



Handbrake Setting System



www.clavis.co.uk

HANDBRAKE SETTING SYSTEM



The Clavis handbrake setting systems measures the distance a brake actuating lever. Designed and built for production lines and manufacturing facilities, the system is the industry standard for most OEMs.



**Winners of The Queen's
Award for Enterprise**

INNOVATION - 1997, 2004, 2010, 2016
INTERNATIONAL TRADE - 2012, 2014





ABOUT US

Integrated Display Systems (IDS) is internationally recognised as the industry leader in both the design and manufacture of belt tension measurement equipment and automotive handbrake setting equipment.

Established in 1982, over the last 37 years IDS has helped over 1000 customers worldwide to achieve consistent, quantifiable quality control by providing accurate, reliable, and durable equipment.

Our dedicated team is made up of a wide range of highly skilled and expert mechanical design, electronic, and software engineers who ensure that every customer receives the high standard of equipment and support the company is renowned for.

Our fully equipped, high tech CNC machine shop and manufacturing facilities can cope with the most demanding of jobs and all our machining services and manufacturing processes are backed by a proven and recognised quality system.

We have the flexibility to offer a customised and tailored solution to every customer, building close relationships and a sound understanding of requirements to ensure we provide the best possible products and service to meet their needs. We pride ourselves on ensuring efficient lead times, quality and accuracy in everything we do and in every piece of equipment we design, manufacture and supply.



IDS INTEGRATED
DISPLAY SYSTEMS LTD

ABOUT US

Queen's Award for Enterprise

In the last 12 years Integrated Display Systems has received numerous independent accolades for innovation and technological achievement, most notably by receipt on six separate occasions of the annual Queen's Awards for Enterprise.

The Queen's Award for Enterprise is the most prestigious business award in the United Kingdom and honours outstanding achievement in the areas of innovation, development and international trade.

IDS has received a Queen's Award for every one of its flagship products. We are proud to be one of only a few companies in history to have achieved this.

In 2016 the founding partners of IDS were personally presented with the Queen's Award for Enterprise by Her Majesty the Queen. This award acknowledged the technology IDS had developed for the Gusto (POPP Clamp Release) Tool. A presentation at Buckingham Place was followed by a more informal celebration for the IDS team with the Lord Lieutenant of Northumberland.

Previous Queen's Awards were won for developing the technology of the handheld belt tension meters, Electric Power Assisted Steering (EPAS) belt tension setting equipment, and the unique patented automotive handbrake setting equipment.





Integrated Display Systems Awards

Queen's Award For Enterprise: **Technological Achievement** - 1997

Integrated Display Systems won this Innovation Award for the hand-held belt tension meter. The meter uses a unique design to measure the natural frequency of vibration of a belt span using acoustic sensors. This frequency is directly related to the tension in the belt, as the tension in the belt is increased the frequency of vibration also increases. The acoustic sensor uses a technique for detecting the belt vibration signal whilst minimising ambient noise. The meter is a two-component system consisting of a hand-held meter attached to a sensor via an electronic cable.



Signed by the Sovereign's Command
John Major

Queen's Award For Enterprise: **Innovation** - 2004

Integrated Display Systems won this Innovation Award for its state-of-the-art vehicle handbrake system, which is used on vehicle production lines throughout the world. The perfect brake setting is achieved when the brake cables are adjusted so that any cabin lever movement is immediately translated into brake lever movement. The measurement tools communicate with a control cabinet using UHF radio telemetry links and adjust the vehicle by interfacing with a power tool, which winds the adjustment nut until the perfect setting is reached. Each Clavis measurement tool is specifically designed to match the design of the brake.



Signed by the Sovereign's Command
Tony Blair





Integrated Display Systems Awards

Queen's Award For Enterprise: **Innovation - 2010**

Integrated Display Systems won this Innovation Award for designing and developing a belt tensioning system for Electric Power Assisted Steering (EPAS) equipment. The automotive industry had been switching from conventional power assisted steering towards electric power assisted steering (EPAS), improving engine efficiency and increasing miles per gallon by 4% to 8% and bringing potential benefits to the environment in a reduced carbon footprint. The CLAVIS technology is used to accurately tension belts in these systems, leading to enhanced durability and reduced threat of belt failure, which could result in a serious car accident. Sophisticated designs are taken from concept to installation by a highly skilled and dedicated team.



