



IDI350/IDI250/IDI175
Ignition Booster

Version 1.4

25-Sep-2016

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Ensure this manual is read and understood before fitting the IDI high power ignition. Failing to follow this manual could cause damage to the engine or ignition system.

Document contains:

- Installation Checklist (Complete before powering device)
- Informational Notes
- Installation Notes
- Wiring Diagrams

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INSTALLATION CHECKLIST

Ensure the following criteria are met before powering the device.

Mounting

- Device is protected from exposure to moisture and water.
- Device is NOT located near any heat sources.
- Device is located somewhere it can dissipate heat.
- Vents on the front and back of the device are not obstructed.
- Mounting minimizes vibration and shock on the device.

Ignition Settings

- ECU firing edge is set to falling.
- Dwell is shorter than 5ms, approximately 2 to 3ms is reasonable for most coils.
- Firing order is correct.

Wiring

Before working on wiring, ensure the battery and any battery chargers are disconnected.

- Coil (+) and (-) are twisted together with 1 turns per 25mm
- The correct number of outputs are wired to each coil:
 - 8 Coils - 1 output to each coil
 - 6 Coils - 1 outputs to each coil
 - 5 Coils - 1 outputs to each coil
 - 4 Coils - 2 outputs to each coil
 - 3 Coils - 2 outputs to each coil
 - 2 Coils - 4 outputs to each coil
 - 1 Coil - 8 outputs to the one coil
- Relay is rated at a minimum of 40 Amps.
- Fuse is rated for 30 Amps. Do NOT use a larger fuse.

Components

- Coils are NOT CDI coils, and are greater than 0.5 ohms, and greater than 6 mH.
- Spark plugs are NOT resistor plugs, and have at least 0.75mm gap.
- Ignition leads are spiral wound.

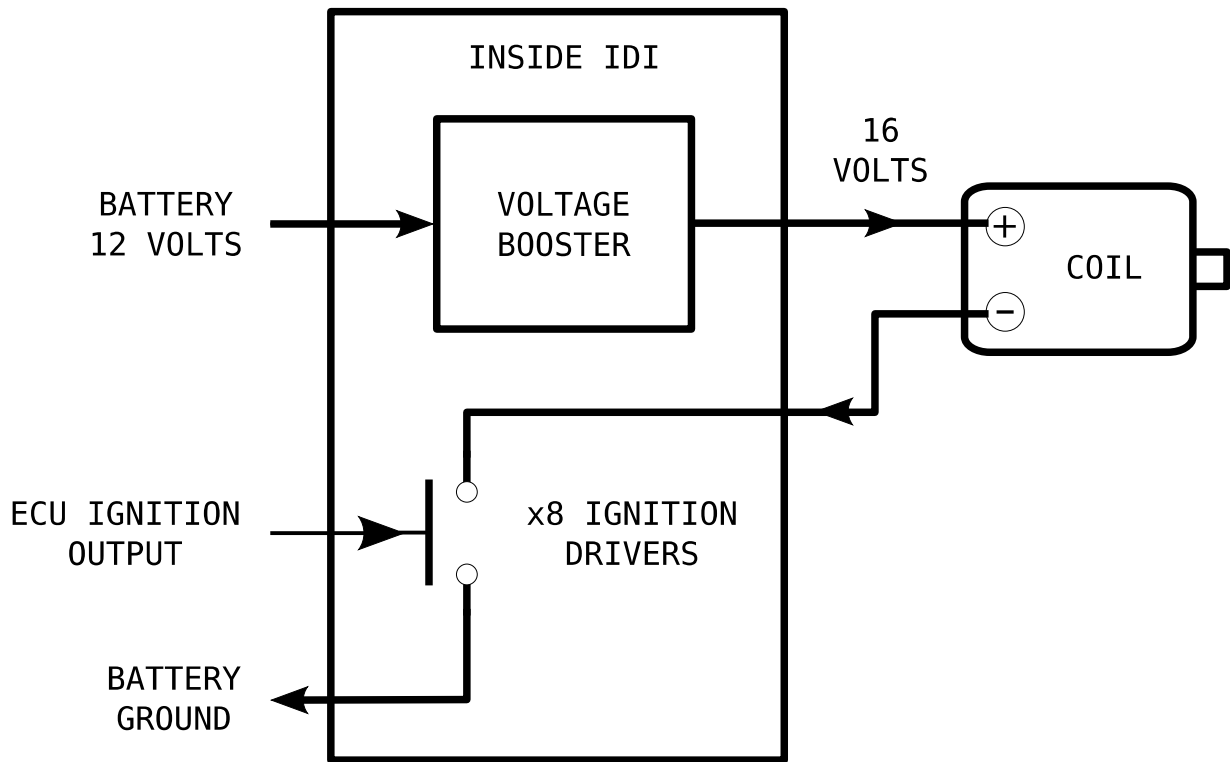
INFORMATIONAL NOTES

Principle of operation

The aim of the IDI is to provide a stronger spark to the spark plug, it does this by driving 16 volts on the coil rather than the standard 12 volts from a battery. The IDI achieves this by boosting the 12 volts from the battery. When keeping a consistent 16 volts on the coils, even when the electrical system is under load, allows for a strong and consistent spark.

The IDI functions in a similar fashion to an ignitor, except that it boosts the voltage on the coils in order to provide a stronger spark with the same dwell.

The IDI350 has a soft current limit of 35 Amps, the IDI250 has a soft current limit of 25 Amps, and the IDI175 has a soft current limit of 17.5 Amps. All models have 8 ignition coil drivers.



A Block Diagram of the IDI system

In comparison with a CDI

This device works differently to a CDI. A CDI applies a very large voltage to the coil when it sees a firing edge, this results in a brief high voltage spark. The IDI builds a large current through the coils within the time set by the dwell, this results in a longer spark duration and a hot spark when compared to a CDI.

A CDI uses approximately 500 volts to charge the coil instantly, this can create issues with insulation and arcing in the wiring and coil primaries. The IDI uses 16 volts on the coils and uses the dwell time to charge the coil, this means there are less issues with insulation and arcing.

A CDI has one coil per output and these outputs usually need to be wired in a specific arrangement, such as odd/even configurations. The IDI's outputs are independent of each other and do not need this configuration, they are instead wiring in parallel to share load current.

INSTALLATION NOTES

1) Mounting Considerations

- a) Keep the device away from moisture and water, this is because if water or excessive moisture gets inside the box, damage to the internal electronics will occur.
- b) Ensure the device is kept away from any heat sources, the device should be kept as cool as possible, to prevent internal damage to the electronics.
- c) Mount the device in a cool location, the device will internally generate heat that it will need to dissipate.
- d) The vents on the front and back of the box should never be obstructed or blocked, the device needs these vents to pass air through the internals of the box, without this, damage could occur to the electronics within the box.
- e) Consideration should be placed on minimizing shock and vibration that the device receives.

2) Ignition Settings

- a) The ECU firing edge must be set to a falling edge, if it is set to a rising edge then damage will occur to the coils and the device.
- b) One method of checking that the firing edge is rising:
 - If fitted, unplug the IDI from its wiring harness.
 - Turn the ignition on, to power the ECU.
 - Check the ECU ignition outputs or the IDI's trigger inputs, with a multimeter or test-light.
 - If there is a voltage greater than 1V or the test-light turns on, then the firing edge is rising and should be changed to falling before connecting the IDI.
- c) Ensure the dwell is not longer than 5ms, excessive dwell will overheat and damage the coils and the device, 2ms is a reasonable dwell setting for most coils.

3) Wiring

- a) There are 8 outputs in the device, and depending on how many coils are in the ignition setup, will determine how many outputs are used per coil:
 - 8 Coils - 1 output to each coil
 - 6 Coils - 1 outputs to each coil
 - 5 Coils - 1 outputs to each coil

- 4 Coils - 2 outputs to each coil
- 3 Coils - 2 outputs to each coil
- 2 Coils - 4 outputs to each coil
- 1 Coil - 8 outputs to the one coil

This is done to share the load across all ignition channels.

- b) Ensure the fuse is rated for 30 Amps, do NOT use a fuse larger than 30 Amps, if the fuse blows it indicates that something is wrong with the wiring or components and this should be double checked for any faults. Putting in a fuse larger than 30 Amps will damage the ignition system.
- c) The relay that switches power on and off the device needs to be rated for at least 40 Amps, to prevent the relay contacts from melting and causing damage to the wiring.
- d) Twist the coil (+) and (-) wires together for each channel, to prevent electrical interference.

4) Recommended Components

- a) Coil selection is critical. The minimum specifications for ignition coils to use with the device are:

- Resistance: Greater than 0.5 ohms
- Inductance: Greater than 6 mH

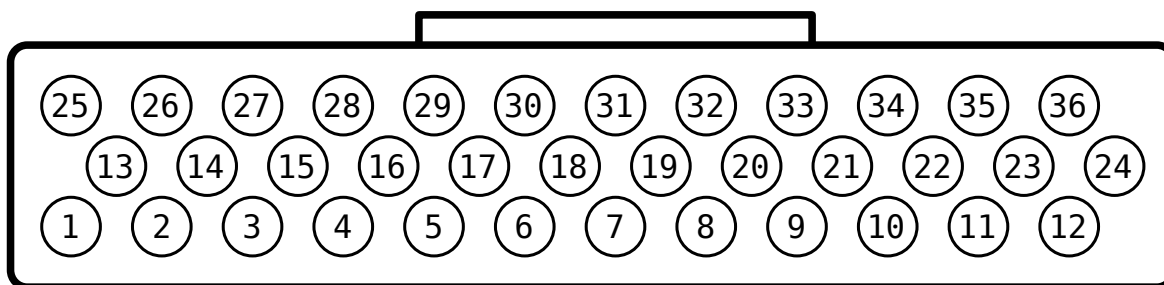
If uncertain of coil specifications, contact EMS support.

