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Application Notes

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Sensor Wiring Examples for the KL3458 8 Channel 4-20mA Input Module

KL-AppNote-007

This application note describes the possible wiring combinations, based on different sensors, with 4 wire, 3 wire, and 2 wire process transmiiters.

2.0

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For additional documentation, please visit
www.beckhoffautomation.com

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Overview

Supporting Documents and References

Documentation for KL/KS3458

Key Concepts and Terms

Concepts

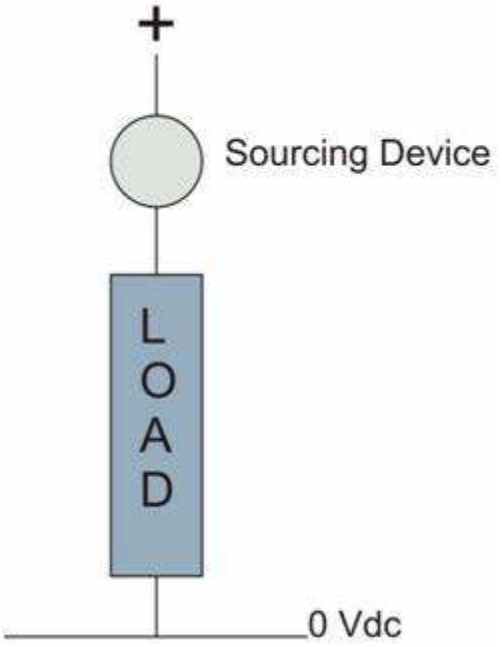
The KL3458 is an eight channel, passive 4-20mA current measurement terminal. It contains an internal shunt that is approximately 65 ohms. It is connected from the input terminal to an internal ground (see data sheet and/or manual). To allow connection signal returns (or to power the 4-20mA loop) the KL9186(24 Vdc) or KL9187(0 Vdc) is required.

Terms

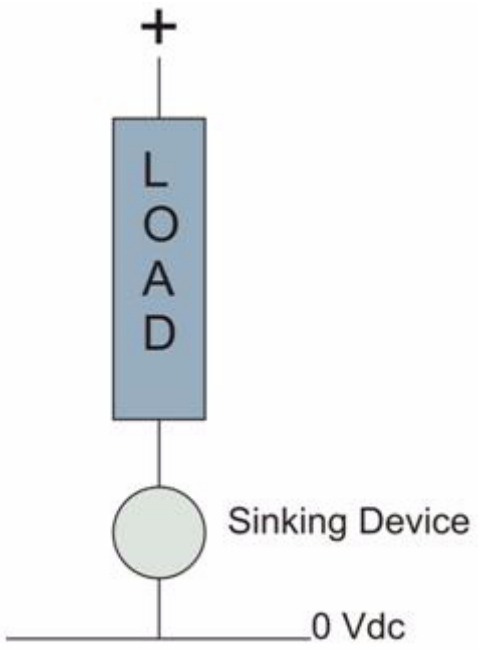
Passive: No external power

Shunt: A low value resistance across an A/D converter for changing the 4-20mA current loop to a mV signal

Sourcing: A device that references the (+) dc power raill



Sinking: A device that references the (-) dc power rail - 0 Vdc



Loop Powererd: General term identifying a 4-20mA loop that needs a dc power supply

