ELECTRICAL SYSTEM GUIDE - "ET NON-PROPORTIONAL"

ET8KX-14' (EFAAAC-0***)
&
ET12KX-15' (EGAAAC-0***)

VENCO VENTURO
INDUSTRIES LLC

INTRODUCTION

ABBREVIATIONS USED IN THIS GUIDE

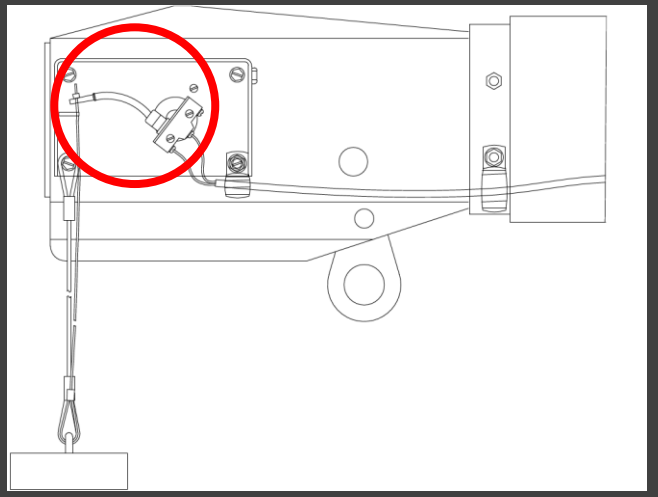
- CRANE FUNCTIONS
  - WU = WINCH UP (RAISE LOAD / PAY IN)
  - WD = WINCH DOWN (LOWER LOAD / PAY OUT)
  - BU = BOOM UP (ELEVATE BOOM)
  - BD = BOOM DOWN (LOWER BOOM)
  - BO = BOOM OUT (EXTEND BOOM)
  - BI = BOOM IN (RETRACT BOOM)
  - RR = ROTATE RIGHT
  - RL = ROTATE LEFT
- A2B = ANTI-TWO-BLOCK

WHY IS IT NECESSARY & WHAT DOES IT DO?

ANTI-TWO-BLOCK SYSTEM,
OVERLOAD PROTECTION SYSTEM,
& TOP POSITION SWITCH

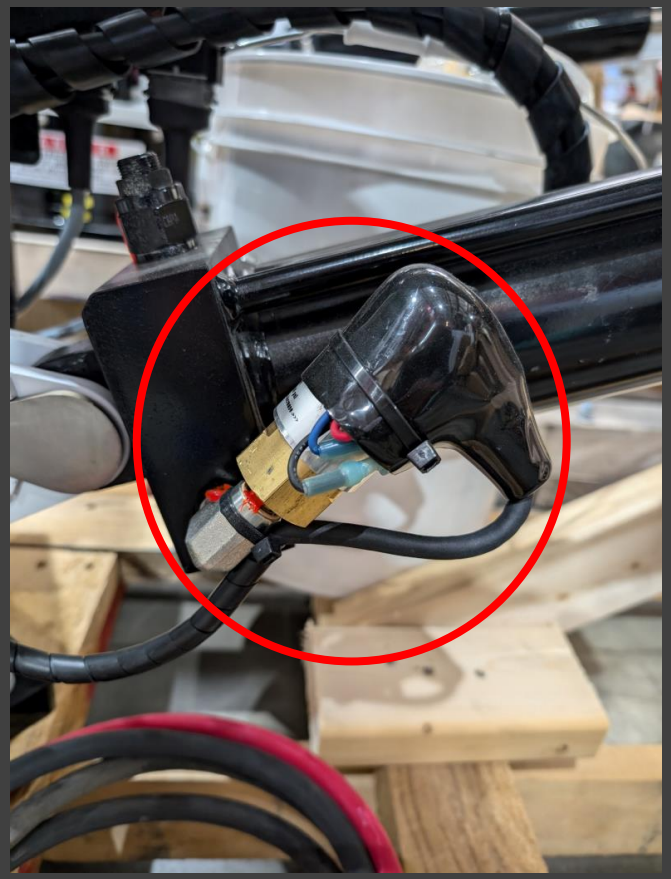
ANTI-TWO-BLOCK (A2B) SYSTEM

- Why Is It Necessary?
  - Prevents over-tensioning of the wirerope which could occur if the load block were to make contact with the boom tip
  - An Anti-Two-Block system is required by ASME/ANSI B30.5 Section 5-1.9.9.1
- How Does It Work?
  - The A2B Switch is located on the boom head (tip)
  - The A2B Switch is a Normally Open (N/O) switch, but it is configured such that during normal operation, the switch itself is actuated and the electrical circuit is Closed
  - The Closed electrical circuit provides a ground path to WU, BD, BO
  - When the hanging weight is contacted by the load block, the tension is taken off the A2B Switch trigger wire and the switch returns to its NON-actuated position and the electrical circuit is Open
  - The Open electrical circuit removes the ground path from WU (relay), BD (valve coil), and BO (valve coil)



OVERLOAD PRESSURE SYSTEM

- Why Is It Necessary?
  - Prevents structural damage to the crane
- What Does It Do?
  - The heart of the system is the Overload Pressure Switch located at the base end of the elevation cylinder
  - The pressure in the base end of the elevation cylinder is used to approximate the stress on the crane due to the load it is lifting at a distance (“overturning moment”)
  - When the Overload Pressure Switch reaches its set pressure, it disconnects the Black Common wire from the Normally Closed Blue/Green wire, removing the ground path from WU (relay), BD (valve coil), and BO (valve coil)



TOP POSITION SWITCH

- Why Is It Necessary?
  - When the elevation cylinder reaches full stroke, the pressure in the base end of the cylinder exceeds the overload pressure, causing the crane to detect an overload condition (it is a “false” overload)
  - Overload disables Boom Down along w/ WU and BO
  - Without the Top Position Switch, the boom would be stuck at full elevation without any way to lower it, since Boom Down would be disabled
- What Does It Do?
  - Located on the front bulkhead of the housing near the base of the elevation cylinder
  - Normally Open (N/O) switch
  - When boom is fully elevated, switch is actuated by elevation cylinder base
  - Once actuated, switch provides alternate ground to Boom Down valve solenoid coil, allowing boom to be lowered

TROUBLESHOOTING

TOOLS / ITEMS NEEDED

- Multimeter with +12 VDC and Continuity/Resistance measurement capability
- Needle Nose Pliers
- Side Cutters (to cut zip ties)
- Zip Ties

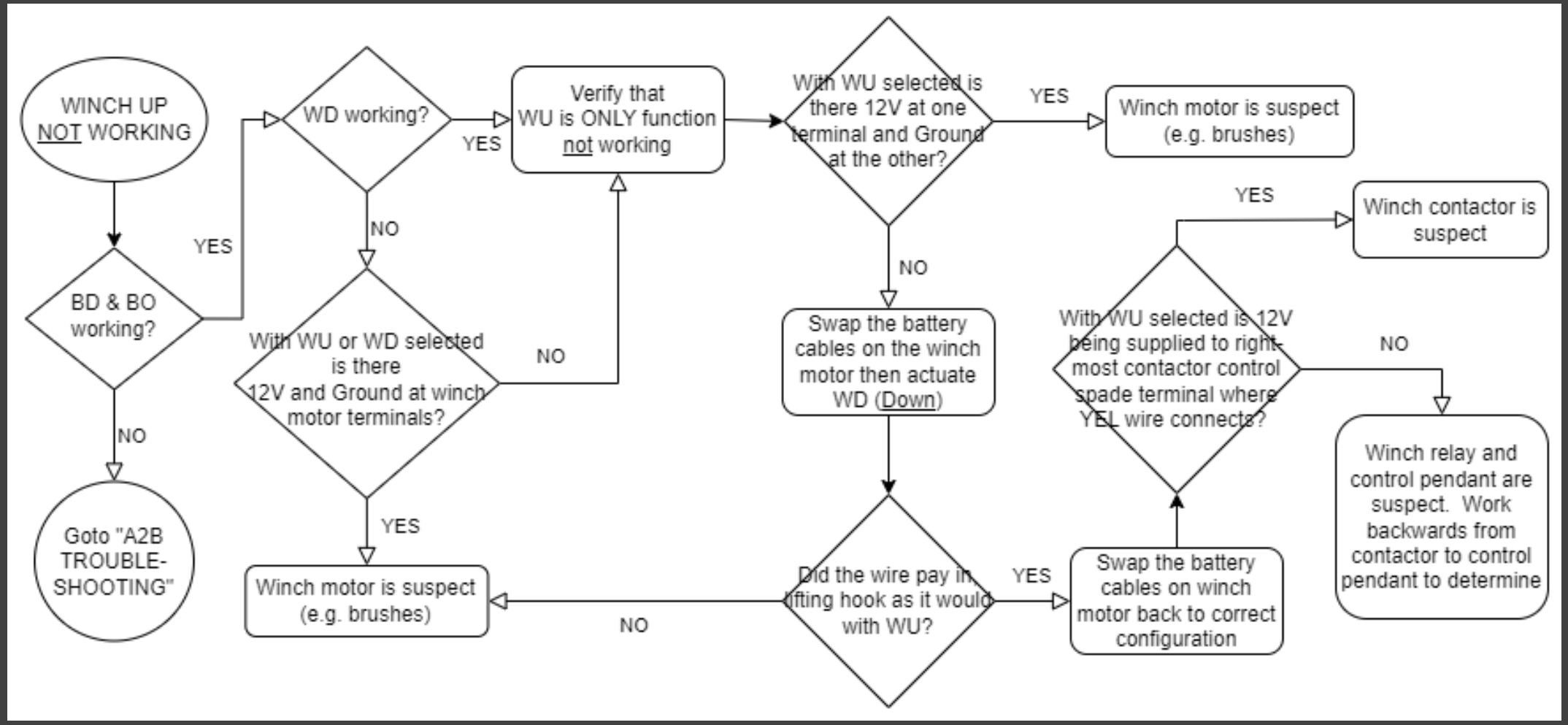
TESTING FOR GROUND

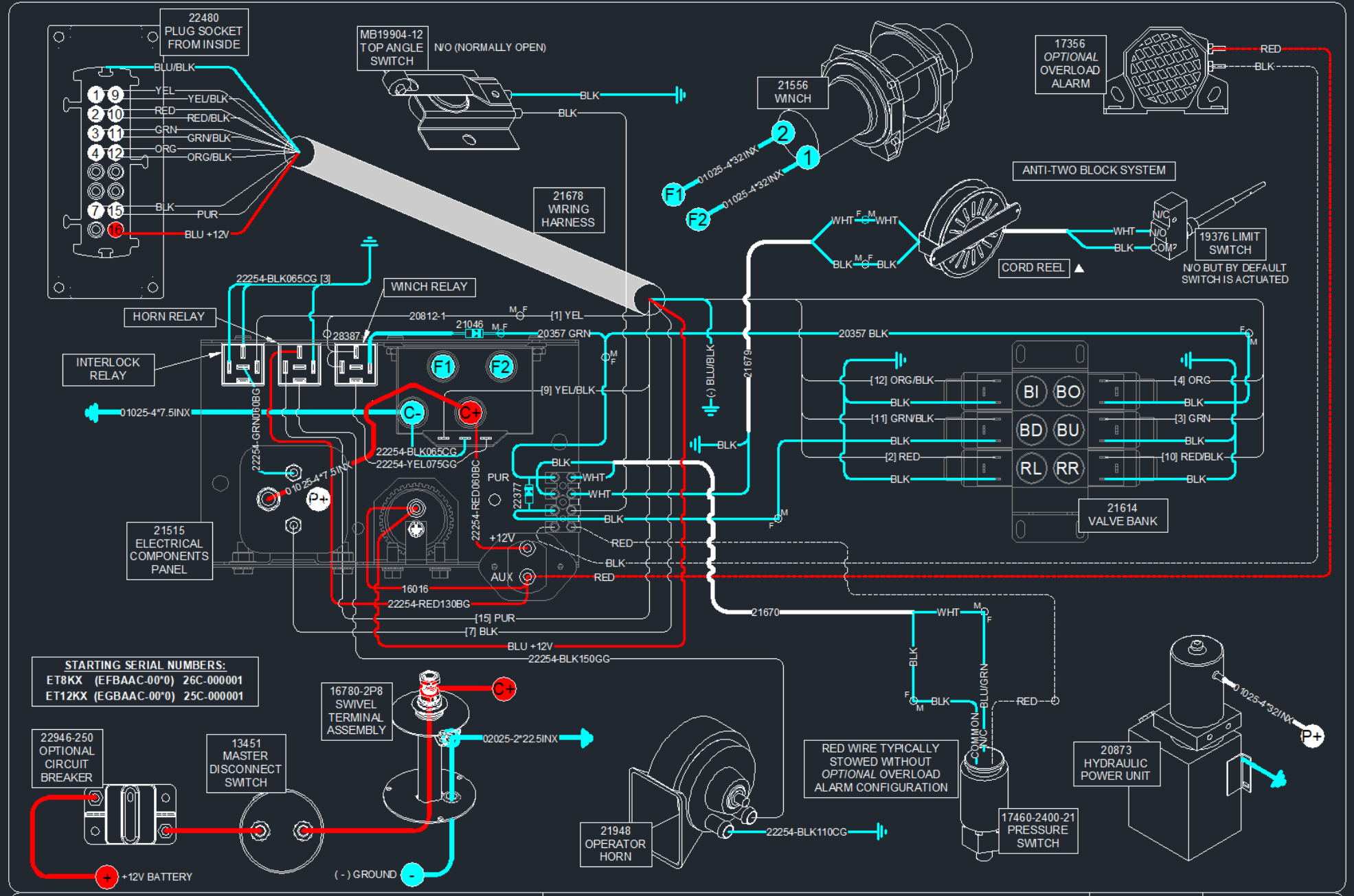
- Use Multimeter set to Continuity/Resistance measurement – ideally an audible alarm sounds when continuity is detected
- Touch probes together to make sure you either hear continuity alert OR register 0 ohms – in other words, you need to know how your multimeter indicates “continuity”
- Put one probe on the wire to be tested
- Touch other probe on a bolt that is threaded into the crane housing