Signed by the Sovereign's Command
Gordon Brown

Queen's Award For Enterprise: **International Trade - 2012**

Integrated Display Systems won the Queen's Award for International Trade for the first time for its continuous improvement in export performance. The growth in overseas earnings was calculated at 271% over the six-year period and the percentage of sales exported had also doubled. IDS maintained its market sales into the automotive supply chain through a proactive approach offering technical innovation along with highly skilled engineering development. Customer support and after sales service are also supplied to good effect. The Company had recently expanded its export effort into the BRIC countries.



Signed by the Sovereign's Command
David Cameron





Integrated Display Systems Awards

Queen's Award For Enterprise: **International Trade** - 2014

Integrated Display Systems won a further Queen's Award for International Trade, increasing the growth recognised by its previous Award in 2012. In 2014 the Company had established a network of technical distributors in each of its key markets. IDS expanded its network into Brazil, Argentina and Russia. It focused on developing unique and patentable products for which it becomes the sole supplier rather than compete head to head with larger multinational competition.



Signed by the Sovereign's Command
David Cameron

Queen's Award For Enterprise: **Innovation** - 2016

Integrated Display Systems won this Innovation Award for a clamp release tool used in automotive manufacture. The innovation uses sensors commonly found in mobile phones to track the motion signature of the tool. Closure of the clamp is detected by the specific motion leading up to release and the characteristic vibration associated with release. The unique signature differentiates between other actions such as knocking the tool against other parts of the engine as it is being positioned. The clamps are used in the industry to provide seals on fluid transfer hoses where any clamps left open can lead to fluid loss and consequent expensive warranty claims.

