TDC-100/200
Stand-Alone Model User's Guide

TORO

TORO TDC-100/200

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Introduction

The Toro TDC-100/200 system combines modular flexibility, ease of use and increased programmability in a single controller. Modularity means flexibility. The TDC-100/200 can control up to 200 stations. The TDC system uses innovative technology to provide an irrigation solution that is safe, reliable and energy efficient.

ET-based runtimes and station-based flow management keep the system running at optimum efficiency, while extensive handheld radio controls allow you to effectively manage your watering while on the course.

The Toro TDC-100/200 system is now compatible with the TriComm™ expansion and user interface (p/n TCOMM-TDC) to allow remote control via the internet.

The intuitive user interface is easy to use and includes a backlight for improved visibility in low-light conditions, yet it is completely viewable in direct sunlight. The faceplate's combination of menu keys, navigation arrows and Input Dial allows for easy menu navigation and quick settings establishment.

With 10 irrigation programs, the TDC-100/200 allows programming flexibility.

General Editing

Pressing a menu key on the TDC-100/200 will display menu items. Items with fields containing values that can be edited are called Entry Fields. Use the arrow keys ◆ ◆ ◆ ◆ to navigate through the menus and entry fields. Modify any selected value by scrolling through the selection using the Input Dial ⌒. Values will be saved automatically when you exit an entry field or press another menu key. Pressing the HOME key 🏠 will also save any modification and revert back to Home display.

If no keypad activity is detected within five minutes, the controller will automatically save any modifications and revert back to Home display.
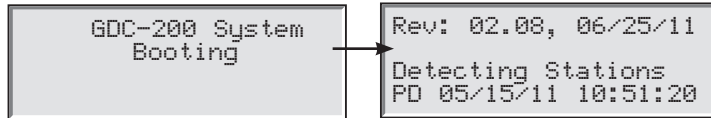
Timing Mechanism
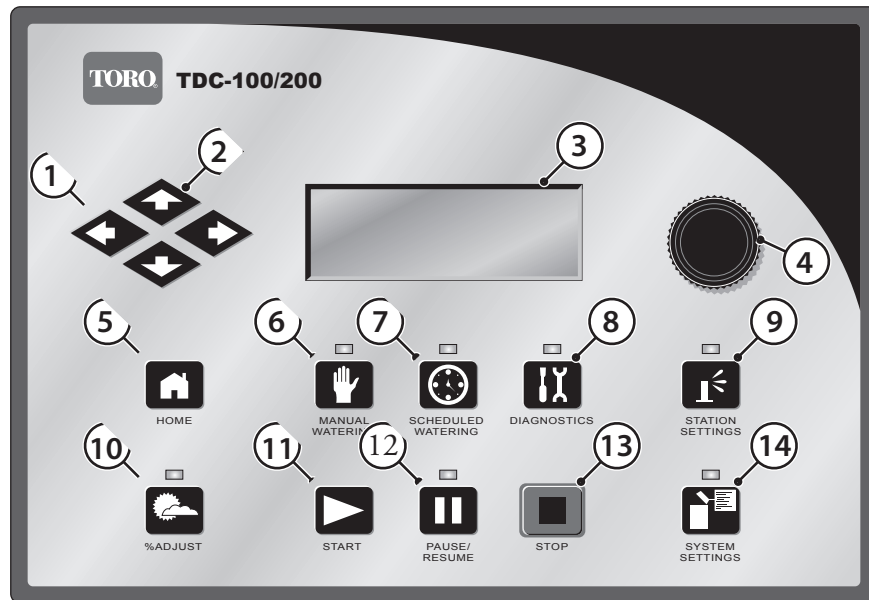
1. ◆▶ ◆▶ **Left and Right Arrows** allow you to select the next entry field within the same menu line. Any changes will be saved after you exit that entry field.

2. ◆▲ ◆▼ **Up and Down Arrows** allow you to scroll up and down through the menu items.

3. **LCD Panel** is the display screen.

4. ⌐‾‾⌐₊ **Input Dial** allows you to scroll through the value selection within the selected entry field.

5. 🏠 **Home Key** allows you to exit from any function menu and return the controller to normal operation. After pressing the Home key, all modifications to the settings will be saved.

6. ✋ **Manual Watering Menu Key** allows you to activate station(s) or program(s) manually.

7. ⊕ **Scheduled Watering Menu Key** allows you to create/modify irrigation programs. Use this function to assign the program type (Standard or Grow- In), watering days, start times, end times, delay times, syringe duration, repeats, soak time, stations, run times and maximum simultaneous stations per program.

8. 𝄪 **Diagnostics Menu Key** allows you to run communications test with each decoder and solenoids.

9. 🔩 **Station Settings Menu Key** allows you to modify station parameters. Within this setting, you can set the station number and assign it to a specific decoder, decoder station and path, specify each station's percent adjust, disable the station from any activity by placing a station hold for a specific number of days, set the station type to a switch and create or edit the station description/name.

10. 🐌 **Percent Adjust Menu Key** allows you to adjust watering to a specific percentage range. The user can specify percentage adjustment for the system, programs and stations.

11. ▶ **Start Key** will execute selected program or manual operation.

12. ❚❚ **Pause/Resume Key** will pause currently activated program(s). To resume operation, press the pause key again and select Resume.

13. ■ **Stop Key** will cancel currently running program(s) or station(s).

14. 📄 **System Settings Menu Key** allows the user to modify the controller parameters. Users can specify the hold duration for controller's activity, set language, time, date, day change, station delay, maximum number of stations to run simultaneously, adjust display contrast and specify sensor type. Within this menu, the user can also reset all programs, reset the station parameters and reset all disables.

Power-Up Diagnostics

Upon power-up, the controller will display:

```
   GDC-200 System              Rev: 02.08, 06/25/11
       Booting
                               Detecting Stations
                               PD 05/15/11 10:51:20
```

The TDC-100/200 will initiate a diagnostic test automatically during power-up. This function will take approximately ten seconds and it cannot be bypassed. If a problem is detected during the diagnostic test, it will be indicated on the display.