TESTING FOR +12 V (DC)

- Use Multimeter set to DC Voltage measurement
- Put red probe on the +12 V source to be tested
- Put black probe on a bolt that is threaded into the crane housing
- You should see +12 V (or more) with an unloaded crane, and at least +9 V with a fully-loaded crane (e.g. when hydraulic power unit is operating against the internal relief valve)

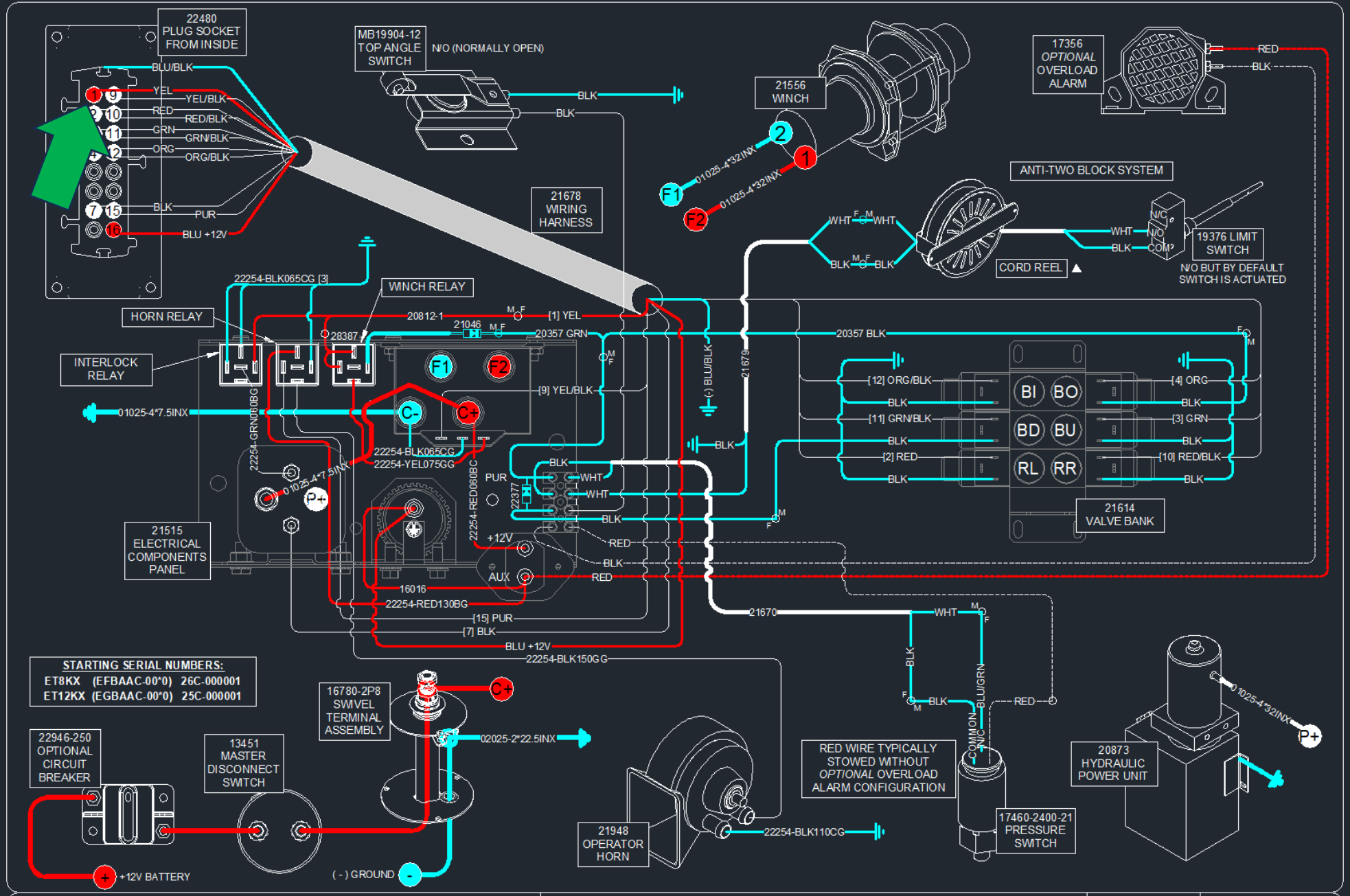
WINCH UP (WU) NOT WORKING





POWER "ON" – NOMINAL

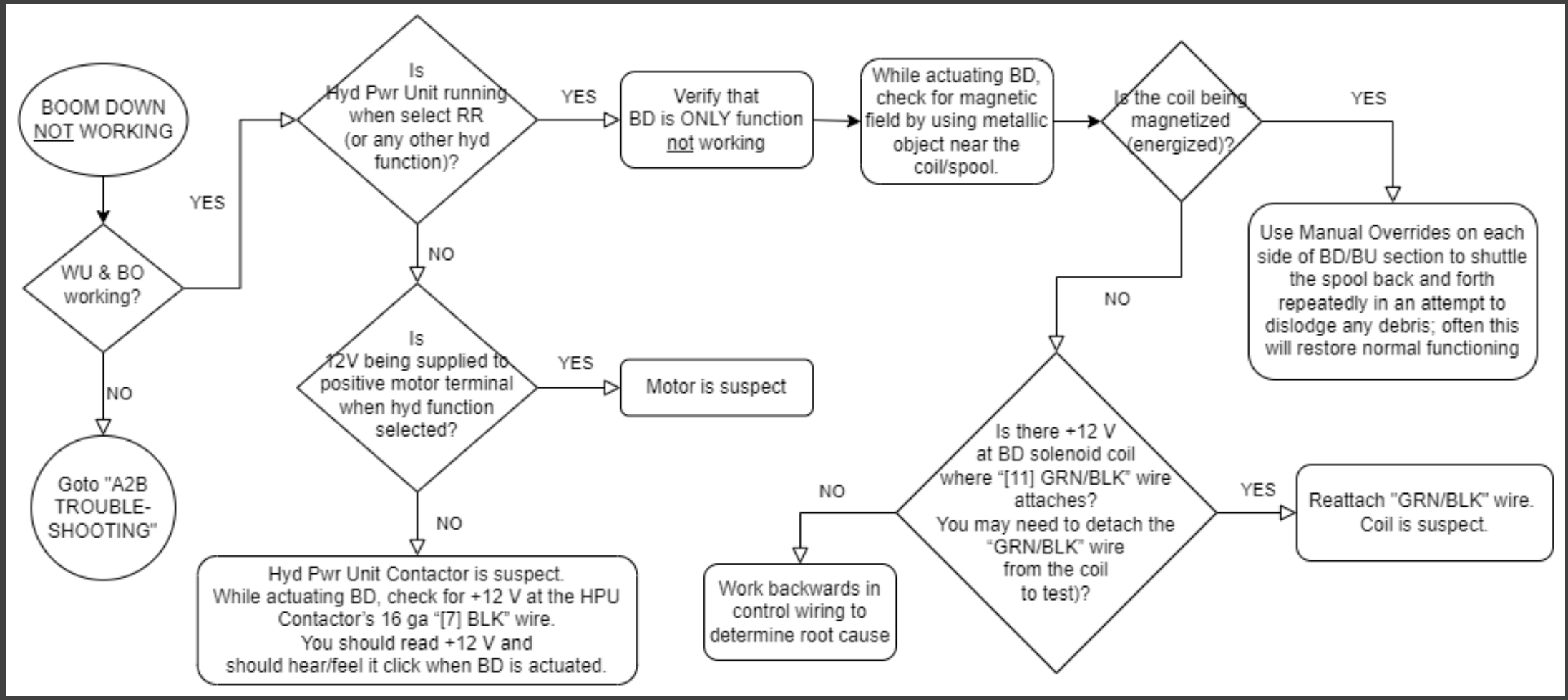
TITLE	DATE	SECTION
WIRING DIAGRAM	03-29-24B	C400
ET8/12KX W/ WINCH RELAY, COMEUP/WARN	SUPERSEDES 01-16-24A	26537

