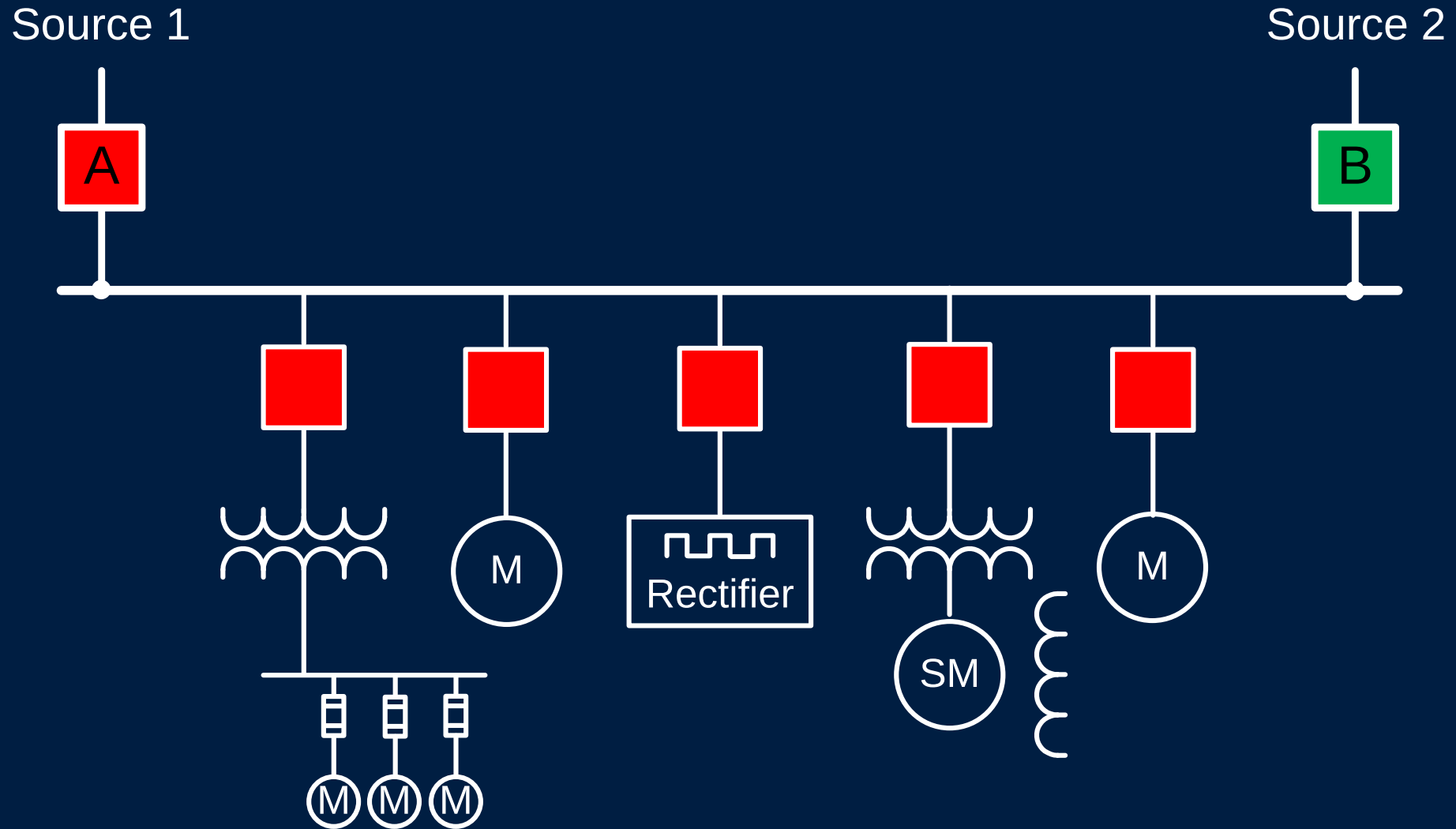




Improve Quality of Service With Fast Motor Bus and Main-Tie-Main Transfers

Iván Yáñez Félix
Gerente Técnico SEL LATAM

What Is Fast Motor Bus Transfer?



Why Is Fast Bus Transfer Necessary?

- Avoid costly, unplanned shutdowns
- Provide personnel safety
- Process shutdown could be much longer than electrical shutdown, for example for continuous processes

