Technical specifications

Type – Overload relay of complete system		**3RB22, 3RB23**
Size		**S00 ... S10/S12**
General data		
Trips in the event of		Overload, phase failure and phase unbalance (> 40 % according to NEMA), + ground fault (with corresponding function expansion module) and activation of the thermistor motor protection (with closed PTC sensor circuit)
Trip class according to IEC 60947-4-1	CLASS	5, 10, 20 and 30 adjustable
Phase failure sensitivity		Yes
Overload warning		Yes, from 1.125 x I_e for symmetrical loads and from 0.85 x I_e for unsymmetrical loads
Reset and recovery		
• Reset options after tripping		Manual, automatic and remote RESET
• Recovery time		
- For automatic RESET	min	- For tripping due to overcurrent: 3 (stored permanently) - For tripping by thermistor: time until the motor temperature has fallen 5 K below the response temperature - For tripping due to a ground fault: no automatic RESET
- For manual RESET	min	- For tripping due to overcurrent: 3 (stored permanently) - For tripping by thermistor: time until the motor temperature has fallen 5 K below the response temperature - For tripping due to a ground fault: immediately
- For remote RESET	min	- For tripping due to overcurrent: 3 (stored permanently) - For tripping by thermistor: time until the motor temperature has fallen 5 K below the response temperature - For tripping due to a ground fault: immediately
Features		
• Display of operating state on device		Yes, with 4 LEDs: Green "Ready" LED, red "Ground Fault" LED, red "Thermistor" LED and red "Overload" LED
• TEST function		Yes, test of LEDs, electronics, auxiliary contacts and wiring of control circuit by pressing the button TEST/RESET / self-monitoring
• RESET button		Yes, with the TEST/RESET button
• STOP button		No
For safe operation of motors with type of protection "Increased Safety"		
EU type test certificate number according to directive 94/9/EU (ATEX)		PTB 05 ATEX 3022 ⟨Ex⟩ II (2) GD
Ambient temperatures		
Storage/transport	°C	-40 ... +80
Operation	°C	-25 ... +60
Temperature compensation	°C	+60
Permissible rated current		
- Temperature inside control cabinet 60 °C	%	100
- Temperature inside control cabinet 70 °C	%	[1]
Repeat terminals		
• Coil repeat terminal		Not required
• Auxiliary contact repeat terminal		Not required
Degree of protection according to IEC 60529		IP20[2]
Touch protection according to IEC 61140		Finger-safe[2]
Shock resistance with sine according to IEC 60068-2-27	g/ ms	15/11
Electromagnetic compatibility (EMC) – Interference immunity		
• Conductor-related interference		
- Burst according to IEC 61000-4-4 (corresponds to degree of severity 3)	kV	2 (power ports), 1 (signal ports)
- Surge according to IEC 61000-4-5 (corresponds to degree of severity 3)	kV	2 (line to earth), 1 (line to line)
• Electrostatic discharge according to IEC 61000-4-2 (corresponds to degree of severity 3)	kV	8 (air discharge), 6 (contact discharge)
• Field-related interference according to IEC 61000-4-3 (corresponds to degree of severity 3)	V/m	10
Electromagnetic compatiblity (EMC) – Emitted interference		Degree of severity A according to EN 55011 (CISPR 11) and EN 55022 (CISPR 22)
Resistance to extreme climates – air humidity	%	100
Dimensions		See dimensional drawings
Installation altitude above sea level	m	Up to 2000
Mounting position		Any
Type of mounting		Evaluation module: Stand-alone installation, current measuring module size S00 to S3: Stand-alone installation, current measuring module size S6 and S10/S12: Stand-alone installation and mounting onto contactors

[1] On request.

[2] Current measuring modules size S6 and S10/S12 with busbar connection in conjunction with cover.

