

Position Indicator Interface

Typ REG-FR 'B2'

The REG-FR resistance interface converts the position of a tap changer with resistor row into a BCD code for RegSys system. A build-in power supply supports the measure transducer, voltage outputs and relays.

Tap changer resistors (same values) will be connected to the measure input of REG-FR by only 3 or 4 wires. The resistor step value (Rs) of one of these resistors should be adjusted by potentiometer R and will be displayed by a voltage measurement on both front connectors (range DC 5V, Rin >500 kΩ/V), with 0.1V/Ω at feature 'R1'; 0.5V/Ω at 'R2'; 1V/100 Ω at 'R3'; 0.5V/100 Ω at 'R4'; 0.5V/10 Ω at feature 'R5' on display.

6 relay contacts (NO contacts) and 6 current outputs make the BCD code available for further use.

- Up to 37 uniform resistor tap-change positions are converted into a BCD code
- 3- or 4-wire connection is applicable
- Up to 100 m distance between tap changer and REG-FR
- 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

Construction Wall mountable Aluminum case
 205x130x67 mm (LxWxH)
 Connector 2 pieces; 'F1': 10pol; 'F2': 16pol
 Degree of protection IP40
 Weight inclusive 2 connectors < 1.2 kg
 Mounting 4-hole assembly,
 center on 130x120 mm

Input

Row resistor Rs 1.5 .. 10 Ω each Step (feature R2)
 5 .. 50 Ω each Step (feature R1)
 30 ..100 Ω each Step (feature R5)
 100 .. 500 Ω each Step (feature R3)
 200 .. 1000 Ω each Step (feature R4)

Number of tap changer resistors < 38
 Resistor tolerance Rs <2 % from adjusted value wire
 3-/ 4-wire connection compensates wire resistance RL
 Wire resistance RL < 20 Ω
 Measure current IK 0.1..10 mA through resistor row
 AC voltage on input <0.3 V 50 Hz

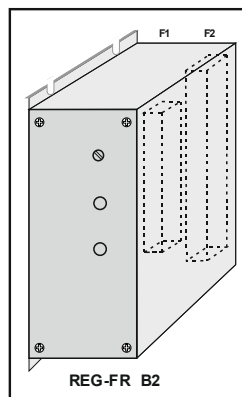
Output

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 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 < 10⁵



Code table

Res.-Step	Input:	Dez	Output signal BCD-Code					
			20	10	8	4	2	1
0 Ohm		1	0	0	0	0	0	1
1 x Rs		2	0	0	0	0	1	0
2 x Rs		3	0	0	0	0	1	1
8 x Rs		9	0	0	1	0	0	1
...								
9 x Rs		10	0	1	0	0	0	0
28 x Rs		29	1	0	1	0	0	1
...								
29 x Rs		30	1	1	0	0	0	0
30 x Rs		31	1	1	0	0	0	1
broken wire		39	1	1	1	0	0	1

Transfer behavior

By default the REG-FR is set to 3-wire connection and the tap-changer resistor to 10 Ω/step at feature R1 (3.0 Ω/step at feature R2; 100 Ω/step at feature R3; 200 Ω/step at feature R4; 30 Ω/step at feature R5) adjusted. If a different adjustment value is required, please specify when ordering.

Cutting the wire on PC board and the wire between connector F2/11 and F2/12 activates the 4 wire resistance compensation. No measure current flows thru the tap switch and short disconnections will be suppressed.

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 to relay contacts

Power supply

Galvanically isolated Feature H1 AC 100 ... 240 V / DC 100 ... 353V
 isolated 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 ... +55 °C
 Storage, transport -25 ... +75 °C

Contact assignment

connector F1 10pol.		connector F2 16pol.	
		11	Ik
		12	Rsi
1	AC/DC L (+)	13	Rsg
2	AC/DC N (-)	14	GND R
		19	U+
4	Relay common	20	GND BCD
5	Rel. 20 od.sgn-	21	BCD 20 od.sgn-
6	Relay BCD10	22	BCD 10
7	Relay BCD 8	23	BCD 8
8	Relay BCD 4	24	BCD 4
9	Relay BCD 2	25	BCD 2
10	Relay BCD 1	26	BCD 1

A FastOn-male 6.3mm on case allows the connection of a protective earth wire.

We take care of it.

Features		Code		
Position indicator interface REG-FR	wall mount case	REG-FR B2		
Auxiliary voltage galvanically isolated	AC 100..240 V / DC 100...353 V AC 20... 60 V / DC 20 ... 72 V	H1 H2	Transfer behavior	Sample calculation
Row resistor Rs	Rs / step Rs / step Rs / step Rs / step Rs / step	1.5 ... 10 Ω 5 ... 50 Ω 30 ... 100 Ω 100 ... 500 Ω 200 ... 1000 Ω	R2 R1 R5 R3 R4	0.5V / Ω 0.1V / Ω 0.5V / 10 Ω 1.0V / 100 Ω 0.5V / 100 Ω
				3.0 R*0.5=1.5 V 24 R*0.1=2.4 V 83 R*0.5/10=4.15 V 300 R*1/100=3.0 V 500 R*0.5/100=2.50V
Deviating code table (max. 6 outputs) 4-wire compensation		Y99	Specify deviating code table when ordering: Example: -9 ... -0 ... 19	

The interface is also available in a 19" plug-in modules 8TE 3HE (feature B1) or panel mount case with display (feature B3). Further, interfaces with standard signal input 0/4...20 mA or output codes such as BINARY, AWZ or GRAY-code are available.