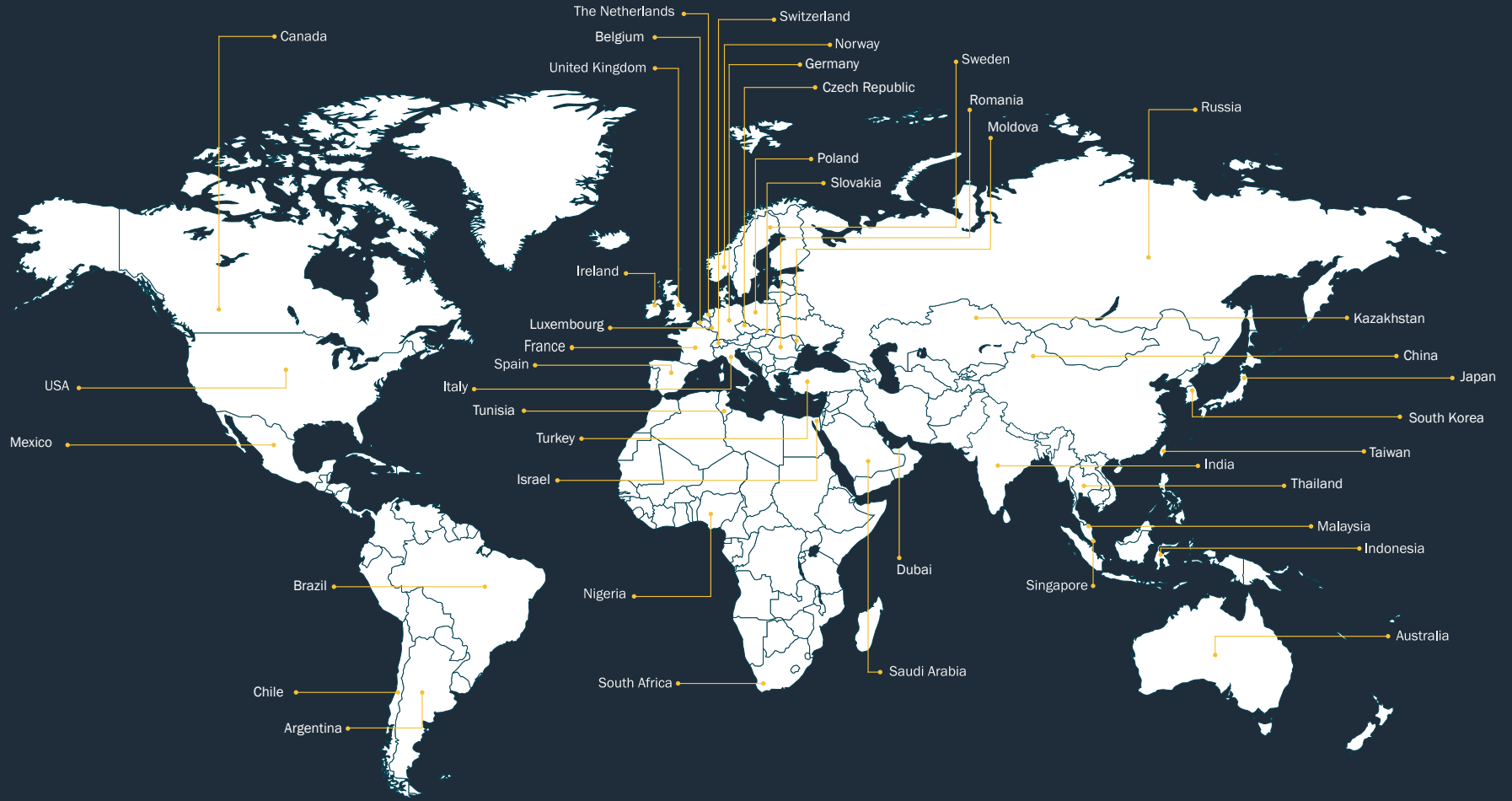


Signed by the Sovereign's Command
Theresa May





Supporting Excellence Worldwide





"I have had the pleasure of working with the team at IDS for over 15 years. During that time we have worked on several major integration projects together including brake setting and hose clamp detection. These projects have been instrumental in enabling Ford to achieve the highest standard of vehicle assembly. The team consistently provide us with high quality products and show continual dedication to understanding our specific business needs and meeting our ever-evolving requirements."

*Mark Hyland,
Senior Automation and Equipment Engineer,
Ford Motor Company - VOME Final Assembly Engineering*





CLAVIS

HANDBRAKE SETTING SYSTEM

The Clavis handbrake setting equipment has been installed in automotive manufacturing plants worldwide for over 16 years, and as of January 2020 is currently utilised in over 28 plants. The equipment has been used to set the brakes on a wide range of vehicles including the Ford Fiesta, Focus, and Mustang, BMW Mini, Volkswagen Jetta, Golf and T-Cross. Clavis equipment has a reputation for innovative design, quality, and reliability, supported by an outstanding field technical support team.

Achieving Perfection

The perfect brake setting is achieved when the brake cables are adjusted so that any cabin lever movement is immediately translated into brake lever movement. The operating levers on the brakes should be set away from their rest stops by a defined distance (typically 0.6 mm for disk brakes).



Drum Brake

The measurement operation is undertaken by placing measurement tools on each of the rear brakes. The measurement tool has a spring-loaded sensor pin which remains in constant contact with the brake lever. The sensor pin is connected to a linear potentiometer from which the position of the brake lever can be determined.

The positions of the brake levers are communicated to a control cabinet which interfaces with an electronic power tool. The length of the handbrake cable is then adjusted by the power tool in response to the brake lever position information communicated by the measurement tools. The sensor nose of the tool should be guided into the access hole on the brake back plate.

As the sensor enters the back plate the magnets on the location arms 'snap' the tool into position aided by the black nylon guide plates. The magnets securely hold the tool in position. The brake drum has been removed for clarity.

