The more valuable your heavy load, the more you need the Hydra Set® Load Positioner.

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Customer List (Partial)

Aerojet Corporation
Aerospatiale
Air France
Alenia
Alcoa Aluminum Co. of America
Alenia Aeronautica
Alitalia Airlines
American Airlines
Ansett Airlines
Anritsu Corporation
Aquasafe
Anton
Arizona Power & Light
Airtex
Babcock & Wilcox Corporation
Ball Aerospace
Baltimore Gas & Electric
Bechtel Corporation
Bendix Corporation
Blue Origin
Boeing Company
Brazilian Aerospace
British Airways
Burlington Northern Railroad
BWX Technologies, Inc.
Canadian Space Agency
California Institute of Technology
Canadian National Space Agency
Canadian Space Agency
Consolidated Rail Corporation
Corning Glass
Doosan Heavy Industries
EADS
Eastman Kodak Company
ED&G Logistics
EADS Technologies
European Astronaut Centre
European Southern Observatory
European Space Agency
General Dynamics
General Electric Corporation
Goodrich Corporation
Grumman Aircraft
Hirai Industries
Harris Corporation
Hercules Corporation
Honeywell, Inc.
Hughes Corporation
Hyundai Heavy Industries Co.
India Space Research Organization
Ink Optical
ITT Industries
ITT Industries
IIA Japan Aerospace Exploration Agency
Iowa State University
Japan Aerospace Exploration Agency
Kansas State University
Korea Aerospace Research Institute
Korea Aerospace Research Institute
Korea Electric Power Company
Korea Hydro & Nuclear Power Co.
Korea Institute of Science & Technology
Liquified Petroleum Systems
Lakehead University
Louisiana Power & Light
L. A. Dept. of Water & Power
Malaysian Airlines
Marine Corps
MLT
Matra
Mississippi Space Services
Missile Defense Agency
Mitsubishi
Mosquito Technology
Motorola
NASA-Ames Research Ctr.
NASA-Blondin Flight Research Ctr.
NASA-Glenn Research Ctr.
NASA-Goddard Space Flight Ctr.
NASA-Johnson Space Ctr.
NASA-Langley Research Ctr.
NASA-Saturn Space Flight Ctr.
National Center for Atmospheric Research
National Oil Well Company
Northrop-Grumman Corp.
Orbital Sciences Corporation
Pacific Oceanographic Co.
PDRN Nuclear Co.
Pratt & Whitney
Princeton University
Programmed Associates, Inc.
Raytheon
Sakai
Sandebe National Labs.
Schaeffler Group
Sener Ing. y Sistemas, S.A.
Singapore Airlines
SNFMA
Southwestern Electric Power
Space Systems Loral
Spacex Corp.
Stark Aerospace Ltd.
Stratos Lab.
Sukhoi
Toulouse
University of Arizona
University of California
University of Colorado
Unitech Composites Corp.
United Launch Alliance
United Space Alliance
United States Air Force
United States Army
United States Navy
United Technologies
University of Arizona
University of Colorado
Concrete University
Wyle Labs

The Gold Standard for Positioning Valuable Loads,
Up to 300 tons (272,400 kg)
To Within 0.001" (0.025mm)

The more valuable your heavy load the more you need the Hydra Set®
Avoid Damage to Your Sensitive Loads

Mate, Demate with Precision to within 0.001 inch (0.025mm)

Precise control over heavy loads being moved, mated or demated by a crane, has always been difficult. Workers beneath the crane face the dangers from sudden crane stops and drops, which result in up and down oscillation during the critical stages of mating and demating.

Often, this can result in damage to both the load and support fixtures, or worse, place the workers at risk.

And that’s where the value of the Hydra Set Load Positioner from Del Mar Avionics comes in. Placed between the load and the crane or hoist, the Hydra Set Load Positioner eliminates these problems, and ensures users against unforeseen damage to critical components. Loads up to 300 tons (272,400kg) can be moved safely and reliably—with precision to within 0.001 inch (0.025mm).

Since 1965, Del Mar Avionics has supplied thousands of Hydra Set Precision Load Positioners for a variety of applications in rugged environments and industries worldwide.

Hydra Set Load Positioners Give You Peace of Mind

Once the load is moved to within inches of its final position, the Hydra Set Positioner lets you ease the load onto its support fixture.

