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Static Relay for the Protection of Motors Types ITX 192, ITX 193

Applications

Static relays for the protection of high-voltage three-phase motors, transformers and cables against the following kinds of fault:

Type ITX 192
- Interphase short circuits
- Prolonged starting, blocked rotor (induction motors)
- Thermal overloading

Type ITX 193
- Unbalanced load
- Earth faults

These relays are the plug-in successors to the proven relays type ITX 162 and ITX 163 and, apart from extended measuring ranges, also possess facilities for indication by means of visual indicators and signalling contacts. They are intended for use singly in standardized casings for mounting in switchboards. It is worth mentioning that a slightly modified version of these relays with the designation ITX 182 and ITX 183 is available as module for mounting in Elnorm enclosures (see data sheet CH-ES 63-32.1).

Main features

- Combined protection in compact form with up to 5 functions
- Apart from current, no other quantities are measured Excellent reliability resulting from the exclusive use of static components
- 3 measuring inputs
- Low consumption of the measuring circuits
- Wide setting range
- Measuring range of the short-circuit protection and the time-lag of the starting protection can be changed by an external command
- Thermal protection during starting, in operation switches over to a longer time constant automatically when the machine is at standstill (cooling)
- Thermal replica available, even if the auxiliary supply fails
- Temperature rise indicated by built-in dial meter
- Separate preliminary warning of overload
- Can be supplied to order with protection against unbalance and earth faults (ITX 193)
- Common tripping contactor for all protective functions
- Separate indication of individual protective functions via contacts or LED, or both
- Auxiliary supply: a.c. or d.c.
- Casing size 1, plug-in, for flush or surface mounting

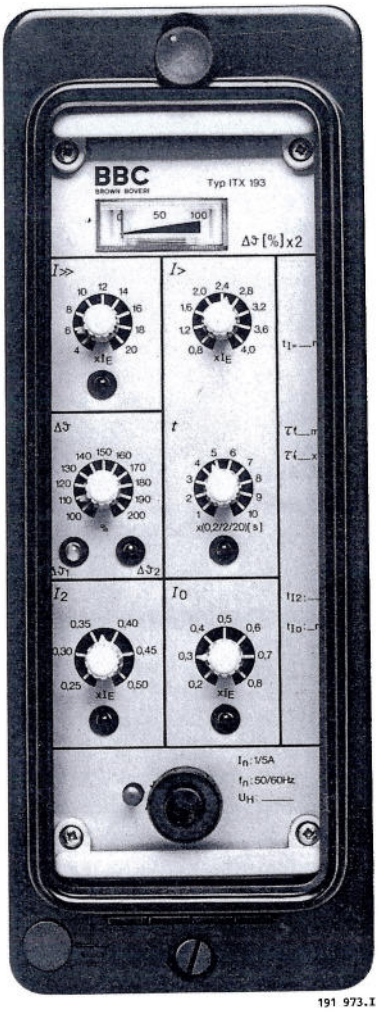


Fig. 1 – Static relay type ITX 193 for the protection of motors

Technical data

Rated current	I_N	1 A and 5 A	
Setting	I_E	0.3–1.2 × I_N in steps of 0.1 × I_N	
Rated frequency	f_N	50 and 60 Hz	●
Measuring circuits		three-phase	
Consumption		≤ 0.1 VA per phase when $I_E = I_N$	
Load capacity continuous short-time thermal limit dynamic limit		 5 I_N 30 I_N for 10 s 100 I_N for 1 s 250 I_N	
Supply circuits			
Auxiliary voltage	U_H	24 V ± 15% or 48 V–250 V or 110/220 V, 50 or 60 Hz	●
Consumption: e.g. ITX 193-321 (24 V_) under operating conditions with all LED alight max. possible short-time consumption		20.4 V 24 V 27.6 V 3 W 3.6 W 4.3 W 4 W 5.1 W 6.4 W 11.5 W	
Tripping and indicating circuits		potential-free	
Tripping: 2 contacts connected as desired		2 normally open or 2 normally closed or 1 normally closed (Cl. 5+7), 1 normally open (Cl. 6+8)	●
Indication: 4 or 6 functions to choice depending on type and variant, with: – LED, colour red Overload protection: yellow Acknowledgement by pressing reset button on relay – Contacts: 1 N/O per function I >, $\Delta\vartheta_2$, I_2, I_0 at a common terminal (11)		contacts (N/O) LED, or both	
Monitoring: for undervoltage of the auxiliary supply		1 N/C contact	

Contact ratings	Tripping contacts	Indicating contacts
Max. service voltage	300 V a.c./d.c.	250 V a.c./d.c.
Making current	30 A/0.5 s	5 A/0.5 s
Continuous current	10 A	1.5 A
Making power	3300 W/110 V_	550 W/110 V_
Breaking currents	0.45 A at 220 V_/L/R = 40 ms	0.4 A ≤ 250 V_
– 2 contacts in series	5 A at 120 V_/L/R = 40 ms 1 A at 250 V_/L/R = 40 ms	

External changeover facilities: Changing over the range from I≫ Changing time setting by reed relay from I> Actuating voltage Other values can be obtained with additional built-in resistors	 coil: 3700 ohm 24 V_ ± 15% 48 V_–250 V_	●

● To be stated when ordering

Protective functions and settings

a.	Short circuit	$I \gg$	
	Setting range		4–20 I_E
		can be externally changed to	2–10 I_E
	Time-lag	fixed setting	50 ms
b.	Protection against prolonged starting	$I >$	
	Setting range	infinite	0.8– 4 I_E
	Time-lag	adjustable and externally changeable to half set value	0.2– 2 s or 2 – 20 s or 20 –200 s
c.	Overload protection	$\Delta\vartheta$	
	Heating time constant	$\tau\uparrow$	10, 20, 30, 40, 50, 60, 70, 80, 90, 100 min
	Cooling time constant	$\tau\downarrow$	$1\times\tau\uparrow$, $2\times\tau\uparrow$, $3\times\tau\uparrow$
	Tripping setting range	$\Delta\vartheta_2$	100%–200%
	Alarm fixed setting	$\Delta\vartheta_1$	80% $\Delta\vartheta_2$
d.	Protection against unbalanced load (ITX 193 only)	I_2	
	Setting range	infinite	0.25–0.5 I_E
	Time-lag	fixed setting	4 s
e.	Earth fault protection (ITX 193 only)	I_0	
	Setting range	infinite	0.2–0.8 I_E
	Time-lag	fixed setting	0.15 s
	Circuit diagrams		
	– Relay with earth fault detection		Fig. 2c, 2f
	– Relay without earth fault detection		Fig. 2d, 2e
Temperature range			
	within specification		–10 to +55 °C
	serviceable		–25 to +70 °C
Test voltages [1]			
–	Measuring and tripping circuits		2 kV, 50 Hz, 1 min
	Between circuits and to earth		5 kV, 1/50 µs
			2.5 kV, 1 MHz
–	Between supply circuit and earth		2 kV, 50 Hz, 1 min
–	Across open contacts		1 kV, 50 Hz, 1 min
Casing size 1, plug-in			Dimension drawings
	Flush mounting, rear terminals		Fig. 12 (HESG 438828)
	Surface mounting, front terminals		Fig. 14 (HESG 438780)
	Surface mounting, rear terminals		Fig. 13 (HESG 438827)
Weight			4.7 kg

● To be stated when ordering

[1] In the case of repeat testing reduced values are valid according to IEC Publication 255-5, Sect. 6.6 and 8.6.

