Operating Manual

SMART IN CONTROL

motrona®
safety - control - motion - interface

IT210
Level Converter, Direction Signal Decoder and programmable pulse divider

Product features:

- Level Converter (RS-422, HTL Single Ended, HTL Differential, TTL and and vice-versa
- Implementation between the two types of representations for the direction of rotation (A / B 90 °, A / B Direction and vice versa)
- Adjustable division ratio of directional A / B pulses
- Adjustable division ratio for the Z pulse
- Reset of the Z divider by external input (defined setting)
- Zero setting of the A / B / Z divider by external input (defined Start / Stop)
- Z divider can also be used as an independent second divider
- Limit frequency up to 1 MHz, depending on the input format
- Push-pull outputs direct SPS control
- 9 to 30 VDC power supply

Die deutsche Beschreibung ist verfügbar unter:
https://www.motrona.com/fileadmin/files/bedienungsanleitungen/It210_d.pdf

The English description is available at:
https://www.motrona.com/fileadmin/files/bedienungsanleitungen/It210_e.pdf

La description en français est disponible sur:
https://www.motrona.com/fileadmin/files/bedienungsanleitungen/It210_f.pdf

Version:	Description:
It210_01a/CF/ Oct 2018	Version 1
It210_01b/CF/ Feb 2019	First revision
It210_02a/AF/MBO/Dez 2019	IT210 extension

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1. Safety Instructions and Responsibility

1.1. General Safety Instructions

This operation manual is a significant component of the unit and includes important rules and hints about the installation, function and usage. Non-observance can result in damage and/or impairment of the functions to the unit or the machine or even in injury to persons using the equipment!

Please read the following instructions carefully before operating the device and <u>observe all safety and warning instructions!</u> Keep the manual for later use.

A pertinent qualification of the respective staff is a fundamental requirement in order to use these manual. The unit must be installed, connected and put into operation by a qualified electrician.

Liability exclusion: The manufacturer is not liable for personal injury and/or damage to property and for consequential damage, due to incorrect handling, installation and operation. Further claims, due to errors in the operation manual as well as misinterpretations are excluded from liability.

In addition the manufacturer reserve the right to modify the hardware, software or operation manual at any time and without prior notice. Therefore, there might be minor differences between the unit and the descriptions in operation manual.

The raiser respectively positioner is exclusively responsible for the safety of the system and equipment where the unit will be integrated.

During installation or maintenance all general and also all country- and application-specific safety rules and standards must be observed.

If the device is used in processes, where a failure or faulty operation could damage the system or injure persons, appropriate precautions to avoid such consequences must be taken.

1.2. Use according to the intended purpose

The unit is intended exclusively for use in industrial machines, constructions and systems. Non-conforming usage does not correspond to the provisions and lies within the sole responsibility of the user. The manufacturer is not liable for damages which has arisen through unsuitable and improper use.

Please note that device may only be installed in proper form and used in a technically perfect condition - in accordance to the "Technical Specifications" (see chapter 10). The device is not suitable for operation in explosion-proof areas or areas which are excluded by the EN 61010-1 standard.

1.3. Installation

The device is only allowed to be installed and operated within the permissible temperature range. Please ensure an adequate ventilation and avoid all direct contact between the device and hot or aggressive gases and liquids.

Before installation or maintenance, the unit must be disconnected from all voltage-sources. Further it must be ensured that no danger can arise by touching the disconnected voltage-sources.

Devices which are supplied by AC-voltages, must be connected exclusively by switches, respectively circuit-breakers with the low voltage network. The switch or circuit-breaker must be placed as near as possible to the device and further indicated as separator.

Incoming as well as outgoing wires and wires for extra low voltages (ELV) must be separated from dangerous electrical cables (SELV circuits) by using a double resp. increased isolation.

All selected wires and isolations must be conform to the provided voltage- and temperature-ranges. Further all country- and application-specific standards, which are relevant for structure, form and quality of the wires, must be ensured. Indications about the permissible wire cross-sections for wiring are described in the Technical Specifications (see chapter 10).

Before first start-up it must be ensured that all connections and wires are firmly seated and secured in the screw terminals. All (inclusively unused) terminals must be fastened by turning the relevant screws clockwise up to the stop.

Overvoltages at the connections must be limited to values in accordance to the overvoltage category II.

For placement, wiring, environmental conditions as well as shielding and earthing/grounding of the supply lines the general standards of industrial automation industry and the specific shielding instructions of the manufacturer are valid. Please find all respective hints and rules on https://www.motrona.com/en/support --> "[General EMC Rules for Wiring, Screening and Earthing]".

1.4. Cleaning, Maintenance and Service Notes

To clean the front of the unit please use only a slightly damp (not wet!), soft cloth. For the rear no cleaning is necessary. For an unscheduled, individual cleaning of the rear the maintenance staff or assembler is self-responsible.

During normal operation no maintenance is necessary. In case of unexpected problems, failures or malfunctions the device must be shipped for back to the manufacturer for checking, adjustment and reparation (if necessary). Unauthorized opening and repairing can have negative effects or failures to the protection-measures of the unit.