Typical Setting
Distance: 2.0mm



Drum Brake

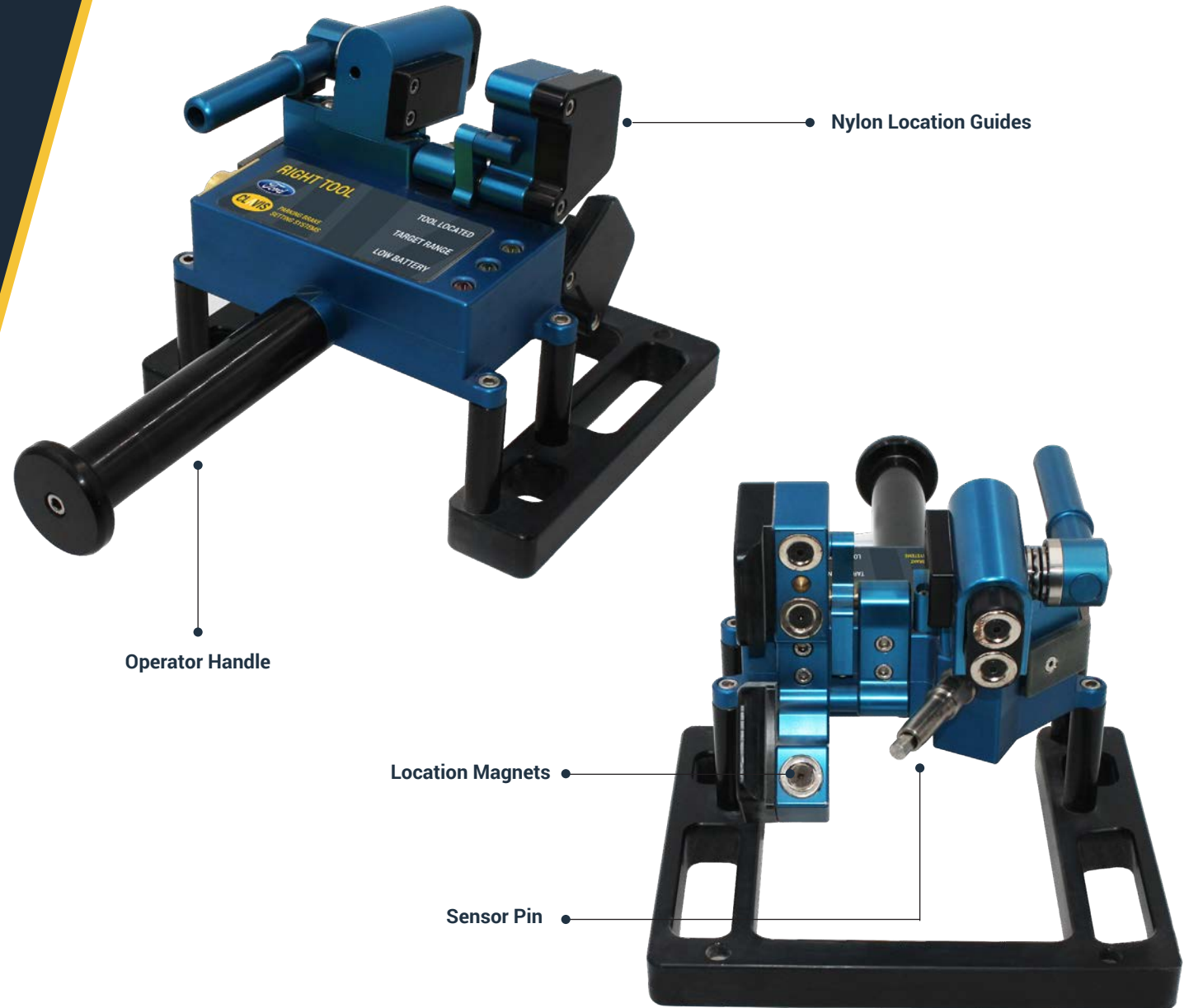
The sensor pin in contact with the back of the drum brake lever.





Drum Brake

Key components of a standard drum tool.