When completed, information will be displayed momentarily on the screen for five seconds. This status information cannot be edited. The information is as follows:

Line 1: TDC-100/200 Firmware Version and Revision Date
Line 2: Detect: [xx stations, yy sensors] (xx = number of stations detected, yy = number of sensors detected)
Line 3: Last Power Downtime Date and Time
Example:

```
Rev: 02.08, 06/25/11

Capacity: 200 stas
PD 02/01/09 10:51:20
```

The default Home display will follow after the diagnostic display has timed-out.
Home display example:

```
Sat 06/25/11 10:50am
             Sec: 45

Day Change:   12:00am
```

Home Key

🏠 Pressing the Home Key will revert to the default display. When editing irrigation programs, Station or System settings, pressing the Home Key will save any setting modifications and return the user to the Home display.
Home display example:

```
Sun 06/26/11  10:50am          Sun 06/26/11  11:15am       Low Pressure detected indicator for flow
              Sec: 45                        Sec: 50        sensor equipped Decoder systems
                               Rain Hold      LowPres
Day Change:   12:00am          Day Change:    12:00am
                                                             Rain detected indicator for rain sensor
                                                             equipped Decoder systems
```

The Day Change line will display the next program start time (Next Start: HH:MM) if the current day is an active watering day. If the controller is running a program, the Day Change line will display Running XX programs to indicate the number of active programs.

The following example display has two programs running with two stations manually activated, the display will read:

```
Mon 06/27/11  06:50am
              Sec: 32

Running 02 Programs
```

```
P01  Sta01 %00:05:00           (The "%" symbol before the runtime indicates that station 1 is percent adjusted.)
P01  Sta02  00:05:00           (P01 indicates Program 01 is currently active)
P01  Sta03D 00:05:00           (The "D" symbol after the station number indicates that station 3 is disabled.)
P02  Sta10P 00:10:00           (The "P" symbol after the station number indicates that program 02 is paused.)
                               ("Man" indicates Manual Watering is currently active)
Man  Sta18S  00:05:00          (The "S" symbol after the station number indicates that programs 18 & 19
Man  Sta19S  00:10:00          are stacked.)
```
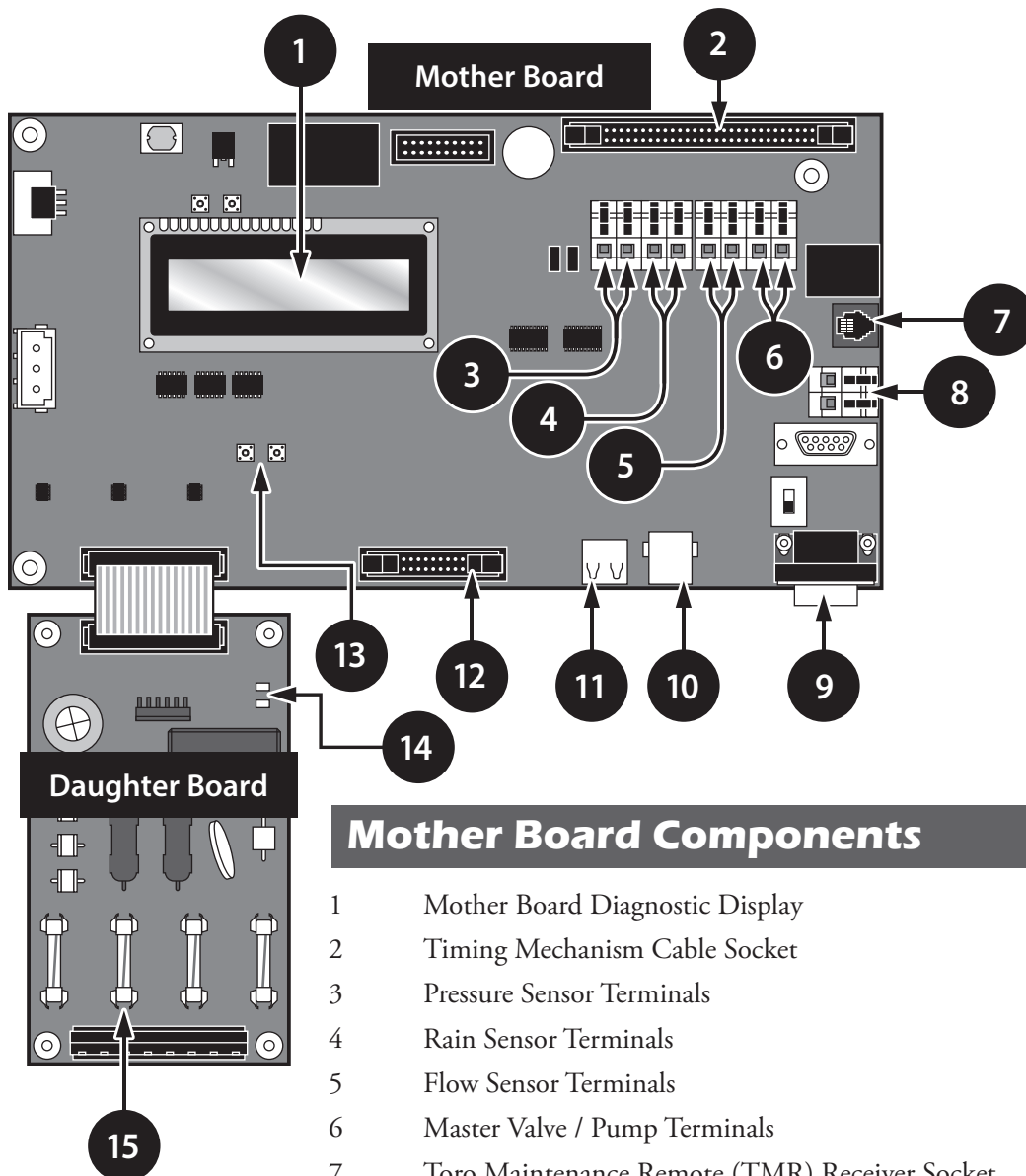
Mother Board Components

