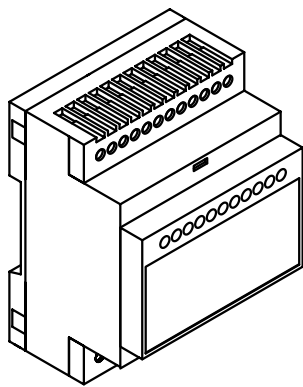


**avior**  
IoT • REMOTE CONTROL

PROGRAMMING GUIDE  
www.contrive.mobi/avior  
CONFIGURATION SOFTWARE  
www.contrive.mobi/E/aviorsuite.php  
CLOUD CONTROL PANEL  
www.avior.webadmin.mobi



**EN USER GUIDE**

**avior 2900 . C M . O B**

**VERSION**

CONTROLLER C  
WiFi MODEM W  
PLMN MODEM P

**MAIN POWER SUPPLY**

NO MAIN 0  
9...27VAC / 10...35VDC L  
85...264VAC / 120...370VDC M

**PLMN**

NO PLMN 0  
4 BAND GSM / GPRS 1  
DUAL SIM 4 BAND GSM / GPRS 2  
LTE + 3G + GSM / EDGE 4

**BATTERY**

NO BATTERY 0  
Li-Poly BATTERY B

**DECLARATION OF CONFORMITY**

Contrive S.r.l.  
Via Fermi 18 I-24040 Suisio  
declares that the DoC is issued under our sole responsibility  
and belongs to the following product :

**Avior**

RADIO CONTROL FOR INDUSTRIAL AND HOUSE EQUIPMENTS

is in conformity with the relevant Union legislation

**Radio Equipment Directive 2014/53/EU**

the following standards and technical specifications have been applied :

STANDARD	ISSUE DATE	
SAFETY		A/V IT COM
EN 62368-1	2014	RF EXPOSURE
EN 62311	2008	
EMC		MULTIMEDIA EQUIPMENT
EN 55032	2015	MULTIMEDIA EQUIPMENT
EN 55035	2017	MULTIMEDIA EQUIPMENT
EN 301 489-1	2017	v2.1.1 RADIO EQUIPMENT
EN 301 489-17	2016	v3.1.1 RADIO EQUIPMENT
EN 301 489-52	2016	v1.1.0 RADIO EQUIPMENT
RADIO SPECTRUM		WIFI BLUETOOTH
EN 300 328	2016	v2.1.1 GSM
EN 301 511	2016	v12.5.1 GSM
EN 301 908-2	2016	v11.1.2 CELLULAR
EN 301 908-13	2016	v11.1.2 CELLULAR

EN55032 Class B equipment (domestic) emission level applied  
EN55032 Class A equipment (industrial) immunity level applied  
STATES INTENDED FOR USE : ALL EU AND EFTA MEMBERS  
MEMBER STATES WITH RESTRICTIVE USE : NONE

THE TECHNICAL DOCUMENTATION AS REQUIRED BY THE CONFORMITY ASSESSMENT  
PROCEDURE IS KEPT AT THE COMPANY MAIN OFFICE

**THIS DEVICE COMPLIES WITH FCC RULES**

CFR (CODE OF FEDERAL REGULATIONS) TITLE 47 TELECOMMUNICATIONS  
Contains FCC ID: 2AC7Z-ESPWROOM32D (ISM)  
Optionally contains FCC ID: XMR201511M85 or XMR201708EC21E

Part 15B Radio Frequency Devices

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:

