SVAB GRIP L8

product and technical information

SVAB
Precision Control Systems

With SVAB Grip L8 we set a new standard in joystick grips. L8 grip ergonomically allows you to control two roller functions simultaneously, using your thumb and index finger

SVAB GRIP L8

The L8 is the multifunction ergonomic joystick grip that has set a new standard with its innovative, functional design. You can control two roller functions simultaneously with your thumb and index finger. Up to three rollers can be installed, two for the thumb and one for the index finger. On the handle there is room for up to nine buttons, which means that most functions can be gathered in a small area.

The properties and flexibility of the grip makes it suitable for most machines, including excavators, graders and forest machines. The design of the L8 is based on far-reaching ergonomic studies. The ergonomics and the easy-to-grip design have made the L8 the most popular joystick grip among machine operators when it comes to controlling the tiltrotator of an excavator. Try it for yourself and you will understand why.

BENEFITS OF SVAB GRIP L8

- True ergonomic design. Reduces the risk of repetitive strain injuries.
- Rubberized and structured surface increases comfort and makes the handle easy to grip.
- Multi-functional with room for a large number of different rollers, pushbuttons, mini joysticks and toggle switches located both on the front and backside of the grip.
- Well proven in field with more than 50,000 units installed. Quality ensured with extensive safety tests performed against all applicable standards in MACHINERY DIRECTIVE 2006/42/EC. (Details in specification).
- Controls for many different functions can be gathered in easy to reach positions allowing for simultaneous control which improves work efficiency.
- Aesthetic design. Suits the operator cab and helps to provide the interior with a more attractive appearance.
- Adapted for easy installation and to fit all joystick bases available on the market. Ensures a wide area of application for the handle.
- Customizable against customer needs. The grip can be tailored with a significant amount of different variations and configurations regarding electromechanical switches and interfaces.
- Durable and flexible cabling delivers good quality and a long service life.

SHORT LEAD TIME FROM REQUEST TO FIRST ORDER

To make it fast and easy for you to develop your machine grip per your request the L8 is based on a unique technology platform. With years of experience managing complex requests on the SVAB Grip L8, we have realized the importance of making our offer flexible and solution-focused. To handle all these requirements without lots of engineering hours that generate long-term projects, we have created a technology platform for the L8 where we have gathered all our years of special solutions and adaptations and made them into a configurable and quality assured standard range. The grip can be configured very freely based on component placement, color, functionality and interface to the machine. To further help in the process of developing your grip you can use our online web configurator where you can easily customize your own L8 grip configuration. All this makes for short lead time from request to first order.

L8 Technical Properties

Maximum equipment:

3 rollers + 5 push buttons / toggle switches
(3 push buttons with 1 mini-joystick)

2 rollers + 7 push buttons / toggle switches
(5 push buttons with 1 mini-joystick)

1 roller + 9 push buttons /toggle switches
(7 push buttons with 1 mini-joystick)

Operating temperature range: -40°C to 70°C

Storage temperature: -40 ° C to 85° C

Case material: PC / ABS

Coating: Soft touch

Mass: Up to 340 g

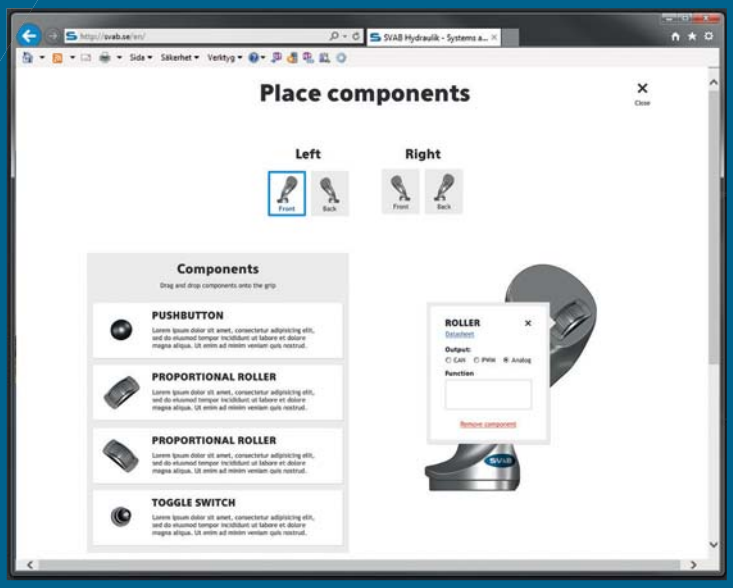
Electrical interface options: Analog / Digital or CAN-bus from integrated CAN module

Front panel thickness: 3mm

More information is found in the Technical Information in this brochure.

THE MARKETS MOST CONFIGURABLE GRIP FOR MACHINES

EASY TO CONFIGURE WITH SHORT LEAD TIME FROM REQUEST TO FIRST ORDER



Example of our online joystick grip configurator

Technical Information

for the SVAB Grip L8 standard range

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Revision E

1. INTRODUCTION

PLEASE NOTE! This technical information does not contain a product key for configuration of the L8 grip. Instead we have developed a user friendly web configurator found at www.svab.se. This brochure and our web configurator covers our standard range. For other requests outside of the standard range please consult a SVAB sales representative.

