FARMSCAN | jackal

one monitor,
many possibilities

area meter
batch meter
tacho meter
rate monitor
spray monitor
pressure monitor
surveillance monitor

FARMSCAN

DISCLAIMER

The warranty offered on Farmscan 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 is not connected as described in section 2.4.

NOTE:

Do not mix imperial and metric units when calibrating inputs. Mixing units may result in incorrect results.

Contents

1. GENERAL DESCRIPTION

The Jackal is designed as a multifunctional monitor, capable of many tasks, from a simple Area Meter, Flow Meter or Batch Meter to a monitor for 4 bin / tank Airseeders monitoring several shafts, air pressure and tyne / plow depth. There are a total of 13 inputs available which are combined with a single output for emergency shut down and simple batching functions. The inputs can have both high and low alarm thresholds set which can trigger emergency shutdown systems. The unit employs a 64 x 128 pixel graphic LCD to provide large legible characters on the main display and enable calibration data to be clear and descriptive.

There are 10 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 signal from the machinery, so that periods of machine operation that should not accumulate as a work total can be excluded from trip totals.

Calibration is simplified with the ability to enter either a ***FACTOR*** (pulses per unit) or simply drive/run a set amount whilst the unit is counting the pulses and letting the system calculate its own ***FACTOR***. Each input can be used to display information using imperial and metric units, however **METRIC AND IMPERIAL UNITS SHOULD NOT BE MIXED**.

1.1. TECHNICAL SPECIFICATIONS

Power Requirements	9 – 16 VDC @ 250mA
Display	128x64 Mono Graphic LCD
Operating Temperature	0 to 50C
Storage Temperature	-5 to 65C
Dimensions	135mm x 100mm x 30mm (HxWxD)
Sensor Inputs	13
Input 1	Up to 400 pulses per second .
Inputs 2 – 6	Up to 1000 pulses per second.
Inputs 7 – 8	Analog Voltage 0 – 5V
Inputs 9 – 13	On/Off: 0V or 12V
Outputs	1
Output 1	Low side drive 3A maximum load.

WARRANTY IS VOID if storage temperature is exceeded. Tractor cabs may exceed 65C if left in full sun when not in operation. Remove the Jackal from the cab if this is a possibility.

2. INSTALLATION

2.1. PARTS LIST

REF	PART NO.	DESCRIPTION	QTY
1	A-Jackal	JACKAL MONITOR	1
2	AH-700	MOUNTING BRACKET	1
3	P-321	11 WAY INPUT PLUG	2
4	AC-103	5m POWER CABLE	1
5	HM-410	SCREWDRIVER	1
6	AM-Jackal	INSTRUCTION MANUAL	1
7	AM-200	FARMSCAN WARRANTY CARD	1
8	P-322	FERRULES	10

2.2. PARTS PICTORIAL

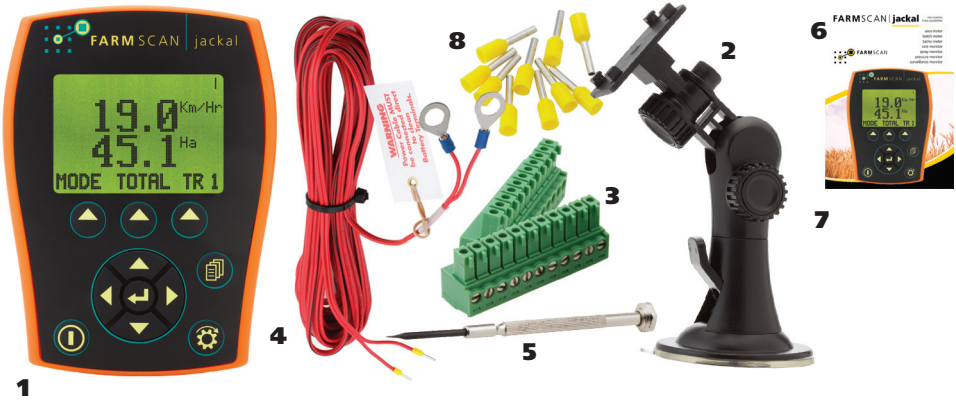


Figure 1: Parts pictorial with parts numbered as per Section 2.1.

2.3. MOUNTING AND INSTALLATION

The Jackal is provided with a suction window mount. (Figure 1)

1. Slide mount onto unit and push sideways to lock into place. Make sure you hear a click of the mount locking into place.
2. Place in a convenient position on the windscreen and using the toggle lever pictured, 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.

2.4. CONNECTIONS

The connector on the rear of the Jackal has the following function:

A1	***GND*** (Ground/Earth/0V)	**B1**	***IN1*** (Coil/Prox/Reed sensor)
A2	***IN13*** (Run hold)	**B2**	***IN2*** (Prox/Reed sensor)
A3	***IN12*** (Alarm/Switching sensor)	**B3**	***IN3*** (Prox/Reed sensor)
A4	***IN11*** (Alarm/Switching sensor)	**B4**	***IN4*** (Prox/Reed sensor)
A5	***IN10*** (Alarm/Switching sensor)	**B5**	***IN5*** (Prox/Reed sensor)
A6	***IN9*** (Alarm/Switching sensor)	**B6**	***IN6*** (Prox/Reed sensor)
A7	***IN8*** (Varying volt sensor)	**B7**	***IN7*** (Varying volt sensor)
A8	***CANBUS HI***	**B8**	***OUT1*** (Solenoid/Shutoff output)
A9	***CANBUS LO***	**B9**	***OUT2*** (Regulated +12V output)
A10	***RS232 TX***	**B10**	***BATT +VE*** (+12V Battery Terminal)
A11	***RS232 RX***	**B11**	***BATT -VE*** (0V/GND Battery Terminal, Vehicle Ground)

2.4.1. POWER CONNECTION

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

1. Connect power cable supplied (Figure 1) **DIRECTLY TO BATTERY**, as described in Figures 2 and 3.
   - Ring terminals are used for battery connection and the end with Ferrules attached (See Figure 1) is used to connect to the Jackal.
   - Connect Ground to ***BATT -VE***, Terminal B11 using the black wire, as shown in Figure 2.
   - Connect +12 Volts (+battery terminal) to ***BATT +VE***, Terminal B10 using the red wire as shown in Figure 2
   - Ensure that the battery connection to the Jackal is 12V as shown in figure 3.
   - **CONNECTING 24V TO THE JACKAL WILL DAMAGE THE UNIT AND VOID WARRANTY**.
2. On the plug you will see a small screw on the top. Screw clockwise until the wire is clamped tightly into the plug.

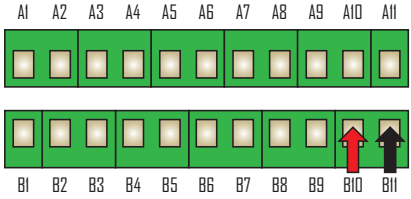


Figure 2: Power Connection at the rear of the Jackal. Red is +12V, Black is Ground (Earth or Common)

WARNING

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

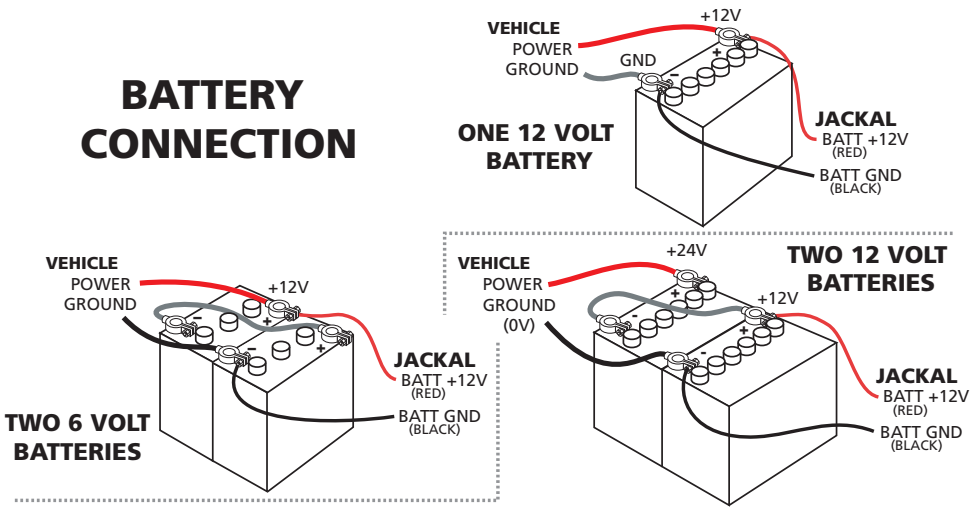


Figure 3: Correct battery connection for possible battery configurations

2.4.2. SENSOR COMPATIBILITY

The Farmscan sensors that are compatible with these inputs are shown in the table below. For

Sensor Options		1007P	1009P	1010	1501	2034	2076	2077	2202	A-2220P	A-2080P	AA-2009P	AA-122P	AA-1 25	AA-242	AA-230	AA-210	AA-232	AA-231
Name	**Terminal**																		
Inputs																			
1	B1	•	•	•		•	•	•				•	•	•	•		•		•
2 – 6	B2 – B6	•	•				•					•	•	•	•	•		•	
7 – 8	A7 & B7										•								
9 – 12	A3 – A6							•	•										
Output																			
1	B8				•														

detail on Sensor Kits or how to connect the specific sensors see section 6.

