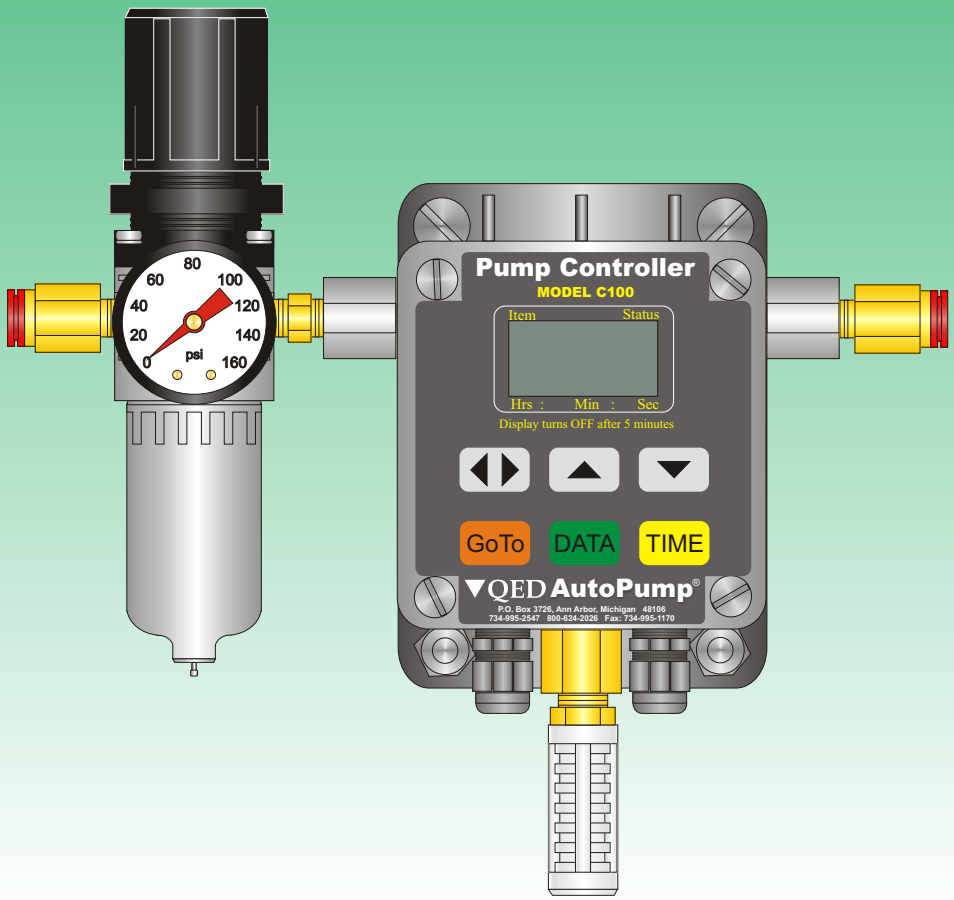
Model C100 Pump Controller

Instruction Manual

P/N 95169 REV. 10-22-04



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Model C100 Pump Controller

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General Warnings

Some AutoPump® and Ferret™ pumping devices are designed to pump floating hydrocarbons from groundwater recovery wells. The recovered product is frequently flammable and vapors may be explosive if exposed to heat, flame, or sparks. ***When any of the pneumatic pumping systems are used care should be taken to ensure that any venting of pump drive air, potentially mixed with the explosive vapors within the pump, is located in a well ventilated area away from sources of open flame, sparks and extreme heat. As in all situations failure to take adequate precautions may result in catastrophic injury or death.*** Protection for eyes, hands, and person should be worn when working with the pumps to avoid injury from contact with hazardous fluids. Tubing used with these systems should be routed in a manner that prevents damage due to chaffing, cutting, or crushing.

Do not apply compressed drive air to the system unless all safety precautions are followed.

C100 Controller Warnings

The C100 controller is a solar powered timer and valve that has an onboard battery pack for operation during the night and on days with marginal sunlight. The C100 is CSA Approved intrinsically safe for Class 1, Division 1, Group C and D use. The General Warning for venting of pump drive air needs to be followed with the C100 as it will vent potentially explosive pump drive air during operation (venting at, or near the C100 is not a problem). The C100 is also NEMA4 rated for use in environments or in situations where the device might be exposed to rain or water spray. The C100 includes an optional AC adapter to allow use inside where there is insufficient light for charging. ***When the controller is used with the AC adapter, the unit is not intrinsically safe.*** Use of the AC charger will require that the controller be mounted ***at least*** 3 feet above the ground and ***at least*** 25 feet horizontally from sources of combustible vapors and liquids (i.e. exhaust valve).

If the rechargeable batteries need to be replaced, they should be replaced only with batteries supplied by QED. ***If replacement batteries other than QED batteries are used in the C100, the "intrinsically safe" certification will be voided.***

If the C100 should shut down due to a low power situation, (low battery voltage, low sunlight) once sufficient power is available (either by plugging the AC adapter, increase in sunlight, new batteries or other power supply) the C100 will resume cycling automatically. ***The default setting for the controller is to be enabled once adequate power is supplied***. When servicing any equipment controlled by the C100, at a minimum, disconnect the air source from the controller to prevent unintentional cycling.

C100 Terminology

Refill Time: This is the time that the pump is venting and product is entering the pump. No pressure is being applied to the pump at this time.

Discharge Time: This is the time that pressure is being applied to the pump to discharge the product.

On Time: This is the time that the system is on: the system is "AWAKE".

Off Time: This is the time that the system is off: the system is "SLEEPING".

System Enabled: This turns the system on and enables the timing sequences to start.

System Disabled: This turns the system off and disengages the timing sequences.

Default Times

Default times are maintained even when the unit is low power disabled. The C100 unit comes with the following default times:

Refill: 5 minutes

Discharge: 30 seconds

OnTime: 4 hours

Off Time: 1 second

Operating a Ferret Pump system with the C100 Controller

Adjust the controller refill and discharge times to allow for complete pump filling and discharge. Partial discharge from a pump can be the result of insufficient product availability in the well, a refill time that is set too short, or a discharge time that is set too short. *In general, a discharge time of 50-60 seconds and refill time of 4-5 minutes will initiate pumping.* Further tuning of times may be required to maximize pump flow rate. If the discharge time is set too long air may appear in the discharge tube. Control of the flow rate is also available through adjustment of the regulator on the controller. *In general, leave the regulator turned fully clock-wise (delivering maximum compressor supply pressure to the pump) unless there is a need to slow down the pump action during a discharge cycle.* Insufficient air pressure supplied to the pump may prevent the pump from discharging from the well or discharging against discharge header back- pressure.

Pump position may require occasional adjustment in cases where static water level changes or product layer thickness changes. Use of the pump positioning tool, QED part number 37342, is recommended whenever repositioning is done to ensure proper location of pump inlet. All Alpha style and Ferret pumps are designed to continue pumping in conditions where coalesced liquids or bio-growth exist in the well. Occasional pump and pump inlet cleaning may be required to ensure trouble-free operation as long as the product continues to pass the specific gravity and viscosity tests.

Controller settings

The C100 has three basic controls available that affect pump operation:

Refill time setting:

The refill time settings determines how long the pump will fill. This time needs to be longer when product has a high viscosity and flows slowly. The fixed inlet Ferret pump will allow faster inflow of product than the floating inlet Ferret pump (where the product flows down a coiled drain attached to the float). The refill time is settable from 1 second to 99 hours, 59 minutes and 59 seconds. In general, a refill time setting of 4 5 minutes with a Ferret pump and 1 2 minutes with an AutoPump is appropriate for most site conditions. Setting a long refill time can help to match the pump performance to product inflow in cases where the product flows into the well slowly.

Discharge time setting:

The discharge time setting determines how long the pump will discharge. This time needs to be longer when the pump is deeper, when the pump is pumping against a higher back-pressure (a pressure header or pumping uphill), and when the product has a high viscosity and flows slowly. The discharge time is settable from 1 second to 99 hours, 59 minutes, and 59 seconds. In general, a discharge time setting of 50-60 seconds with a Ferret pump and 10-15 with a AutoPump is appropriate for most site conditions. If the discharge time is set too long drive air may enter the discharge tubing.

Pump supply pressure setting:

The filter-regulator attached to the controller is used to raise or lower the pressure applied to the pump during a discharge cycle. For most applications this is set at the fully clock-wise position to deliver full compressor supply pressure to the pump. If the pump discharge is too aggressive for your particular application, this pressure may be decreased to slow the flow from the pump during a discharge cycleHowever, if the pressure is decreased it often becomes necessary to increase the discharge time slightly to offset the decrease in flow and to help maintain full pump discharge.

The C100 Controller features an additional control option to set an awake or sleep mode. This option can be used to schedule the system operation over a one or more day period. For example, the controller can be set to cycle for one hour and "sleep" or stop cycling for 6 hours, which would then repeat. This feature is useful in cases when there is a slow recharge rate in the well.

Function Keys

The "**TIME"** button displays and allows the setting of the following times:

First push: This displays and allows the setting of the Refill time.

Second push: This displays and allows the setting of the Discharge time.

Third push: This displays and allows the setting of the System On time.

Fourth push: This displays and allows the setting of the System Off time.

To adjust the time settings use the  keys.
(A minimum time setting of 1 second is required for all of these times, ie 00:00:01)

The time on the display reads hours, minutes, and seconds. The time display will look like this: 00:00:00

Hours Minutes Seconds

Pressing the  key moves the cursor to the desired hour, minute, or second.

Pressing the  key increases the number.

Pressing the  key decreases the number.

If changing the Refill or Discharge times, pressing the "**GO TO"** key will start a new time cycle starting with the Refill time. The next time cycle automatically uses the new time. For example, if after changing the Refill time, pressing the "**GO TO"** key will start the newtime cycle starting with the new Refill time.

If changing the System On or System Off times, pressing the "**GO TO"** key will start a new time cycle starting with the System Off time. The next cycle automatically uses the new time. For example, if after changing the System Off time, pressing the "**GO TO"** key will start the new time cycle starting with the new System Off time.

C100 Battery

Prior to initial installation, remove the paper tab between the battery and the battery terminal

WARNING: The batteries will be drained and possibly damaged if the C100 is stored in this "enabled" mode for an extended period of time

While the unit will charge itself to self-start under full sunlight charging conditions, it is recommended that the unit be charged overnight (***or least 12 hours***) before being placed into field service for the first time.

When the C100's battery gage reads LOW, the C100 goes to OFF cycle (or SLEEP) and keeps the unit in the OFF cycle until the battery gage reads OK.

Whenever the C100 has been stored in a discharged or DEAD battery state for an extended period of time (more than 2 weeks) jump-starting charging may be required for operation.

Battery operation time is affected by the following items:

- Initial charge, a minimum of 12 hours is recommended.
- Time of year (there is less daylight in the winter)
- Weather (cloudy days vs sunny days) the time of day (when the sun is low on the horizon it has less energy to charge the battery), and temperature (colder reduces battery capacity).
- Valve cycle frequency (as the valve cycles more, it drains more energy from the battery)

A C100 controller used in a typical Ferret application, where cycle times are long (greater than 30 seconds each) will have no problem maintaining the battery charge with the built in solar panel. As cycle times become shorter (as is typical with Alpha style pumps), it may be necessary to use an external solar panel or the AC adapter to maintain the battery's charge. The following is a general guide line for cycle times and battery life:

Cycle per Minutes	Cycle Length in Seconds	Run Days*	Recommendations
6	5 refill, 5 discharge	2.6	Use AC Adapter
3	10 refill, 10 discharge	4.3	Use AC Adapter or External Solar Panel
1.5	20 refill, 20 discharge	6.3	Use Built In or External Solar Panel
1	30 refill, 30 discharge	7.3	Use Built in Solar Panel
Default	300 refill, 30 discharge	12	Use Built in Solar Panel

*With a completely charged battery and no charging going to the battery.

