



SINCE  
1918

**HARDY**  
PROCESS SOLUTIONS

**WEIGHING SOLUTIONS IN**  
**Process &**  
**Packaging**

**HARDY**  
PROCESS SOLUTIONS



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# PROCESS WEIGHING



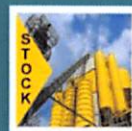
Stable  
Mature  
Innovative  
Strategic



- Founded as Hardy Scales in 1918, 100+ years in business
- Rockwell Automation Encompass Partner since the early 90's, 26 years
- Hardy develops first PLC Integrated Weighing Module on Rockwell Platform
- Technology company with Unique Features for Process Weighing
- Hardy is purchased by Roper Technologies in 2007, a \$5B+ public technology company



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# Industries Served - Process & Packaging

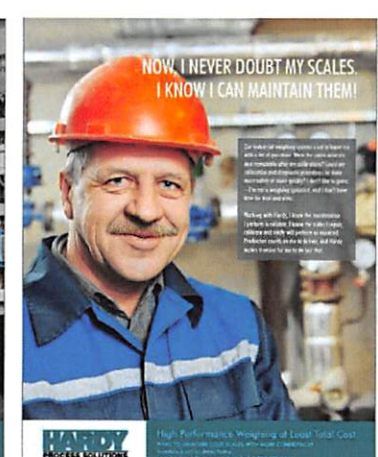
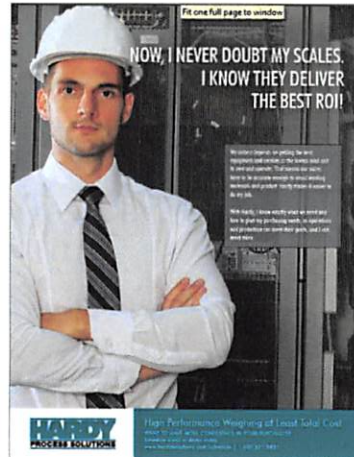
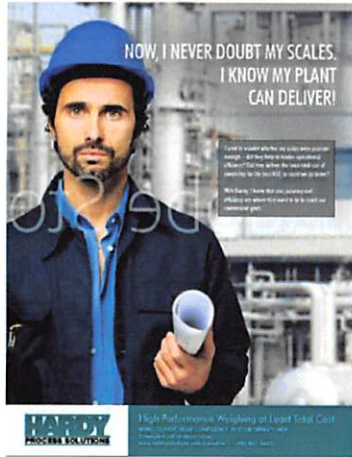
- Food (processed & fresh)
- Beverage (syrup's, concentrates)
- Consumer Packaged Goods (home, personal etc)
- Chemical (specialty: resins, paints, coverings etc)
- Fertilizers & Pesticides
- Mining Minerals & Metals (aggregates & cement)
- Pharma / Bio Pharma (over the counter drugs)
- others ...





