



Example Metering Procedure

Instruction to measure electric power at VMF facility

(Applicable to the facilities where power meter data is not available)

The intent of this instruction is to provide an example procedure to verify existing loads at the panelboard (as indicated on drawings) intended to feed new chargers at the VMF facility. Only licensed electricians, working with companies approved through a subcontracting process through the USPS PMSC contract with WSP-Korte, may continue with observation and work for the VMF program. Please follow all company, project-specific, site-specific, local, USPS and general contractor safety guidelines. This guide is not intended to be a replacement for any metering operation requirement but is intended as a supplement to demonstrated expected information. Complete any JHA per project requirements.

Safety:

If company guidelines require turning off equipment to hook up metering devices, coordinate with the site superintendent and site USPS representative to arrange a best outage time minimum 2 weeks prior to outage and provide coordinated date and time in writing to WSP construction manager. Because all existing panelboards are energized (in service), as per NFPA 70E standard, the following products (PPE CAT 2 minimum -refer to the reference tables) are required to be worn prior to measuring load currents. Note that all PPE listed below is the minimum and based on arc flash warning label, additional PPE may be necessary:

- Safety glasses or safety goggles (SR)
- Hard hat
- Safety boot/Leather footwear
- Rubber insulating gloves(SR)
- Current/Voltage measurement

Please be cautious when you are measuring the current per phase. Besides, please do not move the wires at all. Make sure there is no lock or tag on breakers. If there is any, do not flip the breaker. You can ask the USPS's technician about the connected load and then record the connected device/equipment loads' name plates to calculate the connected total power to that specific breaker.

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Instructions:

1. Have the report readily available for documentation prior to start.
2. Take pictures of equipment (meter) used and of panel to be measured.
3. Have the technician manually turn on/switch on all loads connected to each associated breaker at the panel indicated. Ensure that the equipment is running, for instance, if the breaker serves HVAC equipment, make sure it is running at the time of recording.
4. Use digital clamp meter as shown on Figure 1 to measure current per each single phase.
5. Measure for at least 10 minutes from the beginning of having turned on loads, then record the highest observed load. If the load appears significantly higher at the beginning than the end of 10 minutes, record both values as the higher value could consider motor start loads.

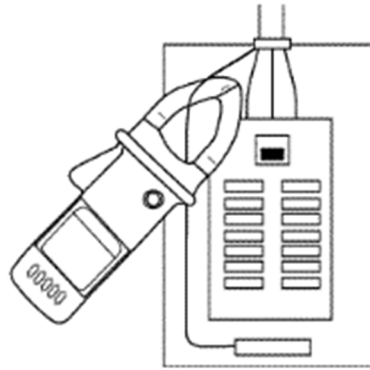


Figure 1: Example scenario: Indicated panelboard which is supposed to feed new transformer

6. Read the real-time current per each single phase.
7. Use digital clamp meter to measure voltage between Phase to neutral/ground (PH A-G, & PH B-G, PH C-G). However, if there is any meter either digital or manual installed on the panel, please read the voltage values and no need to measure voltage by clamp meter. The voltage values can be observed out of the upstream meter if you can't find any meter on the associated panel.
8. Please repeat measurement instructions from step 1 to step 7 for all panels as indicated on drawing.



Conclusion:

To verify the new chargers can be fed through the existing panel(s) as indicated on drawings, the computed available power shall be bigger than larger than the load added. Verification of existing loads on the panel is critical to confirm that the design assumptions are valid.

Reference tables (NFPA 70E):

ARTICLE 130 — WORK INVOLVING ELECTRICAL HAZARDS

130.7

Table 130.7(C)(15)(a) Arc Flash PPE Categories for Alternating Current (ac) Systems

Equipment	Arc Flash PPE Category	Arc Flash Boundary
Panelboards or other equipment rated 240 volts and below Parameters: Maximum of 25 kA available fault current; maximum of 0.03 sec (2 cycles) fault clearing time; minimum working distance 455 mm (18 in.)	1	485 mm (19 in.)
Panelboards or other equipment rated greater than 240 volts and up to 600 volts Parameters: Maximum of 25 kA available fault current; maximum of 0.03 sec (2 cycles) fault clearing time; minimum working distance 455 mm (18 in.)	2	900 mm (3 ft)
600-volt class motor control centers (MCCs) Parameters: Maximum of 65 kA available fault current; maximum of 0.03 sec (2 cycles) fault clearing time; minimum working distance 455 mm (18 in.)	2	1.5 m (5 ft)
600-volt class motor control centers (MCCs) Parameters: Maximum of 42 kA available fault current; maximum of 0.33 sec (20 cycles) fault clearing time; minimum working distance 455 mm (18 in.)	4	4.3 m (14 ft)
600-volt class switchgear (with power circuit breakers or fused switches) and 600-volt class switchboards Parameters: Maximum of 35 kA available fault current; maximum of up to 0.5 sec (30 cycles) fault clearing time; minimum working distance 455 mm (18 in.)	4	6 m (20 ft)
Other 600-volt class (277 volts through 600 volts, nominal) equipment Parameters: Maximum of 65 kA available fault current; maximum of 0.03 sec (2 cycles) fault clearing time; minimum working distance 455 mm (18 in.)	2	1.5 m (5 ft)
NEMA E2 (fused contactor) motor starters, 2.3 kV through 7.2 kV Parameters: Maximum of 35 kA available fault current; maximum of up to 0.24 sec (15 cycles) fault clearing time; minimum working distance 910 mm (36 in.)	4	12 m (40 ft)
Metal-clad switchgear, 1 kV through 15 kV Parameters: Maximum of 35 kA available fault current; maximum of up to 0.24 sec (15 cycles) fault clearing time; minimum working distance 910 mm (36 in.)	4	12 m (40 ft)
Metal enclosed interrupter switchgear, fused or unfused type construction, 1 kV through 15 kV Parameters: Maximum of 35 kA available fault current; maximum of 0.24 sec (15 cycles) fault clearing time; minimum working distance 910 mm (36 in.)	4	12 m (40 ft)
Other equipment 1 kV through 15 kV Parameters: Maximum of 35 kA available fault current; maximum of up to 0.24 sec (15 cycles) fault clearing time; minimum working distance 910 mm (36 in.)	4	12 m (40 ft)
Arc-resistant equipment up to 600-volt class Parameters: DOORS CLOSED and SECURED; with an available fault current and a fault clearing time that does not exceed the arc-resistant rating of the equipment*	N/A	N/A
Arc-resistant equipment 1 kV through 15 kV Parameters: DOORS CLOSED and SECURED; with an available fault current and a fault clearing time that does not exceed the arc-resistant rating of the equipment*	N/A	N/A