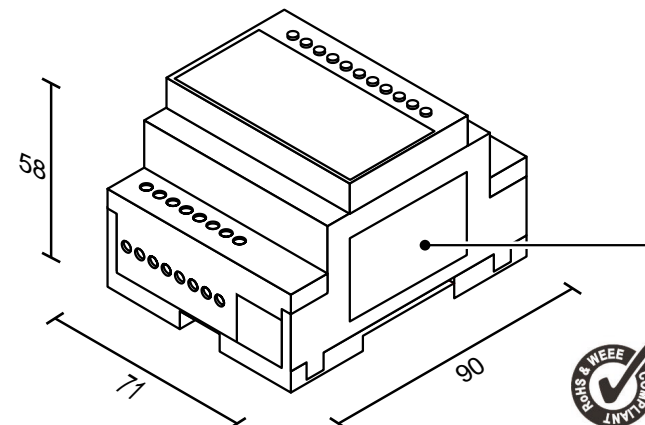
**Fixed** means that the device is physically secured at one location and it is not able to be easily moved to another location.

**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.

**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	



**PLMN 4G**

To access LTE Mobile Network the unit must be equipped with 4G PLMN board, a multi-mode Cat 1 modem providing automatic fallback to 3G or 2G networks.

SIM card	SIM and USIM 3V / 1.8V
LTE Bands	B3 FDD1900 / 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
LTE version	3GPP E-UTRA release 11
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

Network status is reported by yellow LED [S], this indicator is kept off when the PLMN is operated by controller board.

- SLOW BLINK**  
200ms ON / 1800ms OFF  
Network searching
- BLINK**  
1800ms ON / 200ms OFF  
Registered on the network
- QUICK BLINK**  
125ms ON / 125ms OFF  
Communication in progress
- ON**  
Voice call in progress

**PRODUCT DESCRIPTION**

Avior is an industrial DIN rail wireless unit for the supervision and control of remote inputs and outputs through WiFi and cellular connectivity.

- Avior collects data from the environment and performs actions.
- Avior transmits collected data and receives commands from the cloud.
- Avior works both on the edge (as a programmable logic controller) and in the cloud (managed from remote).
- Avior ecosystem includes a web portal and a set of API allowing any smart device to be used as a system interface.
- Main power supply 115/230Vac or low voltage
- Aux power supply 5Vdc
- Li-Poly backup battery
- 6 digital inputs (with time counter / counter / Wiegand)
- 4 analog inputs (software configurable 0+10V / 0+20mA / NTC)
- 4 relay outputs (3A / 250V)
- 1 RS232 port (RJ45 connector)
- WiFi IEEE802.11 b/g/n
- BLE (Advertiser/Observer)
- SD card up to 32GB
- Infrared transmitter and receiver
- Temperature sensor
- Speaker / buzzer SPL 90 dBA @ 10 cm
- Optional 2G Quad band or 2G/3G/4G cellular modem calls, SMS, DTMF, audio files

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.

**PLMN 2G**

To access GSM Mobile Network the unit must be equipped with 2G PLMN board, available with single or dual SIM card.

Bands	B5 GSM850 / B8 EGSM900 / B3 DCS1800 / B2 PCS1900 AUTOMATIC SELECTION
SIM card	SIM and USIM 3V / 1.8V
Output power	Class 4 (2 W) GSM850 / EGSM900 Class 1 (1 W) DCS1800 / PCS1900
Data	GPRS Class 12 uplink and downlink up to 85.6 kbps

Network status is reported by yellow LED [S], this indicator is kept off when the PLMN is operated by controller board.

- SLOW BLINK**  
64ms ON / 2000ms OFF  
Registered on the network
- BLINK**  
64ms ON / 2000ms OFF  
Communication in progress
- QUICK BLINK**  
64ms ON / 600ms OFF  
Network searching
- ON**  
Voice call in progress

**WIFI**

Frequency	802.11b/g/n	2,4 ~ 2,5 GHz
Output power	+20 dBm	MAX
Antenna gain	1 dBi	EMBEDDED
Security	WPA / WPA-2	
Range:	100 m	OUTDOOR TYPICAL
	30 m	INDOOR TYPICAL

**BLUETOOTH**

Frequency	4.2 and BLE	2,4 ~ 2,5 GHz
Output power	0 dBm	TYPICAL
Antenna gain	1 dBi	EMBEDDED
Range:	25 m	OUTDOOR TYPICAL
	10 m	INDOOR TYPICAL

