

# **EQUALIZER MODEL EQ30 INSTALLATION INSTRUCTIONS**

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## **EQUALIZER MODEL EQ30 INSTALLATION INSTRUCTIONS**

**Measurement Technology Model EQ30 Revision Four**

**Retrofit Computer Head Installation Instructions**

**January 2000**

# EQUALIZER MODEL EQ30 INSTALLATION INSTRUCTIONS

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## DISCLAIMER

**The information in this manual has been checked and is believed to be entirely reliable. However no responsibility is assumed by Measurement Technology Ltd., or its affiliates, for any loss or damage resulting from the installation or use of this product.**

## 1.0 CAUTIONS

- 1) The EQ30 contains no user-serviceable parts. Refer servicing to qualified service personnel.
- 2) The Wiring to the EQ30 may contain more than one live circuit. To prevent electrical shock hazard be sure all circuits are dead before servicing. Refer installation and repair operations to qualified service personnel only.
- 3) Follow local electrical codes when installing this product.

All of the EQ30 circuit boards contain components that can be damaged by static electricity. When not in use, always store and transport in an anti-static container (such as its shipping bag). **NEVER PACK IN STYROFOAM.** Do not touch components on the board with your hands.

## 2.0 DESCRIPTIONS

The EQUALIZER model EQ30 Electronic Computer Register is designed to be field retrofittable to all types of pumps that once used a mechanical computer. In addition the EQ30 can be installed in OEM equipment or with optional display adaptors. It can also be used to upgrade older electronic pumps.

## 3.0 UNPACKING and INSPECTION

Every EQ30 is shipped from the factory with a packing list sealed inside the carton. When the container is opened this form should be in the bag with other paperwork including this manual. Check the contents of the box using the packing list as a guide. Also inspect the contents for any shipping damage. If damage is evident do not attempt to install the device - consult the factory for return and replacement instructions.

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## 4.0 THEORY of OPERATION

The following section depicts the theory behind the main operating features of the EQ30 which enable the EQ30 to function properly.

### 4.1 Input Counting

The EQ30 is designed to emulate the function of one or two mechanical heads. Unlike some electronic units, the EQ30 ALWAYS counts volume if the input shaft is turned in the correct direction. Every change ( transition) on either encoder channel is counted as an input "count". The standard encoder used on the EQ30 outputs 128 pulses per channel per rotation. This equates to  $128 \times 2$  transitions  $\times 2$  channels = 512 transitions (counts) per revolution. The factory default input count for one unit is 2048 (4 shaft turns).

The "correct" direction of rotation is programmable to be clockwise or counter clockwise. The factory setting for direction is counter clockwise when the shaft is viewed from the bottom of the unit. The direction of rotation of the shaft is converted to pulses on the output of the shaft encoder. The phase relation of the pulses determines the direction sensed by the EQ30. The shaft encoder wiring consists of four wires as follows:

<b>Wire Colour</b>	<b>Function</b>
RED	+5 Volt power to encoder
GREEN	Ground
WHITE	Encoder channel 0 output (0-5 Volt level)
YELLOW	Encoder channel 1 "

If the encoder direction is reversed, the EQ30 stops counting up and begins to record the number of pulses in the reverse direction. When the encoder stops and goes forward again the EQ30 starts subtracting the reverse counts until the count is zero, then the unit begins to count up again on the display. In this way the unit can tolerate "backlash" on the pulser shaft with no ill effects. However, if the reverse count value becomes too high (255 counts) the unit will shut down, indicating a pulser error. If there are pulses missing on either channel, the missed pulse is counted as an error. If 50 error counts are made the unit will shut down.

If both channels are tied together, direction cannot be sensed and the unit will count two counts for every input transition. This feature is useful for CNG applications where an electronic device is generating input pulses.

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## 4.2 Handle Switch Input/Output

The Handle switch input(s) on the EQ30 are intrinsically safe. That is, the wiring does not have enough current flowing to cause ignition of an explosive gas mixture. The factory supplied handle switch on the EQ30 is a solid state optical switch. The switch has three wires as follows:

Wire Colour	Description
RED	+5 Volt Power
WHITE or YELLOW	Switch Output ( 0 Volts = "ON", 5 Volts = "OFF")
GREEN	Ground

## 4.2 Handle Switch Input/Output (continued)

The output of the switch closes the circuit to ground. The input to the EQ30 is pulled up through a 10K resistor to 5 volts.

The factory switch may be substituted for any switch that is connected between the input (white lead) and ground (green lead). Switching the input (white lead) to ground indicates to the EQ30 that the handle is "ON". The wiring of the switch must not come near any 110 volt circuitry. For example, you CANNOT use the existing pump handle switch in an installation where the switch is mounted in an explosion-proof box and other live wires exist in the same enclosure. Inside the explosion-proof box on the EQ30 there is a relay for each handle switch that "mirrors" the intrinsically safe switch. These relays close when the handle is "ON" and open when the handle is "OFF". The contacts can be used to switch loads up to 5 amps at 220 VAC. Normally this output is used to signal a control system that the pump handle is "ON", requesting authorization to pump.

## 4.3 Motor Control

The EQ30 has two motor control triacs built in, one for side "A" and one for side "B". Both triacs can switch loads of 110/220VAV up to 15 amps and can directly control a 3/4 hp motor.

The motor triacs turn on when the pump handle is on and the unit is "authorized", and when there are no error conditions. If the unit is configured as a 2 hose 2 product unit, the motor triacs operate independently of each other. If the unit is configured as a 2 hose 1 product unit, either handle will cause both motor outputs to be activated.

## 4.4 Solenoid Valve Control

The EQ30 has two solenoid control triacs built in, one for side "A" and one for side "B". Both triacs can switch loads of 110/220VAC at 2 amps. The motor solenoid triacs turn on 2 seconds after the pump handle is turned on and the unit is "authorized", and there are no error conditions. Optionally

# EQUALIZER MODEL EQ30 INSTALLATION INSTRUCTIONS

## 4.4 Solenoid Valve Control (continued)

a two second delay can be programmed between motor start and solenoid operation to pressurize the line before the solenoid opens to prevent leak detector operation on submersible pumps.

The solenoid triacs always operate independently of each other. Normally the solenoid outputs are used to control solenoids and to indicate to a hardwired console that the pump is running.

## 4.5 Hardwired Console Control

The EQ30 has been designed to interface easily with "hardwired" consoles. The term "hardwired" means the pump operation is controlled by individual wires carrying commands and status information to and from the pump. There are four signals required to "hardwire" a pump to a control system as follows:

<b>Signal Name</b>	<b>Description</b>
PULSER OUT	Low voltage line sending sale info to the console
AUTHORIZE IN	110/220 volt signal from the console if OK to pump
PUMP RUNNING	110/220 volt signal from the pump indicating pump "ON"
AUTHORIZE REQUEST	Contact closure from the pump to indicate handle "ON"

Some control systems use current sensing on the authorize line to indicated "AUTHORIZE REQUEST". This saves a wire under ground. The EQ30 can be wired to take advantage of this feature by wiring the handle switch in series with the authorize input line.

In order for the EQ30 to function properly with a hardwired console the unit must be programmed to operate in "penny console" mode. The factory set mode is "stand alone".

## 4.6 Serial Communications Console Control

The EQ30 has been designed to support control and monitoring of its operation by a remote console or other form of control system. When serial communications are used, no "hardwired" wires are needed to control the pump. Instead the command and status information needed for control is sent digitally over only two or three low voltage wires. This method of control offers such added features as remote price setting and remote totalizer reading.

