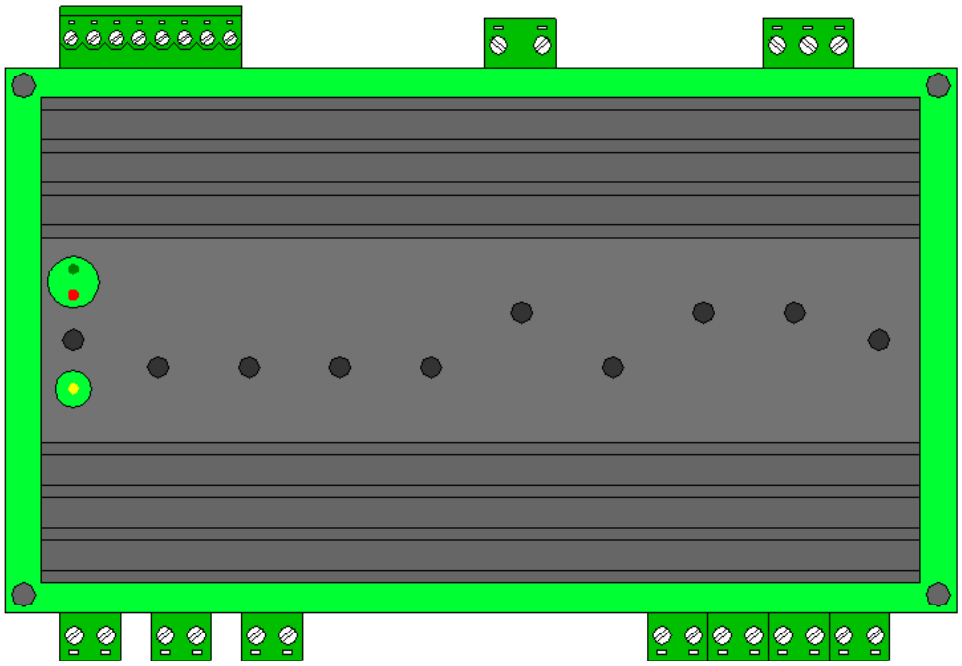
Honeywell

temapower

TP U04



Installation Manual

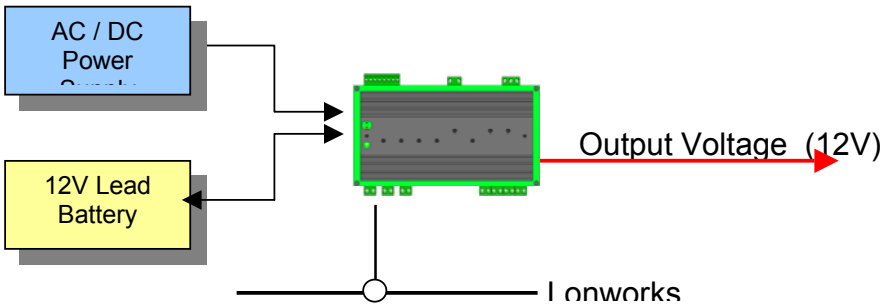
temaline
Creative solutions

TABLE OF CONTENTS

Description

The RTUQ04 is a device designed for supply and control of the power supply utilized in Temaline systems.

It requires a voltage of 14.1VDC, to be provided from an external power AC/DC power supply, as well as a battery for which it will control the discharge and recharge.
It communicates the power supply status (normal status, overload, operating on battery, failures) to the Temaline system via the LON line. It also manages the anti-tamper alarms.
The user is permitted to provide his own settings for protecting the output voltage to field, for the RTUx devices of the Temaline system, from short-circuits and excess voltage or current conditions.



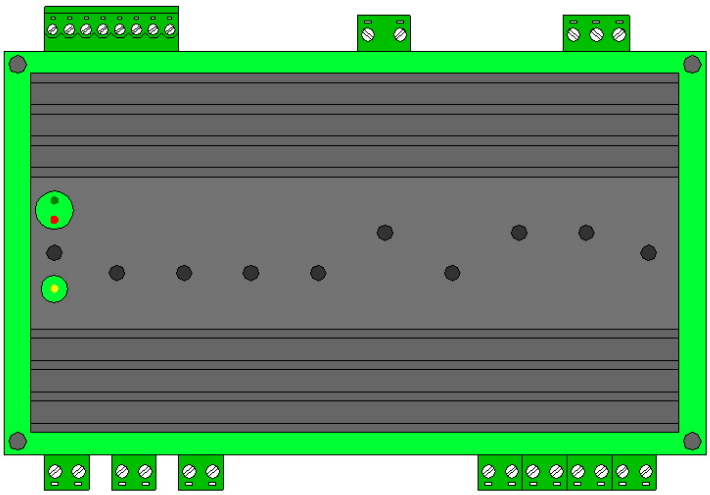


Figure 1. RTUQ04

PRELIMINARY OPERATIONS

Primary Power Isolation

A readily accessible disconnect device shall be incorporated in the building installation wiring to disconnect the equipment from the 115/230Vac supply for servicing.

Typical Setup

The RTUQ04 (TPU04) power control module must be coupled with an AC/DC power supply and a battery, in accordance with the user's requirements.

Typically, the housing will be in an electrical square frame equipped with a DIN bar to which the RTU-Q04, the associated power supply, and the bipolar sectioner will be connected. The battery is to be positioned at the bottom of the square frame.

