

temaline

TK C21P (RTUA01P)



Installation Manual vor.1.2

temaline
Creative solutions

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PRELIMINARY OPERATIONS

Mounting and Cabling Instructions

The cables are attached to an encased box or frame with a DIN rail on which the RTU-A01P unit will be mounted. Figure 1 indicates the minimum size of the panel. If you need to install additional RTU-A01P modules, you can use a larger panel; however, make sure that you allow sufficient space for accessing the cables.

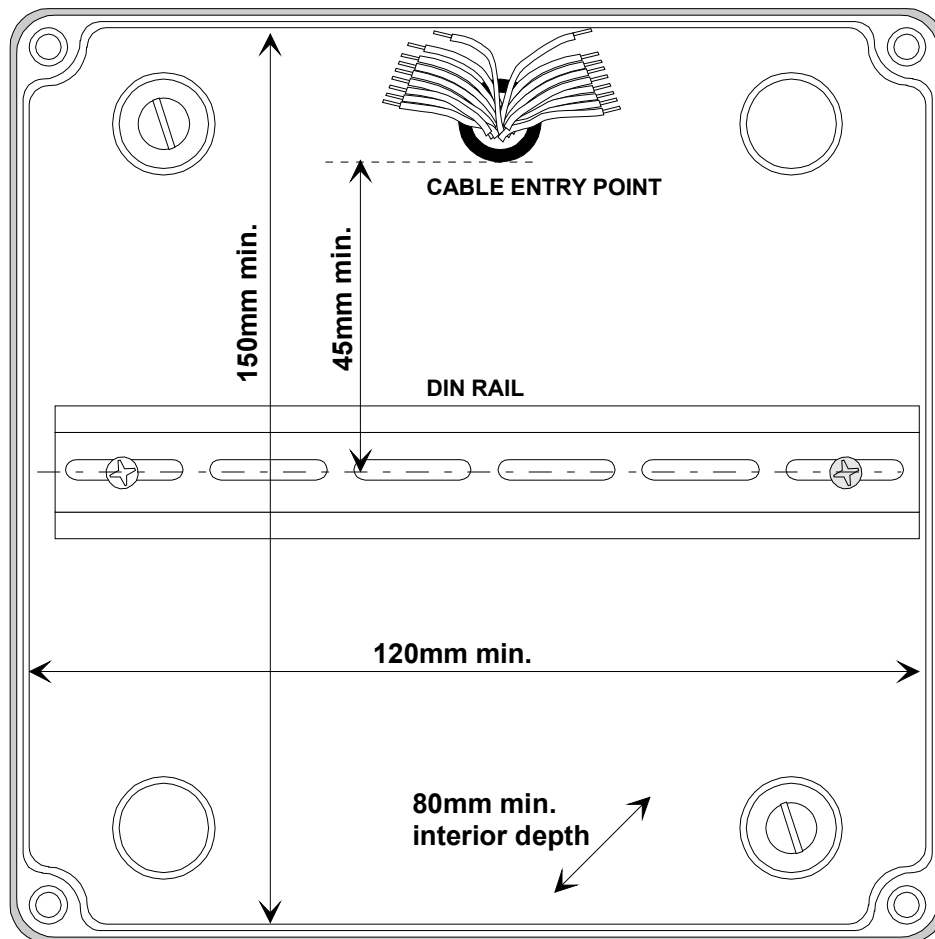


Figure 1. Box with DIN/ Ω Rail

Electrical Connections

You must connect the following cables to the RTU-A01P unit:

- 12V power cable.
- LONWORKS^{®1} twisted-pair cable.
- I/O cables from the contacts/sensors.

Make sure that the 12V cable corresponds in size to the norms indicated in the table below; the size of the 12V cable can be calculated using the following table (maximum voltage drop on the cable = 0.5V):

Cable length(m) = $0.5V / (I[A] \text{ load} \times 2 \times (\text{res [Ohm/km]} / 1000))$

Type of cable			Length (m) in relation to base load					
AWG	mm2	Ohm/Km	100 [mA]	200 [mA]	500 [mA]	1 [A]	2 [A]	5 [A]
10	5,25	3,41	733	367	147	73	37	15
12	3,3	5,7	439	219	88	44	22	9
14	2	8,8	284	142	57	28	14	6
16	1,3	14	179	89	36	18	9	4
18	0,9	21	119	60	24	12	6	2
20	0,6	34	74	37	15	7	4	1
22	0,35	52	48	24	10	5	2	1

- The LONWORKS^{®1} data cable must be twisted-pair.
- In a free-topology configuration, the sum total of the sections must not exceed 500m.
- In a bus configuration, the sum total of the sections must not exceed 2700m.
- In a free-topology configuration, activate the 50ohm terminator by placing the appropriate jumper on the FTT10A plug-in of the TemaServer.
- In a bus configuration, place two terminators (with resistance values of 100ohm 1% ½W) at the two ends of the bus.
- Check that the length of the LONWORKS^{®1} data cable corresponds to the norms indicated in Table 1.

¹LONWORKS[®] is a trademark of the Echelon Corporation

Type of cable			Length [m] in relation to cable capacity				
AWG	mm ²	ohm/Km	50nF/Km	100nF/Km	200nF/Km	500nF/Km	1uF/Km
12	3,3	5,7	2676	1892	1338	846	598
14	2	8,8	2153	1523	1077	681	482
16	1,3	14	1707	1207	854	540	382
18	0,9	21	1394	986	697	441	312
20	0,6	34	1096	775	548	346	245
22	0,35	52	886	626	443	280	198
24	0,2	85	693	490	346	219	155

Table 1. Length/Capacity of LONWORKS[®] Data Cables

- The FTT10A Echelon[®] v1.2 User Guide recommends the cables indicated in Table 2.

