Commissioning and maintenance tests of thermal overload relay type RVAB for generators

GENERAL

This information applies to single-phase thermal overload relay RVAB according to Catalogue RK 65-27 E.

The following equipment is recommended for the tests:

- Secondary injection testing set e.g. type TURE, see Catalogue RK 91-10 E
- Multi-purpose instruments
- Timer
- Test-plug handle type RTXH 18 with test wires
- Ammeter test plug type RTXM
- Trip-block plug type RTXB

COMMISSIONING

The following checks and tests should be carried out before the relay is put into service:

- Inspection
- Check of connections
- Secondary injection test of relay
- Test on dc circuits
- Primary tests

Inspection

Check that all components according to the circuit diagram are included and that there is no visible damage on the relay.

Check of connection

- Check that the external wiring is in accordance with the circuit diagram.
- Check also that the current ratio which is stated on the rating plate of the current transformer is in accordance with the figure given on the general one-line diagram.

It is assumed that the external circuits have already been checked with regard to insulation between phases and between phases and earth.

- Measure the resistance of the current circuit from the cubicle terminals. A resistance of 0.5-1 ohms at 5 A rated secondary current would be expected for the external circuit. For the internal circuit in the cubicle a low resistance value should be measured (approximately $2/I^2$ where I = lowest setting value of the relay).

- Check also that no interruption of the internal current circuit occurs when the RTXH 18 test-plug handle is inserted and withdrawn from the RTXP 18 test switch.

Secondary tests

A Block the tripping circuit(s) by inserting a RTXB trip-block plug in the appropriate test terminal(s) of the RTXP 18 test switch.

Turn the setting knob on RVAB slowly anti-clockwise and check that the relay operates when the pointer is max. ± 1 mm from the red mark which is beyond the left-hand end of the scale. No current shall have been fed to the relay for at least 5 x τ_b or 2.5 hours, whichever is longer, before this test is made, and the ambient temperature should be constant during this time.

If the pointer is more than 1 mm off the red mark when the relay operates, the check should be repeated. If the deviation again is found to be more than 1 mm, the position of the tripping point should be adjusted as follows:

- Set the knob to point vertically upwards and loosen the adjusting screw nut which projects through an opening in the rating plate.

- Move the adjusting screw about 1/4 of a turn anti-clockwise and set the knob pointer to the red mark at the end of the scale.

- Then slowly turn the adjusting screw clockwise until the relay operates.

- Tighten the locknut and check the tripping point once again.