1	Mother Board Diagnostic Display
2	Timing Mechanism Cable Socket
3	Pressure Sensor Terminals
4	Rain Sensor Terminals
5	Flow Sensor Terminals
6	Master Valve / Pump Terminals
7	Toro Maintenance Remote (TMR) Receiver Socket
8	24 VDC (power access for optional accessories)
9	RS-232 Receiver (Used for PC Mode Communication.)
10	USB Device Input (Used for PC Mode Communication.)
11	USB Host (For future use.)
12	2nd Daughter Board Module or TriComm™ Communication Modem Connection Port
13	Diagnostic Display Navigation Buttons

Daughter Board Components

14	Power and Alarm LED Monitor
15	Daughter Board Fuse, 4-Count, 3.15A Fast Blow

Note: Program stacking occurs when the controller is running a program where the maximum simultaneous station limit is surpassed. Additional scheduled programs will be stacked (delayed) until an available station can be activated.

System Settings

System Settings allows you to set controller parameters such as Time, Date and Language.

Use the up or down arrow keys ◆ ◆ to navigate through the menus.

Use the left and right arrow keys ◆ ◆ to advance to the next entry field on the same menu line.

Use the input dial ⁀₊ to select values when editing.

Hold For: – Use this function to suspend system operation. Select the Hold duration from Today, 02-30 days, or Permant (Permanent) to suspend operation indefinitely. Select None to reactivate the system. The following will display when system Hold is set for 2 days:

```
Sun 06/26/11 06:50am
             Sec: 32

On Hold for 02 days
```

Language: – Default, English. Future option, Spanish, French, German and Italian.

Clock Set: – Use this function to set the current time.

Clock Mode: – Use this function to select the clock mode between Am/Pm (12-Hour) and 24-Hour mode.

Date: – Use this function to set the current date.

```
Day Change : 1 am
RainSensActvOpn: No
LowPressActvOpn: Yes
LP Shutdown:   5 min
```

Day Change: – Use this function to set the "day change" time. The "day change" is the specified time that the controller will advance the date. The default day change is 12:00 am. Adjusting the day change time will allow programs to start throughout the night on the same active day schedule. Programs with runtimes beyond the day change time are allowed to finish.

RainSensActvOpn: – Set this parameter to **Yes** when using a normally-closed rain sensor. Set to **No** when using a normally-open rain sensor. The default is **No**.

LowPressActvOpn: – Set this parameter to **Yes** when using a normally-closed pressure sensor. Set to **No** when using a normally-open pressure sensor.

LP Shutdown: – The TDC system can be equipped with a low pressure system to detect system failure. Use this function to set the wait time until the controller reassess the low pressure condition before shutting down the whole system. This delay (default: 5 minutes) prevents system shutdowns caused by intermittent pressure fluctuations.

Max Sim Sta: – Use this function to set the maximum number of simultaneously operating stations. This threshold will be applied to all programs and manual irrigation functions. Each program can then be set with a lower limitation if necessary.

Note: The maximum number of simultaneous stations per controller is 20. The default is 6.

Example: The controller is set with a maximum simultaneous active stations of **7**. All programs in the controller will adhere to the 7 maximum active stations and each can be adjusted with a lower limit (6, 5, 4, etc.).

Display Adj: – Use this function to adjust the contrast of the LCD screen. Use the input dial ⌐∼₊ to darken or lighten the text display.

Reset Sta's: – Use this function to reset all station settings by selecting Yes. After selecting Yes, press the up or down arrows ◆ ◆ to activate. The following will display:

```
Reset All Stations
    to defaults
        05
   STOP to escape
```

All station settings will be erased after a successful reset.

Reset Prg's: – Use this function to reset all controller irrigation program by selecting Yes. After selecting Yes, press the up or down arrow keys ◆ ◆ to activate. The following will display:

```
Reset All Programs
    to defaults
        05
   STOP to escape
```

All program data will be erased after a successful reset.

Reset Disab: – Use this function to reset all stations that are disabled by selecting Yes to the selection. After selecting Yes, press the up or down arrow keys ◆ ◆ to activate. The following will display:

```
Reset Sta Disables
        05

   STOP to escape
```

Reset Unit: – Use this function to reset the controller settings by selecting Yes. After selecting Yes, press the up or down arrow keys ◆ ◆ to activate. The following will display:

```
Reset All Defaults
        10

   STOP to escape
```

After the 10-second countdown, the controller will reboot.

Resetting the unit will erase all user-defined program data and configuration values in the controller's memory.

Station Settings

🖐 Station Settings allows you to set parameters specific to each station.

Use the up or down arrow keys ◆ ◆ to navigate through the menus.

Use the left and right arrow keys ◆ ◆ to advance to the next entry field on the same menu line.

Use the input dial ⌒ to select values when editing.

S001 –	Select the station you want to edit in this field. Choose from Station 001 through the controller maximum station count of 200.
100% –	If weather or other condition requires irrigation program modification, it can be easily adjusted by changing the percent adjustment. Station operation can be reduced to 000% (Off) or increased up to 250%. 100% represents standard operation.
Decoder Addr: –	Enter the decoder's 5-digit address code that corresponds to the selected station.
Dec Sta: –	If using a 2 or 4-station decoder, select the decoder station to designate to the selected station.

Decoder Station Color Codes

RED = Station 1, GREEN = Station 2,
ORANGE = Station 3,   BLUE = Station 4

Board: –	Select the correct daughter board (1 or 2) the station is connected to. Enter wire board 01 for stations connected to the 1st daughter board and wire board 02 for the 2nd daughter board.
Disable: –	Use this function to disable station operation by selecting **Yes** from the menu. Resume station operation by selecting **No** from the menu.
Set Sta as a MV: –	Use this function to designate the station to operate as a Master valve by selecting **Yes**.

Suggestion: Assign station number that will not interfere with your programming such as 100 or 200.

