



DUAL SLIDE CONTROLLER (DSC100)

Newmar Service School Presentation

KIB Electronics
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Revision Sheet

Release No.	Date	Revision Description
Rev.0	2/1/2011	First Release

Conditions of Sale and Product Warranty

KIB Electronics Inc. (KIB) and the buyer agree to the following terms and conditions of Sale and Purchase:

1. The Dual Slide Controller (DSC100) is guaranteed against defect in materials or workmanship for a period of one year from the date of registering of the original purchaser. Any unit which is found to be defective will, at the discretion of KIB, be repaired or replaced. KIB will not be responsible for any cost incurred unless an authorization number is designated by an authorized KIB representative.
2. KIB will not be responsible for the repair or replacement of any unit damaged by the user modification, negligence, abuse, improper installation, or mishandling.
3. KIB is not responsible for any loss or claim of special or consequential damages arising from the use of the product. The product must NOT be used in applications where failure of the product could lead to the physical harm or loss of human life. Buyer is responsible to conduct their own tests to meet the safety regulations of the respective industry.
4. Products distributed, but not manufactured by KIB, carry the full original manufactures warranty. Such products include, but are not limited to: power supplies, sensors, and connectors.
5. KIB reserves the right to alter any feature of specification at any time without notice to the buyer.

Safety precautions:

- 1.) Field Conductors - Shall be marked to indicate the temperature rating (60°C only, 60/75 or 75°C only) of the field installed conductors.
- 2.) Field-wiring terminals shall be marked with the "use with only copper conductor only".
- 3.) Wiring instructions shall be provided requiring the use of female quick-connect terminals suitable for field wiring.