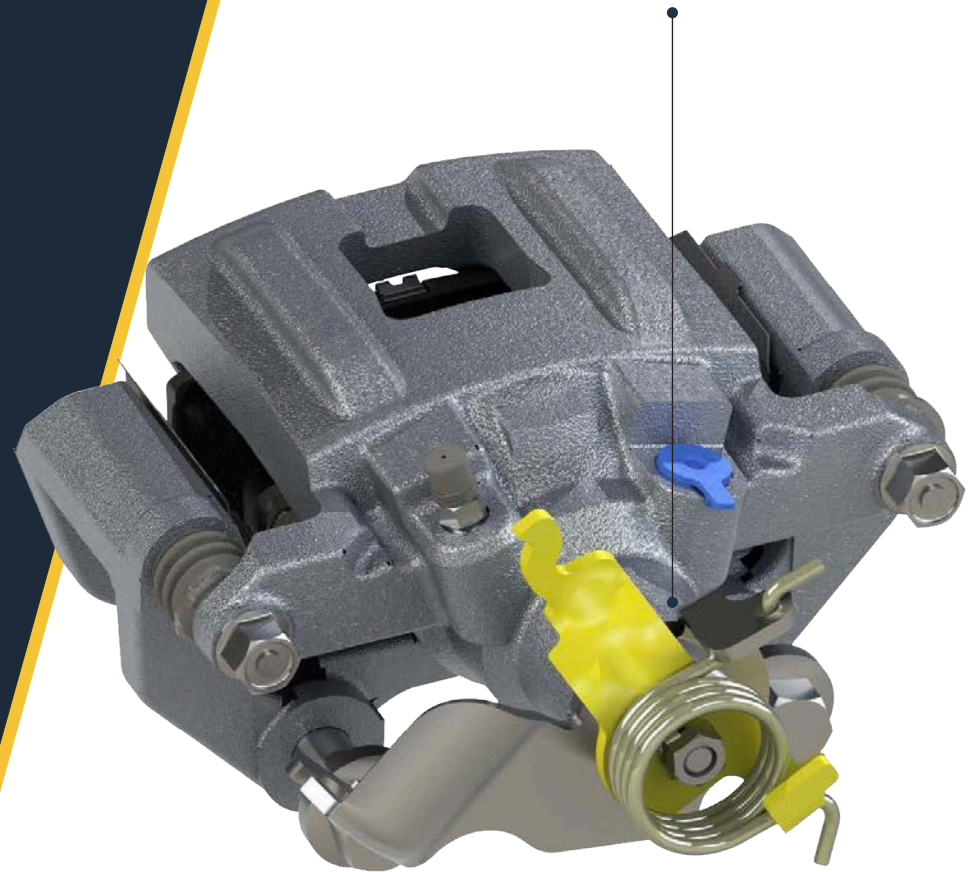
Disk Brake

The caliper lever position for a correctly set brake is defined by the manufacturer of the brake. The aim is such that any cabin lever movement should translate into brake lever movement and increase braking effort. When the cabin lever is in the fully down position there should be no brake drag.

The caliper lever should be advanced by the setting operation so that there is a gap between the lever and the rest stop bracket. The caliper lever is in constant contact with a spring-loaded sensor arm (connected to a linear potentiometer) within the measurement tool.

The disk measurement tool has clamping mechanism which pulls the tool hard against the caliper. This is achieved by pressing the locking handle down which in turn rotates a cam. The cam operates against a pivoted arm which moves a 'flipper' under the body of the caliper. The force which the flipper exerts onto the

