

● **PDM3600 / PDM3700**
Product Update
September 10, 2014



Glossary of Terms

- TEOM – Tapered Element Oscillating Microbalance
- RFI / EMI – radio frequency interference /electromechanical interference
- WinPDM – Software program that communicates with CPDM
- LPM – Liter per minute
- CMDPSU - Coal Mine Dust Personal Sampler Unit
- CPDM – Continuous Personal Dust Monitor
- PM – Preventative Maintenance
- NFF – No fault found
- CFR – Code of Federal Regulations
- PTO – Power Take Off

Improvements to the PDM3600 - Hardware

- Changes to the securing screw assembly and molded material on the charger/PDM interface assembly
 - This addressed the melting of the plastic on some units and the inability to firmly secure the assembly to the instrument.
- Redesign of the three main circuit boards (auxiliary, digital and amplifier)
- RFI shielding added to instrument and TEOM case housings
- Interconnecting grounding cables added
 - Above three improved RFI / EMI susceptibility from high power radios
- Replacement of potentiometer with a resistor on digital board
 - Eliminated potential blank display

Improvements to the PDM3600 – Firmware/Software

- WinPDM modified to permit entering of notes on dust data card
 - Request from users
- Revision to clear flags / status in logged data once condition returns to normal
 - Field request to reflect actual length of flag conditions
- Change to accurately reflect changes in daylight savings time
 - Adjusts start time of shift to compensate for loss/gain of hour (field request)
- Resolved erroneous mass offset errors
 - Field reports of unit displaying a mass offset error when inappropriate

Improvements to the PDM3600 – Firmware/Software

- Modification to shift set up screen in WinPDM to address error when the first designated occupation selected.
 - Reported by several users (could not load shift into instrument)
- Added 30 shift average tonnage and current shift tonnage fields to WinPDM
 - Request from MSHA to permit collection of this data in specific logged data
- Modified WinPDM to permit consolidation of files for MSHA reporting
 - Created a “.MSHA” file containing data needed for compliance reporting
 - New file name format for ease of identification
- Modified firmware to change flow status flag at compromised flow from 0.2 LPM for one minute to 0.1 LPM for three minutes
 - Aligns better with current practice on manual sampler

PDM3700

- 2 kg total weight
 - Achieved through removal of cap lamp, 2nd battery and PTO connector
 - Complies with 30 CFR Part 74 equipment requirements
- New inlet is worn on lapel in a position similar to the cyclone currently used with the CMDPSU
- Incorporates all changes since release of PDM3600
 - All hardware, software & firmware modifications over past 5 years
- Regional field meetings starting in mid - September
 - Overall review of product and release plans
 - Seek feedback on delivery requirements
 - Goal of 200 units available by end of 2014 and 2,000 units by end of 2015

Repair History for PDM3600

- Total of 376 new instruments shipped (May 2009 – April 2014)
 - 313 directly to mines (remainder to MSHA / NIOSH / International / Demos)
- Total of 419 Service transactions since May 2009 (262 returned for annual calibration / PM / NFF)
- 157 repair actions
 - Note: some units experienced multiple failure modes
 - 133 electrical issues
 - 31 digital boards, 23 mass transducers, 18 auxiliary boards, 18 pumps and 6 batteries
 - Includes 22 chargers/cables and 13 cap lamp failures
 - All three main boards revised
 - 16 mechanical issues
 - 6 cyclones damaged and 5 case leaks
 - 8 firmware returns (reloading corrected problem – suspect RFI/EMI issues)

Year	2009	2010	2011	2012	2013	2014
Units returned for repair	3	33	47	39	19	16
New units shipped	125	157	38	16	35	5
Repair Cycle Time (days)	14	26	4	3	4	7

Support for PDM3600

- Only last 5 units shipped (11/13 – 4/14) had all enhancements
 - All new circuit boards to minimize interference from high power radios
 - Shielded instrument case for added RFI / EMI protection
 - Shielded mass transducer case for added RFI / EMI protection
 - Newest operating firmware (version 7.xx) and WinPDM (version 7.xx)
 - Last 5 units will be replaced with PDM3700 if Customer requests
- Future of PDM3600
 - Majority of PDM3600 units (total of 305) will be greater than the 5 year design life of the product as of compliance date of February 1, 2016
 - PDM3700 addresses some concerns raised during comment period
 - Will not upgrade existing PDM3600 units to PDM3700 functional level
 - Not economical to upgrade existing units due to extensive rework to replace cases and age of units
 - Will support PDM3600 for a minimum of 5 years

Future Plans

- Thermo Fisher will hold a series of field meetings on PDM3700
 - Review modifications and identify plans going forward
 - September 17, 2014 in Grand Junction, CO
 - September 25, 2014 in Beckley, WV
 - September 30, 2014 in Evansville, IN
 - October 1, 2014 in Morgantown, WV
- Investigating new packaging for filters to maintain cost and provide easier installation
- Will solicit Customer feedback as units begin use with new regulation
 - Identify needs as unit used for new regulation
 - Help define product evolution and future generation

Questions?

