



2020

SENSING AND INTERNET OF THINGS

Mustafa Sapmaz

Honeywell
THE POWER OF CONNECTED

Honeywell is building a smarter, safer,
and more sustainable world

THAT'S THE POWER OF **CONNECTED**
THAT'S THE POWER OF **HONEYWELL**

Connected Aircraft • Connected Automobile • Connected Home • Connected Building
Connected Plant • Connected Supply Chain • Connected Worker

Honeywell
THE POWER OF **CONNECTED**

Honeywell Sensing and Internet of Things

BE THE LEADING PROVIDER
FOR INTELLIGENT SENSORS
TO **CONNECT THE WORLD.**

Honeywell

THE POWER OF **CONNECTED**

Honeywell Overview

NYSE: HON | ~1,300 sites | ~131,000 employees | Morris Plains, N.J. headquarters | Fortune 100

Aerospace



\$14.8B
Sales

Our products are used on virtually every commercial and defense aircraft platform and in more than 100 million vehicles worldwide and include aircraft propulsion, cockpit systems, and satellite communications.

Home and Building Technologies



\$9.8B
Sales

Our products, software, and technologies are in more than 150 million homes and 10 million buildings worldwide, helping customers control their comfort, security, and energy use.

Performance Materials and Technologies



\$10.3B
Sales

We develop advanced materials, process technologies, automation solutions, and industrial software that are revolutionizing industries around the world.

Safety and Productivity Solutions



\$5.6B
Sales

We improve enterprise performance and worker safety and productivity with our scanning and mobile computers, software, warehouse automation solutions, and personal protective equipment.

Reflects 2018 Full-Year Results

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Aligned to Key Global Macro Trends

Sensing and Internet of Things (IoT)

Aerospace/Defense



Industrial



Medical



Transportation




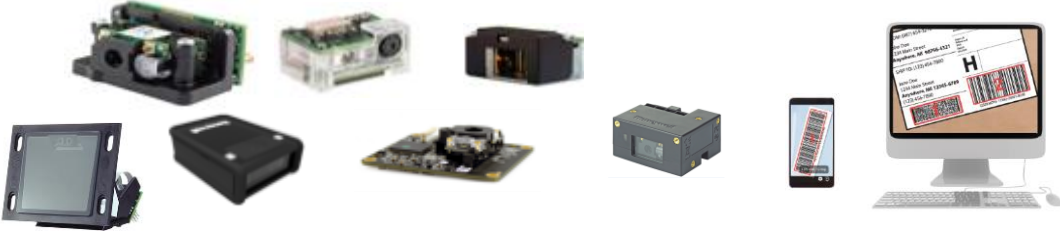



Test & Measurement

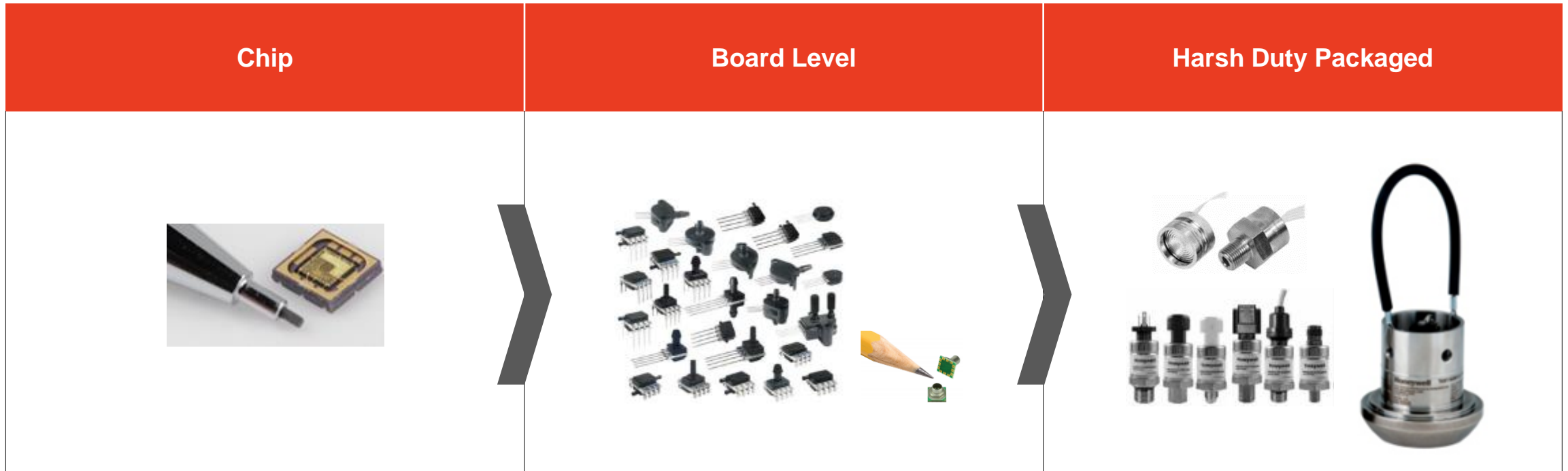


- A leading global supplier of custom-engineered sensors, switches, machine safeguarding and other devices offering enhanced precision, repeatability and durability to a variety of original equipment manufacturers
- Enhanced performance and wide application experience
- Global sourcing and manufacturing footprint
- Superior technical and customer support

