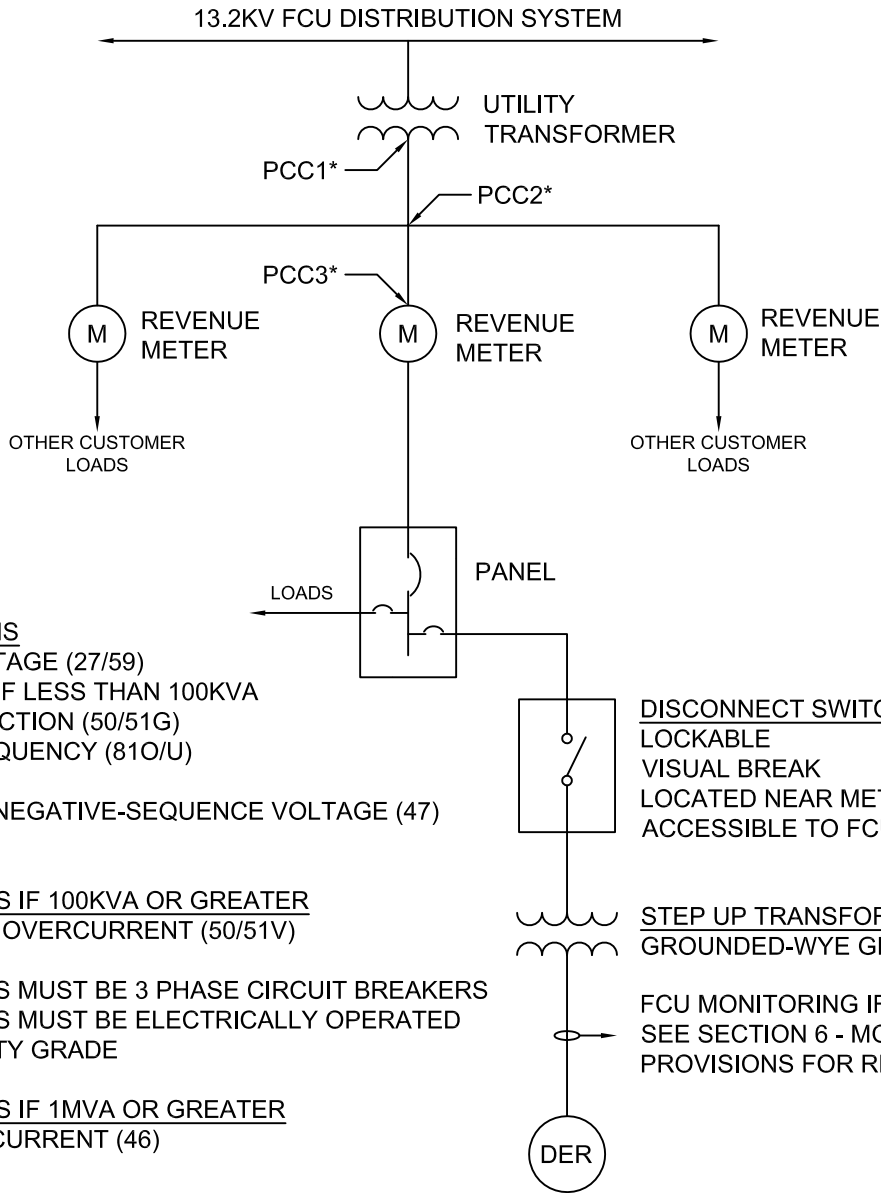


TYPICAL ONE-LINE CATEGORY A1 DER

**CATEGORY A1 INCLUDES:
ALL SYNCHRONOUS GENERATORS EXCEPT WIND TURBINES**



PROTECTIVE FUNCTIONS

- OVER AND UNDER VOLTAGE (27/59)
- OVERCURRENT (50/51) IF LESS THAN 100KVA
- GROUND FAULT PROTECTION (50/51G)
- OVER AND UNDER FREQUENCY (81O/U)
- SYNC CHECK (25)
- PHASE-SEQUENCE OR NEGATIVE-SEQUENCE VOLTAGE (47)
- ANTI-ISLANDING

ADDITIONAL FUNCTIONS IF 100KVA OR GREATER

- VOLTAGE RESTRAINED OVERCURRENT (50/51V)
- REVERSE POWER (32)
- INTERRUPTING DEVICES MUST BE 3 PHASE CIRCUIT BREAKERS
- INTERRUPTING DEVICES MUST BE ELECTRICALLY OPERATED
- RELAYS MUST BE UTILITY GRADE

ADDITIONAL FUNCTIONS IF 1MVA OR GREATER

- NEGATIVE SEQUENCE CURRENT (46)
- LOSS OF FIELD (40)

