



ELECTROTECHNIC WIRING HARNESS FOR A MOTOR STARTER

PRESENTATION OF THE PROJECTX-FINAL LEVEL 1.

Lycée Polyvalent
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Learning Outcomes achieved (to be developed in the future related with ECVET credit system)

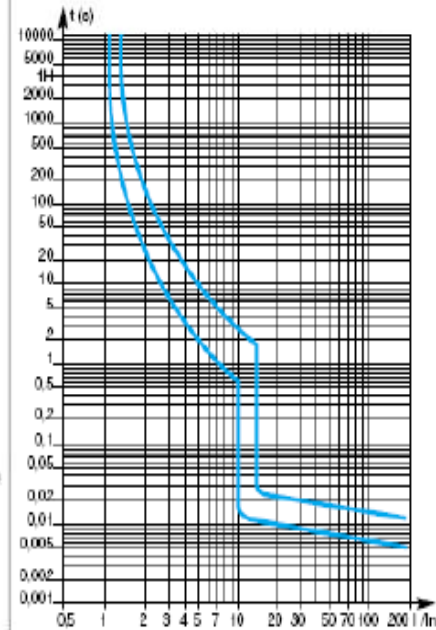
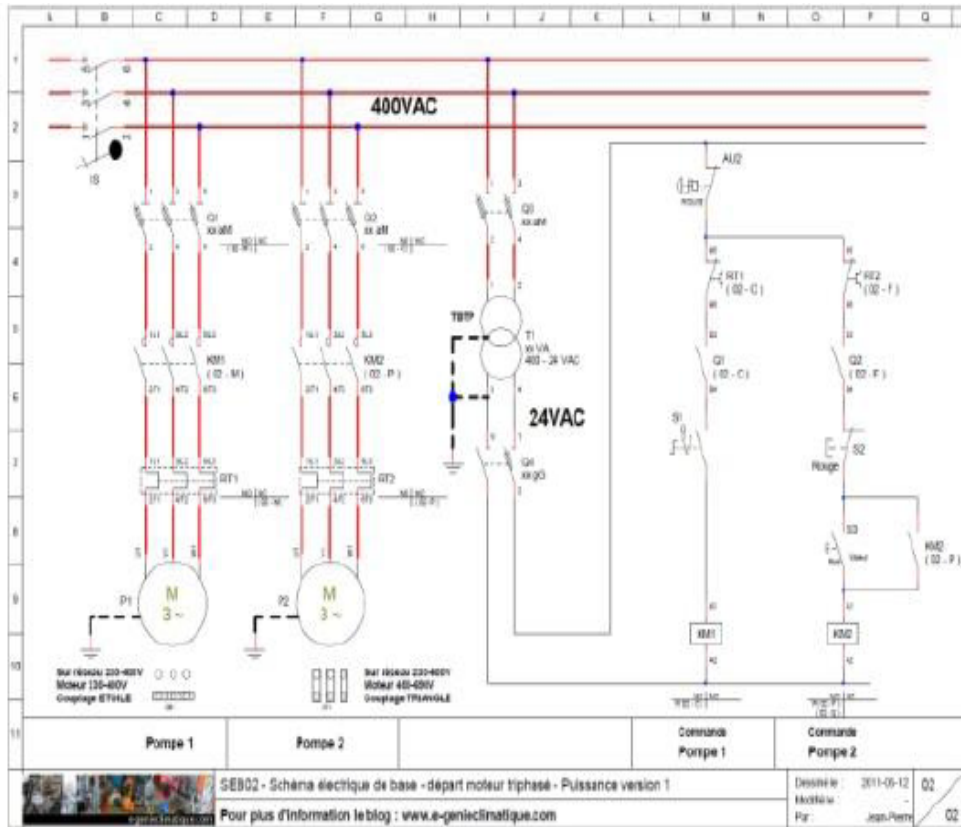
Design an electrical circuit according to the need of industrial activities
(Power and control circuits using 3 phase asynchronous motor)
Realize an industrial wiring harness

Objectives of the theoretical knowledge

1. To decipher a Technical schematic: function and components
2. To understand the technical requirements
2. To do a basic control and power circuit (with electrotechnic components)
3. to determine the amp size of the circuit breaker , fuse, contactor and thermal overload relay
4. To choose correctly type of fuse: aM, gG
5. To understand a time-current tripping curve of a fuse or circuit-breaker