We reserve the right to introduce improvements in the course of technical development.

		Functions ● available						Indication		Aux. supply		
		$I \gg$	$I >$	$\triangle\, \vartheta$		I_2	I_0	⊗		D.C.	D.C.	A.C.
					Instr.			LED	Con-tacts	24 V	48–250 V	110/220 V
1	ITX 192-211	●	●	●	●				●	●		
2	-212	●	●	●	●				●		●	
3	-213	●	●	●	●				●			●
4	ITX 192-221	●	●	●	●			●		●		
5	-222	●	●	●	●			●			●	
6	-223	●	●	●	●			●				●
7	ITX 192-231	●	●	●	●			●	●	●		
8	-232	●	●	●	●			●	●		●	
9	-233	●	●	●	●			●	●			●
10	ITX 193-311	●	●	●	●	●	●		●	●		
11	-312	●	●	●	●	●	●		●		●	
12	-313	●	●	●	●	●	●		●			●
13	ITX 193-321	●	●	●	●	●	●	●		●		
14	-322	●	●	●	●	●	●	●			●	
15	-323	●	●	●	●	●	●	●				●
16	ITX 193-331	●	●	●	●	●	●	●	●	●		
17	-332	●	●	●	●	●	●	●	●		●	
18	-333	●	●	●	●	●	●	●	●			●

Examples of connections for networks which are insulated or earthed through a high impedance

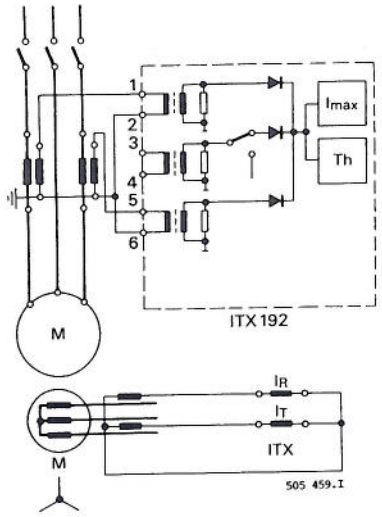


Fig. 2a – Connection to two current transformers without detection of unbalance or earth faults (ITX 192)

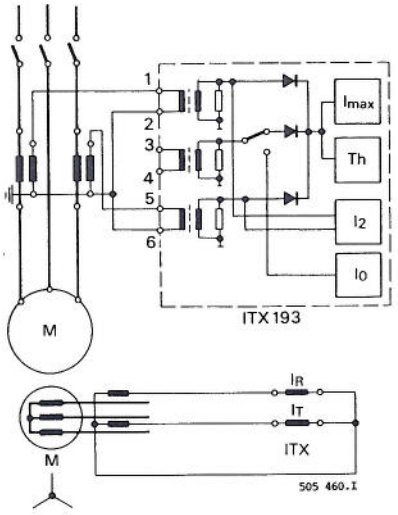


Fig. 2b – Connection to two c.t. with detection of unbalance but without earth fault protection (ITX 193)

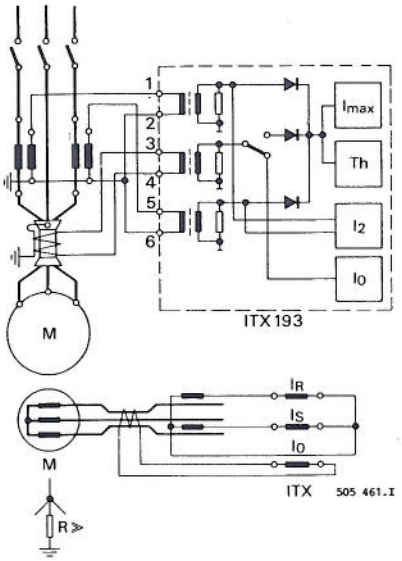


Fig. 2c – Connection to two c.t. and a cable slipover transformer for detection of earth faults, with unbalance protection (ITX 193)

Examples of connections for networks earthed solidly or through a low impedance

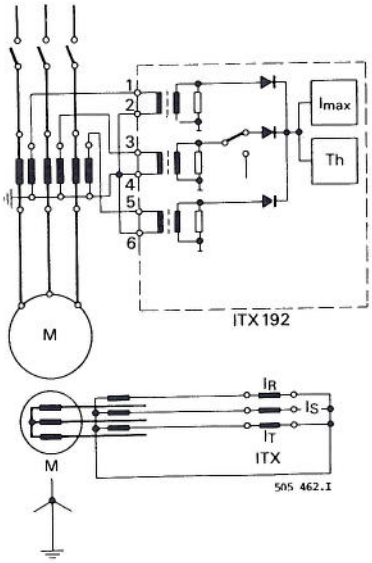


Fig. 2d – Connection to three c.t. Earth faults detected through phase currents (ITX 192)

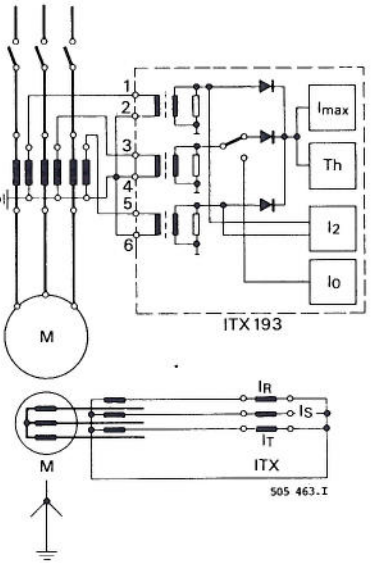


Fig. 2e – Connection to three c.t. with unbalance protection; earth faults detected through phase currents (ITX 193)

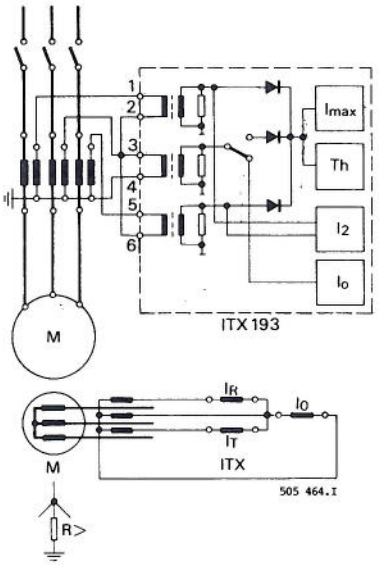


Fig. 2f – Connection to three c.t. with unbalance protection; earth faults detected through neutral current (ITX 193)

