SmartAGSystems

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DRIVING CONTROL EFFICIENCY
IN AGRICULTURE

JACKAL MANUAL

MONITOR, CONTROLLER and MULTI-CONTROLLER SERIES

SmartAGSystems advise that this guide is printed and kept with the Jackal, our robust multifunctional Monitor, Controller and Multi-Controller, to ensure optimal setup and use for your machinery and safety

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GENERAL DESCRIPTION

The Jackal is a compact, robust multifunctional monitor & controller that adapts onto any machine. Performing simultaneous tasks, recording trips and alarm outputs the Jackal is a truly outstanding device that every farming operation should have.

- The Jackal is capable of monitoring and controlling 6 functions simultaneously.
- With appropriate sensors attached the Jackal can display simple speed, area & RPM to providing a full 3 section rate control for liquid applications. A single Jackal can do it all!
- A total of 12 ports available which are split between monitoring and control functions.
- Sensors are simply terminated into the rear of the unit or a handy 5m + 5m Jackal harness can also be provided.
- There are multiple trip counters as well as an overall total allowing the operator to track numerous jobs in a period of work.
- The Jackal can be put 'on hold' by the operator or by a suitable external Run/Hold switch/signal
- Easy wizards for fast setup of Area & speed Meter, Area & Speed Meter with GPS, Tacho Meter, Flowmeter, Slippage Meter, Spray Controller & Generic Wizard
- 1UP, 2UP or 3UP line display - Your choice of up to 3 lines per screen (page)
- Ability to short name each port. i.e. label Shaft 1 as SF1
- Set high & low alarm points for each input
- The ability for each input used to display information using imperial and metric units.
- Arrange front page to your liking.... You select what you want to show on each line
- Auto calculate or manually set calibration factors
- 3 Section Rate controller with the ability to automatically & manually control a flow control valve, 3 sections plus dump valve.

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TECHNICAL SPECIFICATIONS

Specifications below are subject to change and are based on a fully unlocked Jackal Controller.

Power Requirements	10 – 18 VDC @ 250mA
Max Current (Total)	10A
Display	128 x 64 Mono Graphic LCD
Operating Temperature	0 to 50˚c
Storage Temperature	-5 to 65˚c
Dimensions	135mm H x 100mm W x 30mm D
Sensor Inputs	9
Inputs 1-5 & 8-9 (Square Wave)	Up to 400 pulses per second (On/Off/Freq)
Inputs 6-7	Analog Voltage 0 – 5V
GPS	RS232 TX/RX
Ground	2
Output PWM	2
Output +12v	1
Output's	4
Max current (Per channel)	5A Output [1]

[1] Assumes motors with no momentum. If motors have momentum due to application (e.g. spinners) refer to Smart Ag Systems

DISCLAIMER

The warranty offered on this Smart Ag Systems product is limited to the repair or replacement of the faulty goods. No liability will be accepted for loss of profit or productivity. **WARRANTY IS VOID** if power and or sensors are not connected as described in this guide.

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INSTALLATION

PARTS LIST

REF	PART NUMBER	DESCRIPTION	QTY
1	A-Jackal	Jackal Monitor	1
2	AH-407	Mounting Bracket	1
3^	P-321 x1 P-322 x1	11 Way Input Plug Green & Grey	1 each colour
4^	AC-105	5m Power Cable	1
5^	HM-506	Screwdriver	1
Not Pictured	AM-200	Warranty Card	1
Not Pictured	AM-Jackal	Manual	1
6*	AC-4501/T	Jackal Tractor Harness 5m	1
7*	AC-4501/S	Jackal Section Harness 5m	1

^ Items **NOT** supplied when purchased as full spray control
* Items **NOT** supplied if full control kit purchased

PARTS PICTORIAL

MOUNTING & INSTALLATION

The Jackal Monitor & Spray Controller is provided with a suction window mount. An optional RAM style is also available for purchase at an additional cost.

Slide mount onto unit and push sideways to lock into place. Make sure you hear a click of the mount locking into place.

Place in a convenient position on the windscreen and using the toggle lever pictured above (Item 2), push all the way to the bottom until lever locks into position.

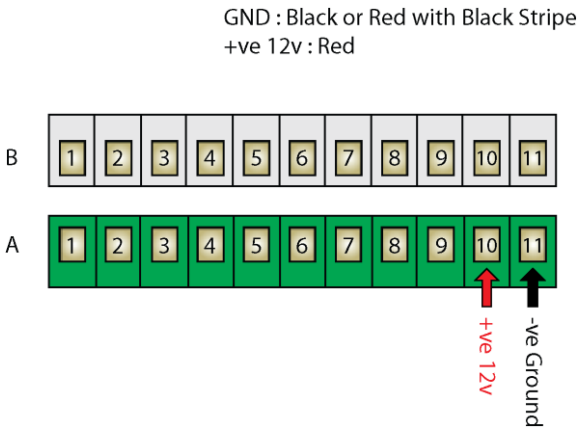
Note: Monitor should be mounted in a clearly visible position in the cab for the operator, but not in a position where it is subject to intense heat or moisture.

CONNECTIONS

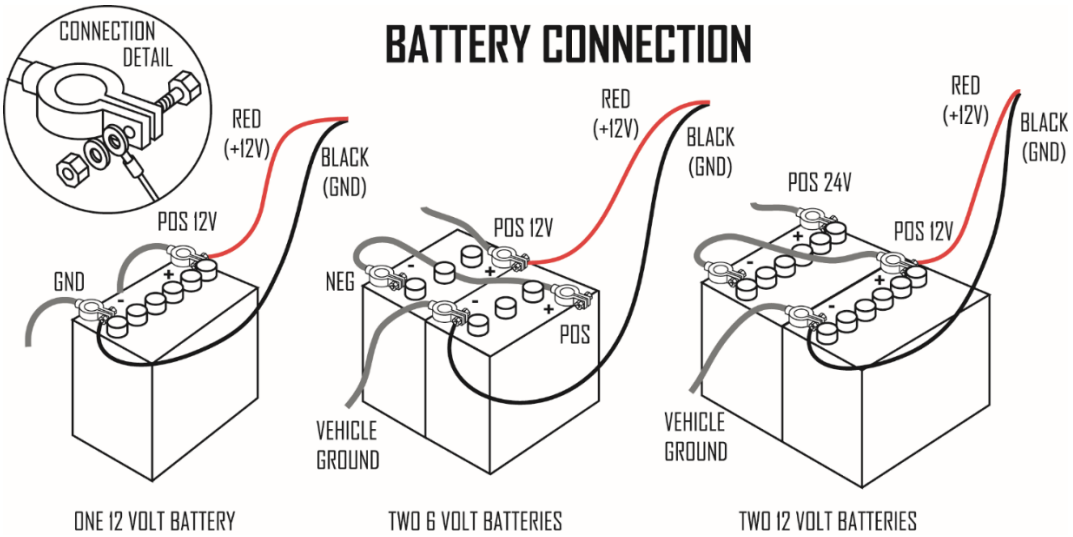
The connector on the rear of the Jackal Controller has the following connection points available for use.

POWER CONNECTION

Power connection must come direct from the battery terminals. **WARRANTY IS VOID** if power is not connected as described in this section.



1. Connect power cable supplied **DIRECTLY TO BATTERY**
2. Ring terminals are used for battery connection and the bare end used to connect to the rear Jackal. (Refer above image for power connection)
3. Connect Ground to BATT -VE, **Terminal A11** using the **RED** with **BLACK** stripe wire
4. Connect **+12** Volts (+battery terminal) to BATT +VE, **Terminal A10** using the **RED** wire
5. Ensure that the battery connection to the Jackal is +**12 Volts**

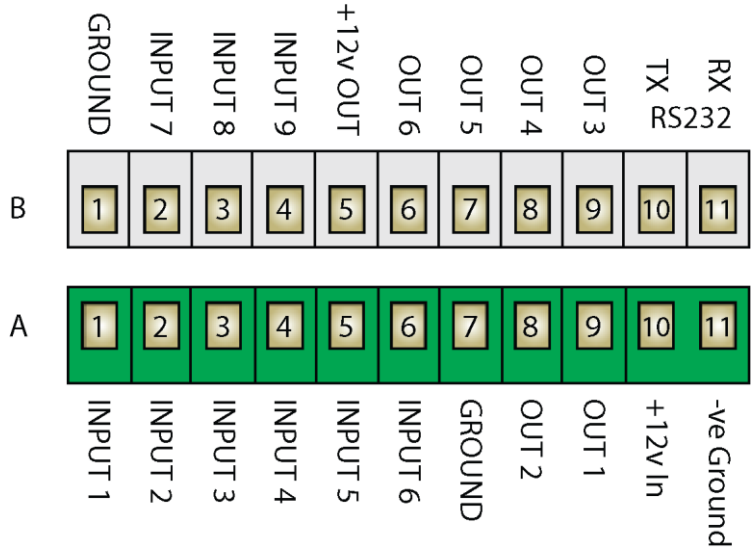


Connecting 24V to the Jackal will VOID WARRANTY

Disconnect the terminal plugs from the Jackal if ARC WELDING on machinery

REAR CONNECTIONS (MONITOR & CONTROL VERSION)

The connector on the rear of the Jackal Monitor & Controller has the following points available for use.



A	BOTTOM ROW (GREEN PLUG)	B	TOP ROW (GREY PLUG)
A1	**INPUT 1** Prox / Reed / High-Low / On-Off / Alarm	**B1**	**GROUND** Earth / 0v
A2	**INPUT 2** Prox / Reed / High-Low / On-Off / Alarm	**B2**	**INPUT 7** Varying (Analogue) Voltage Sensor
A3	**INPUT 3** Prox / Reed / High-Low / On-Off / Alarm	**B3**	**INPUT 8** Prox / Reed / High-Low / On-Off / Alarm
A4	**INPUT 4** Prox / Reed / High-Low / On-Off / Alarm	**B4**	**INPUT 9** Prox / Reed / High-Low / On-Off / Alarm
A5	**INPUT 5** Prox / Reed / High-Low / On-Off / Alarm	**B5**	**+12v OUT^** Supply Out / Sensor Power
A6	**INPUT 6** Varying (Analogue) Voltage Sensor	**B6**	**OUT 6** GND/+12v/Run/Hold/Alarm/Freq/Batch
A7	**GROUND** Earth / 0v	**B7**	**OUT 5** GND/+12v/Run/Hold/Alarm/Freq/Batch
A8	**OUT 2** GND/+12v/Run/Hold/Alarm/Freq/Batch	**B8**	**OUT 4** GND/+12v/Run/Hold/Alarm/Freq/Batch
A9	**OUT 1** GND/+12v/Run/Hold/Alarm/Freq/Batch	**B9**	**OUT 3** GND/+12v/Run/Hold/Alarm/Freq/Batch
A10	**+12v In** +12v Battery	**B10**	**RS232 TX** From GPS
A11	**-Ve In** Ground / GND Battery	**B11**	**RS232 RX** From GPS

Need an extra Square Wave Input? Consider swapping your wheel sensor input for out T-135 GPS Speed sensor

^ B5 supplies 12v out to sensors when the Jackal is turned on

- Any free INPUTS can be used as the remote/run hold function except for the 2 analogue inputs Input

REAR CONNECTIONS (CONTROL VERSION & SPRAY)

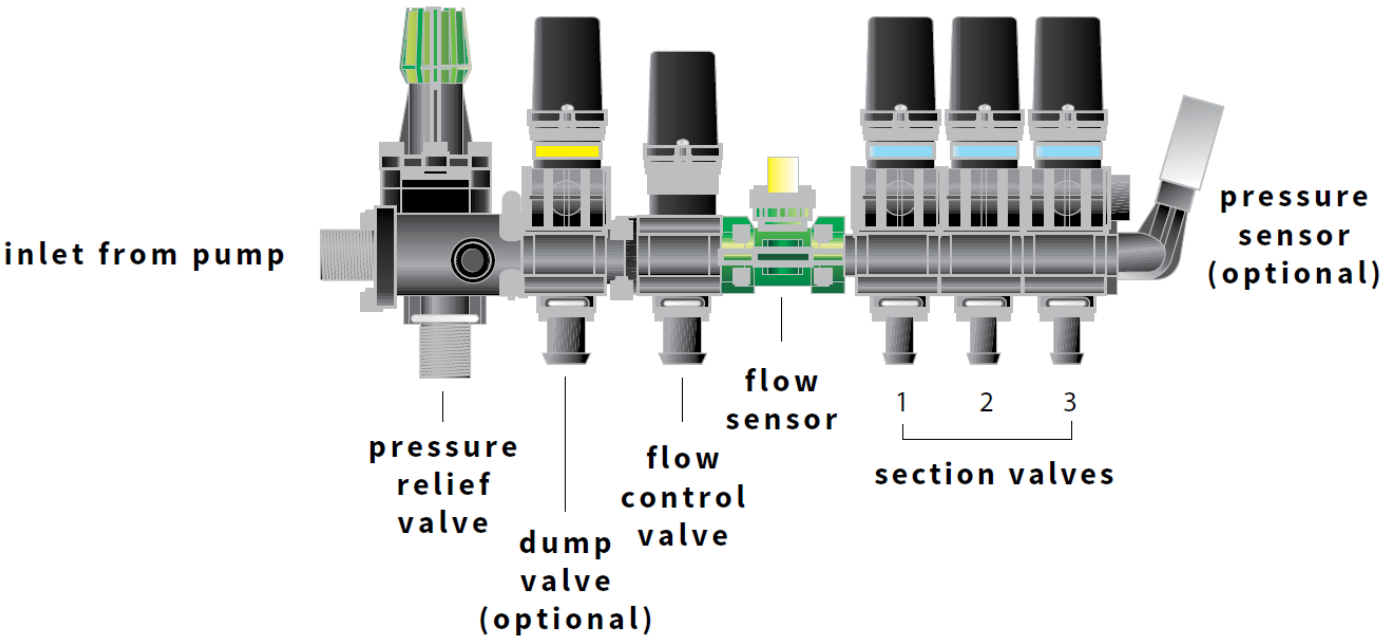
The Jackal Spray Controller & Monitor harness comes pre-terminated for ease of install and convenience.

The following table outlines the pre-termination of this cable.

A	BOTTOM ROW (GREEN PLUG)	B	TOP ROW (GREY PLUG)
A1	INPUT 1 / NOT USED	B1	GROUND / GPS PIN 5
A2	INPUT 2 / FLOW SENSOR	B2	INPUT 7 / NOT USED
A3	INPUT 3 / TANK LEVEL SENSOR	B3	INPUT 8 / NOT USED
A4	INPUT 4 / WHEEL SENSOR	B4	INPUT 9 / NOT USED
A5	INPUT 5 / NOT USED	B5	+12v OUT / COMMON SENSOR POWER
A6	INPUT 6 / PRESSURE SENSOR	B6	OUT 6 / DUMP VALVE
A7	COMMON SENSOR GROUND	B7	OUT 5 / SECTION 3
A8	OUT 2 / MASTER MOTOR -	B8	OUT 4 / SECTION 2
A9	OUT 1 / MASTER MOTOR +	B9	OUT 3 / SECTION 1
A10	+12v IN / +12V BATTERY	B10	RS232 TX
A11	-Ve IN / BATTERY GROUND	B11	RS232 RX

Notes as below:

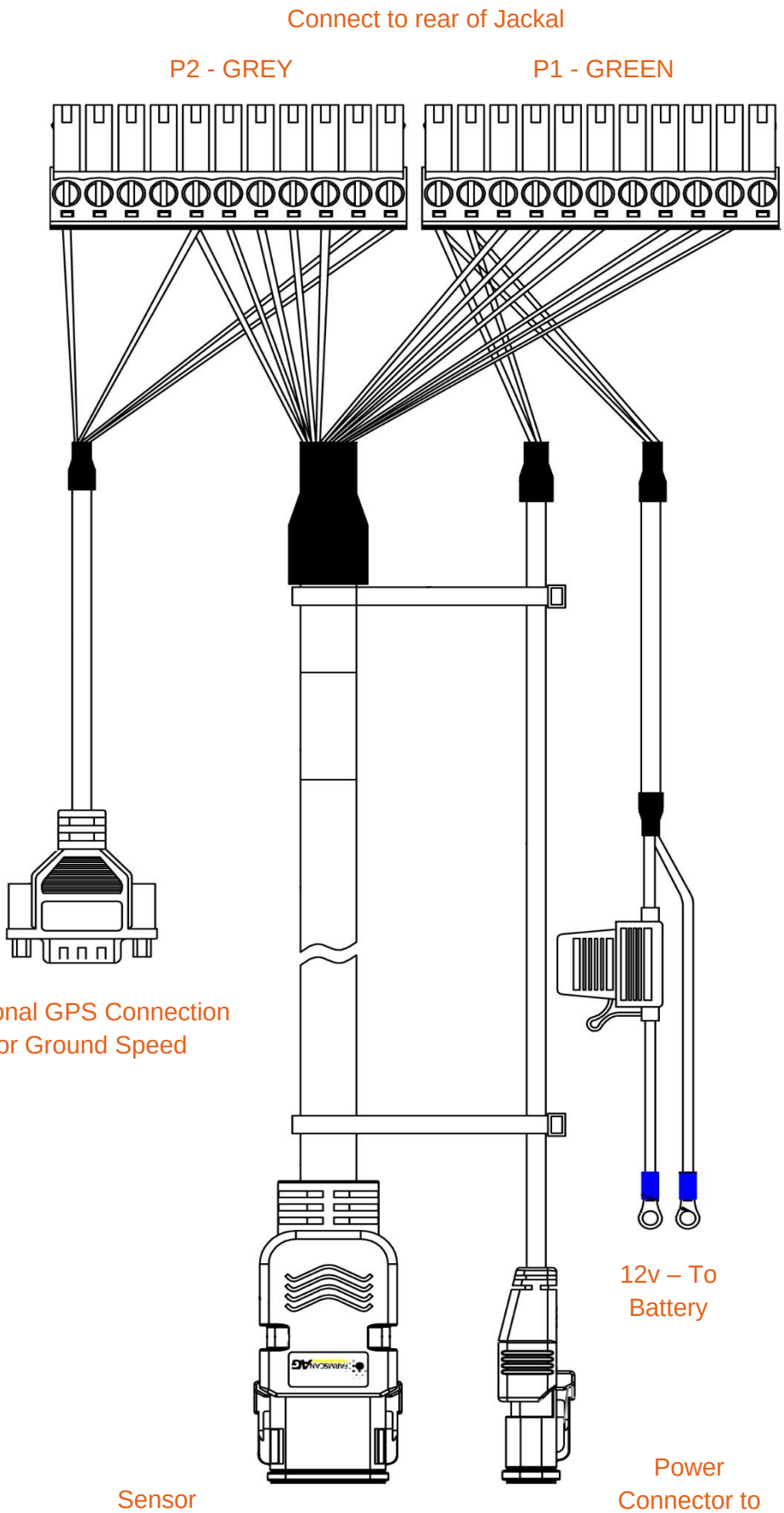
- The Jackal sprayer harness is wired to suit the Smart Ag Systems control valve bank (see below)
- The Jackal Harness comes pre-terminated with Packard plugs & Pins
    - Adapter cables maybe purchased or is included with some kits (Page7)
- This cable can be modified for different valve bank assemblies.
- Please refer to your implement supplier or auto electrician to determine the current requirement and wiring if you are not using a Smart Ag Systems control valve bank.
- The Jackal controller should only be connected directly to 3 wire motorised valves.
- If you are connecting to a 2 wire section valve (E.g., Arag or Hardi) you will require a 2 to 3 Wire Converter **(Smart Ag Systems Part Number A-2091) These are available to order at an additional cost.**



