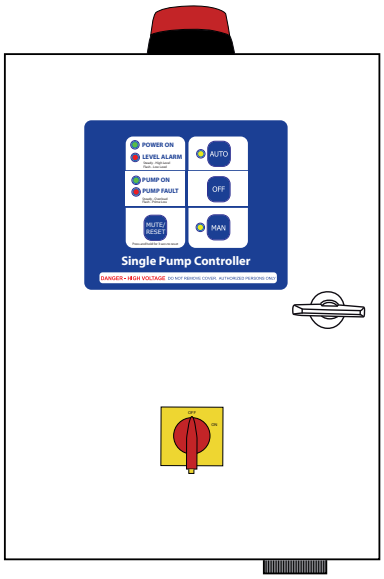
Single Pump Controllers

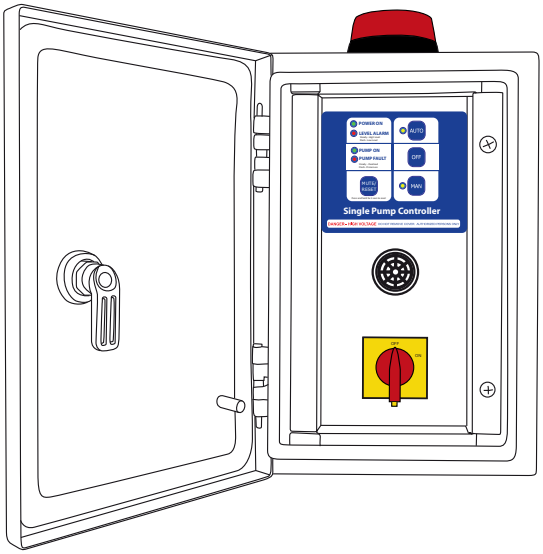
Section 2

Selecting Your Controller

1. Do I need to control a 1 phase or a 3 phase pump?
2. What is the 'full load current' rating of the pump in amps?
3. Do I want to 'direct switch' the single phase pump (8Amps max) or do I want to switch it through a contactor and an overload?
4. What type of enclosure do I require; with inner door, or with the controls on the external door?
5. Do I require BMS ouputs for remote monitoring?
6. Do I require a Remote Status Indicator for remote pump station status indication?

Once the above questions have been answered, selecting a product from our standard range will be easy.





The Range

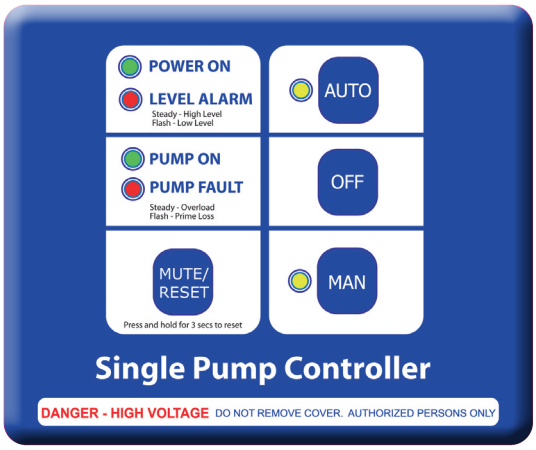
Product Code	Voltage Rating	Contactor Rating	Overload Rating	Enclosure Type *
FPC-15000	240Vac	N/A	N/A	201
FPC-15002-AA	240Vac	18Amp	1.6 - 2.5Amp	102
FPC-15002-A	240Vac	18Amp	2.5 - 4Amp	102
FPC-15002-B	240Vac	18Amp	4 - 6Amp	102
FPC-15002-C	240Vac	18Amp	7 - 10Amp	102
FPC-15002-D	240Vac	18Amp	9 - 13Amp	102
FPC-15002-E	240Vac	18Amp	12 - 18Amp	102
FPC-15005-AA	240Vac	18Amp	1.6 -2.5Amp	103
FPC-15005-A	240Vac	18Amp	2.5 - 4Amp	103
FPC-15005-B	240Vac	18Amp	4 - 6Amp	103
FPC-15005-C	240Vac	18Amp	7 - 10Amp	103
FPC-15005-D	240Vac	18Amp	9 - 13Amp	103
FPC-15005-E	240Vac	18Amp	12 - 18Amp	103
FPC-15006-AA	415Vac	18Amp	1.6 -2.5Amp	102
FPC-15006-A	415Vac	18Amp	2.5 - 4Amp	102
FPC-15006-B	415Vac	18Amp	4 - 6Amp	102
FPC-15006-C	415Vac	18Amp	7 - 10Amp	102
FPC-15006-D	415Vac	18Amp	9 - 13Amp	102
FPC-15006-E	415Vac	18Amp	12 - 18Amp	102
FPC-15007-AA	415Vac	18Amp	1.6-2.5Amp	103
FPC-15007-A	415Vac	18Amp	2.5 - 4Amp	103
FPC-15007-B	415Vac	18Amp	4 - 6Amp	103
FPC-15007-C	415Vac	18Amp	7 -10Amp	103
FPC-15007-D	415Vac	18Amp	9 - 13Amp	103
FPC-15007-E	415Vac	18Amp	12 - 18Amp	103

* Please Note: Refer to Section 5 of this document for Enclosure Specifications

Common Features

"One Controller.....All Applications"

Building on the success of the FPC-150 Series Single Pump Controller, the new FPC-150-Advanced version, further enhances the ***"One controller does it all"*** concept, while at the same time, makes "simplicity of operation" even more user friendly. Although many unique features of the controller are common to all pumping applications, a number of "system specific" optional features, can be enabled or disabled at the flick of a dip switch.