Producer and Model	AWG	Connection to bus -maximum total length [m]	Connection in free topology –maximum node-node length max. [m]	Connection in free topology –maximum total wire length. [m]
Belden 85102	16	2700	500	500
Belden 8471	16	2700	400	500
Level IV (twisted-pair, typically solid and unshielded)	22	1400	400	500
JY (St) 2x2x0.8 (4-wire helical twist, solid shielded)	20	900	320	500
TIA Cat5	/	900	250	450

Table 2. Recommended LONWORKS[®] Cables

INSTALLATION

Hooking Up the Unit

To hook up the unit, follow these steps:

1. Rest the upper panel of the RTU-A01P on the rail.
2. Press until you hear the tongue click into position on the rail (see Figure 2).

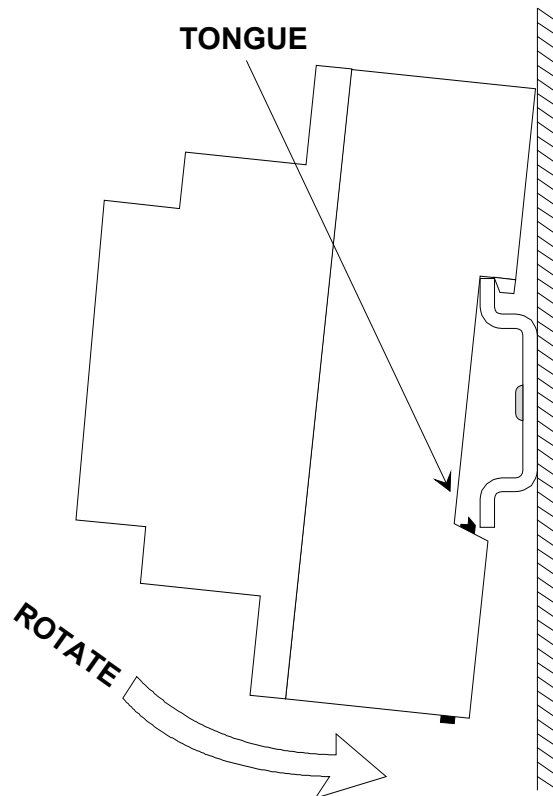


Figure 2. Hooking Up the Unit to the DIN Rail

Connecting the Cables

Connecting to Supervised Contacts

Connect the contact cables to each of the 4 available inputs. Each contact must be fitted with the appropriate balancing resistors supplied with the kit. Place the resistors next to the contacts themselves, as illustrated in Figure 3.

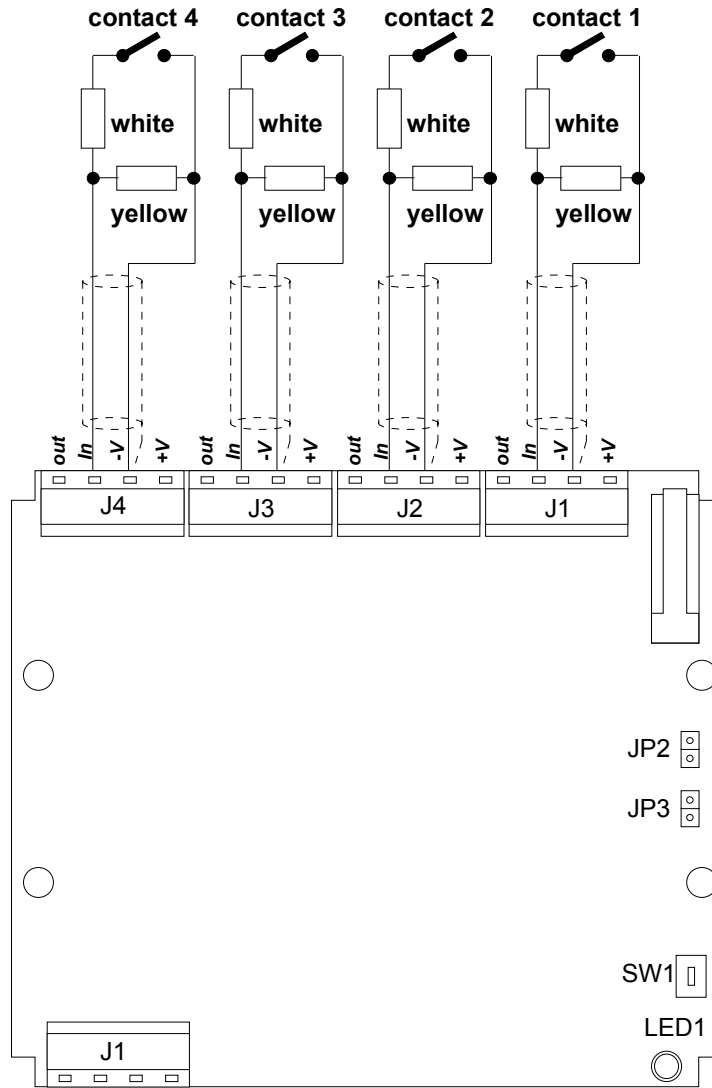


Figure 3. Connecting the Supervised Contact Cables

Yellow resistor: 1210 Ohm 1%

White resistor: 392 Ohm 1%

Close contact resistance: 296 Ohm

Open contact resistance: 1210 Ohm

When the cables go outdoor is mandatory to use shielded cables. The cables' shielding must be connected to the respective ground connectors (-V).

