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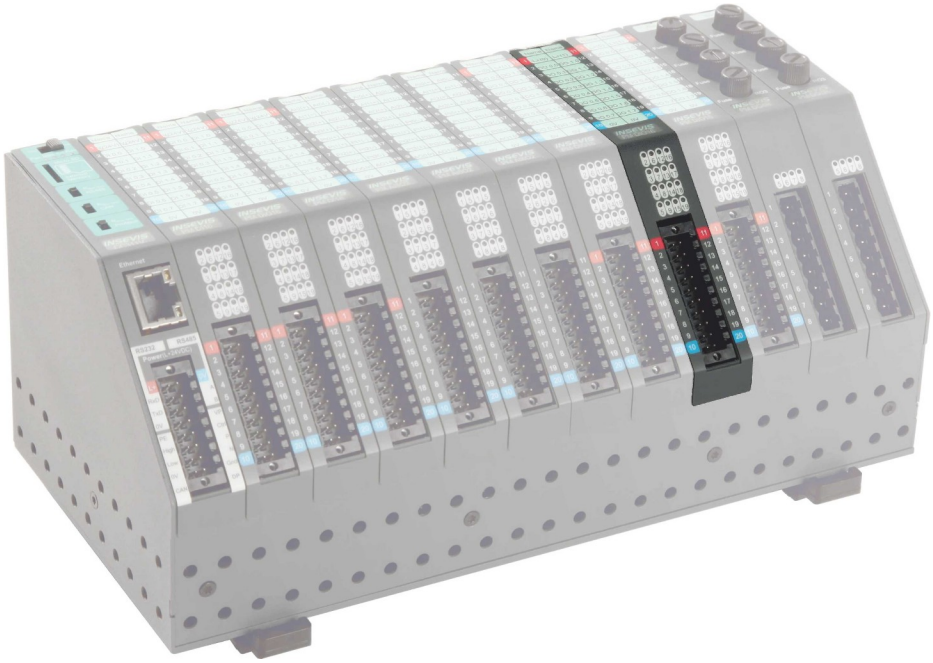
Product information

Periphery module

PM DIO8-Z



Changes to older versions of this document

Changed in Rev. 05: new versions DIO8Z...03 explained
Changed in Rev. 06: new design line
Changed in Rev. 07: new configuration: “count-up counter and time measurement”
Changed in Rev. 08: 24V-input threshold voltage
Changed in Rev. 09: **I**nformation for disposal of old equipment

Description

compact periphery module with 6 dedicated input channels and 2 fast back-readable outputs 24V/2A in 3 hardware versions:

for 24V:
6 digital inputs 24V
2 digital back-readable outputs 24V/2A
(Art.-no. PM-DIO8Z-24V-03)

for 5V
6 digital back-readable outputs 5V
2 digital back-readable outputs 24V/2A
(Art.-no. PM-DIO8Z-5V-03)

for RS422
6 bidirectional channels according RS485 / RS422
2 digital back-readable outputs 24V/2A
(Art.-no. PM-DIO8Z-422-03)

configurable by software to:
- **2 up/down-counter for encoder or puls and direction signal reference track**
  2 compare-outputs

or
- **2 counter to measure frequency or time period for encoder or puls and direction signal**
  2 compare-outputs

or
- **6 counter 16 bit count-up or measure time period**

or
- **2 SSI absolute encoder interfaces**

- alert function
- Counting with 32 Bit
- time resolution 40 ns
- configurable input filter
- green diagnostic LED for each in-/ output
- insertion stripe with description field for every signal