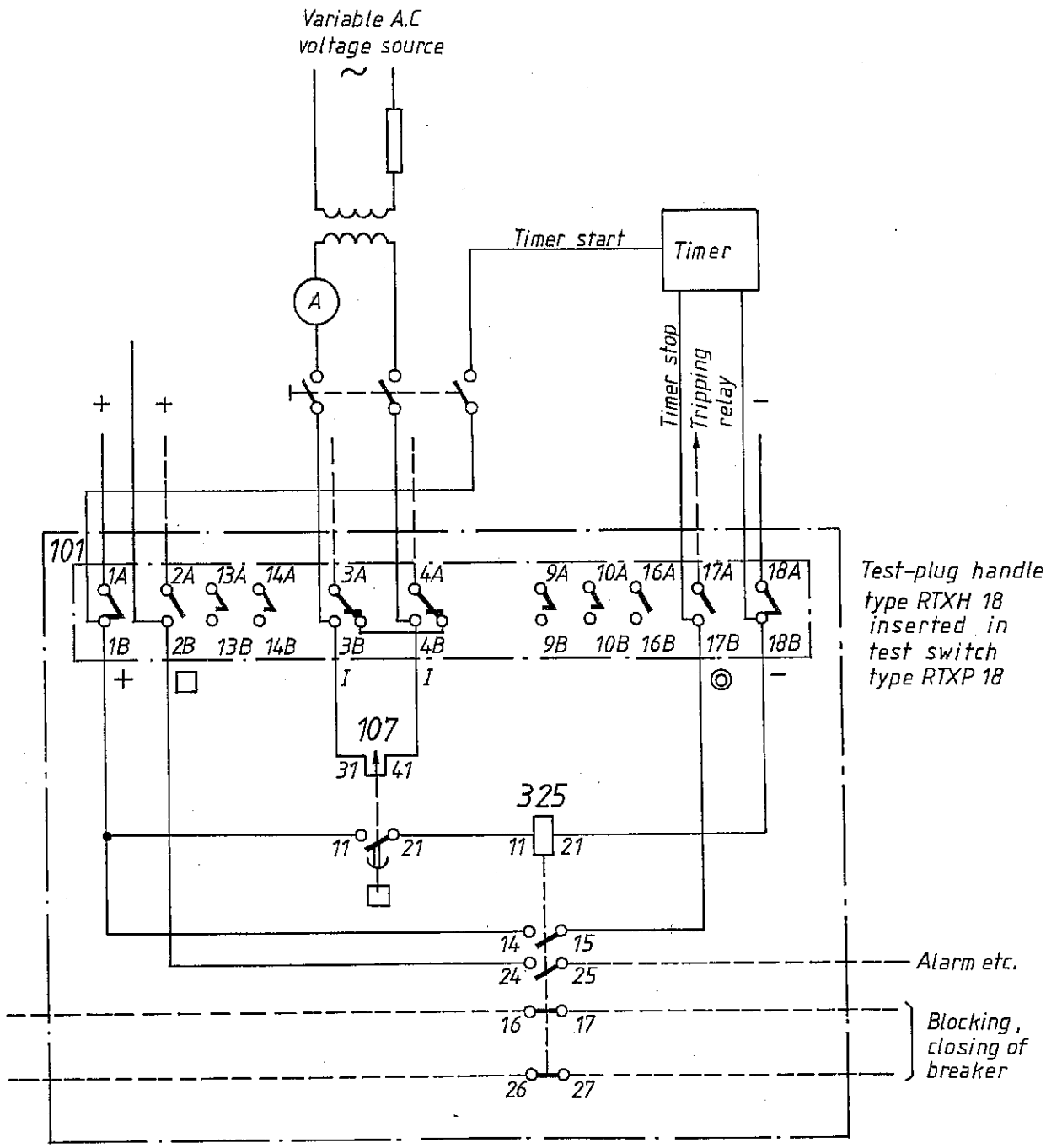


Fig. 1 Secondary injection test of RVAB

B Set the relay to a current which corresponds to max. permissible continuous primary current of the protected object.

Insert a RTXH 18 test-plug handle in the test switch and connect a variable voltage source, a series resistor and instruments to the handle as shown in Fig. 1.

Inject a current which according to the time-current diagram p = 0 gives a relay operating time of about 2 minutes, and check the correct operation of the relay.

Note: This test will normally be made on a relay which has not been carrying any current before the test. The requirements on the time period during which the relay shall not have been fed with current prior to the test are then the same as under A above. The ambient temperature must be constant during this time period.

It is usually sufficient to test only one point on the time curve. If this point corresponds with characteristic in the curve sheet p = 0 the relay is correct.

It is important that the current fed to the relay is rather quickly adjusted to the correct value, otherwise a wrong operating time will be measured. An exact measurement is, in any case, not to be expected.

Test of dc circuits

A systematic check of the dc system should be carried out in order to discover any possible faults. The testing is carried out by operating the relays electrically or by hand (by turning the setting knob to the red mark) and observing that signals and trip pulses obtained at the correct terminals.

The entire tripping circuit(s) should, if possible, be tested by tripping the appropriate breaker(s).

Primary test

Remove the test-plug handle and connect the current transformer to the relay. Check with an ammeter connected to a RTXM test plug that a current, corresponding to the primary current, flows in the relay measuring circuit.

When all these tests have been made the relay can be put into service.