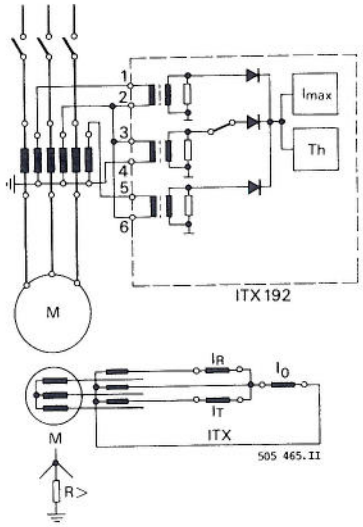
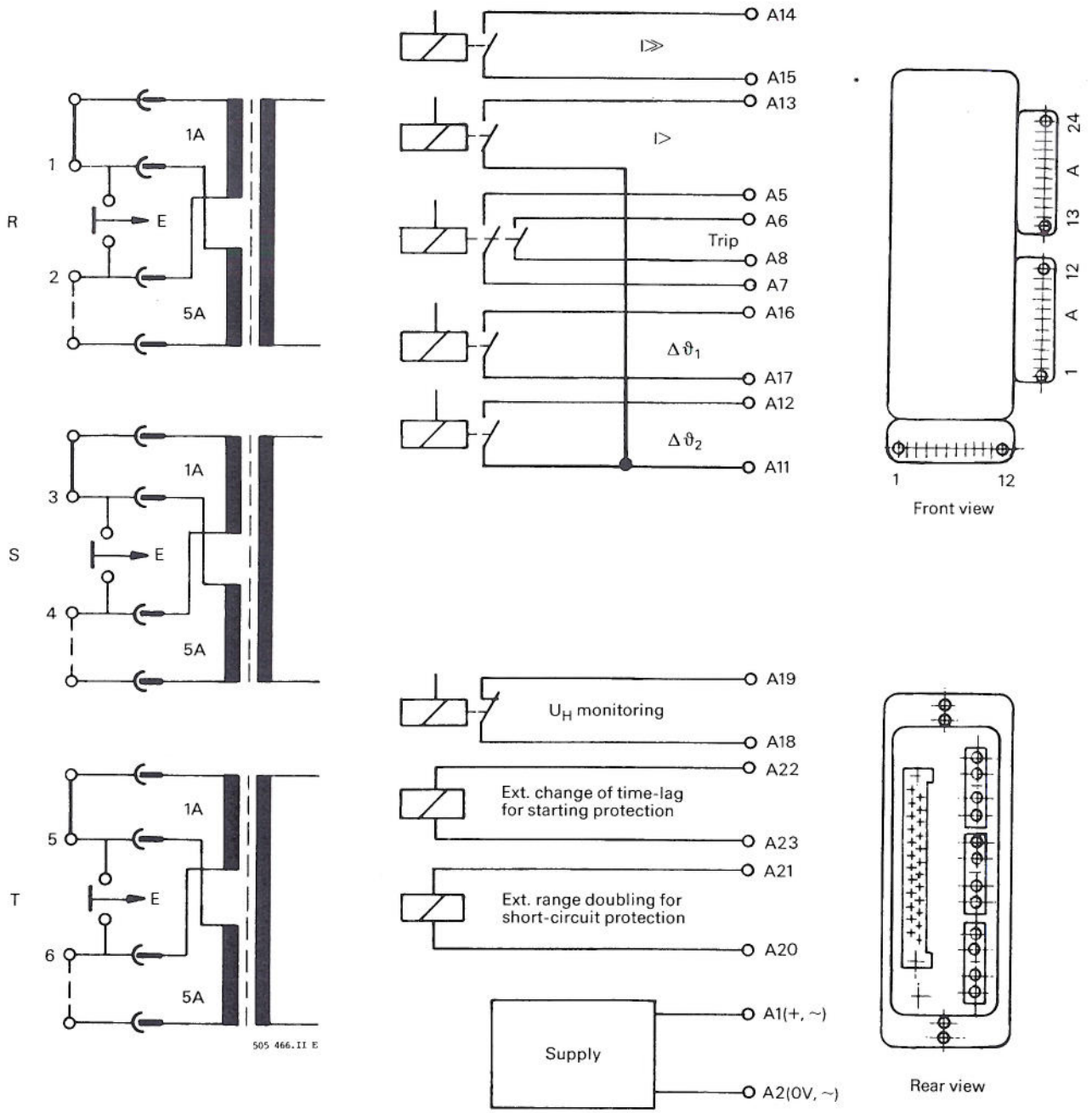
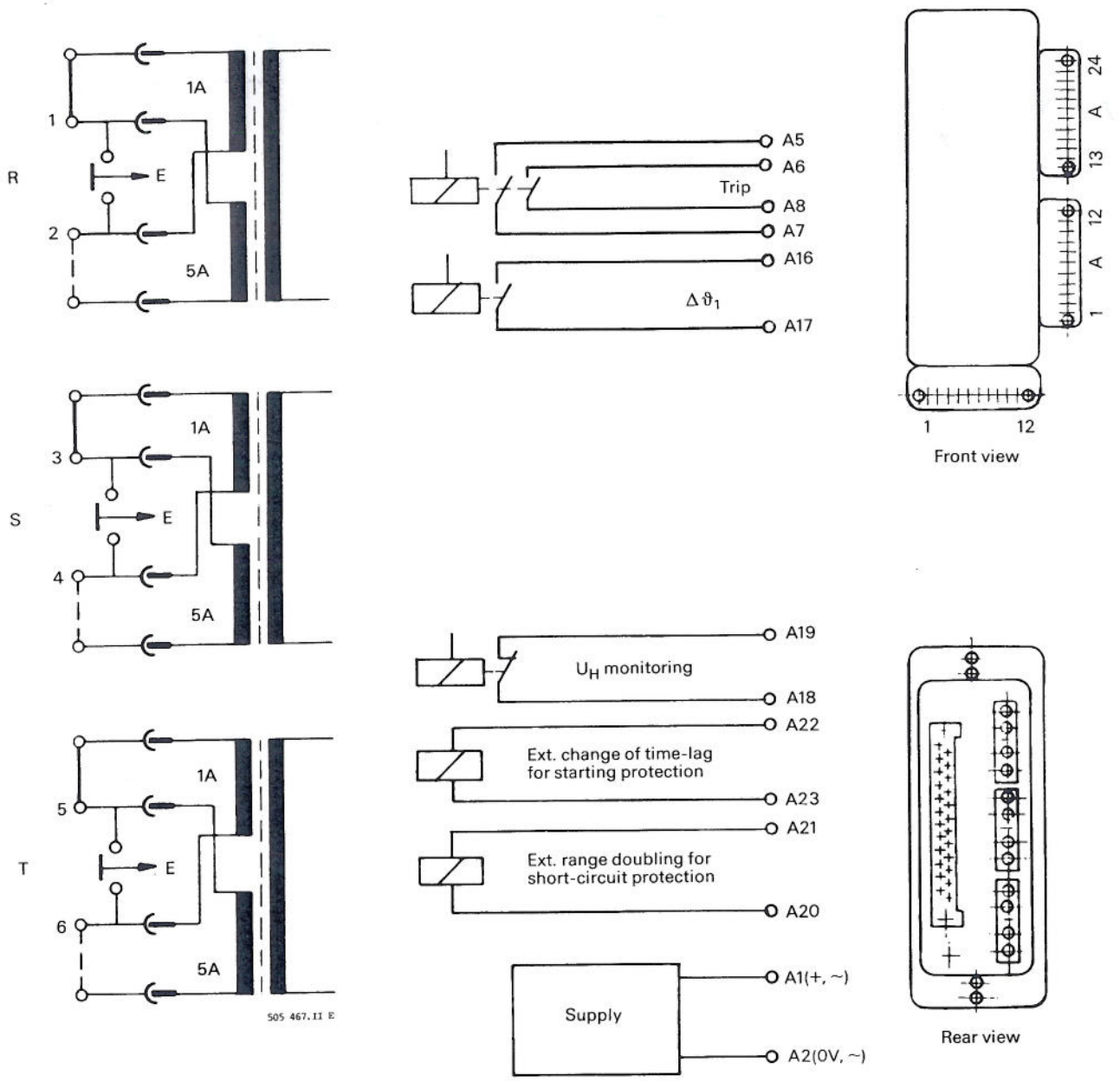


