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Aerospace Group
Conveyance Systems Division

Carter® Ground Fueling

SU64235

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Applicable addition manuals:

IN64235 IN641 01

IN64108 IN641 02

IN64802

Setup & Calibration Manual

Digital II Pressure Control System

Model 64235

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Setup & Calibration Instructions Carter Model 64235

1.0 INTRODUCTION

The new and improved Carter Model 64235 Digital II Electronic Pressure Control System is the follow on to Eaton's original Model 64035 System. The digital system offered by Eaton provides the most accurate system for controlling pressure at the aircraft without the use of often difficult to setup venturis. It can be used on either a

refueler or on a hydrant servicer/cart. All the normal attributes of a hydro-mechanical pressure control system are present in Digital II with greater accuracy of control including surge pressure. All of this is accomplished without the need for air pressure and its problems.

2.0 EQUIPMENT DESCRIPTION

The new and improved Carter Model 64235 Digital II Pressure Control System combines two well-known technologies, as did the original 64035. The combination of hydro-mechanical valving and a microprocessor eliminates the need for air reference pressure, servo controls or springs to control pressure. **Fuel cannot leak into the air system** such as occurs regularly in the industry standard air reference system.

Adjustments for pressure control, rate of flow control, opening and closing times are easily accomplished during the setup process using a hand-held device. Once the system is setup the hand-held device is unplugged from the system and stored away for future use. Only one hand-held device is required per airport location or system per vehicle (two if a vehicle has two systems).

Once the calibration unit has been removed **the operator cannot make any changes to the parameters previously setup**. An improvement from the original system is **the absence of buttons, key locks or switches on the face of the unit**.

The digital system eliminates the need for the use of air and all of its components, including compressors, air tanks, dryers, regulators, gauges and all the associated fittings, valves and tubing not to mention the labor needed to install them. **It also eliminates the need for a venturi** from the system with its confusion in adjustments.

When used on a hydrant servicer **only one fuel line is required from the vehicle to the coupler** versus the twin hoses required on air reference systems.

3.0 TABLE OF OPTIONS AND ORDERING INFORMATION

The basic part number for the Digital II System for ordering purposes is 64235. This part number provides one with the module that is mounted onto the vehicle. There are no options associated with the new Digital II. It is weather proof with improved casing and panel display covering. There are certain special test items needed as described in section 4.0 below to setup the unit and to perform the calibration. Other components that may be desired or needed are described below.

- 64108-** Transducer. The ** should be replaced with the length of connecting cable desired. Cable is available in lengths

of 5-50' lengths in increments of 5'. Specify 64108-15 for example for a 15' cable length.

- 64102 Solenoid Valve Block – Specify 64102A for 12 VDC or 64102B for 24 VDC applications. This is used with a digital coupler on a hydrant servicer application only.
- 64902 4" Digital Coupler – Used to mate to "air operated" API/IP Hydrant Valves. A whip hose is used to connect the coupler to the air port on the hydrant. The hose is not needed on manually operated hydrant valves.

- 64802 3" Digital Coupler – Same as 64902 except for smaller control head. Mates same hydrant valves.
- 64110/64504 3" In-line Control Valve for refueler operation. Specify option A for 12 VDC or B for 24 VDC applications.
- 64120/64505 3" By-pass Control Valve for refueler operation. (Option A – 12 VDC, B – 24 VDC applications.)
- 64050/64514 4" In-line Control Valve for refueler operation. (Option A – 12 VDC, B – 24 VDC applications.)
- 64060/64515 4" By-pass Control Valve for refueler operation. (Option A – 12 VDC, B – 24 VDC applications.)
- 64237 Remote Display for Digital II. This allows for display of flow rate and pressure at a place other than where the control module is mounted, e.g. a lift platform.
- Meter Pulser – The system requires the ability to read the pulses from the meter. Carter does not provide this item but it can be obtained from any Veeder Root distributor. Carter recommends part number 767181 327 with its mounting kit part number 0370020 009. Any brand pulser that produces pulses from 10-100 pulses per gallon/liter can be used, however if one that produces less than 100 pulses the unit will have to be calibrated as noted herein.

4.0 QUICK REFERENCE/SUMMARY

4.1 Definition s

- **Reset** – This term as used as part of the instructions refers to the resetting of the module. Turning the power off to the control module and then turning it back on may accomplish it. On most refueling equipment the power will be turned off to the control module when the refueling equipment is returned to the road condition. For example all of the nozzles stowed, the pump disengaged and the brakes released.
- **System Reset or Power on Reset** - It is possible to restore the system back to the factory or default setup, calibration and configuration settings. With the hand held unit connected to the control module and the rotary switch in the "**Modify**" position push the "**UP**" and "**DOWN**" buttons simultaneously. This will ERASE ALL PREVIOUS USER SETTINGS, and replace them with the original factory (default) setting. While this procedure will bring the unit back to a known baseline, it is NOT recommended that this unit be used to service aircraft, until the "Setup", "Calibration" and "Configuration" procedures are once again performed to completion.

4.2

System Components – The following components are required to setup and calibrate the system:

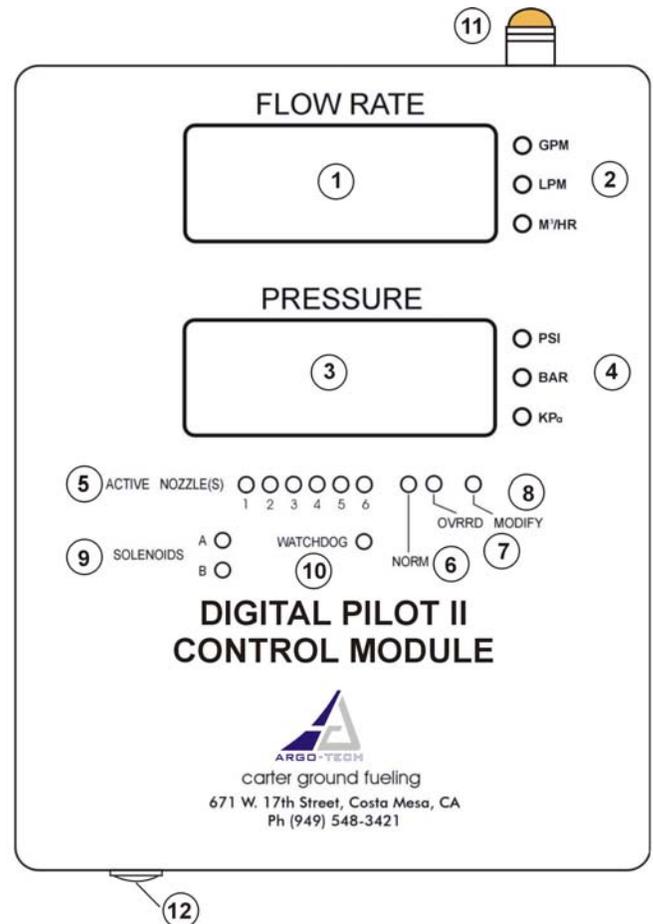
- **64235 Digital II Control Module** properly installed on a refueler or hydrant servicer/cart in accordance with IN64235 Installation Instructions. This should include all components associated with the system as defined in the manual.
- **64236 Hand-Held Device** used to perform set up and calibration. This item is purchased separately and at least one unit is required for each location (airport). One such device is needed for each 64235 Digital II System on a single vehicle to be setup. Therefore if the vehicle happens to have two Digital II Systems then two hand-held devices are needed.
- **64101 Nozzle Transducer/Cable Assembly** also needed for calibration of the system at the test facility.
- **64237 Remote Display** – This item may or may not be present in any system at the customer's option.
- A **pulser** on the meter of the vehicle to provide the flow information to the unit. See paragraph 3.0 above for details.

5.0 OVERVIEW OF CONTROL MODULE

The front panel display is shown in Figure 1 below. The visible displays shown on the panel are as follows:

1. “ **FLOW RATE**” – The rate of flow experienced during refueling or test will be displayed in this area.
2. The indicator lights to the right of the “FLOW RATE” display will illuminate the unit of measure setup. The factory default is “GPM”.
3. “**PRESSURE**” – The pressure at the aircraft (as calibrated and converted from the transducer to compensate for the system pressure loss between it and the aircraft) will be displayed here.
4. The indicator lights to the right of “NOZZLE PRESSURE” will illuminate the unit of measure setup. The factory default is “PSI”.
5. “**ACTIVE NOZZLE**” – Indicator lights 1-6 will illuminate the to indicate the active nozzle (s) currently used or not stowed properly.
6. “**NORM**” – The control module can be programmed to support two user selected refueling pressure settings, referred to as NORMAL and OVERRIDDEN. When illuminated this “NORM” indicator shows that the NORMAL refueling pressure setting is selected.
7. “ **OVRRD**” – This indicator, when illuminated, shows that the OVERRIDDEN refueling pressure setting is selected
8. “**MODIFY**” – This lights up when the 64236 Hand-held Device is connected and is set to the **Modify** position.
9. “**SOLENOIDS**” – The lights labeled “A” and “B” will normally flash continuously to mirror the electrical signal has been applied to operate the “A” and “B” solenoid valves on the controlling valve (in-line or by-pass) or 64102 for a coupler.
10. “**WATCHDOG**” - This light is normally off. It is there for a future addition of a new feature.

11. The amber light on the top right of the enclosure goes on in a steady fashion when the deadman is activated. It will flash when a deadman timeout is imminent.



12. This switch is used to switch between the two possible user programmed refueling pressure control settings, NORMAL or OVERRIDDEN. Pressing and holding for a couple of seconds will switch between the “NORM” indicator light (6) for the NORMAL setting or the “OVRRD” indicator light (7) for the OVERRIDDEN setting.

13. The displays that are shown in either of the two panels (1) or (3) are designed to display numbers hence when letters are displayed they will be unusual in shape. The following table illustrates the various displays, both numbers and letters that one will see:

A	R	I	I	1	1
b	b	i	i	2	2
C	C	L	L	3	3
c	c	n	n	4	4
d	d	o	o	5	5
E	E	P	P	6	6
F	F	r	r	7	7
G	C	S	S	8	8
H	H	t	t	9	9
h	h	u	u	0	0

6.0 NAVIGATING THE MENU SYSTEM

WARNING!

Connecting the cable assembly between the Hand-Held Device and the Control Module when the power is "ON" can damage the Hand-Held Device and the Control Module.

The 64236 Hand-Held Device has been provided in two configurations. The original one has a plastic case, a rotary switch, the connector for the transducer on the face of the unit and touch plate buttons for the arrow buttons. The later unit (serial number 200 and subsequent) has a metal case, a two-position toggle switch, button switches for the arrow keys and the connector for the transducer on the edge of the part. Both work equally well. The steps below will refer to the later design but both function in the same manner. The only difference is mainly in the switch. The rotary switch has more than two positions hence one will have to be certain that the switch is set to one of the two positions indicated and not to a "dead" position.

Navigating the menu system is accomplished as follows:

- Turn off the power to the control module. If there is a master switch on the vehicle one can turn it off as well.
- With the power off, both display panels (1) & (3) above will be blank and all indicator lights will be out.

- Connect the cable furnished with the 64236 Hand-Held Device to both the hand-held device and the control module (to the RS232 port on the bottom of the module). The 25' cable furnished with the 64101 Test Rig Transducer/Cable Assembly is used for this purpose.
- Apply power to the system.
- Remove one of the nozzles from its stowage point. Observe the corresponding active nozzle indicator light (5) is illuminated. The calibration to be performed in the following steps will apply to this particular nozzle/hose.
- Set the Toggle (or rotary) Switch on the hand-held device to the "MODIFY" position. This will allow one to review the menu options as noted below.
 - Pushing the left arrow "←" button will ALWAYS take one to the main program menu.
 - Pushing the right arrow "→" button will ALWAYS display the NEXT BRANCH of the "menu tree".

- The up arrow  and down arrow  are used to CHANGE the settings and on some occasions the down arrow button will be used to open a “sub menu” within the menu tree.
- Use the **MENU TREE** display shown in the next pages in two formats. They are setup as separate pages so they can be removed from the document and used on site.

- Once the calibration as noted below is completed put the toggle (or rotary) switch in the **OPERATE** position.
- Disconnect the 64236 Hand-Held Device from the system and store it along with the cable assembly away until needed. The transducer should be left installed in the test rig.

7.0 MENU TREE FUNCTIONS

There are three basic functions that have to be accomplished before the system is ready to operate:

- **SETUP** – The first step is used to set some of the basic functions of the system including opening and closing times, units of measure for the displays, flow limits for the nozzles and system and the deadman timer. One other function, Throttle Control is not functioning and is intended for future use only.
- **CALIBRATION** – This step is used to calibrate the vehicle meter pulser to assure a proper flow rate. It is also used to calibrate the test rig and vehicle transducers and to set the pressure (s) at which the system will control.
- **CONFIGURATION** – This step is important in that it assigns the various nozzles to a pulser if there is more than one pulser used on the vehicle. It also is used to assure that the system is set for either a refueler or hydrant servicer application. There are several other functions relating to use with auxiliary devices such as a remote beacon or a warning buzzer. Also some future additions that relate to monitoring the filter-separator or filter-monitor pressure

differential are included but not functioning at this time.

To perform the SETUP, CALIBRATION and CONFIGURATION process, connect the 64236 Hand-Held Device to the control module as outlined above. Once connected turn the power on. Turn the Hand-Held Device switch to **MODIFY** position. Remove the nozzle that is to be calibrated from its stowage. Observe the corresponding **ACTIVE NOZZLE** light on the control module is illuminated. Note that the following set-up, calibration and configuration process applies only to this nozzle. For setting any additional nozzles, the same process has to be performed on each.

NOTE:

When performing the nozzle SETUP, CALIBRATION and CONFIGURATION process, **only** the nozzle that is being set should be removed from its interlock. **All** other nozzles are to remain in stowage. If more than one nozzle is removed from stowage, both displays will go blank and no other modifications will be allowed until the errant nozzle is stowed.

8.0 SETUP

While power is required to modify any settings on the Control Module, it is not necessary to actually be connected to the flow rig nor flow fuel for the **SETUP** part of the complete setup. In fact when the system is in this mode it is not possible to actually flow. Use the following to setup the system:

- **OPENING TIME** – Set the menu display to indicate “**OT**” (opening time). The system opening time is expressed as a percentage of a given time span. For example to speedup the opening time, change the number to a smaller number on the display. Use the up and down arrow buttons to raise or lower the value displayed. A setting of 0% = 5

seconds and 100% = 10 seconds. Factory default is 50%.

- **Closing Time** - Set the menu display to “**CT**”. As with opening time setting the closing time is a percentage of a given range, 0% = 2 seconds and 100% = 5 seconds. As before use the up or down arrow buttons to achieve the desired closing time. Factory default is 50%.
 - **FLOW UNITS** – Set the display to indicate “**FLO UNIT**”. This is used to select one of the three available units of measure for the flow rate display. While observing the indicator lights (2 on the front panel figure above), use the down arrow button to rotate through the available options. When the right selection is determined press the right arrow button to confirm the selection. Factory default is gpm.
 - **PRESSURE UNIT** – Set the menu display to indicate “**PRESS UNIT**”. This is used to select the units of measure that will display the pressure during operation. While observing the indicator lights (4 on the front panel figure above), use the down arrow button to rotate through the three options. When the proper selection is determined press the right arrow button to confirm the selection. Factory default is psi.
 - **NOZZLE FLOW LIMIT** – Set the display to indicate “**FL**”. This is used to set the flow limit **for each nozzle**. It is possible to set the flow limit for each of six nozzles. Remove the nozzle to be set from its stowage point. It is not necessary to connect the nozzle to an adapter. After the setting is complete restow the nozzle. Use the up and down arrow buttons to set the maximum rate of flow for each nozzle that is to be used. Normally in some operations two nozzles may be used simultaneously, e.g. two deck hoses. In this case, flow rate at two times the lower of the two set nozzle flow limits will be allowed to flow pass the control valve. And under all circumstances, the system would limit the total flow rate to below the SYSTEM FLOW LIMIT set in the next step. The factory default is set at 1500 gpm to make sure that there is no limitation to flow unless one desires one.
- SYSTEM FLOW LIMIT** – Set the menu display to “**SFL**”. This is used to set the CUMMULATIVE FLOW LIMIT for the system. During a refueling operation the system will use the lowest of this limit and

the combined nozzle flow limit for the particular nozzle(s) in use. This function is mainly intended to be used to protect the filter elements and the meter from exceeding their recommended limits. Therefore it is recommended that the system limit be set to the limit for such devices. The individual nozzle flow limit settings can then be set for the desired limit without regard to protecting the equipment. For example, if a filter is rated for 1,000 gpm. The system limit should be set for the 1,000 gpm and each nozzle (deck hoses mainly) can be set for any flow rate desired. If they are set for 600 gpm each and are used where 1,200 gpm is possible the system setting will limit the system to the 1,000 and not the 1,200. The factory default for this function is again 1500 gpm.

- **DEADMAN TIMER** – Set the menu display to “**DL**”. This is used to turn on and set the deadman timeout function. Use the up or down arrow buttons to set the number of minutes that the system will stay in operation before the operator is required to “cycle” the deadman. Set the display to zero if this function is not desired. If the vehicle is equipped with an overwing nozzle it is recommended that this function be set to zero. The factory default is off or zero.

NOTE:

The deadman timeout function can be set from “0” (off) to “10” minutes for each nozzle. If different times are set for different nozzles the lowest setting will prevail. Deadman Timer is to prevent the operator from “tying” or otherwise keeping the deadman activated without actually holding it. Once the set time has been reached the operator will have 30 seconds to release and reactivate the deadman or the system will close.

- **THROTTLE CONTROL** – The menu item is for future assignment only and is not working.

Note: (⊗) (on older units) signifies pressing the correct arrow key on the Hand-Held Device to 64235 Control Module. Denotes the direction in which the menu can be traversed.

To use this menu turn off power to 64235 Control Module. Connect 64236 Hand-Held Device to 64235 Control Module; turn power back on; put toggle switch to MODIFY to initiate the SETUP process.

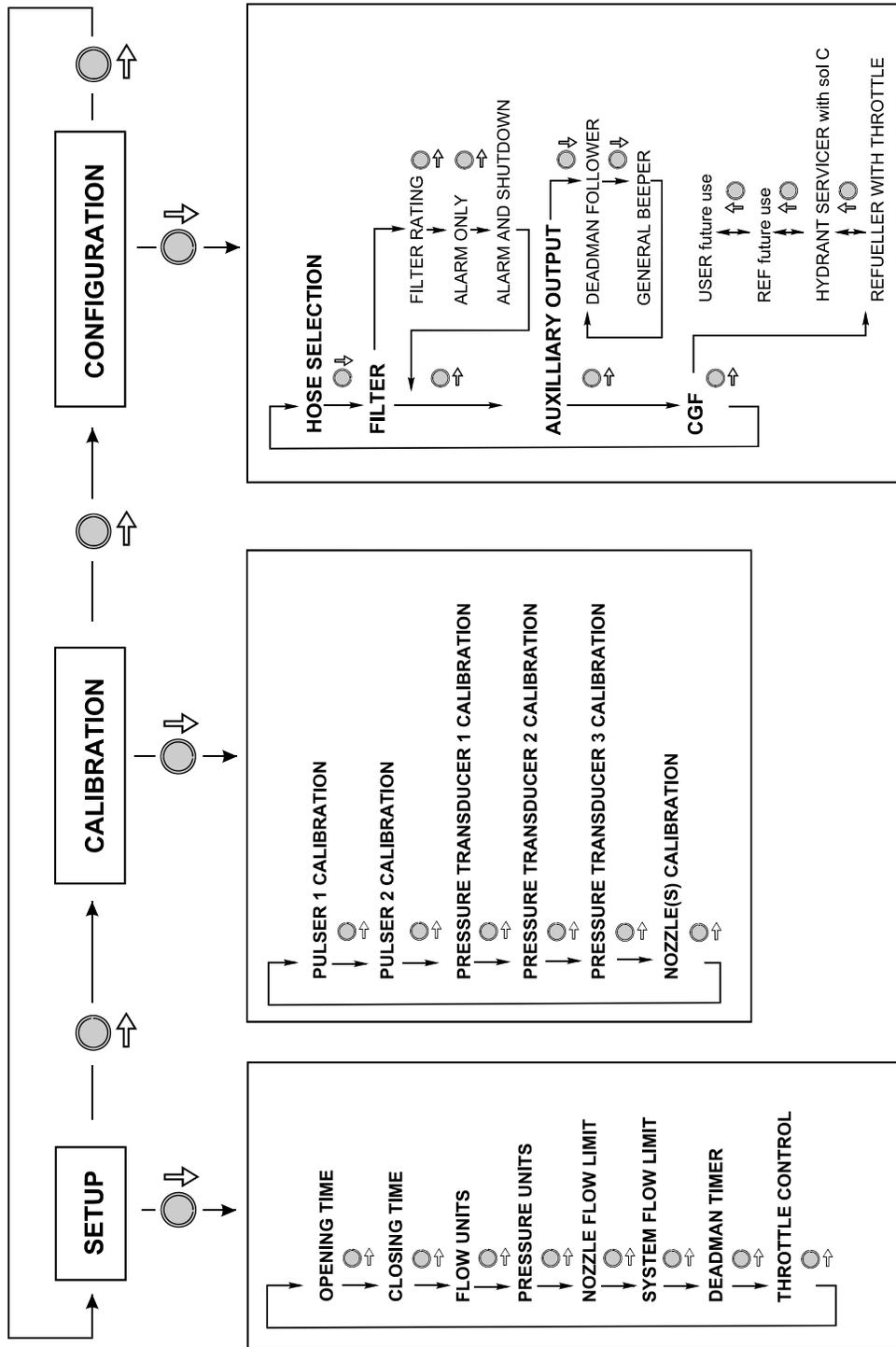
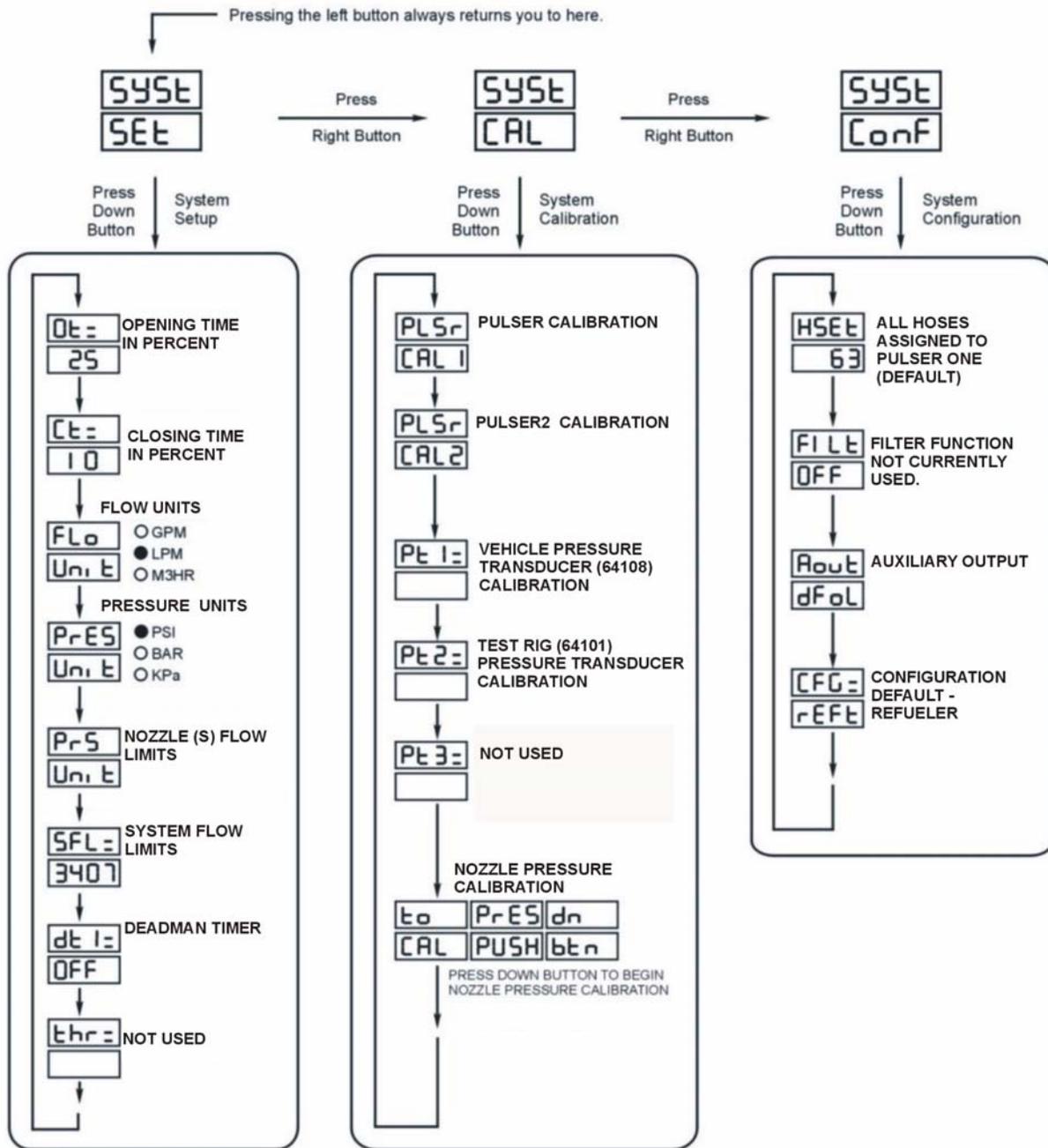


FIGURE 2 – NAVIGATING THE MENU TREE



Use the right arrow button to scroll through the menu as shown in Figure 1. Use the up or down arrow buttons to change the data in any of the displays.

FIGURE 2 - DIGITAL II MENU DIAGRAM

Shows sampling of what will be shown in the display windows.

9.0 CALIBRATION

NOTE:

In a flow vehicle which uses a dual control systems (such as an Bypass Valve for Primary and Inline Valve as Secondary), it is necessary to fail one of the systems to full open position while calibrating the other and vice versa. The system **not in the process of being calibrated** can be failed full open by placing it in the “**PULSER 1 CALIBRATION**” mode as below and proceed with normal calibration on the other.

NOTE:

If the nozzle to be calibrated is equipped with an HECV (Hose End Control Valve), it is essential that the HECV is secured and fully engaged with the block out device in the calibration process.

During this procedure it is required that the vehicle be connected to either a test rig or be set up to recirculate fuel. In both cases the 64101 Test Transducer/cable Assembly has to be installed in the simulated aircraft pressure port (the place one wants the system to control the pressure). This can be just downstream of the simulated aircraft adapter (the most accurate determination of “pressure at the wing” or in the nozzle port. In the latter case the pressure drop of the nozzle/adapter combination penalizes one. In addition the nozzle port does not provide a smooth measuring point for pressure determination. For this reason Carter recommends that the transducer be installed in a straight length of pipe either upstream of the nozzle or downstream of the recirculation adapter (the best choice). The system is designed for use with two meters simultaneously hence there are two pulser calibration steps. If only one pulser is used the second one can be skipped. Press the right arrow to **CALIBRATION** and then the down arrow to:

- **PULSER 1 CALIBRATION** – The display will show as “**PLSR CAL 1**”. If the system has two pulsers select a nozzle that is assigned to pulser 1. Activate the deadman switch to start flow. Observe the flow meter on the test rig and time it with a

stopwatch to determine the actual flow rate. To obtain the most accurate pulser calibration, use the flow control valve at the simulated aircraft adapter to adjust the flow rate to nominally used value, that is from 500 to 600 gpm. Then use the up or down arrows to adjust the flow rate being displayed to match the actual flow rate calculated.

- **PULSER 2 CALIBRATION** – This step is only needed should the system have two pulsers (meters). Pushing the right arrow will move the display to “**PLSR CAL 2**”. Select a nozzle that is associated with pulser 2 and repeat the step outlined for pulser 1 above.

The purpose of the next two steps is to calibrate the transducers on the rig and the vehicle. It is necessary to apply a known pressure to both of the transducers. A gauge should be installed adjacent to and upstream of the transducer in both instances. It is recommended that a ball valve be installed upstream of the transducers with a tee in the line to a gauge. In the case of the vehicle the gauge can be removed if desired and the leg of the tee plugged for operation. A pressure range of 20-75 psi is recommended for the gauge. The 64101 Test Rig Transducer/ Cable is connected to the connector on the 64236 Hand-Held Device before starting this step.

NOTE:

Static pressure can be applied to the transducers in several ways. The simplest way on a refueler is to lockup the pressure in the system and close the ball valve upstream of the transducer. To accomplish this set the Hand-Held Device toggle (or rotary) switch to the **OPERATE** mode. Activate the deadman and allow fuel to flow through the system. Close the valve downstream of the recirculation adapter and then release the deadman. Be sure that the pressure so trapped in the system is between 50 and 75 psi.

NOTE:

A similar way can be used to trap pressure in the system for a hydrant service by flowing, closing the test rig valve downstream of the transducer, releasing the deadman and then closing the hydrant coupler.

Then re-place the Hand-Held Device toggle (or rotary) switch to the **MODIFY** mode and scroll down the calibration menu tree to the **PRESSURE TRANSDUCER 1 CALIBRATION** mode as follows. Note that in the pressure transducer calibration mode, no flow is possible even when the Deadman is applied.

- **PRESSURE TRANSDUCER 1 CALIBRATION** – This step is used to calibrate the vehicle-mounted transducer. Set the menu to indicate “**PT1**”. Establish a system pressure as noted above or in some other manner then use the up or down arrows to adjust the value on the display to that equal to that on the gauge.

NOTE:

If a negative pressure is indicated on the display during this test or in the one that follows, refer to section 10.5.

NOTE:

When calibrating the pressure transducers (system set for **MODIFY**) activating the deadman will not allow flow of fuel. This requires that the pressure be trapped prior to going to this step.

Additionally a negative pressure reading may mean that there is either a faulty connection or a defective transducer. See section 11 for more on this.

It might also indicate the system is improperly calibrated by the user. Re-do calibration on the transducers as required.

- **PRESSURE TRANSDUCER 2 CALIBRATION** – This step is used to calibrate the test rig mounted transducer. Set the menu to indicate “**PT2**”. Repeat the step outlined above for PT1.

- **PRESSURE TRANSDUCER 3 CALIBRATION** – This does not presently function. It is intended for possible future use. It can be skipped

NOTE:

The Control Module can support six nozzles/hoses fueling individually or in combinations. It is necessary to calibrate the pulser and the pressure transducers 1, 2 and 3 as above on one nozzle or hose only. The calibration will automatically apply to these devices on all hose settings. However, the following nozzle pressure control setting must be performed on each hose individually.

- **NOZZLE PRESSURE CONTROL SETTING (NORM)**– This step is used to set the control pressure for refueling. This procedure must be accomplished for **each** nozzle used. Hook up the nozzle to be calibrated to the recirculation or test adapter.

NOTE:

If the nozzle has a Hose End Control Valve (HECV) it must be blocked open. On a Carter nozzle this can be accomplished by using the 61656 Block Out Device.

The test rig transducer used in the previous calibration must remain connected to the Hand-Held Device. Push the right arrow to move to the nozzle (s) calibration mode. The display will scroll through a message that will ask one to press the down arrow button to begin calibration. (“**TO CAL PRES PUSH DN BTN**”). Activate the deadman and then press the down arrow. Establish a stable flow of fuel and then **slowly** throttle the valve downstream of the nozzle to create the desired back pressure or the pressure desired to refuel an aircraft as indicated on the control module. When the flow and pressure is stable and at the desired setting, release the deadman to **set** the pressure. The display will then indicate “**PSET**” and then show the set pressure. If the desired pressure has not been accomplished repeat this step to get the correct setting. If the setting is correct switch the Hand-Held to “**OPERATE**” to lock in the setting.

NOTE:

This procedure **must** be done for **each** nozzle. If one hose is used for an overwing nozzle application it is recommended that this nose/nozzle pressure setting be left at the default pressure of 35-psi. It is not possible to set a specific nozzle pressure using an overwing nozzle. This will provide adequate pressure for this operation and keep it low enough to make it easier for the operator to use the nozzle.

NOTE:

When fueling with a combination of nozzles that are not necessarily set for the same control pressure the nozzle with the lowest set pressure will prevail.

- **OVERRIDDEN (OVRRD) PRESSURE CONTROL SETTING** – This is a system function that allows the operator to switch fueling pressure settings from the **NORMAL (NORM)** settings. There may be some applications where an aircraft or customer

wants a pressure lower than normal to the industry. This can be accomplished by following the above procedure after first pressing and holding the button (12) on the bottom of the Control Module for at least 4-seconds. When this operation has been successful the **(OVRRD)** indicator light (7) on the module will be lit. Follow the above procedure for each nozzle to be used.

NOTE:

If the OVERRIDEN pressure control is not set then the button on the bottom of the module will be inactive.

To return to **SETUP** after completing this section of the procedure press the left arrow or to move on to the **CONFIGURATION** section of the menu press the right arrow twice.

10.0 CONFIGURATION

At present there are three active sections to the Configuration part of the setup, HOSE SELECTION, AUXILIARY OUTPUT and CGF. The FILTER selection is inactive and reserved for future use. If the vehicle is a refueler only two of these are necessary since the default setting for CGF (System Configuration) is for a refueler. Only if the vehicle is other than a refueler is it necessary to ever enter the CFG portion of the menu. AUXILIARY OUTPUT is used only if an auxiliary device, e.g. remote beacon or buzzer is installed and is operated by the system. Press the down arrow to enter the submenu of CONFIGURATION. The first setting display will be "HSET".

- **HOSE ASSIGNMENT TO PULSERS** - If only one pulser (meter) is present this step can be skipped. The default setting is for one pulser. To assign a nozzle(s) to pulser one remove **all** nozzles to be so assigned from their stowage points and activate the deadman and hold it for a minimum of 15 seconds. Release the

deadman. The nozzle indicator lights that are lit are now assigned to pulser one.

NOTE:

Pulser 2 is not currently supported hence if the vehicle has two pulsers contact Carter at (949) 764-2200 for assistance. Therefore no nozzles can be assigned to pulser 2.

- **FILTER** – This function is for future use only and is not active at this time. Press the right arrow to move on to the next function.
- **AUXILIARY OUTPUT** – There are two selections in this section, "**D.FOL**" (deadman follower) and "**D.BEP**" (deadman beeper). D.FOL will switch the circuit to ground following the action of the deadman switch. D.BEP will provide a pulsing ground signal tied to the deadman timer function such that in the last 30-seconds of the timeout a remote beacon will flash in synch with the amber light on the module.

NOTE:

The maximum load on the appropriate terminals discussed in IN64235 Installation Instructions Manual is to be 28VDC at 2 amps. If a greater load is needed the appropriate relay will have to be installed.

Set the display to “**A.OUT**” then press the down arrow to cycle through the two choices described above. Once the selection at “**D.FOL**” and “**D.BEP**” are set at the desired setting (YES or NO), press the right arrow to move on.

- **CONFIGURATION (CFG)** – The display will indicate “**SYST CONF**”. Again if the vehicle is a refueler this step can be skipped. If it is other than a refueler then push the up or down buttons to arrive at the desired vehicle configuration.

The USER and REF sections of the submenu are not currently active and are reserved for future use.

Select “**REF**” (REF.T is inactive for now) for a refueler (factory default) or “**HYDR**” for a hydrant dispenser or cart using a hydrant coupler.

11.0 TROUBLE SHOOTING & ERROR CODES Initial Display Message

When the power is turned on to the Control Module it will momentarily display the firmware version, e.g. C1.01. If this does not occur reset the unit as noted below. If this does not correct the problem contact Carter at (949) 764-2200

11.1 Reset

As noted above in section 4 to reset the unit turn off the power to the control module and turn it back on.

11.2 Reset to Factory Defaults

It is possible to restore the factory defaults for all settings. Connect the Hand-Held Device, switch to MODIFY and push the up and down arrow buttons simultaneously. This will wipe out all previous customer settings but it is not to be used to service an aircraft until the unit has been properly recalibrated.

11.3 Error Codes

Digital II includes self-diagnosing functions and when a problem is encountered an error code will be displayed as follows:

- E1.1 Processor has encountered an “*Invalid Instruction*”. (OPERATIONS STOP..!)
- E1.2 “*Interrupt*” from an unassigned or reserved area”. (OPERATIONS STOP..!)
- E1.3 An “*unknown Interrupt*” has occurred. (OPERATIONS STOP..!)
- E1.4 A “*Clock Failure*” has occurred.”. (OPERATIONS STOP..!)
- E1.5 A “*System Monitor Interrupt*” has occurred. (OPERATIONS STOP..!)

E2.1 *Zero or Negative pressure* calculated. (OPERATIONS CONTINUE..!)

E2.2 “*Cv*” is calculated as *Less than one*. (OPERATIONS CONTINUE..!)

E2.3 Pressure is *too large* to be displayed. (OPERATIONS CONTINUE..!)

E2.4 Pressure is *Negative*. (OPERATIONS CONTINUE..!)

E3.1 “Control Module” has lost contact with “VEHICLE Pressure Transducer”.

E3.2 “Control Module” has lost contact with “NOZZLE Pressure Transducer”.

E3.3 “Control Module” has lost contact with “FILTER Pressure Transducer”.

E4.1 “Invalid Display Address” firmware error.

E9.1 “Power Supply Voltage” to Control Module has dropped *BELOW 10 Volts*.

If Error Codes 1.1 through 1.5 are displayed the problem may be resolved by completing a “Power-On-Reset”. This will return all of the Setup, Calibration and Configuration settings to the factory default setting. Therefore, before the unit is returned to service, it **MUST** be subjected to the “Setup”, “Calibration” and “Configuration” procedures. If this does not resolve the problem, contact Carter at (949) 764-2200.

It is possible that during normal operation, the Error Codes 2.1 through 2.4 will appear on the display, for a very short period of

time. It may flash on the display or may stay on as long as two seconds, before the display returns to normal operation. If this occurs, it will not affect the operation of the unit. If any of these error codes appear for 10 seconds or longer during calibration or immediately after calibration this would indicate that the calibration is invalid. It is very important that each step of the Setup, Calibration and Configuration procedure be completed. If the nozzle is equipped with an HECV (Hose-End-Control-Valve) it is essential that the block-out device is secure and fully engaged in the HECV. The block-out device can easily back out and allow the valve to control. If this occurs the information provided during pressure calibration would be invalid, so you would be required to repeat the Setup, Calibration and Configuration procedure.

If Error Codes between 3.1 and 3.3 are encountered, refer to section 10.6 for instructions to check the transducer and cable.

If Error Code 9.1 is encountered, conclude that the supply voltage to the control module has dropped below 10 Volts. Check to ensure that Terminal # 1, #2 and #3 are tight and the wires are secure. With a voltmeter, check the Input Voltage at Terminal # 1. If this is below 10 Volts, repair the vehicle power supply as required. If the voltage reading is above 10 volts, contact Carter at (949) 764-2200.

11.4 Negative Pressure Reading

If the pressure display indicates a negative pressure reading, this would indicate that the transducer has a faulty connection or is defective or the system is improperly calibrated.

Check Terminals #11, 12 and 13 to ensure that they are tight and that the wire is secure. Inspect the cable to ensure that it has not been cut or broken. Remove the connection to the transducer and ensure that the contacts are clean and dry. To perform a continuity check on the cable the wires must be disconnected from the transducer and the control module terminal. To assure that the wires are reconnected correctly, mark the wires before disconnecting them from the terminal connector.

Visually inspect the transducer. If it is bent or dented, it is likely to be defective. If the

transducer appears to be in good condition, you can test the output to ensure that it is functioning properly. To test operation of the 64108 Vehicle Mounted Transducer, activate the pumping system and establish a flow of fuel. Contact the red or positive lead from a voltage meter to Terminal #11 and the black (negative) lead to Terminal #13 and measure the voltage. The voltage should be between 1 and 6 Volts DC. If it is higher or lower than that this, the transducer is certainly defective. Adjust any manually operated valve mounted down stream of the vehicle-mounted transducer in order to cause the pressure to fluctuate. Observe that the voltage also raises and lowers with the fuel pressure. If this voltage remains stable, check the operation of the test rig transducer. Exchange this device with the vehicle mounted transducer. (There are no terminals available to check the output of the Test Rig Transducer).

If the pressure transducers are checked to be working properly, re-calibration of the system might be required.

11.5 Summary of Warnings and Cautions

SINGLE NOZZLE FLOW LIMIT

Only one nozzle at a time can be active. If more than one nozzle is activated the display will be blank.

NEGATIVE PRESSURE INDICATION

This indicates that either the pressure transducer is faulty or is not connected to the system. It might also indicate the system is improperly calibrated by the user. Re-do calibration on the transducers as required.

DO NOT ATTEMPT TO ADJUST FROM A ZERO PRESSURE READING

NORMAL/OVERRIDDEN CONTROL SETUP

The button on the bottom of the unit is meant to be used to choose an alternate or overridden pressure control. It must be setup properly before it is usable.

HOSE/NOZZLE CALIBRATION

Nozzles can be used in any combination but only one can be calibrated at a time or a blank screen will be displayed.

DEADMAN TIMEOUT

As with the pressure setting the deadman timeout will be the lowest set when using more than one nozzle at a time. Fluid Power Group

USING MULTIPLE HOSES

The nozzle pressure will be the lowest of that set by the user for multiple nozzle use.

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