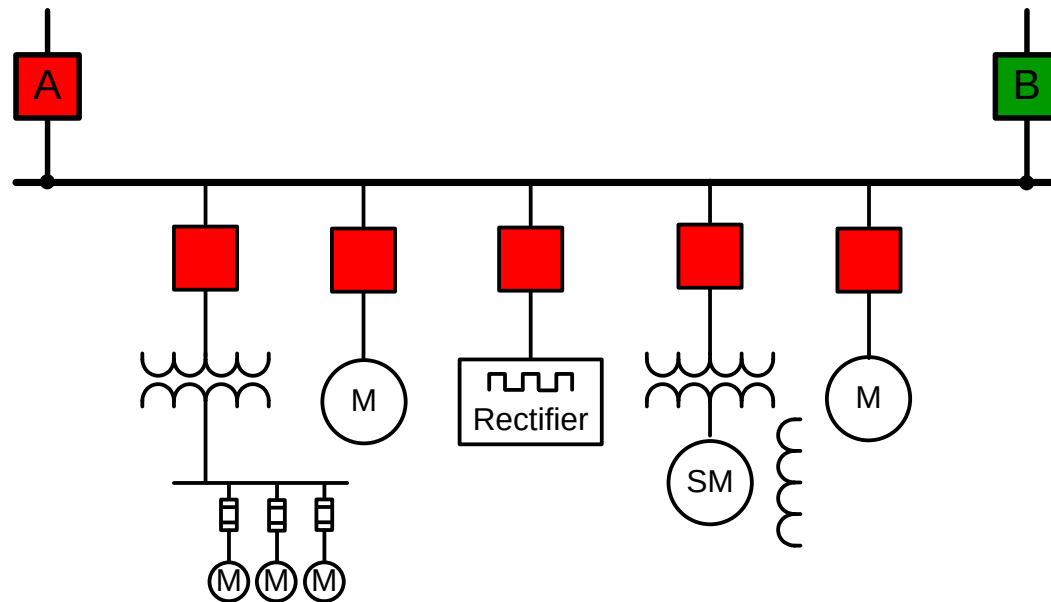




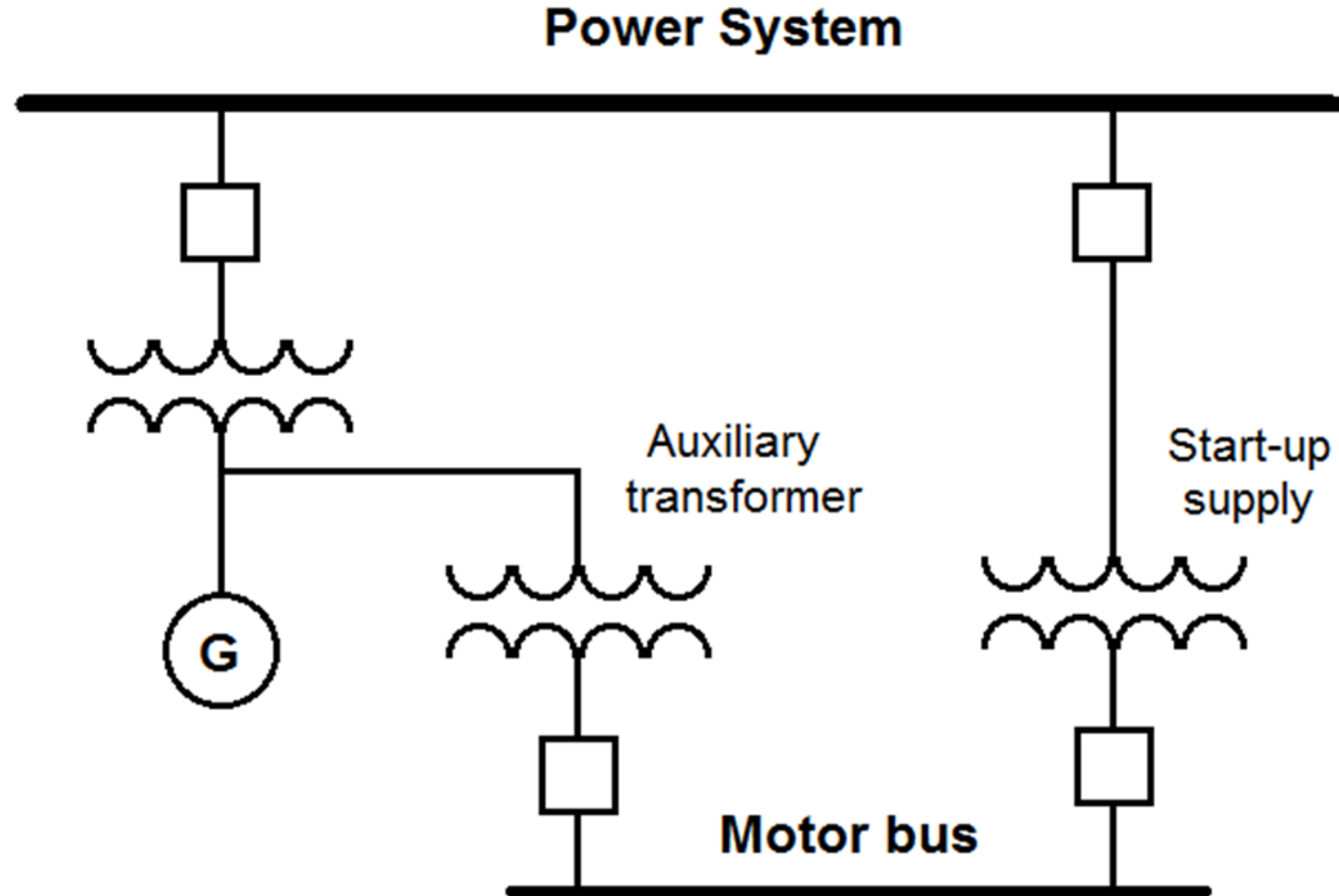
FMBT Requirements



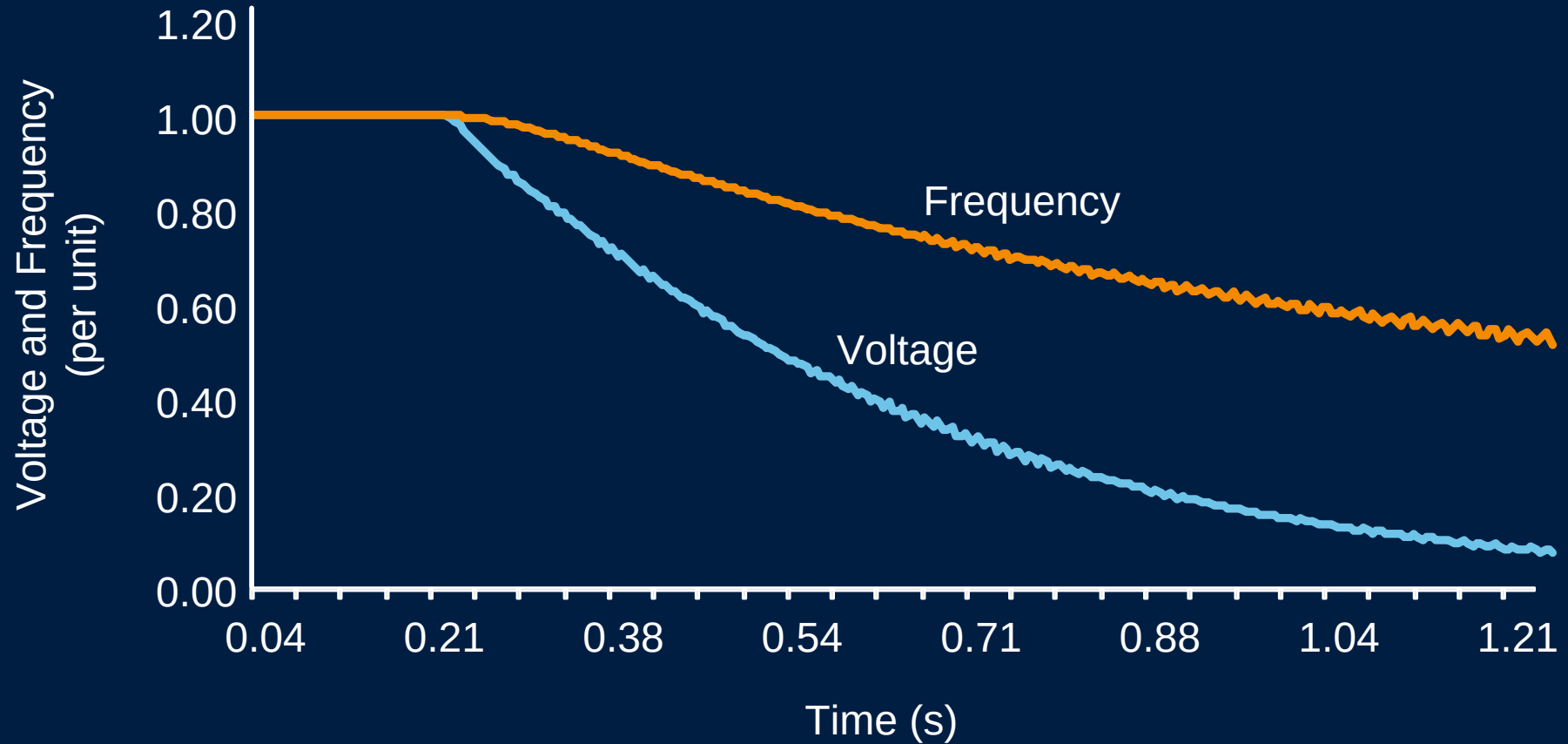
1. Alternate power source
2. Minimum level of rotating inertia



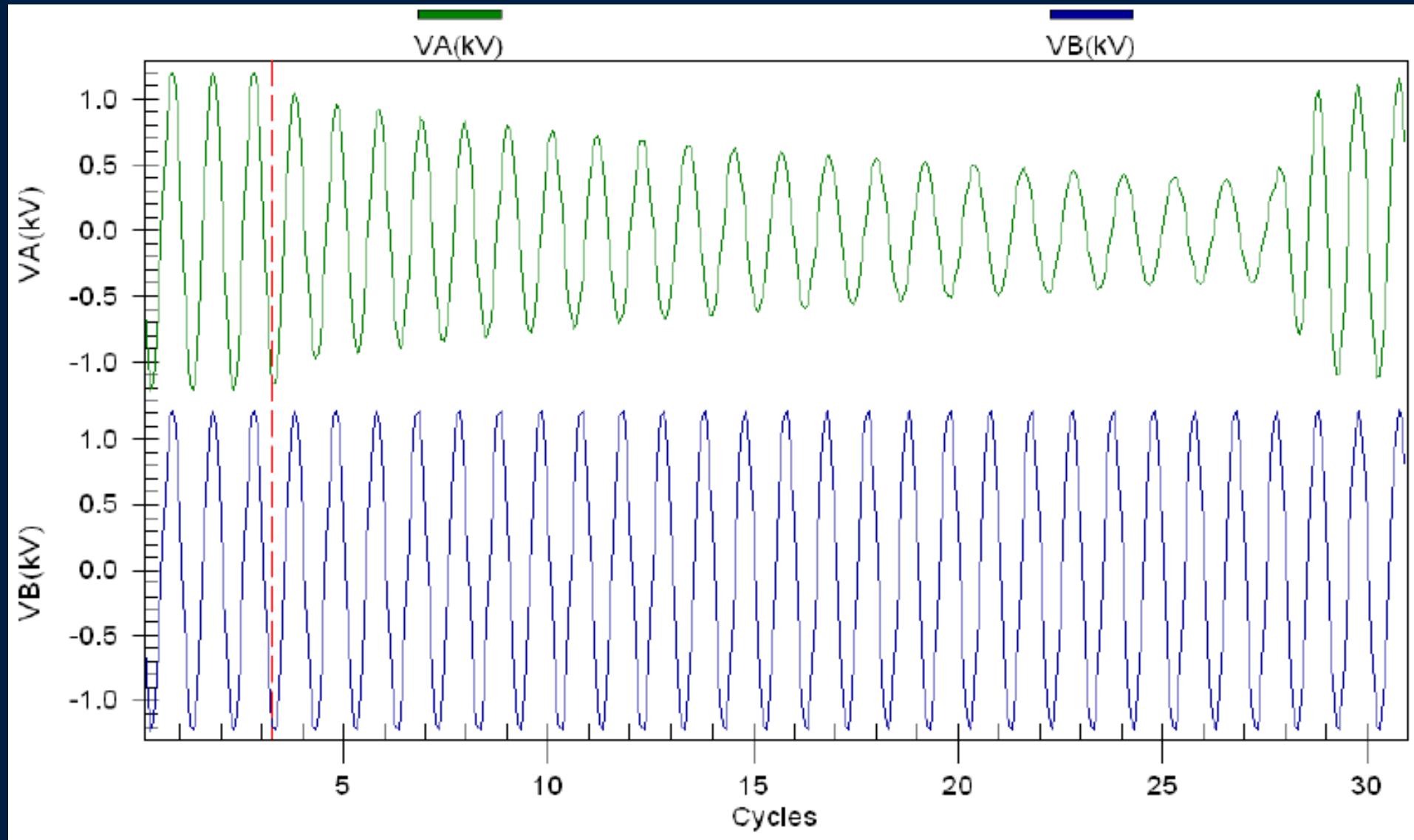
Power Plant Auxiliaries Fast Transfer



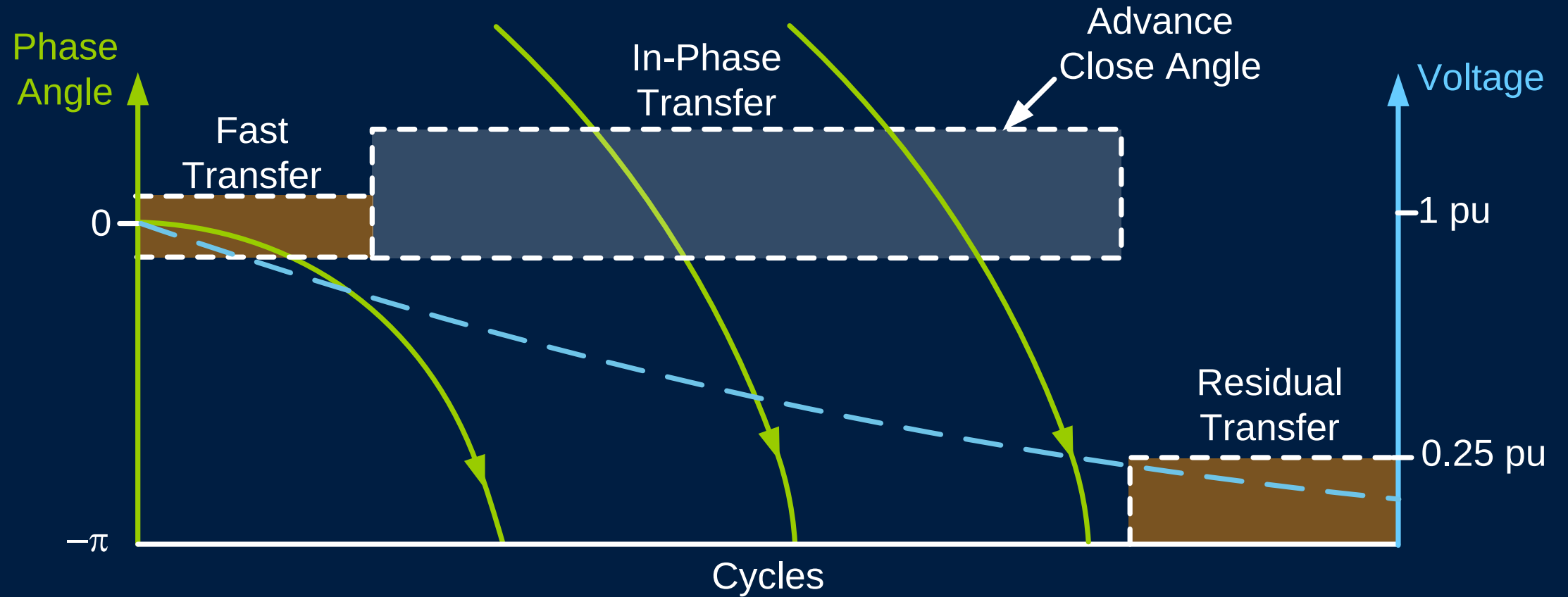
Rundown Plot of a Single Machine Depends on Inertia and Capacitance



