Installation of Esensors IoT Interface for 4-20 Ma Loop Sensors
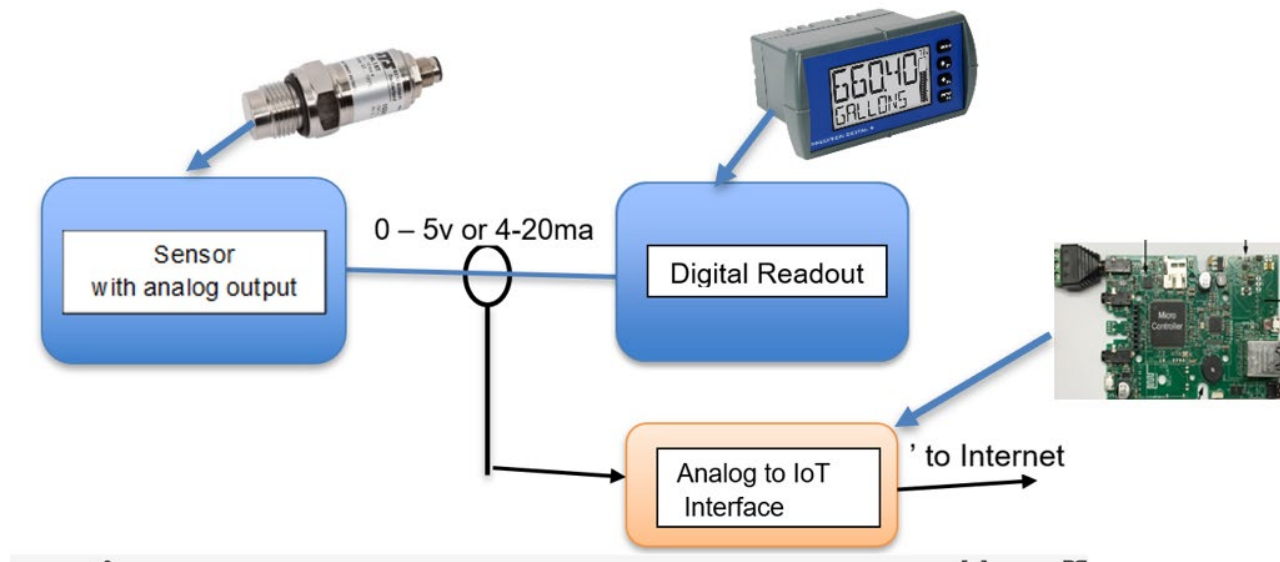
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Oct 2023

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Purpose

❑ Describes configuration or setup of 4-20 ma loop analog sensors with Esensors IoT interface

❑ Interface attaches to existing sensor current loop

❑ Other input type sensors (e..g. voltage) not considered here

4-20 Ma Loop Basics

❑ Current loop signals are much less suspectable to interference than are voltage (e.g. 0-5v) in industrial settings

❑ In use industrially for 50+ years

❑ Transmitter output current is always 4 to 20 Ma

  ❑ Zero or minimum sensor signal is 4 Ma

  ❑ Full scale is 20 Ma

❑ Receiver or readout is scalable to sensor units (e.g. 30 PSI)
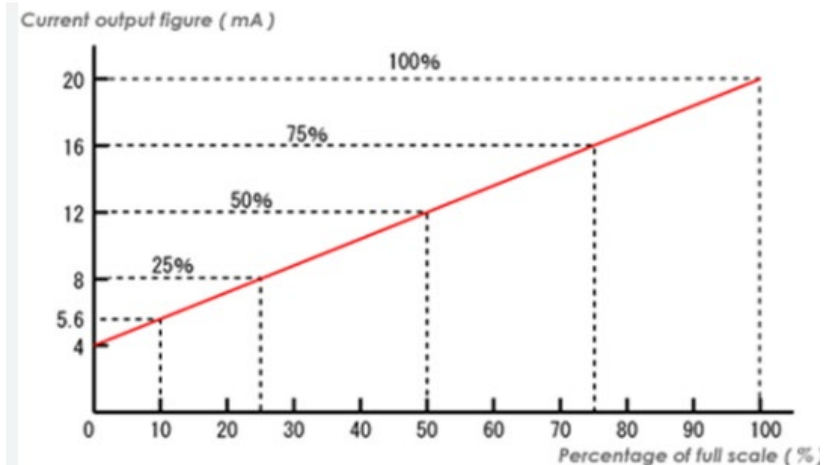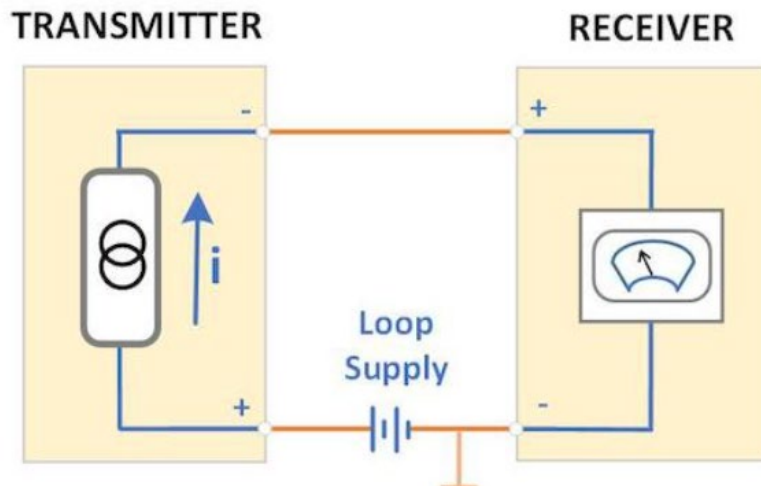
4-20 Ma Loop Basics
Continued

