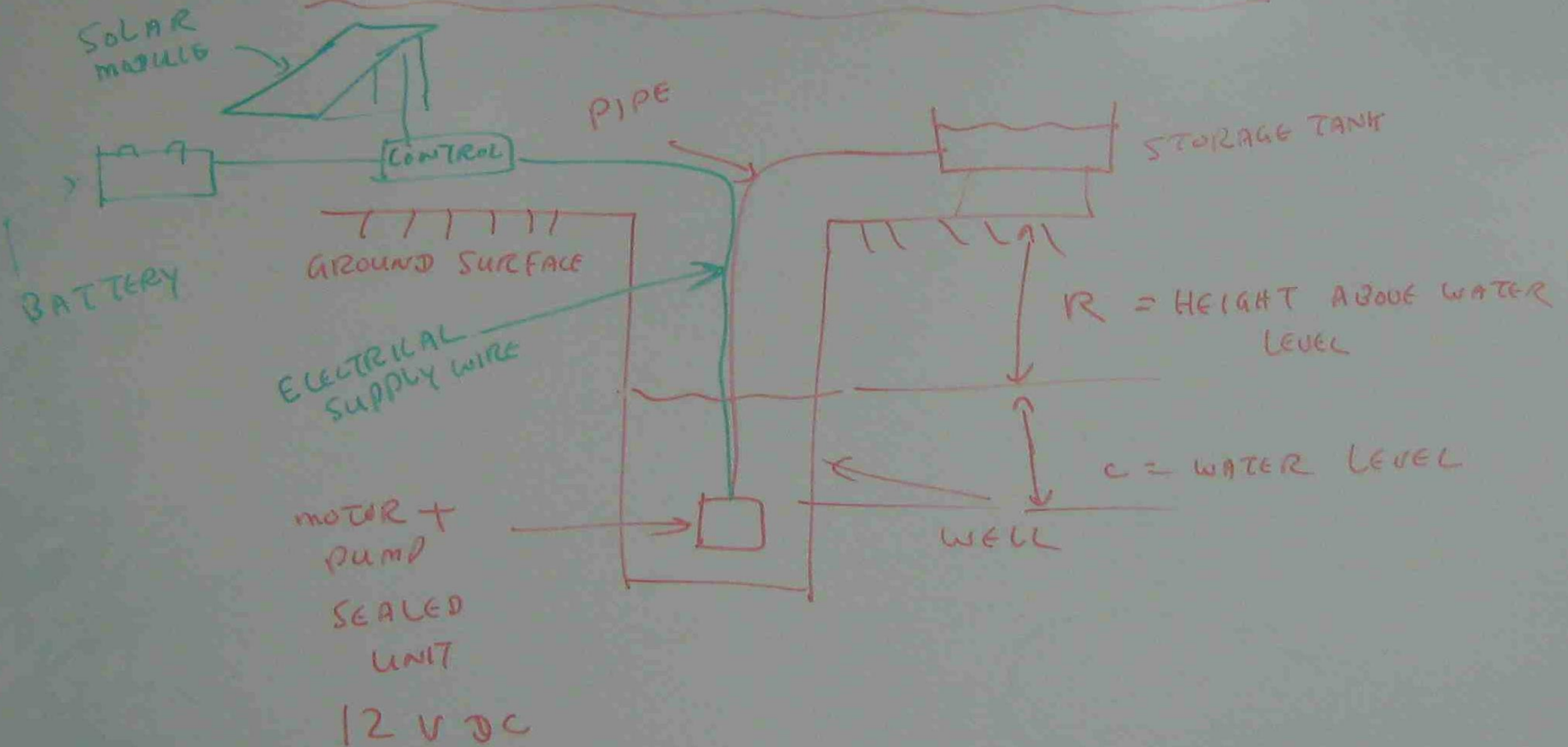


PHOTO VOLT AIC WATER PUMPING SYSTEM COMPONENTS

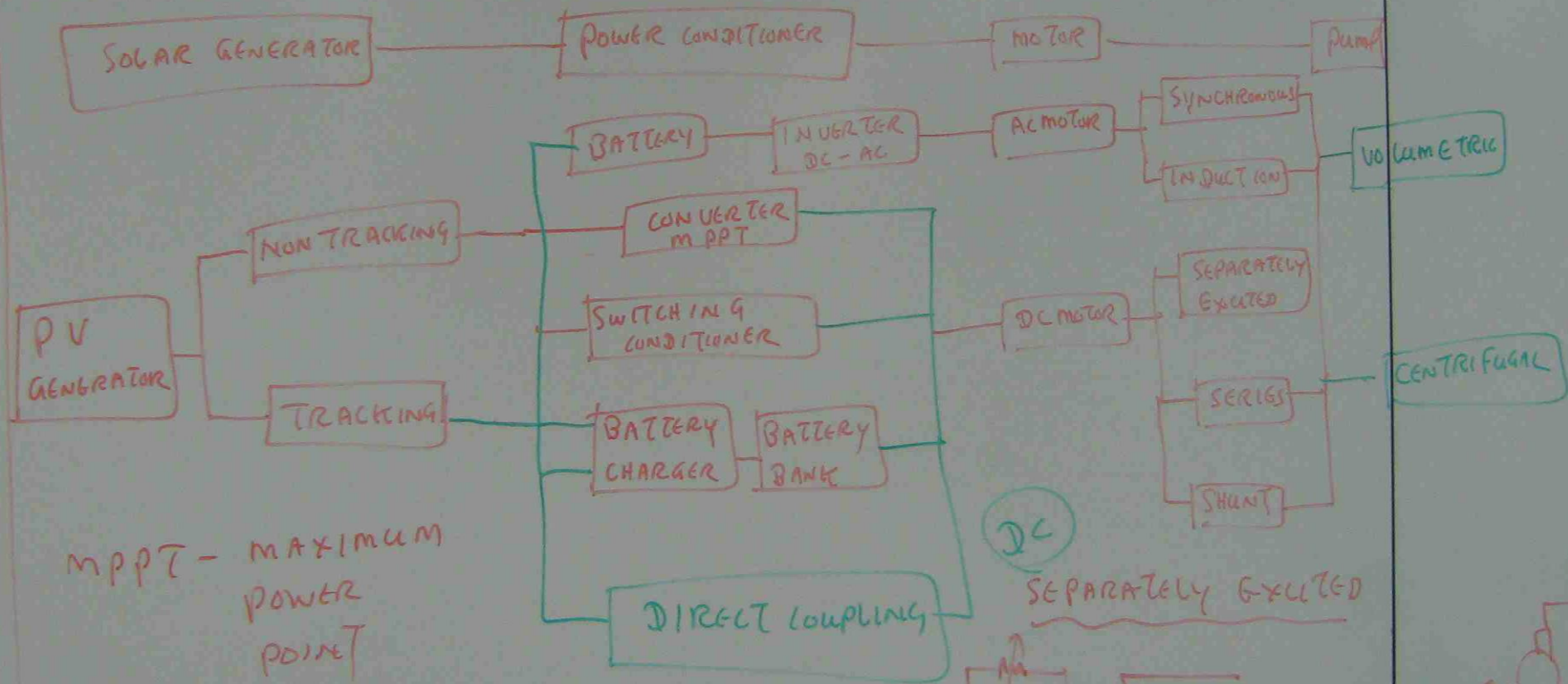


IN THE SIMPLEST PHOTOVOLTIC WATER PUMPING SYSTEM, THE SOLAR PANELS ARE DIRECTLY CONNECTED TO A DC MOTOR WHICH DRIVES THE WATER PUMP.

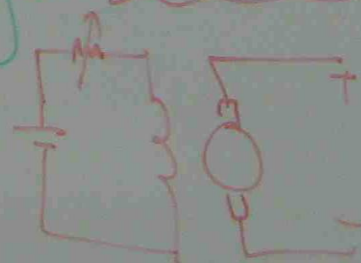
FOR SUCH A SIMPLIFIED SYSTEM, DC MOTORS AND CENTRIFUGAL PUMPS ARE VIRTUALLY MANDATORY.

PUMPS HAVE DIFFERENT TORQUE - SPEED CHARACTERISTICS. IF VOLUMETRIC PUMPS ARE USED, POWER CIRCUIT, POWER CONDITIONING, MAXIMUM POWER POINT TRACKING CIRCUIT IS TO BE USED.

