



JOYSTICK C14

Built for heavy duty

The Caldaro C14 joystick provides the best combination of full grip size and perfect precision. It's large enough to match the full-sized heavy-duty machines and strong enough to withstand the toughest operators. You can rely on the C14 to stay intact and keep its detent year after year.

It stands all the tests we can think of

- **All temperatures** – Hot or cold, the C14 will endure all temperatures from -40°C to $+85^{\circ}\text{C}$.
- **The best materials** – The best material has been chosen for each component. The rubber mixture endures the toughest conditions.
- **The strongest shaft** – The shaft is manufactured in one single piece with extended dimensions, which makes it practically impossible to bend.
- **Protected from fluids** – Thanks to its sealed panel mounting, the electronics are protected from all kinds of fluids and chemicals, such as water, salt, and oil.
- **Precision that lasts** – It will withstand more than 10 million operations and keep its detent precision.

Developed with customer input

- Tested in salt and copper mines.
- The guide feeling is excellent.
- Made in Sweden.

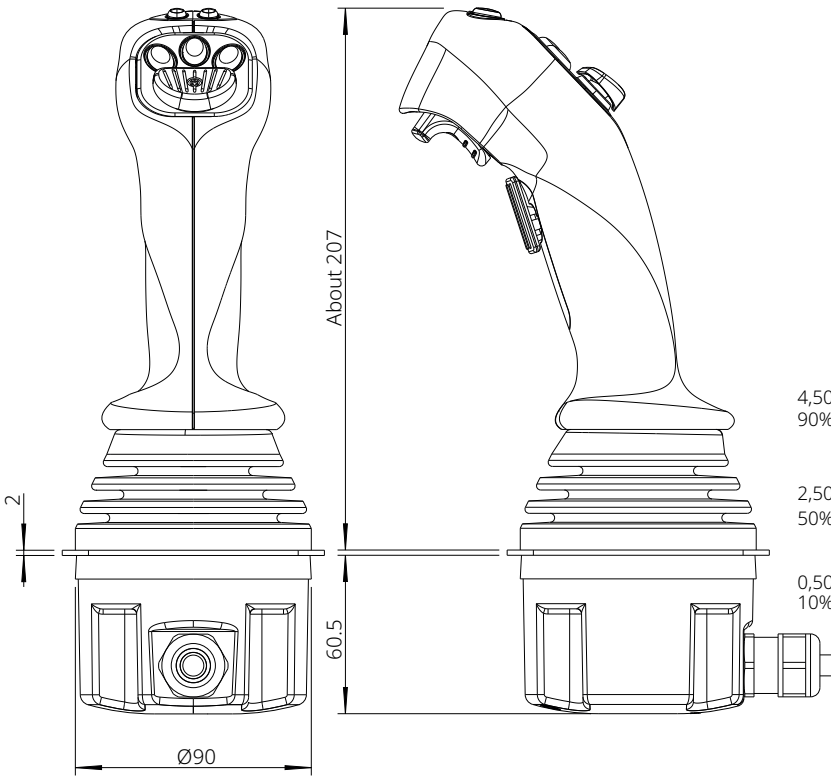
The C14 is available with a palette of handles to be suitable for every situation. We can do custom-made handles even with a relatively small production batch; see the below examples.



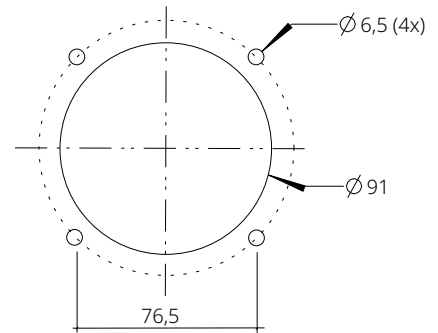


JOYSTICK C14

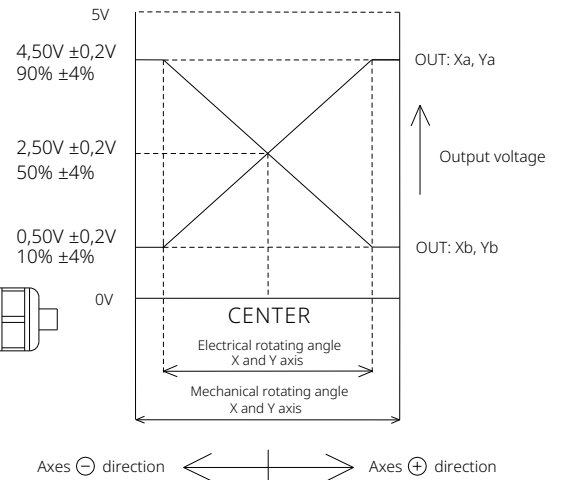
STANDARD DIMENSIONS



PANEL CUTOUT



OUTPUT CHARACTERISTICS



SPECIFICATIONS

MECHANICAL AND ELECTRICAL SPECIFICATIONS

Mechanical operating angle	X/Y axis: ±12° or ±20°
Operating force	X/Y axis: ≈4N–8,5N (≈400gf–850gf)
Lever strength	Max 500N (max 50kgf) (Static load)
Life expectancy	10,000,000 full operations
Sensor type	Hall-effect
Total current consumption	Typically 17mA; max 22mA
Applied voltage	5VDC ±10%
Load resistance	4,7kΩ–100kΩ pull down

Effective output	≈10%–90% V _{in}
Resolution	Essentially infinite

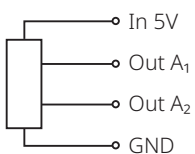
ENVIRONMENTAL SPECIFICATIONS

Operating temperature range	–40°C to +85°C
Storage temperature range	–40°C to +85°C
EMC	100V/m
ESD	±8kV (contact discharge) ±15kV (air discharge)

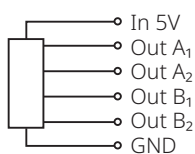


OUTPUT OPTIONS

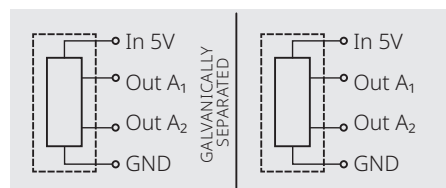
SINGLE OUTPUT



DUAL OUTPUT

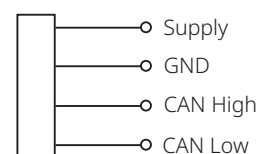


DUAL INDEPENDENT OUTPUT



CAN INTERFACE

CANOpen or J1939 protocol





Unbreakable

Caldaro tackled the challenge of constructing an unbreakable joystick. The result is the C15 which can be used across an application spectrum from the toughest working environments to exquisitely high precision fine-tuned medical equipment.

A masterpiece of construction

- **Protected electronics** – Circuit board and electronics are potted with a compound which protects them from threats such as salt, mist, water, lubricants and virtually all chemicals.
- **The strongest shaft** – The shaft is manufactured in one single piece with extended dimensions, which makes it practically impossible to bend.
- **The best materials** – The best material has been chosen for each component. The rubber mixture endures the toughest conditions.
- **Full redundancy** – The C15 offers single, single + direction switches and dual or double independent sensors.

Other features making C15 irresistible:

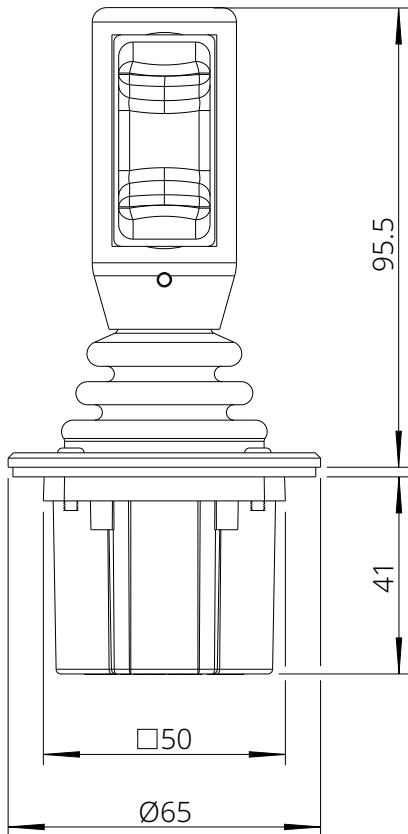
- Guide feeling
- Operating angles 9, 12 or 20 degrees
- Sealed panel mounting
- Made in Sweden

The C15 is available with a palette of handles to be suitable for every situation. We can do custom-made handles even with a relatively small production batch; see the below examples.

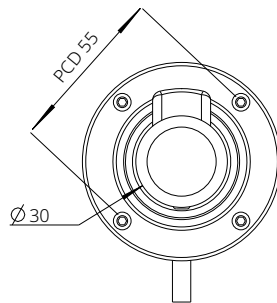
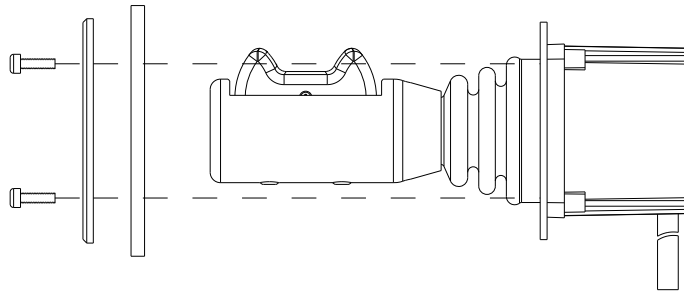


JOYSTICK C15

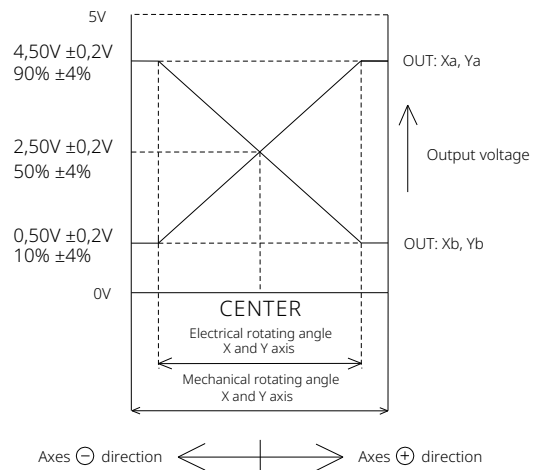
STANDARD DIMENSIONS



MOUNTING ARRANGEMENT



OUTPUT CHARACTERISTICS



SPECIFICATIONS

MECHANICAL AND ELECTRICAL SPECIFICATIONS

Mechanical operating angle	X/Y axis: $\pm 9^\circ$, $\pm 12^\circ$, $\pm 17^\circ$ or $\pm 20^\circ$ crossgate $\pm 20^\circ$
Lever strength	Max 500N static load
Life expectancy	20,000,000 full operations*
Sensor type	Hall-effect
Total current consumption	17mA–22mA
Applied voltage	5VDC $\pm 10\%$
Load resistance	4,7k Ω –100k Ω pull down

**referred to 12 degree angle deflection*

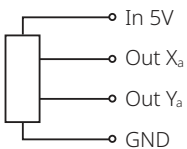
Effective output Resolution	Standard 10%–90% V_{in} , other ratios on request Essentially infinite
-----------------------------	---

ENVIRONMENTAL SPECIFICATIONS

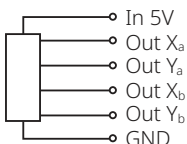
Operating temperature range	-40°C to $+85^\circ\text{C}$
Storage temperature range	-40°C to $+85^\circ\text{C}$
EMC	100V/m
ESD	$\pm 8\text{kV}$ (contact discharge) $\pm 15\text{kV}$ (air discharge)

OUTPUT OPTIONS

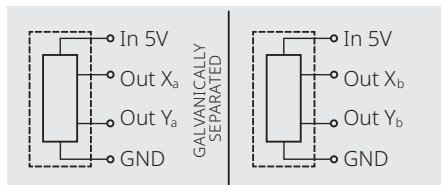
SINGLE OUTPUT



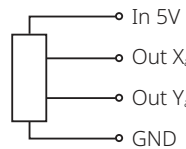
DUAL OUTPUT



DUAL INDEPENDENT OUTPUT



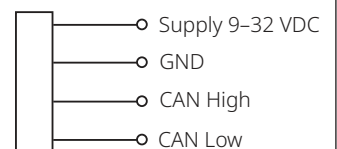
SINGLE DIGITAL OUTPUT*



*One switch signal per direction, or one centre switch per axis (please consult Caldarò).