Assn Sta to MV: –	Use this function to assign a station to run with a specific master valve (Not available if the station is designated as a Master Valve).
Sched Today: –	This function will display the total scheduled station runtime for the current day.
Water Today: –	This function will display the total station runtime that has occurred for the current day.
Is Switch: –	Use this function to assign the selected station to a switch. When the switch (station) is activated, the Master Valve or Pump will not actuate.
Hold Sta: –	Use this function to delay operation for this station. Select the hold duration from 01–30 days, Permanent or None. This function is useful when a specific station needs to be deactivated without affecting any of the programs.
Cycles: –	Use this function to set the station cycle. When Station cycle is set to more than 1, the station's runtime in the program will be divide by the cycle number. Select from 1–4 cycles and Autocycle.

With Autocycle, you can specify the maximum runtime and soak time for the station. TDC will run the station until the maximum cycle time. TDC will then pause watering until Soak time is fulfilled. It will repeat the process until the program's station runtime is fulfilled.

Edit Name: –	Use this function to assign a name description to the station. Assign a 10-character name of your choice, such as "shrubs" or "back lawn" to easily identify the station area.
Output Volts: –	Use this function to select the controller's output voltage. Select between 15 or 20 volts DC.

Important! For proper operation, install compatible DC-latching solenoids only.

Scheduled Watering
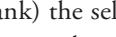
⊙ The TDC-100/200 features 10 fully-independent resident programs. With two types of programs to select from, you can further custom fit your irrigation programs to any landscape.

- **Standard Irrigation Program** will activate a station or group of stations with six start times on a daily basis. Each station will water for the duration specified in hours, minutes and seconds. Percent adjust and maximum number of simultaneous activate stations per program can be specified in this program.

- **Grow-In Irrigation Program** will activate a station or group of stations for the length of their runtime. The program will repeat the cycle after the specified delay time expires and will repeat continuously between the set Start and End times. Percent adjust and the simultaneous activate stations can be specified in this program.

To utilize these programs automatically or manually, each program must be configured.

```
S016 100%   1STSTLAWN
Decoder Addr:   38684
Dec Sta: 4 Board: 1
Disable:   No
```

```
Set Sta as a MV: NO
Assn Sta to MV: 000
Sched today:    NONE
Water today:    NONE
```

```
Is Switch:   NO
Hold Sta :   NO
Cycles   :   01  times
Edit Name:   01TE020
```

```
FlowSens:03StaFlo200
Output Volts:   15
```

Standard Irrigation Program Setting:

Standard Irrigation Program example: Create Program 02 with stations 6–10 running 15 minutes each and stations 15–20 running 10 minutes each with no percent adjustments. Set the start time at 6:30 am with five maximum simultaneous active station.

1. Press the Scheduled Watering key ⊙. The cursor is initially located at the program selection field. Use the input dial ⟋₊ to select the program (P01–P10) you want to create or modify. For this example, select **2**.

2. Press the right arrow key ▶ to standard to the Percent Adjust field. Normally this setting will be 100% unless weather or other condition suggest that less or more irrigation is needed. Use the input dial ⟋₊ to adjust the setting. For this example, no adjustment is needed.

3. Press the down arrow key ◆ to advance the cursor to the **Hold:** field. Use this function to suspend program operation. Select from **None**, **Today**, **02–30** days or **Permanent**. For this example, select **None**.

4. Press the down arrow key ◆ to advance the cursor to the **Type:** field. Use the input dial ⟋₊ to adjust the setting. For this example, set the Type to **Standard**.

5. Press the down arrow key ◆ to advance the cursor to the **Days:** field. Use the input dial ⟋₊ to select the program activation interval from 01–30 days. Select 01 for everyday, 02 for every other day, 03 for every third day and so on. The example does not call for a set interval. Leave the **Days:** setting to **SMTWTFS**.

6. Press the down arrow key ◆ to advance the cursor to the **Set:** field. Use the input dial ⟋₊ to select from any of the preset intervals (All, Alternate days, Weekdays only, Weekends only, None or User set). To create your own program activation interval, select **Set:**. Use the right arrow key ◆ to select the day of the week you want to irrigate and use the input dial ⟋₊ to activate (X) or deactivate (blank) the selection. For this example, activate M (Monday), W (Wednesday) and F (Friday) only. MWF of the 1st and 2nd week should have an **X** mark under while the rest are blank.

7. Press the down arrow key ◆ to advance the cursor to the **Start:** field. The first entry field will indicate the start time number. Each program can have a maximum of 24 start times. Use the input dial ⟋₊ to choose the start time being created or modified. Press the right arrow key ◆ to advance to the time entry field. Use the input dial ⟋₊ to select the start time in hours and minutes (HH:MM). Repeat Step 7 for additional start times. For this example, set start time **01** to **05:45am**.

8. Press the down arrow key ◆ to advance the cursor to the **Sta Dly:** field. Use the left and right arrow keys ◆ ◆ to navigate between the Hour and Minute fields. Use the input dial ⌇ to set the Station Delay duration. Station delay is the wait period when a station finished watering and when the next station is activated. In most situations, station delay is used to allow slow -shutting valves time to fully close before activating another station and also to allow the water source, such as a well, to recover. For this example, set Station Delay to remain at **00**.

9. Press the down arrow key ◆ to advance the cursor to the **MV Sta:** field. When using a station as a master valve, use this function to select the MV station number. Use the input dial ⌇ to select the station number that is being used as a master valve. Press the down arrow key ◆ to advance to each digit. The master valve can be configured to turn off during station delays or remain on. To configure the MV to remain ON during station delays, press the right arrow key ◆ to the Off Dly. Use the input dial ⌇ to toggle Off to On. Off will not toggle to ON if a station number is not assigned.

   Note: Before a station can be assigned to the program as a master valve, the station must be configured in the Station Settings.