# EQUALIZER MODEL EQ30 INSTALLATION INSTRUCTIONS

## 4.6 Serial Communications Console Control (continued)

The EQ30 can support different electrical and serial protocol schemes. The currently supported protocols are:

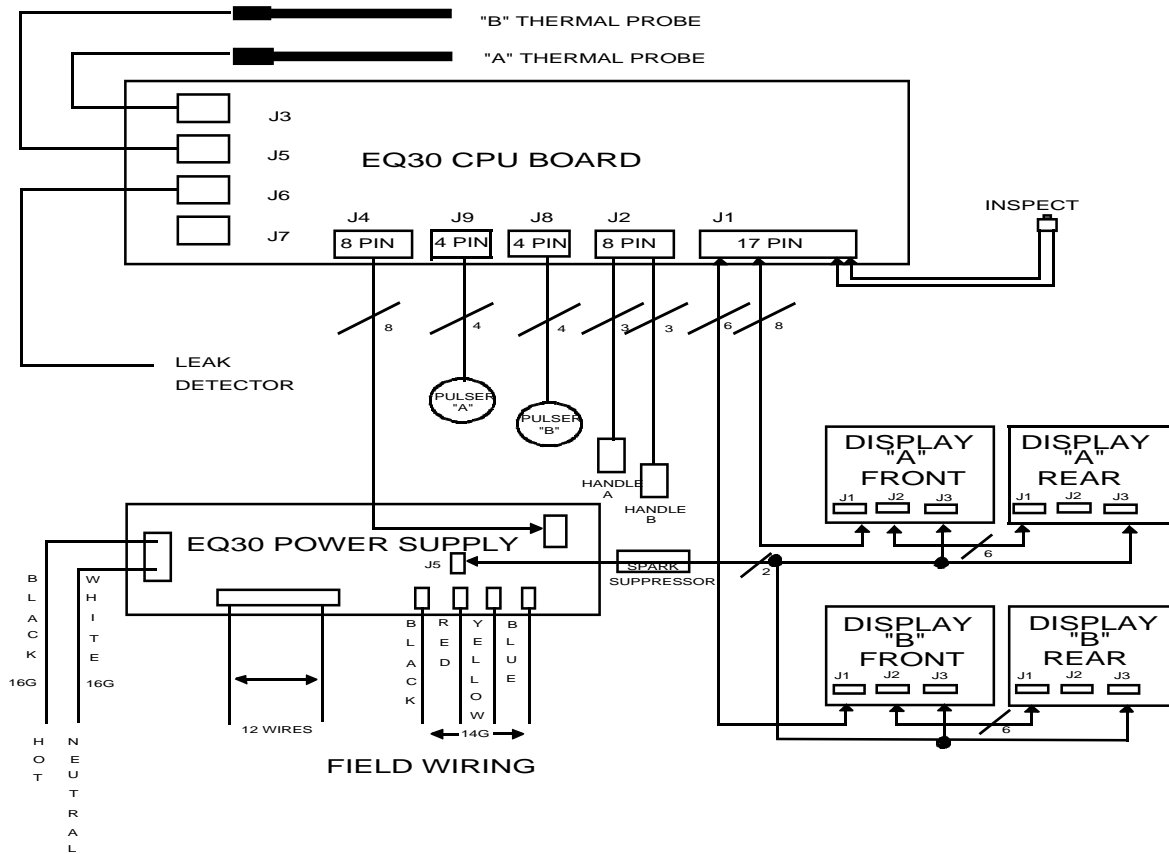
<b>Protocol</b>	<b>Description</b>
DANLINK	Two wire protocol for D&H control systems (public domain)
MNET	Three wire protocol for KRAUS MICON heads
GNET	Two wire protocol for GILBARCO pimps
TNET	Two wire protocol for Tokheim pumps
TERM	Two wire (monitor only) ASCII output for a dumb terminal

DANLINK and MNET are standard equipment on the EQ30 while other protocols are available on special order at extra cost.

In order for the EQ30 to function properly with a serial console, the unit must be programmed to operate in correct serial mode. The factory set mode is "stand alone"

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## 4.7 EQ30 INTERNAL WIRING DIAGRAM





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## 5.0 INSTALLATION

The installation process of the EQ30 initially consists of knowing the origins of the field wires, jumper settings, and the configuration of software.

### 5.1 Field Wiring Detailed Description

The field wiring on the EQ30 consists of up to 18 wires for a dual head configuration, 13 wires for a single. A description of each wire follows:

<b>WIRE NUMBER/COLOR</b>	<b>DESCRIPTION</b>
Black 16G.	Head Power - Power to the EQ30 computer should be connected to 110/220V 50/60Hz hot/L1 depending on 110/220 volt version option.
White 16G	Head Neutral/L2 - Neutral line (or L2 if 220V) should be connected to neutral/L2. This line is also the neutral reference for the authorized input lines.
Yellow 14G	Side A Motor Power Input - 110/220V Hot/L2 power for the side A motor. Maximum input load is 15A @ 110/220VAC 3/4hp
Blue 14G	Side A Motor Power Switched Output - 110/220V power to the side A motor. Maximum load is 15A @ 110/220VAC 3/4 hp. This line is switched by a triac.
Green/Yellow 16G.	Earth Safety Ground - Connect to Earth
Black 14G.	Solenoid A&B, Motor B Power - Power input for solenoids and side B motor. Can be 110/220VAC.
Grey #3 18G.	Solenoid A Output - Power output for the control of side A solenoid. Can supply up to 2A @ 110/220V. This line is switched by a triac.

# EQUALIZER MODEL EQ30 INSTALLATION INSTRUCTIONS

Orange #5 22G. Authorize Side A - 110/220V input to allow hard wired console or card system to allow sales on side A. Neutral/L2 reference is on White 16G (head neutral line).

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Blue #7 #8 18G. Side A handle Contacts - These two wires are switched together whenever side A handle switch is active. They can be used to signal authorize request to a console or card lock system. Maximum load is 220V @ 5A. These lines are connected to relay contacts.

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Yellow #1, Red #11  
Black #12, Green #13 22G. Communications/Pulser Wiring - These four lines are used in conjunction with internal jumpers in the EQ30 to provide pulser or serial communications for console or card lock. See section 5.2 for the wiring configuration verses jumper selections.

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## ADDITIONAL WIRES PRESENT ON A DUAL CONFIGURED HEAD ONLY

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Yellow #9, #10 18g. Side B handle Contacts - These two wires are switched together whenever side B handle switch is active. They can be used to signal authorize request to a console or card lock system. Maximum load is 220V @ 5A. These lines are connected to relay contacts.

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White or Brown #6 22G. Authorize Side B - 110/220V input to allow hard wired console or card system to allow sales on side B. Neutral/L2 reference is on White 16G. (head neutral line).

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Violet #4 18G. Solenoid B Output - Power output for the control of SideB solenoid. Can supply up to 2A @ 110/220V. This line is switched by a triac.

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Red 14 G. Motor B Output - Power output for the control of side B motor. Can supply up to 15A @ 110/220V 3/4 hp. This line is switched by a triac.

## 5.2 EQ30 Jumper Settings

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The equalizer has three field settable jumpers (JP4, JP5 and JP1) for setting console communications. In addition to jumper settings, the EQ30 must be software configured. There are three options as shown below:

## TO SELECT KRAUS SERIAL COMMUNICATIONS

JP4 \*-\* \* (Shunt 1 & 2)  
JP5 \* \*-\* (Shunt 2 & 3)  
JP1 \* \* (No Shunt Installed)

Wiring: Red #11 = DCC (Common)  
Black #12 = TTP (Serial input to pump)  
Yellow # 1 = TTC (Serial output from pump)

## TO SELECT PENNY / VOLUME PULSER

JP4 \* \*-\* (Shunt 2 & 3)  
JP5 \*-\* \* (Shunt 1 & 2)  
JP1 \*-\* (Shunt 1 & 2)

Wiring: Red #11 = Pulser output SIDE A  
Black #12 = +12V pulser power for side B  
Green #13 = Pulser output SIDE B  
Yellow # 1 = +12V Pulser Power for side A

## TO SELECT GILBARCO / TOKHEIM OR DANLINK CURRENT LOOP

JP4 \* \* \* (No Shunt Installed)  
JP5 \*-\* \* (Shunt 1 & 2)  
JP1 \* \* (No Shunt Installed)

Wiring: Red #11 = Loop (-)  
Black #12 = Loop (+)  
Green #13 = Not used  
Yellow # 1 = Loop (+)

The factory default jumper setting is PENNY / VOLUME PULSER OUTPUT.

## 5.3 Mechanical Installation Procedure

For specific instructions on the mechanical installation details of the EQ30, please refer to the Copyright Measurement Technology Ltd. 2000. All Rights Reserved.

# EQUALIZER MODEL EQ30 INSTALLATION INSTRUCTIONS

supplemental instructions supplied with each custom installation kit for various specific pump make and model types.

