

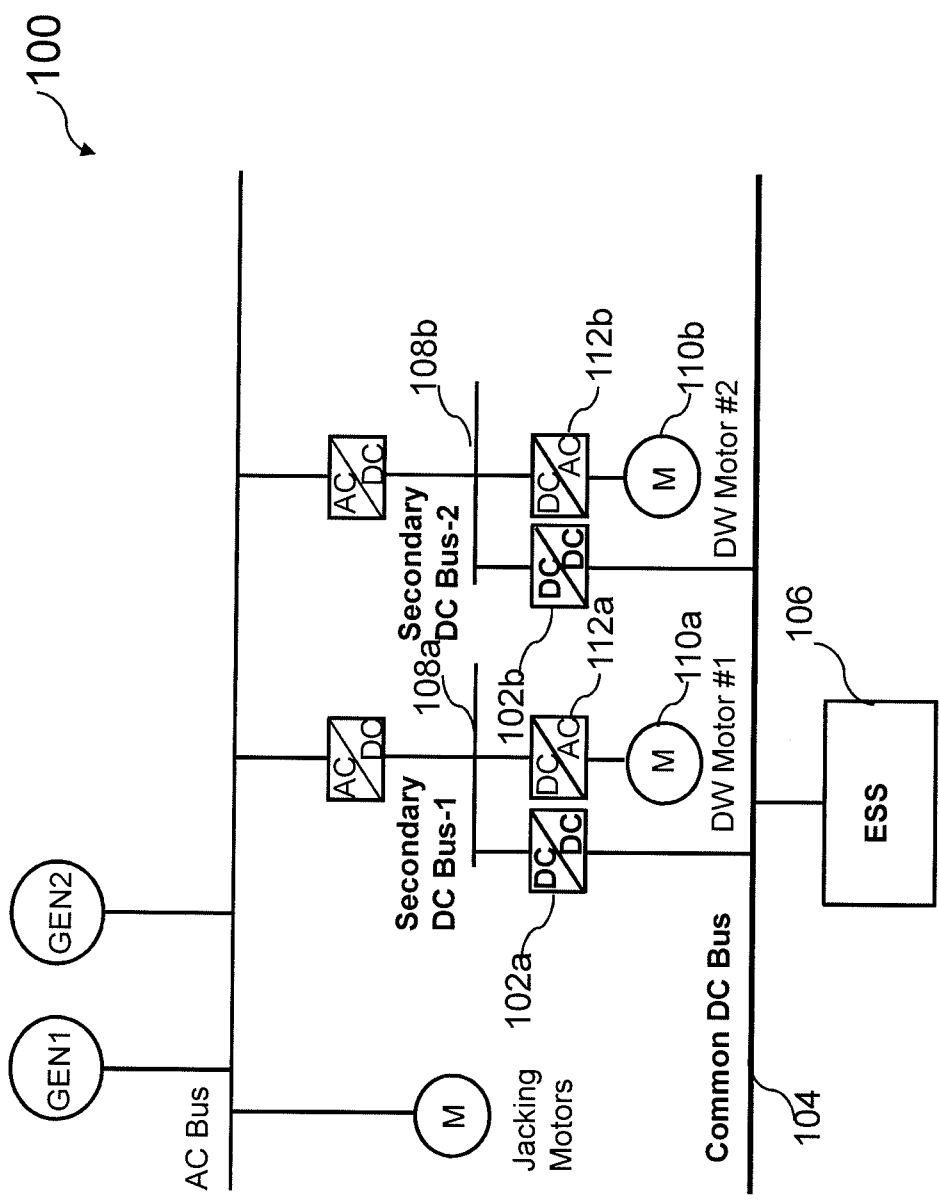


Figure 1

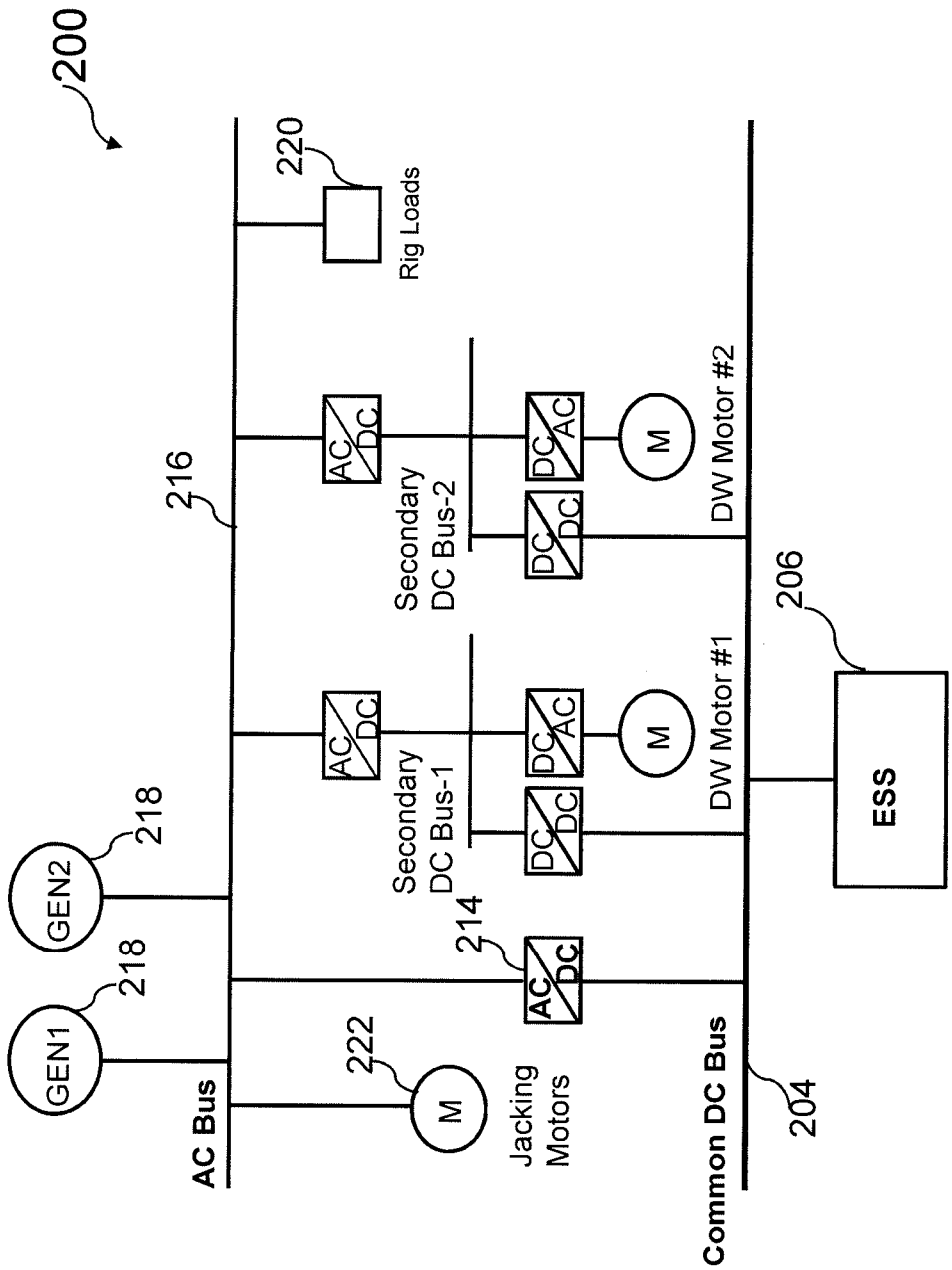


Figure 2



Figure 3

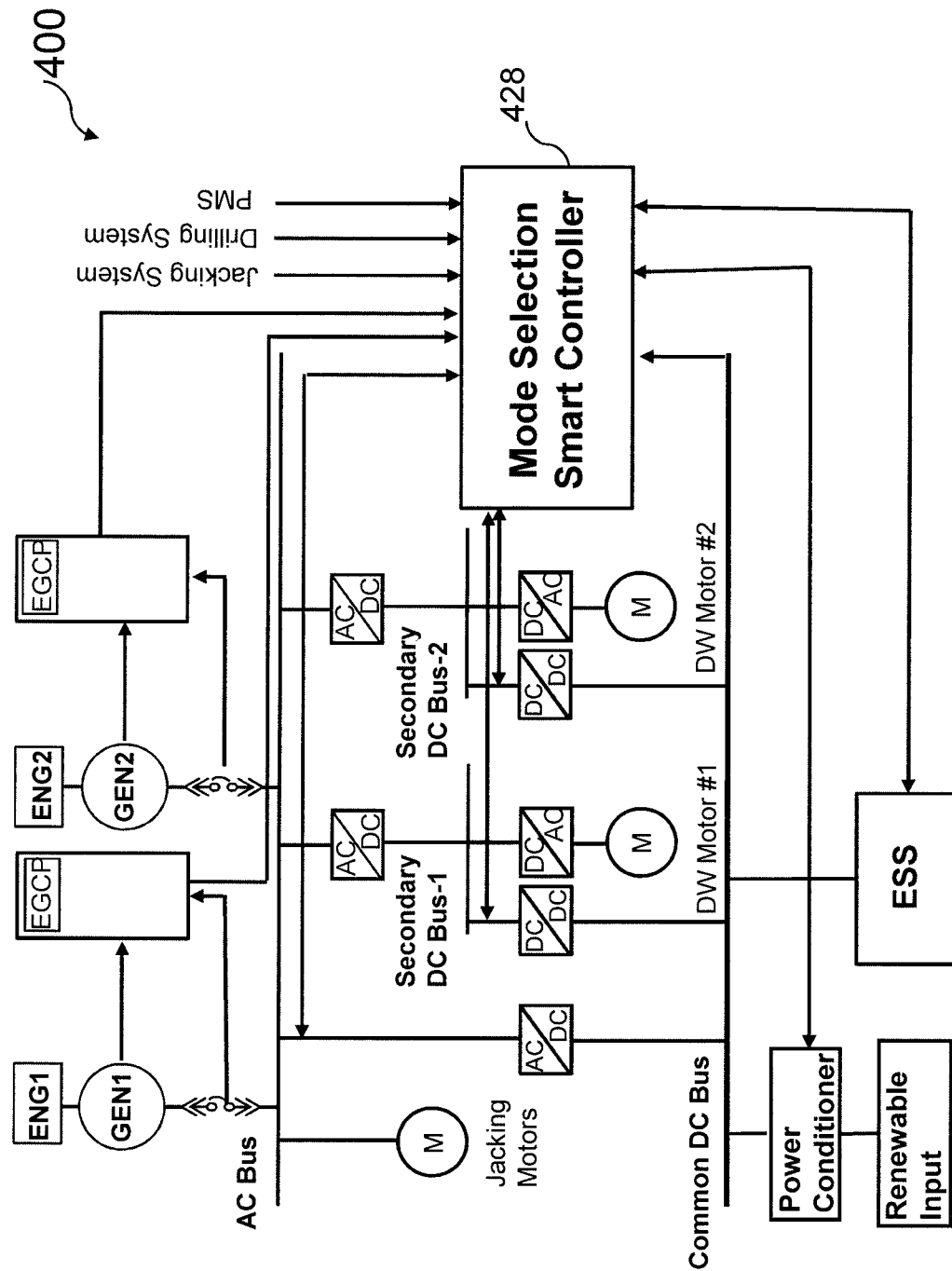


Figure 4

Table 1

S. No.	ESS Features	ESS Status	
		Charge	Discharge
1	Drawworks Regenerative Energy Recovery	✓	✗
2	Jacking Regenerative Energy Recovery	✓	✗
3	Fuel Efficient Operation Mode	✓	✗
4	Jacking Inrush Current Reduction	✗	✓
5	Reduce Drilling DC Power Variation	✗	✓
6	Optimal Discharge Mode	✗	✓
7	Renewable Input	✓	✗

