

# Product information Periphery module PM MI084











# Changes to older versions of this document

Rev.  $1 \rightarrow 2$ : red error flag of a Out deleted, resolution of a In now 12...16 Bit

Rev.  $2 \rightarrow 3$ : address range in process image corrected Rev.  $3 \rightarrow 4$ : LED-references corrected in images

Rev.  $4 \rightarrow 5$ : Counter description (like PC351)

Rev.  $5 \rightarrow 6$ : digial input threshold voltage

Rev.  $6 \rightarrow 7$ : information for disposal of old equipment Rev.  $7 \rightarrow 8$ : description for counter inputs improved

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# Description

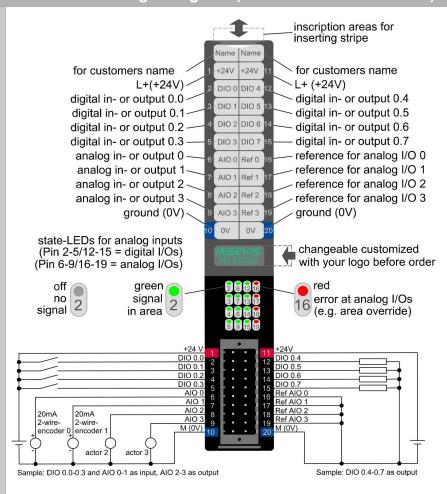
compact periphery module

- 8 digital transistor outputs 24V with backreadable inputs
- green diagnostic LED for each in-/ output
- insertion stripe with description field for every signal
- cage-clamp connector with bolt flanges on side
- Scope of delivery:
- technichal information
- brief instruction

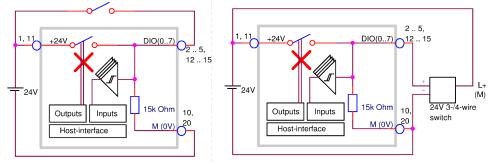
#### **INSEVIS-benefit:**

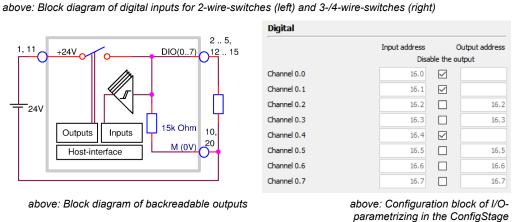
Each single outputs can be switched off, so that you can realize different ratios of I/Os e.g. 6dl and 2dO or 3dl and 5dO. Only the total sum of I/Os must be ≤8.

# for digital signals (2- and 3-/4-wire-switches)



above: Description and wiring of MIO84 for 2-wire switches







# Description

# - 4 analog in- or outputs configurable by software

Inputs:

- 0..10V, 0 (4)..20 mA for 2-wire-encoders including encoder supply
- 4..20 mA or ±20 mA for 4-wire-encoders
- Outputs:
- 0..10V - 0 (4)..20 mA
- Resolution 12 ...16 Bit (depending on integration time)
- green diagnostic-LEDs
- LED 6 for A I/O 0
- LED 7 for A I/O 1
- LED 8 for A I/O 2
- LED 9 for A I/O 3
- red diagnostic-LEDs for errors (override or short circuit on AI)
- LED 16 for A I/O 0
- LED 17 for A I/O 0
- LED 18 for A I/O 0
- LED 19 for A I/O 0
- insertion stripe with description field for every signal
- cage-clamp connector with bolt flanges on side

#### Scope of delivery:

- technichal information
- brief instruction

#### Hint:

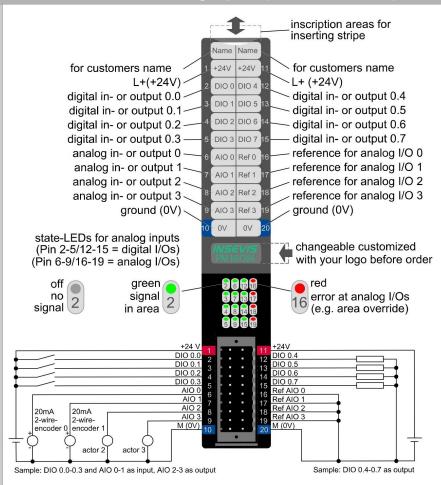
Connect Ref AIO 0..3 with ground (0V) always

#### **INSEVIS-benefit:**

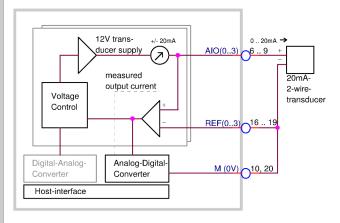
This module has an internal supply for the 2-wire encoders .
So it is not necessary to

So it is not necessary to care for external supply!