Coils with lower inductance, such as CDI coils, will cause engine damage.

The IDI can also be used with coils that have inbuilt ignitors, refer to the drawing at the end of the manual.

- b) Ignition leads should be spiral wound to prevent interference with other electronics, preferably 1500 ohms per foot or greater.
- c) Spark plugs should not be resistor plugs, this is because the resistance within the plug will waste energy in the form of heat rather than deliver that energy to the spark.
- d) Spark plugs should have a gap of at least 0.75mm or more.

IDI CONNECTOR PINOUT



VIEWING
WIRE
SIDE
OF
LOOM
PLUG

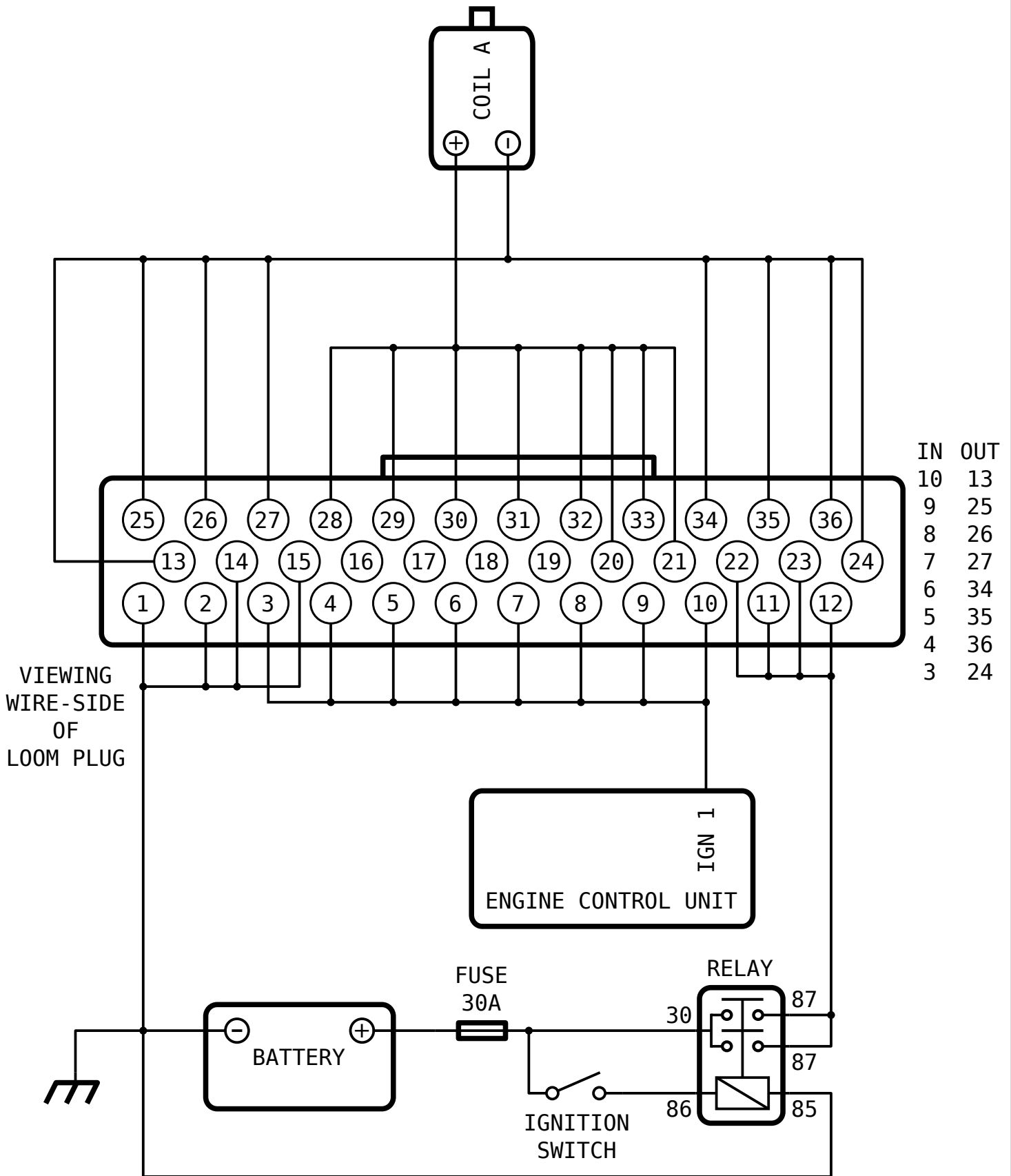
PIN	COLOUR	FUNCTION	CONNECT TO-
1	BLACK	GROUND	ENGINE BLOCK GROUND
2	BLACK	GROUND	ENGINE BLOCK GROUND
3	PINK	INPUT H	TRIGGER FOR OUTPUT H
4	PINK	INPUT G	TRIGGER FOR OUTPUT G
5	PINK	INPUT F	TRIGGER FOR OUTPUT F
6	PINK	INPUT E	TRIGGER FOR OUTPUT E
7	PINK	INPUT D	TRIGGER FOR OUTPUT D
8	PINK	INPUT C	TRIGGER FOR OUTPUT C
9	PINK	INPUT B	TRIGGER FOR OUTPUT B
10	PINK	INPUT A	TRIGGER FOR OUTPUT A
11	RED	POWER	12V POWER IN
12	RED	POWER	12V POWER IN
13	GREEN	OUTPUT A	COIL A NEGATIVE
14	BLACK	GROUND	ENGINE BLOCK GROUND
15	BLACK	GROUND	ENGINE BLOCK GROUND
16	---	---	---
17	---	---	---
18	---	---	---
19	---	---	---
20	WHITE	SUPPLY	16V POWER OUT, CONNECT TO COIL POSITIVE
21	WHITE	SUPPLY	16V POWER OUT, CONNECT TO COIL POSITIVE
22	RED	POWER	12V POWER IN
23	RED	POWER	12V POWER IN
24	GREEN	OUTPUT H	COIL H NEGATIVE
25	GREEN	OUTPUT B	COIL B NEGATIVE
26	GREEN	OUTPUT C	COIL C NEGATIVE
27	GREEN	OUTPUT D	COIL D NEGATIVE
28	WHITE	SUPPLY	16V POWER OUT, CONNECT TO COIL POSITIVE
29	WHITE	SUPPLY	16V POWER OUT, CONNECT TO COIL POSITIVE
30	WHITE	SUPPLY	16V POWER OUT, CONNECT TO COIL POSITIVE
31	WHITE	SUPPLY	16V POWER OUT, CONNECT TO COIL POSITIVE
32	WHITE	SUPPLY	16V POWER OUT, CONNECT TO COIL POSITIVE
33	WHITE	SUPPLY	16V POWER OUT, CONNECT TO COIL POSITIVE
34	GREEN	OUTPUT E	COIL E NEGATIVE
35	GREEN	OUTPUT F	COIL F NEGATIVE
36	GREEN	OUTPUT G	COIL G NEGATIVE

TITLE IDI PINOUT

DATE 25-Sep-2016

REV 2

1 COIL DISTRIBUTOR WIRING DIAGRAM

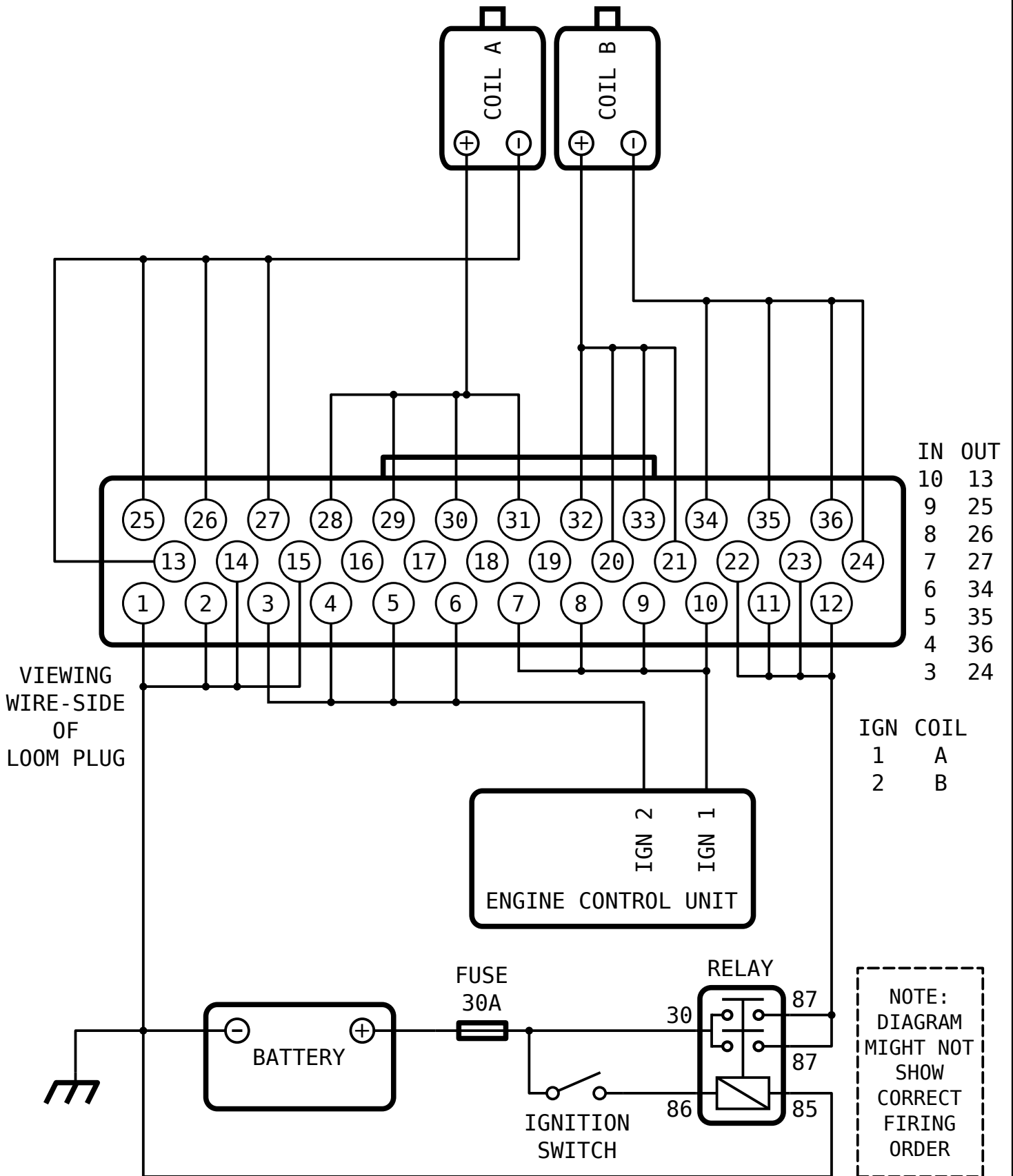


WARNING: ENSURE INSTALLATION CHECKLIST IS COMPLETED BEFORE POWERING THE CIRCUIT.

