

Low-Flow Purging Procedure with MicroPurge basics Equipment



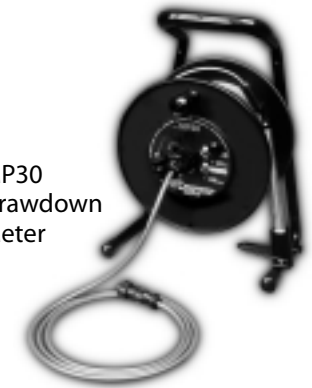
MP10
Bladder Pump
Controller



MP15 Control
and Power Pack



MP20
Flow Cell



MP30
Drawdown
Meter

The basics

Three easy steps to low-flow purging

1. Set the purge flow rate
2. Control drawdown in the well
3. Stabilize the purge water quality indicator parameters



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Contents		
Introduction		2
Low-Flow Procedure with MicroPurge Basics Equipment	2	
Summary		2
Detailed Procedure		3
Water Level		3
Purge Flow		4
Purge Water Quality Stabilization		6
Overview on Drawdown, Purge Flow and Stabilization Settings:	7	
Drawdown Control Point Selection		7
Flow Rate Selection		7
Purge Stabilization		7
Low-Flow Purging Procedure with Other Equipment		8
Contact Information		8



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Low-flow sampling with MicroPurge equipment offers important advantages over traditional purging and sampling methods, and can benefit many ground-water monitoring programs. It requires three basic steps:

1. Set the purge flow rate;
2. Control drawdown in the well;
3. Stabilize the purge water quality indicator parameters.

MicroPurge **basics** are a revolution in low-flow sampling control. The complete line of new MicroPurge **basics** products, combined with proven Well Wizard pumps, will help you through all three steps with equipment that is easier to use, smaller, lighter, more powerful, and lower priced too!

MicroPurge **basics** means you can choose your own system —with the control and power to match your site requirements

Every MicroPurge **basics** component is complete, ready to use, and engineered for rugged field duty. The whole system is designed to let you choose the control and power options that fit your site needs now, with flexibility to meet future requirements.

Microprocessor-based control with water-level feedback and exclusive monitoring devices delivers the most accurate, precise samples you can get, assuring you consistent, repeatable data and eliminating most regulatory hassles.

Low-flow Purging Procedure with MicroPurge basics

System Overview

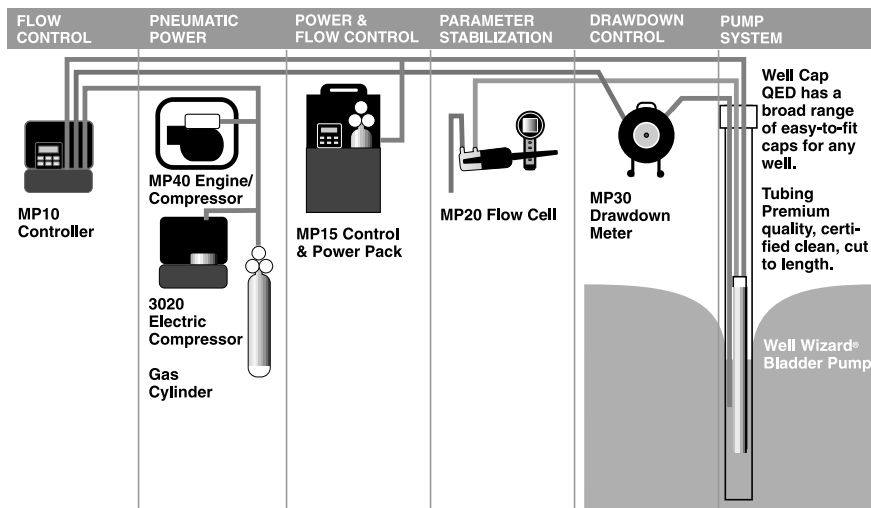


Figure 1 MicroPurge Basics System

Equipment

The following procedure is intended as an overview of typical operations at the well with MicroPurge **basics** equipment. This procedure assumes that all of the equipment is fully prepared with respect to battery condition, calibration and PurgeScan setup of the flow cell, and charging of any compressed gas cylinders. Full detail is provided in the individual manuals for each product.

