Energy sector

Energy switches BI4xx series

Bistable Switch extended with communication BICOM-MODBUS BI420, BI425 & BI432

- Energy efficient Bistable switch extended with serial RS485 Modbus communication
- Small toggle switch coil consumption / almost zero consumption at standby
- Wide application range (Lightning, Electric heating, Electric motors, electric equipment)
- Mounting on 35 mm rail
- Optional sealing of terminal contacts

Iskra®

PROPERTIES

- RS485 Modbus controllable Bistable switch connected DIN-rail
- Maximum current 32 A (Imax)
- 230V rated system voltage input (Un)
- Reference frequency 50 and 60 Hz
- Environmental climatic condition: 95 % relative humidity, -25 … +55 deg, IP20)
- RS485 Serial communication with Modbus open table
- DIN-rail mounting according to EN 60715
- Sealable terminal cover
- 2 DIN modules width

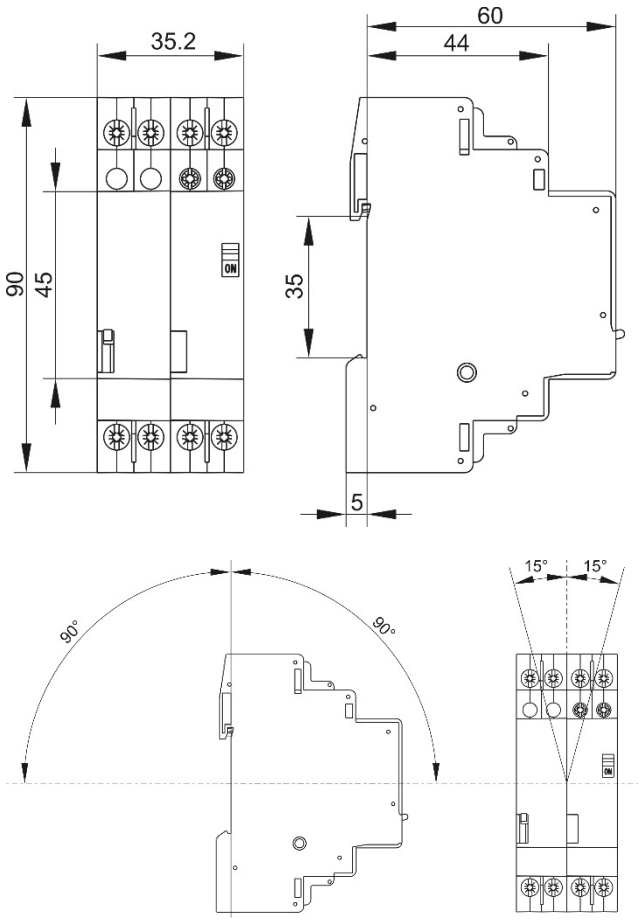
DESCRIPTION

The BICOM-MODBUS is an electronic unit which includes an Iskra Bistable switch and Modbus RTU serial interface over RS485. The Switch is intended to be used with any Modbus compatible device. There is a typically master/slave relationship between BICOM-MODBUS switch where BICOM-MODBUS is a Slave interface on the Modbus network. A serial Modbus interface over a RS485 allows the configuration and activation of the bistable mechanism inside the BICOM-MODBUS. The main benefits of the BICOM-MODBUS switch are:

- Zero crossing switching operation (when toggle command is received over Modbus electronic switch will toggle only at power zero/crossing)
- build in power supply for electronics interface (there is no need to supply external DC/AC voltage for electronic unit)
- customizable Modbus address
- secondary status about the switching position available over Modbus network
- diagnostic function for network address discovery and troubleshooting
- electric insulation between Modbus serial interface and 220V power line network (preventing electrical shorts between communication and power line network)

Configuration of the BICOM-MODBUS is performed through the RS485 interface by using Modbus RTU commands. Iskra MiQen software allows the configuration of all features of the BICOM-MODBUS as well as its diagnostics. The BICOM-MODBUS offers features for detecting the devices present in the Modbus network and for configuring the communication parameters of the BICOM-MODBUS. BICOM-MODBUS doesn't use external switches to set the Modbus address but the address is factory predefined and could be easily changed after MiQen discovers the switch on the RS485 network. Every switch caries unique serial number which also simplifies device discovery and commissioning on the serial network.