# for analog inputs (2-wire-encoders)



above: Description and wiring of all connections of PM MIO84 with 2-wire encoders



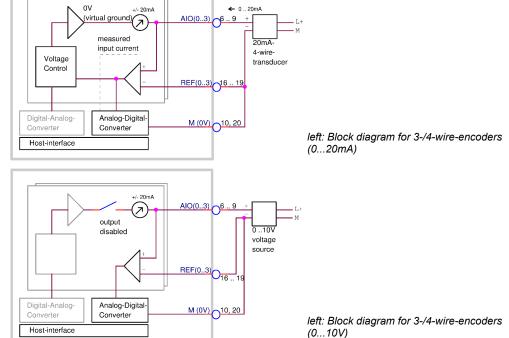
above: Block diagram for 2-wire-encoders (0..20mA)

Analog					
Integration time [ms]:					
	Type		Mode		Address
Channel 1:	Input	~	010V	~	8
Channel 2:	Input	~	420mA (2-wire)	~	10
Channel 3:	Output	~	010V	~	12
Channel 4:	Output	~	420mA	~	14
ave: Configuration block of I/O never metrizing in the ConfigStore					

above: Configuration block of I/O-parametrizing in the ConfigStage



#### for analog inputs (3-/4-wire-encoders) Description inscription areas for - 4 analog in- or outputs inserting stripe configurable by software Name Name Inputs: for customers name - 0..10V, 0 (4)..20 mA for for customers name +24\/ +24V 2-wire-encoders L+ (+24V) L+(+24V) DIO 0 DIO 4 including encoder supply digital in- or output 0.4 digital in- or output 0.0 DIO 1 DIO 5 - 4..20 mA or ±20 mA digital in- or output 0.1 digital in- or output 0.5 for 4-wire-encoders DIO 2 DIO 6 digital in- or output 0.6 digital in- or output 0.2 Outputs: digital in- or output 0.7 digital in- or output 0.3 DIO 3 DIO 7 - 0..10V - 0 (4)..20 mA analog in- or output 0 reference for analog I/O 0 AIO 0 Ref 0 reference for analog I/O 1 analog in- or output 1 AIO 1 Ref 1 Resolution 12 ...16 Bit analog in- or output 2 reference for analog I/O 2 (depending on AIO 2 Ref 2 analog in- or output 3 reference for analog I/O 3 integration time) ground (0V) ground (0V) AIO 3 Ref 3 green diagnostic-LEDs 0V 0V state-LEDs for analog inputs - LED 6 for A I/O 0 changeable customized (Pin1-4/12-15 = digital I/Os)- LED 7 for A I/O 1 with your logo before order (Pin5-8 = analog I/Os) - LED 8 for A I/O 2 - LED 9 for A I/O 3 off green error at analog I/Os no in area 2 signal red diagnostic-LEDs for 2 signal (e.g. area override) errors (override or short circuit on AI) - LED 16 for A I/O 0 +24V - LED 17 for A I/O 0 DIO 0.0 DIO 0.4 DIO 0.5 - LED 18 for A I/O 0 - LED 19 for A I/O 0 DIO 0.2 0.0 DIO 0.7 Ref AIO 0 insertion stripe with Ref AIO 1 20mA 2-/4-wire-encoder 1 20mA 2-/4-wire description field for every signal actor 2 encoder 0 L+ L+ cage-clamp connector with (M) (M) bolt flanges on side Sample: DIO 0.4-0.7 as output Sample: DIO 0.0-0.3 and AIO 0-1 as input, AIO 2-3 as output Scope of delivery: above: Description and wiring of all connections of PM MIO84 with 3-/4-wire encoders - technichal information - brief instruction Hint: (virtual ground) AIO(0..3) 6 Connect Ref AIO 0..3 with ground (0V) always measured 20mA input current Voltage transducer Control REF(0..3) 16 .. 19 Digital-Analog Analog-Digital Converter M (0V) 10, 20



