 <b>YPFB</b> Corporación <small>La fuerza que transforma Bolivia</small>	<b>SPECIFICATIONS AND DRAWINGS (U30)</b>		
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## SPECIFICATIONS AND DRAWINGS (U30)

Project Title: Bolivia YPFB Ammonia/Urea Project

Project Number: SC-2566

Requisition Description: LV SWITCHGEAR & MCC

Requisition Number: 60801

Purchase Order Number: 4500148878

**FINAL**

Item Description: LV SWITCHGEAR & MCC AND PDB(UREA S/S)

Item Number: U30-LVS401,U30-402,U30-PDB501A,U30-PDB501E,U30-PDB502

- |  |   |
|--|---|
| <input type="checkbox"/> <b>APPROVED</b> | <input type="checkbox"/> <b>WITH COMMENTS</b> |
| <input type="checkbox"/> <b>REVIEWED</b> | <input type="checkbox"/> <b>RESUBMIT</b>      |

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THE PURCHASE ORDER**

	ORIGINATOR	CHECKED	APPD(PR)
SIGN			
DATE			

F	09, SEP,'15	FINAL			
REV.	DATE	DESCRIPTION	MADE BY	CHECKED BY	APPROVED BY

**LS** Industrial Systems

**LS INDUSTRIAL SYSTEMS CO., LTD.**

**DOCUMENTO REFERENCIAL:**

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**YACIMIENTOS PETROLIFEROS FISCALES BOLIVIANOS**

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## **I. TECHNICAL SPECIFICATION & DATA SHEET**

***Technical Specification & Data Sheet***  
***for***  
***Low Voltage Switchgear & MCC***  
***(U30-LVS401, U30-LVS402)***



***Technical Specification & Data Sheet***  
***for***  
***Low Voltage Switchgear***  
***(U30-LVS401, U30-LVS402)***

# C O N T E N T S

SECTION	DESCRIPTION
1.	SCOPE
2.	APPLICATION STANDARDS
3.	BASIC CONSTRUCTION
4.	DETAIL SPECIFICATION
5.	DESIGN DATA
6.	MAIN EQUIPMENT DATA

## 1. SCOPE

- 1.1 This specification describes the design, manufacture, test, delivery of 480V low voltage metal enclosed switchgear.
- 1.2 This specification covers only the general description of the switchgear.

## 2. APPLICATION STANDARDS

- 2.1 Each equipment will be designed, manufactured and tested in accordance with the requirements of the current issues of the IEC standard.

## 3. BASIC CONSTRUCTION

- 3.1 Each switchgear assembly consist of indoor, metal-enclosed , free-standing, vertical, dead-front steel structures containing power buses, an earth bus, circuit breakers, necessary auxiliary control devices, and other accessories to make a complete working unit.
- 3.2 Drawout ACB will have three distinct positions, namely, SERVICE, TEST and DRAW OUT.
- 3.3 Potential Transformers will be draw-out type.
- 3.4 A copper earth bus bar will be provided at the entire length of the assembly and afford connections in each vertical section. All non-current carrying metallic parts of the switchgears will be bonded to the earth bar. The earth bar will be located adjacent to the incoming cabling and will be fitted with terminals to facilitate bonding of the cable armoring.
- 3.5 Sheet steel barriers will be provided between the vertical sections and the control compartments and the power compartments.
- 3.6 Each switchgear assembly will be suitable for the future addition of units on each end, unless otherwise noted.
- 3.7 Coloring

Section to be colored			Color
P A N E L	Interior and exterior surface board.(including channel base)	For indoor	RAL 7035
		For outdoor	N / A
	Frames and cases of instruments, relay, and others exposed on board.		N 1.5 (Black)
	Handles of switchgear, controller, and other element.	For normal	N 1.5 (Black)
		For emergency	N / A

### 3.6 Temperature rise limit

Switchgears temperature rise will be in accordance with IEC 61439-1.

### 3.7 Wiring procedure

#### 1) Color code of wire coating and size of wire for control circuit

The color code of wire coating will be as follows except shielding wires and other special wires ;

- PT secondary circuit : 2.5 mm<sup>2</sup> Yellow
- CT secondary circuit : 4.0 mm<sup>2</sup> Red
- AC control circuit : 1.5 mm<sup>2</sup> Black
- DC control circuit : 1.5 mm<sup>2</sup> Gray
- Ground circuit : 4.0 mm<sup>2</sup> Yellow/Green

\* PT : Potential Transformer

\* CT : Current Transformer

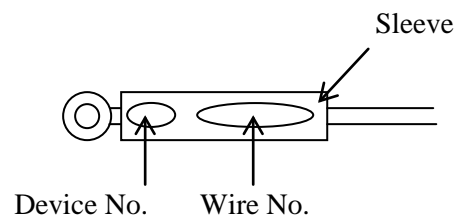
#### 2) Material

0.6/1kV AC grade Flame retardant XHHW/SIS wires of not less than 1.5 mm<sup>2</sup> will be used. sufficiently flexible wire such as stranded tinned copper wire will be used especially for jumpers across doors.

#### 3) Marking of wire numbers

Both ends of each wire used will be provided with the marking indicating wire numbers, except in the case where attachment of mark is impossible, e.g., wires jointed to connecting plugs.

(Sample)



#### 4) Terminal board

The terminal blocks will have sufficient dielectric strength and current carrying capacity.

Terminal blocks for external wire will be adequate to crimp-style round terminals.

Especially terminal blocks of the short circuiting type apply in case of CT's secondary lead wires.

5) Crimp-style terminal

Crimp-style terminals in insulating tubes or non-insulated crimp-style round terminals will be used. Crimping will be made positively with a specified crimping tool and will be checked after completion of crimping.

6) Wiring

Wiring will be a duct type or bunch wiring type. Jumpers across a board door will be protected with spiral tubes or vinyl tubes.

7) Protection of control wire

Sufficient protection will be provided to protect tire coating when the control wires are carried through a hole in a steel plate.

3.8 Structure

1)Enclosure

- a. The enclosure will be an independent vertical type for indoor use which has doors in the front and the rear.
- b. The enclosure will be made of steel plates and angles of not less than 2.3mm thickness and will be provided with sufficient solidity.
- c. The door will be made of a steel plate of not less than 2.3mm thickness and will be provided with a door handle.
- d. The cable chamber will have sufficient space for easy cable termination treatment and safety maintenance and inspection. The cable chamber will be provided with mounts or cable brackets to fix the cable ends, if necessary.
- e. A bottom plate will be provided with the detachable aluminum plates which are possible to make cable holes easily at the installation site.
- f. A protective metal partition or screen will be installed inside the door for protection against accidental touching of high voltage circuits. The protection partition or screen will not be easily removable.
- g. Thickness of the materials (Steel plates)

Front Door : 3.2mm

Rear cover : 3.2mm

Side and top Covers : 3.2mm

The others : Manufacture's standard

2) Separation

Switchgears will be with separation in accordance with IEC 61439-2, Form 3b

3) Auxiliary device

- a. Name plates will be attached on the front and the rear door and made of laminated plastic.

And white letter engraved on the black background in English (with Spanish).

Main name plate for panels will be mounted with stainless bolts at the front and rear side.

- b. Secondary circuit wiring for PT and CT.

The secondary circuit wiring for PT will not be less than 2.5 mm<sup>2</sup>

And CT will not be less than 4.0 mm<sup>2</sup> respectively.

4) Main circuit conductor

- a. The material of conductors will be applied copper which is insulated with heat shrinkable tube.

The color of the heat shrinkable tube is black.

- b. All of the conductors will be plated with silver coating.

- c. Color coding of a conductor's polarity will be made by insulation covers or stickers both ends of the conductor, the main power circuit wires and an part of buses. But in case of the control wires are not especially identified by some colors.

The color coding will be as follows;

AC 3-phase circuit

- |                |         |
|----------------|---------|
| - First phase  | : Black |
| - Second phase | : Brown |
| - Third phase  | : Gray  |
| - Neutral      | : Blue  |

AC single phase circuit

- |                 |         |
|-----------------|---------|
| - First phase   | : Black |
| - Neutral phase | : Blue  |

DC circuit

- Positive phase : Black
- Negative phase : White

- d. Supports of buses and main circuit wires will be made with epoxy molded insulators or BMC supporter.

The insulators will have sufficient strength and the intervals between the insulators will not be excessively long in order to resist short-circuit currents.

- e. The Phase sequence on the switchgear will be as follows:

- AC -

\* Three-phase circuit \*

Direction	Arrangement (Phase)
Left to Right	First → Second → Third → Neutral
Top to Bottom	First → Second → Third → Neutral
Front to Back	First → Second → Third → Neutral
Phase rotation	First → Second → Third → Neutral

\* Single-phase circuit \*

Direction	Arrangement (Phase)
Left to Right	First → Neutral → Second
Top to Bottom	First → Neutral → Second
Front to Back	First → Neutral → Second

- DC -

Direction	Arrangement (Phase)
Left to Right	Positive(P) → Negative(N)
Top to Bottom	Positive(P) → Negative(N)
Front to Back	Positive(P) → Negative(N)

## 4. DETAIL SPECIFICATION

### A. GENERAL SPECIFICATION

- |  |  |  |
|--|--|--|
| 1. Service condition   | :  | <input checked="" type="checkbox"/> Indoor                       |
| 2. The method of installation                                    | :  | <input checked="" type="checkbox"/> Self-standing                |
| 3. Degree of protection of enclosure                             | :  | <input checked="" type="checkbox"/> IP 41 / Form 3b              |
| 4. Painting color  |  |  |
| Outside  | :  | <input checked="" type="checkbox"/> RAL7035                      |
| Thickness of painting  | :  | <input checked="" type="checkbox"/> More than 60 $\mu\text{m}$   |
| 5. Panel size  | :  | <input checked="" type="checkbox"/> Refer to the outline drawing |
| 6. The thickness of steel plate                                  |  |  |
| Front door   | :  | 3.2mm  |
| Rear cover   | :  | 3.2mm  |
| Side cover   | :  | 2.3mm  |
| Top cover  | :  | 2.3mm  |
| Bottom plate   | :  | 1.6mm  |
| Channel base   | :  | 100×50 – 5mm   |
| 7. Extension of cubicle  |  |  |
| 7-1) How to align the SWGR with the existing panels if necessary |  |  |
| <input type="checkbox"/> Yes                                     | <input checked="" type="checkbox"/> Not Applicable |  |
| <input type="checkbox"/> Right side                              | <input type="checkbox"/> Left side                 |  |
| 7-2) Future extension  |  |  |
| <input type="checkbox"/> Yes                                     | <input checked="" type="checkbox"/> No             |  |
| <input type="checkbox"/> Right side                              | <input type="checkbox"/> Left side                 |  |
| <input type="checkbox"/> Right and left side                     |  |  |
| 8. Door  |  |  |
| <input checked="" type="checkbox"/> Front & Rear                 | <input type="checkbox"/>                           |  |
| 9. Door handle   |  |  |
| <input checked="" type="checkbox"/> Handle with key              | <input type="checkbox"/> Handle without key        | <input checked="" type="checkbox"/> Master Key                   |
| 10. The wiring of control cable wires using wire ducts           |  |  |
| 11. Wiring mark ( Hot mark )                                     |  |  |
| <input checked="" type="checkbox"/> Yes                          | <input type="checkbox"/> No                        |  |
| <input type="checkbox"/> To use outside control cable            |  |  |
| <input checked="" type="checkbox"/> All parts                    |  |  |
| 12. Cable entrance hole cover                                    |  |  |
| <input checked="" type="checkbox"/> Aluminum 5.0t                |  |  |



## B. DETAIL SPECIFICATION

1. Input Power : SWGR AC480V, 3 Phase, 4 Wires, 50Hz
2. Interrupting Capacity : SWGR 50kA / 1sec
3. Control Power
  - 3-1) ☒ AC 220V 50Hz (For FL & Heater)  
☒ DC 110V
  - 3-2) The supply of control voltage  
☒ User supply
4. Bus
  - 4-1) Material  
☒ Silver contacted copper
  - 4-2) Bus bar treatment  
☒ Heat shrinkable tube  
☒ Boots for joints
  - 4-3) Color indication of bus  
☒ Color label (Sticker)  

First Phase	: Black	Second Phase	: Brown
Third Phase	: Grey	Neutral	: Blue
  - 4-4) The capacity of bus
    - 1> Horizontal bus : refer to attached sheet & drawings.
    - 2> Vertical bus : refer to attached sheet & drawings.
    - 3> Ground bus : 6mm × 50mm
5. Power incoming and outgoing
  - 5-1) Incoming

<input checked="" type="checkbox"/> Cable	<input type="checkbox"/> Bus bar
<input type="checkbox"/> Top	<input checked="" type="checkbox"/> Bottom
  - 5-2) Outgoing

<input checked="" type="checkbox"/> Cable	<input type="checkbox"/> Bus bar
<input type="checkbox"/> Top	<input checked="" type="checkbox"/> Bottom
6. The cable of power circuit
  - 6-1) XHHW/SIS (0.6/1kV) / Color – Black
7. The cable of control circuit
  - 7-1) The type of cable  
☒ XHHW/SIS 0.6/1kV

7-2) The color and size of cable

- 1> AC control circuit : Black ( 1.5 mm<sup>2</sup>)
- 2> DC control circuit : Gray (1.5 mm<sup>2</sup>)
- 3> PT secondary circuit : Yellow (2.5 mm<sup>2</sup>)
- 4> CT secondary circuit : Red (4.0 mm<sup>2</sup>)
- 5> Earthed cable : Yellow/Green (4.0 mm<sup>2</sup>)

7-3) The method of external control cable

- 1> Incoming
  - Bottom
- 2> Location of entrance
  - Right & Left of front

7-4) External terminal block

- 1>Location
  - Lower of front
- 2> Type
  - Bolt on type                      ■ AC 600V 15A
  - More than 20% spare
- 3> Method of wiring
  - PVC duct                              ■ Bunch cable wiring if necessary

8. Others

8-1) Space heater

- Supply AC220V, 80W with hygro-stat control

8-2) Panel lighting system

- 1> Supply AC220V 10W
- 2> ☐ IL                              ■ FL
- 3> ■ Interlock with the door

8-3) Name plate

- 1> Material : ■ Stainless Steel & Laminated Plastic
- 2> Color
  - Character : ■ Black                      ☐ White
  - Main board : ☐ Black                      ■ White
- 3> Size : ■ LSIS standard
- 4> Language : ■ English (with Spanish)
- 5> Fixed by : ■ Stainless bolt (Only name plate for main door)

## 5. DESIGN DATA

### A. STANDARDS

The equipment will be rated in accordance with follows.

- |                           |             |
|---------------------------|-------------|
| 1. Low Voltage Switchgear | IEC 60439-1 |
| 2. Circuit breakers       | IEC 60947-2 |
| 3. Current transformer    | IEC 60044-1 |
| 4. Potential transformer  | IEC 60044-2 |
| 5. Others                 | IEC         |

### B. SERVICE CONDITION

- |   |                              |
|---|------------------------------|
| 1. Ambient temperature  | : Max.40°C, Min.7°C.         |
| (In case of Indoor, The standard temperature of the equipments is max. .40°C) |                              |
| 2. Humidity   | : 60% to 95%                 |
| 3. Altitude   | : From sea level up to 1000m |
| 4. Service location   | : Indoor                     |
| 5. Protection degree of enclosure   | : IP41                       |

### C. RATING & CHARACTERISTICS

- |  |              |
|--|--------------|
| 1. Rated voltage                       | : 600V       |
| 2. Nominal system voltage              | : 480V       |
| 3. System                              | : 3P 4W      |
| 4. Rated frequency                     | : 50Hz       |
| 5. Rated main bus current              | : 2500A      |
| 6. Short time withstand current        | : 50kA/1sec. |
| 7. Control voltage for Circuit breaker |              |
| - Close                                | : 110V DC    |
| - Trip                                 | : 110V DC    |
| 8. Indicating lamp supply voltage      | : 110V DC    |
| 9. Heater supply voltage               | : 220V AC    |

## 6. MAIN EQUIPMENT DATA

### A. ACB

#### AH-25E3-00 / AH-25E4-00

1-1)	Rated Current	: 2500A
1-2)	Rated Operating Voltage	: 690V
1-3)	Rated insulation Voltage	: 1000V
1-4)	Frequency	: 50Hz
1-5)	Number of poles	: 3Pole / 4 Pole
1-6)	Setting Current (In)	: $I_u = I_n \times 0.4 \sim 1.0$
1-7)	Rated breaking capacity (ICU)(Sys) at IEC 60947-2 AC 500V	: 85kA
1-8)	Rated service breaking capacity (ICS)	: 85kA
1-9)	Rated making capacity (Icm)(Peak) at IEC 60947-2 AC 500V	: 187kA
1-10)	Rated Short-time capacity (ICW)	
-	1sec	: Above 85kA at 1 sec
1-11)	Operating Time	
-	Maximum total breaking time	: Less than 40ms
-	Closing Time	: Less than 80ms
1-12)	Life Cycle	
-	Mechanical	
<input type="checkbox"/>	Without maintenance	: Above 15,000(times)
<input type="checkbox"/>	With maintenance	: Above 20,000(times)
-	Electrical	
<input type="checkbox"/>	Without maintenance	: 5,000(times)
<input type="checkbox"/>	With maintenance	: 10,000(times)
1-13)	Weight	
-	Main body/with cradle	: 87/103 kg
1-14)	Manufacturer	: LSIS

### B. Voltage Transformer

#### DGP Series

1-1)	Maximum voltage system	: 1150V
1-2)	Rated frequency	: 50Hz
1-3)	Accuracy class	: 1.0CL/3P
1-4)	Rated primary voltage(1'ry)	: $480/\sqrt{3}$ V
1-5)	Rated secondary voltage(2'ry)	: $110/\sqrt{3}$ V
1-6)	Rated burden(VA) 2'ry	: 50/50VA
1-7)	Weight	: 3kg
1-8)	Manufacturer	: Deesys

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## C. Current Transformer

### 1) DS Series

1-1)	Single ratio window type CT	
1-2)	Maximum voltage system	:1150V
1-3)	Over current strength	: 50kA/1sec
1-4)	Frequency	: 50Hz
1-5)	Primary current	: Refer to Single line
1-6)	Rated secondary current	: 1A
1-7)	Accuracy class(For meter / For relay)	: 1.0CL / 5P20
1-8)	Burden	: 15VA / 5VA
1-9)	Weight	: 2.7kg
1-10)	Manufacturer	: Deesys

## D. Protective Relay

### 1) OCR, UVR

1) Type	: REF620, REU610,
2) Rated input	: AC 100....240V/1A, 50/60HZ
3) Communications	: IEC61850
4) Maker	: ABB

## E. meter

### 1) Voltage/Ampere Meter

1-1)	Size	: 110 x 110(mm)
1-2)	Angle of Deflection	: 250degree
1-2)	Maker	: Deesys
1-3)	Maker type	:W11 Series (Analogue)

## F. Aux. relay

### 1) MR type

1-1)	Contacts available	: Refer to schematic drawings
1-2)	Rated insulation voltage (Ui)	: 690V
1-3)	Thermal current (Ith)	: 16A
1-4)	Life time (10,000times)	
	1> Electrical	: 25
	2> Mechanical	: 1,000
1-5)	Operating cycle (Time/hour)	: 1,800
1-6)	Ratings of the AC coil	: 110V DC
1-7)	Manufacturer	: LSIS

*Technical Specification & Data Sheet*  
*for*  
*Low Voltage MCC*

# C O N T E N T S

SECTION	DESCRIPTION
1.	SCOPE
2.	APPLICATION STANDARDS
3.	BASIC CONSTRUCTION
4.	DETAIL SPECIFICATION
5.	DESIGN DATA
6.	MAIN EQUIPMENT DATA

## **1. SCOPE**

- 1.1 This specification describes the design, manufacture, test, delivery of 480V Motor Control Center.
- 1.2 This specification covers only the general description of the Motor Control Center.

## **2. APPLICATION STANDARDS**

- 2.1 Each equipment will be designed, manufactured and tested in accordance with the requirements of the current issues of the IEC standard.

## **3. BASIC CONSTRUCTION**

The motor control centers will be of the modular with modular withdrawable / bolted-on type unit.

- 3.1 Main horizontal power bus will be rated for the full load current of the motor control center over their full length. Vertical power bus in each cubicle of the motor control centers will be rated for the sum of the full load currents of all tiers in the cubicle.
- 3.2 Main horizontal power bus will be completely isolated.
- 3.3 Safety mounting and dismounting of the withdrawable motor starter units will be possible while the remaining unit of MCC is in service.
- 3.4 Drawout modules will have three positions, namely, SERVICE, TEST, and DRAWOUT. In the TEST position, the power circuits will be disengaged but the control circuits will be engaged.
- 3.5 Protection degree will be IP41 when the drawout module in service position. The door of MCC is adhered to drawout module.[refer to the 'solution 2000' catalog]
- 3.6 Circuit breaker(MCCB) operating handles indicate "on" "trip" "off" position with the door closed and have provision for padlocking with at least one padlock in the "off" position, with the door closed.
- 3.7 The vertical sections will be a minimum of 1000mm width and 1000mm depth, not more than 2350mm height (excluding mounting channel), and designed to prevent build-up of heat in the upper spaces.
- 3.8 The motor control centers will be suitable for back to back mounting.
- 3.9 Each starter or feeder controller unit door will be mechanically interlocked with the circuit breaker so that the door cannot be opened unintentionally when the breaker is in the "on" position.
- 3.10 All power cabling terminals will be shrouded by insulated coverings. The power cabling and control



cabling are placed on the side of each unit. (with cable support frame)

3.11 Internal wiring will be neatly run and adequately supported either saddle or strapped to supporting steelwork or carried in plastic trucking.

3.12 A bottom plate will be provided with the detachable aluminum plates which are possible to make cable holes easily at the installation site.

3.13 A copper ground bus will be provided at the entire length of each motor control center, and all non-current carrying metallic part of the motor control center will be bonded to this ground bus. It will be equipped with a solder less connector for the applicable cable or bus tap at each end. The size of ground bus will be 6mm or greater thickness and 50mm or greater width.

3.14 Coloring

Section to be colored		Color
PANEL	Interior and exterior surface of board(including channel base)	RAL 7035
	Relay & meter frame	N 1.5
	Switch, handle	N 1.5

3.15 Control wiring procedure

1) Color code of wire coating and size of wire

The color code of wire coating will be as follows except shielding wires and other special wires ;

- AC control circuit : Black (1.5 mm<sup>2</sup>)
- Ground circuit : Yellow/Green ( 2.5 mm<sup>2</sup>)

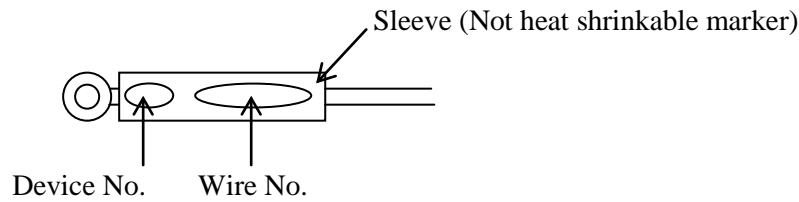
2) Material

AC0.6/1kV Flame retardant XHHW/SIS wires of not less than 1.5 mm<sup>2</sup> will be used. sufficiently flexible wire such as stranded tinned copper wire will be used especially for jumpers across doors.

3) Marking of wire numbers

Both ends of each wire used will be provided with the marking indicating wire numbers, except in the case where attachment of mark is impossible, e.g., wires jointed to connecting plugs.

(Sample)



4) Terminal board

The terminal blocks will have sufficient dielectric strength and current carrying capacity.

Terminal blocks for external wire will be adequate to crimp-style round terminals.

5) Crimp-style terminal

Crimp-style terminals in insulating tubes or non-insulated crimp-style round terminals will be used. For crimp-style round terminals, the crimped section will be covered with a vinyl cap to shield conductors. Crimping will be made positively with a specified crimping tool and will be checked after completion of crimping.

### 3.16 Structure

1) Form of separation will be Form 3b in accordance with IEC 60439-2

2) Thickness of the materials (Steel plates)

Frame	: 2.3mm
Door & Cover	: 2.3mm
The others	: Manufacture's standard

3) Main circuit conductor

- a. The material of conductors will be copper which is insulated with heat shrinkable tube only horizontal bus, vertical bus and all connected parts are bare.

The color of the heat shrinkable tube is black except all connected parts

- b. All of the conductors will be plated with silver coating.
- c. Color coding of a conductor's polarity will be made by insulation covers or stickers both ends of the conductor, the main power circuit wires and an part of buses. But in case of the control

wires are not especially identified by some colors.

The color coding will be as follows;

AC 3-phase circuit

- First phase : Black
- Second phase : Brown
- Third phase : Gray
- Neutral : Blue
- Earth : Green/Yellow

AC single phase circuit

- First phase : Black
- Neutral phase : Blue

- . Supports of buses and main circuit wires will be made with epoxy molded insulators.

The insulators will have sufficient strength and the intervals between the insulators will not be excessively long in order to resist short-circuit currents.

- e. The phase sequence on the switchgear will be as follows:

- AC -

\* Three-phase circuit \*

Direction	Arrangement (Phase)
Left to Right	First → Second → Third → Neutral
Top to Bottom	First → Second → Third → Neutral
Front to Back	First → Second → Third → Neutral
Phase rotation	First → Second → Third → Neutral

\* Single-phase circuit \*

Direction	Arrangement (Phase)
Left to Right	First → Neutral → Second
Top to Bottom	First → Neutral → Second
Front to Back	First → Neutral → Second

### 3.17 Withdrawable Motor Control units

Each motor control unit will have the equipment such as MCCB, magnetic contactor, thermal over load relay, push-button switches, indicating lamps, auxiliary relays and others according to Single Line Diagrams.

### 3.18 Control power source

Control voltage is AC120V. The control power will be supplied by self-contained control TR and Control power busbar will be installed in each vertical sections.

### 3.19 Magnetic motor starters

- 1) The life time of the magnetic contactors will be more than one million times in AC-3 duty of IEC 60947-4. The magnetic contactors will have sufficient number of auxiliary contacts.
- 2) The internal wiring of the magnetic motor starter will be suitable for the maximum motor rating of the magnetic contactors.
- 3) The setting range of motor protection relays will be selected so that the rated current of motor is about in the middle of it.

### 3.20 Circuit Breakers

- 1) Circuit breakers will be Molded case type, 3-pole and will be more than 50kA/1sec at rated AC 480 volts.
- 2) Circuit breakers will be trip free of the handles and cannot be closed under short circuit or over current conditions.
- 3) Feeders shall be with inverse time. Thermal and magnetic element overload protection and trip-free mechanism.

3.21 Name plates will be attached on the front and the rear door and made of stainless steel & laminated plastic. And white letter engraved on the black background in English. Main name plate for panels will be mounted with stainless bolts at the front and rear side.

## 4.DETAIL SPECIFICATION

### A. GENERAL SPECIFICATION

- |                               |   |  |
|-------------------------------|---|--|
| 1. Service condition          | : | <input checked="" type="checkbox"/> Indoor                       |
| 2. The method of installation | : | <input checked="" type="checkbox"/> Self-standing                |
| 3. Degree of protection       | : | <input checked="" type="checkbox"/> IP 41 / Form 3b              |
| 4. Cabinet                    | : | <input checked="" type="checkbox"/> Back to Back type            |
| 5. Painting color             |   |  |
| Outside                       | : | <input checked="" type="checkbox"/> RAL7035                      |
| Thickness of painting         | : | <input checked="" type="checkbox"/> More than 60 $\mu\text{m}$   |
| 6. Panel size                 | : | <input checked="" type="checkbox"/> Refer to the outline drawing |
| 7. Unit construction          |   |  |
| Line                          | : | <input checked="" type="checkbox"/> Drawout                      |
| Load                          | : | <input checked="" type="checkbox"/> Drawout                      |
| Control                       | : | <input checked="" type="checkbox"/> Drawout                      |

\* Above 110kW Moldules & TR Modules : Bolted-on type

\*Power and control terminal board will be located in each unit side

- |   |   |  |
|---|---|--|
| 8. The thickness of steel plate                                     |   |  |
| Front plate   | : | 2.3mm  |
| Rear cover  | : | 2.3mm  |
| Side cover  | : | 2.3mm  |
| Top cover   | : | 2.3mm  |
| Bottom plate  | : | 2.3mm  |
| Channel base  | : | 3.2mm  |
| 9. Extension of cubicle   |   |  |
| 10-1) How to align the SWGR with the existing panels (If necessary) |   |  |
| <input type="checkbox"/> Yes  |   | <input checked="" type="checkbox"/> Not Applicable |
| <input type="checkbox"/> Right side                                 |   | <input type="checkbox"/> Left side                 |
| 10-2) Future extension  |   |  |
| <input checked="" type="checkbox"/> Yes                             |   | <input type="checkbox"/> No                        |
| <input type="checkbox"/> Right side                                 |   | <input type="checkbox"/> Left side                 |
| <input checked="" type="checkbox"/> Right and left side             |   |  |
| 10. Door  |   |  |
| <input type="checkbox"/> Side door                                  |   | <input checked="" type="checkbox"/> Unit door      |
| 11. The wiring of control cable wires using a duct (If necessary)   |   |  |

12. Wiring mark ( Hot mark )

- ☒ Yes ☐ No  
☐ To use outside control cable  
☒ All parts

13. Cable entrance hole cover

- ☒ Aluminum 5.0t

**B. DETAIL SPECIFICATION**

1. Input Power : AC480V, 3 Phase, 4Wires, 50Hz

2. Interrupting Capacity : 50kA/1 sec

3. Control Power

- 3-1) ☒ AC120V, 50HZ  
☐ DC 220V

3-2) The supply of control voltage

- ☒ SELF-CONTAINED CONTROL TR : OPTR 480/120V

4. Bus

4-1) Material

- ☒ Silver contacted copper

4-2) Busbar treatment

1>Horizontal bus

- ☒ Heat shrinkable tube  
☒ Bare (connected parts – operator inaccessible parts)

2> Vertical bus - Unit connection parts

- ☒ Bare

4-3) Color indication of bus

- ☒ Color label

First Phase	: Black	Second Phase	: Brown
Third Phase	: Grey	Neutral	: Blue

4-4) The capacity of bus

- |                 |                         |
|-----------------|-------------------------|
| 1> Horizon bus  | : Refer to the drawings |
| 2> Vertical bus | : Refer to the drawings |
| 3> Ground bus   | : 6mm ×50mm             |

5. Power incoming and outgoing

5-1) Incoming

- |  |                                 |
|--|---------------------------------|
| <input checked="" type="checkbox"/> Busbar | <input type="checkbox"/> Cable  |
| <input checked="" type="checkbox"/> Side   | <input type="checkbox"/> Bottom |

5-2) Outgoing

☐ Busbar

☒ Cable

☐ Side

☒ Bottom

6. The cable of control circuit

6-1) The type of cable

☒ XHHW/SIS (0.6/1kV)

6-2) The color and size of cable

1> AC control circuit : Black ( 1.5 mm<sup>2</sup>)

2> CT secondary : Red (4.0 mm<sup>2</sup>)

[For external Ampere meter CT source is 1.5 mm<sup>2</sup>]

3> Earthed cable : Yellow/Green (1.5 mm<sup>2</sup>)

7.Others

7-1) Name plate

1> Material : ☒ Stainless steel & Laminated plastic

2> Color

Character : ☒ Black ☐ White

Main board : ☐ Black ☒ White

3> Size : ☒ LSIS standard

4> Language : ☒ English (with Spanish)

5> Fixed by : ☒ Stainless bolt (only name plate for main door)

## 5. DESIGN DATA

### A. STANDARDS

The equipment will be rated in accordance with follows.

- |                                       |             |
|---------------------------------------|-------------|
| 1. Motor control center               | IEC 60439-1 |
| 2. Circuit breakers                   | IEC 60947-2 |
| 3. Magnetic starter                   | IEC 60947-4 |
| 4. Current transformer                | IEC 60044-1 |
| 5. Potential transformer              | IEC 60044-2 |
| 6. Others including relays and meters | IEC         |

### B. SERVICE CONDITION

- |                                   |                              |
|-----------------------------------|------------------------------|
| 1. Ambient temperature            | : Max.40 °C, Min.7 °C        |
| 2. Humidity                       | : 60% to 95%                 |
| 3. Altitude                       | : From sea level up to 1000m |
| 4. Service location               | : Indoor                     |
| 5. Protection degree of enclosure | : IP41 / Form 3b             |

### C. RATING & CHARACTERISTICS

- |                                       |               |
|---------------------------------------|---------------|
| 1. Rated voltage                      | : 600V        |
| 2. Nominal system voltage             | : 480V        |
| 3. System                             | : 3P,4W       |
| 4. Rated frequency                    | : 50Hz        |
| 5. Rated current (horizontal bus)     | : 2500A       |
| 6. Rated current (vertical bus)       | : 1000A       |
| 7. Rated short-time withstand current | : 50kA (1sec) |
| 8. Control voltage                    | : AC120V      |



## 6. MAIN EQUIPMENT DATA

### A. MCCB

#### 1) TD100HFMU / TS100HFMU / TS250HFMU

1-1)	Frame size (AF)	: 100AF, 250AF
1-2)	Number of poles	: 3poles or 4pole
1-3)	Rated operational voltage, Ue(50/60Hz)	: 690V
1-4)	Rated operational voltage, Ue(DC)	: 500V
1-5)	Rated insulation voltage, Ui(50/60Hz)	: 750V
1-6)	Rated impulse withstand voltage, Uimp	: 8kV
1-7)	Ultimate breaking capacity (kA), Icu	: 50kA
1-8)	Endurance	
A.	Mechanical	: 25,000(times)
B)	Electrical	: 10,000(times)
1-9)	Manufacturer	: LSIS

#### 2) TS400HFMU

1-1)	Frame size (AF)	: 400AF
1-2)	Number of poles	: 3 poles or 4pole
1-3)	Rated operational voltage, Ue(50/60Hz)	: 690V
1-4)	Rated operational voltage, Ue(DC)	: 500V
1-5)	Rated insulation voltage, Ui(50/60Hz)	: 750V
1-6)	Rated impulse withstand voltage, Uimp	: 8kV
1-7)	Ultimate breaking capacity (kA), Icu	: 65kA
1-8)	Endurance	
A.	Mechanical	: 20,000(times)
B.	Electrical	: 6,000(times)
1-9)	Manufacturer	: LSIS

### B. Magnetic Contactors

#### MC type

1-1)	Rated operational voltage, Ue(50/60Hz)	:690V
1-2)	Aux. Contact (standard)	: 2NO 2NC
1-3)	Rating of the coil	: 120VAC
1-4)	Panel installation	: Rail & Screw
1-5)	Manufacturer	:LSIS

## C. Electronic Overload Relays

### 1) iFMZ

- |      |                |                         |
|------|----------------|-------------------------|
| 1-1) | Control source | :100~240VAC/DC 50/60Hz  |
| 1-2) | Manufacturer   | :Schneider(Samwha EOCR) |

## D. Contactor Relays

### MR-4

- |      |                               |                     |
|------|-------------------------------|---------------------|
| 1-1) | Contacts available            | : refer to drawings |
| 1-2) | Rated insulation voltage (Ui) | : 690V              |
| 1-3) | Thermal current (Ith)         | : 16A               |
| 1-4) | Life time (10,000times)       |                     |
|      | 1> Electrical                 | : 25                |
|      | 2> Mechanical                 | : 1,000             |
| 1-5) | Operating cycle (Time/hour)   | : 1,800             |
| 1-6) | Poles                         | : 4                 |
| 1-7) | Ratings of the coil           | : 120V AC           |
| 1-8) | Manufacturer                  | :LSIS               |

## E. Electronic Ground Fault Relay

### EGR -20RZ7M

- |      |                              |                         |
|------|------------------------------|-------------------------|
| 1-1) | Ground fault current setting | :200 – 2500mA           |
| 1-2) | Trip time setting            | :0.2 – 2.0 sec          |
| 1-3) | Power supply                 | :110/220VAC, 50/60Hz    |
| 1-4) | Manufacturer                 | :Schneider(Samwha EOCR) |

***Technical Specification & Data Sheet***  
***for***  
***Power Distribution Boards***  
***(U30-PDB501, U30-PDB502)***

# C O N T E N T S

SECTION	DESCRIPTION
1.	SCOPE
2.	APPLICATION STANDARDS
3.	BASIC CONSTRUCTION
4.	DETAIL SPECIFICATION
5.	DESIGN DATA
6.	MAIN EQUIPMENT DATA

## 1. SCOPE

- 1.1 This specification describes the design, manufacture, test, delivery of power distribution board.

## 2. APPLICATION STANDARDS

- 2.1 Each equipment will be designed, manufactured and tested in accordance with the requirements of the current issues of the IEC standard.

## 3. BASIC CONSTRUCTION

- 3.1 LV power distribution board shall be free standing, metal enclosed type.
- 3.2 Potential Transformers will be fixed type.
- 3.3 A copper earth bus bar will be provided at the entire length of the assembly and afford connections in each vertical section. All non-current carrying metallic parts of the switchgears will be bonded to the earth bar. The earth bar will be located adjacent to the incoming cabling and will be fitted with terminals to facilitate bonding of the cable armoring.
- 3.4 Coloring

Section to be colored			Color
P A N E L	Interior and exterior surface board.(including channel base)	For indoor	RAL 7035
		For outdoor	N / A
	Frames and cases of instruments, relay, and others exposed on board.		N 1.5 (Black)
	Handles of switchgear, controller, and other element.	For normal	N 1.5 (Black)
		For emergency	N / A

### 3.5 Temperature rise limit

Switchgears temperature rise will be in accordance with IEC 61439-1.