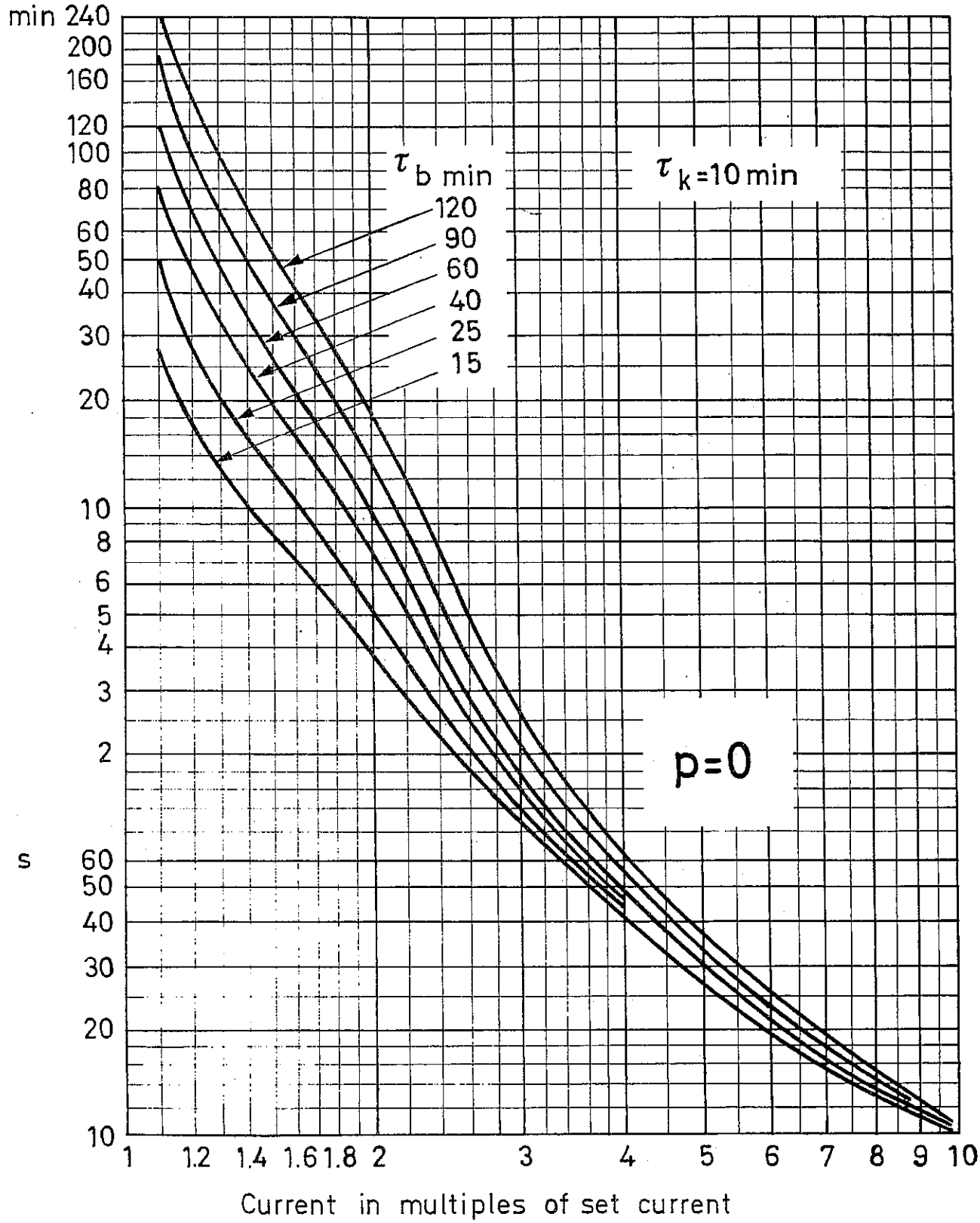
Finally check that

- o Indicating flags are reset
- o The plastic covers are refitted

MAINTENANCE TEST

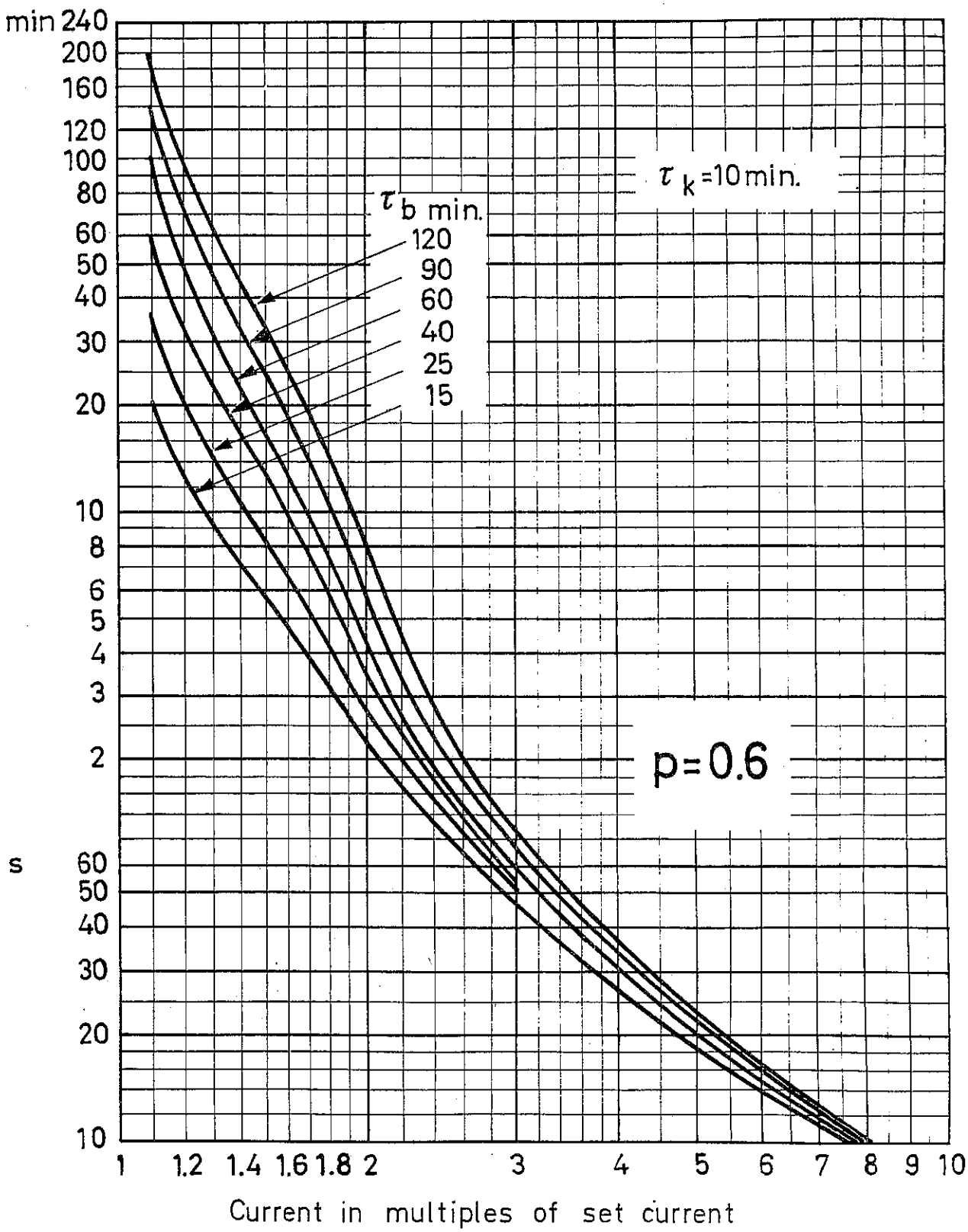
The operating value of the relay is suitably tested once a year or once every second year. If possible, the tripping of the breakers should also be checked in connection with the testing of the relay.