TITLE IDI 1COIL DST

DATE 25-Jun-2015 REV 2

2 CYLINDER 2 COIL GROUP FIRE WIRING DIAGRAM

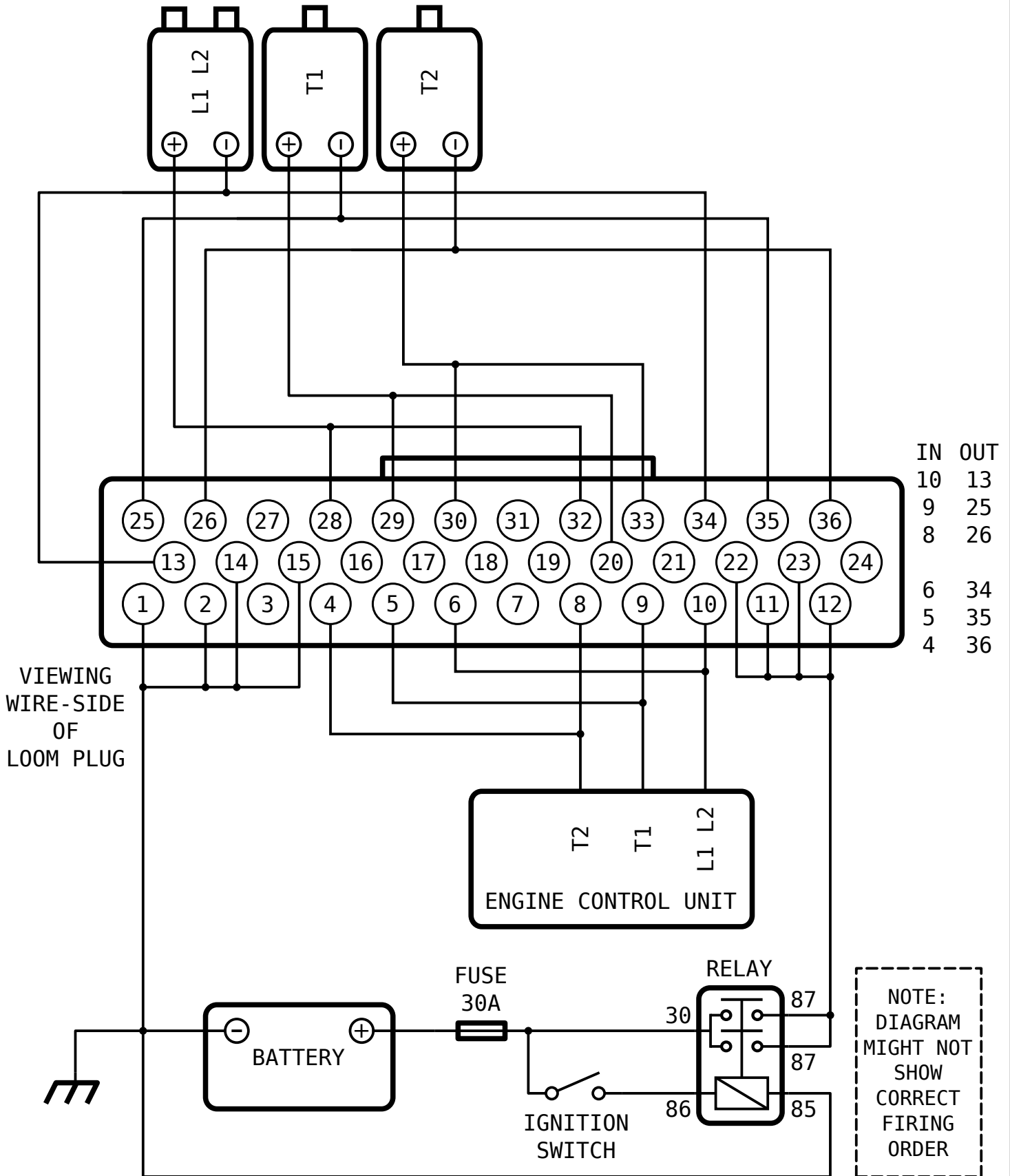


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TITLE IDI 2CYL 2COIL SEQ

DATE 25-Jun-2015 REV 2

2 ROTOR 3 COIL SEQUENTIAL WIRING DIAGRAM

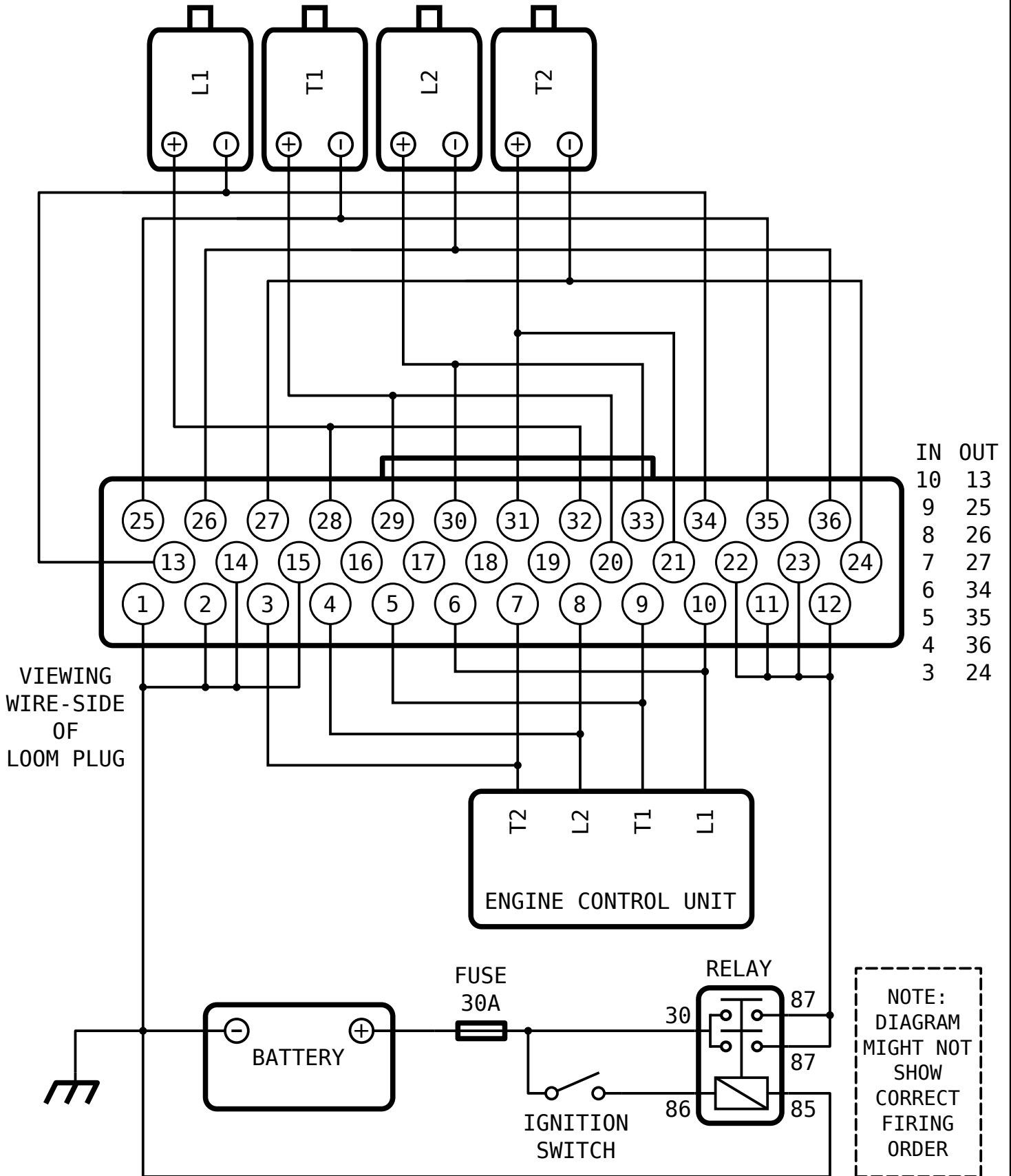


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TITLE IDI 2RTR 3COIL SEQ

DATE 25-Jun-2015 REV 2

2 ROTOR 4 COIL SEQUENTIAL WIRING DIAGRAM

