

Distribution Code Consultation DCRP/20/05/PC

Title: EREC P18 – Complexity of Distribution Circuits Operated at or above 22kV

Target Audience: Distribution Network Operators and stakeholders seeking new connections to distribution circuits which operate at or above 22kV

Date Published: 9th August 2021

Deadline for responses: 17:00 4th September 2021

Summary:

This Distribution Code (DCode) public consultation is seeking the views from stakeholders on the proposed second issue of Engineering Recommendation (EREC) P18. A significant driver behind the revision is the growth of distributed generation and the impact of the associated new connections to distribution systems operated at voltages other than 132kV. As a result the scope of this document has been extended to include the design of distribution circuits operated in the range of 22kV up to 132kV. It does not cover circuits which constitute part of the transmission system.

Introduction:

ER P18 issue 1, first published 1978 (and modernised in 2003), covers the normal limit of complexity of 132kV circuits by stipulating certain restrictions to be applied when they are designed. The proposed EREC P18 Issue 2 retains the intent of Issue 1, includes further clarity on the restrictions and their application to include some feature of current network design for example operational overload schemes, and extends the scope to circuits operated at 22kV and above.

Issue 2 has been developed with input from DNO and IDNO representatives and is based on ER P18 Issue 1.

Included in this consultation document is the following appendix:

Appendix 1: Proposed EREC P18 Issue 2 document

DCode Objectives:

- (i) To permit the development, maintenance and operation of an efficient, coordinated and economical system for the distribution of electricity.
- (ii) To facilitate competition in the generation and supply of electricity.
- (iii) Efficiently discharge the obligations imposed upon DNOs by the Distribution Licence and comply with the Regulation (where Regulation has the meaning defined in the Distribution Licence) and any relevant legally binding decision of the European Commission and/or Agency for the Co-operation of Energy Regulators.
- (iv) Promote efficiency in the implementation and administration of the Distribution Code.

1. The Defect

A review of ER P18 Issue 1 conducted in 2018 found that while the technical content of ER P18 Issue 1 was still relevant, the document would benefit from enhancements to provide additional clarity on the application of ER P18 and also to extend the scope to include lower voltage circuits.

ER P18 Issue 1 sets out the high level requirements relating to the complexity of 132kV circuits. The review identified that there would be benefits, in terms of consistency of application, if further detail was provided on the application of the restrictions set out in Issue 1.

ER P18 Issue 1 applies only to 132kV circuits. The Distribution Code notes that individual DNOs will have an internal standard describing the permitted complexity of distribution circuits operating at voltages lower than 132kV. Many of these DNOs internal standards relating to 33kV and 66kV circuits refer to ER P18. Extending the scope of EREC P18 to include distribution circuits operating at 22kV and above creates a common harmonised complexity standard that is applicable across all DNOs for distribution circuits operating at 22kV, and brings these standards into DCode governance.

2. The Proposed Distribution Code Text Change

2.1 Dcode

The Distribution Code currently references EREC P18 in the main body of text once and in Annex 2. It is proposed to amend the existing section of text (DPC 4.4.1 paragraph e) in line with the revised scope of the document.

- (e) Connections to the **DNO's Distribution System** operating at 132kV may 22kV or above will be subject to the requirements of Annex 2 item 6 (EREC P18). ~~DNOs will have network specific complexity limits for Systems operating at voltages below 132kV which they will make available on request.~~

It is proposed to amend Annex 2 as shown below:

6 Engineering Recommendation P18

Complexity of distribution circuits operated at or above 22kV~~Complexities of 132kV circuits.~~

3. The Proposed changes to EREC P18

3.1 Title of Document

The title of document has been revised to reflect the wider scope of the document.

3.2 Foreword

A foreword has been included to bring this issue of the document in line with the style of recently published engineering recommendation documents.

3.3 Introduction

The introduction section has been revised to clarify the intent of the document in terms of limiting the complexity of circuits, taking into account the enduring operational activities that take place during the lifespan of a circuit and the design of the associated protection scheme.

3.4 Scope

The scope of the document has been updated to:

- Include circuits operating at 22kV and above. The Distribution Code notes that individual DNOs will have an internal standard describing the permitted the complexity of distribution circuits operating at voltages lower than 132kV. Many of these DNOs internal standards relating to 33kV and 66kV circuits refer explicitly to ER P18 Issue 1. Extending the scope of EREC P18 to include distribution circuits operating at 22kV and above creates a common harmonised complexity standard that is applicable across all DNOs for distribution circuits operating at 22kV and above, and brings these standards into DCode governance. Circuits operating at 20kV and below are excluded from the scope and individual DNO design policies cater for the design of such circuits.
- Clarify that EREC P18 should be applied when a circuit is substantially modified, for example by providing a new customer connection from the circuit.
- Clarify that the EREC P18 should be applied to a circuit in its normal system intact operational configuration.
- Recognise that some circuits may need to be designed with a lesser degree of complexity due for other reasons, for example limitations of a protection scheme.

