TECHINCAL DIRECTIVE

How to Program Gemini decoders from a TW2 controller

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Distribution Regions: All Regions   **Product Relevance:** PC, EC

For use by: Distributors, Consultants, Contractors, and End Users.

REPROGRAMMING THE DECODER PRIMARY NUMBERS

(On a decoder that has already been previously programmed)

First you **MUST KNOW** what code/s, is/are already programmed in to the decoder. This may be a code that was put in at the factory at a Customer's specific request (See section "PURCHASE OPTIONS" below), or it may be a previously (or mistaken) implanted code that you now want to change. All decoders **must** be programmed (or re-programmed) before they are installed in to the system.

You can double check any existing code/s in a decoder using the TW2 by cycling through on the diagnostic test program (There must be a solenoid connected to the output being tested).

The highest possible useful station number is 95 and NOT 99.

On multi-way decoders, each station is tested and programmed one by one. In other words, you test and program each output as though they were separate single station decoders.

The re-programming is done with the TW2 in **Diagnostic mode "D1"**.

Connect up the decoder and put a coil on its output.

The re-programming sequence is as follows:

1. Run any station number and leave it powered for 5 to 10 seconds before going any further.

2. Run station "98". This tells the decoder that it is about to have a station output recoded. Then wait ten seconds.

3. Run station "X", where "X" is the old station number still implanted in the decoder. This tells the decoder that station "X" is about to be changed to a different number.

4. Run station "Y", where "Y" is the newly desired station number. This tells the decoder that old number "X" is to be replaced by this new number "Y".

5. Run station "99". This causes the number change to take effect and resets the decoder back to normal.

6. Repeat for each station output.

7. Test that the re-programming is successful in the normal way using TW2's diagnostic modes "D1", "D2" or "D3".

NOTE: When testing a decoder on "D1" or on "Manual", the decoder **may not work** on the first code transmission, but on the second. **This is a deliberate feature** that will not affect the irrigation program in normal "TW2" automatic use and is to overcome an inherent weakness in the "TW2" system design that Bailoy believe contributed to the high failure rate of Watermation's decoders. The reason is complex (Please contact us if you need an explanation).

EXAMPLE of DECODER PROGRAMMING

I have a decoder programmed to station 36. I want to change it to be station 51.

The programming sequence in this example will be:

- Switch the TW2 to **diagnostic mode**
- Select ANY decoder number
- WAIT
- 98
- WAIT
- 36
- 51
- 99

I will then test that the decoder works on code "51".

Once all the decoders are in the ground, any decoder can be "called up" and recoded, but great care must be taken not to re-program it to an already existing station number.

SECONDARY STATION NUMBERS

Every station must have a primary number (i.e. its "normal" station number). However, a station may also be allocated a secondary number between 1 and 95.

EXAMPLE:

Station	Primary number	Secondary number
A	1	8
B	2	8
C	3	None
D	4	15
E	5	8

In this example:

- When code "1" is transmitted, only station "A" will turn on
- When code "2" is transmitted, station "B" only will turn on
- When code "3" is transmitted, station "C" only will turn on
- When code "4" is transmitted, station "D" only will turn on
- When code "5" is transmitted, station "E" only will turn on
- When code "8" is transmitted, stations "A", "B", and "E" will turn on (So will any other station that has 8 as its primary or secondary number)
- When code "15" is transmitted, station "D" will turn on together with any other station that has "15" as its primary or secondary numbers

Warning: Care must be taken not to overload the TW2 output. It must be remembered that the TOTAL OUTPUT OF ALL FOUR CSG's (Electrical zones) of a TW2 controller is limited to about 3Amp.

It is recommended that the block of secondary numbers (If used) be allocated higher than the primary numbers. For example, if a site has 63 decoders numbered 1 through 63 in the normal way, then make any secondary numbers (Say) 70 and upward (But not over 95).

The programming of secondary numbers is similar to that for primary numbers but the sequence here is:

- Select any decoder number using the TW2 **diagnostic mode**
- Wait 5 to 10 seconds
- 96
- Wait ten seconds
- "**X**"
- "**S**"
- 97

Where "**X**" is the primary number and "**S**" is the secondary number.

Secondary numbers can be allocated or re-allocated after system installation.

PURCHASE OPTIONS

There is a Customer choice about how decoders leave the factory as follows:

- A batch of decoders can be pre-programmed with primary numbers for an individual site (But not secondary numbers), according to a list supplied by the Customer.

- Decoders will leave the factory in "virgin" state with no numbers pre-programmed in to them at all (This is the normal way). This makes initial programming from a "TW2" less complex than that described above (See section "**Error! Reference source not found.**" below).

PROGRAMMING A VIRGIN GEMINI DECODER

A decoder that has never been programmed before:

1. The programming is done with the TW2 in **Diagnostic mode "D1"**.
2. Run station number 0 and leave it powered for 5 to 10 seconds.
3. Run station "X", where X is the number to which output A must be programmed:
    - Output B (If available) will be programmed with X+1
    - Output C (If available) will be programmed with X+2
    - Output D (If available) will be programmed with X+3
4. Programmable decoder range:
    - One way decoder. X must be in the range 1 to 95
    - Two way decoder. X must be in the range 1 to 94
    - Three way decoder. X must be in the range 1 to 93
    - Four way decoder. X must be in the range 1 to 92

Attempting to program a decoder outside the given range results in output A=1, B=2, C=3 and D=4.

Note: A virgin decoder does not respond to numbers in the range 96 to 99.

DECODER IDENTIFICATION

The TW2 is a fairly simplistic device and (Unlike the Gemini DOU) cannot differentiate between a "virgin" decoder and one that has previously been programmed. You will therefore need to rely upon studying the product label. If station numbers have been written on to the product label, then the decoder will not be in "virgin state". Unless otherwise dictated by a Customer, all decoders leave the factory in "virgin state" and with no station numbers written on to the product label.

OPERATING THE TW2 WITH GEMINI DECODERS

1. It must be remembered that the idea of installing Gemini decoders on old Watermation sites is for the eventual upgrading to a Gemini system. The Gemini decoder has been designed for the future, not for the past. It therefore works in an entirely different way to the old TW2 decoder. For this reason, when using a TW2 controller, Station No.1 should always be an original TW2 type of decoder, with Gemini decoders used in all other stations.

2. This is **NOT** an error, but has been done in design for very special reasons. Contact Bailoy Products if you need a more thorough understanding of the reasons.