3. OPERATION

3.1. BUTTON FUNCTIONS

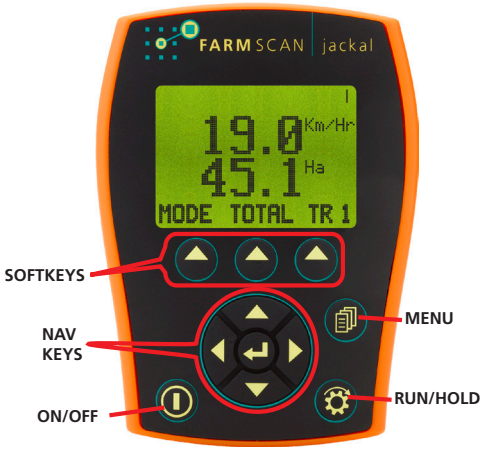


Figure 4: Button names as used in this document.

3.1.1. POWER ON / OFF KEY

Power is turned on by a short press of the **ON/OFF** key (1 second). Power is turned off by two short presses.

3.1.2. MENU KEY

The **MENU** key is used for setting up the ports as well as returning to the main screen from ***TRIPS*** or ***TOTAL*** displays.

3.1.3. RUN / HOLD KEY

The **RUN/HOLD** key has a dual function. Press **RUN/HOLD** once to place the 'MONITOR ON HOLD'. Press **RUN/HOLD** again to resume operation.

When in ***HOLD*** mode, all alarms and accumulating readouts such as ***AREA*** and ***DISTANCE*** are stopped and any solenoid attached to **OUTPUT 1** (Terminal A4) will be deactivated. The monitor will beep an alarm every 10 seconds to remind the operator everything is on hold, and therefore not recording data.

The ***RUN/HOLD*** state is indicated in the top right hand corner of the screen. When the monitor is in ***RUN*** mode, a little bar rotates in the top right corner to signify that the monitor is active. When the monitor is in ***HOLD*** mode this bar is not visible and "ON HOLD" is displayed at the top of the screen.

3.1.3.1. REMOTE RUN/HOLD

As an alternative to manually activating the **RUN/HOLD** key you can automatically place the monitor on hold by connecting Input 13 to any electrical device (e.g. clutch switch) that is activated whenever the machine is operational. Input 13 can be programmed for ***RUN*** signal level to be high (12 volts) or low (0 volts).

A remote **RUN/HOLD** button can also be purchased if the monitor is not within easy reach of the operator.

NOTE: If connection to remote **RUN/HOLD** switch is faulty the signal will be read as high (12V) and the Jackal will behave accordingly.

3.1.4. SOFT KEYS

The Jackal has 3 soft keys placed directly under the LCD. These keys will change function in different menus. The current function of the soft key is indicated at the bottom of the screen directly above the button. In the main menu the soft keys provide access to information display **MODE**, **TOTAL** and **TRIP** memories as described in subsequent sections.

3.1.5. NAVIGATION KEYS

The Round navigation (**NAV**) keys are used to navigate **UP/DOWN** and **LEFT/RIGHT** in calibration screens. **ENTER** is used to activate the selection.

3.2. GENERAL OPERATION

The Jackal has 5 kinds of screen displays: Operation; Trip; Total; Input Calibration; and System. Input Calibration is discussed in detail in section 4.

3.2.1. OPERATION

Operation screens show live information and alarms, measured using the sensors attached to the Jackal. The Jackal can display two pieces of live information at a time. If more than two pieces of information are available, the **MODE** softkey can be used to cycle through the available information, as described below. The first operation screen is referred to as the main screen, and is generally used as the starting point for examples and operational descriptions in this manual.

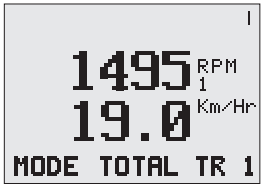


Figure 5: An example of the main screen, when configured as prer the Airseeder example in Section 5.5

3.2.1.1. MODE

The Jackal displays two pieces of live information in addition to alarms (if any) and softkey options when in operation. This is to ensure the information is clear and easily readable. When there is more than two pieces of information available, the softkey below **MODE** allows the user to scroll through the various screens of information available with the current configuration. Information is ordered according to input number with unused inputs not displayed. Alarms and trips remain visible in every screen. Pressing the **MENU** button at any time will return the user to the main screen.

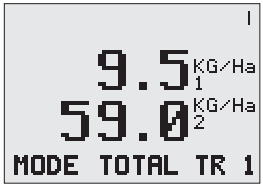


Figure 6: An example of a secondary information screen screen, when configured as prer the Airseeder example in Section 5.5

3.2.1.2. ALARM DISPLAY

In addition to the four dedicated alarm inputs (e.g. bin level) the Jackal can have alarms set for: Shaft ***RPM***; ***RATE***; ***PRESSURE***; and ***DEPTH***.

When an alarm is triggered it is displayed at the top of the LCD. Since several alarms can occur at the same time the Jackal will cycle through the currently active alarms. Each alarm message is displayed for 3 seconds before the next in the cycle is displayed. The format is as follows:

Current Alarm Number | "." | Total Alarms Active | Alarm Description

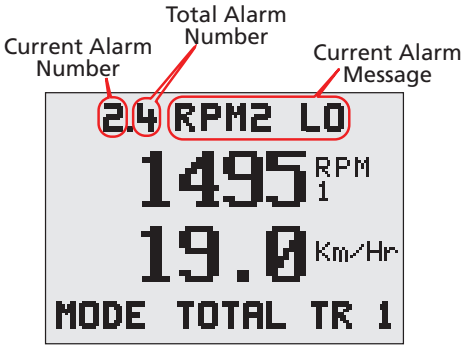


Figure 7: An example of the Jackal display when alarms are triggered, as described in the text above

In the example given below there are a total of four alarms active, the second alarm is currently being displayed, and the second alarm is that the Shaft ***RPM*** is less than the low point alarm. Therefore the unit displays "2.4 RPM 2 LO", as shown in Figure 5.

When any alarm is triggered the Solenoid / Shutdown Output (B8) is activated (ground or 0V). This can be connected to emergency shutdown or some other device to alert the user such as a light or buzzer if the internal buzzer is not considered sufficient.

Alarms can be cancelled by pressing the enter key while they are displayed, if the alarm condition is removed, but at some point in the future is retriggered the alarm will sound anew.

3.2.2. TRIP

The Jackal features 10 trip counters as well as totals counters. The counters accumulate whenever the monitor is off hold.

The **TRIP** menu is entered into from the main screen using the softkey under the **TRIP** legend. Press **TRIP** again to advance trip number and press the softkey under **SET** to activate the ***TRIP***. An ***X*** will appear after trip number to signify the ***TRIP*** is active, as shown in Figure 8. Trips and totals can be reset by holding **CLEAR**.

The main screen can be returned to by either cycling through all 10 ***TRIPS*** or pressing the **MENU** key.

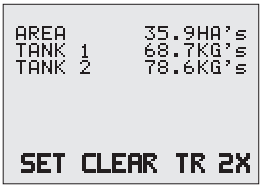


Figure 8: An example of a ***TRIP*** screen displaying ***TRIP 2***, which is the current active ***TRIP***.

3.2.3. TOTAL

The **TOTAL** softkey displays the total of all current trips. The format is similar to the ***TRIP*** display with the **MENU** key used to return to the main screen.

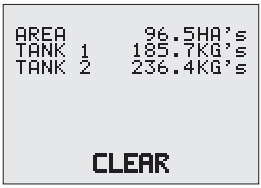


Figure 9: An example of the ***TOTAL*** screen.

3.2.4. SYSTEM MENU

The system menu, shown in Figure 6 allows the user to select the Language and whether GPS is used for speed information. The system menu also contains information about the software version, serial number and total hours of device operation.

To enter the system menu:

1. Ensure the Jackal is turned off
2. Turn On device
3. When the Jackal 'Splash Screen' is displayed, press and release the **MENU** button.
4. System Menu Should Appear, as shown in Figure 6.
5. Use the **NAV** keys to change the user selectable options.

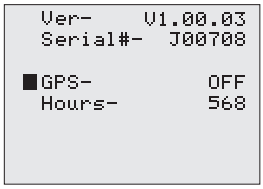


Figure 10: System menu screen example

For detail on using GPS Speed refer to section 4.1.1.2

3.3. MEMORY BACKUP

Memory backup is achieved through non-volatile memory, providing permanent backup, however if power is suddenly removed without switching off using the on/off button, the last 5 seconds of events may be lost.

4. INPUT SETUP

Input setup is accessed via the **MENU** key. If no inputs are enabled the main screen will display as shown in the top of Figure 11. Pressing **MENU** enters input port set-up. The Jackal will display the current configuration of input 1, with the cursor flashing on the left side. If input 1 is not configured it will display as shown in Figure 11. To configure the currently displayed input press **ENTER**. The cursor will move to right side and the desired function can be selected using the **UP/DOWN** keys. Once set press **ENTER** to lock in and return cursor to left side.

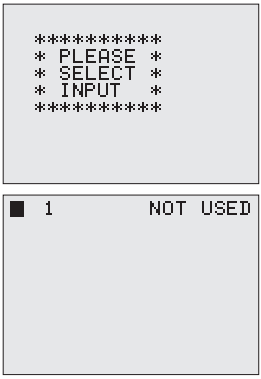


Figure 11: Main screen display when no inputs are calibrated (above) and calibration screen for input 1 when input is not calibrated

UP and **DOWN** can now be used to move the cursor to the setting you wish to change. The **ENTER** key is used to activate that setting and **UP/DOWN LEFT/RIGHT** key to edit the value.

The **MENU** key will select the next input. **EXIT** will return you to main menu.