Applications

- Submersible Sewage
- Submersible Storm Water
- Constant Pressure Systems
- Hot Water Circulation Systems
- Transfer Pumping Systems

Common Features

Hardware

- Advanced Micro Processor Control Module
- Circuit Breaker protected Low Voltage Control and input Circuitry
- Lockable Main Isolator
- Individual Pump Isolation
- Auto/Off/Manual Operation of Pump
- Thermal Overload Protection of Pump Motor*
- Visual and Audible Alarms c/w Mute Switch
- LED Indicator Lights for System Status indication
- IP 65 Weather Proof, Powder Coated Metal Enclosures c/w removable gland plate
- User friendly, clearly labelled, Din Rail mounted, Input and Output Terminal Connection
- Individually Serial Numbered and logged for traceability and product support
- Owner/Operator, Installation and Operation Manual supplied with each controller

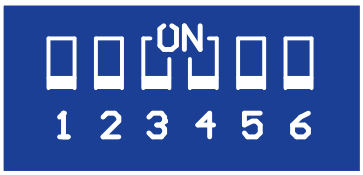
Function

- Provision for 4 digital + 1 Analogue input (typically Low Level, Stop, Start and High Level)
- Delayed Start and Minimum Run Time Feature
- Maximum Idle Time Feature, for "pump out" of residual in Pump Well situations
- Anti Seize/Freeze feature, for Low Use and Seasonal Pumping applications
- Smart "Auto Silencing" and "Chirp Mode" audible Alarm
- Optional "Time Out" on Manual Pump Mode automatic reset to Auto
- Lamp, Strobe and Buzzer Test button
- No Flow/Pressure - Inbuilt Timer feature
- Level Alarm Delay feature avoiding nuisance tripping
- Interconnectable with **Remote Status Indicator** panel, via simple data connection **(see Section 3)**
- Interconnectable with **Building Monitoring System** Module, via simple data connection **(see Section 3)**

Operation

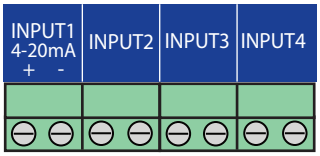
This controller can perform control functions for most Single Pump pumping applications. It is more than likely that the control parameters have already been set up for your particular application however; hereunder you will find details of the set up and configuration options.

There are six DIP switches located on the lower side of the control module (diagram), which allows for selecting "mode" and "feature" options, as per the following table:



DIP Switch	Position	Function
1/2	Off/Off	Mode A: Standard typical float switch configuration (Start, Stop and High level).
	Off/On	Mode B: Standard configuration plus Low level (Start, Stop, High level and Low level).
	On/Off	Mode C: Standard configuration plus Prime Loss enabled, on Low level (Input 1)
	On/On	Mode D: Pressure Pumping configuration (Lead, Lag and Low pressure)
3	Off	N/A. For Dual situations only
4	Off	Anti-seize timer disabled
	On	Anti-seize timer 10 seconds every 7 days enabled
5	Off	When placed in Manual mode, pump remains in Manual mode
	On	When placed in Manual mode, after 5 minutes the pump will revert to Auto
6	Off	High Level alarm Automatically resets upon open circuit of high level input. High level alarm has 15 Minute delay
	On	High level alarm can only be reset Manually. High level alrm has 5 minute delay

Table 1: Mode switch settings and descriptions



Mode A: Standard Configuration

Start/Stop/High level operation. When the pump start input is closed contact (triggered), the duty pump will be turned on . The pump will remain on until both the pump start and pump stop inputs have turned off (open circuited). Upon high level the pump will run until the pump stop input turns off.

In addition to this, there is a maximum idle timer, which will trigger a pump start condition, if the pump has not run for 4 hours, and the stop flow contacts are closed, the pump will continue to run until the stop float contacts open. Input functions are as per table (right)

Input	Function
Input 1	Not used
Input 2	Pump Stop
Input 3	Pump Start
Input 4	High Level

Mode B: Standard Configuration plus Low Level Alarm

As per Mode A, except it has an active Low Level input. The low level input must be closed for pump start and pump stop inputs to function. The High level input however, will still overide the Low level and run the pump. Input functions are as per table (right)

Input	Function
Input 1	Low Level
Input 2	Pump Stop
Input 3	Pump Start
Input 4	High Level

The basic logic on which a High Level Alarm is determined, is set out in the Table A

Table A

Input 1	Input 2	Input 3	Input 4		
Low Level	Pump Stop	Pump Start	High Level	Pump State	Alarm
Closed	Open/Closed	Open	Open	Off	-
Closed	Open/Closed	Closed	Open	On	-
Closed	Open/Closed	Closed	Closed	On	High level (after timeout)
Closed	Open/Closed	Open	Closed	On	High level (after timeout)
Open	Open/Closed	Open	Open	Off	-
Open	Open/Closed	Closed	Open	Off	Low level
Open	Open/Closed	Open	Closed	Off	Low level
Open	Open/Closed	Closed	Closed	On	High level (after timeout)

If there is a low level alarm then the pump will be locked out until the alarm is manually reset. This lockout will only be overridden upon a high level condition where both the Pump Start and High Level inputs are closed.

Note that after high level is triggered, the pump will run until the pump Start and Stop inputs are opened.

Mode C: Standard Configuration plus Prime Loss

As per Mode A, except Input 1 is connected to a prime loss pressure/flow switch. If at any stage, after pump start or whilst the pump is running, the prime loss input opens, for a continuous 2 minute period, a fault is immediately triggered for the pump and the pump is depowered. Input functions are as per table (right)

Input	Function
Input 1	Prime Loss
Input 2	Pump Stop
Input 3	Pump Start
Input 4	High Level

Mode D: Pressure Pumping Configuration

Input functions are as follows:

Input	Function
Input 1	Not used
Input 2	Workin Level pressure switch (set at say 400kPa)
Input 3	Not Used
Input 4	Low pressure switch (set at say 200kPa)

Typical operation for Mode D

- Pressure drops to 400kPA. Pump cuts in.
- Pressure increases and Pump cuts out
- Cycle continues
- The controller has inbuilt timers for "Delayed" Start and Stop to obviate pump chatter. Upon Input 1 contact closure, the pump will not start (delay start) for 1 second and will not stop (minimum run time) for 20 seconds (or 21 seconds from close of Input contacts). This "run on" occurs even if Pressure switch contacts open during this initial period. If however run time exceeds 21 seconds, the pump will stop immediately upon "open circuit" occuring.
- If the Pressure Switch Input closes circuit as well as the Low Pressure Switch Input, a low pressure timer will begin counting. If this condition exists for a period of 60 seconds, then both pumps are shut down and the system signals a level alarm. this would be typical of a Loss of Prime or Burst Main situation
- Pressure switches are normally closed and open on High pressure

