

An NLC automatic transfer switch panel.

NLC ACADEMY · EPISODE 40

Transfer switching, and the edition that changed.

IEC 60947-6-1 Edition 4.0 adds Annex D for ATSE having closed transition capability. What the standard covers, what it does not, and what a specification must name.

THE EDITION THAT MOVED

Edition 4.0 adds Annex D for closed-transition ATSE

Edition 4.0, dated April 2026

IEC 60947-6-1:2021

no annex

The 2021 edition has no annex for closed transition.

Edition 4.0, 2026

Annex D

Edition 4.0 adds Annex D for closed-transition ATSE.

Annex D gives specific requirements for ATSE having closed transition capability. Cite the edition, because the annexes changed.

WHAT THE STANDARD CALLS IT

TSE is the equipment. ATSE is the automatic one.

TSE, transfer switching equipment
IEC 60947-6-1:2021, clause 3.3.1

MTSE
manually operated

clause 3.3.2

RTSE
remotely operated, not self-acting

clause 3.3.3

ATSE
self-acting, with its controller

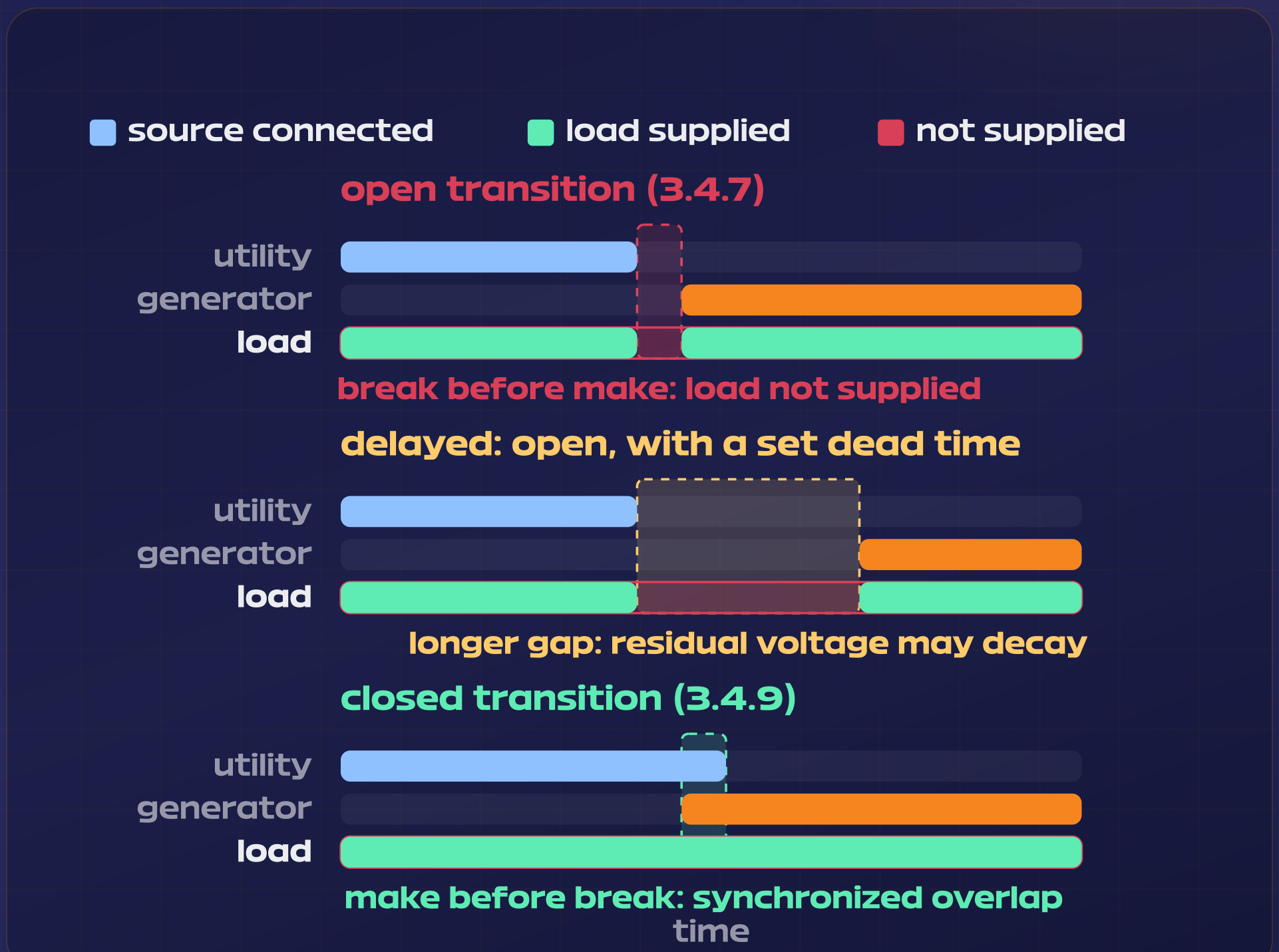
clause 3.3.4

ATS controller
2021, clause 3.3.9
stand-alone units: Annex E, 2026

Write ATSE in the specification, not ATS alone.

