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# IQAN-LSL Input Devices

Electronic Control Systems



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**Application**

The IQAN-LSL is a lever in the IQAN product group. This lever focuses on compact design, weather resistance and safety.

The LSL is a single-axis joystick, 0.5 - 4.5 Vdc, intended for the proportional control of one double-acting hydraulic function. The lever has several options including a manual neutral detent and a switch in the top of the handle. For 24V systems there are solenoid detent options at full stroke in either the B (minus) direction or both A (plus) and B (minus) directions. A solenoid detent at 75% in the B (minus) direction is also available. The LSL can be mounted in the armrest or on the dashboard in mobile vehicles. It has a comfortable grip and is easily actuated for good ergonomics.

**Design and function**

The IQAN-LSL is lightweight with small installation dimensions. The ergonomic design gives a good support to the arms and wrists and assures a comfortable grip from several angles. Mounting screws are installed from underneath for a clean appearance of dashboard, panel or armrest.

The IQAN-LSL has an IP65 rating above the flange and the cable has a choice of either a Saab sealed AMP junior-power timer connector or a Deutsch DT series transportation connector. This unit is designed for the outdoor environment.

The IQAN-LSL is a spring centered, dual sensor device. The optional switch in the top of the handle can be used to detect operator presence. For different application needs there are two options for the locking force of the electrical detent function. The higher locking force detent version has a stronger pre-feeling resistance for operator detection of the lever stroke condition. The dual sensors provide 0.5 - 4.5 Vdc and 4.5 - 0.5 Vdc outputs which allows error checking to meet high safety requirements. All inputs and outputs are protected against short circuit to ground. The LSL is well suited as a control unit for a variety of valve drivers. The LSL fits to the IQAN platform and is designed to meet typical environmental stresses in mobile hydraulic applications.

**General**

Weight	0.22 Kg
Rated power supply ( $V_s$ )	5 Vdc
Load resistive (min.)	4.5K $\Omega$
Load capacitive (max.)	1 $\mu$ F
Current consumption	16 mA

**Mechanical**

Angle of movement	$\pm 20^\circ$
Expected life (operations)	5 million
Detented versions (Lx)	2 million

**Environment**

Operating temperature	-40° to 70 °C
Sealing above the flange	IP65
Sealing with DN option	IP44

**Analog outputs**

Active range (VDC out)	10%-90% $V_s$
Resolution	<2 mV

**Digital output option**

Handle switch, top	$V_{BAT}$ (+12V, +24V)
Max load current, DOUT	200 mA

**Other options**

Mechanical detent	Neutral only
Solenoid detents	$V_{BAT}$ (+24V only)
Detent index force	
L1/L2/L3	3 N @ 100 mm
L4/L5	10 N @ 100 mm

**Connectors**

S	Saab (AMP/Tyco JPT)
D	Deutsch DT

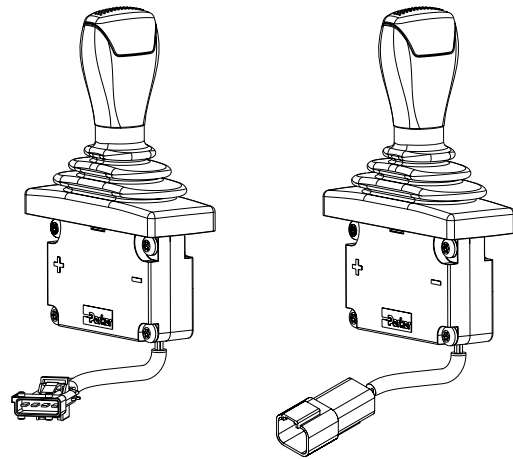
**Ordering part numbers**

IQAN-LSL-E0-//--S	20011365
IQAN-LSL-E0-//--D	20014069
IQAN-LSL-E0-DN-//S	20011366
IQAN-LSL-E0-//L1-S	20011367
IQAN-LSL-E0-//L2-S	20011368
IQAN-LSL-E0-//L3-S	20011369
IQAN-LSL-E0-//L4-D	20077714
IQAN-LSL-E0-//L5-D	20077715
IQAN-LSL-E1-//--S	20011370
IQAN-LSL-E1-DN-//S	20011371
IQAN-LSL-E1-//L1-D	20076217
IQAN-LSL-E1-//L2-D	20076218
IQAN-LSL-E1-//L3-D	20076219
IQAN-LSL-E1-//L4-D	20077706
IQAN-LSL-E1-//L5-D	20077707

