

# DM 046

## S-DIAS Digital Mixed Module

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## S-DIAS Digital Mixed Module

**DM 046**

### with 4 back-readable digital outputs

The S-DIAS Digital Mixed Module DM 046 has four back-readable digital outputs (+24 V/1.7 A). These can also be used as digital inputs (24 V/3.7 mA/0.5 ms). The supply voltage is monitored for under voltage. The back-readable outputs are galvanically separated.



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## 1 Technical Data

### 1.1 Digital Input Specifications (Back-reading the Digital Outputs)

Number	4	
Input voltage	typically +24 V	maximum +30 V
Signal level	low: < +8 V	high: > +14 V
Switching threshold	typically +11 V	
Input current	3.7 mA at +24 V	
Input delay	typically 0.5 ms	
Galvanic isolation	yes (isolation voltage 500 V)	

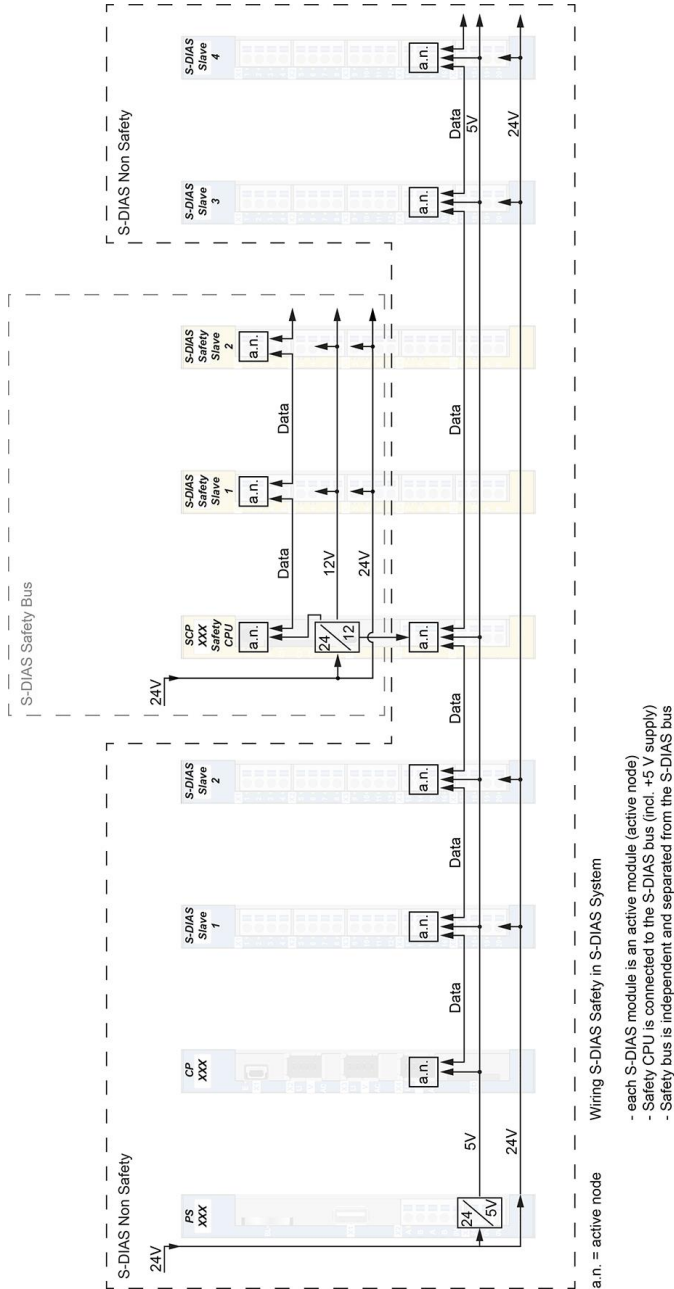
### 1.2 Digital Output Specifications

Number	4	
Short-circuit proof	yes	
Maximum continuous current load/channel allowed	1.7 A	
Maximum total current (entire module)	6.8 A	
Maximum braking energy of outputs (inductive load)	maximum 0.65 Joules/channel maximum 1.95 Joules/4 channels	
Residual current output (off)	≤ 12 μA	
Turn-on delay	< 200 μs	
Turn-off delay	< 200 μs	
Galvanic isolation	yes (isolation voltage 500 V)	

