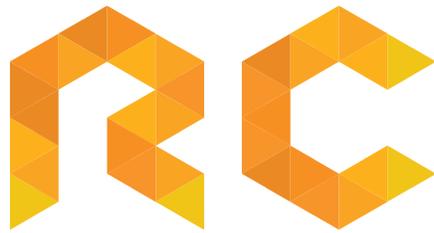




# RUGGED CONTROLS

PRODUCT & SOLUTIONS CATALOG



# **RUGGED** CONTROLS

*Precision that lasts.*

[www.rugged-controls.com](http://www.rugged-controls.com)

**206-634-1308**

**4211 24th Avenue West  
Seattle, WA 98199, USA**

# WELCOME

## Precision that lasts.

At Rugged Controls, we deliver reliability, accuracy, and performance that stand the test of time. Our goal is simple: to provide the most durable and high-performing smart instrumentation on the market.

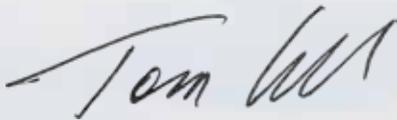
Whether in need of load or pressure monitoring, tension control, or pay-in/pay-out tracking, our systems integrate seamlessly with winch and crane operations for industries including maritime, oil & gas, construction, utilities, and beyond.

True to our name, every product we build is engineered to thrive under extreme conditions. We know our customers never quit and they depend on equipment that won't either.

There is no greater honor than earning the trust of professionals who work in some of the most challenging environments on Earth. We're proud to be their long-term partner and are ready to be yours.

Thank you for your interest in Rugged Controls. Let's get to work.

Tom Rezanka



President, Rugged Controls

## TABLE OF CONTENTS:

**3-16: Products**

**17-28: Solutions**

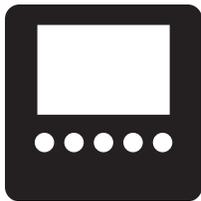
**29-37: Industries**

# PRODUCTS

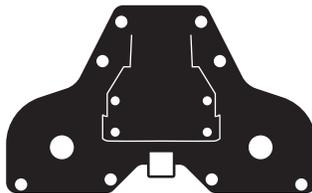
At Rugged Controls, our products are designed to perform reliably in demanding environments where precision and durability matter most. Every system we build reflects decades of experience solving the challenges of load monitoring, line control, and data acquisition.

We design each product to work as part of a larger ecosystem, seamlessly integrating with winches, cranes, pump/frac trucks, and other heavy equipment to deliver accurate, actionable information. From controllers to sensors, every component is built to deliver clarity and confidence in critical operations.

Our engineering philosophy prioritizes both performance and practicality. Our products are tested to endure harsh conditions and designed to adapt easily within existing systems, helping customers improve safety, efficiency, and insight across a wide range of industries.



**Rugged Programmable Controllers**



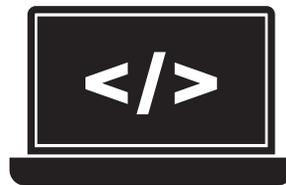
**Running Line Tensiometers**



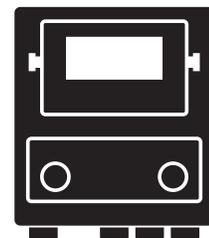
**Load Pins, Load Cells, & Sensors**



**Smart Shackles**



**Software**



**Accessories (Enclosures, Sheaves, Supports)**

# PROGRAMMABLE CONTROLLERS | RPC-90x-C

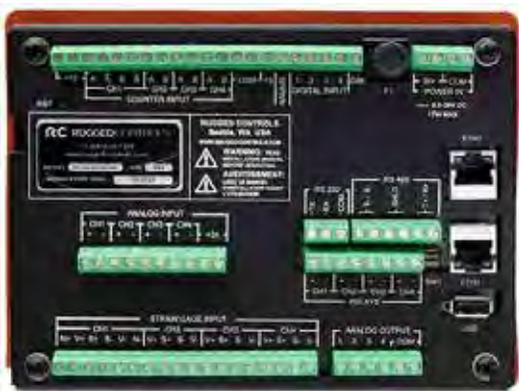
## Control and monitor single/multi-sensor systems in severe or hazardous conditions.

The RPC-90x is now upgraded to the RPC-90x-C. This next-generation Rugged Programmable Controller (RPC)—now in full color—is designed for advanced signal processing and dependable performance even in the most demanding environments. The RPC-90x-C is fully interchangeable with all legacy products.

Its intuitive onboard programming and configurable inputs/outputs support a wide range of measurement types, including tension, torque, weight, and pressure, and its high-visibility display ensures clear readouts regardless of light, angle, or weather conditions.

Engineered for versatility and performance, the RPC-90x-C fits seamlessly into both new and retrofit projects.

## FEATURES & BENEFITS



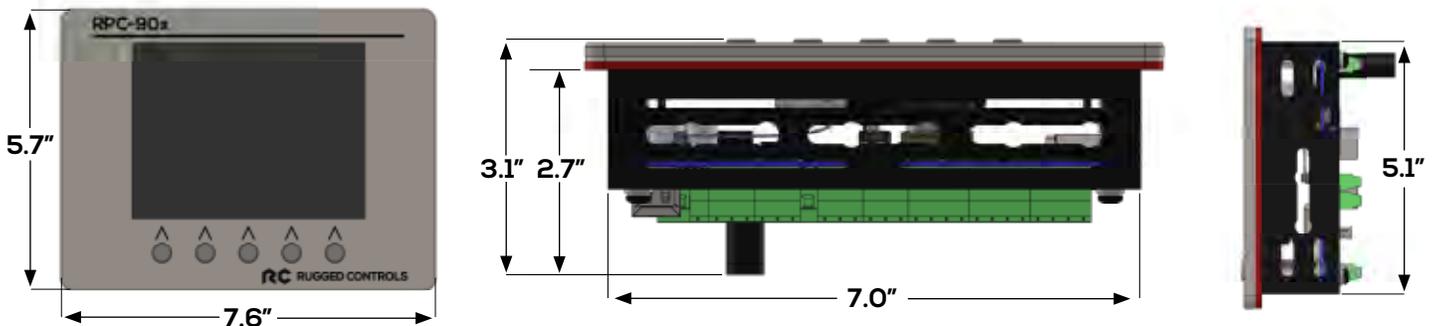
- ▶ **Transmissive color TFT display** offers bright and clear visibility at angles up to 170°.
- ▶ **Sunlight readable at 1,000 Nits** means clear visibility even in direct, intense light, and no ghosting due to burn-in.
- ▶ **Heavy-duty 316 stainless steel** front panel with five fully-sealed, tactile buttons for superior durability to withstand harsh environments.
- ▶ **Onboard browser interface** allows for remote measurement viewing, remote access and control, downloading internal data files, and upload/download of settings profiles. Firmware can be upgraded remotely or via USB.
- ▶ **Real-time data** available to users and other Rugged Controls devices via RS-485, RS-232, and (2) Ethernet ports. Internal and external data logging options for internal memory, USB, and PC applications.
- ▶ **Full programmability** via English language menus. Configurable measurements, alarms, and any other standard setting. No custom firmware required. 4 key functions configurable from menu system provide ultimate flexibility for operators.
- ▶ **Multiple sensor input channels (rotational, analog, and digital)** support high-level and strain gauge analog inputs and a variety of serial or Ethernet enabled sensors. Configurable counter input channels are available for quadrature, pulse, or sinusoidal signals.



- ▶ **Up to 20 alarms**, independently linked to any measurement, to ensure the highest degree of safety for personnel and equipment.
- ▶ **Timestamp measurements and alarms.** Configurable measurements with no custom firmware required. On-screen diagnostics /alarm log.
- ▶ **Displays can be set up as either local or remote.** Configure up to four run-time screens and easily toggle between screens with front-panel button.
- ▶ **Network configurable data ports.** High speed data capture up to 1000 Hz.
- ▶ **Each unit is pre-loaded with a wide variety of application specific profiles** (for example: single winch, single cement, safe load indicator, dual nitro, and more) that don't require the user to be a software expert.
- ▶ **Password enabled security** to prevent unwanted configuration tampering.
- ▶ **RPC-LINK protocol** allows connection between controllers for seamless data exchange. Optional data logging and report generating software available.
- ▶ **Class 1, Division 2** hazardous certification.