Example – Smart Ag Systems 3 Section Valve Bank
(Smart Ag Systems Part Number AA-24V1/3)

TRACTOR HARNESS (CONTROL VERSION & SPRAY)

Overview of Tractor Harness as below:

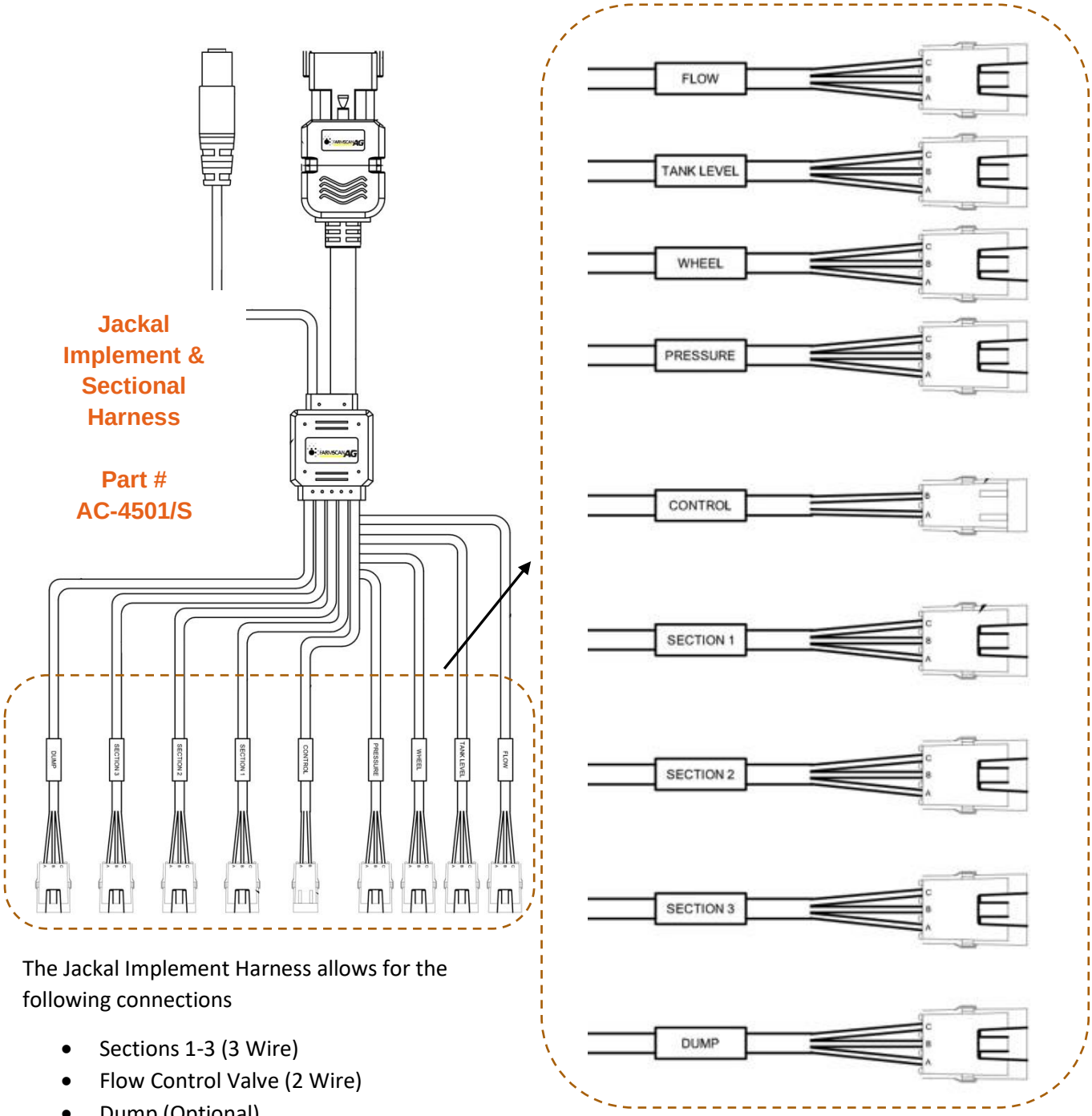


Jackal Tractor Harness

Part # AC-4501/T

IMPLEMENT/SECTION HARNESS (CONTROL VERSION & SPRAY)

Overview of Implement/Section Harness as below:



The Jackal Implement Harness allows for the following connections

- Sections 1-3 (3 Wire)
- Flow Control Valve (2 Wire)
- Dump (Optional)
- Pressure
- Wheel Input (Speed)
- Tank Level Sensor
- Flow Meter (3 Wire)

NB: The Jackal harness comes pre-terminated with Packard's. Kits purchased directly may include adapters as below.

Packard Adapters are as follows:

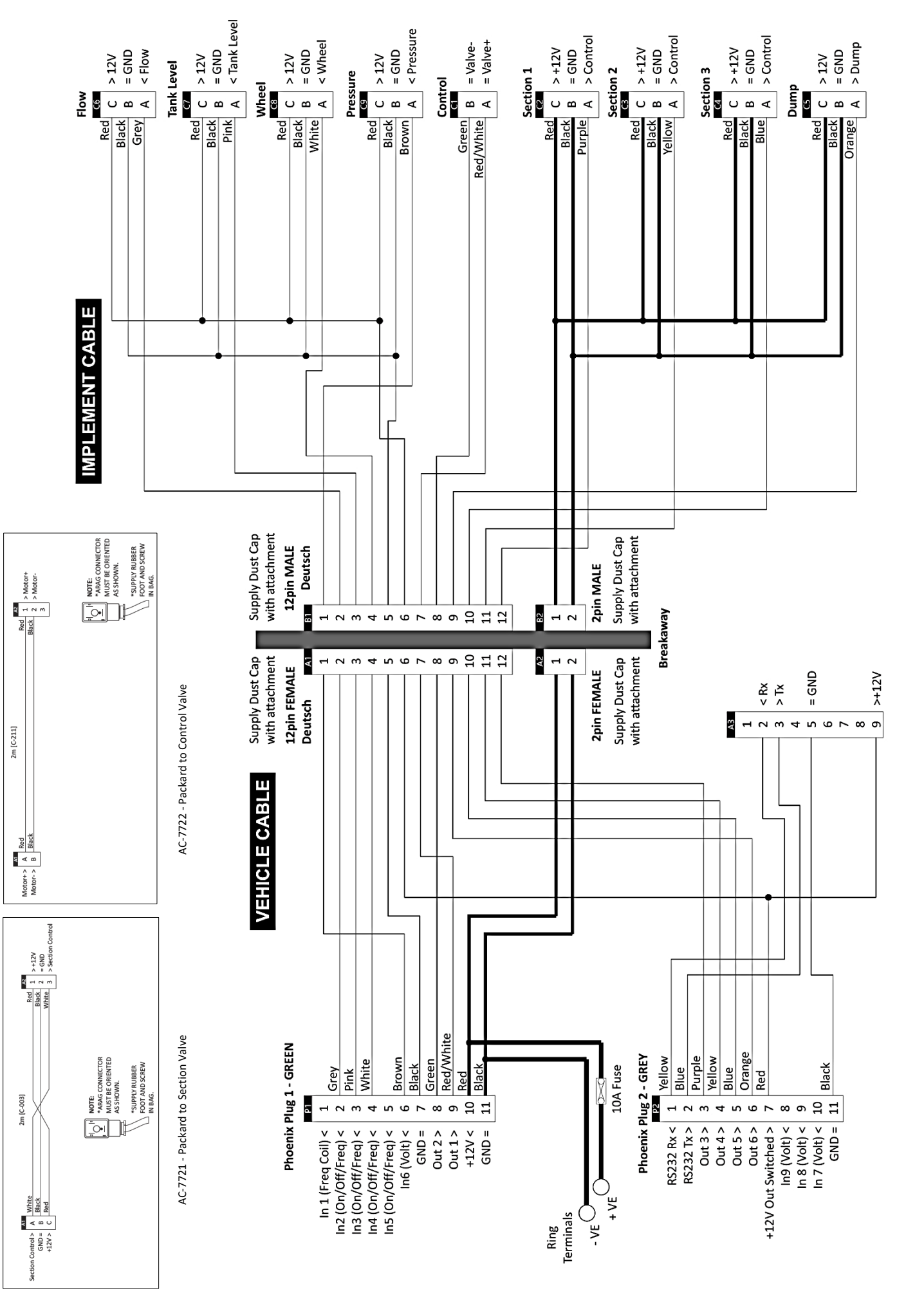
- AC-7722 – Packard to Flow Control
- AC-7721 – Packard to Section Valves

WARNING

Connect to implement as required. Unused connectors and wires should be taped back to avoid weather corrosion or accidental shorting and damage.
NB: All Red Wires are +12v (live when Jackal is on) – DO NOT SHORT

WARNING

SPRAY HARNESS OVERVIEW (CONTROL VERSION & SPRAY)



INSTALLING SENSORS

The following examples will help to determine appropriate sensor input connections into the Jackal.

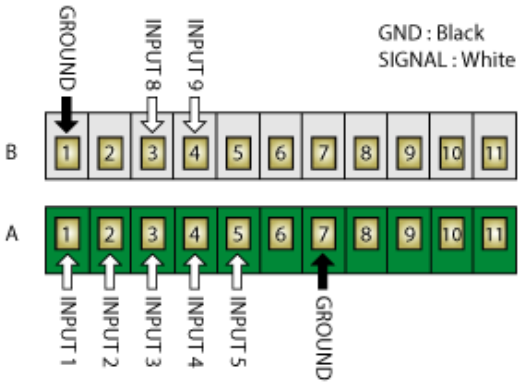
TWO WIRE "REED" – BLACK END SENSOR
KIT # 1007P, 2009, 2076

These kits will all include a "reed" type sensor. The reed type sensor is a 2 wire sensor (normally black end) and only uses a ground/earth wire and a signal wire.

The diagram to the right shows which terminals to connect your sensors to.

Insert the black ground wire to either **(A7 or B1)** and the white/coloured signal wire into any **(A1-A5 or B3-B4)**

Use the wizard to setup the port and calibrate a sensor once installed.



THREE WIRE – PROX SENSOR OR 3 WIRE FLOW METERS
KIT # AA-2010P, AA-123P, AA-125, AA-242, AA-230X, AA-232X, AA-231

These kits will all include a "square wave" type sensor. The sensor is 3 wires and uses a ground/earth wire, a signal wire and a 12v power wire.

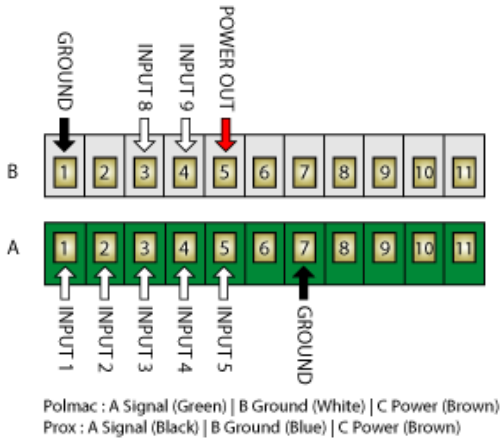
These inputs are also used with 3 wire (square wave) flow meters.

The diagram to the right shows which terminals to connect your sensors to.

Insert the ground wire to either **(A7 or B1)** and the sensor wire into any **(A1-A5 or B3-B4)** and the power wire to **(B5)**

Use the wizard to setup the port and calibrate a sensor once installed.

NB: A Proximity sensor can be used for wheel speed or RPM.



THREE WIRE "ANALOGUE/VOLTAGE" – PRESSURE SENSOR OR DEPTH SENSOR
KIT # AA-114, AA-119-H, AA-119-L, AA-430

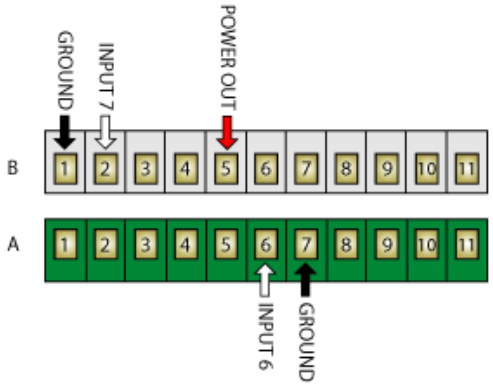
These kits will all include an "analogue" type of sensor. The analogue sensor is 3 wire and uses a ground/earth wire, a signal wire and a 12v power wire.

Typical sensors would include Pressure & Depth.

The diagram to the right shows which terminals to connect your sensors to.

Insert the ground wire to either **(A7 or B1)** and the sensor wire into **(A6 or B2)** and the power wire to **(B5)**

Use the generic wizard to setup the port and calibrate a sensor once installed.



NB: The AA-430 (Depth Sensor) is powered by 5v – Please contact us to discuss powering options via the Outputs Menu

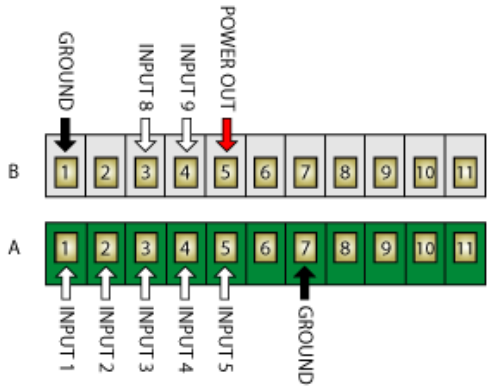
THREE WIRE "BIN/TANK LEVEL"
KIT # 2060, A-2220P

These kits will all include an "on/off, high/low, empty/full" type of sensor. The analogue sensor is 3 wire and uses a ground/earth wire, a signal wire and a 12v power wire.

The diagram to the right shows which terminals to connect your sensors to.

Insert the ground wire to either **(A7 or B1)** and the sensor wire into any **(A1-A5 or B3-B4)** and the power wire to **(B5)**

Use the generic wizard to setup the port and calibrate a sensor once installed.



GPS
KIT #T-135

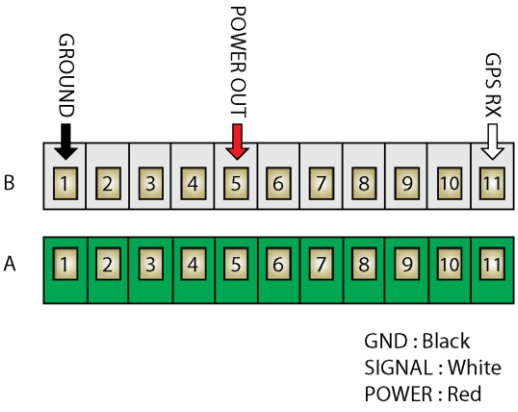
GPS units supplied from Smart Ag Systems are pre-programmed and ready to use with the Jackal Monitor.

The diagram to the right shows which terminals to connect your GPS to.

Insert the black or green wire to **(B1)** and the white or yellow wire into **(B11)** and the red wire into **(B5)**

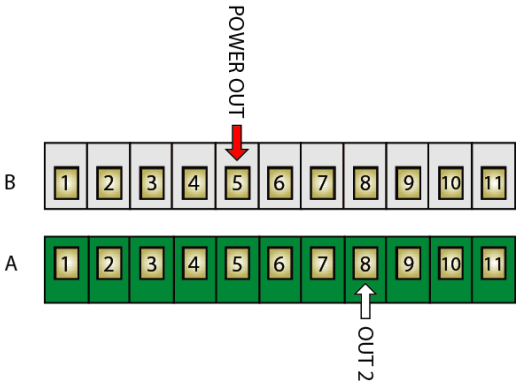
Use the wizard to setup the port and calibrate once installed.

NB: If you BYO GPS please ensure the GPS is set to: GGA, VTG, RMC, 5Hz and a baud rate over 19200kbps.



BATCH (SOLENOID)
KIT # 1501

The Batch function is designed to measure bulk water into a spray tank via either a bottom or top fill system. The minimum flow rate for effective operation is 75 L/min to a maximum of 750L/min using our standard 2” flow sensor.



Water may be pumped, or gravity fed through the flow sensor, which will give accurate readings providing no air enters the system. The Flow sensor can be installed on either the suction or pressure side of the water delivery system, and the readout will count up to display the total litres delivered.

Alternatively, the TANK BATCHMETER may be automated by installing either the SOLENOID SHUTOFF option which will automatically stop the flow after the readout counts down to zero from a preset batch total.

When using the Jackal as a batch meter with liquid, please ensure the appropriate flow meter is setup as per the previous instructions.

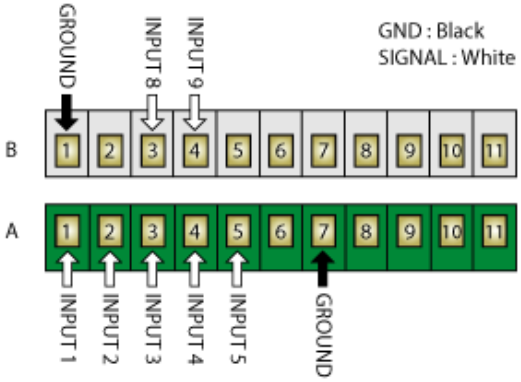
Insert one wire to **(B5 POWER OUT)** and the other wire into **(A8 OUT 2)**

Use the wizard & instructions to setup the port and calibrate once installed.

If water quality is doubtful, water intake should be filtered via an 80-mesh filter before the flow sensor, to avoid foreign matter clogging / jamming the turbine. Chemicals may be introduced into the water stream without causing damage to the flow sensor, but some chemicals may damage or reduce the solenoid diaphragm life, particularly if undiluted.

REMOTE RUN/HOLD (ACTIVATE BY INPUT)

The Jackal can connect an external Run/Hold trigger (e.g. Remote Switch) & wire into any unused signal INPUT 1-5 or 8-9 **(port A1-A6 & B3-B4)**



This allows the Jackal to be remotely placed on hold or run mode from an external source or switch without having to press the Run/Hold button on the Jackal itself. When the external Run/Hold is active on any input the Run/Hold button on the Jackal is then disabled.

Insert the signal wire from your external switch to any of the unused input ports as mentioned above.

If the Run/Hold signal is from a noisy or inductive source, then it may be prudent to fit an inline relay to condition the signal before connecting into the Jackal.

NORMALLY ON	NORMALLY OFF
WHEN A CIRCUIT EXISTS BETWEEN THE SELECTED INPUT AND GROUND (GND), SELECTING NORMALLY ON WILL RESULT IN THE JACKAL GOING INTO HOLD MODE	SELECTING NORMALLY OFF WILL RESULT IN THE REVERSE I.E. THE JACKAL WILL BE IN RUN MODE UNTIL THE CIRCUIT IS BROKEN AFTER WHICH IT WILL GO INTO HOLD MODE.

Enable the remote run/hold via **OTHER SETTINGS** as further described on ***PAGE 53.***

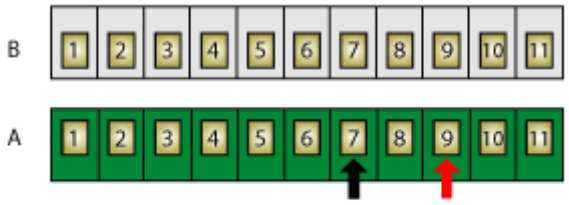
REMOTE RUN/HOLD (ACTIVATE BY OUTPUT)

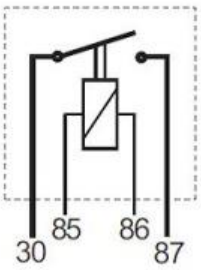
The Jackal has the ability to turn on and off an external device such as a clutch by.

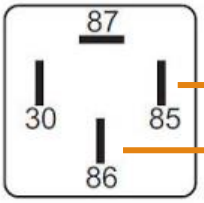
This allows you to press the Run/Hold on the Jackal to enable an external device.