# Value Needs

# - Higher performance, ease of use, efficiency



Plant  
Manager

Least Cost to Own

- Purchase
- Operate
- Maintain

Highest  
Operational  
Equipment  
Efficiency

Procurement  
Manager

Least Cost to Own

- Purchase
- Operate
- Maintain

Process  
Engineer

Best  
Process  
Performance

Higher  
Operational  
Equipment  
Efficiency

Controls  
Engineer

Ease of  
Integration

Best  
Control  
Performance

Maintenance  
Manager

Ease of  
Validation –  
Calibration

Ease of  
Diagnostics -  
Repair

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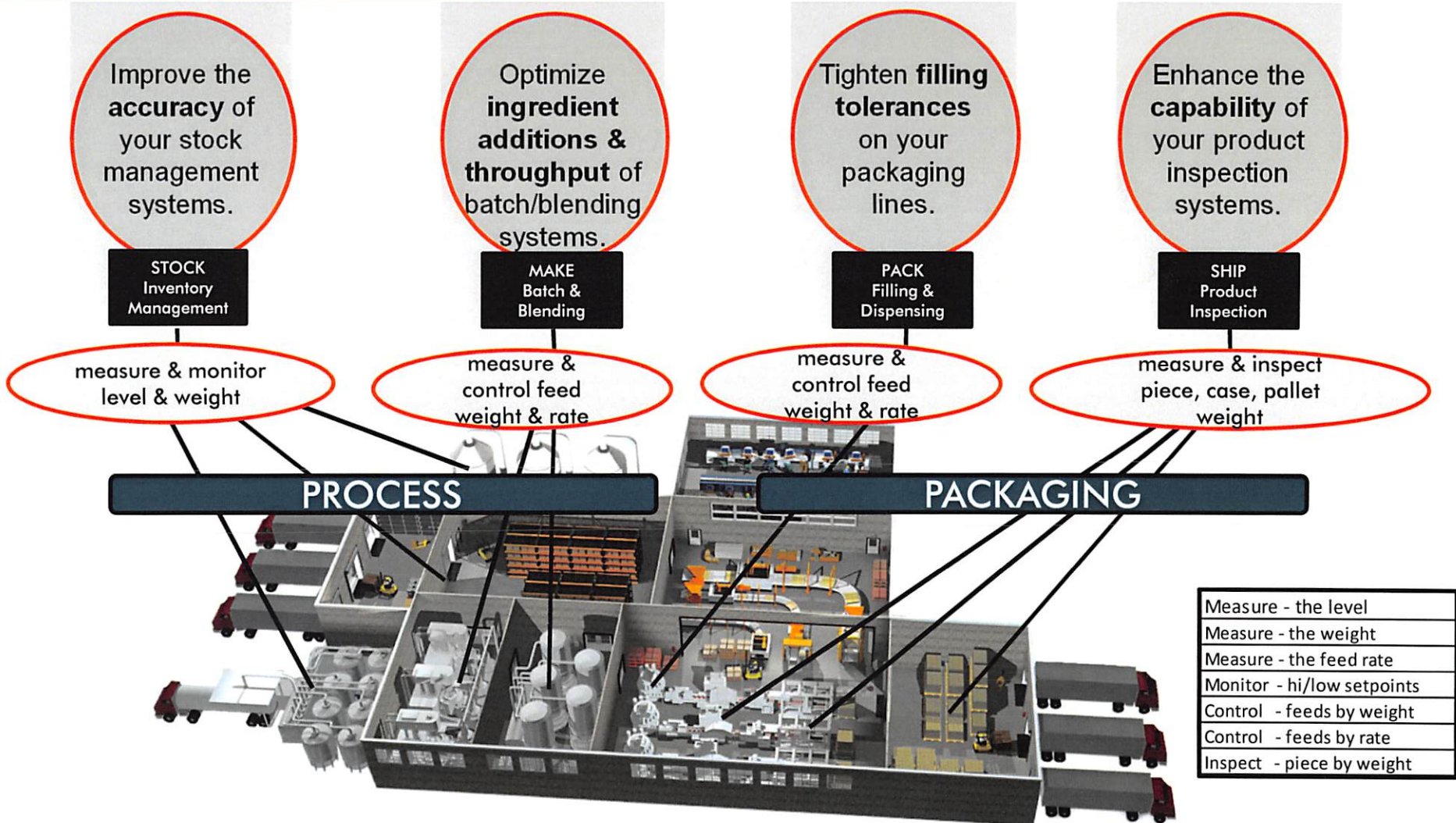