The SVAB Grip L8 was initially designed as an ergonomic joystick grip for earth-moving machinery but can today be found in a range of different machine types. It can be fitted with a variety of electromechanical switches and Hall Effect controls. Proportional rollers can be fitted on both sides of the joystick grip for simultaneous control with index finger and thumb. Available with direct analog/digital, CAN bus (CANopen and J1939) and PWM outputs. It is possible to combine both analog/digital, CAN bus and PWM outputs in the same grip. The L8 grip is available in both left and right hand design and in dark gray or black color. Developed in accordance with the MACHINERY DIRECTIVE. SS-ISO 10968:2004.

2. L8 GRIP - GENERAL TECHNICAL DATA

SVAB GRIP L8

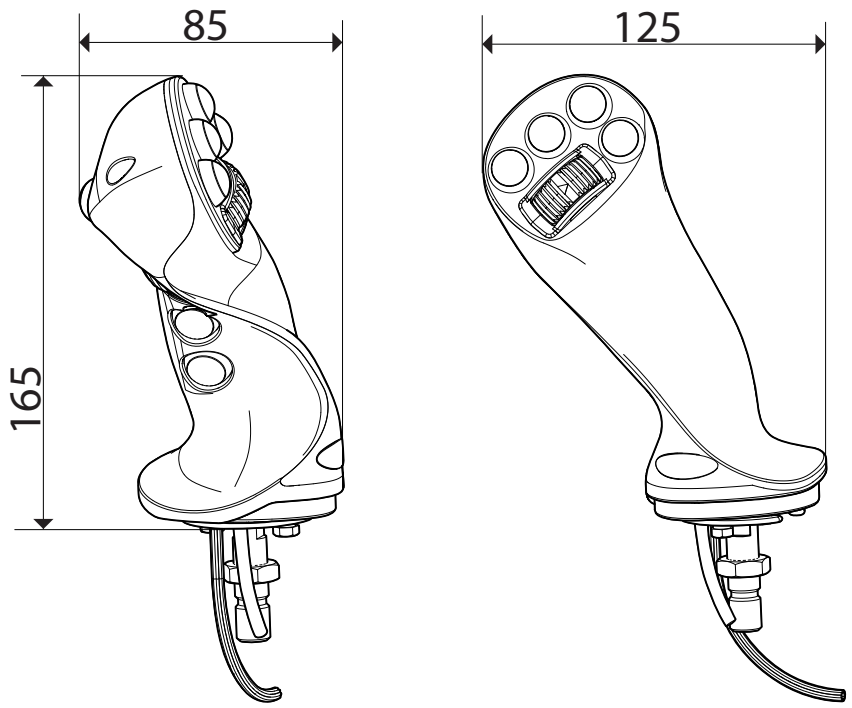
DIMENSIONS *(in millimeters)* **AND TECHNICAL DATA**

Description

The development of the SVAB Grip L8 joystick grip comes from long experience and ergonomic studies which has given the L8 great comfort and functionality.

Features

- Ergonomically designed.
- Rubberized surface.
- Room for rollers and electromechanical switches on both the front and back.
- Easily mounted on market joystick bases. Both hydraulic and electric.
- Adapted for a large variety of electro-mechanical switches and hall effect controls.



Operating temperature range	-40°C to 70°C
Storage temperature	-40°C to 85°C
Case material	PC/ABS
Coating	Soft touch
Mass	Up to 340 g
Front panel thickness	3mm
Electrical interface options	Analog/Digital, CAN-bus or PWM

Safety

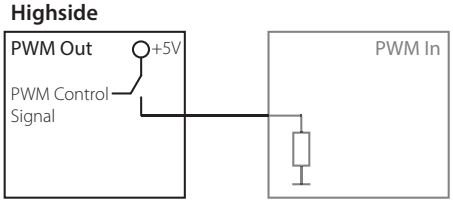
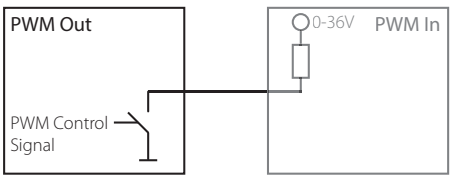
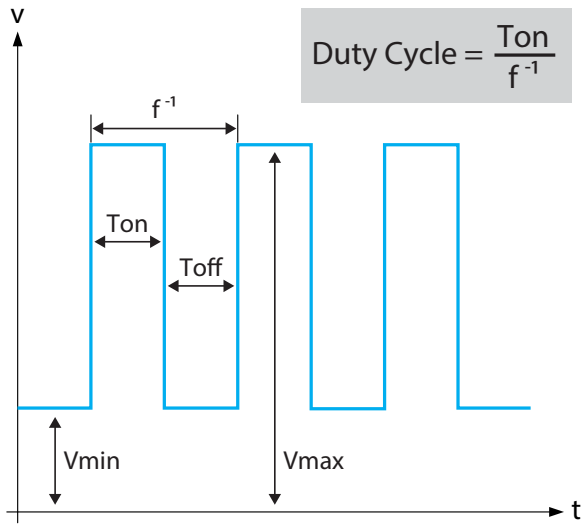
Developed in accordance with the MACHINERY DIRECTIVE 2006/42/ EC. SS-ISO 10968:2004.

	Tests according to
Electromagnetic compatibility	ISO13766 Volvo STD 515-0003
Environmental conditions	ISO16750-4
Salt spray test	Volvo STD 423-0010
Shock	Free fall acc. to ISO16750-3
Vibration	Test VIII acc. to ISO16750-3
Chemical resistance	ISO16750-5

3. OUTPUTS

Available outputs for the L8 are analog / digital, CAN and PWM. Direct output from Hall Effect controls we refer to as analog. Direct output from electromechanical switches we refer to as digital. It is possible to combine both analog / digital, CAN bus and PWM outputs in the same grip. For more information on Hall Effect controls or electro-mechanical switches please see their respective data sheet.