DISCONNECT SWITCH
LOCKABLE
VISUAL BREAK
LOCATED NEAR METER
ACCESSIBLE TO FCU PERSONNEL

STEP UP TRANSFORMER - IF NEEDED
GROUNDED-WYE GROUNDED-WYE

FCU MONITORING IF 100KVA OR LARGER
SEE SECTION 6 - MONITORING
PROVISIONS FOR REQUIREMENTS

*POINT OF COMMON COUPLING (PCC):

- PCC1 - PCC FOR COMMERCIAL CUSTOMERS SERVED BY DEDICATED TRANSFORMER
- PCC2 - PCC FOR COMMERCIAL CUSTOMERS WITHOUT DEDICATED TRANSFORMER
- PCC3 - PCC FOR RESIDENTIAL CUSTOMERS

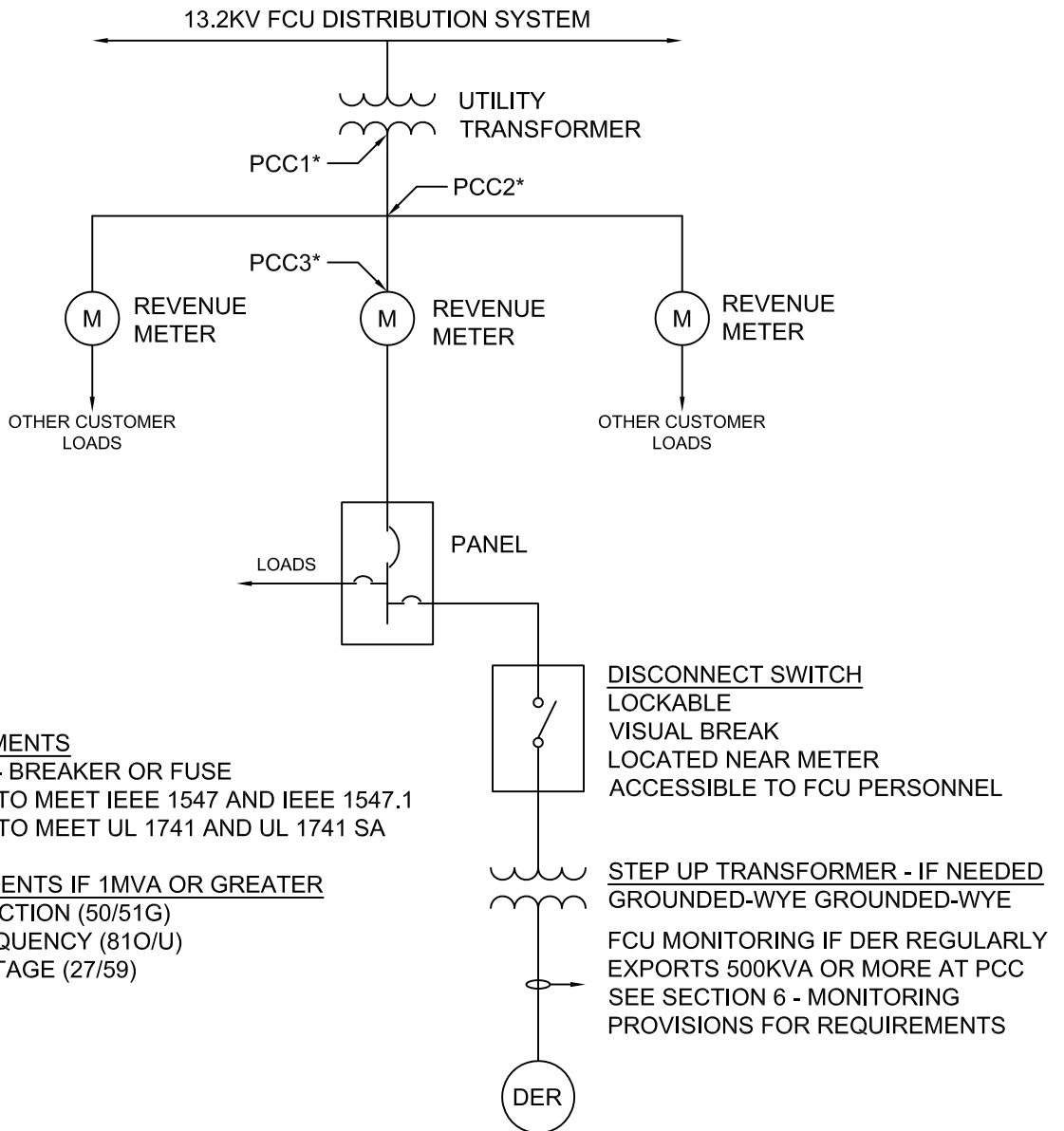
NOTES:

THIS DRAWING IS AN EXAMPLE AND MAY NOT BE REPRESENTATIVE OF ALL SYSTEMS.

SEE FCU INTERCONNECTION STANDARDS FOR COMPLETE REQUIREMENTS.

