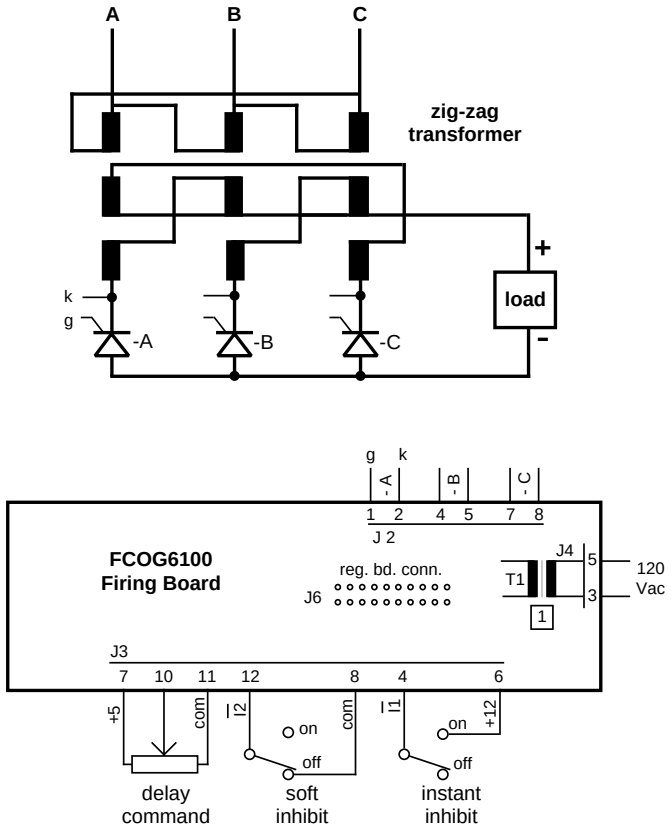
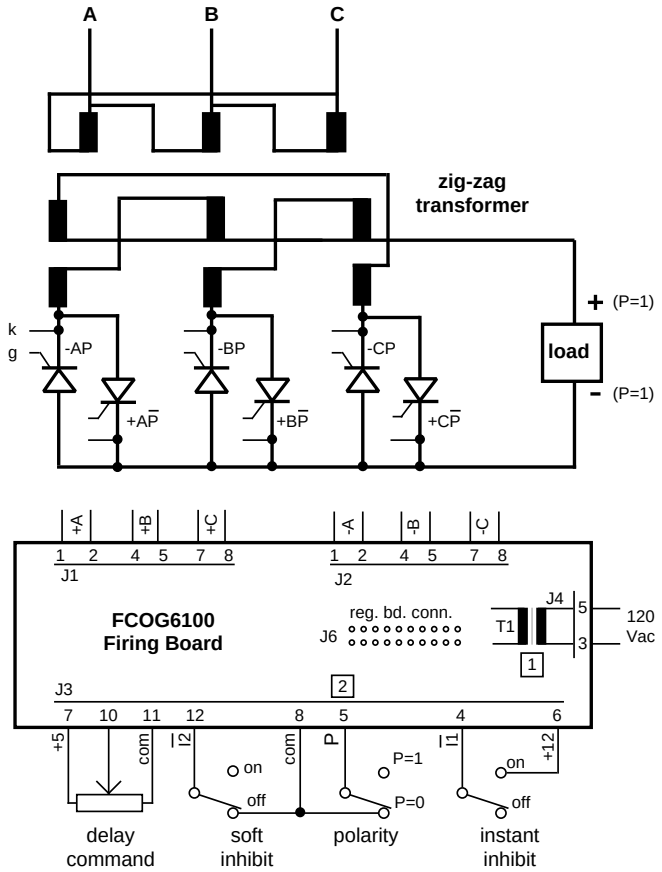




Design Features:
- Lowest cost three phase converter.
- Poor transformer utilization.

Applications:
- DC motor drive
- Power supply

Firing Board Setup:
- 30° phase references.
- 2-30° burst gating.
- 5° to 175° delay angle range.
- Omit J1.

Firing Board Options:
1. T1 energized from thyristor cathodes(omit J4).
2. Other - consult factory.

1. 3-Pulse 2-Quadrant Half Bridge Converter

Design Features:
- Four-quadrant conversion with six thyristors and one firing board.
- Poor transformer utilization.

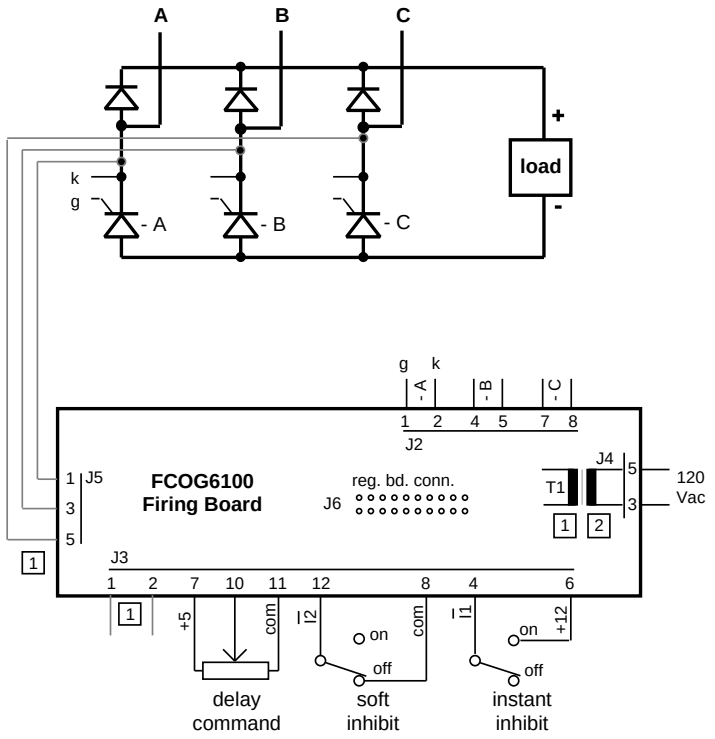
Applications:
- DC servo motor drive
- Reversing power supply

Firing Board Setup:
- 30° phase references.
- 2-30° burst gating.
- 5° to 175° delay angle range.
- Cut +12V trace to J3-5.
- Connect jumper from U4-28 to common.
- Connect polarity (P) command to J3-5.

Firing Board Options:
1. T1 energized from thyristor cathodes(omit J4).
2. Polarity transition inhibit.
3. Other - consult factory.

