



Peak production with minimal operator intervention.

## ALiEn²

ALiEn² is the most feature-rich plunger lift controller in its class. Patented optimization algorithms achieve maximum production with minimal operator intervention. Use as a simple well intermitter or in conjunction with a plunger and arrival sensor to optimize production. Protect your well by using a line pressure device to shut in on high line pressure. Log your plunger's mileage with Plunger Tracking, and use Vent Tracking to keep tabs on vent time.

ALiEn²'s standard Modbus communication port enables remote monitoring and control, and is preconfigured to work with several popular SCADA

solutions. ALiEn² can also be configured to work with your internal SCADA system. No SCADA? ALiEn² is fully functional and accessible right on site.

ALiEn² and ALiEn² Expert come certified to the highest and most up-to-date safety standards available, providing unlimited safe installation locations. Features such as Fast Velocity, Dangerous Velocity, and a variety of configurable alarms protect your wellhead equipment and prevent accidents.

## FEATURES AND BENEFITS

- Class I, Zone 0 (Div 1) Certified
- -40°F to +160°F Operation
- 8+ Months\*\* of Battery Standby
- Numeric/Navigation Interface
- Operate up to 3 Valves\*\*
- RS-485 Modbus Communications
- Adaptive Seeking Velocity Optimization™
- Pressure Optimization
- Flexible Connector/Solenoid Locations
- Universal Mounting
- Type 4 Powder Coated Steel Enclosure
- Locking Door



\*\*Expert model



*ALiEn<sup>2</sup>'s intelligent and effective optimization algorithms will help you achieve maximum production.*

## ADAPTIVE SEEKING VELOCITY OPTIMIZATION™

This patented\* algorithm reduces the need for operator intervention by making automatic adjustments that are proportional to the current flow/close time.

When Adaptive Seeking Velocity Optimization™ is used with a plunger arrival sensor such as Cyclops®, ALiEn<sup>2</sup> reacts to the average velocity of the plunger, making proportionate changes to the amount of Close and Afterflow time for the well. The user specifies a Target Rise Velocity, which ALiEn<sup>2</sup> then works to achieve. For best results, use a Sasquatch® Plunger Velocity Sensor in conjunction with Adaptive Seeking Velocity Optimization™ to maximize production using real-time Surface Velocity. ALiEn<sup>2</sup> is the first plunger lift controller capable of optimizing on Surface Velocity; a standard feature in the ALiEn<sup>2</sup> Expert model, available as an upgrade for the ALiEn<sup>2</sup>.

## PRESSURE OPTIMIZATION

Use a combination of Line Pressure, Tubing Pressure, Casing Pressure\*\*, and Differential Pressure\*\* to optimize the well. ALiEn<sup>2</sup> automatically adapts to use enabled devices. Optimize on Flow Rate (AGA 3 table based) when using a Line Pressure and Differential Pressure sensor.

## LOAD FACTOR

Load Factor is a parameter that can be used to determine when to open a plunger lift well to rise the plunger. It is a ratio of the slug size (casing pressure - tubing pressure) to the lifting pressure (casing pressure - line pressure). It is used by a number of different control systems as a standard optimization setting and is a standard feature on the ALiEn<sup>2</sup> Expert plunger lift controller. Please note that this feature requires a pressure splitter.