TYPICAL ONE-LINE CATEGORY B2 INVERTER CONNECTED DER

**CATEGORY B2 (INVERTER) INCLUDES INVERTER CONNECTED DER SOURCED BY:
SOLAR PV, ENERGY STORAGE, FUEL CELLS, OR ANY OTHER SOURCE**



PROTECTIVE REQUIREMENTS

OVERCURRENT (50/51) - BREAKER OR FUSE
INVERTERS CERTIFIED TO MEET IEEE 1547 AND IEEE 1547.1
INVERTERS CERTIFIED TO MEET UL 1741 AND UL 1741 SA

ADDITIONAL REQUIREMENTS IF 1MVA OR GREATER

GROUND FAULT PROTECTION (50/51G)
OVER AND UNDER FREQUENCY (81O/U)
OVER AND UNDER VOLTAGE (27/59)

*POINT OF COMMON COUPLING (PCC):

PCC1 - PCC FOR COMMERCIAL CUSTOMERS SERVED BY DEDICATED TRANSFORMER
PCC2 - PCC FOR COMMERCIAL CUSTOMERS WITHOUT DEDICATED TRANSFORMER
PCC3 - PCC FOR RESIDENTIAL CUSTOMERS

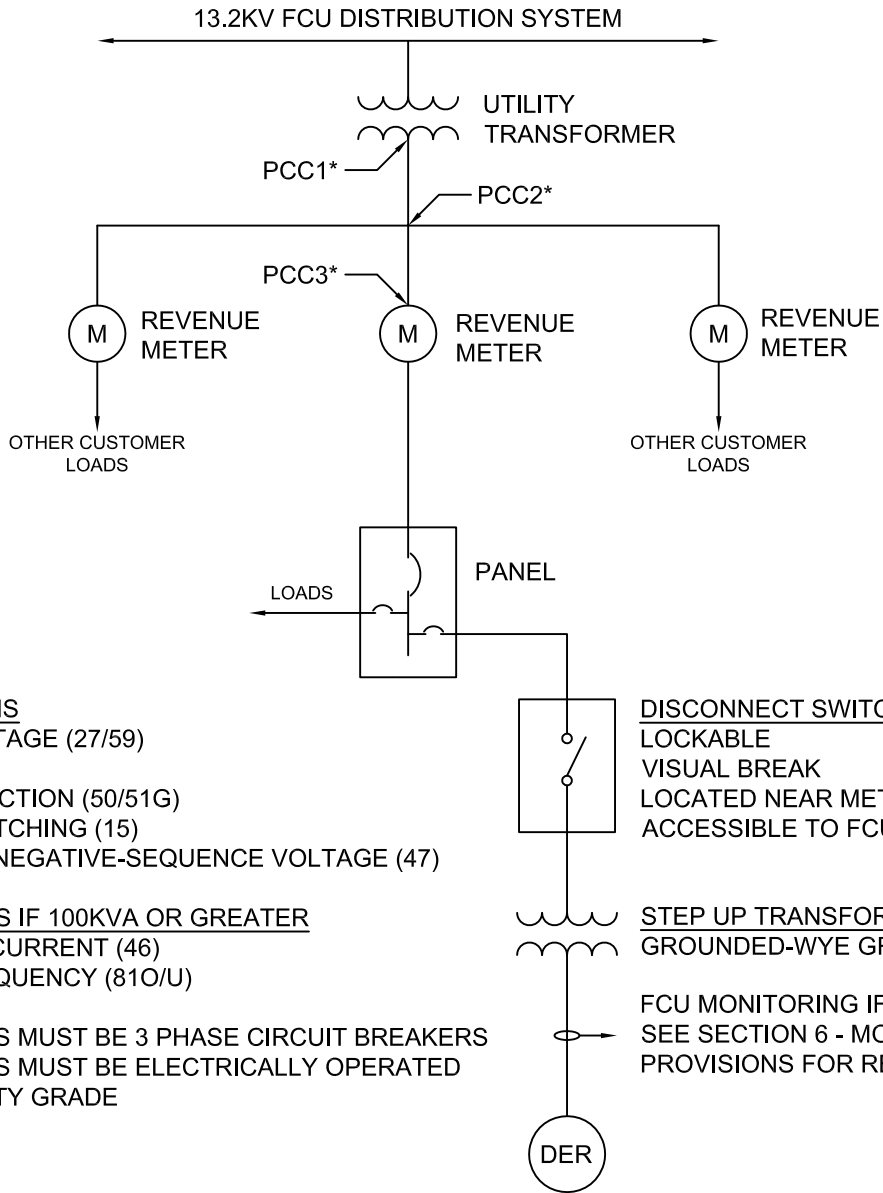
NOTES:

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SEE FCU INTERCONNECTION STANDARDS FOR COMPLETE REQUIREMENTS.