### 1.3 Electrical Requirements

External power supply +24 V	18-30 V DC	
External current consumption Power supply +24 V <sup>(1)</sup>	corresponds to the load on the digital outputs + outgoing 24 V supply  maximum 6.8 A	
Voltage supply from S-DIAS bus	+5 V	
Current consumption on the S-DIAS bus (+5 V power supply)	typically 39 mA	maximum 50 mA

<sup>(1)</sup> The outgoing sensor supply for X1, X2, X3 and X4 are fed via X5. Due to space requirements, there is no fuse in the module. The 24 V/0 V supply connections are designed for a maximum current of 6.8 A. The supply therefore requires an external fuse with a maximum rating of 6.8 A. The PE connection is designed for a maximum current of 6.8 A and function shielding with a maximum voltage of 125 C.





## 1.4 Voltage Monitor

Power supply +24 V	supply voltage > 18 V (DC OK-LED lights green)
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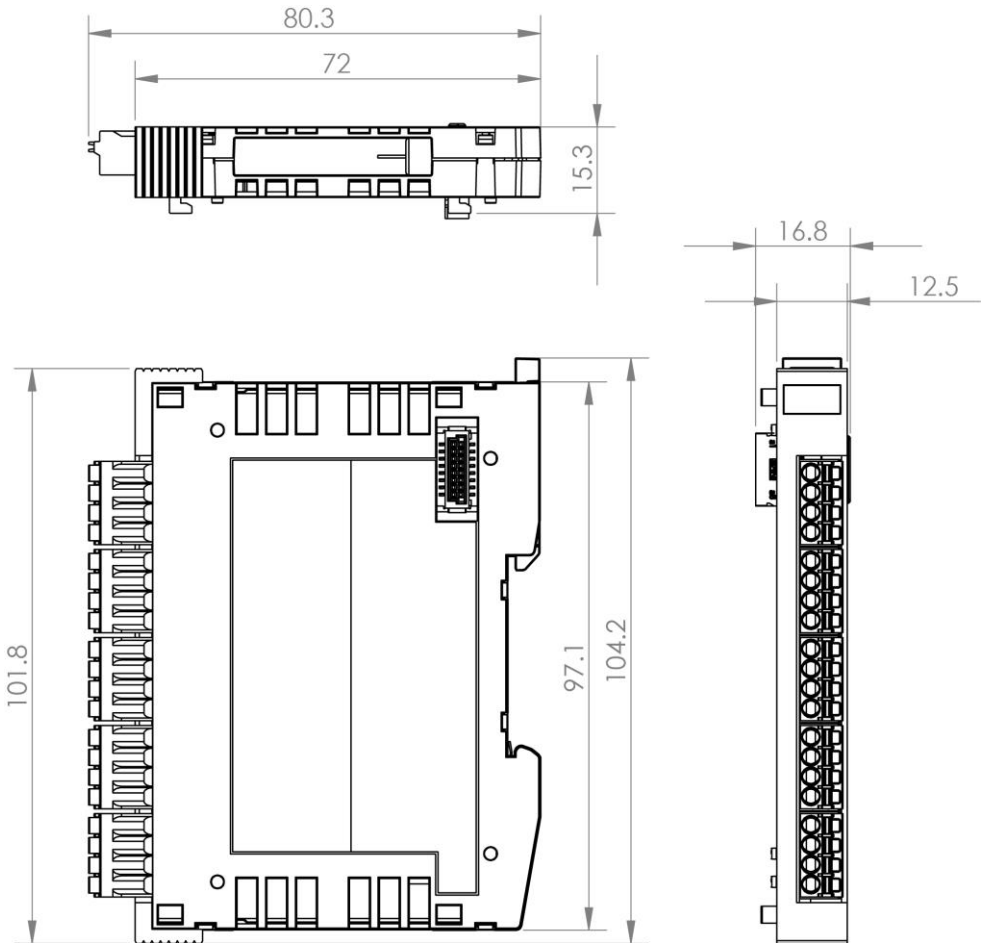
## 1.5 Miscellaneous

Article number	20-008-046
Hardware version	1.x
Standard	UL in preparation
Approbations	UL in preparation