THREE TRANSITIONS

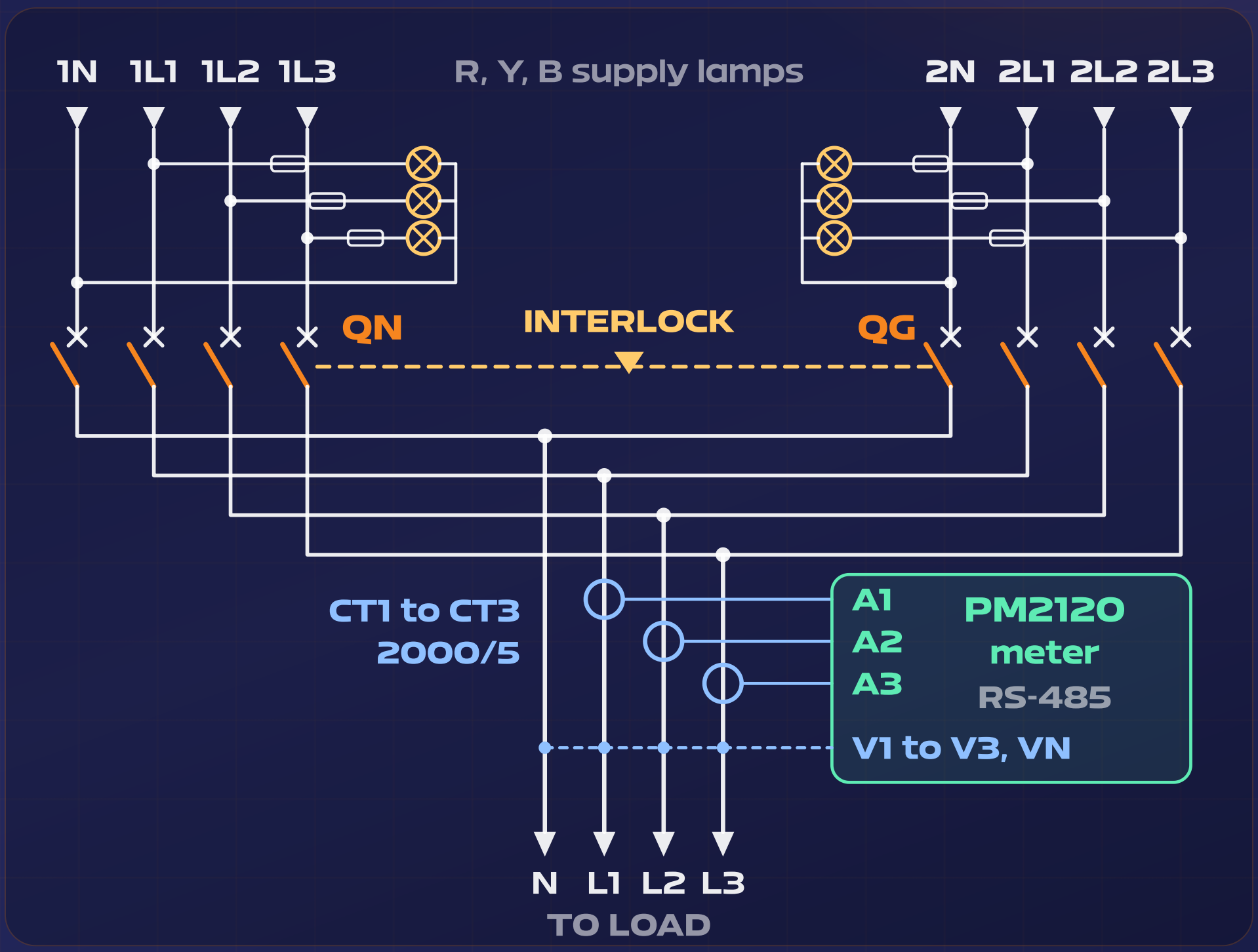
Closed transition keeps the load supplied



Closed transition overlaps the sources only once they are in synchronism: voltage, frequency and phase within limits, which is engineering practice. IEC 60947-6-1:2021, 3.4.9 defines closed transition with a synchronized second source.

