

# Guidance Note – Metering Polarity Convention for Power Flow Data

**Issue 1**

***April 2026***

## Executive Summary

NESO needs to operate the GB electricity network securely and safely in real-time using the Supervisory Control and Data Acquisition (SCADA) tool. The NESO SCADA system constantly receives power flow measurement data from external parties including Generators, Transmission Owners (TOs) and Network Operators (NOs) to show NESO Control Room engineers the most up-to-date network status and assist them to take operational actions if necessary.

In order to help the power flow measurement data received by NESO be consistent with the polarity convention used by the NESO SCADA system, this guidance note has been created for use when setting up new or modified operational metering equipment. The convention used in this guidance is not currently enforced, however, it describes the best practice approach and its application will be beneficial for all to ensure correct and efficient operation of the transmission network.

Grid Code modification GC0182 is currently underway to formalise the requirements for GB Code Users and EU Code Users to follow the metering polarity convention, described in this guidance note, when submitting power flow data to NESO. If GC0182 is approved by Ofgem, a new Electrical Standard will be created and implemented into the Grid Code, requiring the operational metering signals of GB Code Users and EU Code Users, being installed or modified after a specific date, to adhere to the metering polarity convention. Please note, there is currently no known date of when such a new Electrical Standard may be accepted into the Grid Code and there is no guarantee that it will be accepted. Application of this guidance is optional and aims to encourage Users to implement good practice.

## Version History

Version	Date	Comment
Issue 1	17 <sup>th</sup> April 2026	First Issue

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## Contents

Executive Summary .....	2
Version History.....	3
Disclaimer .....	3
Contents .....	4
Abbreviations.....	5
1. Purpose, Scope and How to Use This Document .....	6
1.1 Purpose .....	6
1.2 Who Should Use This Guidance .....	6
1.3 Scope.....	6
2. Introduction to the Metering Polarity Convention.....	7
3. Metering Polarity Convention for Power Flow Data.....	8
4. Explanation of Metering Polarity Convention .....	9
Appendix A: Important Links.....	11
Appendix B: Contacting NESO .....	12

## Abbreviations

This section includes a list of the abbreviations that appear in this document.

<b>Abbreviation</b>	<b>Description</b>
Aux Tx	Auxiliary Transformer
BCA	Bilateral Connection Agreement
BEGA	Bilateral Embedded Generation Agreement
BELLA	Bilateral Exemptible Large License Exempt Generator Agreement
CT	Current Transformer
CUSC	Connection and Use of System Code
DRC	Dynamic Reactive Compensation
GB	Great Britain
HVDC	High Voltage Direct Current
IEMS	Integrated Energy Management System (NESO’s SCADA system)
KV	Kilo Volt
LEEMPS	License Exemptible Embedded Medium Power Station
LV	Low Voltage
MVAR	Mega Volt Ampere Reactive
MW	Mega Watt
NESO	National Energy System Operator
NO	Network Operator
Ofgem	Office of Gas and Electricity Markets
OFTO	Offshore Transmission Owner
S/S	Substation
SCADA	Supervisory Control and Data Acquisition
SVC	Static VAR Compensator
The Company	NESO
TO	Transmission Owner
VT	Voltage Transformer

## 1. Purpose, Scope and How to Use This Document

### 1.1 Purpose

The metering polarity convention described in this guidance note aims to clearly outline the best practice approach when setting up new or modified operational metering equipment, to create consistency across the transmission network.

The application of this convention will be beneficial for all, to ensure correct and efficient operation of the transmission network.

### 1.2 Who Should Use This Guidance

This guidance is intended for:

- CUSC parties (BCA, BEGA, BELLA)
- LEEMPS
- Transmission Licensees

### 1.3 Scope

This Guidance applies to parties in all areas providing power flow operational metering to The Company.

## 2. Introduction to the Metering Polarity Convention

Power flow polarity (assigning positive or negative direction) is of critical importance to ensure all parties can understand and interpret the direction of flow reported by the metering. Therefore, extreme care must be taken when configuring power flow meters.

Where it is required to assign directional flow to a quantity (e.g. MW and MVAR), “positive” (+) and “negative” (-) signs should be used in accordance with the diagram below (in section ‘Metering Polarity Convention for Power Flow Data’). The diagram details the application of this sign convention for most types of Feeders, Transformers, Shunt Connected Reactive Compensation, Series Connected Reactive Compensation and Generator/Demand Connections. The arrows denote the direction of active and reactive power flow at the CT and VT.

