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MVI56E-AFC / MVI69E-AFC

Enhanced Liquid and Gas Flow Computer

Mass Allocation Shrinkage Calculation (MASC) Equation of State (EOS) Table Entries

March 7, 2022

TECHNICAL NOTE

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MVIxxE-AFC MASC EOS Table Entries Technical Note
For public use.

March 7, 2022

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1 Preface

1.1 Background

In order to calculate the additional mass and volume flow rates determined from the mass allocation shrinkage calculations (MASC), the calculations depend upon eight properties of the hydrocarbon mixture which must be pre-determined (as functions of temperature and pressure) using an equation of state (EOS). Tables expressing the relationships between temperature, pressure, and seven of these eight properties are provided as meter configuration input data. On each meter calculation, the flowing temperature and pressure process inputs are interpolated within each table to derive the appropriate hydrocarbon property value. These derived hydrocarbon property values are referred to as intermediate calculation results which are then used in the mass allocation shrinkage calculations for the related mass and volume flow rates.

1.2 Purpose of this Technical Note

The purpose of this document is to provide details on the operations required to manage mass allocation shrinkage calculation (MASC) equation of state (EOS) tables for the MVI56E-AFC and MVI69E-AFC Enhanced Liquid and Gas Flow Computers. This information will assist with the integration of third-party products with the MASC database and the troubleshooting of issues that may arise.

1.3 Additional Information

The following resources contain additional information that can assist the user with the module installation and operation.

Table 1.1. - Additional Information

Resource	Link
MVI56E-AFC / MVI69E-AFC Reference Guide	www.prosoft-technology.com
MVI56E-AFC / MVI69E-AFC Setup and Configuration Guide	www.prosoft-technology.com

1.4 Support

Technical support will be provided via the Web (in the form of user manuals, FAQ, datasheets, etc.) to assist with installation, operation, and diagnostics.

For additional support the user can use either of the following:

Table 1.2. – Support Details

Resource	Link
Contact Us web link	www.prosoft-technology.com
Support email	www.prosoft-technology.com

2 Overview of MASC EOS Property Tables

2.1 Table Organization

Each mass allocation shrinkage calculation (MASC) equation of state (EOS) property table consists of EOS property values for a given temperature and pressure. Each row consists of a temperature value followed by the EOS property values for the given temperature row and pressure column.

	Pressure Value P1	**Pressure Value P2**	**Pressure Value P3**	**Pressure Value P4**	**Pressure Value P5**
Temperature Value T1	EOS Property Value P1, T1	EOS Property Value P2, T1	EOS Property Value P3, T1	EOS Property Value P4, T1	EOS Property Value P5, T1
Temperature Value T2	EOS Property Value P1, T2	EOS Property Value P2, T2	EOS Property Value P3, T2	EOS Property Value P4, T2	EOS Property Value P5, T2
Temperature Value T3	EOS Property Value P1, T3	EOS Property Value P2, T3	EOS Property Value P3, T3	EOS Property Value P4, T3	EOS Property Value P5, T3
…	…	…	…	…	…
Temperature Value T10	EOS Property Value P1, T10	EOS Property Value P2, T10	EOS Property Value P3, T10	EOS Property Value P4, T10	EOS Property Value P5, T10

2.2 Table Limits

Each MASC EOS property table has the following limitations:

Property	Description
Maximum table dimensions	5 (pressure columns) * 10 (temperature rows) = 50 table entries
Number of pressure columns	2 to 5
Number of temperature rows	2 to 10

Note: The initial dimensions of the MASC EOS property tables are 0 pressure columns and 0 temperature rows. It is possible to revert to this initial dimension if desired.

2.3 Required Privilege

An operator must have the *Measurement* privilege in order to manage the MASC EOS property tables.

3 Overview of MASC Table Entries Special Window

3.1 Overall Constraints

- Special Window access uses holding register bank starting address 37400.
- Maximum packet size is 120 registers.
- Minimum packet size depends on command (see below); excess over this number (up to the 120 limit) must be all zero else Modbus exception code 03 “Illegal Data”.
- Direct access to any register in range 37400-37519 other than 37400 itself elicits Modbus exception code 02 “Illegal Address”.
- Upon “opening” a session, a “session context” is created, in which is maintained the currently selected (a) meter index (1-based); (b) tableset class (non-zero), and (c) table view (non-zero).
- A maximum of one session is allowed per connection, but multiple read-only sessions are permitted (on different connections). Connections include the 8 network connections plus the 2 serial ports plus the backplane.

3.2 Close Session

The Close Session operation closes the session identified by the given session ID. This operation is performed by utilizing Modbus function code 6: Write Single Register or Modbus function code 16: Write Multiple Registers with starting address 37400.

3.2.1 Request

<table>
<tr><td>Function Code</td><td>1 byte</td><td>0x06 (6) or 0x10 (16)</td></tr>
<tr><td>Starting Address</td><td>2 bytes</td><td>0x9218 (37400)</td></tr>
<tr><td>Quantity of Registers</td><td>2 bytes</td><td>0x0001 (1)</td></tr>
<tr><td>Byte Count</td><td>1 byte</td><td>0x02 (2)</td></tr>
<tr><td colspan="3">Register Values</td></tr>
<tr><td>Register Number</td><td>Data Type</td><td>Values</td></tr>
<tr><td>37400</td><td>UINT16</td><td>Lo byte:
Session command
<table>
<tr><th>Value</th><th>Description</th></tr>
<tr><td>0</td><td>Close session</td></tr>
<tr><td>1</td><td>(Re)open session read-only</td></tr>
<tr><td>2</td><td>(Re)open session read-write</td></tr>
<tr><td>3</td><td>Set selection</td></tr>
<tr><td>4</td><td>Write “pending” table</td></tr>
<tr><td>5</td><td>Commit “pending” table</td></tr>
</table>
Hi byte:
Session ID</td></tr>
</table>

3.2.2 Response

The normal response returns the function code, starting address, and quantity of registers written.

Function Code	1 byte	0x06 (6) or 0x10 (16)
Starting Address	2 bytes	0x9218 (37400)
Quantity of Registers	2 bytes	0x0001 (1)

3.2.3 Error

If an error occurs related to the Modbus function, an error code and exception code are returned.

Error Code	1 byte	0x90
Exception Code	1 byte	01 or 02 or 03 or 04

3.3 (Re)open Session Read-Only

The (Re)Open Session Read-Only command is performed by utilizing Modbus function code 16: Write Multiple Registers with starting address 37400.

A maximum of one session is allowed per connection, but multiple read-only sessions are permitted (on different connections). Connections include the 8 network connections plus the 2 serial ports plus the backplane.

The “locked” tables are those in non-volatile memory and used in the MASC calculations. The “pending” tables reside in the session context and are copied from the “locked” tables upon session open.

3.3.1 Request

<table>
<tr><td>Function Code</td><td>1 byte</td><td>0x10 (16)</td></tr>
<tr><td>Starting Address</td><td>2 bytes</td><td>0x9218 (37400)</td></tr>
<tr><td>Quantity of Registers</td><td>2 bytes</td><td>0x0004 (4)</td></tr>
<tr><td>Byte Count</td><td>1 byte</td><td>0x08 (8)</td></tr>
<tr><td colspan="3">Register Values</td></tr>
<tr><td>Register Number</td><td>Data Type</td><td>Values</td></tr>
<tr><td>37400</td><td>UINT16</td><td>Lo byte:
Session command
<table><tr><th>Value</th><th>Description</th></tr><tr><td>0</td><td>Close session</td></tr><tr><td>1</td><td>(Re)open session read-only</td></tr><tr><td>2</td><td>(Re)open session read-write</td></tr><tr><td>3</td><td>Set selection</td></tr><tr><td>4</td><td>Write “pending” table</td></tr><tr><td>5</td><td>Commit “pending” table</td></tr></table>
Hi byte:
Session ID</td></tr>
<tr><td>37401</td><td>UInt16</td><td>Handle of selected meter

Lo byte: Meter index (1-based)
Hi byte: Always 0</td></tr>
<tr><td>37402</td><td>UInt16</td><td>Selected tableset class

Lo byte: Table index (1-based)
<table><tr><th>Value</th><th>Description</th></tr><tr><td>1</td><td>Pending</td></tr><tr><td>2</td><td>Locked</td></tr></table>
Hi byte: Always 0</td></tr>
</table>

<table>
<tr>
<td>37403</td>
<td>UInt16</td>
<td>Selected table view

Lo byte:
<table>
<tr><th>Value</th><th>Description</th></tr>
<tr><td>1</td><td>Parameters (dimensions and captions)</td></tr>
<tr><td colspan="2">Index base for individual tables:</td></tr>
<tr><td>2</td><td>NGL density at standard conditions</td></tr>
<tr><td>3</td><td>Oil density at standard conditions</td></tr>
<tr><td>4</td><td>Oil density at metering conditions</td></tr>
<tr><td>5</td><td>Mass shrinkage factor, gas</td></tr>
<tr><td>6</td><td>Mass shrinkage factor, NGL</td></tr>
<tr><td>7</td><td>Gas-oil ratio</td></tr>
<tr><td>8</td><td>Gas molar mass (molecular weight)</td></tr>
</table>

Hi byte: Always 0</td>
</tr>
</table>

3.3.2 Response

The normal response returns the function code, starting address, and quantity of registers written.