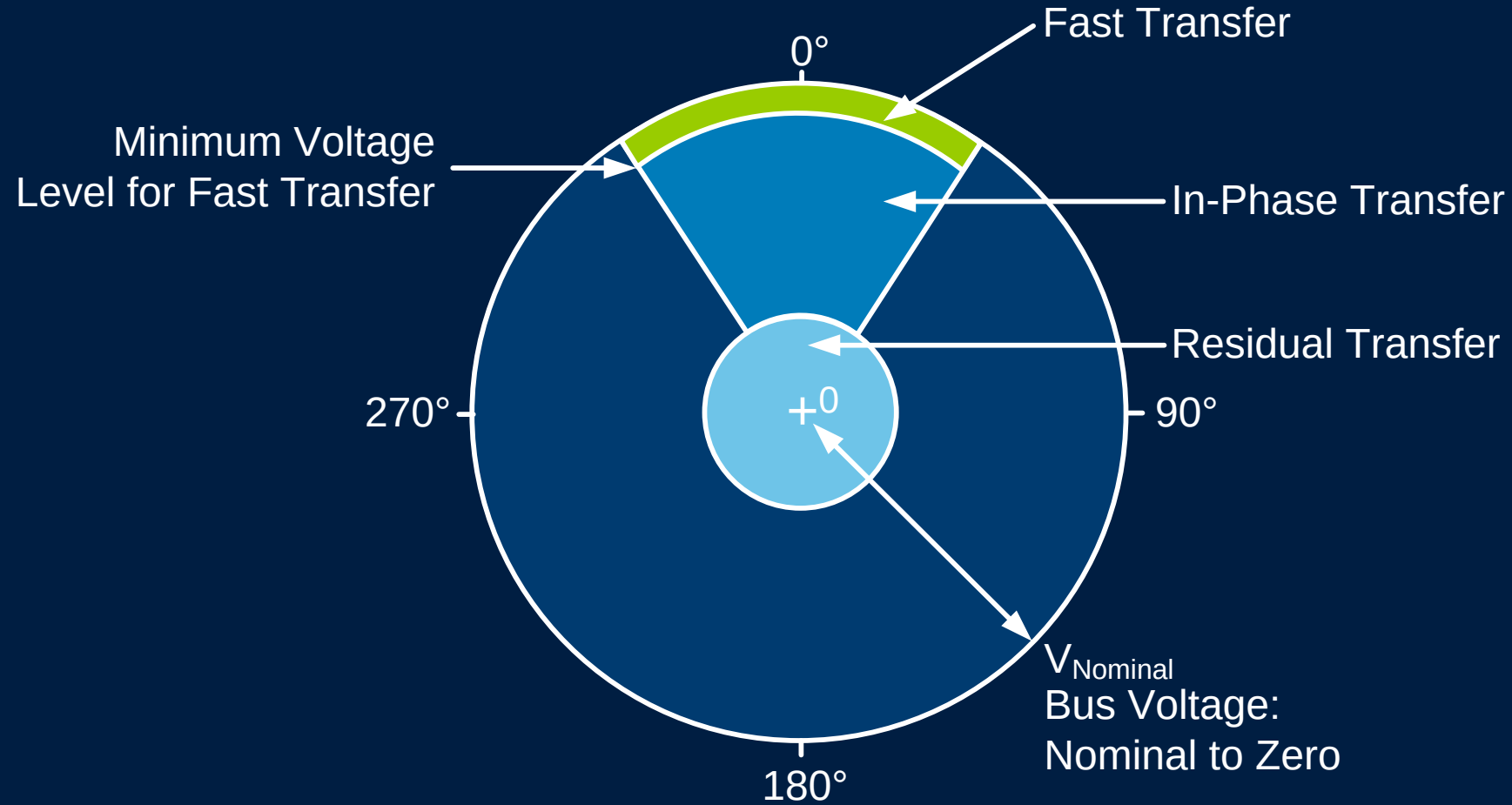
Motor Bus Voltage Decay



Motor Fast Bus Transfer Methods / Stages



Motor Bus Transfer Overview



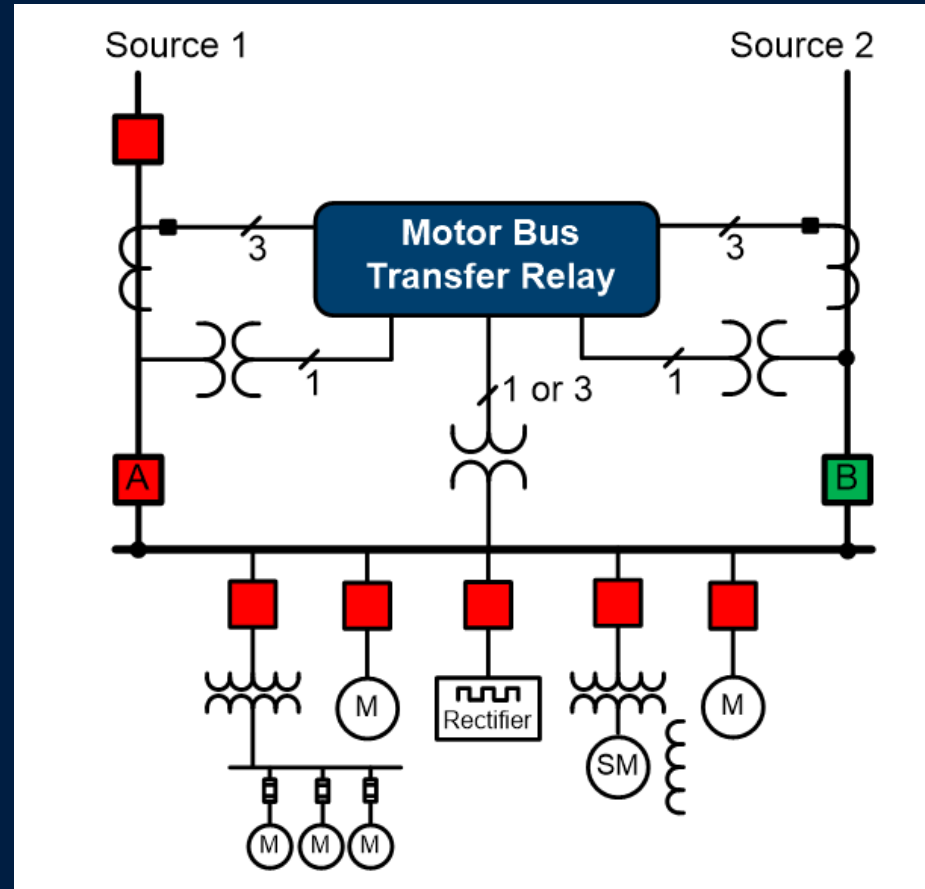
Motor Bus Transfer Types

Closed transition

- Manual
- Make-before-break

Open transition

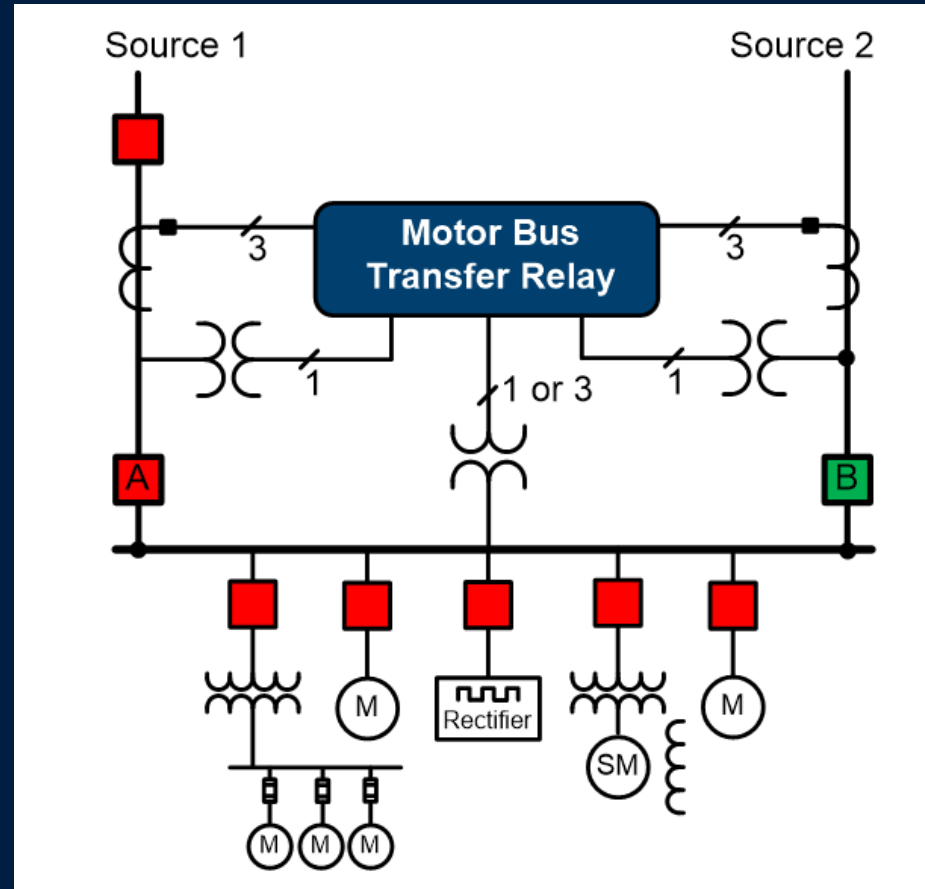
- Manual or automatic
- Break-before-make



