg No.	Addr		Description	No. Reg.	Format	Access	Remarks
	Dec	Hex					
42021	2020	07E4	Limit low	2	FLOAT INT32	RW	FLOAT or INT32 value for lower limit at channel 1
42023	2022	07E6	Limit high	2	FLOAT INT32	RW	FLOAT or INT32 value for upper limit at channel 1
42025	2024	07E8	Limit hysteresis	2	FLOAT INT32	RW	FLOAT or INT32 value for limit hysteresis at channel 1
== Channel 2 ==							
42101	2100	0834	Operating mode channel 2	1	UINT16	RW	Set the operating mode of **channel 2** (for Description see Channel 1)
42102	2101	0835	Input level	1	UINT16	RW	Input level for channel 2 (for Description see Channel 1)
42103	2102	0836	Pulse width	1	UINT16	RW	Pulse width at pulse output [ms] ch 2 (for Description see Channel 1)
42112	2111	083F	Contact type	1	UINT16	RW	Contact type for channel 2 (for Description see Channel 1)
42113	2112	0840	min. activation time	1	UINT16	RW	Minimal activation time [100 ms] ch 2 (for Description see Channel 1)
42114	2113	0841	max. activation time	1	UINT16	RW	Maximal activation time [100 ms] ch 2 (for Description see Channel 1)
42115	2114	0842	ON delay	1	UINT16	RW	ON delay [100 ms] for ch 2 (for Description see Channel 1)
42116	2115	0843	OFF delay	1	UINT16	RW	OFF delay [100 ms] for ch 2 (for Description see Channel 1)
42117	2116	0844	Initial state after power-on	1	UINT16	RW	Initial state for ch 2 (for Description see Channel 1)
42118	2117	0845	Limit low	1	INT16	RW	INT16 value for lower limit ch 2
42119	2118	0846	Limit high	1	INT16	RW	INT16 value for upper limit ch 2
42120	2119	0847	Limit hysteresis	1	INT16	RW	INT16 value for limit hysteresis at ch 2
42121	2120	0848	Limit low	2	FLOAT INT32	RW	FLOAT or INT32 value for lower limit at channel 2
42123	2122	084A	Limit high	2	FLOAT INT32	RW	FLOAT or INT32 value for upper limit at channel 2
42125	2124	084C	Limit hysteresis	2	FLOAT INT32	RW	FLOAT or INT32 value for limit hysteresis at channel 2
== Channel 3 ==							
42201	2200	0898	Operating mode channel 3	1	UINT16	RW	Set the operating mode of **channel 3** (for Description see Channel 1)
42202	2201	0899	Input level	1	UINT16	RW	Input level for channel 3 (for Description see Channel 1)
42203	2202	089A	Pulse width	1	UINT16	RW	Pulse width at pulse output [ms] ch 3 (for Description see Channel 1)

Reg No.	Addr		Description	No. Reg.	Format	Access	Remarks
	Dec	Hex					
42212	2211	08A3	Contact type	1	UINT16	RW	Contact type for channel 3 (for Description see Channel 1)
42213	2212	08A4	min. activation time	1	UINT16	RW	Minimal activation time [100 ms] ch 3 (for Description see Channel 1)
42214	2213	08A5	max. activation time	1	UINT16	RW	Maximal activation time [100 ms] ch 3 (for Description see Channel 1)
42215	2214	08A6	ON delay	1	UINT16	RW	ON delay [100 ms] for ch 3 (for Description see Channel 1)
42216	2215	08A7	OFF delay	1	UINT16	RW	OFF delay [100 ms] for ch 3 (for Description see Channel 1)
42217	2216	08A8	Initial state after power-on	1	UINT16	RW	Initial state for ch 3 (for Description see Channel 1)
42218	2217	08A9	Limit low	1	INT16	RW	INT16 value for lower limit ch 3
42219	2218	08AA	Limit high	1	INT16	RW	INT16 value for upper limit ch 3
42220	2219	08AB	Limit hysteresis	1	INT16	RW	INT16 value for limit hysteresis at ch 3
42221	2220	08AC	Limit low	2	FLOAT INT32	RW	FLOAT or INT32 value for lower limit at channel 3
42223	2222	08AE	Limit high	2	FLOAT INT32	RW	FLOAT or INT32 value for upper limit at channel 3
42225	2224	08B0	Limit hysteresis	2	FLOAT INT32	RW	FLOAT or INT32 value for limit hysteresis at channel 3
== Channel 4 ==							
42301	2300	08FC	Operating mode channel 4	1	UINT16	RW	Set the operating mode of **channel 4** (for Description see Channel 1)
42302	2301	08FD	Input level	1	UINT16	RW	Input level for channel 4 (for Description see Channel 1)
42303	2302	08FE	Pulse width	1	UINT16	RW	Pulse width at pulse output [ms] ch 4 (for Description see Channel 1)
42312	2311	0907	Contact type	1	UINT16	RW	Contact type for ch 4 (for Description see Channel 1)
42313	2312	0908	min. activation time	1	UINT16	RW	Minimal activation time [100 ms] ch 4 (for Description see Channel 1)
42314	2313	0909	max. activation time	1	UINT16	RW	Maximal activation time [100 ms] ch 4 (for Description see Channel 1)
42315	2314	090A	ON delay	1	UINT16	RW	ON delay [100 ms] for ch 4 (for Description see Channel 1)
42316	2315	090B	OFF delay	1	UINT16	RW	OFF delay [100 ms] for ch 4 for Description see Channel 1)
42317	2316	090C	Initial state after power-on	1	UINT16	RW	Initial state for ch 4 (for Description see Channel 1)