Function Code	1 byte	0x10 (16)
Starting Address	2 bytes	0x9218 (37400)
Quantity of Registers	2 bytes	0x0004 (4)

3.3.3 Error

If an error occurs related to the Modbus function, an error code and exception code are returned.

Error Code	1 byte	0x90
Exception Code	1 byte	01 or 02 or 03 or 04

3.4 (Re)open Session Read-Write

The (Re)open Session Read-Write command is performed by utilizing Modbus function code 16: Write Multiple Registers with starting address 37400.

When multiple sessions are open simultaneously (over different connections), at most one can be read-write while all others must be read-only. A reopen of a read-only session as read-write that fails because another session is already read-write leaves the current session open (as read-only) with no change to its current context.

The “locked” tables are those in non-volatile memory and used in the MASC calculations. The “pending” tables reside in the session context and are copied from the “locked” tables upon session open.

3.4.1 Request

<table>
<tr><td>Function Code</td><td>1 byte</td><td>0x10 (16)</td></tr>
<tr><td>Starting Address</td><td>2 bytes</td><td>0x9218 (37400)</td></tr>
<tr><td>Quantity of Registers</td><td>2 bytes</td><td>0x0004 (4)</td></tr>
<tr><td>Byte Count</td><td>1 byte</td><td>0x08 (8)</td></tr>
<tr><td colspan="3">Register Values</td></tr>
<tr><td>Register Number</td><td>Data Type</td><td>Values</td></tr>
<tr><td>37400</td><td>UINT16</td><td>Lo byte:
Session command
<table>
<tr><th>Value</th><th>Description</th></tr>
<tr><td>0</td><td>Close session</td></tr>
<tr><td>1</td><td>(Re)open session read-only</td></tr>
<tr><td>2</td><td>(Re)open session read-write</td></tr>
<tr><td>3</td><td>Set selection</td></tr>
<tr><td>4</td><td>Write “pending” table</td></tr>
<tr><td>5</td><td>Commit “pending” table</td></tr>
</table>
Hi byte:
Session ID</td></tr>
<tr><td>37401</td><td>UInt16</td><td>Handle of selected meter

Lo byte: Meter index (1-based)
Hi byte: Always 0</td></tr>
<tr><td>37402</td><td>UInt16</td><td>Selected tableset class

Lo byte: Table index (1-based)
<table>
<tr><th>Value</th><th>Description</th></tr>
<tr><td>1</td><td>Pending</td></tr>
<tr><td>2</td><td>Locked</td></tr>
</table>
Hi byte: Always 0</td></tr>
</table>

<table>
<tr>
<td>37403</td>
<td>UInt16</td>
<td>Selected table view

Lo byte:
<table>
<tr><th>Value</th><th>Description</th></tr>
<tr><td>1</td><td>Parameters (dimensions and captions)</td></tr>
<tr><td colspan="2">Index base for individual tables:</td></tr>
<tr><td>2</td><td>NGL density at standard conditions</td></tr>
<tr><td>3</td><td>Oil density at standard conditions</td></tr>
<tr><td>4</td><td>Oil density at metering conditions</td></tr>
<tr><td>5</td><td>Mass shrinkage factor, gas</td></tr>
<tr><td>6</td><td>Mass shrinkage factor, NGL</td></tr>
<tr><td>7</td><td>Gas-oil ratio</td></tr>
<tr><td>8</td><td>Gas molar mass (molecular weight)</td></tr>
</table>

Hi byte: Always 0</td>
</tr>
</table>

3.4.2 Response

The normal response returns the function code, starting address, and quantity of registers written.

Function Code	1 byte	0x10 (16)
Starting Address	2 bytes	0x9218 (37400)
Quantity of Registers	2 bytes	0x0004 (4)

3.4.3 Error

If an error occurs related to the Modbus function, an error code and exception code are returned.

Error Code	1 byte	0x90
Exception Code	1 byte	01 or 02 or 03 or 04

3.5 Set Selection

The set selection command specifies the table class (“pending” or “locked”) and the table view (either parameters, or one of the 7 tables) to be accessed subsequently by Modbus reads. This operation is performed by utilizing Modbus function code 16: Write Multiple Registers with starting address 37400.

3.5.1 Request

<table>
<tr><td>Function Code</td><td>1 byte</td><td>0x10 (16)</td></tr>
<tr><td>Starting Address</td><td>2 bytes</td><td>0x9218 (37400)</td></tr>
<tr><td>Quantity of Registers</td><td>2 bytes</td><td>0x0004 (4)</td></tr>
<tr><td>Byte Count</td><td>1 byte</td><td>0x08 (8)</td></tr>
<tr><td colspan="3">Register Values</td></tr>
<tr><td>Register Number</td><td>Data Type</td><td>Values</td></tr>
<tr><td>37400</td><td>UINT16</td><td>Lo byte:
Session command
<table><tr><th>Value</th><th>Description</th></tr><tr><td>0</td><td>Close session</td></tr><tr><td>1</td><td>(Re)open session read-only</td></tr><tr><td>2</td><td>(Re)open session read-write</td></tr><tr><td>3</td><td>Set selection</td></tr><tr><td>4</td><td>Write “pending” table</td></tr><tr><td>5</td><td>Commit “pending” table</td></tr></table>
Hi byte:
Session ID</td></tr>
<tr><td>37401</td><td>UInt16</td><td>Handle of selected meter

Lo byte: This value may be either 0 or the meter number selected at opening; any other value is an error.

Hi byte: Always 0</td></tr>
<tr><td>37402</td><td>UInt16</td><td>Selected tableset class

Lo byte: Table index (1-based)
<table><tr><th>Value</th><th>Description</th></tr><tr><td>1</td><td>Pending</td></tr><tr><td>2</td><td>Locked</td></tr></table>
Hi byte: Always 0</td></tr>
</table>

<table>
<tr>
<td>37403</td>
<td>UInt16</td>
<td>Selected table view

Lo byte:
<table>
<tr><th>Value</th><th>Description</th></tr>
<tr><td>1</td><td>Parameters (dimensions and captions)</td></tr>
<tr><td colspan="2">Index base for individual tables:</td></tr>
<tr><td>2</td><td>NGL density at standard conditions</td></tr>
<tr><td>3</td><td>Oil density at standard conditions</td></tr>
<tr><td>4</td><td>Oil density at metering conditions</td></tr>
<tr><td>5</td><td>Mass shrinkage factor, gas</td></tr>
<tr><td>6</td><td>Mass shrinkage factor, NGL</td></tr>
<tr><td>7</td><td>Gas-oil ratio</td></tr>
<tr><td>8</td><td>Gas molar mass (molecular weight)</td></tr>
</table>

Hi byte: Always 0</td>
</tr>
</table>

3.5.2 Response

The normal response returns the function code, starting address, and quantity of registers written.

Function Code	1 byte	0x10 (16)
Starting Address	2 bytes	0x9218 (37400)
Quantity of Registers	2 bytes	0x0004 (4)

3.5.3 Error

If an error occurs related to the Modbus function, an error code and exception code are returned.