### 3.6 Wiring procedure

#### 1) Color code of wire coating and size of wire for control circuit

The color code of wire coating will be as follows except shielding wires and other special wires ;

- PT secondary circuit : 2.5 mm<sup>2</sup> Yellow
- CT secondary circuit : 4.0 mm<sup>2</sup> Red
- AC control circuit : 1.5 mm<sup>2</sup> Black
- DC control circuit : 1.5 mm<sup>2</sup> Gray

- Ground circuit : 4.0 mm<sup>2</sup> Yellow/Green

\* PT : Potential Transformer

\* CT : Current Transformer

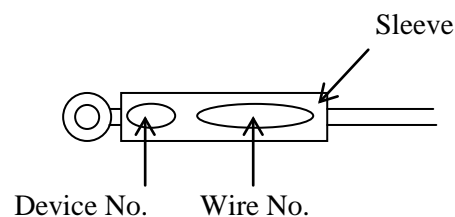
## 2) Material

0.6/1kV AC grade Flame retardant XHHW/SIS wires of not less than 1.5 mm<sup>2</sup> will be used. sufficiently flexible wire such as stranded tinned copper wire will be used especially for jumpers across doors.

## 3) Marking of wire numbers

Both ends of each wire used will be provided with the marking indicating wire numbers, except in the case where attachment of mark is impossible, e.g., wires jointed to connecting plugs.

(Sample)



## 4) Terminal board

The terminal blocks will have sufficient dielectric strength and current carrying capacity.

Terminal blocks for external wire will be adequate to crimp-style round terminals.

Especially terminal blocks of the short circuiting type apply in case of CT's secondary lead wires.

## 5) Crimp-style terminal

Crimp-style terminals in insulating tubes or non-insulated crimp-style round terminals will be used. Crimping will be made positively with a specified crimping tool and will be checked after completion of crimping.

## 6) Wiring

Wiring will be a duct type or bunch wiring type. Jumpers across a board door will be protected

with spiral tubes or vinyl tubes.

7) Protection of control wire

Sufficient protection will be provided to protect tire coating when the control wires are carried through a hole in a steel plate.

3.7 Structure

1) Enclosure

- a. The enclosure will be an independent vertical type for indoor use which has doors in the front and the rear.
- b. The enclosure will be made of steel plates and angles of not less than 2.3mm thickness and will be provided with sufficient solidity.
- c. The door will be made of a steel plate of not less than 2.3mm thickness and will be provided with a door handle.
- d. The cable chamber will have sufficient space for easy cable termination treatment and safety maintenance and inspection. The cable chamber will be provided with mounts or cable brackets to fix the cable ends, if necessary.
- e. A bottom plate will be provided with the detachable aluminum plates which are possible to make cable holes easily at the installation site.
- f. A protective metal partition or screen will be installed inside the door for protection against accidental touching of high voltage circuits. The protection partition or screen will not be easily removable.
- g. Thickness of the materials (Steel plates)

Front Door	: 3.2mm
Rear cover	: 3.2mm
Side and top Covers	: 3.2mm
The others	: Manufacture's standard

2) Auxiliary device

- a. Name plates will be attached on the front and the rear door and made of laminated plastic.  
And white letter engraved on the black background in English (with Spanish).  
Main name plate for panels will be mounted with stainless bolts at the front and rear side.
- b. Secondary circuit wiring for PT and CT.

The secondary circuit wiring for PT will not be less than 2.5 mm<sup>2</sup>

And CT will not be less than 4.0 mm<sup>2</sup> respectively.

3) Main circuit conductor

- a. The material of conductors will be applied copper which is insulated with heat shrinkable tube.  
The color of the heat shrinkable tube is black.
- b. All of the conductors will be plated with silver coating.
- c. Color coding of a conductor's polarity will be made by insulation covers or stickers both ends of the conductor, the main power circuit wires and an part of buses. But in case of the control wires are not especially identified by some colors.

The color coding will be as follows;

AC 3-phase circuit

- |                |         |
|----------------|---------|
| - First phase  | : Black |
| - Second phase | : Brown |
| - Third phase  | : Gray  |
| - Neutral      | : Blue  |

AC single phase circuit

- |                 |         |
|-----------------|---------|
| - First phase   | : Black |
| - Neutral phase | : Blue  |

DC circuit

- |                  |         |
|------------------|---------|
| - Positive phase | : Black |
| - Negative phase | : White |

- d. Supports of buses and main circuit wires will be made with epoxy molded insulators or BMC supporter.

The insulators will have sufficient strength and the intervals between the insulators will not be excessively long in order to resist short-circuit currents.

- e. The Phase sequence on the switchgear will be as follows:



- AC -

\* Three-phase circuit \*

Direction	Arrangement (Phase)
Left to Right	First → Second → Third → Neutral
Top to Bottom	First → Second → Third → Neutral
Front to Back	First → Second → Third → Neutral
Phase rotation	First → Second → Third → Neutral

\* Single-phase circuit \*

Direction	Arrangement (Phase)
Left to Right	First → Neutral → Second
Top to Bottom	First → Neutral → Second
Front to Back	First → Neutral → Second

- DC -

Direction	Arrangement (Phase)
Left to Right	Positive(P) → Negative(N)
Top to Bottom	Positive(P) → Negative(N)
Front to Back	Positive(P) → Negative(N)

## 4. DETAIL SPECIFICATION

### 4.1. GENERAL SPECIFICATION

- |   |   |  |
|---|---|--|
| 1. Service condition  | : | <input checked="" type="checkbox"/> Indoor                       |
| 2. The method of installation                                   | : | <input checked="" type="checkbox"/> Self-standing                |
| 3. Degree of protection of enclosure                            | : | <input checked="" type="checkbox"/> IP 41 / Form 2a              |
| 4. Painting color   |   |  |
| Outside   | : | <input checked="" type="checkbox"/> RAL7035                      |
| Thickness of painting   | : | <input checked="" type="checkbox"/> More than 60 $\mu\text{m}$   |
| 5. Panel size   | : | <input checked="" type="checkbox"/> Refer to the outline drawing |
| 6. The thickness of steel plate                                 |   |  |
| Front door  | : | 3.2mm  |
| Rear cover  | : | 3.2mm  |
| Side cover  | : | 2.3mm  |
| Top cover   | : | 2.3mm  |
| Bottom plate  | : | 1.6mm  |
| Channel base  | : | 100×50 – 5mm   |
| 7. Extension of cubicle   |   |  |
| 7-1) How to align the PDB with the existing panels if necessary |   |  |
| <input type="checkbox"/> Yes                                    |   | <input checked="" type="checkbox"/> Not Applicable               |
| <input type="checkbox"/> Right side                             |   | <input type="checkbox"/> Left side                               |
| 7-2) Future extension   |   |  |
| <input type="checkbox"/> Yes                                    |   | <input checked="" type="checkbox"/> No                           |
| <input type="checkbox"/> Right side                             |   | <input type="checkbox"/> Left side                               |
| <input type="checkbox"/> Right and left side                    |   |  |
| 8. Door   |   |  |
| <input checked="" type="checkbox"/> Front & Rear                |   | <input type="checkbox"/>   |
| 9. Door handle  |   |  |
| <input checked="" type="checkbox"/> Handle with key             |   | <input type="checkbox"/> Handle without key                      |
| 10. The wiring of control cable wires using wire ducts          |   |  |
| 11. Wiring mark ( Hot mark )                                    |   |  |
| <input checked="" type="checkbox"/> Yes                         |   | <input type="checkbox"/> No                                      |
| <input type="checkbox"/> To use outside control cable           |   |  |
| <input checked="" type="checkbox"/> All parts                   |   |  |
| 12. Cable entrance hole cover                                   |   |  |
| <input checked="" type="checkbox"/> Aluminum 5.0t               |   |  |

## 4.2 DETAIL SPECIFICATION

1. Input Power : AC380V, 3 Phase, 4 Wires, 50Hz
2. Interrupting Capacity : PDB 20kA / 1sec
3. Control Power
  - 3-1) ☒ AC 220V 50Hz
  - 3-2) The supply of control voltage
    - ☒ Internal transformer power
4. Bus
  - 4-1) Material
    - ☒ Silver contacted copper
  - 4-2) Bus bar treatment
    - ☒ Heat shrinkable tube
    - ☒ Boots for joints
  - 4-3) Color indication of bus
    - ☒ Color label (Sticker)
    - First Phase : Black                      Second Phase : Brown
    - Third Phase : Grey                      Neutral : Blue
  - 4-4) The capacity of bus
    - 1> Horizontal bus : refer to attached sheet & drawings.
    - 2> Vertical bus : refer to attached sheet & drawings.
    - 3> Ground bus : 6mm × 50mm
5. Power incoming and outgoing
  - 5-1) Incoming
    - ☒ Cable ☐ Bus bar
    - ☐ Top ☒ Bottom
  - 5-2) Outgoing
    - ☒ Cable ☐ Bus bar
    - ☐ Top ☒ Bottom
6. The cable of power circuit
  - 6-1) XHHW/SIS (0.6/1kV) / Color – Black
7. The cable of control circuit
  - 7-1) The type of cable
    - ☒ XHHW/SIS 0.6/1Kv

1> AC control circuit	:	Black ( 1.5 mm <sup>2</sup> )
2> DC control circuit	:	Gray (1.5 mm <sup>2</sup> )
3> PT secondary circuit	:	Yellow (2.5 mm <sup>2</sup> )
4> CT secondary circuit	:	Red (4.0 mm <sup>2</sup> )
5> Earthed cable	:	Yellow/Green (4.0 mm <sup>2</sup> )

8-1) Space heater

- ### 8-2) Panel lighting system

- ### 3>■Interlock with the door

1> Material : ■ Stainless Steel & Laminated Plastic

Main board :  Black  White

- 5> Fixed by : ■ Stainless bolt (Only name plate for main door)

## 5. DESIGN DATA

### 5.1 STANDARDS

The equipment will be rated in accordance with follows.

- |                           |             |
|---------------------------|-------------|
| 1. Low Voltage Switchgear | IEC 60439-1 |
| 2. Circuit breakers       | IEC 60947-2 |
| 3. Current transformer    | IEC 60044-1 |
| 4. Potential transformer  | IEC 60044-2 |
| 5. Others                 | IEC         |

### 5.2 SERVICE CONDITION

- |   |                              |
|---|------------------------------|
| 1. Ambient temperature  | : Max.40°C, Min.7°C.         |
| (In case of Indoor, The standard temperature of the equipments is max. .40°C) |                              |
| 2. Humidity   | : 60% to 95%                 |
| 3. Altitude   | : From sea level up to 1000m |
| 4. Service location   | : Indoor                     |
| 5. Protection degree of enclosure   | : IP41 / Form 2a             |

### 5.3 RATING & CHARACTERISTICS

- |                                   |              |
|-----------------------------------|--------------|
| 1. Rated voltage                  | : 600V       |
| 2. Nominal system voltage         | : 380V       |
| 3. System                         | : 3P 4W      |
| 4. Rated frequency                | : 50Hz       |
| 5. Rated main bus current         | : 500A       |
| 6. Short time withstand current   | : 20kA/1sec. |
| 7. Control voltage                | : 220V AC    |
| 8. Indicating lamp supply voltage | : 220V AC    |
| 9. Heater supply voltage          | : 220V AC    |

## 6. MAIN EQUIPMENT DATA

### A. Voltage Transformer

#### DGP Series

1-1)	Maximum voltage system	: 1150V
1-2)	Rated frequency	: 50Hz
1-3)	Accuracy class	: 1.0CL
1-4)	Rated primary voltage(1'ry)	: $480/\sqrt{3}$ V
1-5)	Rated secondary voltage(2'ry)	: $110/\sqrt{3}$ V
1-6)	Rated burden(VA) 2'ry	: 50VA
1-7)	Weight	: 3kg
1-8)	Manufacturer	: Deesys

### B. Current Transformer

#### 1) DS Series

1-1)	Single ratio window type CT	
1-2)	Maximum voltage system	: 1150V
1-3)	Over current strength	: 50kA/1sec
1-4)	Frequency	: 50Hz
1-5)	Primary current	: Refer to Single line
1-6)	Rated secondary current	: 1A
1-7)	Accuracy class(For meter / For relay)	: 1.0CL
1-8)	Burden	: 15VA
1-9)	Weight	: 1.5kg
1-10)	Manufacturer	: Deesys

### C. Protective Relay

#### 1) EGR

1) Type	: EGR-20RZ7M
2) Rated input	: 85~250Vdc/Vac
3) Setting range	: 500~2500mA
4) Maker	: SCHNEIDER

### D. meter

#### 1) Voltage/Ampere Meter

1-1)	Size	: 110 x 110(mm)
1-2)	Angle of Deflection	: 250degree
1-2)	Maker	: Deesys
1-3)	Maker type	: W11 Series (Analogue)

## E. Aux. relay

### 1) MR type

1-1)	Contacts available	: Refer to schematic drawings
1-2)	Rated insulation voltage (Ui)	: 690V
1-3)	Thermal current (Ith)	: 16A
1-4)	Life time (10,000times)	
	1> Electrical	: 25
	2> Mechanical	: 1,000
1-5)	Operating cycle (Time/hour)	: 1,800
1-6)	Ratings of the AC coil	: 220V AC
1-7)	Manufacturer	: LSIS

## F. MCCB

### 1) ABS type

1-1)	Pole	: 4
1-2)	Rated voltage	: 690V
1-3)	Maker	: LSIS

## G. ELCB

### 1) EBS type

1-1)	Pole	: 3
1-2)	Rated voltage	: 460V
1-3)	Rated residual current	: 100/200/500mA
1-4)	Maker	: LSIS

## H. CONTACTOR

### 1) MC type

1-1)	Pole	: 3
1-2)	Rated voltage	: 690V
1-3)	Rated insulation voltage	: 1000V
1-4)	Frequency	: 50/60Hz
1-5)	Auxiliary	: 2a2b
1-6)	Maker	: LSIS

SPECIFICATION  
OF  
DRY TYPE TRANSFORMER



## CONTENTS

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## 1. GENERAL

This specification is applied for the design, construction and test of dry type transformer. The dry type transformer is used for power supply of *Urea* project. If any statement specified herein is conflict with the reference standard or other requirements, the statement governs to the extent of such conflict.

## 2. REFERENCE STANDARD

The transformer is designed, constructed and tested in accordance with all applicable section of the latest issue of the standard.

IEC-60076-11 : DRY TYPE TRANSFORMER
-------------------------------------

## 3. SERVICE CONDITIONS

The transformer is operated under the service conditions as follows :

Ambient temperature : - 5 °C ~ + 40 °C  
 Altitude : Below 1000m above sea level  
 Installation : Indoor use

## 4. GENERAL SPECIFICATION

No.	Phase	Rated voltage(V)		Rated capacity ( AN )	Connection	Q'ty
		Primary	Secondary			
U30- PDB501A	3	480	400-230	350kVA	DELTA-WYE	1
U30- PDB501E	3	480	400-230	100kVA	DELTA-WYE	1
U30- PDB502	3	480	400-230	400kVA	DELTA-WYE	1

## 5. **STRUCTURE**

### 5.1 **CORE**

Cold rolled oriented silicon steel sheet with excellent characteristics is employed for the core. The cores are constructed from high quality, cold rolled, grain orientated, stress relieved silicon steel laminations, insulated on one side and working at a flux density not exceeding 1.6 Tesla. Joints and clamping structure are design in such a way to match the excellent characteristics of the core material. Core legs are clamped with tape of adequate mechanical strength. The core frame shall incorporate lifting lugs and be mounted on a base frame having towing holes.

### 5.2. **WINDING**

One of the most outstanding characteristics of **Dea Heung** dry type transformer originates in the construction of the windings. The high and low voltage windings are arranged coaxially on the core legs and separated unit. Cooling ducts are provided between high and low voltage windings to ensure effective heat dissipation. Winding top and buttom parts molding by epoxy resin.

## 6. **ACCESSORY**

Each transformer is provided with accessories as follows :

- 6.1 Name plate
- 6.2 Primary and secondary terminals
- 6.3 Lifting lugs
- 6.4 Earthing terminal
- 6.5 Digital type thermometer (P-300C)

## 7. **TEST**

- 7.1 Visual inspection ( Dimension & Weight Tolerance :  $\pm 5\%$  )
- 7.2 Measurement of winding resistance
- 7.3 Measurement of voltage ratio and check of voltage vector relationship
- 7.4 Measurement of impedance load loss
- 7.5 Efficiency and voltage regulation test
- 7.6 Measurement of no-load loss and current
- 7.7 Induced overvoltage withstand test

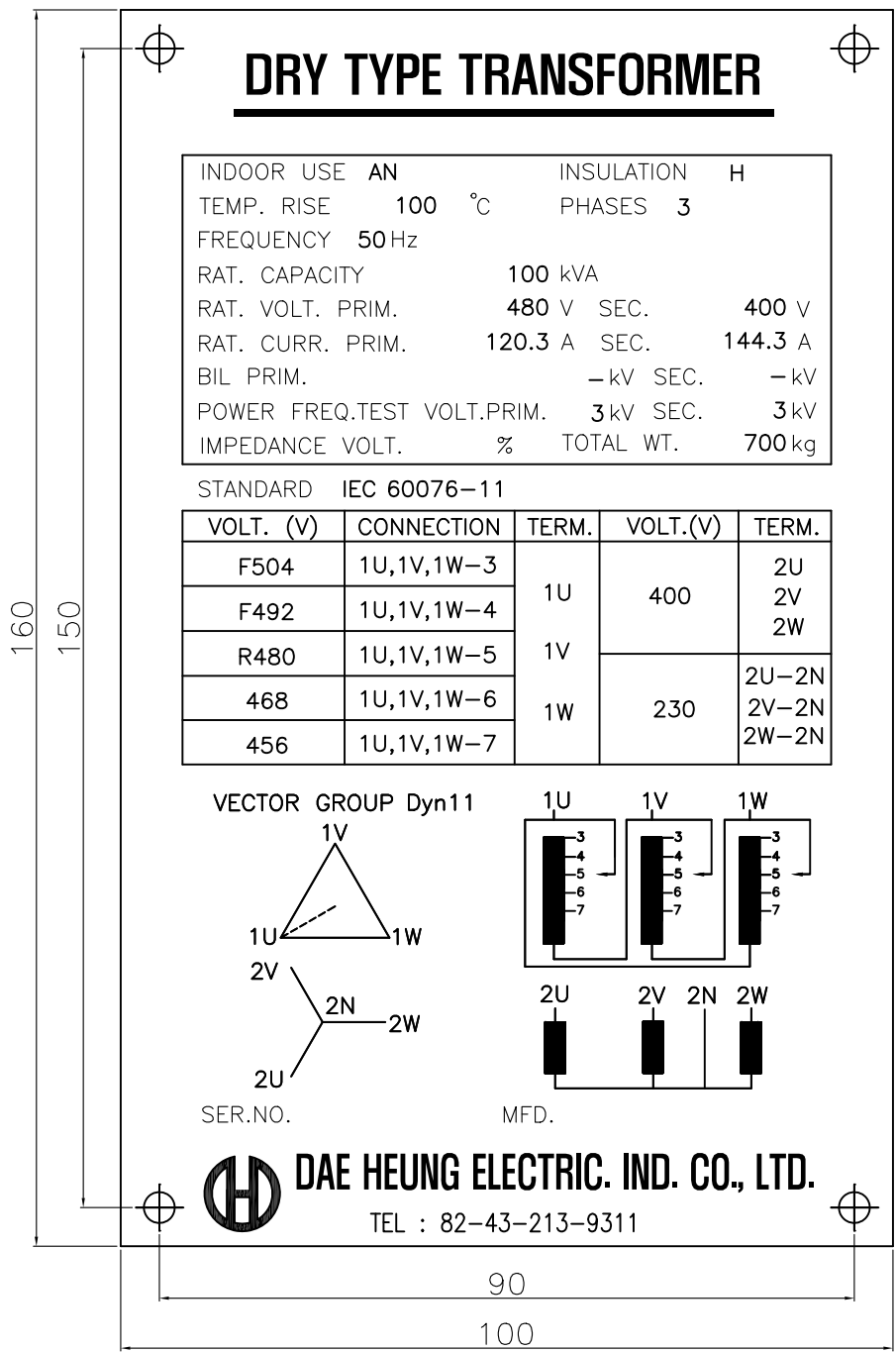
**8. TECHNICAL SHEET**

(P.F.=1.0, At 145°C, Based on AN)

NO	ITEM		U30-PDB501A	U30-PDB501E	U30-PDB502
1	Capacity (AN)	(kVA)	350	100	400
2	Phase		3		
3	Frequency	(Hz)	50		
4	Primary voltage	(V)	480		
5	Secondary voltage	(V)	400-230		
6	Primary tap voltage	(V)	F504-F492-R480-468-456		
7	Connection		DELTA-WYE		
8	Efficiency	(%)	98.1	97.7	98.3
9	Percent exciting current at rated voltage	(%)	3.0	6.5	2.5
10	Regulation at full load	(%)	1.7	2.1	1.5
11	Winding Temperature Rise (K) at 40°C	i. HV ii. LV	100 100		
12	Applied potential Test(1min) (KV)	i. HV ii. LV	3 3		
13	Impluse Voltage (KV)	i. HV ii. LV	---- ----		
14	Insulation Class at 40°C	HV/LV	H		
15	% Impedance	(%)	4.0		
16	Winding Material		Copper		
17	Cooling Type		AN		

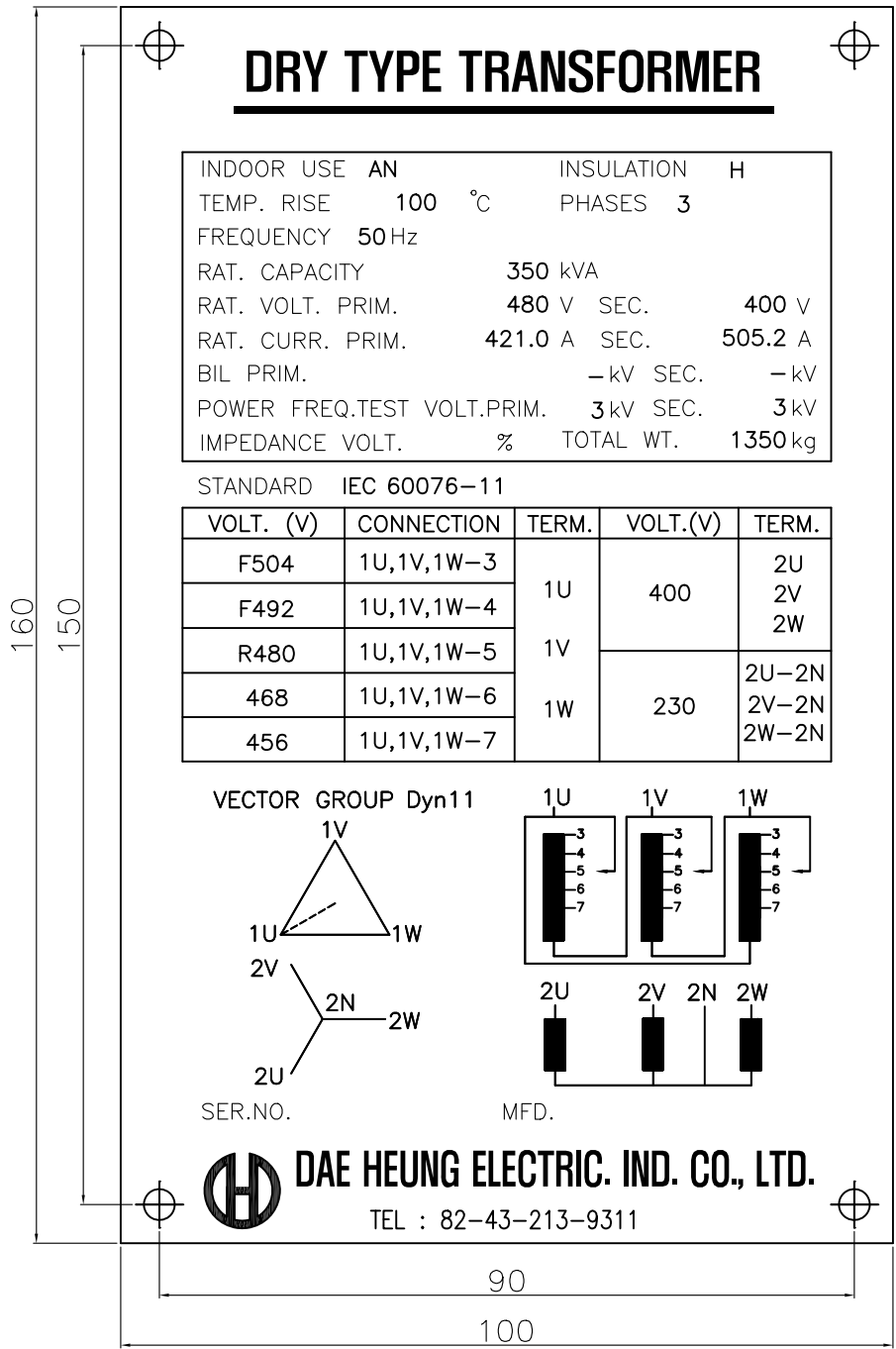
**9. PHASE INDICATION COLOR**

R : ● BLACK ○ WHITE ○ BROWN ○ GREY ○ GREEN ○ BLUE  
 S : ○ BLACK ○ WHITE ● BROWN ○ GREY ○ GREEN ○ BLUE  
 T : ○ BLACK ○ WHITE ○ BROWN ● GREY ○ GREEN ○ BLUE  
 N : ○ BLACK ○ WHITE ○ BROWN ○ GREY ○ GREEN ● BLUE

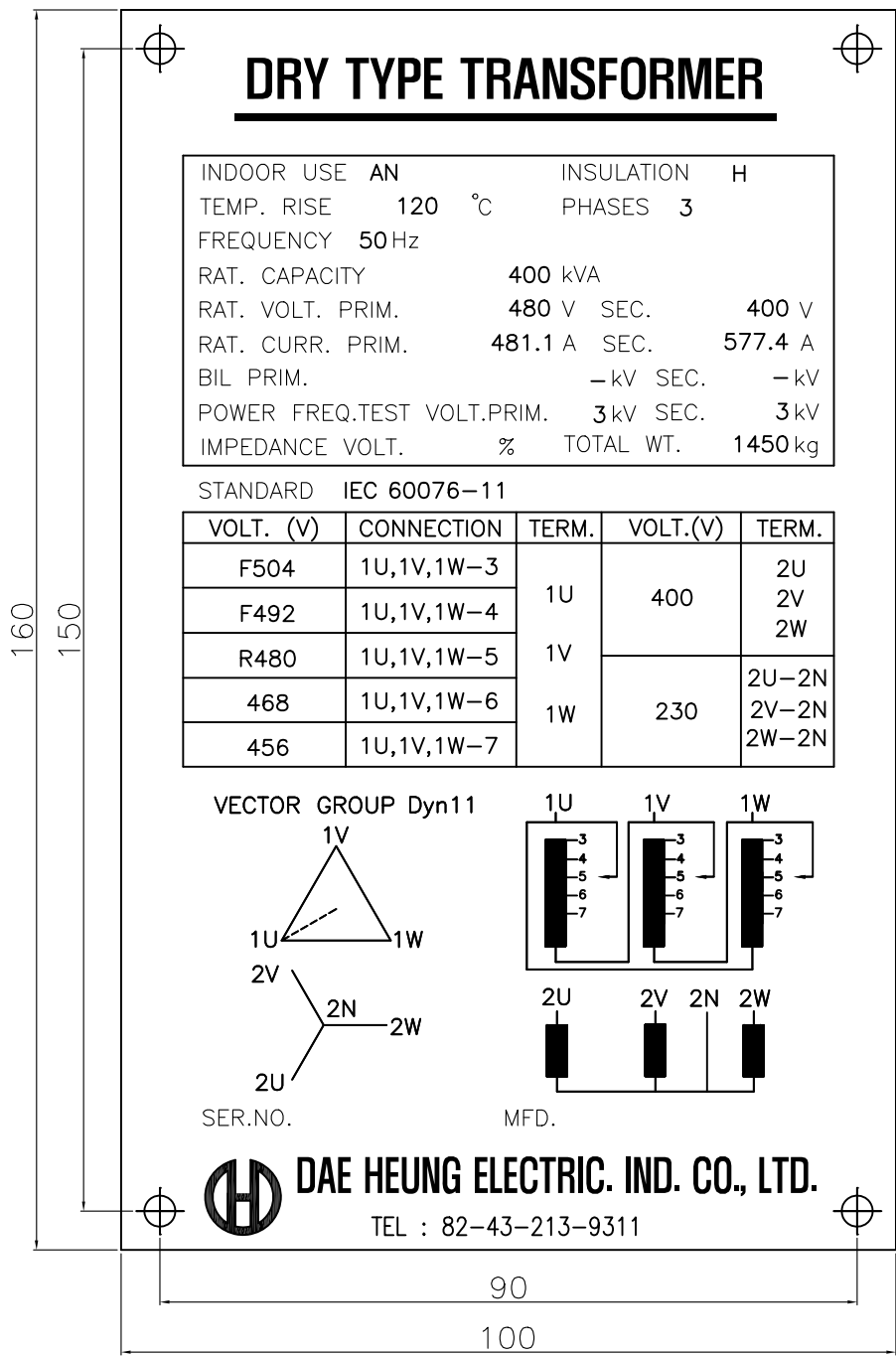



수량 Q'TY	명 칭 DESCRIPTIONS	품 번 PART NO	도 번 DWG. NO.			재 질 MATERIAL	치 수 DIMENSIONS	비 고 REMARKS
			척 도 SCALE	단 위 UNIT	공 차 TOLERANCE	재 질 MATERIAL	NAME PLATE	
			N S	mm				
				일 자 DATE	서 명 NAME	명 칭 DESCRIPTION		
			제 도 DR.BY	2014. 9.16	S.H.KIM			
			설 계 DES.BY	2014. 9.16	S.H.KIM	도 번 DWG.NO.		
변 경 사 항 REVISION		일 자 DATE	서 명 NAME	검 도 CH.BY	2014. 9.16	S.H.KIM	DH020027	
				승 인 PER'N	2014. 9.16	S.H.KIM		
DAE HEUNG ELECTRIC IND. CO., LTD						관계도번 REF.NO		

U30-PDB501A

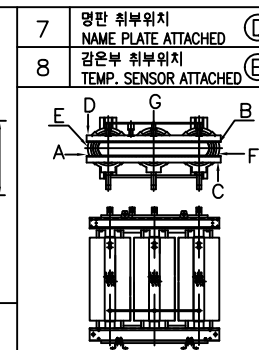
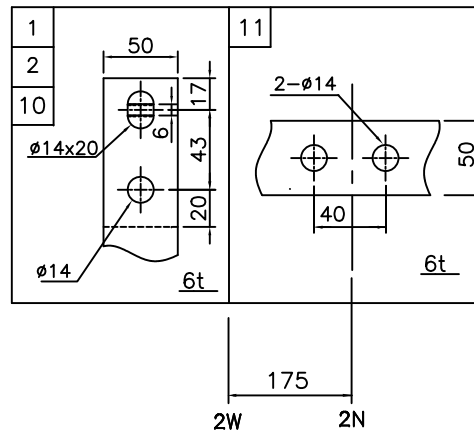
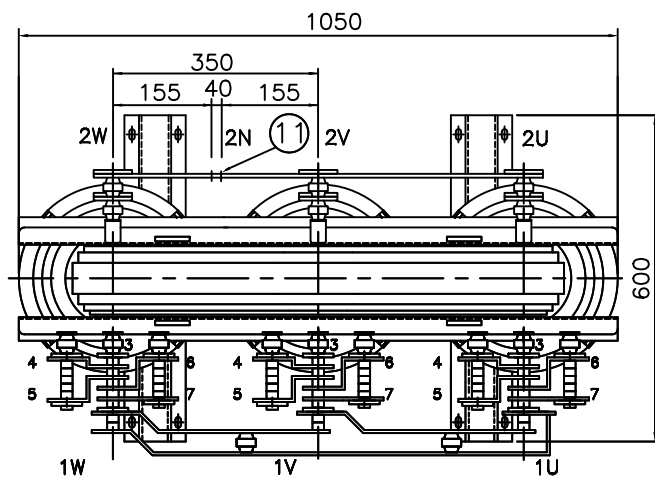


수량 Q'TY	명 칭 DESCRIPTIONS	품 번 PART NO	도 번 DWG. NO.			재 질 MATERIAL	치 수 DIMENSIONS	비 고 REMARKS
			척 도 SCALE	단 위 UNIT	공 차 TOLERANCE	재 질 MATERIAL	NAME PLATE	
			N S	mm				
				일 자 DATE	서 명 NAME	명 칭 DESCRIPTION		
			제 도 DR.BY	2014. 9.16	S.H.KIM			
			설 계 DES.BY	2014. 9.16	S.H.KIM	도 번 DWG.NO.		
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				승 인 PER'N	2014. 9.16	S.H.KIM		
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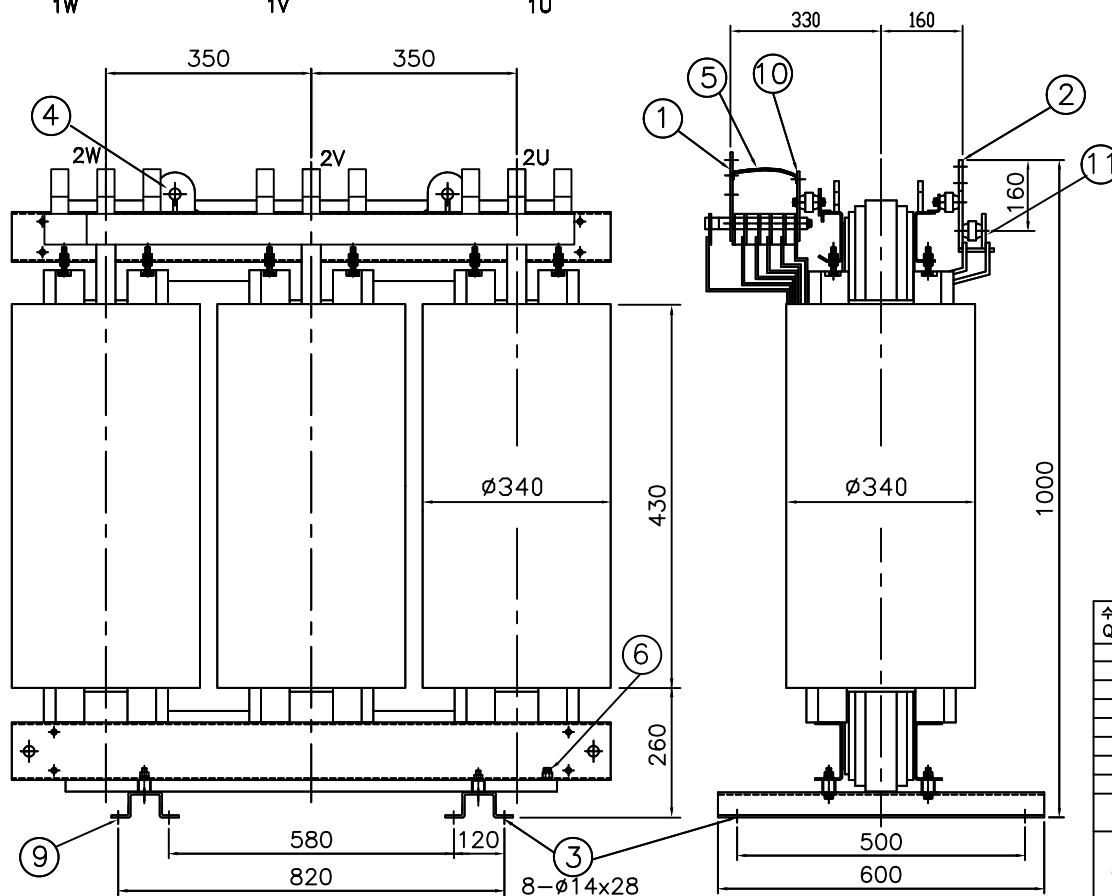


수량 Q'TY	명 칭 DESCRIPTIONS	품 번 PART NO	도 번 DWG. NO.			재 질 MATERIAL	치 수 DIMENSIONS	비 고 REMARKS
			척 도 SCALE	단 위 UNIT	공 차 TOLERANCE	재 질 MATERIAL	NAME PLATE	
			N S	mm				
				일 자 DATE	서 명 NAME	명 칭 DESCRIPTION		
			제 도 DR.BY	2014. 9.16	S.H.KIM			
			설 계 DES.BY	2014. 9.16	S.H.KIM	도 번 DWG.NO.		
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				승 인 PER'N	2014. 9.16	S.H.KIM		
<div>  <b>DAE HEUNG ELECTRIC IND. CO., LTD</b> </div>						관 계 도 번 REF.NO		