2. Compatibility Hint

The main differences between the IT210 and the respective predecessor model IT251 are listed below:

	IT251	IT210
Housing	251	210
Input	RS422/DSUB HTL/clamps	clamps
Input characteristics	RS422/HTL Single	RS422/HTL Diff/HTL Single/TTL
Frequency	Max. 300kHz	1MHz/1MHz/350kHz/350kHz
Output	RS422/DSUB HTL/clamps Parallel outputs	clamps Only 1 output
Encoder supply	5.5V/130mA	5.5V/250mA
Temperature	0..45°	0..60°
MTBF	55,4a	109,3a
Supply	18..30V	9..30V (supply determines the nominal output level)
Input type	A/B90° A/BDir APuls/BPuls	A/B90° A/BDir -
A/B-divider	1:4096	1:4096
Z-divider	1:256	1:256
Zero pulse length	Adjustable	Adjustable

3. Introduction

The IT210 is a universal interface using with incremental measuring systems.
The device allows the solution of the following problems:

- Level conversion (RS-422, HTL single ended, HTL differential, TTL and vice versa)
- Division of two-track A / B pulses with adjustable ratio 1: 1 to 1: 4096
- Division of the Z pulse with adjustable ratio 1: 1 to 1: 256
- External HTL signals for various functions
- Implementation between the two types of representations for the direction of rotation (A/B 90 °, A/B Dir and vice versa, Division possible)
- Start / stop functionality via external ZERO_A signal

All settings are made on the DILL switches on the housing. The device consists of a compact housing with screw terminals and can be mounted on a DIN rail. Block diagram

4. Block diagram
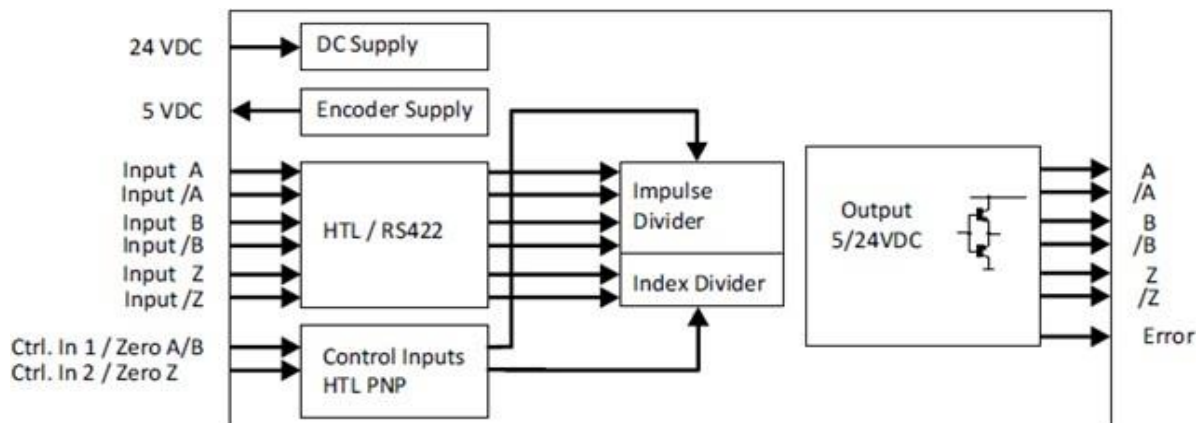
5. Electrical Connections

The terminal screws should be tightened with a slotted screwdriver (blade width 2mm).
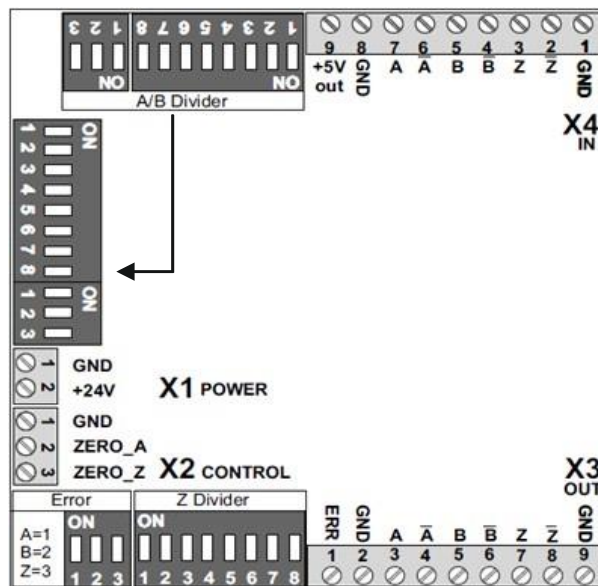
5.1.   DC Power Supply

The device is supplied with a DC voltage between 9 … 30 VDC via terminals 1 and 2 of X1. The current consumption depends on the level of the supply voltage and the settings and is approx. 35 mA without load from the sensor supply and additional on the extracted encoder current at the auxiliary voltage output.

All GND terminals are internally interconnected.

5.2.   Auxiliary Voltage Output

At terminal 8 and 9 of X4 the auxiliary voltage as encoder / sensor supply is +5.5 VDC and can be charged with max. 250 mA.

5.3.   Incremental Inputs A, /A, B, /B, Z, /Z

At terminal 2 … 7 of X4, 3 pulse inputs are available for HTL / TTL / RS422 signals. The unused inputs must be open (HTL single ended vs. HTL differential) or terminated (unused Z track in RS-422 or HTL differential format).

Wiring of the incremental inputs:

RS422   HTL DIFFERENTIAL

HTL PNP
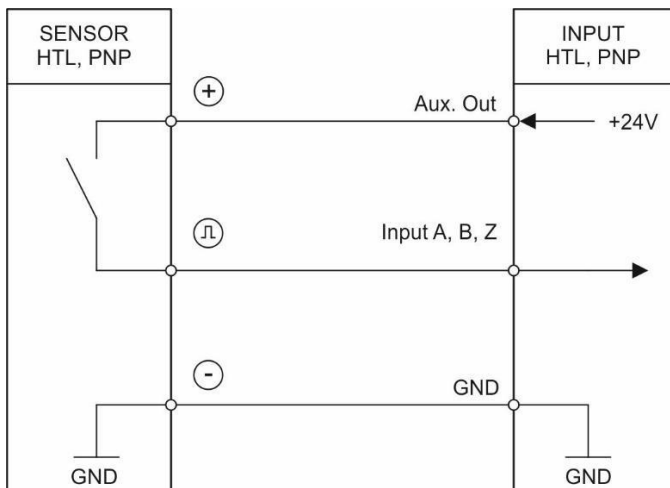
5.4.   Control Inputs

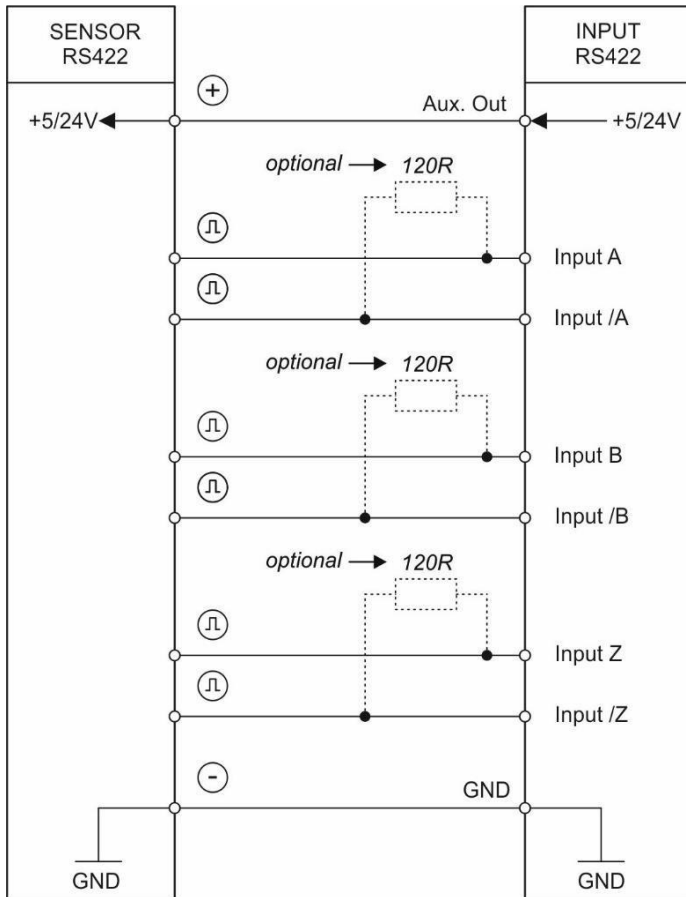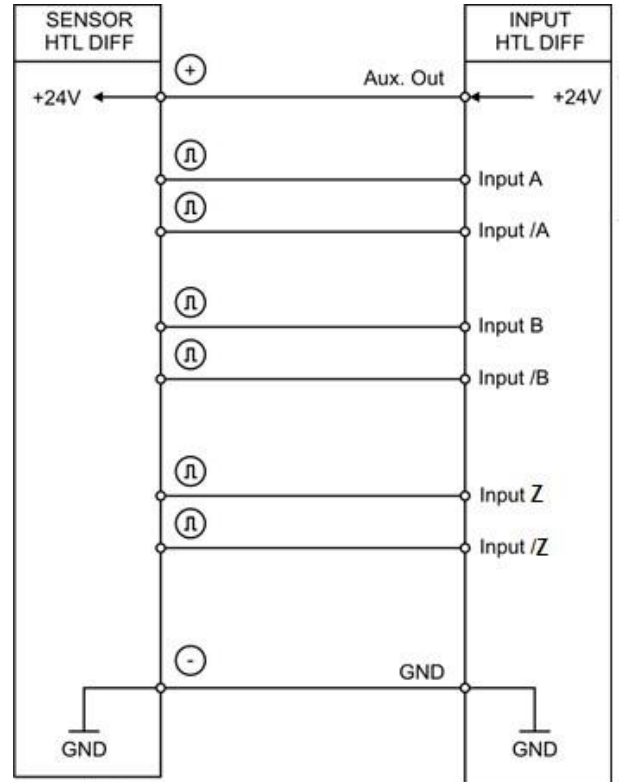Two control inputs with HTL PNP characteristics are available at terminals 2 and 3 of X2 and are used for resetting the internal dividers
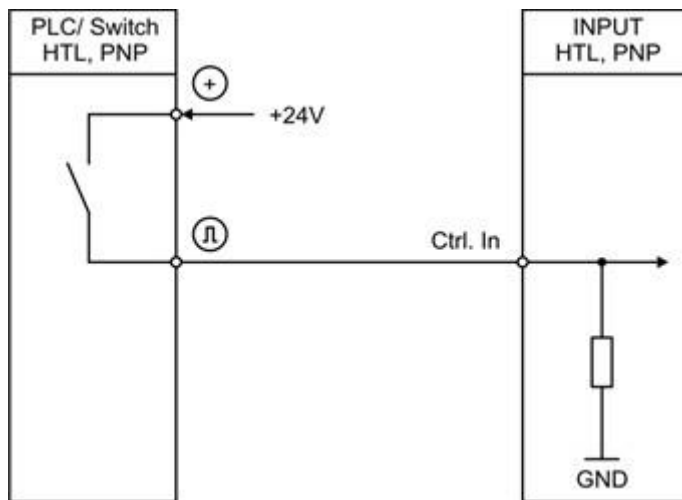
Unconnected control inputs are always "LOW".
All inputs are designed to receive impulses from an electronic impulse source.

Notice for mechanical switching contacts:
When exceptionally mechanical contacts are used, please connect an external capacitor between GND (-) and the corresponding input (+). A capacity of 10 µF will reduce the input frequency to
20 Hz and miscounting due to contact bouncing will be eliminated.

5.5.   Pulse output

Depending on the DIL switch setting, the pulses are available in HTL or RS-422 format at the outputs of screw terminal X3 and are independent of the used format. The height of the pulse level at the push-pull outputs in the HTL setting corresponds approximately to the input voltage at the supply input X1.

Please note that all input and output signals refer to the same common potential (GND) which at the same time is also the minus potential of the power supply.
At any time, the total transmission characteristics of encoder, external components and capacity of the cable must ensure proper signals at the input terminals of the unit, with respect to the levels, the shape and the phase displacement A/B.

