IQAN-LSL
Instruction book

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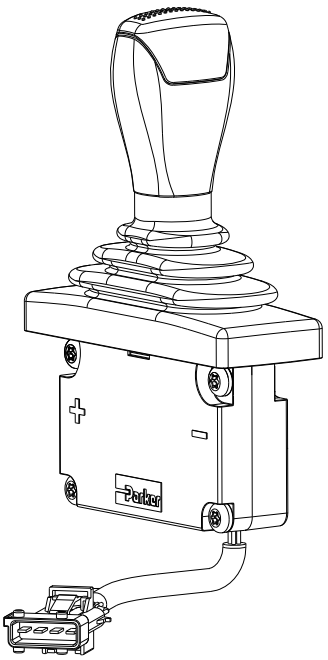


ENGINEERING YOUR SUCCESS.

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.

Safety symbols

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

The different safety levels used in this manual are defined below.

WARNING

Sections labeled *WARNING* with a caution symbol in the left margin, indicate that a hazardous situation exists. If precautions are not taken, this could result in death, injury, or property damage.

NOTICE

Sections labeled *NOTICE* with a notice symbol in the left margin, indicate there is important information about the product. Ignoring this could result in less than optimal performance, or damage to the product.

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.

WARNING

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.

WARNING

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.

WARNING

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.

NOTICE

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

WARNING

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

WARNING

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

Safety during start-up

WARNING

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.

Follow the instructions for function control in the Start-up section.

Safety during maintenance and fault diagnosis

WARNING

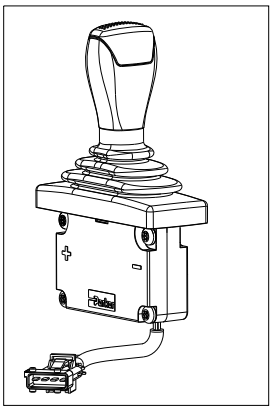
Ensure that the following requirements are fulfilled before any work is carried out on the hydraulics control electronics.

- 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.

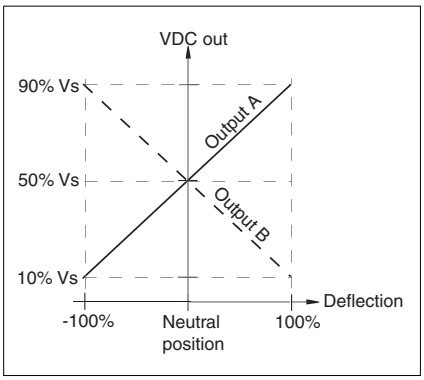
Output

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

NOTICE

In order to increase the safety of the LSL the opposing 10% - 90% V_S and 90% - 10% V_S outputs can be compared to verify center position.

With a 5 Vdc supply the outputs are typically 0,5-4,5Vdc and 4,5-0,5Vdc

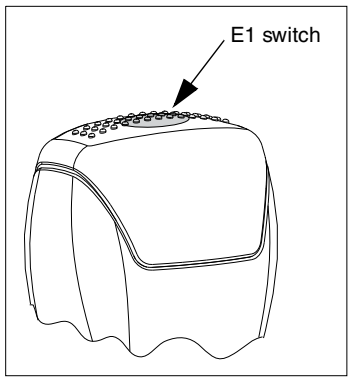


Graph showing dual outputs A and B.

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}.

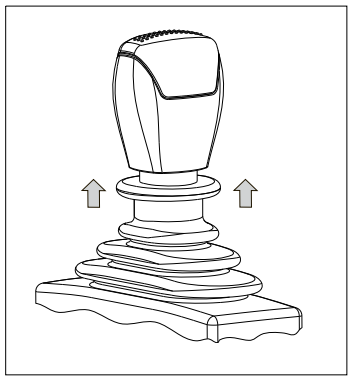
For maximum load current of switch,see Appendix A, on page 11.



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 several configurations. The **L1/L4** options have a detent in the full on minus (-) direction. The **L2/L5** options have detents in the full plus (+) and in the full minus (-) directions. The **L3** option has 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). To engage the detent function, a push/pull force needs to be applied to exceed an increase in spring force at the end of stroke. The L4/L5 has the same function as the L1/L2 option but with a higher force.

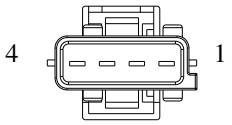
For detent activation force L1/L2 and L4/L5, see Appendix A, on page 11.