Complete Portfolio

Electronic Sensing	Packaged Products	Test & Measurement Devices
Pressure, Thermal, Speed & Position	Packaged Sensors & Switches, Controls & Monitoring, Precision Aerospace Products	Pressure, Load, Torque, Instrumentation
		
Optical Scan Engines and Barcode Decoding Software		Gas Sensors
1D / 2D Scan Engine, Imager Module, Fix Mount Scanner, Specialty Engine, SwiftDecoder™		Electrochemical, Catalytic Bead, Infrared, Solid Electrolyte, Pulse Oximetry, Respiratory Sensors
		

Vertically Integrated with In-House Sensor MEMs Fab








Sensing and IoT Portfolio





Pressure / Force	Speed / Position / Magnetic	Torque / Load	Humidity / Temperature	Optical / Particle
				
Scan Engines and Decoding Software	Gas Sensing	Electromechanical	Current	Airflow
				

Medical / Healthcare

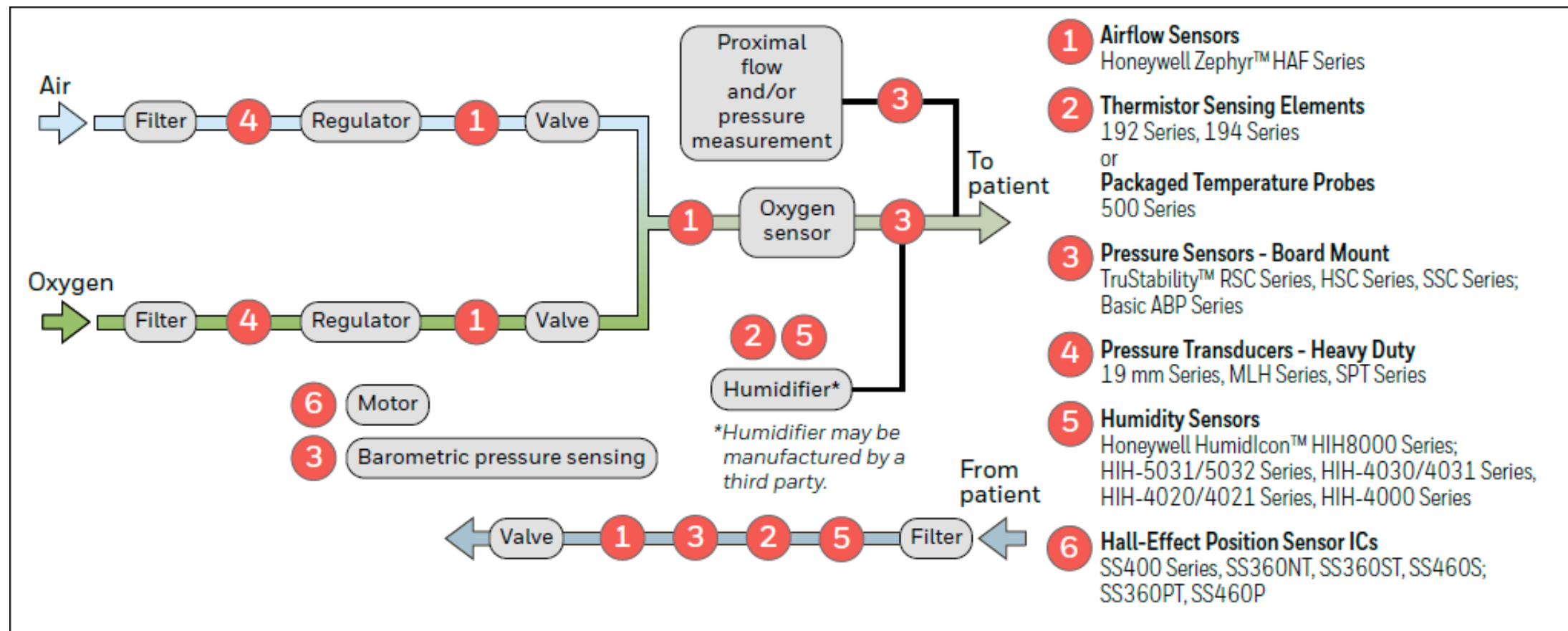
POTENTIAL APPLICATIONS

Anesthesia	Wearables / Pulse Monitoring	Ventilators	Hospital Equipment – Blood Pump, Drug Cart	Home Medical Equipment – Alcohol Monitoring, Sleep Apnea Machines
				