3RB2 Solid-State Overload Relays

3RB22, 3RB23 for high-feature applications

Type – Overload relay of current measuring module		3RB29 06	3RB29 06	3RB29 56	3RB29 66
Size		**S00/S0**	**S2/S3**	**S6**	**S10/S12**
Width		**45 mm**	**55 mm**	**120 mm**	**145 mm**
Main circuit					
Rated insulation voltage U_i (degree of pollution 3)	V	690		1000	
Rated impulse withstand voltage U_{imp}	kV	6		8	
Rated operational voltage U_e	V	690			
Type of current					
• Direct current		No			
• Alternating current		Yes, 50/60 Hz ± 5%			
Set current	A	0.3 ... 3; 2.4 ... 25	10 ... 100	20 ... 200	63 ... 630
Power loss per unit (max.)	W	0.5			
Short-circuit protection					
• With fuse without contactor		See Catalog LV 1, Selection and Ordering Data			
• With fuse and contactor		See Technical Specifications (short-circuit protection with fuses for motor feeders)			
Safe isolation between main and auxiliary conducting path according to IEC 60947-1 (degree of pollution 2)	V	690[1]			
Connection for main circuit					
Connection type		**Straight-through transformers**		**Screw terminals with box terminal / bus connection / straight-through transformer**	**Screw terminals with box terminal / bus connection**
Screw terminals					
• Terminal screw		--		4 mm allen screw	5 mm allen screw
• Tightening torque	Nm	--		10 ... 12	20 ... 22
• Conductor cross-sections (min./max.), 1 or 2 conductors					
- Solid	mm^2	--		--	--
- Finely stranded without end sleeve	mm^2	--		With 3RT19 55-4G box terminal: 2 × (1 × max. 50, 1 × max. 70), 1 × (10 ... 70) With 3RT19 56-4G box terminal: 2 × (1 × max. 95, 1 × max. 120), 1 × (10 ... 120)	2 × (50 ... 185), Front clamping point only: 1 × (70 ... 240) Rear clamping point only: 1 × (120 ... 185)
- Finely stranded with end sleeve	mm^2	--		With 3RT19 55-4G box terminal: 2 × (1 × max. 50, 1 × max. 70), 1 × (10 ... 70) With 3RT19 56-4G box terminal: 2 × (1 × max. 95, 1 × max. 120), 1 × (10 ... 120)	2 × (50 ... 185), Front clamping point only: 1 × (70 ... 240) Rear clamping point only: 1 × (120 ... 185)
- Stranded	mm^2	--		With 3RT19 55-4G box terminal: 2 × (max. 70), 1 × (16 ... 70) With 3RT19 56-4G box terminal: 2 × (max. 120), 1 × (16 ... 120)	2 × (70 ... 240), Front clamping point only: 1 × (95 ... 300) Rear clamping point only: 1 × (120 ... 240)
- AWG conductors, solid or stranded	AWG	--		With 3RT19 55-4G box terminal: 2 × (max. 1/0), 1 × (6 ... 2/0) With 3RT19 56-4G box terminal: 2 × (max. 3/0), 1 × (6 ... 250 kcmil)	2 × (2/0 ... 500 kcmil), Front clamping point only: 1 × (3/0 ... 600 kcmil) Rear clamping point only: 1 × (250 kcmil ... 500 kcmil)
- Ribbon cable conductors (number x width x circumference)	mm	--		With 3RT19 55-4G box terminal: 2 × (6 × 15.5 × 0.8), 1 × (3 × 9 × 0.8 ... 6 × 15.5 × 0.8) With 3RT19 56-4G box terminal: 2 × (10 × 15.5 × 0.8), 1 × (3 × 9 × 0.8 ... 10 × 15.5 × 0.8)	2 × (20 × 24 × 0.5), 1 × (6 × 9 × 0.8 ... 20 × 24 × 0.5)
Busbar connection					
• Terminal screw		--		M8 × 25	M10 × 30
• Tightening torque	Nm	--		10 ... 14	14 ... 24
• Conductor cross-section (min./max.)		--			
- Solid with cable lug	mm^2	--		16 ... 95 [2]	50 ... 240 [3]
- Stranded with cable lug	mm^2	--		25 ... 120 [2]	70 ... 240 [3]
- AWG conductors, solid or stranded, with cable lug	AWG	--		4 ... 250 kcmil	2/0 ... 500 kcmil
- With connecting bar (max. width)	mm	--		15	25
Straight-through transformers					
• Diameter of opening	mm	7.5	14	25	--
• Conductor cross-section (max.)					
- NYY	mm^2	4)	4)	120	--
- H07RN-F	mm^2	4)	4)	70	--