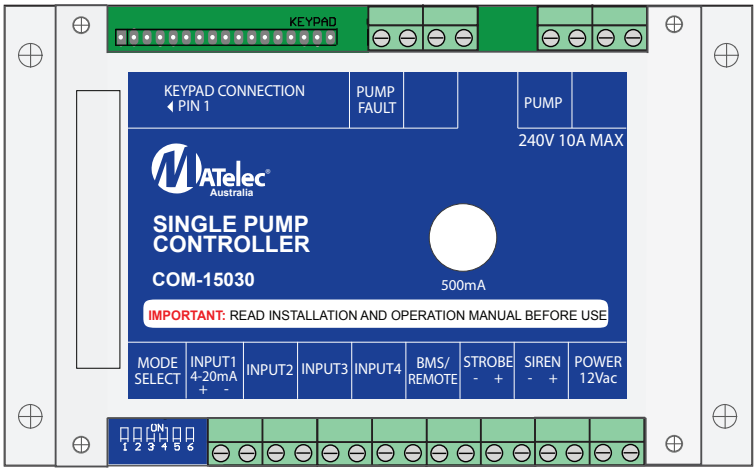
Operating Data

Anti-Seize Timer

With **DIP Switch 4** set to "On", the Anti-Seize timer will automatically run the pump for 10 seconds, every 7 days. this pump operation will completely overide all inputs including the low level (if enabled). This feature will only run pump that are set in Auto. A pump that has been locked out due to a fault will not run.

Manual Mode Timeout

With **DIP Switch 5** set to "On", the pump will only remain in Manual Mode for 5 minutes, after which time it will automatically revert to Auto.



FPC-150 Series Module

High Level Alarm Reset

With **DIP Switch 6** set to "Off", the High Level Alarm will automatically reset once the high level input opens circuit. The controller will also use the alternate high level alarm delay. Typically used for Storm Water applications. High Level Alarm delay in this mode is 5 minutes.

Setting this DIP Switch to "On", will cause the High Level Alarm to remain active until the controller is reset. The High Level Alarm will use the standard High Level Alarm activation delay. Typically used for Sewerage applications. High Level Alarm delay in this mode is 5 minutes.

Audible and Visual Alarm Test

By pressing the **Mute/Reset** button on the keypad continuously for a period of 5 seconds, the Strobe, Siren and Indicator Lights will be powered up for inspection.

Fault Reset

To reset all faults on the controller, press and hold the **Mute/Reset** button on the keypad continuously for a period of 3 seconds until an acknowledgement beep is heard.

Pump Fault

A Pump Fault is indicated for two types of faults. A Thermal Overload will be indicated by way of a steady Fault Indicator light. A Prime loss fault will be indicated by way of a flashing Fault Indicator light. Both types of faults can be reset by way of the Fault Reset button.

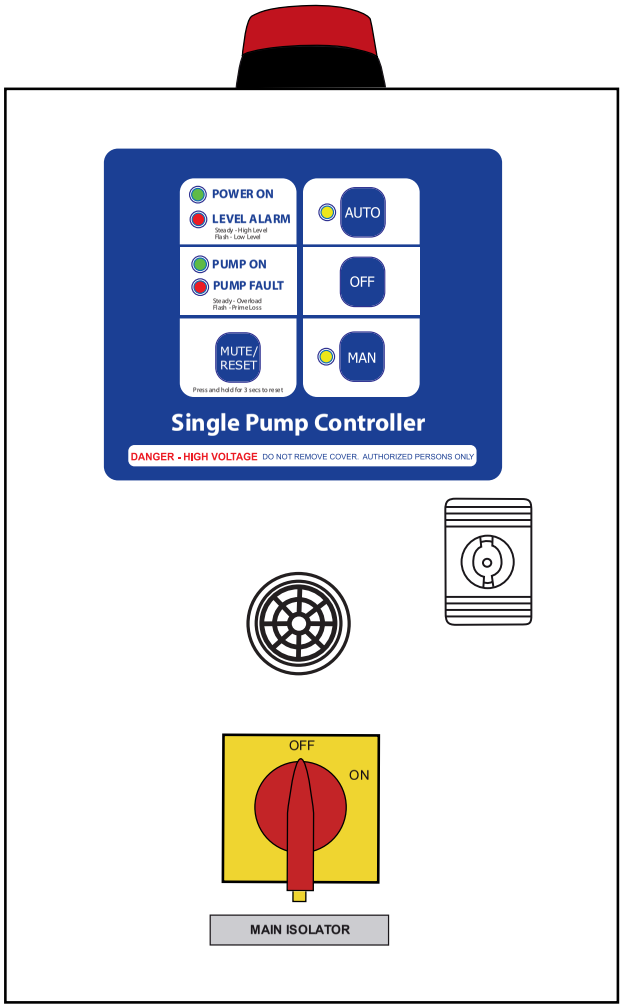
Level Alarms

A High Level Alarm is indicated by way of a steady Level Alarm Indicator light.
A Low Level/Low Pressure Alarm is indicated by way of a Flashing Level Alarm light.

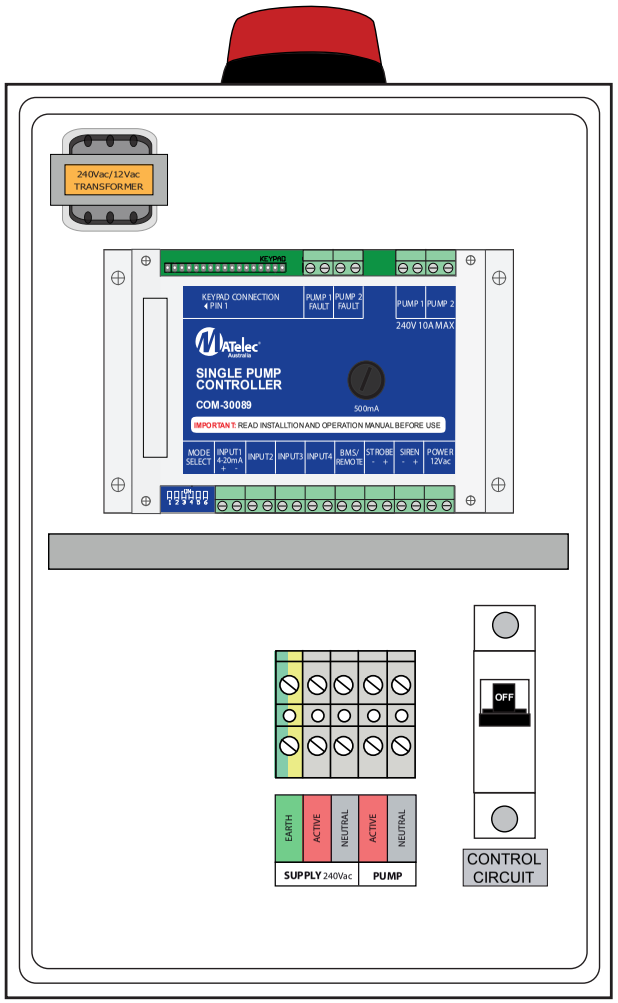
Auto Silencing Alarm Feature

The Audible Alarm is programmed to sound for 5 minutes continuously, unless muted, and will thereafter automatically silence and enter "Chirp" mode. In Chirp mode the Audible Alarm will sound briefly (2 seconds) every 5 minutes.

