ISO 9001
OBAC/002/SZJ/20

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INDEX CARD

Replacing the SH630 / M circuit breaker with a new Tmax T5 circuit breaker by ABB

Tmax T5 circuit-breaker with PR221DS electronic protection by ABB has obtained a positive opinion for use in flameproof transformer stations. In the overhauled or serviced transformer stations, the lower voltage compartment of the substation was equipped with the ABB Tmax T5 circuit breaker, instead of the previously used SH630 / M circuit breaker. The station's flameproof enclosure and other electrical equipment remained unchanged.

After installing the Tmax T5 circuit breaker with PR221DS electronic protection in transformer stations in accordance with DT by an employee of the IZOL-PLAST company, the explosion-proof safety level of flameproof transformer stations is maintained and the stations retain their approval feature. After installing the Tmax T5 circuit breaker with the PR221DS electronic protection, the station is marked with an additional repair plate with the date and number of renovation, as well as the type and serial number of the station, also this change is recorded in the documents of the transformer station.

Tmax T5 circuit-breaker with PR221DS electronic protection, manufactured by ABB, used in renovated flameproof transformer stations, type:

- **IT3Sb 315/6, IT3Sb 315/6N, IT3Sb 315/6/Z, IT3Sb 400/6, IT3Sb 400/6N, IT3Sb 400/6/1, IT3Sb 400/6/1N, IT3Sb 400/6/BM, IT3Sb 400/6/1/BM, IT3Sb 630/6/1;**
- **IT3Sc 400/6, IT3Sc 400/6/1, IT3Sc 400/6/M, IT3Sc 400/6/1/M, IT3Sc 400/6/MR, IT3Sc 400/6/1/MR, IT3Sc 500/6, IT3Sc 630/6/1, IT3Sc 630/6/1/M, IT3Sc 630/6/1/MR;**
- **IT3Sd 315/6/Z, IT3Sd 400/6, IT3Sd 400/6N, IT3Sd 400/6/1, IT3Sd 400/6/1N, IT3Sd 400/6/Z, IT3Sd 400/6/1/Z, IT3Sd 500/6, IT3Sd 630/6/1;**
- **IT3SF-2 1000/6/1;**
- **IT3Sm-1 315/6 R-R, IT3Sm-1 315/6 R-U, IT3Sm-1 400/6 R-R, IT3Sm-1 400/6 R-U, IT3Sm-1 400/6/1 R-R, IT3Sm-1 400/6/1 R-U.**

Rated data of the switch

Type	Tmax T5
Long-term rated current I_u	400/630A
Number of poles	3
Rated operating voltage U_e	1000 V DC 1150 V AC
Rated impulse withstand voltage U_{imp}	8kV
Rated insulation voltage U_i	1000 V DC 1150 V AC
Test voltage according to network frequency, for 1 min	3500 V
Terminal and possible to turn off short-circuit current I_{CU}	For 1000V-20kA For 1150V-12kA
Operating and possible to turn off short-circuit current I_{CS}	For 1000V-10kA For 1150V-6kA
Switchable short-circuit current I_{CM}	For 1000V-40kA For 1150V-24kA
Number of starts	20000
Number of starts per hour	120

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Functions of Tmax T5 circuit breaker with electronic protection PR221DS by ABB:

Security features (1)		Trigger threshold	Trigger curves	Possibility to switch off	Relationship t = f(I)
L	Time dependent overload protection according to the time specified by the curve (I^2t=k) according to the standard IEC 60947-2	I_1 = 0.40 - 1 x In step = 0.04 x In Triggering in the interval: 1.1...1.30 x I_1 (T4,T5,T6) Triggering in the interval: 1.05...1.30 x I_1 (T2)	by 6 x I_1 t_1 = 3-6 (only for T2) - 12s (only for T4, T5, T6) Tolerance: ± 10% to 6 x In (T4,T5,T6) ± 10% to 2 x In (T2) ± 20% above 6 x In (T4,T5,T6) ± 20% above 2 x In (T2)	–	t = k/I^2
S	Time-dependent short-circuit protection according to the time specified by the curve (I2t=K) (alternatively to be selected with protection I)	I_2 = 1-1.5-2-2.5-3-3.5-4-5-5.5-6-6.5-7-7.5-8-8.5-9-10 x In(2) Tolerance: ± 10% (T4,T5,T6) ± 10% to 2 x In (T2) ± 20% above 2 x In (T2)	by 8 x In t_2 = 0.1 - 0.25s Tolerance: ± 10% to 6 x In (T4,T5,T6) ± 20% above 6 x In (T4,T5,T6) ± 20% (T2)	■	t = k/I^2
I	Short-circuit protection with immediate-release (instantaneous) (selectable alternatively with protection S)	I_3 = 1-1.5-2-2.5-3-3.5-4-5-5.5-6-6.5-7-7.5-8-8.5-9-10 x In(2) Tolerance: ± 10% (T4,T5,T6) ± 20% (T2)	immediate (instantaneous)	■	t = k

(1) The given tolerances apply to the following conditions:
- the release is powered from the protected circuit at full load (except during the starting
- power supply from two or three

Under conditions other than those stated above, the following tolerances apply:

	Trigger threshold	Trigger time
S	± 20%	± 20%
I	± 20%	≤ 40ms

(2) For T4 In = 320 A ; T5 In = 630 A ; for T6 In = 1000 A ⇒ I_2max = 9.5 x In, I_3max = 9.5 x In
Setting 10 x In corresponds to the value 9.5 x In