## 5.4 Software Configuration (also see Equalizer Operation Manual)

In order to function correctly in service, the EQ30 must be configured for each unique installation. Below is a list of configuration parameters that may vary from one installation to another, along with a factory default setting of the parameter. If you find a parameter that does not match the factory default, you will need to change the parameter. Refer to the EQ30 programming manual to determine how to set the parameter.

MODE#	PARAMETER	FACTORY SETTING
02	Console control	Stand alone
04	Communications Link address	0
60	Meter turns per unit	4 turns per unit
12	Shaft encoder direction of rotation	Counter Clockwise
13	Leak detector option	OFF
14	Turbine prestart	OFF
41/51	Meter calibration	0.00%
03	Pulser output speed and type	8 msec. volume pulse
62	Pulses per unit (if volume pulse)	10 Pulses per unit
65	Unit Mode (# of hoses and products)	1 Hose 1 Product
40/50	ATC type	OFF, Canadian VCF
01	Number of price tiers	1 tier
05	No flow timeout	OFF
06	Delivery volume limit	999.999
07	Delivery dollar limit	9999.99
63	Sale \$ display decimal point	4 (nnnn.nn)
63	Sale volume decimal point	3 (nnn.nnn)
63	Price per unit decimal point	1 (n.nnn)

## 5.5 ATC Temperature Probe Installation

The temperature probe(s) must be installed close to the meter, either on the inlet or outlet side. In addition, the supplied thermal well must be installed as close as possible to the temperature probe. The well must be positioned so that it can be filled with conductive fluid and so that it can be easily reached by W&M inspectors.

## 5.5 ATC Temperature Probe Installation (continued)

When installing probes and thermal wells the following points should be adhered to:

\* A thermal well must be installed in the fuel flow for each probe. The well must be mounted as

# EQUALIZER MODEL EQ30 INSTALLATION INSTRUCTIONS

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close as possible to the probe (not more than 12 inches away). The well must be mounted so that it can be filled with thermally conductive oil (i.e. it must be less than 45 degrees from vertical) and it must be accessible so that a thermometer can be placed into it.

\* There must be a probe in the fuel flow for each product being metered. The probe can be located anywhere in the flow before or after the meter. In the case of a single product twin hose, a single probe can be used but it must be installed so that the fuel for both meters flows by the probe.

\* The well and probe fittings are 1/8 inch NPT fittings. These fittings require that at least five threads are present at the joint. If the wall being tapped is too thin, the fitting must be soldered.

\* Do not drill or tap piping while on the pump. Instead, remove, tap and clean before reinstalling. Metal shavings left after drilling and tapping could damage the pump.

## **CAUTION**

**Do not operate electric drills or other devices which may pose a fire hazard within 25 feet of a gas pump. Fittings to be modified MUST BE REMOVED FROM THE PUMP BEFORE DRILLING, SOLDERING OR WELDING!**

After the installation has been completed, the housing should be installed on the EQ30. Weights and Measures personnel should then be contacted, so that the housing can be sealed using a sticker, probe fittings and probe connectors can be sealed against tampering, using wire seals.

## **5.6 Final Installation Check**

Apply AC power to the pump and observe that the displays light and the green power light comes on steadily. The displays should show the last sale data and pricing. Using the remote control (press "0", "0"), check the temperature reading for each side and that the correct product type is displayed for each side in the status display. Then dispense a small amount of fuel from each side and ensure no error status is reported. Place the supplied notification and EQ30 identification labels on the side of the pump next to the make and model plates.

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## 5.7 Manual Calibration

To determine if meter calibration is required, perform the following steps:

- 1) Disable temperature compensation and set the calibration factor to 00.00% using program function "41" for side "A" and "51" for side "B". See programming manual section 4.2.2.
- 2) Dispense exactly 20 litres of fuel into a test can, use the test can for measurement, not the pump display.
- 3) With 20 litres in the test can, note the pump reading. If the reading is 20.000 litres + / - .01 litres, no calibration is required.
- 4) If calibration is required, the meter calibration can be computed as:

$$\text{Calibration Factor} = ((20.000 / \text{pump reading}) * 100\%) - 100\%$$

**Example # 1** For a pump reading of 20.570 litres:

$$\begin{aligned}\text{Calibration factor} &= ((20.000 / 20.570) * 100\%) - 100\% \\ &= ((.9722) * 100\%) - 100\% \\ &= 97.22\% - 100\% \\ &= -2.78\%\end{aligned}$$

The closest settable factor to -2.78% is -2.80%, so set -2.80%.

**Example # 2** For a pump reading of 19.350 litres:

$$\begin{aligned}\text{Calibration factor} &= ((20.000 / 19.350) * 100\%) - 100\% \\ &= ((1.0336) * 100\%) - 100\% \\ &= 103.36\% - 100\% \\ &= 3.36\%\end{aligned}$$

The closest settable factor to 3.36% is 3.35%, so set 3.35%

If meter calibration is required, you can manually set the calibration factor using the remote control or refer to section 5.8 for automatic calculation and setting of the calibration factor.

After you have set a meter calibration factor, repeat the calibration test by dispensing 20.000 litres into a test can and check that the pump now reads 20.000 litres + / - .01 litres.

## 5.8 Automatic Calibration

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This feature allows set up of the electronic calibration value needed to correct for small errors in the mechanical calibration of the meter automatically.

## To Perform Automatic Calibration of Side "A"

1) Using mode "41" (51 for side B) reset the calibration factor to "0000" Pressing #4 on the remote when in this mode will reset the factor to "0000"

2) Dispense exactly 20.000 litres into a test can. The display may show more or less than 20.000 litres.

3) Now enter audited programming function "42", the EQ30 will compute the correction factor needed and display it as:

"CAL A nnnn" where nnnn is the new calibration constant

The new calibration factor will be automatically entered when the "ENTER" key is pressed. There are two possible error messages during automatic calibration. "Error 5" will be displayed if the calibration factor was not set to "0000" when the auto-calibration mode was started. "Error 6" will be displayed if the meter is too far out of calibration for the auto-calibration function to work. The displayed value must be within + / - 12.75 of 20.000 litres for the function to work.

## To Perform Automatic Calibration of Side "B"

1) Enter audited programming function "52" and follow the above sequence as for SIDE "A".

**NOTE:** For automatic calibration the following equipment is required.

- A) 20 Litre prover for low volume pumps
- B) 200 or 500 Litre prover for high volume pumps

## 5.9 Sealing

After the installation has been completed, the plastic housing should be installed on the EQ30 using screws provided. W&M personnel should then be contacted, so that the housing, probe fittings and probe connectors can be sealed against tampering, using wire and / or tape seals as indicated below:

Seal Location	Seal Type
Probe fitting	Wire seal
Probe plug	Wire seal
Plastic housing	Tape seal

At the present time Weights and Measures does not provide a full approval on AUDIT TRAIL ELECTRONIC SEALING. Therefore DIP switch #2 on the CPU housing must be placed in the

# **EQUALIZER MODEL EQ30 INSTALLATION INSTRUCTIONS**

"OFF" position to disable the remote control access to audited parameter settings. See programming manual section 5.2 for more information on the function of this switch.

After W & M has approved the pump for operation with ATC, tape over the "corrected to 15 C" notice on the face plates must be removed.

## **6.0 INSTALLING OPTIONS**

The following represent the procedures for installing options on the EQ30.

### **6.1 Hydrocarbon Leak Detector**

To install the leak detector simply tie wrap the leak detector cable along the fuel line and let a few inches of the cable protrude into and along the bottom of the containment enclosure. Plug the RCA end of the cable into J6 on the EQ30 CPU box (the third RCA jack from the top of the box).

### **6.2 Two Tier Price Option Wiring**

Refer to the specific instructions supplied with the two tier switches.

