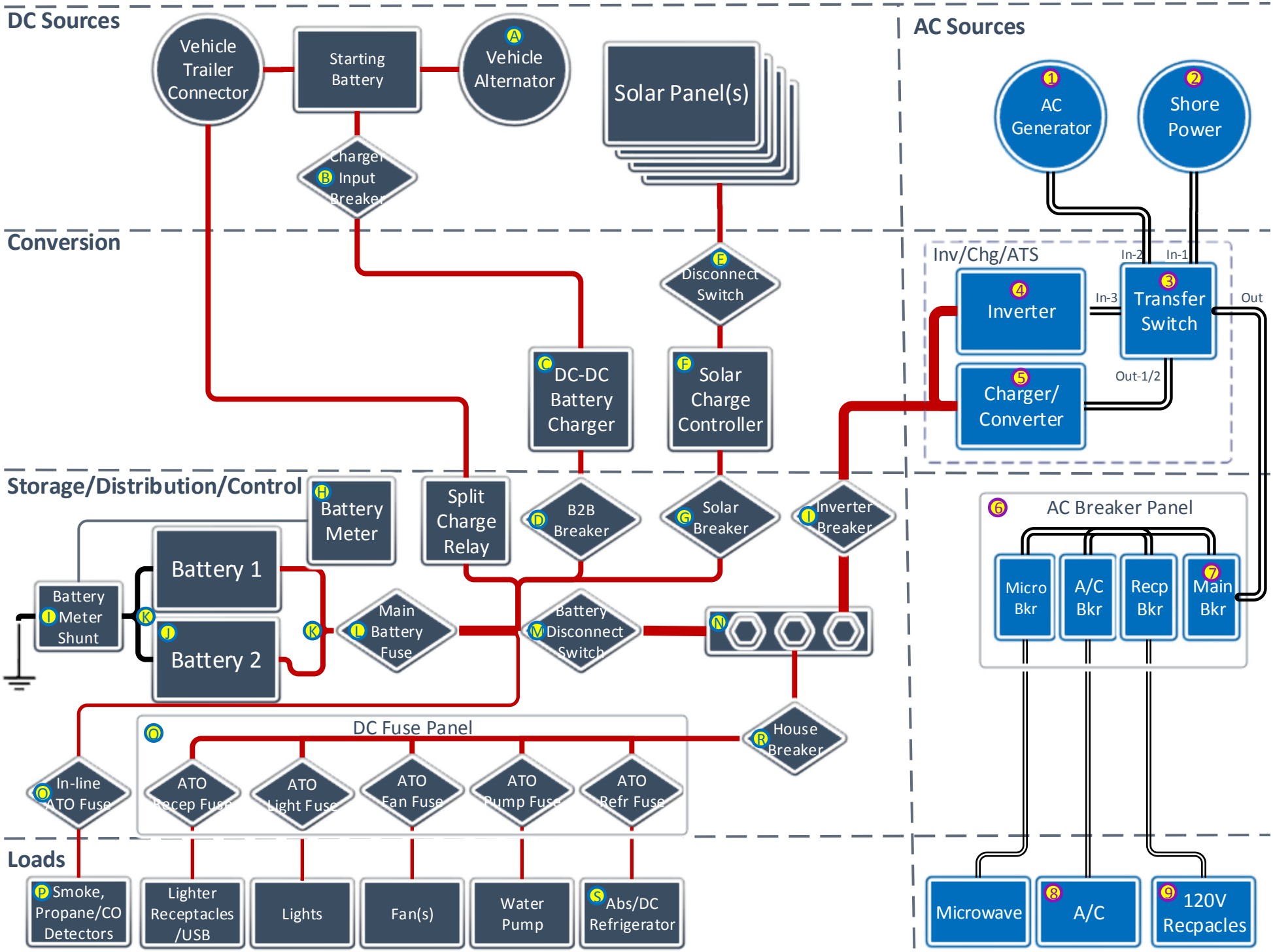
Basic Electrical Diagram for an RV



(A) - Vehicles have either a variable (VVA, 2011 or later) or fixed voltage alternator (FVA). An alternator's 'continuous duty' capacity is about HALF of it's 'rated' capacity.
(B) – Power cables attached to a battery must have a fuse or breaker near the battery. B2B installation instructions specify the fuse and wire size.
(C) – A 'DC-DC charger' (aka 'B2B') is necessary to provide controlled and powerful auxiliary battery charging with a VVA or lithium batteries. Recommend for lead-acid batteries.
(D) – If distance is short and cable management good, an Over-Current protective Device (OCPD) here may be omitted but switching may also be desired.
(E) – Solar array connection requires switch to remove power for equipment service. A breaker may be used it will have no OCPD function.
(F) – The wiring on both sides of the charger may be different. Current is higher on the battery side.
(G) – The solar input connection is not cut off by the disconnect switch. To shut off charging (when storing lithium batteries), it is convenient for this to be a breaker not a fuse.
(H) – To accurately measure battery state of charge (SOC), a device that uses energy flow rather than just reading battery voltage is necessary.
(I) – To measure energy flow in and out of the batteries, measuring both current and voltage (simultaneously) is required. A 'shunt' measures current.
(J) – A battery bank can be either lead-acid (LA) or lithium iron phosphate (LFP). There may be multiple batteries in either serial (with 6V 'golf cart' batteries) or parallel connected.
(K) – If paralleling multiple LFP batteries, cabling affects equal charging. Use equal length cables on all batteries connecting to a single location.
(L) – All battery power flows through single OCPD as close to the battery as possible.
(M) – A 'battery disconnect' removes power from all loads except solar and safety sensors. To remove the unwitched loads, turn the breaker off or remove the fuse.
(N) – A power distribution block provides a connection point for main load connections. All loads will connect with OCPD as close as possible.
(O) – Safety equipment is low power and should never be shut off unless stored. It normally has an in-line fuse somewhere near its connection to battery power.
(P) – Detectors may have internal battery back up (usually smoke) and if they are shut down, removing the internal battery is also necessary.
(Q) – DC distribution is normally through a panel using ATO/ATC 'automotive' type fuses. Having spare fuses on the capacities used is recommended.
(R) – The fuse panel may not be fed by a separate breaker if the connections to the distribution block is close by.
(S) – If the refrigerator is an 'absorption' type '2-way' (propane and AC), it still needs DC power to operate controls.

(1) – The AC generator can either be on-board or portable and plugged in to the shore cable.
(2) – Shore power can come in as 240V/50A or 120V/30A. Regardless of the input, all of the power is distributed as 120V.
(3) – The 'Automatic Transfer Switch' will keep sources separate and route power by priority; 1-Shore, 2-Generagor of 3 – Inverter.
(4) – The inverter is manually switched on, presumably only when either generator or shore power is not available/desired. Some inverters have integrated charges and ATS.
(5) – Charging is a 'smart' function (varies voltage to suit battery charging ~13.5-14.6V) while 'converting' is not (DC power supply @ ~13.8V).
(6) - AC power is distributed solely by conventional AC breakers in a rated panel. Even though 240VAC is received on a '50A' connection, it is distributed on 120V lines.
(7) – A 'main' breaker protects the source cable from exceeding its capacity.
(8) – Branch line breakers supply can supply individual pieces of equipment.
(9) - Branch line breakers can supply general purpose receptacle strings strings. GFCI outlets should be used at the beginning of a receptacle string and must in all 'wet' locations