All of the examples of the main screen are based on only the one input configured as described in the particular section. In the examples the use of the navigation keys as described above and in Figure 4 will be referred to a using the **NAV** keys.

4.1. DIGITAL INPUTS

INPUTS 1-6 (Terminal B1 to B6) can be set up to monitor shaft ***RPM*** (e.g.. Fan, wheel etc), ***BATCH***, ***RATE*** and ***SPEED*** with a number of options in each category as well as choice of imperial or metric calibration.

Only **INPUT 1** can accept coil sensor inputs. If the desired setup uses a coil sensor do not use **INPUT 1** for any other sensors.

4.1.1. SPEED

The Jackal can use and display speed information, as shown in Figure 12, from: a wheel sensor; GPS input; or Radar Speed input.

4.1.1.1. WHEEL AND RADAR SPEED

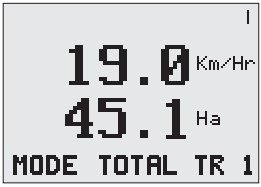


Figure 12: Speed main screen

4.1.1.1.1. FEATURES

- Automatic wheel factor (wheel size) calibration.
- Imperial and metric display.
- Set implement ***WIDTH*** to display ***AREA***
- Display ***SPEED*** or ***AREA***
- Live ***PULSE*** counter

4.1.1.1.2. SPEED CALIBRATION

Calibrating a speed input is the same for Wheel sensors, Radar Speed sensors or GPS speed sensors. The subsequent section on GPS Speed Refers to directly connecting the RS-232 output of a GPS device to the Jackal.

1. Press the **MENU** key until the input the sensor used for calculating rate information is connected to is displayed (input 1 – 6).
2. Press **ENTER** to edit the input function and use the **NAV** keys to select the ***SPEED*** option as shown in Figure 13.
3. Select ***SPEED*** setting with desired Units.
   - **DO NOT MIX METRIC AND IMPERIAL UNITS**.
4. Clear ***PULSES*** by holding **CLEAR** for approximately 1 second.
5. Ensure Jackal is in ***RUN*** mode (when in ***HOLD*** mode "ON HOLD" is displayed at the top of the screen)
6. Drive a known distance Jackal should count ***PULSES***.
7. Enter distance into monitor using **NAV** keys and hold **SET** for approximately 1 second to calculate ***WHEEL*** factor.
8. Enter the Implement ***WIDTH*** using the **NAV** keys.

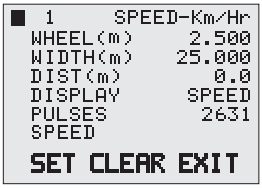


Figure 13: Speed calibration screen

NOTES:

1. If the desired setup uses a coil sensor do not use input 1 for wheel sensor.
2. Known distance should be many rotations of the wheel. 100 – 200m is generally a good distance.
3. Enter implement ***WIDTH*** in the indicated units.
4. Mixing Metric and Imperial units **WILL RESULT IN INCORRECT INFORMATION**.

4.1.1.2. GPS SPEED

The Jackal is capable of using any GPS that produces NEMA GPS strings containing VTG information, communicated using the RS-232 Port. ***GPS SPEED*** is enabled through the System Menu.

Setting Up ***GPS SPEED***:

1. Enter the System Menu as described in section 3.2.4.
2. Use the **NAV** keys to select the GPS baud rate (refer to your GPS manual for appropriate baud rate), shown in Figure 14.
3. Exit System Menu by pressing **MENU**.
4. Configure any input from 1 to 6 as a speed input as described in section 4.1.1.1.2.
5. ***WHEEL*** must be set to 0.
   - **ANY *WHEEL* VALUE OTHER THAN ZERO WILL RESULT IN INCORRECT *SPEED* READING**.

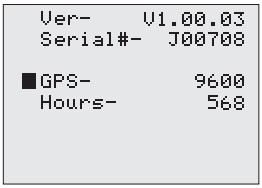


Figure 14: System menu screen with GPS enabled, using 9600 Baud Rate

NOTES:

1. If the desired setup uses a coil sensor do not use input 1 for wheel sensor.
2. If there is any error in communications from the GPS then "GPS FAIL" will be displayed at the top of the Main Screen.
3. Mixing Metric and Imperial units **WILL RESULT IN INCORRECT INFORMATION**

4.1.2. RPM (SHAFT SPEED)

4.1.2.1. FEATURES

Figure 15: Example RPM main screen display

- Displays live ***RPM*** input of any shaft, as shown in Figure 15.
- High and Low shaft speed ***ALARMS***.
- Output is active (0V) when alarm is triggered, enabling, for example connection to engine shut down.
- Divider, divides pulses from sensor in case of more than one pulse per revolution.

4.1.2.2. RPM CALIBRATION

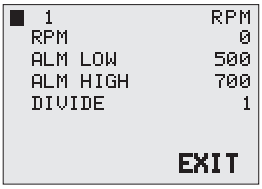


Figure 16: RPM calibration screen

1. Press the **MENU** key until the input that the shaft sensor is attached to is displayed (**INPUT 1 – 6**).
2. Press **ENTER** to edit the input function and use the **NAV** keys to select the ***RPM*** option as shown in Figure 16.
   a. If using a coil sensor, **ONLY INPUT 1** can be used.
   b. If the desired setup uses a coil sensor, and the ***RPM*** sensor currently being set up is not a coil sensor do not use input 1 for sensor.
3. Press **ENTER** to edit the input function and use the NAV keys to select the RPM option.
4. Use **NAV** keys to set ***DIVIDE*** value (***DIVIDE*** value is the number of magnets or teeth on the shaft, and therefore the number of pulses received by the Jackal per shaft rotation).
5. Use ***NAV*** keys to set alarm points.

NOTES:

1. ***DIVIDE*** should be equal to the number of magnets placed on the shaft.
2. ***PULSES*** from Shaft Sensor must be less than 1000 pulses per second for **INPUTS 2-6** and less than 400 pulses per second for **INPUT 1** ('coil' sensor input).
   - Maximum Pulse Per Second rate is calculated by:

$$\frac{MAX\ RPM * DIVIDE}{60}$$

4.1.3. BATCH

4.1.3.1. FEATURES

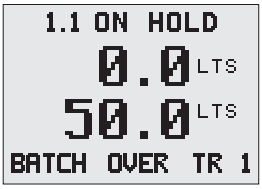


Figure 17: Batch main screen

- Automatic factor calculation.
- Display batch volume in metric (shown in Figure 17) or imperial units (L or Gal respectively).
- Over run compensation.
- Live pulse counter to confirm correct operation.

4.1.3.2. BATCH METER CALIBRATION

1. Press the **MENU** key until the input the sensor used for calculating ***BATCH*** information

is connected to is displayed (**INPUT 1 – 6**).

2. Press **ENTER** to edit the input function and use the **NAV** keys to select the ***BATCH*** option as shown in Figure 18.
   a. If using a 'coil' flow sensor **INPUT 1** must be used.
   b. If using a 'Reed' sensor, **INPUT 1 – 6** can be used. If the flow meter will produce greater than 400 pulses per second, **INPUTS 2 – 6** must be used. The relevant calculation is described in the notes for this section.
3. Clear ***PULSES*** by holding **CLEAR**.
4. Ensure Jackal is in ***RUN*** mode (when in ***HOLD*** mode "ON HOLD" is displayed at the top of the main screen).
5. Select the desired ***DISPLAY*** and measurement units using the **NAV** keys.
6. Put a known amount of liquid through the flow meter.
7. The Jackal should count pulses from the flow meter. If no pulses are detected check wiring.
8. Enter the known amount of liquid put through the flow meter into ***AMOUNT*** using the **NAV** keys.
9. Hold **SET** and the counted pulses will be divided into the ***AMOUNT*** to give the calibration ***FACTOR***. The user should notice ***FACTOR*** change in value unless calibration is identical to previous.
10. Press **EXIT** to return to the main screen.

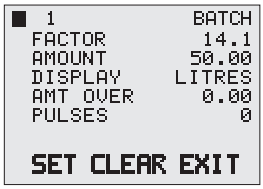


Figure 18: Batch calibration screen

4.1.3.3. ALTERNATIVE CALIBRATION METHOD

If the flow meter pulse ***FACTOR*** (i.e. Pulses Per Liter (PPL)) is known, enter this ***FACTOR*** directly using the **NAV** keys. This replaces steps 5 – 8 in the previously described calibration method.

4.1.3.4. BATCH OPERATION

1. Ensure solenoid operated valve is in line with the flow meter and connected to the Jackal.
2. After the flow meter used has been calibrated, the ***AMOUNT*** parameter in the calibration screen functions as the ***BATCH*** volume. Enter the desired batch volume using the **NAV** keys.
3. Main screen should display as shown in Figure 17 if the batch ***AMOUNT*** was 50L with the Jackal in ***HOLD*** mode (solenoid activated). The display on the top line is a running total for all batches in the current series (***TRIP***).
4. Press **RUN/HOLD** to initiate batch. Batch amount should count down to zero.
5. When the batch amount approaches zero the Jackal will deactivate the solenoid output to stop the batch. Any excess to the batch ***AMOUNT*** is recorded in ***LTS OVER*** (***GAL OVER***) as shown in Figure 19. Press and hold **OVER** until the Jackal beeps to update the compensation for valve turn off time.
   - In the example shown in Figure 19, the batch volume was 50L and with 0.5L of overflow the total volume of the batch was 50.5L.
   - The overflow correction can be manually edited in the calibration screen (***AMT OVER***) using the **NAV** keys. This may be necessary if the overflow correction is too high.

