

Students, please affix one of your self-adhesive identification labels to this space. Do not obscure other parts of this page with the label. If you do not have a self-adhesive identification label, please complete the following information. Write your name as it appears on your badge.

Your Name: _____

Participation Number:

Two letter state abbreviation. →

State code (0301, 0302, to 0350) ↑

Team member number (01, 02, 03, or 04) ↑

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Students, please do not write or mark within this box.

Judges, after this skill sheet has been scored and double checked, write the total score for this activity in the blank below.

Skill Activity Score: _____

Judges Initials: _____

2019 National Agricultural Technology & Mechanical Systems Career Development Event

Electrical Systems Skill Activity

Problem: The 230 V (nominal) single-phase receptacle is an individual circuit that will supply current to a Lincoln Electric Power MIG 256 GMAW welder. Properly wire the installed supply conductors for the 4-wire service feeder panel in accordance with **NEC Article 250.32(B)(1)**. The sub-panel will be grounded by #6 soft drawn bare copper connected to an assumed driven ground at the farm shop. Select and install the proper conductor and over-current protection (circuit breaker). Make connections to the 230V receptacle in accordance with the National Electrical Code and the attached electrical schematic. Individual branch circuit conductors will be installed in conduit.

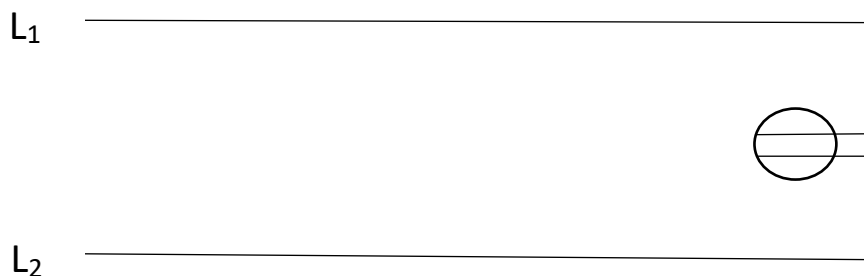
Use the provided name plate rating information from the welding machine and the code references identified in each question to determine:

- The minimum ampacity of the supply conductors serving the receptacle.
- The correct conductor size serving the receptacle
- The correct over-current protection device (circuit breaker) size

Answer the questions before selecting and installing the circuit conductor and over current protection. Choose from the materials provided to wire the circuit.

Directions:

1. Eye protection (safety glasses) is required at all times.
2. All tools and electrical supplies are provided.
3. **Answer the questions** using the information and resources provided.
DO NOT MARK IN THE REFERENCE BOOK!
4. Connect the service conductors and equipment grounding conductor in the feeder panel.
5. Install the correct over-current protection by selecting either the 30-amp double pole breaker or the 60-amp double pole breaker.
6. Select either the 12 AWG or 10 AWG conductor placed before you; install the conductors between the feeder panel and the outlet box.
7. Only prepare the wire ends, **do not cut any wire.**
8. Complete the wiring of the receptacle, in the surface mounted metal box, in accordance with the National Electrical Code and the attached electrical schematic drawing.
8. **Do not attach any of the devices to the boxes.**
9. **Do not tuck any of the conductors (wire) into the boxes.**
10. Submit this sheet to the officials upon completion of the problem or when time is called.



Lincoln Electric Power MIG 256 Name Plate Rating

230 V/1Ø/ 60 Hz

Duty Cycle = 40% @ 250 output Amps

Input Ampere Rating = 47A

DO NOT MARK IN THE CODE BOOK!! Record your answers in the spaces provided.

Choose the circuit conductor and overcurrent protection device based on your responses to the following:

1. Use the provided name plate rating information and **NEC Article 630.11** to determine the **minimum** ampacity of the receptacle supply conductors.
_____ (1 pt.)
2. According to the information found in **NEC Table 310.15 (B)(16)** and **Article 240.4 (D)**, what is the **minimum** size THHN-2, THHN or THHW insulated copper conductor required for the receptacle circuit?
_____ (1 pt.)
3. Determine the **maximum** rating of the circuit conductor over current protection in accordance with **NEC Article 630.12(B)**.
_____ (1 pt.)

Evaluation Score Sheet (For contest officials only)

Item		Points Possible	# of opportunities	Points each	Points Earned
1.	Workability of wiring problem	4	1	All or none	
2.	Correct bonding (grounding) of metal enclosures	2	2	1	
3.	Correct size circuit conductor installed	2	1	All or none	
4.	Correct over current protection	2	1	All or none	
5.	Service conductor connections are properly made and identified in the feeder panel	6	3	2	
6.	Branch circuit conductors properly attached at breaker	2	2	1	
7.	Receptacle connections made properly	8	2	4	
8.	Splicing conductors	1	1	1	
9.	Questions	3	3	1	
10.	Safety & work habits	- 2pts./violation			
		Total Pts. Possible = 30		Total Earned	

Please write the total score in the space provided at the top of the front page.