- insertion stripe with description field for every signal

- cage-clamp connector with bolt flanges on side

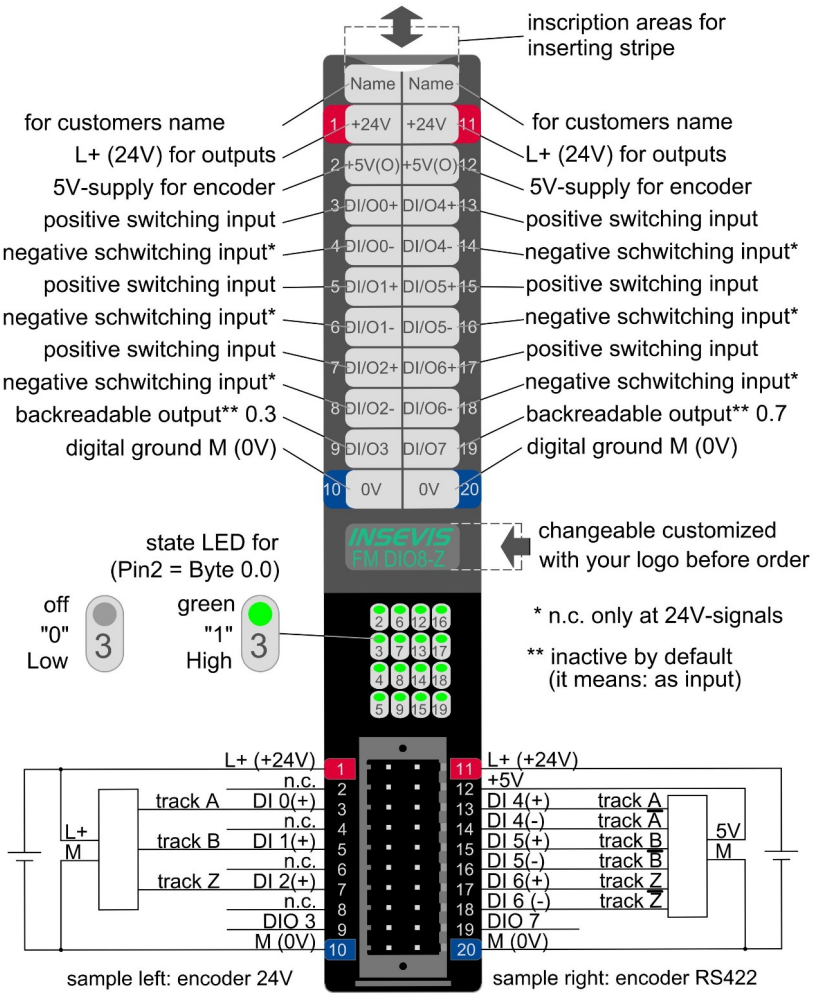


Figure above: description and wiring of all connections of periphery module DIO8Z-24V-03

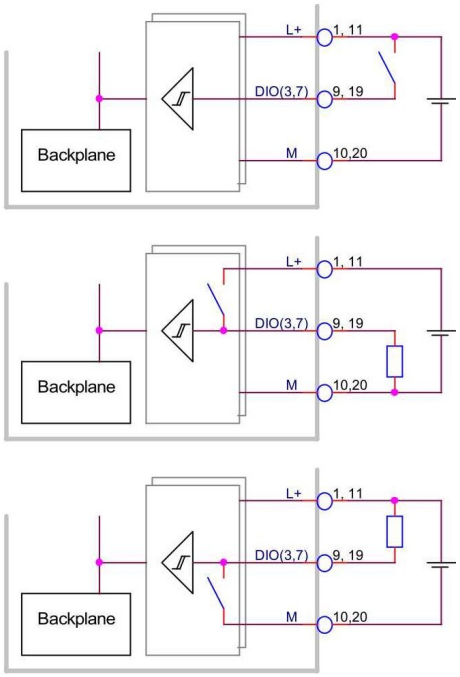


Figure above: block diagram of DIO3 and DIO7 as input (top), as output (L+ switching, middle) and as output (M-switching, down)

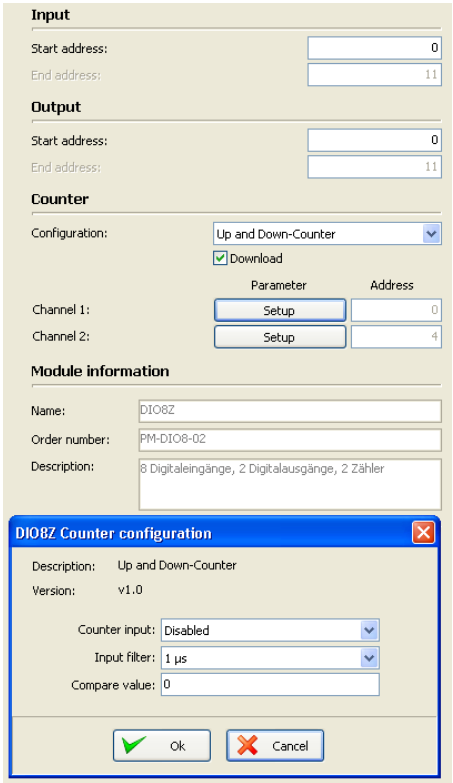


Figure above: configuration in ConfigStage

Technical data

Dimensions W x H x D (mm)	20 x 108 x 70 mm
Weight	ca. 150 g
Operating temperature range	-20°C ... +60°C (without condensation)
Storage temperature range	-30°C ... +80°C
Connection technology	cage clamp connector with bolt flanges on the sides (cage clamp technology) for cross section up to max. 1,5mm²
Load voltage L+	10 V ... 30 V DC
Current consumption	20 mA (max.) without load
Power dissipation	internal limited
Wire length	
unshielded (max.)	30m
shielded (max.)	100m