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#### Description for analog outputs inscription areas for - 4 analog in- or outputs inserting stripe configurable by software Inputs: - 0..10V, 0 (4)..20 mA for for customers name +24V +24V for customers name 2-wire-encoders L+(+24V) L+ (+24V) DIO 0 DIO 4 including encoder supply digital in- or output 0.4 digital in- or output 0.0 -- 4..20 mA or ±20 mA DIO 1 DIO 5 digital in- or output 0.5 digital in- or output 0.1 for 4-wire-encoders DIO 2 DIO 6 digital in- or output 0.2 digital in- or output 0.6 Outputs: - 0..10V digital in- or output 0.7 digital in- or output 0.3 DIO 3 DIO 7 - 0 (4)..20 mA analog in- or output 0 reference for analog I/O 0 Ref 0 AIO 0 analog in- or output 1 reference for analog I/O 1 Resolution 12 ...16 Bit AIO 1 Ref 1 reference for analog I/O 2 analog in- or output 2 (depending on AIO 2 Ref 2 analog in- or output 3 reference for analog I/O 3 integration time) ground (0V) AIO 3 Ref 3 ground (0V) green diagnostic-LEDs 0V 0V - LED 6 for A I/O 0 state-LEDs for analog inputs (Pin 2-5/12-15 = digital I/Os) changeable customized - LED 7 for A I/O 1 - LED 8 for A I/O 2 with your logo before order (Pin 6-9/16-19 = analog I/Os) - LED 9 for A I/O 3 green off signal 2 error at analog I/Os red diagnostic-LEDs for signal 2 no (e.g. area override) errors (override or short in area circuit on AI) - LED 16 for A I/O 0 - LED 17 for A I/O 0 DIO 0.0 DIO 0.4 DIO 0.5 - LED 18 for A I/O 0 - LED 19 for A I/O 0 DIO 0.. DIO 0.6 DIO 0.7 Ref AIO 0 insertion stripe with AI Ref AIO 1 description field for 20mA 20mA every signal Ref AIO 3 M (0V M (0V) encoder cage-clamp connector with bolt flanges on side Sample: DIO 0.0-0.3 and AIO 0-1 as input, AIO 2-3 as output Sample: DIO 0.4-0.7 as output Scope of delivery: - technichal information above: Description and wiring of all connections of PM MIO84 for analog outputs - brief instruction Hint: Connect Ref AIO 0..3 AIO(0..3) 6 with ground (0V) always measured Load 0 .. 20mA output current Voltage REF(0..3) 16 .. 19 Digital-Analog Analog-Digital M (0V) 10, 20 left: Block diagram for Converter Converter analog outputs (0...20mA) Host-interface AIO(0..3) 6 .. 9 Load 0 .. 10V output current Voltage Control REF(0..3) 16

M (0V) 10, 20

left: Block diagram for analog outputs (0...10V)

Digital-Analog

Host-interface

Converter

Analog-Digital

Converter



# Configuration of the counter inputs

#### Counter Channel 1 (settings by ConfigStage)

#### Configuration "counting forward (up)"

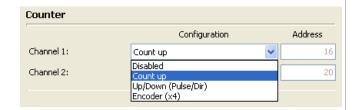
→ rising edges at input DI 0.0 will be counted

#### Configuration "counting for- / backwards (down)"

- → rising edges at input DI 0.0 will be counted and
- → input DI 0.1 is used as direction bit (0=backwards, 1=forward)

#### Configuration "Encoder"

→ inputs DI 0.0 and DI 0.1 represent the encoder interface with quadruple evaluation



In " Address " the number of the input double word is displayed, which contains the counter value.

#### Counter Channel 2 (settings by ConfigStage)

#### Configuration "counting forward (up)"

→ rising edges at input DI 0.2 will be counted

#### Configuration "counting for- / backwards (down)"

- $\rightarrow$  rising edges at input DI 0.2 will be counted and
- → input DI 0.3 is used as direction bit (0=backwards, 1=forward)

#### Configuration "Encoder"

→ inputs DI 0.2 and DI 0.3 represent the encoder interface with quadruple evaluation



In " Address " the number of the input double word is displayed, which contains the counter value.

# Hints for usage of the counter inputs

All following addresses are specified as offset related to configured start address of the MIO84 module!

#### onboard:

- read in counter by reading of ED16 / ED20 (synchronous to control point)
- set counter by writing to PAD16 / PAD20 (by direct periphery access only)
- this configuration can be modified in runtime with Step7 too:

configuration word for counter 1 is PAW24 configuration word for counter 2 is PAW28 "inactive" 0x00 "counting forward / up" 0x01 "for- / backward (pulse, direction)" 0x02 "encoder (x4)" 0x03

#### decentral:

- read in counter by reading of ED12 / ED16 (synchronous to control point)
- direct periphery access is implemented for decentral periphery only for data which are mapped into the process image.
- to set counters or write configuration use CANopen objects via SDO access.

configuration word for counter 1 object index 0x3010 + slot-1, subindex 6 object index 0x3010 + slot-1, subindex 7 setpoint counter 1 (dw) object index 0x3100 + slot-1, subindex 1 object index 0x3100 + slot-1, subindex 2