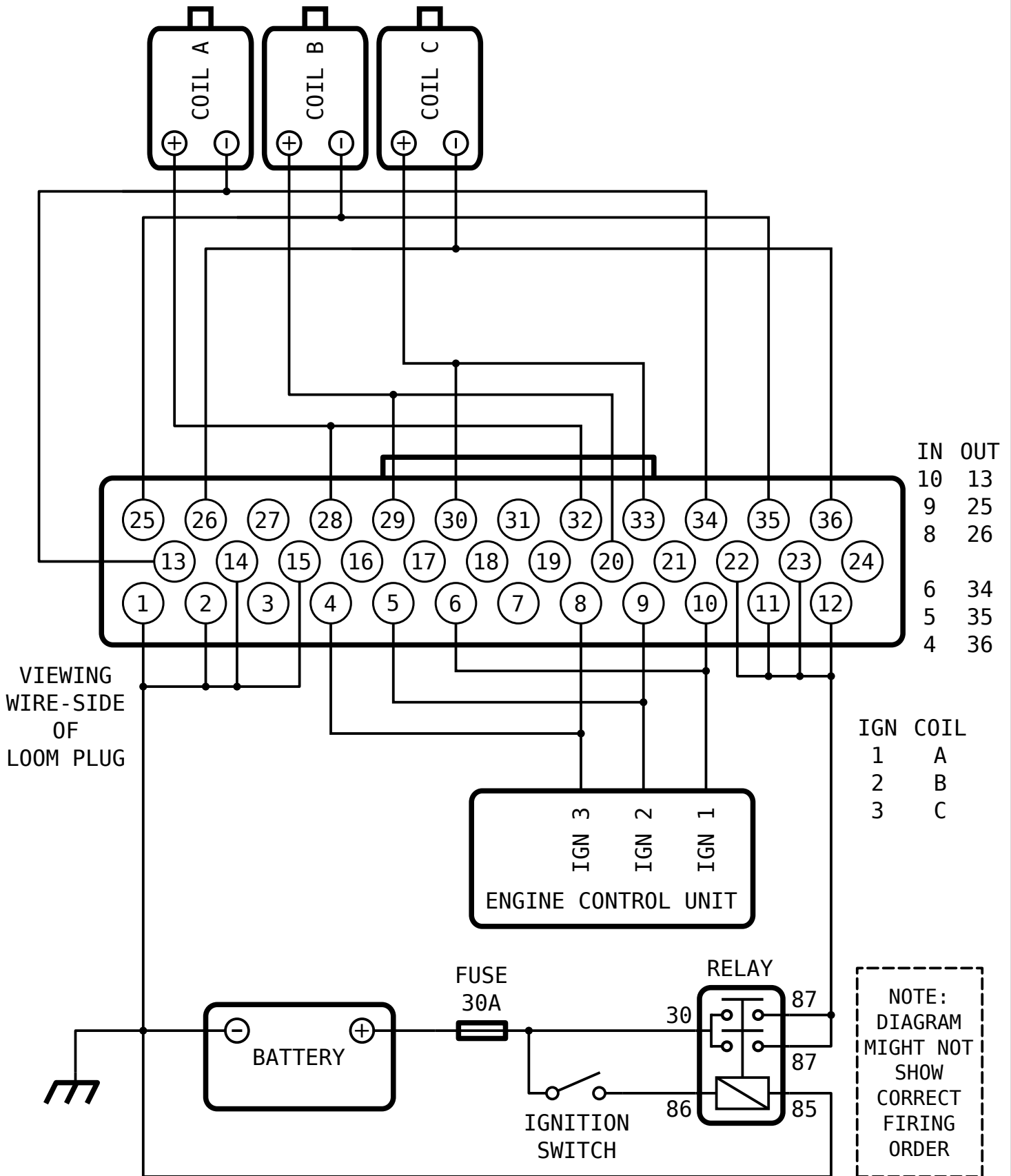


WARNING: ENSURE INSTALLATION CHECKLIST IS COMPLETED BEFORE POWERING THE CIRCUIT.

TITLE IDI 2RTR 2COIL SEQ

DATE 25-Jun-2015 REV 2

3 CYLINDER 3 COIL SEQUENTIAL WIRING DIAGRAM

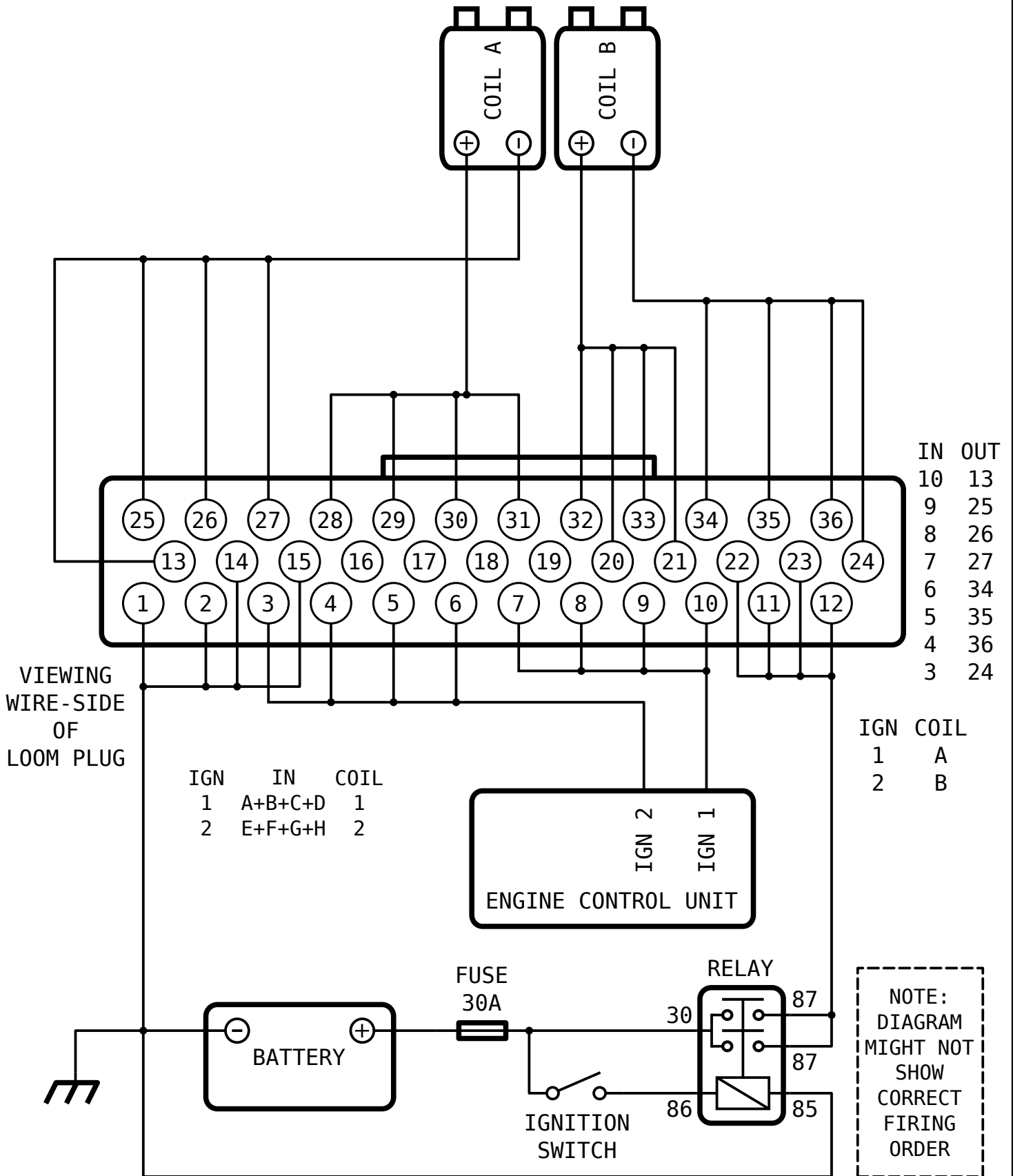


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TITLE IDI 3CYL 3COIL SEQ

DATE 25-Jun-2015 REV 2

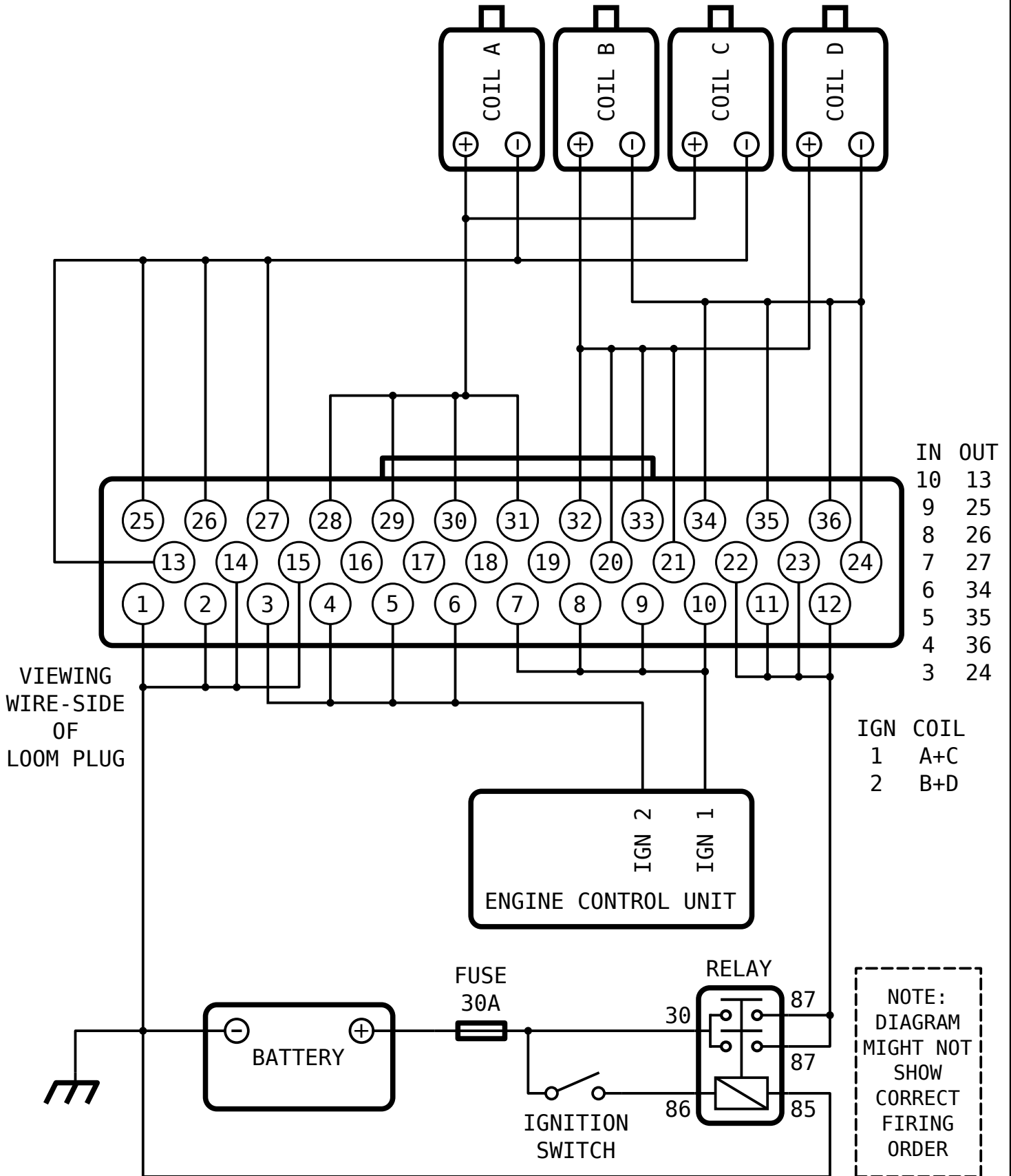
4 CYLINDER 2 COIL GROUP FIRE WIRING DIAGRAM