10. Press the down arrow key ◆ to advance the cursor to the **Syringe:** field. Use the input dial ⌇ to set the Syringe duration. When a syringe duration (0–99 minutes) is set, an asterisk is placed in front of the start time number to indicate that this start time is a syringe start. During a syringe, the stations will all activate for the syringe duration regardless of their assigned runtimes. For this example, do not set a Syringe duration.

11. Press the down arrow key ◆ to advance the cursor to the **Repeats#:** field. Use the input dial ⌇ to enter the number of times the program will repeat the cycle. For this example,set Repeat to remain at **00**.

12. Press the down arrow key ◆ to advance the cursor to the **Soak#:** field. Use the input dial ⌇ to enter the soak duration before the station is reactivated. For this example, set a soak duration of **00:10:00**.

13. Press the down arrow key ◆ to advance the cursor to the **Sta#:** field. Use the input dial ⌇ to select the first station being irrigated in the sequence. For this example, select station **06**.

14. Press the right arrow key ◆ to advance the cursor to the next value. This value will indicate the last station in the sequence. If irrigating only one station, this value will be the same as the first value. For this example, select station **10**. With 6 being the first station and 10 being the last station, the program will water stations 6, 7, 8, 9 and 10 in sequence.

15. Press the right arrow key ◆ to advance the cursor to the next entry field. This entry field will indicate the runtime in hours and minutes (HH:MM). Use the input dial ⌇ and the right arrow key ◆ to select the appropriate runtime value. For this example, set the value to **00:15**.

   Repeat Steps 8–10 to assign stations 15–20 with a runtime of 10 minutes.

16. Press the down arrow key ◆ to advance the cursor to the **Simult:** field. Use the input dial ⌇ to select the maximum allowable simultaneous active station. For this example, set the value to **05**.

   Note: The Program's Simultaneous setting is limited to the System's Simultaneous value.

   When finished, the display should read:

```
P02    100%   01:15:00      Days:  SMTWTFSSMTWTFS
Hold: None                  set>:   XX XX XX XX
Type: Standard              Start  : 01 05:45am
                            Sta Dly: 00:00 (h:m)
```

```
MV Sta:   000 Off Dly       Sta#: 06-10   00:15
Syringe: 00 min             Sta#: 15-20   00:10-
Repeats: 0                  Sta#: -------  --:--
Soak:    10:00 (h:m)        Simult: 05
```

Grow In Irrigation Program Setting:

Grow In Irrigation Program example: Create program 3 with stations 21–30 for 5 minutes each with no percent adjustment. Set the start time at 6:30 am and the end time at 4:00 pm. Set the delay for 2 hours and 15 minutes and the maximum simultaneous active station to 5.

1. Press the Scheduled Watering key ⊕. The cursor is initially located at the program selection field. Use the input dial ⌒₊ to select the program (P01–P10) you want to create or modify. For this example, select program **3**.

2. Press the right arrow key ◆ to advance to the Percent Adjust field. Normally this setting will be 100% unless weather or other condition suggest that less or more irrigation is needed. Use the input dial ⌒₊ to adjust the setting. For this example, no adjustment is needed.

3. Press the down arrow key ◆ to advance the cursor to the **Hold:** field. Use this function to suspend program operation. Select from **None**, **Today**, **02–30** days or **Permanent**. For this example, select **None**.

4. Press the down arrow key ◆ to advance the cursor to the **Type:** field. Use the input dial ⌒₊ to adjust the setting. For this example, set the Type to **Grow-In**.

5. Press the down arrow key ◆ to advance the cursor to the **Start:** field. This start time will indicate the starting point of the Grow-In cycle. Use the input dial ⌒₊ to select the start time value. Use the Left and right arrow keys ◆ ◆ to navigate between the Hours and Minutes fields. For this example, set the start time to **06:30am**.

6. Press the down arrow key ◆ to advance the cursor to the **End:** field. This end time will indicate the end point of the Grow-In cycle. Use the input dial ⌒₊ to select the end time value. Use the Left and right arrow keys ◆ ◆ to navigate between the Hours and Minutes fields. For this example, set the end time to **04:00pm**.

7. Press the down arrow key ◆ to advance the cursor to the **Delay:** field. This delay time will determine the wait time between program cycles. Use the input dial ⌒₊ to select the delay time value. Use the Left and right arrow keys ◆ ◆ to navigate between the Hours and Minutes fields. For this example, set the delay time to **02:15**.

8. Press the down arrow key ◆ to advance the cursor to the **Sta Dly:** field. Station delay will determine the wait duration between station operations. Use the input dial ⌒₊ to select the delay time value. Use the Left and right arrow keys ◆ ◆ to navigate between the Hours and Minutes fields. For this example, no adjustment is needed.

9. Press the down arrow key ◆ to advance the cursor to the **MV Sta:** field. When using a station as a master valve, use this function to select the MV station number. Use the input dial ⌒₊ to select the station number that is being used as a master valve. Press the right arrow key ◆ to advance to each digit. The master valve can be configured to turn off during station delays or remain on. To configure the MV to remain ON during station delays, press the right arrow key ◆ to select Off Dly. Use the input dial ⌒₊ to toggle Off to On. Off will not toggle to ON if a station number is not assigned.

10. Press the down arrow key ◆ to advance the cursor to the **Sta#:** field. Use the input dial ⌒₊ to select the correct value of the first station being irrigated. For this example, select station **21**.

11. Press the right arrow key ◆ to advance to advance the cursor to the next value. This value will indicate the last station of the range. If irrigating only one station, this value should be the same as the first value. For this example, select station **30**.

12. Press the right arrow key ◆ to advance to advance the cursor to the next entry field. This entry field will indicate the runtime in hours, minutes and seconds (HH:MM). Use the input dial ⌒₊ and the right arrow key ◆ to select the appropriate runtime value. For this example, set the runtime to **00:05**.

13. Press the down arrow key ◆ to advance the cursor to the **Simult:** field. Use the input dial ⌒₊ to select the maximum allowable simultaneous active station. For this example, set the value to **05**.