NB: This function is used in conjunction through an automotive relay.

Example: Hella Automotive Relay (12v / 30A) – 4RA003510-08





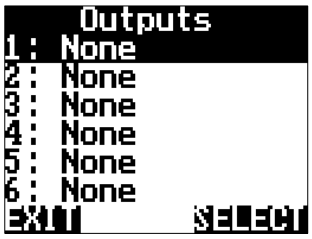


Pin 86 to **A9 Out 1** (Jackal +12v Run/Hold Output)
Pin 85 to **A7** (Ground)
Pin 30 to **12v in** (Direct to Vehicle Battery)
Pin 87 to **Positive Side** of clutch or device to be powered ***(Ensure negative/ground on other side of device returns to battery)***

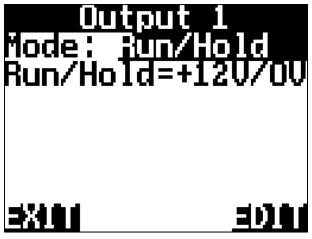
Enable the remote run/hold out by:

From the front screen press **SETUP**

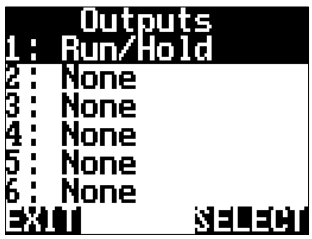
Highlight **OUTPUTS** and press **SELECT**



Highlight **1: NONE** and press **SELECT**

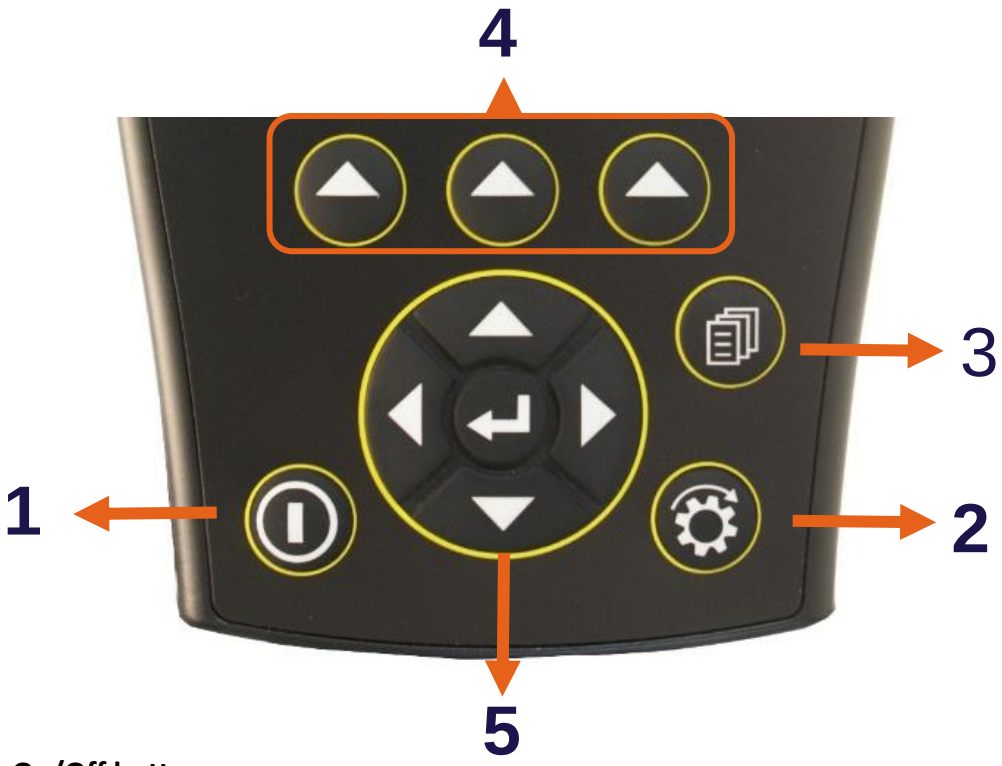


Press **EDIT** and change to **MODE: Run/Hold**
Press **EXIT**



Press **EXIT** when done.

BUTTON FUNCTIONS



1. **Power On/Off button**
    a. Power is turned on by pressing the **ON/OFF** button for 1 second.
    b. Power is turned off by holding the **ON/OFF** button for 2 seconds.

2. **Run/Hold button**
    a. The **RUN/HOLD** button has a dual function.
        a. Press **RUN/HOLD** once to place the 'MONITOR ON HOLD'.
        b. Press **RUN/HOLD** again to resume operation.
    b. The **RUN/HOLD** state is indicated in the top left-hand corner of the screen. When the monitor is in RUN mode, the unit displays RUN to signify that the monitor is active.
    c. When the monitor is in **HOLD** mode the unit displays the word "**HOLD" & "BEEPS"** every 2 seconds

3. **Page button**
    a. The **PAGE** button is used to scroll through BATCH mode screens or Spray Control functions.

4. **Select button (3 of)**
    a. The Jackal has 3 buttons placed directly under the LCD. These buttons will change function in different menus.
    b. The function of the button is indicated at the bottom of the screen directly above the button.

5. **Navigation button (Up, Down, Left, Right, Enter)**
    a. The Round navigation (**NAV**) buttons are used to navigate **UP/DOWN/LEFT/RIGHT** in calibration screens as well as scrolling through the display lines on the main screen.
    b. **ENTER** is used to select the option highlighted onscreen.

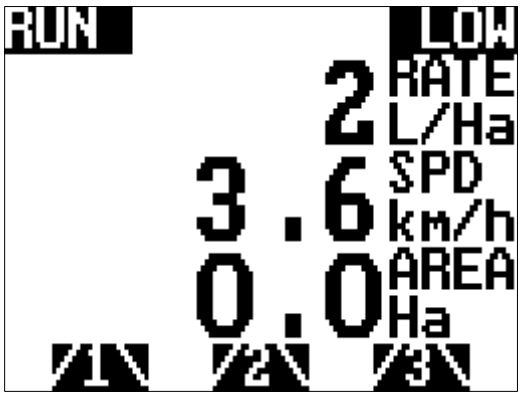
SCREEN LAYOUT

The Jackal can display one, two or three lines of live information at any one time.

Using the middle **NAV/Enter** button allows you to toggle between the different display modes when multiple inputs are being used.

Example: 1 Line

Example: 2 Line



Example: 3 Line

MAIN MENU

The level of Jackal unlock will determine what options are viewable and available to be edited.

Use the NAV button down to reveal further menu information

Wizard Run a predefined wizard for setting up the Jackal Monitor as:

- Sprayer (Automatic Mode) – *only available on Control version*
- Area/Speed Wheel
- Area/Speed GPS
- Tachometer (Fast & slow shaft speed option available)
- Flow Meter
- Slippage Meter
- Generic Wizard
- Sprayer Manual (Manual Mode) – *only available on Control version*

Inputs Manually enable or edit ports in which sensors are connected to.

Front Screen Enable/define/order/edit/name the lines on the front screen.
Select the number of decimal places displayed and edit the alarms.

Other Settings Change speed input, implement & section widths, external run/hold alarm notification settings (beep & on hold), language options, speed simulation for diagnostics.

Outputs This menu is used to control the Jackal outputs. Refer to this manual and edit the outputs described ONLY to prevent damage to external sensors connected to the Jackal.

GPS/Serial When an external GPS is connected view and ensure the GPS is setup correctly. Setup baud rate and confirm GPS messages (NMEA messages RMC or GGA+VTG are required) Latitude, Longitude, heading, speed, date & time.

About Jackal Shows current version of Jackal software and unlock codes installed on the unit.

Diagnostics Shows current input voltage and input diagnostics on enabled ports.

Reset Options Factory reset will set the unit back to its factory default setting. User Save/Load allows the user to configure the Jackal to their requirements and then save this configuration for reloading if necessary.

UNLOCK FUNCTION

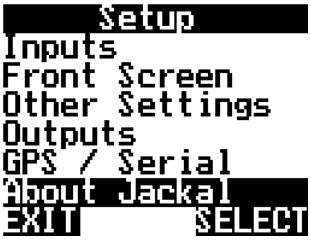
Additional features are available for the Jackal usually configured at the factory to the UNLOCK level purchased. If you want to utilize extra functionality the Jackal will need to be unlocked through the purchase of an additional Unlock Code. These additional features are:-

Control	Single product rate control, batching, 3 section Sprayer.
Multi - Control	Control for up to three products/functions.
OEM	These are OEM specific programs.

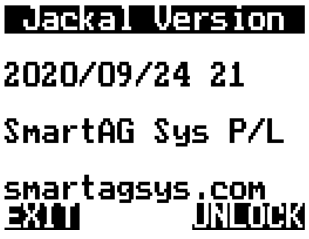
To purchase an Unlock Code for your Jackal, contact your Smart Ag Systems agent and provide them with the unlock level you require and the serial number of your Jackal. They will provide you with the new Unlock Code.

To Unlock your Jackal

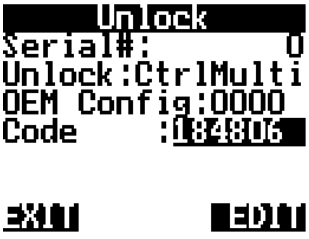
Press the **Setup** Key to get to the Setup screen



Use the **Down Arrow** to highlight **About Jackal** and press the **Select** key



Press the **Unlock** Key to display unit serial number and it's unlocked level

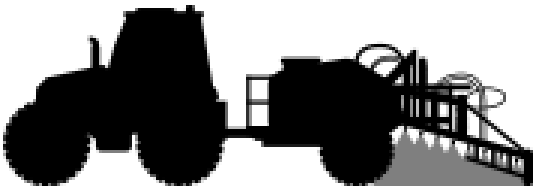


Select **Edit** and type in the code and this will unlock your unit

SPRAYER (WIZARD) – CONTROL VERSION ONLY

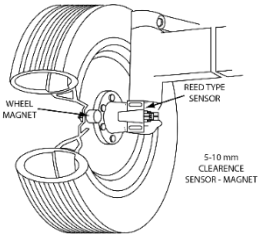
The Jackal can be setup to control an application rate when using both a speed & flow input. It offers Fully Manual, or Manual with auto dump valve open when stopped & Full Rate Control when varying speed.

Rates and 3 sections can be controlled from the main screen



Sensors Required:

- Wheel Sensor/GPS for Speed & Area calculation
- Flow meter (any style) to display liters



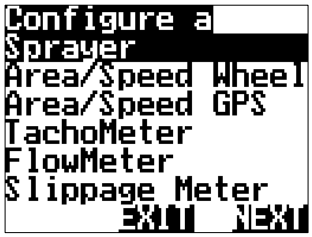
Available Connections: Refer to Installing Sensors from **PAGES 13-16**

NB: The following setup uses information from multiple pages in this manual.

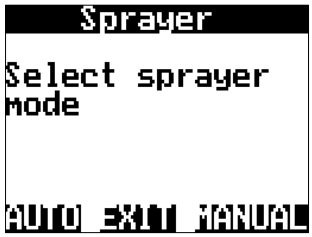
SETUP – AUTO MODE (WIZARD)

From the front screen press **SETUP**

Highlight **WIZARD** and press **SELECT**



Highlight **Sprayer** and Press **NEXT**

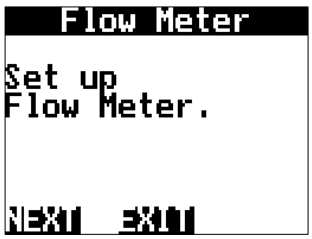


Select Spray Mode

Auto: Requires speed & flow Input. Auto rate adjust

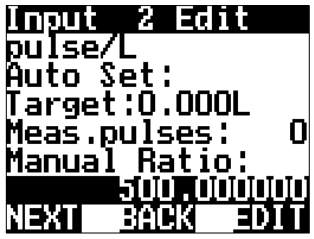
Manual: Adjust the flow control valve manually

Page 23



Press **NEXT** to setup your Flow Meter

NB: Please have your pulse per litre (PPL) factor from your flow meter ready to enter.

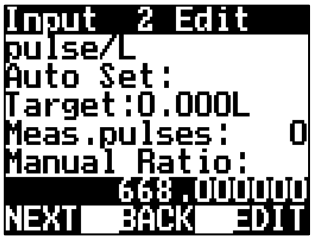


Press the **DOWN** arrow to the Manual Ratio value of 500.00 & Press **EDIT** to change the unit of Pulse.

Using the NAV buttons enter the PPL factor as displayed on the flow meter tag.

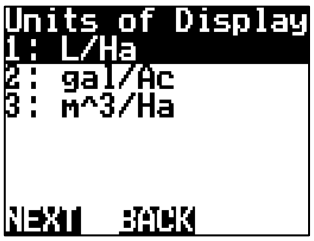
Press EXIT when done.

If your sprayer has 3-way section valves then press the **DOWN** arrow twice to the **3WaySectVlve** value, press **EDIT** to change the value to **YES.**

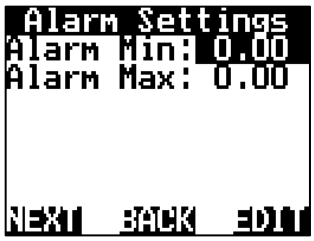


Press **NEXT** to accept the new manual ratio (PPL)

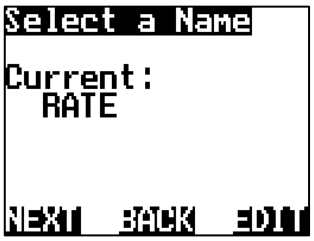
NB: If you are unsure leave this value at NO.



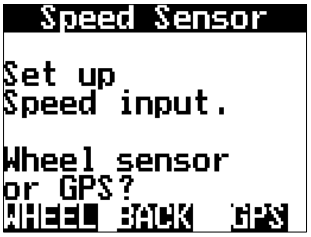
Using the **NAV** buttons select how you would like the **UOD** to be displayed on the front screen.
Press **NEXT**



You have the option to set Alarm Min/Max points if required. Using the **NAV** buttons select and **EDIT** as required. Press **NEXT**



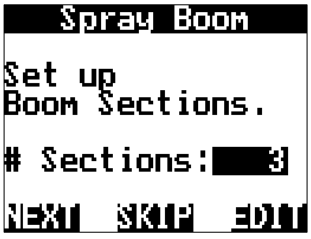
Change the input name if you desire, Press **EDIT**,
or Press **NEXT**



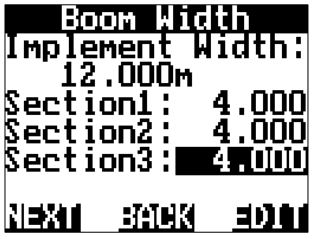
Select **WHEEL** or **GPS** to setup the speed input. This depends on the speed option you have purchased.

For Wheel:
Refer to Page 27 & 28

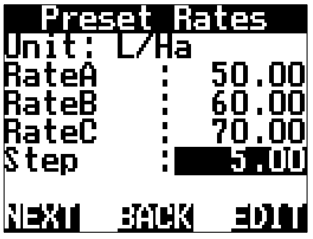
For GPS:
Refer to Page 29



Press **EDIT** and change the number of sections required to control.
Press **NEXT**



Using the **NAV** & **EDIT** keys, highlight and edit the section width values as required. The Section Widths will also Total and be displayed. Press **NEXT**

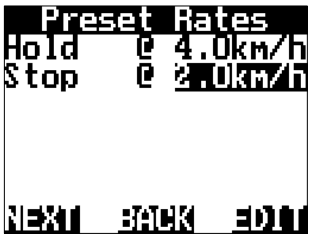


Using the **NAV** & **EDIT** keys, highlight and edit the "Quick set Rates" & Quick rate Step Value.
Press **NEXT**

The Jackal has the ability to have **Preset Rates** across the bottom of the screen. Example 50l/ha, 60l/ha etc.

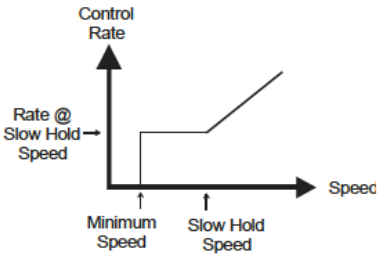
The Step rate allows you to easily up the rate by this amount quickly from the front screen.

Press **NEXT**

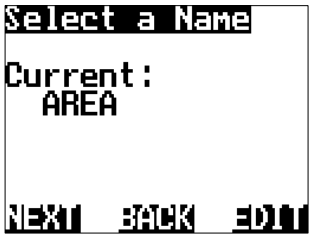


Using the **NAV** & **EDIT** keys, highlight and edit the **HOLD** & **STOP** values as described below

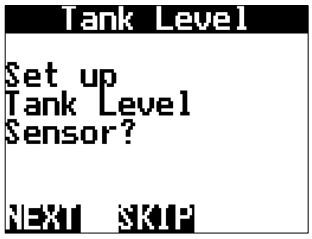
Press **NEXT**



- The Slow Hold Speed function is used to avoid loss of spray coverage caused by loss of pressure when travelling too slow or when reducing the target rate below the recommended minimum for the nozzles.
- If the implement is travelling below this speed (but above the minimum speed) then flow control is regulated as if the implement were travelling at the Slow Hold Speed.
- NOTE: Slow Hold is an optional function that can be set to operate at a minimum speed equivalent to the minimum recommended pressure for a given target rate (speed-based).
- **STOP**: Will simply put the Jackal on hold at a set speed.

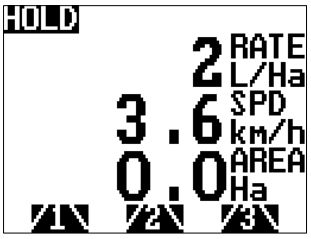


Change the input name if you desire, Press **EDIT**, Press **NEXT**



If you wish to setup a Tank Level Sensor please refer to **Page 41.** If not, Press **SKIP**

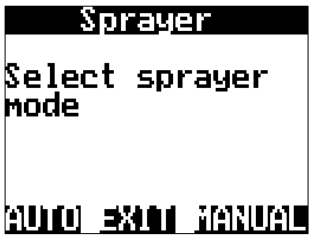
Press **NEXT** to finalise the Wizard and return to the front screen



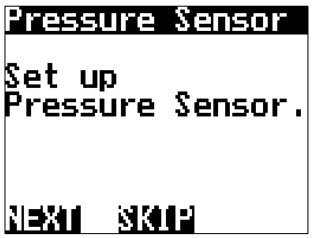
THIS ENDS THE AUTO SET WIZARD SETUP FOR SPRAYER SETUP

SETUP – MANUAL MODE (WIZARD)

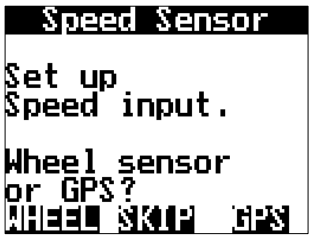
The Jackal can be setup to work in **MANUAL** mode in the event of no wheel speed or flow meter input, or combination of both. Manual mode simply allows adjustment of the flow control valve. In the event of a dump valve being installed, manual mode will close the dump valve & open all sections when the Run/Hold button is pressed.