3.5 Normative References

Text has been added to the document is in line with the formatting present in line with recently published ENA documents.

3.6 Terms and Definitions

A set of definitions has been included to describe the meaning behind each key terms used in the document. This is to allow for a better and more consistent understanding of the terms used within the document. Where appropriate, the definition of these terms are consistent with related industry documents.

One of the key terms that has been defined is a Circuit. An informative note has been added to clarify that the switchgear, which defines the boundary of a circuit, can be different depending on the EREC P18 restriction being considered.

There are relaxed restrictions relating to the number of Ends where they are located at a Mesh Type Substation. A new definition of a Mesh Type Substation has been included.

ER P18 Issues 1 defines the distance between sites as being 'within walking distance'. Further clarity has been provided, in the definition of a Site, that this means within 'approximately 10 minutes' walking distance.

3.7 Restrictions and Interpretations

The restrictions and interpretations set out in EREC P18 are substantially unchanged from those in ER P18 Issue 1. Additional guidance has been provided to add clarity to the application of each restriction. The purpose of the restrictions is to ensure that circuits are designed in such a way that they can be constructed, protected (without creating excessively complex protection, intertripping and communications requirements), maintained, isolated and generally operated e.g. in response to a safety related event, without requiring excessive Distribution Network Operator resources or taking an excessive period of time.

There are four categories of restrictions:

1. Restriction A1 relates to making dead for operational purposes, for example so that maintenance can be carried out safely. Restriction A1 sets out the maximum number of Ends that need to be operated to make a circuit dead and the number of Sites where those Ends can be located.
2. Restriction A2 protection clearance to ensure that all infeeds to a circuit that has faulted can be disconnected quickly and efficiently. Restriction A2 sets out the maximum number of Ends that need to be operated to disconnect a faulty circuit and the number of Sites where those Ends can be located.
3. Restriction B relates to limiting the number of transformers connected to a circuit end to limit the amount of demand or generation affected by taking a circuit supplying transformers out of service.
4. Restriction C relates to the provision of isolating facilities so that a circuit, once it has been made dead, can be made safe for DNO staff to work on. Restriction C sets out the maximum number of Ends that need to be operated to isolate a circuit and the number of Sites where those Ends can be located.

The interpretations associated with each restriction have been revised make reference to:

- Switchgear associated with operational overload schemes; and
- Switchgear that needs to be operated to disconnect networks that would otherwise become unearthed, inadequately protected or to manage system voltages.

EREC P18 Issue 2 now has an annex describing typical circuit configurations which are used to demonstrate compliance with the restrictions described in section 4 of EREC P18. There are 6 typical configurations with accompanying tables explaining the compliance or otherwise with EREC P18, based on providing a new connection from an existing circuit. The tables document the compliance or otherwise associated with the four restrictions, A1, A2, B and C.

3.8 Implementation

As EREC P18 Issue 2 is substantially based on Issue 1 and DNO internal standards relating to the complexity of circuits operating at a nominal voltage of 22kV, 33kV and 66kV are typically also based on ER P18 Issue 1, the introduction of EREC P18 Issues 2 is not expected to have an impact on the vast majority of circuits that are in the process of being designed. However there may be some instances where the additional clarity in EREC P18 Issue 2 does have implications for circuits in the process of being designed. It is therefore proposed to have an implementation period of 90 days, so that following the approval of EREC P18 Issue 2, Issue 1 may be applied to circuits which are in the process of being designed. At the end of the 90-day period, all new circuit designs, including those associated with a new customer connection should comply with EREC P18 Issue 2.

4. Consultation Questions

1. Do you agree with the general intent of the proposed modification? If not, please explain your views.
2. Do you agree that the proposed modifications satisfy the applicable Distribution Code objectives? If not, please explain your concerns.
3. Since many DNOs have internal standards that apply the principles of EREC P18 Issue 1 to EHV circuit design, do you agree that extending the scope to include circuits operating at 22kV and above brings benefits in terms of harmonisation and commonality?
4. Do you agree with the proposed implementation approach? If not do you have an alternative implementation approach?
5. Do you have any comments on the proposed legal text drafting?
6. Do you have any other comments?

5. Next Steps

Responses to this consultation should be sent to the Distribution Code Review Panel Secretary at dcode@energynetworks.org by [1700 on 4th September 2021] on the pro-forma provided for the purpose, or via any other convenient means. Responses received after this date may not be considered.

For more information, please contact:

Christopher McCann – Code Administrator - dcode@energynetworks.org

Appendix 1 Propose EREC P18 Dcoument

The document in this Appendix covers the proposed EREC P18 Issue 2 – See separate document.