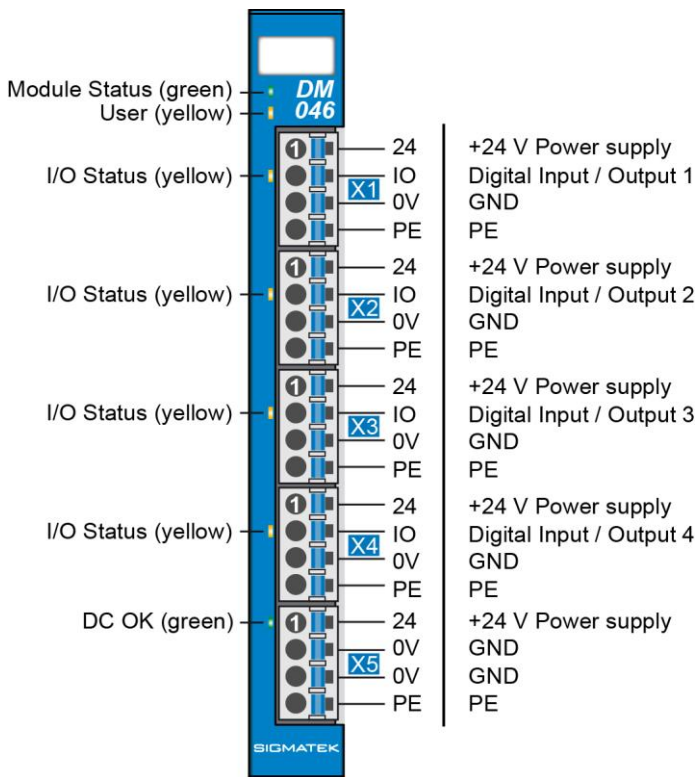
## 1.6 Environmental Conditions

Storage temperature	-20 ... +85 °C	
Ambient temperature	0 ... +60 °C	
Humidity	0-95 %, non-condensing	
Operating conditions	Pollution degree 2 altitude up to 2000 m	
EMC resistance	in accordance with EN 61000-6-2 (industrial area)	
EMC noise generation	in accordance with EN 61000-6-4 (industrial area)	
Vibration resistance	EN 60068-2-6	3.5 mm from 5-8.4 Hz 1 g from 8.4-150 Hz
Shock resistance	EN 60068-2-27	15 g
Protection type	EN 60529	IP20

## 2 Mechanical Dimensions



### 3 Connector Layout



The GND supply (X5: Pin 2 and Pin 3) is internally bridged. Only one GND pin (pin 2 or pin 3) is required to power the module. The bridged connections may be used for further looping of the +24 V supply and the GND supply. However, it must be taken into account that a total current of 6 A per connection is not exceeded by the forward looping!

### 3.1 Status LEDs

Module Status	green	ON	module active
		OFF	no supply available
		BLINKING (5 Hz)	no communication
User	yellow	ON	can be set from the application (e.g. the module LED can be set to blinking through the visualization so that the module is easily found in the control cabinet)
		OFF	
		BLINKING (2 Hz)	
		BLINKING (4 Hz)	
I/O Status	yellow	ON	output/input x ON
		OFF	output/input x OFF
DC OK	green	ON	voltage is supplied to the output group

### 3.2 Applicable Connectors

#### Connectors:

**X1-X5:** Connectors with spring terminals (included in delivery)

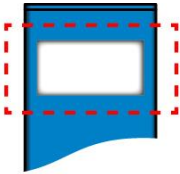
The spring terminals are suitable connecting ultrasonically compacted (ultrasonically welded) strands.