Fig. 2g – Connection to three c.t. without unbalance protection; earth faults detected through neutral current (ITX 193)



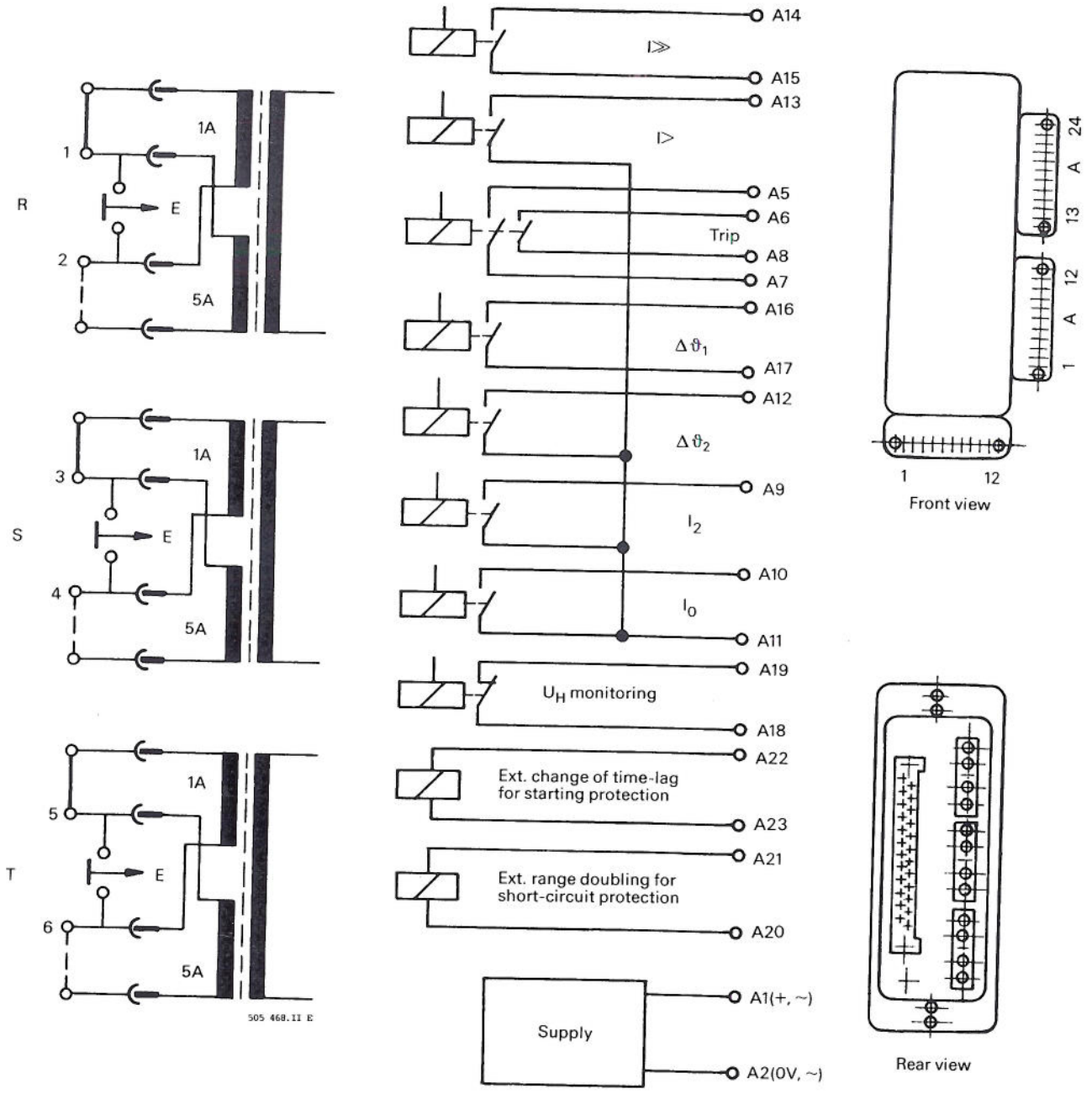
* Terminals for front connection, only supplied if ordered.
Terminals of the same designation are connected.

Fig. 3 – Protection for electric motors
Type ITX 192-211/-212/-213
ITX 192-231/-232/-233



* Terminals for front connection, only supplied if ordered.
Terminals of the same designation are connected.

Fig. 4 – Protection for electric motors
Type ITX 192-221/-222/-223
ITX 193-321/-322/-323



* Terminals for front connection, only supplied if ordered.
Terminals of the same designation are connected.

Fig. 5 – Protection for electric motors
Type ITX 193-331/-332/-333
ITX 193-311/-312/-313

