MOORE INDUSTRIES WORLDWIDE

FS FUNCTIONAL SAFETY SERIES

SLD

Functional Safety
Programmable Loop Display

April 2023

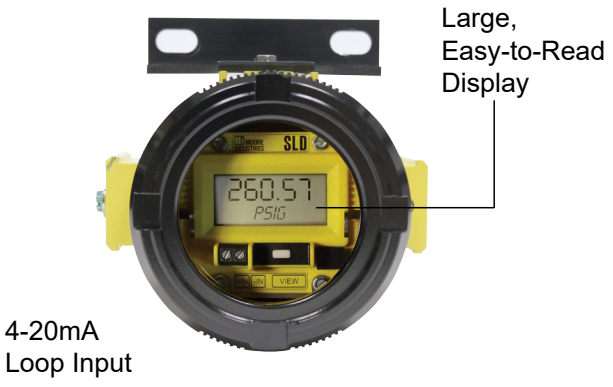
Description

Moore Industries' universal SLD PC-Programmable Functional Safety Loop Display features a large integral display that shows real-time process status in mA, percent, or any designated 5-character Engineering units (EGU). The SLD is part of Moore Industries' **FS Functional Safety Series** products. It is a SIL3 capable, non-interfering device for use in a safety loop.

The SLD Functional Safety Programmable Loop Display is the perfect solution to accurately and reliably display process status in a safety loop:

- **Displays information with phenomenal accuracy**
- **Flexible enough to mount anywhere**
- **Select a square root or linear curve from the library or quickly create a custom one**
- **Easy-to-read display with two rows of large characters**
- **DTM programmability allows the SLD to be custom scaled to display percent or scaled directly in engineering units**

Figure 1. *The SLD is available complete in our BH housing; an explosion-proof enclosure that protects your display in even the harshest field environments.*



The SLD installs easily on the loop, protected by an Explosion-Proof BH housing.

Features

- **SIL3 Capability.** The SLD is assessed for non-interference in a safety loop. (It is not SIL3 assessed to be used as part of the safety function.)
- **Easy-to-read, customizable display.** The SLD's independently configured display features two rows of large characters that can be clearly read in the field and set to display any EGU.
- **360° flexible mounting.** When placed into one of our housings, the SLD can be mounted at any angle in nearly any environment.
- **Low voltage drop.** Loop-powered by less than 2.3 Volts, the SLD can even be installed on burdened loops.
- **Loop Maintenance Zener Diode Option.** Allows the SLD to be removed from the loop for maintenance without interrupting your safety function.
- **Custom and square root curves.** Select a square root or linear curve from the library, or create your own. Use our software to input a table in one EGU and have the PC program convert it into a different EGU for display.

Certifications

ANZEx FM APPROVED CSA US Ex CE

- **RFI/EMI immunity.** The SLD is resistant to the harmful, unpredictable effects of radio frequency and electromagnetic interference.
- **Superior Accuracy.** The loop-powered SLD reads any 4-20mA signal and displays the information with phenomenal accuracy of ±0.012% of input scale.
- **Easy Calibration.** A single button on the front of the unit allows you to easily calibrate your loop by displaying the loop current in mA with three-decimal-place accuracy.
- **Superior Reliability.** Up to 5 years between scheduled calibrations.

Simple PC Setup

The SLD Functional Safety Programmable Loop Display is DTM programmable. You can program it with any FDT compliant host or program such as PACTware (Figure 2) utilizing our DTM and USB communication cable.

DTM Programmable for Fast and Accurate Configuration— Using the DTM, the SLD can either be custom scaled to display in a percent or scaled directly into engineering units for indicating any process measurements such as pressure, temperature, level, or flow. Span, zero, input range, display range, and filtering frequency can also be easily programmed. The SLD even allows the capturing of the input range limits of the loop to provide you with the most accurate display available.

FREE PACTware Configuration Software with Versatile Programming Options— Download PACTware software for FREE from our website which allows you to set up all display settings utilizing our DTM's easy to use pull down menus (Figure 2).