2. 3-Pulse 4-Quadrant Half Bridge Converter

R090



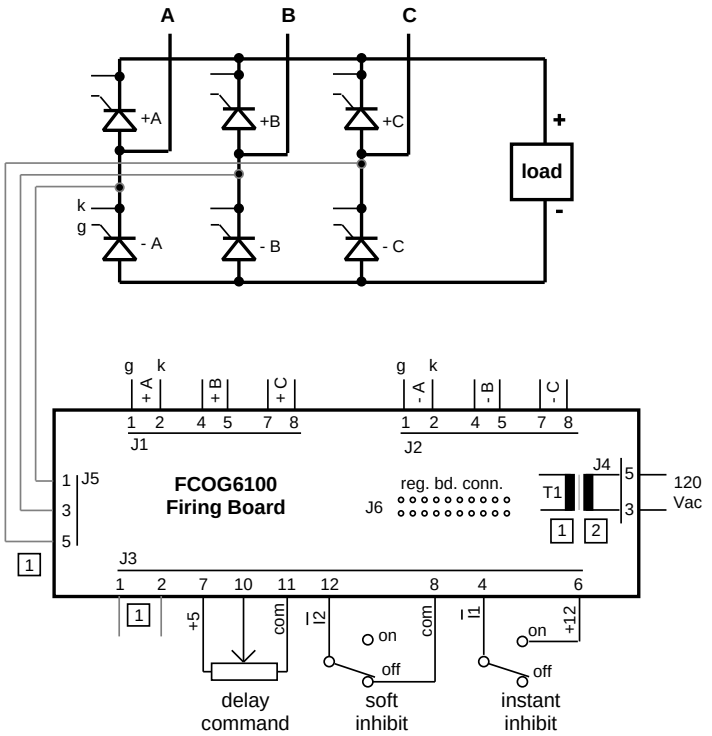
Design Features:
- Low cost converter.
- Improved power factor re. 6-thyristor converter.
- Third harmonic in mains current.

Applications:
- Power supply
- Motor drive

Firing Board Setup:
- 30° phase references.
- 2-30° burst gating.
- 5° to 175° delay angle range.
- Omit J1.

Firing Board Options:
1. Phase references from ac mains (requires external 24VAC source).
2. T1 energized from thyristor cathodes (omit J4).
3. Other - Consult factory.

3. 6-Pulse 1-Quadrant Bridge Semi-converter



Design Features:
- Good transformer utilization.
- fifth, seventh, etc. mains current harmonics.

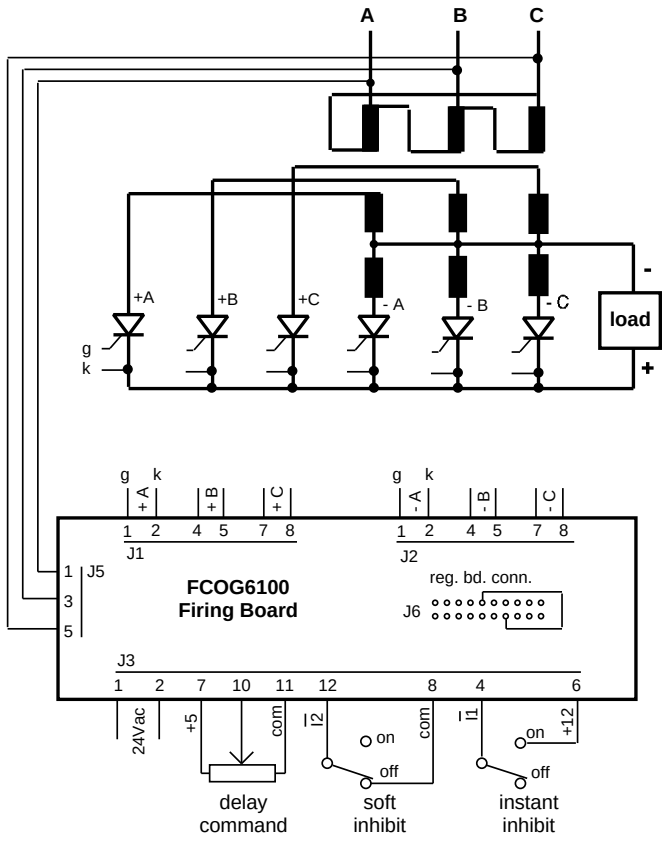
Applications:
- Power supply
- Motor drive

Firing Board Setup:
- 30° phase references.
- 2-30° burst gating
- 5° to 130° delay angle range.

Firing Board Options:
1. Phase references from ac mains (requires external 24VAC source).
2. T1 energized from thyristor cathodes(omit J4).
3. Other - consult factory.

4. 6-Pulse 2-Quadrant Bridge Full-Converter

R090



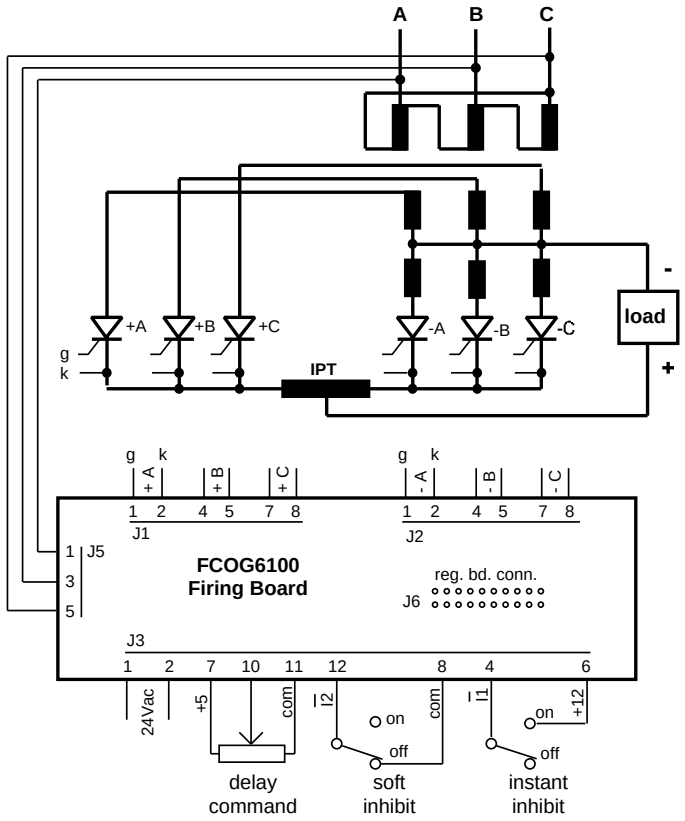
Design Features:
- Common cathodes (or anodes).
- 60° current duration.
- Poor transformer utilization.