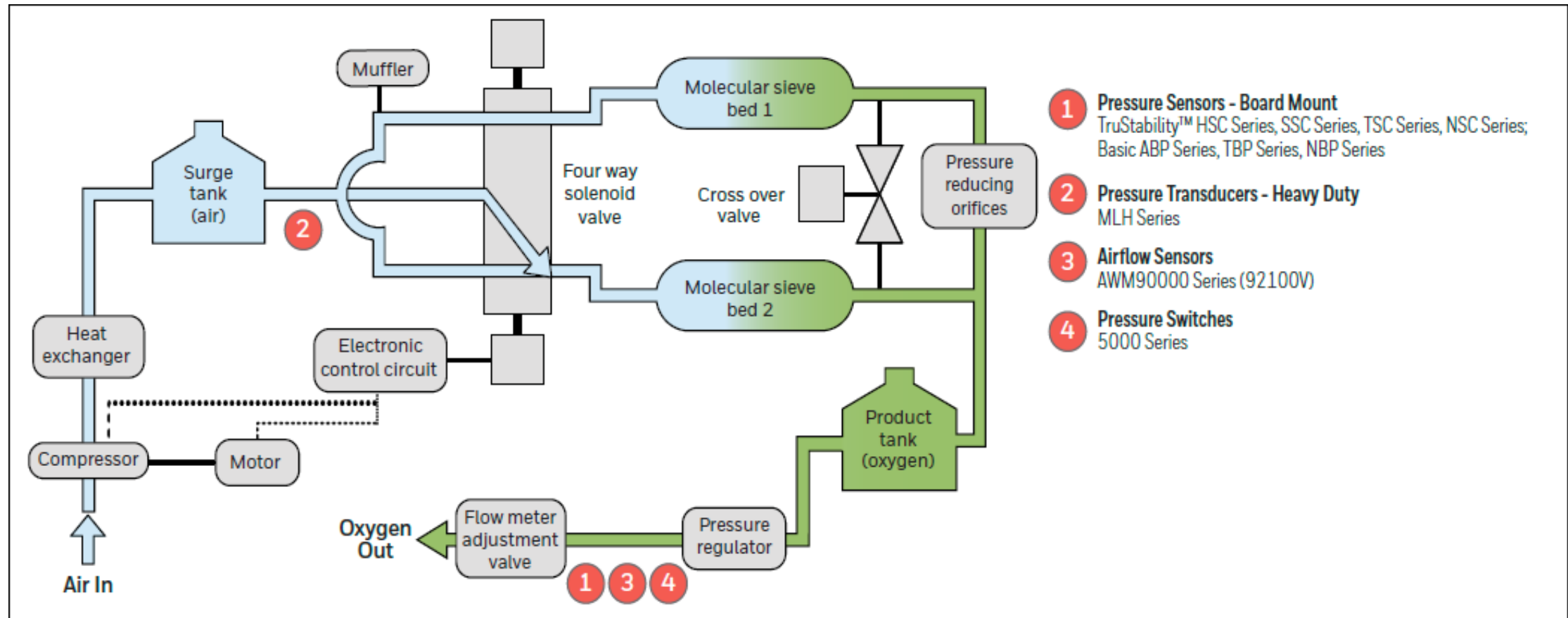
PORTFOLIO

Airflow / Humidity Sensors	Pressure Sensors	Force Sensors	Magnetics
			

