

Downhole Actuator (DACT)



Description

Northstar's Downhole Actuator (DACT) stands out as an exceptional downhole linear force generator, offering a range of 30,000 to 90,000lbs. of force, depending on the tool size required. This innovative tool, free from explosives and lithium, serves a multitude of functions when combined with other tools. It can be used to set permanent or retrievable bridge plugs, packers, or straddles, puncture tubing or casing, retrieve stuck objects, actuate valves, centralize or dimple tubing, pinpoint leaks in tubing, and even cut pipes.

The force generation mechanism is controlled through a dedicated control module (PCM). Once activated, the DACT efficiently completes its task. When the job is done, the system is removed from the well. With a simple module change, the tool can be reset within minutes, ready for immediate use without the need for any further maintenance or cleaning.

The control module, powered by a disposable alkaline battery pack, is designed for a single setting operation per pack. Furthermore, the tool's electronics are integrated into the control module, which is replaced with each run, enhancing service reliability by eliminating potential fatigue-related failures. The alkaline battery pack is user-friendly, easy to transport, recyclable, and poses no safety hazards at the wellsite.

TAG-enabled DACT: Wireless Actuation and Surface Readout

The DACT has an optional configuration that includes a Q177 Quartz downhole gauge and the TAG (Tiny Acoustic Gizmo). The Q177 is a groundbreaking advancement in downhole gauge technology, tailored to withstand the harshest operating conditions. The TAG is a compact 2-way short-hop acoustic communication device that can transmit signals up to 150 meters through solid or liquid media (think downhole Bluetooth). This configuration allows surface control of multiple DACTs to complete multiple operations with one wireline intervention trip (eg. Set a plug and punch casing). The TAG-enabled DACT can also collect data from below a plug for barrier verification (BVS) pressure testing.

The DACT can be operated in real-time or memory mode and is compatible with various conveyance methods, including mechanical slickline, real-time slickline, electric line, coiled tubing, sucker rod, or jointed work string.

Features

- **Enhanced Safety Profile:** This tool is engineered to be non-explosive and lithium-free, significantly improving safety during handling and logistics.
- **Effortless Deployment:** Featuring a “Plug & Play” design, it offers user-friendly functionality and simplicity, making it easy to set up and use.
- **Wireless Communication:** Equipped with an integrated 2-way short-hop wireless acoustic transceiver known as TAG, facilitating seamless communication.
- **Precise Pressure Monitoring:** Includes an integrated Quartz pressure gauge (Q177) for accurate and reliable pressure readings downhole.
- **Controlled Setting Speeds:** Ensures precise and high-quality setting of downhole devices by regulating setting speeds.
- **Compact and Lightweight:** Its short and lightweight design makes it suitable for swift mobilization via winged aircraft or helicopters, particularly useful in remote locations.
- **Rigless Operations:** Ideal for operations with limited rig up height, like rigless operations, where space constraints are a concern.
- **Cost-Effective:** This multipurpose tool platform is cost-effective, reducing the need for multiple specialized tools.
- **Real-Time or Memory Activation:** Offers the flexibility to be activated in real-time or memory mode, depending on operational requirements.
- **Reliability:** Tool electronics are replaced with each run, ensuring consistent quality and reliability in performance.
- **High-Temperature Tolerance:** Qualified to withstand high temperatures, up to 437°F, for a duration of 6 hours, making it suitable for challenging environments.

Specifications

Outside diameter	2.720"
Tool Length	55.10" / 4.59 feet
Tool Weight	66.20 lbs
Stroke Length	10.00"
Stroke Speed x10"	0.50" per minutes
Fish Neck	EL - 3.000" / SL -2.313"
Output Nominal Force	40,000 lbs
Output Maximal Force	50,000 lbs
Maximum Operating Pressure	15,000 psi
Max Temp - Standard Tool	250°F for 8 hours 275°F for 6 hours
Max Temp - RAZORHEAT Tool	392°F for 12 hours 473°F for 6 hours
Upper Connection	Slickline: 1 1/6" Sucker Rod - Eline: 1 3/16" Go - Pipe: As Required
Lower Connection	Baker 10 Equivalent

E-setting Tool

Tool Map

Tiny Acoustic Gizmo (TAG)

2 way Short-hop Wireless
Acoustig Transceiver

- **Wireless commands:** Trigger tools below a packer or plug
- **Surface Readout:** Read pressure and temperature above and below a packer plug
- TAG units can be added to the network as repeaters as needed to extend the range

Set force and plug setting confirmed with surface

Q177 Quartz Pressure/Temperature Memory Gauge

The most advance Quarts gauge:

- Highest accuracy and resolution Quartz Transducer
- Clock-Time Accuracy with Temperature Corrected Sampling
- 8,000,000 sample onboard memory

Battery-powered
(non-explosive)

Triggered from
surface or timer

Conveyed on slickline, slick
e-line, wireline or coil tubing