Rechargeable Batteries

It is recommended that replacement batteries are fully charged using commercially available chargers for these batteries before installing them on the C100 unit. This is to ensure that the two battery cells are matched in terms of cell voltage and charge status so they will function properly in the series cell pack configuration of the C100 unit.
CAUTION: DO NOT use any primary, non rechargeable battery in the C100 unit. If charged, these batteries will swell and rupture causing damage and possible injury to equipment operators. Also, DO NOT use Lithium or Lithium Ion type batteries in the C100 unit. The Lithium batteries have a higher voltage (3 Vdc per cell) and use different charging methods than used in the C100 unit.

Tank Full Shutoff

This feature is designed to be used with QED's Tank High Level Shutoff Kit, QED Model CTRTFO. The Tank Full Shutoff uses a normally closed float switch installed at a high tank position in your tank. It is designed to stop pump and controller operation when the level in the collection tank exceeds the upper limit defined by the float switch location. When high levels are detected, the C100 controller will discontinue pump operation and Disable the controller, and will remain in a **"Tank Full"** and **"System Disable"** mode until both are reset. The **"Tank Full"** condition will be shown on the display of the controller as a **"T"** in the upper right hand corner of the display. When this condition is detected, the tank level must be lowered enough to deactivate the switch and the controller must be reset to resume normal operation. First the **"Tank Full"** switch has to be reset by pushing the ◀▶ key. Then the controller needs to be Enabled. Pressing the **"GO TO"** key three times will take you to the Disable/Enable screen. Once the QED Model CTRTFO is installed, any disconnection or breaks in the switch cable will also cause a **"Tank Full"** and **"System Disable"** response.

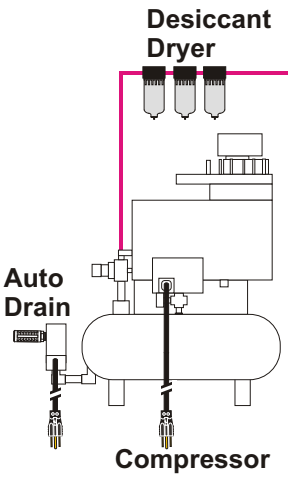
If the QED Model CTRTFO is not being used, then there is a jumper wire in place inside the controller, which disables this feature.

On/Off Level Control

This feature is designed to be used with QED's On/Off Level Control Kit, Model CTRLSW. The On/Off Level Control switch uses a normally closed float switch which is designed to stop pump operation when the level of the liquid being pumped falls below the limit defined by the float switch location and resume pumping automatically when the liquid level rises again and activates the float switch. A "Level Off" condition will be shown as a **"L"** in the lower right hand corner of the display.

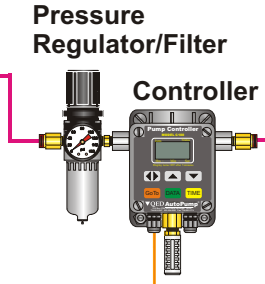
Ferret System Installation Overview
(Programmable Models Only)

Air Supply
(See Air Supply Overview sheet for more details)



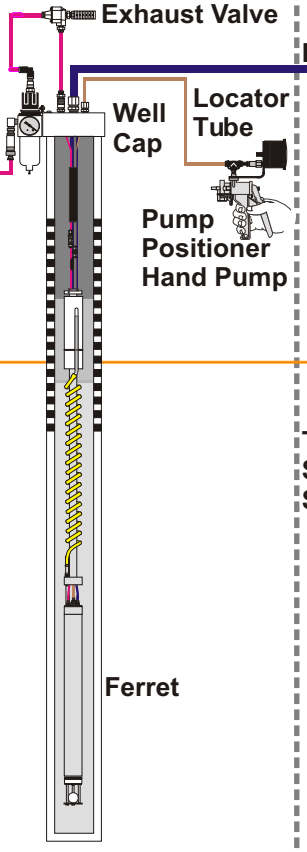
CAUTION: Standard compressors not rated for use near explosive or flammable liquids or vapors.

Controller
(See Controller Overview sheet for more details)

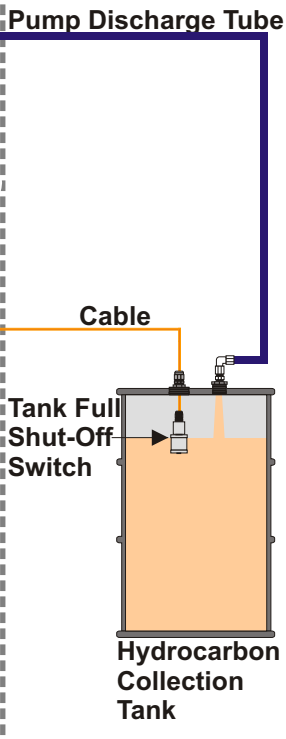


CAUTION: The C100 controller in Solar Powered mode is rated for use near explosive or flammable liquids or vapors. All externally powered controllers must be located in a safe area according to local codes

Well
(See Well Overview sheet for more details)

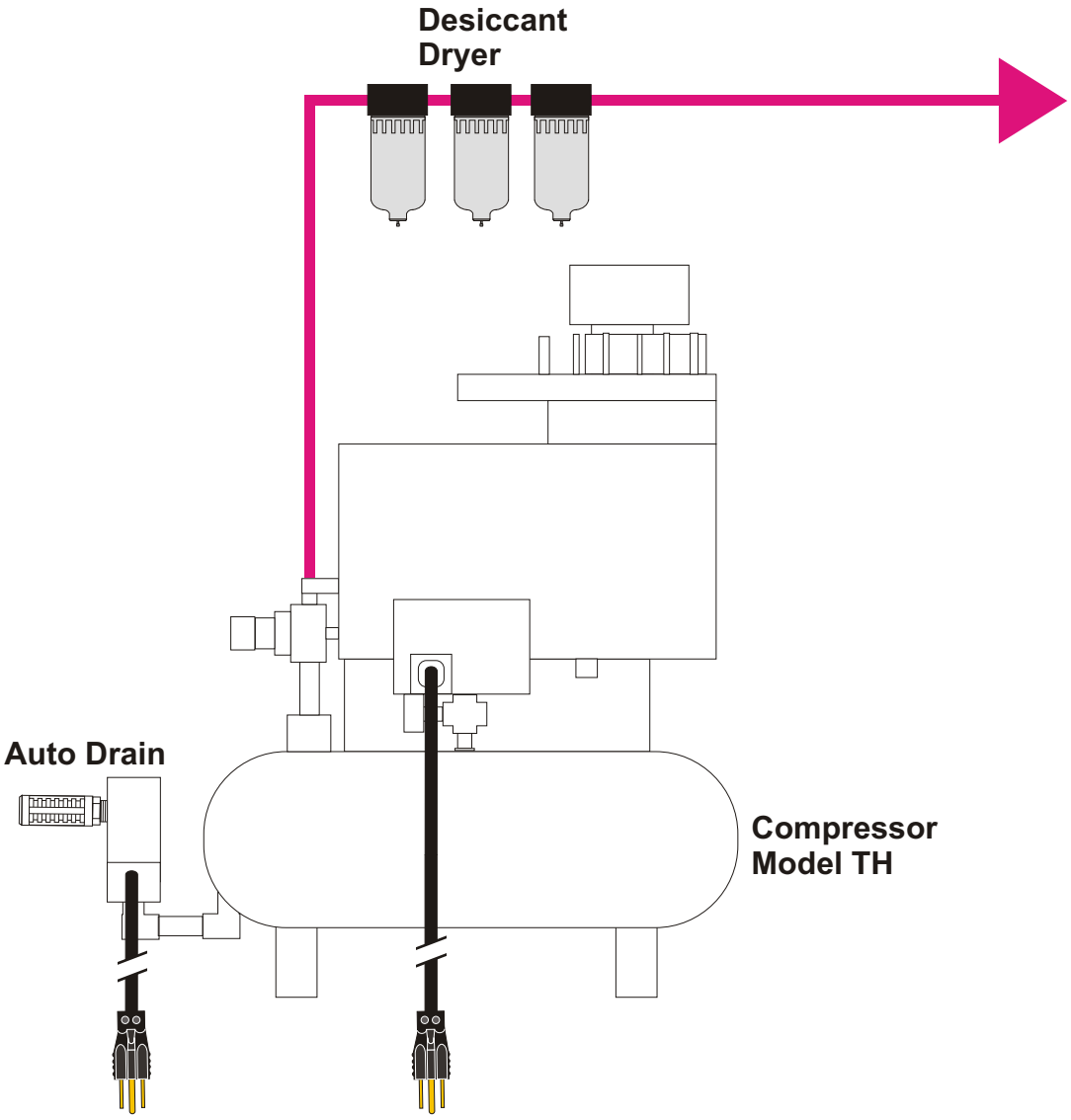


Tank
(See Tank Overview sheet for more details)



Air Supply Overview

(Programmable Models Only)



Installation guidelines - refer to individual equipment manuals for detailed information

1. Choose compressor location which is away from potential sources of flammable or explosive liquids or vapors.

2. Model TH3 compressor is equipped with a 3 prong grounded power plug and requires a 115 V AC, 15 A, 60 Hz power supply. The auto drain unit has a separate 3 prong grounded power plug and requires a 120 V AC, .08 A, 60 Hz power supply.

3. Install auto drain onto compressor tank, fasten desiccant dryer to nearby wall or other vertical surface, and connect compressor output to desiccant dryer with supplied black nylon tubing.

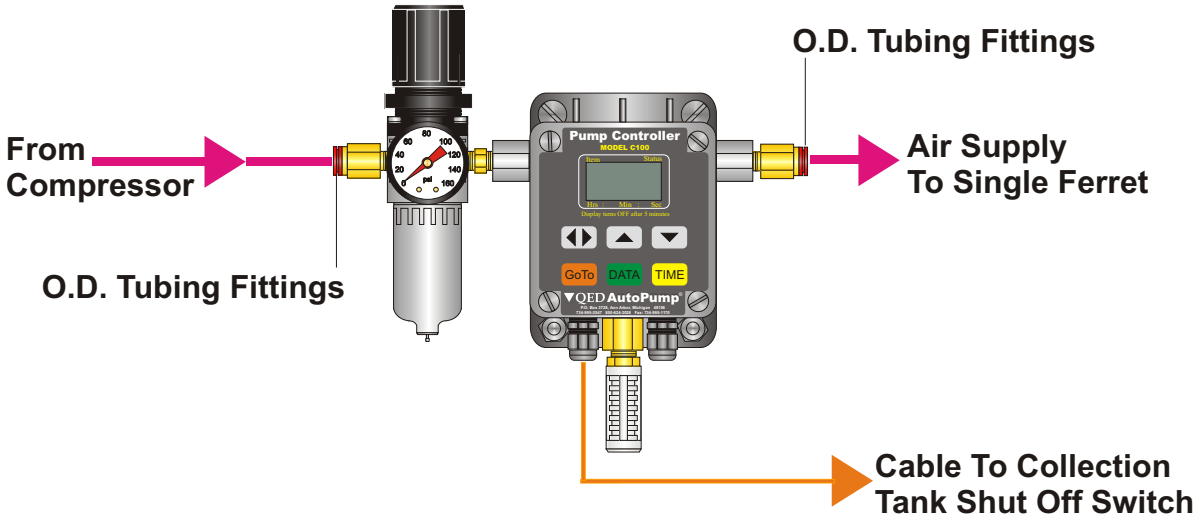
Controller Overview

(Programmable Models Only)

