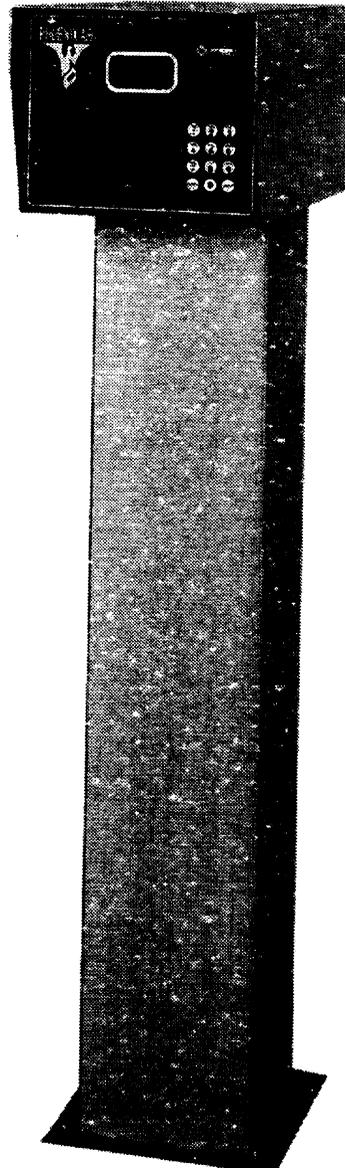


**PHOENIX
8000**

**PHOENIX 8000/8000DK
SYSTEM**

SERVICE MANUAL



SYSTEM AND SERVICE

1.0 System components	8
2.0 Site preparation	8
2.1 Mounting	8
2.2 Wiring	8
2.21 Definitions	8
2.22 Requirements	9
3.0 Unpacking	9
3.1 Components check	9
3.2 Tools required for installation	10
4.0 Installation	10
4.1 Mechanical	10
4.2 Wiring	10
4.21 Power	10
4.22 Control	10
4.23 Printer	11
5.0 Initial option switch settings	11
5.1 Pin required/not required. (Switch 1)	11
5.2 Mileage required/not required. (Switch 2)	11
5.3 System shutdown on data overflow. (Switch 3)	12
5.4 Decimal places. (Switches 4 & 5)	12
5.5 Number of hoses	12
5.6 Pump time-out	12
6.0 Powering up	13
6.1 System	13
6.2 Printer	13
7.0 Testing	13
7.1 System	13
A. Durakey system	13
B. Identikey System	14
7.2 Pump	14
7.3 Printer	14
8.0 Resetting system memory for operation.	14
9.0 Troubleshooting and Repair	14
<u>System Won't Start Up at Initial Installation</u>	14
System Simply Does Nothing	14
System Beeps When Turned On But There Is No display	14

General System-Wide Problems	14
9 Volt Battery On ICB is Swollen	14
System Intermittently Loses Pin Numbers	15
More Than 1 PIN Will Work With The Same Vehicle Card/Key	15
System Beeps Continuously	15
System Displays OUT OF SERVICE	15
System Is Clicking Continuously	15
System Won't Authorize A Hose	16
One Hose Only	16
All Hoses	16
Transactions Terminate Early (Before Or While Pumping)	16
Transactions Won't Terminate On Pump Hang-Up	16
Erroneous PUMP IS BUSY Message	17
Card Reader Problems	17
Every Card Yields The Message CARD INVALID	17
System Displays "INVALID VEHICLE" When Using A Vehicle Card	18
System Always Displays INSERT CARD	18
System Always Displays REMOVE CARD	18
Key Reader Problems	18
System Displays The Message 'KEY READ ERROR' With Every IdentiKey	18
System Displays 'INVALID VEHICLE' When Using A Vehicle Key	18
System Always Displays INSERT IDENTIKEY or REMOVE IDENTIKEY	18
Display Problems	19
Display Blank	19
Light Or Dark Display	19
Garbage Or Stray Characters On Display	19
Display Doesn't Change (Always Displays The Same Message)	19
Display Has No Backlight	20
Incorrect Date and/or Time	20
Keypad Problems	20
Clicking Or Popping Sound When Pressing Keys	20
Erratic Operation In Wet Or Very Humid Weather	20
No Response, Erratic Response, Or Repeating Key(s)	20
Counting Problems	21
System Not Counting - New Installation	21
System Not Counting - Existing Installation	22
System Counts, But The Quantities Are Incorrect	23
Printer Problems	23
Normal Operating Conditions	23
Printer Won't Print Any Transactions	24
Printer Repeats Transactions	24
Delayed Printing	24
Printer Prints Transactions, But Won't Print Administrative Reports	24
No Operation, Light Print, Or Ink Smudges Across The Paper	24
Strange Data Or Blank Lines	24
Paper Won't Feed Or All Transactions Print On The Same Line	25

Transaction Computer Interface (TCI) Problems	25
Randomly Prints TCI POWER INTERRUPTION Message And Self-Test	25
One Or More Of The Self-Tests Reports: FAILED	25
The Power Light Doesn't Come On	25
Won't Print To Printer	25
Self-test prints but transactions do not	25
Neither The Self-Test Nor Transactions Print	26
Transactions Will Not Download - New Installation	26
Direct Connection to PC	26
Modem Connection	26
Transactions Will Not Download - Existing Installation	27
Direct Connection to PC	27
Modem Connection	27
9.1 Display Replacement	27
9.2 CPU Board Set Replacement	27
9.3 Card Reader, DuraKey Reader, and IdentiKey Reader Replacement	28
9.4 Keypad Replacement	28

PHOENIX SYSTEM REPLACEMENT PARTS LIST 30
SYSTEM OPERATION INSTRUCTIONS

1.0 Introduction	32
1.1 Fueling operations	32
1.2 Transaction Report Format	33
2.0 Specifications	34
2.1 Physical	34
2.2 Electrical	34
2.3 Data Storage	34
2.4 Switch Selective Options	34
2.5 Pump Time-Out	34
2.6 Optional Transaction Computer Interface Unit	35
3.0 Initial startup procedures	36
3.1 Clearing all transactions from memory (RED CARD/KEY)	36
3.2 Clearing all vehicle numbers from memory (RED CARD/KEY)	36
3.3 Clearing all personal identification numbers (RED CARD/KEY)	36
3.4 Reset transaction number to 1 (YELLOW CARD/KEY)	36
4.0 Product and pump assignments	36
4.1 Assigning pump numbers	37
4.2 Definition of product types	37
4.3 Assigning product types to the pumps (YELLOW CARD/KEY)	37
5.0 Setting the current date and time (GREEN CARD/KEY)	37
6.0 Vehicle numbers	37

6.1 Assigning fuel types to vehicles	37
6.2 Assigning vehicle numbers	38
6.3 Validating vehicles (GREEN CARD/KEY)	38
6.4 Invalidating vehicles	38
6.5 Programming Durakeys (Optional)	38
6.5 DuraKey Encoder Installation	38
7.0 Personal identification numbers	39
7.1 Assigning personal identification numbers	39
7.2 Validating personal identification numbers (GREEN CARD/KEY)	40
7.3 Invalidating personal identification numbers	40
8.0 Administrative Reporting (EPROM versions 4.x and higher only)	40
8.1 Print Valid PINs	40
8.2 Print Valid Vehicles	41
8.3 Reprint Transactions	41
9.0 Printer	41
10.0 Routine maintenance	41
10.1a Card Reader	41
10.1b Key Reader	41
10.2 Printer	41
10.3 Enclosure	42
11.0 Troubleshooting	42
11.1 Printer	42
11.2 Card/Key system	42

TRANSACTION COMPUTER INTERFACE - INSTALLATION

1.0 Introduction	43
2.0 Unpacking the unit	43
2.1 Tools needed	43
2.2 Parts check	43
3.0 Locating the Transaction Computer Interface	43
4.0 Configuring the Transaction Computer Interface	43
4.1 Modem or PC connection	43
A. Modem connection	44
B. PC Direct connection	44
5.0 Connecting peripherals	45
5.1 Printer	45
5.2 Phoenix system	45
5.3 Modem	45
5.4 PC Direct connection	46

6.0 Powering up	46
7.0 Troubleshooting	46

TRANSACTION COMPUTER INTERFACE - OPERATION

1.0 INTRODUCTION	48
1.1 BASIC OPERATION.....	48
2.0 SPECIFICATIONS	48
2.1 Physical	48
2.2 Electrical	48
2.3 Data storage	48
2.4 Custom configurations	48
2.5 Communication requirements	48
3.0 OPERATION OF THE TRANSACTION COMPUTER INTERFACE	49
3.1 Receiving data via modem	49
3.2 Retrieving data via PC connection	49
3.3 Using the data retrieval software	49
3.31 Installation of version 3.X software	49
3.4 Basic DOS Functions	52
4.0 PRINTER	54
4.1 OPERATION	54
4.2 PAPER REPLACEMENT	54
4.3 RIBBON REPLACEMENT	54
5.0 ROUTINE MAINTENANCE	55
5.1 Printer	55
5.2 Transaction Computer Interface	55
6.0 TROUBLESHOOTING	55
6.1 Printer	55
6.2 Transaction Computer Interface	55
TECHNICAL INFORMATION ON THE TCI SERIAL PORT	56

***SIMPLEX* FUEL REPORTING SOFTWARE**

INSTALLATION AND SETUP

I. ABOUT SIMPLEX SOFTWARE	58
II. INSTALLING SIMPLEX	58
A. OPERATION FROM FLOPPY DISK	58
B. OPERATION FROM THE HARD DISK	58
C. MINIMUM HARDWARE REQUIREMENTS	58

III. LOADING AND MANIPULATING THE PHOENIX DATA FILE	58
A. PROGRAM MEMORY CAPACITY	58
B. APPENDING FILES	59
C. EDITING THE DATA FILES	59
IV. RUNNING SIMPLEX.....	59
A. THE EXE, CTR, AND DAT FILES	59
B. MEMORY RESIDENT PROGRAMS.....	59
V. USING SIMPLEX MENUS	59
A. MENU STRUCTURE	59
B. QUITTING MENUS	59
C. WHAT TO DO IF ERRORS OCCUR	60
I. ENTERING THE SERIAL NUMBER	61
II. LOADING THE DATA FILE	61
A. USING THE PATH	61
B. WHAT TO DO IF ERRORS OCCUR	61
III. THE MAIN MENU	62
1. SEARCH TRANSACTION DATA	62
A. FUNCTION OF THE SEARCH MENU	62
B. SEARCH BY VEHICLE	62
C. SEARCH BY PIN NUMBER	63
d. SEARCH BY DATE	63
e. SEARCH BY DEPARTMENT	64
2. PRINT REPORTS	64
a. FUNCTION OF THE PRINT REPORTS SUBMENU	64
b. REPORTS BY VEHICLE	64
c. REPORTS BY PIN	64
d. REPORTS BY DATE	65
e. REPORTS BY DEPARTMENT	65
3. CALCULATE FUEL TOTALS.....	65
<i>a. FUNCTION OF THE FUEL TOTALS MENU</i>	<i>65</i>
<i>b. CALCULATE GRAND TOTAL</i>	<i>66</i>
<i>c. TOTALS BY FUEL TYPE</i>	<i>66</i>
<i>d. TOTALS BY PUMP</i>	<i>66</i>
<i>e. TOTALS BY DEPARTMENT</i>	<i>67</i>
4. VIEW TRANSACTION DATA	67
5. ASSIGN INFORMATION	67
<i>a. FUNCTION OF ASSIGN INFORMATION</i>	<i>67</i>
<i>b. ASSIGN VEHICLES TO DEPARTMENT.....</i>	<i>67</i>
<i>c. ASSIGN INFORMATION TO VEHICLE</i>	<i>67</i>
<i>d. ASSIGN INFORMATION TO PIN NUMBER</i>	<i>68</i>
<i>e. ASSIGN INFORMATION TO FUEL TYPE</i>	<i>68</i>
6. FILE MAINTENANCE	69
<i>a. FUNCTION OF THE FILE MAINTENANCE SUBMENU.....</i>	<i>69</i>

b. BACKUP CURRENT DATA	69
c. VIEW BACKUP FILES	69
d. LIST BACKUP FILES	70
e. DELETE FILES	70
f. RENAME FILES	70

IV. USING DATAFIX FILE EDITOR AND REPAIR PROGRAM	71
a. FUNCTIONS OF THE DATAFIX UTILITY	71
b. DISPLAY TRANSACTION DATA	71
c. EDIT TRANSACTION DATA	71
d. DELETE TRANSACTION	72
e. ADD TRANSACTION TO DATA	72
f. CHECK DATA FOR ERRORS	72
g. WRITE CHANGES TO DISK	72

V. USING FILMERGE DATA MERGING UTILITY	73
a. FUNCTIONS OF FILMERGE	73
b. DISPLAY TRANSACTION DATA	73
c. MERGE FILE WITH CURRENT DATA	73
d. WRITE MERGED FILE TO DISK	74

VI. TANK INVENTORY TRACKING	74
a. ADD FUEL TO TANK	75
b. UPDATE TANK INVENTORY	75
c. VIEW TANK INVENTORIES	75
d. PRINT INVENTORY REPORT	75
e. SAVE NEW TANK INVENTORY	75

VII. TROUBLESHOOTING	75
a. SERIAL NUMBER INPUT	75
b. ERROR MESSAGES	76
1. ILLEGAL FUNCTION CALL	76
2. OVERFLOW ERROR	76
3. OUT OF MEMORY	76
4. DEVICE TIME-OUT	76
5. DEVICE FAULT	76
6. OUT OF PAPER	76
7. FILE NOT FOUND	76
8. FILE ALREADY EXISTS	76
9. DISK FULL	76
10. ERROR IN DATA FILE	76
11. BAD FILENAME	76
12. TOO MANY FILES	77
13. DISK IS WRITE PROTECTED	77
14. DISK NOT READY	77
15. DISK MEDIA ERROR	77
16. RENAME ACROSS DISKS	77
17. PATH/FILE ACCESS ERROR	77
18. PATH NOT FOUND	77
19. INTERNAL ERROR	77

1.0 System components

The operational components of the system include:

- a. Central Processor Unit (CPU) boards- These boards contain the program memory, data memory, and perform all of the data storage and logic functions.
- b. LCD Display Assembly. The display attaches to the CPU via ribbon cable.
- c. Inter-Connect Board (ICB). This board contains the system power supply, the pump control relays, the pulser inputs from the pumps, the in-use circuits from the pumps, and the standby battery used to temporarily power the unit in the event of a power failure.
- d. Card reader or Key Reader. The reader connects to the CPU board via a 20 conductor ribbon cable.
- e. Front Panel/Keypad. The keypad is contained within the front panel overlay, and connects to the CPU board via a 7 conductor cable which is molded into the panel.
- f. Printer. The transaction printer is a serial "line printer", and connects to the CPU board via a 3 conductor shielded cable.

2.0 Site preparation

If possible, some consideration should be given to the location of the Phoenix system. If the unit is located facing south, there will be fewer problems with blowing snow and freezing rain. The transaction printer is rated for indoor service only and some consideration should be given to its location in order to prevent premature failure of the mechanism.

2.1 Mounting

The bolt pattern of the mounting pedestal is four 5/8 inch holes located on 10 inch centers. Seal-off's and rigid conduit should be provided as per all applicable electrical codes. Refer to the baseplate diagram in the appendix of this manual. Anchor bolts in 5/16 inch to 1/2 inch range are recommended for holding the unit. Because the mounting pedestal is 48 inches tall, consideration should be given to placing the unit on a short curb to facilitate operation by the average height person.

2.2 Wiring

All wiring must meet all electrical codes, this includes using gas and oil resistant pump wiring and proper installation practices.

******* 220V versions *******

The Phoenix 8000 system may be specially ordered to operate with 220VAC at 50 or 60 cycles. The system will operate on this voltage just as it would with the typical 110VAC system. All associated instructions for operation will be identical. The appropriate 220V wiring diagrams can be found in the appendix of this manual. It is important to notice that for the 220V system, 220VAC (L2) is substituted for 110VAC NEUTRAL and 220VAC (L1) is substituted for substituted for 110VAC HOT.

2.21 Definitions

- a. Pulser wiring - Two separate wires for each pulser. These wires carry only 12 VDC and may be 16 AWG or larger.
- b. In-use wiring - Single wire for each hose. This wire is often referred to as the "motor return" circuit. This wire carries 110 VAC but at a very low current and therefore requires only a 14 AWG or larger wire. This signal is used by the system to determine when the pump is operating and should be attached to either the motor circuit on a suction pump or the solenoid circuit when using a submersible pump as per the installation drawings in appendix 1. If a sealed switch push-rod motor is used in the pump, either a handle switch kit or an Emco Electronics EMR switch kit must be used to obtain an in-use (MR). If neither is used, the system will simply time out.
- c. Authorize wiring - Single wire for each electric reset. This wire is used to provide Power to the electric reset of the pump and must carry the necessary current. A 12 AWG or larger wire is recommended.

IMPORTANT: This wire must carry sufficient current to operate the suction pump motor and be sized appropriately.

- d. Data wiring - Three conductor shielded cable from the system to the printer (or optional computer interface). This wiring carries only 12 VDC data at very low current and may be 22 AWG for runs under 300 feet. For runs 300 to 500 feet, use 20 AWG wire. Use 18 AWG wire for runs 500 to 1000 feet.

2.22 Requirements

Wiring requirements will of course vary from one installation to another and occasionally from pump to pump when different brands of pumps are used together. Appendix 1 should be consulted as to specific pump wiring. Wire sizing should be determined by a qualified electrician knowledgeable about wire length and circuit load. The following is an overall system to pump wire list recommendation although some of these wires may not be necessary.

(Per Hose)

- 2 - 14 AWG Red wires for pulser circuit
- 1 - 14 AWG Black wire for in-use circuit
- 1 - 12 AWG Blue wire for authorize to electric reset
- 1 - 12 AWG White wire for AC neutral
- (1 - 12 AWG Red wire for L2 power to 220 VAC pumps)

The following is an overall breaker-to-system wire list recommendation:

- 1 - 12 AWG Black wire for L1 power to the system
- 1 - 12 AWG White neutral wire for the system
- 1 - 12 AWG Green earth ground wire for the system
- 1 - 12 AWG Black wire for L1 power to each hose
- 1 - 12 AWG White neutral wire for each hose
- 1 - 12 AWG Green earth ground wire for each hose
- 1 - 12 AWG Red wire for L2 power to 220 VAC pumps
- 1 - 3 conductor shielded cable from the system CPU board to the printer or optional Transaction Computer Interface

3.0 Unpacking

Inspect the shipment immediately upon receipt for completeness and for damage. Retain any damaged cartons and equipment for claims purposes and make claims with the carrier immediately. Return all equipment to the cartons for protection until actual installation is made. Save the cartons until after installation is complete in case a return shipment is necessary. The Phoenix system is shipped in three separate cartons which contain the mounting pedestal, printer, and main unit.

3.1 COMPONENTS CHECK

Since the Phoenix system is shipped complete and ready to wire into the installation, a check should be made to ensure that the system is complete. One carton should contain the mounting pedestal. This pedestal should have 4 mounting nuts. Since the pedestal is made to fit onto customer supplied anchor bolts, there is no hardware provided for the bottom of the pedestal. The nuts have been attached to the mounting studs in order to prevent any damage to the threads. Another carton should contain the main unit which contains the electronic circuitry. The third carton should contain the printer, data line adapter, and printer manual. The following should also be found:

- a. Phoenix System Manual with programming cards/keys and cabinet keys.
- b. Relays for the pump control (to be inserted into their sockets by the installer).
- c. Conduit knockout plate (nut and washers are attached to the base of the main unit).
- d. Two interface adapters and software will be enclosed if the optional transaction computer interface is purchased.

3.2 TOOLS REQUIRED FOR INSTALLATION

- a. Small width flat blade screwdriver for attaching printer data cable to the CPU board and printed adapter board.
- b. Medium flat or Phillips blade screwdriver for attaching power, in-use, and pulser wiring to ICB board.
- c. Hammer and small punch for removing selected conduit knockouts from the conduit knockout plate.
- d. Small wrenches or nut-drivers for installing the conduit knockout plate to the base of the main unit and the main unit to the top of the mounting pedestal.
- e. Appropriate hand tools for installing pulser and pump wiring.
- f. AC/DC volt/ohm general purpose test meter. (May be analog or digital)

4.0 Installation

How well a system functions and its' reliability in the future are dependant on the quality of the installation. The following instructions should be followed to ensure all equipment is installed properly:

4.1 MECHANICAL

Mount the Phoenix pedestal at the fueling island by bolting it to the anchor studs. The pedestal should fit over the conduit and may be leveled by inserting washers under the base of the unit. Mount the Phoenix main unit (without the cover) to the studs provided at the top of the pedestal. Secure the unit with the nuts provided. At this time it should be decided which conduit knockouts need to be removed from the knockout plate, and removed with a small punch and hammer. After fitting the knockout plate into the unit, secure the plate with the nuts provided. Locate the printer indoors at a suitable location. Install the pulsers in the pumps if they are not in place. If the wiring has not been pulled, it should be done now.

4.2 WIRING

All wiring must be installed in accordance with all applicable electrical codes and by qualified service personnel.

4.21 POWER

IMPORTANT: IN ORDER TO PREVENT ANY LINE SURGES OR NOISE REACHING THE COMPUTER ON THE CPU BOARD, A SEPARATE SET OF 110 VAC (LI), NEUTRAL (COMMON), AND EARTH GROUND WIRES SHOULD BE RUN FROM A SEPARATE CIRCUIT BREAKER TO THE SYSTEM.

The PHOENIX has some line input protection circuitry, however additional protection against lightning or surges should be installed. The Emco Electronics Guardian is highly recommended.

After these three wires have been attached to the breaker and the 3 terminal power strip at the top rear of the ICB board near the ON/OFF switch, (WITH NO OTHER WIRES ATTACHED TO POWER OR THE SYSTEM) turn on the circuit breaker.

Using an AC voltmeter, confirm 110 VAC present between the terminal marked 110 and Neutral.

Turn on the ON/OFF switch of the system and note the small indicator lamp beside the switch light. If the lamp is on, check the LCD display on the front of the system for the phrase "INSERT CARD" or "INSERT DURAKY." If the lamp is not on or the display is not operating, see section 9.1 Troubleshooting and Repair.

Turn off the power switch of the system, then the circuit breaker to the system before finishing the system wiring.

NOTE: Because of the battery contained on the ICB board, it is important that the system ON/OFF switch be turned off before turning off the breaker. If 110 VAC power is disconnected with the ON/OFF switch on, the system will continue to operate for approximately 1/2 hour on a full battery charge.

4.22 Control

Wire the power to the pumps according to one of the wiring diagrams in APPENDIX 1.

Insert the enclosed system relays into their sockets. Set the individual pump control switches located above these relays to the down position (AUTO).

Engage the circuit breakers to provide power for the pumps.

The pumps should not be on.

With the system ON/OFF switch set to off, engage the system circuit breaker to provide power to the system. The pumps should not come on.

Switch each pump control switch from AUTO to MAN and note that the pump becomes operational. If any pump does not operate when switched to manual, see section 9.1 on Troubleshooting and Repair.

As each pump is energized and running, using an AC voltmeter, check the voltage between the In-use (IU) terminal and AC neutral of the ICB board for that pump to confirm 110 VAC present at the system ICB board. If 110 VAC is not present with the pump authorized and turned on, see section 9.14 on Troubleshooting and Repair.

Hang up all pumps, switch all pump control switches to the down position (AUTO) and switch off all circuit breakers providing power to the pumps and the system.

Using the APPENDIX wiring diagrams and the information provided with the pulsers, wire the pulsers to the system.

4.23 Printer

Terminate the three conductor printer data cable to the small three terminal connector at the bottom left of the CPU board. If a shield is also used, connect it to a chassis mounting screw. If used, do not terminate the shield at the other end of the cable in order to avoid ground loop current. Use the following table to make a permanent record of the color code you use:

TERMINAL	COLOR
Ground _____	
Data _____	
Busy _____	

Using the same above color code, terminate the other end of the printer data cable to the lightning protected printer adapter furnished for the printer. Plug the printer power cable into a 110 VAC outlet. Refer to the diagram in the appendix of this manual.

IT IS IMPERATIVE THAT THE INTEGRITY OF THE DATA WIRE BE MAINTAINED. IF THIS WIRE BECOMES DISCONNECTED FOR ANY REASON, WHILE THE BUSY AND GND WIRES REMAIN CONNECTED, DATA SENT FROM THE PHOENIX TO THE PRINTER WILL BE LOST AND NOT RECOVERABLE. THE PHOENIX WILL CONTINUE TO SEND DATA TO THE PRINTER/TRANSACTION COMPUTER INTERFACE AS LONG AS THE VOLTAGE ON THE BUSY WIRE REMAINS HIGH. ONCE EACH TRANSACTION HAS BEEN TRANSMITTED BY THE PHOENIX SYSTEM AND THE BUSY LINE REMAINS ACTIVE, THE TRANSACTION IS ERASED FROM THE PHOENIX MEMORY.

5.0 Initial option switch settings

The option switch is an eight position DIP switch located on the upper portion of the CPU board of the system. Each switch is labeled from left to right and should be set according to the customers desired specifications. If any of these switches are changed, the CPU must be reset by turning the system ON/OFF switch off and back to on. The system should arrive at the customers location with the switches set as per the instructions provided to the factory when the system was ordered.

5.1 PIN REQUIRED/NOT REQUIRED. (SWITCH 1)

If this switch is set on, the system will require a valid Personal Identification Number (PIN) to be entered before the system will authorize any fueling transaction. For more information, consult the system Operation Manual. If this switch is set to off, the system will not prompt for a PIN and will proceed directly to the next input requirement.

5.2 MILEAGE REQUIRED/NOT REQUIRED. (SWITCH 2)

If this switch is set on, the system will request a mileage be entered by the fueling operator. The system makes no checks on this number and allows even an "Enter" key entry to be an acceptable mileage. For more information, consult the system Operation Manual. If this switch is set to off, the system will not prompt for a mileage and will proceed directly to the next step.

5.3 SYSTEM SHUTDOWN ON DATA OVERFLOW. (SWITCH 3)

If this switch is set on, the system will refuse fueling transactions when the data memory becomes full (100 transactions). This will ensure that no data is lost in the event that the printer is unable to record it. For more information, consult the system Operation Manual.

IMPORTANT: IF THIS SWITCH IS SET TO OFF, EACH UNPRINTED TRANSACTION IN EXCESS OF 100 WILL OVERWRITE THE OLDEST TRANSACTION IN MEMORY.

5.4 DECIMAL PLACES. (SWITCHES 4 & 5)

These two switches determine how many decimal places the data will contain in the transaction data. All pumps must use the same ratio. This setting is for all pumps. This switch should be set according to the count ratio of the pulser in the system as follows:

<u>Switch 4</u>	<u>Switch 5</u>	<u>Data printout</u>	<u>Remarks</u>
OFF	OFF	00000000	Used to count whole gallons. Must use 1:1 pulser.
ON	OFF	0000000.0	Used to count 1/10 gallons. Must use 10:1 pulser.
OFF	ON	000000.00	Used to count dollars or 1/100 gallons. May use either 100:1 pulser for gallons or 1 pulse per penny for dollars.
ON	ON	00000.000	Used to count 1/1000 gallons. Must use 1000:1 pulser.

5.5 NUMBER OF HOSES

These last three switches determine how many hoses are controlled by the system. These switches should be set at the actual number of hoses controlled by the system, and not necessarily the number of pumps the system has the hardware to control. These switches should be set as follows:

<u>Switch 6</u>	<u>Switch 7</u>	<u>Switch 8</u>	<u>Number of hoses</u>
OFF	OFF	OFF	1
ON	OFF	OFF	2
OFF	ON	OFF	3
ON	ON	OFF	4
OFF	OFF	ON	5
ON	OFF	ON	6
OFF	ON	ON	7
ON	ON	ON	8

5.6 Pump time-out

The pump time-out switch is located at the lower left corner of the Pump Control board. This is an eight position DIP switch used to set the time-out period of the pumps when fueling activity stops. The pumps will time-out if any of the following conditions are encountered:

1. The pump has been activated by the system, but never turned on.
2. The pump has been activated by the system and turned on, but no fuel has been pumped.
3. The pump has been activated by the system and fuel has been pumped, but the pumping has stopped for some reason and the pump has not been hung up.

To set the time-out period, the switches should be set as follows:

Note: These times are approximate and may vary from system to system. These times may be added by turning more than one switch on.

<u>Switch number set on</u>		<u>All others</u>
1	11 sec.	OFF
2	22 sec.	OFF
3	50 sec.	OFF
4	2 min.	OFF
5	4 min.	OFF
6	8 min.	OFF
7	16 min.	OFF
8	32 min.	OFF

6.0 Powering up

6.1 SYSTEM

1. Turn all pump circuit breakers on.
2. Turn system circuit breaker on.
3. Leave pump control switches set to AUTO
4. Turn on system power switch.
5. No pumps should be on.
6. System should display "INSERT CARD", "INSERT DURAKEY", or "INSERT IDENTIKEY" (or "PRESS ENTER" if you have a cardless/keyless system).

6.2 PRINTER

After paper has been placed into the printer according to the instructions in the printer manual, turn the printer's power switch on. Note that the on-line indicator light comes on. Make certain that the cut-sheet / form-feed switch is set for form-feed paper.

7.0 Testing

The Phoenix system is shipped from the factory with the option switches set to operate with the test card or key supplied and according to the switch settings information furnished when the system was ordered. The vehicle test card or key uses vehicle number 7999, and a valid PIN is 97999. They may be left as a valid vehicle and PIN after initial testing or invalidated by the system operator if he does not wish to allow system usage by the test card/key or PIN number. The test card/key number 7999 has a fuel type of 9 which allows it to operate all pumps.

7.1 SYSTEM

The system should be ready to accept fueling transactions from the test card or key at this time.

A. Card System

IF LIGHT SHINES ON THE BACK OF THE INTERNAL MAGNETIC STRIPE CARD READER, IT MAY NOT OPERATE PROPERLY.

Refer to section 1.0 of the operations manual to perform a transaction. In summary:

1. Place the stainless cover onto the unit to avoid sunlight reaching the card reader.
2. Insert and withdraw test card smoothly.
3. Key in requested information. (A valid PIN is 97999 if needed)
4. Select a hose.

B. DuraKey System

1. Insert the test DuraKey and wait for the system prompt "REMOVE DURAKEY".
2. Remove the DuraKey.
3. Key in requested information. (A valid PIN is 97999 if needed)
4. Select a hose.

C. IdentiKey System

1. Insert key and turn 90(to the right. Hold the key in this position until the display reads "REMOVE KEY:"
2. Turn key back to the left and remove.
3. Enter requested information (a valid PIN is 97999, if needed)
4. Select a hose.

7.2 PUMP

The selected pump should be enabled at this time. Dispense fuel into a test can or vehicle, and hang the pump up. Immediately after pump hang-up, the system should display "PLEASE WAIT" for a very short time. This is the time it is taking the system to send the transaction to the printer.

7.3 PRINTER

The above transaction should be printed by the system immediately after pump hang-up. If the system does not print the transaction, refer to section 9.0 Troubleshooting and Repair. Each of the pumps should be tested to ensure that there are no problems. After these tests are completed, the system should be reset to clear the stored transaction data.

8.0 Resetting system memory for operation.

In order to initialize the system for operation, follow the instructions in the Operation Manual section 3.0 through 7.0. THOSE INSTRUCTIONS WILL INVALIDATE THE TEST CARD/KEY VEHICLE NUMBER AND PIN TEST NUMBER. THEY WILL NO LONGER OPERATE THE SYSTEM UNLESS THEY ARE VALIDATED ONCE AGAIN.

9.0 Troubleshooting and Repair

System Won't Start Up at Initial Installation

System Simply Does Nothing

There are two primary causes for this type of failure: lack of power, and bad or no connection.

Check to see that that 110VAC is present on the power terminals of the ICB. Also, check the fuses on the ICB.

If power is applied properly, it may still be interrupted before reaching the system by the power-line filter. This is a small, stainless steel box mounted to the chassis with 5 wires attached (2 black, 2 white, 1 green). It connects to the ICB on the far right side just below the power inputs and all system power runs through it. If this becomes disconnected, no power will reach the electronics.

Check all of the cable connections. A typical Phoenix can have 6 or more cables connecting the various parts. Remove each cable connection (one at a time so you won't forget where it goes), and re-seat it firmly. Also, check that the EPROM and RAM chips are firmly seated in their sockets. Refer to the CPU board diagram in the appendix if you are unsure of the location of these chips.

System Beeps When Turned On But There Is No display

If the system beeps two or three times quickly and then stops when you turn on the power, it is probably working. Consult the Display Problems section of this guide.

General System-Wide Problems

9 Volt Battery On ICB is Swollen

The battery on the ICB that looks like a standard 9 volt battery is NOT a 9 volt battery. It is a special 7.2 volt rechargeable battery. It is covered loosely with a thin plastic shell for aesthetics only. When inserted into the battery holder (which is very stiff), the plastic shell becomes compressed and will tend to bulge. This is normal for this battery.

Do not replace this battery with anything except an exact replacement from Emco Electronics. A standard heavy duty or alkaline battery will EXPLODE if installed on this board.

System Intermittently Loses Pin Numbers

This is typically caused by a new PIN being assigned which is in conflict with a previously assigned PIN. No two PINs may have the same last 4 digits. If you assign a new PIN using the same last 4 digits as a previously assigned PIN, the new one will overwrite the older one, making the older one invalid. Consult your Phoenix Operations Manual for a complete list of restrictions governing PIN assignments

More Than 1 PIN Will Work With The Same Vehicle Card/Key

This is normal. The Phoenix is intended for use in industrial settings, fleet fuelings, etc.. In this environment, there are often numerous drivers (each with their own PIN) driving multiple vehicles (each with their own vehicle card or key). The Phoenix system does not allow restricting a specific PIN to any given vehicle card/key or group of cards/keys.

System Beeps Continuously

This can be seen in two different forms.

If the system gives two quick beeps repeating about every two seconds, this indicates that the system is resetting. You may notice the display resetting as well.

This is most often caused by the card or key reader becoming unplugged (or having a loose connection) from the CPU board. Remove the cable connecting your card or key reader from the CPU board and re-seat the cable. Also, re-seat the cable on the card/key reader end.

Or, you may have lost power to the system. In the event of a power failure, the system's onboard battery back-up will keep the system running for about 1/2 hour. When the battery begins to run low, the CPU will sense the low voltage condition and attempt to reset. Check to see that there is 110VAC at the power input to the ICB and check the fuses on the ICB if necessary.

If the system is making a smooth high pitched whine, then you have lost power. The onboard battery back-up has taken over, but the battery is now very low and will no longer power the entire system. The beeper is draining any remaining power out of the battery. Restore power to the system.

System Displays OUT OF SERVICE

The Phoenix typically prints each transaction as it is completed, and then makes the internal memory area where that transaction was stored available for storing a new transaction. If, for any reason, the Phoenix does not detect the presence of the logging printer or the optional Transaction Computer Interface (TCI), it will not attempt to print the transaction data and will retain it in memory. This portion of memory will not be made available for new transactions until the stored transaction is printed.

When the Phoenix printer or TCI becomes disconnected for an extended period of time, the Phoenix will continue to fuel, storing transaction data until the printer/TCI becomes available. The system has enough internal memory to store up to 100 transactions. When 100 transactions have been completed without being printed, the system's memory is full. At this point the system will display the message OUT OF SERVICE and refuse to authorize any hoses until it is allowed to print the transaction data stored in memory.

The optional TCI will store up to an additional 1000 transactions. If you receive the OUT OF SERVICE message and are using a TCI, the first step would be to try to download the TCI information to disk and clear the TCI's modem memory. For instructions on how to perform these tasks, consult your Phoenix Operations Manual.

In order to clear the OUT OF SERVICE condition, you must get the printer or TCI back on-line to accept the stored transaction data.

For assistance in trouble shooting the printer or TCI, consult their respective sections in this guide.

System Is Clicking Continuously

This is the sound of the communications relays closing and opening. They close in order to check the status of the logging printer or TCI. If a printer or TCI is not detected, the relays re-open and the Phoenix will check again later. This means that there are transactions stored in memory that have not yet been printed. Consult the [Printer Problems](#) section of this guide to locate and correct the associated printer problem.