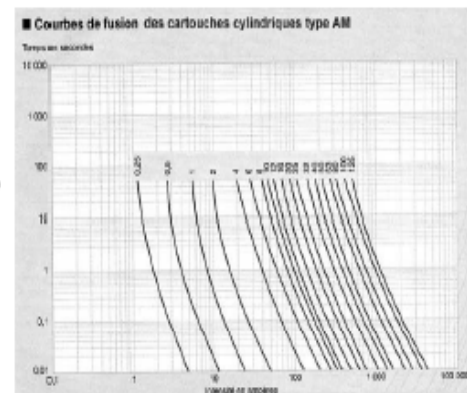
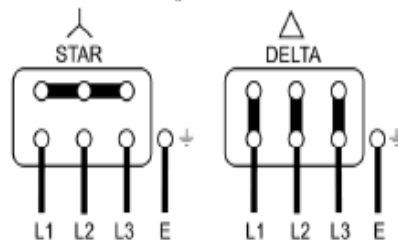
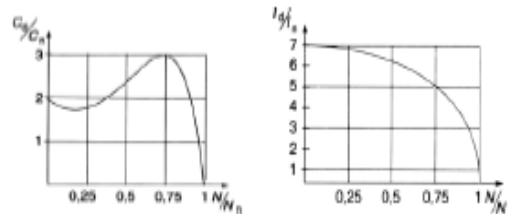
List of activities

1. Create a motor starter schematic with an electrotechnic circuit design software (schemaplic)
2. Explain the teacher how does it work
2. Check the working order of the motor starter in simulation mode



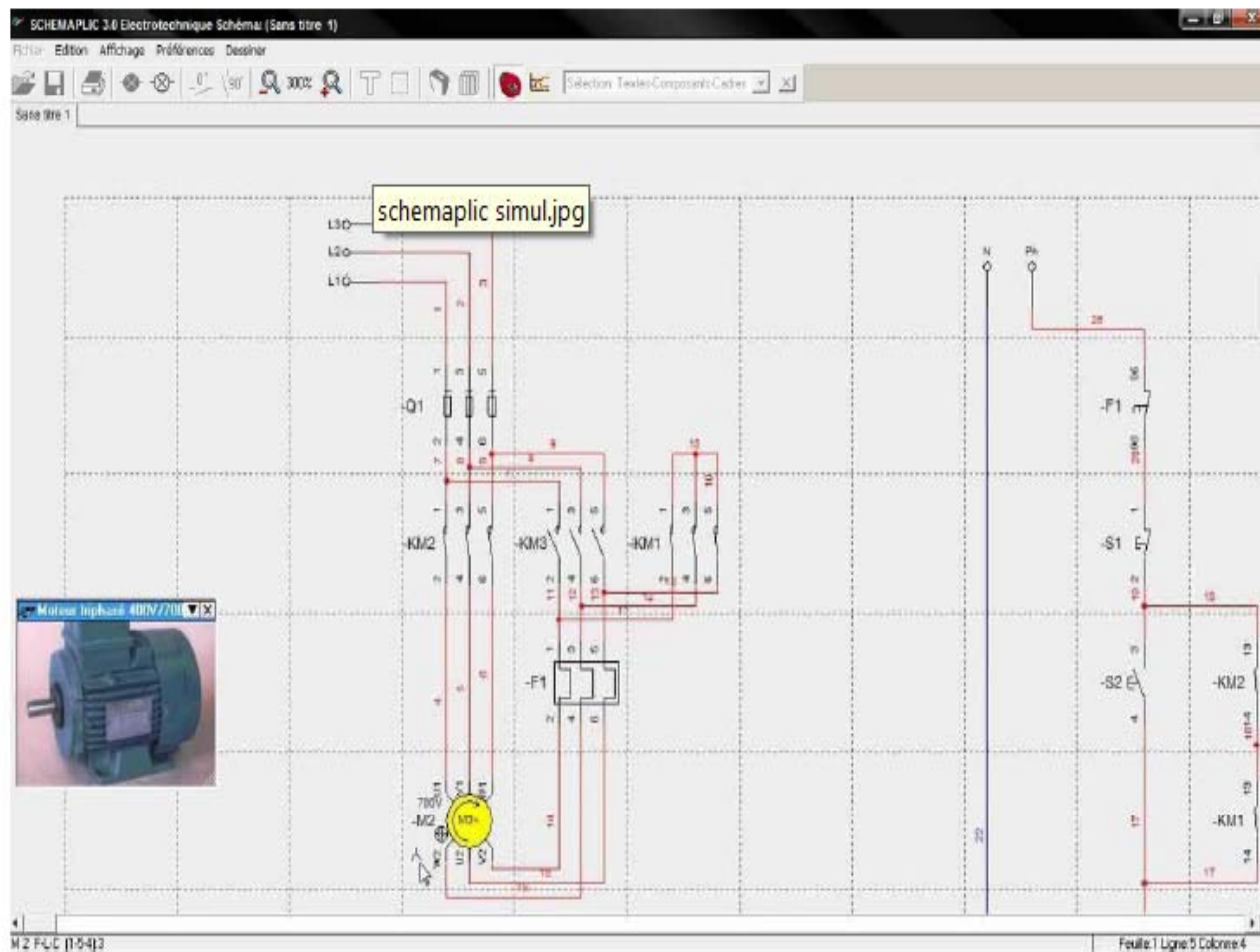
LEROY SOMER		MOT. 3 ~ LS 315 MR				
Code 1		NI 116412/2		785 kg		
IP 55	I c L F	40°C	S1	%	c/h	
	Hz	min ⁻¹	KW	cos φ	A	
	1 380	50	1485	152	0,86	244
	1 400	50	1485	132	0,85	234
1 415	50	1485	132	0,84	229	
DE 4320 C3		50/3				
NDE 8.117 C3		3500 IP				