1) For grounded networks, otherwise 600 V.

2) When connecting cable lugs according to DIN 46235, use the 3RT19 56-4EA1 terminal cover for conductor cross-sections from 95 mm^2 to ensure phase spacing.

3) When connecting cable lugs according to DIN 46234 for conductor cross-sections from 240 mm^2 as well as DIN 46235 for conductor cross-sections from 185 mm^2, use the 3RT19 56-4EA1 terminal cover to ensure phase spacing.

4) On request.

Type – Overload relay of evaluation module		**3RB22 83, 3RB23 83**
Size		**S00 ... S10/S12**
Width		**45 mm**
Auxiliary circuit		
Number of NO contacts		2
Number of NC contacts		2
Auxiliary contacts – assignment		1 NO for the signal "tripped due to overload and/or thermistor", 1 NC for switching off the contactor 1 NO for the signal "tripped due to ground fault", 1 NC for switching off the contactor or[1)] 1 NO for the signal "tripped due to overload and/or thermistor and/or ground fault", 1 NC for switching off the contactor 1 NO for overload warning, 1 NC for switching off the contactor
Rated insulation voltage U_i (degree of pollution 3)	V	300
Rated impulse withstand voltage U_{imp}	kV	4
Auxiliary contacts – Contact rating		
• NC contact with alternating current AC-14/AC-15 Rated operational current I_e at U_e:		
- 24 V	A	6
- 120 V	A	6
- 125 V	A	6
- 250 V	A	3
• NO contact with alternating current AC-14/AC-15: Rated operational current I_e at U_e:		
- 24 V	A	6
- 120 V	A	6
- 125 V	A	6
- 250 V	A	3
• NC, NO contact with direct current DC-13: Rated operational current I_e at U_e:		
- 24 V	A	2
- 60 V	A	0.55
- 110 V	A	0.3
- 125 V	A	0.3
- 250 V	A	0.2
• Continuous thermal current I_{th}	A	5
• Contact reliability (suitability for PLC control; 17 V, 5 mA)		Yes
Short-circuit protection		
• With fuse, gL/gG operational class	A	6
• With miniature circuit breaker (C characteristic)	A	1.6
Safe isolation between main and auxiliary conducting path according to IEC 60947-1	V	300
CSA, UL, UR rated data		
Auxiliary circuit – switching capacity		B300, R300
Connection of the auxiliary circuit		
Connection type		**Screw terminals**
• Terminal screw		Pozidriv size 2
• Tightening torque	Nm	0.8 ... 1.2
• Conductor cross-section (min./max.), 1 or 2 conductors		
- Solid	mm^2	1 × (0.5 ... 4), 2 × (0.5 ... 2.5)
- Finely stranded without end sleeve	mm^2	--
- Finely stranded with end sleeve	mm^2	1 × (0.5 ... 2.5), 2 × (0.5 ... 1.5)
- Stranded	mm^2	--
- AWG conductors, solid or stranded	AWG	2 × (20 ... 14)
Connection type		**Spring-loaded terminals**
• Conductor cross-section (min./max.), 1 or 2 conductors		
- Solid	mm^2	2 × (0.25 ... 1.5)
- Finely stranded without end sleeve	mm^2	--
- Finely stranded with end sleeve	mm^2	2 × (0.25 ... 1.5)
- Stranded	mm^2	2 × (0.25 ... 1.5)
- AWG conductors, solid or stranded	AWG	2 × (24 ... 16)

[1)] The assignment of auxiliary contacts may be influenced by function expansion modules.

