

42V PowerNet BATTERY CONNECTION

DESIGN PROPOSAL

Yazaki Corporation

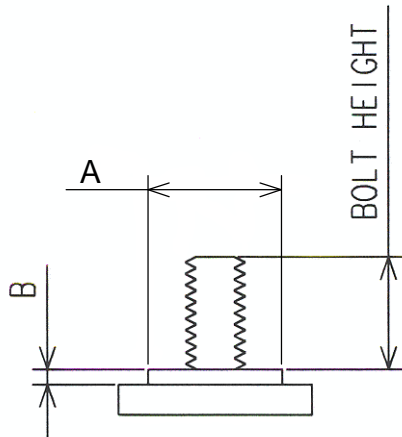
**Toyota Motor Corporation
Matsushita Battery Industrial Co., Ltd
Japan Storage Battery Co., Ltd
Sumitomo Wiring Systems, Ltd**

APRIL 13, 2000

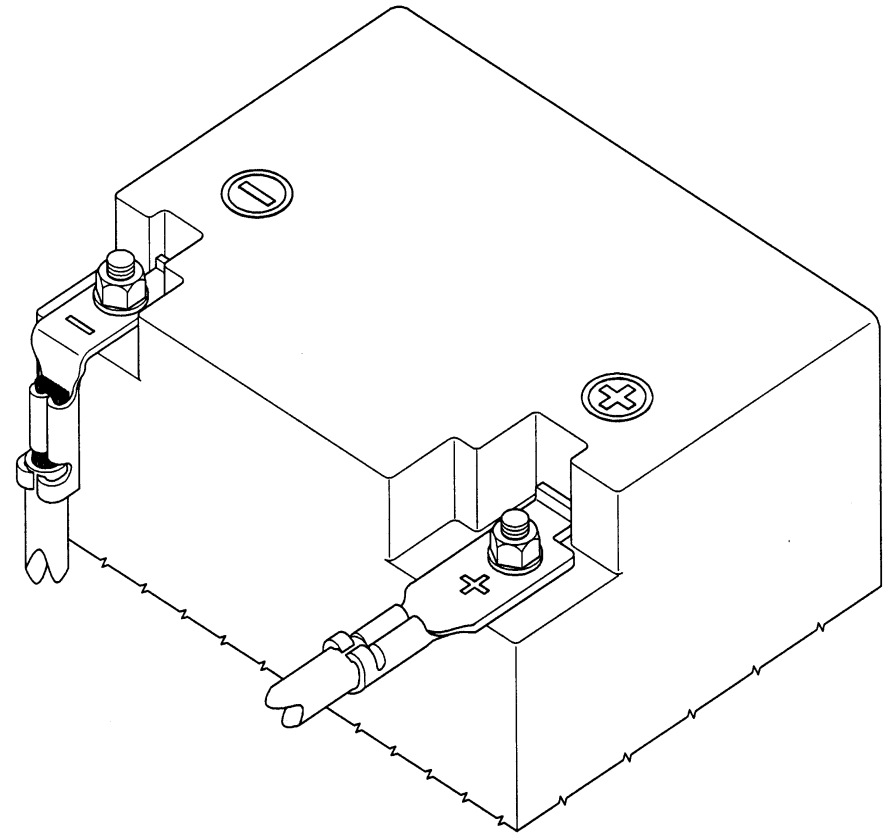


TERMINAL DESIGN

CONCEPT PROPOSAL



ITEM	PROPOSED
Stud Bolt Dia.	φ 8mm
Torque	14.7 N · m
A: Width	φ 18min.
B: Height	2.0 mm
Bolt Height	15.0 mm



