B9 Robot
12 & 24VDC Battery Power System

With built in or external 12vdc power supply for display with or without charging batteries.

Power Source

- System uses two 12vdc sealed batteries in a common ground system.
- During battery operation one battery provides 12vdc and both wired in ‘series’ provide 24vdc for the drive system.
- During charging power to the drive section is locked out by relays.

Charging

- Charging is provided by external 24vdc charger with separate plug in on B9.
- Charger needs to have capability of charging sealed batteries.
- Robot circuit has pushbutton to initiate charging.

Backup Charging

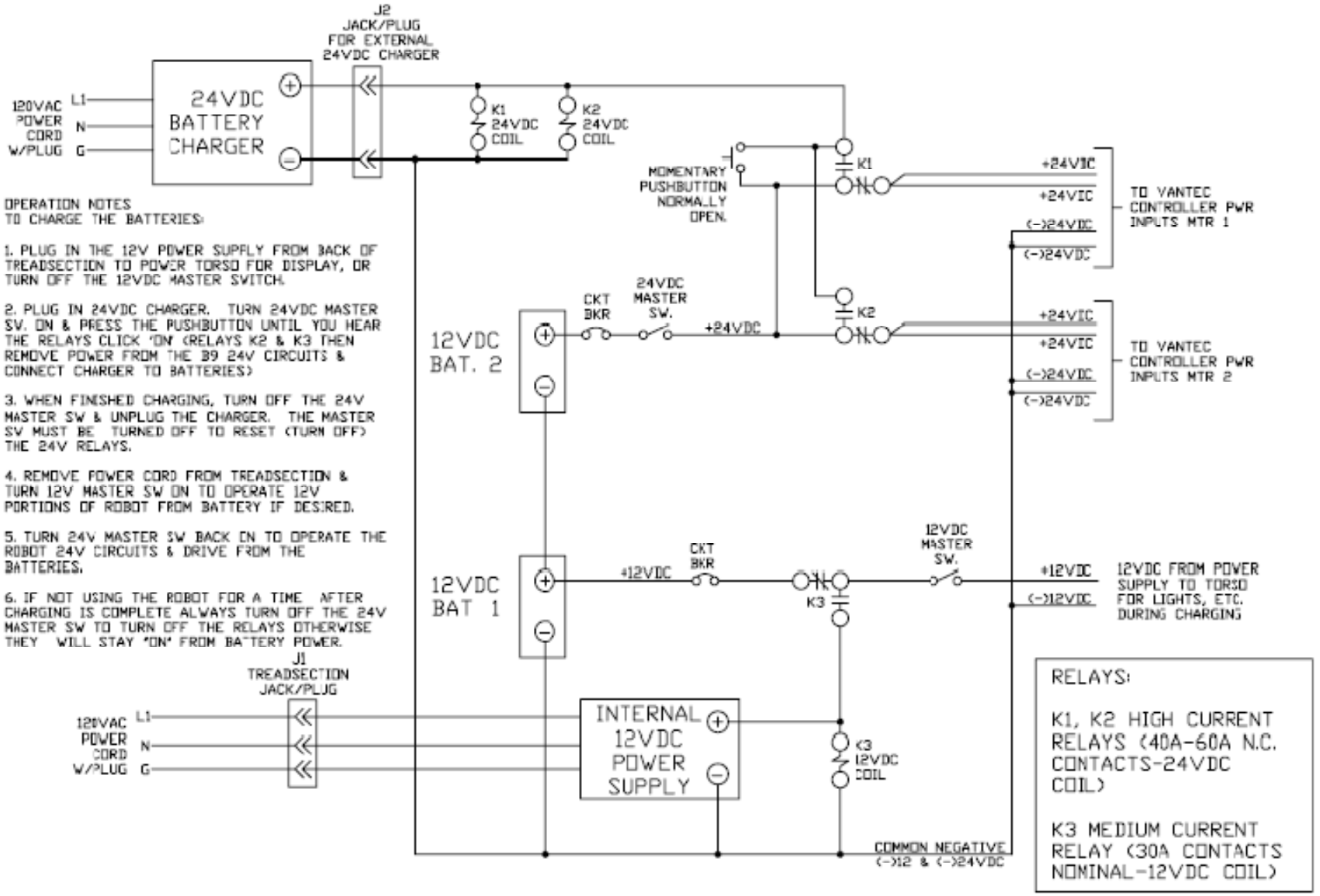
- If your 24vdc charger is not available, charging can be provided by two separate external 12vdc chargers.