TYPICAL ONE-LINE CATEGORY B2 NON-INVERTER DER

CATEGORY B2 (NON-INVERTER) INCLUDES: INDUCTION GENERATORS AND NON-INVERTER CONNECTED WIND TURBINES



PROTECTIVE FUNCTIONS

OVER AND UNDER VOLTAGE (27/59)
 OVERCURRENT (50/51)
 GROUND FAULT PROTECTION (50/51G)
 AUTOMATIC SPEED MATCHING (15)
 PHASE-SEQUENCE OR NEGATIVE-SEQUENCE VOLTAGE (47)

ADDITIONAL FUNCTIONS IF 100KVA OR GREATER

NEGATIVE SEQUENCE CURRENT (46)
 OVER AND UNDER FREQUENCY (81O/U)
 REVERSE POWER (32)
 INTERRUPTING DEVICES MUST BE 3 PHASE CIRCUIT BREAKERS
 INTERRUPTING DEVICES MUST BE ELECTRICALLY OPERATED
 RELAYS MUST BE UTILITY GRADE

DISCONNECT SWITCH

LOCKABLE
 VISUAL BREAK
 LOCATED NEAR METER
 ACCESSIBLE TO FCU PERSONNEL

STEP UP TRANSFORMER - IF NEEDED

GROUNDED-WYE GROUNDED-WYE
 FCU MONITORING IF 100KVA OR LARGER
 SEE SECTION 6 - MONITORING
 PROVISIONS FOR REQUIREMENTS

*POINT OF COMMON COUPLING (PCC):

PCC1 - PCC FOR COMMERCIAL CUSTOMERS SERVED BY DEDICATED TRANSFORMER
 PCC2 - PCC FOR COMMERCIAL CUSTOMERS WITHOUT DEDICATED TRANSFORMER
 PCC3 - PCC FOR RESIDENTIAL CUSTOMERS

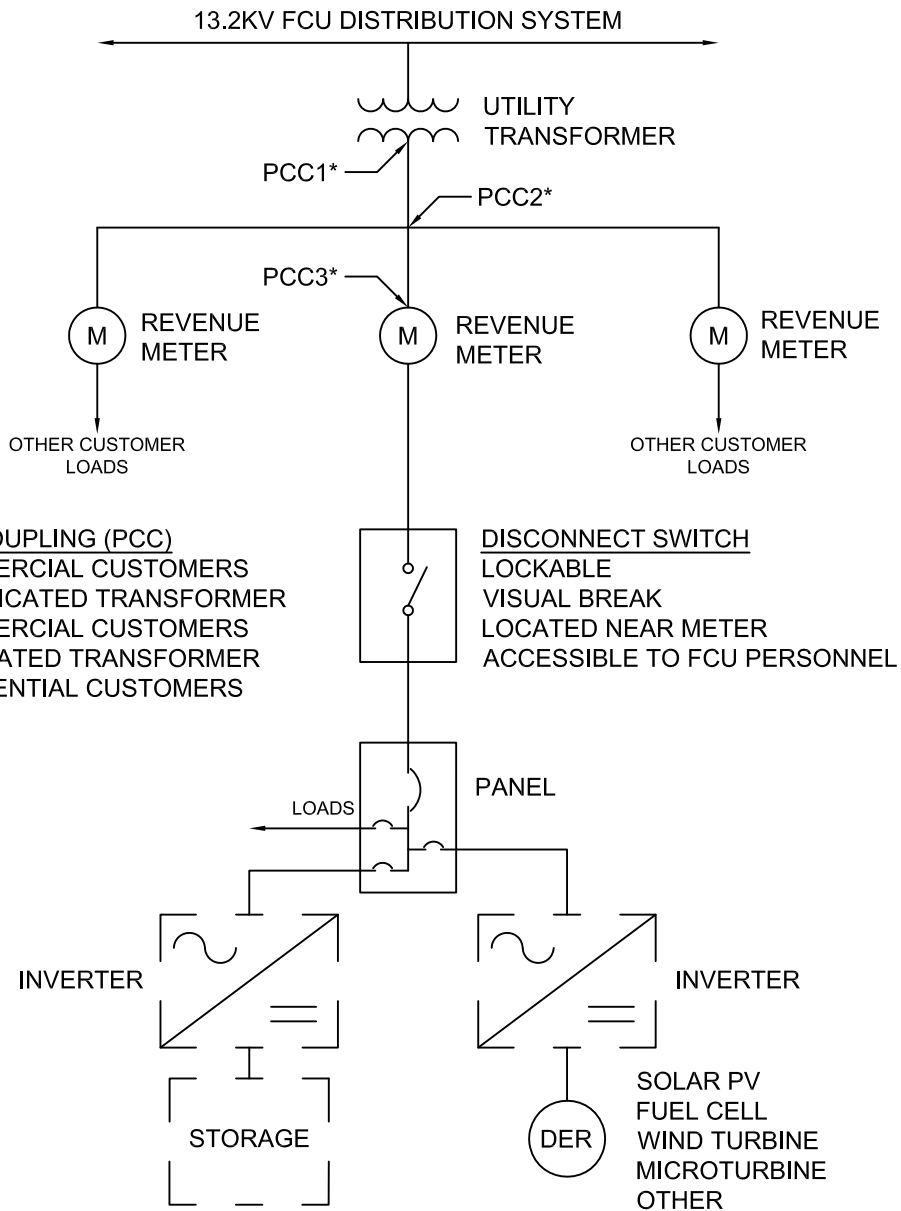
NOTES:

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SEE FCU INTERCONNECTION STANDARDS FOR COMPLETE REQUIREMENTS.

