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TECHNICAL SPECIFICATION

HIGH PRESSURE (HP) TRANSMISSION SYSTEMS

STANDARDIZATION OF LOW VOLTAGE FUSES

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0	05/04/2011	First Issue (as Spec 724/3)
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REFERENCES DOCUMENTS

EU Directive 2014/95/EU LVD
[Low Voltage Directive]

ELOT EN 60269-1
[Low-voltage fuses - Part 1: General requirements]

ELOT EN 60269-2
[Low-voltage fuses - Part 2: Supplementary requirements for fuses for use by authorized persons (fuses mainly for industrial application)]

All standards or codes mentioned in this specification are valid in their latest version or by the relative superseded edition.

1. SCOPE

Scope of this specification is to obtain the uniformity of fuses in shape, size and rating, with the purpose of making possible the interchangeability of fuses to be provided in combination with direct on - line motor starters (contactor plus thermal relay), for protection of three - phase induction motors, in all motor control centers (including power motor control centers) to be installed throughout the entire complex.

2. GENERAL

The standardization shall be applied to low voltage power with high breaking capacity per **ELOT EN 60269 Part 1 and 2.** Only fuse links and bases with blade contacts shall be considered on power circuits, other types of fuses e.g. cartridge type with cylindrical caps may be accepted for control and auxiliary circuits.

3. BASIS OF STANDARDIZATION

To make possible the interchangeability of fuses by different manufactures to be installed in the control centers in combination with differed type of motor starter selected for the same motor rating service, the following shall be standardized:

a) Shape and size of fuse-link and fuse bases related to the rating;

b) fuses rating related to motor rated outputs.

3.1 SHAPE AND SIZE OF FUSE-LINKS AND FUSE-BASES

Blade contacts type fuse-links and bases have shape and dimensions as shown on:

a) **ELOT EN 60269-2A** data sheet 11 for fuse-links;

b) **ELOT EN 60269-2A** data sheet 12 for fuse-base.

The size of fuses and bases related to their rating are shown on **TABLES 1 and 2.**

3.2 FUSE RATING RELATED TO MOTOR RATED OUTPUTS

The fuse ratings related to motor rated outputs as shown on **TABLES 1 and 2** have been selected on the basis of considerations specified below.

Fuse ratings shall be ones indicated on **ELOT EN 60269-1.**

Fuse ratings with relation to the motor rating outputs shall be such that:

- The fuse will allow, without blowing, the most severe motor running-up condition. It shall be considered that:

a) for normal starting motors

The starting current (six times the rated current) referred to **ELOT EN** (*) pre-arching (melting) characteristics of fuse shall be allowed for a duration of 1.6 times the motor starting time (5 sec.) at least.

c) for heavy starting motors

The starting current (6-7 times the rated current) referred to the pre-arching characteristics of fuse shall be allowed for a duration of 1.6 times the motor starting time (10-12 sec.) at least.

- The fuse shall be coordinated with motor starter in order to give a backup protection to the thermal relay against the motor overload (due to mechanical faults) and to give a circuit overcurrent protection (due to electrical faults e.g. short circuits).

All electrical components of the circuits must withstand to dynamic and thermal stresses due to overcurrents determinated by the fuses selected on the basis indicated on previous paragraph, with reference to their time/current operating characteristics given by **ELOT EN** (*).

Particular care shall be made for the contactor being this the weak component of the circuit; for this purpose the manufactures of contactors shall be requested to check and test dynamic and thermal withstanding(**).

(*) Pre-arching and operating time/current characteristics shall be referred to ones given by **ELOT EN 60269 Part 2,** for the reasons that if the fuse rating to be selected, as shown on **TABLE 1 and 2,** by different Manufacturers comply with **ELOT EN**, the correspondent above mentioned characteristics which determine respectively the blowing time/current and stresses time/current on the protected component will be included within the **ELOT EN** limits; then, the interchanging of fuses of different manufacturers having the same rating will not affect motor running and protection coordination.

(**) Generally the contactor Manufacturers have already performed the withstanding test of contactor/thermal relay coordinated with the fuse having a determinate time current characteristics for each motor rating service limit. What shall be checked by manufactures is if the fuse rating shown on Table 1 with reference to the characteristics given by ELOT EN 60269-2 are coordinate with the starter which are intended to be supplied for the specified motor ratings.

TABLE 1 - FUSE-LINKS AND BASES FOR NORMAL STARTING MOTORS

MOTOR RATED OUTPUT (KW)	MOTOR RATED CURRENT (A) (2)	FUSE-LINK RATING (A)	FUSE-BASE RATING (A)	FUSE LINK AND BASE SIZE	REMARKS
0.25	1.0	4	100	00	
0.37	1.25				
0.55	1.6	6			
0.75	2.0	8			
1.1	2.6				
1.5	3.5	10			
2.2	5.0	16			
3 (1)	6.6	20			
4 (1)	8.5	25			
5.5	11.5	32			
7.5	15.5	40			
11	22	63			
15	30	80			
18.5	37	100			
22	44	125	250	1	
30	60	160			
37	72.5	200			
45	85	250			
55	105				
75	138	315	400	2	
90	170	400			

MOTOR RATED OUTPUT (KW)	MOTOR RATED CURRENT (A) (2)	FUSE-LINK RATING (A)	FUSE-BASE RATING (A)	FUSE LINK AND BASE SIZE	REMARKS
110	205	500	630	3	
132	245				
150	300	630			
160	320	800	1000	4	
195	345				
200	370				
220	408	1000			
250	475				

Notes

(1) MOTOR RATED OUTPUTS NOT INCLUDED IN ELOT EN STANDARD

(2) CURRENTS ARE REFERRED TO 400V THREE PHASE, FOUR POLE INDUCTION MOTORS WITH NORMAL CHARACTERISTICS OF TORQUE

TABLE 2 - FUSE-LINKS AND BASES FOR HEAVY DUTY STARTING MOTORS

MOTOR RATED OUTPUT (KW)	MOTOR RATED CURRENT (A) (2)	FUSE-LINK RATING (A)	FUSE-BASE RATING (A)	FUSE LINK AND BASE SIZE	REMARKS
0.25	1.0	4	100	00	
0.37	1.25	6			
0.55	1.6	8			
0.75	2.0				
1.1	2.6	10			
1.5	3.5	16			
2.2	5	20			
3 (1)	6.6	25			
4 (1)	8.5	32			
5.5	11.5	40			
7.5	15.5	50			
11	22	80			
15	30	100			
18.5	37	125	250	1	
22	44	160			
30	60	200			
37	72.5	250			
45	85				
55	105	315	400	2	
75	138	400			

MOTOR RATED OUTPUT (KW)	MOTOR RATED CURRENT (A) (2)	FUSE-LINK RATING (A)	FUSE-BASE RATING (A)	FUSE LINK AND BASE SIZE	REMARKS
90	170	500	630	3	
110	205	630			
132	245				
150	300	800	1000	4	
160	320				
195	345	1000			
200	370				
220	408				

Notes:

(1) MOTOR RATED OUTPUTS NOT INCLUDED IN IEC STANDARD

(2) CURRENTS ARE REFERRED TO 400V THREE PHASE, FOUR POLES INDUCTION MOTORS WITH NORMAL CHARACTERISTICS OF TORQUE