DIMENSIONAL DRAWINGS



TECHNICAL DATA

SERIAL COMMUNICATION RS485

Connection type	Network
Insulation	Protection class **II**
	3.5 kV AC RMS 1 min
Max. connection length	1000 m
Transfer mode	Asynchronous
Protocol	MODBUS RTU / DNP3
Transfer rate	9.6 kBaud or 19.2 kBaud

TECHNICAL DATA

	Type	Symbol	Unit	BI420	BI425	BI432
GENERAL	Standards			IEC/EN 60669-2-2		
	Approvals			CE, CB		
	Module width			BI420: 2/BI820: 4	BI425: 2/BI825: 4	BI432: 2/BI832: 4
	Number of poles			BI420: 4/BI820: 8	BI425: 4/BI825: 8	BI432: 4/BI832: 8
	Degree of protection			IP20		
	Pollution degree			3		
	Climatic conditions			95 % relative humidity		
	Ambient temperature (open)		°C	-25 … +55 (>55 … +70 at max. impulse duration which is 1 min)		
	Storage temperature		°C	-30 … +80		
	Maximum altitude U_i and U_e is reduced for 1.2 % and I_e for 0.4 % for every additional 100 m		m	2000		
	Number of contactors or switches side-by-side: ≤40 °C (40 … 55) °C (55 … 70) °C			 no limitation max. 3 max. 1		
	Noise level (operation)		dB	0 (coil voltage is switched off)		
	Vibration resistance according to IEC/EN 60068-2-6	a	g	3 (Z axix)		
	Shock resistance according to IEC/EN 6068-2-27	a	g	15 (Z axis)		
	Maximum operating frequency with no load		op./h	900	450	
	Mechanical endurance		op. c.	1.000.000		
	Weight		g	BI4xx: 195/BI8xx: 390		
MAIN CIRCUIT	Contact reliability			≥10 V; >100 mA		
	Minimum distance of open contacts		mm	>3		
	Power dissipation per pole		W	1.5	2	3
	Overload current withstand capability: 10 s		A	56	68	96
	Maximum back-up fuse for short-circuit protection gL and gG: coordination type 1	I_v	A	20	25	32
	Rated insulation voltage	U_i	V	440		
	Rated impulse withstand voltage	U_{imp}	kV	4		
	Rated operational voltage	U_e	V	440		
	Rated frequency	f	Hz	50/60		
	Thermal current	I_{th}	A	20	25	32
	Rated operational current for cosφ = 0.6 acc. to IEC/EN 60669-2-2			20	25	32
	Maximum operating frequency for cosφ = 0.6 acc. to IEC/EN 60669-2-2		op./h	900	450	
	Electrical endurance for cosφ = 0.6 acc. to IEC/EN 60669-2-2		op. c.	100.000		
	Rated operational current for AC-1, AC-7a and AC-21	I_e	A	20	25	32
	Operational power for AC-1, AC-7a and AC-21: single-phase 230 V three-phase 230 V three-phase 400 V	P_e	kW	 4.4 7.6 13.2	 5.5 9.5 16.5	 7 12.1 21
	Maximum operating frequency for AC-1, AC-7a and AC-21		op./h	600	450	
	Electrical endurance for AC-1, AC-7a and AC-21		op. c.	100.000		
	Rated operational current for AC-2	I_e	A	10	13	16
	Operational power for AC-2: single-phase 230 V three-phase 230 V three-phase 400 V	P_e	kW	 1.5 2.6 4.5	 2 3.3 5.8	 2.4 4.1 7.2
	Maximum operating frequency for AC-2		op./h	120		
	Electrical endurance for AC-2		op. c.	100.000		
	Rated operational current for AC-3, AC-7b and AC-23	I_e	A	7	8.5	12
	Operational power for AC-3, AC-7b and AC-23: single-phase 230 V three-phase 230 V three-phase 400 V	P_e	kW	 0.5 1.5 3	 0.75 2.2 4	 1.1 3 5.5
	Maximum operating frequency for AC-3, AC-7b and AC-23		op./h	600	450	
	Electrical endurance for AC-3, AC-7b and AC-23		op. c.	100.000		
	Rated operational current for AC-5a (at 230 V)	I_e	A	16		
	Maximum operating frequency for AC-5a		op./h	600	450	
	Electrical endurance for AC-5a		op. c.	100.000		
	Rated operational current for AC-5b (at 230 V)	I_e	A	[1]10	[1]10 / [2]12	[1]10 / [3]16
	Maximum operating frequency for AC-5b		op./h	600	450	
	Electrical endurance for AC-5b		op. c.	[1]100.000 / [2]60.000 / [3]20.000		