**Bolt & terminal design provides a strong terminal to housing retention.
(C/H & C/W control crimp retention)**

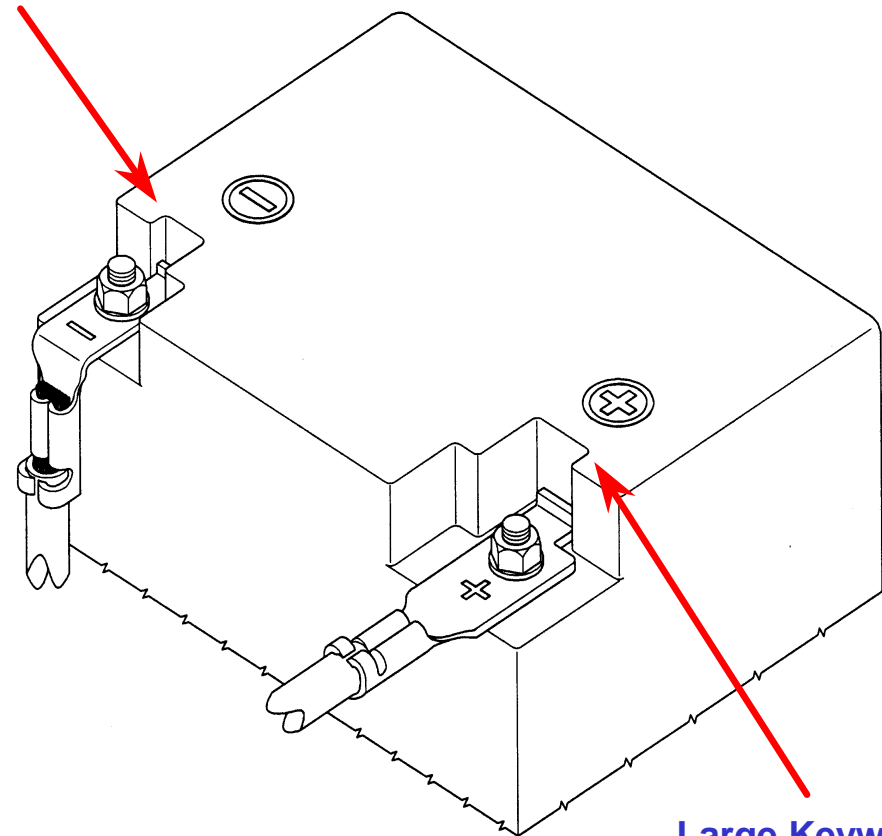
TERMINAL DESIGN

CONCEPT PROPOSAL

TERMINAL KEYWAY:

- ① Prevents reverse polarity connection
- ② Prevents incorrect voltage bus connection
- ③ Differentiates between battery technologies

Smaller Keyway
(ground)



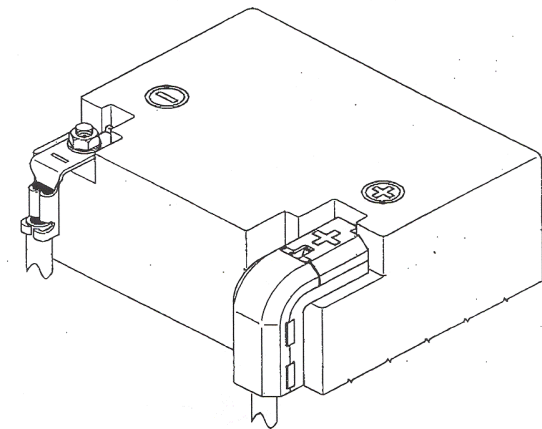
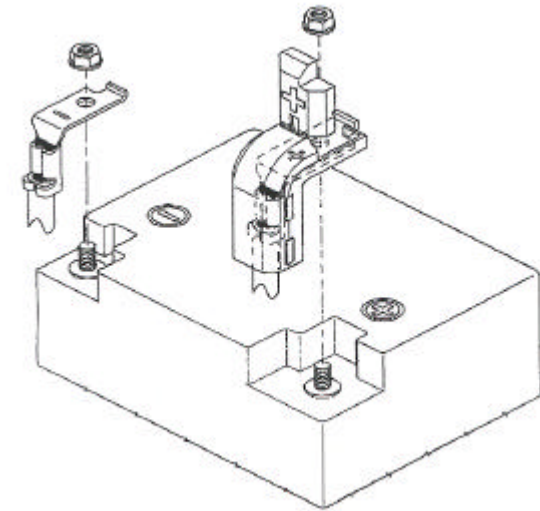
Large Keyway
(positive)

