

NEW!



Announcing the release of the *Tempest 2.0*

Liquid Polymer Feed and Control System

Innovative Improvements Developed From
Customer Feedback

We Listened. We Worked. We Tested.



Tempest

Liquid Polymer Feed System

2.0





NEW!



“This new design integrates leading edge control technologies, expanded application capabilities , greater available I/O and seamless access to any Cloud Based Data Acquisition System.”

- Tempest 2.0 Development Team Leader

- Municipal Wastewater
- Chemical Processing
- HPI / Refining
- Primary Metals
- Power Generation
- Drinking Water
- Automotive
- Food & Beverage
- Aerospace
- Mining
- Paper Making
- Hydrocarbon Refining
- Textiles
- Agricultural
- Grey Water
- Transportation
- Health Care Facilities
- Electronics
- Pharmaceuticals
- Recreational Waters
- Light Manufacturing
- Oil Field
- Transportation



PROVEN PERFORMANCE

The Tempest Polymer Feed System has gained widespread acceptance over the past eight years.

These systems have improved results and lowered costs across a broad range of industries and municipalities.

The design has been proven to be an economical solution to the numerous challenges encountered in polymer applications in dozens of solids separation applications.

PROVEN PERFORMANCE

Our original design features have enabled the Tempest core technology to prove itself in hundreds of applications.

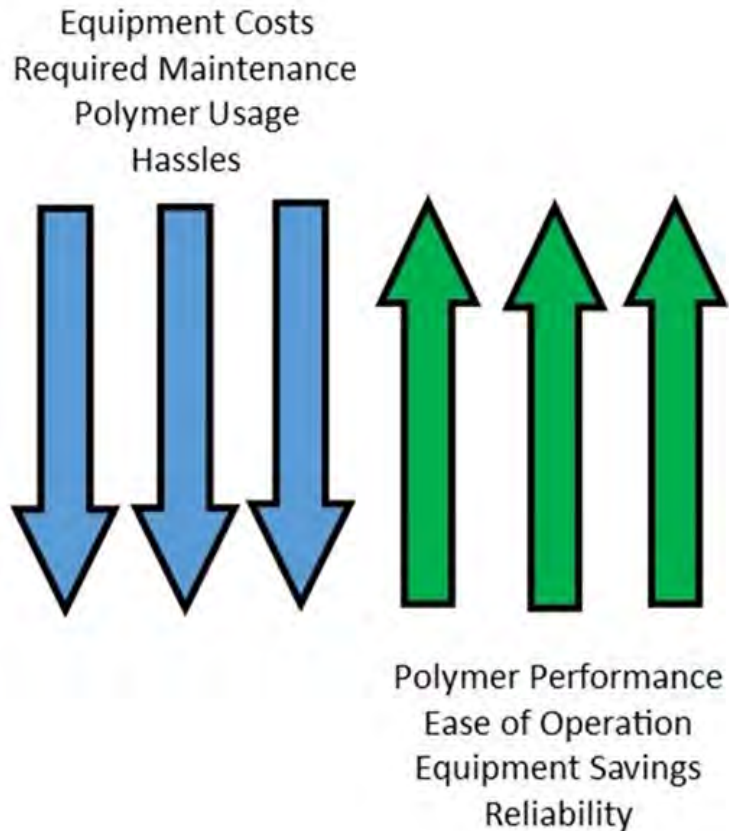
- Motorless, Multi-Stage Mixing
- Hydro-Kinetic Disperser
- EZ View Mixing Chamber
- Choice of Pump Type
- Choice of Pump Manufacturer
- Touch Pad Microprocessor
- Polymer Paced to Water Flow
- Remote Set-Point Control
- Easy Access and Serviceability
- Local and Remote Operation
- Water Flow Readout
- Concentration Set-Point
- Remote 4-20 mA Control
- Feed Rate Calibration
- Adjustable Flushing Cycle
- On-Board Post Dilution
- High/ Low Solution Limiters
- Rugged SS Construction



Tempest 1.0

IT WORKS! CUSTOMER BENEFITS

Our customers have experienced real measurable benefits from our original design features such as:



- Simple to Install and Operate
- Economical
- Rapid Delivery
- Optimized Polymer Performance
- Zero Plugging
- Minimized Polymer Waste
- Low Maintenance
- Broad Application Range
- Flexible Controls
- Start Up Assistance
- Trial Units Available
- Reduced Polymer Usage
- Customizable
- XP Option
- Batch System Option
- Installation Services

OUR CUSTOMERS PROVIDED FEEDBACK

WE LISTENED

NEW DESIGN BASIS

Many of our customers responded to our request for their opinions and suggestions for future Tempest versions. We incorporated their feedback in the Basis of Design for the Tempest 2.0. Here's what they asked for:

- Improved Manual and Operating Instructions
- Enhanced Programming Options
- Add the Ability to Customize the Controls Specific to Applications
Example: Batch Systems
- Include a Duplex Pump Option
- Expand the Control Capabilities and Available I/O

There's more . . .



OUR CUSTOMERS PROVIDED FEEDBACK

WE LISTENED

NEW DESIGN BASIS

- Add Communication / Remote Access with a Versatile Protocol Bundle
- Add Datalogging and On-Screen Graphing
- Include a Batch Tank System Programming Option
- Include Tank Level Monitoring Option
- Provide the Option to Allow for Process Signal Integration and Automated Dilution Water Flow Control to Optimize Dosing and Concentration.



WE WORKED

PRODUCT DEVELOPMENT

Our priority enhancement was the development of a new, State of the Art System Controller.

Purpose built and configured specifically for the management of polymer feed applications and the challenges our customers face each day.

The Tempest 2.0 offers an industry leading platform of data acquisition and connectivity to enable a new level of convergence of technical and commercial optimization.



State-Of-The-Art T2 CONTROLLER

- Simpler Programming Via Superior Menu Navigation
- Greatly Expandable I/O – Customize to Application
- On-Board Digital Manual
- On-Screen Digital Wiring Diagram for each I/O
- On-Screen Graphing – Can be Referenced by User
- One Minute Frequency Data Logging – 90 Days Includes SD Card Easily Transferred to PC



State-Of-The-Art T2 CONTROLLER

- Remote Direct Connect with Advanced Diagnostic Capability
- Versatile Communications Protocols
- On Screen Data Logging
- Cloud Based Remote Monitoring – Any Portal
- Critical Performance Data Collection
- Integrated Batch Tank Program
- Rapid Availability – In Stock



T2 Controller

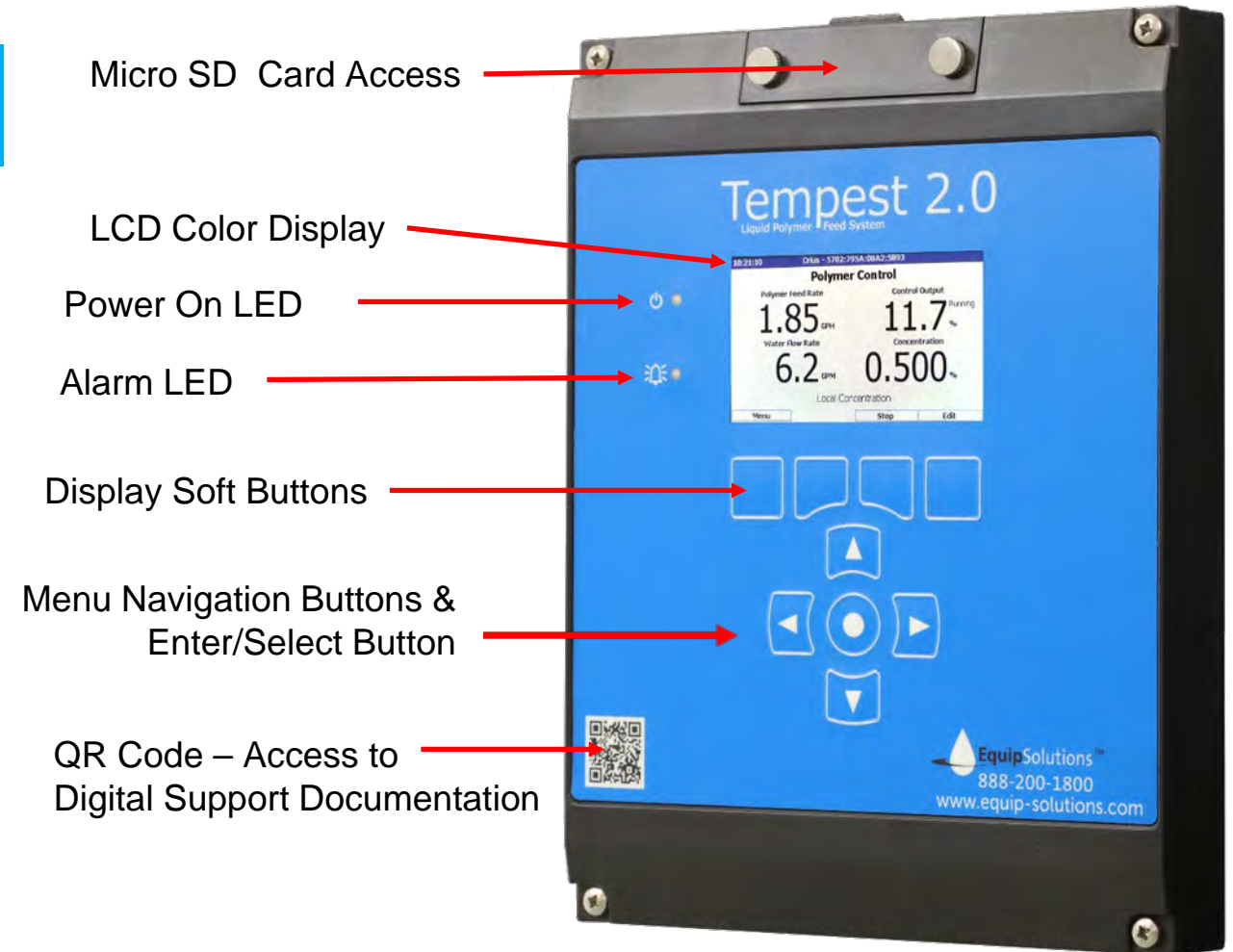
INTUITIVE NAVIGATION

When the Tempest 2.0 is powered on, the Polymer Control Home screen is the analyzer default.