4 Installation

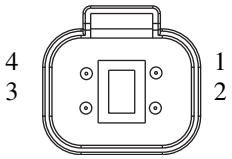
Connector C1

Connector kit	**-S (Saab, AMP/Tyco) Parker no. 5031097**	**-D (Deutsch DT) Parker no. 5031113**
Housing	Amp no. 1-963207-1	DT06-4S-C015
Plane sealing	Amp no. 963208-1	-
Pin type	Amp no. 929940-1	Deutsch 1062-16-122
Wedge	-	W4S-P012
Cable	0,75-1,0 mm²	0,75-1,0 mm²
Wire seals	Amp no. 828904-1	-
Plugs, empty pos.	Amp no. 828922	Deutsch no. 11431
IQAN crimping tool references	Red handle, pos. A Yellow extraction tool	-
IQAN tool kit	**Parker no. 5031061**	**-**

-S



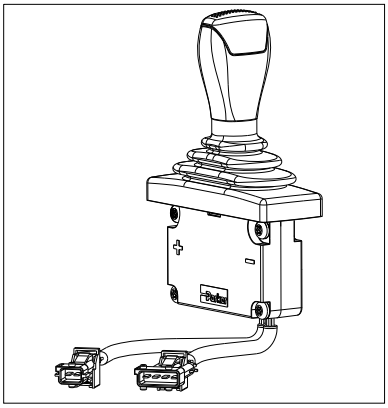
-D



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

Pos	**Signal name**
1	GND
2	V_S (+5Vdc)
3	VOUT-A
4	VOUT-B

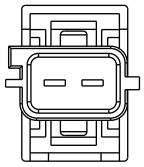
The IQAN-LSL has more than one cable depending on the specified options. When the -S connector type is specified, the additional cable for the switch or electrical detent option will have a 2 position Saab, AMP/Tyco connector. When the -D connector type is specified, the appropriate number of pin positions Deutsch DT housing will be used.



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

Connector C2, -S Saab, AMP/Tyco (option E1, switch or Lx, detent)

Connector kit	**Parker no. 5031098**
Housing	Amp no. 1-963210-1
Plane sealing	Amp no. 963209-1
Pin type	Amp no. 929940-1
Cable	0,75-1,0 mm²
Wire seals	Amp no. 828904-1
Plugs (empty pos.)	Amp no. 828922
IQAN crimping tool references	Red handle, pos. A use Yellow extraction tool
IQAN tool kit	**Parker no. 5031061**

2  1

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

E1 pin definitions

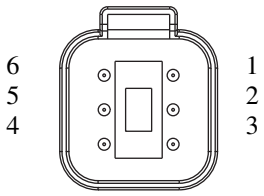
Pos	Signal name
1	DOUT
2	$VBAT_{SW}$ (+12V, +24V)

Detent pin definitions

Pos	Signal name
1	-BAT (GND)
2	$VBAT_{DT}$ (+24V only)

Connector C1 -D Deutsch (option E1, switch or Lx, detent)

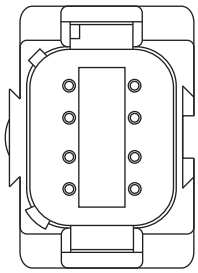
Connector kit	**-D (Deutsch DT) Parker no. 5035014**
Housing	DT06-6S-CE06
Pin type	Deutsch 1062-16-122
Wedge	W6S-P012
Cable	0,75-1,0 mm² (18AWG)
Plugs (empty pos.)	Deutsch no. 11431



Pos	**E1 Signal name**	**Pos**	**Lx Signal name**
1	GND	1	GND
2	V_S (+5Vdc)	2	V_S (+5Vdc)
3	VOUT-A	3	VOUT-A
4	VOUT-B	4	VOUT-B
5	DOUT	5	-BAT (GND)
6	$VBAT_{SW}$ (+12V, +24V)	6	$VBAT_{DT}$ (+24V only)

Connector C1 -D Deutsch (options E1, switch and Lx, detent)

Connector kit	**-D (Deutsch DT) Parker no. 5035015**
Housing	DT06-08SA-CE06
Pin type	Deutsch 1062-16-122
Wedge	W8S-P012
Cable	0,75-1,0 mm² (18AWG)
Plugs (empty pos.)	Deutsch 11431



Pos	**Signal name**
1	GND
2	V_S (+5Vdc)
3	VOUT-A
4	VOUT-B
5	DOUT
6	$VBAT_{SW}$ (+12V, +24V)
7	-BAT (GND)
8	$VBAT_{DT}$ (+24V only)

Appendix A

IQAN-LSL Technical Overview

Absolute maximum ratings

T_A = +25 °C (unless otherwise specified)

Parameter	Limit values			Unit	Remark
	min.	typ.	max.		
Operating ambient temperature, T_A Storage temperature	– 40 – 40		+70 +100	°C	
Voltage supply, V_S	4,5	5,0	5,5	V	
Over voltage			11,0	V	Max. 10 min.
Sensor output			11,0	V	Max. 10 min.

