NORISYS 4 LS4
Control Lever System

- Single lever and double lever setups
- Several available scales, separated for both handles
- LED band for position indication of active lever for each handle
- Optional electrical shaft functionality for each handle with force feedback
- 2 separated CANbus interfaces (option)
  (CAN1 can be configured as RS-232/RS-485 interface)
- 1 RS-485 interface (optional)
- 1 scale illumination input (dimmable)
- 2 digital inputs, galvanically isolated (optional)
- 2 analogue outputs 4 ... 20 mA (one for each handle, optional)
- Extended operating temperature range -25°C ... +70°C
- IP56 front side

Control lever system NORISYS4 LS4

Application range

The NORISTAR control lever system is designed for ship propulsion plant applications in accordance to marine certification requirements. The lever can be equipped in three levels, starting from a mechanical setup with potentiometric signal outputs, basic electronic equipment with analogue standard signal output 4 ... 20 mA for each handle and as full electric version with integrated data interface and optional electrical shaft system onboard.

Description

In relation to its area of application the lever can be equipped as single or double lever as well as control lever chain. The portfolio of standard and customer-specific scales matches a wide range of applications. Direct wiring of standard industrial signal cables is provided by 2.5 mm² terminal blocks. The design as a plug-and-play component in the basic and full electronic version requires no calibration handling on customer side. The full electronic version is equipped with a high performance ARM processor, which calculates the handle positions, controls the integrated LED band as well as the stepper motors of the optional electrical shaft system and powers the data interfaces. The integrated LED band for each handle is a precise visualisation to indicate the current position of the active control lever and to support the operator during control position transfer. An optional electrical shaft system provides automatic alignment of each handle according to the position of the active control lever in the network. The ESS option uses the existing network interconnection between all levers and the remote control system and requires no separate control hardware.

Interconnection

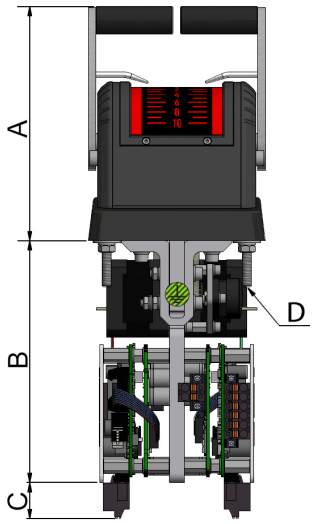
The full electronic version is equipped with several data interfaces as well as analogue standard signal outputs. The full electronic equipped control lever can be interconnected to an automation system via redundant or single CANbus as well as by using the integrated RS-485 interface with Modbus-RTU or NORISYS 4 ExtBus protocol. The electronic control lever can be used as gateway to add NORISYS 4 and NORISTAR 4 extension units to an automation system. All versions provide a signal output for each handle, positioning indication and dimming of the scale illumination. The data interfaces are short-circuit proved and 24 V protected.

Mechanical Versions

The mechanical design allows a setup of several application specific versions. The lever can be equipped as single and double handle. For main propulsion systems a base socket can be used to tend the device towards the operator. For thruster applications the control lever can be mounted rotated by 90°. The handle can be mounted according to application and user requirements. For similar propulsion plants it is possible to establish a control lever chain by connecting the control levers with a reversible mechanical linkage.

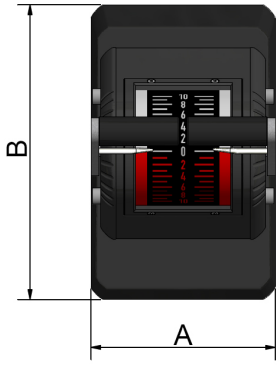
Dimensions, connections and drawings

Device dimensions



Explanation to the left illustration (side view)

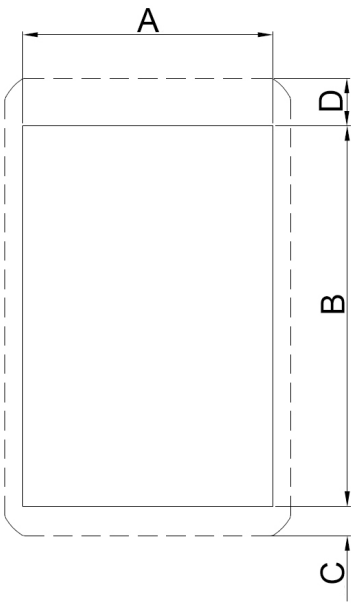
A) Length 128 mm
B) Length 132 mm
C) Length 20 mm
D) Thread M5, length 25 mm