Motor Bus Transfer Startup

External startup

- Slightly faster



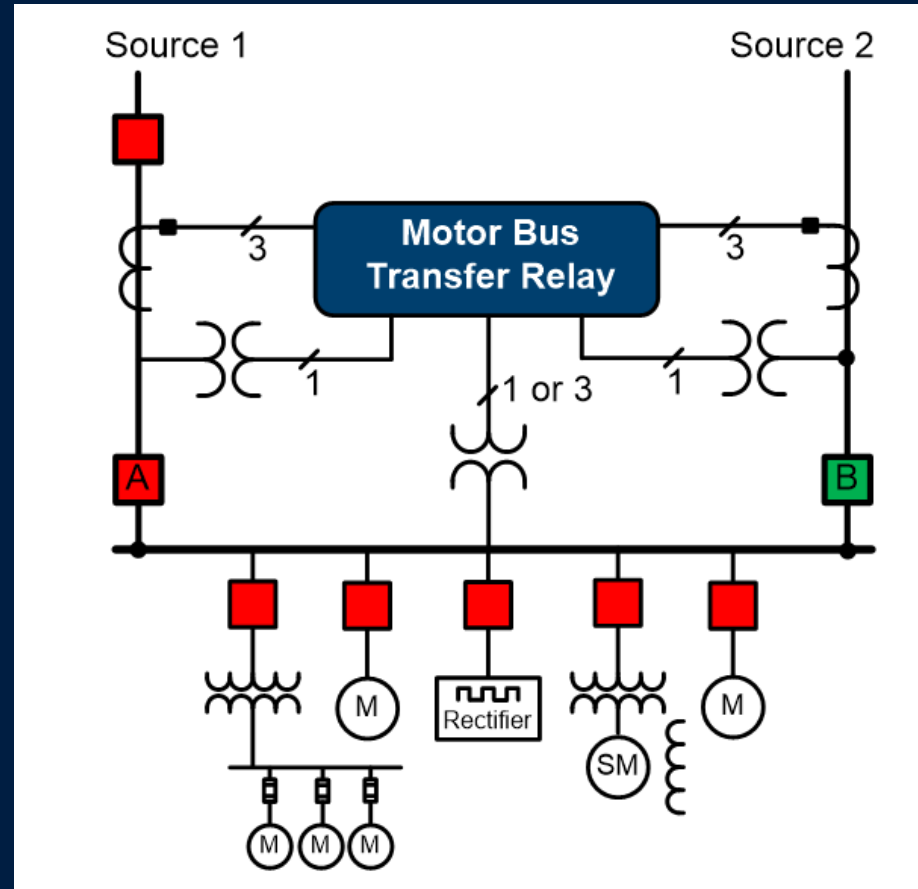
Voltage decay
detection startup

- Machines startups
must be considered

Motor Bus Transfer Methods

Primary methods

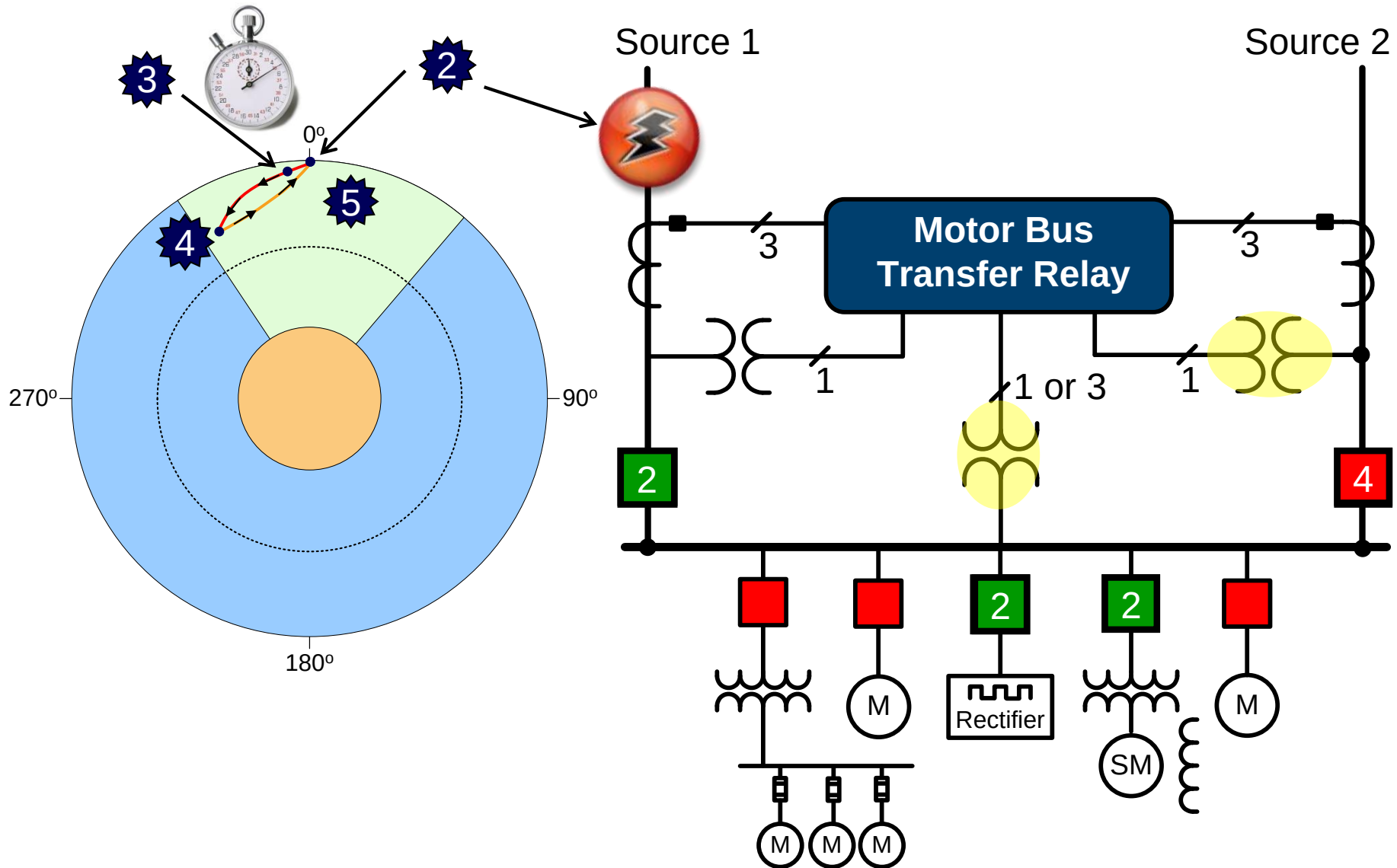
- Fast (1 to 8 cycles)
- In-phase (9 to 500 cycles)



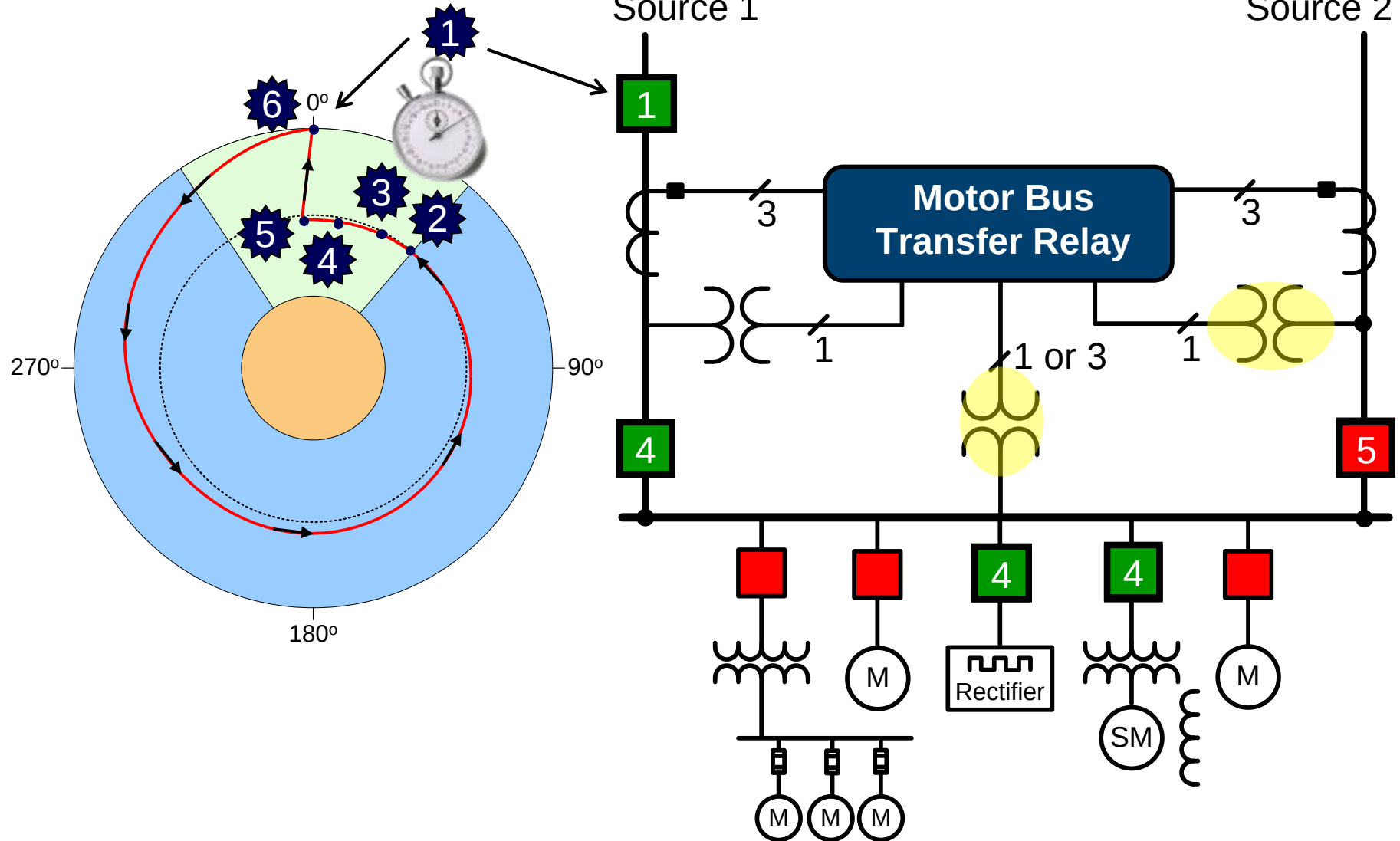
Back-up methods

- Residual voltage (10+ cycles)
- Fixed time (30 to 1,000 cycles)