FROM AN NLC PANEL

A 2000 A ATS with interlocked incomers



1. **QN**: the normal-supply incomer, 1L1 to 1L3 with 1N.
2. **QG**: the alternate (generator) incomer, 2L1 to 2L3 with 2N.
3. **Interlock**: QN and QG cannot close together, so the load transfers by open transition.
4. **CT1 to CT3**, 2000/5, feed the PM2120 meter, which reports over RS-485.

Redrawn from an NLC as-built panel drawing (ATS 2000 A meter wiring). Client details are not shown.

A DIFFERENT STANDARD

Static transfer systems are covered by IEC 62310

IEC 60947-6-1

TSE: transfer switching equipment, including ATSE with its controller.

IEC 62310 series

Static transfer systems (STS): a different equipment type.

Check the standard that matches the equipment type.

IEC 62310-1:2005, Part 1.

IEC 62310-1:2005 covers the general and safety requirements of STS.

THE SCOPE LIMIT

The DC limit matters as PV and batteries arrive



IEC 60947-6-1:2021 covers up to 1000 V AC or 1500 V DC.

PC AND CB

PC and CB are IEC 60947-6-1 classes

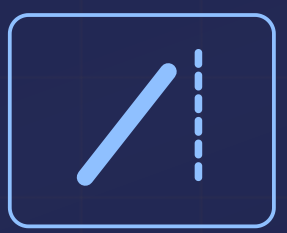
PC



switch disconnector based

2021, clause 3.3.6

CB



circuit-breaker based

2021, clause 3.3.7

Clause numbers from IEC 60947-6-1:2021.

Name the standard the ratings follow: IEC 60947-6-1 or UL 1008.

THE REFERENCE TABLE

What Edition 4.0 adds, annex by annex

Topic	Status	Annex
Bypass/isolation TSE	added	C
Closed-transition ATSE	added	D
Stand-alone ATS controller	added	E
Fire pump TSE	added	F

Edition 4.0:2026 is the current edition. It adds four annexes, C to F.

THE MISTAKE

Citing IEC 60947-6-1 without an edition

IEC 60947-6-1
in the spec, with no edition

read against 2021
No annex for closed transition.

read against 2026
Annex D: closed-transition ATSE.

The same words now point at a different document.

Put the edition in every citation, in the specification and in the submittals.

THE CORRECTION

Cite Edition 4.0:2026, and name the annex

Edition 4.0:2026, dated April 2026

Annex C	**Annex D**	Annex E	Annex F
bypass / isolation TSE	**closed transition ATSE**	stand-alone ATS controllers	fire pump TSE

Cite: Edition 4.0:2026, Annex D

Edition 4.0 adds Annex D for ATSE having closed transition capability.

AT THE TRANSFER SWITCH

For motor loads, delayed transition may allow residual voltage to decay.



In an NLC panel: a gloved hand at the ON button of a 1600 A circuit breaker.

decays
residual voltage
After disconnection, a motor can keep generating a decaying voltage.

out of phase
still present
Closing onto it out of phase can cause high current and torque.

wait
until decayed
Delayed transition waits until the residual voltage has decayed.

PARALLELING

Closed transition parallels the sources briefly



Utility connection conditions	Approval required?	If so, in writing

Check whether the utility's connection conditions require approval, and get it in writing if they do. That depends on the utility's regulations, operating arrangements and project requirements, not on IEC 60947-6-1.