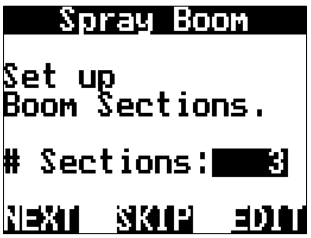
Select **MANUAL**: To Adjust the Flow Control Valve Manually



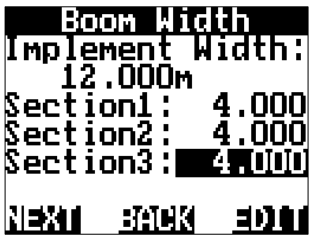
Press **SKIP**



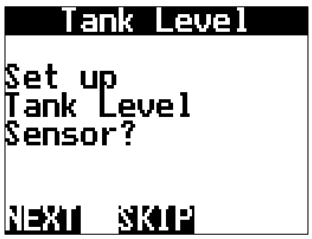
Press **SKIP**



Press **EDIT** and change the number of sections required to control.
Press **NEXT**



Using the **NAV** & **EDIT** keys, highlight and edit the section width values as required. The Section Widths will also Total and be displayed. Press **NEXT**



Press **SKIP**

Press **NEXT** to finalise the Wizard and return to the front screen

When you return to the **Front Screen** the Jackal needs to display a value.

The value of 1.0km/h is not relevant. It's simply used for the manual fucntion

Press the Run/Hold button

You can now manually adjust your flow control valve by pressing the Rate + or Rate –

Simply drive to a set speed

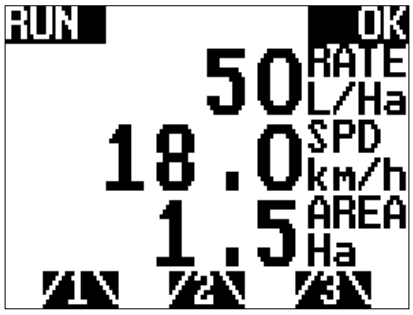
Press the **PAGE** button to display Rate+/- Flush

THIS ENDS THE MANUAL SET WIZARD SETUP FOR SPRAYER SETUP

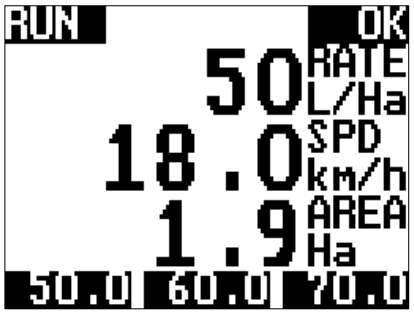
SPRAY CONTROL – HOW TO USE

Once the Sprayer Wizard has been run you are now ready to start spraying. Familiarise yourself with the Spray Controller layout as described below.

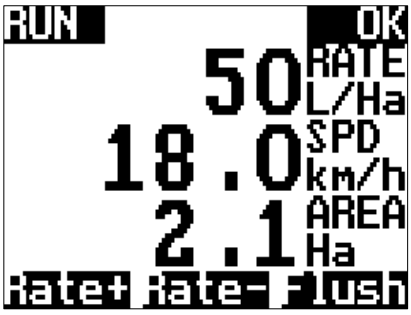
The Jackal Spray Controller Menu is laid out in 4 easy to use menus. These can be easily accessed by pressing the **PAGE** button



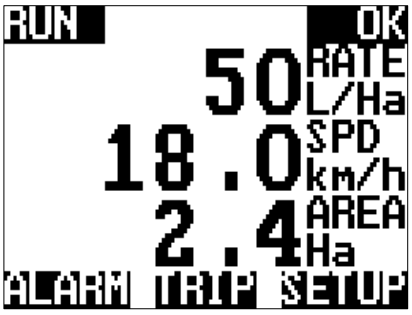
Default **Section On/Off Control** & **Run Screen**



Pre-Set A/B/C Rate Screen

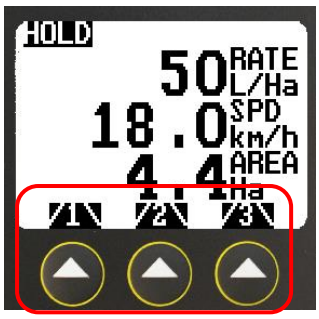


Step Rate Adjust & **Flush** Screen

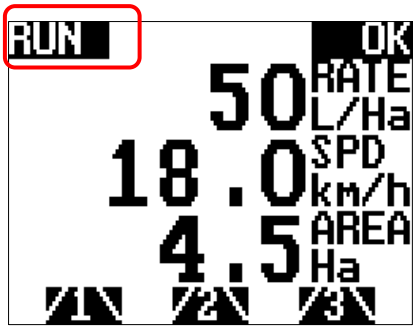


Alarm, **Trip** & **Setup** Layout

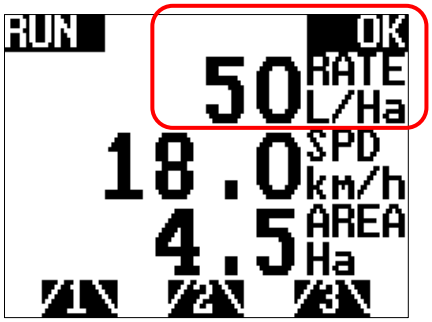
DEFAULT RUN & HOLD SCREEN



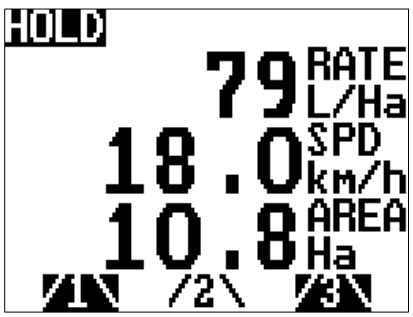
Sections can be individually turned On/OFF by pressing the soft keys underneath the sections numbers "/x\"



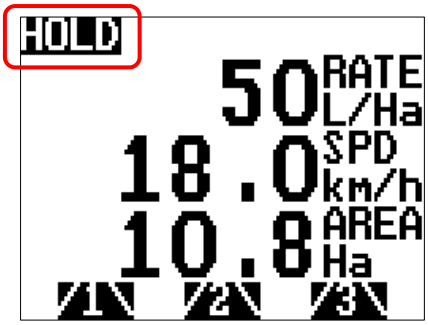
Pressing the Run/Hold button changes the Jackal from HOLD to RUN



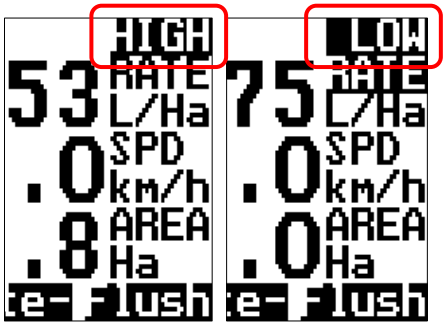
The LIVE rate in L/Ha is displayed and if the desired target is reach, **OK** will also be displayed



Example shows **Section 2** as OFF

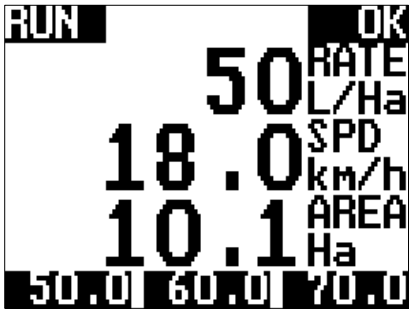


Example - **HOLD**

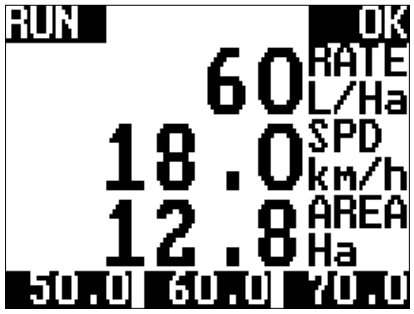


Both **HIGH** & **LOW** rate warnings are also displayed

PRESET RATES SCREEN



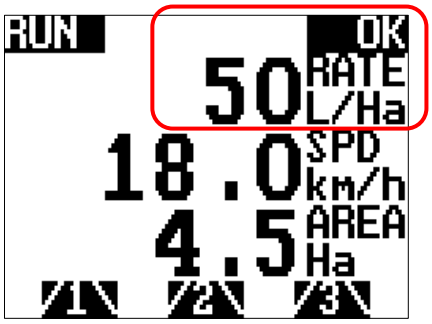
Quick Pre-set rates allows you to change rates on the go with ease. The Jackal will control up or down to the desired rate depending on vehicle speed.



Pre-Set Rates can be changed via

SETUP > FRONT SCREEN > RATE

RateA/B/C/D

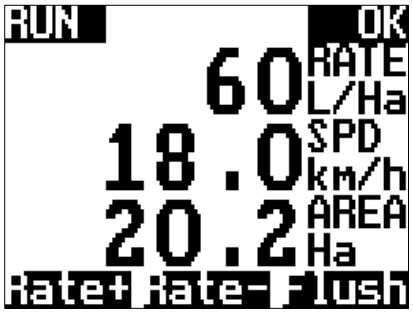


When changing rates, the Jackal will adjust the master control valve to allow more or less flow.

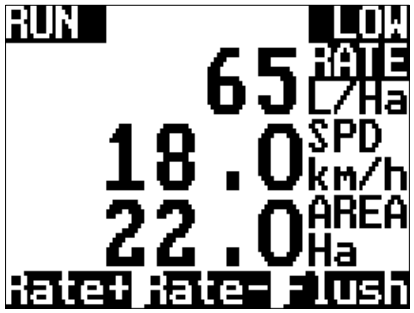
NB: If you believe the rate is not being maintained correctly when you speed up and slow down, it's possible the Flow Control Valve is opening back to front.

Please refer to the OUTPUTS on PAGE 56 to swap the + & - Outputs

MANUAL RATE & STEP ADJUST DURING FLUSH

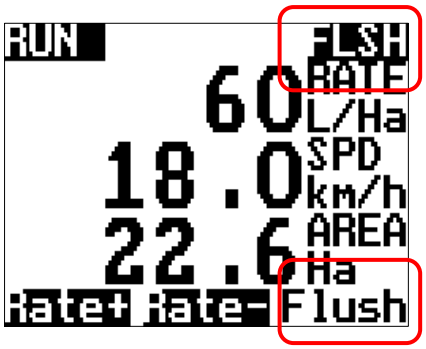


The **Rate +** & **Rate (STEP) –** allows you to adjust your flow rate with the Pre-Defined **STEP** rate previously input via the Wizard.



Your STEP can be changed via

SETUP > FRONT SCREEN > RATE



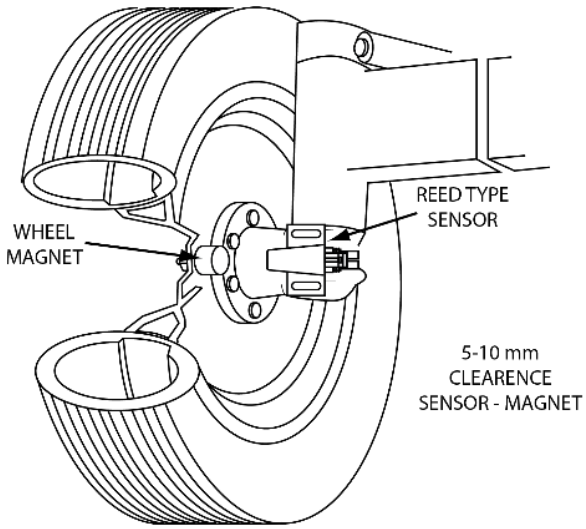
The **FLUSH** function will enable the full flow rate possible on your system.

Dump valve will close & all sections and control valve will open fully.

AREA & SPEED METER SETUP (WIZARD)

The Jackal can display Speed & Area in any combination of km/Ha or mph/acre.

A pickup can be mounted either on a wheel hub or shaft. (Example image right)



NB: THERE SHOULD BE A 5-10MM CLEARANCE BETWEEN SENSOR AND MAGNET

Sensors Required:

- Wheel sensor pickup 2 (Reed) or 3 wire (Proximity)
- Magnet (Used with 2 wire sensor)

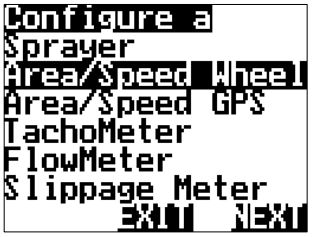
Available Connections: Refer to Installing Sensors from ***Pages 13-16***.

NB: The Implement harness has 3 wires by default. If using our standard wheel sensor kit, please only use the black & colored wire. The RED (Positive) does not need to be connected. – Trim this back or cover with heat shrink to prevent shorting out.

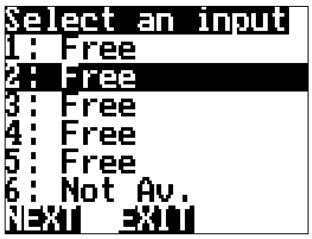
SETUP

From the front screen press **SETUP**

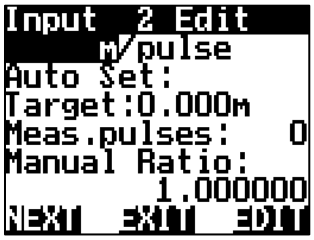
Highlight **WIZARD** and press **SELECT**



Highlight **Area/Speed Wheel** and Press **NEXT**



Highlight the **INPUT** number the speed is connected into the back of Jackal & press **NEXT**



Leave the unit of pulse calibration method as **M**

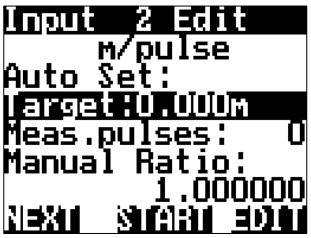
Choose your calibration method

Auto Set > PAGE 27

Manual Ratio > PAGE 28

CALIBRATION (AUTO SET)

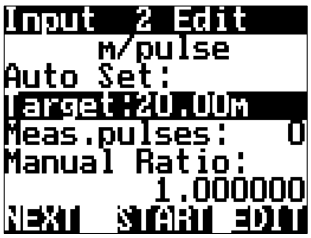
1. Ensure that the sensor and pickup are end-end before continuing
2. Mark bottom center of tyre on which the sensor is fitted and peg ground in corresponding position
3. Measure out a known distance to calibrate i.e. 20m-100m
4. Peg the corresponding point i.e. at the 20/100m mark



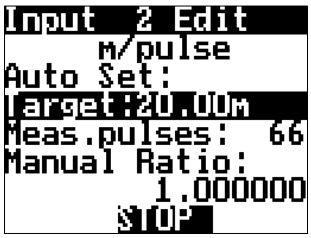
Select **TARGET**

Select **EDIT**

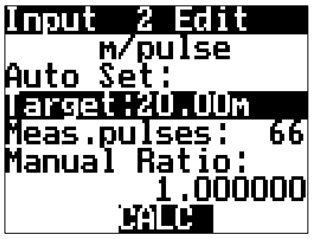
Using the **NAV** buttons enter your measured distance. i.e. 20.0000
Press **EXIT** when done.



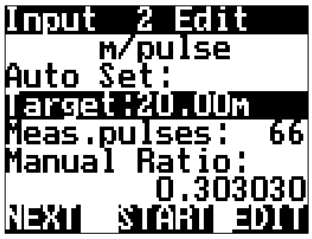
Press **START** and move forward slowly.
This will allow pulses to register.



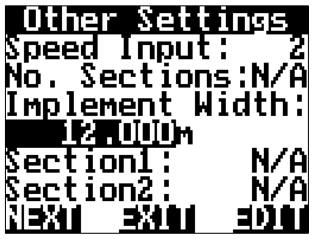
When you arrive at the center mark point of tyre to peg press **STOP**



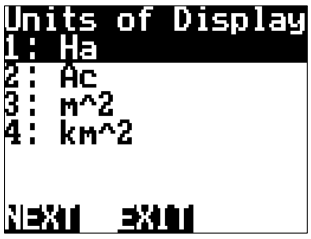
Press **CALC.** This will divide the distance travelled by the number of pules registered.



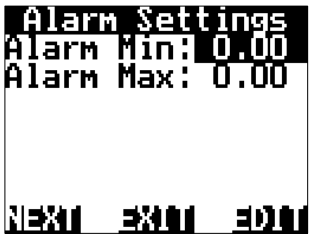
MANUAL RATIO will now be updated to reflect the calibration factor.
Press **NEXT**



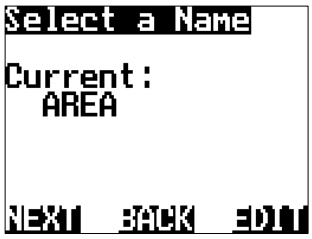
Using the NAV buttons and pressing **EDIT** enter your implement width in (m). e.g. **12m**
Press **NEXT**



Using the **NAV** buttons select how you would like the area to be displayed on the front screen.
Press **NEXT**

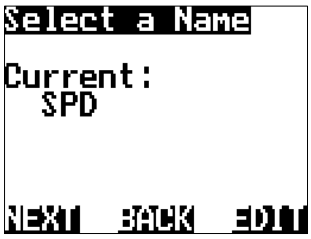


You have the option to set Alarm Min/Max points if required. Using the **NAV** buttons select and **EDIT** as required. Press **NEXT**



Change the input name if you desire, Press **EDIT,**
Press **NEXT**

Select either YES or NO to display Speed on the front screen with the area covered.



Change the input name if you desire, Press **EDIT**
Press **NEXT**

Press **NEXT** to finalise the Wizard and return to the front screen

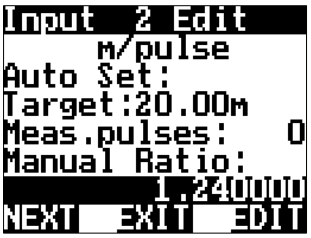
THIS ENDS THE AUTO SET WIZARD SETUP FOR SPEED/AREA METER

1. Ensure that the sensor and pickup are end-end before continuing
2. Mark bottom center of tyre on which the sensor is fitted and mark ground in corresponding position
3. Drive ONE full rotation of the wheel, returning the mark point on tyre to bottom center
4. Measure between the two points.
    - This is your Manual Ratio (Example 1.24m)

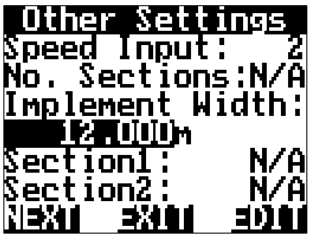
Select **MANUAL RATIO**

Select **EDIT**

Using the **NAV** buttons enter your measured distance. i.e. 1.240000
Press **EXIT** when done.

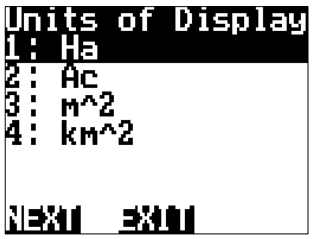


Press **NEXT**

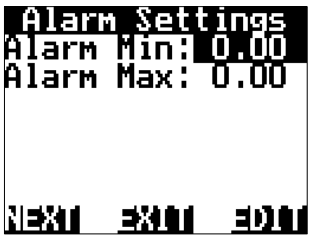


Using the **NAV** buttons and pressing **EDIT** enter your implement width in (m). e.g. **12m**

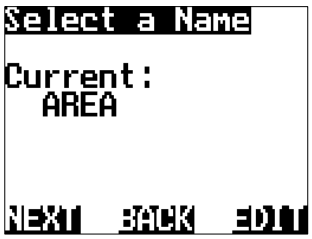
Press **NEXT**



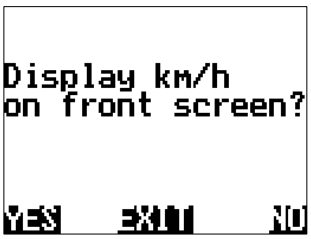
Using the **NAV** buttons select how you would like the area to be displayed on the front screen.
Press **NEXT**



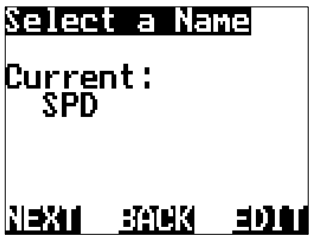
You have the option to set Alarm Min/Max points if required. Using the **NAV** buttons select and **EDIT** as required. Press **NEXT**



Change the input name if you desire, Press **EDIT**
Press **NEXT**



Select either **YES** or **NO** to display Speed on the front screen with the area covered.