Operating time



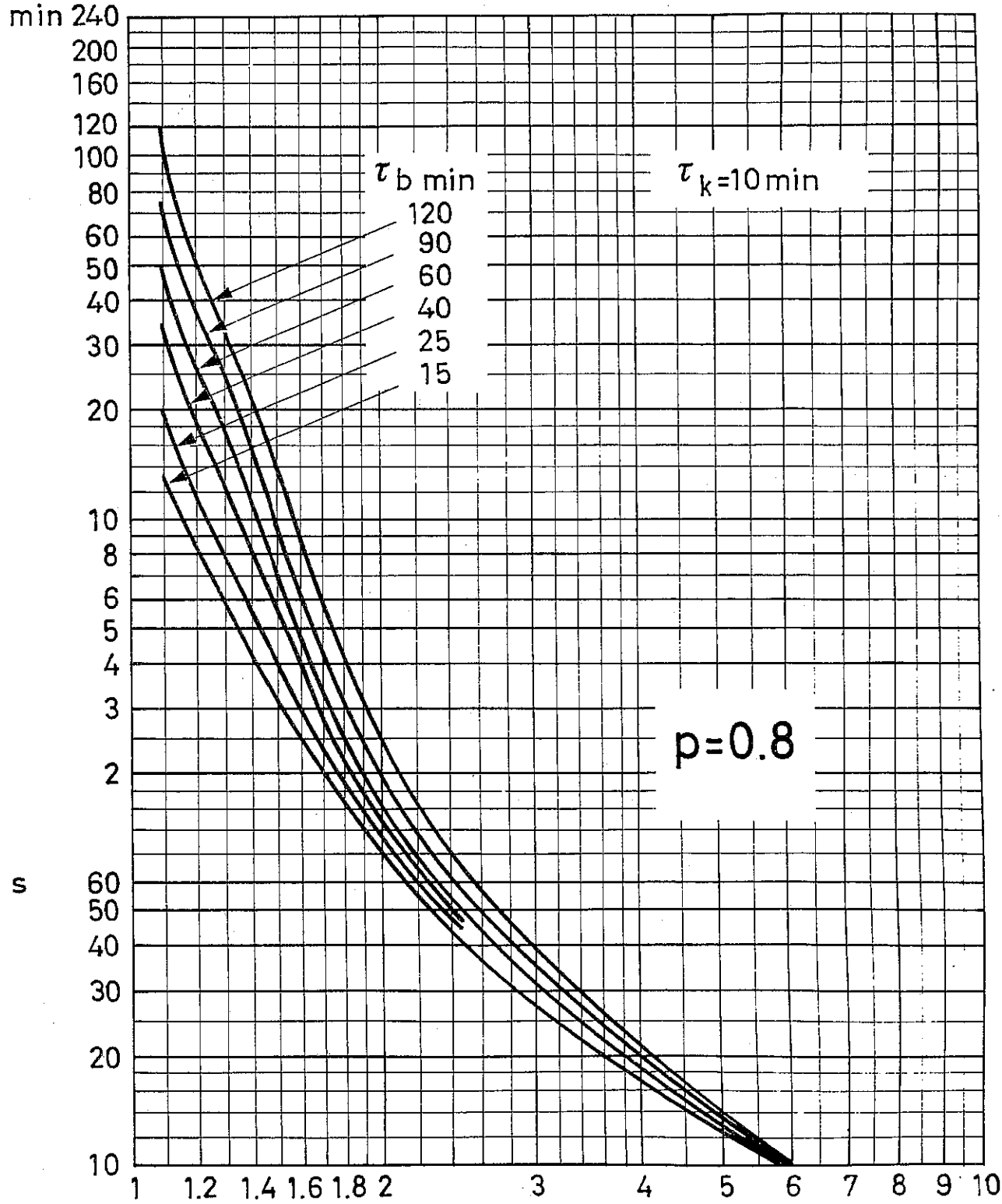
p = pre-load factors

Operating time



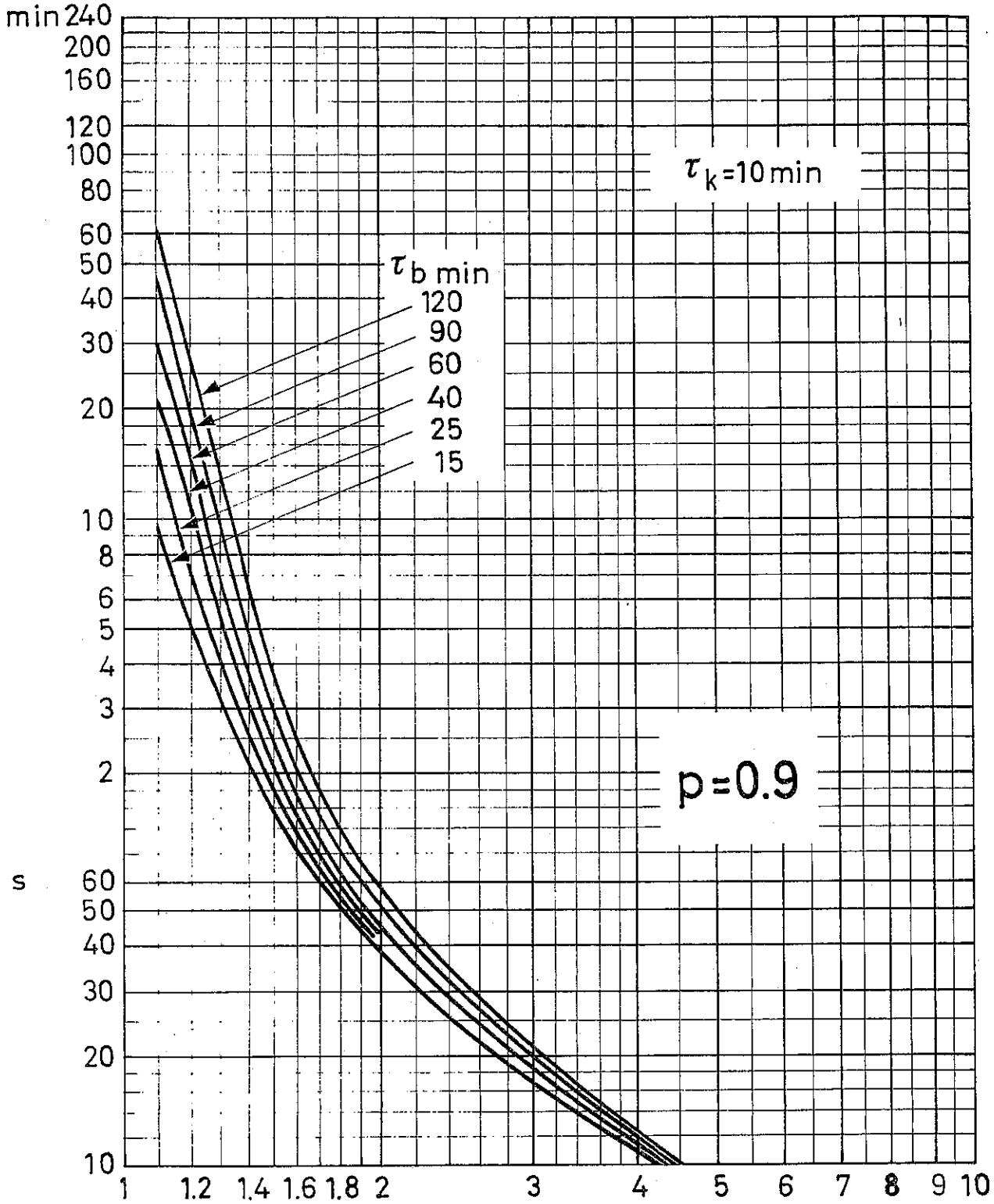
p = pre-load factors

Operating time