\* Patent Number US 9,297,238

TECHNICAL DATA

	<b>ALiEn<sup>2</sup></b>	<b>ALiEn<sup>2</sup> Expert</b>
Operating Temp	-40°F to +160°F	-40°F to +160°F
Current Draw	Typ. - 0.5 mA, Max. - 190 mA	Typ. - 0.5 mA, Max. - 190 mA
Battery	6 V, 5 Ah	6 V, 8 Ah
Valves Supported	1-2	1-3
Standby Time	5+ Months*	8+ Months*,**
Solar Panel	6 V, 1.1 W Rugged Solar Enclosure	6 V, 1.1 W Rugged Solar Enclosure
Arrival Sensor	Cyclops, Most other vendors	Cyclops, Sasquatch, Most other vendors
Other Inputs	Dry contact switch or 0.5 V to 4.5 V sensor Line Pressure Upgrade to Tubing Pressure Additional input available with pressure splitter	2 x dry contact switch or 0.5 V to 4.5 V sensor Line Pressure Tubing Pressure Casing Pressure Differential Pressure Additional input available with pressure splitter
Optimization	Upgrade to Adaptive Seeking Velocity Optimization™ Upgrade to open on TP	Adaptive Seeking Velocity Optimization™ Open on CP, TP, or CP-LP Close on CP, DP, or Flow
Cycle History	Last 25 Cycles	Last 25 Cycles
Daily History	Current Day + 14 Previous Days	Current Day + 14 Previous Days
Communications Interface	2 wire RS-485 Modbus Slave	2 wire RS-485 Modbus Slave 2 wire RS-485 Modbus Master
Certifications	Class I, Zone 0, Ex/AEx ia [ia] IIB Class I, Division 1, Groups C and D	Class I, Zone 0, Ex/AEx ia [ia] IIB Class I, Division 1, Groups C and D

\*Average temperatures of 0°F, 24 valve operations a day, 10 minutes a week of display-on time, and a Cyclops arrival sensor.

\*\*Expert model.



# ALiEn² Accessories & Replacement Parts



## ALiEn² SIMULATOR

Use this free tool for testing, training, and troubleshooting. This simulator functions exactly the same as the actual product, and includes the ability to manipulate simulated well conditions including battery & solar voltage, pressure (line, casing, differential, tubing) velocity readings, and plunger arrivals.



## UPGRADE, TEST & TROUBLESHOOT ALiEn² WITH LINK AND VISION SOFTWARE

Link connects ETC plunger lift controllers, Cyclops plunger arrival sensors, and Sasquatch plunger velocity sensors to our Vision Device Management platform. Keep your controller loaded with the latest features using Vision Device Management Software. Product updates, documentation, testing & troubleshooting for ETC controls and sensors are available in the included resource library.



## UNIVERSAL MOUNTING BRACKET

Each ALiEn² comes with the innovative Universal Mounting Bracket. With support for wall, single vertical stud, single horizontal stud, vertical pipe, horizontal pipe, or valve mount, this is the only mounting bracket you will ever need.



## SOLAR PANEL

ETC's Solar Panel is designed for use with both the ALiEn² and ALiEn² Expert series of controllers to provide continuous operation. Even on the cloudiest of days, this panel will provide enough power to keep the battery topped up. It comes in a rugged type 4 cast aluminum enclosure.



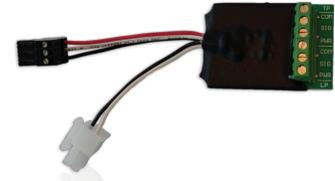
## SOLAR PANEL MOUNTING BRACKET

Quickly mount your controller solar panel to virtually any surface, including right on top of your controller.



## HIGH QUALITY PRESSURE SENSORS

ETC Pressure sensors feature all stainless steel wetted parts, a broad selection of electrical and pressure connections and a wide choice of electrical outputs.



## PRESSURE SPLITTER

The Pressure Input Splitter allows additional Pressure Transducers to be connected to the ALiEn<sup>2</sup> Expert plunger lift controller.



## BATTERY CHARGER

A quick and convenient way to top up a spare controller battery prior to replacement.



## SOLENOID VALVE

Available in single or dual valve configurations, with or without elbows.



## SOLENOID POPPIT

Solenoid poppits are replaceable to prolong life expectancy of solenoids for ETC controllers.



## 5Ah CONTROLLER BATTERY

With enough storage to power an ALiEn<sup>2</sup> controller for 5 months on a single charge, the 5AH Controller Battery is rechargeable, making it quick and easy to replace.