Figure 5 (a)

Table 2

	ESS Features \ Benefits	Energy recovery + Fuel Optimization	Power Quality / Reliability +	Availability	Emissions
1	Drawworks Regenerative Energy Recovery	✓			✓
2	Jacking Regenerative Energy Recovery	✓			✓
3	Fuel Efficient Operation Mode	✓		✓	✓
4	Jacking Inrush Current Reduction		✓		
5	Reduce Drilling DC Power Variation		✓	✓	
6	Optimal discharge mode		✓	✓	
7	Renewable Input	✓			✓

Figure 5 (b)

ITEM	STATUS	
	Charge	Discharge
ESS	✓	✗
	✗	✗
AC Bus	Power in from	✗
	Power out to	✗
Bi-directional AC-DC Converter	Power in from	✗
	Power out to	✗
Common DC Bus	Power in from	Bi-directional DC-DC Converter
	Power out to	ESS
Bi-directional DC-DC Converter	Power in from	Secondary DC Bus-1
	Power out to	Common DC Bus
Secondary DC Bus-1	Power in from	Inverter-1
	Power out to	Bi-directional DC-DC Converter
Rectifier-1	Power in from	AC Bus
	Power out to	Secondary DC Bus-1
Inverter-1	Power in from	DW Motor #1
	Power out to	Secondary DC Bus-1

Figure 6 (b)