Change the input name if you desire, Press **EDIT**,
Press **NEXT**

Press **NEXT** to finalise the Wizard and return to the front screen

THIS ENDS THE MANUAL RATIO SET WIZARD SETUP FOR SPEED/AREA METER

AREA & SPEED METER USING GPS SETUP (WIZARD)

The Jackal can display Speed & Area in any combination of km/Ha or mph/acre.

A wheel sensor is not required when using a GPS. GPS purchased from Smart Ag Systems are
pre-programmed. If you BYO please ensure the following:

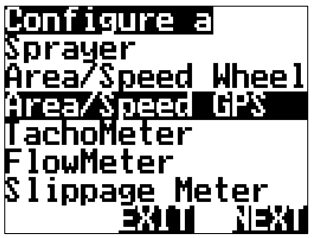
- GPS programmed with RMC – GGA - VTG NMEA messages.
- Any Baud Rate of - 4800,9600,19200,38400,115200 @ 5hz minimum.

Available Connections: Refer to Installing Sensors from **PAGES 13-16**

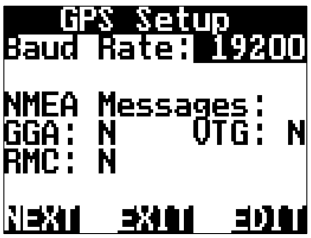
SETUP

From the front screen press **SETUP**

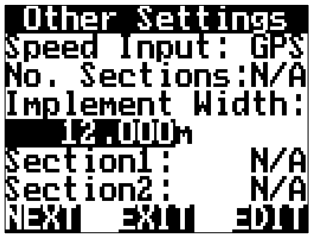
Highlight **WIZARD** and press **SELECT**



Highlight **AREA/SPEED GPS** and press **NEXT**

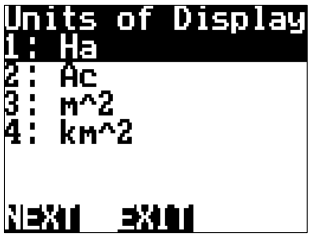


Press the **EDIT** button to change the baud rate, when the correct baud rate is selected the corresponding NMEA message will be acknowledged with a Y.
Press **NEXT**

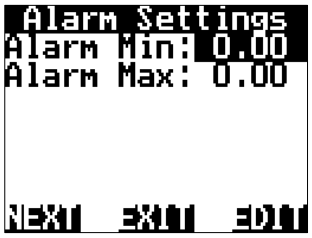


Using the NAV buttons and pressing EDIT enter your implement width in (m). e.g. 12m

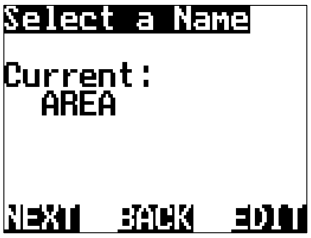
Press NEXT



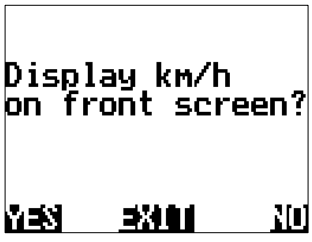
Using the NAV buttons select how you would like the area to be displayed on the front screen.
Press NEXT



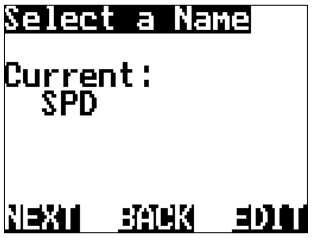
You have the option to set Alarm Min/Max points if required. Using the NAV buttons select and EDIT as required. Press NEXT



Name the input if you desire, Press EDIT. e.g. SPEED
Press NEXT



Select either **YES** or **NO** to display Speed on the front screen with the area covered.



Change the input name if you desire, Press EDIT,
Press NEXT

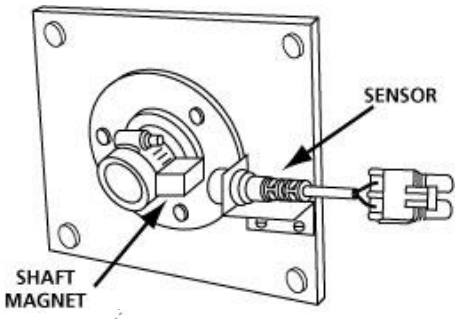
Press NEXT to finalise the Wizard and return to the front screen

THIS ENDS THE AUTO SET WIZARD SETUP FOR SPEED/AREA GPS INPUTETER

TACHOMETER - RPM METER SETUP (WIZARD)

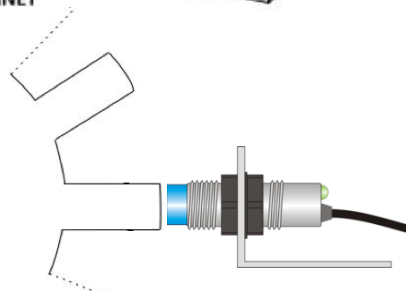
The Jackal can display an rpm (Revolutions per minute) which is useful for monitoring fans or shafts. Available in slow & fast options.

NB: THERE SHOULD BE A 5-10MM CLEARANCE BETWEEN SENSOR AND MAGNET OR 2-5MM BETWEEN PROX AND PICKUP



Sensors Required

- Shaft Sensor pickup 2 (Reed) or 3 wire (Proximity)
- Magnet (Used with 2 wire sensor)

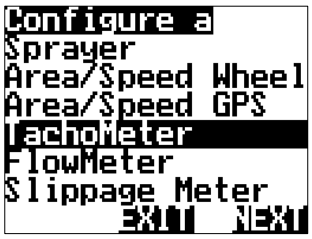


Available Connections: Refer to Installing Sensors from **PAGES 13-16**

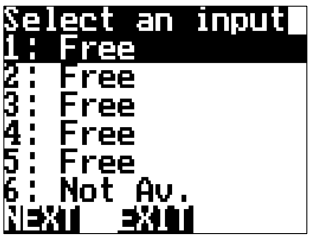
SETUP

From the front screen press **SETUP**

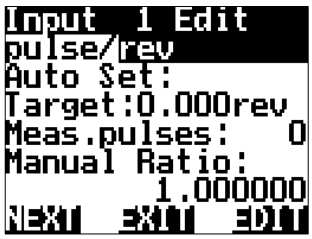
Highlight **WIZARD** and press **SELECT**



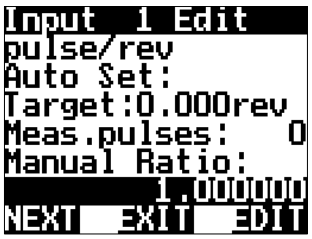
Highlight **TACHOMETER** and press **NEXT**



Highlight and select the appropriate sensor **INPUT** and press **NEXT**



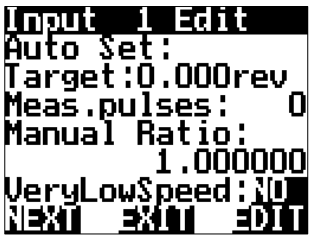
Leave the default value of **pulse/rev** and press **NEXT**



Select MANUAL RATIO
Select EDIT

The manual ratio is the number of magnets or bolt heads/teeth (for proximity). In most cases the ratio will be **1.**

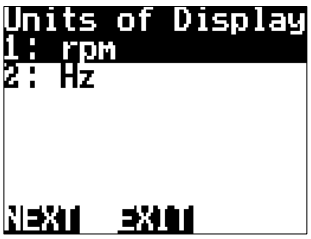
or Press **NEXT**



FOR LOW RPM (1rpm-20rpm)

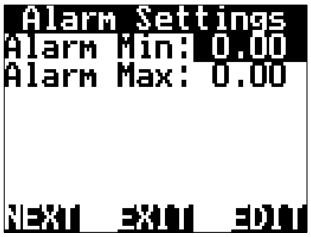
Press the **DOWN** button and change **VeryLowSpeed** from **NO** to **YES** by pressing **EDIT**

Press **NEXT** when done

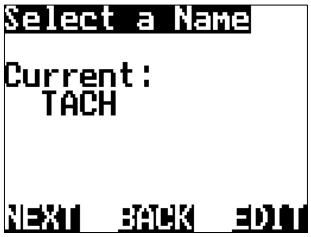


Leave the default value of RPM.

Select **NEXT**



You have the option to set Alarm Min/Max points if required. Using the NAV buttons select and **EDIT** as required. Press **NEXT**



Change the input name if you desire, Press **EDIT**, Press **NEXT**

Press **NEXT** to finalise the Wizard and return to the front screen

THIS ENDS THE WIZARD SETUP FOR A TACHOMETER

FLOW METER SETUP (WIZARD)

The Jackal can be configured to monitor liquid products. If only one input is used the Jackal main screen will display the flow information of your choice. If the Jackal is also setup and installed with a Wheel Sensor input, the Jackal can be setup to display L/Ha for example.

NB: At no stage can the Jackal Monitor take into account multiple spray sections turning on/off. Talk to use about the Jackal Control Series.

Sensors Required

- 3 Wire Flow Sensor (Square Wave)

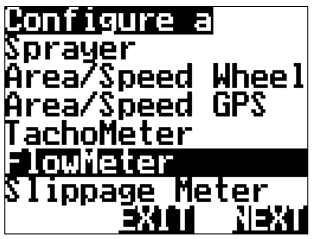
Available Connections: Refer to Installing Sensors from **PAGES 13-16**

The example uses Input 2 – Polmac Flow Sensor

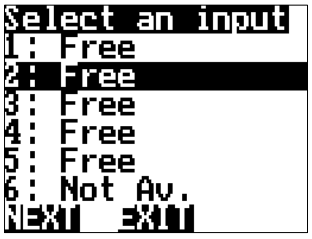
SETUP

From the front screen press **SETUP**

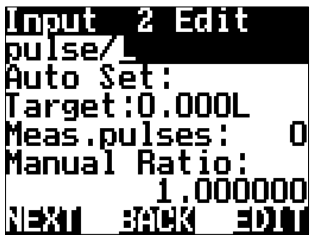
Highlight **WIZARD** and press **SELECT**



Highlight **FLOWMETER** and press **NEXT**



Highlight and select the appropriate sensor **INPUT** as described above and press **NEXT**



Edit the unit of Pulse or leave as is.

Choose your calibration method

Auto Set > PAGE 33

Manual Ratio > PAGE 34

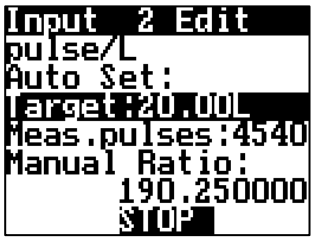
CALIBRATION (AUTO SET)

1. Ensure tank has water & pump is ready
2. Have a bucket ready to collect the water
3. Have a measuring device to measure the amount of liquid

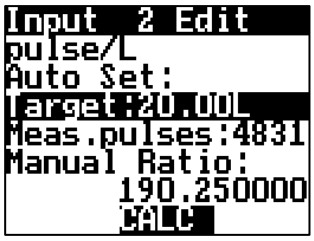
Highlight **TARGET** & press **EDIT**

Using the **NAV** buttons enter the target amount (L) to be measured. i.e. 20.0000
Press **EXIT** when done.

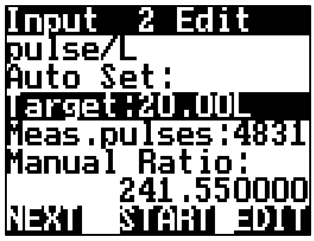
Press **START** & let water flow. This will allow pulses from the flow meter to register and the number of pulses will be displayed next to Meas.pulses:



When the desired test volume has been reached press **STOP**

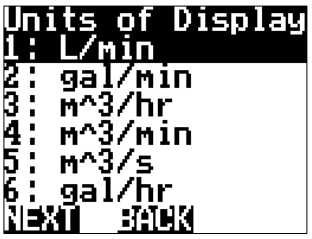


Press **CALC.** This will divide the measured amount by the number of pules registered.

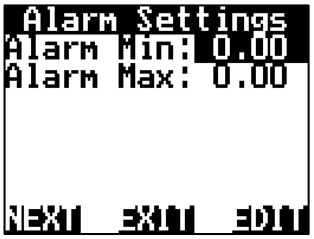


MANUAL RATIO will now be updated to reflect the calibration factor.

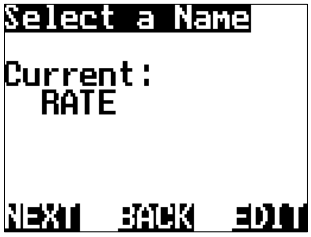
Press **NEXT**



Using the **NAV** buttons select how you would like the UOD to be displayed on the front screen.
Press **NEXT**



You have the option to set Alarm Min/Max points if required. Using the **NAV** buttons select & **EDIT** as required. Press **NEXT**



Name the input if you desire,
Press **EDIT**
or Press **NEXT**

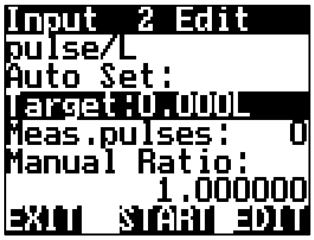
The Wizard is now complete.
Press **NEXT**

You will be returned to the Front Screen.

THIS ENDS THE AUTO SETUP WIZARD FOR FLOW METER

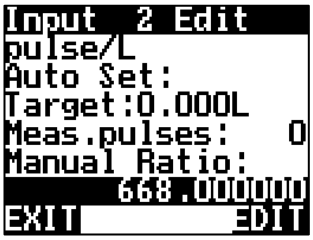
REFER TO PAGE 34 TO SETUP AS RATE MONITOR L/Ha

Manual set allows for the manual input of a known pulse per litre (PPL) factor. The pulse per litre factor can be obtained from the flow meter manufacture or from the plastic tag attached to the flowmeter.

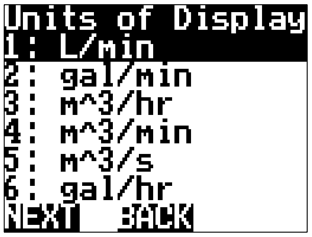


Highlight 1.000000 under MANUAL RATIO & press EDIT

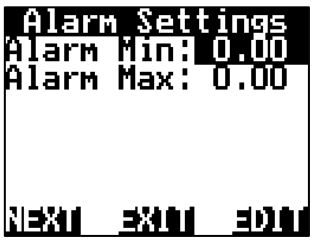
Using the NAV buttons enter the PPL factor as displayed on the flow meter tag.
i.e. 91.2
Press EXIT when done.



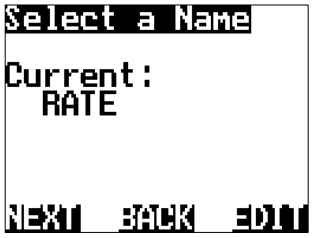
Press NEXT to accept the new manual ratio (PPL)



Using the NAV buttons select how you would like the UOD to be displayed on the front screen.
Press NEXT

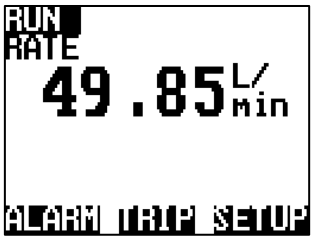


You have the option to set Alarm Min/Max points if required. Using the NAV buttons select & EDIT as required. Press NEXT



Name the input if you desire,
Press EDIT
or Press NEXT

The Wizard is now complete.
Press NEXT



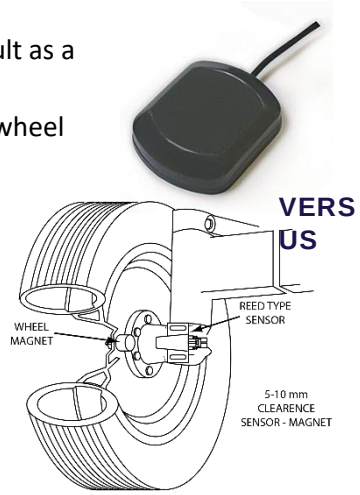
You will be returned to the Front Screen.

THIS ENDS THE MANUAL CALIBRATION WIZARD SETUP FOR FLOW METER

** IT IS ADVISED TO CHECK YOUR MANUAL CALIBRATION BY MEASURING OUT A KNOWN QTY TO CONFIRM PPL**
THIS CAN BE DONE BY COMPLETING THE CALIBRATION AUTO SET ON THE PREVIOUS PAGE (33)

SLIPPAGE METER (WIZARD)

The Jackal Monitor can allow the operator to compare two inputs and provide the result as a percentage. This is applicable when speed over ground is not necessarily equivalent to rotational speed of the wheel/s. This will enable you to set up a comparison between wheel speed and actual speed (using GPS)



Sensors Required:

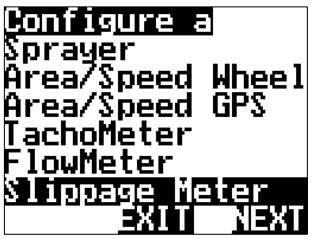
- Wheel sensor input (wheel or shaft pickup)
- GPS

Available Connections: Refer to Installing Sensors from **PAGES 13-16**

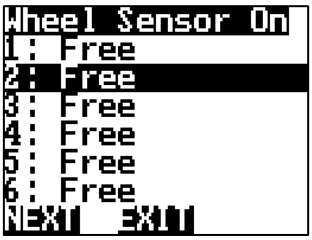
SETUP

From the front screen press **SETUP**

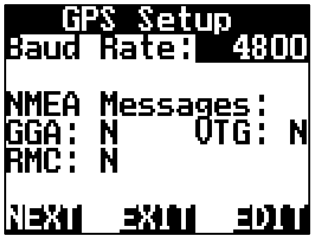
Highlight **WIZARD** & press **SELECT**



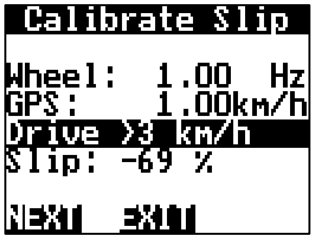
Highlight **SLIPPAGE METER** press **NEXT**



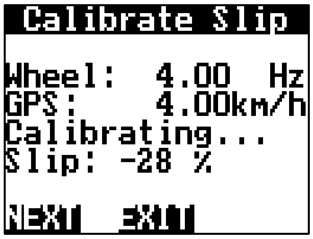
Highlight the **INPUT** number X: the WHEEL sensor wire is connected into on the rear of the Jackal & press **NEXT**



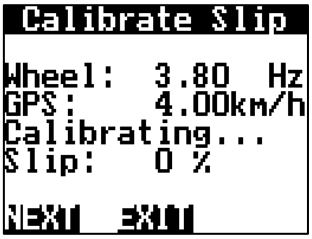
Press the **EDIT** button to change the baud rate, when the correct baud rate is selected the corresponding NMEA message will be acknowledged with a Y. Press **NEXT**



As indicated, drive above 3km/hr

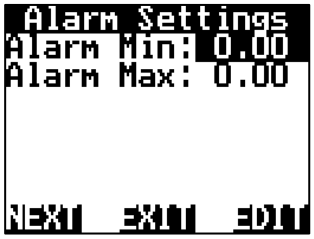


Wheel input will then increment up (displayed in Hz) & GPS speed will start to show.