Model FPC-15000

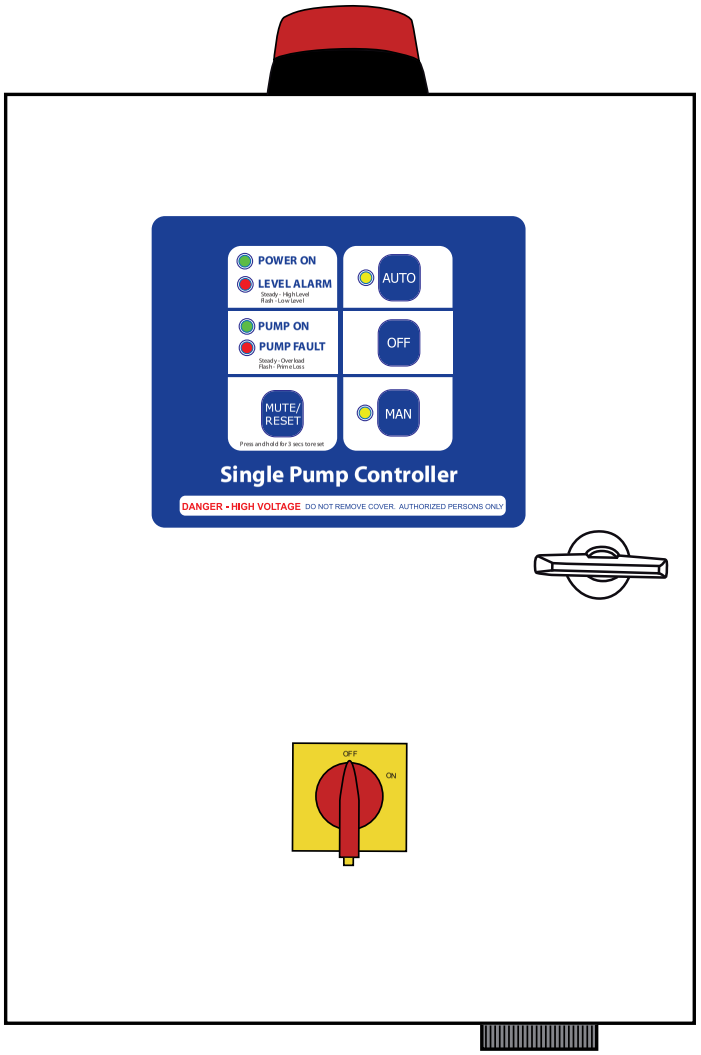


External Door

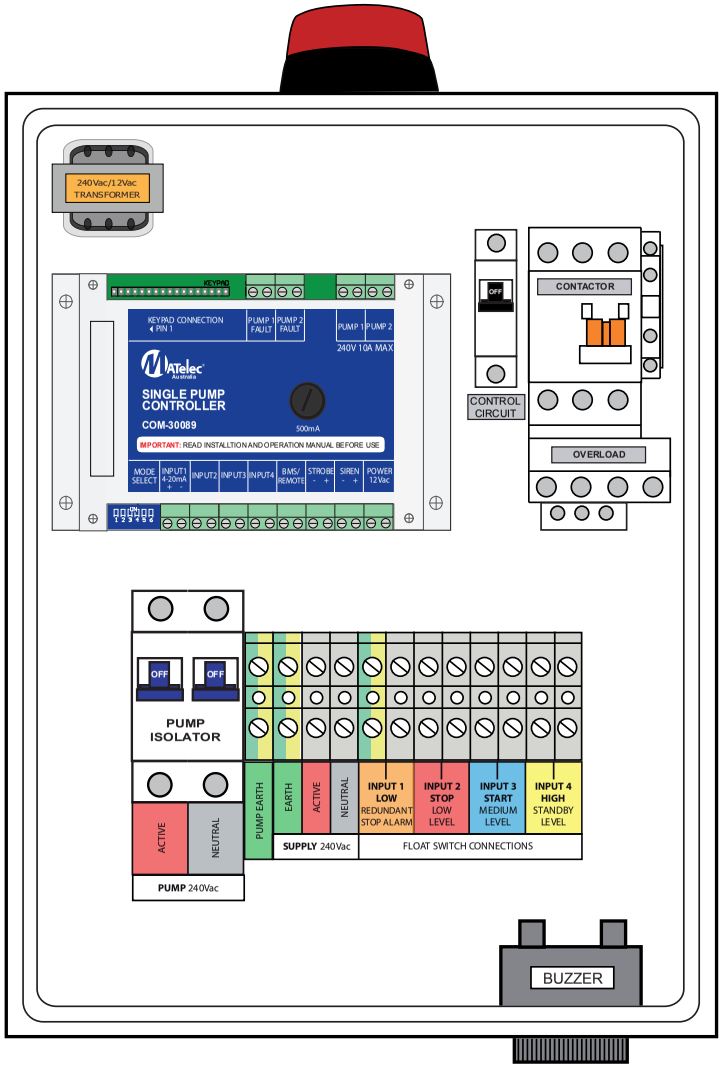


Internal Component Layout

Model FPC-15002



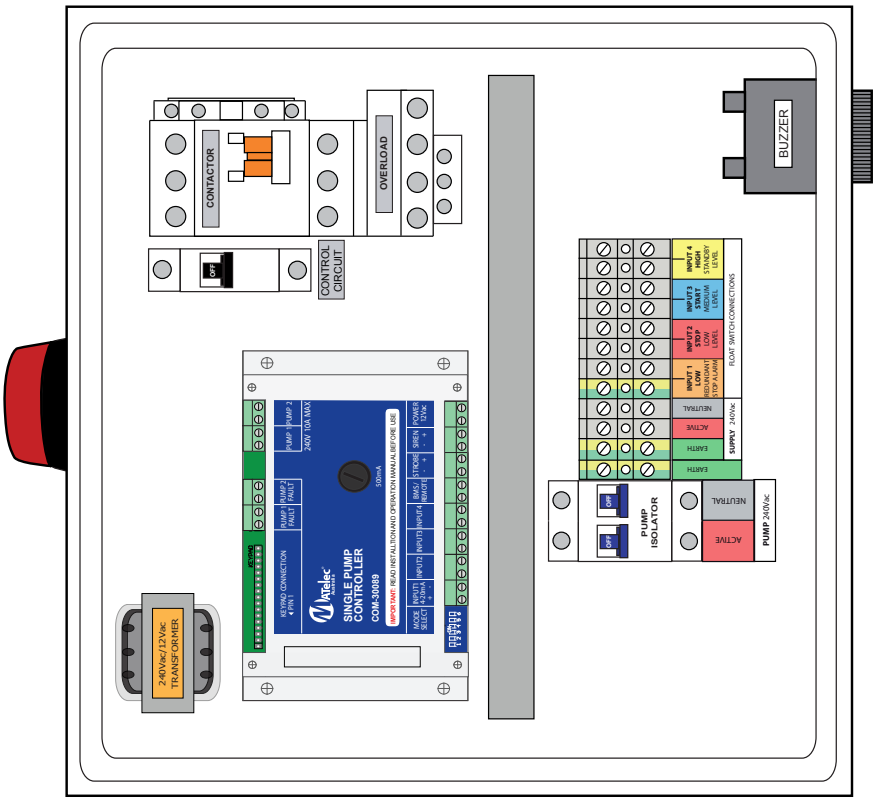