Applications:
- low voltage power supply.
- Motor drives.

Firing Board Setup:
- 30° phase references.
- 2-30° burst gating.
- 5° to 130° delay angle range.
- Jumper pads 7 & 15 of J6.
- Phase references from ac mains (install J5).
- 24 Vac external firing board power.
- Omit J4 and T1.

Firing Board Options:
- Consult factory.

5. 6-Pulse 2-Quadrant Star Converter



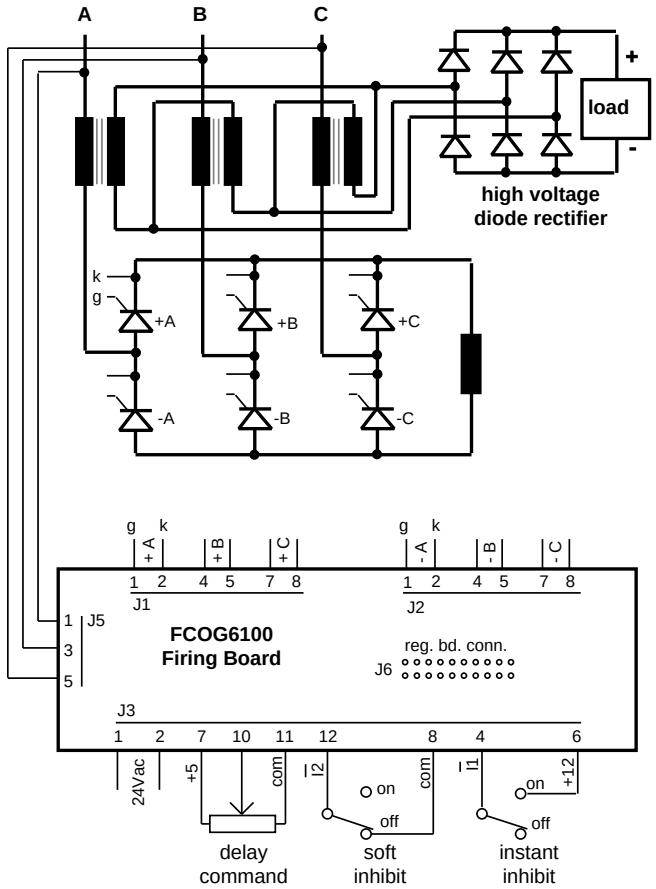
Design Feature:
- Unidirectional secondary current with 120° conduction.

Applications:
- Electro-plating power supply.
- Motor drives.

Firing Board Setup:
- 0° phase references.
- 2-30° burst gating.
- 5° to 165° delay angle range.
- Positive phase sequence only.
- Phase references from ac mains (install J5).
- 24 Vac external firing board power.
- Omit J4 and T1.

Firing Board Options:
- Consult factory.

6. 6-Pulse 2-Quadrant Star Converter With Interphase Transformer



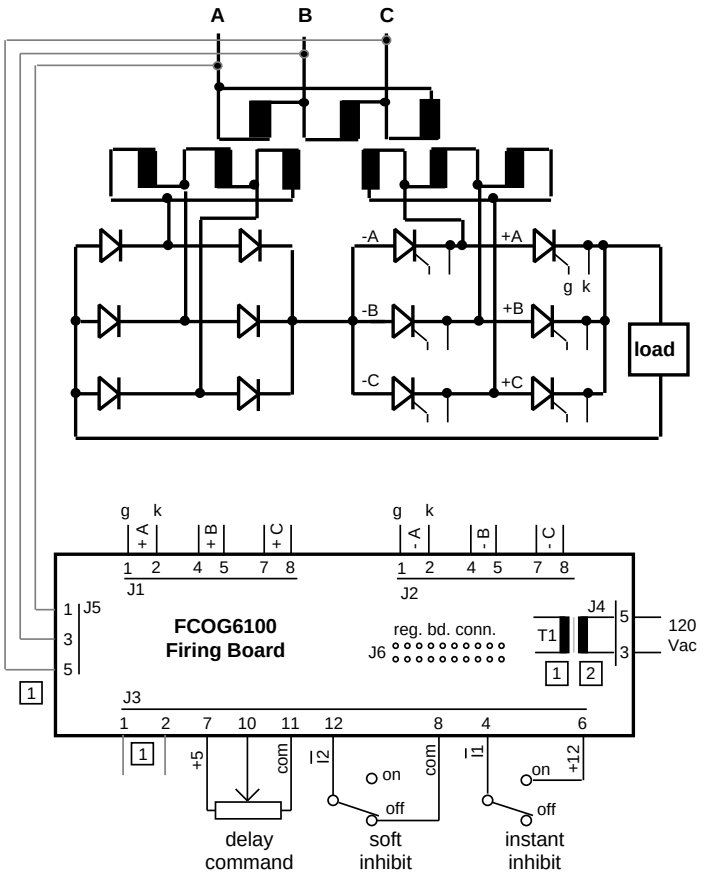
Design Feature:
- Low energy storage in high voltage rectifier filter.

Applications:
- Electron beam power supply.
- Vacuum sputtering power supply.

Firing Board Setup:
- 30° phase references.
- 2-30° burst gating.
- 5° to 165° delay angle range.
- Phase references from ac mains.
- 24 Vac external firing board power.
- Omit J4 and T1.

Firing Board Options:
- Consult factory.