CAN INTERFACE

CANopen or J1939 protocol





Super sealed

This single-axis mini joystick C16 results from 20 years of experience in the toughest usage conditions. The heart of the joystick, the electronics, is completely sealed. The unique rubber gaiter protects the joystick and is tightly sealed to the panel, which makes it even more durable.



Virtually indestructible

- **Protected electronics** – The circuit board and the electronics are potted with compounds that protect them from threats such as salt, mist, water, lubricants and virtually all chemicals.
- **Almost indestructible** – Our engineers put it through an extreme durability test. We pulled and pushed the knob in all directions until it snapped off at very high loads. However, the only thing that possibly happened was that the knob had snapped out of gear. With a simple push, the joystick was fully functioning again.
- **A tight seal** – A rubber gaiter protects the joystick and tightly seals it towards the panel when the joystick is mounted.
- **The best materials** – The best material has been chosen for each component. The rubber mixture endures the harshest conditions.

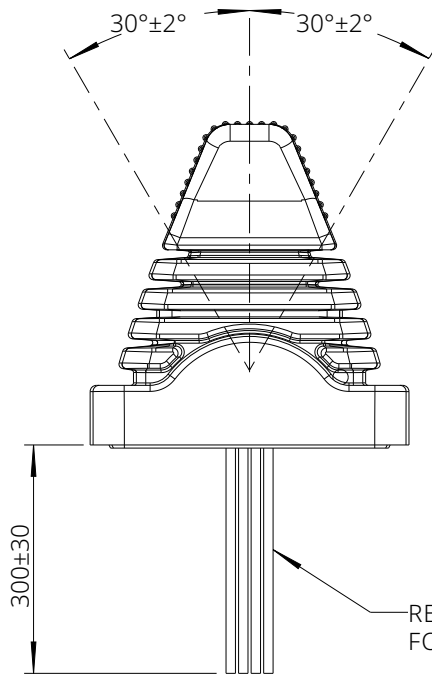
Other features making the C16 irresistible:

- Ergonomic design
- Smooth operator control with high precision
- Made in Sweden

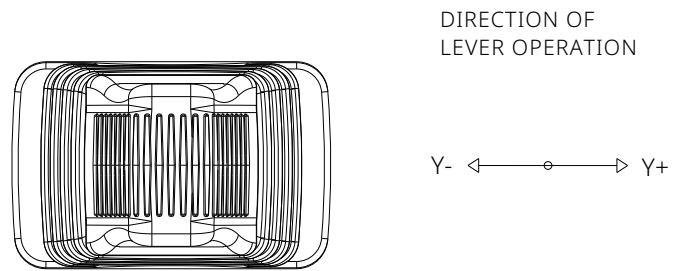
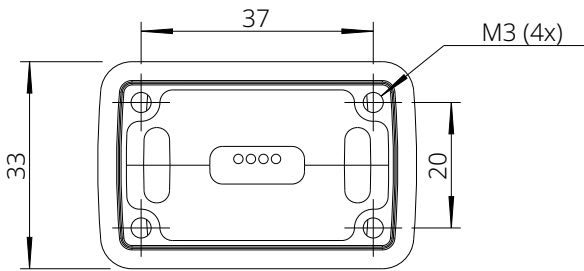
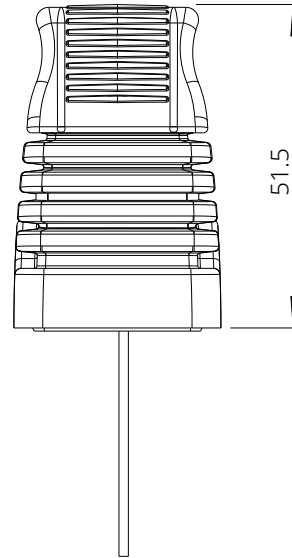




JOYSTICK C16

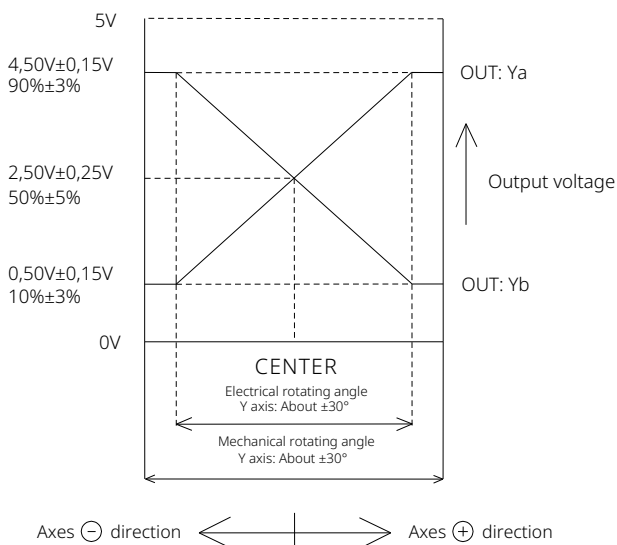


STANDARD DIMENSIONS



OUTPUT OPTIONS

OUTPUT CHARACTERISTICS



SPECIFICATIONS

MECHANICAL AND ELECTRICAL SPECIFICATIONS

Mechanical operating angle	±30°
Lever strength	Max 200N static load
Life expectancy	5,000,000 full operations
Sensor type	Hall-effect
Total current consumption	17mA-22mA
Applied voltage	5VDC ±10%
Load resistance	4,7kΩ-100kΩ pull down
Effective output	Standard 10%-90% Vin, other ratios on request
Resolution	Essentially infinite

ENVIRONMENTAL SPECIFICATIONS

Operating temperature range	-40°C to +85°C
Storage temperature range	-40°C to +85°C
EMC	100V/m
ESD	±8kV (contact discharge) ±15kV (air discharge)

FULL GRIP JOYSTICKS



CALDARO



THE LINK BETWEEN MAN AND MACHINE

BUILT FOR HEAVY DUTY



In 2010, when our existing joystick couldn't quite cope with a customer's extremely harsh environment and brutal use, we had to develop one that could. The result was the C14, which the customer is still using today.

The Caldaro C14 joystick provides the best combination of full grip size and perfect precision. It's large enough to match the full-sized heavy-duty machines and strong enough to withstand the toughest operators. You can rely on the C14 to stay intact and keep its precision year after year.

Caldaro is a modern company with a decentralised organisation where people enjoy working and take responsibility. Exciting problems make our brains tick.

I love my job because it's rewarding to be part of developing the future operator environment. I also think it's an honour to work with the leading manufacturers of machines in the world; they trust us and rely on our expertise.

Thanks to working with prominent customers, we quickly realised the importance of sustainability issues, which are close to our hearts.

We always want to deliver the very best product to our customers. Best as in "solving the customer's challenges and fulfilling their needs". We started as a trading company, but since 2003, we have been designing our own products.

To customise a product will sometimes mean just configuring or modifying one of the products we have already developed. In other cases, it means creating a whole new product.

Don't hesitate to ask us even if you want just a small batch; it's a matter of adapting the manufacturing methods. Our speciality is to think outside the box. Please go ahead and challenge us!

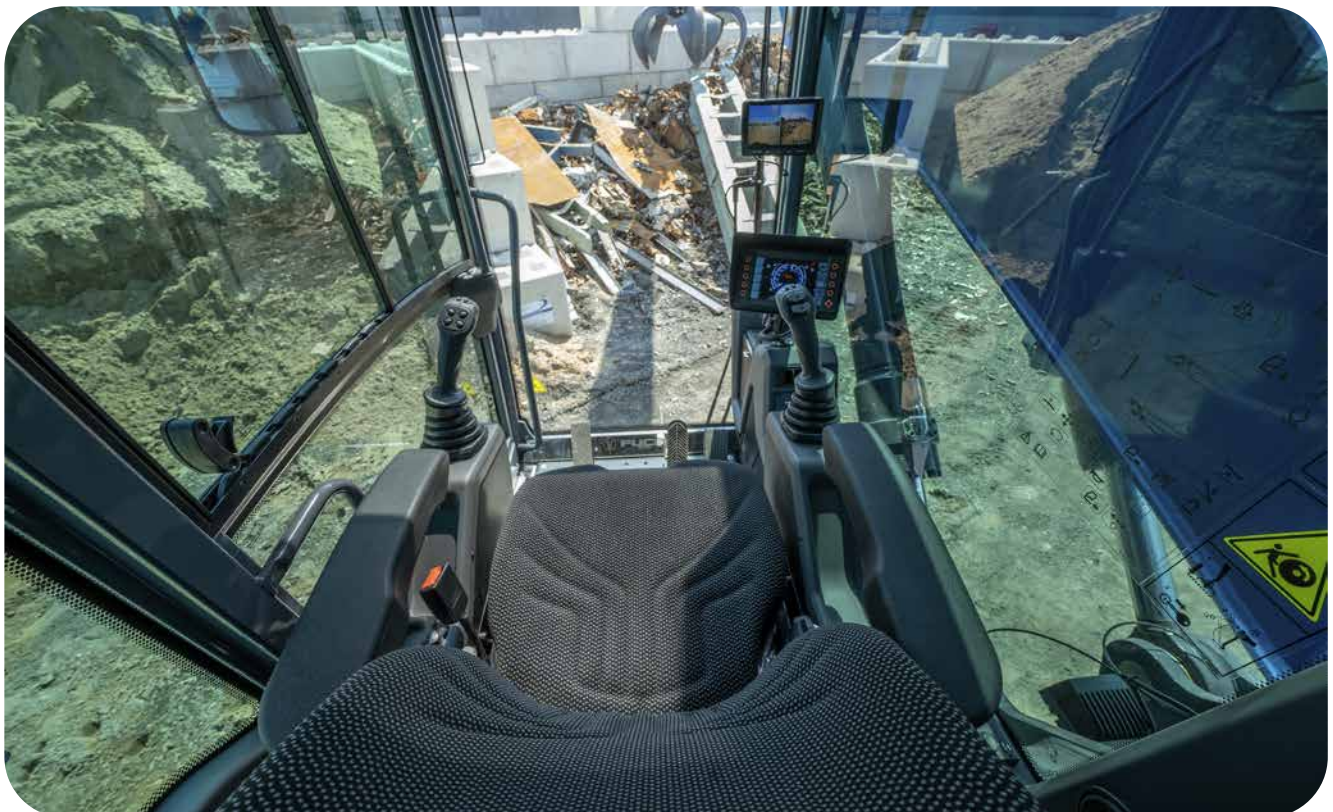
Claudio Talamo, CEO Caldaro

ERGONOMIC AND USER-FRIENDLY

Our full grip-sized industrial joystick C14 is designed to suit the most demanding heavy duty applications in terms of mechanical strength and environmental requirements. Typically, you will find these industrial joysticks in heavy-duty applications, such as Mining and Construction applications, to mention a few, where robustness and reliability are essential. To meet the requirements, we can offer these joysticks with a protection class up to IP67.