## 제 3 각 법 3RD-ANGLE PROJECTION



NO	명 칭	NAME OF PARTS
1	1차측 단자	PRIM. SIDE TERMINAL
2	2차측 단자	SEC. SIDE TERMINAL
3	기초 구멍	FOUNDATION HOLE
4	인양 고리	LIFTING LUGS
5	무전압 탭 절환리드	NO VOLTAGE TAP CHANGER
6	접지 단자	EARTHING TERMINAL
7	명 판	NAME PLATE
8	온도계	THERMOMETER
9	방진 고무	ANTIVIBRATION RUBBER
10	1차측 TAP 단자	PRIM. TAP TERMINAL
11	2차측 중성점 단자	SEC. NEUTRAL TERMINAL



U30-PDB501E

<div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 5px; margin-right: 10px;">6</div> <div> <b>접지단자 상세</b>  <b>EARTHING TERMINAL</b> </div> </div> <div style="text-align: center; margin-top: 20px;"> </div>	<div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 5px; margin-right: 10px;">상 수</div> <div>PHASES</div> </div> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;">정격용량 RAT. CAPACITY</div> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;">1차전압 RAT. VOLT. PRIM.</div> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;">2차전압 RAT. VOLT. SEC.</div> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;">결선 CONNECTION</div> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;">총중량 TOTAL WEIGHT</div>	<div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 5px; margin-right: 10px;">3</div> <div>주파수</div> </div> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;">FREQUENCY</div> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;">50 Hz</div>	<div style="border: 1px solid black; padding: 5px; margin-top: 10px;">100 kVA</div> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;">480 V</div> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;">400-230 V</div> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;">△-Y (Dyn11)</div> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;">700 kg</div>
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수량 Q'TY	명칭 DISCRIPTIONS	품번 PARTS NO	도번 DWG. NO.		재질 MATERIAL	치수 DIMENSIONS	비고 REMARKS
			척도 SCALE	단위 UNIT	공차 TOLERANCE	재질 MATERIAL	OUTLINE DWG.
			N/S	mm	±5%		
				일자 DATE	서명 NAME	명칭	
					DISCRIPTION		
			제도 DR. BY	2014. 9.19	S.H.KIM		
변경사항 REVISION	일자 DATE	서명 NAME	설계 DES.BY	2014. 9.19	S.H.KIM	도번 DWG NO.	DH030071
			검도 CH. BY	2014. 9.19	S.H.KIM		
			승인 PER' N	2014. 9.19	S.H.KIM	관계도번 REF.NO	

DAE HEUNG ELECTRIC IND. CO., LTD

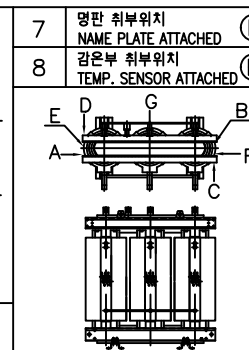
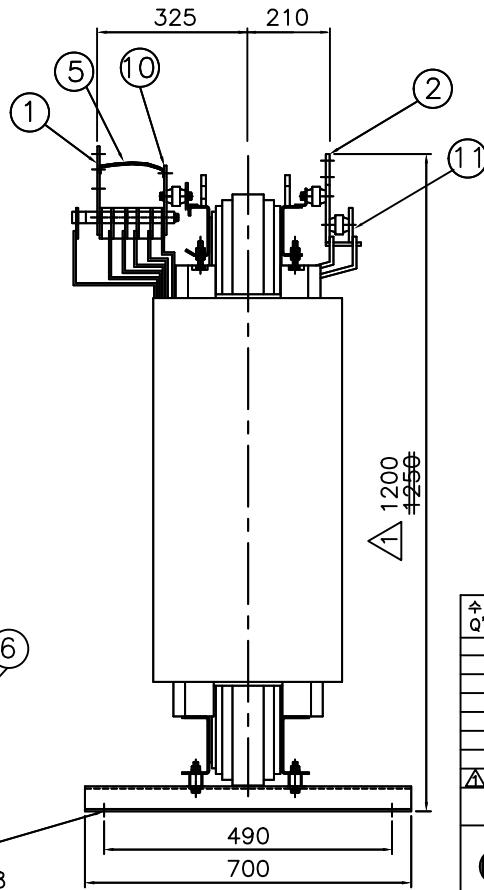
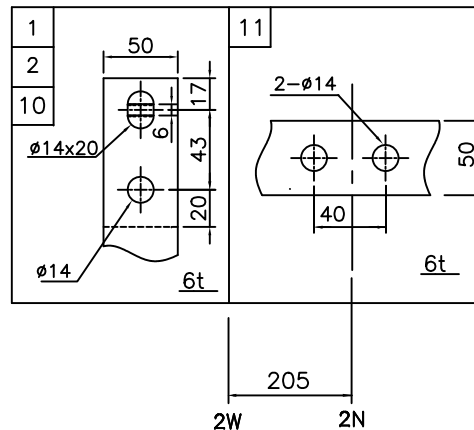
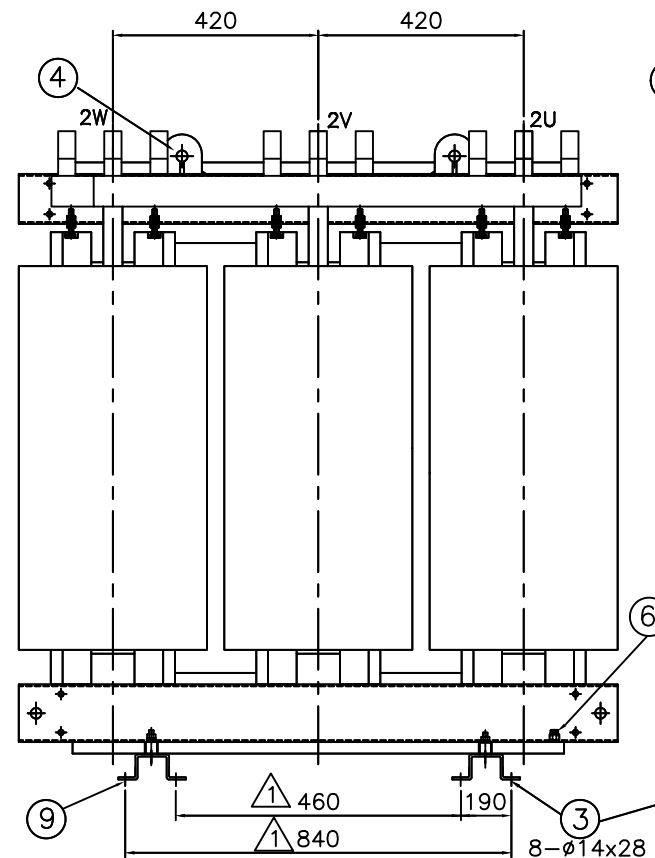
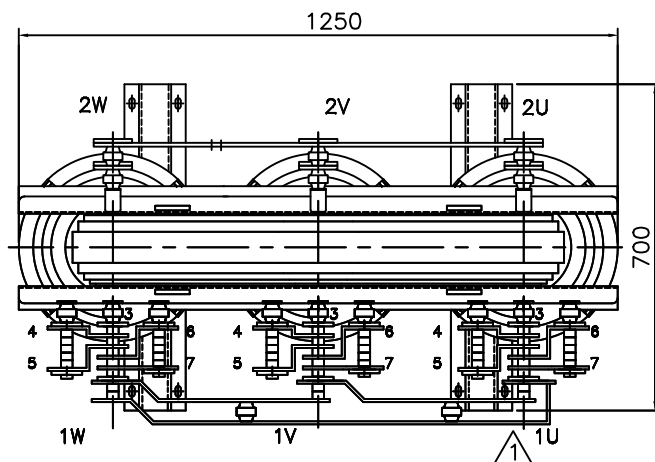
100, DONGGANG-RO, YONGIN-SI, GYEONGGI-DO, KOREA

TEL: 031-390-1111 FAX: 031-390-1112

WWW.DHEUNG.CO.KR E-MAIL: DHEUNG@DHEUNG.CO.KR

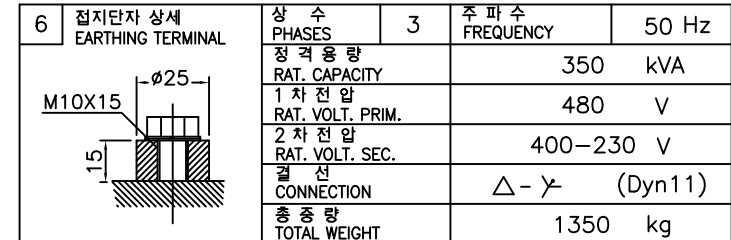




## 제 3 각 법 3RD-ANGLE PROJECTION



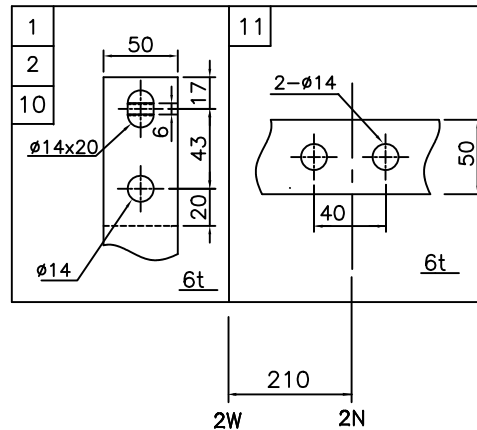
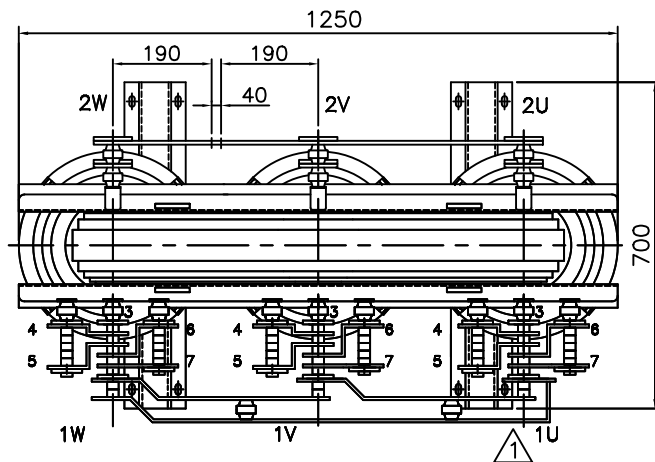
NO	명 칭	NAME OF PARTS
1	1차측 단자	PRIM. SIDE TERMINAL
2	2차측 단자	SEC. SIDE TERMINAL
3	기초 구멍	FOUNDATION HOLE
4	인양 고리	LIFTING LUGS
5	무전압 탭 절환리드	NO VOLTAGE TAP CHANGER
6	접지 단자	EARTHING TERMINAL
7	명 판	NAME PLATE
8	온도계	THERMOMETER
9	방진 고무	ANTIVIBRATION RUBBER
10	1차측 TAP 단자	PRIM. TAP TERMINAL
11	2차측 중성점 단자	SEC. NEUTRAL TERMINAL

U30-PDB501A

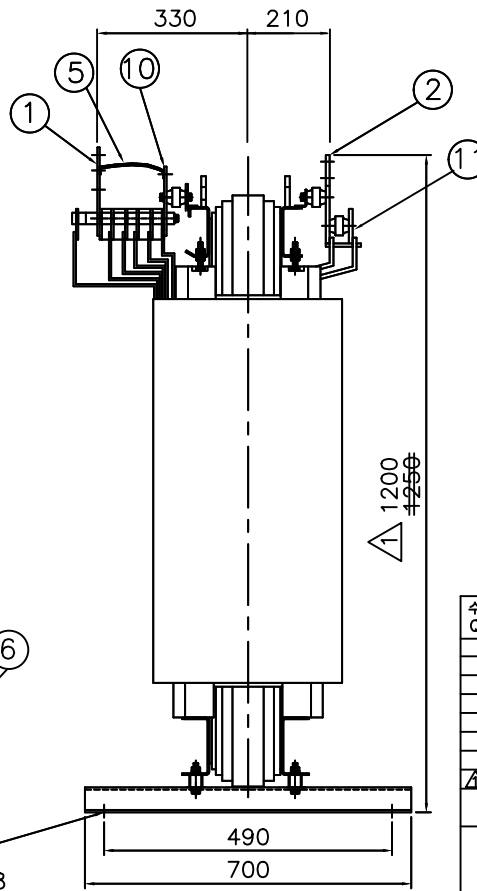
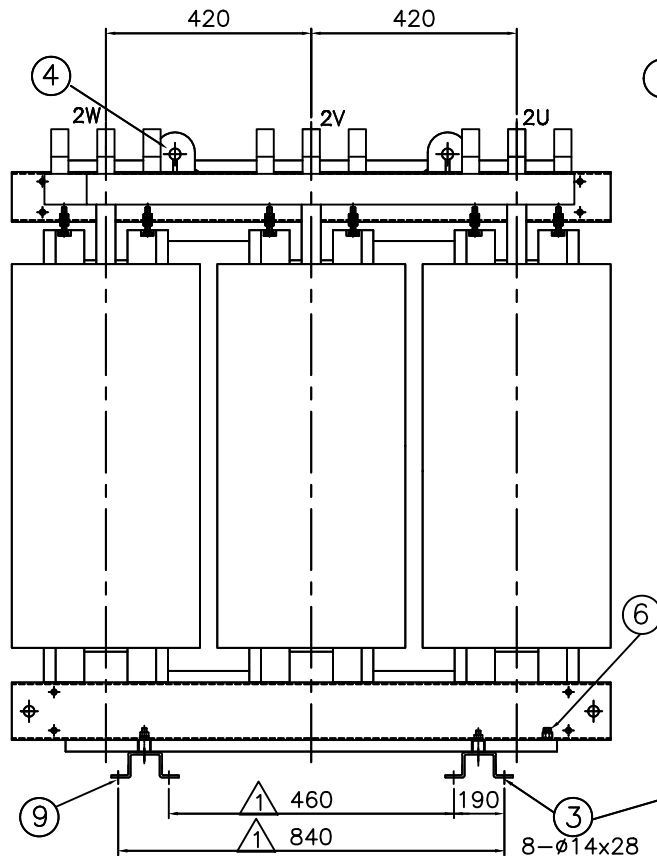


수량 Q'TY	명 칭 DISCRIPTIONS	품 번 PARTS NO	도 번 DWG. NO.		재 질 MATERIAL	치 수 DIMENSIONS	비 고 REMARKS		
			척도 SCALE	단 위 UNIT	공 차 TOLERANCE	재 질 MATERIAL			
			N / S	mm	±5%				
				일 자 DATE	서 명 NAME			명 칭	
			제 도 DR. BY	2014.10.27	E.Y.PARK			DISCRIPTION	OUTLINE DWG.
			설 계 DES.BY	2014.10.27	H.S.LEE			도 번 DWG NO.	
			검 토 CH. BY	2014.10.27	H.S.LEE				
			승 인 PER' N	2014.10.27	H.S.LEE	관계도번 REF.NO			
3TAPs-5TAPs 변경사항 REVISION		일 자 DATE	서 명 NAME	DH030069 					
 DAE HEUNG ELECTRIC IND. CO., LTD									

제 3 각 법  
3RD-ANGLE PROJECTION



명칭	명칭	NAME OF PARTS
7	명판 취부위치 NAME PLATE ATTACHED	⑦
8	감온부 취부위치 TEMP. SENSOR ATTACHED	⑧
1	1차측 단자	PRIM. SIDE TERMINAL
2	2차측 단자	SEC. SIDE TERMINAL
3	기초 구멍	FOUNDATION HOLE
4	인양 고리	LIFTING LUGS
5	무전압 탭 절환리드	NO VOLTAGE TAP CHANGER
6	접지 단자	EARTHING TERMINAL
7	명판	NAME PLATE
8	온도계	THERMOMETER
9	방진 고무	ANTIVIBRATION RUBBER
10	1차측 TAP 단자	PRIM. TAP TERMINAL
11	2차측 중성점 단자	SEC. NEUTRAL TERMINAL



U30-PDB502

6	접지단자 상세 EARTHING TERMINAL	상 수 PHASES	3	주 파 수 FREQUENCY	50 Hz
		정 격 용 량 RAT. CAPACITY	400	kVA	
		1 차 전 압 RAT. VOLT. PRIM.	480	V	
		2 차 전 압 RAT. VOLT. SEC.	400-230	V	
		결 선 CONNECTION	△-Y	(Dyn11)	
		총 중 량 TOTAL WEIGHT	1450	kg	

수 량 Q'TY	명 칭 DISCRIPTIONS	품 번 PARTS NO	도 번 DWG. NO.	재 질 MATERIAL	치 수 DIMENSIONS	비 고 REMARKS
			척 도 SCALE	단 위 UNIT	공 차 TOLERANCE	재 질 MATERIAL
			N	mm	±5%	
			제 도 DR. BY	일 자 DATE	서 명 NAME	명 칭 DISCRIPTION
			2014.10.27	2014.10.27	E.Y.PARK	
			검 도 CH. BY	일 자 DATE	서 명 NAME	도 번 DWG. NO.
			2014.10.27	2014.10.27	H.S.LEE	
			승 인 PER'N	일 자 DATE	서 명 NAME	관 계도번 REF.NO
			2014.10.27	2014.10.27	H.S.LEE	



DAE HEUNG ELECTRIC IND. CO., LTD

OUTLINE DWG.

DH030070

## **II. DETAIL PANEL SCHEDULE**

**BOLIVIA YPFB AMMONIA/UREA**  
**UREA S/S LV SWITCHGEAR & MCC PANEL LIST**

No.	ITEM NO	DESCRIPTION	DIMENSIONS(mm)			REMARK (Include side cover)
			WIDTH	DEPTH	HEIGHT	
1	U30-LVS401A	INCOMING ACB	900	1200	2350	
2	U30-LVS401B	INCOMING ACB	900	1200	2350	
3	U30-LVS401C	TIE ACB	900	1200	2350	
4	DUMMY	BLANK PANEL	300	1000	2350	
5	U30-LVS401AF01/R01	MCC BACK TO BACK	1000	1000	2350	
6	U30-LVS401AF02/R02	MCC BACK TO BACK	1000	1000	2350	
7	U30-LVS401AF03/R03	MCC BACK TO BACK	1000	1000	2350	
8	U30-LVS401AF04/R04	MCC BACK TO BACK	1000	1000	2350	
9	U30-LVS401AF05/R05	MCC BACK TO BACK	1000	1000	2350	
10	U30-LVS401AF06/R06	MCC BACK TO BACK	1000	1000	2350	
11	U30-LVS401AF07/R07	MCC BACK TO BACK	1000	1000	2350	
12	U30-LVS401BF01/R01	MCC BACK TO BACK	1000	1000	2350	
13	U30-LVS401BF02/R02	MCC BACK TO BACK	1000	1000	2350	
14	U30-LVS401BF03/R03	MCC BACK TO BACK	1000	1000	2350	
15	U30-LVS401BF04/R04	MCC BACK TO BACK	1000	1000	2350	
16	U30-LVS401BF05/R05	MCC BACK TO BACK	1000	1000	2350	
17	U30-LVS401BF06/R06	MCC BACK TO BACK	1000	1000	2350	
18	U30-LVS401BF07/R07	MCC BACK TO BACK	1000	1000	2350	
U30-LVS401		TOTAL WIDTH	17000			17050

**BOLIVIA YPFB AMMONIA/UREA**  
**UREA S/S LV SWITCHGEAR & MCC PANEL LIST**

No.	ITEM NO	DESCRIPTION	DIMENSIONS(mm)			REMARK (Include side cover)
			WIDTH	DEPTH	HEIGHT	
1	U30-LVS402A	INCOMING ACB	900	1200	2350	
2	U30-LVS402B	INCOMING ACB	900	1200	2350	
3	U30-LVS402C	TIE ACB	900	1200	2350	
4	U30-LVS402AF01/R01	MCC BACK TO BACK	1000	1000	2350	
5	U30-LVS402AF02/R02	MCC BACK TO BACK	1000	1000	2350	
6	U30-LVS402AF03/R03	MCC BACK TO BACK	1000	1000	2350	
7	U30-LVS402AF04/R04	MCC BACK TO BACK	1000	1000	2350	
8	U30-LVS402BF01/R01	MCC BACK TO BACK	1000	1000	2350	
9	DUMMY	BLANK PANEL	300	1000	2350	
10	U30-LVS402BF02/R02	MCC BACK TO BACK	1000	1000	2350	
11	U30-LVS402BF03/R03	MCC BACK TO BACK	1000	1000	2350	
12	U30-LVS402BF04/R04	MCC BACK TO BACK	1000	1000	2350	
U30-LVS402		TOTAL WIDTH	11000			11050

**BOLIVIA YPFB AMMONIA/UREA**  
**UREA S/S Power Distribution Board LIST**

No.	ITEM NO	DESCRIPTION	DIMENSIONS(mm)			REMARK (Include side cover)
			WIDTH	DEPTH	HEIGHT	
1	U30-PDB501A	POWER DISTRIBUTION BOARD(350kVA)	1500	1400	2350	
2	U30-PDB501A01	NORMAL POWER DISTRIBUTION BOARD	800	1400	2350	
3	U30-PDB501A02	NORMAL POWER DISTRIBUTION BOARD	800	1400	2350	
4	U30-PDB501A03	NORMAL POWER DISTRIBUTION BOARD	800	1400	2350	
U30-PDB501A		TOTAL WIDTH	3900			3950
1	U30-PDB501E	POWER DISTRIBUTION BOARD(100kVA)	1200	1400	2350	
2	U30-PDB501E01	EMERGENCY POWER DISTRIBUTION BOARD	800	1400	2350	
3	U30-PDB501E02	EMERGENCY POWER DISTRIBUTION BOARD	800	1400	2350	
4	U30-PDB501E03	EMERGENCY POWER DISTRIBUTION BOARD	800	1400	2350	
U30-PDB501E		TOTAL WIDTH	3600			3650
1	U30-PDB502	POWER DISTRIBUTION BOARD(400kVA)	1600	1600	2350	
2	U30-PDB502A01	NORMAL POWER DISTRIBUTION BOARD	1000	1600	2350	
U30-PDB502		TOTAL WIDTH	2600			2350

### **III. DRAWINGS**

DRAWINGS FOR  
U30-LVS401, U30-LVS402  
480-277V SWITCHGEAR & MCC  
(UREA SUBSTATION)

△					
△					
△					
△					
△					
REV. NO. NºREV	DATE FECHA	DESCRIPTION DESCRIPCION	DIN ELABORADO	CHECKED VERIFICADO	APPROVED APROBADO
OWNER : PROPIETARIO:		YACIMIENTOS PETROLIFEROS FISCALES BOLIVIANOS			
<div>LS Industrial Systems</div>					
PROJECT : PROYECTO:		PROYECTO DE AMONIACO/UREA DE YPFB			
JOB NO. NºDE PROYECTO		DWG. TITLE:			
		DWG. NO. : NºDEL DIBUJO:			



	A	B	C	D	E	F	G	H	I	J
	NOMBRE DEL DIBUJO									
7										
6	DEVICE FUNCTION NUMBER LIST (ANSI C37.2-2008)									
	NO.	FUNCTION AND DEFINITION	NO.	FUNCTION AND DEFINITION	NO.	FUNCTION AND DEFINITION	NO.	FUNCTION AND DEFINITION		
	1	MASTER ELEMENT	26	APPARATUS THERMAL DEVICE	51	AC INVERSE TIME OVERCURRENT RELAY	76	DC OVERCURRENT RELAY		
	2	TIME-DELAY STARTING OR CLOSING RELAY	27	UNDervOLTAGE RELAY	52	AC CIRCUIT BREAKER	77	TELEMETERING DEVICE		
	3	CHECKING OR INTERLOCKING RELAY	28	FLAME DETECTOR	53	FIELD EXCITATION RELAY	78	PHASE-ANGLE MEASURING RELAY		
	4	MASTER CONTACTOR	29	ISOLATING CONTACTOR OR SWITCH	54	TURNING GEAR ENGAGING DEVICE	79	AC RECLOSING RELAY		
	5	STOPPING DEVICE	30	ANNUNCIATOR RELAY	55	POWER FACTOR RELAY	80	FLOW SWITCH		
5	6	STARTING CIRCUIT BREAKER	31	SEPARATE EXCITATION DEVICE	56	FIELD APPLICATION RELAY	81	FREQUENCY RELAY		
	7	RATE-OF-CHANGE RELAY	32	DIRECTIONAL POWER RELAY	57	SHORT-CIRCUITING OR GROUNDING DEVICE	82	DC LOAD-MEASURING RECLOSING RELAY		
	8	CONTROL POWER DISCONNECTING DEVICE	33	POSITION SWITCH	58	RECTIFICATION FAILURE RELAY	83	AUTOMATIC SELECTIVE CONTROL OR TRANSFER RELAY		
	9	REVERSING DEVICE	34	MASTER SEQUENCE DEVICE	59	OVERVOLTAGE RELAY	84	OPERATING MECHANISM		
	10	UNIT SEQUENCE SWITCH	35	BRUSH-OPERATION OR SLIP-RING SHORT-CIRCUITING DEVICE	60	VOLTAGE OR CURRENT BALANCE RELAY	85	PILOT COMMUNICATIONS, CARRIER OR PILOT-WIRE RELAY		
	11	MULTIFUNCTION DEVICE	36	POLARITY OR POLARIZING VOLTAGE DEVICE	61	DENSITY SWITCH OR SENSOR	86	LOCKOUT RELAY		
4	12	OVERSPEED DEVICE	37	UNDERCURRENT OR UNDERPOWER RELAY	62	TIME-DELAY STOPPING OR OPENING RELAY	87	DIFFERENTIAL PROTECTIVE RELAY		
	13	SYNCHRONOUS-SPEED DEVICE	38	BEARING PROTECTIVE DEVICE	63	PRESSURE SWITCH	88	AUXILIARY MOTOR OR MOTOR GENERATOR		
	14	UNDERSPEED DEVICE	39	MECHANICAL CONDITION MONITOR	64	GROUND DETECTOR RELAY	89	LINE SWITCH		
	15	SPEED OR FREQUENCY MATCHING DEVICE	40	FIELD (OVER/UNDER EXCITATION) RELAY	65	GOVERNOR	90	REGULATING DEVICE		
	16	DATA COMMUNICATIONS DEVICE	41	FIELD CIRCUIT BREAKER	66	NOTCHING OR JOGGING DEVICE	91	VOLTAGE DIRECTION RELAY		
	17	SHUNTING OR DISCHARGE SWITCH	42	RUNNING CIRCUIT BREAKER	67	AC DIRECTIONAL OVERCURRENT RELAY	92	VOLTAGE AND POWER DIRECTIONAL RELAY		
3	18	ACCELERATING OR DECELERATING DEVICE	43	MANUAL TRANSFER OR SELECTOR DEVICE	68	BLOCKING OR "OUT-OF-STEP" RELAY	93	FIELD-CHANGING CONTACTOR		
	19	STARTING-TO-RUNNING TRANSITION CONTACTOR	44	UNIT SEQUENCE STARTING RELAY	69	PERMISSIVE CONTROL DEVICE	94	TRIPPING OR TRIP-FREE RELAY		
	20	ELECTRICALLY OPERATED VALVE	45	ABNORMAL ATMOSPHERIC CONDITION MONITOR	70	RHEOSTAT	95	(RESERVED FOR FUTURE APPLICATION)		
	21	DISTANCE RELAY	46	REVERSE-PHASE OR PHASE-BALANCE CURRENT RELAY	71	LIQUID LEVEL SWITCH	96	(RESERVED FOR FUTURE APPLICATION)		
	22	EQUALIZER CIRCUIT BREAKER	47	PHASE-SEQUENCE OR PHASE-BALANCE VOLTAGE RELAY	72	DC CIRCUIT BREAKER	97	(RESERVED FOR FUTURE APPLICATION)		
2	23	TEMPERATURE CONTROL DEVICE	48	INCOMPLETE SEQUENCE RELAY	73	LOAD RESISTOR CONTACTOR	98	(RESERVED FOR FUTURE APPLICATION)		
	24	VOLTS PER HERTZ RELAY	49	MACHINE OR TRANSFORMER THERMAL RELAY	74	ALARM RELAY	99	(RESERVED FOR FUTURE APPLICATION)		
	25	SYNCHRONIZING OR SYNCHRONISM-CHECK RELAY	50	INSTANTANEOUS OVER CURRENT RELAY	75	POSITION CHANGING MECHANISM				
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REV. NO.	DATE	DESCRIPTION	DIN	CHECKED	APPROVED
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OWNER : PROPIETARIO:		YPFB YACIMIENTOS PETROLIFEROS FISCALES BOLIVIANOS			

LICENSOR : LICENCIADOR:		
LS Industrial Systems		
PROJECT : PROYECTO:		
PROYECTO DE AMONIAO/UREA DE YPFB		
JOB NO. NÚMERO PROYECTO	DWG. TITLE:	
	DWG. NO. : NÚMERO DIBUJO:	

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A. MAIN EQUIPMENT	1			CIRCUIT BREAKER (DRAWOUT TYPE - VCB & GCB) (DRAWOUT TYPE - ACB NONE PROTECTION)		A. MAIN EQUIPMENT	13			METERING OUT-FIT																																																																	
	2			CIRCUIT BREAKER (DRAWOUT TYPE - ACB PROTECTION)			14			CAPACITOR																																																																	
	3			VACUUM SWITCH WITH POWER FUSE (DRAWOUT TYPE - VCS)			15			REACTOR																																																																	
	4			MOLDED CASE CIRCUIT BREAKER			16			LIGHTENING ARRESTER OR SURGE ARRESTER																																																																	
	5			EARTH LEAKAGE CIRCUIT BREAKER			17			TRANSFORMER																																																																	
	6			MAGNETIC CONTACTOR VACUUM SWITCH (FIXED TYPE)			18			MOTOR																																																																	
	7			DISCONNECTING SWITCH MANUAL OPERATING MECHANISM : MOTOR DRIVEN OPERATING MECHANISM :			19			GENERATOR																																																																	
	8			LOAD BREAKER SWITCH WITH FUSE MOTOR DRIVEN OPERATING MECHANISM			20			FUSE SWITCH WITH FUSE																																																																	
	9			GROUND POTENTIAL TRANSFORMER			21			PLUG AND SOCKET DEVICE																																																																	
	10			POTENTIAL (VOLTAGE) TRANSFORMER			22			PLUG AND SOCKET DEVICE																																																																	
11			CURRENT TRANSFORMER		23			EARTH (GROUND) CONNECTION																																																																			
12			ZERO PHASE SEQUENCE CURRENT TRANSFORMER		24																																																																						
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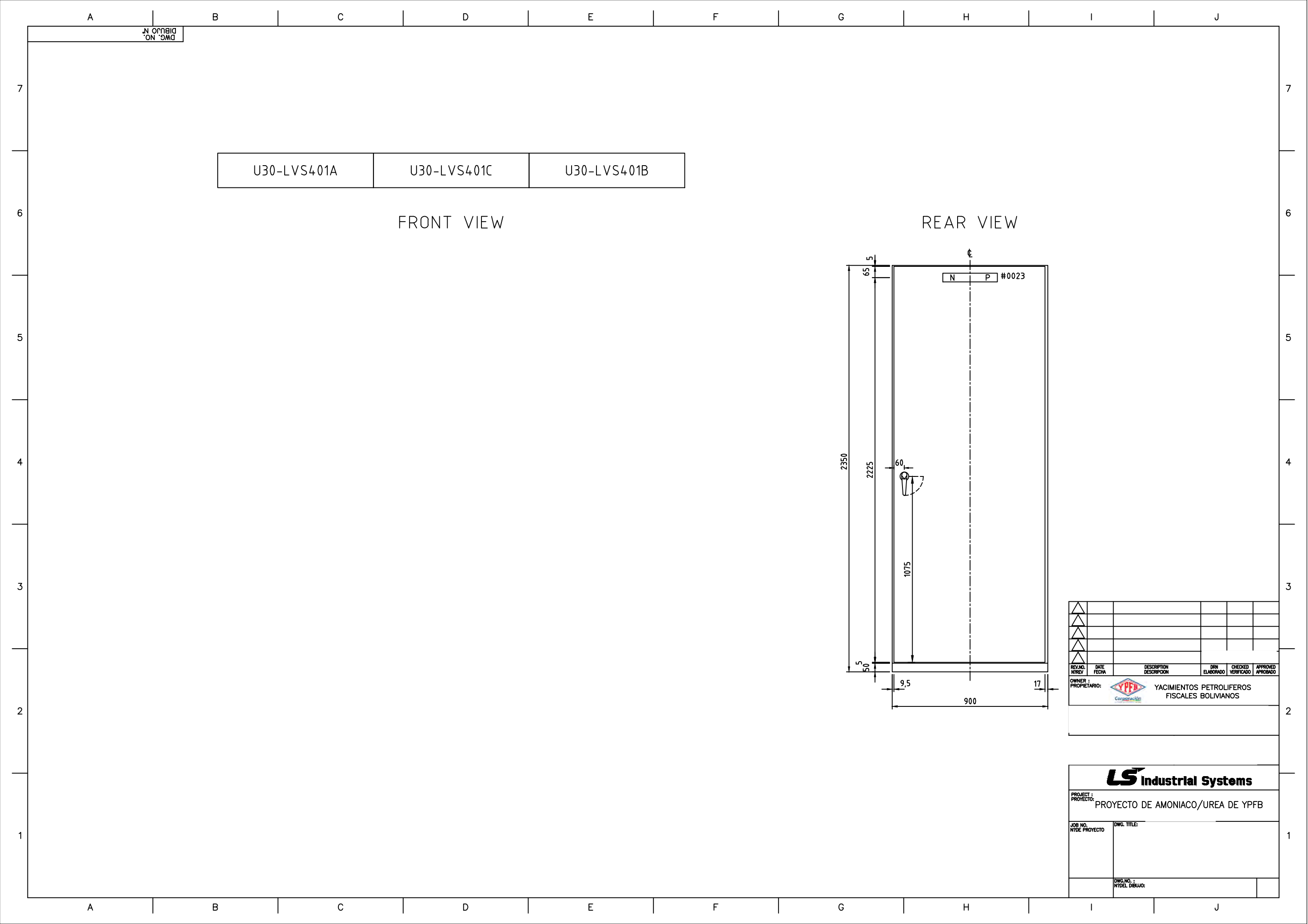
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SYMBOL LEGENDS									
DIVI-S ION	NO.	SYMBOL	DESCRIPTION	DIVI-S ION	NO.	SYMBOL	DESCRIPTION		
C. INSTRUMENT METER	1		AMPERE METER (AC & DC METER)	D. CONTROL AND AUX. DEVICE	13		THERMOSTAT		
	2		VOLTAGE METER (AC & DC METER)		14		SPACE HEATER		
	3		WATT METER		15		FAN		
	4		VAR METER		16		BUZZER		
	5		WATT HOUR METER WATT HOUR METER W/DEMAND		17		BELL		
	6		VAR HOUR METER		18		DIODE		
	7		ZERO PHASE AMPERE METER ZERO PHASE VOLTAGE METER		19		PUSH BUTTON		
	8		FREQUENCY METER		20		PUSH BUTTON W/LAMP		
	9		POWER FACTOR METER		21		SIGNAL LAMP FLUORESCENT LAMP INCANDESCENT LAMP		
	10		SYNCHRO METER SPEED METER		22		ON-DELAY TIMER		
11		EXTERNAL TERMINAL	23		OFF-DELAY TIMER				
12		INTERNAL TERMINAL	24		FLICKER RELAY ON-OFF DELAY TIMER				
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REV. NO. N° REV	DATE FECHA	DESCRIPTION DESCRIPCION	DRN ELABORADO	CHECKED VERIFICADO	APPROVED APROBADO
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LICENSOR : LICENCIADOR:					
PROJECT : PROYECTO: PROYECTO DE AMONIACO/UREA DE YPFB					
JOB NO. N° DE PROYECTO		DWG. TITLE:			
DWG. NO. : N° DEL DIBUJO:					