CAN bus The signals from hall effect controls and electromechanical switches can be converted to CAN data.		
	Protocols	J1939 and CANopen
	CAN bus bit rate	125kb, 250kb or 500kb
	CAN termination resistance	600 Ω
	Supply voltage, permissible range	8 to 36 VDC
	For further information regarding the CAN protocols please request the documentation "SVAB L8 CAN Profile" from SVAB.	

PWM Our PWM is available in two different variants. "Highside" and "Lowside". If an error is detected on the hall effect control, 50% DC is outputted.		
	PWM outputs	2
	PWM Frequency	Configurable.
	PWM Duty Cycle	Configurable. Possibility to extend or shorten the pulse to compensate for signal rise and fall times.
	Electrical Properties Highside	Voltage range 0-5V, Max current 30mA
	Electrical Properties Lowside	Voltage range 0-36V, Max current 30mA
	Highside  External pull-down resistor possibly situated in ECU.	**Lowside**  External pull-up resistor possibly situated in ECU.
	PWM Signal Explanation  	

4. CABLES

SVAB Grip L8 cables are available for both analog / digital signals as well as for CAN bus / PWM communication. It's possible to combine analog / digital and CAN bus / PWM cables in the same joystick grip. Our cables consists of high-performance insulation and sheath materials which cover a wide temperature range and are highly resistance to chemicals and abrasion. Cables are also well protected by a braided polyester sleeving which adds further mechanical resistance.

We refer direct outputs from Hall Effect controls as analogue signals. Direct outputs from electromechanical switches are referred to as digital signals.

Cables are delivered without contacting. Consult a SVAB sales representative if contacting is required.

5. PROPORTIONAL ROLLER

HECR II

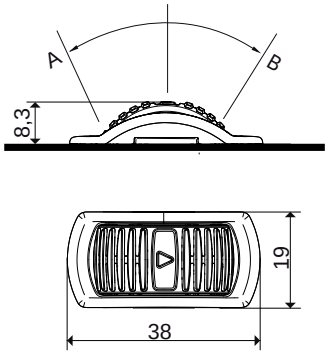
TECHNICAL DATA

Description

The HECR II is a finger / thumb controlled dual proportional output spring-back roller used for proportional steering. The HECR II uses hall effect technology and is constructed for small mounting dimensions. The HECR II is fully backward compatible with the HECR I.

Features and Benefits

- Rubberized roller surface - Greater friction.
- Constructed with high performing electrical linearity in mind - Allows stable calibration with minimal error detections.
- Sturdy construction and good magnetic shielding - Long operating life and reduced risk of external influences.
- Programmable output range - Good compatibility.



Electrical characteristics		
Sensor type	Hall-effect	
Resolution	12-bit DAC	
Supply voltage (Vs)	5±0.5 VDC	
Output	Dual analog programmable outputs ratiometric to Vs	
Output voltage	**Thumb roller**	**Index finger roller**
	0.5 ◄— 2.5 —► 4.5 VDC	0.5 ◄— 2.5 —► 4.5 VDC
	0.7 ◄— 2.5 —► 4.3 VDC	0.7 ◄— 2.5 —► 4.3 VDC
	1.25 ◄— 2.5 —► 3.75 VDC	
Output voltage tolerance (@5VDC Vs)	± 0.15 VDC	
Max load/output	5mA (1kΩ)	
Max current consumption (@max load)	25 mA	

Mechanical characteristics	
Roller mechanical angle	± 40°
Roller mechanical force	0.65 to 1.08 N
Operating life	> 5 million cycles
Weight	11g
Material wheel	PC/ABS+TPU
Material housing	POM

Environmental parameters	
Operating temperature	-40 to +90°C
Storage temperature	-40 to +90°C (100°C for 2h)
EMI/RFI rating	100 V/m acc. to ISO13766
ESD	±8 kV contact discharge ±15 kV air discharge acc.to ISO10605 mounted in panel
Shock	Free fall acc. to ISO16750-3
Vibration	Test VIII acc. to ISO16750-3

6. PUSHBUTTONS

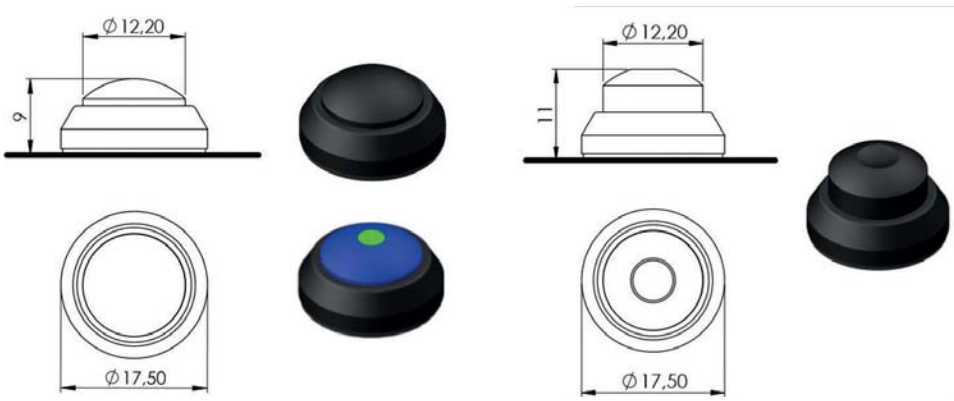
PUSHBUTTONS

DIMENSIONS *(in millimeters)* AND TECHNICAL DATA

Features

- Momentary snap-action.
- Tactile feedback.
- Sealed to IP67.
- UL 61058 Recognized.
- Wide Range of appearances.
- Illuminated (LED) Option.
- Long Life.