Designed with the operator in focus, our full grip industrial joysticks are ergonomic and user friendly, built for precise functioning every working hour. By using the best possible materials, our joysticks are built to superior standards. They are tough, smooth to handle, and have a high-quality feel. All of our full grip joysticks can be customised to meet your expectations and requirements. They are available with field bus interface J1939 and CANopen.

Caldaro defines a joystick as a two-part module: the joystick base and the joystick grip attached to the base. The C14 joystick is best combined with our Viper grips.



C14: PROVEN DURABILITY

Tested and have been used for years in salt and copper mines.

All temperatures. Hot or cold, the C14 will endure all temperatures from -40°C to $+85^{\circ}\text{C}$.

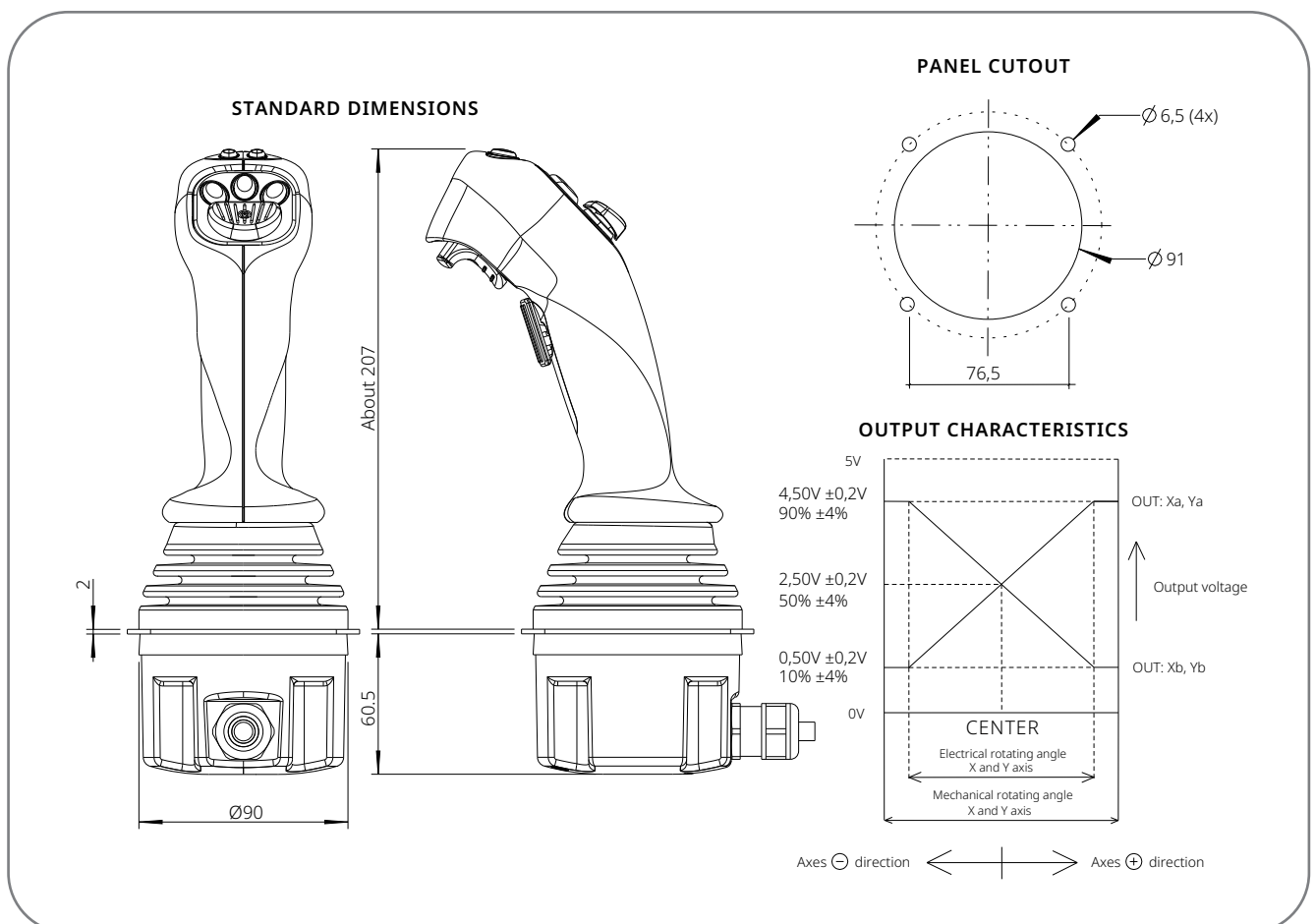
The best material has been chosen for each component. The rubber mixture endures the toughest conditions.

The strongest shaft. The shaft is manufactured in one single piece and with extended dimensions. This makes it practically impossible to bend.

Sealed panel mounting. The electronics are protected from fluids, salt, and oil.

Precision that lasts. It will withstand more than 10 million operations and keep its detent precision.

Adding operator feeling. Fully customisable feeling with Guide feeling. Optional spring force and Over-press feature.



MECHANICAL SPECIFICATIONS

Mechanical angle two axis: $\pm 12^\circ$ or $\pm 20^\circ$

Mechanical angle one axis: $\pm 12^\circ$ or $\pm 20^\circ$

Lever strength: Max 500N Static load

Life expectancy: 10 000 000 operations

ENVIRONMENTAL SPECIFICATIONS

Storage temperature: -40°C to $+85^\circ\text{C}$ (-40°F to 185°F)

Operating temperature: -40°C to $+85^\circ\text{C}$ (-40°F to 185°F)

Sealing: IP67 (above panel subject to handle and final specification)

EMC: 100V/M

ESD: $\pm 8\text{kV}$ (contact discharge) $\pm 15\text{kV}$ (air discharge)

ELECTRICAL SPECIFICATIONS: ANALOGUE

Effective output: Standard 10%–90% V_{in}

Total current consumption: 17–22mA

Power supply: 5VDC $\pm 10\%$ (regulated)

Load resistance: 4,7k Ω –100k Ω pull down

ELECTRICAL SPECIFICATIONS: CAN

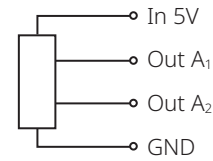
Power Supply: 9–32VDC

Baud rate: 125, 250, 500 Kbit/s

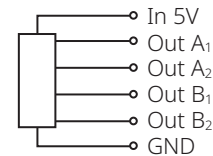
Transmission rate: 10, 20, 50 ms

OUTPUT OPTIONS

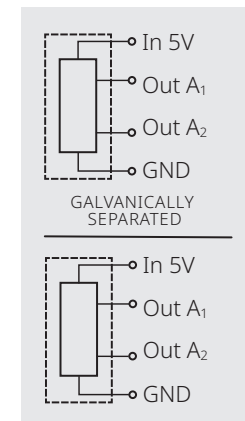
SINGLE OUTPUT



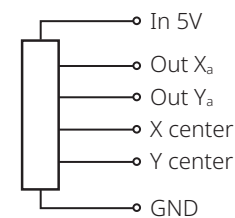
DUAL OUTPUT



DUAL INDEPENDENT OUTPUT



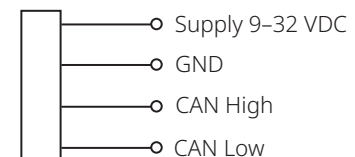
SINGLE + DIGITAL OUTPUT*



*Centre validation signal 1 per axis (please consult Caldaro)

CAN INTERFACE

CANopen, CANopen Safety or J1939 protocol



Available with direction or centre Switch function (please consult Caldaro)

COMBINE THE POWERFUL C14 JOYSTICK WITH OUR ERGONOMIC VIPER GRIPS

FEATURES FOR THE VIPER GRIPS

- Directly suitable for a hydraulic valve
- Modular design; numerous adaptation possibilities
- Multifunction grip
- Ergonomic design
- Buttons
- A capacitive sensor for "operator presence"

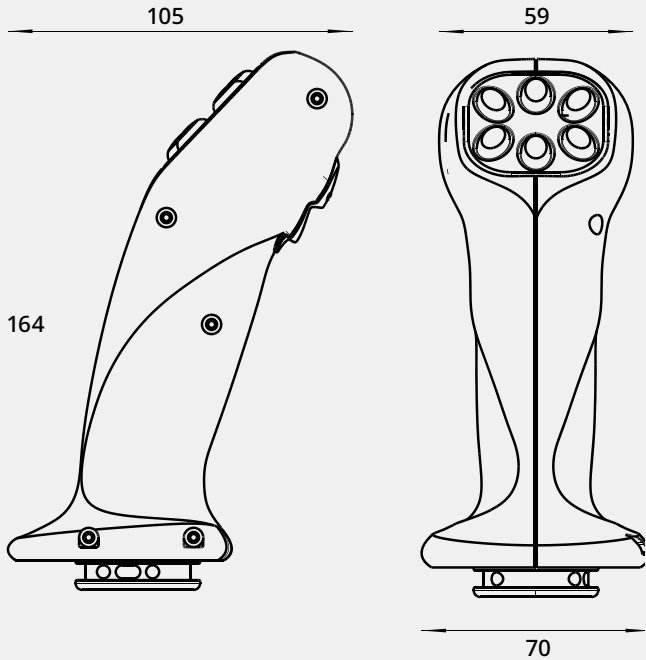
OPTIONS FOR THE VIPER GRIPS

- Choose between 10 faceplate panels
- Incorporate the Co3B joystick within the Viper faceplate
- Black buttons
- Multicoloured buttons
- Hall effect sensor
- Proportional rocker sensor

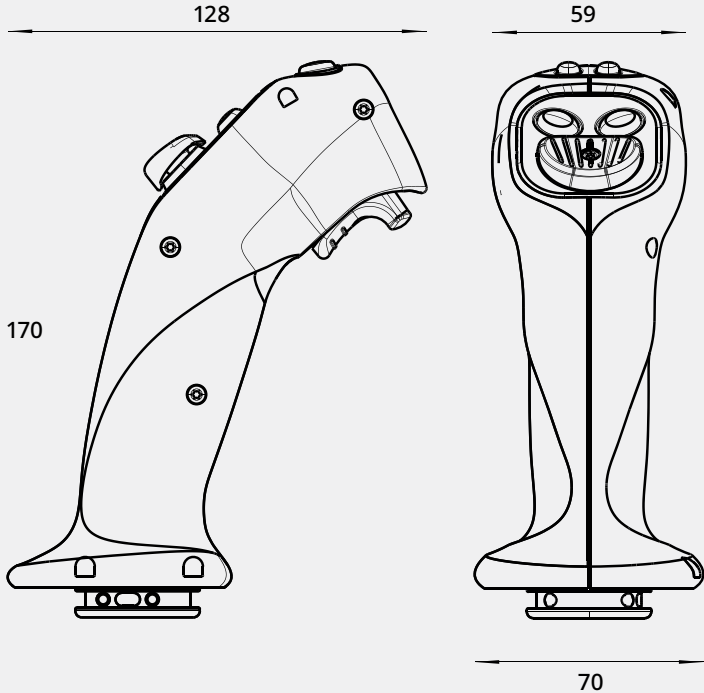
Can't find
your required
specifics?
Consult us!