Error Code	1 byte	0x90
Exception Code	1 byte	01 or 02 or 03 or 04

3.6 Write "Pending" Table

The Write "Pending" Table command is performed by utilizing Modbus function code 16: Write Multiple Registers with starting address 37400. This command can be used to write table parameters (dimensions and headers) or table values.

The "pending" tables reside in the session context and are copied from the "locked" tables upon session open. If the session is closed without issuing a "Commit", the edited "pending" tables are discarded and lost.

3.6.1 Write Table Parameters

Request

Function Code	1 byte	0x10 (16)
Starting Address	2 bytes	0x9218 (37400)
Quantity of Registers	2 bytes	0x0078 (120)
Byte Count	1 byte	0xF0 (240)
Register Values		
Register Number	**Data Type**	**Values**
37400	UINT16	Lo byte: Session command **Value** / **Description** 0 – Close session 1 – (Re)open session read-only 2 – (Re)open session read-write 3 – Set selection 4 – Write "pending" table 5 – Commit "pending" table Hi byte: Session ID
37401	UInt16	Handle of selected meter Lo byte: This value may be either 0 or the meter number selected at opening; any other value is an error. Hi byte: Always 0
37402	UInt16	Selected tableset class Lo byte: Table index (1-based) **Value** / **Description** 1 – Pending Hi byte: Always 0

<table>
<tr><td>37403</td><td>UInt16</td><td>Selected table view

Lo byte:
<table><tr><th>Value</th><th>Description</th></tr><tr><td>0</td><td>No change</td></tr><tr><td>1</td><td>Parameters (dimensions and captions)</td></tr><tr><td colspan="2">Index base for individual tables:</td></tr><tr><td>2</td><td>NGL density at standard conditions</td></tr><tr><td>3</td><td>Oil density at standard conditions</td></tr><tr><td>4</td><td>Oil density at metering conditions</td></tr><tr><td>5</td><td>Mass shrinkage factor, gas</td></tr><tr><td>6</td><td>Mass shrinkage factor, NGL</td></tr><tr><td>7</td><td>Gas-oil ratio</td></tr><tr><td>8</td><td>Gas molar mass (molecular weight)</td></tr></table>
Hi byte: Always 0</td></tr>
<tr><td>37404</td><td>UInt16</td><td>Reserved: Always 0</td></tr>
<tr><td>37405</td><td>UInt16</td><td>Reserved: Always 0</td></tr>
<tr><td>37406</td><td>UInt16</td><td>Reserved: Always 0</td></tr>
<tr><td>37407</td><td>UInt16</td><td>Reserved: Always 0</td></tr>
<tr><td>37408</td><td>UInt16</td><td>Reserved: Always 0</td></tr>
<tr><td>37409</td><td>UInt16</td><td>Reserved: Always 0</td></tr>
<tr><td>37410</td><td>UInt16</td><td>Reserved: Always 0</td></tr>
<tr><td>37411</td><td>UInt16</td><td>Reserved: Always 0</td></tr>
<tr><td>37412</td><td>UInt16</td><td>Reserved: Always 0</td></tr>
<tr><td>37413</td><td>UInt16</td><td>Reserved: Always 0</td></tr>
<tr><td>37414</td><td>UInt16</td><td>Reserved: Always 0</td></tr>
<tr><td>37415</td><td>UInt16</td><td>Reserved: Always 0</td></tr>
<tr><td>37416</td><td>UInt16</td><td>Reserved: Always 0</td></tr>
<tr><td>37417</td><td>UInt16</td><td>Reserved: Always 0</td></tr>
<tr><td>37418</td><td>UInt16</td><td>Interpolation table parameter

Lo byte: Configured number of temperature rows

Hi byte: Always 0</td></tr>
<tr><td>37419</td><td>UInt16</td><td>Interpolation table parameter

Lo byte: Configured number of pressure columns

Hi byte: Always 0</td></tr>
<tr><td>37420</td><td rowspan="2">IEEE Float32</td><td rowspan="2">Interpolation table caption, temperature row 1</td></tr>
<tr><td>37421</td></tr>
</table>

37422 37423	IEEE Float32	Interpolation table caption, temperature row 2
37424 37425	IEEE Float32	Interpolation table caption, temperature row 3
37426 37427	IEEE Float32	Interpolation table caption, temperature row 4
37428 37429	IEEE Float32	Interpolation table caption, temperature row 5
37430 37431	IEEE Float32	Interpolation table caption, temperature row 6
37432 37433	IEEE Float32	Interpolation table caption, temperature row 7
37434 37435	IEEE Float32	Interpolation table caption, temperature row 8
37436 37437	IEEE Float32	Interpolation table caption, temperature row 9
37438 37439	IEEE Float32	Interpolation table caption, temperature row 10
37440 37441	IEEE Float32	Interpolation table captions, pressure column 1
37442 37443	IEEE Float32	Interpolation table captions, pressure column 2
37444 37445	IEEE Float32	Interpolation table captions, pressure column 3
37446 37447	IEEE Float32	Interpolation table captions, pressure column 4
37448 37449	IEEE Float32	Interpolation table captions, pressure column 5
37450 to 37519	IEEE Float32	Reserved, always 0

Response

The normal response returns the function code, starting address, and quantity of registers written.

Function Code	1 byte	0x10 (16)
Starting Address	2 bytes	0x9218 (37400)
Quantity of Registers	2 bytes	0x0078 (120)

Error

If an error occurs related to the Modbus function, an error code and exception code are returned.

Error Code	1 byte	0x90

Exception Code	1 byte	01 or 02 or 03 or 04

3.6.2 Write Table Values

Request

Function Code	1 byte	0x10 (16)
Starting Address	2 bytes	0x9218 (37400)
Quantity of Registers	2 bytes	0x0078 (120)
Byte Count	1 byte	0xF0 (240)
Register Values		
Register Number	**Data Type**	**Values**
37400	UINT16	Lo byte: Session command **Value** / **Description** 0 – Close session 1 – (Re)open session read-only 2 – (Re)open session read-write 3 – Set selection 4 – Write “pending” table 5 – Commit “pending” table Hi byte: Session ID
37401	UInt16	Handle of selected meter Lo byte: Meter index (1-based) Hi byte: Always 0
37402	UInt16	Selected tableset class Lo byte: Table index (1-based) **Value** / **Description** 0 – No session 1 – Pending 2 – Locked Hi byte: Always 0

<table>
<tr><td>37403</td><td>UInt16</td><td>Selected table view

Lo byte:<table><tr><th>Value</th><th>Description</th></tr><tr><td>0</td><td>No session</td></tr><tr><td>1</td><td>Parameters (dimensions and captions)</td></tr><tr><td colspan="2">Index base for individual tables:</td></tr><tr><td>2</td><td>NGL density at standard conditions</td></tr><tr><td>3</td><td>Oil density at standard conditions</td></tr><tr><td>4</td><td>Oil density at metering conditions</td></tr><tr><td>5</td><td>Mass shrinkage factor, gas</td></tr><tr><td>6</td><td>Mass shrinkage factor, NGL</td></tr><tr><td>7</td><td>Gas-oil ratio</td></tr><tr><td>8</td><td>Gas molar mass (molecular weight)</td></tr></table>
Hi byte: Always 0</td></tr>
<tr><td>37404</td><td>UInt16</td><td>Reserved: Always 0</td></tr>
<tr><td>37405</td><td>UInt16</td><td>Reserved: Always 0</td></tr>
<tr><td>37406</td><td>UInt16</td><td>Reserved: Always 0</td></tr>
<tr><td>37407</td><td>UInt16</td><td>Reserved: Always 0</td></tr>
<tr><td>37408</td><td>UInt16</td><td>Reserved: Always 0</td></tr>
<tr><td>37409</td><td>UInt16</td><td>Reserved: Always 0</td></tr>
<tr><td>37410</td><td>UInt16</td><td>Reserved: Always 0</td></tr>
<tr><td>37411</td><td>UInt16</td><td>Reserved: Always 0</td></tr>
<tr><td>37412</td><td>UInt16</td><td>Reserved: Always 0</td></tr>
<tr><td>37413</td><td>UInt16</td><td>Reserved: Always 0</td></tr>
<tr><td>37414</td><td>UInt16</td><td>Reserved: Always 0</td></tr>
<tr><td>37415</td><td>UInt16</td><td>Reserved: Always 0</td></tr>
<tr><td>37416</td><td>UInt16</td><td>Reserved: Always 0</td></tr>
<tr><td>37417</td><td>UInt16</td><td>Reserved: Always 0</td></tr>
<tr><td>37418</td><td>UInt16</td><td>Reserved: Always 0</td></tr>
<tr><td>37419</td><td>UInt16</td><td>Reserved: Always 0</td></tr>
<tr><td>37420
37421</td><td>IEEE Float32</td><td>Interpolation table value, row 1, column 1</td></tr>
<tr><td>37422
37423</td><td>IEEE Float32</td><td>Interpolation table value, row 2, column 1</td></tr>
<tr><td>37424
37425</td><td>IEEE Float32</td><td>Interpolation table value, row 3, column 1</td></tr>
<tr><td>37426
37427</td><td>IEEE Float32</td><td>Interpolation table value, row 4, column 1</td></tr>
<tr><td>37428
37429</td><td>IEEE Float32</td><td>Interpolation table value, row 5, column 1</td></tr>
</table>