The operational metering shown in the diagram is asset specific and does not include the bay metering in the TOs and NOs system. Bay metering in these areas is considered to always follow the convention of:

- “positive” (+) assigned to power flow out of the bay
- “negative” (-) assigned to power flow into the bay

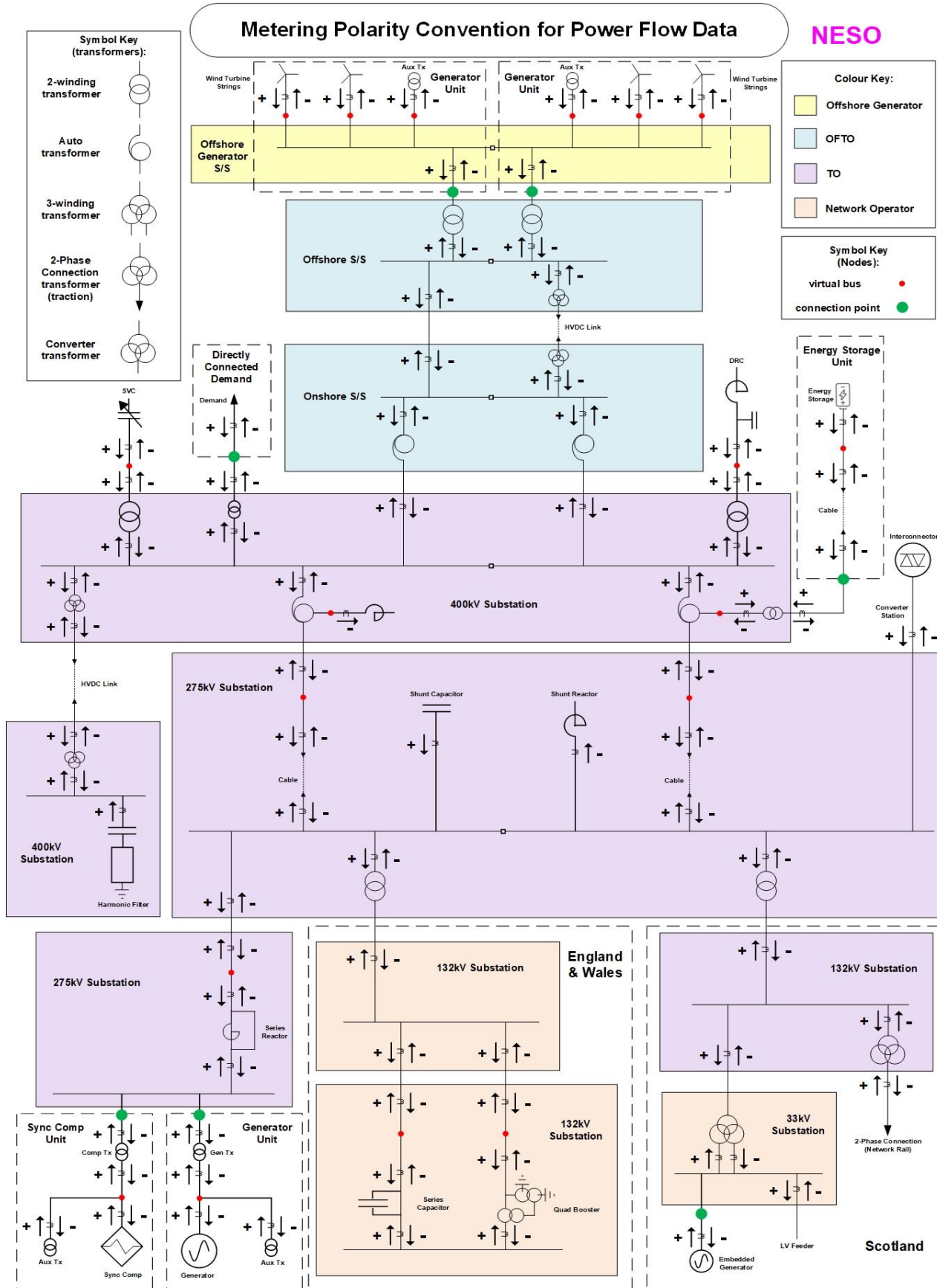
In order to more clearly distinguish the asset specific metering, virtual bus nodes (highlighted in red) have been denoted in the diagram. These virtual bus nodes represent the connection points between each individual asset, where there is no physical bus present.

Additionally, connection point nodes (highlighted in green) have been indicated in the diagram to clearly define the boundary between Generator/Demand operational metering and the Onshore/Offshore Transmission and Distribution operational metering.

Not all operational metering seen in the diagram is required to be provided to NESO, however, the operational metering that is provided will be required to follow the convention shown.