Agency approvals



Electrical ratings (Sea Level @ 28VDC or 115VAC 60/400Hz)

Load	SPST (NO)	SPDT (NO/NC)
Resistive	5A	5A
Inductive	3A	3A
Dielectric strength	1,000 Vrms	1,000 Vrms

Mechanical / Electrical characteristics

Insulation resistance	1 GΩ
Contact resistance	50 mΩ
Contact bounce	1 millisecond
Electrical life	25,000 cycles maximum 5A @ 28VDC
Mechanical life	1,000,000 cycles
Sealing	IP67 to IEC 60529
Temperature (operating)	-40°C to + 85°C
Button travel	1.5mm
Operating force	3.5N±0.5N

Materials

Case	Thermoplastic
Button	Thermoplastic
Contacts	Gold over silver
Cables	Potted AWG 20 ETFE-Single Core
Available buttons	Black, Red, Green, Blue, Yellow, Orange, Black (High Profile)

LED illumination

Available LED's	Red, Green & Blue
Voltage supply	5V
Cables	Potted AWG 28 ETFE-Single Core for LED
Available buttons	Black, Red, Green & Blue

PUSHBUTTON DOUBLE PRESS

TECHNICAL DATA

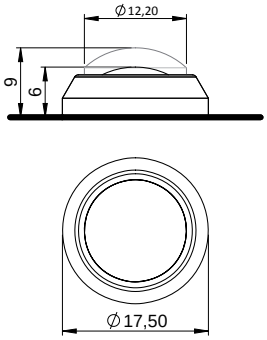
Description

Double press is our recommended option when a distinct remaining button press is desired. When pressing the button it remains pressed down until the button is pressed again.

Features

- Maintained action
- Panel sealed to IP 67
- Long life

Agency approvals



Maintained Action "ON"

Electrical ratings SPST (NO) Double Press	
Resistive load	250mA @ 12VDC, 100K cycles 150mA @ 28VDC, 150K cycles (momentary) 100mA @ 48VDC, 100K cycles 10mA @ 12VDC, 1 million cycles (momentary)
Dielectric strength	1,000 Vrms
Mechanical / Electrical characteristics	
Insulation resistance	1G OHM
Contact resistance	50 mΩ max (initial)
Contact bounce	1 millisecond
Sealing	IP67 to IEC 60529
Temperature (operating)	-40°C to +85°C
Button travel	2.3 mm
Operating force	3N±0.5N
Materials	
Case	Thermoplastic
Button	Thermoplastic
Contacts	Gold
Available buttons	Black

7. TOGGLE SWITCHES AND MINI JOYSTICKS

TOGGLE SWITCH

DIMENSIONS *(in millimeters)* AND TECHNICAL DATA

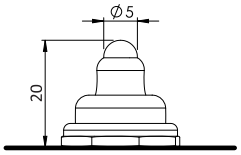
Types

Model No.	Switching Position		
	↙	↓	↘
44	ON	ON	ON
46	ON		ON
47	(ON)	OFF	(ON)
49	ON	OFF	ON

Agency Approvals / Preferential List

CECC 96201-007

3A 250VAC, 6A 125VAC



Electrical characteristics

Contact	Maximum	Minimum
Silver, gold plated (AD)	4A 30VDC Gold plating withstands up to 100mA 30VDC	10mA 50mV 10µA 5V

Initial contact resistance	10 mΩ max
Insulation resistance	1.000 MΩ min. at 500VDC
Dielectric strength	1.000 Vrms 50 Hz min. between terminals 1.500 Vrms 50 Hz min. between poles 1.500 Vrms 50 Hz min. between terminals and frame
Contact bounce	2ms max
Electrical life at full load	50.000 cycles
Low level or mechanical life	100.000 cycles

Materials

Case	Diallylphthalate (DAP) or high temperature plastic material (UL94-V0)
Actuator	Brass, nickel plated
Paddles	UL94HB polyamide
Lever caps	Vinyl
Bushing	Brass, nickel plated
Housing	Stainless steel or steel tin plated
Contacts	AD : silver, gold plated
Terminal seal	Epoxy

General specifications

Operating temperature	-40°C to +85°C

MINI JOYSTICK

DIMENSIONS *(in millimeters)* AND TECHNICAL DATA

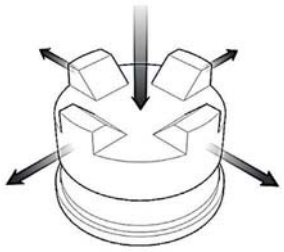
Description

The mini joysticks gives the L8 grip an additional X- & Y-axis and is great for navigating in system displays and menus.

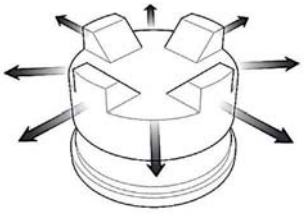
Mini joysticks are single pole momentary contact (self return to center ON/OFF-switches).