## **7.0 TYPICAL ELECTRICAL WIRING DIAGRAMS**

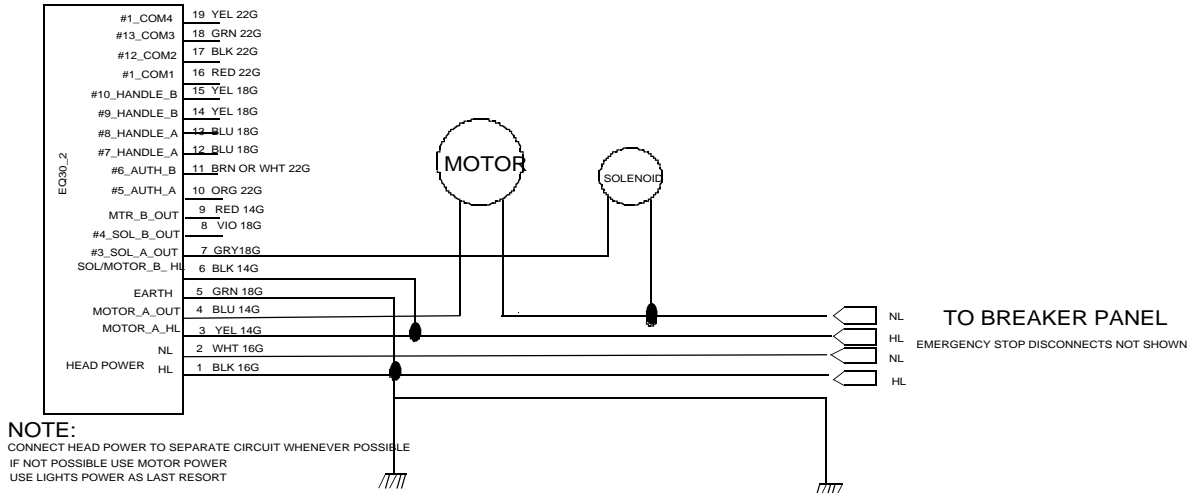
The following pages indicate typical wiring for various installation types. These are by no means  
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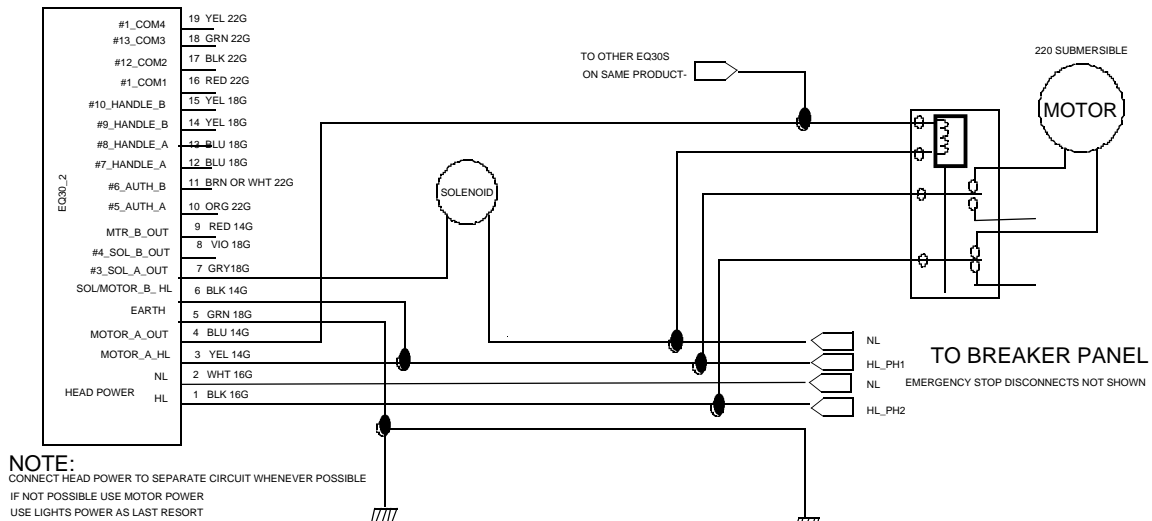
a complete list of possibilities and a true understanding of each circuit in the EQ30 and associated equipment is a definite asset in determining the best way to wire a site.

## 7.1 Single Hose Suction Pump



EQ30 REVISION 2 WIRING

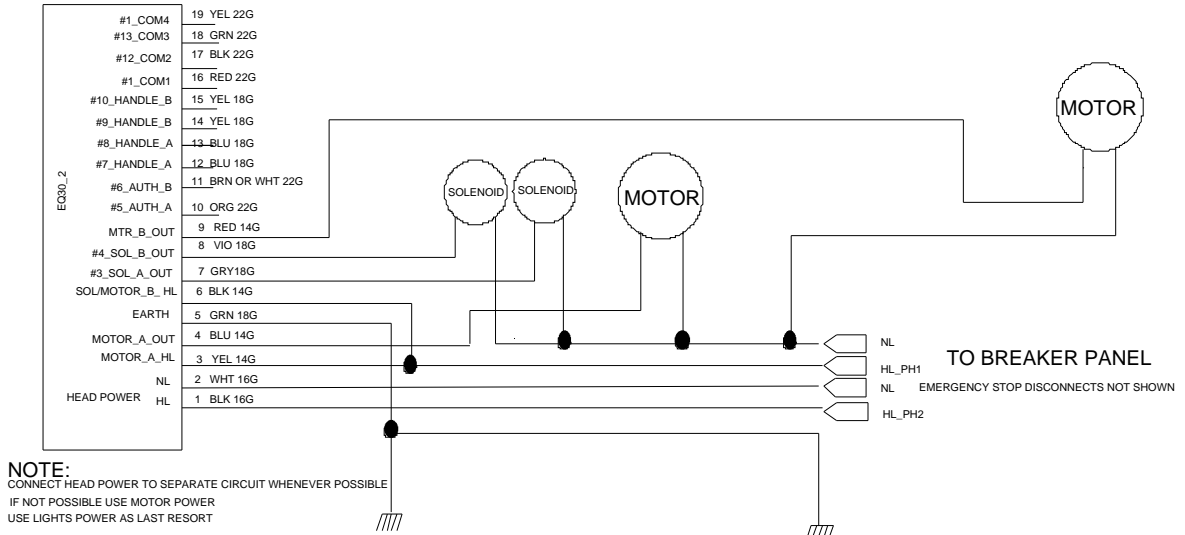
## 7.2 Single Hose Dispenser



EQ30 REVISION 2 WIRING

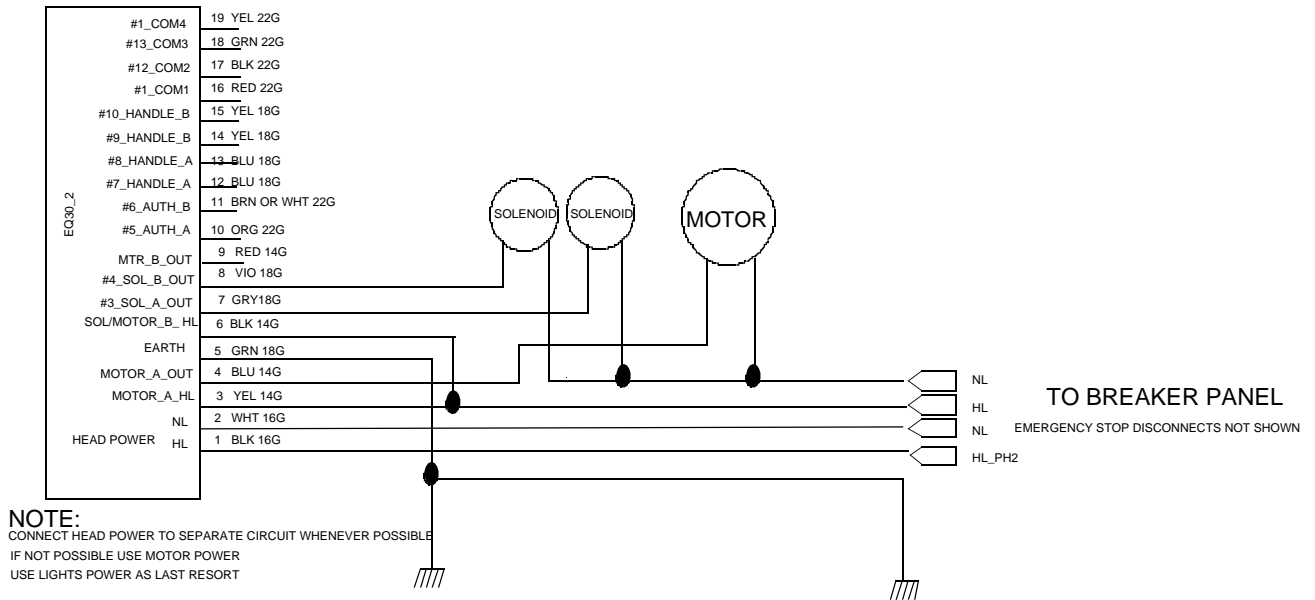
# EQUALIZER MODEL EQ30 INSTALLATION INSTRUCTIONS