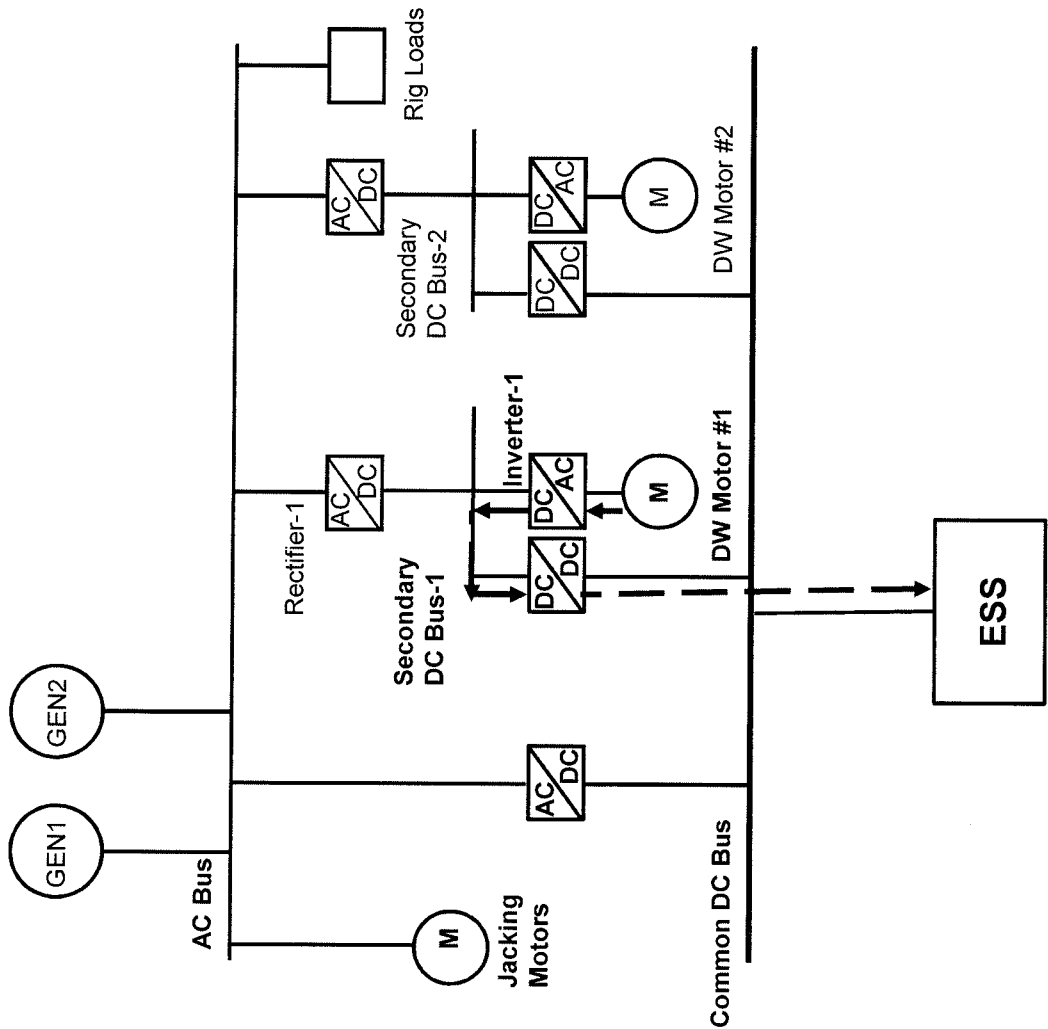


Figure 6 (a)

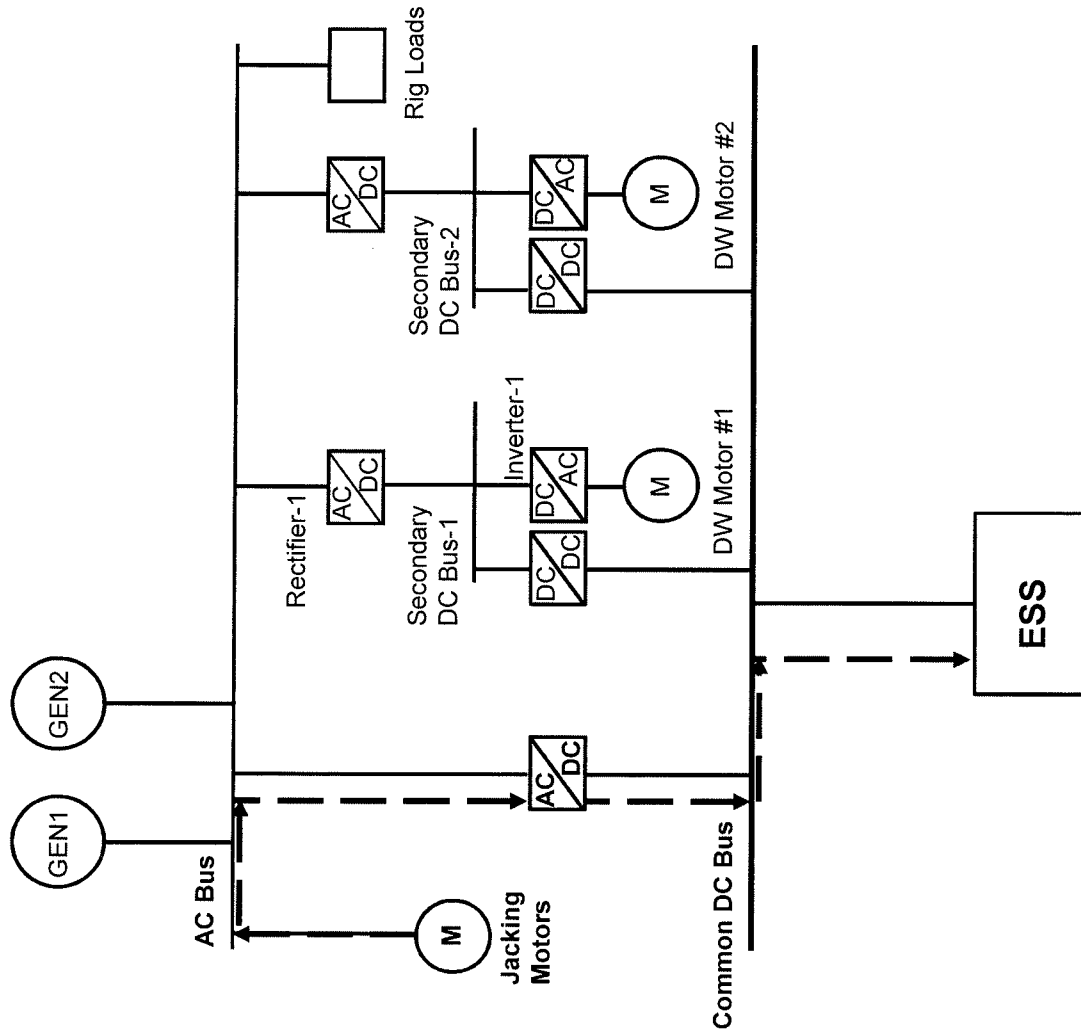


Figure 7 (a)

ITEM	STATUS	
ESS	Charge	✓
	Discharge	✗
AC Bus	Power in from	Jacking Motors
	Power out to	Bi-directional AC-DC Converter
Bi-directional AC-DC Converter	Power in from	AC Bus
	Power out to	Common DC Bus
Common DC Bus	Power in from	Bi-directional AC-DC Converter
	Power out to	ESS
Bi-directional DC-DC Converter	Power in from	✗
	Power out to	✗
Secondary DC Bus-1	Power in from	✗
	Power out to	✗
Rectifier-1	Power in from	✗
	Power out to	✗
Inverter-1	Power in from	✗
	Power out to	✗

Figure 7 (b)