Reg No.	Addr		Description	No. Reg.	Format	Access	Remarks
	Dec	Hex					
42318	2317	090D	Limit low	1	INT16	RW	INT16 value for lower limit ch 4
42319	2318	090E	Limit high	1	INT16	RW	INT16 value for upper limit ch 4
42320	2319	090F	Limit hysteresis	1	INT16	RW	INT16 value for limit hysteresis at ch 4
42321	2320	0910	Limit low	2	FLOAT INT32	RW	FLOAT or INT32 value for lower limit at channel 4
42323	2322	0912	Limit high	2	FLOAT INT32	RW	FLOAT or INT32 value for upper limit at channel 4
42325	2324	0914	Limit hysteresis	2	FLOAT INT32	RW	FLOAT or INT32 value for limit hysteresis at channel 4
45001	5000	1388	Configuration counter	1	UINT16	R	Counter is incremented internally each write of Conf parameters. The Modbus master can remember this value. As long as the counter has the same value, the configuration is unchanged.
45002	5001	1389	Register order	1	UINT16	RW	Order of registers at INT32 or FLOAT values 0x0001 HH-HL-LH-LL (**default**) 0x0000 LH-LL-HH-HL
45003	5002	138A	Date of last modification	2	UINT32	RW	Date (UNIX_TIMESTAMP) last change (Not managed by the device)
45010	5009	1391	Modbus: Address (in PC Mode)	1	UINT16	RW	Modbus address: **1** ... 247 (default = 1)
45011	5010	1392	Baud rate (in PC Mode)	1	UINT16	RW	Baud rate: 0x0000 - 300 0x0001 - 600 0x0002 - 1200 0x0003 - 2400 0x0004 - 4800 0x0005 - 9600 0x0006 - **19200** (default) 0x0007 - 38400 0x0008 - 57600 0x0009 - 115200 other: *undefined*
45012	5011	1393	Parity/Stop bits (in PC Mode)	1	UINT16	RW	Parity: 0x0000 - **Even, 1 Stop bit** (default) 0x0001 - Odd, 1 Stop bit 0x0002 - None, 2 Stop bits 0x0003 - None, 1 Stop bit (no Spec !) (from Firmware 01.4.0) other: *undefined*
45013	5012	1394	Response delay (in PC Mode)	1	UINT16	RW	Delay: **1** ... 1000 ms (default = 1)

Reg No.	Addr		Description	No. Reg.	Format	Access	Remarks
	Dec	Hex					
45020	5019	139B	Modbus: Address (in DIP Mode)	1	UINT16	R	Modbus address: 1 ... 63
45021	5020	139C	Baud rate (in DIP Mode)	1	UINT16	R	Baud rate: 0x0005 - 9600 0x0006 - 19200 0x0007 - 38400 0x0009 - 115200
45022	5021	139D	Parity/Stop bits (in DIP Mode)	1	UINT16	R	Parity: 0x0000 - Even, 1 Stop bit 0x0002 - None, 2 Stop bits
45023	5022	139E	Response delay (in DIP Mode)	1	UINT16	R	Delay: 1 ms at 115200 Baud 3 ms at 38400 Baud 5 ms at 19200 Baud 10 ms at 9600 Baud
48213	8212	2014	Save settings	1	UINT16	W	0x0043 Speeds up the save procedure of settings. Without this command the device saves changes approx. 5 seconds after the last write of a configuration parameter.

DMB 96800 4 Channel Relay Module

- 4 independent power relays, make or break contact
- Programmable switch-ON and switch-OFF behavior
- Extensive programmable operating functions
- Monitoring functions for operating conditions
- Status indication for each relay

Contact
AC: 250 V / 2 A
DC: 30 V / 2A

Additional functions
ON / OFF delay, Wiper contact. Power monitoring

Supported communication features:

Baud rates:	300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200	
Formats:	Parity even,	1 stop bit
	Parity odd,	1 stop bit
	Parity none,	2 stop bits
	Parity none,	1 stop bit (not conform with specification!)