## Descriptions

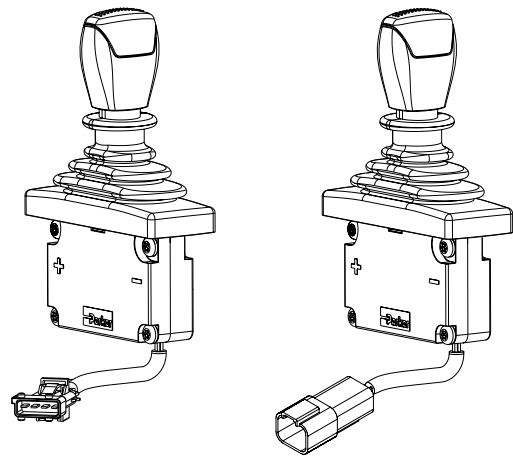
### **IQAN - LSL - E0 - // - // - /**

The basic version of the LSL has a single cable with a sealed 4 position connector. The range for Output A is 0.5 to 4.5Vdc and the range for Output B is 4.5 to 0.5Vdc.



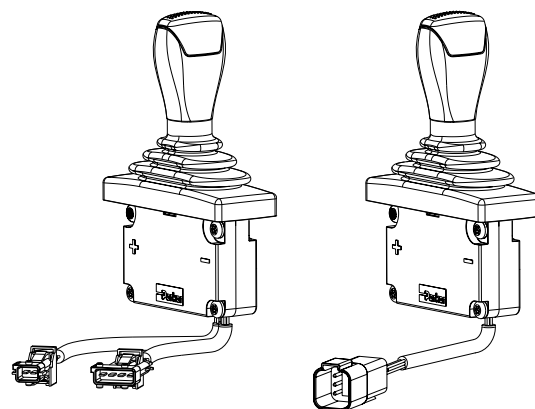
### **IQAN - LSL - E0 - DN - // - /**

This version of the LSL has a single cable with a sealed 4 position connector. The range for Output A is 0.5 to 4.5Vdc and the range for Output B is 4.5 to 0.5Vdc. There is a spring loaded manual detent that must be disengaged to move the handle away from the center (neutral) position.



### **IQAN - LSL - E0 - // - Lx - /**

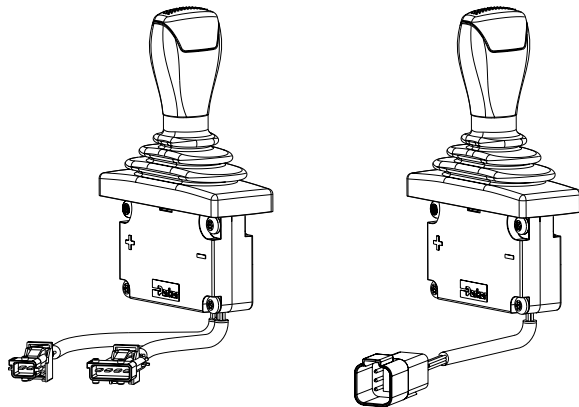
The -S version of this LSL has two cables. The main cable has a sealed Saab (AMP/Tyco JPT) 4 position connector. The second cable is for the electrical detent option and has a sealed Saab (AMP/Tyco JPT) 2 position connector. Two versions of locking force for the electrical detent function are offered. The range for Output A is 0.5 to 4.5Vdc and the range for Output B is 4.5 to 0.5Vdc. The electrical detent supply is from  $V_{BAT}$  (option offered in 24V only). The -D version has a single 6 position Deutsch DT connector.