WARNING: ENSURE INSTALLATION CHECKLIST IS COMPLETED BEFORE POWERING THE CIRCUIT.

TITLE	IDI 4CYL 2COIL GRP		
DATE	25-Jun-2015	REV	2

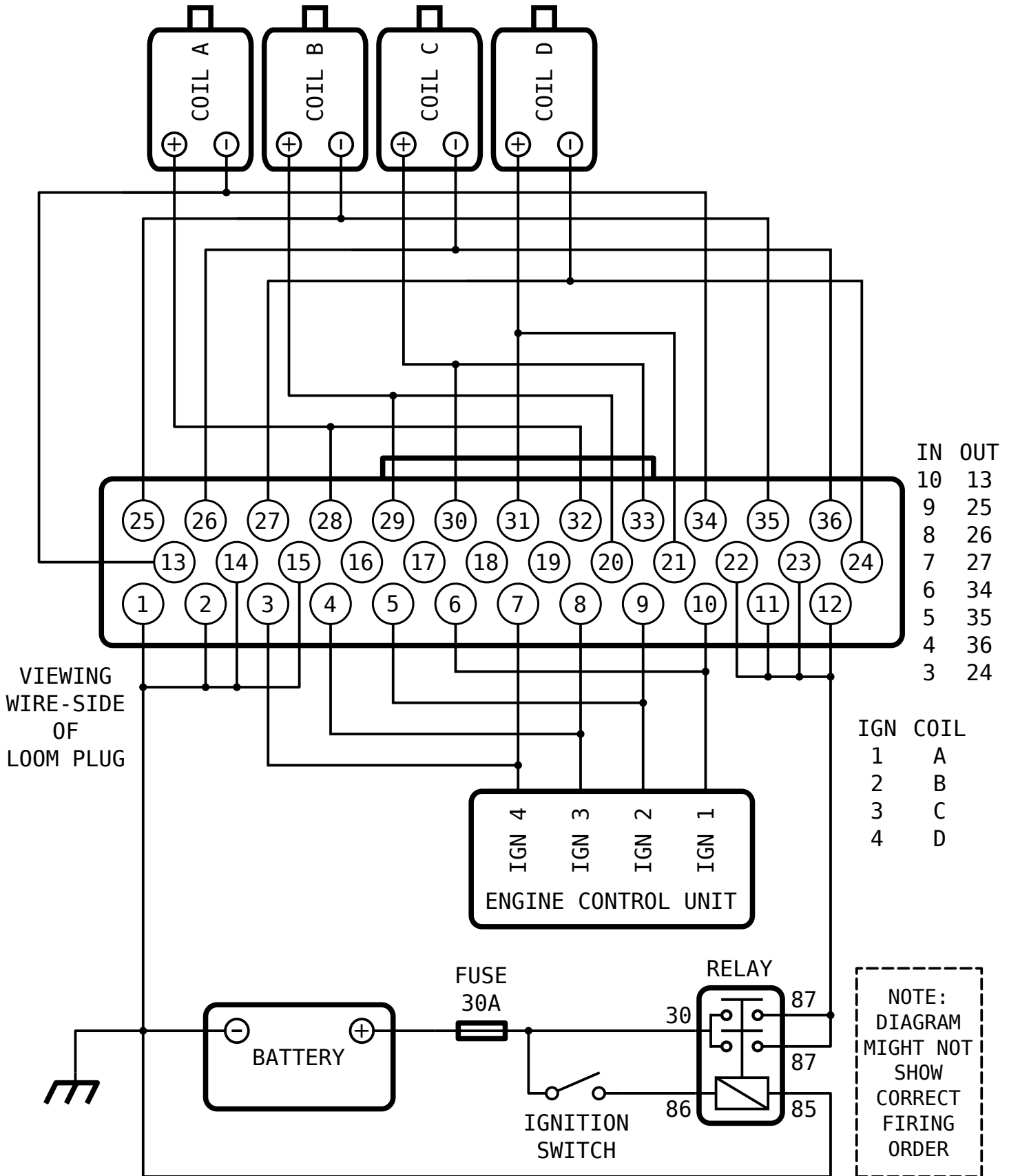
4 CYLINDER 4 COIL GROUP FIRE WIRING DIAGRAM



WARNING: ENSURE INSTALLATION CHECKLIST IS COMPLETED BEFORE POWERING THE CIRCUIT.