    When finished, the display should read:

```
P03    100%   00:50:00      End:     04:00pm         Sta#:   21-30 00:05
Hold:   None                Delay: 02:15(hr:min)     Sta#:   ----- --:--:--
Type:   Grow In             Sta Dly: 00:00 (h:m)     Simult: 05
Start:  06:30am             MV Sta:   000 On Dly
```

Manual Watering

⬛ The Manual Watering functions are used for additional watering if the irrigation program is not sufficient. They can also be used to troubleshoot each station for proper operation. Pressing the Manual Watering Key will access three manual irrigation functions; Multi-Manual, Syringe and Program.

M-Manual - Select M-Manual to activate a station or group of stations with a specified runtime.

Multi-Manual Station Activation Directions

Manual station activation example: Activate stations 1–12 with a runtime of 5 minutes each and limit watering to 3 stations simultaneously.

Note: The Multi-Manual function is limited to the maximum simultaneous station settings of the controller. In cases where a program is running and a multi-manual activated, the controller will activate all stations specified in the multi-manual in addition to the currently activated stations. Thus, the multi-manual will allow the controller to exceed the maximum simultaneous station settings.

1. Press the Manual Watering key ⬛.

2. The cursor should be located in the Manual Field, use the input dial ⏚ to select **M-Manual**.

3. Press the down arrow key ◆ to advance the cursor to the **Sta#:** field. Use the input dial ⏚ to select the correct station being irrigated. For this example, select station **01**.

4. Press the right arrow key ◆ to advance the cursor to the next value. This value will indicate the last station of the range. If irrigating only one station, this value should be the same as the first value. For this example, select station **12**.

5. Press the right arrow key ◆ to advance the cursor to the next entry field. This entry field will indicate the runtime in hours, minutes and seconds (HH:MM). Use the input dial ⏚ and the right arrow key ◆ to select the appropriate runtime value. For this example, set the value to **00:05**.

6. Press the down arrow key ◆ to advance the cursor to the next entry field. Notice that a new **Station:** line was created. Fill this line only if irrigating multiple ranges of stations, otherwise, leave this line blank.

7. Press the down arrow key ◆ to advance the cursor to the **Simult:** field. Use the input dial ⏚ to select the maximum simultaneous irrigating stations. For this example, set the value to **03**.

8. Press the Start key ▶ to activate Multi-Manual or press the Home key ⌂ to cancel and revert back to the default display.

   When finished, the display should read:

   ```
   Manual: M-Manual
   Sta#: 01-12   00:05
   Sta#: -----   --:--
   Simult: 03
   ```

   ```
   Press START to water
   ```

Syringe - Choose Syringe to activate all the stations in a selected irrigation program for a specified runtime.

Note: The Maximum number of simultaneous stations set in the program still applies.

Manual Syringe Activation Directions

Syringe activation example: Manually activate all the stations in Program 3 for 2 minutes each.

Note: An irrigation program must be configured to activate Manual Syringe.

1.   Press the Manual Watering key 🖐.

2.   The cursor should be located in the Manual field. Use the input dial ⟋₊ to select Syringe.

3.   Press the down arrow key ◆ to advance the cursor to the **Runtime:** field. Use the input dial ⟋₊ to select the runtime duration in minutes. For this example, set the value to **02** minutes.

     Note: The Runtime setting in Syringe will not affect the actual runtime in the program.

4.   Press the down arrow key ◆ to advance the cursor to the **Program:** field. Use the input dial ⟋₊ to select the program to syringe. For this example, select program **03**.

5.   Once the correct program is selected, press the Start key ▶ to activate or press the Home key 🏠 to cancel and revert back to the default display.

     When finished, the display should read:

```
Manual:   Syringe
Runtime: 02 min
Program: 03
Press START to water
```

Start Program - Select Start Prog to activate a watering program regardless of its set start time.

Manual Program Activation Directions

Start Program example: Manually activate Program 08.

Note: An irrigation program must be configured to activate Manual Program. A program on hold can still be manually activated.

1.   Press the Manual Watering key 🖐.

2.   The cursor should be located in the Manual field. Use the input dial ⟋₊ to select Start Prog.

3.   Press the down arrow key ◆ to advance the cursor to the **Program:** field. Use the input dial ⟋₊ to select the program to activate. For this example, select program **08**.

4.   Once the correct program is selected, press the Start key ▶ to activate or press the Home key 🏠 to cancel and revert back to the default display.

     When finished, the display should read:

```
Manual:   Start Prog
Program: 08

Press START to water
```

% (Percent) Adjust
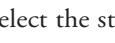
The percent adjust function allows you to fine tune irrigation programs. With weather conditions changing constantly, Percent Adjust allows you to easily adjust your system's schedules without modifying the program values.

Important: The percentage settings do not override each other, instead, they multiple each other to get the effective adjustment.

Example: Controller's Global% is set at 150%, Program% is set at 125% and Station% is set at 90%. The effective watering adjustment is calculated to be 1.5 x 1.25 x 0.9 = 1.68 or 168%.

```
Percent Adjust...
Global:        100%  ◄──── Global will adjust from 1–250%
Program  : P01 100%  ◄──── Program will adjust from 10–250%
Station  : S01 100%  ◄──── Station will adjust from 0–250%
```

% Adjust Directions

1. Press the % Adjust key. The cursor is initially located at the **Global:** adjust field. Use the input dial to adjust all scheduled watering up to 250% or down to 1%.
   Note: The controller adjustment will affect all programs universally. Do not adjust the System % settings if the adjustment is only needed to a specific program.

2. Press the down arrow to advance the cursor to the **Program:** field. The first entry field will be the program selection field. Use the input dial to select the program being adjusted. Press the right arrow key to advance the cursor to the percent adjustment field. Use the input dial to adjust the program watering up to 250% or down to 10%. Repeat step 2 to adjust additional programs.
   Note: Do not adjust the program % setting if adjustment is station specific.