Weight readouts are accurate to within one half of one percent of full scale, traceable to the National Institute of Standards and Technology.

Eliminates oscillations produced by sudden starts and stops in crane cables, chains or slings. Also eliminates the need to jog the load into position, saving wear on crane brakes.

Safe and Reliable

A fail-safe locking system provides back-up during power failures or sudden loss of pneumatics. (Pneumatic and Electro-hydraulic models only)

Five to One mechanical Design Safety Factor; proof tested to twice rated capacity.

Built-in Load Scale indicates binding or galling of load by registering a change in the weight readout. Also serves as a crane scale to prevent overloading crane, slings, etc. in conformance with industry and OSHA requirements.

Operating Flexibility and Simplicity

Four methods of operation: manual, pneumatic, crane, slings, etc. in conformance with industry and OSHA requirements.

Five Important Advantages of the Hydra Set Precision Load Positioner

Eliminates risk of damage

Creates a safer work environment

Cuts labor costs

Saves time

Improves productivity

Aerospace

Satellite loading and positioning

Aerospace components assembly and test/vertical stabilizer assembly

Commercial Aviation

Component assembly

Landing gear, horizontal stabilizer assembly

Engine installation and removal

Component load testing

Nuclear and Fossil Fuel Power Generating Plants

Nuclear fuel Power Fuel Generating Plants

Turbine teardown and rebuild

Construction

Fuel rod replacements

Transformer placements

Turbine bearing changes

Heavy Industry

Mill roll changes

Bearing inspection

Tool and mold changes

Machinery loading

Model                  Capacity         Overall Length               Standard Lowering stroke      Net Weight          Shipping Weight (Approx.)
C-LC                   1/2 ton   453.6 kg          25.2 in 64.0 cm              12 in 32.5 cm              44 lb 20 kg         88 lb 40 kg             250 lb 114 kg
A-LC                   1 ton     907.2 kg          29.5 in 74.9 cm              12 in 32.5 cm              89 lb 40 kg         120 lb 55 kg           250 lb 114 kg
B-LC                   1 1/2 ton 2,268.0 kg       29.5 in 74.9 cm              12 in 32.5 cm              89 lb 40 kg         120 lb 55 kg           250 lb 114 kg
C-LC                   5 ton     4,535.9 kg       31.7 in 80.5 cm              12 in 32.5 cm              109 lb 50 kg        218 lb 99 kg           435 lb 190 kg
D-LC                   10 ton   9,071.9 kg        36.0 in 91.4 cm              12 in 32.5 cm              218 lb 99 kg        435 lb 190 kg           750 lb 340 kg
E-LC                   20 ton   18,143.7 kg        46.1 in 117.1 cm             12 in 32.5 cm              318 lb 149 kg       660 lb 301 kg          1350 lb 615 kg
ES-LC                  25 ton   22,679.6 kg        46.1 in 117.1 cm             12 in 32.5 cm              318 lb 149 kg       660 lb 301 kg          1350 lb 615 kg
F-LC                   50 ton   45,359.2 kg        50.8 in 131.7 cm             12 in 32.5 cm              636 lb 295 kg       1,080 lb 490 kg        2700 lb 1230 kg
FS-LC                  55 ton   49,386.2 kg        50.8 in 131.7 cm             12 in 32.5 cm              636 lb 295 kg       1,080 lb 490 kg        2700 lb 1230 kg
DHS-75                 75 ton   68,038.9 kg        72.1 in 184.2 cm             12 in 32.5 cm              800 lb 363 kg       1,440 lb 651 kg        3350 lb 1505 kg
DHS-150                150 ton 116,077.7 kg     90.2 in 228.6 cm              12 in 32.5 cm              1193 lb 541 kg      2300 lb 1043 kg        6800 lb 2757 kg
DHS-250                250 ton 226,796.2 kg     90.2 in 228.6 cm              12 in 32.5 cm              1193 lb 541 kg      2300 lb 1043 kg        6800 lb 2757 kg
DHS-300                300 ton 272,400.0 kg     90.2 in 228.6 cm              12 in 32.5 cm              1193 lb 541 kg      2300 lb 1043 kg        6800 lb 2757 kg

Pneumatic Remote Control

Increases versatility of the Hydra Set by providing pneumatic remote operation, up to 100 feet (30.5 meters) away from a load being positioned.