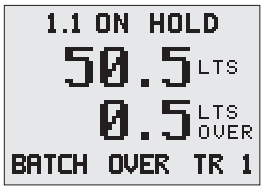


Figure 19: Example of Batch main screen when an overrun of 0.5L has occured.

6. To start another batch of the same volume press the **BATCH** softkey.
7. Using the **TRIP** key, ten different series of batches can be separately totaled.

NOTES:

1. Only the batch input can be active when using batch mode. Ensure all other inputs display 'NOT USED' when cycled through using the **MENU** key.
2. The maximum pulses per second created by a flow meter is calculated using the following formula:

$$\frac{\textit{MAX LITERS PER MINUTE} * \textit{FACTOR}}{60}$$

4.1.4. RATE

4.1.4.1. FEATURES

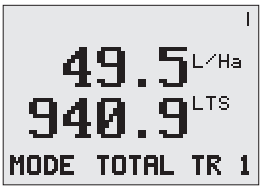


Figure 20: Example Rate display on main screen

- High and Low rate ***ALARMS*** with output.
- Imperial or Metric units.
- Solid or Liquid product ***RATES***.
- Automatic factor calculation.
- Live ***PULSE*** counter reading to indicate correct operation and refine calibration.
- Rates can be displayed as shown in Figure 20, using both Metric and Imperial units in the following formats: volume/area (L/Ha, Gal/Ac); weight/area (kg/Ha, lbs/Ac); volume/time (L/min, Gal/min); weight/time (kg/min, lbs/min).

4.1.4.2. LIQUID RATE CALIBRATION

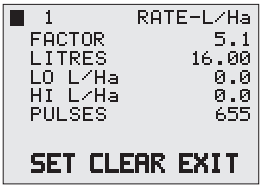


Figure 21: Liquid product Rate calibration screen

1. Press the MENU key until the input sensor used for calculating rate information is connected to is displayed (**INPUT 1 – 6**).
2. Press **ENTER** to edit the input function and use the **NAV** keys to select the ***RATE*** option in the desired units, as shown in Figure 21.
   - **DO NOT MIX METRIC AND IMPERIAL UNITS**
3. Clear ***PULSES*** by holding the **CLEAR** softkey.
4. Run a known amount of product through the flow sensor whilst the Jackal counts the pulses
5. Enter the known amount of product run through the flow sensor in liters and press **ENTER**. Hold **SET** for approximately 1 second and the Jackal will calculate the calibration ***FACTOR***.
   - An alternative to this step is, if the calibration ***FACTOR*** is known, enter this ***FACTOR*** directly using the **NAV** keys. This is not advised if not absolutely certain about the ***FACTOR***.
6. Enter the ***LO*** and ***HI ALARM*** values in the indicated units using the **NAV** keys.
   - If ***LO*** and ***HI*** values are both 0, alarms are not active for the input

4.1.4.3. SOLID RATE CALIBRATION

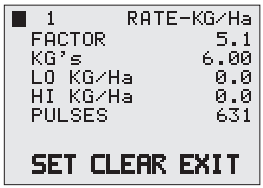


Figure 22: Solid product rate calibration screen

1. Fill the product bin to be calibrated with an ample amount of product for calibration.
2. Press the **MENU** key until the input the sensor used for calculating rate information is connected to is displayed (**INPUT 1 – 6**).
3. Press **ENTER** to edit the input function and use the **NAV** keys to select the ***RATE*** option in the desired units, as shown in Figure 22.
   - **DO NOT MIX METRIC AND IMPERIAL UNITS**
4. Clear ***PULSES*** by holding the **CLEAR** softkey.
5. Run an amount of product through the metering shaft or belt whilst the Jackal counts the ***PULSES***.
6. Accurately weigh the product that has passed through the metering shaft or spinner.
7. Enter the weight of product in selected units and press **ENTER**. The counted ***PULSES*** will be divided into the product weight to give the calibration ***FACTOR***.
   - An alternative to steps 4-7 is if the calibration ***FACTOR*** is known, enter this ***FACTOR*** directly using the **NAV** keys. This is not advised if not absolutely certain about the ***FACTOR***.
8. Enter the ***LO*** and ***HI ALARM*** values in the indicated units using the **NAV** keys.
9. If ***LO*** and ***HI*** values are both 0, ***ALARMS*** are not active for the input

NOTES:

1. Mixing Metric and Imperial units **WILL RESULT IN INCORRECT INFORMATION**
2. The accuracy of the calibration is dependent on the number of ***PULSES*** recorded by the Jackal. Using larger volumes or weights will result in more accurate calibration.

4.2. ANALOGUE INPUTS

INPUTS 7 AND 8 (Terminal A7 and B7 respectively) are analogue inputs designed to measure ***PRESSURE*** or ***DEPTH*** information. Calibration of the analogue inputs requires an independent measurement for calibration. Therefore the user must have either a pressure gauge in appropriate units (pressure monitoring) or a tape measure (depth monitoring).

The range used to calibrate the analog inputs will affect the range and accuracy of the measured sensor value. Calibration requires two values. The low value sets the zero point. If the sensor ever produces a lower output that the low point used for calibration the Jackal will display zero not a negative number. Therefore the Jackal must be calibrated using the lowest value expected in operation. The high point does not limit the maximum value recognised by the Jackal, however the difference between the two calibration points will affect the accuracy of the calibration, with a large difference resulting in greater accuracy.

4.2.1. PRESSURE

4.2.1.1. FEATURES

- Live pressure reading Metric or Imperial Units as shown in Figure 23.
- High and low alarms with output.
- Output active (0V) when in alarm state enabling, for example, engine shut down to be connected.
- Live A/D reading.

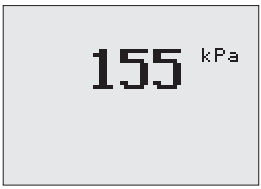


Figure 23: Pressure display on main screen

4.2.1.2. PRESSURE CALIBRATION

1. Press the **MENU** key until the input the pressure sensor is connected to is displayed (input 7 or 8).
2. Press **ENTER** to edit the input function and use the **NAV** keys to select the ***PRESSURE*** option in the desired units, as shown in Figure 24.
3. Adjust the operating pressure to the lowest operating value (e.g. turn pump / compressor off).
4. Record the reading on the pressure gauge in units used for display (referred to as ***P1***).
5. Use the **NAV** keys to move the cursor to the ***A/D LO*** line.
6. Hold **SET** until ***A/D LO*** value updates.
7. Adjust the operating pressure to the highest expected operating value.
8. Record the reading on the pressure gauge in units used for display (referred to as ***P2***).
9. Use the **NAV** keys to move the cursor to the ***A/D HI*** line.
10. Hold **SET** until ***A/D HI*** value updates.
11. Enter the difference between the high and low pressure in ***AMOUNT*** (***AMOUNT*** = ***P2*** – ***P1***)

$$\begin{aligned} \textbf{\textit{AMOUNT}} &= \textbf{\textit{P2}} - \textbf{\textit{P1}} \\ &= 250 - 0 \\ &= 250 \end{aligned}$$

12. The Jackal will calculate A/D counts per unit of pressure.
13. Enter the ***ALM LO*** and ***ALM HI*** alarm values in the indicated units using the **NAV** keys.
    a. If ***ALM LO*** and ***ALM HI*** values are both 0, ***ALARMS*** are not active for the input.
    b. For correct operation ***P1*** should be lower than ***ALM LO***.
    c. ***P2*** is not required to be higher than ***ALM HI***.

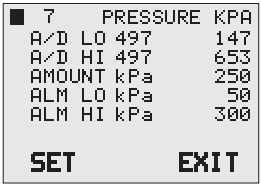


Figure 24: Pressure calibration screen The number immediately to the right of ***A/D LO*** and ***A/D HI*** is the live A/D reading. Numbers to the far right are the stored values for the calibration point.

4.2.1.3. CALIBRATION EXAMPLE

In this instance the User considers atmospheric pressure to be a low pressure and 250kPa above atmosphere to be a high pressure during machine operation. His pressure gauge only reads

pressure above atmospheric, and therefore is a relative pressure, not absolute.

1. The user turned off the pump/compressor and vented the system applied to both the pressure sensor and an independent gauge to atmospheric pressure.
2. After allowing the A/D value to stabilize at atmospheric pressure, ***P1***, had a A/D value of 147. The User held the **SET** softkey until the ***A/D LO*** Value updated (147 displayed far right of ***A/D LO*** line, as shown in figure 24).
3. The user turned on the pump/compressor and adjusted the pressure applied to both the pressure sensor and an independent Gauge to 250kPa.
4. After allowing the A/D value to stabilize at the high pressure, ***P2***, had a A/D value of 653.The User held the **SET** softkey until the ***A/D HI*** Value on the far right of the screen updated, as shown in Figure 20.
5. The user then calculated the ***AMOUNT***:
6. The ***AMOUNT*** (250) was entered using the **NAV** keys.
7. The User then entered high and low ***ALARM*** points of 300kPa and 50kPa respectively

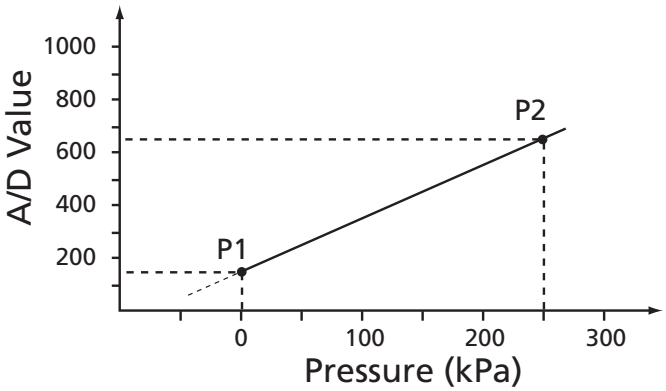


Figure 25: Output of A/D with a change in pressure, indicating the assumed linear change in A/D value with change in pressure. NOTE: Values used in this graph do not relate to any specific pressure sensor and is only intended to illustrate the calibration process in the example provided.

using the **NAV** keys.

