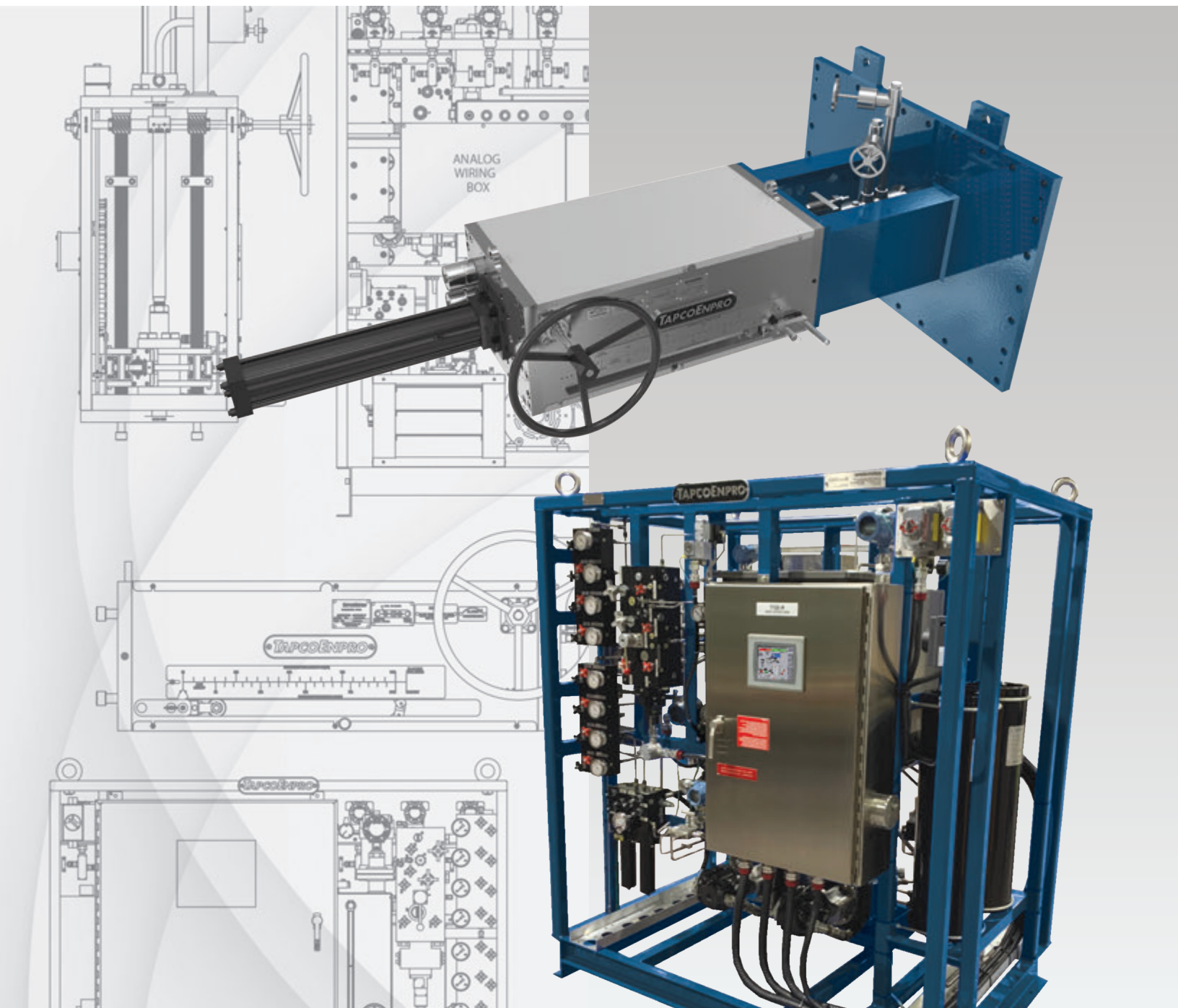


FLUID CATALYTIC CRACKING

ACTUATION AND CONTROLS



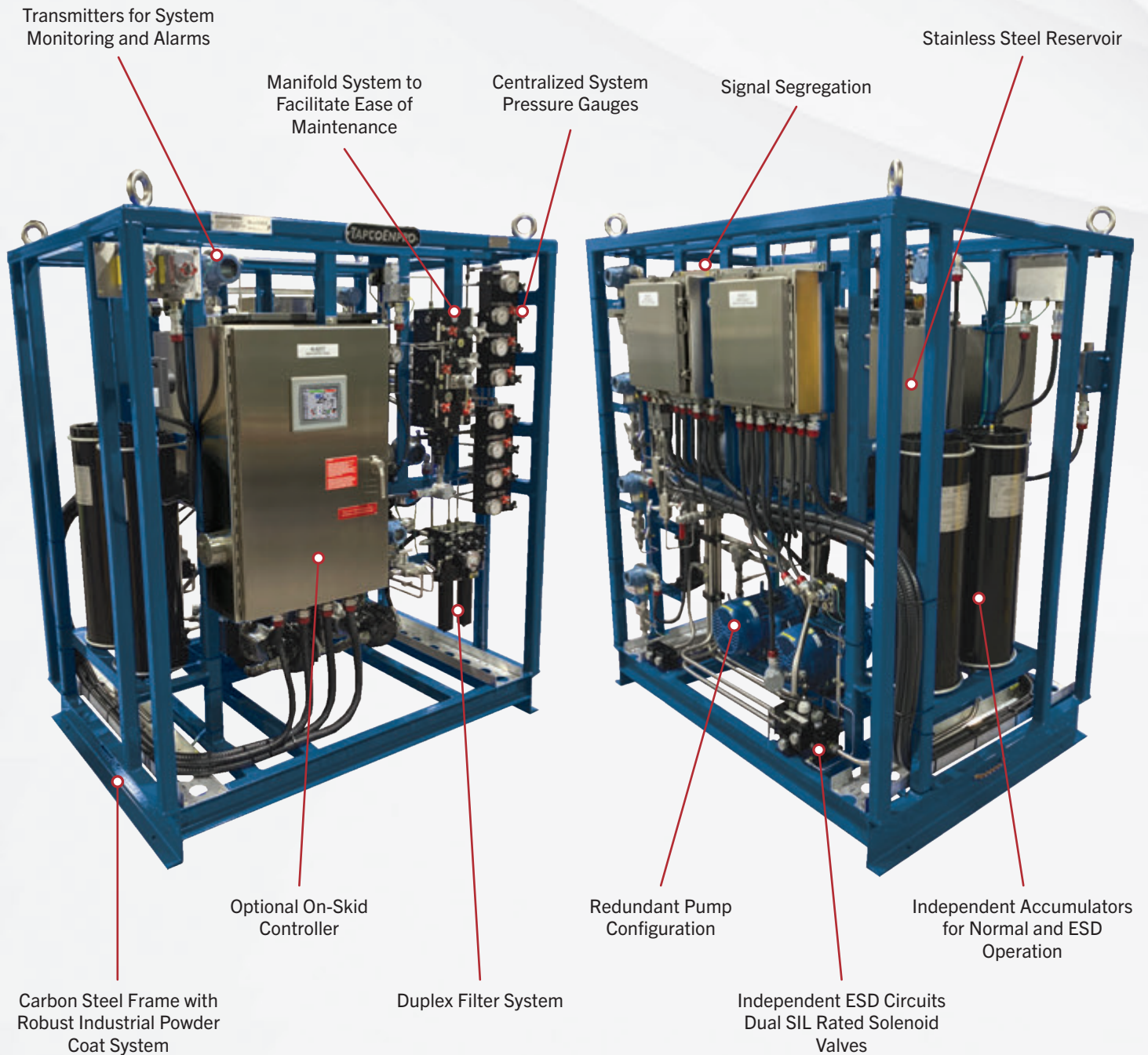
TapcoEnpro

HYDRAULIC SYSTEMS

Pioneers in Hydraulic Positioning Systems

TapcoEnpro was the first to:

- Become a single source actuator, hydraulic power unit and valve supplier on the FCCU
- Design the system to use off-the-shelf components for simplicity, ease of maintenance and repair with parts that are available worldwide
- Provide onsite single-contractor for valve and hydraulics maintenance and turnarounds
- Create innovations and inventions which are now standards on Fluid Catalytic Cracking Units



Single Valve Hydraulic Power Unit (HPU)



Dual Hydraulic Power Unit (HPU)

Every valve demands unique capabilities from its actuator and controls system. We offer total flexibility in your configuration upon installation. TapcoEnpro actuators and controls are available for all type of valves, and in several unique packages.

If you have specific needs unique to your refinery, TapcoEnpro will complete each package with components tailored to your situation. Our ever-improving systems technology offers increasing operational capabilities, such as on-line and off-line fluid conditioning and greater redundancies, to whatever degree you specify.