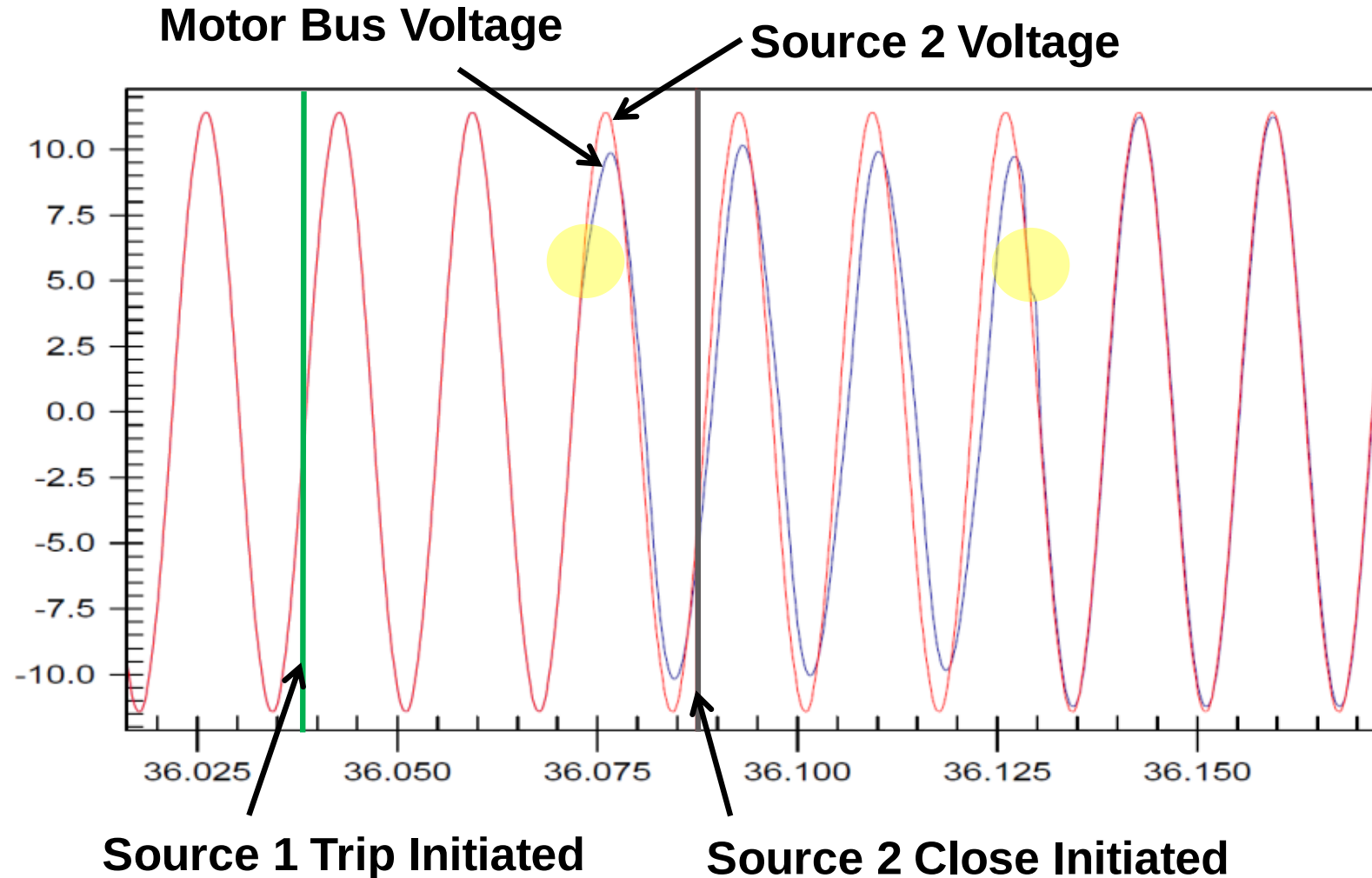
Fast Transfer, External Initiation



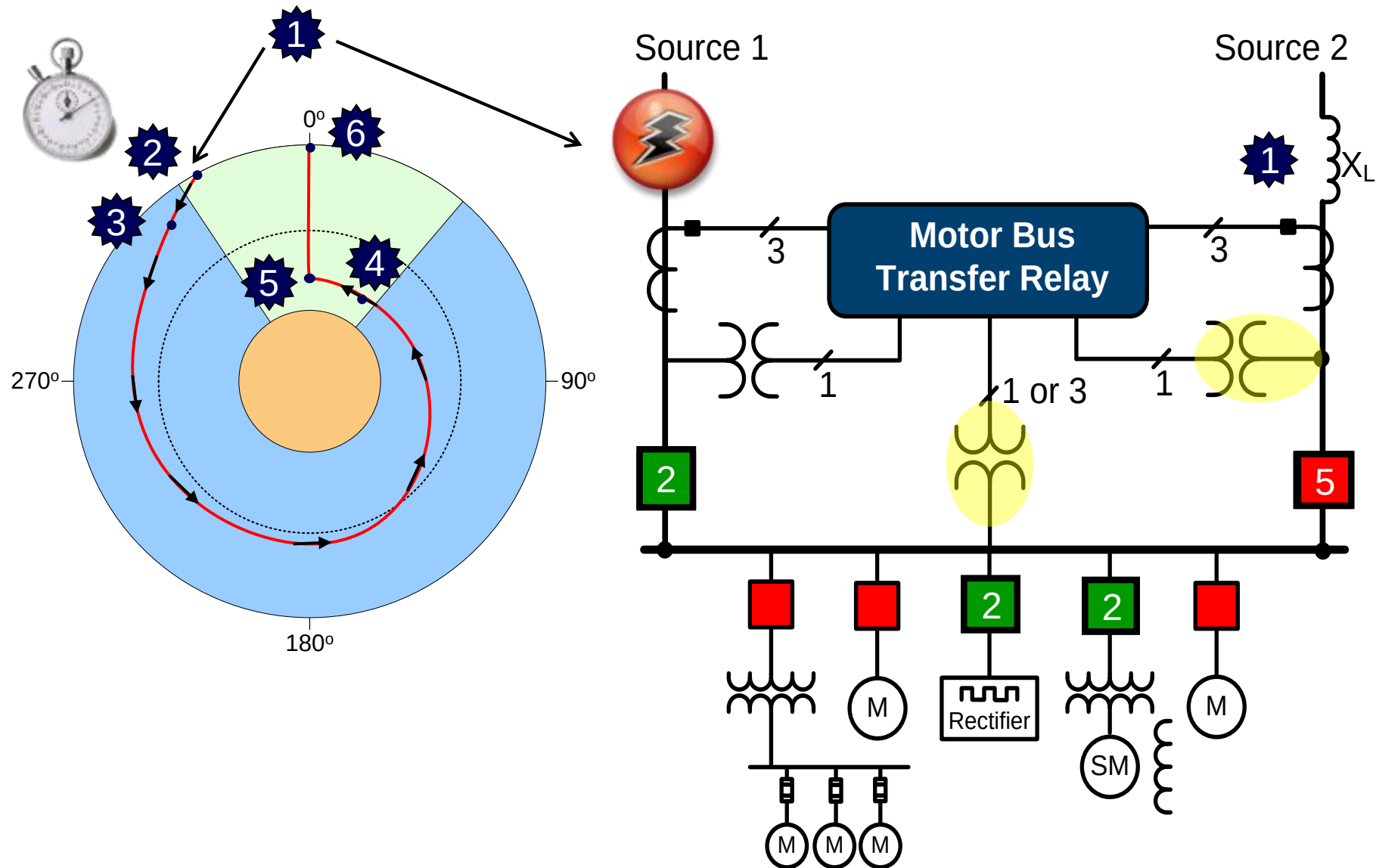
Fast Transfer, Voltage Initiation



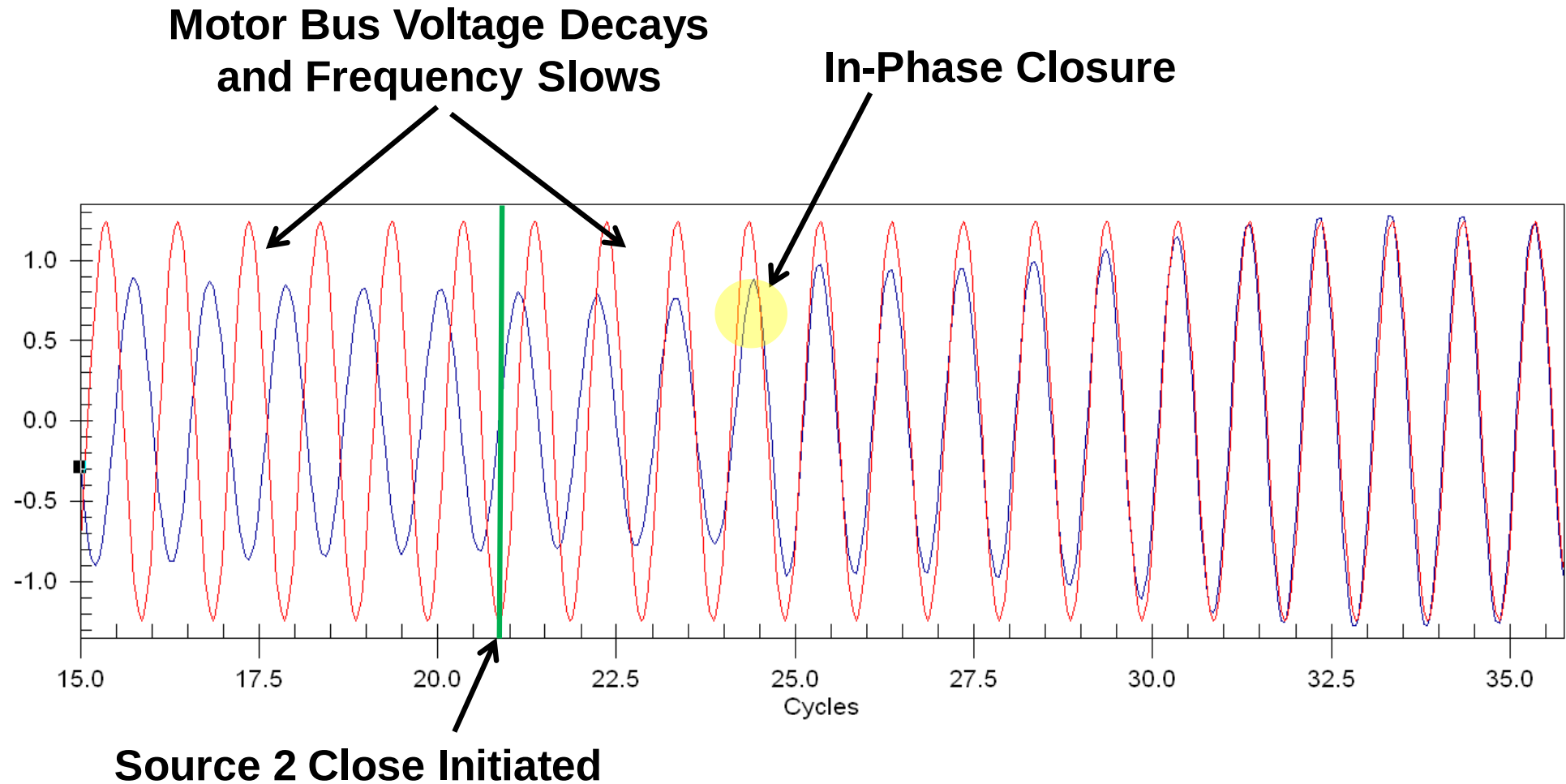
Fast Transfer Minimizes Down Time



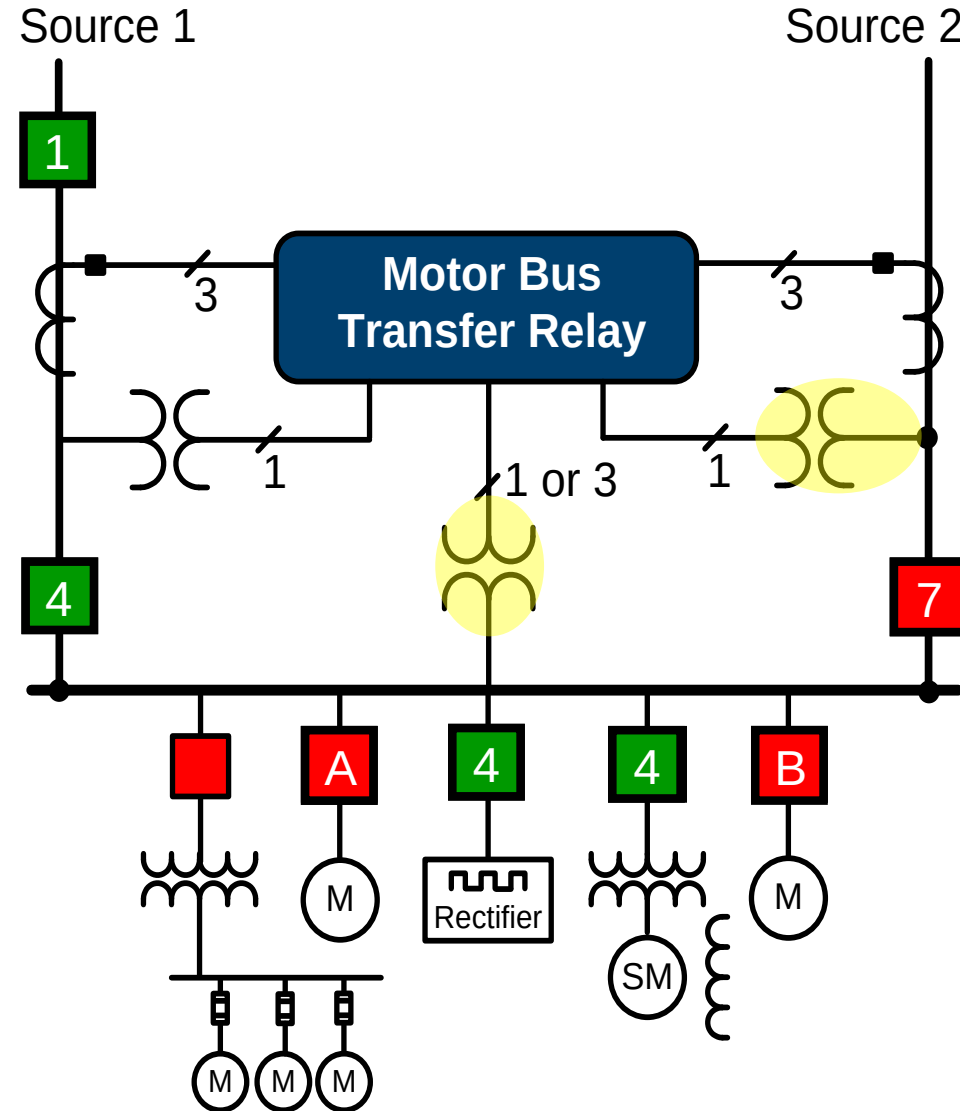
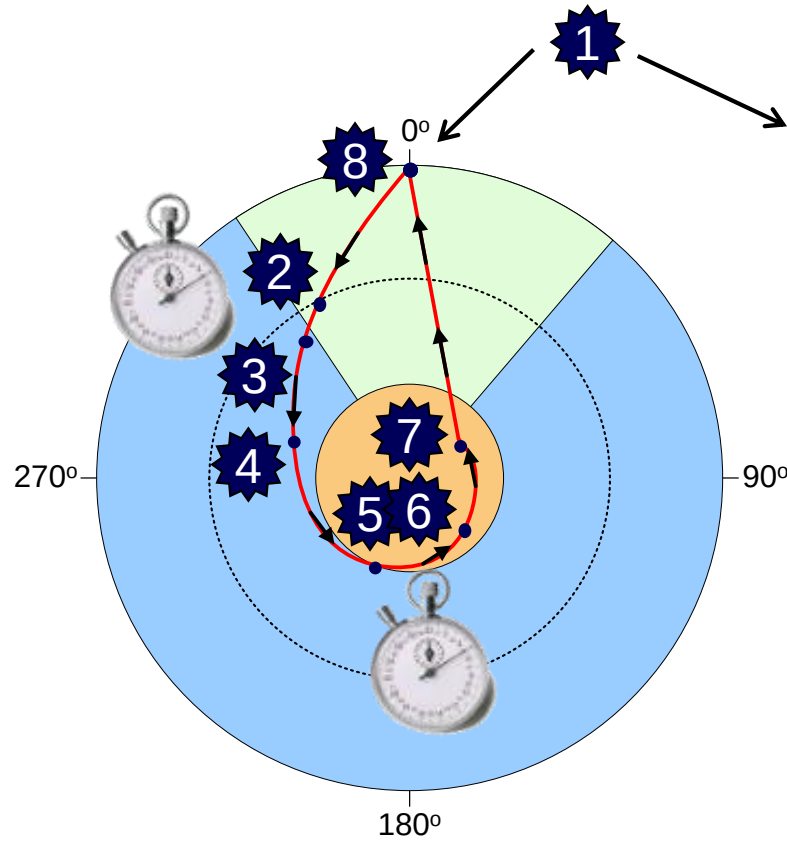
In-Phase Transfer, External Initiation



In-Phase Transfer Oscillography



Residual Transfer, Voltage Initiation