TERMINAL COVER

ELECTRICAL ACCESS PREVENTION

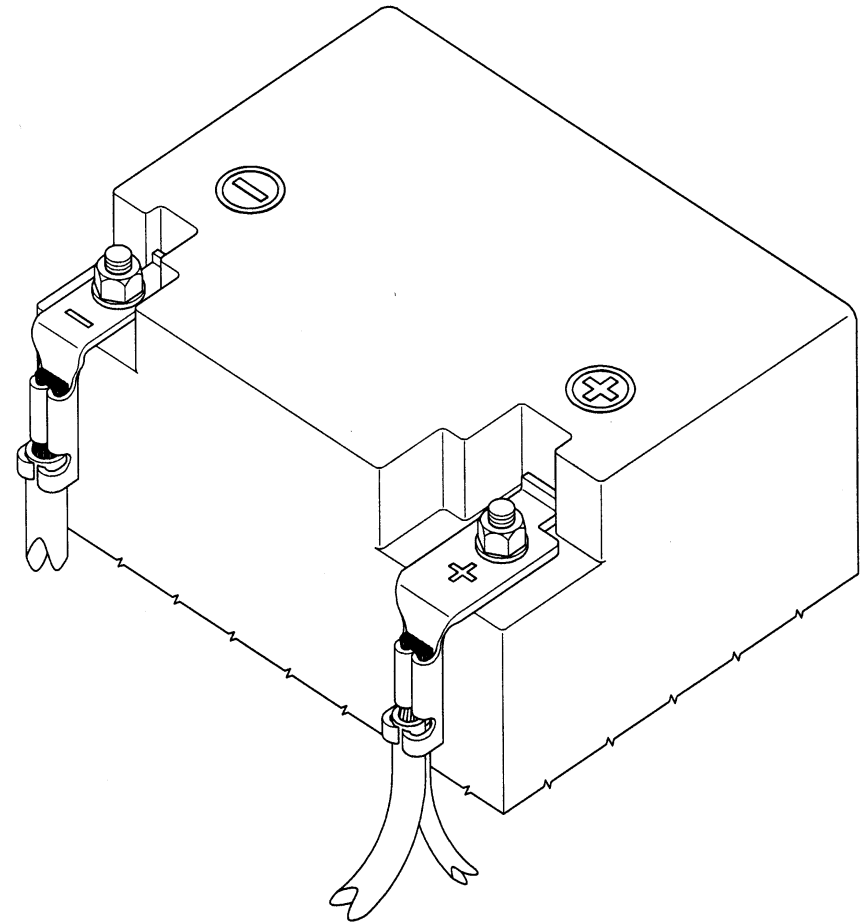
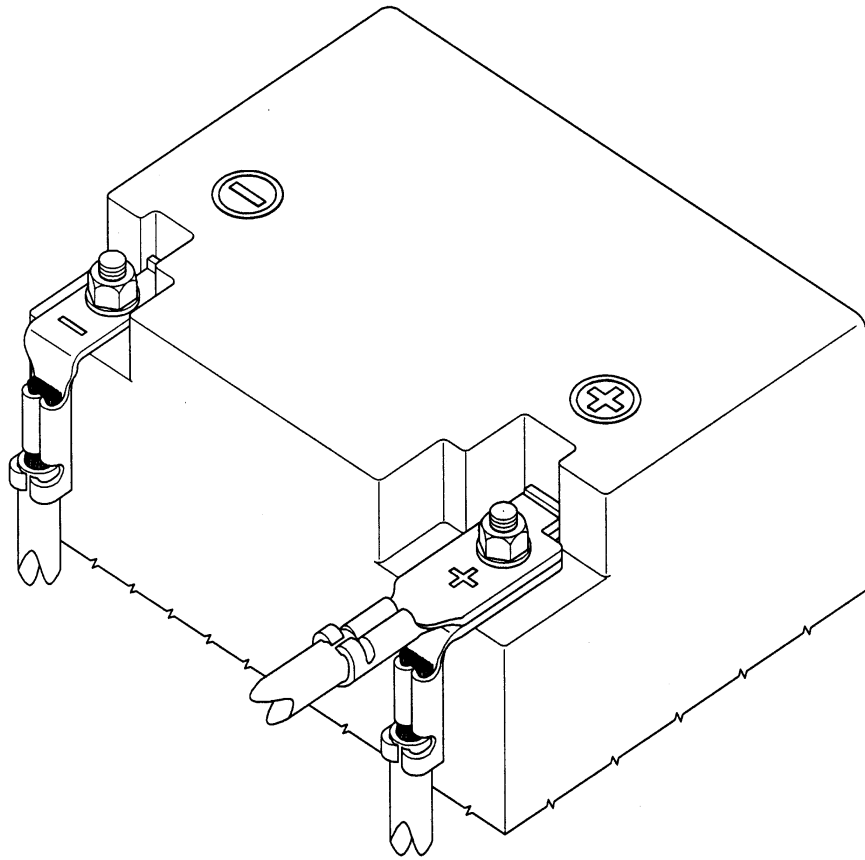
PLASTIC TERMINAL COVER:

- ① Prevents electrical shorts from simple metal tools (ex: wrenches, etc.)
- ② Prevents connection of “alligator” type jumper cables
- ③ Prevents electrical access when connected
- ③ Minimal terminal access when disconnected



MULTIPLE CONNECTIONS

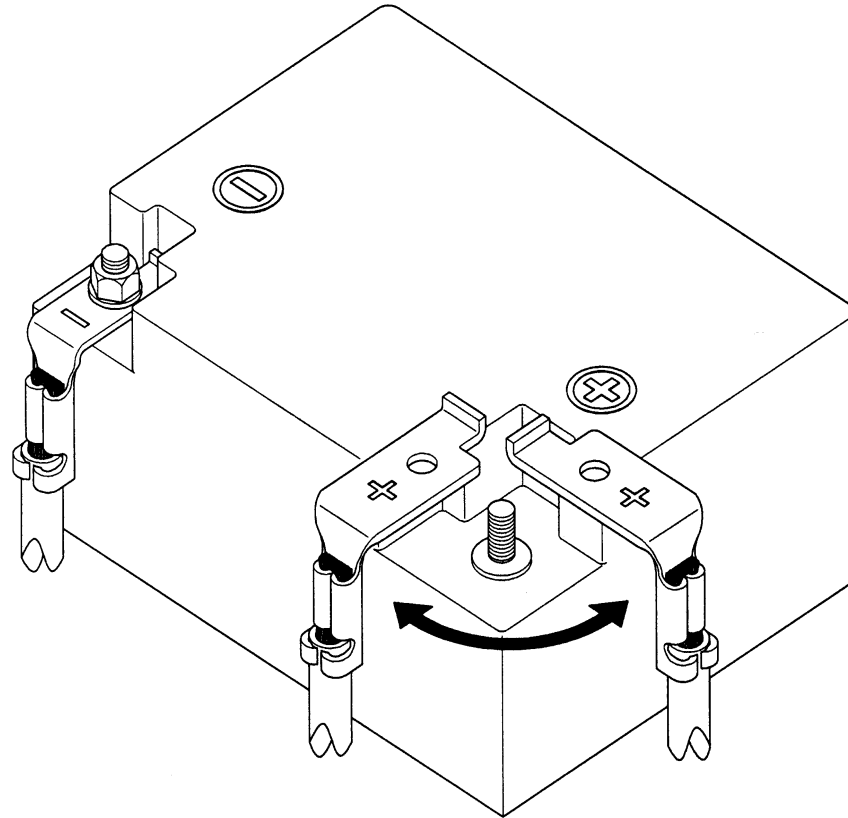
MULTIPLE CRIMPS AND/OR TERMINALS



Terminal design allows multiple crimps and/or multiple terminal connections to the battery post.