For internal wiring without shielded cables is recommended an electrical environment where the cables are well separated, even at short runs, especially to the power cables or external cables which can be essentially subjected to interference or lighting.

Use a twisted-pair cable for the contact cables. Make sure that the cables correspond in size to the norms indicated in.

Max contact resistance = 25 Ohm

Cable type			Lenght
AWG	mm2	ohm/Km	[m]
12	3,3	5,7	2193
14	2	8,8	1420
16	1,3	14	893
18	0,9	21	595
20	0,6	34	368
22	0,35	52	240
24	0,2	85	147

Table 3. Length of Contact Cables

Connecting to Sensors

Connect each sensor as illustrated in Figure 4, using the appropriate balancing resistors supplied with the kit.

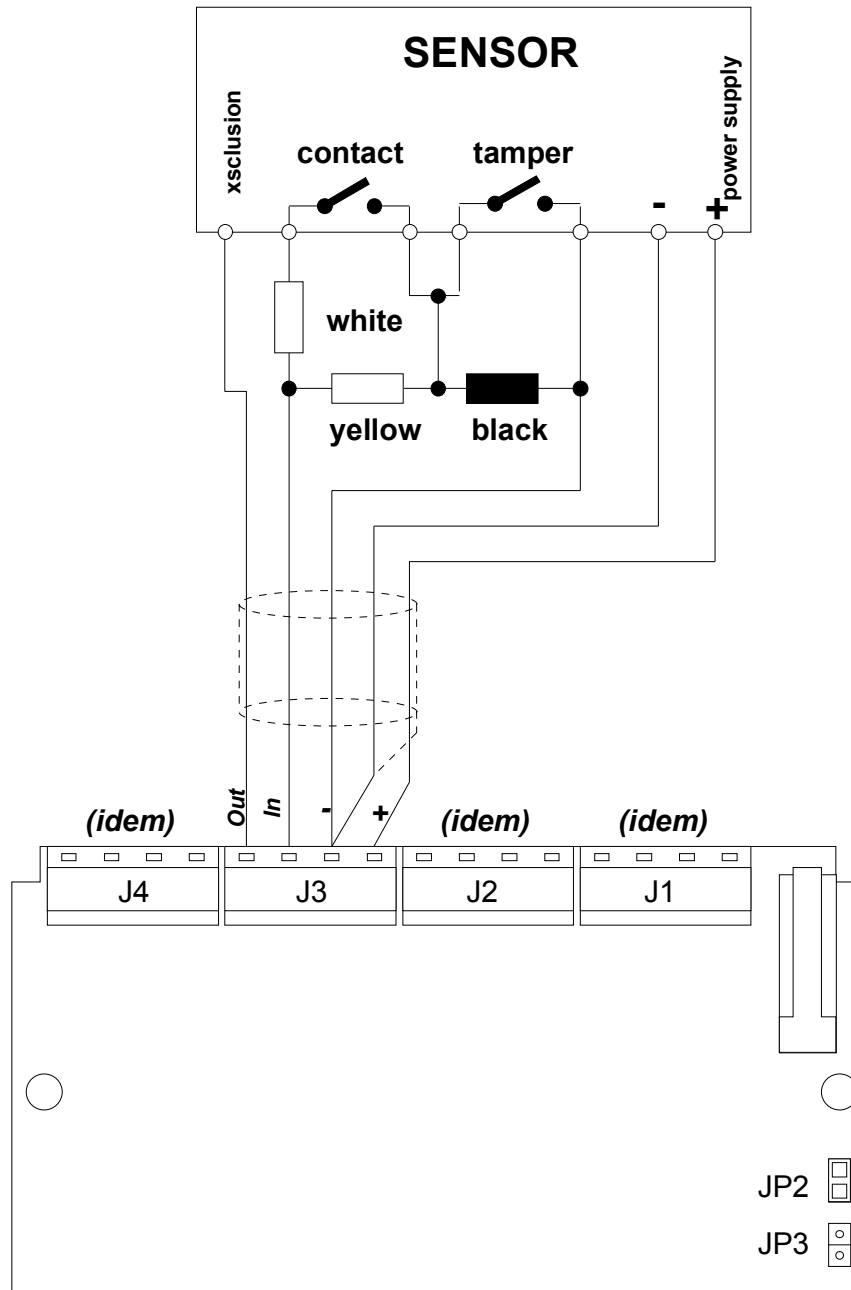


Figure 4. Connecting the Sensor Cables

Yellow resistor: 1210 Ohm 1%; White resistor: 392 Ohm 1%; Black resistor=3920 Ohm 1%

Close contact resistance: 296 Ohm; Open contact resistance: 1210 Ohm;

Tamper contact resistance: 3920 + 296 Ohm or 3920 + 1210 Ohm

When the cables go outdoor is mandatory to use shielded cables. The cables' shielding must be connected to the respective ground connectors (-V).

For internal wiring without shielded cables is recommended an electrical environment where the cables are well separated, even at short runs, especially to the power cables or external cables which can be essentially subjected to interference or lighting.