#### Connections:

Stripping length/Sleeve length:	10 mm
Mating direction:	parallel to the conductor axis or circuit board
Conductor cross section rigid:	0.2-1.5 mm <sup>2</sup>
Conductor cross section flexible:	0.2-1.5 mm <sup>2</sup>
Conductor cross section ultrasonically compacted:	0.2-1.5 mm <sup>2</sup>
Conductor cross section AWG/kcmil:	24-16
Conductor cross section flexible with ferrule without plastic sleeve:	0.25-1.5 mm <sup>2</sup>
Conductor cross section flexible with ferrule with plastic sleeve:	0.25-0.75 mm <sup>2</sup> (reason for reduction d2 of the ferrule)



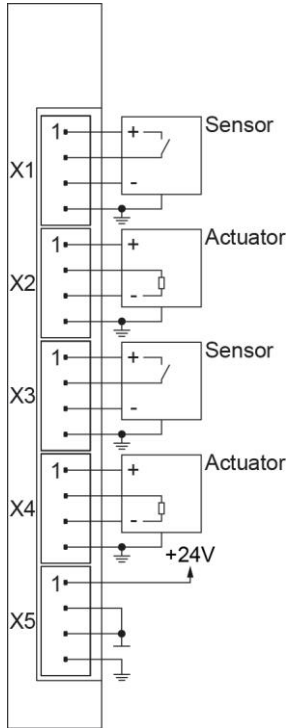
### 3.3 Label Field



Manufacturer	Weidmüller
Type	MF 10/5 CABUR MC NE WS
Weidmüller article number	1854510000
Compatible printer	Weidmüller
Type	Printjet Advanced 230V
Weidmüller article number	1324380000

## 4 Wiring

### 4.1 Wiring Example



## 4.2 Note

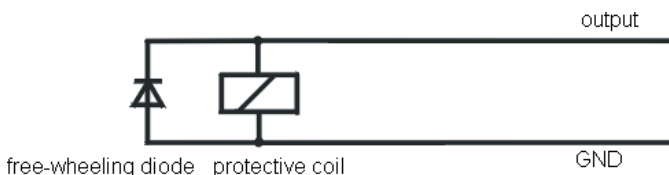
- Up to 4 outputs are powered by a common +24 V supply.
- The cross section of the conductor for the +24 supply must be sufficient for the maximum total current.
- The outputs can be turned off by turning off the +24 V supply voltage.
- Applying power to a back-readable output whose supply voltage exceeds 0.7 V is not allowed.
- If only the digital inputs of the module are used, a 24 V supply is still required to avoid feedback in the digital output through the I/O pin.

**Inductive loads must always be connected to a freewheeling diode or an RC network.  
This should be placed as close to the load as possible.**

**IMPORTANT:  
The S-DIAS module CANNOT be connected/disconnected while voltage is applied!**

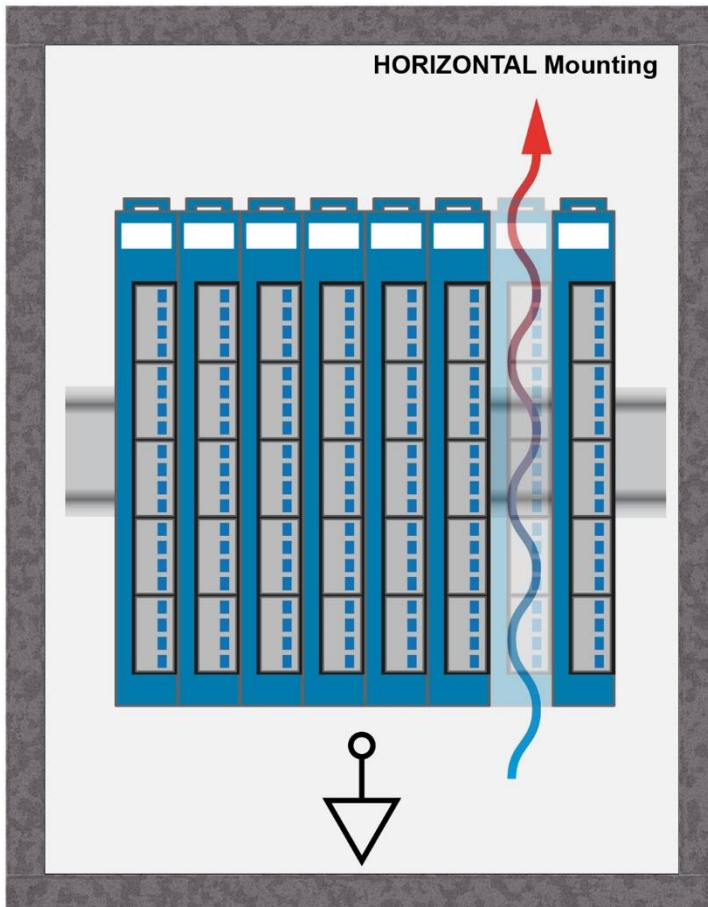
**Important!  
Le module S-DIAS ne peut pas être inséré ou retiré sous tension**

