



مجلس مراجعة قسواعد التوزيع
Distribution Code Review Panel

Protection and testing engineers Certification



Protection Certification Guidelines

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Protection Certification Guidelines

Table of Contents

1. Introduction	3
2. Protection Authorization Levels	3
3. Competency Requirement	4
3.1 Level 1	4
3.2 Level 2	4
3.3 Level 3	6
3.4 Level 4	7
4. Authorization Assessment Workflow	8
5. Assessment Overview	9
6. Application requirement	10
6.1 Minimum Qualification	10
6.2 Minimum years of Experience	10
6.3 Application Documents	10
7. HSE requirements	11
8. Awarding the license	11
9. Renewal Application	11
10. Authorization Upgrading Application	12
11. Performance feedback	13
12. Transfer of Authorization	13
13. Application Fees	13
14. License Withdrawal	14

1. Introduction

The DCRP protection authorization aims to certify protection and testing and commissioning engineers working in the utility distribution networks. The distribution code defines the distribution network for the electrical network with a voltage less than 132kV. The DCRP authorization includes the protection and testing engineers in the electrical contracting and consulting companies registered in DCRP and the protection and non-protection engineers in the distribution utility companies.

2. Protection Authorization Levels

Authorization Levels	Scope
Level 1	Testing & Commissioning of current transformers (CT), voltage transformers (VT), power transformers, auxiliary relays, and trip circuits.
Level 2	Level 1 and testing & commissioning of Overcurrent & Earth fault relays, voltage and frequency relays, pole mounter reclosers, and capacitor banks.
Level 3	Level 2 and testing & Commissioning of all distribution protection schemes, including the protection of distributed generators (directional over current/earth fault relay, distance protection relay, transformer differential, busbar differential, line differential, restricted earth fault protection).
Level 4	Level 3 and protection design, coordination, setting calculation and CT/VT sizing calculation.

3. Competency Requirement

3.1 Level 1

S.N.	Competencies
1.	Testing and Commissioning of all types of Instrument transformers
2.	Testing and Commissioning of protection systems and equipment at voltages up to 11kV.
3.	Testing of basic components, switchgear trip & close circuits, CT's, VT's & AC/DC scheme wiring.
4.	Testing and commissioning of power transformers, circuit breakers, control and relay panels

3.2 Level 2

S.N.	Competencies
1.	Testing and Commissioning of all types of Instrument transformers
2.	Testing and Commissioning of non-directional overcurrent/earth fault protection
3.	Testing and Commissioning of protection of self-power relays in the ring main units
4.	Carry out all protection activities associated with capacitor banks at voltages less than 132kV
5.	Testing and Commissioning of under/over voltage relays

S.N.	Competencies
6.	Testing and Commissioning of under/over frequency relays
7.	Alteration of protection relay settings at voltages less than 132kV, including the extraction and interpretation of settings, records and measurements from numerical relays
8.	Testing and Commissioning of protection systems and equipment at voltages up to 11kV.
9.	Testing and Commissioning of pole-mounted auto-reclose equipment at voltage less than 132kV, including protection functions configuration and testing.
10.	Connection and disconnection of quality of supply monitoring equipment at voltages less than 132kV
11.	Testing of basic components, switchgear trip & close circuits, CT's, VT's & AC/DC scheme wiring.
12.	Testing and Commissioning of power transformers, circuit breakers, control and relay panels.
13.	Testing and Commissioning of backup protection of distributed generators.