PUBLISHED TRANSFER TIMES

Motor-operated switches take seconds, not a fraction

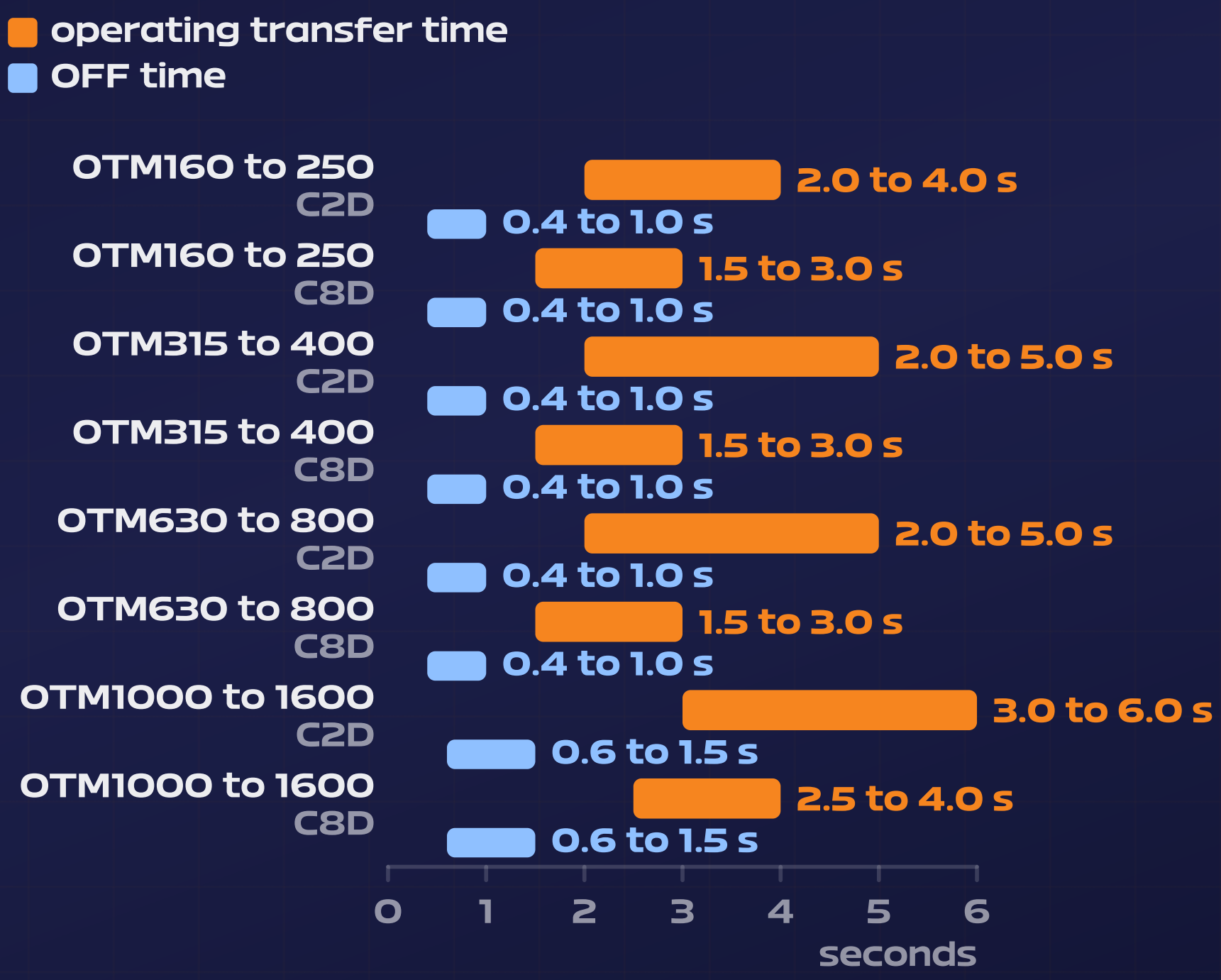
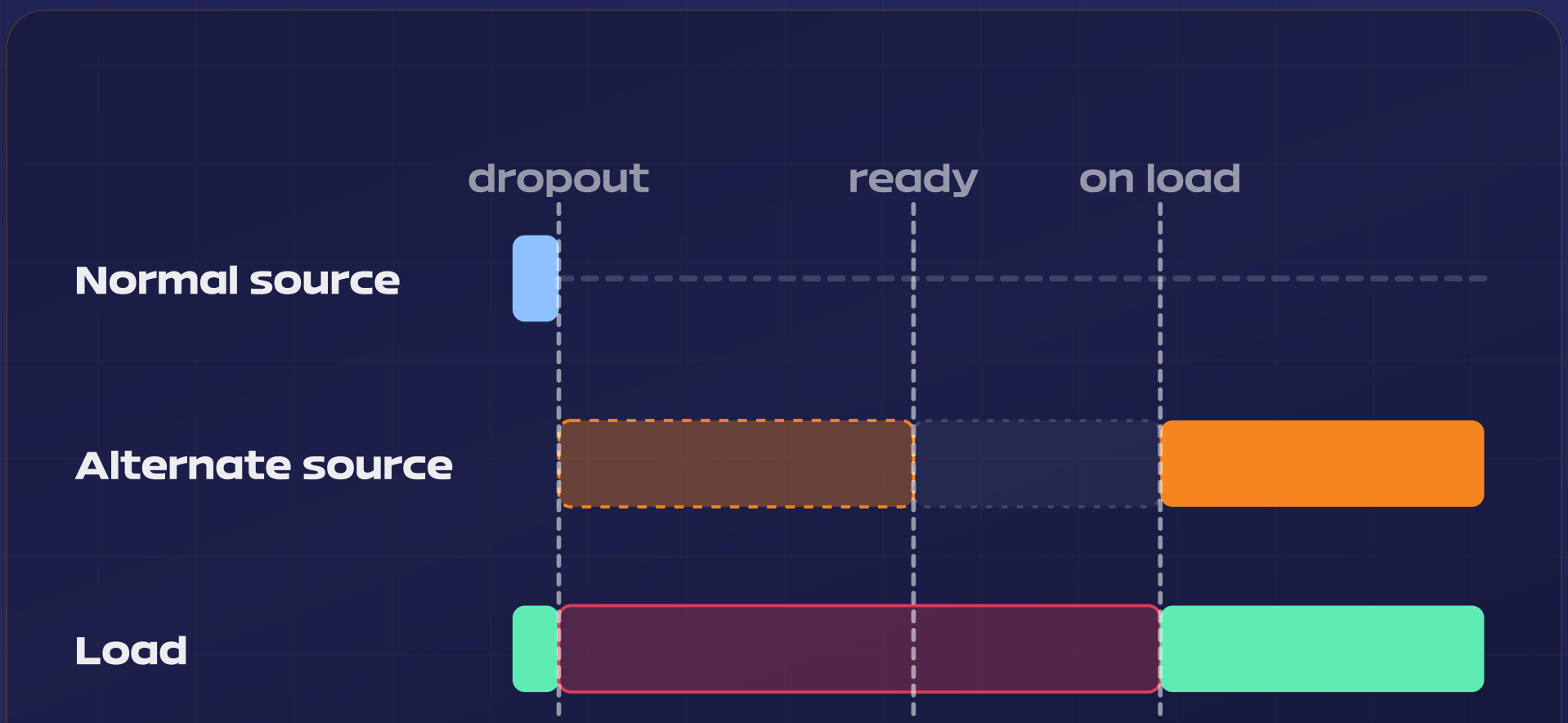