- Your Master 12v and 24v switches should be turned off. The 24v automatic lockout circuit does not work with backup charging, so the pushbutton(s) are not used.

- You can use the 12 vdc internal power supply for torso display operation during backup charging, plug in the supply and turn on the 12v master switch.

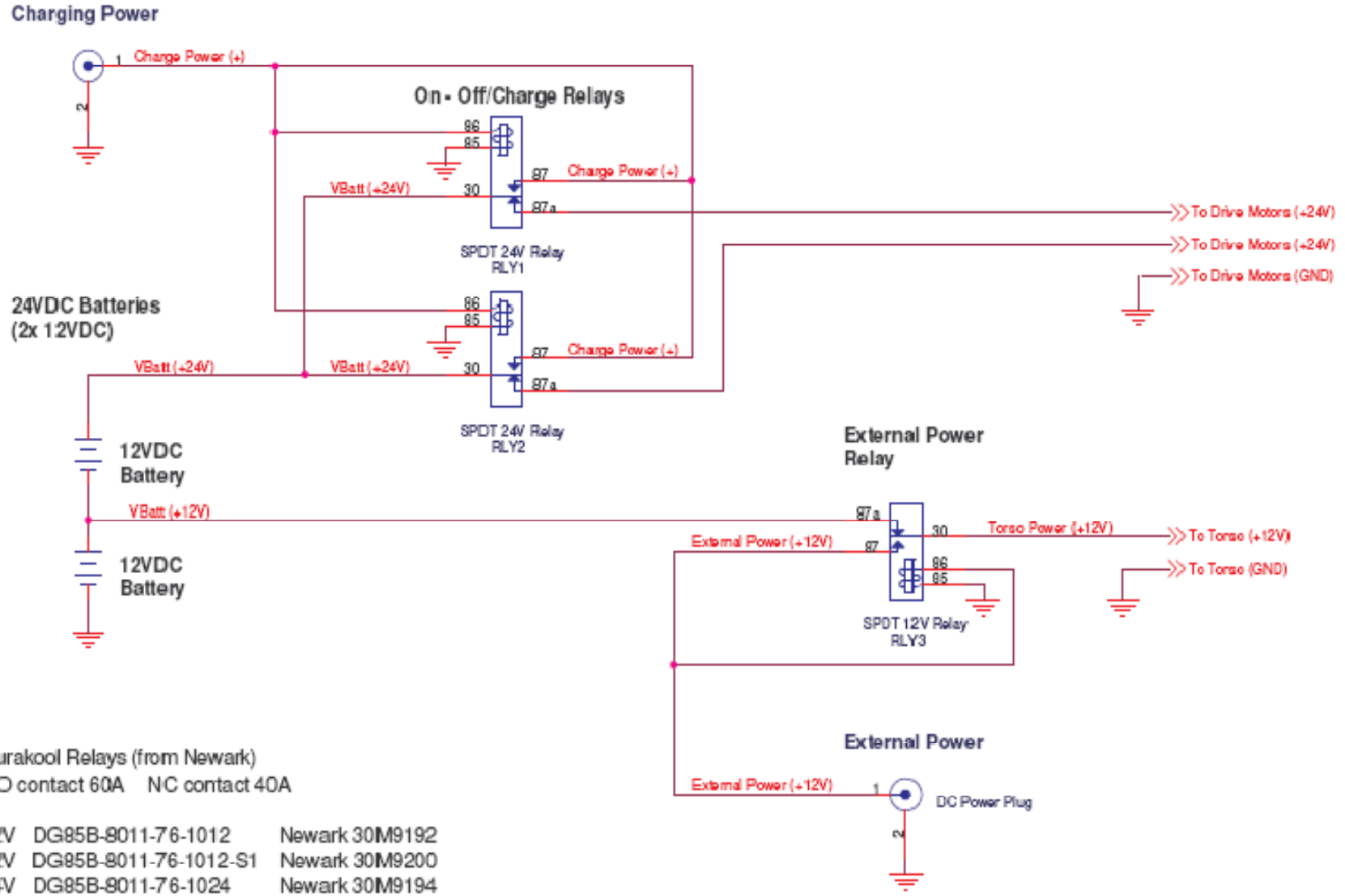
- Each charger must be connected to its battery separately. You can build in pigtail plugs for this purpose.