INVERTER CONNECTED DER INCLUDING STORAGE BELOW 1MVA

CONFIGURATION: AC COUPLED WITH NO BACKED UP LOADS



***POINT OF COMMON COUPLING (PCC)**

- PCC1 - PCC FOR COMMERCIAL CUSTOMERS SERVED BY DEDICATED TRANSFORMER
- PCC2 - PCC FOR COMMERCIAL CUSTOMERS WITHOUT DEDICATED TRANSFORMER
- PCC3 - PCC FOR RESIDENTIAL CUSTOMERS

DISCONNECT SWITCH
 LOCKABLE
 VISUAL BREAK
 LOCATED NEAR METER
 ACCESSIBLE TO FCU PERSONNEL

NOTES:

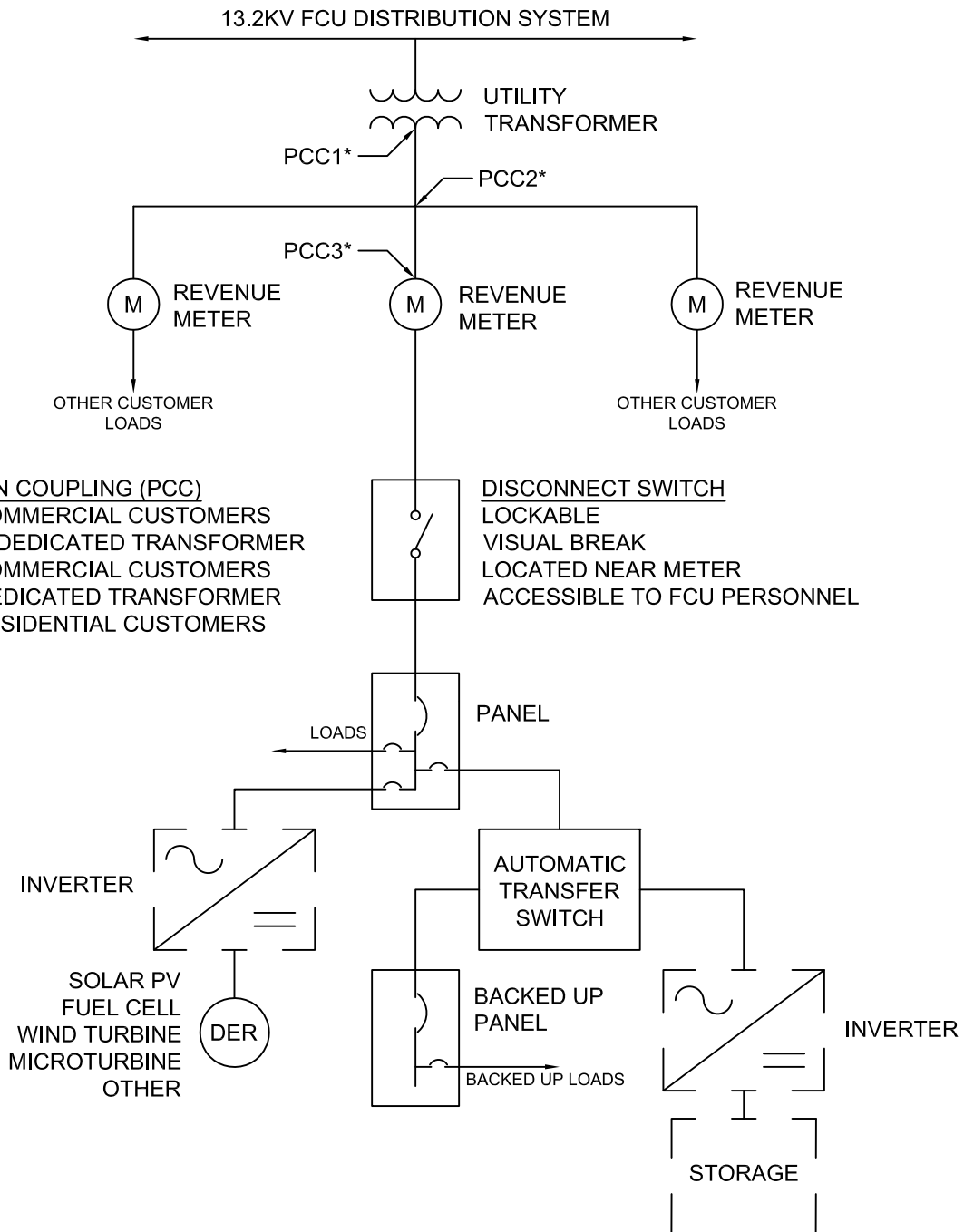
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ALL ENERGY SOURCES ELECTRICALLY CONNECTED TO THE FCU DISTRIBUTION SYSTEM MUST BE ABLE TO BE ISOLATED BY A DISCONNECT SWITCH. MORE THAN ONE DISCONNECT SWITCH MAY BE USED TO SATISFY THIS REQUIREMENT.

