

Technical Bulletin, Using the Totalizer Maintenance Mode



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NOTE: User Manual Reference - This Technical Bulletin complements the information contained in Revisions 22, 23, 24, 26, and 27.

Totalizer Maintenance Mode – This mode allows the operator to verify meter run calculations by measuring meter run flow rate (gross, net, mass, or energy) without impacting the custody transfer totals)

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Scope

The Maintenance Mode feature applies to the following application revisions:

- 24.74+ Turbine / Positive Displacement / Coriolis Liquid Flow Metering Systems with K Factor Linearization (metric units only)
- 23.74+/27.74+ Office/Turbine Gas Flow Metering System
- 22.74.30/26.74.04 Turbine Gas Flow Metering System

Abstract

The purpose of maintenance mode function is to allow operators to verify meter run calculations. This function measures meter run flow rate (gross, net, mass, and also energy in gas firmware applications) without impacting the overall operation of the custody transfer totals.

When in the maintenance mode, the flow measured by the target meter run will not be accumulated in the meter run and/or station totalizers used for normal operation. Furthermore, any D/A outputs configured to output flow rate will not be impacted. While the specific meter is in the maintenance mode, the meter will display zero (0) flow in all the non-maintenance mode displays.

Procedure to Start and End Maintenance Mode

The maintenance mode function requires a technician Level '1' password. The following is the required procedure to Start and End the Maintenance Mode:

1. Enter a positive value for 'low flow cutoff' or 'active frequency' (refer to "Meter Run Setup" in Volume 3 of the User Manuals). A positive non-zero entry must be made to ensure that the meter active flag operates correctly at zero (0) flow.
2. Shutdown the meter (flow rate = Zero).
3. In the display mode, press **[Alpha Shift] [Diag] [Meter] [n] [Enter]**. The OMNI LCD screen will display:

NOTE: Maintenance Mode Active/Inactive – If there is a 'Y' next to 'Maintenance Mode' in the display, then the mode is active. The maintenance mode is inactive when an 'N' is displayed.

```
METER #1
MAINTENANCE
Maintenance Mode
N
Reset Maint Totals
Toggle Maint Mode
```

4. Press **[↓]** (down arrow key) to place the cursor at '**Toggle Maint Mode**' and press **[Alpha Shift] [Y] [Enter]**. Depending on the maintenance mode status, the OMNI will toggle the mode. If the maintenance mode is active, then this step will end or "turn off" the mode; and vice versa.

You will be prompted for the password. The LCD screen will display:

NOTE: Configuration Settings – The maintenance mode uses current flow computer configuration settings; i.e., additional configuration entries are not required.

```
METER #1
MAINTENANCE
Maintenance Mode
N
Reset Maint Totals
Password
_
```

- 5. Type the Level 1 password and press **[Enter]**. The OMNI LCD screen will display a screen similar to the following:

```

METER #1
MAINTENANCE
Maintenance Mode
Y
Reset Maint Totals
Toggle Maint Mode
_

```

NOTE: When the maintenance mode starts after selecting the type of measurement (gross net, mass or energy), the flow rate and totalized flow are zero.

- To end (deactivate) the totalizer maintenance mode, repeat bullet steps two (2) and five (5).

Maintenance Mode Flow Rate and Totalizer Resolutions

After a RAM reset, the Maintenance Mode Flow Rate and Totalizer resolutions are automatically defaulted to the same settings as the normal (i.e. non-Maintenance mode) flow rates and totalizer settings. The following is the required procedure to Set or Change the Maintenance Mode Flow Rates and Totalizer resolution settings without affecting the normal mode flow rate and totalizer settings:

- You should ensure that you have stopped the Maintenance Mode by following the procedures in the previous section titled "Procedure to Start and End Maintenance Mode".