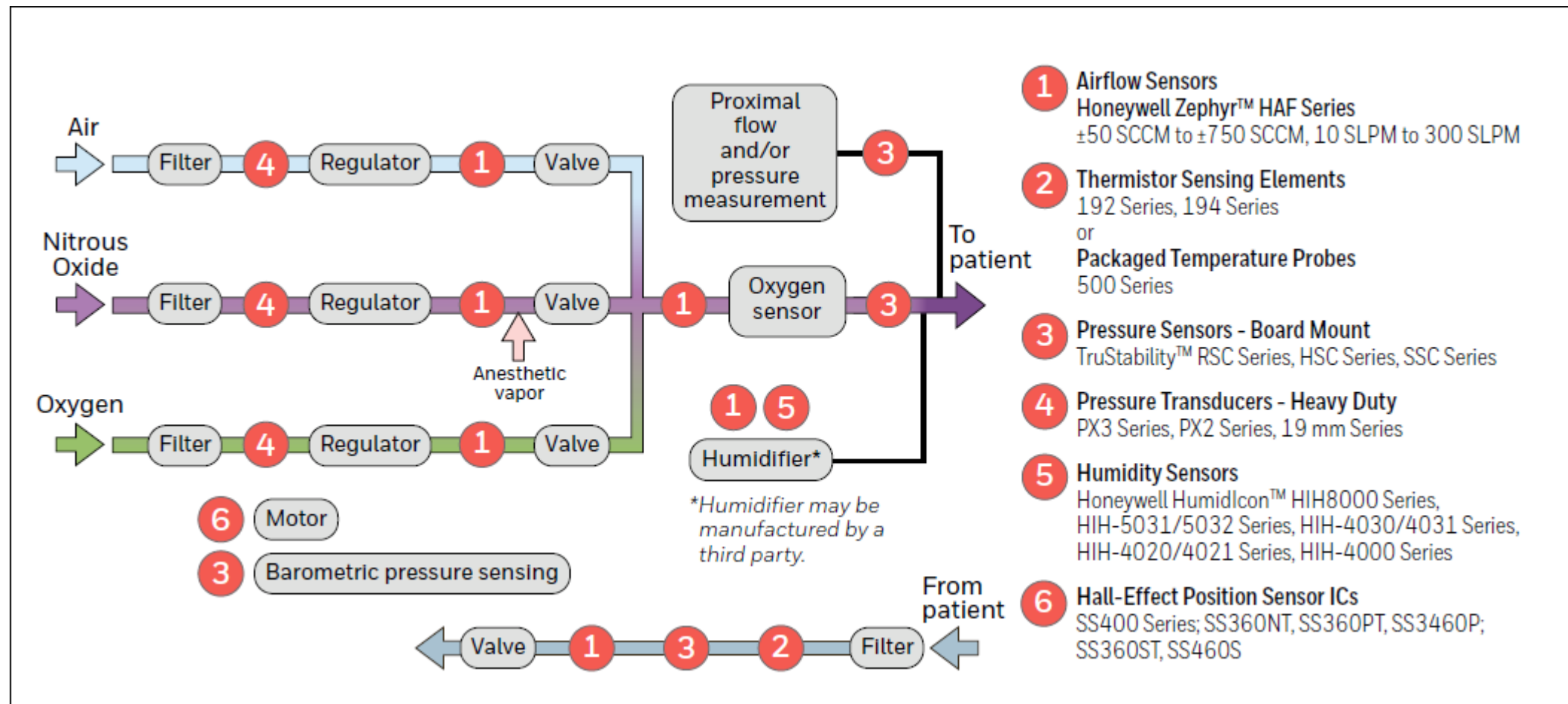
Ventilator Block Diagram



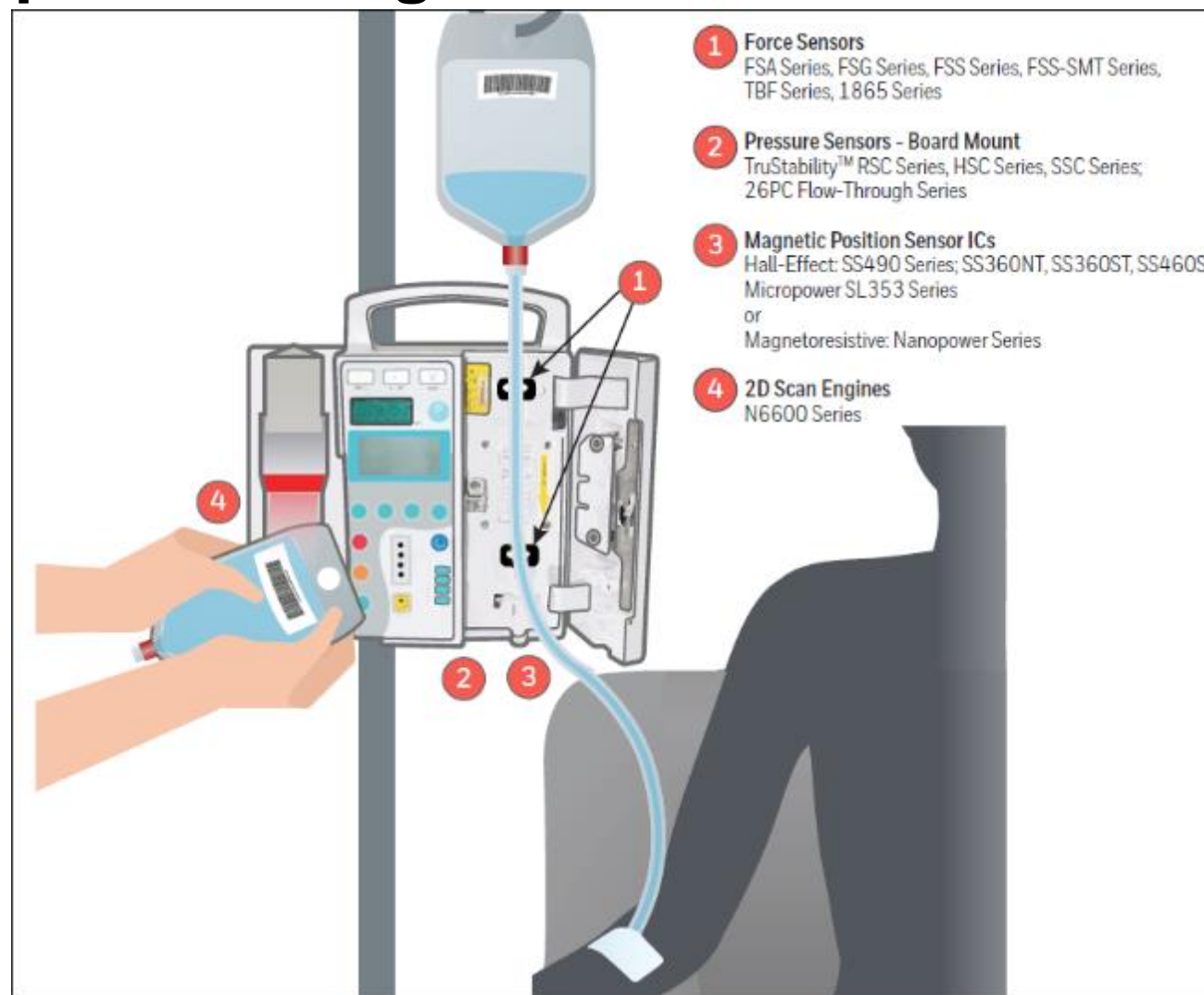