5.6. Error Ausgang

An HTL error signal (input error, only with RS-422 or HTL differential) is available at the X3 screw terminal 1. (Error = low).

The error is triggered by a line fault (short circuit or line break) by the input lines A, / A, B, / B or Z, / Z. (Test mode OFF, DIL2 / 2 = OFF.

The DIL switch DIL3 (right, 3-pin) can be used to select the corresponding channel. If the DIL3 / 1 contact is set to OFF, no errors are evaluated on the A, / A line, DIL3 / 2 refers to the line B, / B and DIL3 / 3 to the line Z, / Z.

An error can only be detected in RS-422 or HTL differential format, all other formats will not trigger an error.

5.7. LED

The green LED indicates operational readiness (power supply switched on).
The yellow LED signals an input error. (only with RS-422 or HTL differential)

6. Input and output configuration

> Changes in the settings on the DIL switches will only be taken over by the device after the supply voltage has been switched on again!

Configuration								
DIL1 (Front 8-pole)								Function
1	2	3	4	5	6	7	8	
ON								Level for HTL Single Ended: $U_L < 10V$ / $U_H > 14V$
OFF								Level for HTL Single Ended: $U < 5V$ / $U > 9V$
	ON	ON						Input format: TTL
	ON	OFF						Input format: HTL Single Ended
	OFF	ON						Input format: RS-422
	OFF	OFF						Input format: HTL Differential
			ON	ON				Z-pulse length: 1 Z-Puls, independent of A / B
			OFF	ON				Z-pulse length: ynchronized with AOUT / BOUT
			ON	OFF				Z-pulse length: synchronized with AIN / BIN
			OFF	OFF				Z-pulse length: 1 Z-Puls, a depending on A/B
					ON			Input Mode : A/B Dir (Pulse / Direction)
					OFF			Input Mode : A/B 90°
						ON		Output Mode : A/B Dir (Pulse / Direction)
						OFF		Output Mode : A/B 90°
							ON	ZERO_A : Zero setting delayed, no errors
							OFF	ZERO_A : Zero setting immediately, error possible
							ON	Highest divider for A / B divider on (2048)
							OFF	Highest divider for A / B divider off (2048)

Configuration			
DIL2 (Front 3-pole)			Function
1	2	3	
ON			Z-pulse: Generation of a Z-pulse from AIN & BIN, AOUT & BOUT
OFF			Z-pulse: Z input is used
	OFF		Test mode deactivated: OFF
		ON	Output format : HTL Differential, HTL Single Ended ($_{UX1(2)}$ – 2V)
		OFF	Output format: RS-422, TTL (5V)

6.1. Level converter A/B Pulse (A/B Divider: All OFF)

If the A/B pulse have to be switched unchanged from the input to the output (no division, no change in length and position), then the DIL switch position listed below must be chosen. A level conversion is only possible if the input mode (A/B 90 ° or A/B dir) corresponds to the output mode. (DIL1/6 = DIL1/7).

Divider [A/B]												
DIL5 (Left 8-pole)								DIL6 (Left 3-pole)			DIL1 (Front)	Comment
1	2	3	4	5	6	7	8	1	2	3	8	
1	2	4	8	16	32	64	128	256	512	1024	2048	← Binary value
OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	AIN = AOUT, BIN = BOUT

6.2. Input/Output Mode Converter (A/B Divider: All OFF)

If input mode differs from output mode and in addition, the DIL switches DIL5 and DIL6 of the divider A/B are all set to OFF, the following signal characteristics are set up at the output.

Case 1:   Input A/B 90°, Output A/B Dir
DIL1/6 = OFF, DIL1/7 = ON with A/B Divider setting: DIL5, 6 = all OFF
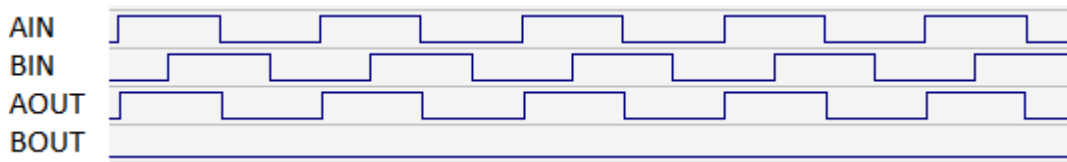
If the direction of the A/B 90 ° signal changes at the input, a change takes place at the BOUT output signal. (A/B dir). There is no division.

Case 2:   Input A/B Dir, Output A/B 90°
DIL1/6 = ON, DIL1/7 = OFF with A/B Divider setting: DIL5, 6 = all OFF
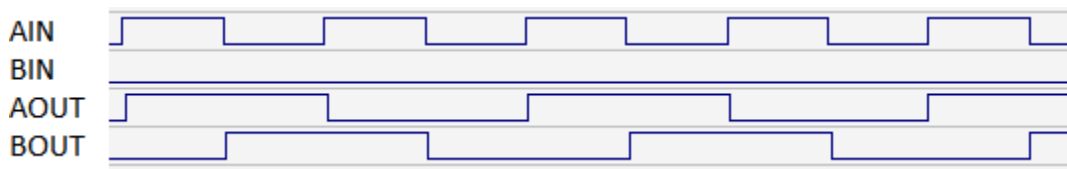
If a change takes place at the BIN input signal (A/B dir), the direction of the A/B 90 ° signal changes at the output. Here is a division 1:2, from the input in relation to the output.