Wiring Diagram with Internal Power Supply



Wiring Diagram with external power supply

(add pushbutton between relay #1 terminals 30 & 86)



Durakool Relays (from Newark)
NO contact 60A NC contact 40A

12V	DG85B-8011-76-1012	Newark 30M9192
12V	DG85B-8011-76-1012-S1	Newark 30M9200
24V	DG85B-8011-76-1024	Newark 30M9194
24V	DG85B-8011-76-1024-S1	Newark 30M9203

High Current Relays

Durakool Relays (from Newark)
NO contact 60A NC contact 40A

12V	DG85B-8011-76-1012	Newark 30M9192
12V	DG85B-8011-76-1012-S1	Newark 30M9200
24V	DG85B-8011-76-1024	Newark 30M9194
24V	DG85B-8011-76-1024-S1	Newark 30M9203

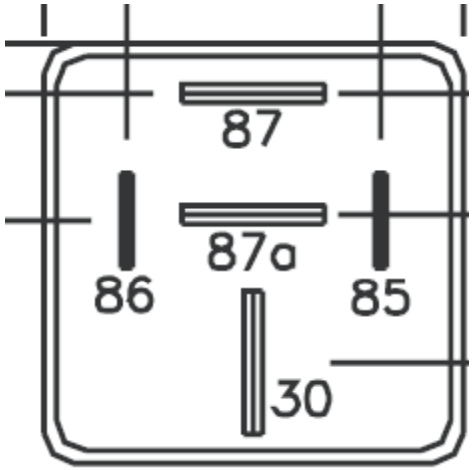
-S1 is a straight metal mounting bracket option

Newark website: http://www.newark.com/

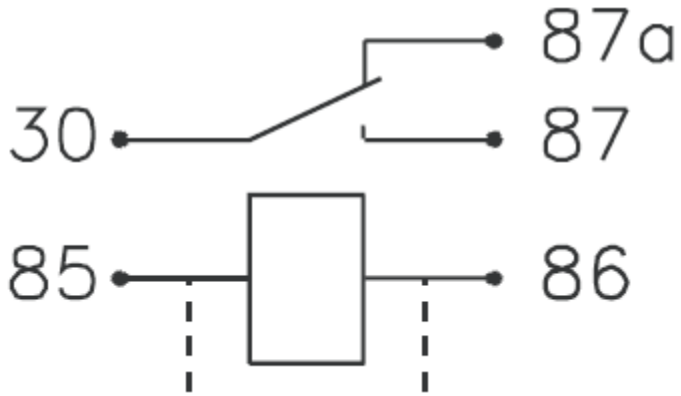
Relay Coil Voltages

- Two types of relays are used.
- One relay has a 12vdc coil and energizes when powered by 12vdc. We use this one in the 12vdc display power supply circuit.
- The other two relays have 24vdc coils and energize when powered by the 24vdc charger circuit.

Relay Details
SPDT (Single Pole-Double Throw)



PHYSICAL TERMINAL LAYOUT



CONTACT & COIL NUMBERS:

85 & 86 = COIL

30 = CONTACT COMMON

87A = NORMALLY CLOSED CONTACT

87 = NORMALLY OPEN CONTACT

SOCKETS ARE AVAILABLE FOR THE RELAYS.