7. 6-Pulse Neutral Point Converter



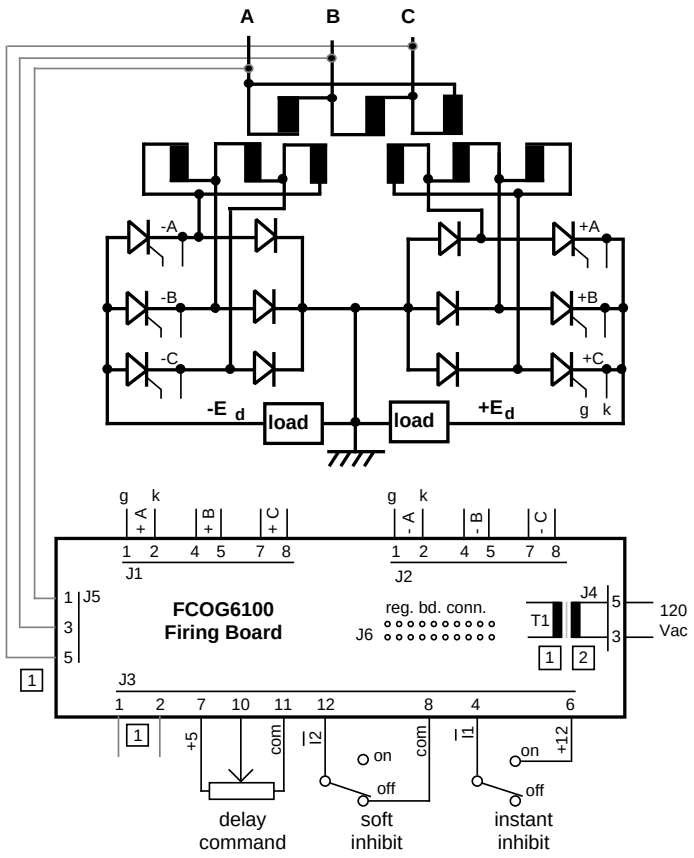
Design Feature:
- Improved power factor and reduced harmonics

Applications:
- Magnet power supply.
- DC motor drive.

Firing Board Setup:
- 0° phase references.
- 2-30° burst gating.
- 5° to 165° delay angle range.

Firing Board Options:
1. Phase references from ac mains.
2. T1 energized from thyristor cathodes (omit J4).
3. Other - consult factory.

8. 6-Pulse Controlled and Uncontrolled Bridge Converters in Series



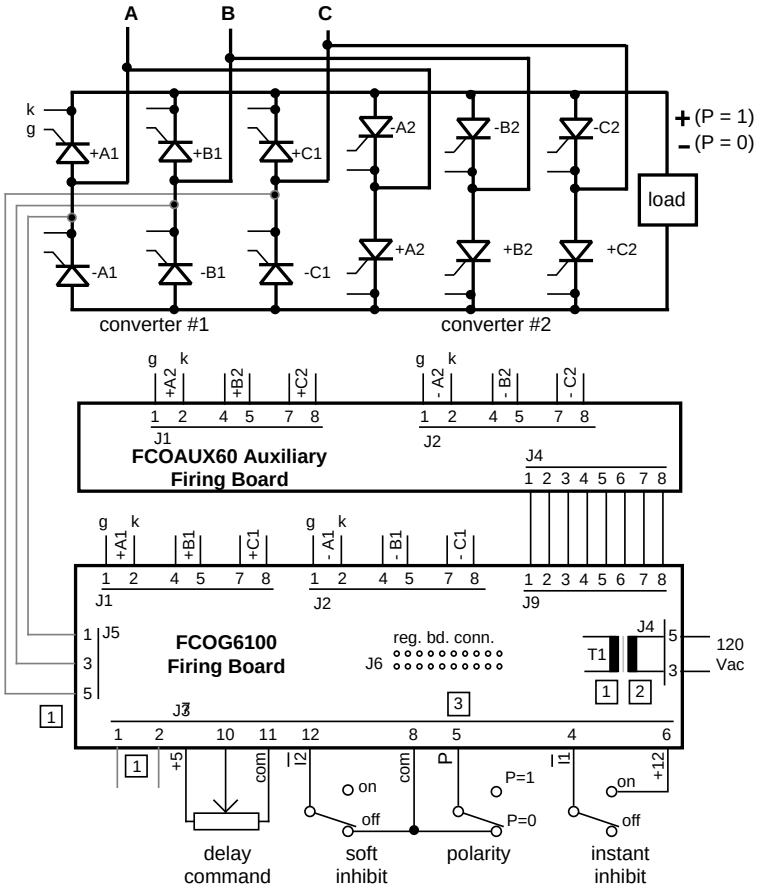
Design Feature:
- Positive and negative power supply using one firing board.

Applications:
- UPS rectifier stage.
- Bipolar power supply.

Firing Board Setup:
- 30° phase references.
- 2-30° burst gating.
- 5° to 165° delay angle range.

Firing Board Options:
1. Phase references from ac mains.
2. T1 energized from thyristor cathodes(omit J4).
3. Other - consult factory.

9. 6-Pulse Semi-Converters in Series



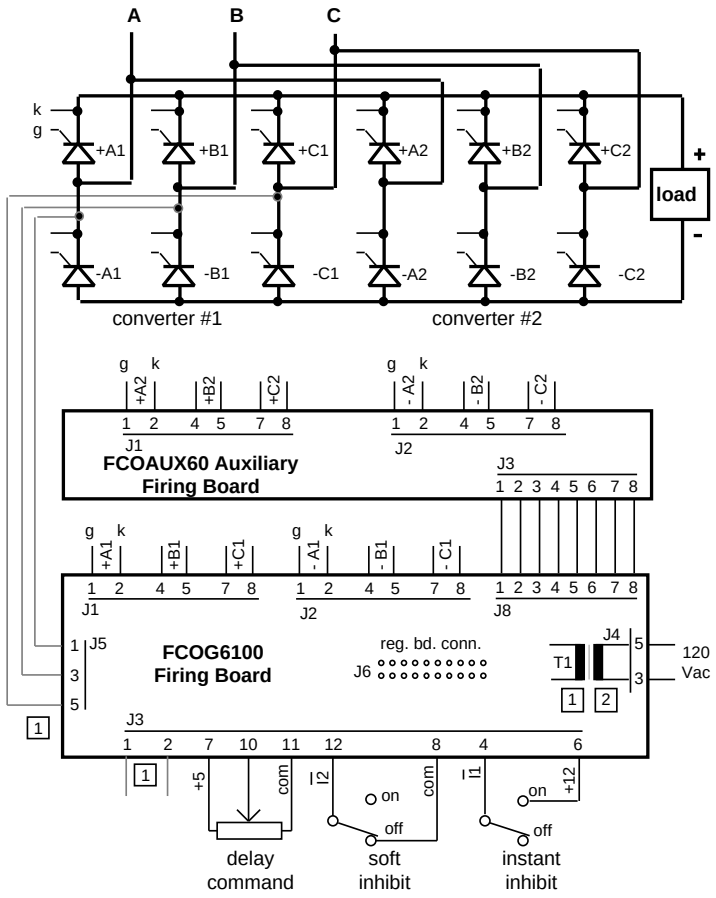
Design Feature:
- Four quadrant conversion with one gate delay determinator.

