PHOTO INSPECTION REFERENCE – 2017 NEC

Energy Storage

The photo inspection resource is used by Energy Storage's third-party QA Contractor to evaluate the quality of the battery installation. Participating contractors are encouraged to reference this resource throughout the installation process for each project to ensure compliance with the Energy Storage program rules and requirements.

		Requirement	Defect Category	Code Reference
Overall Observations	Program	Existing Service Panel is not a split bus (FPE Stab-Lok, Push-O-Matic etc.,).	Critical	Energy Storage System Program
		Installed Battery manufacturer shall match Program records.	Incidental	Energy Storage System Program
		Installed Battery model number shall match Program records.	Incidental	Energy Storage System Program
		Installed Battery quantity shall match Program records.	Incidental	Energy Storage System Program
		As per Program requirements, any roof damage must be repaired prior to installation.	Minor	Energy Storage System Program
		Site address must match site address submitted.	Critical	Energy Storage System Program
		Current Transformers are installed and meet Program requirements.	Major	Energy Storage System Program

		Requirement	Defect Category	Code Reference
AC Combiner	Conductors	Grounded (neutral) conductor is properly identified.	Incidental	NEC Article 200.6(A)&(B)
		Ungrounded conductor properly identified.	Incidental	NEC Article 200.7
		Grounded conductor(s) are insulated from metal enclosure surfaces and the ground terminal inside combiner box.	Major	NEC Article 250.24(A)(5)
		The neutral conductor is connected at its own dedicated terminal isolated from metal enclosure.	Minor	NEC Article 408.41
	Conduit	The conduit is grounded (when required).	Major	NEC Articles 250.4(A)(3)
	Electrical	AC Combiner is suitable for environment.	Major	NEC Articles 314.15 and 110.3(B)
		Equipment must be sufficiently rated for expected voltage and/or current.	Critical	NEC Article 110.3(B)
	Grounding	Where operating voltage is 250V or greater and enclosure knockouts are not listed to carry fault current, metallic conduit is properly bonded to maintain electrical continuity around eccentric and concentric knockouts.	Major	NEC Articles 250.4(A)(5) and 250.64(E). Ground fault path cannot include eccentric or concentric knockouts, per NEC Article 250.97
		Grounded conductor(s) terminal lug is properly installed.	Major	NEC Articles 110.3(B) and 250.4
		Grounding electrode conductor is continuous.	Major	NEC Article 250.64(C)
		Grounding electrode conductor is sufficiently sized.	Major	NEC Articles 250.66 and 250.166
		AC Combiner is properly grounded.	Major	NEC Articles 250.4, 250.8 and 250.12
	OCPD	AC Combiner Overcurrent protection is sufficient.	Critical	NEC Article 240.4
		Energy Storage System Backfed breaker is properly sized at, or above 125% of inverter output current	Major	NEC Article 240.4
		Circuit Breaker shall be installed and used in accordance with any instruction included in the listing or labeling.	Major	NEC Article 110.3(B)