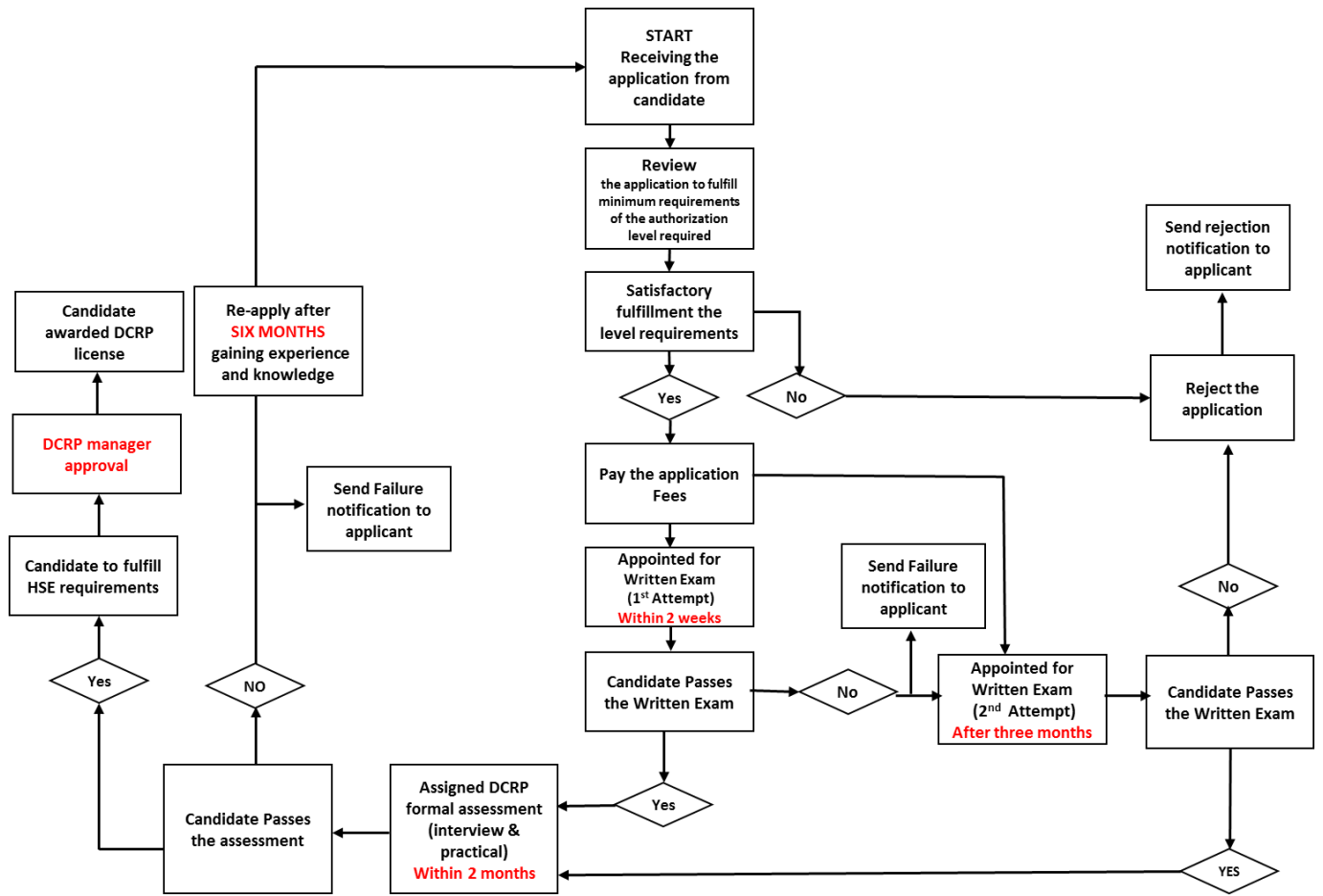
3.3 Level 3

S.N.	Competencies
1.	Carry out all protection activities listed for Level 2 from (1-13)
2.	Testing and Commissioning of Bus-Bar protection (Low/High impedance) (87 B)
3.	Testing and Commissioning of Distance protection with different relay characteristics (21)
4.	Testing and Commissioning of Line differential protection (87 L)
5.	Testing and Commissioning of Transformer differential protection (87 T)
6.	Testing and Commissioning of Restricted earth fault protection (87 N)
7.	Testing and Commissioning of Directional OC/EF protection (67/67N)
8.	Competency to design/change the relay logic as required.
9.	Stability tests & analysis for transformer differential, line differential, Bus-Bar differential, and REF.
10.	Basic power system calculations (power, current, power factor, CT ratio, burden, etc).
11.	Testing and Commissioning of backup and main protection of distributed generators.

3.4 Level 4

S.N.	Competencies
1.	Carry out all testing activities listed for Level 3 from (1-11)
2.	CT&VT sizing calculations
3.	Basic short circuit calculations (3 phases, 2 phases, 1 phase faults), sequences impedances.
4.	Time-grading and coordination studies
5.	Distance relay setting calculation
6.	Bus Bar differential setting calculation
7.	Transformer differential setting calculation
8.	REF setting calculation
9.	Line Differential setting calculation
10.	Directional relay setting calculation
11.	Review of all protection schemes
12.	Understanding of system topology and system behaviour.
13.	All other protection schemes calculations & settings including distribution generating unit protection.