7. Adjustable divider A/B

7.1. Setting the A/B Divider (at A/B Dir to A/B 90°)

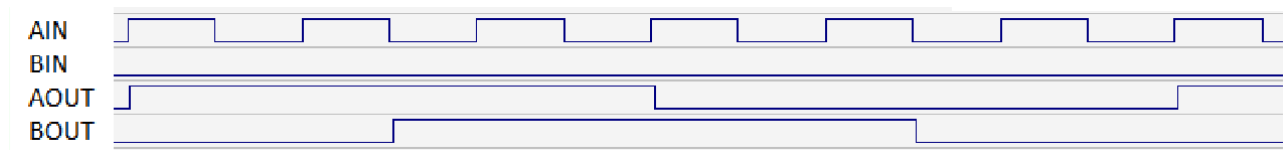The division ratio for the A/B pulses is set at the DIL switches DIL5 and DIL6. The switch positions use a binary code like shown in the subsequent list. (DIL1/6 = ON, DIL1/7 = OFF).

Divider [A/B]												
DIL5 (Left 8-pole)								DIL6 (Left 3-pole)			DIL1 (Front)	Comment
1	2	3	4	5	6	7	8	1	2	3	8	
1	2	4	8	16	32	64	128	256	512	1024	2048	← Binary value division => 1 : (Binary value +1) x2
ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	value 1 => 1 : 4
OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	value 2 => 1 : 6
ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	value 3 => 1 : 8
OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	value 4 => 1 : 10
ON	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	value 5 => 1 : 12
											OFF	…etc.
OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	1 : 1026
OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	1 : 2050
ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF	1 : 4096
ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	1 : 8192

Example: Input A/B dir, output A/B 90° with A/B division 1:6 (setting DIL6, 5: OFF ON OFF)


Division 1:2: See Input/Output Mode Conversion (A/B Divider: All OFF)

## 7.2. Setting the A/B divider (for all other modes)

The division ratio for the A/B pulses is set at the DIL switches DIL5 and DIL6. The switch positions use a binary code like shown in the subsequent list. (DIL1/6 = OFF, DIL1/7 = X).

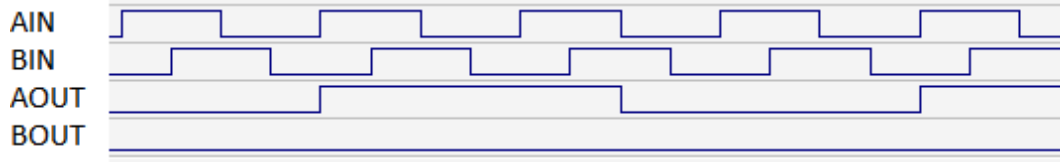| Divider [A/B]												
DIL5 (Left 8-pole)								DIL6 (Left 3-pole)			DIL1 (Front)	Comment
1	2	3	4	5	6	7	8	1	2	3	8	
1	2	4	8	16	32	64	128	256	512	1024	2048	← Binary value division => 1 : Binary value +1
ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	value 1 => 1 : 2
OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	value 2 => 1 : 3
ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	value 3 => 1 : 4
OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	value 4 => 1 : 5
ON	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	value 5 => 1 : 6
OFF	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	value 6 => 1 : 7
ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	value 7 => 1 : 8
											OFF	...etc.
OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	1 : 513
OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	1 : 1025
ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF	1 : 2048
ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	1 : 4096
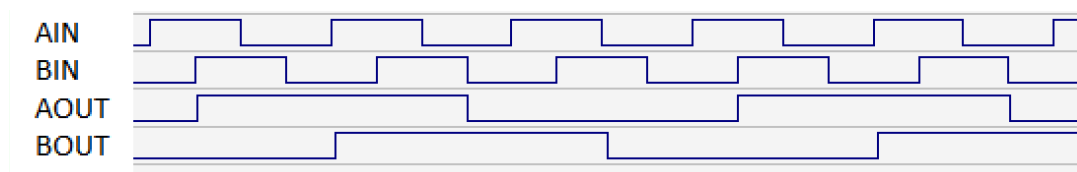
Example: Input A/B 90˚, output A/B 90 ˚ with A/B division 1:6 (setting DIL6, 5: OFF ON OFF

Example: Input A/B 90˚, output A/B 90˚ with A/B division 1:3 (setting DIL6, 5: OFF ON OFF
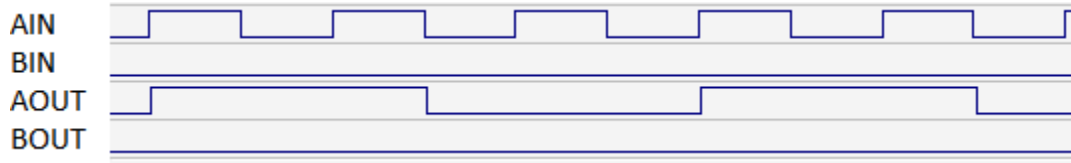
AIN
BIN
AOUT
BOUT

Example: Input A/B 90˚, output A/B 90˚ with A/B division 1:3 (setting DIL6, 5: OFF ON OFF

AIN
BIN
AOUT
BOUT

7.3.   Setting to zero the A/B divider with ZERO_A Signal

The divider will only be reset in the zero phase of the output signals AOUT and BOUT and will remain as long as the signal is attached. This prevents the miscounting of subsequent circuits. This function can only be applied to A/B 90°, it is independent of the divider ratio.
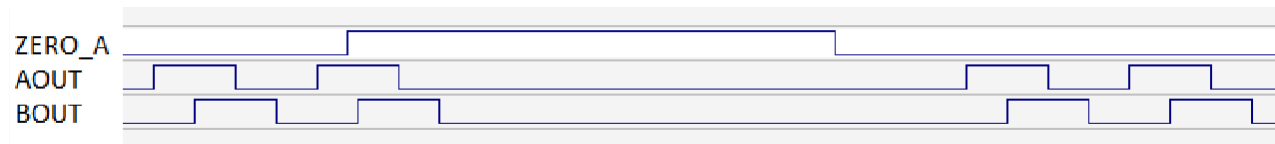
If there is a high signal at ZERO_A the A/B divider is reset and has the starting state AOUT = BOUT = Low. The divider is in a defined state. Depending on the direction of the input signals, the next split A/B pulse appears immediately after the reset, or after the set division ratio. The length of the ZERO_A pulse has to be greater than the period of frequency, than it can be switched off. This feature can be used for define start and stop.