External Door



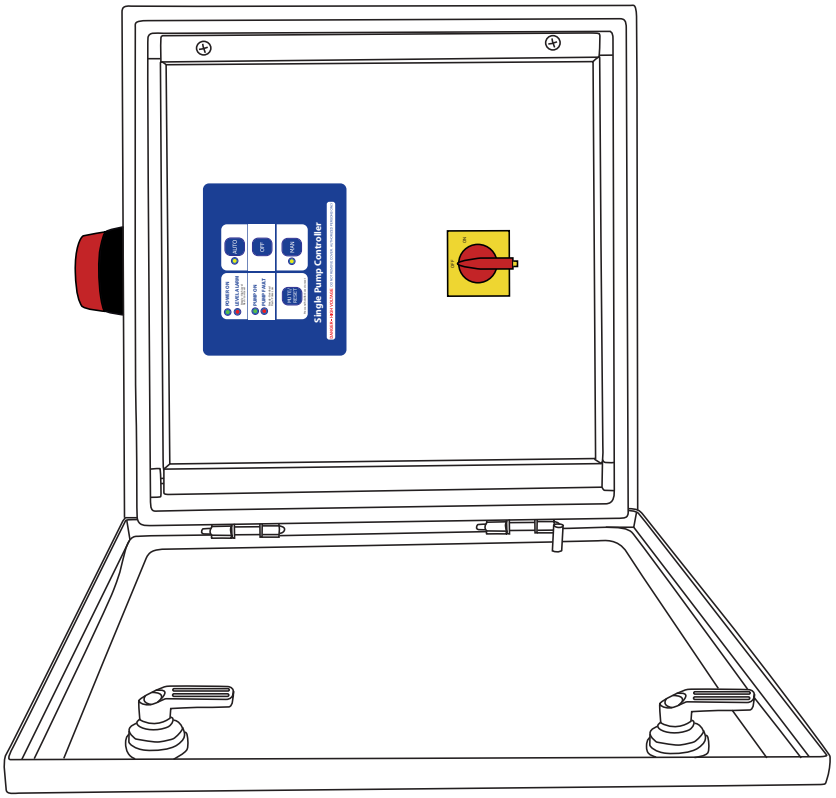
Internal Component Layout

General Component Layout

Model FPC-15005

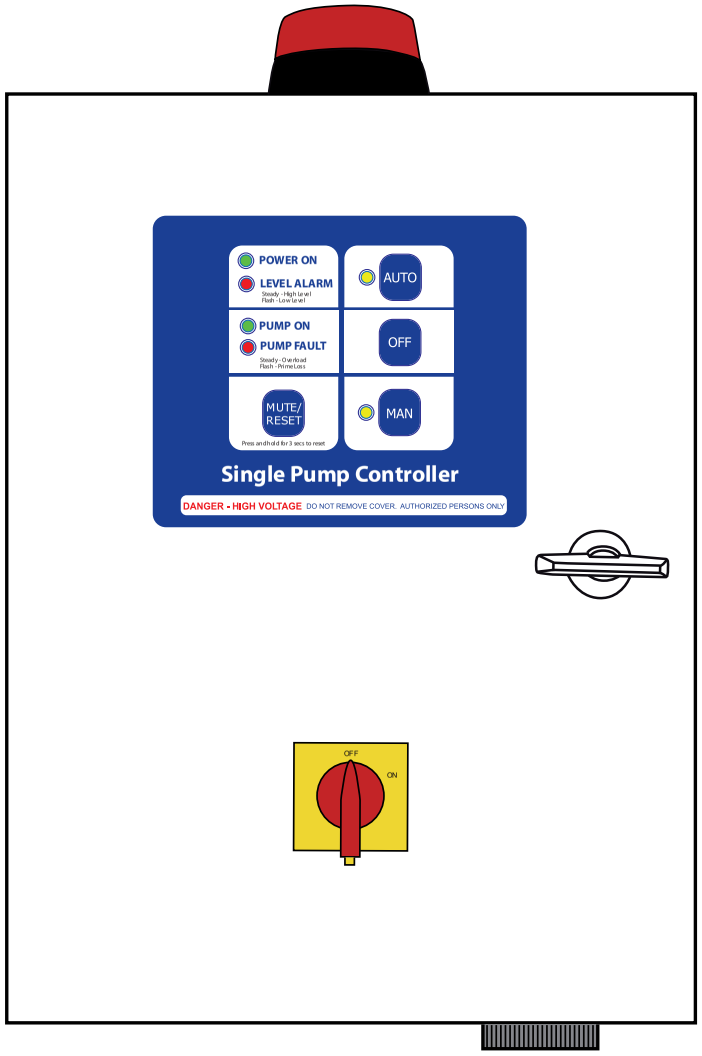