Standard Features

- Customized hydraulics to suit the application
- Accumulator(s) specific to individual functions
- Electro-hydraulic servo valves
- Weather protection from the FCC environment and local conditions
- Powder Coated carbon steel skid
- Stainless Steel reservoir
- Modular components and manifolds
- Solid state electronics (PLC or Digital)
- Redundant hydraulic pump system with automatic switch over
- Agency-certified electrical components

Additional Optional Features:

- Offline Filtration System
- Air or Water Heat Exchanger
- Reservoir Nitrogen Purge
- Winterization Packages
- Skid Roof and Sun Shade
- Skid Drip Pan
- Stainless Steel or Galvanized Skid Frame
- Pneumatic Stand-by Back-up Pump
- Filtration Carts

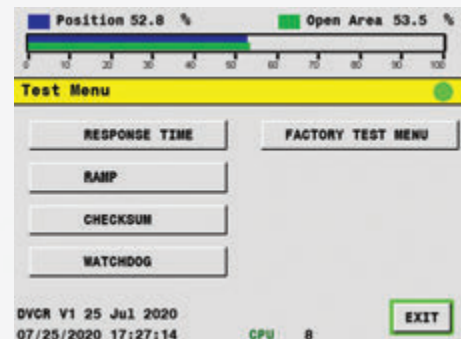
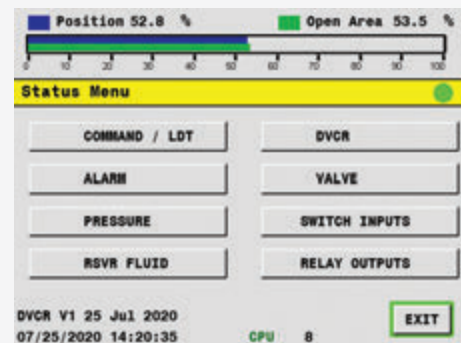
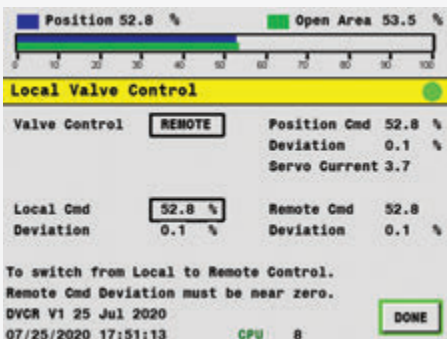
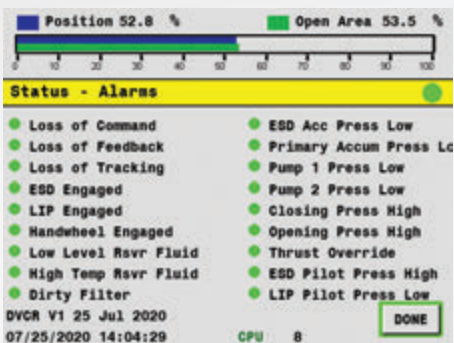
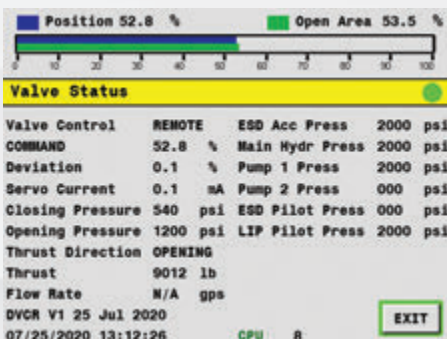


Hydraulic Control Unit (HCU)

The Digital Valve Controller (DVC) is designed to provide a state-of-the-art valve controller with features specifically to improve reliability and modernize current systems.

TA-3000 Digital Valve Controller

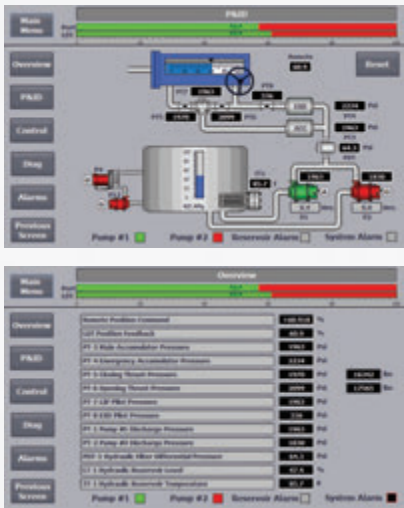
- One of the true digital controllers for FCCU slide, butterfly, and plug valves
- Rugged Compact Design
- Redundant Processors and Power Supplies
- Built-in diagnostics for ease of maintenance and preventive maintenance
- Configurable for valve specific operation
- Event history logging
- Data history available via Modbus
- Graphic User Interface
- User interface based set-up and calibration (no special tools or software required)



The Programmable Logic Controller (PLC) based systems are designed to provide the highest level of flexibility for configuration, fault monitoring, and degree of reliability.