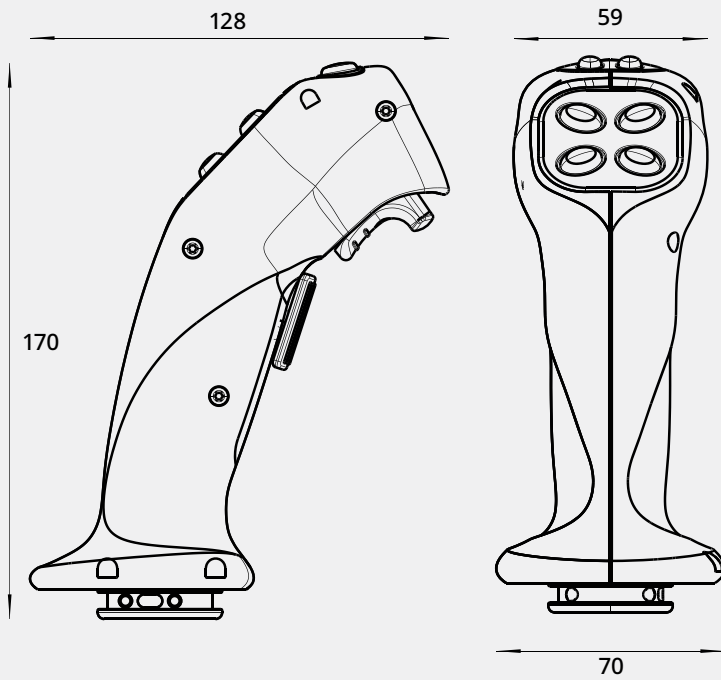
VIPER STANDARD



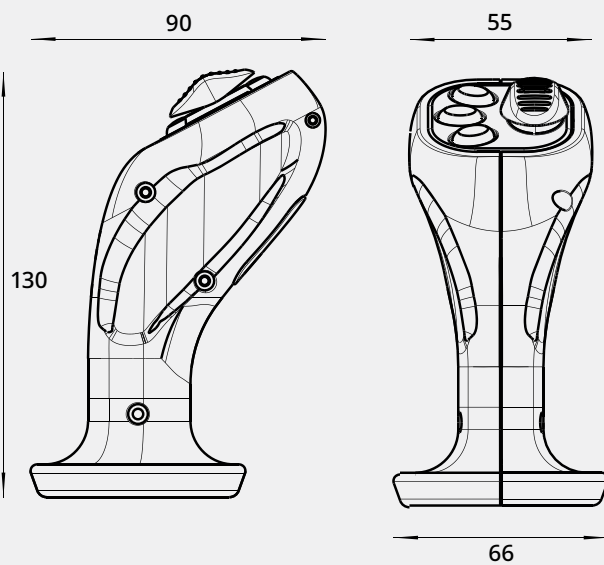
VIPER PLUS



VIPER XT



VIPER MEDIUM



MECHANICAL PERFORMANCE

Viper Standard, Plus, XT: dual mould black plastic

Viper Medium, Slim: single mould black plastic

High grade silicon (button)

Temperature range: -40°C to +85°C

Ingress Protection: IP 66 & IP67 (Viper), IP65 (ViperPlus)

Maximum load: 600N

PUSHBUTTON AND TRIGGER SWITCHES

Function: Momentary type, tactile action

Switch life: minimum 10 000 000 operations

Power rating: 50mA at 24 VDC

Optional: Changeover (NO/NC)

Optional: High current switch (1A at 24 VDC)

FNR SHIFTER

Function: Alternating type, haptic action

3-position rocker switch (F, N and R)

Separate switch signal for each position

Life expectancy: Minimum 5 000 000 operations

Power rating: 1A at 24 VDC

PROPORTIONAL ROCKER

Sensor: Hall effect, ratiometric

Single or dual output

Mechanical travel: $\pm 12^\circ$ from centre

Power supply: Regulated 5 VDC ($\pm 10\%$)

Proportional voltage output: 10-90%, others upon request

Life: minimum 10 000 000 operations

Current consumption: 14mA

EMC: 100V/m

ESD (Connector pin/air): ± 8 kV/+15 kV

OPERATOR PRESENT SENSOR (DMH)

Optional contactless electronic sensor located inside handle.

Power supply: 7.0-28 VDC or 5 VDC

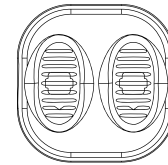
Characteristics of output: 5 VDC = ON (with hand present) and 0 V = OFF (with hand not present)

Current consumption: 30mA at 28 VDC and 15mA at 5 VDC

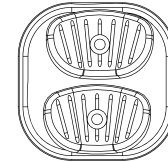
Switching time: 0.1 ms

EMC: 100 V/m (preliminary)

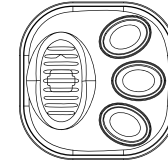
FACEPLATE PANELS



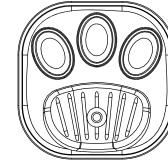
Type A



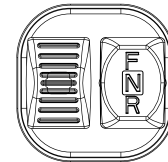
Type A*



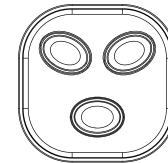
Type B



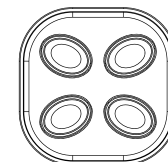
Type B*



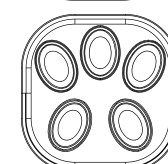
Type C



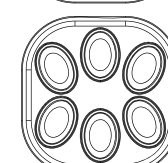
Type D



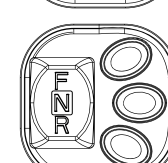
Type E



Type F



Type G



Type H

*Turned 90 degrees

CUSTOMER-ADAPTED PRODUCTS MADE IN SWEDEN

Caldaro is an international company based in Sweden that develops premium HMI products like joysticks, pedals and sensors for customers with high-quality expectations and special requirements. Our products are typically used in harsh conditions or operating environments where ergonomics and design are important.

We develop our products according to each customer's distinctive needs while pushing the boundaries of design and technology. Our extensive know-how from several demanding applications allows us to design each product according to each customer's quality and function needs.

We are dedicated to providing modern, safe controls that lead the industry in durability, precision, and dependability through constant innovation. Ergonomics and simplified design go hand in hand. We are the link between man and machine; our task is to optimise that interaction.

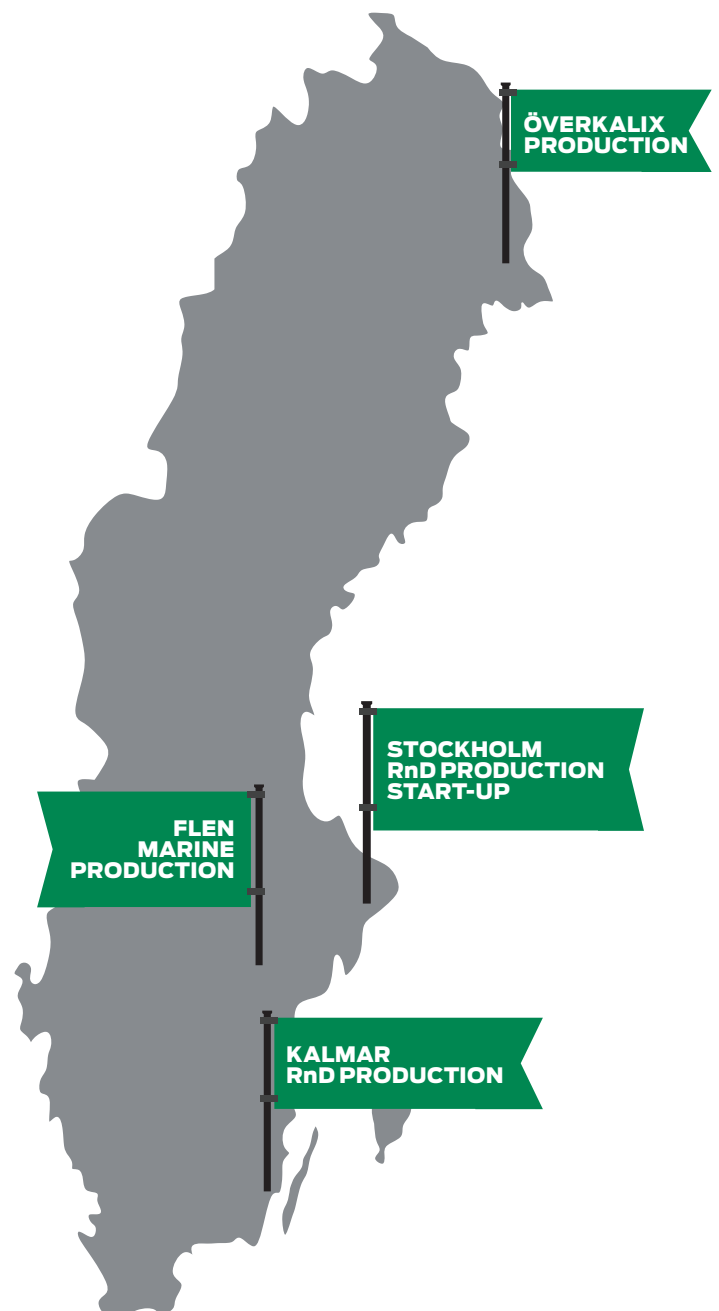
WE DELIVER HIGH-END SOLUTIONS

We have become the go-to supplier for customers with high performance, accuracy, and functionality demands in various industries worldwide.

With solid growth, we have established ourselves as the leading player in our niche. A modern organisation with cutting-edge expertise at our head office means we can deliver on short lead times with a proven track record of reliability.

Outsourced production allows us to increase or decrease capacity as necessary while we get the best help and solutions. We see this as a winning model.

We operate in an exciting technical environment where, in close cooperation with our customers, we are designing the operator environments of the future.



SUSTAINABILITY IS NECESSARY



We are committed to building a sustainable society with our customers, partners and stakeholders. Our focus areas are the environment, ethics, social responsibilities, and economy.

In everything we do, we follow Caldaro's values, ethical principles, and appropriate laws and regulations. In line with our values and Code of Conduct, we aim to provide excellent customer experiences professionally in all our projects. We deliver on our customers' promises and are committed to increasing customer satisfaction.

Our fundamental principle is to offer the best working conditions. With happy, skilled and motivated employees, we can design the best possible products and thereby get satisfied customers.

We increase environmental awareness by communicating our sustainable goals and results internally and externally to ensure that quality and environmental policies are embedded and adhered to at all levels of the organisation.

In 2019, we committed to the UN Global Compact's sustainability goals. In 2022, we received our first. Ecovadis sustainability rating: their Platinum medal for the top 1% of companies.

CALDARO QUALITY

- Joysticks and pedals built to last "forever". We always perform extensive life and other tests to ensure we can exceed our specified requirements.
- Long life expectancy is also a matter of sustainability.
- We use the most durable materials.
- Ergonomic design.
- Excellent precision.
- Simplified design to reduce the number of parts.
- Custom-made to fit the customer's needs.
- Constantly working to get more sustainable: environment, ethics, social, and economy.
- The ID number on each manufactured item allows for full traceability and test data from end-of-line testing if needed.

PREMIUM PRODUCTS

© CALDARO AB • NOVEMBER 2023



INDUSTRIAL JOYSTICKS

Our full grip-sized industrial joysticks are designed to suit the most demanding heavy-duty applications in terms of mechanical strength and environmental requirements. Designed with the operator in focus, these joysticks are ergonomic and user-friendly, built for operating every productive hour.

Our palm grip joysticks are designed with particular emphasis on operator comfort and precision control. After decades of experience working with joysticks, our technical advisers are well placed to supply customers with the ideal solution for their individual needs, and always with various CAN bus options.

Our fingertip joysticks are designed for smooth operator control with high precision. These mini joysticks are often used in precision machines, forklifts and remote controls but can also be found in agricultural applications.

We can offer a wide range of joysticks with up to 5 analog axis and contactless redundant sensors.



INDUSTRIAL PEDALS

Our specially designed foot pedals for heavy-duty throttle, brake and retardation control are as robust as they are precise. All our industrial pedals are designed and manufactured for the most demanding applications in harsh environments. The pedals withstand the toughest conditions in all surroundings for dependability and your safety.