**INFRARED**

Receiver angle	± 45°
Receiver distance	> 15 m
Transmitter angle	± 20°
Transmitter distance	> 2 m



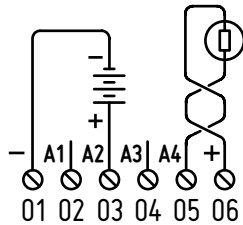
## ANALOG INPUTS

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	1 ... 10 V
Input max	12 V
Resolution	0,014 V
Accuracy	± 2 %
Impedance	35 kΩ

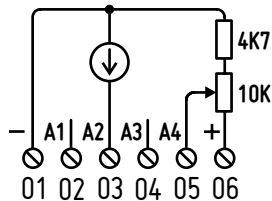


**NTC temperature sensor** here is connected to analog input A4 (terminal 05) and powered by 3,3V internal power supply (terminal 06).

Input range	-40 ... 100 °C
Resolution	0,1 °C
Accuracy	± 2 °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	2 ... 20 mA
Input max	24 mA
Voltage drop	2 V @ 20mA
Resolution	0,028 mA
Accuracy	± 2 %
Impedance	100 Ω



**Apotentiometer** is connected to analog input A4 to measure the voltage corresponding to cursor position between 1V and 3,3V (terminal 06). 4,7K resistor introduces 1V offset to keep the signal within the reliable input range.

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 L** for units allowing low voltage supply in a wide voltage range. The power supply must not be shared with other equipment and meet SELV circuits requirements according to EN / IEC 62368, like a cheap 12VAC / 10VA transformer. Length between power supply and device must be less than 3m.

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



**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

## CELLULAR ANTENNA

5

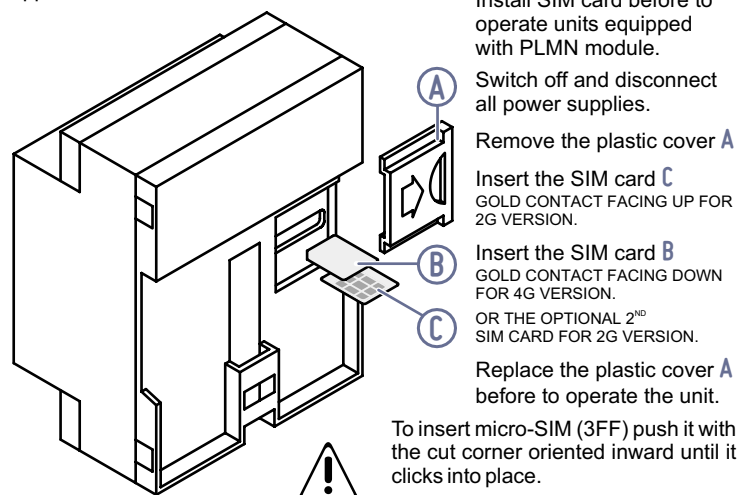
An SMA female coaxial jack is available for devices equipped with PLMN module. Below the antenna requirements for GSM and LTE version.

	GSM	LTE
INPUT POWER	4 BAND GSM/GPRS > 10 W	2 BAND GSM/EDGE + 3G + LTE > 10 W
IMPEDANCE	50 Ω	50 Ω
GAIN	≥ 1 dBi	≥ 1 dBi
VSWR	≤ 2 : 1	≤ 2 : 1
FREQUENCY	824 + 960 MHz 1710 + 1990 MHz	698 + 960 MHz 1710 + 2170 MHz 2500 + 2700 MHz

ANTENNA IS NOT INCLUDED

## 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 units equipped with PLMN module.

Switch off and disconnect all power supplies.

Remove the plastic cover **A**

Insert the SIM card **C** GOLD CONTACT FACING UP FOR 2G VERSION.

