Portable Hoist - 220v 3ph
Troubleshooting Guide

1. Does the hoist do anything?
   YES – 2
   NO - 24

2. What does the hoist do?

Goes down not up	- 3
Goes up not down	- 13
Does not move but hums	- 18
Runs but will not lift a load	- 19
Runs but will not hold a load	- 23

3. Remove the Enclosure Box Cover. Locate the UP and Down contactors. Press the UP button on the Control Pendant. Does the UP contactor close?
   YES – 4
   NO – 6

4. Check the voltage with a multi-meter on the input side of the contactor. Are the three lines of voltage present?
   YES – 5
   NO – Check wire connections

5. Check the voltage with a multi-meter on the output side of the contactor while the contactor is closed by pressing the UP button on the Control Pendant. Are the three lines of voltage present?
   YES –Check the wires and connections feeding the motor
   NO – Replace the contactor (bad main contacts)

6. Locate the UP contactor by pressing the Down button on the Control Pendant. The DOWN contactor will close the other contactor will be the UP contactor. Locate the contactor coil inputs “A1” and “A2”. With a multi-meter set to AC voltage, test the voltage between “A1” and “A2” while pressing the UP button on the Control Pendant. Is the control voltage present while pressing the UP button on the Control Pendant?
   YES – Replace contactor (bad contactor coil)
   NO – 7

7. With a multi-meter set to AC voltage, check the voltage at the contactor coil input “A1” and terminal “96” of the Motor Overload. Is the control voltage present?
   YES – 8
   NO – Check the wiring between the UP contactor coil input “A1” and the DOWN contactor coil input “A1”

8. Locate the Up Limit Bar Limit Switch. With a multi-meter set to AC voltage, check the input voltage of the Limit Switch between the Limit Switch input and contactor coil location “A1” while pressing the UP button on the Control Pendant. Is the control voltage present while pressing the UP button on the Control Pendant?
   YES – 9
   NO – Check wiring from the Limit Switch to the Control Pendant

9. With a multi-meter set to AC voltage, check the output voltage of the Limit Switch between the Limit Switch output and contactor coil location “A1” while pressing the UP button on the Control Pendant. Is the control voltage present while pressing the UP button on the Control Pendant?
   YES – Check the wiring between the output of the Limit Switch and the contactor coil “A2”
   NO – 10

10. Move the Up Limit Bar and listen carefully is the switch clicking?
   YES – 12
   NO – 11

11. Adjust the Limit Switch in or out until the switch clicks when the Up Limit Bar resting fully away from the Drum moves one(1) inch towards the Drum. Can the Limit Switch be adjusted?

    YES – 12
    NO – Replace Limit Switch

12. Using a multi-meter set to Ohms (Ω), check the continuity of the NO circuit of the switch. Move the Limit Bar up and down. Is there continuity through the circuit with the Up Limit Bar resting freely away from the Drum and No continuity through the circuit with the Up Limit Bar pushed towards the Drum?

    YES – 9
    NO – Replace Limit Switch

13. Remove the Enclosure Box Cover. Locate the UP and Down contactors. Press the DOWN button on the Control Pendant. Does the DOWN contactor close?

    YES – 14
    NO – 16

14. Check the voltage with a multi-meter on the input side of the contactor. Are the three lines of voltage present?

    YES – 15
    NO – Check wire connections

15. Check the voltage with a multi-meter on the output side of the contactor while the contactor is closed by pressing the DOWN button on the Control Pendant. Are the three lines of voltage present?

    YES –Check the wires and connections feeding the motor
    NO – Replace the contactor (bad main contacts)

16. Locate the DOWN contactor by pressing the Up button on the Control Pendant. The UP contactor will close the other contactor will be the DOWN contactor. Locate the contactor coil inputs “A1” and “A2”. With a multi-meter set to AC voltage, test the voltage between “A1” and “A2” while pressing the DOWN button on the Control Pendant. Is the control voltage present while pressing the DOWN button on the Control Pendant?