## Descriptions

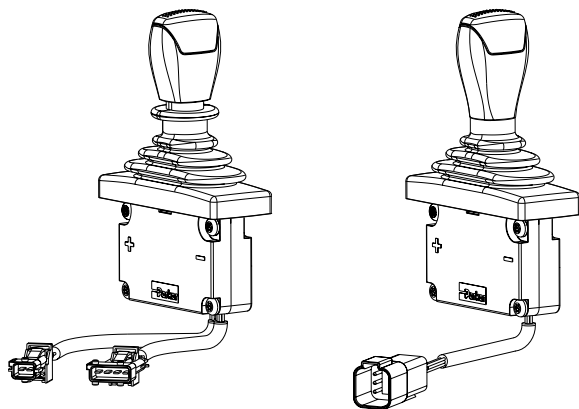
### IQAN - LSL - E1 - //-//-/

The -S version of this LSL has two cables. The main cable has a sealed Saab (AMP/Tyco JPT) 4 position connector. The second cable is for the switch option and has a sealed Saab (AMP/Tyco JPT) 2 position connector. The range for Output A is 0.5 to 4.5Vdc and the range for Output B is 4.5 to 0.5Vdc. The switch supply is from  $V_{BAT}$ . The -D version has a single 6 position Deutsch DT connector.



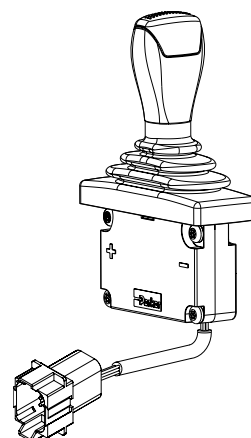
### IQAN - LSL - E1 - DN -//-/

The -S version of this LSL has two cables. The main cable has a sealed Saab (AMP/Tyco JPT) 4 position connector. The second cable is for the switch option and has a sealed Saab (AMP/Tyco JPT) 2 position connector. The range for Output A is 0.5 to 4.5Vdc and the range for Output B is 4.5 to 0.5Vdc. There is a spring loaded manual detent that must be disengaged to move the handle away from the center (neutral) position. The -D version has a single 6 position Deutsch DT connector.



### IQAN - LSL - E1 - //-Lx - D

This type of LSL is only available in the -D version. The cable has a sealed 8 position Deutsch DT connector. 4 positions are used for the lever power supply and outputs. The other 4 positions are for the switch and electrical detent options. The switch and the detent each use 2 positions in the connector. The range for Output A is 0.5 to 4.5Vdc and the range for Output B is 4.5 to 0.5Vdc. Two versions of locking force for the electrical detent function are offered. The switch supply is from  $V_{BAT}$  and the electrical detent supply is from  $V_{BAT}$  (option offered in 24V only).



**Model code**

**IQAN - LSL - E0 - // - // - /**

Code	Description
<b>E0</b>	standard handle
<b>E1</b>	handle w/ button

Code	Description
<b>DN</b>	Detent, neutral
<b>//</b>	no option

Code	Description
<b>S</b>	Saab (AMP/Tyco JPT)
<b>D</b>	Deutsch DT

**Note:**

Not all option combinations are supported with ordering part numbers. The most commonly requested models are available for ordering.

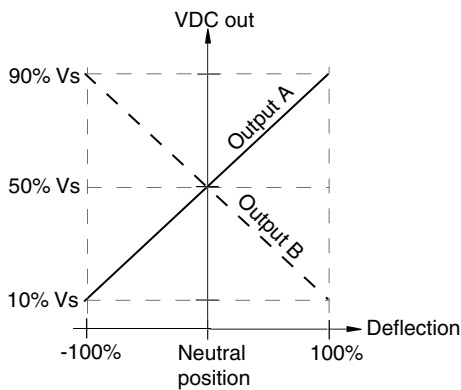
Code	Description
<b>L1</b>	1 solenoid detent, (-) direction std. force
<b>L2</b>	2 solenoid detents, (+) and (-) std. force
<b>L3</b>	1 solenoid detent, (-) direction, 75% std.
<b>L4</b>	1 solenoid detent, (-) direction high force
<b>L5</b>	2 solenoid detents, (+) and (-) high force
<b>//</b>	no option

## Outputs

The graph below demonstrates the mirrored voltage outputs. Output A is 10% - 90%  $V_s$  and Output B is 90% - 10%  $V_s$ .