Use 4-wire (or 5-wire, if the sensor is provided with input disable) cables for the connections to the sensors. Make sure that the cables correspond in size to the norms indicated in Table 4 (maximum voltage drop on the cable = 0.1V):

$$\text{Cable length(m)} = 0.1V / (I[A] \text{ load} \times 2 \times (\text{res [Ohm/km]} / 1000))$$

I load max for each sensor = 100mA (400mA overall)

Type of cable			Length (m)				
			in relation to current absorbed by sensor				
AWG	mm2	ohm/Km	20 [mA]	50 [mA]	100 [mA]	200 [mA]	500 [mA]
12	3,3	5,7	439	175	88	44	18
14	2	8,8	284	114	57	28	11
16	1,3	14	179	71	36	18	7
18	0,9	21	119	48	24	12	5
20	0,6	34	74	29	15	7	3
22	0,35	52	48	19	10	5	2
24	0,2	85	29	12	6	3	1

Table 4. Sensor Cable Length

Connecting to load

Connect each of the cables from the load to one of the 4 available output connectors, as shown in Figure 7. Internally, all of the output lines are provided with Power Mosfet that can drive to ground:

1,2A 30V continuous

5A 30V (0,5 sec) peak current for inductive loads

When the cables go outdoor is mandatory to use shielded cables. The cables' shielding must be connected to the respective ground connectors (-V).

For internal wiring without shielded cables is recommended an electrical environment where the cables are well separated, even at short runs, especially to the power cables or external cables which can be essentially subjected to interference or lighting.

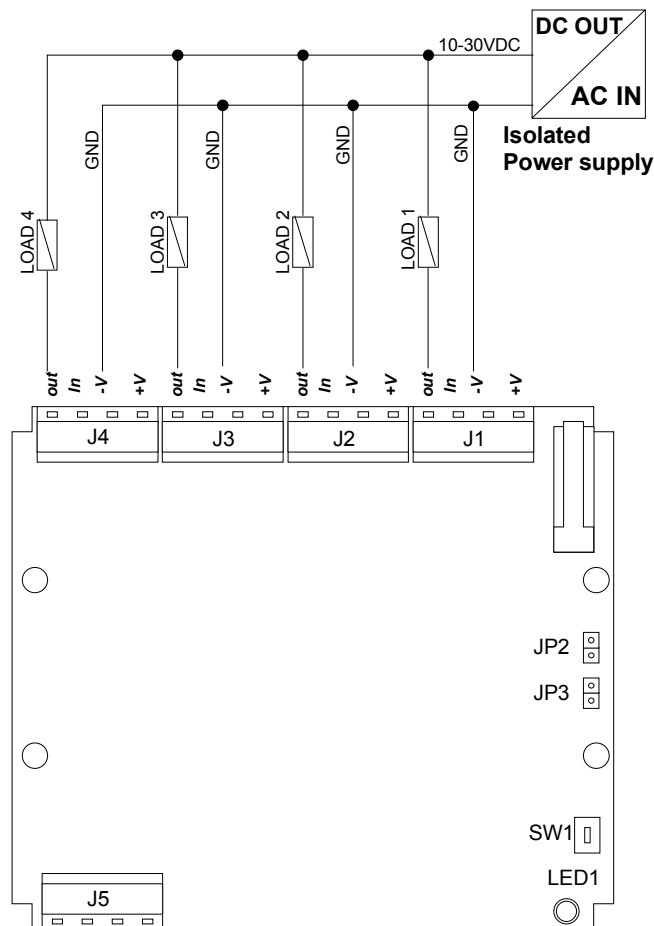


Figure 5: Connecting to resistive loads

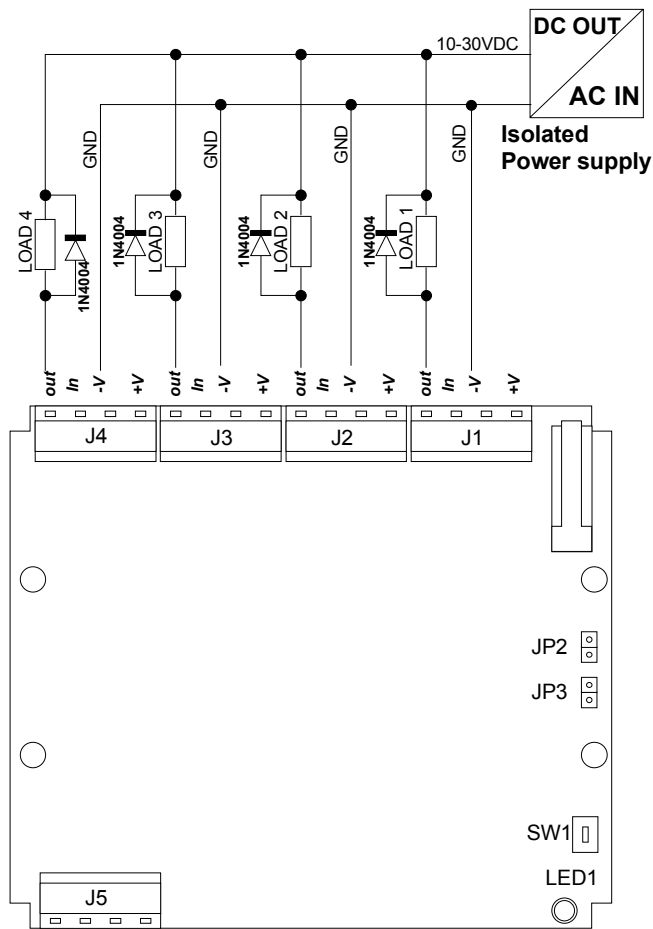


Figure 6: Connecting to inductive loads with an external isolated power supply

Note for inductive loads

- In this case is mandatory use the 1N4004 diodes as in figure. Four (4) Diodes are included in the product
- The external power supply have to be isolated