It is important to note that the diagram is an example of the most common equipment found on the network and is not suggesting that each substation or voltage level be required to contain the equipment represented. Equally, it is not suggesting that each substation or voltage level be limited to the equipment represented.

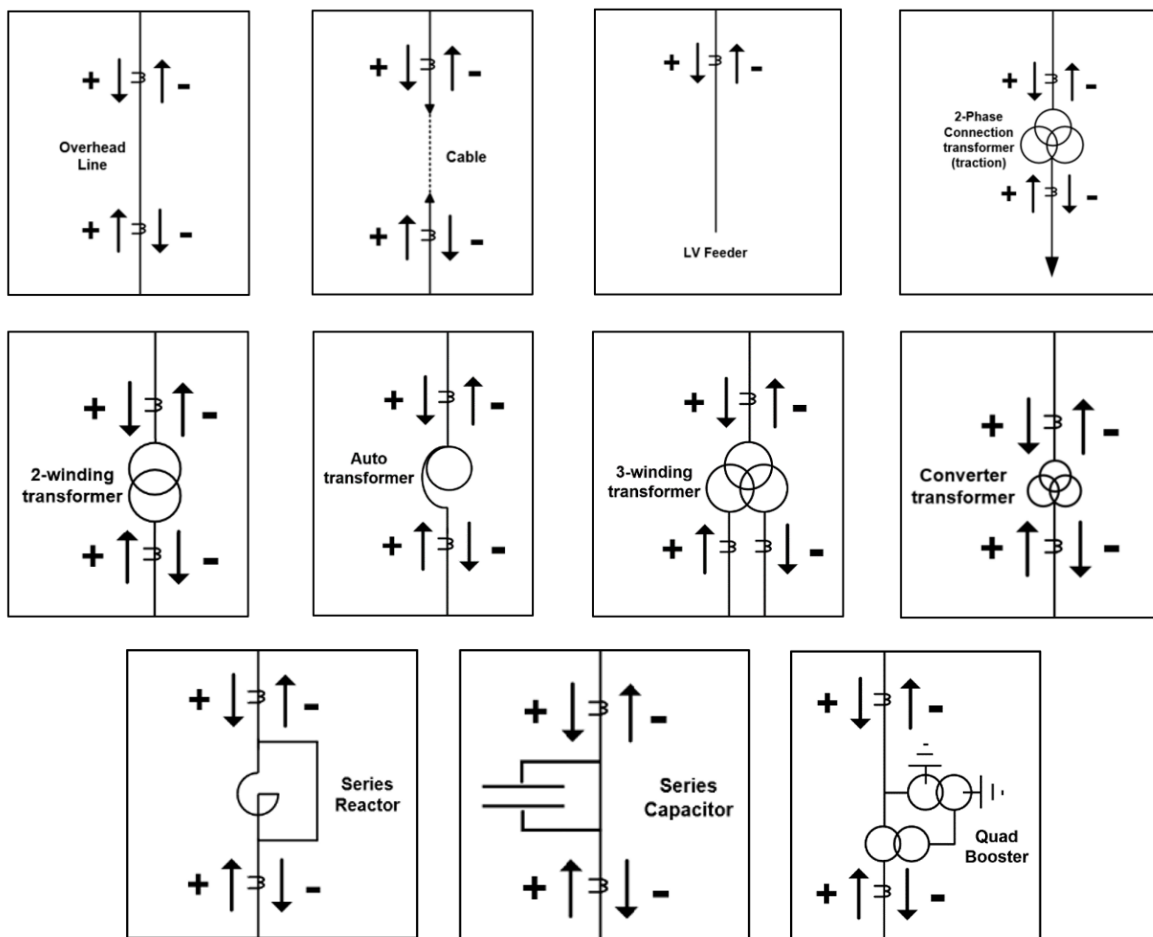
### 3. Metering Polarity Convention for Power Flow Data



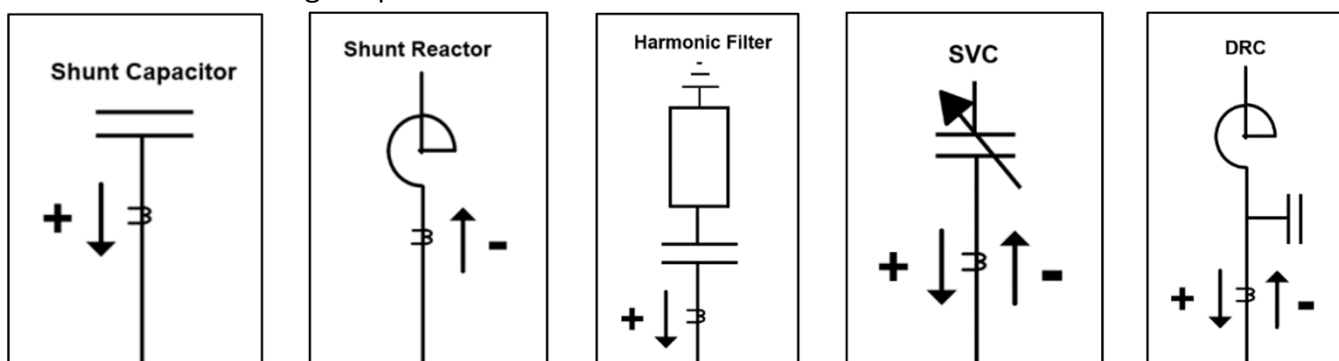
## 4. Explanation of Metering Polarity Convention