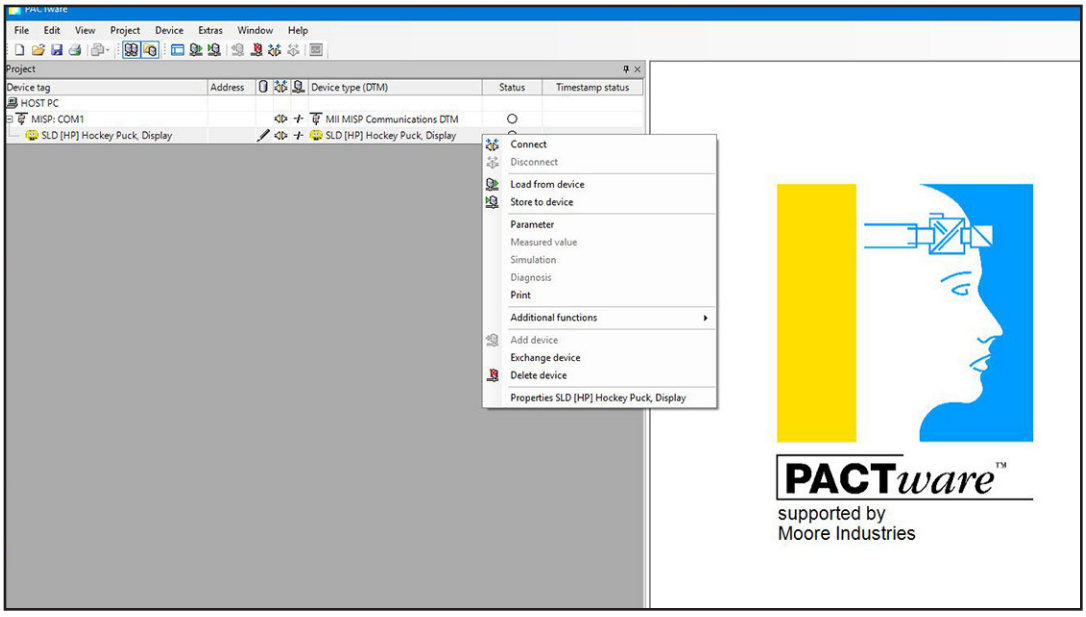
Quick Transmitter/Configuration Upload/Download— PACTware offers one button uploading and downloading of transmitter configuration.

Toolbar for Frequently Used Commands— A conveniently located toolbar provides quick access to often used configuration functions.

Real-Time Process Readout—The process measurement and the communication status between the SLD and PACTware can be viewed in a one-page window.

Store, E-mail, Download and Print Files—The configuration you've created may be downloaded to any number of transmitters, saved, e-mailed, or printed for record keeping.

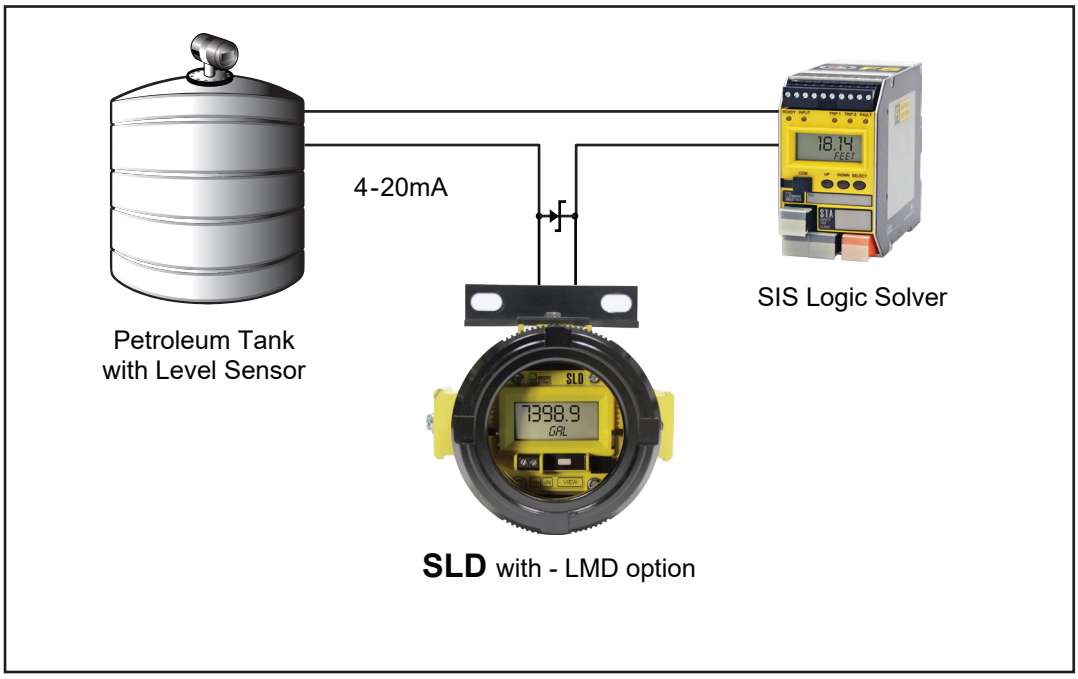
Figure 2. *The SLD provides easy software configuration with PACTware.*