1 DSC100 System Overview Diagram

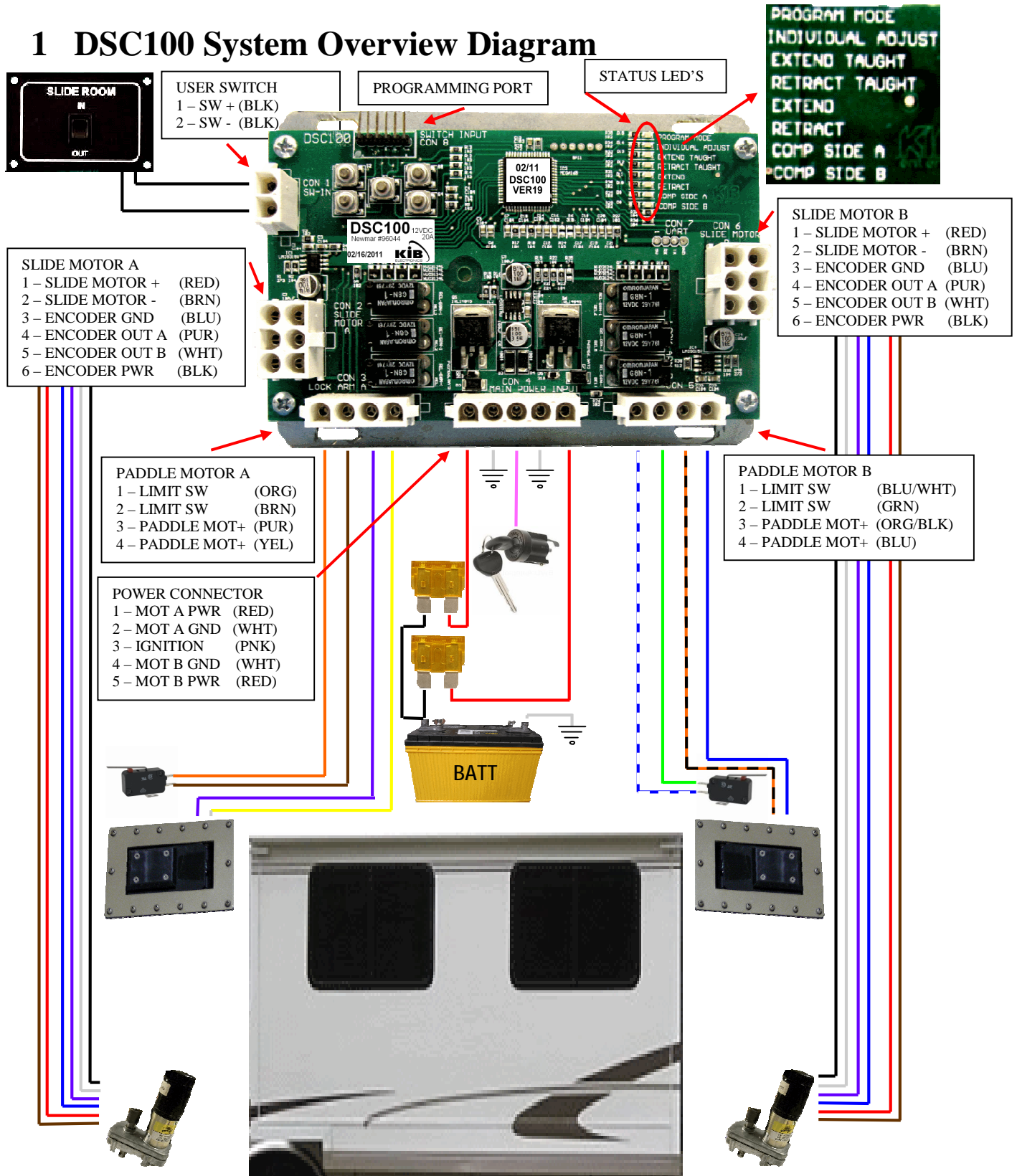


Figure 1.1

1.1 System Overview

Note:

This presentation only covers the DSC100 controller.
KIB Does not specify or supply any other part of the slide room system.

Dual slide controller (DSC100) is a dual motor controller with paddle lock control designed by KIB Electronics Inc. DSC100 uses encoders that are built into the motors to keep the slide room square while moving. DSC100 also has paddle motor control, wattage limits, under voltage lockout, ignition lockout, two individual power feeds to motors, and redundant grounds.

1.2 Electrical Specifications

All voltages are with respect to ground unless otherwise noted.
Typical values noted reflect the assumed parameters of $T_a=25^{\circ}\text{C}$ and voltage of 13.2VDC.
The following is the DSC100 board only unless noted otherwise.
Do not exceed maximum values or damage to the components could occur.

Characteristic	Min	Typ	Max	Unit
Operating Voltage Range Fully Operational	10.5	13.2	18	V
Operating Current	200	-	500	mA
Standby Current	-	1	-	mA
Min Motor Start Voltage (Note:1)	-	10.5	-	V
Ignition On Voltage	9.4	9.6	9.8	V
Motor current (Note:2)	-	-	-	W
Paddle Motor Wattage Stop (Note:3)	-	50	-	W
Max Slide Motor Wattage Stop (Note:3)	-	800	-	W
Slide Motor Timeout	-	90	-	Sec
Paddle Motor Timeout	-	12	-	Sec
Percent Slide Motor Wattage Stop (Note:3 & 4)	-	125	-	%
Motor Over Wattage Time	-	187	-	mSec
Wattage Sample Rate	-	31	-	mSec
Operating Temperature (T_a)	0	-	70	$^{\circ}\text{C}$

Chart 1.2

Note: 1 This is measured voltage at the controller before the motors begin

Note: 2 This is motor dependent, the DSC100 does not control current

Note: 3 This is per motor, overall system WILL be higher

Note: 4 This is based on an average current pulled by an individual motor for the motor wattage averaging time.