❑ Current loop has transmitter, one or more receivers and a power supply

❑ All loop elements are in series

❑ The transmitter controls the current between 4 and 20 mA

❑ The receiver(s) reads out the current

❑ Some elements are loop powered

❑ Typical elements have significant, but near constant, voltage drops

❑ Often load and line resistances present – voltage drops vary with I_L

❑
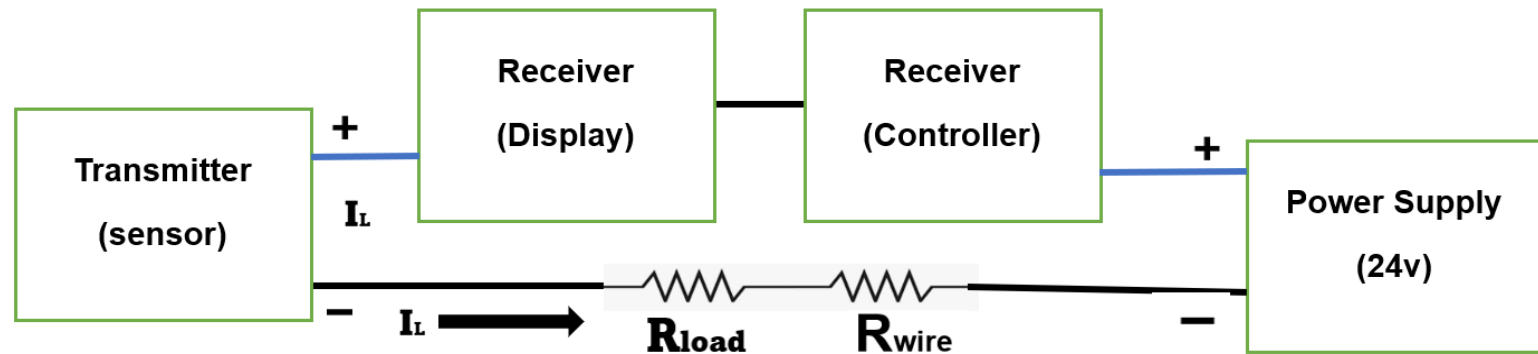
Loop Transmitter Details

❑ The toop transmitter or driver has an output (loop) current proportional to the input voltage, plus a minimum current (4 ma)