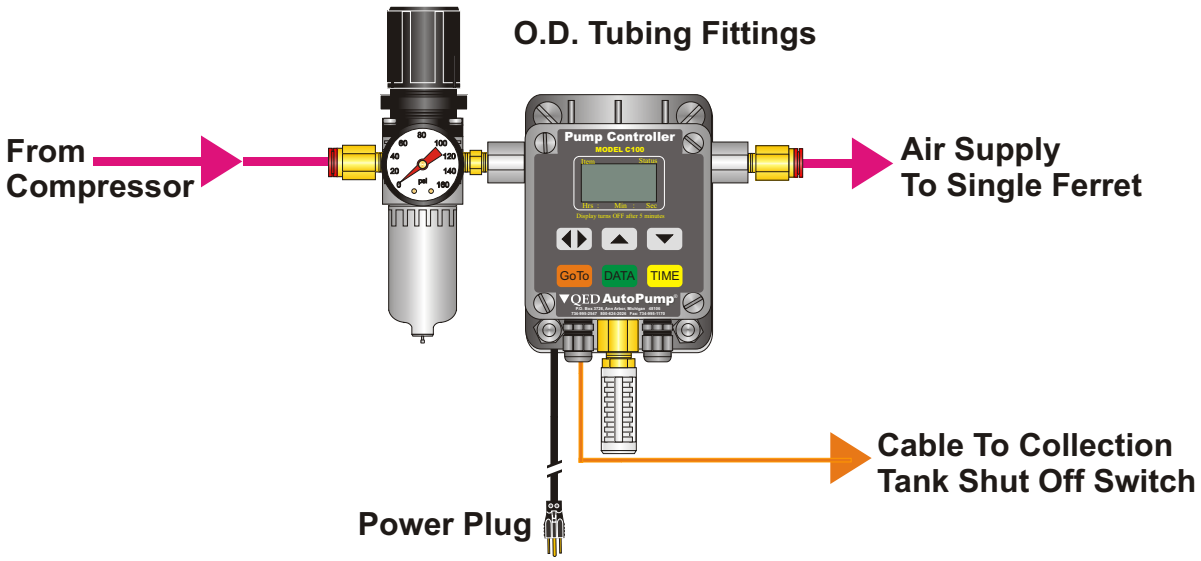
Installation guidelines - refer to individual equipment manuals for detailed information

Controller Options:

Model C100 - Solar powered mode, single Ferret- Requires that solar power panel on controller top be exposed to unobstructed sunlight



Model C100 - Powered by external power adapter, single Ferret- 110V AC input (**Not rated for use near explosive or flammable liquids or vapors**), VDC output.

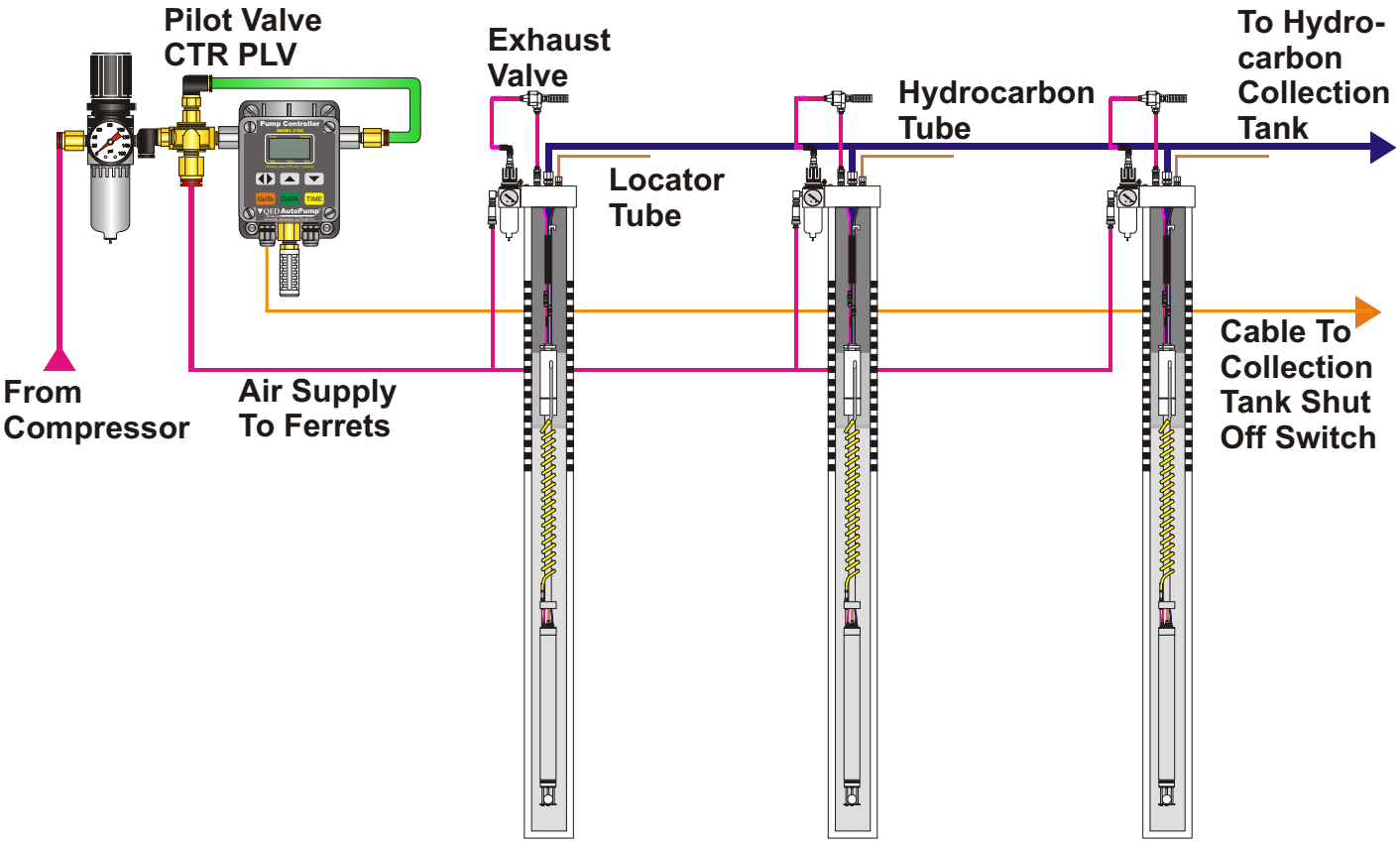


Controller Overview

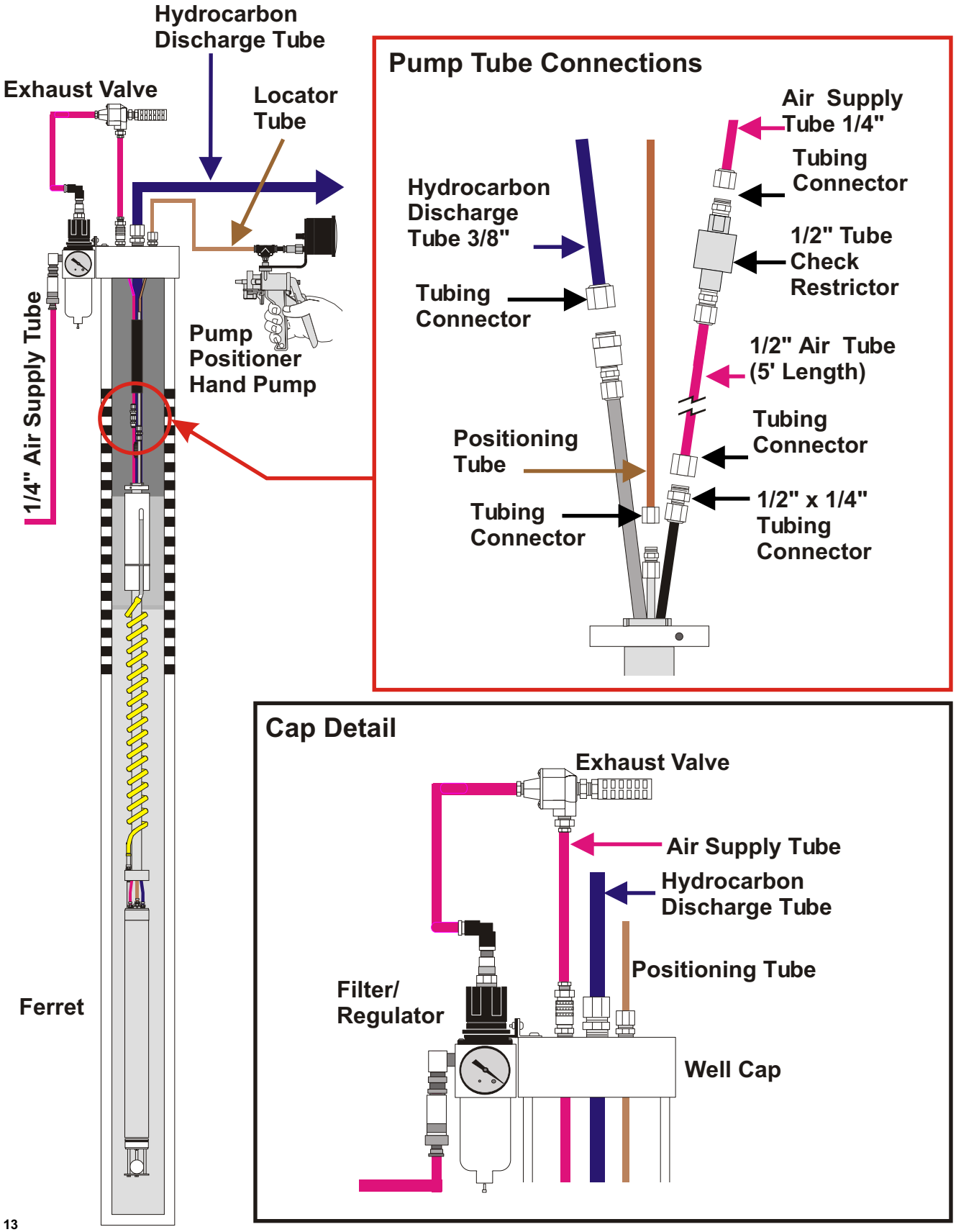
(Programmable Models Only)

Installation guidelines - refer to individual equipment manuals for detailed information