2 Dual Slide controller (DSC100)

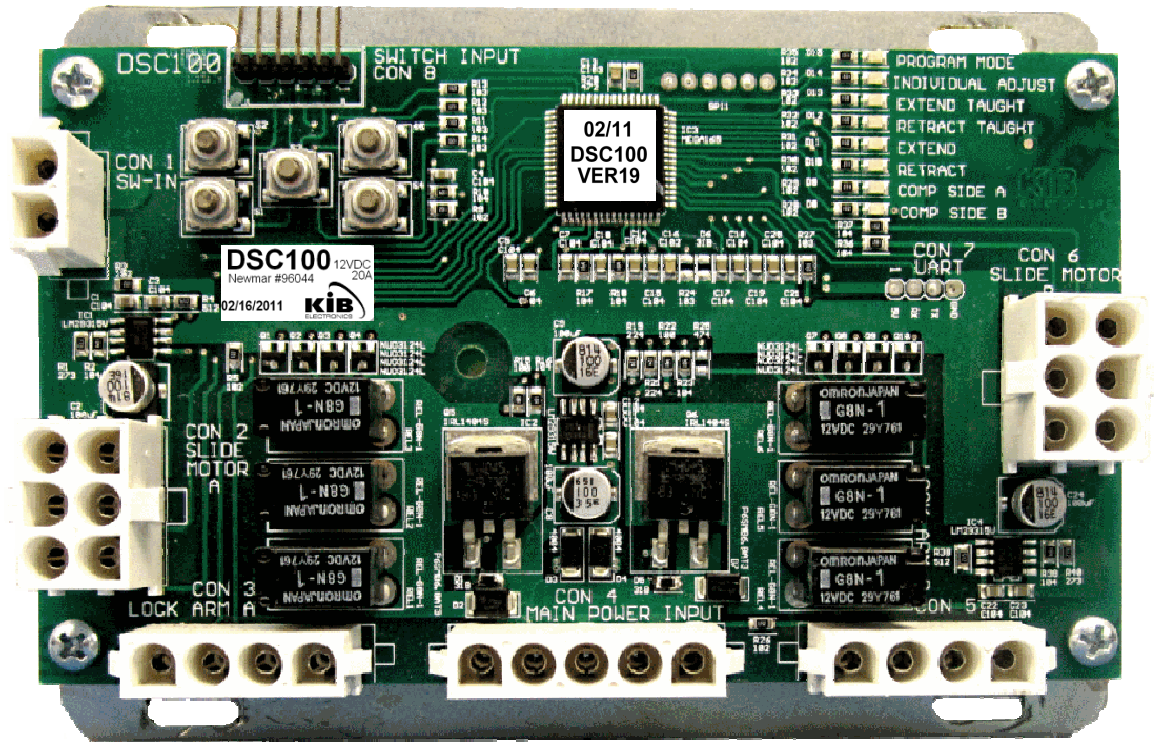


Figure 2.1

2.1 Tool Requirements (For DSC100 Only)

- Philips screw driver
- Blue and yellow butt splices
- Wire crimping tool
- Volt meter (Voltage, Current, and Resistance)

2.2 Overview

The DSC100 was designed to face a unique challenge of using two slide motors and keeping the slide room square while doing it. The DSC100 also has the capability to control paddle locks with position switch feedback. The DSC100 uses a single switch with a 470Ω resistor in series for extend and a short for retract, see section 5.1 for switch connection diagram.

There are five categories that this document will cover, program mode (set soft limits), user operation mode, encoder error mode, low voltage error mode, and over wattage stop.

3.1 PROGRAM MODE (SET SOFT LIMITS):

Soft limits must be set before entering the user operation mode. If soft limits are unset all LED's will be flashing on the DSC100. To enter the program mode press the program switch, the program and individual adjust LED will be lit. Note that in this mode the user switch is inactive and the motors will move independently. Motor will not error out because of encoder issues while in program mode. Also note that while in program mode paddle switches are ignored, so be sure that the paddle locks are unlocked before proceeding.

Begin by pressing the program switch, the program and individual adjust LED will light. Press motor A&B extend or retract switches to move the slide room to the desired soft limit position. Fine adjustments can now be done on a single motor. Once at the desired soft limit position press and hold the program switch then press and release the direction that is to be set, confirm that the extend or retract taught LED has lit to show that the direction has been programmed, after release the program switch. Any of the four direction switches can be pressed while the program switch is held, be aware that individual motors are not being set, but both motors soft limits are being set at the same time. If the soft limit needs changed or was accidentally set the soft limit will need unset. To do this press and hold the program switch followed by the direction that is to be unset. Note that if at any point the slide room motors slip or jump, both directions will need to be reprogrammed.

3.2 USER OPERATION MODE:

In this mode only the user switch is active. When the slide switch is pressed and held in the extend position the paddle-locks, if equipped, will unlock completely before the wall begins to move. The wall will not move in the user mode until the paddle lock switches have shorted. If there are no paddle locks there will be a jumper in the paddle connector. After paddle lock fully unlock the wall will begin to extend until the factory extend soft limits are reached, or until an obstruction is encountered. If there is no paddle locks there will be approximately a two second delay before the wall begins to move out. When the slide switch is pressed and held in the retract position the wall will begin to retract until the factory retract soft limits are reached, or until an obstruction is encountered. Once retract soft limits are reached the paddle-locks, if equipped, will begin to lock until individually they reach end of travel.

There are five unseen safety features working in the background that might be encountered.

1. Slide room motors only move if the user switch is pressed, if for any reason the user releases the switch the system will stop.
2. The wall must travel the factory set distances on retract before the paddle-locks, if equipped, will lock. If for some reason the paddle-locks do not lock on retract, extend the room to the soft limits and try again.
3. The control board is constantly monitoring the wattage of the motors. If a large enough obstruction is reached the room will stop. The room will start where it stopped on the next switch press, but it is advised to walk around the slide room inside and out and look for obstruction, because the next switch press will allow more wattage to overcome the obstruction.
4. The motors are constantly being compensated to keep the room square, it is normal that one motor may stop while the other motor continues to move.
5. If the ignition is on, the slide room will only be allowed to move in.