TITLE	IDI 4CYL 4COIL GRP		
DATE	25-Jun-2015	REV	2

4 CYLINDER 4 COIL SEQUENTIAL WIRING DIAGRAM

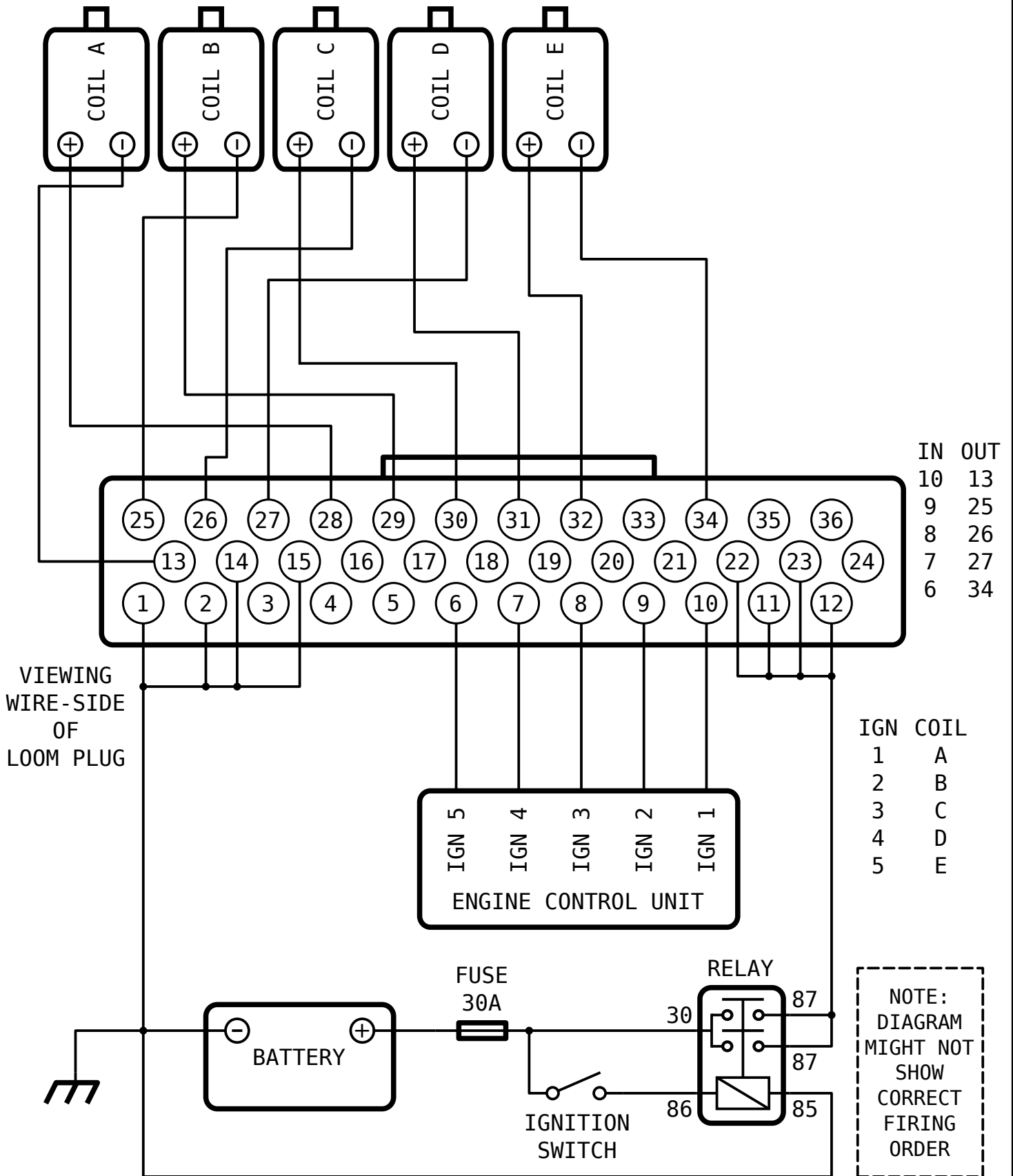


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TITLE IDI 4CYL 4COIL SEQ

DATE 25-Jun-2015 REV 2

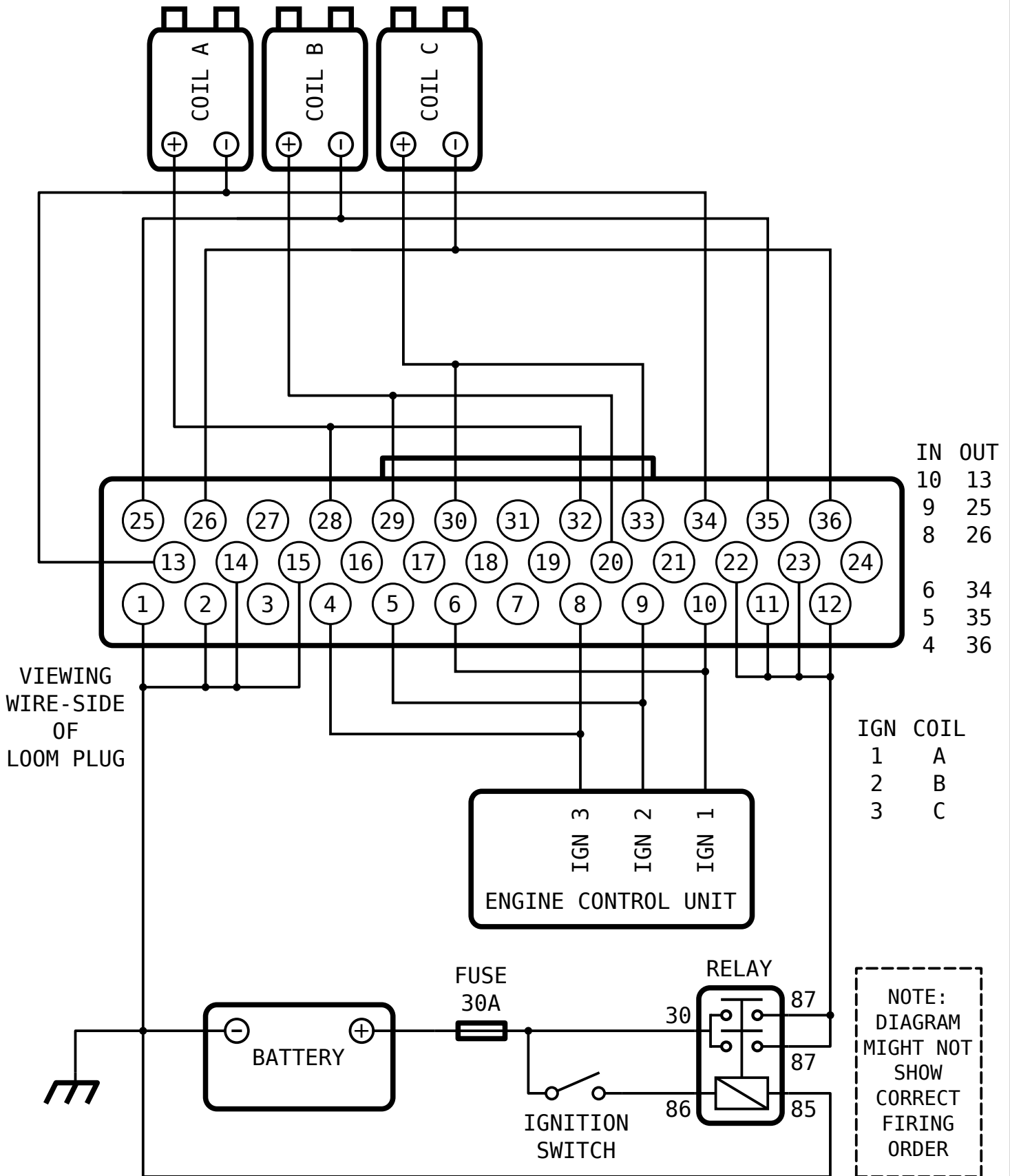
5 CYLINDER 5 COIL SEQUENTIAL WIRING DIAGRAM



WARNING: ENSURE INSTALLATION CHECKLIST IS COMPLETED BEFORE POWERING THE CIRCUIT.

TITLE	IDI 5CYL 5COIL SEQ		
DATE	25-Jun-2015	REV	2

6 CYLINDER 3 COIL GROUP FIRE WIRING DIAGRAM

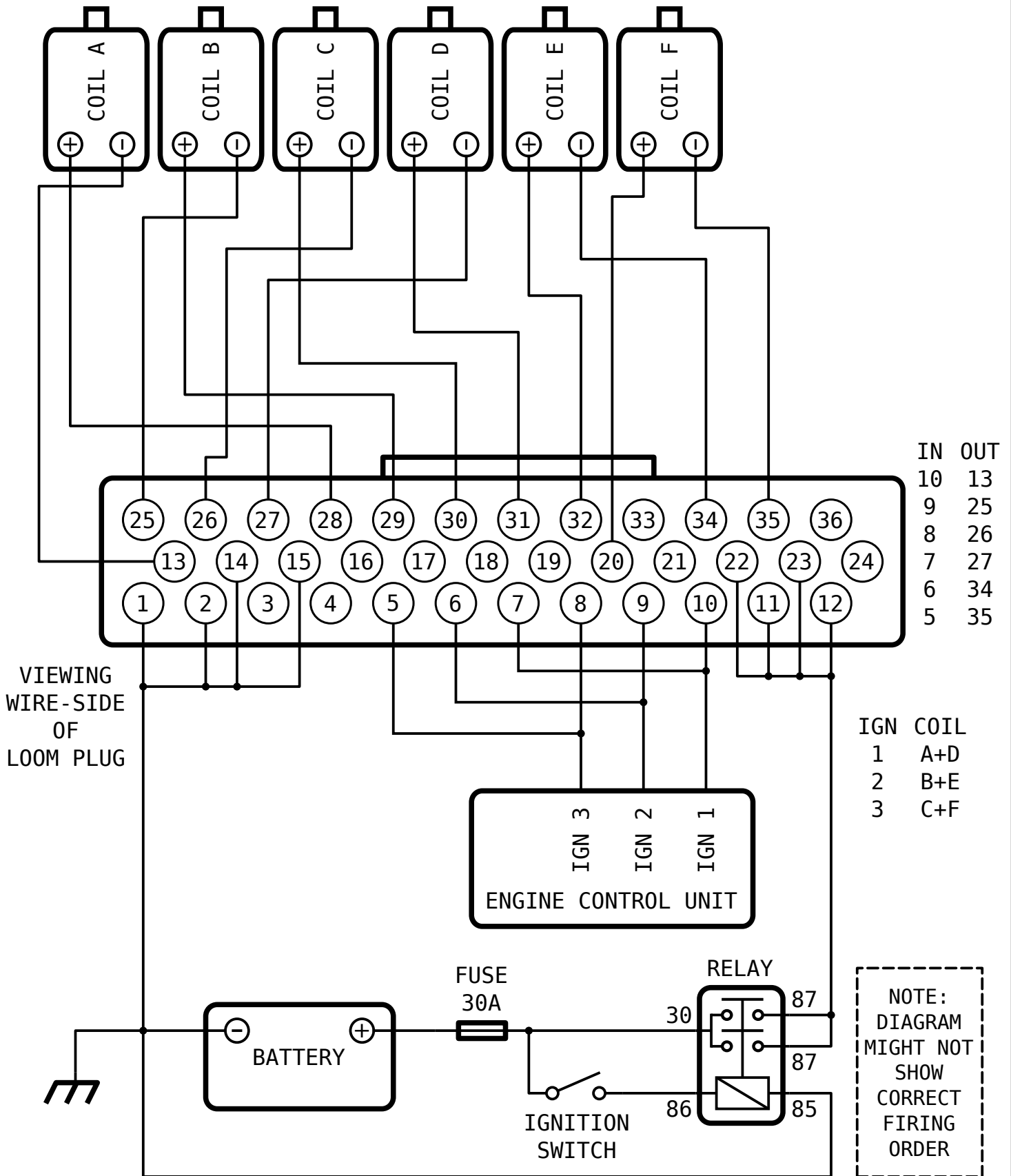


WARNING: ENSURE INSTALLATION CHECKLIST IS COMPLETED BEFORE POWERING THE CIRCUIT.