PLC Based Control System

- Simplex and redundant PLC configurations
- Multiple levels of Redundancy (Power Supplies, Processors, I/O, and Communications)
- On-skid or safe area locations
- Configurable parameters
- Built-in diagnostics
- Event history logging
- Advanced health monitoring
- Meets and or exceeds all requirements and specifications of licensors, industry standards and best practices
- Available in all major PLC platforms
- Automated “bump-less” transfer on redundant systems
- User interface based set-up and calibration (no special tools or software required)
- Multiple communication protocols
- Fiber optic or copper transmission available



Standard Features for all TapcoEnpro Control Systems

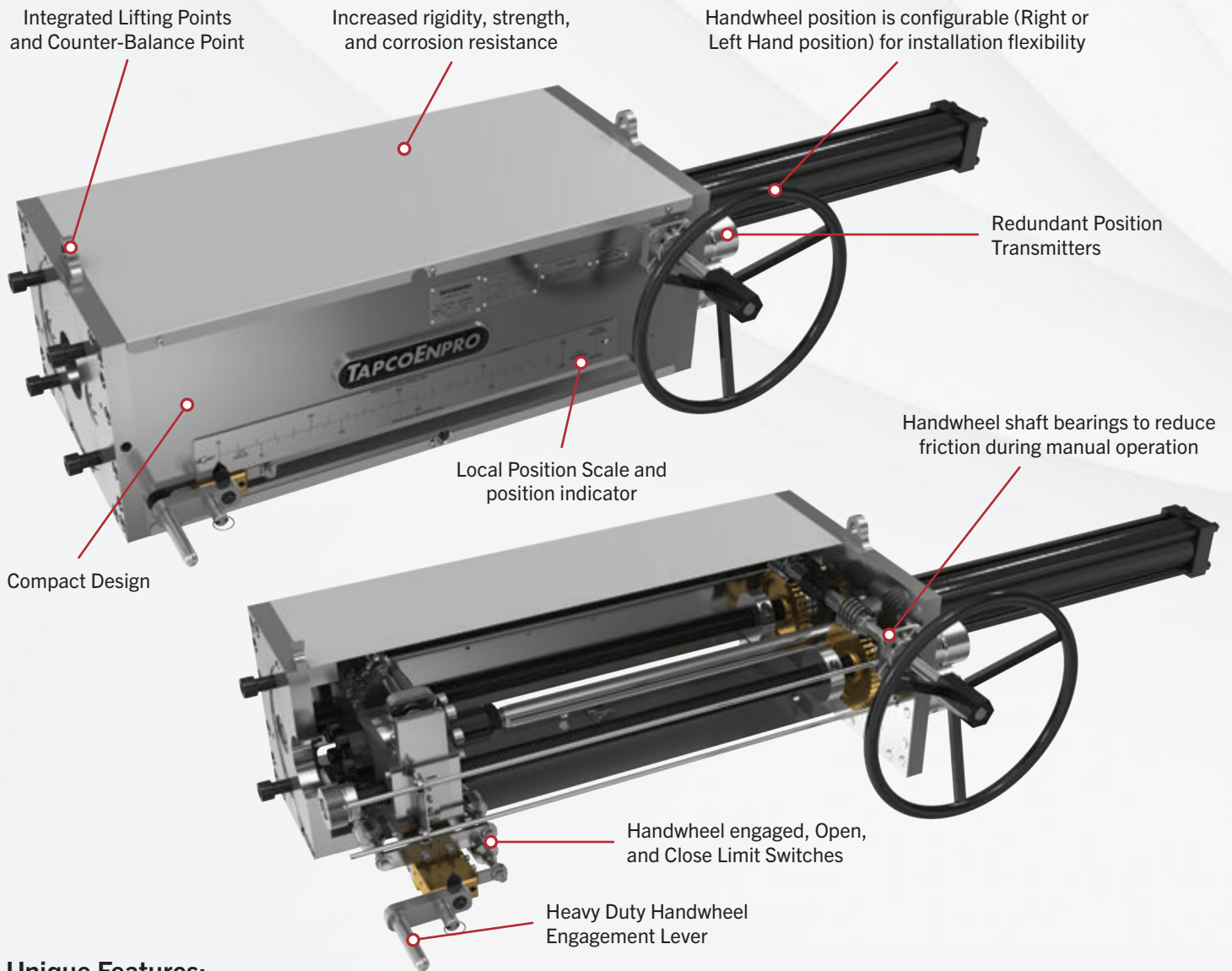
- User Friendly Graphic Interface
- Input Power Surge Protection
- Loss-of-DC-Field power alarms
- Loss-of-feedback command alarm
- Loss-of-input signal alarm
- Loss-of-tracking alarm
- Agency-certified systems
- Supports both English and metric units
- Thrust control for plug valves
- Data on valve capacity/port opening
- Remote / Local valve control