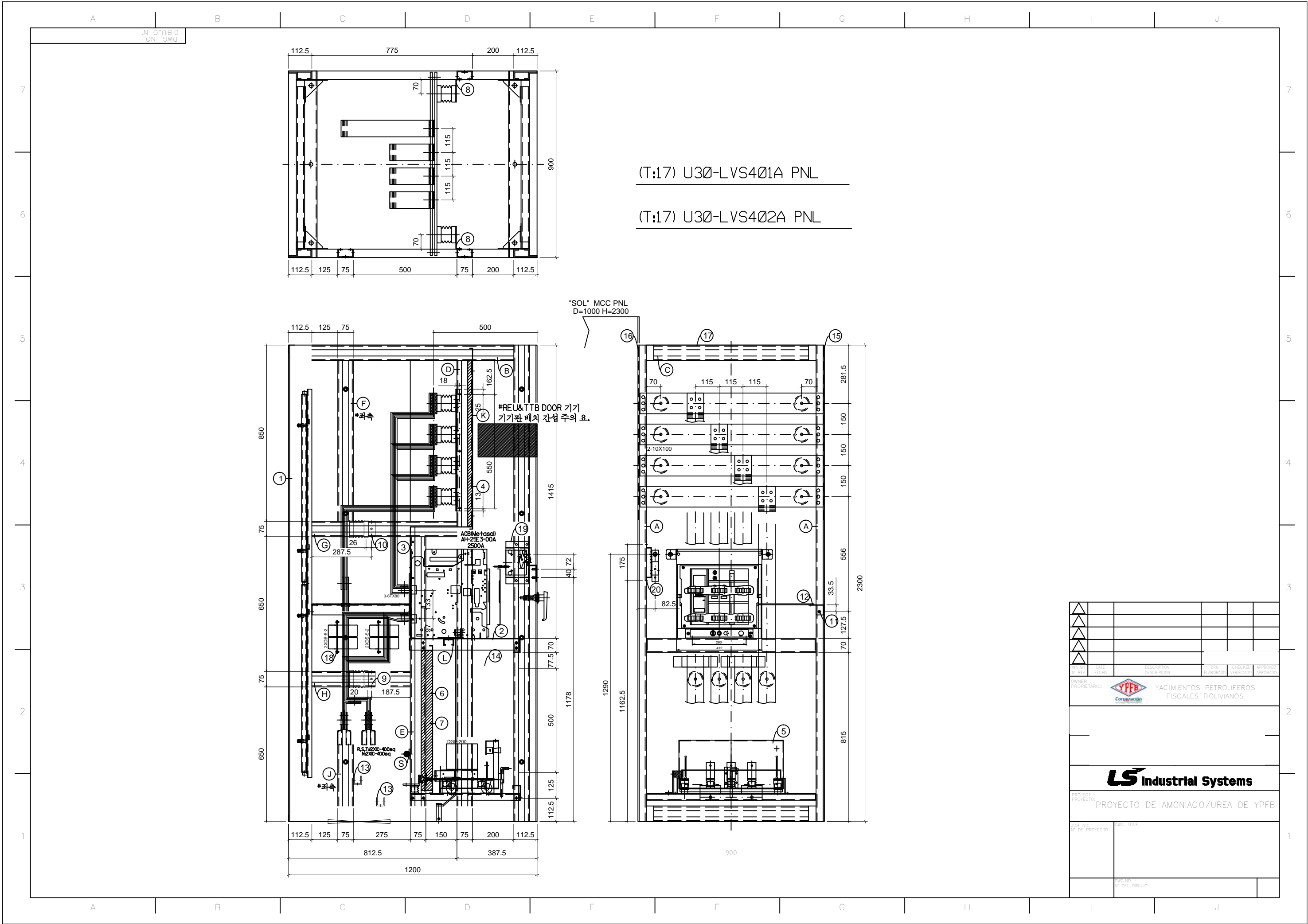



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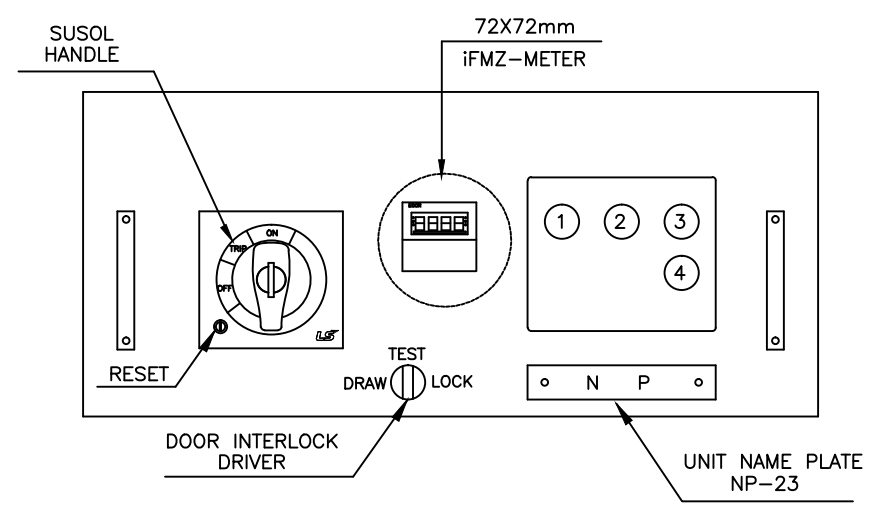
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<b>LS Industrial Systems</b>					
PROJECT - PROYECTO:		PROYECTO DE AMONIACO/UREA DE YPFB			
DRW. NO. W. DE PROYECTO		DWG. TITLE:			
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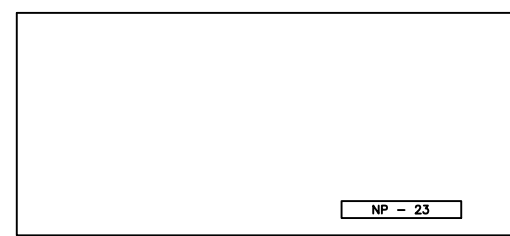
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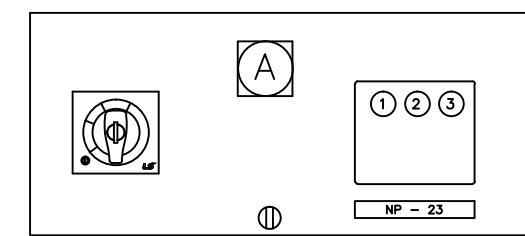
LAMP PANEL

- 1 : START PB W/LAMP or S/LAMP (RED) (FWD,REV)
- 2 : STOP PB W/LAMP or S/LAMP (GREEN)
- 3 : FAULT PB W/LAMP or S/LAMP (YELLOW)

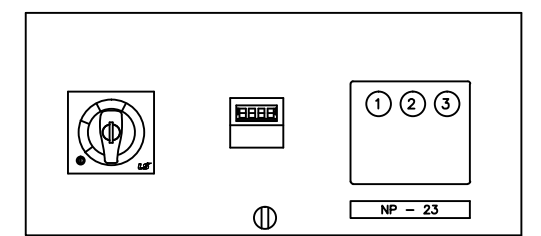
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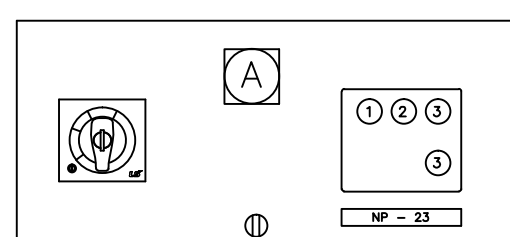
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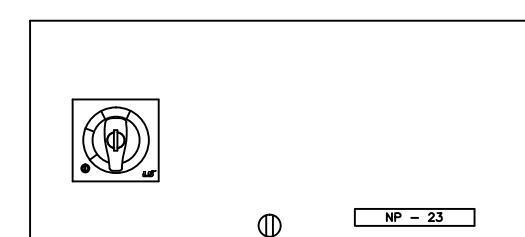
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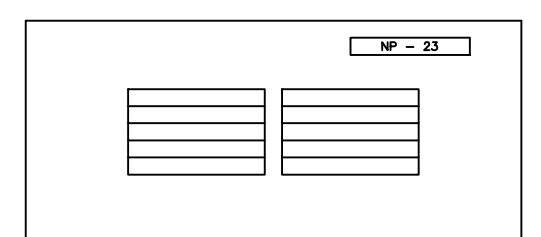
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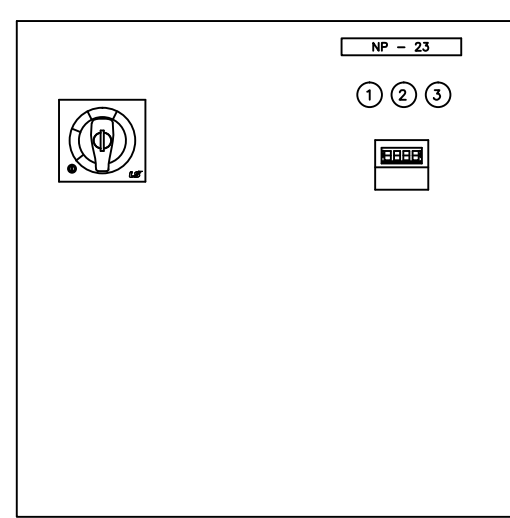
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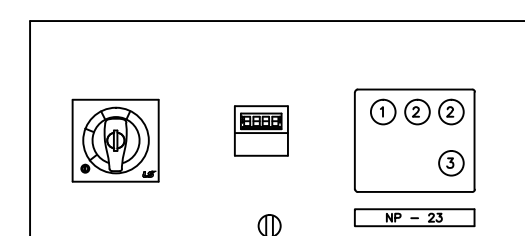
MCC DOOR TYPE : (D)



MCC DOOR TYPE : (S)



MCC DOOR TYPE : (H)



REV					
NO					
PRC					

REV  
NO  
PRC









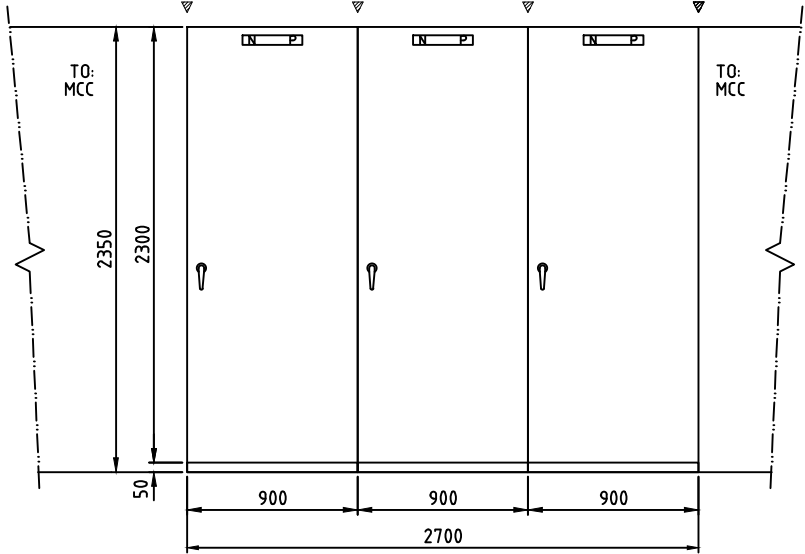


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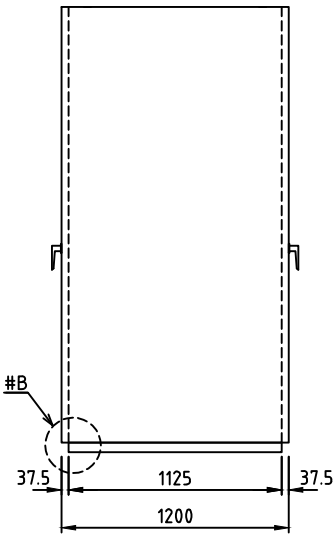
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U30-LVS402A	U30-LVS402C	U30-LVS402B	KKS NO.

1000	1000	1000	WEIGHT(Kg).
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FRONT VIEW

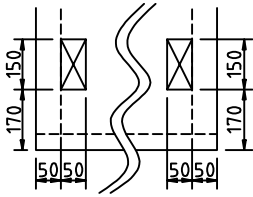


SIDE VIEW

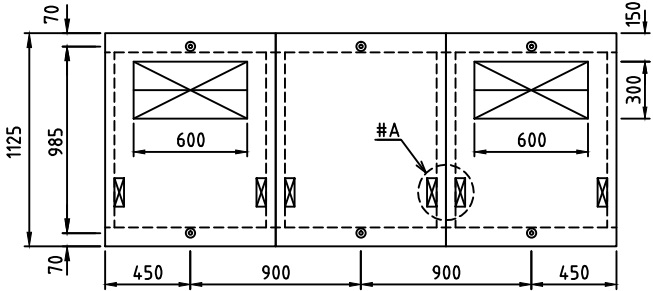


NOTE :  
1. ▽: SHIPPING SPLIT  
2. PANEL ENTRANCE SIZE :

#A DETAIL



BASE PLAN



SKELETON DIAGRAM

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△				
△				
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REV. NO.	DATE	DESCRIPTION	DRN	CHECKED
NYREV	FECHA	DESCRIPCION	ELABORADO	VERIFICADO
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PROPIETARIO:		FISCALES BOLIVIANOS		

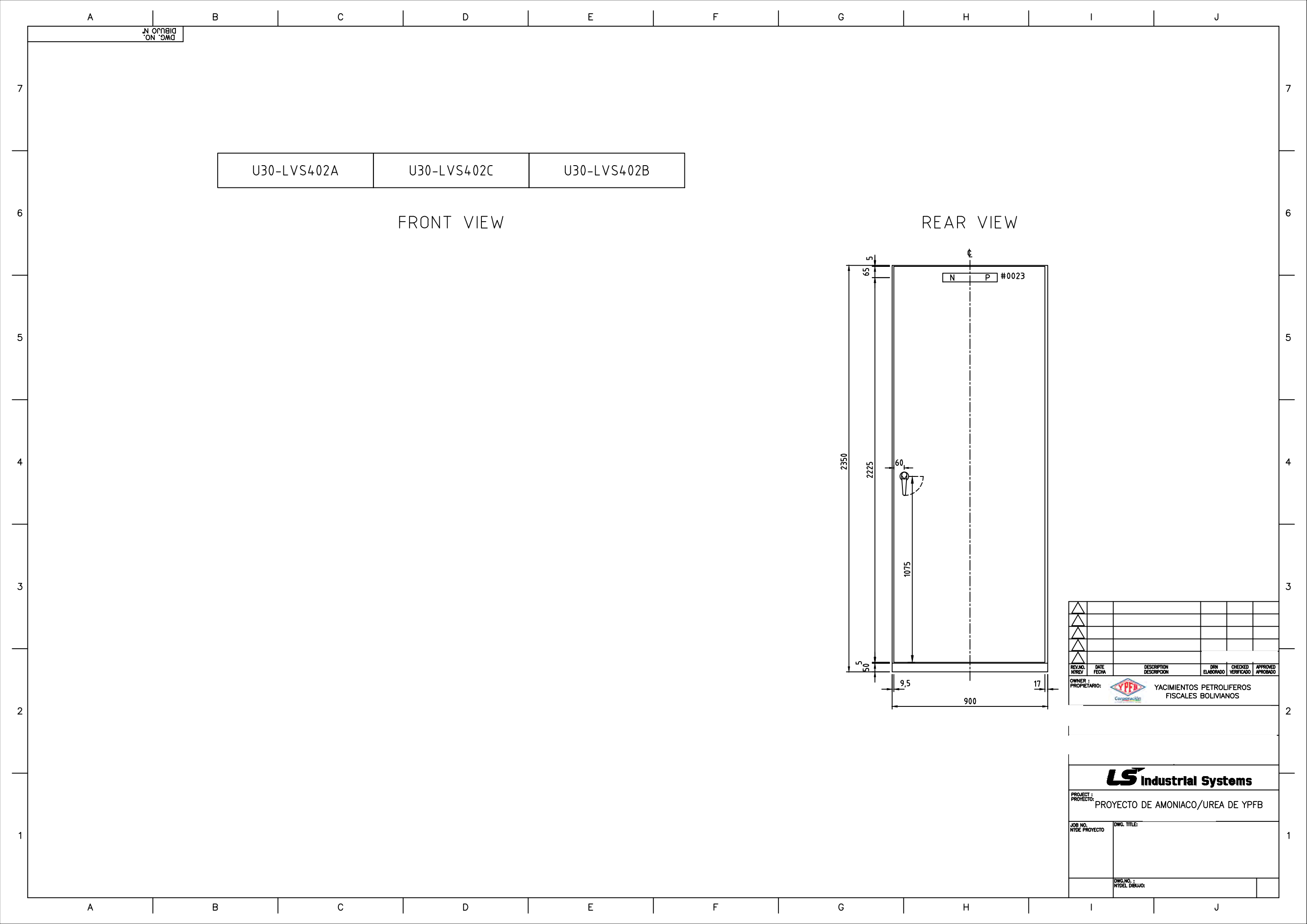
**LS** Industrial Systems

PROJECT :  
PROYECTO: PROYECTO DE AMONIAO/UREA DE YPFB

JOB NO.  
Nº DE PROYECTO

DWG. TITLE:

DWG. NO. :  
Nº DEL DIBUJO:

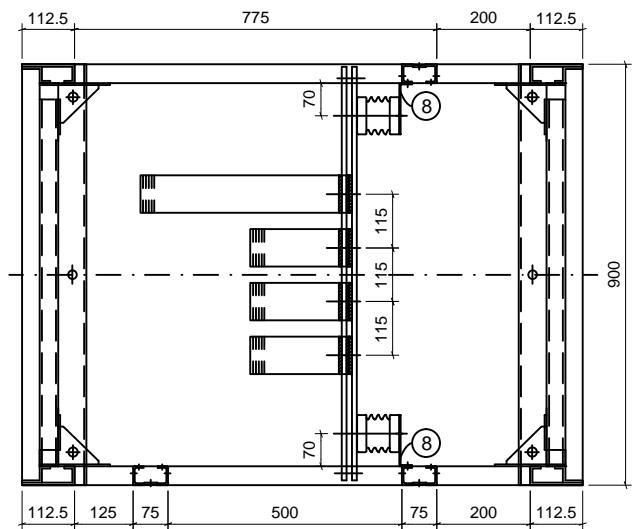


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OWNER : PROPRIETARIO:  YACIMIENTOS PETROLIFEROS FISCALES BOLIVIANOS

<b>LS Industrial Systems</b>	
PROJECT : PROYECTO: PROYECTO DE AMONIACO/UREA DE YPFB	
JOB NO. NÚMERO DE PROYECTO	DWG. TITLE:
DWG. NO. : NÚMERO DEL DIBUJO:	

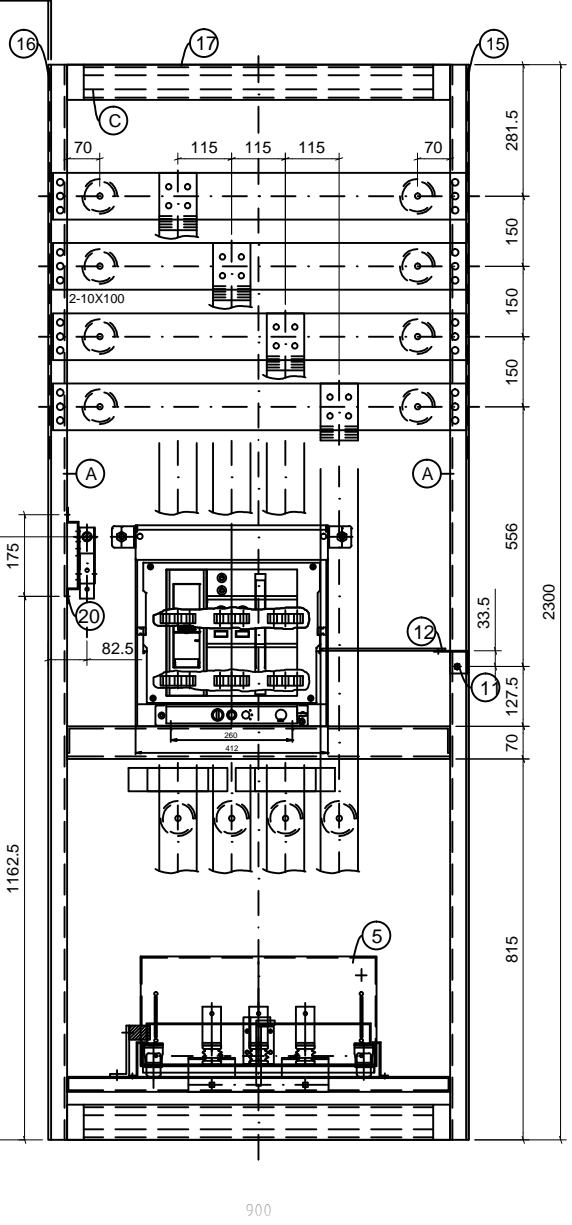
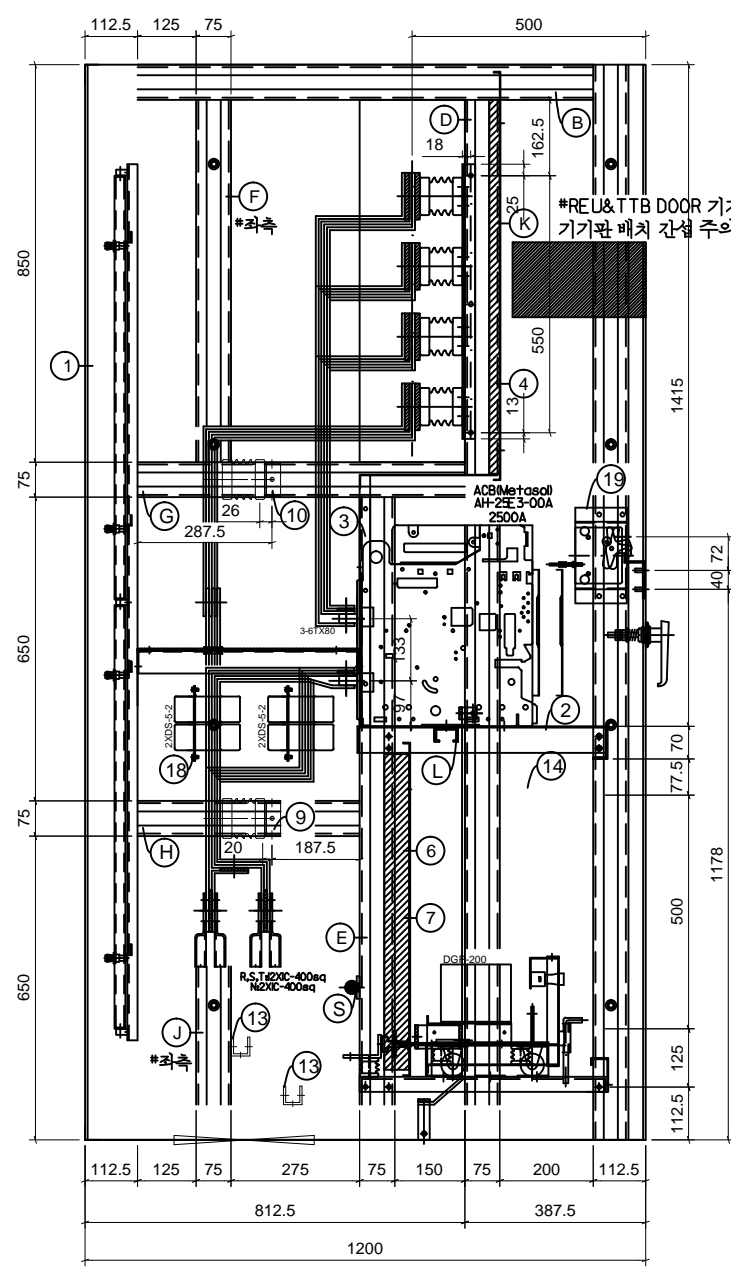
DWG. NO. 011810  
N. ON. 011810




(T:17) U3Ø-LVS4Ø1A PNL

(T:17) U3Ø-LVS4Ø2A PNL

"SOL" MCC PNL  
D=1000 H=2300



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REVISOR	DATE	DESCRIPTION	BY	CHECKED	APPROVED
W. REA	FECHA	DESCRIPCION	LABORADO	VERIFICADO	APROBADO
OWNER PROPIETARIO:		YACIMIENTOS PETROLIFEROS FISCALES BOLIVIANOS			
					
Corporación					
2					
PROJECT PROYECTO:					
PROYECTO DE AMONIACO/UREA DE YPFB					
JOB NO. N° DE PROYECTO		DWG. TITLE:			
DIBUJO N° DEL DIBUJO:					

LS Industrial Systems

A	B	C	D	E	F	G	H	I	J
7									
6									
5									
4									
3									
2									
1									
A	B	C	D	E	F	G	H	I	J

PROYECTO DE AMONIACO/UREA DE YPFB

OWNER :  
PROPIETARIO:

YPFB

Corporación

YACIMIENTOS PETROLIFEROS  
FISCALES BOLIVIANOS

PROJECT :  
PROYECTO:

PROYECTO DE AMONIACO/UREA DE YPFB

JOB NO.  
N° DE PROYECTO

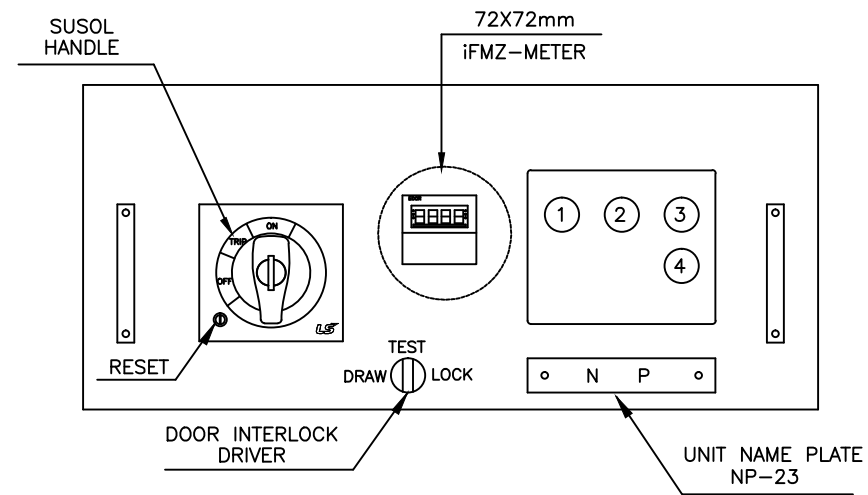
DWG. TITLE:

DWG. NO.  
N° DEL DIBUJO:

REVISED N° REV.	DATE FECHA	DESCRIPTION DESCRIPCION	DRN ELABORADO	CHECKED VERIFICADO	APPROVED APROBADO
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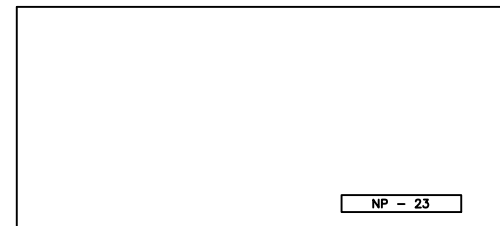
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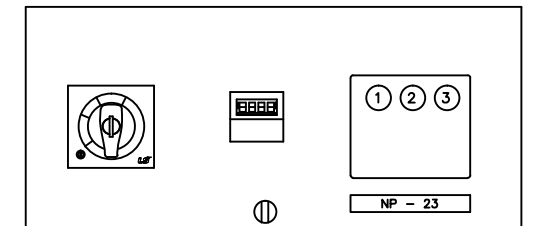


- LAMP PANEL
- 1 : START PB W/LAMP or S/LAMP (RED)
  - 2 : STOP PB W/LAMP or S/LAMP (GREEN)
  - 3 : FAULT PB W/LAMP or S/LAMP (YELLOW)

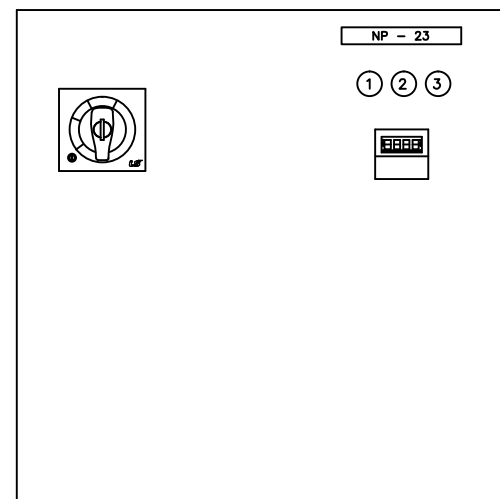
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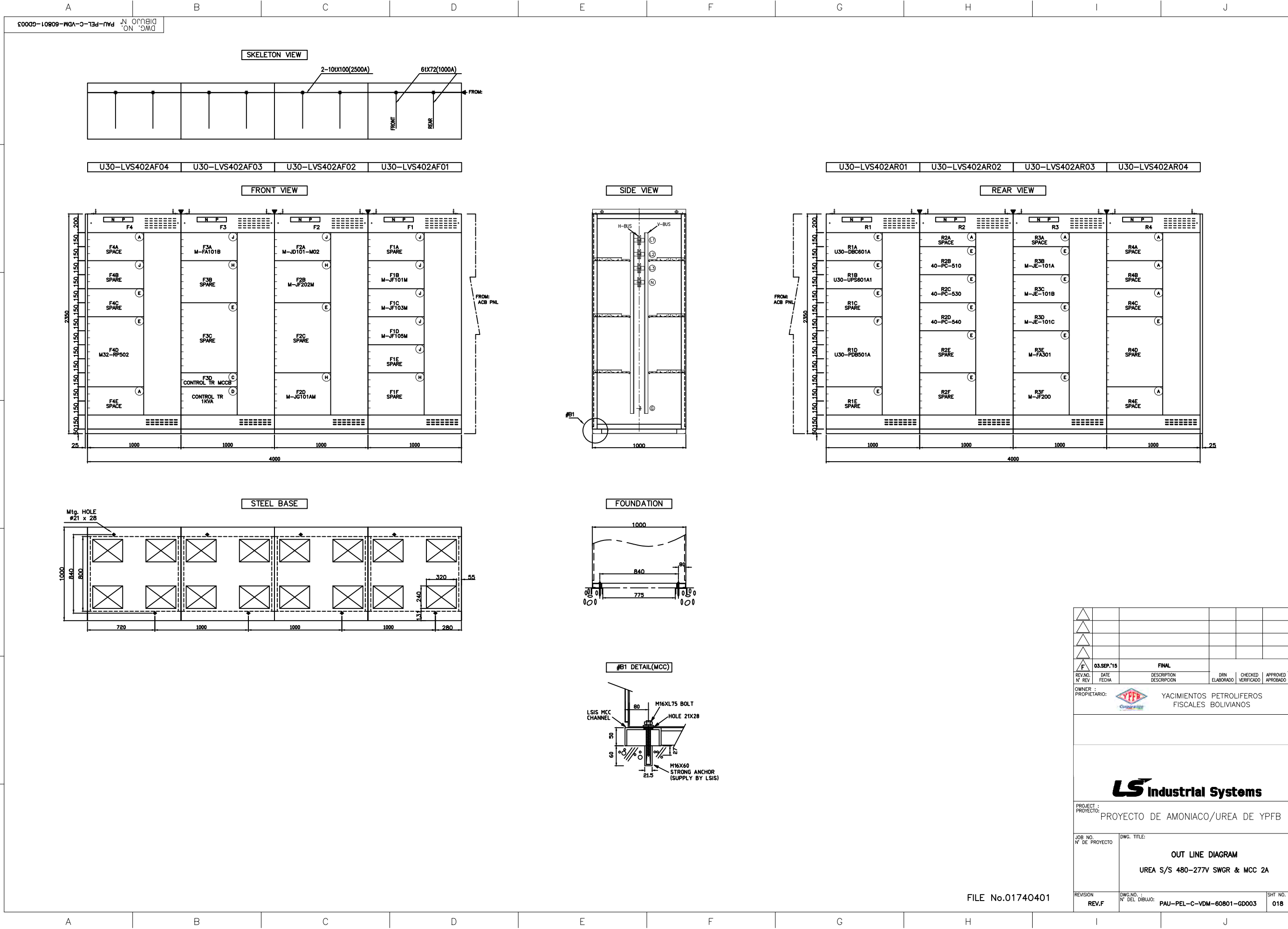
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MCC DOOR TYPE : (S)



MCC UNIT DOOR TYPE

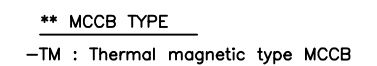


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△	03.SEP.'15	FINAL	BRN	CHECKED	APPROVED
REV. NO.	DATE	DESCRIPTION	ELABORADO	VERIFICADO	APROBADO
N° REV	FECHA	DESCRIPCION			
OWNER : PROPRIETARIO: YPFB YACIMIENTOS PETROLIFEROS FISCALES BOLIVIANOS					
PROJECT : PROYECTO: PROYECTO DE AMONIACO/UREA DE YPFB					
JOB NO.	DWG. TITLE:				
N° DE PROYECTO		OUT LINE DIAGRAM			
		UREA S/S 480-277V SWGR & MCC 2A			
REVISION	DWG. NO. :				
REV.F	N° DEL DIBUJO:	PAU-PEL-C-VDM-60801-GD003	SHT. NO.		
			018		



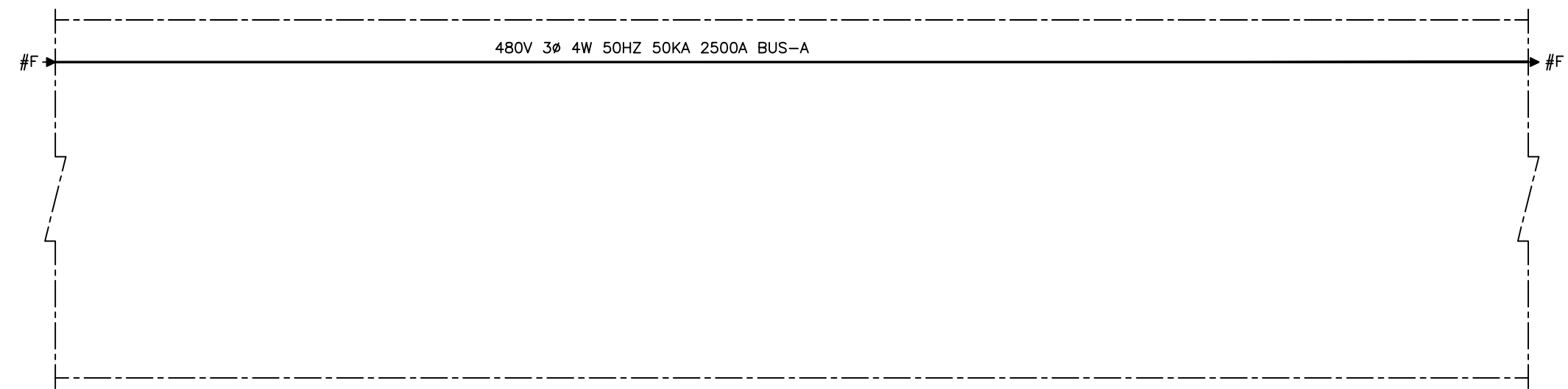




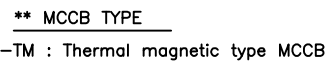



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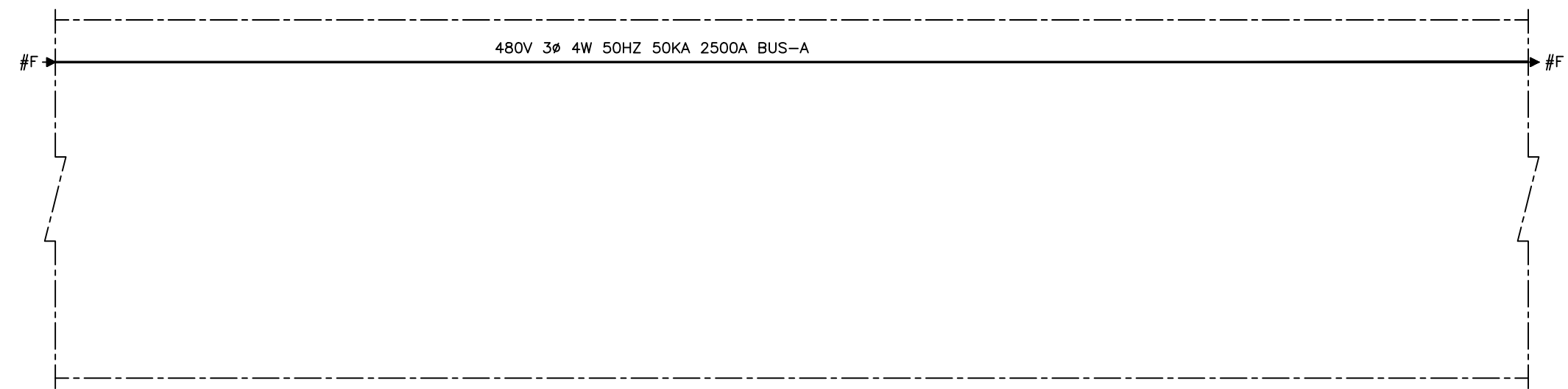


MOTOR CONTROL CENTER	FEEDER NO.		F2A	F2B	F2C	F2D				
	KKS NO.		U-FD601CM	U-GA106AM	U-GA107AM					
	FEEDER NAME		SCREEN	STEAM CONDENSATE PUMP	RETURN CONDENSATE					
	CAPACITY	KW								
	STAB CONNECTOR	Sq								
	MCCB	AF/AT								
	CT	/5A								
	A-METER	/A								
	MAGNETIC CONTACTOR	MCM (88)								
		MCD (88)								
		MCY (88)								
	EOCR									
	ZCT									
	50GS									
	V-METER	V								
	CONTROL TR	VA								
	CONTROL FUSE	A								
	WIRE	Sq								
	2'nd CLIP	A								
	UNIT SIZE	DOOR TYPE								
	SEQUENCE TYPE									
	REMARK									

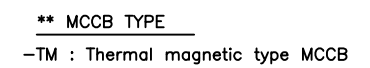







F	03.SEP.'15	FINAL					
REVNO. Y REV.	DATE FEDHA	DESCRIPTION DESCRIPCION	DRI ELABORADO	CHECKED VERIFICADO	APPROVED APROBADO		
OWNER : PROPIETARIO:							
YACIMIENTOS PETROLIFEROS FISCALES				BOLIVIANOS			

 <b>LS Industrial Systems</b>		
PROYECTO : PROYECTO: PROYECTO DE AMONIACO/UREA DE YPFB		
JOB NO. N° DE PROYECTO	DWG. TITLE:  SINGLE LINE DIAGRAM FOR 480V UREA S/S 480-277V SWGR & MCC 1A	
REVISION  REV. F	DWG.NO. : N° DEL DIBUJO: PAU-PEL-C-VDM-60801-GD003	SHT NO.  023