Agency approvals

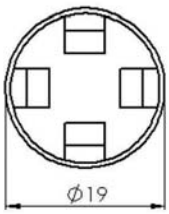
RoHS COMPLIANT 2002/95/EC



4-Way + Push button



8-Way



Electrical Ratings

Load	Rating
Resistive	10mA @ 5VDC (low level)
Inductive	1A @ 28VDC
Dielectric strength	1050Vrms

Mechanical / Electrical characteristics

Electrical life	100,000 cycles 1A Inductive @ 28VDC
Lever travel	Toggle: 15° max from center OFF
Seal	IP64
Temperature (operating)	-55°C to +85°C
Operating force	Toggle: 4.5N ±1.65N
Lever pivot & stop strength	Switch is capable of withstanding a force of 110N applied to the actual button.
Pushbutton (4-way + P.B)	The button withstands 65N minimum pull force.

Materials

	8-way	4-way + P.B
Case	Thermoplastic	Aluminum alloy
Button	Thermoplastic	Thermoplastic
Contacts	Gold over silver	Gold over silver
Cables	AWG28 ETFE-Single Core	AWG28 ETFE-Single Core

8. MOUNTINGS

The L8 joystick grip is attached on the joystick base with mountings and accessories. Mountings and accessories allows the joystick grip to be fitted on a large variety of joystick bases.

STANDARD

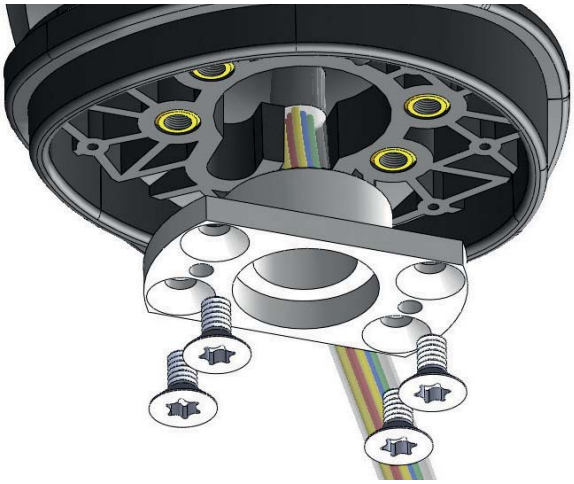
DIMENSIONS *(in millimeter)*

NOTE! Accessories for mountings, like the adapter ball kit, is selected separately.

See "ADAPTER BALL KIT FOR STANDARD MOUNTING" on page 17.

Info:

Standard mounting that with accessories fit a wide range of joystick bases.



OPTION 1

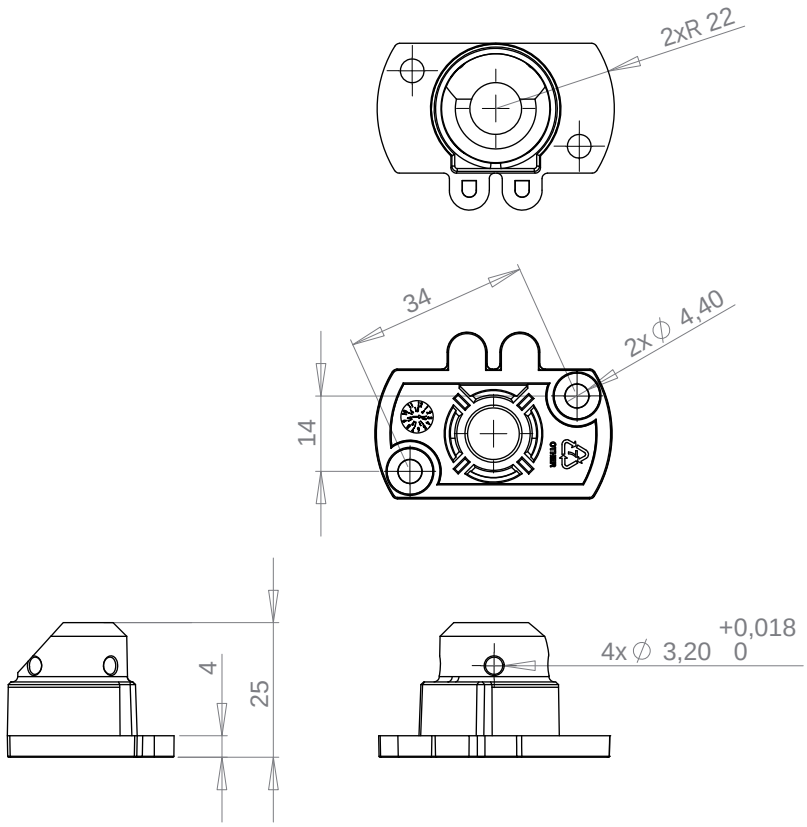
DIMENSIONS *(in millimeter)*

Description

Option 1 has been developed for Penny + Giles joystick base JC6000 but it can also fit other brands of joystick bases.

Option 1 can be fitted directly on the JC6000 joystick base.

With the adapter sticks seen on page 18 this mounting is compatible with most joystick bases.



9. ACCESSORIES

Accessories allows the SVAB Grip L8 joystick grip to be fitted on market joystick bases.

Among the accessories, bellow washers and adapters can be found which facilitates the attachment of the joystick base bellow to the joystick grip.

