

# INCA

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Design & Manufacture of:  
Custom-built switchboards  
Electronic control equipment  
AC/DC pumping controls  
Installation & service

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## **INCA MODEL**

### **PSJ2**

## **PRESSURE CONTROLLER**

### **USER MANUAL**

### **Inca Reference PSJ2**

**Software Version 1.0**

Technical Support  
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Drawing supplied separately

## 1.0 Control Panel Overview

### 1.1 Features

- JAZZ HMIPLC with user friendly setup & display
- Display of system pressure
- Low & high pressure pump shutdown with reset button
- Low level pump shutdown with automatic reset
- Manual/off/auto selectors on JAZZ Face
- Duty selector on JAZZ face
- Hour run meter (resetable)
- Mathematical calculation of Total flow in Kilolitres
- Microprocessor controlled
- Useable with any 4-20mA loop powered Pressure Transducer
- Usable with Irrigation controller input

### 1.2 Description

The pressure control panel is designed to maintain a system discharge pressure via adjustable control points entered by the operator. The display shows the actual live pressure input received from the system discharge pressure transducer. It also displays the pump operating condition & alarm conditions

#### User Interface

Display	An LCD screen displaying 2 lines of text, each 16 characters long
Keypad	Operator keyboard, 16 sealed membrane keys

#### Performance

Range	0 – 1000kpa generally, programmable to suit transducer range
Flow	Totaliser up to 32000 kilolitres

#### Inputs

2 wire plus shield connected to terminals located on panel base plate for pressure transducer.  
 2 wire plus earth connected to terminals for irrigation controller  
 2 wire connected to terminals for Low Level float switch

#### Outputs

Motors	3 wire plus earth sized to suit motor FLC connected directly to motor starters overload terminals.
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#### Power Supply

415V 3phase neutral & earth power supply sized to suit the total load of the three motor & must have a protection circuit breaker sized to suit the starting characteristics of the motor

#### Mechanical Specification

Enclosure	Mild steel powder coated RAL 7032 IP54 Stainless steel is available
Dimension	Up to 4kW 400Hx400Wx150D Larger motor sizes available Sizes may vary for specials
Pump Unit	See Pumping detail by Brooks Irrigation

#### Environmental Specification

Operating Temp	-10 to 50deg C
Relative Humidity	Do not install in areas of high humidity Locate control panel internally where possible to help reduce heat & weather damage & increase mechanical life.
Vibration	Do not install in a location that is subject to large amounts of vibration

## 2.0 Installation

**Note: If any damage to control panel is found, please notify your pump supplier or Inca Control as soon as possible prior to installation.**

The control panel can be wall mounted separately from the pumping unit; distance is governed by the cable sizing to the motor.

It is recommended that the control panel is within view of the pumping unit for safety reasons. If not in view lockable isolating switches must be installed at the pump motors

### 2.1 Mechanical Installation

Mount the control panel via the mounting holes in each corner at the back of the enclosure using minimum 6mm screws, nuts & locking washers, or masonry anchors

Install in a dry well ventilated location that matches with environmental specification in 1.2 above

### 2.2 Sensor Installation

Locate the pressure transducer in the discharge pipe work as close as practical to the control panel.

### 2.3 Electrical Installation

**Note: All cable entries must enter via the bottom of the cabinet. If cables are entered via the roof Inca Control Pty Ltd reserve the right to withdraw warranty because of the possibility of shaving entering sensitive electronic equipment.**

#### Transducer wiring

The pressure transducer must be wired in 1 pair overall screened data cable. This type of cable provides the most protection against electrical noise & allows a more accurate outcome

Connect to the sensor as per data supplied by the sensor supplier

At the control panel connect the positive lead to terminal No10 & the return signal to terminal No12.

The screen must be solidly earthed, with a saddle clamp providing the best screening earth.

#### Float switch wiring

The float switch is wired in the cable supplied with switch. The cable to be connected must close the circuit when water in the suction tank falls

Connect the float switch as per data supplied by the float switch supplier

At the control panel connect the float switch lead to terminal No10 & terminal No11.

The screen must be solidly earthed, with a saddle clamp providing the best screening earth.