DI/O0 ... DI/O2, DI/O4 ... DI/O6	24V	5V (RS422 without terminating resistor)	RS422 (with terminating resistor)
Digital inputs	8 (max.), all with alert-function (interrupt)		
Diagnostic LEDs	8, green		
Article number	PM-DIO8Z-24V-03	PM-DIO8Z-5V-03	PM-DIO8Z-422-03
Input voltage			
for signal 0	0V ... +5V	0 .. +3V	
for signal 1	+7,5V ... +30V	+4 .. +5V	
positive switching	DI/O0(+) .. 7(+): signal DI/O0(-)..2(-), 4(-) .. 6(-): open	DI/O0(+) ..2(+), 4(+) .. 6(+): signal DI/O0(-)..2(-), 4(-) .. 6(-): open	
Input voltage			
for signal 0	+2.5V ... +30V	+2..+5V	
for signal 1	0V ... +1.5V	0..+1V	
negative switching "open collector"	DI/O0(+) .. 2(+), 4(+) .. 6(+): 5V DI/O0(-) .. 2(-), 4(-) .. 6(-): signal	DI/O0(+) .. 2(+), 4(+) .. 6(+): open DI/O0(-) .. 2(-), 4(-) .. 6(-): signal	
Inputs (differential)	-	differential reg. RS422	
Outputs	-	differential reg. RS422	
Input resistance	DI/O0(+)..2(+), 4(+).. 6(+): 6kOhm DI/O0(-) .. 2(-), 4(-) .. 6(-): Diode + 1.5 kOhm	1.5 kOhm	150 Ohm
Input current for signal 1	max.5mA		
Broken wire detection	no		
Error diagnostic	no		
Potential separation to PLC	no		
Input delay	2 µs (typ.)		
Output delay	2 µs (typ.)		
Max. counting frequency	125kHz (subject to change)		

DI/O3, DI/O7			
Digital outputs	2 with L+		
Diagnostic LEDs	2, green		
Output signal level		Input signal level	
for signal 0	1,0 V bei 500Ω (max.)	for signal 0	0V ... +5V
for signal 1	L+ - 1,0V bei 0,5A Last (min.)	for signal 1	+10,5V ... +30V
Output current			
for signal 0	0,5mA (max.)		
for signal 1	2 A (max. bis 60°C, subject to change)		
Output delay	30 µs (typ., without load)	Input delay	50 µs (typ.)
Max. switching frequency with ohmic load	100 Hz		
Broken wire detection	no		
Error diagnostic	no		
Potential separation to PLC	no		

The function module DIO8Z is a counter module with 6 function channels and 2 fast digital back-readable outputs.

Signal level

Function channels are available in 24V-, 5V- and RS422-versions (to be configured at INSEVIS only).
Bi-directional functions are possible only in 5V- and RS422-versions.

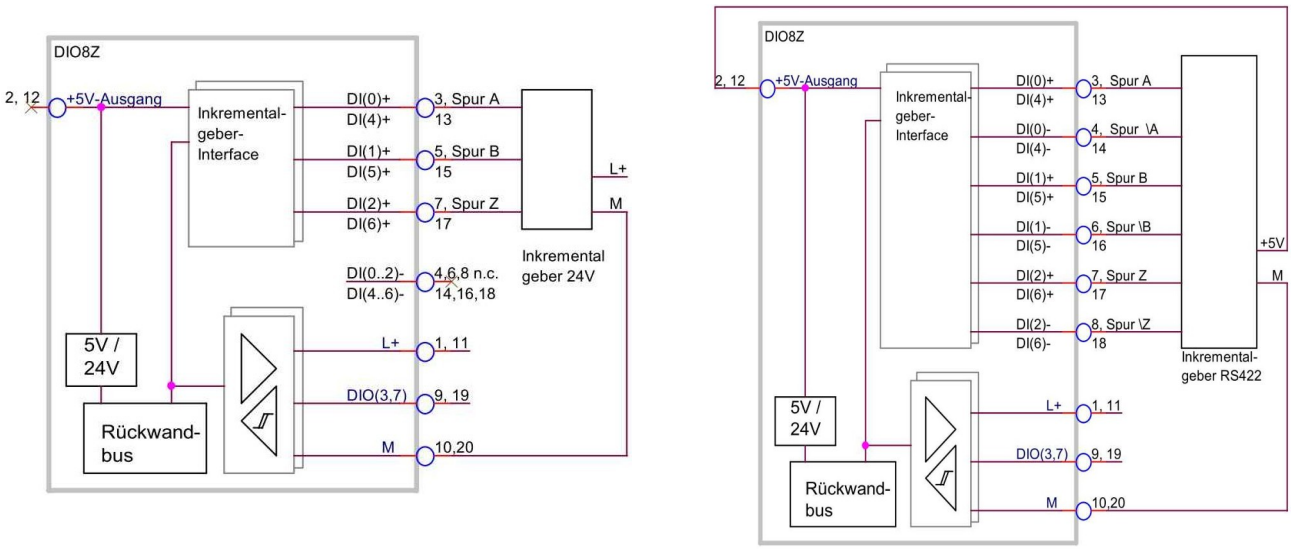
Configuration "up/down counter"

(hardware version 4.0, configuration vers. 1.000)
The function module contains 2 fast forward- and backward counters with alternative interfaces for encoder or pulse and direction signals.
The counter register has a preset- and a reference function.
The encoder interface always quadruples (x4) the number of physical pulses.

Preset and Reset
Counter can be preset in an asynchronous way with any values by the preset function. The new setpoint is written into the setpoint register (for reset write "0") and activated by a bit inside of the control byte.

Homing
The reference (homing-) function sets back the counter in a synchronous way onto an external reference signal (Z-trace). The homing mode will be started by setting a bit inside of the control byte and keeps active until the reference signal is detected. Then the counter returns into normal operation mode. The appearance of the reference signal can be requested by status bits.