❑ Often the sensor, its analog signal conditioner electronics and the transmitter is combined in one package.
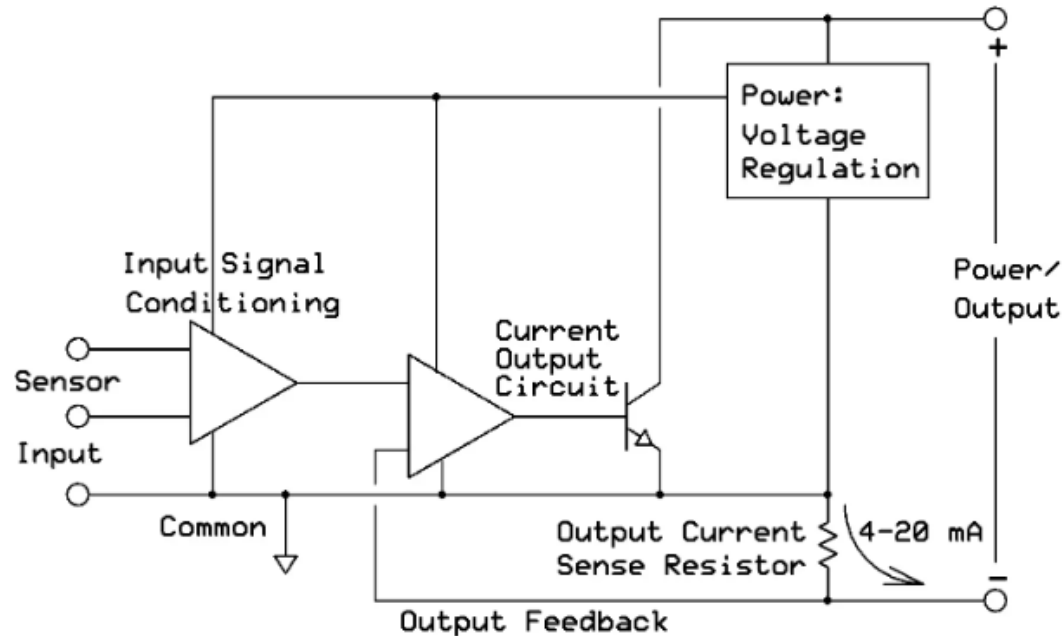
Loop Power Supply

❑ Loop elements are loop powered or externally powered

    ❑ A loop powered unit uses the voltage drop across the unit (and the minimum 4 ma current) to power the unit

❑ Transmitters are 2, 3 or 4 wire

    ❑ A 2-wire is loop powered

    ❑ A 3-wire has external supply but with common loop ground

    ❑ A 4-wire has an isolated power supply
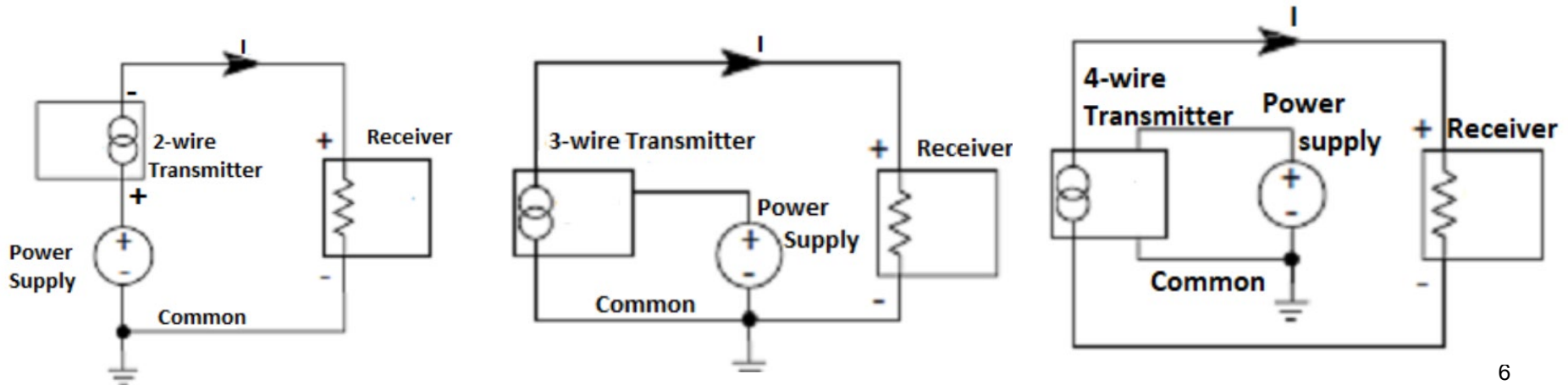
4-20 Ma Loop Budget

❑ Loop Budget (voltage drops around loop)

❑ Loop supply typically 24v (but could be 20 to 36 v)

❑ Loop voltages (example)

❑ Supply	+24 V
❑ Controller (optional)	-5.8 V
❑ Display	-4.5 V
❑ Transmitter <u>minimum</u>	-8.0 V
❑ Load resistance (optional)	-2.0 V
❑ Wire resistance	<u>-0.3 V</u>
■ Remaining for other loads	3.4 V