SEE FCU INTERCONNECTION STANDARDS FOR COMPLETE REQUIREMENTS.

INVERTER CONNECTED DER INCLUDING STORAGE BELOW 1MVA

CONFIGURATION: AC COUPLED WITH BACKED UP LOADS NON-STORAGE DER NOT OPERATIONAL DURING BACKUP



***POINT OF COMMON COUPLING (PCC)**

- PCC1 - PCC FOR COMMERCIAL CUSTOMERS SERVED BY DEDICATED TRANSFORMER
- PCC2 - PCC FOR COMMERCIAL CUSTOMERS WITHOUT DEDICATED TRANSFORMER
- PCC3 - PCC FOR RESIDENTIAL CUSTOMERS

DISCONNECT SWITCH
LOCKABLE
VISUAL BREAK
LOCATED NEAR METER
ACCESSIBLE TO FCU PERSONNEL

NOTES:

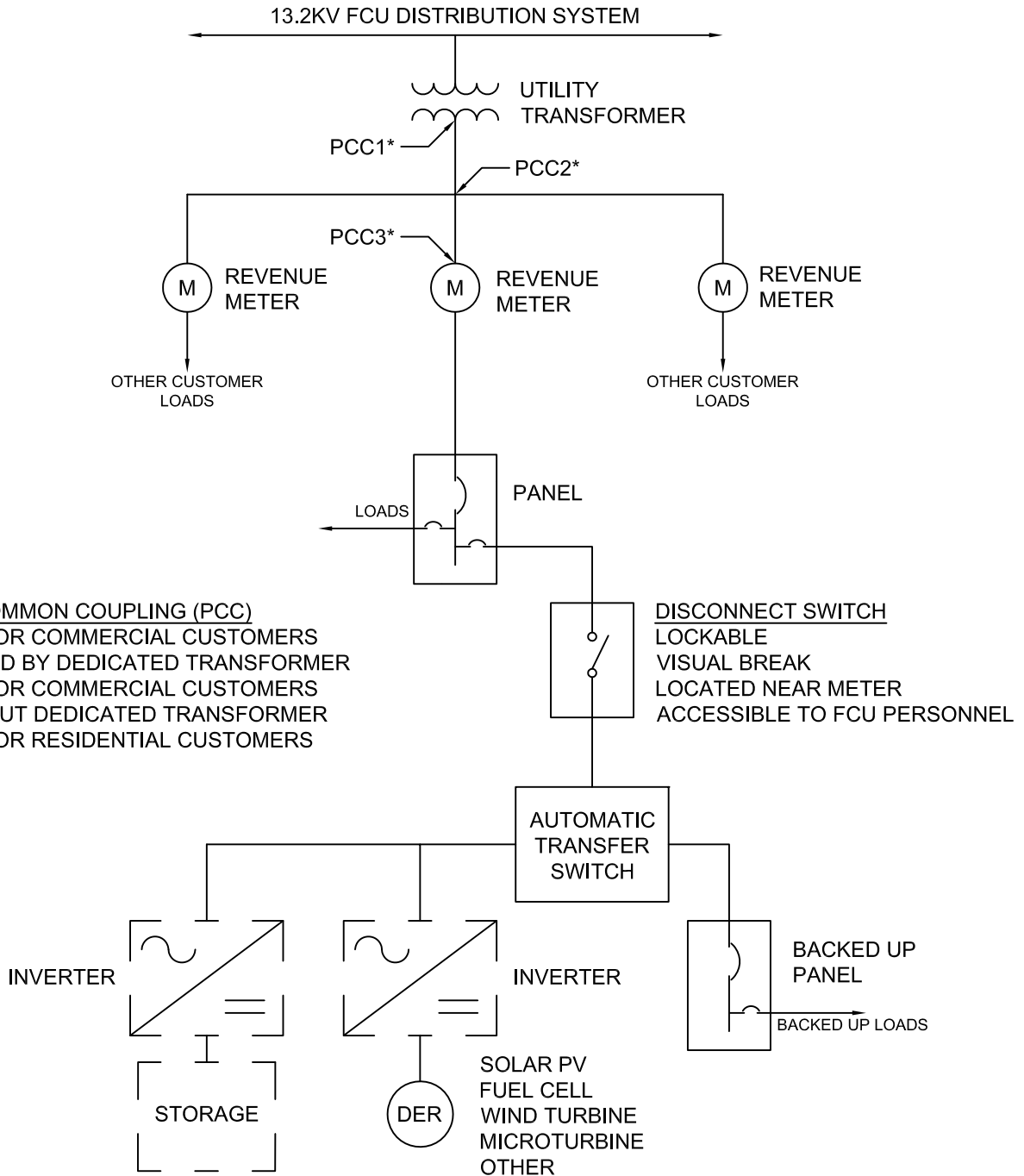
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SEE FCU INTERCONNECTION STANDARDS FOR COMPLETE REQUIREMENTS.