CAUTION

- Never connect or touch together the +12vdc and the +24vdc power supply wiring or connections.

- This would cause a direct short across battery number 2.

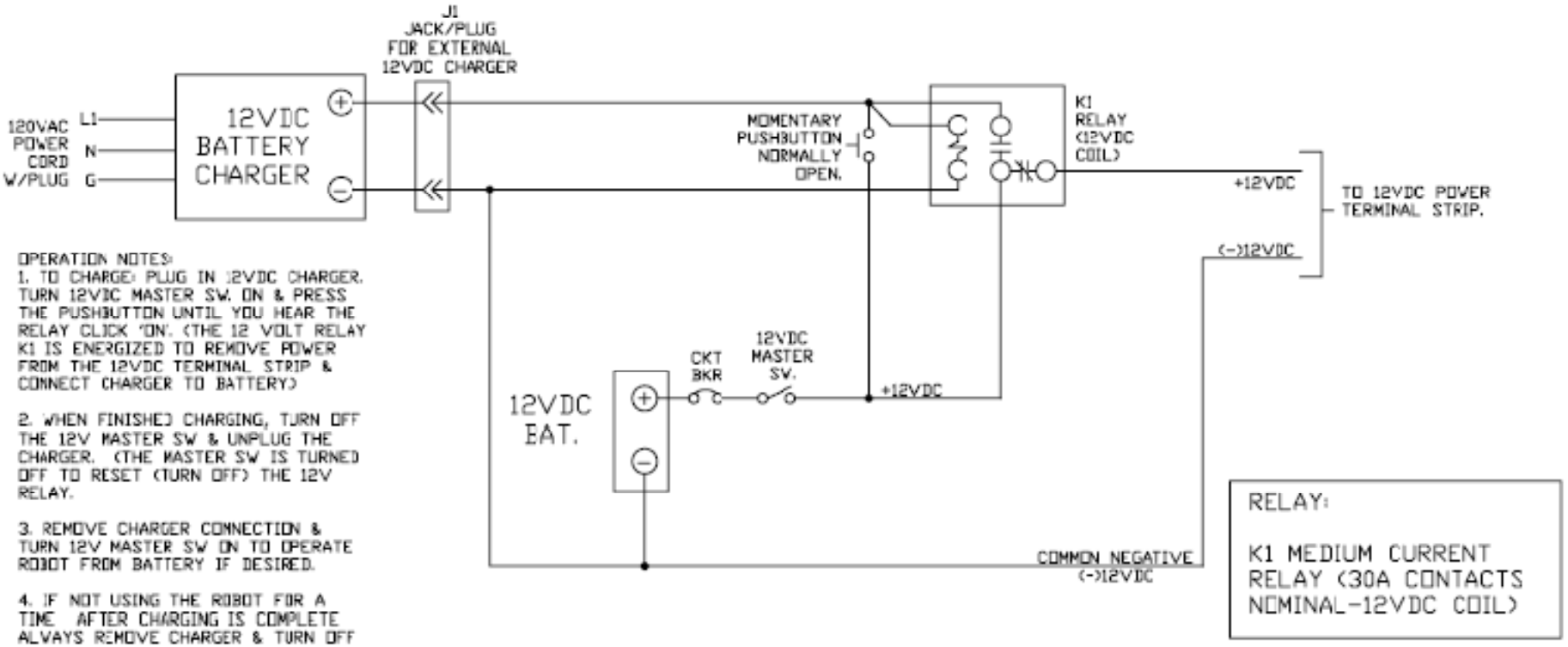
- There would be no reason to ever do this, but just a word of caution.

Other 12VDC Charging only systems

- Each of these systems use the 12vdc Durakool relays to lockout the robot's circuitry during charging.