    YES – Replace contactor (bad contactor coil)
    NO – 17

17. With a multi-meter set to AC voltage, check the voltage at the contactor coil input “A1” and terminal “96” of the Motor Overload. Is the control voltage present?
    YES – Check the wiring from contactor coil “A2” to the control pendant
    NO – Check the wiring from the Control Transformer

18. Do you hear a distinctive metallic click in the Motor when pressing the Up or Down button on the pendant?
    YES – Possible internal motor damage
    NO – 22

19. Ensure that the Control Box is connected to the proper power, taking in the factor the length of power supply cable and size of cable. Is the power feed correct?
    YES – 20
    NO – Correct the power feed

20. Is the LED on the outside of the Control Box lit?
    YES – 21
    NO – 30

21. What color is the LED?
    GREEN – 22
    RED – 28

22. Follow the “Portable Hoist Brake Replacement and Adjustment Procedure”

23. Adjust the Motor Brake Tension. Does the hoist hold the load and operate correctly?
    YES – Place unit back into operation
    NO – 22

24. Check all cable connections. Is the Control Pendant connected to control box and the Power Cord plugged into power?
    YES – 25
    NO – Repair connections

25. Ensure that the Control Box is connected to the proper power, taking in the factor the length of power supply cable and size of cable. Is the power feed correct?
    YES – 26
    NO – Correct the power feed

26. Is the LED on the outside of the Control Box lit?
    YES – 27
    NO – 30

27. What color is the LED?
    GREEN – Check the wire feeding to the Control Pendant from terminal "95" of the Motor Overload to the Control Pendant
    RED – 28

28. Check the phase sequence of the input source power. Is the phase sequence correct?
    YES – 29
    NO – Correct the phasing sequence

29. Check all of the connections from the input source power to the Phase Monitor. Are the connections ok?
    YES – Adjust the phase monitor or replace
    NO – Repair connections

30. With a multi-meter set to AC voltage, check the voltage at terminal "1" and "5" of the Control Transformer. Is the supply voltage present?
    YES – 31
    NO – Check the Inline Fuse and wire connections

31. With a multi-meter set to AC voltage, check the voltage at terminal "6" and "10" of the Control Transformer. Is the control voltage present?
    YES – 32
    NO – Replace control transformer

32. With a multi-meter set to AC voltage, check the voltage at terminal “6” of the Control Transformer and terminal “96” of the Motor Overload. Is the control voltage present?

    YES – 33

    NO – Check the wiring connections from terminal “96” of the Motor Overload to terminal “6” of the Control Transformer

33. With a multi-meter set to AC voltage, check the voltage at terminal “10” of the Control Transformer and input “A1” of the UP contactor. Is the control voltage present?

    YES – Check wiring to LED or bad LED

    NO – Check wiring from the input “A1” of the UP contactor to input “A1” of the DOWN contactor to the terminal “10” of the Control Transformer

Leo VFD Standard & Wireless Hoist
Troubleshooting Guide

1. Does the hoist do anything?

   YES – 2
   NO – 40

2. Is the LEO VFD System Standard (Wired) or Wireless?

   Standard – 3
   Wireless - 17

3. What does the hoist do?

Goes down not up	– 4
Goes up not down	– 7
Goes down but only slow speed up	– 9
Goes up but only low speed down	– 11
Goes down but only fast speed up	– 13
Goes up but only fast speed down	– 15
Runs but will not lift a load	– 37
Runs but will not hold a load	– 39

4. Open the enclosure box and locate the PLC and the input/output lights is the **"X5"** input light lit?

   YES - 5
   NO – Check the Up Limit Switch so that the circuit is closed

5. While pressing the **"UP"** pushbutton on the control pendant, does the inputs **"X1"** and/or **"X3"** light up on the PLC?

   YES – 6
   NO – Check the wiring from the **"UP"** button of the control pendant to the PLC

6. While pressing the "**UP"** pushbutton does the output **"Y0"** light up on the PLC?

   YES – Check connections from the PLC to the VFD
   NO – Check the PLC switch located on the top of the PLC (left side in box orientation) and ensure it is in the **"RUN"** position and/or bad PLC

7. Open enclosure box and locate the PLC and the input/output lights, while pressing the **"DOWN"** pushbutton on the control pendant, does the **"X2"** and/or **"X4"** input lights light up on the PLC?

