
TER

Installation, Operating and Servicing Instructions



excellence in hot water

1. PRODUCT DESCRIPTION

Medium-power, heating only boiler, for industrial and commercial applications

- Boiler body manufactured out of STW22 carbon steel plates
- Stylish metal casing, painted red
- Replaceable heating elements
- Rigid polyurethane foam insulation
- Control panel, complete with
 - main switch
 - 4 power stages status lights
 - overheating warning lights
 - boiler temperature thermometer
 - boiler control thermostat adjustable between 30 and 90°C
 - overheating safety thermostat, to be resetted manually
- Available in 5 models between 57 and 259 kw

2. CONSTRUCTION FEATURES

BOILER BODY

Manufactured out of ST37 high-thickness steel. The boiler body is submitted to a hydraulic test pressure of 6 bars (the maximum allowable working pressure is 4 bars).

HEATING ELEMENTS

Replaceable elements, mounted on the front of the boiler body with a pressure gasket. The heating elements are made out of Incoloy stainless steel, with a specific thermal load of 12.9 W/cm².

ELECTRICAL CONNECTION PANEL

The panel is equipped with:

- Power terminal board for three-phase power supply (400 V + N)
- Control circuit terminal board for single-phase 230 V power supply
- Grounding terminal
- Four power contactor groups
- 4-power stage cascade programmer
- Fast cut-off relay
- Programmer resetting relay

INSULATION

CFC-free, 50 mm thick rigid polyurethane foam insulation.

CASING

The casing is entirely made out of steel plates and submitted to degreasing and phosphating before epoxy-powder painting. After painting, the panels are baked at 220°C. This coating guarantees a good resistance and a perfect finish.

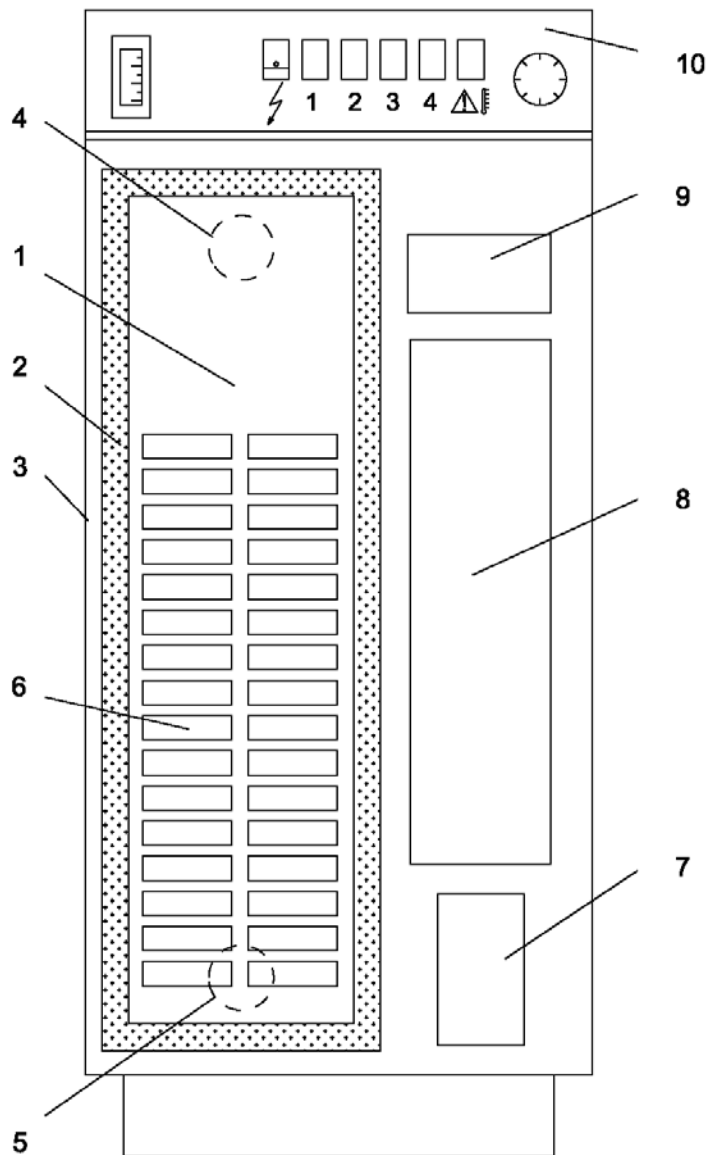
PACKAGING

A special packaging has been designed for the vertical transport of the unit.

The boiler is wrapped in shrink wrap film to protect it against scratches and to make any damage caused during transport immediately visible.



GENERAL LAYOUT

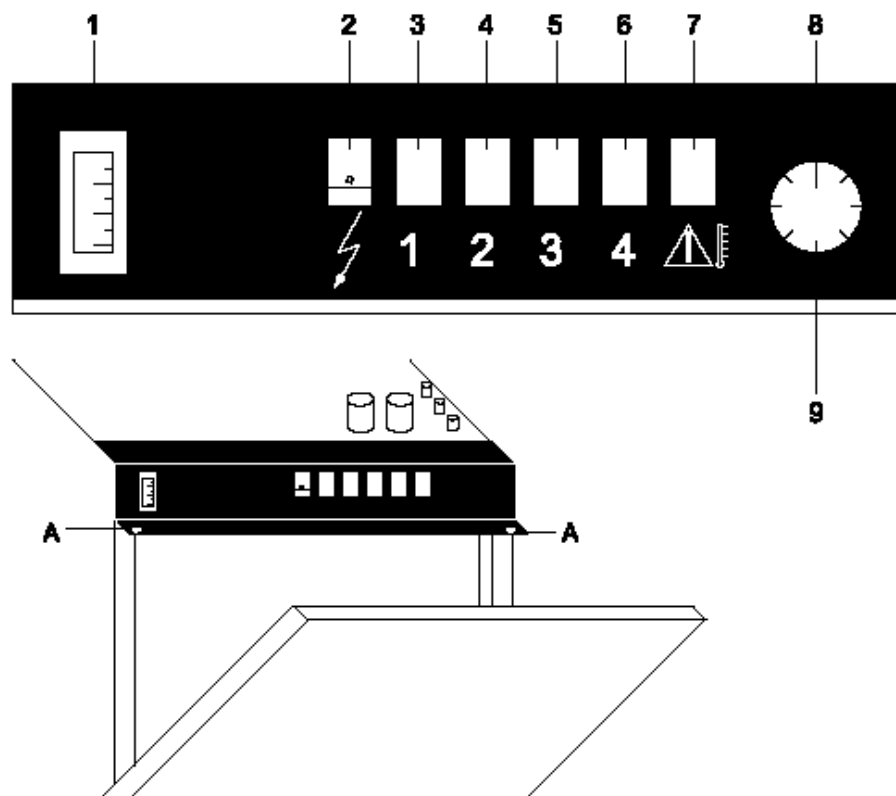


1.	Boiler body
2.	rigid polyurethane foam insulation
3.	Enameled casing
4.	Heating water supply
5.	Heating water return
6.	Heating elements
7.	Cascade programmer
8.	Electrical panel
9.	Connection terminals
10.	Control panel



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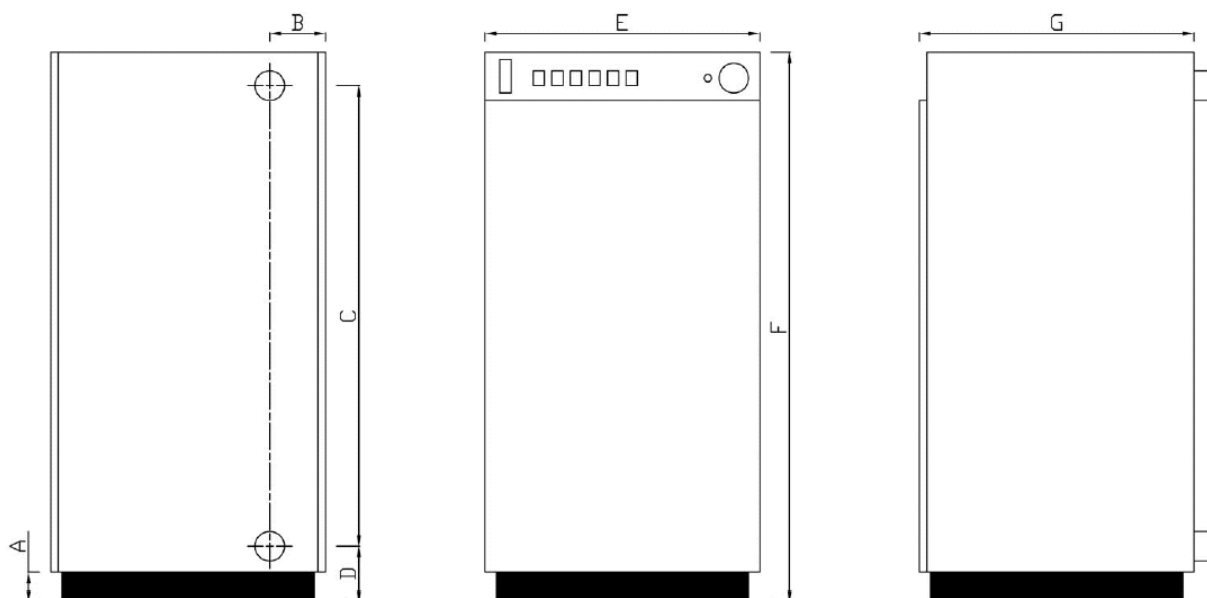
3. DESCRIPTION OF THE CONTROL PANEL



- 1) Thermometer
- 2) Main switch
- 3) 1st stage operation light
- 4) 2nd stage operation light
- 5) 3th stage operation light
- 6) 4th stage operation light
- 7) Overheating lock-out indicating light
- 8) Boiler control thermostat (30-90°C)
- 9) Manually resettable safety thermostat, set at 103 °C

To access to the connection terminals, unscrew the two screws "A" and remove the front panel.

4. DIMENSIONS AND TECHNICAL SPECIFICATIONS



TYPE		TER 57	TER 86	TER 115	TER 144	TER 201	TER 259
Partnumber		00080401	000080801	00081201	00081601	00079101	00079901
Power	kW	57,6	86,4	115,2	144	201,6	259,2
Power voltage	V	3x400 + N	3x400 + N	3x400 + N	3x400 + N	3x400 + N	3x400 + N
Control circuit voltage	V	230	230	230	230	230	230
Heating elements	nombre	12 x 2	18 x 2	24 x 2	30 x 2	42 x 2	54 x 2
Total capacity	L	155	155	155	155	250	250
Working pressure (max)	bar	4	4	4	4	4	4
Temperature (max)	°C	90	90	90	90	90	90
Heating connection (female)	ø	2"	2"	2"	2"	DN 100*	DN 100*
Dimensions	A	mm	80	80	80	80	80
	B	mm	124	124	124	124	190
	C	mm	1134	1134	1134	1134	1060
	D	mm	130	130	130	130	197
	E	mm	610	610	610	610	752
	F	mm	1380	1380	1380	1380	1380
	G	mm	610	610	610	610	752
Weigth (empty)		Kg	102	102	102	102	195

(*) Above 144 kW, heating circuit connection with DN 100 flange.



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5. SIZING OF SUPPLY WIRES

The supply wires are sized depending of the type and current of the MCB. This last is sized depending of the nominal current of the boiler. The admissible current of the supply wires depends of the ambient temperature, the section, the length and the insulation of the wires, the wires ducts, the mounting and the environment.

The following values are given for information for an ambient temperature of 25°C and a maximal length of 5 meters. In all the circumstances, the installation must be in accordance with the current IEE wiring regulations.

Diametre	mm ²	0,8	1	1,5	2,5	4,6	10	16	25	35	50	70	95	120	150	185	240
current	Amp	13	16	20	27	36	47	65	87	115	143	178	220	265	310	355	480

For higher temperatures, the current rating should be reduced according to the next table:

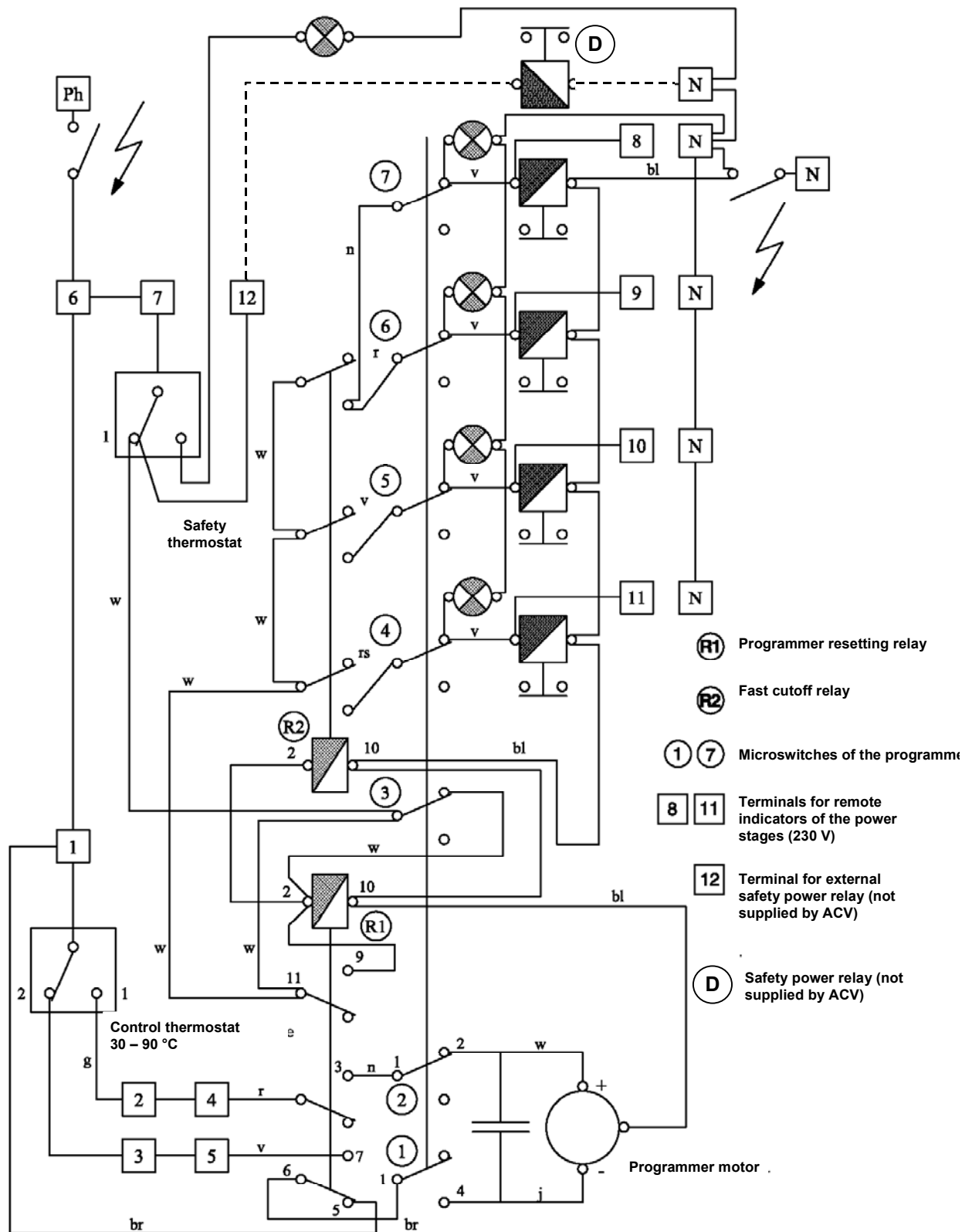
T _{ambient}	°C	25	30	35	40	45	50	55
Current derating	%	100	92	85	75	65	53	38

6. POWER CHARACTERISTICS: V 400/3/50 + N

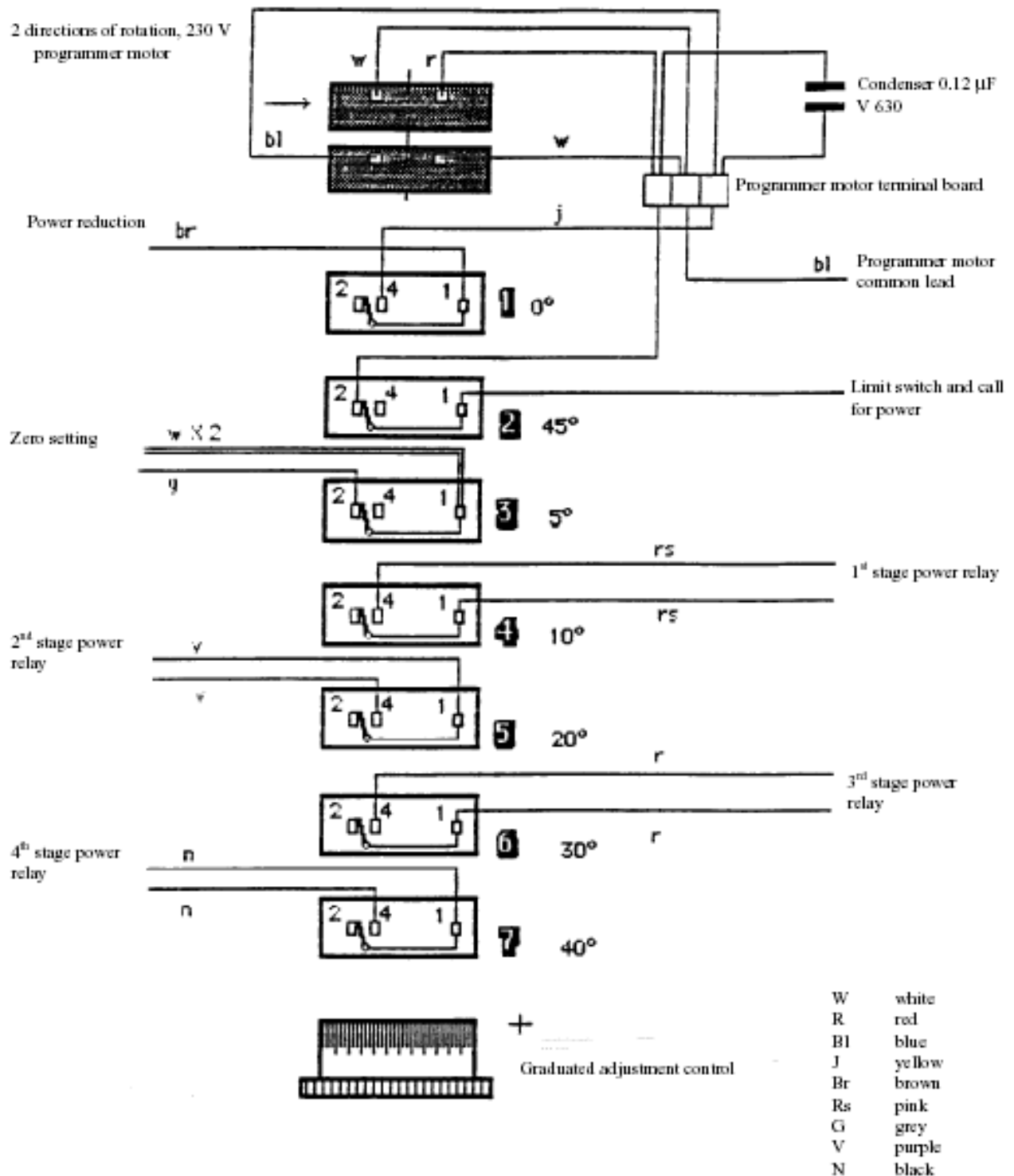
Type	Total power kW	Power, per stage kW				Amperes, per stage, at V 400/3/50				Amperes total
		1° Stage	2° Stage	3° Stage	4° Stage	1° Stage	2° Stage	3° Stage	4° Stage	
TER 57	57,6	14,4	14,4	14,4	14,4	20,9	20,9	20,9	20,9	84
TER 86	86,4	21,6	21,6	21,6	21,6	31,3	31,3	31,3	31,3	125
TER 115	115,2	28,8	28,8	28,8	28,8	41,7	41,7	41,7	41,7	167
TER 144	144,0	36,0	36,0	36,0	36,0	52,2	52,2	52,2	52,2	209
TER 201	201,6	50,4	50,4	50,4	50,4	73	73	73	73	292
TER 259	259,2	64,8	64,8	64,8	64,8	94	94	94	94	376