C100 Controller with high-flow, multi-Ferret option

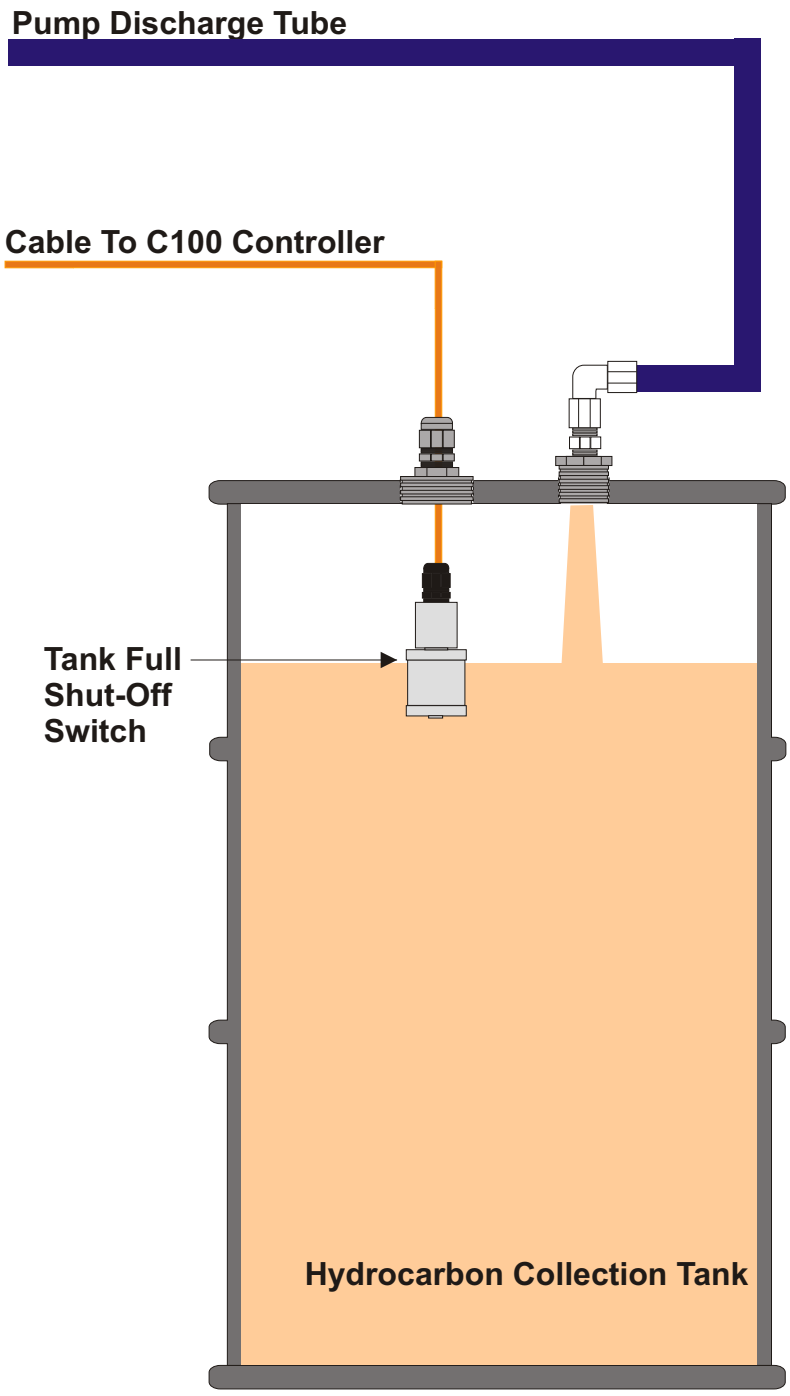


Well Overview
(Programmable Models Only)



Tank Overview

(Programmable Models Only)



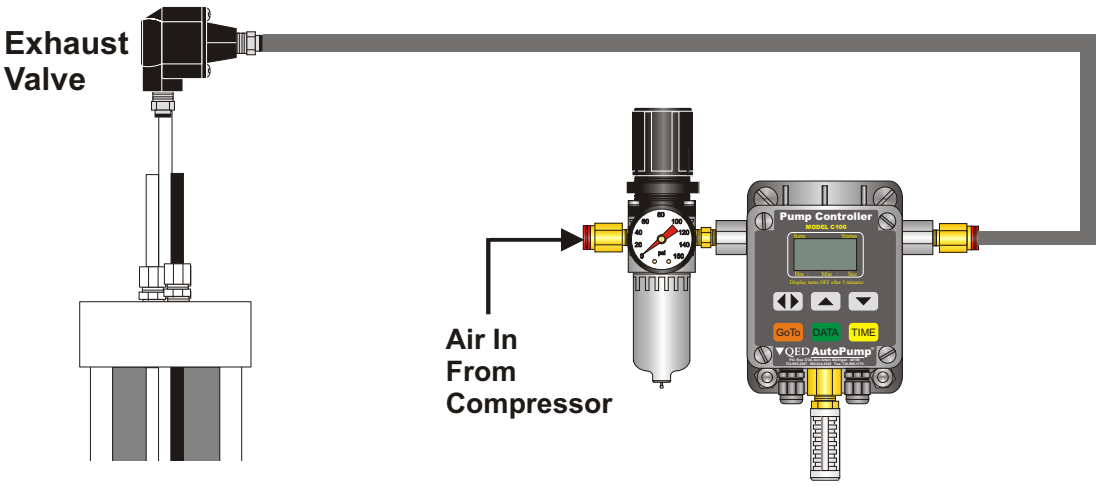
Installing The Controller

The Ferret pump requires a timer operated air valve to provide pump discharge and refill action. The two options for this control are the 110V-AC powered MPS360 Controller or the solar powered C100 Controller. Controller installation is similar for both units. The C100 Controller can be used in environments containing explosive vapors, when powered only by the solar panel and not with the A/C adapter, while the MPS360 may not. See the *Safety Section* of this manual for further information. If one controller is being used to operate more than one pump, see the section titled Multiple pump installation in the Installation Section or more information.

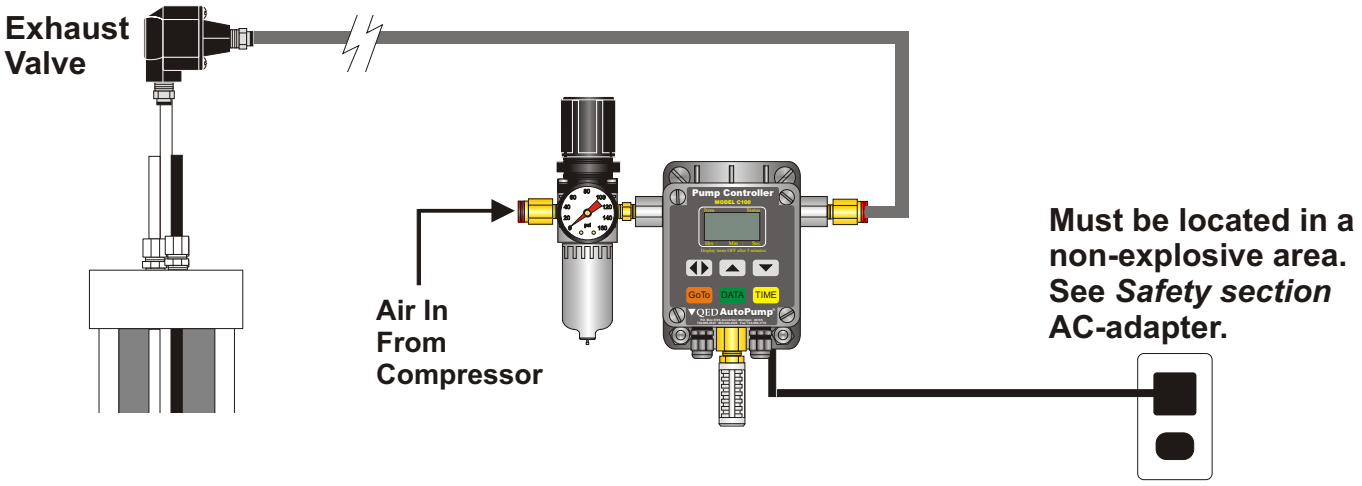
C100 Controller Installation

C100 in outdoor use mode. See Fig. 10. C100 is located near or at the recovery well in an area that receives sunlight. Fig. 11 shows optional AC adapter use with the C100. Use of the AC adapter makes the C100 unsafe for use in explosive environments. See *Safety section* in this manual for more information.

