

Tap Position Interface

Type REG-F

Operation

The tap position interface REG-F decodes the position of a tap changer transformer to BCD code. A power supply supports the moving side of a dry contact row with a DC voltage, feeds voltage outputs and 6 relay. REG-F gets the information from this switch and the built-in diode matrix decodes the closed contact out of n to BCD (see code table). At one time only one contact should be closed. Voltage outputs of REG-F should be wired to BCD inputs of REGSys and 6 relay contacts show the BCD code too. A capacitor on each input and a coil on DC output U+ enhance the noise suppression.

- ⊕ up to 33 dry contacts of a switch were decoded to BCD
- ⊕ 6 output signals show BCD 1.. 39 or -13 .. 19 steps
- ⊕ up to 100m cable length between switch and REG-F
- ⊕ contacts with AC 250V 2A, DC 220V 150W
- ⊕ wide range power supply for AC & DC

Technical Characteristics

Applied Rules and Standards

IEC1010, IEC801-1 to 6, VDE0110, VDE0160
 electrical noise immunity EN50082-2
 electrical noise emission EN50081-2, EN55011

Mechanical Construction

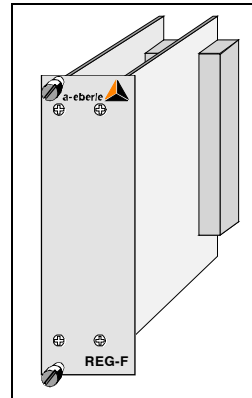
case plug-in module 8T 3U 19"rack
 size of pc board 100 x 160mm
 front Alu, painted grey RAL 7035
 module mounting see DIN 41494 part 5
 edge connectors 2 pcs, 'F1': DIN 41612 MH 24+7poles
 'F2': DIN 41612 F 48poles
 conn. mounting 'F1' at position 'n' and 'F2' n plus 5T
 protection IP00
 weight module ≤ 0,5 kg

Input

voltage out of transformer tap switch
 switch closed (AC 45..65 Hz, sinusf.)
 voltage Ue 12 ...100 V AC / DC feature E12
 50 ...250 V AC / DC feature E3
 180 ...240 V DC f. E39 (Re 30kΩ)
 switch open
 voltage Ue < 2 V AC / DC feature E12
 < 10 V AC / DC feature E3
 < 60 V DC feat. E39 (Re 30kΩ)

Output

BCD 1...BCD 20, connect to REG-D BCD inputs
 - voltage limit <55 V DC ->REG-D LV-input feat.E39
 - level = voltage Ue (Diodenmatrix) with feat. E12, E3
 supply voltage U+ 15V DC; reference GND;
 Output resistance < 300 Ω (feature E12)
 6 relay, one N/O contact each for BCD code 1..20/sgn-;
 contact closed /open (1) / (0)
 insulation between relay contacts and
 to other circuits AC 250 V
 contact rating AC 250V 2A, DC 220V 150W
 expected life 10⁵ electrical operations



Code Table

input: 1 out of n (only one switch closed)	output: BCD - Code					
	20	10	8	4	2	1
tap 1	0	0	0	0	0	1
tap 2	0	0	0	0	1	0
tap 10	0	1	0	0	0	0
tap 11	0	1	0	0	0	1
tap 29	1	0	1	0	0	1
tap 30	1	1	0	0	0	0
tap 31	1	1	0	0	0	1

Electrical Safety

protect.class/ overvoltage categorie I / II
 pollution degee / test voltage 2 / AC 2,3kV
 between DC voltage U+ to power supply volt. (H1, H2),
 to relay contacts,
 between power sup. volt. to relay contacts

Power Supply

insulated char. H1 AC 85..240 V / DC 100 ..264 V
 char. H2 AC 20.. 60 V / DC 18 .. 72 V
 power consumpt. < 6VA / 6W H1; 1A/T H2; 2A/T
 DC voltage U+ for tap switch connection, to inp. tap1..33
 out of REG-F DC 15 V -feature E12 only
 external from tap switch row