7. WIRING DIAGRAM OF THE CONTROL CIRCUIT 230V / Single phase / 50Hz

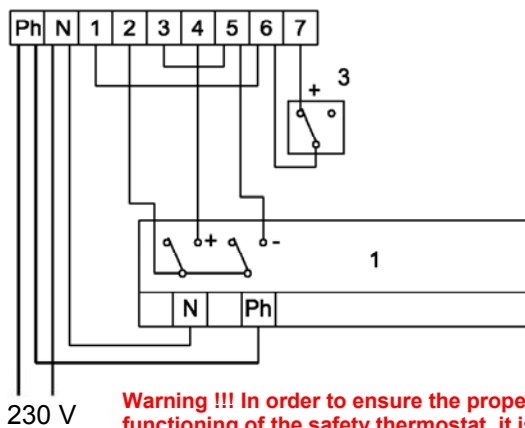
TER > V05: see schematics at the end of this manual



8. WIRING DIAGRAM OF THE CASCADE PROGRAMMER



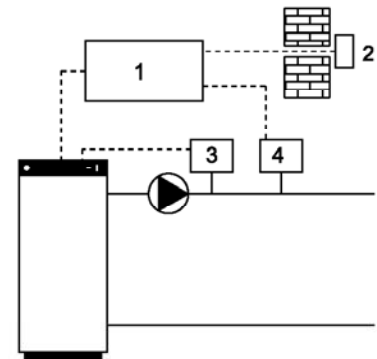
9. HYDRAULIC AND ELECTRICAL CONNECTIONS



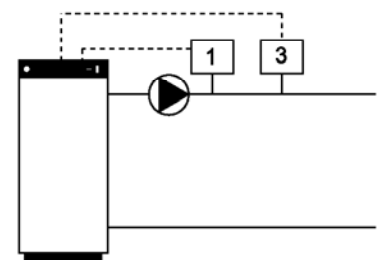
230 V **Warning !!! In order to ensure the proper functioning of the safety thermostat, it is mandatory to connect the phase / neutral the right way**

- 1) Controller
 - 2) Climatic sensor
 - 3) Overheating safety thermostat, interrupting the power relays and powering the reset relay
 - 4) Supply thermo-sensor
- NB: the listed devices are not supplied by ACV.

01 CONTROLLED BY CLIMATIC SENSOR

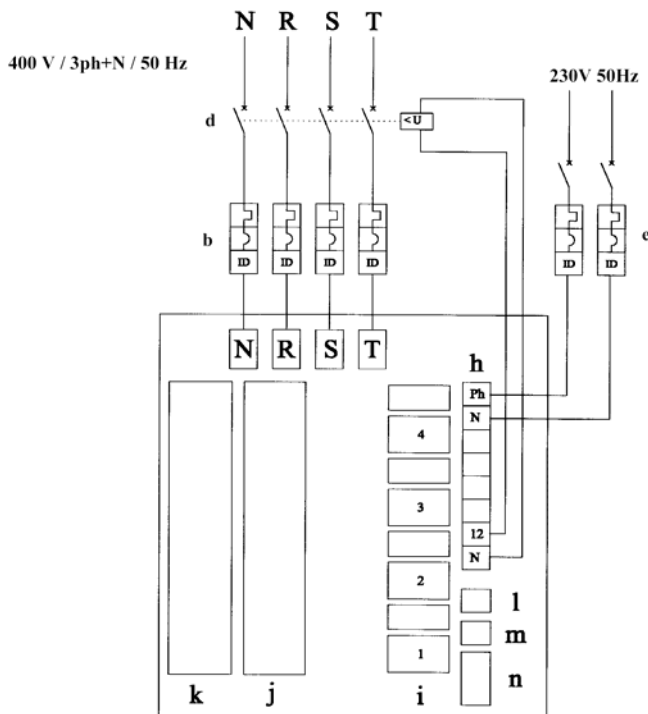


02 STABILIZED TEMPERATURE CONTROL



Electrical connection

TER 57 up to 144

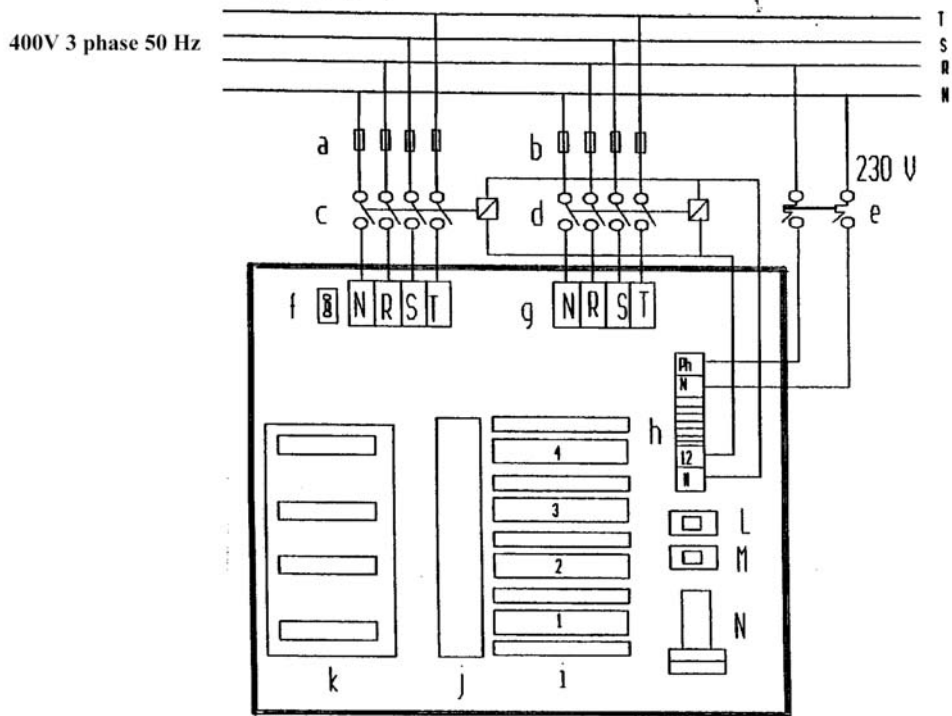


- b) Boiler protection fuses
- d) Safety relay with positive safety release coil
- e) Control circuit protection fuses
- g) Power terminals
- h) Control circuit terminals 230V 50Hz
- i) 1st – 2nd – 3rd – 4th stage contactors
- j) Main circuit
- k) Heating elements 2 x 2400 W
- l) Control circuit main cut-out relay
- m) Programmer resetting relay
- n) Programmer

WARNING !!!
For protection against electrical hazard, it is always recommended to install a differential cut-out device (Ground Fault Isolator) on the power supply circuit, upstream of the boiler.

N.B. The devices "b", "d" and "e" are not part of ACV delivery.

TER 201 and 259



- a) et b) Boiler protection fuses
- c) et d) Safety relay with positive safety release coil
- e) On/off switch of the control circuit
- f) Power terminals for 2^d, 3th and 4th stages
- g) Power terminals 1st stage
- h) Control circuit terminals 230V 50Hz
- i) 1st – 2nd – 3th – 4th stage contactors
- j) Main circuit
- k) Heating elements 2 x 2400 W
- l) Control circuit main cut-out relay
- m) Programmer resetting relay
- n) Programmer

WARNING !!!

For protection against electrical hazard, it is always recommended to install a differential cut-out device (Ground Fault Isolator) on the power supply circuit, upstream of the boiler

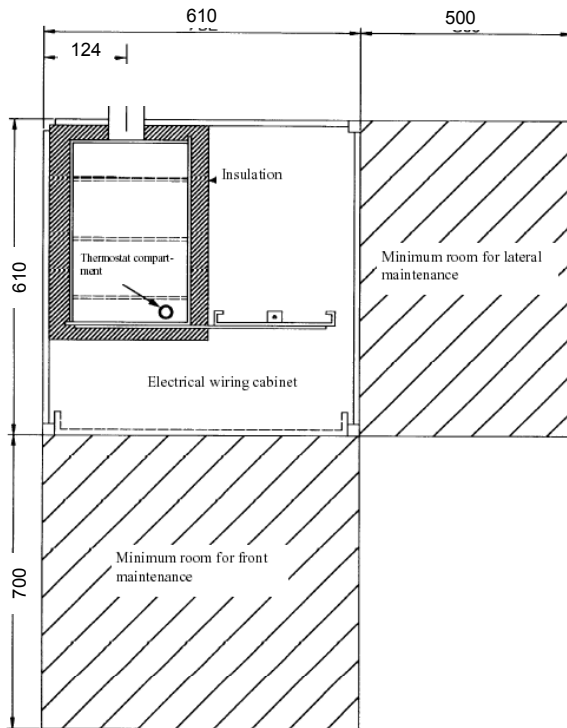
N.B. The devices “ a ”, “ b ”, “ c ”, “ d ” et “ e ” are not part of ACV delivery



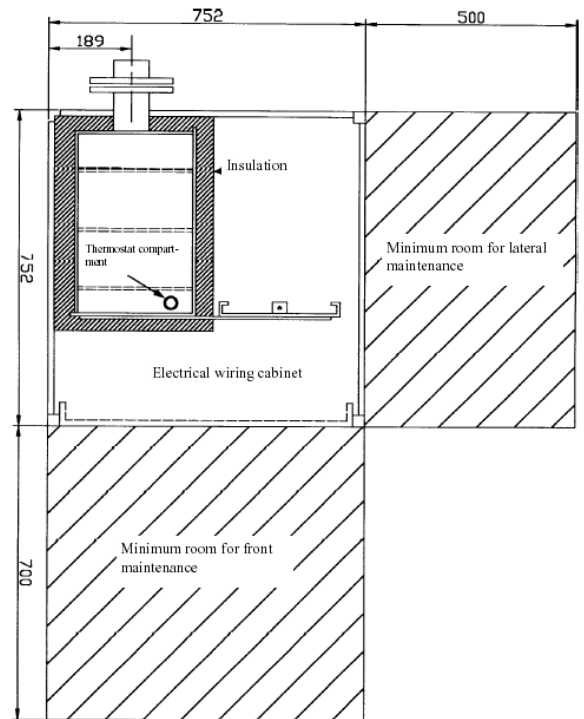
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10. MAINTENANCE SPACE

TER 57 up to TER 144



TER 201 and TER 259



11. INSTALLATION

WARNING !!! Size the flowrate in the hydraulic circuit to ensure a 10°C maximum Δt .

GENERAL SAFETY RULES :

- The boiler must be installed by an registered company.
- After the installation work, the installer must issue a statement of compliance, declaring that the installation has been carried out in a workmanlike manner, as defined for by the applicable regulations.
- Make sure that the wiring system and the power input lines are designed and installed by skilled engineers in compliance with the applicable regulations.

IMPORTANT

- As far as the power input to the boiler is concerned, the installation must comply with IEC 364 standards and other provisions concerning installation conditions.
- For protection against electrical hazard, it is always recommended to install a differential cut-out device (Ground Fault Isolator) on the power supply circuit, upstream of the boiler.
- For protection against overheating, it is advisable to place a positive safety electric power cut-out, controlled by the boiler safety thermostat.

BOILER ROOM

- Electric boilers must be installed in boiler rooms complying with the technical standards and applicable regulations.
- The appliance should never be installed outdoors, because it has not been designed for and is not equipped with automatic defrosting systems.
- If possible, install the boiler above the ground level, to reduce the risk of flooding the electrical components.

INSTALLATION ON AN EXISTING HEATING CIRCUIT

If you connect the boiler on an existing heating circuit, please carefully check that:

- The pump is powerful enough and in good shape.
- The boiler room is clean and ventilated.
- The expansion vessel is sized to absorb the heat expansion of the complete heating circuit.

12. COMMISSIONING

PREPARATION BEFORE COMMISSIONING

Before powering up the boiler and performing the functional tests, make sure that:

- the hydraulic circuit valves are opened;
- the electric power is available;
- the pressure of the (cold) hydraulic circuit is higher than 1 bar and lower than the maximum working pressure of the appliance;
- the hydraulic circuits have been throughtoutly purged: pump the heating fluid through the hydraulic circuit and purge the air from the installation
- the electric connection to the power mains and the external control connection have been carefully carried out;
- the grounding connections have been installed as specified by local regulations

13. MAINTENANCE

- Check on a regular base that the heating circuit pressure is higher than 1 bar. If the pressure drops below 1 bar, please contact your installer

**DON'T SWAP THE PHASE / NEUTRAL CONNECTIONS.
GROUNDING CONNECTION IS MANDATORY**



14. SPECIFICATION SHEET

"TER" ELECTRIC BOILER

- Heating-only electric boiler, with high-thickness ST37/2 steel body
- Connections to the heating circuit located at the upper part of the boiler
- Removable 2.4 kW heating elements mounted with gaskets to the front of the boiler body
- Incolloy stainless steel heating elements with 12.9 W/sq.cm specific load
- 50 mm thick rigid projected polyurethane insulation
- Metal casing, stoved and submitted to special degreasing and phosphating before painting
- Control panel including:
 - thermometer
 - main switch
 - 4 power stage indicator lights
 - overheating lock-out indicating light
 - boiler control thermostat (30-90°C)
 - manual resetable safety thermostat factory set at 103°C.
- Cyclic cam-programmer motor with two directions of rotation, for automatic connection and disconnection of the power stages.
- Power: KW
- Maximum working pressure: 4 bars
- Max temperature: 90°C
- Power stages: 4
- ACV trade-mark Model TER



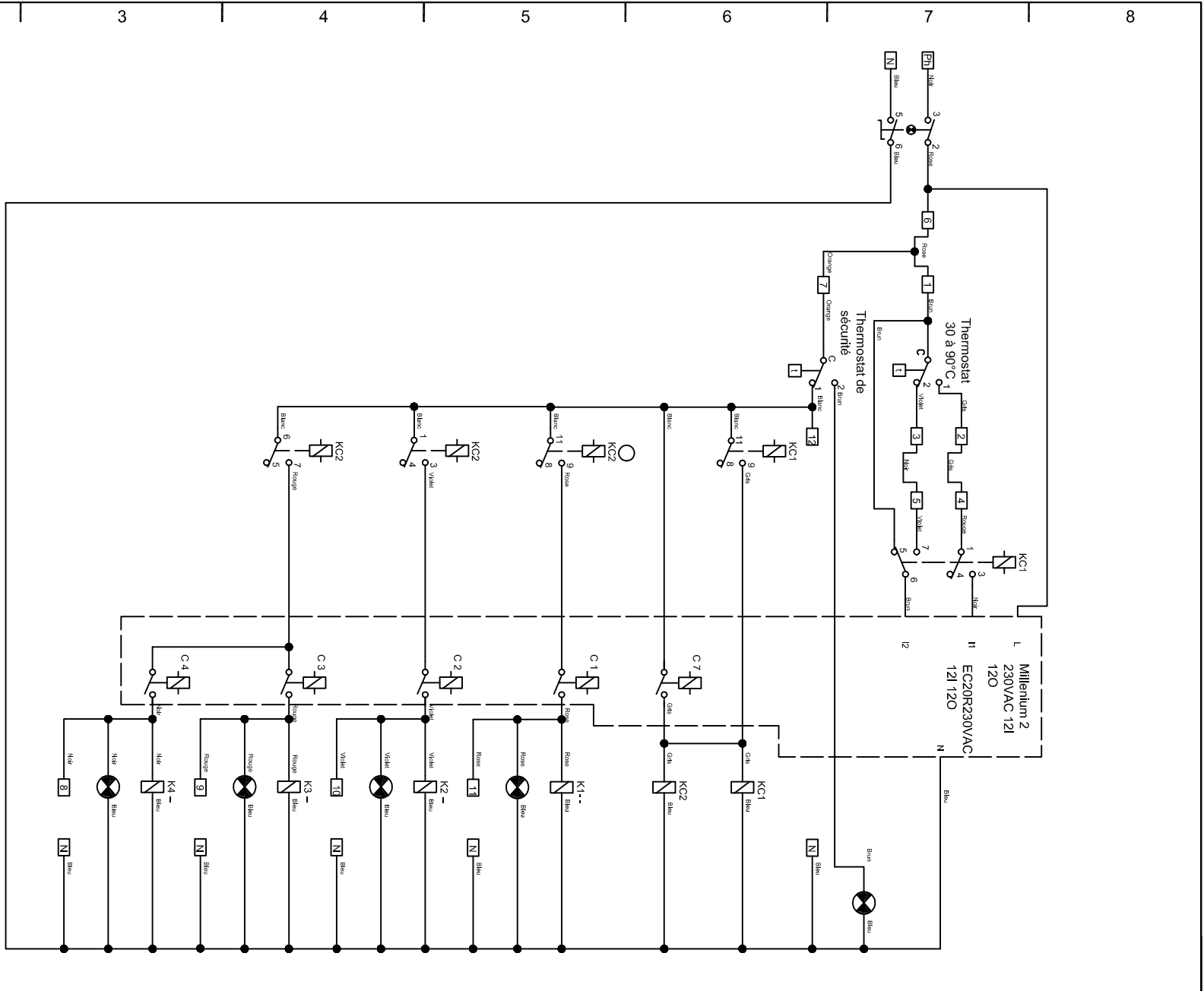
15. LISTE DES PIECES DE RECHANGE TER 57-259 SPARE PARTS LIST

Description en français	Code	English denomination
Résistance 2 x 2,4 kW	54428182	Immersion heater 2 x 2,4 kW
Relais de puissance 20 Amp	54452082	Power relay 20 Amp
Programmateur Crouzet 10 contacts	54452095	Timer Crouzet 10 contacts
Condensateur moteur de programmeur	54429014	Condensator for timer-motor
Relais 3 inverseurs 230 V 10 A	54428220	Reverse relay 230 V 10 A
Thermostat de commande à bulbe 30 à 90 °C	54442045	Control thermostat with bulb 30-90°C
Interrupteur bipolaire lumineux	54428116	Switch, double pole, with indicator light
Thermostat à réarmement	54764009	Safety thermostat with manual reset
Thermomètre vertical à capillaire 1,5 m	54441012	Thermometer vertical with capilair 1.5 m
Lampe témoin rouge	54428203	Indicator light red
Lampe témoin verte	54766000	Indicator light green
Borne 70 mm ²	54428242	Terminal block 70mm ²
Borne 150 mm ²	54428244	Terminal block 150mm ²
Borne 240 mm ²	54428245	Terminal block 240mm ²
Jacquette TER 57 -144 (ensemble)	21470058	Housing TER 57 -144 (complete set)
Latérale droite	21471058	Right panel
Latérale gauche	21472058	Left panel
Porte avant	21473058	Front door
Tôle arrière	21474058	Back panel
Couvercle	21475058	Top panel
Tableau de commande (tôle non câblée)	21477058	Control Panel (panel only)
Tableau de commande (câblé)	257F1051	Control Panel (complete)
Jacquette TER 201 -259 (ensemble)	21470059	Housing TER 201-259 (complete set)
Latérale droite	21471059	Right panel
Latérale gauche	21472059	Left panel
Porte avant	21473059	Front door
Tôle arrière	21474059	Back panel
Couvercle	21475059	Top panel
Tableau de commande (tôle non câblée)	21477059	Control Panel (panel only)
Tableau de commande (câblé)	257F1052	Control Panel (complete)