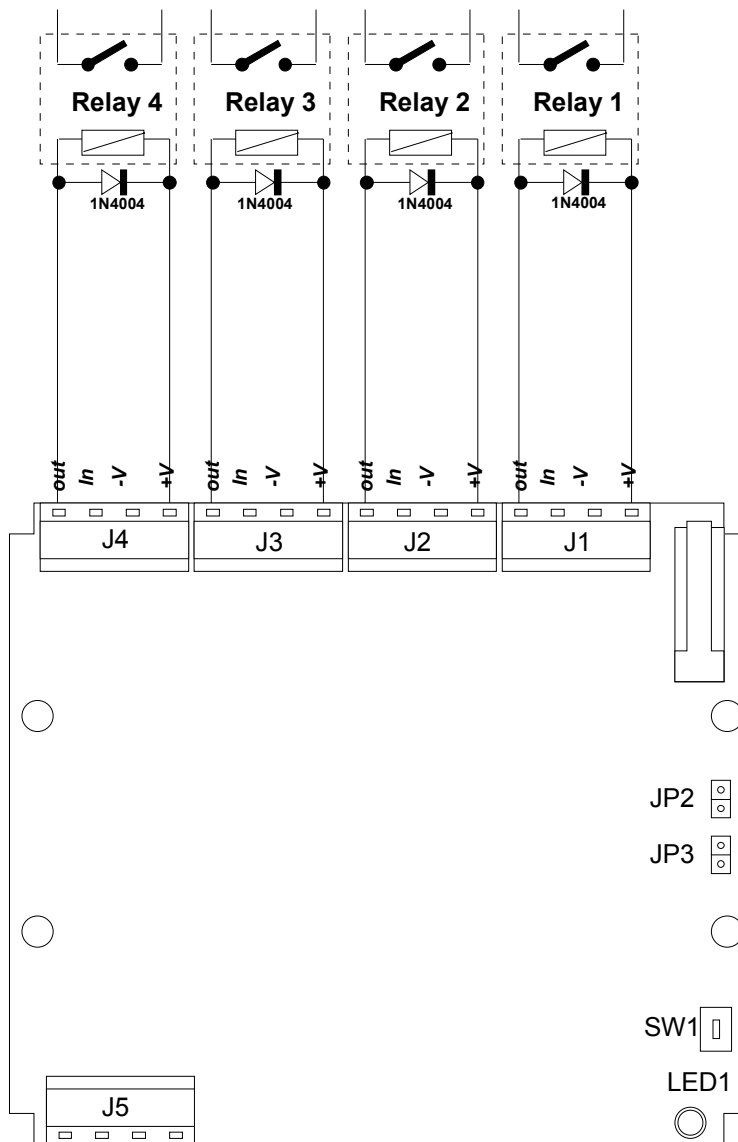


Figure 7. Connecting the Relays

Notes:

- Use 12VDC relay - max coil current = 100mA each.
- In this case is mandatory use the 1N4004 diodes as in figure.

LON and Power connection

Connect the LONWORKS[®] data cable and the two power cables to connector J5, as illustrated in Figure 8.

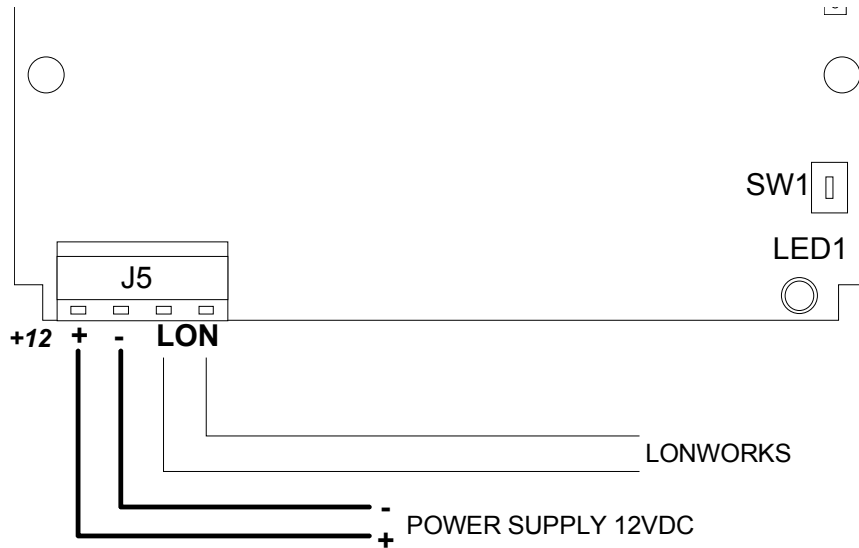


Figure 8. LON and power Connection

Anti-Removal Tamper Option

The anti-removal option consists of two optional microswitches. To mount this option, follow these steps:

1. Mount the first microswitch (an anti-removal tamper) onto the bottom panel of the box, so that it presses against the wall.
2. Mount the second microswitch (an anti-opening tamper) so that the lid of the box presses against it.

NOTES

- In this configuration, there is no need to place the safety cover on the RTU-A01P unit. The anti-opening tamper on the box protects all the contents (the unit itself, the cables, and the anti-removal tamper).
 - If the box contains several RTU-A01P units, it is only necessary to mount the anti-removal option on one of them.
3. Connect the anti-removal and the anti-opening tampers to their respective jumpers (JP2 and JP3) on the RTU-A01P unit (see Figure 9).
 4. Connect the tampers so that they are left in the “open” position.
 5. Use a Mascon CE100F24-2 Connector with AWG24 wires (no polarity)