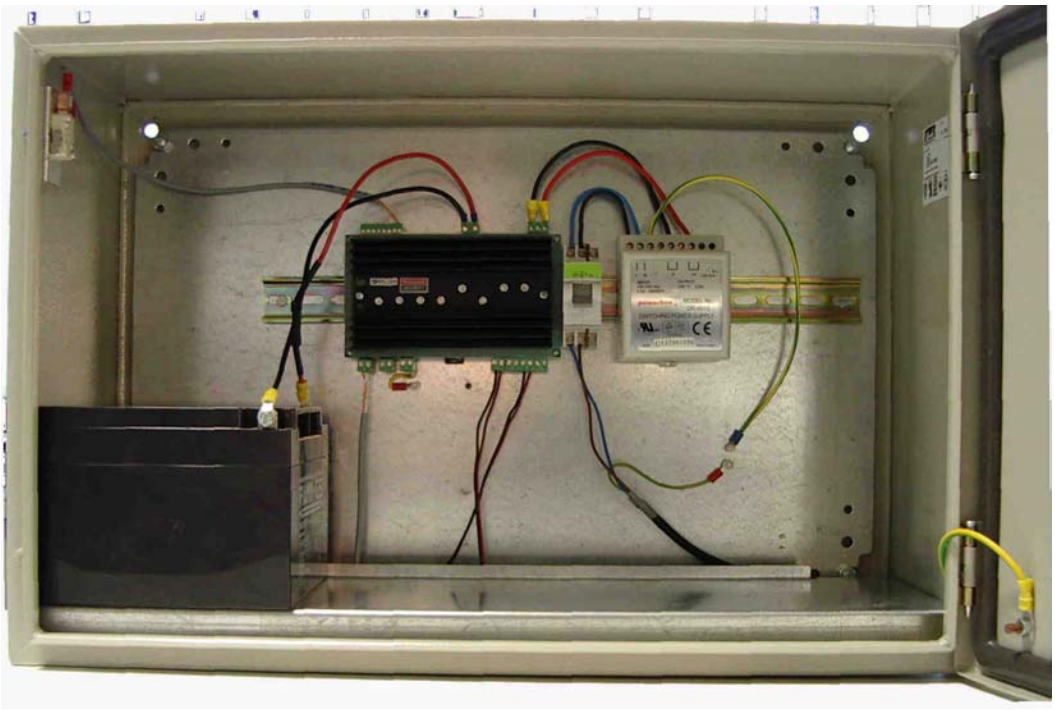


Figure 2. Typical Setup

Choosing the Right Battery

The battery must be lead, hermetic, and must provide 12V. Among those brands currently available, correct operation can be ensured when using Fiamm-GS or Dryfit, series A512 Sonnenschein. Other brands are not advised.

CAUTION:

Risk of explosion if the battery is replaced with an incorrect type.

Batteries should be recycled when possible.

Disposal of used batteries must be in accordance with local environmental regulations.

- Sizing:

The battery is to be chosen in accordance with the manufacturer's discharge tables, based on the discharge time, which is dependent upon field current.

Note: Maximum field current = 5 A
Maximum battery recharge current = 5 A

The power supply will disconnect from the battery at a voltage of 11.1V, therefore, for the Sonnenschein battery, the following table is to be applied:

Constant current discharge
Minimum battery voltage = 11.1V – Discharge in A at 20°C

Type	A/h	Part number	Discharge Time									
			5'	10'	20'	30'	1h	3h	5h	8h	10h	
A512/1.2S	1.2	NGA51201D2HS0SA	3.52	2.44	1.58	1.20	0.75	0.34	0.21	0.13	0.10	Discharge Current
A512/2S	2	NGA5120002HS0SA		3.70	2.60	2.00	1.50	0.56	0.34	0.22	0.18	
A512/3.5S	3.5	NGA51203D5HS0SA			4.50	3.40	2.10	0.95	0.60	0.39	0.32	
A512/6.5S	6.5	NGA51206D5HS0SA					3.60	1.50	1.10	0.73	0.61	
A512/10S	10	NGA5120010HS0SA						2.80	1.80	1.18	0.96	
A512/16G5	16	NGA5120016HS0BA						4.3	2.7	1.8	1.4	
A512/25G5	25	NGA5120025HS0BA							3.9	2.5	2.1	
A512/30G6	30	NGA5120030HS0BA							4.9	3.2	2.6	
A512/40A	40	NGA5120040HS0CA								4.3	3.5	
A512/40G6	40	NGA5120040HS0BA								4.3	3.5	
A512/55A	55	NGA5120055HS0CA									4.9	
A512/60A	60	NGA5120060HS0CA										
A512/60G6	60	NGA5120060HS0BA										
A512/65A	65	NGA5120065HS0CA										
A512/65G6	65	NGA5120065HS0BA										
A512/85A	85	NGA5120085HS0CA										
A512/115A	115	NGA5120115HS0CA										
A512/120A	120	NGA5120120HS0CA										
A512/140A	140	NGA5120140HS0CA										
A512/200A	200	NGA5120200HS0CA										

As an example, if the field current (discharge current) is 1.2A and 8 hours of autonomy are required, you must select the battery A512/10S (see the highlighted portion of the table).

For Fiamm-GS batteries, the following table applies:

Constant current discharge
Minimum battery voltage = 11.1V – Discharge in A at 20°C

Type	A/h	Discharge Time						
		1h	2h	3h	5h	10h	20h	
FG20721	7,2	*4,4*	*2,5*	*1,80*	*1,16*	*0,63*	*0,36*	*Discharge Current*
FG21202	12		*4,1*	*2,9*	*1,86*	*1,01*	*0,60*	
FG21803	18			*4,5*	*2,9*	*1,59*	*0,90*	
FG22703	27				*4,5*	*2,46*	*1,41*	
FG24204	42					*3,96*	*2,14*	
FG27004	70						*3,58*	

Approximate calculation: for cases where the requirements of the plant do not correspond in scale to any of the cases provided in the table, the following calculation can be applied:

Battery capacity [A/h] = discharge current I[A] * discharge time [hours]
Add 10% to the result and choose the closest battery that exceeds the result thus found.

As an example, if the field current is 1.1A and about 8 hours of autonomy are required ➔ 1.1 * 8 = 8.8 ➔ 8.8 + 10% = 9.7 A/h ➔ the battery is 10 A/h

As yet another example, if the field current is 3A and about 4 hours of autonomy are required ➔ 3 * 4 = 12 ➔ 12 + 10% = 13.2 A/h ➔ the battery is 16 A/h

As yet another example, if the field current is 2A and about 24 hours of autonomy are required ➔ 2 * 24 = 48 ➔ 48 + 10% = 53 A/h ➔ the battery is 55 A/h

Operating Temperature for the Battery
The table is calculated for autonomy at a temperature of 20:

0 degrees = 85% of the nominal capacity at 20°C
10 degrees = 95% of the nominal capacity at 20°C
20 degrees = 100% of the nominal capacity at 20°C
30/40 degrees = 102% of the nominal capacity at 20°C

Current Settings for Recharging the Battery

The chosen battery must be recharged at a current of no more than ¼ of the nominal capacity. This choice allows for a rapid recharge in about 4 hours. If plant requirements permit, it is preferable to extend the recharge period over a longer duration of time (8 hours, for example), as this will maximize the lifetime of the battery.