POSITION SENSORS

Caldaro has been supplying sensors since the early 80's. Initially, it was only potentiometers with wire-wound or conductive plastic in both rotating and linear versions. Currently, contactless technology (Hall effect and inductive) has evolved and is now used effectively in many different sensor types, both rotating and linear.

MARINE CONTROLS

Real craftsmanship levers made by our specialist team in Flen. Every control lever has a smooth, elegant feeling and consists of small, moving parts that fit together intricately. All parts are custom-made, with no mass production. We have developed about 200 different variations for a great variety of marine and offshore applications since we started in 1985.



PALM GRIP JOYSTICKS



CALDARO



THE LINK BETWEEN MAN AND MACHINE

THE UNBREAKABLE JOYSTICK



We tackled the challenge of constructing an unbreakable joystick for one of the harshest environments on earth – the mining industry.

When we designed the C15, the original idea was to make it simple and ergonomic, with no room for customisation. However, it wasn't long before we were asked to add features and the joystick with its grip has today evolved into a system with a whole range of different configurations. Contrary to the original intention, the C15 turned out to be incredibly customisable. This joystick is the base within our Palm Grip segment.

Caldaro is a modern company with a decentralised organisation where people enjoy working and take responsibility. Exciting problems make our brains tick.

I love my job because it's rewarding to be part of developing the future operator environment. I also think it's an honour to work with the leading manufacturers of machines in the world; they trust us and rely on our expertise.

Thanks to working with prominent customers, we quickly realised the importance of sustainability issues, which are close to our hearts.

We always want to deliver the very best product to our customers. Best as in "solving the customer's challenges and fulfilling their needs". We started as a trading company, but since 2003, we have been designing our own products.

To customise a product will sometimes mean just configuring or modifying one of the products we have already developed. In other cases, it means creating a whole new product.

Don't hesitate to ask us even if you want just a small batch; it's a matter of adapting the manufacturing methods. Our speciality is to think outside the box. Please go ahead and challenge us!

Claudio Talamo, CEO Caldaro

ERGONOMIC WITH PRECISION

Our palm grip joysticks are designed with particular emphasis on operator comfort and precision control. After decades of experience working with joysticks, our technical advisers are well placed to supply customers with the ideal solution for their individual needs, and always with a variety of CAN bus options.

It is used across a spectrum of applications, from the toughest working environments to exquisitely high precision, fine-tuned medical equipment.

The joystick can be fitted with numerous grips, functions and withstand the harshest conditions for your application, as it is available with high protection class and is customisable to the fullest.

Caldaro defines a joystick as a two-part module: the joystick base and the joystick grip attached to the base. The C14 joystick is best combined with our Viper grips.



C15: A WORK OF JOY

Protected electronics. Circuit board and electronics are potted with a silicone compound that protects them from threats such as salt, mist, water, lubricants and virtually all chemicals.

A strong shaft. Manufactured in one single piece and with extended dimensions. This makes it practically impossible to bend.

The best material have been chosen for each component. The rubber mixture endures the toughest conditions.

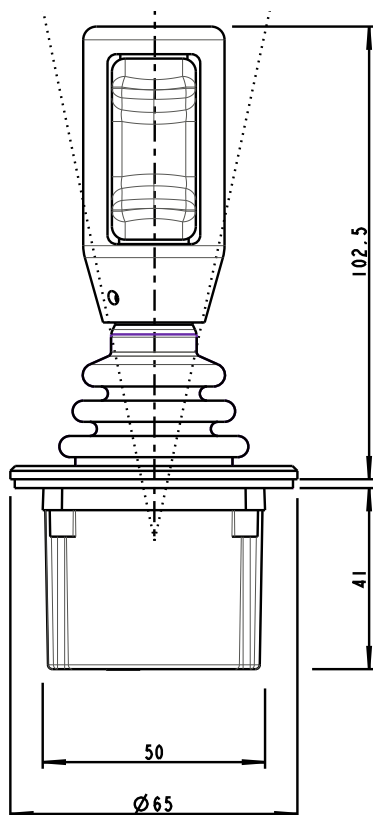
Full redundancy with direction switches, using double or double independent output signals. The C15 is also available with CAN interface.

Adding operator feeling. Fully customisable feeling with Guide feeling, optional spring force and Over-press feature.

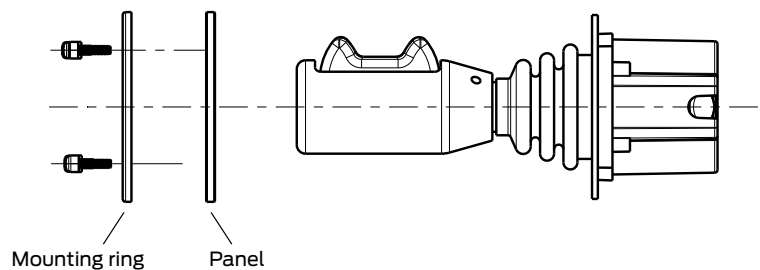
Proportional axis. Choose between 1, 2 or 3 axis to be operated in ± 9 , 12, 17 and 20.



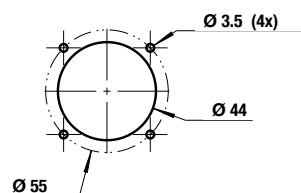
Standard dimensions



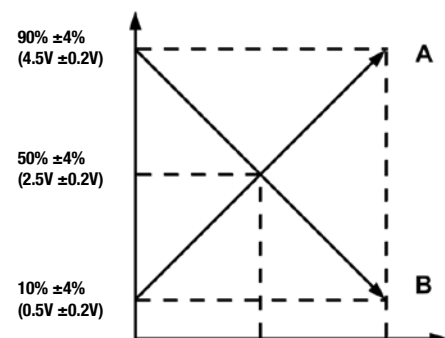
Mounting arrangement



Panel cutout



Example of output signal



MECHANICAL SPECIFICATIONS

Life expectancy: 10 000 000 operations

Mechanical angle two axis: $\pm 9^\circ$, $\pm 12^\circ$, $\pm 17^\circ$ or $\pm 20^\circ$

Mechanical angle one axis: $\pm 12^\circ$ or $\pm 20^\circ$ (X or Y)

Lever strength: max 500N Static load

Break out force: 1N or 1,7N or 2,5N or 3,8N
(Depending on spring force)

ENVIRONMENTAL SPECIFICATIONS

Storage temperature: -40°C to $+85^\circ\text{C}$ (-40°F to 185°F)

Operating temperature: -40°C to $+85^\circ\text{C}$ (-40°F to 185°F)

Sealing: IP67 (above panel subject to handle and final specification)

EMC: 100V/M

ESD: $\pm 8\text{kV}$ (contact discharge) $\pm 15\text{kV}$ (air discharge)

ELECTRICAL SPECIFICATIONS: ANALOG

Effective output standard 10%–90% V_{in}

Total current consumption: 17–22mA

Power supply: 5VDC $\pm 10\%$ (regulated)

Recommended load resistance 4,7k Ω –100k Ω pull down

ELECTRICAL SPECIFICATIONS: CAN

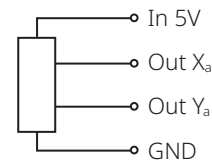
Power supply: 9–32VDC

Baud rate: 125, 250, 500 Kbit/s

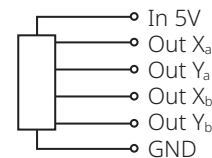
Transmission rate: 10, 20, 50ms

OUTPUT OPTIONS

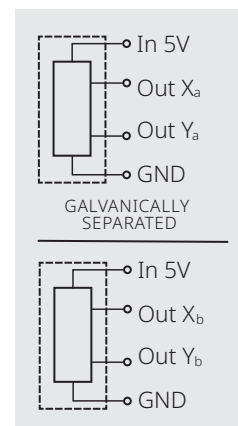
SINGLE OUTPUT



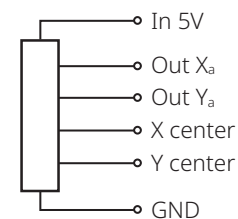
DUAL OUTPUT



DUAL INDEPENDENT OUTPUT



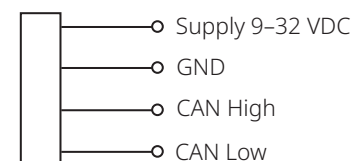
SINGLE + DIGITAL OUTPUT*



*Centre validation signal 1 per axis (please consult Caldaro)

CAN INTERFACE

CANopen, CANopen Safety or J1939 protocol



Available with direction or centre Switch function (please consult Caldaro)

COMBINE THE C15 WITH VIPER, LION OR A VARIETY OF GECKO GRIPS

THE VIPER SLIM GRIP

Viper Slim is a professional multifunction joystick that provides all necessary functions easily accessible to the operator's hand. It has a highly appreciated design that provides a natural grip for the operator's ergonomics and is used in many types of applications and special vehicles.

Configuration on image: 5 buttons, one sensor • A capacitive sensor for "operator presence" • 2-4-axis • Height 128 mm



THE LION GRIP

The Lion grip is a multi-functional grip made for professional usage. First developed solely for mining applications. Made to endure the test of time and harsh conditions. It is available with two sliders on the front side, allowing the intuitive operation of a belt-driven machine. It can be found in mining applications, snow removal machines, cranes, and other special vehicles.

Configuration on image: 6 buttons + 2 sensors for 3rd and 4th axis • Sensors; a capacitive sensor for "operator presence" • Proportional sensors • 2-4-axis • Height 128 mm

THE GECKO GRIPS SERIES

Our Grip series consists of a great variety of grips made to fit a great variety of machines. The grips in the Gecko series are commonly used with the C15 joystick and will give your machine perfect control. By machining the shape from a solid part, split lines can be avoided, providing a more comfortable and higher-quality appearance.



GECKO A0

Configuration on image: Plain robust grip • Does not include any additional functionality • Height 97,4 mm



GECKO A1

Configuration on image: 1 momentary push button • Button specifics are customized with NO/NC • Height 103 mm



GECKO A2

Configuration on image: 2 momentary push buttons • Buttons specifics are customized with NO/NC • Height 110 mm



GECKO A3

Configuration on image: 3 push momentary buttons • Buttons specifics are customized with NO/NC • Height 110 mm



GECKO R0

Configuration on image: 1 Proportional Hall effect thumb rocker • Height 97,5 mm

THE GECKO GRIPS SERIES CONTINUES



GECKO R1

Configuration on image: 1 Proportional Hall effect thumb rocker • 1 momentary push button • Button specifics are customized with NO/NC • Height 117 mm



GECKO R1 LED

Configuration on image: 1 latching LED push button (Optional push button specifics: Icon etc) • 1 Proportional Hall effect thumb rocker • Height 128 mm



GECKO R4+1

Configuration on image: 1 Proportional Hall effect thumb rocker • 4 momentary push buttons on front • 1 momentary push button on top (Optional push button specifics: NO/NC) • Height 126 mm



GECKO R5

Configuration on image: 1 Proportional Hall effect thumb rocker • 5 momentary push buttons on front • Height 116 mm



GECKO R7

Configuration on image: 1 Proportional Hall effect thumb rocker • 5 momentary push buttons on front • 2 momentary push buttons on rocker side • Height 116 mm



GECKO R9

Configuration on image: 1 Proportional Hall effect thumb rocker • 5 momentary push buttons on front • 4 momentary push buttons on rocker side • Height 116 mm



GECKO R12

Configuration on image: 1 Proportional Hall effect thumb rocker • 10 momentary push buttons on front • 2 momentary push buttons on rocker side • Height 116 mm



GECKO W0

Configuration on image: 1 Rubber covered rocker button • Optional push button specifics: NO/NC • Height 114 mm



GECKO W1

Configuration on image: 1 Rubber covered rocker button • 1 Rubber covered momentary push button • Optional push button specifics: NO/NC • Height 114 mm



GECKO W1B

Configuration on image: 1 momentary rocker button • 1 momentary trigger button • Buttons specifics are customized with NO/NC • Height 114 mm



GECKO W2

Configuration on image: 1 Rubber covered rocker button • 2 Rubber covered momentary push button • Optional push button specifics: NO/NC • Height 114 mm



GECKO WR

Configuration on image: 1 Rubber covered rocker button (Optional push button specifics: NO/NC) • 1 Proportional Hall effect thumb rocker • Height 114 mm

CUSTOMER-ADAPTED PRODUCTS MADE IN SWEDEN

Caldaro is an international company based in Sweden that develops premium HMI products like joysticks, pedals and sensors for customers with high-quality expectations and special requirements. Our products are typically used in harsh conditions or operating environments where ergonomics and design are important.