37430	IEEE Float32	Interpolation table value, row 6, column 1
37431		
37432	IEEE Float32	Interpolation table value, row 7, column 1
37433		
37434	IEEE Float32	Interpolation table value, row 8, column 1
37435		
37436	IEEE Float32	Interpolation table value, row 9, column 1
37437		
37438	IEEE Float32	Interpolation table value, row 10, column 1
37439		
37440	IEEE Float32	Interpolation table value, row 1, column 2
37441		
37442	IEEE Float32	Interpolation table value, row 2, column 2
37443		
37444	IEEE Float32	Interpolation table value, row 3, column 2
37445		
37446	IEEE Float32	Interpolation table value, row 4, column 2
37447		
37448	IEEE Float32	Interpolation table value, row 5, column 2
37449		
37450	IEEE Float32	Interpolation table value, row 6, column 2
37451		
37452	IEEE Float32	Interpolation table value, row 7, column 2
37453		
37454	IEEE Float32	Interpolation table value, row 8, column 2
37455		
37456	IEEE Float32	Interpolation table value, row 9, column 2
37457		
37458	IEEE Float32	Interpolation table value, row 10, column 2
37459		
37460	IEEE Float32	Interpolation table value, row 1, column 3
36461		
37462	IEEE Float32	Interpolation table value, row 2, column 3
36463		
37464	IEEE Float32	Interpolation table value, row 3, column 3
36465		
37466	IEEE Float32	Interpolation table value, row 4, column 3
36467		
37468	IEEE Float32	Interpolation table value, row 5, column 3
37469		
37470	IEEE Float32	Interpolation table value, row 6, column 3
37471		
37472		Interpolation table value, row 7, column 3

37473	IEEE Float32	
37474	IEEE Float32	Interpolation table value, row 8, column 3
37475		
37476	IEEE Float32	Interpolation table value, row 9, column 3
37477		
37478	IEEE Float32	Interpolation table value, row 10, column 3
37479		
37480	IEEE Float32	Interpolation table value, row 1, column 4
37481		
37482	IEEE Float32	Interpolation table value, row 2, column 4
37483		
37484	IEEE Float32	Interpolation table value, row 3, column 4
37485		
37486	IEEE Float32	Interpolation table value, row 4, column 4
37487		
37488	IEEE Float32	Interpolation table value, row 5, column 4
37489		
37490	IEEE Float32	Interpolation table value, row 6, column 4
37491		
37492	IEEE Float32	Interpolation table value, row 7, column 4
37493		
37494	IEEE Float32	Interpolation table value, row 8, column 4
37495		
37496	IEEE Float32	Interpolation table value, row 9, column 4
37497		
37498	IEEE Float32	Interpolation table value, row 10, column 4
37499		
37500	IEEE Float32	Interpolation table value, row 1, column 5
37501		
37502	IEEE Float32	Interpolation table value, row 2, column 5
37503		
37504	IEEE Float32	Interpolation table value, row 3, column 5
37505		
37506	IEEE Float32	Interpolation table value, row 4, column 5
37507		
37508	IEEE Float32	Interpolation table value, row 5, column 5
37509		
37510	IEEE Float32	Interpolation table value, row 6, column 5
37511		
37512	IEEE Float32	Interpolation table value, row 7, column 5
37513		
37514		Interpolation table value, row 8, column 5

37515	IEEE Float32	
37516	IEEE Float32	Interpolation table value, row 9, column 5
37517		
37518	IEEE Float32	Interpolation table value, row 10, column 5
37519		

Response

The normal response returns the function code, starting address, and quantity of registers written.

Function Code	1 byte	0x10 (16)
Starting Address	2 bytes	0x9218 (37400)
Quantity of Registers	2 bytes	0x0078 (120)

Error

If an error occurs related to the Modbus function, an error code and exception code are returned.

Error Code	1 byte	0x90
Exception Code	1 byte	01 or 02 or 03 or 04

3.7 Commit "Pending" Table

The Commit "Pending" Table command must be issued to store pending table data in the locked tables, which are stored in the module's non-volatile memory.

The Commit "Pending" Table command is performed by utilizing Modbus function code 6: Write Single Register or Modbus function code 16: Write Multiple Registers with starting address 37400.

3.7.1 Request

Function Code	1 byte	0x06 (6) or 0x10 (16)
Starting Address	2 bytes	0x9218 (37400)
Quantity of Registers	2 bytes	0x0001 (1)
Byte Count	1 byte	0x02 (2)
Register Values		
Register Number	**Data Type**	**Values**
37400	UINT16	Lo byte: Session command

Value	Description
0	Close session
1	(Re)open session read-only
2	(Re)open session read-write
3	Set selection

		4 Write “pending” table 5 Commit “pending” table Hi byte: Session ID

3.7.2 Response

The normal response returns the function code, starting address, and quantity of registers written.

Function Code	1 byte	0x10 (16)
Starting Address	2 bytes	0x9218 (37400)
Quantity of Registers	2 bytes	0x0001 (1)

3.7.3 Error

If an error occurs related to the Modbus function, an error code and exception code are returned.

Error Code	1 byte	0x90
Exception Code	1 byte	01 or 02 or 03 or 04

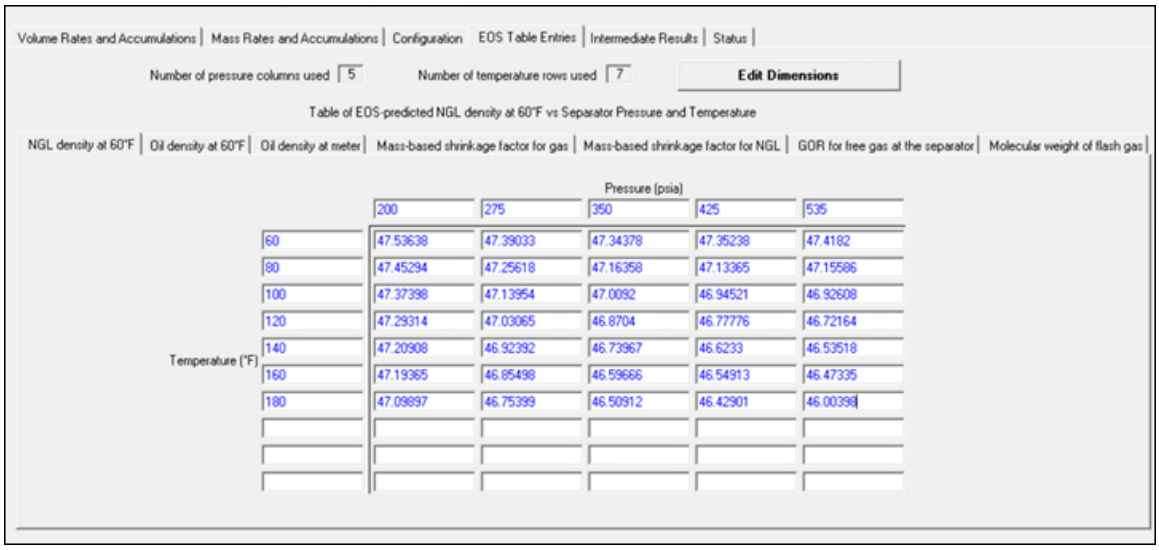
4 Session States vs. Valid Session Commands

The following tables shows the valid session commands based on the current session state.

