



Managing The Nelson Irrigation TD200 TWIG System With Automation Control

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Introduction

Ctek offers packaged configurations specifically for use with Nelson Irrigation's TD200 TWIG systems. All configurations utilize Ctek's Automation Control application running on the Ctek Z4550 Industrial Control platform.

Applicability

This document is applicable to the following configurations of the Z4550 Industrial Control Platform:

- ZWI10001 – Industrial controller with TWIG configuration for DIN rail mounting in locations with no direct exposure to precipitation.
- RWI10001 – Industrial controller with TWIG configuration in a weatherproof NEMA 4X enclosure including AC power supply and internal antennas.

Ctek supports TWIG configurations on firmware release 7.00.04 or later.

More detailed operational information and technical specifications may be found in the standard documentation of the Z4550 Industrial Control Platform.

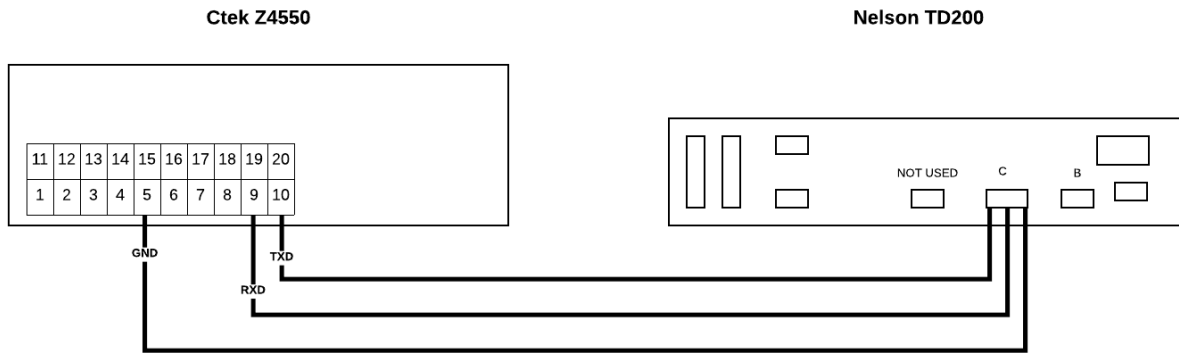
Data Connection.

The data connection between the Ctek Controller and the TWIG Irrigation controller is RS-232. Using the **RS232/RS485 Ports** screen located in the Interfaces section of the Ctek **Admin Facilities**, configure the RS-232 port as follows:

- 115200 bps
- 8 bit characters
- 1 stop bit
- No parity
- No flow control
- Service type: None

Once you have properly configured the RS-232 port it is necessary to restart the Ctek Controller.

Wiring Diagram



Ctek RS-232 Configuration

- **Bit Rate:** 115200
- **Stop Bits:** 1
- **Parity:** None

Configuring System Parameters

When installing the Ctek controller, there are a number of system level configuration options to consider. These options will be found on the **Device Profile** screen of the Ctek Administrative Facilities. Items to consider:

- **Location Name** – This will become the identity of this particular device. Location Name will be presented in alarm messages, cloud display, and various other areas.
- **Alarming Status** – If you plan to send alarm messages, turn this on. You may choose to send alarms using SMS, email or both by setting **Delivery Method** as required.
- **Alarm Groups** – If you are going to send alarms, you must define destinations here. This can include a phone number for SMS alarms or an email address for email alarms. You may configure multiple groups to meet your requirements.
- **Logging** – If you require history or if you plan to use the graphing facilities of the onboard dashboard interface, logging must be enabled. Event Log is a simple event logging format while System Log is a more detailed format that supports the graphing features of the dashboard. In the logging configuration, you can define how much logging history to keep and you can choose to have the Ctek controller email logs to you on a defined schedule. Logs are emailed in a csv format that can be processed by Excel.
- **Dashboard Groups** – If you will be using the dashboard facilities of the Ctek controller, you can divide your dashboard into groups. In the TWIG configuration, three typical groups have been pre-defined. You may choose to use these or rename them to meet your requirements. You may add other groups as required.

Configuring TWIG Valves (Outputs)

Control of TWIG valves is managed by Ctek's Automation Control application. From the Ctek Administrative Facilities, select **Applications** and then select **Automation Configuration**. You will find 128 basic TWIG valve definitions defined under **Outputs**. Since TWIG valves are either on or off, they are defined as digital outputs within Automation Control.

Addressing a valve - To enable a valve, select the **Digital** button associated with that valve. Select the **Destination** parameter and proceed to select **TWIG Protocol**. Selecting TWIG Protocol will cause an **Address** window to appear to the right. Enter the address of the TWIG valve to be controlled as shown in the following example.