TITLE IDI 6CYL 3COIL GRP

DATE 25-Jun-2015 REV 2

6 CYLINDER 6 COIL GROUP FIRE WIRING DIAGRAM

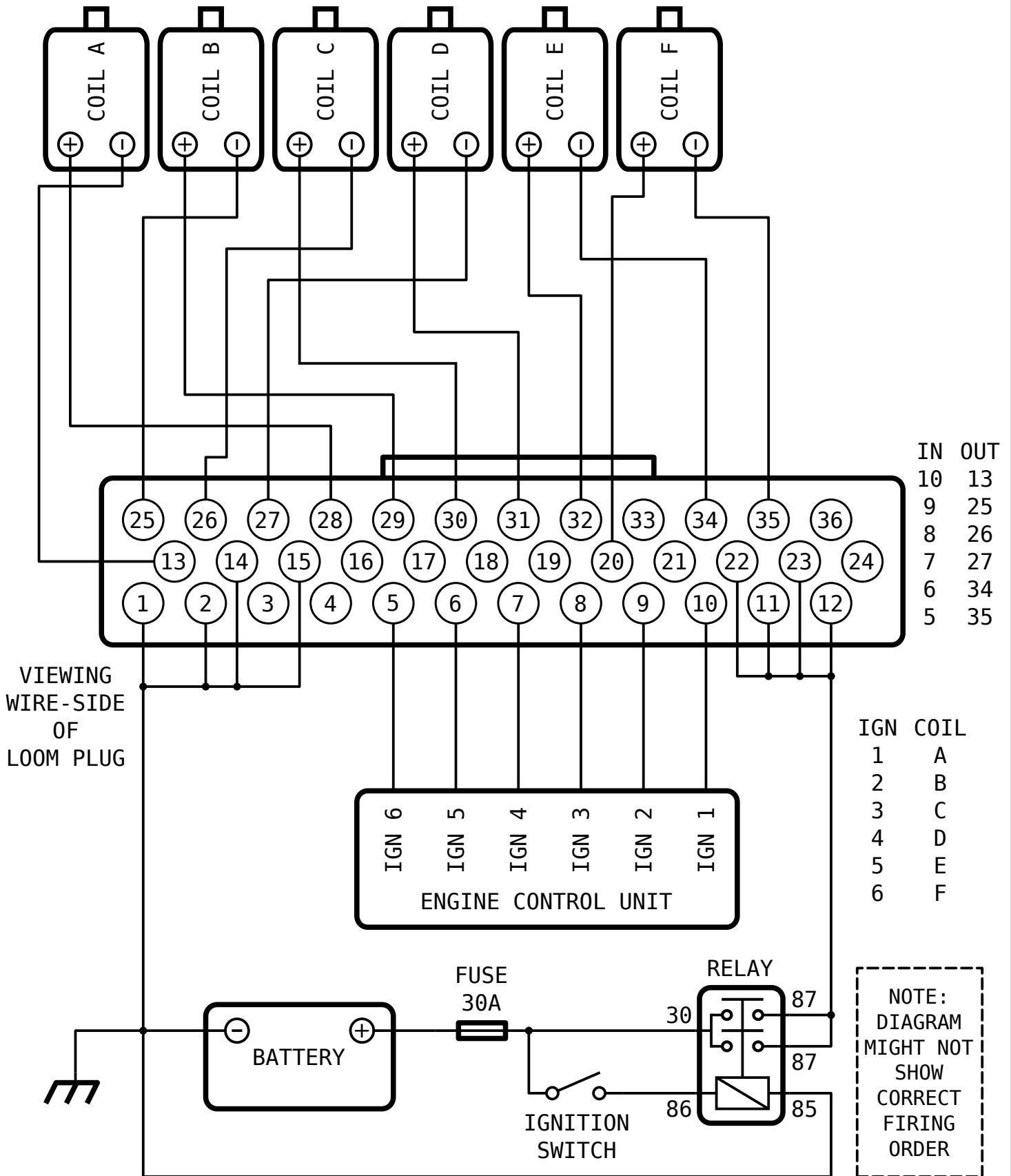


WARNING: ENSURE INSTALLATION CHECKLIST IS COMPLETED BEFORE POWERING THE CIRCUIT.