This screen displays the Polymer Feed Rate of the neat Polymer Pump (in GPH), the Control Output (% mA Output to the Polymer Pump), the Water Flow Rate (in GPM), and the Percent Concentration.

Below the parameters indicate whether the Tempest 2.0 is in Local or Remote mode of operation

At the bottom of the Home Screen, three (3) choices are available including Menu, Start/Stop (when in Local control mode) and Edit (used to program mode of operation). Selection of any bottom menu button is chosen using the adjacent Display Soft Button directly below the indicator.



T2 Controller

STANDARD INPUTS & OUTPUTS

Two (2) 4-20mA Inputs

- Flow Meter
- Remote % Concentration/ Rate Input

Eight (8) Digital Inputs

- Remote Start/Stop
- Polymer Pump Alarm
- Two (2) Batch Control
- Four (4) Spares

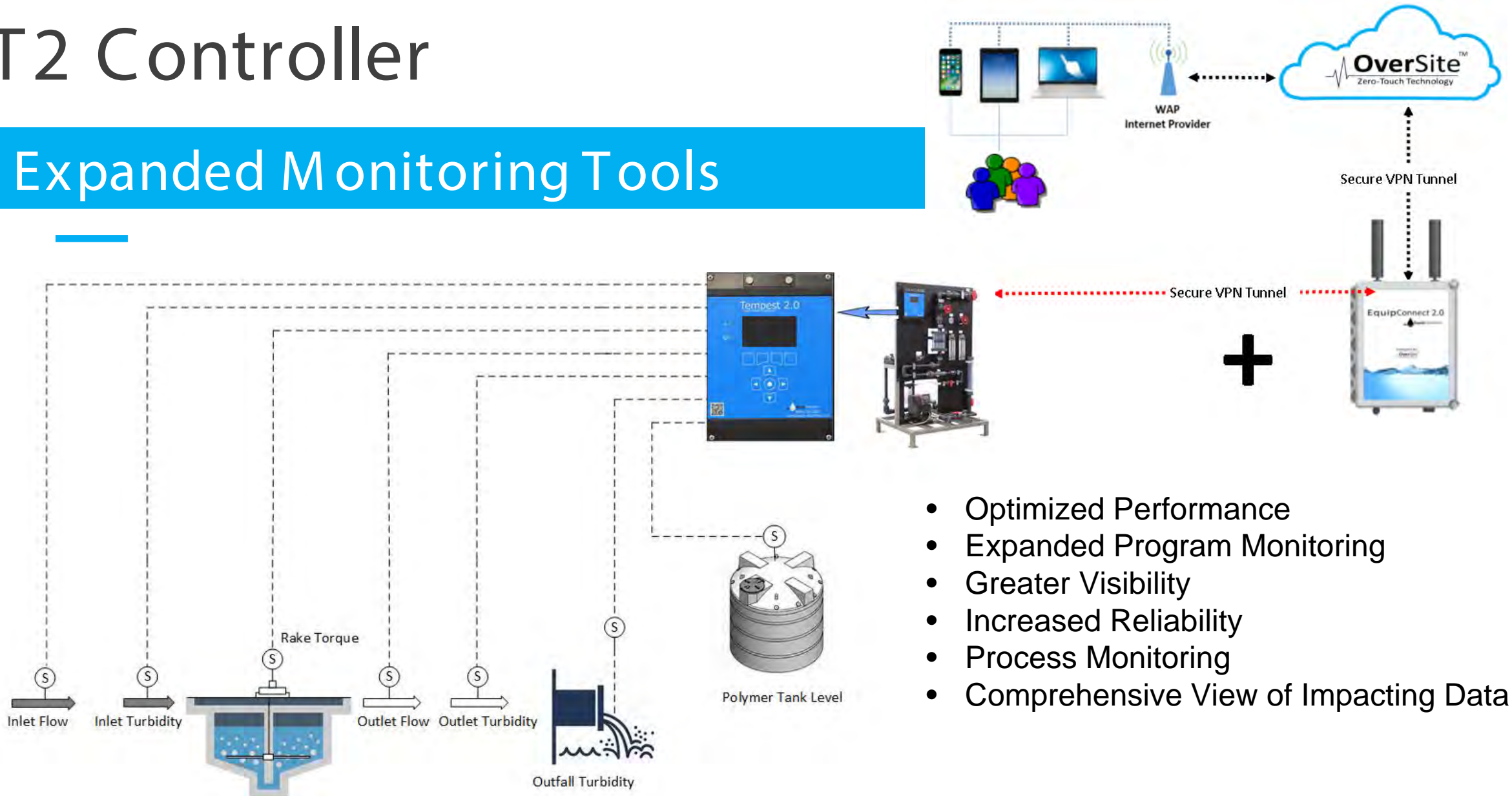
One (1) 4-20mA Output for Pump Control

- Eight (8) Relay Outputs
- One for Solenoid
- One for General Alarm
- Six (6) Spares



T2 Controller

Expanded Monitoring Tools



- Optimized Performance
- Expanded Program Monitoring
- Greater Visibility
- Increased Reliability
- Process Monitoring
- Comprehensive View of Impacting Data

T2 Controller

LEVEL 2 – More I/O and Comms

Optimize Each Application

Level 2: Options Include:

- Two (2) Additional Analog/Sensor Inputs
- Three (3) Additional Analog Outputs
- Communications Options
 - Modbus TCP Comms over LAN (Ethernet)
 - Modbus ASCII/RTU (RS485)
 - Profibus DPV1
 - Cellular – EquipConnect 2.0



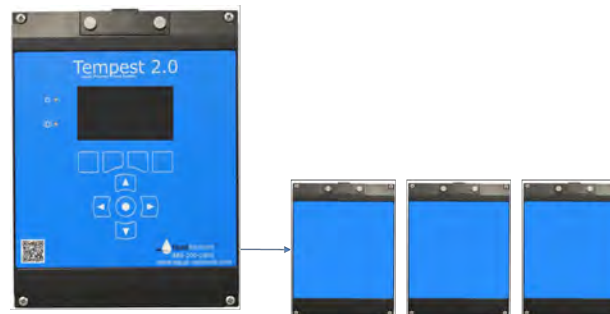
T2 Controller

LEVEL 3 EXPANSION I/O MODULES*

Expansion allows the incorporation of multiple parameter monitoring such as flow, pH, turbidity, suspended solids, temperature, chemical flow, chemical usage, alarms and tank level monitoring.

Expansion Modules May Include Any Combination of the Following:

- Four (4) Analog/Sensor Inputs
- Four (4) Analog Outputs
- Eight (8) Digital Inputs
- Eight (8) Digital (Relay) Outputs
- Three (3) Communication Options



* Can Incorporate Three Complete Expansion Modules

T2 Controller I/O Overview

Standard I/O Options Include

AI 4-20mA Remote % Concentration / Rate Input

DI Remote Start/Stop

DI Polymer Pump Alarm

DI Two Batch Control

DI Four Spares

AI 4-20mA Flow Meter Dilution Water

AO 4-20mA Output for Pump Control

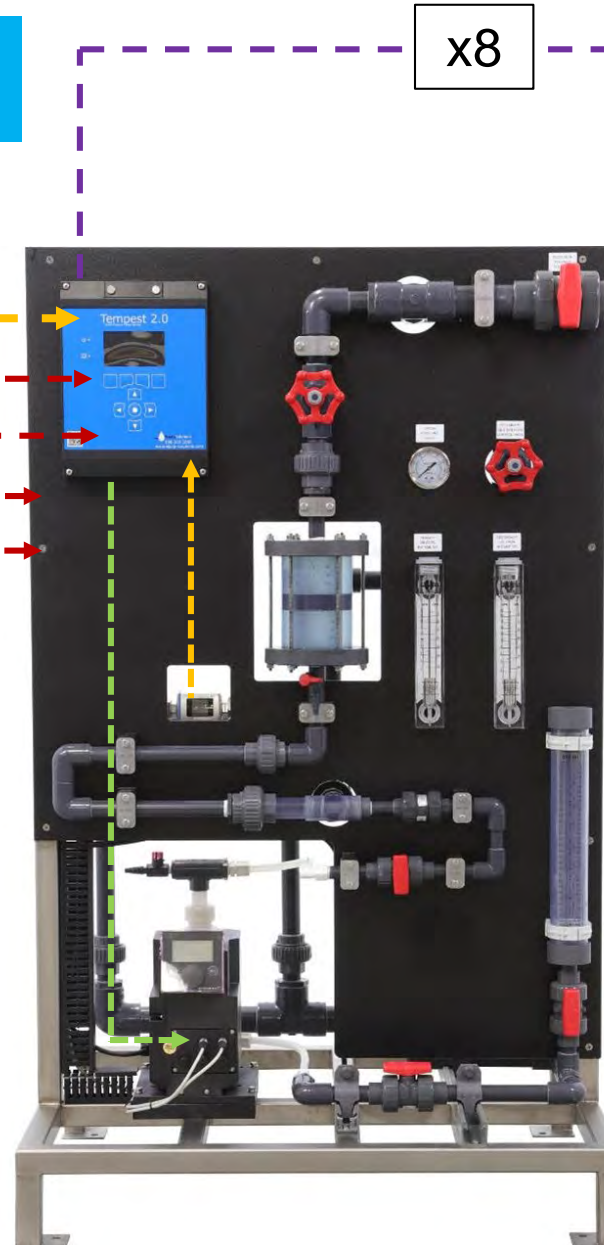
Eight (8) Relay Outputs

Level 2 Additional I/O Options Include:

Two (2) Additional Analog/Sensor Inputs

Three (3) Additional Analog Outputs

Communication Options



Level 3 Expansion Modules*

- Four (4) Analog/Sensor Inputs
- Four (4) Analog Outputs
- Eight (8) Digital Inputs
- Eight (8) Digital (Relay) Outputs
- Three (3) Communication Options

* Can Incorporate Three Complete Expansion Modules

T2 Controller

VERSATILE COMMS

- Modbus TCP Comms over LAN (Ethernet)
- Modbus ASCII/RTU (RS485)
- Profibus DPV1
- Cellular – EquipConnect 2.0
- Integrated Option for Digital Portal & Data Acquisition System – Agnostic & Cloud Based



T2 Controller

INTEGRATED DIGITAL PORTAL



Tempest 2.0 includes an integrated option for access to Any Digital Portal & Data Acquisition System.