4. Authorization Assessment Workflow



5. Assessment Overview

Assessment type	Overview
Written test	The written exam could be a paper-based or computer-based test covering the fundamentals of the authorization level elements. The minimum pass mark is 70%.
Interview	The interview will be conducted if and only if passing the written test. The assessment panel will cover the scope of the authorization level to ensure the minimum understanding of the theoretical and practical elements of the authorization level. The minimum pass mark is 70%.
Practical test	The practical test will be conducted if only passing the interview assessment. The candidate will be assessed on the competency to do wiring, configuration, and testing on a given protection relay. The minimum pass mark is 70%.

6. Application requirement

6.1 Minimum Qualification

Level 2	Diploma in electrical/electronic engineering
Level 3	Diploma in electrical/electronic engineering
Level 4	Bachelor's degree in electrical/electronic engineering

6.2 Minimum years of experience

Level	Omani candidates	Non-Omani candidates
Level 2	2 years in relay testing & commissioning/protection	7 years with a diploma and 5 years with bachelor's degree in relay testing & commissioning/protection
Level 3	5 years in relay testing & commissioning/protection	7 years with a diploma and 5 years with bachelor's degree in relay testing & commissioning/protection
Level 4	5 years in the protection testing and design field	5 years in the protection testing and design field

6.3 Application Documents

- Resume
- Qualification copy
- Experience certificates
- Passport Copy/resident card copy/ identity card copy
- Visa Copy for non-Omani candidates
- HSE courses certificates
- Contact person details (email and phone number)

7. HSE requirements

When the candidate finalizes all required assessments, he/she shall submit the required HSE course certificates required by the DCRP HSE section for the technical staff in the registered companies. The courses shall be conducted in any approved institute by DCRP.

8. Awarding the license

The candidate can be only awarded the license card if:

- the application fee is paid,
- all required assessment sessions are finalized, and
- the required HSE certificates are submitted.

The license is valid for three years. The license card contains the following information:

- Authorization Level
- Name of the engineer
- Name of the company
- Date of issue
- Date of expiry
- Candidate personal photo (any background color)

9. Renewal Application

The renewal application shall be submitted at least one month before the license expiry date. The candidate's performance will be evaluated by sending a feedback request to all protection departments in the distribution companies. DCRP will assess the feedback according to the following criterion:

Feedback	Action
Positive	Issue the license without further assessment.
Negative	Assess the candidate as a new applicant.
No Feedback (No one knows the candidate)	The head of protection control section assesses the candidate in DCRP, and if he/she is found competent, the renewal will take place without further assessment; otherwise, he/she will be considered a new applicant.

10. Authorization Upgrading Application

The licensed applicants can apply for upgrading their authorization level, subjected to having the minimum qualification and experience of the level. In addition, the candidate shall provide proven progress and experience that shows his competency for upgrading.

The following table shows the required assessment sessions for upgrading applications:

Upgrade from/ to	Written test	Interview	Practical test
Level 3 to level 4	Yes	Yes	No
Level 2 to level 3	Yes	Yes	Yes

11. Performance feedback

The protection control section shall call the candidate for an interview if the DCRP has received negative performance feedback against any approved engineer. If the candidate does not perform excellently during the interview, the DCRP has the right to withdraw his license.

12. Transfer of Authorization

Authorized candidates can transfer their authorization from one company to another. The new employer must apply for the licensed engineer by providing the following:

- Valid resident card/employment Visa under his company name,
- Valid required HSE courses
- Payment of the application fee.

13. Application Fees

For any of the following applications, the fee amount is **250 OMR in addition to the approved percentage of VAT (Value-Added Tax)**:

- A new application in any authorization level
- Transfer application from one company to another
- Upgrading application
- Renewal application

The charges shall be paid after getting the acceptance of the application and before the appointment for assessment authorization. The fee is not refundable.

14. License Withdrawal

The protection working group can propose license withdrawal from any candidate breaching the operational and safety standard. License withdrawal decisions can only be implemented through DCRP panel members.