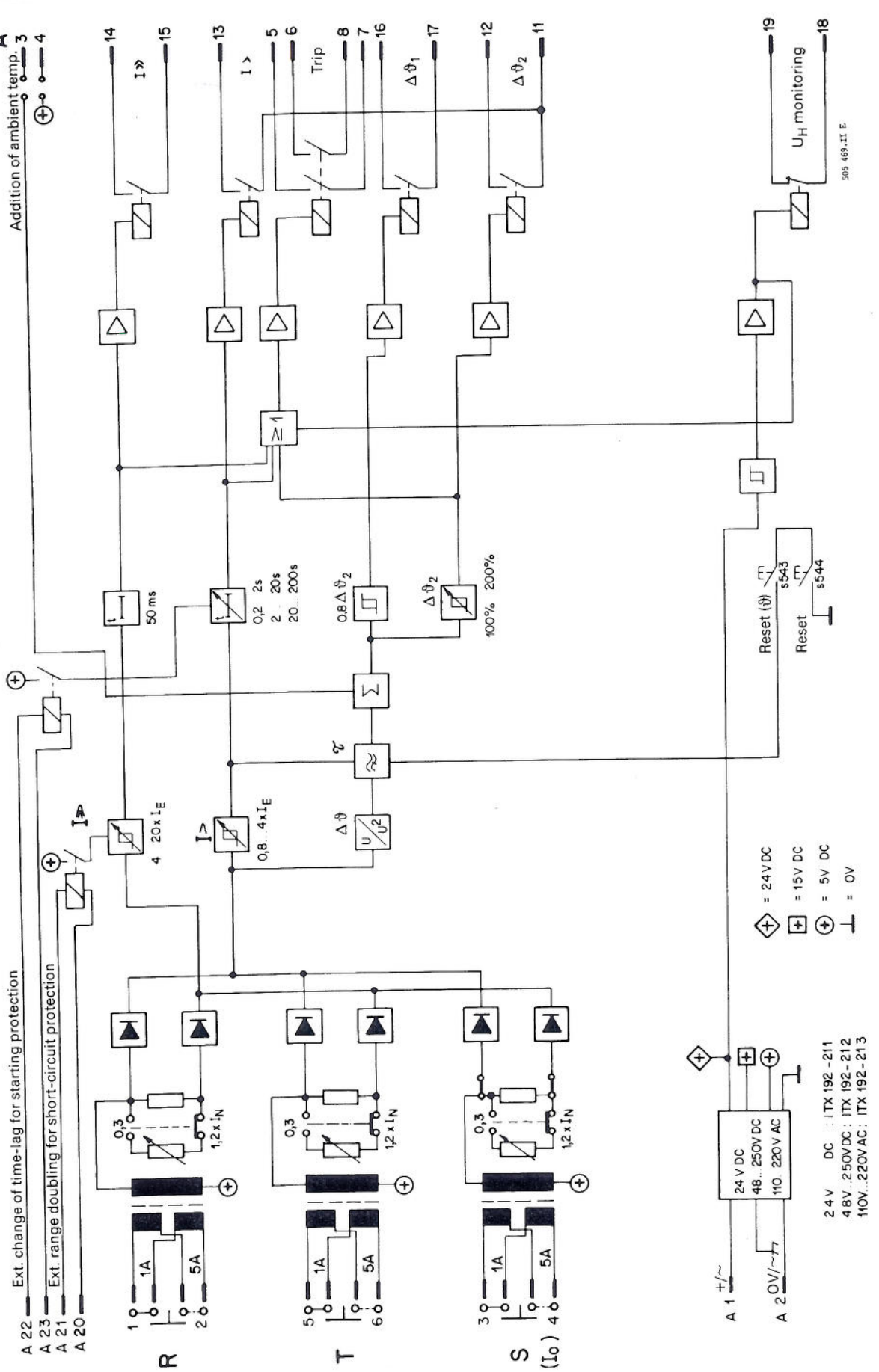


Fig. 6 – Block diagram
Relay for the protection of motors ITX 192-211/-212/-213

HESG 323511

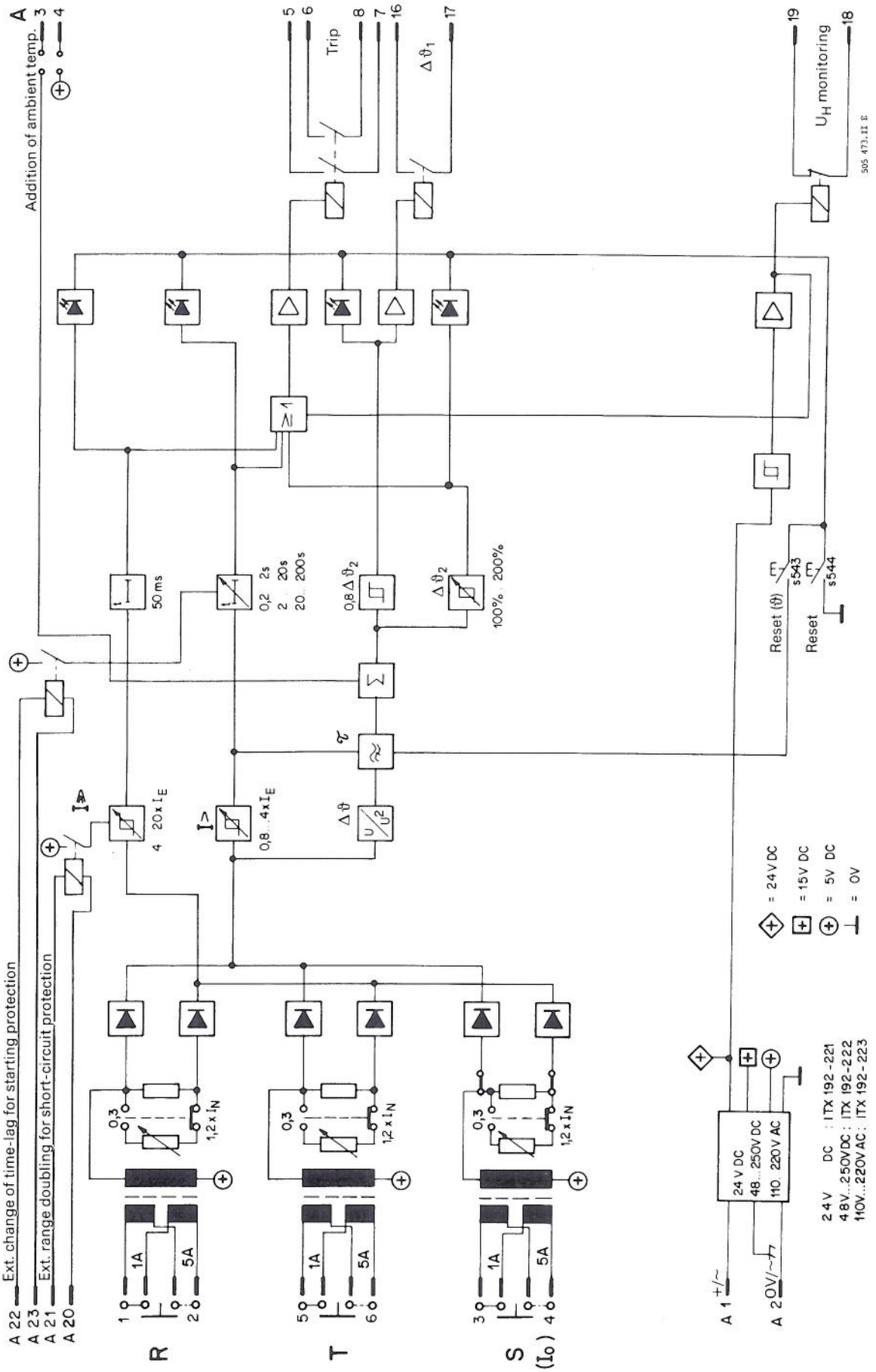


Fig. 7 – Block diagram
Relay for the protection of motors ITX 192-221/-222/-223

HESG 323512

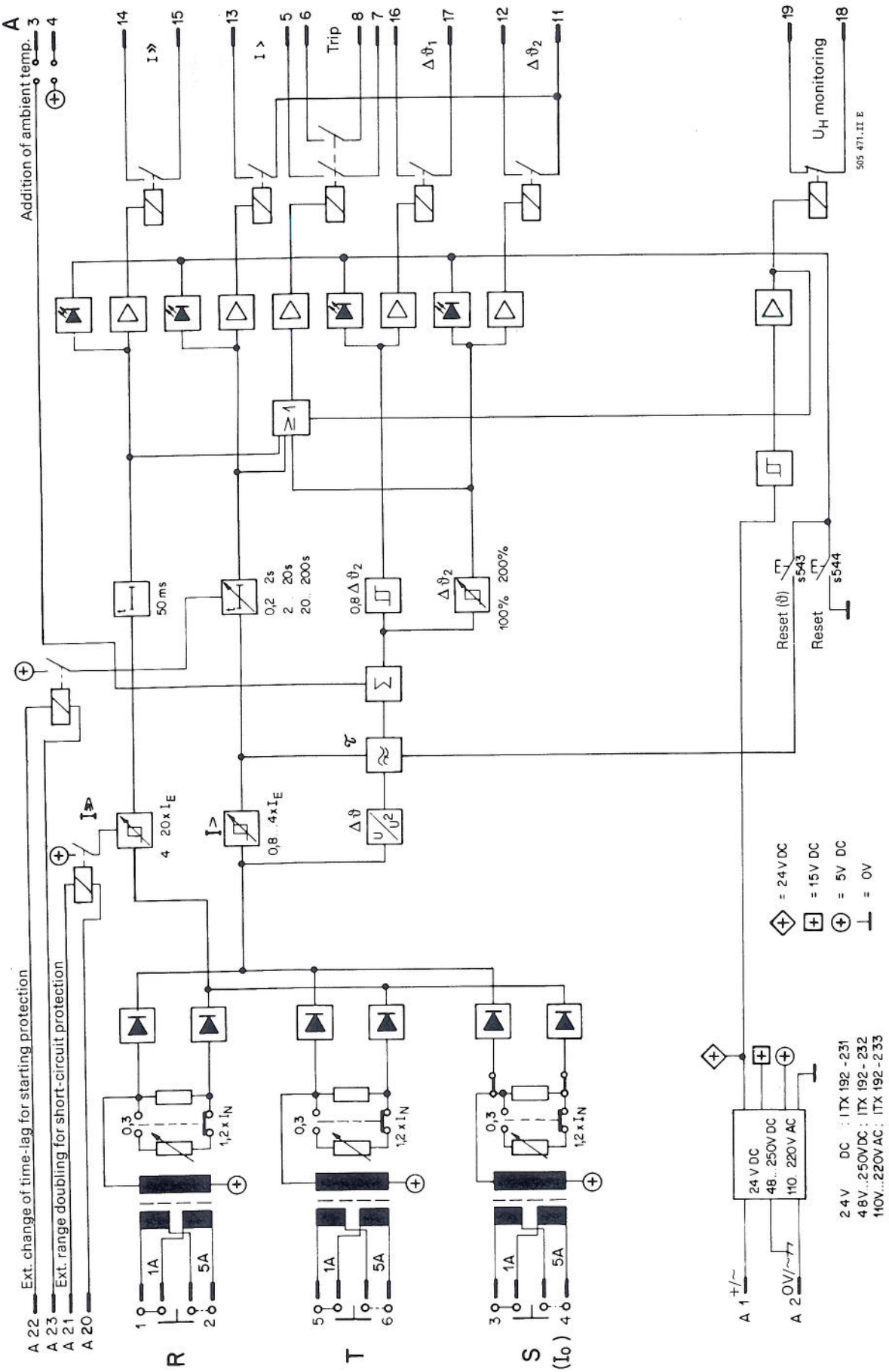


Fig. 8 – Block diagram
Relay for the protection of motors ITX 192-231/-232/-233

HESG 323513