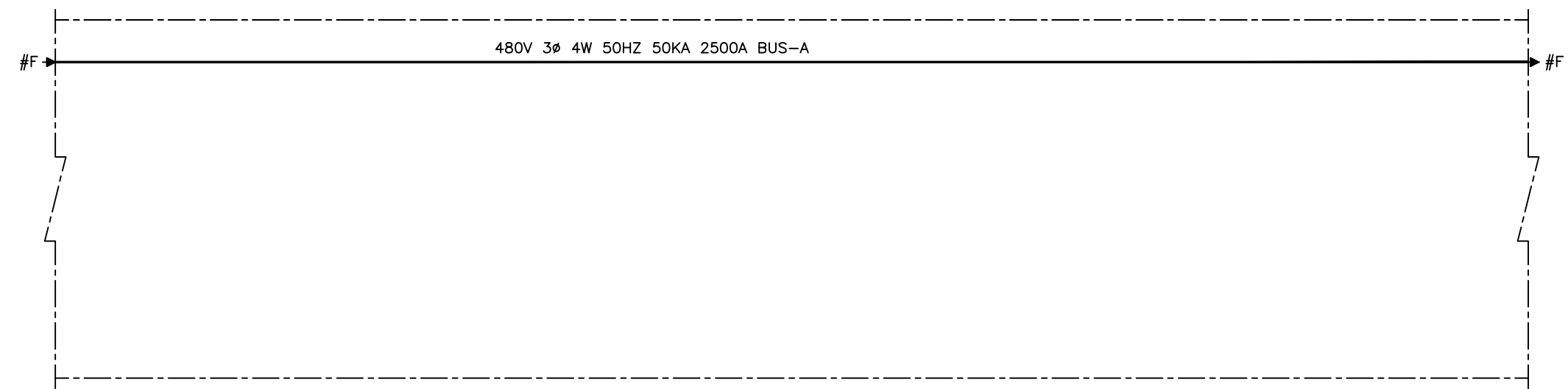


MOTOR CONTROL CENTER	FEEDER NO.		F4A	F4B	F4C					
	KKS NO.		U-FD602-XM02B	U-GA201BM	U-GA103BM					
	FEEDER NAME		VIBRATING FEEDER	UREA SOLUTION PUMP	AMMONIA BOOST-UP					
	CAPACITY	KW								
	STAB CONNECTOR	Sq								
	MCCB	AF/AT								
	CT	/5A								
	A-METER	/A								
	MAGNETIC CONTACTOR	MCM (88)								
		MCD (88)								
		MCY (88)								
	EOCR									
	ZCT									
	50GS									
	V-METER	V								
	CONTROL TR	VA								
	CONTROL FUSE	A								
	WIRE	Sq								
	2'nd CLIP	A								
	UNIT SIZE	DOOR TYPE								
	SEQUENCE TYPE									
	REMARK									



					
					
					
					
	<b>03.SEP.'15</b>	<b>FINAL</b>			
REVNO. N° REV	DATE FECHA	DESCRIPTION DESCRIPCION	DRN ELABORADO	CHECKED VERIFICADO	APPROVED APROBADO
OWNER : PROPIETARIO:			YACIMIENTOS PETROLIFEROS FISCALES BOLIVIANOS		

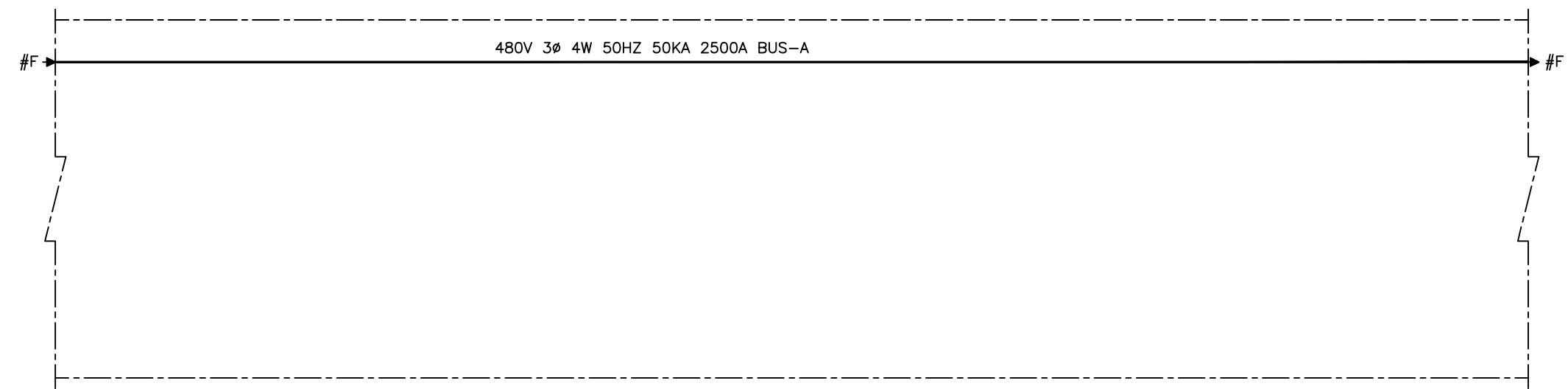
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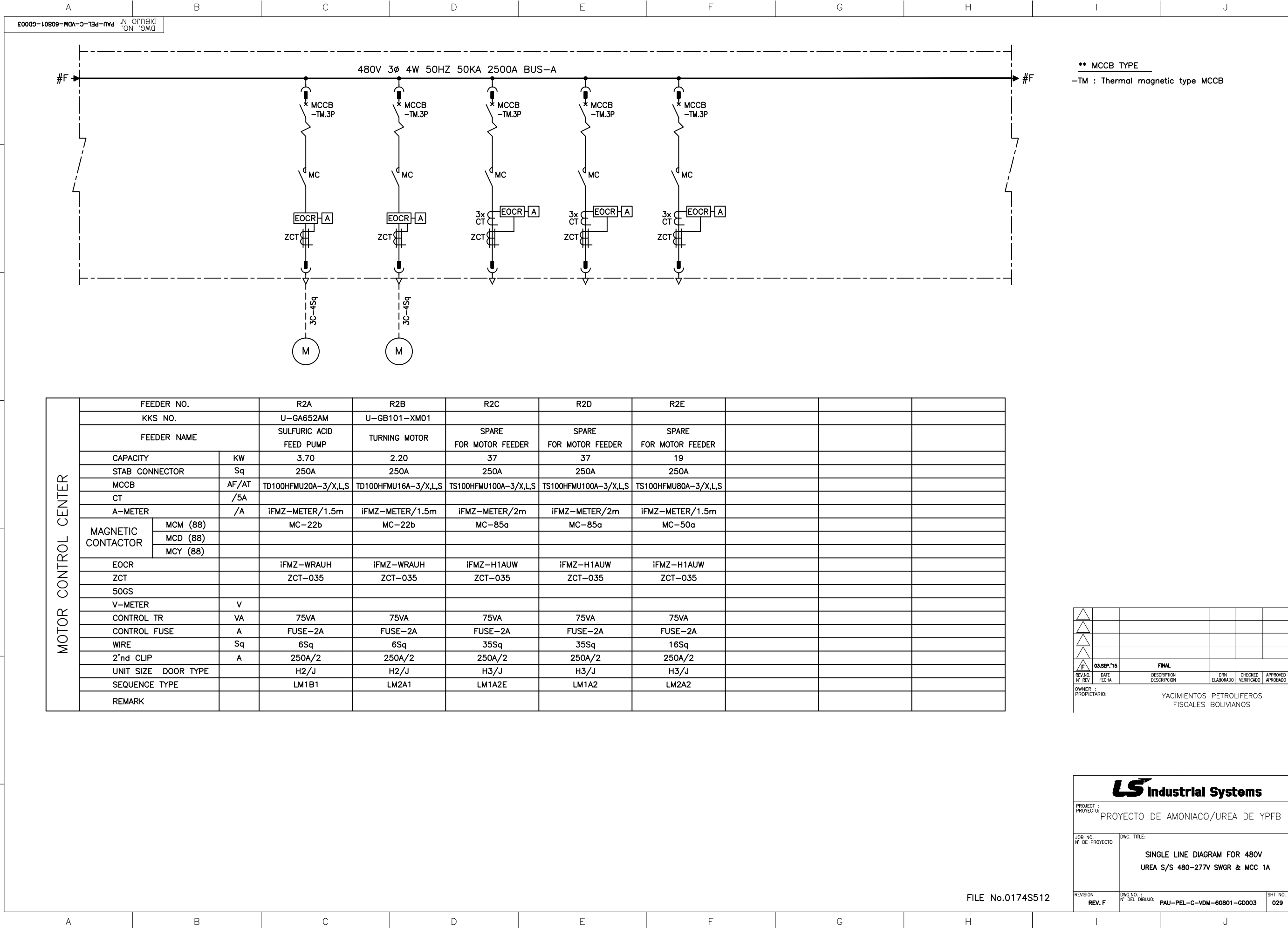
MOTOR CONTROL CENTER	FEEDER NO.		F6A	F6B	F6C	F6D				
	KKS NO.		U-FD602-XM02F	U-GA503AM		U-GA402AM				
	FEEDER NAME		VIBRATING FEEDER	LP ABSORBENT PUMP	CARBAMATE BOOST-UP	HP ABSORBENT PUMP				
	CAPACITY	KW								
	STAB CONNECTOR	Sq								
	MCCB	AF/AT								
	CT	/5A								
	A-METER	/A								
	MAGNETIC CONTACTOR	MCM (88)								
		MCD (88)								
		MCY (88)								
	EOCR									
	ZCT									
	50GS									
	V-METER	V								
	CONTROL TR	VA								
	CONTROL FUSE	A								
	WIRE	Sq								
	2'nd CLIP	A								
	UNIT SIZE	DOOR TYPE								
	SEQUENCE TYPE									
	REMARK									

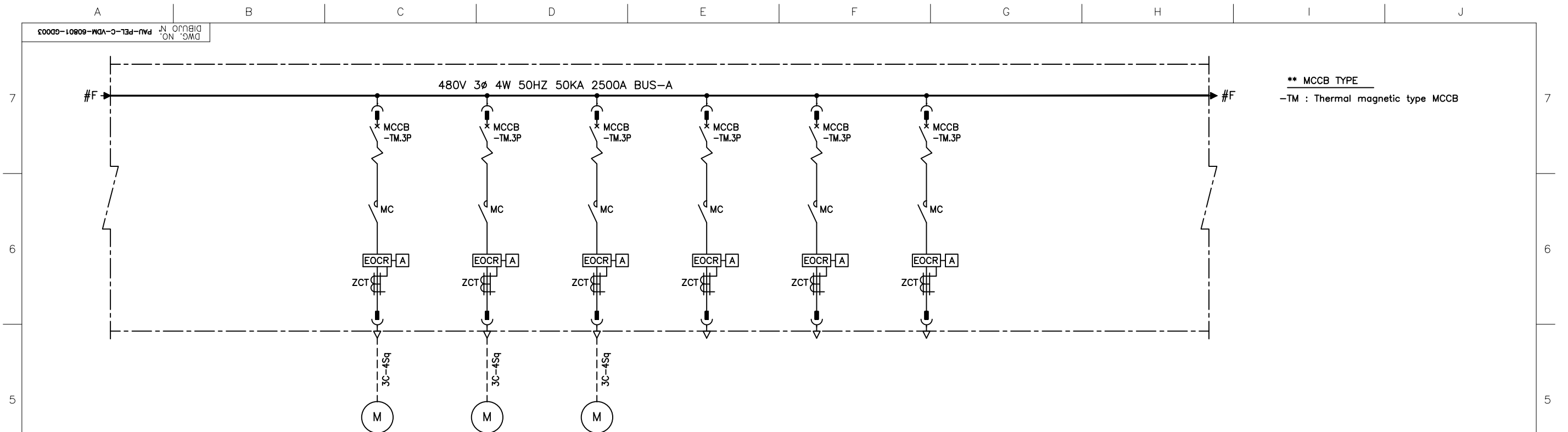






MOTOR CONTROL CENTER	FEEDER NO.		R1A	R1B	R1C	R1D	R1E			
	KKS NO.		U-GA604AM	U-GA651AM	U-GB604M	U-GB701M	U-JD601A-M01			
	FEEDER NAME		DISSOLVING PIT PUMP	AS SOLUTION CIRCULATION PUMP	DUST COLLECTION	N2 COMPRESSOR	MAIN MOTOR FOR U-JD601A			
	CAPACITY	KW								
	STAB CONNECTOR	Sq								
	MCCB	AF/AT								
	CT	/5A								
	A-METER	/A								
	MAGNETIC CONTACTOR	MCM (88)								
		MCD (88)								
		MCY (88)								
	EOCR									
	ZCT									
	50GS									
	V-METER	V								
	CONTROL TR	VA								
	CONTROL FUSE	A								
	WIRE	Sq								
	2'nd CLIP	A								
	UNIT SIZE	DOOR TYPE								
	SEQUENCE TYPE									
	REMARK									



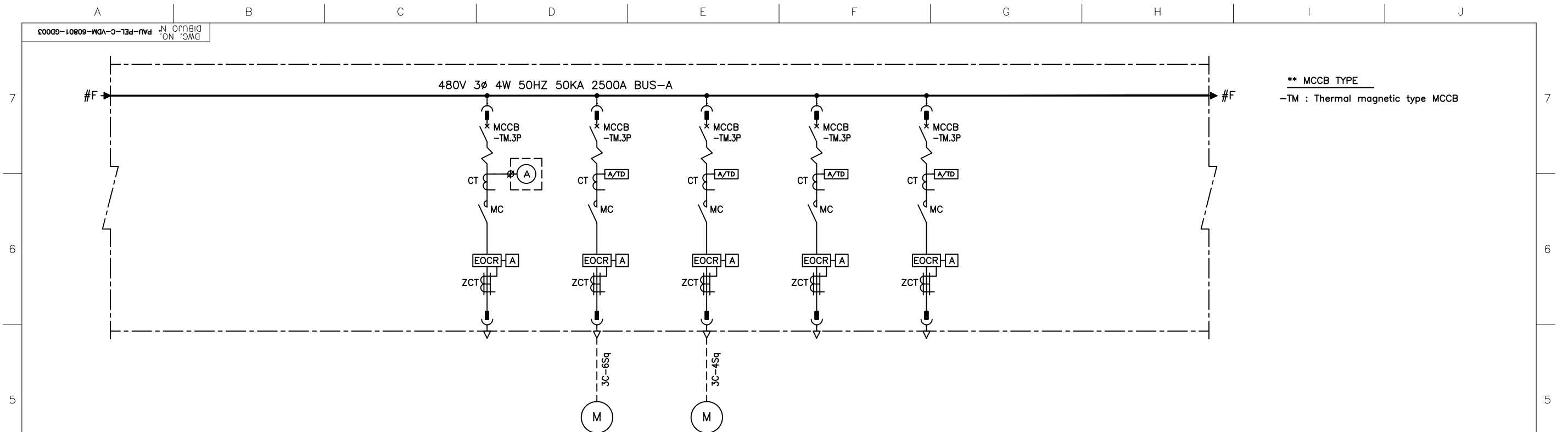


MOTOR CONTROL CENTER	FEEDER NO.		R3A	R3B	R3C	R3D	R3E	R3F		
	KKS NO.		U-JD601B-M02	U-JF601M	U-JF602BM					
	FEEDER NAME		CREEP MOTOR FOR BUCKET ELEVATOR U-JD601B	BELT CONVEYOR WITH PRODUCT WEIGHER	BELT CONVEYOR WITH GRANULATOR OUTLET WEIGHER	SPARE FOR MOTOR FEEDER	SPARE FOR MOTOR FEEDER	SPARE FOR MOTOR FEEDER		
	CAPACITY	KW	1.10	7.50	5.50	1.50	5.50	3.70		
	STAB CONNECTOR	Sq	250A	250A	250A	250A	250A	250A		
	MCCB	AF/AT	TD100HFMU16A-3/X,L,S	TS100HFMU50A-3/X,L,S	TD100HFMU32A-3/X,L,S	TD100HFMU16A-3/X,L,S	TD100HFMU32A-3/X,L,S	TD100HFMU20A-3/X,L,S		
	CT	/5A								
	A-METER		/A	iFMZ-METER/1.5m	iFMZ-METER/1.5m	iFMZ-METER/1.5m	iFMZ-METER/1.5m	iFMZ-METER/1.5m	iFMZ-METER/1.5m	
	MAGNETIC CONTACTOR	MCM (88)		MC-22b	MC-22b	MC-22b	MC-22b	MC-22b	MC-22b	
		MCD (88)								
		MCY (88)								
	EOCR			iFMZ-WRAUH	iFMZ-WRAUH	iFMZ-WRAUH	iFMZ-WRAUH	iFMZ-WRAUH	iFMZ-WRAUH	
	ZCT			ZCT-035	ZCT-035	ZCT-035	ZCT-035	ZCT-035	ZCT-035	
	50GS									
	V-METER		V							
	CONTROL TR	VA	75VA	75VA	75VA	75VA	75VA	75VA	75VA	
	CONTROL FUSE	A	FUSE-2A	FUSE-2A	FUSE-2A	FUSE-2A	FUSE-2A	FUSE-2A	FUSE-2A	
WIRE	Sq	6Sq	6Sq	6Sq	6Sq	6Sq	6Sq	6Sq		
2'nd CLIP	A	250A/2	250A/2	250A/2	250A/2	250A/2	250A/2	250A/2		
UNIT SIZE	DOOR TYPE		H2/J	H2/J	H2/J	H2/J	H2/J	H3/J		
SEQUENCE TYPE			LM1B1	LM1B1	LM1B1	LM1A1	LM1A1	LM1A1E		
REMARK										






\*\* MCCB TYPE


-TM : Thermal magnetic type MCCB

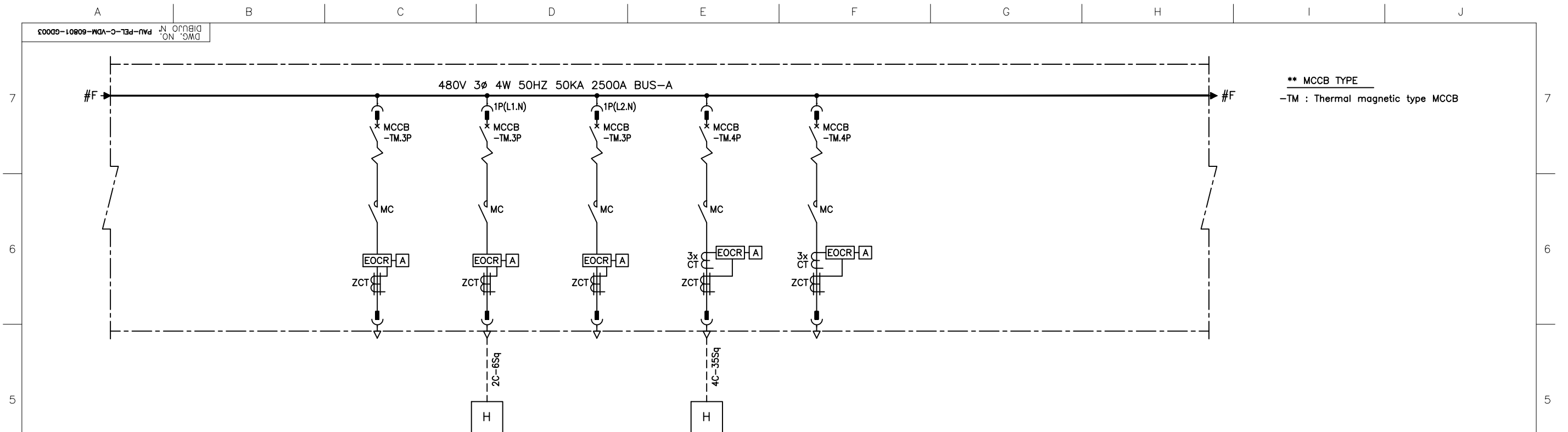
F	03.SEP.'15	FINAL							
RELAND. N° REV.	DATE FECHA	DESCRIPTION DESCRIPCION	DIN ELABORADO	CHECKED VERIFICADO	APPROVED APROBADO				
OWNER : PROPIETARIO:						YACIMIENTOS PETROLIFEROS			



MOTOR CONTROL CENTER	FEEDER NO.		R4A	R4B	R4C	R4D	R4E	R4F		
	KKS NO.				U—GA504M	U—GA703M				
	FEEDER NAME		SPACE	SPARE FOR MOTOR FEEDER	DRAIN RECOVERY PUMP	UREA SOLUTION RECOVERY PUMP	SPARE FOR MOTOR FEEDER	SPARE FOR MOTOR FEEDER		
	CAPACITY	KW		5.60	7.50	3.70	3.70	7.50		
	STAB CONNECTOR	Sq		250A	250A	250A	250A	250A		
	MCCB	AF/AT		TD100HFMU32A—3/X,L,S DR—1(15/1A)	TS100HFMU50A—3/X,L,S DR—1(30/1A)	TD100HFMU20A—3/X,L,S DR—1(10/1A)	TD100HFMU20A—3/X,L,S DR—1(10/1A)	TS100HFMU50A—3/X,L,S DR—1(30/1A)		
	CT	/5A								
	A—METER		/A	iFMZ—METER/1.5m	iFMZ—METER/1.5m	iFMZ—METER/1.5m	iFMZ—METER/1.5m	iFMZ—METER/1.5m		
	MAGNETIC CONTACTOR	MCM (88)		MC—22b	MC—22b	MC—22b	MC—22b	MC—22b		
		MCD (88)								
		MCY (88)								
	EOCR			iFMZ—WRAUH	iFMZ—WRAUH	iFMZ—WRAUH	iFMZ—WRAUH	iFMZ—WRAUH		
	ZCT			ZCT—035	ZCT—035	ZCT—035	ZCT—035	ZCT—035		
	50GS									
	V—METER		V							
	CONTROL TR		VA	75VA	75VA	75VA	75VA	75VA		
CONTROL FUSE		A	FUSE—2A	FUSE—2A	FUSE—2A	FUSE—2A	FUSE—2A			
WIRE		Sq	6Sq	6Sq	6Sq	6Sq	6Sq			
2'nd CLIP		A	250A/2	250A/2	250A/2	250A/2	250A/2			
UNIT SIZE DOOR TYPE			H1/A	H2/J	H2.5/J	H2.5/J	H2.5/J			
SEQUENCE TYPE			LM1B1M	LM1B1T	LM1B1T	LM1B1T	LM1B1T			
REMARK				DT—1AB1AC	DT—1AB1AC	DT—1AB1AC	DT—1AB1AC			

					
					
					
					
					
REV.NO. N° REV	DATE FECHA	DESCRIPTION DESCRIPCION	DRN ELABORADO	CHECKED VERIFICADO	APPROVED APROBADO
OWNER : PROPIETARIO:					
YACIMIENTOS PETROLIFEROS FISCALES BOLIVIANOS					

			
PROJECT : PROYECTO :			
PROYECTO DE AMONIACO/UREA DE YPFB			
JOB NO. N° DE PROYECTO		DWG. TITLE:  SINGLE LINE DIAGRAM FOR 480V UREA S/S 480-277V SWGR & MCC 1A	
REVISION  REV. F	DWG.NO. : N° DEL DIBUJO:	PAU-PEL-C-VDM-60801-GD003	SHT NO.  031

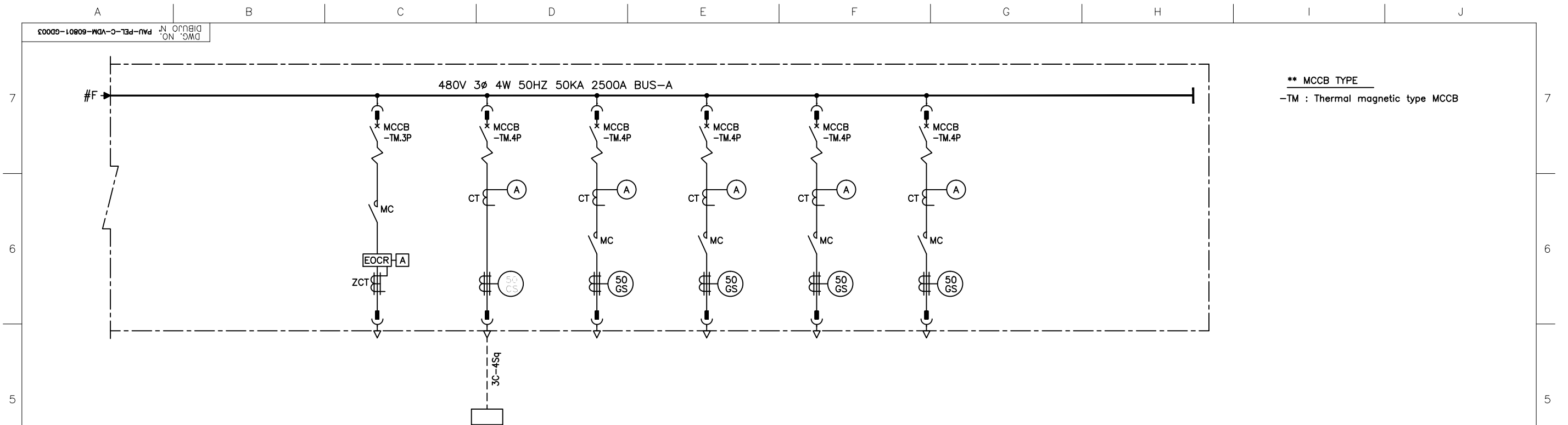




MOTOR CONTROL CENTER	FEEDER NO.		R5A	R5B	R5C	R5D	R5E		
	KKS NO.			U—GA101A—H01		U—GB101—H01			
	FEEDER NAME		SPARE FOR MOTOR FEEDER	OIL HEATER	SPARE FOR HEATER FEEDER	ELECTRICAL LUBE OIL HEATER	SPARE FOR HEATER FEEDER		
	CAPACITY	KW	11	1.00	1.00	30	30		
	STAB CONNECTOR		Sq	250A	250A+N	250A+N	250A+N		
	MCCB	AF/AT	TS100HFMU50A—3/X,L,S	TD100HFMU16A—3/X,L,S	TD100HFMU16A—3/X,L,S	TS100HFMU100A—4/X,L,S	TS100HFMU100A—4/X,L,S		
	CT	/5A							
	A—METER		/A	iFMZ—METER/1.5m	iFMZ—METER/1.5m	iFMZ—METER/1.5m	iFMZ—METER/2m	iFMZ—METER/2m	
	MAGNETIC CONTACTOR	MCM (88)		MC—32a	MC—22b	MC—22b	MC—100a	MC—100a	
		MCD (88)							
		MCY (88)							
	EOCR			iFMZ—WRAUH	iFMZ—WRAUH	iFMZ—WRAUH	iFMZ—H1AUW	iFMZ—H1AUW	
	ZCT			ZCT—035	ZCT—035	ZCT—035	ZCT—080	ZCT—080	
	50GS								
	V—METER		V						
CONTROL TR		VA	75VA	75VA	75VA	75VA	75VA		
CONTROL FUSE		A	FUSE—2A	FUSE—2A	FUSE—2A	FUSE—2A	FUSE—2A		
WIRE		Sq	10Sq	6Sq	6Sq	35Sq	35Sq		
2'nd CLIP		A	250A/2	250A/2	250A/2	250A/2	250A/2		
UNIT SIZE DOOR TYPE			H3/J	H2/J	H2/J	H3/J	H3/J		
SEQUENCE TYPE			LM1A1E	LH2D	LH2D	LH1D	LH1D		
REMARK									


\*\* MCCB TYPE  
-TM : Thermal magnetic type MCCB

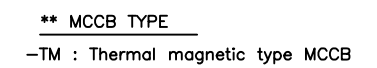
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E	03.SEP.'15	FINAL			
REVIS. N° REV.	DATE FECHA	DESCRIPTION DESCRIPCION	DIN ELABORADO	CHECKED VERIFICADO	APPROVED APROBADO
OWNER : PROPIETARIO:					
YACIMIENTOS PETROLIFEROS FISCALES BOLIVIANOS					
PROJECT : PROYECTO:					
PROYECTO DE AMONIACO/UREA DE YPFB					
JOB NO. N° DE PROYECTO	DWG. TITLE:  SINGLE LINE DIAGRAM FOR 480V UREA S/S 480-277V SWGR & MCC 1A				
REVISION  REV. F	DWG.NO.: Nº DEL DIBUJO:			SHT NO. 032	
PAUL - PEL-C-VDM-60801-GD003					





























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REVNO. N° REV	DATE FECHA	DESCRIPTION DESCRIPCION	DRN ELABORADO	CHECKED VERIFICADO
OWNER : PROPIETARIO:			YACIMIENTOS PETROLIFEROS FISCALES BOLIVIANOS	

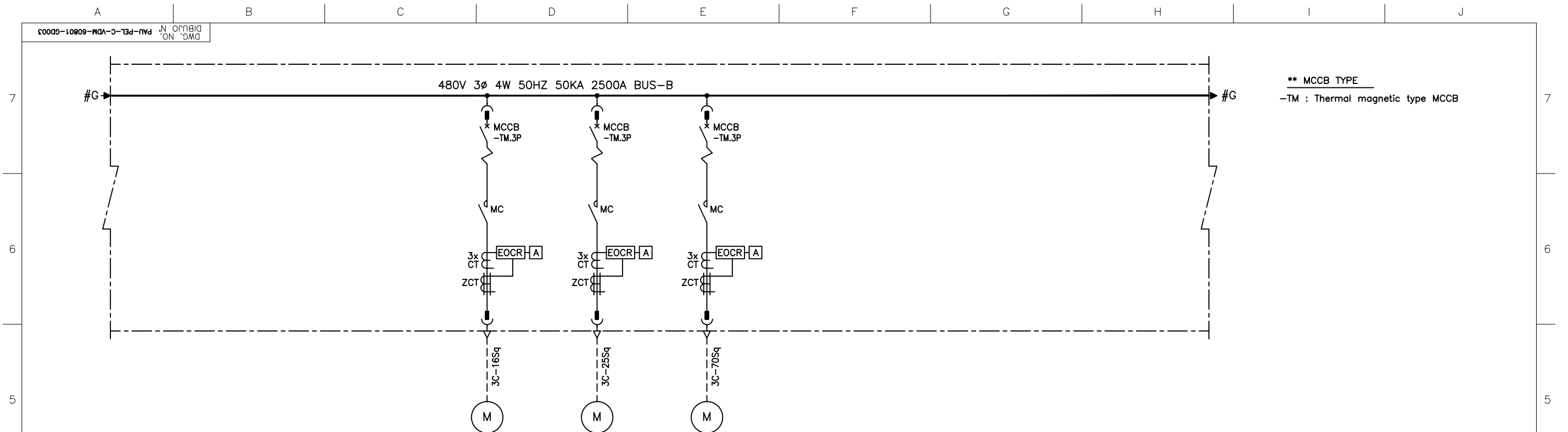
 <b>LS Industrial Systems</b>			
PROJECT : PROYECTO :			
PROYECTO DE AMONIACO/UREA DE YPFB			
JOB NO. N° DE PROYECTO		DWG. TITLE:	
		SINGLE LINE DIAGRAM FOR 480V UREA S/S 480-277V SWGR & MCC 1A	
REVISION		DWG.NO. :	
REV. F		N° DEL DIBUJO:	
		PAU-PEL-C-VDM-60801-GD003	
		SHFT NO.	
		034	








					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					


FILE No.0174S601



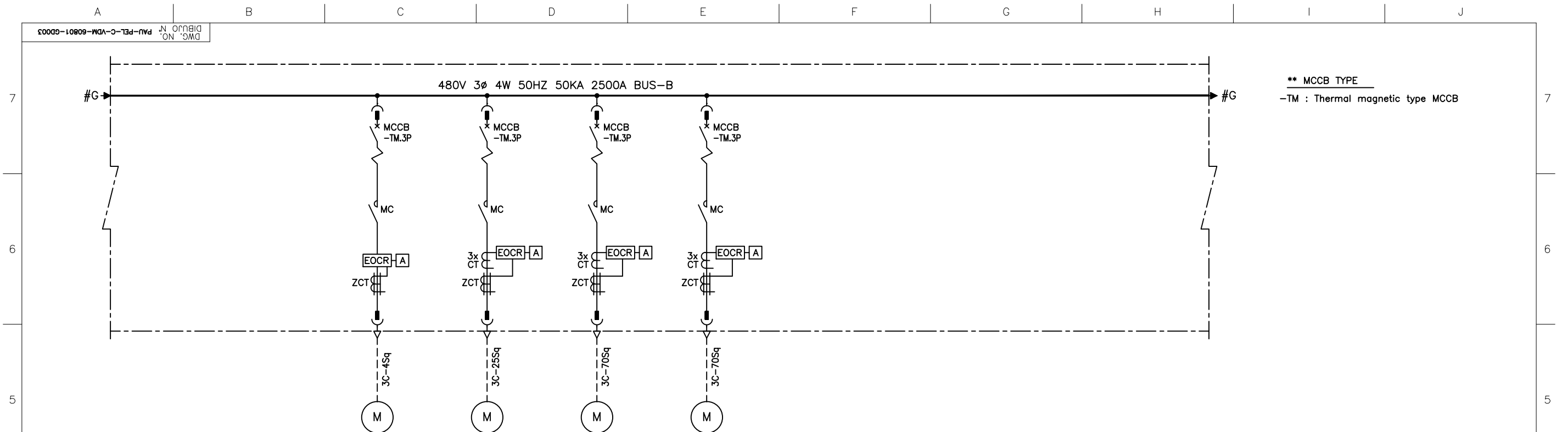


MOTOR CONTROL CENTER	FEEDER NO.		F2A	F2B	F2C	F2D			
	KKS NO.		U-FD601DM	U-GA107BM	U-GA110AM	U-GA502AM			
	FEEDER NAME		SCREEN	RETURN CONDENSATE PUMP	STEAM CONDENSATE MAKE-UP PUMP	UREA HYDROLYZER FEED PUMP			
	CAPACITY	KW		22	37	90			
	STAB CONNECTOR		Sq	250A	250A	250A			
	MCCB	AF/AT		TS100HFMU100A-3/X,L,S	TS100HFMU100A-3/X,L,S	TS250HFMU250A-3/X,L,S			
	CT	/5A							
	A-METER		/A		iFMZ-METER/1.5m	iFMZ-METER/2m	iFMZ-METER/2m		
	MAGNETIC CONTACTOR	MCM (88)			MC-50a	MC-85a	MC-185a		
		MCD (88)							
		MCY (88)							
	EOCR				iFMZ-H1AUW	iFMZ-H1AUW	iFMZ-H2AUW		
	ZCT				ZCT-035	ZCT-035	ZCT-080		
	50GS								
	V-METER		V						
	CONTROL TR		VA		75VA	75VA	100VA		
	CONTROL FUSE		A		FUSE-2A	FUSE-2A	FUSE-2A/4A		
WIRE		Sq		16Sq	35Sq	95Sq			
2'nd CLIP		A		250A/2	250A/2	250A/2			
UNIT SIZE DOOR TYPE				H3/J	H3/J	H5/J			
SEQUENCE TYPE				LM1A2E	LM1A2E	LM1B2			
REMARK									

					
					
					
					
					
REV.NO. N° REV	DATE FECHA	DESCRIPTION DESCRIPCION	DRN ELABORADO	CHECKED VERIFICADO	APPROVED APROBADO
OWNER PROPIETARIO:			YACIMIENTOS PETROLIFEROS FISCALES BOLIVIANOS		

		
PROJECT : PROYECTO :		
PROYECTO DE AMONIACO/UREA DE YPFB		
JOB NO. N° DE PROYECTO	DWG. TITLE:  SINGLE LINE DIAGRAM FOR 480V UREA S/S 480-277V SWGR & MCC 1B	
REVISION  REV.	DWG. NO. : DEL DIBUJO:	SHIT NO.  036
	PAU-PEL-C-VDM-60801-GD003	









MOTOR CONTROL CENTER	FEEDER NO.		F4A	F4B	F4C	F4D			
	KKS NO.		U-FD602-XM02D	U-GA304BM	U-GA103AM	U-GA104M			
	FEEDER NAME		VIBRATING FEEDER	TEMPERED WATER PUMP	AMMONIA BOOST-UP PUMP	LOW PRESSURE FLOODING PUMP			
	CAPACITY	KW	0.95	30	75	75			
	STAB CONNECTOR	Sq	250A	250A	250A	250A			
	MCCB	AF/AT	TD100HFMU16A-3/X,L,S	TS100HFMU100A-3/X,L,S	TS250HFMU250A-3/X,L,S	TS250HFMU250A-3/X,L,S			
	CT	/5A							
	A-METER		/A	iFMZ-METER/1.5m	iFMZ-METER/1.5m	iFMZ-METER/2m	iFMZ-METER/2m		
	MAGNETIC CONTACTOR	MCM (88)		MC-22b	MC-65a	MC-150a	MC-150a		
		MCD (88)							
		MCY (88)							
	EOCR			iFMZ-WRAUH	iFMZ-H1AUW	iFMZ-H2AUW	iFMZ-H2AUW		
	ZCT			ZCT-035	ZCT-035	ZCT-080	ZCT-080		
	50GS								
	V-METER		V						
	CONTROL TR		VA	75VA	75VA	75VA	75VA		
	CONTROL FUSE		A	FUSE-2A	FUSE-2A	FUSE-2A	FUSE-2A		
WIRE		Sq	6Sq	25Sq	70Sq	70Sq			
2'nd CLIP		A	250A/2	250A/2	250A/2	250A/2			
UNIT SIZE DOOR TYPE			H2/J	H3/J	H4/J	H4/J			
SEQUENCE TYPE			LM1B1	LM1A2E	LM1A2	LM1B2E			
REMARK									


