# General Specifications

# AI-517-01

GS48C17Z01-00E-N

Analog Input Module (open < 2.8 mA)

## ■ GENERAL

This Analog Input module, or trip amplifier, contains two circuits and can be utilized for various applications.

The open line detection level is configured for 2.8 mA.

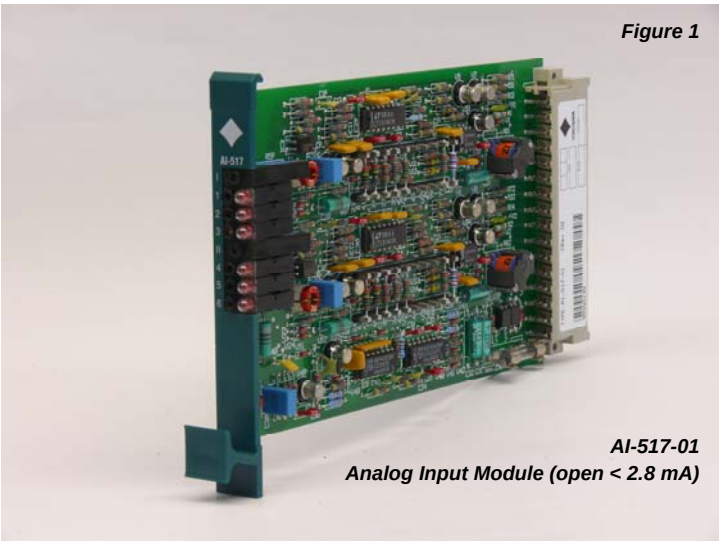

***Figure 1***

***AI-517-01***
***Analog Input Module (open < 2.8 mA)***

This module has a number of typical characteristics:

- Galvanic isolation between inputs and between inputs and logic
- Supply for passive transmitters
- Current or voltage input
- Internal or external set point setting with set point limiter
- LED indication
- Transmitter and set point outputs
- Open line input detection
- Normal or inverting operation
- Shift register circuit for connection to the Sequence of Event Recording system (SER)

The incoming field current signal is converted to a voltage signal. This signal (or a voltage input signal) is internally compared with the set point and open line levels. The result of comparison with the set point is used for the circuit output. Depending on the wiring, the output is a high or a low trip signal.

The result of the open line comparison can be used to disable the output in case of a line fault. Open line levels are set by resistors on the module.

Both set point and field input signals are available for monitoring as a 0 - 10 V signal.