Setting of the recharge current is effected by using the dip switches on the RTUQ04, which have significance as follows:

DIP Switch 1 ON = 0.5A
DIP Switch 2 ON = 1.0 A
DIP Switch 3 ON = 2A
DIP Switch 4 ON = 2.5A

DIP Switches 1,2,3, and 4 can be used in an additive manner to select the desired current. In this way, it becomes possible to set any desired recharge current (at an increment of 0.5A) between 0.5A and 5A. For example, to set a recharge current of 2.5A, you would set Dip Switches 1 and 3 to the ON position.

Therefore, if you have chosen a Sonnenschein Dryfit A512/10S battery, the recharge current will be:
Recharge in 4 hours ➔ 10A/h / 4 = 2.5A ➔ OK - DIP Switch 4 ON
Recharge in 8 hours ➔ 10A/h / 8 = 1.25A ➔ corresponding value to be set ➔ 1.5 A DIP Switches 1 and 2 ON (10 A/h / 1.5 A = recharge in 6.6 hours)

In the event that no selection has been made, the recharge current is set to 0.2A, and this error condition is signaled by a blinking red LED on the front panel.

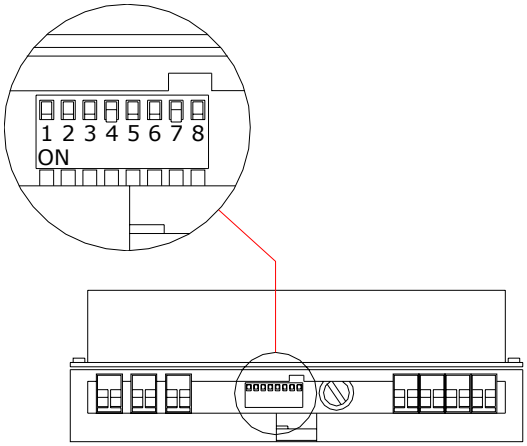


Figure 3: DIP Switch – Setting the battery recharge

Choosing the AC/DC Power Supply

The power supply must have the following characteristics:

- DIN rail TS35 mounting
- Vin = 115 / 230Vac 50/60Hz +/-10%
- Vout =14.1VDC (typically 12 or 15V, adjustable)
- Tolerance = +/- 2%
- Ripple & noise = 240mV max
- Excess current protection between 105% and 135% of current limit
- Excess voltage protection between 115% and 135% of voltage limit
- Operating temperature = from 0°C to +45°C
- Minimum life at 25°C at 100% charge = 32,000 hrs minimum
- Electrical Safety Standard: EN60950 or UL60950
- EMC standard: EN55022 Class B, EN61000-3-2, EN61000-4-2,3

I out = I field + I battery charge
For example:
I Out to field = 1.2A
I battery charge = 2.5A

Power Supply power:
Vout = 14.1V
I out = 3.7A

Pout = 52W
In order to improve the reliability of the system, it is advisable to choose the power delivered at about 10% greater, therefore:
Pout = 58W minimum

Setting the Maximum Output Current

The power supply is equipped with a circuit for protecting against current overloads and short circuits. The maximum output current is set through the use of the dip switches that are present on the RTUQ04, which have significance as follows:

DIP Switch 5 ON = 1A
DIP Switch 6 ON = 2.5A
DIP Switch 7 ON = 5A
DIP Switch 8 = must be kept in the OFF position

Multiple selections are not permitted. In the event that there are several selectors, or no selectors, in the ON position, the output current will be set at 5A, and this error condition will be indicated by the blinking red light on the front panel.

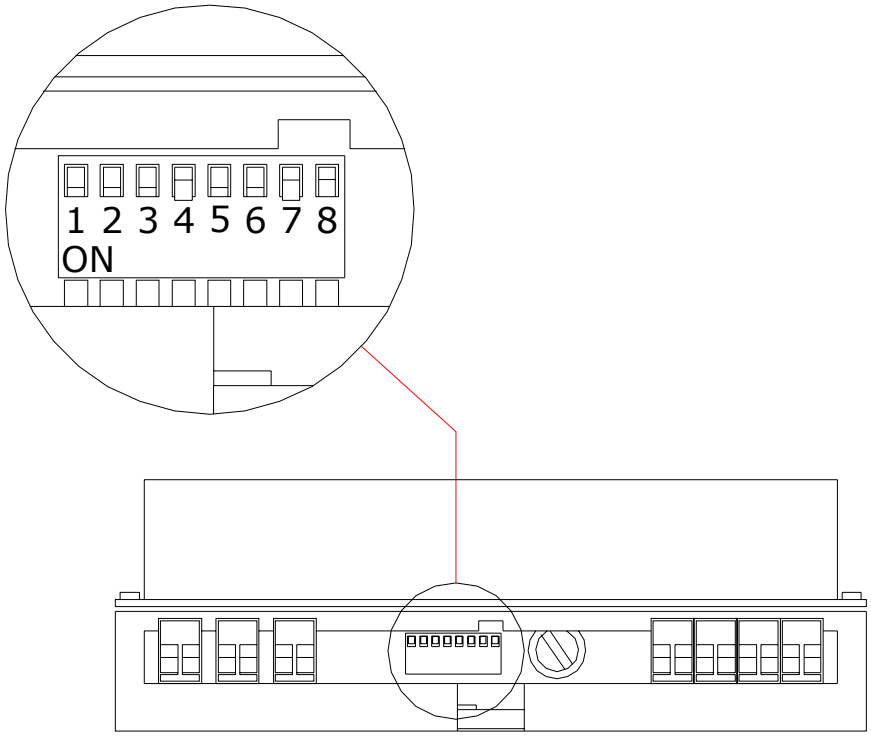
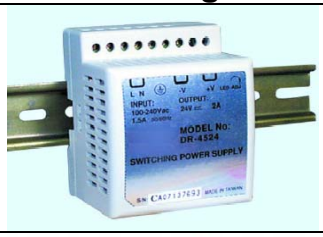