## SPECIFICATIONS

<b>Display</b>	640x480 resolution. Transmissive color TFT, 170° visibility. Contrast ratio of 1,000:1.
<b>Enclosure Size</b>	Height: 5.7" x Width: 7.6" x Depth: 3.1".
<b>Panel Cutout</b>	Height: 5.25" x Width: 7.15"
<b>Operating Temperature</b>	-30° C (low threshold) to 75°C (high threshold).
<b>Environmental</b>	Waterproof front panel with silicon mounting gasket.
<b>Power</b>	9.5-36 VDC, 2.8 W.
<b>Analog Input High Level</b>	4 channels   4-20 mA, 0-5DC, 0-10VDC, ± 5VDC, ± 10VDC.
<b>Analog Input Low Level</b>	4 channels   ± 20 mV, ±100 mV.
<b>Analog Output</b>	4 channels   4-20 mA, 0-10VDC, 0-5 VDC, ± 5VDC.
<b>Sensor Excitation</b>	Regulated +5/+12/+24VDC. NAMUR sensor interface. Precision strain gauge excitation.
<b>Count Input</b>	4 channels   Quadrature x1, x2, x4. Count/direction. Up/down counter. 1 channel differential. 10kHz bandwidth.
<b>Output Relays</b>	4 channels, isolated   SPDT dry contact: 125VAC 60VDC @ 1Amp.
<b>Digital Input</b>	4 channels   0-60VDC, trigger level: 2.5V. Functions are menu-selectable.
<b>Serial Communication</b>	RS-485, isolated, half-duplex RS-232.
<b>Alarms</b>	Measurement parameters high and low set-points (any measurement). Accessible via front panel menu interface: filtering, delay, deadband, adjustments.
<b>Approvals</b>	NEMA 4X per NEMA-250:2018 hosedown/impact. UL certified. Class 1, division 2. Groups A, B, C, and D, T5.
<b>Ethernet</b>	Ethernet: 10base T, TCP/UDP.



## PROGRAMMABLE CONTROLLERS | RPC-80x

### Control and monitor single/multi-sensor systems in severe or hazardous conditions.

The RPC-80x is a next-generation Rugged Programmable Controller (RPC) designed for advanced signal processing and dependable performance even in the most demanding environments.

Its intuitive onboard programming and configurable inputs/outputs support a wide range of measurement types, including tension, torque, weight, and pressure, and its high-visibility display ensures clear readouts regardless of light, angle, or weather conditions.

Engineered for versatility and performance, the RPC-80x fits seamlessly into both new and retrofit projects.

### FEATURES & BENEFITS



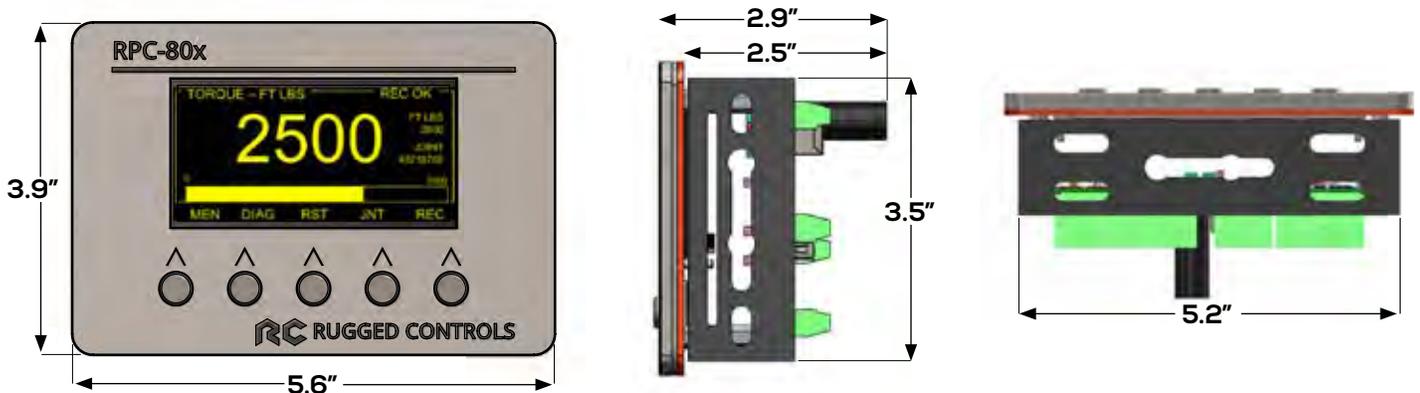
- ▶ **Electroluminescent (EL) display** offers bright and clear visibility at angles up to 179°.
- ▶ **Heavy-duty 316 stainless steel** front panel with five fully-sealed, tactile buttons for superior durability to withstand harsh environments.
- ▶ **Onboard browser interface** allows for remote measurement viewing, remote access and control, downloading internal data files, and upload/download of settings profiles. Firmware can be upgraded via USB.
- ▶ **Real-time data** available to users and other Rugged Controls devices via RS-485, RS-232, and (1) Ethernet port. Data logging options for USB and PC applications.
- ▶ **Full programmability** via English language menus. Configurable measurements, alarms, and any other standard setting. No custom firmware required. 4 key functions configurable from menu system provide ultimate flexibility for operators.
- ▶ **Multiple sensor input channels (rotational, analog, and digital)** support high-level and strain gauge analog inputs and a variety of serial or Ethernet enabled sensors. Configurable counter input channels are available for quadrature, pulse, or sinusoidal signals.



- ▶ **Configure up to three run-time screens** and easily toggle between screens with front panel button.
- ▶ **Employ mathematical functions** to measurements for streamlined calculation of sum, average, and peak data.
- ▶ **Timestamp measurements and alarms** to ensure reporting accurate and automated reporting.
- ▶ **(2) Relays and analog outputs** for safety, control, and third-party integration.
- ▶ **(2) Digital inputs** with functions that are easily menu selectable.
- ▶ **Optional data logging and report generating** software available for highly accurate record keeping.
- ▶ **RPC-LINK protocol** allows connection between RPC-90x or 80x products for seamless data exchange.
- ▶ **Network configurable data ports.** High speed data capture up to 1000 Hz.

## SPECIFICATIONS

<b>Display</b>	160x80 resolution. Electroluminescent (EL).
<b>Enclosure Size</b>	Height: 3.9" x Width: 5.6" x Depth: 2.5".
<b>Panel Cutout</b>	Height: 3.55" x Width: 5.27"
<b>Operating Temperature</b>	-40° C (low threshold) to 70°C (high threshold).
<b>Environmental</b>	Waterproof front panel with silicon mounting gasket.
<b>Power</b>	9-36VDC, 8W, fused/filtered. Surge protected.
<b>Analog Input High Level</b>	2 channels   4-20mA 0-5VDC, 0-10VDC, ± 5VDC.
<b>Analog Input Low Level</b>	1 channels   Load Cell: 5/10 VDC Excitation, 0-20/0-100mV.
<b>Analog Output</b>	2 channels   4-20 mA, 0-5VDC, 0-10VDC, ± 5VDC.
<b>Sensor Excitation</b>	Regulated +5/+12/+24VDC. 0.5A.
<b>Count Input</b>	Quadrature, 1x, 2x, 4x. Inductive proximity (Hall Effect). Count direction. Up/down. 30kHz bandwidth.
<b>Output Relays</b>	(2) SPDT, NO-NC. 125VAC 60VDC @ 1 Amp.
<b>Digital Input</b>	2 channels   0-60VDC, trigger level: 2.5V. Functions are menu-selectable.
<b>Serial Communication</b>	RS-485, isolated, 2 wire. RS-232, USB, non-isolated.
<b>Alarms</b>	Measurement parameters high and low set-points (any measurement). Accessible via front panel menu interface: filtering, delay, deadband, adjustments.
<b>Ethernet</b>	Ethernet: 10base T, TCP/UDP.



## RPC ENCLOSURE OPTIONS

For use in combination with Rugged Programmable Controllers (RPCs), Enclosures offer additional protection from harmful environments, and are available for either permanent installation or portable applications.