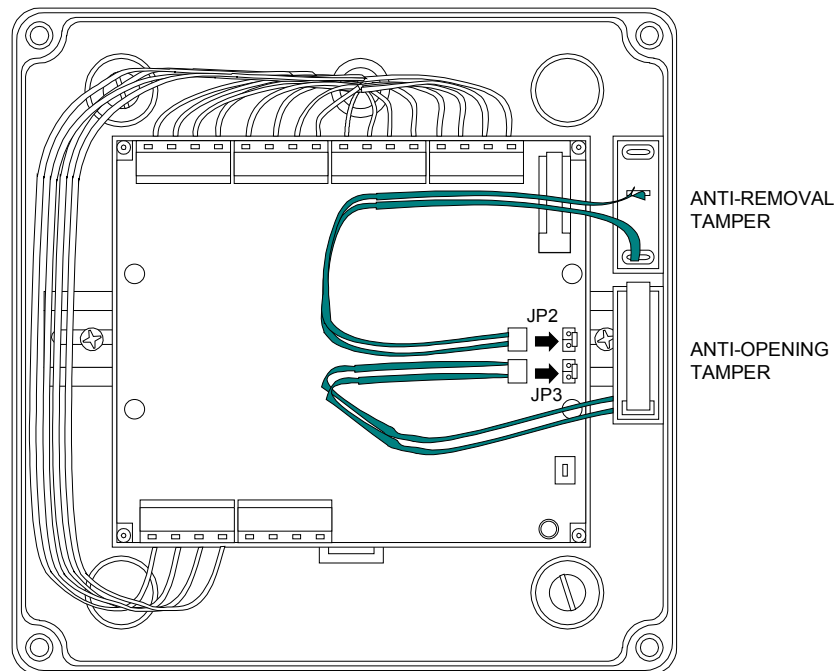


Figure 9. Anti-Removal Tamper Option

Elemental Detail

Figure 10 provides a detailed representation of the electronic card, including the main connectors, and jumpers.

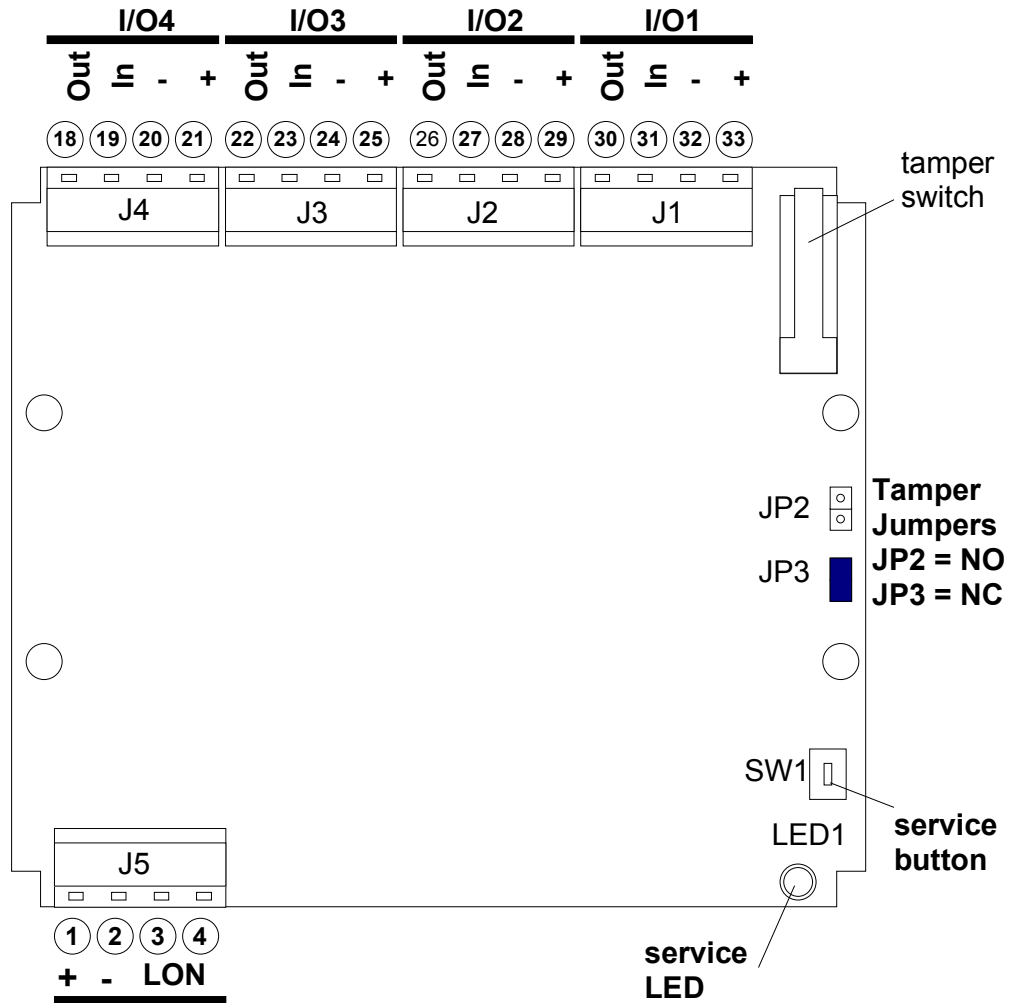


Figure 10. Elemental Detail

Jumpers

For normal operation, configure the jumpers on the main board as specified in Table 5.

Jumper	Function	Default State
JP2	anti-opening tamper	open
JP3	anti-removal tamper	inserted

Table 5. Configuration of Jumpers

If the anti-opening and anti-removal tampers are present on the board, connect the corresponding cables to JP2 and JP3, respectively. In this situation, the internal tamper does not serve any purpose, and there is no need to replace the upper safety cover of the unit (which can therefore be left open).