Increases utility by providing a zero-weight, balanced load operation that cannot be achieved with manual operation. Load stops automatically if a pre-determined resistance is met, allowing the operator to align, mate or demate blind surfaces without risk of damaging them.

Wireless Remote Control

Consisting of a Hydra Set with new Load Controller and a separate Hand-Held unit, this product permits remote operation of the load positioner with instant data feedback (weight, linear travel, rate of travel, load deflection, battery status and other conditions) to the operator. Operates from a distance of up to 1,020 feet (305 meters). See the Wireless Remote Control Section for details.

Electronic Remote Control

Equipped with an electronic display which shows load weight or pounds on a digital readout.

Electronic Remote Digital Linear Travel Display

Equipped with an electronic display which shows load weight or pounds on a digital readout.

Positive Fluid Retention System (PFRS)

Some Hydra Set models may be configured to ensure positive retention of fluids via encapsulation and pressurization of the unit. Combined with a remote control console (pictured above), the PFRS is used in clean room environments to protect spacecraft or other critical components from contamination.

Hook Rotation

Frees the load from the crane and stores it safely on the ground.

Custom Engineering

Hydra Set Precision Load Positioners are available with special eyes, hooks, connectors, longer or shorter stroke lengths and other variables. Ask us about special requirements.

Accessories

• A remote control console combined with a Positive Fluid Retention System protects spacecraft and other clean-room components from contamination.

Del Mar employees gather with two 250-ton Hydra Set Precision Load Positioner Systems being readied for shipment to overseas nuclear power plants.
The Del Mar Avionics Hydra Set® Precision Load Positioner has become an important industrial aid for moving valuable loads in the power generation industry around the world. Used in conjunction with a crane or hoist, loads of up to 300 tons (272,400 kg) can be moved, mated, and demated with precision placement to within .001 inch (0.025 mm), regardless of dimensions.

Over four decades of proven performance ensure our customers of product protection from unforeseen damage to critical, expensive components. The Hydra Set Load Positioner never lets them down. In the manual mode, binding or galling of critical or blind parts is indicated instantly on the integral load scale, so that linear travel can be stopped immediately. With the remote controller accessory, and on all electro-hydraulic units, the zero-weight balance mode freezes all movement automatically upon encountering even the slightest resistance, so that any obstacle can be removed before damage occurs.

Applications:

Commercial Aviation & Aerospace

Mating and demating critical components accurately is absolutely essential in the commercial aviation and aerospace industries. The Hydra Set® Precision Load Positioner assures manufacturers the micro-inching precision they demand: to within .001 inch (0.025 mm).

During assembly and testing of aircraft components, satellites and associated space hardware, the Hydra Set Load Positioner eliminates binding or galling that can damage these expensive, critical parts. Final positioning is accomplished quickly, gently and with the confidence of fail-safe operation.
General Industry

When the job calls for heavy, valuable objects to be moved, mated or demated, and with exacting precision placement, the missing link between the crane or hoist and the load is the Del Mar Avionics Hydra Set® Precision Load Positioner.

Micro-inching precision to within .001 inch (0.025mm) by either simple manual maneuvering, or optional automatic remote control, is guaranteed with complete safety. Hang-up or binding of critical parts is indicated instantly on the built-in load scale.

Critical placement of expensive, heavy loads is accomplished using the Hydra Set Load Positioner’s unique micro-inching capability to raise and lower loads to within .001 inch. By simply attaching the appropriate model to your crane or hoist, and lowering the load to within inches of the final position, the Hydra Set system will complete the job.

Applications:

Dynamically tested to twice its rated capacity, and accurate to within one half of one percent of full scale (traceable to the National Institute of Standards and Technology), the Hydra Set system prevents damage resulting from unforeseen impact collision.

Half-ton to 300-ton load capacities enable the Hydra Set Load Positioner to move anything from a small gear to a large auxiliary generator with complete safety and precision.

Absolute confidence is mandatory when positioning an expensive load like this. The Hydra Set Load Positioner ensures safe and precise placement in a fraction of the time required by other methods.

(Lower Left Photo) Inspection, maintenance and repair are no longer time-consuming and costly. Turbine components are easier to inspect with the Hydra Set Load Positioner micro-inching precision.