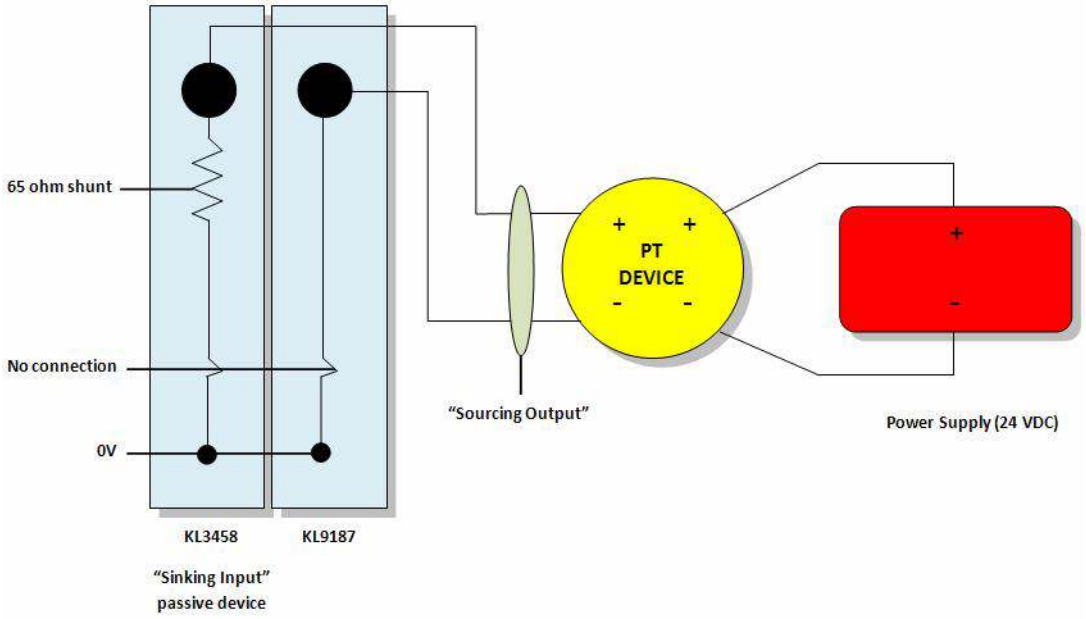
I/O: Input/Output

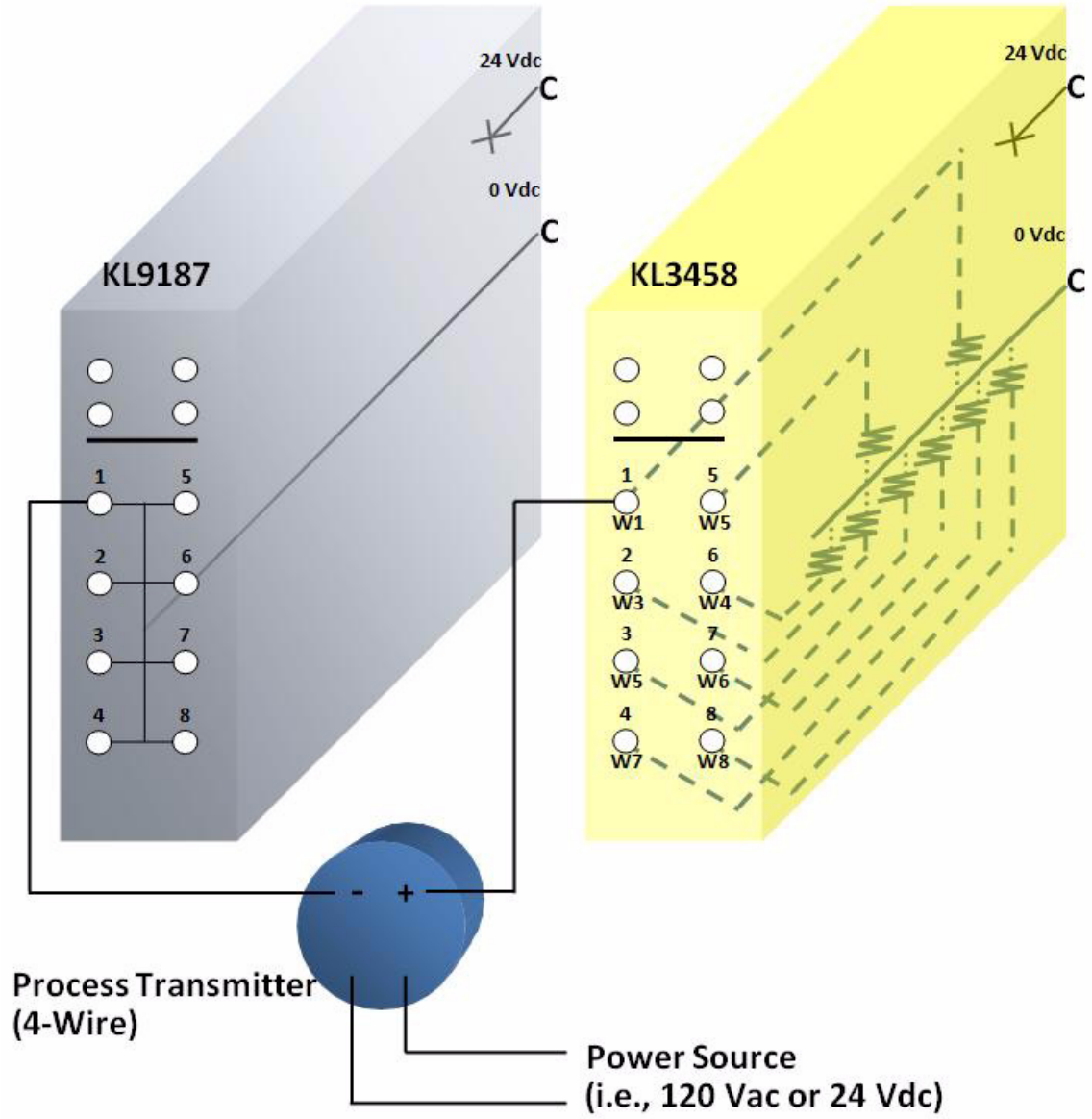
A/D Converter: Analog to Digital converter. An analog voltage connected at the input of the A/D converter generates a finite digital value at the output of the converter.