Oxygen Concentrator Block Diagram



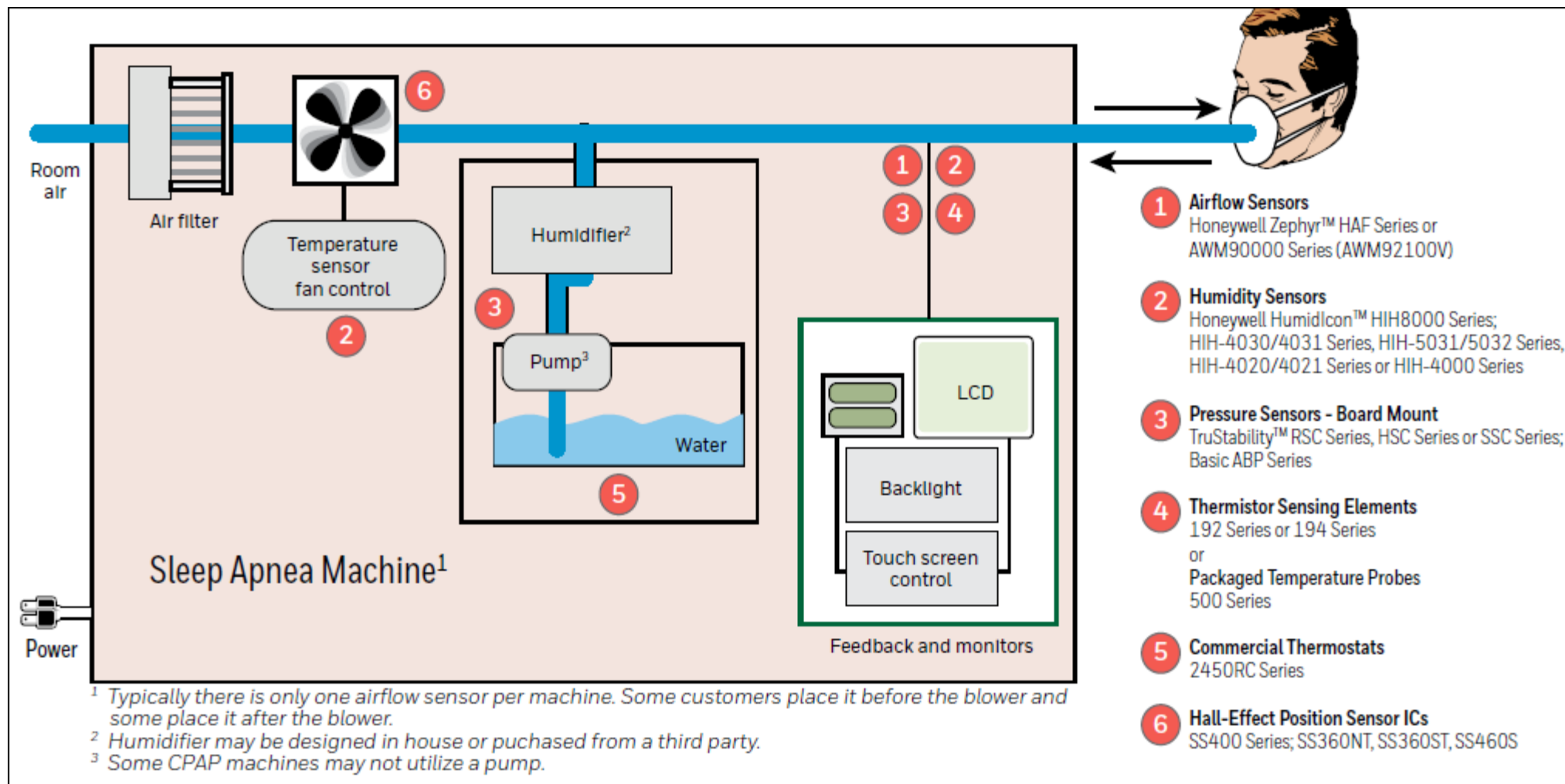
Anesthesia Delivery Machine Block Diagram