Motor Bus Transfer Considerations

- Motor bus coast-down profile (very dynamic)
- Stresses to process equipment

Determine what method of transfer will be successful
based on system topology at time of transfer

The SEL-451 Has Motor Bus Transfer Logic!



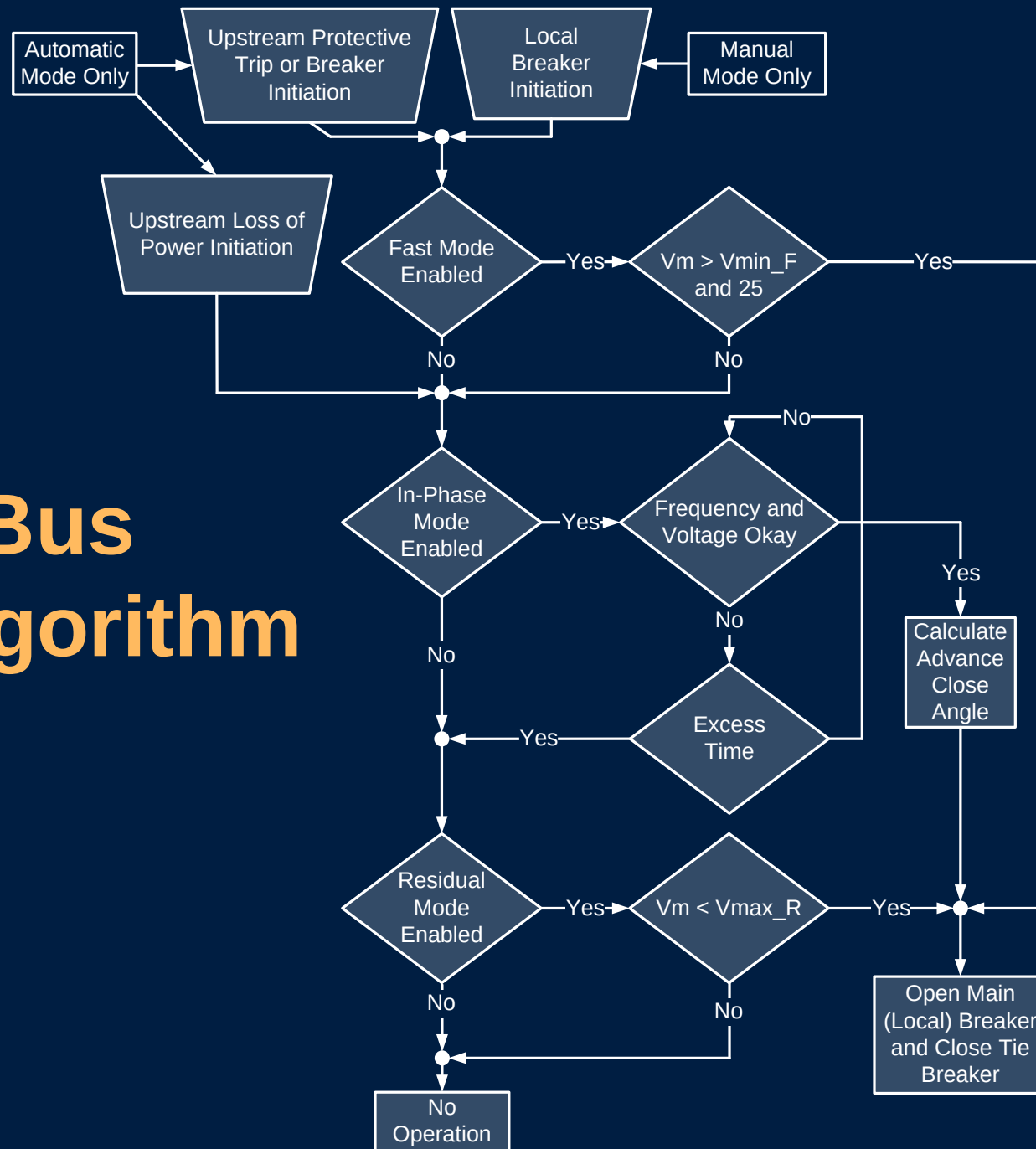
Provides full range of motor bus transfer options with the convenience of the SEL-451 Protection, Automation, and Bay Control System

SEL-451 With MBT Logic Provides...