## 7.3 Two Hose Two Product Suction Pump



EQ30 REVISION 2 WIRING

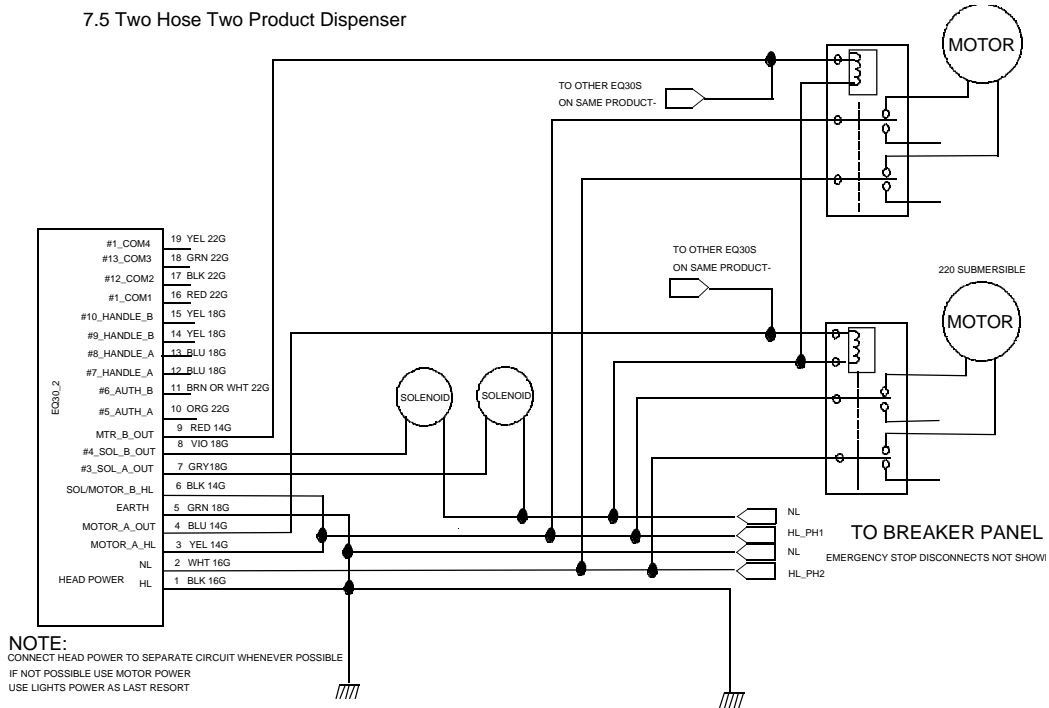
## 7.4 Two Hose Single Product Suction Pump



EQ30 REVISION 2 WIRING

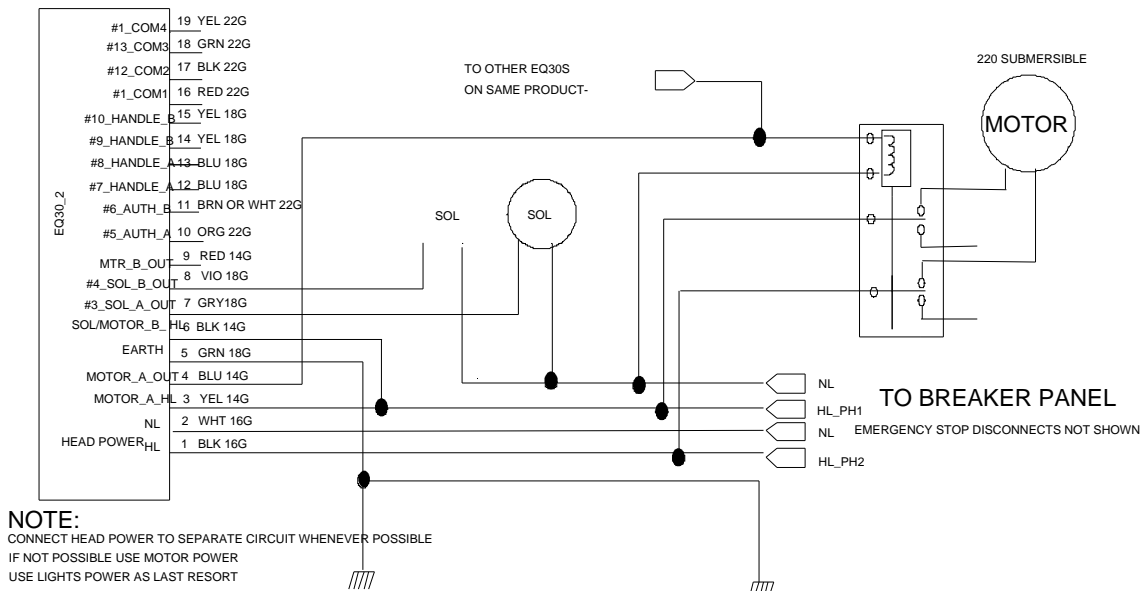
# EQUALIZER MODEL EQ30 INSTALLATION INSTRUCTIONS

## 7.5 Two Hose Two Product Dispenser



EQ30 REVISION 2 WIRING

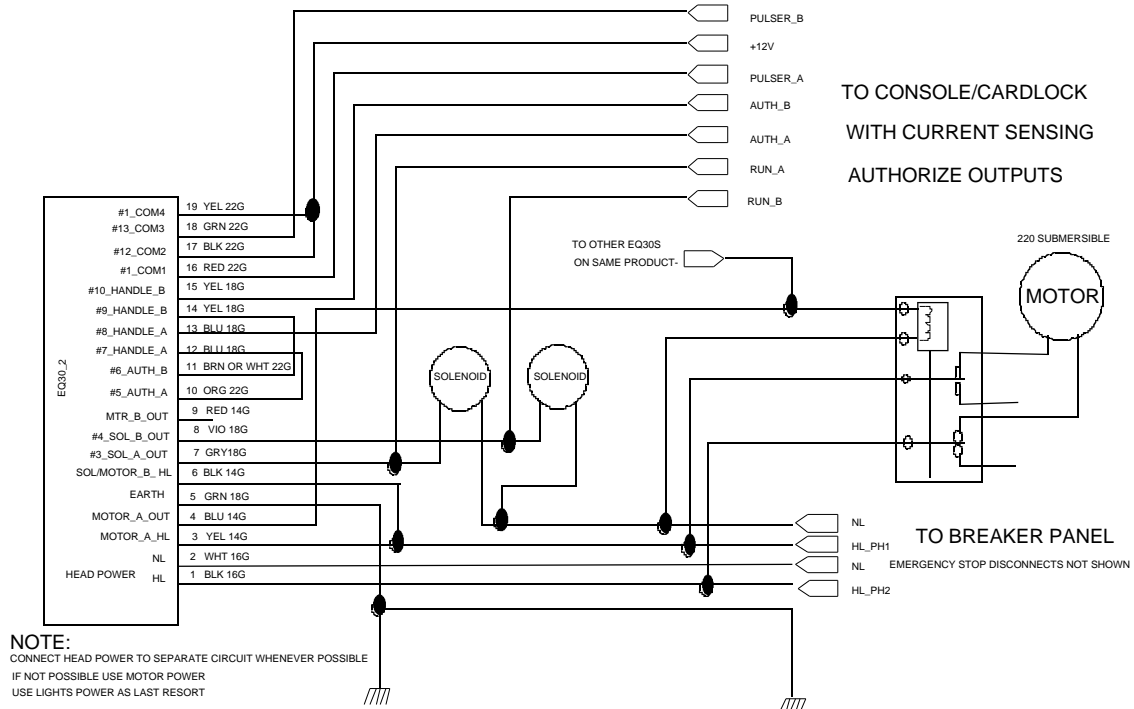
## 7.6 Two Hose Single Product Dispenser