Borniers – Terminal blocks

TER 57 à 115 (4x150 mm ²)	54428244
TER 144 (3x150 mm ²)	54428244
(1x240 mm ² pour le neutre)	54428245
TER 201 (4x240 mm ²)	54428245
4x70 mm ² pour le premier étage	54428242
TER 259 (4x240 mm ²)	54428245
4x150 mm ² pour le premier étage	54428244



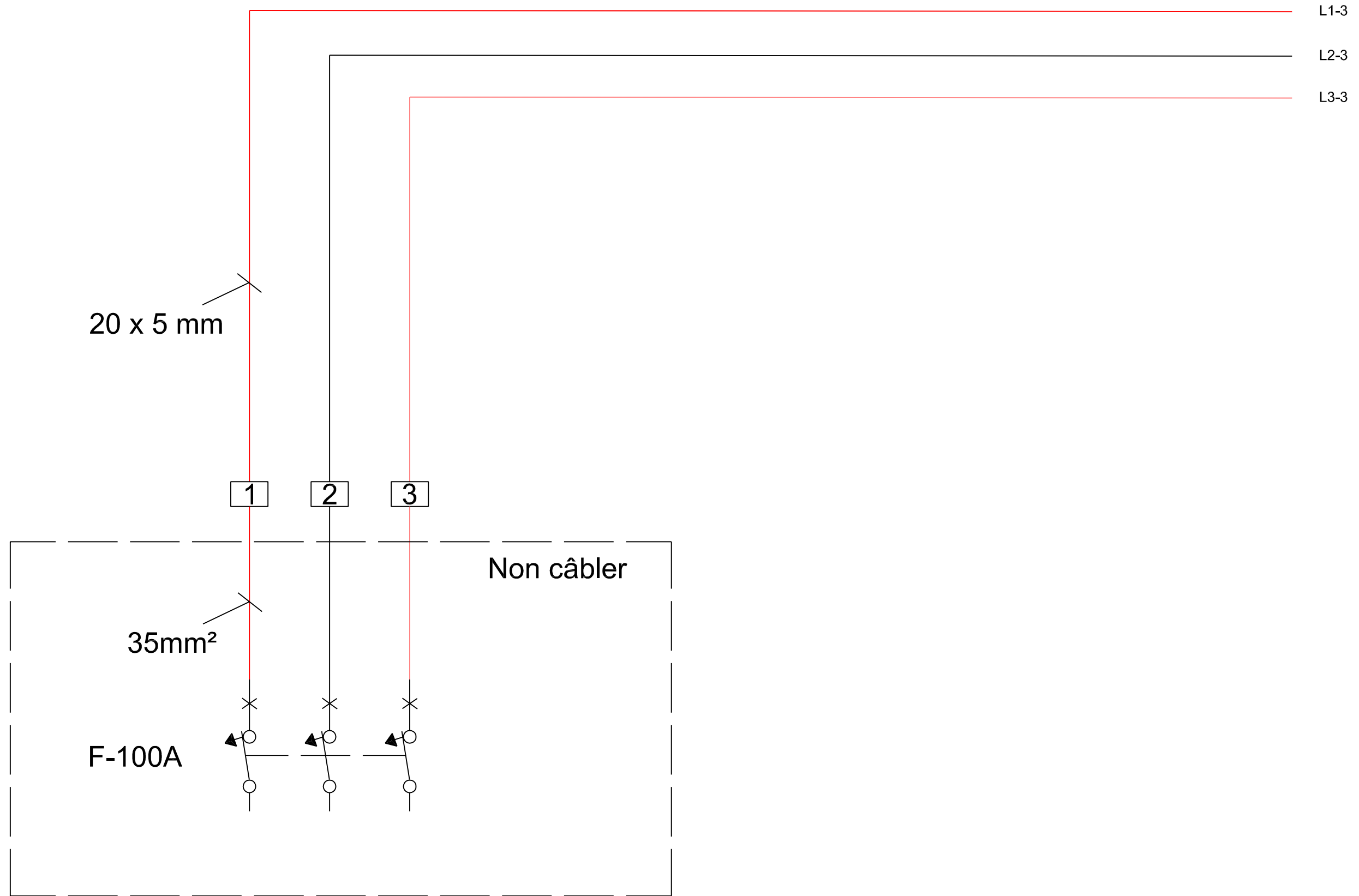


Projet :
TER Commande V05
 257F1051 & 257F1052

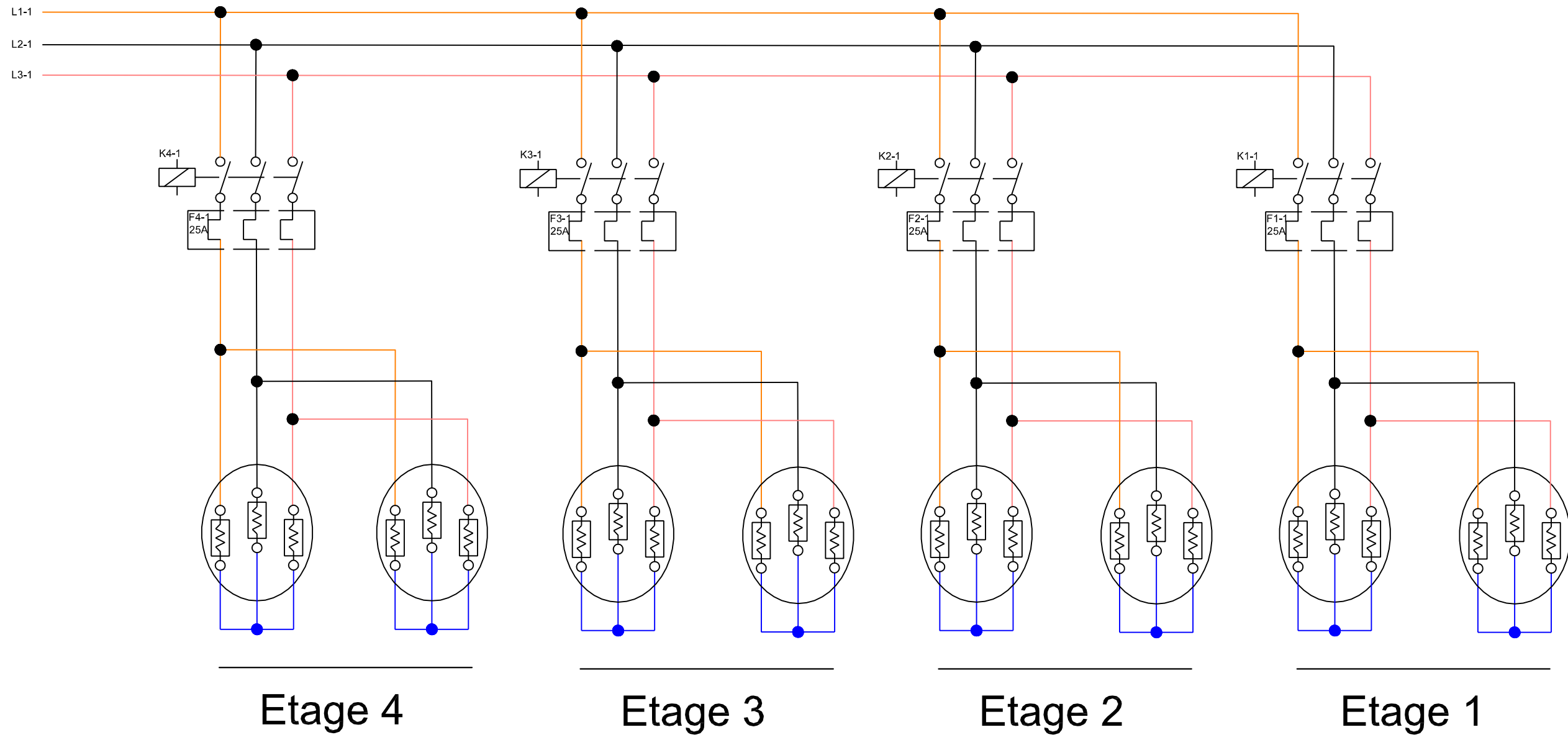
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Dessiné	06/10/2006
Contrôlé	
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LCH

Observation :



Projet : Ter 57 Alimentation des étages	Dernière modification :	Observation :		Page : 1
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ACV Manufacturing	Contrôlé : 10/08/2005 PCO			de : 2
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Etage 4

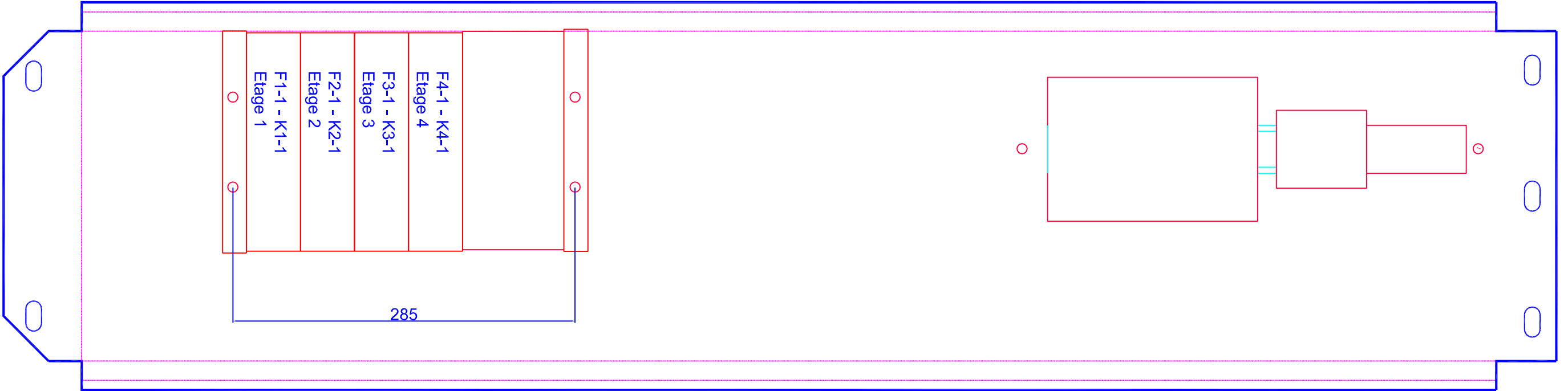
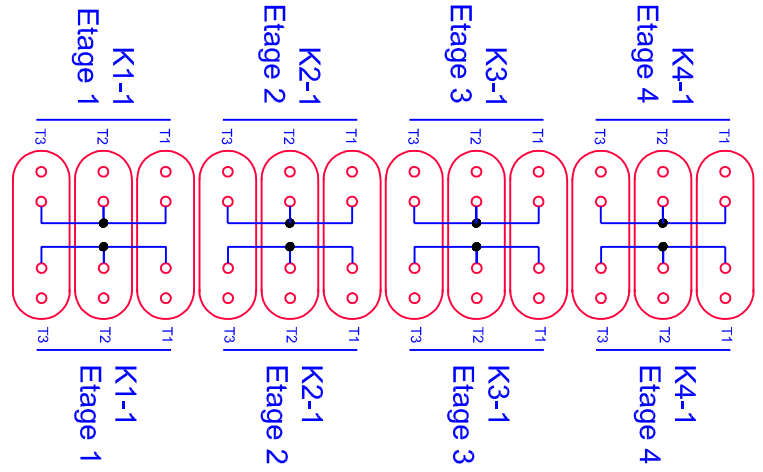
Etage 3

Etage 2

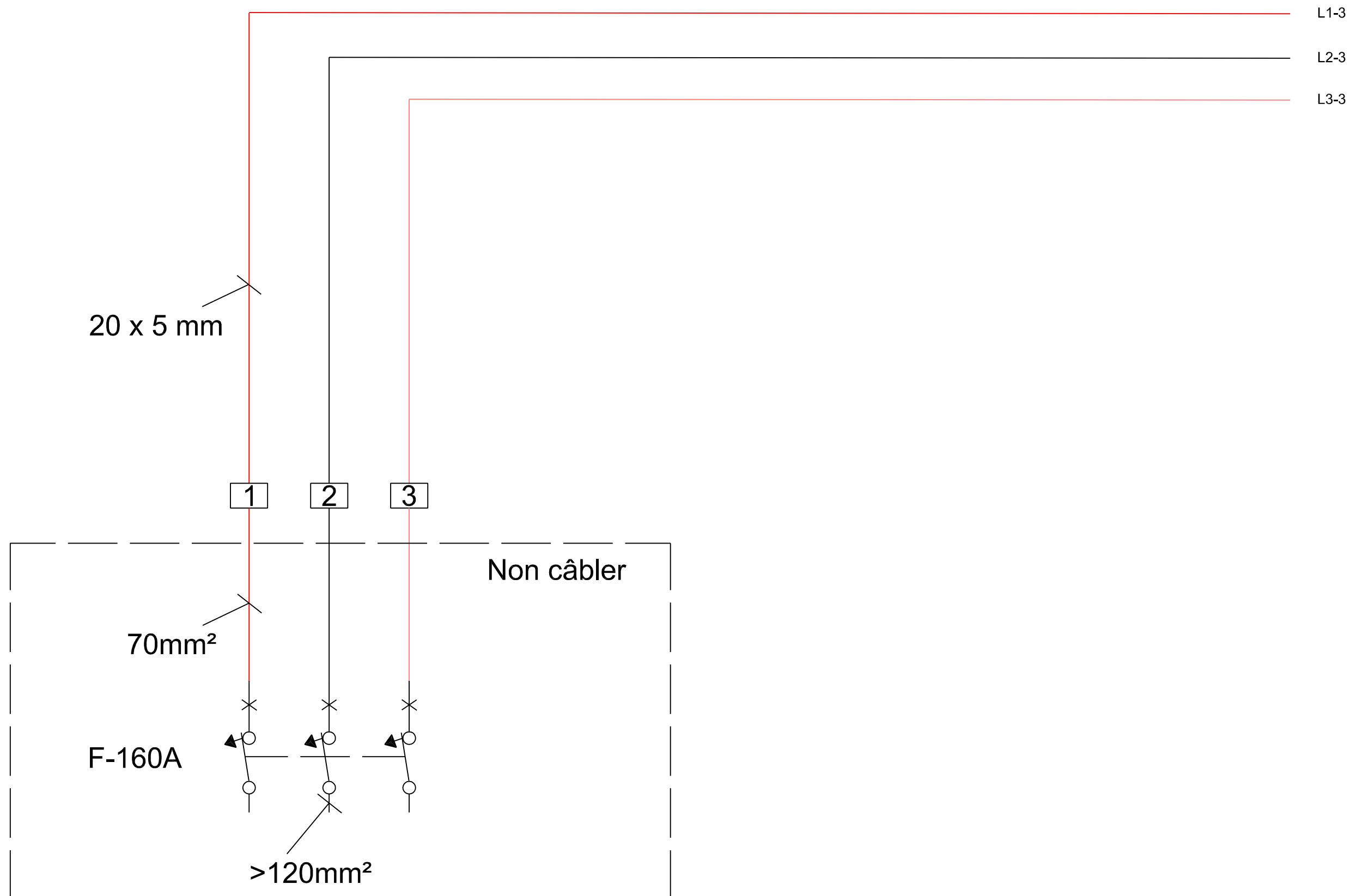
Etage 1

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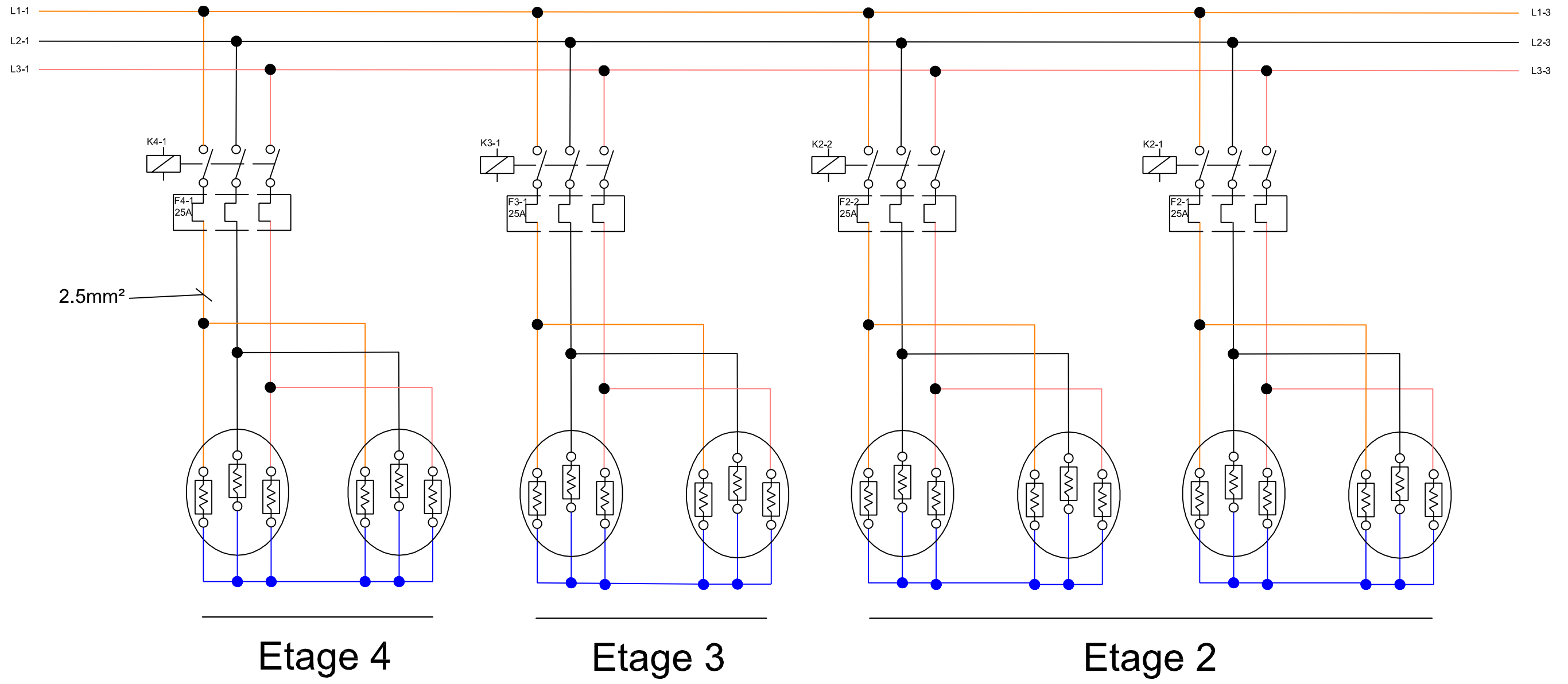
1 2 3 4 5 6 7 8