Using the Hydra Set system to place this $750,000 gear, bottom photo, into final position gives an added measure of assurance to the crane operator that unforeseen jogging, binding or galling will be avoided, thus preventing damage to an expensive component.
The upper portion of the outer cylinder is charged with nitrogen, which may be introduced or released through a valve.

To avoid a vacuum, the upper portion of the inner cylinder is vented to atmosphere.

The Hydra Set is precharged with nitrogen to maintain constant back pressure (or constant prime) on the pump. Also serves to retract the lower connector when the load is removed.

A separator ring provides a moving seal between the hydraulic fluid and the nitrogen.

Arrows shown indicate up movement. During down movement, the flow direction is reversed.
Quality Construction
Only the finest quality materials are used in construction. Most models are finished in black instrument crackle for long life and a pleasing appearance. The Hydra Set Load Positioner is NASA qualified.

Hydra Set® Precision Load Positioner

Light Emitting Diode (LED)
Displays the weight of the load lifted. Also acts as a strain gauge under known load conditions by instantly indicating any unexpected loss or gain of weight.

Upper Connector
Connected to the crane hook or hoist lifting line, the Hydra Set Positioner has an ultimate design strength of five times rated capacity.

Load Cell
An electronic tension-measuring device, with automatic temperature compensation, which relays stable, instantaneous, accurate load weight data to the digital weight display.

Return Force Dial
Indicates return force in pounds, allowing the Hydra Set Precision Load Positioner piston rod to retract automatically after the load has been positioned.

Down Valve Handle
Operation allows the load to descend slowly and smoothly. Accuracy of descent is controlled to within .001 inch (0.025mm). Both up and down spring-loaded handles automatically return to the closed position when released.

Piston Rod
Standard models allow maximum stroke of 12 inches (30.5cm). Special-length strokes are available upon request. Rod automatically retracts to closed position when load is released.

Up Pump
One complete stroke raises a suspended load approximately .005 inch (0.126mm). Partial strokes provide control to within .001 inch (0.025mm).

Lower Connector
This is where the load is attached. Special eyes or hooks can be furnished to meet individual specifications.
Hydra Set® Precision Load Positioner
Since 1965, the Hydra Set Precision Load Positioner from Del Mar Avionics® has provided the aerospace, aviation, power generation and other heavy industries with a proven means to allow critical loads, suspended from a crane or hoist, to be mated or demated, raised or lowered, with excursions to within 0.001 inch (0.025 mm).

During a typical placement, the load is lowered by the crane or hoist to a safe distance from its intended resting position. Then, the operator engages the Hydra Set Load Positioner for final and reliable incremental placement to ensure safety to the load and surrounding critical components. Any impediment encountered during the mating/demating process is sensed, immediately halting the load from any further movement. Other Hydra Set models, including those which are manually operated or remotely controlled, require physical connection between the operator and the Hydra Set Load Positioner.
Load Controller

Upper Connector connects to the crane or hoist

Load Cell
An electronic tension-measuring device, with automatic temperature compensation, which relays stable, instantaneous, accurate load weight data to the digital weight display.

Hydra Set® Precision Load Positioner

Return Force Dial indicates return force in pounds or kilograms.

Motors drive mechanical devices to pump hydraulic fluid (to raise the load) or release the fluid (to lower the load) to and from the inner cylinder.

Load Controller
Mounted on the Hydra Set Load Positioner, this sub-system contains the electronics, motors and batteries. The Load Controller is commanded by digital instructions contained in radio transmissions from the Hand-Held Unit. Hydra Set load and controller status information is transmitted to the Hand-Held Unit from the Load Controller electronics. Load Controller electronics include the radio transceiver, microcontroller, and separate modules for accommodating interface functions and for driving the motors which control the hydraulic flow.

Load Controller power is provided by 14.5-Volt nickel-metal hydride rechargeable batteries. To ensure continued operation and labor efficiency, a spare quick-connect/disconnect battery pack is furnished with each Load Controller.

Dual Antennae send/receive the clearest signal to ensure uninterrupted communications.

Lower Connector provides a means to attach the load.

Load Cell
An electronic tension-measuring device, with automatic temperature compensation, which relays stable, instantaneous, accurate load weight data to the digital weight display.
Hand-Held Unit  
This portable device is easily carried by the operator with shoulder straps. Numerous controls and displays provide maximum control over all functions of the Hydra Set Load Positioner.