We develop our products according to each customer's distinctive needs while pushing the boundaries of design and technology. Our extensive know-how from several demanding applications allows us to design each product according to each customer's quality and function needs.

We are dedicated to providing modern, safe controls that lead the industry in durability, precision, and dependability through constant innovation. Ergonomics and simplified design go hand in hand. We are the link between man and machine; our task is to optimise that interaction.

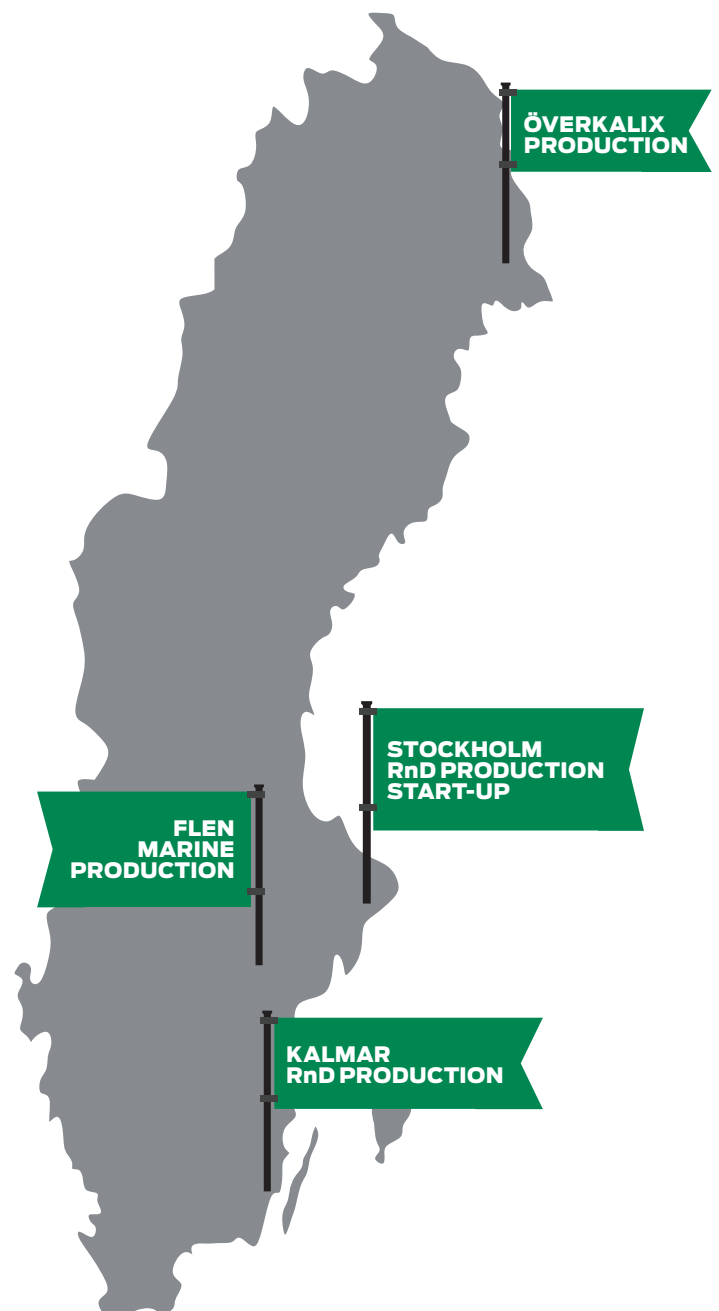
WE DELIVER HIGH-END SOLUTIONS

We have become the go-to supplier for customers with high performance, accuracy, and functionality demands in various industries worldwide.

With solid growth, we have established ourselves as the leading player in our niche. A modern organisation with cutting-edge expertise at our head office means we can deliver on short lead times with a proven track record of reliability.

Outsourced production allows us to increase or decrease capacity as necessary while we get the best help and solutions. We see this as a winning model.

We operate in an exciting technical environment where, in close cooperation with our customers, we are designing the operator environments of the future.



SUSTAINABILITY IS NECESSARY



We are committed to building a sustainable society with our customers, partners and stakeholders. Our focus areas are the environment, ethics, social responsibilities, and economy.

In everything we do, we follow Caldaro's values, ethical principles, and appropriate laws and regulations. In line with our values and Code of Conduct, we aim to provide excellent customer experiences professionally in all our projects. We deliver on our customers' promises and are committed to increasing customer satisfaction.

Our fundamental principle is to offer the best working conditions. With happy, skilled and motivated employees, we can design the best possible products and thereby get satisfied customers.

We increase environmental awareness by communicating our sustainable goals and results internally and externally to ensure that quality and environmental policies are embedded and adhered to at all levels of the organisation.

In 2019, we committed to the UN Global Compact's sustainability goals. In 2022, we received our first. Ecovadis sustainability rating: their Platinum medal for the top 1% of companies.

CALDARO QUALITY

- Joysticks and pedals built to last "forever". We always perform extensive life and other tests to ensure we can exceed our specified requirements.
- Long life expectancy is also a matter of sustainability.
- We use the most durable materials.
- Ergonomic design.
- Excellent precision.
- Simplified design to reduce the number of parts.
- Custom-made to fit the customer's needs.
- Constantly working to get more sustainable: environment, ethics, social, and economy.
- The ID number on each manufactured item allows for full traceability and test data from end-of-line testing if needed.

PREMIUM PRODUCTS

© CALDARO AB • NOVEMBER 2023



INDUSTRIAL JOYSTICKS

Our full grip-sized industrial joysticks are designed to suit the most demanding heavy-duty applications in terms of mechanical strength and environmental requirements. Designed with the operator in focus, these joysticks are ergonomic and user-friendly, built for operating every productive hour.

Our palm grip joysticks are designed with particular emphasis on operator comfort and precision control. After decades of experience working with joysticks, our technical advisers are well placed to supply customers with the ideal solution for their individual needs, and always with various CAN bus options.

Our fingertip joysticks are designed for smooth operator control with high precision. These mini joysticks are often used in precision machines, forklifts and remote controls but can also be found in agricultural applications.

We can offer a wide range of joysticks with up to 5 analog axis and contactless redundant sensors.



INDUSTRIAL PEDALS

Our specially designed foot pedals for heavy-duty throttle, brake and retardation control are as robust as they are precise. All our industrial pedals are designed and manufactured for the most demanding applications in harsh environments. The pedals withstand the toughest conditions in all surroundings for dependability and your safety.



POSITION SENSORS

Caldaro has been supplying sensors since the early 80's. Initially, it was only potentiometers with wire-wound or conductive plastic in both rotating and linear versions. Currently, contactless technology (Hall effect and inductive) has evolved and is now used effectively in many different sensor types, both rotating and linear.

MARINE CONTROLS

Real craftsmanship levers made by our specialist team in Flen. Every control lever has a smooth, elegant feeling and consists of small, moving parts that fit together intricately. All parts are custom-made, with no mass production. We have developed about 200 different variations for a great variety of marine and offshore applications since we started in 1985.



VIPER JOYSTICK GRIP SERIES



CALDARO



THE LINK BETWEEN MAN AND MACHINE

VIPER – THE NATURAL GRIP



The first product we designed was the Viper grip in 2003. We first tried to convince our supplier that they needed to develop a better grip for their joystick, but they didn't see a problem. As soon as the Viper grip was available, two prominent market leaders in the mining industry wanted to use it in their machines.

One of them pushed us to develop an FNR switch with a lifespan of 5 million operations while meeting the IP67 standard for protection against particles and water. At that time, we could not find such a highly specified product anywhere in the world, so we had to develop it ourselves. That was a significant development step for the company.

Caldaro is a modern company with a decentralised organisation where people enjoy working and take responsibility. Exciting problems make our brains tick.

I love my job because it's rewarding to be part of developing the future operator environment. I also

think it's an honour to work with the leading manufacturers of machines in the world; they trust us and rely on our expertise.

Thanks to working with prominent customers, we quickly realised the importance of sustainability issues, which are close to our hearts.

We always want to deliver the very best product to our customers. Best as in "solving the customer's challenges and fulfilling their needs". We started as a trading company, but since 2003, we have been designing our own products.

To customise a product will sometimes mean just configuring or modifying one of the products we have already developed. In other cases, it means creating a whole new product.

Don't hesitate to ask us even if you want just a small batch; it's a matter of adapting the manufacturing methods. Our speciality is to think outside the box. Please go ahead and challenge us!

Claudio Talamo, CEO Caldaro

VERSATILE AND ADAPTABLE VIPER SERIES

Viper™ allows variable grip positions and thus prevents awkward angles and wear on the wrist joint, thanks to its highly appreciated, ergonomic design. Proportional steering can be performed easily with the thumb via a rocker button for maximum sensitivity and control, which means no more thumb rolling. As an option, you can even have a unique index finger-controlled gear selector (FNR) that makes operation comfortable and distinct.

The three largest Viper grips – standard, plus, and XT – are made of double-moulded plastic, with a hard inner core for durability and a soft outer shell for superior comfort. This provides not only an exclusive touch but also seals the two plastic halves properly, providing a grip made for harsh environments. The electronics are effectively protected.



BUILD IT TO MEET YOUR REQUIREMENTS

Viper™ is available in many different versions and sizes. The modular design makes it easy to fit all the functions you need to get quick access within your palm. The possibilities for adapting the controls are almost endless.

The Viper grips fit our joystick bases C14 and C15.

AVOID DOWNTIME

Viper™ has been tested and approved for tough environments and has a proven lifetime of more than 20 million operations*.

Viper™ proves that quality pays for itself. With Viper grips, you get a tool that makes your daily life easier and more comfortable at the same time as the operators' work becomes efficient.