System Options

- Local or Remote panels
- Local HMI to provide information and control near the valve
- Junction Boxes with signal segregation for field terminations
- On-skid motor starters
- Climate controlled enclosures
- Enclosure purging
- Intrinsically safe protection
- CSA, CE, NEC, EAC, TIIS, KOSHA, PESO, etc. compliant systems

HYDRAULIC ACTUATORS

The most robust, and maintenance friendly FCC and Flexi-Coker linear hydraulic actuator on the market.



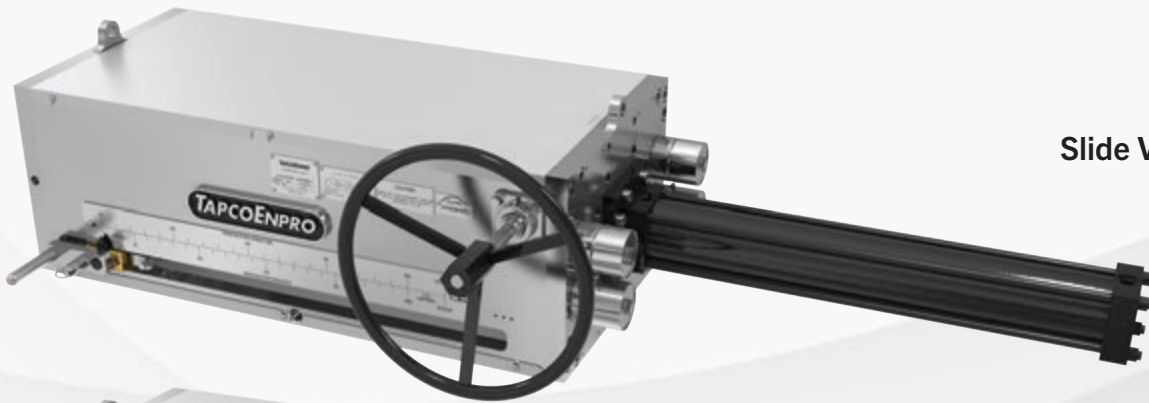
Unique Features:

- Maintenance friendly design, allowing for on-deck maintenance and repair
- Patented handwheel engagement system - effortless handwheel engagement at any valve position, and increased force capability
- Integrated alignment mechanism for 100% error free valve stem and actuator alignment
- Integrated alignment mechanism for cylinder rod to extend the cylinder service life
- Dry lubrication coating system on the dual lead screws to minimize friction during manual operation

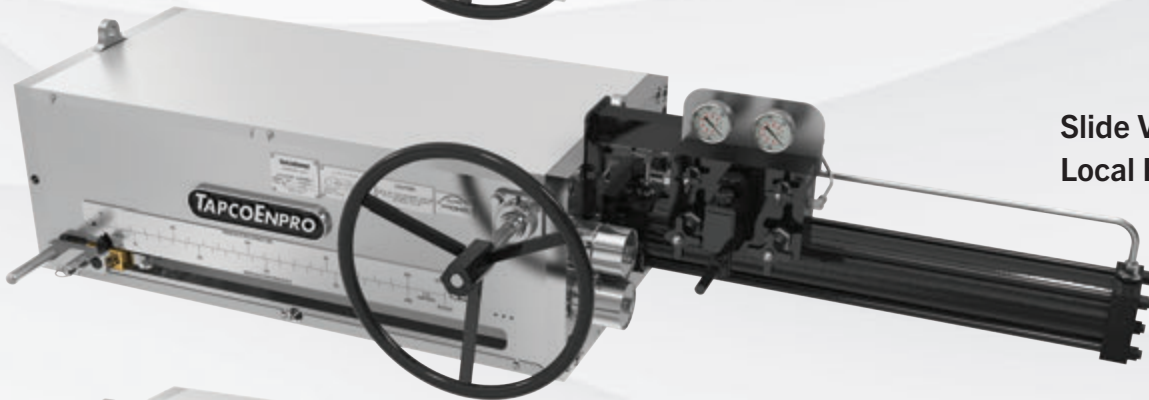
Additional Optional Features:

- Redundant position transmitters with options for up to four (4) transmitters
- DPDT position switches
- Lockable Handwheel Engagement Lever
- Actuator mounted hydraulic manifold for local hydraulic manual position control
- Custom actuator to valve yoke adapter
- Custom valve stem connection options to accommodate a variety of valve stem configurations

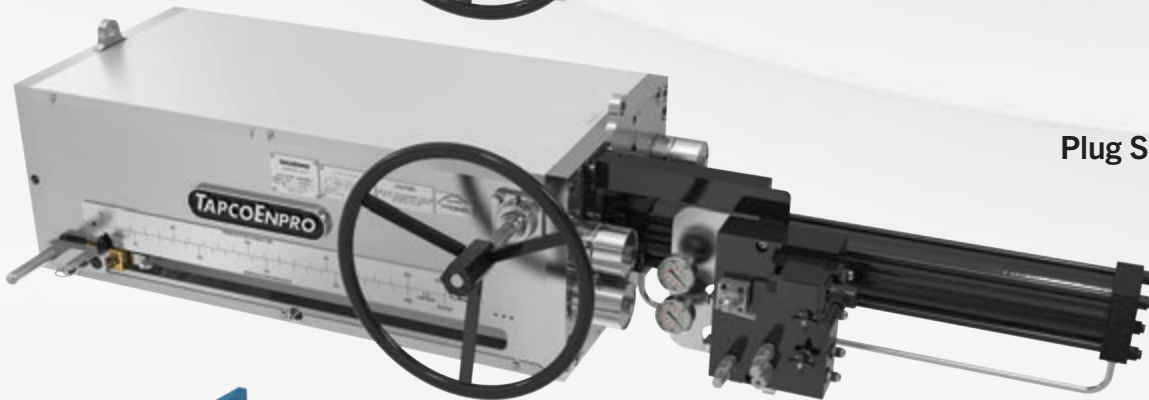
The Model TLA-20 dual lead screw design allows more surface area for the manual gear jaw blocks and therefore, more force is safely exerted when you need it the most. The dual lead screw design also allows the assembly to be 1/3 shorter than the “long style single lead screw” actuator which takes up less space and provides minimal obstruction on the deck of the structure.



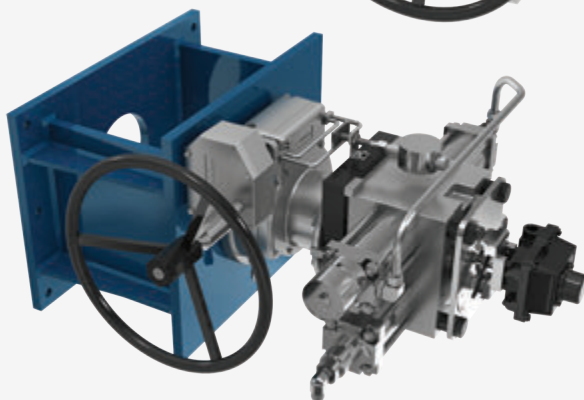
Slide Valve Actuator



**Slide Valve Actuator with
Local Hydraulic Manifold**



Plug Slide Valve Actuator



Rotary Actuator

To ensure TapcoEnpro delivers the highest quality products with the longest life expectancy we can offer, the TLA-20 Actuators have been through the CIRCOR New Product Development program where we conducted design analysis and strenuous testing before being made available to the industry.