**\*\* MCCB TYPE**

—TM : Thermal magnetic type MCCB

					
					
					
					
REV.NO. N° REV	DATE FECHA	DESCRIPTION DESCRIPCION	DRN ELABORADO	CHECKED VERIFICADO	APPROVED APROBADO

OWNER :  
PROPIETARIO:

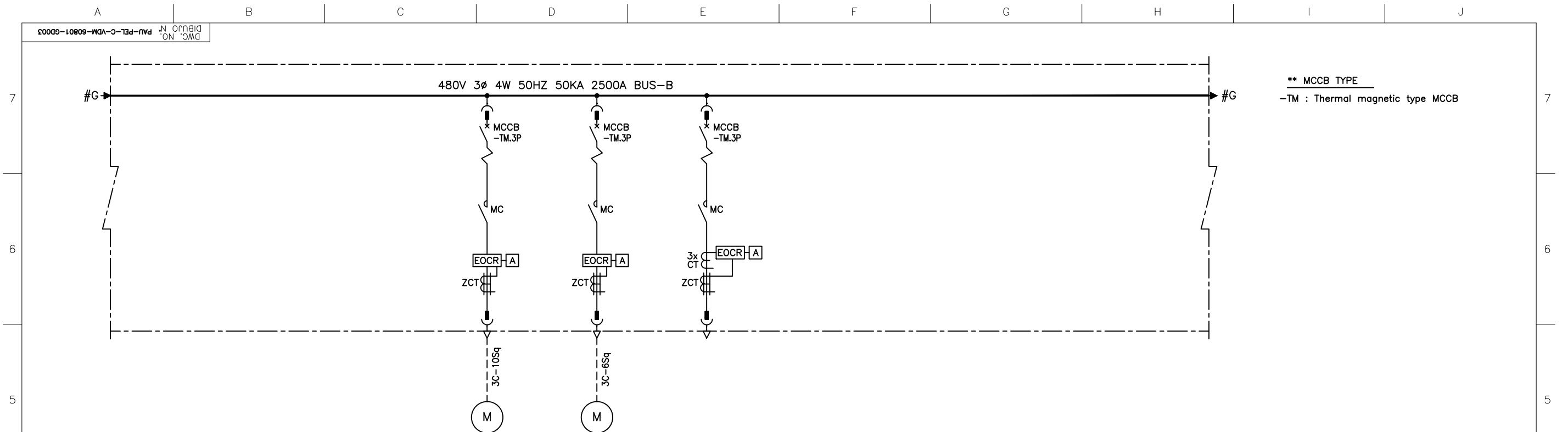
YACIMIENTOS PETROLIFEROS  
FISCALES BOLIVIANOS

			
PROJECT : PROYECTO:		PROYECTO DE AMONIACO / IIRFA DE YPFB	
JOB NO. N° DE PROYECTO		DWG. TITLE:  SINGLE LINE DIAGRAM FOR 480V UREA S/S 480-277V SWGR & MCC 1B	
REVISION  <b>REV.</b>	DWG. NO. : N° DEL DIBUJO:	PAU-REL-C-VDM-60801-GD003	SHEET NO.  <b>038</b>












MOTOR CONTROL CENTER	FEEDER NO.		R1A	R1B	R1C	R1D	R1E		
	KKS NO.			U-GA404BM	U-GA604BM				
	FEEDER NAME			No.2 HP ABSORBENT PUMP	DISSOLVING PIT PUMP				
	CAPACITY	KW		15	7.50	37			
	STAB CONNECTOR			250A	250A	250A			
	MCCB	AF/AT		TS100HFMU50A-3/X,L,S	TS100HFMU50A-3/X,L,S	TS100HFMU100A-3/X,L,S			
	CT	/5A							
	A-METER		/A	iFMZ-METER/1.5m	iFMZ-METER/1.5m	iFMZ-METER/2m			
	MAGNETIC CONTACTOR	MCM (88)		MC-40a	MC-22b	MC-85a			
		MCD (88)							
		MCY (88)							
	EOCR			iFMZ-WRAUH	iFMZ-WRAUH	iFMZ-H1AUW			
	ZCT			ZCT-035	ZCT-035	ZCT-035			
	50GS								
	V-METER		V						
	CONTROL TR	VA		75VA	75VA	75VA			
CONTROL FUSE	A		FUSE-2A	FUSE-2A	FUSE-2A				
WIRE	Sq		10Sq	6Sq	35Sq				
2'nd CLIP	A		250A/2	250A/2	250A/2				
UNIT SIZE	DOOR TYPE		H2/J	H2/J	H3/J				
SEQUENCE TYPE			LM1B1	LM1B1	LM1A2E				
REMARK									

\*\* MCCB TYPE

-TM : Thermal magnetic type MCCB

					
					
	<b>03.SEP.'15</b>	<b>FINAL</b>			
REV.NO. N° REV	DATE FECHA	DESCRIPTION DESCRIPCION	DRN ELABORADO	CHECKED VERIFICADO	APPROVED APROBADO
OWNER : PROPIETARIO:			YACIMIENTOS PETROLIFEROS FISCALES BOLIVIANOS		

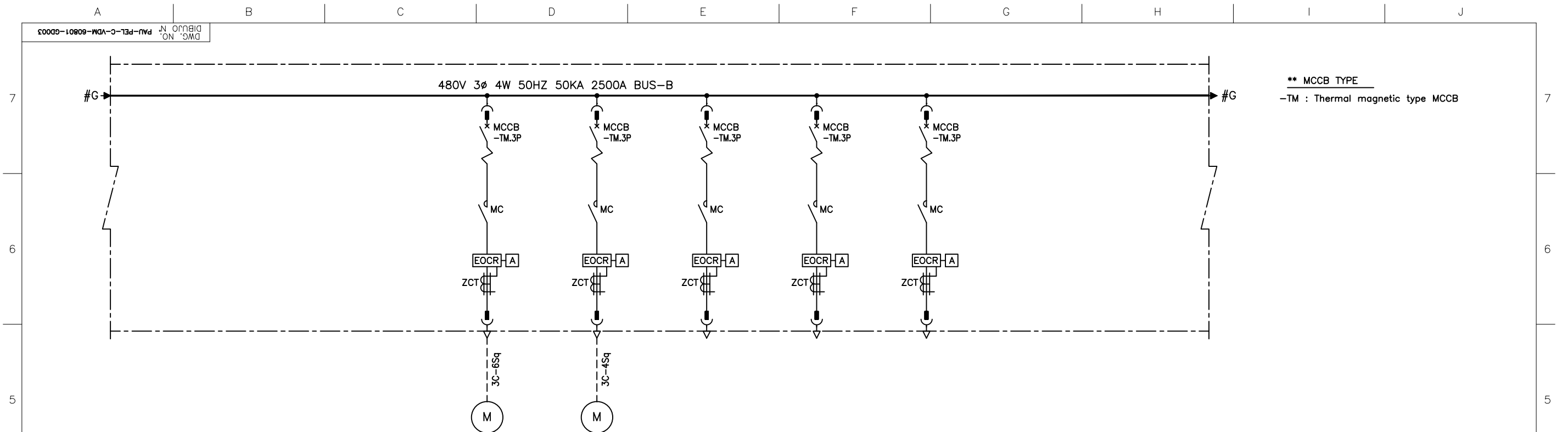
**LS Industrial Systems**

PROJECT : PROYECTO:	PROYECTO DE AMONIACO/UREA DE YPFB
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



JOB NO. N° DE PROYECTO	DWG. TITLE:  SINGLE LINE DIAGRAM FOR 480V UREA S/S 480-277V SWGR & MCC 1B
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REVISION	DWG.NO. : N° DEL DIBUJO:	SHT NO.
REV.	PAU-PEL-C-VDM-60801-GD003	042

FILE No.0174S611

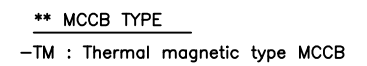







MOTOR CONTROL CENTER	FEEDER NO.		R2A	R2B	R2C	R2D	R2E		
	KKS NO.			U-GA606M	U-GA651BM				
	FEEDER NAME			AS SOLUTION RECOVERY PUMP	AS SOLUTION CIRCULATION PUMP				
	CAPACITY	KW		11	3.70	7.50	1.50	3.70	
	STAB CONNECTOR	Sq		250A	250A	250A	250A	250A	
	MCCB	AF/AT		TS100HFMU50A-3/X,L,S	TD100HFMU20A-3/X,L,S	TS100HFMU50A-3/X,L,S	TD100HFMU16A-3/X,L,S	TD100HFMU20A-3/X,L,S	
	CT	/5A							
	A-METER		/A	iFMZ-METER/1.5m	iFMZ-METER/1.5m	iFMZ-METER/1.5m	iFMZ-METER/1.5m	iFMZ-METER/1.5m	
	MAGNETIC CONTACTOR	MCM (88)		MC-32a	MC-22b	MC-22b	MC-22b	MC-22b	
		MCD (88)							
		MCY (88)							
	EOCR			iFMZ-WRAUH	iFMZ-WRAUH	iFMZ-WRAUH	iFMZ-WRAUH	iFMZ-WRAUH	
	ZCT			ZCT-035	ZCT-035	ZCT-035	ZCT-035	ZCT-035	
	50GS								
	V-METER		V						
	CONTROL TR		VA	75VA	75VA	75VA	75VA	75VA	
CONTROL FUSE		A	FUSE-2A	FUSE-2A	FUSE-2A	FUSE-2A	FUSE-2A		
WIRE		Sq	10Sq	6Sq	6Sq	6Sq	6Sq		
2'nd CLIP		A	250A/2	250A/2	250A/2	250A/2	250A/2		
UNIT SIZE DOOR TYPE			H2/J	H2/J			H3/J		
SEQUENCE TYPE			LM1B1	LM1B1	LM1A1	LM1A1	LM1A1E		
REMARK									

						
						
						
						
						
						
						
						
						
						
<b>F</b>	<b>03.SEP.'15</b>					
REVNO. N° REV	DATE FECHA	DESCRIPTION DESCRIPCION	DRN ELABORADO	CHECKED VERIFICADO	APPROVED APROBADO	
OWNER PROPIETARIO:		YACIMIENTOS PETROLIFEROS FISCALES BOLIVIANOS				

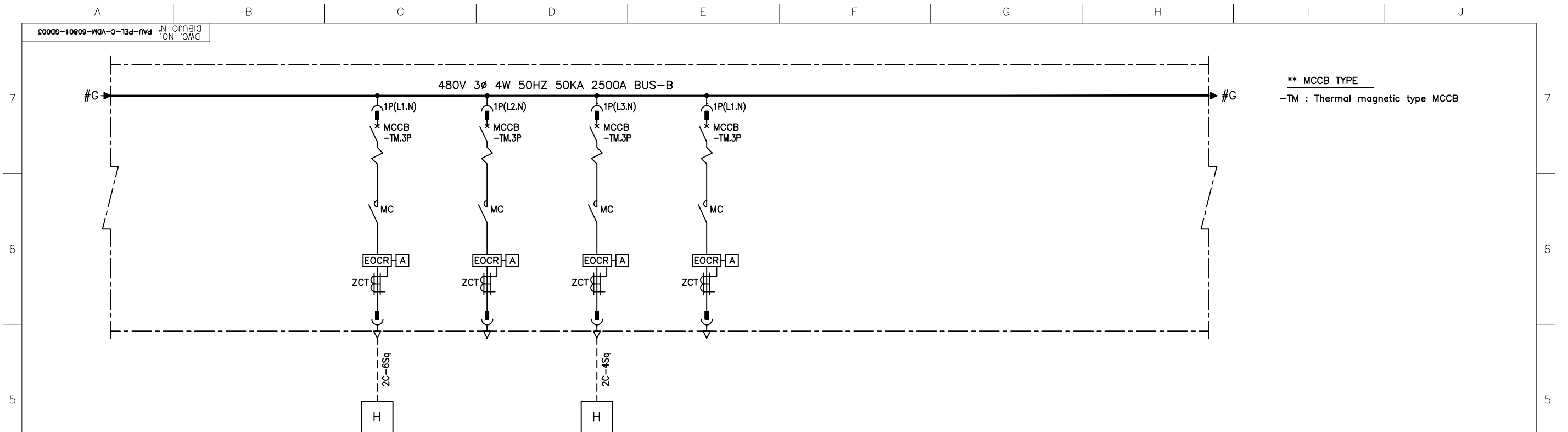
			
PROJECT : PROYECTO:		PROYECTO DE AMONIACO/UREA DE YPFB	
JOB NO. N° DE PROYECTO		DWG. TITLE:  SINGLE LINE DIAGRAM FOR 480V UREA S/S 480-277V SWGR & MCC 1B	
REVISION  <b>REV.</b>	DWG.NO.: N° DEL DIBUJO:	PAU-PEL-C-VDM-60801-GD003	SHT NO.  <b>043</b>





					
					
					
					
					
<b>F</b>	<b>03.SEP.'15</b>				
REV.NO. N° REV	DATE FECHA	DESCRIPTION DESCRIPCION	DIN ELABORADO	CHECKED VERIFICADO	APPROVED APROBADO
OWNER PROPIETARIO:					
YACIMIENTOS PETROLIFEROS FISCALES BOLIVIANOS					














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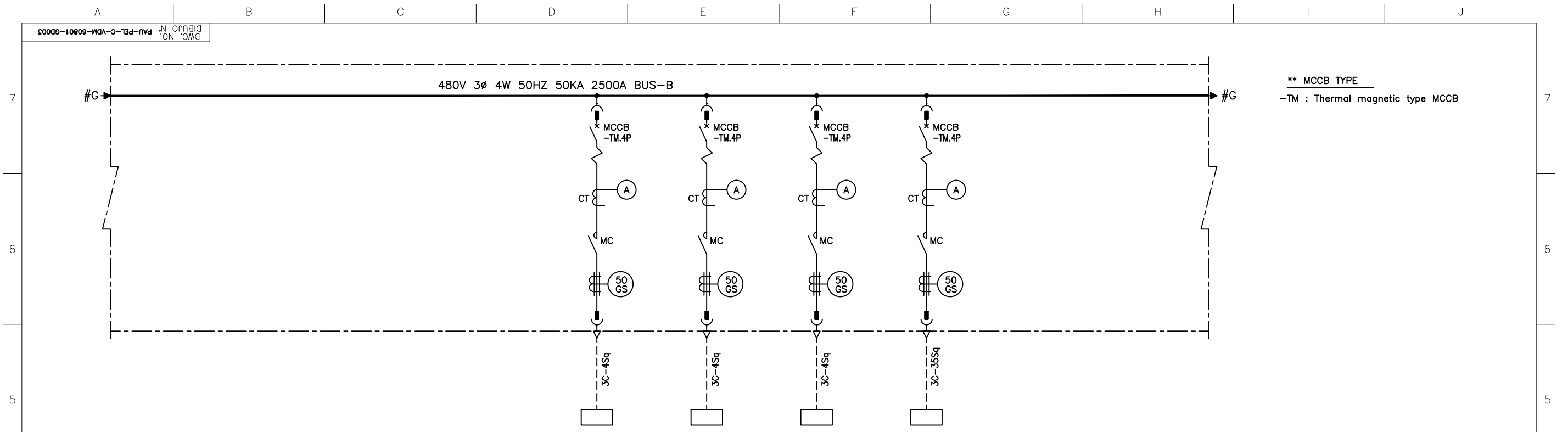
MOTOR CONTROL CENTER	FEEDER NO.		R4A	R4B	R4C	R4D	R4E	R4F			
	KKS NO.		U-GA101B-H01		U-GB701-H01						
	FEEDER NAME		OIL HEATER		ELECTRICAL LUBE OIL HEATER		SPACE				
	CAPACITY	KW	1	1	0.40						
	STAB CONNECTOR	Sq	250A+N	250A+N	250A+N	250A+N					
	MCCB	AF/AT	TD100HFMU16A-3/X,L,S	TD100HFMU16A-3/X,L,S	TD100HFMU16A-3/X,L,S	TD100HFMU16A-3/X,L,S					
	CT	/5A									
	A-METER	/A	iFMZ-METER/1.5m	iFMZ-METER/1.5m	iFMZ-METER/1.5m	iFMZ-METER/1.5m					
	MAGNETIC CONTACTOR	MCM (88)		MC-22b	MC-22b	MC-22b	MC-22b				
		MCD (88)									
		MCY (88)									
	EOCR		iFMZ-WRAUH	iFMZ-WRAUH	iFMZ-WRAUH	iFMZ-WRAUH					
	ZCT		ZCT-035	ZCT-035	ZCT-035	ZCT-035					
	50GS										
	V-METER	V									
	CONTROL TR	VA	75VA	75VA	75VA	75VA					
	CONTROL FUSE	A	FUSE-2A	FUSE-2A	FUSE-2A	FUSE-2A					
	WIRE	Sq	6Sq	6Sq	6Sq	6Sq					
	2'nd CLIP	A	250A/2	250A/2	250A/2	250A/2					
	UNIT SIZE DOOR TYPE		H2/J	H2/J	H2/J	H2/J	H2/A				
SEQUENCE TYPE		LH2D	LH2D	LH2B	LH2B						
REMARK											

**\*\* MCCB TYPE**



















—TM : Thermal magnetic type MCCB


	
PROJECT : PROYECTO: PROYECTO DE AMONIACO/UREA DE YPFB	
JOB NO. N° DE PROYECTO	DWG. TITLE:  SINGLE LINE DIAGRAM FOR 480V UREA S/S 480-277V SWGR & MCC 1B
REVISION  REV.	DWG. NO.: N° DEL DIBUJO: PAU-PEL-C-VDM-60801-GD003
	SHT NO. 045

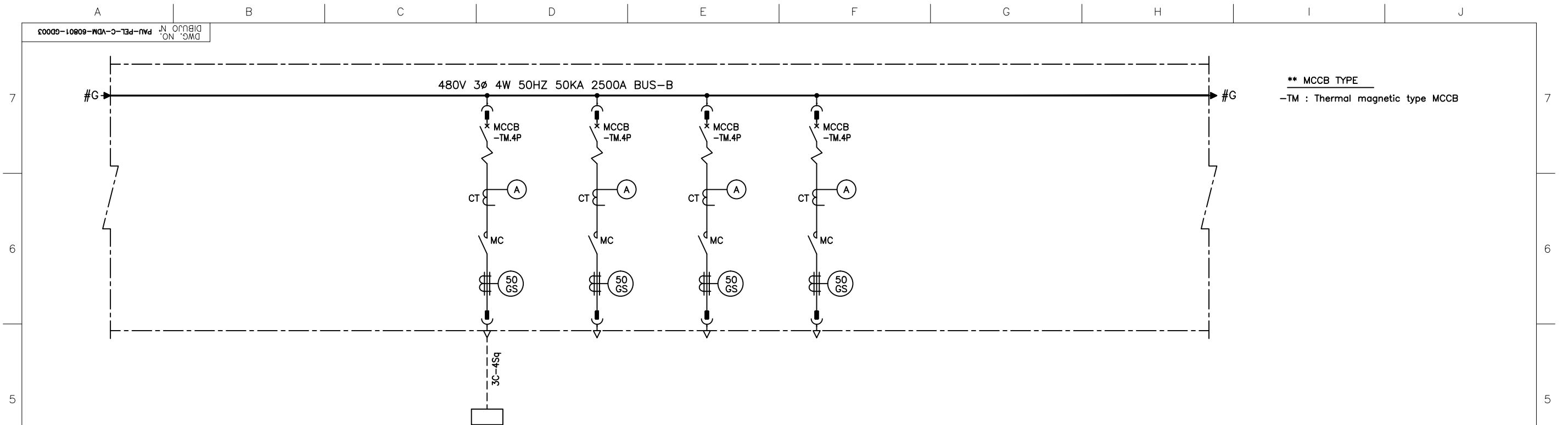


MOTOR CONTROL CENTER	FEEDER NO.		R5A	R5B	R5C	R5D	R5E	R5F		
	KKS NO.				20-LP-956	20-LP-961	20-LP-966	U-EL601		
	FEEDER NAME				LOCAL CONTROL PANEL FOR VIBRATING FEEDER FOR GRANULATOR OUTLET	LOCAL CONTROL PANEL FOR VIBRATING FEEDER FOR SEED HOPPER	LOCAL CONTROL PANEL FOR VIBRATING FEEDER FOR OVERSIZE COOLER	PASSENGER LIFT		
	CAPACITY	KW			1.40	1.10	0.33	30		
	STAB CONNECTOR		Sq		250A+N	250A+N	250A+N	250A+N		
	MCCB	AF/AT			TS100HFMU40A-4/X.L.S	TS100HFMU40A-4/X.L.S	TS100HFMU40A-4/X.L.S	TS100HFMU80A-4/X.L.S		
	CT	/5A			DR-1(15/1A)	DR-1(15/1A)	DR-1(15/1A)	DR-1(75/1A)		
	A-METER		/A		W8-AA(0-15-45A)	W8-AA(0-15-45A)	W8-AA(0-15-45A)	W8-AA(0-75-225A)		
	MAGNETIC CONTACTOR	MCM (88)			MC-22b	MC-22b	MC-22b	MC-75a		
		MCD (88)								
		MCY (88)								
	EOCR									
	ZCT				ZCT-035	ZCT-035	ZCT-035	ZCT-035		
	50GS				EGR-20RZ7M	EGR-20RZ7M	EGR-20RZ7M	EGR-20RZ7M		
	V-METER		V							
	CONTROL TR		VA		75VA	75VA	75VA	75VA		
	CONTROL FUSE		A		FUSE-2A	FUSE-2A	FUSE-2A	FUSE-2A		
WIRE		Sq		6Sq	6Sq	6Sq	25Sq			
2'nd CLIP		A		250A+N/1	250A+N/1	250A+N/1	250A+N/1			
UNIT SIZE DOOR TYPE				H2/E	H2/E	H2/E	H3/E			
SEQUENCE TYPE				48LF2N	48LF2N	48LF2N	48LF2N			
REMARK										






					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					


N.º	REF.	FECHA	DESCRIPCION	ESPECIES	VERIFICADO	A. ROLANDO
OWNER :			YACIMIENTOS PETROLIFEROS			
PROPIETARIO:			FISCALES BOLIVIANOS			

		
PROJECT : PROYECTO :		
PROYECTO DE AMONIACO/UREA DE YPFB		
JOB NO. N° DE PROYECTO	DWG. TITLE:	
	SINGLE LINE DIAGRAM FOR 480V UREA S/S 480-277V SWGR & MCC 1B	
REVISION REV.	DWG. NO. : N° DEL DIBUJO:	SHIT NO. 046
	PAU-PEL-C-VDM-60801-GD003	



MOTOR CONTROL CENTER	FEEDER NO.		R6A	R6B	R6C	R6D	R6E	R6F		
	KKS NO.			20-LP-951						
	FEEDER NAME			LOCAL CONTROL PANEL FOR VIBRATING FEEDER FOR SEED HOPPER	FOR GENERAL FEEDER	FOR GENERAL FEEDER	FOR GENERAL FEEDER			
	CAPACITY	KW		1.20	1.40	1.10	0.33			
	STAB CONNECTOR	Sq		250A+N	250A+N	250A+N	250A+N			
	MCCB	AF/AT		TS100HFMU40A-4/X.L.S	TS100HFMU40A-4/X.L.S	TS100HFMU40A-4/X.L.S	TS100HFMU40A-4/X.L.S			
	CT	/5A		DR-1(15/1A)	DR-1(15/1A)	DR-1(15/1A)	DR-1(15/1A)			
	A-METER	/A		W8-AA(0-15-45A)	W8-AA(0-15-45A)	W8-AA(0-15-45A)	W8-AA(0-15-45A)			
	MAGNETIC CONTACTOR	MCM (88)		MC-22b	MC-22b	MC-22b	MC-22b			
		MCD (88)								
		MCY (88)								
	EOCR									
	ZCT			ZCT-035	ZCT-035	ZCT-035	ZCT-035			
	50GS			EGR-20RZ7M	EGR-20RZ7M	EGR-20RZ7M	EGR-20RZ7M			
	V-METER	V								
	CONTROL TR	VA		75VA	75VA	75VA	75VA			
	CONTROL FUSE	A		FUSE-2A	FUSE-2A	FUSE-2A	FUSE-2A			
WIRE	Sq		6Sq	6Sq	6Sq	6Sq				
2'nd CLIP	A		250A+N/1	250A+N/1	250A+N/1	250A+N/1				
UNIT SIZE	DOOR TYPE		H2/E	H2/E	H2/E	H2/E				
SEQUENCE TYPE			48LF2N	48LF2N	48LF2N	48LF2N				
REMARK										





					
					
					
					
	<b>03SEP'15</b>				
REVNO. N° REV	DATE FECHA	DESCRIPTION DESCRIPCION	DRN ELABORADO	CHECKED VERIFICADO	APPROVED APROBADO
OWNER : PROPIETARIO:		YACIMIENTOS PETROLIFEROS FISCALES BOLIVIANOS			

			
PROJECT : PROYECTO : PROYECTO DE AMONIACO/UREA DE YPFB			
JOB NO. N° DE PROYECTO		DWG. TITLE:  SINGLE LINE DIAGRAM FOR 480V UREA S/S 480-277V SWGR & MCC 1B	
REVISION <b>REV.</b>		DWG.NO. : N° DEL DIBUJO: <b>PAU-PEL-C-VDM-60801-GD003</b>	
		SHT NO. <b>047</b>	



–TM : Thermal magnetic type MCCB

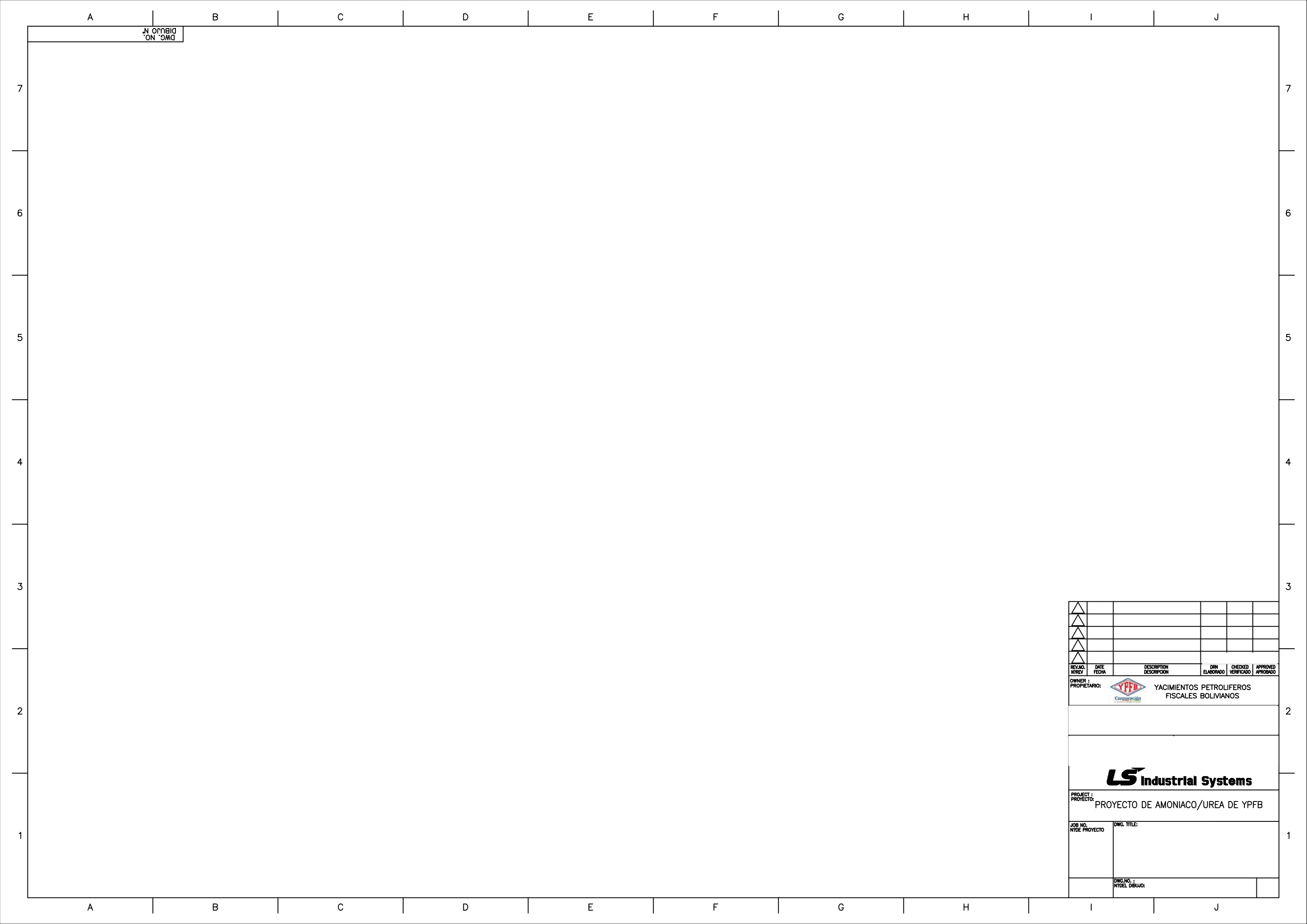
MOTOR CONTROL CENTER

					
					
					
	03.SEP.'15				
REV.NO N° REV	DATE FECHA	DESCRIPTION DESCRIPCION	DRN ELABORADO	CHECKED VERIFICADO	APPROVED APROBADO



YACIMIENTOS PETROLIFEROS  
FISCALES BOLIVIANOS

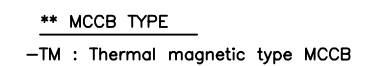
REVISION	DWG.NO. : N° DEL DIBUJO:	SHT NO
REV.	PAU-PEL-C-VDM-60801-GD003	048











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DWG. NO.  
N.º DEL DIBUJO

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REV. NO. N.º REV.	DATE FECHA	DESCRIPTION DESCRIPCION	DIN ELABORADO	CHECKED VERIFICADO	APPROVED APROBADO
OWNER : PROPIETARIO:		 YACIMIENTOS PETROLIFEROS FISCALES BOLIVIANOS			
					
PROJECT : PROYECTO:		PROYECTO DE AMONIACO/UREA DE YPFB			
JOB NO. N.º DE PROYECTO		DWG. TITLE:			
		DWG. NO. : N.º DEL DIBUJO:			



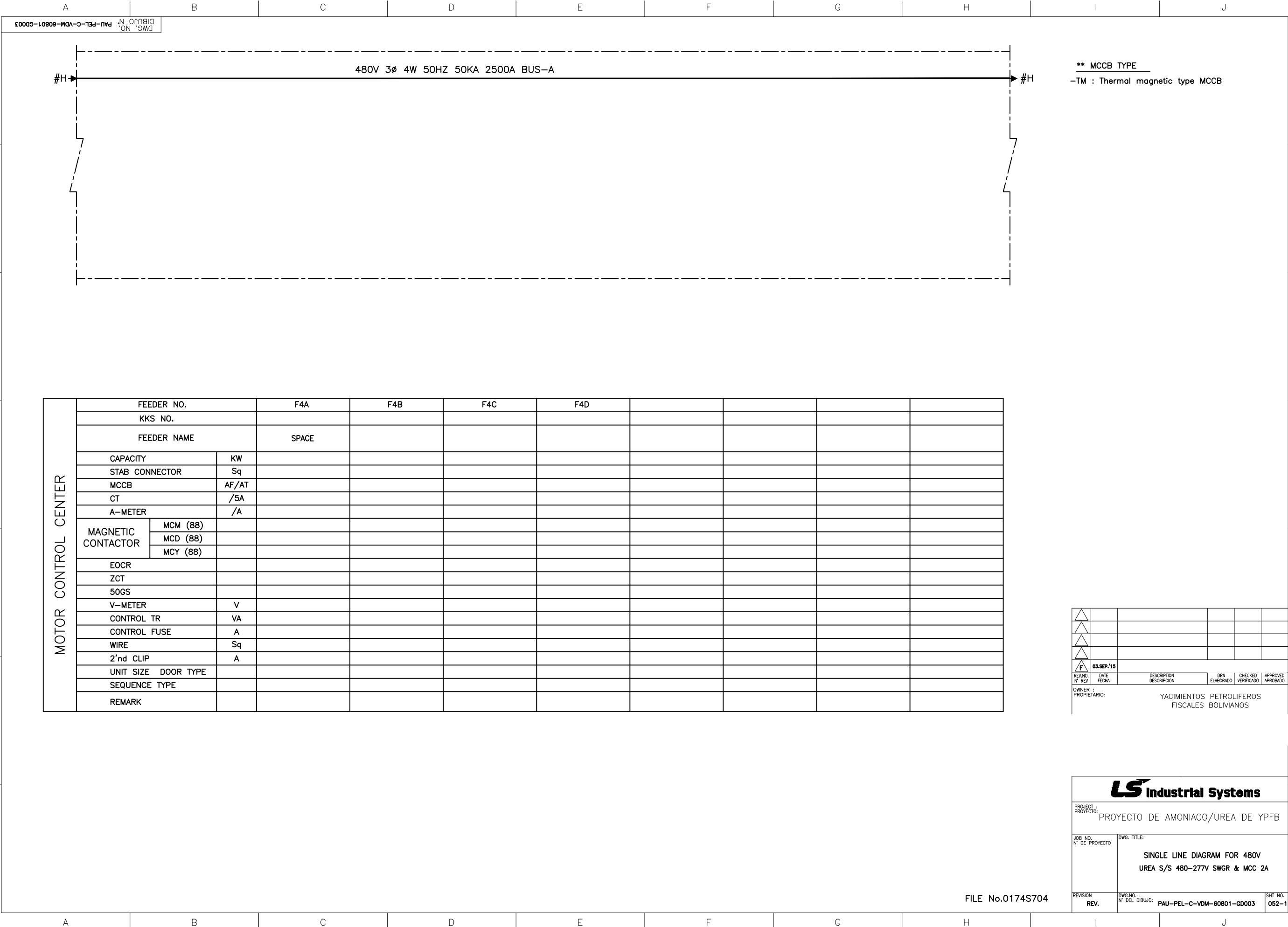
					
					
					
					
					
					
					
					
					
					

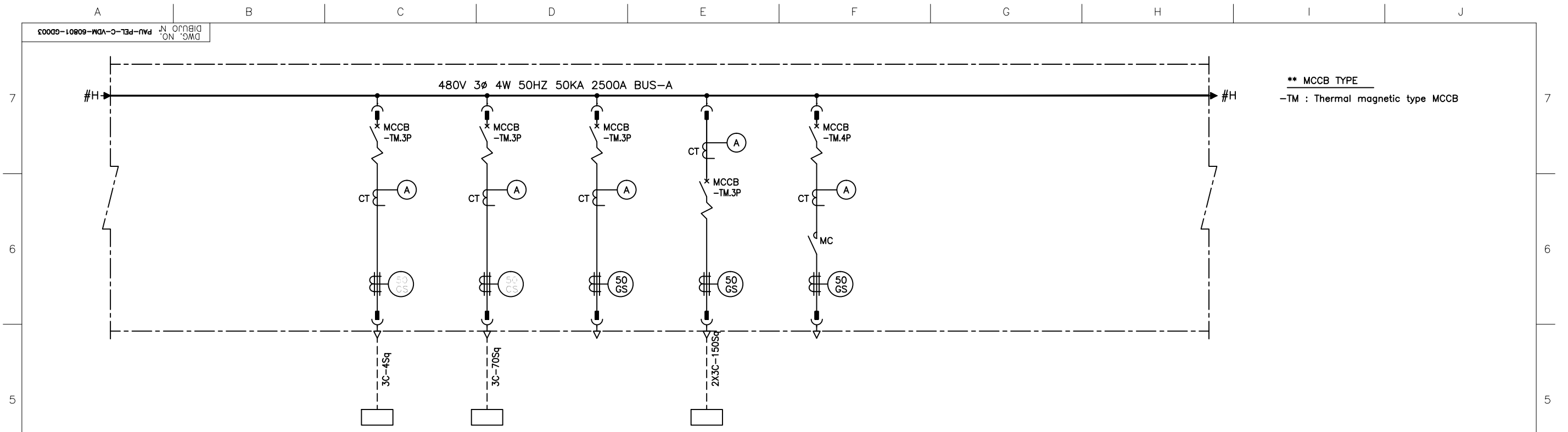
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