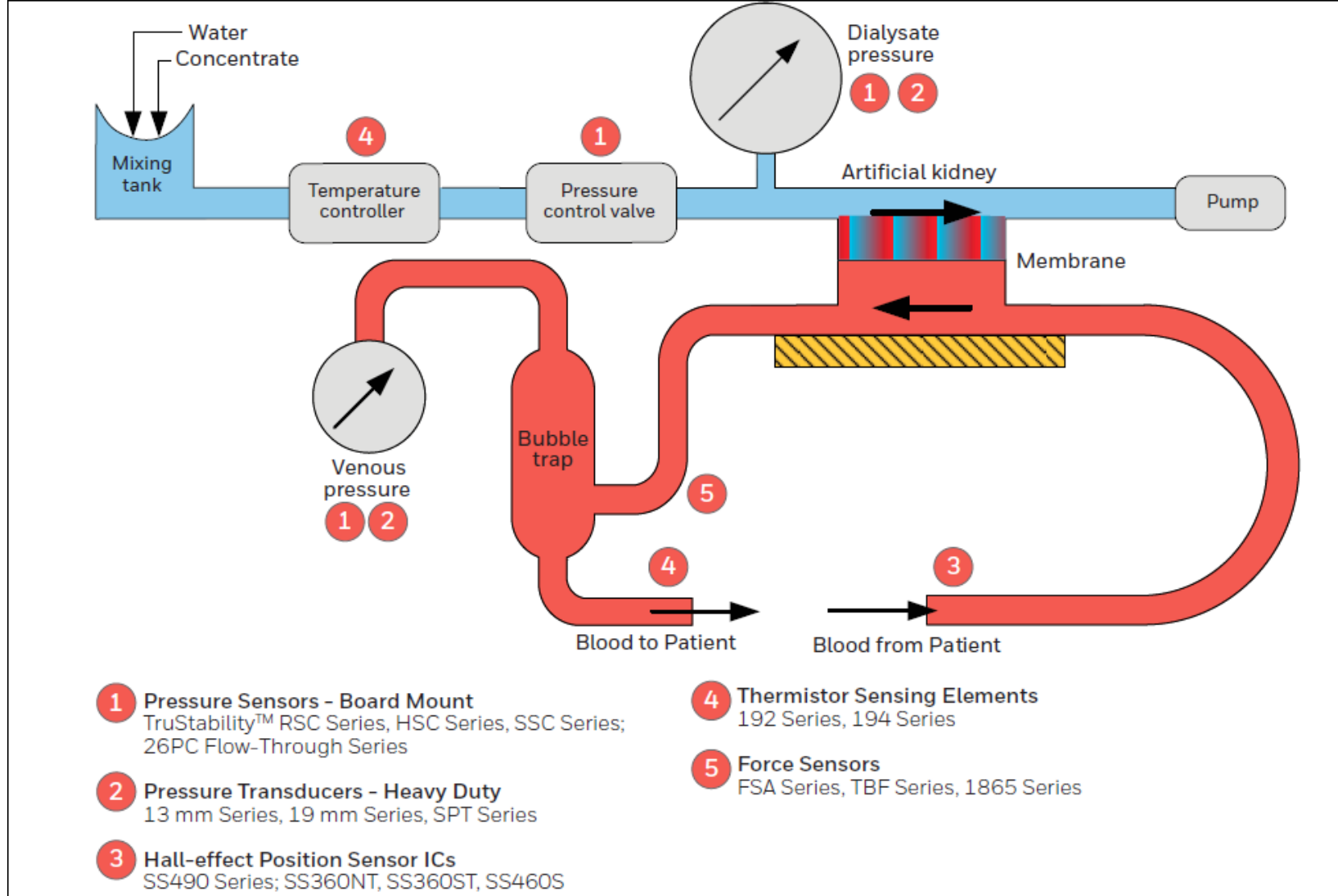
Infusion Pump Block Diagram



Sleep Apnea Machine Block Diagram






Kidney Dialysis Machine Block Diagram



Pressure and Force Portfolio

Strengths





- Stable, low-drift performance
- Integrated circuitry for on-chip signal conditioning
- On sensor compensation, amplification, digital out
- Wide pressure range (1 inH₂O to >150,000 psi)

TruStability™ Pressure	Basic Pressure	20PC Pressure	Legacy	T&M	Force
					
PX2 / PX3 Heavy Duty Pressure	MLH Heavy Duty Pressure	SPT Heavy Duty Pressure	13 / 19 MM Heavy Duty Pressure	Pressure Switch	
					

Environmental – Humidity, Temperature, Airflow and Particulate Matter Portfolio

Strengths

- Integrated circuitry for on-chip signal conditioning
- Enhanced accuracy and stability
- Wide operating ranges and low hysteresis
- Low total error band

Humidity HumidCon / HIH	Thermistors	Low Temperature Probes LTP	Airflow	Particulate Matter
				

Gas Sensing Portfolio

Strengths

- Trusted technology in critical applications
- Applications knowledge across environments and ancillary gases
- Low profile / small size
- Broad target gas sensing capability

Electrochemical



Pellistor



Photo Ionization Detector (PID)



Magnetics, Speed and Position Portfolio

Strengths

- Low power consumption
- Enhanced accuracy
- Non-contact design extends product life
- High environmental ratings
- Faster response times

VRS



Speed



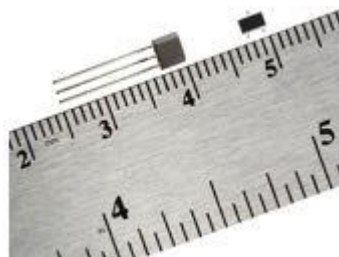
Rotary



SMART



Magnetics



Potentiometer



Inertial Measurement Unit

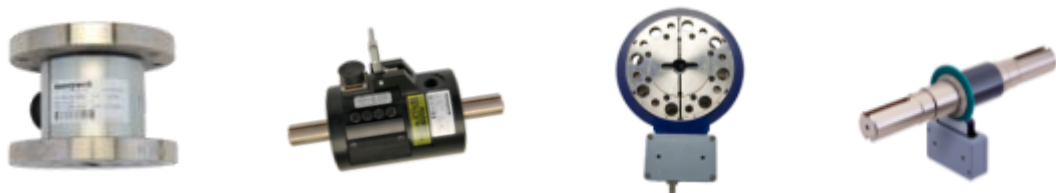


Torque and Load Portfolio

Strengths

- Decades of design experience
- Accuracy from 0.05%
- Expertise for product integration
- Scale offering covering very low to high loads
- In-house calibration across load ranges

