Test & Monitoring Services

Renewable Plants


PSL PQube 3 AC Analyzer
400V / 230V
50Hz
Power Configuration

In Test and Measurement energetic's field, we are offering the following services:

- *Measurement*
- *Testing*
- *Monitoring*
- *Diagnostic*
- *Analysis*
- *Engineering*
- *Projecting*
- *Expert training*
- *Consultances*
- *Experts seminars*

TECTRA has a longterm exoeriences in above topics. Our engineers passed the trainings at the world famous T&M equipment manufacturers. We have experts, knowledge and equipment to complete the most complex projects

Our service is always complete. If its about measurements, it includes observe the conditions, problem analysis, test and measurement, test results analysis and solution proposal (optional the complete solution execution)

TECTRA has colaboration with the most worldwide reputable organisations like:
IEC, IEEE, CIGRE, SEV, CENELEC, PTB, METAS, MPL, NMI, VSL, DKD, TUV, NIST, UL, EPRI, ELECTROTEK

For each project we can, according to the needs and customer requirements, include each of above mentioned organisaions and their experts as well

1 RENEWABLE ENERGY SOURCES

WIND PLANTS

1.1COMMISSIONING

1.1.1 TESTING

ON-LINE

1. GENERAL INSPECTION

Inspection of the entire plant
Type of testing: visual, video, sound, thermovision, partial discharge

2. INSPECTION OF PLANT ENEMENTS

Inspection of plant elements: wind generators, step-up power transformerstrans, grid power transformers, power cables, UPS i batteries
Type of testing: visual, video, sound, thermovision, partial discharge

3. ELECTRIC POWER / ENERGY

Measurement of electric power / energy delivered to the grid in certain period (active, reactive and apparent)
Type of testing: measurement with smart revenue meter Class 0,2

4. POWER QUALITY

Recording of PQ at PCC, according to stadard EN 50160, 7 days
Type of testing: measurement with power quality meter Class A

5. UPS AND BATTERIES

Inspection and testing of UPS and batteries
Type of testing: voltage , voltage drop and visual inspection on cells

1.1.2 MECHANICAL PREPARATION

a) Disconnecting and grounding the cables according to the instructions in the special cable document
b) Disconnecting and grounding the transformer according to the instructions in the special transformer document
c) Connecting of test equipment to test facilities
d) Removing the ground from the cable ends according to a separate document
e) Removing the ground from the transformer according to a special document
f) Reconnecting the cable heads to the switchgear according to a separate document

1.1.3 TESTING

OFF-LINE

1. UPS AND BATTERIES

Inspection and testing of UPS and batteries
Type of testing: cells capacity, cell impedance and voltage , voltage drop and visual inspection on all connections

2. POWER TRANSFORMERS

Testing and diagnostic of power transformers
(see detailed specification in separate document)

3. POWER CABLES

Periodic testing and diagnostics of power cables
(see detailed specification in separate document)

1.2 PERIODIC MAINTENANCE

1.2.1 TESTING

ON-LINE

1. GENRAL INSPECTION

Inspection of the entire plant
Type of testing: visual, video, sound, thermovision, partial discharge

2. GENRAL OF PLANT ELEMENTS

Inspection of plant elements: wind generators, step-up power transformerstrans, grid power transformers, power cables, UPS i batteries
Type of testing: visual, video, sound, thermovision, partial discharge

3. ELECTRIC POWER / ENERGY

Periodic measurement of electric power / energy delivered to the grid (active, reactive and apparent)
Type of testing: measurement with smart revenue meter Class 0,2

4. POWER QUALITY

Periodic recording of PQ at PCC, according to stadard EN 50160, 7 days
Type of testing: measurement with power quality meter Class A

5. UPS AND BATTERIES

Inspection and testing of UPS and batteries
Type of testing: voltage , voltage drop and visual inspection on cells

1.2.2 MECHANICAL PREPARATION

OFF-LINE

1. Disconnecting and grounding the cables according to the instructions in the special cable document
2. Disconnecting and grounding the transformer according to the instructions in the special transformer document
3. Connecting of test equipment to test facilities
4. Removing the ground from the cable ends according to a separate document
5. Removing the ground from the transformer according to a special document
6. Reconnecting the cable heads to the switchgear according to a separate document

1.2.3 TESTING

OFF-LINE

1. POWER TRANSFORMERS

Testing and diagnostic of power transformers
(see detailed specification in separate document)

2. POWER CABLES

Testing and diagnostics of power cables
(see detailed specification in separate document)

3. UPS AND BATTERIES

Inspection and testing of UPS and batteries
Type of testing: cells capacity, cell cell impedance and voltage , voltage drop and visual inspection on all connections

4. BLADE INSPECTION

Periodic inspection, recording and analysis of blade conditions
Type of testing: using drone, special camera and SW

1.3 MONITORING

1. POWER TRANSFORMERS

Monitoining of power transformers
(see detailed specification in separate document)

2. POWER CABLES

Monitoring of power cables
(see detailed specification in separate document)