C100 in Solar Charge Mode

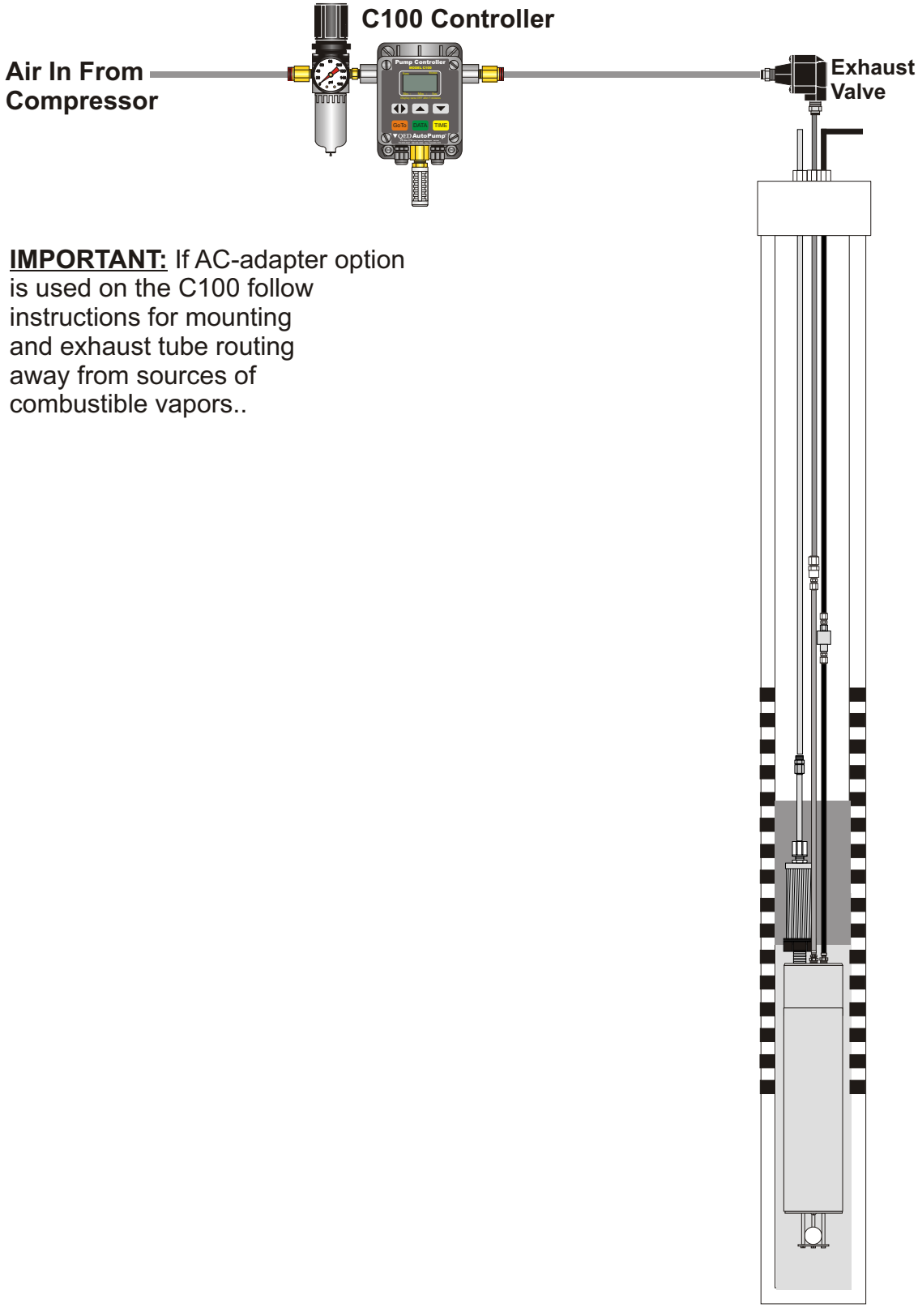


C100 When Used W/ Optional AC Adapter



Single Pump Installation

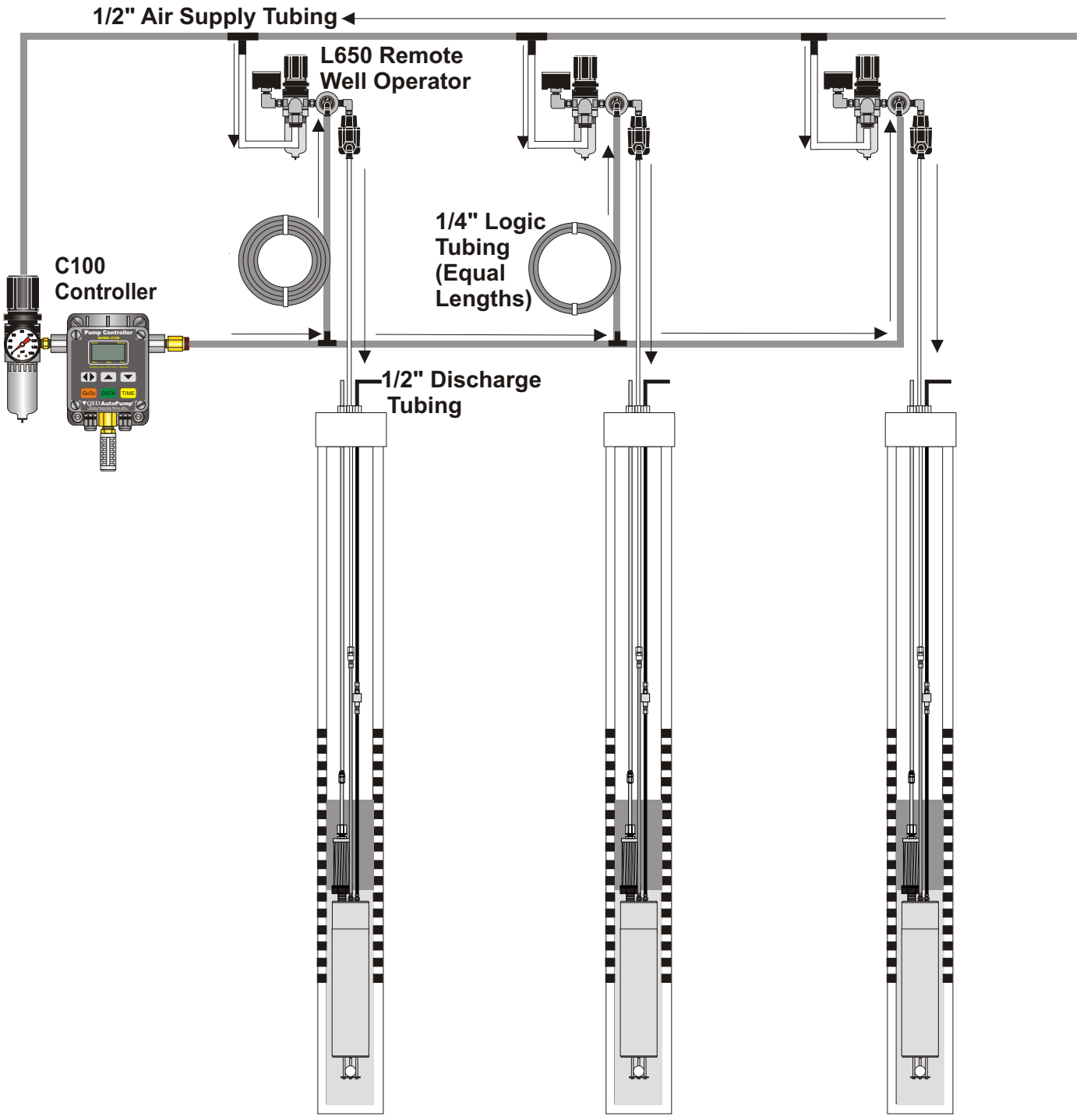
The drawing below shows a single pump being controlled by a single controller. The drawing shows C100 controller use.



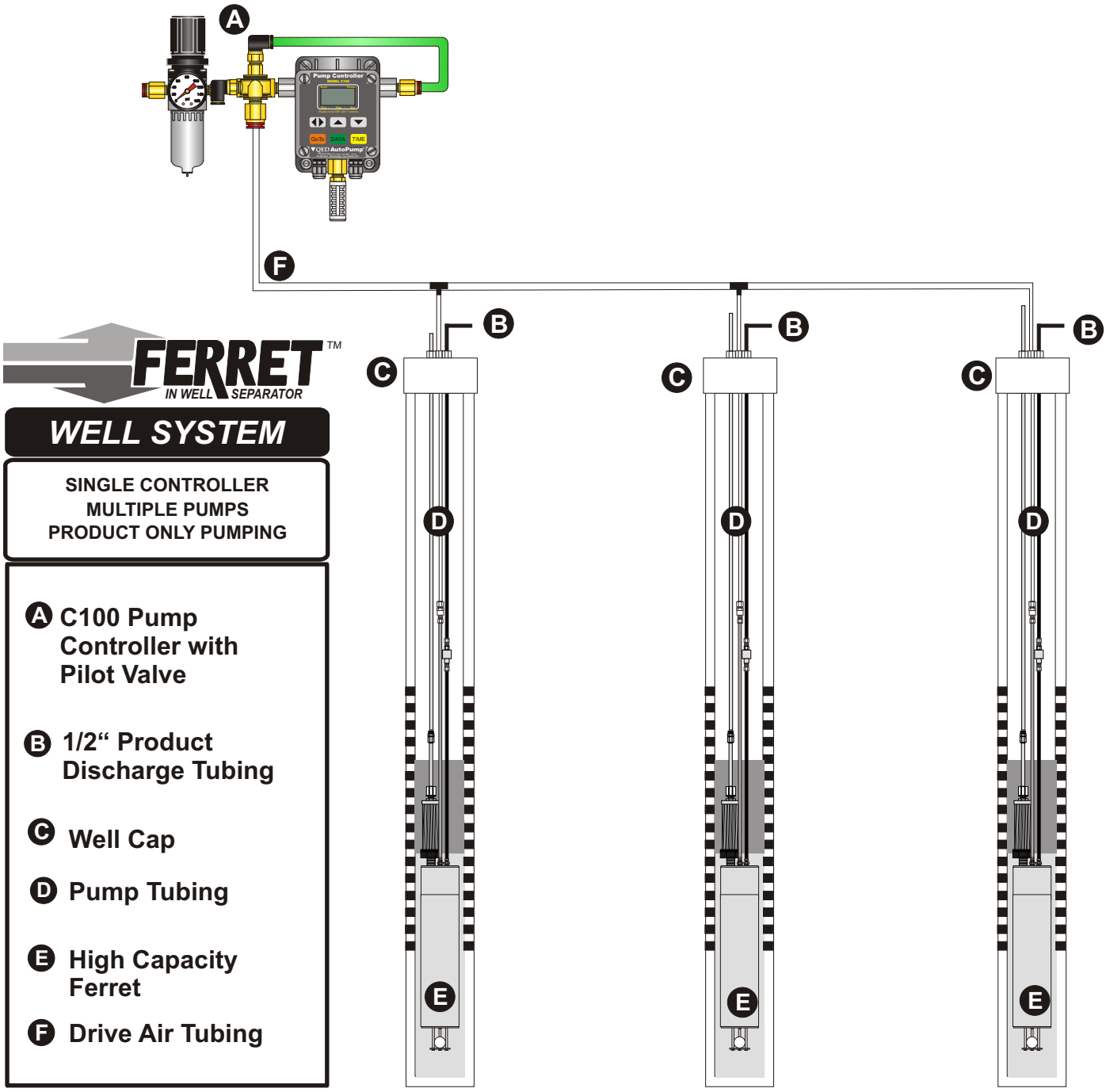
IMPORTANT: If AC-adapter option is used on the C100 follow instructions for mounting and exhaust tube routing away from sources of combustible vapors..

Multiple Pump Installation

The drawing below shows a single controller being used to optimize more than one pump. L650 remote well operators are used to allow some independent drive pressure adjustment on each pump.



Multiple Pump System with a Pilot Valve



WARNING: This equipment is designed to be used only with the QED Model C100 Controller and in accordance with the following installation and operation instructions. Serious personal injury, fire or explosion could result from misuse of this product!

Equipment Description

The Tank Full Shutoff option is designed to stop pump operation when the level in the collection tank exceeds the upper limit defined by the float switch location. When high levels are detected, the C100 will discontinue pump operation and will enter and remain in a "Tank Full" and "System Disable" mode; to resume normal operation, the tank level must be lowered sufficiently to deactivate the switch and the C100 must be manually reset. Once installed,any disconnections or breaks in the switch cable will also cause a "Tank Full" and "System Disable" response.

This system is designed for safe use with flammable liquids, when used in accordance with these instructions. Alteration, misuse,connection to other pump controllers or equipment, or introduction of other electrical power sources could cause serious personal injury, fire, or explosion when used with or near flammable liquids. Ensure that any collection tank is properly vented, so that pumping into the tank does not raise internal pressures beyond safe limits of the tank. Without proper venting, this pumping system can create high pressure levels (up to 120 PSI) within the tank, causing rupture or explosion of the tank!

Part No.	Description
800021	Level Switch, normally closed, w/100' cable
800011	Strain relief for switch cable at tank, 1/2" MPT
38186	Reducer, 1/2" FPT x 2" MPT, with vent port
38192	Tubing elbow connector, 1/2" tube x 1/2" MPT
36254	Bushing, 1/2" FPT x 3/4" MPT

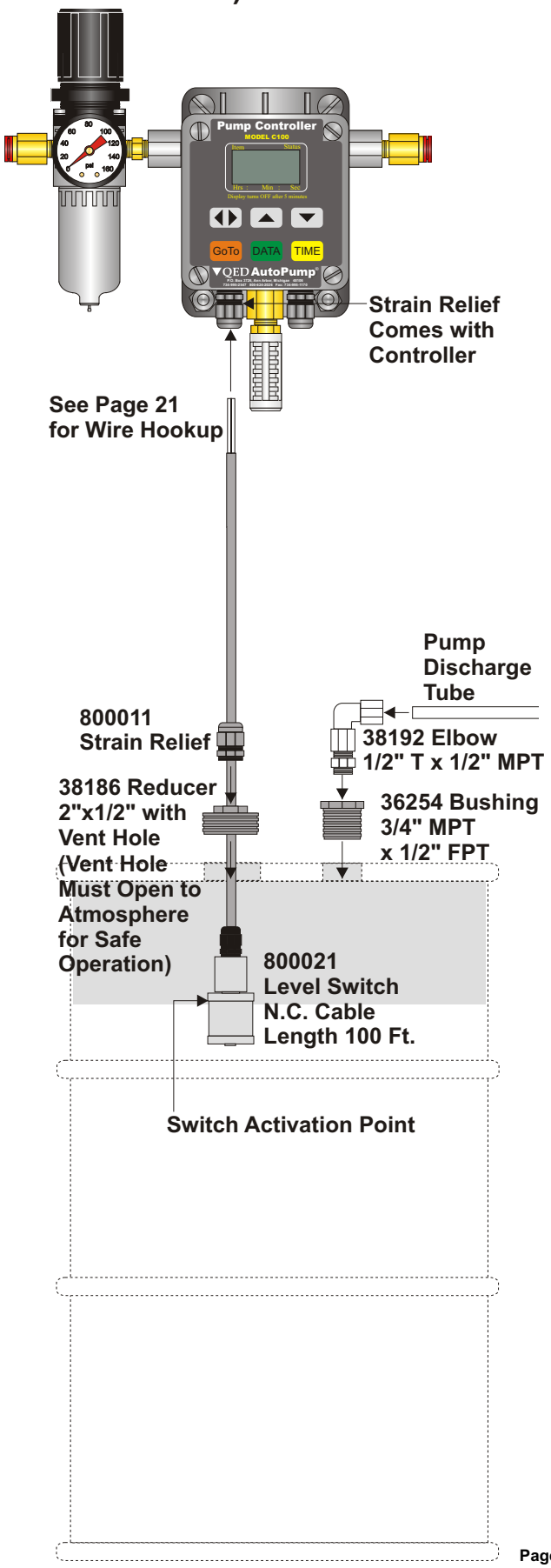
SAFETY WARNING: This switch should only be used with the QED Model C100 Controller and connected as shown. The cable should be protected from abrasion and damage and isolated from other sources of electrical power. Failure to do so may cause personal injury, fire, or explosion. All collection tanks should be properly vented and grounded, including compliance with localcodes.