TITLE IDI 6CYL 6COIL GRP

DATE 25-Jun-2015 REV 2

6 CYLINDER 6 COIL SEQUENTIAL WIRING DIAGRAM

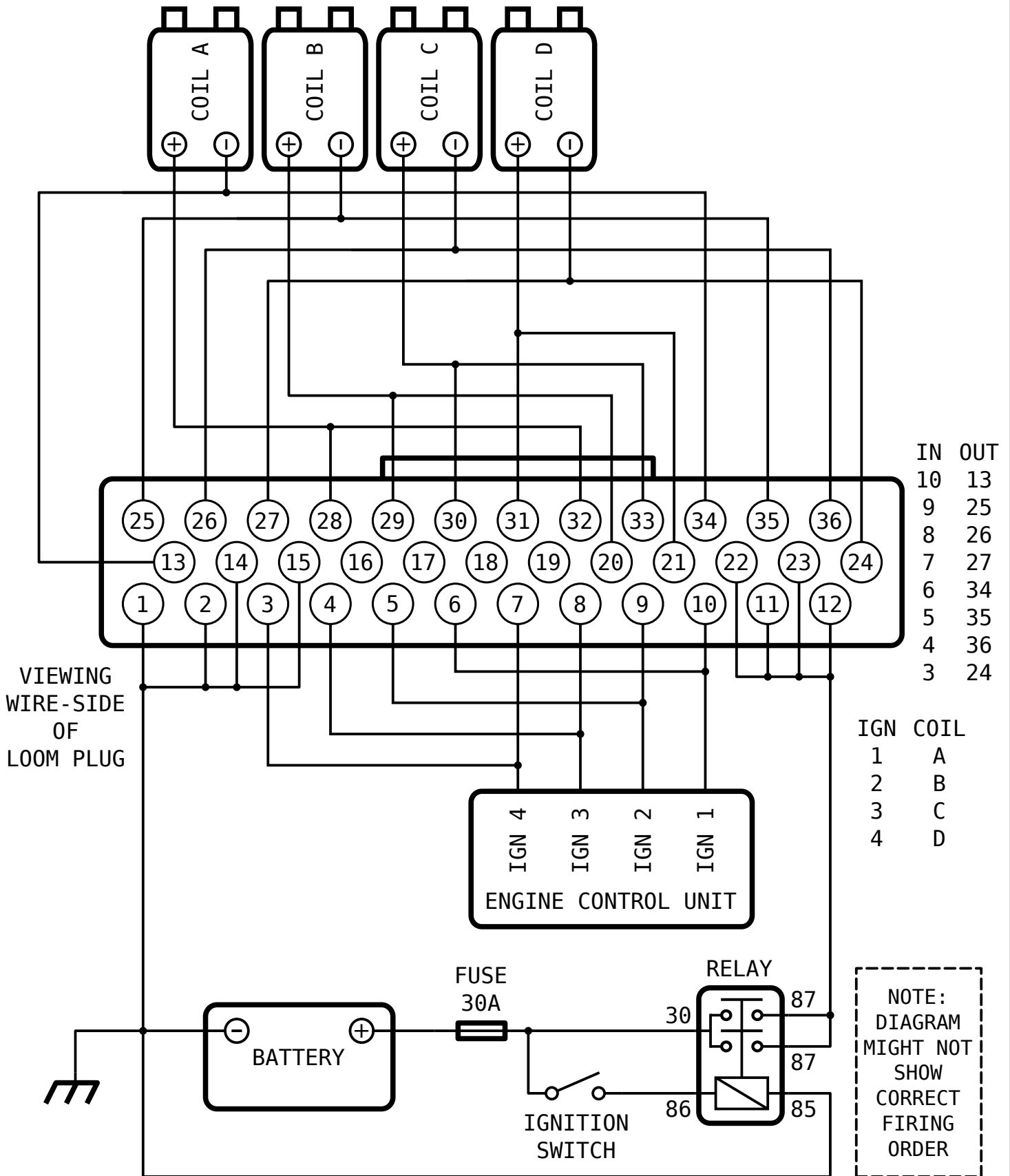


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TITLE IDI 6CYL 6COIL SEQ

DATE 25-Jun-2015 REV 2

8 CYLINDER 4 COIL GROUP FIRE WIRING DIAGRAM

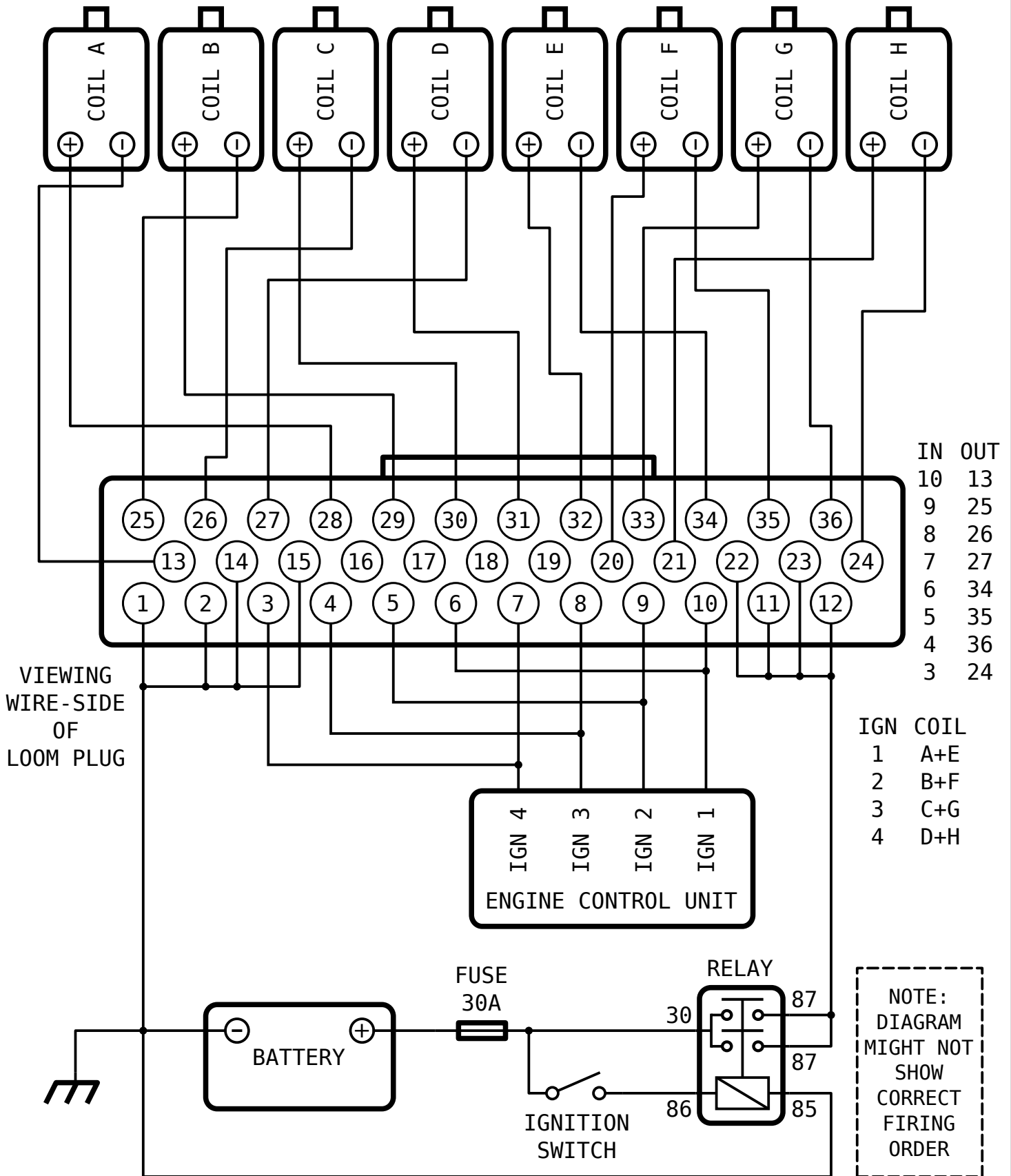


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TITLE IDI 8CYL 4COIL GRP

DATE 25-Jun-2015 REV 2

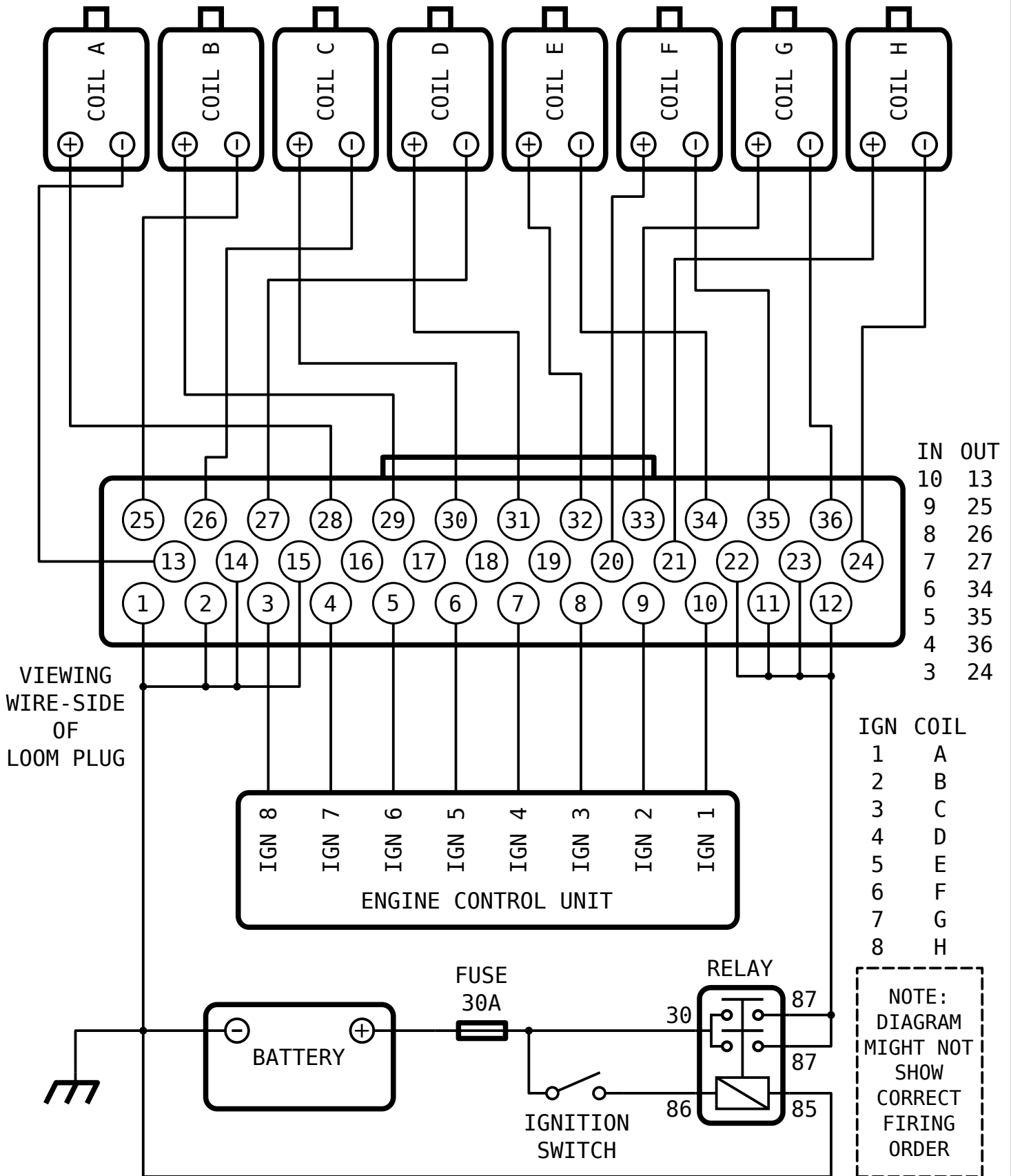
8 CYLINDER 8 COIL GROUP FIRE WIRING DIAGRAM



WARNING: ENSURE INSTALLATION CHECKLIST IS COMPLETED BEFORE POWERING THE CIRCUIT.

TITLE IDI 8CYL 8COIL GRP	
DATE 25-Jun-2015	REV 2

8 CYLINDER 8 COIL SEQUENTIAL WIRING DIAGRAM

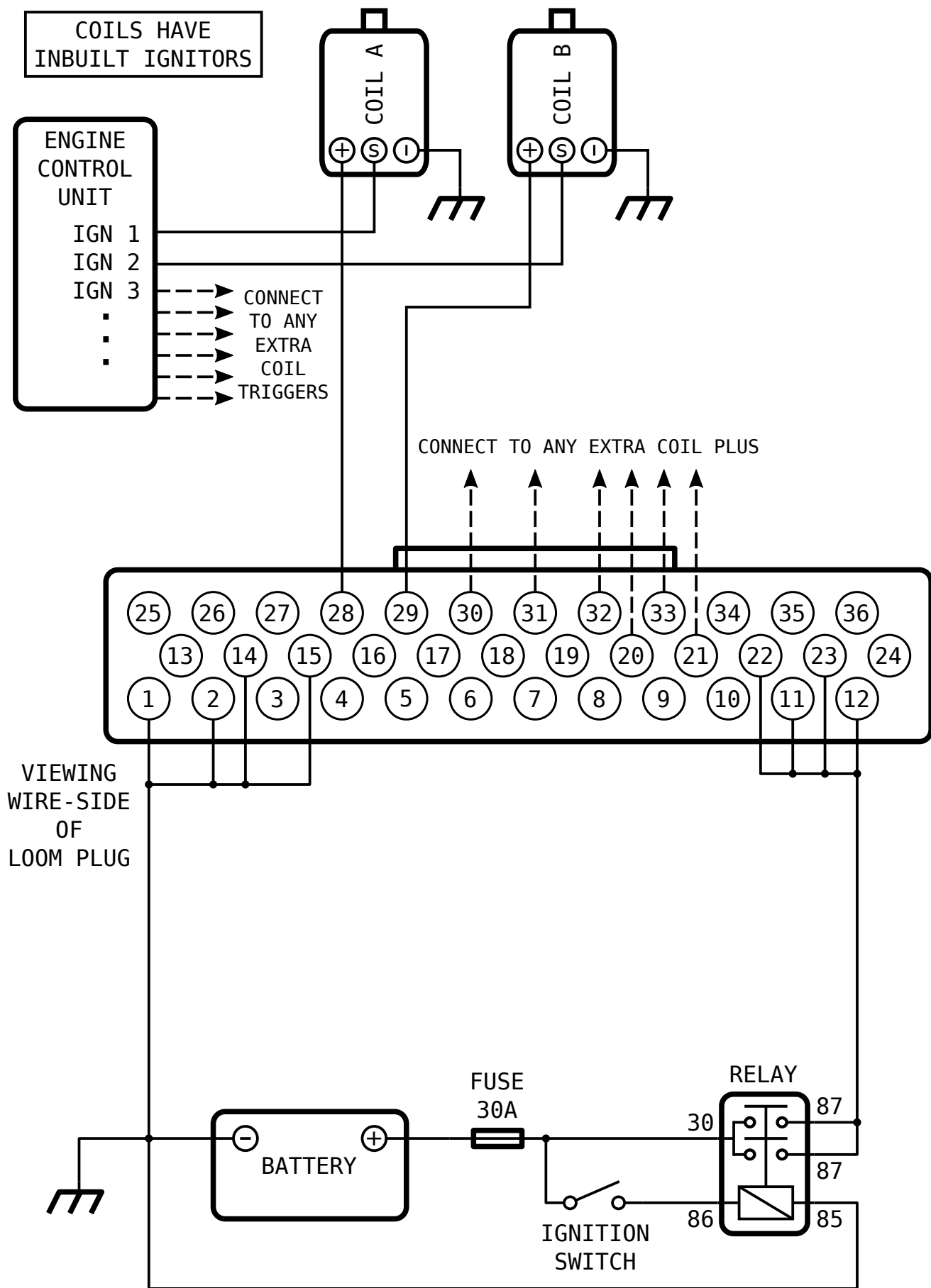


WARNING: ENSURE INSTALLATION CHECKLIST IS COMPLETED BEFORE POWERING THE CIRCUIT.

TITLE IDI 8CYL 8COIL SEQ

DATE 25-Jun-2015 REV 2

INBUILT IGNITOR WIRING DIAGRAM



WARNING: ENSURE INSTALLATION CHECKLIST IS COMPLETED BEFORE POWERING THE CIRCUIT.

TITLE	IDI EXT IGNITOR		
DATE	23-Jan-2016	REV	2