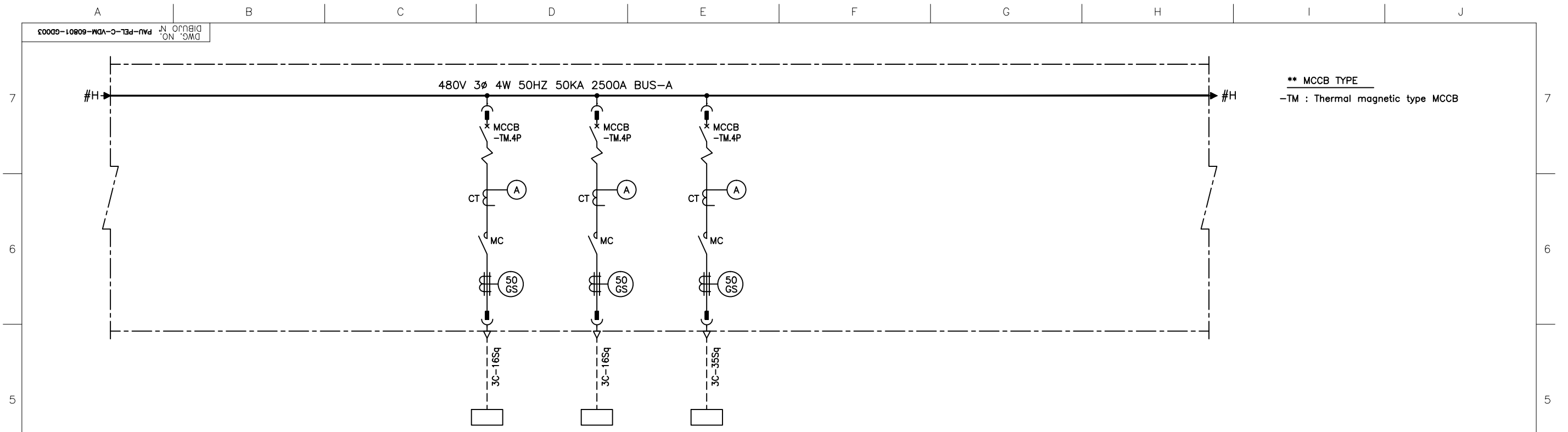




MOTOR CONTROL CENTER	FEEDER NO.		R1A	R1B	R1C	R1D	R1E			
	KKS NO.		U30-DBC601A	U30-UPS601A1		U30-PDB501A				
	FEEDER NAME		DC UPS "NORMAL"	AC UPS "NORMAL"	FOR GENERAL FEEDER	POWER DISTRIBUTION BOARD(350KVA)	FOR GENERAL FEEDER			
	CAPACITY	KW	4.40	60KVA		350KVA				
	STAB CONNECTOR	Sq	250A	250A	250A	630A	250A+N			
	MCCB	AF/AT	TS100HFMU40A-3/2X.LS	TS250HFMU160A-3/2X.LS	TS250HFMU160A-3/2X.LS	TS630HFMU500A-3/2X.LS	TS100HFMU40A-4/X.LS			
	CT	/5A	DR-1(40/1A)	DR-1(150/1A)	DR-1(150/1A)	DS-2(500/1A)	DR-1(15/1A)			
	A-METER	/A	W8-AA(0-40-120A)	W8-AA(0-150-450A)	W8-AA(0-150-450A)	W8-AA(0-500-1500A)	W8-AA(0-15-45A)			
	MAGNETIC CONTACTOR	MCM (88)					MC-22b			
		MCD (88)								
		MCY (88)								
	EOCR									
	ZCT		ZCT-035	ZCT-080	ZCT-080	DZS-A210	ZCT-035			
	50GS		EGR-20RZ7M	EGR-20RZ7M	EGR-20RZ7M	EGR-20RZ7M	EGR-20RZ7M			
	V-METER	V								
	CONTROL TR	VA	50VA	50VA	50VA	50VA	75VA			
	CONTROL FUSE	A	FUSE-2A	FUSE-2A	FUSE-2A	FUSE-2A	FUSE-2A			
	WIRE	Sq	16Sq	50Sq	50Sq	BUS	6Sq			
	2'nd CLIP	A	250A/1	250A/1	250A/1	630A/1	250A+N/1			
	UNIT SIZE DOOR TYPE		H2/E	H2/E	H2/E	H5/F	H2/E			
SEQUENCE TYPE		48LF1E	48LF1E	48LF1E	48LF3T	48LF2N				
REMARK										

					
					
					
					
	03.SEP.'15				
REV.NO. N° REV	DATE FECHA	DESCRIPTION DESCRIPCION	DRM ELABORADO	CHECKED VERIFICADO	APPROVED APROBADO
OWNER : PROPIETARIO:					
YACIMIENTOS PETROLIFEROS FISCALES BOLIVIANOS					






 <b>LS Industrial Systems</b>			
PROJECT : PROYECTO:			
PROYECTO DE AMONIACO/UREA DE YPFB			
JOB NO. N° DE PROYECTO		DWG. TITLE:  SINGLE LINE DIAGRAM FOR 480V  UREA S/S 480-277V SWGR & MCC 2A	
REVISION  <b>REV.</b>		DWG. NO. : N° DEL DIBUJO:	
		PAU-PEL-C-VDM-60801-GD003	
		SHT NO. <b>053</b>	



MOTOR CONTROL CENTER	FEEDER NO.		R2A	R2B	R2C	R2D	R2E	R2F		
	KKS NO.			40-PC-510	40-PC-530					
	FEEDER NAME		SPACE	MCC FOR BAGGING MACHINE(SMALL BAG)	MCC FOR STRETCH WRAPPER	MCC FOR BIG BAG MACHINES				
	CAPACITY	KW		9	13	27				
	STAB CONNECTOR	Sq		250A+N	250A+N	250A+N				
	MCCB	AF/AT		TS100HFMU100A-4/X.LS						
	CT	/5A		DR-1(20/1A)	DR-1(30/1A)	DR-1(50/1A)				
	A-METER	/A		W8-AA(0-20-60A)	W8-AA(0-30-90A)	W8-AA(0-50-150A)				
	MAGNETIC CONTACTOR	MCM (88)		MC-22b	MC-32a	MC-50a				
		MCD (88)								
		MCY (88)								
	EOCR									
	ZCT			ZCT-035	ZCT-035	ZCT-035				
	50GS			EGR-20RZ7M	EGR-20RZ7M	EGR-20RZ7M				
	V-METER	V								
	CONTROL TR	VA		75VA	75VA	75VA				
	CONTROL FUSE	A		FUSE-2A	FUSE-2A	FUSE-2A				
	WIRE	Sq		6Sq	6Sq	16Sq				
	2'nd CLIP	A		250A+N/1	250A+N/1	250A+N/1				
	UNIT SIZE DOOR TYPE		H1/A	H2/E	H2/E	H2/E				
SEQUENCE TYPE			48LF2N	48LF2N	48LF2N					
REMARK										


**\*\* MCCB TYPE**

—TM : Thermal magnetic type MCCB

					
					
					
					
	<b>03.SEP.'15</b>				
REV.NO. N° REV	DATE FECHA	DESCRIPTION DESCRIPCION	DRN ELABORADO	CHECKED VERIFICADO	APPROVED APROBADO

OWNER :  
PROPIETARIO:

YACIMIENTOS PETROLIFEROS  
FISCALES BOLIVIANOS

			
PROJECT : PROJECTO: PROYECTO DE AMONIACO/UREA DE YPFB			
JOB NO. N° DE PROYECTO		DWG. TITLE:  SINGLE LINE DIAGRAM FOR 480V UREA S/S 480-277V SWGR & MCC 2A	
REVISION  REV.		DWG. NO. : N° DEL DIBUJO: PAU-PEL-C-VDM-60801-GD003	
		SHT NO.  054	

DWG. NO. PAU-PEL-C-VDM-60801-GD003  
DIBUJO N.º

#H

480V 3Ø 4W 50HZ 50KA 2500A BUS-A

\*\* MCCB TYPE

-TM : Thermal magnetic type MCCB

MOTOR CONTROL CENTER

FEEDER NO.		R3A	R3B	R3C	R3D	R3E	R3F		
KKS NO.			M-JE-101A	M-JE-101B	M-JE-101C	M-JF200	M-FA301		
FEEDER NAME		SPACE	ELECTRIC HOIST 0.5T FOR T/T	ELECTRIC HOIST 0.5T FOR T/T	ELECTRIC HOIST 0.5T FOR T/T	RECLAIMER FOR UREA BULK WAREHOUSE	BAG FILTER FOR BAGGING AND PALLETIZING AREA		
CAPACITY	KW		4.10	4.10	4.10	55.85	47.90		
STAB CONNECTOR	Sq		250A+N	250A+N	250A+N	250A+N	250A+N		
MCCB	AF/AT		TS100HFMU40A-4/X.L.S	TS100HFMU40A-4/X.L.S	TS100HFMU40A-4/X.L.S	TS250HFMU160A-4/X.L.S	TS250HFMU160A-4/X.L.S		
CT	/5A		DR-1(15/1A)	DR-1(15/1A)	DR-1(15/1A)	DR-1(150/1A)	DR-1(150/1A)		
A-METER	/A		W8-AA(0-15-45A)	W8-AA(0-15-45A)	W8-AA(0-15-45A)	W8-AA(0-150-450A)	W8-AA(0-150-450A)		
MAGNETIC CONTACTOR	MCM (88)		MC-22b	MC-22b	MC-22b	MC-150a	MC-150a		
	MCD (88)								
	MCY (88)								
EOCR									
ZCT			ZCT-035	ZCT-035	ZCT-035	ZCT-080	ZCT-080		
50GS			EGR-20RZ7M	EGR-20RZ7M	EGR-20RZ7M	EGR-20RZ7M	EGR-20RZ7M		
V-METER	V								
CONTROL TR	VA		75VA	75VA	75VA	75VA	75VA		
CONTROL FUSE	A		FUSE-2A	FUSE-2A	FUSE-2A	FUSE-2A	FUSE-2A		
WIRE	Sq		6Sq	6Sq	6Sq	50Sq	50Sq		
2'nd CLIP	A		250A+N/1	250A+N/1	250A+N/1	250A+N/1	250A+N/1		
UNIT SIZE	DOOR TYPE	H1/A	H2/E	H2/E	H2/E	H3/E	H3/E		
SEQUENCE TYPE			48LF2N	48LF2N	48LF2N	48LF2N	48LF2N		
REMARK									

FILE No.0174S713

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REV. NO. N° REV.	DATE FECHA	DESCRIPTION DESCRIPCION	DRN ELABORADO	CHECKED VERIFICADO	APPROVED APROBADO	
OWNER : PROPIETARIO:		YACIMIENTOS PETROLIFEROS FISCALES BOLIVIANOS				

LS Industrial Systems		
PROJECT : PROYECTO:		
PROYECTO DE AMONIACO/UREA DE YPFB		
JOB NO. N° DE PROYECTO	DWG. TITLE:	
	SINGLE LINE DIAGRAM FOR 480V UREA S/S 480-277V SWGR & MCC 2A	
REVISION REV.	DWG. NO. : N° DEL DIBUJO: PAU-PEL-C-VDM-60801-GD003	SHT NO. 055



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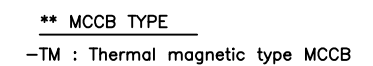
** MCCB TYPE











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-TM : Thermal magnetic type MCCB

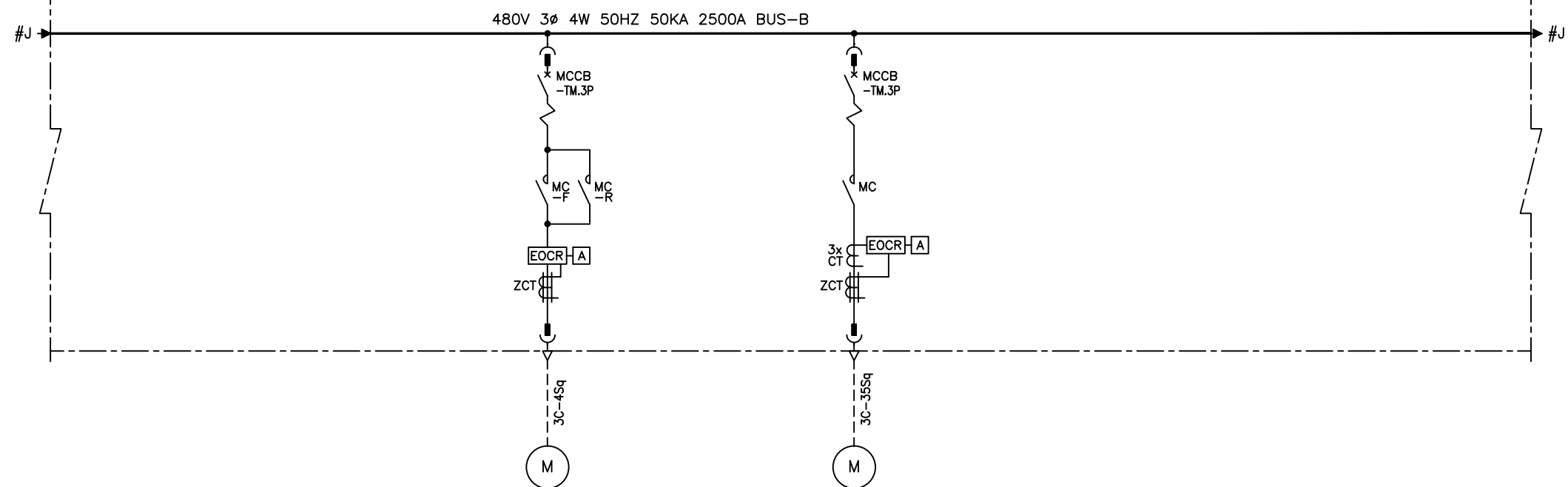
MOTOR CONTROL CENTER	FEEDER NO.									
	KKS NO.									
	FEEDER NAME									
	CAPACITY	KW								
	STAB CONNECTOR	Sq								
	MCCB	AF/AT								
	CT	/5A								
	A-METER	/A								
	MAGNETIC CONTACTOR	MCM (88)								
		MCD (88)								
		MCY (88)								
	EOCR									
	ZCT									
	50GS									
	V-METER	V								
	CONTROL TR	VA								
	CONTROL FUSE	A								
WIRE	Sq									
2'nd CLIP	A									
UNIT SIZE	DOOR TYPE									
SEQUENCE TYPE										
REMARK										

									
									
									
									
REV. NO. N° REV	DATE FECHA	DESCRIPTION DESCRIPCION	DRN ELABORADO	CHECKED VERIFICADO	APPROVED APROBADO				
OWNER : PROPIETARIO:		YACIMIENTOS PETROLIFEROS FISCALES BOLIVIANOS							
									
PROJECT : PROYECTO:		PROYECTO DE AMONIACO/UREA DE YPFB							
JOB NO. N° DE PROYECTO		DWG. TITLE:  SINGLE LINE DIAGRAM FOR 480V UREA S/S 480-277V SWGR & MCC 2A							
REVISION  REV.		DWG. NO. : N° DEL DIBUJO:				SHT NO. 055-			
		PAU-PEL-C-VDM-60801-GD003							



						
						
						
						
						
						
						
						
						
						
<b>F</b>	<b>03.EP.'15</b>	<b>FINAL</b>				
REV.NO. N° REV	DATE FECHA	DESCRIPTION DESCRIPCION	DRN ELABORADO	CHECKED VERIFICADO	APPROVED APROBADO	
OWNER PROPIETARIO:			YACIMIENTOS PETROLIFEROS FISCALES BOLIVIANOS			






FILE No.0174S801




MOTOR CONTROL CENTER	FEEDER NO.		F2A	F2B	F2C	F2D			
	KKS NO.			M-JG101BM		M-JD101-M01			
	FEEDER NAME			DIVERTER		MAIN MOTOR FOR BUCKET ELEVATOR FOR BAGGING HOUSE			
	CAPACITY	KW		1.10		45			
	STAB CONNECTOR	Sq		250A		250A			
	MCCB	AF/AT		TD100HFMU16A-3/X,L,S		TS250HFMU160A-3/X,L,S			
	CT	/5A							
	A-METER		/A		iFMZ-METER/1.5m	iFMZ-METER/2m			
	MAGNETIC CONTACTOR	MCM (88)			MC-22b	MC-100a			
		MCD (88)			MC-22b				
		MCY (88)							
	EOCR				iFMZ-WRAUH	iFMZ-HHAUW			
	ZCT				ZCT-035	ZCT-035			
	50GS								
	V-METER	V							
	CONTROL TR	VA		75VA		75VA			
	CONTROL FUSE	A		FUSE-2A		FUSE-2A			
WIRE	Sq		6Sq		35Sq				
2'nd CLIP	A		250A/2		250A/2				
UNIT SIZE DOOR TYPE			H3/H		H4/J				
SEQUENCE TYPE				FRM	LM1A2				
REMARK									

\*\* MCCB TYPE

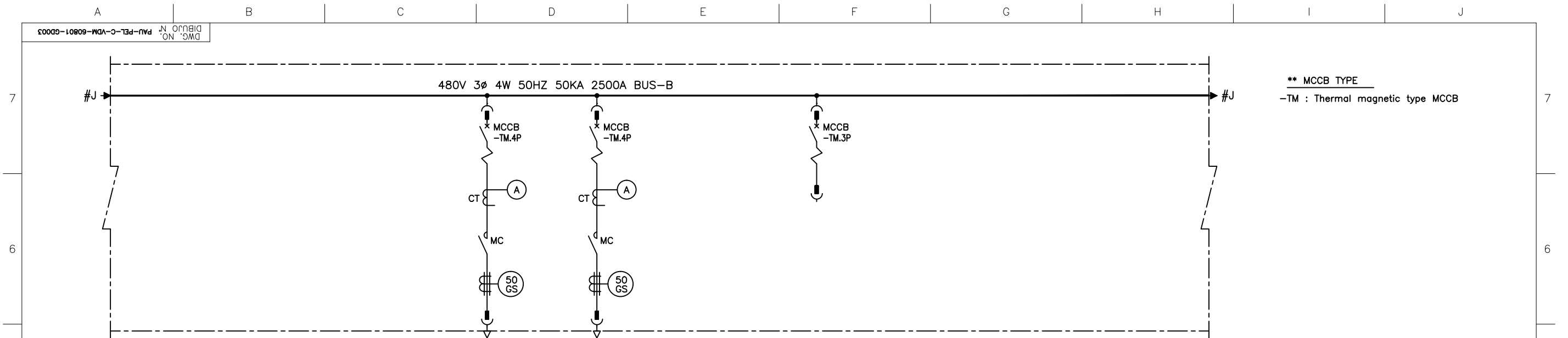
-TM : Thermal magnetic type MCCB

					
					
					
					
	<b>03.SEP.'15</b>				
REV.NO. N° REV	DATE FECHA	DESCRIPTION DESCRIPCION	DRN ELABORADO	CHECKED VERIFICADO	APPROV APROBADO
OWNER : PROPIETARIO:					
YACIMIENTOS PETROLIFEROS FISCALES BOLIVIANOS					






			
PROJECT : PROYECTO :		PROYECTO DE AMONIACO/UREA DE YPF	
JOB NO. N° DE PROYECTO		DWG. TITLE:  SINGLE LINE DIAGRAM FOR 480V UREA S/S 480-277V SWGR & MCC 2B	
REVISION  REV.		DWG. NO. : N° DEL DIBUJO:	
		PAU-PEL-C-VDM-60801-GD003	
		SHT 05	







MOTOR CONTROL CENTER	FEEDER NO.		F4A	F4B	F4C	F4D	F4E				
	KKS NO.										
	FEEDER NAME		SPACE	FOR GENERAL FEEDER		FEEDER FOR FORK LIFT BATTERY CHARGER	CONTROL TR MCCB				
	CAPACITY	KW			6						
	STAB CONNECTOR	Sq		250A+N	250A+N		250A				
	MCCB	AF/AT		TS100HFMU40A-4/X.L.S	TS100HFMU40A-4/X.L.S		TD100HFMU16A-3				
	CT	/5A		DR-1(15/1A)	DR-1(15/1A)						
	A-METER	/A		WB-AA(0-15-45A)	WB-AA(0-15-45A)						
	MAGNETIC CONTACTOR	MCM (88)		MC-22b	MC-22b						
		MCD (88)									
		MCY (88)									
	EOCR										
	ZCT			ZCT-035	ZCT-035						
	50GS			EGR-20RZ7M	EGR-20RZ7M						
	V-METER	V									
CONTROL TR	VA		75VA	75VA							
CONTROL FUSE	A		FUSE-2A	FUSE-2A							
WIRE	Sq		6Sq	6Sq		6Sq					
2'nd CLIP	A		250A+N/1	250A+N/1		250A/30A					
UNIT SIZE	DOOR TYPE		H1/A	H2/E	H2/E		H1/C				
SEQUENCE TYPE			48LF2N	48LF2N		TR1					
REMARK											

					
					
					
					
	03.SEP.'15				
REV.NO. N° REV	DATE FECHA	DESCRIPTION DESCRIPCION	DRM ELABORADO	CHECKED VERIFICADO	APPROVED APROBADO

OWNER : PROPIETARIO:	YACIMIENTOS PETROLIFEROS FISCALES BOLIVIANOS
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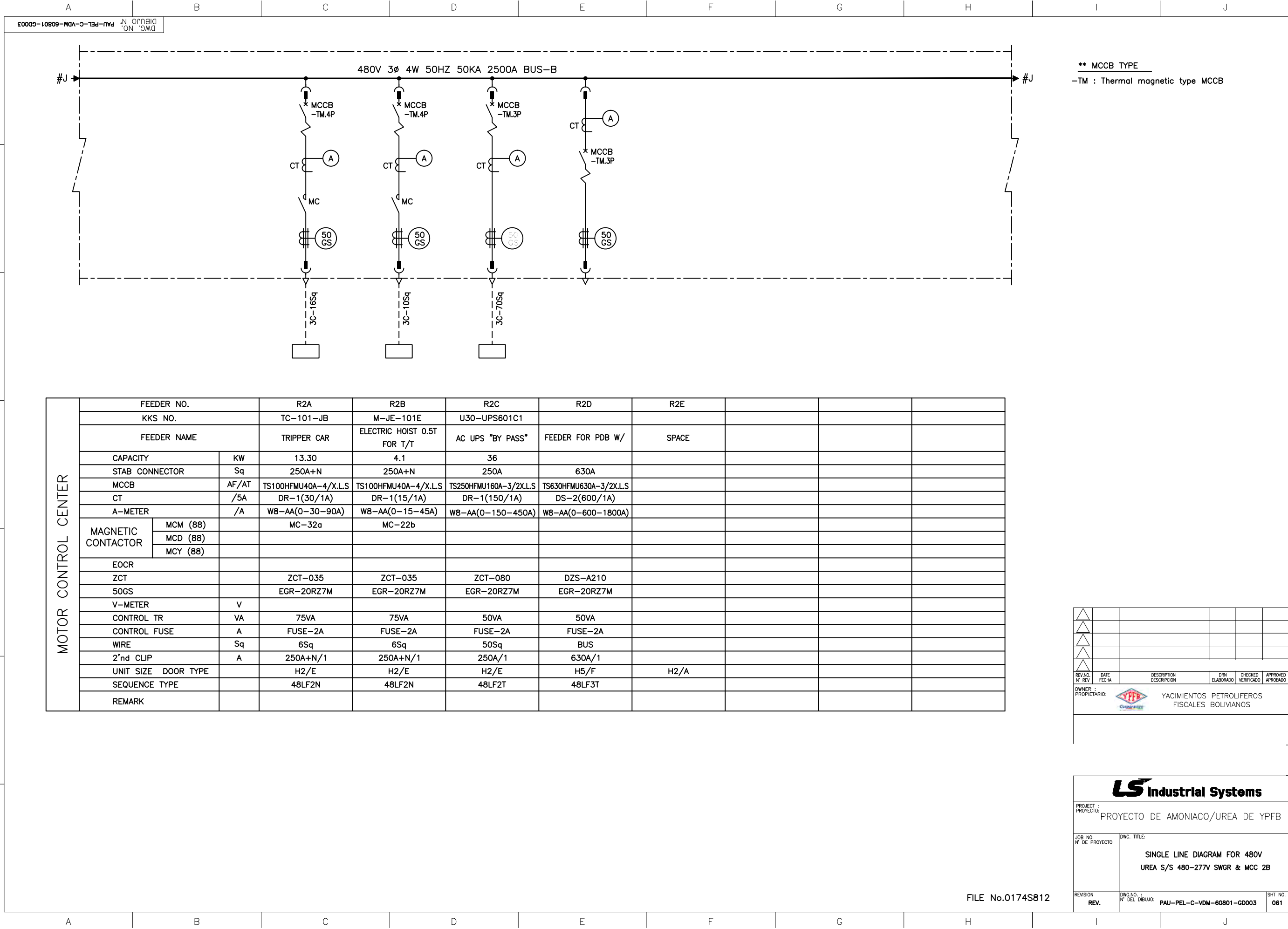
**LS Industrial Systems**

PROJECT :  
PROYECTO: PROYECTO DE AMONIACO/UREA DE YPFB

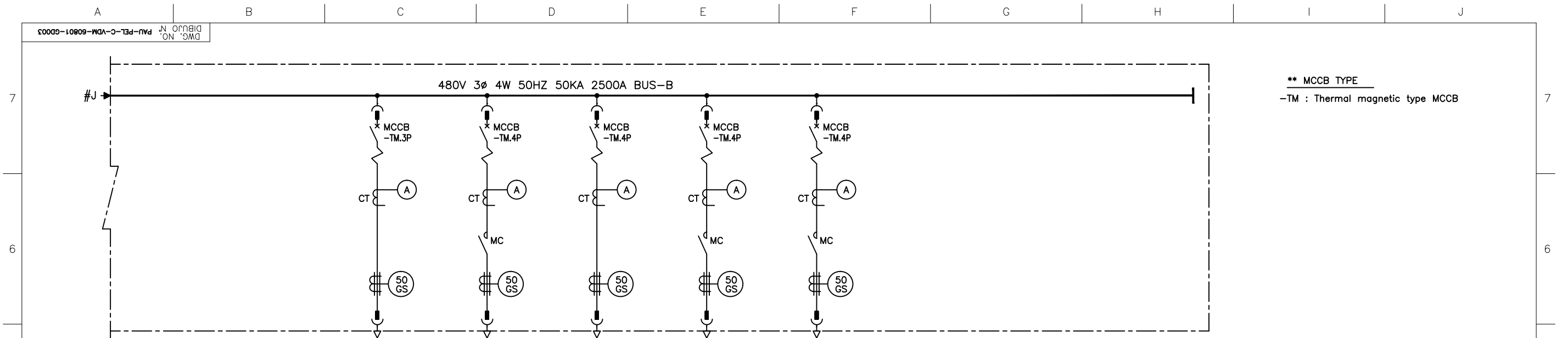
JOB NO. N° DE PROYECTO	DWG. TITLE:  SINGLE LINE DIAGRAM FOR 480V UREA S/S 480-277V SWGR & MCC 2B
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REVISION	DWG.NO. : N° DEL DIBUJO:	SHT NO.
REV.	PAU-PEL-C-VDM-60801-GD003	059











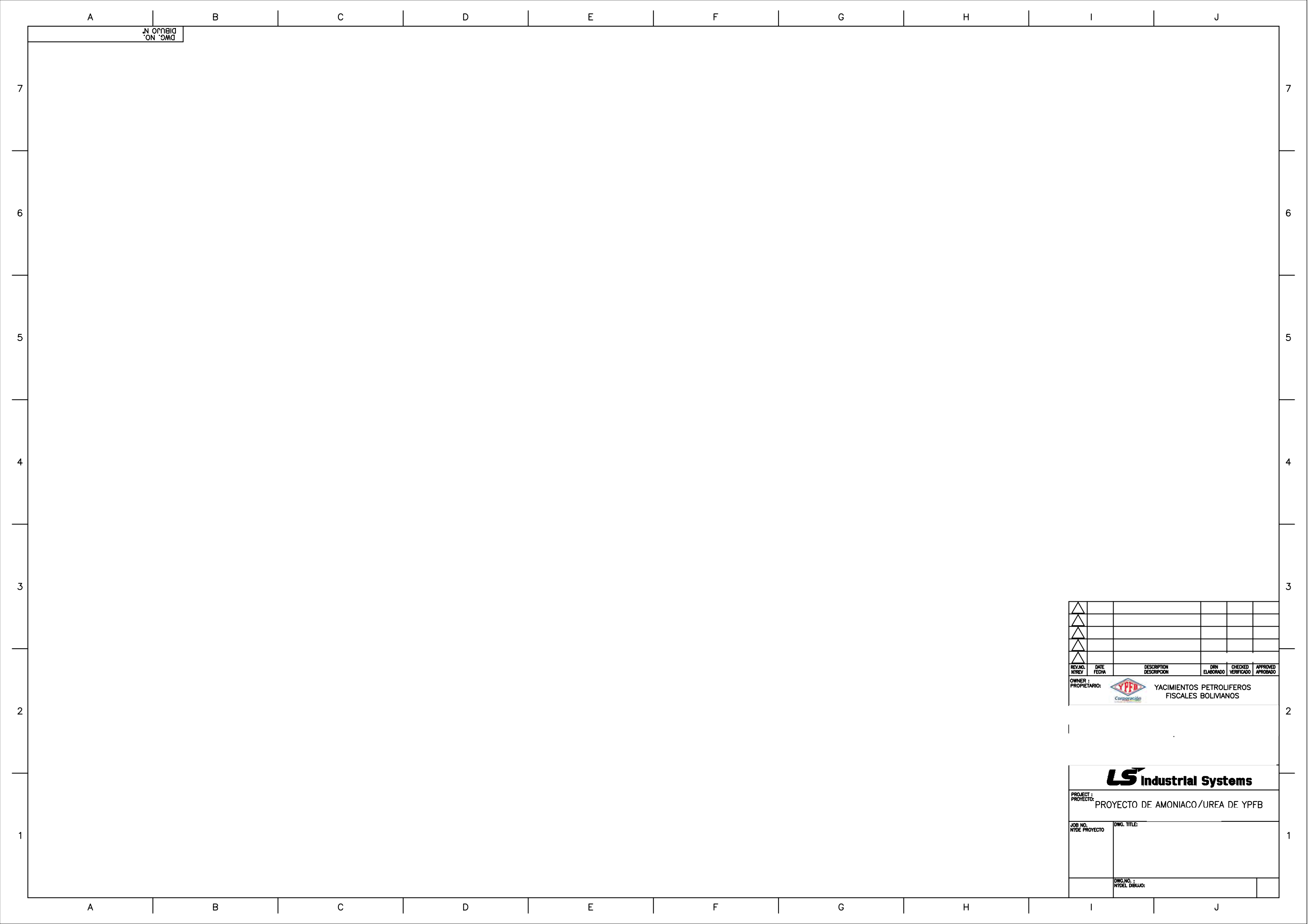




MOTOR CONTROL CENTER	FEEDER NO.		R4A	R4B	R4C	R4D	R4E	R4F		
	KKS NO.									
	FEEDER NAME		FEEDER FOR PDB W/	FOR GENERAL FEEDER	FOR GENERAL FEEDER	FOR GENERAL FEEDER	LOCAL PANEL FOR BRAKE	SPACE		
	CAPACITY	KW								
	STAB CONNECTOR	Sq	250A	250A+N	250A+N	250A+N	250A+N			
	MCCB	AF/AT	TS250HFMU200A-3/2X.LS	TS100HFMU100A-4/X.LS	TS100HFMU40A-4/2X.LS	TS100HFMU40A-4/X.LS	TS100HFMU40A-4/X.LS			
	CT	/5A	DR-1(200/1A)	DR-1(50/1A)	DR-1(40/1A)	DR-1(30/1A)	DR-1(15/1A)			
	A-METER	/A	W8-AA(0-200-600A)	W8-AA(0-50-150A)	W8-AA(0-40-120A)	W8-AA(0-30-90A)	W8-AA(0-15-45A)			
	MAGNETIC CONTACTOR	MCM (88)		MC-50a		MC-32a	MC-22b			
		MCD (88)								
		MCY (88)								
	EOCR									
	ZCT		ZCT-080	ZCT-035	ZCT-035	ZCT-035	ZCT-035			
	50GS		EGR-20RZ7M	EGR-20RZ7M	EGR-20RZ7M	EGR-20RZ7M	EGR-20RZ7M			
	V-METER	V								
	CONTROL TR	VA	50VA	75VA	50VA	75VA	75VA			
	CONTROL FUSE	A	FUSE-2A	FUSE-2A	FUSE-2A	FUSE-2A	FUSE-2A			
WIRE	Sq	95Sq	16Sq	16Sq	6Sq	6Sq				
2'nd CLIP	A	250A/1	250A+N/1	250A+N/1	250A+N/1	250A+N/1				
UNIT SIZE DOOR TYPE		H2/F	H2/E	H2/E	H2/E	H2/E	H3/A			
SEQUENCE TYPE		48LF2T	48LF2N	48LF2E	48LF2N	48LF2N				
REMARK										

					
					
					
					
					
REV. NO. N° REV	DATE FECHA	DESCRIPTION DESCRIPCION	DIN ELABORADO	CHECKED VERIFICADO	APPROVED APROBADO
OWNER : PROPIETARIO:		YACIMIENTOS PETROLIFEROS FISCALES BOLIVIANOS			

			
PROJECT : PROJECTO: PROYECTO DE AMONIACO/UREA DE YPFB			
JOB NO. N° DE PROYECTO		DWG. TITLE:  SINGLE LINE DIAGRAM FOR 480V UREA S/S 480-277V SWGR & MCC 2B	
REVISION <b>REV.</b>		DWG. NO. : N° DEL DIBUJO: PAU-PEL-C-VDM-60801-GD003	
		SHF NO. <b>063</b>	



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REV. NO.	DATE	DESCRIPTION	DIN	CHECKED	APPROVED
NYREV	FECHA	DESCRIPCION	ELABORADO	VERIFICADO	APROBADO

OWNER :  
PROPIETARIO:  YACIMIENTOS PETROLIFEROS  
FISCALES BOLIVIANOS

**LS Industrial Systems**

PROJECT :  
PROYECTO: PROYECTO DE AMONIACO/UREA DE YPFB

JOB NO. NÚMERO PROYECTO	DWG. TITLE:
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DWG. NO. : NÚMERO DIBUJO:	
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A	B	C	D	E	F	G	H	I	J	
										7
										6
										5
										4
										3
										2
										1
A	B	C	D	E	F	G	H	I	J	

REV.NO.  
N°REV

DATE  
FECHA


DESCRIPTION  
DESCRIPCIÓN

DRN  
ELABORADO

CHECKED  
VERIFICADO

APPROVED  
APROBADO

OWNER :  
PROPIETARIO:



YACIMIENTOS PETROLIFEROS  
FISCALES BOLIVIANOS

PROJECT :  
PROYECTO:

PROYECTO DE AMONIACO/UREA DE YPFB

JOB NO.  
N°DE PROYECTO

DWG. TITLE:

DWG.Nº. 1:  
N°DEL DIBUJO:

DWG. NO.  
DIBUJO N°



A

B

C

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CHECKED  
VERIFICADO

APPROVED  
APROBADO

OWNER :  
PROPIETARIO:

YPFB

Corporación

YACIMIENTOS PETROLIFEROS  
FISCALES BOLIVIANOS

PROJECT :  
PROYECTO:

PROYECTO DE AMONIACO/UREA DE YPFB

JOB NO.  
NºDE PROYECTO

DWG. TITLE:  
NºDEL DIBUJO:

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YACIMIENTOS PETROLIFEROS  
FISCALES BOLIVIANOS

LS

Industrial Systems

PROJECT :  
PROYECTO:

PROYECTO DE AMONIACO/UREA DE YPFB

JOB NO.  
NºDE PROYECTO

DWG. TITLE:

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PROYECTO DE AMONIACO/UREA DE YPFB					
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LS