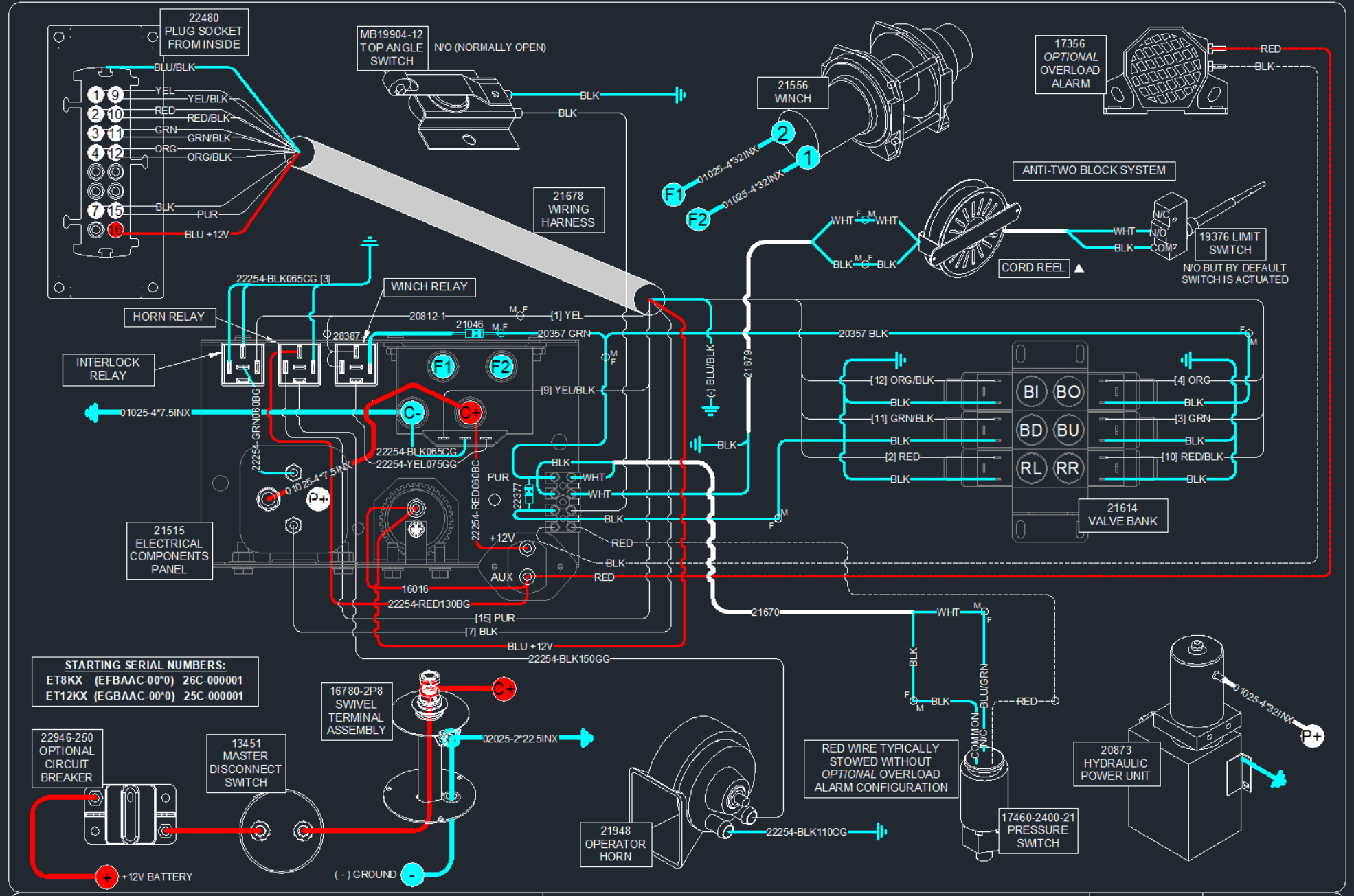


WINCH UP ACTUATED

TITLE	DATE	SECTION
WIRING DIAGRAM	03-29-24B	C400
ET8/12KX W/ WINCH RELAY, COMEUP/WARN	SUPERSEDES 01-16-24A	26537

BOOM DOWN (BD) NOT WORKING





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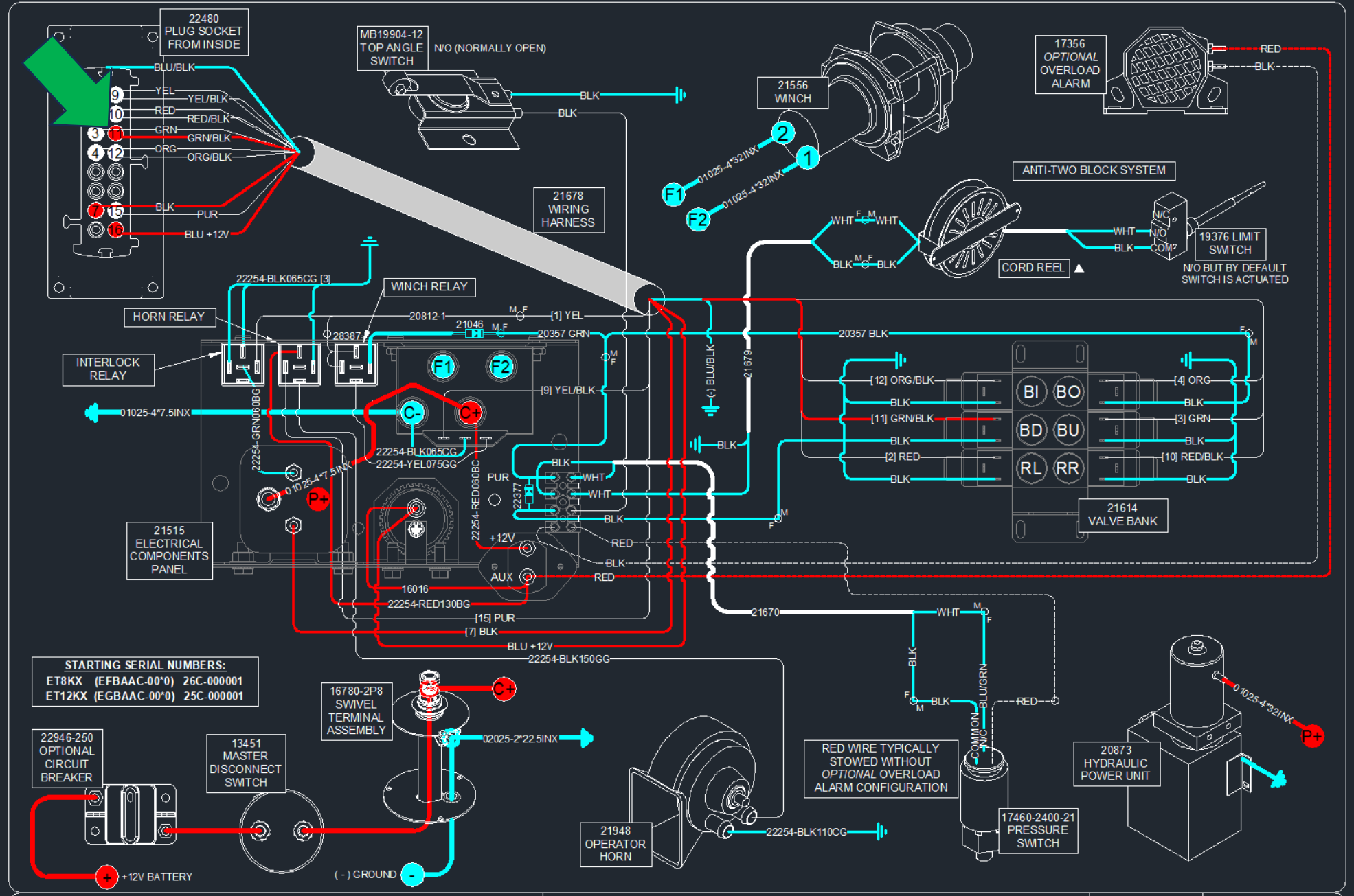
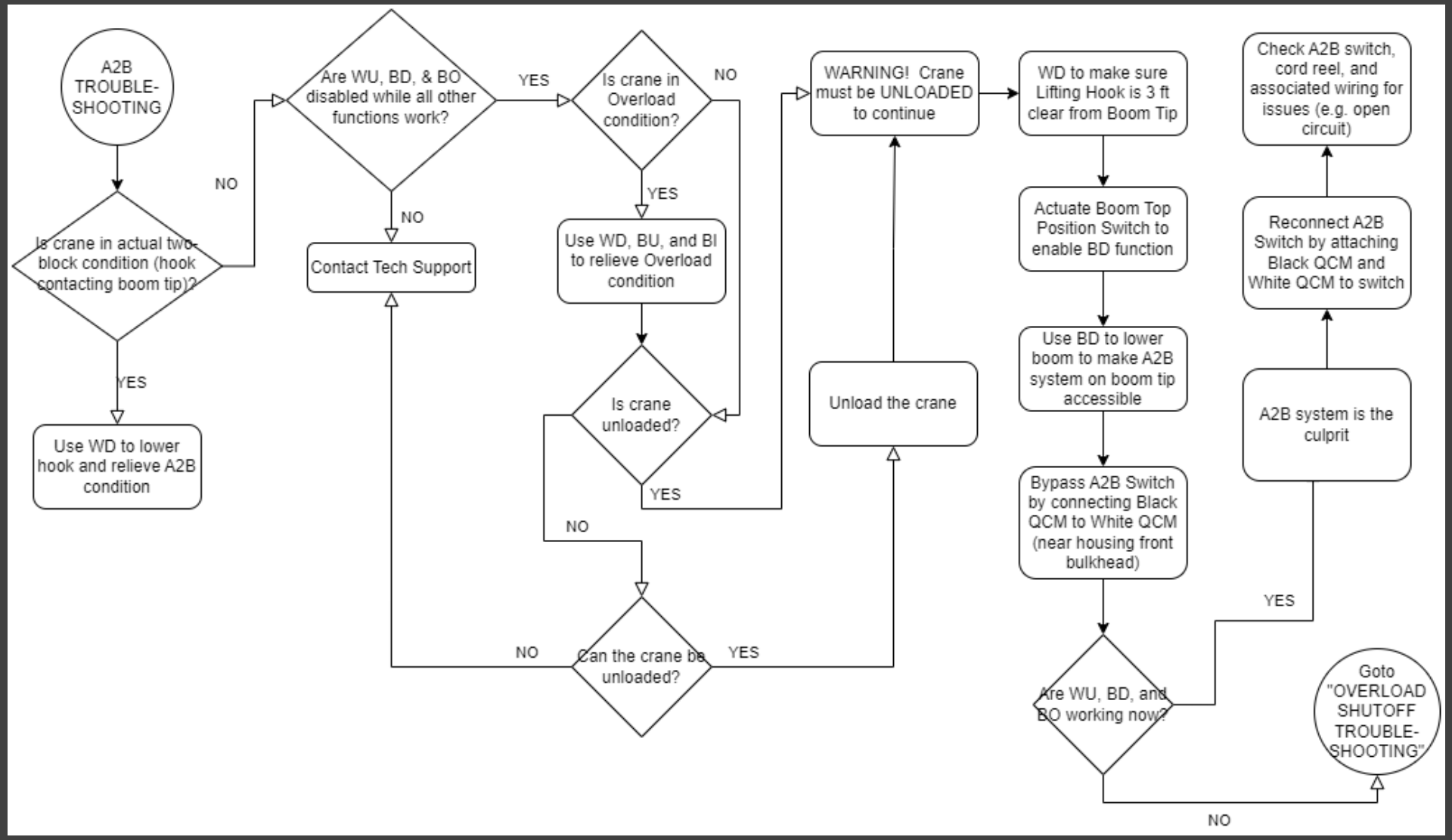
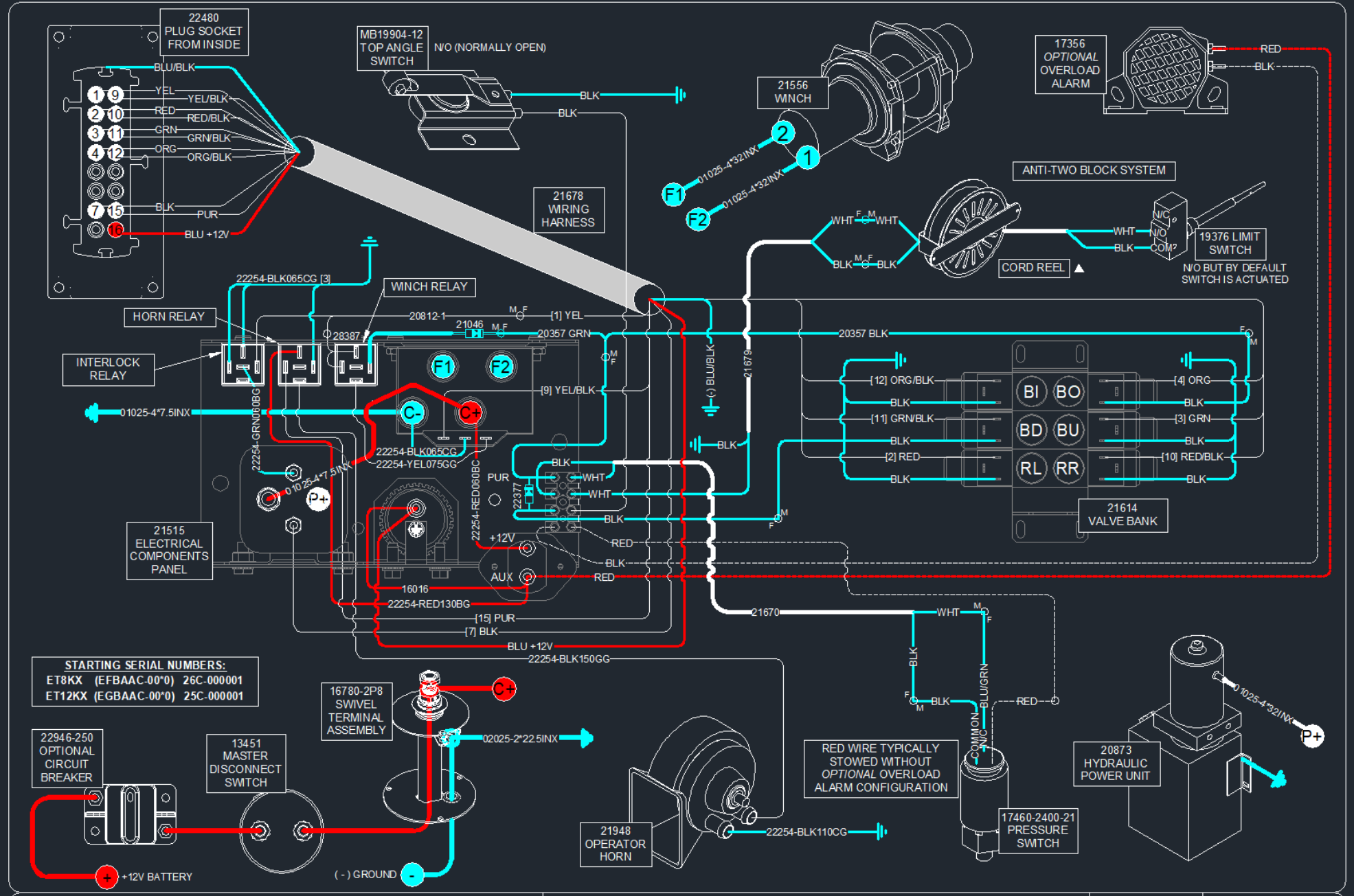