TECHNICAL DATA

	Type	Symbol	Unit	BI420	BI425	BI432
MAIN CIRCUIT	Rated operational current for AC-6a (at 230 V)	I_e	A	3	3.6	4.5
	Maximum operating frequency for AC-6a		op./h	600	450	
	Electrical endurance for AC-6a		op. c.	100.000		
	Switching of capacitors AC-6b and AC-7c (at 230 V)	C	µF	100	120	150
	Maximum operating frequency for AC-6b and AC-7c		op./h	600	450	
	Electrical endurance for AC-6b and AC-7c		op. c.	100.000		
	Rated operational current for DC-1 (L/R< 1 ms):					
	1 pole … 24 V DC/48 V DC/60 V DC/110 V DC/ 220 V DC			20/15/10/5/0.5	25/20/15/6/0.6	32/25/20/7/0.7
	2 poles in series … 24 V DC/48 V DC/60 V DC/110 V DC/ 220 V DC	I_e	A	20/18/15/8/4	25/25/20/10/5	32/28/22/12/6
	3 poles in series … 24 V DC/48 V DC/60 V DC/110 V DC/ 220 V DC			20/20/20/18/12	25/25/25/20/15	32/32/28/22/18
	4 poles in series … 24 V DC/48 V DC/60 V DC/110 V DC/ 220 V DC			20/20/20/20/15	25/25/25/22/18	32/32/32/25/20
	Maximum operating frequency for DC-1		op./h	300		
	Electrical endurance for DC-1		op. c.	100.000		
	Rated operational current for DC-3 (L/R< 2 ms):					
	1 pole … 24 V DC/48 V DC/60 V DC/110 V DC/ 220 V DC			10/5/2/1/0.1	15/8/3/1.1/0.2	18/10/4/1.2/0.3
	2 poles in series … 24 V DC/48 V DC/60 V DC/110 V DC/ 220 V DC	I_e	A	20/10/8/3/0.4	25/16/12/4/0.6	32/18/14/5/0.8
	3 poles in series … 24 V DC/48 V DC/60 V DC/110 V DC/ 220 V DC			20/20/20/10/2	25/25/25/15/3	32/30/28/18/4
	4 poles in series … 24 V DC/48 V DC/60 V DC/110 V DC/ 220 V DC			20/20/20/15/6	25/25/25/20/8	32/32/30/22/10
	Maximum operating frequency for DC-3		op./h	300		
	Electrical endurance for DC-3		op. c.	100.000		
	Rated operational current for DC-5 (L/R< 7.5 ms):					
	1 pole … 24 V DC/48 V DC/60 V DC/110 V DC/ 220 V DC			10/4/1/0.3/0.05	15/5/2/0.5/0.08	18/6/3/0.8/0.1
	2 poles in series … 24 V DC/48 V DC/60 V DC/110 V DC/ 220 V DC	I_e	A	20/8/6/2/0.2	25/15/10/3/0.4	32/16/12/4/0.6
	3 poles in series … 24 V DC/48 V DC/60 V DC/110 V DC/ 220 V DC			20/20/18/8/1	25/25/20/12/2	32/28/25/16/3
	4 poles in series … 24 V DC/48 V DC/60 V DC/110 V DC/ 220 V DC			20/20/20/12/3	25/25/25/15/5	32/30/28/18/8
	Maximum operating frequency for DC-5		op./h	300		
	Electrical endurance for DC-5		op. c.	100.000		
	Terminal capacity:					
	rigid (solid and stranded)	S	mm^2	1 … 10		
	flexible			1 … 10		
	Length of removed wire insulation		mm	9		
	Screw			M4		
	Screw head			PZ2		
	Tightening torque		Nm	1.2		
COIL	Range of control voltage for switch-on	U_c	%	90 ... 110		
	Range of control voltage for drop out	U_c	%	AC: 75 … 20 / DC: 75 … 10		
	Kind of voltage			AC or DC		
	Standard control voltages	U_c	V	AC: 8, 12, 24, 48, 120, 230, 240 / DC: 12, 24, 48, 110, 220		
	Frequency of AC control voltage	f	Hz	AC: 50 or 60		
	Control mode			remote control with impulse voltage / manual control		
	Impulse duration of control voltage:					
	minimum			AC: 50 ms / DC: 100 ms		
	optimum - recommended			AC: 100 ... 500 ms / DC: 150 ... 500 ms		
	maximum (only in case of breakdown of control system)			AC: 1 hour / DC: 1 minute		
	Minimum duration between two impulses of control voltage		ms	AC: 150 / DC: 500		
	Surge immunity withstand voltage 1.2/50 µs acc. to standard IEC/EN 61000-4-5		kV	3		
	Coil consumption:					
	switch-on		VA/W	AC: 18/13 / DC: 9/9		
	operation			AC: 9/4 / DC: 9/9		
	Delays:					
	make		ms	AC: 5 … 20 / DC: 8 ... 35		
	brake			AC: 5 … 20 / DC: 8 ... 35		
	Terminal capacity:					
	rigid (solid and stranded)		mm^2	1 … 4		
	flexible			1 … 4		
	Length of removed wire insulation		mm	7		
	Screw			M3		
	Screw head			PZ1		
	Tightening torque		Nm	0.6		
SAFETY	MTTF - Mean time to failure $MTTF = 1/\lambda = B10/(0.1\ n_{op})$		h	4.166		
	$MTTF_d$ - Mean time to failure dangerous $MTTFd = 1/\lambda_d = B10_d/(0.1\ n_{op})$		h	8.333		
	B10 - Number of operating cycles until 10 % of devices fail		op. c.	50.000		
	$B10_d$ - Number of operating cycles until 10 % of device dangerous $B10_d$ = B10/ratio of dangerous failures		op. c.	100.000		
	λ - Failure rate $\lambda = (0.1\ n_{op})/B10$		1/h	0.00024		
	λ_d - Failure rate dangerous $\lambda_d = (0.1\ n_{op})/B10_d$		1/h	0.00012		
	Ratio of dangerous failures		%	50		
	n_{op} - Operating cycles (operating cycles/h)		op. c./h	120		