Industrial Systems

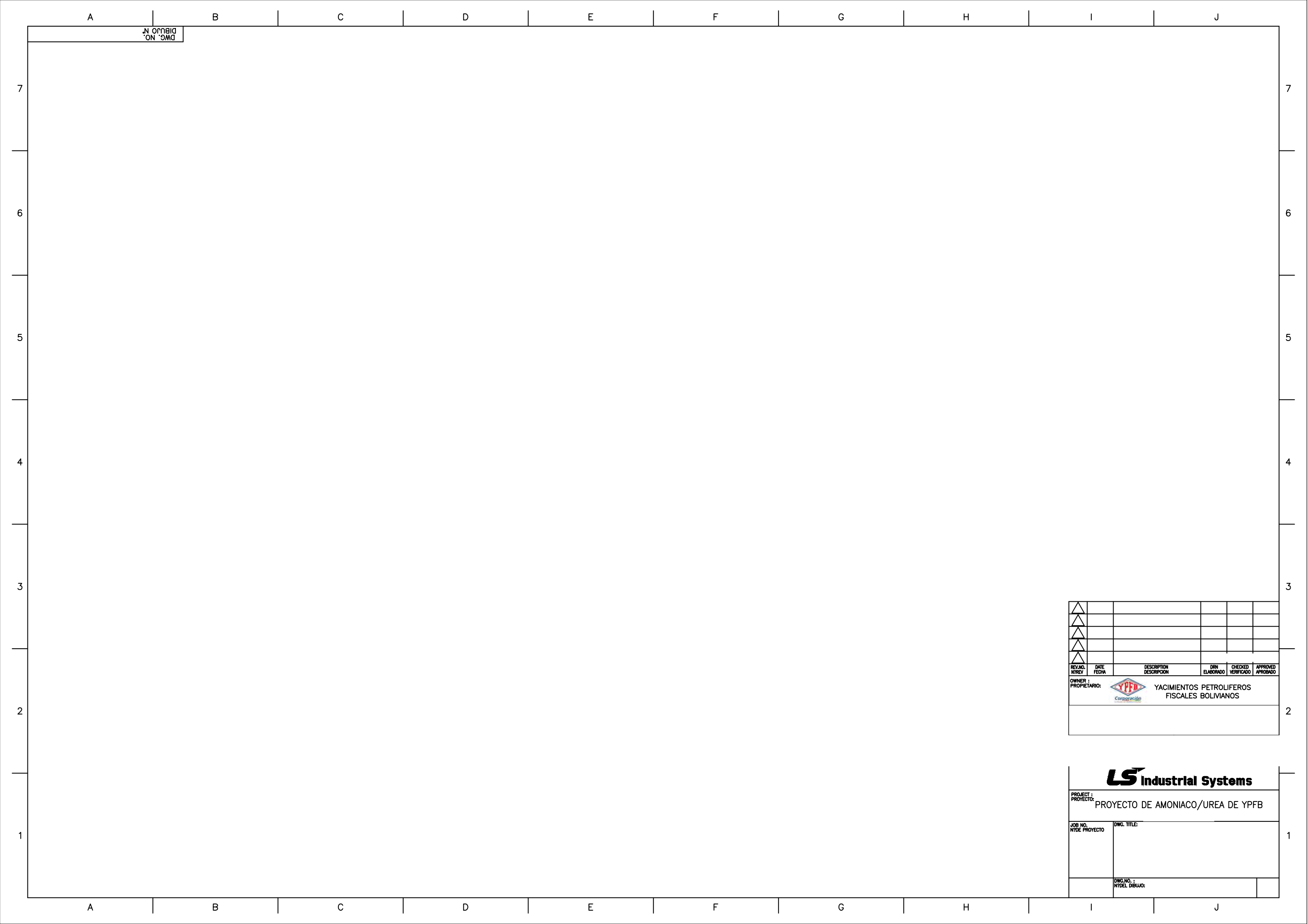
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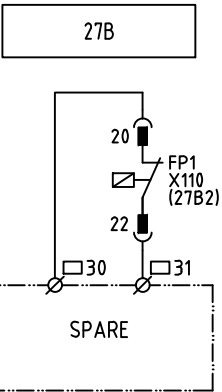
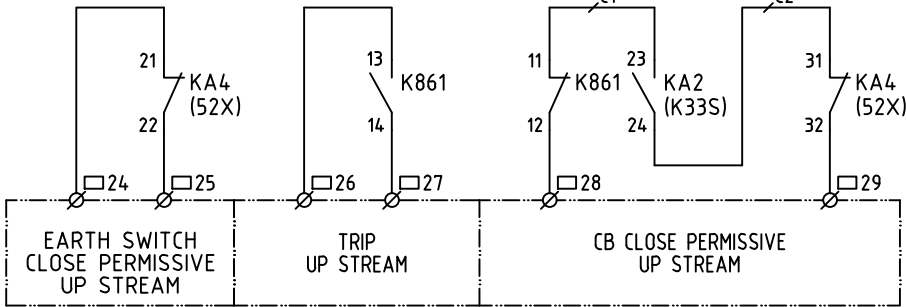
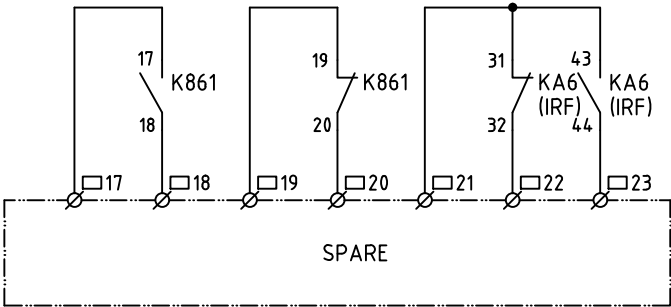
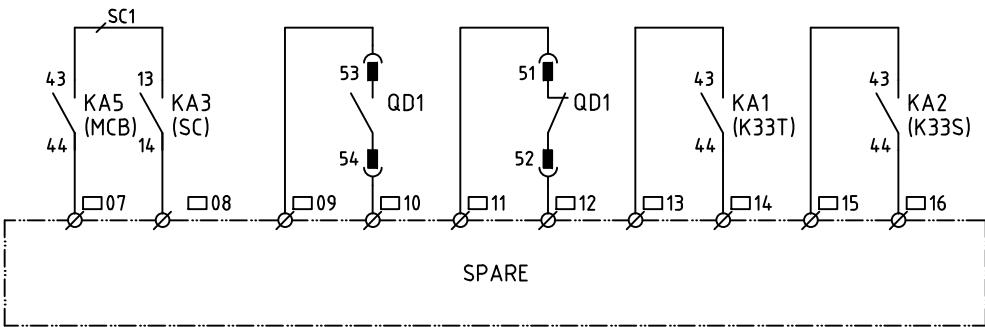
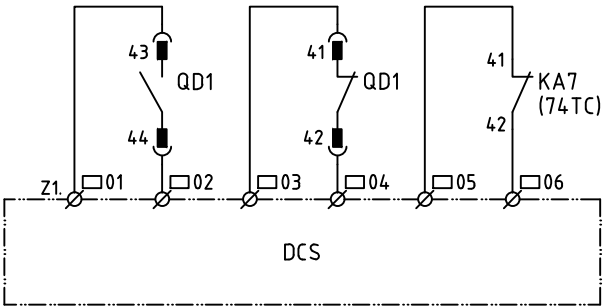
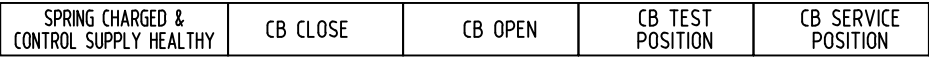
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PROPIETARIO:		FISCALES BOLIVIANOS			

**LS** Industrial Systems

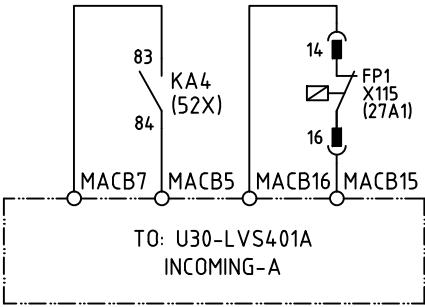
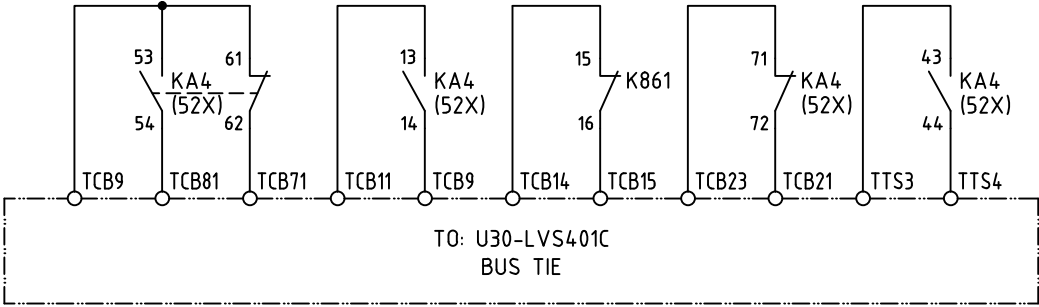
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DWG. NO. 9400



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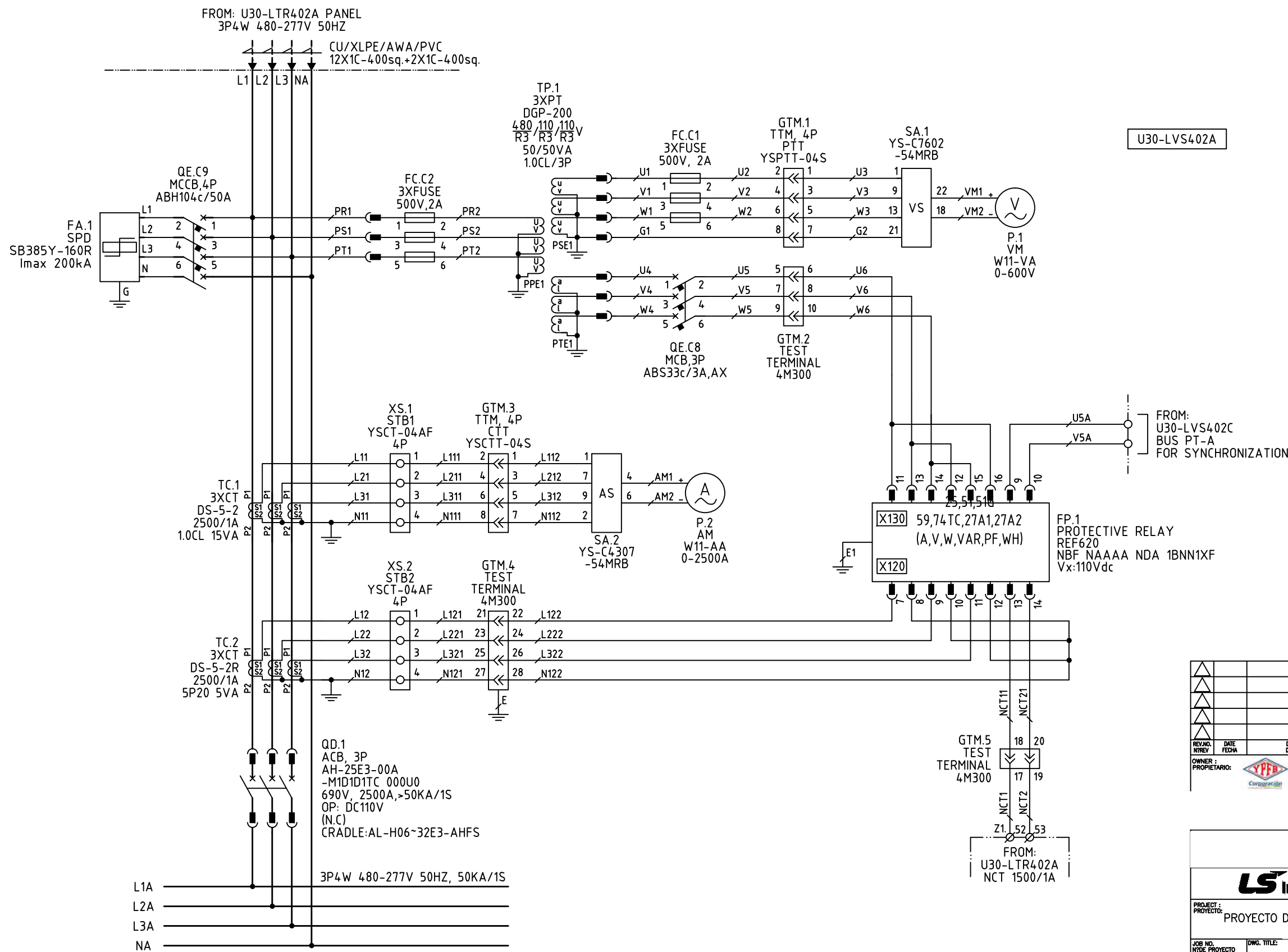
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OWNER : PROPIETARIO:		YACIMIENTOS PETROLIFEROS FISCALES BOLIVIANOS			

PROJECT : PROYECTO:		PROYECTO DE AMONIACO/UREA DE YPFB	
JOB NO. NÚMERO PROYECTO	DWG. TITLE:		
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REV. NO.	DATE	DESCRIPTION	DIN	CHECKED	APPROVED
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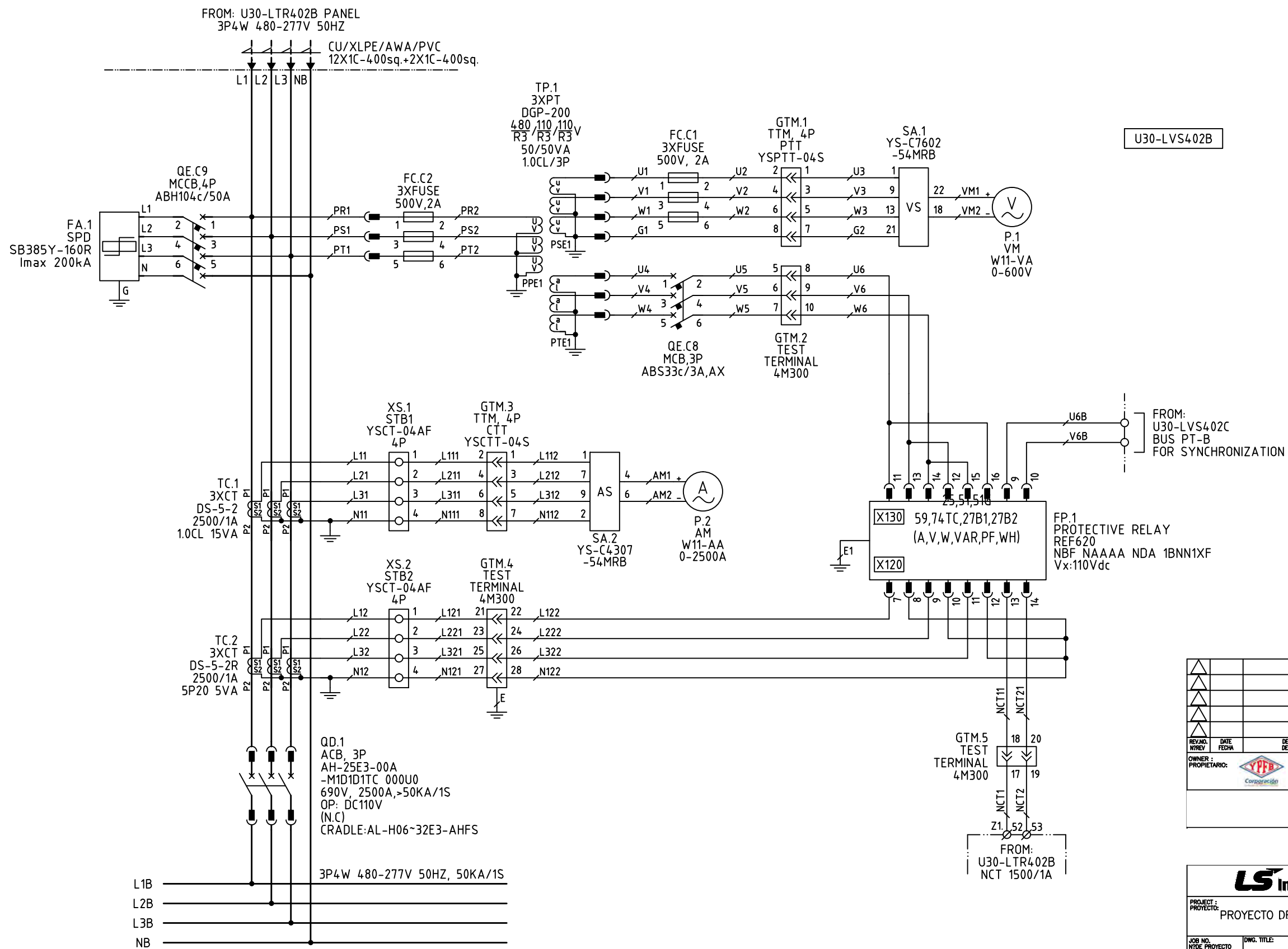
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PROPIETARIO : YPFB  
Corporación

YACIMIENTOS PETROLIFEROS  
FISCALES BOLIVIANOS

<b>LS Industrial Systems</b>	
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JOB NO. NÚMERO PROYECTO	DWG. TITLE:
DWG. NO. : NÚMERO DIBUJO:	

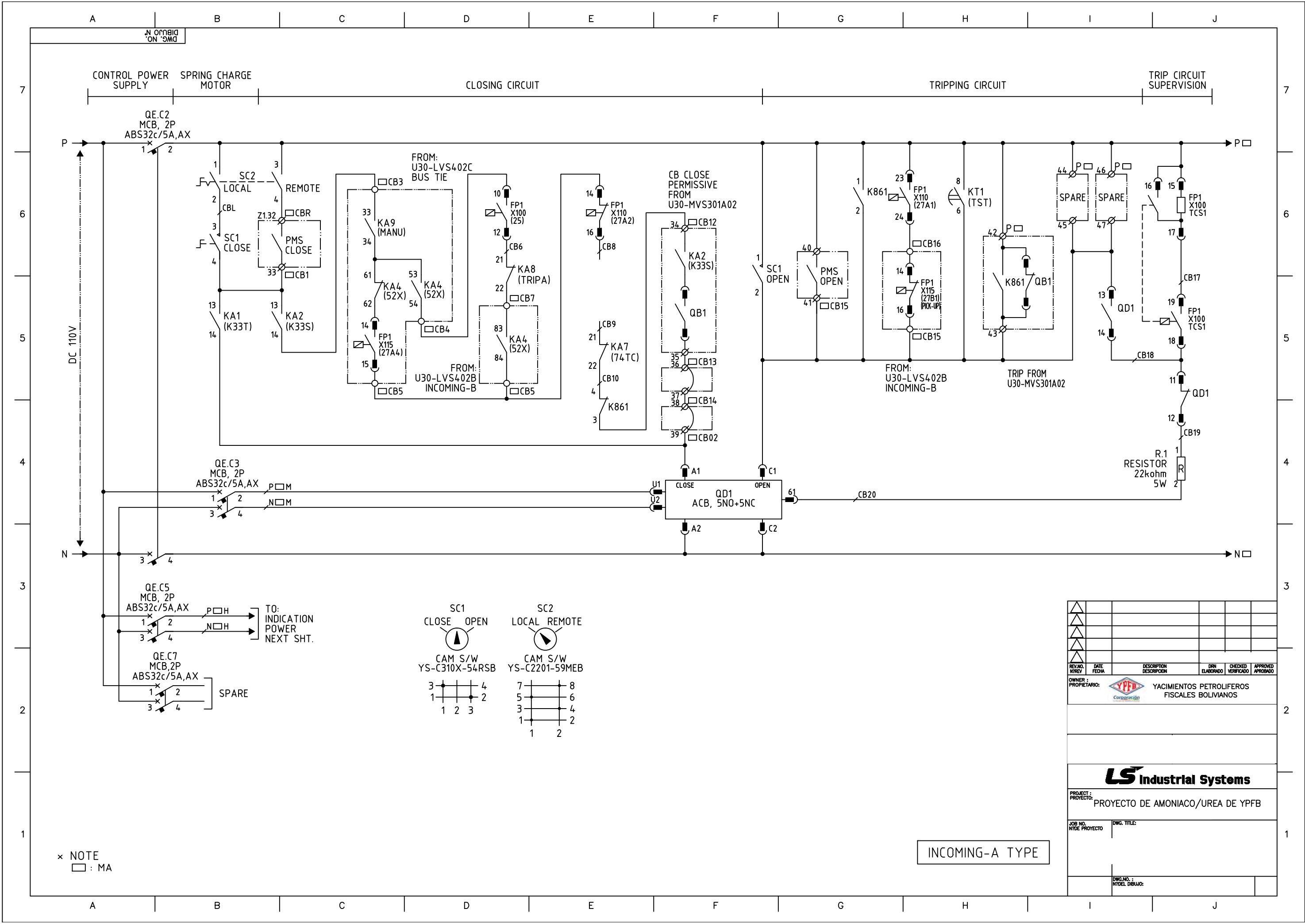
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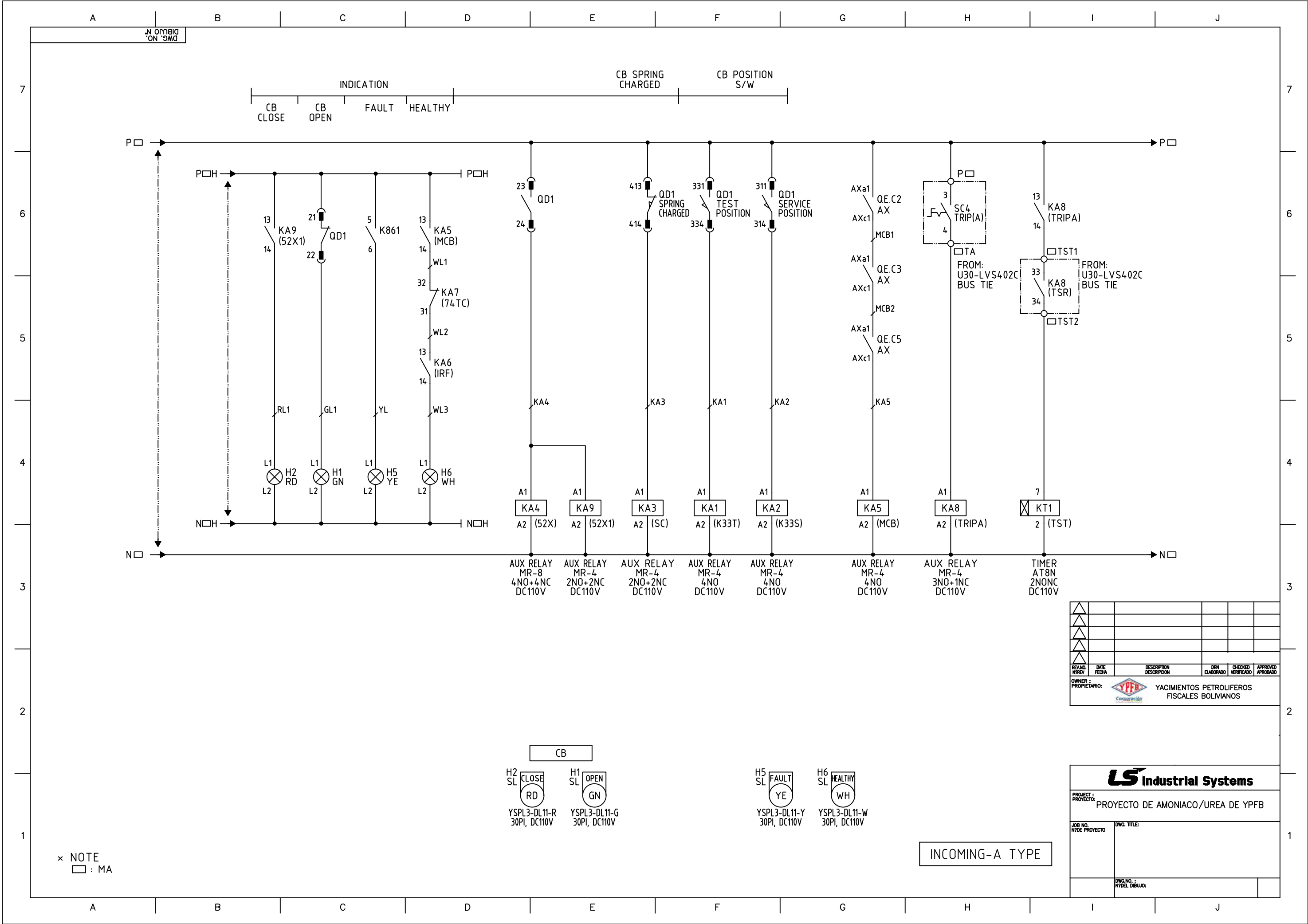


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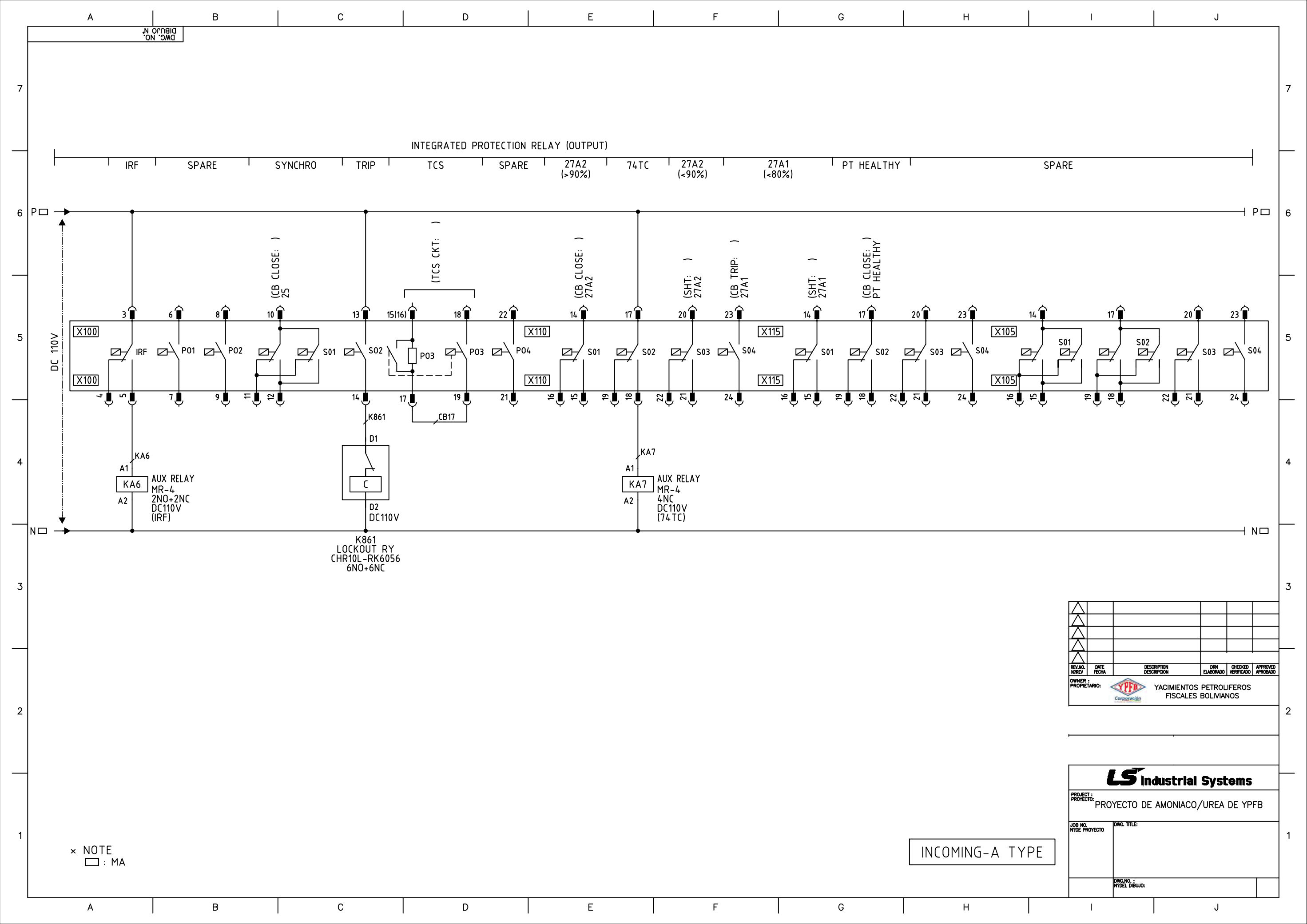
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JOB NO. NÚMERO PROYECTO	DWG. TITLE:
DWG. NO. : NÚMERO DIBUJO:	



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REV. NO.	DATE	DESCRIPTION	DIN	CHECKED	APPROVED
01	2024-01-15	PROYECTO DE AMONIACO/UREA DE YPFB	ELABORADO	VERIFICADO	APROBADO

**LS** Industrial Systems

PROJECT :  
PROYECTO: PROYECTO DE AMONIACO/UREA DE YPFB

JOB NO.  
NÚMERO PROYECTO

DWG. TITLE:  
TÍTULO DEL DIBUJO

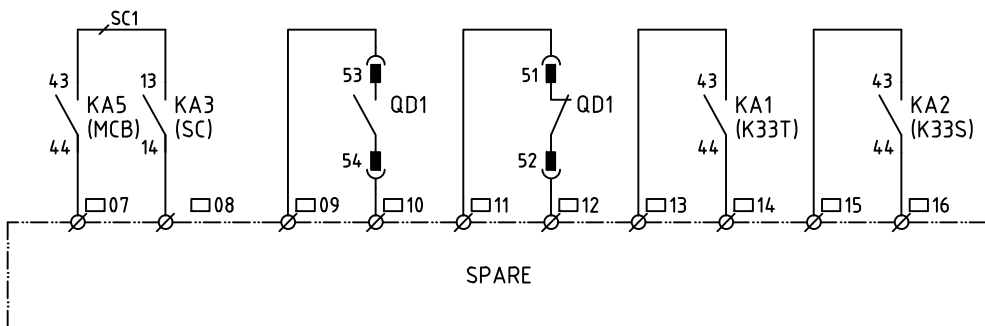
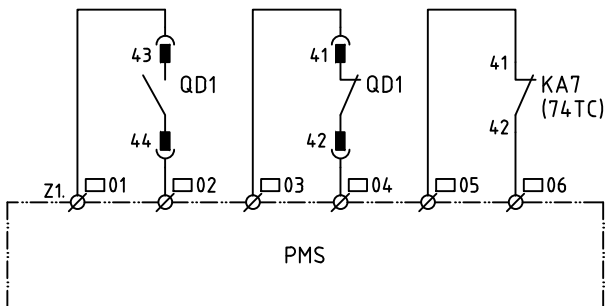
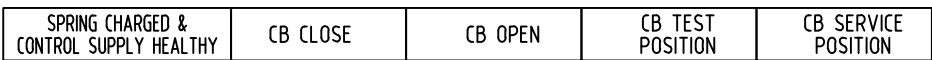
DWG. NO. :  
NÚMERO DEL DIBUJO

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DWG. NO. 9400  
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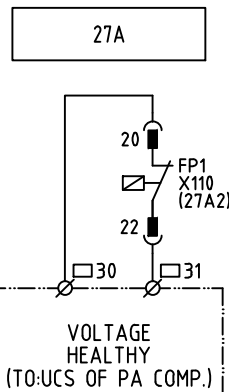
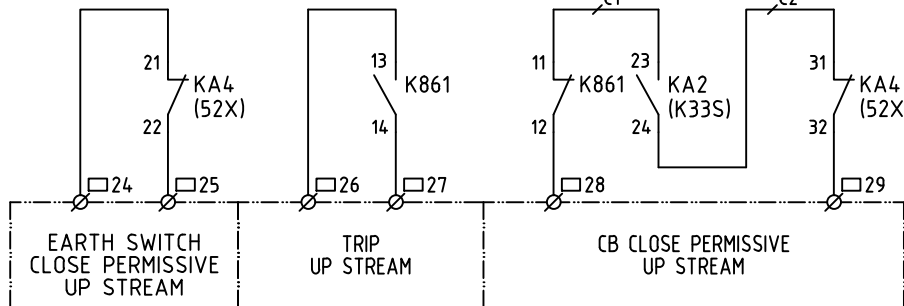
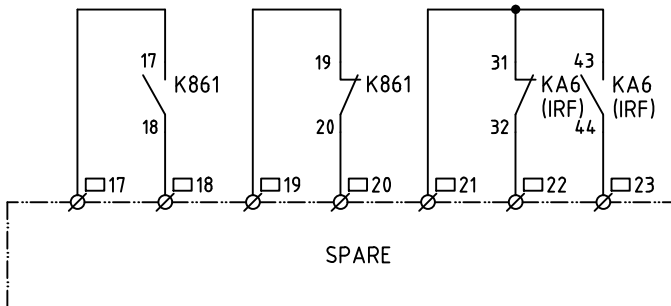
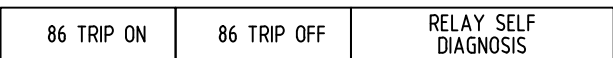


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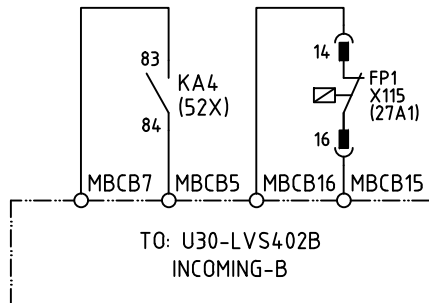
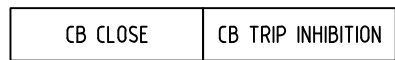
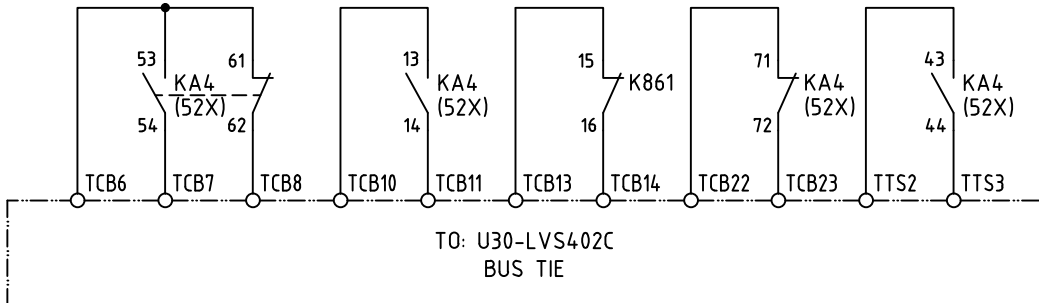
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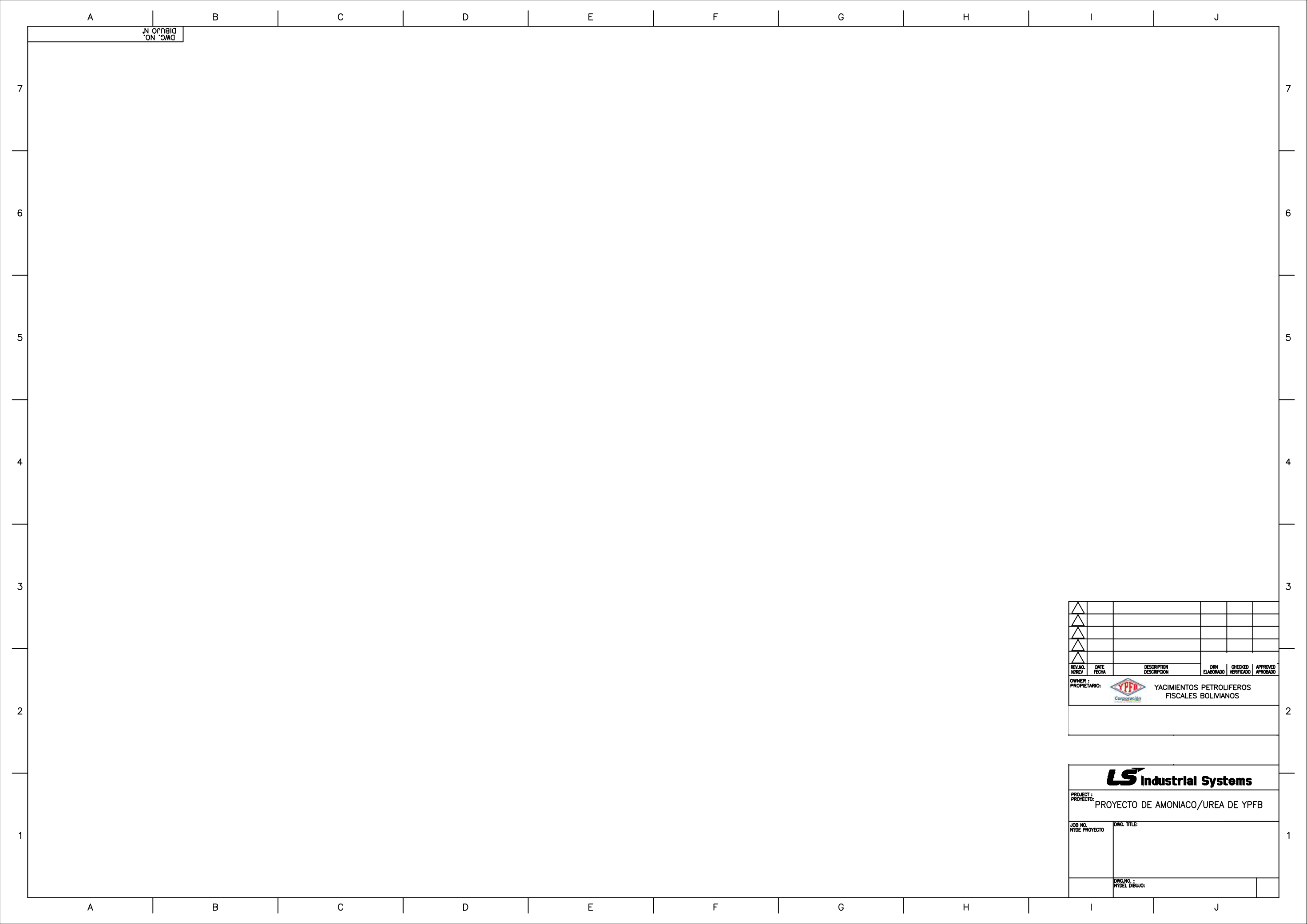
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REV. NO.	DATE	DESCRIPTION	DIN	CHECKED	APPROVED
WREV	FECHA	DESCRIPCION	ELABORADO	VERIFICADO	APROBADO
OWNER : PROPIETARIO:		YACIMIENTOS PETROLIFEROS FISCALES BOLIVIANOS			


<b>LS Industrial Systems</b>	
PROJECT : PROYECTO:	
PROYECTO DE AMONIACO/UREA DE YPFB	
JOB NO. NÚMERO PROYECTO	DWG. TITLE:
DWG. NO. : NÚMERO DIBUJO:	





DWG. NO.  
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REV. NO. NºREV	DATE FECHA	DESCRIPTION DESCRIPCION	DIN ELABORADO	CHECKED VERIFICADO	APPROVED APROBADO
OWNER : PROPIETARIO:		 YACIMIENTOS PETROLIFEROS FISCALES BOLIVIANOS			

	
PROJECT : PROYECTO: PROYECTO DE AMONIACO/UREA DE YPFB	
JOB NO. NºDE PROYECTO	DWG. TITLE:
DWG. NO. : NºDEL DIBUJO:	