Temperature operation 0 ... +65°C
 storage, transportation -25 ... +85°C

Contact Position

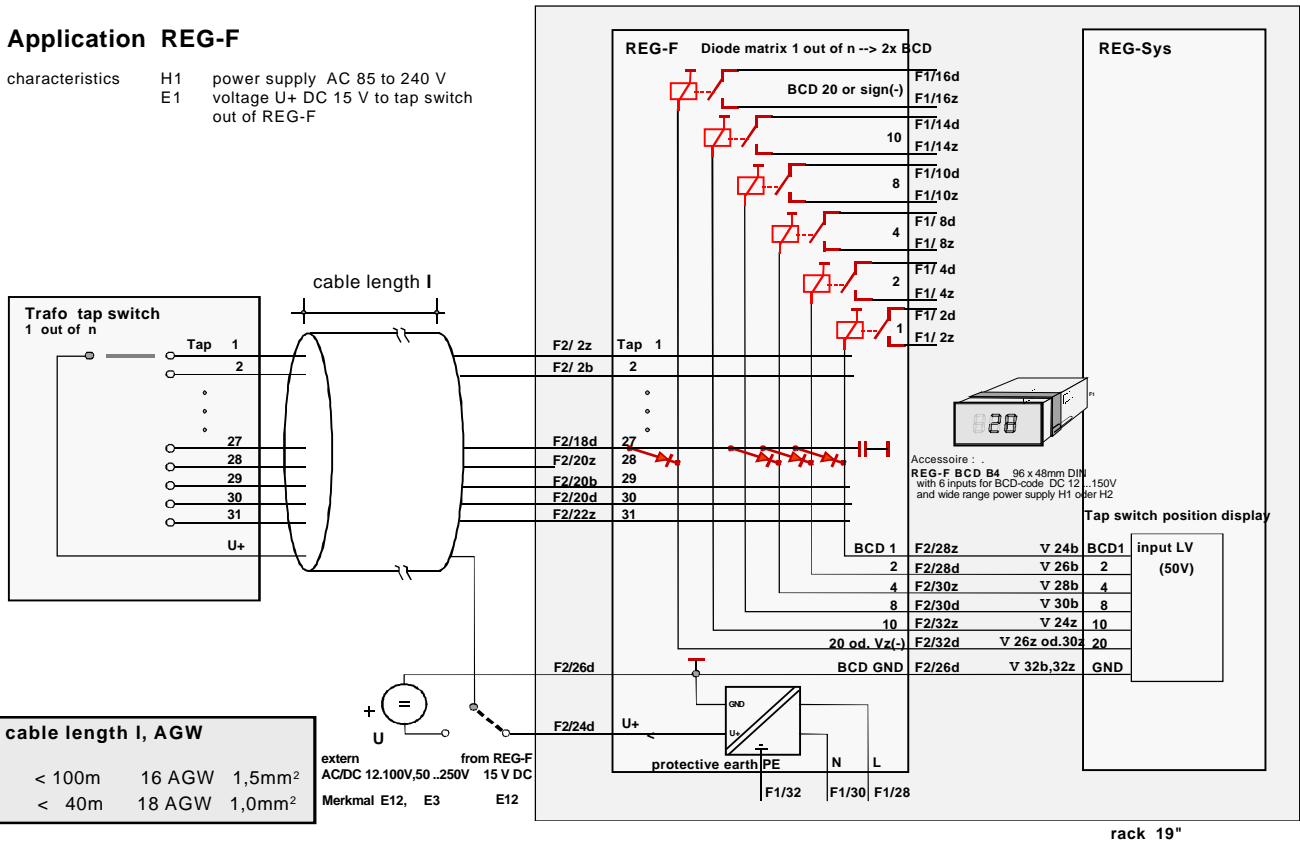
connector 'F1' "MH" 24+7p.	z	b	d
2	relay BCD 1		relay BCD 1
4	relay BCD 2		relay BCD 2
8	relay BCD 4		relay BCD 4
10	relay BCD 8		relay BCD 8
14	relay BCD 10		relay BCD 10
16	rel. 20 or sign-		rel. 20 or sign -
28	power supply AC/DC		L / +
30	power supply AC/DC		N / -
32	protective earth PE		

connector 'F2' "F" 48pol.	z	b	d
2	tap 1	tap 2	tap 3
4	tap 4	tap 5	tap 6
6	tap 7	tap 8	tap 9
8	tap 10	tap 11	tap 12
10	tap 13	tap 14	tap 15
12	tap 16	tap 17	tap 18
14	tap 19	tap 20 or -0	tap 21 or -1
16	tap 22 or -2	tap 23 or -3	tap 24 or -4
18	tap 25 or -5	tap 26 or -6	tap 27 or -7
20	tap 28 or -8	tap 29 or -9	tap 30 or -10
22	tap 31 or -11	tap 32 or -12	tap 33 or -13
24	U+ feat.'E12only	U+ feat.'E12only	U+ feat.'E12only
26	GND		GND
28	BCD 1		BCD 2
30	BCD 4		BCD 8
32	BCD 10		BCD20or sgn(-)

characteristics			code	
Tap Position Interface	REG-F	8T 3U 19" rack	REG-F	
power supply	insulated	AC 85..240 V / DC 100 ..264 V	H1	
	./.	AC 20... 60 V / DC 18 .. 72 V .	H2	
DC voltage U+	out of REG-F at tap 1...33	DC 15 V .	E12	
	or ext. power supply voltage U+ at tap1..33	AC/DC 12 ...100 V	E3	
external power supply	voltage U+	AC/ DC 50 ..250 V	E39	
external voltage U+(output BCD limited to <55V)		DC 180 ..240 V		

Application REG-F

characteristics H1 power supply AC 85 to 240 V
 E1 voltage U+ DC 15 V to tap switch out of REG-F



cable length l, AGW		
< 100m	16 AGW	1,5mm ²
< 40m	18 AGW	1,0mm ²

On longer distance between REG-F and the tap switch the max. cable length will be less determined by its impedance –see following example- ; more important is the noise coupling from parallel mounted energy cables.
 REG-F input allows a superimposed AC voltage up to 2 V (char. 'E12'), 10V (char. 'E3') or 60V (Char. 'E39').

Because every application has its own earth- and voltage relations, lower input noise (by shields and more distance to parallel cables) allows longer cables. (build-in noise suppression by a capacitor >33nF on each input and a coil in output U+)

example cable length 1 wire with 20AWG (0,5mm², 4 copper wires with 0,8mm diameter, shielded)
 $R_L = \text{distance to tap} + \text{switch resist.} = 12 + 3 \Omega$
 $l = R \times A / \rho = 12 \times 0,5 / 0,02 = 300 \text{ m}$