Digital Numeric Hex

Digital Output Destination

Destination:

Address:

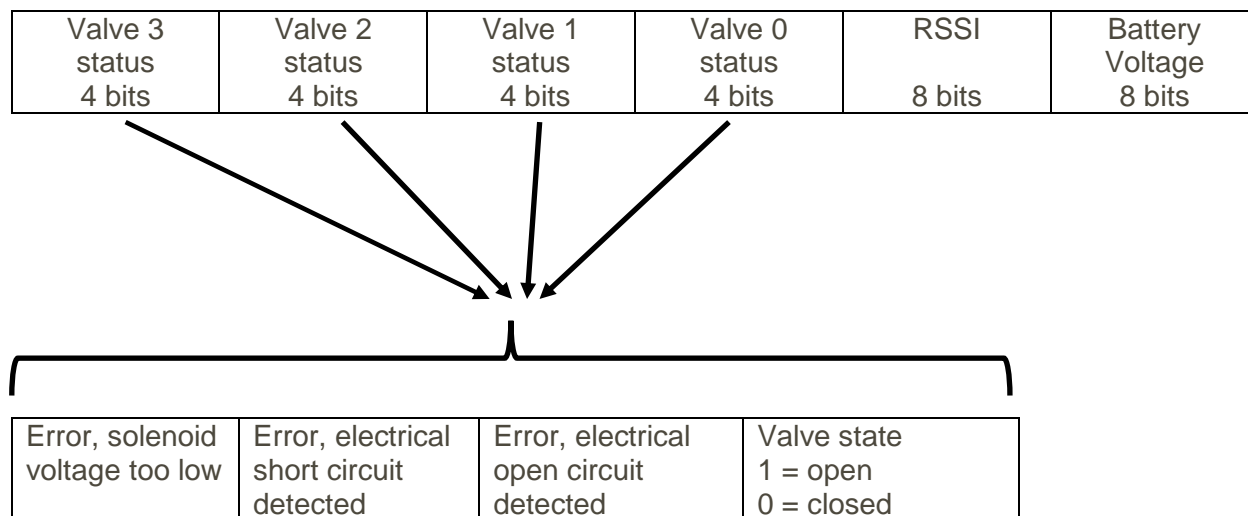
Other options to consider:

- Logging - If you would like to log all state changes, enable logging under the Log parameter.
- Shutoff Timer – If you want to enforce a maximum run time beyond those defined in a schedule, enter a value in the Shutoff Timer field. Please note that the value indicates seconds.
- Dashboard Display – If you want to create a manual control button on the dashboard, select the appropriate group under Dashboard Group and the button will be created. If you do not see an appropriate group name, you may create a new group as defined under System Level Configuration.
- Cloud Display – If you want to display the status of the valve on SkyCloud, select the appropriate group under SkyCloud.
- Phone Display – If you are using the Ctek phone app, and wish to display and/or control this valve from your phone, enable it under Phone Display.

NOTE: Once you have made changes to valve configurations, you must go back to the Automation Configuration screen and select **Run Configuration**. This will activate all configuration changes that were made.

Configuring TWIG Controllers (Inputs)

The status of TWIG valves is managed by Ctek's Automation Control application. From the Ctek Administrative Facilities, select **Applications** and then select **Automation Configuration**. You will find 40 TWIG controllers defined under **Inputs**. Since TWIG controllers generate status values, they are defined as hex inputs within Automation Control. Each hex input is a 32 bit word representing battery voltage and signal level (RSSI) of the controller as well as the status of up to 4 valves per controller. The format of the 32 bit status word is shown in the following diagram.



Addressing a controller - To enable a controller, select the **Hex** button associated with that controller. Select the **Input Source** parameter and scroll down to select **TWIG Protocol**. Selecting TWIG Protocol will cause an **Address** window and a **Poll Rate** window to appear below. Enter the address of the TWIG controller to be read as shown in the following example and enter the desired poll rate in seconds.

Digital
Numeric
Hex

Hex Input Source

Input Source:

TWIG Protocol ▼

Address:

D009840

Poll Rate:

60

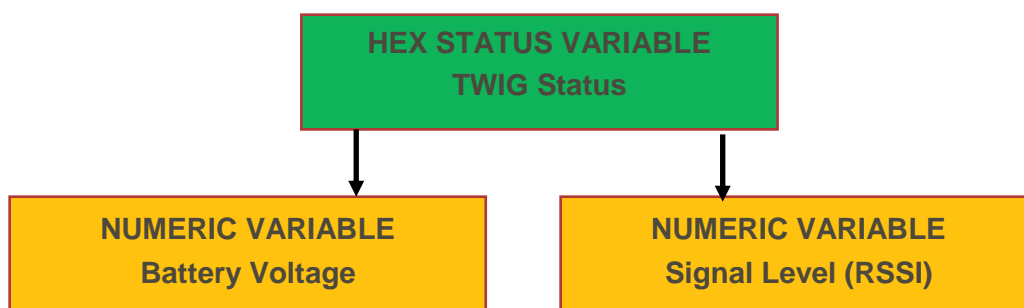
Other options to consider:

- Dashboard Display – If you want to display this value on the dashboard, select the appropriate group under Dashboard Group and the button will be created. If you do not see an appropriate group name, you may create a new group as defined under System Level Configuration.
- Cloud Display – If you want to display the status of the valve on SkyCloud, select the appropriate group under SkyCloud.
- Phone Display – If you are using the Ctek phone app, and wish to display this valve from your phone, enable it under Phone Display.
- Alarms – Critical values, such as the various valve errors, are ideal candidates for alarms. You may set thresholds that will monitor any or all of these bits and trigger a text message or email alarm.