The Z track can be set to zero with the ZERO_A input. The DIL switch DIL1/8 has been set to ON, A/B 90 ° output signals have been selected and the Z Pulse length has been synchronized to the output.

7.4.   Informationen over the signal change A/B Dir

Signal changes from B (direction) should appear shortly before or latest at the same time as the A flank so that the change can be detected correctly.

8. Adjustable divider Z

8.1.　Pegel conversion Z Puls (Z Divider: all OFF)

If the Z pulse have to be switched unchanged from the input to the output (no division, no change in length and position), then the DIL switch position listed below must be chosen.

Divider [Z]								
DIL4 (right 8-pole)								Comment
1	2	3	4	5	6	7	8	
1	2	4	8	16	32	64	128	← Binary value
OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ZIN = ZOUT (ZERO_Z = Low)

The output at the level conversion can be set to zero (ZOUT = Low) with the control input X2(3) ZERO_Z = High.
The function is active as long as there is a high level at the control input. The Z pulse can be trimmed by switching.

8.2.　Setting the Z Divider

The programming of the Z divider is subject to the same rules as the programming of the A/B divider.

Divider [Z]								
DIL4 (right 8-pole)								Comment
1	2	3	4	5	6	7	8	
1	2	4	8	16	32	64	128	← Binary value Divider => 1: Binary value +1
ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	1 : 2
OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	1 : 3
ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	1 : 4
OFF	OFF	ON	ON	ON	ON	ON	ON	1 : 253
ON	OFF	ON	ON	ON	ON	ON	ON	1 : 254
OFF	ON	ON	ON	ON	ON	ON	ON	1 : 255
ON	ON	ON	ON	ON	ON	ON	ON	1 : 256

8.3.   Location and width of the Z pulse

If the DIL switch DIL4 of the Z divider is completely set to OFF, the Z Pulse is forwarded from the input directly to the output (see level conversion Z Puls).

All pictures in this section assume that the A/B divider is set to 8. The Z Pulse is divided according to its divider (additionally DIL2/1 on OFF, ZIN is used, Z dividers not complete on OFF).

Depending on the length or location of the Z Pulses input and through the synchronization to the input or output signals, the Z pulse at the output can fluctuate around an input or output period (not with DIL1/5 = DIL1/4 = ON).
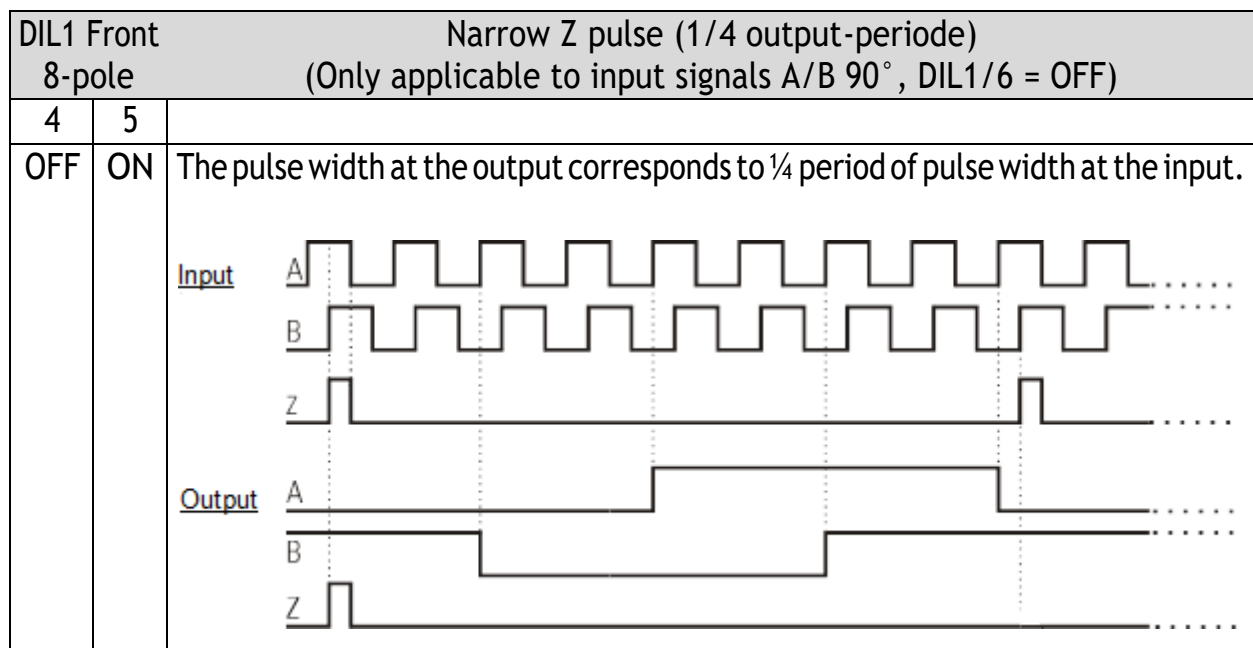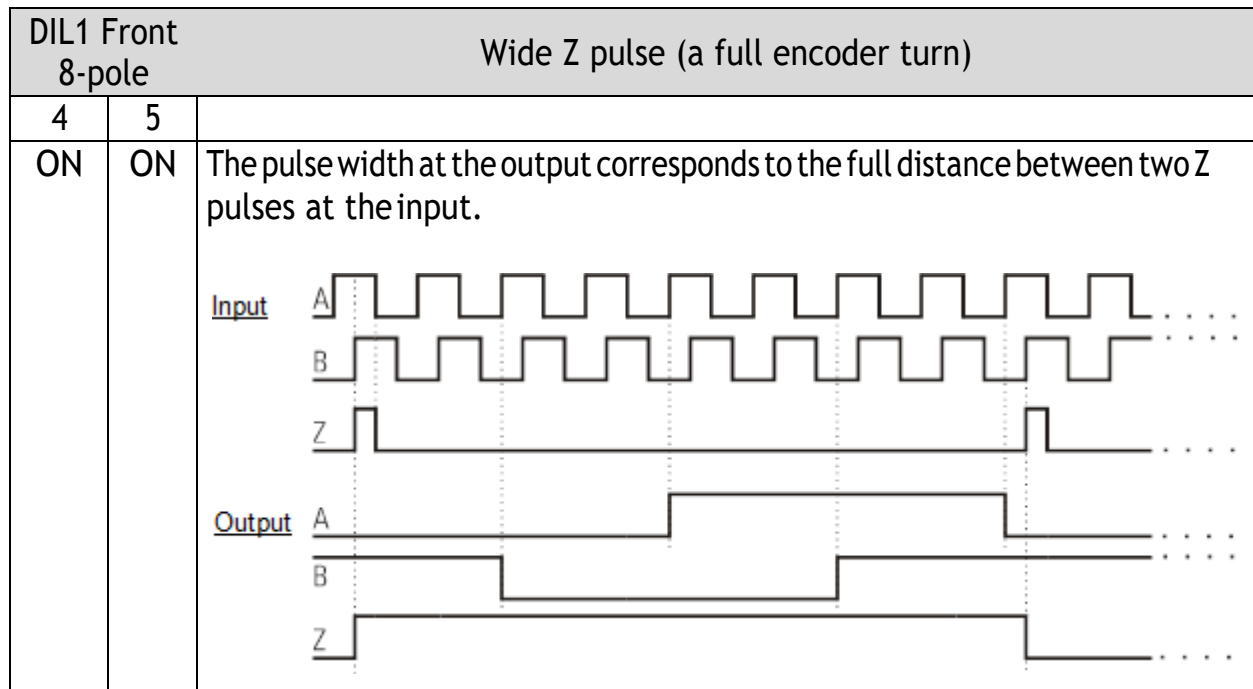
DIL1 Front 8-pole		Wide Z pulse (a full encoder turn)
4	5	
ON	ON	The pulse width at the output corresponds to the full distance between two Z pulses at the input.