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GS48C17Z01-00E-N

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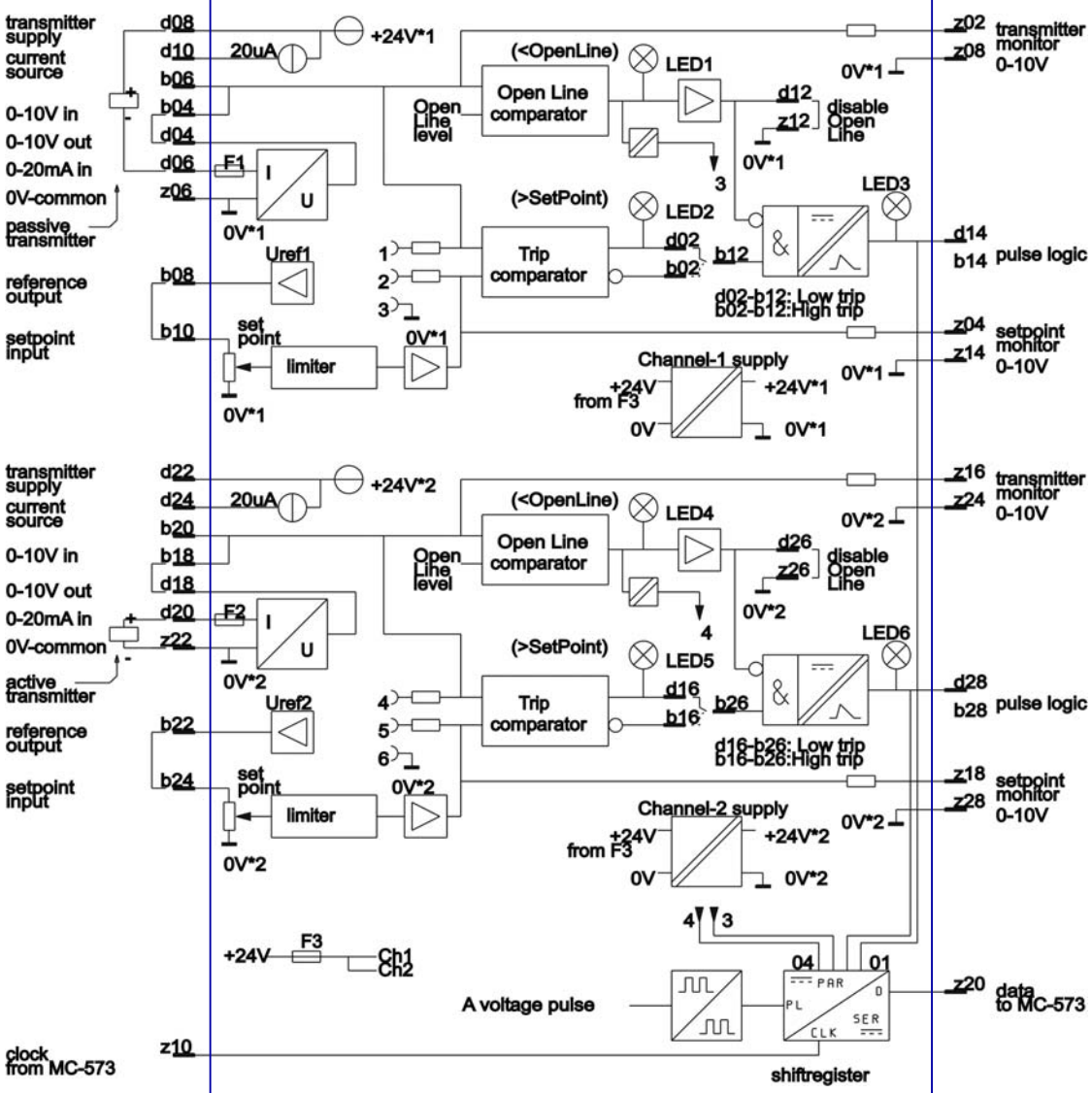
## ■ FUNCTIONAL DIAGRAM




### Supply

| | |
|---|---|
| z32 | 24 Vdc field |
| z30 | 0 Vdc field |
| b32 | 20 Vdc logic |
| d32 | 0 Vdc logic |
| d30 | A voltage pulse |
| b30 | not used |

### Notes

The output LED's 3 and 6 represents the output current.

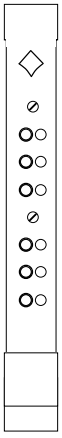
Disabling LED's for unused circuits:

connect b04-b08 (b18-b22) for LED 1(4)

connect b02-z06 (b16-z22) for LED 2(5)

### Front

| | |
|---|---|
| 1 | set point circuit 1 |
| 2 | test bus / led 1 |
| 3 | test bus / led 2 |
| 4 | test bus / led 3 |
| 5 | set point circuit 2 |
| 6 | test bus / led 4 |
| 7 | test bus / led 5 |
| 8 | test bus / led 6 |