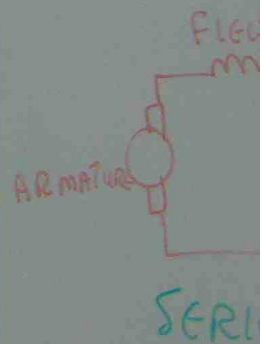
PHOTO VOLTIC WATER PUMPING SYSTEM COMPONENTS AND CONFIGURATION



MPPT - MAXIMUM
POWER
POINT
TRACKER



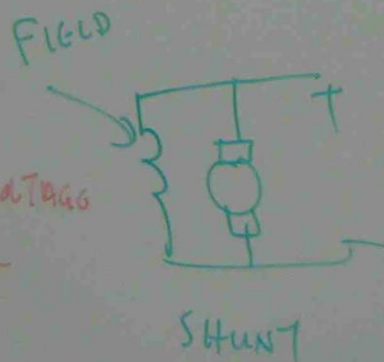
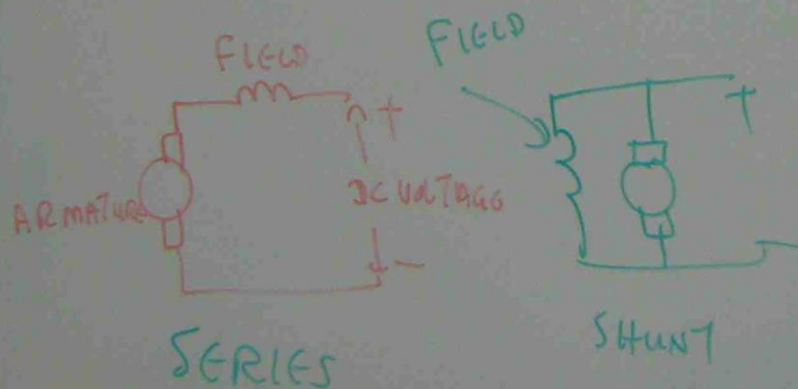
FIELD ARMATURE



SERIES

Pump
 Volumetric
 Centrifugal
 Series
 Shunt
 Field
 Armature
 DC Voltage
 Series
 Shunt

CENTRIFUGAL PUMP



POWER CONDITIONING CIRCUITRY

THE ROLE OF POWER CONDITIONING CIRCUITRY
 THE MOTOR / PUMP WITH THE MOST SUITABLE
 CURRENT COMBINATION WHILE ENSURING
 PANELS OPERATE AT THEIR MAXIMUM
 POINT.
 IN EFFECT, IT ALTERS THE LOAD IN
 TO MATCH THE OPTIMUM IMPEDANCE
 ARRAY.

THE CIRCUITRY MUST CONSUME VERY

CENTRIFUGAL PUMP

$$\text{TORQUE} \propto (\text{SPEED})^2$$

POWER CONDITIONING CIRCUITRY

THE ROLE OF POWER CONDITIONING CIRCUITRY IS TO PROVIDE THE MOTOR / PUMP WITH THE MOST SUITABLE VOLTAGE / CURRENT COMBINATION WHILE ENSURING THE SOLAR PANELS OPERATE AT THEIR MAXIMUM POWER POINT.

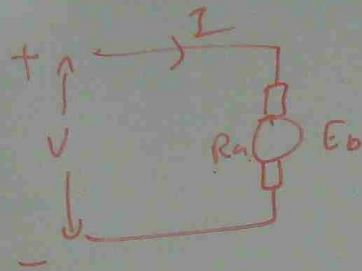
IN EFFECT, IT ALTERS THE LOAD IMPEDANCE TO MATCH THE OPTIMUM IMPEDANCE OF THE ARRAY.

THE CIRCUITRY MUST CONSUME VERY LITTLE POWER.

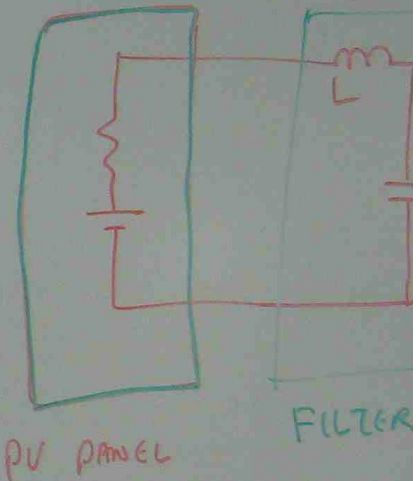
CENTRIFUGAL PUMP

$$\text{TORQUE} \propto (\text{SPEED})^2$$

POWER CONDITIONING CIRCUIT (CURRENT REGULATOR)



$$I = \frac{V - E_b}{R_a}$$



- AT STARTING TIME, motor speed is zero.

$V - E_b$ is higher, IT INDUCES THE HIGHER MAGNITUDE OF CURRENT TO START THE MOTOR.

- AT RUNNING TIME, motor speed is higher,

$V - E_b$ is smaller, IT REDUCES THE CURRENT SUPPLY IN TO MOTOR.

ATOR)

$$\frac{E_b}{R_a}$$

ED IS ZERO.

INDUCES THE HIGHER
START THE MOTOR.

SPEED IS HIGHER,

[REDUCES THE CURRENT