We can provide our OverSite™ device agnostic, cloud-based data acquisition and process management portal or facilitate the on-boarding to any Third-Party Portal.

T2 Controller

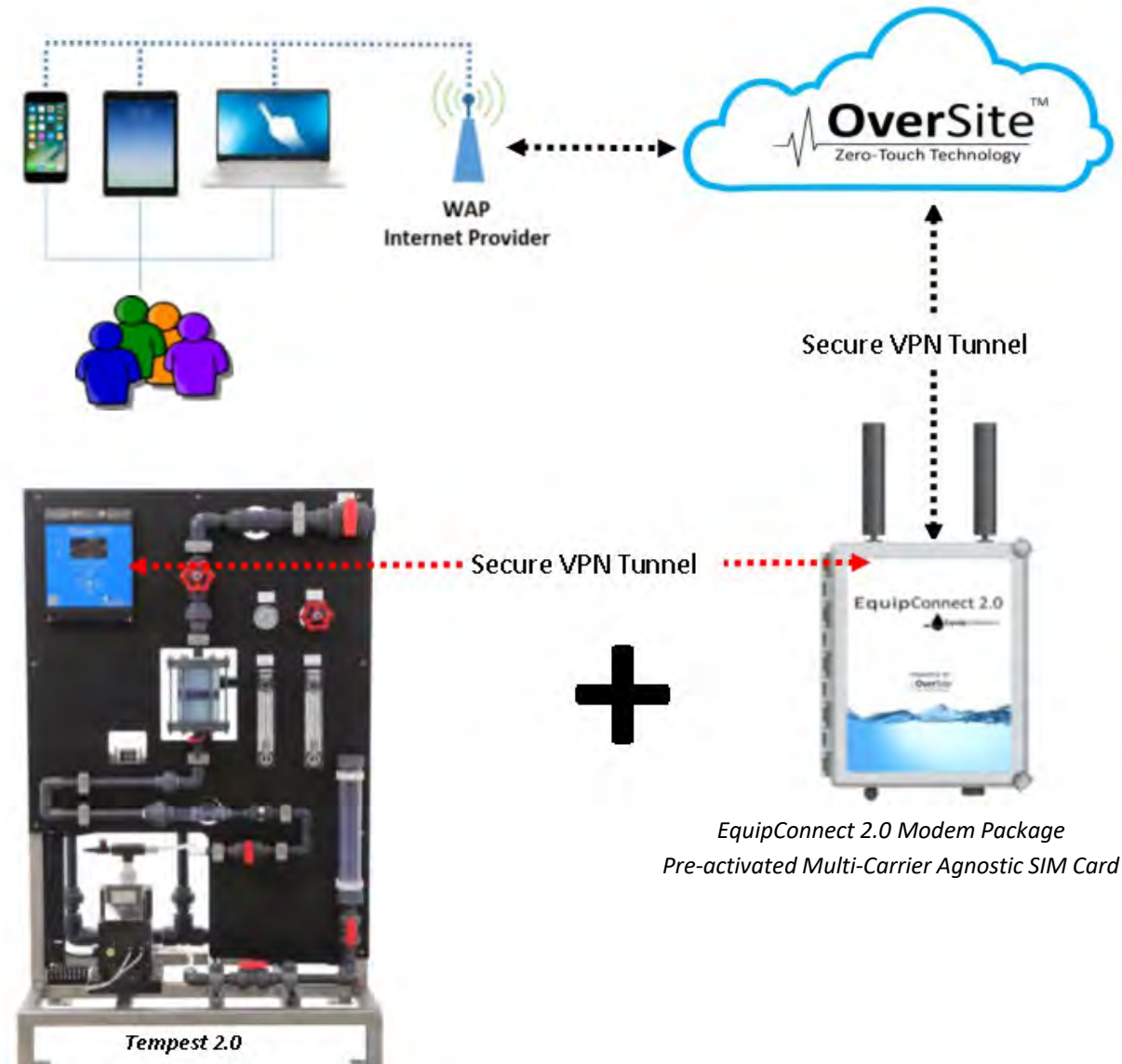
INTEGRATED DIGITAL PORTAL

OverSite™ is a device agnostic, cloud-based data acquisition and process management portal. Users can log on to the highly secure website from anywhere in the world, to view, store and manipulate all of their process data and critical parameters

Our Zero Touch Technology makes onboarding easy, as a true Cloud Solution, it can be commissioned, ran and supported remotely.

This enables EquipSolutions to onboard new clients to our OverSite™ portal or any third-party portal remotely without any hassle. Our analysts can gather all of the information needed to build a client profile remotely.

We can enter application data and establish site parameters for the tempest 2.0 or any other third-party end point devices without having to be onsite.



T2 Modes of Operation

Standard

- Local % Concentration
- Local Neat Polymer Feed Rate
- Remote % Concentration
- Remote Neat Polymer Feed Rate
- Batch Tank Operation - New
- Remote Start/Stop

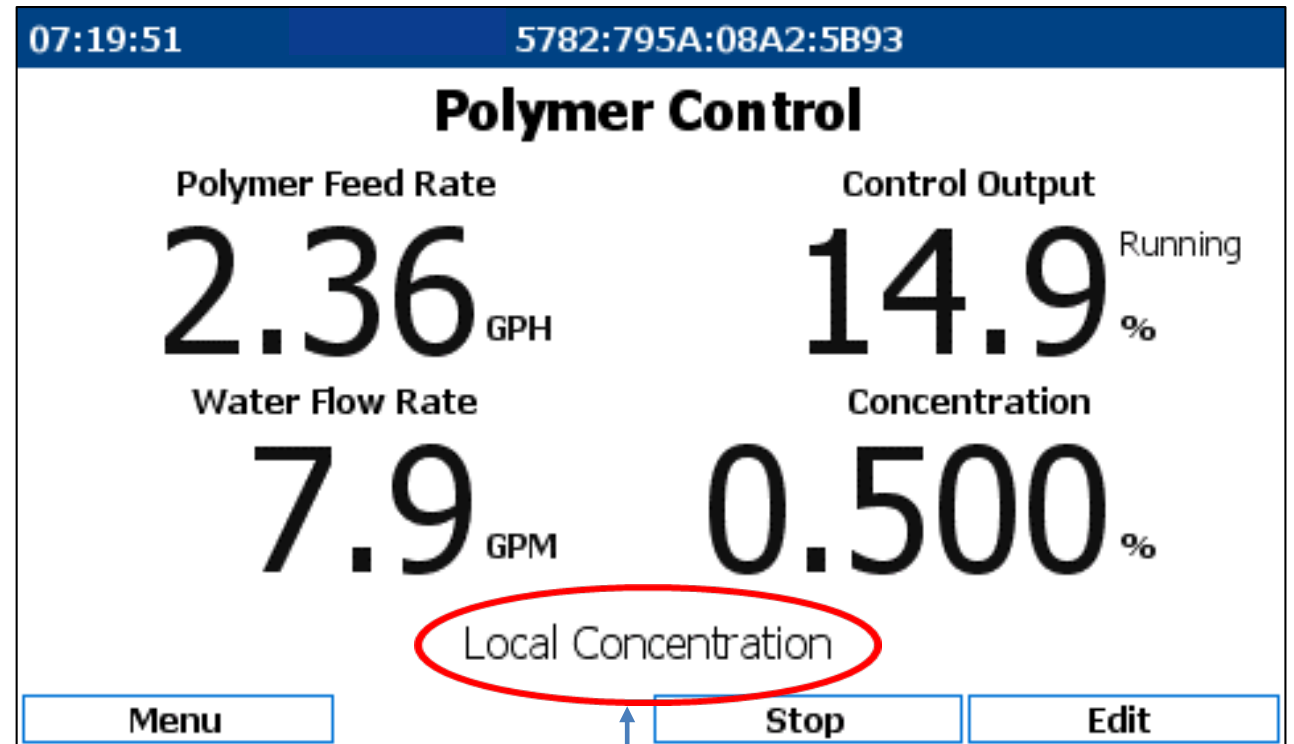


T2 Controller HOME SCREEN

MAIN OPERATING PARAMETERS

When the Tempest 2.0 is powered on, the Polymer Control Home screen is the analyzer default.