Figure 4. DIP Switches – setting the output current

Suggested Power Supplies

Manufacturer	Vac input	Vout	Power	Image
PowerBox DR-45-15 DIN Rail 35TS	85/264Vac	15VDC +/-10%	42W	
Hitron HPD150-S120125 DIN Rail 35TS	100/240V ac	12VDC +/-20%	150W	
PowerBox S-150-13,5 Accessories required for the DIN Rail 35TS mounting PowerBox models DRP01 and DRP03	Choices available: 88/132Vac or 176/264V ac	13.5VDC +/-10%	151W	

Electrical Connections

- +12Vout field power supply connection
- Lonworks cable connection
- +14.1 VIN Connection
- Battery connection
- Tampers connection

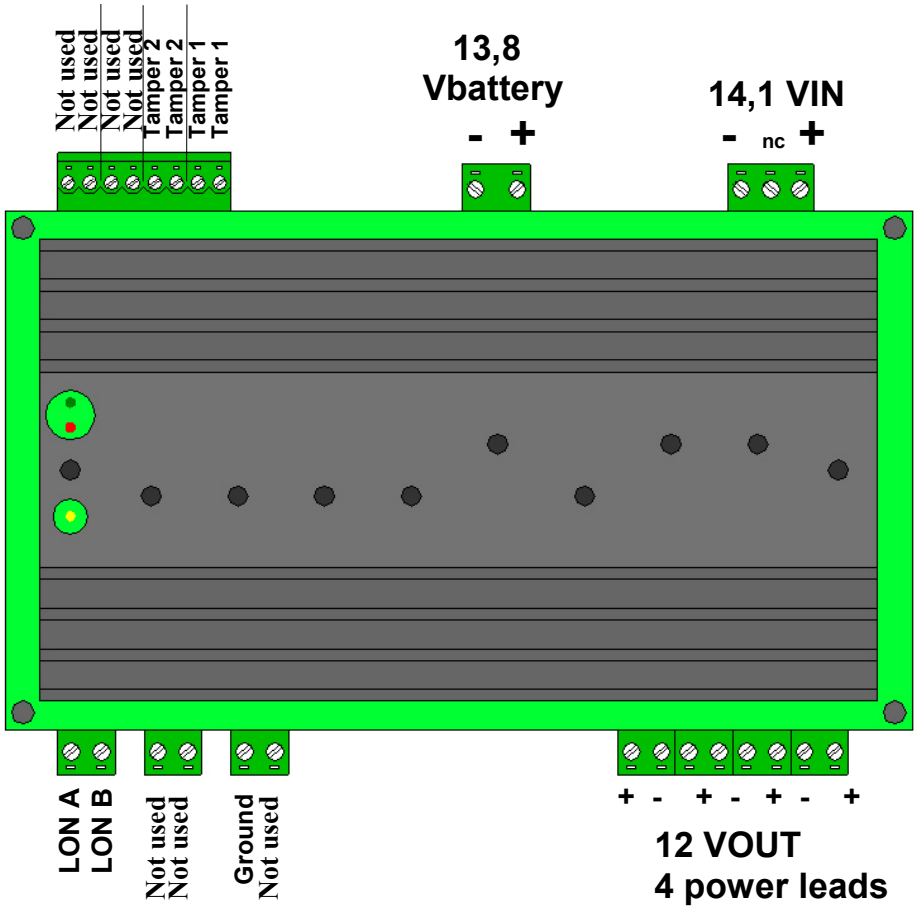


Figure 5. Cable Connections

12Vout Field Power Supply Cable

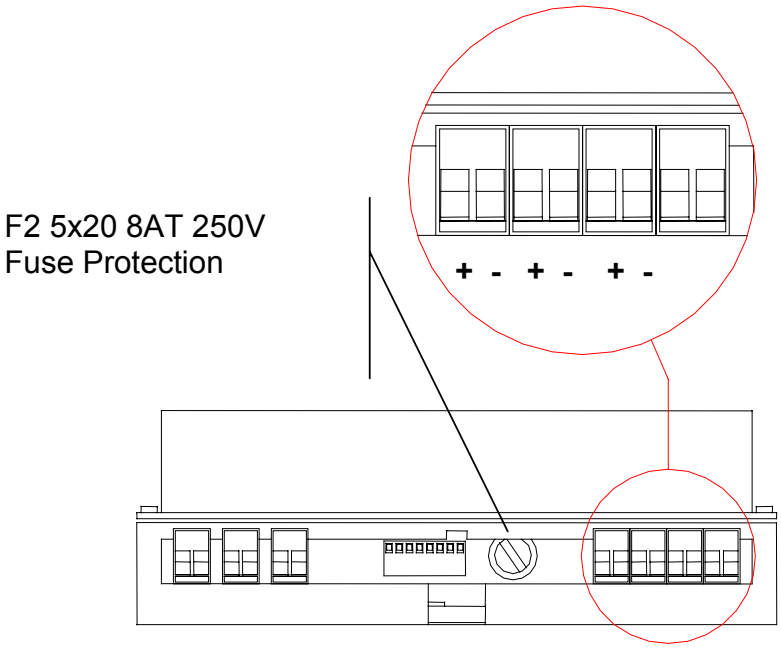


Figure 6. Cable Connection: +12VDC to RTUxxx

The output power supply is present on 4 connectors[1] which allow the connection for four power leads going to the RTUxxx devices. The section of the 12Vout cable for each of the leads can be calculated in accordance with the indications provided in the following table (maximum voltage drop on the cable = 0.7V):

Cable length(m) = 0.7V / (I[A] load x 2 x (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	1026	513	205	103	51	21
12	3,3	5,7	614	307	123	61	31	12
14	2	8,8	398	199	80	40	20	8
16	1,3	14	250	125	50	25	13	5
18	0,9	21	167	83	33	17	8	3
20	0,6	34	103	51	21	10	5	2
22	0,35	52	67	34	13	7	3	1

[1] Size of the connection conductor = max. 2,5 mm^2

For connection of the RTUA01 devices with 12V detectors connected, the section of the 12V cable can be calculated according to the indications provided in the following table (maximum voltage drop on the cable = 0.5V):

Cable length(m) = 0.5V / (I[A] load x 2 x (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

Parallel connection of several power supplies:

Power supplies can be placed in parallel. In this manner, the overall power can be calculated as the sum total of the powers of the individual power supplies. In this case the actual load to be used for sizing the conductors is the sum of all the loads placed in parallel.

