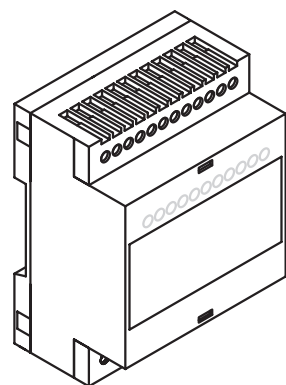




EN USER GUIDE



avior 2904 . C M . N B

VERSION

CONTROLLER C
CONTROLLER + GNSS G

MAIN POWER SUPPLY

NO MAIN 0
9...27VAC / 10...35VDC L
85...264VAC / 120...370VDC M
3,8V PRIMARY BATTERY B

PLMN

2G / 3G / 4G N
SIM + CONNECTIVITY 2G / 3G / 4G S

BATTERY

NO BATTERY 0
Li-Poly BATTERY B

DECLARATION OF CONFORMITY

Contrive S.r.l. Via Fermi 18 I-24040 Suisio
declares that the radio equipment **AviorEco** is in compliance with



UK Regulation 2017 (Radio Equipment) and
UK Regulation 2012 (RoHS)
The full text of DoC is available at the following internet address
<https://www.contrive.mobi/E/avioreco.php>



Directive 2014/53/EU (RED) and
Directive 2011/65/EU (RoHS)
The full text of DoC is available at the following internet address
<https://www.contrive.mobi/E/avioreco.php>
Countries:
AL AT BG BA BE CH CY CZ DE DK EE ES FI FR GE GR HR
HU IE IT LI LU ME MK MT NL NO PL PT RO SK SL SE

This device Contains FCC ID: XMR201708EC21E
complies with Part 22H and 27 of the FCC Rules

changes or modifications not expressly approved by the party responsible for compliance
could void the User's Authority to operate the equipment

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

SAFETY INFORMATION

- Do not use this unit near medical devices like pacemakers or hearing aids. This unit may interfere with the operation of these devices.
- Switch off this unit when flying. Secure it so that it cannot be switched on inadvertently.
- Do not install this unit near petrol stations, fuel depots, chemical plants or blasting operations when this unit can disturb the operation of technical equipment.
- Interference can occur if this unit is used near televisions, radios or personal computers.
- If the device has been stored in a cold environment, condensation can occur. Before starting operations, the device must be absolutely dry.
- In order to avoid possible damage, we recommend that you only use the specified accessories. These have been tested and shown to work well with this unit.

This device complies with Parts 15, 22, 27 and 24 of the FCC Rules. Operation is subject to the following two conditions:

- this device may not cause harmful interference, and
- this device must accept any interference received, including interference that may cause undesired operation.

This device should be installed only by qualified personnel. Carefully read the instruction manual in its entirety and keep it safe for future reference. It is essential to know the information and comply with the instructions given in the manual to ensure the fitting is installed, used and serviced correctly and safely.

This unit is not designed for and intended to be used in portable applications (within 20 cm or 8 inches of human body) and such uses are strictly prohibited. This unit is not authorised for use as critical component in life-support devices or systems unless a specific written agreement has been given.

If incorrectly installed in a vehicle, the operation of radio devices could interfere with the correct functioning of vehicle electronics. Verification of the protection of vehicle electronics should form a part of the installation.

No complex software or hardware system is perfect. Bugs are always present in a system of any size.

In order to prevent danger to life or property, it is the responsibility of the system designer to incorporate protective mechanism appropriate to the risk involved.

All units are 100% functionally tested. Specifications are based on characterisation of tested sample units rather than testing over temperature and voltage each unit.

Contrive disclaims all liability for damage to the fitting or to other property or persons deriving from installation, use and maintenance that have not been carried out in conformity with this instruction manual, which must always accompany the fitting.

CARE AND MAINTENANCE

Your Avior is the product of advanced engineering, design and craftsmanship and should be treated with care. The suggestion below will help you to enjoy this product for many years.