INVERTER CONNECTED DER INCLUDING STORAGE BELOW 1MVA

CONFIGURATION: AC COUPLED WITH BACKED UP LOADS NON-STORAGE DER OPERATIONAL DURING BACKUP



***POINT OF COMMON COUPLING (PCC)**

- PCC1 - PCC FOR COMMERCIAL CUSTOMERS SERVED BY DEDICATED TRANSFORMER
- PCC2 - PCC FOR COMMERCIAL CUSTOMERS WITHOUT DEDICATED TRANSFORMER
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NOTES:

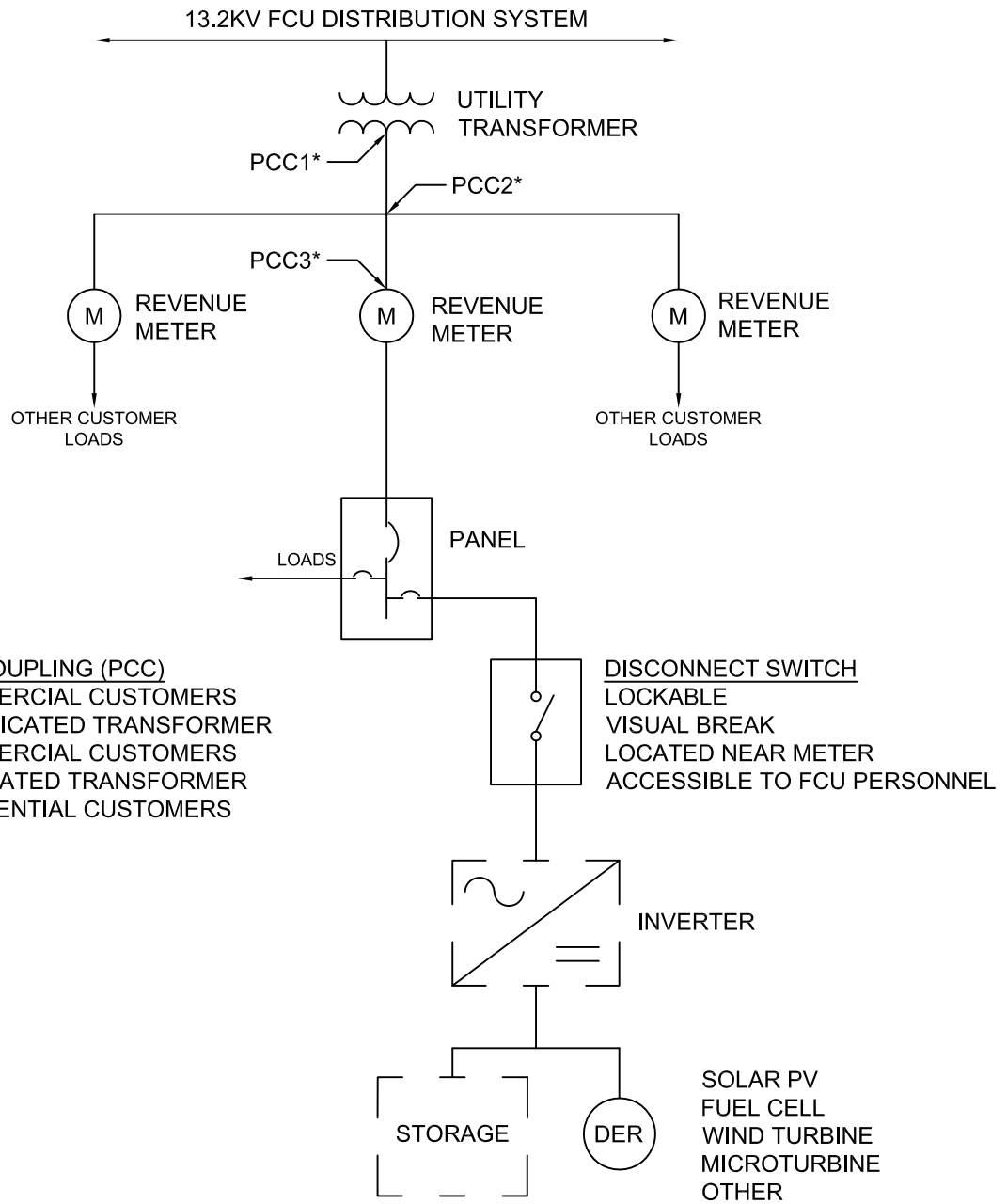
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SEE FCU INTERCONNECTION STANDARDS FOR COMPLETE REQUIREMENTS.