Applications:
- Reversing DC motor drive.
- Reversing magnet power supply.
- Three phase to single phase. frequency conversion .

Firing Board Setup:
- 30° phase references.
- 2-30° burst gating.
- 5° to 130° delay angle range.
- Cut +12V trace to J3-5.
- Connect polarity (P) command to J3-5 as shown.

Firing Board Options:
1. Phase references from ac mains.
2. T1 energized from thyristor cathodes(omit J4).
3. Polarity transition inhibit circuit.
4. Other - consult factory.

10. 6-Pulse 4-Quadrant Bridge Converter



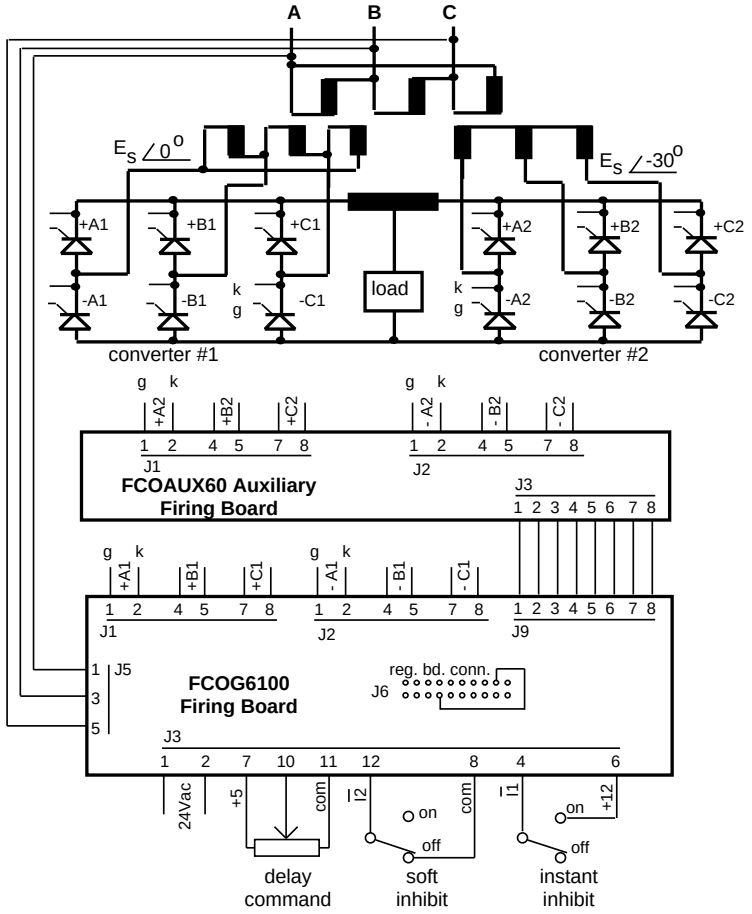
Design Feature:
- High current converter with one delay angle determinator(ensures simultaneous application of gate current).

Applications:
- dc motor drives.
- dc power supplies .

Firing Board Setup:
- 30° phase references.
- 2-30° burst gating.
- 5° to 130° delay angle range.

Firing Board Options:
1. Phase references from ac mains.
2. T1 energized from thyristor cathodes(omit J4).
3. Other - consult factory.

11. 6-pulse 2-Quadrant Parallel Bridge Converters



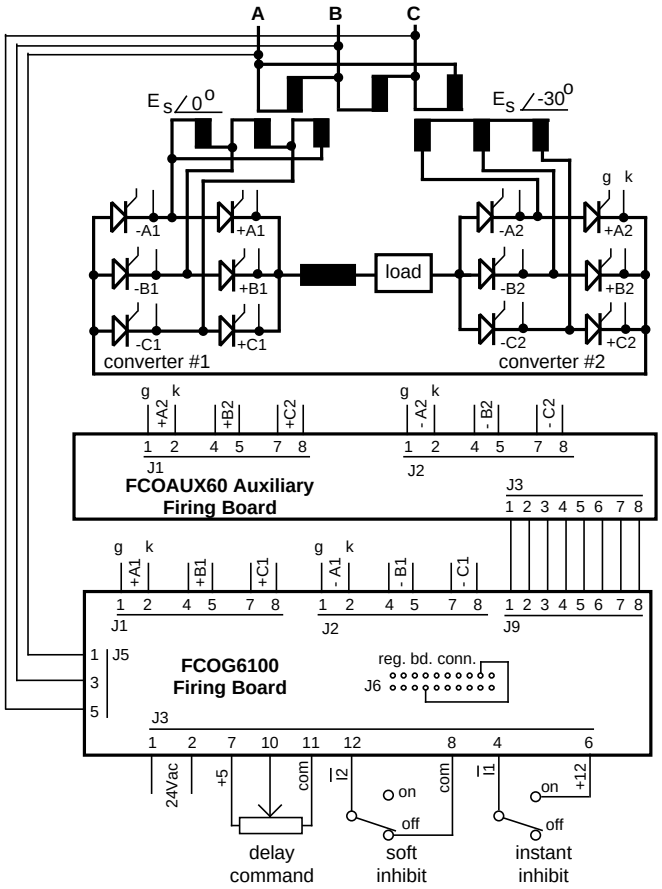
Design Features:
- 30° phase shifted converter #2 gating with one delay angle determinator.
- Eliminate 5th harmonic of mains current and 6th harmonic of dc output voltage.

Applications:
- High current power supply.
- DC motor drives.
- UPS input converter.
- Magnet power supply .

Firing Board Setup:
- 30° phase references.
- 2-30° burst gating.
- 5° to 130° delay angle range.
- Jumper pads 4 and 19 of J6.
- Cut +12V trace to J3-5.
- Jumper pads of R64.
- Omit section 7&8 of RN5.
- Phase references from ac mains.
- 24 Vac external firing board power.