- Automatic and manual transfers
- Ability to automatically select fast, in-phase, and residual MBTs
- More secure simultaneous transfers



Motor Bus Transfer Algorithm



Additional Benefits

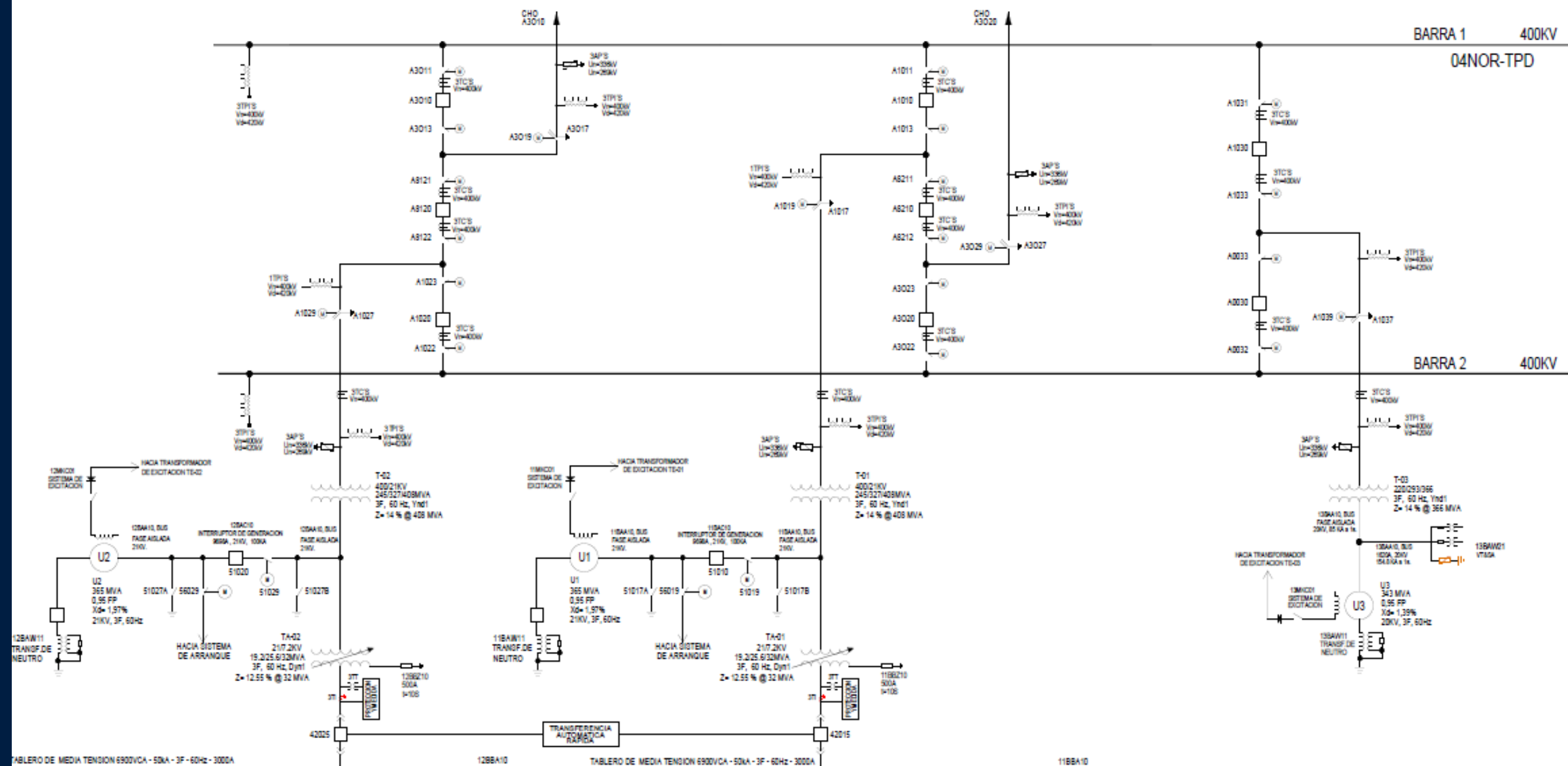
- High-speed breaker protection for simultaneous or sequential transfer
- Protective relay
- Metering
- 12 configurable pushbuttons



BARRA 1 400KV

04NOR-TPD

BARRA 2 400KV



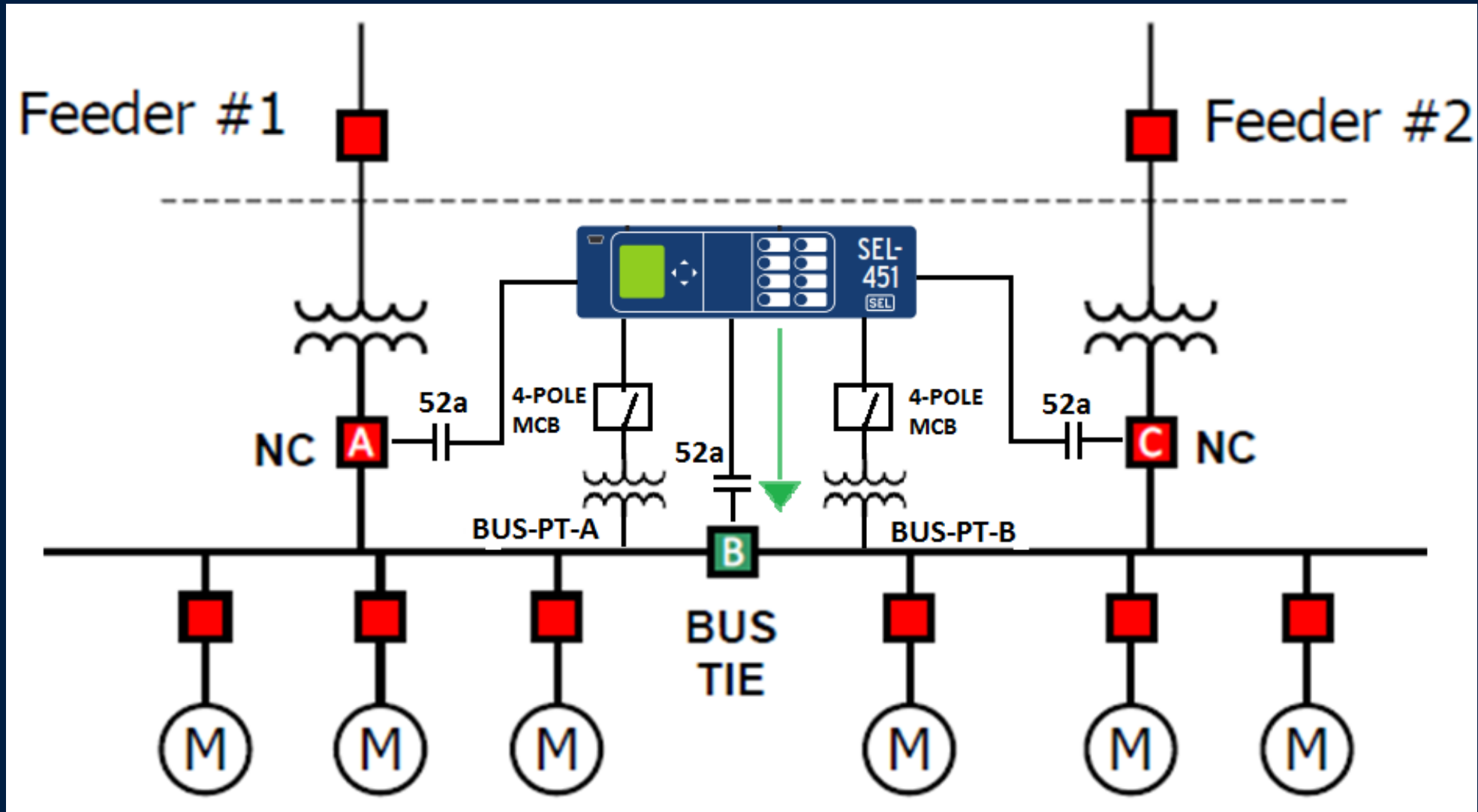
TABLERO DE MEDIA TENSION 6900VCA - 50KA - 3F - 60Hz - 3000A

