Lesson 16: Automated Watering

In this lesson, you will learn how to answer these questions:

Why use automated watering?
What is automated watering?
How do I drill and install watering pipes?
How do I connect the pipes to a water source?
How do I automatically turn the water on or off?

Why use automated watering?

Since more than 80% of a plant's weight is water, consistent and adequate watering is essential for healthy plants. If a plant begins to wilt, it has already stopped growing. That's why plants usually require water at least once a day during warm weather and sometimes more often in hot weather.

The aim in watering should be to provide a uniform amount of water at all times. This encourages uniform plant growth day after day.

You can grow a very successful Mittleider Garden by watering with a hose as described in *Lesson 4: Soil-Bed Watering* and *Lesson 11: Grow-Box Watering*. However, an automated watering system makes it quicker and easier to evenly distribute water across the entire length of the soil-bed or grow-box.

What is automated watering?

A completely automated watering system in a Mittleider garden consists of three parts. Use any or all of the parts to make watering easier and more consistent.

1. Drilling and installing the PVC watering pipes for the soil-beds or grow-boxes.
2. Connecting the PVC watering pipes to a water source and balancing the flow between the beds or boxes.
3. Using a hose timer or tying into a sprinkler system to turn the water on and off automatically.

How do I drill and install watering pipes?

Below are the materials needed to make the watering pipe assembly for one 18" x 30' soil-bed or grow-box. Adjust the materials as needed for your garden. Treat one 4'-wide grow-box the same as two 18"-wide grow-boxes.

Materials:

- Three 10' lengths of 3/4" PVC pipe (200 PSI)
- Two 3/4" threaded male couplings
- Two 3/4" slip couplings
- One 3/4" threaded female cap
- Five 2" x 4" x 5" blocks of wood to support the watering pipe
- Twelve 1 1/2" finishing nails
- PVC glue
- Teflon tape

> ***Tip:*** If you want to take your watering pipes apart for storage in the winter, use threaded couplings between the pipe sections instead of glued slip couplings. Threaded couplings would also allow you to rotate the pipes slightly so the holes line up perfectly from one pipe section to the next.

Tools:

- Jig for marking pipe (see below)
- Pencil
- Drill and a few #57 drill bits (smaller than 1/16")
- Hammer
- Saw to cut wood blocks
- Hacksaw or PVC pipe cutters

Procedure:

Step 1: Make a Jig

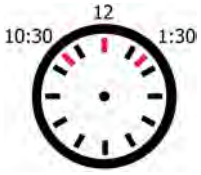
Make a simple jig as shown in the illustration to mark the pipe.

Step 2: Mark Lines down the Length of the Pipe

Have a helper hold the 10' pipe to keep it from turning or place a foot-long 1/2" dowel rod into the pipe and clamp the dowel to a long flat surface.

Slide the marking jig down the pipe to make a visible line down the full length of the pipe.

Rotate the pipe 45 degrees and make another line.

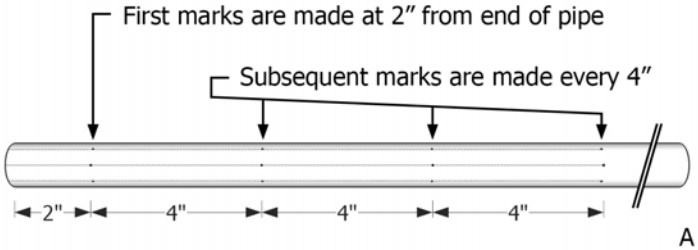


Repeat a third time.

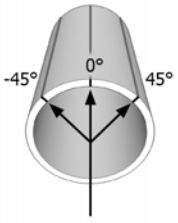
> ***Tip:*** An easy way to measure off two 45 degree angles on the pipe is to look at the end of the pipe as a clock face. So you will mark the pipe at 10:30, 12:00, and 1:30.

Step 3: Mark the Pipe at 4" Intervals

Next mark the pipe at 4" intervals along the length of the pipe. Start 2" from the end of the pipe and mark the pipe at 4" intervals across the 3 long lines for the full length of the pipe. The first mark will be at 2", the second mark at 6" and the third at 10", etc. The last mark will be at 118"on a 10' pipe.



3/4" Schedule 200 PVC pipe (section)



A reference mark is drawn at the 12:00 position and at 45° to either side of that mark.