INVERTER CONNECTED DER INCLUDING STORAGE BELOW 1MVA

CONFIGURATION: DC COUPLED WITH NO BACKED UP LOADS



***POINT OF COMMON COUPLING (PCC)**

- PCC1 - PCC FOR COMMERCIAL CUSTOMERS SERVED BY DEDICATED TRANSFORMER
- PCC2 - PCC FOR COMMERCIAL CUSTOMERS WITHOUT DEDICATED TRANSFORMER
- PCC3 - PCC FOR RESIDENTIAL CUSTOMERS

NOTES:

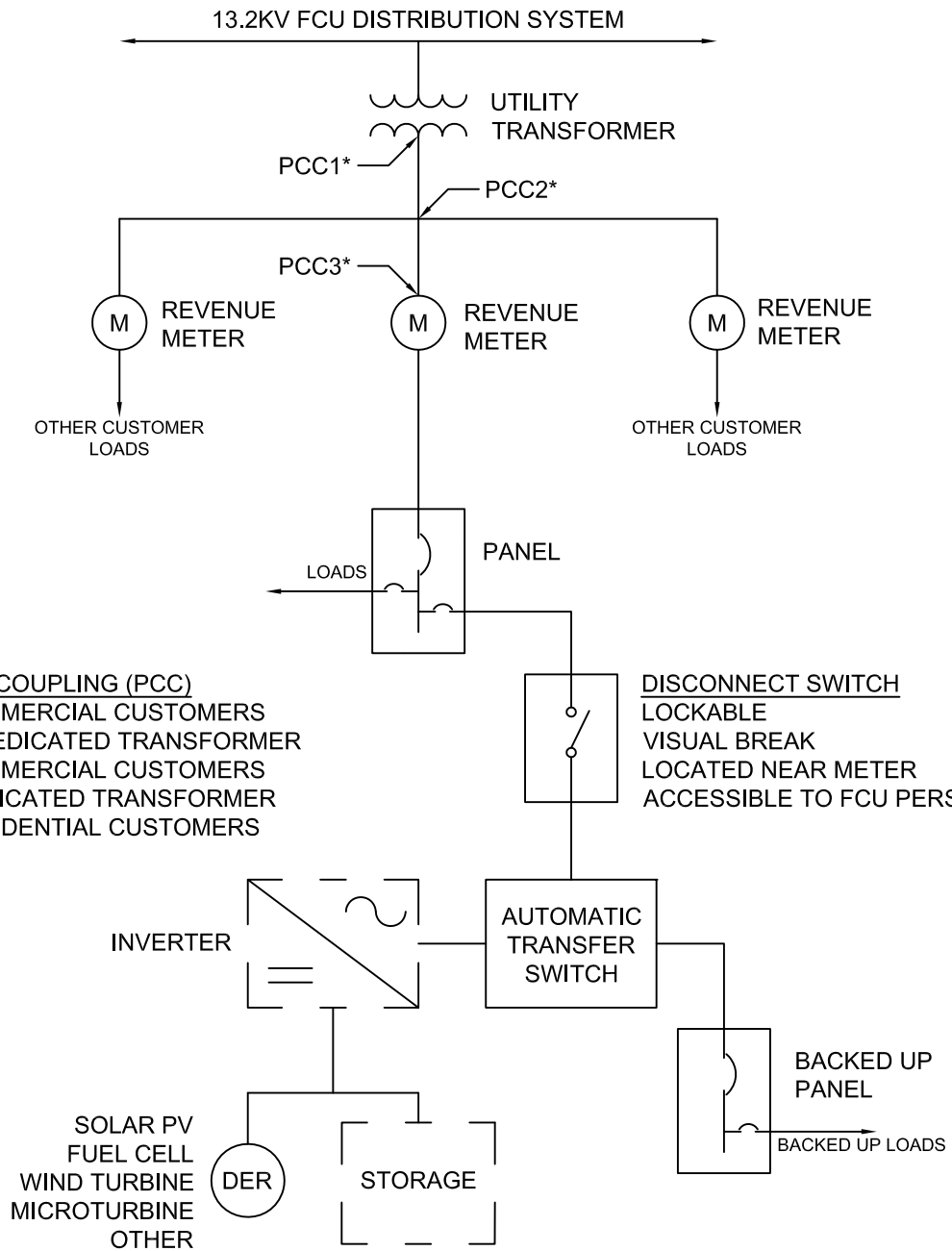
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SEE FCU INTERCONNECTION STANDARDS FOR COMPLETE REQUIREMENTS.

INVERTER CONNECTED DER INCLUDING STORAGE BELOW 1MVA

CONFIGURATION: DC COUPLED WITH BACKED UP LOADS



***POINT OF COMMON COUPLING (PCC)**

- PCC1 - PCC FOR COMMERCIAL CUSTOMERS SERVED BY DEDICATED TRANSFORMER
- PCC2 - PCC FOR COMMERCIAL CUSTOMERS WITHOUT DEDICATED TRANSFORMER
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