Monitoring Critical Functions

The SLD, a member of the FS Series product line, is a non-interference device and can be taken out of the loop with the –LMD option (Loop Maintenance Diode) without affecting the integrity of the SIF (Safety Instrumented Function) loop. The example shown in Figure 3 demonstrates the SLD in a SIF. It is used to display a critical tank level at eye level for plant personnel.

Figure 3. *With the -LMD option the SLD can be removed from the safety loop without affecting the integrity of the SIF*



Specifications

DISPLAY	PERFORMANCE	AMBIENT CONDITION	WEIGHT
Type: LCD; Top Row, 10mm (0.4 in) high black digits on a reflective background;Bottom Row, 6mm (0.23 in) high black digits on a reflective background **Format:** Top row is five numeric characters plus sign and decimal point; Bottom row is five alphanumeric characters **Range:** -99999 to 99999 **Display Update Rate:** 100msec **Minimum Display Span:** 1.00	**Accuracy:** ±0.012% of input scale. This includes the combined effects of linearity, hysteresis, repeatability, and adjustment resolution. It does not include ambient temperature effect. **Stability:** Error is in % of maximum span: Stability / Input to Display: Year(s) 1 3 5; mA 0.08 0.14 0.18 **Resolution:** 0.0028% of input scale **Over-Current Protection:** 100mA, maximum **Display Input Overrange:** 24mA **Digital Input Filter:** User-programmable; 50 or 60Hz **Minimum Operating Current:** ≥3.8mA **Input Loop Burden:** Volt Drop: 2.3V; 5.1V with -LMD added & SLD removed. Equivalent Resistance: 115 ohms @ 20mA; 255 ohms @ 20mA with -LMD added and SLD removed.	**Operating Range:** -25°C to 85°C (-13°F to 185°F) **Storage Range:** -40°C to 85°C (-40°F to 185°F) **Relative Humidity:** 0-95%, non-condensing **Ambient Temperature Effect:** ±0.015% of span per °C change, maximum **RFI/EMI Immunity:** 20V/m@ 80-1000MHz, 1kHz AM, when tested according to IEC61000-4-3 **Common Mode Rejection:** 100dB@60Hz **Normal Mode Rejection:** 30dB@60Hz	**BH Housing:** 1.37kg (3 lbs, 1.1 oz) **HP-Style Housing:** 150g (5.3 oz) **SB Housing:** 2.6kg (7 lbs)