9.1 ADAPTER BALL KIT FOR STANDARD MOUNTING

ADAPTER BALL KIT FOR STANDARD MOUNTING

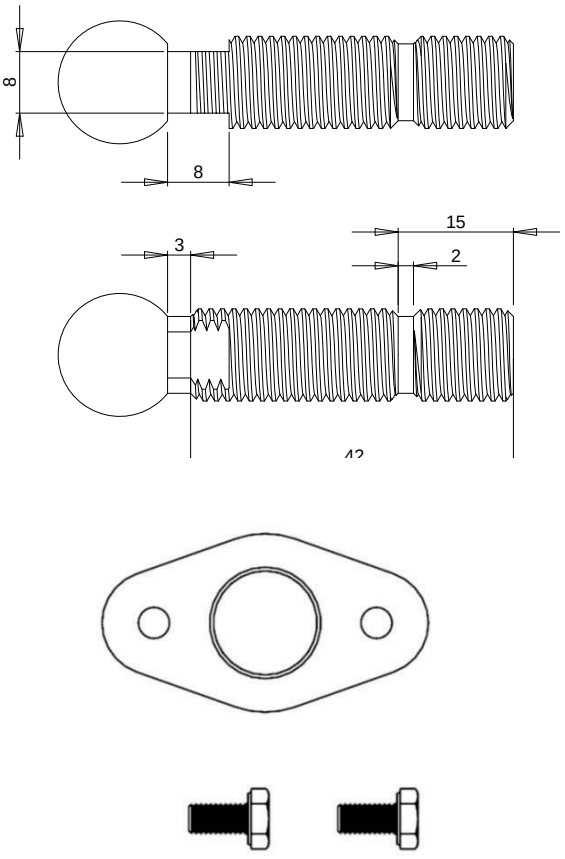
DIMENSIONS *(in millimeter)*

Description

The ball head screw allows attachment of the L8 joystick grip to the joystick base with the use of a locking plate. This kit is compatible with the L8 joystick grip standard mounting (page 15).

The kit includes ball screws, locking plate and screws for the locking plate. The kit comes with three different standard size screws for attachment to most joystick bases.

Currently available in M12, M14 and M14x1,5 threads.



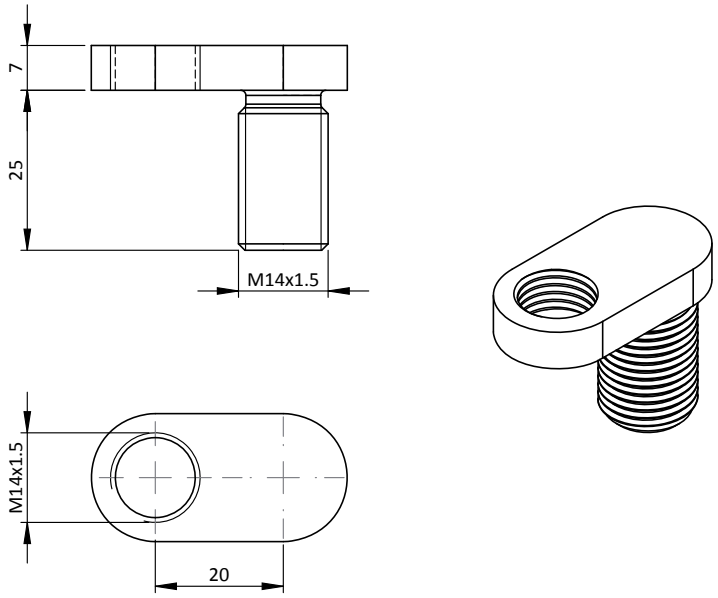
OFFSET ADAPTER FOR BALL KIT

DIMENSIONS *(in millimeter)*

Description

The offset adapter offsets the ball head screw and joystick grip 20 mm in the preferred direction from the joystick base.

Currently available in M14x1,5 thread. Other threads possible on request.



9.2 ADAPTER STICK AND BELLOW ADAPTER FOR OPTION 1 MOUNTING

ADAPTER STICK FOR OPTION 1 MOUNTING

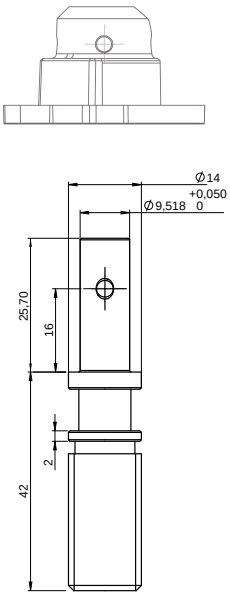
DIMENSIONS *(in millimeter)*

Description

The Adapter Stick enables the Option 1 mounting (page 16) to be fitted on most joystick bases.

The design is simple and sturdy. Adapter Stick is delivered pre-mounted when ordered together with Option 1 Mounting. L8 Grip gets limited adjustability with the Adapter Stick.

Currently available in M12 and M14 threads.



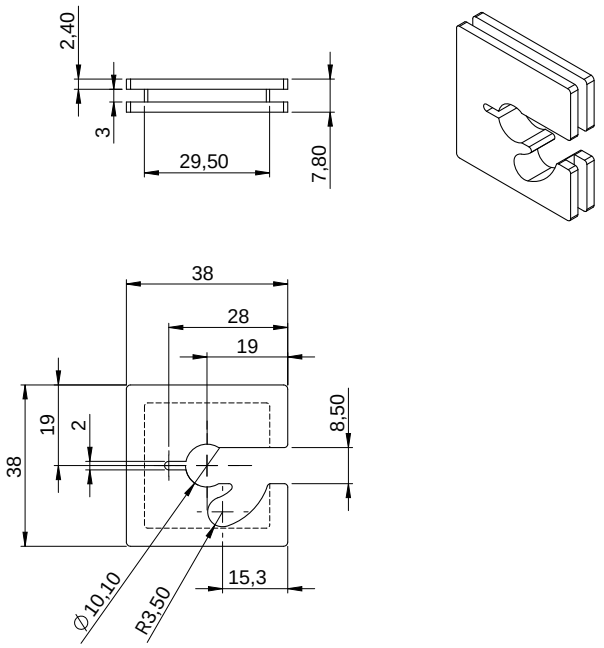
BELLOW ADAPTER 38x38 FOR ADAPTER STICK

DIMENSIONS (in millimeter)

Description

Used for attaching the bellow of the joystick base to the joystick grip. This bellow adapter is compatible with the Adapter Sticks only.