### DECK ENCLOSURE

- ▶ Recommended for on-deck applications.
- ▶ Manufactured from 304 stainless steel.
- ▶ Sun visor for glare protection and enhanced screen visibility. Optional bracket attachment.
- ▶ Door-mounted RPC facilitates easy access for wiring, data retrieval, troubleshooting, and firmware upgrade.
- ▶ Power switch and alarm for easy operation.
- ▶ Custom and hazardous options available.
- ▶ USB or Ethernet data ports.  
AC or DC input power.
- ▶ RPC-90x Enclosure: 12" H x 10" W x 6" D.  
RPC-80x Enclosure: 10" H x 8" W x 4" D.



### PELICAN CASE ENCLOSURE



- ▶ Recommended for portable applications.
- ▶ Manufactured from polypropylene, making it watertight, dust-proof, and crushproof.
- ▶ RPC mounted to internal panel.
- ▶ Field and power cables connect to side for easy access without need to open Pelican Case.
- ▶ Panel-mounted power switch and alarm for easy operation.
- ▶ USB or Ethernet data ports.  
AC or DC input power.
- ▶ RPC-90x Enclosure: 13.7" H x 11.6" W x 5.9" D.  
RPC-80x Enclosure: 10.7" H x 9.8" W x 6.9" D.



## GIMBAL ENCLOSURE W/BRACKET

- ▶ Recommended for bridge, cab, or lab locations where space may be limited.
- ▶ Manufactured from 304 powder coated stainless steel.
- ▶ Gimbal bracket mounting for optimal viewing angle.
- ▶ Two 1/2" NPT knockouts on back. Glanded cable entry/exit.
- ▶ Optional power switch and alarm for easy operation. USB or Ethernet data ports.
- ▶ AC or DC input power.
- ▶ RPC-90x Enclosure: 6.4" H x 7.7" W x 7.8" D.  
RPC-80x Enclosure: 5.5" H x 5.6" W x 5.3" D.



## EXPLOSION PROOF ENCLOSURE



- ▶ Recommended for use in environments with risk of exposure to combustible fuels. Designed to contain ordinary location instrumentation components.
- ▶ Manufactured from copper-free aluminum or 316 stainless steel for ultimate protection. IP66 gasketing with stainless steel hardware.
- ▶ Factory drilled and tapped holes for glanded cable entry.
- ▶ Internal isolation barriers allow connection to any hazardous sensor.
- ▶ Viewing window to see displayed measurements on RPC-80x or RPC-90x in real-time.
- ▶ Various operators can be installed on doors such as switches and push buttons. Typical functions: ON/OFF, TARE, and PYT RESET.
- ▶ Hazardous rating: Class 1, Division 1, Zone 1, and IECEx Ex d.
- ▶ Dimensions may vary. Example RPC-90x Enclosure: 20" H x 14.1" W x 13" D.

## RUNNING LINE TENSIO METERS

### Heavy-duty and highly accurate for all types of line monitoring systems.

Running Line Tensiometers (RLTs) are an essential component for both new and existing winch or hoist systems that enable monitoring of line tension, speed, and payout.

All models feature a durable, compact design and install quickly and easily. Standard products are available for applications ranging from 0-500 tons and cable/rope diameters up to 6".

### FEATURES & BENEFITS



Shown: RL10A

Shown: RL10V



Shown: RL10S

Shown: RL10P



Articulating Arm Attachment

- ▶ **Compatible with many types of cable/rope**, including wire rope, EM, fiber optic, synthetic cable, and fiber rope. One product, multiple uses.
- ▶ **All electronics safely located** in center sensing head to prevent accidental damage or contamination.
- ▶ **Sold separately, or paired** with Rugged Controls RPC Displays. When paired with an RPC-90x or RPC-80x display, the system provides winch operators with real-time line parameter monitoring.
- ▶ **Sealed roller bearings** rated for high static and dynamic tension loads. High line speed rating under full load allows for reduced maintenance requirements and the ability to measure tension at high line velocities.
- ▶ **Constructed from thermoplastic coated tool steel** with 316 stainless steel fasteners and 4340 hardened steel sheaves. Ideal for withstanding exposure to harsh or hazardous conditions.

#### Four styles to accommodate a range of applications and use requirements:

- A: Manufactured with removable center sheave for faster installation. Sheaves are grooved for single line diameter.
  - S: Manufactured with single side plate. Sheaves are grooved for single line diameter.
  - V: Suitable for variable cable/rope diameters (see table).
  - P: Clamps on to cable/rope and intended for payout and speed monitoring applications only.
- ▶ **Design validated by both finite element analysis (FEA) and in-field testing** for the highest degree of confidence in product performance and integrity. Industry leading factor of safety of minimum 2.5x full scale rating.
  - ▶ **Custom designs available** to accommodate non-standard cable/rope diameters. Contact Rugged Controls if needed.
  - ▶ **Ideal for new and retrofit applications.** Fast and accurate data collection when you need it, where you need it.
  - ▶ **Hazardous rated sensors are optionally available.** Contact Rugged Controls if needed.
  - ▶ **Complete line monitoring systems available for rent.** Contact Rugged Controls for more information.



**SPECIFICATIONS**

MODEL	WEIGHT	MAX TENSION	MAX WIRE DIAMETER	DIMENSIONS
RL05A	27 lbs. / 12 kg	10 ton / 100 kN	7/8"   22 mm	10 1/8" x 6 1/2" x 9 3/16" H
RL05P2	25 lbs. / 11 kg	NA	7/8"   22 mm	16" x 7" x 7 1/2" H
RL10A	95 lbs. / 43 kg	45 ton / 448 kN	1 1/2"   38 mm	19" x 10" x 15" H
RL10S	60 lbs. / 27 kg	45 ton / 448 kN	1 1/2"   38 mm	19" x 7" x 12" H
RL10V	70 lbs. / 32 kg	45 ton / 448 kN	1 1/2"   38 mm	19" x 10" x 16" H
RL10P	50 lbs. / 23 kg	NA	2"   51 mm	20" x 11" x 8 5/8" H
RL20A	260 lbs. / 118 kg	150 ton / 1495 kN	2"   51 mm	28 1/2" x 13" x 22" H
RL20S	220 lbs. / 100 kg	150 ton / 1495 kN	2"   51 mm	28 1/2" x 10" x 19" H
RL20V	230 lbs. / 104 kg	150 ton / 1495 kN	2"   51 mm	28 1/2" x 12" x 21" H
RL20XL	Call - used for ropes with high bending stiffness			
RL30A	440 lbs. / 200 kg	375 ton / 3737 kN	2 3/4"   70 mm	36" x 15 5/8" x 26 5/8" H
RL30S	350 lbs. / 159 kg	375 ton / 3737 kN	2 3/4"   70 mm	36" x 15 5/8" x 26 5/8" H
RL30V	440 lbs. / 200 kg	375 ton / 3737 kN	2 3/4"   70 mm	36" x 15 5/8" x 26 5/8" H
RL30XL	Call - used for ropes with high bending stiffness			
RL45V	665 lbs. / 302 kg	500 ton / 4982 kN	4 1/2"   114 mm	41" x 16 3/16" x 30 4/8" H
RL50V	TBD	TBD	6"   127 mm	TBD

Custom solutions available. Contact for more information.

Frame	Thermoplastic coated tools steel.
Fasteners	316 stainless steel.
Pins & shafts	17-4 PH stainless steel. Fixed mounting points and tether points.
Sheaves	4340 alloy steel (standard). 17-4 PH stainless steel (optional). Machined cast nylon (optional).
Bearings	Regreasable roller bearings.
Temperature range	-20°C to 70°C.
Tension sensor	Load pin, 4-20mA (3 wire) or mV/V. High tensile stainless steel. Mechanical overload: 300% (ultimate). Proof load: 150%.
Count sensor	Hall effect (quadrature output). 9-36 VDC excitation. Stainless steel housing.
Payout	4-12 targets per sheave revolution.
Sensors	Hazardous sensors available.
Enclosure	IP66 or better.
Mounting	Tethered, or with Rugged Controls Articulating Arms.

## FORCE SENSORS

### A complete offering of both standard and custom load monitoring solutions.

Force Sensors are transducers that convert an applied force into either an analog or digital electrical signal. This conversion is achieved by the physical deformation of resistive strain gauges bonded internally to the sensor.

Force Sensors most frequently integrate into crane and winch systems and are essential components in applications that require precise measurements of heavy loads.