Plaque signalétique de moteur asynchrone (Leroy-Somer)



SCHEMAPLIC (Drawing and simulation) 45 days free trail

<http://www.schemaplic.fr/actualites-schemaplic/5-telecharger-version-integrale.html>



Virtual practical wiring :

<http://stiphy.ec-lyon.fr/appli2/TPfinal.swf>

Câbler le fil représenté en rouge sur le schéma, en cochant les extrémités de la connexion

Puissance

2 mn : 18 sec nombre de connexions faites : 2 nombre d'erreurs : 2

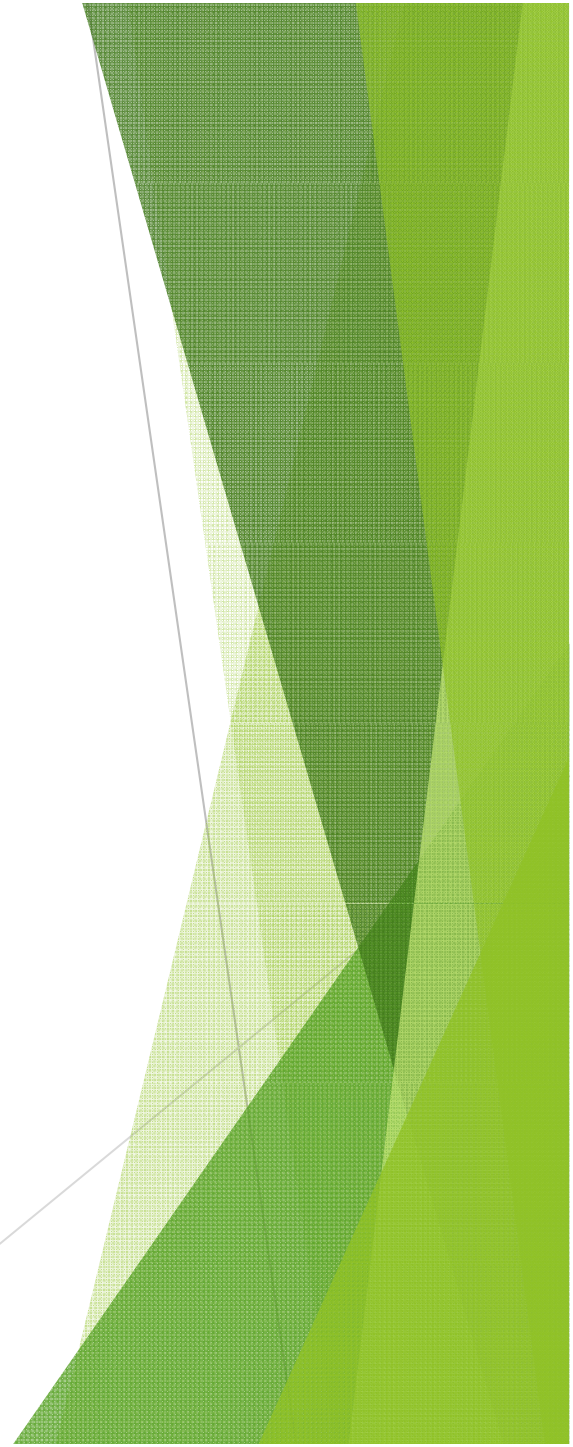
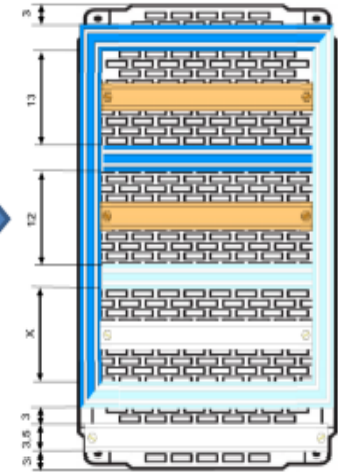
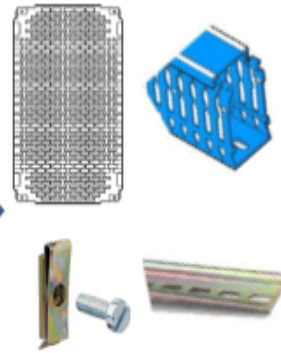
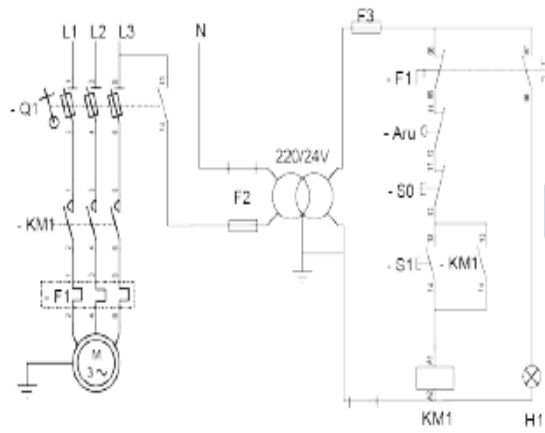
TP virtuel V1.0 du 19/05/2003 par H REYMOND