BOOM DOWN ACTUATED

TITLE: WIRING DIAGRAM		DATE: 03-29-24B	SECTION: C400
ET8/12KX W/ WINCH RELAY, COMEUP/WARN		SUPERSEDES: 01-16-24A	26537

A2B (ANTI-2-BLOCK) TROUBLESHOOTING





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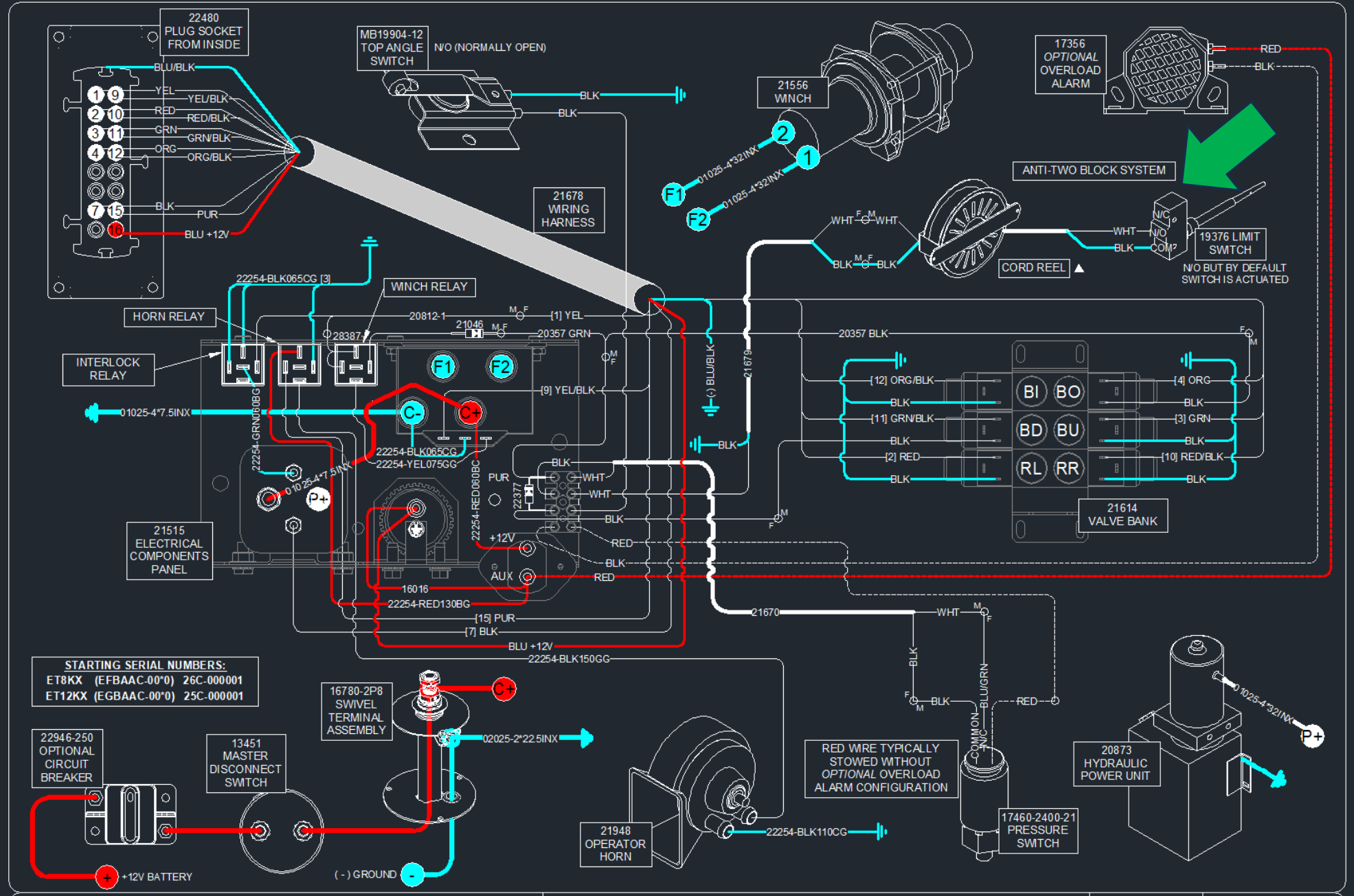


A2B CONDITION (SWITCH RELAXED)

TITLE	DATE	SECTION
WIRING DIAGRAM	03-29-24B	C400
ET8/12KX W/ WINCH RELAY, COMEUP/WARN	SUPERSEDES 01-16-24A	26537

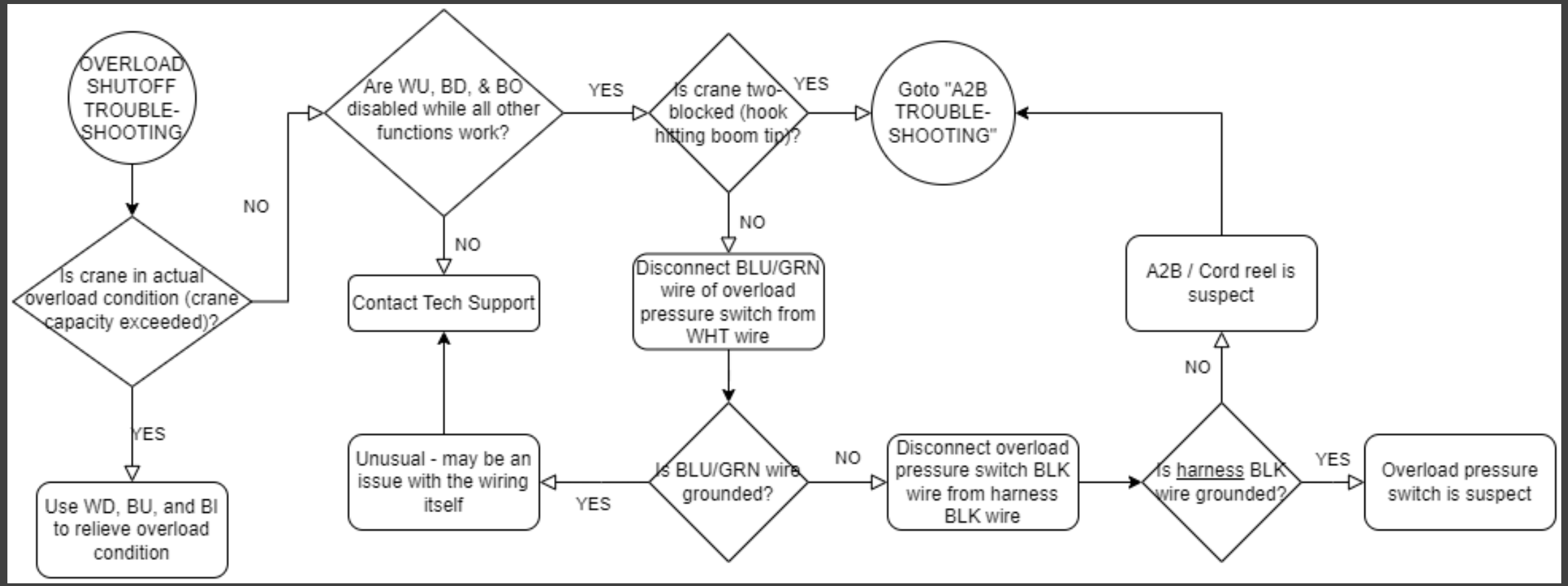
Top Position Switch

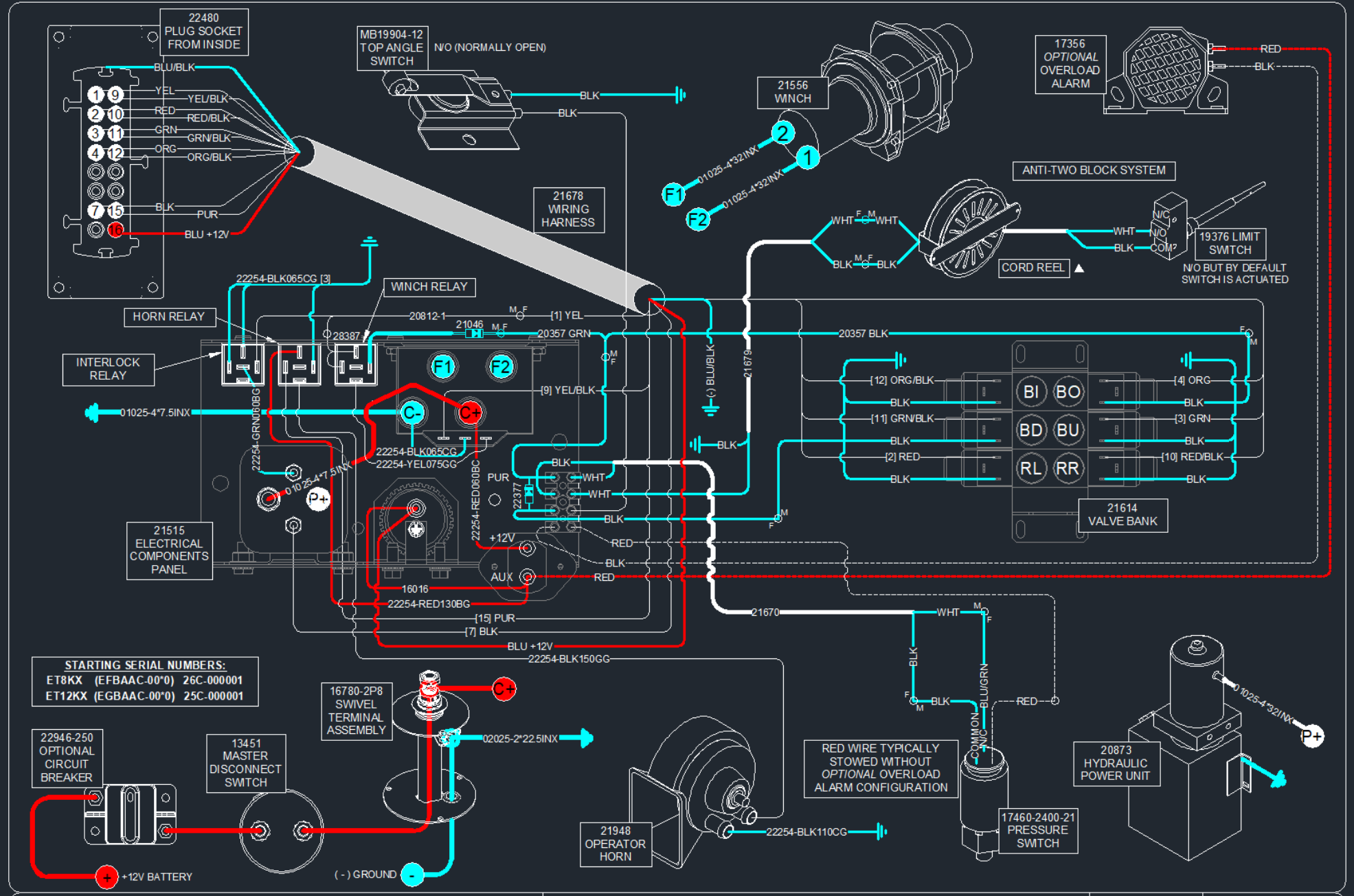
A2B Switch

Normal operation:
Tension on wire connected to wand switch and wand switch actuated

A2B condition:
No tension on wire connected to wand switch and wand switch not actuated