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# Manufacturing Needs

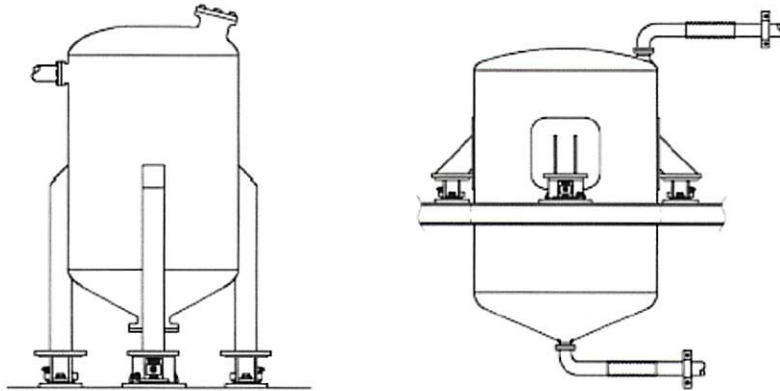
# - Process & Packaging



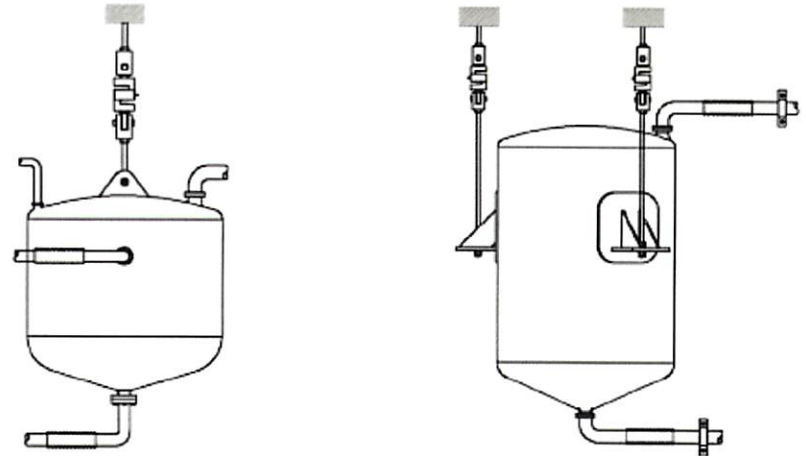
# Weighing Applications

# - Loadcells & Scales

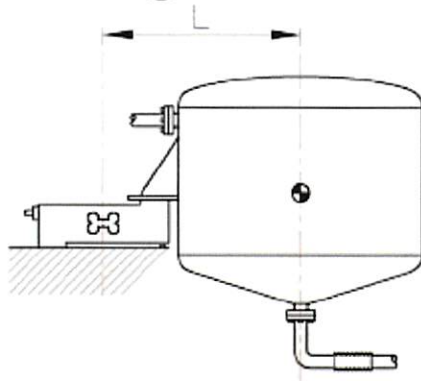
## Bending/Shear Beams & Compression



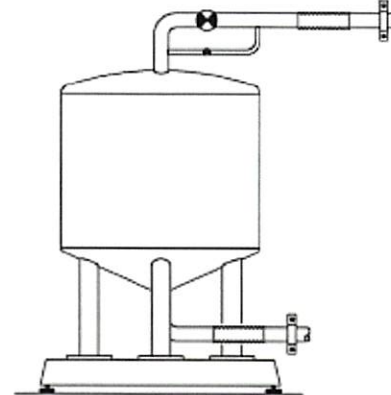
## Tension



## Single Point



## Bench/Floor Scale





# Hardy Tool Box

# - Core Technology Features



**C2®** - Calibrate Without Weights  
Factory Pre-Calibrated, Certified, Traceable



**WAVERSAVER®** - Firmware Algorithm to reduce  
Vibration Noise



**INTEGRATED TECHNICIAN®** - Remote  
Troubleshooting Tools for Operators, and Technicians



**Embedded Web Server** - Connect from Anywhere  
From a Network Connected PC Browser



**Rockwell Premiere Integration Partner**  
Encompass Partner for 26 Years



**OneMount®** - Precision Sensors @.02% accuracy  
Versatile Installation, Self-Centering with 360° Checking

- ✓ Accurate
- ✓ Stable
- ✓ Fast



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# Hardy Scale Technology

# - Instrumentation, Sensors & Scales

PLC, DCS, PC



**PLC INTEGRATION TOOLS**  
Easy to configure and setup with  
a Rockwell Automation PLC  
**Rockwell Add-on-Profile**

**INSTRUMENTS and PLUG-IN-MODULES**

Vibration immunity from  
mechanical noise

**WAVERSAVER®**



**HOME RUN CABLE**



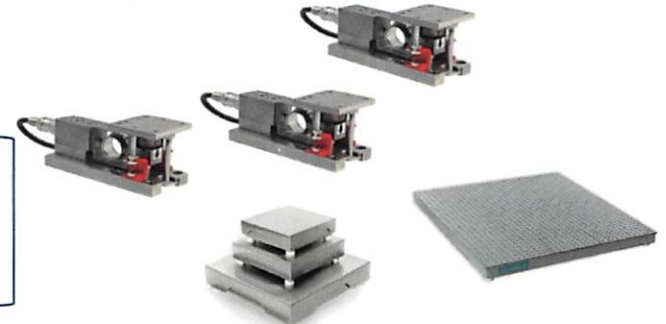
**SUMMING CARD mounted in JUNCTION BOX**  
Weighing system monitoring,  
diagnostics and troubleshooting