	Session Commands					
Session State	**Close Session**	**(Re)open Session Read-Only**	**(Re)open Session Read-Write**	**Set Selection**	**Write "Pending" Table**	**Commit "Pending" Table**
none, closed	✓	✓	✓			
open, read-only	✓	✓	✓	✓		
open, read-write, "clean" data	✓	✓	✓	✓	✓	✓
open, read-write, "dirty" data	✓	✓	✓	✓	✓	✓

5 Examples

Following is an example of an EOS property table showing the predicted NGL density at 60°:



The following sections provide examples of the commands that would be used to create and read this example EOS table.

5.1 Push

5.1.1 Overview

Pushing EOS table configuration data to the module involves the following steps:

1 Open a read-write session.

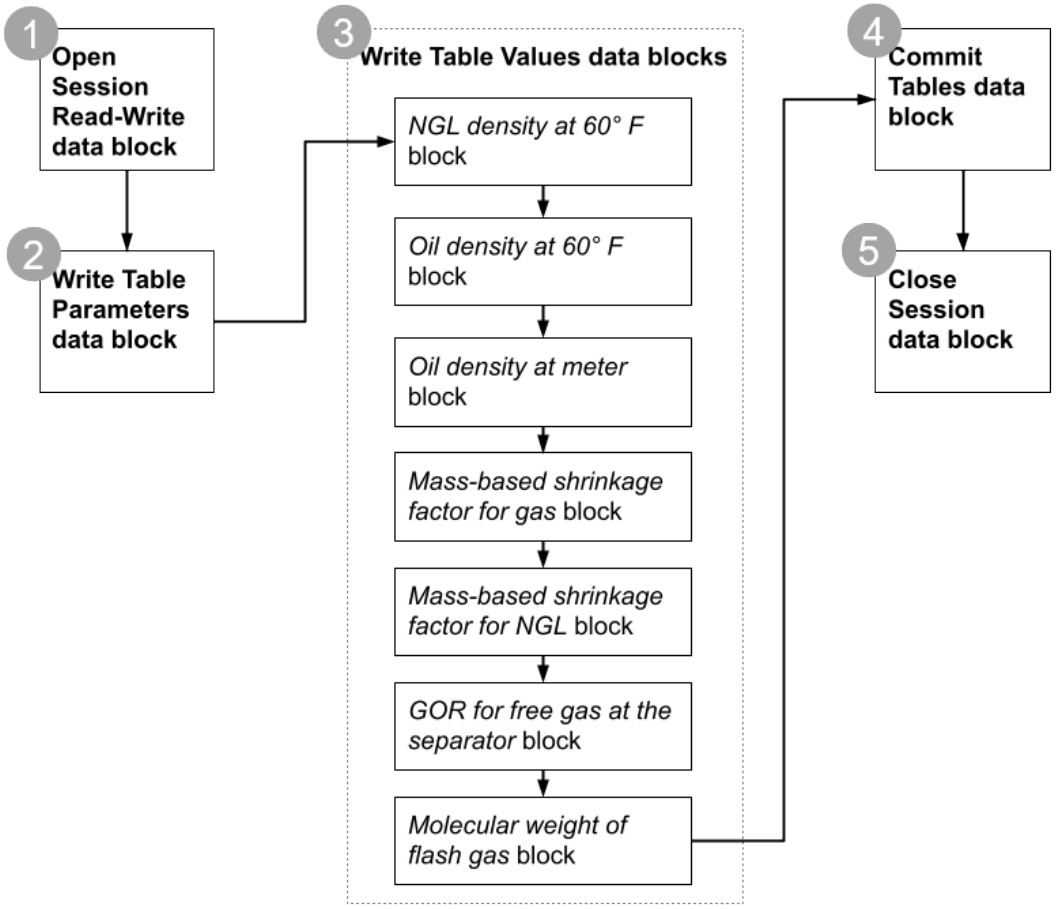
2 Write EOS table parameters (table dimensions and captions) to the module. The same parameters will be used for all seven tables. Only a single data block is required for this step.

3 Write interpolation values to the module. Each of the seven tables will require a separate Write “Pending” Table command.

4 Commit the pending table data to the module’s non-volatile memory.

5 Close the session.

The following diagram illustrates this process showing the data blocks involved in each step:



Sections 5.1.2 through 5.1.6 provide examples of the Modbus commands and data blocks that would be used to configure the example EOS table shown above.

5.1.2 Open Session Read-Write

To open a session, we would execute the (Re)open Session Read-Write command utilizing Modbus function code 16: Write Multiple Registers with starting address 37400.

Parameter	Value
Modbus function code	0x10 (16)
Starting address	0x9218 (37400)
Quantity of Registers	0x04 (4)
Byte Count	0x08 (8)
Register Values	Values for executing the (Re)open Session Read-Write command

Register	Value	Meaning
37400	0x0102	Lo byte: 02- (Re)open session Read-Write command Hi byte: 01 - Session ID
37401	0x0004	Handle of selected meter
37402	0x0001	Selected tableset class: 1 – Pending
37403	0x0001	Selected table view: 1 - Parameters (dimensions and captions)

5.1.3 Write Table Parameters

To write the EOS table dimensions and captions, we would execute the Write "pending" table operation using Modbus function code 16: Write Multiple Registers with starting address 37400, as shown in the following table. The specified dimensions will be used for all seven EOS tables.

<table>
<tr><th>Parameter</th><th>Value</th></tr>
<tr><td>Modbus function code</td><td>0x10 (16)</td></tr>
<tr><td>Starting address</td><td>0x9218 (37400)</td></tr>
<tr><td>Quantity of Registers</td><td>0x78 (120)</td></tr>
<tr><td>Byte Count</td><td>0xF0 (240)</td></tr>
<tr><td>Register Values</td><td>Values for executing the Write "Pending" Table command
<table>
<tr><th>Register</th><th>Value</th><th>Meaning</th></tr>
<tr><td>37400</td><td>0x0104</td><td>Lo byte: 04- Write "Pending" Table command
Hi byte: 01 - Session ID</td></tr>
<tr><td>37401</td><td>0x0004</td><td>Handle of selected meter</td></tr>
<tr><td>37402</td><td>0x0001</td><td>Selected tableset class: 1 – Pending</td></tr>
<tr><td>37403</td><td>0x0001</td><td>Selected table view: 1 – Parameters (dimensions and captions)</td></tr>
<tr><td>37404</td><td>0x0000</td><td>Reserved: Always 0</td></tr>
<tr><td>37405</td><td>0x0000</td><td>Reserved: Always 0</td></tr>
<tr><td>37406</td><td>0x0000</td><td>Reserved: Always 0</td></tr>
<tr><td>37407</td><td>0x0000</td><td>Reserved: Always 0</td></tr>
<tr><td>37408</td><td>0x0000</td><td>Reserved: Always 0</td></tr>
<tr><td>37409</td><td>0x0000</td><td>Reserved: Always 0</td></tr>
<tr><td>37410</td><td>0x0000</td><td>Reserved: Always 0</td></tr>
<tr><td>37411</td><td>0x0000</td><td>Reserved: Always 0</td></tr>
<tr><td>37412</td><td>0x0000</td><td>Reserved: Always 0</td></tr>
<tr><td>37413</td><td>0x0000</td><td>Reserved: Always 0</td></tr>
<tr><td>37414</td><td>0x0000</td><td>Reserved: Always 0</td></tr>
<tr><td>37415</td><td>0x0000</td><td>Reserved: Always 0</td></tr>
<tr><td>37416</td><td>0x0000</td><td>Reserved: Always 0</td></tr>
<tr><td>37417</td><td>0x0000</td><td></td></tr>
<tr><td>37418</td><td>0x0007</td><td>Interpolation table parameter

Configured number of temperature rows (7)</td></tr>
<tr><td>37419</td><td>0x0005</td><td>Interpolation table parameter

Configured number of pressure columns (5)</td></tr>
<tr><td>37420</td><td>0x0000</td><td rowspan="2">Temperature row 1 caption</td></tr>
<tr><td>37421</td><td>0x003C</td></tr>
<tr><td>37422</td><td>0x0000</td><td>Temperature row 2 caption</td></tr>
</table></td></tr>
</table>