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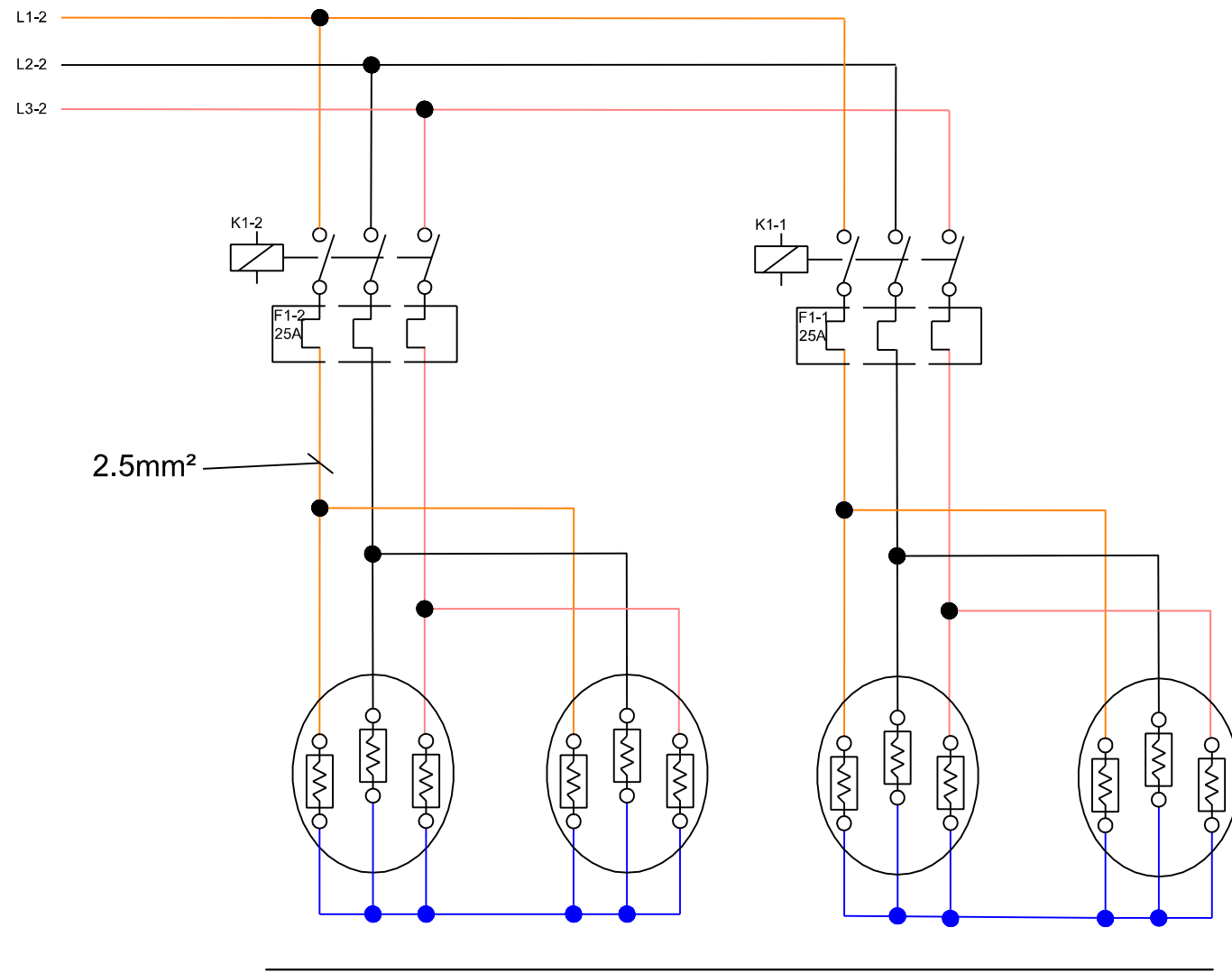


Etage 4


Etage 3

Etage 2

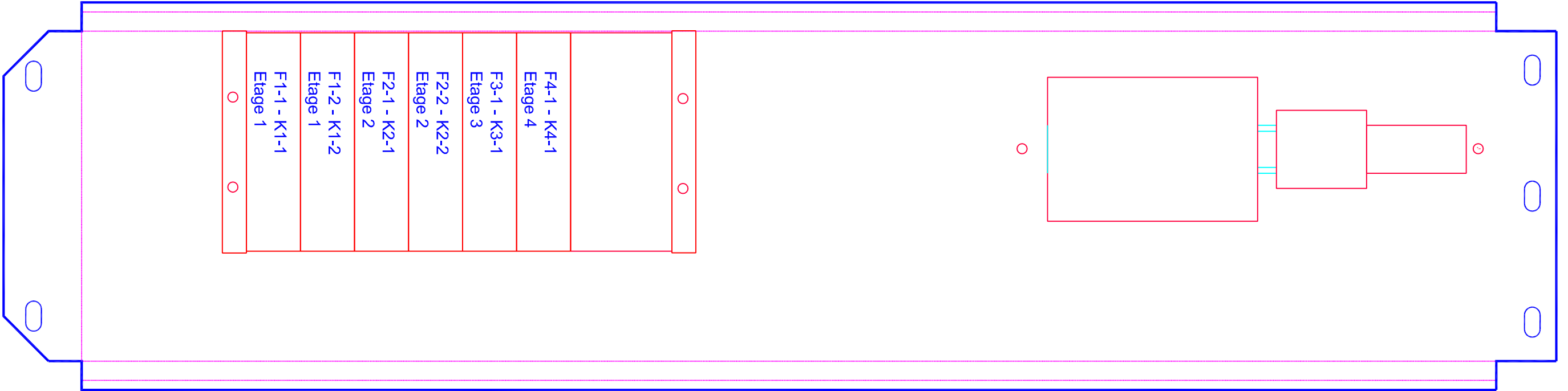
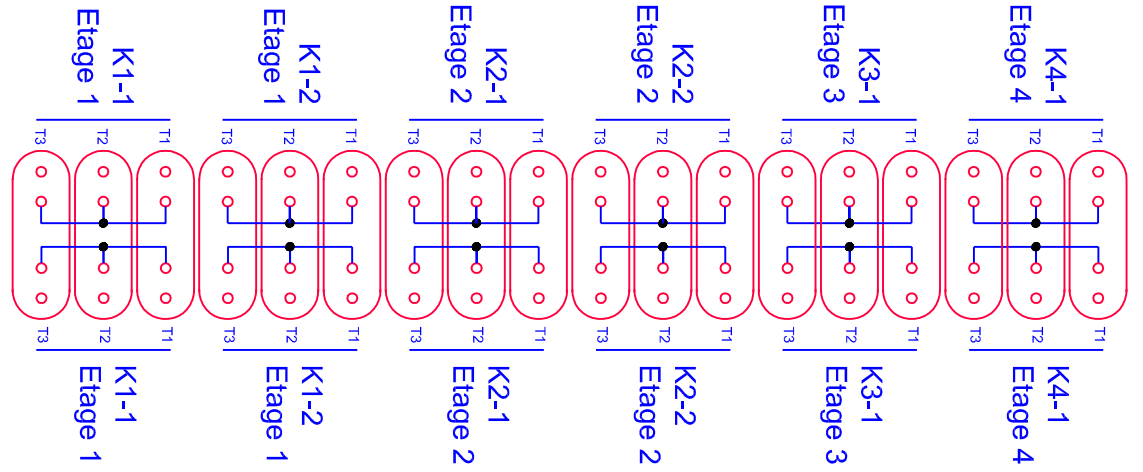
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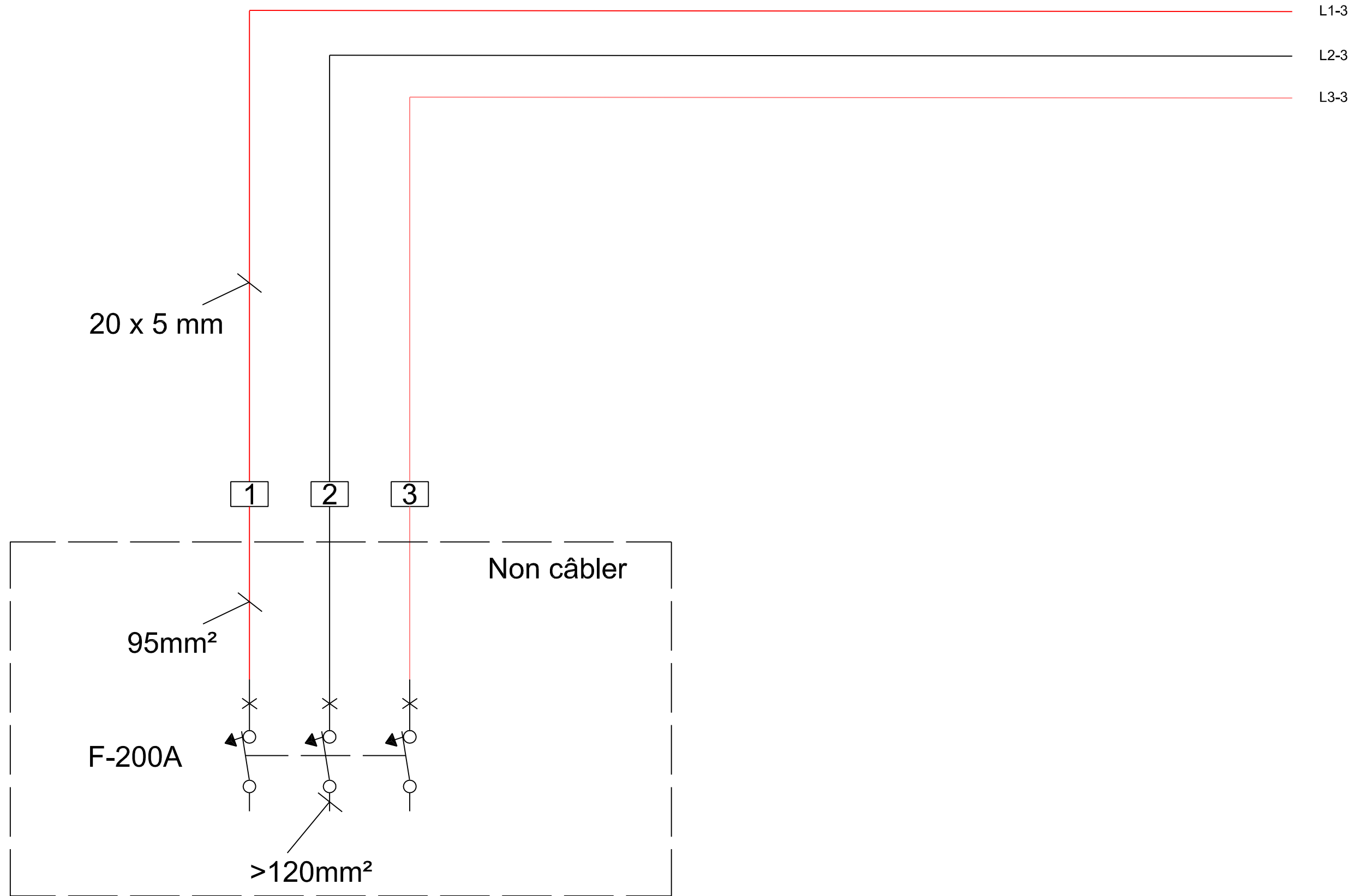
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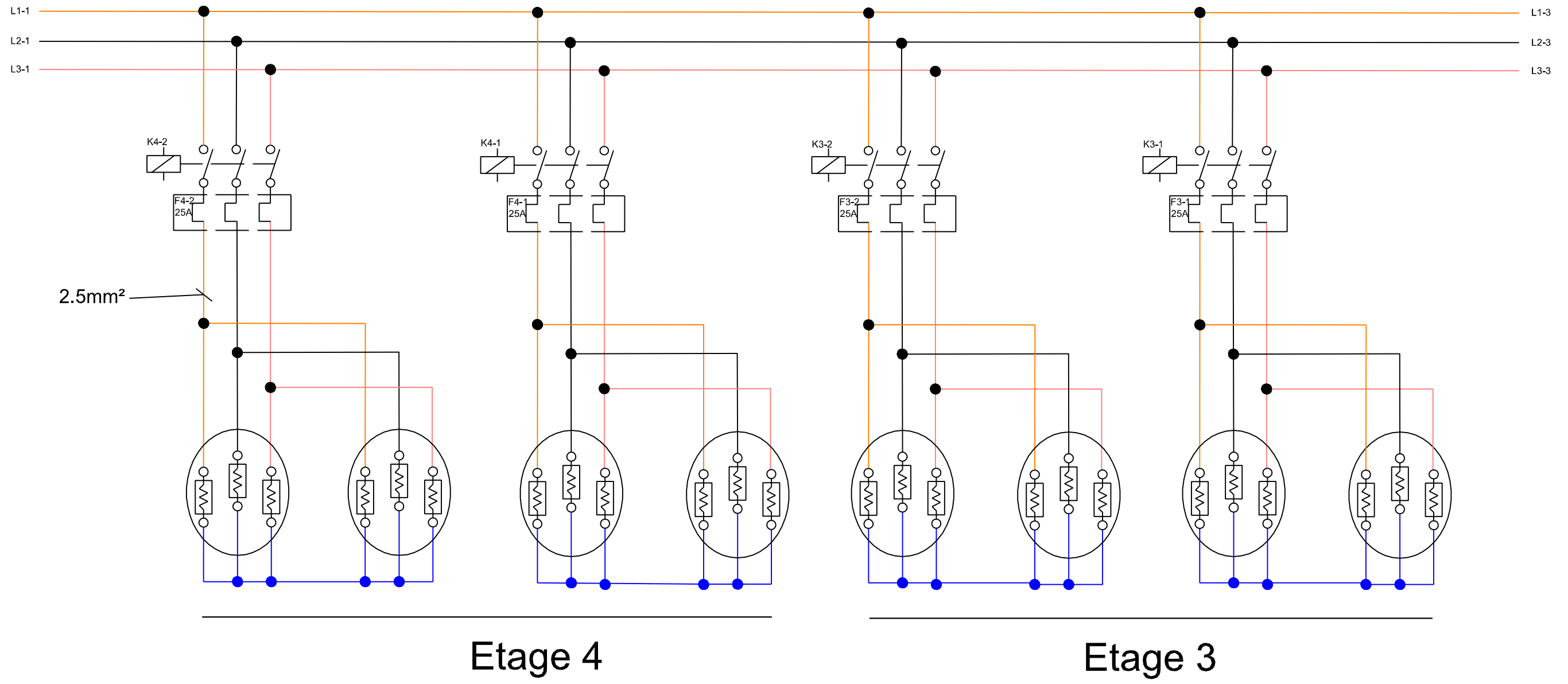
1 2 3 4 5 6 7 8