Summary:

1. Measure static water level with MP30 Drawdown meter.
2. Set MP30 probe at desired drawdown limit.
3. Connect compressed gas source (compressed gas cylinder or compressor) to MP10 or MP15 MicroPurge basics controller, then connect controller to the pump supply fitting on the well cap.
4. Connect pump discharge tube to MP20 Flow Cell inlet tube, turn MP20 power ON, and verify that PurgeScan setup includes desired parameters and time interval.
5. Follow controller instructions to set desired flow rate; if drawdown limit is exceeded, reduce flow rate as needed to stay within limit.
6. Initiate PurgeScan on MP20 Flow Cell and write down data storage location #.
7. Watch for MP20 sound and flashing display indicators of stabilization, then begin sample collection.

Detailed Procedure:

Water Level

1. Determine static water level with MP30 Drawdown Control Meter power switched "ON" and Drawdown Control mode switched to "OFF" (see Figure 2 below).

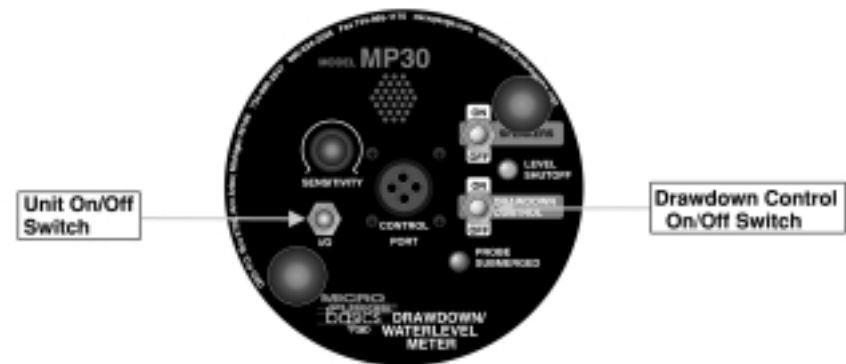


Figure 2 MP30 Keypad

Purge Flow

3. Connect the MP30 to the MicroPurge basics controller with the cable provided (See Figure 1 at left).
4. Connect MicroPurge basics controller (MP10 or MP15) to pump air supply fitting on the well cap (See Figure 1 at left)
5. Connect the pump discharge tube to the MP20 Flow Cell inlet tube (See Figure 1 at left) and press the MP20 Power "ON" key.

6. Activate the MP10 controller power by opening the case lid. To activate Controller power on the MP15, toggle on power switch mounted on side of key pad.
7. On **basics** controller, select desired Cycles Per Minute (CPM) with arrow key (default value is 4 CPM, lower CPM for deeper wells, higher CPM possible with shallow wells) (see Figure 3 below).

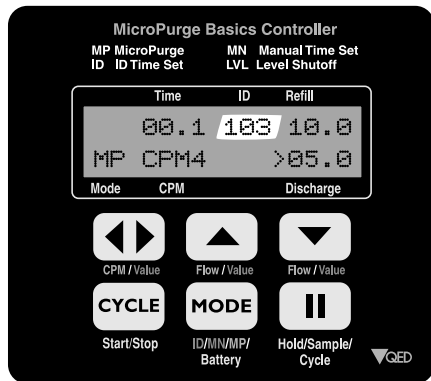


Figure 3
MP10 Keypad

8. Turn basics controller throttle to set depth on gauge to 10-20 feet deeper than the pump location in the well (see Figure 4 below).



Figure 4
MP10 Throttle and Gauge

9. Press the **basics** controller cycle key to start pumping (see Figure 3 above).
10. When water discharge begins, adjust throttle until a slow, steady flow-stream is achieved.
11. Press basics controller "UP/DOWN" keys (see Figure 3 above) to set the desired purge flow rate.

12. The MP30 Drawdown Meter will automatically signal the controller to pause pumping if the probe is no longer submerged, and will also activate the buzzer and the "Level Shutoff" (see Figure 5 below) light.
13. If the water level in the well recovers and reaches the probe, the basics controller will resume pump operation and the MP30 "Probe Submerged" light (see Figure 5 below) will activate.
14. If the drawdown level exceeds the selected drawdown limit point too consistently, the purge flow rate can be further decreased with adjustment of the controller through one or more presses of the flow "DOWN" arrow key (see Figure 6 below). If the flow rate is already at or near a minimum desired rate, in some cases it may be also possible to lower the probe to a new, lower drawdown control point to increase the well recovery rate. Consult the site Sampling and Analysis Plan and regulatory guidance before adjusting purging protocols.