Factory setting: 19200 baud, 8 data bits, parity even, 1 stop bit, Modbus address 1

Supported function codes:

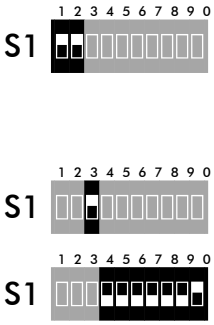
Command 1:	0x01	Read Coils	
Command 2:	0x02	Read Discrete Input	
Command 3:	0x03	Read Holding Registers	
Command 4:	0x04	Read Input Registers	(Firmware 01.3.0 and later)
Command 5:	0x05	Write Single Coil	
Command 6:	0x06	Write Single Register	
Command 15:	0x0F	Write Multiple Coils	
Command 16:	0x10	Write Multiple Registers	
Command 43 / 14:	0x2B / 0x0E	Read Device Identification	

Note: Command 43, subcode 14 (Read Device Identification) supported in the 'Basic' category to allow the device identification.

DMB 96800 DIP settings

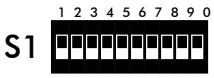
Operating modes with DIP switch settings

Modbus settings



	1	2	3	4	5	6	7	8	9	0
9600 Baud	■									
19200 Baud										
38400 Baud		■								
115200 Baud	■	■								
Parity even, 1 stop bit										
Parity none, 2 stop bits			■							
Modbus address 1										■
2									■	
3									■	■
4								■		
5								■		■
... 127				■	■	■	■	■	■	■

Setting via USB interface or Modbus commands



PC Mode

All switches in OFF position

Configuration the Modbus interface or with DRAGOmodbus software

Factory Setting

All switches in OFF position (PC Mode),
the default configuration in PC-Mode:

- Modbus address 1
- 19200 baud
- Parity even
- 1 stop bit

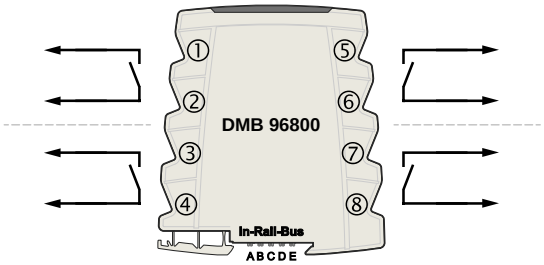
DMB 96800 Operating modes and examples

Operating mode with DIP switch settings

With the DIP switches S1-1 and S1-2 the baud rate ist selected, with S1-3 the parity bit. The DIP switches S1-4 to S1-10 defines the Modbus address of the device in range of 1 to 127. The Modbus address must be unique in the Modbus segment. For higher adresses you must use the PC mode (see below).

a. Relay

Write **coil** or the **holding register 40011** via Modbus. The relay contact will direct follow to ON or OFF.



Modbus RTU + 24 V Supply

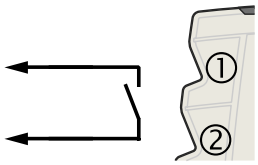
Operating modes with PC mode

All DIP switches must be OFF. Modbus address and all device parameters are set via the Modbus interface or the front USB interface in the holding registers (see holding register map).

[1] The register addresses always refer to relay 1

a. Direct control (relay contact)

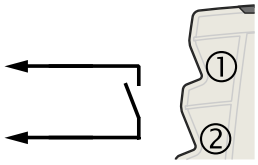
Holding register 42011[1] = 0x0000
(other relays: 42111[2]/42211[3]/42311[4])



Write **coil** or the **holding register 40011** via Modbus. The relay will follow to ON or OFF, with compliance with the relay settings, such as min/max activation time and ON/OFF delay.

b. Limit monitoring INT16

Holding register 42011[1] = 0x0001
(other relays: 42111[2]/42211[3]/42311[4])

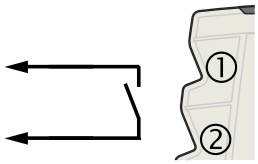


The device monitors a 16-bit integer measured value, which is supplied via Modbus in **register 40001**[1], to lower and higher limits. If the lower limit value in register 42018[1] is exceeded or the higher limit value in register 42019[1] is exceeded, the relay is activated. To switch back to inactive output, the hysteresis in register 42020[1] must be passed through. This can combined with the output settings, such as min/max activation time and ON/OFF delay.

Register 42018[1]	INT16 limit low	(–32768 to +32767, factory setting –1000)
Register 42019[1]	INT16 limit high	(–32768 to +32767, factory setting +1000)
Register 42020[1]	INT16 hysteresis	(3 to +32767, factory setting 10)

c. Limit monitoring FLOAT

Holding register 42011[1] = 0x0002
(other relays: 42111[2]/42211[3]/42311[4])

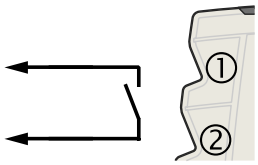


The device monitors a measured floating point value, which is supplied via Modbus in **register 40051**[1], to lower and higher limits. If the lower limit value in register 42021[1] is exceeded or the higher limit value in register 42023[1] is exceeded, the relay is activated. To switch back to inactive output, the hysteresis in register 40025[1] must be passed through. This can combined with the output settings, such as min/max activation time and ON/OFF delay.