		Requirement	Defect Category	Code Reference
AC Disconnect	Conductors	Grounded (neutral) conductor is properly identified.	Incidental	NEC Article 200.6(A)&(B)
		Ungrounded conductor properly identified.	Incidental	NEC Article 200.7
		Grounded conductors are isolated from enclosure and ground terminal.	Major	NEC Article 250.24(A)(5)
		The neutral conductor is connected at its own dedicated terminal insulated from metal enclosure.	Minor	NEC Article 408.41
	Conduit	The conduit is grounded (when required).	Major	NEC Article 250.4(A)(3)
	Electrical	AC Disconnect enclosure is suitable for environment.	Major	NEC Articles 314.15 and 110.3(B)
		AC Disconnect is properly rated for expected current load.	Critical	NEC Articles 110.3(B), 705.60 (125% of the inverter output) and 705.65(OCP), 706.7 and 706.21
		A disconnecting means shall be provided for all ungrounded conductors derived from an energy storage system.	Major	NEC Articles 706.7(A)
		Service disconnect is properly rated for the application.	Major	NEC Article 230.79(D)
	Grounding	Where operating voltage is 250V or greater and enclosure knockouts are not listed to carry fault current, metallic conduit is properly bonded to maintain electrical continuity around eccentric and concentric knockouts.	Major	NEC Articles 250.4(A)(5) and 250.64(E). Ground fault path cannot include eccentric or concentric knockouts, per NEC Article 250.97
		Grounded conductor(s) terminal lug is properly installed.	Major	NEC Articles 110.3(B) and 250.4
		Grounding electrode conductor must be continuous.	Major	NEC Article 250.64(C)
		Grounding electrode conductor is properly bonded to the main premises grounding electrode system.	Major	NEC Article 250.64
		Grounding electrode conductor is sufficiently sized.	Major	NEC Articles 250.66, and 250.166
		AC Disconnect is grounded.	Major	NEC Articles 250.4, 250.8 and 250.12
		Equipment grounding conductor is properly sized.	Major	NEC Article 250.122
	OCPD	Conductors shall be protected against overcurrent in accordance with their ampacity.	Critical	NEC Article 240.4 and 706.21(B)
		The AC OCPD is properly sized for the expected output current of the ESS system.	Major	NEC Article 706.21(B)
		Fused AC Disconnect shall be installed and used in accordance with any instruction included in the listing or labeling and Fuses are present.	Major	NEC Article 110.3(B)
		No overcurrent device shall be connected in series with any conductor that is intentionally grounded.	Major	NEC Article 240.22
		Fuses are present and installed in accordance with any instruction included in the listing or labeling.	Major	NEC Article 110.3(B)
		Equipment intended to interrupt current at fault levels shall have an interrupting rating sufficient for the current that is available at the line terminals of the equipment.	Major	NEC Articles 110.9, 110.10 and 230.82
		The service overcurrent device shall be an integral part of the service disconnecting means or shall be located immediately adjacent.	Critical	NEC Articles 230.91 and/ or 110.3(B)

		Requirement	Defect Category	Code Reference
DC Combiner	Conductors	DC Combiner splice components are rated for environment.	Major	NEC Articles 110.3(B), 110.11, and 110.14
		DC Combiner splices and connections are secure and of high integrity.	Major	NEC Article 110.14
		Ungrounded conductor properly identified.	Incidental	NEC Article 200.7
	Conduit	The conduit is grounded (when required).	Major	NEC Article 250.4(A)(3)
	Electrical	Combiner box is suitable for environment.	Major	NEC Articles 314.15 and 110.3(B)
		Enclosure rating is sufficient for expected current load in accordance with its listing.	Critical	NEC Article 110.3(B)
		DC Combiner is properly identified and listed.	Major	NEC Articles 110.3(B)
	Grounding	Equipment grounding conductor is identified as bare, green, or green with continuous yellow stripe(s).	Incidental	NEC Article 250.119
		Where operating voltage is 250V or greater and enclosure knockouts are not listed to carry fault current, metallic conduit is properly bonded to maintain electrical continuity around eccentric and concentric knockouts.	Major	NEC Articles 250.4(A)(5) and 250.64(E). Ground fault path cannot include eccentric or concentric knockouts, per NEC Article 250.97
		Grounded conductor(s) terminal lug is properly installed.	Major	NEC Articles 110.3(B) and 250.4
		DC Combiner box is grounded.	Major	NEC Articles 250.4, 250.8 and 250.12
		Equipment grounding conductor is properly sized.	Major	NEC Article 250.122
	OCPD	Overcurrent devices used in any DC portion of the ESS shall have the appropriate voltage, current and interrupt ratings.	Major	[NEC Article 706.21(C)]
		No overcurrent device shall be connected in series with any conductor that is intentionally grounded.	Major	NEC Article 240.22
		Energy storage system circuit conductors shall be protected.	Critical	NEC Article 706.21(A)