   YES – 8
   NO – Check the wiring from the **"DOWN"** button of the control pendant to the PLC

8. While pressing the "**DOWN"** pushbutton does the output **"Y1"** light up on the PLC?

   YES – Check connections from the PLC to the VFD
   NO – Check the PLC switch located on the top of the PLC (left side in box orientation) and ensure it is in the **"RUN"** position and/or bad PLC

9. While pressing the **"UP"** pushbutton on the control pendant fully to the **2nd** position, does the inputs **"X1"** light up on the PLC?

   YES – 10
   NO – Check the wiring from the **"UP"** button of the control pendant to the PLC

10. While pressing the "**UP"** pushbutton fully to the **2nd** position, does the output **"Y3"** light up on the PLC?

    YES – Check connections from the PLC to the VFD
    NO – Check the PLC switch located on the top of the PLC (left side in box orientation) and ensure it is in the **"RUN"** position and/or bad PLC

11. While pressing the **"DOWN"** pushbutton on the control pendant fully to the **2nd** position, does the inputs **"X2"** light up on the PLC?

    YES – 12
    NO – Check the wiring from the **"DOWN"** button of the control pendant to the PLC

12. While pressing the "**DOWN"** pushbutton fully to the **2nd** position, does the output **"Y3"** light up on the PLC?

    YES – Check connections from the PLC to the VFD
    NO – Check the PLC switch located on the top of the PLC (left side in box orientation) and ensure it is in the **"RUN"** position and/or bad PLC

13. While pressing the **"UP"** pushbutton on the control pendant to the **1st** position, does the inputs **"X3"** light up on the PLC?

    YES – 14
    NO – Check the wiring from the **"UP"** button of the control pendant to the PLC

14. While pressing the "**UP"** pushbutton to the **1st** position, does the output **"Y2"** light up on the PLC?

    YES – Check connections from the PLC to the VFD
    NO – Check the PLC switch located on the top of the PLC (left side in box orientation) and ensure it is in the **"RUN"** position and/or bad PLC

15. While pressing the **"DOWN"** pushbutton on the control pendant to the **1st** position, does the inputs **"X4"** light up on the PLC?

    YES – 16
    NO – Check the wiring from the **"DOWN"** button of the control pendant to the PLC

16. While pressing the "**DOWN"** pushbutton fully to the **1st** position, does the output **"Y2"** light up on the PLC?

    YES – Check connections from the PLC to the VFD
    NO – Check the PLC switch located on the top of the PLC (left side in box orientation) and ensure it is in the **"RUN"** position and/or bad PLC

17. What does the hoist do?

Goes down not up	– 18
Goes up not down	– 22
Goes down but only slow speed up	– 25
Goes up but only low speed down	– 28
Goes down but only fast speed up	– 31
Goes up but only fast speed down	– 34
Runs but will not lift a load	– 37
Runs but will not hold a load	– 39

18. Open the enclosure box and locate the PLC and the input/output lights is the **"X5"** input light lit?

    YES - 19
    NO – Check the Up Limit Switch so that the circuit is closed

19. Engage the wireless remote, while pressing the **"UP"** pushbutton does the inputs **"X1"** and/or **"X3"** light up on the PLC?

    YES – 20
    NO – Check the wiring from the **"NO"** circuit of **relay 3** of the wireless receiver to the PLC

20. Engage the wired control pendant, while pressing the **"UP"** pushbutton on the control pendant, does the inputs **"X1"** and/or **"X3"** light up on the PLC?

    YES – 21
    NO – Check the wiring from the **"UP"** button of the control pendant to the PLC

21. While pressing the "**UP"** pushbutton does the output **"Y0"** light up on the PLC?

    YES – Check connections from the PLC to the VFD
    NO – Check the PLC switch located on the top of the PLC (left side in box orientation) and ensure it is in the **"RUN"** position and/or bad PLC

22. Engage the wireless remote, while pressing the **"DOWN"** pushbutton does the inputs **"X2"** and/or **"X3"** light up on the PLC?

    YES – 23
    NO – Check the wiring from the **"NO"** circuit of **relay 2** of the wireless receiver to the PLC

23. Engage the wired control pendant, while pressing the **"DOWN"** pushbutton on the control pendant, does the inputs **"X2"** and/or **"X4"** light up on the PLC?