OVERLOAD SHUTOFF TROUBLESHOOTING





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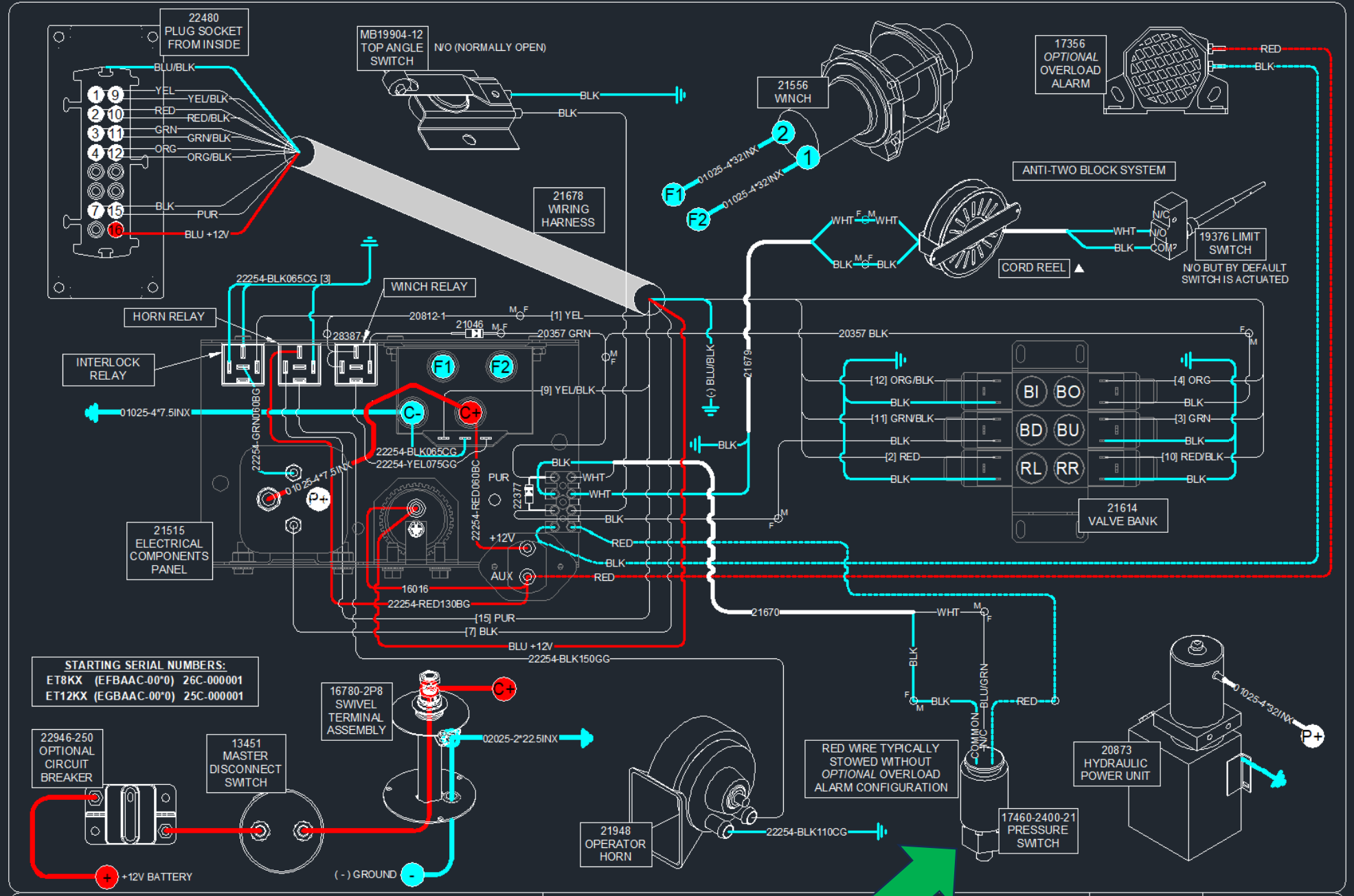
22480
PLUG SOCKET
FROM INSIDE
BLU/BLK
YEL
YEL/BLK
RED
RED/BLK
GRN
GRN/BLK
ORG
ORG/BLK
BLK
PUR
BLU +12V
MB19904-12
TOP ANGLE
SWITCH
N/O (NORMALLY OPEN)
BLK
BLK
21556
WINCH
01025-4*32INX
01025-4*32INX
F1
F2
17356
OPTIONAL
OVERLOAD
ALARM
RED
BLK
21678
WIRING
HARNESS
ANTI-TWO BLOCK SYSTEM
WHT
WHT
BLK
BLK
CORD REEL
WHT
BLK
19376 LIMIT
SWITCH
N/O BUT BY DEFAULT
SWITCH IS ACTUATED
22254-BLK065CG [3]
WINCH RELAY
HORN RELAY
20812-1
21046
[1] YEL
28387
20357 GRN
INTERLOCK
RELAY
[9] YEL/BLK
01025-4*7.5INX
22254-GRN060BG
C-
C+
22254-BLK065CG
22254-YEL075GG
22254-RED060BG
P+
01025-4*7.5INX
PUR
22377
BLK
WHT
WHT
BLK
RED
BLK
RED
+12V
AUX
16016
22254-RED130BG
[15] PUR
[7] BLK
BLU +12V
22254-BLK150GG
(-) BLU/BLK
21679
BLK
20357 BLK
[12] ORG/BLK
BLK
[11] GRN/BLK
BLK
[2] RED
BLK
BI
BO
BD
BU
RL
RR
[4] ORG
BLK
[3] GRN
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[10] RED/BLK
BLK
21614
VALVE BANK
21515
ELECTRICAL
COMPONENTS
PANEL
21670
WHT
BLK
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COMMON
N/C
STARTING SERIAL NUMBERS:
ET8KX (EFBAAC-00*0) 26C-000001
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16780-2P8
SWIVEL
TERMINAL
ASSEMBLY
C+
02025-2*22.5INX
22946-250
OPTIONAL
CIRCUIT
BREAKER
13451
MASTER
DISCONNECT
SWITCH
+12V BATTERY
(-) GROUND
21948
OPERATOR
HORN
22254-BLK110CG
RED WIRE TYPICALLY
STOWED WITHOUT
OPTIONAL OVERLOAD
ALARM CONFIGURATION
17460-2400-21
PRESSURE
SWITCH
20873
HYDRAULIC
POWER UNIT
01025-4*32INX
P+
OVERLOAD CONDITION
TITLE
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ET8/12KX W/ WINCH RELAY, COMEUP/WARN
DATE
03-29-24B
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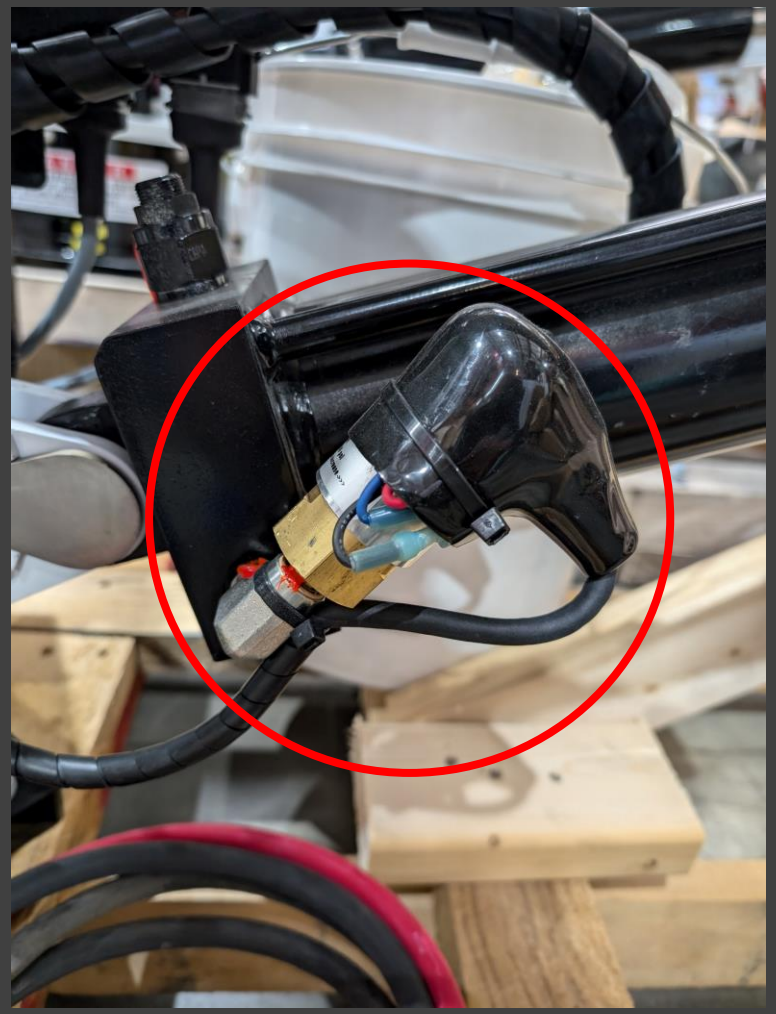
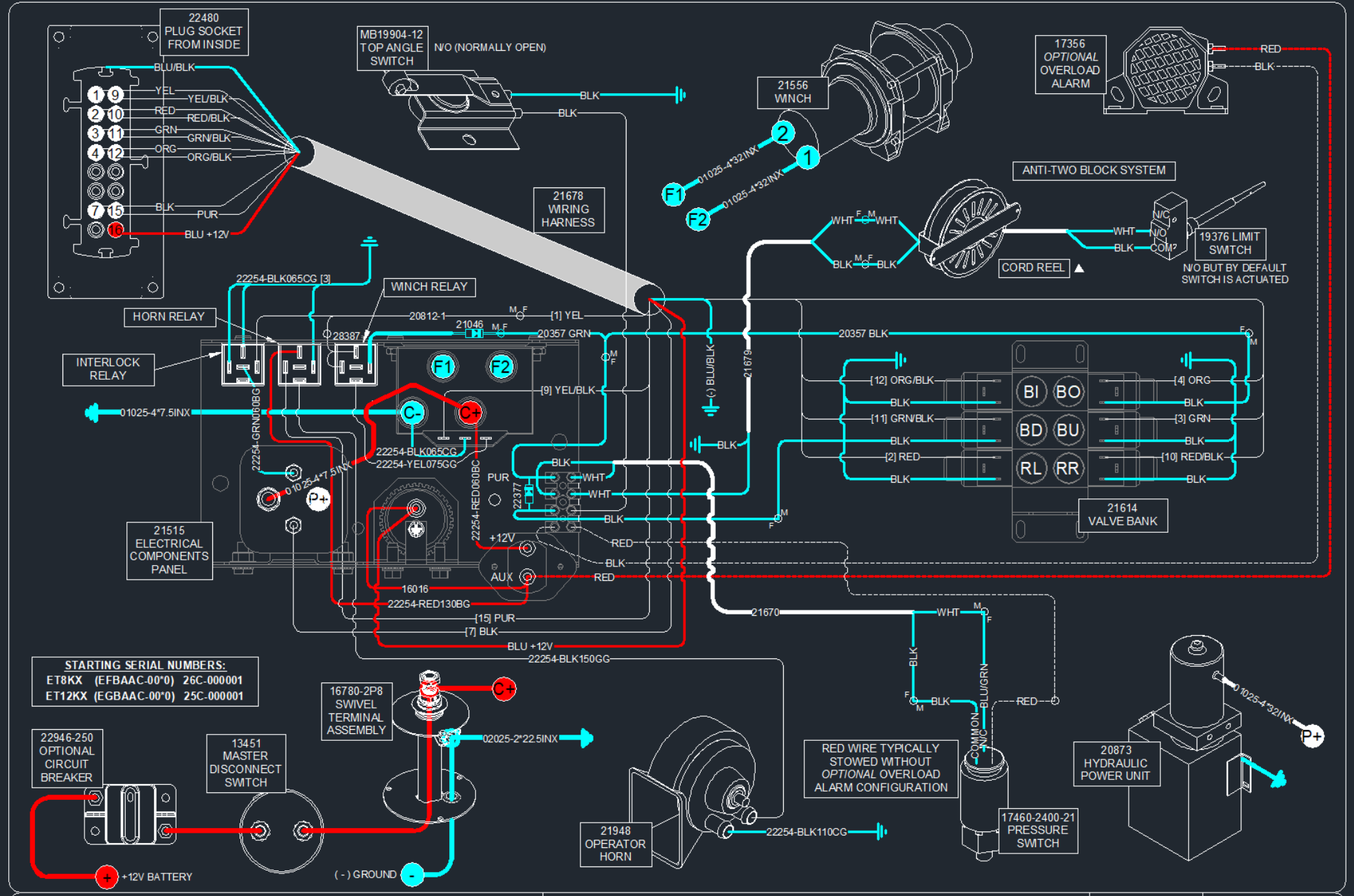
Overload Pressure Switch



ELECTRICAL SCHEMATICS



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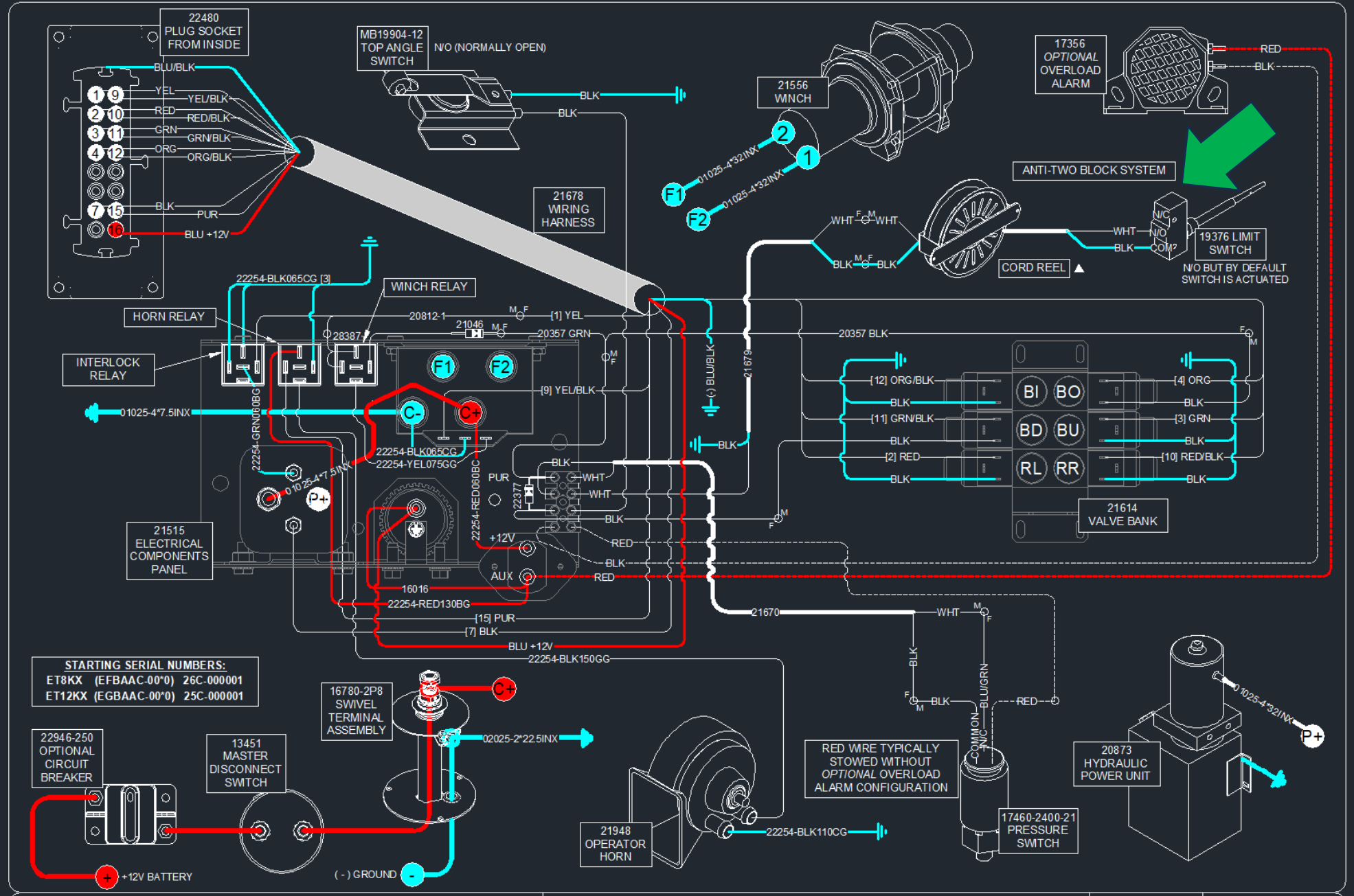