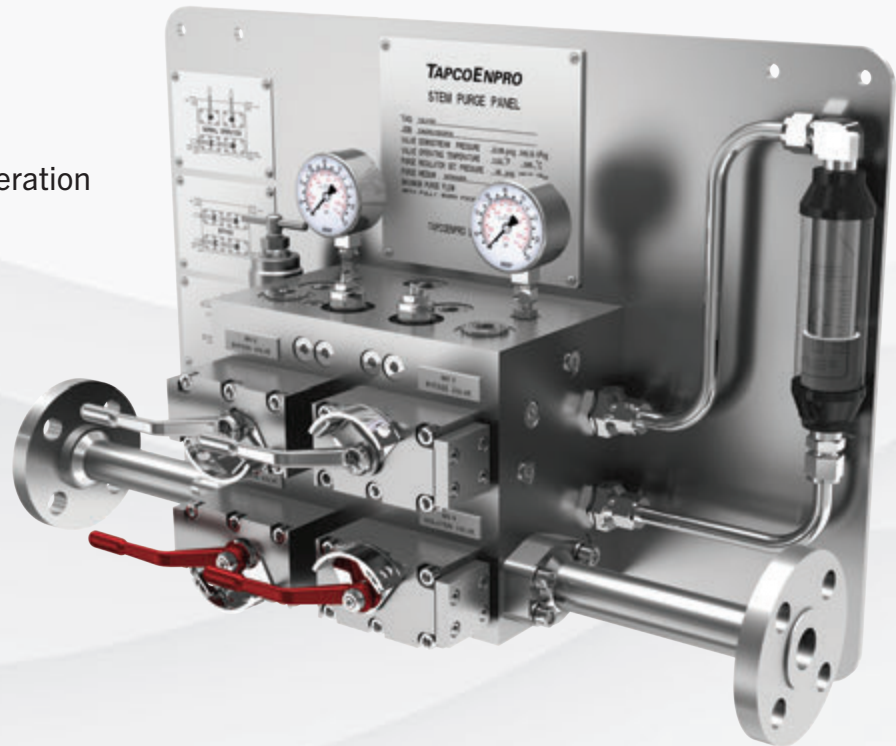
Stuffing Box Nitrogen Purge Panels

Standard Features:

- Pressure regulation
- Flow indicator
- Robust compact design
- Stainless steel construction
- Intuitive design for worry free operation

Optional Features:

- Pressure and Flow Transmitters
- 150# or 300# ANSI pipe classes



Stuffing Box Smart Purge Panel

TapcoEnpro's Smart Purge system provides continuous controllability and monitoring of purge nitrogen supply for FCC slide valve, butterfly valve and plug valve stuffing box(es). The Smart Purge system simultaneously monitors the supply nitrogen's mass and volumetric flow rate, pressure, and temperature to the stuffing box.

With a customer supplied process pressure signal the system will control the stuffing box pressure to track and maintain a positive stuffing box purge pressure (above process pressure). Purge medium flow is monitored and limited to prevent over purge issues that will lead to valve component damage. The system provides real time status and alarms to allow plant operations to easily identify issues early, take preemptive action and therefore reduce the risk of purge related valve damage.



Steam purge systems are designed to provide the most efficient solution for pressure controlled steam purge valves including FCCU Fractionator Isolation Valves and Goggle Valves.

Steam Purge Control Racks

Standard Features:

- Pressure regulation
- Flow Transmitter
- Modular design to allow for installation flexibility
- Free standing rack mount to minimize cost of installation
- Fully designed solution that is repeatable (only requires configuration for site conditions)
- Steam flow and pressure monitoring providing the tools required to determine seal health
- Reduction of steam consumption due to proper control of steam pressure

Optional Features:

- Self regulating pressure control valve
- Pressure Transmitters
- 150# or 300# ANSI pipe classes
- Pressure Relief Valve
- PLC Controlled



Condensate Control Racks

Standard Features:

- Modular design to allow for installation flexibility
- Free standing rack mount to minimize cost of installation
- Oversized blow down leg with blow down functions to minimize clogged steam traps
- Large oversized steam trap design to resist clogging due to fines
- Y-strainer prevent contamination from reaching the steam trap

Optional Features:

- Automated Blow-Down Valve
- 150# or 300# ANSI pipe classes
- DP Gauge or Transmitter to monitor Y-Strainer.



CRITICAL FLOW SOLUTIONS™



Catalyst Plug Valve



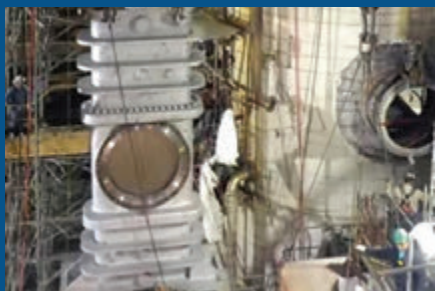
Expander Control



Flue Gas Diversion



Flue Gas Isolation



FCC Reactor Isolation



Catalyst / Flue Gas Slide Valves



Expander Isolation



Catalyst Withdrawal

ONSITE VALVE & ACTUATOR REBUILD

Our Field Services department oversees all TapcoEnpro equipment installations, commissioning, maintenance / repair and onsite training for both valve and control systems. We are focused on attending to our customer's turnaround needs, maintenance and repair requirements.



When you are responsible for the maintenance and operation of flow control equipment for your refinery or processing facility, you need technical expertise you can rely upon. Nothing makes better sense than to trust your assets to the original inventors of the world's most respected valve and control system... TapcoEnpro.

TRUSTED PARTNER

As a trusted partner, we deliver safe, reliable products while providing the best value for our customers. From the moment a customer contacts us, through delivery, installation, support and service we're there to provide unparalleled products, service and support. We continually strive to make our products the best, most reliable in the industry.