Torque Cells



Load Cells



Scan Engines and Barcode Decoding Software Portfolio

Strengths

- Robust reading technology
- Low profile / small size
- Value to high performance
- Deep integration knowledge in mobile, tablets, clinical instruments and presentation scanners

1D Scan Modules



2D Scan Module



SwiftDecoder™ Barcode Decoding Software



Electromechanical Portfolio

Strengths

- Expertise in harsh duty packaging
- Heritage of product robustness
- Full industry certifications
- Applications knowledge in Factory, Oil & Gas, Aerospace and Vehicles
- Broad portfolio with depth in features

Basics



Sealed



Limits



Toggles



Aero Proximity



RVDT / LVDT



Wireless



Operator Controls



2017-18 Major Product Launches

Micro Pressure Platform



- High accuracy in a small size and low cost design
- Non-invasive blood pressure, water level detection for home appliances

AMR S&D 2/3/4 Wire Universal IC Platform



- Ring magnet sensing
- Higher accuracy, better system level control and application flexibility
- Automotive Tier 1 and Tier 2, Industrial motor and bearing

TARS* Series IMU



- Robustly packaged, configurable software capability
- Dynamic grade control, vehicle implement location and stability

Intelligent Gas Sensor 1-Series Platform



- New format platform to embed digital layer for intelligent gas sensors
- Industrial Safety, Emissions, Environmental applications

* Transportation Attitude Reference System







Potential Sensor Applications

Home Appliance and Environmental Monitoring

POTENTIAL APPLICATIONS

Door Position	Electric Motor	Thermostats	Smoke and Carbon Monoxide Detectors	Indoor Air Quality
				

PORTFOLIO

General Industrial	Humidity Sensors	Gas Sensors	Board Mount Magnetics	Pressure / Force	Particulate PM 2.5
					

Smart Cities

POTENTIAL APPLICATIONS

Air Quality: Sensing and monitoring of indoor and outdoor air for pollution, comfort, safety and health

Gas Metering: Magnetics improve measurement and tampering

Smart Parking: Position sensing and monitoring for city parking, garages and meters

Visual Displays: Optical engines and sensors for scanning and position sensing in kiosks and vending



PORTFOLIO

General Industrial

Humidity/Temperature Sensors

Gas Sensors

Pressure

Magnetics

Particulate PM 2.5

Scan Engines



HVAC and Refrigeration

POTENTIAL APPLICATIONS

Refrigeration



Compressors/Chillers



Pumps



Variable Air Volume



PORTFOLIO

Thermostats



Heavy Duty Pressure



Heavy Duty
Temperature



Value-Added Products
& Heaters



Indoor Air
Quality Sensing




Emissions and Gas
Sensing





Oil and Gas

POTENTIAL APPLICATIONS

Motor Control	Process Flow Controls: Valve control, liquid level, differential pressure and flow measurement in oil and gas	Gas Detection	Tank Level Monitoring	Well Head Pressure
				

PORTFOLIO

Heavy Duty Pressure	Hazardous Location	Valves and Flow	Gas Sensors
			

Transportation

POTENTIAL APPLICATIONS

Autonomous Vehicle Operation: Utilize position/inertial feedback on articulating members of vehicle to automate routine tasks and prevent unsafe operation



Hybrid/Electric Vehicle Transmission: Closed-loop control utilizing Speed and Position sensors to optimize shift points; superior EMC performance for electric vehicles



Hydraulic and Braking Systems: Feedback of system hydraulic pressure to ensure operation within safe limits with onboard switch diagnostics



PORTFOLIO

Pressure Solutions



Speed Sensors



Position Sensors



Inertial Measurement



Operator Controls








Heavy Duty Pressure








Retail

POTENTIAL APPLICATIONS

Mobile POS	POS	Kiosk / Lottery	ATM	Handheld Scanner
				

PORTFOLIO

1D Scan Engine	2D Scan Engine	Decoder Board	Barcode Decoding Software	Optical
				

Industrial Automation

POTENTIAL APPLICATIONS

Safety: Machine safety, interlocks and industrial emergency stop systems for use in packaging equipment, textiles, plastic molding and conveyors



Hazardous Location: Position detection, pressure gauging and motor control in explosion proof grain handling, oil, gas and chemical applications



Process Flow Controls: Valve control, liquid level, differential pressure and flow measurement in oil and gas, food and beverage and industrial process



PORTFOLIO

General Industrial	Heavy Duty Pressure	Safety Products	Hazardous Location	Valves and Flow	Indoor Air Quality	Emissions and Gas Sensing	Heavy Duty Temperature

Access Control and Evacuation Devices

POTENTIAL APPLICATIONS

Fire Alarm Break Glass
Detection



Tamperproof



Electric Gate Access



Gas Shut Off



Barcode Scanning



PORTFOLIO

General Industrial



Embedded Barcode Scanning Modules



Aerospace Sensing and Control Profile

POTENTIAL APPLICATIONS

Engines & Auxiliary
Power Unit (APU)