Parameter	Value		
	37423	0x0050	
	37424	0x0000	Temperature row 3 caption
	37425	0x0064	
	37426	0x0000	Temperature row 4 caption
	37427	0x0078	
	37428	0x0000	Temperature row 5 caption
	37429	0x008C	
	37430	0x0000	Temperature row 6 caption
	37431	0x00A0	
	37432	0x0000	Temperature row 7 caption
	37433	0x00B4	
	37434	0x0000	Reserved, always 0
	37435	0x0000	Reserved, always 0
	37436	0x0000	Reserved, always 0
	37437	0x0000	Reserved, always 0
	37438	0x0000	Reserved, always 0
	37439	0x0000	Reserved, always 0
	37440	0x0000	Pressure column 1 caption
	37441	0x00C8	
	37442	0x0000	Pressure column 2 caption
	37443	0x0113	
	37444	0x0000	Pressure column 3 caption
	37445	0x015E	
	37446	0x0000	Pressure column 4 caption
	37447	0x01A9	
	37448	0x0000	Pressure column 5 caption
	37449	0x0217	

5.1.4 Write Table Values

To write the EOS table data, we would execute the Write "pending" table operation using Modbus function code 16: Write Multiple Registers with starting address 37400, as shown in the following table.

Note: The following example shows the Modbus command for writing EOS values to the first EOS table, *NGL Density at 60°F*. This command would need to be repeated for each of the six other tables.

<table>
<tr><th>Parameter</th><th>Value</th></tr>
<tr><td>Modbus function code</td><td>0x10 (16)</td></tr>
<tr><td>Starting address</td><td>0x9218 (37400)</td></tr>
<tr><td>Quantity of Registers</td><td>0x78 (120)</td></tr>
<tr><td>Byte Count</td><td>0xF0 (240)</td></tr>
<tr><td>Register Values</td><td>Values for executing the Write "Pending" Table command
<table>
<tr><th>Register</th><th>Value</th><th>Meaning</th></tr>
<tr><td>37400</td><td>0x0104</td><td>Lo byte: 04- Write "Pending" Table command
Hi byte: 01 - Session ID</td></tr>
<tr><td>37401</td><td>0x0004</td><td>Handle of selected meter</td></tr>
<tr><td>37402</td><td>0x0001</td><td>Selected tableset class: 1 – Pending</td></tr>
<tr><td>37403</td><td>0x0004</td><td>Selected table view: 2 - NGL density at standard conditions</td></tr>
<tr><td>37404</td><td>0x0000</td><td>Reserved: Always 0</td></tr>
<tr><td>37405</td><td>0x0000</td><td>Reserved: Always 0</td></tr>
<tr><td>37406</td><td>0x0000</td><td>Reserved: Always 0</td></tr>
<tr><td>37407</td><td>0x0000</td><td>Reserved: Always 0</td></tr>
<tr><td>37408</td><td>0x0000</td><td>Reserved: Always 0</td></tr>
<tr><td>37409</td><td>0x0000</td><td>Reserved: Always 0</td></tr>
<tr><td>37410</td><td>0x0000</td><td>Reserved: Always 0</td></tr>
<tr><td>37411</td><td>0x0000</td><td>Reserved: Always 0</td></tr>
<tr><td>37412</td><td>0x0000</td><td>Reserved: Always 0</td></tr>
<tr><td>37413</td><td>0x0000</td><td>Reserved: Always 0</td></tr>
<tr><td>37414</td><td>0x0000</td><td>Reserved: Always 0</td></tr>
<tr><td>37415</td><td>0x0000</td><td>Reserved: Always 0</td></tr>
<tr><td>37416</td><td>0x0000</td><td>Reserved: Always 0</td></tr>
<tr><td>37417</td><td>0x0000</td><td>Reserved: Always 0</td></tr>
<tr><td>37418</td><td>0x0000</td><td>Reserved: Always 0</td></tr>
<tr><td>37419</td><td>0x0000</td><td>Reserved: Always 0</td></tr>
<tr><td>37420</td><td>0x423E</td><td rowspan="2">Interpolation table value, row 1, column 1 (47.53638)</td></tr>
<tr><td>37421</td><td>0x2540</td></tr>
<tr><td>37422</td><td>0x423D</td><td rowspan="2">Interpolation table value, row 2, column 1 (47.45294)</td></tr>
<tr><td>37423</td><td>0xCFCF</td></tr>
<tr><td>37424</td><td>0x423D</td><td rowspan="2">Interpolation table value, row 3, column 1 (47.37398)</td></tr>
<tr><td>37425</td><td>0x7EF4</td></tr>
<tr><td>37426</td><td>0x423D</td><td></td></tr>
</table></td></tr>
</table>

Parameter	Value		
	37427	0x2C2C	Interpolation table value, row 4, column 1 (47.29314)
	37428	0x423C	Interpolation table value, row 5, column 1 (47.20908)
	37429	0xD619	
	37430	0x42C3	Interpolation table value, row 6, column 1 (47.19365)
	37431	0xC64C	
	37432	042C3	Interpolation table value, row 7, column 1 (47.09897)
	37433	0x6558	
	37434	0x0000	0.0
	37435	0x0000	
	37436	0x0000	0.0
	37437	0x0000	
	37438	0x0000	0.0
	37439	0x0000	
	37440	0x423D	Interpolation table value, row 1, column 2 (47.39033)
	37441	0x8FB2	
	37442	0x423D	Interpolation table value, row 2, column 2 (47.25618)
	37443	0x0654	
	37444	0x423C	Interpolation table value, row 3, column 2 (47.13954)
	37445	0x8EE3	
	37446	0x423C	Interpolation table value, row 4, column 2 (47.03065)
	37447	0x1F62	
	37448	0x423B	Interpolation table value, row 5, column 2 (46.92392)
	37449	0xB218	
	37450	0x423B	Interpolation table value, row 6, column 2 (46.85498)
	37451	0x6B80	
	37452	0x423B	Interpolation table value, row 7, column 2 (46.75399)
	37453	0x0416	
	37454	0x0000	0.0
	37455	0x0000	
	37456	0x0000	0.0
	37457	0x0000	
	37458	0x0000	0.0
	37459	0x0000	
	37460	0x423D	Interpolation table value, row 1, column 3 (47.34378)
	37461	0x6007	
	37462	0x423C	Interpolation table value, row 2, column 3 (47.16358)
	37463	0x A781	
	37464	0x423C	Interpolation table value, row 3, column 3 (47.0092)
	37465	0x096B	
	37466	0x423B	Interpolation table value, row 4, column 3 (46.8704)
	37467	0x7B4A	

Parameter	Value		
	37468	0x423A	Interpolation table value, row 5, column 3 (46.73967)
	37469	0xF56C	
	37470	0x423A	Interpolation table value, row 6, column 3 (46.59666)
	37471	0x62FB	
	37472	0x423A	Interpolation table value, row 7, column 3 (46.50912)
	37473	0x0957	
	37474	0x0000	0.0
	37475	0x0000	
	37476	0x0000	0.0
	37477	0x0000	
	37478	0x0000	0.0
	37479	0x0000	
	37480	0x423D	Interpolation table value, row 1, column 4 (47.35238)
	37481	0x68D6	
	37482	0x423C	Interpolation table value, row 2, column 4 (47.13365)
	37483	0x88DB	
	37484	0x423B	Interpolation table value, row 3, column 4 (46.94521)
	37485	0xC7E5	
	37486	0x423B	Interpolation table value, row 4, column 4 (46.77776)
	37487	0x1C6D	
	37488	0x423A	Interpolation table value, row 5, column 4 (46.6233)
	37489	0x7E42	
	37490	0x423A	Interpolation table value, row 6, column 4 (46.54913)
	37491	0x324F	
	37492	0x4239	Interpolation table value, row 7, column 4 (46.42901)
	37493	0xB74EE	
	37494	0x0000	0.0
	37495	0x0000	
	37496	0x0000	0.0
	37497	0x0000	
	37498	0x0000	0.0
	37499	0x0000	
	37500	0x423D	Interpolation table value, row 1, column 5 (47.4182)
	37501	0xAC3C	
	37502	0x423C	Interpolation table value, row 2, column 5 (47.15586)
	37503	0x9F99	
	37504	0x423B	Interpolation table value, row 3, column 5 (46.92608)
	37505	0xB44E	
	37506	0x423A	Interpolation table value, row 4, column 5 (46.72164)
	37507	0xE2F5	
	37508	0x423A	Interpolation table value, row 5, column 5 (46.53518)
	37509	0x2406	

Parameter	Value		
	37510	0x4239	Interpolation table value, row 6, column 5 (46.47335)
	37511	0xE4B6	
	37512	0x4238	Interpolation table value, row 7, column 5 (46.00398)
	37513	0x0413	
	37514	0x0000	0.0
	37515	0x0000	
	37516	0x0000	0.0
	37517	0x0000	
	37518	0x0000	0.0
	37519	0x0000	

5.1.5 Commit Tables

The Commit "Pending" Table command stores pending table data in the module's non-volatile memory. A single Commit "Pending" Table command commits all table data written during the current session.