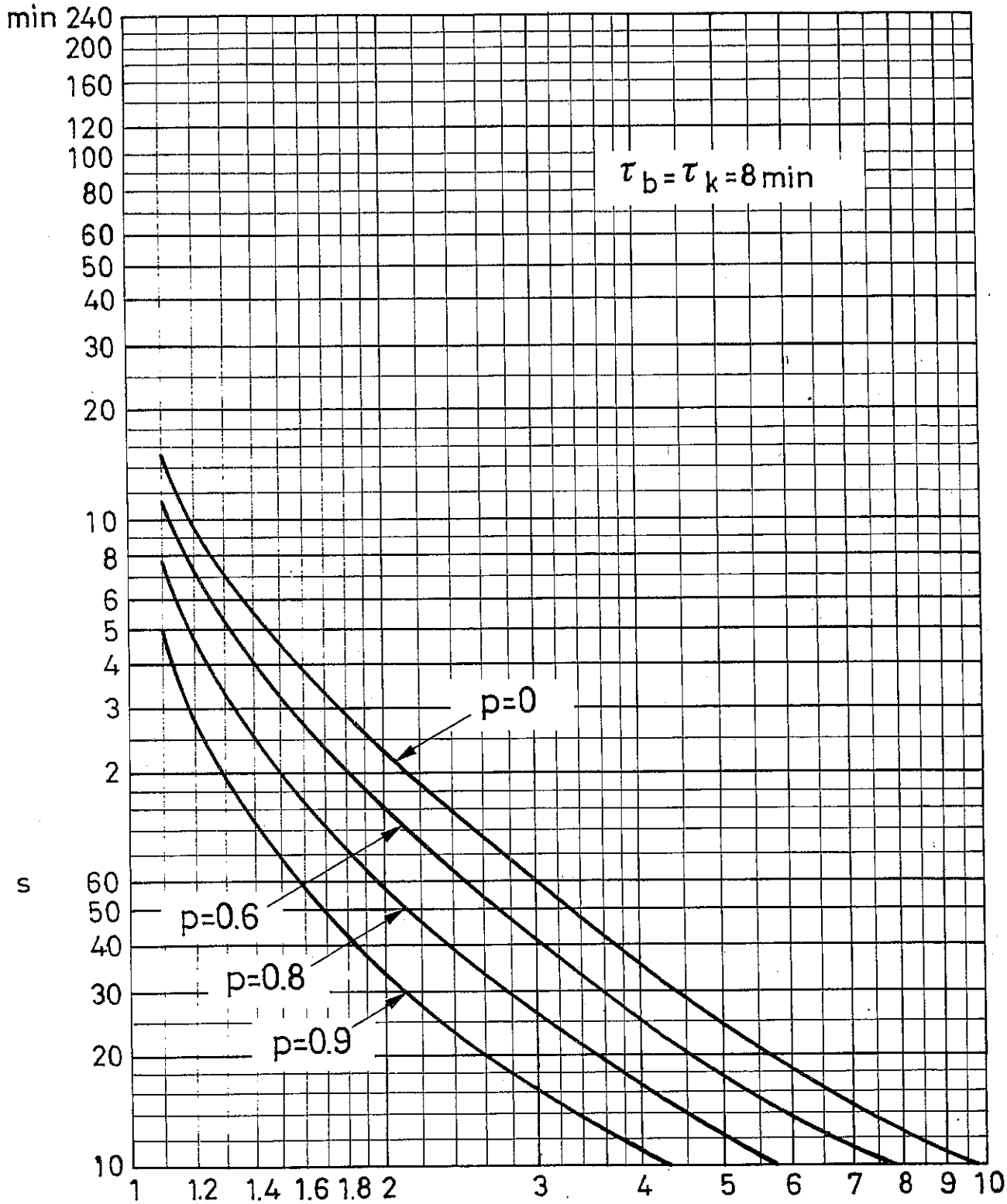
p = pre-load factors

Operating time



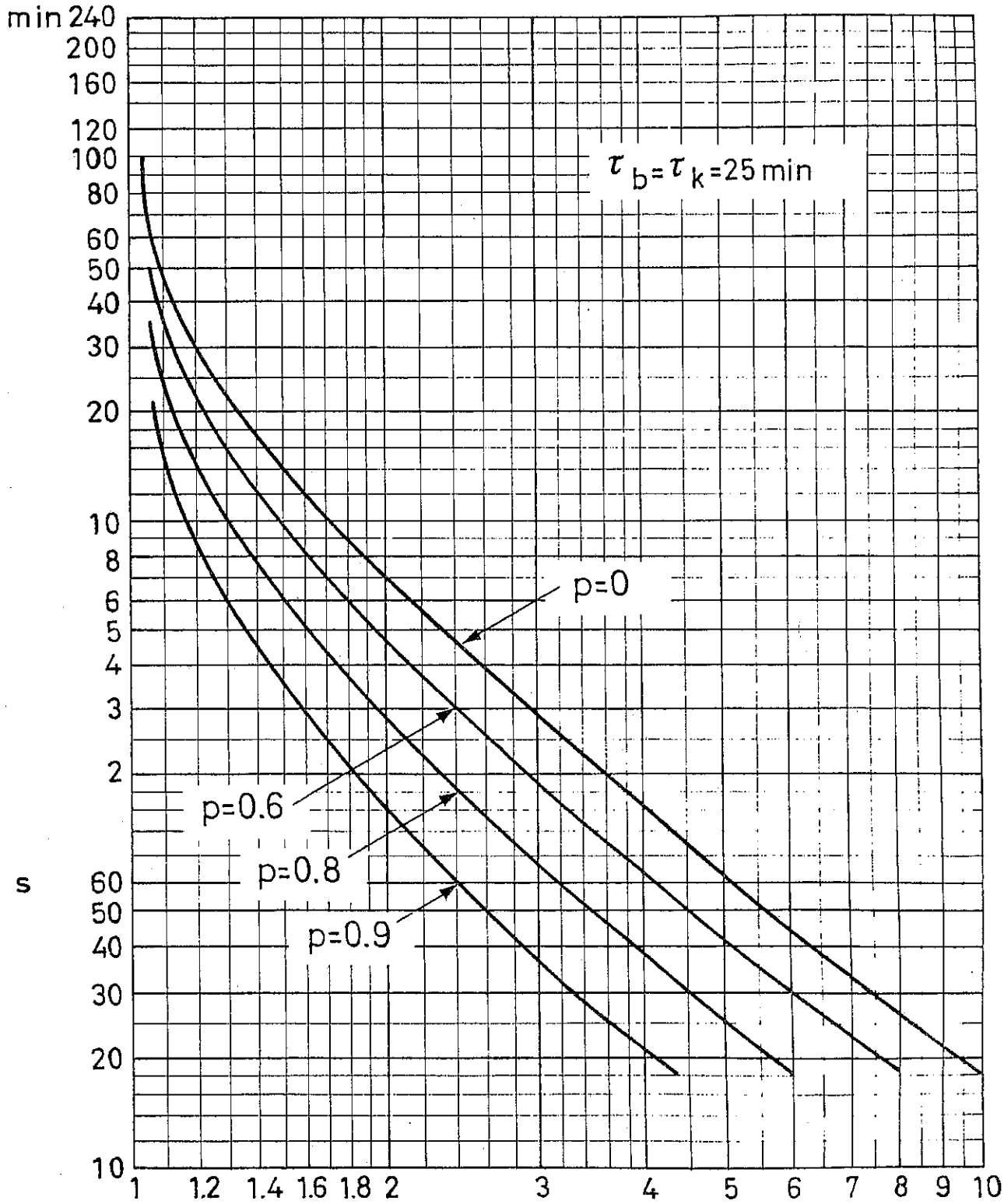
p = pre-load factors

Operating time



p = pre-load factors