- Do not expose the unit to any extreme environment where the temperature or humidity are out of operating range.
- Do not use or store the unit in dusty or dirty areas.
- Do not use chemical cleaning agent on the unit or the SIM card.
- Do not attempt to disassemble the unit or remove any part or label.
- Do not expose the unit to water, rain or spilt beverages. It is not waterproof.
- Do not abuse the unit by dropping, knocking or violently shaking it. Rough handling can damage it.
- Do not place the unit alongside computer discs, credit cards or other magnetic media. Information contained on these devices may be affected.
- This unit is under your responsibility. Please treat it with care respecting all local regulations. It is not a toy: keep it in a safe place and out of the reach of children.
- Treat the SIM card with the same care as your credit card: do not bend or scratch or expose it to static electricity.
- Keep your password, unlock and PIN codes in safe place.

Both fixed and mobile applications are allowed, as defined below:

Fixed means that the device is physically secured at one location and it is not able to be easily moved to another location.

Mobile means that the device is designed to be used in other than fixed locations and generally in such a way that a separation distance of at least 20 cm (8 inches) is normally maintained between the transmitter's antenna and the body of the user or nearby persons.

Do contact an authorized service center in the unlikely event of a fault in the unit.

HOW IT WORKS

AviorEco is more or less a small computer with a built-in operating system to handle incoming events in real time (i.e. at the time of their occurrence).

Avior can work both as a passive remote controller managed by remote commands (CLOUD) or as a programmable controller deploying actions in response of events (EDGE).

Avior has input, output and communication CHANNELS, each of them can be enabled or disabled and can trigger events.

Avior is user programmable by means of RULES (up to 500).

A rule is activated by a TRIGGER EVENT associated with a channel (i.e.: input change, incoming email, wiegand code, etc).

Up to 5 optional CONDITIONS can be set for each rule (i.e: status of an input, analog input measured value, last wiegand code, etc). Existing conditions will be verified once the rule is activated.

Up to 5 COMMANDS can be set to be deployed when rule is activated and optional conditions verified.

- ✓ **REAL TIME EVENTS** such as an input activation or an incoming message are triggered immediately.
- ✓ **EVENTS BASED ON VALUES** such as analog input reading or pulse counters are evaluated every 60 seconds and triggered if due.
- ✓ **TIME BASED EVENTS** are evaluated every 60 seconds and triggered in case of matching.

Actions are queued to be executed once the resource is available: it means an hardware resource like a relay output will be activated immediately but a remote communication could be deferred until the bearer is available.

Some events can be associated with USERS (i.e.: the sender of an SMS can be recognized by his phone number, an user recognized by the code of his Wiegand badge, another device by its WebId, etc.).

Up to 5000 users can be stored into the device memory, for each of them it will be possible to define the name, an optional belonging group, a time based activation or a limited number of operations (tickets).

Different events are triggered by Avior when users are involved, distinguishing between active user, disabled user or unknown user.

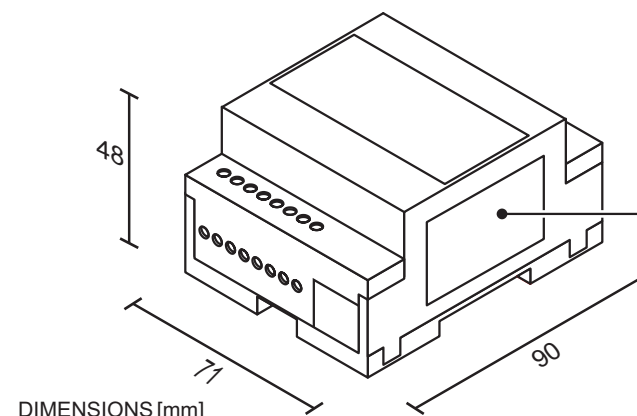


Download the configuration software
<https://www.contrive.mobi/E/aviorsuite.php>
Avior.Suite is a portable program.
No installation is required: extract the files to any local or remote location and run it.

If the device has a data connection, the configuration can be made also from the cloud interface.

