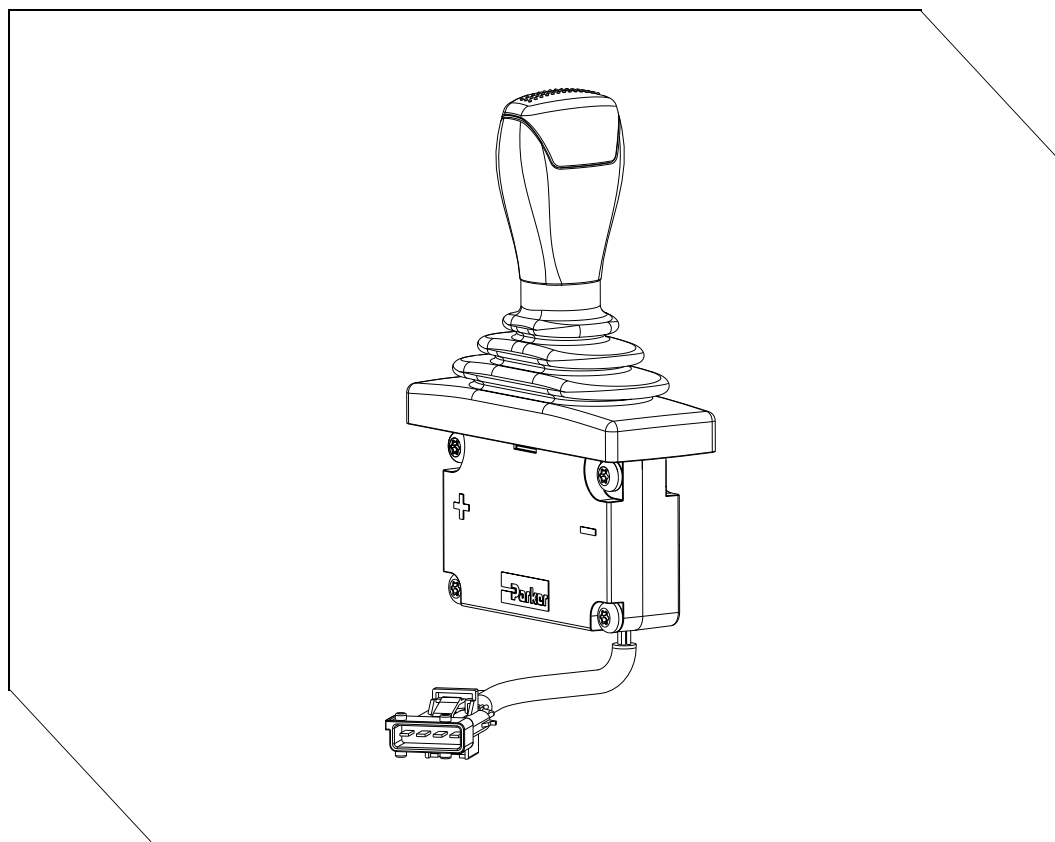




# Instruction book IQAN-LSL

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Edition 0301*



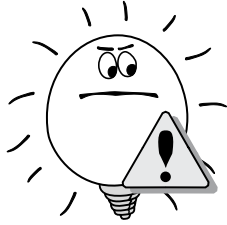
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# 1 Introduction

These instructions are to be used as a reference tool for the vehicle manufacturer's design, production, and service personnel.

The user of these instructions should have basic knowledge in the handling of electronic equipment.



## **ATTENTION**

Sections regarding safety, marked with the IQman symbol shown in the left margin, must be read and understood by everyone using the system, carrying out service work or making changes to hardware/software.

Contact the manufacturer if there is anything you are not sure about or if you have any questions regarding the product and its handling or maintenance.

The term "manufacturer" refers to Parker Hannifin Corporation.

## 2 Precautions

### General safety regulations

Work on the hydraulics control electronics may only be carried out by trained personnel who are well-acquainted with the control system, the machine and its safety regulations.

Mounting, modification, repair and maintenance must be carried out in accordance with the manufacturer's regulations. The manufacturer has no responsibility for any accidents caused by incorrectly mounted or incorrectly maintained equipment. The manufacturer does not assume any responsibility for the system being incorrectly applied, or the system being programmed in a manner that jeopardizes safety.

Damaged product may not be used. If the control system shows error functions or if electronic modules, cabling or connectors are damaged, the system shall not be used.