#### Irrigation control wiring

The control signal from the irrigation controller operates the pumps start signal & must be 24VAC or DC signal on to start pump & 24VAC/DC signal off to stop pump

At the control panel connect the 24VAC/DC Irrigation control signal directly to the coil on relay R1 at the base of the control panel. Active lead to terminal No A1+ & the negative to terminal A2-.

#### Motor Wiring

The motor must be wired in cabling sized to suit the motor power requirement.

The motor is to be connected in star or delta as instructed by the nameplate on the motor.

The cabling entering into the motor terminal box shall be glanded unless a submersible motor is being used in this case the pump lead is supplied by the pump manufacturer

The cable entering the control panel end can be glanded using standard nylon glands & run directly to the appropriate overload terminals T1, T2, T3

### 2.4 Maintenance

Check that all connections are tight as copper is soft & can work loose

Check that all controls are functioning as intended

## 3.0 Start up

### 3.1 Notes on Value Entry

When entering a numeric value, the cursor can be backspaced to correct mistakes by pressing the LEFT ARROW button.

Decimal points can only be entered on entries with decimal points in the display line. The decimal point is entered by pressing the +/- . down arrow key on the bottom of the blue buttons

You can only enter a value of as many digits as is displayed on the screen. Example an input that displays 3 digits can only have 3 digit entered

### 3.2 Power Up Display

On power up the screen will display the main page including the pressure, switch position & operating information.

### 3.3 Screen Display Layout

The screen displays two lines of information

- The top line displays the live discharge pressure in kPa
- The bottom line displays the manual/off/auto switch position & operating condition of the pump

## 4.0 Calibration

The calibration of the controller is carried out on pages accessed by pressing & holding in the RIGHT ARROW Button for 5seconds. The first calibration page will appear. You can move through the calibration pages by pressing the RETURN ARROW button & then the RIGHT ARROW button to move on. Continuing this process will move you through the pages with out making any changes. If changes are made the inputted value is recorded once the enter button has been pressed. The enter button is the return arrow located at the bottom right corner of the facia. To get out of calibration pages press the RETURN ARROW button twice & return to the main page.

### 4.1 Setting Low Pressure Shutdown

Press & hold the RIGHT ARROW button for 5seconds to enter calibration pages. Low pressure on will now be displayed.

The Cursor will be flashing under the first digit of the LOW PRESSURE ON setting. Simply type in the appropriate pressure you want the low pressure shutdown to operate at, example 200kPa Press 2, press 0, press 0 & then press Return Arrow button.

Press the RIGHT ARROW Button to move onto the next Page

### 4.2 Setting Low Pressure Time Delay

Low pressure time delay will now be displayed.

The Cursor will be flashing under the first digit of the LOW PRESSURE TIME DELAY setting. Simply type in the appropriate delay time you want after the low pressure set point has been reached, example 45sec Press 0, press 0, press 4, Press 5, & then press Return Arrow button.

Press the RIGHT ARROW Button to move onto the next Page

### 4.3 Setting High Pressure Shutdown

High pressure on will now be displayed.

The Cursor will be flashing under the first digit of the HIGH PRESSURE ON setting. Simply type in the appropriate pressure you want the High pressure shutdown to operate at, example 800kPa Press 8, press 0, press 0 & then press Return Arrow button.

Press the RIGHT ARROW Button to move onto the next Page

### 4.4 Setting High Pressure Time Delay

High pressure time delay will now be displayed.

The Cursor will be flashing under the first digit of the HIGH PRESSURE TIME DELAY setting. Simply type in the appropriate delay time you want after the High pressure set point has been reached, example 45sec Press 0, press 0, press 4, Press 5, & then press Return Arrow button.

Press the RIGHT ARROW Button to move onto the next Page

### 4.5 Duty Pump Start Pressure

Duty pressure on will now be displayed.

The Cursor will be flashing under the first digit of the DUTY PRESSURE ON setting. Simply type in the appropriate pressure you want the Pump start pressure to operate at, example 400kPa Press 4, press 0, press 0 & then press Return Arrow button.

Press the RIGHT ARROW Button to move onto the next Page

### 4.6 Duty Pump Off Pressure

Duty pressure off will now be displayed.

The Cursor will be flashing under the first digit of the DUTY PRESSURE OFF setting. Simply type in the appropriate pressure you want the Pump stop pressure to operate at, example 500kPa Press 5, press 0, press 0 & then press Return Arrow button.