PRODUCT SPECIFICATION

Temperature	-20 to 60 °C -40 to 85 °C	OPERATING STORAGE / TRANSPORT
Humidity	5 to 95%	NON-CONDENSING
Degree of protection	IP 40	EN-60529 / IEC 529
Electric equipment	Class II	DOUBLE INSULATION
Altitude	< 2000 m	
Pollution degree	2	
Overvoltage category	II	
Enclosure	4 modules POLYCARBONATE	EN-50022-35 RAIL UL94 -V0
Weight	< 200 g	



DIMENSIONS [mm]

26 / 36 / 46

Avior can access LTE Mobile Network by means of multi-mode Cat 1 modem providing automatic fallback to 3G and 2G networks.

LTE Bands	B3 FDD1800 / B7 FDD2600 / B20 FDD800
UMTS Bands	B1 WCDMA2100 / B8 WCDMA900
GSM Bands	B3 DCS1800 / B8 EGSM900
Output power	Class 4 (2W) EGSM900 Class 1 (1W) DCS1800 Class E2 (500mW) GSM900 8-PSK Class E2 (400mW) DCS1800 8-PSK Class 3 (250mW) WCDMA Class 3 (200mW) LTE-FDD Class 3 (200mW) LTE-TDD
Data LTE	Cat 1 FDD and TDD FDD uplink up to 10Mbps FDD downlink up to 5Mbps TDD uplink up to 8.96Mbps TDD downlink up to 3.1Mbps
Data UMTS	DC-HSDPA / HSPA+ / HSDPA / HSUPA / WCDMA DC-HSDPA downlink up to 42 Mbps HSUPA uplink up to 5.76Mbps WCDMA downlink up to 384 Kbps WCDMA uplink up to 384 Kbps
Data GPRS	multi-slot class 33 (default) downlink up to 107Kbps uplink up to 85.6Kbps
Data EDGE	multi-slot class 33 (default) downlink up to 296Kbps uplink up to 236.8Kbps

POWER SAVING

Power consumption depends on the operating conditions and the activation of some functions.

- ✓ **NO** - device is fully operational : 80...4000 mW
- ✓ **SLEEP** - low power mode after 1 minute of inactivity : 30 mW
Wake up occurs when an active digital input changes state, at specific wake up threshold of active analog channels, at incoming communication from cellular network and it's also possible to set a periodic wake up time.
- ✓ **HIBERNATE** - lowest power mode after 1 minute of inactivity : 0,8 mW
Wake up occurs when an active digital input changes state or after specified time.

Each channel can be activated and deactivated, the power supply for the digital inputs can be switched off in all modes, further reducing consumption. Power saving is suspended when the console (COM port) is open.

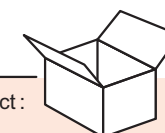
COMMUNICATIONS

AviorEco has multiple communication channels through which it can interact with humans and machines.

- ✓ Make and receive **TELEPHONE CALLS** from both users and unknown, play audio files and detect keypress (DTMF) during the call.
- ✓ Send and receive **SMS** from both users and unknown.
- ✓ Send **CHAT MESSAGES** and receive it through Telegram BOTs.
- ✓ Send and receive **EMAIL MESSAGES** through the SMM Server.
- ✓ Read/write device over COM port using the **Modbus RTU** protocol.
- ✓ Make requests with GET, POST, PUT and DELETE methods to any address, both **HTTP** and **HTTPS**.
- ✓ Send data to specific port of an IP address using the simpler **UDP** protocol.
- ✓ Send notifications to 4 distinct HTTP or HTTPS addresses (**WEBHOOKS**) when the configuration, log, users and rules change.
- ✓ Subscribe and publish topics to **MQTT** broker.
- ✓ Comprehensive set of **APIs** for device management from any IoT platform.

Please perform the following tasks after receiving the product :

- Inspect the unit for damage. If the unit appears damaged upon receipt, contact the shipper immediately.
- Verify receipt of the correct unit by checking the label on the side of the unit.
- If you have received the wrong model or the device does not function properly, contact your supplier.