Internal Component Layout

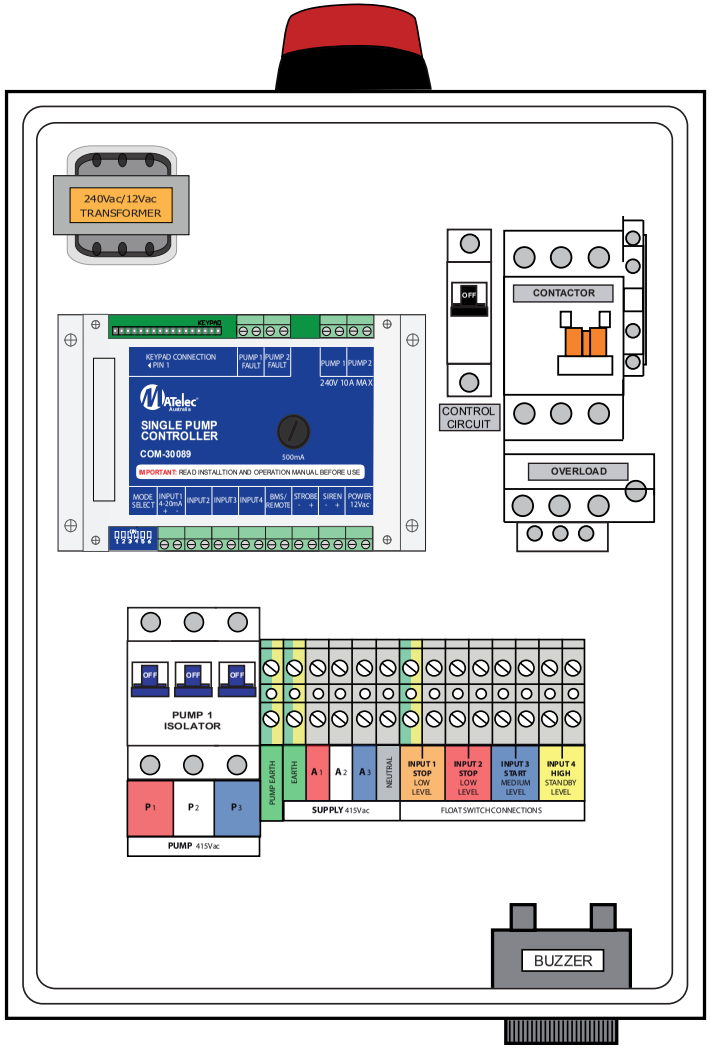


Internal Door

Model FPC-15006



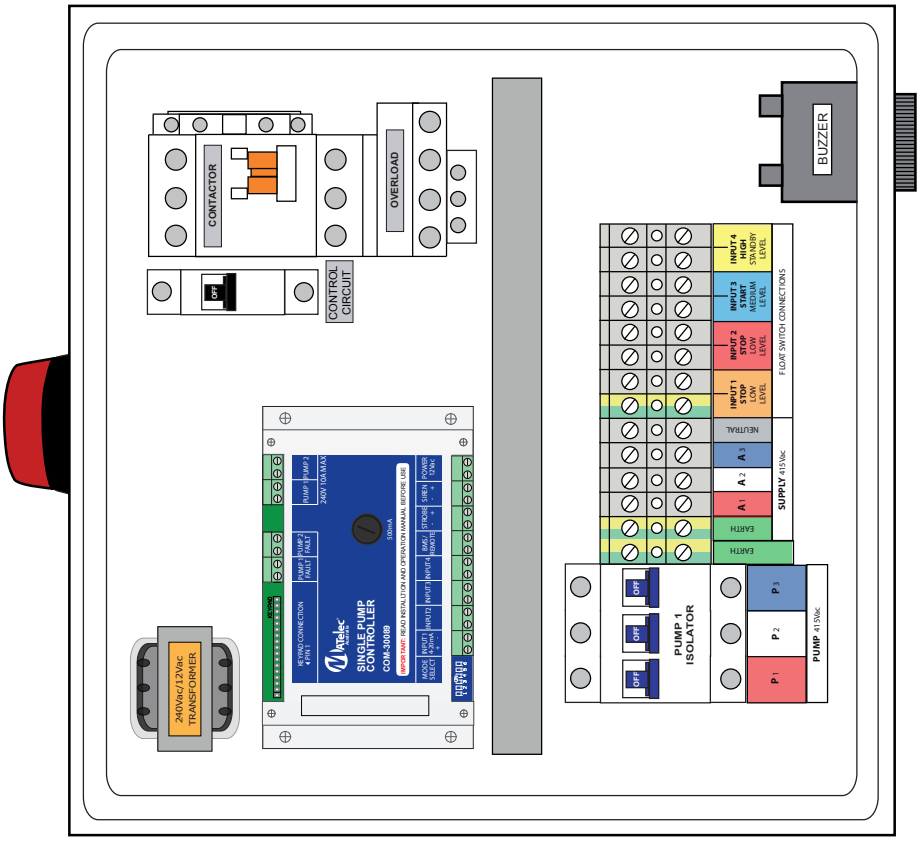
External Door