EQ30 REVISION 2 WIRING

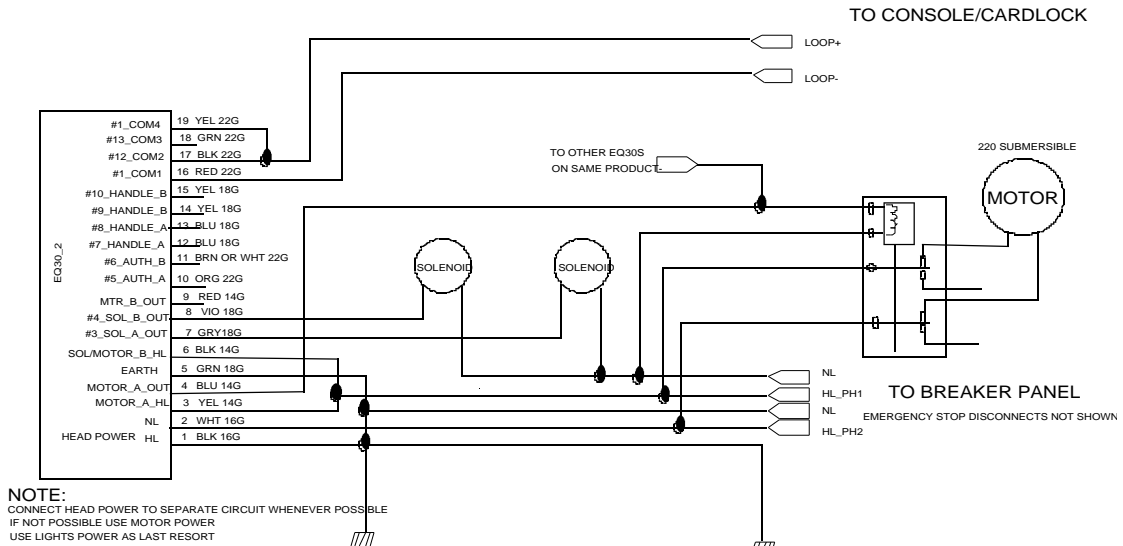
# EQUALIZER MODEL EQ30 INSTALLATION INSTRUCTIONS

## 7.7 Penny/Volume Pulsar Console or Cardlock Installation



EQ30 REVISION 2 WIRING

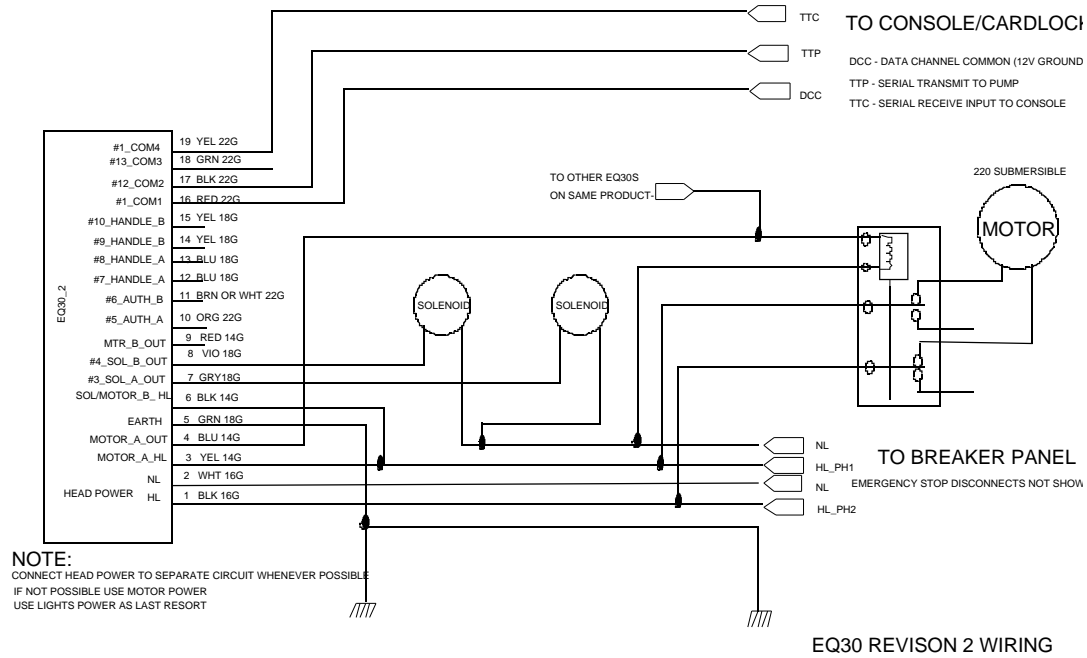
## 7.8 2 - Wire Serial Communications Console Installation