		Requirement	Defect Category	Code Reference
DC Disconnect	Conductors	Ungrounded conductor properly identified.	Incidental	NEC Article 200.7
	Conduit	The conduit is grounded (when required).	Major	NEC Article 250.4(A)(3)
	Electrical	DC Disconnect enclosure is suitable for environment.	Major	NEC Articles 314.15 and 110.3(B)
		Equipment must be sufficiently rated for expected voltage and/or current.	Critical	NEC Article 110.3(B)
		Disconnect is listed for DC use.	Critical	NEC Article 110.3(B)
		A disconnecting means shall be provided for all ungrounded conductors derived from an energy storage system.	Major	NEC Articles 706.7(A)
	Grounding	Equipment grounding conductor is identified as bare, green, or green with continuous yellow stripe(s).	Incidental	NEC Article 250.119
		Where operating voltage is 250V or greater and enclosure knockouts are not listed to carry fault current, metallic conduit is properly bonded to maintain electrical continuity around eccentric and concentric knockouts.	Major	NEC Articles 250.4(A)(5) and 250.64(E). Ground fault path cannot include eccentric or concentric knockouts, per NEC Article 250.97
		Grounded conductor(s) terminal lug is properly installed.	Major	NEC Articles 110.3(B) and 250.4
		DC Disconnect is properly grounded.	Major	NEC Articles 250.4, 250.8 and 250.12
		Equipment grounding conductor is properly sized.	Major	NEC Article 250.122
	OCPD	Disconnect is rated for nominal voltage and current.	Critical	NEC Article 110.3(B)
		Disconnect fuses are DC rated and properly sized for system voltage.	Critical	NEC Article 110.3(B)
Feeder Tap Connection	Conductors	Grounded (neutral) conductor is properly identified.	Incidental	NEC Article 200.6(A)&(B)
		Conductors are properly spliced.	Major	NEC Articles 110.3(B) and 110.14
		Ungrounded conductor(s) are properly identified.	Incidental	NEC Article 200.7
	Conduit	The conduit is grounded (when required).	Major	NEC Article 250.4(A)(3)
	Electrical	Boxes, conduit bodies and fittings installed in wet locations shall be listed for use in wet locations.	Major	NEC Articles 314.15 and 110.3(B)
		Equipment must be sufficiently rated for expected voltage and/or current.	Critical	NEC Article 110.3(B)
	Grounding	Grounded conductor(s) terminal lug is properly installed.	Major	NEC Articles 110.3(B) and 250.4
		Grounding electrode conductor is properly bonded to the main premises grounding electrode system.	Major	NEC Article 250.64
		Grounding electrode conductor is present and sufficiently sized.	Major	NEC Articles 250.66, and 250.166
		Enclosure is properly grounded.	Major	NEC Articles 250.4, 250.8 and 250.12
		When a metal water pipe is used as a grounding electrode, there must be a ground jumper present across water meter/filter.	Major	NEC Article 250.53(D)(1)
		A metal underground water pipe shall be supplemented by an additional electrode.	Major	NEC Article 250.53(D)(2)
		Water pipe electrode supplemented by other electrode.	Major	NEC Article 250.53(D)(2)