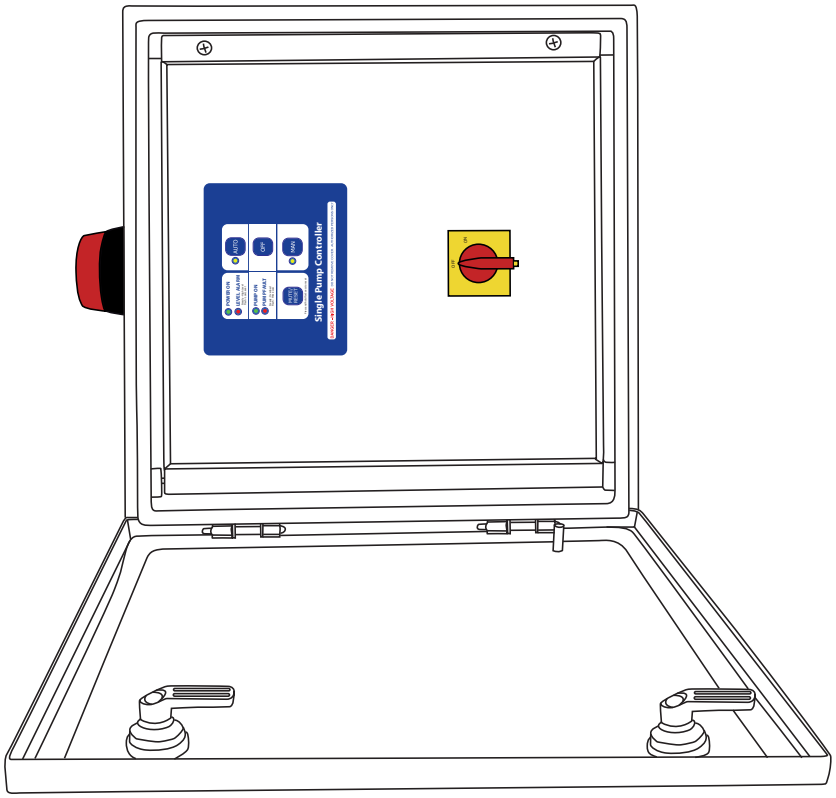
Internal Component Layout

General Component Layout

Model FPC-15007



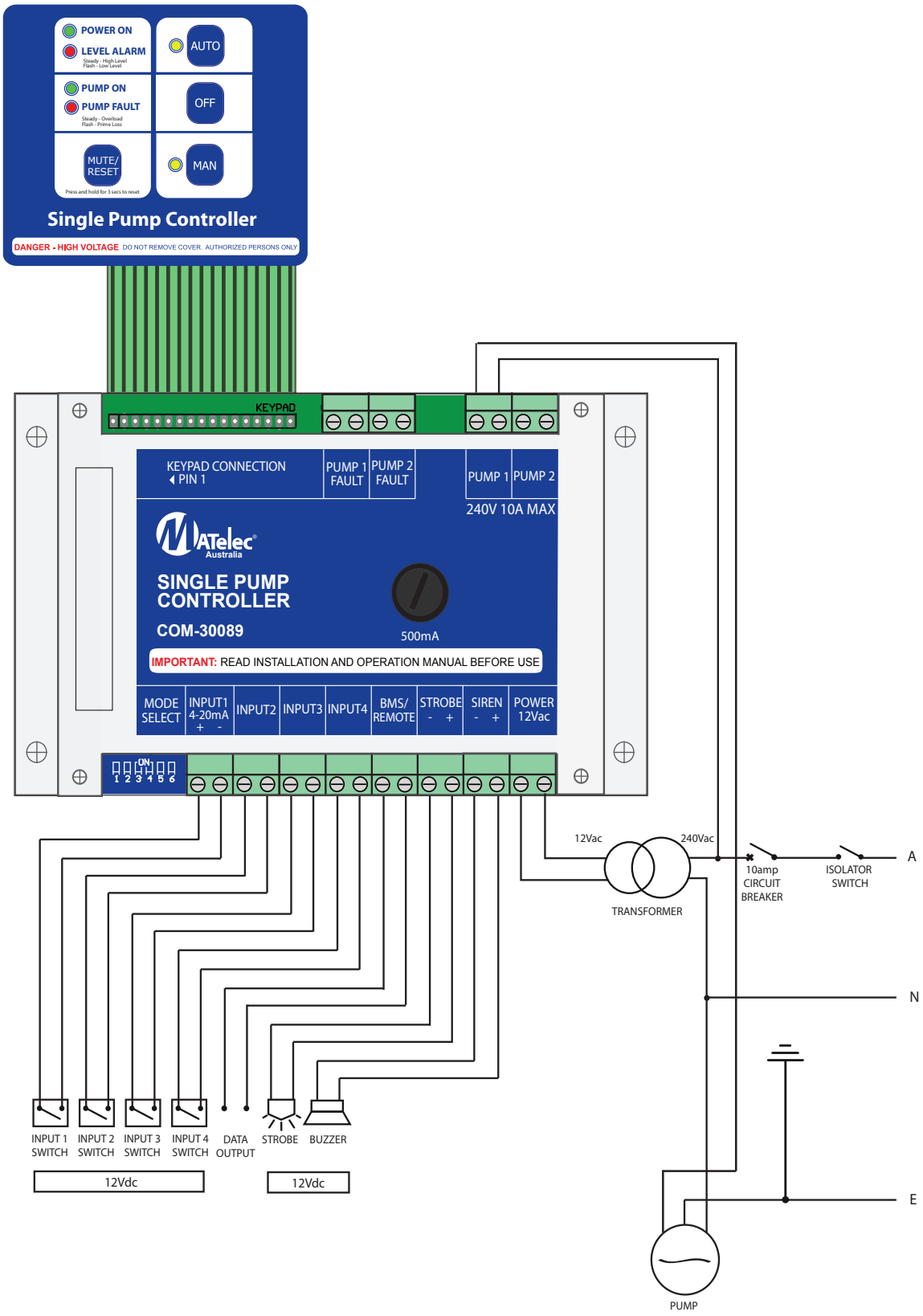
Internal Component Layout



Internal Door