*referred to Viper + C14 12-degree angle deflection

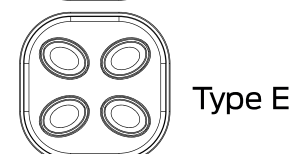
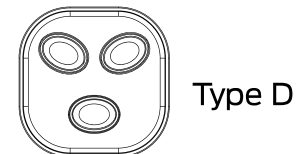
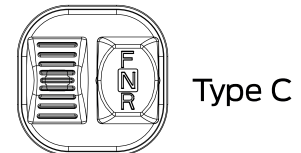
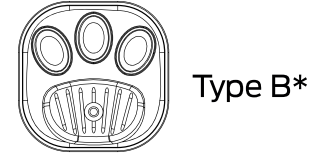
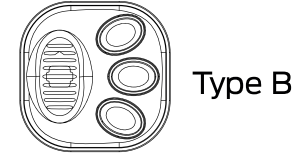
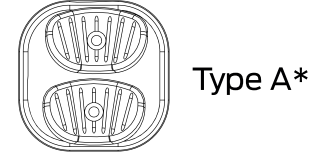
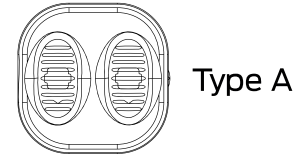
FEATURES FOR THE VIPER GRIPS

- Fits C14 and C15
- Directly suitable for a hydraulic valve
- Modular design; numerous adaptation possibilities
- Multifunction grip
- Ergonomic design
- Buttons
- A capacitive sensor for "operator presence" detection

OPTIONS FOR THE VIPER GRIPS

- Choose between 10 faceplate panels
- Incorporate the small Co3B joystick within the Viper faceplate
- Black buttons
- Multicoloured buttons
- Hall effect sensor

FACEPLATE PANELS



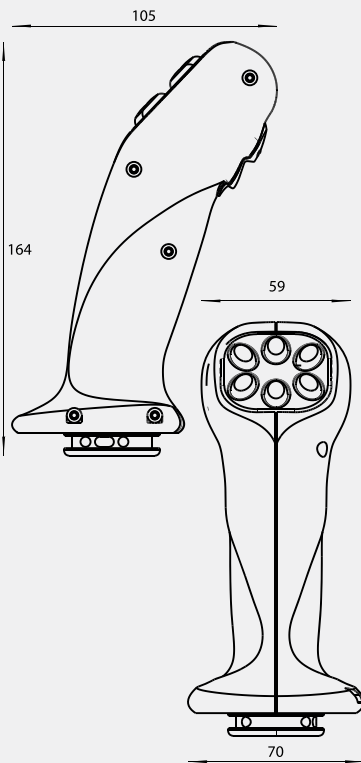
*Turned 90 degrees



C14

VIPER

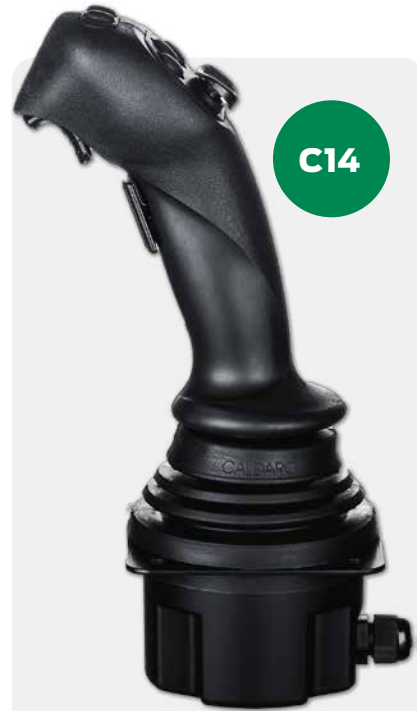
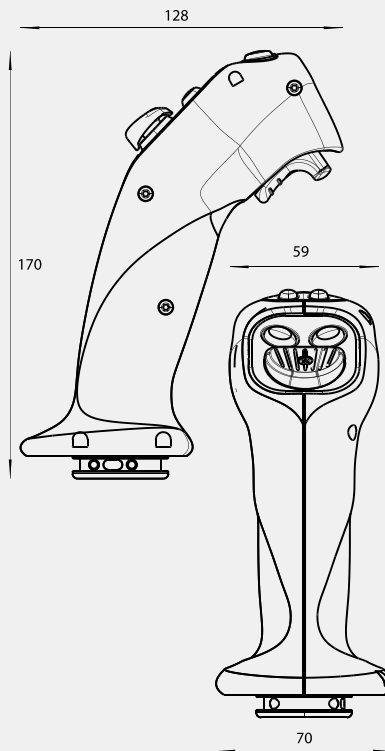
1-2 proportional sensors,
height 164 mm



C14

VIPER PLUS

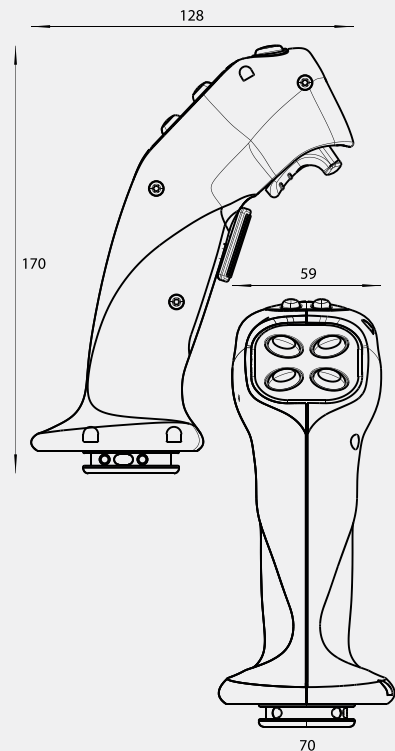
1-2 proportional sensors,
height 170 mm



C14

VIPER XT

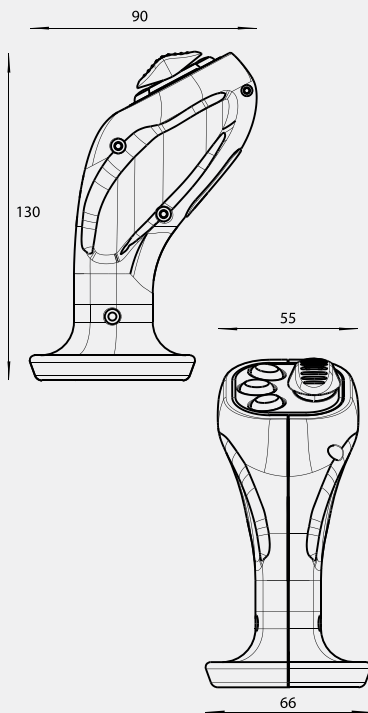
1-3 proportional sensors,
height 170 mm





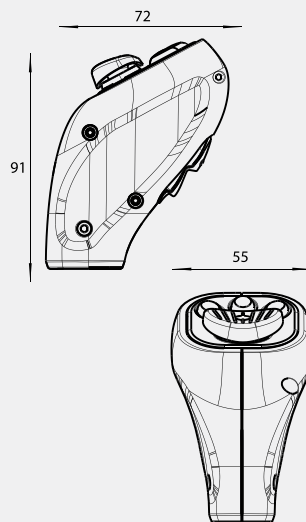
VIPER MEDIUM

1-3 proportional sensors,
height 170 mm



VIPER SLIM

1-2 proportional sensors,
height 164 mm



SPECIFICATIONS

CAN'T FIND YOUR REQUIRED SPECIFICS? CONSULT US!

MECHANICAL PERFORMANCE

Viper Standard, Plus, XT: dual mould black plastic

Viper Medium, Slim: single mould black plastic

High grade silicon (button)

Temp. range: -40°C to +85°C (-40°F to 185°F)

Ingress Protection: IP 66 & IP67 (Viper), IP65 (ViperPlus)

Maximum load: 600 N

PUSHBUTTON AND TRIGGER SWITCHES

Function: Momentary type, tactile action

Switch life: min 10 000 000 operations

Power rating: 50mA at 24 VDC

Optional: Changeover type (NO/NC)

Optional: High current switch (1A at 24 VDC)

FNR SHIFTER

Function: Alternating type, haptic action

3-position rocker switch (F, N and R)

Separate switch signal for each position

Life expectancy: Min 5 000 000 operations (mechanical)

Power rating: 1A at 24 VDC

PROPORTIONAL ROCKER

Sensor: Hall effect, ratiometric

Single or dual output

Mechanical travel: $\pm 12^\circ$ from centre

Power supply: regulated 5 VDC ($\pm 10\%$)

Proportional voltage output: 10–90%, dual crossed or parallel, others upon request

Life: min 10 000 000 operations

Current consumption: 14mA

EMC: 100 V/m

ESD (Connector pin/air): $\pm 8\text{kV}/+15\text{kV}$

OPERATOR PRESENT SENSOR (DMH)

Optional contactless electronic sensor located inside handle.

Power supply: 7.0–28 VDC or 5 VDC

Characteristics of output: 5 VDC = ON (with hand present) and 0V = OFF (with hand not present)

Current consumption: 30mA at 28 VDC and 15mA at 5 VDC

Switching time: 0.1 ms

EMC: 100 V/m (preliminary)

BUILT FOR HEAVY DUTY



The Caldaro C14 joystick base provides the best combination of full grip size and perfect precision. It's large enough to match the full-sized heavy-duty machines and strong enough to withstand the toughest operators. You can rely on the C14 to stay intact and keep its precision year after year.

All temperatures, hot or cold, the C14 will endure all temperatures from -40°C to $+85^{\circ}\text{C}$ (-40°F to 185°F).

The best material has been chosen for each component. The rubber mixture endures the toughest conditions.

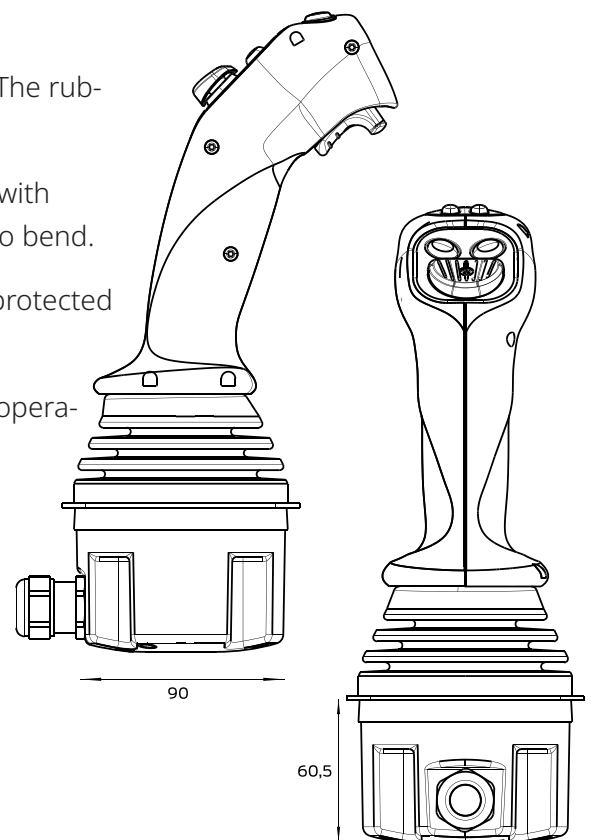
The strong shaft is manufactured in one single piece and with extended dimensions. This makes it practically impossible to bend.

Thanks to its **sealed panel mounting**, the electronics are protected from fluids, salt, and oil.

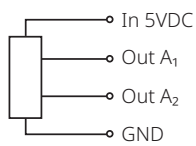
Precision that lasts; it will withstand more than 10 million operations and keep its precision over time.