Insert the SIM card **B** GOLD CONTACT FACING DOWN FOR 4G VERSION.

OR THE OPTIONAL 2<sup>nd</sup> SIM CARD FOR 2G VERSION.

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

To insert micro-SIM (3FF) push it with the cut corner oriented inward until it clicks into place.

To remove the micro-SIM (3FF) push in to eject it from its slot.

PUT YOUR SIM CARD INTO A CELLULAR PHONE AND PROGRAM IT SO IT WON'T ASK FOR THE PIN

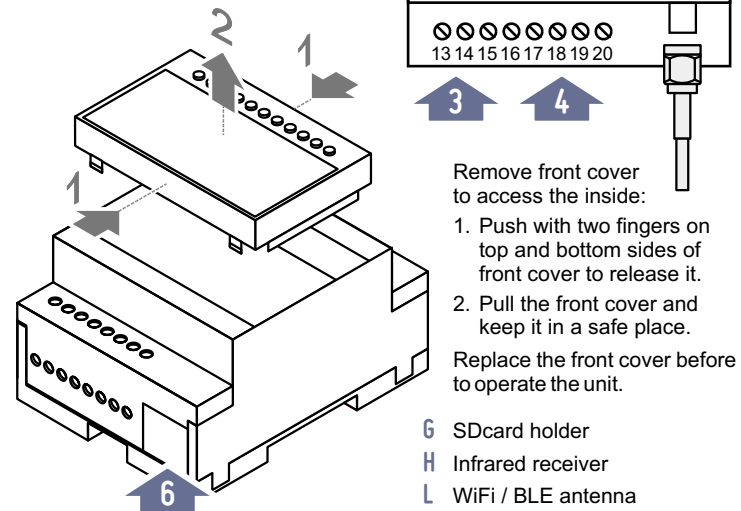
**D** Output green LED indicators

**E** Radio LED indicator

- YELLOW – WiFi  
FAST BLINK : NOT LINKED TO SSID  
SLOW BLINK : LINKED TO SSID
- BLUE – PLMN  
FAST BLINK : NOT REGISTERED  
SLOW BLINK : REGISTERED  
TRIPLE : NO INTERNET

**F** Digital input red LED indicators

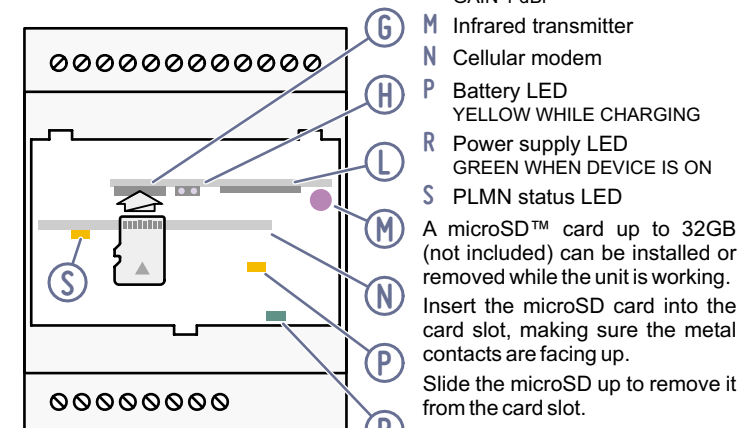
FAST BLINK = 500ms ON / 1500ms OFF



Remove front cover to access the inside:

1. Push with two fingers on top and bottom sides of front cover to release it.
2. Pull the front cover and keep it in a safe place.

Replace the front cover before to operate the unit.



**G** SDCard holder

**H** Infrared receiver

**L** WiFi / BLE antenna  
GAIN 1 dBi

**M** Infrared transmitter

**N** Cellular modem

**P** Battery LED  
YELLOW WHILE CHARGING

**R** Power supply LED  
GREEN WHEN DEVICE IS ON

**S** PLMN status LED

A microSD™ card up to 32GB (not included) can be installed or removed while the unit is working. Insert the microSD card into the card slot, making sure the metal contacts are facing up.