DIL1 Front 8-pole		Narrow Z pulse (1/4 output-periode) (Only applicable to input signals A/B 90°, DIL1/6 = OFF)
4	5	
OFF	ON	The pulse width at the output corresponds to ¼ period of pulse width at the input.

DIL1 Front 8-pole		Narrow Z pulse (1/4 output-periode) (Only applicable to output signals A/B 90°, DIL1/7 = OFF)
4	5	
ON	OFF	The pulse width at the output corresponds to ¼ period of pulse width at the output.

In this operation mode, only division ratios may be used, which together with the A/B divisor deliver clear and completely results. A division with rest causes that the Z pulse at the output can fluctuate around an input or output period.

Example:
If at an encoder with 1000 pulses the A/B devider were set to 3 and at the same time the Z Pulse divider were set to 2, then the Z Pulse at the output would have to appear after 666,666 pulses, which is not physically possible.

8.4. Independent Z Divider

The Z divider works independently of the A/B track, the directional evaluation of the A/B signal does not affect the counting sequence (additionally DIL2/1 on OFF, ZIN is used, Z divider not completely set to OFF).

DIL1 Front 8-pole		Wide Z pulse (a full encoder turn)
4	5	
ON	ON	The pulse width at the output corresponds to the full distance between two Z pulses at the input.

8.5.   Automatic generation of a Z pulse

If the DIL switch DIL2/1 is set to ON, a Z pulse can be automatically generated.
The Z input is ineffective and does not need to be connected (Z divider not completely set on OFF).

DIL1 Front 8-pole		Narrow Z puls e (1/4 output- or input-period)
4	5	
OFF	ON	The Z pulse is generated from the input signal A/B. Each input period generates one count for the Z divider. The Z pulse width at the output corresponds to 1/4 period of the pulse width of the input signal A/B (Only applicable to input signals A/B 90°, DIL1/6 = OFF).
ON	OFF	The Z pulse is generated from the output signal A/B. Each output period generates one count for the Z divider. The Z pulse width at the output corresponds to 1/4 period of the pulse width of the output signal A/B (Only applicable to output signals A/B 90°, DIL1/7 = OFF).