3.3 ENCODER ERROR MODE:

Encoder error mode will occur when one of the two encoders send bad or no information to the DSC100 board, this is represented by the COMP SIDE A and/or B LED flashing constantly. Consequently this can be caused by a motor not operating when it was suppose to. While in this mode wattage and encoder info are ignored, this gives the user the chance to manually reposition the wall. To get out of this mode press the program switch, this should only be done after the problem has been solved, otherwise the unit will return to the encoder error mode. After pressing the program button the soft limits must be reset, failure to do this will result in a misaligned room with unknown soft limits.

3.4 LOW VOLTAGE ERROR MODE:

Low voltage mode occurs when the user attempts to move the slide room while the voltage is below the *Min Motor Start Voltage* measured at the DSC100, see chart 1.2 for values. This mode is represented by the individual adjust LED flashing while holding the user switch. To get out of this mode cycle the power to the DSC100 or press the program button. Units labeled with Program VER19 or higher can get out of this mode by simply pressing the user switch again. The cause of this is in the way the DSC100 is wired to the bathroom fuse panel instead of directly to the battery. The reason low voltage error exists is because the motors have electric brakes that will not disengage properly unless enough voltage is supplied to them at the motor.

Note: The solution to this problem is start the generator or plug into shore power before using the slide room!

3.5 WATTAGE STOP:

There are two different wattage stops for the slide motors, *Max Slide Motor Wattage Stop* and *Percent Slide Motor Wattage Stop*, see chart 1.2 for values. The *Max Slide Motor Wattage* is a fixed value and whenever a motor reaches this value it will stop. The *Percent Slide Motor Wattage Stop* is an algorithm that will adapt to any motor and system voltage. The algorithm starts by constantly monitoring the wattage of a *Motor Over Wattage Time* and calculating an average wattage. Then the algorithm takes the instantaneous wattage and compares it to the average wattage multiplied by the *Percent Slide Motor Wattage Stop*, and if it is a larger value motor stops.

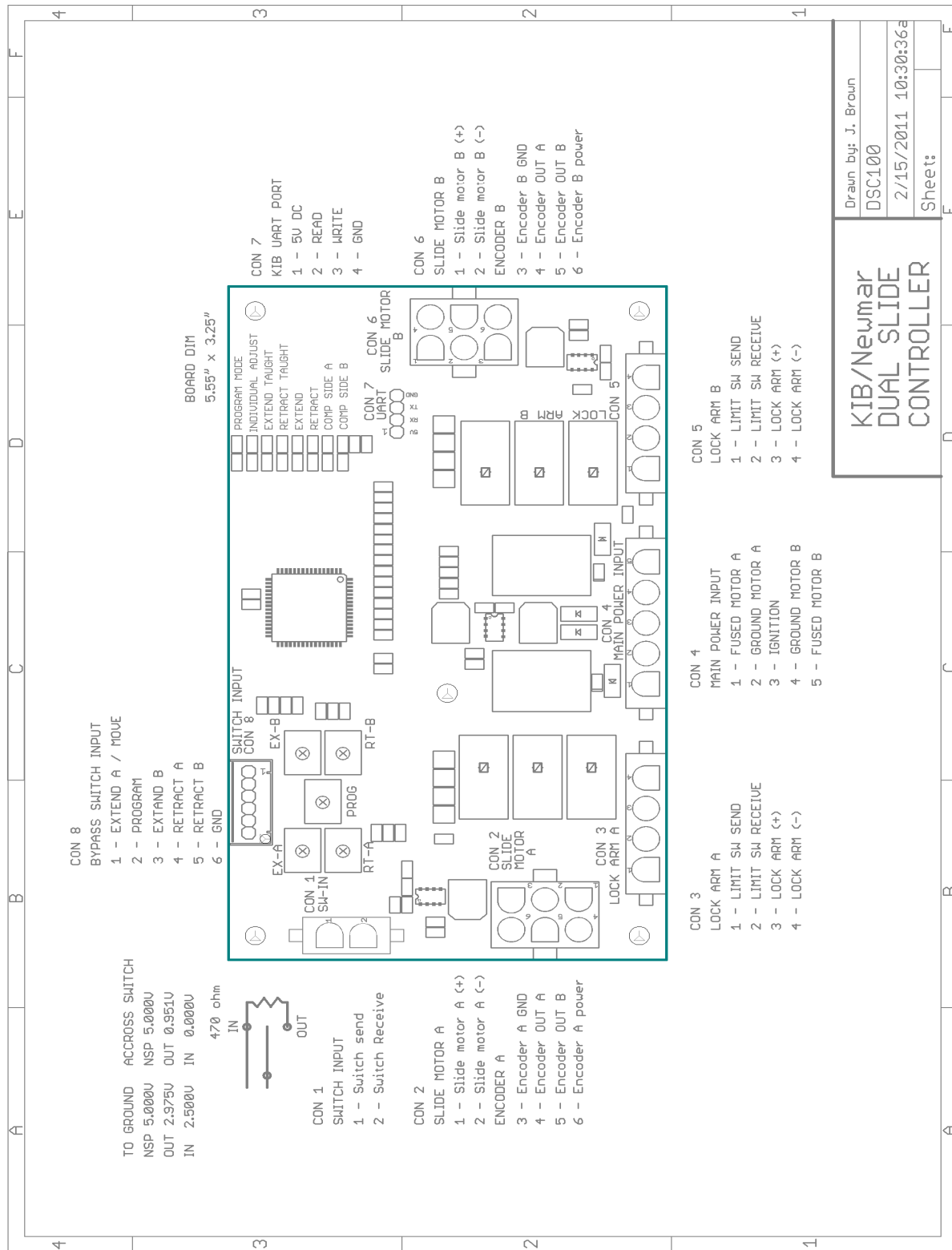
If (Instant Watts > (Avg Watts X *Percent Slide Motor Wattage Stop*))
for more than *Motor Over Wattage Time* (also see *Wattage Sample Rate*)
then stop motor