### 4.2.1 Connecting Inductive Loads



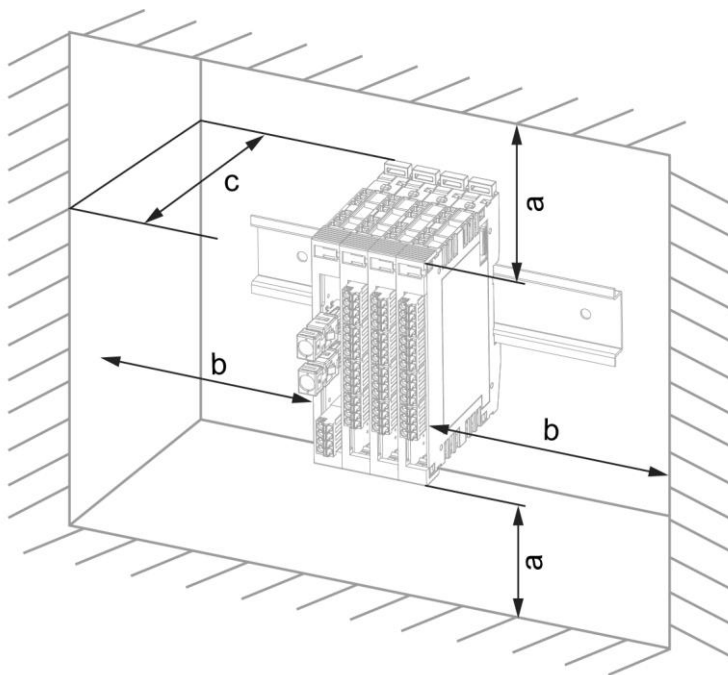
## 5 Mounting

The S-DIAS modules are designed for installation into the control cabinet. To mount the modules a DIN-rail is required. The DIN rail must establish a conductive connection with the back wall of the control cabinet. The individual S-DIAS modules are mounted on the DIN rail as a block and secured with latches. The functional ground connection from the module to the DIN rail is made via the grounding clamp on the back of the S-DIAS modules. The modules must be mounted horizontally (module label up) with sufficient clearance between the ventilation slots of the S-DIAS module blocks and nearby components and/or the control cabinet wall. This is necessary for optimal cooling and air circulation, so that proper function up to the maximum operating temperature is ensured.





Recommended minimum distances of the S-DIAS modules to the surrounding components or control cabinet wall:



a	b	c
30 mm (1.18")	30 mm (1.18")	100 mm (3.94")

a, b, c ... distances in mm (inches)

## 6 Addressing

Address (hex)	Size (bytes)	Access Type	Description	Reset value
<b>Memory</b>				
0000	2	r	Input register Bit 0     Input 1 Bit 1     Input 2 ... Bit 3     Input 4 Bit 4-7   Reserved Bit 8     DC 24 V OK Bit 9-15  Reserved	0000
0000	1	w	Output register Bit 0     Output 1 Bit 1     Output 2 ... Bit 3     Output 4 Bit 4-7   Reserved	00

## 7 Supported Cycle Times

### 7.1 Cycle Times below 1 ms (in $\mu\text{s}$ )

50	100	125	200	250	500
x	x	x	x	x	x

x= supported

### 7.2 Cycle Times equal to or higher than 1 ms (in ms)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x

x= supported

17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x

x= supported

## 8 Hardware Class DM046

### Hardware Class DM046 For the S-DIAS DM046 digital module

```

SDIAS:42, DM046 (DM0461)
[S] Class State (ClassState) <-[]->
[S] Device ID (DeviceID) <-[]->
[S] FPGA Version (FPGAVersion) <-[]->
[S] Hardware Version (HwVersion) <-[]->
[S] Serial Number (SerialNo) <-[]->
[S] Retry Counter (RetryCounter) <-[]->
[O] LED Control (LEDControl) <-[]->
----- Digital Inputs -----
[I] Digital Input 1 (Input1) <-[]->
[I] Digital Input 2 (Input2) <-[]->
[I] Digital Input 3 (Input3) <-[]->
[I] Digital Input 4 (Input4) <-[]->
[I] Input Byte (InputByte) <-[]->
----- Digital Outputs -----
[O] Digital Out 1 (Output1) <-[]->
[O] Digital Out 2 (Output2) <-[]->
[O] Digital Out 3 (Output3) <-[]->
[O] Digital Out 4 (Output4) <-[]->
[O] Output Byte (OutputByte) <-[]->
[S] Voltage OK Output 1-4 (VoltageOk) <-[]->
[ ] ALARM:00, Empty