Harsh environment

In the harsh environment where the electromagnetic noise is very High the connections have to be:

- LON cable = unshielded or shielded with the shield connected to Earth in an only point and separate to the internal Ground
- Power input cable = shielded with the shield connected to Earth in an only point and separate to the internal Ground
- Inputs cable = shielded as in the Figure 3
- Output = use direct outs only if the load is at a distance less than 3 mt with an unshielded cable well separate to others cables.

If the load distance is more than 3 mt use the external relays to mount close to the RTUA01P at a distance less than 3 mt, connected with an unshielded cable well separate to others cables. See Figure 7

Closing the Unit

To close the unit, follow these steps (see Figure 11):

1. Place the safety cover onto the lower part of the unit.
2. Screw down the safety cover, using the 4 self-tapping screws (you will need a \varnothing 3mm Philips screwdriver).

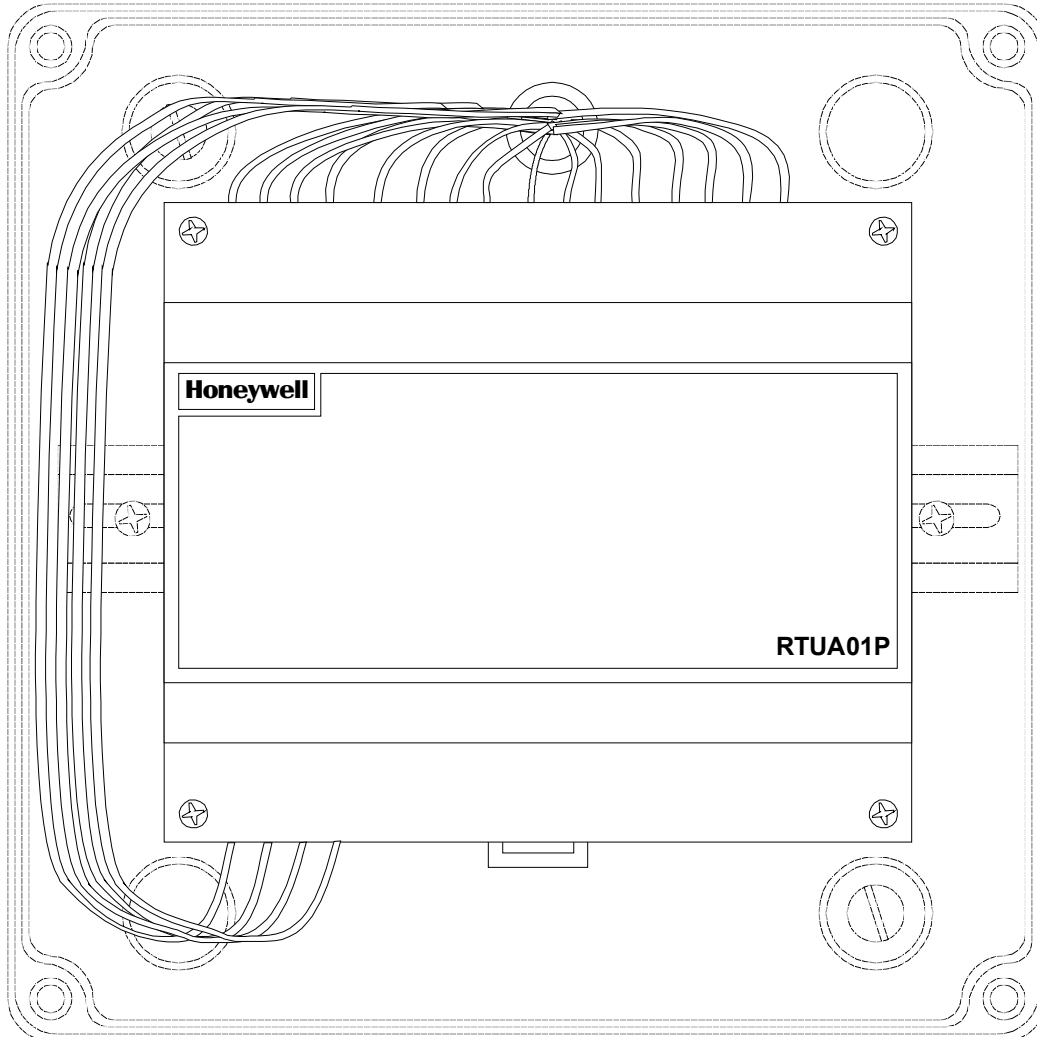


Figure 11. Closing the Unit

TECHNICAL SPECIFICATIONS

FCC NOTICE

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by tuning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.




Canadian Compliance Statement

This Class B Digital apparatus meets all the requirements of the Canadian Interference-Causing Equipment Regulations.
Cet appareil numérique de la classe B respecte les exigences du Règlement sur le matériel brouilleur du Canada.

TemaKey TK C21P (RTU-A01P code 1500163xx)

Parameter	Value												
Power Supply	12V +/-15% [18V internal PTC protection] 50mA [nominal], 450mA Max [including loads]												
Weight	0.2 Kg												
Dimensions	90x105x61 mm												
Mounting Support	Standard DIN/omega rail 35												
IP Protection Rating	IP31												
Environmental temperature	-20°C to 60°C												
LONWORKS [®] Connection ²	Unshielded twisted-pair cable in free topology (Echelon FT3120E4 RoHS chip)												
Outputs	<table border="0"> <tr> <td>Number</td> <td>4</td> </tr> <tr> <td>Type</td> <td>Power Open drain (MOSFET)</td> </tr> <tr> <td>Current</td> <td>1,2A continuous 5A (0,5sec) impulsive</td> </tr> <tr> <td>Voltage</td> <td>10V...+14V (internal Power supply)</td> </tr> <tr> <td>Voltage (absolute max)</td> <td>10V...+30V (from external Power supply).</td> </tr> <tr> <td>Current</td> <td>1,2A [5A / 0,5sec peak max –</td> </tr> </table>	Number	4	Type	Power Open drain (MOSFET)	Current	1,2A continuous 5A (0,5sec) impulsive	Voltage	10V...+14V (internal Power supply)	Voltage (absolute max)	10V...+30V (from external Power supply).	Current	1,2A [5A / 0,5sec peak max –
Number	4												
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Current	1,2A [5A / 0,5sec peak max –												