Operating time



p = pre-load factors

No	Revision	Year	Wk	Dept	Appd
1	Omr. ej ändr. Redrawn not changed.	74	04	RKK	C L

ASEA

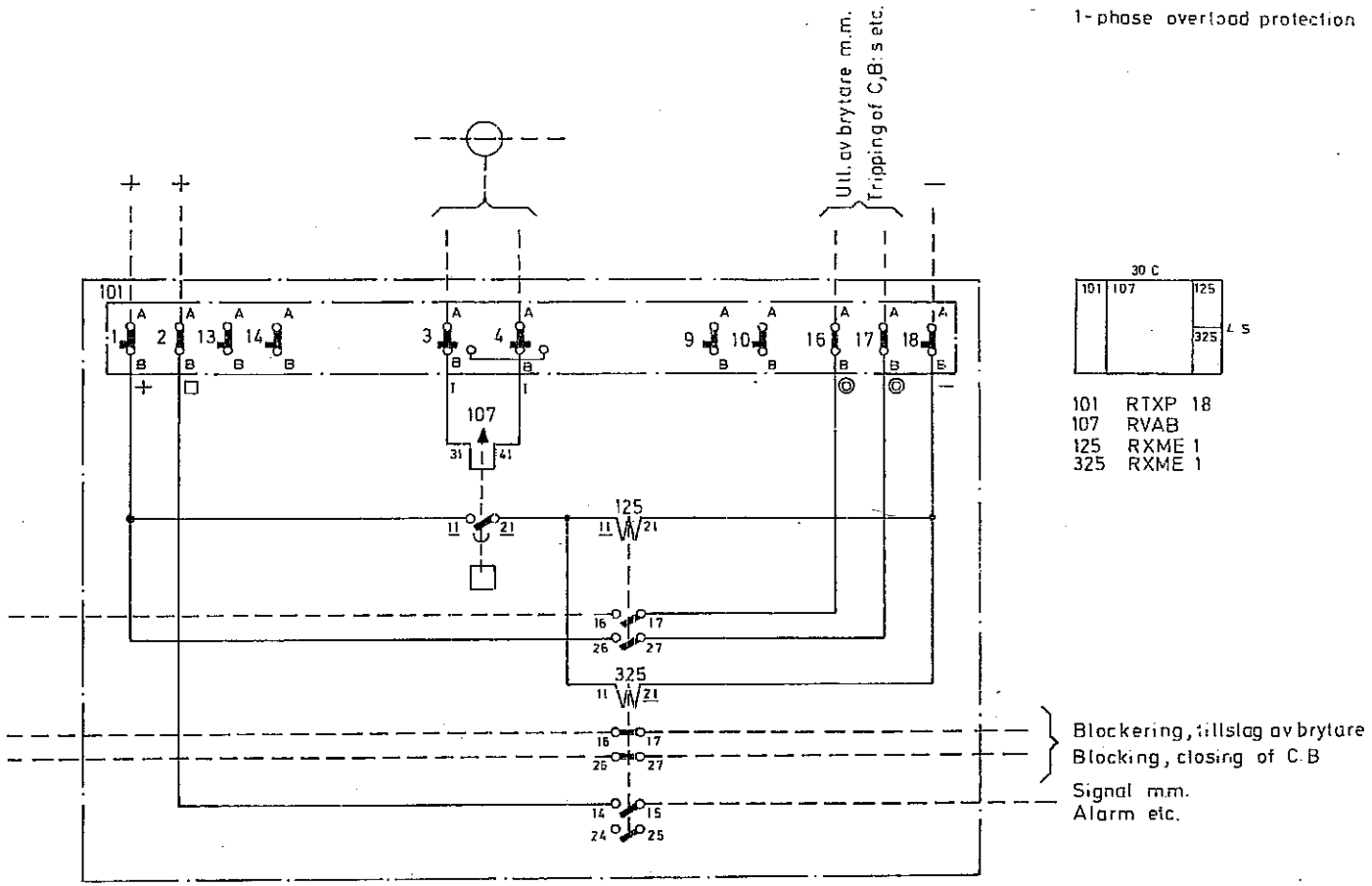
Kretsschema Circuit diagram

Enfas överlastskydd

7421 010-BA

Department	Year	Week	Design checked by	Drawing checked by	Drawn by		Sheet	Cont.
RKK	72	34	L Ljungner	S.Nilsson	BT	RK 651 080-BA	1	–