Electronic control systems in an inappropriate installation and in combination with strong electromagnetic interference fields can, in extreme cases, cause an unintentional change of speed of the output function.

As much as possible of the welding work on the chassis should be done before the installation of the system. If welding has to be done afterwards, the electrical connections on the system must be disconnected from other equipment. The negative cable must always be disconnected from the battery before disconnecting the positive cable. The ground wire of the welder shall be positioned as close as possible to the place of the welding. The cables on the welding unit shall never be placed near the electrical wires of the control system.

### Construction regulations

The vehicle must be equipped with an emergency stop which disconnects the supply voltage to the control system's electrical units. The emergency stop must be easily accessible to the operator. The machine must be built if possible, so that the supply voltage to the control system's electrical units is disconnected when the operator leaves the operator's station.

### Safety during installation

Incorrectly positioned or mounted cabling can be influenced by radio signals which can interfere with the functions of the system.

### **Safety during start-up**

The machine's engine must not be started before the control system is mounted and its electrical functions have been verified.

Ensure that no one is in front, behind or nearby the machine when first starting up the machine.

### **Safety during maintenance and fault diagnosis**

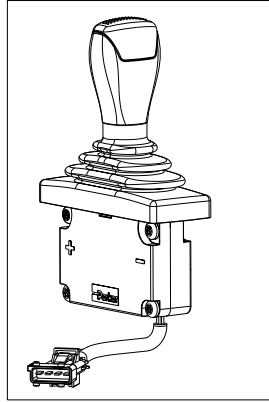
Ensure that the following requirements are fulfilled before any work is carried out on the hydraulics control electronics.

- The machine cannot start moving.
- Functions are positioned safely.
- The machine is turned off.
- The hydraulic system is relieved from any pressure.
- Supply voltage to the control electronics is disconnected.

## 3 Product description

### IQAN-LSL

The IQAN-LSL is one of several single axis joysticks designed for controlling hydraulic functions in vehicles and machinery, using 0,5-4,5Vdc outputs.

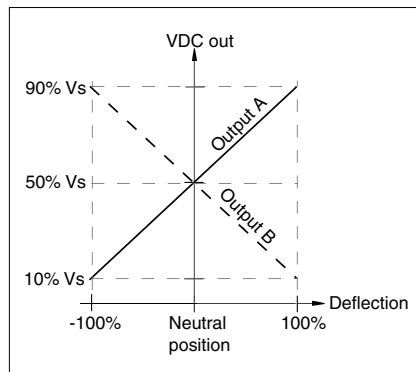


The IQAN-LSL lever.

#### Output

The IQAN-LSL has two (2) contactless hall effect sensors that provide mirrored *voltage outputs* for controlling proportional valve drivers.

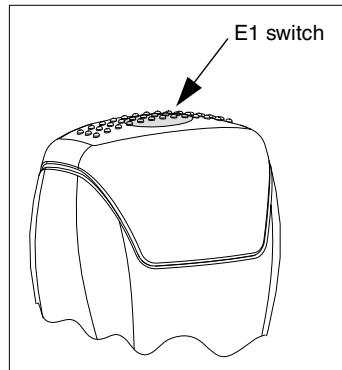
In order to increase the safety of the LSL the opposing 10% - 90%  $V_S$  and 90% - 10%  $V_S$  outputs can be compared eg. to verify center position. With a 5 Vdc supply the outputs are typically 0,5-4,5Vdc and 4,5-0,5Vdc



Graph showing dual outputs A and B.

### Switch

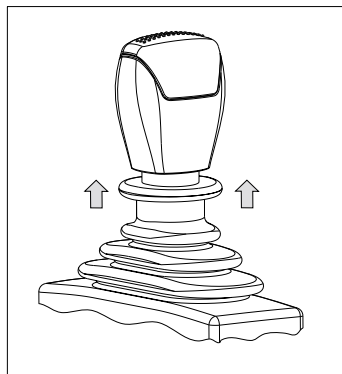
The IQAN-LSL has a switch option in the top of the handle. The momentary push button can be used for an 'operator present' switch. Supply for the switch is from  $V_{BAT}$ .



Location of switch in handle.

### Manual neutral detent

The IQAN-LSL has a handle detent option in the neutral position. The detent lock is released by pulling up on a spring loaded collar. This feature prevents accidental activation of the joystick.



Operation of manual detent.