3. ELECTRIC POWER / ENERGY

Permanent measurment of electric power / energy delivered to the grid
(active, reactive and apparent)
Type of monitoring: measurement with revenue meter Class 0,2

4. POWER QUALITY

Permanent power quality monitoring at PCC
Type of monitoring: permanent installed PQ monitor Class A

5. PMU, PHASE ANGLE

Permanent PMU meter at PCC, to measure frequency, magnitudes and phase angles
Type of monitoring: permanent installed PMU u

2 RENEWABLE POWER SOURCES- SOLAR PLANTS

2.1 COMMISSIONING

2.1.1 TESTING

ON-LINE

1. GENERAL INSPECTION
Inspection of the entire plant
Type of testing: visual, video, sound, thermovision, partial discharge

2. INSPECTION OF PLANT ELEMENTS
Inspection of plant elements: wind generators, step-up power transformerstrans, grid power transformers, power cables, UPS i batteries
Type of testing: visual, video, sound, thermovision, partial discharge

3. ELECTRIC ENERGY
Measurment of electric power / energy delivered to to the grid in certain period (active, reactive and apparent)
Type of testing: measurement with revenue meter Class 0,2

4. POWER QUALITY
Recording of PQ at PCC, according to stnadard EN 50160, 7 days
Type of testing: measurement with PQ meter Class A

5. UPS AND BATTERIES
Inspection and testing of UPS and batteries
Type of testing: voltage , voltage drop and visual inspection on cells

6. SOLAR SYSTEM EFFICIENCY
Measurement of efficiency of solar plant
Type of testing: solar radiation, cell temperature, DC/AC inverter

7. SOLAR PANEL EFFICIENCY
Termovision testing of solar panel and connections efficiency
Type of testing: temovision camera inspections

2.1.2 MECHANICAL PREPARATION

OFF-LINE

1. Disconnecting and grounding the cables according to the instructions in the special cable document
2. Disconnecting and grounding the transformer according to the instructions in the special transformer document
3. Connecting of test equipment to test facilities
4. Removing the ground from the cable ends according to a separate document
5. Removing the ground from the transformer according to a special document
6. Reconnecting the cable heads to the switchgear according to a separate document

2.1.3 TESTING

OFF-LINE

1. POWER TRANSFORMERS

Periodic testing and diagnostic of power transformers
(see detailed specification in separate document)

2. POWER CABLES

Periodic testing and diagnostics of power cables
(see detailed specification in separate document)

3. UPS AND BATTERIES

Inspection and testing of UPS and batteries
Type of testing: cells capacity, cell impedance and voltage , voltage drop and visual inspection on all connections

2.2 PERIODIC MAINTENANCE

2.2.1 TESTING

ON-LINE

1. GENERAL INSPECTION

Inspection of the entire plant
Type of testing: visual, video, sound, thermovision, partial discharge

2. INSPECTION OF PLANT ELEMENTS

Inspection of plant elements: wind generators, step-up power transformerstrans, grid power transformers, power cables, UPS i batteries
Type of testing: visual, video, sound, thermovision, partial discharge

3. ELECTRIC ENERGY

Measurment of electric power / energy delivered to to the grid (active, reactive and apparent)
Type of testing: measurement with revenue meter Class 0,2

4. POWER QUALITY

Recording of PQ at PCC, according to stnadard EN 50160, 7 days
Type of testing: measurement with PQ meter Class A

5. UPS AND BATTERIES

Inspection and testing of UPS and batteries
Type of testing: voltage , voltage drop and visual inspection on cells

6. SOLAR SYSTEM EFFICIENCY

Measurement of efficiency of solar plant
Type of testing: solar radiation, cell temperature, DC/AC inverter

7. SOLAR PANEL EFFICIENCY

Termovision testing of solar panel and connections efficiency
Type of testing: temovision camera inspections

2.2.2 MECHANICAL PREPARATION

OFF-LINE

1. Disconnecting and grounding the cables according to the instructions in the special cable document
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4. Removing the ground from the cable ends according to a separate document
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2.2.3 TESTING

OFF-LINE

1. POWER TRANSFORMERS

Periodic testing and diagnostic of power transformers
(see detailed specification in separate document)

2. POWER CABLES

Periodic testing and diagnostics of power cables
(see detailed specification in separate document)

3. UPS AND BATTERIES

Inspection and testing of UPS and batteries
Type of testing: cells capacity, cell impedance and voltage , voltage drop and visual inspection on all connections

2.3MONITORING

1. POWER TRANSFORMERS

Monitoring of power transformers
(see detailed specification in separate document)

2. POWER CABLES

Monitoring of power cables
(see detailed specification in separate document)

3. ELECTRIC POWER / ENERGY

Permanent measurment of electric power / energy delivered to the grid
(active, reactive and apparent)
Type of monitoring: measurement with revenue meter Class 0,2

4. POWER QUALITY

Permanent PQ monitoring at PCC
Type of monitoring: permanent installed PQ monitor Class A

5. PMU, PHASE ANGLE

Permanent PMU meter at PCC, to measure frequency, magnitudes and phase angles
Type of monitoring: permanent installed PMU unit