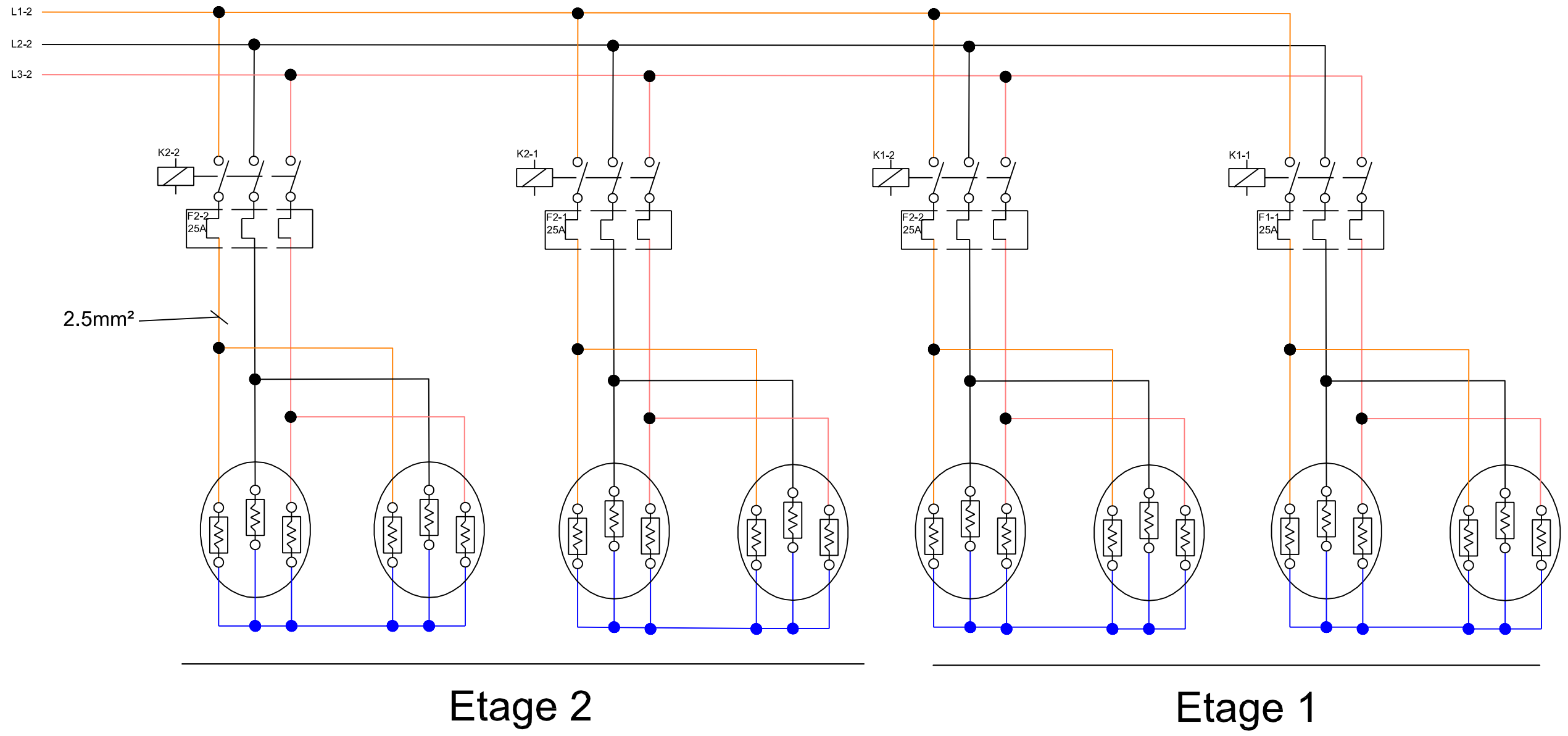
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Projet : Ter 115 Alimentation des étages	Dernière modification :	Observation :		Page : 1
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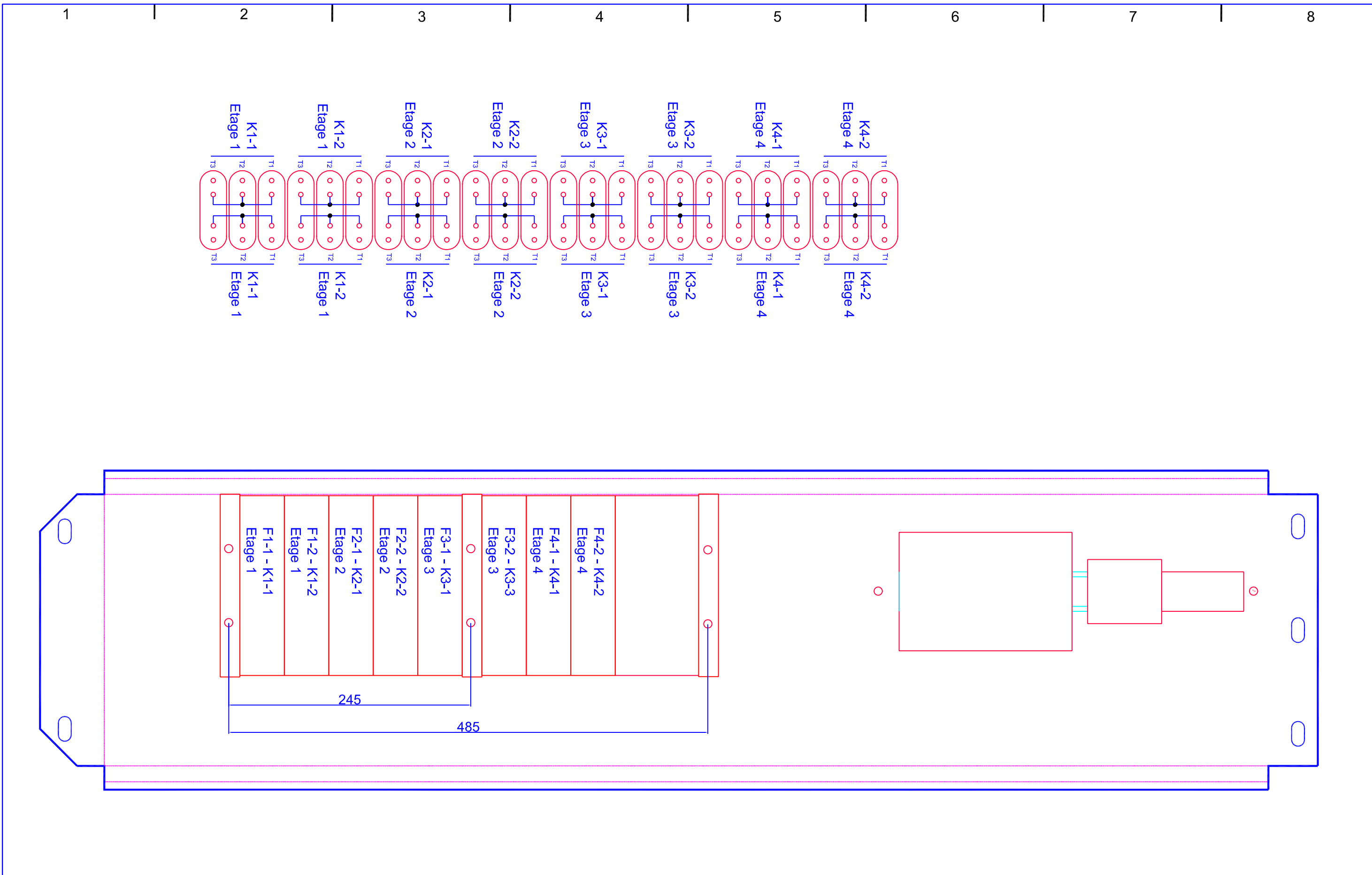
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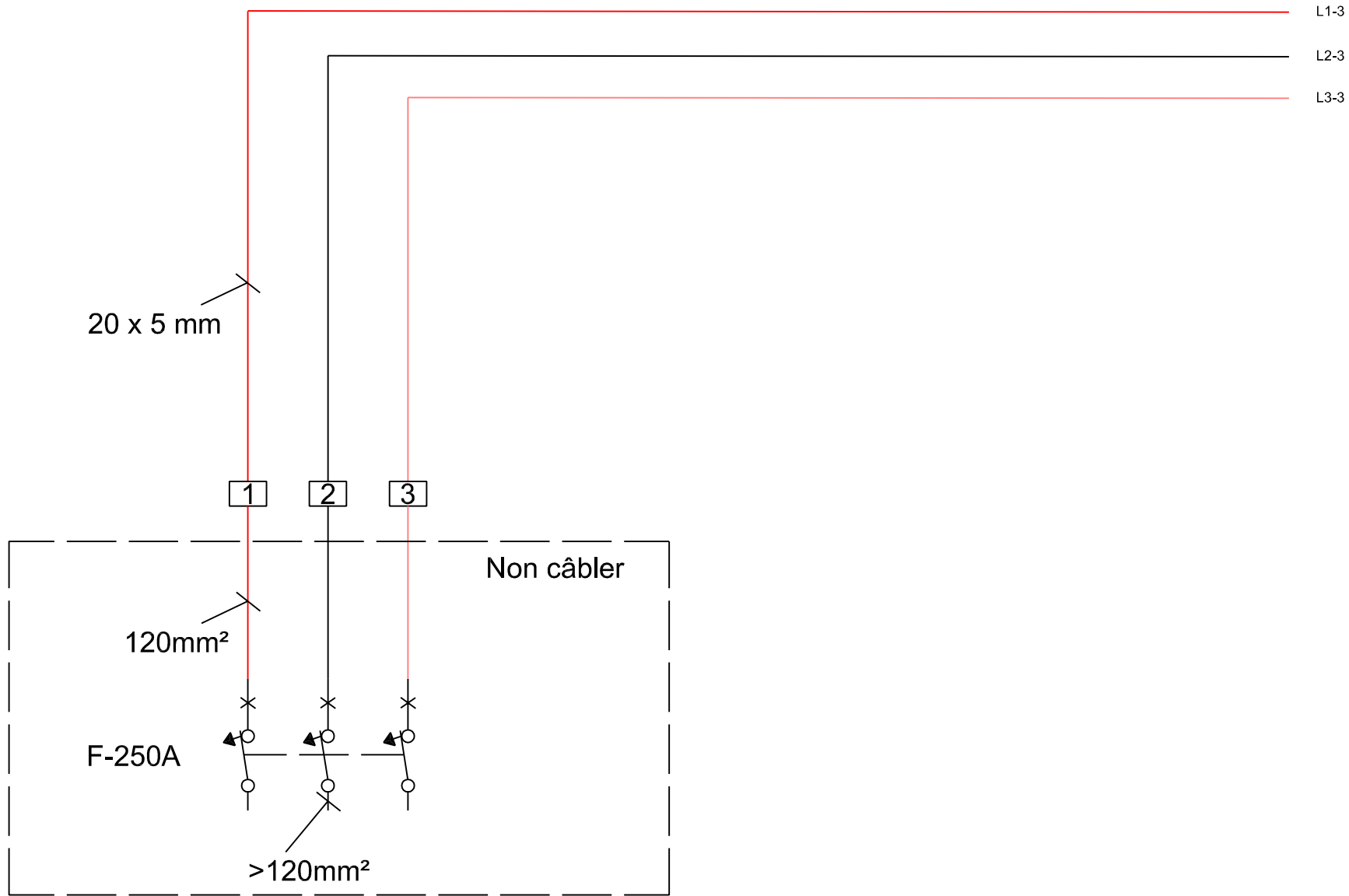
Etage 2

Etage 1

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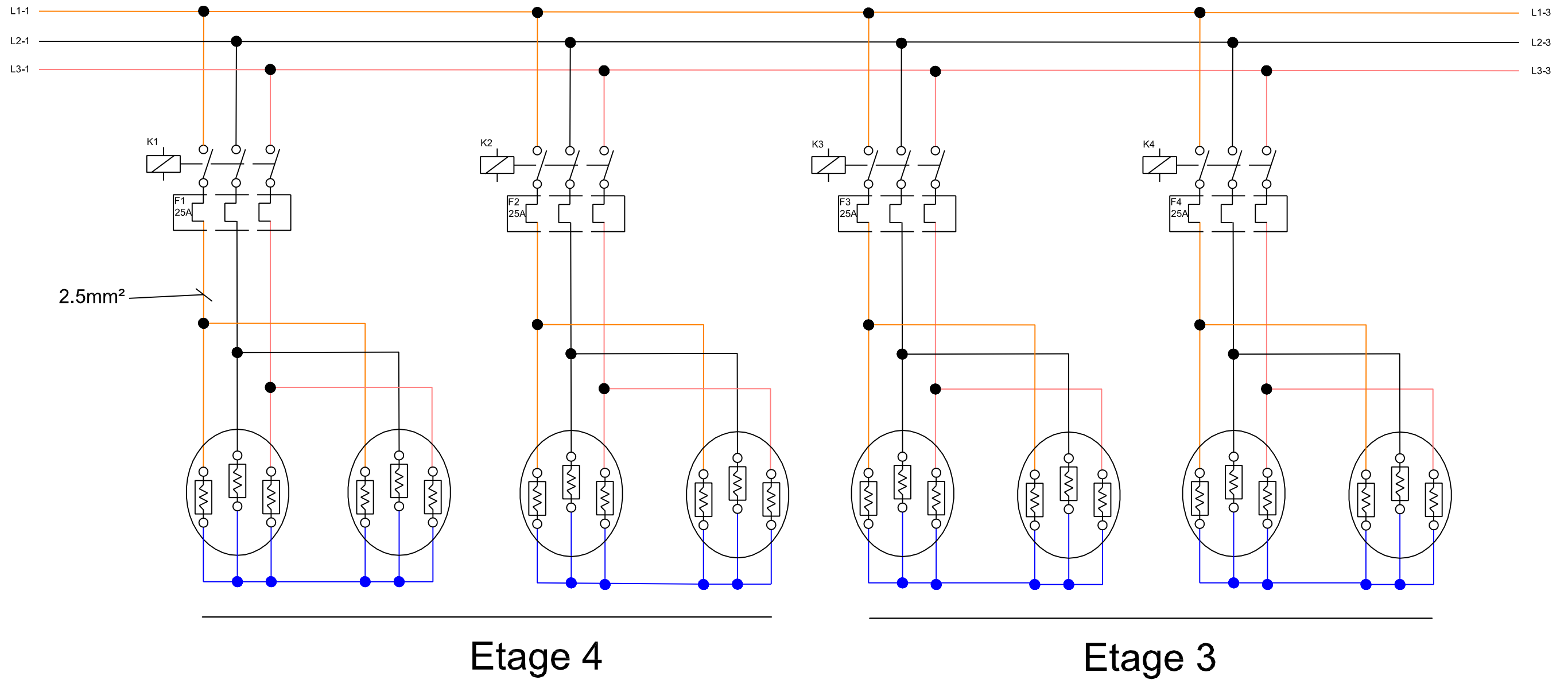
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Ter 144
 Alimentation des étages

Dernière modification :		
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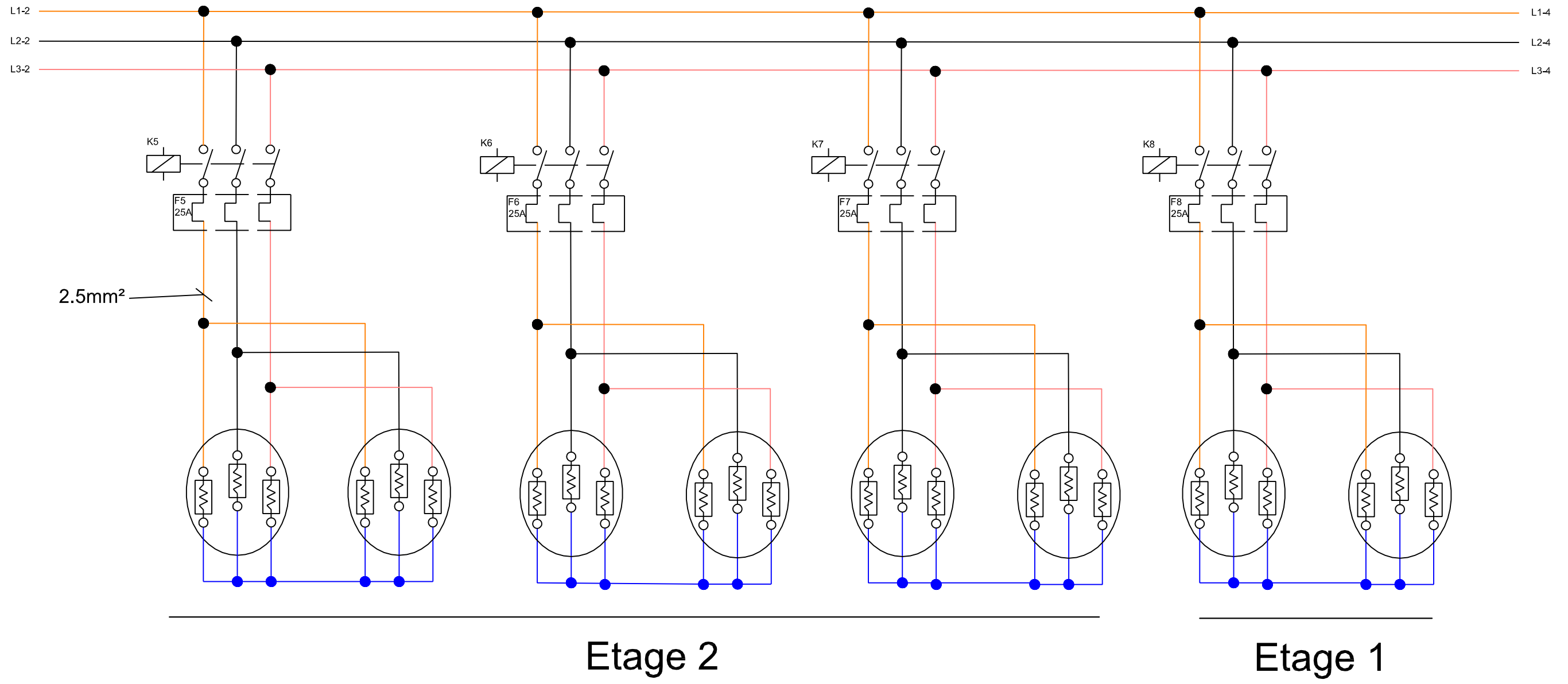
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ACV Manufacturing