    YES – 24
    NO – Check the wiring from the **"DOWN"** button of the control pendant to the PLC

24. While pressing the "**DOWN"** pushbutton does the output **"Y1"** light up on the PLC?

    YES – Check connections from the PLC to the VFD
    NO – Check the PLC switch located on the top of the PLC (left side in box orientation) and ensure it is in the **"RUN"** position and/or bad PLC

25. Engage the wireless remote, while pressing the bottom **"UP"** pushbutton, does the inputs **"X1"** and **"X3"** light up on the PLC?

    YES – 26
    NO – Check the wiring from the **"NO"** circuit of **relay 4** of the wireless receiver to the PLC

26. Engage the wired control pendant, while pressing the **"UP"** pushbutton fully to the **2nd** position; does the input **"X1"** light up on the PLC?

    YES – 27
    NO – Check the wiring from the **"UP"** button of the control pendant to the PLC

27. While pressing the "**UP"** pushbutton fully to the **2nd** position, does the output **"Y3"** light up on the PLC?

    YES – Check connections from the PLC to the VFD
    NO – Check the PLC switch located on the top of the PLC (left side in box orientation) and ensure it is in the **"RUN"** position and/or bad PLC

28. Engage the wireless remote, while pressing the bottom **"DOWN"** pushbutton, does the input **"X1"** light up on the PLC?

    YES – 29
    NO – Check the wiring from the **"NO"** circuit of **relay 4** of the wireless receiver to the PLC

29. Engage the wired control pendant, while pressing the **"DOWN"** pushbutton fully to the **2nd** position; does the input **"X2"** light up on the PLC?

    YES – 30
    NO – Check the wiring from the **"DOWN"** button of the control pendant to the PLC

30. While pressing the "**DOWN"** pushbutton fully to the **2nd** position, does the output **"Y3"** light up on the PLC?

    YES – Check connections from the PLC to the VFD
    NO – Check the PLC switch located on the top of the PLC (left side in box orientation) and ensure it is in the **"RUN"** position and/or bad PLC

31. Engage the wireless remote, while pressing the top **"UP"** pushbutton does only the input **"X3"** light up on the PLC

    YES – 32
    NO – Check the wiring from the **"NO"** circuit of **relay 3** of the wireless receiver to the PLC

32. Engage the wired control pendant, while pressing the **"UP"** pushbutton only to the **1st** position on the control pendant, does only the input **"X3"** light up on the PLC?

    YES – 33
    NO – Check the wiring from the **"UP"** button of the control pendant to the PLC

33. While pressing the "**UP"** pushbutton does the output **"Y2"** light up on the PLC?

    YES – Check connections from the PLC to the VFD
    NO – Check the PLC switch located on the top of the PLC (left side in box orientation) and ensure it is in the **"RUN"** position and/or bad PLC

34. Engage the wireless remote, while pressing the top **"DOWN"** pushbutton does only the input **"X4"** light up on the PLC

    YES – 35
    NO – Check the wiring from the **"NO"** circuit of **relay 2** of the wireless receiver to the PLC

35. Engage the wired control pendant, while pressing the **"DOWN"** pushbutton only to the **1st** position on the control pendant, does only the input **"X4"** light up on the PLC?

    YES – 36
    NO – Check the wiring from the **"UP"** button of the control pendant to the PLC

36. While pressing the **"DOWN"** pushbutton does the output **"Y2"** light up on the PLC?

    YES – Check connections from the PLC to the VFD
    NO – Check the PLC switch located on the top of the PLC (left side in box orientation) and ensure it is in the **"RUN"** position and/or bad PLC

37. Ensure that the Control Box is connected to the proper power (230Vac-1PH-30A for single phase configuration or 208Vac-3PH-30A for three phase configuration), taking into factor the length of the power supply cable and size of cable. Is the power correct?

    YES – 38
    NO – Correct the supply power and/or the supply cable

38. Follow the "Portable Hoist Brake Replacement and Adjustment Procedure"

39. Adjust the Motor Brake Tension. Does the hoist hold the load and operate correctly?

    YES – Place unit back into service
    NO - 38

40. Check all cable connections; that the control box is connected to motor, the cord pendant is connected to the control box, and the power cord is plugged into power. Is everything connected?

    YES – 41
    NO – Repair connections

41. Ensure that the Control Box is connected to the proper power (230Vac-1PH-30A for single phase configuration or 208Vac-3PH-30A for three phase configuration), taking into factor the length of the power supply cable and size of cable. Is the power correct?