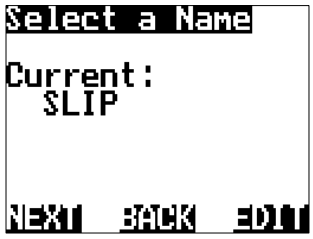


As the system self-calibrates the slip % will get closer to 0%.

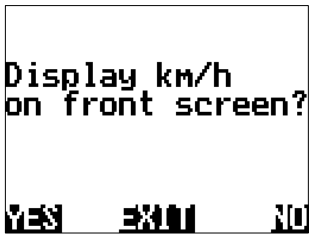
When the slip has settled close to 0% press **NEXT**



You have the option to set Alarm Min/Max points if required. Using the NAV buttons select & EDIT as required. Press **NEXT**



There is no need to EDIT the name. It will default to GPS Press **NEXT**



Finally acknowlege that you wish to also display Speed (km/hr) on the front screen with the area covered. Press **YES**

The Wizard is now complete. Press **NEXT.**

THIS ENDS THE SETUP WIZARD FOR WHEEL SLIPPAGE

RATE MONITOR – LIQUID

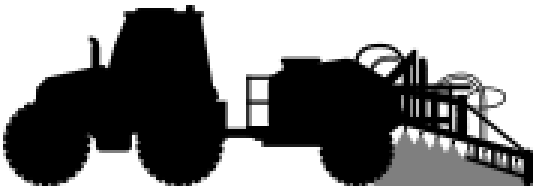
The Jackal can be setup to display an application rate when using both a speed & flow input.

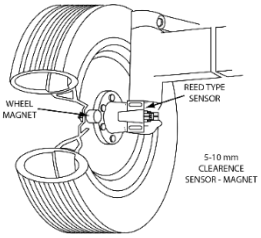
Rates can be displayed in common formats such as L/Ha

Sensors Required:

- Wheel Sensor/GPS for Speed & Area calculation
- Flow meter (any style) to display Litres

Available Connections: Refer to Installing Sensors from **PAGES 13-16**



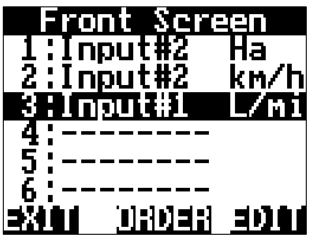


SETUP LIQUID (L/HA)

1. Follow the setup guide on page **24** for "Speed/Area Meter setup"
2. Follow the setup guide on page **30** for "Flow Meter Setup"
3. Follow the steps as described below

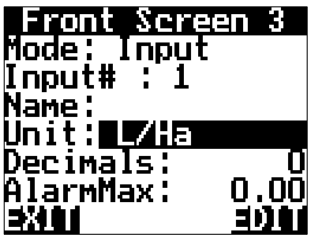
From the front screen press **SETUP**

Highlight **FRONT SCREEN** & press **SELECT**



Highlight the line in which the Flow Meter is connected to.
e.g. 3: Input#3 L/min

Press **EDIT**



Highlight the **UNIT** & press **EDIT** to change the unit to **L/Ha**.

Press **EXIT** 3 times to return to the front screen.

Jackal will now display the flow rate as L/Ha with Area & Speed

At no stage can the Jackal take into account multiple sections turning on an off and adjusting the Ha to suit.

This feature is only available in the Jackal Spray Control configuration

THIS ENDS THE SETUP FOR RATE METER SETUP AS L/Ha

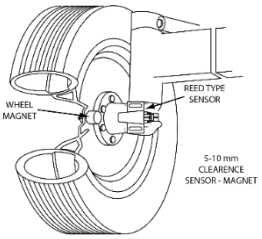
RATE MONITOR – SOLID

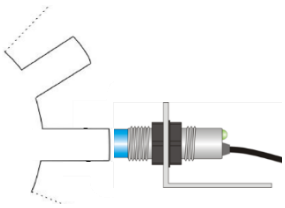
The Jackal can be setup to display an application rate when using both a speed & pulse input from a shaft or other pickup.

Rates can be displayed in common formats such as kg/Ha

Sensors Required

- Shaft sensor kit (2076) - 2 wire or
- Proximity sensor kit (2010P) (3 wire)





Available Connections: Refer to Installing Sensors from **PAGES 13-16**

SETUP

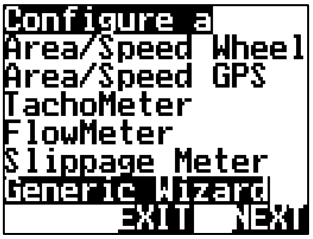
1. Follow the steps below to setup the Jackal to display a pulse/kg (**accumulation**)

Note:

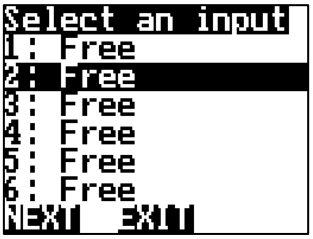
a) Ensure there is product in the bin/tank to calibrate
b) Have a bucket ready to catch the product
c) Have a set of scales (e.g. Smart Ag Systems Part # 2199) ready to weigh the product

From the front screen press **SETUP**

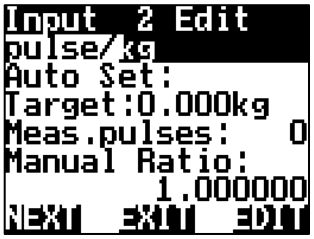
Highlight **WIZARD** & press **SELECT**



Highlight **GENERIC WIZARD** & press **NEXT**

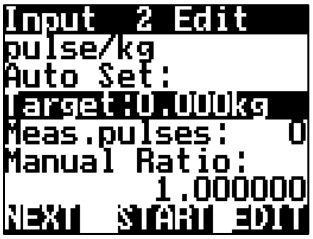


Highlight the **INPUT** number where the sensor wire is connected into on the rear of the Jackal & press **NEXT**



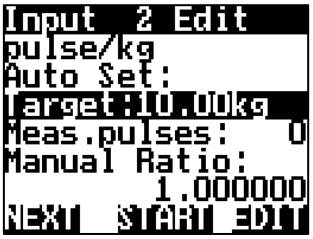
Choose your unit of pulse by pressing the **EDIT**

E.g. pulse/kg

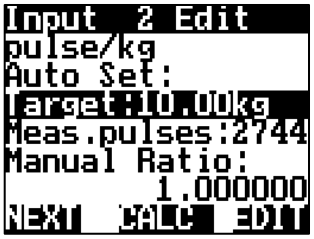


Highlight TARGET & press EDIT

Using the NAV buttons enter the target amount (kg) to be measured. i.e. 10.0000
Press EXIT when done.



Prime the Bin/Tank until product flows & then stop it. Press START on the Jackal, Run Bin & let product flow. This will allow pulses from the sensor to register and the number of pulses will be displayed next to Meas.pulses:



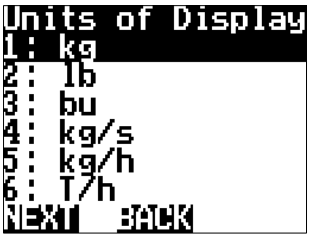
When the scales measure the desired test volume, i.e. 10kg, stop the Bin/Tank. Press **STOP**

Press **CALC.** This will divide the measured amount by the number of pules registered.

MANUAL RATIO will now be updated to reflect the calibration factor.

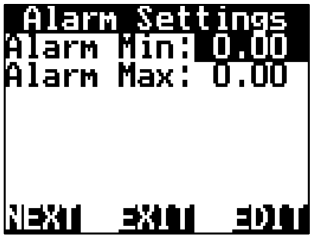
Press **NEXT**

It's recommended to do this test 3 times to get an average pulse count per kg

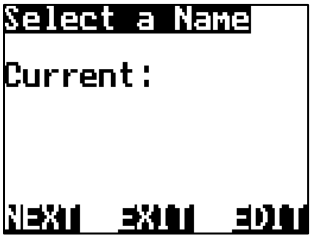


Using the **NAV** buttons select how you would like the Unit Of Display to be displayed on the front screen. I.e. **kg**

Press **NEXT**



You have the option to set Alarm Min/Max points if required. Using the NAV buttons select & **EDIT** as required. Press **NEXT**



Name the input if you desire, Press **EDIT**
or Press **NEXT**

The Wizard is now complete.
Press **NEXT**

You will be returned to the Front Screen.

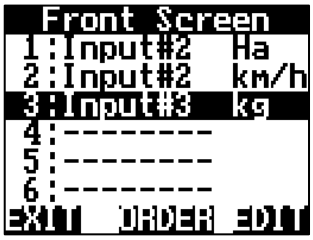
kg will now accumulate

2. Follow the setup guide on **PAGE 22** for "Speed/Area Meter setup
3. Follow the steps as described below

SETUP SOLID (KG/HA)

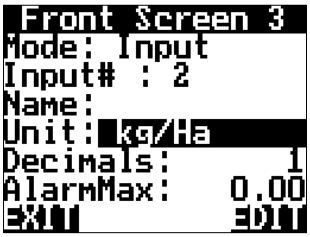
From the front screen press **SETUP**

Highlight **FRONT SCREEN** & press **SELECT**



Highlight the line in which the Metering sensor is connected to.
e.g. 3: Input#3 kg

Press **EDIT**



Highlight **UNIT** & press **EDIT** to change the unit to **kg/Ha**.

Change the Decimals displayed if desired also

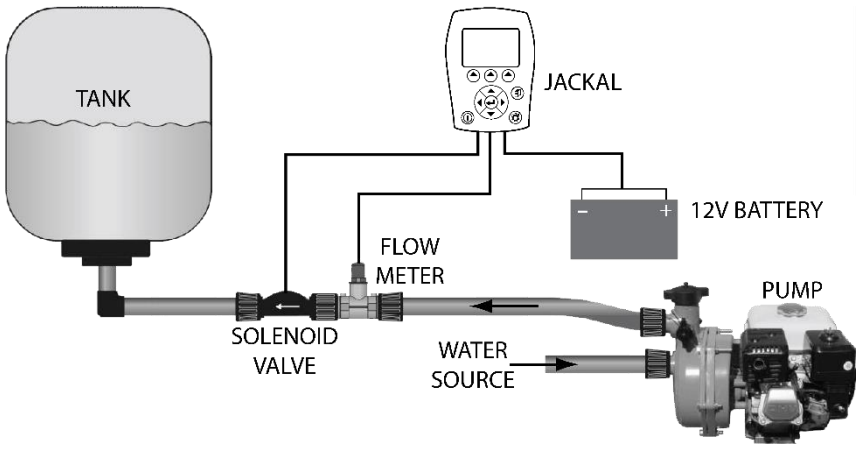
Press **EXIT** 3 times to return to the front screen.

Jackal will now display the flow rate as L/Ha with Area & Speed

THIS ENDS THE SETUP
FOR RATE METER SETUP
AS kg/Ha

BATCH METER

The Jackal can be configured as a Batch Meter to use a flow sensor and optional solenoid valve to meter liquid volumes & cease flow. The output of the Jackal is suitable for direct connection to a 12V solenoid valve.



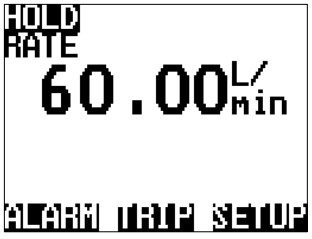
Sensors Required:

- Flow meter (any style)
- 1501 (Optional, from Smart Ag Systems) or any 12V Solenoid Valve

Available Connections: Refer to Installing Sensors from **PAGES 13-16**

SETUP

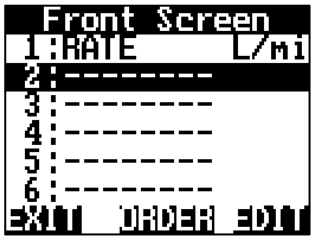
1. Follow the setup guide on **PAGE 27** for "Flow Meter Setup"



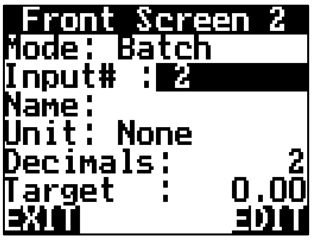
From the front screen press **SETUP**

Highlight **FRONT SCREEN** & press **SELECT**

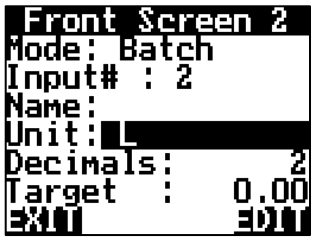
NB: The Jackal only supports ONE batch at a time.



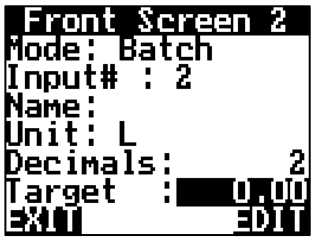
Select an **UNUSED** front screen position & press **EDIT**



Press **EDIT** to select **BATCH.** NB: **INPUT #** should match flow meter input. Change if necessary (Normally 2)

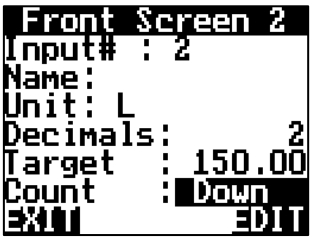


Highlight **UNIT** & press **EDIT** to change Unit to **L**

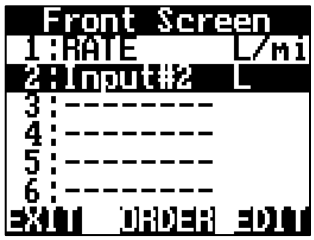


Highlight **TARGET** & press **EDIT** to change the batch volume required.

Using the NAV buttons enter the volume required. Press **EXIT** when done

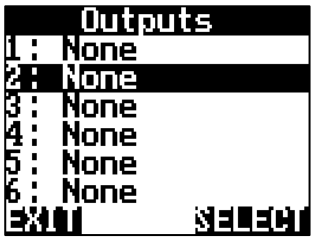


Using the NAV buttons press **DOWN** and **EDIT** the **COUNT** to batch **UP** or **DOWN**. Press **EXIT** when done

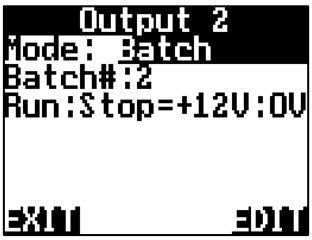


Press **EXIT** again

Highlight **OUTPUTS** & press **SELECT**

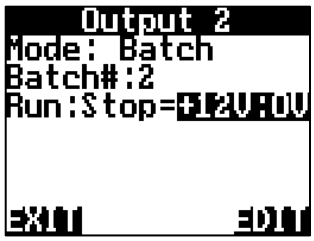


Highlight 2: None & Press **SELECT** to edit Output 2



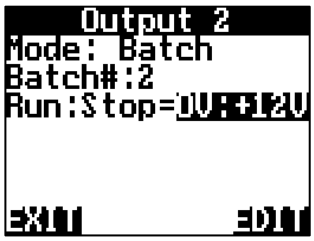
Press **EDIT** and change the MODE to **BATCH**

CONTIUNE INSTRUCTIONS IF A SOLENOID IS INSTALLED OR SKIP TO OPERATION



Highlight & **EDIT** the **Run:Stop** value to

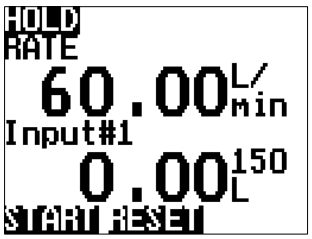
0V:+12V



Highlight & **EDIT** the Run to Stop voltage.

The option allows the output selected to pull from:

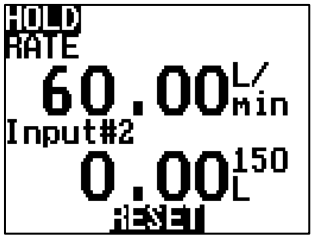
+12v to 0V or
0v to 12v



Press **EXIT** 3 times to return to the Front Screen

IF YOU FIND DURING THE FIRST BATCH OR ON STARTUP YOUR SOLENOID IS WORKING IN REVERSE – CHANGE THE RUN:STOP VALUE

OPERATION

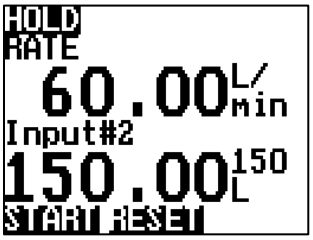


Start by pressing the **PAGE** button and toggle between

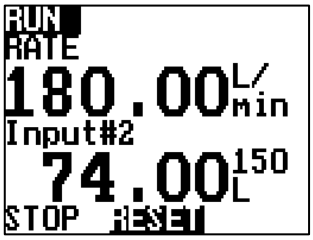
ALARM TRIP SETUP

To

IIIIIIII RESET



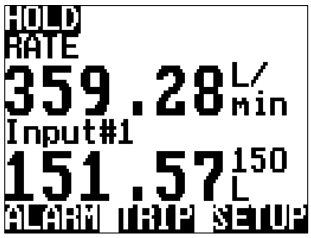
Press **RESET** to clear the count value followed by **START**.
Water will flow and the batch will start to either count **UP** or count **DOWN** as selected.



START will toggle to **STOP** if you need to restart a batch.

RUN/HOLD also performs the same action

Press **RESET** if required.

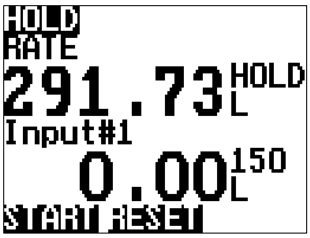


If you need to keep a record of your batch, press the **PAGE** button and press the **TRIP** button to save.

More about **TRIPS** on **PAGE 40**

TIP: If you want to see a Total Litres displayed (rather than L/Min) – Change the FRONT SCREEN value from L/Min to L

Refer to the Flow Meter Setup



All Values can be reset or saved when using the TRIP functions

THIS ENDS THE SETUP FOR A LIQUID BATCH METER

BIN LEVEL SENSOR

The Jackal can be configured with a bin level sensor for detecting empty/full. All Smart Ag Systems sensor will register as High/Low (H/L) for liquid or solid.

Sensors Required:

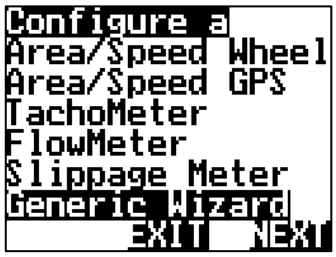
- Bin Level Sensor (A-2220P Sensor or 2060 Kit)

Available Connections: Refer to Installing Sensors from **PAGES 13-16**

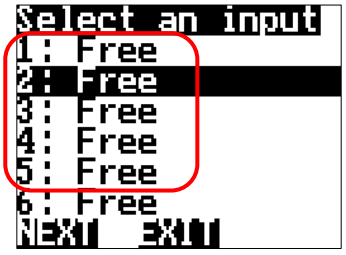
SETUP

From the front screen press **SETUP**

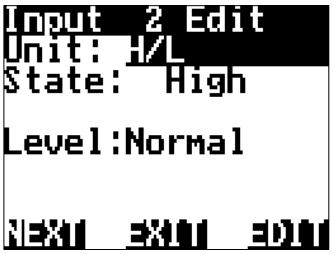
Highlight **WIZARD** & press **SELECT**



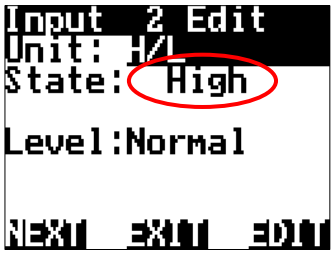
Highlight **GENERIC WIZARD** & press **SELECT**



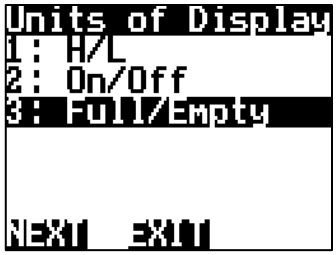
Highlight the **INPUT** number **(1-5 or 8-9)** to where the sensor wire is connected into on the rear of the Jackal & press **NEXT**



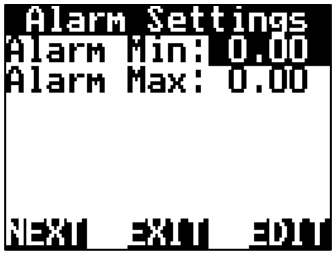
Press **EDIT** to change the unit to **H/L (high/low)** – Other options include On/Off, Full/Empty



State will updated "Live" For example. Low = bin empty, High = bin full. Test by placing hand around sensor.