ITEM	STATUS	
	Charge	Discharge
ESS	✓	✗
AC Bus	Power in from	Gensets
	Power out to	Bi-directional AC-DC Converter
Bi-directional AC-DC Converter	Power in from	AC Bus
	Power out to	Common DC Bus
Common DC Bus	Power in from	Bi-directional AC-DC Converter
	Power out to	ESS
Bi-directional DC-DC Converter	Power in from	✗
	Power out to	✗
Secondary DC Bus-1	Power in from	✗
	Power out to	✗
Rectifier-1	Power in from	✗
	Power out to	✗
Inverter-1	Power in from	✗
	Power out to	✗

Figure 8 (b)

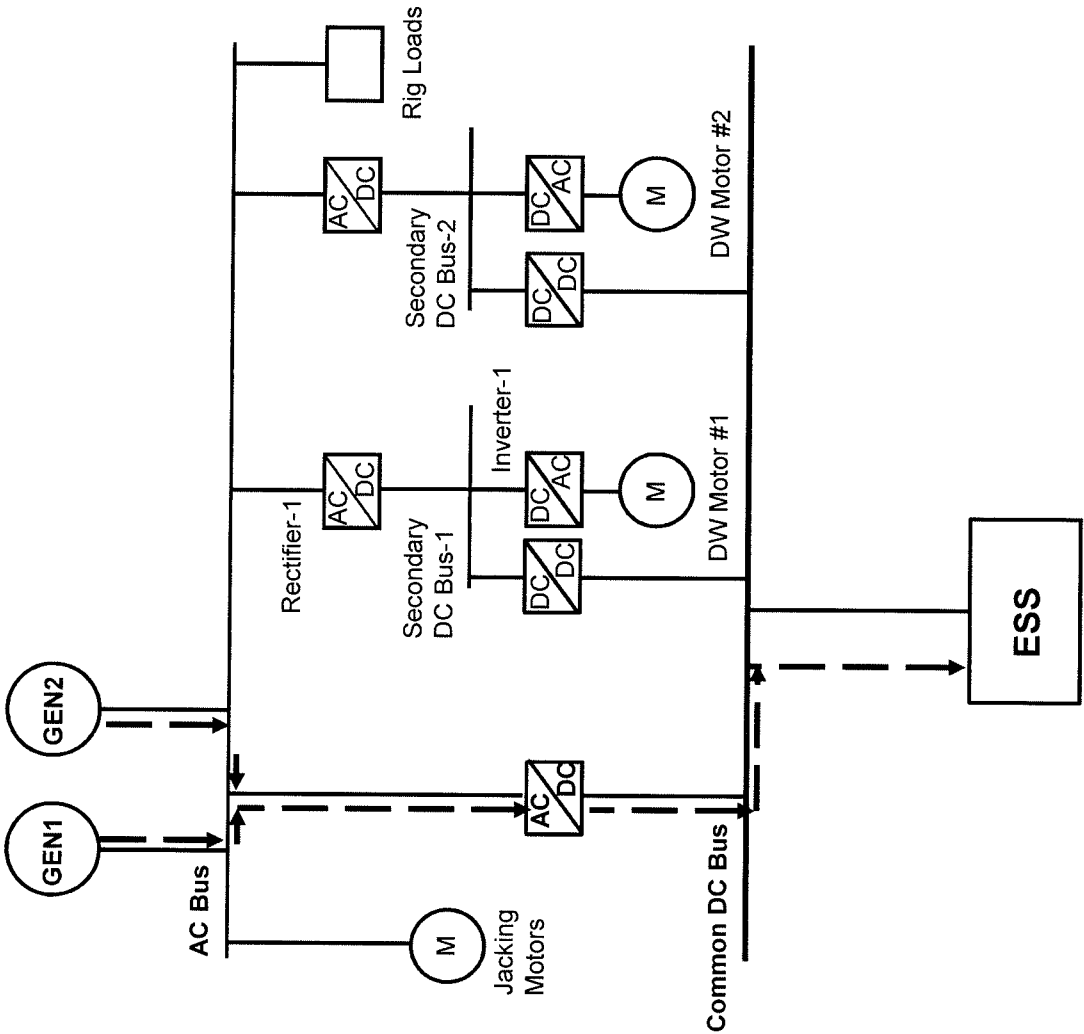


Figure 8 (a)