3. Press the down arrow to advance the cursor to the **Station:** field. The first entry field will be the station selection field. Use the input dial to select the station being adjusted. Press the right arrow key to advance to the percent adjustment field. Use the input dial to adjust the station watering up to 250% or down to 000%. Repeat step 3 to adjust additional stations.
   Note: Adjusting the station's watering to 000% will prevent it from running within a program. Multi-Manual and Syringe are not affected by the % Adjustment.

Start Key

The Start key is used to execute a manual function.

Note: Pressing the Start key while the controller is idle will prompt the Manual Watering menu.

Multi-Manual Start Display

```
   Multi-Manual
     Starting
       03
  STOP to cancel
```

Manual Syringe Start Display

```
  Syringe Starting
    Program 01
       03
  STOP to cancel
```

Manual Start Display
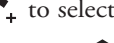
```
    Program 01
     Starting
       03
  STOP to cancel
```

Pause / Resume

⏸ The Pause command is used to suspend active program or manual irrigation. The Pause function allows the user to specify the pause duration.

Pause / Resume Function Directions

Pause function example: Program 01 has been manually activated. Pause program 01 for 30 minutes.

1. Press the Pause ⏸ key.

2. Use the input dial ⌇₊ to select All, M-Man or Prg:XX (XX = the program number). If multiple programs are active, use the right arrow key ◆ to advance to the program number field before using the input dial ⌇₊ to select the correct program number. For this example, select **Prg: 01**.

3. Press the down arrow key ◆ to advance the cursor to the **for:** field. Use the input dial ⌇₊ and the right arrow key ◆ to select the pause duration in hours and minutes. For this example, set the pause duration to **00 hr 30 min**.

   The display should read:

   ```
   Pause: Prg: 01
   for: 00hr 30 min
   Press PAUSE to pause
   00 Programs Paused
   ```

   Note: *The default pause time is* **0 hr 05 min** *minutes.*

4. Press the Pause ⏸ key to initiate the Pause function.

Resume Controller Activity example: Reactivate Program 01 when Paused.

1. Press the Pause ⏸ key.

2. Use the input dial ⌇₊ until the correct program or multi-manual operation is displayed.
   For this example, select **Resume: Prg: 01**.

   The display should read:

   ```
   Resume: Prg: 01

   Press PAUSE to pause
   01 Programs Paused
   ```

3. Press the Pause ⏸ key to release the Pause function.

Pause Function	TDC-100/200 Action
Pause Program XX	Allow the start of other programs, multi-manuals and syringe. If the start time of the paused program occur's again while still on Pause, that runtime will be stacked (delayed until the first occurrence is completed).
	If Program XX is already on Pause or Pause All is in effect, the new pause time-out will override the remaining pause time for program XX.
Pause Multi-Manual	Allows any program or syringe start. If a new multi-manual is activated, the previous will be canceled.
	If Multi-Manual is already on Pause or Pause All is in effect, the new pause time-out will override the remaining pause time for the multi-manual.
Pause Syringe	Allows any program or manual start. If a new syringe is activated for the same paused syringed program, the pause will be cancelled and activity will resume with the new runtime.

	If a syringed program is on Pause All, activating a new pause for the same syringe program will overwrite the remaining pause time with the new pause time for that syringed program.
Pause All	All currently running programs, multi-manual and syringe will be suspended until the pause time-out expires.
	New start is allowed only for Manual functions.
	Additional programs that are scheduled to start while Pause All is in effect will be stacked until the Pause time-out expires.
Pause All Timed out	All activity delayed by Pause All function will resume. Programs and Manual functions that were paused after the Pause All function will resume when their pause time-out expires.
Resume Program XX	Resumes program XX activity.
Resume Multi-Manual	Resumes multi-manual activity.
Resume Syringe	Resumes syringe activity.
Resume All	Resumes all irrigation activity.
Cancel (Stop) Program XX	If Program XX is paused, the pause status will be cancelled and activity terminated. If the same program is stacked, it will also be terminated.
Cancel (Stop) Manual	If Manual activity is paused, the pause status will be cancelled and the manual activity is terminated.
Cancel (Stop) All	All paused activities will be cancelled and all watering will be terminated.

Stop Key

■ Use the Stop function to cancel program or manual irrigation. If the controller has no current activity, pressing the Stop key will have no effect.

Stop Function Directions
Stop Function Example: Program 01 is activated automatically. Cancel watering for program 01.

1. Press the Stop ■ key.

2. Use the input dial ⌒ until the desired program or station to be cancelled is displayed.
   For this example, select **Cancel: Prg: 01**.

   The display should read:

   ```
   Cancel: Prg:01
   STOP to cancel water
   Running 01 programs
   P01 is running
   ```

3. Press the Stop ■ key to finalize the program cancelation.

   When finished, the display should read:

   ```
   Cancelling P01
           03

   STOP to escape
   ```

Diagnostics

The diagnostics function allows the user to monitor Radio Link status, check the firmware version, trouble-shoot stations using the Sequence Stations options, monitor the system's water usage, monitor all system's sensor status, monitor system's voltages, check alarm status, clear alarms and execute a self diagnostics to the system.

```
Menu: Station Alarms
S001   Alarms: 01
No Comm w/ Decoder
06/15/11,  10:07
```

Use this menu to check alarm codes that have been activated. Use the codes to troubleshoot for possible errors and faults.

```
Menu: Clear Alarms

Press START to clear
alarms for all Sta's
```

Use this menu to clear alarm codes once it's been restored.