## ■ SPECIFICATIONS

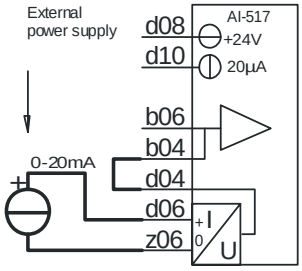
| Description | | Data |
|---|---|---|
| General | No. of channels | 2 |
| | Size | single Euro format 3TE (160x100x15 mm) |
| | Connector | DIN 41612 Bauform F 48p |
| | Identification | AI-517 on front |
| Environmental | Temperature (working) | -20 to +70 °C |
| | Temperature (storage) | -25 to +85 °C |
| | Relative humidity | max. 95%, no condensation |
| | EMC | EN 61000-6-2 Immunity<br>EN 61000-6-4 Emission<br><br>With an EMC system enclosure |
| | Shock | 10g ; 16 ms |
| | Vibration | 10-55 Hz ; ± 0.35 mm |
| Input | Current input | 0 - 20 mA, 55 Ω ± 10% (60 mA max., fuse protected) |
| | Voltage input | 0 - 10 V, 1 MΩ (max. 30 V) |
| | Voltage output | 0 - 10 V ± 0.5%, max. 5 mA |
| | Open line level<br>Open line indication | 2.8 mA ± 0.4 mA<br>below open line level : red LED |
| | Reference output | 11.25V±1%, 5 mA max.(*1) |
| | Set point input<br>Set point level<br>Set point limiter<br>Trip indication | 10 kΩ (30 V max.)<br>adjustable by potentiometer<br>optional (*1)<br>above set point : red LED |
| | Hysteresis | 1%(full scale, trip & open line) (*1) |
| | Stability error | < 0.2% (full temp. range) |
| | Clock | clock pulses from MC-573, level 0/11 V |
| Output | Pulse logic<br>Capacity<br>Status indication | current pulses 500 mA<br>10 unit loads<br>red LED per output |
| | Monitor | 0 - 10 V, 1 kΩ |
| | Test bus | 0 - 10 V, 10 kΩ (0 Ω for 0 V test bus) |
| | Transmitter supply | 25.5 Vdc ± 0.5 V (@2 x 20 mA) and field voltage tolerance,<br>80 mA max/channel (fuse protected) |
| | Data | 8 bits serial data, level 0/11 V |
| Propagation | RC-filtering | 50 ms |
| Supply | Logic supply | 20 Vdc, 5 mA |
| | Field supply | 24 Vdc ± 10%, 35 - 50 mA passive / 40 - 100 mA active |
| | Clock signal | A voltage pulse |
| Isolation | Analog circuit | 0.5 kV (test) |
| Dissipation | Passive | 1.0 - 1.3 W |
| | Active | 1.1 - 1.6 W |

Notes: (*1) = adjustable by fixed resistor.

Signal definition: 0-100% ≡ 0-20 mA ≡ 0-10 V (max. signal: 120%)

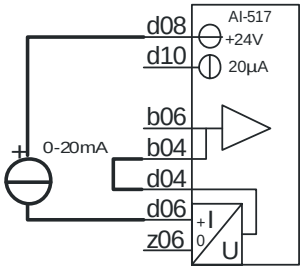
## ■ NOTES

### Input & Setpoint configurations



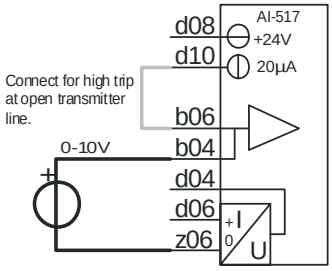

Current input
Active transmitter

Active transmitter (with external power supply)
Passive AI-517



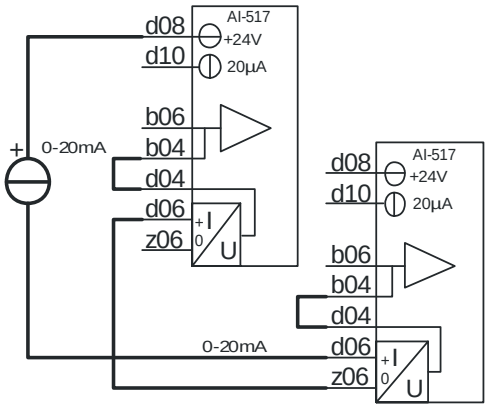

Current input
Passive transmitter

Passive transmitter (powered by AI-517)
Active AI-517



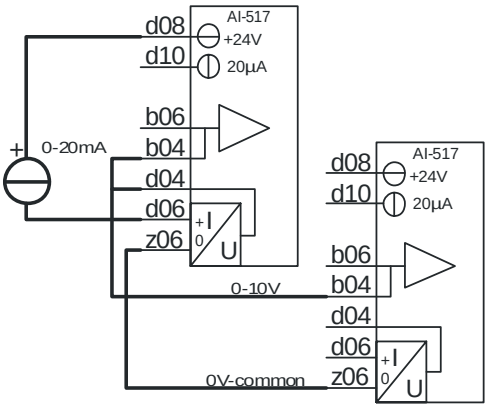

Voltage input
Active transmitter

Active transmitter (with external power supply)
Passive AI-517



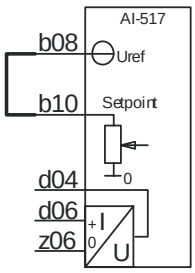

Current input, passive transmitter
2 Channels serial connected

Passive transmitter (powered by AI-517)
Active AI-517 (first AI-517 active, second AI-517 passive)
No galvanic isolation between channels



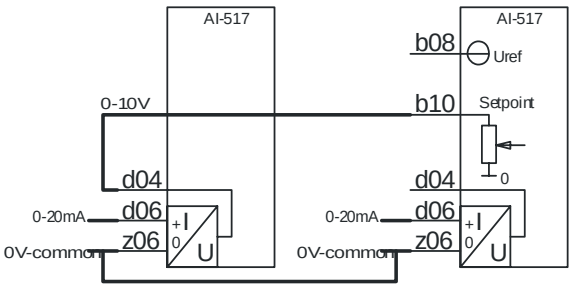

Current input, passive transmitter
2 Channels parallel connected

Passive transmitter (powered by AI-517)
Active AI-517 (first AI-517 active, second AI-517 passive voltage input)
No galvanic isolation between channels




Internal Setpoint reference

Adjust Setpoint with multitum potentiometer at module front panel
Clockwise is up, counter clockwise is down

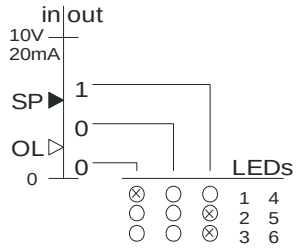


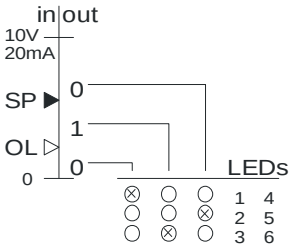

External Setpoint reference

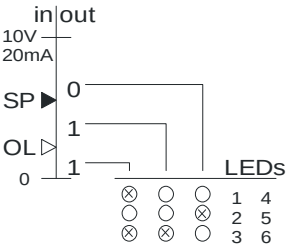
Example for comparing 2 analog signals
No galvanic isolation between channels

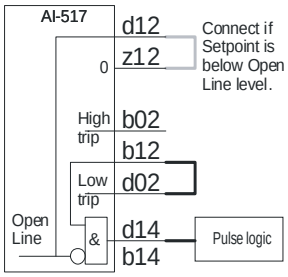
## Output configurations

(SP = SetPoint OL = Open Line)



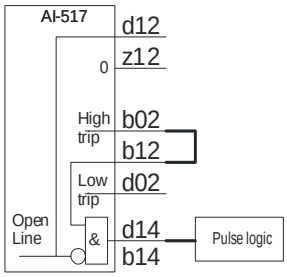



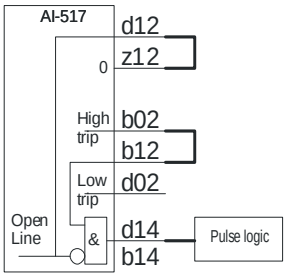




### Low trip

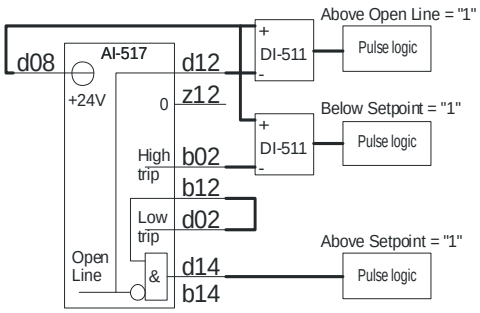
Open Line disabled if Setpoint is below Open Line level




### High trip
### Open Line enabled

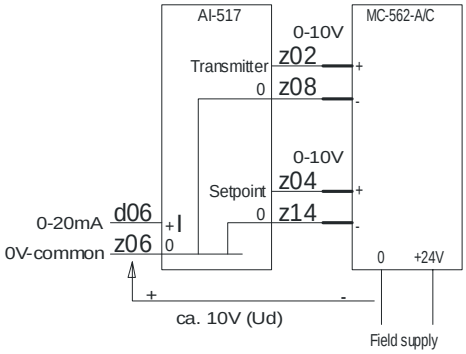



### High trip
### Open Line disabled




### Low or High trip
### Open Line disabled

Open Line, Low trip and High trip signals used in SLS logic

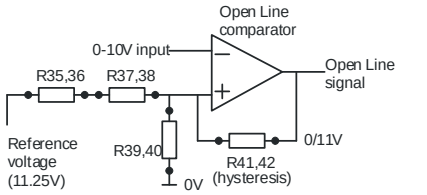


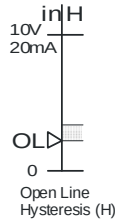

### Transmitter and Setpoint monitoring

Voltage difference (Ud) ca. 10V when AI-517 input is floating
Maximum -40V to +72V difference (Ud) allowed for MC-562-A/C
Galvanic isolation is reduced by using the MC-562-A/C

## Open Line, Hysteresis, Reference and Limiter details

(SP = SetPoint OL = Open Line Resistor values in Ohm)
(R35,36 = R35 for channel 1, R36 for channel 2)



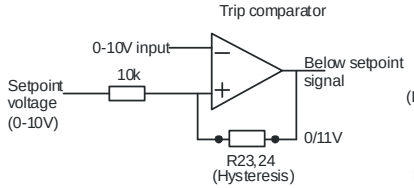



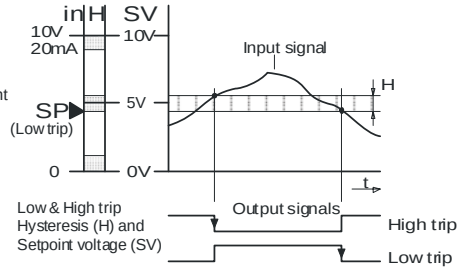

| AI-517 type | Open Line level | | R35 R36 | R37 R38 | R39 R40 |
|---|---|---|---|---|---|
| 0 | 1.4V | 2.8mA | 2k7 | 82k | 12k |
| A | 0.85V | 1.7mA | 27k | 120k | 12k |
| B | 1.9V | 3.8mA | 2k7 | 56k | 12k |

| Hysteresis (% full scale) | | | R41 R42 |
|---|---|---|---|
| 1% | 0.1V | 0.2mA | 1M (default) |
| 2% | 0.2V | 0.4mA | 560k |
| 5% | 0.5V | 1mA | 220k |

### Open Line circuit & hysteresis

Parallel value R39 and R35+R37 should be ca. 10k
Minimum value for R41,42 is 100k
Open Line will be activated below the Open Line level
Open Line will be deactivated above the Open Line level + hysteresis value
Example: OL=1.4V H=1% OL(activated)=1.4V (2.8mA) OL(deactivated)=1.5V (3.0mA)

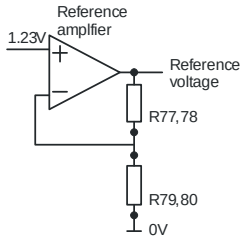


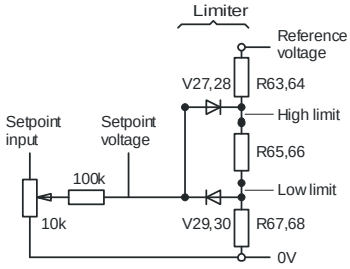

| Hysteresis (% full scale) | | | R23 R24 |
|---|---|---|---|
| 1% | 0.1V | 0.2mA | 1M (default) |
| 2% | 0.2V | 0.4mA | 560k |
| 5% | 0.5V | 1mA | 220k |

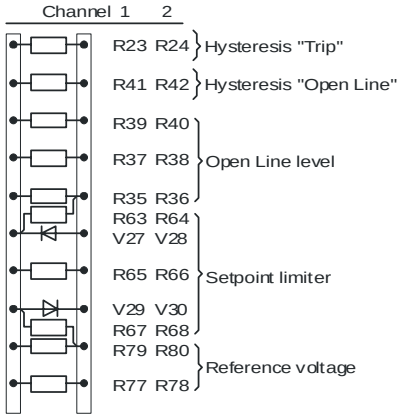
### Trip circuit & hysteresis

Minimum value for R23,24 is 100k
Due to hysteresis the Setpoint voltage (SV) is slightly different than the Setpoint level (SP)
The Setpoint voltage differs also slightly for Low trip and High trip
Example 1: SV=5.0V H=1% SP(Low trip)=4.95V (9.9mA) SP(High trip)=5.05V (10.1mA)
Example 2: SV=10.0V H=1% SP(Low trip)=9.9V (19.8mA) SP(High trip)=10.0V (20.0mA)




| Reference voltage | R77 R78 | R79 R80 |
|---|---|---|
| 11.25V | 22k | 2k7 |




### Reference voltage circuit

Set current from reference voltage to 0.1-1mA

### Setpoint limiter circuit

Limiter part optional (default not mounted)
Set current from reference voltage to 1-5mA

### Card layout for adjustments

## ■ NOTES

## ■ NOTES