Position Indicator Interface Typ REG-FA 'B1'

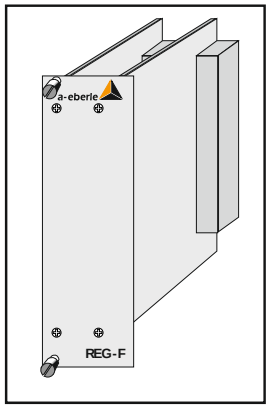
Function

The REG-FA position interface converts the position of a AWZ transformer tap changer row into a BCD code for RegSys system.

An external auxiliary voltage feeds the AWZ tap changer row. It must be connected to the 'AWZ U +' and 'AWZ GND' connections of the REG-FA.
Switching contacts give the signals A1, A2, A3 or A10, A20, A30 to the REG-FA and are converted into the BCD code by a code converter.

A binary output transmits the information to the voltage control system REGSys. For further use the BCD code is provided by 6 relay contacts.

- Up to 39 combinations are converted into a BCD code
- The cable between the tap changer row and the REG-FA can be up to 100 m (maximum)
- Interference suppression through opto-isolation of the inputs
- Relay contacts with AC 250V 2A, DC 220V 150W
- Large auxiliary voltage range of the power supply



Codetable

Input				Output
AWZ-Code			Dec	BCD-Code
A1 A10	A2 A20	A3 bzw. A30		8 4 2 1 20 10
x	U+	GND	0	0 0 0 0
GND	U+	x	1	0 0 0 1
GND	U+	U+	2	0 0 1 0
GND	x	U+	3	0 0 1 1
GND	GND	U+	4	0 1 0 0
x	GND	U+	5	0 1 0 1
U+	GND	x	6	0 1 1 0
U+	GND	GND	7	0 1 1 1
U+	x	GND	8	1 0 0 0
U+	U+	GND	9	1 0 0 1

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

Voltage AWZ U+ at A1..30, reference AWZ GND

Output on	(Feature E12)	DC 12 ..100V, Re ~18kΩ
	(Feature E3)	DC 35 ..150V, Re ~50kΩ
Switch closed	(R-switch+cable <1kΩ)	
to AWZ GND:	U1 < 10% from AWZ U+	
to AWZ U+	U1 > 90% from AWZ U+	
Switch open (x)	(R-switch+cable >1MΩ	
Superimposed alternating voltage at input	< 2 V	

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	$< 10^5$

Transfer behavior

The intrinsically AWZ safe code requires that all 6 inputs (A1… A30) are always connected.
At the open input, the ½ AWZ U+ voltage can be measured.

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

Pinout

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 BCD10		relay BCD10
16	relay BCD20		relay BCD20
28	power supply AC/DC L / +		
30	power supply AC/DC N / -		
32	PE		

connector **'F2'** "F"48pol.	z	b	d
2			A1
4			A2
6			A3
8			A10
10			A20
12			A30
20	**GND U** at **E12**	**GND U** at **E12**	**GND U** at **E12**
22	**U+** at **E12**	**U+** at **E12**	**U+** at **E12**
24	AWZ U+	AWZ U+	AWZ U+
26	AWZ GND	AWZ GND	AWZGND
28	BCD 1		BCD 2
30	BCD 4		BCD 8
32	BCD 10	BCD GND	BCD 20