W/H ROUTING FREEDOM

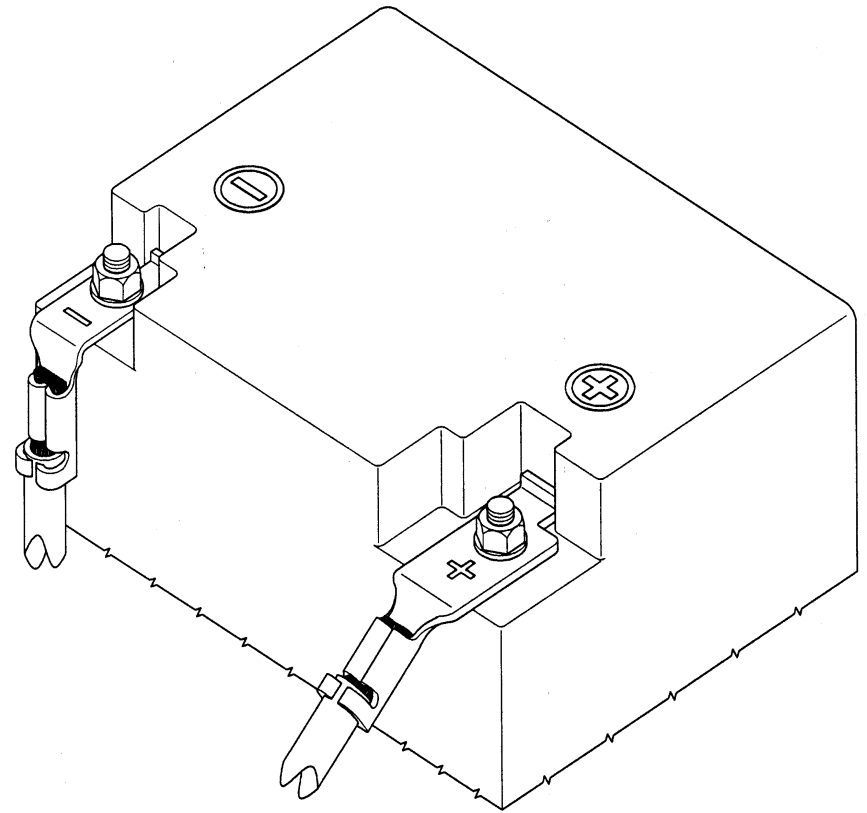
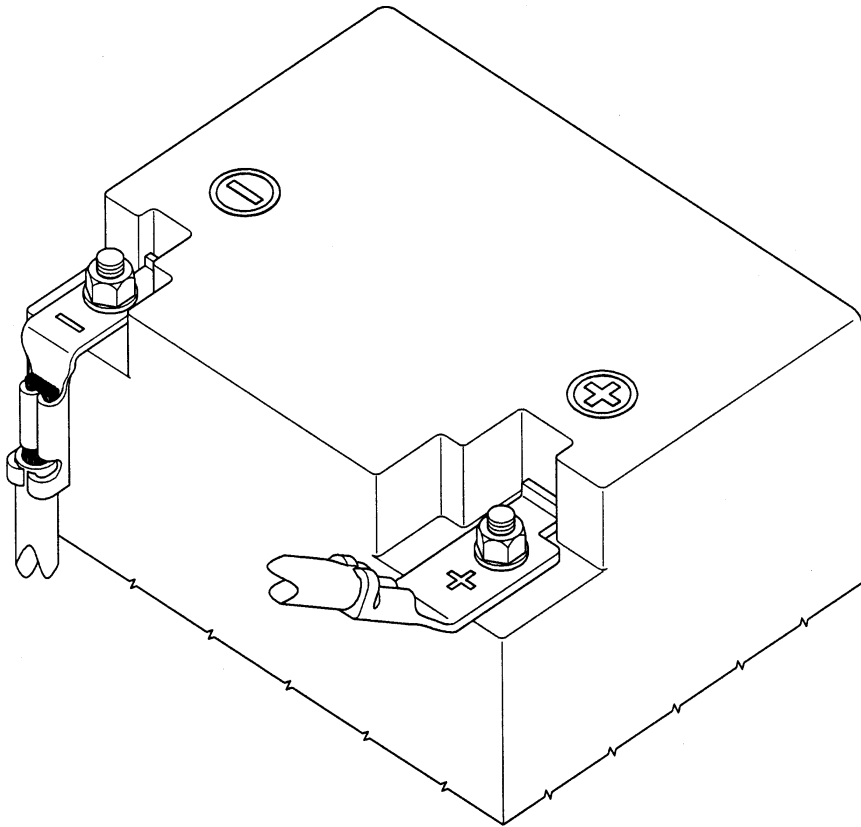
90° ROTATION



