a-eberle

Position Indicator Interface
Typ REG-FI 'B1'

Function

The REG-FI position indicator interface converts a standard 0/4-20 mA output current of a tap-changer into a BCD code.

A power supply unit delivers the supply voltages for the measuring transducer and the relays.

The entering current is connected with a couple of lines to the measurement input. A current Id change (I_{delta}) generates the next step message.

A binary output transmits the information to the voltage control system REGSys.

For further use the BCD code is provided by 6 relay contacts and 6 current outputs.

- Up to 38 uniform current tap-change positions are converted into a BCD code
- The cable between the tap-changer and the REG-FI can be up to 100 m (maximum)
- Relay contacts with AC 250V 2A, DC 220V 150W
- Large auxiliary voltage range of the power supply

Technical specifications

Regulations and standards

IEC1010, IEC801-1 to 6, VDE0110, VDE0160
Interference immunity   EN50082-2
Emitted interference   EN50081-2, EN55011

Mechanical data

Design	19"plug-in modules (8TE, 3HE)
Circuit board	100 x 160 mm
Front panel	Aluminum, RAL 7035 grey
Configurations	according to DIN 41494 part 5
Plug-in connector	2 units. 'F1': DIN 41612 MH 24+7pole
	'F2': DIN 41612 F 48-pole
19"mounting	'F1' at position 'n' and 'F2' plus 5 TE
Degree of protection	IP00
Weight	Plug-in modules ≤ 0.3 kg

Input

DC current	0/4 mA … 20 mA
Current tap change Id	0.25 ... 2.5 mA same current stage
Tap-change positions	≤38
Input resistance R_E	< 25 mV / Id
Tolerance of current tap-change pos. Id	<2 % of specified value
Superimposed alternating current at input	<0.1 mA (50 Hz sinus)

Output

Binary output BCD 1 …	BCD 20/sign- to the BCD input (50V) of the REG-D; reference BCD GND
Voltage at 10kOhm	ON (1) ≥10 V DC
	OFF (0) ≤ 5 V DC
Voltage output U+	15 V DC ± 10 %; reference GND; Internal resistance 1.2 kΩ

Relays with one N/O contact for output:

BCD Codes 1..20/sign-	contact closed (1) / open (0)
Potential isolation	auxiliary voltage and relays contacts from each other and all other circuits
Contact load	AC 250 V 2 A, DC 220 V 150 W
Number of switching operations	< 10^5

REG-F
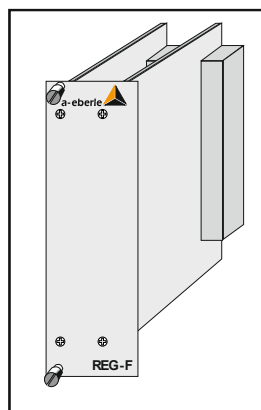
Codetable

Input: Current tab change	DEC	Output: Display, relays Output BCD-Code					
		20	10	8	4	2	1
0 / 4mA	1	0	0	0	0	0	1
1 x Id	2	0	0	0	0	1	0
2 x Id	3	0	0	0	0	1	1
…							
9 x Id	10	0	1	0	0	0	0
10 x Id	11	0	1	0	0	0	1
…							
28 x Id	29	1	0	1	0	0	1
29 x Id	30	1	1	0	0	0	0
30 x Id	31	1	1	0	0	0	1
Error signal	**39**	1	1	1	0	0	1

DEC = decimal output value

Response characteristics

The requested conversion - current into BCD message of REG-FI - **must be specified with the order**. This will be fixed internally and cannot be changed afterwards: Output code at start, input current 0 mA respectively 4 mA and output code at full scale at 20 mA.

The negative measurement input (Id-) is connected to the internal earth GND I of REG-FI. If the current transducer **is not** isolated from earth, this will result in a ground loop. To prevent this, open the external wire bridge at socket connector F2, pin 14-15.

Safety

Safety class / overvoltage category	I/II
Contamination level	2
Test voltage	AC 2.3 kV
Measurement input, BCD-output	to auxiliary voltage
	to relay contacts
Auxiliary voltage	to relay contacts

Power supply

Galvanically isolated	Feature H1 AC 100 … 240 V / DC 100 … 353V
	Feature H2 AC 20 … 60 V / DC 20 ... 72V
Power consumption	< 6 VA / 6 W H1; 1 A/T H2; 2 A/T

Temperature	Operation	0 ... +65 °C
	Storage, transport	-25 ... +85 °C

Contact assignment

connector **'F1'** **"MH"** 24+7p.	z	b	d
2	Relais BCD 1		Relais BCD 1
4	Relais BCD 2		Relais BCD 2
8	Relais BCD 4		Relais BCD 4
10	Relais BCD 8		Relais BCD 8
14	Rel. BCD10		Rel. BCD10
16	Rel.20 od. Vz-		Rel.20 od. Vz-
28	power supply AC/DC L / +		
30	power supply AC/DC N / -		
32	PE		

connector **'F2'** **"F"48pol.**	z	b	d
2			
4			Id+
6			Id-
8			GND I
20		U+	
26	BCD GND	BCD GND	BCD GND
28	BCD 1		BCD 2
30	BCD 4		BCD 8
32	BCD 10		BCD 20 od. Vz-

Features		Code		
Position indicator interface REG-FI	19"plug-in module 8TE 3HE	**REG-FI B1**		
Auxiliary voltage galvanically isolated	AC 100..240 V / DC 100…353 V	**H1**		
	AC 20... 60 V / DC 20 ... 72 V	**H2**		
Input current Id 0 .. 20 mA	BCD code: 1 ... 28 / 26 / 18 tap-positions out of range: code 39	**E1;E2;E3**		
Input current Id 4 .. 20 mA	BCD code: 1 ... 13 / 17 / 19 tap-positions Line breakage, < 4 mA: code 39	**E8;E5;E9**		
Output	BCD-Code 1 … 38 tap-positions out of range: code 39	**Y1**		
	Deviating current tap-change / code table (max. 6 outputs)	**E99**	**Y99**	

Other signals can also be assigned to the tap-change positions. Please include the requested code table with the order.