NOTES:

1. High and Low pressures used for calibration should be representative of highest and lowest pressures expected during operation.
2. The ***A/D LO*** value used for calibration defines what the Jackal considers 0. Therefore the low pressure point used for calibration **MUST** be lower than any pressures expected in operation.
3. Maximum values are determined by which ever is lowest of either the voltage input limit (5V), or the sensor output limit.
4. The Jackal does not calculate an offset for the sensor. Therefore if the lowest pressure measured by the sensor is 1 Atmosphere (14.7 PSI, 101 kPa) the absolute pressure measurement will be e.g. 1 Atmosphere + Jackal reading, i.e. if the Jackal is reading 50kPa the absolute pressure is 100 + 50 = 150kPa.
5. Accuracy of calibration is proportional to the difference of pressures used for calibration,

i.e. a large pressure difference between ***P1*** and ***P2*** will provide a more accurate calibration.

6. The Jackal assumes that the Pressure Sensor output changes linearly with a change in pressure, as shown in Figure 21. In practice sensors may not be perfectly linear. It is recommended that pressure sensors used are operated in the linear region of sensor output.
7. The maximum possible A/D counts are 1023. If the maximum expected pressure reading is greater than 95% (~970 counts) of this value consider changing your pressure sensor. Alarms set at or above the 95% level may not operate reliably due to being in the 'non-linear' region of pressure sensor operation.

4.2.2. DEPTH

4.2.2.1. FEATURES.

- Imperial or metric units as shown in Figure 26.
- High and low alarms with output
- Output active when in alarm state
- Live A/D reading

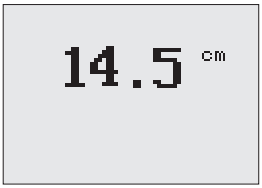


Figure 26: Depth Main Screen

4.2.2.2. DEPTH CALIBRATION

1. Press the **MENU** key until the input the depth sensor is connected to is displayed (input 7 or 8).
2. Press **ENTER** to edit the input function and use the **NAV** keys to select the ***DEPTH*** option in the desired units, as shown in Figure 27.
3. When the implement is on flat ground, adjust the depth of the tynes or plow to zero depth, e.g.. resting on the ground.
4. Use the **NAV** keys to move the cursor to the ***A/D LO*** line.
5. Hold **SET** until ***A/D LO*** value updates. This sets the point which the Jackal considers depth to be 0.
6. Still on level ground, adjust the implement to a deep value.
7. Use the **NAV** keys to move the cursor to the ***A/D HI*** line.
8. Hold **SET** until ***A/D HI*** value updates.
9. Dig a hole next to the plow or tyne and measure the distance from the surface of the soil to the lowest point of the plow or tyne in the units used for display.
10. Enter the depth measured in the previous step in ***AMOUNT***.
11. The Jackal will calculate the A/D counts per unit of depth.
12. Enter the ***ALM LO*** and ***ALM HI*** alarm values using the **NAV** keys.
    a. If ***ALM LO*** and ***ALM HI*** values are both 0, alarms are not active for the input.
    b. For correct operation ***D1*** should be lower than ***ALM LO*** but ***D2*** does not need to be higher than ***ALM HI*** as the Jackal will extrapolate.

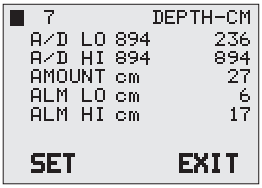


Figure 27: Depth calibration screen. The number immediately to the right of ***A/D LO*** and ***A/D HI*** is the live A/D reading. Numbers to the far right are the stored values for the calibration point.

4.2.2.3. CALIBRATION EXAMPLE

In this instance the User considers 27cm to be deep during machine operation.

1. When on flat ground the user adjusted the tynes such that they were resting on the ground.
2. After allowing the A/D value to stabilize giving a value of 236. The User held the **SET** softkey until the ***A/D LO*** Value updated (236 displayed on far right as in Figure 23).
3. The user adjusted the tyne depth to what they consider deep, and after digging around a tyne the ground level to the bottom of the tyne was measured as 27cm.
4. After allowing the A/D value to stabilize at the deep value the A/D had a value of 894, as shown in Figure 27. The User held the **SET** softkey until the ***A/D HI*** Value updated (far right of screen, as shown in Figure 23).

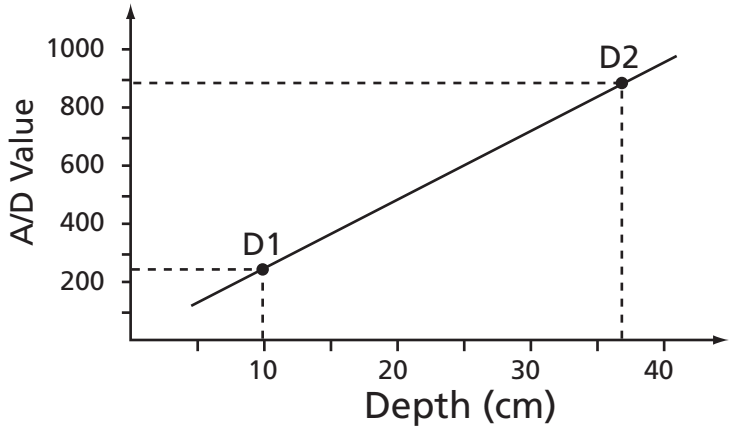


Figure 28: Output of A/D with a change in depth, indicating the assumed linear change in A/D value with change in depth. The values used in this graph do not relate to any specific depth sensor and is only intended to illustrate the calibration process.

5. The user then entered 27 in the ***AMOUNT*** setting using the **NAV** keys.

NOTES:

1. High and Low depths used should be representative of highest and lowest depths expected during operation.
2. The ***A/D LO*** value used for calibration defines what the Jackal considers 0. Therefore all alarm points **MUST** have a higher A/D value than the ***A/D LO*** value used in calibration.
3. Maximum values are determined by which ever is lowest of either the voltage input limit (5V), or the sensor output limit.
4. Accuracy of calibration is proportional to the difference of depths used for calibration, i.e. a large depth difference between ***A/D LO*** and ***A/D HI*** will provide a more accurate calibration than a small difference.
5. The Jackal assumes that the potentiometer output changes linearly with a change in depth, as shown in Figure 24. In practice sensors may not be perfectly linear. It is recommended that depth sensors used are operated in the linear region of sensor output.
6. The maximum possible A/D counts are 1023. If the maximum expected depth reading

is greater than 95% (~970 counts) of this value consider changing your depth sensor. Alarms set at or above the 95% level may not operate reliably due to being in the 'non-linear' region of depth sensor or A/D operation.

4.3. TANK / BIN LEVEL ALARM INPUTS

INPUTS 9-12 (Terminal A3 to A6) are simple alarm inputs for use on bin level, temperature and pressure switches. Alarms are displayed in all screens other than Calibration, Trip and Total screens. The way alarms are displayed is discussed in Section 3.2.1.2.

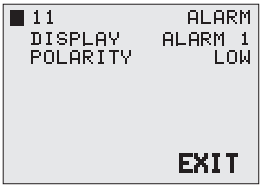


Figure 29: Alarm calibration screen

4.3.1. FEATURES

- Alarm for high or low input with output.
- Choice of alarm message.
- Set polarity of input.

4.3.2. CALIBRATION

1. Press the **MENU** key until the input the level sensor is connected to is displayed (**INPUT 9 TO 12**).
2. Press **ENTER** to edit the input function and use the **NAV** keys enable the ***ALARM***, as shown in Figure 29.
3. Use the **NAV** keys to enter a useful name for the alarm that will ***DISPLAY*** if the alarm is triggered. The choices are ALARM 1 - 4.
4. Use **NAV** keys to select if ***ALARM*** condition is ***HIGH*** (12 volt) or ***LOW*** (0 volt) input condition.
5. If ***ALARM*** condition is set for low the ***ALARM*** will sound if the input is connected to ground. If the input is set for ***HIGH*** it will trigger, if left unconnected (not connected to ground) or if 12 volt is applied to input.

NOTES:

1. There is an internal pull up resistor so a floating or 12 volt input is not differentiated. Therefore, if the alarm Polarity is set ***LOW*** and the sensor is disconnected from the Jackal (either by the user, connector or cable failure) the **ALARM WILL NOT TRIGGER**.

4.4. RUN HOLD INPUT

Input 13 (Terminal A2) is remote **RUN/HOLD** input.

4.4.1. FEATURES

- Activate for high or low input.
- Can be connected to machine signals to automate ***RUN/HOLD*** mode change.

4.4.2. CALIBRATION

1. Press the **MENU** key until the external run/hold, **INPUT 13**, is displayed.
2. Press **ENTER** to edit the input function and use the **NAV** keys enable in Figure 30. Enabling the external Run/Hold disabled the **RUN/HOLD** key on the jackal keypad.
3. Use **NAV** keys to select if hold condition is ***HIGH*** (12V) or ***LOW*** (Ground / 0V) input condition.
   - If set for ***LOW*** polarity, the monitor will be in ***RUN*** mode when the input is ***LOW***.
   - If set for ***HIGH*** the monitor will be in ***RUN*** mode when input is ***HIGH***.
   - Floating or disconnected inputs to ***RUN/HOLD*** are registered as ***HIGH*** (12V).