### FEATURES & BENEFITS



#### Load Pins:

- Designed to replace stock pins in a sheave, shackle, spelter, or clevis.

#### Donut Style :

- Used where height may be limited and central loading cannot be guaranteed. Ideal for crane load blocks and column applications.

#### Compression Cells:

- Used to determine center of gravity or under winches for line tension measurement. Pillar or pancake style available.

#### Tension Links:

- Standard capacities from 5-500 tons. Higher capacities and custom designs available.

- ▶ **Custom Load Pin quote request available at:** [www.rugged-controls/load-pin-quote-form.com](http://www.rugged-controls/load-pin-quote-form.com)
- ▶ **Cabled and wireless versions available** to meet both stationary and mobile needs.
- ▶ **Manufactured from 17-4 stainless steel** for superior durability. Material and calibration certificates available for quality traceability.
- ▶ **Sensors are rated to withstand a 150% proof load and 300%-500% catastrophic load** for superior safety and reliability. Higher load ratings available for custom order.
- ▶ **Subsea options available** to full ocean depth.
- ▶ **A variety of outputs offered** (mv/v, mA, 0-5/10VDC, RS-485) allowing for flexibility of integration depending on end user requirements.
- ▶ **Sensors are optionally provided with a redundant bridge output** to minimize service replacement time.
- ▶ **Integral glanded cable exit** to meet any customer preference. Exit can be radial or axial. Optional cabled units are provided with bulkhead connectors and mating cable assembly

### SPECIFICATIONS

<b>Linearity</b>	<±0.1% of full scale.
<b>Non-Repeatability</b>	±0.1% of full scale.
<b>Zero Balance</b>	±0.1% of full scale.
<b>Operating Temperature</b>	-25° C (low threshold) to 70° C (high threshold). Expanded ranges available.
<b>Hazardous Rating</b>	NEC, ATEX, and IECEx ratings available. Contact Rugged Controls for more information.



## SMART SHACKLES

**Specially engineered to measure weight in all types of lifting applications.**

Smart Shackles, also known as Instrumented Load Shackles, are designed for industrial, rigging, maritime, and general heavy lifting applications. They are built to last and designed for performance even in extreme conditions.

### FEATURES & BENEFITS



Example display solutions.

- ▶ **Pair with GP-5263 or Skookum #320 Anchor Shackles.** Other compatible shackle designs available.
- ▶ **Cabled and wireless versions available** to meet both stationary and mobile needs.
- ▶ **Complete load monitoring systems are available,** which include sensor and display solutions.
- ▶ **Calibration certificate provided** for quality traceability.
- ▶ **Compatible with digital displays, PLCs, DAC,** and more for optimal end user integration flexibility.
- ▶ **Environmentally sealed for use in marine environments** to ensure the highest degree of resistance to water and contamination.
- ▶ **Rental options available** for temporary and short lead time solutions.
- ▶ **17-4 stainless steel shackle pin** for superior durability.
- ▶ **Load centering bobbins available** to maintain measurement accuracy.
- ▶ **Subsea options available** to full ocean depth.

### SPECIFICATIONS | STOCK SIZES

MODEL	SMS 3.5T	SMS 7T	SMS 12T	SMS 25T	SMS 52T	SMS 117T
CAPACITY (t)	3 1/2	7	12	25	52	117
NOM. SIZE (in)	5/8	1	1 1/8	1 1/2	2	3
ACCURACY	+/- 1% of full scale.					
PROTECTION	NEMA 4x / IP67					
DESIGN FACTOR	300% of full scale.					
PROOF TEST	150% of full scale.					
OUTPUT	wireless   mV/V   4-20mA					
OPERATING TEMP.	-25° C to +70° C.					



## SHEAVE ASSEMBLIES

**Instrumented deck machinery used for deployment, rig/barge mooring, and wherever accurate and reliable line control is required.**

Rugged Controls is a global industry leader in instrumented mooring, sheave, and winch systems for offshore rigs, oceanographic research, and related support vessels. Light duty sheaves for payout monitoring are always in stock.

For mission-critical towing and workboat operations, our smart sheaves can be counted on to deliver the highest level of quality, performance, and reliability.

Sheave assemblies can be customized to your application and provided with sensors for tension, payout, speed, and angle. We can design vertical or horizontal lead sheave assemblies, or hanging blocks for EM cable, wire, or synthetic rope.

Individual sheaves can be provided to customers for integration into their levelwinds or existing sheave assemblies. We can also retrofit existing sheave assemblies with force and rotational sensors to enable line parameter viewing.



### We can provide:

- ▶ Engineered design services (SolidWorks, AutoCAD, FEA Analysis).
- ▶ Rotational Sensors, Tension Shackles, and Load Pins.
- ▶ TAPS (tension, angle, payout, and speed) sheaves.
- ▶ Wireless options.
- ▶ Software for data-logging and remote viewing.
- ▶ Inclinometers for wrap angle compensation.
- ▶ Local and remote displays with data logging.



## SOFTWARE

Rugged Controls offers a range of software solutions to help you maximize data capture, accuracy, and implementation.

### SenseDAC

A full-featured PC data acquisition system for Rugged Programmable Controllers (RPC-90x, RPC-80x).

- ▶ **Numerical and graphical views available** for multiple sensors and controllers. Software can be configured for single or multiple Rugged Programmable Controllers. High data rates when connected to Rugged Controls' products.
- ▶ **All data logged and timestamped into .csv file** for post-processing and report generation. Data trends available in multiple time series format.
- ▶ **Ability to track** both maximum and minimum measurements in real-time.
- ▶ **Hoist Test Module** a monitoring and reporting platform for hoists and load testing.
- ▶ **Measurement data is encrypted** and reports offer anti-manipulation feature which triggers if data is modified.
- ▶ **Alarm notifications available** on both numeric and time series formats. Alarm limits are automatically linked to configuration of Rugged Programmable Controller. Maximum limits available on time series.
- ▶ **Serial or Ethernet** communication protocols for maximum end user flexibility.
- ▶ **Report Generator Module** allows for the creation of customer-branded .pdf reports and certificates. A modern replacement for digital chart recorders.