3RB2 Solid-State Overload Relays

3RB22, 3RB23 for high-feature applications

Type – Overload relay of evaluation module		**3RB22 83, 3RB23 83**
Size		**S00 ... S10/S12**
Width		**45 mm**
Control and sensor circuit as well as the analog output		
Rated insulation voltage U_i (degree of pollution 3)[1]	V	300
Rated impulse withstand voltage U_{imp}[1]	kV	4
Rated control supply voltage U_s[1]		
• AC 50/60 Hz	V	24 ... 240
• DC	V	24 ... 240
Operating range[1]		
• AC 50/60 Hz		$0.85 \times U_{s\,min} \leq U_s \leq 1.1 \times U_{s\,max}$
• DC		$0.85 \times U_{s\,min} \leq U_s \leq 1.1 \times U_{s\,max}$
Rated power[1]		
• AC 50/60 Hz	W	0.5
• DC	W	0.5
Mains buffering time[1]	ms	200
Thermistor motor protection (PTC thermistor detector)[2]		
• Summation cold resistance	kΩ	≤ 1.5
• Response value	kΩ	3.4 ... 3.8
• Return value	kΩ	1.5 ... 1.65
Ground fault detection		The information refers to sinusoidal residual currents at 50/50 Hz
• Tripping value I_Δ[3]		
- For $0.3 \times I_e < I_{motor} < 2.0 \times I_e$		$> 0.3 \times I_e$
- For $2.0 \times I_e < I_{motor} < 8.0 \times I_e$		$> 0.15 \times I_{motor}$
• Response time t_{trip}	ms	500 ... 1000
Analog output[3]		
• Output signal	mA	4 ... 20
• Measuring range		0 to $1.25 \times I_e$ 4 mA corresponds to $0 \times I_e$ 16.8 mA corresponds to $1.0 \times I_e$ 20 mA corresponds to $1.25 \times I_e$
Connection for the control and sensor circuit as well as the analog output		
Connection type		**Screw terminals**
• Terminal screw		Pozidriv size 2
• Tightening torque	Nm	0.8 ... 1.2
• Conductor cross-section (min./max.), 1 or 2 conductors		
- Solid	mm^2	1 × (0.5 ... 4), 2 × (0.5 ... 2.5)
- Finely stranded without end sleeve	mm^2	--
- Finely stranded with end sleeve	mm^2	1 × (0.5 ... 2.5), 2 × (0.5 ... 1.5)
- Stranded	mm^2	--
- AWG conductors, solid or stranded	AWG	2 × (20 ... 14)
Connection type		**Spring-loaded terminals**
• Conductor cross-section (min./max.), 1 or 2 conductors		
- Solid	mm^2	2 × (0.25 ... 1.5)
- Finely stranded without end sleeve	mm^2	--
- Finely stranded with end sleeve	mm^2	2 × (0.25 ... 1.5)
- Stranded	mm^2	2 × (0.25 ... 1.5)
- AWG conductors, solid or stranded	AWG	2 × (24 ... 16)

1) Control circuit.

2) Sensor circuit.

3) In conjunction with corresponding function expansion module.