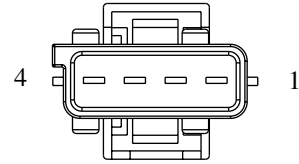
### Electrical detents

The IQAN-LSL has solenoid detents available in three configurations. The **L1** option is a detent in the full on minus (-) direction. The **L2** option has detents in the full plus (+) and in the full minus (-) directions. The **L3** option is a detent in the minus (-) direction at 75% of stroke. These detents can be disengaged electrically or by exceeding the holding force applied by the solenoid(s).

## 4 Installation

### Connector C1

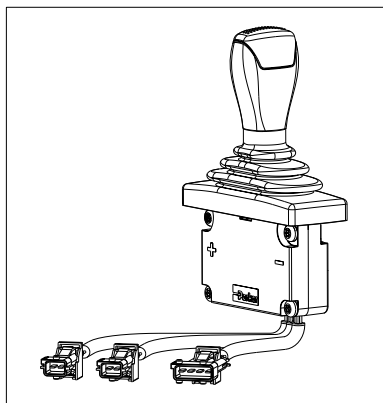
<b>Connector kit</b>	<b>Parker no. 5031097</b>
Housing	Amp no. 1-963207-1
Plane sealing, 4 p	Amp no. 963208-1
Pin type	Amp no. 929940-1
Cable	0,75-1,0 mm <sup>2</sup>
Seals	Amp no. 828904-1
Plugs (empty pos.)	Amp no. 828922
IQAN crimping tool references	Red handle, pos. A use Red extraction tool
<b>IQAN tool kit</b>	<b>Parker no. 5031061</b>



The IQAN tool kit is found in the 'IQAN accessories' datasheet.

Pos	Signal name
1	GND
2	POWER (+5Vdc)
3	OUT-A
4	OUT-B

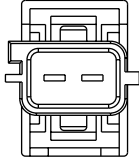
The IQAN-LSL has from one to three cables depending on the specified options. The additional cables for the switch and electrical detent options each have a 2 position connector



The IQAN-LSL-E1-//L1 lever and cables.



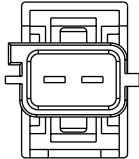
### Connector C2 (option E1, switch)

Connector kit	Parker no. 5031098			
Housing	Amp no. 1-963210-1	2		1
Plane sealing, 2 p	Amp no. 963209-1			
Pin type	Amp no. 929940-1			
Cable	0,75-1,0 mm <sup>2</sup>			
Seals	Amp no. 828904-1			
Plugs (empty pos.)	Amp no. 828922			
IQAN crimping tool references	Red handle, pos. A use Red extraction tool			
<b>IQAN tool kit</b>	<b>Parker no. 5031061</b>			

The IQAN tool kit is found in the 'IQAN accessories' datasheet

Pos	Signal name
1	DOUT
2	+BAT (+12V, +24V)

### Connector C3 (options L1, L2 & L3, elec. detents)

Connector kit	Parker no. 5031098			
Housing	Amp no. 1-963210-1	2		1
Plane sealing, 2 p	Amp no. 963209-1			
Pin type	Amp no. 929940-1			
Cable	0,75-1,0 mm <sup>2</sup>			
Seals	Amp no. 828904-1			
Plugs (empty pos.)	Amp no. 828922			
IQAN crimping tool references	Red handle, pos. A use Red extraction tool			
<b>IQAN tool kit</b>	<b>Parker no. 5031061</b>			

The IQAN tool kit is found in the 'IQAN accessories' datasheet

Pos	Signal name
1	-BAT (GND)
2	+BAT (+24V only)

# Appendix A

## IQAN-LSL Technical Overview

### Absolute maximum ratings

$T_A = +25\text{ °C}$  (unless otherwise specified)

Parameter	Limit values			Unit	Remark
	min.	typ.	max.		
Operating ambient temperature, $T_A$	-40		+70	°C	
Storage temperature	-50		+100		
Voltage supply, $V_S$	-11		+11	V	$t < 10\text{ min.}$
Voltage supply DOOUT switch			36	V	
Load current DOOUT switch					internally limited
Voltage supply detent			36	V	
Analog output			11	V	short circuit protected

### Operating

$T_A = +25\text{ °C}$  (unless otherwise specified)

Parameter	Limit values			Unit	Remark
	min.	typ.	max.		
Operating ambient temperature, $T_A$	-40		+70	°C	
Voltage supply, $V_S$	4.5		5.5	V	
Voltage supply DOOUT switch	9		34	V	
Voltage supply detent	24		34	V	
Start-up delay		11.5		ms	power to activated output
Current consumption		16		mA	