This screen displays the Polymer Feed Rate of the neat Polymer Pump (in GPH), the Control Output (% mA Output to the Polymer Pump), the Water Flow Rate (in GPM), Percent Concentration and the Program Mode

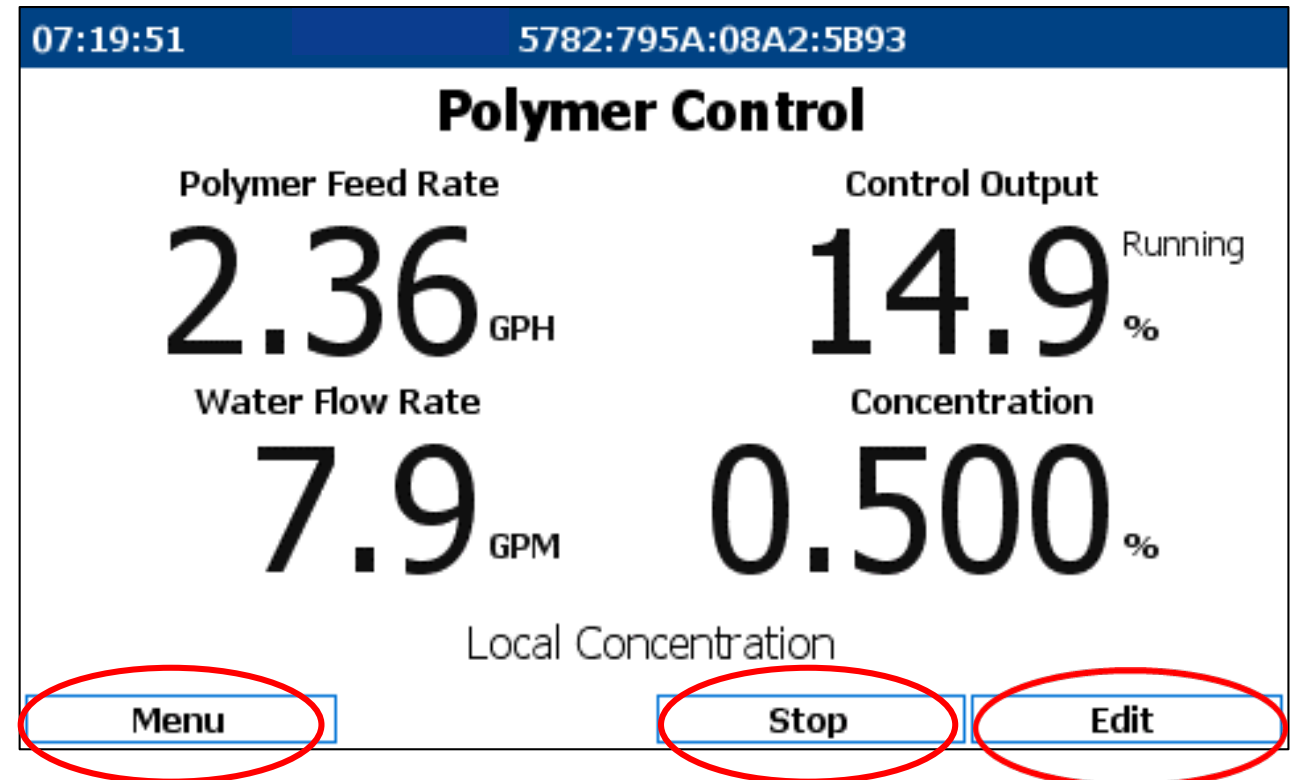


T2 Controller HOME SCREEN

MAIN OPERATING PARAMETERS

Below the parameters indicate whether the Tempest 2.0 is in Local or Remote mode of operation

At the bottom of the Home Screen, three (3) choices are available including **Menu**, **Start/Stop** (when in Local control mode) and **Edit** (used to program mode of operation).



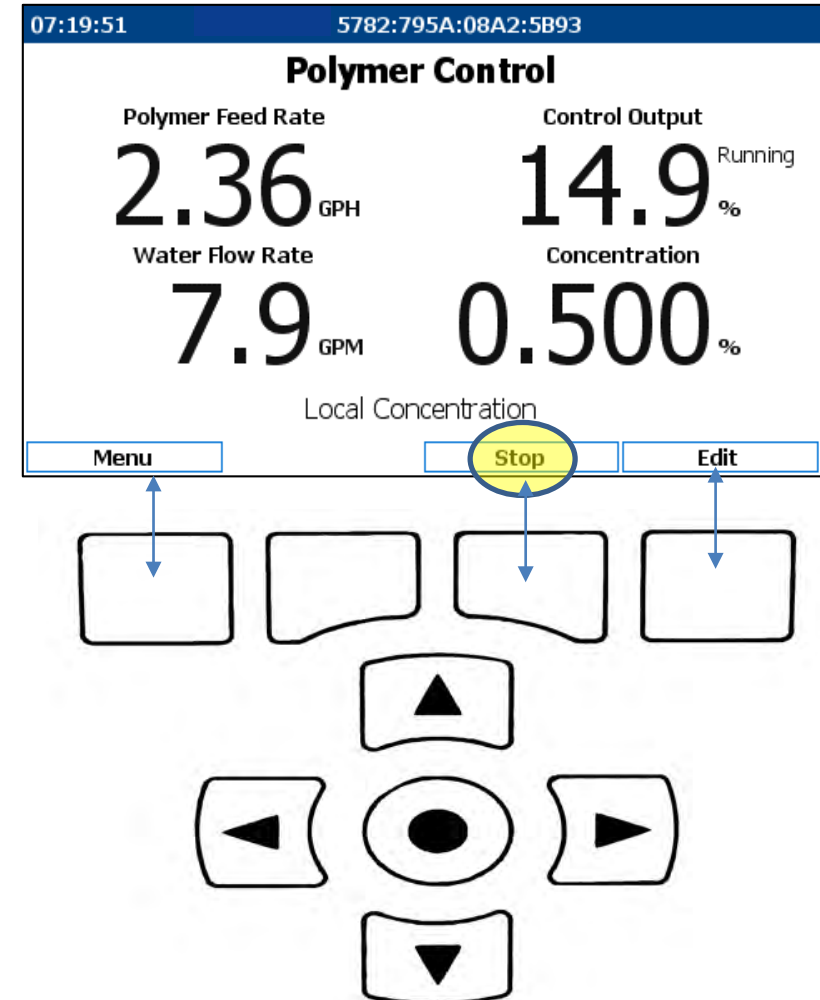
T2 Controller HOME SCREEN

MAIN OPERATING PARAMETERS

Selection of any bottom menu button is chosen using the adjacent Display Soft Button directly below the indicator.

To initiate Tempest 2.0 Polymer System, press the **Start Button** adjacent to the Start indicator.

To Stop the system Press the **Stop Button** adjacent to the display indicator.