**IT INTEGRATED  
TECHNICIAN®**



**LOAD CELLS mounted in LOAD POINTS**  
Electronic calibration without test  
weights

**C2® eCAL**



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# Hardy Scale Technology

# C2 weightless calibration.

on-site "transfer" of calibration data & "combining" calculations

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FINAL DATA SUMMARY

Type : HI SP6-200      Serial No. : 12220423

Capacity : 4401b

Rated Output @ 4401b : 2.0059 mV/V **(B)**

Terminal Resistance : 1,086.89 Ohms Input  
                                  946.14 Ohms Output

Non-Linearity : 0.003 % of R.O. **(A)**

Hysteresis : -0.006 % of R.O. **(C)**

Bridge Unbalance : 0.35 % of R.O. **(C)**

Insulation Resistance:

Bridge to Element : > 10 Giga Ohms

Bridge to Shield : > 10 Giga Ohms

Element to Shield : > 10 Giga Ohms

Technician : SPD

Date Calibrated : 9-Jun-18 **(A)**

Percent Creep @ 5 Minutes : -0.002% of R.O. **(A)**

Percent Creep @ 5 Minutes : -0.002% of R.O.

Percent Creep @ 5 Minutes : -0.002% of R.O.

**STEP 1**  
(CAPTURED DURING PRODUCTION)  
Ensures that each loadcell is "MATCHED" that is the "COMBINED ERROR" of each loadcell is within the "MATCHED" specification tolerance

Combined Error	
Max Allowed Tolerance <=0.02%	
(as a % of Rated Output)	
Loadcell 1	0.0030000000000000
Loadcell 2	0.0050000000000000
Loadcell 3	0.0060000000000000
Loadcell 4	0.0010000000000000

Non-Linearity	Hysteresis	Creep	Combined Error
0.0030000000000000	-0.0060000000000000	-0.0020000000000000	<b>0.0070</b>
0.0050000000000000	-0.0090000000000000	-0.0030000000000000	<b>0.0107</b>
0.0060000000000000	-0.0020000000000000	-0.0050000000000000	<b>0.0081</b>
0.0010000000000000	-0.0080000000000000	-0.0060000000000000	<b>0.0100</b>



**STEP 2**  
(DONE ON-SITE AT COMMISSIONING)  
C2 algorithm calculates the combined compensated "SLOPE" using each loadcells unique output resistance and unique rated output

Output Resistance (ohm)	
Loadcell 1	946.14
Loadcell 2 <b>(C)</b>	1005.23
Loadcell 3	973.12
Loadcell 4	934.27

Combined Output Resistance (ohms)			
Loadcell 1	Loadcell 1 & 2	Loadcell 1 & 2 & 3	Loadcell 1 & 2 & 3 & 4
946.1400000000000000	487.3951696500410000	324.7443075880510000	240.9812679821910000

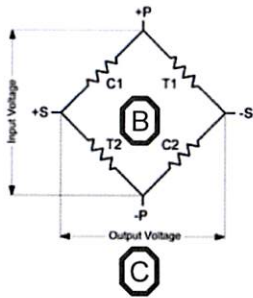
Rated Output (mV/V)	
Loadcell 1	2.0059
Loadcell 2 <b>(B)</b>	1.9101
Loadcell 3	2.2340
Loadcell 4	2.1500

Combined Rated Output with Combined Output Resistance (mV/V/ohm)			
Loadcell 1	Loadcell 1 & 2	Loadcell 1 & 2 & 3	Loadcell 1 & 2 & 3 & 4
2.0059000000000000	1.9746178950202100	2.0395190265097800	2.0621727736742400 <b>(D)</b>

**STEP 3**  
(DONE ON-SITE AT COMMISSIONING)  
C2 algorithm compensates for the "ZERO OFFSET" using each loadcells unique zero load offset

Bridge Unbalance at zero weight (as a % of Rated Output)	
Loadcell 1	0.3500
Loadcell 2 <b>(C)</b>	0.2000
Loadcell 3	0.1030
Loadcell 4	-0.1876

Combined Bridge UnBalance = zero offset (mV)			
Loadcell 1	Loadcell 1 & 2	Loadcell 1 & 2 & 3	Loadcell 1 & 2 & 3 & 4
0.0351032500000000	0.0542042500000000	0.0657093500000000	0.0455423500000000 <b>(E)</b>
0.0351032500000000	0.0191010000000000	0.0115051000000000	-0.0201670000000000