		Requirement	Defect Category	Code Reference
Junction Box	Conductors	Junction Box splice components are rated for environment.	Major	NEC Articles 110.3(B), 110.11, and 110.14
		Junction Box splices and connections are secure and of high integrity.	Major	NEC Article 110.14
		Grounded (neutral) conductor is properly identified.	Incidental	NEC Article 200.6(A)&(B)
		Ungrounded conductor properly identified.	Incidental	NEC Article 200.7
		Grounded conductor(s) are insulated from metal enclosure surfaces and the ground terminal inside Junction Box.	Minor	[NEC Article 250.24(A)(5)]
	Conduit	The conduit is grounded (when required).	Major	NEC Article 250.4(A)(3)
	Electrical	Junction Box is suitable for environment.	Major	NEC Articles 314.15 and 110.3(B)
		Junction Box is properly identified and listed.	Major	NEC Articles 110.3(B)
	Grounding	Grounded conductor(s) terminal lug is properly installed.	Major	NEC Articles 110.3(B) and 250.4
		Listed means used to ground enclosure.	Major	NEC Articles 250.4, 250.8 and 250.12
		Equipment grounding conductor is properly sized.	Major	NEC Article 250.122
	Structural	Roof penetrations are properly sealed and flashed.	Major	NYS Uniform Building Code and NEC Article 110.3(B)
Load Side Connection	Conductors	Grounded (neutral) conductor is properly identified.	Incidental	NEC Article 200.6(A)&(B)
		Ungrounded conductor(s) are properly identified.	Incidental	NEC Article 200.7
		The Neutral (grounded conductor(s)) shall be routed with the ungrounded conductors to each service disconnecting means and shall be connected to each disconnecting means grounded conductor(s) terminal or bus.	Major	NEC Article 300.20
		The neutral conductor is connected at its own dedicated terminal insulated from metal enclosure.	Minor	NEC Article 408.41
	Conduit	The conduit is grounded (when required).	Major	NEC Article 250.4(A)(3)
	Grounding	Grounded conductor(s) terminal lug is properly installed.	Major	NEC Articles 110.3(B) and 250.4
		Enclosure is properly grounded using a listed grounding method.	Major	NEC Articles 250.4, 250.8 and 250.12
		When a metal water pipe is used as a grounding electrode, there must be a ground jumper present across water meter/filter.	Major	NEC Article 250.53(D)(1)
		A metal underground water pipe shall be supplemented by an additional electrode.	Major	NEC Article 250.53(D)(2)
		Water pipe electrode supplemented by other electrode.	Major	NEC Article 250.53(D)(2)
	OCPD	Main panel overcurrent protection is sufficient.	Critical	NEC Article 240.4
		ESS Backfed breaker is properly sized at, or above 125% of inverter output current.	Major	NEC Article 240.4 and 706.21(C)
		Back-fed plug in devices shall be secured in place by additional fastener.	Minor	NEC Article 408.36(D)
		Where two sources, one a primary source and the other another source are located at opposite ends of a busbar that contains loads, the sum of 125 percent of the power device protecting the busbar shall not exceed 120 percent of the ampacity of the busbar.	Major	NEC Article 705.12(B)(2)(3)(b)

		Requirement	Defect Category	Code Reference
Production Meter	Conductors	Grounded (neutral) conductor is properly identified.	Incidental	NEC Article 200.6(A)&(B)
		Ungrounded conductor(s) are properly identified.	Incidental	NEC Article 200.7
		Grounded conductor(s) are insulated from metal enclosure surface and ground terminal inside meter enclosure.	Minor	[NEC Article 250.24(A)(5)]
	Conduit	The conduit is grounded (when required).	Major	NEC Article 250.4(A)(3)
	Electrical	Meter enclosure is suitable for environment.	Major	NEC Articles 314.15 and 110.3(B)
		Meter is rated for expected current load.	Critical	NEC Article 110.3(B)
	Grounding	Grounding means for enclosure installed.	Major	NEC Articles 250.4, 250.8 and 250.12
Subpanel	Conductors	Grounded (neutral) conductor is properly identified.	Incidental	NEC Article 200.6(A)&(B)
		Ungrounded conductor(s) are properly identified.	Incidental	NEC Article 200.7
		Grounded conductor(s) are insulated from metal enclosure surface and ground terminal inside meter enclosure.	Minor	NEC Article 250.24(A)(5)
		The neutral conductor is connected at its own dedicated terminal insulated from metal enclosure.	Minor	NEC Article 408.41
	Conduit	The conduit is grounded (when required).	Major	NEC Article 250.4(A)(3)
	Electrical	Boxes, conduit bodies and fittings installed in wet locations shall be listed for use in wet locations.	Major	NEC Articles 314.15 and 110.3(B)
		Equipment must be sufficiently rated for expected voltage and/or current.	Critical	NEC Article 110.3(B)
	Grounding	Grounded conductor(s) terminal lug is properly installed.	Major	NEC Articles 110.3(B) and 250.4
		Subpanel is properly grounded.	Major	NEC Articles 250.4, 250.8 and 250.12
	OCPD	Subpanel Overcurrent protection is sufficient.	Critical	NEC Article 240.4
		ESS Backfed breaker is properly sized at, or above 125% of inverter output current.	Major	NEC Article 240.4 and 706.21(C)
		Back-fed plug in devices shall be secured in place by additional fastener.	Minor	NEC Article 408.36(D)