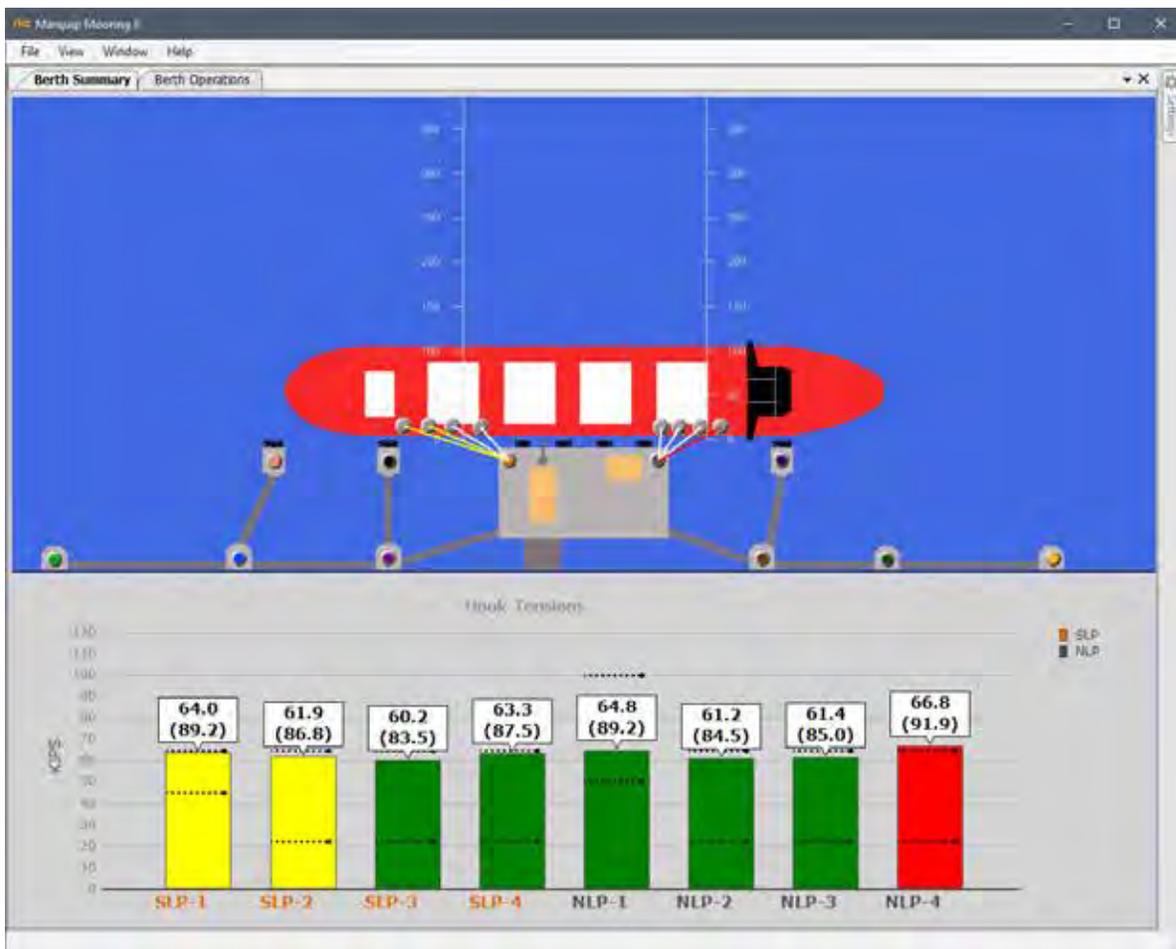
## Release Hook Monitoring Systems

Mooring and vessel approach software that provides accurate monitoring of docking status.

- ▶ **Real-time monitoring of mooring line tension data** supports terminal safety and efficiency operations. Alarm notification if tension limits are exceeded.
- ▶ **Ethernet of serial connection protocols** between control room and release hook bases for maximum data flexibility.
- ▶ **One software solution for any pier** - user can define mooring patterns and location of release hooks. Pier and vessel layouts can be easily recalled, configurable through the software.
- ▶ **Connects to any release hook on the pier** and displays real-time tension and alarm status in control room.

Optional add-on modules include:

- ▶ **Vessel Approach Module:** Measures speed, distance, and angle of approaching vessels to enable safer berthing.
- ▶ **Remote Release Module:** Allows operators to release any/all hooks from control room. Typically requires key switch and password protection.
- ▶ **Meteorologic Module:** Monitors weather conditions including wind speed and direction, temperature and humidity.
- ▶ **Oceanographic Module:** Monitors ocean currents and tidal information in real-time.



## SOLUTIONS

At Rugged Controls, we deliver more than hardware; we provide complete solutions tailored to complex operational challenges. Our integrated systems combine controllers, smart deck machinery, sensors, and software to give operators real-time visibility and control over dynamic mechanical processes.

Each solution is the result of close collaboration with customers. By understanding the full scope of their operations, we design systems that not only meet performance requirements but also simplify operation, reduce downtime, and enhance safety.

Our approach to problem-solving is grounded in precision engineering and practical insight. Whether the goal is monitoring sensors on winches, cranes, or pump/frac trucks, Rugged Controls' solutions are built to deliver measurable improvements in performance and reliability.



## SOLUTIONS | RENTALS

### Stocking locations in Seattle, WA and Houma, LA.

- ▶ **Rugged Controls offers equipment** for spooling, offshore mooring, bollard pulls, winches, cranes and other load testing applications.
- ▶ **All rental systems available** standard with a Rugged Programmable Controller (RPC) installed in portable pelican cases, and an optional laptop with data logging software.
- ▶ **System are plug-and-play** for quick set up, helping you minimize downtime.
- ▶ **The operator can easily observe** tension, speed and payout locally in real-time. Simultaneously, our data-logging software catches every spike and valley for post-test analysis and report generation.
- ▶ **Additional equipment is available** to monitor different parameters, such as angle and drive shaft torque.
- ▶ **All systems provided with current calibration certificates**, with optional certifying witnesses from DNV, ABS, Lloyds, Bureau Veritas and any other required certifying body available.
- ▶ **Rugged Controls engineers are available** for on-site support, witnessing, and report generation.



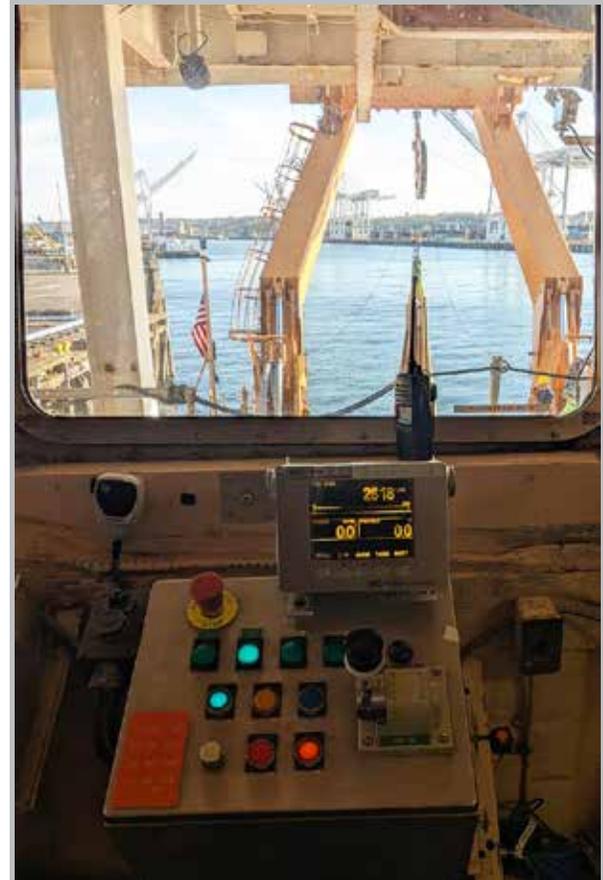
### RENTAL ASSETS

- ▶ **Running Line Tensiometers (RLTs):**  
Standard compatible diameters: 1" to 4.5".  
Standard tension capacity: 10 tons to 500 tons.
- ▶ **Tension Links:**  
Standard capacity: 5 to 150 tons.  
Higher capacities available on request.
- ▶ **Load Shackles:**  
Cabled and wireless versions available.  
Standard capacity: 5 to 200 tons.
- ▶ **Instrumented Hanging Blocks:**  
Standard compatible diameters: 12" to 28".  
Larger sizes available on request.
- ▶ **Vertical Lead Sheaves:**  
Standard compatible diameters: 18" to 36".  
Larger sizes available on request.
- ▶ **Compression Load Cells:**  
Use to determine center of gravity and weight.

## SOLUTIONS | WINCH SYSTEMS

Controllers and sensors that enable precise, reliable line tension, speed, and payout monitoring for winch operations.

- ▶ **Comprehensive system solutions available** comprised of smart deck machinery and Rugged Programmable Controllers.
- ▶ **Integrated load measurement** ensures safe operation and integrity of the tension member.
- ▶ **Real-time data logging** captures critical winch performance information for optimal line maintenance and retirement criteria.
- ▶ **High-bright controller display** allow operators access to winch parameters in all weather conditions.
- ▶ **Programmable alarms** help prevent overload and line breakage by maintaining safe working limits.
- ▶ **Rugged Programmable Controllers can connect into new or existing winch systems** for maximum system versatility.
- ▶ **Compatible with multiple winch types (hydraulic, electric, and pneumatic)** for versatile deployment
- ▶ **Multiple winch sensor options available** including rotational, angle, and force sensors.
- ▶ **Single or multi-winch view options** saves space in the bridge and centralizes data.



**RPC-90x-C**

Rugged Programmable Controller

For direct system control, tension monitoring, and data logging.



**Load Pins**

Built custom per project specifications.

Compliance options:  
NEC, ATEX, and IECEx.



**Hanging Block/Sheave**

Built custom per project specifications.

For line positioning and deployment/recovery.

## SOLUTIONS | CRANE LOAD MONITORING

Controllers designed to monitor key operational and safety parameters while recording critical lift data.

- ▶ **Multiple sensor options** for tension, boom radius, angle, anti-two block, wind speed, and other parameters.
- ▶ **Visual and audible warnings** linked to adjustable setpoint parameters for enhanced jobsite safety.
- ▶ **Built in data-logging** to USB and to onboard memory. Bar graph indicating live load percentage of rated capacity.
- ▶ **Wireless or cabled solutions** and remote I/O available for expanded functionality.
- ▶ **Main/aux hoist (winch), duty, and lines (falls)** all selectable via onscreen menus.
- ▶ **Modbus RTU or TCP/IP** for crane PLC integration.
- ▶ **All relays for motion control** can be overridden via function key or remote I/O.
- ▶ **Optional scoreboard displays available** for enhanced, real-time data visibility.