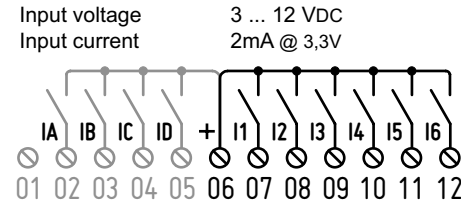
Slide the microSD up to remove it from the card slot.

WITH PLMN OPTION ONLY

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.



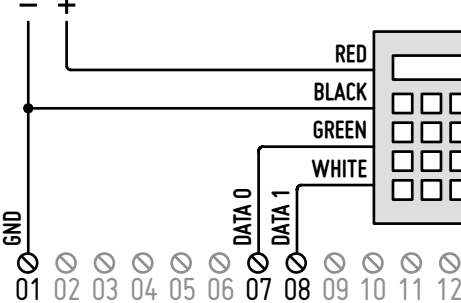
Inputs I1 - I6 can operate also as a pulse or time counter.

SPST contacts, magnetic reed, hall sensor or electronic switches can be used.

Pulse width	> 20 ms
Frequency	< 25 Hz

External power supply for optional wiegand reader must comply with SELV specifications (EN / IEC 62368).

Led indicators 1 and 2 are illuminated when associated data line is connected.

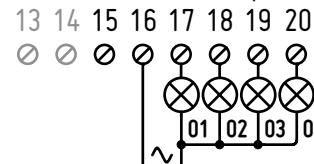


4

## 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
Breaking voltage	277 VAC
Max breaking capacity	750 VA
Insulation voltage	277 V (IEC60664)
Surge voltage coil contacts	5000VRMS
Dielectric strength	coil-contacts 3000VRMS open contact 750VRMS

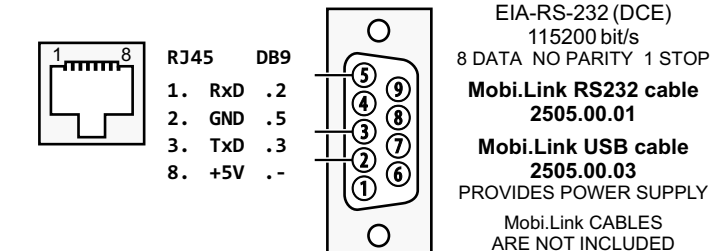


To prevent relay contacts from damaging, an external protection should be provided (fuse or similar), according to the relay breaking capacity.

6

## LINK PORT - AUX SUPPLY

The communication interface is implemented as a 8 pole RJ45 modular socket. Circuit type SELV, max 15 m length, shielding not required.



Voltage	5 VDC
Current	50 ... 300 mA TYPICAL 800 mA MAX

ALL INPUTS AND OUTPUTS ACTIVE, BATTERY CHARGING, LTE DATA TRANSFER

## BATTERY

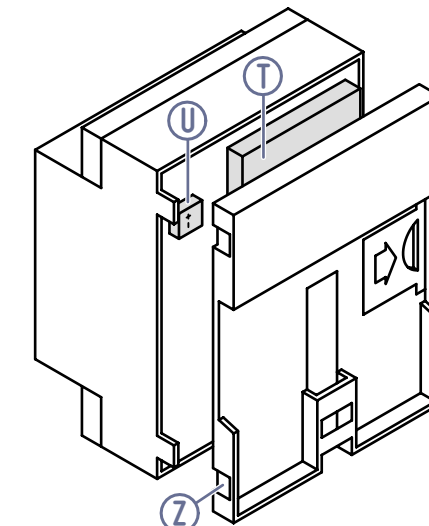
This unit can be optionally provided with a Li-Poly battery.

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 [P] 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 6 hours, 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.



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.

INPUT / OUTPUT TERMINALS NOT AVAILABLE ON PLMN MODEMS

## 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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