- They do not provide any power to the robot for display during charging.
- Following are diagrams for:
- Single 12VDC Battery system
- Dual 12VDC Battery system

Single 12V Battery System



OPERATION NOTES:

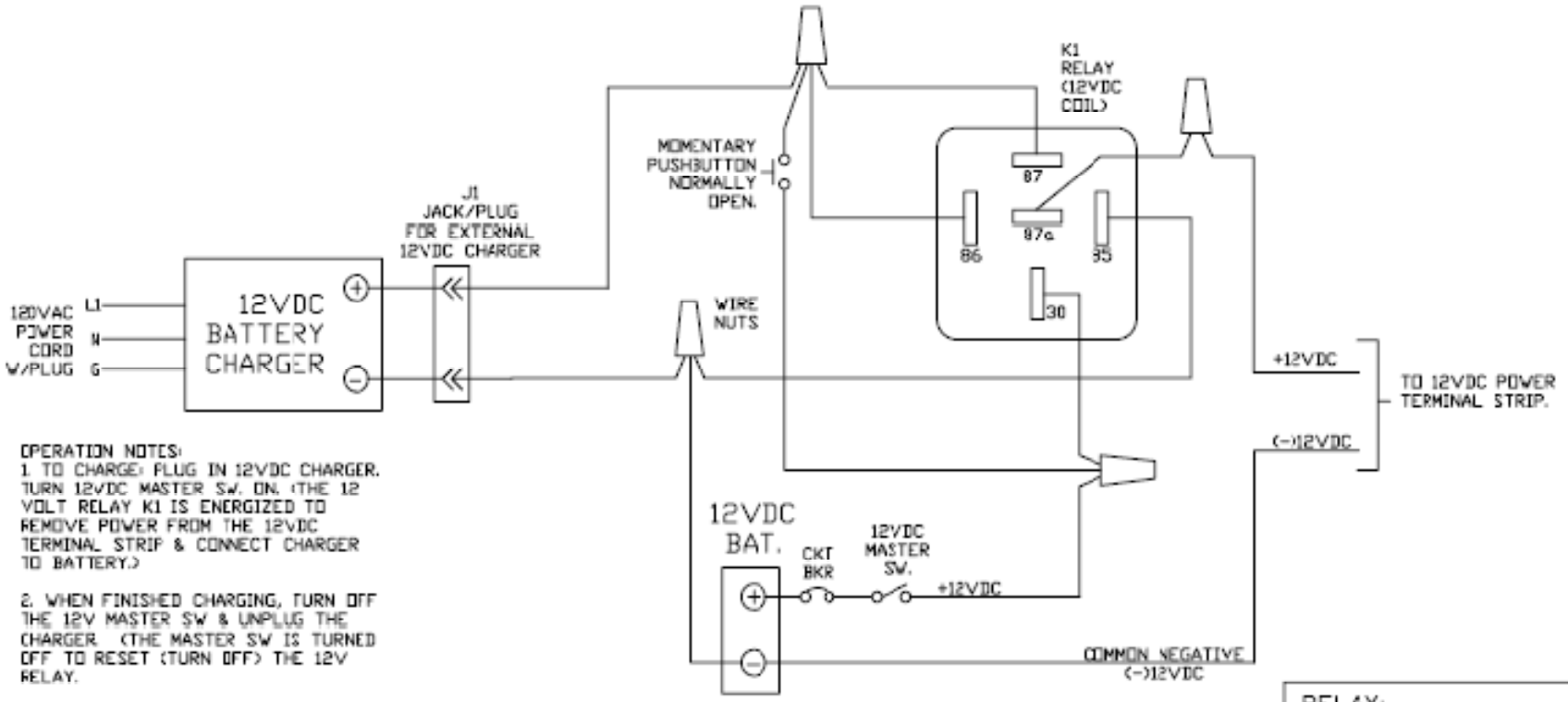
1. TO CHARGE: PLUG IN 12VDC CHARGER. TURN 12VDC MASTER SW. ON & PRESS THE PUSHBUTTON UNTIL YOU HEAR THE RELAY CLICK 'ON'. (THE 12 VOLT RELAY K1 IS ENERGIZED TO REMOVE POWER FROM THE 12VDC TERMINAL STRIP & CONNECT CHARGER TO BATTERY)

2. WHEN FINISHED CHARGING, TURN OFF THE 12V MASTER SW & UNPLUG THE CHARGER. (THE MASTER SW IS TURNED OFF TO RESET (TURN OFF) THE 12V RELAY.