Firing Board Options:
- Consult factory

12. 12-Pulse 2-Quadrant Parallel Converters



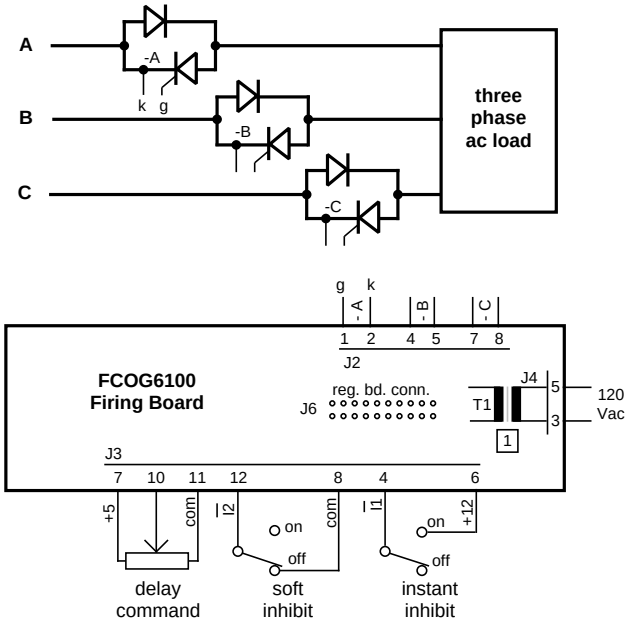
Design Features:
- 30° phase shifted converter #2 gating with one delay angle determinator.
- Eliminates 5th harmonic of ac mains current and 6th harmonic of dc output voltage.

Applications:
- High voltage power supply.
- DC motor drives.
- UPS input converter.
- Magnet power supply .

Firing Board Setup:
- 30° phase references.
- 2-30° burst gating.
- 5° to 130° delay angle range.
- Jumper pads 4 and 19 of J6.
- Cut +12V trace to J3-5.
- Jumper pads of R64.
- Omit section 7&8 of RN5.
- Phase references from ac mains.
- 24 Vac external firing board power.

Firing Board Options:
- Consult factory

13. 12-Pulse 2-Quadrant Series Converters



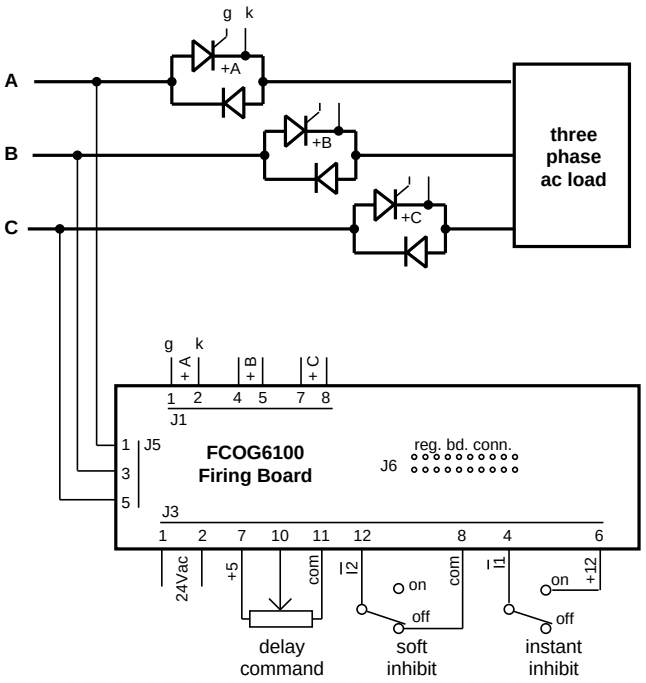
Design Features:
- Minimum cost ac controller.
- Positive DC voltage on load with thyristors off.

Applications:
- Transformer primary control.
- Solid -state reduced voltage motor starter.

Firing Board Setup:
- 0° phase references.
- 120° burst gating.
- 5° to 175° delay angle range.
- Phase references from thyristor cathodes.
- Omit J1.

Firing Board Options:
1. T1 energized from thyristor cathodes (omit J4).
2. Other - consult factory.

14. 3-Thyristor/3-Diode In-Line AC Controller(thyristors load-to-line)



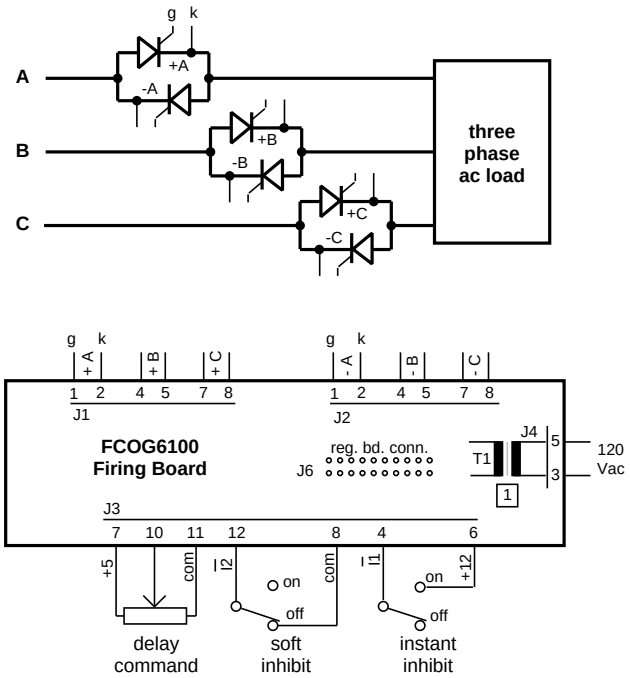
Design Features:
- Minimum cost ac controller.
- Negative dc voltage load-to-ground with thyristors off.

Applications:
- Transformer primary control.
- Solid -state reduced voltage motor starter.

Firing Board Setup:
- 0° phase references.
- 120° burst gating.
- 5° to 175° delay angle range.
- Phase reference from ac mains.
- Omit J2 and J4.
- 24 Vac board power.

Firing Board Options:
- Consult factory.