Register 42021[1]	FLOAT limit low	(factory setting: Float –1000.0)
Register 42023[1]	FLOAT limit high	(factory setting: Float +1000.0)
Register 42025[1]	FLOAT hysteresis	(factory setting: Float 10.0)

d. Limit monitoring INT16 (relay 1)

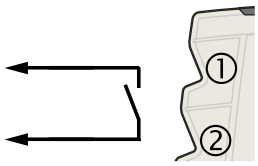
Holding register 42011[2] = 0x0003
(other relays: 42211[3]/42311[4])



Is identical as for limit monitoring INT16 (b), except that the measured value of channel 1 is used for the comparison. It is possible to control several relays as min and max contacts from one measured value in **register 40001**.

e. Limit monitoring FLOAT (relay 1)

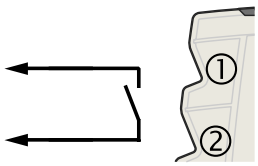
Holding register 42011[2] = 0x0004
(other relays: 42211[3]/42311[4])



Is identical as for limit monitoring FLOAT (c), except that the measured value of channel 1 is used for the comparison. It is possible to control several relays as min and max contacts from one measured value in **register 40051**.

f. Monitoring of power supply

Holding register 42011[1] = 0x0005
(other relays: 42111[2]/42211[3]/42311[4])



Limit value monitoring of the supply voltage to lower and higher limits. If the lower limit

value in register 42018[1] is exceeded or the higher limit value in register 42019[1] is exceeded, the relay is activated. To switch back to inactive output, the hysteresis in register 42020[1] must be passed through. This can combined with the compliance with the relay settings, such as min/max activation time and ON/OFF delay.

Register 42018[1]	Power supply limit low	in [0.1 V] resolution
Register 42019[1]	Power supply limit high	in [0.1 V] resolution
Register 42020[1]	Power supply hysteresis	in [0.1 V] resolution

Relay parameters

For all modes, there are a variety of parameters to comply all relay contact requirements:

Register **42012**[1] **Contact type**

N/O (normally open) with inactive relay the contact is open (factory setting)

N/C (normally closed) with inactive relay the contact is short-circuited

Register **42013**[1] **min. activation time**

The minimum activation time is the minimum duration of a short output pulse, for example, when controlling a stepping motion switch, the output pulse must not be too short. The minimum activation time is programmed in steps of [100 ms]. Factory setting is 0x0000.

Register **42014**[1] **max. activation time**

The maximum activation time is effective when the output is activated for a long time. For example, in order to avoid overloading valves, the maximum permissible operating time can be programmed in steps of [100 ms]. Factory setting is 0x0000.

Register **42015**[1] **ON delay**

The response of the relay to the input signal can be influenced by a ON delay. When activated at the input, the relay follows after the delay time. If the input is inactive during this time, the relay remains inactive. The relay follows the input signal only after the ON delay has elapsed. The ON delay can be used to tolerate short input pulses. The delay time is programmed in steps of [100 ms]. The factory setting is 0x0000 (no delay).

Register **42016**[1] **OFF delay**

The OFF delay prevents an immediate turn-off of the relay when the input is inactive. The relay remains active for the programmed OFF delay. If the input is active again during this time, the delay time starts again. The delay time is programmed in steps of [100 ms]. The factory setting is 0x0000 (no delay).

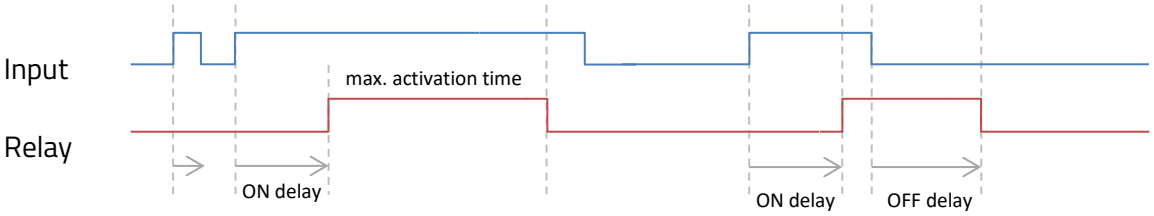
A special case is the value 0xFFFF, which activates the confirmation mode. In confirmation mode,

the relay remains active until an confirmation has been received. The confirmation request is signaled by a bit in the confirmation register 40012 and can be confirmed by writing to this register. The relay becomes inactive after the confirmation, if the input is inactive.

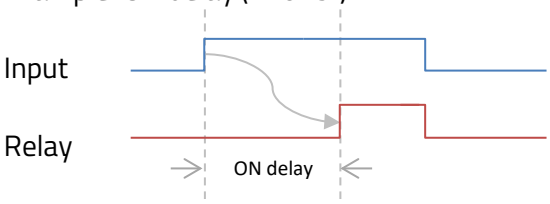
Register **42017**[1] **device power-on**

The state programmed in this register is the relay state after start-up, reset or power failure. The input regularly controls the relay so that the relay follows the input signal shortly after the start. In confirmation mode the relay would remain active until an incoming confirmation.