System Won't Authorize A Hose

ONE HOSE ONLY

First check that the control relay for the problem hose is operational. Switch the Auto/Manual switch (located on the ICB right next to the relay) to Manual and watch to see if the relay closes. Move the switch back and forth several times to verify proper operation of the relay and control circuit.

Next, set the Auto/Manual switch for that hose to Auto. In this position, the Phoenix has control over the relay that switches power to the pump. Check also, that the relays on the ICB are firmly in place and have not become loose or extracted from their sockets.

If this is a new installation, verify that the problem hose is wired according to the diagrams provided in the Phoenix Service Manual. When authorizing a hose, the Phoenix closes a relay. This action connects terminal 2 for that hose (on the bottom of the ICB) to terminal 3, and connects terminal 4 to terminal 5. Power must be continuously supplied to one of these terminals (either 3 or 4) so that it will be switched to the hose (connected to terminal 2 or 5 respectively) when the relay closes.

For a new installation, check to ensure that the relays have been installed. These look like large yellow ice cubes and are to be inserted into the black relay sockets along the bottom of the ICB.

ALL HOSES

If this is a new installation, verify that hoses are wired according to the diagrams provided in the Phoenix Service Manual. When authorizing a hose, the Phoenix closes a relay. This action connects terminal 2 for that hose (on the bottom of the ICB) to terminal 3, and connects terminal 4 to terminal 5. Power must be continuously supplied to one of these terminals (either 3 or 4) so that it will be switched to the hose (connected to terminal 2 or 5 respectively) when the relay closes. Check also, that the relays on the ICB are firmly in place and have not become loose or extracted from their sockets.

For a new installation, check to ensure that the relays have been installed. These look like large yellow ice cubes and are to be inserted into the black relay sockets along the bottom of the ICB.

If this is an existing installation, you have probably lost AC power. The Phoenix will continue to operate normally upon loss of power for about 1 hour due to its' on-board battery backup. It will be unable to authorize any hose, however, because there will be no power to supply the pump.

Transactions Terminate Early (Before Or While Pumping)

First, check to see if the Phoenix is counting any fuel that is pumped. Consult the printout and check that the quantity is not zero. If the quantity is zero, then your problem lies in the fact that the Phoenix is not counting, and therefore timing out. Consult the [Counting Problems](#) section of this guide to track down the problem.

If the pump turns off before you are able to pump any fuel at all, consult the Phoenix Operations Manual for instructions on setting the proper time-out.

If the pump turns off while pumping, and the Phoenix is properly recording the actual quantity pumped, run a few test transactions with a controlled in-use signal. To do this, remove the In-Use wire from terminal 1 on the ICB. Initiate a transaction per normal procedure, and use a small jumper wire to tie the In-Use terminal 1 to the AC input that powers the Phoenix at the top right of the ICB. Do not make this connection until after you authorize the hose, or the Phoenix will detect the In-Use and refuse to authorize. If the problem goes away, you have a faulty In-Use wire or circuit

Transactions Won't Terminate On Pump Hang-Up

If you complete a transaction and the pump remains authorized, the In-Use signal is not dropping out. This signal should drop out when the handle switch is turned off.

Check that the In-Use signal is fed from an output of the reset which is switched with the handle. Use a meter to make sure that the voltage on the appropriate In-Use terminal drops below 20 VAC when the pump handle is turned off.

If you are using 220V pump motors without a motor contactor, the other leg of the 220 may be feeding back through the motor and maintaining 110V on the in-use. If this is the case, the pump wiring must be reconfigured. Consult the wiring diagrams provided in the Phoenix Service Manual.

A high resistance AC neutral common to both the Phoenix and all of the pumps can cause strange problems, including the IN-USE circuit finding AC neutral via the motor circuit of another pump. It is imperative that a good, low resistance, and common AC neutral be provided for proper operation. All systems should have as many NEUTRAL wires as they have HOT wires and they should be the same gauge.

IMPORTANT: If the two legs of the 110 are used on separate pumps, there will be no problem as long as the AC neutral remains solid. However, if the AC neutral connections become intermittent between the Phoenix and the pumps, the in-use circuit on the ICB board may be damaged because of 220 volts being effectively placed across it. The circuit has been designed to prevent damage in this instance, but may not survive a long term problem.

Erroneous PUMP IS BUSY Message

The Phoenix normally displays the PUMP IS BUSY message when it detects an in-use signal from the hose you are trying to authorize.

FOR ONE HOSE ONLY

This can be caused by a bad microswitch in the reset of your pump. Try bypassing the reset motor switch. If this solves the problem, you may need a new reset or switch.

The in-use wire from another hose may have been connected to the in-use terminal for the hose in question. If this is a two hose system, check to see that both in-use wires are not reversed.

Disconnect the in-use wire coming from the problem hose. If this solves the problem, find out why the in-use wire is hot when the pump is not yet authorized. This can indicate major wiring faults. If the Phoenix still reports PUMP IS BUSY, your system may need repair.

If you are using 220V pump motors, the other leg of the 220 may be feeding back through the motor and maintaining 110V on the in-use. If this is the case, the pump wiring must be reconfigured. Consult the wiring diagrams provided in the Phoenix Service Manual.

For All Hoses

If you are using 220V pump motors, the other leg of the 220 may be feeding back through the motor and maintaining 110V on the in-use. If this is the case, the pump wiring must be reconfigured. Consult the wiring diagrams provided in the Phoenix Service Manual.

Remove the in-use wires from the ICB. If the problem disappears, check for wiring shorts. This can indicate major wiring faults.

Card Reader Problems

Every Card Yields The Message CARD INVALID

This problem is most commonly caused by a dirty or worn card reader. Try using one or more of your System cards (the red, yellow, and green cards that came with the system) to verify operation of the card reader.

Warning: DO NOT use the red system cards to verify card reader operation. If they are read properly, you will lose valuable data that you may not have wanted to erase.

If the system cards work properly, but others do not, inspect the cards in question for worn or dirty magnetic stripes (the brown stripe on the back of the card). If your system cards don't work, your card reader may be in need of repair.

If you have just replaced the card reader and continue to get this message, check that the card reader is not installed

upside down. When properly installed, the circuit boards on the card reader face the inside of the Phoenix, and the bare plastic side faces out.

System Displays “INVALID VEHICLE” When Using A Vehicle Card

If you receive this message, the card reader is working properly. The vehicle card you are using is damaged, or the vehicle number on the card has not been validated.

Use the green SET VEHICLE card to validate the vehicle number you are trying to use. For instructions on validating vehicle numbers, consult your Operations Manual.

System Always Displays INSERT CARD

This is most often caused by the Phoenix unit's cover being off (while being serviced or installed). Sunlight is flooding the optical “Card Detect” sensor and the card reader does not recognize that a card is present. Replace the system cover and try your card again.

Remove and re-seat the card reader cable, and check for any obstructions in the card reader. If a foreign object (usually a coin) prevents the card from fully inserting into the slot, the card reader may not detect its' presence.

This can also occur if the CPU ceases to function. To verify this, turn the Phoenix off (using the switch on the ICB board, not the circuit breaker), and then back on. If the problem persists, or if the display now remains blank, your system may be in need of repair.

System Always Displays REMOVE CARD

This is most often caused by an obstruction in the card reader. If a foreign object (usually coins or small bits of paper and plastic) is blocking the optical “Card Detect” sensor, the system will assume that a card is in the reader and constantly remind you to remove it. To check this, remove the card reader (3 screws and 1 ribbon cable) and look for foreign objects lodged in the card slot.

Remove and re-seat the card reader cable and try your card(s) again.

This can also occur if the CPU ceases to function. To verify this, turn the Phoenix off (using the switch on the ICB board, not the circuit breaker), and then back on. If the problem persists, or if the display now remains blank, your system may be in need of repair.

Key Reader Problems

System Displays The Message ‘KEY READ ERROR’ With Every IdentiKey

This is usually caused by dirty keys. Inspect each key for dirt or oil on the contacts. The contacts are the low spots between the plastic ‘teeth’ along both edges of the key. The contacts should shine bright gold. If they are dirty, scrub the keys with alcohol using a toothbrush.

Try using your system keys (the ones with the colored tags that came with the system). If these keys work but others do not, your vehicle keys are probably dirty. If these keys don't work either, your key receptacle may be damaged.

System Displays ‘INVALID VEHICLE’ When Using A Vehicle Key

If you receive this message, the key reader is working properly. The vehicle number on the key has not been validated.

Use the green tagged SET VEHICLE key to validate the vehicle number you are trying to use. For instructions on validating vehicle numbers, consult your Operations Manual.

System Always Displays INSERT IDENTIKEY or REMOVE IDENTIKEY

This is usually caused by a loose or damaged cable. Inspect the cable connecting the key socket to the key reader, and the cable connecting the key reader to the CPU board. Remove and re-seat both of these cables. If this problem persists, your key socket may have been damaged by improper use (turning it too far, or inserting a key backwards).

This message can also occur if the CPU ceases to function. To verify this, turn the Phoenix off (using the switch on the ICB board, not the circuit breaker), and then back on. If the problem persists, or if the display now remains blank, your system may be in need of repair.

Display Problems

Display Blank

This can be caused by power surges external to the system. Try cycling the power to the Phoenix. Turn it off, wait a few seconds, then turn it back on (using the power switch on the ICB, not the circuit breaker). When turning the power on, listen for the Phoenix to beep two or three times rapidly. If you hear the two or three quick beeps and no more, the CPU board is probably working properly. This will usually correct the display.

Check the multicolored ribbon cable connecting the display to the CPU board. It should not be twisted and should cover all 14 pins of the connector on each end (inserting one or both connectors upside down is possible but difficult). Cycle the power to the system and check the display.

Remove the data communication cable (the 3 conductor shielded cable leading from the CPU board to the printer or TCI) taking note of which color wire is on which terminal. If the display begins to operate upon removal of this cable, there is a problem with the cable. Find and correct this problem before re-installing it.

Try adjusting the display contrast. This is done by turning the contrast knob next to the display connector on the CPU board with a small flat blade screwdriver. Turning the knob to the left (counterclockwise) will increase the contrast and make it darker.

Light Or Dark Display

This can be adjusted by turning the contrast knob next to the display connector on the CPU board with a small flat blade screwdriver. Turning the knob to the left (counterclockwise) will increase the contrast and make it darker. Turning the knob to the right (clockwise) will decrease the contrast make it lighter.

If this doesn't help, remove the data communication cable (the 3 conductor shielded cable leading from the CPU board to the printer or TCI) taking note of which color wire is on which terminal. If the display begins to operate properly upon removal of this cable, there is a problem with the cable. Find and correct this problem before re-installing it.

Garbage Or Stray Characters On Display

This is most commonly caused by a loose display cable. Check the multicolored ribbon cable connecting the display to the CPU board. It should not be twisted and should cover all 14 pins of the connector on each end (inserting one or both connectors upside down is possible but difficult). Cycle the power to the system and check the display.

Display Doesn't Change (Always Displays The Same Message)

This may be caused by a loose display cable. Check the multicolored ribbon cable connecting the display to the CPU board. It should not be twisted and should cover all 14 pins of the connector on each end (inserting one or both connectors upside down is possible but difficult). Cycle the power to the system and check the display.

This can also occur if the CPU ceases to function. To verify this, turn the Phoenix off (using the switch on the ICB board, not the circuit breaker), and then back on. If the problem persists, or if the display now remains blank, your system may be in need of repair.

If the system displays PLEASE WAIT for long periods of time, you may have initiated one of the administrative reports. If so, the report should be printing to your printer and the Phoenix is unavailable for fueling operations during this time. If you are printing all of the valid PIN or Vehicle numbers and have a large number of PINs or Vehicles validated, this report can take 20 minutes or more. The only way to prematurely terminate one of these reports is to remove the system cover and turn the power off and back on.

Display Has No Backlight

This is most often caused by loss of power to the Phoenix. Since the Phoenix has its' own battery backup, it will continue to function for about 1/2 hour with no power applied, but the display backlight will not operate from the battery. Check that 110VAC is present across the 110 and NEU terminals on the ICB, and check the fuses on the ICB.

If the power is present and the fuses are good, inspect the red and black wires leading from the side of the display to the ICB for damage (it is normal for there to be a splice in the red wire which is covered with black heat-shrink tubing). If these are in good shape, remove the backlight connector from the ICB and check the voltage on the outer two pins of this connector (on the ICB) with a voltmeter set to measure DC volts. Proper readings will be between 2 and 5 VDC depending on the age of your ICB.

Incorrect Date and/or Time

Once the system clock has been set, it should never need to be changed except to allow for daylight savings time. The on board clock has its' own battery backup to keep it running when the power is off (even if the CPU board is removed from the system).

If the clock is erratic, or stuck on a certain date/time, the battery may have become discharged and is preventing the clock from working at all. This can occur even if you have never lost power to the system because the battery does have a finite shelf life. Check this by removing the clock battery. Set the proper date and time again using the green SET DATE/TIME system card or key, and run a test transaction to check the clock. If the clock is now functioning properly, a new battery may be purchased from Emco Electronics.

If the date/time is 12 hours slow, you may have set the time using the 12 hour AM/PM format. The Phoenix clock requires that you set the time using the military 24 hour format. All times after 12 noon should have 12 added to the hour (for instance 3:15 PM would be entered as 15:15).

Keypad Problems

Clicking Or Popping Sound When Pressing Keys

Our newer keypads use a small stainless steel dome inside each key to provide a more tactile feel to the keypad. When pressed this dome collapses and springs back when released. It is normal for this to make a clicking or popping sound.

Erratic Operation In Wet Or Very Humid Weather

This was a problem only on the very early Phoenix systems. It was remedied by the introduction of firmware version 3.0 and is incorporated into all succeeding versions. To see if you have this version, remove the cover from the Phoenix system and look at the label on the EPROM. This label will show the version # of the program installed in the system.

Also, newer boards are environmentally coated to prevent moisture from affecting the boards. This coating is clear and rubbery and completely covers all 3 boards in the system. It is most visible on the CPU board where it covers the serial number label.

If your system does not incorporate either of these two modifications, contact Emco Electronics to arrange for an upgrade.

No Response, Erratic Response, Or Repeating Key(s)

In order to diagnose other various problems involving the keypad, it will be necessary to determine if the problem is within the keypad itself, or in the CPU board to which the keypad is attached. The following procedure will guide you through the testing of the CPU board. You may need a second person to assist in watching the display.

1. Inspect the ribbon cable to make sure there is no obvious damage such as a torn cable or burned spots due to possible lightning or overvoltage surge.

2. Disconnect the ribbon cable from the CPU board. Note that there are seven pins exposed. The pin nearest the top of the board is pin #1. The next pin down is pin #2 and so on through pin #7, which is the bottom pin.
3. For this test, the power switch on the ICB will need to be in the on position. Connect one end of an alligator clip test lead to pin #1. Make sure that the wire doesn't accidentally touch any other pins. Insert a valid card/key and remove it. The display should prompt you to enter a "PIN NUMBER", "MILEAGE" or another keypad entry.
4. At this time with the test lead connected to pin #1, tap the other end of the test lead to pin #5. When you do this, the number 1 should appear on the display. Now with the test lead still attached to pin # 1, tap the other end on pin # 6 and then pin # 7, the numbers 2 and 3 should now be displayed.

Note: It may be necessary to insert the card/key several times during this test since the PIN number is only five digits and the mileage is six. The display must be awaiting an entry. This test cannot be performed at an "INSERT CARD/KEY" prompt. It is common for a number to appear several times during this test due to contact bounce by the technician.

5. Move the alligator clip test lead down to pin #2. With the lead firmly attached to pin #2, and tap the other end to pins 5, 6, and 7, noting that the numbers 4, 5, and 6 appear on the display respectively.
6. Move the test lead down to pin # 3. Again tap the other end of the lead to pin # 5, 6, and 7, noting that the numbers 7, 8, and 9 will appear on the display.
7. Move the test lead down to pin # 4. Tap the other end to pin 5 (no number will appear since this is the connection for the CLEAR key, however, you should hear a beep). Now tap pin #6 and the number 0 should appear. And finally, tap pin 7 (no number will be displayed since this is the connection for the ENTER key).

If this test is performed and all numbers will appear on the display, the CPU is functioning properly. Contact Emco Electronics to arrange for a replacement keypad.

Counting Problems

System Not Counting - New Installation

ONE HOSE ONLY

Check to ensure that the pulser being used on this hose is a contact type pulser. The Phoenix system does not support active (generally 3 wire) pulsers. Emco Electronics model 400-B and model 500 pulsers will fit on most Veeder Root registers and are both contact type pulsers.

Also, check that the Phoenix is receiving the proper in-use signal during fueling. The Phoenix will not count (even if good pulses are being received) without the presence of the in-use signal. It is also possible that the in-use wires from 2 pumps were mixed up during installation and connected to the wrong terminals. Consult the Phoenix Service Manual for the appropriate wiring diagrams.

Finally, try pulsing the system manually. To do this, remove the pulser wires for the problem hose from the ICB. Authorize the hose and turn on the handle switch (to provide the in-use signal) and use a short piece of wire to connect the two pulser terminals (labeled +12 and PUL) together. Connect one end to the terminal marked +12 and tap the other end to the terminal marked PUL several times to simulate pumping fuel. Turn the handle switch off and check to see if the Phoenix counted your pulses. If not, then your system may be in need of repair.

If the system did count the manual pulses, reconnect the pulser wires to the ICB, and try manual pulsing from the other end of the wires (inside the pump). Disconnect the wires from the pulser, initiate a transaction just as before, and touch the two wires together several times. If the Phoenix did not count these pulses, your problem lies in the wiring between the pulser and the Phoenix. If these pulses were counted, you may need a new pulser.

ALL HOSES

If this is a two hose system, the pulser wires or in-use wires for the two hoses may be crossed. This is more likely on a two hose system than 4, 6, or 8 hose systems because the larger systems would require that many more wires be crossed in order for all of the hoses to fail. Also, make certain that you have the pulser (and pump) wires for hose #1 on the rightmost set of terminals, counting 2, 3, etc. to the left. It is a common mistake to wire hose #1 to the left side of the board and hose #8 to the right.

Check that the HOT (110VAC) and NEUTRAL wires have not been reversed at the power inputs to the system on the ICB. If this is the case, everything else would work fine, but the in-use circuits would not register.

Check the +12 VDC pulser power on the ICB (consult diagram N in the appendix). Put the red lead of your meter at the top of this large diode, and your black lead at the bottom of it. You should read approximately +12 VDC. If this voltage is less than 10 VDC, disconnect the pulsers one at a time and recheck this voltage to find the bad pulser. If this voltage is 0, check the fuses on the ICB and recheck that power is being supplied to the Phoenix.

Check to be certain that your pulsers are receiving power. While some pulsers use magnetic Reed switches, others (including all Emco Electronics models) require power.

System Not Counting Existing Installation

ONE HOSE ONLY

Check that the Phoenix is receiving the in-use signal during fueling. The Phoenix will not count (even if good pulses are being received) without the presence of the in-use signal. It is also possible that the in-use wires from 2 pumps were mixed up during installation and connected to the wrong terminals. Consult the Phoenix Service Manual for the appropriate wiring diagrams.

Next, check to be certain that your pulsers are receiving power. While some pulsers use magnetic Reed switches, others (including all Emco Electronics models) require power.

Finally, try pulsing the system manually. To do this, remove the pulser wires for the problem hose from the ICB. Authorize the hose and turn on the handle switch (to provide the in-use signal) and use a short piece of wire to connect the two pulser terminals (labeled +12 and PUL) together. Connect one end to the terminal marked +12 and tap the other end to the terminal marked PUL several times to simulate pumping fuel. Turn the handle switch off and check to see if the Phoenix counted your pulses. If not, then your system may be in need of repair.

If the system did count the manual pulses, reconnect the pulser wires to the ICB, and try manual pulsing from the other end of the wires (inside the pump). Disconnect the wires from the pulser, initiate a transaction just as before, and touch the two wires together several times. If the Phoenix did not count these pulses, your problem lies in the wiring between the pulser and the Phoenix. If these pulses were counted, you may need a new pulser.

ALL HOSES

First, check the +12 VDC pulser power on the ICB (consult diagram N in the appendix). Put the red lead of your meter at the top of this large diode, and your black lead at the bottom of it. You should read approximately +12 VDC. If this voltage is less than 10 VDC, disconnect the pulsers one at a time and recheck this voltage to find the bad pulser. If this voltage is 0, check the fuses on the ICB and recheck that power is being supplied to the Phoenix.

Check to be certain that your pulsers are receiving power. While some pulsers use magnetic Reed switches, others (including all Emco Electronics models) require power.

Try manual pulsing. To do this, remove the pulser wires for the problem hose from the ICB. Authorize the hose and turn on the handle switch (to provide the in-use signal) and use a short piece of wire to connect the two pulser terminals (labeled +12 and PUL) together. Connect one end to the terminal marked +12 and tap the other end to the terminal marked PUL several times to simulate pumping fuel. Turn the handle switch off and check to see if the Phoenix counted your pulses. If not, then your system may be in need of repair.

If the system did count the manual pulses, reconnect the pulser wires to the ICB, and try manual pulsing from the other end of the wires (inside the pump). Disconnect the wires from the pulser, initiate a transaction just as before, and touch the two wires together several times. If the Phoenix did not count these pulses, your problem lies in the wiring between the pulser and the Phoenix. If these pulses were counted, you may need a new pulser.

System Counts, But The Quantities Are Incorrect

Quantity Is Too High

Check that your pulser is configured properly for the register on which it is installed. Consult your pulser documentation for the proper settings.

If the count is EXACTLY 10 or 100 times too high, consult the Phoenix Operations Manual to set the system decimal point properly. Note that all hoses must use the same decimal point setting.

Run a few test transactions WITHOUT pumping any fuel. This will test the pulser to see if it is giving extra pulses when it should not. If you do this and the quantity reported is not 0, there is probably a problem with your pulser. This can be caused by low or dirty power being supplied to the pulser. Try installing a snubber (available from Emco Electronics) on the pulser's power input.

Or, if you are using an optical pulser, such as a Emco Electronics pulser, you may have a vibration problem. If the pump motor causes the register to vibrate excessively, an optical pulser may count the vibrations. In the case of the Emco Electronics models Century and 500 pulsers, check that the anti-rotation wire is properly installed.

Quantity Is Too Low

Check that your pulser is configured properly for the register on which it is installed. Consult your pulser documentation for the proper settings.

If the count is EXACTLY 10 or 100 times too low, consult the Phoenix Operations Manual to set the system decimal point properly. Note that all hoses must use the same decimal point setting.

Check that any cotter pins necessary to affix the pulser head to a register shaft are in place.

Check the pulser power supply. If the voltage drops at any point during the transaction, the pulser may stop pulsing briefly.

Printer Problems

NORMAL OPERATING CONDITIONS

Under normal conditions, the printer communicates with the Phoenix system passively. The only signal the printer sends to the Phoenix is on the BUSY wire of the data communications cable.*

When the Phoenix has transaction data to be printed, it closes the communications relays to check the BUSY line. This line is normally held high (+4 to +12 VDC) by the printer when the it is ready to receive data. If this line is low (0 VDC), the printer is not ready, and the Phoenix will hold the transaction data in memory and try again later. If the BUSY line is high, the Phoenix will transmit the data and then check the BUSY line again. If the BUSY line remains high after the transaction data has been sent, the Phoenix assumes the printer received the data properly and removes it from memory.

If the DATA line is broken or shorted to some other wire, while the BUSY and GND wires remain intact, the above procedures will take place per normal operation, but the data will not be received by the printer, and will be removed from the Phoenix's internal memory.

The GND (ground) wire is used as a reference for both the BUSY and the DATA wires.

Note: Version 4.x and higher Phoenix EPROMs will not remove a transaction from memory right away, but it will be passed over after printing. This transaction will be available for reprinting until it is overwritten 100 transactions later. For more information on this feature, consult you Phoenix Operations Manual.

* For instructions on the proper installation of this cable, consult your Phoenix Service Manual.

Printer Won't Print Any Transactions

The most common problem is the printer being off-line. The on-line or ready light must be on for the printer to operate. Generally when the line feed button is used to advance the paper (in order to read a transaction), the on-line button is turned off, and the operator forgets to return the printer to on-line.

Check the BUSY signal at both the printer and the CPU board. This should be between +4 and +12 VDC (measure with respect to the GND terminal) depending on the model of printer you have, but should be the same at both ends of the BUSY wire.

If the BUSY line is high (between +4 and +12 VDC) at the CPU, check the 2 small fuses on the CPU board near the data communications connector.

If the BUSY line is low (approximately 0 VDC) at the printer, the printer is probably OFF-LINE. The printer must have paper and be selected (usually by pressing an ON-LINE button) before it will supply a BUSY signal.

If the BUSY line is high at the printer, but low at the CPU board, you may have a faulty data communications cable. To check this, carry your printer out to the Phoenix and connect it to the CPU with a short piece of cable. If the printer starts working, your problem lies in the data communications cable. If the printer still won't print, your printer and/or CPU may be in need of repair.

Printer Repeats Transactions

This is caused by an intermittent connection on the BUSY line. It may be a loose connection, or it may be a bad wire in the data communications cable. Check and tighten the connections at the printer and at the CPU. To check the cable, carry your printer out to the Phoenix and connect it to the CPU with a short piece of cable. If the printer stops repeating, your problem lies in the data communications cable. If the printer still repeats transactions, your CPU may be in need of repair.

Delayed Printing

If your transactions take several minutes (more than 2) or more to transmit to the printer, you probably have a poor BUSY signal. It may be a loose connection, or it may be a bad wire in the data communications cable. Check and tighten the connections at the printer and at the CPU. To check the cable, carry your printer out to the Phoenix and connect it to the CPU with a short piece of cable. If the delay disappears, your problem lies in the data communications cable. If the printer delays, your CPU may be in need of repair.

Printer Prints Transactions, But Won't Print Administrative Reports

This can only occur if you are using the optional Transaction Computer Interface (TCI) and have version 4.x or higher firmware installed in your Phoenix system. If your Phoenix is connected directly to the printer, you will not encounter this problem. If you are using a TCI and see this problem, your TCI hasn't been updated with the proper firmware to support the reporting functions. Contact Emco Electronics to arrange for an upgrade.

No Operation, Light Print, Or Ink Smudges Across The Paper

Consult the printer manual supplied with the system.

Strange Data Or Blank Lines

These are usually caused by noise in the data communications cable. They can originate from ground currents, or more often from radio frequency (RF) transmissions. RF transmissions are generated by TV transmitters, CB radio's, Radio transmitters, Microwave transmitters, Cellular phone and pager transmitters, and many other sources. If any of these are nearby (nearby means within a few thousand feet), they may interfere with the operation of the Phoenix printer. Usually, however, these transmissions will be shielded out by the shield in the data communications cable. Make certain that the shield of this cable is grounded at the Phoenix end only. For instructions on the proper installation of this cable, consult your Phoenix Service Manual.

Paper Won't Feed Or All Transactions Print On The Same Line

There are two primary causes for this type of malfunction. Either the paper is out or jammed, or the tractor feed unit is not turning.

Check that you have not reached the end of the form-feed paper. Also, check that the paper is not caught on something prior to entering the printer which would prevent it from being fed properly. Or, the paper may be wrinkled and jammed up inside the print mechanism.

Make sure the tractor feed unit is snapped firmly into place. Use the Line Feed (or LF) button on the printer to test that the tractor feed is pulling the paper.

Transaction Computer Interface (TCI) Problems

Randomly Prints TCI POWER INTERRUPTION Message And Self-Test

This normally occurs at startup only. If you get this message (with or without the self-test) without having turned the unit off and back on, you have experienced power loss or a temporary drop in voltage. A drop in voltage is usually caused by the presence of a large inductive load on the same circuit. Motors of all types are inductive loads. Try moving the TCI to a location where it may be powered on a circuit separate from air conditioners, refrigerators, pumps, air compressors, etc..

One Or More Of The Self-Tests Reports: FAILED

This can occur from time to time due to noise on the power line or strong RF transmissions nearby during the self-test cycle. Try turning the power off and then back on several times. If the problem persists for 3 or more resets, contact Emco Electronics to arrange for the repair of your TCI.

TCI Reports: MODEM MEMORY FULL - TCI OFF-LINE or
PRINTER MEMORY FULL - TCI OFF-LINE

The TCI can store up to a maximum of 999 transactions in either the printer or modem memory. If either of these memories become full, the TCI will go off-line (stop responding to the Phoenix system).

If the MODEM memory becomes full, this means that you need to download the stored transaction data to your PC, AND THEN CLEAR THE TCI MODEM MEMORY, using the PHOENIX software supplied with the TCI.

If the PRINTER memory becomes full, this means that the TCI is not aware that a printer is attached and awaiting transaction data to be printed. This may still be true even if the TCI prints its' self-test properly. Check your printer to ensure that it is powered on and on-line (consult the Printer Problems section of this guide for more information on your printer). If you are not using a printer at all, contact Emco Electronics Customer Service Department for further instructions on your custom installation. You may use the PHOENIX software supplied with your TCI to clear the printer memory without printing the data (but you should be SURE to download this information to your PC first).

The Power Light Doesn't Come On

If the power light doesn't come on, and the TCI doesn't seem to be operating at all (doesn't print self-test to printer), check that you have the proper power applied to the unit. Next, power down the TCI and remove the cover. Check the fuse at the power input. If this fuse is blown, replace it with an identical fuse.

If the proper power is applied and the fuse is good, your TCI may be in need of repair.

Won't Print To Printer

This may be seen in two different forms:

SELF-TEST PRINTS BUT TRANSACTIONS DO NOT

If this occurs, the problem is most likely with the printer or the cable connecting the printer to the TCI. When printing transactions, the TCI first checks the status of the BUSY line coming from the printer. If there is no BUSY signal, the TCI will not print transactions but will rather store them in memory until a BUSY signal is detected. When printing the self-test, the TCI does not check the status of the BUSY line, the test results are just transmitted. If the printer is available, it will print the information. If the printer is unavailable for any reason, the TCI still transmits the information and continues with normal operation. For more information, consult the Printer Problems section of this guide.

NEITHER THE SELF-TEST NOR TRANSACTIONS PRINT

If nothing will print to the printer, first check out the printer as described in the [Printer Problems](#) section of this guide.

You may need to remove the TCI from the data path. Connect the data communications cable coming from the Phoenix directly to the printer and run a few test transactions. If these print normally, the problem must be in the TCI or the cable leading from the TCI to the printer. Check out the cable with an Ohmmeter (continuity tester) and tighten any loose connections at the interface adapters. If this does not solve the problem, your TCI may be in need of repair.

Transactions Will Not Download - New Installation

DIRECT CONNECTION TO PC

The most common cause of this problem is that the software was configured for the incorrect comm port during the installation procedure. Try reconfiguring the software for the other comm port (by running the installation program again) and try again. Next, try moving the cable connecting the TCI with the computer to the other comm port on the computer. Then try setting the software for each comm port one at a time. If your PC is functioning properly, this method should get you connected to the TCI in a maximum of 4 attempts.

Another common mistake is using the wrong port on the PC. A comm port (also called a serial port) connector on a PC is ALWAYS a male connector. This means that the connector has pins (either 9 or 25) protruding from the connector body. These pins will be surrounded by a shroud for protection. A female connector of the same type will be present on the PC, but this is a different type of port.

You may be using an improper cable. A standard serial cable should be used. This cable will have all 25 conductors connected to the same pin on both ends (1 to 1, 2 to 2, etc.). A null modem cable looks identical to a standard serial cable, but all of the wires don't go straight through (pins 2 and 3 on one end connect to pins 3 and 2 respectively on the other). This cable will not work for the TCI connection.

Remove the cover from the TCI and check that the jumpers shown at bottom right in Diagram S (in the appendix of this guide) are set to PC and not MODEM.

There may be two or more components of your computer attempting to use the same internal resources. This is sometimes referred to as a serial port conflict, comm port conflict, or IRQ conflict. Refer to your computer's documentation, or contact the computer's manufacturer to determine if there is a conflict in your system.

MODEM CONNECTION

The most common cause of this problem is an incorrectly configured TCI. Consult your Phoenix Operations Manual for proper installation instructions and diagrams. Pay particular attention to the proper DIP switch and jumper settings. Also, make sure that the settings on the TCI match the settings you made to the Phoenix software when you installed it. You may need to run the installation program (INSTALL.EXE) again to reconfigure the software.

Next, make certain that you are using a Hayes (or a 100% Hayes compatible) modem. The communications software was written using Hayes modems for testing and we know they work properly. Also, Hayes is the de-facto computer industry standard for modem design.

It is also important to turn on the TCI after you turn on the modem to which it is attached. Only in this way can you be sure that the modem is ready to receive its' configuration data from the TCI when it is sent.

If your modem is configured by DIP switches instead of by software, it is important to set the modem to AutoAnswer. Usually, the modem will have a light on the front labeled 'AA' which will be illuminated if AutoAnswer mode has been initiated.

Another common problem is with the calling modem (the one connected to the PC at the remote location). If this is an internal modem (completely enclosed inside your computers main box), then it must be configured to operate as either comm 1 or comm 2. The Phoenix software does not support modems on comm 3 or comm 4. This may require that you

disable the standard comm 1 or comm 2. Consult your computer's documentation or contact your computer's manufacturer if you need assistance in this area. This is not generally a problem with external modems (ones which are self contained and connect to the computer with a cable) because they almost exclusively connect to either comm 1 or comm 2.

Transactions Will Not Download - Existing Installation

DIRECT CONNECTION TO PC

First, try cycling the power to the TCI. Turn it off for a few seconds, and then back on. Remember to wait for the self test to finish printing before attempting to download.

If the TCI has been downloading in the past, and suddenly will not, the configuration of your PC has probably changed. This can include the installation of any new (or different) hardware and software. It may be as simple as the cable becoming disconnected. If these possibilities can be ruled out, contact Emco Electronics Customer Service Department for assistance.

MODEM CONNECTION

If the TCI has been downloading in the past, and suddenly will not, the configuration of your PC has probably changed. This can include the installation of any new (or different) hardware and software. It may be as simple as the modem cable becoming disconnected.

It will be necessary to have someone at the remote site (where the Phoenix, TCI, and printer are located) to check that the power has not failed and that all connections are still good. Use a telephone on the same line the TCI uses to check that the phone line is still in service. Call the TCI's phone number with a regular phone to see if the modem answers.

Try cycling the power to both the TCI and the modem. Turn them both off for a few seconds, and then back on. Turn the modem on first, so it will be properly configured by the TCI. Remember to wait for the self-test to finish printing before attempting to download. Also, check the TCI and modem cables for worn spots or loose connections.

If these possibilities can be ruled out, contact Emco Electronics Customer Service Department for assistance.

9.1 Display Replacement

To replace the LCD Display, remove the two 4-40 hex nuts from the top of the display and unplug the ribbon cable from the CPU board and backlight cable from the ICB board. To install a display, reverse the above procedure.

9.2 CPU Board Set Replacement

1. Switch the ON/OFF switch on the ICB board to OFF.
2. Switch all pump control switches to manual if fueling operations are to continue. If fueling operations are to be terminated, leave the pump control switches set to AUTO.
3. Unplug the card reader or key reader cable from the CPU board at the CPU board end.
4. Remove the three wires leading to the printer from the lower left of the CPU board. Make a note of which color wire is connected to each terminal so that it may be reconnected the same way.
5. Unplug the front panel keyboard ribbon cable from the CPU Board. Note: Be very careful when handling this cable, it can be easily torn.
6. Unplug the pump control ribbon cable from the far right side of the pump control board.
7. Remove the four screws holding the CPU/pump control board assembly to the chassis.
8. The CPU board, and pump control board should now be ready for removal.
9. The above steps should be reversed to replace the repaired components.
10. The program memory IC will need to be removed from the old CPU and installed into the new CPU. Make certain that pin 1 is to the top of the unit, and that no pins are bent upon insertion.

9.3 Card Reader, DuraKey Reader, and IdentiKey Reader Replacement

A. Card Reader Replacement

Keep in mind that light falling on the back of the card reader may cause the reader to malfunction. Any test of the reader should be made with the unit cover in place.

If the card reader becomes worn or damaged, the following procedures should be followed for its removal prior to return for repair:

1. Unscrew the three screws holding the reader to the front panel.
2. Unplug the ribbon cable connecting the reader to the CPU board from the reader.
3. The card reader is now removable through the front panel.
4. The above steps should be reversed to replace the repaired card reader. Note: The card reader should periodically be cleaned with a card reader cleaning kit available from Emco Electronics.

If the card reader DIP switches have been changed for some reason, use the following list to reset the switches to the proper positions:

<u>Switch A</u>		<u>Switch B</u>	
1	OFF	1	ON
2	OFF	2	ON
3	ON	3	OFF
4	ON	4	ON
5	OFF	5	OFF
6	OFF	6	OFF
7	OFF	7	ON
8	OFF	8	ON

B. DuraKey or IdentiKey Reader Replacement

If the key reader becomes worn or damaged, the following procedure should be followed for its removal prior to return for repair.

1. Remove the ribbon cable between the key reader and the CPU board.
2. Using an Allen wrench and nut driver, remove the 2 bolts from the key reader board mounting brackets. (Place the bolts back into the chassis after removal)
3. Unplug the ribbon cable from the key reader socket.
4. Using a pair of pliers, gently squeeze the retaining clips on the sides of the key reader socket and remove through the front of the chassis.
5. To install the key reader, reverse the above procedure.

9.4 Keypad Replacement

The keypad is formed within the front panel overlay and may be replaced due to damage or failure by the following steps:

1. Remove the card reader or key reader as per section 9.3 above.
2. Unplug the keyboard ribbon cable from the CPU board.

Most newer Phoenix systems have the front panel adhered to a 1/8" thick plastic plate.

If yours does not include this plate, go on to step 4.

3. If yours is like this, just unbolt the panel (5 places), and bolt on the replacement making certain to feed the cable through the rectangular hole in the front of the chassis. Then replace the card reader. Skip steps 4 through 7.
 4. Using a knife, screwdriver, or other sharp object, pry a corner of the front panel overlay away from the front panel. Continue pulling the overlay until it is free from the front panel.
 5. Using a solvent such as lighter fluid, WD-40 or naphtha, clean the front panel of the chassis removing ALL adhesive remaining on the front of the chassis. If the adhesive is not removed problems will occur with the new keypad. Do not spray the chassis. If cleaner mist contacts the circuit boards, the system may have problems during high humidity conditions.
6. Remove the backing from the new overlay, paying close attention to the area around the cable.
 7. After inserting the cable through the front panel, CAREFULLY place the new overlay on the front panel. Smooth the overlay to insure good bonding, plug the keyboard into the CPU board (do not twist the cable), and replace the card/key reader following the above procedures.

Note: Be very careful with the ribbon cable of the keypad, it can be easily torn.

PHOENIX SYSTEM REPLACEMENT PARTS LIST

<u>DESCRIPTION</u>	<u>PART NUMBER</u>
CPU ASSEMBLY - 2 PUMP	9102000
CPU ASSEMBLY - 4 PUMP	9104000
CPU ASSEMBLY - 6 PUMP	9106000
CPU ASSEMBLY - 8 PUMP	9108000
ABOVE ARE LESS MEMORY CHIP & LCD MODULE	
<i>NOTE: CPU ASSEMBLY INCLUDES BOTH THE CPU ELECTRONICS AND THE PUMP CONTROL ELECTRONICS</i>	
CPU ELECTRONICS ONLY (LESS MEMORY CHIP)	9301000
CPU PROGRAM CHIP (CARD SYSTEM)	9000306
CPU PROGRAM CHIP (KEY SYSTEM)	9000306-K
PUMP CONTROL ELECTRONICS - 2 PUMP	9402000
PUMP CONTROL ELECTRONICS - 4 PUMP	9404000
PUMP CONTROL ELECTRONICS - 6 PUMP	9406000
PUMP CONTROL ELECTRONICS - 8 PUMP	9408000
ICB ELECTRONICS - 2 PUMP	9202000
ICB ELECTRONICS - 4 PUMP	9204000
ICB ELECTRONICS - 6 PUMP	9206000
ICB ELECTRONICS - 8 PUMP	9208000
ABOVE ARE LESS RELAYS	
PRINTER	9000200
PRINTER RIBBON	9000201
PRINTER ADAPTER (FOR AP2250 PRINTER ONLY)	9000205
CABLE ASSEMBLY FOR PRINTER ADAPTER (AP2250 ONLY)	9000206
INTERFACE ADAPTER	9000202
FUSED DATA LINE ADAPTER	9000203
TRACTOR FEED FOR PRINTER MODEL 1109	9000613
RECEIPT PRINTER REPLACEMENT PAPER	9501001
RECEIPT PRINTER REPLACEMENT RIBBON	9501002
RECEIPT PRINTER PROGRAM CHIP	9501004
PRINT MECHANISM FOR MODEL SP-342	9501003
SWITCH FRONT PANEL (KEYPAD)	9000300
FRONT PANEL BACK PLATE	9000300-BP
CARD READER	9000301
CARD READER COVER KIT	9000301-CK
CARD READER CLEANING KIT	9000510
CABINET LOCK	9000302
CABINET KEYS	9000303
MEMORY CHIP	9000304
LCD MODULE	9000305
CABINET BASE	9000400
CABINET TOP	9000401
KNOCK-OUT PLATE	9000402
PEDESTAL BASE W/BACK PLATE	9000403
PEDESTAL BACKPLATE	9000404
VEHICLE CARD	9000509
SYS. CARD - ERASE VEHICLES	9000501
SYS. CARD - ERASE PINS	9000502
SYS. CARD - ERASE TRANS.	9000503
SYS. CARD - PUMP ASSIGN.	9000504
SYS. CARD - RESET TRANS. 9000505	
SYS. CARD - SET VEHICLE	9000506
SYS. CARD - SET PIN	9000507
SYS. CARD - SET DATE/TIME	9000508
SYS. CARD - REPRINT TRANSACTIONS	9000526
SYS. CARD - PRINT VALID VEHICLES	9000527
SYS. CARD - PRINT VALID PINs	9000528
SYSTEM CARDS (COMPLETE SET)	9000500
DURAKEYS	
VEHICLE DURAKY	9000901

TEST DURAKY	9000902
SYS. DURAKY - ERASE VEHICLES	9000903
SYS. DURAKY - ERASE PINS	9000904
SYS. DURAKY - ERASE TRANSACTIONS	9000905
SYS. DURAKY - PUMP ASSIGNMENTS	9000906
SYS. DURAKY - RESET TRANSACTIONS	9000907
SYS. DURAKY - SET VEHICLE	9000908
SYS. DURAKY - SET PIN	9000909
SYS. DURAKY - SET DATE/TIME	9000910
SYS. DURAKY - REPRINT TRANSACTIONS	9000911
SYS. DURAKY - PRINT VALID VEHICLES	9000912
SYS. DURAKY - PRINT VALID PINS	9000913
SYSTEM DURAKYs (COMPLETE SET)	9000914
DURAKY RECEPTACLE	9000940
DURAKY READER BOARD	9000941
DURAKY RECEPTACLE CABLE (10 PIN)	9000942
DURAKY READER/CPU CABLE (20 PIN)	9000943
DURAKY FRONT PANEL (ALUMINUM ARTWORK PLATE)	9000944
DURAKY ENCODER	9000930
WALL TRANSFORMER FOR DURAKY ENCODER (110VAC)	9000931
WALL TRANSFORMER FOR DURAKY ENCODER (220VAC)	9000932
IDENTIKEYs	
VEHICLE IDENTIKEY	9000512
SYS. IDENTIKEY - ERASE VEHICLES	9000513
SYS. IDENTIKEY - ERASE PINS	9000514
SYS. IDENTIKEY - ERASE TRANS. 9000515	
SYS. IDENTIKEY - PUMP ASSIGN. 9000516	
SYS. IDENTIKEY - RESET TRANS. 9000517	
SYS. IDENTIKEY - SET VEHICLE	9000518
SYS. IDENTIKEY - SET PIN	9000519
SYS. IDENTIKEY - SET DATE/TIME	9000521
SYS. IDENTIKEY - REPRINT TRANSACTIONS	9000523
SYS. IDENTIKEY - PRINT VALID VEHICLES	9000524
SYS. IDENTIKEY - PRINT VALID PINS	9000525
SYSTEM IDENTIKEYS (COMPLETE SET)	9000522
IDENTIKEY RECEPTACLE	9000550
IDENTIKEY RECEPTACLE CABLE, 30 PIN	9000551
IDENTIKEY RECEPTACLE PCB	9000552
IDENTIKEY PANEL W/COVER	9000553
IDENTIKEY RECEPTACLE CABLE, 20 PIN	9000554
IDENTIKEY RECEPTACLE PROGRAM CHIP	9000555
IDENTIKEY RECEPTACLE RETAINERS	9000556
IDENTIKEY ENCODER	9000530
HARDWARE KIT	9000601
PLEXIGLASS WINDOW	9000602
BATTERY, 3.6V LITHIUM	9000603
BATTERY, 9V NiCad	9000604
ICB CABLE ASSY, 40 PIN	9000605
LCD INTERCONNECT CABLE	9000612
CARD READER CABLE, 20 PIN	9000606
FUSE, 1/2 AMP SLOW BLOW	9000607
FUSE, 1 AMP	9000608
FUSE, 2 AMP	0909001
FUSE KIT (2 EACH: 1/4A 5mm, 1/16A 5mm, 1A, 2A)	9000611
RELAY, 120V AC COIL	1010001
LCD HEATER	9000307
DATA LINE SUPPRESSOR	9000207
CPU / DATA LINE SUPPRESSOR KIT	9000208
TCI DOWNLOADING SOFTWARE FOR PC	9000101
TCI PROGRAM CHIP	9000102
SERVICE MANUAL	9000701

SYSTEM OPERATION INSTRUCTIONS

1.0 Introduction

The Phoenix card/key system is used to control from one to eight fueling positions providing access by either magnetic stripe cards or electronic keys.

Alternatively, the Phoenix can be equipped to accept a vehicle number entry directly from the keypad. This method still allows the use of vehicle cards or keys but does not require them. If your Phoenix is so equipped, the provided system cards / keys are still necessary for programming the system. This option requires only the changing of the Phoenix program chip (EPROM). If you do not currently have this option and would like to, contact your distributor to arrange for an upgrade.

The Phoenix system comes complete with the island mounted control unit, pedestal and transaction printer. All systems are factory equipped to perform all functions except those provided by the optional computer interface unit. The functions of the optional computer interface unit are explained in section 2.6 under Specifications.

Note: There are no controls or limits placed on the quantity of product dispensed during a transaction.

1.1 Fueling operations

A. Card system

- a. The system LCD displays "INSERT CARD".
- b. The vehicle operator inserts the vehicle card fully and smoothly into the card reader and the system displays: "REMOVE CARD".
- c. The vehicle operator removes the card with a smooth and continuous movement.
- d. If the card is invalid for the system, or if the reader cannot read the card for any reason, the display will indicate "CARD INVALID", and there will be no transaction.
- e. If the vehicle is not authorized, the system will display "INVALID VEHICLE", and there will be no transaction.

B. DuraKey System

- a. The system LCD displays "INSERT DURAKEY".
- b. The vehicle operator inserts the key into the receptacle and the system displays "REMOVE DURAKEY".
- c. The vehicle operator removes the key.
- d. If the key is invalid for the system or if the reader cannot read the key for any reason, the display will indicate "KEY INVALID" and there will be no transaction.

C. IdentiKey system

- a. The system LCD displays "INSERT IDENTIKEY".
- b. The vehicle operator inserts the key into the receptacle and turns it 90 (to the right, the system displays "REMOVE KEY".
- c. The vehicle operator rotates the key 90 (to the left and removes the key.
- d. If the key is invalid for the system or if the reader cannot read the key for any reason, the display will indicate "KEY INVALID" and there will be no transaction.

D. Cardless or Keyless system

- a. The system LCD displays "PRESS ENTER".
- b. The vehicle operator presses the ENTER key and the system displays "ENTER VEHICLE #".
- c. The vehicle operator enters the appropriate vehicle number and presses ENTER.

E. Operations for either system

- a. If the personal identification number (PIN) is required by the system (an option set by the installer), the system will display "ENTER PIN #".
- b. The vehicle operator must then provide a five digit number which is checked by the system for validity.
- c. If a valid personal identification number has not been entered by the vehicle operator within a predetermined time, the transaction is terminated.
- d. If a mileage entry is required by the system (an option set by the installer), the system will display "ENTER MILEAGE".
- e. The vehicle operator may then enter a mileage in whole miles with no decimals (not to exceed 999999 miles).

NOTES: *The Phoenix system does not perform any validity or reasonability check on the mileage entry. The mileage is simply passed on with the remainder of the transaction data. The system will accept "ENTER" as a valid mileage and produce 000000 on the transaction report.*

- f. The system will then display "SELECT PUMP"
- g. The vehicle operator must then select a hose which has been assigned the same fuel type that the vehicle has been assigned. (See section 4.0 on fuel assignments and section 6.0 on vehicle fuel types).
- h. If the hose selected is not a proper fuel match, the system will display "INCORRECT FUEL".
- i. If the hose selected is being used by another operator, the system will display "PUMP IS BUSY".
- j. If the hose selected does not exist, the system will display "NO SUCH PUMP".
- k. If the hose selection is correct, the system will enable the pump and display "PUMP IS ON".
- l. Fuel may then be obtained by the operator.
- m. If the hose is not activated within the set time-out period (an option set by the installer) or fuel is not pumped continuously during this time, the transaction will terminate.
- n. When the fueling has been completed, the pump will be disabled upon hang-up.
- o. If the transaction printer is on-line, the transaction will be printed. If the transaction printer is off line, the transaction will be stored within the system until the printer is brought back on line. (Also see section 2.6 under Optional transaction computer specifications).

1.2 TRANSACTION REPORT FORMAT

The transaction report generated by the Phoenix card system is in the following format:

TTTT	MM/DD/YY	HH:MM	vvvv	F	ppppp	mmmmmmmp	QQQQQQ.QQ
0001	01/25/89	14:15	4321	1	12345	0325432	8.57

TTTT	-	Transaction number	VVVV	-	Vehicle number
MM	-	Month	F	-	Fuel type
DD	-	Day	PPPPP	-	Personal identification number
YY	-	Year	MMMMMM	-	Mileage
HH	-	Hours	P	-	Pump
MM	-	Minutes	QQQQQQQQ	-	Quantity

Note: The decimal places in the quantity are set at the time of installation, and must be the same for all pumps.

Technical Note: Two space characters separate the fields in each transaction. Each transaction line ends with a line feed and carriage return.

2.0 Specifications

All Phoenix systems are shipped from the factory complete (except for pump pulsers, see section 2.4 for pulser selection information). The enclosure is made of brushed stainless steel for ruggedness and appearance.

2.1 PHYSICAL

Height - 58 inches (includes pedestal)

Width - 12 inches

Depth - 20 inches

Weight - 80 pounds

Temperature - Operating - 20C to + 70C

There are nine conduit knockouts on a removable plate separating the enclosure and the pedestal which may be used with either 1/2 or 3/4 inch conduit. All conduit from the ground up is enclosed within the pedestal and accessible through a removable rear panel.

2.2 ELECTRICAL

The power requirement is 110 VAC 60 Hz 100 WATTS

- a. Requires three wire hookup.
 1. Neutral
 2. Earth ground
 3. 110 VAC
- b. Should be protected with circuit protection such as the Emco Electronics Guardian Surge Suppressor and an emergency shutoff switch.

Pump control relays are DPST rated for 10 AMPS.

- a. Two sets of contacts for each pump.
- b. May be placed into manual operation in event of system failure.

System requires 110 VAC in-use (motor return) circuit to sense pump usage.

Pulser should be of a contact closure type (two wire). For other types of pulser installations contact the factory.

2.3 DATA STORAGE

The system contains provisions for 8000 vehicle numbers and 8000 personal identification numbers. The vehicle number is a four digit number, while the personal identification number is a five digit number. For details on vehicle and personal identification number assignments see section 6.0 and 7.0 under Vehicle numbers and Personal identification numbers.

The system will hold 100 fueling transactions in battery backed memory when the printer is off-line. (See section 2.4 under Switch selective options).

2.4 SWITCH SELECTIVE OPTIONS

An eight position dip-switch, located within the system, is used to enable or disable any of the following options. The installer must set these switches before operation of the system, however they may be changed at any time by qualified service personnel.

- 2.41 Personal identification number required/not required.
 - a. If this option is selected, the system must be provided with a valid five digit number before any transaction may take place.
 - b. There are some restrictions on valid number assignments. (See section 7.0 under Personal identification numbers).
 - c. If this option is not selected, the system will not prompt for any operator entry and it will proceed directly to the next operation.

- 2.42 Mileage required/not required.
- a. If this option is selected, the system prompts for a keyboard mileage entry from the vehicle operator.
 - b. There are no checks made of this data and simply selecting the "ENTER" key will insert all zeros for a mileage.
 - c. If this option is not selected, the system will not prompt for any operator entry and it will proceed directly to the next operation.
- 2.43 System transaction data overflow allowed/not allowed.
- a. If this option is selected, the system will shut down if the transaction memory fills with 100 transactions and refuse any further fueling operations. Should the system shut down due to this situation, one of the following must be performed:
 1. Put the printer back on-line and allow the system to dump the transactions in the normal manner.
 2. Use the "ERASE ALL TRANSACTIONS" system card/key and delete the stored transactions.

WARNING: THE TRANSACTIONS ERASED IN THIS MANNER ARE UNRECOVERABLE AND PERMANENTLY ERASED.

- b. If this option is not selected, the system will write over the stored transactions and they will be lost. The system will continue operation uninterrupted.
- 2.44 Number of decimal places used in transaction quantity information
This option allows system operation and transaction printout with pulsers generating pulses with the following ratio:
- a. Whole gallon (0)
 - b. Tenths of a gallon (0.0)
 - c. Hundredths of a gallon or dollars/cents (0.00)
 - d. Thousandths of a gallon (0.000)
- Since the pulser determines how many pulses per unit of product is dispensed, this option is for the transaction file format only. This does not determine the number of pulses per gallon, it only sets the decimal places for the transaction report.

- 2.45 Number of hoses in system
This option sets the number of hoses operating. Since the Phoenix system is supplied in an even number of hoses (2, 4, 6, or 8), these switches are used to disable any excess relays not used on odd numbered hose systems. If an unused hose is selected by the vehicle operator, the system will display "NO SUCH PUMP".

2.5 PUMP TIME-OUT

The pump time-out limit is set with an eight position dip switch. The time is determined in discrete time periods by the system installer. The time-out feature will terminate a transaction according to the following conditions:

- a. A transaction has been authorized, but the pump was never turned on.
- b. A transaction has been authorized and the pump has been turned on, but no product has been dispensed.
- c. A transaction is in progress, but the fueling has been interrupted for the selected time period.

2.6 Optional transaction computer interface unit

The Transaction Computer Interface is an optional unit which connects between the Phoenix card/key system and a computer system. It will receive transaction data from the card/key system, print it on the printer, and store the data until a computer, terminal, or modem is ready to accept it. For more information, refer to the Transaction Computer Interface installation or operation manuals.

- 2.61 Data storage
The Transaction Computer Interface can hold up to 999 transactions in battery backed memory.
- 2.62 Communications requirements
The interface requires a serial cable of appropriate length to connect it to the customer supplied modem or computer. The Phoenix system printer is disconnected from the card/key system and connected to the interface. The interface transmits and receives data to and from the computer system at 1200 or 2400 baud using RS-232 protocol.

3.0 Initial startup procedures

Four of the eight system cards or keys are used to initialize the system functions

WARNING: USE OF THESE CARDS OR KEYS MAY DESTROY THE DATABASE INCLUDING ALL VALID VEHICLE FILES, ALL PERSONAL IDENTIFICATION NUMBERS, AND ALL STORED TRANSACTIONS. THESE CARDS OR KEYS SHOULD BE USED ONLY BY QUALIFIED PERSONNEL WHO ARE AWARE OF THE DANGER IN TOTAL LOSS OF MEMORY DATA. ONCE THESE HAVE BEEN USED, THERE IS NO POSSIBLE WAY TO RECOVER THE DATA THEY HAVE ERASED.

Note: When version 4.x EPROM's are installed, a printer or TCI must be attached to the Phoenix system and be operational (powered up, online, paper loaded) before any of these actions can be performed.

3.1 Clearing all transactions from memory (RED CARD/KEY)

In order to erase all of the transactions from the memory of the system, the card or key labeled "ERASE ALL TRANSACTIONS" is simply inserted and withdrawn from the system. There is no further action to be taken by the system operator. Any existing transactions will be cleared, however, the current transaction number will still be used by the system. In order to reset the transaction number see section 3.4 under Reset transaction numbers.

NEW!! Phoenix firmware versions 4.x and higher will report to the printer when this action is performed.

3.2 Clearing all vehicle numbers from memory (RED CARD/KEY)

In order to erase all of the valid vehicle numbers from the memory of the system, the card or key labeled "ERASE ALL VEHICLES" is simply inserted and withdrawn from the system. There is no further action to be taken by the system operator. The fuel types of all vehicles in the system will be set to zero (Setting the fuel type of a vehicle to zero will invalidate that vehicle.)

NEW!! Phoenix firmware versions 4.x and higher will report to the printer when this action is performed.

3.3 Clearing all personal identification numbers (RED CARD/KEY)

In order to erase all of the valid personal identification numbers from the memory of the system, the card or key labeled "ERASE ALL PINS" is simply inserted and withdrawn from the system. There is no further action to be taken by the system operator.

NEW!! Phoenix firmware versions 4.x and higher will report to the printer when this action is performed.

3.4 Reset transaction number to 1 (YELLOW CARD/KEY)

In order to reset the current transaction number to 1, the card or key labeled "RESET TRANS. NUMBER" is simply inserted and withdrawn from the system. There is no further action to be taken by the system operator. If this card or key is not used to reset the transaction numbers, the system will automatically roll over from 9999 to 0001. This does not clear any data from memory, it simply sets the next transaction number. If any transactions are being held within the system memory, they will not be changed.

NEW!! Phoenix firmware versions 4.x and higher will report to the printer when this action is performed.

4.0 Product and pump assignments

The Phoenix system will support from one to eight hoses according to the configuration of the system as ordered from the factory. The system will also support from one to eight products. Each vehicle is validated with a number representing the type of product. The product type 9 will enable the vehicle to use any pump selected, with no limitation by fuel or product type. Multiple pumps may be assigned the same product type with no restrictions.

4.1 ASSIGNING PUMP NUMBERS

The pumps should be clearly labeled as to hose number and type of product. The assignments of the numbers must match the wiring of the pumps into the Phoenix system at the time of installation. The total number of hoses should be set with proper DIP switches within the system by the installer. There may be fewer hoses in the system than the system has the capability to control, (i.e., five hoses on a six hose system.) therefore, this feature is used to prevent vehicle operators from selecting hoses which do not exist. In the event the number has not been set to the proper number of hoses, the selected hose will simply time-out. However, this will cause a transaction to be printed on the transaction printer which will not relate to a valid pump.

4.2 DEFINITION OF PRODUCT TYPES

In the Phoenix system, pumps and fuel types are referenced only to numbers. The numbers assigned to the pumps are totally different from the numbers assigned to the type of product dispensed from that pump. It is the system operators responsibility to assign a number from 1 to 8 to each of the different types of product available. The product type 9 is used by vehicles which are not restricted by product type. Either one or all fuel types may be assigned a vehicle, there may not be multiple products assigned to a vehicle unless all the products are assigned (type 9).

4.3 ASSIGNING PRODUCT TYPES TO THE PUMPS (YELLOW CARD/KEY)

In order to set the product types to the respective hoses, the card or key labeled "PUMP ASSIGNMENTS" should be inserted and withdrawn from the system. At this time the fuel type selection for each hose must be input by the system operator. As each selection for the respective hose is prompted by the system, the operator simply assigns the proper product number for that hose. This card may be used at any time to change the type of product dispensed by a particular hose, however, all product types must be assigned to all of the dispensers each time it is used.

NEW!! Phoenix firmware versions 4.x and higher will report to the printer when this action is performed.

NOTE: When version 4.x EPROM's are installed, a printer or TCI must be attached to the Phoenix system and be operational (powered up, online, paper loaded) before this action can be performed.

5.0 Setting the current date and time (GREEN CARD/KEY)

In order to set the current date and time to the system, the system operator simply inserts and withdraws the system card or key labeled "SET DATE/TIME". The system will prompt the operator for the following information which should be entered in the following two digit format:

NOTE: All entries should be two digits, single digit fields should be preceded by a zero. Data in-put from the system operator should be followed with the "ENTER" key at the end of each field.

- a. Month (MM) - Two digits
- b. Day of month (DD) - Two digits
- c. Year (YY) - Two digits
- d. Hour (HH) - Two digits in military time (0 to 24 hours)
- e. Minutes (MM) - Two digits

Once the time has been set, the only occasion that the clock will require resetting is for daylight savings time. The clock circuit has its own lithium battery in case of power failure.

6.0 Vehicle numbers

The memory of the system contains preset vehicle numbers from 0001 to 7999. To validate a vehicle number, the vehicle fuel type must be set to a number between 1 and 9. If the fuel type for a vehicle number is set to 0, that vehicle becomes invalid. Vehicle numbers do not need to be assigned in any particular order. For example - the vehicle number 7849 could be the only valid vehicle in the system.

6.1 Assigning fuel types to vehicles

Any fuel type from 1 through 8 may be assigned to a vehicle. This assignment will limit that vehicle to obtain only that type product. If more than one type of fuel is to be used by a vehicle, that vehicle should be assigned a fuel type 9. Product type 9 is recognized to allow dispensing any fuel from any hose.

6.2 ASSIGNING VEHICLE NUMBERS

The system must use the four digit 0001 to 7999 numbering system. Any correlation between the card/key number and the desired vehicle number must be performed by the system operator and limited to these numbers.

6.3 VALIDATING VEHICLES (GREEN CARD/KEY)

The following steps should be performed in order to validate a vehicle:

- a. Insert and withdraw the system card or key labeled "SET VEHICLE".
- b. The system will prompt the system operator with "ENTER VEHICLE #". The system operator should then enter the vehicle number. The system will accept only a number ranging between 0001 and 7999. If a number is used which has already been validated, the type of fuel will be changed to the new selection. Leading zeros must be entered if they are needed.
- c. The system will then prompt the system operator for a fuel type with "SELECT FUEL TYPE". Any number from 1 through 9 will validate the vehicle number. The fuel type 9 is used to allow the vehicle to use any pump. If the fuel type selected is between 1 and 8, that type of product will be the only one obtained by that vehicle.
- d. Steps a through c above must be repeated for each vehicle number validated.

6.4 INVALIDATING VEHICLES

The same procedures used to validate vehicle numbers is used to invalidate vehicle numbers. To invalidate a vehicle the fuel type 0 is used instead of one of the numbers from 1 through 9. Since the system looks up the fuel type assigned to a vehicle number prior to authorizing a transaction, if a 0 is found there is no fuel type assigned to that vehicle number and it is invalid.

6.5 PROGRAMMING DURAKEYS (OPTIONAL)

Durakeys can be programmed on-site using the optional DuraKey Encoder. The DuraKey encoder is a stand-alone programmer for Emco Electronics' Durakeys. The encoder will allow the user to program and read keys. Previously programmed keys may be reprogrammed with new information or they may be read to verify proper operation.

6.5.1 DURAKEY ENCODER INSTALLATION

Connect the cord from the power brick into the rear of the encoder and plug the power brick into a 110V wall outlet (220V power bricks are available from Emco Electronics).

6.5.2 DURAKEY ENCODER OPERATION

The encoder is a very simple unit to operate. The descriptive prompts may be followed for most operations with no previous experience required. A detailed description of each function is provided below. All units will display the version number of the installed firmware on power-up.

Firmware V-1.0

This version is designed to encode and read keys for use with the Phoenix 8000 Fuel System. Keys encoded with this version will not function properly when inserted into other Durakey capable systems.

After displaying the firmware version header, the main menu will appear providing the options to encode (program) a key or to read a key.

Press 1 to encode any key or press 2 to read any key.

6.5.3 DURAKEY ENCODING

The encoder will request that a system key be inserted. Consult section 6.5.5 entitled 'About System Keys' later in this manual for information about system security.

Insert any system key so that the encoder may read it for system identification and programming authorization. Once the system key has been properly read, the unit will prompt for removal of the key. Remove the system key. It will not be required again until the encoder has been turned off. The encoder will now prompt for a choice between single programming mode and block programming mode.

Press '1' to encode a single key or '2' to program a consecutively numbered block of keys.

Single key - Enter the vehicle number (key number) to be programmed onto the key at the 'Enter Vehicle #' prompt. (The encoder will not accept a vehicle number greater than 7999 or equal to 0000 as these are not valid vehicle numbers.) After entering a valid vehicle number, insert and remove the key to be programmed as prompted.

Block of keys - The encoder will prompt for the beginning number and ending number of the keys to be programmed. After entering these numbers, insert and remove the keys as prompted. Any number of keys may be programmed in a block session. Again, the encoder will not accept a vehicle number greater than 7999 or equal to 0000 as these are not valid vehicle numbers.

6.5.4 DURAKEY READING

The encoder will prompt for a key to be inserted. Upon insertion of any key, the encoder will display the serial number and vehicle number programmed onto the key. This display will remain until the key is removed. Any number of keys may be read continuously. Pressing any button after removing all keys from the socket will return the encoder to the main menu.

6.5.5 DURAKEY ENCODER MAINTENANCE

There are no user serviceable parts inside the encoder box. The unit should be returned to Emco Electronics if it requires service.

6.5.6 ABOUT SYSTEM KEYS

For security reasons, the system keys provided with the Phoenix 8000 should only be available to the system administrator(s). These keys control access to vital information and operating parameters. Since the ability to program new keys should only be available to the system administrator, a system key must be inserted into the encoder to enable the programming mode. Without access to the system keys, operators may read any key to verify proper operation, but programming (and re-programming) will not be possible.

System keys are provided with the Phoenix 8000 at time of purchase and are used to program various parameters such as date, time, valid PIN numbers, etc. They are identified by the red, yellow, and green tags attached to them. These keys hold information specific to their assigned Phoenix unit. The encoder needs to read one of these keys (any one will do as long as it is assigned to the system for which new keys are to be encoded) so that it may match the identifying information from it to the new keys being programmed. This ensures that keys programmed for use on one Phoenix will not be valid in any other Phoenix unit.

7.0 Personal identification numbers

It is very important that the system operator fully understand the manner in which the Phoenix card/key system encodes and decodes personal identification numbers (PINs). If the assignment and entering of the PIN is not performed correctly, the system will not recognize its validity.

7.1 ASSIGNING PERSONAL IDENTIFICATION NUMBERS

The PIN number used by the Phoenix system consists of five digits. Any less will not be accepted by the system, and more than five will clear the entry and prompt for reentry. Consider the last four digits as an address in the system memory with the following characteristics:

- a. It must be between 0001 and 7999.
- b. It must not be repeated.

Consider the first digit as a number stored in the system memory address which has the following characteristics:

- a. It may be any number from 1 through 9 inclusive.
- b. The number 0 is not allowed to be the first digit of the PIN. The number 0 INVALIDATES the PIN.

Examples:

01234 is invalid because the first digit is a 0.

18234 is invalid because the last four digits exceed 8000.

90000 is invalid because the last four digits are less than 0001.

10002 is valid.

20002 is valid - **BUT** validating this number would invalidate the number 10002 used above because the last four digits may not be repeated. 20002 would simply replace 10002 as a valid PIN, while 10002 would become invalid.

7.2 VALIDATING PERSONAL IDENTIFICATION NUMBERS (GREEN CARD/KEY)

The following steps should be performed in order to validate a PIN:

- a. insert and withdraw the system card or key labeled "SET PIN".
- b. The system will prompt the system operator with "ENTER PIN #". The system operator should then enter the Personal Identification Number. The system will accept only a number ranging from x0001 to x7999 inclusive with x representing any digit from 1 through 9 inclusive. Zero may not be the first digit of a valid PIN number.
- c. The system will then prompt the system operator to select either VALID by entering a 1, or INVALID by entering a 0.
- d. Steps a through c above must be repeated for each PIN number validated.

7.3 INVALIDATING PERSONAL IDENTIFICATION NUMBERS

The same procedures used to validate PIN numbers are used to invalidate PIN numbers. When the display prompts "VALID = 1 INVAL = 0", A Zero is entered. The system will then invalidate the PIN number that the system operator has entered.

Note: PIN numbers are not programmed to work with a specific vehicle card/key. Any valid PIN number will work with any valid vehicle card/key.

8.0 Administrative Reporting (EPROM versions 4.x and higher only)

Beginning with version 4.x of the Phoenix firmware, three administrative reports are available via the use of the System Cards. If your Phoenix has an earlier version EPROM and you would like these functions added, contact your distributor to arrange for an upgrade.

Note: A printer or TCI must be attached to the Phoenix system and be operational (powered up, online, paper loaded) before any of these actions can be performed. Also, since these reports may become lengthy (if you have several hundred or thousand PINs/vehicles), these reports will not run if any hose is authorized. Attempting to run an administrative report with a hose authorized results in the message "PUMP IS BUSY".

8.1 PRINT VALID PINS

Using the green 'PRINT VALID PINS' system card, the operator instructs the Phoenix to print a list of all PIN numbers which have been validated for use with the system. To print this report, simply insert the proper system card/key and remove it when prompted to do so.

8.2 PRINT VALID VEHICLES

Using the green 'PRINT VALID VEHICLES' system card, the operator instructs the Phoenix to print a list of all Vehicle Numbers which have been validated for use with the system. This report also shows the fuel type assigned to each vehicle. To print this report, simply insert the proper system card/key and remove it when prompted to do so.

8.3 REPRINT TRANSACTIONS

Using the green 'REPRINT TRANSACTIONS' system card, the operator instructs the Phoenix to reprint all transactions remaining in memory. The Phoenix will store up to the last 100 transactions in memory. This is useful, for instance, if your printer experiences a paper jam or similar problem while printing transactions. There is no limit to the number of times a transaction may be reprinted, provided that it still resides in memory (each new transaction will replace the oldest one in memory).

IMPORTANT: USING THE RED 'ERASE ALL TRANSACTIONS' SYSTEM CARD WILL COMPLETELY CLEAR THE TRANSACTION MEMORY. ONCE A TRANSACTION HAS BEEN ERASED, EITHER BY BEING OVERWRITTEN WITH A NEWER ONE, OR BY USE OF THE RED 'ERASE ALL TRANSACTIONS' SYSTEM CARD, THE TRANSACTION(S) WILL NEVER AGAIN BE AVAILABLE FOR REPRINTING.

Note: All three Administrative Reports print only to the logging printer supplied with the Phoenix system. If the optional Transaction Computer Interface (TCI) is installed, it will pass the report information to the printer, but will not store the reports for download to your PC.

9.0 Printer

The printer supplied with the Phoenix system should require little maintenance other than a constant supply of paper. To avoid fueling operations filling the transaction memory storage (100 transactions) and possible shut down of fueling operations, make sure that the printer remains operational at all times.

The printer has been modified and its factory settings changed to facilitate its use in this specialized application. No setting change or programming is needed. For instruction on basic operation such as running a self test or ribbon and paper replacement refer to the printer owners manual.

10.0 Routine maintenance

10.1a Card reader

The read head of the card reader should be cleaned periodically with a magnetic stripe cleaning card. Card reader cleaning kits are available from many sources including the Phoenix system distributor. Refer to the instructions provided with the kits for reader cleaning procedures.

10.1b Key Reader

The key reader receptacle should be inspected periodically to insure that there is no foreign material present. Aside from this, the key reader requires no routine maintenance.

10.2 Printer

The printer should be cleaned regularly according to the instructions in the printer manual included with the system. Ribbon replacement should be done when the quality of print has degraded. When doing maintenance on the printer, turn the printer off. This will prevent current fueling transactions from being printed until you are finished. Make certain that the printer is restored to full operating condition with sufficient paper in order to receive the transactions from the card system. If the printer is not ready to accept data from the card system, the card system will store 100 fueling transactions and terminate fueling operations if the system has been set to prevent overwriting transaction memory data (see switch selective options).

IT IS IMPERATIVE THAT THE INTEGRITY OF THE DATA WIRE BE MAINTAINED. IF THIS WIRE BECOMES DISCONNECTED FOR ANY REASON WHILE THE BUSY AND GND WIRES REMAIN CONNECTED, DATA SENT FROM THE PHOENIX TO THE PRINTER WILL BE LOST AND NOT RECOVERABLE. THE PHOENIX WILL CONTINUE TO SEND DATA TO THE PRINTER/TRANSACTION COMPUTER INTERFACE AS LONG AS THE VOLTAGE ON THE BUSY WIRE REMAINS HIGH. IF THE BUSY LINE REMAINS ACTIVE, THE PHOENIX SYSTEM WILL CONTINUE TO TRANSMIT TRANSACTIONS AND ERASE THEM FROM THE PHOENIX MEMORY.

10.3 ENCLOSURE

Since the entire Phoenix enclosure is constructed from stainless steel, very little maintenance is required. Cleaning the enclosure and front panel with a mild detergent will remove dirt and contaminants. Do not use solvents to clean the front panel of the unit. Some solvents will attack the material used in construction of the keyboard and front panel. Use care when cleaning the Lexan display window so that you do not scratch it. Replacement front panels and windows may be installed in the field by your Phoenix distributor in the event of damage.

11.0 Troubleshooting

11.1 PRINTER

In the event that the printer does not print the transaction data from the card system, the following procedures should be performed:

- a. Make certain that there is paper present and the printer is set to online.
- b. Check power switch and power source. Printer should have indicators on panel illuminated.
- c. Check the three wires attached to the Printer adapter and/or fused data line adapter at the rear or side of the printer. Make certain that the plug is firmly engaged with the printer.
- d. In the event none of the above steps have identified the problem, turn off the power and disconnect the printer adapter from the printer. Perform the printer self test as described in the printer manual supplied with the system.
- e. Test the lightning protection fuses located within the printer adapter as well as those on the CPU board of the Phoenix.
- f. Contact your Phoenix distributor for further instructions.

11.2 CARD/KEY SYSTEM

Removing the cover from the Phoenix card or key system will expose the system operator to dangerous voltages, and should be performed by qualified service personnel only. Complete procedures for testing and servicing the Phoenix card system are contained within the Phoenix Installation and Service Manual.

TRANSACTION COMPUTER INTERFACE - INSTALLATION

1.0 INTRODUCTION

Congratulations on your purchase of a Phoenix card/key system and a Transaction Computer Interface. These two units simplify the task of fuel management. The Transaction Computer interface is easy to install and will insure that transaction data is secure while providing an easy means of transferring data to a computer system.

The Transaction Computer Interface is a microprocessor controlled unit which contains battery backed up random access memory. It operates by receiving data from the card/key system via a 3 conductor cable. This data is then stored in the memory until the data is either recorded on the system printer or transferred to a personal computer (PC). The TCI is capable of storing 999 transactions at a time, and will not lose data even if the power is disconnected or lost.

2.0 UNPACKING THE UNIT

2.1 TOOLS NEEDED

The tools necessary to install the Transaction Computer Interface are as follows:

- a. Small slotted screwdriver
- b. Wire strippers

2.2 PARTS CHECK

Check the contents of the Box to insure that all of the necessary parts are present to complete the job. Your package should include:

- 1 Transaction Computer Interface
- 2 Interface adapters
- 1 Software for PC on disk

NOTE: The Installation/Operation manual is part of the Phoenix Operations Manual.

A length of three conductor wire, preferably shielded, is provided by the installer to connect the TCI to printer. Before continuing with the installation, determine whether the computer connection will be via modem or direct connect, and then read the instructions thoroughly.

3.0 Locating the Transaction Computer Interface

The Transaction Computer Interface contains sensitive electronic components and should not be located in a place which might damage the unit. When setting up the unit, locate it away from any of the following conditions.

- a. Excessive heat or direct sunlight
- b. Vibration
- c. Moisture

Ensure that the unit is not placed in a location where the connecting wires can not be accidentally pulled from it.

4.0 Configuring the Transaction Computer Interface

4.1 MODEM OR PC CONNECTION

The TCI may be connected to a personal computer system either through a modem or directly to a serial port. It is factory configured for DIRECT connection 1200 BAUD, NO SETUP.

A. MODEM CONNECTION

To connect a modem to the Transaction Computer interface, the jumpers and DIP switches must be set on the PC board. Emco Electronics recommends that the TCI unit be used with a HAYES SMARTMODEM. The HAYES modem contains circuitry which is essential for correct operation. Non-HAYES brand modems may work but will probably require configuration by a knowledgeable technician. The TCI is capable of transmitting data to the computer system at either 1200 or 2400 baud (TCI CONFIGURATION SWITCH 2). The HAYES 1200 baud modem has dip switch selectable configuration while the 2400 baud unit does not. The 2400 baud modem requires a setup command (TCI CONFIGURATION SWITCH 1), to be transmitted on power up. The following steps configure the TCI for the 1200 and 2400 baud HAYES modems.

HAYES 1200 OR 2400 BAUD SMARTMODEM

1. Ensure that power is disconnected from the unit.
2. Remove the top cover of the TCI by removing the four screws on the side of the unit.
3. Locate the PC/MODEM jumpers using Diagram S.
4. Using a pair of small needle nose pliers, move all four jumpers toward the edge of the board with the connectors, as illustrated in the diagram.
5. Locate the CONFIGURATION SWITCHES using Diagram S.
6. For HAYES 1200 BAUD SMARTMODEM, set switches number 1 and 2 to the up position.
7. For HAYES 2400 BAUD SMARTMODEM, set switches number 1 and 2 to the down position.
8. Set switches number 3 and 4 to the up position.
9. Replace the cover and reconnect power.

B. PC DIRECT CONNECTION

To operate the Transaction Computer Interface with a direct connection to a personal computer, the jumpers and DIP switches on the PC board must be set. The TCI can communicate with a computer system at either 1200 or 2400 baud. (No parity, 8 Data bits, 1 Stop bit) Perform the following instructions to configure the TCI for use with a direct serial connection.

1. Ensure that power is disconnected from the unit.
2. Remove the cover by removing the four mounting screws on the side of the unit.
3. Locate the PC/MODEM jumpers using Diagram S.
4. Using a pair of needle nose pliers, move the jumpers away from the edge of the board as illustrated in the diagram.
5. Locate the CONFIGURATION SWITCHES using Diagram S.
6. Set switch number 1 to the up position.
7. For 1200 baud operation, set switch number 2 to the up position.
8. For 2400 baud operation, set switch number 2 to the down position.
9. Set switches number 3 and 4 to the up position.

NOTE: For more technician information on the serial interface, see the appendix.

IMPORTANT: IF THE TRANSACTION COMPUTER INTERFACE IS TO BE USED WITHOUT A PRINTER, CALL EMCO ELECTRONICS FOR INSTRUCTIONS ON SETTING THE PROPER INTERNAL SWITCHES TO ALLOW DATA OVERFLOW OF THE PRINTER MEMORY OF THE UNIT. WITHOUT THIS CHANGE, WHEN THE PRINTER MEMORY SECTION BECOMES FULL, THE UNIT WILL REFUSE ANY MORE DATA AND TAKE THE PHOENIX SYSTEM OUT OF SERVICE UNTIL THE STORED DATA HAS BEEN OFFLOADED.

IMPORTANT: IF THE TRANSACTION COMPUTER INTERFACE IS TO BE USED AS A LARGE PRINTER BUFFER AND NOT USED TO DOWNLOAD THE DATA TO A COMPUTER, CALL EMCO ELECTRONICS FOR INSTRUCTIONS ON SETTING THE PROPER INTERNAL SWITCHES TO ALLOW DATA OVERFLOW OF THE MODEM MEMORY SECTION OF THE UNIT. WITHOUT THIS CHANGE, WHEN THE MODEM MEMORY SECTION BECOMES FULL, THE UNIT WILL REFUSE ANY MORE DATA AND TAKE THE PHOENIX SYSTEM OUT OF SERVICE UNTIL THE STORED DATA HAS BEEN OFFLOADED.

5.0 Connecting peripherals

5.1 PRINTER

To connect the printer to the Transaction Computer Interface, select a location for the printer using the same guidelines which were used for the Transaction Computer Interface.

1. Cut a length of wire about 2 to 4 feet longer than the distance between the unit and the printer.
2. Using a small blade screwdriver, connect the 3 conductor wire to both the printer adapter and interface adapter, making sure that each color of wire is connected to the appropriate connector on the adapter. (Connect the data on one connector to the terminal labeled data on the other etc. ...) Refer to Diagram Q.
3. Make sure that the power is disconnected from the Transaction computer and the printer.
4. Plug the interface adapter into the plug marked PRINTER on the back of the Transaction Computer Interface.
5. Plug the printer adapter into the printer.

5.2 PHOENIX SYSTEM

If the Phoenix system has already been installed according to the instructions supplied, there should be Fused Data line adapter connected to the three conductor line coming from the card system.

1. Insure that the power is disconnected from the unit.
2. Make sure that the wire coming from the Phoenix is of sufficient length to connect to the Transaction Computer Interface.
3. If the Fused Data line adapter supplied with the Phoenix is not connected to the 3-conductor wire, connect it according to the Phoenix System installation manual.
4. Connect the Fused Data line adapter to the plug marked 'CARD SYSTEM' on the back of the Transaction Computer.

5.3 MODEM

To connect the modem to the Transaction Computer Interface, follow these steps:

1. Obtain a Hayes 1200 or 2400 Baud smartmodem and a serial cable (with male connectors) of appropriate length. (The system may work with other auto answer modems, but was designed for use with the Hayes.)

NOTE: (If using the Hayes 2400 smartmodem, skip to step 5)

2. Remove the modem and telephone cord from the package. Use a small slotted screwdriver to carefully pry back the side of the plastic front cover and remove it.
3. Using the slotted screwdriver, move all of the dip switches to the up position.
4. Replace the front cover of the modem.
5. Connect the serial cable from step 1 to the appropriate connector on the Transaction Computer Interface, and on the Modem.
6. Connect the telephone cord provided with the modem to the wall outlet and to the connector marked 'LINE' on the back of the modem.
7. Turn on the power to the modem before turning on the power to the TCI

5.4 PC DIRECT CONNECTION

To connect the Transaction Computer Interface to a personal computer without using a modem, a serial cable must be used. This may be purchased at any computer or electronics shop. Make sure that the cable has the correct type of connectors for the computer system. Insure also that the cable is long enough to reach between the personal computer and the Transaction Computer Interface.

1. Insure that the power is disconnected on both the Transaction Computer and the personal computer. (Connecting the cables with the power on can damage the system.)
2. Connect the male end of the serial cable to the modem connector on the back of the Transaction Computer Interface.
3. Connect the other end of the serial cable to an unused serial port on the personal computer.
4. Make sure that the COMM port associated with the serial port being used is not being used by another device. If you are unsure about the selection of the COMM port, consult the personal computer owners manual.
5. Consult the operation manual to install the TCI communications software.

6.0 Powering up

After the system has been configured for the type of connection and connected to the appropriate peripherals, it is ready to operate. If the unit does not perform the functions as described, consult the troubleshooting section. To power up and test the unit, follow these steps:

1. Plug in the TCI and any other peripherals attached to it. (printer modem etc.)
2. Activate the Phoenix System and check to be sure that it is functioning properly.
3. Turn on any peripherals connected to the TCI.
4. Turn on the power switch to the TCI. (located on the back of the unit.)
5. The red power light on the front panel should come on.
6. Make sure that the printer is turned on and has an ample supply of paper.
7. When transactions are processed by the Phoenix System, the TCI should print the transactions on the printer.
8. After several transactions have printed on the printer, run the software provided with the unit as described in the operation manual.
9. If the auto retrieval file was executed, the personal computer should have received the transaction data. You may then use the method described in the operation manual to erase the data.
10. Exit from the program. If no more commands are issued, the program will exit after a preset time period.
11. Type command 4 to display the data on the screen.
12. The unit is now performing properly and is ready for operation. The system will write the transaction data to a file named DATAFILE.DAT which may read by most popular software packages.

IMPORTANT: SINCE DATAFILE.DAT WILL BE REPLACED AND LOST AFTER THE NEXT DOWNLOAD, IT IS IMPERATIVE THAT THE FILE BE COPIED, MOVED, OR RENAMED PRIOR TO THE NEXT DOWNLOAD. ANY EXISTING DATA RESIDING IN DATAFILE.DAT WILL BE OVERWRITTEN WHEN A DOWNLOAD FROM THE TRANSACTION COMPUTER INTERFACE OCCURS.

7.0 Troubleshooting

If your Transaction Computer Interface is not performing correctly, read the following problems and solutions to determine the cause of the trouble.

- P. After the power switch is turned on, the power light does not come on ...
- S. Turn the unit off and make sure that it is plugged into a working outlet. If this does not correct the problem, unplug the unit and remove the four screws on its sides. Remove the cover and inspect the power fuse on the side of the PC board. If the fuse is blown, replace it with a 1/4 AMP FUSE ONLY, and replace the cover. (If the fuse blows again, or if the fuse was not blown in the first place, the unit may be defective.)

- P. The transactions print on the printer, but the personal computer will not retrieve the information.
- S. Double check the operation manual to make sure that the software is configured properly. If using a modem, make sure that both modems are configured the same and that they are operating at the same baud rate. If using a direct connection, make sure that the COMM port is set correctly and is not being used by another device such as the mouse. Recheck the serial cable or modem connection in section 5.3 and 5.4.
- P. The power indicator is on but the transactions will not print on the printer.
- S. This could be caused by several things. Check the printer to make sure that it has power and plenty of paper. Look at the indicators on the printer control panel. The ready light should be on. If the printer checks out, look at the adapters connecting the printer to the Transaction Computer. They should be connected as illustrated in Diagram Q. Make sure to disconnect the power before removing any connectors.

If the unit still has the same problem, turn the power off and check the wire coming from the Phoenix system. Make sure it is connected properly to the adapter. Try connecting the communication wires from the card system directly to the printer and adapter and process a transaction on the Phoenix system. If the printer does not print the transaction, then there is a problem with the connection or the Phoenix.

There are small fuses located at each end of the data line in order to protect the equipment from lightning damage. Check these fuses making certain they are located in the proper holders. The "Data" fuse 1/4 AMP. The "Busy" fuse @ 1/16 AMP.

TRANSACTION COMPUTER INTERFACE - OPERATION

1.0 INTRODUCTION

1.1 BASIC OPERATION

Emco Electronics' transaction computer interface is designed to operate with the Phoenix system. Its function is to store transactions which are sent from the Phoenix system, so that they may be printed on the printer, and transferred to a personal computer system at a later time. Once the data is written to a file on a personal computer, it may be accessed and manipulated by Emco Electronics' SIMPLEX reporting and accounting software or other popular spreadsheet and database programs. The TCI also includes software for the transfer of stored data to a personal computer.

2.0 SPECIFICATIONS

2.1 PHYSICAL

- 2.11 Height 2.00'
- 2.12 Width 9.00"
- 2.13 Depth 10.50'
- 2.14 Weight 5 LBS.
- 2.15 Temperature - 20 TO + 70 C

2.2 ELECTRICAL

The power requirement of the TCI is 120 VAC 60 HZ @ 15 WATTS. It Requires a 3 terminal outlet for correct operation, if such an outlet is not available, a 3-2 prong adapter may be used with the green ground wire connected to a proven earth ground.

2.3 DATA STORAGE

The TCI has the ability to store 999 transactions. The system stores data in battery backed up memory for both the printer and the personal computer. If the number of transactions held reaches 999, the system will respond as selected by the configuration switches located at the rear of the unit. In the event of a power failure, no data will be lost.

2.4 CUSTOM CONFIGURATIONS

IMPORTANT: IF THE TRANSACTION COMPUTER INTERFACE IS TO BE USED WITHOUT A PRINTER, CALL EMCO ELECTRONICS FOR INSTRUCTIONS ON SETTING THE PROPER INTERNAL SWITCHES TO ALLOW DATA OVERFLOW OF THE PRINTER MEMORY OF THE UNIT. WITHOUT THIS CHANGE, WHEN THE PRINTER MEMORY SECTION BECOMES FULL, THE UNIT WILL REFUSE ANY MORE DATA AND TAKE THE PHOENIX SYSTEM OUT OF SERVICE UNTIL THE STORED DATA HAS BEEN OFFLOADED.

IF THE TRANSACTION COMPUTER INTERFACE IS TO BE USED AS A LARGE PRINTER BUFFER AND NOT USED TO DOWNLOAD THE DATA TO A COMPUTER, CALL EMCO ELECTRONICS FOR INSTRUCTIONS ON SETTING THE PROPER INTERNAL SWITCHES TO ALLOW DATA OVERFLOW OF THE MODEM MEMORY SECTION OF THE UNIT. WITHOUT THIS CHANGE, WHEN THE MODEM MEMORY SECTION BECOMES FULL, THE UNIT WILL REFUSE ANY MORE DATA AND TAKE THE PHOENIX SYSTEM OUT OF SERVICE UNTIL THE STORED DATA HAS BEN OFFLOADED.

2.5 COMMUNICATION REQUIREMENTS

This Transaction computer may be set up to transmit its data in one of two ways. It may connect directly to a personal computer system via serial cable or it may connect to a 1200 or 2400 baud modem which will transmit data over telephone lines to a personal computer.

2.51 DIRECT CONNECTION

If the Transaction computer interface is connected directly to a personal computer, it will be necessary to obtain a serial RS-232 cable of adequate length. This cable should be connected to the modem port on the Transaction computer, and to a serial port on the personal computer.

2.52 MODEM CONNECTION

For modem connection, a Hayes 1200 or 2400 baud smartmodem is recommended. The Hayes modem contains special circuitry which is necessary for correct operation. Refer to the installation manual for dip switch settings and modem configuration.

3.0 OPERATION OF THE TRANSACTION COMPUTER INTERFACE

3.1 RECEIVING DATA VIA MODEM

To use a modem with the transaction computer interface, a Hayes 1200 or 2400 baud smartmodem is recommended. It should be configured as specified in the installation instructions and connected via serial cable to the modem port on the rear of the unit. When the system receives transactions, they are stored in the memory where they may be read through the modem. To retrieve the data, you may use the software supplied with the system. The software supplied with the TCI will automatically connect with the system and write the transaction data to a file it creates on your computer named DATAFILE.DAT. (See Section 3.33)

3.2 RETRIEVING DATA VIA PC CONNECTION

To use a personal computer to retrieve data from the TCI, a serial cable should be connected between a serial port on the PC, and the modem port on the transaction computer. See installation manual.

3.3 USING THE DATA RETRIEVAL SOFTWARE

The software that is provided with the Transaction Computer will operate with either the modem or PC connections. After being executed, it will copy the transaction data to a file named DATAFILE.DAT on the disk.

3.31 INSTALLATION OF VERSION 3.X SOFTWARE

The data retrieval software supplied with the Transaction Computer Interface may be operated from drives A through F. The 3 1/2" diskette supplied by Emco Electronics is write protected, but a backup copy should be created prior to installation. A 5 1/4" disk is available upon request.

A. Software operation from drive A.

To operate the PHOENIX 8000 software from drive A, first make a backup of the original diskette. Place the backup diskette into drive A, and type A: **[enter]**. When the A: \> prompt appears type INSTALL **[enter]**. The installation program will execute and display a message about its function. Press **[enter]** to move to the next screen. When the next menu appears, type 2 to configure the software to run on drive A. Proceed to section 3.32 to configure the software.

B. Software operation from drive B.

To operate the PHOENIX 8000 software from drive B, first make a backup of the original diskette. Place the backup diskette into drive B and type B: **[enter]**. When the B: \> prompt appears type INSTALL **[enter]**. The installation program will execute and display a message about its function. Press **[enter]** to move to the next screen. When the next menu appears, type 2 to configure the software to run on drive B. Proceed to section 3.32 to configure the software.

C. Hard drive installation.

To operate the software from the hard drive (Drive C, D, E or F), first make a backup of the original diskette. Place the backup disk into either drive A or B, and type A: **[enter]** or B: **[enter]** respectively. When the prompt appears, type INSTALL **[enter]**. The installation program will execute and display a message about its function. Press **[enter]** to proceed to main menu. At this menu, type 1 to install the software to the hard drive. The installation program will ask which drive the software is to be loaded from. Enter the letter of the drive where the program diskette is located, (Either A or B). The program will then ask which hard drive the software should be copied to. Enter the letter of the hard drive where the software will be located (C, D, E or F). Now press **[enter]** to proceed. The installation program will now create a subdirectory on the selected hard drive named PHOENIX and will then transfer all necessary information to that directory. Refer to section 3.32 to configure the installation parameters.

3.32 Configuring the software

The installation program will now ask several questions about your PHOENIX 8000 installation and about your computer system. If you are unsure about the correct answer to these questions, the program may be terminated and then re-executed at any time. Perform the following steps to configure the program.

A. MODEM OR SERIAL CONNECTION

The TCI can be connected to a computer system through a telephone modem or directly through a serial cable. It is recommended that with a serial cable, the connection between the computer and the TCI be kept as short as possible to prevent RF interference. Enter the appropriate choice for your system.

B. COMM PORT SELECTION

Whether the computer communicates to the TCI through a serial cable or through a modem, the correct comm port must be selected. Most computer systems have 2 comm ports. The comm port is also called the serial port or RS-232 port. Make sure that the port you select is not being used by another device. If a comm port is selected that is already being used, it may not work properly. Selection 0 on the installation program will display information on the number of comm ports available on your computer system. Enter the number of the comm port to be used.

C. BAUD RATE SELECTION

The baud rate is the speed at which the TCI transfers the data to the computer system. All TCI units are factory configured for 1200 baud operation. While 1200 baud is somewhat slower than 2400 baud, it is less likely to be affected by RF noise with long serial cable connections. Unless there is a specific need for 2400 baud operation, 1200 baud is recommended. Enter the baud rate that will be used.

** For a serial cable connection, skip to paragraph G.

D. NUMBER OF SITES

Some installations may use a single computer system to contact several TCI units via modem. Each program can contact up to 10 TCIs. Enter the number of TCIs that will be contacted from your computer.

E. TELEPHONE NUMBER ENTRY

The installation program will now ask for the telephone number of the TCI. If your telephone system requires a 9 to be dialed for an outside line, enter 9, then a comma and the phone number. Don't forget to enter 1 and the area code if the number is long distance.

F. SITE INFORMATION

This screen will ask for a description of the telephone number that was just entered. Enter an appropriate description of the location of the PHOENIX 8000. This information will be displayed along with the telephone number in the communication program. If more than one site was selected, the installation program will continue to ask for telephone numbers and descriptions until all information has been entered.

G. SAVE INFORMATION

All configuration information has now been entered and the installation program will display it on the left side of the screen. If any of this information is incorrect, select number 2, (RESTART), to correct it. Otherwise select number 1, (SAVE AND EXIT). The configuration file will be written to the appropriate drive. If it becomes necessary to change the configuration of the system, the installation program may be re-executed, Type PHOENIX **[enter]** to run the communication program.

3.33 Running the Communication Program

The communication program which is included with the TCI will run on an IBM compatible computer system with at least 512K of main memory. The files included on the diskette are as follows:

INSTALL.EXE Installs and configures the software.
PHOENIX.EXE Connects to and controls the TCI.
EQUIP.COM Displays the equipment on a computer system.
CNFDAT.CTR Defines the configuration for PHOENIX.EXE.

** To execute the communication program type PHOENIX **[enter]****

After the opening screen has been displayed, the program will display the main menu. The main menu selects all of the functions of the software for the TCI. To execute a function from the main menu, simply press the corresponding number.

```
PHOENIX 8000 MAIN MENU
1  TRANSFER TCI DATA TO DISK
2  ERASE TCI MODEM MEMORY
3  ERASE TCI PRINTER MEMORY
4  VIEW CONTENTS OF DATAFILE.DAT
5  BACKUP DATAFILE.DAT
Q  EXIT TO DOS
```

1. TRANSFER TCI DATA TO DISK

After the installation program has been run, this selection will connect the computer system to the TCI, and transfer the TCI data to a file on the computer's disk drive named DATAFILE.DAT.

IMPORTANT: The file DATAFILE.DAT will be replaced by the TCI data each time selection 1 is used. The file must therefore be moved, copied, or renamed each time selection 1 is used in order to prevent data loss. This can be accomplished by using the BACKUP DATAFILE.DAT function on the main menu.

After the data has been transferred and written to the disk drive, the program will prompt the user to erase the modem memory. If all of the data has been successfully retrieved, it is recommended that the memory be erased. After 10 to 15 seconds, the program will go back to the main menu without erasing the memory. If YES is selected to erase the modem memory, make sure that the message bar at the bottom of the screen reads MODEM MEMORY ERASED. After the modem memory is erased, the file DATAFILE.DAT must be backed up before using selection 1 again. If this is not done, the new data from the TCI will overwrite the old data. A procedure should be established for handling the data after it is retrieved from the TCI.

Note: If the modem memory is allowed to accumulate 1000 transactions, the TCI will stop receiving data from the card system in order to prevent data loss. The card system will then hold up to 100 more transactions before going out of service. Should this condition occur, the TCI memory should be retrieved and erased using selection 1 from the main menu.

2. ERASE TCI MODEM MEMORY

This selection will erase all data stored in the TCI for the computer. This selection should only be used to erase TCI data that is not needed. When 2 is selected from the main menu, the program will prompt: ARE YOU SURE? Press Y to continue or any other key to return to the main menu. After pressing Y, make sure that the message bar at the bottom of the screen reads MODEM MEMORY CLEARED.

3. ERASE PRINTER MEMORY

The TCI holds transaction data for the printer in the event that the printer cannot print. This condition will occur if the printer is disconnected, out of paper, or off-line. The ERASE PRINTER MEMORY selection should only be used when the printer data is not needed and the TCI is in danger of filling up its memory. When 3 is selected from the main menu, the program will prompt: ARE YOU SURE? Press Y to continue or any other key to return to the main menu. After pressing Y, make sure that the message bar at the bottom of the screen reads PRINTER MEMORY CLEARED.

Unlike the modem memory, when each transaction prints on the printer, it is removed from the printer memory. Therefore, if the printer is reconnected to the TCI, the TCI will remove each transaction from the printer memory as it is printed.

4. VIEW CONTENTS OF DATAFILE.DAT

This selection displays the contents of the file DATAFILE.DAT. This is the name of the file that the transaction data is always written to with selection 1. If selection 1 has just been used, use this selection to inspect the data.

5. BACKUP DATAFILE.DAT

This selection will create a backup file of DATAFILE.DAT on drive A through F. When 5 is selected from the main menu, the program will ask for the letter of the drive to write the backup file to. Enter the appropriate letter. It will then ask for the file name to use when creating the backup. Enter the name of the backup file with any necessary subdirectory information and press **[enter]**. (File names must be up to 8 characters with a 3 character extension. Example: BACKFILE.DAT) When creating a backup, any file in the destination drive and directory with the same name will be replaced with the new file. Make sure that before a file name is selected, it does not already exist on the destination drive and directory.

3.34 Normal Operating procedure

The following is the recommended operating procedure for transferring, erasing and backing up the data from the TCI after all software and hardware has been installed.

1. Execute the PHOENIX.EXE program.
2. Select function 1 from the main menu.
3. The program should connect to the TCI and transfer the data to the hard disk. When finished, it should display the message: (DOWNLOAD COMPLETED) ALL DATA TRANSFERRED AND VERIFIED.
4. The program will then prompt the user to erase the modem memory. If the above message was displayed, select Y to erase.
5. The program will erase the transaction data from the TCI and return to the main menu.
6. Select function 4 from the main menu.
7. The data transferred from the TCI will be displayed. Press any key to scroll through the data and verify that there are no data errors.
8. Select function 5 from the main menu.
9. Place a floppy diskette into drive A or B.
10. Type the letter of the drive where the floppy disk is located.
11. Enter the name of the backup file and press **[enter]**. (You may want to use the date that the data was downloaded as the file name. Example: '080592.DAT')
Make sure that the filename entered above does not already exist on the selected disk and press 1 to write the backup file.

The data has now been transferred to the computer system, erased from the TCI, and backed up to a diskette. It is recommended that this procedure be performed about every 100 transactions for backup and data safety purposes.

3.4 BASIC DOS FUNCTIONS

The following information is provided for the computer user who is unfamiliar with the operation of DOS. It will explain briefly the operation of some simple DOS functions. This manual uses **[enter]** to designate the Enter key. When you see **[enter]** in the following text, just press the Enter key. For further information on DOS, consult the DOS manual.

WHAT IS DOS?

DOS is short for Disk Operating System. MS-DOS is the Microsoft version while PC-DOS is IBM's version. DOS is the coordinator for all of the information that goes into and out of the computer. It also handles data transfer between different parts of the computer system and you. DOS operates in the background and takes care of tasks such as the flow of information between the keyboard and the computer, the computer and the printer, and the disk drives and internal memory (RAM).

Other DOS functions are those entered by the user on the command line. The command line is the line immediately after the DOS prompt. A DOS prompt looks like one of the following:

A >
B >
C >
D >

The letters in the prompt refer to the active disk drive, (The drive being used now.) For instance, if the prompt is A>, it means that you are working with the files on drive A, and that all commands that you give to DOS will refer to this drive. When you want to change the disk drive that you are working on, all you need to do is type the letter of the new drive followed by a colon and Enter. For instance, to switch to drive C just type C: **[enter]**.

B. DOS FILES

The DIR command will display a list of the files on a disk. If you type DIR **[enter]**, DOS will display a list of the files on the active drive. If you type DIR A: **[enter]**, DOS will display all of the files on drive A. The same can be done with any drive letter. When you list the directory of the files on a disk, you will notice that the file names consist of up to 8 characters with a period and a 3 character extension. This is the way that DOS names files. The 8 character file name may contain any of the following characters:

A through Z 0 through 9 and () { } @ # \$ % ^ & ! - _ ' ~

Note: The space character cannot be used in a file name.

The extension of a file tells you what type of file it is. The following is a list of some DOS file extensions and their meanings:

COM	Command file
EXE	Executable file
BAT	Batch file
BAK	Backup file

Many other extensions are also used, but these are the ones that DOS reserves for its use. You may not give a file one of these extensions unless it is a file that can be executed. All of the above file extensions except BAK mean that the file contains instructions for the computer to execute (A Program). These files can be executed by simply typing their names followed by Enter. For instance, to execute the file PHOENIX.EXE you would type PHOENIX **[enter]**.

Most other files with an extension such as TXT, DOC or CTR contain information that is used by an executable file. If you were to write a letter on a word processor, the data would probably be stored in a TXT or DOC file.

C. Directories

When files are stored on a disk, they are often separated into directories. A directory is like a file folder in a filing cabinet drawer. Each disk has a directory called the ROOT directory which all of the other directories branch off from. When directory structures are drawn out it is called a directory tree because the result looks something like an upside down tree.

If the root directory is the drawer of the filing cabinet, then each of the first subdirectories are folders inside the drawer. The other subdirectories beneath them are folders inside folders. In this way we can divide up the files on the disk so that they are easier to keep track of. DOS has a feature that makes it easier to tell what subdirectory you are currently in. Many computers are already configured with this feature. If your computer prompt does not display the current subdirectory, type:

PROMPT = \$P\$G **[enter]**

This will tell DOS to display the current directory along with the prompt. To move from one subdirectory to another, use the CD command. This command can be used in several ways.

CD PHOENIX	Will change from the ROOT directory to the PHOENIX directory.
CD..	Will move up 1 directory.
CD C:\	Will jump to the root directory of drive C.
CD C:\ PHOENIX	Will jump to the PHOENIX subdirectory from anywhere on drive C.

D. Copying Files

The copy command allows you to make a duplicate of a file on another disk or directory. You can specify directories with the COPY command just as you can with the CD command. The format of the COPY command is:

COPY (DISK LETTER): (FILENAME) (DISK LETTER): (FILENAME) **[enter]**

For instance, to copy the file DATAFILE.DAT from drive C in the PHOENIX subdirectory to disk A, and change the name to NEWDATA.DAT, type:

COPY C:\PHOENIX\DATAFILE.DAT A:\NEWDATA.DAT **[enter]**

The file DATAFILE.DAT will be copied to drive A, and the name of the copy will be NEWDATA.DAT. Remember that when files are copied, they will overwrite any existing files with the same name.

The above commands are just the very basics of DOS. We hope that this information has been helpful in making you more familiar with the operation of DOS and has given you enough information to be able to operate the computer to use the PHOENIX 8000 software. If you want more information, and find the regular DOS manual difficult to read, there are several DOS supplementary books available at your local computer store.

4.0 PRINTER

The printer supplied with the card system should require little maintenance other than a constant supply of paper. To avoid the printer transaction data from filling up the memory in the Transaction Computer interface, make sure that the printer is operational at all times.

4.1 OPERATION

The printer supplied with the Phoenix System takes the data from the Transaction Computer Interface and holds it in a small buffer before printing it. If the power is lost after the data has been transmitted to the buffer, but before it has been printed, then the transaction will not be printed. This is not likely to happen because of the small amount of time the printer takes to print, but it is possible. If this happens, the transaction will still be held in the TCI memory and can be transferred to the PC.

4.2 PAPER REPLACEMENT

Use fanfold computer paper only (available at any computer or office supply store). Do not attempt to reconfigure your printer for sheet feed, it has been modified to accommodate fanfold paper only.

Note: If your printer runs out of paper, you could lose transaction data.

4.3 RIBBON REPLACEMENT

To insure that all transactions are printed properly and no data is lost, check the printer ribbon periodically. To replace the printer ribbon refer to the printer manual.

5.0 ROUTINE MAINTENANCE

5.1 PRINTER

The maintenance for the printer consists of the following:

- a. Clean the printer with a soft brush at least every three months to remove paper particles and dust.
- b. If the exterior of the printer is dirty, clean it with a damp cloth and detergent solution. Never use alcohol, thinner or other organic solvents.
- c. Do not allow clips or other metal objects fall into the printer as they could cause malfunctions.

5.2 TRANSACTION COMPUTER INTERFACE

The Transaction Computer Interface should need no routine maintenance other than an occasional inspection of the data to insure that it is working properly.

6.0 TROUBLESHOOTING

6.1 PRINTER

If the printer is not performing properly, refer to the printer manual for troubleshooting procedures.

6.2 TRANSACTION COMPUTER INTERFACE

If your Transaction Computer Interface is not performing correctly, read the following problems and solutions to determine the cause of the trouble.

- P. After the power switch is turned on, the power light does not come on.
- S. Turn the unit off and make sure that it is plugged into a working outlet. If this does not correct the problem, unplug the unit and remove the four screws on it's side. Remove the cover and inspect the power fuse on the PC board. If the fuse is blown, replace it with a 0.5 AMP FUSE ONLY, and replace the cover. (If the fuse blows again, or if the fuse was not blown in the first place, the unit may be defective.)
- P. The transactions print on the printer, but the personal computer will not retrieve the information.
- S. Double check the operation manual to make sure that the software is configured properly. If using a modem, make sure that both modems are configured the same and that they are operating at the same baud rate. If using a direct connection, make sure that the COMM port is set correctly and is not being used by another device such as a mouse. Recheck the serial cable or modem connection as described in sections 5.3 and 5.4 of the installation manual.
- P. The power indicator is on but the transactions will not print on the printer.
- S. This could be caused by several things. Check the printer to make sure that it has power and plenty of paper. Look at the indicators on the printer control panel. The ready lights should be on.

If the printer checks out, look at the adapters connecting the printer to the Transaction Computer. They should be connected as illustrated in Diagram Q of the installation manual. Make sure to disconnect the power before removing any connectors.

If the unit still has the same problem, turn the power off and check the wire coming from the Phoenix. Make sure it is connected properly to the adapter. Plug this connector directly into the printer and process a transaction on the Phoenix. If the printer does not print the transaction then, there is a problem with either the connection or the Phoenix.

TECHNICAL INFORMATION ON THE TCI SERIAL PORT

The Emco Electronics Transaction Computer Interface transmits transaction data at either 1200 or 2400 baud (NO PARITY, 8 DATA BITS, 1 STOP BIT) from its serial port to either a modem or through a serial cable to a computer. It has a null modem built in (in the form of four shorting jumpers) to switch the necessary connections between DTE and DCE equipment.

DIRECT SERIAL CONNECTION

If the TCI is jumpered for a direct serial connection it will use the following serial lines.

	PIN 2	RECEIVE DATA
FROM	PIN 3	TRANSMIT DATA
	PINS 4 & 5	REQUEST TO SEND AND CLEAR TO SEND
TCI	PIN 6	DATA SET READY
	PIN 7	SIGNAL GROUND

When jumpered for the direct serial connection, the TCI will periodically set pin 6 (DATA SET READY) and check for a signal on pins 4 & 5 (REQUEST TO SEND AND CLEAR TO SEND). If a signal is detected, the TCI will wait approximately 30 seconds for the logon character (CONTROL L) to be transmitted. When the TCI is waiting for the logon character, and when it is on-line with a computer, it is not able to retrieve transaction data from the PHOENIX system. Therefore if pin 6 (DATA SET READY) is constantly set, the TCI will wait 30 seconds for the logon character every time it executes a program loop and will not be able to keep up with the flow of data from the PHOENIX system. Likewise if the computer system connected to the TCI ignores pins 4 & 5 (REQUEST TO SEND AND CLEAR TO SEND), the same condition will occur. The TCI clears pins 4 & 5 to disconnect from the computer in the event that the time limit for entering commands has elapsed.

When setting up a computer system, or other DTE equipment for use with the TCI, the computer needs to check for a signal on pin 6 (DATA SET READY) and if it is present, set pin 4 (REQUEST TO SEND) when it is ready to connect. If at any time the DATA SET READY signal is cleared by the TCI, the computer should clear the REQUEST TO SEND signal to allow the TCI to process transaction data.

MODEM CONNECTION

If the TCI is jumpered for a modem connection, it will use the following serial lines.

	PIN 2	TRANSMIT DATA
FROM	PIN 3	RECEIVE DATA
	PIN 7	SIGNAL GROUND
TCI	PIN 8	DATA CARRIER DETECT
	PIN 20	DATA TERMINAL READY

When jumpered for a modem connection, the TCI will periodically set pin 20 (DATA TERMINAL READY) and check for a signal on pin 8 (DATA CARRIER DETECT). If a DATA CARRIER DETECT signal is detected, the TCI will wait approximately 30 seconds for the logon character (CONTROL L) to be transmitted. When the TCI is waiting for the logon character, or when it is on line with the modem, it is not able to retrieve transaction data from the PHOENIX system. Therefore if pin 8 (DATA CARRIER DETECT) is constantly set, the TCI will wait 30 seconds for the logon character every time it executes a program loop and will not be able to keep up with the flow of data from the PHOENIX system. Likewise if the modem connected to the TCI ignores pin 20 (DTR), the modem will hold the DCD line on and the same condition will occur. The TCI clears DTR to disconnect from the modem and cause it to hang-up in the event that the time limit for entering commands has elapsed.

When configuring a modem for use with the TCI, it must be set for the following parameters:

AUTO ANSWER	Enabled (AT SO=1)
DTR ACTIVE	Modem hangs up and goes to command state if signal drops. (AT &D2)
CARRIER DETECT	Must reflect result of modem attempt to connect. (AT &C1)
RESULT CODES	Disabled. (AT Q1)
COMMUNICATION STANDARD	Bell 212A
BAUD RATE	1200 BPS
PARITY	None
DATA BITS	8
STOP BITS	1

These modem parameters are selectable on some modems (such as the HAYES SMARTMODEM 1200), by using a configuration DIP switch. (The above AT commands should work on all HAYES compatible modems.) Some modems also have an S register which controls some or all of these functions. The TCI will transmit the necessary AT commands to the modem on power up if its configuration switch 1 is set to the down position. If the modem being used does not have configuration switches (such as the HAYES SMARTMODEM 2400), set TCI configuration switch accordingly.

Getting Started With SIMPLEX

I. ABOUT SIMPLEX SOFTWARE

Simplex fuel accounting software is a user friendly approach to fuel data management. It uses the popular window menu format with easy to understand menu selections. The menu format of SIMPLEX allows the user to operate the software with a minimal amount of training. SIMPLEX also contains two powerful utilities to manipulate the data file for nearly any application. All operations with the transaction data are performed in the memory of the computer as opposed to the disk drive. This increases the speed of the operations and guarantees the safety of the data in the event of a power loss or other problem.

SIMPLEX will read up to 5000 transactions directly from the disk drive in the format written by the PHOENIX 8000 program. It will then allow the user to generate backups of the data for archive purposes.

This manual assumes that the user has a working knowledge of DOS. If you are unfamiliar with the terms and commands used in this manual, consult section 3.4 under 'TCI OPERATION' or your DOS manual.

II. INSTALLING SIMPLEX

A. OPERATION FROM FLOPPY DISK

To operate SIMPLEX software from a floppy drive, first make a copy of the original diskette. The original disk should only be used for backup purposes. Once a copy has been made, the program may be run from either the A or B drive.

TYPE → SIMPLEX *[enter]*

B. OPERATION FROM THE HARD DISK

To install SIMPLEX on the hard disk, first make a copy of the original disk. Put the copy into either the A or B drive and execute the INSTALL program.

TYPE → INSTALL *[enter]*

The INSTALL program will ask for the drive to install from, either A or B. Select the drive where the SIMPLEX disk is located. The INSTALL program will then ask for the hard disk that you would like to install to. Type the letter of the hard disk that you would like to put the software on. (Either C, D, E, or F). At this point, hit the enter key to install the software on the specified drive, or hit Q to quit without installing. After enter is pressed, the program will create a directory on the specified drive named SIMPLEX, and will copy all necessary files to it. When it is finished, hit any key to return to DOS.

C. MINIMUM HARDWARE REQUIREMENTS

SIMPLEX software was designed to run on a standard PC configuration. The computer running SIMPLEX must be an XT or better, and have at least 640K of ram and DOS 3.2 or higher. The software will display color menus if a color monitor (CGA, EGA, or VGA) is attached, and single color menus with a monochrome or laptop LCD monitor. SIMPLEX operates on printer port LPT1. If you are unsure about the type of computer equipment that you have, consult the computers owners manual or the place from where it was purchased. To determine the version of DOS, you may use the DOS VER command.

III. LOADING AND MANIPULATING THE PHOENIX DATA FILE

A. PROGRAM MEMORY CAPACITY

SIMPLEX will handle up to 5000 transactions simultaneously. The EMCO ELECTRONICS TRANSACTION COMPUTER INTERFACE (TCI) will write up to 1000 transactions to a file at a time. This means that the data which is downloaded from the TCI must be moved or saved before downloading again, and that the data may be located on several files. It is recommended that the data from the TCI be downloaded daily in order to have a current backup.

B. APPENDING FILES

The SIMPLEX program will only allow one file to be loaded at a time. If the data to be processed is located on more than one file, it may be joined together by using one of SIMPLEX utilities named FILMERGE. Refer to section (V) of this manual for instructions on using FILMERGE.

C. EDITING THE DATA FILES

When transferring the transaction data from the TCI to the computer system, errors may occur which corrupt the data. In the event of a power or equipment failure, it may be necessary to add manually entered transactions to the data file. Another utility program named DATAFIX is included with SIMPLEX to deal with these problems. DATAFIX will allow the data file to be edited and new transactions to be added. The data may be loaded into memory and changed without altering the file on the disk. After all transaction data is changed, the user may save the new file to the disk. This utility is also password protected so that unauthorized users cannot alter the transaction data.

IV. RUNNING SIMPLEX

A. THE EXE, CTR, AND DAT FILES

On the SIMPLEX software disk, you will notice that the files have different extensions. There are three files with the EXE extension. These files are the ones that are executable. They are:

SIMPLEX.EXE
DATAFIX.EXE
FILMERGE.EXE

The CTR files are files that contain information about the VEHICLES, PIN NUMBERS, FUEL TYPES, AND DEPARTMENTS. These files are created and used by the SIMPLEX program to store the fields of information specified by the user. The SIMPLEX program will not run if all of these files are not present. It is recommended that after information is programmed into SIMPLEX, all simplex files be backed up to save the programmed information.

The program disk also contains the file TESTDATA.DAT. This is a sample of transaction data that will be generated by the TCI and is used in the Operation Section to acquaint the user with the operation of SIMPLEX. (The files which contain transaction data usually have the .DAT extension.)

B. MEMORY RESIDENT PROGRAMS

Since SIMPLEX holds and manipulates 5000 transactions in the memory of the computer, it requires a considerable amount of the 640K of memory. Memory resident programs and (TSR's) are programs that reside in the computers memory, taking up space. If too many TSR's are present in the memory, SIMPLEX may not be able to operate and an error may occur.

V. USING SIMPLEX MENUS

A. MENU STRUCTURE

The SIMPLEX menu structure is designed to provide the user with a simple format for manipulating the transaction data. From the main menu, each submenu allows the user to perform a different set of functions. The operation section of this manual explains in detail the operation of each section and of each operation.

B. QUITTING MENUS

When using SIMPLEX, any menu under the main menu (SUBMENU) may be exited by typing Q. The functions under the submenus may be exited by typing enter on an empty input box. For instance if the search vehicle function under the search menu is accidentally selected, it may be exited by typing enter.

C. WHAT TO DO IF ERRORS OCCUR

Sometimes if an error occurs in the data on the drive, or if the devices used by the program are not present, an error message will be displayed on the screen. An error message will describe the type of error such as **PRINTER NOT READY**, or **FILE NOT FOUND**. Although most errors are simple to remedy, some may not be easily recognized. If you encounter an unusual error, refer to the troubleshooting section of this manual for a description of the error and a cure for it.

Simplex Operation

This section of the manual will explain in detail each function of the SIMPLEX program. Each numbered section in the following text corresponds to a menu in the software. It is suggested that the user operate the program while reading this section to familiarize himself with the operation of the program. To execute the SIMPLEX program from DOS type:

—> SIMPLEX *[enter]*

I. ENTERING THE SERIAL NUMBER

When the SIMPLEX program is run, the first menu to appear will be the serial number entry menu. The serial number menu serves two purposes. First, it serves as a protection device for the transaction data by not allowing unauthorized personnel to execute it. Second, it discourages illegal copying of the software which will violate the purchasers license agreement. The serial number for your software is unique to your company. It is located on the back page of this manual. Keep this number in a secure location to prevent unauthorized access. To enter the serial number, type the four digit serial number, ####. As with all of SIMPLEX entries, if a mistake is made, simply use the delete or backspace keys to correct the entry.

TYPE —> #### *[enter]*

II. LOADING THE DATA FILE

The next screen to appear will be the data file entry screen. This screen allows the user to enter the name of the file which contains the transaction data to be processed. The program will allow only one file to be processed at a time. If several files contain the necessary data, use the FILMERGE utility to combine the data into one file. (Note: When the FILMERGE utility is used, the files must be merged in order of date for SIMPLEX to manipulate the data properly.)

For the purposes of this manual, a file containing sample data is included with your software. The name of this file is TESTDATA.DAT. To continue with the program, type in the name of the data file now:

TYPE —> TESTDATA.DAT *[enter]*

A. USING THE PATH

When the data file is entered, it must be on the SIMPLEX subdirectory for the program to recognize it. If you wish to load it from another subdirectory, enter it along with the file name. For instance if the file DATAFILE.DAT were to be loaded from the PHOENIX subdirectory on the C drive,

TYPE —> C:\PHOENIX\DATAFILE.DAT.

B. WHAT TO DO IF ERRORS OCCUR

After a file name is entered, SIMPLEX will scan the file to insure that the data does not contain errors. If the file being loaded is very large, this may take up to a minute or two. If corrupt data is encountered, SIMPLEX will display the line number of the transaction where it was found. It will then place the user back into DOS so that the error may be corrected.

To correct an error in the transaction data, use the DATAFIX utility program. The line number of the error given by the SIMPLEX program corresponds to the edit number of the transaction in the DATAFIX program. Refer to section IV of this manual for instructions on using DATAFIX.

As with all SIMPLEX data entry boxes, if you wish to leave the data file input screen without loading a data file, simply press ENTER or ESC. Pressing either of these keys on this screen will put the user back into DOS.

III. THE MAIN MENU

After the data file has been entered correctly, the main menu will be displayed. From the main menu the user may perform several different functions on the transaction data. The functions of each selection on the main menu are explained in detail in the following sections. To exit the main menu back into DOS, type Q. If a backup file of the data has not been made, SIMPLEX will respond with, [FILE HAS NOT BEEN SAVED, QUIT? Y/N]. If a backup file has been made, the message, [ARE YOU SURE? Y/N], will appear. Type Y to quit to DOS and any other key to continue.

1. SEARCH TRANSACTION DATA

Selection 1 from the main menu is SEARCH TRANSACTION DATA.

TYPE → 1

A. FUNCTION OF THE SEARCH MENU

This selection allows the user to search the transaction data for a specific VEHICLE, PIN NUMBER, DATE, OR DEPARTMENT. Department information is specified by the user and is explained in section 7, ASSIGN INFORMATION. If a search is made for information that is not present in the transaction data, a blank search screen with zero quantity will be displayed.

B. SEARCH BY VEHICLE

This function allows the user to search the transaction data for transactions by a specific vehicle number. It will then either display the transactions on the screen or print them on the printer. To execute the search by vehicle number function from the search submenu, type:

TYPE → 1

The program will ask for the vehicle number to search by. Enter the four digit vehicle number. If the TESTDATA.DAT file was loaded, enter vehicle 1001.

TYPE → 1001 **[enter]**

The program will now ask where you would like the output sent, to either the screen or the printer. For this demonstration, enter 1 for screen.

TYPE → 1

The transactions with vehicle number 1001 will now be displayed. The screen will display the transaction data along with any fields of information. These fields of information are described in section 5. When transactions are displayed on the screen, 6 lines of data will appear per screen. To view the additional data, hit any key. At the end of the search by vehicle function the program will display the total quantity of fuel for the vehicle, the total miles traveled, and the miles per gallon figure. To jump to the end of the data without viewing all of the transactions, type J. To get back to the SEARCH TRANSACTION DATA submenu:

TYPE → Q

NOTE: *The PHOENIX 8000 fuel system does not require that a mileage entry be made and does not check the mileage figure entered for validity. Therefore the calculations of this program can only be as accurate as the data they are given. If inconsistent mileage entries are present in the data, the mileage and miles per gallon figure will be incorrect.*

C. SEARCH BY PIN NUMBER

This function allows the user to search the transaction data for transactions by a specific PIN number. It will then either display the transactions on the screen or print them on the printer. To execute the search by PIN number function from the search submenu:

TYPE → 2

The program will ask for the PIN number to search by. Enter the 5 digit PIN number. If the TESTDATA.DAT file was loaded, enter PIN number 12345.

TYPE → 12345 **[enter]**

The program will now ask where you would like the output sent, to either the screen or the printer. For this demonstration, enter 1 for screen.

TYPE → 1

The transactions with the PIN number 12345 will now be displayed. The screen will display the transaction data along with any fields of information. Type Q to quit to the submenu, J to jump to the end of the data, and any other key to view the additional data.

TYPE → Q

D. SEARCH BY DATE

This function allows the user to search the transaction data for transactions by a specific DATE. It will then display the transactions on the screen or print them on the printer. To execute the search by DATE function from the search submenu:

TYPE → 3

The program will ask for the starting date. Enter the date that you would like to start the search on. If the TESTDATA.DAT file was loaded, enter 010191. Mistakes may be corrected by using the backspace key. (The program will insert the slash marks.)

TYPE → 010191 **[enter]**

When the starting date has been entered correctly, the program will ask for the ending date to be entered. Enter the date that you would like the search to finish on. If the TESTDATA.DAT file was loaded, enter 121292. (The program will insert the slash marks.)

TYPE → 121292 **[enter]**

When both the starting and ending dates have been entered correctly, SIMPLEX will ask where you would like the output sent, to either the screen or the printer. For this demonstration, enter 1 for screen.

TYPE → 1

The transactions with dates after the starting date and before the ending date will be displayed along with the fields of information. Type Q to quit to the submenu, J to jump to the end of the display, and any other key to view the additional data. To view transactions on one date, enter the same starting and ending date.

TYPE → Q

E. SEARCH BY DEPARTMENT

This function allows the user to search the transaction data for a number of vehicles which have been assigned to a department. These vehicles must first be assigned to a department in the ASSIGN INFORMATION submenu. This process is explained in section 5 of this manual. For the demonstration type Q from the SEARCH TRANSACTION DATA submenu to return to the main menu.

TYPE → Q

2. PRINT REPORTS

Selection 2 from the main menu is PRINT REPORTS.

TYPE → 2

A. FUNCTION OF THE PRINT REPORTS SUBMENU

This submenu allows the user to generate reports on a particular VEHICLE, PIN NUMBER, DATE, OR DEPARTMENT. The reports may be output to either the screen or the printer. The reports contain all of the transactions for the information selected. For instance a report printed by VEHICLE will contain all of the transactions for each vehicle with a quantity total at the end. Department reports require that vehicles be assigned to a department first. Department information is explained in section 5, ASSIGN INFORMATION.

B. REPORTS BY VEHICLE

This function allows the user to generate reports for each VEHICLE NUMBER in the transaction data. It will then either display the reports on the screen or print them on the printer. To execute the PRINT REPORTS BY VEHICLE NO. function from the PRINT REPORTS submenu:

TYPE → 1

SIMPLEX will now ask you where you would like the output sent, to either the screen or the printer. For this demonstration, enter 1 for screen.

TYPE → 1

The program will determine the different number of vehicle numbers present in the transaction data, and will output all of the transactions and fields of information for each vehicle number with a mileage total, miles per gallon figure, and quantity total at the end. If the TESTDATA.DAT file was loaded, the first report printed will be for vehicle number 1001, since this is the first vehicle number which appears in the data file.

As on all of the reports, when the transaction data is being displayed, the user may type j to jump to the end of a report and view the totals, Q to quit to the reports submenu, or any other key to view the additional data.

When reports are generated by vehicle, SIMPLEX will calculate total miles traveled and miles per gallon for each vehicle as it does in the search by vehicle operation.

TYPE → Q

C. REPORTS BY PIN

This function allows the user to generate reports for each PIN NUMBER in the transaction data. It will then either display the reports on the screen or print them on the printer. To execute the PRINT REPORTS BY PIN NO. function from the PRINT REPORTS submenu, type:

→ 2

SIMPLEX will now ask where you would like the output sent, to either the screen or the printer. For this demonstration, enter 1 for screen.

TYPE → 1

SIMPLEX will now determine the different number of PIN numbers present in the transaction data, and will output all of the transactions and fields of information for each pin number with a quantity total at the end. If the TESTDATA.DAT file was loaded, the first report will be for pin number 12345, since this is the first pin number which appears in the data file.

As on all of the reports when the transaction data is being displayed, the user may type J to jump to the end of the report and view the totals, Q to quit to the reports submenu, or any other key to view the additional data.

TYPE → Q

D. REPORTS BY DATE

This function allows the user to generate reports for each DATE in the transaction data. It will then either display the reports on the screen or print them on the printer. To execute the PRINT REPORTS BY DATE. Function from the PRINT REPORTS submenu:

TYPE → 3

SIMPLEX will now ask where you would like the output sent, to either the screen or the printer. For this demonstration, enter 1 for screen.

TYPE → 1

SIMPLEX will now determine the different dates present in the transaction data, and will output all of the transaction and fields of information for each date with a quantity total at the end. If the TESTDATA.DAT file was loaded, the first report will be for the date 01/01/92, since this is the first date which appears in the data file.

As on all of the reports when the transaction data is being displayed, the user may type J to jump to the end of the report and view the totals, Q to quit to the reports submenu, or any other key to view the additional data.

TYPE → Q

E. REPORTS BY DEPARTMENT

This function allows the user to generate reports for each DEPARTMENT in the transaction data. Before this function can be used, vehicles must be assigned to departments in the ASSIGN INFORMATION submenu. This operation is explained in section 5 of this manual.

TYPE → Q

3. CALCULATE FUEL TOTALS

A. FUNCTION OF THE FUEL TOTALS MENU

The fuel totals menu allows the user to calculate fueling totals for all fuel dispensed. Totals may also be calculated by FUEL TYPE, by PUMP, and by DEPARTMENT. With the functions on this menu, the user can keep track of how much of each type of fuel is being used, and by which department. To view the CALCULATE FUEL TOTALS submenu:

TYPE → 3

B. CALCULATE GRAND TOTAL

This function will calculate the quantity total of ALL transactions in the data file. It will display all of the transactions in the data file with a quantity total at the end. To execute the CALCULATE GRAND TOTAL function from the CALCULATE FUEL TOTALS submenu:

TYPE → 1

SIMPLEX will now ask where you would like the data output, to either the screen or the printer. For this demonstration, enter 1 for screen.

TYPE → 1

All of the transactions in the data file will now be displayed with a quantity total at the end. As with all of the functions of the CALCULATE FUEL TOTALS submenu, when transactions are being displayed, the user may type J to jump to the end of the data AND view the totals, Q to quit to the CALCULATE FUEL TOTALS submenu, or any other key to view the additional data. For the demonstration, hit Q to return to the CALCULATE FUEL TOTALS submenu.

TYPE → Q

C. TOTALS BY FUEL TYPE

This function allows the user to calculate totals for a particular type of fuel. The PHOENIX 8000 card system will allow the user to have up to 8 different fuel types. SIMPLEX will accommodate up to 8 also. To execute the TOTALS BY FUEL TYPE function:

TYPE → 2

SIMPLEX will now ask for the type of fuel to calculate totals for. For this demonstration, enter fuel type 1.

TYPE → 1 [enter]

SIMPLEX will now ask where you would like the data output, to either the screen or the printer. For this demonstration, enter 1 for screen.

TYPE → 1

All transactions with fuel type 1 will now be displayed with the quantity total at the end. As with all of the functions on the CALCULATE FUEL TOTALS submenu, when transactions are being displayed, type J to jump to the end of the data and view the totals, Q to quit to the CALCULATE FUEL TOTALS submenu, or any other key to view the additional data.

TYPE → Q

D. TOTALS BY PUMP

This function allows the user to calculate totals for a particular PUMP. The PHOENIX 8000 card system will allow the user to have up to 8 fuel pumps. SIMPLEX will accommodate up to 8 also. To execute the TOTALS BY PUMP function:

TYPE → 3

SIMPLEX will now ask for the pump to calculate totals for. For this demonstration, enter pump number 1.

TYPE → 1 [enter]

SIMPLEX will now ask where you would like the data output, to either the screen or the printer. For this demonstration, enter 1 for screen.

TYPE → 1

All transactions fueled on pump number 1 will now be displayed with the quantity total at the end. As with all of the functions on the CALCULATE FUEL TOTALS submenu, when transactions are being displayed, type J to jump to the end of the data and view the totals, Q to quit to the CALCULATE FUEL TOTALS submenu, or any other key to view the additional data.

TYPE → Q

E. TOTALS BY DEPARTMENT

The totals by department function allows totals to be calculated by department. Before this function may be used, vehicles must be assigned to a department in the ASSIGN INFORMATION submenu. Functions regarding departments are explained in section 5 of this manual.

TYPE → Q

4. VIEW TRANSACTION DATA

This function will allow the user to view the transaction data along with any fields of information associated with it. To invoke the VIEW TRANSACTION DATA function:

TYPE → 4

SIMPLEX will display all of the transaction data on the screen 6 transactions at a time.

Type 1 to scroll up through the data, 2 to scroll down, J to jump to the end, and Q to quit to the main menu.

TYPE → Q

5. ASSIGN INFORMATION

A. FUNCTION OF ASSIGN INFORMATION

This submenu will assign the information which is displayed along with the transaction data, and allow the user to assign vehicles to different departments. So far in the user demonstration, no information has been displayed with the transactions in any of the previous submenus. This information must first be defined in this submenu. (Once information has been assigned in this submenu, SIMPLEX will remember it every time it is executed.)

TYPE → 5

B. ASSIGN VEHICLES TO DEPARTMENT

This function will assign vehicle numbers to a department number. Department numbers may be from 1 to 9999. To assign a vehicle number to a department:

TYPE → 1

SIMPLEX will now ask for the vehicle number to assign. (The vehicle number entered does not need to be present in the transaction data.) For this demonstration enter vehicle number 1001.

TYPE → 1001 **[enter]**

SIMPLEX will now ask for the department number to assign the vehicle to. Enter department number 1.

TYPE → 1 **[enter]**

SIMPLEX will now store the new department information. It will remember the department and all other information assigned every time SIMPLEX is executed.

NOTE: *Simplex will not allow a vehicle number to be assigned to more than one department. To change the department that a vehicle is assigned to, simply assign it to the new department. SIMPLEX will remove it from the previously assigned department. To remove a vehicle altogether, assign it to department number 0.*

TYPE → Q

C. ASSIGN INFORMATION TO VEHICLE

This function will allow 20 characters of information to be assigned to a vehicle number. For instance, if vehicle number 1001 were a 1992 Chevy truck. The user could assign this information to the vehicle number. This information will appear every time transaction data is displayed or printed. To assign information to a vehicle:

TYPE → 2

SIMPLEX will ask for the vehicle number to assign the information to. For the demonstration, enter vehicle number 1001.

TYPE → 1001 **[enter]**

Now enter up to 20 characters of information that you would like to assign to the vehicle number. For the demonstration, type:

→ 1992 CHEVY TRUCK **[enter]**

The information has now been assigned to the vehicle number. To view the information for a vehicle, use function 6, VIEW INFO. BY VEHICLE NO. To change the information assigned to a vehicle number, simply enter the vehicle number and the new information to assign to it. To delete the information for a vehicle number, enter the vehicle number, and a blank line for the information.

TYPE → Q

D. ASSIGN INFORMATION TO PIN NUMBER

This function will allow 20 characters of information to be assigned to a pin number. For instance, if pin number 12345 were assigned to John Doe, the user could assign the name of the man to his PIN number. This information will appear every time transaction data is displayed or printed. To assign information to a pin number:

TYPE → 3

SIMPLEX will ask for the pin number to assign the information to. For the demonstration, enter pin number 12345.

TYPE → 12345 **[enter]**

Now enter up to 20 characters of information that you would like to assign to the pin number. For the demonstration:

TYPE → JOHN DOE **[enter]**

The information has now been assigned to the pin number. To view the information for a pin number, use function 7, VIEW INFO. BY PIN NO. To change the information assigned to a pin number, simply enter the pin number and the new information to assign to it. To delete the information for a pin number, enter the pin number and a blank line for the information.

E. ASSIGN INFORMATION TO FUEL TYPE

This function will allow 20 characters of information to be assigned to a fuel type. For instance, if fuel type 1 were regular gasoline, the user could assign the name of the fuel to its fuel type. This information will appear every time transaction data is displayed or printed. To assign information to a fuel type:

TYPE → 4

SIMPLEX will ask for the fuel type to assign the information to. For the demonstration, enter fuel type 1:

TYPE → 1 **[enter]**

Now enter up to 20 characters of information that you would like to assign to the fuel type. For the demonstration, type:

→ REGULAR GASOLINE **[enter]**

The information has now been assigned to the fuel type. To view the information for a fuel type, use function 8, VIEW INFO. BY FUEL TYPE. To change the information assigned to a fuel type, simply enter the fuel type and the new information to assign to it. To delete the information for a fuel type, enter the fuel type and a blank line for the information.

TYPE → Q

NOTE: Now that information has been assigned to some of the transaction data, retry the search by department submenu with department 1. The print reports submenu will now print reports by department.

TYPE → Q

6. FILE MAINTENANCE

A. FUNCTION OF THE FILE MAINTENANCE SUBMENU

The file maintenance submenu allows the user to generate backups of the current transaction data and to manipulate files from inside the SIMPLEX program. The backup files in SIMPLEX use the file extension BCK. To enter the file maintenance submenu, type 6 from the main menu.

TYPE → 6

B. BACKUP CURRENT DATA

Backup current data will generate a backup file of the transaction data on the SIMPLEX subdirectory of the current drive. After all reports and searches have been made on a file of transaction data, a backup should be made with this function in order to have a permanent record of the transactions in the format which they were sorted.

To execute the backup function:

TYPE → 1

SIMPLEX will ask for the name of the backup file to be written. Enter a filename with the extension BCK. If a file name is entered that is already present on the disk, SIMPLEX will overwrite the previous file. If desired, you may enter the filename under a subdirectory to place the backup file elsewhere on the disk. For example, to put the file BACKUP.BCK on the ARCHIVE subdirectory on drive C, enter C: \ ARCHIVE \ BACKUP.BCK **[enter]**. (You may want to use the date that the transactions were processed as the backup filename.) For the demonstration, enter the filename BACKUP.BCK.

TYPE → BACKUP.BCK **[enter]**

SIMPLEX will now write the file containing the transaction data to the SIMPLEX directory.

C. VIEW BACKUP FILES

This function will allow the user to view the transaction data contained in a backup file. To execute the VIEW BACKUP FILES function, enter 2.

TYPE → 2

SIMPLEX will ask for the name of the backup file to view. Enter the name of the file with the extension BCK. For the demonstration, enter BACKUP.BCK.

TYPE → BACKUP.BCK **[enter]**

All transaction data in the file BACKUP.BCK will now be displayed. In this function, the information associated with the vehicle numbers, pin numbers, and fuel types will not be displayed. To process transaction data from a backup file, simply enter the backup file name when SIMPLEX is executed.

TYPE → Q

D. LIST BACKUP FILES

The list backup files function will display the files with the extension BCK on the SIMPLEX subdirectory. (If the backup file was written on another subdirectory, or with another extension, it will not be displayed.) To execute the list backup files function, enter 3.

```
TYPE → 3
TYPE → Q
```

E. DELETE FILES

The delete file function will erase a file from the disk. Use caution with this function as it can remove the transaction data from the disk. To execute the delete file function enter 4.

```
TYPE → 4
```

SIMPLEX will ask for the name of the file to delete. Enter the filename with the extension. Subdirectory information may also be entered to delete files on another subdirectory. For the demonstration, enter BACKUP.BCK.

```
TYPE → BACKUP.BCK [enter]
```

SIMPLEX will now prompt the user again to avoid accidental deletion of files. Enter Y to delete the above file, or any other key to cancel the operation.

```
TYPE → Y
```

The file BACKUP.BCK will now be removed from the disk. This may be verified by using function 3, list backup files.

F. RENAME FILES

The rename file function allows the names of files to be changed without exiting SIMPLEX. To enter the rename files function, type 5.

```
TYPE → 5
```

SIMPLEX will ask the user for the name of the file to change. Enter the name of the existing file with the extension. For the demonstration, enter TESTDATA.DAT.

```
TYPE → TESTDATA.DAT [enter]
```

Now enter the new name for the file with the extension. For the demonstration, enter NEWDATA.DAT.

```
TYPE → NEWDATA.DAT [enter]
```

When both of the file names have been entered, SIMPLEX will ask for verification to allow the user to stop the process if a mistake is made. To rename the file, type Y. To cancel the operation type any other key.

```
TYPE → Y
```

The file specified has now been renamed. The data file TESTDATA.DAT has now been changed to NEWDATA.DAT.

```
TYPE → Q
```

Now that all of the functions of the SIMPLEX program have been covered, go back and execute each command until you are familiar with the function of each operation. When finished:

```
TYPE → Q
TYPE → Y
```

From the main menu to exit the program

IV. USING DATAFIX FILE EDITOR AND REPAIR PROGRAM

A. FUNCTIONS OF THE DATAFIX UTILITY

The SIMPLEX DATAFIX utility will allow the transaction data to be edited and manual transactions to be added. To invoke the DATAFIX program execute DATAFIX.

TYPE → DATAFIX **[enter]**

DATAFIX will first ask for the serial number to be input. Enter the four digit serial number on the inside back cover of this manual. This serial number protection prevents unauthorized users from editing the transaction data.

TYPE → (four digit serial number, ####)

When the serial number has been entered correctly, DATAFIX will prompt for the filename to fix. Only one file may be loaded into DATAFIX at a time. Enter the filename and extension of the data file. For the demonstration, enter the file TESTDATA.DAT.

TYPE → NEWDATA.DAT

DATAFIX will load the data file into memory so that it may be edited. It will not change the file on the disk until the edited data is saved to disk using function 6.

TYPE → **[enter]**

B. DISPLAY TRANSACTION DATA

This display transaction data function will display the transactions as they were loaded from the file. Use this function to view the incorrect data. Note the edit number of the transaction to be changed. To display the transaction data:

TYPE → 1

Type 1 to scroll up through the transaction data, 2 to scroll down, J to jump to the end of the data, and Q to quit to the main menu.

TYPE → Q

C. EDIT TRANSACTION DATA

This function allows the user to edit the transaction data so that any corrupt data may be corrected. To execute the edit transaction data function, enter 2.

TYPE → 2

DATAFIX will ask for the edit number of the transaction to be changed. Enter the edit number determined by the display transaction data function. For the demonstration, enter edit number 1.

TYPE → 1 **[enter]**

DATAFIX will display the edit number, the transaction, and the list of information that may be changed. Enter the number of the field of information to edit. For the demonstration, enter 7 to edit the mileage field.

TYPE → 7

DATAFIX will ask for the new mileage entry. Enter the new mileage for transaction 1. For the demonstration, enter 999.

TYPE → 999 **[enter]**

The new mileage will now be displayed in the transaction data. Each of the other fields of information may be changed in the same manner. To return to the main menu type Q. Remember that this information will not be changed on the file until it is saved back to the disk with function 6, WRITE CHANGES TO DISK.

TYPE → Q

D. DELETE TRANSACTION

The delete transaction function will delete a specified transaction from the transaction data. To execute the delete transaction function enter 3.

TYPE → 3

DATAFIX will now ask for the edit number of the transaction to delete. Enter the edit number. For the demonstration, enter edit number 1. To exit back to the main menu, hit enter on a blank input box.

TYPE → 1 **[enter]**

DATAFIX has now removed transaction 1 from the list of transactions and reassigned all of the edit numbers to compensate for the missing transaction. It will not be changed on the file until function 6, WRITE CHANGES TO DISK, has been executed. When a transaction is deleted in this way, there will be a gap in the transaction numbers. Notice that the edit numbers are independent of the transaction numbers.

TYPE → **[enter]**

E. ADD TRANSACTION TO DATA

This function allows transactions to be added to the list so that transaction data may be entered manually. To execute this function, enter 4.

TYPE → 4

DATAFIX will display the new transaction line which contains zeroes for each field of information. It will now allow new data for each field of information to be added. Enter information for the transaction by selecting each data field 1-9, and typing the new information for each field. Manual transactions may be distinguished from others by setting the transaction number to 0. (Valid information MUST be entered for each field of information or DATAFIX will not save the data to the disk.) To quit to the main menu, enter Q.

TYPE → Q

F. CHECK DATA FOR ERRORS

This function will scan the transaction data, and verify each field of information in each transaction for validity. If an error is detected, DATAFIX will display the edit number of the transaction and the field of information where the error was found. Type enter after each error to display the next. DATAFIX will continue until all errors in the transaction data have been displayed. All errors in the transaction data MUST be corrected before the data can be saved to disk. DATAFIX will not save a file containing errors. To invoke the CHECK DATA FOR ERRORS function:

TYPE → 5

DATAFIX will display the message "BAD DATA DETECTED IN LINE 32". This is the line that was just added with the previous command. Since all of the fields of information contain zeroes, they are invalid.

DATAFIX will tell the user which field of information contains the corrupt data. In the current message, data in the month field is incorrect. Type any key to continue to view the next message. Continue to type a key until all of the corrupt data has been displayed.

TYPE → **[enter]** (Until all messages have been displayed.)

In order to save the current data to disk in the next section, the line with the corrupt data must either be deleted or edited with correct information. To continue with the demonstration, use function number 3 to delete edit number 32, and continue with the next section.

G. WRITE CHANGES TO DISK

After all information has been edited and/or added to the transaction data, it may be saved back to the disk. To write the new file to the disk, enter 6.

TYPE → 6

DATAFIX will verify that there are no more errors present in the transaction data. If errors remain, the message [[CANNOT SAVE FILE WITH ERRORS]] will be displayed. If this occurs, either delete the corrupt transaction (FUNCTION 3), or edit it with valid information (FUNCTION 2).

If no errors were present, DATAFIX will ask for the name of the fixed file. Enter the name and extension of the file to save. If an existing filename is entered, the existing file will be overwritten by the new file. If desired, path information may also be entered in the information box. To exit this function without saving the file, simply type enter on an empty input box.

TYPE → NEWDATA2.DAT **[enter]**

The above filename will now be saved back to the disk so that it may be loaded with the SIMPLEX program.

TYPE → Q
TYPE → Y

To exit the program.

V. USING FILMERGE DATA MERGING UTILITY

A. FUNCTIONS OF FILMERGE

The FILMERGE utility allows separate data files to be combined into one file so that they may be loaded with the SIMPLEX program. Since SIMPLEX will not manipulate more than 5000 transactions at a time, FILMERGE will not allow more than this number to be merged. If files containing a sum of more than 5000 transactions are merged, the excess data will be truncated. To execute the FILMERGE utility, type FILMERGE at the DOS prompt.

TYPE → FILMERGE **[enter]**

FILMERGE will now ask for the name of the file to load. Enter the name of the first file to be merged with the extension. (Path information may also be used.)

When the filename is entered, FILMERGE will scan the transaction data for errors. If no errors are found, hit any key to view the main menu. The main menu will display the number of transactions that have been loaded along with the menu selections.

TYPE → NEWDATA.DAT

B. DISPLAY TRANSACTION DATA

This function is identical to the function of the same name in the DATAFIX utility program. It will display the transaction data as it appears in the data file. To execute the DISPLAY TRANSACTION DATA function:

TYPE → 1

Type 1 to scroll up through the data, 2 to scroll down, J to jump to the end of the data, and Q to return to the main menu.

TYPE → Q

C. MERGE FILE WITH CURRENT DATA

This function will allow another data file to be merged with the one already loaded. To execute the MERGE FILE function, type 2.

TYPE → 2

FILMERGE will ask for the name of the file to merge with the current file. Enter the filename of the file to be merged with the extension. (FILES MUST BE MERGED IN ORDER OF DATE.) Path information may also be entered in the information box. To exit this function without merging files, simply type enter on a blank information box.

TYPE → NEWDATA2.DAT

(The above file was created previously in this demonstration and is actually a copy of the original data. This is being done for demonstration purposes only and should not be done with actual transaction data.)

When the second filename is entered, FILMERGE will add the information from the second file to that from the first file. This function may be repeated until all transaction data needed is in one file. Remember that the merged files will not appear on the disk until they have been written to the disk using function 3, WRITE MERGED FILES TO DISK.

TYPE → **[enter]**

D. WRITE MERGED FILE TO DISK

After all desired data has been combined using the MERGE FILE function, it may be saved back to disk using this function. To execute the WRITE MERGED FILE TO DISK function, type 3.

TYPE → 3

FILMERGE will ask for the name of the new file to write to the disk. Enter the new filename with the extension. Path information may also be entered.

TYPE → MERGDATA.DAT **[enter]**

When the filename has been entered, the new data file will be written to the disk. This file may now be loaded with the SIMPLEX program to manipulate the transaction data.

TYPE → Q

To exit the program.

VI. TANK INVENTORY TRACKING

The Simplex Tank Inventory program will allow the operator to keep track of the amount of fuel contained in up to 8 tanks. Each time transaction data is retrieved from the Phoenix 8000 fuel system, the quantity of fuel dispensed for each fuel type can be automatically subtracted from the existing tank inventory. The operator may then view or print an inventory report for all tanks.

To execute the tank inventory program from the SIMPLEX directory, type:

→ TANKINV **[enter]**

The program will begin by asking for the serial number input. This feature prevents unauthorized personnel from changing the tank inventories. The serial number can be found on the back inside cover of the Simplex manual. Enter the 4 digit serial number at this prompt.

→ #### **[enter]**

The program will now ask for the name of the file to load. The tank inventory program needs to load the data so that it can compute the total quantity of fuel dispensed for each fuel type. Depending on the procedure being used, this filename may be different. When the data is first retrieved from the Phoenix program, it is saved into a file named DATAFILE.DAT. This filename will be used for the purpose of this manual. Enter the filename with the extension at the prompt.

→ DATAFILE.DAT **[enter]**

Now that the program has the information that it needs, the main menu is displayed. The menu options are as follows:

```
S I M P L E X   E M C O   E L E C T R O N I C S
T A N K   I N V E N T O R Y   C O N T R O L   P R O G R A M

1.....ADD FUEL TO TANK
2.....UPDATE TANK INVENTORY
3.....VIEW TANK INVENTORIES
4.....PRINT INVENTORY REPORT
5.....SAVE NEW TANK INVENTORY

Q.....QUIT TO DOS
```

A. ADD FUEL TO TANK

This option allows the operator to add the quantity of fuel to the tank when a drop is made or when the program is first set up. The program will prompt the user for the tank or fuel type number to add the quantity to. Enter a number from 1 to 8 and press Enter. The program will then prompt the user for the quantity of fuel to add. Remember that this is the quantity of fuel added to the tank and not the new tank level. The entry must be in units of volume and not inches. Enter the quantity of fuel added to the tank and press enter. This new quantity will not be permanently saved until function 5 is used.

B. UPDATE TANK INVENTORY

This option will compute the total quantity of fuel for each fuel type from the transaction data loaded. It will then subtract this quantity from the current tank inventory. The new quantity will not be permanently saved until function 5 is used.

C. VIEW TANK INVENTORIES

This option will display all 8 tanks with the associated quantity and fuel type description. The user can use this function periodically to check for reorder levels.

D. PRINT INVENTORY REPORT

This function will output a 1 page report showing all 8 tanks and their associated quantities with the fuel type descriptions. The user can use this function to generate periodic reports as a means of reconciliation.

E. SAVE NEW TANK INVENTORY

After function 1 or 2 is used, this function is used to save the new inventory information to the disk. This information will automatically be loaded the next time that the tank inventory program is run.

VII. TROUBLESHOOTING

A. SERIAL NUMBER INPUT

The SIMPLEX and DATAFIX programs require that a correct four digit serial number be entered before the program will execute. The serial number is located on the inside back cover of this manual. If the serial number in the manual does not match the software, contact your distributor or Emco Electronics at 1-800-654-5002.

B. ERROR MESSAGES

SIMPLEX and its utilities contain an error trap which will indicate any error that occurs during program execution. If an error message has been displayed, refer to the following list of errors for a solution.

1. *ILLEGAL FUNCTION CALL*

This error can occur if the program tries to calculate incorrect data. For instance, if the program tried to calculate the square root of a negative number, or assign a value which is too large for a particular variable. Correct the transaction data and continue.

2. *OVERFLOW ERROR*

An overflow error is caused by too large a value being assigned to a field of information in the transaction data. Edit the transaction data and continue.

3. *OUT OF MEMORY*

This error will occur if there is insufficient memory to execute the program with the number of transactions loaded. Correct the hardware problem and rerun the program.

4. *DEVICE TIME-OUT*

This error occurs when the device that data is sent to is off-line for a definite period of time. The output device should be checked and put back on-line.

5. *DEVICE FAULT*

This error is displayed when a hardware error has occurred in the printer interface or communications port adapter in your PC. Repair or replace the defective equipment.

6. *OUT OF PAPER*

The printer interface has indicated to SIMPLEX that the printer is out of paper. Reload paper and continue. This error may also occur if the printer is turned off.

7. *FILE NOT FOUND*

SIMPLEX could not find the specified file on the indicated drive and directory. Verify that the file is present on the drive and directory, and retry.

8. *FILE ALREADY EXISTS*

This error indicates that a file was renamed to the name of an existing file. Change the filename or delete the existing file and continue.

9. *DISK FULL*

This error indicates that there is insufficient space on the disk drive for SIMPLEX to carry out a file operation. Make sure that there is enough space on the drive and continue.

10. *ERROR IN DATA FILE*

The data file loaded contains an error which the program cannot overcome. Edit the data file so that the program can read it. (The file may have part of the last transaction missing.)

11. *BAD FILENAME*

The filename specified contains invalid characters. Remove the invalid characters and continue.

12. TOO MANY FILES

This error is caused by writing too many files to the drives root directory or by an invalid file name that affects the performance of DOS's create file system call. Correct the situation and continue.

13. DISK IS WRITE PROTECTED

This error occurs when the user tries to write a file to a write protected disk. Remove the write protect or replace the disk and continue.

14. DISK NOT READY

This error indicates that the door to the floppy drive is open or that there is no disk in the indicated drive. Correct the situation and continue.

15. DISK MEDIA ERROR

The controller of a floppy or hard disk indicates that there is a hard media error in one or more sectors, Correct the hardware problem and continue. If this error occurs on a floppy drive, use another disk.

16. RENAME ACROSS DISKS

A file may not be renamed across disks. Change the drive specification and continue.

17. PATH/FILE ACCESS ERROR

During a command which specifies a path name, the subdirectory was used inappropriately. Change the specification and continue.

18. PATH NOT FOUND

The path specified was not found on the indicated drive. Change the path or create the path and continue.

19. INTERNAL ERROR

This error message will be displayed for other errors that occur which have not been defined. Since there are hundreds of possible errors, only the common ones have been listed. If an internal error message occurs, note the number of the internal error and the conditions under which it occurred, and contact your distributor or Emco Electronics at 1-800-654-5002.

SIMPLEX SOFTWARE SERIAL NUMBER

Below is the serial number for this copy of SIMPLEX. Each copy of SIMPLEX software has its' own unique serial number. Keep this number in a secure location to prevent unauthorized use.

SERIAL NUMBER (_____)

SOFTWARE VERSION (_____)

AUTHORIZATION NUMBER (_____)

TYPICAL PHOENIX PULSER WIRING WITH WESTERN ELECTRONICS PULSERS

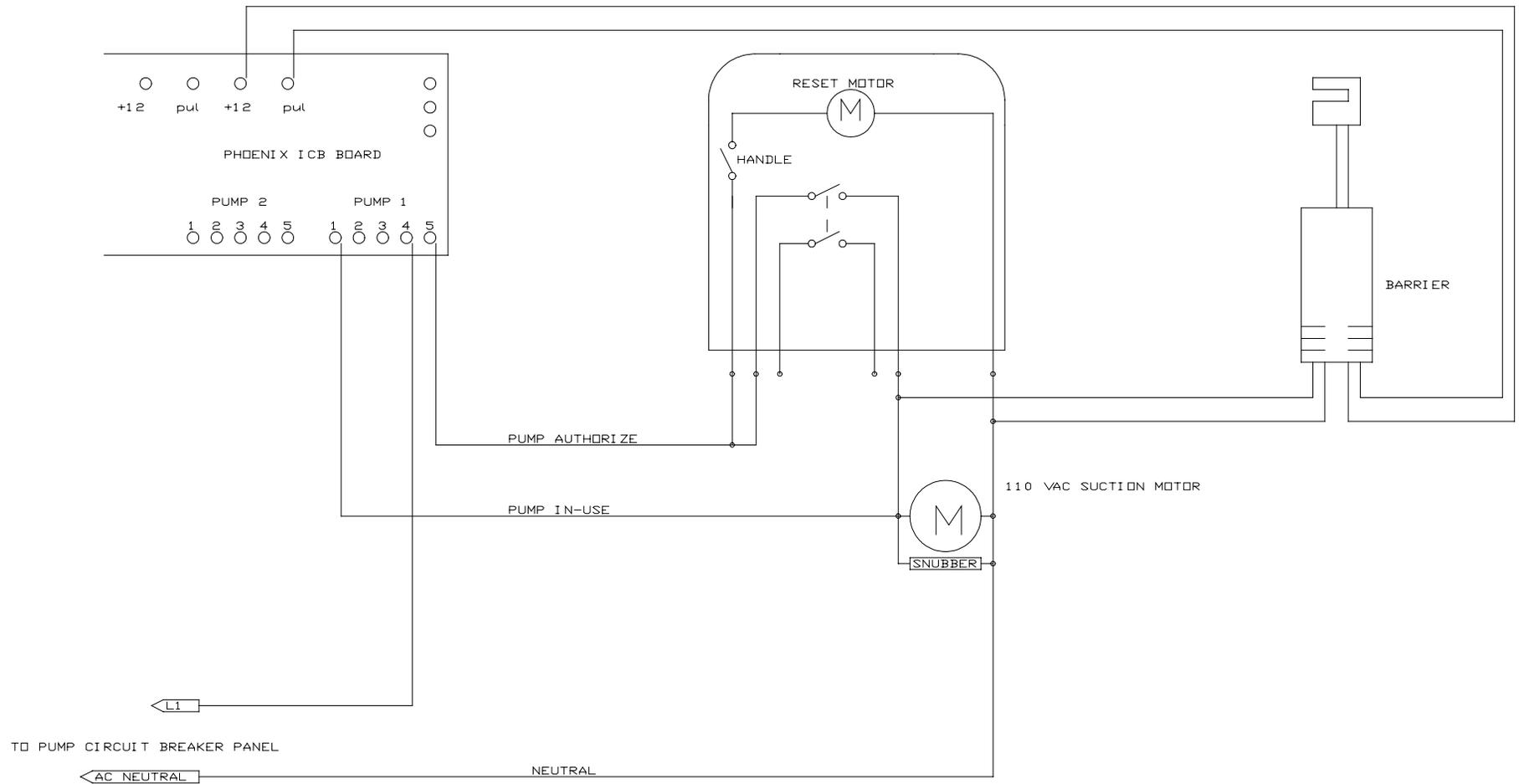
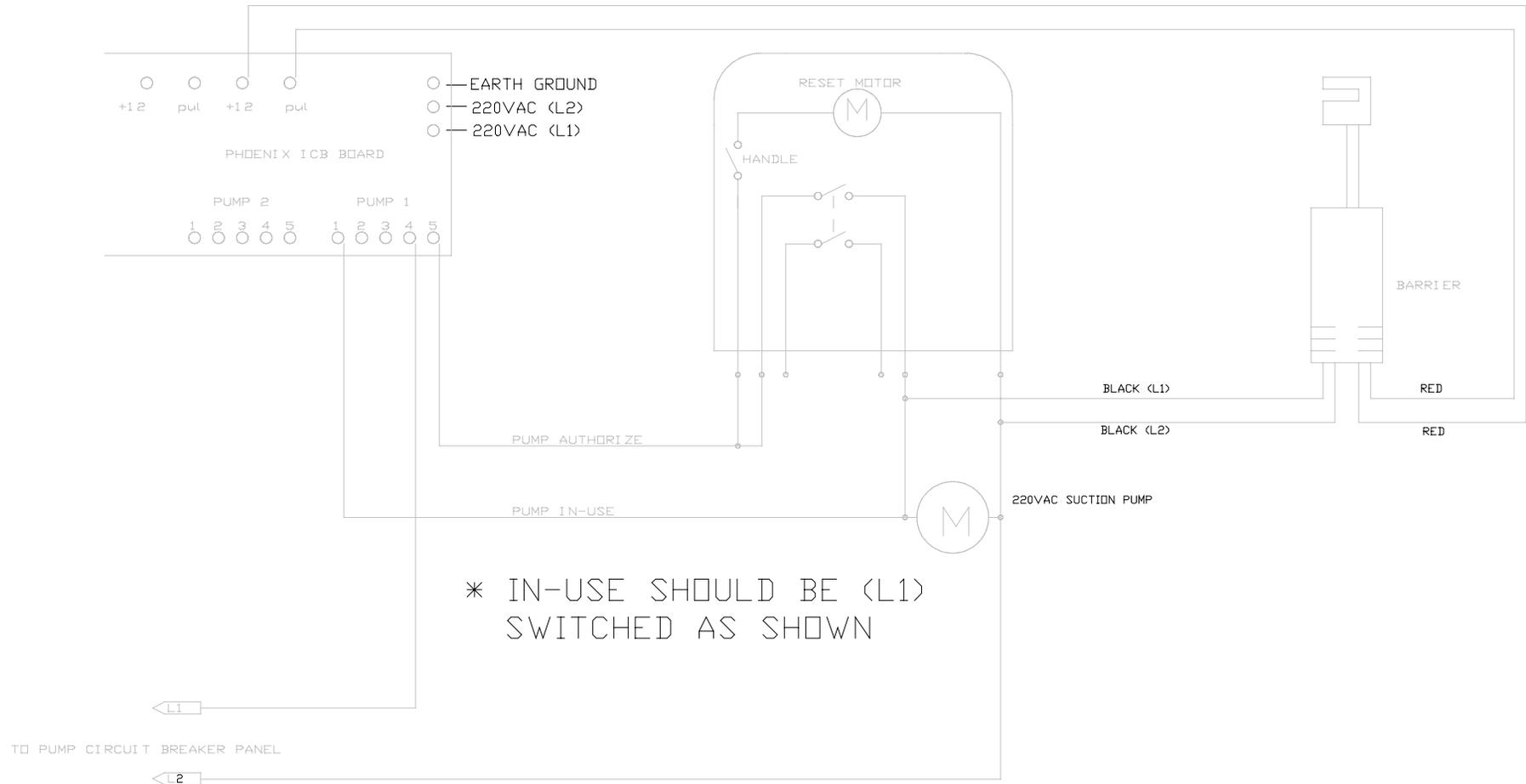


DIAGRAM A

220VAC PHOENIX PULSER WIRING WITH WESTERN ELECTRONICS PULSERS



NOTE : THIS DIAGRAM FOR SPECIAL 220 VOLT PHOENIX ONLY.

DIAGRAM A2

SINGLE PRODUCT, SINGLE HOSE DISPENSER WITH 110VAC SUCTION PUMP

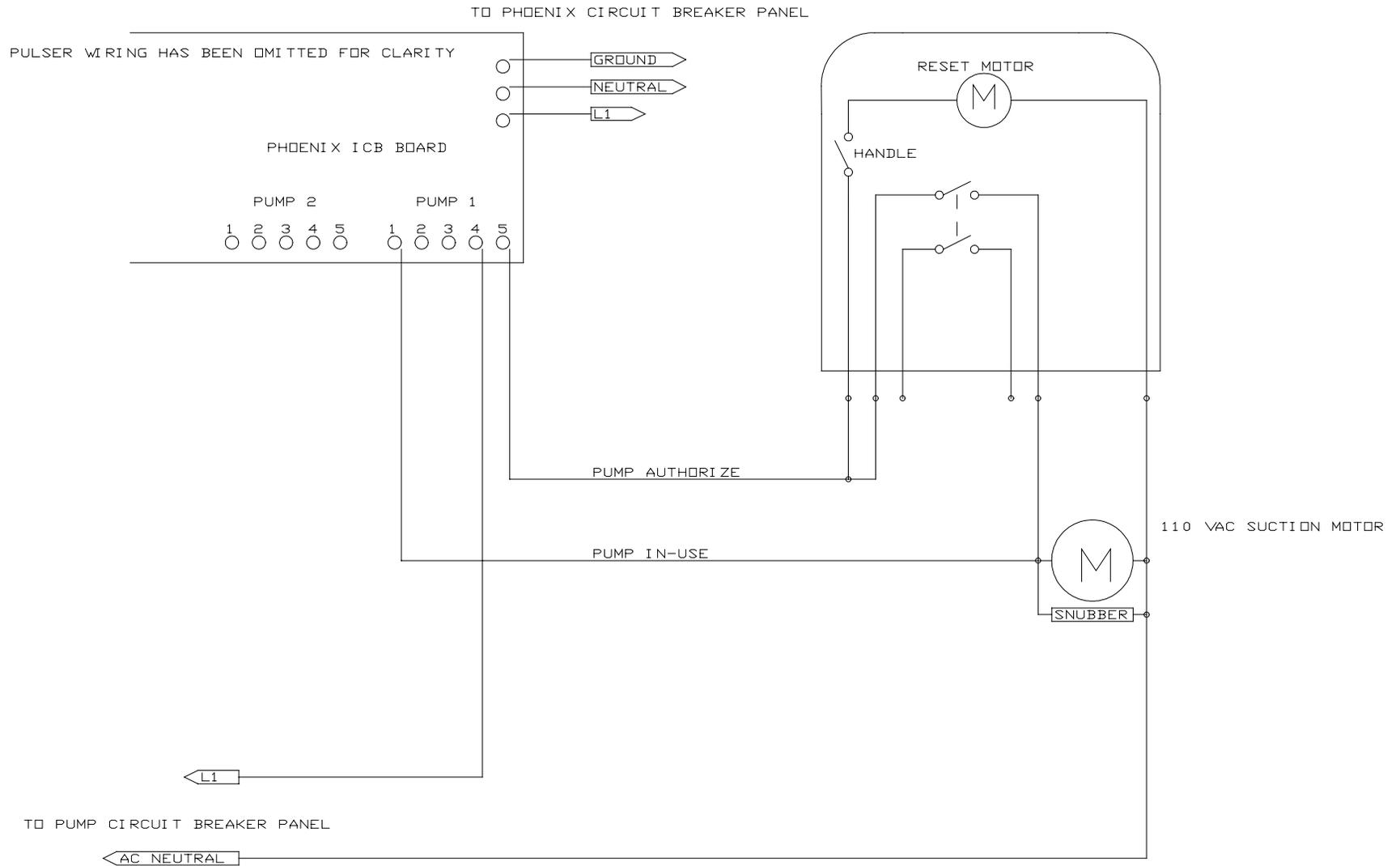


DIAGRAM B

SINGLE PRODUCT, SINGLE HOSE WITH 220 VAC SUCTION PUMP

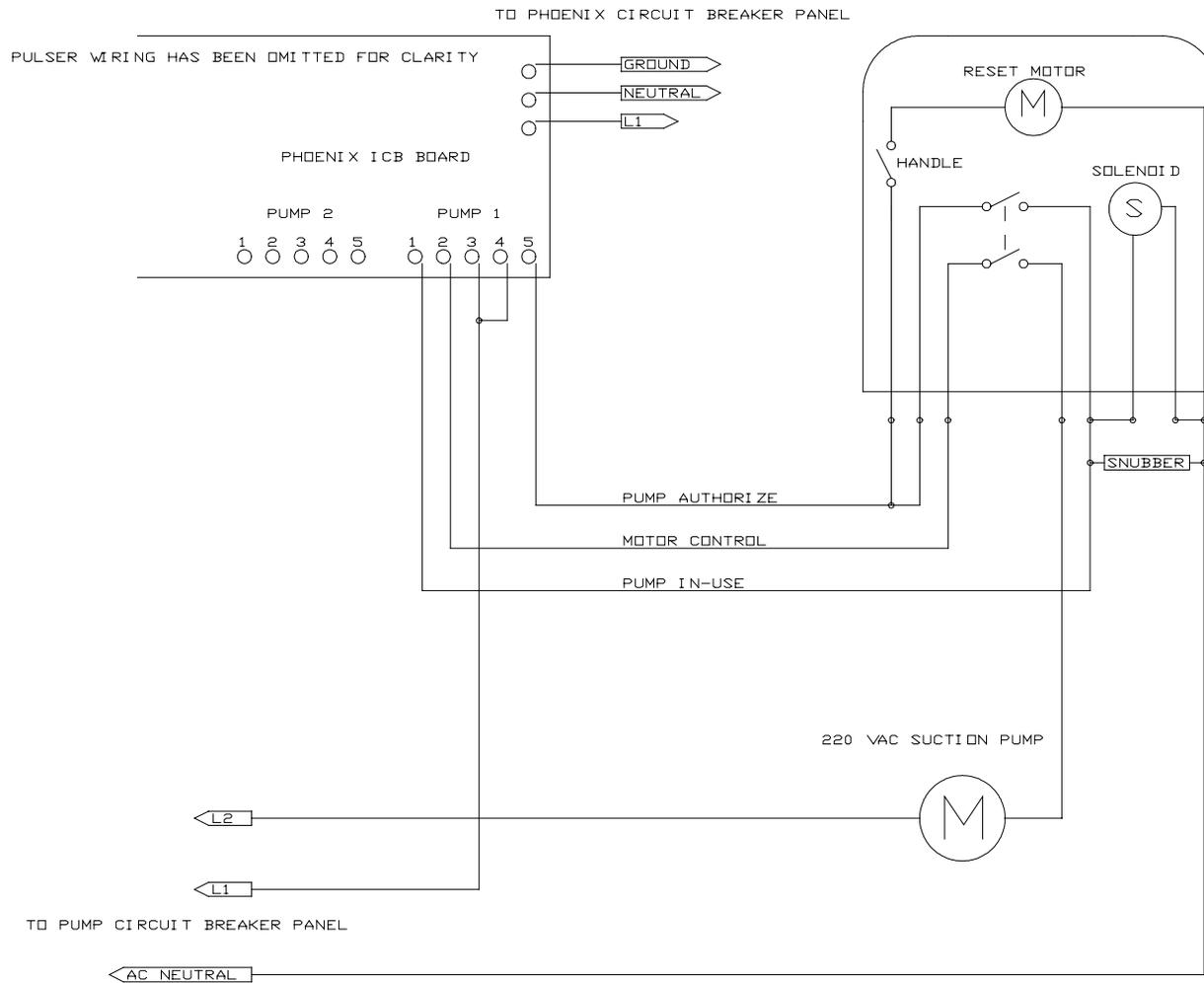


DIAGRAM C

SINGLE PRODUCT SINGLE HOSE WITH 220 VAC SUB PUMP

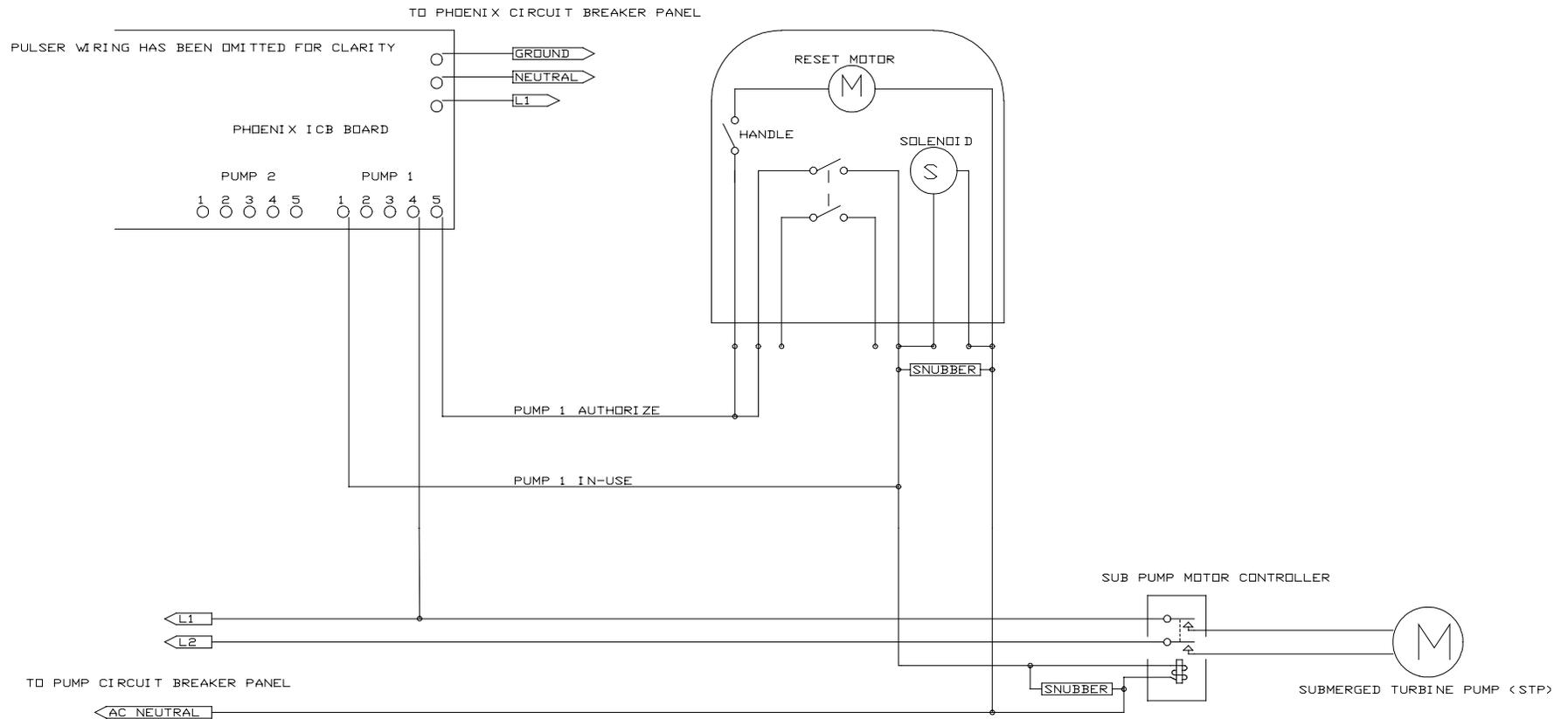
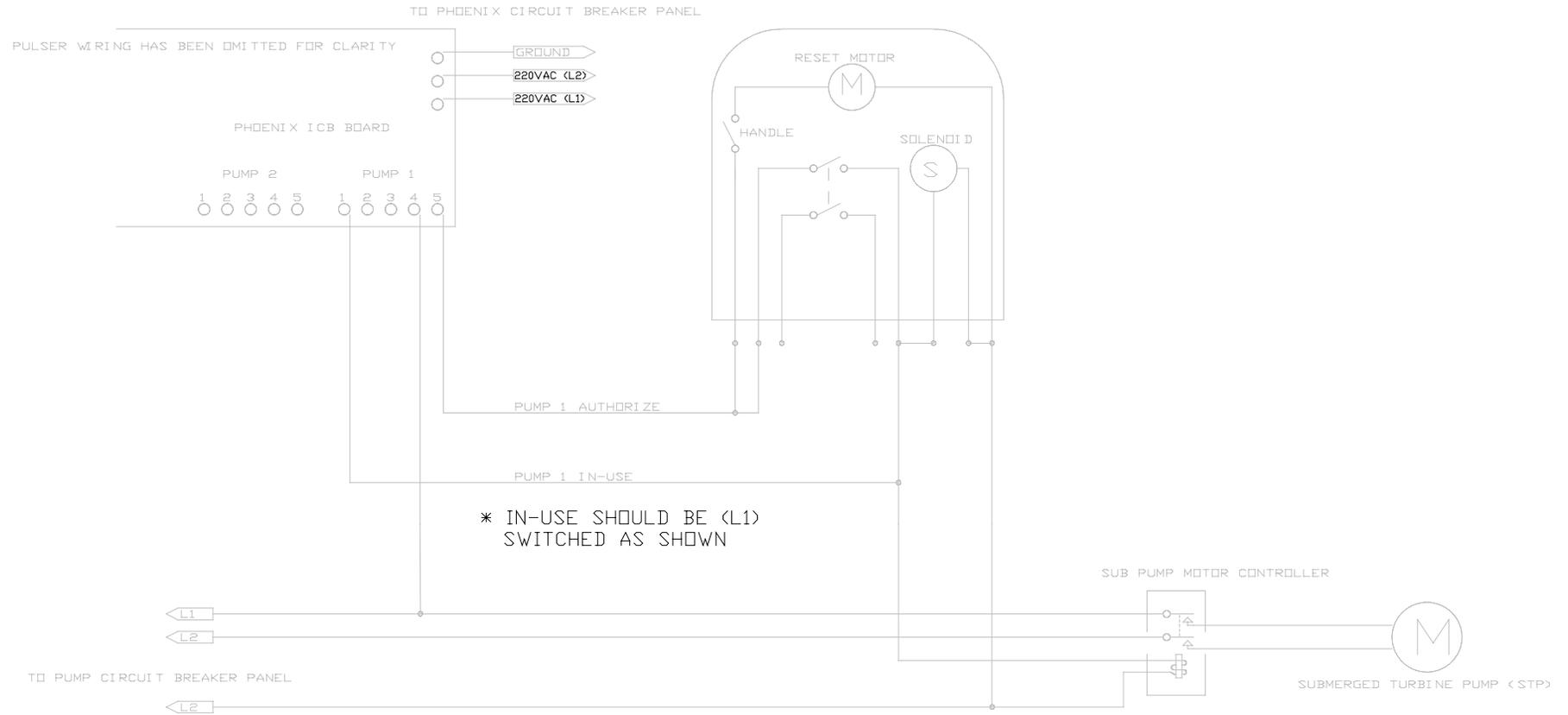


DIAGRAM D

SINGLE PRODUCT SINGLE HOSE WITH 220 VAC SUB PUMP



NOTE : THIS DIAGRAM FOR SPECIAL 220 VOLT PHOENIX ONLY

DIAGRAM D2

DUAL HOSE SINGLE PRODUCT DISPENSER WITH 110 VAC SUCTION PUMP

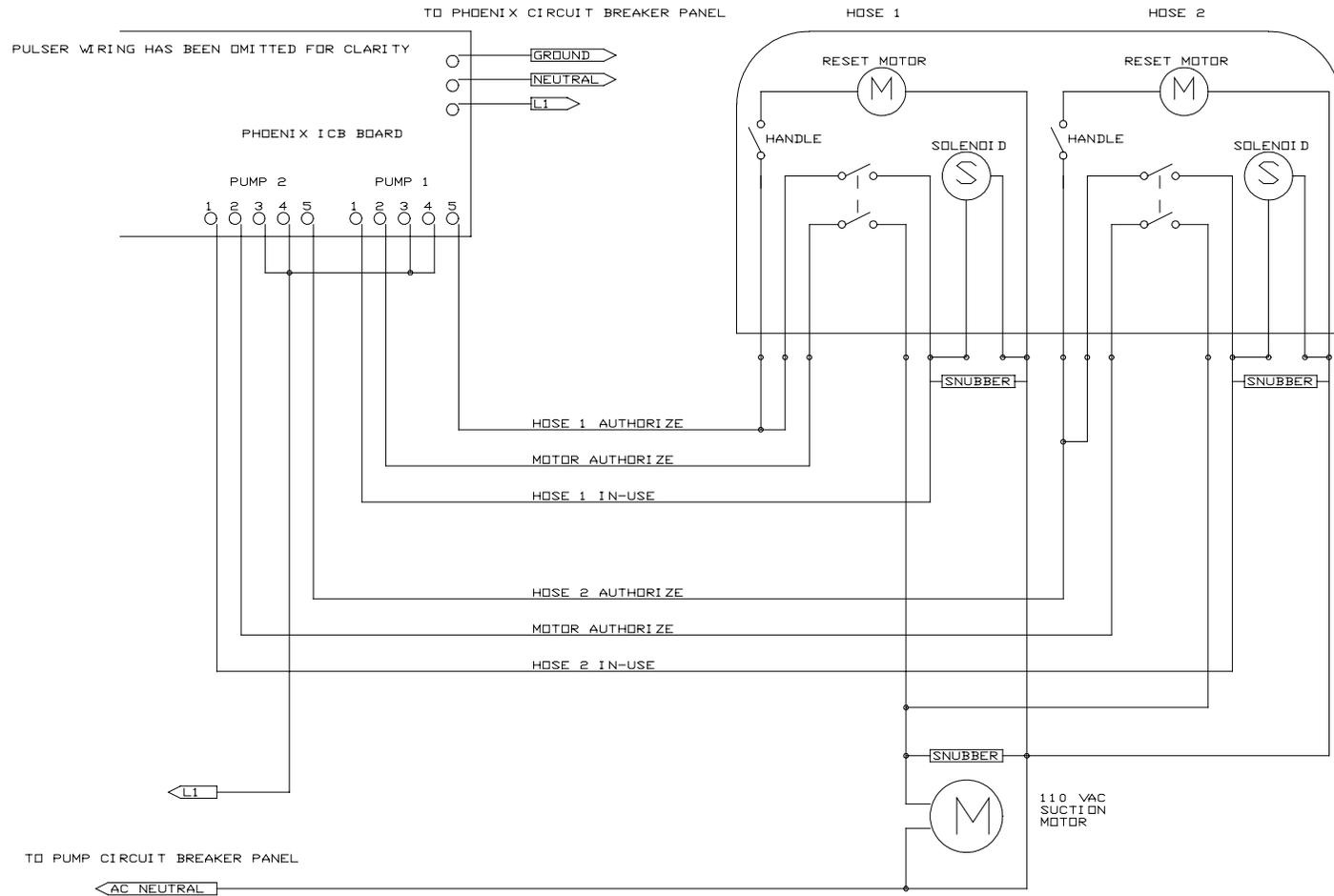


DIAGRAM E

DUAL HOSE SINGLE PRODUCT DISPENSER WITH 220 VAC SUCTION PUMP

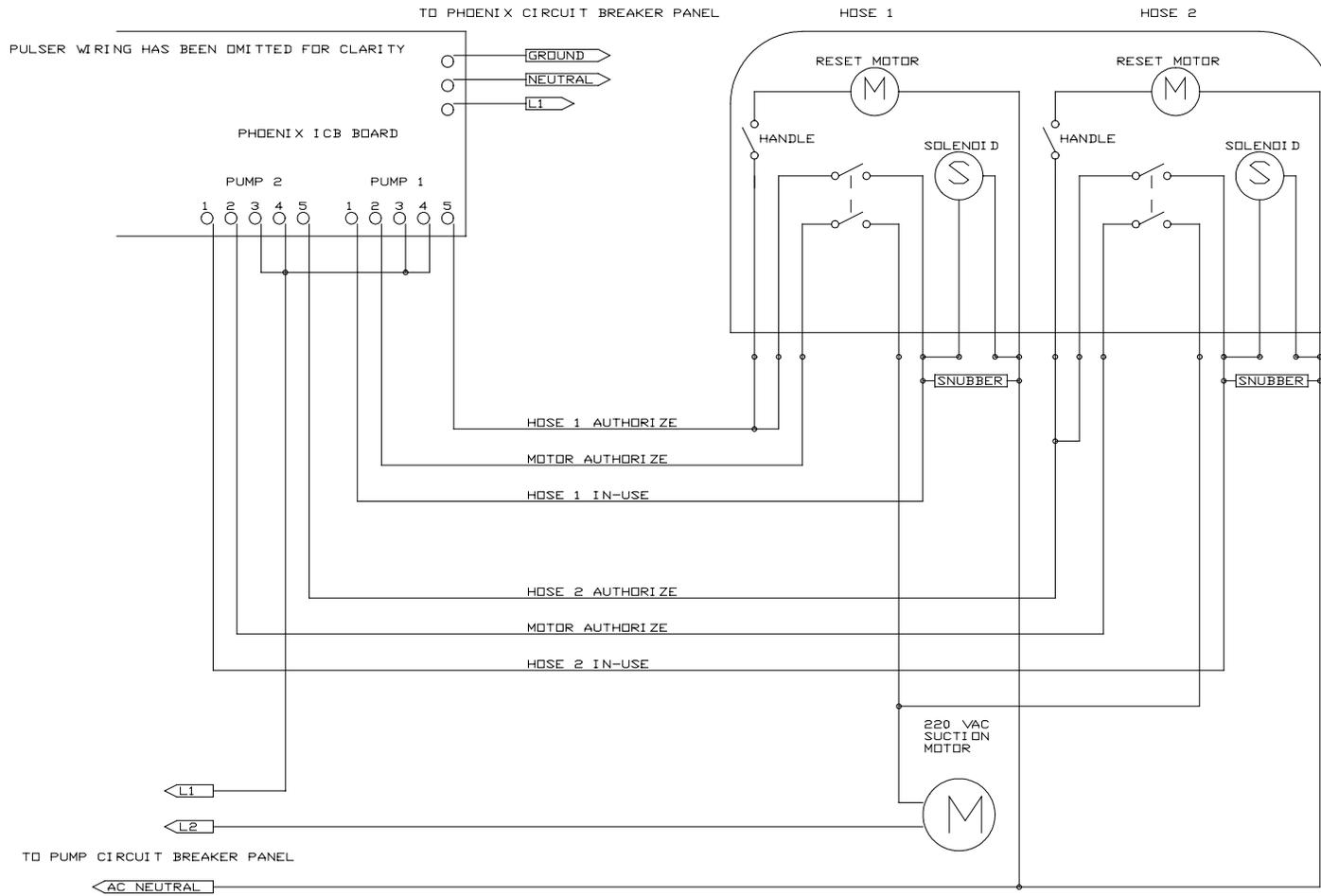


DIAGRAM F

SINGLE PRODUCT DUAL OR MULTIPLE DISPENSERS WITH 220 VAC SUB PUMP

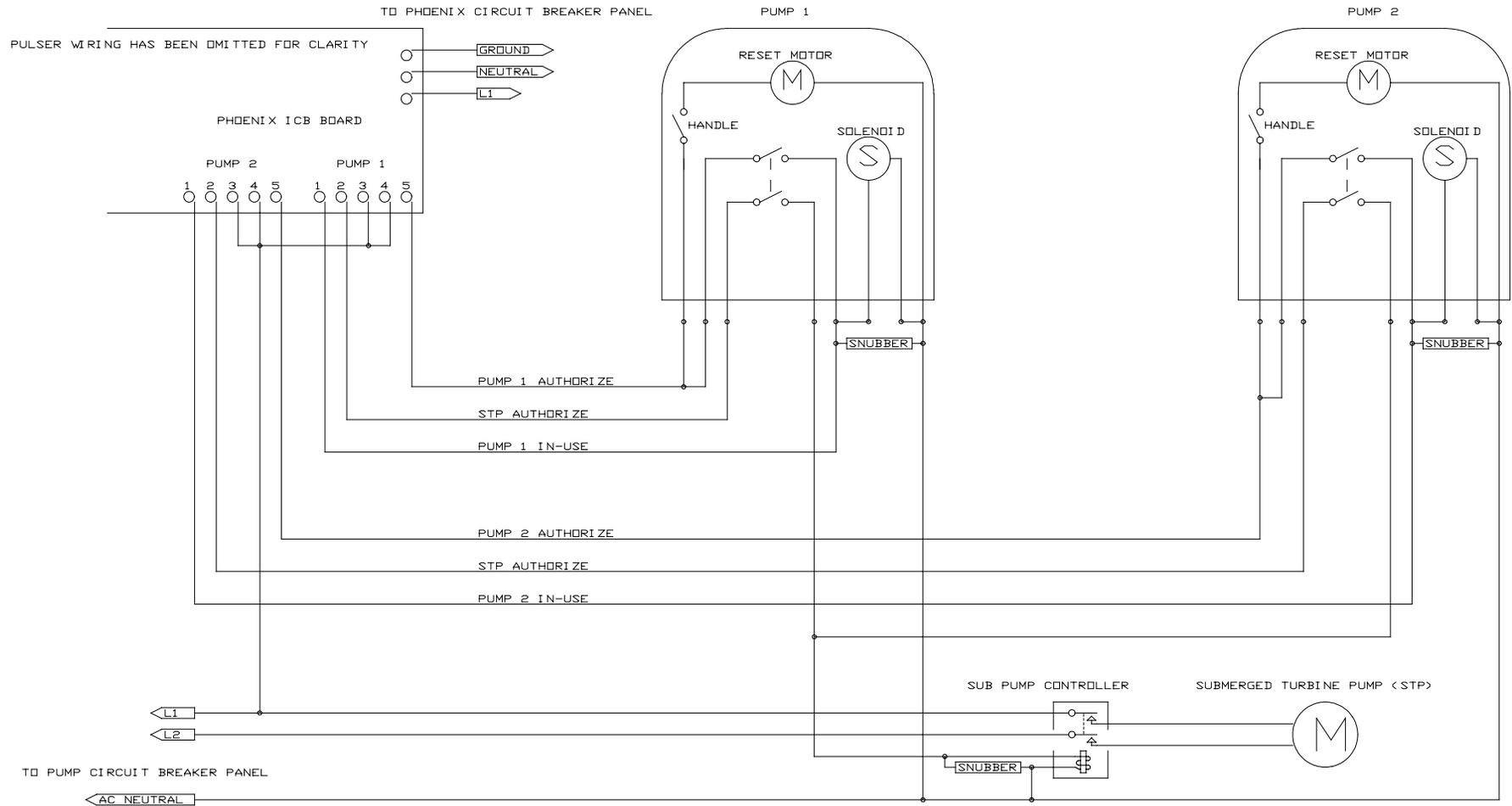


DIAGRAM G

PHOENIX AND SPRINT SYSTEM TIED TO A COMMON 110 SUCTION PUMP

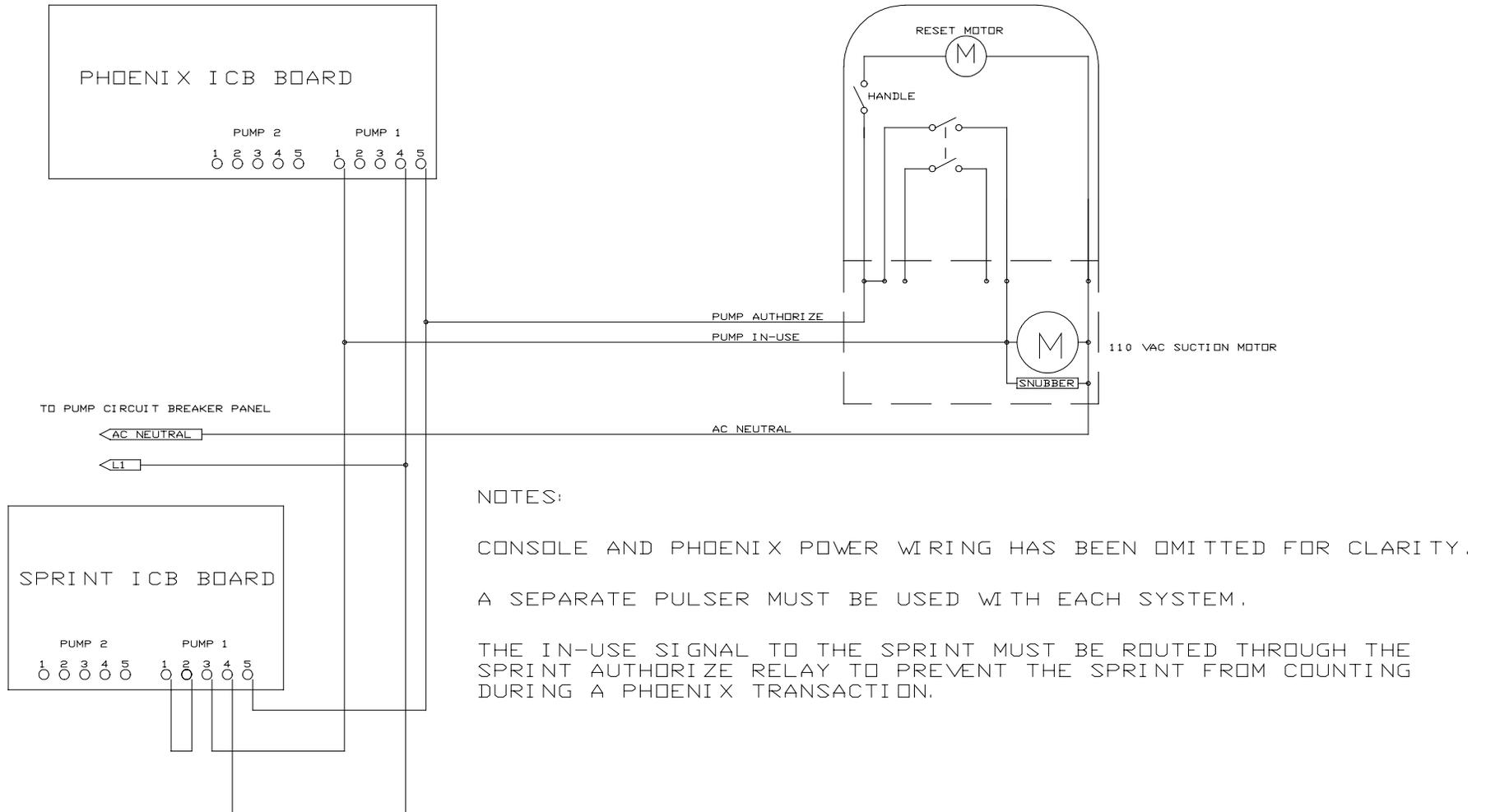


DIAGRAM H

PHOENIX AND ALPHA SYSTEMS TIED TO A COMMON 110 SUCTION PUMP

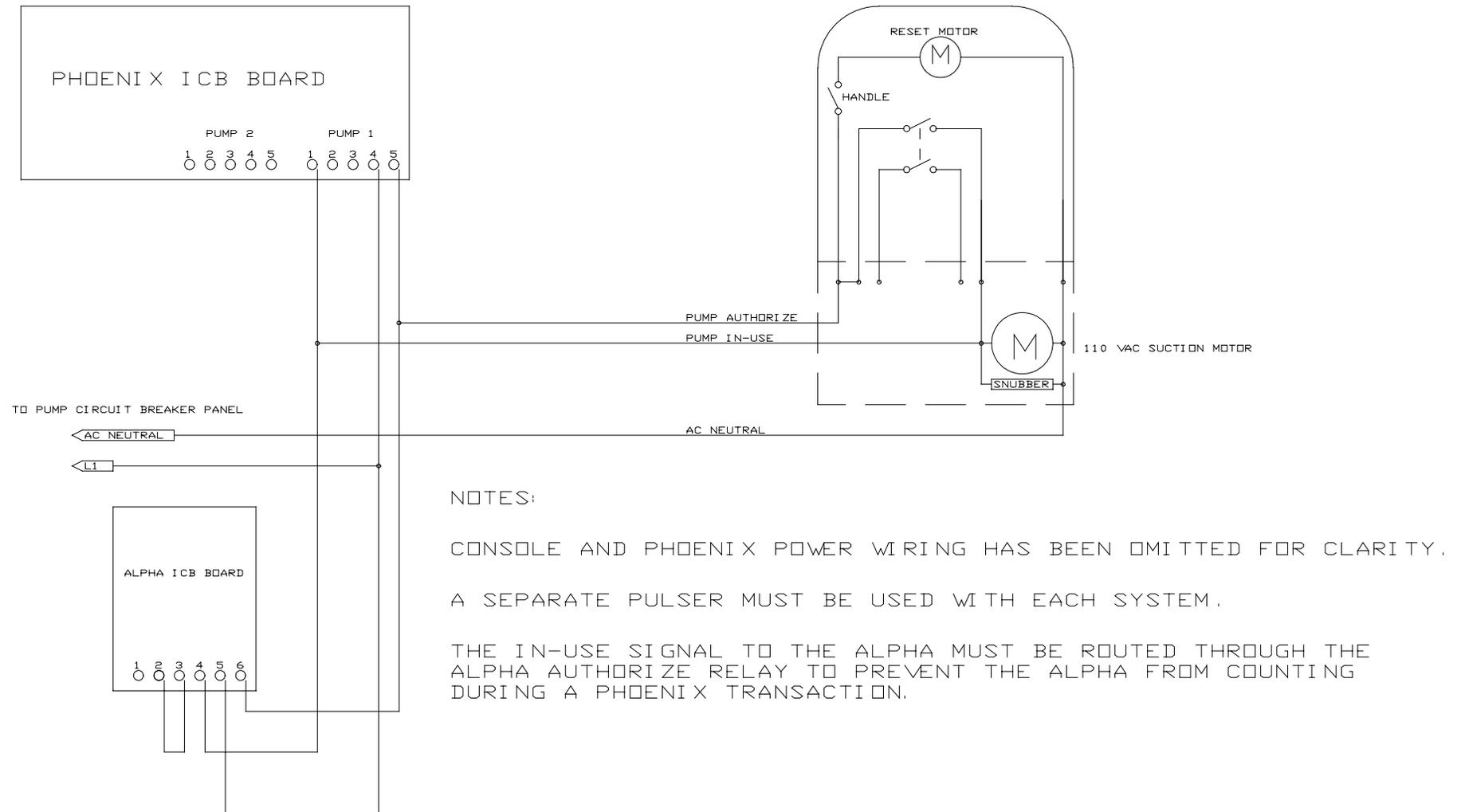
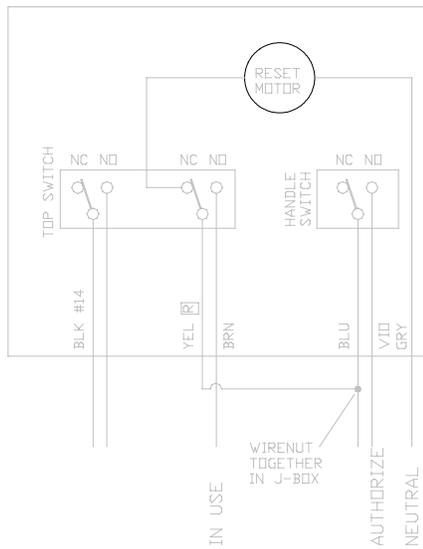


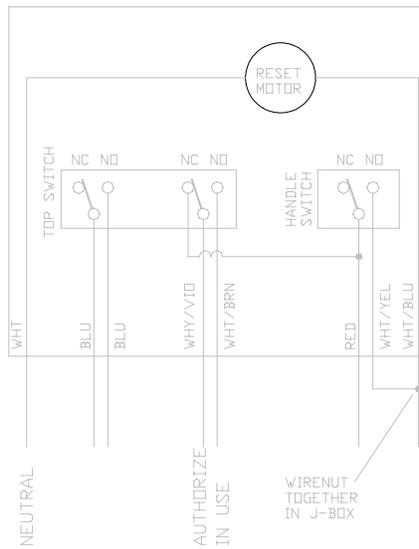
DIAGRAM I

TYPICAL ELECTRIC RESET WIRING DIAGRAMS

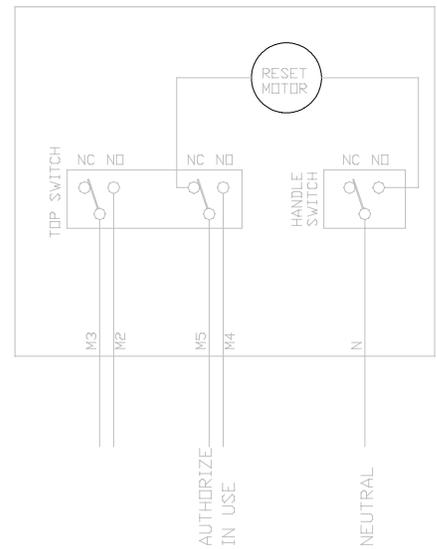
TYPICAL BENNETT



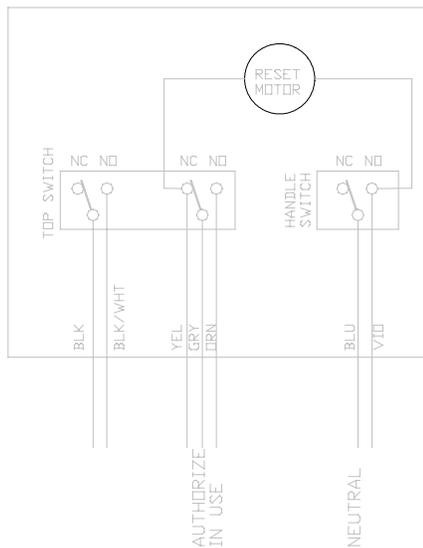
TYPICAL WAYNE



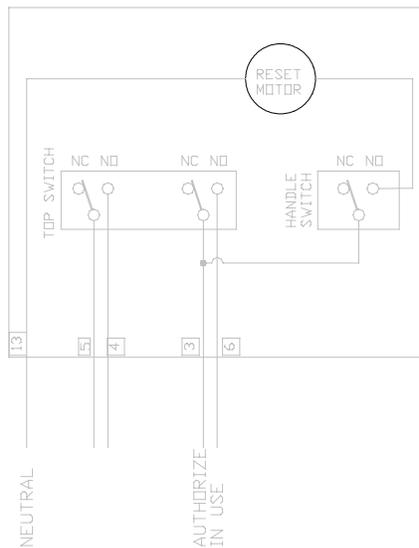
TYPICAL SMITH



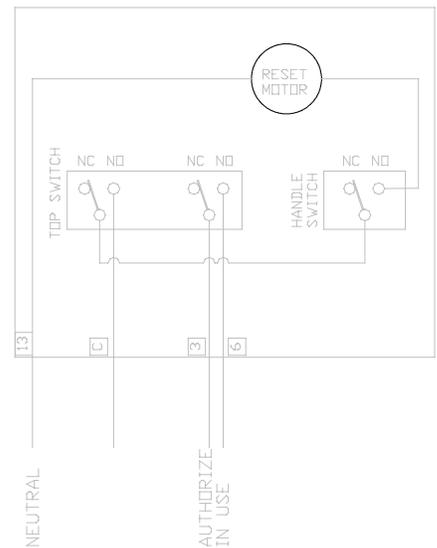
TYPICAL SOUTHWEST



TYPICAL GILBARCO



TYPICAL TOKHEIM

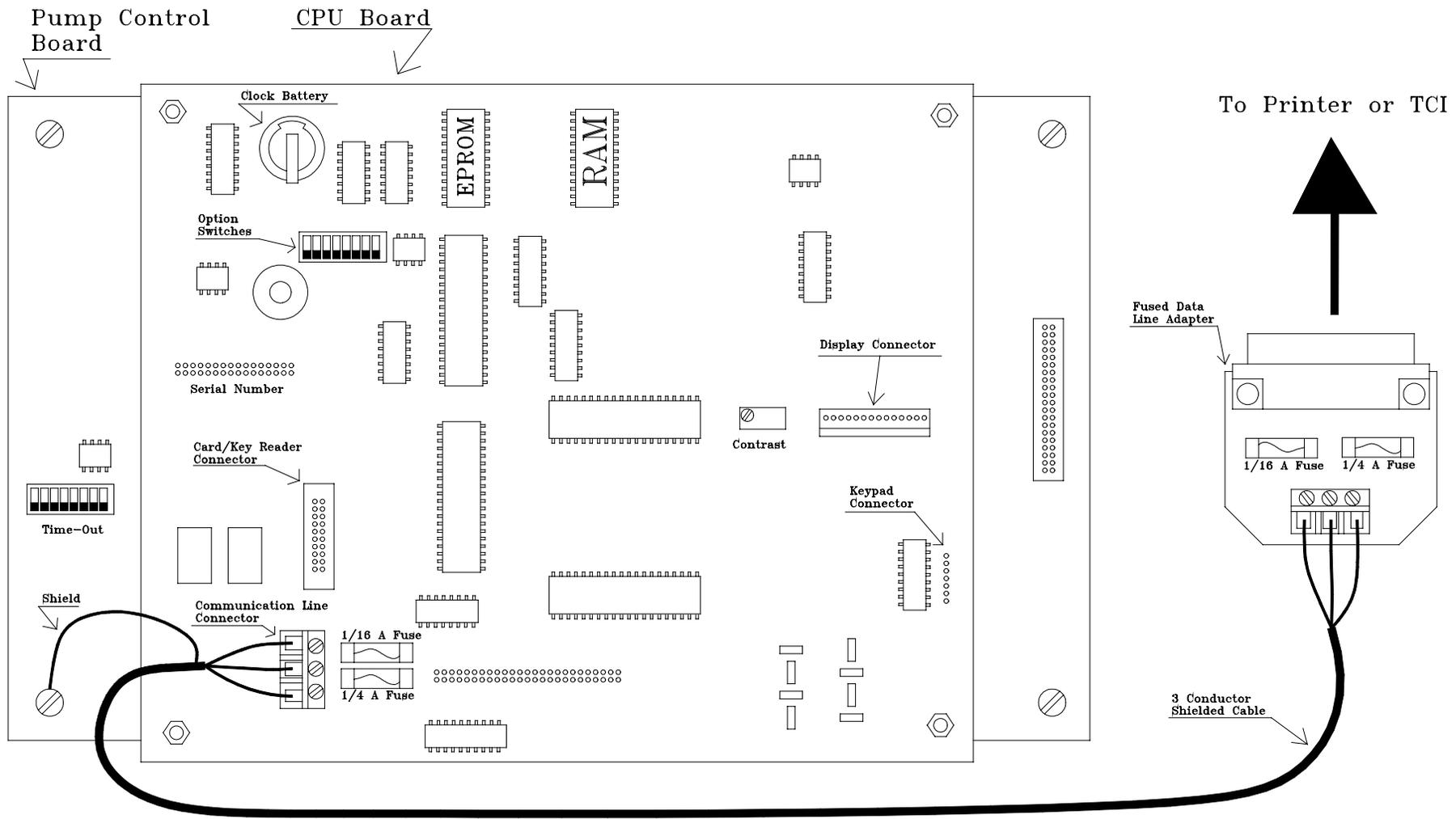


AUTHORIZE The Authorize line powers the electric reset motor, In-use, and sometimes the pump motor.

IN-USE The In-use line sends a 110V signal back to the system to indicate that the handle switch is on.

NOTE *These diagrams are intended to be a general guide for installation. Some older and/or remanufactured resets may have different wire markings or color codes. Wire color and numbers may vary between models. While much effort is given to the accuracy of these diagrams, Western Electronics assumes no liability for diagram accuracy.*

DIAGRAM K



Phoenix CPU

DIAGRAM L

PHOENIX BASEPLATE DIMENSIONS

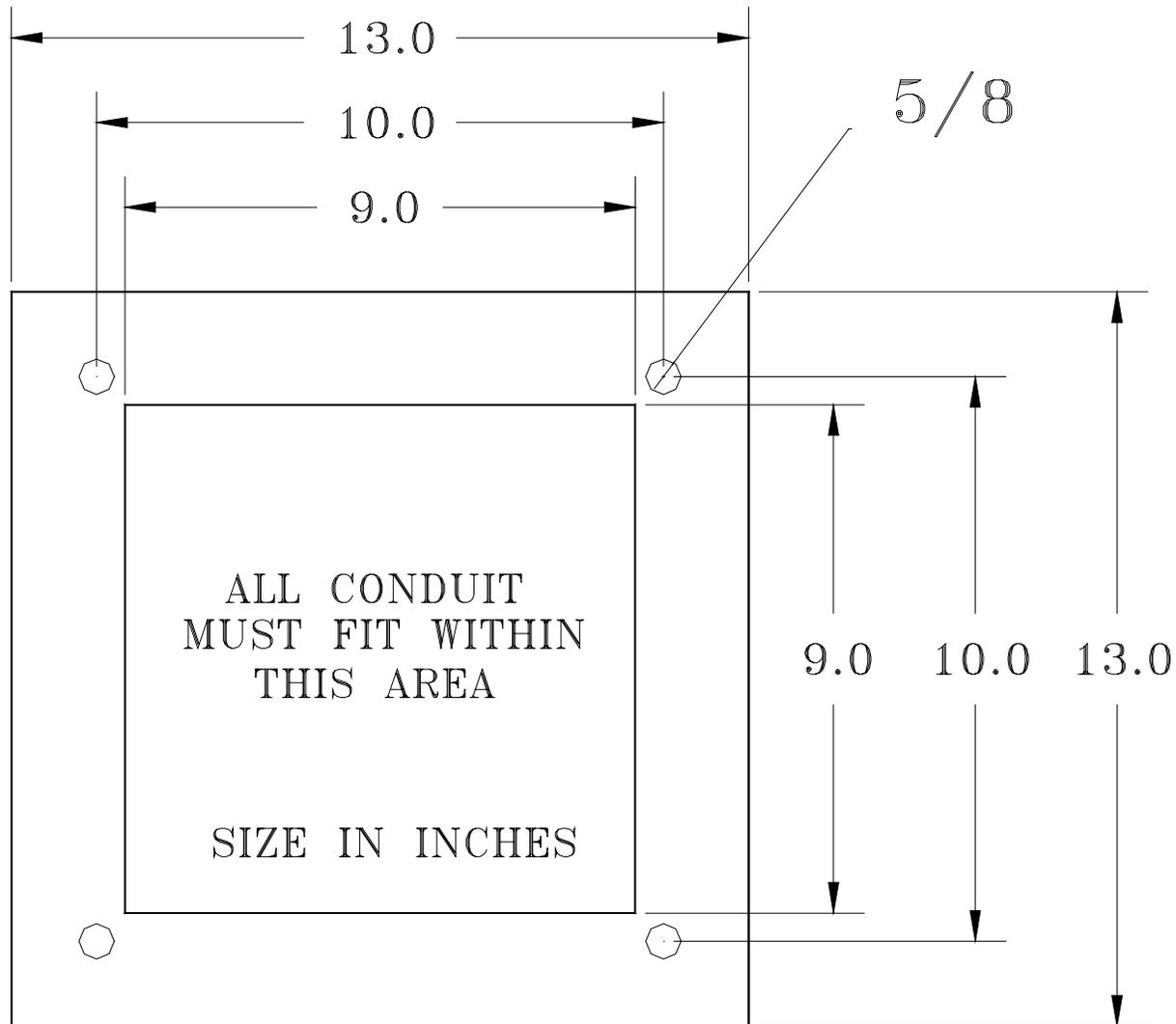
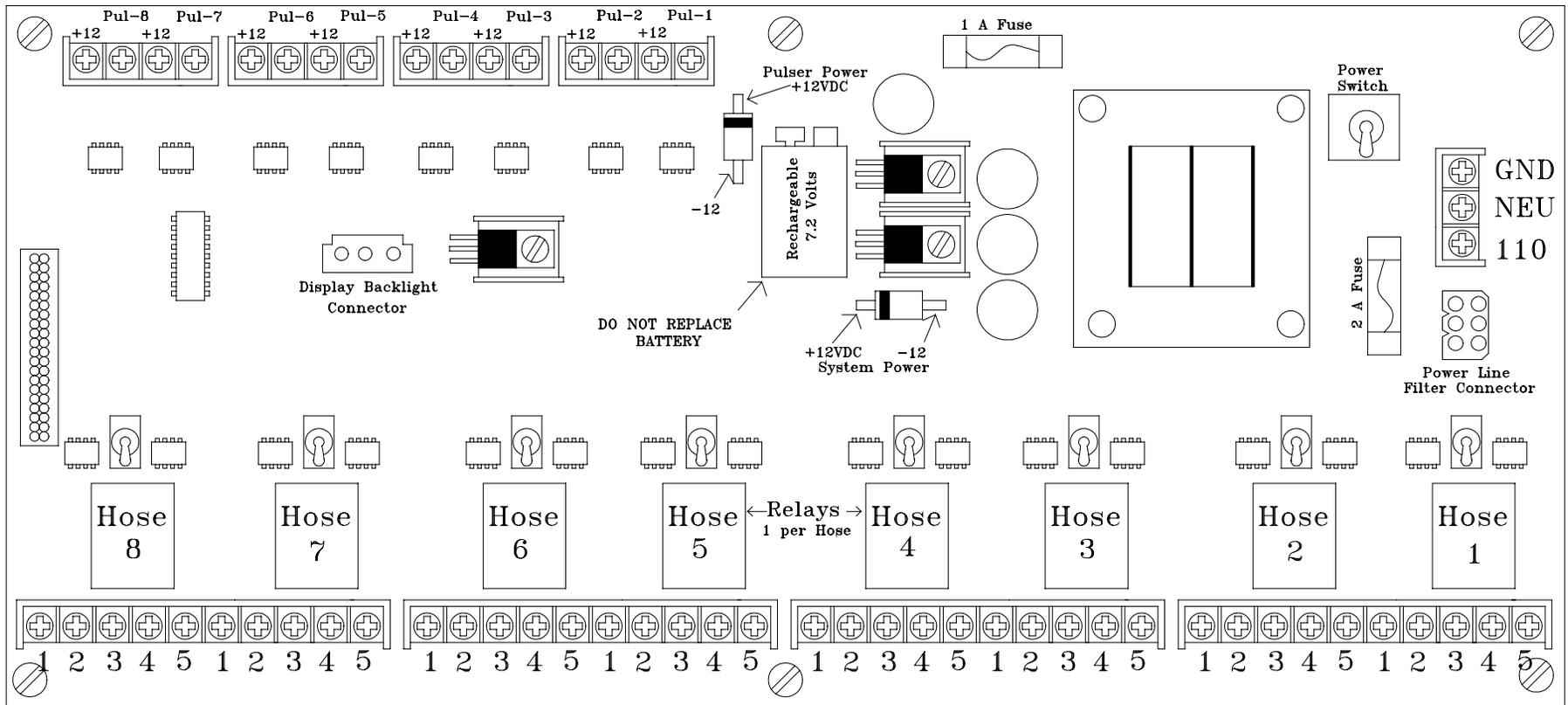
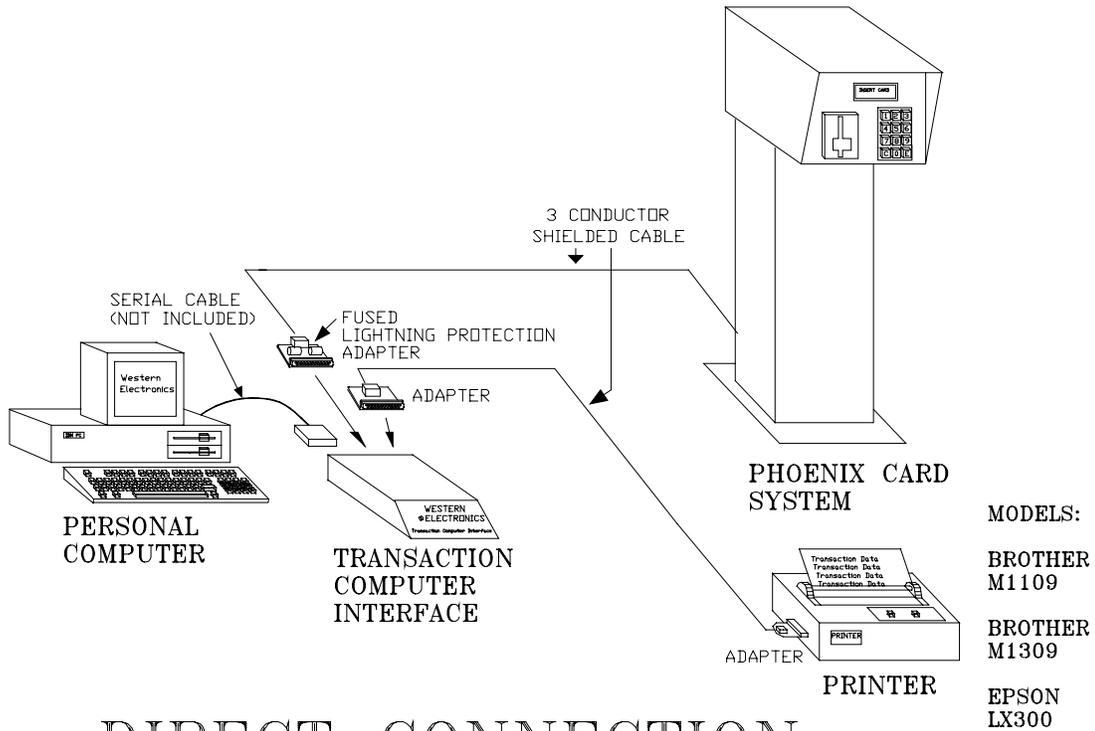
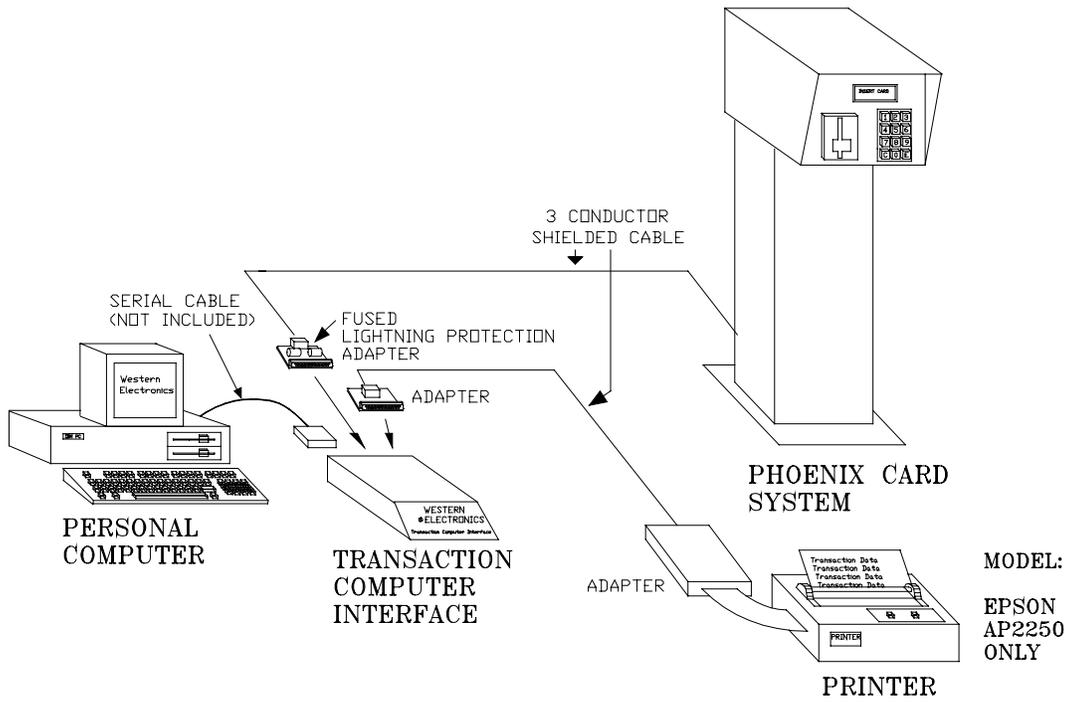