```

This hardware class is used to control the hardware module DM 046 with 4 digital backreadable outputs. More information on the hardware can be found in the module documentation.

## 8.1 General

<b>Class state</b>	State	This server shows the actual status of the hardware class.								
<b>Device ID</b>	State	The device ID of the hardware module is shown in this server.								
<b>FPGA version</b>	State	FPGA version of the module in 16#XY (e.g. 16#10 = version 1.0).								
<b>Hardware version</b>	State	Hardware version of the module in format 16#XXYY (e.g. 16#0120 = version 1.20)								
<b>Serial number</b>	State	The serial number of the hardware module is shown in this server.								
<b>Retry counter</b>	State	This server increments when a transfer fails.								
<b>LED control</b>	Output	<p>With this server, the application LED of the S-DIAS module can be activated to find the module in the network more quickly. The following statuses are possible:</p> <table border="1" data-bbox="380 486 991 619"> <tr> <td>0</td> <td>LED off</td> </tr> <tr> <td>1</td> <td>LED on</td> </tr> <tr> <td>2</td> <td>blinks slowly</td> </tr> <tr> <td>3</td> <td>blinks rapidly</td> </tr> </table>	0	LED off	1	LED on	2	blinks slowly	3	blinks rapidly
0	LED off									
1	LED on									
2	blinks slowly									
3	blinks rapidly									
<b>Required</b>	Property	This client is active by default, which means that the S-DIAS hardware module at this position is mandatory for the system and can under no circumstances be disconnected or return an error. Otherwise, the entire hardware deactivated. If the hardware module is missing or removed, an S-DIAS error is triggered. If his client is initialized with 0, the hardware module located in this position is not mandatory. This means that it can be inserted or removed at any time. However, which components identified as "not required" should be selected with regard to the safety of the system.								

## 8.2 Digital Inputs and Outputs

<b>Input [1-4]</b>	Input	Status of the according backreadable output.				
<b>Output [1-4]</b>	Output	Output set via the write() method.				
<b>Input Byte</b>	Input	In this server, the digital outputs are shown in an 8-bit field. Within this bit field, 0 to 3 are allocated to inputs input1 to input4				
<b>Output Byte</b>	Output	In this server, the digital outputs are shown in an 8-bit field. In this word, bits 0 to 3 are allocated to output1 to output4. A write() instruction to this server writes the bit pattern to these outputs.				
<b>Voltage OK</b>	State	<p>Shows the supply status of the outputs 1-4.</p> <table border="1" data-bbox="380 1133 991 1197"> <tr> <td>0</td> <td>power supply error</td> </tr> <tr> <td>1</td> <td>power supply ok</td> </tr> </table>	0	power supply error	1	power supply ok
0	power supply error					
1	power supply ok					

### 8.2.1 Communication Interfaces

<b>ALARM</b>	Downlink	With this downlink the corresponding alarm class can be placed via the hardware editor.
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## Documentation Changes

Change date	Affected page(s)	Chapter	Note
20.07.2017	10	4.1 Wiring Example	changed
17.08.2017	6 9	1.6 Environmental Conditions 3.2 Applicable Connectors	Pollution Degree Sleeve length added Added info regarding ultrasonically welded strands
18.10.2017	10 14	3.3 Label Field 5 Mounting	Added chapter Graphic replaced
20.09.2018		3 Connector Layout	Note added
14.11.2019	17	7 Supported Cycle Times	Chapter added
28.02.2020	17	7 Supported Cycle Times	Text adapted
08.09.2020	18	8 Hardware Class DM046	Chapter added
04.11.2020	14	5 Mounting	Expansion functional ground connection