4.1 TROUBLE SHOOTING GUIDE

All LED's Flash à Unit needs to have soft limits set
 Program LED Flashes à Paddle locks need unlocked before programming
 Individual adjust LED Flashes à Battery voltage is to low
 Extend LED Flashes à Ignition is in while trying to extend wall
 COMP A LED Flashes à Encoder error side A
 COMP B LED Flashes à Encoder error side B
 Program LED is lit à Unit is in program mode
 Extend LED is lit à Room cannot move until paddle lock motors are ready

Problem	Possible Cause	Possible Solution
Slide room will not move by user switch and the individual adjust LED is flashing while switch is held	Battery voltage is to low at the DSC100	Cycle battery disconnect Start generator or plug into shore power then try again
Slide room will not move and all LED's are flashing	The soft limits have not been taught.	Set soft limits
While the wall is moving the COMPA and/or B LED flickers	Motors are compensating speed to keep the room square	There is no problem this is normal operation
Cannot leave programming mode	Soft limits have not been set	Set soft limits
The retract LED and/or extend LED flashes while trying to extend the room only	The ignition is turned on	Turn the ignition off
Extend LED is lit while switch is pressed, but slide room is not moving	Paddle locks have not unlocked fully	Check all paddle lock wires and motors If unit does not have paddle locks check for two red jumpers on control board
Paddle locks motors never lock	Paddle lock motors are not working	Check paddle lock wires
Only the front motor is moving while pressing user switch or LED COMP A is flashing constantly.	The front motors encoder is slipping or is broken.	Check set screws on front encoders' coupler Check that 7V exist on blue and brown wires of the encoder
Only the back motor is moving while pressing user switch or LED COMP B is flashing constantly.	The back motors encoder is slipping or is broken.	Check set screws on back encoders' coupler Check that 7V exist on blue and brown wires of the encoder

5.1 DSC100 CONNECTION GUIDE



- T F** 1. The DSC100 Controls two separate slide rooms.

- T F** 2. KIB will be responsible for any cost incurred without any authorization numbers from KIB.

- T F** 3. There are two separately fused power and ground lines feeding the DSC100.

- T F** 4. The DSC100 uses a 470Ω resistor in series with the switch for the extend direction, and then uses a shorted switch for retract.

- T F** 5. The DSC100 needs to have at least 10.5V at the battery before the room begins to move.

- T F** 6. When the individual adjust LED is flashing the battery voltage is too low.

- T F** 7. When the ignition is turned on the slide room will only retract.

- T F** 8. It is always recommend that the generator or shore power be turned on before moving the slide room.

- T F** 9. After having a fault condition (ex. Low voltage) the power needs cycled to the DSC100 before it will allow the room to move again. But if the DSC100 has VER.19 or higher software then just simply fixing the voltage issue and trying again will work.

- T F** 10. Paddle lock motors must be fully unlocked before the main slide motors can ever move.