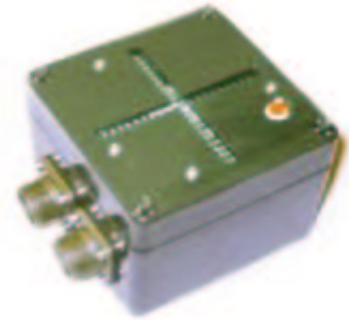


Display of angles in two perpendicular axes measured by the Inclinator MVINC-CO-2 module

Specifications

Type	2 axis LED display
Order code	MVLLD-CO-2 (2 axes)
Range	+90°...-90°
Accuracy	1.0° - Each red LED represents an error of 1 degree. Scaling of angular value received is user configurable.
Interfaces	RS-232 CAN (CANopen) Other fieldbuses on request
CAN controller	Motorola DSP56F805 Digital Signal Processor Additional 32 Kbyte external EEPROM
Operating voltage	9 – 32 VDC
Operating temperature range	-40...+85°C (-40...+185°F)
Electrical connections	2 – Four pin Canon C3102E14S-2P-F80 military style connectors
Packaging and Dimensions	Cast aluminum housing 100 x 100 x 82 mm (W x L x H) 3.93 x 3.93 x 3.23 inches
Protection Class	IP65 (IP67 available on request)

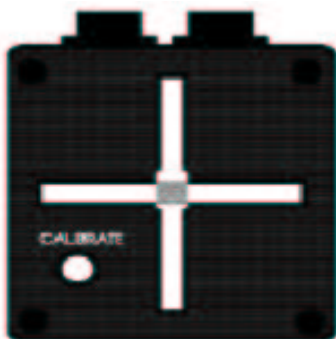


Applications

- mobile applications, vehicles, work machines
- cranes, elevators
- robotics, material handling machines

Product description

The LED Display module is a simple visual indicator for showing level. It is capable of reading angular information from CAN-bus or RS232. The standard product is designed to be used with an MVINC-CO-1(2) single or dual axis inclinometer module or the LVS series of tilt sensor modules. The LED Display module has two 20 red LED rows in a cross shape configuration with one green LED in the middle. A push button is used for calibration of the display. The display's LED pattern corresponds with the inclinometer module's 2 measurement axes. Each red LED represents an error of either 0.1, 1 or 10 degrees depending on the scaling selected during calibration via the RS232 connection.



The green LED in the middle is illuminated when the inclinometer module is in level, having a 0 degree tilt on both axis. The user may also calibrate a different inclinometer angle for a reference. *The drawing shows the measurement sensor is in level.*

The CAN bus node id is changed through the RS-232 interface using normal terminal software. CAN bus termination can be switched on by using a jumper.

The LED module is designed for harsh environments. The module is mounted in an IP65-protected case, and an IP67 version is available on request. The standard module has spring-loaded connectors inside the module case, which require no separate external connectors for wiring. The module can also be supplied with customer-specific connectors.

For information on the inclinometer module, see datasheet #TD6105MV. The inclinometer is available in 2 different versions, with one or two measurement axes. In the one axis version, the measurement range is +90...-90 degrees in one direction, and in two axes version there are two perpendicular measurement axes with the same range. The tilt sensor is described in datasheet #TD9000AX. The tilt sensor indicates out of level condition from its mounting location and drives an external valve, solenoid, relay, lamp or annunciator to shut down equipment or act as a warning system.

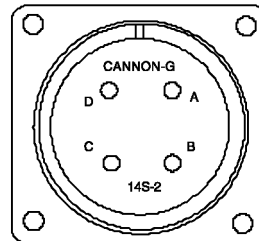
Functionality

Connection

The LED Display module has two 4-pin connectors to accept inputs from the angle sensors on the bus network (inclinometer or tilt sensor) and provide an output over the network.

Connector C3102E14S-2P-F80 (CAN + power supply) pinout:

PIN	FUNCTION
A	+24 V
B	GND
C	CAN HI
D	CAN LO



Power Up

When power is switched on the display performs a self-test. In the self-test, each LED segment is illuminated, one at a time rotating clockwise. The LED Display module will try to establish communications with the sensor module (inclinometer or tilt sensor). This is done by configuring the sensor as a heartbeat producer with an SDO message and sending an NMT (OPERATIONAL) message to the LED Display module. If this configuration is not successful, the LED Display module transfers to FAIL state. FAIL state is indicated when all the red LEDs are illuminated. If the configuration is successful, the module starts indicating the received angle information with its LED segments.

Normal Operation

The module indicated the received angle value by illuminating the equivalent number of LEDs on each axis. The angular value each LED represents can be configured (see Scaling).

Calibration

The reference level can be set during normal operation by pushing the "Calibration" button on the module for 2 seconds.

Reset

The calibration setting can be removed by pressing the calibration button continuously for approximately 5 seconds. The reset is indicated when all the red LEDs are illuminated. Upon illumination, release the calibration button which removes the calibration setting.

Communications

CANopen or RS232 are the communications media.

Scaling

The scaling of the received angular information can be selected. Suggested values include:

- 0...1 degrees > 1 LED is an angular error of 0.1 degrees
- 0...10 degrees > 1 LED is an angular error of 1 degree
- 0...90 degrees > 1 LED is an angular error of 10 degrees



The resolution setting can be changed via RS232 communications by using the standard ASCII protocol.
Type the following.

#SE0! Changes the resolution to 0...1 degrees.
#SE1! Changes the resolution to 0...10 degrees.
#SE2! Changes the resolution to 0...90 degrees.
The default resolution is 0.1 degree/LED.

Specifications are subject to change without notice.
TD6107MV-03/06/03

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