EN

# K107A / K107B

**Half-duplex RS485 serial bus with 3-way isolation**

## *General Description*

The K107A and K107B modules are half duplex serial buses with 3-way isolation.
Both modules feature

- Timed automatic direction switching.
- Communication speeds that can be configured by dip-switch,

The modules differ in the type of interface on the X side

K107A: RS485
K107B: RS232B

## *Technical features*

### *Power supply*

| | |
|---|---|
| Power-supply : | 19.2 to 30 VDC |
| Consumption : | max. 22 mA at 24 VDC<br>under normal operating conditions. |

### *X-side port characteristics*

| | |
|---|---|
| Type: | K107A :RS485, K107B: RS232B |
| Capacity: | 32 standard nodes for K107A |
| Terminator: | Yes for K107 A, No for K107B |
| Protection: | Up to 30 VDC |

### *Y-side port characteristics*

| | |
|---|---|
| Type: | RS485 half-duplex |
| Capacity: | 32 standard nodes |
| Terminator: | Yes |
| Protection: | Up to 30 VDC |

### *Signal transmission/processing characteristics*

| | |
|---|---|
| Handshake : | Timed automatic |
| Isolation : | Optical |
| Speed : | 1200 to 115,200 bps |
| Configuration : | by DIP-switch |
| Other functions available : | X or Y side terminator, X->Y or Y->X communication direction inhibition |

### *General Technical Features*

| | |
|---|---|
| Isolation voltage : | 1.5 kV between each pair of ports |
| Protection : | IP20 |
| Environmental conditions : | Temperature: –20 to +65°C<br>Humidity: 10 to 90% RH non-condensing<br>Altitude: up to 2000 m. a. s. l. |
| Storage temperature: | –40 to +85 °C |
| Dissipation: | Lower than 500 mW |
| LED indicators : | Data present on X port, Data present on Y port, inverted connection on X port and inverted connection on Y port. |
| Connections : | Cable clamp terminals and bus (rear connector for DIN and K-BUS bar) |
| Wire size : | 24 to 14 AWG, 0.2 to 2.5 $mm^2$ |
| Wire stripping : | 5/16" or 8 mm |
| Material, color : | PBT, black |
| Dimensions and weight : | 6.2 x 93.1 x 102.5 mm, 46 g. |
| Reference standards : | EN61000-6-4/2002 (electromagnetic emission, industrial environment) EN61000-6-2/2005 (electromagnetic immunity, industrial environment) EN61010-1/2001 (safety).<br>All circuits must be isolated from the other high volatage circuits with double insulation. The power supply transformer must comply with EN60742: “Insulated transformers and safety transformers”.<br>Notes: - Use with copper conductors.<br>- Use in Pollution Degree 2 Environment .<br>- Power supply must be Class 2.<br>- When supplied by an Isolated Limited Voltage/Limited Current power supply a fuse rated max 2.5 A shall be installed in the field. |

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## *Description of operation*

The device usually stays with both its communication ports in receiving state (idle status); the first transition (character) detected at one of the ports enables the corresponding communication channel, while the opposing port becomes the data outlet by repeating the stream (data flow) received on the first. Whenever the data flow is interrupted, after a period of time depending on the communication speed set, the device returns to its previous receiving state on both ports (idle status). The time for return to idle status is usually around 1.5 characters starting from the receiving line's last active status, however a different period of time can be selected whenever required by protocol. The table below indicates switching times on the basis of the transmission speed set:

| Speed (bps) | Switching time (ms) |
|---|---|
| 115220 | 0.13 |
| 57600 | 0.26 |
| 38400 | 0.39 |
| 19200 | 0.78 |
| 9600 | 1.56 |
| 4800 | 3.13 |
| 2400 | 6.25 |
| 1200 | 12.5 |

Two modules can be used as isolator or repeater for a Full-Duplex connection. In this case, it is recommended that the module installed on the master's Tx line inhibit communication direction by selecting either the X->Y direction or the Y->X direction; although having both DIP-switches ON does not cause malfunctions, it inhibits the device with both ports transmitting.