		Requirement	Defect Category	Code Reference
Supply Side Connection	Conductors	Grounded (neutral) conductor is properly identified.	Incidental	NEC Article 200.6(A)&(B)
		Service entrance conductors are properly spliced.	Major	NEC Articles 110.3(B) and 110.14
		Ungrounded conductor(s) are properly identified.	Incidental	NEC Article 200.7
	Conduit	The conduit is grounded (when required).	Major	NEC Article 250.4(A)(3)
	Electrical	Service disconnect is properly rated for the application.	Major	NEC Article 230.79(D)
	Grounding	Where operating voltage is 250V or greater and enclosure knockouts are not listed to carry fault current, metallic conduit is properly bonded to maintain electrical continuity around eccentric and concentric knockouts.	Major	NEC Articles 250.4(A)(5) and 250.64(E). Ground fault path cannot include eccentric or concentric knockouts, per NEC Article 250.97
		Grounded conductor(s) terminal lug is properly installed.	Major	NEC Articles 110.3(B) and 250.4
		Grounding electrode conductor is properly bonded to the main premise grounding electrode system.	Major	NEC Article 250.64(C)
		Grounding electrode conductor is sufficiently sized.	Major	NEC Articles 250.66, and 250.166
		Disconnect enclosure is properly grounded using a listed grounding method.	Major	NEC Articles 250.4, 250.8 and 250.12
		When a metal water pipe is used as a grounding electrode, there must be a ground jumper present across water meter/filter.	Major	NEC Article 250.53(D)(1)
		A metal underground water pipe shall be supplemented by an additional electrode.	Major	NEC Article 250.53(D)(2)
		Water pipe electrode supplemented by other electrode.	Major	NEC Article 250.53(D)(2)
	OCPD	The AC OCPD is properly sized for the expected output current of the ESS system.	Major	NEC Article 706.21(B)
		No overcurrent device shall be connected in series with any conductor that is intentionally grounded.	Major	NEC Article 240.22
		Fuses are present and installed in accordance with any instruction included in the listing or labeling.	Major	NEC Article 110.3(B)
		Equipment intended to interrupt current at fault levels shall have an interrupting rating sufficient for the current that is available at the line terminals of the equipment.	Major	NEC Articles 110.9, 110.10 and 230.82
		The service overcurrent device shall be an integral part of the service disconnecting means or shall be located immediately adjacent thereto.	Critical	NEC Articles 230.91 and/ or 110.3(B)

		Requirement	Defect Category	Code Reference
Energy Storage	Conductors	Ungrounded conductor properly identified.	Incidental	NEC Article 200.7
		Energy Storage System conductors are protected from accidental contact.	Major	NEC Articles 110.27 and 706.10(B)
		Correct flexible cables are used for battery interconnections.	Major	NEC Article 706.32
		Battery DC conductors are properly sized for expected current load.	Major	NEC Article 706.32
	Conduit	The conduit is grounded (when required).	Major	NEC Article 250.4(A)(3)
	Electrical	A disconnecting means shall be provided for all ungrounded conductors derived from an energy storage system.	Major	NEC Articles 706.7(A)
		Batteries are properly ventilated.	Critical	NEC Article 480.10(A)
		Charge Controller shall be compatible with the energy storage manufacturer's electrical ratings and charging specifications.	Major	NEC article 110.3(B) and IFC 2018, 1206.2.4
	Grounding	Equipment grounding conductor is identified as bare, green, or green with continuous yellow stripe(s).	Incidental	NEC Article 250.119
		Where operating voltage is 250V or greater and enclosure knockouts are not listed to carry fault current, metallic conduit is properly bonded to maintain electrical continuity around eccentric and concentric knockouts.	Major	NEC Articles 250.4(A)(5) and 250.64(E). Ground fault path cannot include eccentric or concentric knockouts, per NEC Article 250.97
		Grounded conductor(s) terminal lug is properly installed.	Major	NEC Articles 110.3(B) and 250.4
		Battery enclosure is properly grounded.	Major	NEC Articles 250.4, 250.8 and 250.12