T2 Controller MENU SCREEN

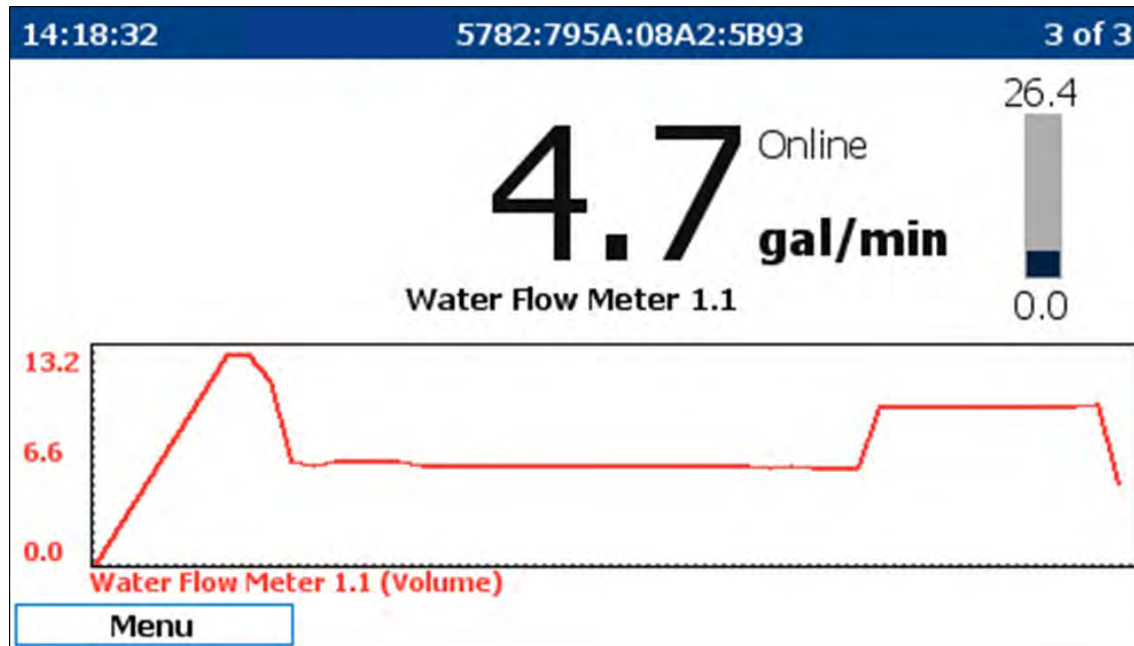
DETAILED OPERATIONS



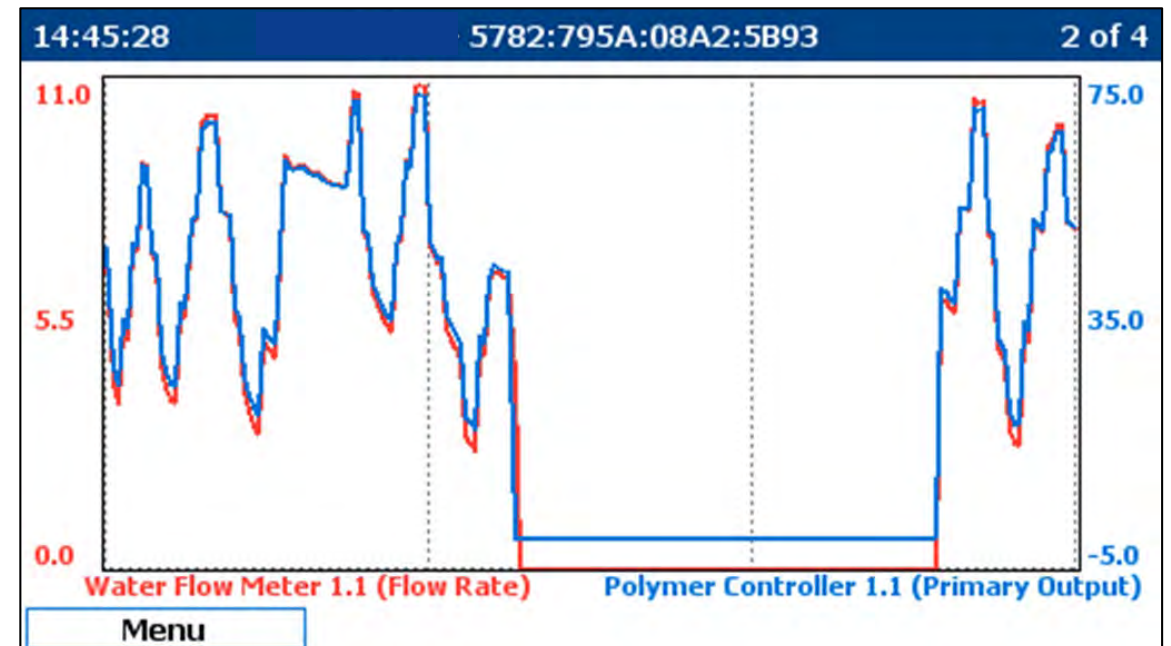
09:14:02		5782:795A:08A2:5B93	
Analyzer 5782:795A:08A2:5B93 Mon May 11 09:14:02 2020	Logs Last backup: None 	Water Flow Meter 1.1 6.8 ^{Online} GPM	
Remote Set Point 1.2 0.0 ^{Online} %	Remote Start-Stop 1.1 Input : Off Polarity : N.O. Alarm : Disabled	Polymer Pump Alarm 1.2 Input : Off Polarity : N.O. Alarm : Enabled	
Polymer Pump % 1.8 12.8 ^{6.1mA} % Control Output	Solenoid Valve Relay 1.8 Mode : Device Polarity : N.O. State : On	Polymer Controller 1.1 12.8 ^{Running} % Local Concentration	
Home		Show	

T2 Controller GRAPHIC DISPLAYS

MULTIPLE PARAMETERS



SINGLE PARAMETER



MULTIPLE PARAMETERS

T2 Controller GRAPHIC DISPLAYS

DATA LOG

14:42:52 5782:795A:08A2:5B93

New Data Log3

ID	Time	Water Flow Meter 1.1 (Flow Rate) [1/1]
18	2020-09-14 14:42:00	7.6
17	2020-09-14 14:41:00	9.8
16	2020-09-14 14:40:00	9.8
15	2020-09-14 14:39:00	9.4
14	2020-09-14 14:38:00	9.3
13	2020-09-14 14:37:00	7.4
12	2020-09-14 14:36:00	7.5
11	2020-09-14 14:35:00	7.7
10	2020-09-14 14:34:00	5.0
9	2020-09-14 14:33:00	5.2
8	2020-09-14 14:32:00	2.7
7	2020-09-14 14:31:00	2.8

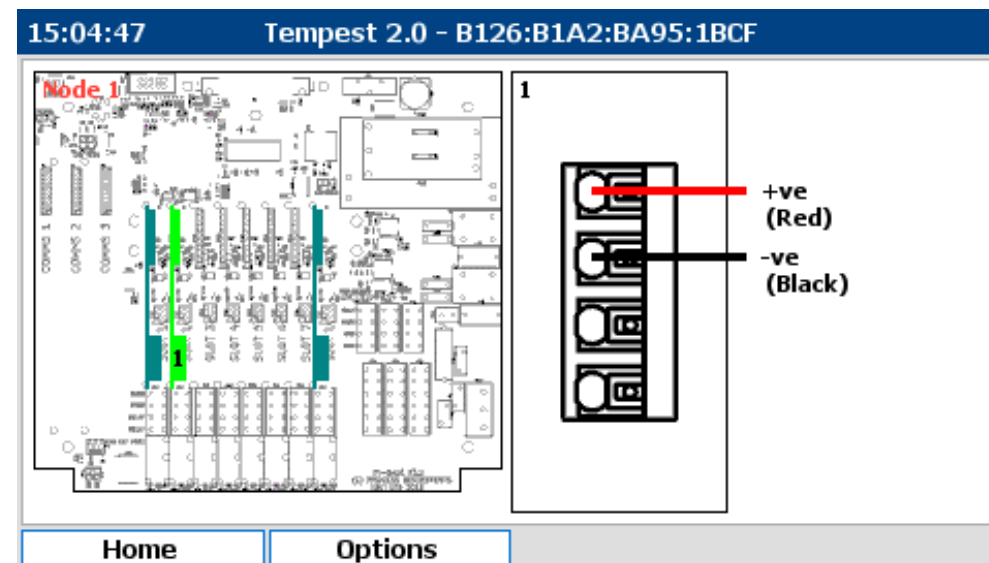
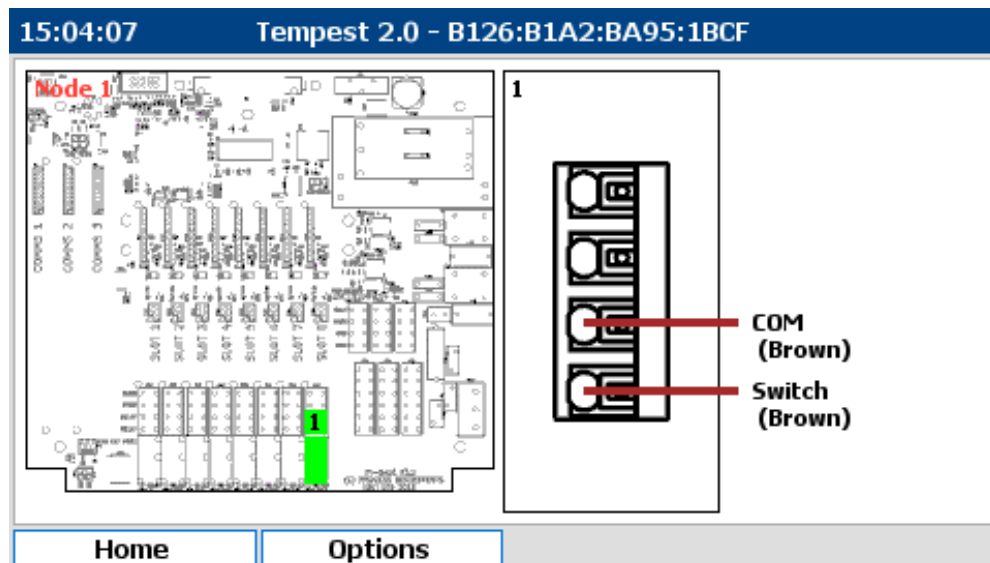
Home Graph Overview Download

T2 Controller GRAPHIC DISPLAYS

On Board Wiring Diagrams

The T2 Controller has the wiring diagrams embedded for easy, on-screen viewing reference during start up , service or troubleshooting making these functions less hassle than ever before.

Our forward-thinking customers requested that the input/output card location and wire terminations on the main board be shown on these diagrams.





T2 Controller

MODES OF OPERATION

- Local % Concentration
- Local Neat Polymer Feed Rate
- Remote % Concentration
- Remote Neat Polymer Feed Rate
- Batch Tank Operation
- Remote Start/Stop

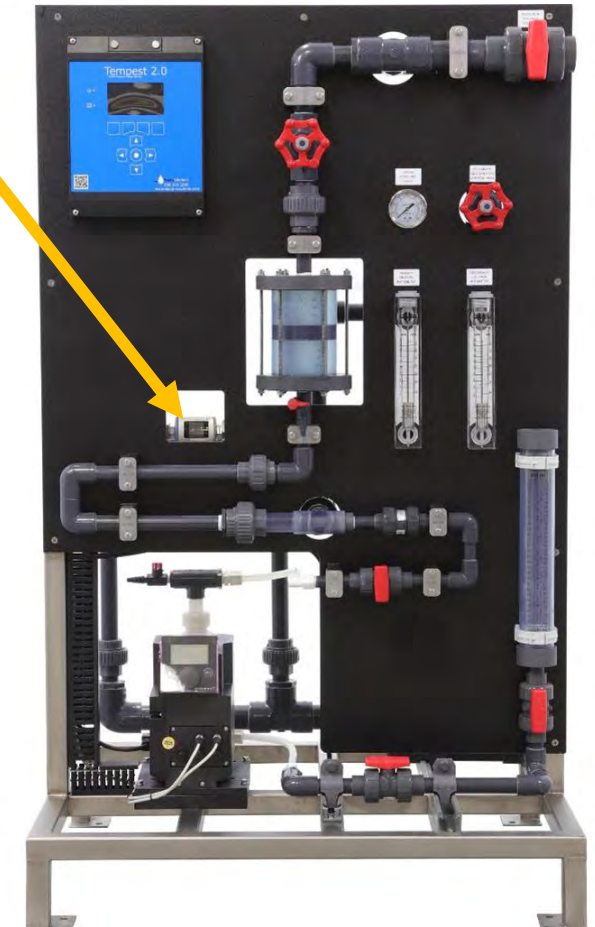
UPGRADED FLOW SENSOR

MAG FLOW METER



Endress & Hauser Electromagnetic Flow Meter

- Crisp Color Display – Rate, Totalizer and Alarms
- Two Selectable Outputs – 4-20mA, Pulse/Switch
- Full Range of Tempest Units
- Self Diagnostics
- Data Logging
- Bluetooth or I/O Link Communications
- Plug & Play



POLYMER METERING PUMPS

GRUNDOS DDA SERIES

The SMART Digital DDA is a compact positive displacement, diaphragm dosing pump with variable-speed drive (stepper motor) and intelligent control electronics with minimum energy consumption.