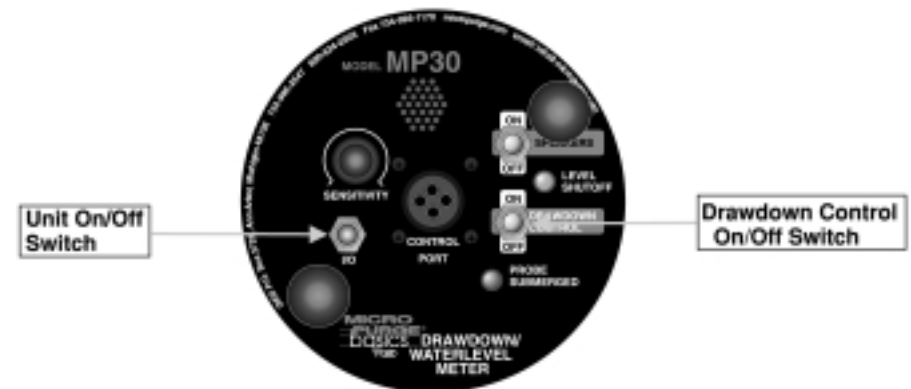


Figure 5
MP30 Control Panel

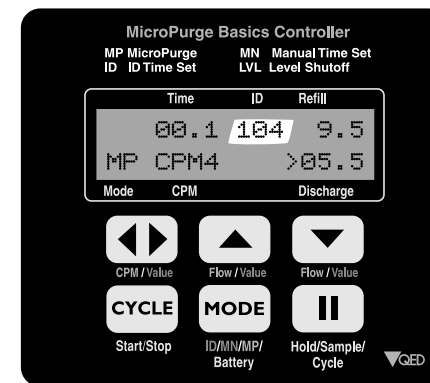


Figure 6
MP10 Keypad

Purge Water Quality Stabilization

- When the final purge rate is achieved, record the ID value and pressure settings from the MP10/MP15 controller, then initiate PurgeScan on the MP20 Flow Cell by pressing the "RIGHT" arrow key once to highlight "STORE", then pressing "ENTER". This begins a PurgeScan stabilization cycle, starting at 00:00 elapsed time at the bottom (See Figure 7 Below) of the MP20 display, including automatic storage of key data frames. If it is desired to restart PurgeScan, press "ESC", then "RIGHT" arrow and "ENTER" again.