Example 28xId taps with offset (sign-), BCD code -12 ... -1 / -0 / 1 / ... 15;   out of range: -19   feature: „Y2"

Example 28xId taps with offset (sign-), BCD code -9 ... -1 / -0 / 1 / ... 18;   out of range: -19   feature: „Y3"

Example 15xId taps,   BCD code 1 ... 15;   out of range: 39   feature: „Y7"

The device is available for standard current transducers 0 ... 20 mA or 4 ... 20 mA. The interface is also available in a wall-mounting housing (feature B2) or panel mount case with display (feature B3).

Alternative assemblies for binary output codes, AWZ, Gray-code or tap-change resistances are available in different implementations, with or without display.

Application REG-FI B1

19" plug-in module code H1 B1

Isolated transducer - output
(bridge „Id-" ↔ „GND I")
same current steps Id

cable length l, AWG

< 100m	18AWG (0.8mm²)
< 40m	24AWG (0.5mm²)
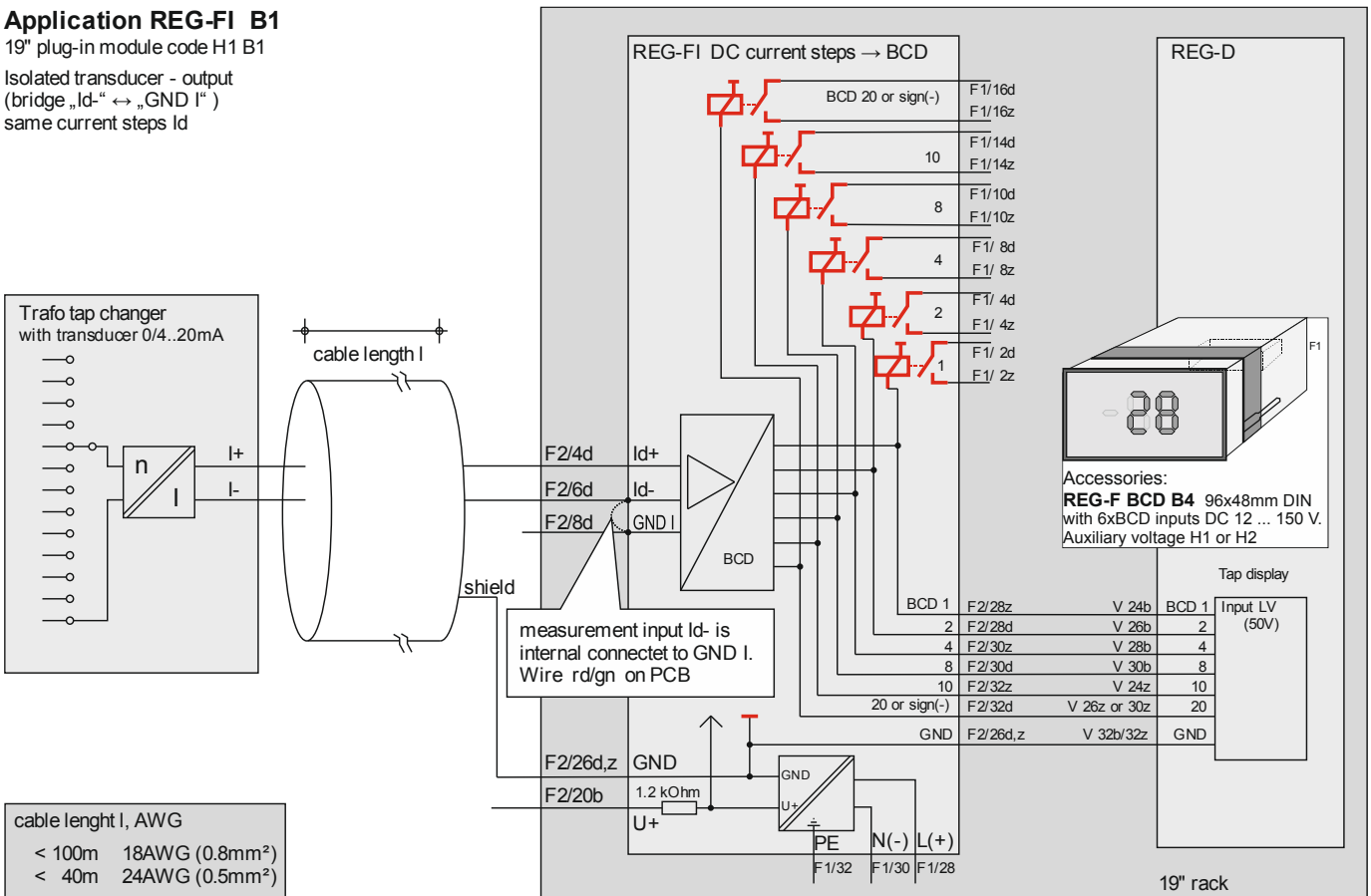
In the case of a large distance between the REG-FI and the current transducer, the maximum cable length depends more on the interference influences of parallel cables than on the maximum output voltage of the transducer. A superimposed AC ripple higher than 0.1 mA AC is not allowed at the REG-FI input. As each application has different earthing and voltage conditions, the only general statement that can be made is that longer lines are possible for the case that the parallel cables are shielded and have a larger distance to the REG-FI cable.

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