8.6.   Reset the Z divider with ZERO_Z Signal

The Z divider can be reset by applying a high signal to the control input ZERO_Z.
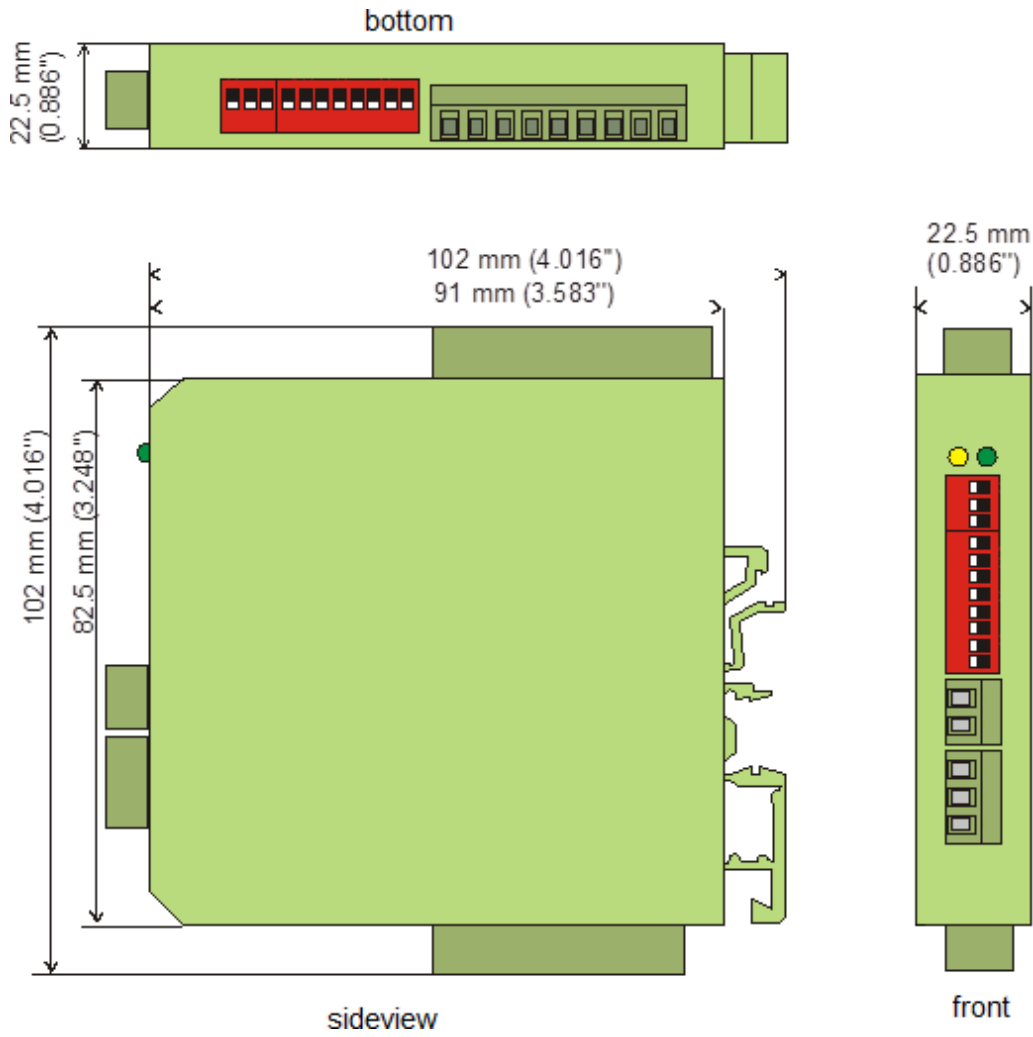The reset will act immediately and as long as the signal is applied.
Depending on the direction of the A/B track, the next Z pulse appears immediately after the reset or according to the set division ratio (not at the independent Z divider).
The reset of the Z divider can also be performed in case of automatic generation of the Z pulse.
By setting the Z-divider = all OFF, the setting of the ZERO_Z input causes an immediate zero setting of the output ZOUT (see level conversion Z pulse).
Note the special case in which the ZERO_A signal can also set the Z output to zero (see Setting to zero of the A/B divider with ZERO_A signal)

9. Dimensions

bottom

22.5 mm
(0.886")

102 mm (4.016")
91 mm (3.583")

22.5 mm
(0.886")

102 mm (4.016")
82.5 mm (3.248")

sideview

front

10. Technical Specifications

Technical Specifications		
Connections	Connection type:	Screw terminals, 1,5 mm² / AWG 16
Power supply:	Input voltage:	9 ... 30 VDC
	Protection circuit:	reverse polarity protection
	Ripple:	≤ 10 %
	Consumption:	approx. 40 mA (at 9 V, unloaded)
		approx. 30 mA (at 30 V, unloaded)
Sensor supply:	Output voltage:	+ 5,5 VDC +/- 5 %
	Output current:	max. 250 mA
Incremental inputs:	Number:	3
	Traces:	A, B, Z (HTL Single Ended, TTL)
		A, /A, B, /B, Z, /Z (RS422, HTL Differential)
	Configuration:	RS422, HTL Differential, HTL Single Ended, TTL
	RS422:	max. 1 MHz (RS422 Differential signal > 1 V)
	HTL Differential:	max. 1 MHz (HTL Differential signal > 2 V)
	HTL Signal Ended:	max. 350 kHz, level 1: Low 0 ... 10V, High 14 ... 30 V
		level 2: Low 0 ... 5V, High 9 ... 30 V
	TTL:	max. 350 kHz, Low 0 ... 0.7V, High 2.2 ... 5 V
Control inputs:	Number:	2
	Format:	HTL, PNP (Low 0 ... 5 V, High 9 ... 30 V)
	Frequency:	max. 20 kHz
	Response time:	50 µs
	Load:	max. 3 mA
Incremental outputs:	Number:	3
	Traces:	A, /A, B, /B, Z, /Z
	Format / level:	HTL: 8 ... 29 V (depending on the supply voltage)
		RS422: 5 V
	Output current:	max. 20 mA / Push-Pull
	Response time:	approx. 600 ns
Housing:	Material:	plastic
	Mounting:	35 mm top hat rail (according to EN 60715)
	Dimensions (w x h x d):	22,5 x 102 x 102 mm / 0,886 x 4,016 x 4,016"
	Protection class:	IP20
	Weight:	approx. 100 g
Ambient temperature:	Operation:	0 °C ... +60 °C / +32 ... +140 °F (not condensing)
	Storage:	-25 °C ... +70 °C / -13 ... +158 °F (not condensing)
Failure rate:	MTBF in years:	109,3 (long-term usage at 60 °C / 140 °F)
Conformity & standards:	EMC 2014/30/EU:	EN 61000-6-2, EN 61000-6-3,
		EN 61000-6-4, EN 61326-1
	RoHS (Ⅱ) 2011/65/EU	
	RoHS (Ⅲ) 2015/863:	EN IEC 63000