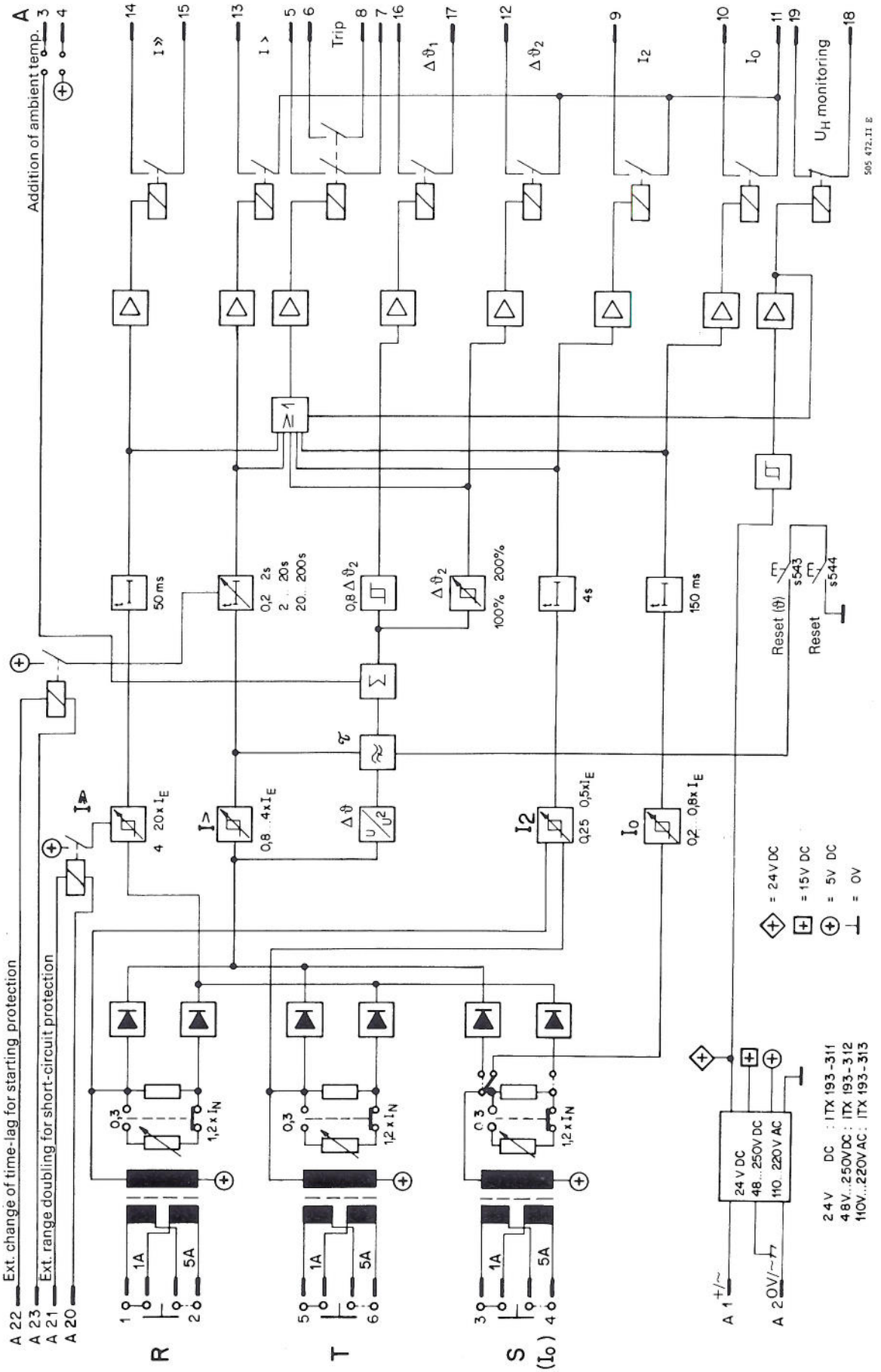


Fig. 9 – Block diagram
Relay for the protection of motors ITX193-311/-312/-313

HESG 323514

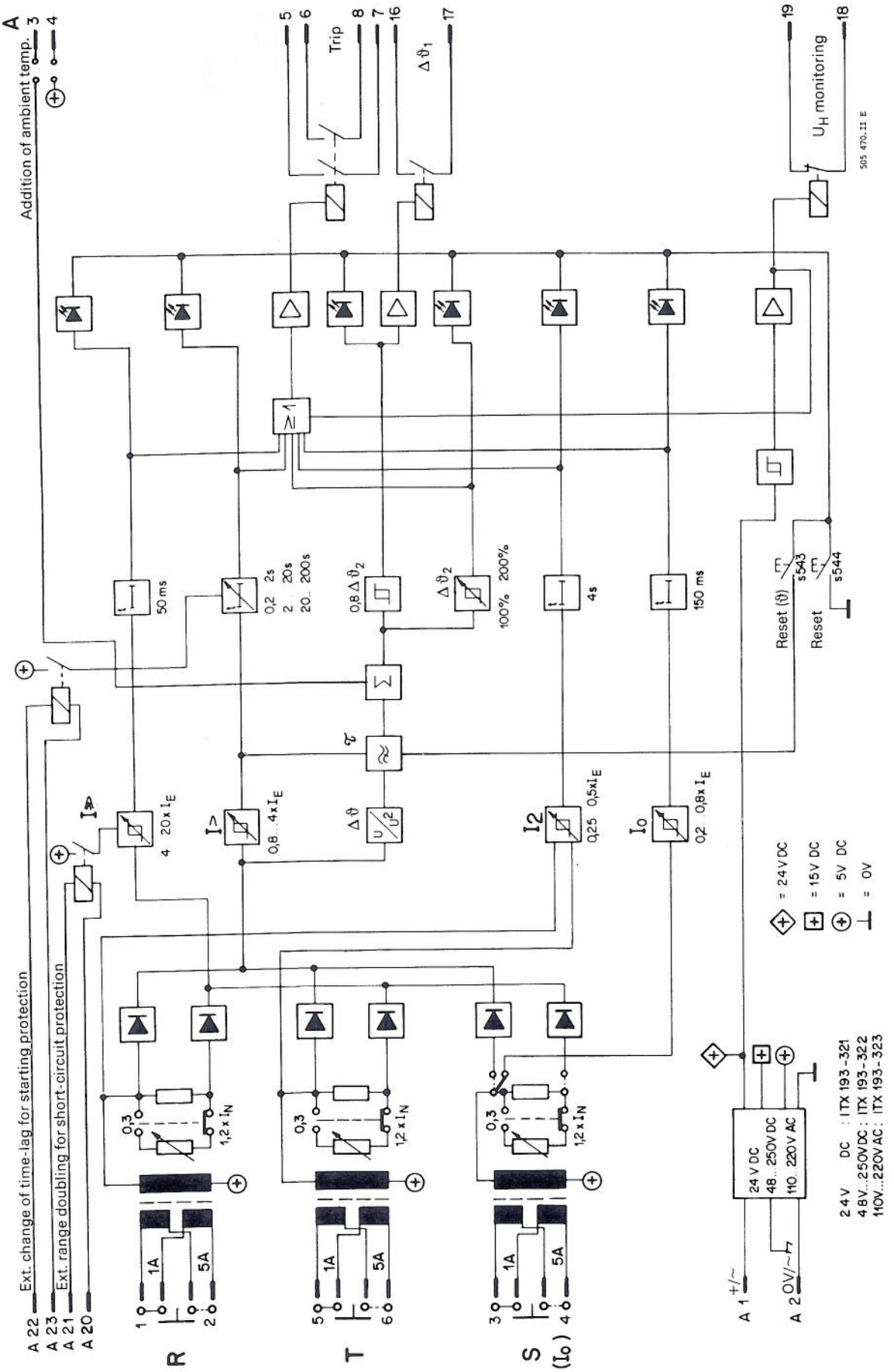


Fig. 10 – Block diagram
Relay for the protection of motors ITX 193-321/-322/-323

HESG 323515

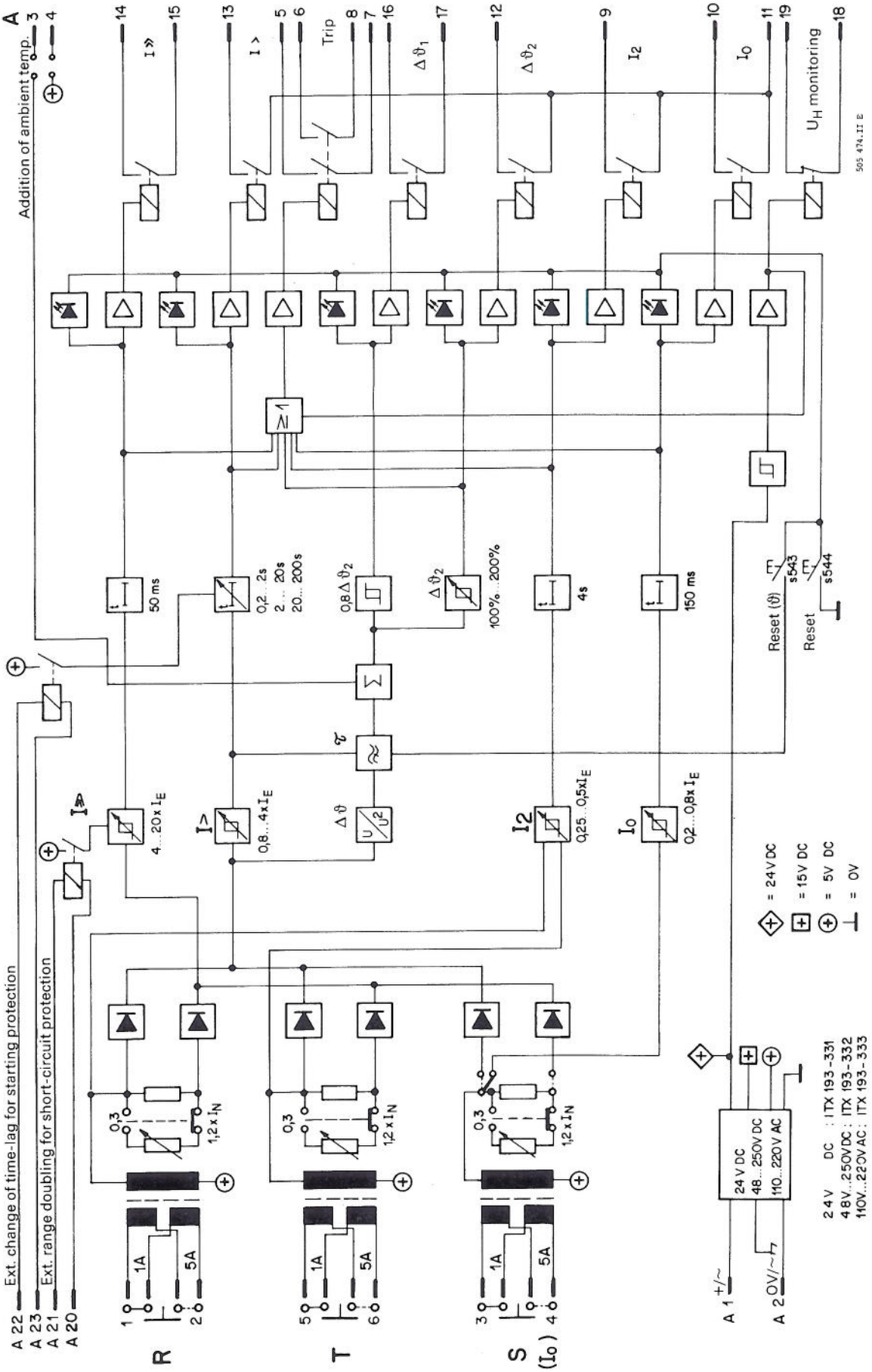


Fig. 11 – Block diagram
Relay for the protection of motors ITX 193-331/-332/-333

HESG 323506