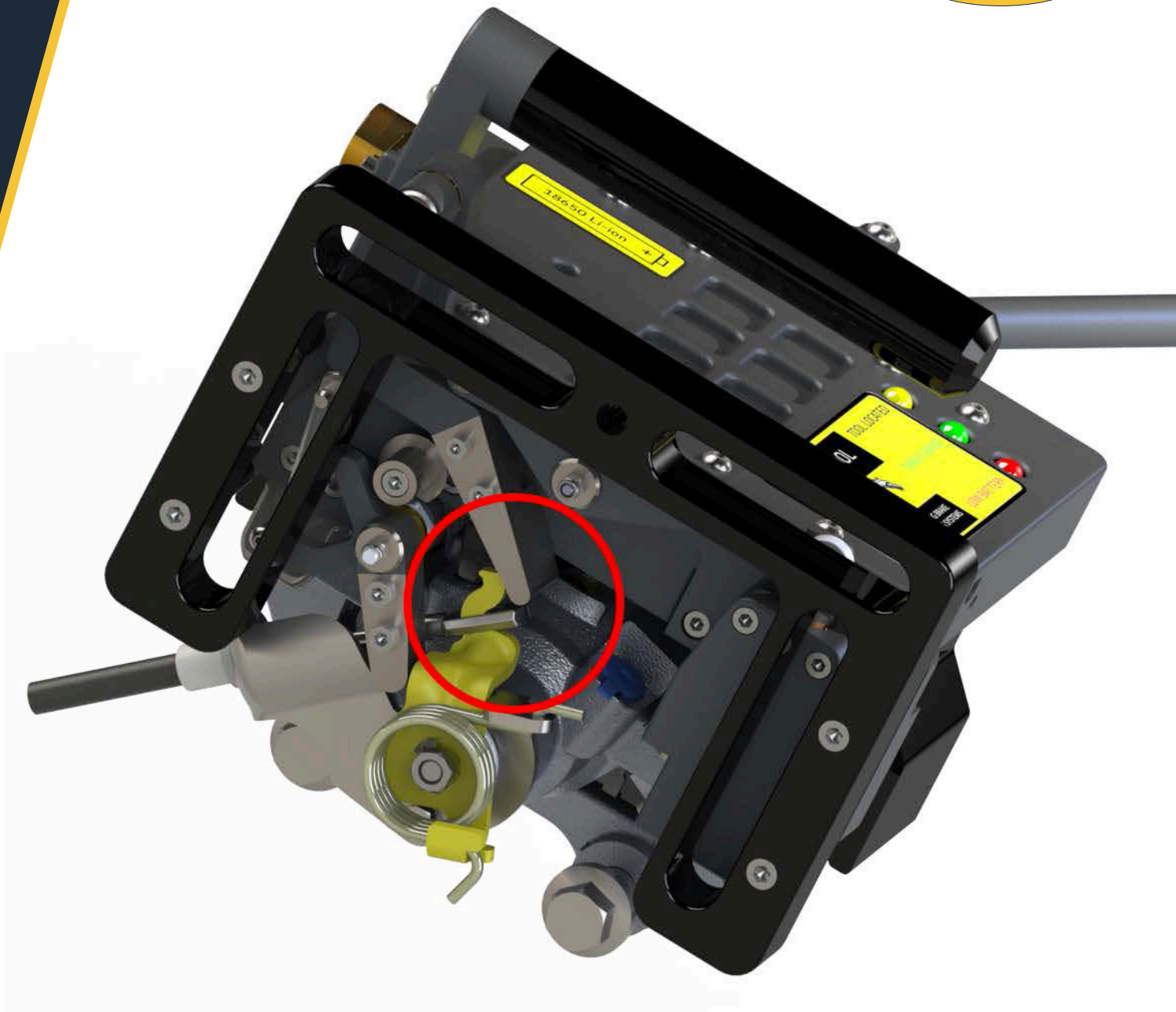
Typical Setting
Distance: 0.6mm





Disk Brake

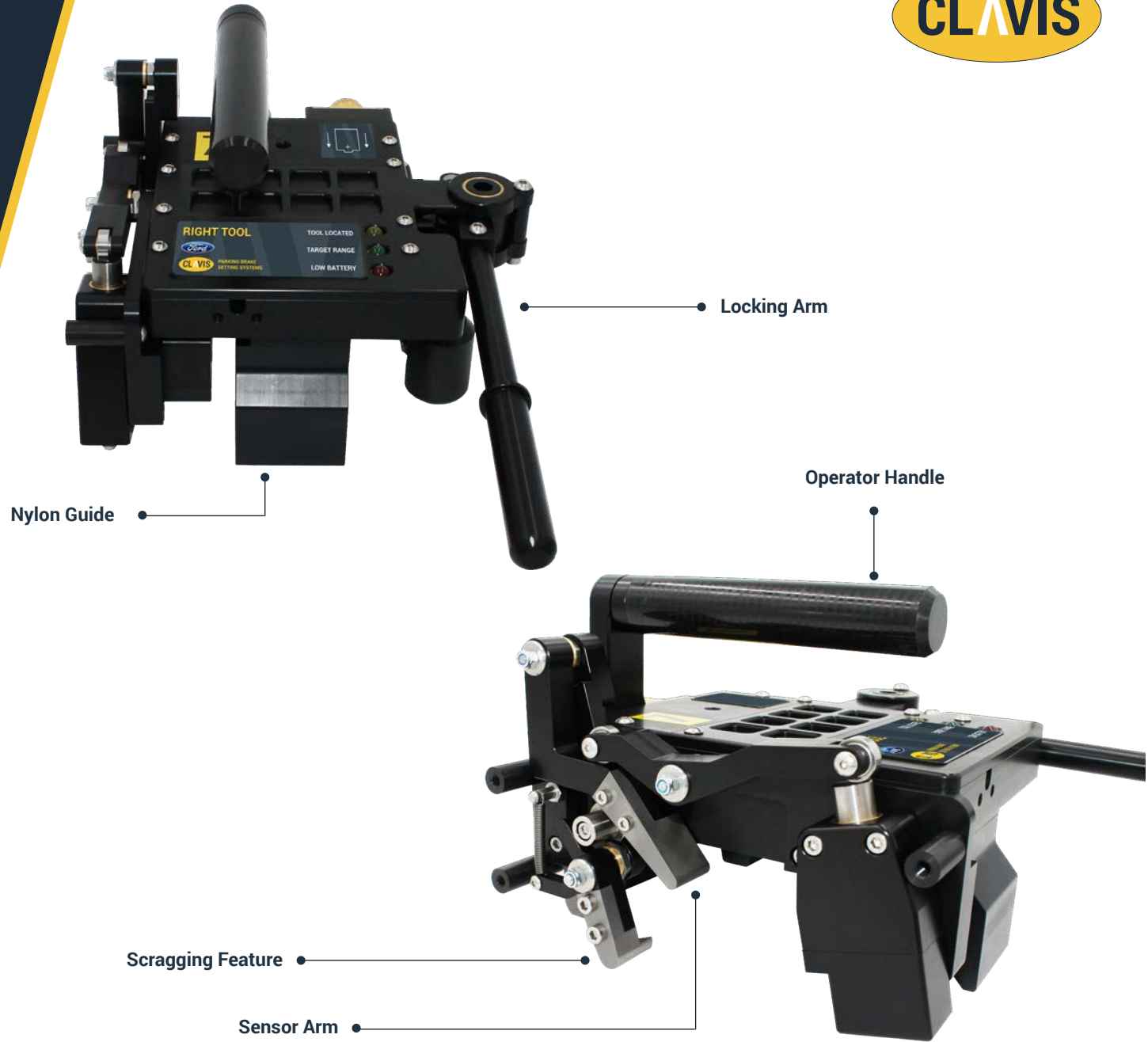
The sensor pin in contact with the back of the disk brake lever.





Disk Brake

Key components of a standard disk tool.



How does the system work?

The Clavis measurement tools are temporarily placed onto the rear brakes to measure lever travel. The measurement tools (one on the left side caliper and one on the right side caliper) communicate with a control cabinet using UHF radio telemetry links. The measurement tools control a power tool by a radio link. The power tool winds the adjustment nut until the perfect setting is reached.

The control cabinet interfaces with an electric power tool (Standard interfaces exist for Stanley, Atlas Copco). After the measurement tools have been located it is only necessary for the operator to place the power tool on the adjustment nut and then hold down the trigger of the power tool. The cycle is complete when the tool stops.

If a fault occurs during the cycle the power tool will also stop and alert the operator by audible and visual warnings. The precise adjustment is achieved in a closed loop operation.

Prior to setting the brake the Clavis system performs a process called **Scragging**. Scragging removes all the elastic stretch out of the handbrake brake system. Scragging pulls on the cables with a large force (typically 1500 N on each cable).

Scragging is achieved by winding the cabin lever adjustment nut down to a torque of typically 8 Nm within the available thread length. This process takes any further stretch out of the cables and the associated brackets.



Communication

The demand for companies to reach the best decisions based on real-time data insights have never been greater. The Fourier is designed to interact not only with operators and engineers, but also other systems and subsystems. PLCs play an important data gathering and reporting role in system transparency by serving and receiving data from plant quality systems. Advanced process control and monitoring functions make it easy to view and collect data.

Fourier interfaces include:

- PROFINET Networked Ethernet
- PROFIBUS
- RS232 Serial connection
- 24v Isolated Outputs

We have developed a range of FourierBMS controllers integrating PLCs produced by Siemens, Allen-Bradley, and Mitsubishi.

The SIEMENS logo is displayed in white capital letters on a teal rectangular background.The Allen-Bradley logo features the letters "AB" in a blue circle followed by the text "Allen-Bradley" in a blue serif font.The MITSUBISHI logo consists of three red diamonds forming a triangle, followed by the word "MITSUBISHI" in black capital letters.