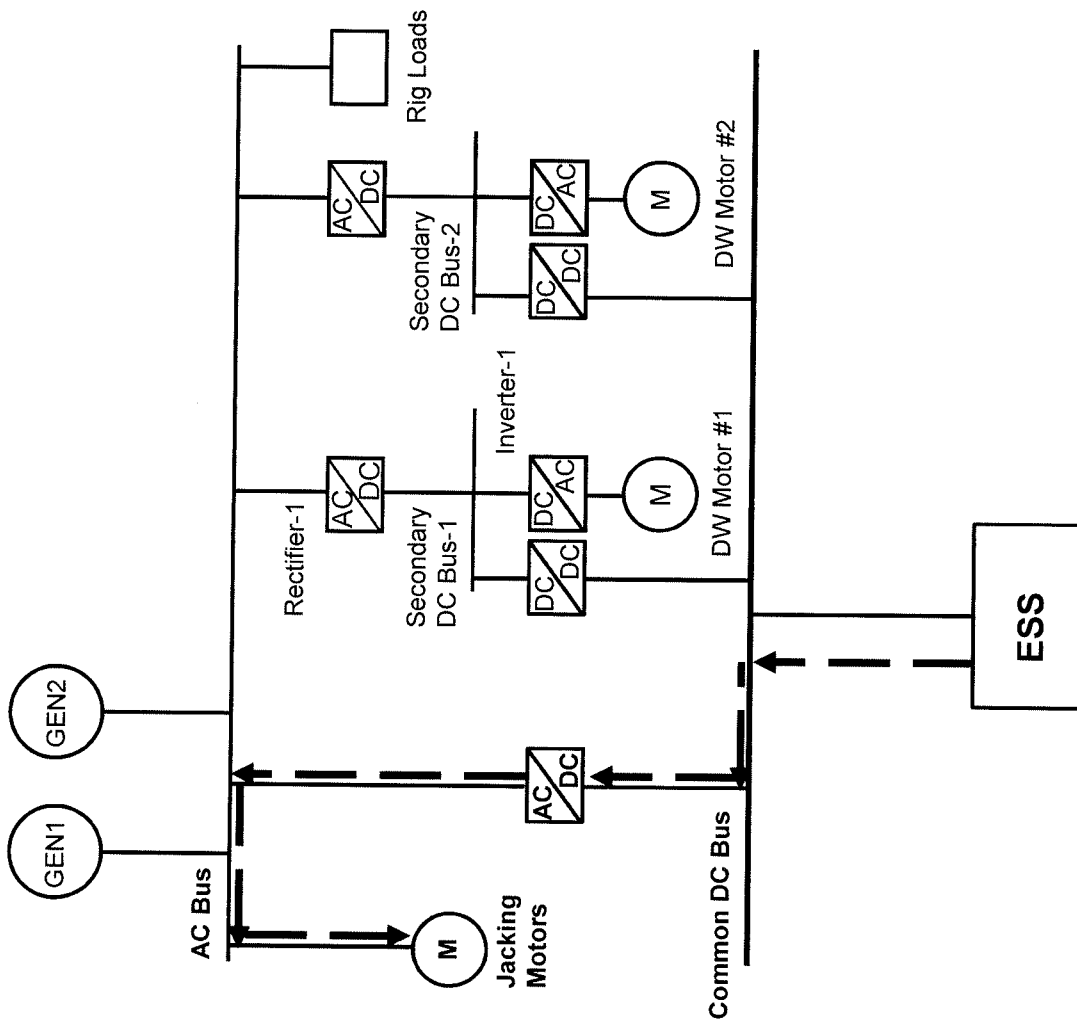


Figure 9 (a)

ITEM	STATUS	
ESS	Charge	✕
	Discharge	✓
AC Bus	Power in from	Bi-directional AC-DC Converter
	Power out to	Jacking Motors
Bi-directional AC-DC Converter	Power in from	Common DC Bus
	Power out to	AC Bus
Common DC Bus	Power in from	ESS
	Power out to	Bi-directional AC-DC Converter
Bi-directional DC-DC Converter	Power in from	✕
	Power out to	✕
Secondary DC Bus-1	Power in from	✕
	Power out to	✕
Rectifier-1	Power in from	✕
	Power out to	✕
Inverter-1	Power in from	✕
	Power out to	✕

Figure 9 (b)