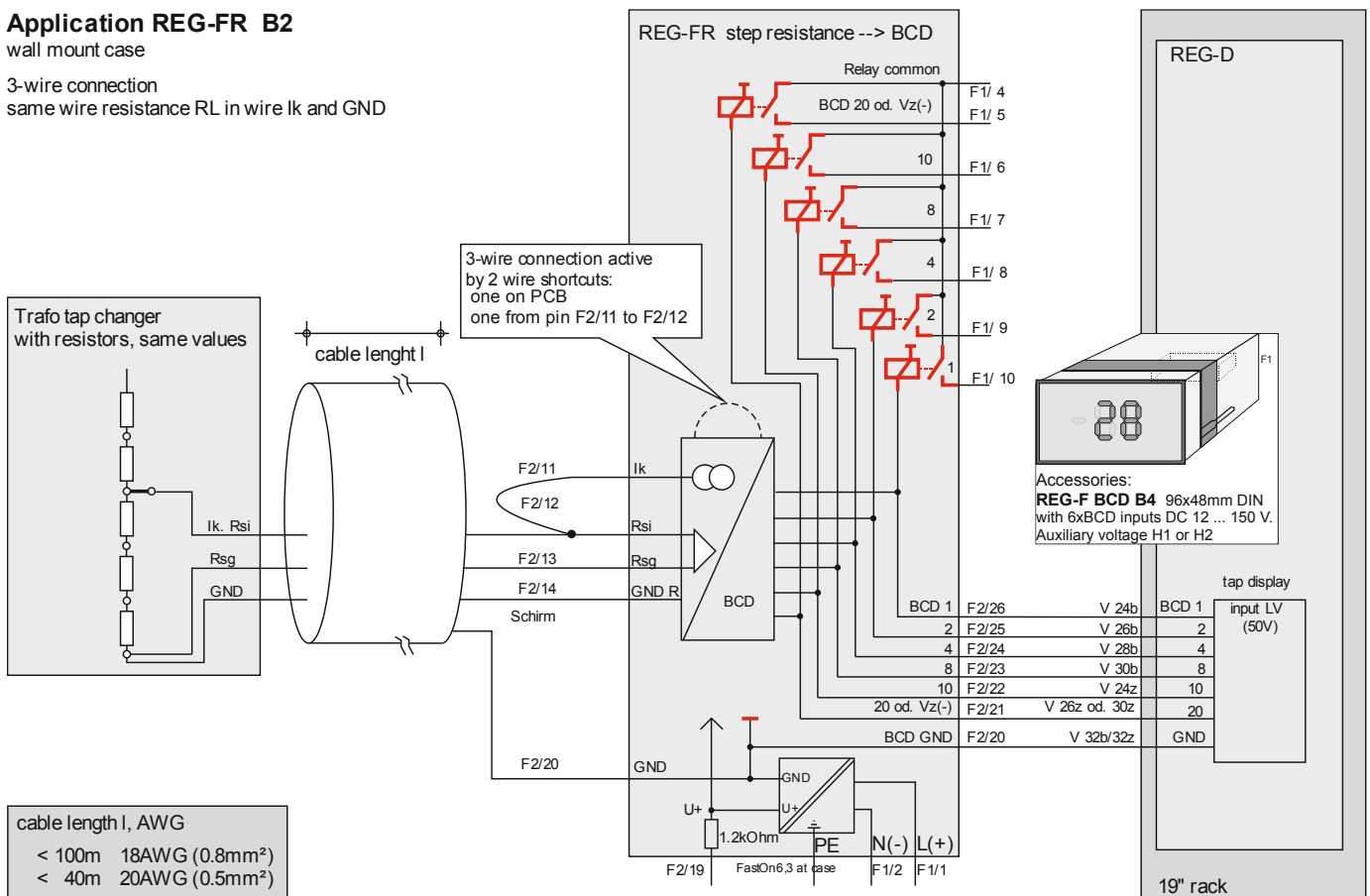
Accessories: Control panel 96x48mm with 20 mm display

Application REG-FR B2

wall mount case

3-wire connection

same wire resistance RL in wire lk and GND



For longer distances between REG-FR and the step resistance Rs, the maximum cable length is less due to the DC resistance (see example), but rather determined by interference from parallel cables. A superimposed AC voltage up to 0.3 V at the REG-FR input is allowed. Each application has different earthing and voltage conditions. It can only be said in general, with shielded cables and greater distance to the parallel cables, a longer distance are possible.

Calculate example cable length L Wire Gauge 20AWG A=0.5mm² (four-wire with each d=0.8mm, shielded)

RL line= supply or return line = 12Ω rho CU 0.02 for solid wire

$L = R \times A / \rho = 12 \times 0.5 / 0.02 = 300 \text{ m}$

12Ω 0.5mm² results 300m wire length. The interface can compensate the DC resistor of this wire. No interference was considered.

Adjust step resistance Rs with the front panel potentiometer R to ±0.2% accuracy. Is the Step resistance not exactly known, an LED in the '+' measuring socket indicates the respective step centre.

When the step resistance Rs >100 Ω/step, the 2-wire circuit can be used. For this case, bridge pins F2/ 6d - 8d and F2/2d - 4d.

If a different code table is needed, please place this when ordering. Example: -9 ... -0 ... 19

A subsequent change via solder bridges is possible. There is a separate description on request available.