Diagrams

Example of a Self-Powered Process Transmitter (4 wire)

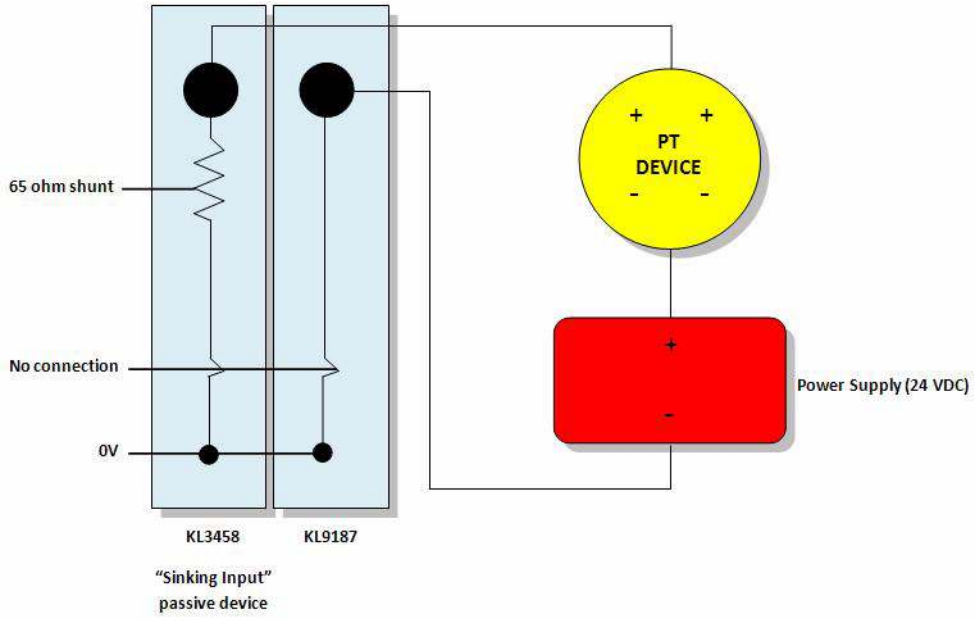
The first two diagrams show a typical process transmitter that has an external supply. The process transmitter provides power for the 4-20mA current loop.




24 Vdc
C
0 Vdc
C
KL9187
1
5
2
6
3
7
4
8
24 Vdc
C
0 Vdc
C
KL3458
1
W1
5
W5
2
W3
6
W4
3
W5
7
W6
4
W7
8
W8
-
+
Process Transmitter
(4-Wire)
Power Source
(i.e., 120 Vac or 24 Vdc)

Example of Loop Powered 4-20mA Circuit

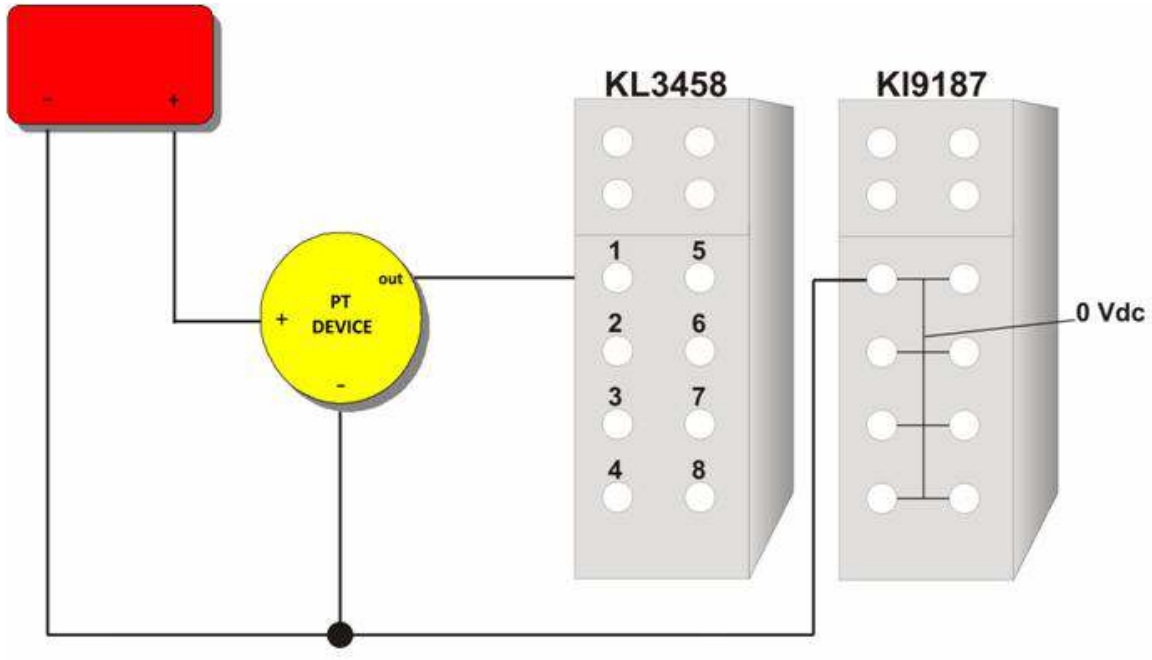
The second diagram shows the process transmitter as a loop-powered device(2 wire). This means the internal electronics are powered by the series connected external power supply.



The KL3458 has a passive shunt inside and acts as a sinking I/O device.

Example of Loop Power with Multiple 4-20mA Devices

The Third diagram is similar to the second, but shows multiple sensor wiring. This DC power supply scheme to supply multiple process transmitters is very common in the industry.



Conclusion

This application note does not include all possible wiring schemes. Innovative ways to land all sensor wires conveniently can be accomplished with the KL9186 and KL9187 terminals.

Please call BUSA technical support at 1-877-TWINCAT with any questions.