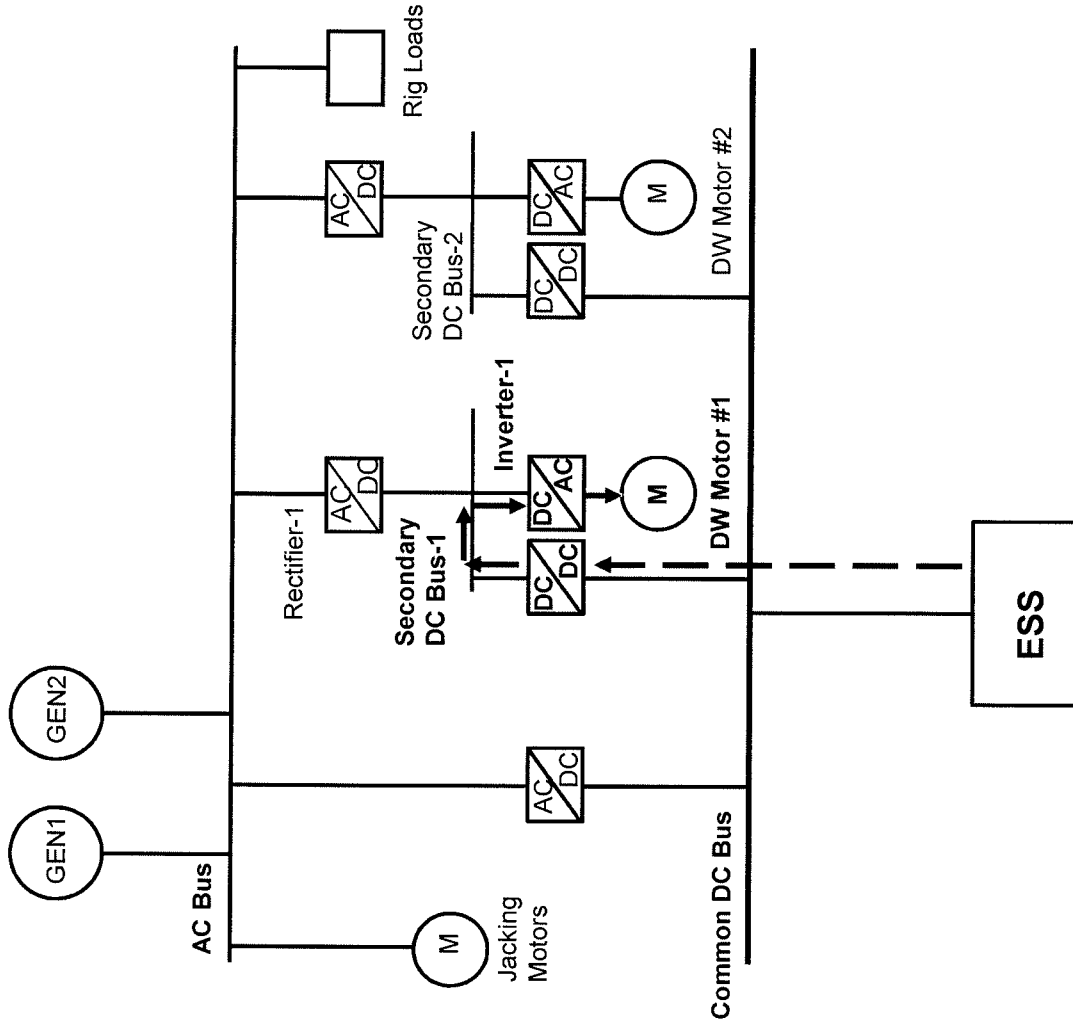


Figure 10 (a)

ITEM	STATUS	
	Charge	Discharge
ESS	×	✓
	Power in from	Power out to
AC Bus	×	×
	Power in from	Power out to
Bi-directional AC-DC Converter	×	×
	Power in from	Power out to
Common DC Bus	ESS	Bi-directional DC-DC Converter
	Power in from	Power out to
Bi-directional DC-DC Converter	Common DC Bus	Secondary DC Bus-1
	Power in from	Power out to
Secondary DC Bus-1	Bi-directional DC-DC Converter	Inverter-1
	Power in from	Power out to
Rectifier-1	×	×
	Power in from	Power out to
Inverter-1	Secondary DC Bus-1	DW Motor #1
	Power in from	Power out to

Figure 10 (b)

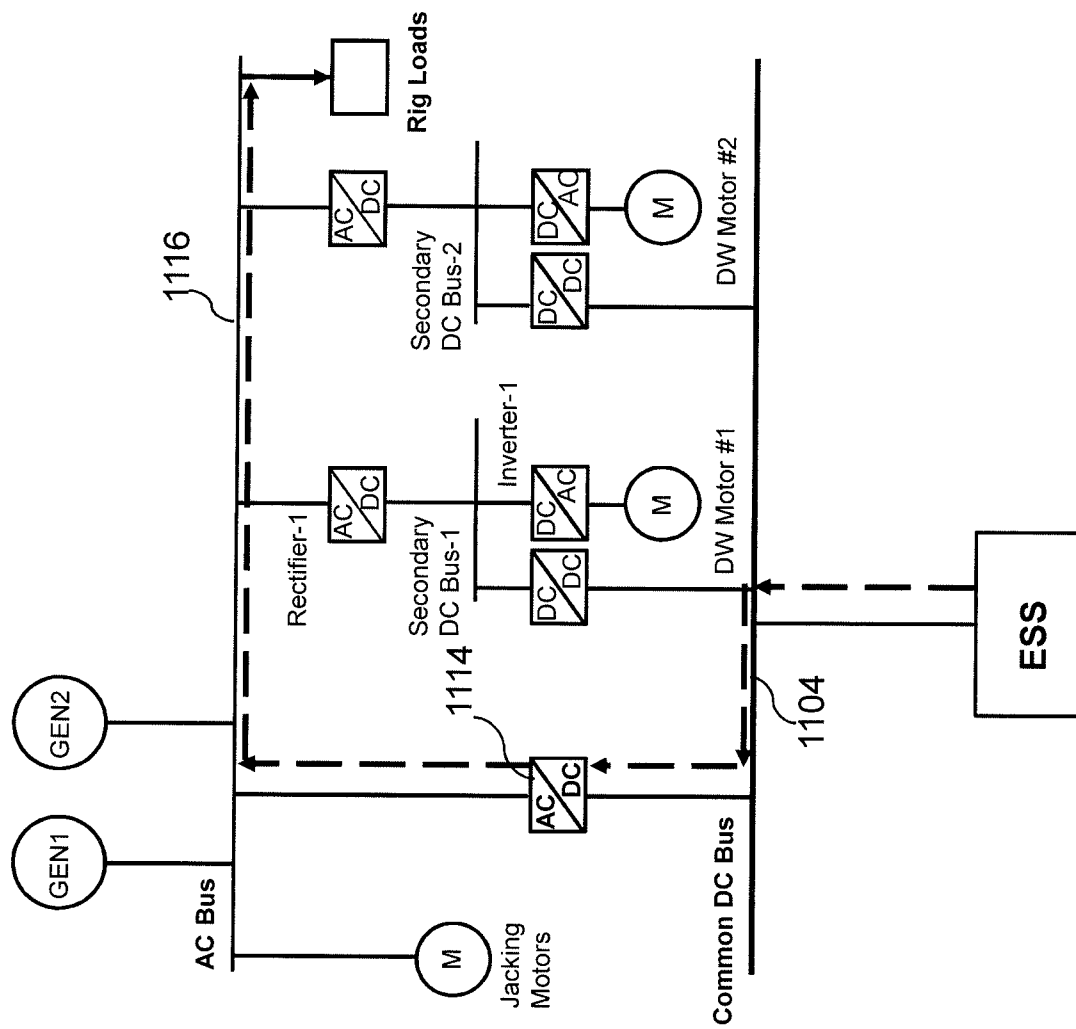


Figure 11 (a)