NOTE: Maintenance Mode Active/Inactive - If there is a 'Y' next to 'Maintenance Mode' in the display, then the mode is active. The maintenance mode is inactive when an 'N' is displayed.

```

METER #1
MAINTENANCE
Maintenance Mode
N
Reset Maint Totals
Toggle Maint Mode
_

```

- From the Display mode, press **[Alpha Shift] [Diag] [Meter] [Enter]**. The LCD screen will display:

```

MAINTENANCE MODE
Resolution Gro Tot      0
Resolution Net Tot      0
Resolution MasTot      0
Resolution Eng Tot      0
Resolution GroFlow      0
Resolution NetFlow      0
Resolution MasFlow      0
Resolution EngFlow      0

```

- Place the cursor on each of the settings to change the resolution. Each of the totalizers and flow rates can be set independently from zero (0) to three (3) places past the decimal. The number of digits wide for the totalizers will be either eight (8) or nine (9) digits according to the setting configured in the Password menu of the flow computer for the normal totalizers.

4. To reset the current totals for an individual meter run, from the Display mode, press **[Alpha Shift] [Diag] [Meter] [n] [Enter]** and scroll down to the **'Reset Maint Totals'** prompt and press **[Alpha Shift] [Y] [Enter]**.

NOTE: When the maintenance mode starts after selecting the type of measurement (gross net, mass or energy), the flow rate and totalized flow are zero (0).

```
METER #1
MAINTENANCE
Maintenance Mode
N
Reset Maint Totals
Y
Toggle Maint Mode
```

Displaying the Maintenance Totals

In the display mode, select the displays you want by entering the corresponding key press sequence as follows:

- For **Gross** Flow Maintenance Totals, press **[Meter] [n] [Gross]**
- For **Net** Flow Maintenance Totals, press **[Meter] [n] [Net]**
- For **Mass** Flow Maintenance Totals, press **[Meter] [n] [Mass]**
- For **Energy** Flow Maintenance Totals (gas applications only —Revisions 23.73+ and 27.72+), press **[Meter] [n] [Energy]**

The OMNI LCD screen will display:

```
MaintenanceMode
am3h
Meter 1
0
MaintenanceMode
am3
Meter 1
0
```

Gross Meter 'N' Enter:

```
MaintenanceMode
am3h
Meter 1..
0
MaintenanceMode
am3
Meter 1
0
```

Net Meter 'n' Enter:

```
MaintenanceMode
nm3h
Meter 1
0
MaintenanceMode
nm3h
Meter 1
0
```

Mass Meter 'n' Enter:

```
Maint Flow
tonnes/hr
Meter 1
0
Maint Total
tonnes
Meter 1
0
```

Energy Meter 'n' Enter:

```
MaintEnergy
flowrate
Meter 1
0
Maintenance
energy
Meter 1
0
```

Totalizers

NOTE: Meter Run Database Registers – The “n” in the database point number represents the meter run number (n = 1, 2, 3, or 4).

In the totalizer maintenance mode, the flow computer will realize all normal calculations and accumulate resulting flow quantities into special maintenance totalizers. The special totalizer registers reset to zero (0) upon entry to maintenance mode or can be manually reset while in the maintenance mode. This reset will not affect the regular meter run totalizers. In this mode, the LCD screen will display meter run current flow rate and accumulated flow rate for the maintenance mode. The following are the Modbus database registers assigned as special maintenance mode totalizers.

Note: Maintenance Mode Totals Modbus registers introduced in v27.74.30 firmware (Table 1).

- 5n92 Gross Maintenance Total
- 5n93 Net Maintenance Total
- 5n94 Mass Maintenance Total
- 5n95 Energy (NSV) Maintenance Total

Status

The following status points are provided in the OMNI Flow Computer's Modbus database to indicate when a meter run is in the totalizer maintenance mode:

- Meter Run #1 - Maintenance Mode Status
- Meter Run #2 - Maintenance Mode Status
- Meter Run #3 - Maintenance Mode Status
- Meter Run #4 - Maintenance Mode Status

Maintenance Mode Command

The maintenance mode function can be activated/deactivated remotely, providing that the flow rate is zero (0) and the meter run is inactive (1n05 = 0). The meter run totalizer maintenance mode is activated by setting one or all the following Modbus database points to '1'; the mode will be ended by writing '0' to these same database points:

- Meter Run #1 - Toggle Maintenance Mode Command
- Meter Run #2 - Toggle Maintenance Mode Command
- Meter Run #3 - Toggle Maintenance Mode Command

- Meter Run #4 - Toggle Maintenance Mode Command

Modbus Database Points Associated with Totalizer Maintenance Mode

Table 1 comprises the database registers for the maintenance mode function.