Step 4: Drill Holes in the Pipe

Using an electric drill or a drill press with a #57 bit, drill holes into the pipe where the lines down the pipe and across the pipe intersect. In each 10' length of pipe you will have 90 holes.

> ***Tip:*** This is a very small diameter drill bit and will break easily. Put the drill bit into the drill so only a small amount of the bit is protruding. This will reduce the likelihood of breaking the bit.

Step 5: Repeat for Each Section of Pipe

Repeat steps 2–4 for the other two 10' pipes.

Step 6: Assemble the Drilled PVC Pipes with Couplings

Join the pipe sections together using 3/4" slip couplings (two couplings for 30') and PVC glue.

Make sure the holes on each pipe section line up with the holes on the adjoining pipe section when you glue them.

Step 7: Attach Adapters to the Ends of Pipe Assembly

At each end of the completed pipe assembly glue a 3/4" threaded male adapter.

Place the 3/4" threaded female cap on one end of the pipe assembly.

Step 8: Place the Pipe Assembly in the Soil-Bed or Grow-Box

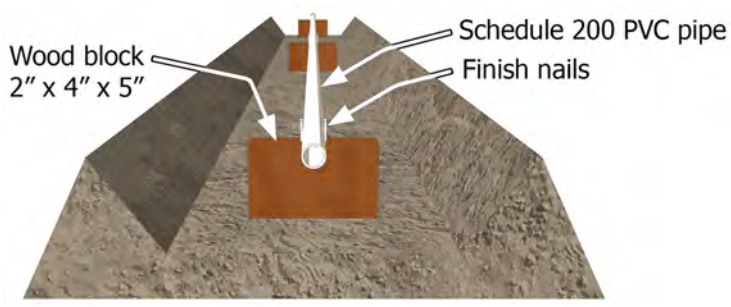
Take the five 2" x 4" x 5" blocks and drive two 1 1/2" finishing nails into the center of the 2" x 5" edge of the block spaced 1" apart.

Place the five blocks evenly down the center of the 30' soil-bed or grow-box. Lay the blocks on edge with the nails facing up across the bed or box, not length-wise.

Lay the pipe assembly down the center of the soil-bed or 18" grow-box on top of the wooden blocks and between the two nails.

In a 4' grow-box, lay each of the two pipe assemblies 6" in from the inside edge of the grow-box.

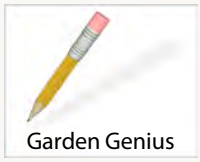
Note: Lay the pipe so the end with the 3/4" threaded cap is away from the water source.



Drilled pipe should rest on 2" x 4" x 5" wooden blocks.

If you plan to use PVC pipes to water your beds or boxes, refer to your *Garden Plot Plan* and calculate the number of 10' 3/4" PVC pipes you will need for your soil-beds or grow-boxes.

Go to the *Tools and Materials List(s)* found in *Appendix A: Garden Genius Planning Forms* to record the number of pipes and any other materials you will need to get.



How do I connect the pipes to a water source?

You can bring water to your soil-beds or grow-boxes with a hose or with PVC pipe (preferably underground).

> ***Tip:*** An inexpensive and very effective "**step up**" from watering with a hose as shown in Lesson 4 or watering with a wand in Lesson 11 is to drill the PVC watering pipes as shown above, put them in your soil-beds or grow-boxes, and connect them to a garden hose.

Connect to a Water Source with a Garden Hose

Step 1: Install a 3/4" Drip Irrigation Adapter or Elbow

Purchase a 3/4" drip irrigation straight or elbow adapter, which has a hose connector on one side and a threaded PVC pipe connector on the other. You can buy the adapters or elbows in PVC or brass. The adapter in the illustration is a 3/4" FPT x FHT straight adpater.

Step 2: Install a Shut-off Valve

Add a shutoff valve between the PVC adapter and the watering hose so you can easily turn off the water without running to the faucet.

> ***Tip:*** Add a Y-connector instead of the single shutoff valve and water two soil-beds or grow-boxes at once.

Step 3: Attach the Hose

Attached the hose between your shut-off valve and the water faucet.