Compare
The compare output will become active when the counter value exceeds the configuren Compare value. To configure the compare value the new value is written into the setpoint register and activated by a bit inside of the controlbyte.
Output 0.3 rsp. 0.7 and the counter compare output are logical xor-ed. Setting the output value bit inverts the compare-output (and vice versa)



Samples: Block diagrams of DIO8-Z(24V) with 24V-encoders and DIO8-Z(RS422) with RS422-encoders

S7-Data
The 32 bit counters are latched with the read of the less significant byte (LSB) into an mirror register. The remaining bytes are read from there. So it is possible to use byte, word and dword access. Consider to always read the LSB first to get a new and consistent counter value. Due to S7's high endian addressing the physical LSB is read at offset 3 using byte and at offset 2 using word access.
The control byte works static, i.e. the control bits must be set and reset. Consider that the process image will be updated at control point time – wait 1 cycle between set and reset or use direct periphery access.

Setup
The setup für input-mode (inactiv/activ, encoder or pulse/direction), filter time and compare value can be done in the software "ConfigStage". It is also possible to change these value at runtime from S7-code.

Hardware Interrupt (for "-T"-series devises only)
The compare output of each counter is assigned to an alarm channel. Each channel is to be enabled or disabled at runtime by a control bit (offset 11) separately.
In case of enabled channel and active compare output OB40 will be called. While the runtime of OB40 new events of the same channel are ignored.
Parameter OB40_MDL_ADDR of OB40's local data contains the base address of the peripheral modul,
parameter OB40_POINT_ADDR of OB40's local data contains status bits, corresponding the causing channel.
The format of the status bits is identical to the enable bits (.0 counter0, .1 counter1)

Assignment of process image "up/down counter"

The function module uses 12 byte in- and outputs in the process image.

Offset	I/O	Function	Description
0..3	I	Counter 0	32 bit forward and backward counter
	O	Setpoint register counter 0 (Config-, Compare-, Preset-Register)	asynchronous setpoint counter0, operation control bit depended
4..7	I	Counter 1	32 bit forward and backward counter
	O	Setpoint register counter 2 (Config-, Compare-, Preset-Register)	asynchronous setpoint of counter1 operation control bit depended
8	I	Input bits (status bits)	.0 pulse / trace A counter 0 .1 direction / trace B counter 0 .2 trace Z counter 0 .3 input 24V or status output 0.3 .4 pulse / trace A counter 1 .5 direction / trace B counter 1 .6 trace Z counter 1 .7 input 24V or status output 0.7
	O	Output enable bits	.0 - .7 output enable activate output driver of corresponding channel - not allowed when use channel as input - doesn't work at 0.-.2 and .4-.7 in 24V version
9	I	reserved	
	O	Output data bits	.0 - .7 output
10	I	Status byte	.4 reference mode counter 0 .5 reference mode counter 1 '1' reference mode active '0' reference impulse detected and counter resetted Mode 'counting'
	O	Control byte	.0 set preset counter 0 While this bit is 1 the output value from offset 0...3 will be carried over into counter 0. .1 set preset counter 1 While this bit is 1 the output value from offset 4...7 will be carried over into counter 1. .2 set compare value 0 While this bit is 1 the output value from offset 0...3 will be carried over into the compare register of counter 0. .3 set compare value 1 While this bit is 1 the output value from offset 4...7 will be carried over into the compare register of counter 1. .4 enable homing mode counter 1 .5 enable homing mode counter 2 If counter is in homing mode and trace Z is '1', the counter is resetted and the homing mode is left.

Offset	I/O	Function	Description
	O	Control byte	.6 Set Config 0 .7 Set Config 1 While this bit is 1 the output value from offset 0...3 / 4...7 will be carried over into the configuration register .0 SW-Gate 0=STOP, 1=RUN .1 Mode_INK 0=Puls/Dir, 1=encoder 4x .2 res .3 res. .4 - 5 limit of input bandwith 00 = 500kHz 01 = 30kHz 10 = 8kHz 11 = 2kHz .6 - .15 res. .16 - .31 res.
11	I	Status Alarm enable	State of enabled alarms
	O	Alarm enable	Alarm .0 enable compare counter 0 .1 enable compare counter 1

Description of function pins "up/down counter"

Pin	Identification	Function	Direction
1,11	+24V	common 24V-supply of outputs	Input / supply
2,12	5V(O)	common 5V-outputs to supply the encoders	Output
3	DI/O0+	positive switching input trace A / pulse counter0	Input
4	DI/O0-	negative switching input[1)] trace /A counter0	Input
5	DI/O1+	positive switching input trace B / direction counter0	Input
6	DI/O1-	negative switching input[1)] trace /B counter0	Input
7	DI/O2+	positive switching input trace Z counter0	Input
8	DI/O2-	negative switching input[1)] trace /Z counter0	Input
9	DI/O3+	back-readable output[2)] 0.4	Output
10,2	0V	common reference potential	Input / supply
13	DI/O4+	positive switching input trace A counter1	Input
14	DI/O4-	negative switching input[1)] trace /A counter1	Input
15	DI/O5+	positive switching input trace B counter1	Input
16	DI/O5-	negative switching input[1)] trace \B counter1	Input
17	DI/O6+	positive switching input trace Z counter1	Input
18	DI/O6-	negative switching input[1)] trace /Z counter1	Input
19	DI/O7+	back readable output[2)] 0.7	Output