To commit the tables, we would execute the Commit "Pending" Table command utilizing Modbus function code 6: Write Single Register or Modbus function code 16: Write Multiple Registers with starting address 37400.

Parameter	Value		
Modbus function code	0x06 (6) or 0x10 (16)		
Starting address	0x9218 (37400)		
Quantity of Registers	0x01 (1)		
Byte Count	0x02 (2)		
Register Values	Values for executing the Commit "Pending" Table command		
	Register	**Value**	**Meaning**
	37400	0x0105	Lo byte: 05 – Commit "Pending" Table command Hi byte: 01 - Session ID

5.1.6 Close Session

To close the session, we would execute the Close Session command utilizing Modbus function code 6: Write Single Register or Modbus function code 16: Write Multiple Registers with starting address 37400.

Parameter	Value		
Modbus function code	0x06 (6) or 0x10 (16)		
Starting address	0x9218 (37400)		
Quantity of Registers	0x01 (1)		
Byte Count	0x02 (2)		
Register Values	Values for executing the (Re)open Session Read-Write command		
	Register	**Value**	**Meaning**
	37400	0x0100	Lo byte: 00- Close Session command

Parameter	Value			
			Hi byte: 01 - Session ID	

5.2 Pull

5.2.1 Overview

Pulling EOS table data from the module involves the following steps:

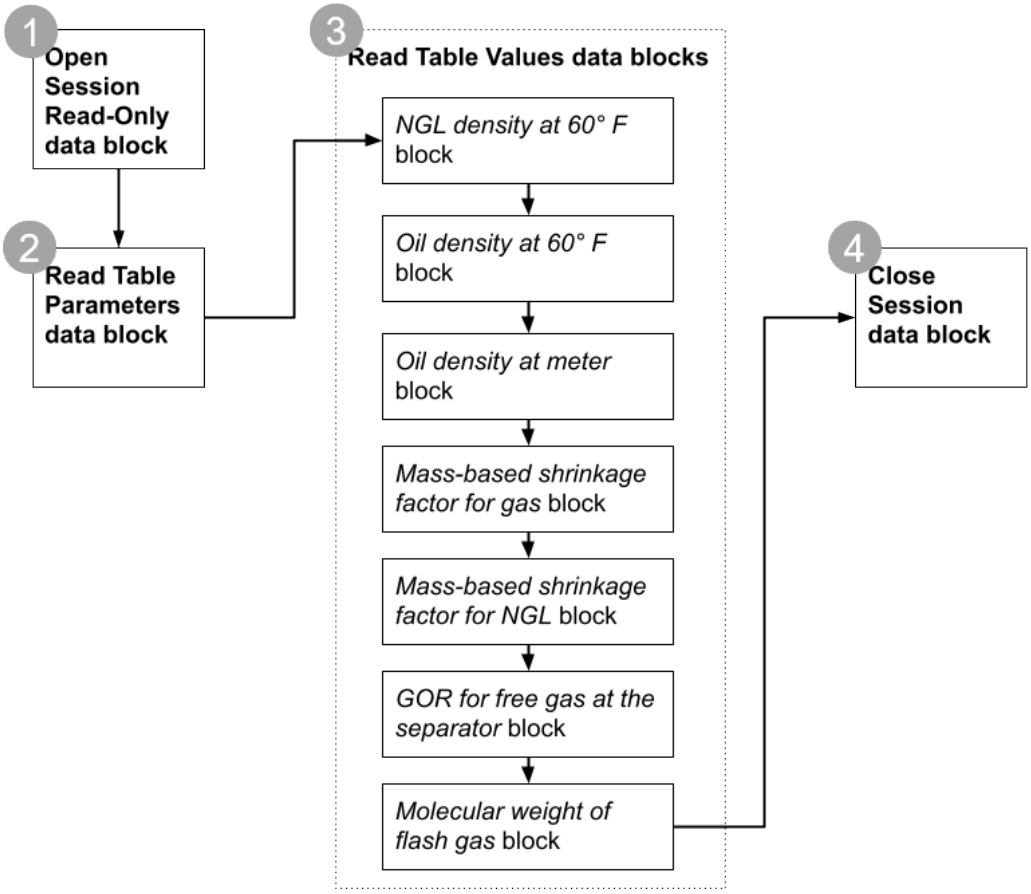
1 Open a read-only or read-write session.

2 Read EOS table parameters (table dimensions and captions) from the module. The same parameters are used for all seven tables. Only a single data block is required for this step.

3 Read interpolation values from the module. Each of the seven tables will require a separate read command.

4 Close the session.

The following diagram illustrates this process showing the data blocks involved in each step:



Sections 5.2.2 through 5.2.5 provide examples of the Modbus commands and data blocks that would be used to read the example EOS table shown above.

5.2.2 Open Session Read-Only

To open a session, we would execute the (Re)open Session Read-Only command utilizing Modbus function code 16: Write Multiple Registers with starting address 37400.

Parameter	Value
Modbus function code	0x10 (16)
Starting address	0x9218 (37400)
Quantity of Registers	0x04 (4)
Byte Count	0x08 (8)
Register Values	Values for executing the (Re)open Session Read-Write command

Register	Value	Meaning
37400	0x0101	Lo byte: 01 - (Re)open Session Read-Only command Hi byte: 01 - Session ID
37401	0x0004	Handle of selected meter
37402	0x0004	Selected tableset class: 1 – Pending
37403	0x0001	Selected table view: 1 - Parameters (dimensions and captions)

5.2.3 Read Table Parameters

Read Table request operations are performed by utilizing Modbus function code 3: Read Holding Registers with starting address 37400. A single read request will return the dimensions and captions used for all 7 interpolation tables.

Parameter	Value
Modbus function code	0x03 (3)
Starting address	0x9229 (37400)
Quantity of Registers	0x2A (42)

The response to this request returns the following data:

Parameter	Value
Modbus function code	0x03
Byte Count	0xF0 (240)
Register Values	Values in the specified holding registers

Register	Value	Meaning
37400	0x0001	Lo byte: 01- Session state – Open, read-only Hi byte: 00 – Error code
37401	0x0004	Handle of selected meter
37402	0x0001	Selected tableset class: 1 – Pending
37403	0x0001	Selected table view: 1 – Parameters (dimensions and captions)
37404	0x0000	Reserved: Always 0
37405	0x0000	Reserved: Always 0
37406	0x0000	Reserved: Always 0
37407	0x0000	Reserved: Always 0

Parameter	Value		
	37408	0x0000	Reserved: Always 0
	37409	0x0000	Reserved: Always 0
	37410	0x0000	Reserved: Always 0
	37411	0x0000	Reserved: Always 0
	37412	0x0000	Reserved: Always 0
	37413	0x0000	Reserved: Always 0
	37414	0x0000	Reserved: Always 0
	37415	0x0000	Reserved: Always 0
	37416	0x0000	Reserved: Always 0
	37417	0x0000	Reserved: Always 0
	37418	0x0007	Interpolation table parameter Configured number of temperature rows (7)
	37419	0x0005	Interpolation table parameter Configured number of pressure columns (5)
	37420	0x0000	Temperature row 1 caption
	37421	0x003C	
	37422	0x0000	Temperature row 2 caption
	37423	0x0050	
	37424	0x0000	Temperature row 3 caption
	37425	0x0064	
	37426	0x0000	Temperature row 4 caption
	37427	0x0078	
	37428	0x0000	Temperature row 5 caption
	37429	0x008C	
	37430	0x0000	Temperature row 6 caption
	37431	0x0000	
	37432	0x0000	Temperature row 7 caption
	37433	0x0000	
	37434	0x0000	Reserved: Always 0
	37435	0x0000	
	37436	0x0000	Reserved: Always 0
	37437	0x0000	
	37438	0x0000	Reserved: Always 0
	37439	0x0000	
	37440	0x0000	Pressure column 1 caption
	37441	0x00C8	
	37442	0x0000	Pressure column 2 caption
	37443	0x0113	
	37444	0x0000	Pressure column 3 caption

Parameter	Value		
	37445	0x015E	
	37446	0x0000	Pressure column 4 caption
	37447	0x01A9	
	37448	0x0000	Pressure column 5 caption
	37449	0x0217	

5.2.4 Read Table Values

Read Table request operations are performed by utilizing Modbus function code 3: Read Holding Registers with starting address 37420. A separate read command will need to be executed for each of the 7 interpolation tables.