3. REMOVE CHARGER CONNECTION & TURN 12V MASTER SW ON TO OPERATE ROBOT FROM BATTERY IF DESIRED.

4. IF NOT USING THE ROBOT FOR A TIME AFTER CHARGING IS COMPLETE ALWAYS REMOVE CHARGER & TURN OFF THE MASTER SW TO TURN OFF THE K1 RELAY OTHERWISE IT WILL STAY "ON" FROM BATTERY POWER.

Single 12V Battery System showing pictorial terminal connections on the relay.



OPERATION NOTES:
1. TO CHARGE: PLUG IN 12VDC CHARGER. TURN 12VDC MASTER SW. ON. (THE 12 VOLT RELAY K1 IS ENERGIZED TO REMOVE POWER FROM THE 12VDC TERMINAL STRIP & CONNECT CHARGER TO BATTERY.)

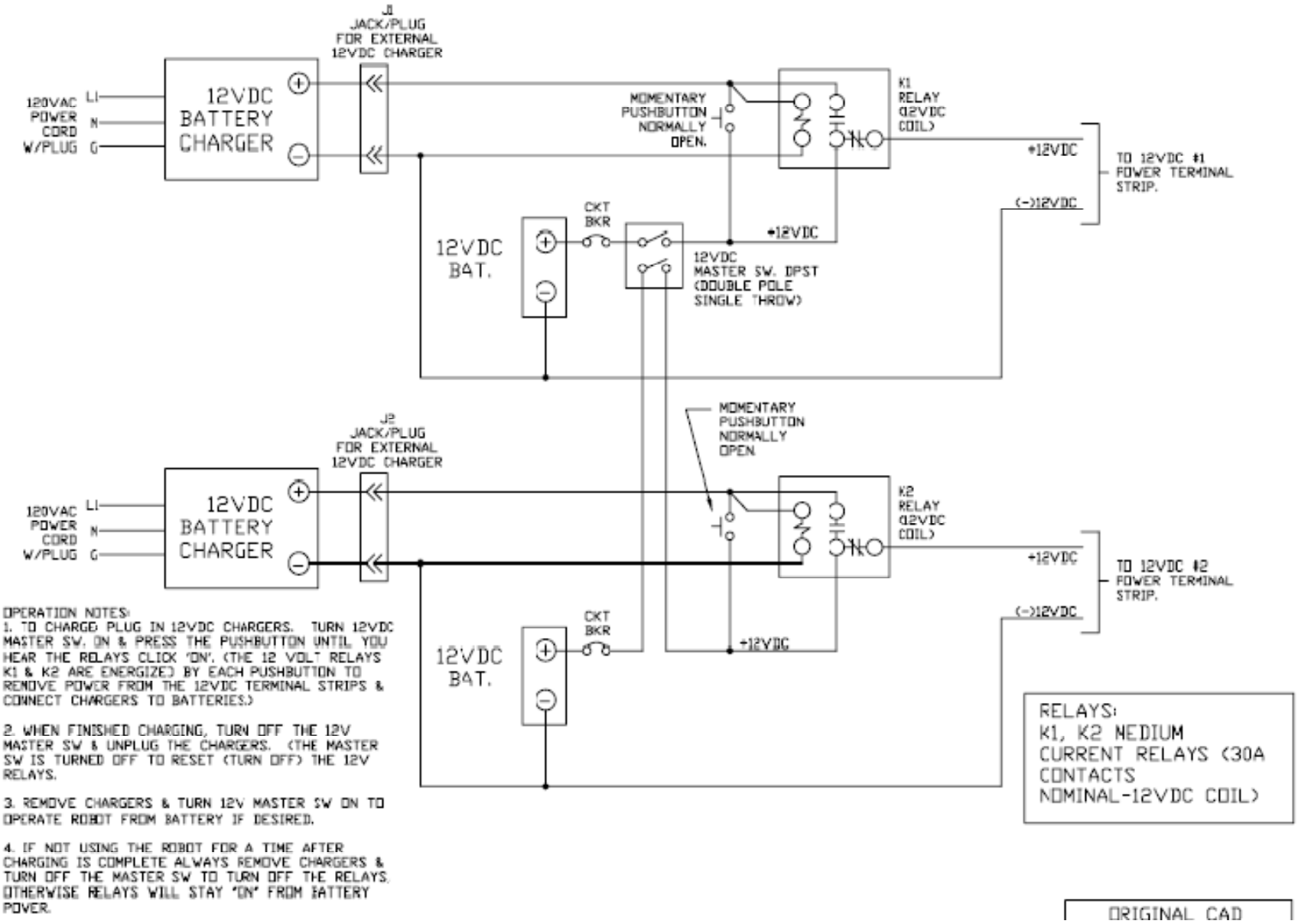
2. WHEN FINISHED CHARGING, TURN OFF THE 12V MASTER SW & UNPLUG THE CHARGER. (THE MASTER SW IS TURNED OFF TO RESET (TURN OFF) THE 12V RELAY.