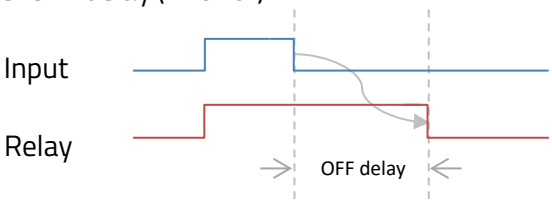
Values: 0x0000 (inactive) or 0x0001 (active), factory setting is 0x0000.



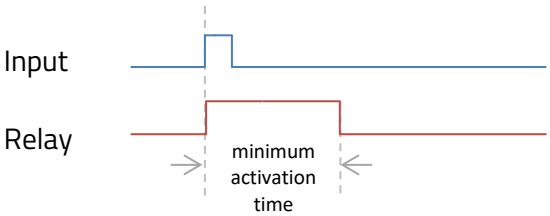
Example: ON delay (42015[1])



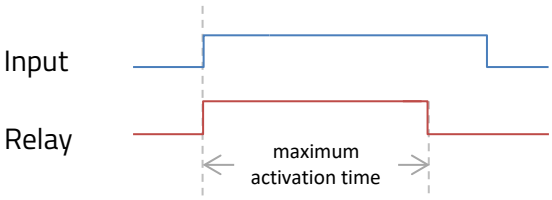
Example: OFF delay (42016[1])



Example: minimum activation time (42013[1])



Example: maximum activation time (42014[1])



[1] The specified register addresses apply to relay 1. At relay 2: +100, relay 3: +200 and relay 4: +300

DMB 96800 coil map

Coil	Addr	Description	Access	Remarks
Discrete outputs				
1	0	Relay 1	W	direct control relay 1
2	1	Relay 2	W	direct control relay 2
3	2	Relay 3	W	direct control relay 3
4	3	Relay 4	W	direct control relay 4

DMB 96800 holding register map

Reg No.	Addr		Description	No. Reg.	Format	Access	Remarks
	Dec	Hex					
Inputs and outputs							
40001	0	0000	Primary Value	1	INT16	W	value for INT16 limit monitoring channel 1
40002	1	0001	Secondary Value	1	INT16	W	value for INT16 limit monitoring channel 2
40003	2	0002	Tertiary Value	1	INT16	W	value for INT16 limit monitoring channel 3
40004	3	0003	Quaternary Value	1	INT16	W	value for INT16 limit monitoring channel 4
40011	10	000A	relays direct	1	UINT16	RW	direct relay control Bit 0 relay 1 Bit 1 relay 2 Bit 2 relay 3 Bit 3 relay 4 inactive = 0, active = 1 When reading, the current output status of the relays is returned.
40012	11	000B	Send acknowledge	1	UINT16	RW	Reset relay in confirmation mode Bit 0 relay 1 confirm = 1 Bit 1 relay 2 Bit 2 relay 3 Bit 3 relay 4 When reading, all bits waiting for an confirmation are set
40021	20	0014	Supply voltage	1	INT16	R	Measured supply voltage [0.1 V]
40051	50	0032	Primary Value	2	FLOAT	W	value for FLOAT limit monitoring ch 1 Range of values according to IEEE 754
40053	52	0034	Secondary Value	2	FLOAT	W	value for FLOAT limit monitoring ch 2
40055	54	0036	Tertiary Value	2	FLOAT	W	value for FLOAT limit monitoring ch 3
40057	56	0038	Quaternary Value	2	FLOAT	W	value for FLOAT limit monitoring ch 4

Reg No.	Addr		Description	No. Reg.	Format	Access	Remarks
	Dec	Hex					
40101	100	0064	current DIP switches	2	UINT32	R	Current DIP switch setting Bit 0/1 S1-1/-2 on/off = 9600 baud off/off = 19200 baud off/on = 38400 baud on/on = 115200 baud Bit 2 S1-3 off = Parity even on = Parity none Bit 3 S1-4 Modbus address : : 1 to 127 Bit 9 S1-10 all DIPs off: PC mode, settings via Modbus
40103	102	0066	current configuration set	1	UINT16	R	currently used configuration set 0x0000 PC mode 0x0001 DIP mode
Auxiliary and diagnosis functions							
41201	1200	07D0	"Here I am"	1	UINT16	W	"Here I am" – Set timer with time [s] Sets a flashing signal on the green LED for the written timeperiod to easy find this device in the system
41202	1201	07D1	Reset counter	1	UINT16	W	Reset of diagnostic counter
41211	1210	07DA	Telegram count	1	UINT16	R	Count of all telegram frames on Modbus
41212	1211	07DB	MyTelegram count	1	UNIT16	R	Request count for telegram frames on Modbus with own device address
41213	1212	07DC	Error count	1	UINT16	R	Error count of frames with error
Device data							
43001	3000	0BB8	Device identifier	1	UINT16	R	Device identifier: 0x0009
43002	3001	0BB9	Hardware version	1	UINT16	R	Hardware version: e.g. 0x0041 (A)
43005	3004	0BBC	RFID identifier	8	16 Char	R	Unique identifier
43029	3028	0BD4	Firmware version	1	UINT16	R	0x0100 – Example for version 01.0.0
45151	5150	141E	Point of measuring	8	16 Char	RW	Point of measuring in ASCII (Tag)