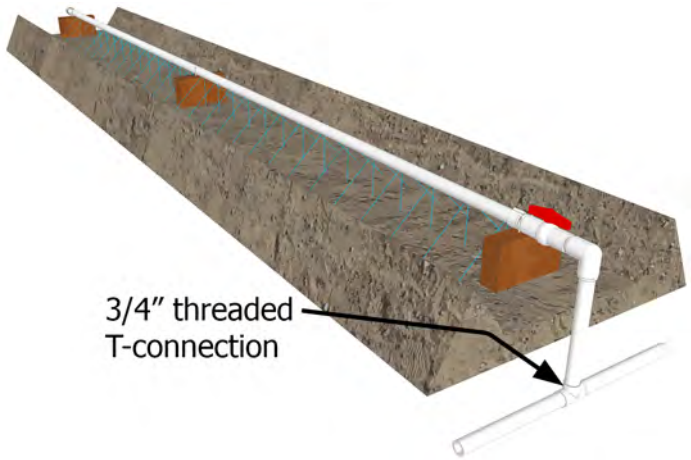
Step 4: Balance the Water Flow

If watering more than one soil-bed or grow-box at a time, adjust the valves to balance the water flow between the beds.

Connect to a Water Source with PVC pipe

Step 1: Plumb and Connect the Water

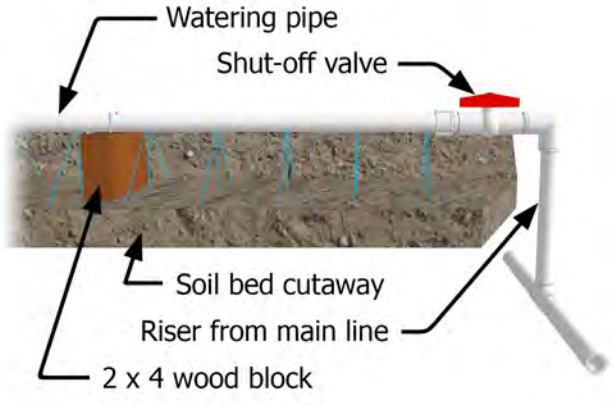
Plumb and connect the water to each soil-bed or grow-box. To do this, dig trenches in the soil and install 3/4" threaded T-connections.



Note: The main water line to the soil-bed above is 3/4" Schedule 40 PVC pipe. However you may need a larger line depending on the size of your garden and your water pressure.

Step 2: Install a Shut-Off Valve

Install a "quick shut-off" valve at the end of the soil-bed or grow-box by the water source. Using plastic pipe fittings, plumb the water source 2" above the end of the bed. Install a half-threaded plastic "L." The threaded portion should be female threads.



Step 3: Cover the Trenches

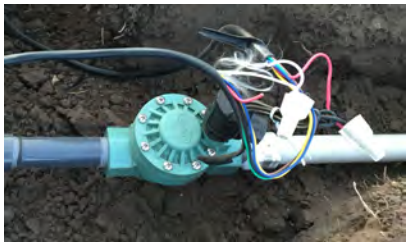
After the main line and risers are connected and glued in place, cover the trenches with soil.

Step 4: Connect Drilled Pipes

Mate the threaded couplings of the drilled pipe with the threaded "L."

How do I automatically turn the water on or off?

You can automatically turn the water on and off using a garden hose timer like the one in the illustration. Connect the timer between the hose bib (faucet) and the garden hose. Look for a timer that allows you to control the duration and the frequency. You can easily find a timer with up to 3 ports which will allow you to create "watering zones" in your garden. Follow the manufacturer's directions to program the timer.



If you have an automatic sprinkler system you may be able to add additional sprinkler valves to create one or more watering zones for your garden. With the valves connected to a timer, you can automatically control the duration and frequency of watering.

Keep in mind that your water pressure will dictate how many soil-beds or grow boxes you can water at one time.

Refer to the scale drawing of your soil-beds or grow-boxes and calculate how much pipe and the number and kinds of fittings you will need to automate the watering in your garden.

Refer to the *Tools and Materials List(s)* found in *Appendix A: Garden Genius Planning Forms* to record what materials and tools you will need to get.

(NW Missouri zone 5b). Plants that receive proper nutrition grow rapidly! ***Above:*** Corn on the left, cantaloupe in the center, and cucumbers to the right. Picture was taken on July 6th. Small inset picture was taken 22 days earlier on June 14th. ***Below:*** Pictures were taken 16 days later on July 22nd (from the opposite end of the rows). Clearly, the 3 1/2' aisles fill up quickly! The cucumber and melon plants below are in need of pruning to give them more air and light. As evidenced here, the Mittleider Method spurs vigorous growth and produces the healthiest of plants!