Power supplies must be setting with max out current 5A (see pag. 12).

LONWORKS Data Cable

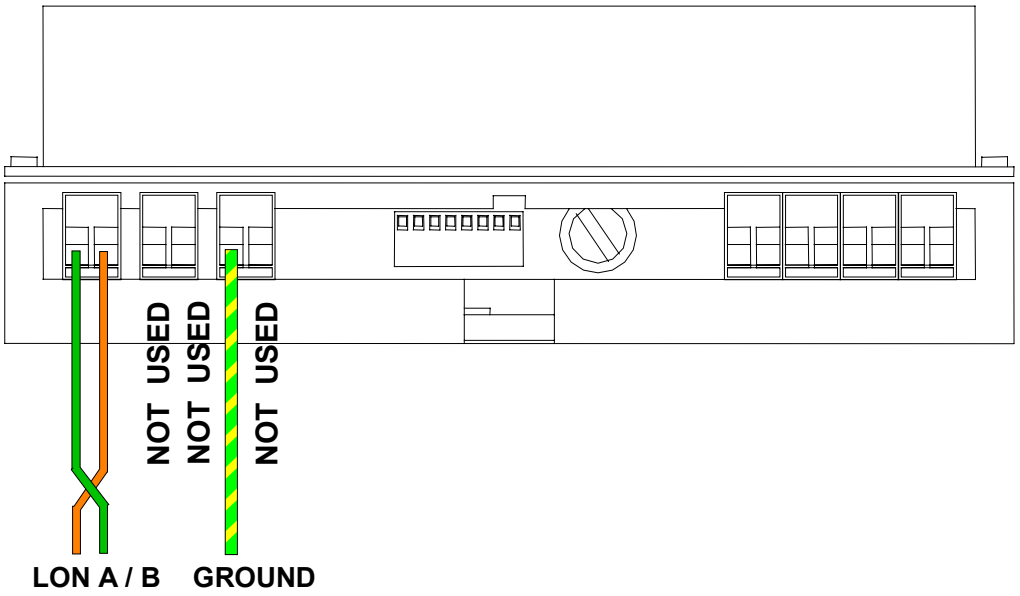


Figure 7.: Lonworks Data Cable Connection

- The conductor must be connected to ground in order to protect the LON line (protection against lightning, electrostatic discharge, etc. …)
- Data cables used with LONWORKS® must be twisted-pair
- In a free-topology configuration, the total sum of the cable lengths must not exceed 500m.
- In a bus configuration, the total sum of the cable lengths must not exceed 2700m.
- In a free-topology configuration the 50-ohm termination is applied by inserting the jumper into the FTT10A plug-in board located in the CTU.
- In a bus configuration, two terminations (100-ohm resistors 1% ½W) are located at the two ends of the bus.

- Refer to Table 1 when sizing data cables to be used with LONWORKS®.

Conductor Size			Length of conductor [m] based on its capacitance				
AWG	Mm2	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/Capacitance of Cables to be Used with LONWORKS®

- The suggested cables in the FTT10A Echelon® v1.2 User Guide are indicated in Table 2.

Mfg description and part number	AWG	Bus connection - Max. total length [m]	Free topology connection - Max. node to node length [m]
Belden 85102	16	2700	500
Belden 8471	16	2700	400
Level IV (twisted pair, solid, non-shielded)	22	1400	400
JY (St) 2x2x0.8 (4-wire helical twist, solid, shielded)	20	900	320

Table 2. Cables Suggested for Use with LONWORKS®

+14.1 VIN Connection

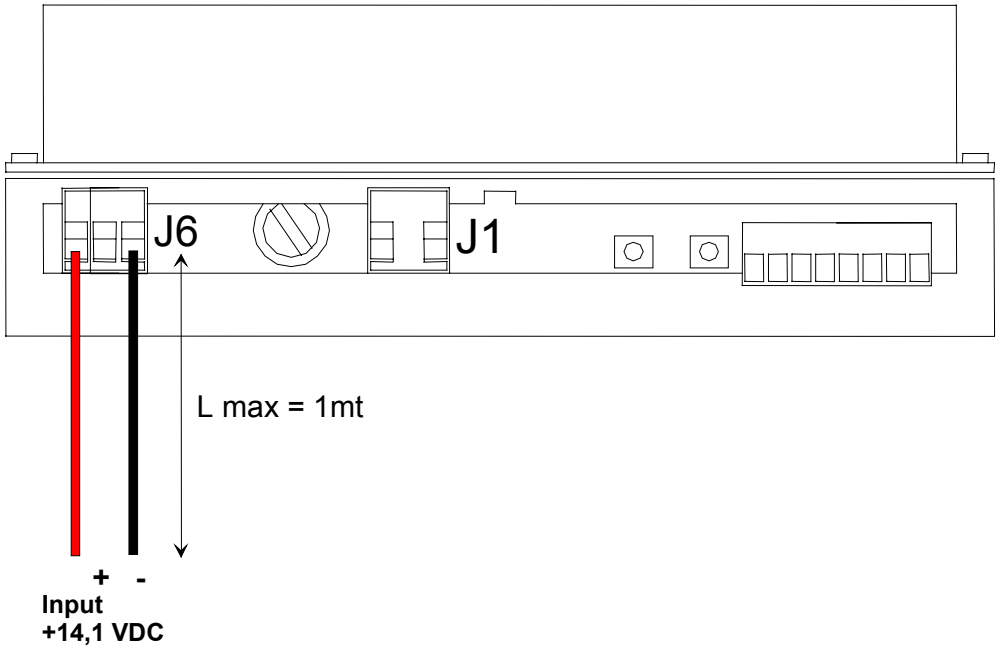


Figure 8. 14.1VDC Input Voltage Cable Connection

- Connection between the AC/DC power supply output and the RTUQ04 input connector must be done using conductors of 2mm^2 section and 1m length max. (this limitation is required in order to respect EN55024 regulations relating to protecting against electromagnetic disturbances)