For example, a LOAD DEVIATION warning light glows if the indicated load weight varies from the preset load weight, alerting the operator with an immediate indication of the load encountering an obstruction. A liquid-crystal display shows the load weight, travel and load deviation, battery status, rate of travel and system set-up options. The user can pre-select several parameters to match the exact requirements of each load.

System functions are controlled by seven push buttons on the Hand-Held Unit, including OPERATE, MENU and ENTER. The others function according to variable legends which appear above each button.

Up and down movement of the load is controlled by a joystick. A large, red, manually-controlled EMERGENCY STOP (E-STOP) button is prominently located on the unit to enable the operator to immediately halt all system operations. The unit is powered by one rechargeable 14.5-Volt nickel-metal-hydride battery.

Ultra-Reliable Data Transmission  
Transceivers embody "Spread Spectrum" technology to provide optimum data transmission and control. Several separate frequencies are scanned sequentially to identify the clearest signal, which is automatically selected, providing uninterrupted data transmission and control.

Built-in Safeguards to Protect Critical Loads  
If any condition occurs which may compromise safety or successful operation, actuation of the manual E-STOP button on the Hand-Held Unit halts instantly all load movement.

To prevent damage to critical loads during de-mating operations when the load had been secured to a base platform, the known weight of the load is entered in the Hand-Held Unit. During the de-mating operation, as this known load weight is approached, a warning light on the unit is illuminated; if the known load weight is exceeded, an automatic E-STOP halts the de-mating operation.

Up to eight malfunctioning conditions will generate an automatic E-STOP, such as a defective sensor, transmitter or joystick, or a severe discharge of one or more of the batteries or a loss of communications. Interactive displays assist the operator in clearing an E-STOP before normal operations can be resumed. Equally important, the system will not respond to an incorrect command.
Hand-Held Unit Displays

Helpful Messages Assist the Operator

The user may select from a number of operating options to suit a particular task or working environment, such as choosing operating modes, selecting data logging (optional), tare-set options, time and date, and units of measurement.

Specifications

- Method of Operation
  The Hydra Set® Precision Load Positioner may be operated by one of the following methods. Models O through F may be operated manually up to 50 feet away by manipulating the up pump or down valve handles via up and down lanyards. Models O through FS may also be fitted with the optional CCI-400 Remote Controller accessory for precise pneumatic (nitrogen gas) operation from up to 100 feet away from the Hydra Set®

- Operating Note
  Optimum performance is achieved when the load to be raised or lowered is mid-range of the capacity of the unit to be selected. Avoid operating with loads at less than 20 percent of the total capacity of the unit selected.
# Accessories

## Pneumatic Remote Control
- Increases versatility of the Hydra Set by providing pneumatic remote operation, up to 100 feet (30.5 meters) away from a load being positioned.
- Increases utility by providing a zero-weight, balanced load operation that cannot be achieved with manual operation. Load stops automatically if a pre-determined resistance is met, allowing the operator to align, mate or demate blind surfaces without risk of damaging them.

## Wireless Remote Control
Consisting of a Hydra Set with new Load Controller and a separate Hand-Held unit, this product permits remote operation of the load positioner with instant data feedback (weight, linear travel, rate of travel, load deviation, battery status and other conditions) to the operator. Operates from a distance of up to 1,000 feet (305 meters). See the Wireless Remote Control Section for details.

## Electronic Remote Control Digital Weight Display
Electronically indicates weight of load in pounds or kilograms.

## Electronic Remote Digital Linear Travel Display
Electronically indicates linear travel of piston rod and lower connector.

## Positive Fluid Retention System (PFRS)
Some Hydra Set models may be configured to ensure positive retention of fluids via encapsulation and pressurization of the unit. Combined with a remote control console (pictured above), the PFRS is used in clean room environments to protect spacecraft or other critical components from contamination.

## Hook Rotation
The load can be rotated 360° in either direction in a plane perpendicular to linear travel by manipulation of the hook rotation control on the remote control console (available as an option on Models DHS-250 and DHS-300 only).

## Custom Engineering
Hydra Set Precision Load Positioners are available with special eyes, hooks, connectors, longer or shorter stroke lengths and other variables. Ask us about special requirements.