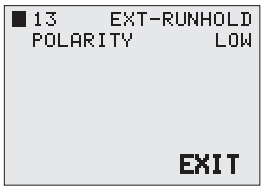


Figure 30: External RUN/HOLD calibration screen

NOTES:

1. When external **RUN/HOLD** is enabled, the **RUN/HOLD** key is disabled
2. There is an internal pull up resistor so **FLOATING (NO CONNECTION) OR 12V INPUT IS NOT DIFFERENTIATED**. Therefore, if the External **RUN/HOLD** input Polarity is set ***LOW*** and the sensor or external switch is disconnected from the Jackal (either by the user or via connector or cable failure) the jackal will remain in RUN mode irrespective of a change in machinery or switch state.

When external **RUN/HOLD** is enabled, the **RUN/HOLD** key is disabled.

5. EXAMPLE CONFIGURATIONS

All of the example configurations assume all inputs are initially inactive. The main screen should display as shown in Figure 31 and each input will display 'NOT USED' when cycled through using the **MENU** key. If the Jackal does not display as shown in Figure 31, use the **MENU** and **NAV** keys to inactivate inputs.

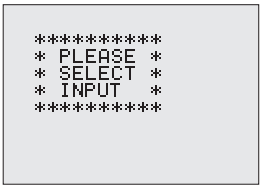


Figure 31: Main screen when no inputs are configured

5.1. AREA METER

To configure the Jackal as an area meter only a ***SPEED*** input is required.

SPEED monitoring can be used in conjunction with shaft ***RPM*** monitoring, ***RATE*** information, bin / tank level ***ALARMS*** and ***PRESSURE*** or ***DEPTH*** monitoring.

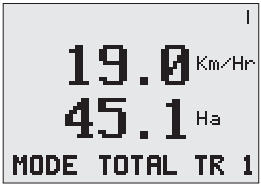


Figure 32: Example of main screen when configured as an Area Meter

5.1.1. SETUP PROCEDURE

1. Set up the desired ***SPEED*** sensor.
   - If using a GPS input ensure ***WHEEL*** is set to zero and the GPS baud rate is correct, as described in section 4.1.1.2.
   - If using a wheel sensor, ensure it is correctly installed, as described in Figure 33.
2. Setup a ***SPEED*** input as defined in section 4.1.1.
3. Exit input configuration using the **EXIT** softkey or cycling through all inputs using the **MENU** key.
4. Main screen should display as described in Figure 32.
5. Pressing **RUN/HOLD** will stop the accumulation of ***TOTAL***s but will continue live ***SPEED*** information readout.

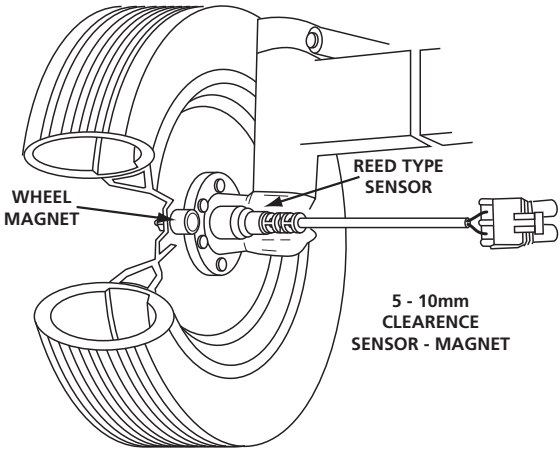


Figure 33: Example of a correct wheel magnet sensor installation. Sensor appearence may differ depending on purchased model.

5.2. TACHO METER

The Jackal can monitor up to 6 shafts, displayed as shown in Figure 29. Shaft ***RPM*** is displayed in order of input number.

RPM monitoring can be used in conjunction with ***SPEED*** monitoring, ***RATE*** information, bin / tank level ***ALARMS*** and ***PRESSURE*** or ***DEPTH*** monitoring.

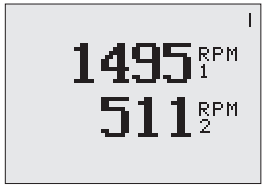


Figure 34: Example of main screen when configured as an Tacho Meter monitoring 2 shaft speeds

5.2.1. SETUP PROCEDURE

1. Ensure shaft sensors and magnets are installed correctly. Examples of correct installation are shown in Figure 35.
2. Setup a ***RPM*** input as defined in section 4.1.2.
   a. Ensure that coil sensors are attached to input 1.
3. Repeat setup procedure as defined in section 4.1.2 until the required number of shaft ***RPM*** inputs are configured.
4. Exit input configuration using the **EXIT** softkey or cycling through all inputs using the **MENU** key.
5. Main screen should display as described in Figure 34.
6. If more than two shafts are monitored use **MODE** key to cycle through shaft ***RPM*** displays.

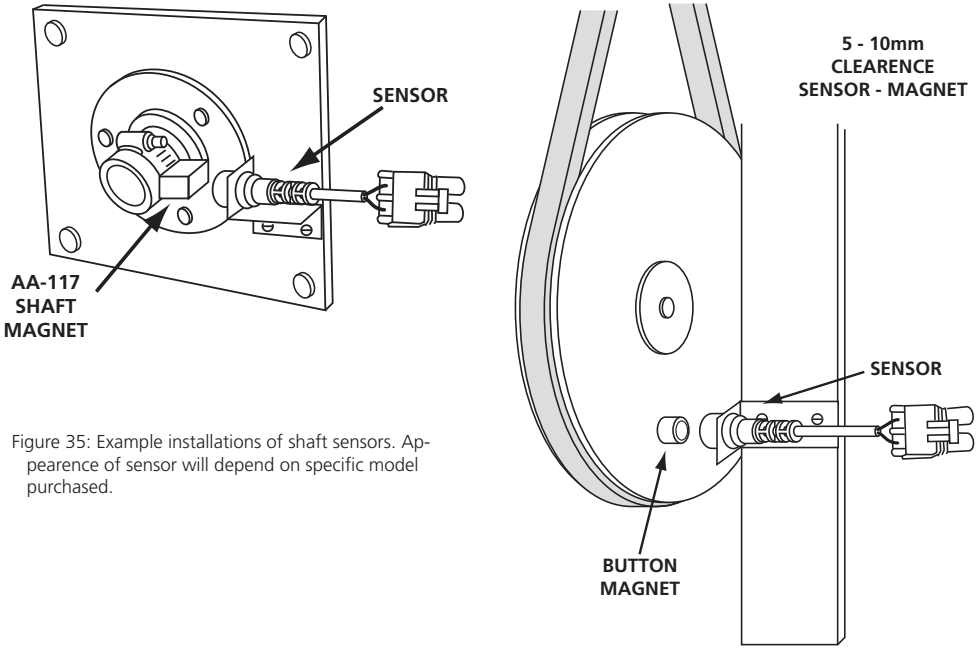


Figure 35: Example installations of shaft sensors. Appearence of sensor will depend on specific model purchased.

5.3. FLOW METER

The Jackal can be configured to monitor application rates of solid and liquid product, using a ***RATE*** input. If only one input is used the main screen will display as shown in Figure 36. The flow information can be displayed as L/min (or Gal/min), or, if also using ***SPEED*** and implement ***WIDTH*** information the Jackal can calculate L/Ha (or Gal/Ac).

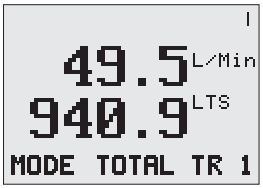


Figure 36: Example of main screen when configured as a Flow Meter

Flow monitoring can be used in conjunction with shaft ***RPM*** monitoring, ***SPEED*** information, bin / tank level ***ALARMS*** and ***PRESSURE*** or ***DEPTH*** monitoring.

5.3.1. SETUP PROCEDURE

1. Setup a ***RATE*** input as defined in section 4.1.4.
   a. If using a 'Coil' sensor ensure that input 1 is used as the ***RATE*** input as discussed in section 4.1.4.
2. Setup a ***SPEED*** input as defined in section 4.1.1
3. Exit input configuration using the **EXIT** softkey or cycling through all inputs using the **MENU** key.
4. When operating, main screen should display as described in Figure 36.

5.4. BATCH METER

When configured as a Batch Meter, as shown in Figure 37, the Jackal uses a flow sensor and solenoid valve to accurately meter liquid volumes. The output of the Jackal (Terminal B8 and B9) is suitable for direct connection to a 12 volt solenoid valve.

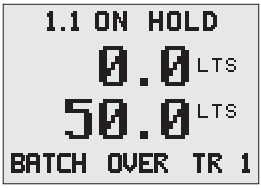


Figure 37: Example of main screen when configured as an Batch Meter

5.4.1. SETUP PROCEDURE

1. Main screen should display as shown in Figure 37. If anything else is displayed on the main screen, use the **MENU** and **NAV** keys inactivate all inputs ('NOT USED' displayed).
2. Calibrate the ***BATCH*** input as defined in section 4.1.3. Exit input configuration using the **EXIT** softkey or cycling through all inputs using the **MENU** key.
3. After the flow meter used has been calibrated use the **MENU** key to reenter the calibration screen.
4. ***AMOUNT*** now functions as the ***BATCH*** volume. Enter the desired amount using the **NAV** keys.
5. Main screen should display as shown in Figure 37 if the batch ***AMOUNT*** was 50L and Jackal is in ***HOLD*** mode (solenoid not activated).
6. Press **RUN/HOLD** to initiate batch. Batch amount should count down to zero.
7. When the batch amount approaches zero the Jackal will deactivate the solenoid output

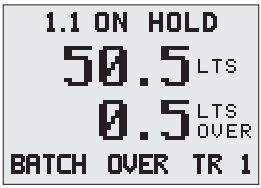


Figure 38: Example of Batch main screen when an overrun of 0.5L has occured

to stop the batch. Any excess to the batch ***AMOUNT*** is recorded in ***LTS OVER*** (***GAL OVER***) as shown in figure 38. Press and hold **OVER** until the Jackal beeps to update the compensation for valve turn off time.