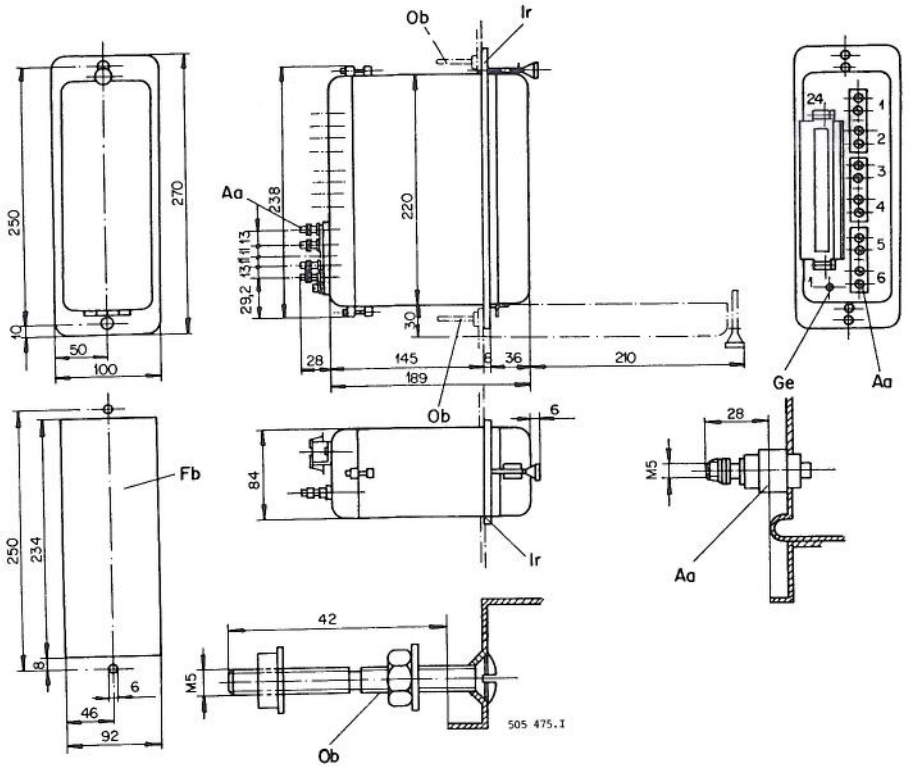


Fig. 12 – Casing for plug-in relays
Flush mounting, rear terminals

Aa = Terminals. Number see diagram, max. 36
Fb = Hole in switchboard
Ir = Fixing frame. Frame can be readjusted for surface mounting
Ob = Fixing screw
Ge = Earthing screw M5

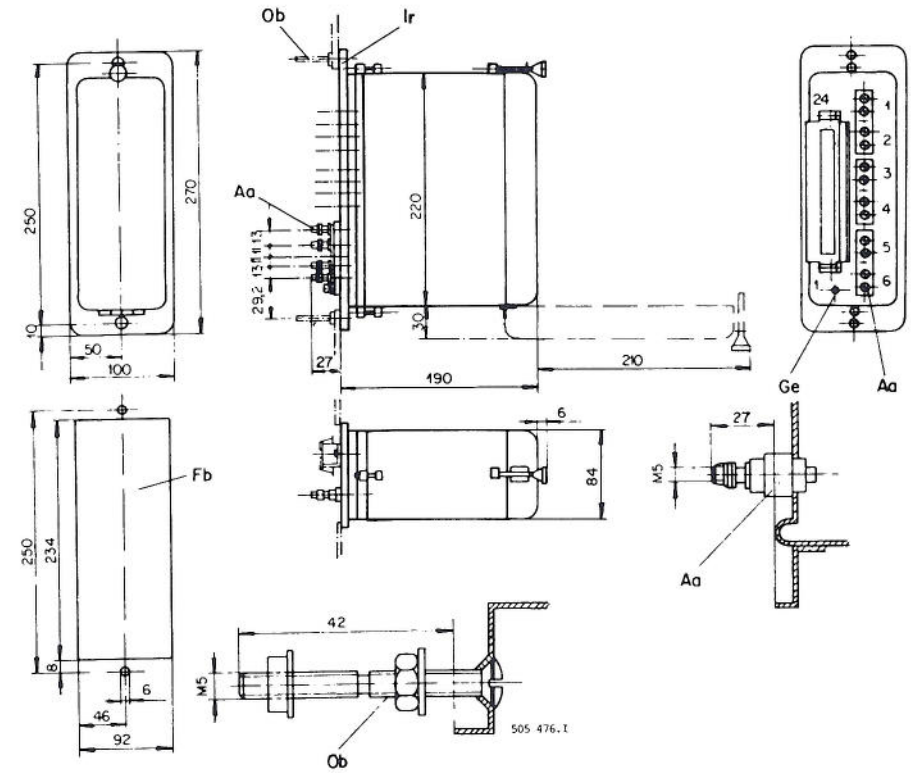


Fig. 13 – Casing for plug-in relays
Surface mounting, rear terminals