Press the RIGHT ARROW Button to move onto the next Page

### 4.7 Standby Pump Start Pressure

Duty pressure on will now be displayed.

The Cursor will be flashing under the first digit of the STANDBY PRESSURE ON setting. Simply type in the appropriate pressure you want the Pump start pressure to operate at, example 400kPa Press 4, press 0, press 0 & then press Return Arrow button.

Press the RIGHT ARROW Button to move onto the next Page

### 4.8 Standby Pump Off Pressure

Duty pressure off will now be displayed.

The Cursor will be flashing under the first digit of the STANDBY PRESSURE OFF setting. Simply type in the appropriate pressure you want the Pump stop pressure to operate at, example 500kPa Press 5, press 0, press 0 & then press Return Arrow button.

Press the RIGHT ARROW Button to move onto the next Page

#### 4.9 Pressure Sensor Calibration

Calibrate Sensor will now be displayed.

The Cursor will be flashing under the first digit of the CALIBRATE SENSOR setting. Simply type in the 20mA scale of the pressure transducer to be used, example 1000kPa (10bar) Press 1, Press 0, press 0, press 0 & then press Return Arrow button.

Press the RIGHT ARROW Button to move onto the next Page

#### 4.10 Total flow Setting Pump No1

Litres per second will now be displayed.

The Cursor will be flashing under the first digit of the LITRES PER SECOND P#1 setting. Simply type in the flow rate of the pump delivery, example 10l/s Press 1, press 0 & then press Return Arrow button.

With this setting, the JAZZ HMIPLC will display a mathematical calculation of total flow in kilolitres. (Flow is reset to zero when 32000k/l is displayed)

Press the RIGHT ARROW Button to move onto the next Page

#### 4.11 Total flow Setting Pump No2

Litres per second will now be displayed.

The Cursor will be flashing under the first digit of the LITRES PER SECOND P#2 setting. Simply type in the flow rate of the pump delivery, example 10l/s Press 1, press 0 & then press Return Arrow button.

With this setting, the JAZZ HMIPLC will display a mathematical calculation of total flow in kilolitres. (Flow is reset to zero when 32000k/l is displayed)

Press the RIGHT ARROW Button to move onto the next Page

#### 4.12 Irrigation Controlled

Irrigation will now be displayed.

The Cursor will be flashing under the digit identifying on or off.

If selected to ON, pump will only run in auto when a 24VAC/DC input has been received from the irrigation controller. The pump will then be controlled via the duty pressure on & off settings

If selected to OFF, the pump will run via the duty pressure on & off settings.

To select the Irrigation control enter 1 in the & status Press Return Arrow to accept

To select NO irrigation control enter 0 in the status & press return arrow to accept

Press the RIGHT ARROW Button to move onto the next Page

#### 4.13 Reset Hours run meter

Reset Hours run meter will now be displayed.

To reset the hour meter press & hold #5 button for 5second. There will be no change on the screen so you will need to check that the reset has been achieved

Press the RETURN ARROW Button to move back to the main page

#### 4.14 Total Flow displays

The JAZZ HMIPLC has a mathematical display of total Flow. This flow is calculated using the litre/second rate of the pump which is set in 4.10 & 4.11 above.

To access the total flow meters, from the main page press the ARROW UP button. The total flow for Pump No1 is now displayed.

Press the ARROW UP button again will display the total hours run for pump No1

Press the ARROW UP button again will display the total flow for pump No2

Note, Total flow before display returns to zero is 32000k/l

#### 4.15 Pump Hours run meter

The JAZZ HMIPLC has a pump hour's run display.

To access the total hours run meter for pump No1, from the main page press the ARROW UP button. The total flow for Pump No1 is now displayed. Press the ARROW Up button again the total hour run meter for Pump No1 will now be displayed

Press the ARROW UP button again will display the total flow for pump No2

Press the ARROW UP button again will display the total hours run for pump No2

Note, Total hours run before display returns to zero is 32000Hours.

To reset the hour meter press & hold #5 button for 5second.

## 5 Operation

### 5.1 System Operation

The system is designed to maintain a pressure in the discharge line of a pumping system relating to the settings entered by the operator. The pump will start when the pressure falls to the duty start set point & will run until the pump stop set point is reached

If the pressure continues to fall & reaches the standby start pressure the standby pump will be started & will run until the standby stop pressure has been reached

If the irrigation input signal is to be used the pump will not operate until this signal is on and will then operate between the start & stop set points.