Explanation to the left illustration (above view)

A) Length 96 mm
B) Length 154 mm

Desk cut-out



Explanation to the left illustration

A) Length 84 mm
B) Length 128 mm
C) Length 10 mm
D) Length 16 mm

NORIS Automation GmbH | Friedrich Barnewitz Str. 10 | 18119 Rostock | Germany | Tel: +49 381 519 944-0 | Fax: +49 381 519 944-4
sales@noris-automation.de | www.noris-group.com

Technical data

Connection	
Supply voltage	U_{nom} 24 VDC, 18 ... 32 VDC
Current consumption	0.15 ... 1.5 A according to level of equipment
Reverse voltage protection	Integrated
Over voltage protection	Integrated

Interfaces	
CANbus (optional)	2 x
RS-485 (optional)	1 x, galvanically isolated
Electrical connections	Terminals for cable profile 2.5 mm^2

In-/Output	
Digital inputs	1 x Input, 1x Output, galvanically isolated
Illumination regulation input	For conventional 24 VDC PWM dimmer or 0 ... 24 VDC

Environmental influences	
Operating temperature	DIN IEC 60068-2-2 and DIN IEC 60068-2-1: -25°C ... +70°C
Climatic test	DIN IEC 60068-2-30 Db
Storage temperature	DIN IEC 60068-2: -40°C ... +85°C
Vibration resistance	DIN IEC 60068-2-6 Fc: ±1.0 mm @ 2 ... 13.2 Hz, ±0.7 g @ 13.2 ... 100 Hz
Degree of protection	DIN EN 60529: IP56 front side
ESD	IEC 61000-4-2: ± 6 kV/Contact Discharge; ± 8 kV/Air Discharge
HF-interference immunity	IEC 61000-6-2; IEC 61000-4-3, -4-4, -4-5, -4-6
Interference emission	IEC 61000-6-4; CISPR16-1, CISPR16-2, EMC 1

Mechanical dimensions	
Material	Enclosure: PUR, AlMg3
Mounting	Console mounting
Installation position	None
Dimensions	96 x 154 x 280 mm (152 mm under floor)
Weight	1.8 kg - 2.4 kg according to level of equipment

Other	
ESS	Optional electrical shaft system with separate 24 VDC power supply
Approvals	CE, BV, DNV GL, LR, NKK, KR

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Type code

Type code structure LS…							
	LSN4	**-FWD**	**-L0-10 / R10-0-10**	**-ORD1**	**-E1**	**-IL1**	**-ESS**
	Base type						
		Scale orientation					
			Scale design				
				Scale subdesign			
					Signal processing		
						Illumination	
							Options

Type code LS…								
Base type	**LS4**	Single lever						
	LSN4	Double lever for two demands, handled by one signal processing electronic						
	LSD4	Double lever for two demands, handled by separated signal processing electronic						
Scale orientation		**-FWD**	Forward oriented installation					
		-AFT	Astern oriented installation					
Scale design			**-0-10**					
			-10-0-10					
			-L0-10 / R10-0-10					
			-L10-0-10 / R0-10					
Scale subdesign					Without code: no extra scale design is used			
				-ORD	Scale design with order steps (*)			
Signal processing					**-E1**	Signal processing electronic, 2 x CANbus, 2 x 4 … 20 mA OUT, 2 x Digital IN, 1 x PWM IN, LED band		
					-E2	Signal processing electronic, 2 x CANbus, 1x RS-485, 1 x Digital IN, 1x Digital OUT, 1 x PWM IN, LED band		
Illumination						**-IL1**	Scale with backlight and position indicator	
Options							**-ESS**	Electrical shaft system; detents are to be defined during order
							-MLP	Mechanical lock points; detents are to be defined during order (not applicable with ESS option)
							-MHL	Mechanical handle linkage (with MLP only)
	LSN4	-_ _ _	-_ _ __ _ _	-_ _ _	-_ _	-_ _ _	-_ _ _	**Example: LSN4-FWD-L0-10 / R10-0-10-E1-IL1-ESS**

* Order steps: MAX. AHEAD, FULL AHEAD, HALF AHEAD, SLOW AHEAD, DEAD SLOW AHEAD, ZERO, DEAD SLOW ASTERN, SLOW ASTERN, HALF ASTERN, FULL ASTERN, MAX. ASTERN

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