Ambient conditions and Safety:

According standards for indoor active energy meters.

Temperature and climatic condition according to EN 62052-11

Dust/water protection:	IP50
Operating temp. range:	-25 ... 55°C
Storage temp. Range	-40 ... 70°C
Enclosure material:	self extinguish complying UL94 V
Indoor meter:	yes
Degree of pollution:	2
Protection class:	**II**
AC voltage test:	4 kV
Installation Category:	300 Vrms cat. III
Standard:	**EN 50470**

EC Directives conformity:

EC Directive on Measuring Instruments **2014/32/EU**
EC Directive on EMC **2014/30/EU**
EC Directive on Low Voltage **2014/35/EU**
EC Directive WEEE **2002/96/EC**

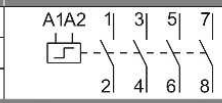
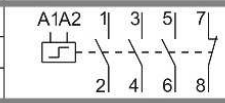
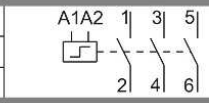
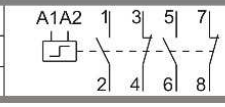
Disposal

It is forbidden to deposit electrical and electronic equipment as municipal waste.
The manufacturer or provider shall take waste equipment free of charge.

DATA FOR ORDERING

Modbus-RTU high-speed RS-485 communication

AC

Type	Rated current I_e	Control voltage at 50 Hz	Wiring diagram	Ordering No.	Weight (g)	Packaging (pcs)
BICOM420-40-MODBUS	20 A	230 V		22.459.111.001	250	2
BICOM425-40-MODBUS	25 A	230 V		22.459.111.002	250	2
BICOM432-40-MODBUS	32 A	230 V		22.459.111.003	250	2
BICOM420-31-MODBUS	20 A	230 V		22.459.111.004	250	2
BICOM425-31-MODBUS	25 A	230 V		22.459.111.005	250	2
BICOM432-31-MODBUS	32 A	230 V		22.459.111.006	250	2
BICOM420-30-MODBUS	20 A	230 V		22.459.111.007	250	2
BICOM425-30-MODBUS	25 A	230 V		22.459.111.008	250	2
BICOM432-30-MODBUS	32 A	230 V		22.459.111.009	250	2
BICOM420-22-MODBUS	20 A	230 V		22.459.111.010	250	2
BICOM425-22-MODBUS	25 A	230 V		22.459.111.011	250	2
BICOM432-22-MODBUS	32 A	230 V		22.459.111.012	250	2

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