DIAGRAM M



Phoenix ICB

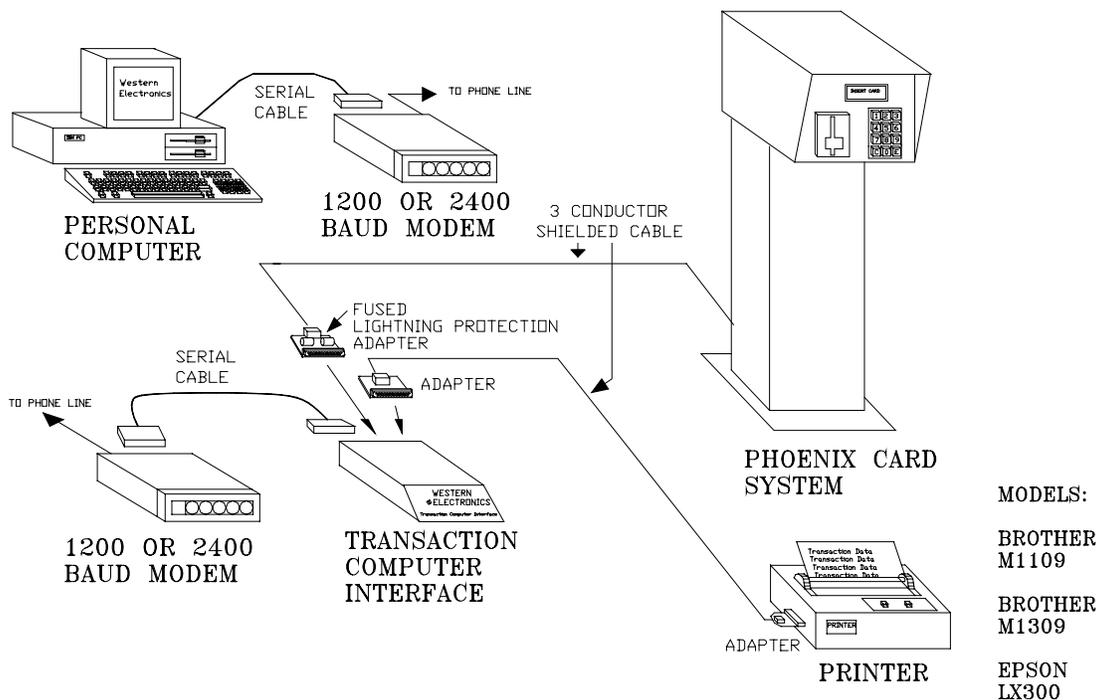
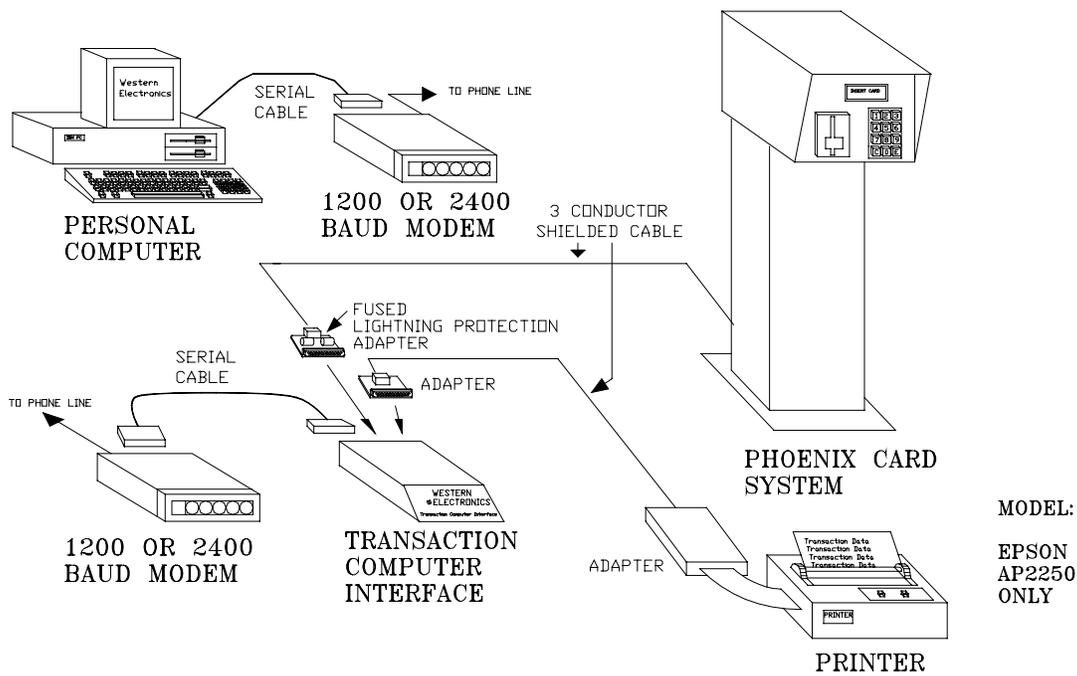
DIAGRAM N



DIRECT CONNECTION

Note: If the system does not include the Transaction Computer Interface, the 3 conductor shielded cable will be connected directly to the printer via the fused data line adapter.

DIAGRAM O

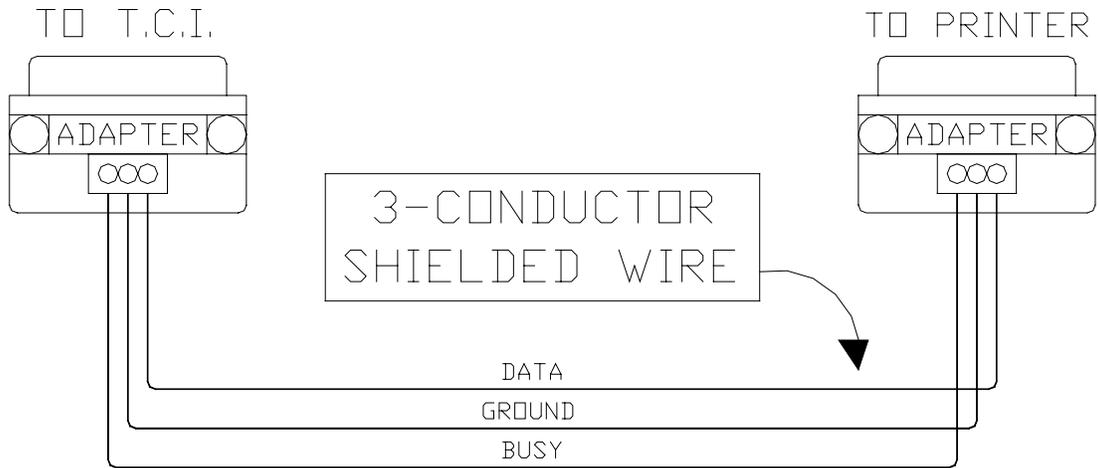


MODEM CONNECTION

Note: If the system does not include the Transaction Computer Interface, the 3 conductor shielded cable will be connected directly to the printer via the fused data line adapter.

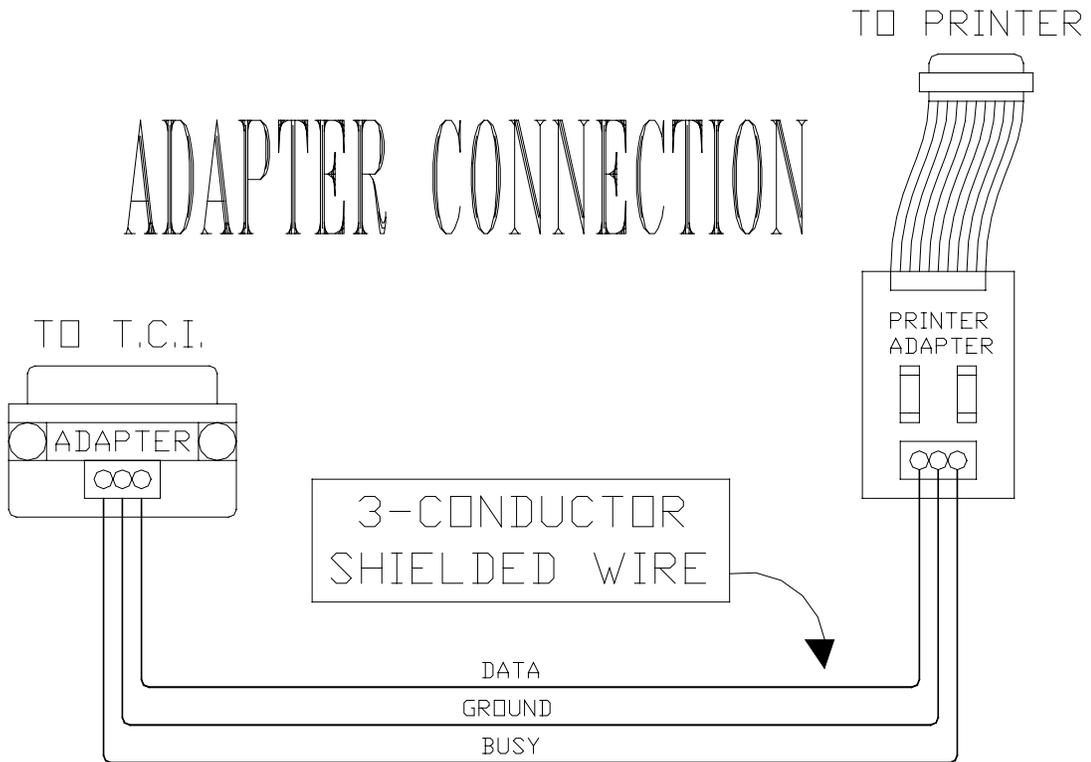
DIAGRAM P

ADAPTER CONNECTION



FOR PRINTER MODELS M1109, M1309, AND LX300

ADAPTER CONNECTION



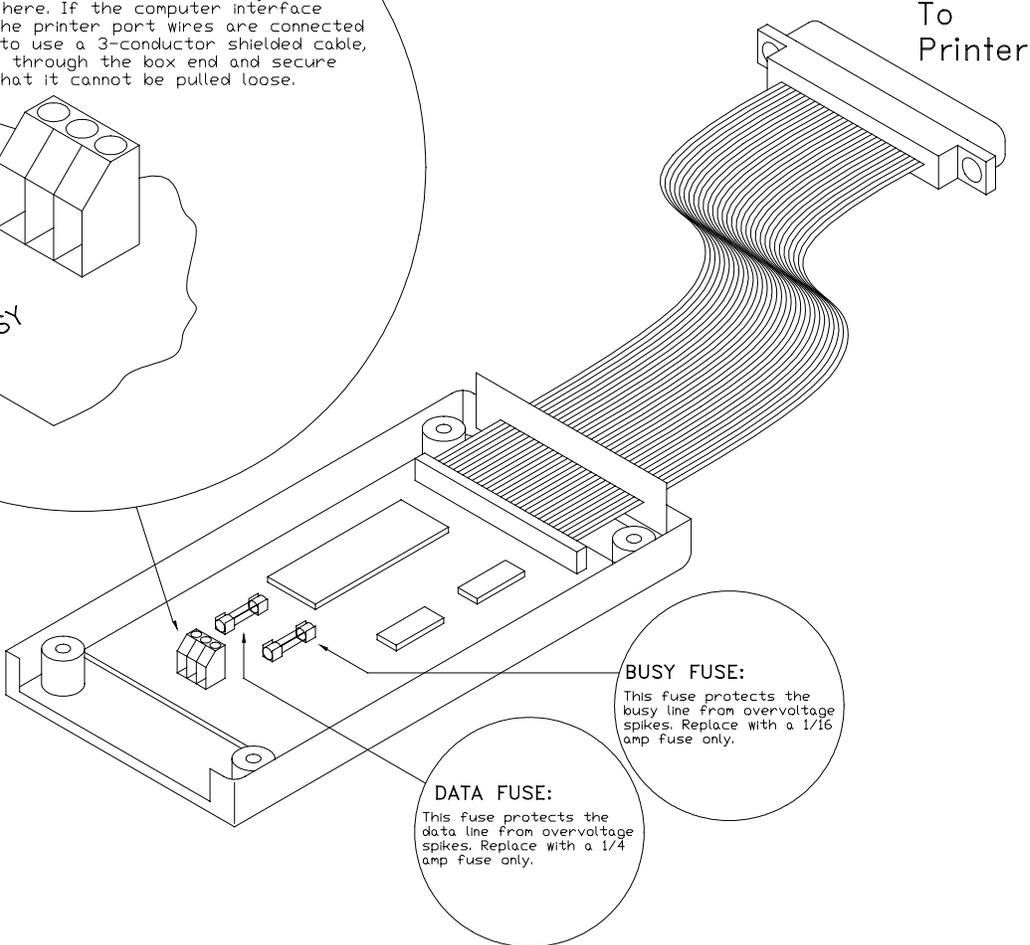
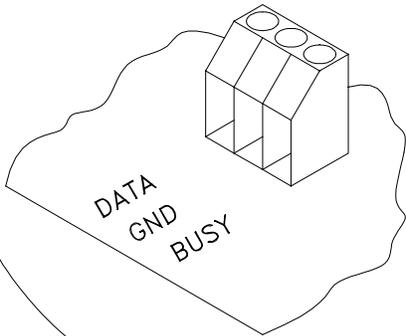
FOR PRINTER MODEL AP2250 ONLY

DIAGRAM Q

PRINTER ADAPTER CONNECTION

TERMINAL BLOCK:

The communication wires from the card system are connected here. If the computer interface is used, then the printer port wires are connected here. Be sure to use a 3-conductor shielded cable, feed the cable through the box end and secure the cable so that it cannot be pulled loose.



BUSY FUSE:
This fuse protects the busy line from overvoltage spikes. Replace with a 1/16 amp Fuse only.

DATA FUSE:
This fuse protects the data line from overvoltage spikes. Replace with a 1/4 amp Fuse only.

FOR PRINTER MODEL AP2250 ONLY

DIAGRAM R

T.C.I. SWITCH SETTINGS

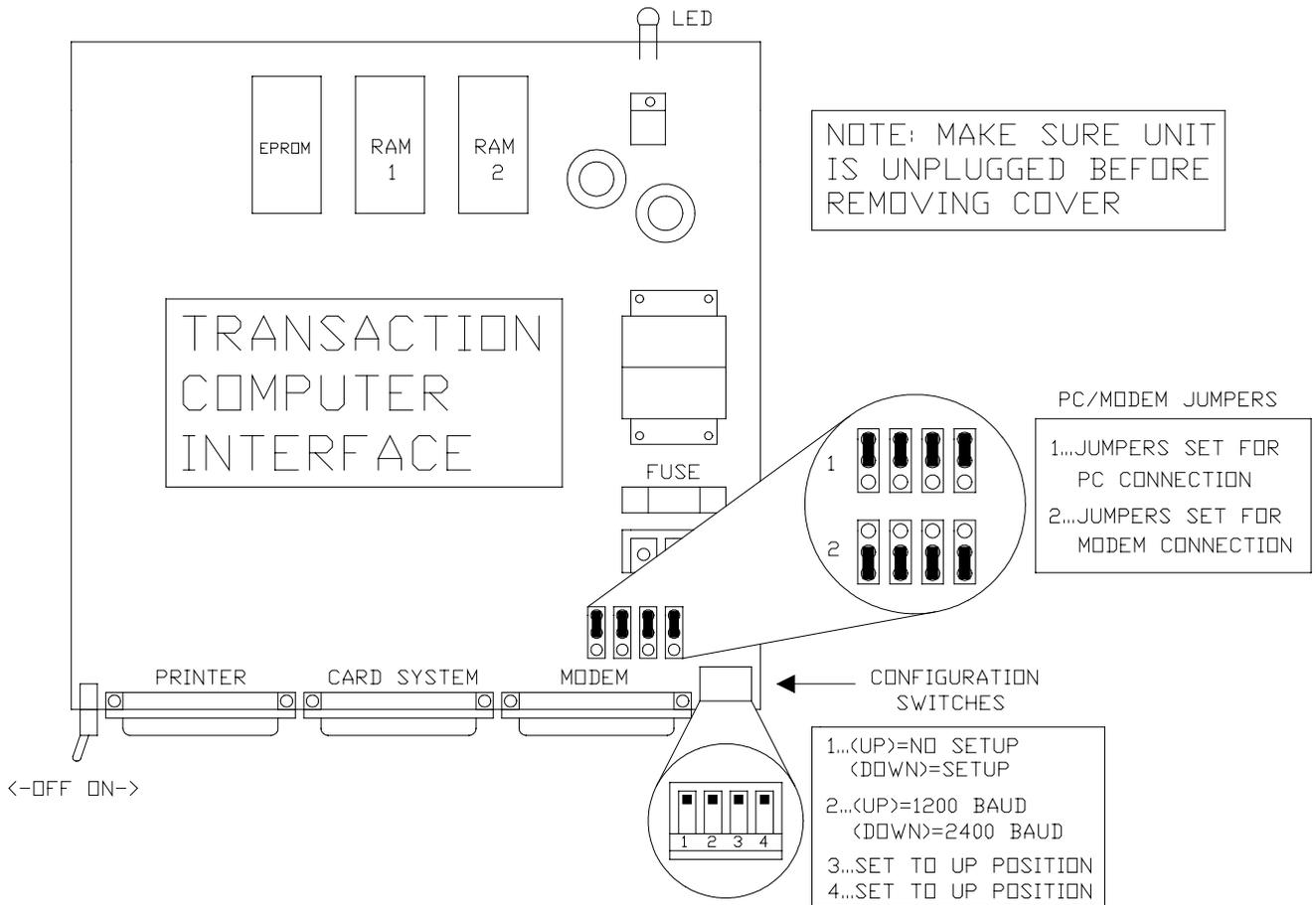


DIAGRAM S

SAMPLE TRANSACTION

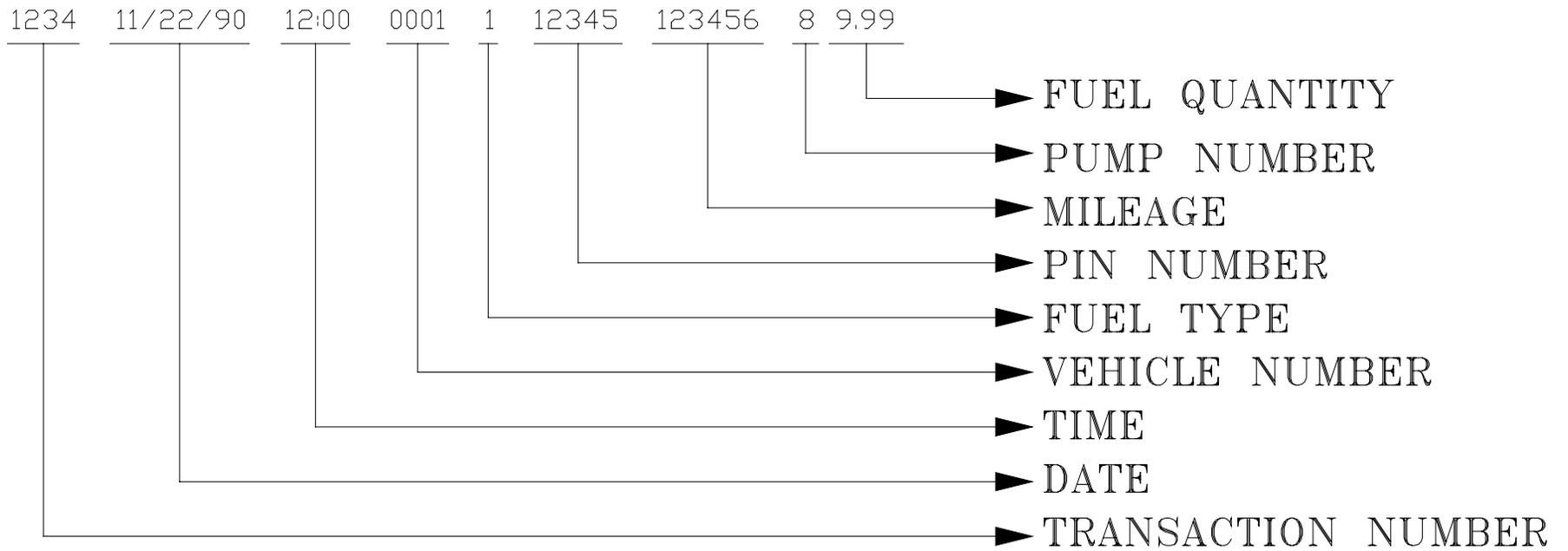


DIAGRAM T

Installation Instructions for the CPU Data Line Suppressor Kit

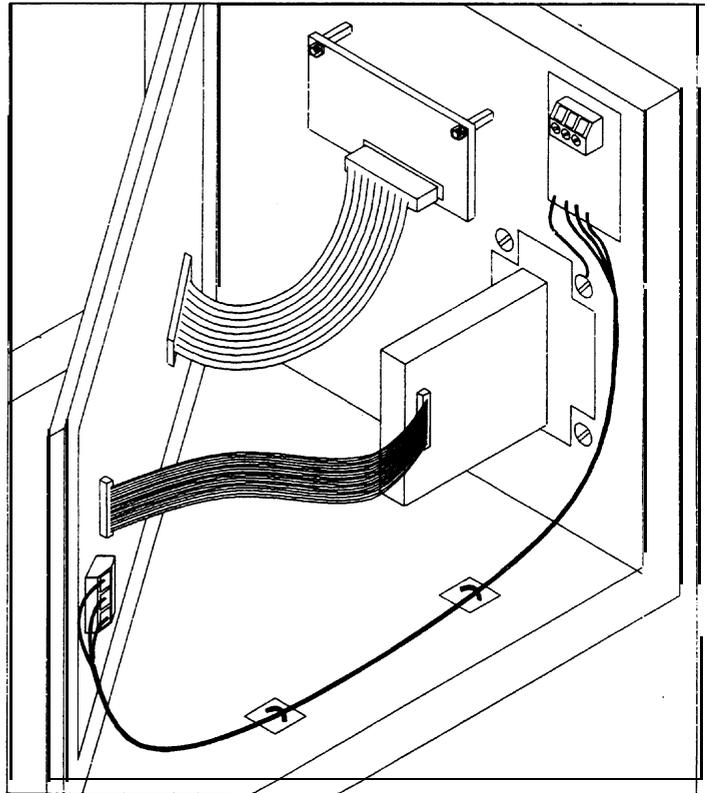
Item # 900208

1. Turn off the power to the Printer and/or TCI connected to the Phoenix.
2. Turn off the power to the Phoenix unit at the circuit breaker providing power to the Phoenix.
3. Remove the cover of the Phoenix 8000 and turn off the power switch at the rear of the unit. Note that the red 'Power' indicator turns off.

4. Disconnect the three conductor communication cable connected to the Phoenix CPU noting which conductor was connected to each of the three terminals labeled DATA, GROUND, and BUSY.

5. Connect the three long wires of the Data Line Suppressor into this connector as follows: Black to Ground, Red to Busy, Brown to Data.

6. Install the Data Line Suppressor to the inside front of the Phoenix chassis using the adhesive strips provided. Connect the short Green wire to the mounting screw of the card or key reader so that it contacts the stainless steel chassis. This Green wire is the transient voltage discharge path; if it is not connected, **NO PROTECTION WILL BE PROVIDED.**



7. Secure the wires to the Phoenix chassis using the adhesive wire mounts provided. The installation should resemble the picture above.
8. Connect the three conductor communication cable removed in step 3 to the three terminals on the Data Line Suppressor making certain to match each conductor with the appropriate label as they were connected to the CPU board. Extra cable mounts have been provided to secure the cable to the chassis. It is recommended that the communication cable be routed through the hole in the center bulkhead at the front of the unit as routing the cable around the rear of the unit may leave the cable in a position to be easily damaged when removing and replacing the system cover.
9. Turn the power switch at the rear of the unit back on, and replace the system cover. Restore power to the Phoenix by turning the circuit breaker back on. Turn the Phoenix printer and/or TCI back on.
10. Run a test transaction or two and **check** to see that they print to the printer to verify that the communication cable is now properly installed.
11. Replace the Fused Data Line Adapter which connects the communication cable to the Transaction Printer (or Transaction Computer Interface if installed) with the supplied Data Line Suppressor making certain to match the Ground, Busy, and Data labels with those on the new adapter.
12. Run a test transaction or two and **check** to see that they print to the printer to verify that the communication cable is now properly installed.

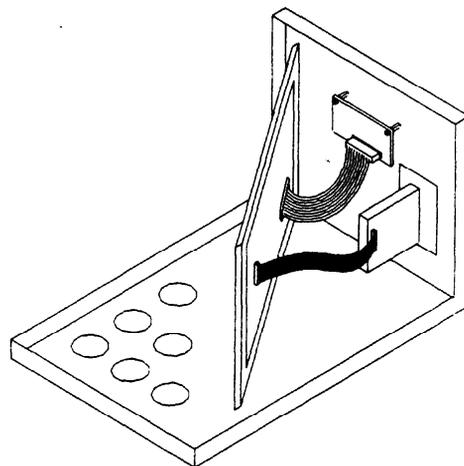
DIAGRAM U

PHOENIX DISPLAY HEATER

PART # 9000307

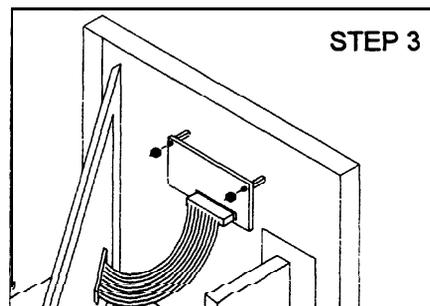
3

The Phoenix display heater prevents display slow-down in very cold weather. The display's response time can slow when the outside temperature drops to about 0°F or lower. Heating the display will maintain the fast response time and prevent the Phoenix system from giving the appearance of sluggish operation. The Phoenix display heater automatically turns on as the temperature falls below 30°F and turns off as the temperature rises.



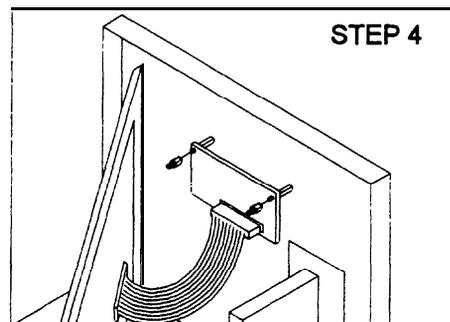
INSTALLATION

1. Remove all electrical power from the Phoenix unit by turning off the circuit breaker.
2. Remove the Phoenix system cover and turn off the system's power switch at the rear of the unit. A small red light indicates when the power switch is on.
3. Using a small 1/4" wrench, remove the two nuts which hold the display in place. Save these nuts, they will be used later.

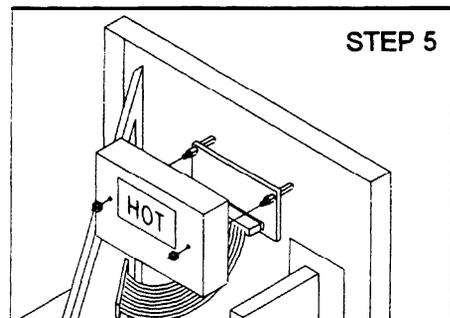


 Screw on the standoffs provided in the place of the nuts you just removed, These standoffs will secure the display and provide a mount for the heater.

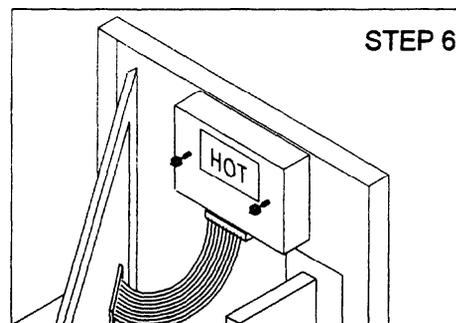
5. Install the heater box, open side down, over the display so that the holes in the box mount on the standoffs installed in step 4. The heater box will enclose the display, but the bottom of the display and its' connector will still be visible.



6. Secure the heater box in place using the nuts removed in step 3. Tighten these nuts only until snug, being careful not to strip the threads.



7. The three power wires should be routed through the chassis hole which accommodates the 40 pin ribbon cable at the front of the Phoenix unit. Connect the three wires to the power input at the rear of the Phoenix unit as follows:



WIRE COLOR	CONNECTION	CONNECTION LABEL
BLACK	HOT	110
WHITE	NEUTRAL	NEU
GREEN	GROUND	GND

DIAGRAM V

CONDUIT LAYOUT PHOENIX 8000 FUEL SYSTEM

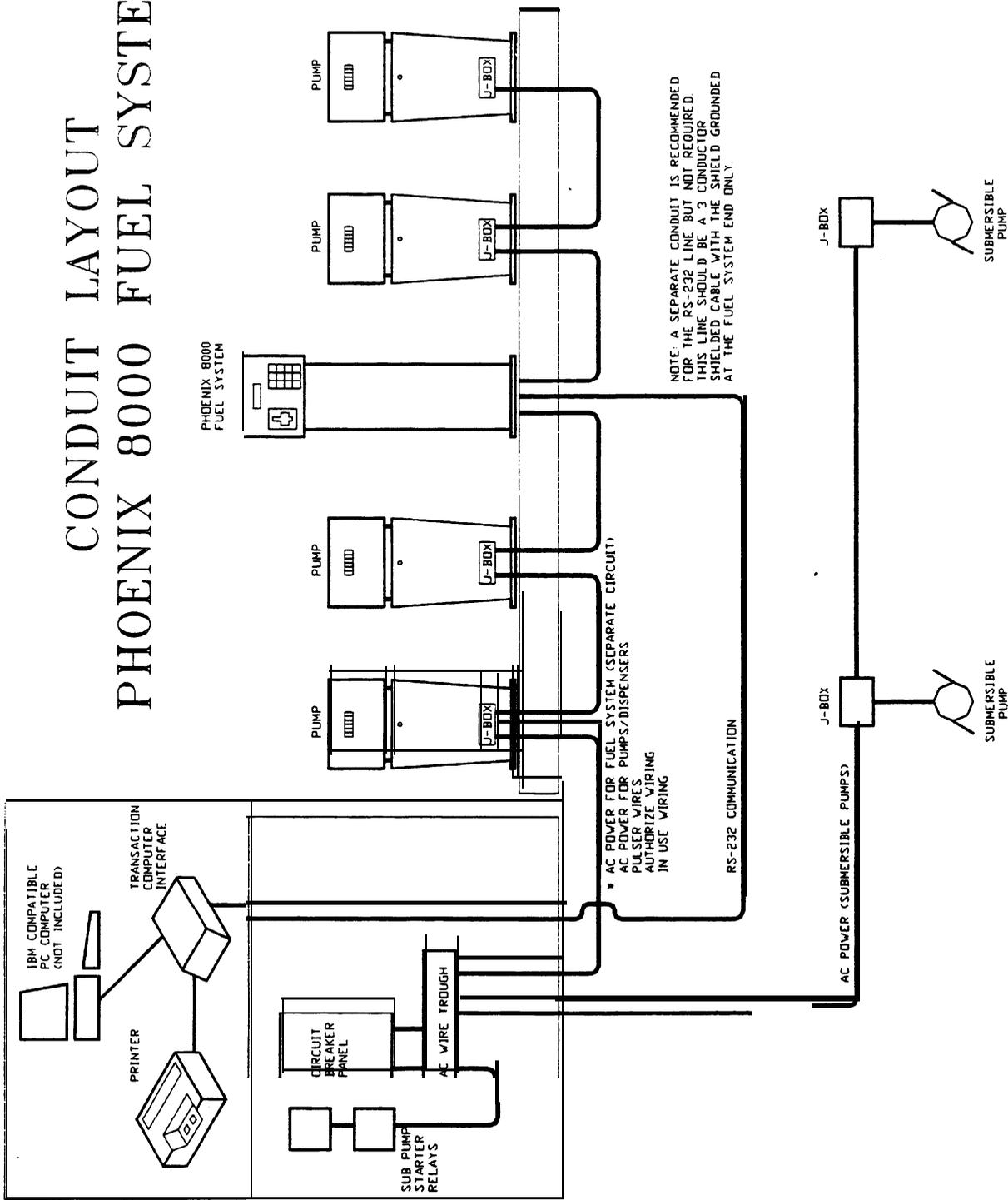


DIAGRAM W

Fuel Control Product Warranty

Emco Electronics ("Manufacturer") warrants to each buyer of its **Fuel Control** Products (the "Buyer") for a period of 2 years from date of shipment that goods of its manufacture ("Goods") will be free from defects of material and **workmanship**. Manufacturer's sole obligation under the foregoing warranties will be limited to either, at Manufacturer's option, replacing or repairing defective Goods (subject to limitations hereinafter provided) or refunding the purchase price for such Goods theretofore paid by the Buyer, and Buyer's exclusive remedy for breach of any such warranties will be enforcement of such obligations of Manufacturer. Manufacturer shall have no obligation to provide on-site repair of Goods. The remedies contained herein shall constitute the sole recourse of the Buyer against Manufacturer for breach of warranty. **IN NO EVENT SHALL MANUFACTURER BE LIABLE FOR CONSEQUENTIAL DAMAGES, NOR SHALL MANUFACTURER'S LIABILITY ON ANY CLAIM FOR DAMAGES ARISING OUT OF THE MANUFACTURE, SALE, DELIVER): OR USE OF THE GOODS EXCEED THE PURCHASE PRICE OF THE GOODS.** The foregoing warranties will not extend to Goods subjected to misuse, neglect, accident, or improper installation or maintenance, or which have been altered or repaired by anyone other than Manufacturer or its authorized representative. **THE FOREGOING WARRANTIES ARE EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES OF MERCHANTABILITY, FITNESS FOR PURPOSE AND OF ANY OTHER TYPE, WHETHER EXPRESS OR IMPLIED.** No person may vary the foregoing warranties and remedies except in writing signed by a duly **authorized** officer of Manufacturer. Warranties or remedies that differ from the foregoing shall not otherwise be binding on Manufacturer. The Buyer's acceptance of delivery of the Goods constitutes acceptance of the foregoing warranties and remedies, and all conditions and limitation thereof.

TERMS: Net Thirty Days. Prices Subject to change without notice.

Returned Goods Policy

Returned Goods are handled exclusively by the Emco Electronics Technical Service & Support Department. Please call to obtain an RGA number (Returned Goods Authorization Number). The number will be issued after a distributor provides the following information:

1. Reason for Return
2. Emco Electronics invoice # or distributors **PO#** for the replacement part
3. Date of Purchase
4. Serial number from unit containing the part
5. Requested action (i.e. credit, repair, replacement, etc.)

Returned Goods must be sent freight **prepaid**. The **RGA#** must be on the outside of the package.

Overstocked Goods must be in re-saleable condition and not obsolete. A minimum 15% restocking fee will be charged for all new equipment returned within 30 days from date of purchase. New equipment may not be restocked if purchase date exceeds 30 days. Warranty returns will receive full credit or replacement at no charge. Return freight for warranty parts should be included on the Warranty Claim Report available from the Customer Service Department.

Notice: Parts warranty will not apply if parts are not returned, parts are returned without an assigned RGA number, or parts are found not to be defective.

FL5A RGA # & Returns: Emco Electronics
114300 Mackenan Drive
Cary, NC 27511
Telephone: 800 **637-6943**