# Hardy Scale Technology

# C2 weightless calibration.

on-site "transfer" of calibration data & "combining" calculations

(C) (B)

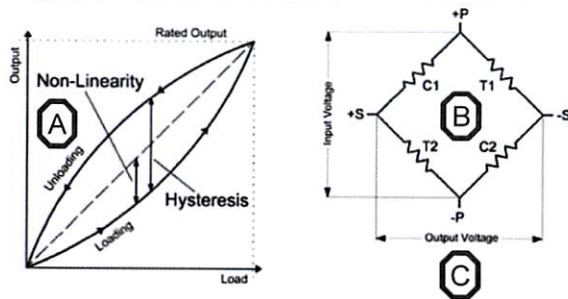
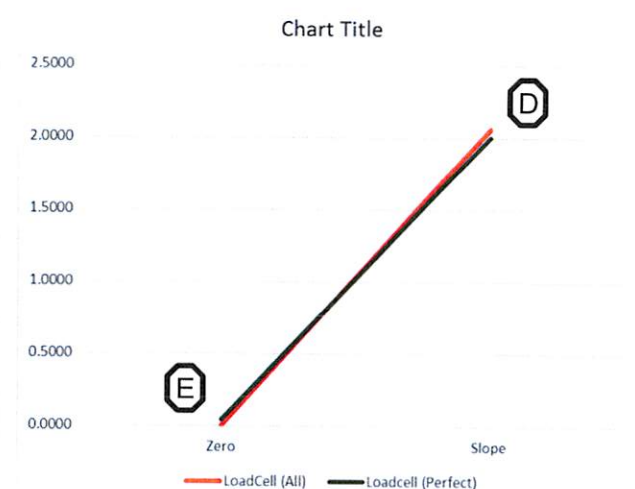
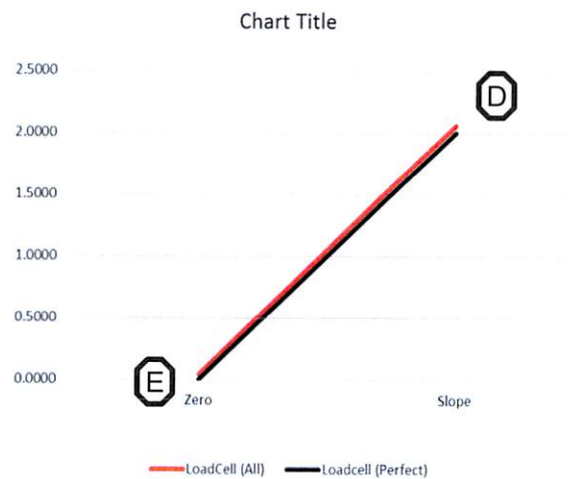
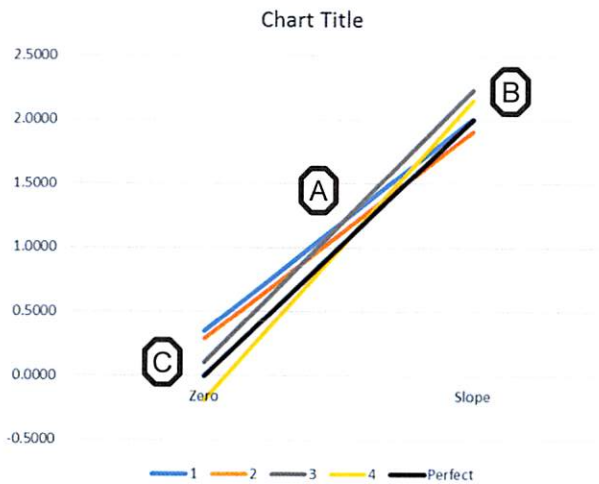
Loadcell #	Zero	Slope
1	0.3500	2.0059
2	0.2890	1.9101
3	0.1030	2.2340
4	-0.1876	2.1500
Perfect	0.0000	2.0000

(E) (D)

	Zero	Slope
LoadCell (All)	0.0455	2.0622
Loadcell (Perfect)	0.0000	2.0000

(E) (D)

	Zero	Slope
LoadCell (All)	0.0000	2.0622
Loadcell (Perfect)	0.0455	2.0000



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# Solutions - Weight processors, controllers & sensors technology