Table 1. Database Registers

| MODBUS DATABASE POINTS ASSOCIATED WITH THE MAINTENANCE MODE | | | | |
|---|-----------------------|----------|----------|----------|
| Database Point Description | Database Point Number | | | |
| | Meter #1 | Meter #2 | Meter #3 | Meter #4 |
| Meter Run Maintenance Mode Status | 1197 | 1297 | 1397 | 1497 |
| Previous Batch 'N' Maintenance Ticket Flag | 2139 | 2239 | 2339 | 2439 |
| Maintenance Ticket (0=No, 1=Yes) | 3109 | 3209 | 3309 | 3409 |
| Gross Maintenance Mode Totalizers | 5192* | 5292* | 5392* | 5492* |
| Net Maintenance Mode Totalizers | 5193* | 5293* | 5393* | 5493* |
| Mass Maintenance Mode Totalizers | 5194* | 5294* | 5394* | 5494* |
| Energy (NSV) Maintenance Mode Totalizers | 5195* | 5295* | 5395* | 5495* |
| Maintenance Mode Command | 2737 | 2738 | 2739 | 2740 |
| Note: The following Modbus registers were introduced in v27.74.20 firmware | | | | |
| Maintenance Mode Gross Flow Rate | 18575 | 18675 | 18775 | 18875 |
| Maintenance Mode Net Flow Rate | 18576 | 18676 | 18776 | 18876 |
| Maintenance Mode Mass Flow Rate | 18577 | 18677 | 18777 | 18877 |
| Maintenance Mode Energy Flow Rate | 18578 | 18678 | 18778 | 18878 |
| # Dec. Places - Maint Mode Gross Totals | 13612 | 13612 | 13612 | 13612 |
| # Dec. Places - Maint Mode Net Totals | 13613 | 13613 | 13613 | 13613 |
| # Dec. Places - Maint Mode Mass Totals | 13614 | 13614 | 13614 | 13614 |
| # Dec. Places - Maint Mode Energy Totals | 13615 | 13615 | 13615 | 13615 |
| # Dec. Places - Maint Mode Gross Flow Rate | 13616 | 13616 | 13616 | 13616 |
| # Dec. Places - Maint Mode Net Flow Rate | 13617 | 13617 | 13617 | 13617 |
| # Dec. Places - Maint Mode Mass Flow Rate | 13618 | 13618 | 13618 | 13618 |
| # Dec. Places - Maint Mode Energy Flow Rate | 13619 | 13619 | 13619 | 13619 |
| Maint Mode Gross Total | 15536 | 15636 | 15736 | 15836 |
| Maint Mode Net Total | 15537 | 15637 | 15737 | 15837 |
| Maint Mode Mass Total | 15538 | 15638 | 15738 | 15838 |

| MODBUS DATABASE POINTS ASSOCIATED WITH THE MAINTENANCE MODE | | | | |
|---|-----------------------|----------|----------|----------|
| Database Point Description | Database Point Number | | | |
| | Meter #1 | Meter #2 | Meter #3 | Meter #4 |
| Maint Mode Energy Total | 15539 | 15639 | 15739 | 15839 |
| Maint Mode Gross Flow Rate | 17586 | 17686 | 17786 | 17886 |
| Maint Mode Net Flow Rate | 17587 | 17687 | 17787 | 17887 |
| Maint Mode Mass Flow Rate | 17588 | 17688 | 17788 | 17888 |
| Maint Mode Energy Flow Rate | 17589 | 17689 | 17789 | 17889 |

***NOTE:** For Revision 27.74.30+ the following Meter #1 database points have been moved to the following Modbus addresses:

- 5192 Moved to 15536
- 5193 Moved to 15537
- 5194 Moved to 15538
- 5195 Moved to 15539
- Meter #2 has been moved to 15636
- Meter #3 has been moved to 15376
- Meter #4 has been moved to 15836

DOCUMENT REVISION HISTORY

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