Landing Gear – Up Locks, Down
Locks and Weight-on-Wheels

Airframe – Doors, Slides, Nacelles &
Thrust Reversers

Flight Controls – High Lift,
Trim Tabs & Devices



PORTFOLIO

Proximity Sensors

Position Sensors

Sealed Switches

Speed Sensors

Thermal Sensors



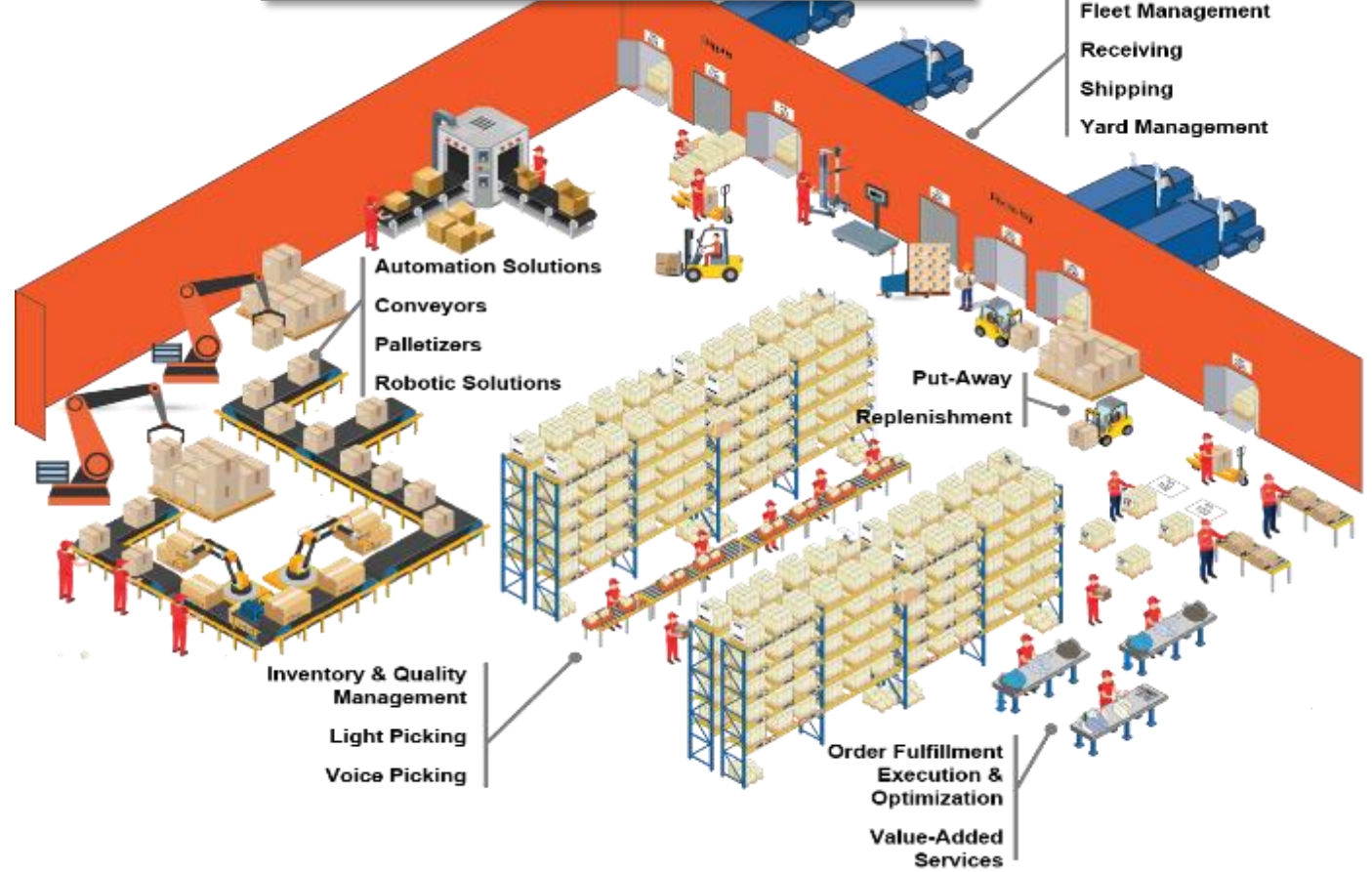
SPS + Intelligrated – The Future of Distribution Fulfillment

Optimization and Aftermarket Services



- Asset Management
- Business Intelligence
- Lifecycle Management
- Operations & Solutions Development Services
- Training
- Vehicle Performance Management
- Industrial Internet of things (IIoT)

Warehouse Execution System



Edge Applications and Devices

- Cloud-based Applications
- Forktruck Terminals
- Light Directed Work
- Printers
- Scanners
- Voice Directed Work



Industrial Safety, Gas and Fire Detection

- General Safety (eye, head, hearing, foot)
- Fall Protection
- Fire, Gas Detection



IoT Industry and Honeywell

About Honeywell's Products

- For more information about all of Honeywell Sensing and Internet of Things' sensor and switch products, visit sensing.honeywell.com.

