AL101A1A   Joystick Controller for Operating a Snow Plow
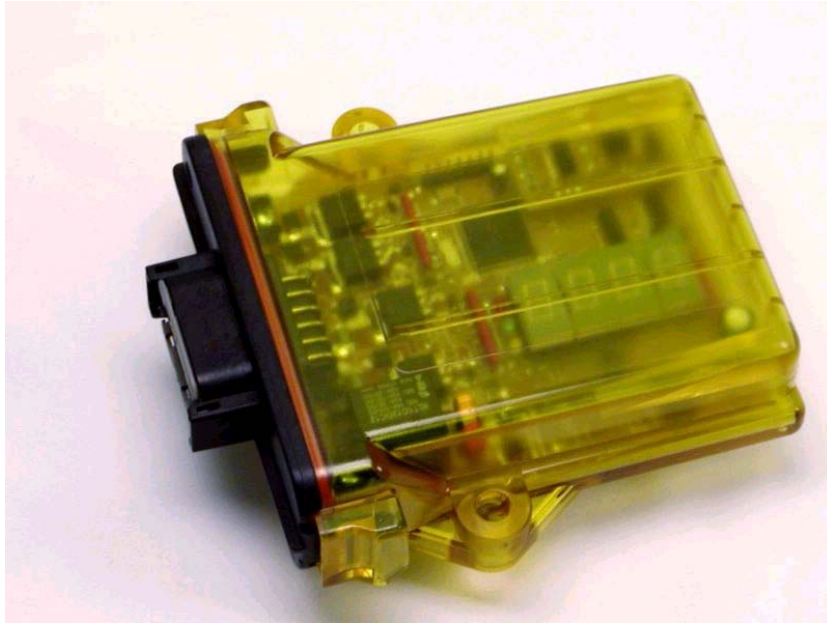
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Operation

The AL101A1A is a 2-axis joystick controller for operating a standard snow plow application. The AL101A1A receives two 0-5vdc signals from a two axis joystick. In response the AL101operates four PWM coil drivers. Each coil driver is current controller. The output configuration uses two coils per axis, each coil has min and max trim adjustment, range 5 to 3500 ma.

Deadman

The AL101 requires a trigger switch (aka dead man switch) input that must be activated to enable the AL101's valve driver outputs. The state of the trigger switch is viewed by the yellow Led.

Float

The AL101 provides a Float PB (pushbutton) input to enable a plow down signal (Float). The Float function has three modes of operation: Auto, Fixed, Off (selected at address no. 10) factory pre-set is **Fixed** mode

Float (**Off mode**) The Float feature is disabled by selecting OFF at address no. 10

Float (**fixed mode**)
> The installer can preset the desired plow down set-point (1-99%) at address no. 10. The user can enable/disable the Float output by a press-n-release of the Float PB. This does not require using the trigger switch and the joystick can be in any position.
>
> The user can pull the joystick back (less than 50%) to allow the plow to move up and temporarily suspending the Float mode. Once the stick is centered or the trigger is released the Float output re-activates.
>
> To exit the Float mode; pull the joystick back to greater than 50% or simply press the Float PB. Neither float exit methods requires using the trigger switch.

Float (**auto mode**)
> The operator establishes the plow down set-point. The user must pull the trigger switch and push the joystick forward to a desired plow down speed and then with a push-n-release of the Float PB the current plow down drive is stored into memory.
>
> The user can pull the joystick back (less than 50%) to allow the plow to move up and temporarily suspending the Float mode. Once the stick is re-centered or the trigger is released the Float output re-activates.
>
> To exit the Float mode pull the joystick back to greater than 50% or simply press the Float PB. Neither of these float exit methods requires using the trigger switch.

Program Mode:

The AL101 employs (3) magnetic switches; marked **FCN**, **INC** and **DEC**. The magnetic switches are labeled on the front but they're actually located down lower on the side of the enclosure. To trip these switches requires using a magnet. The small magnet on the end of a pocket screwdriver works well. If a screwdriver magnet doesn't trip the switches, try a stronger one. When any of the three switches is pressed (tripped) the Green Led will indicate a magnetic switch is active.

Unlock Sequence

To enter the program mode a special sequence of key strokes is required to **unlock** the AL101. Once unlocked you can view and/or edit the internal settings. Note; The unlock sequence must be done as described below, if the wrong key or sequence is used the process will reset and you must start over.

Step

1   First, use a magnet to press and hold the **FCN** key   (Green Led goes active)
        a.   hold **FCN** and observe the display count down from 9 to 0
        b.   Release **FCN** key
        c.   Display shows **INC**

2   Next, use magnet to press and hold **INC** key   (Green Led goes active)
        a.   hold **INC** and observe the display count down from 9 to 0
        b.   Release **INC** key
        c.   Display shows **DEC**

3   Lastly, use magnet to press and hold **DEC** key   (Green Led goes active)
        a.   hold **DEC** and observe the display count down from 9 to 0
        b.   Release **DEC** key
        c.   Display = **A   1**   (indicates you're at address # 1)

Navigating the various menus

Once in the program mode the display will either show the **address** (always preceded by **A**)or the **data** value that is stored at that address. Since you can only press one magnetic switch at a time, you must press and release the **FCN** Key to toggle between viewing address and viewing data.