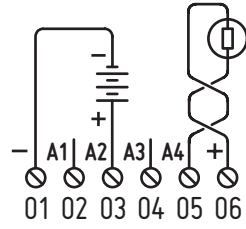
ANALOG INPUTS

1

Up to 4 analog signals can be connected at terminals 02 - 06 respect to negative terminal 01. Input mode and range can be selected by software for each input. Unreliable values returned for measures outside the allowed input range.

Voltage source here is connected to analog input A2 (terminal 03) respect to negative (01).

Input range	0 ... 10 V
Input max	12 V
Resolution	0,014 V
Accuracy	± 1 %
Impedance	35 kΩ

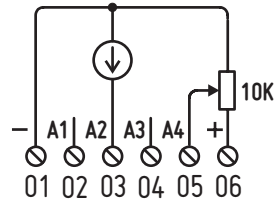


NTC temperature sensor here is connected to analog input A4 (terminal 05) and powered by 3,3V internal power supply (terminal 06).

Input range	-40 ... 100 °C
Resolution	0,1 °C
Accuracy	± 1 °C
NTC	10 kΩ @ 25°C B:3435@25+85°C RSR001 103AT/11

Current source here is connected to analog input A2 (terminal 03) respect to negative (01).

Input range	0 ... 20 mA
Input max	24 mA
Voltage drop	2 V @ 20mA
Resolution	0,028 mA
Accuracy	± 1 %
Impedance	500 Ω



Potentiometer is connected to analog input A4 to measure the voltage corresponding to cursor position between 0V and 3,3V (terminal 06).

Returned value and measuring unit can be set for any input, a value can be set for zero (i.e.: for 4+20mA, set zero to 4).

full scale value	1 ... 100000
zero	0 ... 21
unit	any text

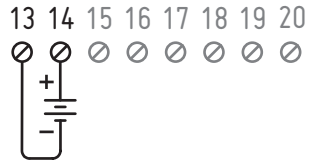
SHIELDED CABLE COULD BE USED FOR LONG LINES: SHIELD CONNECTED TO NEGATIVE TERMINAL 1 ONLY OTHER END MUST BE LEFT UNCONNECTED

MAIN POWER SUPPLY

3

OPTION B for units powered from a long-lasting, non-rechargeable external battery, typically lithium thionyl chloride cells for impulsive use. This solution can be adopted for low-power applications with periodic wake-up.

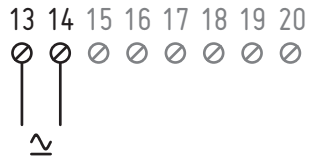
Voltage	3,4 ... 4,2 VDC
Power	80...4000 mW 30 mW SLEEP 0,8 mW HIBERNATE



Connections with reversed polarity do not damage the device but cause a quick discharge of the external battery.

OPTION L for units allowing low voltage supply in a wide voltage range.

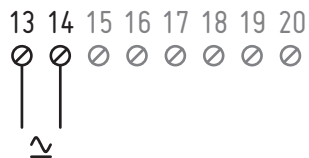
Voltage	9 ... 35 VDC 9 ... 27 VAC
Current	690 mA MAX



Power supply must not be shared with other equipments and meet SELV circuit requirements (EN/IEC 62368). Supply line length must be less than 3m.

OPTION M for units allowing supply from main power line at terminals 13 - 14.

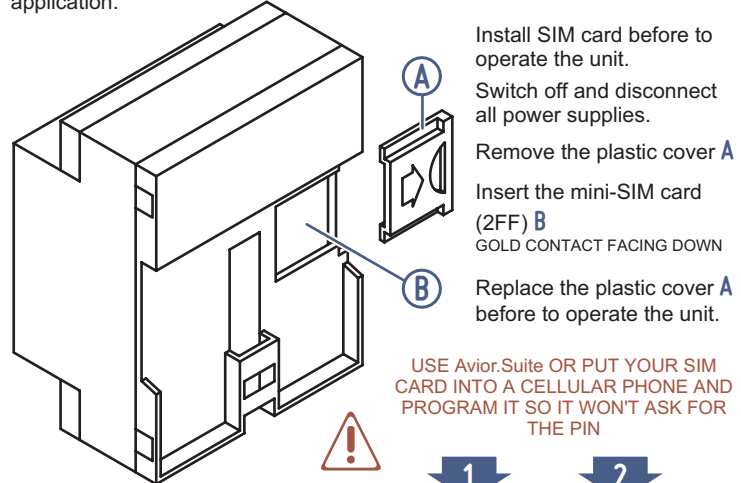
Voltage	85...264 VAC
Frequency	47...63 Hz
Power	< 5VA
Current	250 mA MAX @ 115 VAC 100 mA MAX @ 230 VAC
Power factor	0,60 @ 115 VAC 0,45 @ 230 VAC
Isolation	3 kV 1 MINUTE 4 kV 3 SECONDS