ITEM	STATUS	
	Charge	
ESS	Charge	x
	Discharge	✓
AC Bus	Power in from	Bi-directional AC-DC Converter
	Power out to	Rig loads
Bi-directional AC-DC Converter	Power in from	Common DC Bus
	Power out to	AC Bus
Common DC Bus	Power in from	ESS
	Power out to	Bi-directional AC-DC Converter
Bi-directional DC-DC Converter	Power in from	x
	Power out to	x
Secondary DC Bus-1	Power in from	x
	Power out to	x
Rectifier-1	Power in from	x
	Power out to	x
Inverter-1	Power in from	x
	Power out to	x

Figure 11 (b)

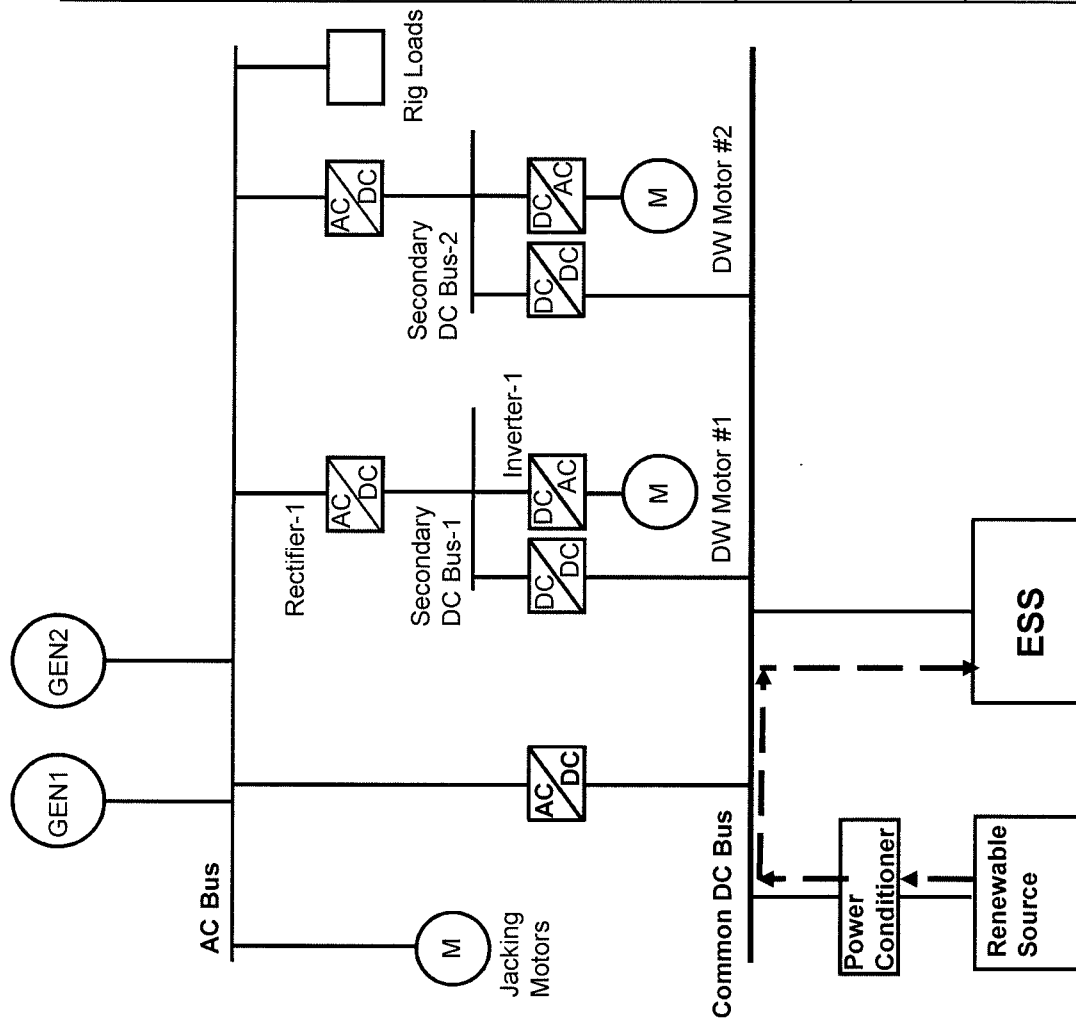


Figure 12 (a)

ITEM	STATUS	
	Charge	
ESS	Discharge	✓
		✗
AC Bus	Power in from	✗
	Power out to	✗
Bi-directional AC-DC Converter	Power in from	✗
	Power out to	✗
Common DC Bus	Power in from	Renewable Input
	Power out to	ESS
Bi-directional DC-DC Converter	Power in from	✗
	Power out to	✗
Secondary DC Bus-1	Power in from	✗
	Power out to	✗
Rectifier-1	Power in from	✗
	Power out to	✗
Inverter-1	Power in from	✗
	Power out to	✗

Figure 12 (b)