❑ Be concerned about loop budget if larger number of loads
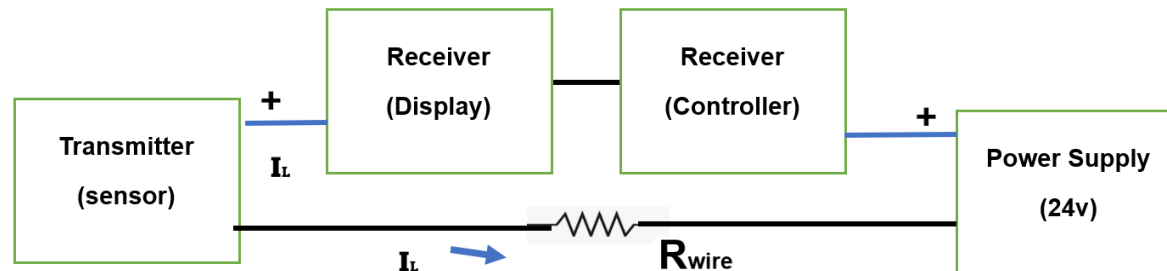
IoT Interface
-- for single loop powered sensor
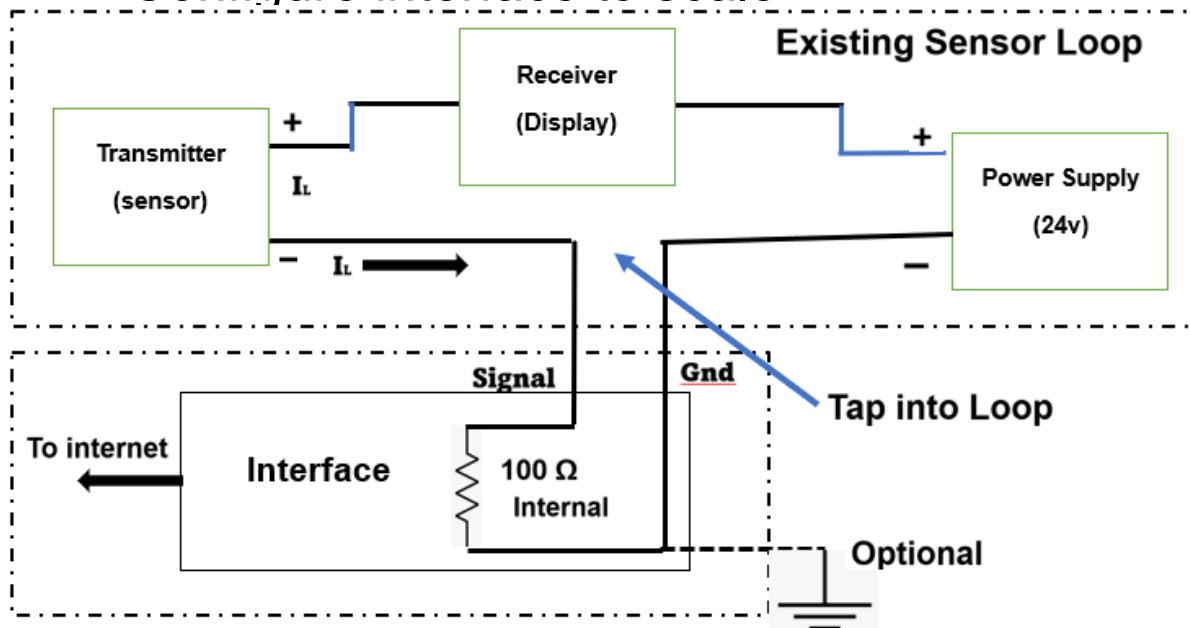
❑ Esensors interface for la 4-20 Ma loop powered sensor

   ❑ See appendix for data sheet (model GS-01)

❑ Connect Interface

   ❑ Connect sensor with transmitter to interface
      Using 2 pins (Power, Signal) on port insert

   ❑ Connect USB port to 5v power supply
      Power on power pin (12v) is supplied internally

   ❑ Connect Ethernet port to Internet

❑ Configure interface to scale
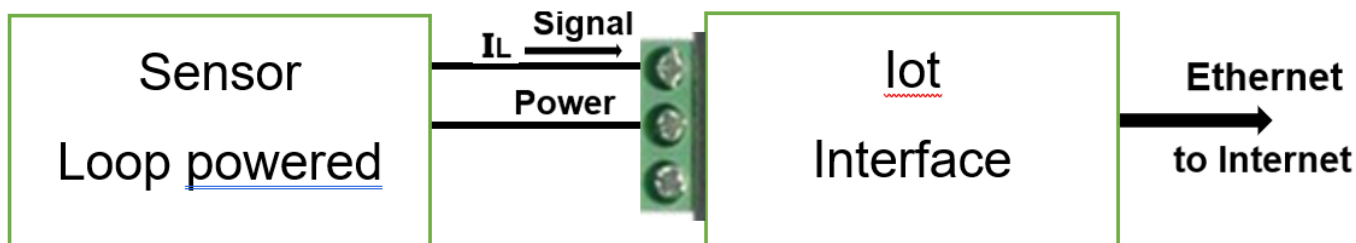
IoT Interface
For existing loop installations