Basic Installation Procedure (Single Switch and Controller)

1. Locate collection tank and C100 controller, and identify the intended cable path between them, and ensure that the cable will be protected and be of sufficient length.

2. Install the High Level Shutoff Switch in the top of the collection tank ONLY, not the side or bottom, using 800011 Strain Relief (½" MPT), and the special, vented 38186 Reducer (1/2" FPT x 2" MPT) to the tank opening. With the Strain Relief nut loosened, lower or raise the top edge of the float switch to the desired activation level. Make sure that this switch point level meets the intended operation and does not allow flammable liquids to inadvertently discharge through any vents or ports located at a lower level in the tank.

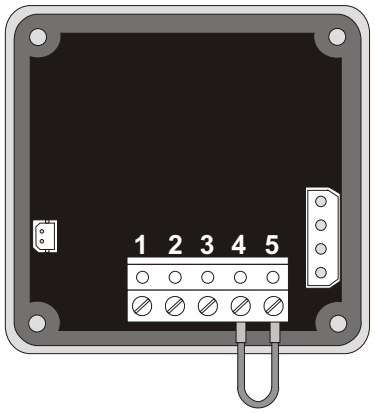
NOTE: the 38186 Reducer includes a vent port to avoid pressure buildup in the tank as liquid is pumped into it. Do not eliminate use of this special fitting without consulting QED! Without proper venting, this pumping system can create high pressure levels (up to 120 PSI) within the tank, causing rupture or explosion of the tank!



3. Route the cable from the switch to the C100 controller, including through all conduits, connectors and restraint devices.
4. Unscrew the four knurled screws on the front cover of the C100 panel. Remove the front panel and disconnect the two electrical plug connectors joining the front panel to the base of the C100, observing their orientation for reconnecting later.
5. Remove the cable strain relief connector nut from the bottom, left side of the C100 Controller, and pass the cable end up through the connector and through the bottom connections. Loosely install the connector nut.
6. Remove the jumper wire between terminals 4 and 5 (shown in diagram 1) on the back of the C100 front panel, by loosening the terminal screws and taking the jumper wire out of the C100 enclosure.
7. Separate the two conductors for approximately 2", stripping the cable insulation back 3/8-1/2".
8. Connect the cable wires to the C100 by sliding them into the terminals marked 4 and 5, then tightening the screws. It does not matter which wire is connected to terminal 4 or 5- no polarity orientation is required (shown in diagram 2).
9. Reconnect the C100 front panel electrical connectors to the matching plugs inside the C100 housing, and reinstall the C100 front panel by threading in the 4 knurled corner screws.
10. Tighten the cable strain relief nut on the bottom of the C100 housing.
11. **Verify successful installation and system function**. Manually invert the switch housing to create a high level switch position and observe that the C100 responds with a "Tank Full" and "System Disable" condition.

DIAGRAM 1

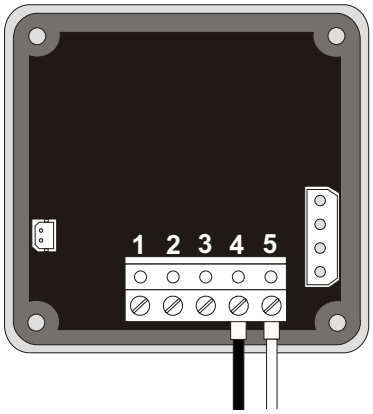
C100 with no switches as shipped



With jumper wire between Terminals #4 and #5.

DIAGRAM 2

Connections for Tank High Level Shutoff



1. **Remove jumper wire from terminals #4 and #5.**
2. **Connect tank switch leads to terminals #4 and #5.**

No polarity so wires can be connected to either terminal.

For Multiple Controllers

If the Tank Full Shutoff function is desired to control multiple C100 controllers, the system should be installed (as shown Diagram1)

1. Install the level switch (800021) for Tank High Level Shutoff in the tank, following instructions 1-11 of instruction sheet (P/N 95175) for Tank High Level Shutoff Kit (Model CTRTFO), and connecting the switch cable to the C100 located nearest thecollection tank.

2. The maximum cable length run between the Level Switch in the tank and the farthest C100 connected to it is 500 feet.

3. Using 2-conductor cables of at least 20 gauge, and in conformance with local codes, connect the first C100 (as shown Diagram 2) to the next closest C100, in each case connecting the two conductors to terminals #4 and #5 of each C100. No polarity is involved, so either conductor can be connected to terminals #4 and #5 at each C100. Follow the same procedures as described in instructions 1-11 of instruction sheet, (P/N 95175) for Tank High Level Shutoff Kit (Model CTRTFO), at each controller, except that the second cable in each case is routed through the second, unused strain relief fitting in the bottom of the C100 enclosure.

4. *Ensure that all terminal screws are tightened securely, and that no wires or connectors are positioned to allow terminals #4 and #5 to be accidently bridged. If terminals #4 and #5 are bridged, the Tank Full Shutoff function will not work, and the collection tank could overflow and cause a spill of flammable or hazardous materials.*

5. Verify successful installation and system function. Manually invert the switch housing to create a high level switch position and observe that each C100 responds with a "Tank Full" and "System Disable" condition. Consult C100 instruction sheet for detailed operating information.

DIAGRAM 1

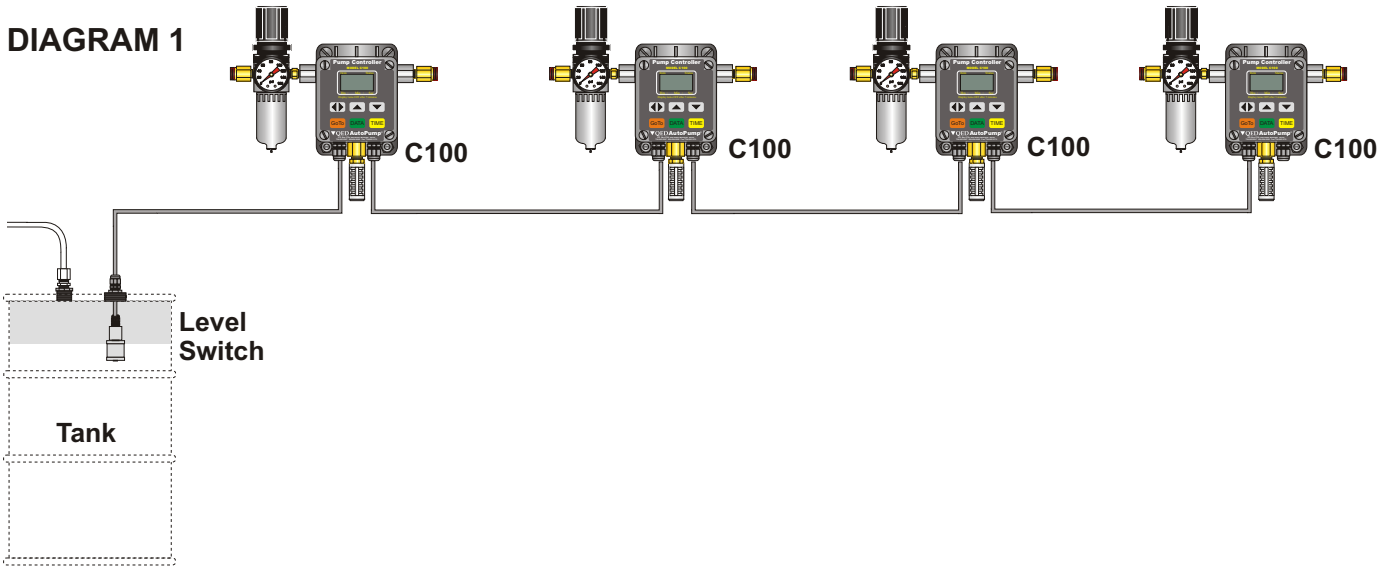
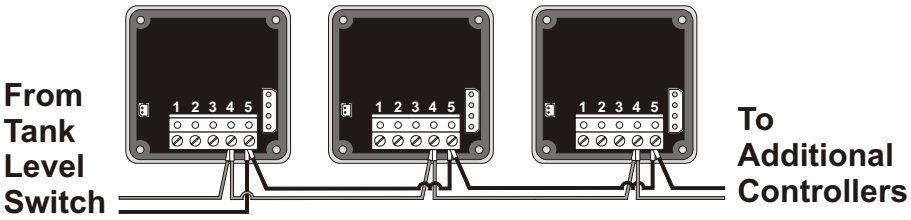


DIAGRAM 2



WARNING: This equipment is designed to be used only with the QED Model C100 Controller and in accordance with the following installation and operation instructions. Serious personal injury, fire or explosion could result from misuse of this product!

Equipment Description

The Level Control Switch option is designed to stop pump operation when the level in the pumped well or sump drops below the limit defined by the float switch location and resume pumping automatically when the liquid level rises again and activates the float switch. When low levels are detected, the C100 will discontinue pump operation and will enter a "Level Off" condition.

This system is designed for safe use with flammable liquids, when used in accordance with these instructions. Alteration, misuse, connection to other pump controllers or equipment, or introduction of other electrical power sources could cause serious personal injury, fire, or explosion when used with or near flammable liquids.

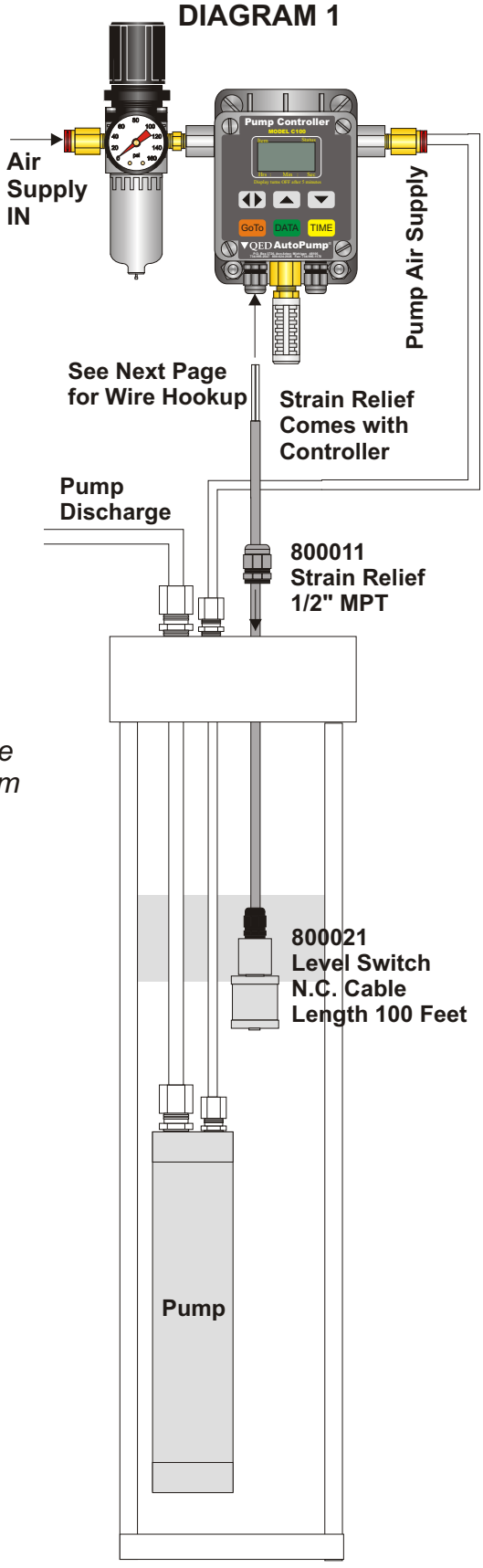
Part No.	Description
800021	Level Switch, normally closed, w/100' cable
800011	Strain relief for switch cable at tank, 1/2" MPT

SAFETY WARNING: *This switch should only be used with the QED Model C100 Controller and connected as shown. The cable should be protected from abrasion and damage and isolated from other sources of electrical power. Failure to do so may cause personal injury, fire, or explosion.*

Installation Procedure

1. Locate well or sump to be pumped and the mounting location of the C100 controller, and identify the intended cable path between them, and ensure that the cable will be protected and be of sufficient length.
2. Install the Level Control Switch in the well using the 800011 Strain Relief (1/2" MPT), in the wellhead or cap. Lower the switch to the desired liquid control level in the well, then tighten the 800021 Strain Relief nut.
3. Route the cable from the switch to the C100 controller, including through all conduits, connectors and restraint devices.