The diagram denotes the convention:

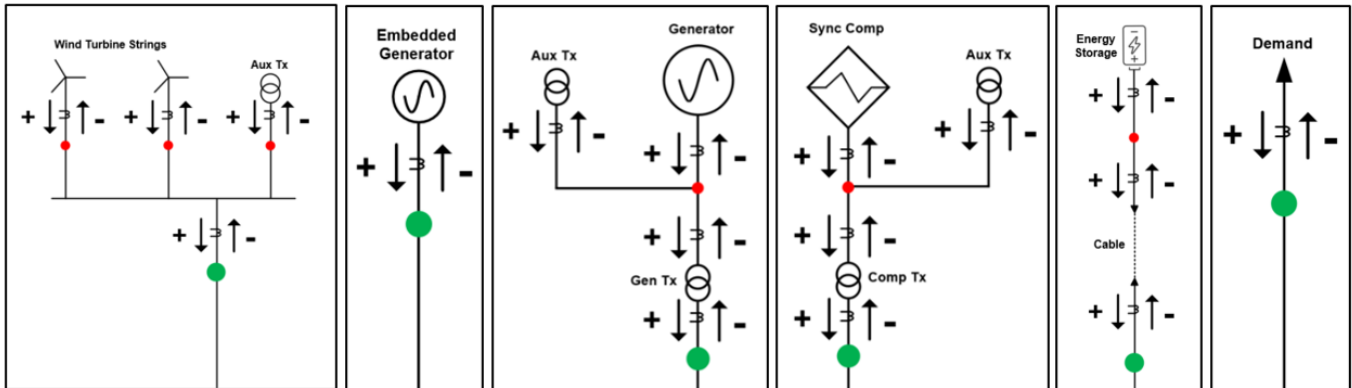
- Connections between GB substations and connections within GB substations (including Series Connected Reactive Compensation) are represented by positive flow into the device and negative flow out of the device, on both sides



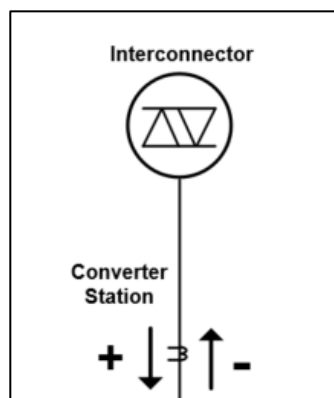
- Shunt Connected Reactive Compensation is positive when leaving the plant and negative when entering the plant



- Generator and Demand Connections include all assets from the User up to the connection point. All metering associated with User Connections is positive towards the connection point and negative away from the connection point



- International Interconnectors are positive at the converter station when power is being supplied into a GB substation and negative at the converter station when power is being supplied from a GB substation (effectively they are treated like generators on the GB system)



For any equipment not represented in the diagram, the convention used should be that of the category to which the equipment belongs (as mentioned above):

- Connections between GB substations and connections within GB substations (including Series Connected Reactive Compensation):
  - positive into the device and negative out of the device (on both sides)
- Shunt Connected Reactive Compensation:
  - positive when leaving the plant and negative when entering the plant
- Generator and Demand Connections (including all assets from the User up to the connection point):
  - positive towards the connection point and negative away from the connection point
- International Interconnectors:
  - positive at the converter station when power is being supplied into a GB substation and negative at the converter station when power is being supplied from a GB substation (effectively they are treated like generators on the GB system)

## Appendix A: Important Links

Code modifications currently underway to formalise the requirements for users to follow the metering polarity convention, described in this guidance note, when submitting power flow data to NESO:

- [GC0182: Standardisation of Power Flow Metering Polarity | NESO](#)

## Appendix B: Contacting NESO

For any queries regarding this Guidance Note, please contact the NESO Operational Metering team via [opsmetering@neso.energy](mailto:opsmetering@neso.energy)

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