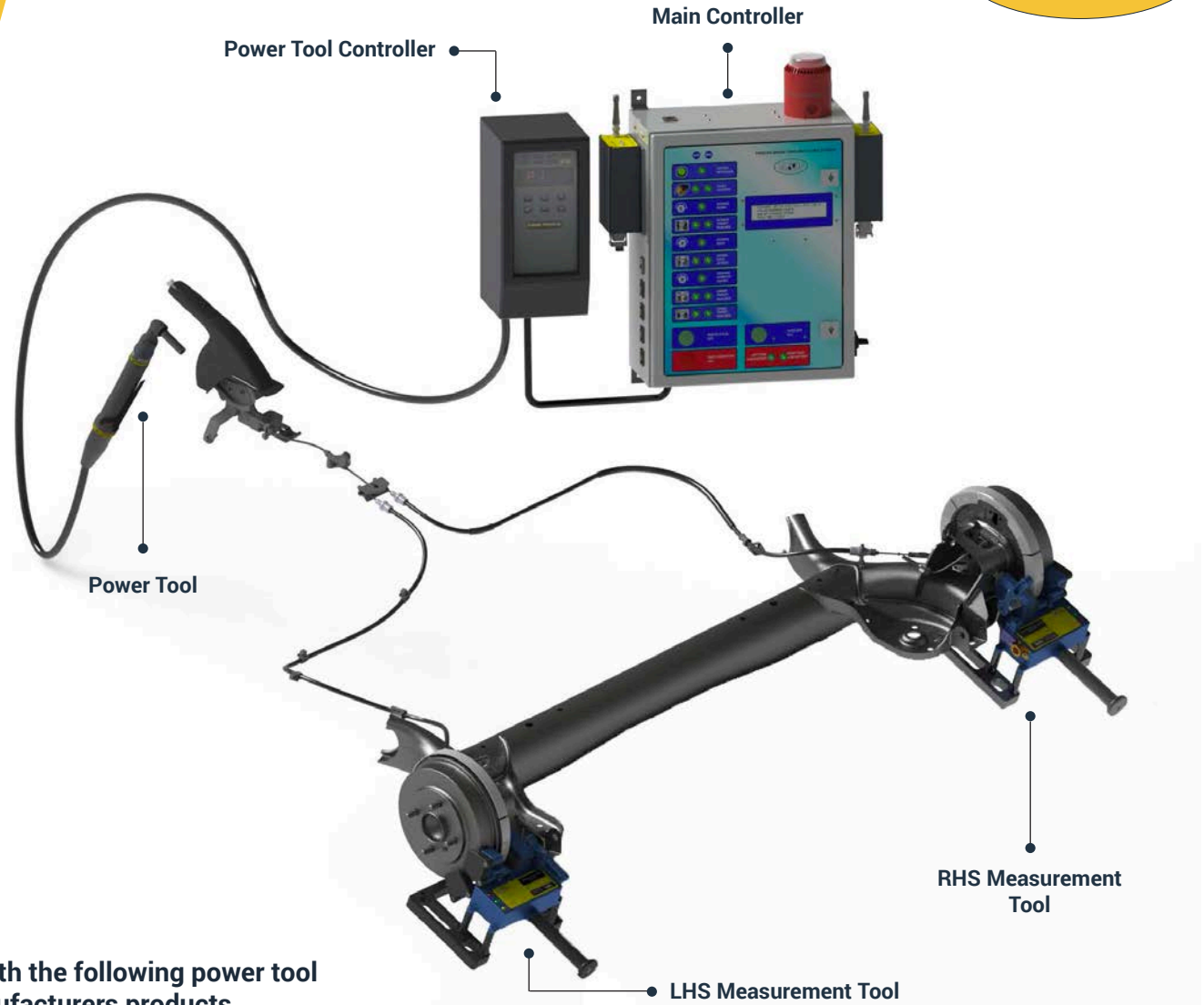
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Closed-Loop System

Clavis have developed a closed-loop system which measures, monitors, and accurately controls the handbrake setting process from start to finish.

The closed-loop system is designed to automatically achieve and maintain the optimum setting distance of the braking system.



Interface with the following power tool manufacturers products





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