The SMART Digital Dosing series operates at full stroke length to ensure optimum accuracy, priming and suction for high-viscosity polymers.

The click wheel and the multi-colored backlit graphical, plain-text LC display make commissioning and operation intuitive. The control elements are protected by a transparent cover.



POLYMER METERING PUMPS

GRUNDOS DDA SERIES

The standard Tempest 2.0 series offers a neat polymer feed range of .5 – 15.8 gph.

All Tempest pumps have spring loaded checks and a PVDF head for maximum compatibility.

Pumps have a turn-down of 1000:1 and can handle very high viscosities via the slow mode feature.



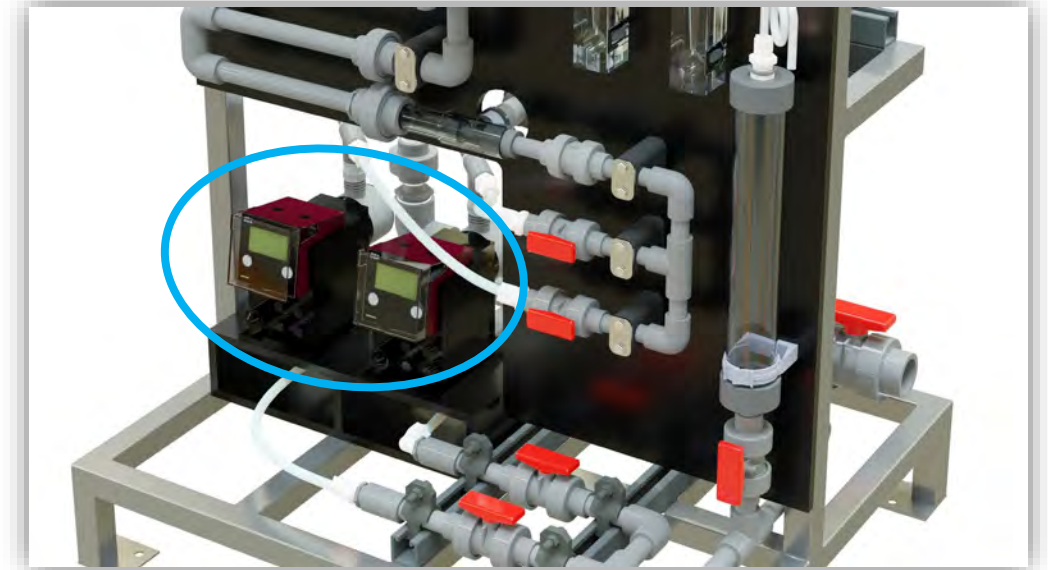
POLYMER METERING PUMPS

GRUNDOS DDA SERIES

Duty / Standby Duplex Pump Option

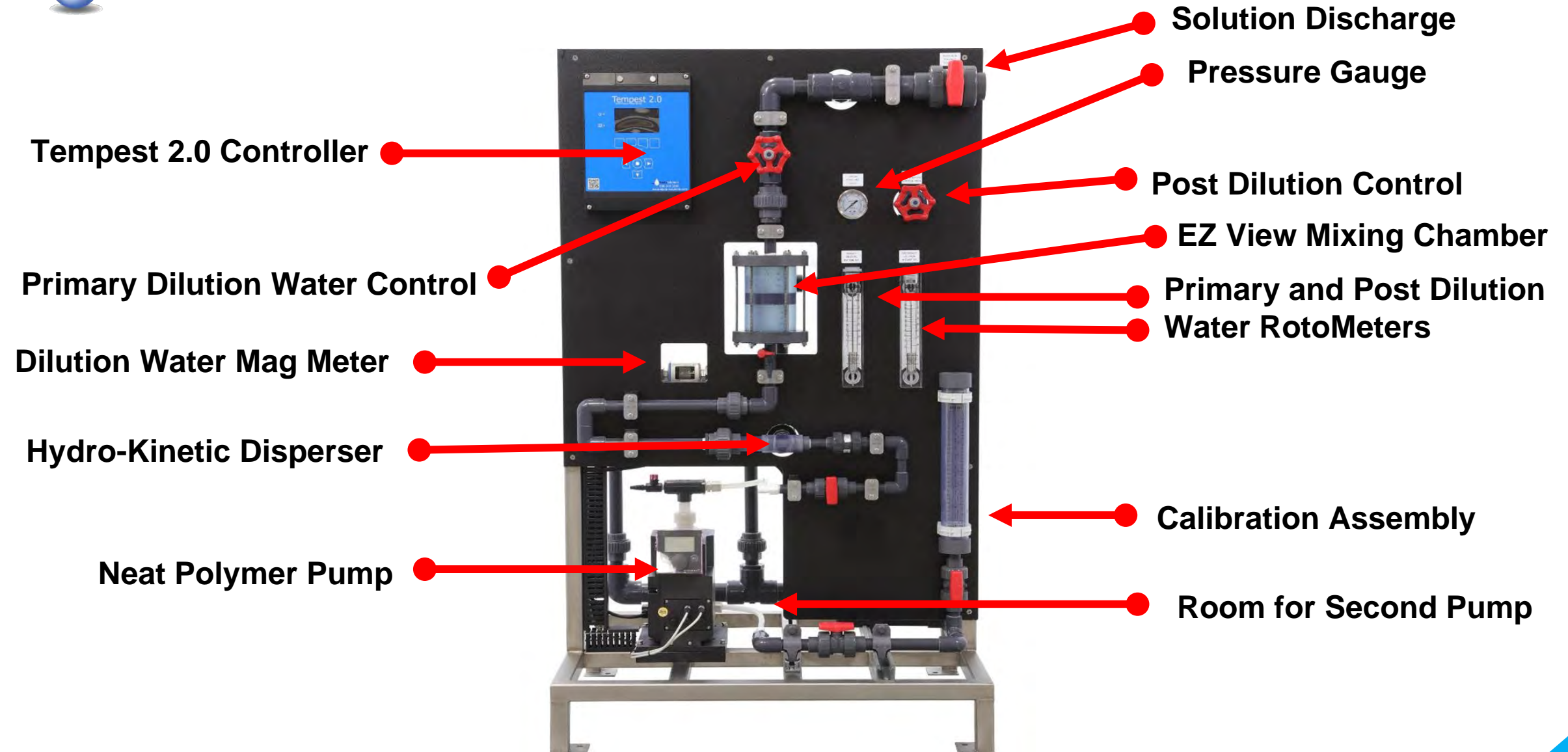
In direct response to customer requests, we expanded the design to optimize the space and piping layout to accommodate an second pump configured in a standby arrangement.

This optional feature enhances reliability and assures the unit will be ready to deliver product if the primary pump requires routine maintenance.