Channelview, Texas



Barnsley, UK



Calgary, Canada

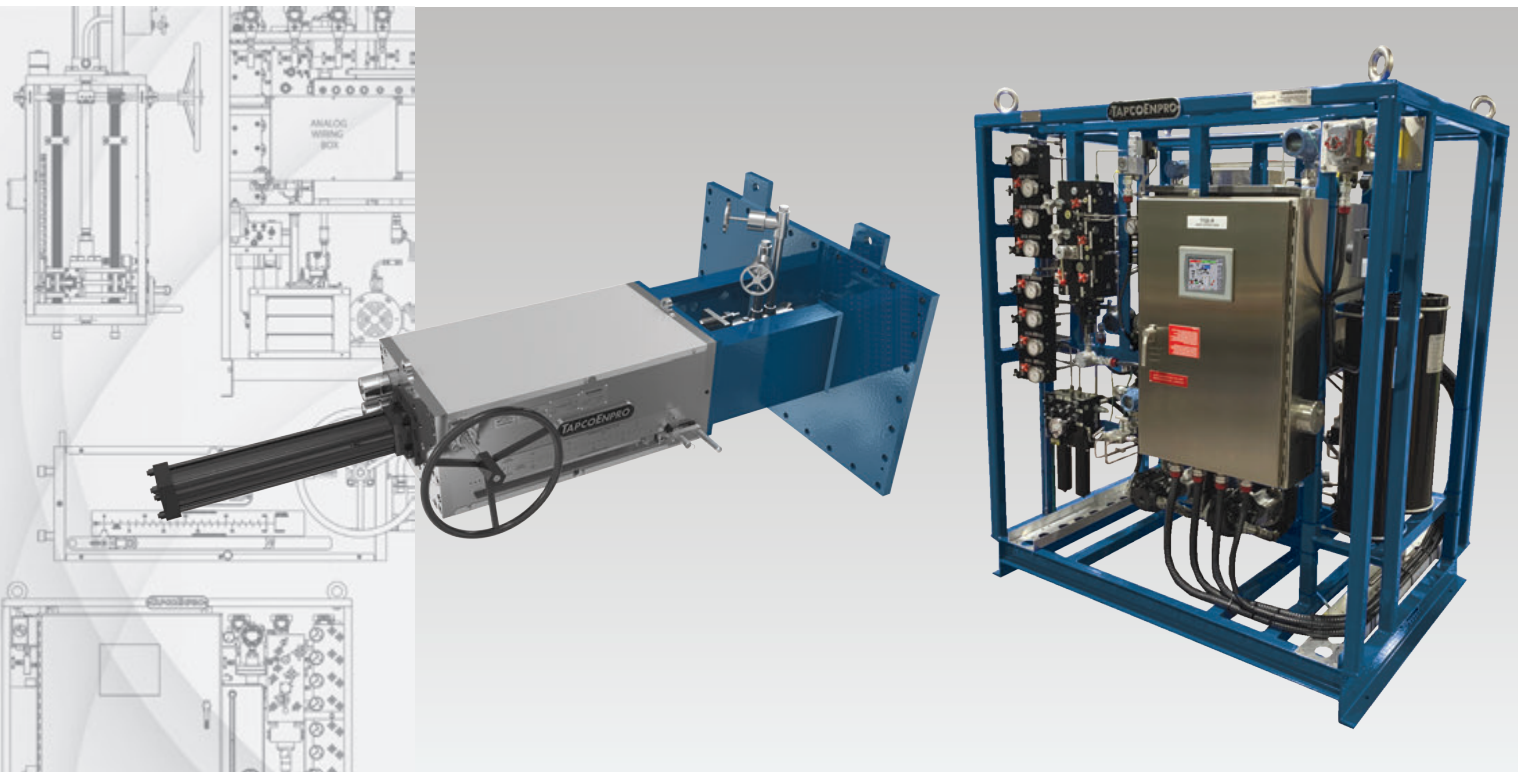


Coimbatore, India

For over 70 years, TapcoEnpro has been the world leader in the design and manufacture of critical service valves, equipment and services for Fluid Catalytic Cracking (FCC) Units.

We offer a full range of products including:

- Fractionator / Reactor Isolation Valves
- Spent and Regen Plug Valves
- Regenerated Catalyst Slide Valves
- Flue Gas Butterfly Valves
- Spent Catalyst Slide Valves
- Expander Butterfly Valves
- Flue Gas Diverter Valves
- Catalyst Cooler Slide Valves
- Catalyst Withdrawal Valves
- Recirculation Catalyst Slide Valves



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