Checking and Clearing Alarms

Press the down arrow key ◆ to advance the cursor to the **S001:** field. Use the input dial ◟‾‾◝₊ to scroll through all the stations with alarms. To clear the alarm, press the right arrow key ◆ to the Alarm: field, use the Input Dial ◟‾‾◝₊ to display **Clear Alarm**. Press the down arrow key ◆ to execute.

```
Menu: RunDiagnostics
Perform: Comm Check

Press START to start
```

Use this menu perform a Comm (Communication) Check or a Solenoid Chk (check).

```
Menu: Revision

Revision: 02.08
Rev. Date 01/04/11
```

Use this menu to verify firmware version.

```
Menu: VA Monitor
Battery Volt: 3.3
LCD Voltage: 2.7
Board temp:  28c
```

Use this menu to monitor the system's voltages.

```
Menu: PowerUp Detect
Capacity: 200 sta's
PD 06/28/11 13:53:51
PU 06/29/11 11:15:32
```

This menu will display the detected station capacity from the last Power Down (PD). PU will display the date and time of the last Power Up.

```
Menu: Event Codes
Clear log:  No
Last code:  93
06/30/11  10:21:46
```

This menu will display the last logged event that may help diagnose problems. The event code, date and time the event occurred will be displayed. Clear the log by navigating to "Clear log: No" using the Right or Left arrows ◆ ◆.

Use the input dial to toggle No to Yes. Press the Up or Down arrow to accept.

```
Menu: Link Monitor
Sent: GetPumpPress
Resp: 2nd
Total Bad Resp: 001
```

Use this menu to display when and what messages are sent.

```
Total Timeouts: 001
Total Failed:   002
Clear Total:    No
```

1st Line: Name of the sent message
2nd Line: Response status
3rd Line: Number of messages that were sent out with bad responses
4th Line: Number of messages that did not get a response
5th Line: Number of messages that failed to communicate after

Use the arrow keys to navigate to Clear Total and toggle No to Yes to clear all Link Monitor's values.

Sample Alarm Display During Normal Operation:

```
Sun 07/03/11 11:04am
Chk Alarms   Sec: 36

Next start: 07:00pm
```

TDC indicates Check Alarms Status when a fault is detected within the system.

```
Press DOWN to list
07/03/11, 11:05
Station OPEN
No comm w/ decoder
```

Station Alarms will list any detected system faults with descriptions for quick and easy system troubleshooting.

```
Tue 08/07/12 02:24pm
             Sec: 54
             LowPres
 Day Change:  12:00am
```

"LowPres" indicates a low-pressure alarm.

Mother Board Diagnostic Display

The TDC-100/200 features a 2-line, 16 character LCD display for quickly viewing for system diagnostic information. Use the left button bellow the LCD to scroll through the display lines and if needed, use the right button to scroll through the available options.

Screen   **Explanation**

```
   Rev 2.02
  03/28/2011
```
After power up, the screen will display board's firmware version.

```
D1 A=1.500
D2 = OFF
```
After the initial Revision screen, the display will show the total real time current for each daughter board.

```
D1L1=0.123 A
D1L2=0.121 A
```

```
D2L1=0.224 A
D2L2=0.223 A
```
The display will also show the total real-time current for each of the white and black wire groupings of a daughterboard.
L1 = Black wire group
L2 = White wire group

```
Rain sw  =open
Pump pres=closed
```
The display will show the Rain and Pump Pressure sensor state and will be updated in real time.

```
D1 DEC 32396
10 min Send...
```
The display will show the information contained in the message during transmission execution. The information will only be displayed while the transmission is being executed. The display will refresh if a different command is transmitted.

```
Display Contrast
Psh Opt to Adj
```
Scroll to this menu to adjust the display contrast. Press the right button below the LCD to adjust.

```
No Alarms
```
Use the Alarms display to view fault information such as daughter board thermal alarms, shorts, high current and wire load imbalances. You can clear the alarms by pressing and holding the scroll (left) button for four seconds.

See **Alarm Conditions**, next page.

```
00:00:06:23:05
```
This is the time counter in Month:Days:Hours:Mnutes:Seconds which starts upon power up.

```
Flow=0.00 Hz
```
The display will show the real time pulse frequency of the flow sensor input.

Alarm Conditions

All of the Alarm Conditions, when active, toggle back and forth between the two message states below.

Short Circuit Alarm

```
D1 Short
D2 A=0.500
```

```
Hold Opt to Clr
D2 A=0.500
```

- 2.0 Amp Trigger
- Shuts off and disables daughter board indefinitely.
- Motherboard LCD toggles alarm and instruction on how to re-enable the daughter board.
- Affected daughter board's alarm LED blinks on and off.

Thermal Alarm

```
D1 Thermal
D2 A=0.500
```

```
Hold Opt to Clr
D2 A=0.500
```

- Shuts off and disables daughter board indefinitely.
- Motherboard LCD toggles alarm and instruction on how to re-enable the daughter board.
- Affected daughter board's alarm LED blinks on and off.

High Current Alarm

```
D1 High Amp
D2 A=0.500
```

```
D1 A=1.100
D2 A=0.500
```

- Triggered when individual daughter board's load current is above 1.0 Amps for a minimum 10 seconds.
- 10 second timer is reset when below 1.0Amps.
- Does NOT shut off or disable daughter board.
- Motherboard LCD toggles alarm message and load current.
- Affected daughter board's alarm LED blinks on and off.

Phase Current Imbalance Alarm

```
D1L1 High Amp
D2 A=0.500
```

```
D1L1 A=0.750
D2 A=0.500
```

- Triggered when load current of one wire is 2x higher than the opposite wire for a minimum 20 seconds.
- 20 second timer is reset when load current of one wire is no longer 2x higher.
- Does NOT shut off or disable daughter board.
- Motherboard LCD toggles alarm message and load current.
- Affected daughter board's alarm LED blinks on and off.

> The display difference between the **High Current Alarm** and **Phase Current Imbalance Alarm** is subtle: Notice the two-character difference in the display on the first line:
> "D1" (High Current Alarm) vs. "D1L1" (Phase Imbalance).

Specifications

Fuse and Circuit Breaker
1.5A On/Off Switch/Circuit Breaker – Main Power Input
3.15A Fuse (Slow-Blow) – PCB Output

Controller
Input: 100–240 VAC, 50/60 Hz
Output: 36 VDC, 1.8A Maximum Total
Operating Temperature: -10°C to +60°C (14°F to 140°F)
Storage Temperature: -30°C to +65°C (-22°F to 149°F)

  Form Number 373-0717 Rev. C