Reg No.	Addr		Description	No. Reg.	Format	Access	Remarks
	Dec	Hex					
Settings (CONF)							
== Relay 1 ==							
42011	2010	07DA	Relay 1 input type	1	UINT16	RW	Set the operating mode of **relay 1** 0x0000 Direct control 0x0001 Limit monitoring INT16 0x0002 Limit monitoring FLOAT 0x0003 Limit monitoring INT16 (relay 1) 0x0004 Limit monitoring FLOAT (relay 1) 0x0005 Power supply [0.1 V]
42012	2011	07DB	Contact type	1	UINT16	RW	Contact type for relay 1 0x0000 N/O normally open 0x0001 N/C normally closed
42013	2012	07DC	min. activation time	1	UINT16	RW	Minimal activation time [100 ms] relay 1 The output stays active minimal this time. 0x0000 Function off
42014	2013	07DD	max. activation time	1	UINT16	RW	Maximal activation time [100 ms] relay 1 The active output ist limited to this time. Example: wiping contact 0x0000 Function off
42015	2014	07DE	ON delay	1	UINT16	RW	ON delay [100 ms] for relay 1 A activation signal turns on the output after this time 0x0000 Immediate turn-on
42016	2015	07DF	OFF delay	1	UINT16	RW	OFF delay [100 ms] for relay 1 At inactive signal the output turns off after this time 0x0000 Immediate turn-off 0xFFFF Turn-off only with confirm* * power-on resets the wait for confirmation
42017	2016	07E0	Initial state after power-on	1	UINT16	RW	Initial state for relay 1 0x0000 Output inactive 0x0001 Output active
42018	2017	07E1	Limit low	1	INT16	RW	INT16 value for lower limit relay 1
42019	2018	07E2	Limit high	1	INT16	RW	INT16 value for upper limit relay 1
42020	2019	07E3	Limit hysteresis	1	INT16	RW	INT16 value for limit hysteresis at relay 1
42021	2020	07E4	Limit low	2	FLOAT	RW	FLOAT value for lower limit at relay 1
42023	2022	07E6	Limit high	2	FLOAT	RW	FLOAT value for upper limit at relay 1
42025	2024	07E8	Limit hysteresis	2	FLOAT	RW	FLOAT value for limit hysteresis at relay 1
42027	2026	07EA	Timeout function relay 1	1	UINT16	RW	Timeout function 0 OFF 1 to 65534 Timeout for relay 1 [100 ms]

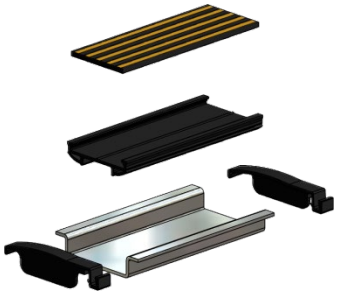
Reg No.	Addr		Description	No. Reg.	Format	Access	Remarks
	Dec	Hex					
== Relay 2 ==							
42111	2110	083E	Relay 2 input type	1	UINT16	RW	Set the operating mode of **relay 2** 0x0000 Direct control 0x0001 Limit monitoring INT16 0x0002 Limit monitoring FLOAT 0x0003 Limit monitoring INT16 (relay 1) 0x0004 Limit monitoring FLOAT (relay 1) 0x0005 Power supply [0.1 V]
42112	2111	083F	Contact type	1	UINT16	RW	Contact type for relay 2 (for description see relay 1)
42113	2112	0840	min. activation time	1	UINT16	RW	Minimal activation time [100 ms] relay 2 (for description see relay 1)
42114	2113	0841	max. activation time	1	UINT16	RW	Maximal activation time [100 ms] relay 2 (for description see relay 1)
42115	2114	0842	ON delay	1	UINT16	RW	ON delay [100 ms] for relay 2 (for description see relay 1)
42116	2115	0843	OFF delay	1	UINT16	RW	OFF delay [100 ms] for relay 2 (for description see relay 1)
42117	2116	0844	Initial state after power-on	1	UINT16	RW	Initial state for relay 2 (for description see relay 1)
42118	2117	0845	Limit low	1	INT16	RW	INT16 value for lower limit relay 2
42119	2118	0846	Limit high	1	INT16	RW	INT16 value for upper limit relay 2
42120	2119	0847	Limit hysteresis	1	INT16	RW	INT16 value for limit hysteresis at relay 2
42121	2120	0848	Limit low	2	FLOAT	RW	FLOAT value for lower limit at relay 2
42123	2122	084A	Limit high	2	FLOAT	RW	FLOAT value for upper limit at relay 2
42125	2124	084C	Limit hysteresis	2	FLOAT	RW	FLOAT value for limit hysteresis at relay 2
42127	2126	084E	Timeout function relay 2	1	UINT16	RW	Timeout function 0 OFF 1 to 65534 Timeout for relay 2 [100 ms]
== Relay 3 ==							
42211	2210	08A2	Relay 3 input type	1	UINT16	RW	Set the operating mode of **relay 3** (for description see relay 2)
42212	2211	08A3	Contact type	1	UINT16	RW	Contact type for relay 3 (for description see relay 1)
42213	2212	08A4	min. activation time	1	UINT16	RW	Minimal activation time [100 ms] relay 3 (for description see relay 1)
42214	2213	08A5	max. activation time	1	UINT16	RW	Maximal activation time [100 ms] relay 3 (for description see relay 1)
42215	2214	08A6	ON delay	1	UINT16	RW	ON delay [100 ms] for relay 3 (for description see relay 1)
42216	2215	08A7	OFF delay	1	UINT16	RW	OFF delay [100 ms] for relay 3 (for description see relay 1)