Terminal keyway with battery housing design increases degree of freedom for W/H routing.

W/H ROUTING

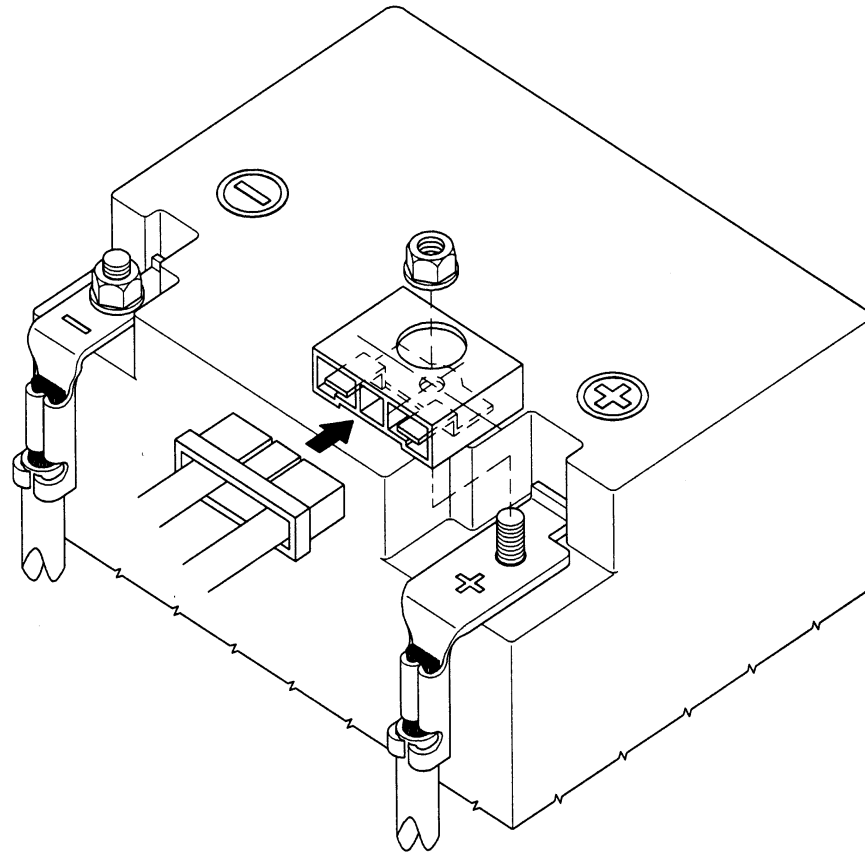
VARIABLE ANGLE TERMINAL BENDING



Terminal capable of accommodating multiple W/H directions without bending of cable.