Brief description of the Practice

1. The objective is to wire a motor starter.
 - a) Direct on line motor starter
 - b) Star-delta motor starter
2. Must have the ability to verify if we have the good working order according to the specifications

Steps or activities to be performed by the student

1. Distinguish different part of the wiring harness on the schematics
 - A. control circuit
 - B. power circuit
2. Choose the correct wire gauge
3. Do the "electrical risk analysis" (electrician's certification?)
3. Wire properly all the components by using the correct tools (pliers, minus/plus screwdriver ...)
3. Check proper working of the motor starter
4. If not, Perform properly with the multimeter some measures to fix the wiring harness.



Choose the correct motor Ingress protection code according to the

IP Classification Codes

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Basis of IP Rating System

International Standard IEC 60529 outlines an international classification system that describes the sealing characteristics of electrical equipment. The classification system defines the level of protection provided by enclosures to prevent the ingress of foreign objects and moisture into the electrical equipment. The classification system uses the "IP" code, or "Ingress Protection" code, to define the level of seal. The IP code uses a system of two numerical digits to define the level of both foreign object and moisture protection. Although the IP classification is primarily used for establishing the level of seal in electrical equipment, it is adapted herein for determining the level of seal in passive electrical components.

Degrees of Protection (Foreign Bodies) – 1st Digit

The first digit of the IP code indicates the degree of protection against solid foreign objects from entering the electrical device. The table below outlines the level of protection against foreign objects for each level.

IP Level 1st Digit	Description of Protection Level
0	Not protected
1	Protected against solid foreign objects of 50 mm diameter and greater
2	Protected against solid foreign objects of 12.5 mm diameter and greater
3	Protected against solid foreign objects of 2.5 mm diameter and greater
4	Protected against solid foreign objects of 1.0 mm diameter and greater
5	Protected from the amount of dust that would interfere with normal operation
6	Dust tight

Degrees of Protection (Moisture) – 2nd Digit

The second digit of the IP code indicates the degree of protection against the ingress of various forms of moisture (e.g. drips, spray, submersion, etc.) into the component. Tests to determine the level of protection are carried out with fresh water and do not take into account the use of solvents.

IP Level 2nd Digit	Description of Protection Level
0	Not protected
1	Protected against vertically falling water drops
2	Protected against vertically falling water drops when enclosure is tilted up to 15°
3	Protected against water sprayed at an angle up to 60° on either side of the vertical
4	Protected against water splashed against the component from any direction
5	Protected against water projected in jets from any direction
6	Protected against water projected in powerful jets from any direction
7	Protected against temporary immersion in water
8	Protected against continuous immersion in water, or as specified by the user

Example of an IP Code



A component with this IP code indicates that a component is protected against ingress of solid foreign objects having a diameter of 2.5 mm and greater; and is protected against harmful effects due to water splashed against the component from any direction.

IP Code Symbols

This chart is based on an internationally recognized set of symbols that graphically represent the IP classification system. These symbols are sometimes used instead of the IP code to illustrate the level of protection.

1st Digit	Foreign Object Protection	2nd Digit	Water Protection
0	Not protected	0	Not protected
1		1	
2		2	
3		3	
4		4	
5		5	
6		6	
		7	
		8	