## WEIGHT PROCESSORS



## WEIGH SCALE PLC MODULES



## APPLICATION-SPECIFIC CONTROLLERS



## APPLICATION-SPECIFIC MODULES



## INTEGRATED SOLUTIONS



## BENCH & FLOOR SCALES



## LOAD POINTS / LOAD CELLS / LOAD SENSORS



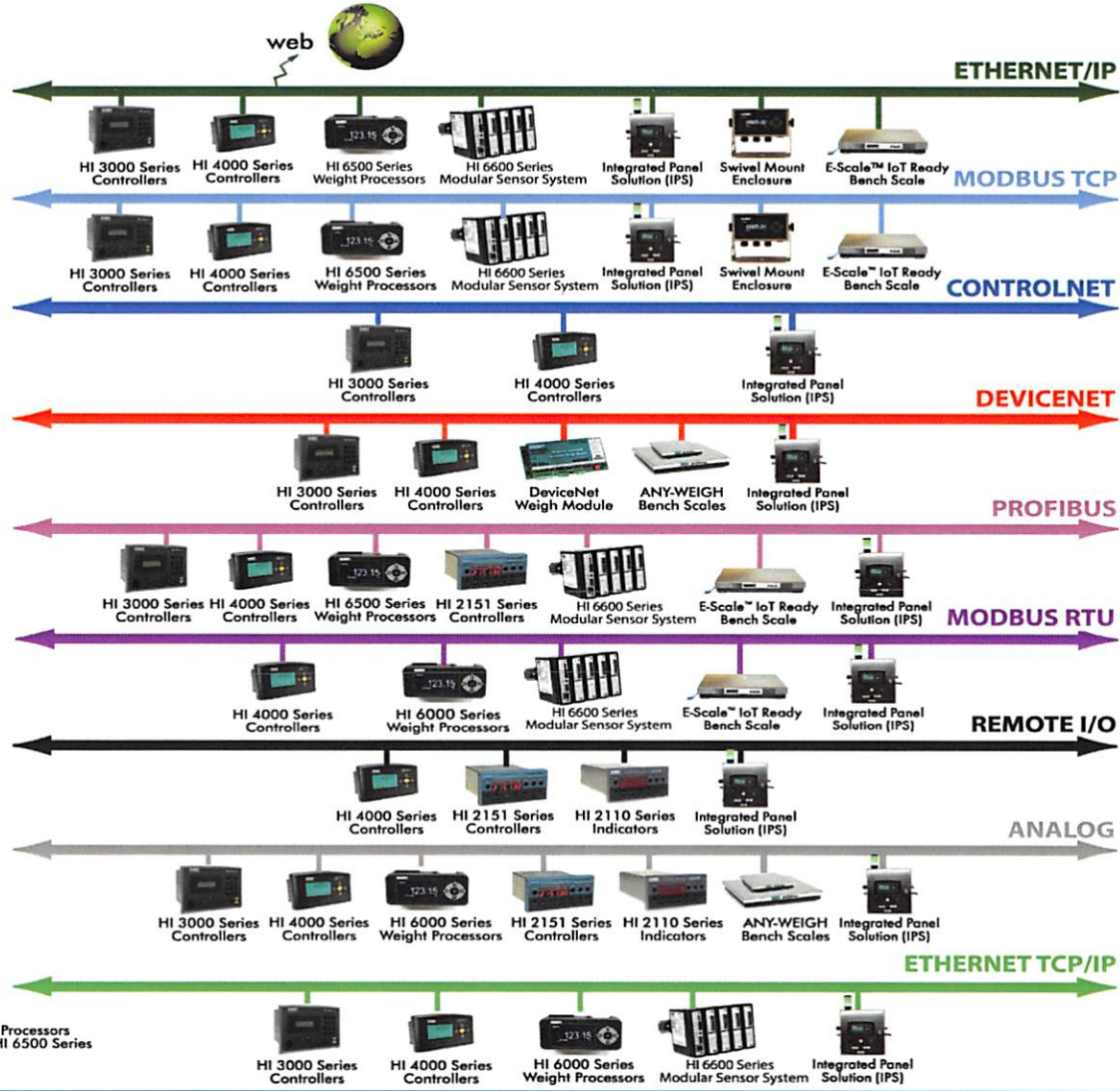
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# Solutions