DEVELOPED WITH CUSTOMER INPUT

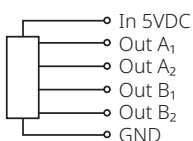
- Tested in salt and copper mines
- Excellent guide-feeling



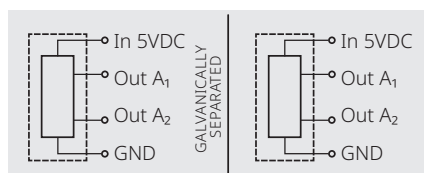
SINGLE OUTPUT



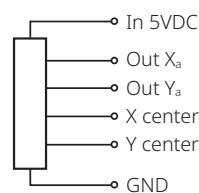
DUAL OUTPUT



DUAL INDEPENDENT OUTPUT



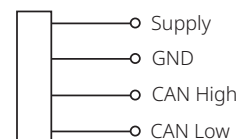
SINGLE + DIGITAL OUTPUT*



*Centre validation signal 1 per axis (please consult Caldaro)

CAN INTERFACE

CANopen, CANopen Safety or J1939 protocol



THE UNBREAK- ABLE JOYSTICK



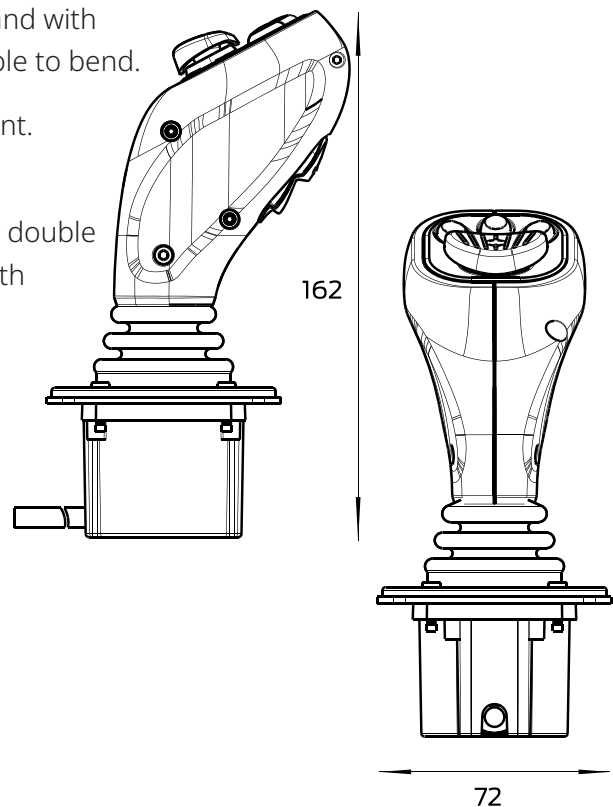
Caldaro tackled the challenge of designing an unbreakable joystick. The result is the C15. This can be used across a spectrum of applications, from the toughest environments to exquisitely high-precision, fine-tuned medical equipment.

Protected electronics: circuit boards and electronics are potted with a silicone compound that protects them from threats such as salt, mist, water, lubricants and virtually all chemicals.

The strong shaft is manufactured in one single piece and with extended dimensions. This makes it practically impossible to bend.

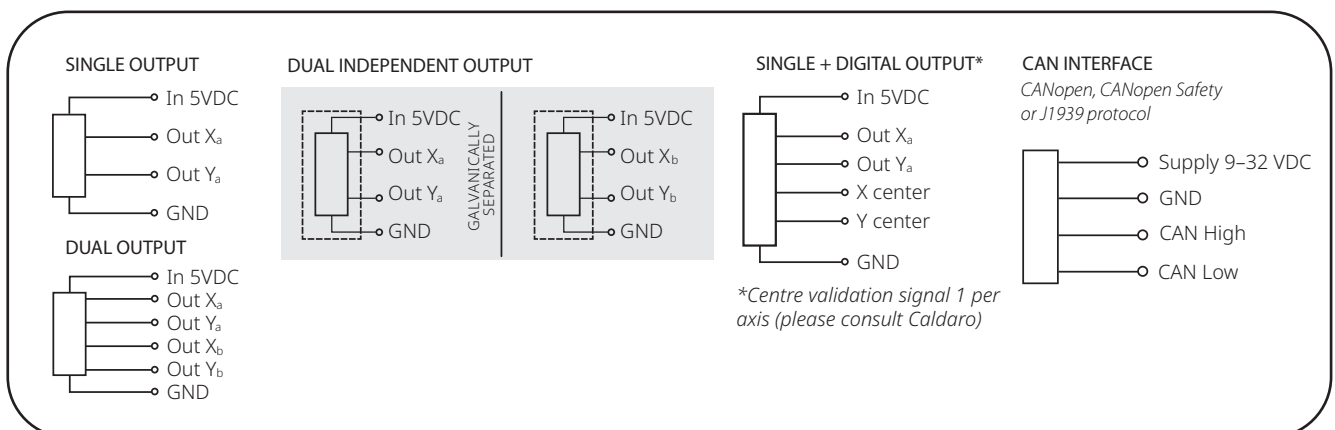
The best material has been chosen for each component. The rubber mixture endures the toughest conditions.

Full redundancy with direction switches and double or double independent output signals. The C15 is also available with CAN interface.



OTHER FEATURES MAKING C15 IRRESISTIBLE:

- Guide-feeling
- Operating angle 9, 12, 17 or 20 degrees
- Sealed panel mounting



CUSTOMER-ADAPTED PRODUCTS MADE IN SWEDEN

Caldaro is an international company based in Sweden that develops premium HMI products like joysticks, pedals and sensors for customers with high-quality expectations and special requirements. Our products are typically used in harsh conditions or operating environments where ergonomics and design are important.

We develop our products according to each customer's distinctive needs while pushing the boundaries of design and technology. Our extensive know-how from several demanding applications allows us to design each product according to each customer's quality and function needs.

We are dedicated to providing modern, safe controls that lead the industry in durability, precision, and dependability through constant innovation. Ergonomics and simplified design go hand in hand. We are the link between man and machine; our task is to optimise that interaction.

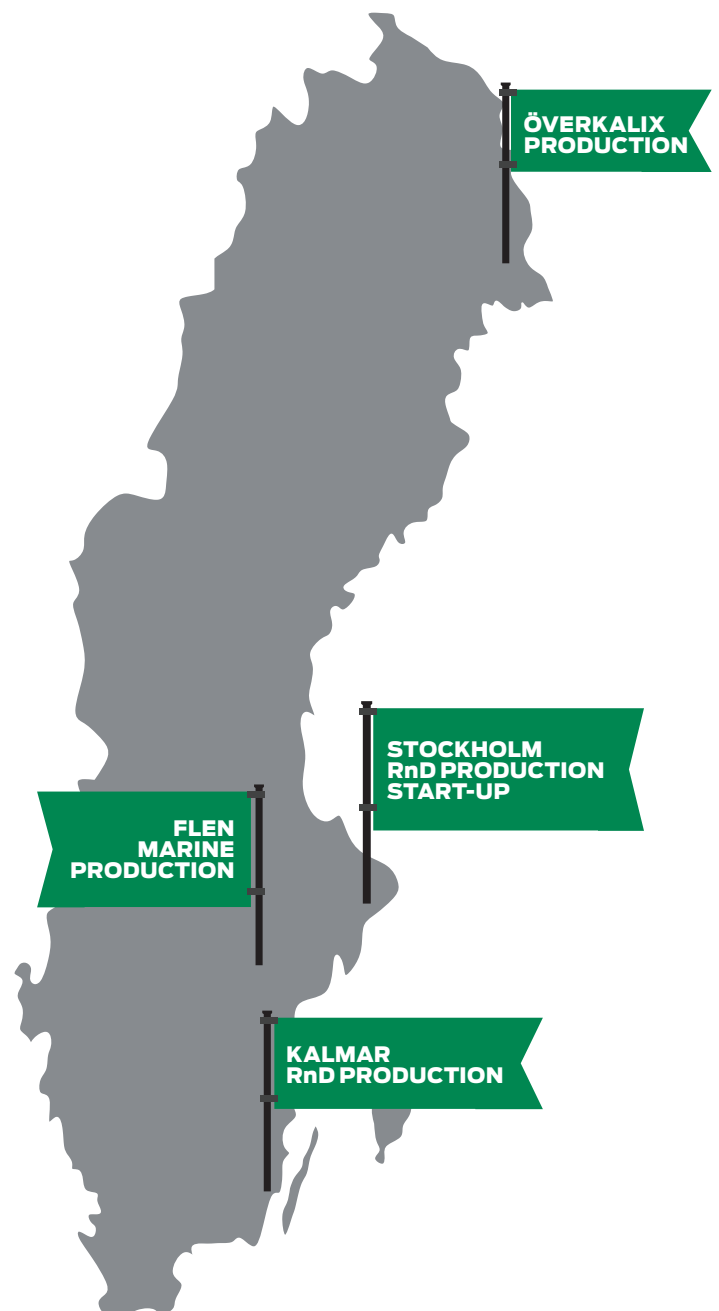
WE DELIVER HIGH-END SOLUTIONS

We have become the go-to supplier for customers with high performance, accuracy, and functionality demands in various industries worldwide.

With solid growth, we have established ourselves as the leading player in our niche. A modern organisation with cutting-edge expertise at our head office means we can deliver on short lead times with a proven track record of reliability.

Outsourced production allows us to increase or decrease capacity as necessary while we get the best help and solutions. We see this as a winning model.

We operate in an exciting technical environment where, in close cooperation with our customers, we are designing the operator environments of the future.



SUSTAINABILITY IS NECESSARY



We are committed to building a sustainable society with our customers, partners and stakeholders. Our focus areas are the environment, ethics, social responsibilities, and economy.

In everything we do, we follow Caldaro's values, ethical principles, and appropriate laws and regulations. In line with our values and Code of Conduct, we aim to provide excellent customer experiences professionally in all our projects. We deliver on our customers' promises and are committed to increasing customer satisfaction.

Our fundamental principle is to offer the best working conditions. With happy, skilled and motivated employees, we can design the best possible products and thereby get satisfied customers.

We increase environmental awareness by communicating our sustainable goals and results internally and externally to ensure that quality and environmental policies are embedded and adhered to at all levels of the organisation.

In 2019, we committed to the UN Global Compact's sustainability goals. In 2022, we received our first. Ecovadis sustainability rating: their Platinum medal for the top 1% of companies.

CALDARO QUALITY

- Joysticks and pedals built to last "forever". We always perform extensive life and other tests to ensure we can exceed our specified requirements.
- Long life expectancy is also a matter of sustainability.
- We use the most durable materials.
- Ergonomic design.
- Excellent precision.
- Simplified design to reduce the number of parts.
- Custom-made to fit the customer's needs.
- Constantly working to get more sustainable: environment, ethics, social, and economy.
- The ID number on each manufactured item allows for full traceability and test data from end-of-line testing if needed.

PREMIUM PRODUCTS

© CALDARO AB • NOVEMBER 2023



INDUSTRIAL JOYSTICKS

Our full grip-sized industrial joysticks are designed to suit the most demanding heavy-duty applications in terms of mechanical strength and environmental requirements. Designed with the operator in focus, these joysticks are ergonomic and user-friendly, built for operating every productive hour.

Our palm grip joysticks are designed with particular emphasis on operator comfort and precision control. After decades of experience working with joysticks, our technical advisers are well placed to supply customers with the ideal solution for their individual needs, and always with various CAN bus options.

Our fingertip joysticks are designed for smooth operator control with high precision. These mini joysticks are often used in precision machines, forklifts and remote controls but can also be found in agricultural applications.

We can offer a wide range of joysticks with up to 5 analog axis and contactless redundant sensors.



INDUSTRIAL PEDALS

Our specially designed foot pedals for heavy-duty throttle, brake and retardation control are as robust as they are precise. All our industrial pedals are designed and manufactured for the most demanding applications in harsh environments. The pedals withstand the toughest conditions in all surroundings for dependability and your safety.



POSITION SENSORS

Caldaro has been supplying sensors since the early 80's. Initially, it was only potentiometers with wire-wound or conductive plastic in both rotating and linear versions. Currently, contactless technology (Hall effect and inductive) has evolved and is now used effectively in many different sensor types, both rotating and linear.

MARINE CONTROLS

Real craftsmanship levers made by our specialist team in Flen. Every control lever has a smooth, elegant feeling and consists of small, moving parts that fit together intricately. All parts are custom-made, with no mass production. We have developed about 200 different variations for a great variety of marine and offshore applications since we started in 1985.