DIAGRAM 1



Installation Procedure Continued...

4. Unscrew the four knurled screws on the front cover of the C100 panel. Remove the front panel and disconnect the two electrical plug connectors joining the front panel to the base of the C100, observing their orientation for reconnecting later. (The terminal orientation inside the front panel will be as shown in Diagram 1).

5. Remove the cable strain relief connector nut from the bottom, right side of the C100 Controller, and pass the cable end up through the connector and through the bottom of the C100, leaving approximately 1 ft. of cable to allow ease of completion of connections. Loosely install the connector nut.

6. Separate the two conductors for approximately 2", stripping the cable insulation back 3/8-1/2".

7. Connect the cable wires to the C100 by sliding them into the terminal screws marked 1 and 2, then tightening the screws. It does not matter which wire is connected to terminal 1 or 2- no polarity orientation is required (shown in diagram 2).

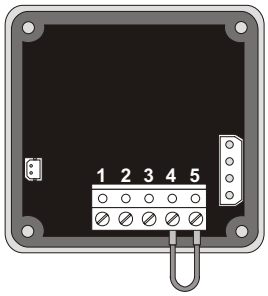
NOTE: The jumper wire between terminals 4 and 5 should remain in place, unless the "Tank Full Shutoff Kit" is also installed. If so, follow all instructions for the Tank Full Shutoff Kit.

8. Reconnect the C100 front panel electrical connectors to the matching plugs inside the C100 housing, and reinstall the C100 front panel by threading in the 4 knurled corner screws.

9. Tighten the cable strain relief nut on the bottom of the C100 housing.

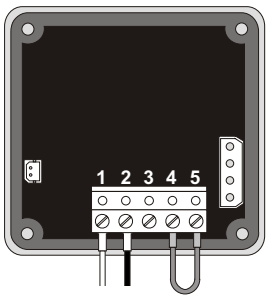
10. Verify successful installation and system function. Manually raise the float above the liquid level and observe that the C100 responds with a "Level Off" condition.

DIAGRAM 1
C100 with no switches as shipped



When connecting, breaking 4 & 5 will disable

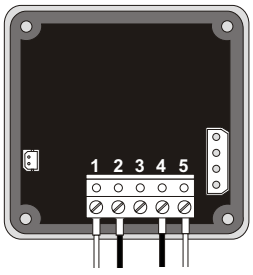
DIAGRAM 2
ON/OFF Level Shutoff



1. Connect leads from level switch to terminals #1 and #2.
2. Jumper remains connected between #4 and #5.

No polarity so wires can be connected to either terminal.

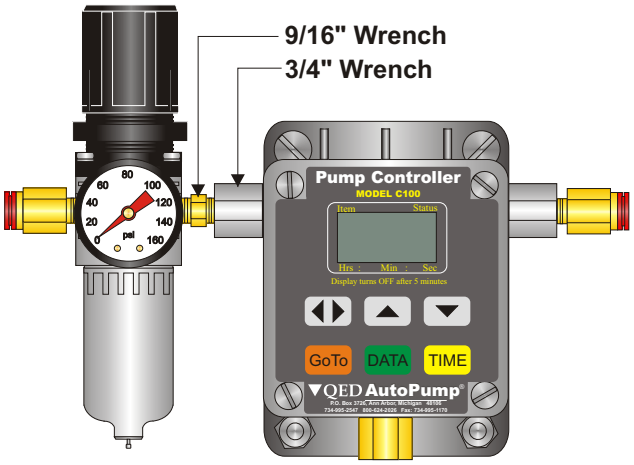
DIAGRAM 3
Tank High Level Shutoff Installation With ON/OFF Level Switch

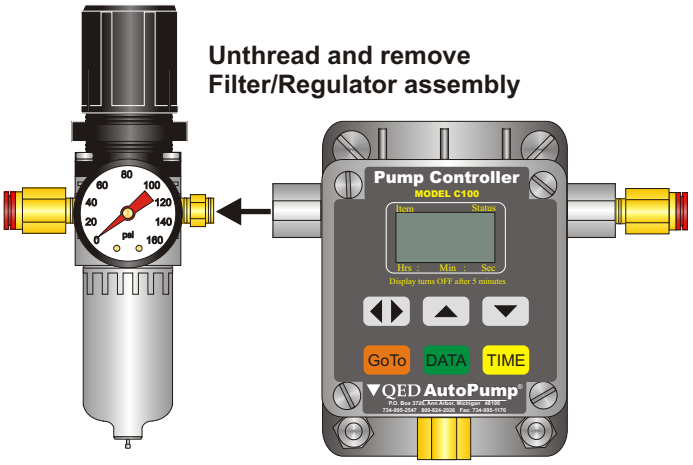


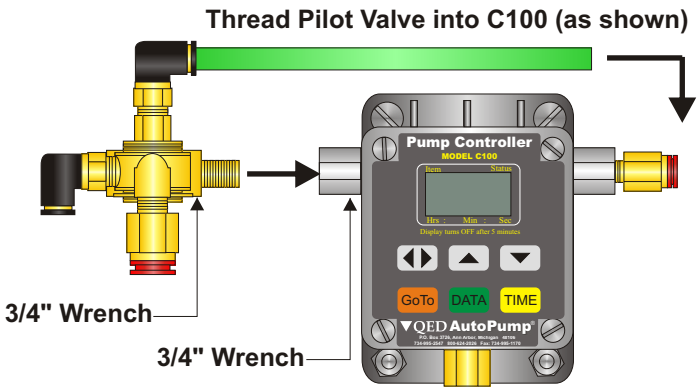
1. Remove jumper wire from terminals #4 and #5.
2. Connect tank switch leads to terminals #4 and #5.
3. Connect level switch leads to terminals #1 and #2.

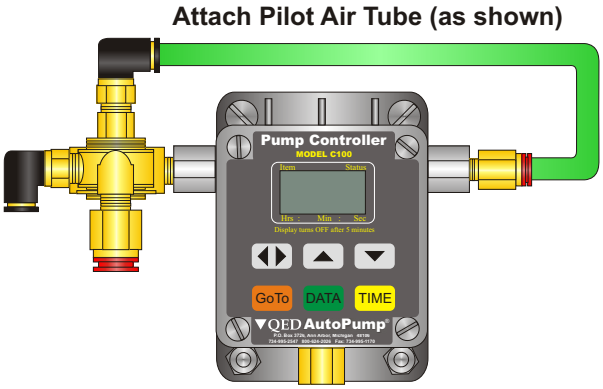
No polarity so wires can be connected to either terminal.