3. REMOVE CHARGER CONNECTION & TURN 12V MASTER SW ON TO OPERATE ROBOT FROM BATTERY IF DESIRED.

4. IF NOT USING THE ROBOT FOR A TIME AFTER CHARGING IS COMPLETE ALWAYS REMOVE CHARGER & TURN OFF THE MASTER SW TO TURN OFF THE K1 RELAY OTHERWISE IT WILL STAY 'ON' FROM BATTERY POWER.

RELAY:
K1 MEDIUM CURRENT RELAY
(60A-NC/40A-NO CONTACTS
NOMINAL 12VDC COIL)
12V DG85B-8011-76-1012-S1
Newark 30M9200

Dual 12V Battery System



OPERATION NOTES:

1. TO CHARGE PLUG IN 12VDC CHARGERS. TURN 12VDC MASTER SW. ON & PRESS THE PUSHBUTTON UNTIL YOU HEAR THE RELAYS CLICK 'ON'. (THE 12 VOLT RELAYS K1 & K2 ARE ENERGIZED BY EACH PUSHBUTTON TO REMOVE POWER FROM THE 12VDC TERMINAL STRIPS & CONNECT CHARGERS TO BATTERIES.)

2. WHEN FINISHED CHARGING, TURN OFF THE 12V MASTER SW & UNPLUG THE CHARGERS. (THE MASTER SW IS TURNED OFF TO RESET (TURN OFF) THE 12V RELAYS.

3. REMOVE CHARGERS & TURN 12V MASTER SW ON TO OPERATE ROBOT FROM BATTERY IF DESIRED.

4. IF NOT USING THE ROBOT FOR A TIME AFTER CHARGING IS COMPLETE ALWAYS REMOVE CHARGERS & TURN OFF THE MASTER SW TO TURN OFF THE RELAYS. OTHERWISE RELAYS WILL STAY "ON" FROM BATTERY POWER.

ORIGINAL CAD

Info.

- Clear full page .pdf diagrams available on the DVD.
- Durakool spec sheet available on the DVD.
- Newark website: http://www.newark.com/

Durakool Spec Sheet

DG85
automotive / industrial relays

DURAKOOL

- General purpose automotive or industrial relays
- High resistance to inrush current
- PCB mounting versions available
- Ideal for DC motor control
- Industry standard size and footprint
- High continuous DC current capacity
- RoHS Compliant