# - Connectivity technology



Note: HI 6000 Series Weight Processors refers to both the HI 6300 and HI 6500 Series



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# Solutions

## - Loadcell & Scale technology

1. Compression Rockers(15.5Klbs-660Klbs)



2. Double Ended Shear Beam(1.1Klbs to 250Klbs)



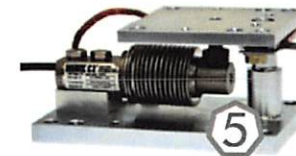
3. Shear Beam(44lbs-22.5Klbs)



4. Tension S-Type(220lbs-11.25Klbs)



5. Bending Beam (22-550lbs)



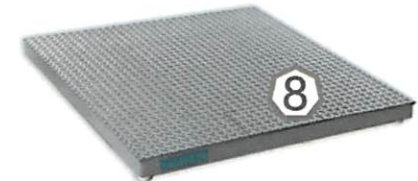
6. Single Point(0.66lbs-2.2Klbs)



7. Bench Scales(2lbs-1.3Klbs)



8. Floor Scales(500lbs-10Klbs)





# Solutions

# - Checkweigher technology

<b>Suggest Price:</b>	<b>\$21,000 - \$26,000</b>	<b>\$32,000 - \$37,000</b>	<b>\$18,500 - \$24,000</b>	<b>\$19,500 +</b>
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## Hardy Dynamic Checkweigher Series

<b>NEW - Hardy Process Solution's Dynamic Series Family of In-motion Checkweighers</b>				
	<b>Model</b>	<b>Dynamic C Series</b>	<b>Dynamic S Series</b>	<b>Dynamic I Series</b>
<b>Construction</b>	Stainless Steel Tube Frame USDA/FDA Multistrand Nylatron® Flat-Top Chain Weighbridge Length: Min 28", Max 48" Weighbridge Width: Min 1", Max 14" TEFC or Food-Grade & Wash-Down VDC Drive	Stainless Steel Tube Frame USDA/FDA continuous belt Weighbridge Length: Min 12", Max 18" Weighbridge Width: Min 6", Max 14" IP65 Stainless Brushless Motor or IP54 Zinc Plated Brushless Motor	Formed Stainless Frame USDA/FDA continuous belt Weighbridge Length: Min 24", Max 36" Weighbridge Width: Min 10", Max 36" IP65 Stainless Brushless Motor or IP54 Zinc Plated Brushless Motor	Structural Channel Frame USDA/FDA continuous belt Weighbridge Length: Min 24", Max 36" Weighbridge Width: Min 10", Max 36" IP65 Stainless Brushless Motor or IP54 Zinc Plated Brushless Motor
<b>Applications</b>	Small Parts Mfg., Pharmaceutical and Packaged consumer goods, food industry	Food industry, packaged or raw products, FFS liquid or dry products.	Food & Related Industries, light manufacturing, bakery, Specialty chemical and consumer goods	Industrial & Institutional bagged product; 10-100 lbs. bags of Concrete, Grain, and various Chemicals
<b>Available Options</b>	3 or 5 Zone Stack light Air or mechanical rejecter Rejecter conveyor Corrosion/Hazardous area options Closed-loop feedback Metal and X-Ray Detectors	3 or 5 Zone Stack light Air or mechanical rejecter Rejecter conveyor Corrosion/Hazardous area options Closed-loop feedback Metal and X-Ray Detectors	3 or 5 Zone Stack light Mechanical rejecter Rejecter conveyor Corrosion/Hazardous area options Closed-loop feedback Metal and X-Ray Detectors	3 or 5 Zone Stack light Mechanical rejecter Rejecter conveyor Corrosion/Hazardous area options Closed-loop feedback Metal and X-Ray Detectors





# Solutions

# - Hardy OneMount™ technology



- **360° Checking Mechanism** means load points can be installed in any direction – eliminated need of fixed, bumper, slider configuration of load cells
- **Self-centering Rocker** design maintains alignment under considerable shear forces
- **Precision** built sensor – Matched **mV/V/Ohm** output, simplifies replacing load cell sensors.
- **C2® Electronic Calibration** for fast **Startup, Verification and Calibration**



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# HARDY OFFERS.....

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- Precision Instruments
- Embedded Technology
- Connectivity
- Ease of Use
- Lowest Cost of Ownership

## Certifications