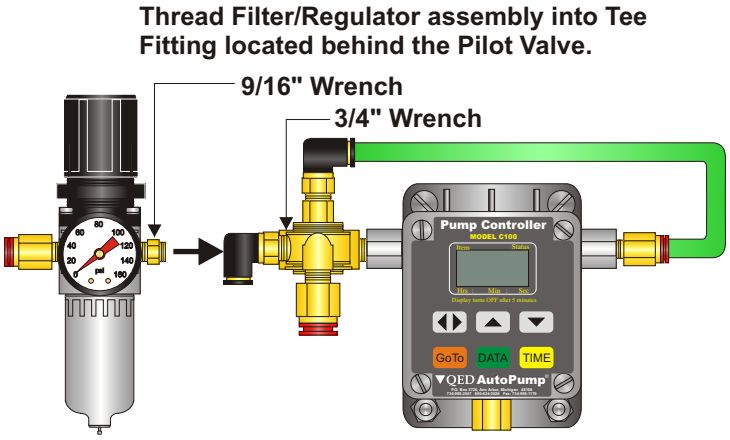
Pilot Valve Kit

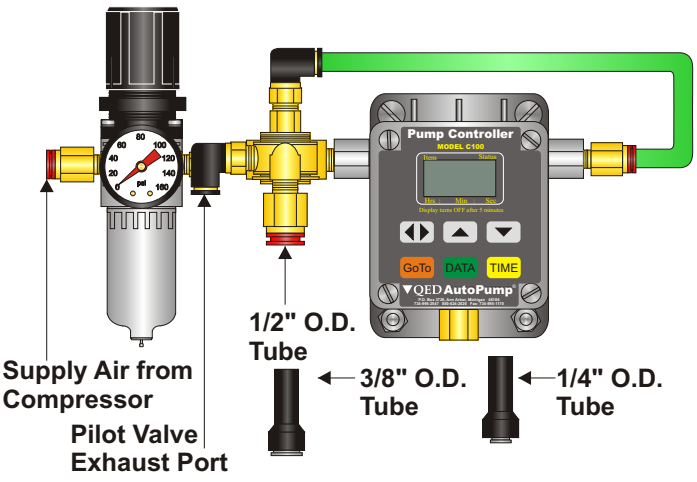




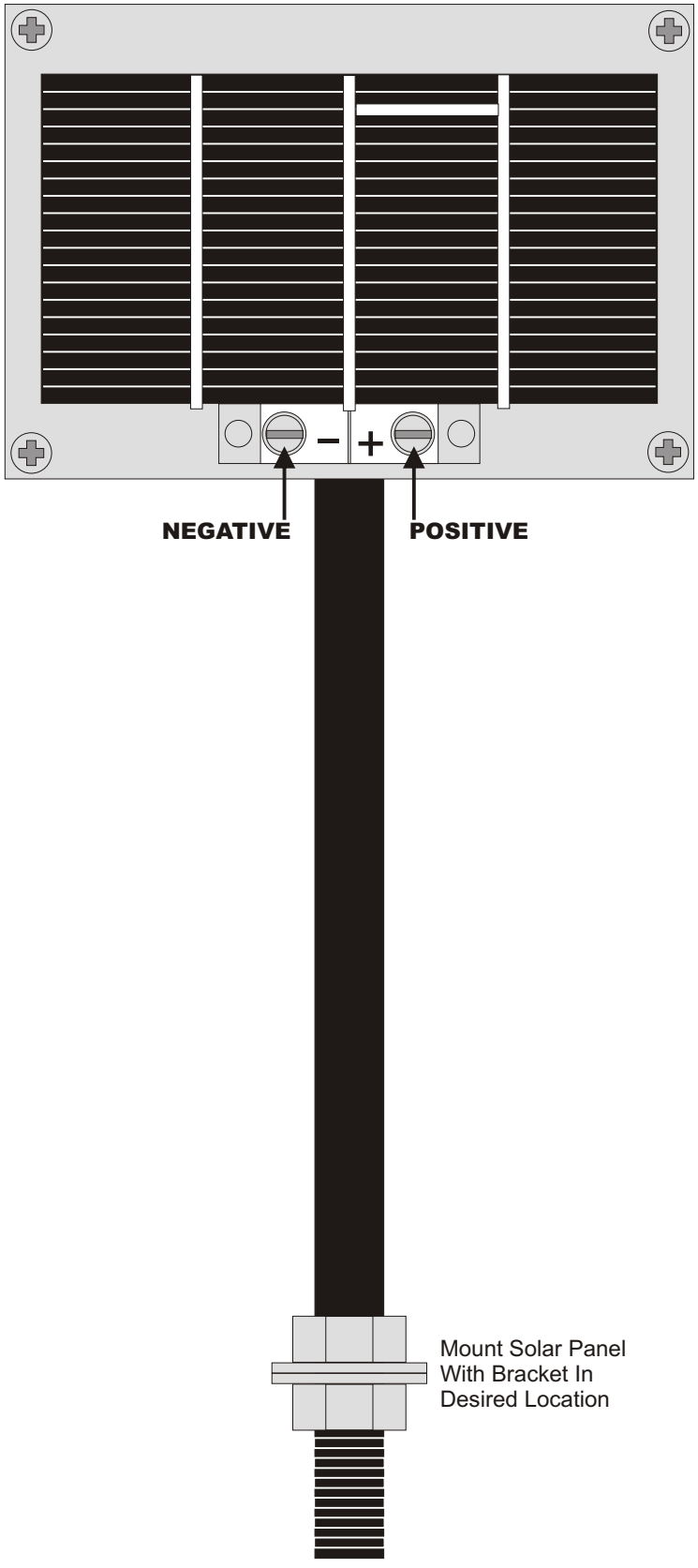


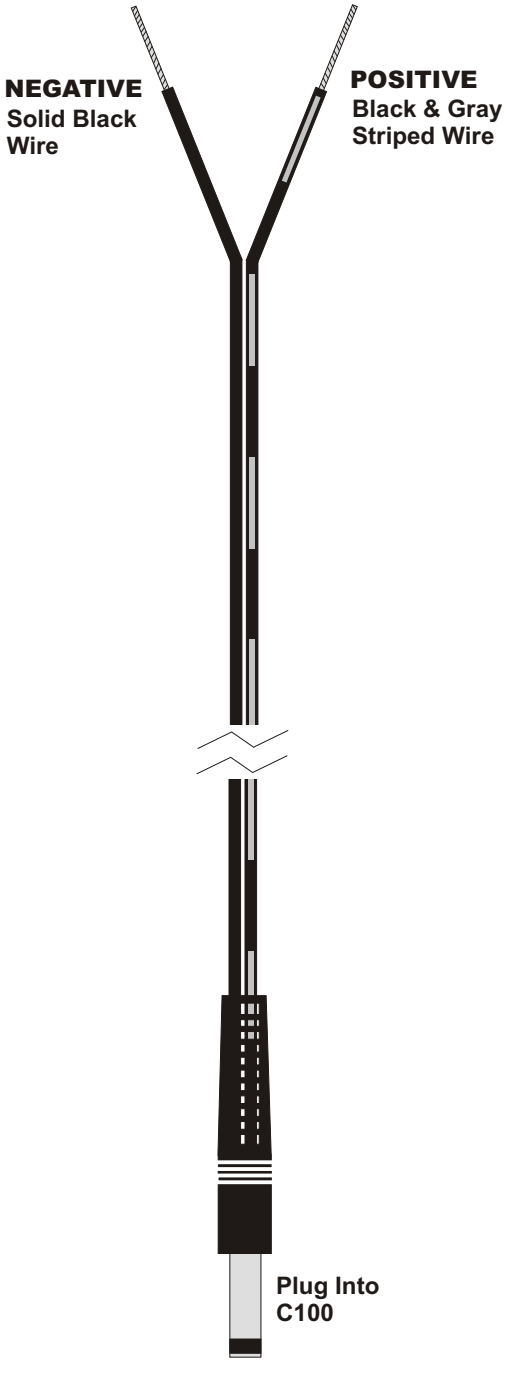


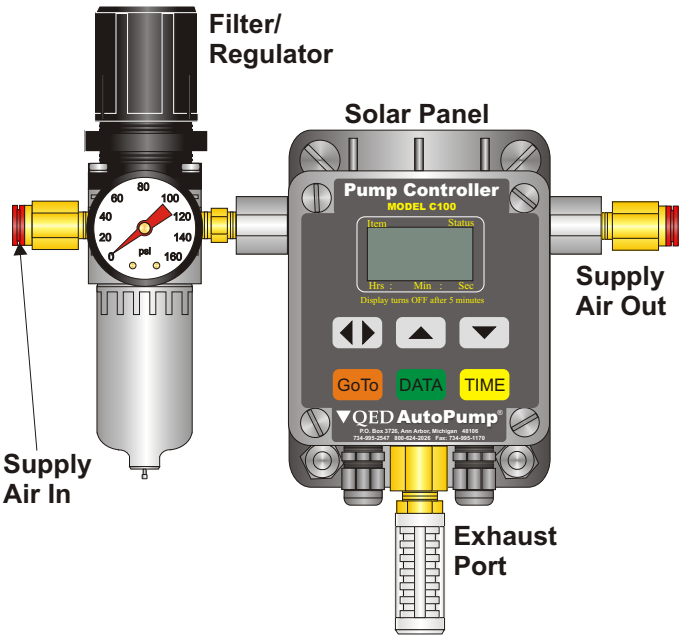




External Solar Panel Instructions







Control Keys:

GoTo — Allows manual toggling of valve and system ON & OFF cycles. Also allows enabling & disabling of system.

DATA — Multi screen key to sequentially display well status, battery status, solar panel voltage, ON/OFF and system valve.

TIME — Allows system counts and time sums, and valve time settings.

Set Keys:

Left/right cursor key

Up or add key.

Down or subtract key.

NOTE:
Display turns off after five minutes of non activity. Press any key to turn display back on.

Controller Type:

Solar/Electrical/Pneumatic

Enclosure:

Dimensions - 3.5" (8.9 cm) **W** x 3.65" (9.3 cm) **H** x 3.5" (8.9 cm) **D**

Weight - 3 LBS. (1.4 kg)

Type - Fiber reinforced thermoplastic NEMA 4X & UL 508

Power:

Solar - Shatterproof solar panel on enclosure top, with backup battery pack with. CSA compliance, intrinsically safe, class 1, division 1, group C & D

C100 is CSA rated intrinsically safe when used in solar mode

110 VAC - Power converter plugs in to standard 110 VAC outlet and supplies 3 VDC,(300 milliamp) to connector plug in enclosure bottom.3-24 VDC external power supply (C100 batteries must be removed and polarity must be correct.

C100 is <u>not</u> rated intrinsically safe when used with 110 VAC power converter or external DC source.

Temperature:

Operating - -20 F to 150 F (-28.9 C to 65.6 C)

Display:

Type - LCD display, 16 character alphanumeric w/ temperature compensated contrast and power off control

Window - Non-glare, double hardened optical acrylic

Pneumatic Control:

Type - Latching solenoid w/ dual port manifold

Fittings - Female 1/4-18 NPT brass with nickel plating

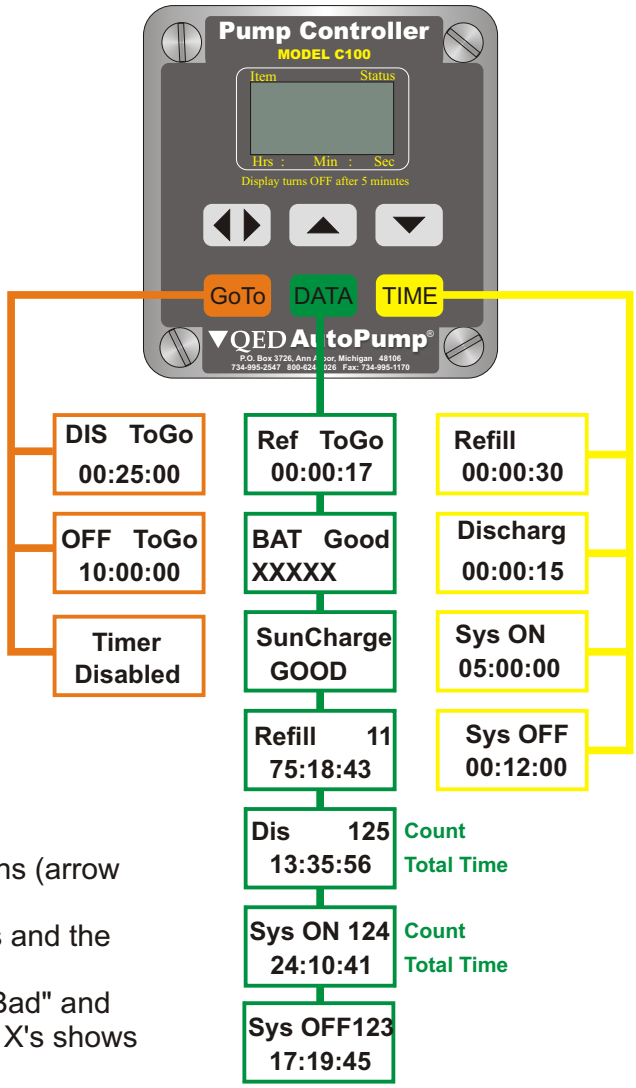
Pressure - 100 P.S.I. (690 kPa) maximum

Flow Capacity:

Sufficient for single Ferret - Call factory for other requirements

***Introduction*-** The C100 electronic/pneumatic controller provides basic refill/discharge air valve cycling to operate QED pneumatic pumps and an ON/OFF timer to allow pump scheduling. Two independent timers maximize system operation flexibility. A built-in solar charging system maintains 24 hour-365 day operation for most sites. CSA approved for intrinsically safe operation near hydrocarbon vapors. Intuitive keypad makes for easy system setup and operation.

Key Menu Sequences:



Go To Key (orange) Key press runs through 3 status/option screens (◀▶ Key Used).
Dis/Ref ToGo- Shows current valve status (pump discharge or refill) and the time left in that mode. pressing the ◀▶ key causes the valve to immeadiately go to the next mode and begin timing down.
System ON/OFF- Shows if the system is ON (awake) or OFF (in sleep mode) and the time left in that mode. Pressing the ◀▶ key causes the system to immediately go to the next mode and begin timing down.
Timer Disabled- Shows if the system is disabled or enabled. Pressing the ◀▶ key causes the system to immediately go to the next mode. System disabled can be used to override system timers during pump maintenance.

***Data Key (green)*-** Key press runs through 7 status screens (arrow keys not used).
Dis/Ref ToGo- Default screen, shows current valve status and the time left in that mode.
Bat Good/Bad XXXX- Shows battery status as "Good"/ "Bad" and shows a bar-graph of X's indicating battery strength, (less X's shows lower strength).
Sun Charge Good/Bad- indicates if sun charge has been sufficient to maintain battery charge for this system's power use (depends on time settings & valve cycle frequency).
Refill - Shows count of refill cycles and total system refill time (sum of all refill times).
Discharge - Shows count of discharge cycles and total system discharge time (sum of all discharge times).
Sys ON - Shows count of system ON cycles and total system ON time.
Sys OFF - Shows count of system OFF cycles and total system OFF time.

Time Key (yellow) - Key press through 4 option screens (◀▶,▲,▼, keys used).
Refill - Sets refill time, ◀▶ moves to hours, minutes, seconds position and ▲▼ keys increase or decrease time settings. Range: 0 seconds to 99 Hours: 99 Minutes: 99 Seconds.
Discharge - Sets discharge time, ◀▶ moves to hours, minutes, seconds position and ▲▼ keys increase or decrease time settings. Range: 0 seconds to 99 Hours: 99 Minutes: 99 Seconds.
System ON - Sets system ON, or awake time, ◀▶ moves to hours, minutes, seconds position and ▲▼ keys increase or decrease time settings. Range: 0 seconds to 99 Hours: 99 Minutes: 99 Seconds.
System OFF - Sets system Off, or sleep mode time, ◀▶ moves to hours, minutes, seconds position and ▲▼ keys increase or decrease time settings. Range: 0 seconds to 99 Hours: 99 Minutes: 99 Seconds.

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