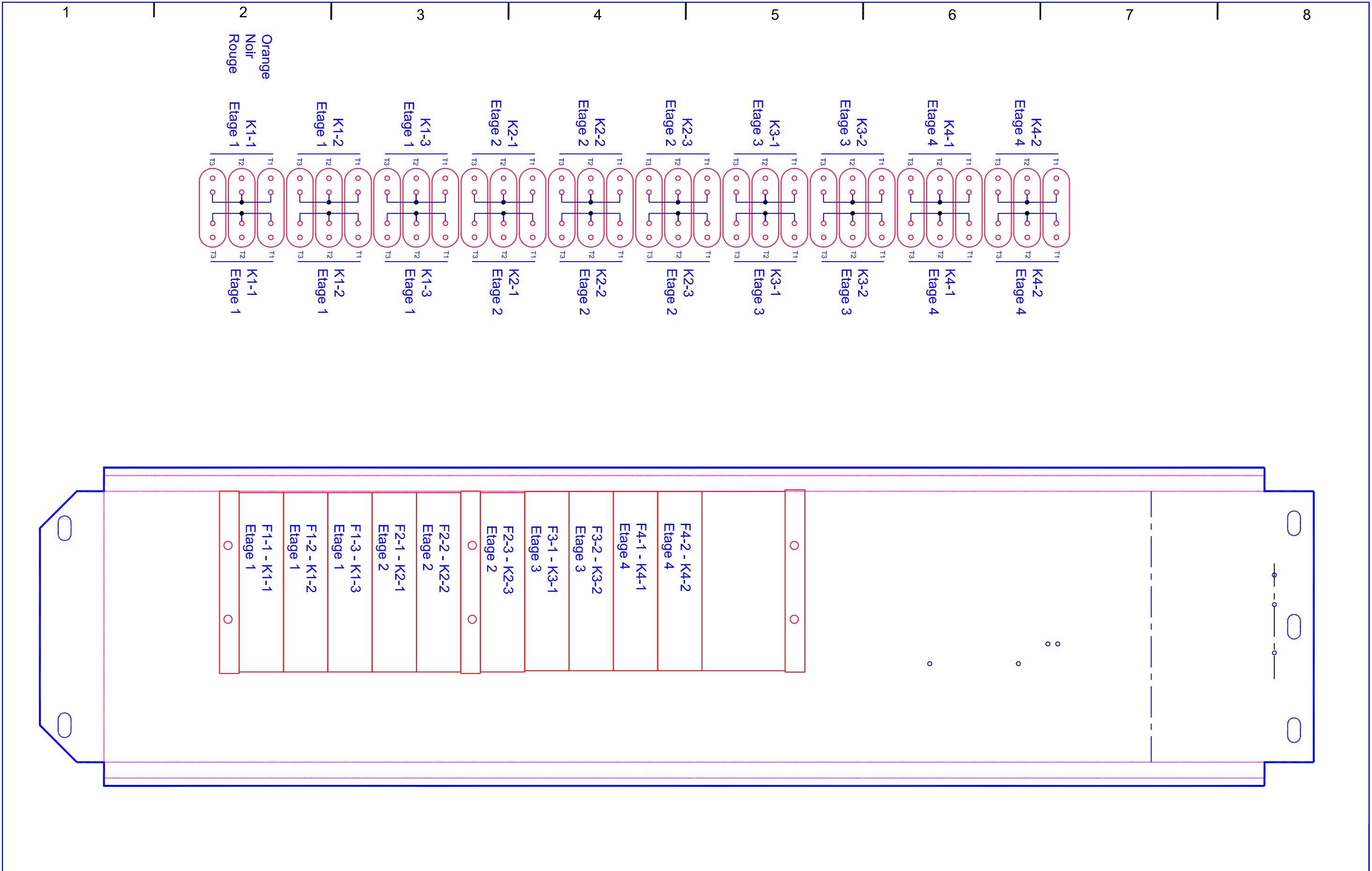
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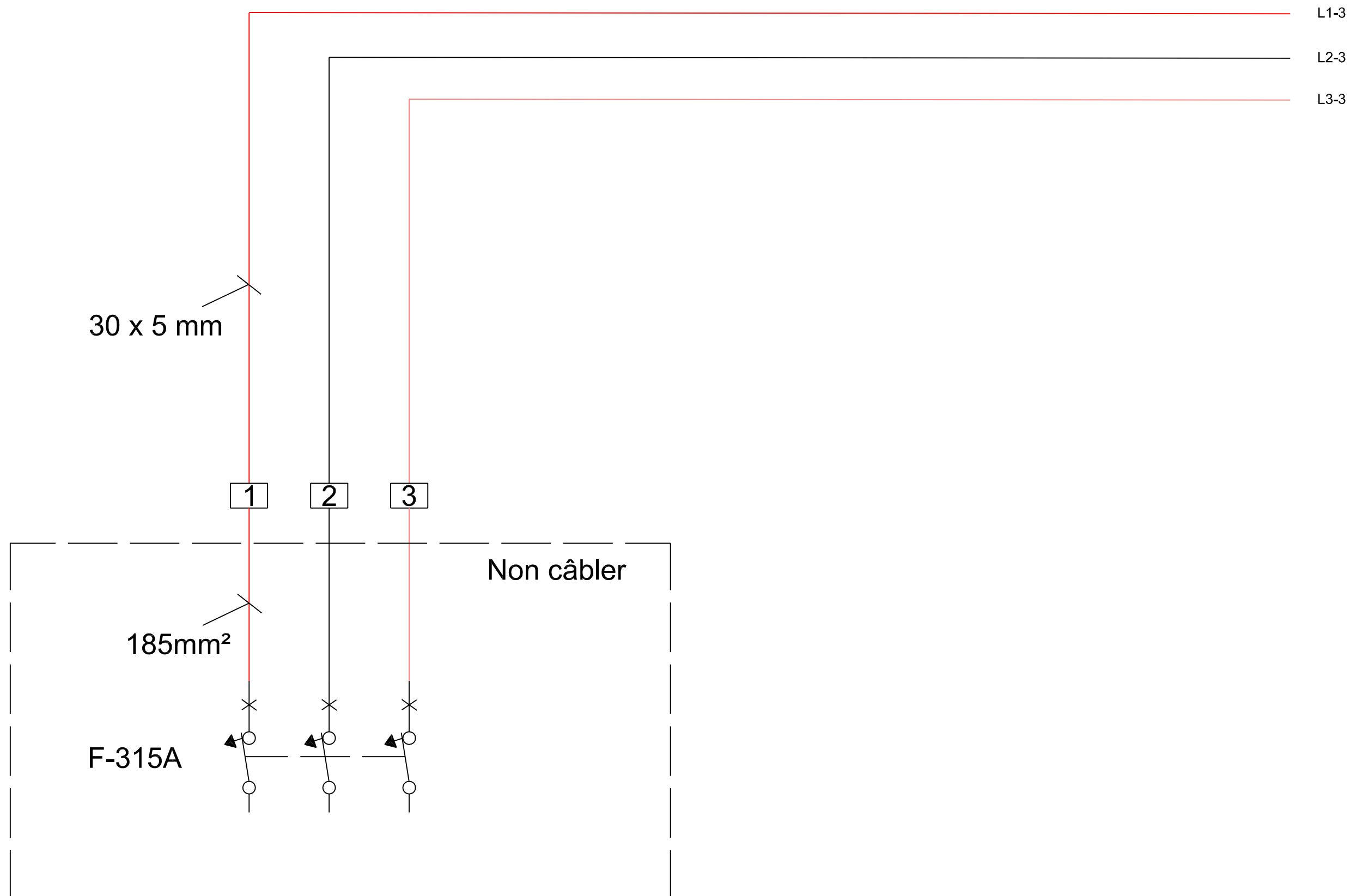
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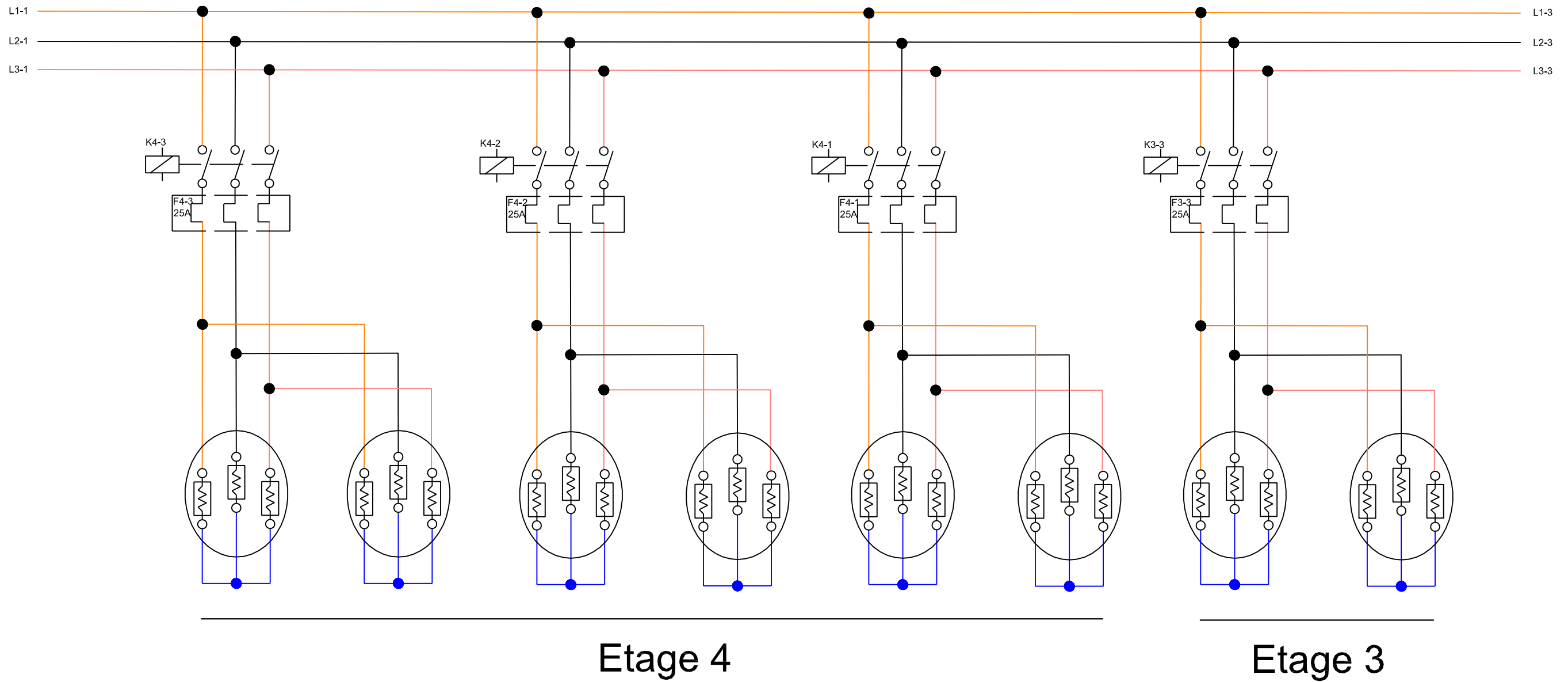
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	Remplace			



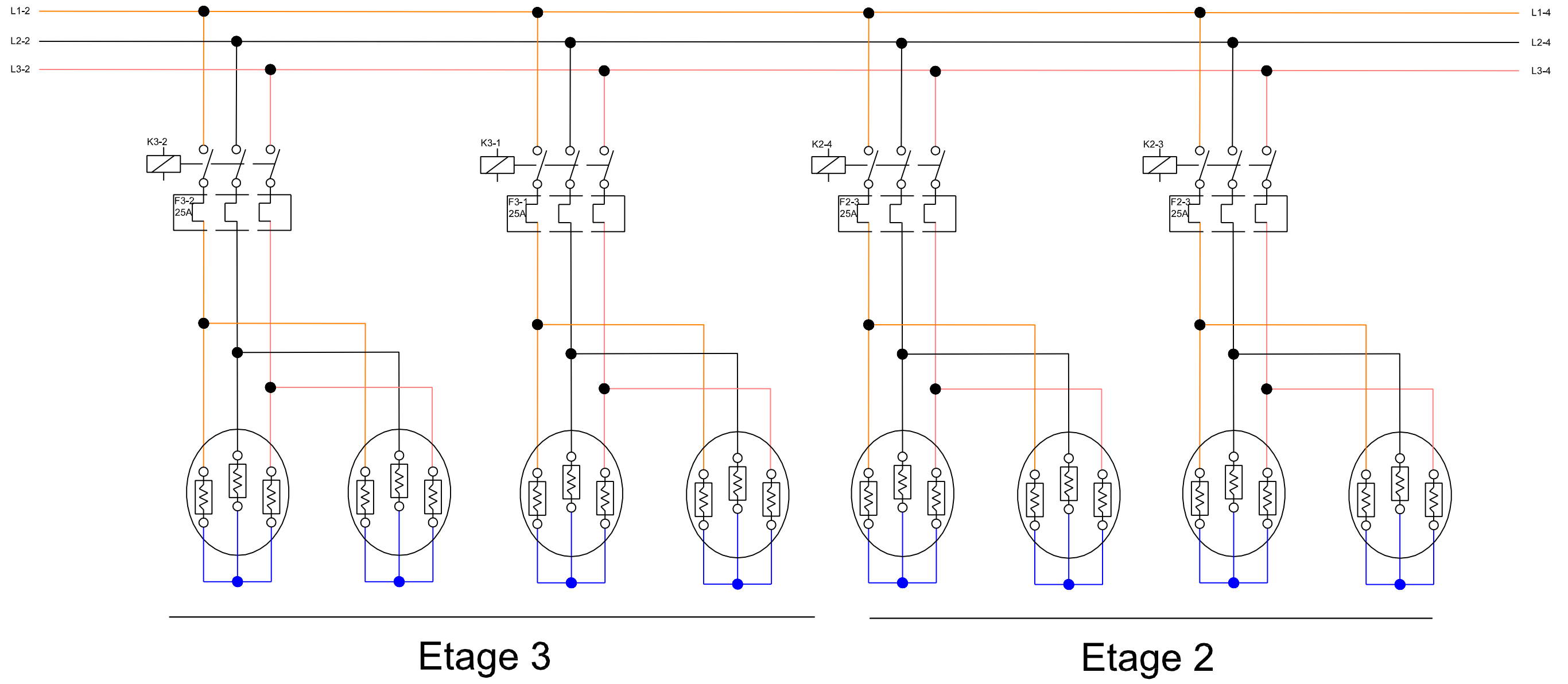
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ACV Manufacturing	Remplacé par			de : 5
	Remplace			



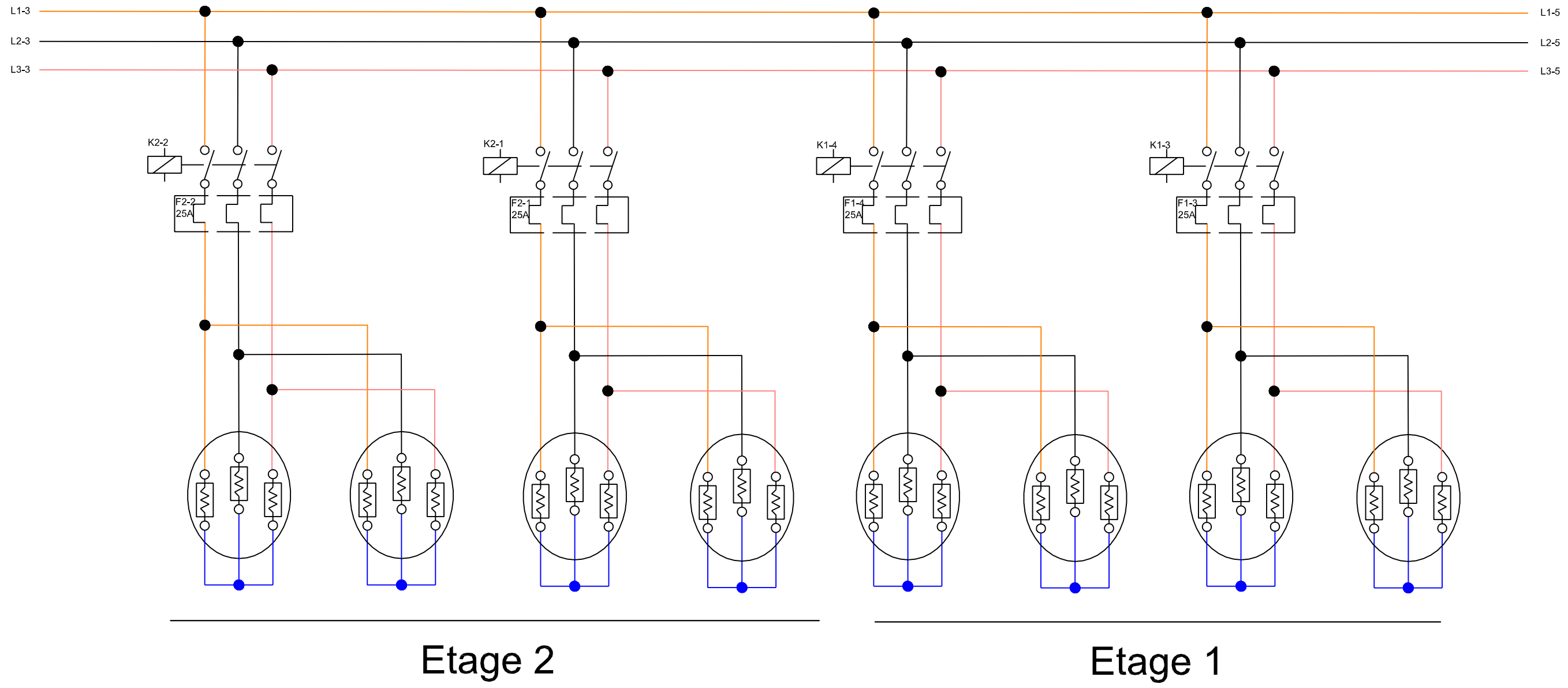
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ACV Manufacturing	Remplacé par			
	Remplace			



Etage 3

Etage 2

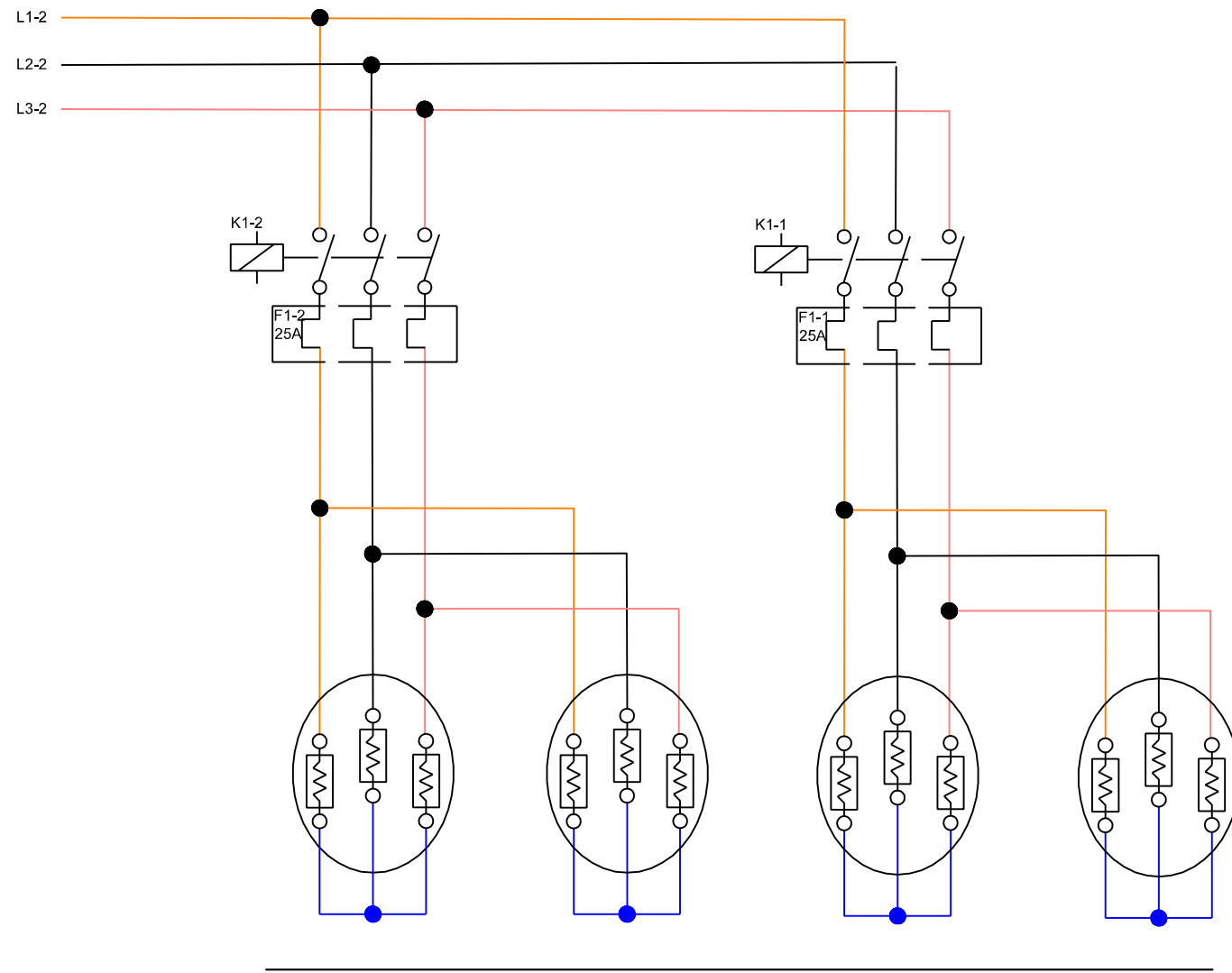
Projet : Ter 201 étage 3 & 2	Dernière modification :	Observation :		Page : 3
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ACV Manufacturing	Remplacé par			de : 5
	Remplace			