15. 3-Thyristor/3-Diode In-Line AC Controller(thyristors line-to-load)



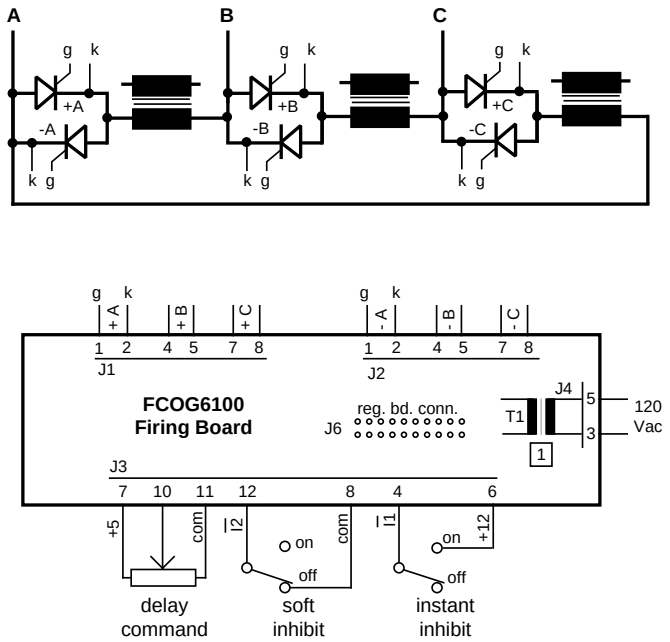
Design Features(re. circuits #14 and 15):
- Zero load voltage to ground with thyristors off.
- Zero triplen harmonic currents.

Applications:
- Transformer primary control.
- Solid -state reduced voltage motor starter.

Firing Board Setup:
- 0° phase references.
- 120° burst gating.
- 5° to 175° delay angle range.
- Phase references from thyristor cathodes.

Firing Board Options:
1. T1 energized from thyristor cathodes(omit J4).
2. Regulator board connector.
3. Other - consult factory.

16. 6-Thyristor In-Line AC Controller



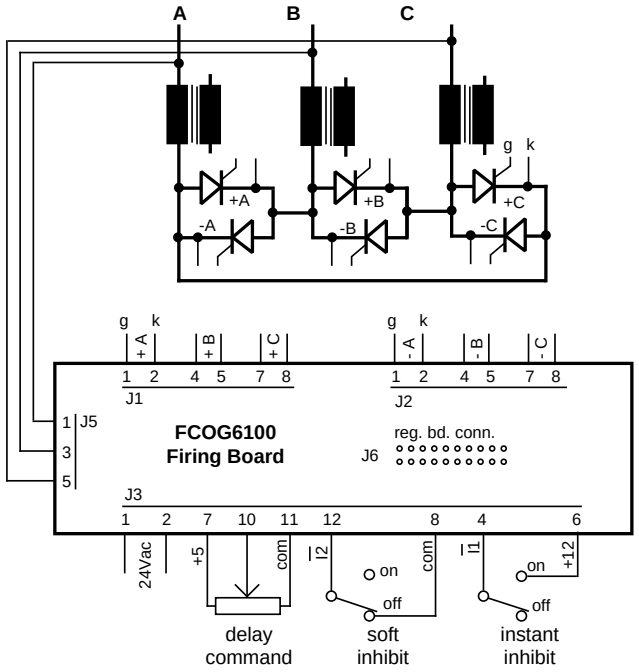
Design Features(re. circuit #16):
- Reduced thyristor RMS current.
- Triplen harmonics in load current (but not in mains current).

Applications:
- Transformer primary control.
- Solid -state reduced voltage motor starter.

Firing Board Setup:
- 0° phase references.
- 120° burst gating.
- 5° to 175° delay angle range.
- Phase references from thyristor cathodes.

Firing Board Options:
1. T1 energized from thyristor cathodes(omit J4).
2. Other - consult factory.

17. 6-Thyristor Inside-The-Delta AC Controller



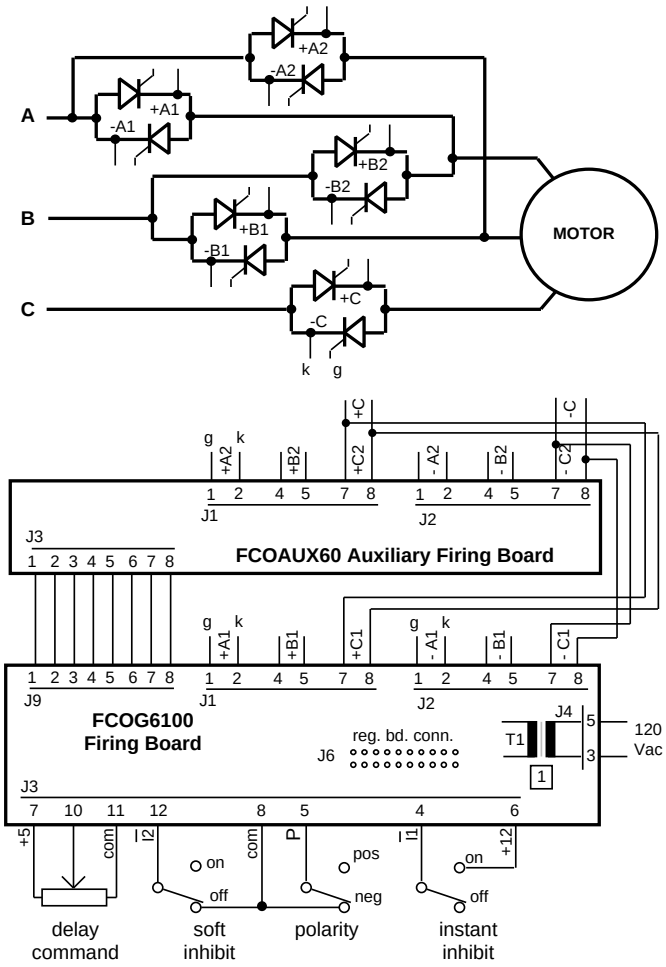
Design Features(re. circuit #16):
- Reduced thyristor RMS current.
- Triplen harmonics in load current (but not in mains current).

Applications:
- Transformer primary control.
- Solid -state reduced voltage motor starter.

Firing Board Setup:
- 0° phase references.
- 120° burst gating.
- 5° to 175° delay angle range.
- Phase references from ac mains.
- 24 Vac external board power.

Firing Board Options:
- Consult factory.