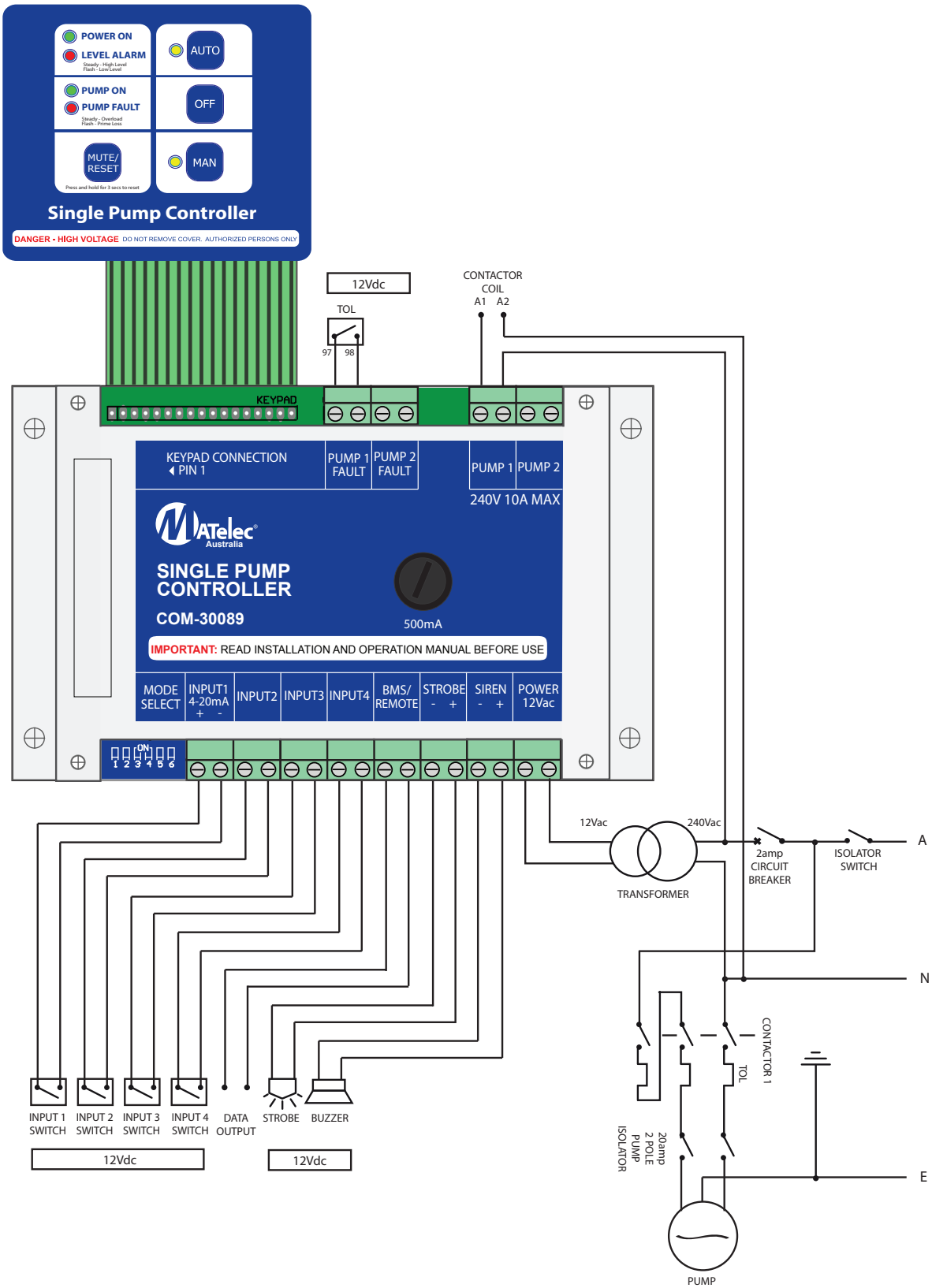
Wiring Diagram

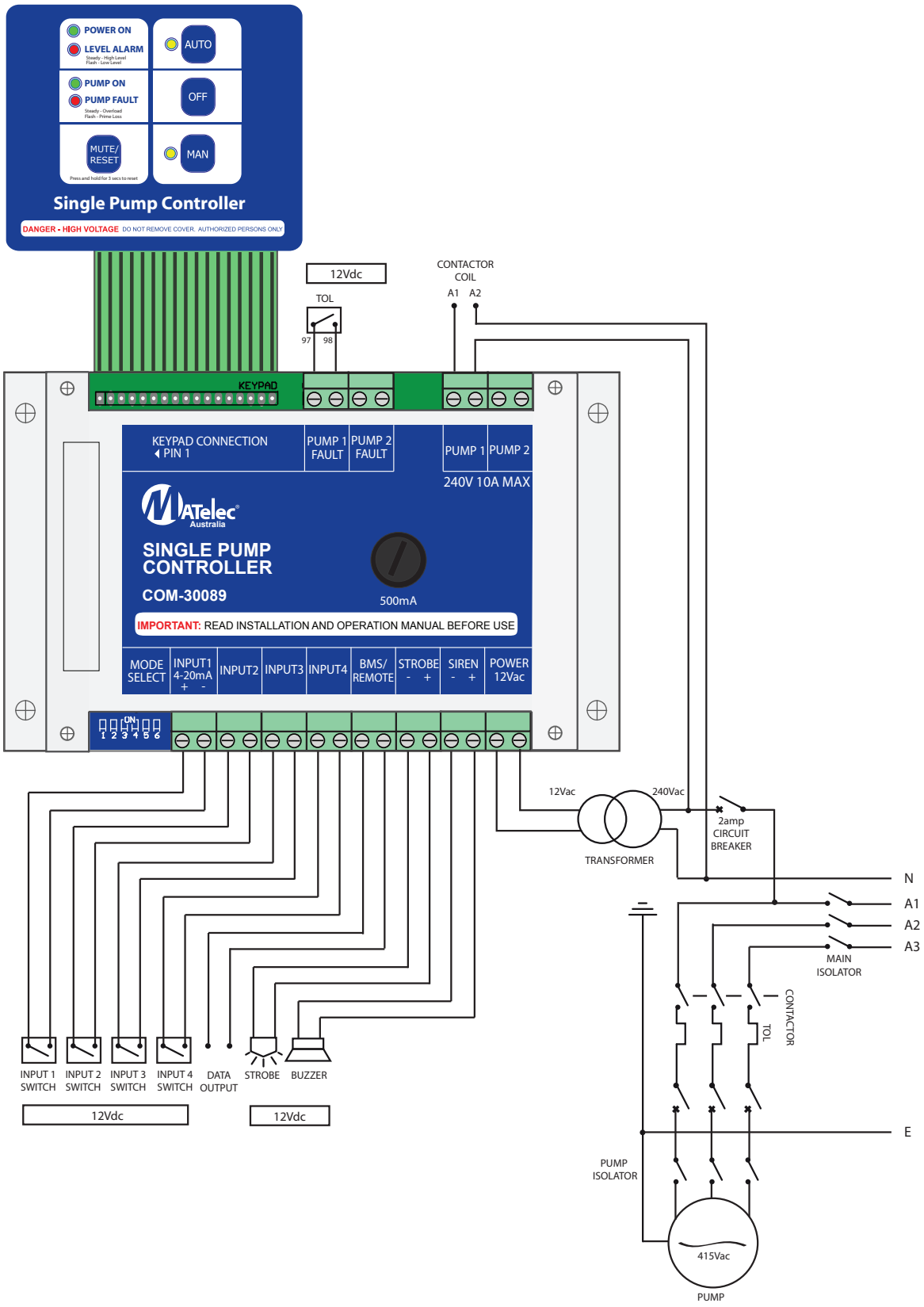
FPC-15000



Wiring Diagram

FPC-15002 & FPC-15005



Wiring Diagram

FPC-15006 & FPC-15007