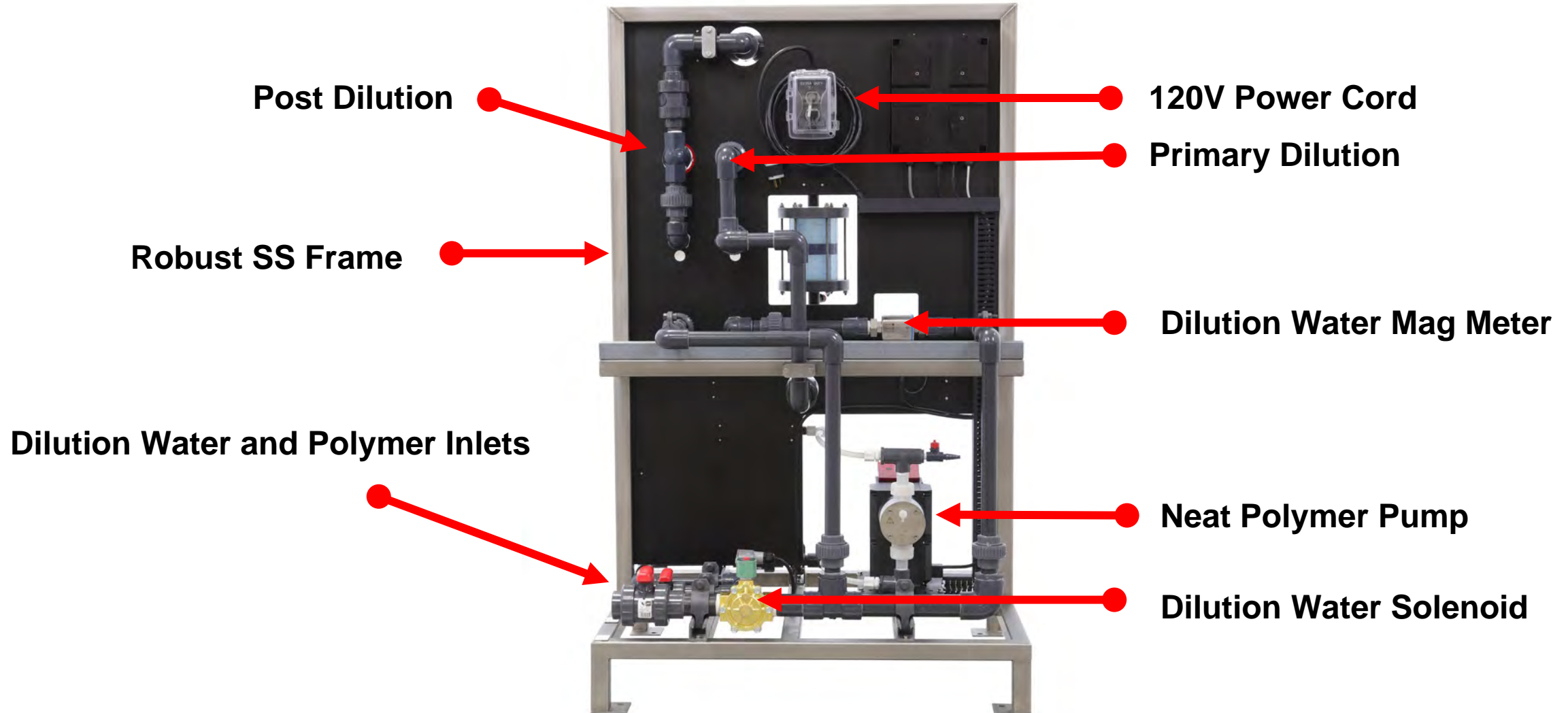


Tempest 2.0





Tempest 2.0



WE LISTENED

“Provide the Option to Allow for Process Signal Integration and Automated Dilution Water Flow Control to Optimize Dosing and Concentration.”

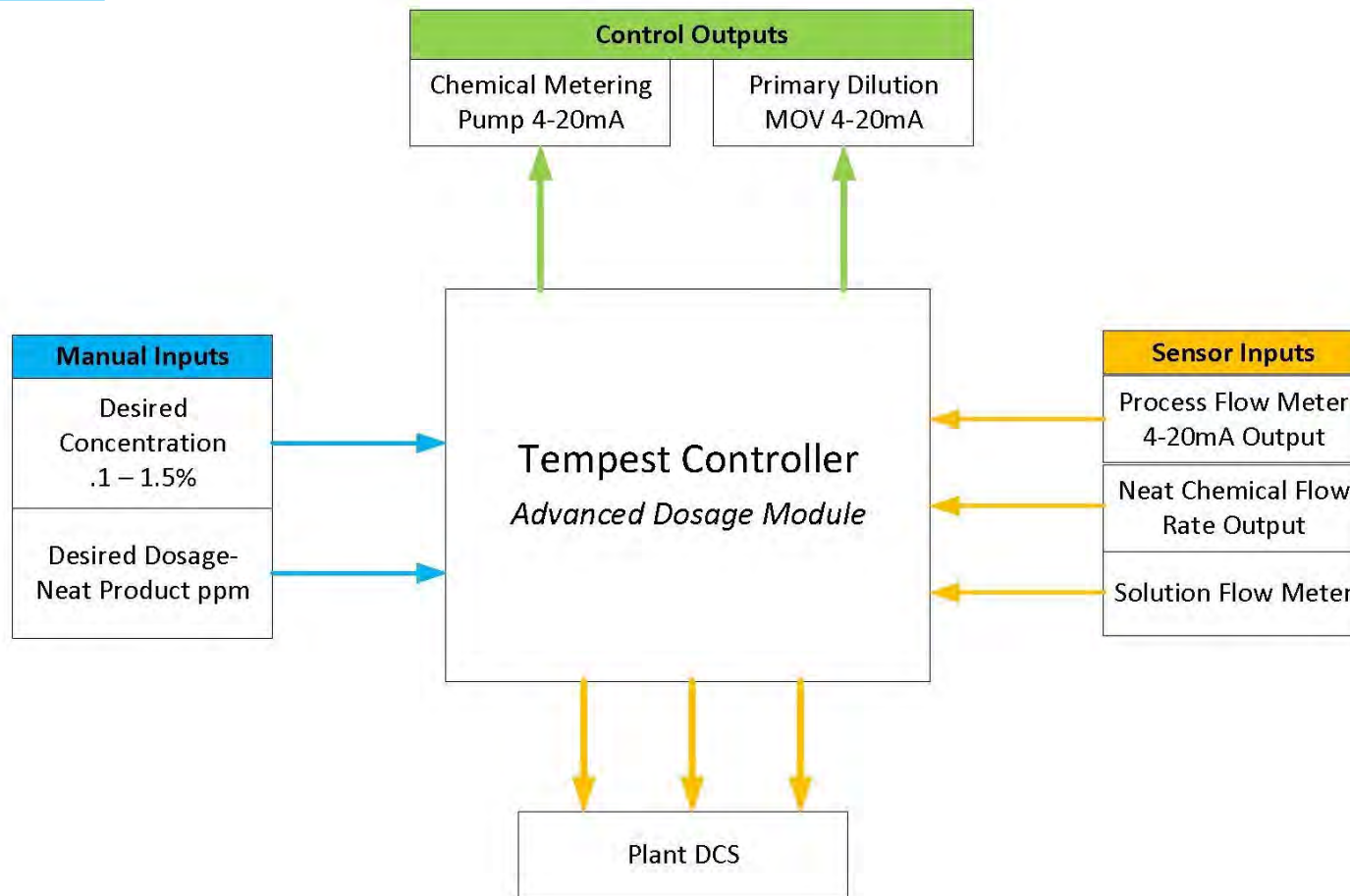
ADVANCED DESIGN CONTROL OPTION

We created our own proprietary PLC based control system to answer this need and provide an intuitive, customizable platform to optimize a broad range of polymer applications.



TEMPEST 2.0 AD

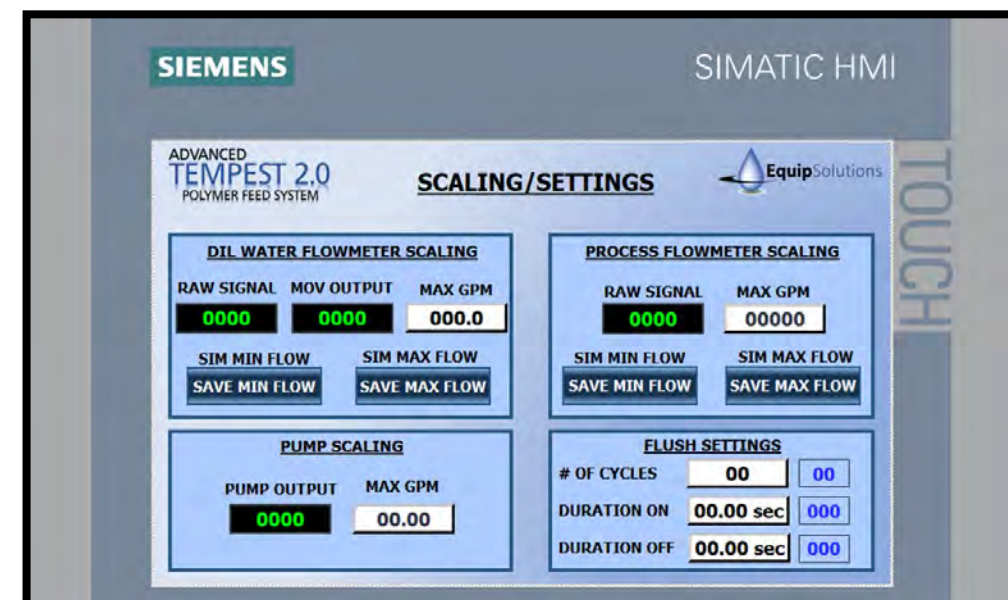
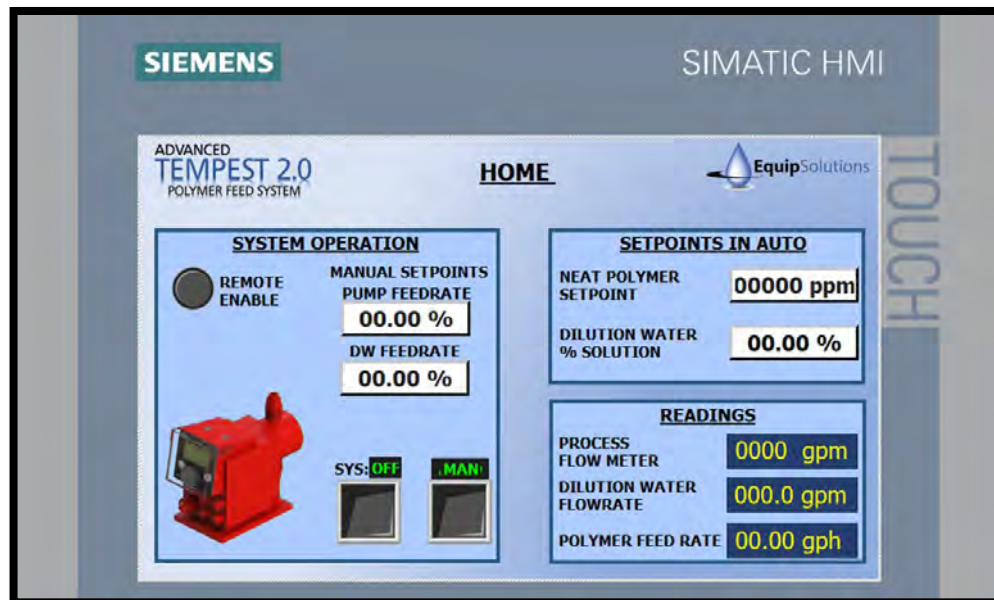
ADVANCED DESIGN CONTROL OPTION



TEMPEST 2.0 AD

ADVANCED DESIGN CONTROL OPTION

The integration of a demand-based process flow signal and the ability to automatically adjust dilution water and polymer solution concentration makes this a winner!