Battery connection

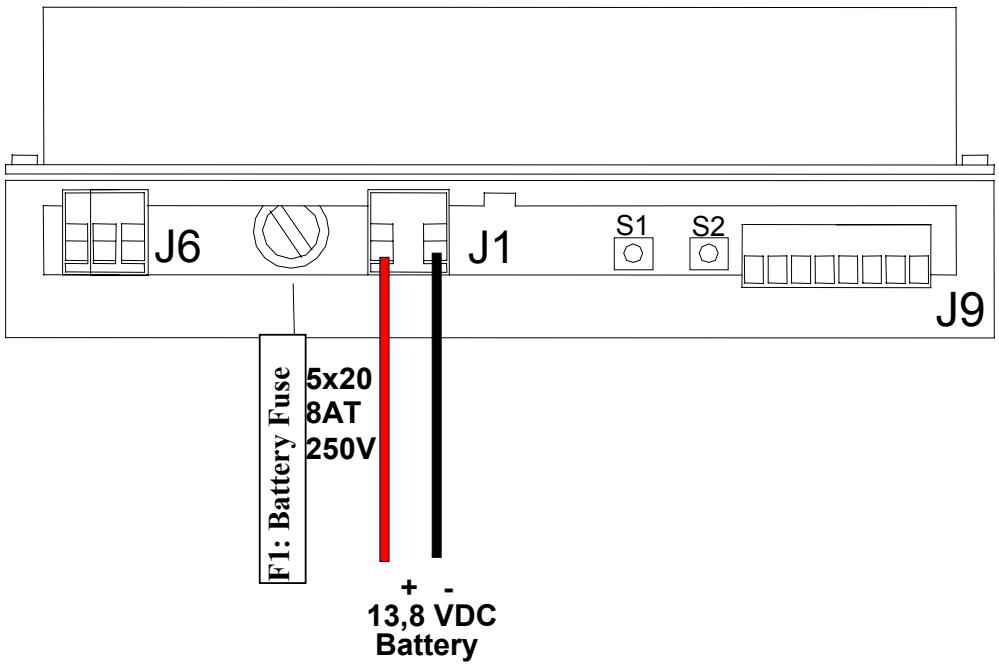


Figure 9. Battery Cable Connection

- The connection to the battery must be done using conductors of 2.5mm^2 section and length of 1m max. (this limitation is required in order to respect EN55024 regulations for protection against electromagnetic disturbances and because of the necessity to limit voltages drops related to cable length).

Tampers Switch (optional)

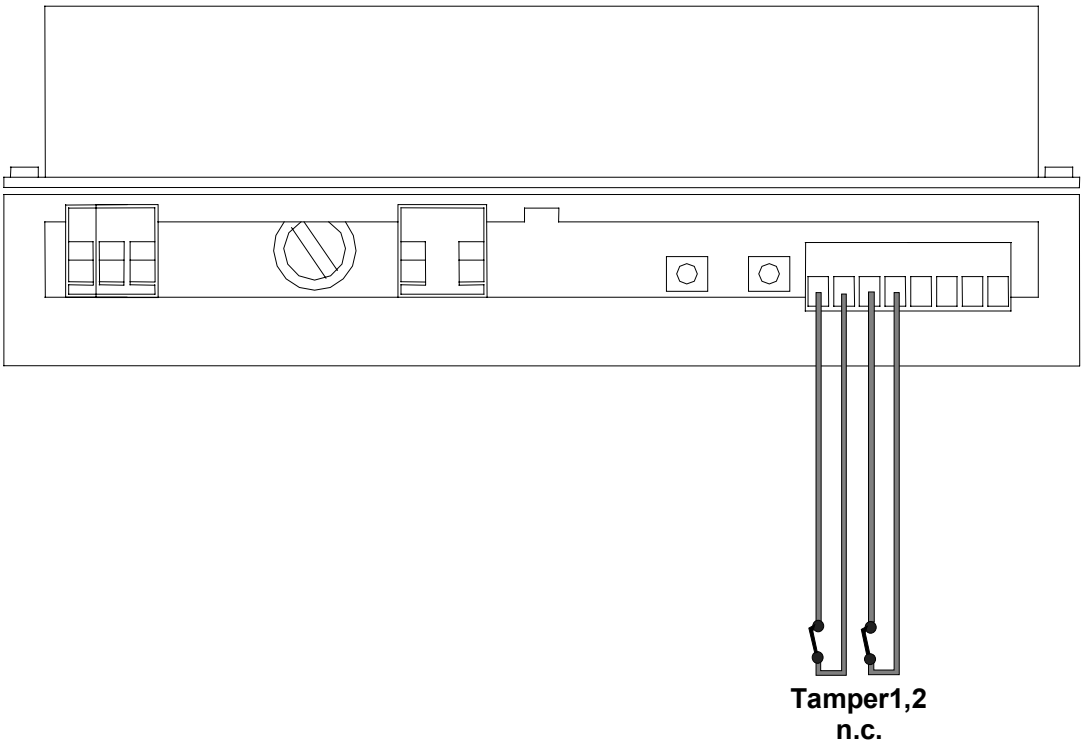


Figure 10. Tampers Cable Connection

- Through the use of appropriate inputs, it is possible to control access to the panel in which the RTUQ04 is inserted. The anti-tamper switches must be closed in a normal status. These are typically utilized for the open alarm (tamper 1) and the antiremoval alarm (tamper 2).

  Note: maximum length of connection = 3m; max conductor section = 1.5mm^2 (this limitation is required in order to respect the EN55024 regulations for protection against electromagnetic disturbances).

- When this function is not being used, the contacts must be wire jumpered (to simulate a closed contact).

Mounting the Module

Mount the module using the following procedures:

1. Rest the upper side of the RTU-Q04 on the support bar.
2. Push until you hear the connector flap make a click on the support bar (see Figure 11 – Mounting on the DIN Bar).