❑ Esensors interface for legacy 4-20 Ma (and other) sensors

    ❑ See appendix for data sheet

❑ Break loop and add Interface in series to attach

    ❑ Connect to 2 pins (Signal, Gnd) on port insert

    ❑ Internal load is 100 ohm (2v max)

❑ Configure interface to scale

Existing Sensor Loop

Receiver
(Display)

Transmitter
(sensor)

I_L

I_L

Power Supply
(24v)

+

−

+

−

Signal

Gnd

To internet

Interface

100 Ω
Internal

Tap into Loop

Optional

IGNAL
PWR
GND

3-pin stereo plug

ESensors

21:17 EDT   192.168.1.45
AT&T
STATUS   OK
Press.   12.53 psi
Temp   68.4   F
Line   ON

Set Sensor Scale on Website

- ❑ Download user manual: EM08 Programming Procedure (eesensors.com)
  - ■ For sensor IoT interface Esensors model GS-01
  - ■ Go to IoT Interface section (p 16) – Current (4-20) signal input
  - ■ Other sensor input options (e.g. voltage) not consided herre
- ❑ Connect to Ethernet (other options available)
  - ■ Connect USB port to 5v power supply
  - ■ Web address on sensor display on power up
- ❑ Choose automatic calibration (gradient field blank)
- ❑ Set zero and full scale values (e.g., 0 and 15 for 15 PSI sensor)
- ❑ Select units from table
- ❑ Configure Ethernet connection
  - ■ (WiFi and GMS are options)
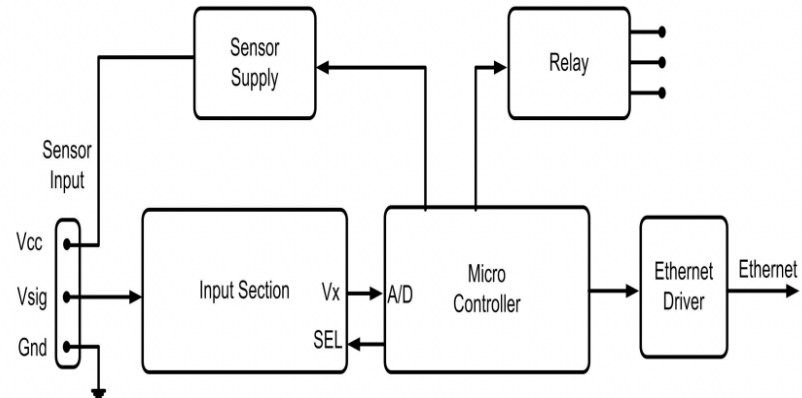- ❑ Review other options
  - ■ E.g. limits

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End

Background Information follows

IoT Interface Data Sheet
model GS-01

❑ Works with new and legacy sensors. Brings intelligent internet connectivity to existing (or new) sensors (sensors are not included with interface)

❑ Powerful web server built-in. Access data with any standard browser on a PC or smart phone.

❑ Connects to a network via Ethernet (or WiFi)

❑ Compatible with any 10/100 Mbps network

❑ Set high and low threshold settings for each sensor and configure alerts.

❑ Supports API calls with sensor data output in XML, JSON formats.

❑ Sends email or Email-to-SMS alerts

(Ethernet and other options).

IoT Interface Data Sheet
Continued

- ❑ Installation
  - ❑ Connects to your network through Ethernet. It is easily installed and configured in less than 15 minutes via the integrated web interface.
- ❑ Full service
  - ❑ We provide help in installation via Zoom, email and phone. Contact us at eesensors/ASI_install.
- ❑ Support
  - ❑ We provide superior customer support.
  - ❑ Simple and easy to follow user manuals.
  - ❑ Application notes addressing case specific issues. This is updated on a regular basis
  - ❑ Direct Support. ----- Got a question, don't hesitate to email or call us.

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- ❑ xxx