Etage 2

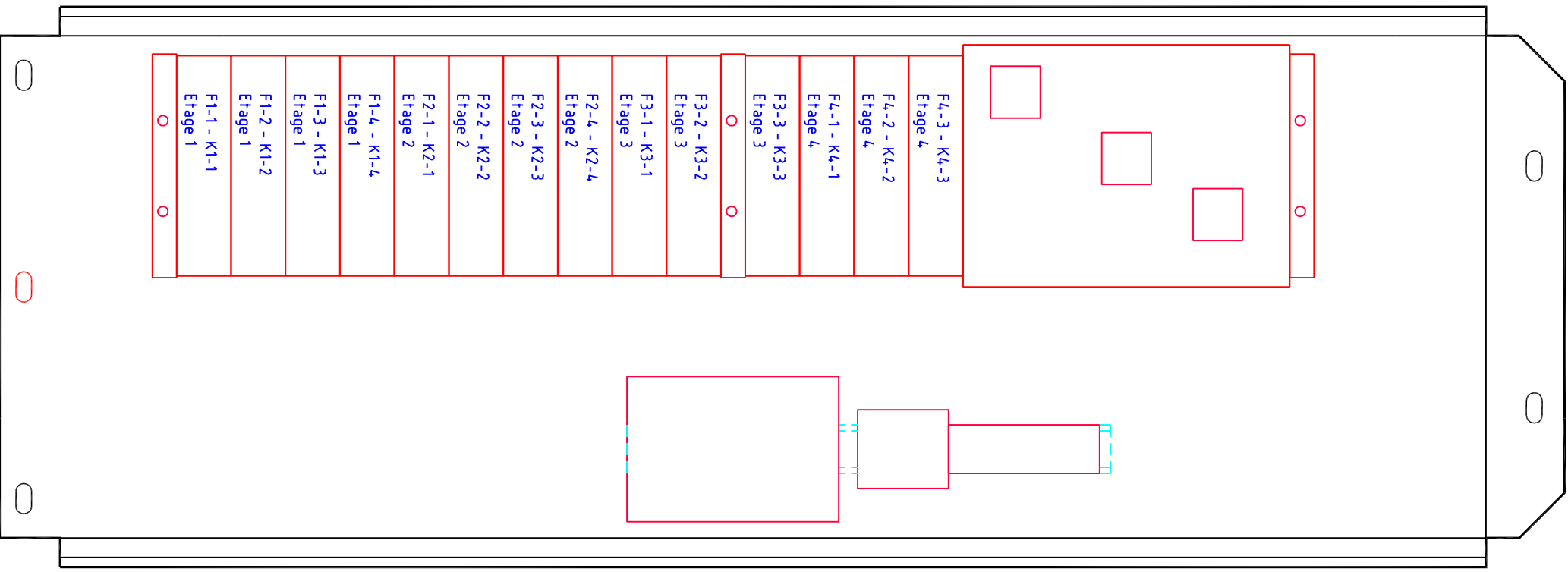
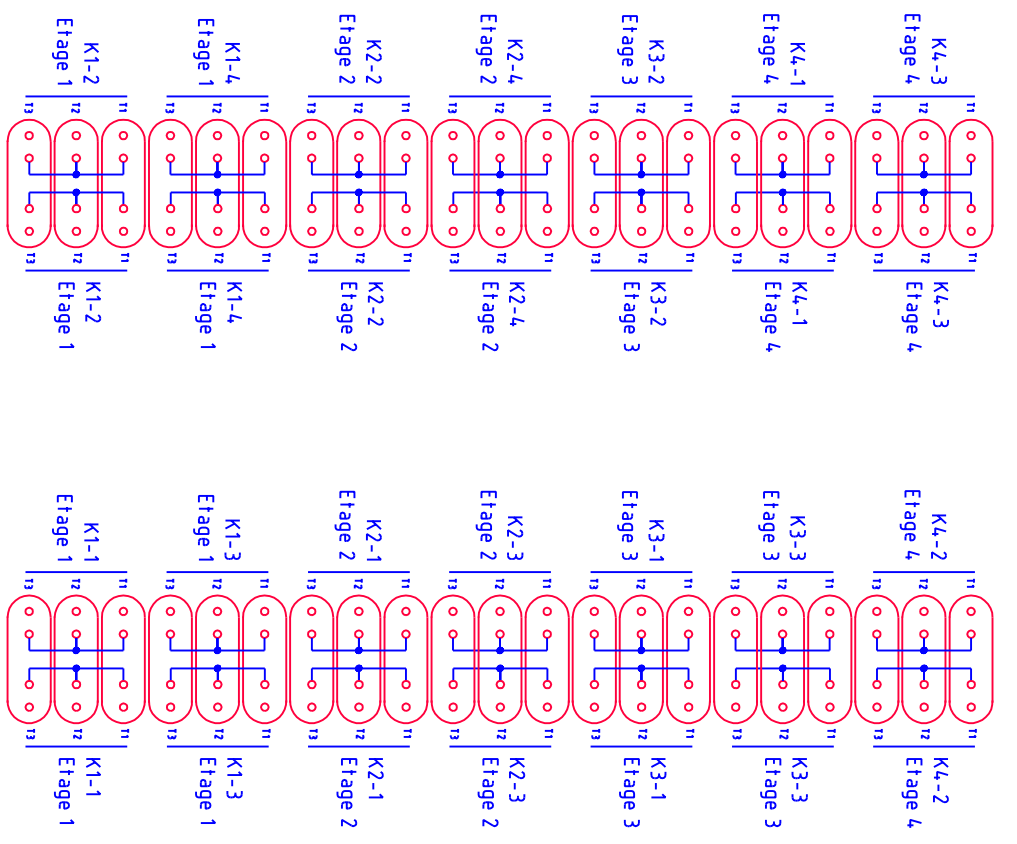
Etage 1

Projet : Ter 201 étage 2 & 1	Dernière modification :	Observation :		Page : 4
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ACV Manufacturing	Remplacé par			de : 5
	Remplace			

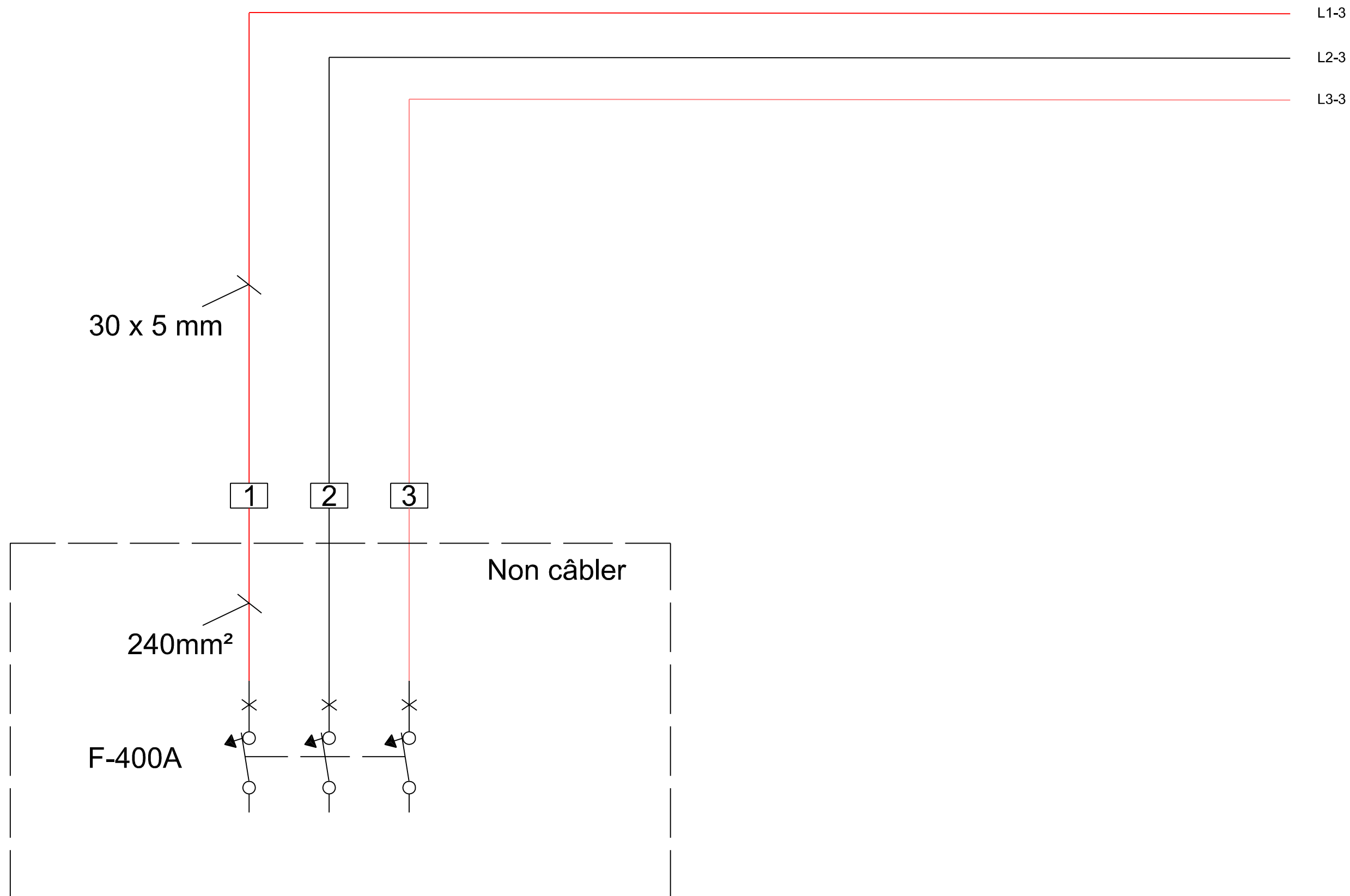


Etage 1

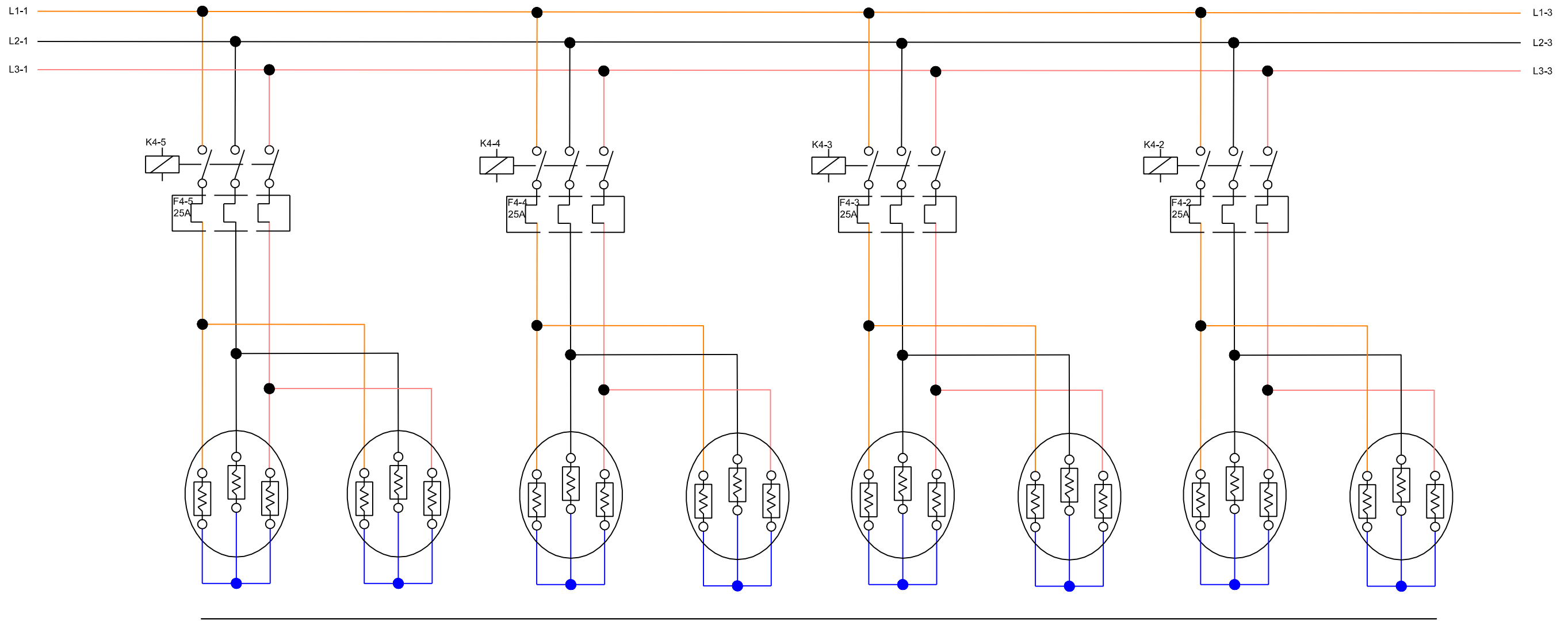
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	Remplace			



Projet : Ter 201	Dernière modification :		Observation :	Page : 1
	Dessiné	10/08/2005		
	Contrôlé	10/08/2005		PCO
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	Remplace			

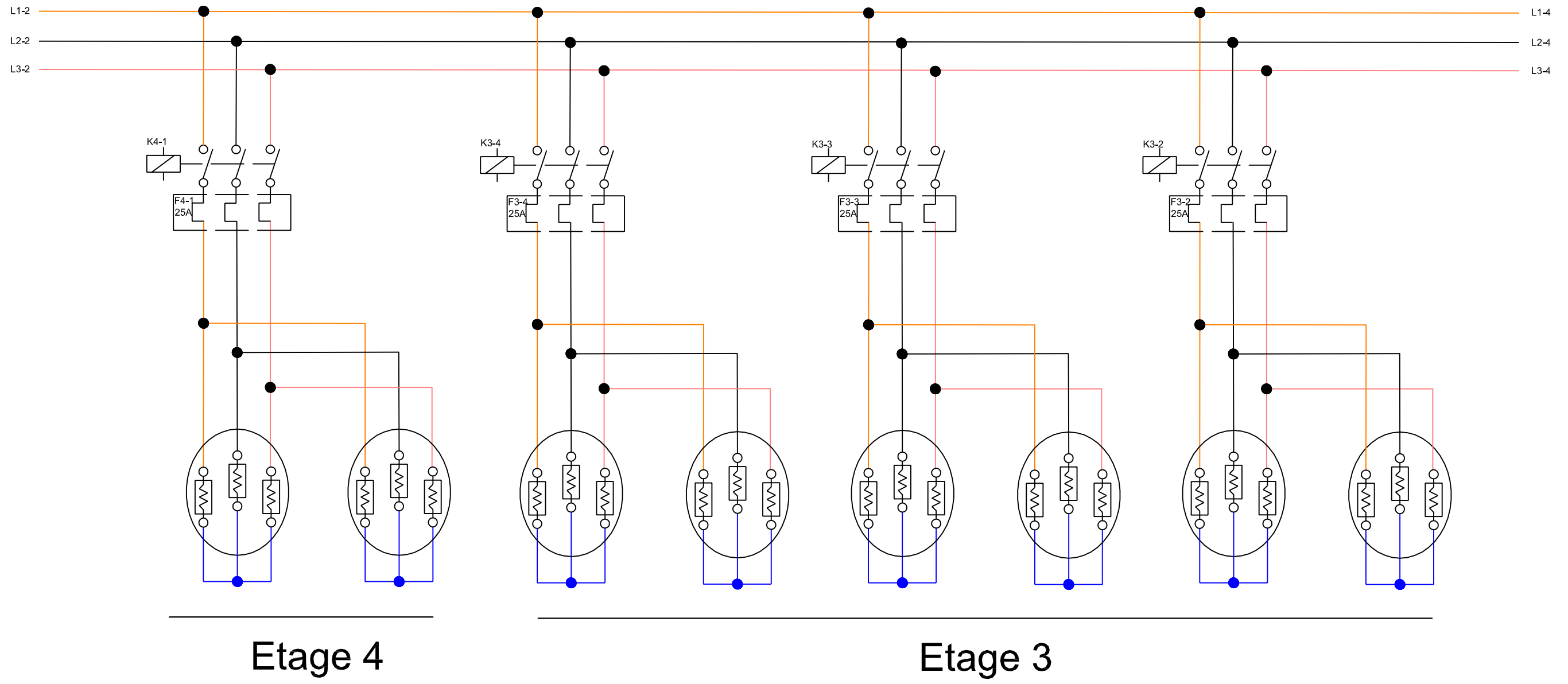


Projet : Ter 259 Alimentation des étages	Dernière modification :	Observation :		Page : 1
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	Remplace :			