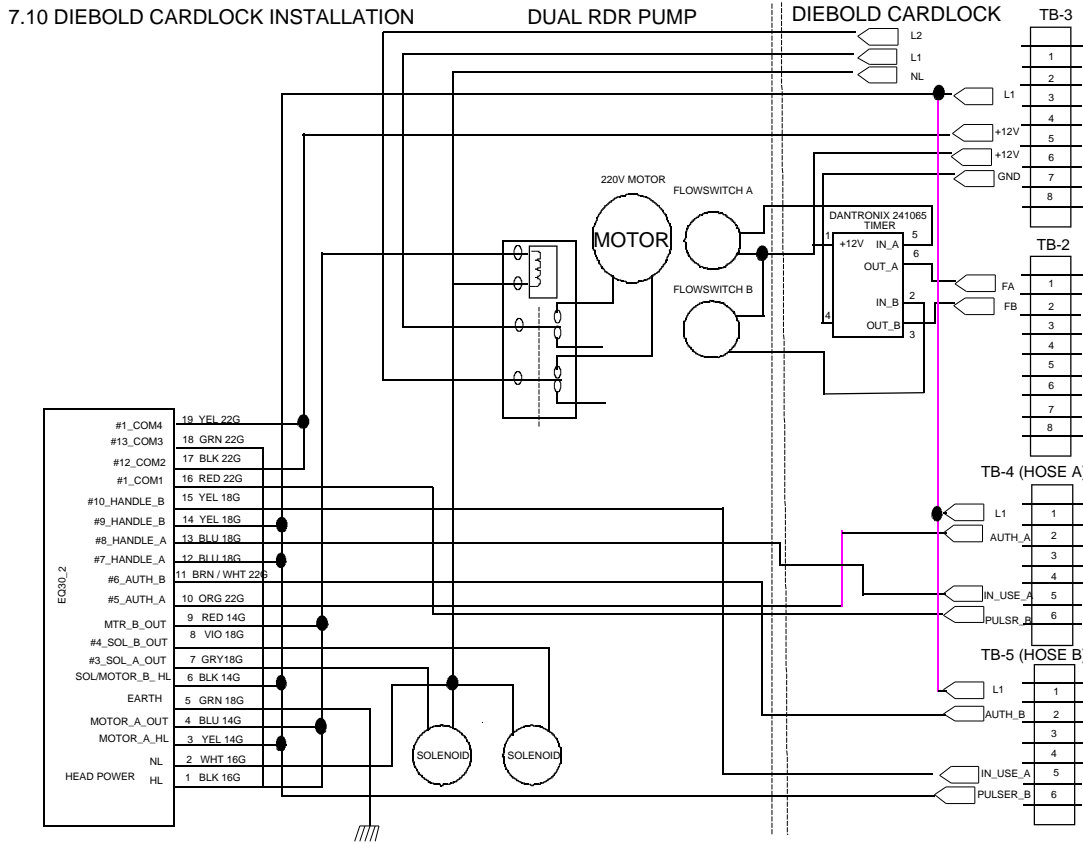
EQ30 REVISION 2 WIRING

# EQUALIZER MODEL EQ30 INSTALLATION INSTRUCTIONS

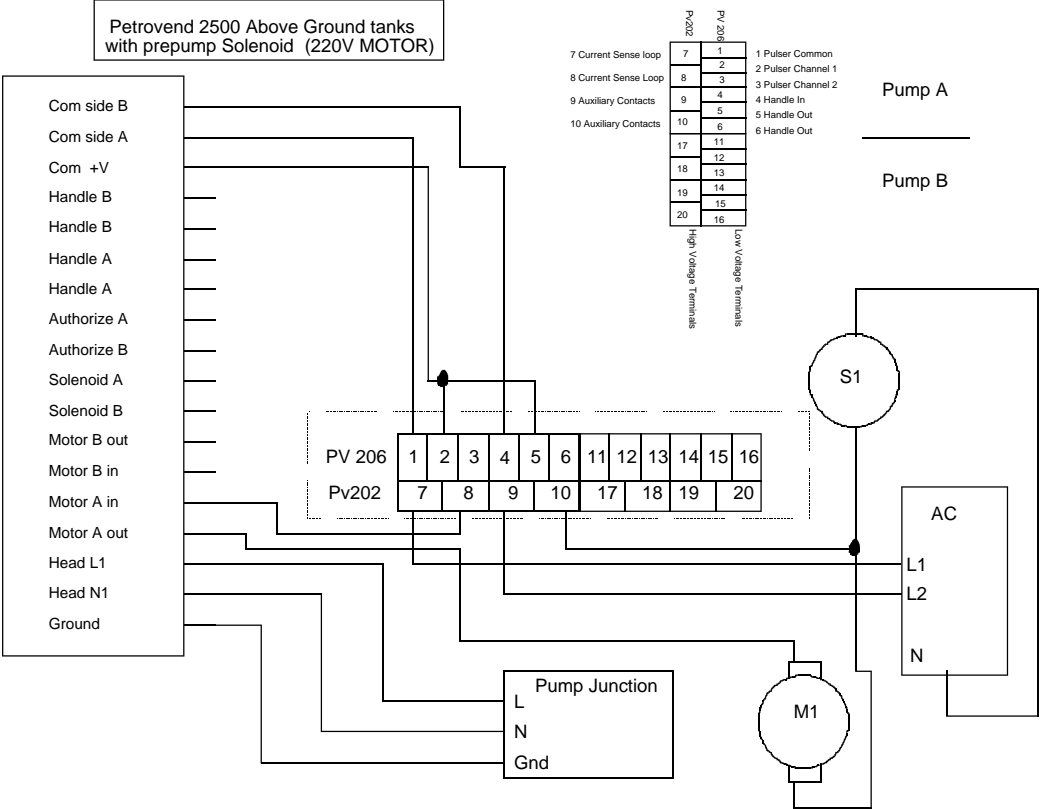
## 7.9 3 - Wire Serial Communications Console Installation



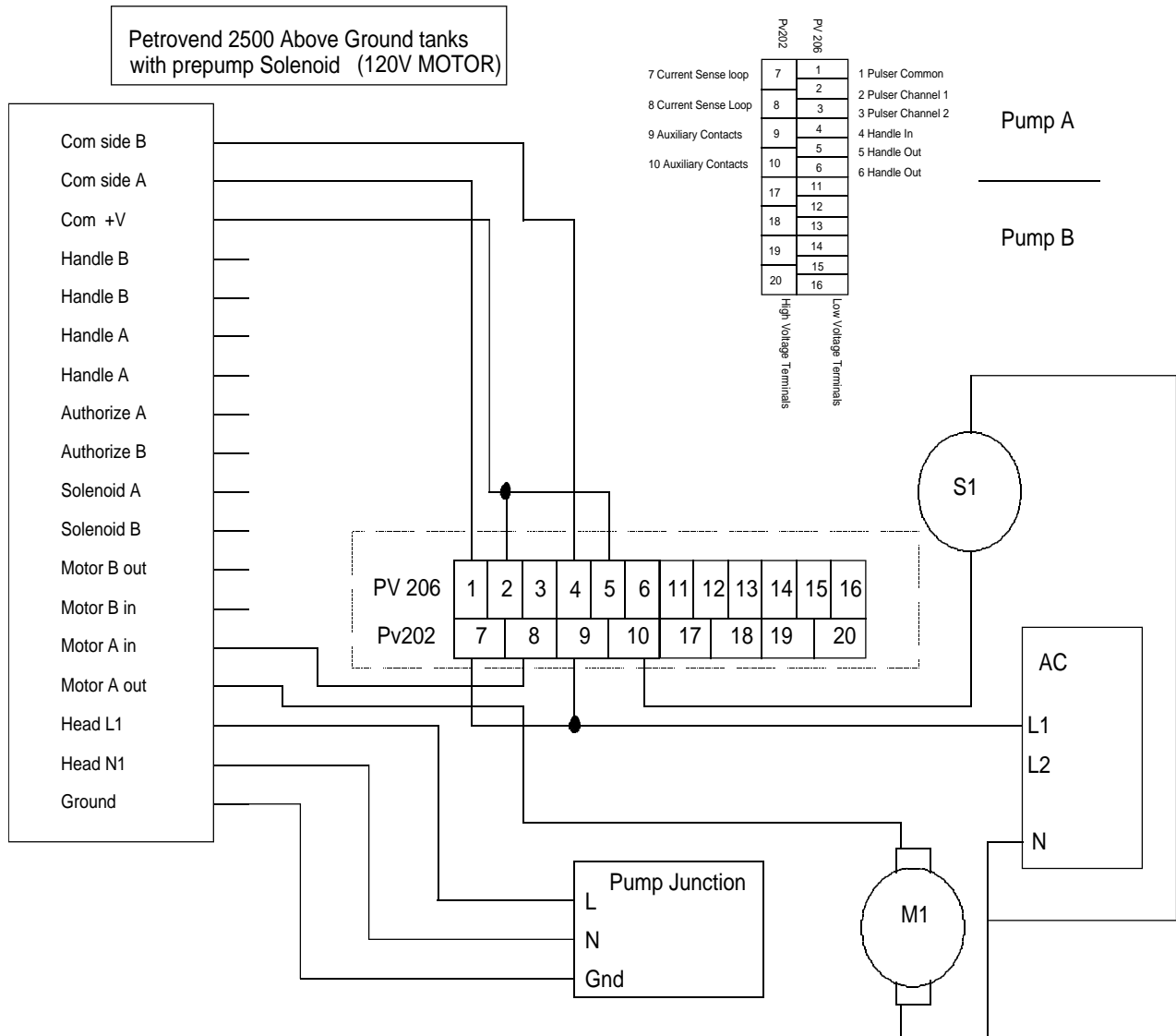
# EQUALIZER MODEL EQ30 INSTALLATION INSTRUCTIONS



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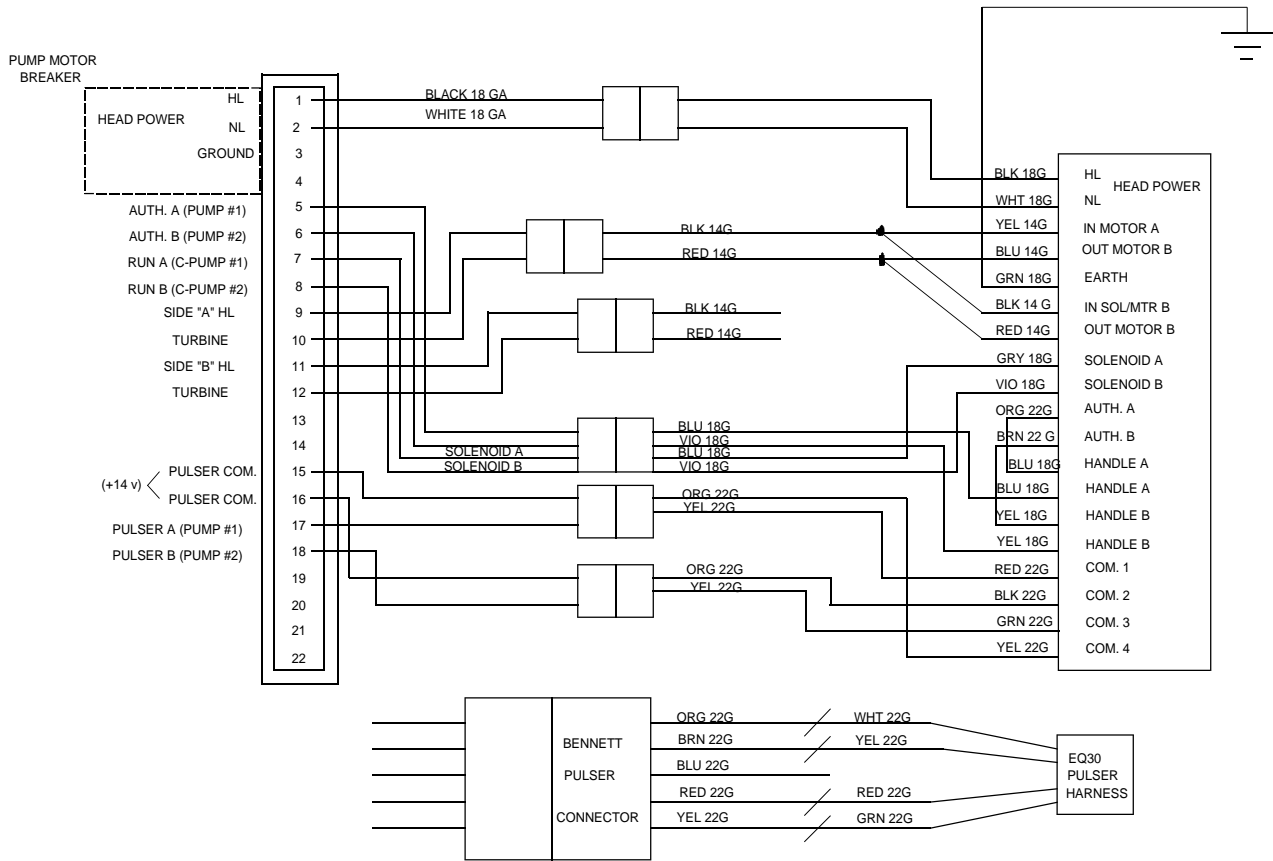
# EQUALIZER MODEL EQ30 INSTALLATION INSTRUCTIONS