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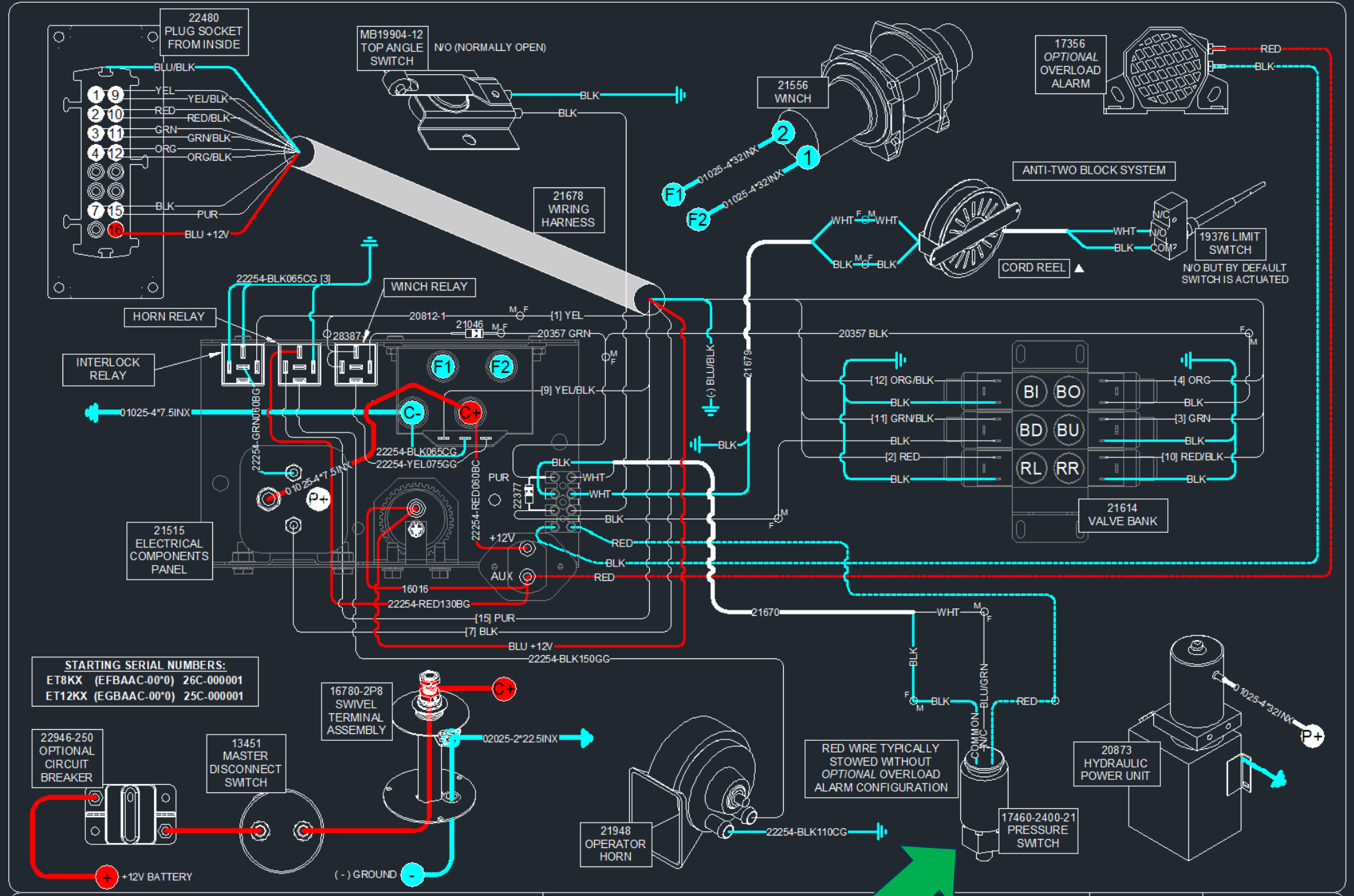
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OVERLOAD CONDITION
TITLE
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ET8/12KX W/ WINCH RELAY, COMEUP/WARN
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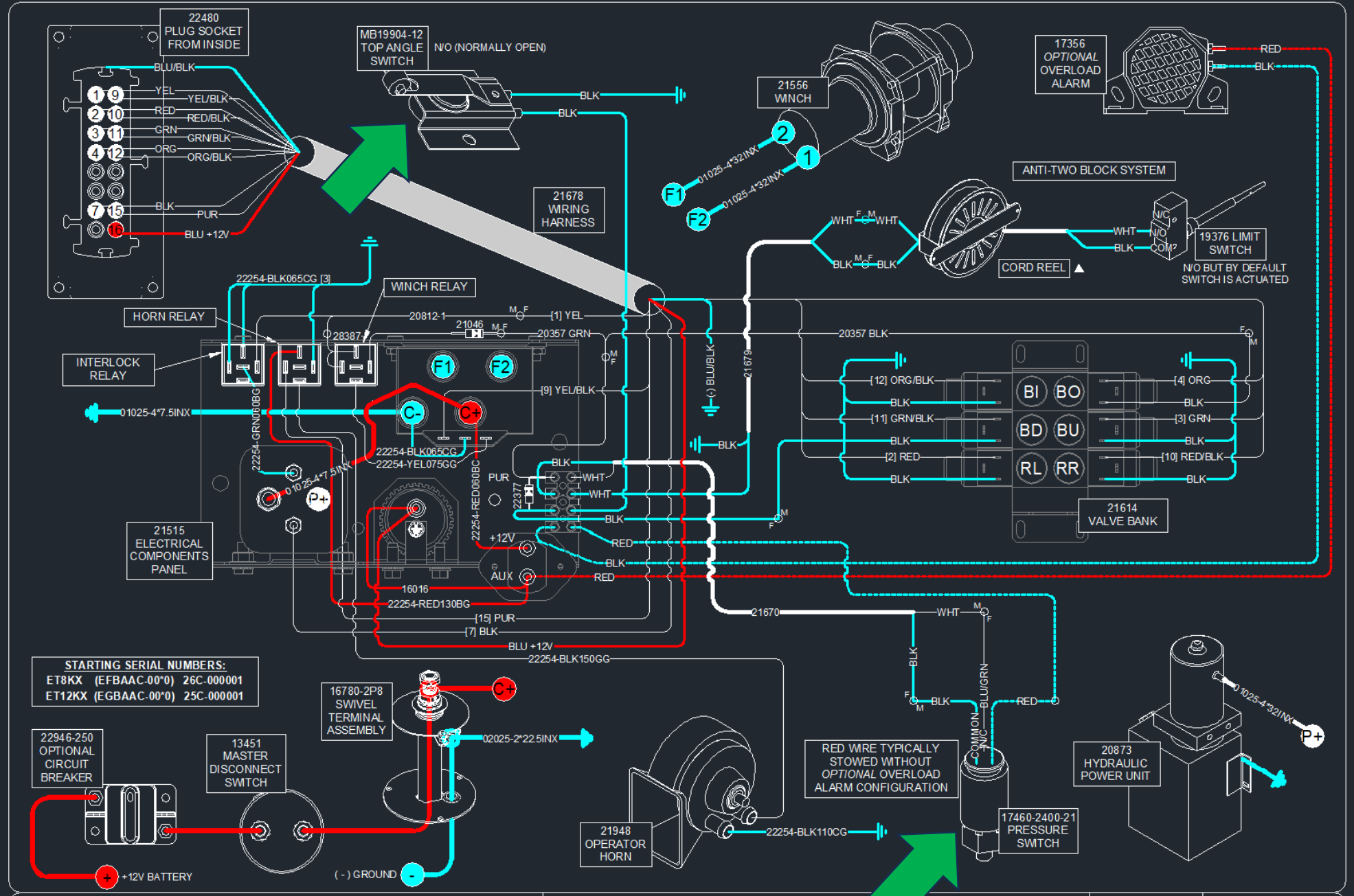

TOP POSITION SWITCH ACTUATED IN OVERLOAD CONDITION

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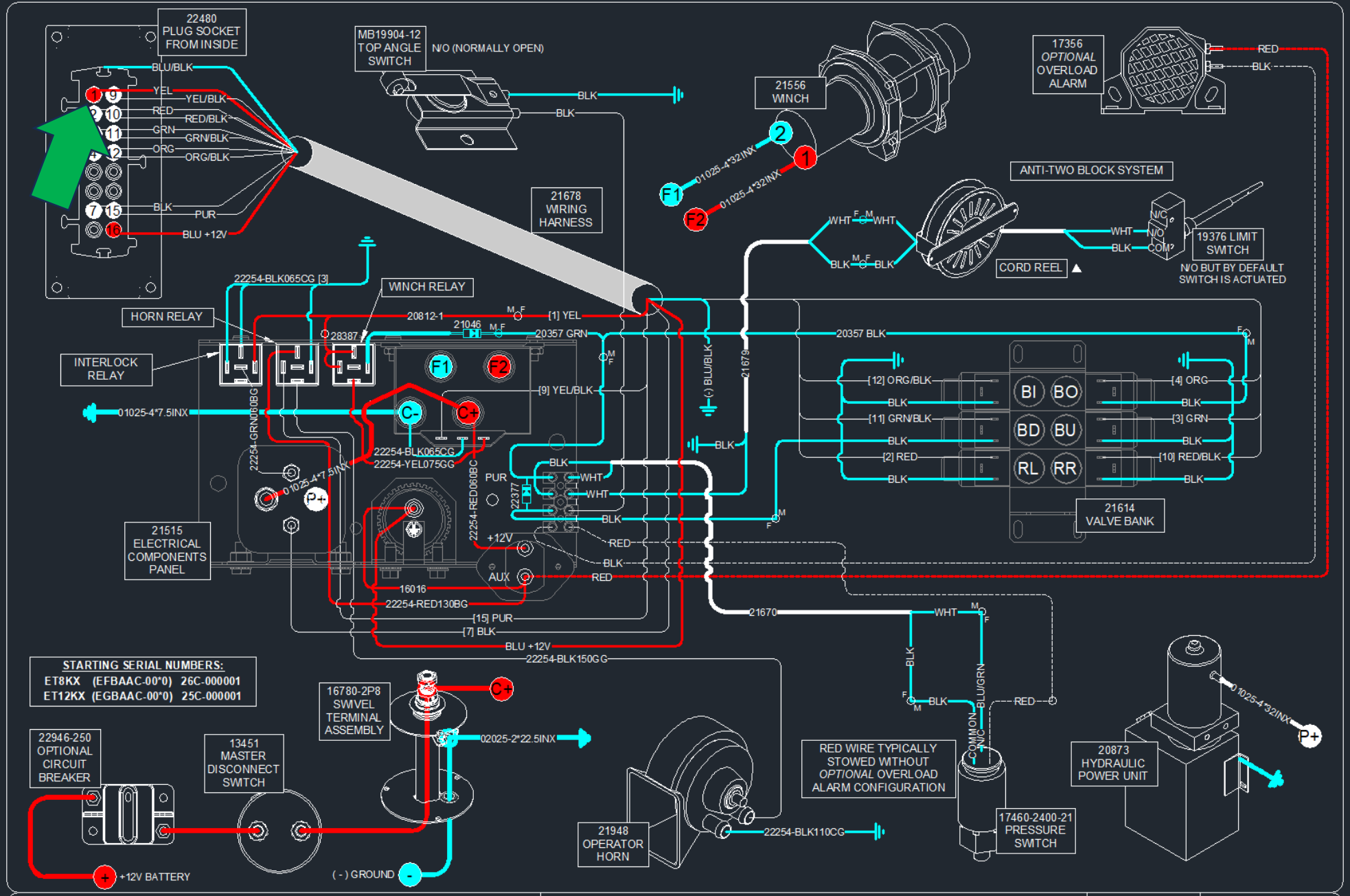

