



**Advanced Technology Solutions
for Process Weighing,
Tension Control, and
Vibration Monitoring
Applications**

Capabilities Guide

Hardy's line of multi-purpose and application-specific process weighing controls are used in a wide variety of applications such as Batching/Blending, Filling/Dispensing, Check Weighing, Level by Weight,

The Hardy History

Since 1918, Hardy has been a leader in the industrial marketplace. We are renowned in many areas, but particularly in our innovative approaches to precision instrumentation in the process weighing and condition monitoring arenas.

With a name change to Hardy Instruments in 1984, we soon began to develop unique core technologies that would enhance the accuracy, increase the effectiveness, and improve the accessibility of process weighing systems and machinery performance information.

With a string of significant product introductions, Hardy boasts a wide range of innovative products that will enhance your business processes, like our 3000 series controllers, our



Advantage™ Load Sensors, and our Any-Weigh™ Bench Scales.

In addition, to supplement our inventive progress, we have expanded our sales and service network to reach globally.

MULTI-PURPOSE

Single scale general applications



Weight Controller

A general purpose weight controller with as many as eight relay outputs based on gross, net, rate-of-change, peak or totalized weight values. The HI 2151/30WC can act as a standalone or front end to a control system, transmitting weight data to a PLC or DCS.



MULTIPLE SCALES

1, 2, or 4 scale general applications



Multi-Scale Controller

Provides simultaneous control of up to four independent scales. Whether used as a standalone, or as a control system's front end, the HI 3030's extensive networking capabilities make it the complete solution for your multi-scale requirements.



email Websaver

INDICATORS

Quickly transfer true, accurate weight data

Weight Indicator

The HI 2110WI is a weight indicator that acts like a front end for a control system, transmitting stable gross, net, and tare weight data to a PLC or DCS. Its available in panel mount and remote mount configurations with a choice of Allen-Bradley RIO, Profibus, Analog, or BCD interfaces.



Process Weighing

Instrumentation

Force Measurement, Rate Control, and monitoring to name a few. They can operate as standalone controllers or transfer clean, accurate weight data to a PC, PLC, or DCS via a variety of network interfaces.

APPLICATION-SPECIFIC CONTROLLERS

Filling, dispensing, and IBC control

Filler/Dispenser

The HI 3010 can act as a standalone controller, or as a sub-routine in your PC, PLC, or DCS Ladder Logic control for a variety of filling, dispensing, or intermediate bulk container applications. It powers the scale, controls the speed, evaluates the weight, automatically refills and discharges the desired amount of product and notifies you of errors through its extensive networking capabilities.



SMM
WAVERSAVER
email Webserver

Loss-in-Weight by Rate Control

Rate Controller

The Loss-in-Weight Rate Controller is the instrument of choice for converting a volumetric system to a Loss-in-Weight gravimetric system. It powers the scale, evaluates the weight, controls the rate of flow, automatically refills and delivers the desired amount of product at a pre-determined rate. The HI2160RC^{PLUS} can be used as a standalone closed-loop controller, or as an intelligent front end to a PLC or DCS.



SMM
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Secure Memory Module

The Secure Memory Module stores critical configuration, calibration, and setup data for an instrument, protecting this information from corruption. Use the Secure Memory Module (SMM) to transfer configuration data in minutes.



During system operation when a new parameter is entered, the SMM automatically updates that value in its memory. Data stored in one instrument may be restored in another by physically transferring the SMM to the new instrument. The SMM is conveniently accessible from the instrument's rear panel.

THE BUTTON™

With one push of "THE BUTTON™", Hardy's weigh scale modules automatically calibrate your C2® weighing system, making it instantaneously ready for use.



With no weight on the scale, simply depress the red button and hold for approximately three seconds. The system's C2® load point performance parameters will combine within the module, electronically calibrating the scale.