    YES – 42
    NO – Correct the supply power and/or the supply cable

42. Is the VFD powered up?

    YES – 44
    NO – 43

43. With a multi-meter set to AC voltage, check the supply voltage at terminals **"L2/S"** and **"L3/T"** for a single phase configuration or present at terminals **"L1/R"**, **"L2/S"**, and **"L3/T"** for a three phase configuration. Is the supply power present at the VFD?

    YES – Damaged drive
    NO – Check the wiring and connections feeding the VFD

44. Is the PLC powered up?

    YES – 50
    NO – 45

45. With a multi-meter set to AC voltage, check the control power on the secondary side of the control transformer (TR3) at terminals **"6"** and **"10"**. Is the control power present?

    YES – 48
    NO – 46

46. With a multi-meter set to AC voltage, check the supply power on the primary side of the control transformer (TR3) at terminals **"1"** and **"5"**. Is supply power present?

    YES – Bad transformer
    NO – 47

47. With a multi-meter set to continuity (Ω), check the two(2) inline fuses on the primary side of the control transformer (TR3). Are the fuses good?

    YES – Check supply power wiring and connections feeding the control transformer (TR3)
    NO – Replace fuses

48. With a multi-meter set to continuity (Ω), check the one(1) inline fuse on the secondary side of the control transformer (TR3). Is the fuse good?

    YES – 49
    NO – Replace fuse

49. With a multi-meter set to AC voltage, check the control voltage at terminals **"L"** and **"N"** on the PLC. Is the control voltage present?

    YES – Check the plug of the PLC and/or bad PLC
    NO – Check the wiring from the control transformer (TR3) to the PLC

50. Locate the PLC input/output lights is the **"X0"** light lit?

    YES – 61
    NO – 51

51. Is the unit a Standard (Wired) or Wireless VFD system?

    STANDARD – 52
    WIRELESS – 55

52. Check that the **"STOP"** button is pulled out on the control pendant. Is the **"STOP"** button pulled out?

    YES – 54
    NO – 53

53. Check the PLC for the **"X0"** light. Is the **"X0"** light lit?

    YES – 61
    NO – 54

54. Using a multi-meter set to AC voltage, check the control voltage between the PLC terminals **"L"** and **"X0"**. Is the control voltage present?

    YES – Check the input plug of the PLC
    NO – Check the wiring from the PLC to the control pendant **"STOP"** button

55. Open the yellow cover of the wireless receiver and locate terminals **"21"** and **"23"**, this is the Power Regulator Board, locate the Power LED on the Power Board. Is the LED lit?

    YES – 57
    NO – 56

56. With a multi-meter set to AC voltage, check the control voltage between terminals **"21"** and **"23"** on the Power Board. Is the control voltage present?

    YES – Contact BetaMax Technical Support concerning the wireless receiver
    NO – Check the control power wiring from the PLC to the wireless receiver

57. Turn **ON** and engage **ONLY** one(1) of the wireless remotes by pressing the **"ON/START"** button twice. Is the green light on the remote present?

    YES – 58
    NO – Check the three(3) AAA batteries of the remote and ensure that you are within transmitting range

58. Check that the **"STOP"** button is pulled out on the wired control pendant. Is the **"STOP"** button pulled out?

    YES – 60
    NO – 59

59. Check the PLC for the **"X0"** light. Is the **"X0"** light lit?

    YES – 61
    NO – 60

60. Using a multi-meter set to AC voltage, check the control voltage between the PLC terminals **"L"** and **"X0"**. Is the control voltage present?

    YES – Check the input plug of the PLC
    NO – Check the wiring from the PLC through the wireless receiver relay 1 and the wired control pendant **"STOP"** button

61. Is the output **"Y5"** light lit?

    YES – Check the plug of the PLC and/or bad PLC
    NO – 62

62. Press one of the directional operations of the unit did an input **"X"** and an output **"Y"** light up?

    YES – Check the wiring of the PLC **"C2"** and **"C3"** terminals to the VFD **"CM"** terminal
    NO – Check the PLC switch located on the top of the PLC (left side in box orientation) and ensure it is in the **"RUN"** position