Aa = Terminals. Number see diagram, max. 36
Fb = Hole in switchboard
Ir = Fixing frame. Frame can be readjusted for surface mounting
Ob = Fixing screw
Ge = Earthing screw M5

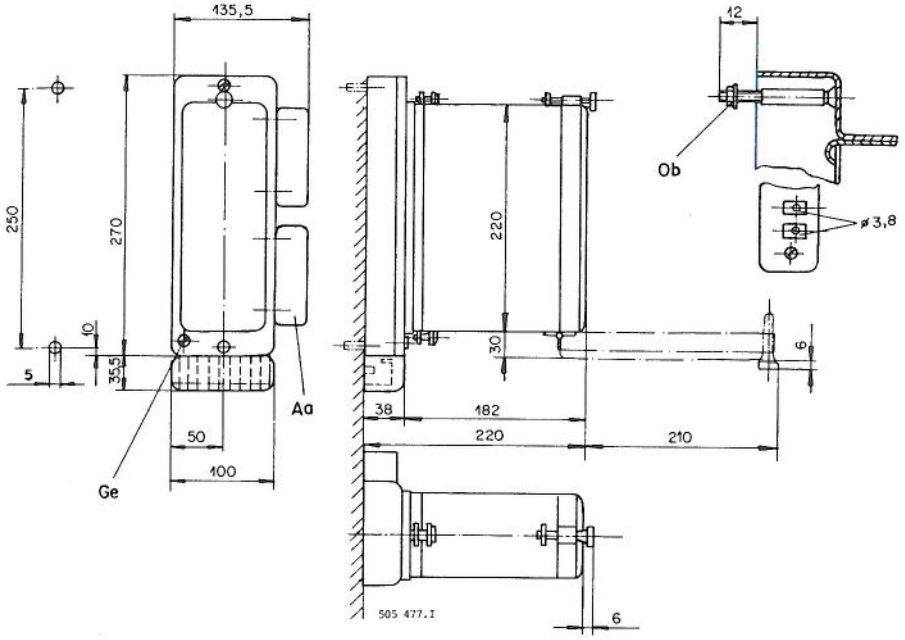


Fig. 14 – Casing for plug-in relays
Surface mounting, front connections

Aa = Terminals. Number see diagram, max. 36
Ob = Fixing screw
Ge = Earthing screw M 5

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