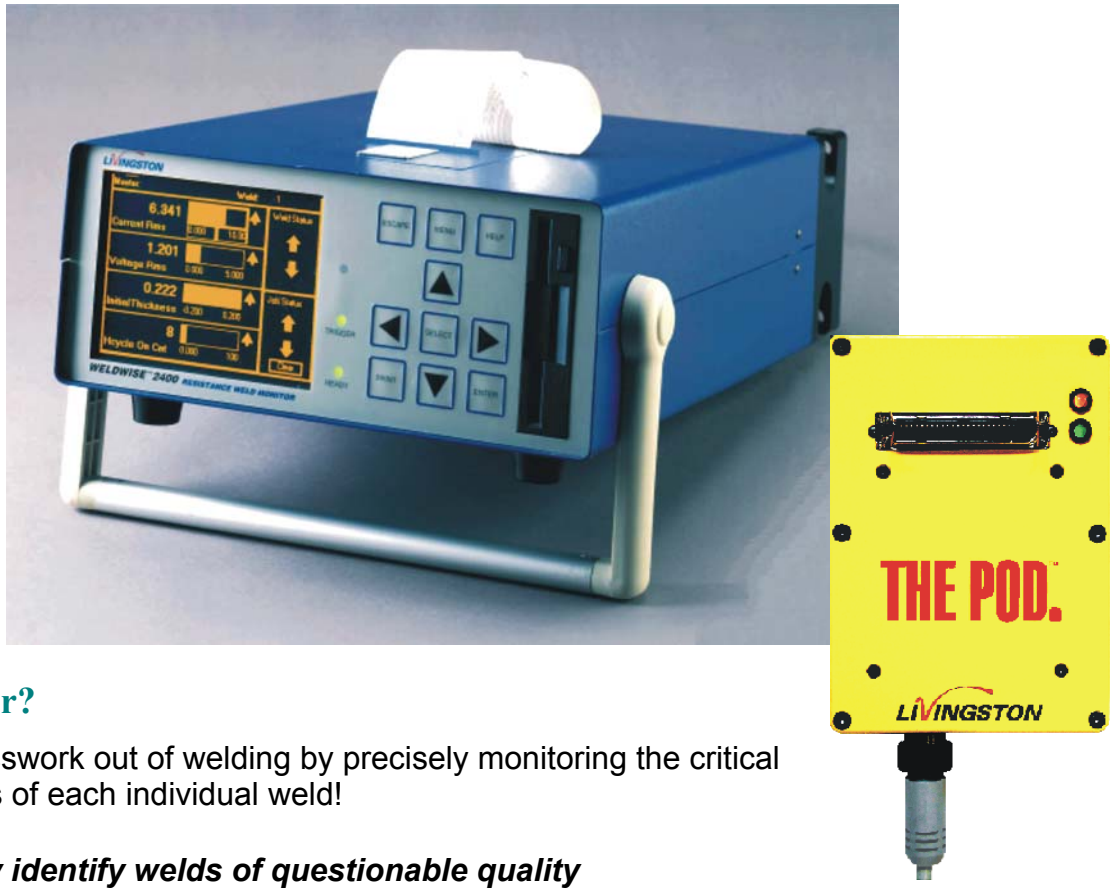
LIVINGSTON & COMPANY, INC.

TOOLS FOR WELD QUALITY ASSURANCE

Livingston & Company offers a comprehensive line of resistance weld monitors to help ensure weld process quality



Why Monitor?