To move thru the address list, press-n-release **FCN** key to view an **A** (left digit) then use the **INC** or **DEC** keys to move to the desired address location (**A 1** thru **A 12**)

At your desired address number, press-n-release the **FCN** key to toggle the display to show the corresponding data value. While viewing the data value, use the **INC** and **DEC** keys to change the data value. After changing a data value for it to be saved you MUST press and release the **FCN** key.

Warning   There is a 2 minute time out if no key is pressed. The time out will close your secession (bumping you out of program mode). If after the last value is changed you were to simply walk away the change will NOT be saved. To prevent this it's always recommended that you follow your last change with a **FCN** key.

To get back into **Run** mode you can either, 1) scroll back to address no 1 or cycle the power.

Program address list, settings, ranges, presets

The factory pre-sets are to be used as a starting point. Each vehicle may require further adjustments. When adjusting the min/max trims you're blocked from making a min trim greater than its max trim or visa-versa.

Addr **1**   **Run mode**   Display: **xx yy** shows the hydraulic valve drive (percentage)

Left 2 digits   **xx** = Plow Up / Dn   (Plow Up is indicated with decimal points **x.x.**)
Right 2 digits   **yy** = Plow Left / Right (Plow Left is indicated with decimal points **y.y.**)

Addr **2**   **Plow Left min valve drive (amps)**
                  Range: 0.005 - 3.500 amps
                  Factory pre-set = 0.500 amps

RUN Mode Display

Float ●
Trigger ○
PB ●

Addr **3**   **Plow Left max valve drive (amps)**
                  Range: 0.005 - 3.500 amps
                  Factory pre-set = 0.700 amps

Addr **4**   **Plow Right min valve drive (amps)**
                  Range: 0.005 - 3.500 amps
                  Factory pre-set = 0.500 amps

Left two digits
Plow Up and Down
DN 0 0 - 9 9
UP .0.0 -.9.9

Right two digits
Plow Left and Rig
RT 0 0 - 9 9
LT .0.0 -.9.9

Addr **5**   **Plow Right max valve drive (amps)**
                  Range: 0.005 - 3.500 amps
                  Factory pre-set = 0.700 amps

note; the decimal points indicate the joystick
          output is decreasing from 2.5v to 0v (

Addr **6**   **Plow Up min valve drive (amps)**
                  Range: 0.005 - 3.500 amps
                  Factory pre-set = 0.500 amps

LEDs:
● - Float = Float PB is active
○ - Trigger = Trigger PB is active
● - PB = 1 of 3 magnetic keys is active

Addr **7**   **Plow Up max valve drive (amps)**
                  Range: 0.005 - 3.500 amps
                  Factory pre-set = 0.750 amps

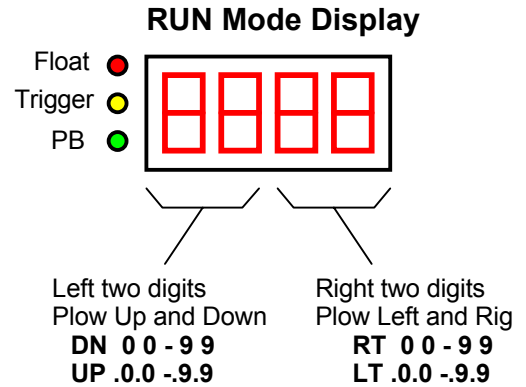**A**ddr **8**   **Plow Down min valve drive (amps)**
                  Range: 0.005 - 3.500 amps
                  Factory pre-set = 0.500 amps

Addr **9**   **Plow Down max valve drive (amps)**
                  Range: 0.005 - 3.500 amps
                  Factory pre-set = 0.750 amps

Addr **10**   **Float setup**
                  Range: OFF   (No float operation)
                  Range: 1-99   (Fixed Float set-point. 1-99% output)
                  Range: Auto   (Auto Float set-point)
                  Factory pre-set = Fixed set-point 80

Addr **11**   **Serial Number**
                  View Only: 1 - 9999   serial number is set by the factory

Addr **12**   **Software Check-sum**
                  View Only: four digit hexadecimal, indicates the software version