8. Using the **TRIP** key, ten different series of batches can be separately totaled.

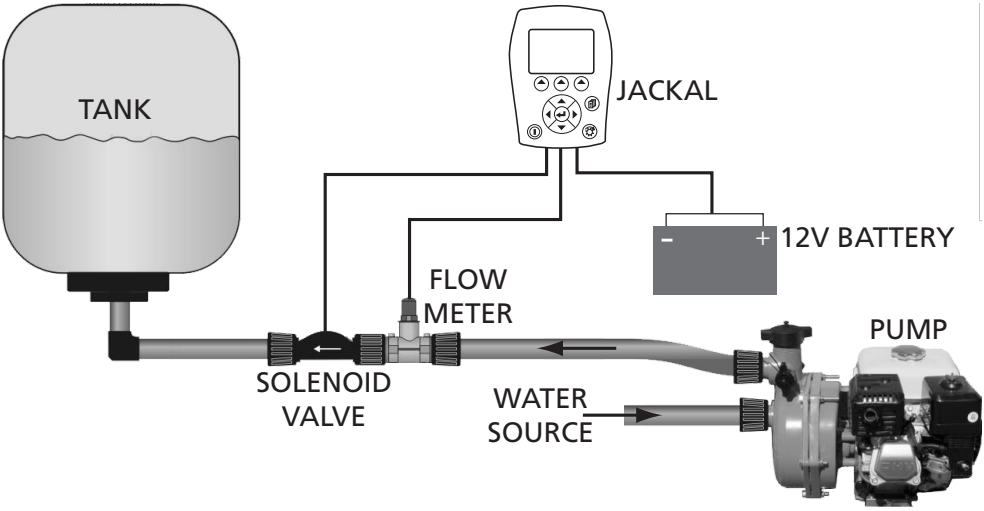


Figure 39: Example configuration of a Batch system using the Jackal.

5.5. AIRSEEDER SURVEILLANCE MONITOR

Two bin airseeders are a common unmonitored airseeder configuration. An example setup for such an airseeder is:

- 1 ***SPEED*** input
- 2 bin level ***ALARMS***
- 1 Fan ***RPM*** (coil sensor)
- 1 Air ***PRESSURE***
- 2 metering shaft ***RATE***s

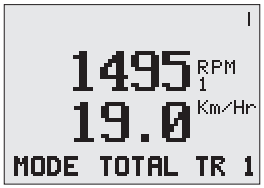


Figure 40: Example of main screen when configured as an Airseeder Surveillance Monitor

It is recommended that the user purchase a Farmscan Junction Box 2202 to minimise ease the connection requirements and minimise wiring confusion.

5.5.1. SETUP PROCEDURE

1. Ensure no inputs are active by cycling through all inputs using the **MENU** key. All inputs must display 'NOT USED'.
2. Decide on which sensors will be connected to which input.
   a. The input is important for both the type of sensor and the order of display. In this example the fan shaft ***RPM*** sensor must connected to **INPUT 1**, as it is a coil sensor. Therefore the fan ***RPM*** will always be displayed on the top line on the main screen. The user decides that they would like the second line of the main screen display

shaft ***SPEED*** and attaches the wheel sensor to **INPUT 2**. **INPUTS 3 AND 4** are used for ***RATE*** information. The ***RATE*** information the user is concerned with is kg/Ha of seed and fertiliser and therefore the relevant ***RATE*** input type is selected. The ***PRESSURE*** sensor is connected to **INPUT 7**. Bin level ***ALARM*** sensors are connected to **INPUTS 9 AND 10** and appropriate ***DISPLAY*** names are entered ("ALARM 1" and "ALARM 2"). As alarms are only displayed when triggered, and are displayed on all operational screens (i.e. not input calibration, trip, total and system menu screens) their order of connection does not affect display of other information.

3. Setup fan ***RPM*** in input 1, as described in section 4.1.2.
4. Setup metering shaft ***RATE*** monitoring in inputs 3 and 4, as described in section 4.1.2.
5. Setup Tank level ***ALARMS***, as described in section 4.3.
6. Setup Fan air ***PRESSURE*** sensor, as described in section 4.2.1 (requires extra air pressure gauge to calibrate).
7. Calibrate the ***SPEED*** input (either ***WHEEL*** or ***GPS***) as defined in section 4.1.1 (requires driving a known distance).
   - ***SPEED*** input is calibrated last as all other inputs can be configured while the vehicle is stationary.
8. Exit input configuration using the **EXIT** softkey or cycling through all inputs using the **MENU** key.
9. Main screen should display as described in Figure 40.
10. Cycle through the information using the **MODE** key. The series of screens should display as described below in Figure 41.
11. An example of ***TOTAL***s, ***TRIP 1*** and ***TRIP 2*** (current) for the described Airseeder configuration is shown in Figure 38.
12. Pressing **RUN/HOLD** will stop the accumulation of ***TOTAL***s but will continue live information readout.

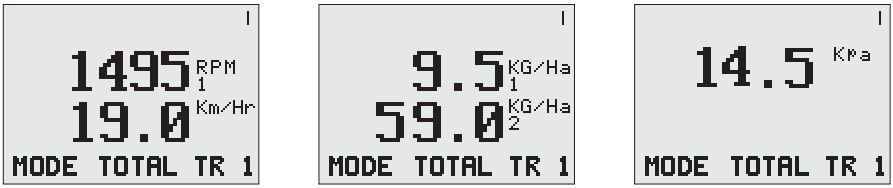


Figure 41: Example of main screen and secondary information screens as the **MODE** button is pressed when configured as an Airseeder monitor as described in this section

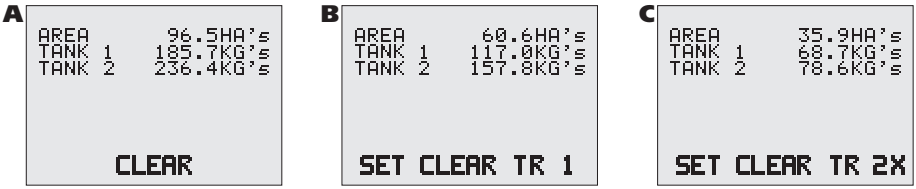


Figure 42: Example of the **TOTAL** (A), ***TRIP 1*** (B) and ***TRIP 2*** (currently active trip, indicated by the X) screens for the Example Airseeder configuration

6. SENSOR INSTALLATION

Most Farmscan sensor wires have a common color code system:

WHITE	SIGNAL
BLACK	GROUND/EARTH (COMMON)
RED	+ 12V SUPPLY

Some sensors such as wheel sensors and shaft sensors only have two wires (signal and ground/earth). Other sensors that require +12 volts as well as signal and ground/earth will have 3 wires, such as flow sensors, bin level sensors and pressure sensors. All connections to the Jackal are provided via two 11 way terminals. The terminals are described in section 2.4.

6.1. SENSOR COMPATIBILITY CHART

Sensor Options		1007P	1009P	1010	1501	2034	2076	2077	2202	A-2220P	A-2080P	AA-2009P	AA-122P	AA-1 25	AA-242	AA-230	AA-210	AA-232	AA-231
Name	**Terminal**																		
Inputs																			
1	B1	•	•	•		•	•	•				•	•	•	•		•		•
2 – 6	B2 – B6	•	•				•					•	•	•	•	•		•	
7 – 8	A7 & B7										•								
9 – 12	A3 – A6							•	•										
Output																			
1	B8				•														

6.2. COMPATIBLE SENSOR KITS

There are a range of separate sensor kits available for the Jackal. Below is a list and brief description of these kits.

Part #	Description	Kit Parts	Possible additional parts	Compatible Inputs
1007P	Wheel sensor kit	AA-110P x 1 AA-133 x 1	AC-200 AC-205	Input 1-6 (B1-B6)
2002	Wheel sensor kit			Input 1-6 (B1-B6)
1009P	Tail shaft sensor kit (Slow speed 1-1500 RPM)	AA-423 x 1 AA-110P x 1		Input 1-6 (B1-B6)
1010	Tail shaft sensor kit (High speed 100-9999 RPM)	AA-423 x 1 AA-112P x 1		Input 1 (B1)
1501	Solenoid Shutdown Kit	AH-488 x 1 AC-208 x 1 M/F Packard's		Output 1 (B8)
2034	Pulley Sensor kit (High speed 100-9999 RPM)	AA-105 x 1 AA-112P x 1		Input 1 (B1)
2076	Shaft sensor kit (Slow speed 1-1500 RPM)	AA-117 x 1 AA-110P x 1		Input 1-6 (B1-B6)
2077	Shaft sensor kit (High speed 100-9999 RPM)	AA-117 x 1 AA-112P x 1		Input 1 (B1)
2202	Remote junction box kit			
A-2060	Bin/Tank level sensor kit	A-2220P AC-300	AC-300 AC-305	Input 9-12 (A6-A3)
A-2080	Airflow pressure sensor	A-2030 AC-300		Input 7-8 (A7&B7)
AA-2008P	Proximity sensor kit - Blue			Input 1-6 (B1-B6)
AA-2009P	Proximity sensor kit - Brown			
AA-122P	2-90 l/min 1' Flow meter			
AA-125	1-18 l/min Flow meter			
AA-242	2.5-75 l/min Flow meter			
AA-230	10-100 l/min 1' Rapid check Flow meter			
AA-232	35-350 l/min 1 ½' Rapid check Flow meter			
AA-210	35-350 l/min 1 ½' Coil flow sensor			Input 1 (B1)
AA-231	75-750 l/min 2' Coil flow sensor			

6.3. INSTALLING SENSOR KITS

6.3.1. TWO WIRE 'REED' SENSOR KITS

This section applies to the following sensor kits:

1007P, 1009P, 2076

These kits will all include a 'reed' type sensor. The reed type sensor is a 2 wire sensor and only uses a ground/earth wire and a signal wire. Figure 43 shows which terminals to connect your sensors to. If the ground/earth (A1) terminal already has a wire from another sensor applied to it then you will need to piggy back onto this wire. If the signal port has wires from another sensor applied to it then move to one of the ports shown that is free.