[1)] keep pin unconnected at hardware version „24V", optional use in version „5V"
[2)] default configuration: input

Description of the status-LEDs configuration "up/down counter"

Pin	Identification	Function
2,12	5V	5V-supply voltage ok
3	DI/O0	State on input .0 pulse / track A counter0
4	DI/O0	Output .0 enabled
5	DI/O1	State on input .1 direction / track B counter0
6	DI/O1	Output .1 enabled
7	DI/O2	State on input .2 track Z counter0
8	DI/O2	Output .2 enabled
9	DI/O3	State on input .3 / back-readable output 0.3
13	DI/O4	State on input .4 pulse / track A counter1
14	DI/O4	Output .4 enabled
15	DI/O5	State on input .5 direction / track B counter1
16	DI/O5	Output .5 enabled
17	DI/O6	State on input .6 track Z counter1
18	DI/O6	Output .6 enabled
19	DI/O7	State on input .7 / back readable output 0.7

Configuration "Frequency and Time measurement"

(hardware version 4.0, configuration ver. 1.0)
The function module contains 2 fast forward- and backward counters to measure frequency (rsp. revolution speed) or time period

Measure frequency / revolution speed
The counter inputs can be configured as single channel, detecting rising edges or as encoder interface, which quadruples (x4) the number of physical pulses.

Cycle duration / time measurement
The counter measures the time between two rising edges of the pulse input, encoders are treated as single channel. There is no direction detection

Compare
The compare output will become active when the counter value exceeds the configuration Compare value. To configure the compare value the new value is written into the setpoint register and activated by a bit inside of the control byte.
Output 0.3 rsp. 0.7 and the counter compare output are logical xor-ed. Setting the output value bit inverts the compare-output (and vice versa)

S7-Data
The 32 bit counters are latched with the read of the less significant byte (LSB) into an mirror register. The remaining bytes are read from there. So it is possible to use byte, word and dword access. Consider to always read the LSB first to get a new and consistent counter value. Due to S7's high endian addressing the physical LSB is read at offset 3 using byte and at offset 2 using word access.
The control byte works static, i.e. the control bits must be set and reset. Consider that the process image will be updated at control point time – wait 1 cycle between set and reset or use direct periphery access.

Assignment of process image "Frequency and Time measurement"

The function module uses 12 byte in- and outputs in the process image.

Offset	I/O	Function	Description
0..3	I	Counter 0	32 bit forward and backward counter
	O	Setpoint register counter 0 (Config-, Compare-Register)	asynchronous setpoint counter0, operation control bit depended
4..7	I	Counter 1	32 bit forward and backward counter
	O	Setpoint register counter 2 (Config-, Compare-Register)	asynchronous setpoint of counter1 operation control bit depended
8	I	Input bits (status bits)	.0 pulse / trace A counter 0 .1 direction / trace B counter 0 .2 trace Z counter 0 .3 input 24V or status output 0.3 .4 pulse / trace A counter 1 .5 direction / trace B counter 1 .6 trace Z counter 1 .7 input 24V or status output 0.7
	O	Output enable bits	.0 - .7 output enable activate output driver of corresponding channel - not allowed when use channel as input - doesn't work at 0.-.2 and .4-.7 in 24V version
9	I	reserved	
	O	Output data bits	.0 - .7 output
10	I	Status byte	.0 NDR0 .1 NDR1 New Data Ready '1' the last read counter value was new '0' no new data (no pulse detected)
	O	Control byte	.0 reset NDR 0 While this bit is 1 the NDR0 bit in Status byte will be cleared .1 reset NDR 1 While this bit is 1 the NDR1 bit in Status byte will be cleared .2 set compare value 0 While this bit is 1 the output value from offset 0...3 will be carried over into the compare register of counter 0. .3 set compare value 1 While this bit is 1 the output value from offset 4...7 will be carried over into the compare register of counter 1. .4 res. .5 res. .6 Set Config 0 .7 Set Config 1 While this bit is 1 the output value from offset 0...3 / 4...7 will be carried over into the configuration register .0 SW-Gate 0=STOP, 1=RUN .1 Mode_INK 0=Puls/Dir, 1=encoder 4x .2 Mode_T 0= frequency measurement 1= time measurement .3 res. .4 - 5 limit of input bandwith 00 = 500kHz 01 = 30kHz 10 = 8kHz 11 = 2kHz .6 - .15 res. .16 - .31 res.
11	I	Res.	
	O	Res.	