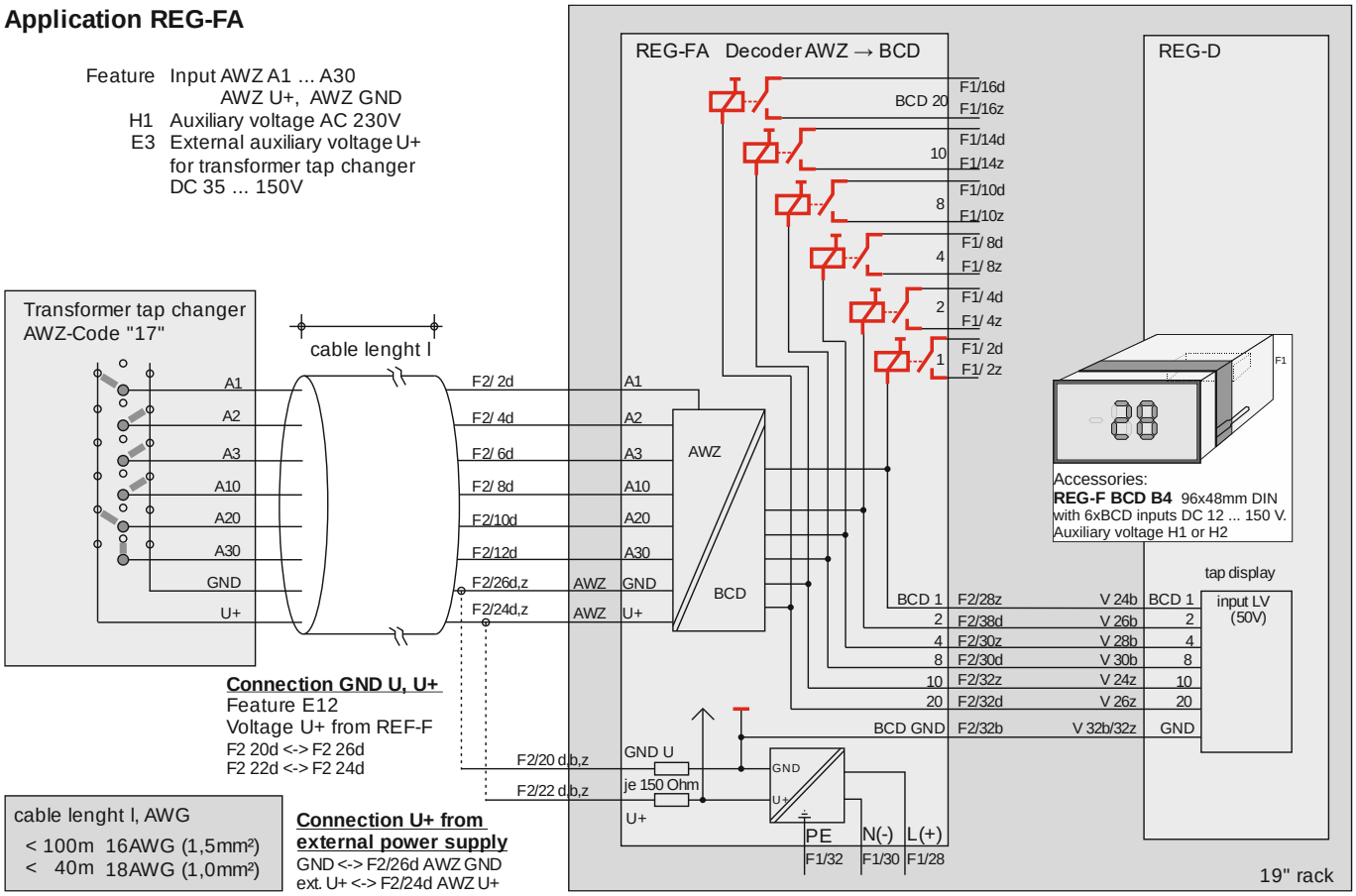
Features			Code		
Position indicator interface REG-FA	19“plug-in module 8TE 3HE		**REG-FA B1**		
Auxiliary voltage galvanically isolated	AC 100..240 V /	DC 100 … 353V	**H1**		
	AC 20... 60 V /	DC 20 … 72V	**H2**		
Voltage U+ from REG-FA at **U+, GND U**		DC 15V			
or external Voltage at **AWZ U+**		DC 12 ... 100V	**E12**		
External voltage at AWZ U+		DC 35 … 150V	**E3**		

The REG-FA 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, Gray-code, tap-change resistances or 4..20mA current are available in different implementations, with or without display.

Application REG-FA

Feature Input AWZ A1 ... A30
AWZ U+, AWZ GND
H1 Auxiliary voltage AC 230V
E3 External auxiliary voltage U+
for transformer tap changer
DC 35 ... 150V



Connection GND U, U+
Feature E12
Voltage U+ from REF-F
F2 20d <-> F2 26d
F2 22d <-> F2 24d

cable lenght l, AWG
< 100m 16AWG (1,5mm²)
< 40m 18AWG (1,0mm²)

Connection U+ from external power supply
GND <-> F2/26d AWZ GND
ext. U+ <-> F2/24d AWZ U+

For longer distances between REG-FA and the tap changer row, 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 2V at the REG-FA input is allowed. Each application has different earthing and voltage conditions. The only general statement that can be made, with shielded cables and greater distance to the parallel cables, a longer distance is possible.
Optocouplers at the inputs provide a better interference suppression.

Example cable length L. Wire with 16AWG wire gauge A = 1,5mm²
RLtg = Supply or return line = 5Ω rho CU 0,025 L= R x A / rho = 5 x 1,5 / 0,025 = 300 m

5Ω 1,5mm² results a cable length of 300m. The DC resistance is compensated. Superimposed interference not taken into account.