

EFFICIENT USE OF WATER CONFIGURING A TONICK RM-1 CONTROLLER

Abstract.

This note describes what information about the site is needed to set up the Tonick RM-1 Rainmaker to obtain optimum irrigation performance and water efficiency.

Introduction.

The latest irrigation controllers, including the Tonick RM-1 Rainmaker, can perform irrigation with far more sophistication than ones designed in the '70s and '80's. Flow management shortens overall time to water and keeps the pump(s) running at peak efficiency. Water Budget allows easy adjustment of water to be applied, so over-watering can be avoided. Comprehensive reporting allows the operator to monitor water usage and plan future applications. However to achieve these features, the controller must initially be given more information about the course than the older controllers. The following sections outline the information needed.

Allocation of Decoders.

The latest controllers work from named areas (stations) supplied at setup, for example 'Green 3 Front', 'Approach 18 Left'. Obviously individual decoders operate each station, so the controller needs to know the number pre-programmed in the decoder. Where more than one control cable is used, the cable (sometimes known as 'zone') must be specified. Once this information has been entered, day-to-day controller use is by name and not decoder number, for example "Water Greens 1-18 for 10 minutes".

Solenoid Loads.

Like pipes which can only carry a certain flow before excessive pressure drop, cables can only support a limited current before excessive volt drop. The length of cable will set a limit to the number of solenoids which can operate concurrently. In defining an electrical load for each named area, knowledge of the approximate distance of the solenoid from the controller is helpful. In the case of long runs, it may be necessary to tell the controller that a name has more load than it actually has to stop too many areas irrigating at once, so causing excessive voltage drop. If the control cable is connected in a loop, this needs to be known, as the current-carrying capacity is doubled.

Flow.

In order to minimise the overall time-to-water, the RM-1 will attempt to activate as many stations (areas) as the hydraulics will allow. This has the benefit of allowing the pumps to run near optimum efficiency and as they run for less time, to save electricity. A shorter overall time will allow longer station times if needed without falling outside the Watering Window.

To achieve this, the nominal flow for each station (name) must be estimated and included in the setup information. This can be found from counting the number of sprinklers on each station and from their nozzle size(s), looking up the nominal flow rate at the design pressure. Multiplying this by the number of sprinklers gives the station flow rate to a good approximation.

Next, the flow capacity of the pipes must be estimated. This may be obtainable from design data, but is usually estimated from a working knowledge of what can be turned on with what, having manually operated the valves. For example, if a pump house is near the centre of a course with a Front and Back Nine, fed with different pipes, it is usually possible to turn on one Green on the Front with one on the Back. It is also probably known that say two Greens in the same Nine will not run, but a Tee can be run with a Green. Thus it is logical to divide the course into two flow zones in this example, one for the Front and another for the Back. Knowing the flows of the Tees and Greens the capacity of each hydraulic zone will be the sum of a Tee flow plus a Green flow.

For each station, the flow rate is entered into the controller, together with which flow zone that the station is in. Up to 127 flow zones can be defined, but in the UK usually 1 - 4 are sufficient.

Finally the maximum delivery capacity of the pump(s) is entered into the controller.

Armed with this hydraulic setup, the RM-1 will activate as many areas simultaneously as the hydraulics will allow.

Precipitation.

Traditionally, the Greenkeeping profession has thought of irrigation in terms of minutes per station, e.g. 10 minutes on each Green every day in dry weather. With the forthcoming passage of the new Water Bill in the UK, it will be necessary to provide evidence of 'efficient water use'. This is helped by keeping a log of precipitation. To enable the controller to display precipitation, the Precipitation Rate (PR) must be entered for each station. As sprinklers on a station should have matched precipitation rates, it is only necessary to know the total irrigated area of the Tee or Green and the total flow from all stations watering it to work the PR out.

Root Depth and Soil Type.

The RM-1 will shortly be available connected to a Rain Gauge and Evapotranspiration (ET) Gauge. Readings from these will be invaluable in the estimate of how much water will need replacing using the irrigation system. If the root depth and soil type is known for each area, the Plant Available Water can be estimated which will materially assist the decision-making process on how much water to put on. The resulting (soon to be statutory) efficient use of water will cut down the water and electricity bills and

maximise the likelihood of obtaining the renewal of the water extraction licence every five years.

How to Lay Out the Information.

This is best done by constructing a table like the example shown below.

Station Information								
Name	Position	Decoder No	Cable	Distance	Hydraulic Zone	Flow Rate (units)	Area (units)	Notes
Green 1	Back Left	7	1	250	2	300	500	examples...
Green 1	Front Right	8	1	250	2	300		flow - L/min
								Area - m sq.
Tee 10	All	28	2	1250	1	100	120	Distance- yds
Tee 11	Mens	30	2		1	80	100	
Tee 11	Ladies	31	2	910	1	50	75	

The decoder number and cable or zone is available from the old controller's documentation (usually pinned to the wall!).

Distance of the station from the controller need only be approximate and can be judged from a rough knowledge of the cable runs and the yardage of each hole.

Flow rates are gained from visiting each area, counting the number of sprinklers on each station and inspecting the nozzle types. Consulting the sprinkler data will then give the flow at some nominal pressure.

Hydraulic Zone can be assigned from where the station is situated amongst the pipe-work. A map of the course with the pipe runs (as known) superimposed will materially assist in this decision.

The irrigated area of each Green/Tee/Approach/Fairway can be estimated from pacing or rough measurements.

Finally the flow capacity of the pump(s) must be obtained and the maximum flow rate handling of each of the defined flow zones using the technique described in the previous **Flow** section.

Given the above information, the RM-1 can be programmed with little extra effort, either on-site or by Tonick Watering prior to shipment.

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