Description of function pins "Frequency and Time measurement"

Pin	Identification	Function	Direction
1,11	+24V	common 24V-supply of outputs	Input / supply
2,12	5V(O)	common 5V-outputs to supply the encoders	Output
3	DI/O0+	positive switching input trace A / pulse counter0	Input
4	DI/O0-	negative switching input[1)] trace /A counter0	Input
5	DI/O1+	positive switching input trace B / direction counter0	Input
6	DI/O1-	negative switching input[1)] trace /B counter0	Input
7	DI/O2+	positive switching input trace Z counter0	Input
8	DI/O2-	negative switching input[1)] trace /Z counter0	Input
9	DI/O3+	back-readable output[2)] 0.4	Output
10,2	0V	common reference potential	Input / supply
13	DI/O4+	positive switching input trace A counter1	Input
14	DI/O4-	negative switching input[1)] trace /A counter1	Input
15	DI/O5+	positive switching input trace B counter1	Input
16	DI/O5-	negative switching input[1)] trace \B counter1	Input
17	DI/O6+	positive switching input trace Z counter1	Input
18	DI/O6-	negative switching input[1)] trace /Z counter1	Input
19	DI/O7+	back readable output[2)] 0.7	Output

[1)] keep pin unconnected at hardware version „24V", optional use in version „5V"
[2)] default configuration: input

Status-LEDs in configuration "Frequency and Time measurement"

Pin	Identification	Function
2,12	5V	5V-supply voltage ok
3	DI/O0	State on input .0 pulse / track A counter0
4	DI/O0	Output .0 enabled
5	DI/O1	State on input .1 direction / track B counter0
6	DI/O1	Output .1 enabled
7	DI/O2	State on input .3 track Z counter0
8	DI/O2	Output .2 enabled
9	DI/O3	State on input .3 / back-readable output 0.3
13	DI/O4	State on input .4 pulse / track A counter1
14	DI/O4	Output .4 enabled
15	DI/O5	State on input .5 direction / track B counter1
16	DI/O5	Output .5 enabled
17	DI/O6	State on input .6 track Z counter1
18	DI/O6	Output .6 enabled
19	DI/O7	State on input .7 / back readable output 0.7

Configuration “Count-up counter or Time measurement”

(hardware version 4.0, configuration ver. 1.0)
The function module contains 6 fast forward-counters. The counter mode can by changed to measure time period.
To measure frequency the PLC's timebase must be used.
For compatibility purposes to other configurations the counters are grouped into 2 channels with 3 counter each.

Count up
The counter inputs are configured as single channel, detecting rising edges with 16 bit.

Cycle duration / time measurement
The counter measures the time between two rising edges of the pulse input in timesteps of 1µs or 250 µs.

Compare
In this configuration are no compare outputs.

Program
The 16 bit counters are latched with the read of the less significant byte (LSB) into an mirror register. The remaining byte is read from there. So it is possible to use byte, word and dword access. Consider to always read the LSB first to get a new and consistent counter value. Due to S7's high endian addressing the physical LSB of a DW is read at offset 3 using byte and at offset 2 using word access.
The payload data of this configuraion are 16 bit words, the counter bytes are arranged this way to get 6 words (using “L IW”)
The bits of the control byte works static, i.e. the control bits must be set and reset. Consider that the process image will be updated at control point time – wait 1 cycle between set and reset or use direct periphery access.

Assignment of process image "Count-up counter or Time measurement"

The function module uses 12 byte in- and outputs in the process image.

Offset	I/O	Function	Description
0..1	I	Channel 0, counter 0	16 bit forward counter or period time
2..3	I	Channel 0, counter 1	16 bit forward counter or period time
0..3	O	Config-register channel 0, counter 0 - 2	configuration data buffer, control bit depended
4..5	I	Channel 1, counter 0	16 bit forward counter or period time
6..7	I	Channel 1, counter 1	16 bit forward counter or period time
4..7	O	Config-register channel 0, counter 0 - 2	configuration data buffer, control bit depended
8	I	Input bits (status bits) or MSB Channel 0, counter 2	.0 state of input channel 0, counter 0 .1 state of input channel 0, counter 1 .2 state of input channel 0, counter 2 .3 input 24V or status output 0.3 .4 state of input channel 1, counter 0 .5 state of input channel 1, counter 1 .6 state of input channel 1, counter 2 .7 input 24V or status output 0.7
	O	Output enable bits	.3, .7 output enable activate output driver of corresponding channel (0.-.2 and .4-.7 ignored)
9	I	reserved or LSB Channel 0, counter 2	
	O	Output data bits	.3, .7 output data (0.-.2 and .4-.7 ignored)
10	I	Status byte or MSB Channel 1, counter 2	
	O	Control byte	.0 resets channel 0, counter 0 - 2 .1 resets channel 0, counter 0 - 2 Writing this bits '1' resets the corresponding counter synchron .2 - .5 res. .6 Set Config channel 0 .7 Set Config channel 1 Writing this bits '1' the value from offset 0...3 / 4...7 will be carried over into the configuration register .0 - .2 Mode counter 0 – 2 0=counter, 1=period time count .3 - .5 Timestep (period time count only) 0= 250µs, 1=1 µs .6 - .7 limit of input bandwith 00 = 500kHz 01 = 30kHz 10 = 8kHz 11 = 2kHz .8 - .11 Interrupt enable input .0 bis .7
11	I	reserved or LSB Channel 1, counter 2	
	O	Mux	.7 Multiplexor input bytes 8 – 11 0= Status 1= channel 0, counter 2, channel 1, counter 2