Ordering Information

Unit	Input	Output	Power	Options	Housings
SLD Functional Safety Loop Display	**4-20MA** Loop Input	**PRG** Programmable via FDT host with supplied DTM. Displays loop current in milliamps (MA), percent (PCT) or any other EGU of up to 5 characters in length.	**2.3VLP** Loop Powered	**-LMD** Loop Maintenance Zener Diode provided at input terminals allowing the SLD to be removed from the loop without interrupting loop continuity **-ISE:** ATEX Approved Intrinsically-Safe	**BH2NG*** (*) or (‡) Aluminum 2-Hub, Explosion-Proof enclosure with two, ½-inch NPT entry ports and a glass cover **BH2TG*** (*) or (‡) Aluminum 2-Hub, Explosion-Proof enclosure with two, ¾-inch NPT entry ports and a glass cover **BH2MG*** (*) or (‡) Aluminum 2-Hub, Explosion-Proof enclosure with two, M20 x 1.5 entry ports and a glass cover **BH3NG*** (*) or (‡) Aluminum 3-Hub, Explosion-Proof enclosure with three, ½-inch NPT entry ports and a glass cover **BH3TG*** (*) or (‡) Aluminum 3-Hub, Explosion-Proof enclosure with two, ¾-inch NPT side-entry ports, one ½-inch NPT bottom-entry port, and a glass cover **BH3MG*** (*) or (‡) Aluminum 3-Hub, Explosion-Proof enclosure with two, M20 x 1.5 side-entry ports, one ½-inch bottom-entry port, and a glass cover **HP** Hockey-puck housing and spring clips **DN** Snap-in mounting for HP case on 32mm G or 35mm Top-Hat DIN-rail **FL** Mounting flanges on HP suitable for relay track or screw mounting **FLD** Mounting flanges on HP suitable for 3½" relay track or screw mounting **SB2NG*** (*) or (‡) 316 Stainless Steel 2-Hub, Explosion-Proof enclosure with two, ½-inch NPT entry ports and a glass cover **SB2MG*** (*) or (‡) 316 Stainless Steel 2-Hub, Explosion-Proof enclosure with two, M20 x 1.5 entry ports and a glass cover * A suffix (comes supplied with 2" pipe mount hardware) **A** suffix indicates ANZEx/TestSafe (Ex d) Flameproof approvals (i.e. BH2MG**A**) ‡ **P** suffix indicates enclosure comes equipped with base plate and U-bolts for mounting on a 2-inch pipe (i.e. BH2NG**P**) See BH, SB and D-BOX Datasheets for additional information.

To order, specify: Unit / Input / Output / Power / Options [Housing]
Model Number Example: SLD / 4-20MA / PRG / 2.3VLP / -LMD [BH2NG]

FMEDA (Failure Modes, Effects and Diagnostics Analysis) Report for the SLD Safety Programmable Loop Display can be found in Section 6 of the SLD Installation Manual

Accessories

PACTware software is available for free on the Moore Industries web site. Visit www.miinet.com/pactware. Cables must be purchased separately.

Part Number	Part
804-030-26	Non-Isolated Fuse Protected USB Communication Cable (required by ATEX for products installed in Intrinsically-Safe areas)
803-040-26	Non-Isolated Serial Configuration Cable for 2-Wire Instruments