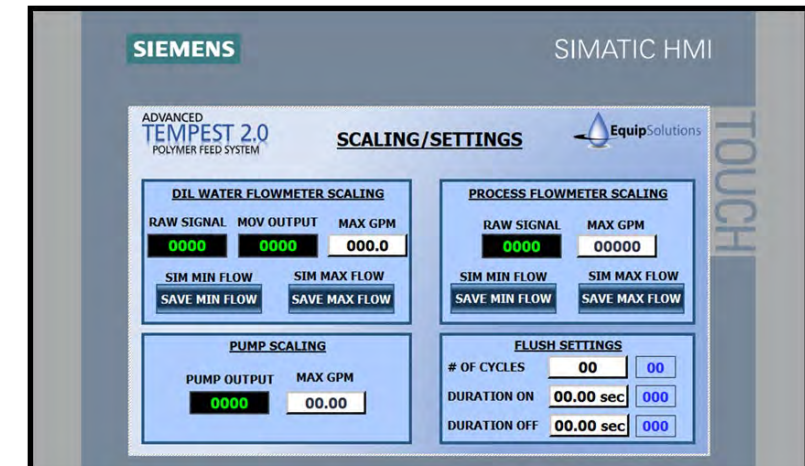
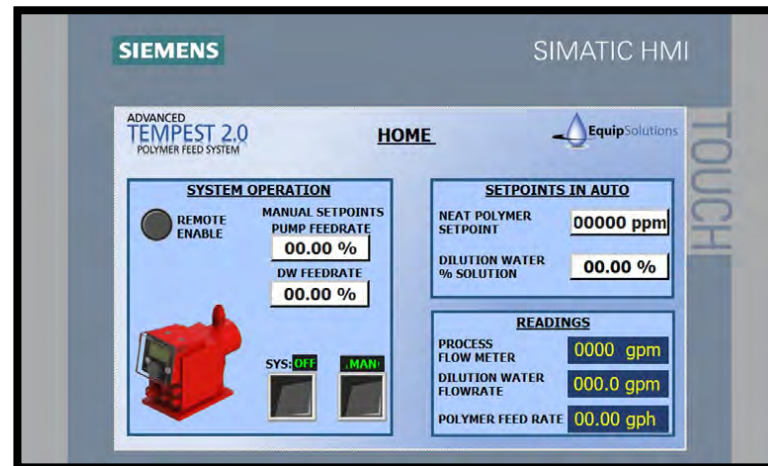


TEMPEST 2.0 AD

ADVANCED DESIGN CONTROL OPTION

Display Elements

- Pump Alarm
- System On/Off Button
- System Man/Auto Button
- Process Flowmeter Reading (GPM)
- Dilution Water Reading (GPM)
- Polymer Feed Rate (GPH)
- Signals Scaling Screen
- Flush Settings
- PID Screen
- Remote Enable Indication



TEMPEST 2.0 AD

ADVANCED DESIGN CONTROL OPTION

I/O Hardware

- Siemens Logos Logic Controller
- 8 Digital Inputs
- 4 Digital Outputs
- 4 Analog Inputs
- 4 Analog Output
- Siemens Basic Comfort 7" HMI Touch Screen
- 120VAC Power Cord
- Power On Light
- Nema 4X Rating
- Panel is UL 508A rated

Software Features

- Application I/O - Inputs From Customer
- DI: Remote Start/Stop
- AI: Remote Process Flowmeter

Application I/O - Inputs to Controller From Tempest Components

- Pump Run Status; DI
- Pump Alarm; DI
- Dilution Water Flowmeter; AI
- Pump Feed Rate Feedback; AI

Application I/O - Controller Outputs to Customer

- Pump Feed Rate Feedback; AO (has to be scaled at the DCS for PPM value)

Application I/O - Controller Outputs to Tempest Components

- Pump Enable Command; dry contact
- Pump Feed Rate Control Signal; AO
- MOV Control Signal; AO

TEMPEST 2.0 AD

ADVANCED DESIGN OPERATION OVERVIEW

Manual / Auto Operation

In Manual Mode

- Pump Feed rate is entered at the HMI; 0-100% (translates to a 4-20mA signal to the pump)
- Dilution Water Feed Rate is entered at the HMI; 0-100% (translates to a 4-20mA signal to the motorized ball valve)

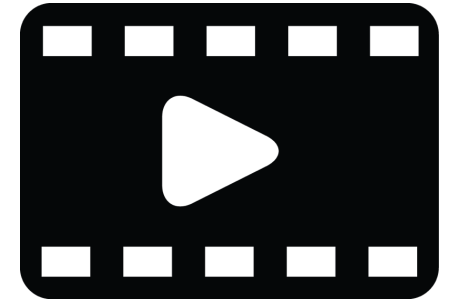
In Auto Mode

- Neat Polymer PPM Setpoint is entered on the HMI; 0-1000ppm
- % Solution Rate is entered on the HMI; 0-100%
- The Dilution Water MOV is controlled via a PID driven 4-20mA signal derived from an algorithm (insert name here) given a Neat Polymer PPM setpoint, desired % Solution concentration, and customer provided Process Flow Meter signal (4-20mA).

Tempest 2.0

DOCUMENTATION / SUPPORT

- Promo Video
- Power Point Presentation
- Product Bulletin / Data Sheet
- Start Up Video (YouTube)
- Programming Guide
- Operational Manual
- Discovery / Application Pre-Programming Sheet



<https://www.equip-solutions.com/tempest2>

Tempest 2.0

DOCUMENTATION / SUPPORT

Pre-Programming Support Commitment

Our Pre-Programming Support Commitment allows our customers to relay application specifics to our support team in advance fabrication, testing and delivery.

By pre-selecting the preferred Mode of Operation , desired feed rates and solution concentration along with settings for alarms, flushing frequency and other operating parameters the unit is pre-programmed and fully tested prior to delivery.

This makes start –up and treatment program implementation simply Plug and Play!

The form is available on-line on our web site and can be emailed for maximum convenience.

EquipSolutions™ Customer: _____
 Contact: _____
 Tempest 2.0 Pre-Programming Form Tempest Model #: _____

Thank you for choosing the new Tempest 2.0 Liquid Polymer Feed System for your application. To ensure your unit is ready for plug and play installation, please complete this Pre-Programming form. This will ensure your system is correctly configured for ease of use.

- Please select your Control Mode (choose one):**
 - Local % Concentration (Set desired % concentration on the controller)
 - Local Rate (Set desired Polymer Pump Feed Rate on the controller)
 - Remote % Concentration (Set desired % Concentration via 4-20mA signal)
 - Remote Rate (Set desired Polymer Pump Feed Rate via 4-20mA signal)
- Please select either % Concentration or Rate Values:**

% Concentration:	Polymer Pump Rate (GPH)
NA	NA
Other:	Other:
- Will you be using Remote Start/Stop?** (Used to remotely Start/Stop system with a dry-contact)
 - Yes No
- Select Low Water Flow Alarm Setting** (Low water alarm setting to shut-down system. Default is set to 10% full scale).

Low Water Flow Alarm (GPM)
2.0
Other:
- Timer Settings** (Alarm Delay, Polymer Feed Delay and Auto-Prime Time Out Limits)

Alarm Delay Timer in Seconds (Default 20 Seconds):	20	Other:
Polymer Pump Feed Delay in Seconds (Default 5 Seconds):	5	Other:
Polymer Pump Prime Timeout in Seconds (Default 30 Seconds):	30	Other:
- Flush Timer Settings** (Sets the length of flush, time between flushes and how many flush cycles)

Flush Duration (Default 15 Seconds):	15	Other:
Interval between Flushes (Default 10 Seconds):	10	Other:
# of Flush Cycles (Default 3 Cycles):	3	Other:

Tempest 2.0

Benefit Summary

- Trusted, Proven Technology
- Eliminates Polymer Waste
- Optimizes Polymer Performance
- Simple to Install, Set Up and Use
- Robust, Open SS Frame – Easy Component Access
- Friendly Graphic Interface
- Multiple Operational Modes – Local or Remote, Batch , Etc.
- Precision Preparation of Selected Solution Concentrations
- Smart Digital Metering Pumps or Your Choice
- Pre-Delivery Programming Support
- Comprehensive Documentation & Support Resources
- Field Service and Installation Available
- Rapid, Reliable Delivery



Tempest 2.0

Benefit Summary

- Intuitive State-of-the Art Smart Digital Controller
- No Hassle Programming
- Remote Direct Connect with Advanced Diagnostic Capability
- Expandable I/O Configurable to Application Requirements
- Programmable Flush Cycles, Timers, Relays and Alarms
- Water Quality Sensor Inputs for Results Monitoring
- Versatile Comms Protocols
- Convenient On-Board Manual and Wiring Diagrams
- At-a-Glance On-Screen Graphing and
- Data Logging – Easy SD Card Transfer to PC
- Cloud Based Remote Monitoring (OverSite™)
- Access to Any Digital Data Acquisition Portal





Tempest
Liquid Polymer Feed System
2.0





CONNECT WITH US ON



Headquarters:
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Roselle, IL 60172

Corporate Headquarters:
888-200-1800

Metering Pump Hotline:
855-890-5650

Tempest 2.0:
www.equip-solutions.com/tempest2

General Email:
CustomerCare@equip-solutions.com

Web:
www.equip-solutions.com