

2026 - 2027 EMC

Speech/Demonstration Topic

PROBLEM:

A customer has contacted you to install an individual equipment branch circuit supplying power for a Miller Thunderbolt 210 MV welder, with the ability to add a ChargePoint Home Flex Level 240A Plug-In EV Charger in the future. The Maximum Effective Supply Current (I_{eff}) for the welder is 22.5 amps, and the Rated Maximum Supply Current (I_{max}) is 44.9 amps. The Maximum Load for the EV charger is 40 amps. The subpanel, circuit, and charger will be located within the same agricultural structure. The charger requires a NEMA 6-50R receptacle. Branch circuit conductors will run from the SEP to the NEMA plug. The conductors will be 6/2 NM-B, rated for 60°C (140°F). The outlet box will be installed to accommodate a noncombustible wall finish.

You will need to thoroughly explain the operating principles and installation of circuit conductors for the individual equipment branch circuit. Also, you should select the correct overcurrent protection and receptacle type in accordance with Articles 625 and 630 and Table 310.16 of the 2026 National Electric Code.

The Speech Demo board will resemble an unfinished garage within an agricultural structure, free of excessive dust and corrosive atmosphere. All wiring materials, including the subpanel, NM conductor, and device box, will be installed in a mock stud wall. The components installed will be prepared for noncombustible metal wall covering. NM conductor will be prepared but not terminated in the subpanel and the device box.

MATERIALS LIST:

- 1 - 100 Amp Eaton Sub-Panel (with bonding strap removed)
- 1 - #6 TWN Stranded Cu Grounding conductor. (Installed)
- 1 - 1 ¼" Conduit for Subpanel raceway
- 3 - 4 TWN Cu Supply conductors installed in a 100-amp circuit breaker.
- 1 - 50 Amp Double-Pole GFI circuit breaker (Not Installed)
(BR 50 Amp 120-Volt/240-Volt 2-Pole GFCI Circuit Breaker Pigtail Neutral) (Not Installed)
- 1 - NEMA 6 -50R EV-rated rec (Not Installed)
- 1 - 4 x 2 18 Device Box and F Bracket (Installed in Demo Board)
(Home Depot SKU Number 1009220895)
(Lowe's Item Number 72459)
- 1 - Square Device Cover plate (Not Installed)
- 3 - 1 ½" x 3" 14 Gauge Nail Stop (Two Installed, One Not Installed)
- 2 - 1" Non-Metallic Clamp
- 1 - 1" Insulated Electrical Staple
- 6/2 NM-B Cable

REFERENCE:

2026 National Electrical Code
Agricultural Wiring Handbook – 18th Edition
Poster Size Schematic Drawing
ChargePoint Home Flex Installation Guide
Miller Thunderbolt 210 MV Manual

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