WINCH UP ACTUATED

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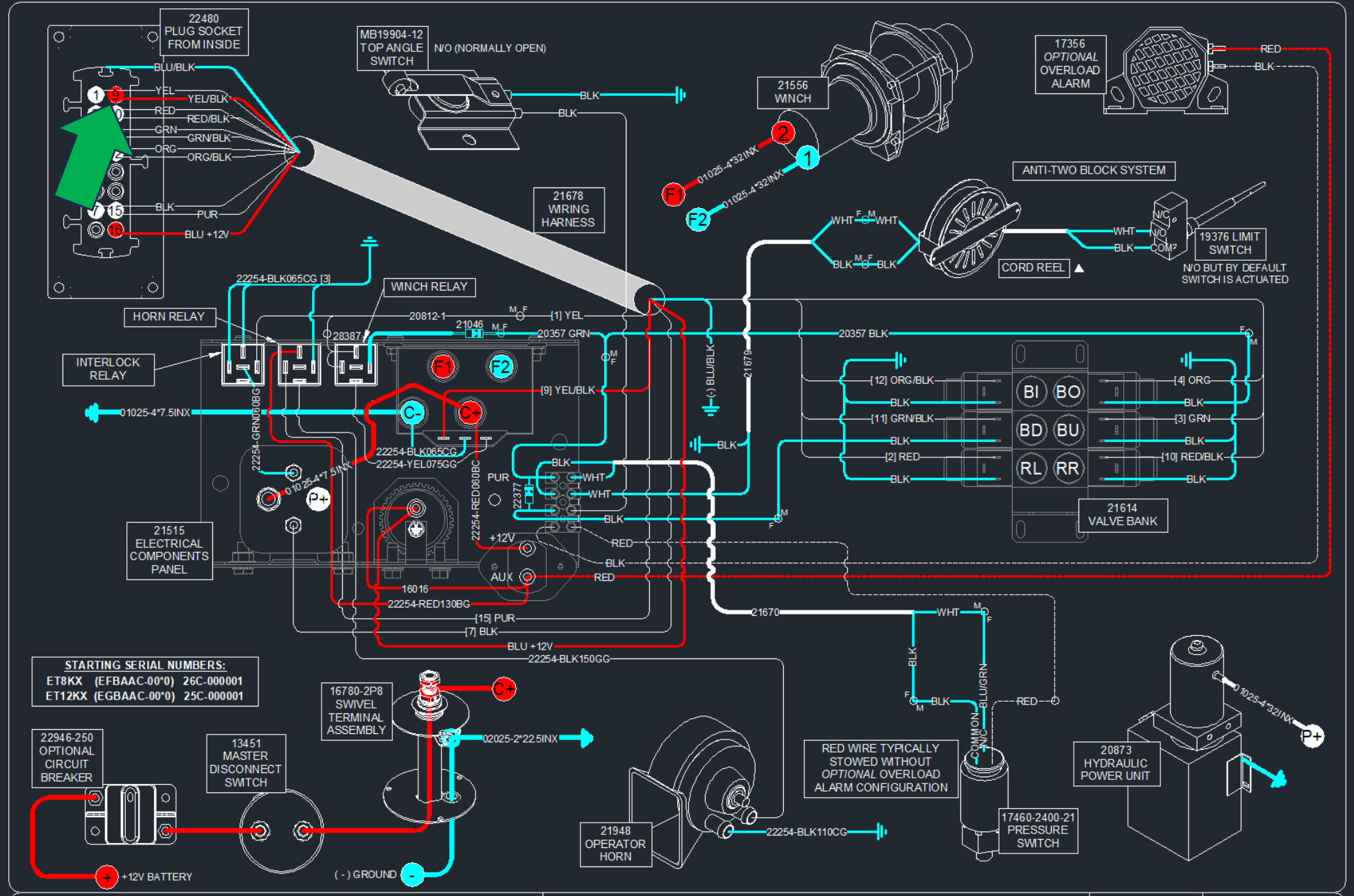

WINCH DOWN ACTUATED

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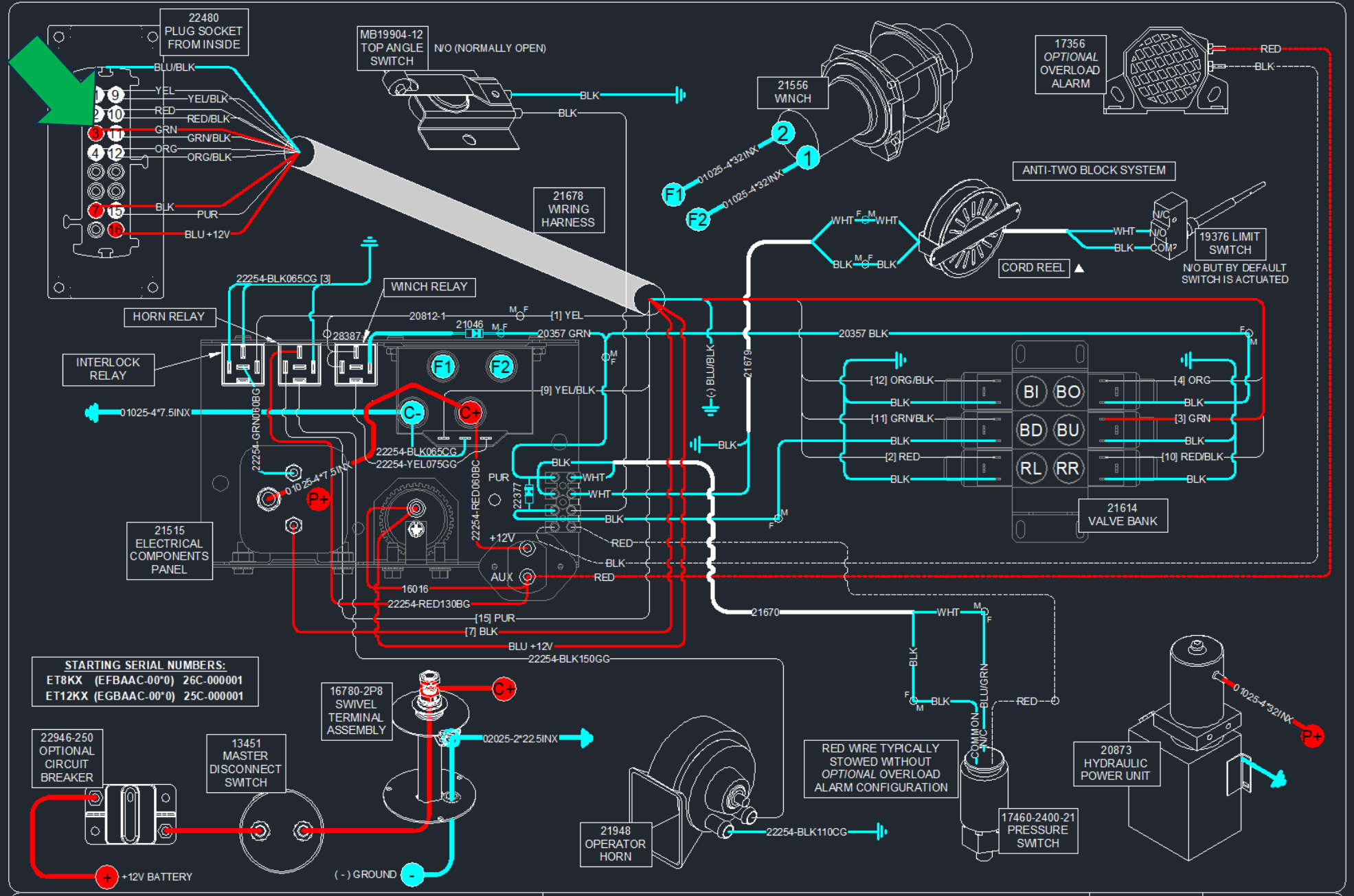

BOOM UP ACTUATED

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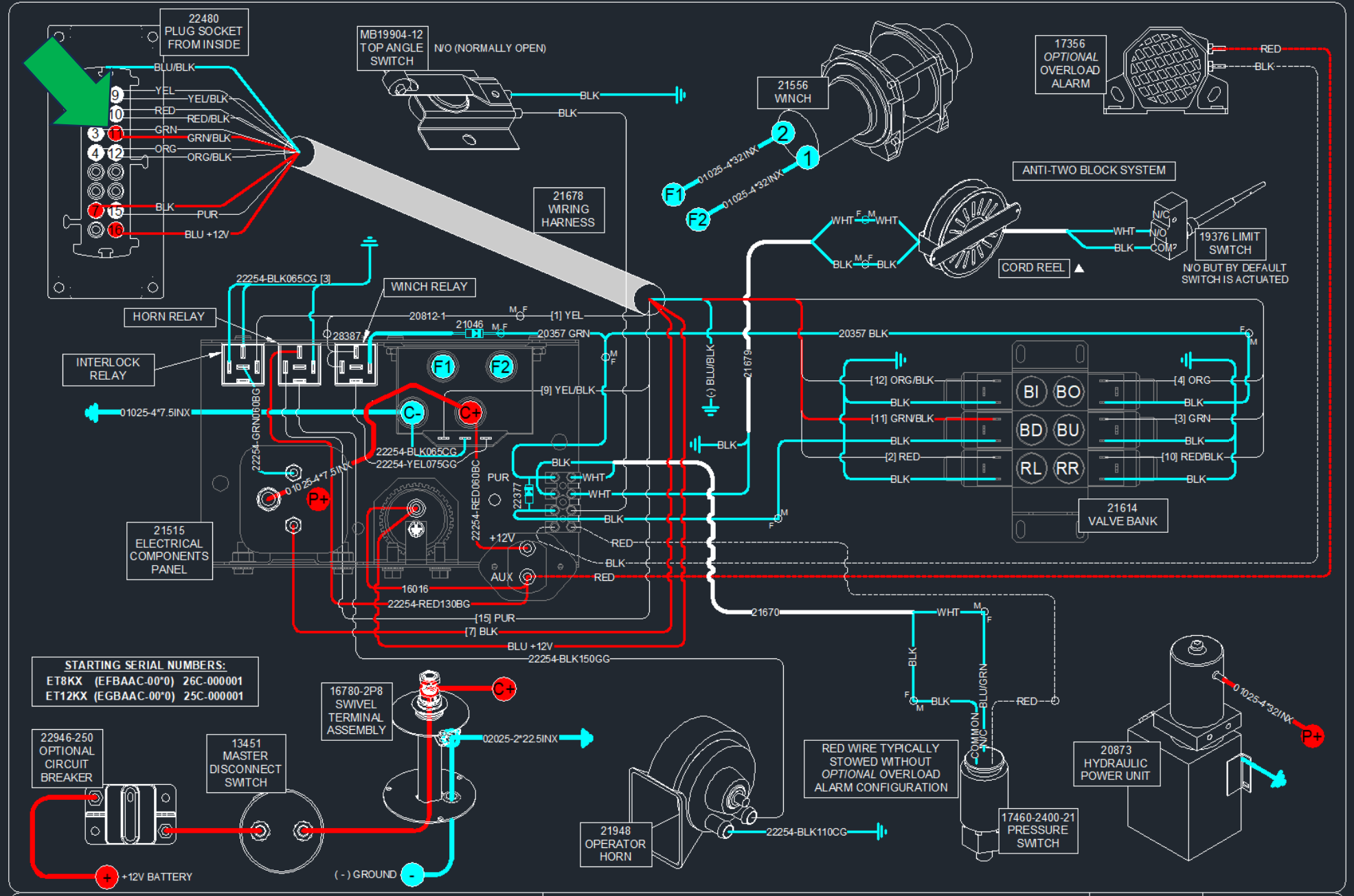
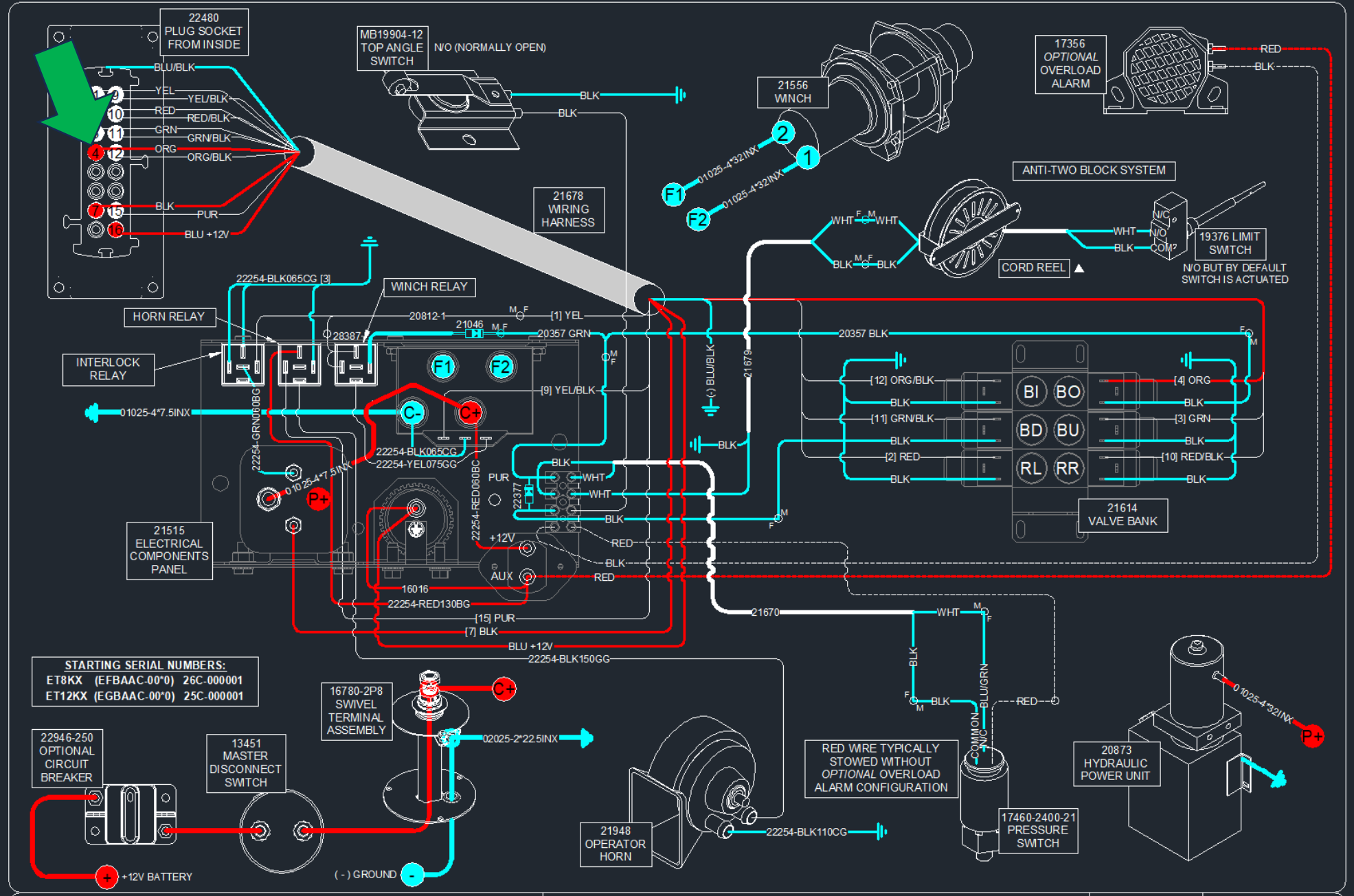