## 8Ah CONTROLLER BATTERY

Lasting up to 8 months on a single charge, the 8AH rechargeable controller battery that comes standard with the ALiEn<sup>2</sup> Expert controller is easy to replace.



## CONTROLLER BATTERY BRACKET

If you've lost or damaged the battery bracket in your ETC controller, this bracket can be replaced. One bracket works for both 5Ah and 8Ah batteries.

# Solar Panel

Recharge with ETC's compact 1.1 W solar panel, which comes standard with every ALiEn<sup>2</sup> plunger lift controller.



## RUGGED

ETC's solar panel comes in a rugged cast aluminum enclosure. This type 4 enclosure protects the terminal block so that it can withstand the harshest conditions and the tempered glass cover protects the solar cells, ensuring extended durability.

## FLEXIBLE

ETC's solar enclosure is designed with careful attention to ease of installation. Built-in mounting supports both a wall and pole mount using a standard U-bolt between 2" – 3 1/4". ETC's solar panel mounting bracket allows for more mounting options, including right on top of your controller. The two-part design allows the base to be mounted prior to terminating the wiring, and the enclosure lid containing the electronics fastens securely with captive screws. The pre-drilled 1/2" NPT port enables the use of armoured cabling with a Teck connector or instrumentation cabling with a standard cable gland.

## OPERATION

This panel is designed for use with both the ALiEn<sup>2</sup> and ALiEn<sup>2</sup> Expert series of controllers to provide continuous operation. Even on the cloudiest of days, this panel will provide enough power to keep the battery topped up.

## TECHNICAL DATA

Peak Power	1.1 W
Open Circuit Voltage	9.76 V
Max Power Voltage	8.16 V
Short Circuit Current	149 mA
Max Power Current	135 mA
Certifications	Class I, Div 2, Groups A, B, C, & D, Temperature Code: T3C
Enclosure	Type 4 Cast Aluminum



Utilizing modern Geomagnetic Sensing Technology™, Cyclops is the most advanced and reliable plunger sensor available.

## MISSED ARRIVAL? FALSE DETECTS? NOT ON MY WATCH.

Cyclops is not your average plunger arrival sensor. Utilizing modern Geomagnetic Sensing Technology™, market-leading Cyclops is the most advanced and reliable sensor available.

Within the rugged enclosure lies a geomagnetic “eye” and a tiny yet powerful microprocessor. When powered, Cyclops is actively watching for a change in the earth’s magnetic field around it to signal plunger arrival. Constantly filtering out “background noise” from nearby equipment or environmental changes, Cyclops is able to consistently detect any type of plunger as it arrives at surface.



ETC’s innovative line of plunger sensors provide advantages such as the ability to adjust sensitivity, upgrade software, or troubleshoot problematic wells right at the well head.

## FEATURES AND BENEFITS

- Digitally Controlled Output
- Intrinsically Safe or Explosion Proof
- Compatible with Wireless Solutions
- -40°F to +160°F Operation
- 5 V to 24 V Operating Voltage
- Low Power
- Adjustable Sensitivity
- Self Calibrating
- 1/2” NPT Port

### TECHNICAL DATA

Supply Voltage	5 V - 24 V DC
Current Draw	Typ. - 0.77 mA, Max. - 0.80 mA
Switch Interface	Dry contact, normally open, 100 Ω impedance
Communications Interface	1 wire RS-485 test interface
Operating Temperature	-40°F to +160°F
Certification (IS Model)	Class I, Zone 0, AEx ia IIB T4 Class I, Division 1, Groups C, D T4; Ex ia IIB T4 Class I, Zone 2, Group IIC T4 Class I, Division 2, Groups A, B, C, D T4
Certification (ATX Model)	CE Ex II 3G Ex nA IIC T4 Gc
Certification (ExP Model)	Class I, Zone 1, AEx d IIB T4 Class I, Division 1, Groups C, D; Ex d IIB T4