MODULE ACCOMMODATIONS

MULTIPLE CONDUCTORS CONNECTION

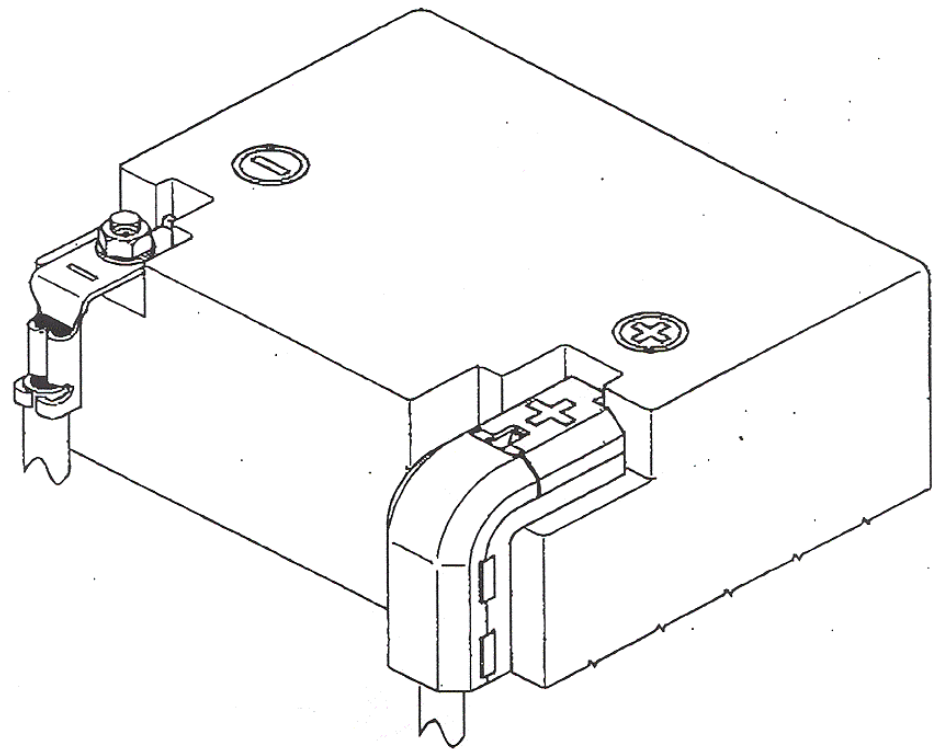


Terminal capable of accommodating electronic module for power/load management.

CONCEPT SUMMARY

SYSTEM BENEFITS

- Low Cost
- Reliable/Low Resistance Electrical Contact
- W/H Routing Freedom
- Allows Multiple Wire Connections
- Low Part Complexity
- Good Vibration/Mechanical Shock Performance



CONCEPT SUMMARY

SYSTEM REQUIREMENT

	Requirement	Satisfied	Comments
1	Separate connections for positive and negative terminals.	✓	Distinct terminal designs utilized
2	Electrical shorts between terminals of different voltage potential and between positive and vehicle ground minimized when disconnected (screwdriver, wrenches, etc.)	✓	Plastic cover on (+) terminal incorporated, recessed battery posts
3	Possibility of shorts between the harness positive terminal and vehicle ground minimized.	✓	Plastic cover on (+) terminal incorporated
4	Direct "alligator" type jumper cable access prevented (when connection mated or unmated).	✓	Plastic cover on (+) terminal incorporated
5	Battery connections prevent electrical access (current carrying) when connected (Terminals inaccessible when mated).	✓	Plastic cover on (+) terminal incorporated
6	Indexing prevents connecting to a battery of different voltage (12V and 36V battery mis-connection prevention).	✓	Smaller battery post incorporated
7	Positive/Negative terminal cross-circuit prevention.	✓	(+) and (-) terminals have unique shape for indexing
8	Indexing differentiates between battery technologies.	✓	
9	Battery technology variation (current/time) accommodations.	✓	
10	Assembly without tool.	X	Bolt connection requires tool
11	Ability to incorporate electronic module for energy/load management.	✓	
12	Minimal packaging/assembly space.	✓	Very minimal space required for packaging and assembly