BOOM DOWN ACTUATED

TITLE: WIRING DIAGRAM		DATE: 03-29-24B	SECTION: C400
ET8/12KX W/ WINCH RELAY, COMEUP/WARN		SUPERSEDES: 01-16-24A	26537



BOOM OUT ACTUATED

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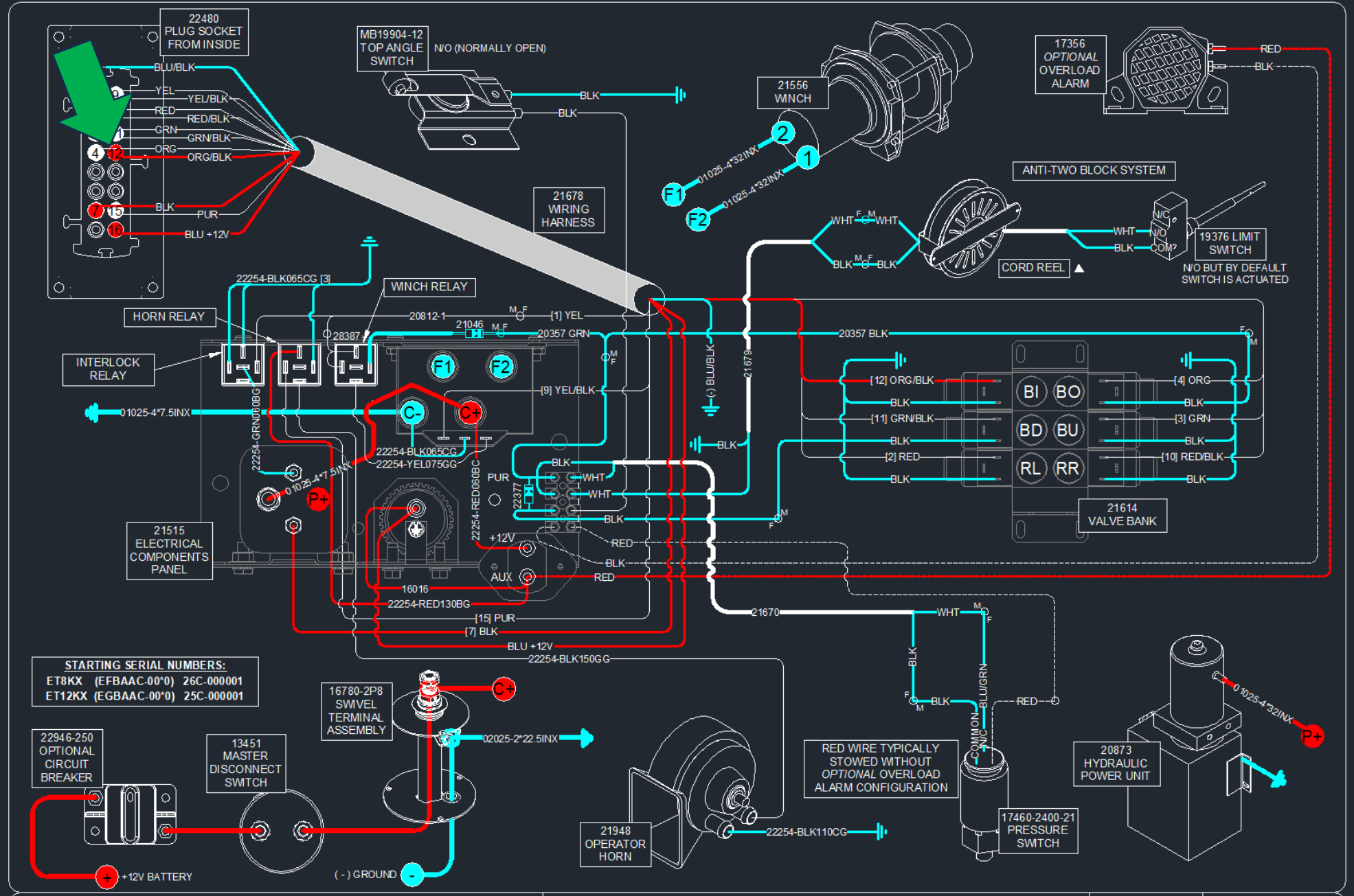

BOOM IN ACTUATED

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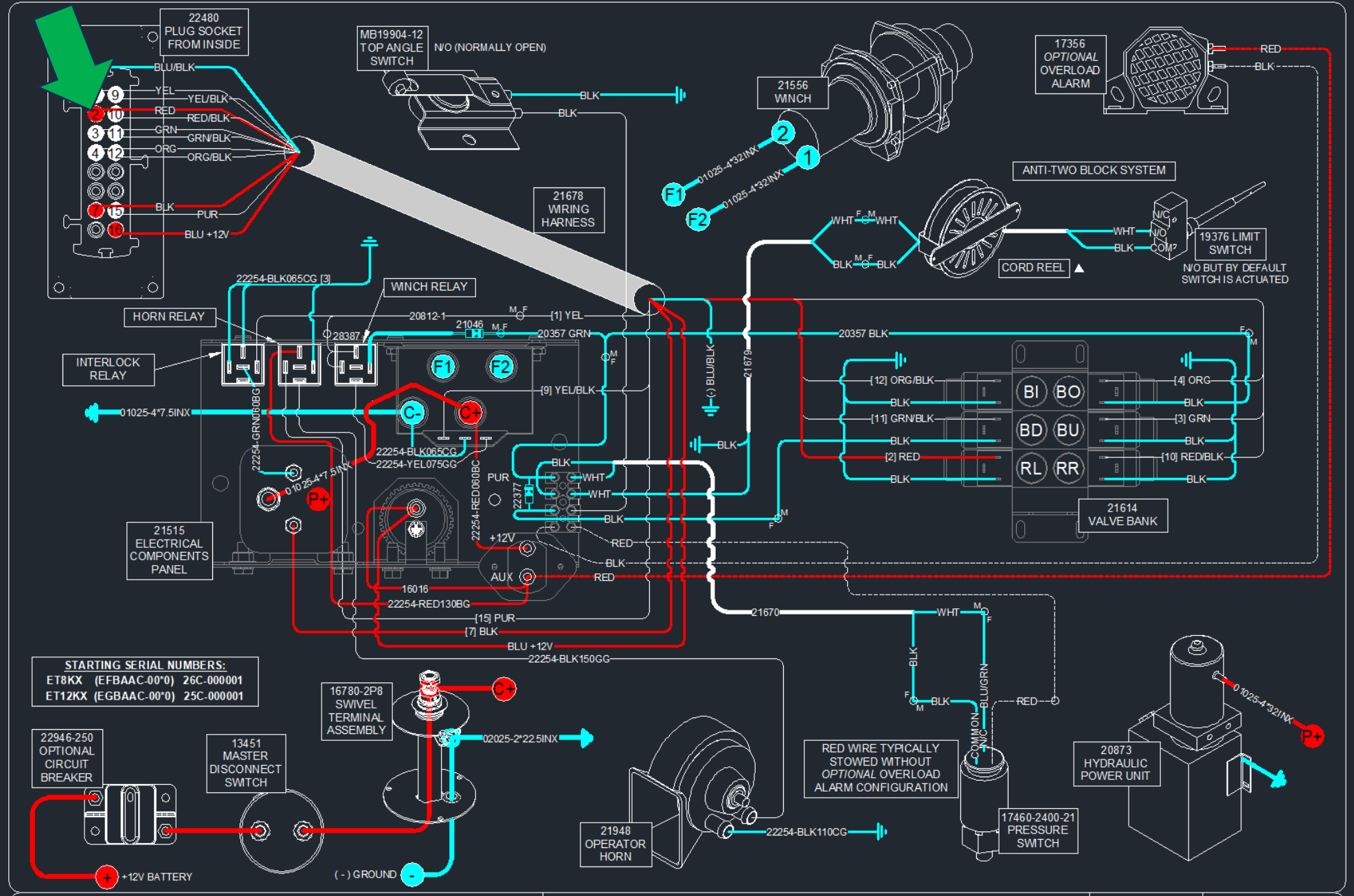

ROTATE LEFT ACTUATED

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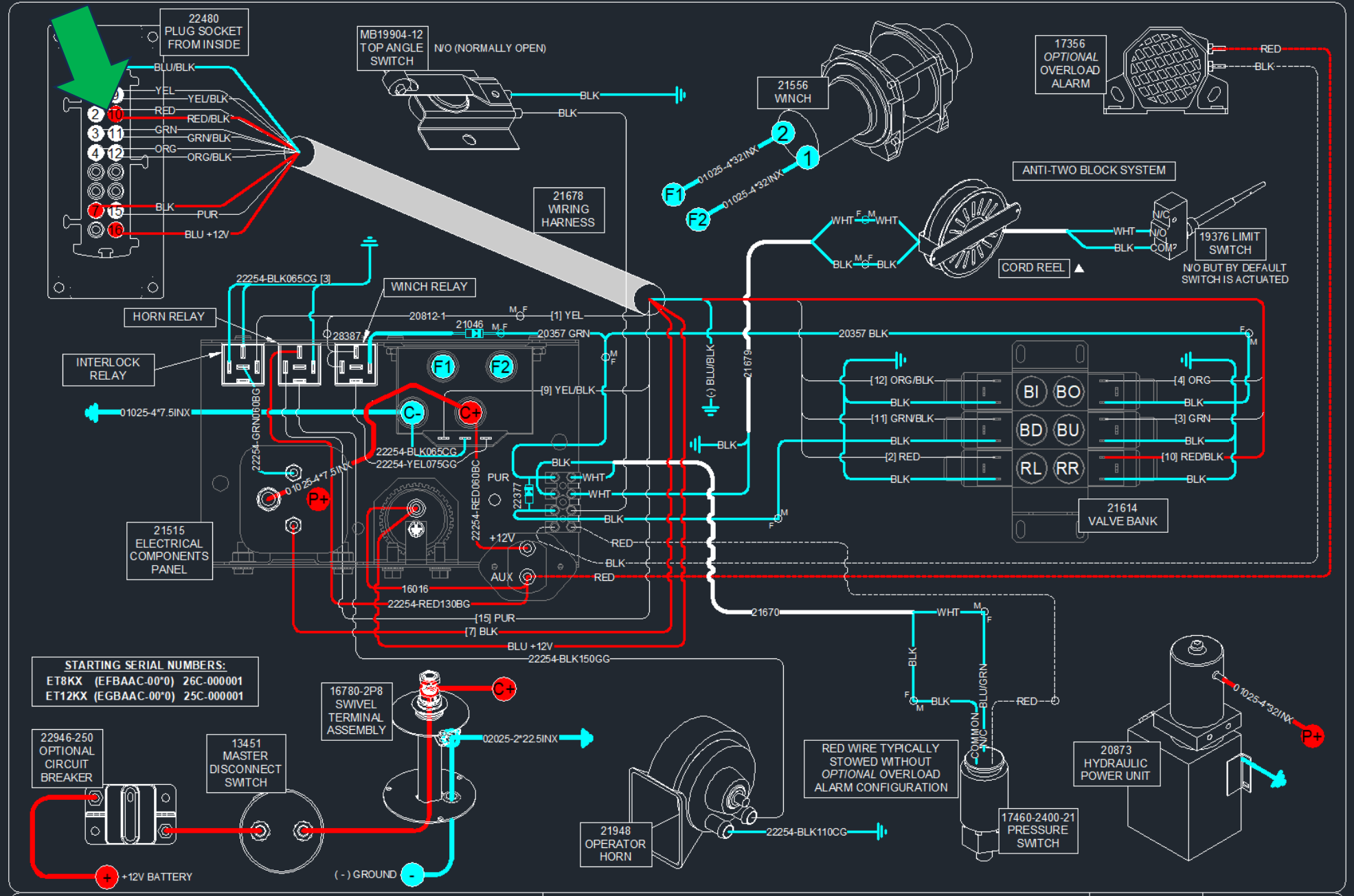
ET8/12KX W/ WINCH RELAY, COMEUP/WARN	SUPERSEDES 01-16-24A	26537



ROTATE RIGHT ACTUATED

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