An automatic 2 pole circuit breaker or equivalent protection capable of disconnecting circuit in the event of short circuit or over current should be provided

INSTALLATION

This unit can be installed on any standard EN-50022 rail by simple snap-in. For safe operation, the unit must be installed only by qualified personnel in an enclosure which prevents accidental contact with hazardous voltages. Protection degree IP40 must be guaranteed, raised to IP54 for open air application.



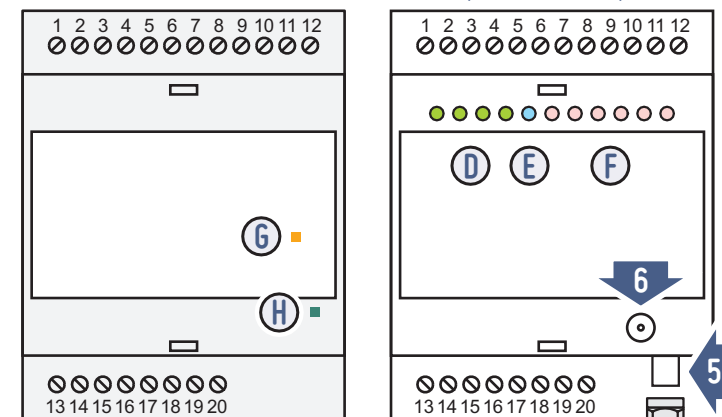
Install SIM card before to operate the unit.
Switch off and disconnect all power supplies.

Remove the plastic cover **A**

Insert the mini-SIM card (2FF) **B**
GOLD CONTACT FACING DOWN

Replace the plastic cover **A** before to operate the unit.

USE Avior.Suite OR PUT YOUR SIM CARD INTO A CELLULAR PHONE AND PROGRAM IT SO IT WON'T ASK FOR THE PIN



D Output **green** LEDs ON WHEN ACTIVE

F Digital input **red** LEDs ON WHEN ACTIVE

G Battery **yellow** LED ON WHILE CHARGING

H Power Supply **green** LED

All led indicators are visible through the transparent enclosure.

E Radio **blue** LED

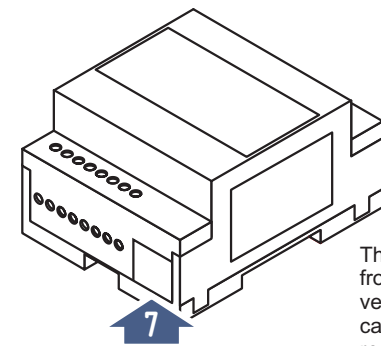
SLOW BLINK
500ms ON / 550ms OFF
NETWORK SEARCHING

FAST BLINK
500ms ON / 1500ms OFF
REGISTERED ON THE NETWORK

TRIPLE BLINK
REGISTERED NO INTERNET
OFF
SLEEP / HIBERNATE / OFF

LINK PORT - AUX SUPPLY

The communication interface is implemented as a 8 pole RJ45 modular socket.



RJ45	DB9
1.	RxD .2
2.	GND .5
3.	TxD .3
8.	+5V .-

115200 bit/s
8 DATA NO PARITY 1 STOP
Mobi.Link RS232 cable 2505.00.01
Mobi.Link USB cable 2505.00.03

Mobi.Link CABLES ARE NOT INCLUDED

This unit can receive the power supply from a Personal Computer USB, wall or vehicle adapter through Mobi.Link USB cable (power supply must meet SELV requirements EN/IEC62368). Maximum connection length between unit and supply source is 3 m.