Black POM plastic.



9.3 BELLOW WASHERS

Bellow washers allows for the attachment of the joystick base bellow to the L8 joystick grip.

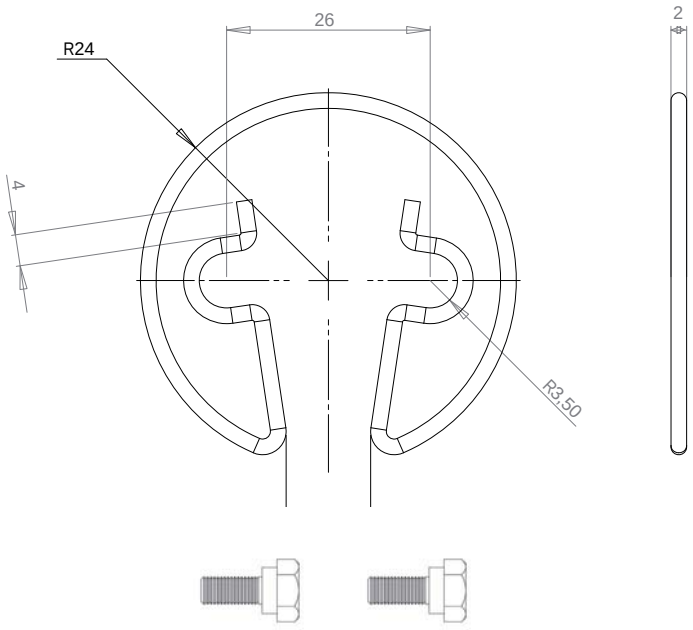
STANDARD BELLOW WASHER FOR STANDARD MOUNTING

DIMENSIONS (in millimeter)

Description

Bellow washer in spring steel for "Standard mounting" (page 15).

Enables the attachment of the joystick base bellow to the L8 joystick grip.



9.4 BELLOW ADAPTERS FOR STANDARD BELLOW WASHER

If the joystick bases upper bellow hole is too large to fit the standard bellow washer, a bellow adapter may be required.

The bellow adapter allows for attaching bellows with large upper holes to the L8 joystick grip.

Contact SVAB if you do not find a suitable measure among existing bellow adapters.

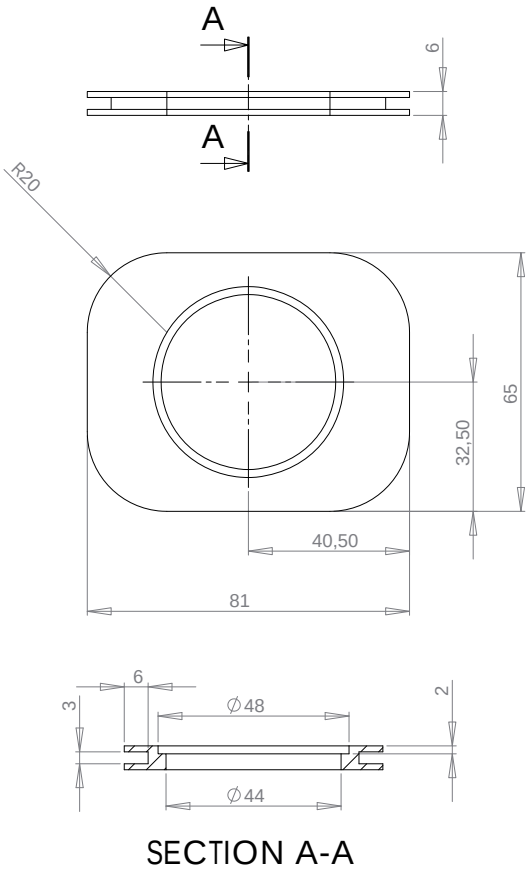
BELLOW ADAPTER 65x81 FOR STANDARD BELLOW WASHER

DIMENSIONS (in millimeter)

Description

The bellow adapter allows for attaching bellows with large upper holes to the L8 joystick grip.

Black POM plastic.



SECTION A-A

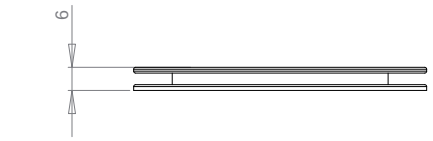
BELLOW ADAPTER D76 FOR STANDARD BELLOW WASHER

DIMENSIONS (in millimeter)

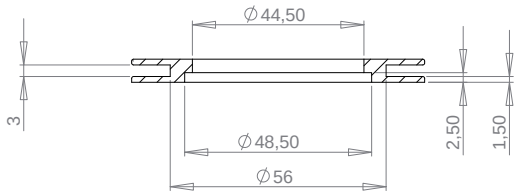
Description

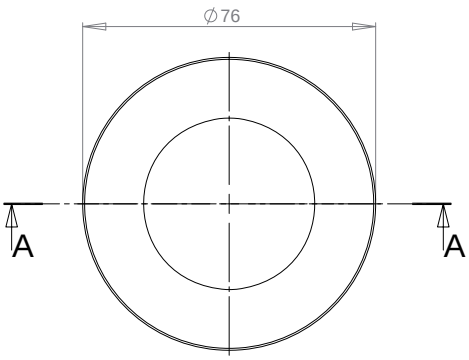
The bellow adapter allows for attaching bellows with large upper holes to the L8 joystick grip.

