MAKING MODERN LIVING POSSIBLE

Technical Information

PLUS+1® Compliant
CLS1000 Laser Receiver

Revision History

Table of Revisions

Date	Changed	Rev
07 January 2014		AA

Contents

Product Overview

The CLS1000 Laser Receiver is a machine control sensor which is ideal for control systems that provide automated grade leveling for mobile machine applications when paired with a standard rotating laser.

Features and Options

- Illuminated Display
- Range up to 800 m (0.5 mi)
- Designed to withstand the mobile environment
- PLUS+1® Compliant GUIDE function block available
- CAN 2.02 B compliant
- Input pin for use of multiple sensors on a single CAN bus
- 9 to 36 Vdc power supply
- CE Compliant

Theory of Operation LED laser strike

The Laser Deviation CAN message is initiated by a rotating transmitter laser beam striking the CLS1000 Laser Receiver, repeating for each rotation. The CLS1000 Laser Receiver has a bright LED display which indicates laser strike deviation from the center of the sensor (default) or the LED deviation display can be customized by CAN messages from the system.

The LED display will automatically indicate proportional laser strike deviation from the center of the sensor over a fixed window. The system developer can customize the LED display flash rate and window size by writing LED Display CAN messages.

User Liability and Safety Statements - OEM User Liability and Safety Responsibility

The OEM of a machine or vehicle in which PLUS+1™ compliant product is installed has the full responsibility for all consequences that might occur. Danfoss has no responsibility for any consequences, direct or indirect, caused by failures or malfunctions.

- This product is not intended to be used as a stand-alone safety device in safety critical applications.
- Danfoss has no responsibility for any accidents caused by incorrectly mounted or maintained equipment.
- Danfoss does not assume any responsibility for products being incorrectly applied or the system being programmed in a manner that jeopardizes safety. All safety critical systems shall include an emergency stop to switch off the main supply voltage for the outputs of the electronic control system.
- All safety critical components shall be installed in such a way that the main supply voltage can be switched off at any time. The emergency stop must be easily accessible to the operator.

Ordering Information

Part Number Quick Reference

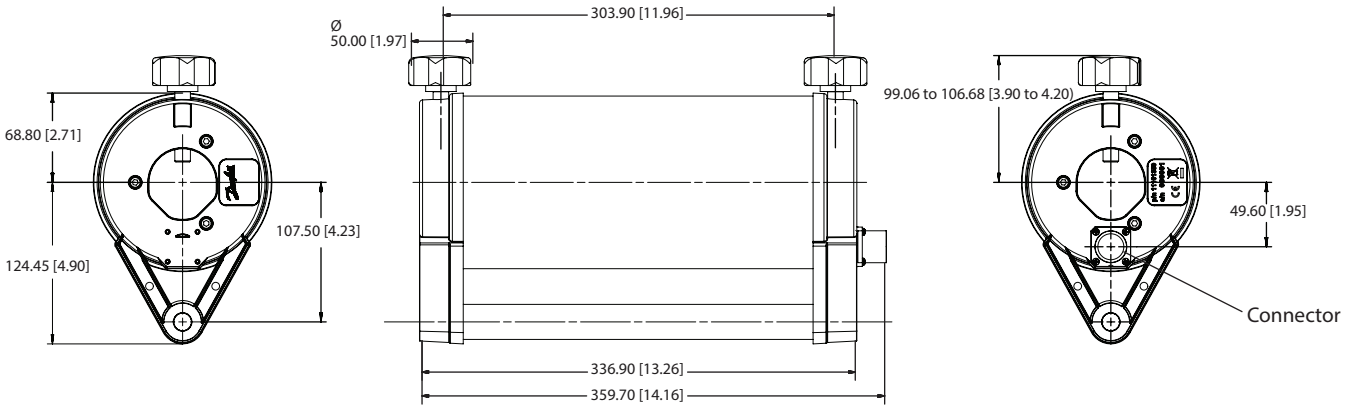
Part number	Supply voltage	Connector
11101359	9 to 36 Vdc	6 pin

Related Product

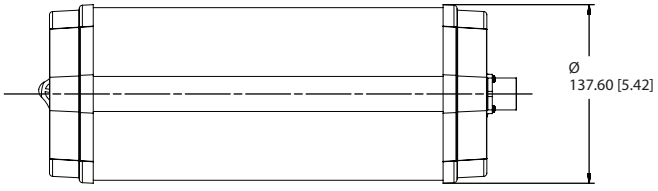
Part number	Description
11031032	Mating connector

Dimensions

Millimeters [Inches]



Mounting Pole diameter:
44.45 to 50.8 mm [1.75 to 2.0 in]

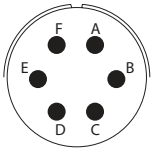


Caution

This device is not field serviceable. Opening the device housing will void the warranty.

Connector Pin Assignments

6 pin Connector



Pinout and Wiring Information

Pin	Controller function
A	Power
B	Ground
C	CAN Hi
D	CAN Lo
E	Config
F	CANshield

Use care when wiring mating connector. Above pinouts are for device pins.