Reg No.	Addr		Description	No. Reg.	Format	Access	Remarks
	Dec	Hex					
42217	2216	08A8	Initial state after power-on	1	UINT16	RW	Initial state for relay 3 (for description see relay 1)
42218	2217	08A9	Limit low	1	INT16	RW	INT16 value for lower limit relay 3
42219	2218	08AA	Limit high	1	INT16	RW	INT16 value for upper limit relay 3
42220	2219	08AB	Limit hysteresis	1	INT16	RW	INT16 value for limit hysteresis at relay 3
42221	2220	08AC	Limit low	2	FLOAT	RW	FLOAT value for lower limit at relay 3
42223	2222	08AE	Limit high	2	FLOAT	RW	FLOAT value for upper limit at relay 3
42225	2224	08B0	Limit hysteresis	2	FLOAT	RW	FLOAT value for limit hysteresis at relay 3
42227	2226	08B2	Timeout function relay 3	1	UINT16	RW	Timeout function 0 OFF 1 to 65534 Timeout for relay 3 [100 ms]
== Relay 4 ==							
42311	2310	0906	Relay 4 input type	1	UINT16	RW	Set the operating mode of **relay 4** (for description see relay 2)
42312	2311	0907	Contact type	1	UINT16	RW	Contact type for relay 4 (for description see relay 1)
42313	2312	0908	min. activation time	1	UINT16	RW	Minimal activation time [100 ms] relay 4 (for description see relay 1)
42314	2313	0909	max. activation time	1	UINT16	RW	Maximal activation time [100 ms] relay 4 (for description see relay 1)
42315	2314	090A	ON delay	1	UINT16	RW	ON delay [100 ms] for relay 4 (for description see relay 1)
42316	2315	090B	OFF delay	1	UINT16	RW	OFF delay [100 ms] for relay 4 (for description see relay 1)
42317	2316	090C	Initial state after power-on	1	UINT16	RW	Initial state for relay 4 (for description see relay 1)
42318	2317	090D	Limit low	1	INT16	RW	INT16 value for lower limit relay 4
42319	2318	090E	Limit high	1	INT16	RW	INT16 value for upper limit relay 4
42320	2319	090F	Limit hysteresis	1	INT16	RW	INT16 value for limit hysteresis at relay 4
42321	2320	0910	Limit low	2	FLOAT	RW	FLOAT value for lower limit at relay 4
42323	2322	0912	Limit high	2	FLOAT	RW	FLOAT value for upper limit at relay 4
42325	2324	0914	Limit hysteresis	2	FLOAT	RW	FLOAT value for limit hysteresis at relay 4
42327	2326	0916	Timeout function relay 4	1	UINT16	RW	Timeout function 0 OFF 1 to 65534 Timeout for relay 4 [100 ms]