Press **NEXT**
Highlight the Unit of Display that you wish to be displayed on the front screen.
Press **NEXT**



You have the option to set Alarm Min/Max points if required. Using the NAV buttons select & **EDIT** as required.
Press **NEXT**

Name the input if you desire, i.e. BIN1.
Press **EDIT** & **EXIT**

Press **NEXT.**
Wizard is now complete.
Press **NEXT**

Press **EXIT** to return to the front screen

Example - Full

Example - Empty

THIS ENDS THE SETUP FOR A BIN LEVEL SENSOR

AIR/VOLT / DEPTH / TEMP PRESSURE SENSOR

The Jackal can be configured to read & display a pressure sensor, voltage, percentage, temperature and display as: kPa, psi, bar, Volt, %, ˚C. Smart Ag Systems recommends sensors that can be powered by 12v but output from 0-5v in a linear style. Call us if you are unsure.

Sensors Required:

- AA-119H or AA-119L (Smart Ag Systems Pressure Sensor)
- Any other style that outputs a voltage. I.e. Position sensor (AA-430) for displaying depth as a percentage (%)

Available Connections: Refer to Installing Sensors from **PAGES 13-16**

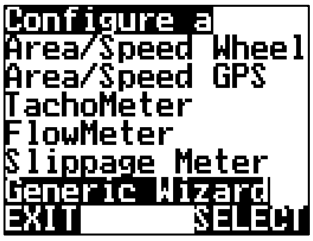
The example uses Input 9 – Liquid Pressure Sensor

CALIBRATION (MANUAL)

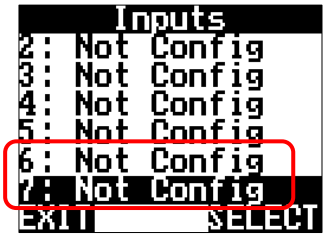
The example below details setting up **a LIQUID PRESSURE SENSOR**.

From the front screen press **SETUP**

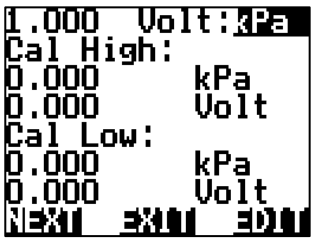
Highlight **WIZARD** & press **SELECT**



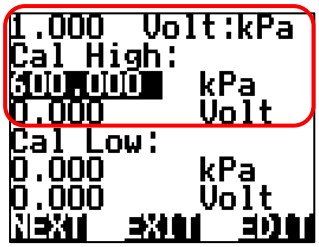
Highlight **GENERIC WIZARD** & press **SELECT**



Highlight the **INPUT** number **(6-9)** to where the sensor wire is connected into on the rear of the Jackal & press **NEXT**

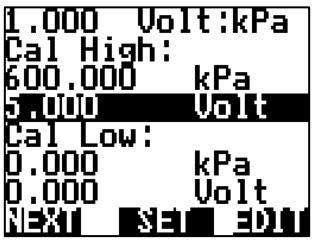


Press **EDIT** to change the unit. kPa, psi, bar, Volt, %, ˚C. i.e. kPa

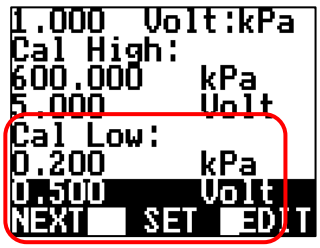


Highlight the 1st **CAL HIGH** value and **EDIT** the field to set the maximum the device will be able to display. I.e. 600kPa. Current input voltage of input is displayed in the top left corner.

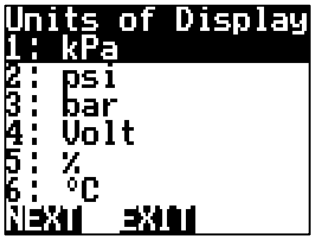
NB: If manufacture values are not available, please refer to PAGE 44 for LIVE calibration instructions



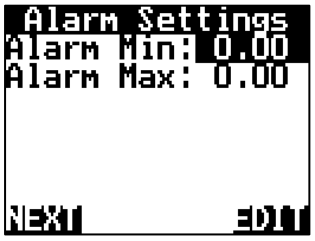
Using the manufactures guide set the maximum voltage of the sensor. e.g. 5.000v by pressing **EDIT**



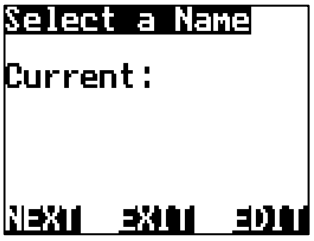
Repeat the previous 2 steps to set the minimum range of the sensor.
Press **NEXT** when done



. Highlight or confirm the UOD (Unit of Display) eg kPa.
Press **NEXT** when done

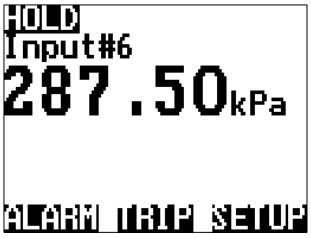


You have the option to set Alarm Min/Max points if required. Using the NAV buttons select & **EDIT** as required. Press **NEXT**



Name the input if you desire, Press **EDIT**
or Press **NEXT**

The Wizard is now complete.
Press **NEXT**



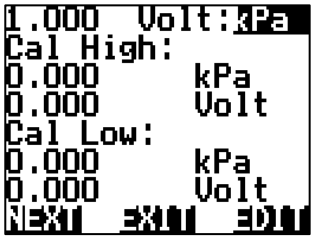
You will be returned to the front screen

THIS ENDS THE MANUAL SETUP FOR A VARAIBLE VOLTAGE INPUT SENSOR (LIQUID)

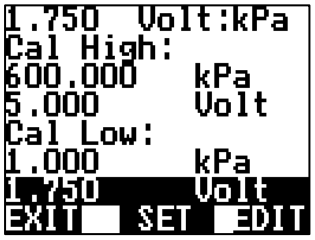
CALIBRATION (LIVE READOUT)

The Jackal also allows for a semi-automatic setup when the voltage values are unknown for a particular voltage input. A live voltage readout is displayed in the top left-hand side when the sensor is active.

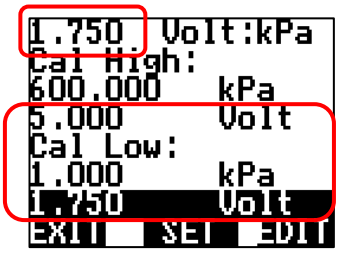
Follow the previous 5 steps, followed by:



Press **EDIT** to change the unit. kPa,psi,bar,Volt,%,˚C. i.e. kPa

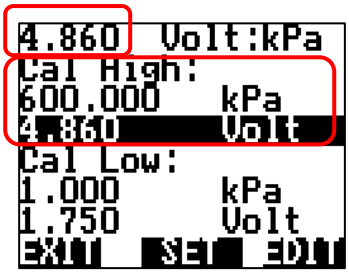


Engage the implement and/or adjust the pressure manually to the low point the sensor will need to operate in.

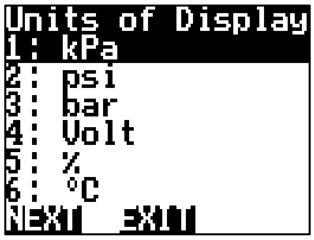


The voltage will now be displayed. e.g. **1.75v**.
In the above example we can set the minimum of **1kPa** by **HIGHLIGHTING** & **EDITTING** the values as required.

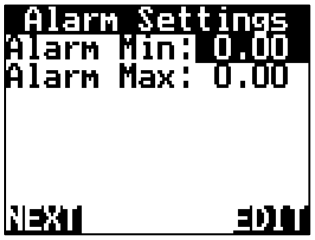
Press **SET**. This will copy the live voltage into the **CAL LOW** voltage point



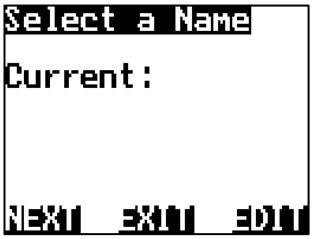
Repeat the previous 2 steps for the **CAL HIGH** values



Highlight or confirm the UOD (Unit of Display)
e.g. kPa
Press **NEXT** when done

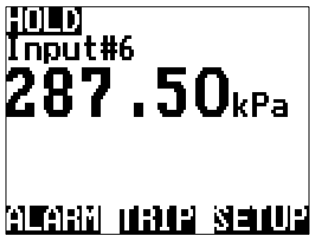


You have the option to set Alarm Min/Max points if required. Using the NAV buttons select & **EDIT** as required. Press **NEXT**



Name the input if you desire, Press **EDIT**
or Press **NEXT**

The Wizard is now complete. Press **NEXT**



You will be returned to the front screen

THIS ENDS THE AUTO SETUP FOR A VARAIBLE VOLTAGE INPUT SENSOR (LIQUID)

CONTROL AND MULTI CONTROL

The Jackal can be configured to output a control signal that will drive one of the following:

Output Types

- Hydraulic valve
- DC Electric Motor (Requires A-SMDB-1 for greater than 3A output)
- Solenoid Valve
- Electric Motor control valve

Available Output Signals Refer to Output Types on **Page 56**

CONTROL SETUP - INPUTS

- Set up **Inputs** as you would if the Jackal was just monitoring, see ***Page 36*** for Liquid and ***Page 37*** for solid

CONTROL SETUP – FRONT SCREENS

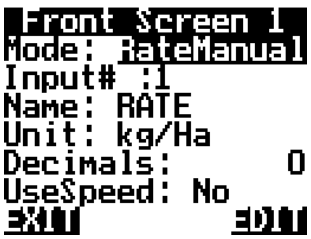
- Note when Jackal is used for control, the Mode must be set to **Rate Manual** or **Rate**

Rate Manual allows you to manually adjust the output via the front screen i.e. no feedback control

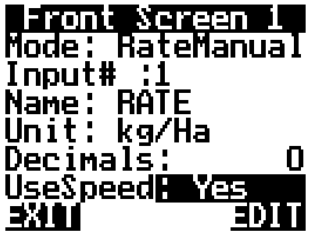
Rate allows for full automation of the rate based on feedback from a sensor.

Setup front screen as described on ***Page 52***, except for the following items

If you select Yes for **Use Speed** then the output will compensate for the speed changes.



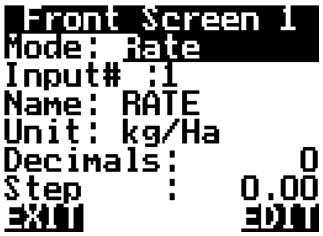
Press the **Edit** key to select Rate Manual



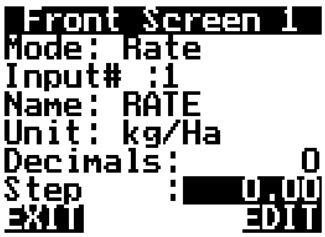
Use the **Down Arrow** to highlight Use Speed and Press the **Edit** Key to select Yes or No

Rate will control the output with feedback from an input sensor confirming you are maintaining the correct rate. It automatically adjusts the output to compensate for any speed or application rate changes.

Setup front screen as described on ***Page 52***, except for the following items

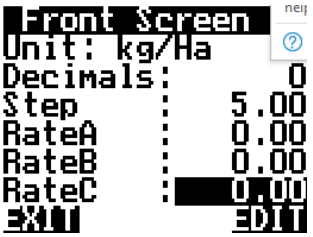


Press the **Edit** key to select Rate

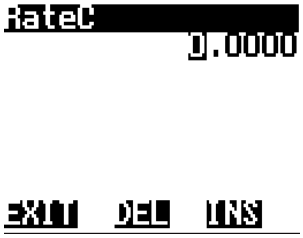


Use the **Down Arrow** to highlight Step and Press the **Edit** Key

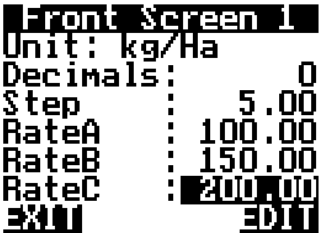
Use the use the **Navigation buttons** to enter the rate step size you want. Press **Exit**



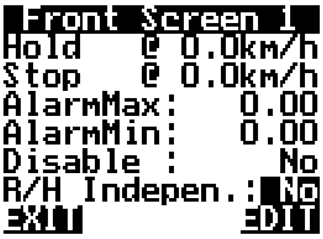
Use the **Down Arrow** to highlight the three rate settings, select one and Press the **Edit** Key



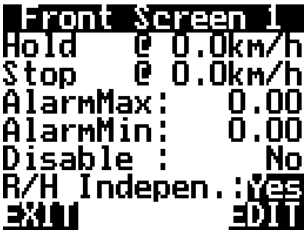
Use the use the Navigation buttons to enter the rate step size you want. Press Exit



Once all three rates are set select the Exit Key



The control of each output can be selected to run Independent of the Run/Hold button on the Keypad



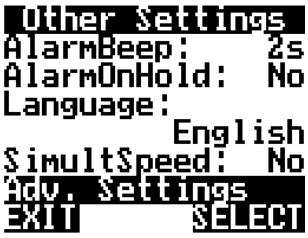
If you want the spinners to run constantly and not switch off with the run/hold then Select R/H Indepen to Yes

Repeat the above steps with a different input another control channel.

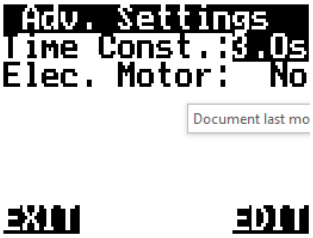
CONTROL SETUP – OTHER SETTINGS

- Setup **Other Settings** as per ***Page 53***

When a controlled output is configured on the Jackal we have some Advanced Setting to improve the control response,

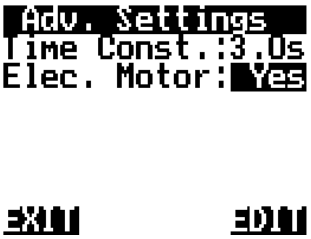


Use the **Down Arrow** to highlight **Adv. Settings** and Press the **Select** Key



Press the Edit Key

Adjust your time constant to the value required

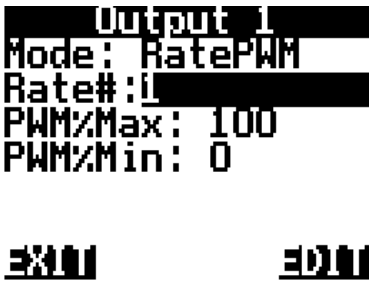


Use the **Down Arrow** to highlight Elec Motor and Press the **Edit** Key to select Yes or No

CONTROL SETUP - OUTPUTS

- Setup **Outputs** as per ***Page 56***

If you have the Jackal set up for Multi Control and you are using more than 1 Rate you will need ensure that you have set the outputs for all the control channels that you are using.



Use the **Down Arrow** to highlight **Rate #** and Press the **Edit** Key to scroll through the available Rate Numbers

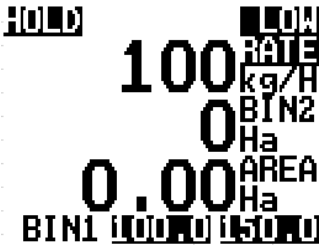
CONTROL OPERATION

When Using the Jackal for control the page button options will be changed with the preset rates and Rate +/- for each control output enabled.

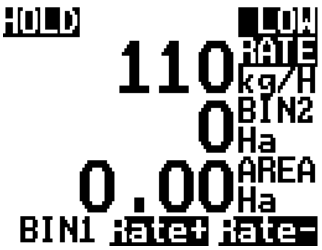
The Jackal will not control any output after initial start up of the display until a rate has been selected. Note if you have three rates all three must be selected. Then the Run button will need to be pressed to get the unit to output a signal.

Note: This is a safety feature to ensure that the system does not run until, ***both*** the rate and the run button are selected.

Press the **Pages** button to get select the Rate

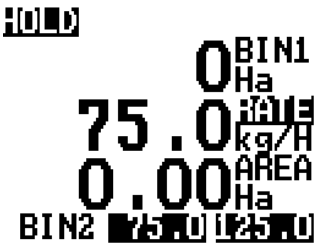


Press the Rate Button to select the desired Rate and it will display on the screen for 3 second

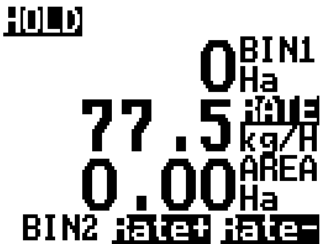


Press the **Pages** button to get the Rate Inc/Dec screen and press Rate +/- Button to change the rate on the go by the step amount

Press the **Pages** button to get select the next Rate



Press the Rate Button to select the desired Rate and it will display on the screen for 3 second



Press the **Pages** button to get the Rate Inc/Dec screen and press Rate +/- Button to change the rate on the go by the step amount

TRIPS

The Trips page allows accumulating values to be saved and recalled at a later time.

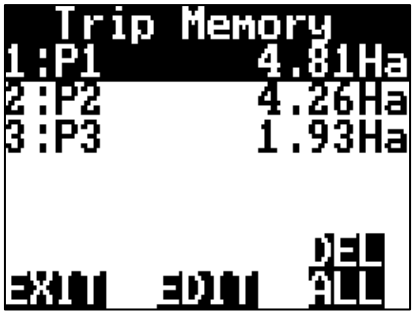
Examples include Area, Distance, Weight, Volume etc. Instantaneous readings such as Speed, Flow & Rate etc. are not able to be recorded.

- From the front-page press **TRIP**

The screen above allows you to SAVE/RESET individual trips or view SAVED TRIPS

By pressing the **SAVE/RESET** you have the ability to
Reset Trip | Save Trip | Reset All

By pressing **2. Save Trip** it will be stored in the SAVED TRIPS option



You can now view the SAVED TRIPS. You also have the ability to **EDIT** and name the Trip or **DEL ALL**
(Delete All Trips)

When you return to the TRIPS page the Trip will continue to accumulate. (Like above)
You will need to SAVE/RESET the trip if you want to start from Zero (0) again

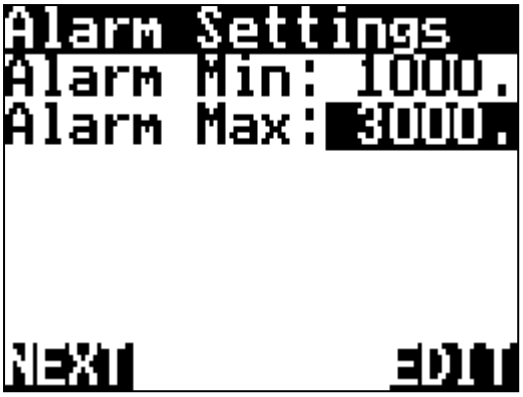
ALARMS

Alarms are set on a per-front-screen-display-line basis. High/Low Alarm points can be set for any input including: speed, hectares, RPM, Pressure, Bin/Tank Levels.