Specifications

Supply voltage	9 to 36 Vdc
Operating temperature range	-20° to 70° C (-4° to 158° F)
Storage temperature range	-40° to 85° C (-40° to 185° F)
Horizontal reception angle	360 degrees
Vertical reception height	250 mm (9.84 in)
Operating range	800 m (0.497 mi)
Center resolution	< 1 mm (< 0.039 in), Up to 800 mm (31.50 in)
IP rating	IP 67
Weight	3.1 kg (6 lbs)

May be customized with LED Display control message.

Automatic Error Symbol Range

Automatic Error Symbol	Automatic Error Indicator	Range (mm)
	Out of range up	120 mm +
	Large up - large arrow up	60 to 120 mm
	Small up - small arrow up	5 to 60 mm
	On grade - straight line	± 5 mm
	Small down - small arrow down	-5 to -60 mm
	Large down - large arrow down	-60 mm to -120 mm
	Out of range	-120 mm -

Wiring Guidelines

- Protect wires from mechanical abuse, run wires in flexible metal or plastic conduits.
- Use 85˚ C (185˚ F) wire with abrasion resistant insulation and 105˚ C (221˚ F) wire should be considered near hot surfaces.
- Use a wire size that is appropriate for the module connector.
- Separate high current wires such as solenoids, lights, alternators or fuel pumps from sensor and other noise-sensitive input wires.
- Run wires along the inside of, or close to, metal machine surfaces where possible, this simulates a shield which will minimize the effects of EMI/RFI radiation.
- Do not run wires near sharp metal corners; consider running wires through a grommet when rounding a corner.
- Do not run wires near hot machine members.
- Provide strain relief for all wires. Avoid running wires near moving or vibrating components.
- Avoid long, unsupported wire spans. Power the analog sensors by the sensor power source from the module and ground returned to the sensor ground pin on the module.
- Twist sensor lines about one turn every 10 cm (4 in).Use wire harness anchors that will allow wires to float with respect to the machine rather than rigid anchors.
- Ground electronic modules to a dedicated conductor of sufficient size that is connected to the battery (-).

Welding Procedures

The following procedures are recommended when welding on a machine equipped with modules:

1. Turn the engine off.
2. Disconnect the negative battery cable from the battery.
3. Do not use electrical components to ground the welder.
4. Clamp the ground cable for the welder to the component that will be welded as close as possible to the weld.

Using the Sensor's Configuration Input Pin to Set the Source Address

The device has one configuration input to set the Source Address, SA, which is capable of detecting up to 32 distinct SAs. The input can be connected directly to ground (SA 0), left floating (SA 31) or connected to ground through 1 of 30 different resistor values (SA 1-30).

Configuration Input Resistor Selection Table

SA (dec)	Resistor
0	0
1	76.8
2	162
3	249
4	340
5	442
6	562
7	665
8	806
9	931
10	1100
11	1270
12	1430
13	1650
14	1870
15	2150
16	2430
17	2740
18	3160
19	3570
20	4120
21	4750
22	5490
23	6490
24	7680
25	9310
26	11500
27	14700
28	19600
29	28700
30	51100
31	open

The SA input is only checked during start-up. In order to change the SA values, the device must be powered up with the SA input in the desired SA. Any changes made to the SA input while the device is powered are ignored.

CAN Communication

Baud Rate	Up to 1M
Termination	No internal, 250 kBaud only, no up to 1Meg

All communication for the Laser Receiver is through a proprietary protocol.

PGN/ID Summary

PGN Type	Transmit/Receive	PGN (d)	ID (d)	ID (h)
Laser Leveling PGN	Transmit	65141	65141 + (0 – 255)	0x0CFE75SA
LED Display control PGN	Receive	65142	65142 + (0 – 255)	0x10FE76SA

SA is the source address which can be selected through a configuration resistor, as detailed in SA Resistor Configuration table shown above.

Transmission Rate	20 ms
Data Length	3
PGN	65141
Laser Leveling Identifier	0x0CFE75SA

Byte	**1**	**2**	**3**
Bit(s)	1-8	1-8	1-8
Description	Laser Strike Vertical Deviation		Laser Receiver status message
Type	U16		U8
Data Range	0x0000 – 0xFFFF -32,000 Offset: 0x0000 = -3,200 mm		0 - reserved 1 - receiving laser in range 2 - have not seen laser 3 - laser went out of range, high 4 - laser went out of range, low 5 - sensor fault
Units	mm x 10		NA
Resolution	0.1 mm		NA

Receive Rate	1 per 250 to 500 ms*
Data length	1
PGN	65142
LED Display Control Identifier	0x10FE76SA

* Custom LED messages must be sent faster than 500 mS or the display will default to the automatic display mode.

Byte	1
Bit(s)	1-8
Description	LED Display Data
Type	S8
Data Range**	-4 – Out of range down -3 – Large down -2 – Medium down -1 – small down 0 – On grade, middle bar 1 – Small up 2 – Medium up 3 – Large up 4 – Out of range up 9 – Lost laser
Units	NA
Resolution	NA

** Writing any other value will blank the LED display: useful for turning off the display or blinking the display.

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L1316583 • Rev AA • Jan 2014

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