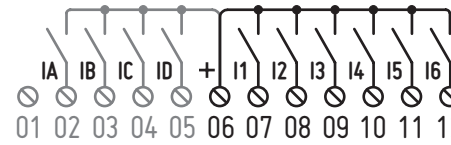
Voltage	5 VDC
Current	50 ... 300 mA TYPICAL 800 mA MAX ALL INPUT & OUTPUT ACTIVE BATTERY CHARGING LTE DATA TRANSFER

2

DIGITAL INPUTS

Up to 6 SPST contacts can be wired to terminals 07 - 12. Status is reported on LED indicators [F]. Internal power supply is available at terminal 06. Analog inputs (terminals 02 - 05) can be used as additional digital inputs. Debounce time setting for each input in the range 1 second to 18 hours.

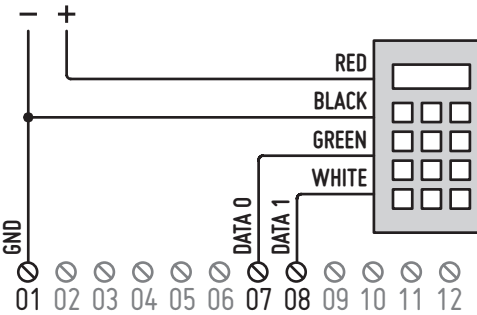
Input voltage	3 ... 12 VDC
Input current	0,5mA @ 3,3V



Inputs I1 - I6 can operate also as a **pulse or time counter**. SPST contacts, magnetic reed, hall sensor or electronic switches can be used.

Pulse width	> 20 ms
Frequency	< 25 Hz

WIEGAND reader can be connected to digital inputs I1 and I2, led indicators 1 and 2 are illuminated when associated data line is connected. External power supply for optional wiegand reader must comply with SELV specifications (EN / IEC 62368). Negative (GND) to terminal 01.



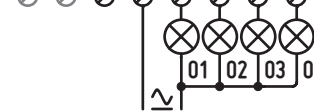
4

OUTPUTS

Up to four SPST relay contacts are available for process or appliance control at terminals 17 - 20. Status is reported on LED [D]. Common return at terminal 16.

Rated current	3 A cosφ = 1 / 1 A cosφ = 0,6
Rated voltage	250 VAC
Max breaking capacity	750 VA
Insulation voltage	277 V (IEC60664)

13 14 15 16 17 18 19 20



To prevent relay contacts from damaging, an external protection should be provided (fuse or similar), according to the relay breaking capacity.

5

CELLULAR ANTENNA

An external antenna (NOT INCLUDED) suitable for 2G / 3G / 4G networks must be connected to the RF interface, implemented as a SMA female connector:

Input Power	> 10 W
Impedance	50 Ω
Gain	≥ 1 dBi
VSWR	≤ 2 : 1
Frequency	698 + 960 MHz 1710 + 2170 MHz 2500 + 2700 MHz

6

GNSS ANTENNA

A specific antenna (NOT INCLUDED) must be connected to SMA female coaxial jack to operate the embedded GNSS receiver (option G).

GNSS SYSTEM	GPS / GLONASS
Tracking sensitivity	-162 dBm
Time To First Fix	35s COLD - 26s WARM - 3s HOT
Accuracy	< 2,5 m

Power supply for active antenna is provided by Avior (is the same 3,3V available at terminal 06 and can be switched on/off by software):

Frequency range	GPS/L1 1575,42 MHz GLONASS 1597,55 - 1605,89 MHz
Impedance	50 Ω
Gain	≥ 0 dBi < 18dBi

BATTERY

This unit can be optionally provided with a Li-Poly battery.