With a nominal 5Vdc supply, the range for Output A is 0.5 to 4.5Vdc and the range for Output B is 4.5 to 0.5Vdc.

**Deflection vs. output diagram**



## Environmental Protection

### EMI

ISO 14982:1998, Radiated emission  
EN 55022:2003, Conducted emission  
ISO 11452-2:1995, Radiated Susceptibility  
ISO 11452-4:2001, Conducted Susceptibility  
ISO7637-3:1995, Conducted transient susceptibility  
EN 61000-4-8:, Magnetic immunity

### ESD

EN 61000-4-2, external  
ISO TR 10605:2001, ESD

### Mechanical environment

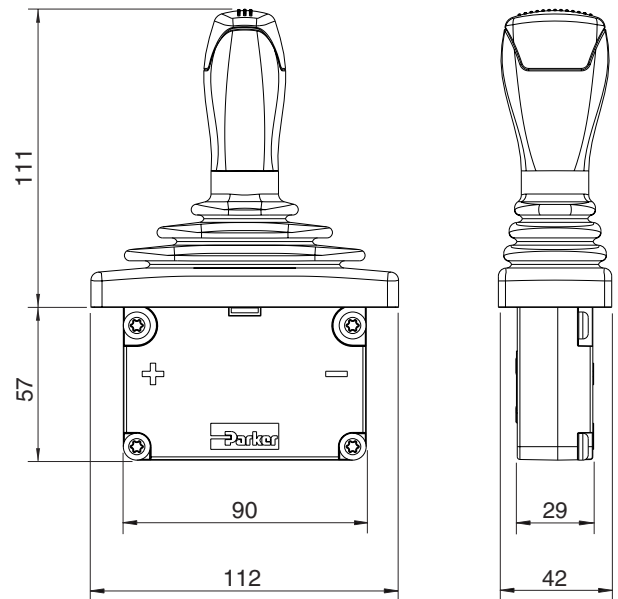
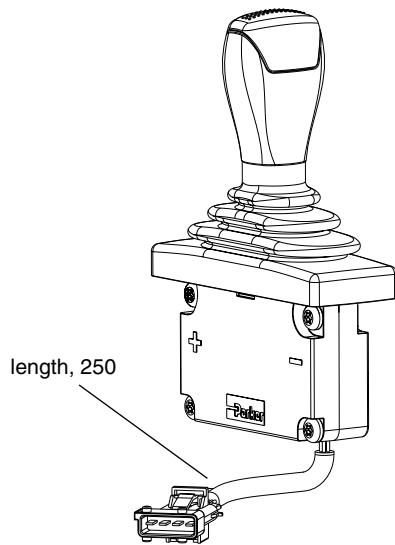
IEC 60068-2-64:1993 Fh, random  
IEC 60068-2-29:1987 Eb, bump

### Climate environment

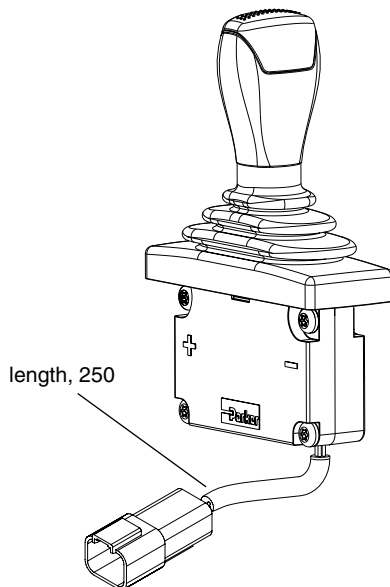
IEC 60068-2-1:1993 Ab, cold  
IEC 60068-2-2:1993-01 Bb, heat  
IEC 60068-2-3 Ca, damp heat, steady  
IEC 60068-2-14:1984 Nb, temperature change  
IEC 60068-2-18 Rb2, ISO529, IP65  
IEC 60068-2-30:1985 Db, damp heat, cyclic

### Chemical environment

IEC 60068-2-52:1996 Kb salt mist, cyclic



unit = mm



## **WARNING**

**FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.**

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