NOTE: Once you have made changes to valve configurations, you must go back to the Automation Configuration screen and select **Run Configuration**. This will activate all configuration changes that were made.

Preconfigured TWIG Status Variables (Inputs)

For each hex status variable associated with a TWIG controller, two numeric values have been configured to extract values from the hex status variable. One of the numeric values presented is battery voltage and the other is signal level (RSSI). The standard TWIG configuration includes formulas that convert the binary value received from the TWIG controller into meaningful, human readable values. Formulas may be reviewed and modified on the **Formulas** screen of Automation Configuration.



As with other variables, you can choose to enable:

- Logging - If you would like to log these values, enable logging under the Log parameter. Please note that analog values such as these, are best logged on a time basis instead of on value change. Typically, it is sufficient to monitor values such as these in hourly intervals. When entering time in the Log parameter, values are interpreted in seconds.

- Dashboard Display – If you want to display this value on the dashboard, select the appropriate group under Dashboard Group and the button will be created. If you do not see an appropriate group name, you may create a new group as defined under System Level Configuration.
- Cloud Display – If you want to display the status of the valve on SkyCloud, select the appropriate group under SkyCloud.
- Phone Display – If you are using the Ctek phone app, and wish to display this valve from your phone, enable it under Phone Display.
- Alarms – Critical values like these are ideal candidates for alarms. For any variable, thresholds may be set that will trigger a text message or email alarm.

The Dashboard

As mentioned in previous sections, any input or output can be presented on the dashboard of the Ctek Industrial Control Platform. The following is an example of the dashboard that is automatically generated when both the inputs and outputs associated with a 4 valve TWIG controller are configured to display on the dashboard.

The screenshot displays the Ctek Series 4550 SkyRouter Automation Dashboard. The interface includes a header with the Ctek logo and 'Series 4550 SkyRouter'. Below the header, there are navigation tabs for 'Engineering Demo' and 'Automation Dashboard'. The main content area shows 'Location: Engineering Demo', 'Time: Wed Feb 6 09:26:54 2019', and 'System Errors:0'. A 'Data Groups' dropdown menu is set to 'TWIG Test'. Below this, there are tabs for 'Details', 'Overview', 'Analysis', and a checked 'Refresh' button. The central display area, titled 'TWIG Test', contains five data points: 'TWIG 0' (421E), 'TWIG Voltage' (3.00 Vdc), 'TWIG RSSI' (-30.02 dBm), 'TWIG 1' (Off), 'TWIG 2' (Off), 'TWIG 3' (Off), and 'TWIG 4' (Off). At the bottom of the dashboard, there are 'Refresh' and 'Back' buttons, and a footer with the text 'Ctek Automation & Wireless Solutions © Ctek 2019'.

Scheduling and Control

With the standard configurations defined in this document, three methods are provided for scheduling and control of the associated network of TWIG controllers and valves:

- Manual Control – Using a web browser or phone app, valves may be manually turned on and off. As mentioned in the previous section on valve control, it may be advisable to set a maximum run time on outputs that are being manually controlled to eliminate situations where a valve is inadvertently left on.
- Onboard Scheduling – Ctek’s Automation Control application provides a screen for creating and maintaining onboard schedules. Please see the screen example below.
- Remote Schedule Upload – Ctek’s Automation Control application provides facilities for accepting schedule uploads from a remote server. Please see Ctek Technical Note TN045 for more detail.

The screenshot displays the 'Automation Control Schedule' interface for a Ctek Series 4550 SkyRouter. The interface is titled 'Current Weekly Schedule' and shows a weekly schedule for various days. A modal window is open over the Thursday entry, showing details for a schedule event.

Day	Time Range	Control Device	Start Time	Duration
Sunday	0:00 AM - 0:55 AM	AJ Camera		
Monday	3:30 PM - 4:15 PM	Sill Pump	03:30 PM	45
Tuesday	1:58 AM - 2:48 AM			
Wednesday				
Thursday	0:00 AM - 0:15 AM			
Friday				
Saturday				

Modal Window Details:

- Control Device: Sill Pump
- Start Time: 03:30 PM
- Duration: 45
- Buttons: Cancel, Save

Footer: Ctek Automation & Wireless Solutions © Ctek 2019