12BA10

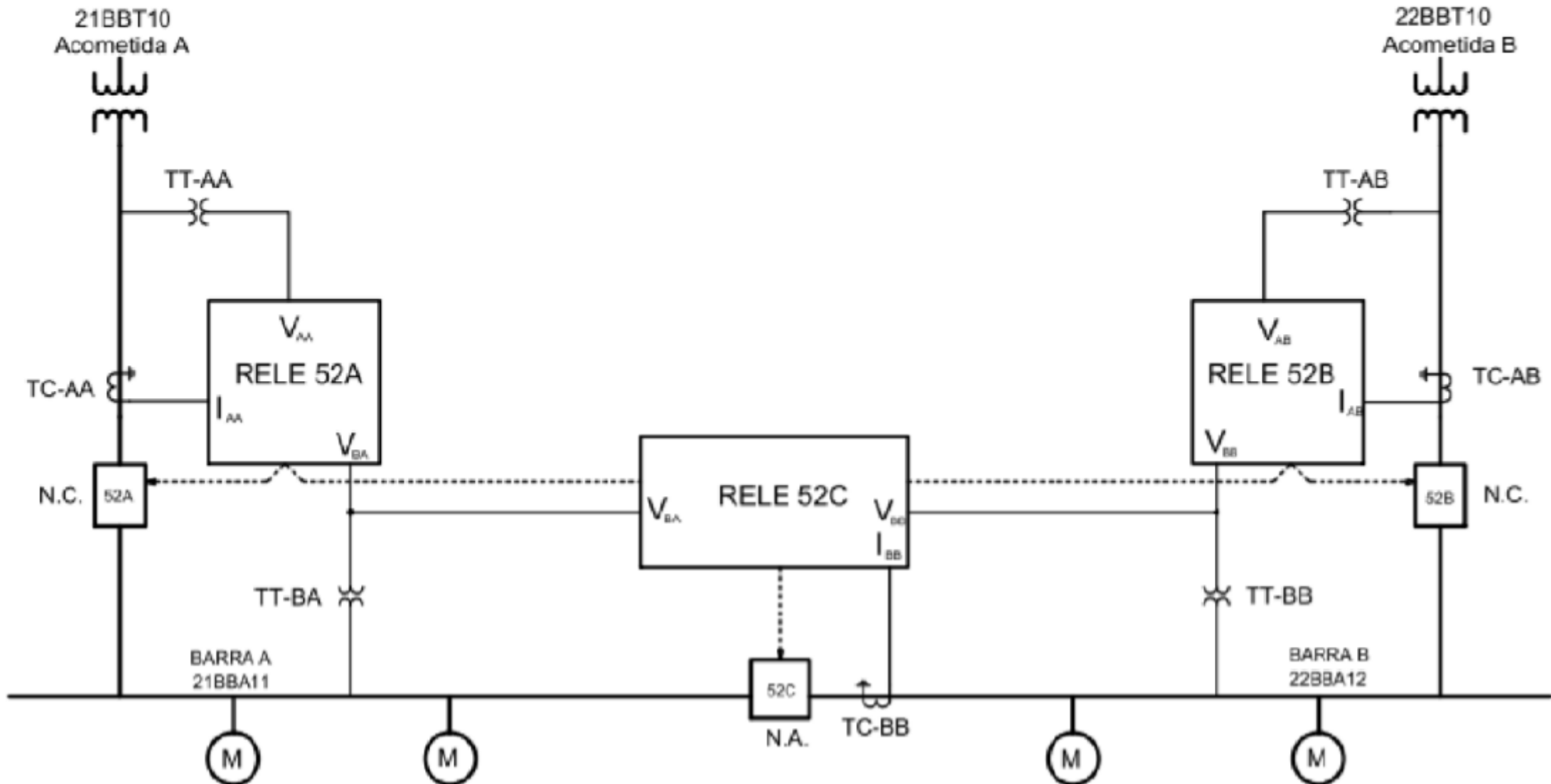
TABLERO DE MEDIA TENSION 6900VCA - 50KA - 3F - 60Hz - 3000A

11BA10

Main-Tie-Main Scheme



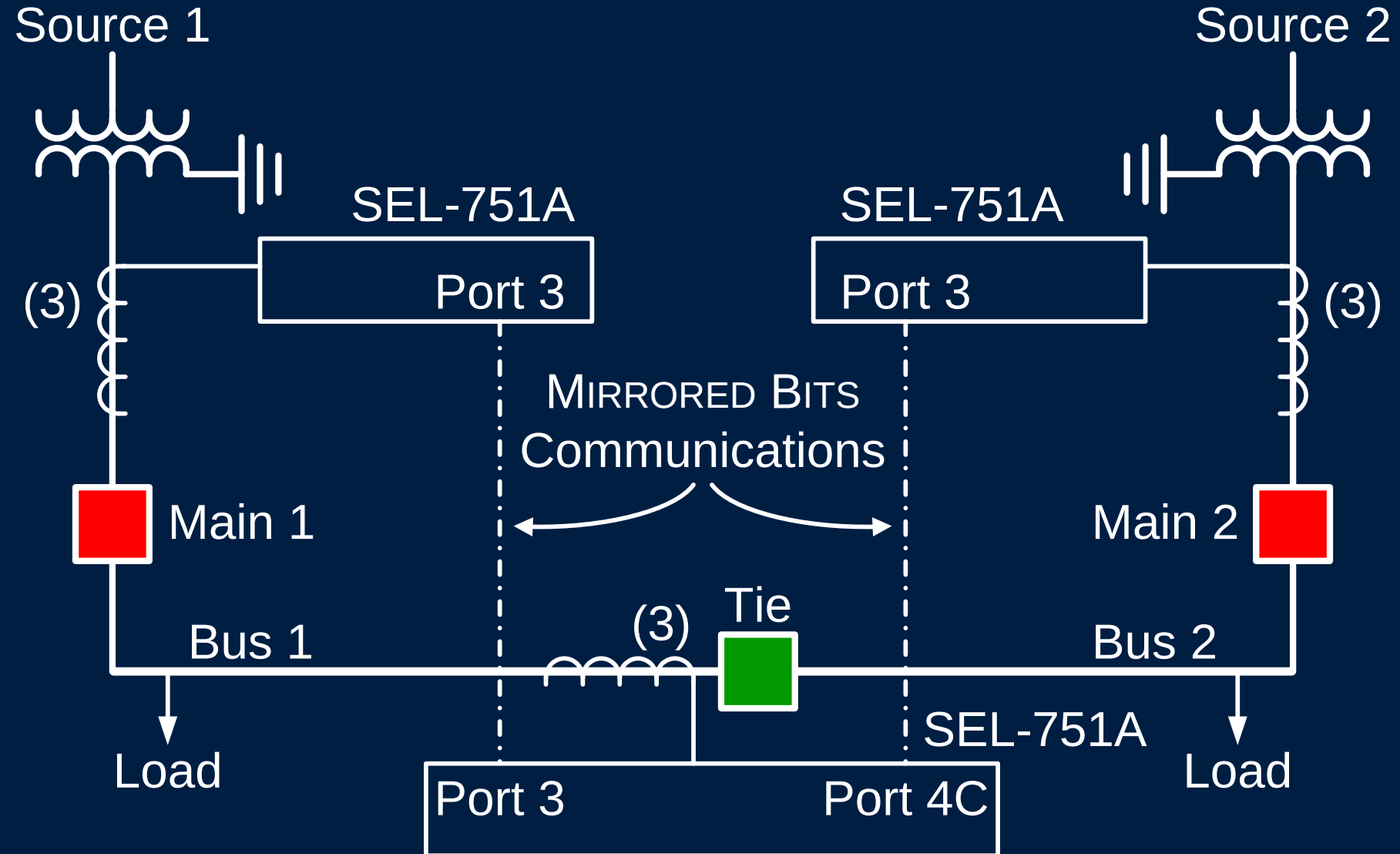
Main-Tie-Main Scheme



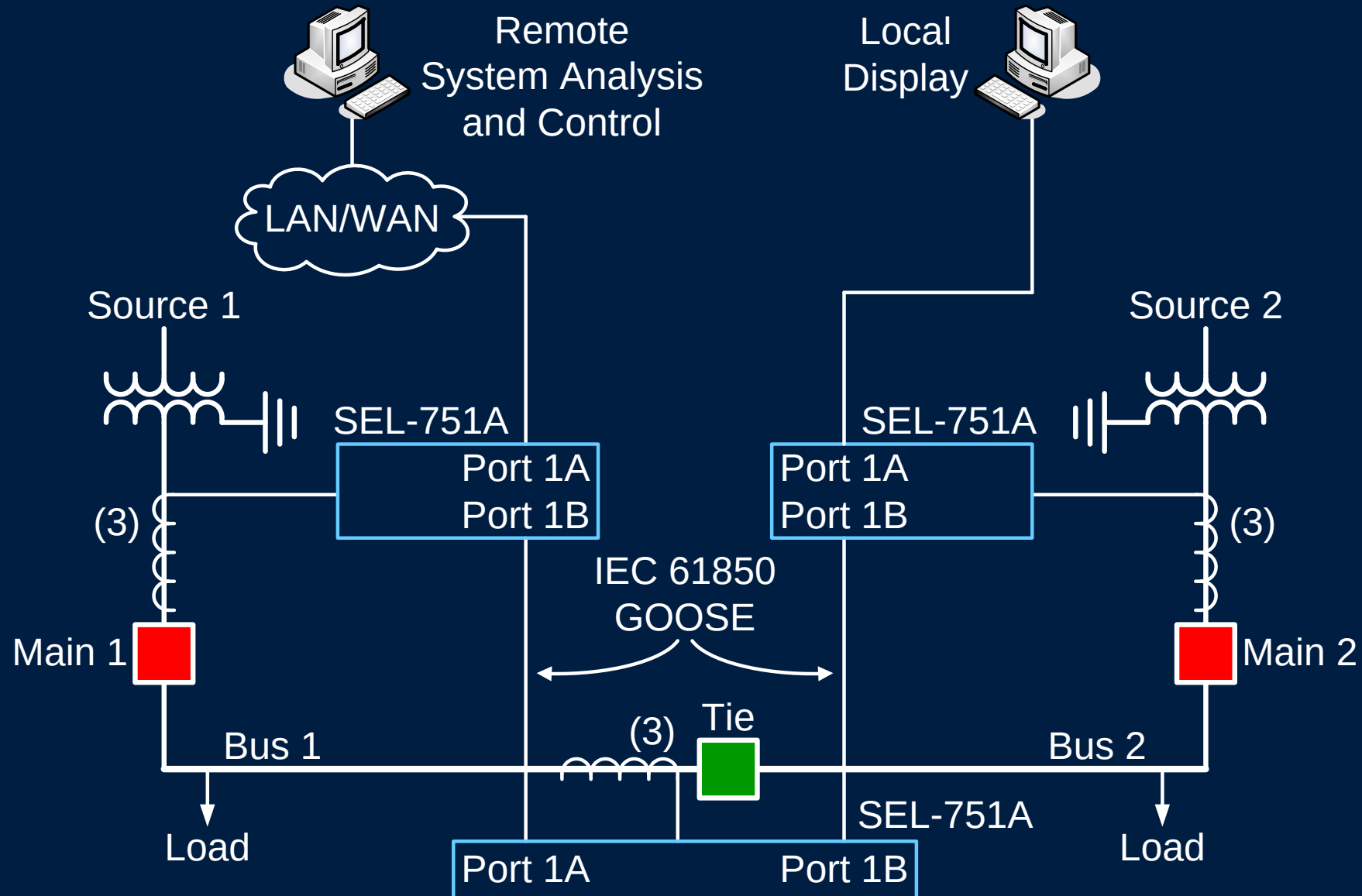
Communications Options

- MIRRORED BITS only
- MIRRORED BITS + EIA-232 serial communications for DCS control
- MIRRORED BITS + Ethernet communications port for DCS control
- Ethernet communication for DCS control and IEC 61850 GOOSE messaging

Serial Communications



Ethernet Communications



Questions?