## *Signal LEDs on the front panel*

| LED | Function |
|---|---|
| Green LED on X side | Flashing: data present at X-port.<br>Steady: inverted connection at X port or X -> Y direction inhibition enabled. |
| Green LED on Y side | Flashing: data present at Y-port.<br>Steady: inverted connection at Y port or Y -> X direction inhibition enabled. |
| Central Green LED | A blink of the LED when the device is turned on indicates the presence of voltage. |

## *DIP-SWITCH SETTINGS*

Both the K107 A and K107 B modules can be completely configured by DIP-switches. The DIP-switch settings are provided below.

In the following tables, the indication ● means that the DIP-switch is set to 1 (ON). When no such indication is shown, it means that the DIP-switch is set to 0 (OFF).

| **X->Y DIRECTION INHIBITION** | | |
|---|---|---|
| SW1 | 1 | |
| | ● | Enabled |
| | | Disabled |

| **Y Terminator** | | |
|---|---|---|
| SW1 | 2 | |
| | ● | Enabled |
| | | Disabled |

| **Transmission speed** | | | | |
|---|---|---|---|---|
| SW2 | 3 | 4 | 5 | |
| | | | | 115200 |
| | ● | | | 57600 |
| | | ● | | 38400 |
| | ● | ● | | 19200 |
| | | | ● | 9600 |
| | ● | | ● | 4800 |
| | | ● | ● | 2400 |
| | ● | ● | ● | 1200 |

| **Y->X DIRECTION INHIBITION** | | |
|---|---|---|
| SW1 | 6 | |
| | ● | Enabled |
| | | Disabled |

| **X Terminator (only for the K107A)** | | |
|---|---|---|
| SW1 | 7 | |
| | ● | Enabled |
| | | Disabled |

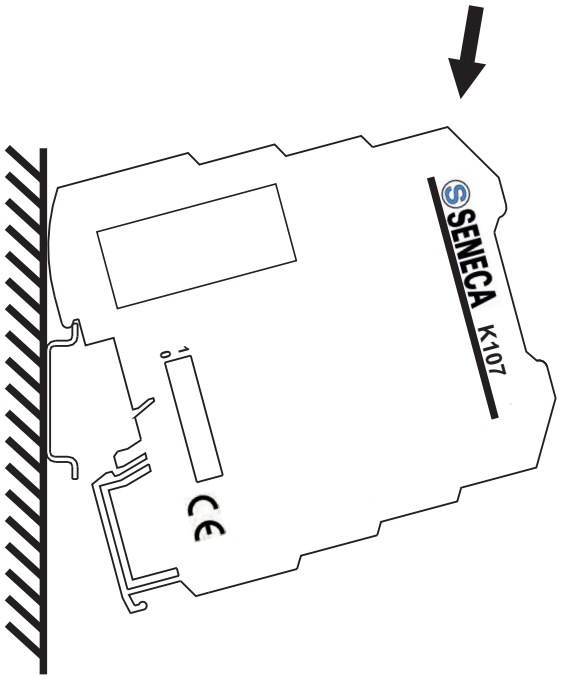
| **Polarizer * (only for the K107 B RS232)** | | |
|---|---|---|
| SW1 | 8 | |
| | ● | Enabled |
| | | Disabled |

* When installed, the polarizer prevents the RS232 line from capturing noise when left disconnected

## *Installation*

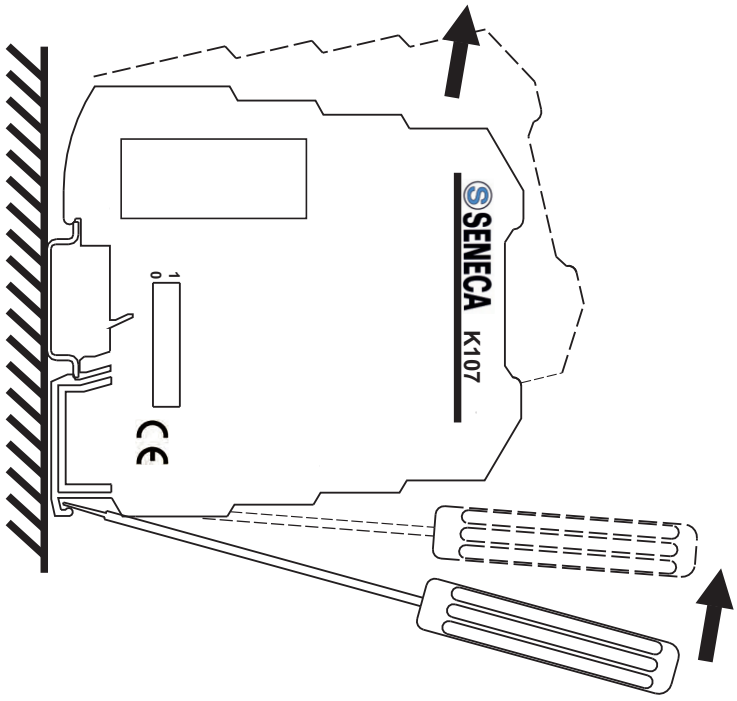
This module has been designed for a 35 mm DIN (46277) rail. Assembly in a vertical position is recommended in order to increase the module's ventilation, and no raceways or other objects that compromise air flow should be positioned in the vicinity.
Do not position the module above equipment that generates heat; we recommend positioning the module in the lower part of the control panel or cabinet. We recommend rail-type assembly using the corresponding bus connector (Model K-BUS) that eliminates the need to connect a power supply to each module.

Attaching the module to the rail



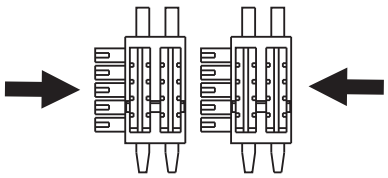

1 - Attach the module to the upper part of the rail.
2 - Press the module downwards.

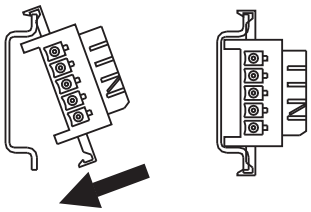
Removing the module from the rail




1 - Apply leverage using a screwdriver (as shown in the figure).
2 - Rotate the module upwards.

## *Using the K-BUS connector*

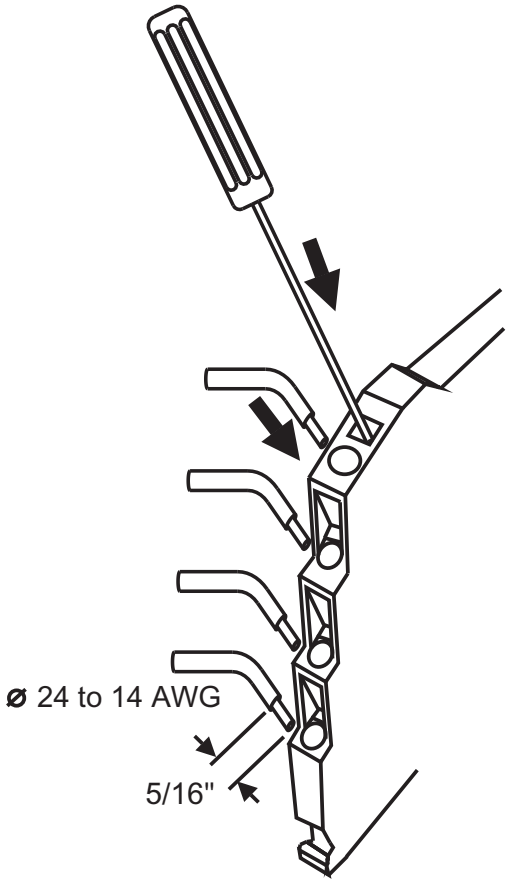




1 - Connect K-BUS connectors together as required in order to obtain the number of positions necessary (each K-BUS permits the insertion of two modules).
2 - Attach the K-BUS connectors to the rail by positioning them on the upper side of the rail and then rotating them downwards.
IMPORTANT: Pay particular attention to the position of the protrudent terminals of the K-BUS. The K-bus must be inserted in the rail with the protruding terminals on the left (as shown in the figure) otherwise the modules will be turned upside down.

- Never connect the power supply directly to the bus connector on the DIN rail.
- Never tap power supply from the bus connector either directly or by using the module's terminals.

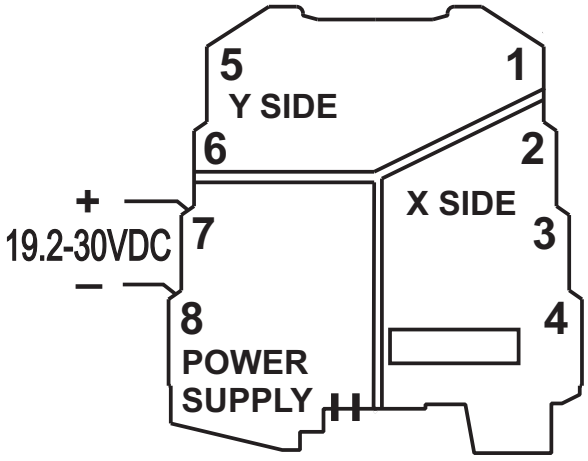
## *Electrical Connections*




The module uses spring-type terminal electrical connections.
Proceed as follows to make the connections:
1 - Strip the wires 5/16"
2 - Insert a screwdriver in the square hole and press it until the cable lock spring opens.
3 - Insert the cable in the round hole.
4 - Remove the screwdriver and make sure that the cable is tightly fastened in the terminal.

## *Power supply*

There are various ways to provide the K Series modules with power.



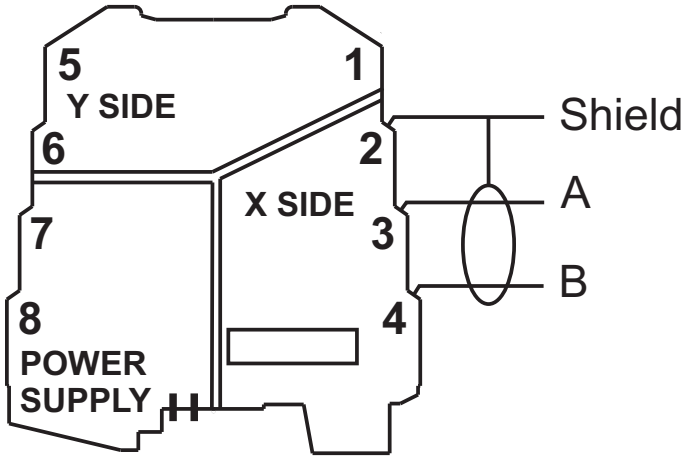

1 - Direct power supply to the modules by connecting a 24 VDC power supply directly to Terminals 7 ( + ) and 8 ( – ) of each module.

2 - Using the K-BUS connector accessory for the distribution of power to the modules via bus connector. This way eliminates the need to connect power supply to each module.
The bus can be supplied from any of the modules; the total amperage of the bus must be less than 400 mA. Higher amperage through the module can damage it. An appropriately sized fuse must be connected in series with the power supply.

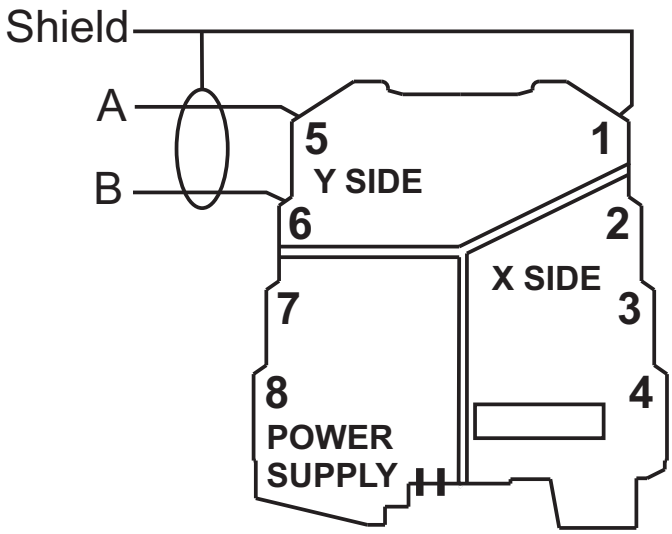
3 - Using the K-BUS connector accessory for the distribution of power to the modules via bus connector and the K-SUPPLY power supply.
The K-SUPPLY is a 6.2 mm wide regulated power supply that is designed to protect the modules connected via bus against over-voltage.
The bus connector can be provided with power using the K-SUPPLY module if the total amperage of the bus is less than 1.5 A. Higher amperage can damage both the module and the bus. An appropriately sized fuse must be connected in series with the power supply.

## *K107A Serial port electrical connections*

***X-side serial port: half-duplex RS485***



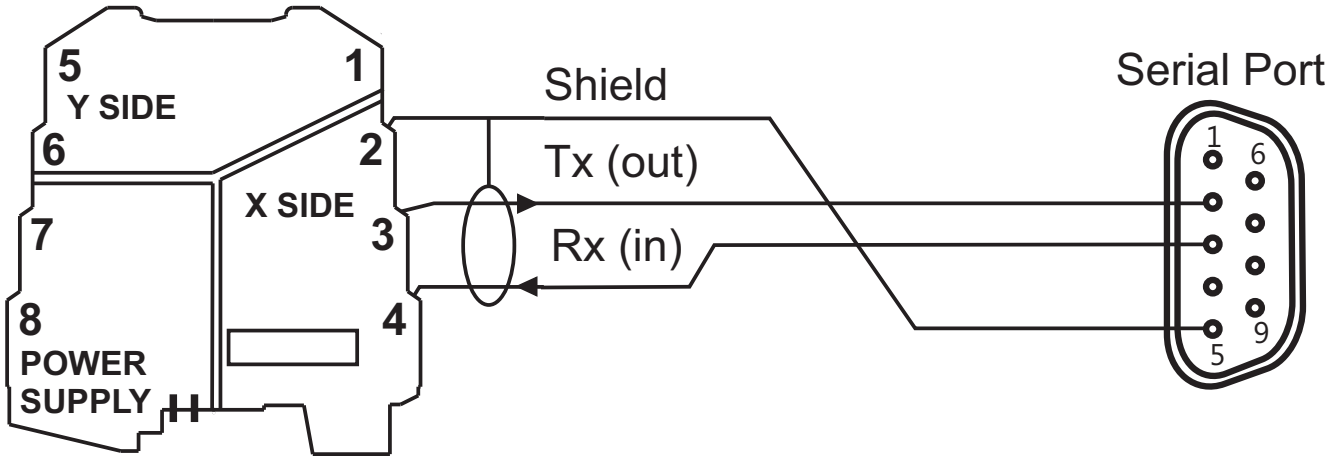

***Y-side serial port: half-duplex RS485***



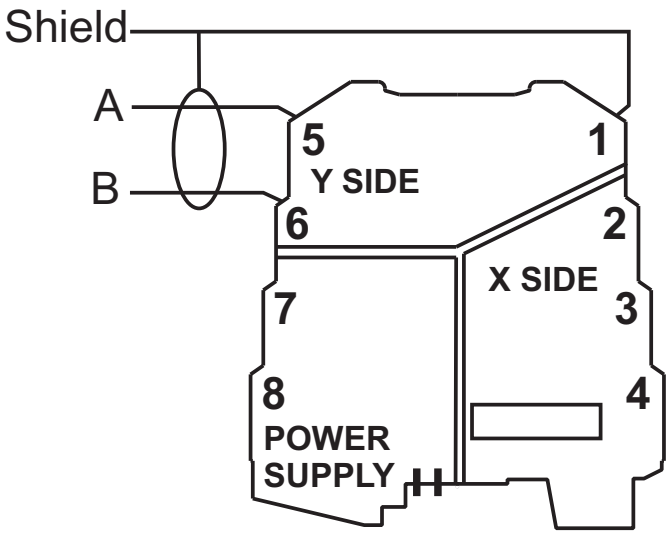

The use of shielded cables is recommended, especially when the length is greater than 3 ft.

## *K107B Serial port electric connections*

***X-side serial port: half-duplex RS232***



### *Y-side serial port: half-duplex RS485*




The use of shielded cables is recommended, especially when the length is greater than 3 ft.

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