AL101 connector pinout

Pin No.	Name	Description	
1	Power	+10vdc to +32vdc	vehicle power
2	Input 1	Analog signal **X axis**	use to move the plow left and right
		Plow left: joystick left,	(signal decreases from 2.5v - 0v)
		Plow right: joystick right,	(signal increases from 2.5v - 5.0v)
3	Input 2	Analog signal **Y axis**	use to move the plow up and down
		Plow up: joystick pull backward,	(signal decreases from 2.5v - 0v)
		Plow down: joystick push forward,	(signal increases from 2.5v - 5.0v)
4	Input 3	Float sw	(Float active when switch pulls the input to ground)
5	Input 4	Trigger sw	(Trigger active when switch pulls the input to ground)
6	Output 4	**Y plow down**	(push joystick forward)
7	Output 3	**Y plow up**	(pull joystick backward)
8	Vref	joystick ref. supply (5.0vdc, 75ma max)	
9	Gref	joystick ref. common	
10	Output 2	**X plow right**	(move joystick right)
11	Output 1	**X plow left**	(move joystick left)
12	Ground	Ground	(negative)

AL101 Connector Type

Mating plug for the AL101, 12 pin Deutsch connector
Mini series mating plug   p/n: **DTM06-12SA-E007**   Key = A
Manuf; Ladd Industries   1-800-223-1236
The DTM06 mating plug requires; crimp sockets, wedge lock and a back-shell strain relief

Joystick

Penny + Giles JC6000
There are four connectors in the bottom of this joystick use the 16 & 12 pin connectors. This joystick offers redundant output signals for each axis. The AL101 will only use one signal for each channel. There is a dead-man trigger switch in the handle and one pushbutton on the handle for the Float function

16-way Amp connector
Pin 4   Float PB   (connect to AL1 pin 4)
Pin 11 Float PB   (connect to ground)
Pin 8   Person present sw (Trigger sw) (connect to AL1 pin 5)
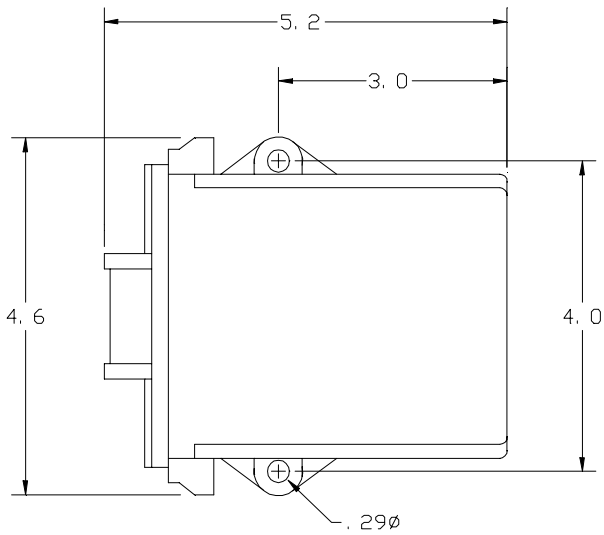Pin 12 Person present sw (Trigger sw) (connect to ground)

12-way Amp connector
Pin 1   5V supply   (connect to AL1 pin 8, Vref)
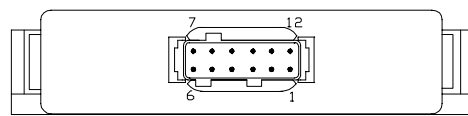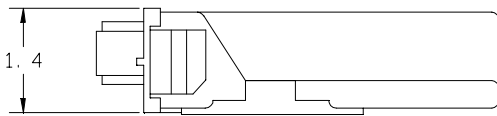Pin 2   0V supply   (connect to AL1 pin 9,   Gref)
Pin 5   Fwd/Back output (connect to AL1 pin 3, Y-axis)
Pin 7   Left/Right output   (connect to AL1 pin 2, X-axis)

5.2

3.0

4.6

4.0

.29Ø

1.4

ENCLOSURE FEATURES

ENVIRONMENTALLY SEALED AGAINST MOISTURE
NON-CORROSIVE, THERMOPLASTIC HOUSING
SHOCK & VIBRATION RESISTANT
CONNECTOR KEYING OPTION AVAILABLE

MAG SWITCHES

7   12

6   1
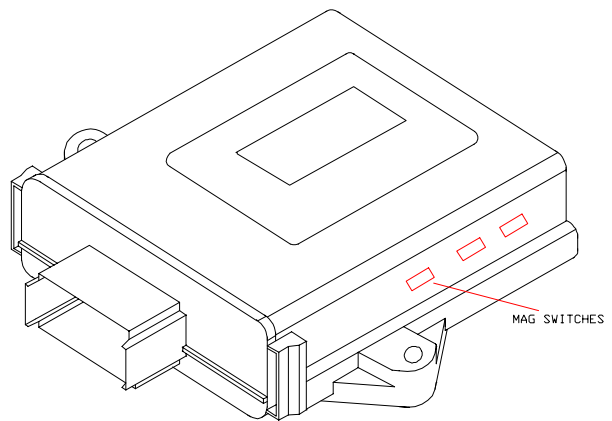
FACING VIEW

CONNECTOR PINOUT

ALL DIMENSIONS IN INCHES

DITCO INC		
TITLE	AL101 Enclosure	
DATE	9-24-08	BY jmb
DRW NO	AL101 Encl	