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Technical data		digital in-/ outputs	
Load voltage L+ Power dissapation Connection technology	24V DC (10 V 30 V DC) internal limited cage clamp technology for cross section up to max. 1,5mm <sup>2</sup>	Wire length unshielded (max.) shielded (max.)	30 m 100 m
Digital in- / outputs  Diagnostic LEDs	8 in- or outputs 8, green	Outputs: switch on delay switch off delay Inputs: switch on delay switch off delay	50 μs (typ.) 30 μs (typ., without load) 25μs
Output current for signal 0 for signal 1	0,5 mA (max.) 0,5 A (max. to 60°C)	Max. switching frequency of outputs	100 Hz with ohmic load
Cumulated current	2 A (max. to 60°C)	Counter  Frequency limit	2 each as forward counter, forward/backward counter or incremental encoder 10 kHz
Broken wire detection Error diagnostic Potential seperation to PLC	no no	Signal level of outputs for signal 0 for signal 1 Signal level of intputs for signal 0 for signal 1	1,0 V at 500 Ω (max.) L+ - 1,0 V at 0,5 A load (min.) 0V +5 V +10,5V +30 V

Technical data		analog in-/ outputs		
Load voltage L+	24V DC (17 V 30 V DC) connected by device supply	Wire length unshielded (max.) shielded (max.)	30 m 100 m	
Analog inputs Input areas	4 (alternatively to outputs what is to be configured by software) ±20 mA, 420 mA, 010 V	Valid voltage between inputs and A-GND (max.)	-1 V +24 V DC	
Diagnostic LEDs  4 green: signal in valid area 4 red: override or saturation no displaying broken wires and open inputs		Error message during override metering area	adjustable diagnosis- and limit value alert on request	
Value number format	9400 6C00 (hexadecimal) for range ± 20 mA all other 0000 6C00 (hexadecimal)	Broken wire detection	by overrun / shortfall of metering area	
Override area	20 mA 22 mA 10V 11,3 V	Acces of sensor	unsymetric against A-GND (single ended)	
Imput resitance	$0\Omega$ (typ.) for metering area current 1M $\Omega$ (typ.) for metering area voltage	Metering priciple / conversion priciple Resolution	successive approximation  1216Bit (depending on integration time assigned in ConfigStage)	
Sampling cycle time = Integration time	adjustable 1ms 35767 ms default: 100 ms (=line frequency filter 50Hz and 60Hz)	Deviation (based on input area)	< 1%	
Analog outputs  Output area (nominal values)	4 (alternatively to inputs what is to be configured by software) 0(4)20 mA, 010V	Value number format	0000 6C00 (hexadecimal)	
Resolution	15 Bit ΣΔ-Modulation	Short cut protection	yes	
Diagnostic LEDs	4 green: signal in valid area 4 rot: override or Load error	Override area	20 23 mA 10 11,3 V	
Setting time: response time $\tau$ (typ)	1,5 ms	Short cut current (typ.)	20 mA (at 10V) 32 mA (at mA)	
Load resistance against A-GND	mA: 500 Ω (max.) V: 1 kΩ (min.)	Deviation (based on output area)	< 1%	

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#### Configuration of the process image onboard:

module allocates 24 bytes of process data input and output.

Offset	I/O	Function	Description
0, 2, 4, 6	I	Input AI 0AI 3	Measuring range according to configuration - in voltage output mode: measure of output current - in current output mode: measure of output voltage
0, 2, 4, 6	0	Output AO0AO 3	Measuring range according to configuration - in input mode: ignored
8	I	Digital inputs .0 to .7	(Byte access)
8	0	Digital outputs .0 to .7	(Byte access)
9 15	I/O	Reserved	
16, 20	I/O	Counter 0, 1	Counter value (DINT, DWORD access)

## Configuration of the process image as decentral periphery:

module allocates 20 bytes of process data input and 9 bytes of process data output.

1				
Offset	I/O	Function	Description	
0, 2, 4, 6	I	Input AI 0AI 3	Measuring range according to configuration	
0, 2, 4, 6	0	Output AO0AO 3	Measuring range according to configuration	
8	I	Digital inputs .0 to .7	(Byte access)	
8	0	Digital outputs .0 to .7	(Byte access)	
9 11	I	Reserved		
12,16	I	Counter 0, 1	Counter value (DINT, DWORD access)	

Ordering data module		
Identification	Order-no.	Packaging unit
Periphery module MIO84	PM-MIO84-02	PU: 1 piece
Connector 2x10pin with pin markings and bolt flanges on side	E-CONS20D-00	PU: 1 piece

#### Qualified personnel

All devices described in this manual may only be used, built up and operated together with this documentation. Installation, initiation and operation of these devices might only be done by instructed personnel with certified skills, who can prove their ability to install and initiate electrical and mechanical devices, systems and current circuits in a generally accepted and admitted standard.

## Manuals, sample programs

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#### Disposal

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Do not throw old appliances in the household waste! In the interest of environmental protection, old appliances must be collected separately from unsorted municipal waste. You can find out more about the proper disposal / return of your old appliance at <a href="www.insevis.com/disposal">www.insevis.com/disposal</a>. Attention: The deletion of personal data on the old devices to be disposed of is the responsibility of the end user.

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