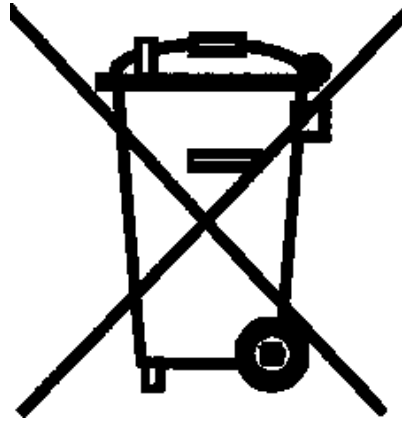
²LONWORKS[®] is a trademark of the Echelon Corporation

	<p>inductive load]</p> <p>Normality NO or NC via software setting</p> <p>Wire length connection: it depends on cable diameter, load current sink and load min power supply</p> <p>On state resistance = typical 20 mOhm Load 1A = 0.02 V</p>
Inputs	<p>Number 4</p> <p>Type Supervised</p> <p>Current 0 to 3mA for each input (internal reference)</p> <p>Voltage +14V max. 0V min</p>
Power Output for external devices	<p>12V +/-15%</p> <p>300mA Max. (overall) [internal PTC protection]</p>
Compliance with Regulations	<p> Directive EMC 89/336/EEC, 92/31/EEC, Directive Low Voltage 72/23/EEC, 93/68/EEC: EN60950, EN55024, EN55022</p>
	<p> This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.</p>
Environment friendly 	<p>RoHS / WEEE compliant device</p> <p>Directives 2002/95/EC 2002/96/EC</p>

Recycling

In application of directive 2002/96/EC regarding electrical and electronic waste devices, from 13 August 2005, Honeywell engages, when requested by the customer, to the collection, treatment, recovery, and proper disposal of all devices produced.

All users within the European Union are hereby informed of the requirement for the proper elimination of the product as regulated by laws, rules, and local procedures.



Spare Parts

Yellow resistor	Code	1651067
Black resistor	Code	1651068
White resistor	Code	1651069
Resistor kit	Code	1584927

ACTIVATION

Identification via the Service Pin

To identify the node, you can activate the service pin by means of a reed sensor located inside the unit (see Figure 12). This procedure consists of the following steps:

1. Place a magnet in front of the service reed sensor (see Figure 14).
2. The TemaServer then sends a *wink* command in response to the service pin, which makes yellow LED flash for 2 seconds. This allows you to verify that communication to and from the TemaServer is working.
3. Check that the service LED remains off after you have completed this operation.

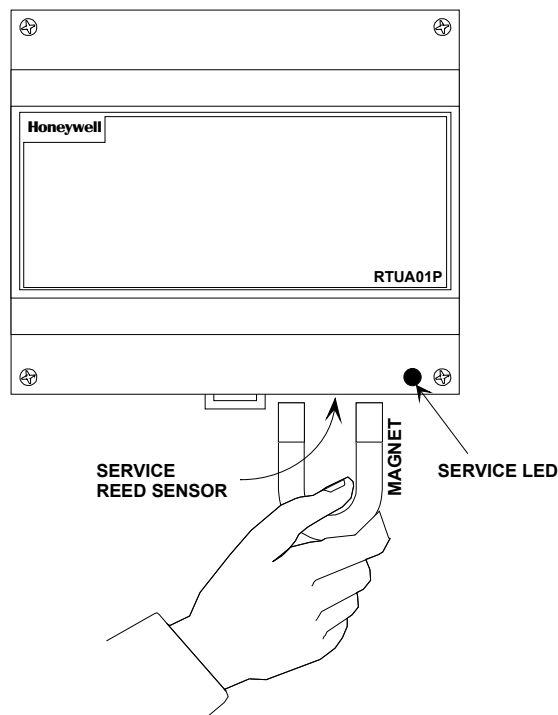


Figure 12. Service Elements

Identification via Bar Code

The components enclosed in the packaging include a bar code label. The person responsible for installing the terminal must apply this label to the corresponding identification form, and indicate the location of the terminal in the appropriate box (see example in Table 6).

Description of location <i>Office entrance area, first floor - staircase E</i>	
Description of TemaServer <i>Panel 2 entrance area, first floor - staircase E</i>	
RTU-A01P	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;"> Bar code label with Neuron ID </div>
Input 1	<i>Contact at entrance to offices</i>
Output 1	X
Input 2	<i>Contact at staircase entrance</i>
Output 2	X
Input 3	<i>Microwave sensor - entrance to offices</i>
Output 3	" " "
Input 4	<i>Infra-red sensor - entrance to offices</i>
Output 4	" " "

Table 6. Example of Completed Identification Form

Identification Form

Description of location	
Description of TemaServer	
RTU-A01P	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: auto;">Bar code label with Neuron ID</div>
Input 1	
Output 1	
Input 2	
Output 2	
Input 3	
Output 3	
Input 4	
Output 4	

Notes: