Weatherford®

Red Eye® 2G
Installation, Configuration, and Operation Manual

Manual Part Number:
BM-RE2GWCM-00

August 2008

Revision G

Record of Revisions

Revision	*Description*	*Date*
Original (O)	Initial Release	April, 2005
Revision A	Revised to incorporate changes in electronic boards	June, 2005
Revision B	Revised to incorporate changes in certifications	July, 2005
Revision C	Revised to include changes in Certifications and *RedLine*	August, 2005
Revision D	Revise to current build standard	December, 2005
SA-RE2GWCM-01	Addendum to correct the Pre-Amp Wiring Diagram	February, 2006
Revision E	Revise to current build standard and incorporate Addendum 01	April, 2006
SA-RE2GWCM-01	Addendum to correct the Modbus Table	May, 2007
Revision F	Revised to include Special Addendum SA-RE2GWCM-02, PRN 2571, PRN 2240	June, 2007
Revision G	Revised to include New Modbus Register Map, new state and status message notifications, & new firmware.	August 2008

Copyright Notice

Disclaimer

Weatherford makes no representations or warranties with respect to the contents hereof. Further, **Weatherford** reserves the right to revise this publication and to make changes in the content hereof without obligation to notify any person or organization of such revision or changes.

The following products and organizations have been mentioned in this documentation. Various trademarks are owned by the respective owners.

- Microsoft® and Windows® are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries, http://www.microsoft.com

Documentation Nomenclature

This manual uses the following protocol to present information.

- The Uppercase in bold type words set apart keystrokes that you must press on the keyboard or numeric keypad for a defined action or input.
- The **KEYNAME** notation refers to a specific key on the keyboard or keypad. For example, **CTRL** refers to the control key, which is usually labeled CTRL or Ctrl.
- The **KEYNAME1** + **KEYNAME2** notation means that two keys must be pressed at the same time. The user does this by holding down one key and pressing the other key. Situations in which this occurs usually include the **SHIFT**, **ALT**, or the **CTRL** keys.
- The DOS® Operating System, used on IBM® and compatible computers, does not differentiate between upper and lower case characters. DOS commands in this manual appear in lower case and bold type.
- When the computer generates characters on the monitor or display and a response is required from the user, these are *italicized* in the documentation.

Microsoft Windows

The phrase “choose” followed by a command in bold text means that the cursor is to be moved to the command in question and left-mouse click. A trailing right bracket followed by another command indicates to highlight the first command, move the cursor to the right, and highlight the second command. For example:

Choose **FILE >** OPEN *filename*

The expression “click” instructs the user to left-mouse click on the Window button that display on the screen. For example:

Click **EXIT** to return to the main menu screen.

Click **OK** to accept the values in the fields.

Data Conventions

In certain instances, this manual sets specific information aside from the normal format of the text. This is done to attract the attention of the reader. This manual uses the terms, "***Note***", "***Caution***" and "***Warning***".

Note: A note highlights information that will benefit the reader.

Caution: A caution denotes conditions under which lack of care or attention to instructions could result in damage to equipment.

WARNING: A warning tells of a situation in which lack of care or attention to instructions could result in injury or death to personnel.

Table of Contents

List of Paragraphs

Introduction and Description....1
Display 1
General Principle of Operation....3
Technical Specifications 5
Model Number Information 5
Unit Weight 6
Physical Dimensions 7
Electrical Specifications 9
Prior-To-Installation Instructions 9
NACE MR0175 Compliance 10
Quality Assurance....10
Physical Mounting 11
Flange Unit Mounting 11
2 and 3 Inch Pipe 11
Screw-In Unit Mounting....14
Display Orientation Instructions....15
Wiring Connections 19
Introduction 19
Terminals....20
Analog Input for Well Selection Wiring....20
Well Selection Wiring 21
Water Cut 4 to 20mA Out Remote Field Device Wiring 22
Flow Meter Wiring or Analog In Remote Field Device Wiring....23
External Pre-Amp Wiring 25
Communications Hook Up....26
RS485 for Modbus Host Communications 26
Connections 26
Default Settings....26
RS232 support for HMI Port and Modbus Communication 27
Connections 27
Default Settings....27
RedLine Communications Connections 28
Water Cut Output Wiring 28
Lamp Power Connections....28
Power Connections 28
Operation 31
LCD Screen Display 31

Detector Board Temperature 32
Status Register Fault Codes 32
Water Cut Calculations 34
Water Cut Methods and Coefficients for Firmware versions 4.0 and Lower 35
***RedLine* Configuration Program 37**
Appendix A – Modbus Register Maps 39
Modbus Register Map version 2.8e 39
Modbus Register Map version 2.2 59
Modbus Register Map version 2.1 72
Modbus Register Map version 2.0 84
Appendix B – Quick Start Instructions 95
Installation Supplies 95
Installation Steps 96
Physical Mounting and Connections 97
Wiring 97
Operating Power 98
Process Connections 99
P1 Comm port 99
SW1 Settings 100
Power up Initialization and setup 100
Appendix C – Suggested Spare Parts 101
Optional Parts 101

List of Tables

Table 1: State and Status Message Interpretations 2
Table 2: Model Number Matrix 5
Table 3: Examples of Model Numbers 6
Table 4: Specifications 9
Table 5: NACE MR0175 Compliance Guidelines 10
Table 6: Input Type Selection Switches 23
Table 7: Status Register Fault Table 33
Table 8: *Red Eye* 2G Modbus Register Map version 2.8e 39
Table 9: *Red Eye* 2G Modbus Register Map version 2.2 59
Table 10: *Red Eye* 2G Modbus Register Map version 2.1 72
Table 11: *Red Eye* 2G Modbus Register Map version 2.0 84
Table 12: Operating Power Inputs 98
Table 13: Process Connection Table 99
Table 14: Switch SW1 Settings 100

List of Figures

Figure 1: Crude Oil and Water Spectral in the Infrared region 3
Figure 2: Flange Mount Unit Dimensions 7
Figure 3: NPT Mount Unit Dimensions 8
Figure 4: Hazardous Locations Approvals 10
Figure 5: Installation Showing Flanged Unit Mounted in Different Orientations 12
Figure 6: Minimum and Maximum Depth Dimensions for Flange Types 13
Figure 7: Alignment Mark on *Red Eye* 2G Screw-Mount 14
Figure 8: Removing Cap, Insulator, and Display Mounting Screws 15
Figure 9: Display Board Removed Revealing Connector Sockets 16
Figure 10: Display Board Being Plugged In 17
Figure 11: Wiring Going Into or Out of the *Red Eye* Unit 19
Figure 12: T1 Connector Wiring 20
Figure 13: 4 to 20mA Input with Loop Power for the Well Selection Device 21
Figure 14: 4 to 20mA Output with Loop Power for the Field Device 22
Figure 15: Analog with Loop Power or Frequency Inputs 24
Figure 16: Frequency Input with Pre-Amp Wiring 25
Figure 17: T2 Terminal Strip Connections 29
Figure 18: Unit Showing Electrical Terminals 98

This page intentionally left blank.

Introduction and Description

The Red Eye® 2G Water Cut Meter is a multi-channel filter spectrometer designed for accurate measurement of oil and water fractions in a commingled stream. The unit employs a patented optical sensor technology based on the bulk transmission of infrared radiation through an oil-water mixture. The *Red Eye* 2G is a full range 0-100% water cut meter that performs over the wide range of conditions encountered in the oil field. The sensor is independent of brine salinity, variability in liquid densities, and insensitive to entrained gas and vibration.

The Red Eye® 2G sensor interfaces with network systems, including remote terminal units (RTU) and supervisory control and data acquisition systems (SCADA) for remote operation. The transmitter provides RS232 and RS485 serial communications for output and configuration control. A Flash memory allows the user to configure and store the calibration parameters for up to 40 wells (or process applications).

A separate 2G NOC (Net Oil Computer) allows the user to run well tests using the reading from the Red Eye® 2G Water Cut Meter and a liquid flow meter.

Display

A two-line display, on the meter itself, allows the operator to monitor the water cut and other pertinent data at the installed site. The first line of the display always displays the current percentage of water. The second line will scroll through the following items:

- Active Well = ‘X’ (Current Well being monitored. Options displayed from 1 – 40)
- Temp = ‘X’ (Current temperature of the *Red Eye* 2G BoardStack in °C)
- W-Select = Mode for Well Selection (Options displayed between MBUS = ModBUS and AI = Analog Input)
- Modbus ID = ‘X’ (Current ID set for *Red Eye* 2G Communication. Options displayed from 1 – 255. Factory Default Setting at 49.)
- S = 00, Stat = OK (Current Status of the *Red Eye* 2G device. See Table 1 for further status interpretations.)
- Photocur = “Live” or “User” (Displays whether the photocurrents used by the algorithm are live or user entered.)
- Board = “Log Amp” or “Linear Amp” (Displays the detector board type. From the user’s standpoint these two board types are identical. There is no difference in the operation of the water cut meter.)
- All Channels On (Indicates that the channel is switched ON for calculation.)
- All Channels Off (Indicates that the channel is switched OFF for calculation.)

Note: The Red Eye 2G unit will save any edits to the database one minute after the last edit. The unit will display "Saving CFG" on the second line of the display for 2 seconds during actual writing of configuration values to the Unit Flash Memory.

Note: The Red Eye 2G unit will display the firmware version of the unit for 2 seconds upon powering up the unit.

Table 1: State and Status Message Interpretations

Display	***Description***
S = 00, Stat = OK	Everything is OK
S = 01, Stat = Def Conf	Default Configuration Alarm
S = 02, Stat = No Air Cal	No Air Calibration
S = 04, Stat = OK	Low Signal Warning
S = 08, Stat = Low Fault	Low Signal Alarm
S = 16, Stat = Coef Err	Method Coefficients Error
S = 32, Stat = ReadI Error	ADC Reading Error
S = 64, Stat = DtecBd Err	Incompatible Detector Board

Note: Not all State and Status Messages are available in all firmware versions.

Note: If the status of the Red Eye 2G contains the "No Air Cal" alarm (S=02), then the Water Cut % will be fixed at 0.00%

Several means of configuration control are possible. For instance:

- *RedLine* Configuration Program on a Pocket PC
- Modbus via a Network – Server or through a Modbus program running on a laptop.

General Principle of Operation

The *Red Eye* 2G Water Cut Meter uses the basic principle of spectroscopy, relying on the large difference in the absorption of Near Infrared Radiation (NIR) between crude oil and water. Spectroscopy is any measurement of a quantity as a function of either wavelength or frequency. The differentiation of NIR, crude oil, and water is achieved by operating over a very narrow band of radiation with maximum intensity occurring at a wavelength where crude oil and water exhibit large differences in opacities.

The second generation Water Cut Meter, Red Eye® 2G, measures transmissions at multiple infrared frequencies simultaneously. This device supports four simultaneous measurements of optical power over a range of infrared frequencies. Each measurement covers a different frequency range where water and oil can be differentiated. The advantage of this is a pronounced increase in accuracy over the full range of water cut (i.e. 0 – 100%). Other advantages include the enhancement of the calibration process enabling a less rigorous, but accurate "Pure" fluids calibration method.

A new algorithm has been recently developed to improve the accuracy of the 2G unit. In this algorithm all four wavelengths are used to calculate water cut. In the previous generation only two of the four wavelengths were used at one time. This new version provides better "out of the box" performance, has improved stability over varying emulsion levels, and handles high gas content.

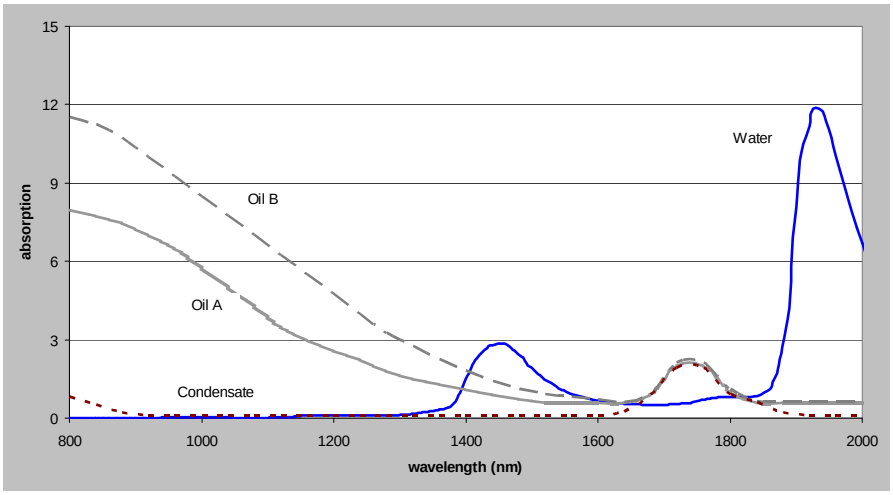


Figure 1: Crude Oil and Water Spectral in the Infrared region

Figure 1 shows the spectral properties of two crude oils, water, and condensate. By measuring optical transmission at wavelengths where there are distinct differences in absorption for oil and water, the Red Eye® 2G Water Cut can accurately determine the relative concentrations.

A key advantage of this technique is the insensitivity to varying salinity of the water. The absorption curve for water is governed by the water molecule itself rather than the dissolved components. This feature allows the Red Eye® 2G to have a single calibration point for water irrespective of the water chemistry.

Water-cut techniques that measure properties such as dielectric constant are strongly affected by salinity.

Spectral measurements of a wide range of oil samples along with field experience have shown that, absorption coefficients can and do vary even for oils with similar specific gravities. This means well-to-well variation of oil spectral properties must be reflected in a specific calibration factor.

Gas carry-under in the liquid leg of a two-phase separator is commonly encountered during well testing. This is true especially with high gas-oil ratio (GOR) and high volume wells. Fields that are under tertiary recovery using carbon dioxide flooding are particularly susceptible to free gas in the liquid phase during well testing. This is due to the high solubility of CO_2 in oil and water that can evolve as free gas even at separator conditions.

Hydrocarbon and non-hydrocarbon gases transmit close to 100% of the NIR radiation. Thus, the presence of free gas in the liquid phase can be distinguished from the oil and water resulting in very little or no effect on the net oil measurement. Furthermore, solution gas does not affect the NIR interaction with the crude oil.

The *Red Eye* 2G sensor interactions with oil, water, and free gas (also called entrained gas) are summarized below:

- Both crude oil and water are the absorbing media depending on the frequency of measurement. This improves the accuracy of water cut measurement.
- Pure Fluid calibration is possible.
- Variation in crude oil density over the producing life of a well does not affect the oil calibration factor.
- Variation in water properties does not affect the transmission of the NIR radiation.
- Free gas (entrained gas). Limited measurements have shown that up to 10% gas void fraction has little or no effect on the *Red Eye* 2G sensor.
- Solution gas does not affect the *Red Eye* 2G performance.

Technical Specifications

The following paragraphs and tables list the specifications that may be needed throughout the course of using this equipment.

Model Number Information

Table 2: Model Number Matrix

Model # format 2G-V1-V2-V3-V4-V5-V6	***Variable***	***Description***
V1	Process Line Size	Line size or range in inches (2 through 24). -2- means 2" size only -2/4- means suitable for 2" through 4" line size. The range will depend on process connection style.
V2	Pressure Rating	P6 is ANSI 600# equivalent (1200 psi Cold Working Pressure) P9 is ANSI 900/1500# equivalent (2160 psi). Both P6 & P9 are available in 1.5 inch RF Flanges P9 is also available in a 2 inch RTJ flange (3600 psi)
V3	Wetted Material	316=316LStainless steel HS= Hastelloy C276
V4	Process Connection	T=1" NPT Threaded Fx=Raised Face Flange and "x" is style number (e.g. 1=1-1/2" 600#ANSI, 2=1-1/2" 900/1500#ANSI, 3=1-1/2" API 2000) Rx=Ring Joint Flange and "x" is style number. Additional flange styles may be added provided they are compatible with pressure rating
V5	Probe gap	A=0.080" B=0.060" C=0.040" D=0.25” E=0.5” F=0.030 etc.
V6	Filter Set	A=Standard Filter B=Same “A”, but 1450 filter replaced with 1950

Note: The Model Number is specific for the pipe size and pressure rating. You must have a Red Eye 2G that is the correct size for your pipe. Check your Model Number before installing.

Table 3: Examples of Model Numbers

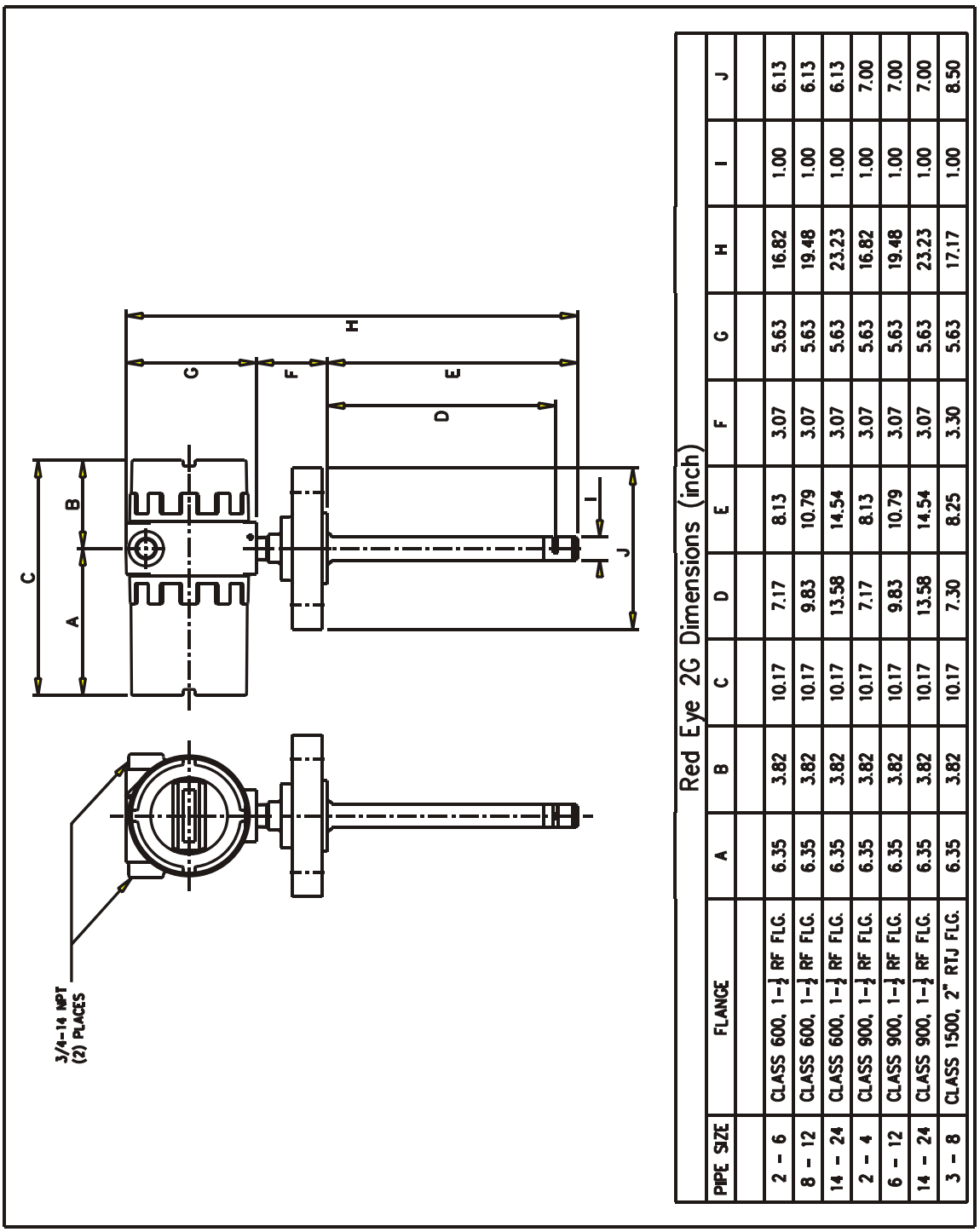
Part Number	Model #	Description
2G.1005	2G-2-P6-316-T-B-A	2" line 1480 psi CWP 316SS 1" NPT connection 0.060" gap "A" filter set
2G.1006	2G-3/4-P6-316-T-B-A	3" or 4" line 1480 psi CWP 316SS 1" NPT connection 0.060" gap "A" filter set
2G.1007	2G-6/10-P6-316-T-B-A	6" to 10" line 1480 psi CWP 316SS 1" NPT connection 0.060" gap "A" filter set
2G.1024	2G-2/4-P9-316-F2-B-A	2" to 4" line 2220 psi CWP 316SS 1-1/2" 1500# ANSI raised face flange connection 0.060" gap "A" filter set
2G.1034	2G-2/4-P9-HS-F2-B-A	2" or 4" line, 2160 psi CWP Hastelloy 1-1/2" 1500# ANSI raised face flange connection 0.060" gap "A" filter set
2G.1037	2G-2/6-P6-HS-F1-C-A	2" to 6" line, 1480 psi CWP Hastelloy 1-1/2" 600# ANSI raised face flange connection 0.040" gap "A" filter set
2G.1001	2G-3/4-P6-316-T-C-A	3" to 4" line 1480 psi CWP 316SS 1" NPT Connection 0.040" gap "A" filter set

Unit Weight

The *Red Eye* 2G is approximately 23lbs ±10% depending upon configuration.

Physical Dimensions

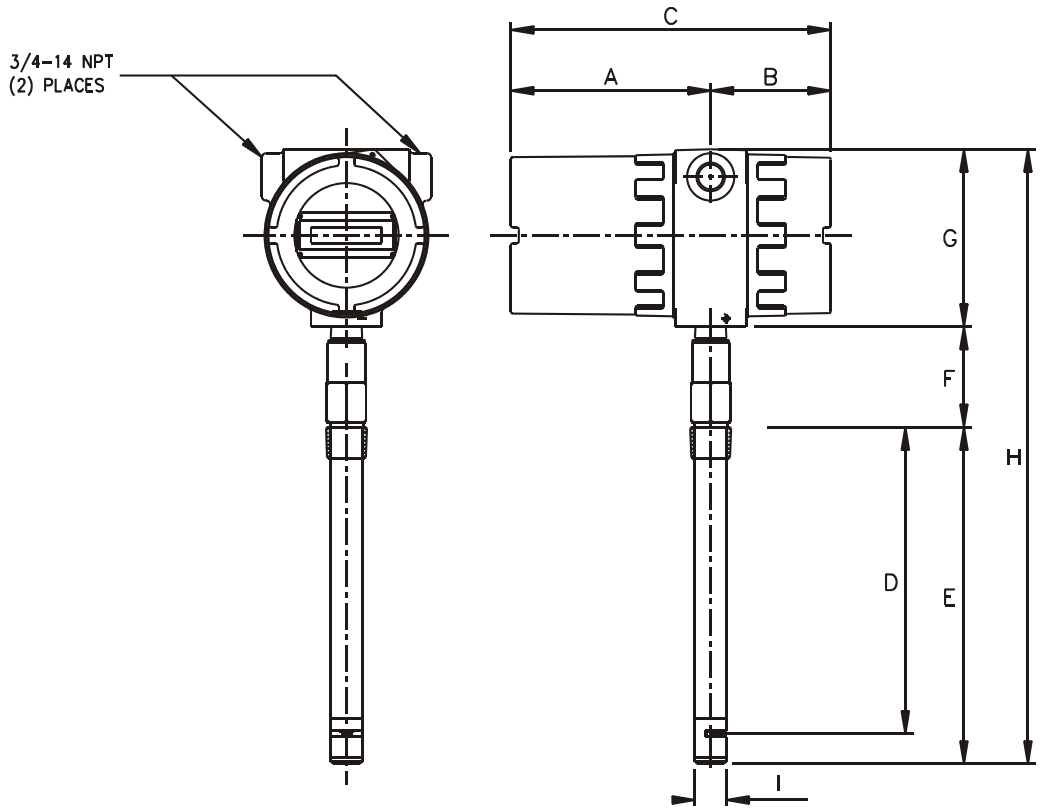
The following drawings show the physical dimensions of the various flange and NPT mount units:



Red Eye 2G Dimensions (inch)

PIPE SIZE	FLANGE	A	B	C	D	E	F	G	H	I	J
2 – 6	CLASS 600, 1-¼ RF FLG.	6.35	3.82	10.17	7.17	8.13	3.07	5.63	16.82	1.00	6.13
8 – 12	CLASS 600, 1-¼ RF FLG.	6.35	3.82	10.17	9.83	10.79	3.07	5.63	19.48	1.00	6.13
14 – 24	CLASS 600, 1-¼ RF FLG.	6.35	3.82	10.17	13.58	14.54	3.07	5.63	23.23	1.00	6.13
2 – 4	CLASS 900, 1-¼ RF FLG.	6.35	3.82	10.17	7.17	8.13	3.07	5.63	16.82	1.00	7.00
6 – 12	CLASS 900, 1-¼ RF FLG.	6.35	3.82	10.17	9.83	10.79	3.07	5.63	19.48	1.00	7.00
14 – 24	CLASS 900, 1-¼ RF FLG.	6.35	3.82	10.17	13.58	14.54	3.07	5.63	23.23	1.00	7.00
3 – 8	CLASS 1500, 2" RTJ FLG.	6.35	3.82	10.17	7.30	8.25	3.30	5.63	17.17	1.00	8.50

Figure 2: Flange Mount Unit Dimensions



Red Eye 2G Dimensions (inch)									
PIPE SIZE	A	B	C	D	E	F	G	H	I
2	6.35	3.82	10.17	2.70	3.62	4.68	5.63	13.92	1.00
3 – 4	6.35	3.82	10.17	3.72	4.64	3.66	5.63	13.92	1.00
6 – 10	6.35	3.82	10.17	6.14	7.06	3.18	5.63	15.86	1.00

Figure 3: NPT Mount Unit Dimensions

Electrical Specifications

Table 4: Specifications

Electrical Power Required:	10 – 32 Volts DC @ 1 Amp Maximum
Analog Input Current:	4 – 20mA (Well Selection and Flow Rate)
Analog Output Current:	4 – 20mA (Water Cut)
High Level Frequency:	0 – 10kHz @ TTL level or 24 VDC
Operating Temperature:	-40° to +65°C*

**NOTE: Operating at -40°C requires a minimum input voltage level of 11 VDC.*

Prior-To-Installation Instructions

The following instructions apply to the *Red Eye* 2G Water-Cut Meter covered by certificate number Sira 05ATEX1138:

1. Installation shall be carried out by suitably-trained personnel in accordance with the applicable code of practice, e.g., EN 60079-14:1997
2. Inspection and maintenance of this equipment shall be carried out by suitably-trained personnel in accordance with the applicable code of practice, e.g., EN 60079-17.
3. Repair of this equipment shall be carried out by suitably-trained personnel in accordance with the applicable code of practice, e.g., EN 60079-19.
4. Replacement of component parts is limited to the termination board and the complete system board-stack. Fiber bundle, lamp, optical filter, sapphire window, and board level repair must be sent to the factory for repair/replacement.
5. The certification of this equipment relies upon the use of sapphire windows and 316 stainless steel or Hastelloy in the construction of the probe assemblies.
6. The *Red Eye* 2G is chemically resistant to normal oilfield solvents. Use of the 2G in H_2S environments for an extended period may cause degradation of metallic parts. (See NACE MR0175 Compliance statement)
7. The *Red Eye* 2G must be installed in suitable conduit systems, i.e., Class I Zone 1 approved for flameproof installations.
8. Approval Certificates and Certification Codes for the *Red Eye* 2G are as follows:
    a. Factory Mutual Approvals Project I.D. 3022805 XP Class I, Division 1, Groups C & D, T3C, Ta= $+85^{o}$ C
    b. Sira Certification Services Certificate SIRA 05ATEX1138 EEx d IIB T3 Ta= $+85^{o}$ C, IP66

c. Canadian Standards Association Certificate Number 1675737 Class I, Division 1, Groups C & D, T3C, Ta= +85° C, Type 4

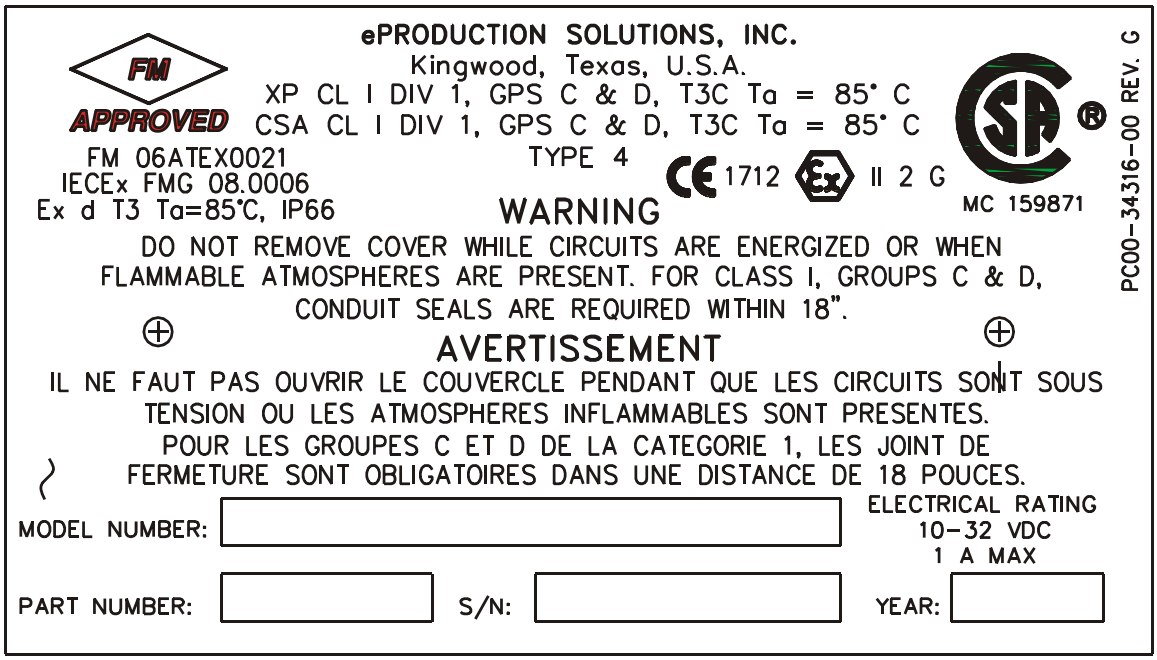


Figure 4: Hazardous Locations Approvals

NACE MR0175 Compliance

The wetted metal components of the 2G meter comply with NACE MR0175 recommendations for use in H_2S environments within the guidelines stipulated below.

Table 5: NACE MR0175 Compliance Guidelines

Probe Material	*Process Temp*	*H2S Partial Pressure*
316SS	T<95°C	No Limit
316SS	95°C<T<120°C	1 PSI
Hastelloy	T<150°C	No Limit

Quality Assurance

1. Perry Johnson Registrars, Inc.

   ISO 9001: 2000

2. UL International DEMKO

   CE 0539 04 ATEX Q138586

Physical Mounting

WARNING: The Red Eye® 2G is a production monitoring device and is not rated to withstand any impact from pipeline intervention equipment. The unit shall be removed from the production line before any pipeline intervention services are performed. Purchaser assumes the entire risk and liability for conducting any type of intervention services without removing the Red Eye 2G unit.

Mounting of the *Red Eye* 2G involves the following:

- Preparing the pipe to receive the unit by welding on a Thread-O-Let for the Screw-In Mount style or a Weld Neck Flange for the Flange Mount style.
- Inserting at the proper depth and securing, noting the position and alignment of the Alignment Mark.
- Repositioning the display as needed for easy viewing.

Note: The Red Eye 2G does not need to be mounted in a vertical position to function properly. It may be mounted in any position for ease of viewing, to keep it out of the way, or to ease installation.

Caution: Do not loosen the Locking Nut or move the Head of the unit in relation to the probe. Movement of the head will affect calibration and may cause internal damage.

Flange Unit Mounting

There are several variations when installing a flange mount *Red Eye* 2G. The requirements are basically divided up into 2 categories, 2 and 3 inch mounting and 4 inch and above mounting. Each specific model has a Probe insertion depth designed for a particular range of pipe diameters. The following diagrams depict the requirements for Flange installation.

Note: The Model Number is specific for the pipe size and pressure rating. You must have a Red Eye 2G that is the correct size for your pipe. Check your Model Number before installing.

2 and 3 Inch Pipe

On 2 and 3 inch pipe, a pipe reducing “T” may need to be installed and an extension added to make a specific height. Refer to Figure 6.

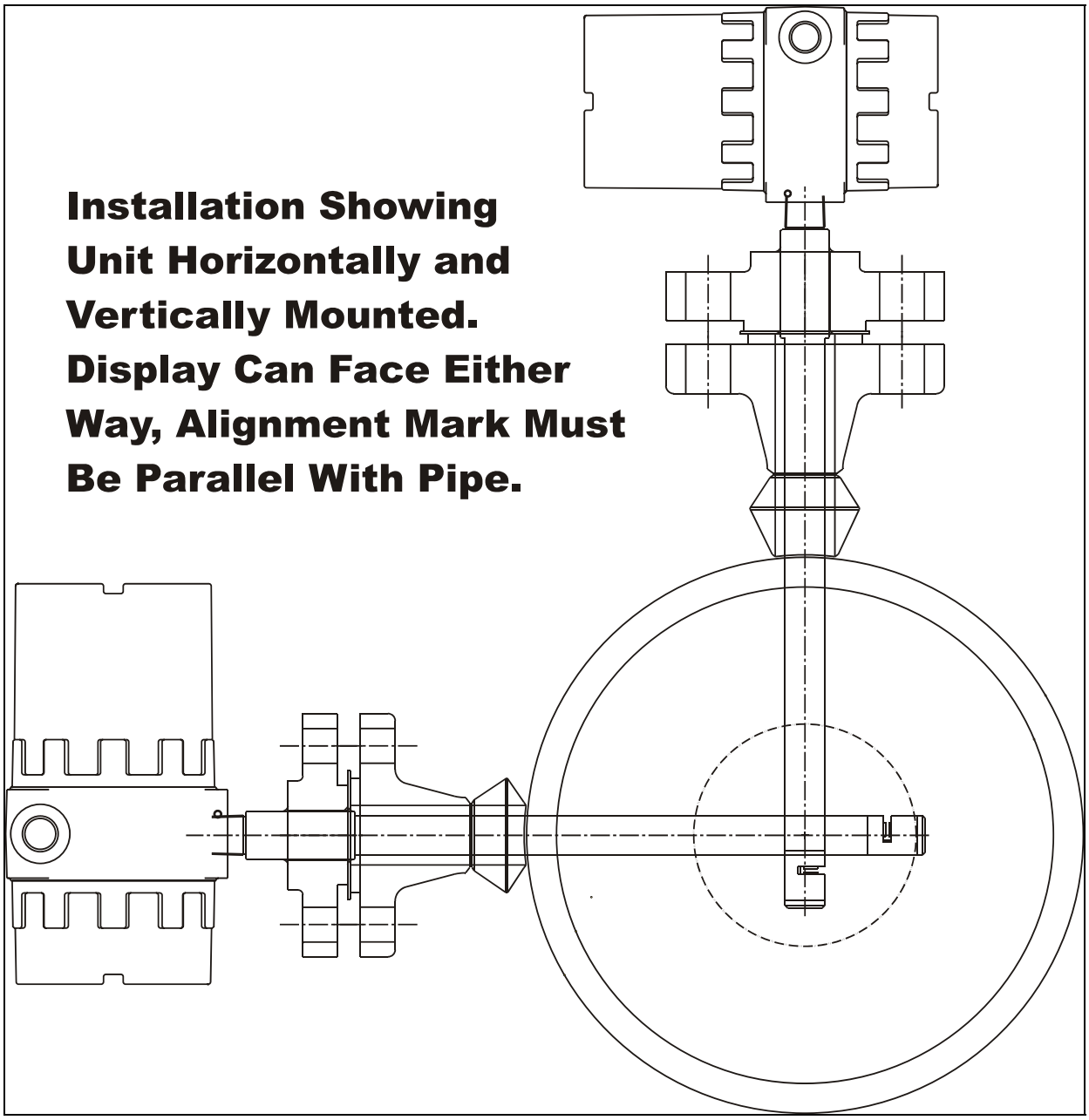
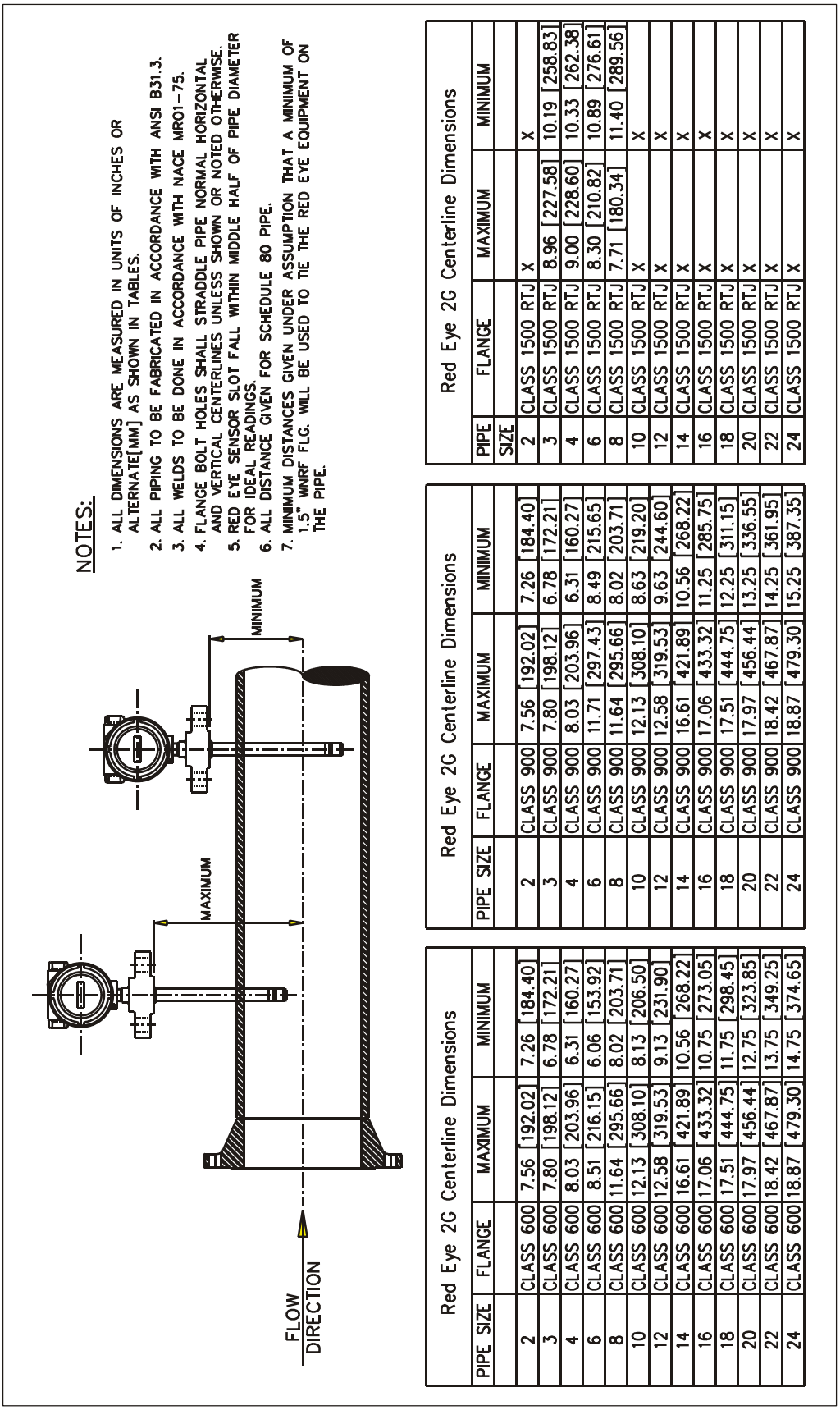


Figure 5: Installation Showing Flanged Unit Mounted in Different Orientations



Red Eye 2G Centerline Dimensions

PIPE SIZE	FLANGE	MAXIMUM		MINIMUM	
2	CLASS 600	7.56	[192.02]	7.26	[184.40]
3	CLASS 600	7.80	[198.12]	6.78	[172.21]
4	CLASS 600	8.03	[203.96]	6.31	[160.27]
6	CLASS 600	8.51	[216.15]	6.06	[153.92]
8	CLASS 600	11.64	[295.66]	8.02	[203.71]
10	CLASS 600	12.13	[308.10]	8.13	[206.50]
12	CLASS 600	12.58	[319.53]	9.13	[231.90]
14	CLASS 600	16.61	[421.89]	10.56	[268.22]
16	CLASS 600	17.06	[433.32]	10.75	[273.05]
18	CLASS 600	17.51	[444.75]	11.75	[298.45]
20	CLASS 600	17.97	[456.44]	12.75	[323.85]
22	CLASS 600	18.42	[467.87]	13.75	[349.25]
24	CLASS 600	18.87	[479.30]	14.75	[374.65]

Red Eye 2G Centerline Dimensions

PIPE SIZE	FLANGE	MAXIMUM		MINIMUM	
2	CLASS 900	7.56	[192.02]	7.26	[184.40]
3	CLASS 900	7.80	[198.12]	6.78	[172.21]
4	CLASS 900	8.03	[203.96]	6.31	[160.27]
6	CLASS 900	11.71	[297.43]	8.49	[215.65]
8	CLASS 900	11.64	[295.66]	8.02	[203.71]
10	CLASS 900	12.13	[308.10]	8.63	[219.20]
12	CLASS 900	12.58	[319.53]	9.63	[244.60]
14	CLASS 900	16.61	[421.89]	10.56	[268.22]
16	CLASS 900	17.06	[433.32]	11.25	[285.75]
18	CLASS 900	17.51	[444.75]	12.25	[311.15]
20	CLASS 900	17.97	[456.44]	13.25	[336.55]
22	CLASS 900	18.42	[467.87]	14.25	[361.95]
24	CLASS 900	18.87	[479.30]	15.25	[387.35]

Red Eye 2G Centerline Dimensions

PIPE SIZE	FLANGE	MAXIMUM		MINIMUM	
2	CLASS 1500 RTJ	X		X	
3	CLASS 1500 RTJ	8.96	[227.58]	10.19	[258.83]
4	CLASS 1500 RTJ	9.00	[228.60]	10.33	[262.38]
6	CLASS 1500 RTJ	8.30	[210.82]	10.89	[276.61]
8	CLASS 1500 RTJ	7.71	[180.34]	11.40	[289.56]
10	CLASS 1500 RTJ	X		X	
12	CLASS 1500 RTJ	X		X	
14	CLASS 1500 RTJ	X		X	
16	CLASS 1500 RTJ	X		X	
18	CLASS 1500 RTJ	X		X	
20	CLASS 1500 RTJ	X		X	
22	CLASS 1500 RTJ	X		X	
24	CLASS 1500 RTJ	X		X	

Figure 6: Minimum and Maximum Depth Dimensions for Flange Types

Screw-In Unit Mounting

For 2 inch to 10 inch pipe, the Screw-In unit should be screwed into the 1”, 3000 or 6000#, ASME A-105 Material, ThreadoLet/Flexolet until it is seated and the alignment mark is straight with the pipe. Use the provided pipe thread lubricant (P/N: PC00-33565-00) or an approved API pipe thread lubricant when installing.

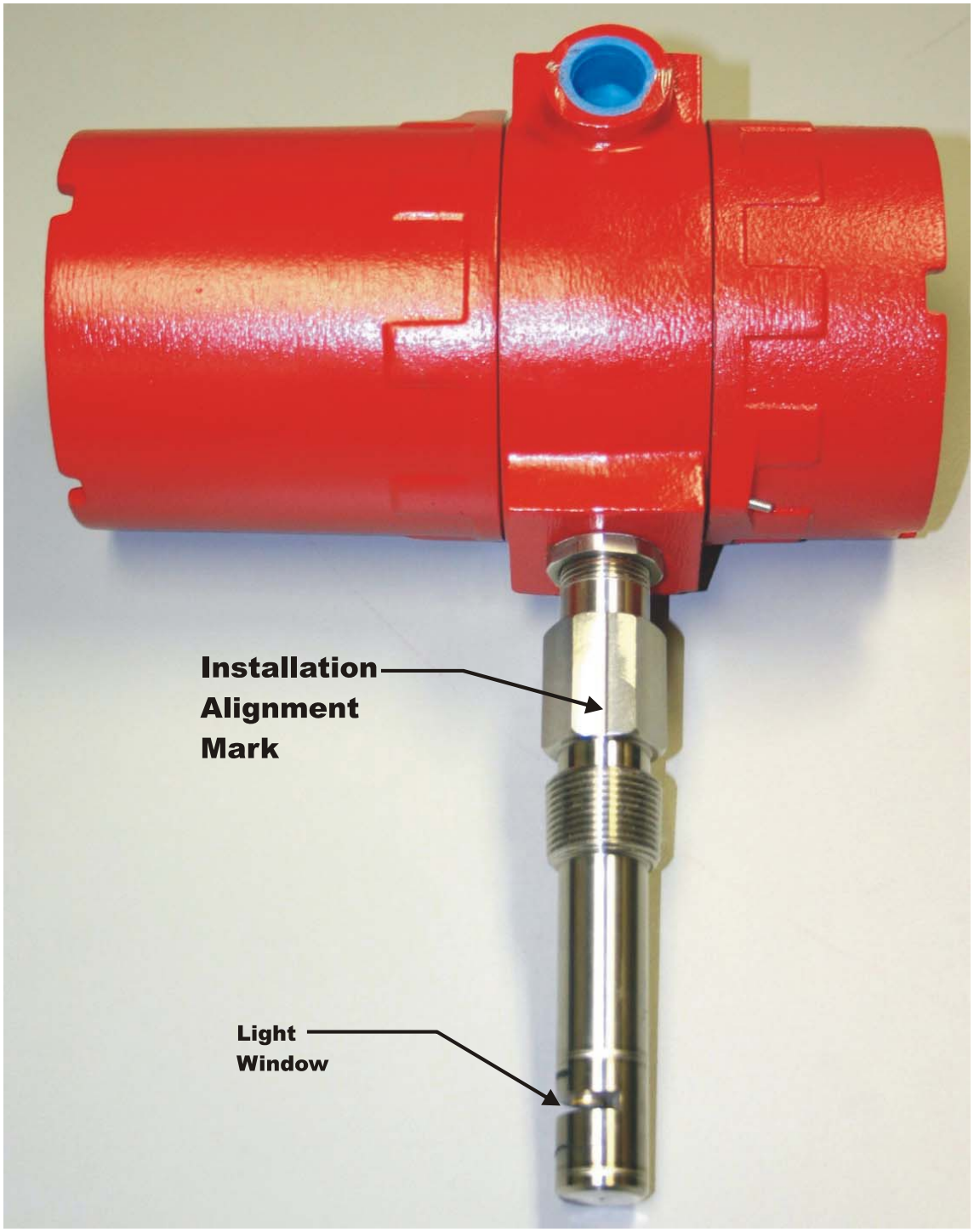


Figure 7: Alignment Mark on *Red Eye* 2G Screw-Mount

Display Orientation Instructions

The internal display can be re-orientated in one of 3 ways to make it easier to read when installed on the piping. The following instructions guide you in re-orientating your display.

1. Remove the seal cap from the display head of the *Red Eye* 2G by loosening the locking screw and turning the seal cap counter-clockwise. Set the seal cap and the insulator (if installed) aside for re-installation later.
2. Remove the 4 plastic screws that hold the display board onto the electronics package and set them aside as shown in Figure 8.

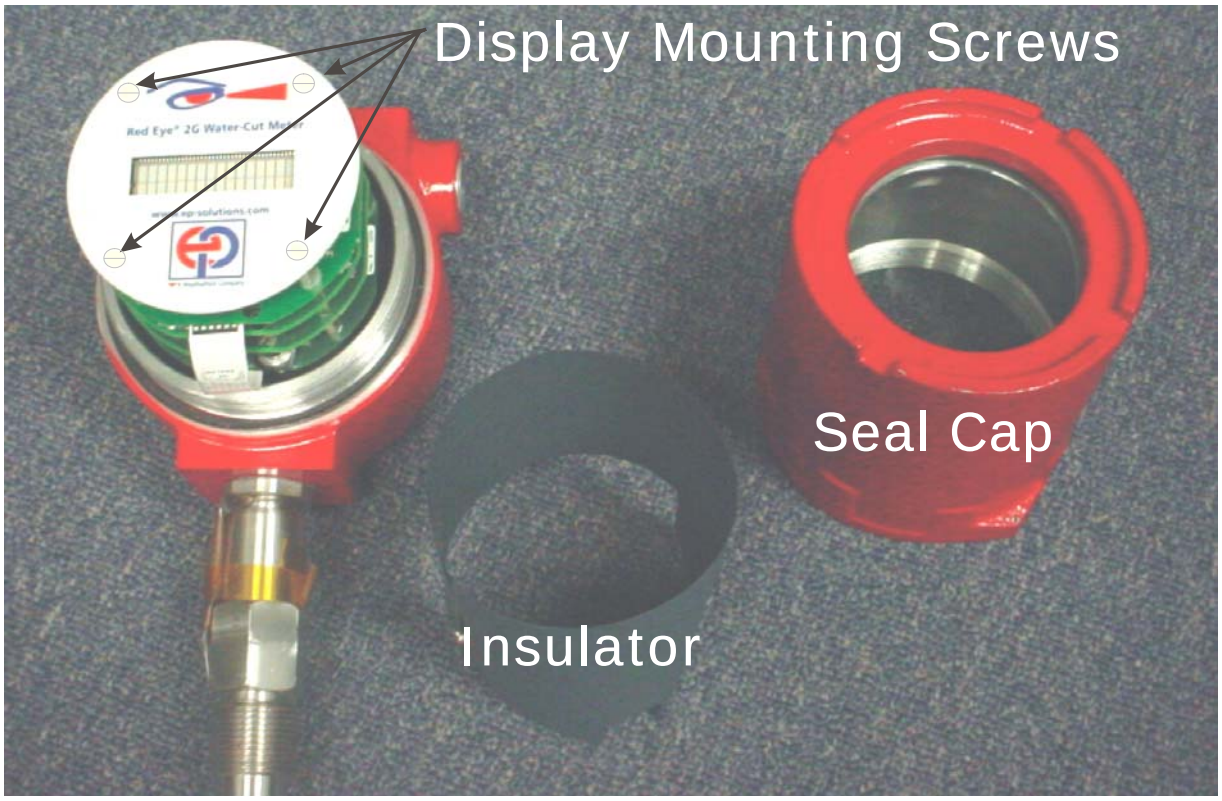


Figure 8: Removing Cap, Insulator, and Display Mounting Screws

3. Remove the display board by pulling straight up and set it aside. See Figure 9.
4. You will notice that there are 3 socket connectors on the electronics package board, J1, J2, and J3. The display board can plug into any of the three. Rotate the display so that it is viewable as desired and carefully plug the display board back into any plug that is correct for your viewing. Be sure that all the pins are lined up in the female plug before pushing down on the display board to firmly seat the plug. See Figure 9 and Figure 10.
5. Install the 4 display mounting screws.

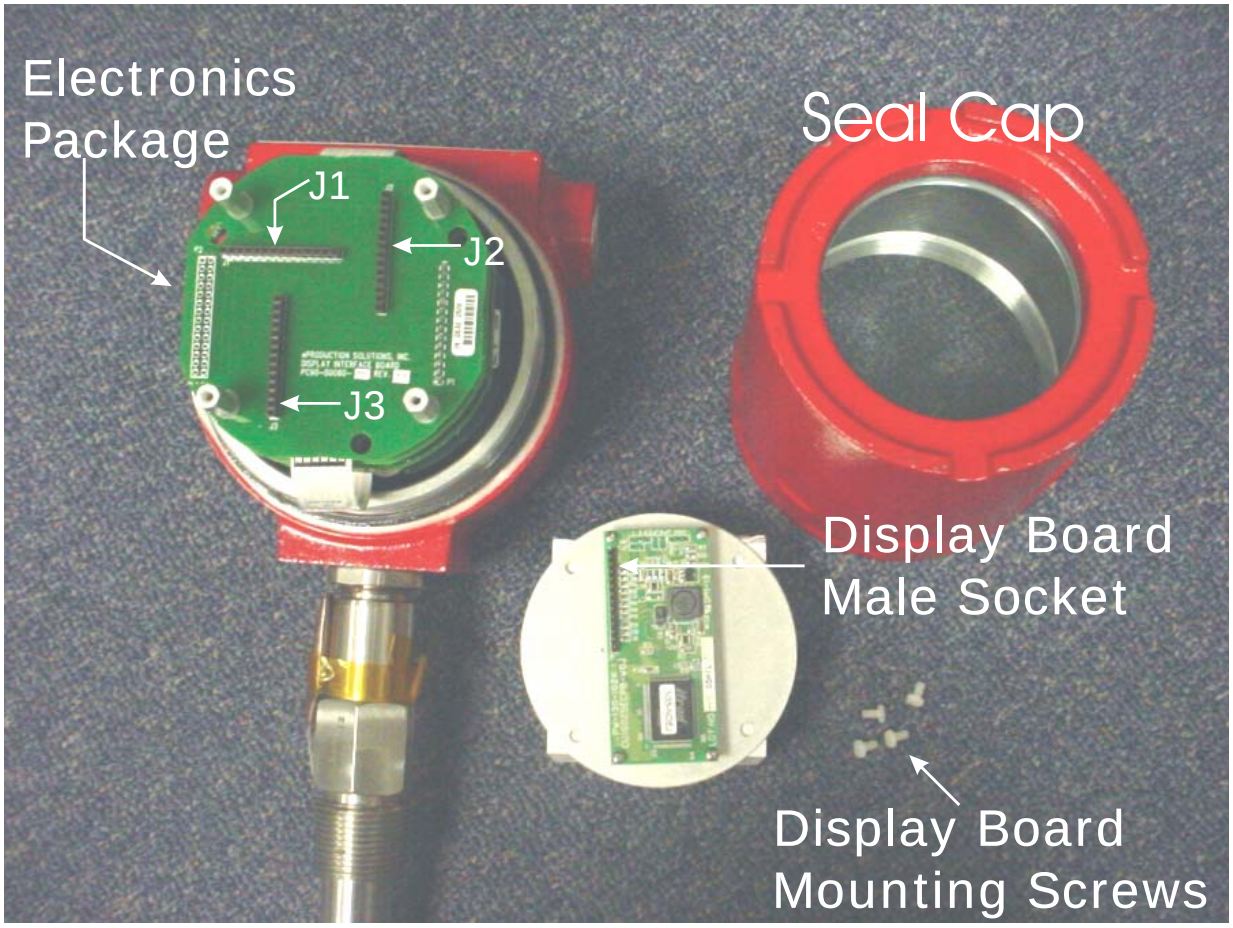


Figure 9: Display Board Removed Revealing Connector Sockets

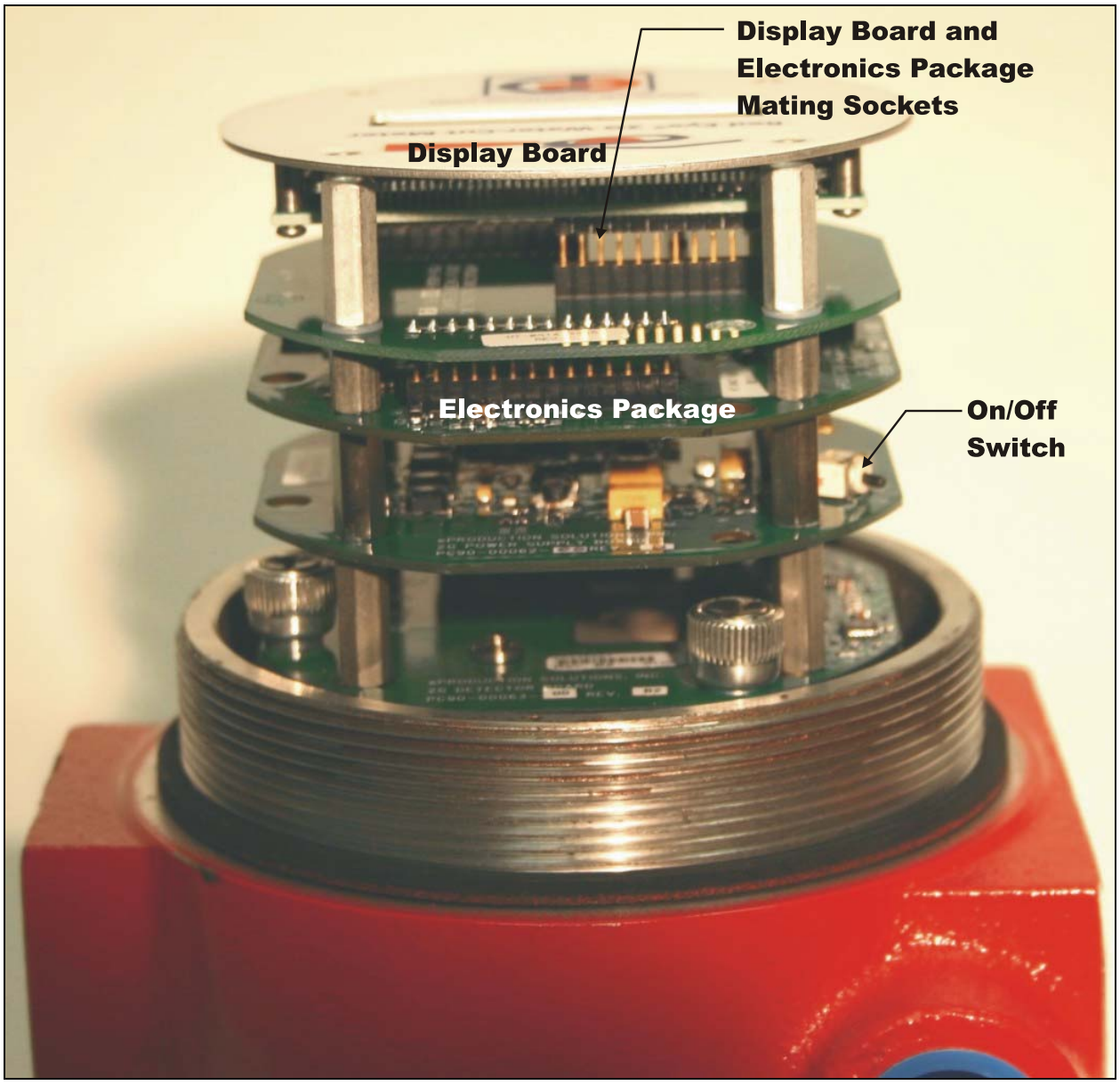


Figure 10: Display Board Being Plugged In

6. Re-install the insulator and then re-install the window seal cap.
7. Tighten the locking screw and the display is properly orientated for viewing.

This page intentionally left blank.

Wiring Connections

Introduction

All wiring going into or out from the *Red Eye* 2G unit will enter or leave through the conduit flanges on the unit case. All wiring must be encased in conduit per API Specifications. See Figure 11. Wiring connections are made at the bottom of the unit, opposite from the display.

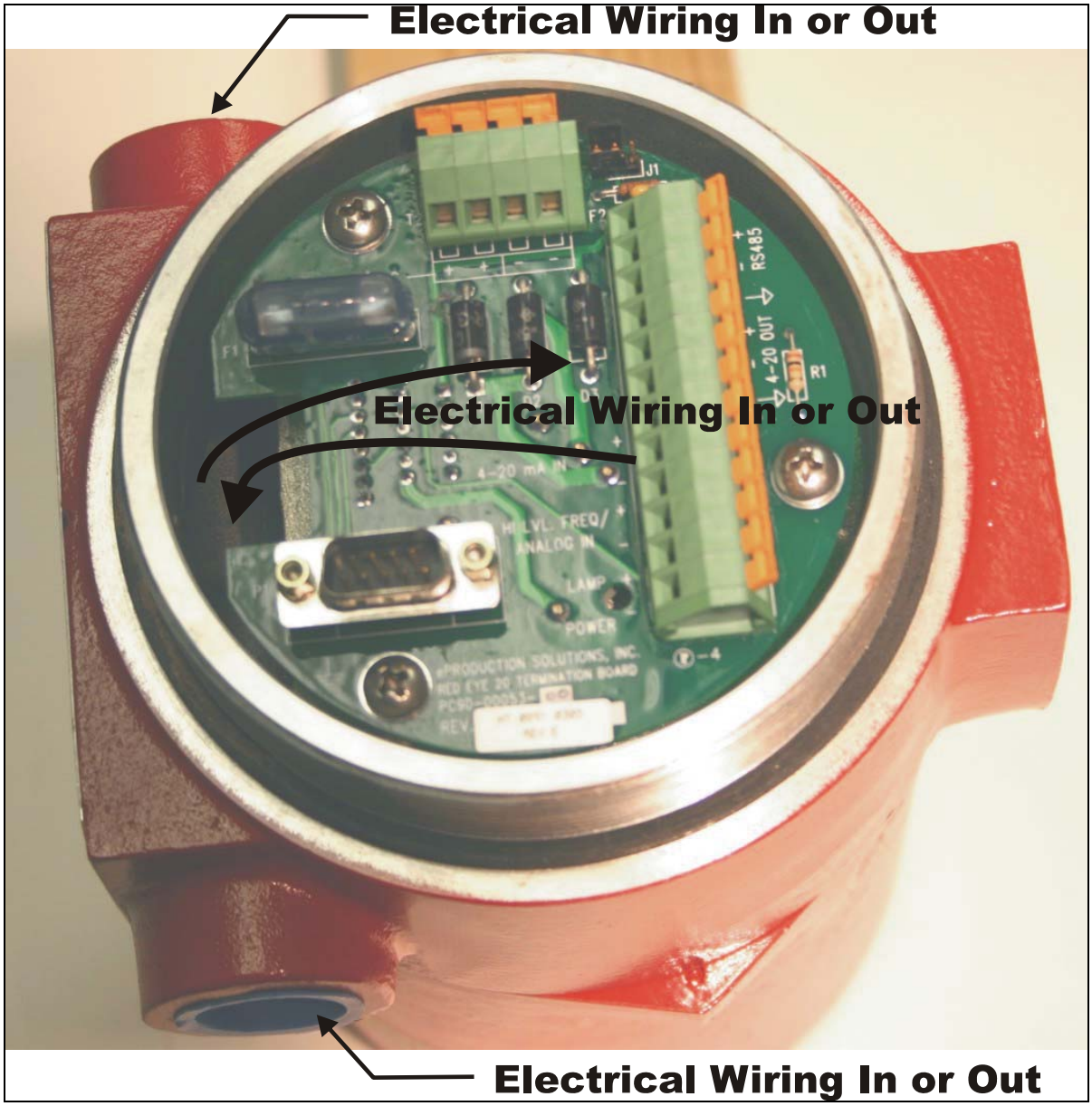
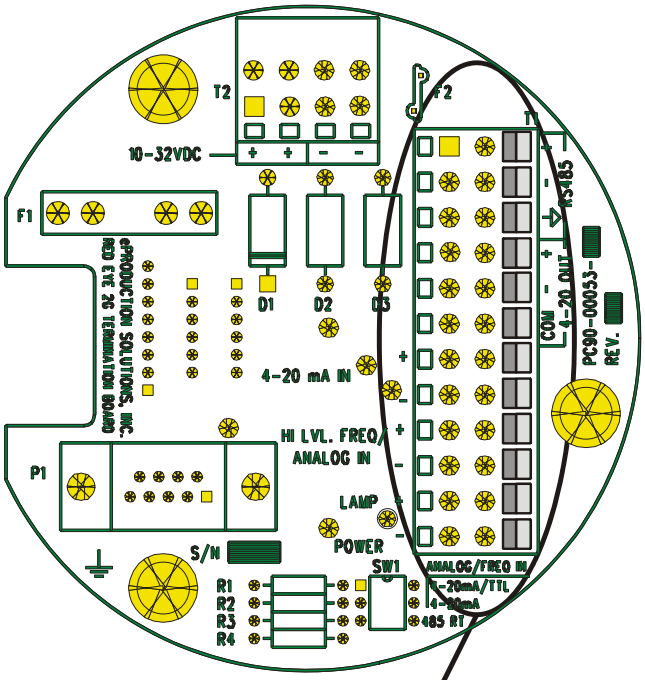


Figure 11: Wiring Going Into or Out of the *Red Eye* Unit

Terminals

Most wiring connections are made to the T1 and T2 Terminals. These terminals have little levers on the side which allow you to open the terminal and slide the bare wire end into it. Only about ¼" of single conductor wire is required to be stripped bare. They make for easy and secure connections. P1 is a standard RS232 Connector.



Analog Input for Well Selection Wiring

An Analog Input for Well Selection is provided on terminal T1, positions T1-7 and T1-8 (See Figure 12). These connections allow input well selection information, 4 to 20mA, from an external source. The well number is directly associated with the mA number input:

4 ± 0.25mA = Well #1
5 ± 0.25mA = Well #2
.
.
.
18 ± 0.25mA = Well #15
19 & 20 ± 0.25mA = Well #16

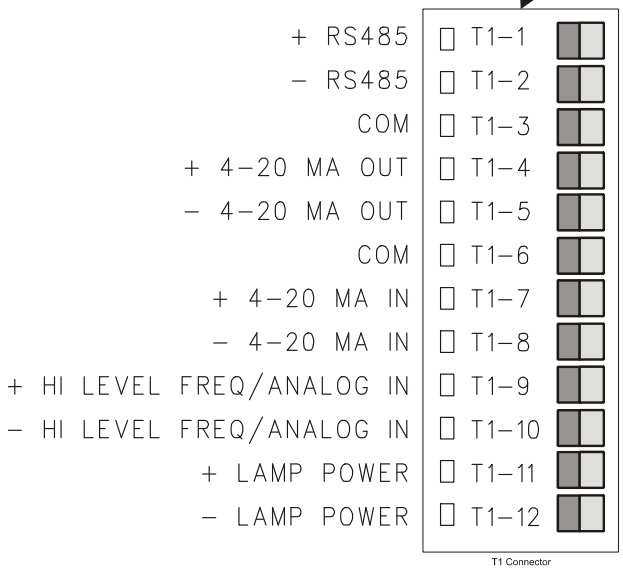


Figure 12: T1 Connector Wiring

Note: When using analog input for well selection, the user is limited to 16 wells. Signals outside of ranges, mentioned above, leave the current well active. When using Modbus commands or RedLine for well selection, all 40 wells are available.

Note: The analog input must be of a discrete step type, not of a ramp up or ramp down nature.

Well Selection Wiring

The following illustration guides you in connecting a Well Selection device to terminals 7 and 8 of T1.

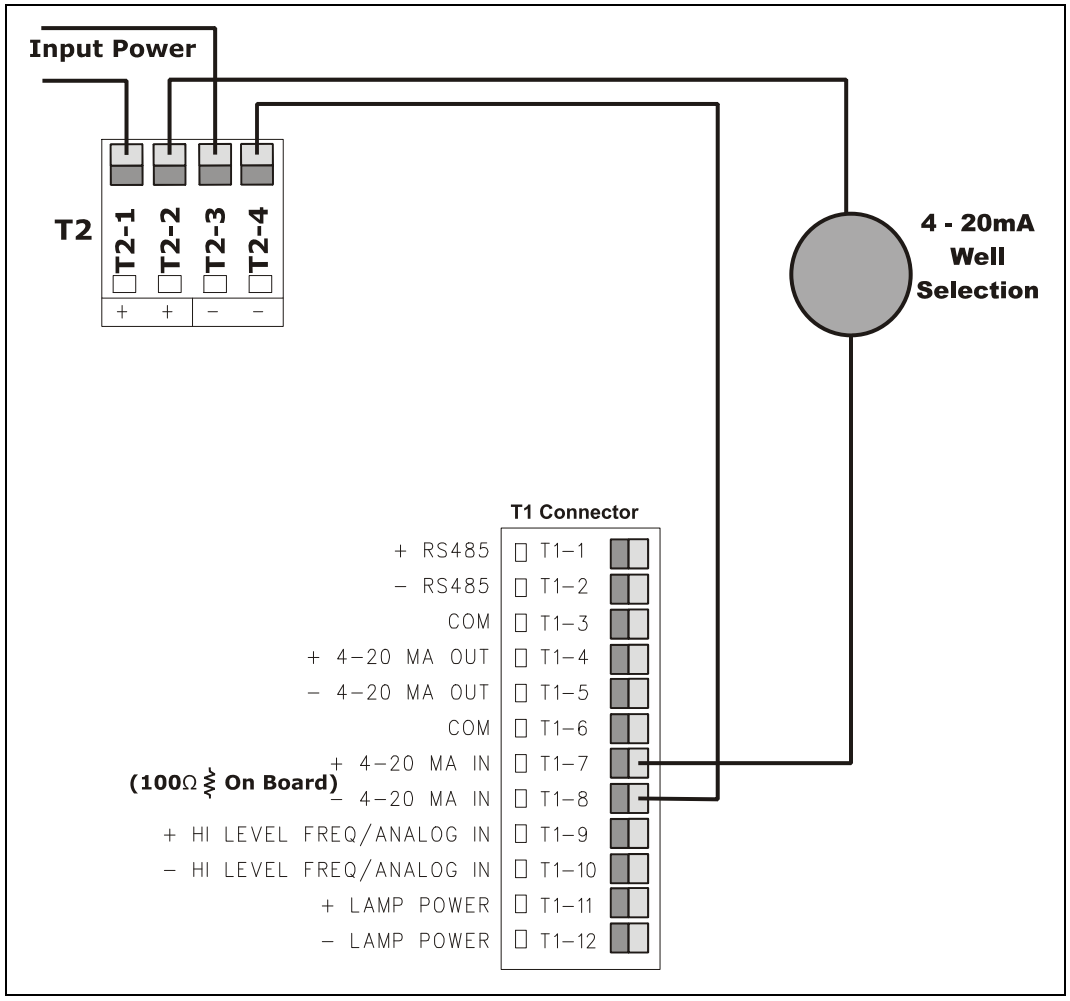


Figure 13: 4 to 20mA Input with Loop Power for the Well Selection Device

Note: For self-powered 4 to 20mA devices, connect directly to T1-7 and T1-8.

Water Cut 4 to 20mA Out Remote Field Device Wiring

The following illustration guides you in connecting a remote field device to terminals 4 and 5 of T1.

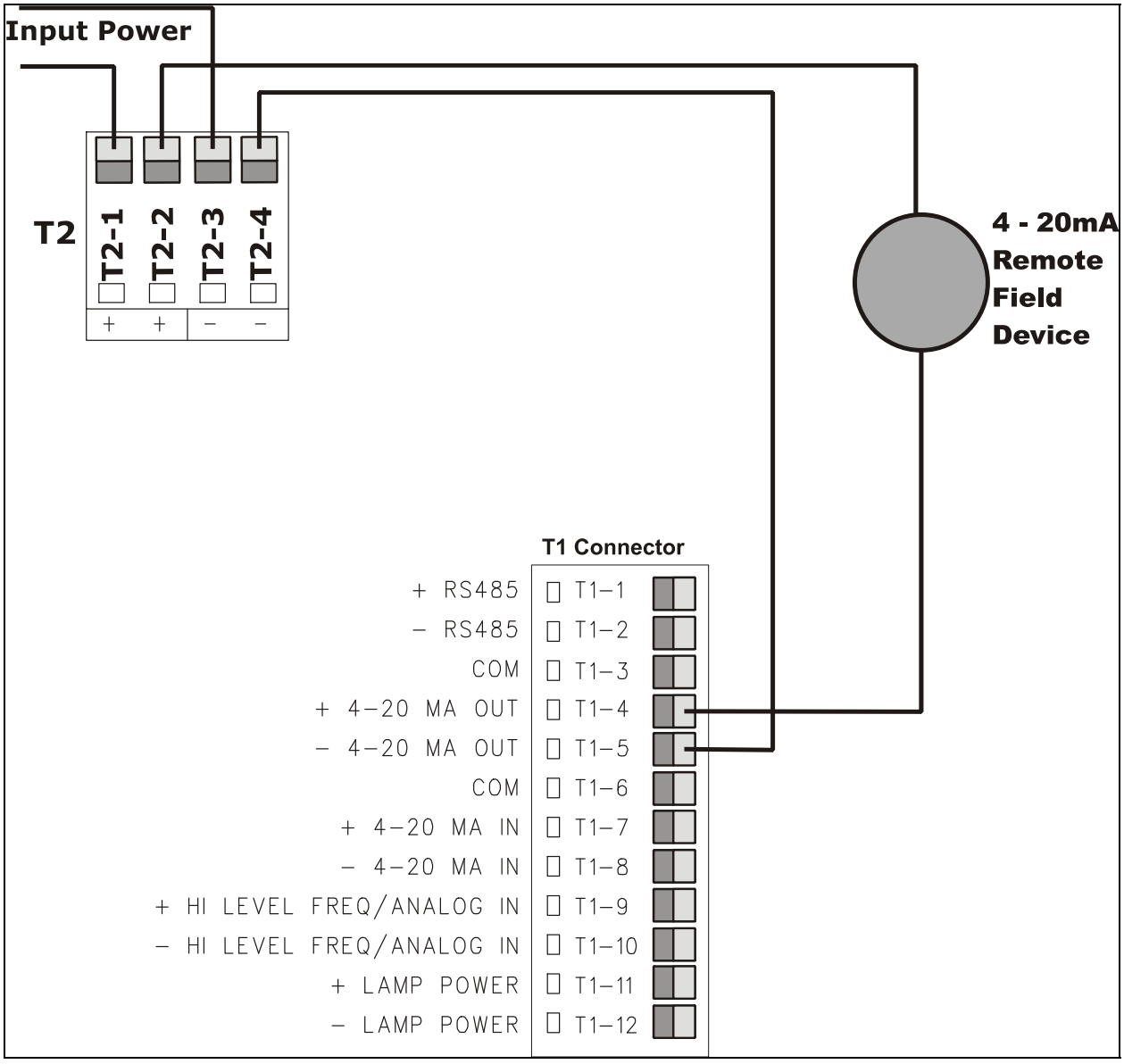


Figure 14: 4 to 20mA Output with Loop Power for the Field Device

Note: For self-powered 4 to 20mA passive connect configuration, connect directly to T1-4 and T1-5.

Flow Meter Wiring or Analog In Remote Field Device Wiring

A Flow Meter can be connected to this unit and the signal will be passed through to the NOC or Flow Computer. This signal can be either an analog signal (4 to 20mA or 24V Pulse) or a High Level Frequency (TTL Pulse) input signal.

Note: The Flow Meter input signal is not used within this unit, but is passed on as a Modbus accessible parameter.

Switches and resistors are provided on the terminal board in order to select the proper resistance device for each of the inputs. Table 6 and Figure 15 provide the switch settings for the various input types.

Table 6: Input Type Selection Switches

Input Type	***SW1-1***	***SW1-2***
4 to 20mA	Closed	Closed
TTL Pulse	Closed	Open
24V Pulse	Open	Open

Connections for the Flow Meter input are at Terminal Strip T1, connectors T1-9 and T1-10. Refer to Figure 12 and Figure 15 for additional details.

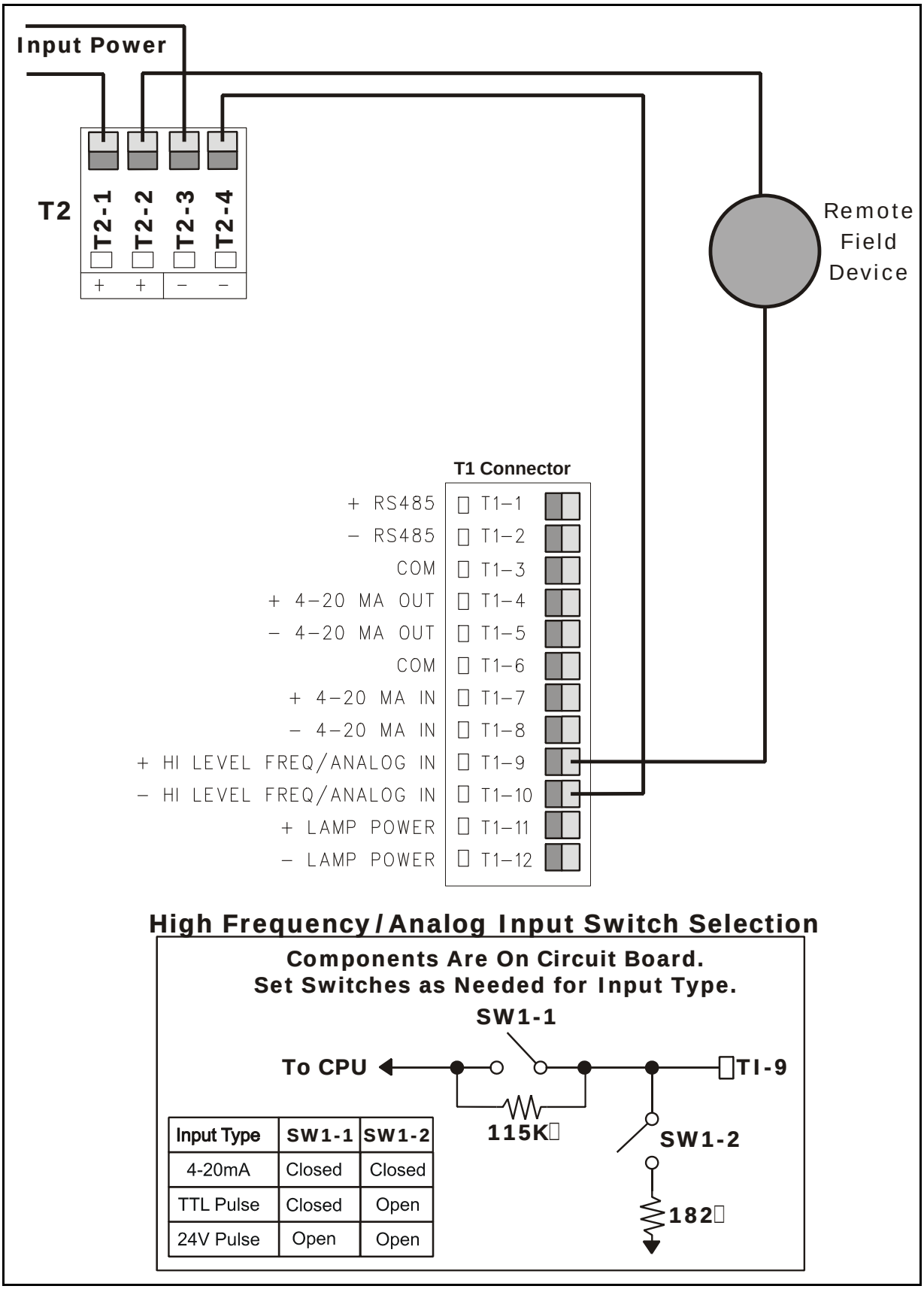


Figure 15: Analog with Loop Power or Frequency Inputs

External Pre-Amp Wiring

The following illustration guides you in connecting a pre-amp to the *Red Eye* 2G.

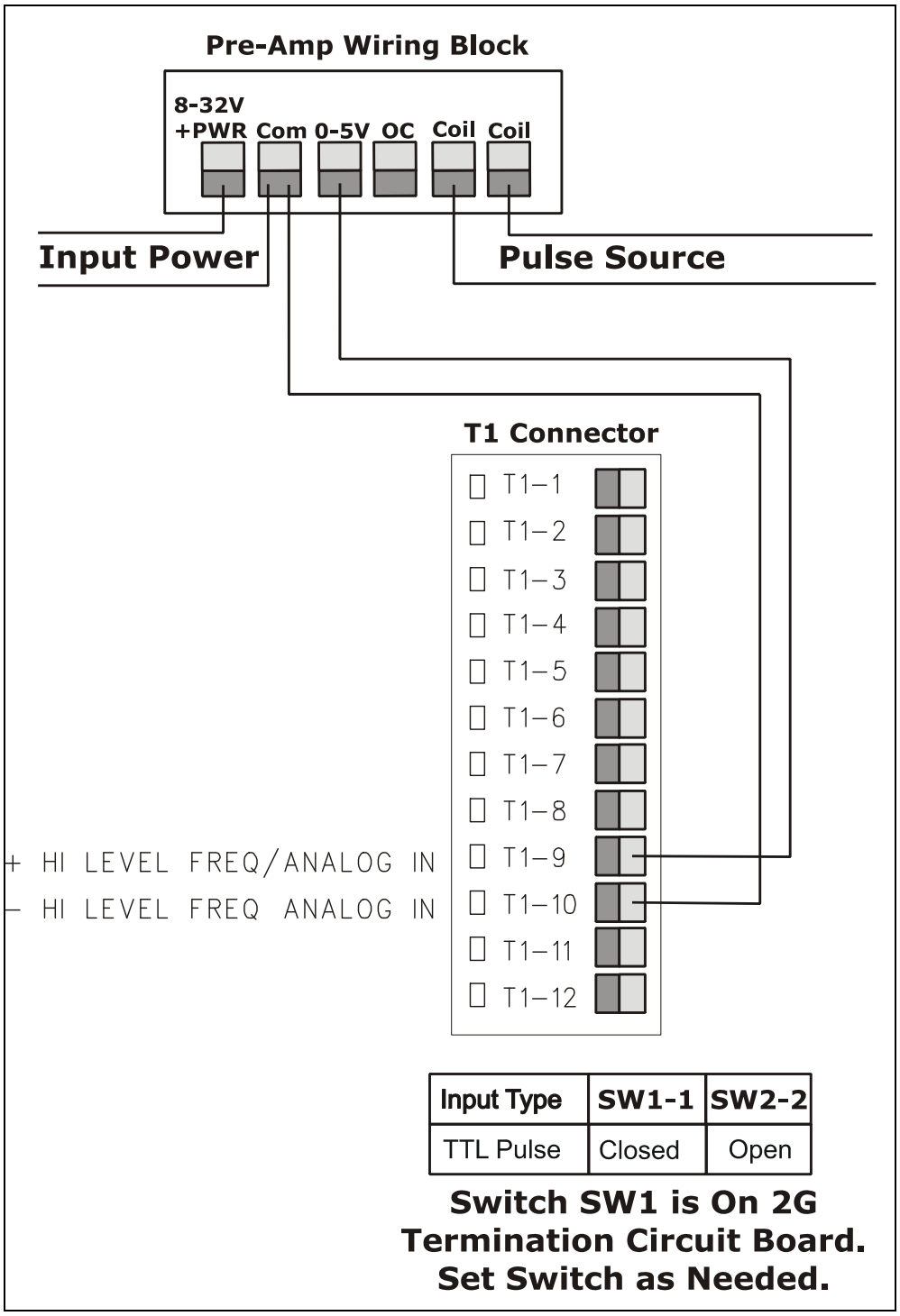


Figure 16: Frequency Input with Pre-Amp Wiring

NOTE: The unit comes from the factory with the power switch ON (Figure 10). Once power is applied to terminals T2-1 & T2-3, the unit will power up.

Communications Hook Up

RS485 for Modbus Host Communications

The Red Eye supports a single RS485 port for Modbus Host communication. Scanning consists of single or multiple Modbus register reads or writes. The scanned data is either: Function Code 4 – Read Only or Input Registers and Function Code 3 – Read/Write or Holding Registers. *Red Eye* host communication is via wired RS485 protocol. The terminal unit needs a RS485/232 converter changing RS485 to RS232 protocol before connecting to the terminal's serial communication port. RS485 protocol is used as it supports longer distance communication (1000 or so feet) than serial communication (<50 feet). The RS485 communication connections are normally used to connect to a Net Oil Computer or Flow Computer. Connections are made at Terminal Panel T1 on terminals T1-1, T1-2, and T1-3. Refer to Figure 12 to make the connections.

Connections

- 485(+) – T1-1
- 485(-) – T1-2
- 485 Common – T1-3

Default Settings

Communication with the *Red Eye* 2G via the RS485 requires these settings:

- Data Bits: 8 bits
- Parity: None
- Stop bits:1 bit
- Flow: None

The RS485 port is configurable to one of four baud rates: 9600, 14400, 19200, and 28800 bps. The user can configure the baud rate in register 40038 (Refer to the appropriate Modbus Map in Appendix A) by setting it to one of these values:

- 0 = 9600 bps (default)
- 1 = 14400 bps
- 2 = 19200 bps
- 3 = 28800 bps

Note: The baud rate change will take affect after the Red Eye 2G performs a configuration save.

Note: If the 2G Watercut Meter is the last unit in the RS485 Transmission Line, CLOSE Termination Resister SW1-3; otherwise, leave it OPEN. Refer to Figure 17 for switch location.

RS232 support for HMI Port and Modbus Communication

The *Red Eye* supports a single RS232 port for HMI communication for CDPD or network. Also, this port has added functionality for Modbus scanning over the HMI Port.

Note: Byte Order for Modbus communications to the Red Eye 2G is "ABCD".

The Red Eye supports a single RS232 port HyperTerminal communications. HyperTerminal is the communications program that is included free with Windows 95 through Windows XP. Windows Vista does not include HyperTerminal, though the commercial products HyperTerminal Private Edition and HyperACCESS both support Vista.

- To switch to HyperTerminal mode, the user needs to press the **ESC** key 4 times consecutively with about 500ms a stroke from HyperTerminal. A welcome display showing the revision and the checksum will be displayed.
- To switch HyperTerminal back to Modbus, the user needs to press **ESC** key 4 times consecutively with about 500ms a stroke from HyperTerminal. Currently there is no indication displayed for the mode.

Caution: Hyperterminal mode is a diagnostic mode for trained operators only.

An RS232 communication connection, for the Pocket PC, is made to P1, a standard male DB9 connector. Refer to Figure 12 to make the connections.

Connections

- RXD – P1-2
- TXD – P1-3
- COM – P1-5
- RTS – P1-7
- CTS – P1-8

Default Settings

Communication with the *Red Eye* 2G via the RS232 has these default settings:

- Data Bits: 8 bits
- Parity: None
- Stop bits: 1 bit
- Flow: None

The RS232 port is set to a default baud rate of 115,200 bps.

Note: Connecting a standard PC or laptop will require a null modem cable.

Note: Modbus communication can be established via both the RS232 and the RS485 ports simultaneously. The Red Eye 2G has the capability of communicating with two separate hosts online at the same time.

RedLine Communications Connections

The *RedLine* connection to the 2G can be made in several ways:

- HMI Port (RS232): Fixed baud rate of 115 Kbps. (PDA to HMI connection does not require null modem).
- Host Port (RS485): Configurable baud rates of 9600, 14400, 19200 or 28800 bps.
- TCP/IP: This connection is possible if the 2G is connected serially to a separate device with an IP Address such as a 2GNOC or CDMA modem.
- *Bluetooth*: This connection is possible if the 2G is connected serially to a separate device with *Bluetooth* capability.

Water Cut Output Wiring

The Water Cut percentage output signal is taken from Connector T1 at terminals T1-4 and T1-5. The output is a 4 to 20mA signal and corresponds to 0-100% watercut.

- 4 mA out is equal to 0% watercut.

  .

  .
- 20 mA out is equal to 100% watercut.

Refer to Figure 12 and Figure 14 to make these connections.

Lamp Power Connections

The lamp power connections are made at Terminal Strip 1, T1-11 and T1-12. These are factory connected and should not be changed. Refer to Figure 11.

Power Connections

Four terminals are available for connections on Terminal Strip T2. Terminals T1 and T2 (+) are connected together. Terminals 3 and 4 (-) are connected together. Connect 10-32 Volts DC to a + (1 or 2) and a – (3 or 4) Terminal. Refer to Figure 17. The spare power terminals are available to provide loop power for a 4 to 20mA Transducer.

NOTE: The unit comes from the factory with the power switch ON (Figure 10). Once power is applied to terminals T2-1 & T2-3, the unit will power up.

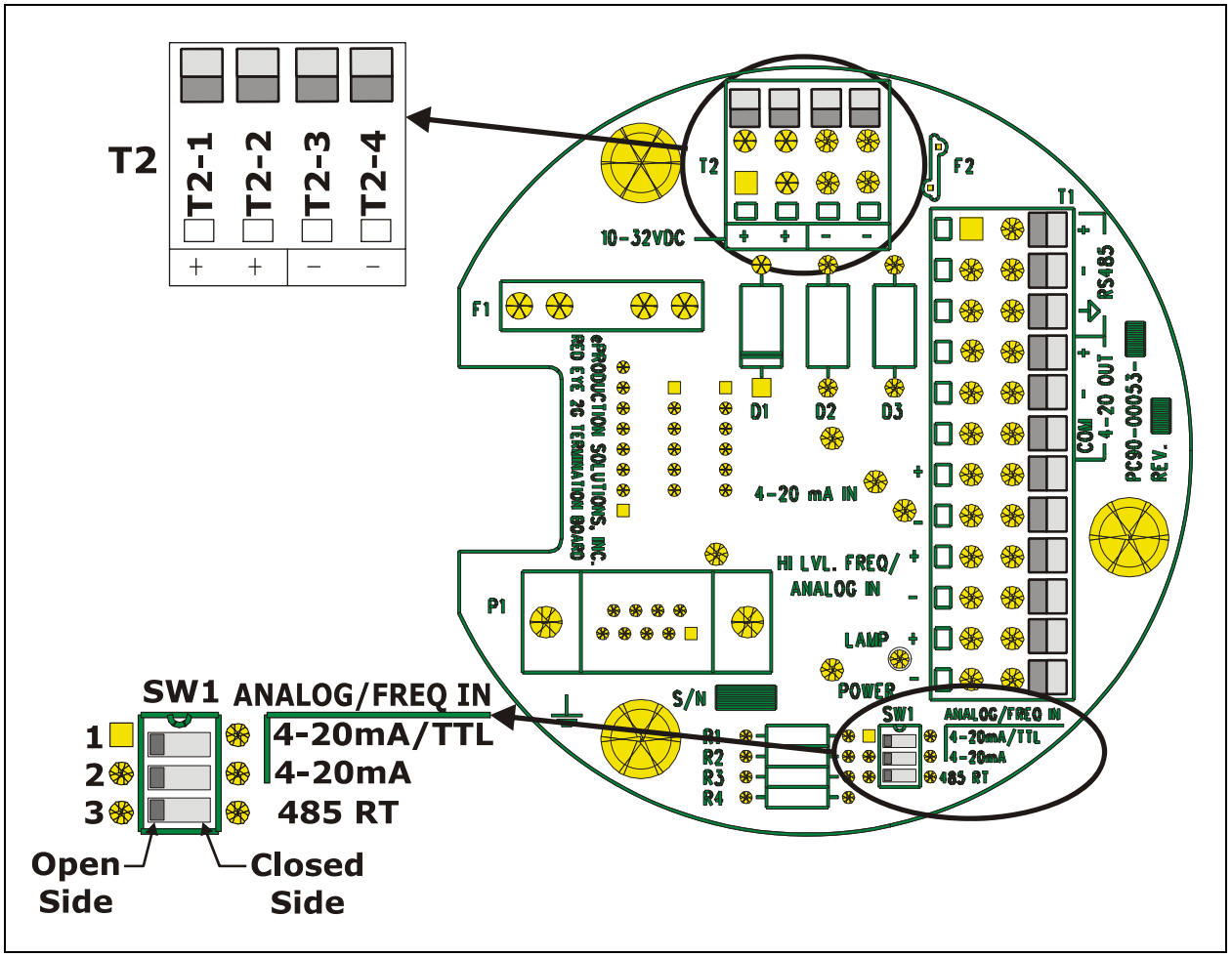


Figure 17: T2 Terminal Strip Connections

Note: Attach a ground wire to an external point on the Red Eye 2G Casing.

This page intentionally left blank.

Operation

There are no operating controls at the unit except for the On/Off switch. Refer to Figure 10 to locate that switch. Control of the unit is limited to RS232 and RS485 communications channels.

LCD Screen Display

A two-line display is available for viewing the actual water cut of the selected well. This display allows the operator to monitor the water cut and other pertinent data at the installation site. The first line of the display always displays the current percentage of water. The second line scrolls through the following items:

- S = 00, Stat = OK (Current Status of the *Red Eye* 2G device. See Table 1 for more status interpretations.)
- Active Well = 'X' (Current well being monitored. Options displayed from 1 – 40)
- Temp = 'X' (Current temperature of the *Red Eye* 2G BoardStack in °C)
- W-Select = Mode for Well Selection (Options displayed between MBUS = ModBUS and AI = Analog Input)
- Modbus ID = 'X' (Current ID set for *Red Eye* 2G Communication. Options displayed from 1 – 255. Factory Default Setting at 49.)
- Photocur = "Live" or "User" (Displays whether the photocurrents used by the algorithm are live or user entered.)
- Board = "Log Amp" or "Linear Amp" (Displays the detector board type. From the user's standpoint these two board types are identical. There is no difference in the operation of the water cut meter.)
- All Channels On (Indicates that the channel is switched ON for calculation.)
- All Channels Off (Indicates that the channel is switched OFF for calculation.)

NOTE: The 2nd line of the local display will display all the errors and warnings first prior to displaying the temperature, AI Method and Active Well. The Display will update the screen at approximately 5 seconds intervals.

Note: The Red Eye 2G unit saves any edits to the database one minute after the last edit. The unit displays "Saving CFG" on the second line of the display for 2 seconds during actual writing of configuration values to the Unit Flash Memory.

Note: The RE2G unit displays the firmware version of the unit for 2 seconds upon powering up the unit.

Detector Board Temperature

With the current Detector Board, the reading of the I2C based temperature sensor should be displayed in the local display after showing the Active Well. This can be viewed or retrieved from the Modbus Register 30015 -30016 (Float inverse).

Status Register Fault Codes

The following paragraphs describe how fault readings in the status register can be read. For example:

If the status register (30051) reads 23. This is a decimal number reading. This decimal number should be converted into a binary number. The binary equivalent of 23 is 10111.

This number should be filled into the table shown below to indicate which faults are occurring. Each column with a “1” assigned to it will indicate a fault and each column with a “0” assigned to it will indicate “no fault”. The 2G Status will display a decimal value of “0” when there are no faults.

The number 23 (10111) would mean the following:

- Method Coefficients Error
- Low Signal Warning
- No Air Calibration
- Default Configuration

Note: Table 7 contains a complete list of Status Register Fault codes for all firmware versions. Not all faults will be applicable for all firmware versions.

Table 7: Status Register Fault Table

Method Coefficients Error*	Low Signal Fault/Alarm	Low Signal Warning	No Air Calibration	Default Configuration	Decimal Equivalent
0	0	0	0	0	0
0	0	0	0	1	1
0	0	0	1	0	2
0	0	0	1	1	3
0	0	1	0	0	4
0	0	1	0	1	5
0	0	1	1	0	6
0	0	1	1	1	7
0	1	0	0	0	8
0	1	0	0	1	9
0	1	0	1	0	10
0	1	0	1	1	11
0	1	1	0	0	12
0	1	1	0	1	13
0	1	1	1	0	14
0	1	1	1	1	15
1	0	0	0	0	16
1	0	0	0	1	17
1	0	0	1	0	18
1	0	0	1	1	19
1	0	1	0	0	20
1	0	1	0	1	21
1	0	1	1	0	22
1	0	1	1	1	23
1	1	0	0	0	24
1	1	0	0	1	25
1	1	0	1	0	26
1	1	1	1	1	27
1	1	1	0	0	28
1	1	1	0	1	29
1	1	1	1	0	30
1	1	1	1	1	31

**Note: There are no Method Coefficients Errors in Red Eye 2G firmware versions 5.0 and later.*

Water Cut Calculations

Firmware version 5.02 introduces a new water cut calculation technique that simplifies the configuration and improves measurement accuracy. The improvement is based on moving from a two wavelength calculation where the user was required to select the optimal wavelength pair to a four wavelength calculation where sophisticated chemometric techniques are used to determine the optimal solution.

Note: Chemometrics is the application of mathematical or statistical methods to chemical data.

The configuration steps still rely on accurate water and oil absorption calibrations, but the "method" selection featured in earlier firmware versions has been eliminated. Please refer to the *RedLine* manual for detailed configuration steps.

Note: The firmware version for the Red Eye 2G can be determined when powering up the unit. At that time the firmware version will be displayed for two seconds.

Water Cut Methods and Coefficients for Firmware versions 4.0 and Lower

There are five methods of calculating the Water Cut % available for each well. The methods for each well can be selected in registers 41321-41360 (Depending on which firmware version you are using refer to the appropriate Modbus Map in Appendix A.) The first four methods each have 7 coefficients that can be set in registers 40045-40072 to use the wavelength channels as follows:

Coefficient 1 uses Freq 1110 & 1450 ratio (Register 30023)

Coefficient 2 uses Freq 1450 & 1632 ratio (Register 30025)

Coefficient 3 uses Freq 1632 & 1730 ratio (Register 30027)

Coefficient 4 uses Freq 1110 & 1632 ratio (Register 30029)

Coefficient 5 uses Freq 1110 & 1730 ratio (Register 30031)

Coefficient 6 uses Freq 1450 & 1730 ratio (Register 30033)

Coefficient 7 uses Freq 1110 channel (Register 30021)

The sum of the 7 coefficients of a method has to equal 100 or the unit will signal that there is a methods coefficient error in the status (Refer to Table 7).

Method 5 is a combination of methods 1-4. This method should be used for those wells which will require one method for low water cut measurements and another method for higher water cut measurements. The low method is set in register 40073 and the high method is set in register 40075. Register 40074 is the transition % value which method 5 will switch from high to low. (Depending on which firmware version you are using refer to the appropriate Modbus Map in Appendix A). Method 5 will calculate the water cut based on the chosen high method first and compare the water cut result to the transition % value. If the result is less than the transition value, method 5 will use the low method to calculate the final water cut.

Note: The firmware version for the Red Eye 2G can be determined when powering up the unit. At that time the firmware version will be displayed for two seconds.

This page intentionally left blank.

RedLine Configuration Program

The 2G includes the *RedLine* configuration software designed for Pocket PCs. This software allows the user to configure communications, perform one-button fluid calibrations, and check system diagnostics. The connection can be done through either of the meter's configuration ports. See the *RedLine* Communication Connections section found earlier in this manual for further information on how to connect to the 2G using this software. Also, refer to the *RedLine* Configuration Program User manual, Part Number BM-REDLINE-00, for details on how to use the software.

This page left intentionally blank.

Appendix A – Modbus Register Maps

Modbus Register Map version 2.8e

Currently, Function Codes 3 and 4 are supported for Modbus.

Table 8: *Red Eye* 2G Modbus Register Map version 2.8e
Red Eye 2G PC59-00118-00 (Compatible with Linear Board ver. 5.xx onwards)
Red Eye 2G PC59-00118-01 (Compatible with Log Board ver. 5.xx onwards)

Start Reg	End Reg	Well #	Description	Default Value	Low Limit	High Limit	Type	Access
Input Registers								
30001	30002		Water Cut Result (%)	0	0	100	FLOAT	RO
30003	30003		Aux Analog Input	0	0	1023	WORD	RO
30004	30004		Reserved				WORD	RO
30005	30005		Freq Input (Hz)	0	0	65535	WORD	RO
30006	30006		Reserved					
30007	30008		Current @ 1110nm (nA)	0	Float Limit	Float Limit	FLOAT	RO
30009	30010		Current @ 1450nm (nA)	0	Float Limit	Float Limit	FLOAT	RO
30011	30012		Current @ 1632nm (nA)	0	Float Limit	Float Limit	FLOAT	RO
30013	30014		Current @ 1730nm (nA)	0	Float Limit	Float Limit	FLOAT	RO
30015	30016		Temperature (degC)	0	Float Limit	Float Limit	FLOAT	RO
30017	30018		Firmware ID	590011800 (LINEAR) 590011801 (LOG)	NA	NA	LONG	RO
30019	30020		Reserved	0	Float Limit	Float Limit	FLOAT	RO
30021	30022		Water Cut @ 1110nm (%)		Float Limit	Float Limit	FLOAT	RO
30023	30024		Ratio 1 (1110nm-1450nm)	0	Float Limit	Float Limit	FLOAT	RO
30025	30026		Ratio 2 (1450nm-1632nm)	0	Float Limit	Float Limit	FLOAT	RO
30027	30028		Ratio 3 (1632nm-1730nm)	0	Float Limit	Float Limit	FLOAT	RO
30029	30030		Ratio 4 (1110nm-1632nm)	0	Float Limit	Float Limit	FLOAT	RO
30031	30032		Ratio 5 (1110nm-1730nm)	0	Float Limit	Float Limit	FLOAT	RO
30033	30034		Ratio 6 (1450nm-1730nm)	0	Float Limit	Float Limit	FLOAT	RO
30035	30035		Firmware version Major Number	5	NA	NA	CHAR	RO
30036	30036		Firmware version Minor Number	5	NA	NA	CHAR	RO

Table 8: *Red Eye* 2G Modbus Register Map version 2.8e
Red Eye 2G PC59-00118-00 (Compatible with Linear Board ver. 5.xx onwards)
Red Eye 2G PC59-00118-01 (Compatible with Log Board ver. 5.xx onwards)

Start Reg	End Reg	Well #	Description	Default Value	Low Limit	High Limit	Type	Access
30037	30037		Modbus version Major Number	2	NA	NA	CHAR	RO
30038	30038		Modbus version Minor Number	8	NA	NA	CHAR	RO
30039	30050		Reserved					RO
30051	30051		Status	0			WORD	RO
30052	30052		# of Good Messages	0	0	65535	WORD	RO
30053	30053		# of Bad Messages	0	0	65535	WORD	RO
30054	30054		# of Received Characters	0	0	65535	WORD	RO
30055	30056		Absorbance value at 1110	0	Float Limit	Float Limit	FLOAT	RO
30057	30058		Absorbance value at 1450	0	Float Limit	Float Limit	FLOAT	RO
30059	30060		Absorbance value at 1632	0	Float Limit	Float Limit	FLOAT	RO
30061	30062		Absorbance value at 1730	0	Float Limit	Float Limit	FLOAT	RO
30063	30064		Xw	0	Float Limit	Float Limit	FLOAT	RO
30065	30066		Xo	0	Float Limit	Float Limit	FLOAT	RO
30067	30068		Xw+Xo	0	Float Limit	Float Limit	FLOAT	RO
30069	30070		scattering coefficient S	0	Float Limit	Float Limit	FLOAT	RO
30071	30071		Exit Flag	0	0	6	CHAR	RO
30072	30072		Number of iterations	0	1	9	CHAR	RO
30073	30074		Min boundary for S (diagnostic)	0	Float Limit	Float Limit	FLOAT	RO
30075	30076		Max boundary for S (diagnostic)	0	Float Limit	Float Limit	FLOAT	RO
Holding Registers								
40001	40002		Current in Air @ 1110nm (nA)	0	Float Limit	Float Limit	FLOAT	RW
40003	40004		Current in Air @ 1450nm (nA)	0	Float Limit	Float Limit	FLOAT	RW
40005	40006		Current in Air @ 1632nm (nA)	0	Float Limit	Float Limit	FLOAT	RW
40007	40008		Current in Air @ 1730nm (nA)	0	Float Limit	Float Limit	FLOAT	RW
40009	40010		H2O Absorbance Coefficient @ 1110nm (unitless)	-0.021	Float Limit	Float Limit	FLOAT	RW
40011	40012		H2O Absorbance Coefficient @ 1450nm (unitless)	4.197	Float Limit	Float Limit	FLOAT	RW
40013	40014		H2O Absorbance Coefficient @ 1632nm (unitless)	0.65	Float Limit	Float Limit	FLOAT	RW

Table 8: *Red Eye* 2G Modbus Register Map version 2.8e
Red Eye 2G PC59-00118-00 (Compatible with Linear Board ver. 5.xx onwards)
Red Eye 2G PC59-00118-01 (Compatible with Log Board ver. 5.xx onwards)

Start Reg	End Reg	Well #	Description	Default Value	Low Limit	High Limit	Type	Access
40015	40016		H2O Absorbance Coefficient @ 1730nm (unitless)	0.714	Float Limit	Float Limit	FLOAT	RW
40017	40018		Reserved	0	0	1	FLOAT	RW
40019	40020		Reserved	0	0	1	FLOAT	RW
40021	40022		Reserved	0	0	1	FLOAT	RW
40023	40024		Reserved	0	0	1	FLOAT	RW
40025	40026		Reserved	0	0	1	FLOAT	RW
40027	40028		Reserved	0	0	1	FLOAT	RW
40029	40030		Reserved	0	0	1	FLOAT	RW
40031	40032		Reserved	0	0	1	FLOAT	RW
40033	40034		Reserved	0	0	1	FLOAT	RW
40035	40036		Reserved	0	0	1	FLOAT	RW
40037	40037		Modbus Address	49	1	255	WORD	RW
40038	40038		Host port baud rate	0 (9600)	0	3	WORD	RW
40039	40039		# of 1 sec samples to average	1	1	10	BYTE	RW
40040	40040		Low Signal Alarm/Warning Limit	10	5	20	WORD	RW
40041	40041		Reserved					
40042	40042		Reserved					
40043	40043		WellSelectMethod	0 (MODBUS)	0 (MODBUS)	1 (AI)	CHAR	RW
40044	40044		Current Active Well	1	1	40	CHAR	RW
40045	40045		Method 1, coefficient 1	50	0	100	CHAR	RW
40046	40046		Method 1, coefficient 2	50	0	100	CHAR	RW
40047	40047		Method 1, coefficient 3	0	0	100	CHAR	RW
40048	40048		Method 1, coefficient 4	0	0	100	CHAR	RW
40049	40049		Method 1, coefficient 5	0	0	100	CHAR	RW
40050	40050		Method 1, coefficient 6	0	0	100	CHAR	RW
40051	40051		Method 1, coefficient 7	0	0	100	CHAR	RW
40052	40052		Method 2, coefficient 1	0	0	100	CHAR	RW
40053	40053		Method 2, coefficient 2	0	0	100	CHAR	RW
40054	40054		Method 2, coefficient 3	0	0	100	CHAR	RW
40055	40055		Method 2, coefficient 4	100	0	100	CHAR	RW
40056	40056		Method 2, coefficient 5	0	0	100	CHAR	RW
40057	40057		Method 2, coefficient 6	0	0	100	CHAR	RW
40058	40058		Method 2, coefficient 7	0	0	100	CHAR	RW
40059	40059		Method 3, coefficient 1	0	0	100	CHAR	RW
40060	40060		Method3, coefficient 2	100	0	100	CHAR	RW
40061	40061		Method3, coefficient 3	0	0	100	CHAR	RW
40062	40062		Method 3, coefficient 4	0	0	100	CHAR	RW
40063	40063		Method 3, coefficient 5	0	0	100	CHAR	RW
40064	40064		Method3, coefficient 6	0	0	100	CHAR	RW
40065	40065		Method 3, coefficient 7	0	0	100	CHAR	RW
40066	40066		Method 4, coefficient 1	0	0	100	CHAR	RW
40067	40067		Method 4, coefficient 2	0	0	100	CHAR	RW
40068	40068		Method 4, coefficient 3	100	0	100	CHAR	RW
40069	40069		Method 4, coefficient 4	0	0	100	CHAR	RW
40070	40070		Method 4, coefficient 5	0	0	100	CHAR	RW

Table 8: *Red Eye* 2G Modbus Register Map version 2.8e
Red Eye 2G PC59-00118-00 (Compatible with Linear Board ver. 5.xx onwards)
Red Eye 2G PC59-00118-01 (Compatible with Log Board ver. 5.xx onwards)

Start Reg	End Reg	Well #	Description	Default Value	Low Limit	High Limit	Type	Access
40071	40071		Method 4, coefficient 6	0	0	100	CHAR	RW
40072	40072		Method 4, coefficient 7	0	0	100	CHAR	RW
40073	40073		Method 5, Low Water Cut Method	1	1	4	CHAR	RW
40074	40074		Method 5 Transition (% Water Cut)	50	0	100	CHAR	RW
40075	40075		Method 5, High Water Cut Method	2	1	4	CHAR	RW
40076	40076		Gap value for this unit (for user reference)	60	0	65535	WORD	RW
40077	40078		Minimum Photocurrent value	10	Float Limit	Float Limit	FLOAT	RW
40079	40079		Flag to indicate that user supplies photocurrent values. 0 = live photocurrents, non zero = user supplied photocurrents, (Resets on power cycle, defaults to live photocurrents)	0	0	255	CHAR	RW
40080	40080		Watercut analog output calibration parameter - LowCount	655	0	65535	WORD	RW
40081	40081		Watercut analog output calibration parameter - HighCount	3276	0	65535	WORD	RW
40082	40082		Channel to be switched off. A value of 0 means all channels are ON. A value of 1 through 4 selects the channel to be switched off	0	0	4	CHAR	RW
40083	40084		K Factor (For RedLine local display)	0	Float Limit	Float Limit	FLOAT	RW
40085	40086		Analog 4mA	0	Float Limit	Float Limit	FLOAT	RW
40087	40088		Analog 20mA	100	Float Limit	Float Limit	FLOAT	RW
40089	40090		Flow Meter Input	0	Float Limit	Float Limit	FLOAT	RW
41001	41002	1	Oil Absorbance Coefficient @ 1110nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41003	41004		Oil Absorbance Coefficient @ 1450nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW

Table 8: *Red Eye* 2G Modbus Register Map version 2.8e
Red Eye 2G PC59-00118-00 (Compatible with Linear Board ver. 5.xx onwards)
Red Eye 2G PC59-00118-01 (Compatible with Log Board ver. 5.xx onwards)

Start Reg	End Reg	Well #	Description	Default Value	Low Limit	High Limit	Type	Access
41005	41006		Oil Absorbance Coefficient @ 1632nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41007	41008		Oil Absorbance Coefficient @ 1730nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41009	41010	2	Oil Absorbance Coefficient @ 1110nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41011	41012		Oil Absorbance Coefficient @ 1450nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41013	41014		Oil Absorbance Coefficient @ 1632nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41015	41016		Oil Absorbance Coefficient @ 1730nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41017	41018	3	Oil Absorbance Coefficient @ 1110nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41019	41020		Oil Absorbance Coefficient @ 1450nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41021	41022		Oil Absorbance Coefficient @ 1632nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41023	41024		Oil Absorbance Coefficient @ 1730nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41025	41026	4	Oil Absorbance Coefficient @ 1110nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41027	41028		Oil Absorbance Coefficient @ 1450nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41029	41030		Oil Absorbance Coefficient @ 1632nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41031	41032		Oil Absorbance Coefficient @ 1730nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41033	41034	5	Oil Absorbance Coefficient @ 1110nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41035	41036		Oil Absorbance Coefficient @ 1450nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41037	41038		Oil Absorbance Coefficient @ 1632nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW

Table 8: *Red Eye* 2G Modbus Register Map version 2.8e
Red Eye 2G PC59-00118-00 (Compatible with Linear Board ver. 5.xx onwards)
Red Eye 2G PC59-00118-01 (Compatible with Log Board ver. 5.xx onwards)

Start Reg	End Reg	Well #	Description	Default Value	Low Limit	High Limit	Type	Access
41039	41040		Oil Absorbance Coefficient @ 1730nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41041	41042	6	Oil Absorbance Coefficient @ 1110nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41043	41044		Oil Absorbance Coefficient @ 1450nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41045	41046		Oil Absorbance Coefficient @ 1632nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41047	41048		Oil Absorbance Coefficient @ 1730nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41049	41050	7	Oil Absorbance Coefficient @ 1110nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41051	41052		Oil Absorbance Coefficient @ 1450nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41053	41054		Oil Absorbance Coefficient @ 1632nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41055	41056		Oil Absorbance Coefficient @ 1730nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41057	41058	8	Oil Absorbance Coefficient @ 1110nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41059	41060		Oil Absorbance Coefficient @ 1450nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41061	41062		Oil Absorbance Coefficient @ 1632nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41063	41064		Oil Absorbance Coefficient @ 1730nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41065	41066	9	Oil Absorbance Coefficient @ 1110nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41067	41068		Oil Absorbance Coefficient @ 1450nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41069	41070		Oil Absorbance Coefficient @ 1632nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41071	41072		Oil Absorbance Coefficient @ 1730nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW

Table 8: *Red Eye* 2G Modbus Register Map version 2.8e
Red Eye 2G PC59-00118-00 (Compatible with Linear Board ver. 5.xx onwards)
Red Eye 2G PC59-00118-01 (Compatible with Log Board ver. 5.xx onwards)

Start Reg	End Reg	Well #	Description	Default Value	Low Limit	High Limit	Type	Access
41073	41074	10	Oil Absorbance Coefficient @ 1110nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41075	41076		Oil Absorbance Coefficient @ 1450nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41077	41078		Oil Absorbance Coefficient @ 1632nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41079	41080		Oil Absorbance Coefficient @ 1730nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41081	41082	11	Oil Absorbance Coefficient @ 1110nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41083	41084		Oil Absorbance Coefficient @ 1450nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41085	41086		Oil Absorbance Coefficient @ 1632nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41087	41088		Oil Absorbance Coefficient @ 1730nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41089	41090	12	Oil Absorbance Coefficient @ 1110nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41091	41092		Oil Absorbance Coefficient @ 1450nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41093	41094		Oil Absorbance Coefficient @ 1632nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41095	41096		Oil Absorbance Coefficient @ 1730nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41097	41098	13	Oil Absorbance Coefficient @ 1110nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41099	41100		Oil Absorbance Coefficient @ 1450nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41101	41102		Oil Absorbance Coefficient @ 1632nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41103	41104		Oil Absorbance Coefficient @ 1730nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41105	41106	14	Oil Absorbance Coefficient @ 1110nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW

Table 8: *Red Eye* 2G Modbus Register Map version 2.8e
Red Eye 2G PC59-00118-00 (Compatible with Linear Board ver. 5.xx onwards)
Red Eye 2G PC59-00118-01 (Compatible with Log Board ver. 5.xx onwards)

Start Reg	End Reg	Well #	Description	Default Value	Low Limit	High Limit	Type	Access
41107	41108		Oil Absorbance Coefficient @ 1450nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41109	41110		Oil Absorbance Coefficient @ 1632nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41111	41112		Oil Absorbance Coefficient @ 1730nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41113	41114	15	Oil Absorbance Coefficient @ 1110nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41115	41116		Oil Absorbance Coefficient @ 1450nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41117	41118		Oil Absorbance Coefficient @ 1632nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41119	41120		Oil Absorbance Coefficient @ 1730nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41121	41122	16	Oil Absorbance Coefficient @ 1110nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41123	41124		Oil Absorbance Coefficient @ 1450nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41125	41126		Oil Absorbance Coefficient @ 1632nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41127	41128		Oil Absorbance Coefficient @ 1730nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41129	41130	17	Oil Absorbance Coefficient @ 1110nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41131	41132		Oil Absorbance Coefficient @ 1450nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41133	41134		Oil Absorbance Coefficient @ 1632nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41135	41136		Oil Absorbance Coefficient @ 1730nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41137	41138	18	Oil Absorbance Coefficient @ 1110nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41139	41140		Oil Absorbance Coefficient @ 1450nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW

Table 8: *Red Eye* 2G Modbus Register Map version 2.8e
Red Eye 2G PC59-00118-00 (Compatible with Linear Board ver. 5.xx onwards)
Red Eye 2G PC59-00118-01 (Compatible with Log Board ver. 5.xx onwards)

Start Reg	End Reg	Well #	Description	Default Value	Low Limit	High Limit	Type	Access
41141	41142		Oil Absorbance Coefficient @ 1632nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41143	41144		Oil Absorbance Coefficient @ 1730nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41145	41146	19	Oil Absorbance Coefficient @ 1110nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41147	41148		Oil Absorbance Coefficient @ 1450nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41149	41150		Oil Absorbance Coefficient @ 1632nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41151	41152		Oil Absorbance Coefficient @ 1730nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41153	41154	20	Oil Absorbance Coefficient @ 1110nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41155	41156		Oil Absorbance Coefficient @ 1450nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41157	41158		Oil Absorbance Coefficient @ 1632nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41159	41160		Oil Absorbance Coefficient @ 1730nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41161	41162	21	Oil Absorbance Coefficient @ 1110nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41163	41164		Oil Absorbance Coefficient @ 1450nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41165	41166		Oil Absorbance Coefficient @ 1632nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41167	41168		Oil Absorbance Coefficient @ 1730nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41169	41170	22	Oil Absorbance Coefficient @ 1110nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41171	41172		Oil Absorbance Coefficient @ 1450nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41173	41174		Oil Absorbance Coefficient @ 1632nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW

Table 8: *Red Eye* 2G Modbus Register Map version 2.8e
Red Eye 2G PC59-00118-00 (Compatible with Linear Board ver. 5.xx onwards)
Red Eye 2G PC59-00118-01 (Compatible with Log Board ver. 5.xx onwards)

Start Reg	End Reg	Well #	Description	Default Value	Low Limit	High Limit	Type	Access
41175	41176		Oil Absorbance Coefficient @ 1730nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41177	41178	23	Oil Absorbance Coefficient @ 1110nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41179	41180		Oil Absorbance Coefficient @ 1450nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41181	41182		Oil Absorbance Coefficient @ 1632nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41183	41184		Oil Absorbance Coefficient @ 1730nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41185	41186	24	Oil Absorbance Coefficient @ 1110nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41187	41188		Oil Absorbance Coefficient @ 1450nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41189	41190		Oil Absorbance Coefficient @ 1632nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41191	41192		Oil Absorbance Coefficient @ 1730nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41193	41194	25	Oil Absorbance Coefficient @ 1110nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41195	41196		Oil Absorbance Coefficient @ 1450nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41197	41198		Oil Absorbance Coefficient @ 1632nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41199	41200		Oil Absorbance Coefficient @ 1730nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41201	41202	26	Oil Absorbance Coefficient @ 1110nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41203	41204		Oil Absorbance Coefficient @ 1450nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41205	41206		Oil Absorbance Coefficient @ 1632nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41207	41208		Oil Absorbance Coefficient @ 1730nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW

Table 8: *Red Eye* 2G Modbus Register Map version 2.8e
Red Eye 2G PC59-00118-00 (Compatible with Linear Board ver. 5.xx onwards)
Red Eye 2G PC59-00118-01 (Compatible with Log Board ver. 5.xx onwards)

Start Reg	End Reg	Well #	Description	Default Value	Low Limit	High Limit	Type	Access
41209	41210	27	Oil Absorbance Coefficient @ 1110nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41211	41212		Oil Absorbance Coefficient @ 1450nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41213	41214		Oil Absorbance Coefficient @ 1632nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41215	41216		Oil Absorbance Coefficient @ 1730nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41217	41218	28	Oil Absorbance Coefficient @ 1110nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41219	41220		Oil Absorbance Coefficient @ 1450nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41221	41222		Oil Absorbance Coefficient @ 1632nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41223	41224		Oil Absorbance Coefficient @ 1730nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41225	41226	29	Oil Absorbance Coefficient @ 1110nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41227	41228		Oil Absorbance Coefficient @ 1450nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41229	41230		Oil Absorbance Coefficient @ 1632nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41231	41232		Oil Absorbance Coefficient @ 1730nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41233	41234	30	Oil Absorbance Coefficient @ 1110nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41235	41236		Oil Absorbance Coefficient @ 1450nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41237	41238		Oil Absorbance Coefficient @ 1632nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41239	41240		Oil Absorbance Coefficient @ 1730nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41241	41242	31	Oil Absorbance Coefficient @ 1110nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW

Table 8: *Red Eye* 2G Modbus Register Map version 2.8e
Red Eye 2G PC59-00118-00 (Compatible with Linear Board ver. 5.xx onwards)
Red Eye 2G PC59-00118-01 (Compatible with Log Board ver. 5.xx onwards)

Start Reg	End Reg	Well #	Description	Default Value	Low Limit	High Limit	Type	Access
41243	41244		Oil Absorbance Coefficient @ 1450nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41245	41246		Oil Absorbance Coefficient @ 1632nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41247	41248		Oil Absorbance Coefficient @ 1730nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41249	41250	32	Oil Absorbance Coefficient @ 1110nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41251	41252		Oil Absorbance Coefficient @ 1450nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41253	41254		Oil Absorbance Coefficient @ 1632nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41255	41256		Oil Absorbance Coefficient @ 1730nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41257	41258	33	Oil Absorbance Coefficient @ 1110nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41259	41260		Oil Absorbance Coefficient @ 1450nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41261	41262		Oil Absorbance Coefficient @ 1632nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41263	41264		Oil Absorbance Coefficient @ 1730nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41265	41266	34	Oil Absorbance Coefficient @ 1110nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41267	41268		Oil Absorbance Coefficient @ 1450nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41269	41270		Oil Absorbance Coefficient @ 1632nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41271	41272		Oil Absorbance Coefficient @ 1730nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41273	41274	35	Oil Absorbance Coefficient @ 1110nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41275	41276		Oil Absorbance Coefficient @ 1450nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW

Table 8: *Red Eye* 2G Modbus Register Map version 2.8e
Red Eye 2G PC59-00118-00 (Compatible with Linear Board ver. 5.xx onwards)
Red Eye 2G PC59-00118-01 (Compatible with Log Board ver. 5.xx onwards)

Start Reg	End Reg	Well #	Description	Default Value	Low Limit	High Limit	Type	Access
41277	41278		Oil Absorbance Coefficient @ 1632nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41279	41280		Oil Absorbance Coefficient @ 1730nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41281	41282	36	Oil Absorbance Coefficient @ 1110nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41283	41284		Oil Absorbance Coefficient @ 1450nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41285	41286		Oil Absorbance Coefficient @ 1632nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41287	41288		Oil Absorbance Coefficient @ 1730nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41289	41290	37	Oil Absorbance Coefficient @ 1110nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41291	41292		Oil Absorbance Coefficient @ 1450nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41293	41294		Oil Absorbance Coefficient @ 1632nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41295	41296		Oil Absorbance Coefficient @ 1730nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41297	41298	38	Oil Absorbance Coefficient @ 1110nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41299	41300		Oil Absorbance Coefficient @ 1450nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41301	41302		Oil Absorbance Coefficient @ 1632nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41303	41304		Oil Absorbance Coefficient @ 1730nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41305	41306	39	Oil Absorbance Coefficient @ 1110nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41307	41308		Oil Absorbance Coefficient @ 1450nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41309	41310		Oil Absorbance Coefficient @ 1632nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW

Table 8: *Red Eye* 2G Modbus Register Map version 2.8e
Red Eye 2G PC59-00118-00 (Compatible with Linear Board ver. 5.xx onwards)
Red Eye 2G PC59-00118-01 (Compatible with Log Board ver. 5.xx onwards)

Start Reg	End Reg	Well #	Description	Default Value	Low Limit	High Limit	Type	Access
41311	41312		Oil Absorbance Coefficient @ 1730nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41313	41314	40	Oil Absorbance Coefficient @ 1110nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41315	41316		Oil Absorbance Coefficient @ 1450nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41317	41318		Oil Absorbance Coefficient @ 1632nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41319	41320		Oil Absorbance Coefficient @ 1730nm (unitless)	0	Float Limit	Float Limit	FLOAT	RW
41321	41321	1	Method selection for well 1	1	1	5	CHAR	RW
41322	41322	2	Method selection for well 2	1	1	5	CHAR	RW
41323	41323	3	Method selection for well 3	1	1	5	CHAR	RW
41324	41324	4	Method selection for well 4	1	1	5	CHAR	RW
41325	41325	5	Method selection for well 5	1	1	5	CHAR	RW
41326	41326	6	Method selection for well 6	1	1	5	CHAR	RW
41327	41327	7	Method selection for well 7	1	1	5	CHAR	RW
41328	41328	8	Method selection for well 8	1	1	5	CHAR	RW
41329	41329	9	Method selection for well 9	1	1	5	CHAR	RW
41330	41330	10	Method selection for well 10	1	1	5	CHAR	RW
41331	41331	11	Method selection for well 11	1	1	5	CHAR	RW
41332	41332	12	Method selection for well 12	1	1	5	CHAR	RW
41333	41333	13	Method selection for well 13	1	1	5	CHAR	RW
41334	41334	14	Method selection for well 14	1	1	5	CHAR	RW
41335	41335	15	Method selection for well 15	1	1	5	CHAR	RW
41336	41336	16	Method selection for well 16	1	1	5	CHAR	RW
41337	41337	17	Method selection for well 17	1	1	5	CHAR	RW
41338	41338	18	Method selection for well 18	1	1	5	CHAR	RW

Table 8: *Red Eye* 2G Modbus Register Map version 2.8e
Red Eye 2G PC59-00118-00 (Compatible with Linear Board ver. 5.xx onwards)
Red Eye 2G PC59-00118-01 (Compatible with Log Board ver. 5.xx onwards)

Start Reg	End Reg	Well #	Description	Default Value	Low Limit	High Limit	Type	Access
41339	41339	19	Method selection for well 19	1	1	5	CHAR	RW
41340	41340	20	Method selection for well 20	1	1	5	CHAR	RW
41341	41341	21	Method selection for well 21	1	1	5	CHAR	RW
41342	41342	22	Method selection for well 22	1	1	5	CHAR	RW
41343	41343	23	Method selection for well 23	1	1	5	CHAR	RW
41344	41344	24	Method selection for well 24	1	1	5	CHAR	RW
41345	41345	25	Method selection for well 25	1	1	5	CHAR	RW
41346	41346	26	Method selection for well 26	1	1	5	CHAR	RW
41347	41347	27	Method selection for well 27	1	1	5	CHAR	RW
41348	41348	28	Method selection for well 28	1	1	5	CHAR	RW
41349	41349	29	Method selection for well 29	1	1	5	CHAR	RW
41350	41350	30	Method selection for well 30	1	1	5	CHAR	RW
41351	41351	31	Method selection for well 31	1	1	5	CHAR	RW
41352	41352	32	Method selection for well 32	1	1	5	CHAR	RW
41353	41353	33	Method selection for well 33	1	1	5	CHAR	RW
41354	41354	34	Method selection for well 34	1	1	5	CHAR	RW
41355	41355	35	Method selection for well 35	1	1	5	CHAR	RW
41356	41356	36	Method selection for well 36	1	1	5	CHAR	RW
41357	41357	37	Method selection for well 37	1	1	5	CHAR	RW
41358	41358	38	Method selection for well 38	1	1	5	CHAR	RW
41359	41359	39	Method selection for well 39	1	1	5	CHAR	RW
41360	41360	40	Method selection for well 40	1	1	5	CHAR	RW
41361	41362	1	WC measurement for well 1	0.50	0.50	99.50	FLOAT	RW
41363	41364		WC reference for well 1	0.50	0.50	99.50	FLOAT	RW
41365	41366	2	WC measurement for well 2	0.50	0.50	99.50	FLOAT	RW
41367	41368		WC reference for well 2	0.50	0.50	99.50	FLOAT	RW

Table 8: *Red Eye* 2G Modbus Register Map version 2.8e
Red Eye 2G PC59-00118-00 (Compatible with Linear Board ver. 5.xx onwards)
Red Eye 2G PC59-00118-01 (Compatible with Log Board ver. 5.xx onwards)

Start Reg	End Reg	Well #	Description	Default Value	Low Limit	High Limit	Type	Access
41369	41370	3	WC measurement for well 3	0.50	0.50	99.50	FLOAT	RW
41371	41372		WC reference for well 3	0.50	0.50	99.50	FLOAT	RW
41373	41374	4	WC measurement for well 4	0.50	0.50	99.50	FLOAT	RW
41375	41376		WC reference for well 4	0.50	0.50	99.50	FLOAT	RW
41377	41378	5	WC measurement for well 5	0.50	0.50	99.50	FLOAT	RW
41379	41380		WC reference for well 5	0.50	0.50	99.50	FLOAT	RW
41381	41382	6	WC measurement for well 6	0.50	0.50	99.50	FLOAT	RW
41383	41384		WC reference for well 6	0.50	0.50	99.50	FLOAT	RW
41385	41386	7	WC measurement for well 7	0.50	0.50	99.50	FLOAT	RW
41387	41388		WC reference for well 7	0.50	0.50	99.50	FLOAT	RW
41389	41390	8	WC measurement for well 8	0.50	0.50	99.50	FLOAT	RW
41391	41392		WC reference for well 8	0.50	0.50	99.50	FLOAT	RW
41393	41394	9	WC measurement for well 9	0.50	0.50	99.50	FLOAT	RW
41395	41396		WC reference for well 9	0.50	0.50	99.50	FLOAT	RW
41397	41398	10	WC measurement for well 10	0.50	0.50	99.50	FLOAT	RW
41399	41400		WC reference for well 10	0.50	0.50	99.50	FLOAT	RW
41401	41402	11	WC measurement for well 11	0.50	0.50	99.50	FLOAT	RW
41403	41404		WC reference for well 11	0.50	0.50	99.50	FLOAT	RW
41405	41406	12	WC measurement for well 12	0.50	0.50	99.50	FLOAT	RW
41407	41408		WC reference for well 12	0.50	0.50	99.50	FLOAT	RW
41409	41410	13	WC measurement for well 13	0.50	0.50	99.50	FLOAT	RW
41411	41412		WC reference for well 13	0.50	0.50	99.50	FLOAT	RW
41413	41414	14	WC measurement for well 14	0.50	0.50	99.50	FLOAT	RW
41415	41416		WC reference for well 14	0.50	0.50	99.50	FLOAT	RW
41417	41418	15	WC measurement for well 15	0.50	0.50	99.50	FLOAT	RW
41419	41420		WC reference for well 15	0.50	0.50	99.50	FLOAT	RW
41421	41422	16	WC measurement for well 16	0.50	0.50	99.50	FLOAT	RW
41423	41424		WC reference for well 16	0.50	0.50	99.50	FLOAT	RW
41425	41426	17	WC measurement for well 17	0.50	0.50	99.50	FLOAT	RW

Table 8: *Red Eye* 2G Modbus Register Map version 2.8e
Red Eye 2G PC59-00118-00 (Compatible with Linear Board ver. 5.xx onwards)
Red Eye 2G PC59-00118-01 (Compatible with Log Board ver. 5.xx onwards)

Start Reg	End Reg	Well #	Description	Default Value	Low Limit	High Limit	Type	Access
41427	41428		WC reference for well 17	0.50	0.50	99.50	FLOAT	RW
41429	41430	18	WC measurement for well 18	0.50	0.50	99.50	FLOAT	RW
41431	41432		WC reference for well 18	0.50	0.50	99.50	FLOAT	RW
41433	41434	19	WC measurement for well 19	0.50	0.50	99.50	FLOAT	RW
41435	41436		WC reference for well 19	0.50	0.50	99.50	FLOAT	RW
41437	41438	20	WC measurement for well 20	0.50	0.50	99.50	FLOAT	RW
41439	41440		WC reference for well 20	0.50	0.50	99.50	FLOAT	RW
41441	41442	21	WC measurement for well 21	0.50	0.50	99.50	FLOAT	RW
41443	41444		WC reference for well 21	0.50	0.50	99.50	FLOAT	RW
41445	41446	22	WC measurement for well 22	0.50	0.50	99.50	FLOAT	RW
41447	41448		WC reference for well 22	0.50	0.50	99.50	FLOAT	RW
41449	41450	23	WC measurement for well 23	0.50	0.50	99.50	FLOAT	RW
41451	41452		WC reference for well 23	0.50	0.50	99.50	FLOAT	RW
41453	41454	24	WC measurement for well 24	0.50	0.50	99.50	FLOAT	RW
41455	41456		WC reference for well 24	0.50	0.50	99.50	FLOAT	RW
41457	41458	25	WC measurement for well 25	0.50	0.50	99.50	FLOAT	RW
41459	41460		WC reference for well 25	0.50	0.50	99.50	FLOAT	RW
41461	41462	26	WC measurement for well 26	0.50	0.50	99.50	FLOAT	RW
41463	41464		WC reference for well 26	0.50	0.50	99.50	FLOAT	RW
41465	41466	27	WC measurement for well 27	0.50	0.50	99.50	FLOAT	RW
41467	41468		WC reference for well 27	0.50	0.50	99.50	FLOAT	RW
41469	41470	28	WC measurement for well 28	0.50	0.50	99.50	FLOAT	RW
41471	41472		WC reference for well 28	0.50	0.50	99.50	FLOAT	RW
41473	41474	29	WC measurement for well 29	0.50	0.50	99.50	FLOAT	RW
41475	41476		WC reference for well 29	0.50	0.50	99.50	FLOAT	RW

Table 8: *Red Eye* 2G Modbus Register Map version 2.8e
Red Eye 2G PC59-00118-00 (Compatible with Linear Board ver. 5.xx onwards)
Red Eye 2G PC59-00118-01 (Compatible with Log Board ver. 5.xx onwards)

Start Reg	End Reg	Well #	Description	Default Value	Low Limit	High Limit	Type	Access
41477	41478	30	WC measurement for well 30	0.50	0.50	99.50	FLOAT	RW
41479	41480		WC reference for well 30	0.50	0.50	99.50	FLOAT	RW
41481	41482	31	WC measurement for well 31	0.50	0.50	99.50	FLOAT	RW
41483	41484		WC reference for well 31	0.50	0.50	99.50	FLOAT	RW
41485	41486	32	WC measurement for well 32	0.50	0.50	99.50	FLOAT	RW
41487	41488		WC reference for well 32	0.50	0.50	99.50	FLOAT	RW
41489	41490	33	WC measurement for well 33	0.50	0.50	99.50	FLOAT	RW
41491	41492		WC reference for well 33	0.50	0.50	99.50	FLOAT	RW
41493	41494	34	WC measurement for well 34	0.50	0.50	99.50	FLOAT	RW
41495	41496		WC reference for well 34	0.50	0.50	99.50	FLOAT	RW
41497	41498	35	WC measurement for well 35	0.50	0.50	99.50	FLOAT	RW
41499	41500		WC reference for well 35	0.50	0.50	99.50	FLOAT	RW
41501	41502	36	WC measurement for well 36	0.50	0.50	99.50	FLOAT	RW
41503	41504		WC reference for well 36	0.50	0.50	99.50	FLOAT	RW
41505	41506	37	WC measurement for well 37	0.50	0.50	99.50	FLOAT	RW
41507	41508		WC reference for well 37	0.50	0.50	99.50	FLOAT	RW
41509	41510	38	WC measurement for well 38	0.50	0.50	99.50	FLOAT	RW
41511	41512		WC reference for well 38	0.50	0.50	99.50	FLOAT	RW
41513	41514	39	WC measurement for well 39	0.50	0.50	99.50	FLOAT	RW
41515	41516		WC reference for well 39	0.50	0.50	99.50	FLOAT	RW
41517	41518	40	WC measurement for well 40	0.50	0.50	99.50	FLOAT	RW
41519	41520		WC reference for well 40	0.50	0.50	99.50	FLOAT	RW
Read only Holding Registers block, image of 30001 - 30054 block								
45001	45002		Water Cut Result (%)	0	0	100	FLOAT	RO
45003	45003		Aux Analog Input	0	0	1023	WORD	RO
45004	45004		Reserved				WORD	RO
45005	45005		Freq Input (Hz)	0	0	65535	WORD	RO
45006	45006		Reserved					

Table 8: *Red Eye* 2G Modbus Register Map version 2.8e
Red Eye 2G PC59-00118-00 (Compatible with Linear Board ver. 5.xx onwards)
Red Eye 2G PC59-00118-01 (Compatible with Log Board ver. 5.xx onwards)

Start Reg	End Reg	Well #	Description	Default Value	Low Limit	High Limit	Type	Access
45007	45008		Current @ 1110nm (nA)	0	Float Limit	Float Limit	FLOAT	RO
45009	45010		Current @ 1450nm (nA)	0	Float Limit	Float Limit	FLOAT	RO
45011	45012		Current @ 1632nm (nA)	0	Float Limit	Float Limit	FLOAT	RO
45013	45014		Current @ 1730nm (nA)	0	Float Limit	Float Limit	FLOAT	RO
45015	45016		Temperature (degC)	0	Float Limit	Float Limit	FLOAT	RO
45017	45020		Reserved	0	Float Limit	Float Limit	FLOAT	RO
45021	45022		Water Cut @ 1110nm (%)		Float Limit	Float Limit	FLOAT	RO
45023	45024		Ratio 1 (1110nm-1450nm)	0	Float Limit	Float Limit	FLOAT	RO
45025	45026		Ratio 2 (1450nm-1632nm)	0	Float Limit	Float Limit	FLOAT	RO
45027	45028		Ratio 3 (1632nm-1730nm)	0	Float Limit	Float Limit	FLOAT	RO
45029	45030		Ratio 4 (1110nm-1632nm)	0	Float Limit	Float Limit	FLOAT	RO
45031	45032		Ratio 5 (1110nm-1730nm)	0	Float Limit	Float Limit	FLOAT	RO
45033	45034		Ratio 6 (1450nm-1730nm)	0	Float Limit	Float Limit	FLOAT	RO
45035	45035		Firmware version Major Number	5	NA	NA	CHAR	RO
45036	45036		Firmware version Minor Number	3	NA	NA	CHAR	RO
45037	45037		Modbus version Major Number	2	NA	NA	CHAR	RO
45038	45038		Modbus version Minor Number	8	NA	NA	CHAR	RO
45039	45050		Reserved					RO
45051	45051		Status	0			WORD	RO
45052	45052		# of Good Messages	0	0	65535	WORD	RO
45053	45053		# of Bad Messages	0	0	65535	WORD	RO
45054	45054		# of Received Characters	0	0	65535	WORD	RO
45055	45056		Absorbance value at 1110	0	Float Limit	Float Limit	FLOAT	RO
45057	45058		Absorbance value at 1450	0	Float Limit	Float Limit	FLOAT	RO
45059	45060		Absorbance value at 1632	0	Float Limit	Float Limit	FLOAT	RO
45061	45062		Absorbance value at 1730	0	Float Limit	Float Limit	FLOAT	RO
45063	45064		Xw	0	Float Limit	Float Limit	FLOAT	RO

Table 8: *Red Eye* 2G Modbus Register Map version 2.8e
Red Eye 2G PC59-00118-00 (Compatible with Linear Board ver. 5.xx onwards)
Red Eye 2G PC59-00118-01 (Compatible with Log Board ver. 5.xx onwards)

Start Reg	End Reg	Well #	Description	Default Value	Low Limit	High Limit	Type	Access
45065	45066		Xo	0	Float Limit	Float Limit	FLOAT	RO
45067	45068		Xw+Xo	0	Float Limit	Float Limit	FLOAT	RO
45069	45070		scattering coefficient S	0	Float Limit	Float Limit	FLOAT	RO
45071	45071		Exit Flag	0	0	6	CHAR	RO
45072	45072		Number of iterations	0	1	9	CHAR	RO
45073	45074		Min boundary for S (diagnostic)	0	Float Limit	Float Limit	FLOAT	RO
45075	45076		Max boundary for S (diagnostic)	0	Float Limit	Float Limit	FLOAT	RO

Modbus Register Map version 2.2

Table 9: *Red Eye* 2G Modbus Register Map version 2.2
(*Red Eye* 2G PC52-00116-00 version 4.xx to 5.xx compatible)

Start Reg	End Reg	Well #	Description	Default Value	Low Limit	High Limit	Type	Access
Input Registers								
30001	30002		Water Cut Result (%)	0.00	0.00	100.00	FLOAT	RO
30003	30003		Aux Analog Input	0	0	1023	WORD	RO
30004	30004		Reserved				WORD	RO
30005	30005		Freq Input (Hz)	0	0	65535	WORD	RO
30006	30006		Reserved					
30007	30008		Current @ 1110nm (nA)	0.00	Float Limit	Float Limit	FLOAT	RO
30009	30010		Current @ 1450nm (nA)	0.00	Float Limit	Float Limit	FLOAT	RO
30011	30012		Current @ 1632nm (nA)	0.00	Float Limit	Float Limit	FLOAT	RO
30013	30014		Current @ 1730nm (nA)	0.00	Float Limit	Float Limit	FLOAT	RO
30015	30016		Temperature (degC)	0.00	Float Limit	Float Limit	FLOAT	RO
30017	30018		Firmware ID	520011600	NA	NA	LONG	RO
30019	30020		Reserved	0.00	Float Limit	Float Limit	FLOAT	RO
30021	30022		Water Cut @ 1110nm (%)		Float Limit	Float Limit	FLOAT	RO
30023	30024		Ratio 1 (1110nm-1450nm)	0.00	Float Limit	Float Limit	FLOAT	RO
30025	30026		Ratio 2 (1450nm-1632nm)	0.00	Float Limit	Float Limit	FLOAT	RO
30027	30028		Ratio 3 (1632nm-1730nm)	0.00	Float Limit	Float Limit	FLOAT	RO
30029	30030		Ratio 4 (1110nm-1632nm)	0.00	Float Limit	Float Limit	FLOAT	RO
30031	30032		Ratio 5 (1110nm-1730nm)	0.00	Float Limit	Float Limit	FLOAT	RO
30033	30034		Ratio 6 (1450nm-1730nm)	0.00	Float Limit	Float Limit	FLOAT	RO
30035	30035		Firmware version Major Number				CHAR	RO
30036	30036		Firmware version Minor Number				CHAR	RO
30037	30037		Modbus version Major Number				CHAR	RO
30038	30038		Modbus version Minor Number				CHAR	RO
30039	30050		Reserved					RO
30051	30051		Status	0			WORD	RO

Table 9: *Red Eye* 2G Modbus Register Map version 2.2
(*Red Eye* 2G PC52-00116-00 version 4.xx to 5.xx compatible)

Start Reg	End Reg	Well #	Description	Default Value	Low Limit	High Limit	Type	Access
30052	30052		# of Good Messages	0	0	65535	WORD	RO
30053	30053		# of Bad Messages	0	0	65535	WORD	RO
30054	30054		# of Received Characters	0	0	65535	WORD	RO
Holding Registers								
40001	40002		Current in Air @ 1110nm (nA)	0.00	Float Limit	Float Limit	FLOAT	RW
40003	40004		Current in Air @ 1450nm (nA)	0.00	Float Limit	Float Limit	FLOAT	RW
40005	40006		Current in Air @ 1632nm (nA)	0.00	Float Limit	Float Limit	FLOAT	RW
40007	40008		Current in Air @ 1730nm (nA)	0.00	Float Limit	Float Limit	FLOAT	RW
40009	40010		H2O Absorbance Coefficient @ 1110nm (unitless)	-0.021	Float Limit	Float Limit	FLOAT	RW
40011	40012		H2O Absorbance Coefficient @ 1450nm (unitless)	4.197	Float Limit	Float Limit	FLOAT	RW
40013	40014		H2O Absorbance Coefficient @ 1632nm (unitless)	0.650	Float Limit	Float Limit	FLOAT	RW
40015	40016		H2O Absorbance Coefficient @ 1730nm (unitless)	0.714	Float Limit	Float Limit	FLOAT	RW
40017	40018		Reserved	0.00	0.00	1.00	FLOAT	RW
40019	40020		Reserved	0.00	0.00	1.00	FLOAT	RW
40021	40022		Reserved	0.00	0.00	1.00	FLOAT	RW
40023	40024		Reserved	0.00	0.00	1.00	FLOAT	RW
40025	40026		Reserved	0.00	0.00	1.00	FLOAT	RW
40027	40028		Reserved	0.00	0.00	1.00	FLOAT	RW
40029	40030		Reserved	0.00	0.00	1.00	FLOAT	RW
40031	40032		Reserved	0.00	0.00	1.00	FLOAT	RW
40033	40034		Reserved	0.00	0.00	1.00	FLOAT	RW
40035	40036		Reserved	0.00	0.00	1.00	FLOAT	RW
40037	40037		Modbus Address	49	1	255	WORD	RW
40038	40038		Host port baudrate	0 (9600)	0	3	WORD	RW
40039	40039		# of 1 sec samples to average	1	1	10	BYTE	RW
40040	40040		Low Signal Alarm/Warning Limit	10	5	20	WORD	R/W
40041	40041		Reserved					
40042	40042		Reserved					
40043	40043		WellSelectMethod	0 (MODBUS)	0 (MODBUS)	1 (AI)	CHAR	RW
40044	40044		Current Active Well	1	1	40	CHAR	RW
40045	40045		Method 1, coefficient 1	50	0	100	CHAR	RW

Table 9: *Red Eye* 2G Modbus Register Map version 2.2
(*Red Eye* 2G PC52-00116-00 version 4.xx to 5.xx compatible)

Start Reg	End Reg	Well #	Description	Default Value	Low Limit	High Limit	Type	Access
40046	40046		Method 1, coefficient 2	50	0	100	CHAR	RW
40047	40047		Method 1, coefficient 3	0	0	100	CHAR	RW
40048	40048		Method 1,coefficient 4	0	0	100	CHAR	RW
40049	40049		Method 1, coefficient 5	0	0	100	CHAR	RW
40050	40050		Method 1, coefficient 6	0	0	100	CHAR	RW
40051	40051		Method 1, coefficient 7	0	0	100	CHAR	RW
40052	40052		Method 2, coefficient 1	0	0	100	CHAR	WR
40053	40053		Method 2, coefficient 2	0	0	100	CHAR	WR
40054	40054		Method 2, coefficient 3	0	0	100	CHAR	RW
40055	40055		Method 2, coefficient 4	100	0	100	CHAR	RW
40056	40056		Method 2, coefficient 5	0	0	100	CHAR	RW
40057	40057		Method 2, coefficient 6	0	0	100	CHAR	RW
40058	40058		Method 2, coefficient 7	0	0	100	CHAR	RW
40059	40059		Method 3, coefficient 1	0	0	100	CHAR	RW
40060	40060		Method3, coefficient 2	100	0	100	CHAR	RW
40061	40061		Method3, coefficient 3	0	0	100	CHAR	RW
40062	40062		Method 3, coefficient 4	0	0	100	CHAR	RW
40063	40063		Method 3, coefficient 5	0	0	100	CHAR	RW
40064	40064		Method3, coefficient 6	0	0	100	CHAR	RW
40065	40065		Method 3, coefficient 7	0	0	100	CHAR	RW
40066	40066		Method 4, coefficient 1	0	0	100	CHAR	RW
40067	40067		Method 4, coefficient 2	0	0	100	CHAR	RW
40068	40068		Method 4, coefficient 3	100	0	100	CHAR	RW
40069	40069		Method 4, coefficient 4	0	0	100	CHAR	RW
40070	40070		Method 4, coefficient 5	0	0	100	CHAR	RW
40071	40071		Method 4, coefficient 6	0	0	100	CHAR	RW
40072	40072		Method 4, coefficient 7	0	0	100	CHAR	RW
40073	40073		Method 5, Low Water Cut Method	1	1	4	CHAR	RW
40074	40074		Method 5 Transition (% Water Cut)	50	0	100	CHAR	RW
40075	40075		Method 5, High Water Cut Method	2	1	4	CHAR	RW
41001	41002	1	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41003	41004		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41005	41006		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41007	41008		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW

Table 9: *Red Eye* 2G Modbus Register Map version 2.2 (*Red Eye* 2G PC52-00116-00 version 4.xx to 5.xx compatible)								
Start Reg	**End Reg**	**Well #**	**Description**	**Default Value**	**Low Limit**	**High Limit**	**Type**	**Access**
41009	41010	2	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41011	41012		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41013	41014		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41015	41016		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41017	41018	3	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41019	41020		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41021	41022		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41023	41024		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41025	41026	4	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41027	41028		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41029	41030		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41031	41032		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41033	41034	5	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41035	41036		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41037	41038		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41039	41040		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41041	41042	6	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41043	41044		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41045	41046		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41047	41048		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41049	41050	7	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41051	41052		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW

Table 9: *Red Eye* 2G Modbus Register Map version 2.2 (*Red Eye* 2G PC52-00116-00 version 4.xx to 5.xx compatible)								
Start Reg	**End Reg**	**Well #**	**Description**	**Default Value**	**Low Limit**	**High Limit**	**Type**	**Access**
41053	41054		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41055	41056		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41057	41058	8	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41059	41060		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41061	41062		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41063	41064		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41065	41066	9	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41067	41068		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41069	41070		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41071	41072		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41073	41074	10	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41075	41076		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41077	41078		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41079	41080		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41081	41082	11	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41083	41084		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41085	41086		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41087	41088		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41089	41090	12	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41091	41092		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41093	41094		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41095	41096		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW

Table 9: *Red Eye* 2G Modbus Register Map version 2.2 (*Red Eye* 2G PC52-00116-00 version 4.xx to 5.xx compatible)								
Start Reg	**End Reg**	**Well #**	**Description**	**Default Value**	**Low Limit**	**High Limit**	**Type**	**Access**
41097	41098	13	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41099	41100		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41101	41102		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41103	41104		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41105	41106	14	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41107	41108		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41109	41110		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41111	41112		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41113	41114	15	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41115	41116		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41117	41118		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41119	41120		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41121	41122	16	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41123	41124		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41125	41126		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41127	41128		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41129	41130	17	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41131	41132		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41133	41134		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41135	41136		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41137	41138	18	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41139	41140		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW

Table 9: *Red Eye* 2G Modbus Register Map version 2.2 (*Red Eye* 2G PC52-00116-00 version 4.xx to 5.xx compatible)								
Start Reg	**End Reg**	**Well #**	**Description**	**Default Value**	**Low Limit**	**High Limit**	**Type**	**Access**
41141	41142		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41143	41144		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41145	41146	19	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41147	41148		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41149	41150		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41151	41152		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41153	41154	20	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41155	41156		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41157	41158		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41159	41160		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41161	41162	21	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41163	41164		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41165	41166		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41167	41168		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41169	41170	22	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41171	41172		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41173	41174		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41175	41176		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41177	41178	23	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41179	41180		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41181	41182		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41183	41184		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW

Table 9: *Red Eye* 2G Modbus Register Map version 2.2
(*Red Eye* 2G PC52-00116-00 version 4.xx to 5.xx compatible)

Start Reg	End Reg	Well #	Description	Default Value	Low Limit	High Limit	Type	Access
41185	41186	24	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41187	41188		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41189	41190		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41191	41192		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41193	41194	25	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41195	41196		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41197	41198		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41199	41200		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41201	41202	26	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41203	41204		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41205	41206		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41207	41208		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41209	41210	27	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41211	41212		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41213	41214		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41215	41216		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41217	41218	28	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41219	41220		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41221	41222		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41223	41224		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41225	41226	29	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41227	41228		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW

Table 9: *Red Eye* 2G Modbus Register Map version 2.2 (*Red Eye* 2G PC52-00116-00 version 4.xx to 5.xx compatible)								
Start Reg	**End Reg**	**Well #**	**Description**	**Default Value**	**Low Limit**	**High Limit**	**Type**	**Access**
41229	41230		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41231	41232		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41233	41234	30	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41235	41236		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41237	41238		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41239	41240		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41241	41242	31	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41243	41244		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41245	41246		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41247	41248		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41249	41250	32	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41251	41252		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41253	41254		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41255	41256		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41257	41258	33	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41259	41260		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41261	41262		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41263	41264		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41265	41266	34	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41267	41268		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41269	41270		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41271	41272		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW

Table 9: *Red Eye* 2G Modbus Register Map version 2.2 (*Red Eye* 2G PC52-00116-00 version 4.xx to 5.xx compatible)								
Start Reg	**End Reg**	**Well #**	**Description**	**Default Value**	**Low Limit**	**High Limit**	**Type**	**Access**
41273	41274	35	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41275	41276		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41277	41278		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41279	41280		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41281	41282	36	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41283	41284		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41285	41286		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41287	41288		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41289	41290	37	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41291	41292		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41293	41294		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41295	41296		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41297	41298	38	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41299	41300		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41301	41302		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41303	41304		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41305	41306	39	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41307	41308		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41309	41310		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41311	41312		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41313	41314	40	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41315	41316		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW

Table 9: *Red Eye* 2G Modbus Register Map version 2.2 (*Red Eye* 2G PC52-00116-00 version 4.xx to 5.xx compatible)								
Start Reg	**End Reg**	**Well #**	**Description**	**Default Value**	**Low Limit**	**High Limit**	**Type**	**Access**
41317	41318		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41319	41320		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41321	41321		Method selection for well 1	1	1	5	CHAR	RW
41322	41322		Method selection for well 2	1	1	5	CHAR	RW
41323	41323		Method selection for well 3	1	1	5	CHAR	RW
41324	41324		Method selection for well 4	1	1	5	CHAR	RW
41325	41325		Method selection for well 5	1	1	5	CHAR	RW
41326	41326		Method selection for well 6	1	1	5	CHAR	RW
41327	41327		Method selection for well 7	1	1	5	CHAR	RW
41328	41328		Method selection for well 8	1	1	5	CHAR	RW
41329	41329		Method selection for well 9	1	1	5	CHAR	RW
41330	41330		Method selection for well 10	1	1	5	CHAR	RW
41331	41331		Method selection for well 11	1	1	5	CHAR	RW
41332	41332		Method selection for well 12	1	1	5	CHAR	RW
42333	41333		Method selection for well 13	1	1	5	CHAR	RW
42334	41334		Method selection for well 14	1	1	5	CHAR	RW
41335	41335		Method selection for well 15	1	1	5	CHAR	RW
41336	41336		Method selection for well 16	1	1	5	CHAR	RW
41337	41337		Method selection for well 17	1	1	5	CHAR	RW
41338	41338		Method selection for well 18	1	1	5	CHAR	RW
41339	41339		Method selection for well 19	1	1	5	CHAR	RW
41340	41340		Method selection for well 20	1	1	5	CHAR	RW
41341	41341		Method selection for well 21	1	1	5	CHAR	RW
41342	41342		Method selection for well 22	1	1	5	CHAR	RW
41343	41343		Method selection for well 23	1	1	5	CHAR	RW
41344	41344		Method selection for well 24	1	1	5	CHAR	RW
41345	41345		Method selection for well 25	1	1	5	CHAR	RW
41346	41346		Method selection for well 26	1	1	5	CHAR	RW
41347	41347		Method selection for well 27	1	1	5	CHAR	RW
41348	41348		Method selection for well 28	1	1	5	CHAR	RW
41349	41349		Method selection for well 29	1	1	5	CHAR	RW
41350	41350		Method selection for well 30	1	1	5	CHAR	RW
41351	41351		Method selection for well 31	1	1	5	CHAR	RW
41352	41352		Method selection for well 32	1	1	5	CHAR	RW
41353	41353		Method selection for well 33	1	1	5	CHAR	RW
41354	41354		Method selection for well 34	1	1	5	CHAR	RW
41355	41355		Method selection for well 35	1	1	5	CHAR	RW

Table 9: *Red Eye* 2G Modbus Register Map version 2.2
(*Red Eye* 2G PC52-00116-00 version 4.xx to 5.xx compatible)

Start Reg	End Reg	Well #	Description	Default Value	Low Limit	High Limit	Type	Access
41356	41356		Method selection for well 36	1	1	5	CHAR	RW
41357	41357		Method selection for well 37	1	1	5	CHAR	RW
41358	41358		Method selection for well 38	1	1	5	CHAR	RW
41359	41359		Method selection for well 39	1	1	5	CHAR	RW
41360	41360		Method selection for well 40	1	1	5	CHAR	RW
Read Only Holding Registers block, image of 30001 – 30054 block								
45001	45002		Water Cut Result (%)	0.00	0.00	100.00	FLOAT	RO
45003	45003		Aux Analog Input	0	0	1023	WORD	RO
45004	45004		Reserved				WORD	RO
45005	45005		Freq Input (Hz)	0	0	65535	WORD	RO
45006	45006		Reserved					
45007	45008		Current @ 1110nm (nA)	0.00	Float Limit	Float Limit	FLOAT	RO
45009	45010		Current @ 1450nm (nA)	0.00	Float Limit	Float Limit	FLOAT	RO
45011	45012		Current @ 1632nm (nA)	0.00	Float Limit	Float Limit	FLOAT	RO
45013	45014		Current @ 1730nm (nA)	0.00	Float Limit	Float Limit	FLOAT	RO
45015	45016		Temperature (degC)	0.00	Float Limit	Float Limit	FLOAT	RO
45017	45020		Reserved	0.00	Float Limit	Float Limit	FLOAT	RO
45021	45022		Water Cut @ 1110nm (%)		Float Limit	Float Limit	FLOAT	RO
45023	45024		Ratio 1 (1110nm-1450nm)	0.00	Float Limit	Float Limit	FLOAT	RO
45025	45026		Ratio 2 (1450nm-1632nm)	0.00	Float Limit	Float Limit	FLOAT	RO
45027	45028		Ratio 3 (1632nm-1730nm)	0.00	Float Limit	Float Limit	FLOAT	RO
45029	45030		Ratio 4 (1110nm-1632nm)	0.00	Float Limit	Float Limit	FLOAT	RO
45031	45032		Ratio 5 (1110nm-1730nm)	0.00	Float Limit	Float Limit	FLOAT	RO
45033	45034		Ratio 6 (1450nm-1730nm)	0.00	Float Limit	Float Limit	FLOAT	RO
45035	45035		Firmware version Major Number				CHAR	RO
45036	45036		Firmware version Minor Number				CHAR	RO
45037	45037		Modbus version Major Number				CHAR	RO
45038	45038		Modbus version Minor Number				CHAR	RO
45039	45050		Reserved					RO

Table 9: *Red Eye* 2G Modbus Register Map version 2.2 (*Red Eye* 2G PC52-00116-00 version 4.xx to 5.xx compatible)								
Start Reg	**End Reg**	**Well #**	**Description**	**Default Value**	**Low Limit**	**High Limit**	**Type**	**Access**
45051	45051		Status	0			WORD	RO
45052	45052		# of Good Messages	0	0	65535	WORD	RO
45053	45053		# of Bad Messages	0	0	65535	WORD	RO
45054	45054		# of Received Characters	0	0	65535	WORD	RO

Modbus Register Map version 2.1

Table 10: *Red Eye* 2G Modbus Register Map version 2.1
(*Red Eye* 2G version 3.03 compatible)

Start Reg	End Reg	Well #	Description	Default Value	Low Limit	High Limit	Type	Access
Input Registers								
30001	30002		Water Cut Result (%)	0.00	0.00	100.00	FLOAT	RO
30003	30003		Aux Analog Input	0	0	1023	WORD	RO
30004	30004		Reserved				WORD	RO
30005	30005		Freq Input (Hz)	0	0	65535	WORD	RO
30006	30006		Reserved					
30007	30008		Current @ 1110nm (nA)	0.00	Float Limit	Float Limit	FLOAT	RO
30009	30010		Current @ 1450nm (nA)	0.00	Float Limit	Float Limit	FLOAT	RO
30011	30012		Current @ 1632nm (nA)	0.00	Float Limit	Float Limit	FLOAT	RO
30013	30014		Current @ 1730nm (nA)	0.00	Float Limit	Float Limit	FLOAT	RO
30015	30016		Temperature (degC)	0.00	Float Limit	Float Limit	FLOAT	RO
30017	30020		Reserved	0.00	Float Limit	Float Limit	FLOAT	RO
30021	30022		Water Cut @ 1110nm (%)		Float Limit	Float Limit	FLOAT	RO
30023	30024		Ratio 1 (1110nm-1450nm)	0.00	Float Limit	Float Limit	FLOAT	RO
30025	30026		Ratio 2 (1450nm-1632nm)	0.00	Float Limit	Float Limit	FLOAT	RO
30027	30028		Ratio 3 (1632nm-1730nm)	0.00	Float Limit	Float Limit	FLOAT	RO
30029	30030		Ratio 4 (1110nm-1632nm)	0.00	Float Limit	Float Limit	FLOAT	RO
30031	30032		Ratio 5 (1110nm-1730nm)	0.00	Float Limit	Float Limit	FLOAT	RO
30033	30034		Ratio 6 (1450nm-1730nm)	0.00	Float Limit	Float Limit	FLOAT	RO
30035	30035		Firmware version Major Number				CHAR	RO
30036	30036		Firmware version Minor Number				CHAR	RO
30037	30037		Modbus version Major Number				CHAR	RO
30038	30038		Modbus version Minor Number				CHAR	RO
30039	30050		Reserved					RO
30051	30051		Status	0			WORD	RO
30052	30052		# of Good Messages	0	0	65535	WORD	RO

Table 10: *Red Eye* 2G Modbus Register Map version 2.1
(*Red Eye* 2G version 3.03 compatible)

Start Reg	End Reg	Well #	Description	Default Value	Low Limit	High Limit	Type	Access
30053	30053		# of Bad Messages	0	0	65535	WORD	RO
30054	30054		# of Received Characters	0	0	65535	WORD	RO
Holding Registers								
40001	40002		Current in Air @ 1110nm (nA)	0.00	Float Limit	Float Limit	FLOAT	RW
40003	40004		Current in Air @ 1450nm (nA)	0.00	Float Limit	Float Limit	FLOAT	RW
40005	40006		Current in Air @ 1632nm (nA)	0.00	Float Limit	Float Limit	FLOAT	RW
40007	40008		Current in Air @ 1730nm (nA)	0.00	Float Limit	Float Limit	FLOAT	RW
40009	40010		H2O Absorbance Coefficient @ 1110nm (unitless)	-0.021	Float Limit	Float Limit	FLOAT	RW
40011	40012		H2O Absorbance Coefficient @ 1450nm (unitless)	4.197	Float Limit	Float Limit	FLOAT	RW
40013	40014		H2O Absorbance Coefficient @ 1632nm (unitless)	0.650	Float Limit	Float Limit	FLOAT	RW
40015	40016		H2O Absorbance Coefficient @ 1730nm (unitless)	0.714	Float Limit	Float Limit	FLOAT	RW
40017	40018		Reserved	0.00	0.00	1.00	FLOAT	RW
40019	40020		Reserved	0.00	0.00	1.00	FLOAT	RW
40021	40022		Reserved	0.00	0.00	1.00	FLOAT	RW
40023	40024		Reserved	0.00	0.00	1.00	FLOAT	RW
40025	40026		Reserved	0.00	0.00	1.00	FLOAT	RW
40027	40028		Reserved	0.00	0.00	1.00	FLOAT	RW
40029	40030		Reserved	0.00	0.00	1.00	FLOAT	RW
40031	40032		Reserved	0.00	0.00	1.00	FLOAT	RW
40033	40034		Reserved	0.00	0.00	1.00	FLOAT	RW
40035	40036		Reserved	0.00	0.00	1.00	FLOAT	RW
40037	40037		Modbus Address	49	1	255	WORD	RW
40038	40038		Host port baudrate	0 (9600)	0	3	WORD	RW
40039	40039		# of 1 sec samples to average	1	1	10	BYTE	RW
40040	40040		Low Signal Alarm/Warning Limit	10	5	20	WORD	R/W
40041	40041		Reserved					
40042	40042		Reserved					
40043	40043		WellSelectMethod	0 (MOD)	0 (MOD)	1 (AI)	CHAR	RW
40044	40044		Current Active Well	1	1	40	CHAR	RW

Table 10: *Red Eye* 2G Modbus Register Map version 2.1
(*Red Eye* 2G version 3.03 compatible)

Start Reg	End Reg	Well #	Description	Default Value	Low Limit	High Limit	Type	Access
40045	40045		Method 1, coefficient 1	50	0	100	CHAR	RW
40046	40046		Method 1, coefficient 2	50	0	100	CHAR	RW
40047	40047		Method 1, coefficient 3	0	0	100	CHAR	RW
40048	40048		Method 1,coefficient 4	0	0	100	CHAR	RW
40049	40049		Method 1, coefficient 5	0	0	100	CHAR	RW
40050	40050		Method 1, coefficient 6	0	0	100	CHAR	RW
40051	40051		Method 1, coefficient 7	0	0	100	CHAR	RW
40052	40052		Method 2, coefficient 1	0	0	100	CHAR	WR
40053	40053		Method 2, coefficient 2	0	0	100	CHAR	WR
40054	40054		Method 2, coefficient 3	0	0	100	CHAR	RW
40055	40055		Method 2, coefficient 4	100	0	100	CHAR	RW
40056	40056		Method 2, coefficient 5	0	0	100	CHAR	RW
40057	40057		Method 2, coefficient 6	0	0	100	CHAR	RW
40058	40058		Method 2, coefficient 7	0	0	100	CHAR	RW
40059	40059		Method 3, coefficient 1	0	0	100	CHAR	RW
40060	40060		Method3, coefficient 2	100	0	100	CHAR	RW
40061	40061		Method3, coefficient 3	0	0	100	CHAR	RW
40062	40062		Method 3, coefficient 4	0	0	100	CHAR	RW
40063	40063		Method 3, coefficient 5	0	0	100	CHAR	RW
40064	40064		Method3, coefficient 6	0	0	100	CHAR	RW
40065	40065		Method 3, coefficient 7	0	0	100	CHAR	RW
40066	40066		Method 4, coefficient 1	0	0	100	CHAR	RW
40067	40067		Method 4, coefficient 2	0	0	100	CHAR	RW
40068	40068		Method 4, coefficient 3	100	0	100	CHAR	RW
40069	40069		Method 4, coefficient 4	0	0	100	CHAR	RW
40070	40070		Method 4, coefficient 5	0	0	100	CHAR	RW
40071	40071		Method 4, coefficient 6	0	0	100	CHAR	RW
40072	40072		Method 4, coefficient 7	0	0	100	CHAR	RW
40073	40073		Method 5, Low Water Cut Method	1	1	4	CHAR	RW
40074	40074		Method 5 Transition (% Water Cut)	50	0	100	CHAR	RW
40075	40075		Method 5, High Water Cut Method	2	1	4	CHAR	RW
41001	41002	1	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW

Table 10: *Red Eye* 2G Modbus Register Map version 2.1
(*Red Eye* 2G version 3.03 compatible)

Start Reg	End Reg	Well #	Description	Default Value	Low Limit	High Limit	Type	Access
41003	41004		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41005	41006		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41007	41008		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41009	41010	2	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41011	41012		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41013	41014		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41015	41016		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41017	41018	3	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41019	41020		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41021	41022		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41023	41024		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41025	41026	4	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41027	41028		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41029	41030		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41031	41032		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41033	41034	5	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41035	41036		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41037	41038		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41039	41040		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41041	41042	6	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41043	41044		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW

Table 10: *Red Eye* 2G Modbus Register Map version 2.1
(*Red Eye* 2G version 3.03 compatible)

Start Reg	End Reg	Well #	Description	Default Value	Low Limit	High Limit	Type	Access
41045	41046		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41047	41048		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41049	41050	7	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41051	41052		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41053	41054		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41055	41056		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41057	41058	8	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41059	41060		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41061	41062		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41063	41064		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41065	41066	9	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41067	41068		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41069	41070		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41071	41072		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41073	41074	10	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41075	41076		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41077	41078		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41079	41080		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41081	41082	11	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41083	41084		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41085	41086		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW

Table 10: *Red Eye* 2G Modbus Register Map version 2.1
(*Red Eye* 2G version 3.03 compatible)

Start Reg	End Reg	Well #	Description	Default Value	Low Limit	High Limit	Type	Access
41087	41088		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41089	41090	12	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41091	41092		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41093	41094		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41095	41096		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41097	41098	13	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41099	41100		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41101	41102		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41103	41104		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41105	41106	14	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41107	41108		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41109	41110		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41111	41112		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41113	41114	15	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41115	41116		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41117	41118		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41119	41120		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41121	41122	16	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41123	41124		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41125	41126		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41127	41128		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW

Table 10: *Red Eye* 2G Modbus Register Map version 2.1
(*Red Eye* 2G version 3.03 compatible)

Start Reg	End Reg	Well #	Description	Default Value	Low Limit	High Limit	Type	Access
41129	41130	17	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41131	41132		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41133	41134		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41135	41136		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41137	41138	18	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41139	41140		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41141	41142		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41143	41144		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41145	41146	19	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41147	41148		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41149	41150		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41151	41152		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41153	41154	20	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41155	41156		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41157	41158		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41159	41160		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41161	41162	21	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41163	41164		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41165	41166		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41167	41168		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41169	41170	22	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW

Table 10: *Red Eye* 2G Modbus Register Map version 2.1
(*Red Eye* 2G version 3.03 compatible)

Start Reg	End Reg	Well #	Description	Default Value	Low Limit	High Limit	Type	Access
41171	41172		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41173	41174		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41175	41176		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41177	41178	23	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41179	41180		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41181	41182		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41183	41184		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41185	41186	24	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41187	41188		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41189	41190		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41191	41192		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41193	41194	25	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41195	41196		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41197	41198		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41199	41200		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41201	41202	26	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41203	41204		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41205	41206		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41207	41208		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41209	41210	27	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41211	41212		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW

Table 10: *Red Eye* 2G Modbus Register Map version 2.1
(*Red Eye* 2G version 3.03 compatible)

Start Reg	End Reg	Well #	Description	Default Value	Low Limit	High Limit	Type	Access
41213	41214		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41215	41216		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41217	41218	28	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41219	41220		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41221	41222		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41223	41224		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41225	41226	29	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41227	41228		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41229	41230		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41231	41232		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41233	41234	30	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41235	41236		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41237	41238		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41239	41240		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41241	41242	31	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41243	41244		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41245	41246		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41247	41248		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41249	41250	32	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41251	41252		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41253	41254		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW

Table 10: *Red Eye* 2G Modbus Register Map version 2.1
(*Red Eye* 2G version 3.03 compatible)

Start Reg	End Reg	Well #	Description	Default Value	Low Limit	High Limit	Type	Access
41255	41256		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41257	41258	33	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41259	41260		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41261	41262		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41263	41264		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41265	41266	34	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41267	41268		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41269	41270		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41271	41272		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41273	41274	35	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41275	41276		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41277	41278		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41279	41280		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41281	41282	36	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41283	41284		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41285	41286		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41287	41288		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41289	41290	37	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41291	41292		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41293	41294		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41295	41296		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW

Table 10: *Red Eye* 2G Modbus Register Map version 2.1
(*Red Eye* 2G version 3.03 compatible)

Start Reg	End Reg	Well #	Description	Default Value	Low Limit	High Limit	Type	Access
41297	41298	38	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41299	41300		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41301	41302		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41303	41304		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41305	41306	39	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41307	41308		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41309	41310		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41311	41312		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41313	41314	40	Oil Absorbance Coefficient @ 1110nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41315	41316		Oil Absorbance Coefficient @ 1450nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41317	41318		Oil Absorbance Coefficient @ 1632nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41319	41320		Oil Absorbance Coefficient @ 1730nm (unitless)	0.00	Float Limit	Float Limit	FLOAT	RW
41321	41321		Method selection for well 1	1	1	5	CHAR	RW
41322	41322		Method selection for well 2	1	1	5	CHAR	RW
42323	41323		Method selection for well 3	1	1	5	CHAR	RW
42324	41324		Method selection for well 4	1	1	5	CHAR	RW
41325	41325		Method selection for well 5	1	1	5	CHAR	RW
41326	41326		Method selection for well 6	1	1	5	CHAR	RW
41327	41327		Method selection for well 7	1	1	5	CHAR	RW
41328	41328		Method selection for well 8	1	1	5	CHAR	RW
41329	41329		Method selection for well 9	1	1	5	CHAR	RW
41330	41330		Method selection for well 10	1	1	5	CHAR	RW
41331	41331		Method selection for well 11	1	1	5	CHAR	RW
41332	41332		Method selection for well 12	1	1	5	CHAR	RW
42333	41333		Method selection for well 13	1	1	5	CHAR	RW
42334	41334		Method selection for well 14	1	1	5	CHAR	RW

Table 10: *Red Eye* 2G Modbus Register Map version 2.1
(*Red Eye* 2G version 3.03 compatible)

Start Reg	End Reg	Well #	Description	Default Value	Low Limit	High Limit	Type	Access
41335	41335		Method selection for well 15	1	1	5	CHAR	RW
41336	41336		Method selection for well 16	1	1	5	CHAR	RW
41337	41337		Method selection for well 17	1	1	5	CHAR	RW
41338	41338		Method selection for well 18	1	1	5	CHAR	RW
41339	41339		Method selection for well 19	1	1	5	CHAR	RW
41340	41340		Method selection for well 20	1	1	5	CHAR	RW
41341	41341		Method selection for well 21	1	1	5	CHAR	RW
41342	41342		Method selection for well 22	1	1	5	CHAR	RW
41343	41343		Method selection for well 23	1	1	5	CHAR	RW
41344	41344		Method selection for well 24	1	1	5	CHAR	RW
41345	41345		Method selection for well 25	1	1	5	CHAR	RW
41346	41346		Method selection for well 26	1	1	5	CHAR	RW
41347	41347		Method selection for well 27	1	1	5	CHAR	RW
41348	41348		Method selection for well 28	1	1	5	CHAR	RW
41349	41349		Method selection for well 29	1	1	5	CHAR	RW
41350	41350		Method selection for well 30	1	1	5	CHAR	RW
41351	41351		Method selection for well 31	1	1	5	CHAR	RW
41352	41352		Method selection for well 32	1	1	5	CHAR	RW
41353	41353		Method selection for well 33	1	1	5	CHAR	RW
41354	41354		Method selection for well 34	1	1	5	CHAR	RW
41355	41355		Method selection for well 35	1	1	5	CHAR	RW
41356	41356		Method selection for well 36	1	1	5	CHAR	RW
41357	41357		Method selection for well 37	1	1	5	CHAR	RW
41358	41358		Method selection for well 38	1	1	5	CHAR	RW
41359	41359		Method selection for well 39	1	1	5	CHAR	RW
41360	41360		Method selection for well 40	1	1	5	CHAR	RW

Modbus Register Map version 2.0

Table 11: *Red Eye* 2G Modbus Register Map version 2.0
(*Red Eye* version 3.02 compatible)

Start Reg	End Reg	Well #	Description	Default Value	Low Limit	High Limit	Type	Access
Input Registers								
30001	30002		Water Cut Result	0.00	0.00	100.00	FLOAT	RO
30003	30003		Aux Analog Input	0	0	1024	WORD	RO
30005	30005		Freq Input	0	0	65535	WORD	RO
30006	30006		Reserved					
30007	30008		Currents Freq 1110	0.00	Float Limit	Float Limit	FLOAT	RO
30009	30010		Currents Freq 1450	0.00	Float Limit	Float Limit	FLOAT	RO
30011	30012		Currents Freq 1632	0.00	Float Limit	Float Limit	FLOAT	RO
30013	30014		Currents Freq 1730	0.00	Float Limit	Float Limit	FLOAT	RO
30015	30016		Temperature	0.00	Float Limit	Float Limit	FLOAT	RO
30017	30022		Reserved	0.00	Float Limit	Float Limit	FLOAT	RO
30023	30024		Ratios 0	0.00	Float Limit	Float Limit	FLOAT	RO
30025	30026		Ratios 1	0.00	Float Limit	Float Limit	FLOAT	RO
30027	30028		Ratios 2	0.00	Float Limit	Float Limit	FLOAT	RO
30029	30030		Ratios 3	0.00	Float Limit	Float Limit	FLOAT	RO
30031	30032		Ratios 4	0.00	Float Limit	Float Limit	FLOAT	RO
30033	30034		Ratios 5	0.00	Float Limit	Float Limit	FLOAT	RO
30035	30035		Firmware Major Number				CHAR	RO
30036	30036		Firmware Minor Number				CHAR	RO
30037	30037		Modbus version Major Number				CHAR	RO
30038	30038		Modbus version Minjor Number				CHAR	RO
30039	30050		Reserved					RO
30051	30051		Status	0			WORD	RO
30052	30052		# of Good Messages	0	0	65535	WORD	RO
30053	30053		# of Bad Messages	0	0	65535	WORD	RO
30054	30054		# of Received Characters	0	0	65535	WORD	RO
Holding Registers								
40001	40002		Air Scale Freq 1110	0.00	Float Limit	Float Limit	FLOAT	RW
40003	40004		Air Scale Freq 1450	0.00	Float Limit	Float Limit	FLOAT	RW

Table 11: *Red Eye* 2G Modbus Register Map version 2.0
(*Red Eye* version 3.02 compatible)

Start Reg	End Reg	Well #	Description	Default Value	Low Limit	High Limit	Type	Access
40005	40006		Air Scale Freq 1632	0.00	Float Limit	Float Limit	FLOAT	RW
40007	40008		Air Scale Freq 1730	0.00	Float Limit	Float Limit	FLOAT	RW
40009	40010		H2O Absolute Scale Freq 1110	0.20	Float Limit	Float Limit	FLOAT	RW
40011	40012		H2O Absolute Scale Freq 1450	1.10	Float Limit	Float Limit	FLOAT	RW
40013	40014		H2O Absolute Scale Freq 1632	5.70	Float Limit	Float Limit	FLOAT	RW
40015	40016		H2O Absolute Scale Freq 1730	1.20	Float Limit	Float Limit	FLOAT	RW
40017	40018		Reserved	0.00	0.00	1.00	FLOAT	RW
40019	40020		Reserved	0.00	0.00	1.00	FLOAT	RW
40021	40022		Reserved	0.00	0.00	1.00	FLOAT	RW
40023	40024		Reserved	0.00	0.00	1.00	FLOAT	RW
40025	40026		Reserved	0.40	0.00	1.00	FLOAT	RW
40027	40028		Reserved	0.20	0.00	1.00	FLOAT	RW
40029	40030		Reserved	0.00	0.00	1.00	FLOAT	RW
40031	40032		Reserved	0.00	0.00	1.00	FLOAT	RW
40033	40034		Reserved	0.00	0.00	1.00	FLOAT	RW
40035	40036		Reserved	0.20	0.00	1.00	FLOAT	RW
40037	40037		Modbus Address	255	1	255	WORD	RW
40038	40038		Host port baudrate	0 (9600)	0	3	WORD	RW
40039	40039		Calculated Sample Rate (sec)	1.00	1.00	10.00	BYTE	RW
40040	40040		Reserved					
40041	40041		Reserved					
40042	40042		Reserved					
40043	40043		WellSelectMethod	0 (MODBUS)	0 (Modbus)	1 (AI)	CHAR	RW
40044	40044		Current Active Well	1	1	40	CHAR	RW
40045	40045		Method 1, coefficient 1	50	0	100	CHAR	RW
40046	40046		Method 1, coefficient 2	50	0	100	CHAR	RW
40047	40047		Method 1, coefficient 3	0	0	100	CHAR	RW
40048	40048		Method 1,coefficient 4	0	0	100	CHAR	RW
40049	40049		Method 1, coefficient 5	0	0	100	CHAR	RW
40050	40050		Method 1, coefficient 6	0	0	100	CHAR	RW
40051	40051		Method 1, coefficient 7	0	0	100	CHAR	RW
40052	40052		Method 2, coefficient 1	0	0	100	CHAR	RW
40053	40053		Method 2, coefficient 2	0	0	100	CHAR	RW

Table 11: *Red Eye* 2G Modbus Register Map version 2.0
(*Red Eye* version 3.02 compatible)

Start Reg	End Reg	Well #	Description	Default Value	Low Limit	High Limit	Type	Access
40054	40054		Method 2, coefficient 3	0	0	100	CHAR	RW
40055	40055		Method 2, coefficient 4	100	0	100	CHAR	RW
40056	40056		Method 2, coefficient 5	0	0	100	CHAR	RW
40057	40057		Method 2, coefficient 6	0	0	100	CHAR	RW
40058	40058		Method 2, coefficient 7	0	0	100	CHAR	RW
40059	40059		Method 3, coefficient 1	0	0	100	CHAR	RW
40060	40060		Method3, coefficient 2	100	0	100	CHAR	RW
40061	40061		Method3, coefficient 3	0	0	100	CHAR	RW
40062	40062		Method 3, coefficient 4	0	0	100	CHAR	RW
40063	40063		Method 3, coefficient 5	0	0	100	CHAR	RW
40064	40064		Method3, coefficient 6	0	0	100	CHAR	RW
40065	40065		Method 3, coefficient 7	0	0	100	CHAR	RW
40066	40066		Method 4, coefficient 1	0	0	100	CHAR	RW
40067	40067		Method 4, coefficient 2	0	0	100	CHAR	RW
40068	40068		Method 4, coefficient 3	100	0	100	CHAR	RW
40069	40069		Method 4, coefficient 4	0	0	100	CHAR	RW
40070	40070		Method 4, coefficient 5	0	0	100	CHAR	RW
40071	40071		Method 4, coefficient 6	0	0	100	CHAR	RW
40072	40072		Method 4, coefficient 7	0	0	100	CHAR	RW
40073	40073		Last Method, Low Method	1	1	4	CHAR	RW
40074	40074		Last Method, Transition	50	0	100	CHAR	RW
40075	40075		Last Method, High Method	2	1	4	CHAR	RW
41001	41002	1	Oil Scaler freq 1110	0.00	Float Limit	Float Limit	FLOAT	RW
41003	41004		Oil Scaler freq 1450	0.00	Float Limit	Float Limit	FLOAT	RW

Table 11: *Red Eye* 2G Modbus Register Map version 2.0
(*Red Eye* version 3.02 compatible)

Start Reg	End Reg	Well #	Description	Default Value	Low Limit	High Limit	Type	Access
41005	41006		Oil Scaler freq 1632	0.00	Float Limit	Float Limit	FLOAT	RW
41007	41008		Oil Scaler freq 1730	0.00	Float Limit	Float Limit	FLOAT	RW
41009	41010	2	Oil Scaler freq 1110	0.00	Float Limit	Float Limit	FLOAT	RW
41011	41012		Oil Scaler freq 1450	0.00	Float Limit	Float Limit	FLOAT	RW
41013	41014		Oil Scaler freq 1632	0.00	Float Limit	Float Limit	FLOAT	RW
41015	41016		Oil Scaler freq 1730	0.00	Float Limit	Float Limit	FLOAT	RW
41017	41018	3	Oil Scaler freq 1110	0.00	Float Limit	Float Limit	FLOAT	RW
41019	41020		Oil Scaler freq 1450	0.00	Float Limit	Float Limit	FLOAT	RW
41021	41022		Oil Scaler freq 1632	0.00	Float Limit	Float Limit	FLOAT	RW
41023	41024		Oil Scaler freq 1730	0.00	Float Limit	Float Limit	FLOAT	RW
41025	41026	4	Oil Scaler freq 1110	0.00	Float Limit	Float Limit	FLOAT	RW
41027	41028		Oil Scaler freq 1450	0.00	Float Limit	Float Limit	FLOAT	RW
41029	41030		Oil Scaler freq 1632	0.00	Float Limit	Float Limit	FLOAT	RW
41031	41032		Oil Scaler freq 1730	0.00	Float Limit	Float Limit	FLOAT	RW
41033	41034	5	Oil Scaler freq 1110	0.00	Float Limit	Float Limit	FLOAT	RW
41035	41036		Oil Scaler freq 1450	0.00	Float Limit	Float Limit	FLOAT	RW
41037	41038		Oil Scaler freq 1632	0.00	Float Limit	Float Limit	FLOAT	RW
41039	41040		Oil Scaler freq 1730	0.00	Float Limit	Float Limit	FLOAT	RW
41041	41042	6	Oil Scaler freq 1110	0.00	Float Limit	Float Limit	FLOAT	RW
41043	41044		Oil Scaler freq 1450	0.00	Float Limit	Float Limit	FLOAT	RW
41045	41046		Oil Scaler freq 1632	0.00	Float Limit	Float Limit	FLOAT	RW
41047	41048		Oil Scaler freq 1730	0.00	Float Limit	Float Limit	FLOAT	RW
41049	41050	7	Oil Scaler freq 1110	0.00	Float Limit	Float Limit	FLOAT	RW
41051	41052		Oil Scaler freq 1450	0.00	Float Limit	Float Limit	FLOAT	RW
41053	41054		Oil Scaler freq 1632	0.00	Float Limit	Float Limit	FLOAT	RW

Table 11: *Red Eye* 2G Modbus Register Map version 2.0
(*Red Eye* version 3.02 compatible)

Start Reg	End Reg	Well #	Description	Default Value	Low Limit	High Limit	Type	Access
41055	41056		Oil Scaler freq 1730	0.00	Float Limit	Float Limit	FLOAT	RW
41057	41058	8	Oil Scaler freq 1110	0.00	Float Limit	Float Limit	FLOAT	RW
41059	41060		Oil Scaler freq 1450	0.00	Float Limit	Float Limit	FLOAT	RW
41061	41062		Oil Scaler freq 1632	0.00	Float Limit	Float Limit	FLOAT	RW
41063	41064		Oil Scaler freq 1730	0.00	Float Limit	Float Limit	FLOAT	RW
41065	41066	9	Oil Scaler freq 1110	0.00	Float Limit	Float Limit	FLOAT	RW
41067	41068		Oil Scaler freq 1450	0.00	Float Limit	Float Limit	FLOAT	RW
41069	41070		Oil Scaler freq 1632	0.00	Float Limit	Float Limit	FLOAT	RW
41071	41072		Oil Scaler freq 1730	0.00	Float Limit	Float Limit	FLOAT	RW
41073	41074	10	Oil Scaler freq 1110	0.00	Float Limit	Float Limit	FLOAT	RW
41075	41076		Oil Scaler freq 1450	0.00	Float Limit	Float Limit	FLOAT	RW
41077	41078		Oil Scaler freq 1632	0.00	Float Limit	Float Limit	FLOAT	RW
41079	41080		Oil Scaler freq 1730	0.00	Float Limit	Float Limit	FLOAT	RW
41081	41082	11	Oil Scaler freq 1110	0.00	Float Limit	Float Limit	FLOAT	RW
41083	41084		Oil Scaler freq 1450	0.00	Float Limit	Float Limit	FLOAT	RW
41085	41086		Oil Scaler freq 1632	0.00	Float Limit	Float Limit	FLOAT	RW
41087	41088		Oil Scaler freq 1730	0.00	Float Limit	Float Limit	FLOAT	RW
41089	41090	12	Oil Scaler freq 1110	0.00	Float Limit	Float Limit	FLOAT	RW
41091	41092		Oil Scaler freq 1450	0.00	Float Limit	Float Limit	FLOAT	RW
41093	41094		Oil Scaler freq 1632	0.00	Float Limit	Float Limit	FLOAT	RW
41095	41096		Oil Scaler freq 1730	0.00	Float Limit	Float Limit	FLOAT	RW
41097	41098	13	Oil Scaler freq 1110	0.00	Float Limit	Float Limit	FLOAT	RW
41099	41100		Oil Scaler freq 1450	0.00	Float Limit	Float Limit	FLOAT	RW
41101	41102		Oil Scaler freq 1632	0.00	Float Limit	Float Limit	FLOAT	RW
41103	41104		Oil Scaler freq 1730	0.00	Float Limit	Float Limit	FLOAT	RW

Table 11: *Red Eye* 2G Modbus Register Map version 2.0
(*Red Eye* version 3.02 compatible)

Start Reg	End Reg	Well #	Description	Default Value	Low Limit	High Limit	Type	Access
41105	41106	14	Oil Scaler freq 1110	0.00	Float Limit	Float Limit	FLOAT	RW
41107	41108		Oil Scaler freq 1450	0.00	Float Limit	Float Limit	FLOAT	RW
41109	41110		Oil Scaler freq 1632	0.00	Float Limit	Float Limit	FLOAT	RW
41111	41112		Oil Scaler freq 1730	0.00	Float Limit	Float Limit	FLOAT	RW
41113	41114	15	Oil Scaler freq 1110	0.00	Float Limit	Float Limit	FLOAT	RW
41115	41116		Oil Scaler freq 1450	0.00	Float Limit	Float Limit	FLOAT	RW
41117	41118		Oil Scaler freq 1632	0.00	Float Limit	Float Limit	FLOAT	RW
41119	41120		Oil Scaler freq 1730	0.00	Float Limit	Float Limit	FLOAT	RW
41121	41122	16	Oil Scaler freq 1110	0.00	Float Limit	Float Limit	FLOAT	RW
41123	41124		Oil Scaler freq 1450	0.00	Float Limit	Float Limit	FLOAT	RW
41125	41126		Oil Scaler freq 1632	0.00	Float Limit	Float Limit	FLOAT	RW
41127	41128		Oil Scaler freq 1730	0.00	Float Limit	Float Limit	FLOAT	RW
41129	41130	17	Oil Scaler freq 1110	0.00	Float Limit	Float Limit	FLOAT	RW
41131	41132		Oil Scaler freq 1450	0.00	Float Limit	Float Limit	FLOAT	RW
41133	41134		Oil Scaler freq 1632	0.00	Float Limit	Float Limit	FLOAT	RW
41135	41136		Oil Scaler freq 1730	0.00	Float Limit	Float Limit	FLOAT	RW
41137	41138	18	Oil Scaler freq 1110	0.00	Float Limit	Float Limit	FLOAT	RW
41139	41140		Oil Scaler freq 1450	0.00	Float Limit	Float Limit	FLOAT	RW
41141	41142		Oil Scaler freq 1632	0.00	Float Limit	Float Limit	FLOAT	RW
41143	41144		Oil Scaler freq 1730	0.00	Float Limit	Float Limit	FLOAT	RW
41145	41146	19	Oil Scaler freq 1110	0.00	Float Limit	Float Limit	FLOAT	RW
41147	41148		Oil Scaler freq 1450	0.00	Float Limit	Float Limit	FLOAT	RW
41149	41150		Oil Scaler freq 1632	0.00	Float Limit	Float Limit	FLOAT	RW
41151	41152		Oil Scaler freq 1730	0.00	Float Limit	Float Limit	FLOAT	RW
41153	41154	20	Oil Scaler freq 1110	0.00	Float Limit	Float Limit	FLOAT	RW

Table 11: *Red Eye* 2G Modbus Register Map version 2.0
(*Red Eye* version 3.02 compatible)

Start Reg	End Reg	Well #	Description	Default Value	Low Limit	High Limit	Type	Access
41155	41156		Oil Scaler freq 1450	0.00	Float Limit	Float Limit	FLOAT	RW
41157	41158		Oil Scaler freq 1632	0.00	Float Limit	Float Limit	FLOAT	RW
41159	41160		Oil Scaler freq 1730	0.00	Float Limit	Float Limit	FLOAT	RW
41161	41162	21	Oil Scaler freq 1110	0.00	Float Limit	Float Limit	FLOAT	RW
41163	41164		Oil Scaler freq 1450	0.00	Float Limit	Float Limit	FLOAT	RW
41165	41166		Oil Scaler freq 1632	0.00	Float Limit	Float Limit	FLOAT	RW
41167	41168		Oil Scaler freq 1730	0.00	Float Limit	Float Limit	FLOAT	RW
41169	41170	22	Oil Scaler freq 1110	0.00	Float Limit	Float Limit	FLOAT	RW
41171	41172		Oil Scaler freq 1450	0.00	Float Limit	Float Limit	FLOAT	RW
41173	41174		Oil Scaler freq 1632	0.00	Float Limit	Float Limit	FLOAT	RW
41175	41176		Oil Scaler freq 1730	0.00	Float Limit	Float Limit	FLOAT	RW
41177	41178	23	Oil Scaler freq 1110	0.00	Float Limit	Float Limit	FLOAT	RW
41179	41180		Oil Scaler freq 1450	0.00	Float Limit	Float Limit	FLOAT	RW
41181	41182		Oil Scaler freq 1632	0.00	Float Limit	Float Limit	FLOAT	RW
41183	41184		Oil Scaler freq 1730	0.00	Float Limit	Float Limit	FLOAT	RW
41185	41186	24	Oil Scaler freq 1110	0.00	Float Limit	Float Limit	FLOAT	RW
41187	41188		Oil Scaler freq 1450	0.00	Float Limit	Float Limit	FLOAT	RW
41189	41190		Oil Scaler freq 1632	0.00	Float Limit	Float Limit	FLOAT	RW
41191	41192		Oil Scaler freq 1730	0.00	Float Limit	Float Limit	FLOAT	RW
41193	41194	25	Oil Scaler freq 1110	0.00	Float Limit	Float Limit	FLOAT	RW
41195	41196		Oil Scaler freq 1450	0.00	Float Limit	Float Limit	FLOAT	RW
41197	41198		Oil Scaler freq 1632	0.00	Float Limit	Float Limit	FLOAT	RW
41199	41200		Oil Scaler freq 1730	0.00	Float Limit	Float Limit	FLOAT	RW
41201	41202	26	Oil Scaler freq 1110	0.00	Float Limit	Float Limit	FLOAT	RW
41203	41204		Oil Scaler freq 1450	0.00	Float Limit	Float Limit	FLOAT	RW

Table 11: *Red Eye* 2G Modbus Register Map version 2.0
(*Red Eye* version 3.02 compatible)

Start Reg	End Reg	Well #	Description	Default Value	Low Limit	High Limit	Type	Access
41205	41206		Oil Scaler freq 1632	0.00	Float Limit	Float Limit	FLOAT	RW
41207	41208		Oil Scaler freq 1730	0.00	Float Limit	Float Limit	FLOAT	RW
41209	41210	27	Oil Scaler freq 1110	0.00	Float Limit	Float Limit	FLOAT	RW
41211	41212		Oil Scaler freq 1450	0.00	Float Limit	Float Limit	FLOAT	RW
41213	41214		Oil Scaler freq 1632	0.00	Float Limit	Float Limit	FLOAT	RW
41215	41216		Oil Scaler freq 1730	0.00	Float Limit	Float Limit	FLOAT	RW
41217	41218	28	Oil Scaler freq 1110	0.00	Float Limit	Float Limit	FLOAT	RW
41219	41220		Oil Scaler freq 1450	0.00	Float Limit	Float Limit	FLOAT	RW
41221	41222		Oil Scaler freq 1632	0.00	Float Limit	Float Limit	FLOAT	RW
41223	41224		Oil Scaler freq 1730	0.00	Float Limit	Float Limit	FLOAT	RW
41225	41226	29	Oil Scaler freq 1110	0.00	Float Limit	Float Limit	FLOAT	RW
41227	41228		Oil Scaler freq 1450	0.00	Float Limit	Float Limit	FLOAT	RW
41229	41230		Oil Scaler freq 1632	0.00	Float Limit	Float Limit	FLOAT	RW
41231	41232		Oil Scaler freq 1730	0.00	Float Limit	Float Limit	FLOAT	RW
41233	41234	30	Oil Scaler freq 1110	0.00	Float Limit	Float Limit	FLOAT	RW
41235	41236		Oil Scaler freq 1450	0.00	Float Limit	Float Limit	FLOAT	RW
41237	41238		Oil Scaler freq 1632	0.00	Float Limit	Float Limit	FLOAT	RW
41239	41240		Oil Scaler freq 1730	0.00	Float Limit	Float Limit	FLOAT	RW
41241	41242	31	Oil Scaler freq 1110	0.00	Float Limit	Float Limit	FLOAT	RW
41243	41244		Oil Scaler freq 1450	0.00	Float Limit	Float Limit	FLOAT	RW
41245	41246		Oil Scaler freq 1632	0.00	Float Limit	Float Limit	FLOAT	RW
41247	41248		Oil Scaler freq 1730	0.00	Float Limit	Float Limit	FLOAT	RW
41249	41250	32	Oil Scaler freq 1110	0.00	Float Limit	Float Limit	FLOAT	RW
41251	41252		Oil Scaler freq 1450	0.00	Float Limit	Float Limit	FLOAT	RW
41253	41254		Oil Scaler freq 1632	0.00	Float Limit	Float Limit	FLOAT	RW

Table 11: *Red Eye* 2G Modbus Register Map version 2.0
(*Red Eye* version 3.02 compatible)

Start Reg	End Reg	Well #	Description	Default Value	Low Limit	High Limit	Type	Access
41255	41256		Oil Scaler freq 1730	0.00	Float Limit	Float Limit	FLOAT	RW
41257	41258	33	Oil Scaler freq 1110	0.00	Float Limit	Float Limit	FLOAT	RW
41259	41260		Oil Scaler freq 1450	0.00	Float Limit	Float Limit	FLOAT	RW
41261	41262		Oil Scaler freq 1632	0.00	Float Limit	Float Limit	FLOAT	RW
41263	41264		Oil Scaler freq 1730	0.00	Float Limit	Float Limit	FLOAT	RW
41265	41266	34	Oil Scaler freq 1110	0.00	Float Limit	Float Limit	FLOAT	RW
41267	41268		Oil Scaler freq 1450	0.00	Float Limit	Float Limit	FLOAT	RW
41269	41270		Oil Scaler freq 1632	0.00	Float Limit	Float Limit	FLOAT	RW
41271	41272		Oil Scaler freq 1730	0.00	Float Limit	Float Limit	FLOAT	RW
41273	41274	35	Oil Scaler freq 1110	0.00	Float Limit	Float Limit	FLOAT	RW
41275	41276		Oil Scaler freq 1450	0.00	Float Limit	Float Limit	FLOAT	RW
41277	41278		Oil Scaler freq 1632	0.00	Float Limit	Float Limit	FLOAT	RW
41279	41280		Oil Scaler freq 1730	0.00	Float Limit	Float Limit	FLOAT	RW
41281	41282	36	Oil Scaler freq 1110	0.00	Float Limit	Float Limit	FLOAT	RW
41283	41284		Oil Scaler freq 1450	0.00	Float Limit	Float Limit	FLOAT	RW
41285	41286		Oil Scaler freq 1632	0.00	Float Limit	Float Limit	FLOAT	RW
41287	41288		Oil Scaler freq 1730	0.00	Float Limit	Float Limit	FLOAT	RW
41289	41290	37	Oil Scaler freq 1110	0.00	Float Limit	Float Limit	FLOAT	RW
41291	41292		Oil Scaler freq 1450	0.00	Float Limit	Float Limit	FLOAT	RW
41293	41294		Oil Scaler freq 1632	0.00	Float Limit	Float Limit	FLOAT	RW
41295	41296		Oil Scaler freq 1730	0.00	Float Limit	Float Limit	FLOAT	RW
41297	41298	38	Oil Scaler freq 1110	0.00	Float Limit	Float Limit	FLOAT	RW
41299	41300		Oil Scaler freq 1450	0.00	Float Limit	Float Limit	FLOAT	RW
41301	41302		Oil Scaler freq 1632	0.00	Float Limit	Float Limit	FLOAT	RW
41303	41304		Oil Scaler freq 1730	0.00	Float Limit	Float Limit	FLOAT	RW

Table 11: *Red Eye* 2G Modbus Register Map version 2.0
(*Red Eye* version 3.02 compatible)

Start Reg	End Reg	Well #	Description	Default Value	Low Limit	High Limit	Type	Access
41305	41306	39	Oil Scaler freq 1110	0.00	Float Limit	Float Limit	FLOAT	RW
41307	41308		Oil Scaler freq 1450	0.00	Float Limit	Float Limit	FLOAT	RW
41309	41310		Oil Scaler freq 1632	0.00	Float Limit	Float Limit	FLOAT	RW
41311	41312		Oil Scaler freq 1730	0.00	Float Limit	Float Limit	FLOAT	RW
41313	41314	40	Oil Scaler freq 1110	0.00	Float Limit	Float Limit	FLOAT	RW
41315	41316		Oil Scaler freq 1450	0.00	Float Limit	Float Limit	FLOAT	RW
41317	41318		Oil Scaler freq 1632	0.00	Float Limit	Float Limit	FLOAT	RW
41319	41320		Oil Scaler freq 1730	0.00	Float Limit	Float Limit	FLOAT	RW
41321	41321		Method selection for well 1	1	1	5	CHAR	RW
41322	41322		Method selection for well 2	1	1	5	CHAR	RW
42323	41323		Method selection for well 3	1	1	5	CHAR	RW
42324	41324		Method selection for well 4	1	1	5	CHAR	RW
41325	41325		Method selection for well 5	1	1	5	CHAR	RW
41326	41326		Method selection for well 6	1	1	5	CHAR	RW
41327	41327		Method selection for well 7	1	1	5	CHAR	RW
41328	41328		Method selection for well 8	1	1	5	CHAR	RW
41329	41329		Method selection for well 9	1	1	5	CHAR	RW
41330	41330		Method selection for well 10	1	1	5	CHAR	RW
41331	41331		Method selection for well 11	1	1	5	CHAR	RW
41332	41332		Method selection for well 12	1	1	5	CHAR	RW
42333	41333		Method selection for well 13	1	1	5	CHAR	RW
42334	41334		Method selection for well 14	1	1	5	CHAR	RW
41335	41335		Method selection for well 15	1	1	5	CHAR	RW
41336	41336		Method selection for well 16	1	1	5	CHAR	RW
41337	41337		Method selection for well 17	1	1	5	CHAR	RW

Table 11: *Red Eye* 2G Modbus Register Map version 2.0
(*Red Eye* version 3.02 compatible)

Start Reg	End Reg	Well #	Description	Default Value	Low Limit	High Limit	Type	Access
41338	41338		Method selection for well 18	1	1	5	CHAR	RW
41339	41339		Method selection for well 19	1	1	5	CHAR	RW
41340	41340		Method selection for well 20	1	1	5	CHAR	RW
41341	41341		Method selection for well 21	1	1	5	CHAR	RW
41342	41342		Method selection for well 22	1	1	5	CHAR	RW
41343	41343		Method selection for well 23	1	1	5	CHAR	RW
41344	41344		Method selection for well 24	1	1	5	CHAR	RW
41345	41345		Method selection for well 25	1	1	5	CHAR	RW
41346	41346		Method selection for well 26	1	1	5	CHAR	RW
41347	41347		Method selection for well 27	1	1	5	CHAR	RW
41348	41348		Method selection for well 28	1	1	5	CHAR	RW
41349	41349		Method selection for well 29	1	1	5	CHAR	RW
41350	41350		Method selection for well 30	1	1	5	CHAR	RW
41351	41351		Method selection for well 31	1	1	5	CHAR	RW
41352	41352		Method selection for well 32	1	1	5	CHAR	RW
41353	41353		Method selection for well 33	1	1	5	CHAR	RW
41354	41354		Method selection for well 34	1	1	5	CHAR	RW
41355	41355		Method selection for well 35	1	1	5	CHAR	RW
41356	41356		Method selection for well 36	1	1	5	CHAR	RW
41357	41357		Method selection for well 37	1	1	5	CHAR	RW
41358	41358		Method selection for well 38	1	1	5	CHAR	RW
41359	41359		Method selection for well 39	1	1	5	CHAR	RW
41360	42360		Method selection for well 40	1	1	5	CHAR	RW

Appendix B – Quick Start Instructions

Note: All parameters of the 2G device are stored to flash memory. This allows for parameters to be maintained even after power has been removed from the 2G device.

Caution: For any parameter change to be stored in the 2G Flash memory, maintain power for a period of 90 Seconds, after the final parameter change.

Installation Supplies

Prior to physically mounting the unit, the 2G can be fully configured and calibrated on a bench-top. You will need the following:

- 2G unit
- 10-32V power supply
- PDA running *RedLine*
- PDA-2G cable

If fluid calibrations need to be done you will need the following in addition to the above items:

- A single water sample and one oil sample for each well. *(Approx. 50cc each.)*
- Tape *(To cover probe slot)* or calibration boot
- Syringe or pipet *(needle not required)*
- Towels and solvent for cleaning.

Installation Steps

1. Connect a PDA to the *Red Eye* 2G and turn on the power. Start the *RedLine* program.
2. Go to the **Set Up** Screen and set the following:
   - Modbus Address
     [Note: The default 2GNOC expects the 2G to be address 49. This address is changeable. Remember when changing the address to change it on both devices.]
   - Host Port Baud Rate
     [Note: The 2GNOC expects the 2G to be set at 9600]
   - Well Select Method
     "MODBUS" if the host port or HMI port selects the active well. "AI" if a 4 to 20mA signal is used to select the active well.
3. Go to the **Air Calibration** Screen. Make sure the gap between the probe's sapphire lenses is clean with only air in between. Tap **READ**. If Channel 1 and 3 are greater than 40,000 and Channel 2 and 4 are greater than 10,000, tap **CALIBRATE**.
4. Go to the **Water Calibration** Screen. The unit comes with default values that are good for 060 probe gaps (See Table 2 to determine your probe gap). You can use default water calibration values or calibrate with a sample of produced water which may give slightly better performance. To calibrate, fill the gap with water. Use electrical tape or equivalent to hold the fluid in. Insure there are no air bubbles on the sapphire lenses. Tap **READ** then tap **CALIBRATE**.
5. Go to the **Oil Calibration** Screen. Absorbance coefficients for oil samples from each well need to be measured/entered. Fill the gap with oil for well number 1. Insure "Well 1" is selected from the drop down menu. Tap **READ** then **CALIBRATE**. Repeat for each well.
6. Go to the Service Screen to **Save Configuration File**. Tap **READ** then in the lower left corner tap **TOOLS/SAVE**. Use the default file name (date included) or create your own. Tap **OK** in the upper right hand corner to save.
7. Mount the unit per the Physical Mounting instructions. Insure the alignment grooves are in line with the pipe.
8. Wire the unit per the Wiring instructions in this User Manual.
9. Connect the flow meter signal (if used). Set SW1 for analog or pulse input.
10. Connect to the 2GNOC (if used). Two pair connections are required to the 2GNOC, DC power and RS485 communication line.

Physical Mounting and Connections

The *Red Eye* 2G comes in two mounting styles; threaded and flanged. The threaded style has a 1" NPT process connection suitable for insertion through a standard weldolet. The flange styles are 1-½" raised face (600# or 900# ANSI) and 2" RTJ (#1500 ANSI).

For either style, the mounting guidelines are as follows:

- Horizontal or vertical pipe are acceptable for mounting.
- The probe slot should be in the center 1½ diameter of the pipe.
- The alignment grooves on the 2G unit must be parallel with the pipe.
- To avoid damage to feed-through cables and fiber optics, do not spin the head assembly relative to the probe shaft.
- If the linear flow rate is less than 4 ft/sec, a static mixer should be used. Install the mixer no more than 3 ft upstream of meter.

Wiring

All wiring connections are made on the termination board located under the back access cover. Power connections are made to terminal T2 and process connections are made to terminal T1.

Note. All wiring connections should be made with unit power OFF.

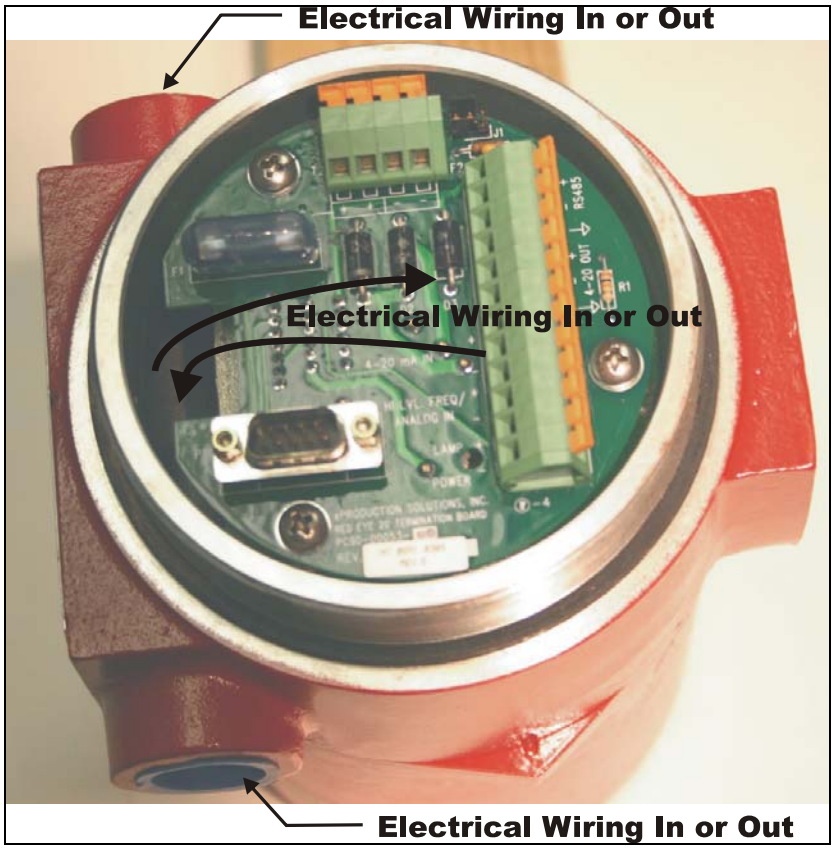


Figure 18: Unit Showing Electrical Terminals

Operating Power

The 2G meter requires 10-32 VDC power for operation (approx 8 watts). Connect wires as shown in Table 12.

Table 12: Operating Power Inputs

Terminal	*Signal*
T2-1	+ power
T2-3	- power

Note: The Red Eye 2G comes configured from the factory with the power switch in the ON position.

Process Connections

There are a variety of process connection points. Not all may be required for a particular installation. Refer to the guide below (Table 13) to see which are required for your application. Connect wires as needed.

Table 13: Process Connection Table

Term	*Signal*	*Comments*
T1-1	+RS485	Host port communications. Two wire RS485 plus com line. Modbus RTU. This is the connection for the 2GNOC
T1-2	-RS485	
T1-3	Com	
T1-4	+ 4 to 20mA Output	4 to 20mA Output of instantaneous water cut. 4 to 20 represents 0-100%
T1-5	- 4 to 20mA Output	
T1-6	Com	
T1-7	+ 4 to 20mA In	4 to 20mA Input for analog well selection. 16 wells. Use *RedLine* to choose AI for WELL SELECTION
T1-8	- 4 to 20mA In	
T1-9	+ High Level Freq/ Analog In	Flow meter input. Either pulse (5Volt TTL or 24V pulse) or analog (4 to 20mA). Set SW1 accordingly (see below)
T1-10	- High Level Freq/ Analog In	
T1-11	+ Lamp pwr	Factory set. Do not change
T1-12	- Lamp pwr	Factory set. Do not change

Note: The default 4 to 20mA output wiring is passive. For self powered 4 to 20mA, refer to Figure 16: Frequency Input with Pre-Amp Wiring.

P1 Comm port

This port is a RS232 HMI port using Modbus RTU protocol. This is the typical connection point for a *RedLine* Pocket PC connection.

SW1 Settings

Set Switch SW1 as needed per Table 14.

Table 14: Switch SW1 Settings

Input Type	*SW1-1*	*SW1-2*
4 to 20mA	Closed	Closed
TTL Pulse	Closed	Open
24V Pulse	Open	Open

Note: SW1-3 is for a termination resistor for the Host Port RS485 Line

Power up Initialization and setup

After being properly installed the *Red Eye* unit can be started. At power-up the default display appears and should not show any application errors. Check to see that the *Red Eye* 2G can function in the specified voltage range of 8-32 VDC and does not exceed the specified power usage restriction of 10W before using the unit to measure water-cut.

hi

Appendix C – Suggested Spare Parts

The following are recommended start up and two year operating spares.

Part Number	Description
PC00-21051-00	2G Spare/Replacement Fuse (Suggested Qty 6)
PC00-21132-01	2G Terminal Board Fuse Cover (Suggested Qty 1)
PC02-00499-00	IPAQ Pocket PC with *RedLine* Software installed for 2G configuration & calibration. Includes IPAQ serial cable adapter (optional & qty 1)
PC00-33565-00	Pipe Thread Lubricant

Optional Parts

The following part numbers are associated with the 2G product line.

Part Number	Description
PC54-00030-00	*RedLine* software
PC40-00063-00	PDA Serial Cable
PC03-00270-00	NOC to Pocket PC cable
PC00-19761-00	Null Modem
PC03-00282-00	Connector
PC03-00071-00	Cable 8P – 8P
PC90-00053-00	2G Termination Board (with meter power supply)
PREM-60-0073	Display Board
PC00-40082-00	Redesigned probe to Housing Lock Nut
PC02-00612-00SP	LCD Display Retrofit Kit (Inc interface PCB, hardware, & inst.)
PC02-00612-01SP	VFD Display Retrofit Kit (Inc interface PCB, hardware, & inst.)
PC00-4008200	Nut, Locking ¾" NPSM (Probe to housing lock nut replacement)
PC00-21051-03	Spare Fuse for NOC Power 3A
PC00-2105-00	Spare Fuse for NOC Loop Power 1A
BM-RE2GWCM-00	2G Installation, Configuration, & Operation Manual (8 ½ x 11)
BM-RE2GWCM-M	2G Installation, Configuration, & Operation (A4)
BM-REDLINE-00	*RedLine* Configuration Program User Manual
BM-RE2GNOC-00	NOC User Manual (8 ½ x 11)
BM-RE2GNOC-M	NOC User Manual (A4)

This page intentionally left blank.

Index

2

2 and 3 Inch Pipe 11

3

316 Stainless Steel 5–6, 9–10

A

Analog Input 1, 20–21, 31

B

Baud Rates 26–28, 96
  Host Port 96
Bluetooth 28
Byte Order 27

C

Calibration 1–4, 11
  Air 96
  Fluid 37, 95
  Oil 4, 96
  Pure Fluid 3–4
  Water 96
Canadian Standards Association Certificate 10
Certification 9–10
Chemometric 34
Coefficients 35
Crude Oil Density 4

D

DB9 Connector 27
Detector Board 1, 2, 31–32
  Temperature 32
Display 1, 2, 11, 15–19, 27, 31, 32, 34, 35, 100, 101
  Orientation 15–19
Display Board 15–19, 101

E

Electrical Specifications 9
Entrained Gas 1, 4

F

Factory Mutual Approvals 9
Flange Mount Unit Dimensions 7
Flange Types
  Depth Dimensions 13
Flange Unit Mounting 11
Flash Memory 1, 2, 31, 95
Flow Meter 1, 23, 96, 99
Frequency Inputs 24–25

G

Gas Carry-under 4
Gas-Oil Ratio 4
GOR ..... *See* Gas-Oil Ratio

H

H_2S environments 9
Hastelloy 5, 9
Hazardous Locations Approvals 10
High Level Frequency 9, 23
High Volume Wells 4
HMI 27–28
  Communication 27
  Connection 28
  Port 27–28, 96, 99
Host Port 28, 96, 99–100
Hydrocarbon 4
HyperACCESS 27
HyperTerminal 27
HyperTerminal Private Edition 27

I

Insulator 15, 17
ISO 9001: 2000 10

L

Lamp Power Connections 28
LCD Screen Display ..... *See* Display
Linear Amp 1, 31
Locking Nut 11
Locking Screw 15, 17
Log Amp 1, 31
Loop Power 21–23, 24, 28

M

Modbus Address 96
Modbus ID 1, 31
Modbus Register Map version 2.0 84
Modbus Register Map version 2.1 72
Modbus Register Map version 2.2 59
Modbus Register Map version 2.8e 39
Modbus RTU Protocol 99
Model Numbers 6
  Model Number Matrix 5

N

NACE Compliance 10
Near Infrared Radiation ..... *See* NIR
NIR 3
Non-hydrocarbon 4
NPT Mount Unit Dimensions 8

O

Operating Spares 101

P

P1 Comm Port 99
PDA 28, 95, 96
Photocur 1, 31
Pipe Thread Lubricant 14, 101
Pocket PC 2, 27, 37, 99, 101
Power Switch 25, 29, 98
Probe 9–11, 95–97, 101
  Assemblies 9
  Materials 10
  Probe Gap 5, 96
Process Connections 97, 99

Q

Quality Assurance 10

R

RedLine 2, *21*, *28*, *34*, *37*, *42*, *95*, *99*, 101
RS232 ..... 1, 26–28, 31, 99
  Communication 27
  Connector 20
  Port 27
RS485 ..... 1, 26, 99, 100
  Communications 26, 31, 96
  Connections 26
  Port 26, 28
  Transmission Line 26
RS485/232 converter 26

S

Sapphire Window 9
Screw-In Unit Mounting 11, 14
Seal Cap 15, 17
Single Conductor Wire 20
Sira Certification 9
Socket Connectors 16
Spectroscopy 3
State and Status Message Interpretations 2
Static Mixer 97
Status Interpretations 1, 31
Status Register Fault Codes 32–33
SW1 Settings 100

T

TCP/IP 28
Temperature 1, 31–32
  Operating 9
Terminal Board 23, 101
Terminal Strip 23, 28–29
Thread-O-Let 11
Two-line Display ..... *See* Display

U

UL International 10

W

Weld Neck Flange 11
Well Select Method 96
Well Selection Mode 1
Wiring 19–20, 97, 99
  Field Device 22–23
  Flow Meter 23
  Lamp Power 28
  Pre-Amp 25
  Water Cut Output 28
  Well Selection 20
  Wiring Connections 19–20