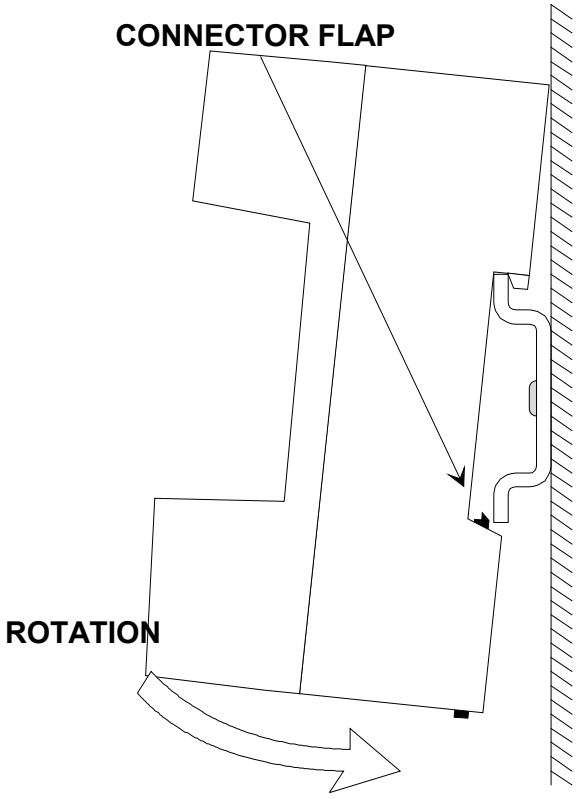


Figure 11 – Mounting on the DIN Bar

Turning On the Power Supply

Use the following procedures to activate the apparatus:

1. Turn the on switch to “ON” for the panel into which the RTUQ04 is inserted
2. Wait 2 to 3 seconds. If the red LED goes on, this means that there is an overload or short circuit on the output (or that the anti-open tamper is open): check the cabling and eliminate the cause of the error (see next paragraph).

   If the green LED is on it means the unit is operating normally.

Figure 12. Status Leds

Using LEDs for Problem Tracking

Red LED:

Off: normal status

Steady ON — possible causes:

1) Tamper alarm

- Close the anti-tamper contact and verify that it is off

2) Short circuit alarm or output voltage 8VDC

- Short circuit; disconnect the output load and verify that the LED goes off = check for a short circuit.

- Output voltage low; disconnect the output load and verify the voltage on the output terminals;

  - If the F2 output fuse is still whole and the voltage is 12V when the LED is off, then it probably means that a load greater than 5A was inserted; in this case the power supply will go into protection and deactivate the output.

- Remove a portion of the load and verify that the LED goes off.

  - If the F2 output fuse is still whole and the voltage is 10.5V, then the input voltage at J3 must be checked (see Figure 8. 14.1VDC Input Voltage Cable Connection):

    1. if the voltage is 13.8V, you must regulate it using the trimmer found on the power supply. When the battery is disconnected and with its load removed, the voltage at terminal J6 must be regulated to 14.1V. If it is not possible to regulate to 14V, the power supply is faulty and must be replaced.

- If the F2 output fuse is broken, then you must check that:

    1. That a reverse voltage was not inserted with the connection cable;

    2. That on the cable (without reconnecting it to the power supply) there is no voltage 18V (protection intervention voltage).

3) Battery charge voltage alarm 10.5VDC

- Disconnect the battery and use a tester to check the voltage on the J1 terminal (see

Figure 9. Battery Cable Connection);

- if the fuse at F1 is unbroken and the voltage is less than 13.5V, you must check the input voltage at J6:

    1. if the voltage is 13.8V, you must regulate it using the trimmer found on the power supply. When the battery is disconnected and with its load removed, the voltage at terminal J6 must be regulated to 14.1V. If it is not possible to regulate to 14V, the power supply is faulty and must be replaced.

- If the F1 output fuse is broken, then you must check that:

    1. The battery was installed with the correct polarity.

    2. If the fuse is replaced (after disconnecting the battery) and it stops immediately, then the power supply is faulty and must be replaced.

4) Battery disconnected or inefficient:

The power supply checks every 10 minutes for the presence and efficiency of the battery. If it occurs that the battery is disconnected or if the load voltage is less than 10V, the red LED will go on.

Note: this test is performed 30 seconds after startup.

- If the battery is disconnected, it must be reconnected, and after 10 minutes the red LED must go out.

Warning: when first turned on, you may find that the battery connected is undercharged (with voltage less than 10V) because of long warehouse storage, though it may still be possible to recharge it.

If this is the case, wait for the battery to recharge (which causes the red LED to go off). If the battery does not recharge even partially after about 4 hours, the battery must be replaced.

- If the battery is inefficient, it must be checked by disconnecting it from the power supply: insert a resistance load of 22 Ohm 5% 7W (about 0.5A load) between the two poles; if the voltage is less than 9V, the battery is inefficient and must be replaced.

  Note: this test is not to be performed on first startup, because the battery might simply be undercharged due to its time in the warehouse

Note: avg. battery lifespan = 3 yrs at 25º room temp.; with temperature increase avg life decreases (35º = 2 yrs)

Blinking 1sec on / 3 sec off:

current alarm > limit set using dip switches (see Figure 4. DIP Switches – setting the output current)

- insert an amperometer in series with the load and verify the current

Note: beyond the current limit that has been set, the output voltage gets disconnected, and the red LED signal goes steady ON for low output voltage. Once the load returns within limits, the reset is automatic.

Blinking 0.1sec on / 0.9 sec off:

Dip switch setting error.

- Set the battery charge current and the value for the maximum output current (see Figure 3: DIP Switch – Setting the battery recharge e Figure 4. DIP Switches – setting the output current).