Contacts

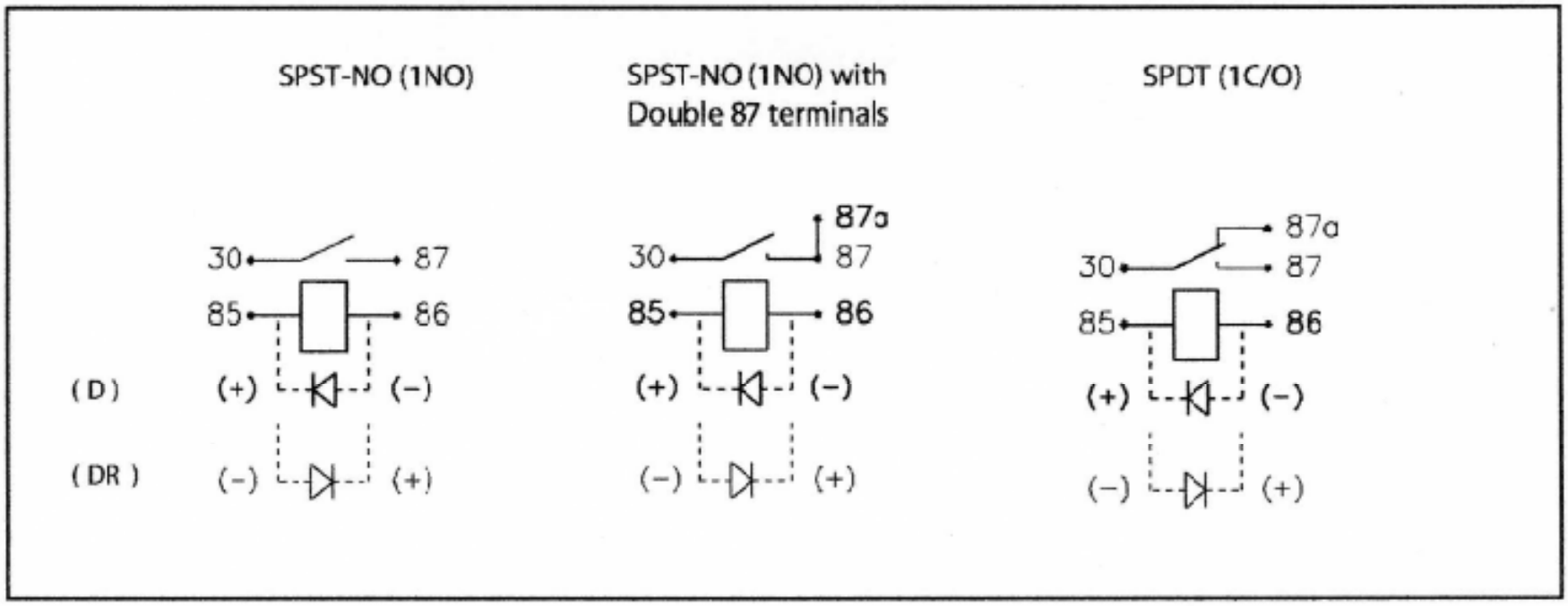
Contact number & arrangement		SPST-NO (1NO), SPDT (1 C/O)			
Contact material		AgNi, AgNi0.15, AgSnOInO, AgCdO			
Max. switching voltage		30VDC - current dependent - see curve Fig 2			
		DG85A	DG85B	DG85C	DG85D
Max. continuous current	SPST-NO	40A	60A	80A	100A
	SPDT (NO / NC)	40A/30A	60A/40A	80A/60A	—
Max. switching current - make	SPST-NO	120A	120A	240A	240A
	SPDT	120A/45A	120A/45A	240A/180A	—
Max. switching current - break	SPST-NO	40A	60A	80A	100A
	SPDT	40A/30A	60A/40A	80A/60A	—
Min. switching current		0.1A 12VDC	0.5A 12VDC	0.5A 12VDC	0.5A 12VDC
Resistance		< 100mΩ at 0.1A / 6VDC			

Durakool Spec Sheet

Coil Data - DC voltage version — Table 1

Coil code	Rated voltage V DC	Coil resistance ± 10% at 20°C Ω	Must Operate Voltage Max VDC	Must Release Voltage Min VDC
1006	6	22	3.6	0.6
1012	12	90	7.2	1.2
1024	24	330	14.3	2.4

Wiring diagrams — Fig. 3



Durakool Spec Sheet

DG85
automotive / industrial relays

DURAKOOL

Dimensions - plug-in types

Fig. 4