Reg No.	Addr		Description	No. Reg.	Format	Access	Remarks
	Dec	Hex					
45001	5000	1388	Configuration counter	1	UINT16	R	Counter is incremented internally each write of Conf parameters. The Modbus master can remember this value. As long as the counter has the same value, the configuration is unchanged.
45002	5001	1389	Register order	1	UINT16	RW	Order of registers at INT32 or FLOAT values 0x0001 HH-HL-LH-LL (**default**) 0x0000 LH-LL-HH-HL
45003	5002	138A	Date of last modification	2	UINT32	RW	Date (UNIX_TIMESTAMP) last change (Not managed by the device)
45010	5009	1391	Modbus: Address (in PC mode)	1	UINT16	RW	Modbus address: **1** ... 247 (default = 1)
45011	5010	1392	Baud rate (in PC mode)	1	UINT16	RW	Baud rate: 0x0000 - 300 0x0001 - 600 0x0002 - 1200 0x0003 - 2400 0x0004 - 4800 0x0005 - 9600 0x0006 - **19200** (default) 0x0007 - 38400 0x0008 - 57600 0x0009 - 115200 other: *undefined*
45012	5011	1393	Parity/Stop bits (in PC mode)	1	UINT16	RW	Parity: 0x0000 - **Even, 1 Stop bit** (default) 0x0001 - Odd, 1 Stop bit 0x0002 - None, 2 Stop bits 0x0003 - None, 1 Stop bit (no Spec !) (from Firmware 01.4.0) other: *undefined*
45013	5012	1394	Response delay (in PC mode)	1	UINT16	RW	Delay: **1** ... 1000 ms (default = 1)
45020	5019	139B	Modbus: Address (in DIP Mode)	1	UINT16	R	Modbus address: 1 ... 63
45021	5020	139C	Baud rate (in DIP Mode)	1	UINT16	R	Baud rate: 0x0005 - 9600 0x0006 - 19200 0x0007 - 38400 0x0009 - 115200
45022	5021	139D	Parity/Stop bits (in DIP Mode)	1	UINT16	R	Parity: 0x0000 - Even, 1 Stop bit 0x0002 - None, 2 Stop bits

Reg No.	Addr		Description	No. Reg.	Format	Access	Remarks
	Dec	Hex					
45023	5022	139E	Response delay (in DIP Mode)	1	UINT16	R	Delay: 1 ms at 115200 Baud 3 ms at 38400 Baud 5 ms at 19200 Baud 10 ms at 9600 Baud
48213	8212	2014	Save settings	1	UINT16	W	0x0043 Speeds up the save procedure of settings. Without this command the device saves changes approx. 5 seconds after the last write of a configuration parameter.

Accessories for DMB Modbus series

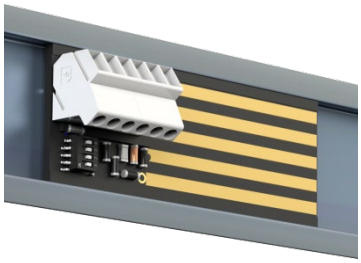


In-Rail-Bus Connector Kit

5-wire bus system for DIN rail

In-Rail-Bus for DIN rail 35 x 7.5 mm or 35 x 15 mm.
Length 120 mm, 250 mm or 500 mm

(The DIN rail is not included in the kit)



In-Rail-Mini Modbus

installation of small Modbus applications with In-Rail Bus System

Cost-effective and fast solution for small In-Rail-Bus installations.

The In-Rail-Mini Modbus is used to put the supply voltage 24 V DC into the In-Rail-Bus connectors and to connect the Modbus lines A and B. Line E is available for group messages, e.g. for a group error message. DIP switches can be used to connect the usual terminating and polarization resistors for RS 485 interfaces.

Modbus RTU Connection Module

for installations with In-Rail-Bus system

The 6.2 mm wide Power Terminal is used for supplying the In-Rail-Bus DIN rail connector with supply voltage up to 32 V DC and connect the Modbus lines to the In-Rail-Bus.
DIP switches can be used to connect the usual terminating and polarization resistors for RS 485 interfaces.

The Power Terminal **DMB 96000 B** for standard applications with 4.5 A output current is able to power up to 80 signal converter.

References

[1] Modbus Organization: "MODBUS APPLICATION PROTOCOL SPECIFICATION V1.1b3", 2012-04-12, http://www.modbus.org/specs.php .

[2] Modbus Organization: "MODBUS over Serial Line - Specification and Implementation Guide V1.02", 2006-12-20, http://www.modbus.org/specs.php.

[3] RIA/EIA: "RIA-485 / EIA-485", last revised 2003.

Revision history

Revision	Date	Changes / Notes
1	2016-03-04	Document created
2	2016-05-12	Register 40101, 40103 corrected
3	2016-11-28	DMB 96500 added
4	2016-12-13	Adding Parity NONE with 1 stop bit to Modbus configuration Reg. 45012 Description of In-Rail-Bus expanded
5	2017-01-19	DMB 96200, DMB 96700, DMB 96800 added
6	2018-01-12	Add detailed description for DMB 96100 and DMB 96500 Add description and holding register map for DMB 96200
7	2018-05-31	Add scale feature for DMB 96100 and DMB 96500 (firmware 01.6.0 and higher)
8	2019-03-01	Add DIP settings for all modules DMB 96400 added New page with useful accessories for DMB Modbus series
9	2019-11-18	Add column with register addresses in hexadecimal Add 96800 registers: 42027, 42127, 42227, 42327 (firmware 01.2.0 and higher)
10	2020-05-06	DMB 96500: Add the documentation of temperature ranges in appendix table 01
11	2023-05-24	Support of Modbus command 4 (Read Input Registers) for register no. from 30001

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