Description of function pins "Count-up counter or Time measurement"

Pin	Identification	Function	Direction
1,11	+24V	common 24V-supply of outputs	Input / supply
2,12	5V(O)	common 5V-outputs to supply the encoders	Output
3	DI/O0+	positive switching input pulse channel 0, counter 0	Input
4	DI/O0-	negative switching input[1)] pulse channel 0, counter 0	Input
5	DI/O1+	positive switching input pulse channel 0, counter 1	Input
6	DI/O1-	negative switching input[1)] pulse channel 0, counter 1	Input
7	DI/O2+	positive switching input pulse channel 0, counter 2	Input
8	DI/O2-	negative switching input[1)] pulse channel 0, counter 2	Input
9	DI/O3+	back-readable output[2)] 0.4	Output
10,2	0V	common reference potential	Input / supply
13	DI/O4+	positive switching input pulse channel 1, counter 0	Input
14	DI/O4-	negative switching input[1)] pulse channel 1, counter 0	Input
15	DI/O5+	positive switching input pulse channel 1, counter 1	Input
16	DI/O5-	negative switching input[1)] pulse channel 1, counter 1	Input
17	DI/O6+	positive switching input pulse channel 1, counter 2	Input
18	DI/O6-	negative switching input[1)] pulse channel 1, counter 2	Input
19	DI/O7+	back readable output[2)] 0.7	Output

[1)] keep pin unconnected at hardware version „24V", optional use in version „5V"
[2)] default configuration: input

Status-LEDs in configuration " Count-up counter or measurement"

Pin	Identification	Function
2,12	5V	5V-supply voltage ok
3	DI/O0	State on input .0 pulse channel 0, counter 0
4	DI/O0	-
5	DI/O1	State on input .1 pulse channel 0, counter 1
6	DI/O1	-
7	DI/O2	State on input .2 pulse channel 0, counter 2
8	DI/O2	
9	DI/O3	State on input .3 / back-readable output 0.3
13	DI/O4	State on input .4 pulse channel 1, counter 0
14	DI/O4	-
15	DI/O5	State on input .5 pulse channel 1, counter 1
16	DI/O5	-
17	DI/O6	State on input .6 pulse channel 1, counter 2
18	DI/O6	
19	DI/O7	State on input .7 / back readable output 0.7

Function module DIO8-Z (8 digital in/ -outputs / encoder inputs)

Configuration „Synchronous Serial Interface“

(hardware version 4.0, configuration version 1.0)
The function module contains 2 Synchronous Serial Interfaces (SSI).

Structure
Each interface contains a configurable clock output, a bit-counter and a data shift register. The shift register includes always 32 bit, the transmission runs „MSB-first“, the LSB will be read and shifted shortly before the (next) rising clock edge.
The data register used in S7 will be updated after the last clock.
Due to 5V-/ RS422- level of the clock output this configuration doesn't run in the 24V-version.

Number of bits, clock-frequency, break length
The number of clocks is configurable from 1 to 32. After the clock burst a configurable break from 8 .. 64 µs occurs.
The clock frequency is configurable from 62,5 kHz to 2 MHz.

Special funktions: Gray-Code, Parity, Latch
Optionally a Gray-Code-Decoder can be switched into the data input path.
At every shift event of the register the parity is determined. The state of the parity is mapped into the status register and must be read separately.
The latch offers sampling synchronized to a digital 24V-signal. „Disabled“ causes free running continuously sampling, at „High“ or „Low“ only during High- resp. Low-level. At switching edges the initiated transfer will be completed. Mode „Edge“ causes sampling initiated by both edges (rising and falling).

Function module DIO8-Z (8 digital in/ -outputs / encoder inputs)

Assignment of process image „Synchronous Serial Interface“

The function module uses 12 byte in- and outputs in the process image.

Offset	I/O	Function	Description
0..3	I	Data interface 0	32 bit data register
	O	Configuration setpoint register 0	asynchronous input of configuration data, s. control bit
4..7	I	Data interface 1	32 Bit Datenregister
	O	Configuration setpoint register 1	asynchronous input of configuration data, s. control bit
8	I	Input bits (status)0 status of clock-output / interface 0 .1 input data / interface 0 .2 status input or output 0.2 .3 24V-input (Latch interface 0) or status output 0.3 .4 status of clock-output / interface 1 .5 input data / interface 1 .6 status input or output 0.6 .7 24V-input (Latch interface 1) or status output 0.7	.0 status of clock-output / interface 0 .1 input data / interface 0 .2 status input or output 0.2 .3 24V-input (Latch interface 0) or status output 0.3 .4 status of clock-output / interface 1 .5 input data / interface 1 .6 status input or output 0.6 .7 24V-input (Latch interface 1) or status output 0.7
	O	Output enable bits	.0 - .7 output enable activate output driver of corresponding channel - .0 and .4 always output (Clock) - .1 and .5 always input (Data)
9	I	reserved	
	O	Output data bits	.0, .1, .4, .5 not connected (SSI signals) .2, .3, .6, .7 outputs
10	I	Status byte	.0 Parity bit interface 0 .1 Parity bit interface 1
	O	Control byte	.0 ... .5 unused .6 Set configuration interface 0 .7 Set configuration interface 1 Writing '1' to these bits causes loading the configuration from setpoint register: .0 ... .4 number of bits [1..32] -1 .5, .6 reserved .7 0: Dual Code, 1: Gray Code .8, .9 break length 0: 64 µs 1: 32 µs, 2: 16 µs, 3: 8 µs .10, .11 Latch 0: disabled, 1: high, 2: low, 3: edge .12 … .14 clock-frequency 0:disabled, 1: 62,5 kHz, 2: 125 kHz, 3: 250 kHz 4: 500 kHz, 5: 1 MHz, 6: 1,5 MHz, 7: 2 MHz
11	I	reserved	
	O	reserved	