### I/O

$T_A = +25\text{ °C}$  (unless otherwise specified)

Parameter	Limit values			Unit	Remark
	min.	typ.	max.		
Unadjusted error			$\pm 2\%$		
Load current DOOUT switch			400	mA	
Analog output levels, OUT-A/OUT-B	10%		90%	V	proportional to $V_S$
Neutral position		50%		V	proportional to $V_S$
Resolution		<2		mV	
Load, resistive	1			k $\Omega$	
Load, capacitive			1	$\mu\text{F}$	

### Mechanical ratings

Parameter	Limit values			Unit	Remark
	min.	typ.	max.		
Breakout force		0,3		N	At top of handle
Operating force		0,6		N	Full deflection, at top of handle
Applied force			250	N	At top of handle
Angle of movement		±20		°	
Expected life	5x10 <sup>6</sup>			cycle	one cycle is: Neutral to full + direction to neutral to full - direction and back to neutral
Weight		250		g	excl. cabling

### Environmental ratings, EMI

Parameter	Limit values			Unit	Remark
	min.	typ.	max.		
EMI ISO 14982:1998 EN 55022:1998 ISO 11452-2:1995 ISO 11452-4:1995 ISO7637-3 EN 61000-4-8			100 150 80 100	Mhz Mhz V/m mA V A/m	30-1000 Mhz 0.15-30 Mhz 20-1000 Mhz 1-200 Mhz
ESD EN 61000-4-2 (external)  ISO TR 10605			8 15 4	kV kV kV	contact air

### Environmental ratings, mechanical

Parameter	Limit values			Unit	Remark
	min.	typ.	max.		
Vibration IEC 68-2-64 Fh			0.4	g <sup>2</sup> /Hz	10-250 Hz
Bump IEC 68-2-29 Eb			6	ms	1000 x 3 cycles

**Environmental ratings, climate**

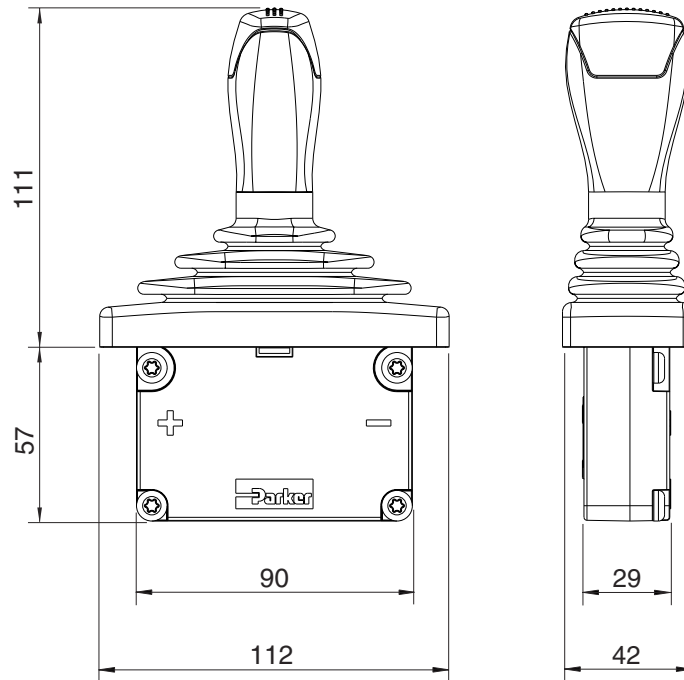
Parameter	Limit values			Unit	Remark
	min.	typ.	max.		
Water IEC 68-2-18 Rb2 (ISO529, IP66)			30	kPa	100 l/min
Humidity IEC 68-2-30 Db (damp heat, cyclic) IEC 68-2-3 Ca (damp heat, steady)			72 240	hrs hrs	25-55°C, 95%RH 44°C, 93%RH
Temperature IEC 68-2-2 Bb (heat) IEC 68-2-1 Ab (cold) IEC 68-2-14 Nb (temperature change)	-40 -40		70 70	°C °C °C	cycle 10 times in 6 hour period

**Environmental ratings, chemical**

Parameter	Limit values			Unit	Remark
	min.	typ.	max.		
Chemical IEC 68-2-52 Kb			72	hrs	salt mist, cyclic

## Appendix B

### Dimensioning of the IQAN-LSL



units=mm