### Main screen features:

Load percentage (bar graph)	A2B alarm
Max rated load	Boom angle and radius
Main/aux/combined %capacity	Duty in use
Hook height	Hook payout
Main/aux/combined load	Hook speed
Net load	Wind speed/direction
Single/multiple load charts	

### Accessible via onscreen menu:

Boom length	High and low presets
Parts-of-line	Boom head height
Load chart details	Wind speed
Azimuth (slew)	Sensor calibration

### Configurable alarm parameters:

Max wind speed	Max rated load moment
Min/max angle	Approaching two-block
Min/max radius	Min/max tip height
Min/max load	Min/max %capacity

## SOLUTIONS | VESSEL BERTH MONITORING

Integrated monitoring and control solutions that enhance safety and situational awareness during vessel berthing, approach, and dockside operations.

- ▶ **Real-time tension monitoring** ensures balanced mooring loads and reduces line fatigue or failure risk. Software configurable for any berthing layout.
- ▶ **Monitoring solutions include** sensors and controllers/annunciators on release hooks connected to data acquisition software in the control room.
- ▶ **RPC-90x Programmable Controller** installs on **release hook base** to allow operators/crew to view mooring line tension in real-time. Serial or Ethernet communication protocols available.
- ▶ **Visual and audible alarms** warn of over-tension or sudden load changes caused by wind, tide, or vessel motion.
- ▶ **Hazardous monitoring solutions** available that meet NEC, IECEX, and ATEX certifications.



### RPC-90x-C

Rugged Programmable Controller

For direct system control, tension monitoring, and data logging.

### Optional modules include:

- ▶ **Remote Release Module:** that allows for mooring line release either by push-button control on the base or through control room computer.
- ▶ **Vessel Approach Module:** Measures speed, distance, and angle of approaching vessels to enable safer berthing.
- ▶ **Meteorologic Module:** Monitors weather conditions including wind speed and direction, temperature, and humidity.
- ▶ **Oceanographic Module:** Monitors ocean currents and tidal information in real-time.



Load Pins

Built custom per project specifications



**Release Hook Monitoring Software:** For data logging and system performance observation.

## SOLUTIONS | MULTI-POINT MOORING

Winch monitoring solutions for complex mooring systems where multiple anchor lines maintain vessel or platform position.

- ▶ **Complete mooring monitoring systems** consisting of smart deck machinery and Rugged Programmable Controllers (RPCs).
- ▶ **RPCs installed at local controls** provide operators a view of single or multiple winch line parameters for safe operations.
- ▶ **Running Line Tensiometers (RLTs) can be applied to any line** to measure tension, speed, and payout. Ideal for both new or retrofit applications.
- ▶ **Custom force transducers (load pins or compression cells) available** for deck sheaves or mounting under the winch. Ideal for both new or retrofit applications.
- ▶ **Data logging and remote display capabilities** combine to aggregate all winch data in the bridge, control, or radio room via PC software or remote RPCs.
- ▶ **Real-time Ethernet data communication link to control room** allows operators/crew to track and verify mooring status on Rugged Controls' mooring software.
- ▶ **Hazardous monitoring solutions** available that meet NEC, IECEX, and ATEX certifications.



### Running Line Tensiometer (Shown: RL10A)

For monitoring line tension, payout, and speed.



### Load Pins & Compression Cells

Built custom per project specifications.



### RPC-90x-C Rugged Programmable Controller

For direct system control, tension monitoring, and data logging.

49.8	1728	49.8	1723
	5087.7		5087.7
49.8	1728	1901.6	1723
	5087.7		1901.6
49.8	1723	49.8	1723
	5087.7		5087.7
1901.6	50	1901.6	49.8
	1723.1		1901.6

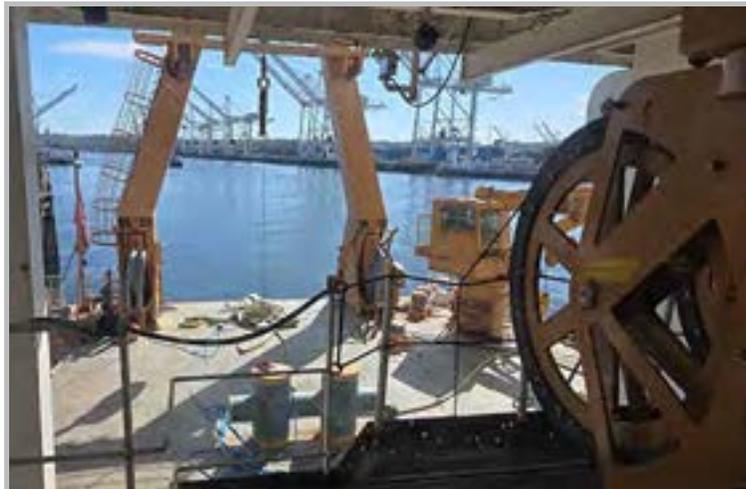
### SenseDAC Software

Customizable builds allow for wide range of views and data collections.

## SOLUTIONS | SIDE SCAN SONAR

Line monitoring for controlled deployment and retrieval of sonar arrays and submersible instruments.

- ▶ **Highly accurate tension measurement** safeguards cables and equipment during deployment and towing.
- ▶ **Live display of line speed and payout** ensures optimal towing geometry and data fidelity.
- ▶ **Waterproof, marine-rated components** designed for long-term exposure to saltwater and vibration.
- ▶ **Optional wireless telemetry** for vessel bridge or lab display integration.
- ▶ **Compact, lightweight housings** simplify on-deck installation and maintenance.



**RPC-80x**

Rugged Programmable Controller

For direct system control, tension monitoring, and data logging.



**Running Line Tensiometers**  
(Shown: RL45V)

For line management and real-time performance information.



**Hanging Block/Sheave**

For line positioning and deployment/recovery.

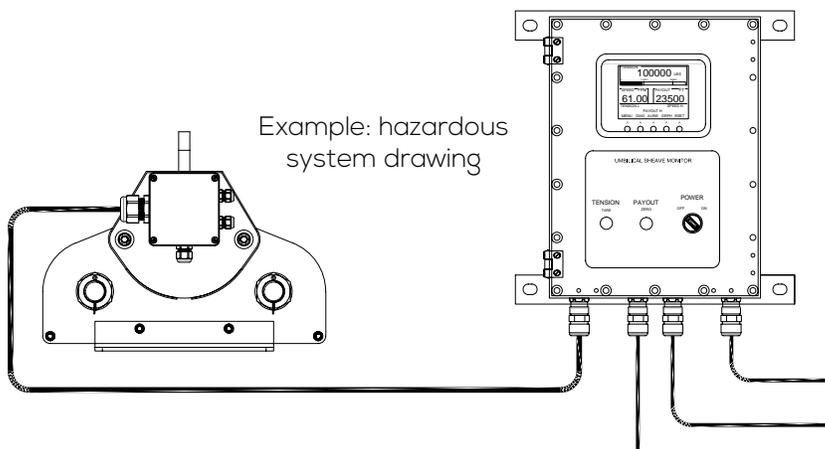
## SOLUTIONS | HAZARDOUS ENVIRONMENTS

Smart instrumentation for use in explosive and dangerous jobsites.

- ▶ **Enables sensors and instrumentation to be located directly in hazardous environments** so operators can work safely.
- ▶ **Hazardous equipment rating available:** NEC, ATEX, and IECEx (see below).
- ▶ **Intrinsically safe and non-incendive (depending on site classification) designs available** to minimize ignition risk in oil, gas, and chemical facilities.
- ▶ **Explosion proof or purged enclosure options** to provide protection from gas and dust ingress.
- ▶ **For mining and oil & gas applications** that introduce risk of spark or combustion.



Example: fuel dock quick-release system



Example: hazardous system drawing



**RPC-90x-C**

Compliant with:  
NEC, Class 1 Division 2.

No enclosure required, but available optionally.