Description of function pins configuration „Synchronous Serial Interface“

Pin	Identification	Function	Direction
1,11	+24V	common 24V-supply of outputs	Input / supply
2,12	5V(O)	common 5V-outputs to supply the encoders	Output
3	DI/O0+	positive switching ouput[1] clock interface 0	Output
4	DI/O0-	negative switching output[1] clock interface 0	Output
5	DI/O1+	positive switching input[1] data interface 0	Input
6	DI/O1-	negative switching input[1] data interface 0	Input
7	DI/O2+	positive switching general input / output[2] 0.2	Input
8	DI/O2-	negative switching general input / output[2] 0.2	Input
9	DI/O3+	back-readable output 24V[2] 0.3	In / Out
10,2	0V	common reference potential	Input / supply
13	DI/O4+	positive switching Ausgang[1] clock interface 1	Output
14	DI/O4-	negative switching Ausgang[1] clock interface 1	Output
15	DI/O5+	positive switching Eingang[1] data interface 1	Input
16	DI/O5-	negative switching Eingang[1] data interface 1	Input
17	DI/O6+	positive switching general input / output[2] 0.6	Input
18	DI/O6-	negative switching general input / ouput[2] 0.6	Input
19	DI/O7+	back-readable output 24V[2] 0.7	In / Out

[1] default configuration, fixed
[2] default: input

Status-LEDs in configuration „Synchronous Serial Interface“

Pin	Identification	Function
2,12	5V	5V-supply voltage ok
3	DI/O0	State of clock-output Interface 0
4	DI/O0	Run: active during SSI-clock burst interface 0
5	DI/O1	State at data input interface 0
6	DI/O1	Output .1 enabled (LED only, no external function due to data input)
7	DI/O2	State at input .2
8	DI/O2	Output .2 enabled
9	DI/O3	State back-readable output .3
13	DI/O4	State of clock-output Interface 1
14	DI/O4	Run: active during SSI-clock burst interface 1
15	DI/O5	State at data input interface 1
16	DI/O5	Output .5 enabled (LED only, no external function due to data input)
17	DI/O6	State at input .6
18	DI/O6	Output .6 enabled
19	DI/O7	State back-readable output .7

Hints for downloading functions from ConfigStage into DIO8Z

- ConfigStage : Enabling the Download-option in counter configuration extensive data are stored into system data. After successful download into the PLC the configuration will be transferred into the DIO8Z module at the next startup and stored remanent. After this the download-option can be disabled.
- If the system data of the PLC contain the configuration data of DIO8Z ("Download" activated)
  and
  if the DIO8Z contains another configuration,
  and in the next run up (changeover from STOP to RUN) the physical download of the configuration data from the PLC into the DIO8Z is carried out. This download takes about 4 seconds.

During this time the PLC may NOT be switched off

and

no new download from ConfigStage into the PLC may be started.

- After a successful download of the counter configuration the configuration will be kept remanently in the DIO8Z-module after the next run up. Than the download-option can be deactivated.
- Older DIO8Z-version doesn't support configuration by ConfigStage
- In case of configuration error the operation system does following diagnostic buffer entries:

Event:		16# BF05
OB:		16# 00
PK:		16# FF
DatID 1/2:		16# 00 00
Add.info	1:	start address of module
	2:	Slotindex (0..10)
	3:	1: „Programming error“ - corrupt VME-data or hardware-error
		2: „no Data“ - Download-Option not enabled or SDB missing or corrupt
		3: Configuration in ConfigStage for old hardware but new hardware detected
		3: Configuration in ConfigStage for new hardware but old hardware detected

The PLC enters always STOP-state.

Ordering data module

Identification	Order-no.	Packaging unit
Periphery module **DIO8-Z** for 24V signals	PM-DIO8Z-24V-03	PU: 1 piece
Periphery module **DIO8-Z** for 5V signals	PM-DIO8Z-5V-03	PU: 1 piece
Periphery module **DIO8-Z** for RS422 signals	PM-DIO8Z-422-03	PU: 1 piece
Connector 2x10pin with bolt flanges	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
Additional documentation by manuals is available as well sample applications at the download area of www.insevis.com in English language for free download.

Disposal
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 www.insevis.com/disposal.
Attention: The deletion of personal data on the old devices to be disposed of is the responsibility of the end user.

With publication of this information all other versions are no longer valid.