EMR^3

Troubleshooting Guide

VEEDER-ROOT

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Testing an EMR³ System

To perform a Display Head Complete Self-Diagnostic Check

Cycle power to the EMR³ system. To cycle power, turn the power off for at least 20 seconds before turning on again. During power up, each Display Head tests all its own circuit board hardware. The self-test takes about 25 to 30 seconds. If a failure occurs, an error code is posted on the display.   See Startup Error Codes Section of this Guide.

To Test the LCD Display

Simulate a delivery by performing a START and FINISH sequence in Volume or Currency mode. The fueling nozzle icon will appear after pressing the START key. For a brief period of time, all of the segments will turn on, then off. If the unit fails to perform this test, press the FINISH key once, then press START and FINISH again. The Display nozzle icon and display activity noted should then occur.   If the display check does not work, then the head will need to be replaced.

Pulse Encoder Input Check

With the cover open and the unit NOT in the C&C mode, disconnect the spring between the pulse encoder and the input shaft. Push start and turn the pulse encoder shaft until a nonzero reading appears on the register portion of the display. Press the FINISH key, the nozzle icon turns off and a delivery ticket is printed. BE SURE TO RECONNECT THE SPRING BEFORE REPLACING THE LID.

Printer Check

Verify ticket printing by either printing duplicate tickets or by simulating a delivery as noted above. To print a duplicate ticket, hold the FINISH key down for a few seconds.l

Available Documentation

For EMR3 hardware related details, see the EMR3 Installation Guide, number 577013-758. For information related to menus or settings, see the EMR3 Setup and Operation Manual, number 577013-766.   Descriptions of the EMR3 System are available on the UL/cUL Control Drawing, document number 331940-016 or the ATEX System Drawing, document number 331940-004. Veeder-Root documents are available on our web site at *www.veeder.com*.

Messages

All messages appear in the 14-character descriptor field located on the EMR³ Display Head. System messages can be either informational or describe an error detected by the self-checking functions of the EMR³ .

EMR³ Informational Messages

Information messages do not inhibit the operation of the EMR³.

NO RECORDS

Inside the Display Head there are zero transactions stored. This message appears in the Setup Mode, when the user attempts to printout or view transaction records on a new start-up or after clearing NVRAM by selecting "RESTART" in C&C mode. This message does not apply to the transaction records stored in the IB and IB records can be restored back to the Display Head.

RECALCULATING

While in the C&C Mode this message is displayed during the meter calibration procedure when new calibration points are calculated. Each point takes a few seconds to calculate

NO PRICE ENTRY

While trying to START a delivery, in the Currency Mode prior to selecting a price, the EMR³ will display this message. Once the desired price is on the preset display, use the ENTER key to select it.

SELECT PRODUCT

During a delivery, when more than one product is available, the user must choose one product prior to each delivery. On the front of the display head, press +/- keys to display the desired product then press ENTER to select it.

Delivery Error Codes

The current delivery will automatically FINISH when a delivery error occurs.

E03 - ENCODER OVER SPEED

The speed of the rotating shaft exceeds the capability of the Display Head Processor. Reduce the flow rate or add a mechanical gear reduction to the input shaft and calibrate the meter. The maximum speed is 1000 rpm.

E04 - ENCODER PULSE ERROR

This error is an indication that an illegal quadrature state has occurred.

Note: The EMR³ encoder is a 2-channel quadrature pulse output device in which the A-channel leads the B-channel by 90 degrees in order to create 4 unique states.

It is possible this error is caused by a random event and another delivery may be started. Should this error repeat itself, the source of the error must be fixed. Before replacing the encoder check the IB input voltage for dropout or power surges. Some solenoid valves do not have transient suppression and may cause the supply voltage to drop

out. Add a suppression diode (Veeder-Root P/N 846000-022) across the solenoid coils as noted in the Veeder-Root Installation Guide, P/N 577013-758.

NOTE: this symptom could also be caused by overspeed, i.e. when the pulse encoder is turned too fast. For example, spinning the encoder by hand will create an E04 error.

E06 - TEMP PROBE TOO HOT

When the fluid temperature is outside of the EMR^3 's measurable range, a delivery cannot continue or start. Go into the set-up then C&C Menu under TEMPERATURE and check what the EMR^3 reads for the fluid temperature. If the EMR^3 temperature is incorrect remove or replace the Thermoprobe and re-calibrate.

E07 - TEMP PROBE TOO COLD

When the fluid temperature is outside of the EMR^3 's measurable range, a delivery cannot continue or start. Go into the set-up then C&C Menu under TEMPERATURE and check what the EMR^3 reads for the fluid temperature. If the EMR^3 temperature is incorrect remove or replace the Thermoprobe and re-calibrate.

E08 - TEMPERATURE PROBE FAILURE

Check the Thermoprobe connections on the back of the Display Head. If the Thermoprobe wiring is corroded, remove both leads and trim them. Cut back the cable insulation and strip each wire by 5mm (1/4 of an inch). Insert both wires into the terminal block and tighten. To test a Thermoprobe, connect each lead to an ohmmeter and measure the resistance. At 25 degrees Celsius, the meter should read about 10 K ohms. If not, replace the Thermoprobe, Veeder-Root P/N 846000-002.

Startup Error Codes

The following messages apply to EMR^3 self-testing during the power up sequence. **<u>Should any of these messages appear, try cycling the power on and off before replacing the Display Head Module.</u>**

E05 - NVRAM FAIL

Test of nonvolatile memory failed.

E15 - RAM FAIL

Test of static memory failed.

E16 - FLASH FAIL

Test of program memory failed.

E17 - ADDR FAIL

Cannot access Display Head Hardware.

E18 - DATA FAIL

Cannot send or receive data from all the electronic hardware in the Display Head

E19 - UART FAIL

One of the serial ports is not communicating.

If during start-up the head stops in any self-check mode, cycle the power off then on. If the situation persists, replace the Display Head.

System Error Codes

E50 - IB COMM FAILURE

Serial communication from the IB Box is not working.

- Check the wiring at both the Display Head and the IB, make sure A goes to A and B goes to B etc. Also, one end of the cable shield, or drain wire, must be tied to chassis ground using the appropriate saddle clamp.

- At the IB box, check the tri-color LED, make sure it is flashing – green, pause green, red then yellow, pause then starting again (see below for other tri-color LED diagnostics to determine the cause of the failure).

- If the IB Comm Error continues, try swapping the Display Head 1 wiring with the Display Head 2 wiring. If the problem follows the Display Head, replace it, if not, test the IB with a known good Display Head. A faulty IB circuit board can also be the cause an E50 error.

- When two display heads are operating from a single IB, the IB COM FAILURE will occur if both heads have the same Head Address. Put the Display Head in Set-up Mode go to System Address and check the address number for each display head. You will need to cycle the power to clear the error message once an address change is made.

- In a two display head configuration, if Display Head 1 has a problem, Display Head 2 may also display an IB COM FAILURE.

- In some EMR[3] Systems, adding a suppression diode across each dc powered flow control solenoid valve will be required to avoid IB COM FAILURES. See the appropriate DC Solenoid Wiring figures located in the EMR[3] Installation Manual, Veeder-Root P/N 577013-758.

- Solenoid valves are one source of electrical noise. See the External Sources of System Noise located in Appendix C of the EMR[3] Setup and Operation Manual, Veeder-Root P/N 577013-766 for further explanation.

E66 - PRINTER BUSY

The ticket printer is busy processing the current request. When the printer is done printing, replace the printed ticket with a new ticket. Verify ticket printing by either printing duplicate tickets or go into C&C Mode, Print Formats, Print Report and hit ENTER.

The printer icon will flash once a ticket is printed and will continue to flash until the ticket is completely removed from the printer. Attempting to print another ticket while the printer icon is still flashing will result in an E66 PRINTER BUSY Error.

EXC ERROR ####

These are 4-digit coded exception processing errors associated with booting up the EMR[3] system. Try cycling the power off and on before replacing the Display Head.

Relay Setup Error Codes

Relay setup errors occur while entering relay or preset information in Setup Mode. When using 2-stage valves, relay 1 is used to control the fast-flow solenoid and relay 2 is used to control the single flow solenoid. Under the RELAY CONTROL settings, two values are used to knockoff each solenoid prior to the end of a preset delivery: SET SLOW FLOW (relay 1) and SET ADVANCE STOP (relay 2).

E60 - STOP ADVANCE ERROR

The volume for flow control relay 2 is set to a volume greater than the volume entered for flow control relay 1. Fix this condition by setting the volume for SET ADVANCE STOP to a number of units smaller than the volume for SET SLOW FLOW.

Calibration Error Codes

Calibration errors occur during meter calibration and must be corrected in order to continue with this process.

E64 - FUEL TYPE UNDEFINED

A meter calibration must be performed for this particular type of fuel.

E65 - CALIBRATION ERROR

One of the multipoint calibration values is different by more that 0.25% of the previous value. For example if calibration point 1 is 100.00 than calibration point 2 must be between 99.75 and 100.25 counts. Push any key to clear the error code. Push the NEXT key to begin calibrating a new flow rate point using either Autocalibrate or Multicalibrate. It is also acceptable to calculate the counts and enter them manually using the Manual Calibrate Feature.

IB Tri-color LED Indicator Lamp – IB self checking

The tri-color LED is located inside the Interconnection Box (IB) on the upper left hand side and is seen protruding through a hole in the metal wiring shield (see Figure 1). The LED is capable of indicating 4 different states: Green, Red, Yellow and Off (see Figure 2).
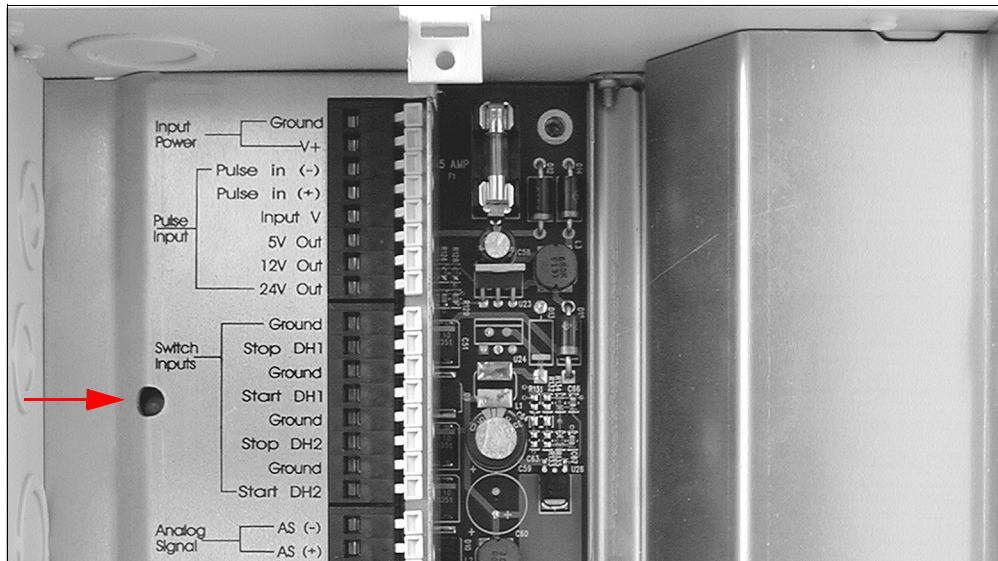
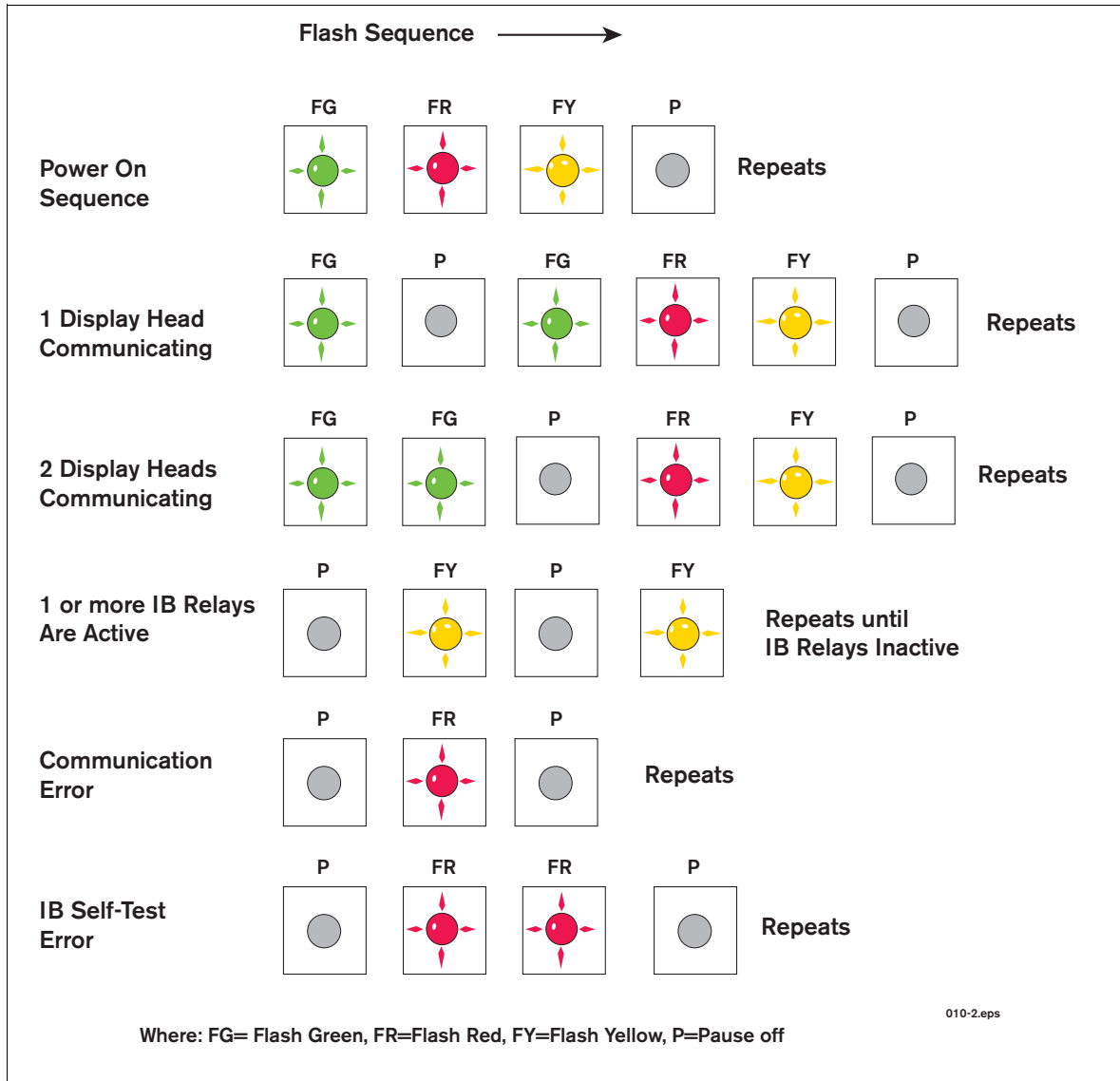**Figure 1.   IB Diagnostic Tri-Color LED**

Figure 2.   IB Tri-Color LED Status Patterns

On power up, the LED flashes the initialization sequence of Off-Green-Red-Yellow-Off indicating that the IB passed the internal self test with no errors.

If one Display Head is communicating with the IB, the LED will flash: green, pause green, red then yellow, pause and then repeat the sequence.

If two Display Heads are communicating with the IB, the LED will flash: green twice, pause green, red then yellow, pause before continually repeating this pattern.

If one or more IB Relay is active, or a delivery is in process, the LED will flash an Off-Yellow-Off sequence until all the relays are inactive.

If a communication error occurs, the LED will flash Off-Red-Off indicating a problem. Try swapping the Display Heads as described above in order to locate the problem.

If a self-test error occurs, the LED will flash an Off-Red-Red-Off sequence indicating a problem. Try swapping the IB with another IB in order to locate the problem.

If the LED is stuck in one of the 4 states, remove input power from the input terminals for a few seconds. Restore power and check the LED for the Off-Green-Red-Yellow-Off sequence. If the LED fails to flash in the proper sequence, replace the IB Circuit Board.

Conclusion

Should faults persist after any of the recommended remedial action above is carried out, call the local Veeder-Root distributor or the following EMR³ technical support departments:

* In the USA: +1 814 696 8125
* In the UK: +44 1233 740134

In France: +33 1 48 79 55 93

Appendix A - Production Release Schedule for EMR³ Software

Version	Release Date	Description of the Software Features and Fixes	PC Tool Version
F04	5/21/2008	New transaction record format	3.1
FB2	3/24/2006	Test for the loss of the battery voltage; fix time and date loss	3.0
F01	2/20/2006	Implement new calendar clock circuit	N/R
E02	1/10/2006	Added option to print Gross Volume on a TC Ticket	N/R
E01	10/7/2005	Implement new calendar clock IC from SIMTEK Fix totalizer divide by zero error; fix totalizer 8-digit roll-over Fix TC array when fluid temperature above 95°F Made jitter threshold programmable	N/R
D03	10/12/2004	Fixed issue with loss of calibration values 2 - 8 on power down	N/R
D02	8/30/2004	Jitter count default threshold changed from 110 to 220	N/R
D01	7/26/2004	Added 8 tanks and 4 Calibration Rates	N/R
C07	5/7/2004	Adjust Encoder Error detection parameter; jitter default set to 110	N/R
C06	3/17/2004	Print nominal product density on every ticket; Delivery timeout menu; Enhanced encoder error detection; Grand totalizer in transaction record; Tank ID field; Either net/gross on ticket; No price changing during a delivery; Grand totalizer rollover enhancement; Interlock menu; Cross product transfer	N/R
C05	11/13/2002	Created calibration ticket; allow entry of negative values in Preset Field	N/R
C04	10/11/2002	Added OBC serial commands	N/R
C03	7/26/2002	Added Preset Interlock and option to disable 20 minute time-out	N/R
C02	6/4/2002	Fixed issue with disappearing prices during multiple deliveries with T.ID.	N/R
C01	5/10/2002	Implement bigger Flash IC with 512K of memory	N/R
B06	3/8/2002	Remove temperature and density from COE Screens Lockout FINISH key during calculations Lockout +/- & ENTER during NTC Make 3 minute time-out optional	N/R
B05	2/19/2002	Add summary ticket label for "Multiple Deliveries at one Site" Fix calculation for average delivery temperature Enabled editing of all pricing labels	N/R
B04	1/19/2002	EMR released for production shipments	N/R

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