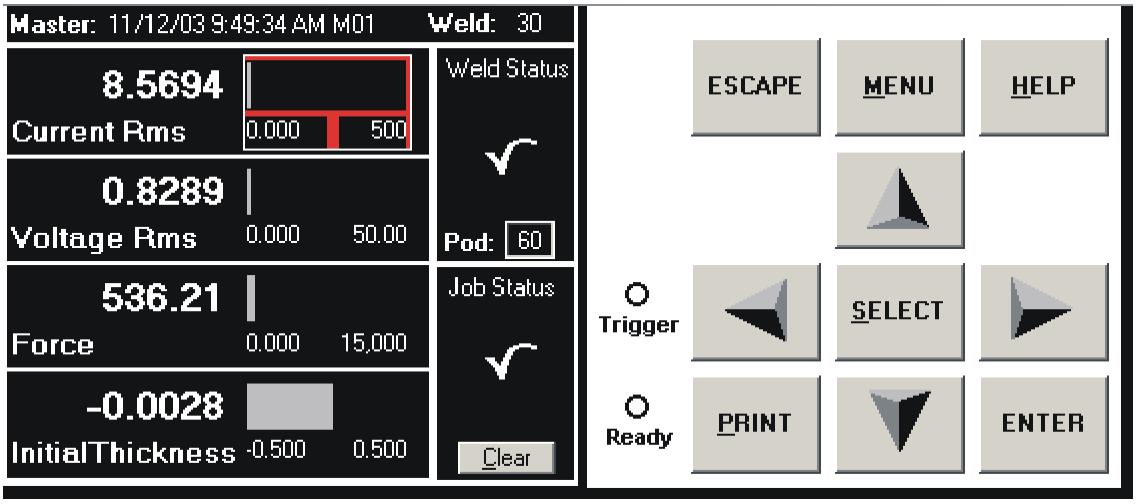
Take the guesswork out of welding by precisely monitoring the critical characteristics of each individual weld!

- ***Instantly identify welds of questionable quality***
- ***Optimize weld schedules***
- ***Reduce wasteful and inefficient destructive testing***
- ***Improve product reliability***
- ***Reduce production and maintenance costs***
- ***Generate production reports from collected data***
- ***Facilitate "traceability" and compliance with ISO 9000 and QS 9000***

Using tolerances that you provide, a Livingston weld monitor can check weld quality and provide real-time Accept/Reject status for each weld.

YES. OR KNOW.NOW.™

Welcome to Livingston's resistance weld monitor product line. Both the **WeldWise™2400** and **THE POD™** share a set of common features and functionality.

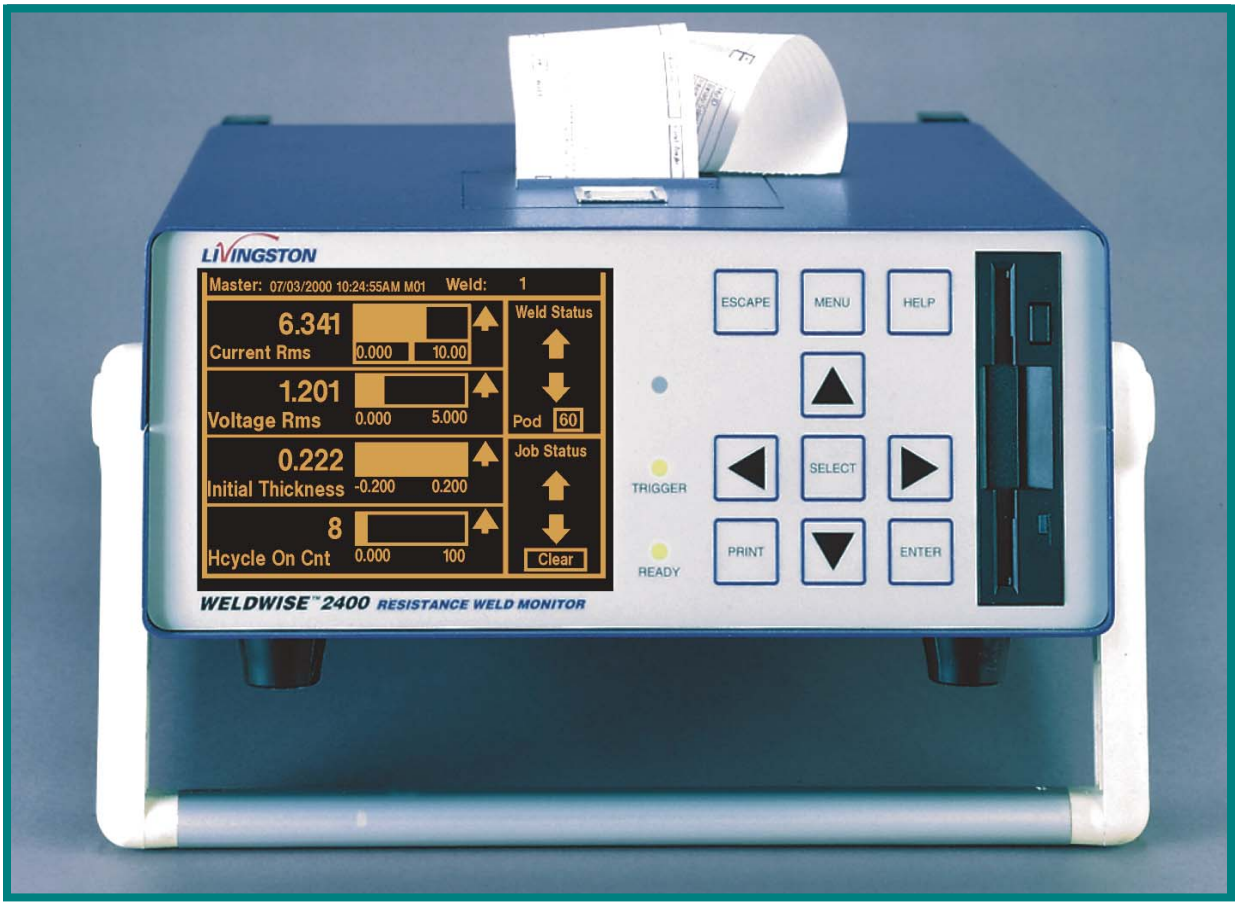


- ***A common user interface for the WeldWise™ 2400 and the POD™ is used for viewing and graphing weld data, sensor calibration, and monitor configuration.***
- ***Up to 4 sensors for monitoring CurrentRMS, CurrentPeak, VoltageRMS, VoltagePeak, Dynamic Resistance, Energy, Conduction Angle, Force, Electrode displacement (Setdown, Expansion, Initial Thickness, Final Thickness), and Cycle Count.***
- ***Accept and Reject parts automatically when interfaced with a PLC or other controller.***
- ***Different sets of master tolerances, selectable "on-the-fly", to accommodate multiple weld schedules.***
- ***Time-stamped data collection before, during and after the weld. Data can be collected by the half cycle, segment or weld.***
- ***Easy data exchange with Microsoft Office® - Weld data is stored in a Microsoft Access® database, which is accessible via Ethernet allowing advanced statistical analysis and up-to-the-minute report generation.***
- ***Historical weld data – Viewing, graphing and trending***

Each time a weld is made, its individual characteristics are instantly measured, displayed and recorded. This "signature" is compared to a "master signature" which is a set of tolerances either absolute or relative to a pre-recorded signature. Individual welds can then be accepted or rejected. Through this process, weld integrity can be closely observed and significantly improved.

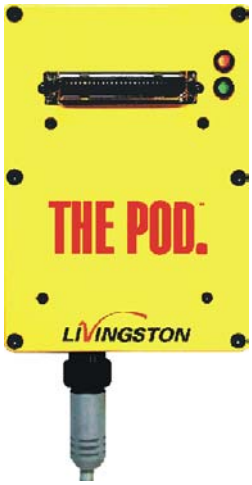
WELDWISE™ 2400

The **WeldWise™ 2400** is Livingston's portable bench top resistance weld monitor for use in the lab or on the production floor. This full-featured single-head weld monitor is completely self-contained with the ability to monitor welds, and also collect, record and view critical weld data.



- ***Waveform feature - used to record a high resolution waveform from each of the sensors, sampled at 12.5kHz***
- ***On-screen waveform and data display.***
- ***Built-in touch screen display, keypad and thermal printer***
- ***Ethernet ready – allows easy access to data stored on internal hard drive***
- ***Discrete I/O - to interface with a PLC or other controller: Inputs for selecting different master tolerances, Outputs for Accept/Reject and Busy/Status***
- ***Floppy drive - for removable media backup of monitor settings, calibration and master tolerances***
- ***Refer to product comparison chart for a complete list of recorded parameters and tolerancing ability***

THE POD™



The POD™ is Livingston's scalable product. This DeviceNet™ based product allows up to 60 Pods on a one network making it suitable for use with multi-head welders and also with large transfer lines with a variety of welders.

- ***Interlocks to a machine controller with discrete I/O (requires DeviceNet I/O block) or to PLC with DeviceNet Scanner***
- ***Window bit – Indicates when Force and Displacement are within acceptable limits. Great for pre weld Process Integrity Check (P.I.C.)***
- ***Refer to product comparison chart for a complete list of recorded parameters and tolerancing ability***

Available POD™ types

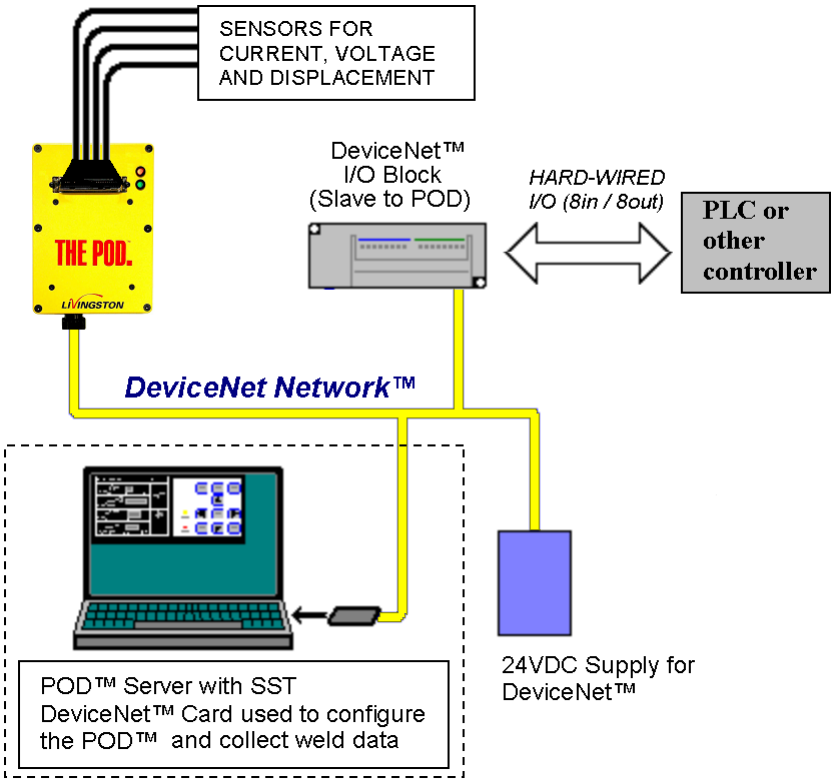
N1 - Pre and post process monitor with a bit output to indicate when Force and Displacement are within acceptable limits.

P1 – Basic featured weld monitor with simplified weld tolerancing.

P3 – Full featured weld monitor.

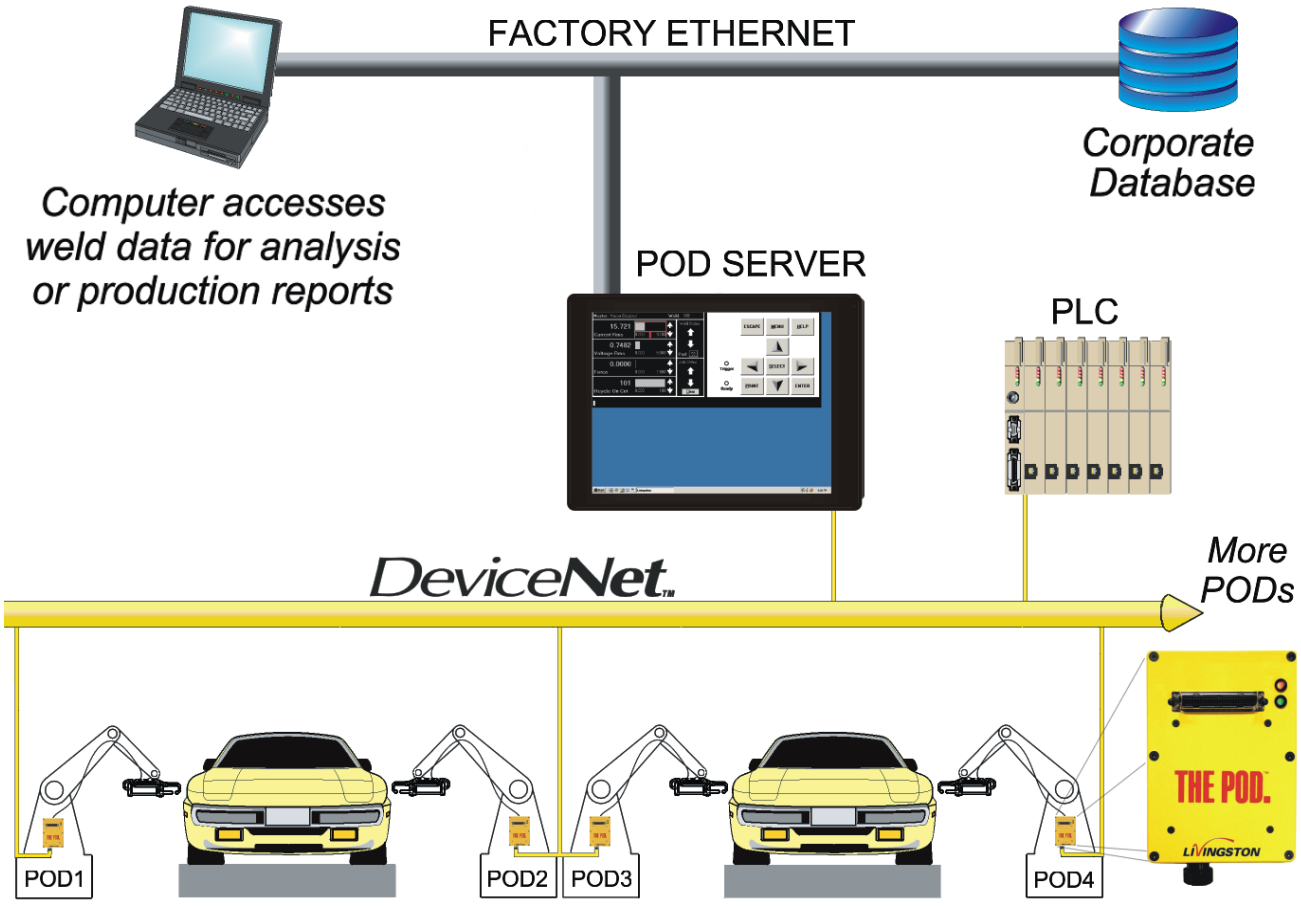
POD™ Server

A Pod™ Server is a computer (Industrial PC, Laptop, Desktop) with an installed SST 5136-DNP or SST-DN3 DeviceNet interface that is running Livingston Pod™ Server software. A Pod Server™ is required to record and view weld data, adjust tolerances and configure the POD™.



POD™ Server System

- ***Collect, view and graph data for weld process trouble-shooting.***
- ***Part and process "traceability": * Allows PLC to send and store time-stamped data (integer and floating point values) and ASCII text to the weld data database. Use data to track cycle-time, machine down time, parts per shift, how often specific faults occur, overall machine and process performance, etc. (*NOTE: Requires PLC with DeviceNet™ explicit messaging capability.)***
- ***Pod™ Server weld database is accessible via Ethernet allowing advanced statistical analysis and up-to-the-minute report generation.***
- ***Interlocks with existing PLC via DeviceNet™ (Requires PLC with DeviceNet™ Scanner module).***



YES. OR KNOW.NOW.™

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Product Feature Chart

	N1	P1	P3	2400
Weld Summary Parameter tolerancing	*1YES	YES	YES	NO
Current RMS		X	X	
Current Peak			X	
Voltage RMS		X	X	
Votlage Peak			X	
Force	X	X	X	
Initial Thickness	X	X	X	
Final Thickness			X	
Setdown		X	X	
Expansion			X	
Conduction Angle			X	
Resistance (Dynamic)			X	
Energy			X	
Half Cycle Count *2		X	X	
Segment and *2Half Cycle Parameter Tolerancing	NO	NO	YES	YES
Current RMS			X	X
Current Peak			X	X
Voltage RMS			X	X
Votlage Peak			X	X
Force			X	X
Initial Thickness			X	X
Final Thickness			X	X
Setdown			X	X
Expansion			X	X
Conduction Angle			X	X
Resistance (Dynamic)			X	X
Energy			X	X
Tolerancing	YES	YES	YES	YES
Absolute	X	X	X	X
Relative			X	X
Multiple Segments			X	X
Masters/Mastering			X	X
Adjustable Post Delay		X	X	X
Binary Selects	31	31	31	15
Weld Type				
AC	X	X	X	X
MFDC *2	X	X	X	
DC 1P (single phase)	X	X	X	

*N1 parameter tolerancing is for Force and Initial thickness "window" bit control only
*2 - MFDC weld type monitored in milliseconds

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