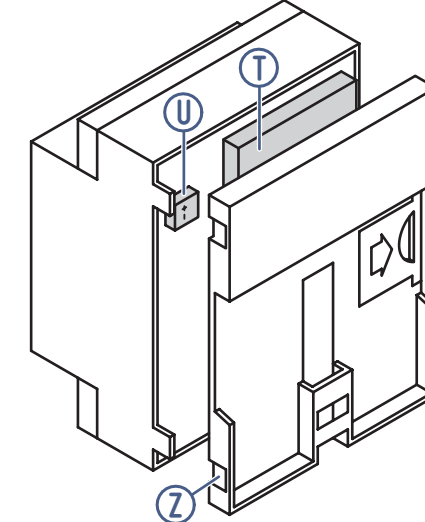
Voltage	3,7 V	4,2 V FULL CHARGE
Capacity	> 320 mAh	1.26 Wh
Temperature	-20...60°C	0...45°C CHARGING

The battery of a new unit is only partially charged. The charging process starts when external power supply is provided and suspended when the temperature is outside the safety charge range 0...45°C.

An internal yellow indicator [G] reports the battery charge in progress: ensure full battery charge for the first time, expected charging time is less than 2 hours. The expected backup time for a new and fully charged battery ranges from 15 minutes up to 10 days, depending on the operating conditions.

Before a long period of inactivity switch off the unit by means of specific command to prevent deep discharge of the battery.

Backup battery is not available for devices with supply from primary battery.



The typical estimated life of the battery is about 2 / 3 years and will gradually lose the capacity to hold a charge. This loss of capacity (aging) is irreversible. As the battery loses capacity, the length of time it will power the unit decreases.

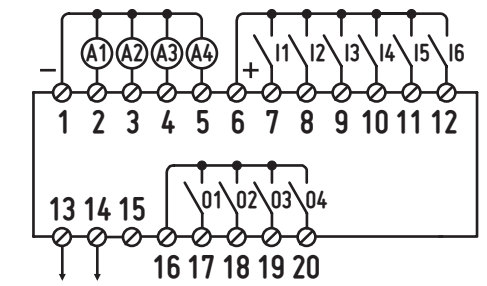
To replace the battery:

- remove the bottom cover **Z**
- unplug the battery **T**
- from the connector **U**
- replace the battery with original spare part only

RECYCLING OPTIONS AVAILABLE IN YOUR AREA MUST BE CONSIDERED WHEN DISPOSING BATTERIES ! DO NOT DISPOSE OF IN FIRE !

WIRING

- 01 Negative
- 02 Analog Input 1
- 03 Analog Input 2
- 04 Analog Input 3
- 05 Analog Input 4
- 06 Positive 3,3VDC
- 07 Digital Input 1
- 08 Digital Input 2
- 09 Digital Input 3
- 10 Digital Input 4
- 11 Digital Input 5
- 12 Digital Input 6
- 13 Power Supply
- 14 Power Supply
- 15 -
- 16 Relays common
- 17 Relay output 1
- 18 Relay output 2
- 19 Relay output 3
- 20 Relay output 4



LOW VOLTAGE POWER SUPPLY, INPUTS AND LINK PORT MUST MEET THE DEMANDS PLACED ON SELV (SAFETY EXTREMELY LOW VOLTAGE) CIRCUITS ACCORDING TO EN / IEC 62368

Regulated 3,3V - 50 mA MAX available at terminal 06 respect to negative terminal 01 can be switched on/off. For battery equipped units such power supply is provided also when main power supply is missing.

WARRANTIES

CONTRIVE GUARANTEES FOR TWO YEARS FROM THE DATE OF MANUFACTURE OF ITS PRODUCT TO REPLACE, OR, AT ITS OPTION, TO REPAIR ANY PRODUCT OR PART THEREOF WHICH IS FOUND DEFECTIVE IN MATERIAL OR WORKMANSHIP OR WHICH OTHERWISE FAILS TO CONFORM TO THE DESCRIPTION OF ITS SALES ORDER. CONTRIVE MAKES NO WARRANTY OF MERCHANTABILITY OR ANY OTHER WARRANTY EXPRESS OR IMPLIED. IN NO EVENT SHALL CONTRIVE BE LIABLE FOR CONSEQUENTIAL OR SPECIAL DAMAGES OF ANY NATURE WHICH MAY ARISE IN CONNECTION WITH SUCH PRODUCTS.

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