18. 6-Thyristor Inside-The-Neutral AC Controller



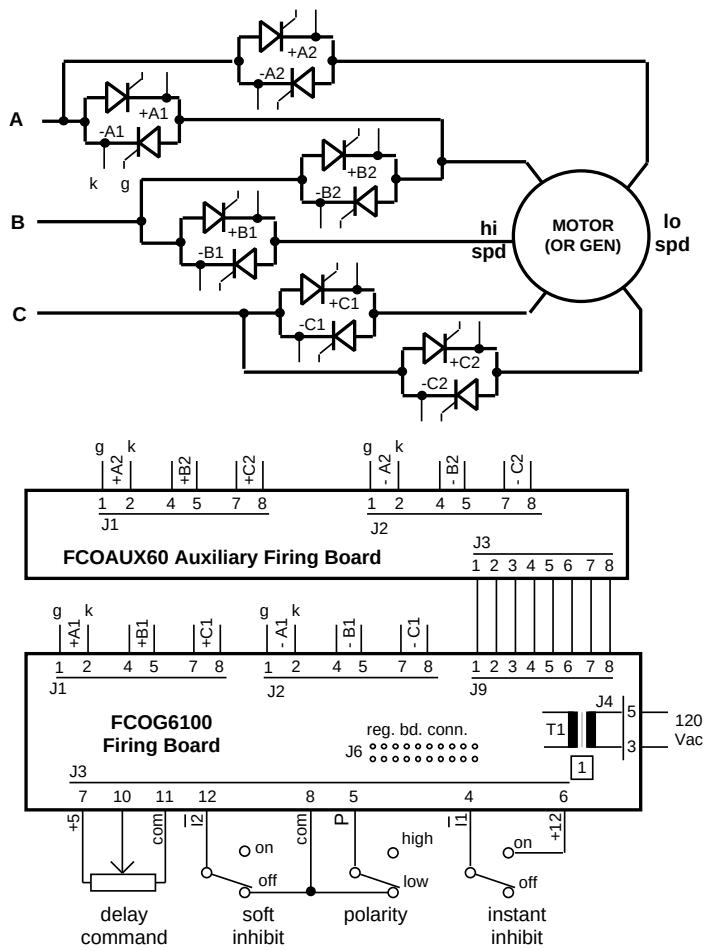
Design Feature:
- Sequence reversing control with one delay angle determinator and ten thyristors.

Applications:
- Reversing Soft-Start Control
- Linear Motor Thrust Control

Firing Board Setup:
- 0° phase references.
- Cut +12V trace to J3-5.
- 5° to 150° delay angle range.
- Phase references from thyristor cathodes.

Firing Board Options:
1. T1 energized from thyristor input voltage(omit J4).
2. other - consult factory.

19. Reversing AC Motor Controller



Design Feature:
- pole changing control with one delay angle detererminator.

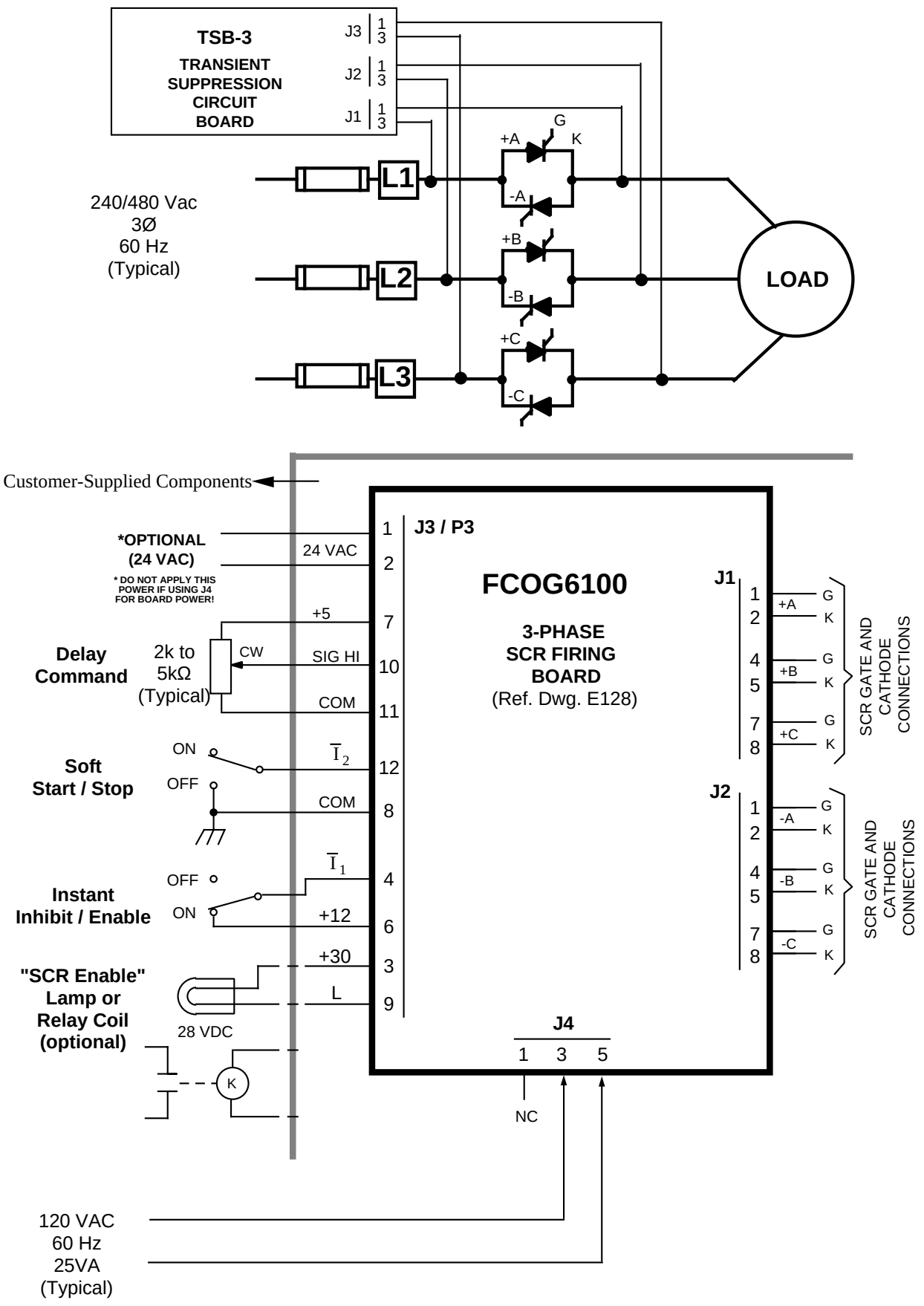
Applications:
- Two speed motor soft-start and soft-transition.
- Two speed induction generator soft-connection.
- Transformer tap changer.

Firing Board Setup:
- 0° phase references.
- Cut +12V trace to J3-5.
- 5° to 150° delay angle range.
- Phase references from thyristor cathodes.

Firing Board Options:
1. T1 energized from thyristor cathodes(omit J4).
2. other- consult factory.

20. 2-Speed Motor(or generator) Controller

Typical AC Controller



Typical DC Converter