Black POM plastic.



SECTION A-A





9.5 HAND-REST

HAND-REST

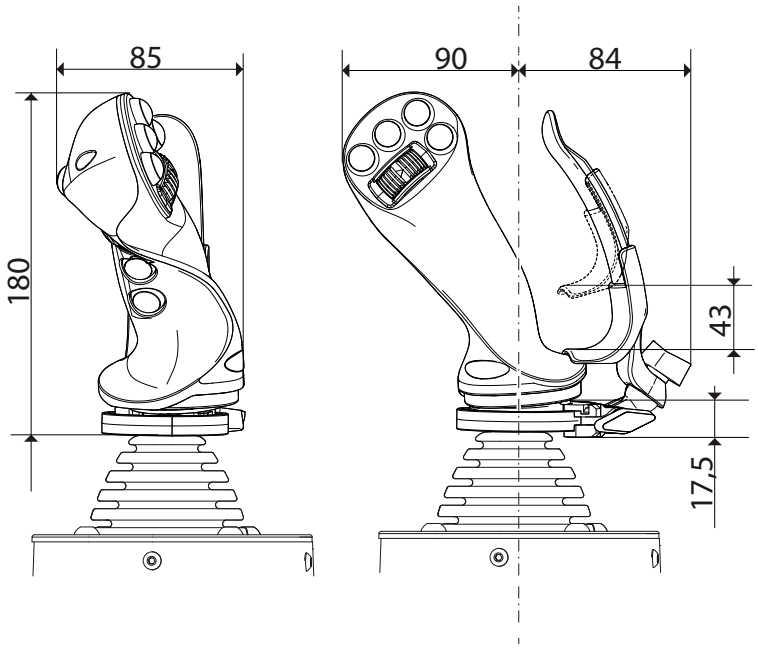
DIMENSIONS (in millimeter)

Description

The hand-rest can easily be retrofitted to any L8 configuration. The hand-rest increases comfort, relieves the hands and reduces the risk of repetitive strain injuries. The hand-rest improves control of the steering and allows a flexible adjustment for different hand sizes and personal preferences.

The hand-rest can be tilted as you prefer and allows free adjustment inward, outward, forward and backward thanks to its mounting system. The lower palm rest is adjustable in 5 different height positions which makes the hand-rest adaptable to different hand sizes.

PC/ABS



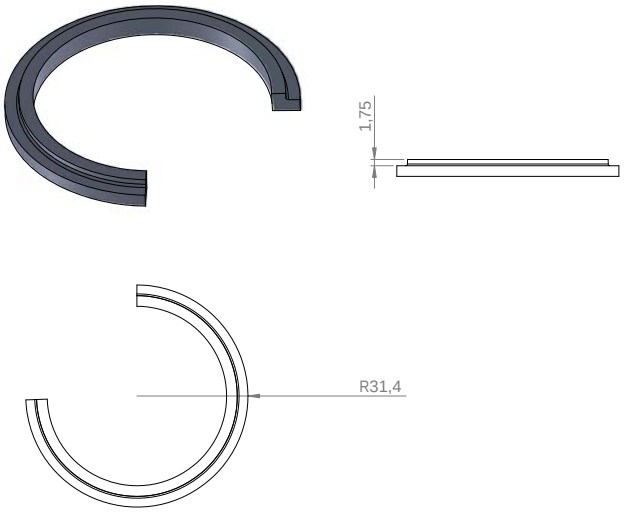
SPACER RING FOR HAND-REST

DIMENSIONS (in millimeter)

Description

The spacer ring is required when a hand-rest is mounted on the L8 in combination with bellow adapters 65x81 or D76. The spacer prevents an incorrect angled mounting of the bellow washer.

POM Black



9.6 MISCELLANEOUS

CABLE SUPPORT

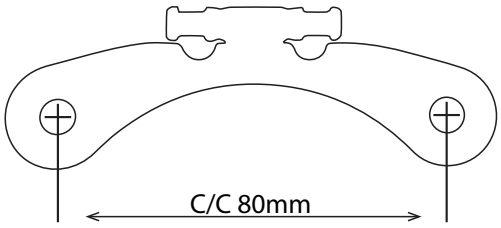
DIMENSIONS (in millimeter)

Description

The cable support is a bracket mounted on the joystick base that fixates cables from the joystick grip. It enhances quality of the joystick installation and minimizes risk of cable damage.

Set of 2 pieces including instructions.

Stainless steel SS2333



10. PRODUCT KEY FOR GRIP CONFIGURATION

Because of the almost endless possible configurations of the L8 grip this technical information does not contain a product key for configuration of the grip. Instead we have developed a user friendly web configurator. You will find the web configurator at www.svab.se.

SVAB Hydraulik AB has extensive experience in hydraulics, control electronics and ergonomic design for industrial vehicles, with guaranteed quality production and prompt delivery.

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