**Load Pins**

Built custom per project specifications

Compliance options: NEC, ATEX, and IECEx.



**Running Line Tensiometer**

Built custom per project specifications

Compliance options: NEC, ATEX, and IECEx.



**Explosion Proof Enclosure**

Can enclose any equipment provided appropriately rated isolation barriers exist.

## SOLUTIONS | UNDERGROUND PULLING

Smart instrumentation designed to improve control and safety during cable or conduit pulling operations in underground applications.

- ▶ **Real-time line tension and payout monitoring** protects cables and equipment from strain.
- ▶ **Programmable setpoints** trigger alarms or automatic shutdowns to prevent costly damage.
- ▶ **Rugged sensors and enclosures** withstand debris, moisture, and other environmental conditions.
- ▶ **Data-logging capability** provides traceable pulling records for QA documentation and compliance.
- ▶ **Simple integration/retrofit** with utility trucks, trailers, and underground line pullers.
- ▶ **Protect pipeline pig operations** with superior line control during hard to access maintenance projects.

### RPC-80x

Rugged Programmable Controller

For direct system control, tension monitoring, and data logging.



### Running Line Tensiometers

(Shown: RL05A)

For line management and real-time performance information.



## SOLUTIONS | MATERIAL HANDLING

Controllers and sensors supporting cranes, hoists, material handlers, and custom lifting equipment in industrial and marine environments.

- ▶ **Multi-sensor input** supports load, angle, slew, and radius measurements.
- ▶ **Machine geometries and angle measurements** are used to determine exact tool location in space.
- ▶ **Leverage 1D or 2D load charts**, when combined with machine geometries, to determine safe working load and lifting capacities at specific points in space.
- ▶ **Visual and audible alarms** provide immediate overload and operational feedback.
- ▶ **Built-in data logging** allows operators to review lift performance and load records.
- ▶ **Support for both wireless and hardwired sensor networks** for flexible installation and use.



### Angle Sensors

Customizable per specification

Installed at boom and/or stick.



### RPC-80x

Rugged Programmable Controller

Measure and log machine geometries and loading.



### Gimbal Enclosure

Installed in operator cabin for improved access and visibility.

## SOLUTIONS | DECOKING HOIST MONITORING

### Complete monitoring systems for hoist systems in coke cutting operations.

Use a Rugged Programmable Controller (RPC) connected to a Running Line Tensiometer (RLT) to monitor and measure hoist system tension, outage, and payout speed.



- ▶ **Capture hoist system line tension, outage, and speed** for comprehensive, real-time measurement data.
- ▶ **Install RLT off-drum** in a range of compatible installation locations.
- ▶ **Built-in data-logging** to USB drive and onboard memory on RPC.
- ▶ **Multiple, user-programmable alarms**, including for high/low tension and outage.
- ▶ **Outage drum encoder interface** for outage redundancy and rotation speed of drill stem.
- ▶ **Remote I/O available** for expanded functionality and versatility.
- ▶ **Vertical bar graph** for cutting head position.
- ▶ **Hazardous area solutions available**, including Enclosures offering NEC, ATEX, IECEx certifications.
- ▶ **Modbus RTU or TCP/IP** for plant DCS integration.
- ▶ **Analog outputs** for line measurement integration to plant DCS.
- ▶ **Easy to use menu wizard** for measurement calibrations.



## SOLUTIONS | LAND-BASED OIL & GAS

Instrumentation engineered for both mobile and stationary drilling and well-servicing rigs and trucks.

- ▶ **Monitoring of hydraulic lines** for high-pressure, pump load, and motor speed to support balanced system performance.
- ▶ **Concrete flow and volume control** ensures well-pours and capping are done with precision and accuracy.
- ▶ **Crown block instrumentation** supports measurements for weight, depth, and rate, and enhances crown-out floor-out (COFO) safeguards.
- ▶ **Electronic weight indicators** most commonly are pad type measurement systems, which replace hydraulic systems and measure hook load, total load, weight on bit, and massed load balance.
- ▶ **Rugged enclosures** protect electronics from heat, vibration, and explosive hazards.
- ▶ **Real-time data recording** via onboard memory supports asset analysis.
- ▶ **Remote monitoring options** via several data protocols, including Modbus, supports centralized decision making.
- ▶ **Alarm parameters** help prevent overloads, hose rupture, wire rope damage, and premature component wear.



**RPC-90x-C**

Rugged Programmable Controller

For direct system control, tension monitoring, and data logging.



**Explosion Proof Enclosure**

For mandated hazardous protection or additional guarding against contamination.



**SenseDAC Software**

Customizable builds allow for wide range of data collection, including liquid/gas pressure and volume.

## INDUSTRIES

Rugged Controls serves industries where equipment reliability and precise control are essential to success. Our systems operate in environments defined by constant motion, heavy loads, and high stakes—places where accurate data and dependable performance cannot be compromised.

From offshore vessels to industrial plants and construction sites, our technology helps operators maintain awareness and control in the most challenging conditions. These are industries that demand more than equipment, they require trust in every reading, every load, and every operation.

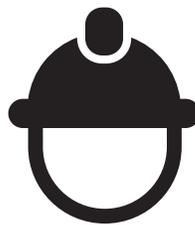
Our deep experience across diverse markets allows us to understand the unique demands of each application. That insight shapes the solutions we design, enabling customers to focus on their work with the confidence that their systems will perform exactly as needed, every time.



Maritime



Oil & Gas



Construction



Energy & Utilities



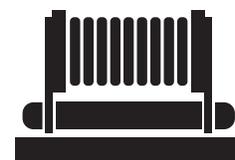
Mining



Government

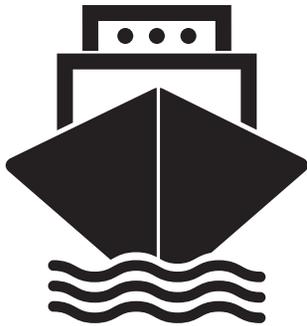


Crane Systems



Winch Systems

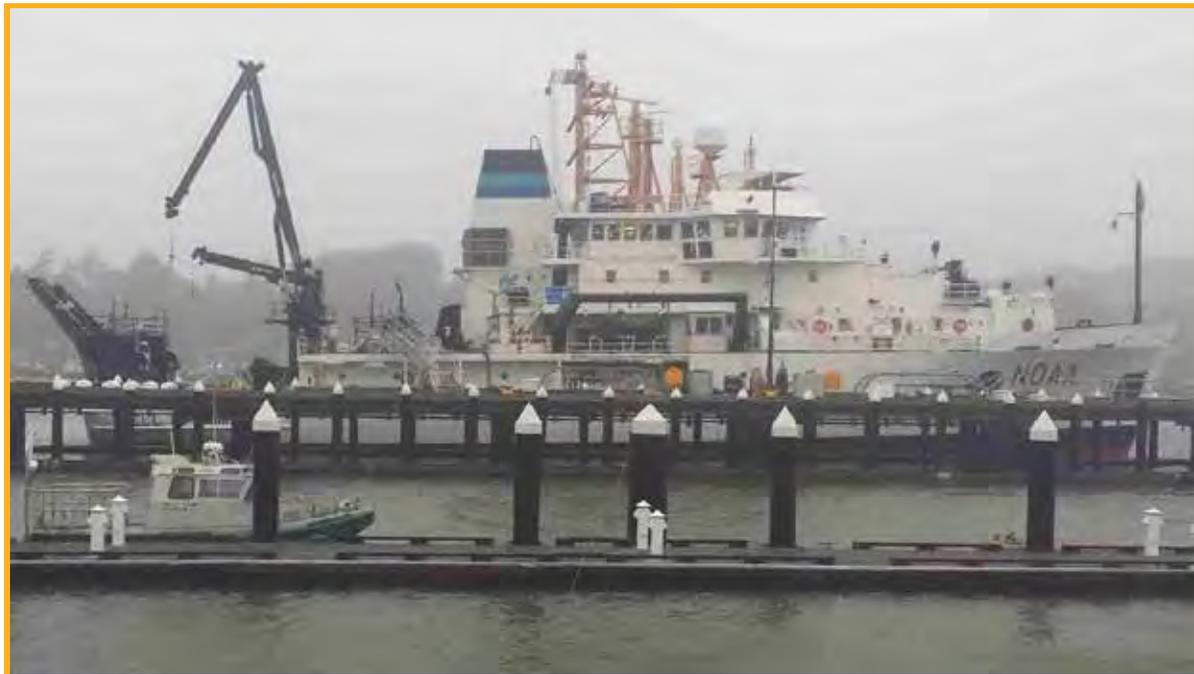
## MARITIME



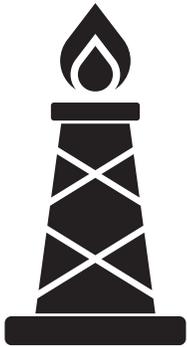
From open-ocean towing to harbor-side logistics, the presence of durable, accurate, and real-time monitoring solutions is critical to ensure safety, compliance, and operational efficiency. Rugged Controls supports maritime operations with precision-engineered systems for measuring line tension, speed, and payout, as well as performance feedback and total system loads.