# EQUALIZER MODEL EQ30 INSTALLATION INSTRUCTIONS

## BENNETT 6000 DUAL/TWO DISPENSER CONSOLE SET-UP



# EQUALIZER MODEL EQ30 INSTALLATION INSTRUCTIONS

## APPENDIX A SPECIFICATIONS

### ATC

Compensation Fluid Densities	Gasoline 730 kg/m <sup>3</sup> Diesel 840 kg/m <sup>3</sup> Propane 510 kg/m <sup>3</sup>
VCF Zero Temperature	15 Degrees Celsius
VCF Range	-60.0 to +50.0 C
Peak Gross Flow Rate	180 units/minute @ .001 resolution 1800 units/minute @ .01 resolution
Gross Display Maximum Resolution	.001 units
Temperature Display Resolution	.1 C
Temperature Accuracy	+/- .3 C overall
Probe Interchangeability	+/- .1 C
Operating Temperature	-55 to +40 C
Operating Humidity	10 to 90% RH (non condensing)
Physical	
Length	9/23 inches/cm
Width	16/40 inches/cm
Overall Height	13/33 inches/cm
Weight	26/12.5 lb/Kg

## APPENDIX B - TROUBLESHOOTING INSTALLATION GUIDE

## EQUALIZER MODEL EQ30 INSTALLATION INSTRUCTIONS

PROBLEM	CAUSE	SOLUTION
1 Display toggles between side "A" and side "B"	DIP switch 1 is turned on	Turn off switch
	Bad CPU	Replace CPU
	Unit is in inspection mode	Press enter on remote
2 Head does not reset	Bad connection on optical handle switch	Plug in switch Re-do connections
	Faulty optical switch	Replace switch
	Authorize circuit not wired properly	Rewire if necessary
	Programmed as console but running as stand alone	Program as stand alone
3 Motor tries to start with handle switch off.	Sunlight getting to optical switch.	Cover switch
	Faulty controller TRIAC.	Replace power supply.
	Broken connections on optical switch.	Repair connections or replace switch.
4 Console not receiving pulses.	Pulser wires reversed.	Correct wiring.
	Head programmed as pulser "Off".	Program for proper pulse width.
	Jumpers JP4 and JP5 are reversed.	Check and reposition.
5 Head resets but motor will not start.	No power to motor TRIACs.	Apply power to inputs.
	Faulty motor TRIACs.	Replace power supply.
6 Head calls console for authorization event with handle off.	Incorrect wiring.	Correct wiring.
	Authorize line going to ground.	Repair short in wiring.
	Authorize line overloaded.	Add snubber circuit Part #DH-EQ-snubber.

# EQUALIZER MODEL EQ30 INSTALLATION INSTRUCTIONS

## APPENDIX B - TROUBLESHOOTING INSTALLATION GUIDE (continued)

PROBLEM	CAUSE	SOLUTION
7 Cannot read totals or program head.	Main display wiring harness reversed.	Reverse harness wiring.
	Faulty programmer.	Replace batteries. Replace programmer
	Faulty receiver on main display.	Replace main display.
8 Stand alone pump starts but stops after a short time, resets and starts again. See 17.	If only one circuit at pump for everything, Fluorescent tube or ballast bad.	Isolate other circuits from pump head power.
	If Head power drops to less than 80 volts the computer will reset If motor is on the same circuit it may be drawing too much power.	Put Head on its own power circuit.
	Optical switch faulty.	Replace optical switch.
9 Console pump starts okay but stops after short time, resets and calls in for authorization repeatedly.	Optical handle switch bad connection.	Replace optical switch.
10 Stand alone pump starts and stops while dispensing. See 17.	Motor overload.	Check breaker for motor power.
11 Display flashes erratically, strange characters appear	Bad connections on wire harness or display board.	Check connections on harness. Replace display board.
12. Console counts wrong amount of pulses from head.	Pulse output from head does not match console.	Program pulse output in memory section(03) until both units agree.
	Pulser output fault, caused by wiring fault.	Repair wiring then check for proper operation. If not: replace power supply.

# EQUALIZER MODEL EQ30 INSTALLATION INSTRUCTIONS



## APPENDIX B - TROUBLESHOOTING INSTALLATION GUIDE (continued)

13 Console or card system miscounts by multiple of 10,100,1000.	Pulse output programmed incorrectly.	Program section (62) for correct ppu amount.
14 Temperature probe B reads 3-10 degrees high or low on a 2 hose single product pump with two probes.	Pump is programmed incorrectly. If programmed as 2 hose 1 product section (65) head will not read the second probe.	Program pump as a 2 hose 2 product in section (65).
15 Pump shuts off at the same amount every time.	Head is programmed for either a volume limit or a dollar limit in sections (06) or (07).	To clear any presets enter sections (06) and (07) with all 9's.
16 Display shows ADC fail.	Hardware failure on the CPU board.	Replace CPU unit.
17 No response from handle switch in stand alone mode or console mode. No display change or flash.	CPU Hardware fault.	Replace CPU after checking for wiring or switch faults. Check section (18) for diagnostic display of handle status.
18 After turning handle switch on nothing happens.	Handle switch may be plugged into the wrong connector.	Check and reverse handle connectors for handle switch.
19 Head rests normally but does not count pulses.	Pulser may be plugged into the wrong connector.	Check and reverse pulser connectors into the CPU.

# EQUALIZER MODEL EQ30 INSTALLATION INSTRUCTIONS

## APPENDIX C - TYPICAL PUMP SETTING

### Example #1: TOKHEIM TWO HOSE TWO PRODUCT ON A CONSOLE

02 - Penny Console  
03 - Penny .004  
12 - CCL (counter clockwise)  
60 - Gal.-Lt. 4 turns (Imperial Grey Meter)  
60 - 512 pt. 2 turns (Metric-Green Meter)  
62 - 10 PPU  
65 - 2 Hose 2 Product

### Example #2:RDR HIGH VOLUME PUMP ON DIEBOLD SYSTEM

01 - Non Price  
02 - Penny Console  
03 - Vol .002  
12 - CL (clockwise)  
60 - 500 Pt. 1 Turn  
62 - 100 PPU  
63 - Vol DP 4  
65 - 1 Hose 1 Product

### Example #3-BENNETT 2 HOSE 1 PRODUCT STAND ALONE

02 - Stand Alone  
12 - CCL (counter clockwise)  
60 - 512 Pt. 2 Turn  
65 - 2 Hose 2 Product

**(NOTE: Both motor input leads must be joined together and motor output leads must be joined together, even if the pump is a 2 hose 1 product, if two probes are used. It must be programmed as a 2 hose 2 product to enable the second probe.)**

### TYPICAL METER SETTINGS

Tokheim Imperial (Grey)	Gal Lt 4 Turn	CCL	
Tokheim Metric (Green)	512 PT 2 Turn		CCL
Bennett	512 PT 2 Turn		CCL
Gilbarco,Wayne	Gal Lt 4 Turn	CCL	