Environmental ratings

Parameter	Remark
EMI ISO 14982:1998, Radiated emission EN 55022:1998, Conducted emission ISO 11452-2:1995, Radiated Susceptibility ISO 11452-4:1995, Conducted Susceptibility ISO7637-3, Conducted transient susceptibility on signal EN 61000-4-8, Magnetic immunity	 30-1000 MHz 0.15-30 MHz 20-1000 MHz 1-200 MHz 80 V 100 A/m, 50Hz and 16,7 Hz
ESD EN 61000-4-2 (external) ISO TR 10605, ESD	 15 kV air 8 kV contact 4 kV connector pin
Mechanical environment IEC 60068-2-64 Fh, Vibration IEC 60068-2-29 Eb, Bump	 0,1 g²/Hz 10-250 Hz 40 g 6 ms, 1000 x 3
Climate environment IEC 60068-2-1 Ab, cold IEC 60068-2-2 Bb, heat IEC 60068-2-3 Ca, damp heat, steady IEC 60068-2-14 Nb, temperature change IEC 60068-2-18 Rb2, ISO529, IP65 (’DN’ option, IP44) IEC 60068-2-30 Db, damp heat, cyclic	 16 hrs, -40°C 72 hrs, 70°C 240 hrs, 44°C, 93%RH 60 hrs, -40 - 70°C in 10 cycles 12,5 l/min, 30kPa, 3 min. 72hrs, 25-55°C, 95%RH
Chemical environment IEC 60068-2-52 Kb, salt mist, cyclic	 72 hrs, 25 - 55°C

Operating

-40 °C < T_A < +70 °C, V_S = 5,0V (unless otherwise specified)

Parameter	Limit values			Unit	Remark
	min.	typ.	max.		
Operating ambient temperature, T_A	– 40		+70	°C	
Voltage supply DOUT switch	9		34	V	
Voltage supply detent	24		34	V	
Start-up delay		7.5		ms	power to activated output
Current consumption	11	16	21	mA	

I/O

-40 °C < T_A < +70 °C, V_S = 5,0V (unless otherwise specified)

Parameter	Limit values			Unit	Remark
	min.	typ.	max.		
Signal range low	0,42	0,50	0,58	V	
Signal range center	2,42	2,50	2,58	V	
Signal range high	4,42	4,50	4,58	V	
Linearity error		3		%	
Resolution		4096		steps	(1,25mV)
Response time		6		ms	
Load, resistive	4.5			kΩ	
Load, capacitive			1	µF	
Load current DOUT switch			200	mA	

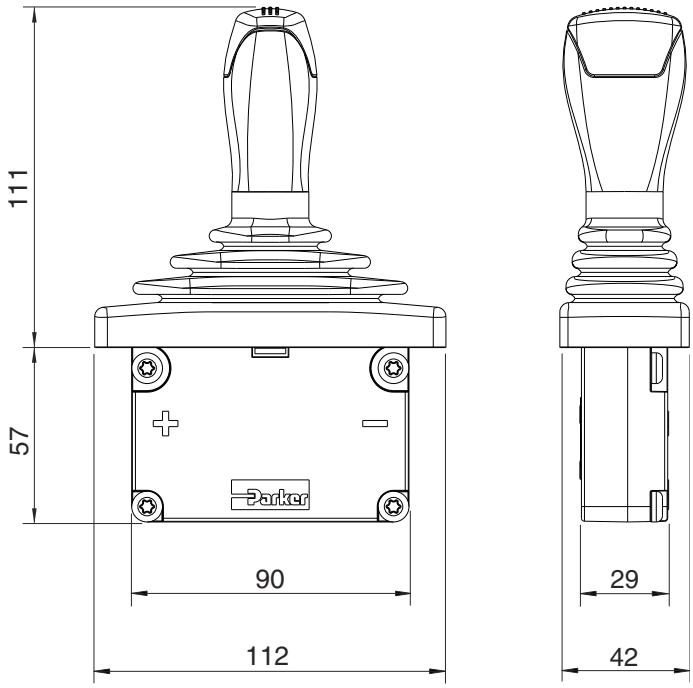
Mechanical ratings

-40 °C < T_A < +70 °C, V_S = 5,0V (unless otherwise specified)

Parameter	Limit values			Unit	Remark
	min.	typ.	max.		
Breakout force		0,2		N	At top of handle
Operating force		0,39		N	Full deflection, at top of handle
Applied force			250	N	100mm from ctr.
Applied force electrical detent L1/L2/L3 L4/L5			 0.3 0.5	N	Activation force of electrical detent function
Angle of movement		±20		°	
Expected life -base -electrical detent		 $5x10^6$ $2x10^6$		cycle	one cycle is: Neutral to full + direction to neutral to full - direction and back to neutral
Weight		250		g	excl. cabling

Appendix B

Dimensioning of the IQAN-LSL



units=mm

For latest information visit our website www.iqan.com

Information in this instructionbook is subject to change without notice

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