Our solutions are deployed across a wide range of vessel types and port-side infrastructure, including tugboats, dredgers, commercial fishing vessels, and terminal cranes. Whether monitoring mooring line forces during dynamic positioning, logging bollard pull during tug testing, or providing winch data during gear deployment, our systems deliver the information operators need to make informed, on-the-spot decisions.

Our offerings of Programmable Controllers, Running Line Tensiometers, Load Cells, and Smart Shackles are specifically designed to withstand marine environments, from salt spray and heavy seas to hydraulic shock and mechanical vibration. With plug-and-play integration and optional software packages for data logging, remote visualization, and diagnostics, Rugged Controls empowers maritime professionals to operate with complete operational insight.



## OIL & GAS

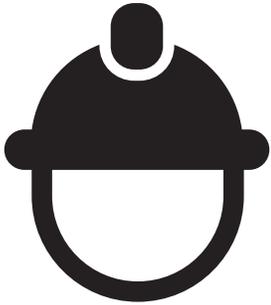


From upstream well-servicing to downstream refinery maintenance, Rugged Controls provides durable, field-proven monitoring and control solutions that enhance safety, reduce downtime, and bring critical transparency to high-risk operations.

Our solutions are trusted across the oil and gas lifecycle, with applications ranging from mobile service rigs and pressure pumping units to wireline trucks and refinery decoking. Whether mounted on a truck in the field or integrated into a control cabin at a processing facility, Rugged Controls' oil and gas equipment delivers real-time visibility into pressure, force, tension, speed, and system status, empowering crews to work with greater confidence and precision.



# CONSTRUCTION



Rugged Controls delivers real-time monitoring and control solutions that support critical lifting, hoisting, and tensioning operations across a wide range of job sites, ranging from bridge building, installing and repairing subsea pipelines and power cables, civil infrastructure work, concrete pours, and marine design and build.

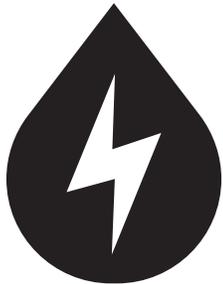
Our systems are commonly integrated with cranes, winches, strand jacks, and load-bearing structures to measure load, tension, speed, and line payout. Whether guiding precast elements into position or monitoring the stability of temporary supports, our sensors and programmable controllers

give operators the data they need to execute lifts with confidence, even in dynamic or harsh environments.

Construction applications often involve variable rigging configurations and challenging conditions like mud, vibration, or weather exposure. Our ruggedized load pins, tensiometers, and wireless systems are built to withstand these realities while remaining easy to install, relocate, or scale as project demands evolve. When combined with our data logging and display options, crews gain clear visibility into performance and load history, which supports both immediate decision-making and long-term reporting needs.



## ENERGY & UTILITIES



Rugged Controls provides real-time monitoring solutions that support power line maintenance, substation construction, fiber installation, and other critical infrastructure activities. Whether in urban corridors or remote terrain, our systems deliver the data crews need to get the work done.

Our line tension monitoring solutions are commonly deployed in stringing and pulling applications, where maintaining proper tension on conductor or fiber optic lines is vital to avoid damage during installation. Operators benefit from live readouts of line data that help them prevent issues like slack or over-tensioning, especially during complex pulls underground or through varied terrain.

Rugged Controls products are designed to endure tough field conditions, from extreme temperatures and high winds to dirty or wet environments. Our tensiometers, load cells, and programmable displays are field-serviceable and operator-friendly, allowing for quick deployment and reliable data collection across projects of all sizes. Optional data logging and wireless transmission features further support job documentation, QA/QC, and post-project analysis.

With equipment trusted by utility contractors, co-ops, and transmission companies, Rugged Controls helps keep grid expansion and maintenance projects moving safely and on schedule and provides the insight needed to manage tension-critical operations with precision.



## MINING



Rugged Controls delivers monitoring and control systems built to handle these environments, providing data on tension, load, and movement for critical applications across both surface and underground mining.

Our solutions support a wide range of mining operations. Monitoring tension on haulage ropes, winches, plumb bob deployments, and lifting systems is essential for maintaining operational safety and extending equipment life. With accurate, high-resolution data on line tension, speed, and payout, operators can detect anomalies early, ensure safe load handling, and minimize unplanned downtime.

From shaft hoisting to material handling, Rugged Controls enables mining operators to monitor the forces at work with confidence. We help reduce risk, improve efficiency, and ensure operations continue moving forward safely and reliably.



# GOVERNMENT



Our systems are trusted by the U.S. Navy, Coast Guard, and other defense-related entities for applications that demand reliability and precision.

Many of these applications align closely with our maritime capabilities, such as monitoring winch and line tension during launch and recovery, towing, or mooring operations. Our ruggedized systems provide real-time force and motion data in dynamic sea states, helping crews maintain control and operational readiness.

We've also supported aerostat programs with custom tension monitoring solutions for tethered systems. These deployments require continuous feedback on line loads and movement to ensure stability in varying wind and environmental conditions.



## CRANE SYSTEMS



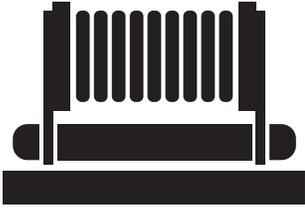
Our products integrate with a wide variety of crane types, including gantry, tower, floating, mobile, pedestal, and pedestal cranes. Whether lifting structural components on a job site, transferring cargo at a port, or supporting offshore installation work, operators depend on accurate load and line monitoring to protect personnel, prevent overloading, and ensure smooth operation.

Rugged Controls offers a range of solutions tailored for crane systems, including load pins, wireless and wired load cells, and line tensiometers that monitor hoist load, speed, and payout in real time. These devices are designed to work seamlessly with our programmable displays and controllers, providing immediate feedback to operators and feeding data into larger safety, logging, or automation systems as needed.

Built for harsh and unpredictable environments, our systems are engineered for maximum durability and accuracy, helping crane operators maintain control, comply with load limits per crane-specific load chart, and reduce the risk of downtime or equipment damage.



## WINCH SYSTEMS



Rugged Controls specializes in providing live monitoring and control solutions that enhance the performance of winch systems in demanding environments.

Rugged Controls offers comprehensive monitoring solutions that include running line tensiometers, load pins, and smart shackles, all connected to our durable programmable controllers. These systems provide continuous data on line tension, speed, and payout, supporting both new and retrofit winch operations.

Designed to withstand vibration, weather, saltwater, and hydraulic shock, our winch monitoring systems are field-proven across the globe. Rugged Controls gives operators the confidence to handle critical loads safely—on deck, onshore, or anywhere in between.



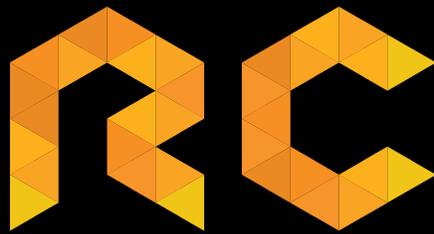
**Our Mission is:**

To deliver smart instrumentation that empowers people in extreme environments to operate with accuracy and confidence.

**Our Vision is:**

To be the trusted global standard for precision control and monitoring solutions.

**At Rugged Controls, we are proud to provide “precision that lasts.”**



**RUGGED** CONTROLS

*Precision that lasts.*

[www.rugged-controls.com](http://www.rugged-controls.com)

206-634-1308

4211 24th Avenue West  
Seattle, WA 98199, USA