Short-circuit protection with fuses for motor feeders

For short-circuit currents up to 50 kA at 400 to 690 V

Overload relay	Contactor	CLASS 5 and 10			CLASS 20			CLASS 30			690 V			415 V
											Fuse links[1]			Fuses according to British Standard BS 88
											LV HRC DIAZED NEOZED	Type 3NA Type 5SB Type 5SE	Type 3ND	
											gL/gG operational class		aM operational classes	
Setting range	Type	Rated operational current I_e AC-3 in A at ... V									Type of coordination[2]			
A		400	500	690	400	500	690	400	500	690	1	2	2	2
Size S00/S0														
0.3 ... 3	3RT10 15	3	3	3	3	3	3	3	3	3	35	20	--	20
	3RT10 16	3	3	3	3	3	3	3	3	3	35	20	--	20
2.4 ... 25	3RT10 15	7	5	4	7	5	4	7	5	4	35	20	--	20
	3RT10 16	9	6.5	5.2	9	6.5	5.2	9	6.5	5.2	35	20	--	20
	3RT10 17	12	9	6.3	10	9	6.3	9	9	6.3	35	20	--	20
	3RT10 23	9	6.5	5.2	9	6.5	5.2	--	--	--	63	25	--	25
	3RT10 24	12	12	9	12	12	9	12	12	9	63	25	20	25
	3RT10 25	17	17	13	16	16	13	14	14	13	63	25	20	25
	3RT10 26	25	18	13	16	16	13	14	14	13	100	35	20	25
	3RT10 34	25	25	20	22.3	22.3	20	19.1	19.1	19.1	125	63	50	63
	3RT10 35	25	25	24	25	25	24	25	25	24	125	63	50	63
Size S2/S3														
10 ... 100	3RT10 34	32	32	20	22.3	22.3	20	19.1	19.1	19.1	125	63	50	63
	3RT10 35	40	40	24	29.4	29.4	24	26.5	26.5	24	125	63	50	80
	3RT10 36	50	50	24	32.7	32.7	24	26.5	26.5	24	160	80	50	80
	3RT10 44	65	65	47	49	49	47	41.7	41.7	41.7	200	125	63	125
	3RT10 45	80	80	58	53	53	53	45	45	45	200	160	80	160
	3RT10 46	95	95	58	59	59	58	50	50	50	200	160	100	160
	3RT10 54	100	100	100	81.7	81.7	81.7	69	69	69	355	315	160	250
	3RT10 55	--	--	--	100	100	100	90	90	90	355	315	200	315
Size S6														
20 ... 200	3RT10 54	115	115	115	81.7	81.7	81.7	69	69	69	355	315	160	250
	3RT10 55	150	150	150	107	107	107	90	90	90	355	315	200	315
	3RT10 56	185	185	170	131	131	131	111	111	111	355	315	200	315
Size S10/S12														
160 ... 630	3RT10 64	225	225	225	160	160	160	135	135	135	500	400	250	400
	3RT10 65	265	265	265	188	188	188	159	159	159	500	400	315	400
	3RT10 66	300	300	280	213	213	213	180	180	180	500	400	315	400
	3RT10 75	400	400	400	284	284	284	240	240	240	630	500	400	450
	3RT10 76	500	500	450	355	355	355	300	300	300	630	500	500	500
	3RT12 64	225	225	225	225	225	225	173	173	173	500	500	400	450
	3RT12 65	265	265	265	265	265	265	204	204	204	500	500	400	450
	3RT12 66	300	300	300	300	300	300	231	231	231	500	500	400	450
	3RT12 75	400	400	400	400	400	400	316	316	316	800	800	630	800
	3RT12 76	500	500	500	500	500	500	385	385	385	800	800	630	800
	3TF68[3]	630	630	630	440	440	440	376	376	376	800	500[4]	630	500
	3TF69[3]	630	630	630	572	572	572	500	500	500	800	630[4]	630	630

1) Please observe operational voltage.

2) Coordination and short-circuit equipment according to EN 60947-4-1:
Type of coordination 1: the contactor or starter must not endanger persons or the installation in the event of a short-circuit. They do not need to be suitable for further operation without repair and the renewal of parts.
Type of coordination 2: the contactor or starter must not endanger persons or the installation in the event of a short-circuit. They must be suitable for further operation. There is a risk of contact welding.

3) Contactor cannot be mounted.

4) Please ensure that the maximum AC-3 operational current has sufficient safety clearance from the rated current of the fuses.