ABB OTM, nominal conditions. OFF time 0.4 to 1.0 s, or 0.6 to 1.5 s at OTM1000 to 1600.

THE SEQUENCE

Quote the whole sequence, not the switch alone



The switch is one line of it. Ask for the generator start and the dwell time in writing.

CYBERSECURITY

"Spec encrypted controllers" is not a specification

not a requirement

Encrypted controllers

Which cipher, which version, which level? Nothing to test.

a testable requirement

Controller:
IEC 62443-4-2.

System:
IEC 62443-3-3.

Security level from the risk assessment,
IEC 62443-3-2.

NCA OTCC-1:2022 control level, if in scope.

A test report answers each line.

Name the framework and the level, or the line is not a spec.

OTCC-1:2022 applies to ICS in critical facilities run by government bodies, and to critical national infrastructure operators. The control level depends on the risk assessment and that classification.

THE CHECKLIST

Three lines that make an ATS specification checkable

Transfer switch specification

1	**Edition**	IEC 60947-6-1 edition stated, or UL 1008 named ✓
2	**Transfer class**	PC or CB, stated for each unit ✓
3	**Closed transition**	is it required, and do the connection conditions permit it? ✓

A specification that names all three can be checked.

SOURCES

Sources for the main claims

[1] IEC 60947-6-1:2026, Edition 4.0, April 2026, Annexes C to F
[2] IEC 60947-6-1:2021, Edition 3.0, clause 1 (scope)
[3] IEC 60947-6-1:2021, clauses 3.3.1, 3.3.6, 3.3.7, 3.3.9
[4] IEC 62310-1:2005, Static transfer systems (STS), Part 1
[5] UL 1008, Transfer Switch Equipment, 9th edition, July 2022
[6] ABB datasheet 1SCC303003C0201, p. 13
[7] IEC 60947-6-1:2021, clauses 3.4.7 and 3.4.9 (transitions)
[8] IEC 62443-3-2:2020, IEC 62443-3-3:2013, IEC 62443-4-2:2019
[9] NCA OTCC-1:2022, OT Cybersecurity Controls, scope p. 10

Editions, annexes and scope: [1] to [3]. STS: [4]. UL: [5]. Frame timing: [6]. Transitions: [7]. Cyber: [8] and [9].

Practical electrical engineering

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https://nlc.com.sa/academy/ats-automatic-transfer.html

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