Etage 4

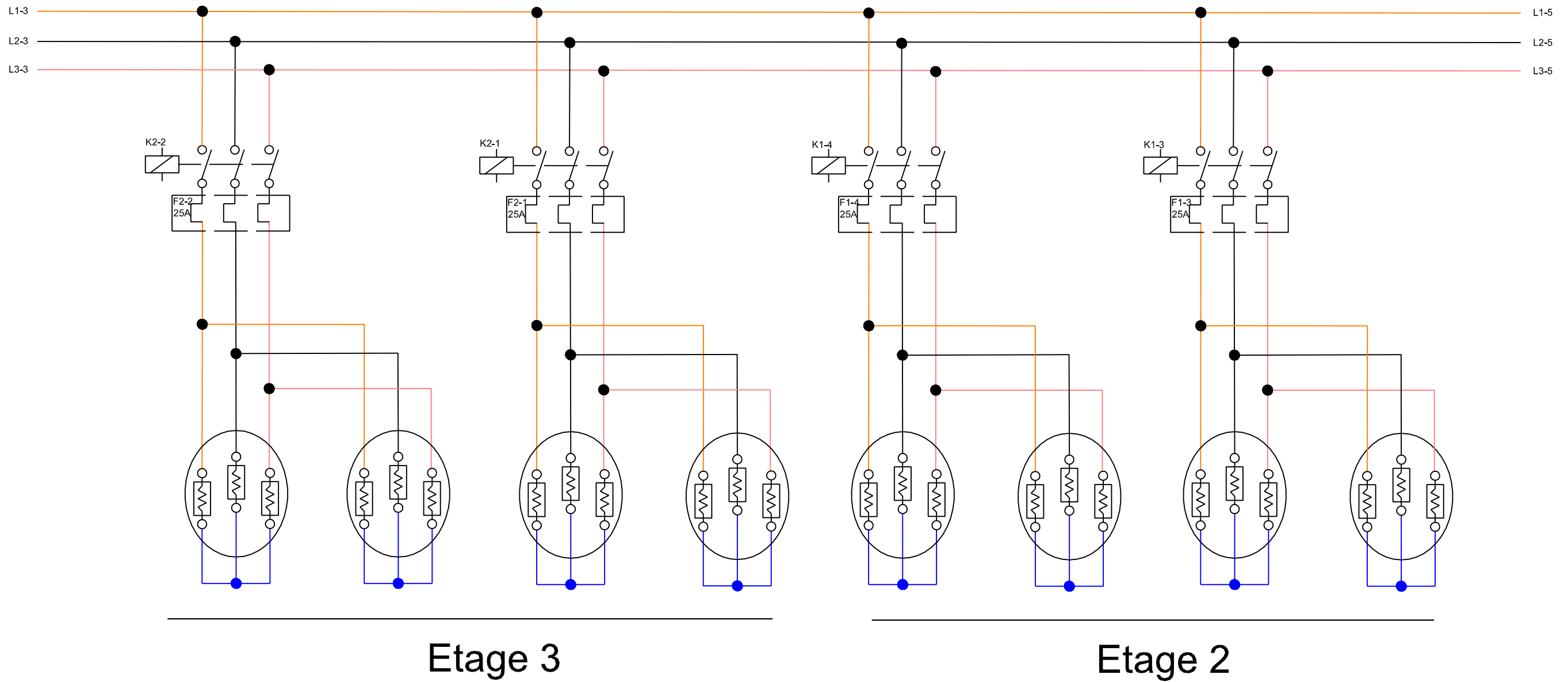
Projet : Ter 259 étage 4	Dernière modification :	Observation :		Page : 2
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Controlé : PCO				
Remplacé par : Remplace				
ACV Manufacturing				



Etage 4

Etage 3

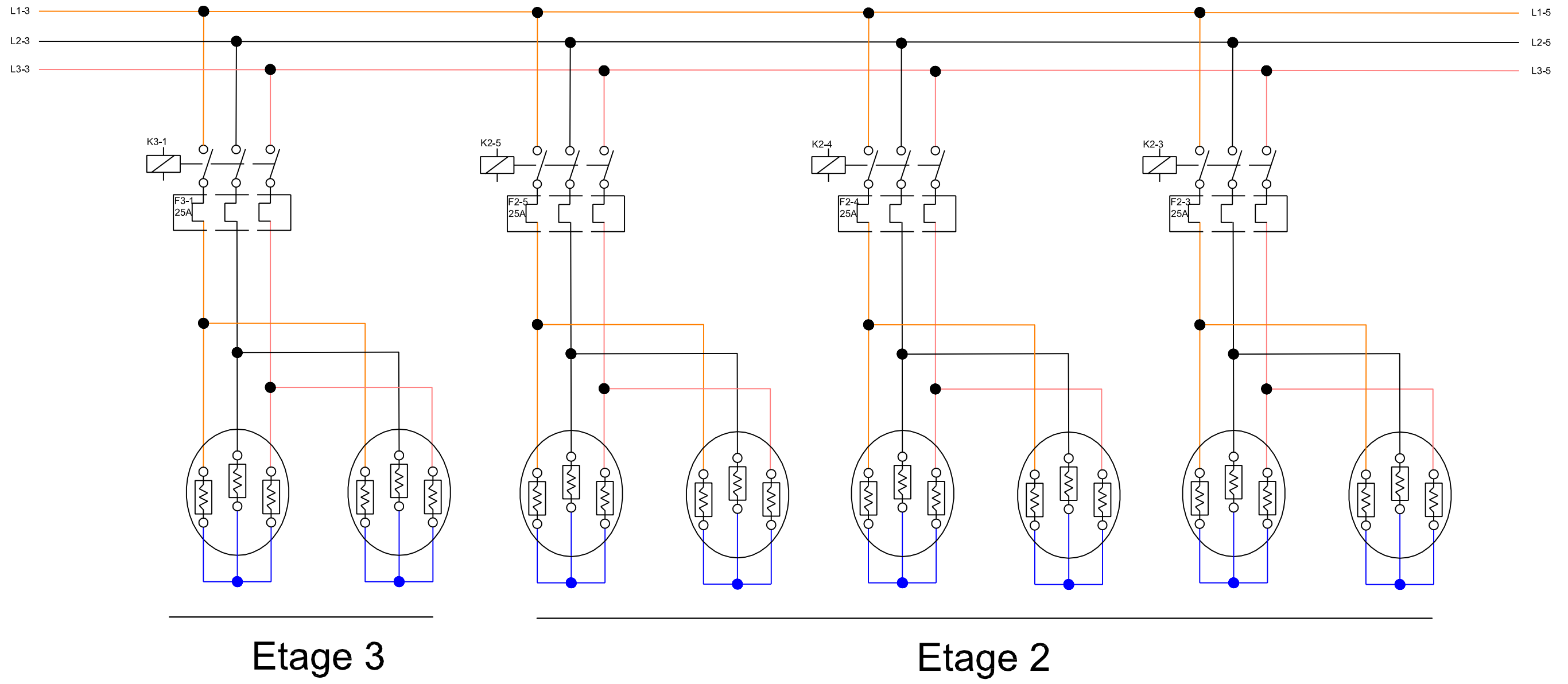
Projet : Ter 259 étage 3 & 2	Dernière modification : 	Observation :		Page : 3
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Contrôlé :	PCO			de : 6
ACV Manufacturing	Remplacé par :			
	Remplace :			



Etage 3

Etage 2

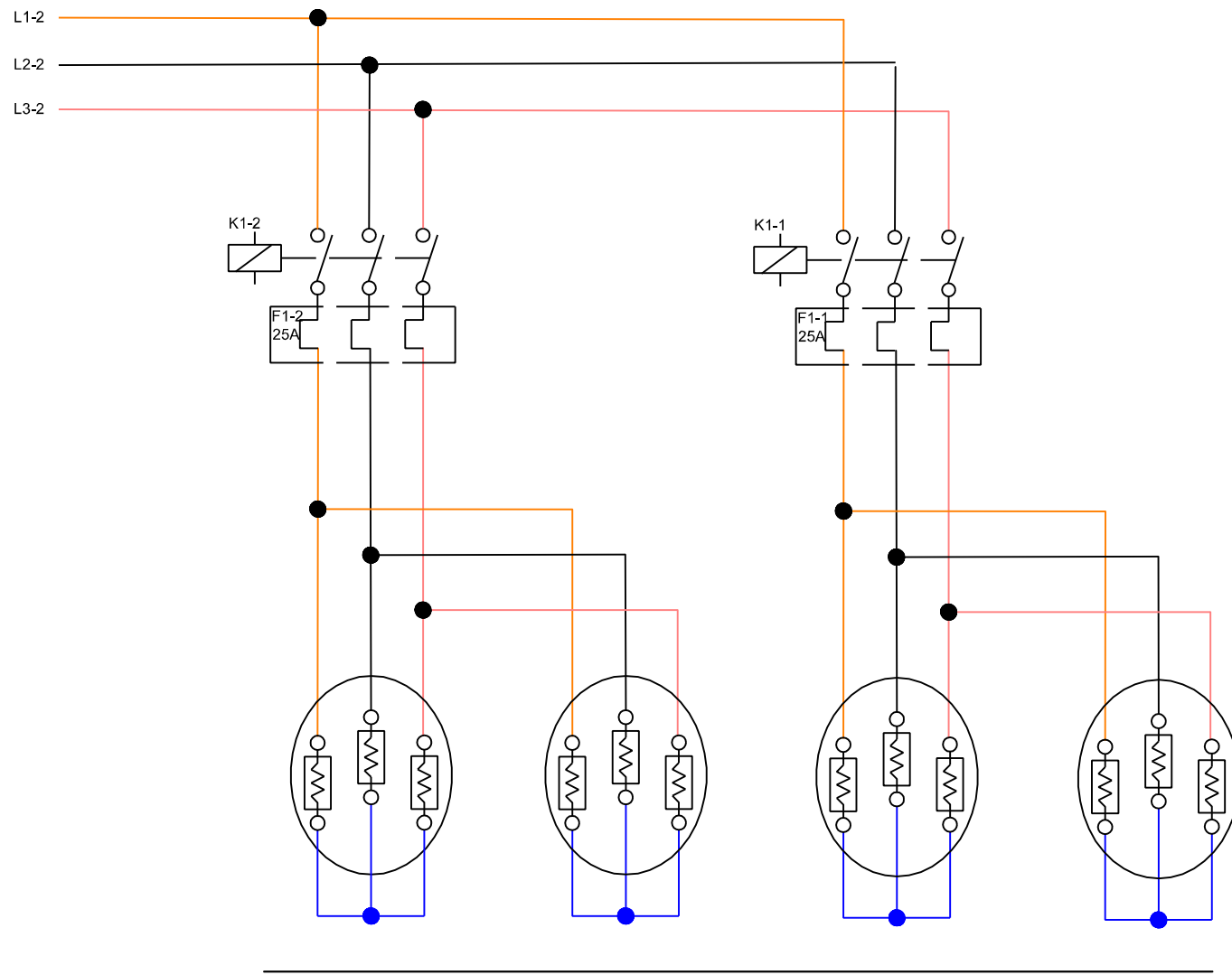
Projet : Ter 259 étage 2 & 1	Dernière modification :	Observation :		Page : 5
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ACV Manufacturing	Remplace :			de : 6




Etage 3

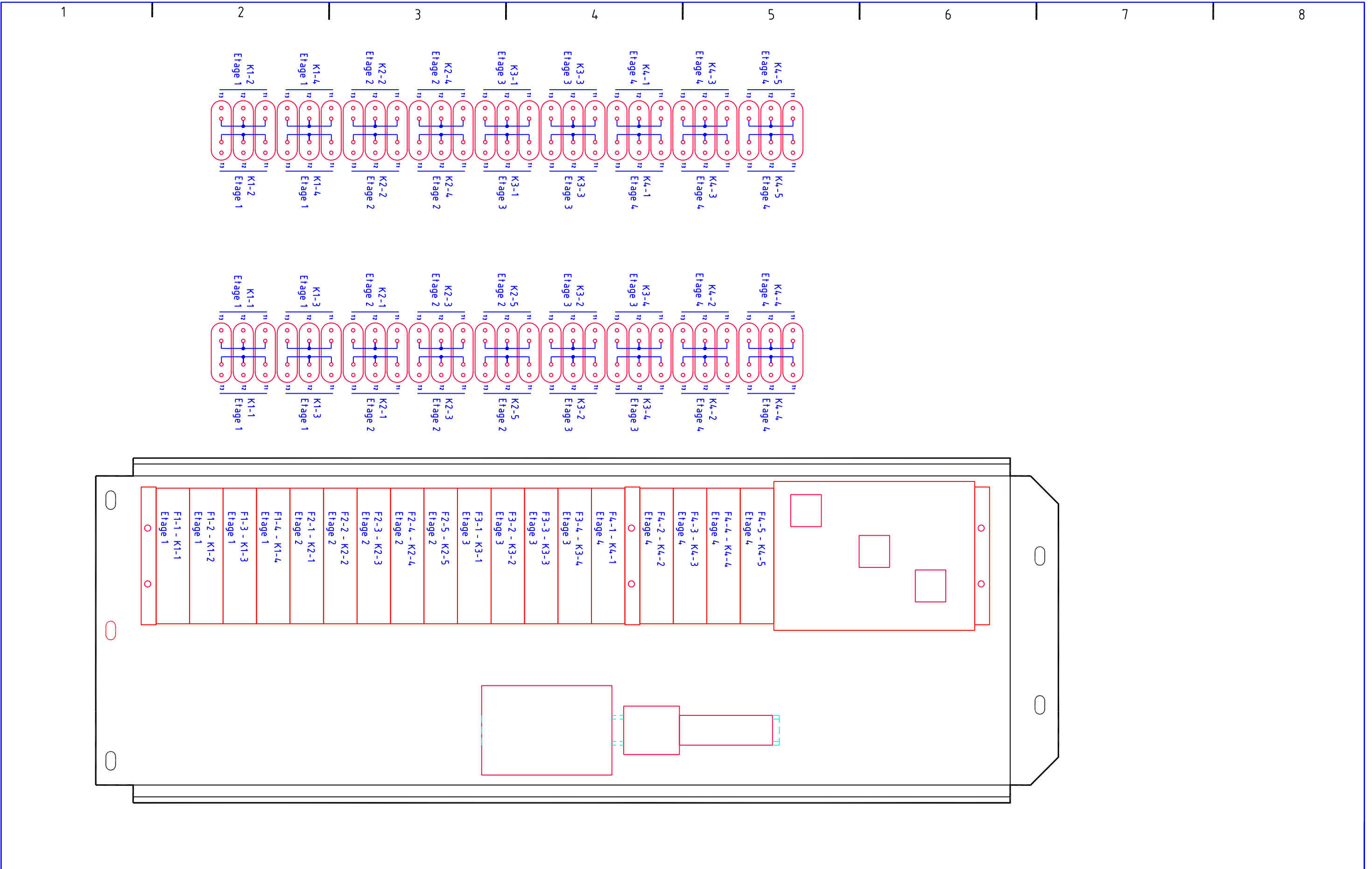
Etage 2

Projet : Ter 259 étage 3 & 2	Dernière modification :	Observation :		Page : 4
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Controlé :	PCO			
Replacé par :	Remplace :			
ACV Manufacturing				

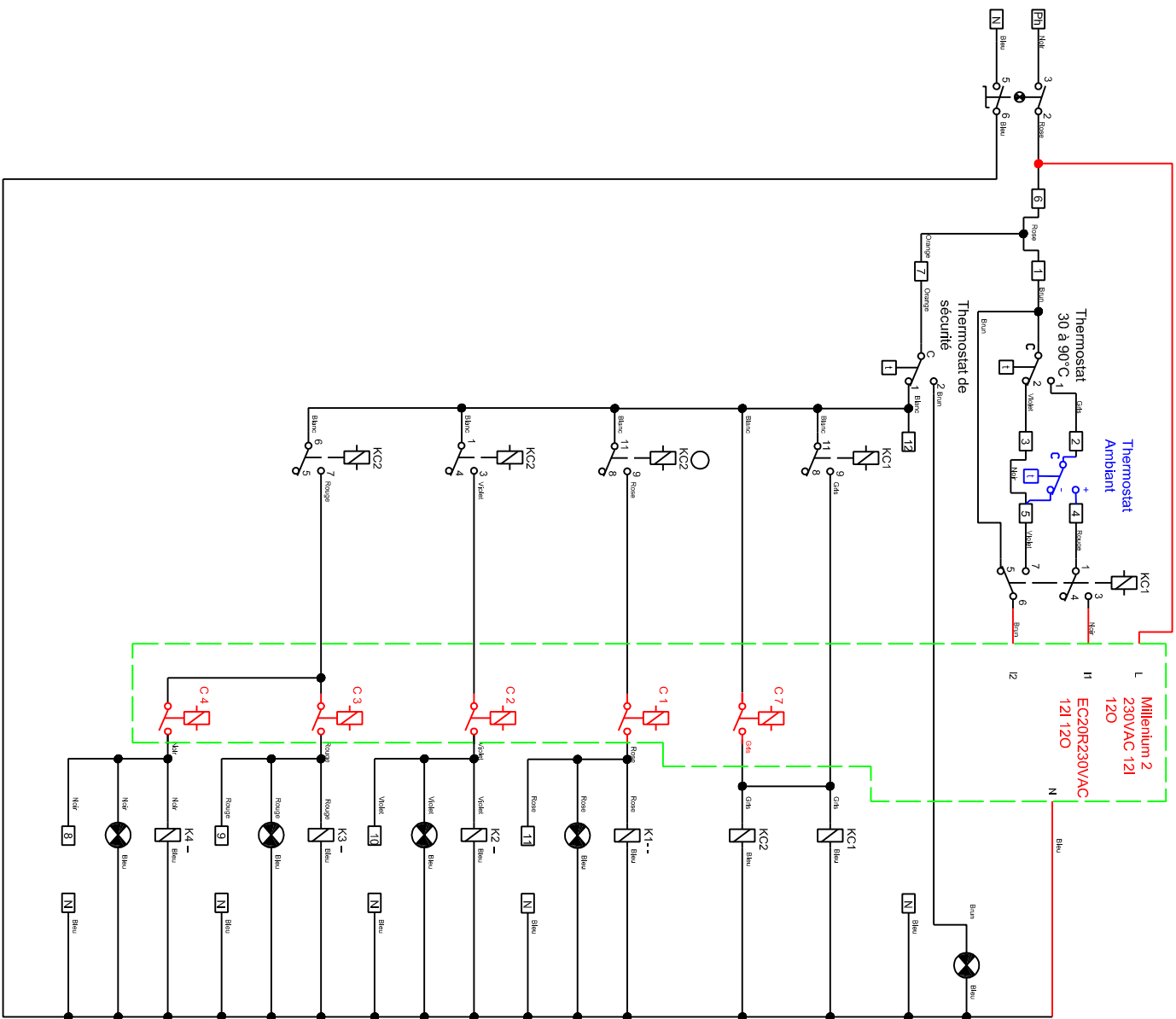


Etage 1

Projet : Ter 259 étage 1	Dernière modification : 	Observation :		Page : 6
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	Contrôlé :	PCO		
ACV Manufacturing	Remplacé par :			de : 6
	Remplace :			



Projet : Ter 259	Dernière modification :		Observation :	Page : 1
	Dessiné	25/04/2006		
	Contrôlé	--/--/200-		PCO
ACV Manufacturing	Remplacé par			de : 1
	Remplace			



Programmateur à
Cam

- <1> 0°
- <2> 45°
- <3> 5°
- <4> 10°
- <5> 20°
- <6> 30°
- <7> 40°

Projet :
TER Commande V05
257F1051 & 257F1052

ACV Manufacturing

Dernière modification : **A** 25/05/2007

Dessiné 06/10/2006

Contrôlé

Remplacé par

Remplace

LCH

LCH

Observation : Ajout thermostat ambiant

Page : 1

de : 1