ARTICLE 130 — WORK INVOLVING ELECTRICAL HAZARDS

130.7

Table 130.7(C)(15)(c) Personal Protective Equipment (PPE)

Arc-Flash PPE Category	PPE
1	<p>Arc-Rated Clothing, Minimum Arc Rating of 4 cal/cm² (16.75 J/cm²)^a Arc-rated long-sleeve shirt and pants or arc-rated coverall Arc-rated face shield^b or arc flash suit hood Arc-rated jacket, parka, high-visibility apparel, rainwear, or hard hat liner (AN)^f Protective Equipment Hard hat Safety glasses or safety goggles (SR) Hearing protection (ear canal inserts)^c Heavy-duty leather gloves, arc-rated gloves, or rubber insulating gloves with leather protectors (SR)^d Leather footwear^e (AN)</p>
2	<p>Arc-Rated Clothing, Minimum Arc Rating of 8 cal/cm² (33.5 J/cm²)^a Arc-rated long-sleeve shirt and pants or arc-rated coverall Arc-rated flash suit hood or arc-rated face shield^b and arc-rated balaclava Arc-rated jacket, parka, high-visibility apparel, rainwear, or hard hat liner (AN)^f Protective Equipment Hard hat Safety glasses or safety goggles (SR) Hearing protection (ear canal inserts)^c Heavy-duty leather gloves, arc-rated gloves, or rubber insulating gloves with leather protectors (SR)^d Leather footwear^e</p>
3	<p>Arc-Rated Clothing Selected so That the System Arc Rating Meets the Required Minimum Arc Rating of 25 cal/cm² (104.7 J/cm²)^a Arc-rated long-sleeve shirt (AR) Arc-rated pants (AR) Arc-rated coverall (AR) Arc-rated arc flash suit jacket (AR) Arc-rated arc flash suit pants (AR) Arc-rated arc flash suit hood Arc-rated gloves or rubber insulating gloves with leather protectors (SR)^d Arc-rated jacket, parka, high-visibility apparel, rainwear, or hard hat liner (AN)^f Protective Equipment Hard hat Safety glasses or safety goggles (SR) Hearing protection (ear canal inserts)^c Leather footwear^e</p>
4	<p>Arc-Rated Clothing Selected so That the System Arc Rating Meets the Required Minimum Arc Rating of 40 cal/cm² (167.5 J/cm²)^a Arc-rated long-sleeve shirt (AR) Arc-rated pants (AR) Arc-rated coverall (AR) Arc-rated arc flash suit jacket (AR) Arc-rated arc flash suit pants (AR) Arc-rated arc flash suit hood Arc-rated gloves or rubber insulating gloves with leather protectors (SR)^d Arc-rated jacket, parka, high-visibility apparel, rainwear, or hard hat liner (AN)^f Protective Equipment Hard hat Safety glasses or safety goggles (SR) Hearing protection (ear canal inserts)^c Leather footwear^e</p>



PROJECT INFORMATION	
BUILDING NAME	
BUILDING ADDRESS	
DATE	
TECHNICIAN	
TECHICIAN COMPANY	
TECHNICAN PHONE	
INSPECTION TIME	
EQUIPMENT MODEL #	
USPS CONTACT NAME	
USPS CONTACT PHONE	

PHOTO CHECKLIST	
METERING EQUIPMENT	
PANEL PHOTO	
MAIN CIRCUIT BREAKER	
ALL CIRCUIT BREAKERS	
PANEL SCHEDULE	
TRANSFORMER NAMEPLATE RATING (VOLTAGE AND kVA) FEEDING VMF BUILDING OR PHOTO OF MAIN BREAKER FROM UPSTREAM PANEL FEEDING VMF BUILDING	

Item	1	2	3	4	5
Panel tag-Inside the VMF building					
Voltage rating (V)					
Current rating(A)					
Are the all breakers at ON position ?(Yes/No)					
Is every single load associated to each breaker switched on?(Yes/No)					
If the answer to the previous cell is no, read the name plate power/hp ratings on the all associated equipment's name plates and then add them all together to obtain total power(W). The total power shall be written down in this column.					
Phase A current (measured by clamp meter)					
Phase B current (measured by clamp meter)					
Phase C current (measured by clamp meter)					
Voltage of phase (A) to ground					
Voltage of phase (B) to ground					
Voltage of phase (C) to ground					
Comment					

Please note that,if possible, all loads during current measurement shall be switched on.