Green LED:

Off: no meaning - power supply faulty

Steady On: 14.1VDC input present

Blinking: 14,1VDC voltage not present – operating on battery

Green LED and Red LED 1 sec blinking / 3 sec OFF:

The input voltage (J6) is checked to avoid a bad setting of the power supply when the input voltage is < of 12,5 VDC or > of 14,5 VDC

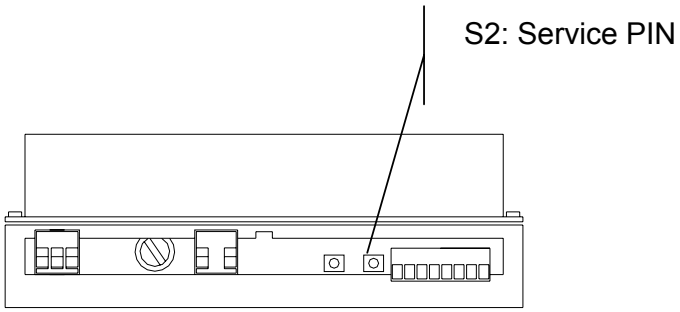
Yellow LED: [LonWorks Service LED]

Off: normal status

Steady On: Neuron Chip without application and not configured

Blinking 0.5Hz: Neuron Chip in application status present, but not configured

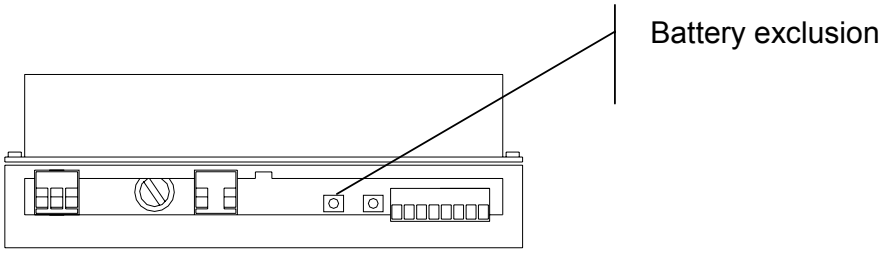
Note: the LED also goes on as an indication of activation of the service PIN via the S2 button.



Switching Off Power Supply (Maintenance)

Use the following procedures to de-activate the apparatus:

1. Turn the on switch to “OFF” for the square frame into which the RTUQ04 is inserted
2. Press the S1 button (battery exclusion) for about 2 seconds. The unit should now be off (green LED off).



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, these 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 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 numerique de la classe B respecte les exigences du Reglement sur le material broilleur du Canada.

TemaPower TP U04 (RTU-Q04 code 1500089xx)

Parameter	Value
Power supply	14.1VDC ±2% 10 A max (depending on the configuration)
Weight	0.4 kg
Dimensions	160 (length) x 110 (width) x 55 (height) mm
IP Protection Rating	IP31
Operating temperature	0°C to 45°C
Operational humidity	85% relative, no condensation
Storage temperature	-20°C to 70°C
Storage humidity	90% relative, no condensation
LONWORKS®[2] connection	"Free-topology" connection with twisted-pair non-shielded cable
Outputs	Voltage 12,5V_{DC}±10% Current 1 / 2.5 / 5 A (configurable)
Battery charge	Voltage 13.8V_{DC}±1% Current 0,5 ÷ 5 A (configurable)
Battery autonomy	Configurable

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

Battery protection	• Battery disconnect for output current 5A (automatic reset) • Load voltage limited to 13.8VDC • Load voltage protection at 14VDC • Polarity inversion protection via breakage of 8AT fuse
Output protection	• Output disconnect on short circuit (without breakage of fuse) • Output current limitation • Protection from excess external voltage 18V, via breakage of 8AT fuse
Conformance to regulation	CE EMC Directives 89/336/EEC, 92/31/EEC, Low Voltage Directives 72/23/EEC, 93/68/EEC: EN60950, EN55024, EN55022, EN61000-3-2/3
	FC **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.**

Spare parts

Fuses	F1 : 8AT 250V delayed F2 : 8AT 250V delayed

Accessory Parts

Battery connector cable	2 red / black conductors: 1m long by 2.5mm^2
+ 14.1 VIN connector cable	2 red / black conductors: 1m long by 2.5mm^2
Ground cable	1 yellow / black conductor: 40 cm long 2.5mm^2

ACTIVATION

Identification via the Service Pin

To identify the node, you can activate the service pin using a button position (see below). Follow the procedures as indicated:

1. Press the button and make sure tha\t the yellow service LED lights up. When the button is released, the yellow LED should go out.

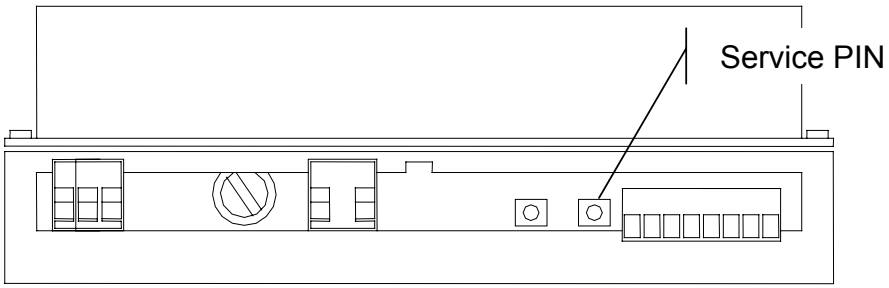


Figure 13. Activating the Service Pin

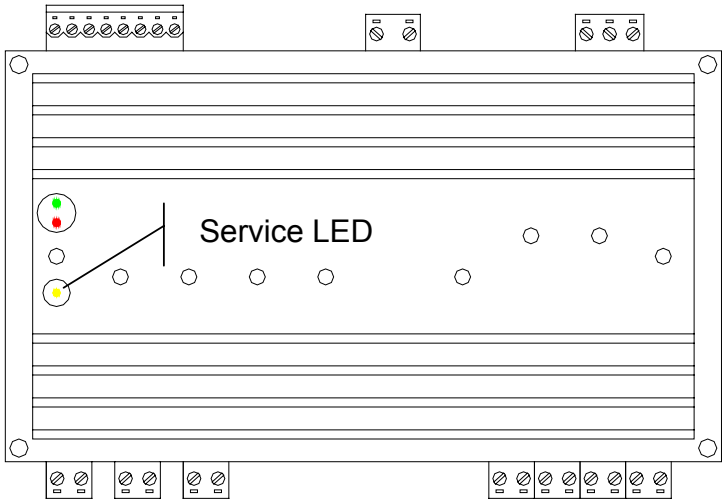


Figure 14. Service LED

Bar Code Identification

The bar code label enclosed in the box must be applied to the identification form by the installer. Terminal location must be indicated in appropriate box (see example in Table 3. Example of Completed Identification Form).

Location description *Office entrance, first floor staircase E*	
TemaServer description *Panel 2 first floor entrances staircase E*	

Table 3. Example of Completed Identification Form