Tension Control

Instrumentation

Precise tension control of both wind-up and unwind applications

Tension Controller

The Tension Controller enables the accurate control of tension and web (including paper, plastic, and non-molden) and cable/strand applications. This powerful control solution will precisely control tension in both rewind and unwind applications in the most challenging of conditions.



WAVERSAVER
SMM
email Webserver

WAVERSAVER®

Machinery such as motors, mixers, blenders, vibrators, conveyors, and even forklifts operating around your scales are necessary to process materials. However, each machine can introduce a unique vibratory force to the scale, causing fluctuating weight displays and inaccurate batch weights.

Hardy Instruments' exclusive WAVERSAVER® technology -

- ignores unwanted plant vibration on and around scales
- enables accurate weight readings
- enables other process activity while you weigh
- improves batch quality and speed
- eliminates wasted product
- dispenses with the need to reset the instrument if vibration levels change periodically

WAVERSAVER® enables you to weigh line conveyors, augers, and even mixers while they are running and can be adjusted to ignore signals above 0.25Hz with virtually instantaneous response. No complex poles or corner filters need be tuned.

Hardy's line of single-slot PLC weigh scale modules (or the general purpose weigh module designed to the DeviceNet Open Network Standard) are used in a wide variety of applications that include

DEVICENET WEIGH MODULE



The HI 200DNWM supports a single scale with up to eight ADVANTAGE® load sensors and communicates net, gross, tare, and set point data over the DeviceNet network to a PC, PLC, or DCS. It features two TTL level setpoints for control.



Series 5 Weigh Scale Module



The HI 1771-WS is a single slot, single-scale weigh module that reads net, gross, tare, and rate-of-change weight and diagnostic data from a scale and transmits the information over the I/O chassis backplane to the Allen-Bradley 1771 processor.



COMPACTLOGIX® SINGLE WEIGH SCALE MODULE



The HI 1769-WS is a single slot, single-channel weigh module that reads and conditions weight and diagnostic data from strain gage load sensors or load cells and communicates this data over the I/O chassis backplane to either the CompactLogix® or MicroLogix® 1500 processor.



COMPACTLOGIX® DUAL WEIGH SCALE MODULE



The HI 1769-2WS is a single slot, dual-scale weigh module that reads and conditions weight and diagnostic data from strain gage load sensors or load cells and communicates this data over the I/O chassis backplane to either the CompactLogix® or MicroLogix® 1500 processor.



COMPACTLOGIX

Plant

MICROLOGIX 1500



Batching/Blending, Filling/Dispensing, Check Weighing, Level by Weight, Force Measurement, and Rate Monitoring.

CONTROLLOGIX® DUAL WEIGH SCALE MODULE

The HI 1756-2WS is a single slot, dual-scale weigh module that reads net, gross, tare and rate-of-change weight, along with diagnostic data from two different scales, and communicates the results over the I/O chassis backplane to the ControlLogix® processor.



CONTROLLOGIX® SINGLE WEIGH SCALE MODULE

The HI 1756-WS is a single slot, single-scale weigh module with the same feature and functions as the dual scale HI 1756-2WS.



CONTROLLOGIX

SLC

SLC 500 WEIGH SCALE MODULE

The HI 1746-SLC is a single slot, single-scale weigh module that reads net, gross, tare and rate-of-change weight and diagnostic data from a scale and transmits the information over the I/O chassis backplane to the 1746 processor.



Service by Design

Hardy Instruments offers unparalleled support and service. Our 'Service by Design' capability enables us to help you successfully integrate and deploy any Hardy solution through

- embedded tools
- printed and online support
- field service
- start-up assistance
- continuous training

Hardy employs best practices to assess your service needs, identify problem areas, validate existing configurations, calibrations and setup data, and assist with instrument installation.

Our embedded technologies (C2®, SMM™, Integrated

Technician™ & Smart Diagnostics, and Data Archiving), online WebTech

Knowledge Base, wiring diagrams and manuals, and technical

whitepapers, and the extensive application knowledge of our service engineers help you to


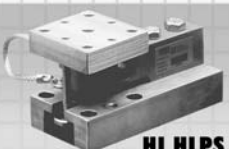





- drive down costs and risks
- keep you ahead of the competition
- ensure dependable uptime
- increase machine availability and enhance operational efficiency




Sensors & Scales

Regardless of type or capacity, Hardy Instruments' ADVANTAGE® Load Point Assemblies with tailored mounting hardware and matched sensors are designed to turn almost any type of container into a high performance scale. All ADVANTAGE® Load Point Assemblies consist of an electrically-matched

ADVANTAGE® LOAD POINT ASSEMBLIES

Capacities lbs/kg	ADVANTAGE™ Compression	ADVANTAGE™ Life Compression	ADVANTAGE™ Tension
44/20			
110/50			
225/100			
450/200			
1.125/0.5K			
2.25K/1K			
4.5K/2K			
11.25K/5K			
22.5K/10K			
33K/15K			
50K/23K			
66K/30K			
110K/50K			
132K/60K			
200K/90K			



Load Cell Junction Box



The Junction Box provides easy isolation and troubleshooting of the weigh system. It is available as an OEM card, or housed in a choice of fiberglass, stainless, or painted steel box.



TRANSMITTERS

Blind transfer of level by weight or force measurement data to PCs, PLCs, or DCSs.

Load Cell Transmitter

The HI 2200LT Strain Gage Transmitter is a low cost two-wire device for strain gage load cells and pressure transducers. Both the HI 2204LT and our Factory Mutual approved (Class I, Div I) HI 2201LT come in several mounting packages and are fully warranted for three years.



Integrated Technician™

Hardy's INTEGRATED TECHNICIAN lowers weighing system maintenance costs by enabling you to quickly troubleshoot and diagnose many weighing system problems.

INTEGRATED TECHNICIAN continuously monitors the weighing system excitation current for shorted or open load sensors (including the cable between the instrument and the junction box) and notifies you of any errors.



Maintenance tests can be run from the front panel of the HI 2151/30WC, from a PLC or SLC using the HI 1746-WS or HI 1756-WS (ControlLogix®) or any 3000 Series product with IT™ or Smart Diagnostics.

These tests show system weights, voltages, and pass/fail displays to help isolate the problem to the instrument, cabling, junction box, or individual sensors. A Return-to-Zero test advises you of any system shift of the zero references.



stainless steel load sensor with true hermetic sealing, C2[®], 1/4 NPT conduit adapter and certifications available on-board, or over the Internet. The assembly provides blind hole load introduction, anti-lift-off protection and comes with either stainless or galvanized steel mounting hardware.

C2[®] Second Generation Calibration

ANY-WEIGH[®] SCALES

Provide complete flexibility in size and capacity

Bench Scales

The ANY-WEIGH[®] Bench Scales are a very low profile industrial scale that is available with standard interfacing to a weigh instrument, or with built-in DeviceNet or analog 4-20mA electronics for direct connection to a PC, PLC or DCS.

ANY-WEIGH[®] Bench Scales can be used for general check weighing or filling applications, placed under a feeder for loss-in-weight, or for general QA laboratory work, to name a few.



Available in three standard sizes:
12" x 12" (298mm x 298mm) to
24" x 24" (600mm x 600mm)

Capacities: 33 lbs. (15kg) to
1,300 lbs. (590kg)

Height: 1.54" (39.1mm) to 2.05" (52.1mm)

C2[®] enables electronic calibration of your weighing system in less than 30 seconds. As soon as your weighing system is installed, you can immediately calibrate and verify proper scale operation.

Calibration with test weights can mask actual scale performance problems, such as binding. C2[®] unmasks these hidden performance barriers before you get into production.

Floor Scales

The ANY-WEIGH[®] Floor Scales provide customer-desired features that have never before been available from a standard floor scale, like INTEGRATED TECHNICIAN[®] built-in diagnostics, matched ADVANTAGE[®] line load sensors (that eliminate the need for cornering and potentiometers) and C2[®] electronic calibration.

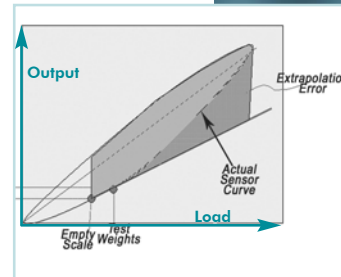
A complete set of accessories, including access ramps, pit frames, lifting eyes, and bumpers, are available.



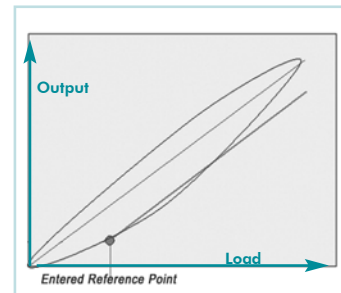
Available in smooth or tread plate stainless and painted decks.

Sizes: 30" x 30" (76.2cm x 76.2cm)
to 6' x 8' (182.88cm x 243.84cm)

Capacities: 1,000 lbs. (500kg)
to 10,000 lbs. (4500kg)



The slope measured during hard cal can cause extrapolation errors.



C2[®] applies the overall slope of the load cell(s), preventing extrapolation errors.

Each individual load sensor has NIST traceable performance characteristics stored on an internal memory device. Your C2[®] system reads these parameters and electronically calibrates the scale for you.

A single reference point is entered to calibrate the scale system. The result is a calibration that is

easier, quicker, safer, and typically more accurate than traditional methods used in the past.



HOME RUN CABLE



C2[®] cable is designed specifically to handle low voltage weight and data signals.



3000 Series

Hardy Applications

Hardy Instruments is a leader in the process control industry. We offer a wide variety of control solutions:

Process Weighing

- Filling
- Dispensing
- Batching
- Rate Control
- Level Control
- Check Weighing
- Tank Farm Monitoring
- Force Measurement

Vibration Monitoring

- Process control using vibration measurement input
- Stand-alone machine protection
- Vibration trending and alarming using the plant control system
- Monitor rotating and reciprocating equipment

Tension Control

- Web Tension
- Wire, Rope, and Fiber
- Unwind/Wind

Applicable Industries

- Food
- Chemical
- Pharmaceutical
- Petrochemical
- Energy
- Mineral
- Plastics
- Beverage
- Mining
- Metals

The Hardy Instruments' HI 3000 Series incorporates both Hardy's core features and our latest technological innovations to provide application-specific control. The HI 3000 Series can be easily

Application-Specific Functionality

Whether your application involves weighing or machine condition monitoring, a Hardy Instruments' 3000 Series product saves you programming, wiring, time, and expense.

Everything you need for your application is built in. No new programming language has to be learned or implemented. If a function is needed, just turn it on. If you need to communicate with your PLC, PC or DCS, the 3000 Series uses all standard protocols.

A 3000 Series product can be an application subroutine in your PLC Ladder Logic Control, operate in a standalone fashion, or perform in conjunction with other 3000 Series controllers in a network with 'plug and play' technology.

Ease of Use

If you know how to operate one 3000 Series instrument, you can operate all. Every 3000 Series product has a common keypad, menu structure, both front panel and web-based help files, and common interfaces.

Its flexible I/O mapping can direct alarms or any parameter to a local output, any point on the plant network, or to the World Wide Web, without having to do or learn any special programming or add supplemental wiring.



Filler/Dispenser



Machine Monitor



Multi-Scale Controller



Tension Controller



configured specifically for your unique operation. It is a team player that seamlessly integrates into your plant network; it is a complete solution with features that provide unparalleled ease of use for your entire team.

Network Applications

Hardy Instruments is the expert in plant control network instrumentation. Our solution systems provide full integration into most plant networks, including:

- DeviceNet
DeviceNet Master/Scanner capabilities are integrated into all 3000 Series controllers. As a Master, DeviceNet I/O can be read or controlled by the 3000 Controller.
- ControlNet
- Profibus
- Remote I/O
- Ethernet TCP/IP
- ModBus TCP
Hardy Modbus-Link™ enables you to monitor and test 3000 Series Modbus slaves. It supports Modbus TCP and OLE automation for interfacing with Visual Basic, Excel, and other software applications.
- OPC
- Analog
- Serial

Hardy-Links™ Communications

Hardy Web-Link™

Hardy Web-Link™ is an embedded webserver that enables local or remote Internet access to your 3000 Series system. Our embedded webserver requires no special software and security levels can be set to permit tamper-proof protection. With Hardy Up-Link™ you can update your 3000 Series product with the latest version of firmware via the Internet.



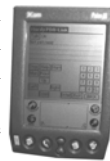
Hardy e-Link™

Hardy e-Link™ is an electronic mail feature that enables your 3000 Series machine to notify you of alarms or changes in equipment events and to access customized reports. Alert emails can be sent to your PC, cell phone, pager, or PDA.



Hardy PDA-Link™

Hardy PDA-Link™ enables access to all aspects of your 3000 Series machine through a wireless IR port. Your Palm PDA can then upload all of the system parameters, allowing you to view the data directly on the PDA or transfer it to your desktop.



Hardy Control-Link™

Link a series of 3000 Controllers together without additional software or network requirements. Only an Ethernet connection between controllers is required.



Controller



Sensors/Conditioners

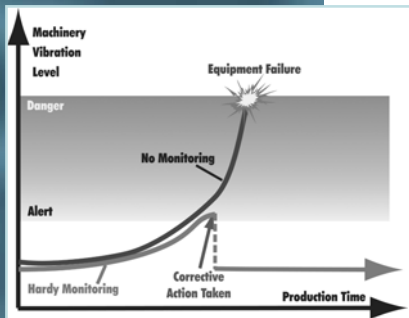
Hardy's Condition Monitoring solutions provide you with the tools to implement an equipment health monitoring program. These systems cover the spectrum from complete standalone shutdown and

Why Monitor Vibration?

Within the industrial facility, vibration is often the most important indicator of the mechanical integrity of rotating or reciprocating machinery.

Using vibration monitoring, you can -

- prevent machinery damage
- prevent costly downtime
- predict problems and properly schedule corrective maintenance



Monitoring your machinery will, in turn, provide longterm benefits such as -

- reduced operating and maintenance costs, and thus, improved profitability
- a longer life on the plant machinery and, thus, reduced capital expenditure requirements
- peace of mind

SENSORS



Hardy's vibration sensor line includes accelerometers, Eddy current probes, and drivers.

Models are available to meet a wide range of requirements, including temperature ranges, mounting capabilities, and accuracy specifications.



SIGNAL CONDITIONERS

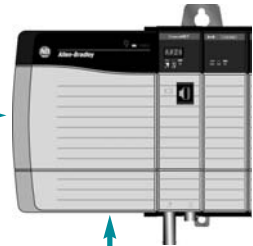
4-20mA



The HI 5500 Signal Conditioner line provides the building blocks for a complete monitoring system.

Each signal conditioner provides an analog output (4-20mA/0-5VDC) and a buffered output. Each HI 5501 system is customizable for:

- Filter settings
- Measurement types
- Output units
- Setpoint and relay output options



TRANSMITTERS

4-20mA



The HI 5700 Series Transmitters integrate the sensor and signal conditioning into a compact package that provides:

- True RMS detection
- 4-20mA output (with non-polarity wiring)
- Raw Buffered Output
- Explosion-proof design
- High immunity to EMI noise

Vibration Monitoring

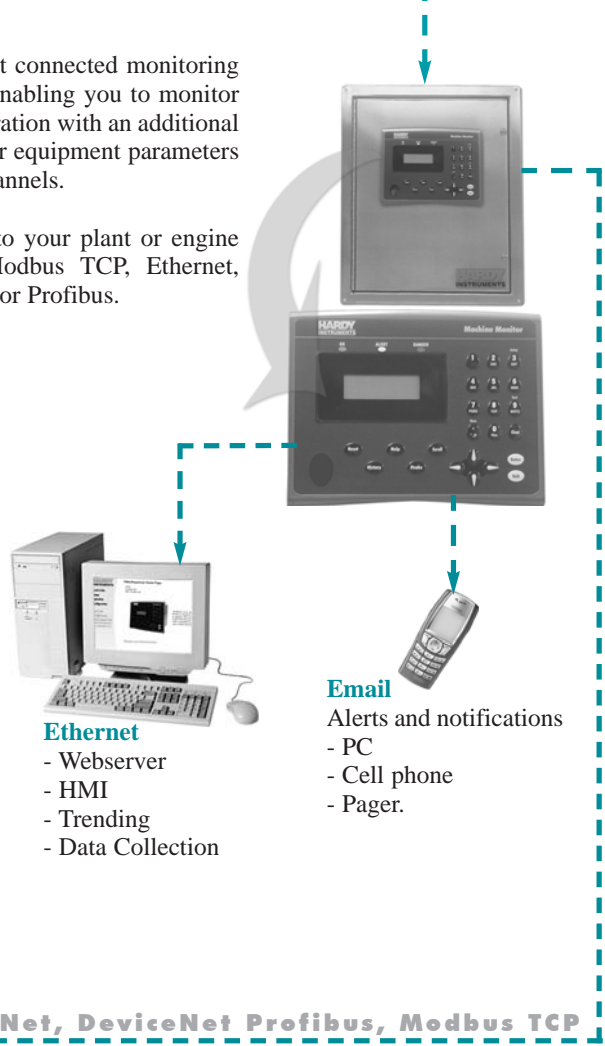
Machine Monitors/Shakers

alarm systems to fully-integrated monitoring systems with remote web access and notification. Hardy provides you with the capability to put together a monitoring system that best fits your needs.

MACHINE MONITORS

The HI 3600 is the most connected monitoring system on the market, enabling you to monitor up to 16 channels of vibration with an additional 16 channels available for equipment parameters using the Expansion Channels.

The HI 3600 connects to your plant or engine control using OPC, Modbus TCP, Ethernet, DeviceNet, ControlNet, or Profibus.



Ethernet

- Webservice
- HMI
- Trending
- Data Collection

Email

- Alerts and notifications
- PC
 - Cell phone
 - Pager.

4-20mA, ControlNet, DeviceNet Profibus, Modbus TCP

SHAKERS



Hardy's line of vibration shakers provides the capability to verify the performance of accelerometers, probes, or velocity transducers.

Thus, a vibration signal of any frequency and amplitude can be simulated to test the vibration monitoring system. Likewise, the published performance of any vibration sensor can also be confirmed.

Leverage Off Your Plant Controller

Monitoring machinery vibration in the plant, or engine control system, provides the ability to

- trend machinery vibration along with existing measurements in the PLC
- take direct preventive action (alarm, reduced flow, equipment bypass) through connectivity to process control system
- achieve a vibration monitoring program without significant implementation costs

Hardy enables you to communicate with the plant control system or HMI using analog or digital communications

- Analog output 4-20mA, 0-5 VDC
- ControlNet
- Profibus
- DeviceNet
- Modbus TCP
- OPC

Hardy's network communication options enable you to save on installation costs by running a single connection with all data, rather than multiple runs of analog signals.

WORLDWIDE FOOTPRINT

To supplement our innovative progress, Hardy has expanded our sales and service network to reach globally. We have representatives worldwide that can help you to expand your enterprise, streamline your processes, or enter the market.

CUSTOMER SERVICE

You may contact the Hardy Service Center Department at any time during your Hardy product lifecycle. Our trained advisors will provide the information you need regarding Hardy products and services, orders, applications, and other support issues. Our Service Center prides itself on providing friendly support in an efficient, thorough manner.

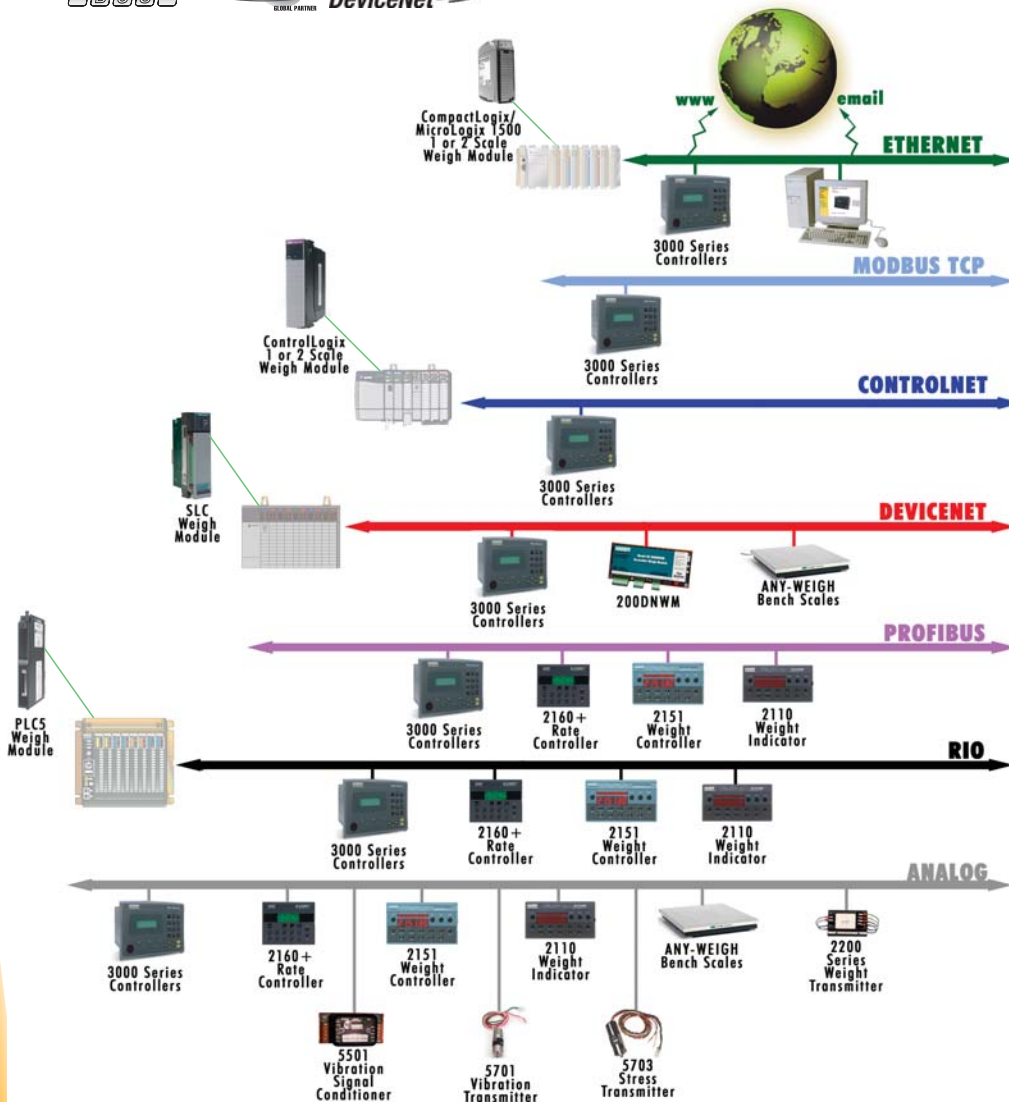


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Hardy Insider is a periodic newsletter that brings you product and event information, tech and application tips, along with free downloads relevant to your process weighing and machinery condition monitoring needs. Sign up today at www.hardyinst.com/newsletter

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CONNECTIVITY SOLUTIONS



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