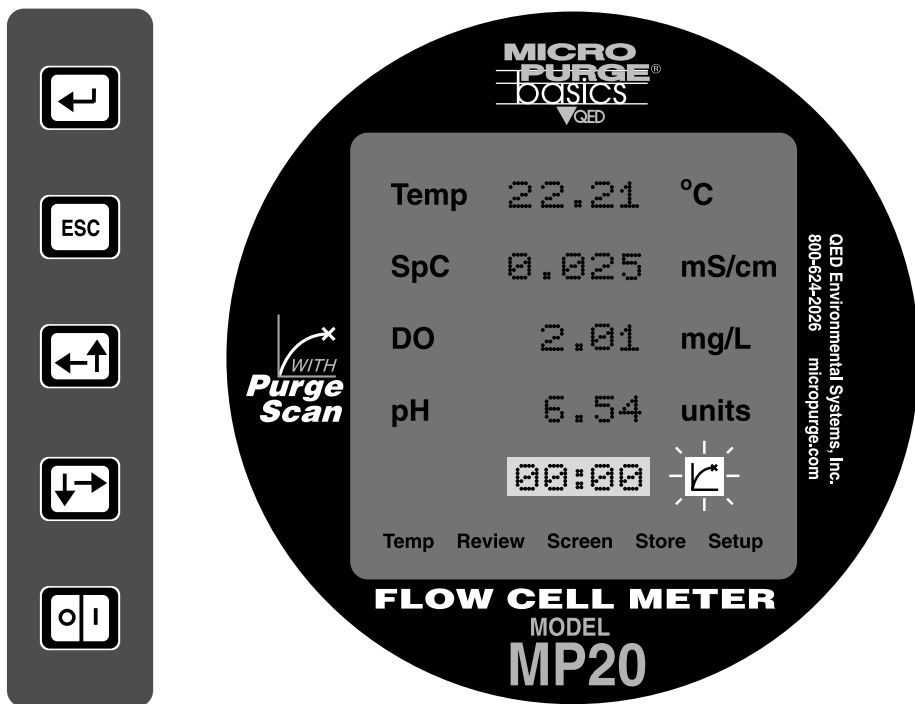


Figure 7
MP20 LCD Display

- Record the data frame Index value from the lower left corner of the MP20 display; this identifies the initial, "TIME ZERO" data set of each PurgeScan event, used for later review of stored data.
- Monitor the MP20 display for the beeping and the flashing PurgeScan icon which signal that three successive readings at the selected time interval were within the stabilization range for selected parameters. Purging is complete and sampling can begin.

Overview on Drawdown, Purge Flow and Stabilization Settings

Go to www.micropurge.com
or call QED at 1-800-624-2026
FOR MORE DETAILED INFORMATION

Drawdown Control Point Selection

The amount of drawdown permissible must be determined for each well on site, and may be affected by federal, state and local regulations or guidance applicable to the site. Once this is determined, the Drawdown Control probe can be positioned using several approaches. First, it can be lowered directly to the point of maximum desirable drawdown and kept in place. Secondly, it can be periodically raised from the set point to detect any changes in water level, then lowered again. Finally, it can be positioned just part of the distance to the maximum drawdown point, for quicker feedback of the response between purge flow rate and drawdown. For example, if 10 inches of maximum drawdown is desired, the probe could be initially lowered to just 5" or less below the static water level. Then, if purge flow exceeds well recovery, this imbalance will be signaled more quickly than in waiting for the whole 10" to be drawn down, and purge flow can be reduced sooner to achieve equilibrium of purge flow with well recovery.

Flow Rate Selection

In general, the flow rate goal in low-flow rate sampling is a rate equal to or less than the well's recovery rate while staying within the drawdown limits. Minimizing drawdown reduces the impact of sampling on the aquifer, and helps minimize turbidity and mixing of water from different zones. Actual flow rates typically range from 100ml/min to 1000ml/min. Within this range, if acceptable, higher flow rates allow faster filling of large volume sample containers. In all cases the flow rate should follow applicable regulations and existing sampling plans.

Purge Stabilization

The most common water quality parameters used to determine purging stabilization are dissolved oxygen (DO), specific conductance, and pH; ORP (redox) and turbidity are less commonly used, and arguments exist against their value for this purpose. The MP20 uses the following ranges as default values for determining stabilization in the PurgeScan mode (these ranges are user adjustable):

Stabilization Parameter	Stabilization Range
pH	.2 units
DO	0.2 mg/l
Conductivity	0.020 mS/cm
ORP (Redox)	20 millivolts

The time interval used to determine stabilization with PurgeScan should take the purge flow rate and purge cell volume into account. In general, the minimum PurgeScan time interval setting should be equal to or greater than the time

DRAWDOWN AND STABILATION SETTINGS

required to replace the internal volume of the flow cell, 175 ml. On this basis, a one-minute or greater interval should be used with purge flow rates of 175 ml/min and higher. A purge flow rate of approximately 90 ml/min would require a time interval of 2 minutes or greater. A 50 ml/min flow rate would require use of a 4 minute interval. A more conservative approach would be to select an interval that allows two or three cell volumes to be purged between readings.

PROCEDURE WITH OTHER EQUIPMENT / CONTACT INFORMATION

Low-flow Purging Procedure with Other Equipment

This procedure assumes use of a conventional water level meter, pump and control systems other than MicroPurge **basics**, and conventional flow cell instrumentation.

1. Measure static water level.
2. Select maximum drawdown level and lower probe to this level.
3. Adjust purge flow to initial target level, and monitor flow periodically to watch for changes in rate.
4. Begin purge flow, while monitoring continued alarm signals from water level meter to make sure drawdown level is not exceeded.
5. Begin to monitor purge water quality, while recording and reviewing all stabilization readings, to observe the point at which they begin to stay within the selected limits for the required time period. Continue to observe the water level meter for excess drawdown.