Parameter	Value
Modbus function code	0x03 (3)
Starting address	0x9229 (37400)
Quantity of Registers	0x78 (120)

The response to this request returns the following data:

Parameter	Value		
Modbus function code	0x03		
Byte Count	0xF0 (240)		
Register Values	Values in the specified holding registers		
	Register	**Value**	**Meaning**
	37400	0x0001	Lo byte: 01- Session state – Open, read-only Hi byte: 00 – Error code
	37401	0x0004	Handle of selected meter
	37402	0x0001	Selected tableset class: 1 – Pending
	37403	0x0001	Selected table view: 2 - NGL density at standard conditions
	37404	0x0000	Reserved: Always 0
	37405	0x0000	Reserved: Always 0
	37406	0x0000	Reserved: Always 0
	37407	0x0000	Reserved: Always 0
	37408	0x0000	Reserved: Always 0
	37409	0x0000	Reserved: Always 0
	37410	0x0000	Reserved: Always 0
	37411	0x0000	Reserved: Always 0
	37412	0x0000	Reserved: Always 0
	37413	0x0000	Reserved: Always 0
	37414	0x0000	Reserved: Always 0
	37415	0x0000	Reserved: Always 0
	37416	0x0000	Reserved: Always 0
	37417	0x0000	Reserved: Always 0

Parameter	Value		
	37418	0x0000	Reserved: Always 0
	37419	0x0000	Reserved: Always 0
	37420	0x423E	Interpolation table value, row 1, column 1 (47.53638)
	37421	0x2540	
	37422	0x423D	Interpolation table value, row 2, column 1 (47.45294)
	37423	0xCFCF	
	37424	0x423D	Interpolation table value, row 3, column 1 (47.37398)
	37425	0x7EF4	
	37426	0x423D	Interpolation table value, row 4, column 1 (47.29314)
	37427	0x2C2C	
	37428	0x423C	Interpolation table value, row 5, column 1 (47.20908)
	37429	0xD619	
	37430	0x42C3	Interpolation table value, row 6, column 1 (47.19365)
	37431	0xC64C	
	37432	042C3	Interpolation table value, row 7, column 1 (47.09897)
	37433	0x6558	
	37434	0x0000	0.0
	37435	0x0000	
	37436	0x0000	0.0
	37437	0x0000	
	37438	0x0000	0.0
	37439	0x0000	
	37440	0x423D	Interpolation table value, row 1, column 2 (47.39033)
	37441	0x8FB2	
	37442	0x423D	Interpolation table value, row 2, column 2 (47.25618)
	37443	0x0654	
	37444	0x423C	Interpolation table value, row 3, column 2 (47.13954)
	37445	0x8EE3	
	37446	0x423C	Interpolation table value, row 4, column 2 (47.03065)
	37447	0x1F62	
	37448	0x423B	Interpolation table value, row 5, column 2 (46.92392)
	37449	0xB218	
	37450	0x423B	Interpolation table value, row 6, column 2 (46.85498)
	37451	0x6B80	
	37452	0x423B	Interpolation table value, row 7, column 2 (46.75399)
	37453	0x0416	
	37454	0x0000	0.0
	37455	0x0000	
	37456	0x0000	0.0
	37457	0x0000	
	37458	0x0000	0.0
	37459	0x0000	

Parameter	Value		
	37460	0x423D	Interpolation table value, row 1, column 3 (47.34378)
	37461	0x6007	
	37462	0x423C	Interpolation table value, row 2, column 3 (47.16358)
	37463	0x A781	
	37464	0x423C	Interpolation table value, row 3, column 3 (47.0092)
	37465	0x096B	
	37466	0x423B	Interpolation table value, row 4, column 3 (46.8704)
	37467	0x7B4A	
	37468	0x423A	Interpolation table value, row 5, column 3 (46.73967)
	37469	0xF56C	
	37470	0x423A	Interpolation table value, row 6, column 3 (46.59666)
	37471	0x62FB	
	37472	0x423A	Interpolation table value, row 7, column 3 (46.50912)
	37473	0x0957	
	37474	0x0000	0.0
	37475	0x0000	
	37476	0x0000	0.0
	37477	0x0000	
	37478	0x0000	0.0
	37479	0x0000	
	37480	0x423D	Interpolation table value, row 1, column 4 (47.35238)
	37481	0x68D6	
	37482	0x423C	Interpolation table value, row 2, column 4 (47.13365)
	37483	0x88DB	
	37484	0x423B	Interpolation table value, row 3, column 4 (46.94521)
	37485	0xC7E5	
	37486	0x423B	Interpolation table value, row 4, column 4 (46.77776)
	37487	0x1C6D	
	37488	0x423A	Interpolation table value, row 5, column 4 (46.6233)
	37489	0x7E42	
	37490	0x423A	Interpolation table value, row 6, column 4 (46.54913)
	37491	0x324F	
	37492	0x4239	Interpolation table value, row 7, column 4 (46.42901)
	37493	0xB74EE	
	37494	0x0000	0.0
	37495	0x0000	
	37496	0x0000	0.0
	37497	0x0000	
	37498	0x0000	0.0
	37499	0x0000	
	37500	0x423D	Interpolation table value, row 1, column 5 (47.4182)
	37501	0xAC3C	

Parameter	Value		
	37502	0x423C	Interpolation table value, row 2, column 5 (47.15586)
	37503	0x9F99	
	37504	0x423B	Interpolation table value, row 3, column 5 (46.92608)
	37505	0xB44E	
	37506	0x423A	Interpolation table value, row 4, column 5 (46.72164)
	37507	0xE2F5	
	37508	0x423A	Interpolation table value, row 5, column 5 (46.53518)
	37509	0x2406	
	37510	0x4239	Interpolation table value, row 6, column 5 (46.47335)
	37511	0xE4B6	
	37512	0x4238	Interpolation table value, row 7, column 5 (46.00398)
	37513	0x0413	
	37514	0x0000	0.0
	37515	0x0000	
	37516	0x0000	0.0
	37517	0x0000	
	37518	0x0000	0.0
	37519	0x0000	

5.2.5 Close Session

To close the session, we would execute the Close Session command utilizing Modbus function code 6: Write Single Register or Modbus function code 16: Write Multiple Registers with starting address 37400.

Parameter	Value		
Modbus function code	0x06 (6) or 0x10 (16)		
Starting address	0x9218 (37400)		
Quantity of Registers	0x01 (1)		
Byte Count	0x02 (2)		
Register Values	Values for executing the (Re)open Session Read-Write command		
	Register	**Value**	**Meaning**
	37400	0x0100	Lo byte: 00 - Close Session command Hi byte: 01 - Session ID

6 Support, Service & Warranty

6.1 Contacting Technical Support

ProSoft Technology, Inc. is committed to providing the most efficient and effective support possible. Before calling, please gather the following information to assist in expediting this process:

- Product Version Number
- System architecture
- Network details

If the issue is hardware related, we will also need information regarding:

- Module configuration and associated ladder files, if any
- Module operation and any unusual behavior
- Configuration/Debug status information
- LED patterns
- Details about the interfaced serial, Ethernet or Fieldbus devices

Note: For technical support calls within the United States, ProSoft's 24/7 after-hours phone support is available for urgent plant-down issues.

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6.2 Warranty Information

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