Figure 2. *Dimensions of the SLD in the BH explosion-proof enclosure.*

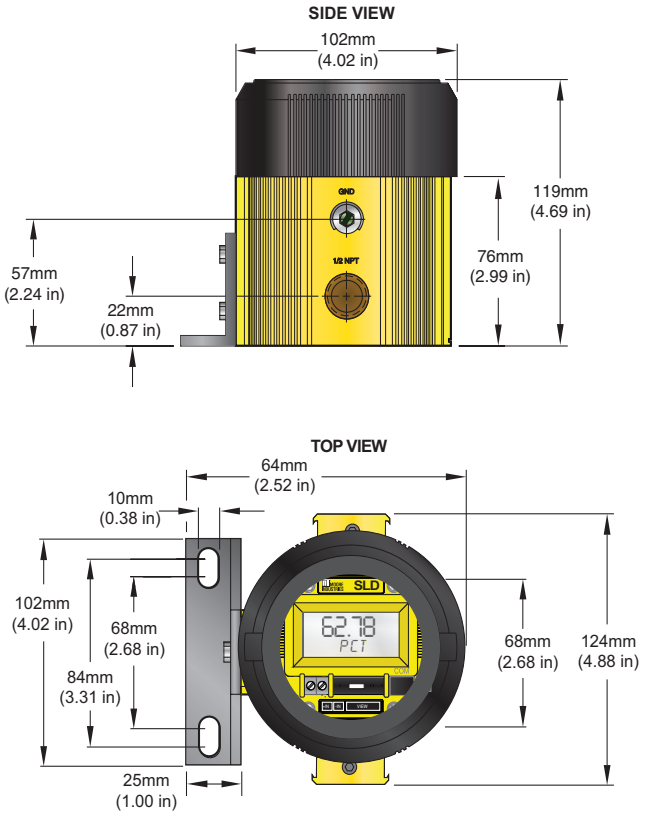
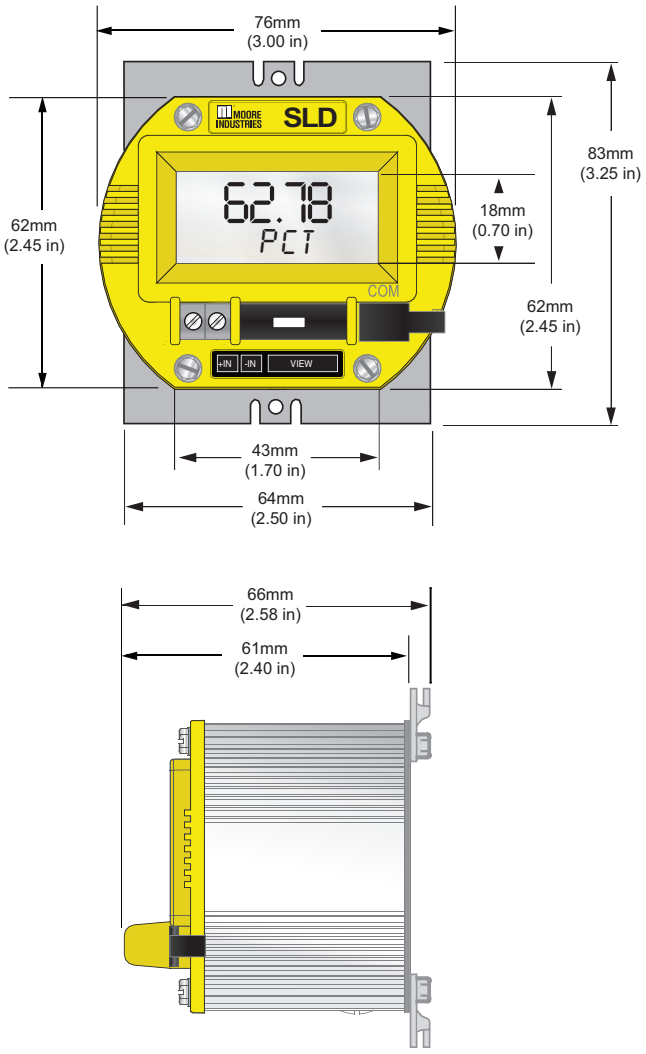


Figure 3. *Dimensions of the SLD HP housing with mounting flanges.*



Certifications

SLD-HP	SLD-HP in BH/SB2 Housing
FM Approvals (FM Global Group): **Non-Incendive** Class I, Division 2, Groups A, B, C & D **Temperature Class T4 @ 85°C Ambient**	**FM Approvals (FM Global Group):** **Explosion-Proof & Dust/Ignition-Proof** Class I, Division 1, Groups A*, B, C & D Class II & III, Division 1, Groups E, F & G **Environmental Protection:** NEMA 4X & IP66 T6 @ 60°C Maximum Operating Ambient **For Group A applications, seal all conduits within 18"*
ATEX Directive 2014/34/EU (LCIE): **Intrinsically-Safe** Ⓔx II 1G Ex ia IIC T4 Ta = 85°C **ATEX Directive 2014/34/EU (MII): Type "n"** Ⓔx II 3G Ex nA IIC T4 Ta = 85°C	**CSA Group (Canadian Standards Association):** **Explosion-Proof** Class I, Division 1, Groups A*, B, C & D Class II, III, Groups E, F & G Type 4X, IP66 Ambient Temp. Range: -20°C to +60°C; T6 **For U.S. Group A applications, seal all conduits within 18"*
CE Conformant: EMC Directive 2014/30/EU – EN 61326	**ANZEx (TestSafe):** **Explosion-Proof/FlameProof** Ex d IIC T6 (Tamb 60°C) IP66

The FS Functional Safety Series

Safeguard your processes when you need it the most. Our line of SIL 2 and 3 capable instruments include Trip Alarms, Safety Relays, Isolators, Temperature Transmitters, Frequency Transmitters, and Indicators. Each has been built to strict IEC 61508 standards, ensuring safe and reliable function – particularly in environments where hazardous or emergency situations are likely to occur.

Learn more at www.miinet.com/safetyseries or ask your rep for a copy of our Functional Safety Line Card.