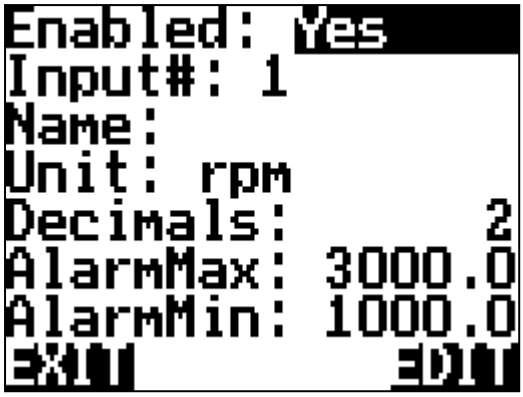
Alarms will be displayed visually (on screen flash) and made audible.

- To **EDIT** your alarms re-run the wizard by pressing **SETUP** from the front screen.
- OR – **RUN SCREEN > SETUP > FRONT SCREEN**

Your existing settings will not be lost during the wizard re-run.



Wizard (Above) or **Manual (Right)** alarm points.
Example of a Shaft Alarm set at
Min of **1000rpm** & Max of **3000rpm**.
Press **EDIT** to adjust these values



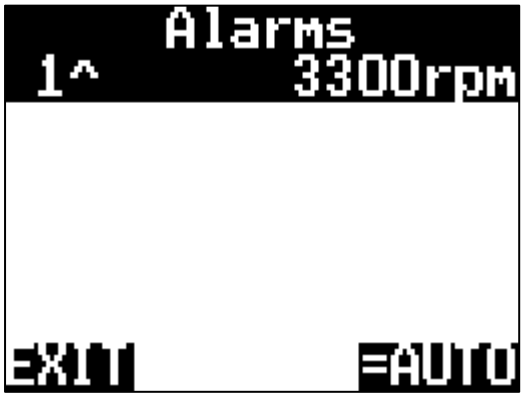
Manual/User setup Alarm points via the
MENU > FRONT SCREEN >EDIT Input #

When the alarm point is reached e.g.: over 3000rpm the line will FLASH notifying you of the alarm point.

Press **ALARM** to enter the page showing all Alarms (active and inactive) to reset the alarm.

REFER TO OUTPUTS ON PAGE 56

IF YOU WANT TO CONNECT AN EXTERNAL ALARM



In the example above Line 1 is ^ over the alarm set point. If it was below it would show 1v.
You have 3 options:

=AUTO: As soon as the value moves back within the Min & Max range the monitor will automatically reset the alarm.

=ON: When the alarm is activated it will remain ON until you enter the ALARM menu and manually reset

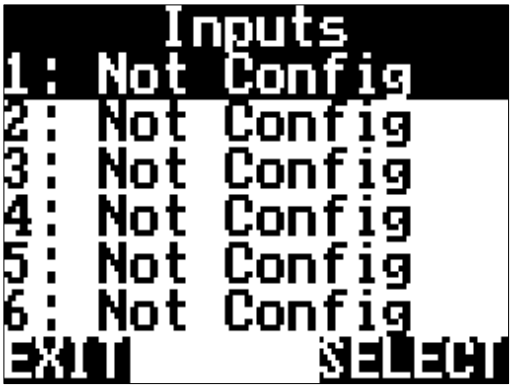
=OFF: You can disable the alarm altogether

INPUTS

Each Input Is designated to display certain values as described below.

Ensure you are plugged into the appropriate port for your sensor.

RUN SCREEN > SETUP > INPUTS



- **Input 1-5 (A1-A5) – Square Wave**
  - m/ft/yd/in/km/mi/pulse
  - pulse/kg/lb/L/gal/bu/rev/bale/unit/each/T/m^3
  - Full/Empty – On/Off – H/L

- **Input 6-7 (A6 & B2) – Varying Voltage**
  - Volt: kPa/psi/bar/volt/%/˚C/

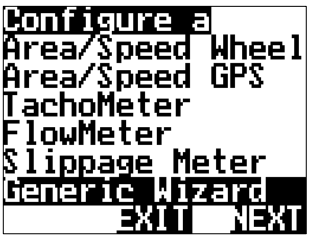
Once your inputs are setup and calibrated you now need to display them on the front screen.

GENERIC WIZARD

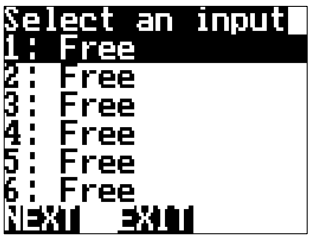
The generic wizard allows to manually setup your Jackal in a customised method. You can also setup the Jackal to your requirements without using the wizard and navigating each menu by enabling and calibrating each port as required. Refer to the previous wizard guides to assist with manual setup.

From the front screen press **SETUP**

Highlight **WIAZRD** & press **SELECT**



Highlight **GENERIC WIZARD** & press **SELECT**



Highlight the appropriate port the sensor is connect to and press **NEXT**

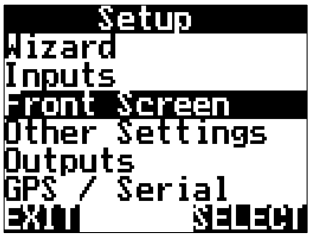
FRONT SCREEN

RUN SCREEN > SETUP > FRONT SCREEN

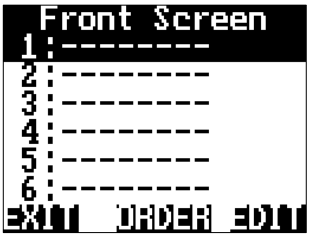
When your inputs have been enabled and calibrated you can now choose to display the values in our chosen formats on the front screen. You can have up to 3-line items per page and viewable at all times. If more lines are added you can use the NAV buttons to scroll through each screen.

NB: Selectable units realte to the input type. E.g: **Input 1** setup as a **rev/pulse** could display **rpm** or **hz** as the unit

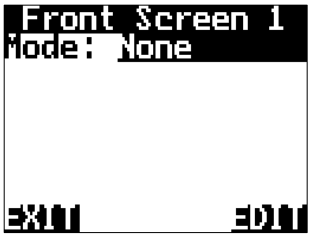
From the front screen press **SETUP**



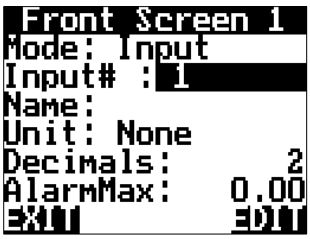
Highlight **FRONT SCREEN** & press **SELECT**



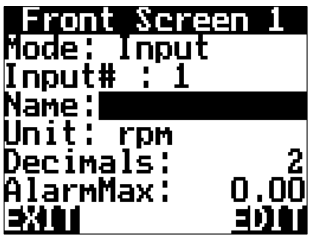
Highlight the line you want to display the first value & press **EDIT**



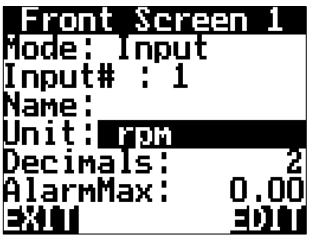
Press **EDIT** to enable the line mode



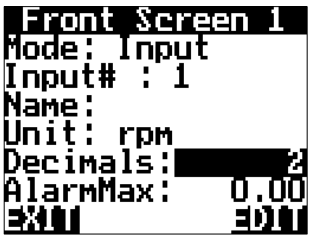
Highlight **INPUT #** and press **EDIT** to associate the calibrated **INPUT** to the line



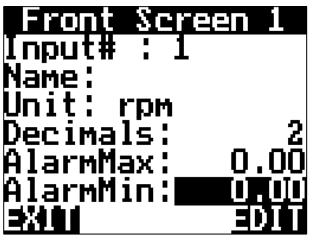
Highlight **NAME** and **EDIT** the input name for easy indetifaction. Eg Shaft



Highlight **UNIT** and press **EDIT** to select the approprate unit associated with the calibrated input



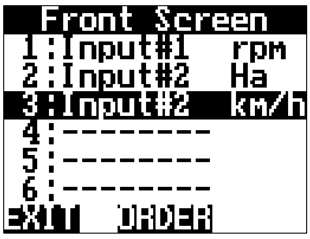
Highlight **DECIMALS** and press **EDIT** to change the number of decimals displayed on the front screen

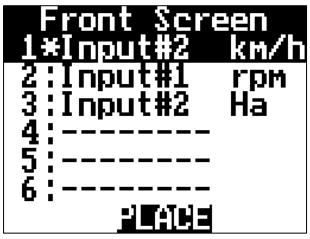


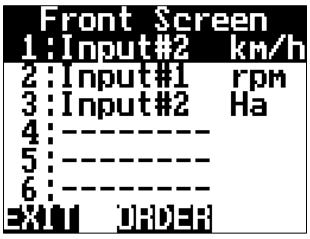
Highlight and **EDIT** the Max & Min Alarm settings if required

FRONT SCREEN (ORDER)

The front screen menu allows you to order the front screen line items. Highlight the line you wish to move, press **ORDER** (a * will appear to the left) then press **PLACE** to accept when you have chosen the new order.



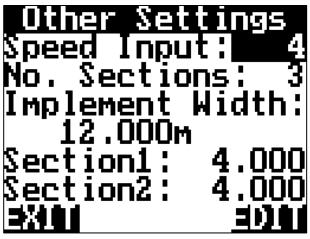




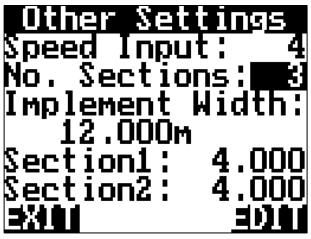
OTHER SETTINGS

RUN SCREEN > SETUP > OTHER SETTINGS

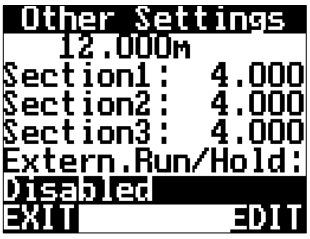
Other Settings is used to edit the following options.



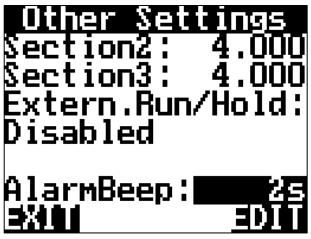
Quicky **EDIT** the **Speed Input**



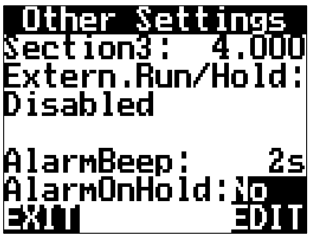
Quickly **EDIT** the **Implement width**, **Number of Sections** & Individual Section Widths



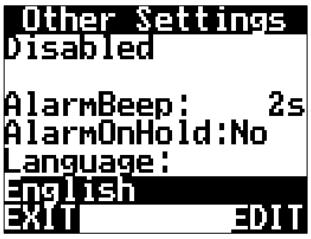
Enable/Disable External Run/Hold Function (As described on **PAGE 15-16**)



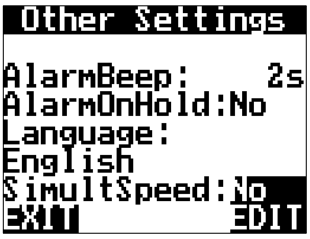
By changing the Alarm Beep (in seconds) you can define how long audible "Beeps" can be heard during the Alarm alert before acknowledgment is required. Press **EDIT** to change these options.



EDIT the **AlarmOnHold** from YES/NO. This option allows you to have alarms active while the Jackal is ON HOLD

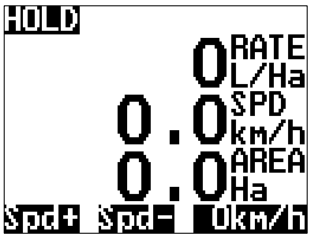


Change the Jackal to your local Language by pressing **EDIT**



Simulate Speed allows you to test the Jackal while stationary.

When the feature is enabled **YES** - return to the front screen to reveal a manual speed adjust.

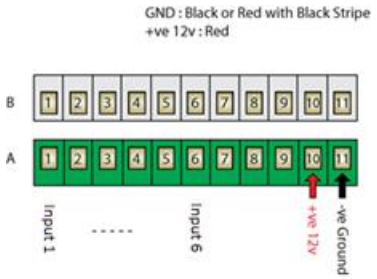


If the feature does not appear. Press the **PAGE** button reveal the new option. Adjust your speed to the test rate required.

<u> Return to the menu to disable when finished **</u>**

EXTERNAL RUN/HOLD SWITCH

The Jackal can connect an external Run/Hold trigger (e.g. Remote Switch) by utilising any signal INPUT.

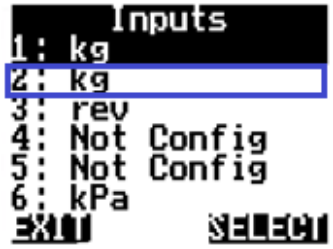


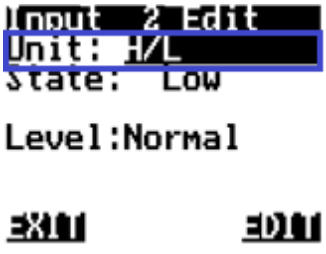
The Run / Hold function allows the Jackal to be remotely placed on either hold or run mode from an external source or switch without having to press the Run/Hold button on the Jackal itself.

When the external Run/Hold is active from an input, the Run/Hold button on the Jackal is then disabled.

In order to configure the remote run/hold function,

1. Insert the signal wire from your external switch to your input port (For example Input 2 on the Jackal. (A2)
2. In the Setup menu
    - Select Inputs
    - Select Input – select the Input number from the first column (Example – 2)
    - Select Edit, continue to press Edit until “Unit : H/L” on Input is selected.
    - Select Exit to return to the “Setup” menu.

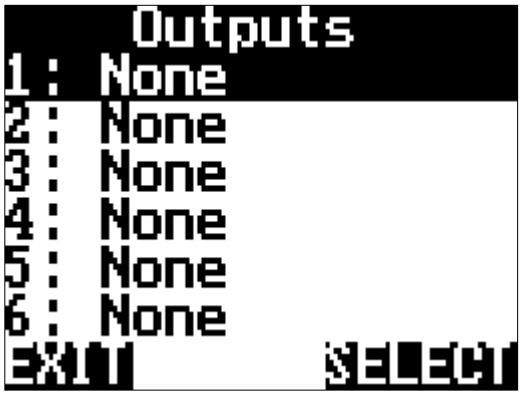




3. In the Setup menu
    - Select “Other Settings”
    - Scroll down to “Extern. Run/Hold”
    - Press “Edit” to enable, by selecting either normally on / normally off
    - Scroll down to Input #
    - Press “Edit” until the selected input port is selected (Example “2”)
    - Press “Exit” to return to the home screen.

N.B. If the Run/Hold signal is from a noisy or inductive source, then it may be prudent to fit an inline relay to condition the signal before connecting into the Jackal.

OUTPUTS



The Outputs menu should be used with caution and only as described in this instruction guide.

Failure to do this can damage sensors connected to existing inputs. This menu allows you to OUTPUT voltage & other values outputs 1-6.

RUN SCREEN > SETUP > OUTPUTS

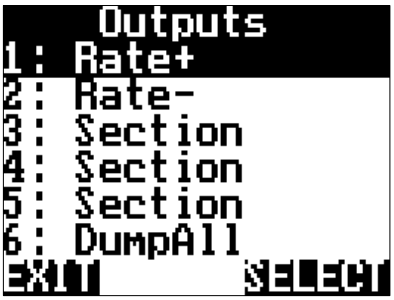
The following Outputs are available

- GND
- + 12v Supply
- Run/Hold
- Alarm Any
    - Ability to activate an external alarm, e.g. External speaker or light. A 12v output will be triggered when Alarm Any is active. – You cannot select an alarm to an output.
- Alarm #
    - Ability to activate an external alarm (as above) on a **chosen port against a specific alarm**. E.g. an external red light could be wired in and activated for a fan alarm and a yellow light could be wired in and activated for a shaft alarm. When multiple alarms are active the available Alarm# will start at "0"

- Batch (As described on **PAGE 36**)
- Section (Sprayer Function)
- Rate + (Sprayer Function)
- Rate – (Sprayer Function)
- Dump All (Sprayer Function)
- Dump # (Sprayer Function)
- Clutch All
- Clutch #
- Section +
- Section –
- Rate PWM
- Rate PVG32
- Rate 5v
- Ratio
- Volt (Varying Voltage) 0-12v

For further explanation of setups of your OUTPUTS please contact our Smart Ag Systems Service Department.

FLOW CONTROL VALVE WORKING BACK TO FRONT?



When using the Jackal Spray Wizard outputs are automatically setup for your convenience. However, this information is provided below as an overview of the setup.

In some circumstances your control valve may work back to front, i.e. opening when it should be closing. The output screen allows you to swap the direction rather than change the physical wiring.

Output 1: Rate +
Output 3: Section 1
Output 5: Section 3

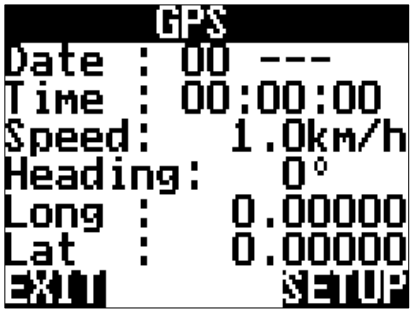
Output 2: Rate –
Output 4: Section 2
Output 6: Dump Valve (if installed)

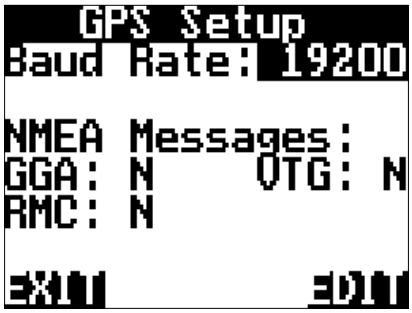
GPS/SERIAL

The GPS/Serial menu allows you to confirm that the GPS connected to the Jackal is function correctly.

By pressing the **SETUP** followed by **EDIT**, confirm the correct strings and Baud rate.

The NMEA messages will change from **N** to **Y**





ABOUT JACKAL

Displays the Firmware version that's installed on the Jackal.

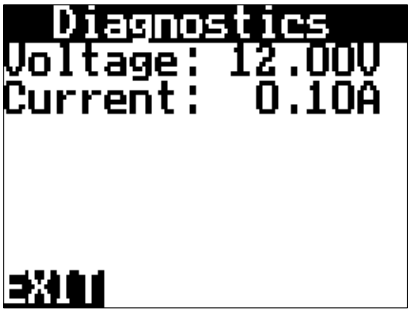
This screen also allows you to **UNLOCK** your Jackal to further functionality.

Please contact Smart Ag Systems should you wish to purchase an unlock code.

DIAGNOSTICS

This screen provides the following information:

- **Voltage** Displays a live input voltage to the Jackal.
- **Current** Displays live Current draw on the Jackal.
- **Input "x"** When inputs are enabled they will also be displayed for easy diagnostics.



RESET OPTIONS

This screen provides the following options:

- **User Save/Load** This allows you to save your current configuration and reload if necessary
- **Factory Reset - WARNING**

This screen allows you to return the Jackal to factory defaults.

All values will be lost after pressing **RESET.**

Power cycle the Jackal to confirm all settings are reset.

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AM-JACKAL-B

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