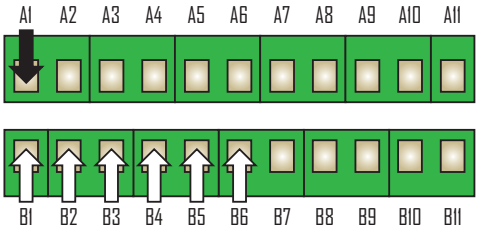


Figure 43: Jackal ports capable of accepting 2 wire 'Reed' sensor inputs. Black is ***GROUND*** and white is ***SIGNAL***. NOTE: do not use any other Ground on the Jackal or vehicle for sensors.

See Section 4 for how to setup an input and calibrate a sensor once installed.

NOTE:

1. If you are intending to use a 'Coil' sensor do not use port B1
2. **DO NOT PIGGY BACK WHITE SIGNAL WIRES INTO SAME PORT**.
3. It is highly recommended that the ferrules, supplied with the Jackal kit, should be crimped to bare wire ends. This minimises chance of any stray wires bridging.

6.3.2. THREE WIRE 'REED' SENSOR KITS

This section applies to the following sensor kits:

AA-2008P, AA-2009P, AA-122P, AA-125, AA-242, AA-230, AA-232

These kits will all include a 'reed' type 'proximity' sensor. The proximity type sensor is a 3 wire sensor and use's a ground/earth wire, a signal wire and a 12V power wire. Figure 44 is a pictorial showing you where you can connect your sensors. If the ground/earth (A1) or regulated 12V power (OUT2, B9) terminal already has a wire from another sensor applied to it then you will need to piggy back onto this wire. If the signal port has wires from another sensor applied to it then move to one of the ports shown that is free.

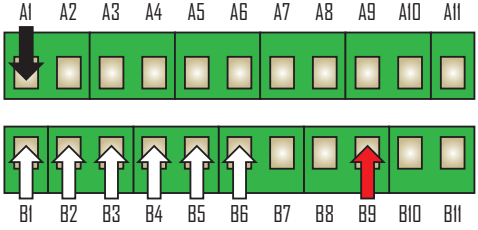


Figure 44: Jackal ports capable of accepting 3 wire 'Reed' sensor inputs. Black is ***GROUND***, Red is ***POWER*** and white is ***SIGNAL***. NOTE: do not use any other Ground or Power on the Jackal or vehicle for sensors

See Section 4 for how to setup an input and calibrate a sensor once installed.

NOTES:

1. **DO NOT PIGGY BACK WHITE SIGNAL WIRES INTO SAME PORT**.
2. It is also recommended that the ferrules supplied should be used to minimise chance of any stray wires bridging.

6.3.3. TWO WIRE 'COIL' SENSOR KITS

This section applies to the following sensor kits:

1010, 2034, 2077, AA-210, AA-231

These kits will all include a 'coil' type sensor. The coil type sensor is a 2 wire sensor and only use's a ground/earth wire and a signal wire. Figure 45 is a pictorial showing you where you can connect your sensors. If the ground/earth (A1) terminal already has a wire from another sensor applied to it then you will need to piggy back onto this wire. If the signal port has wires from another sensor applied to it then you will not be able to complete this application as there is only 1 coil port.

See Section 4 for how to setup an input and calibrate a sensor once installed.

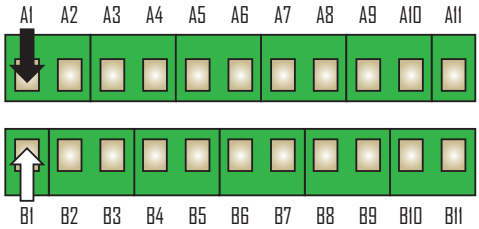


Figure 45: Jackal ports capable of accepting 2 wire 'Coil' sensor inputs. Black is ***GROUND*** and white is ***SIGNAL***. NOTE: do not use any other Ground on the Jackal or vehicle for sensors

NOTES:

1. **DO NOT PIGGY BACK WHITE SIGNAL WIRES INTO SAME PORT**.
2. It is highly recommended that the ferrules supplied should be used to minimise chance of any stray wires bridging. Bridging due to stray wires will cause false readings and can damage sensors.

6.3.4. THREE WIRE ANALOG SENSOR KITS

This section applies to the following sensor kits:

A-2080

These kits will include an analog sensor. The sensors use 3 wires sensor consisting of ground/earth wire, a signal wire and a 12V power wire. Figure 46 is a pictorial showing you where you can connect your sensors. If the ground/earth (A1) terminal or regulated 12V power (OUT2, B9) terminal already has a wire from another sensor applied to it then you will need to piggy back onto this wire. If the signal port has wires

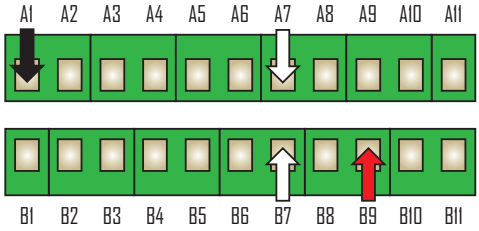


Figure 46: Jackal ports capable of accepting analog sensor inputs. Black is ***GROUND***, Red is ***POWER*** and white is ***SIGNAL***. NOTE: do not use any other Ground or Power on the Jackal or vehicle for sensors

from another sensor applied to it then move to one of the ports shown that is free.

See Section 4 for how to setup an input and calibrate a sensor once installed.

NOTES:

1. **DO NOT PIGGY BACK WHITE SIGNAL WIRES INTO SAME PORT**.
2. It is highly recommended that the ferrules supplied should be used to minimise chance of any stray wires bridging. Bridging due to stray wires will cause false readings and can damage sensors.

6.3.5. BIN / TANK LEVEL SENSOR KITS

This section applies to the following sensor kits:

A-2220P

These kits will include a Bin / Tank Level sensor. The sensors use 3 wires sensor consisting of ground/earth wire, a signal wire and a 12V power wire. Figure 47 is a pictorial showing you where you can connect your sensors. If the ground/earth (A1) terminal or regulated 12V power (OUT2, B9) already has a wire from another sensor applied to it then you will need to piggy back onto this wire. If the signal port has wires from another sensor applied to it then move to one of the ports shown that is free.

See Section 4 for how to setup an input and calibrate a sensor once installed.

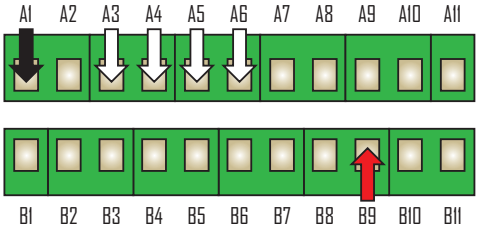


Figure 47: Jackal ports capable of accepting Bin / Tank Level sensor inputs. Black is ***GROUND***, Red is ***POWER*** and white is ***SIGNAL***. NOTE: do not use any other Ground or Power on the Jackal or vehicle for sensors

NOTES:

1. **DO NOT PIGGY BACK WHITE SIGNAL WIRES INTO SAME PORT**.
2. It is highly recommended that the ferrules supplied should be used to minimise chance of any stray wires bridging. Bridging due to stray wires will cause false readings and can damage sensors.

6.3.6. REMOTE RUN/HOLD KIT

This section applies to the following sensor kits:

A-xxxx

Figure 48 is a pictorial showing you where you can connect the external **RUN/HOLD** switch. If the ground/earth (A1) terminal already has a wire from another sensor applied to it then you will need to piggy back onto this wire.

See Section 4 for how to setup and calibrate the switch operation once installed.

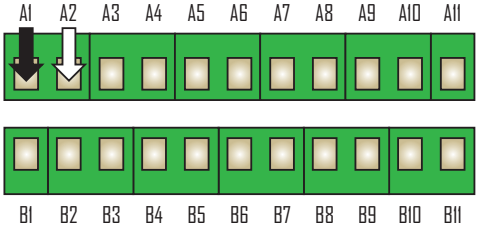
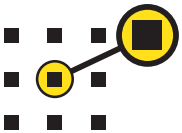


Figure 48: Jackal ports capable of accepting remote **RUN/HOLD** input. Input shown for remote **RUN/HOLD** switch.Example of main screen when configured as an Area Meter

FARMSCAN | jackal

one monitor,
many possibilities



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