1-phase overload protection



101 RTXP 18
107 RVAB
125 RXME 1
325 RXME 1

Appendix 1
RK 651-103 E

No.	Revision	Year Wk	Dept	Appd
1	Formulämr. inf.	74.36	RKK	BE.2

ASEA	Kretsschema Circuit diagram	7421 010-DA
	Enfas överlastskydd	

Department	Year	Week	Design checked by	Drawing checked by	Drawn by		Sheet	Corr
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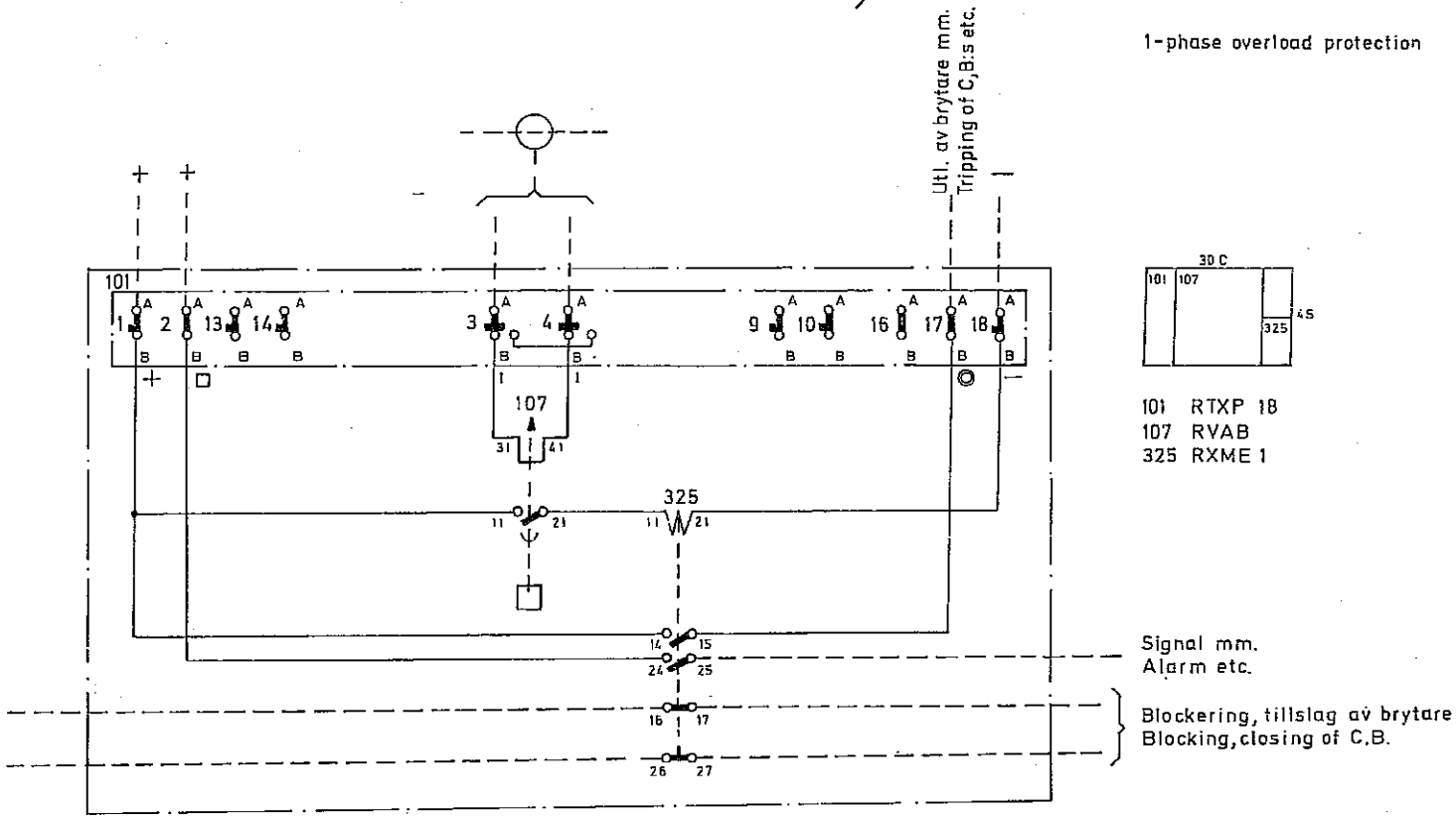
1-phase overload protection



101 RTXP 18
107 RVAB
325 RXME 1

Appendix 2
RK 651-103 E