If the system pressure falls to the low set point for an adjustable time period the pump will be locked out until manually reset.

If the pressure continues to rise to the high pressure set point for an adjustable time the pump will be locked out until manually reset

If a low level float switch is connected & closes this input the pump will be shutdown until the level rises to reset the float switch & automatically restart the pump

### 5.2 Manual/Off/Auto Selector Switches

Each pump has a Manual/Off/Auto selector switch. Each function of the switch is selected by touching on the appropriate button on the JAZZ facia.

**Manual** Touching the MAN button will turn the pump on continuously

**Off** Touching the OFF button will turn the pump off.

**Auto** Touching the AUTO button will select the pump on automatic & is then controlled via the set points within the JAZZ HMIPLC

### 5.3 Duty Selector (P1 / AUTO / P2) Switch

The panel has a Pump 1/Auto/ Pump2 selector switch. Each function of the switch is selected by touching on the appropriate button on the JAZZ facia.

**P1** Touching the P1 button will select Pump No1 to be duty & Pump No2 to be standby continuously

**Auto** Touching the AUTO button will allow the pumps to automatically alternate.

**P2** Touching the P2 button will select Pump No2 to be duty & Pump No1 to be standby continuously



## 6 Trouble Shooting

Condition	Do This
1. Unit does not power up.	Check that power supply is on to panel and isolator is on. Check that control circuit breaker is on.
2. PLC Controller does not power up but power is on.	Check that 24VDC power supply is operating, & power supply plug on PLC controller is fully inserted.
3. Pump does not run but Starter is operating.	Check that all pump circuit breakers are on
4. Pump Fail displayed on screen.	Reset pump overload by pressing overload reset button on to of overload. If problem continues call for service
5. System Produces a Low Pressure shutdown.	Press the reset button & allow system to re-pressurize. If problem continues call for service.
6. System Produces a High Pressure shutdown.	Press the reset button & allow system to re-pressurize. If problem continues call for service.
7. Pressure displaying a negative value.	Pressure transducer has open circuit 4-20mA loop or is faulty. Check pressure transducer cabling connections, replace transducer with the same unit or call for service

## 7 Controller settings sheet

Parameter	Description	Factory settings	User Setting
Low pressure Shutdown	Pressure at which pumps are shutdown for low discharge pressure	100kPa	
Low pressure Timer	Time delay before pump shuts down	5sec	
High pressure Shutdown	Pressure at which pumps are shutdown for high discharge pressure	600kPa	
High pressure Timer	Time delay before pump shuts down	5sec	
Duty Pump on	Duty Pump start set point	400kPa	
Duty Pump off	Duty Pump stop set point	500kPa	
Standby Pump on	Standby Pump Start set Point	350kpa	
Standby Pump off	Standby Pump Stop Set Point	500kpa	
Sensor calibration	Sensor 100% (20mA) Pressure	1000kpa	
Litres per second Pump No1	Pump No1 output in litre per second for total flow calculation	4l/s	
Litres per second Pump No2	Pump No2 output in litre per second for total flow calculation	4l/s	
Irrigation Control	Irrigation control (1) or pressure only control (0)	0	

## 9.0 Warranty Statement

The Products manufactured by Inca Control Pty Ltd is guaranteed against faulty workmanship for a period of 12months from the date of delivery.

Our obligation assumed under this guarantee is limited to the replacement of parts which, by our examination are proved to be defective & have not been misused, carelessly handled, defaced or damaged. This guarantee is VOID where the purchaser has modified or repairs have been made or attempted by anyone except an authorised representative of Inca Control Pty Ltd.

Products for attention under guarantee (unless otherwise agreed) must be returned to the factory freight paid and, if accepted for free repair, will be returned to the customers address in Australia free of charge.

Equipment supplied by Inca Control Pty Ltd, but manufactured by others is covered by their manufacturers warranty only.

When returning the product for service or repair, a full description of the fault must be given and the mode of operation used when the product failed.

In addition to the above, equipment manufactured, installed & commissioned by Inca Control Pty Ltd, within the Sydney Metropolitan Area, includes onsite replacement.

In any event Inca Control Pty Ltd has no other obligation or liability beyond replacement or repair of this product.

### NOTES: