TL-5024
USER`S MANUAL

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Record of revision

Revision	Revision date	Description	ECO#	Insertion date	By
A	1/4/04	Initial Release	---		
B	1/7/04	Language correction	0001		

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1. GENERAL DESCRIPTION

1.1. INTRODUCTION

This manual describes the physical, mechanical and electrical features and functions of the TL-5024 GPRS Communication Module.

1.2. EQUIPMENT DESCRIPTION

The TL-5024 GPRS Communication Module is very sophisticated equipment and complete management for the wireless transfer of any information or measured values from the instruments of the TL-xx24 series (or other producers' licensed instruments) in the aircraft at any time and anywhere in the world into your PC, mobile phone etc.

The GPRS Communication Module includes the new generation of a precise Three-band GPRS transceiver that provides communication with all GPS / GPRS networks in the world.

The GPRS Communication Module provides security of your aircraft or its parts, such as engine, storage compartment etc. In this way, it becomes also security equipment, like e.g. in a car.

The GPRS Communication Module can give you information about the voltage of your accumulator, the temperature and the position of your aircraft, directly to your mobile phone by an SMS message, or this information may be displayed by an internet browser on your PC.

The GPRS Communication Module provides continuous monitoring of the latest firmware versions in the instruments of the TL-xx24 series (or other producers' licensed instruments), setting parameters in the instruments in the aircraft via PC with internet browser etc.

The GPRS Communication Module includes the 16MB memory for storing the measured values from the instruments, storing the latest firmware of the instruments and other values required by the customer.

1.3. TECHNICAL SPECIFICATIONS

The producer guarantees all stated technical parameters only when the equipment is installed by an authorized service or an aircraft manufacturer.

1.3.1 Physical characteristics

Width	57mm (2.244 inches)
Height	38mm (1.496 inches)
Depth	170mm (6.692 inches) including connectors with cover
TL-5024 Weight	0.20 kg (0.44 lbs)
TL-5024 Harness	0.05 kg (0.11 lbs)

1.3.2 General Specifications

Operating Temperature Range	**-20°C to +70°C**
Humidity	**95% non-condensing**
Altitude Range	**4600 meters max.**
Power Range	**10.0 to 32.0 Volts**
Max. Signalization	**30 Volts, 1 Ampere**
Power Consumption	**0.005 Ampere @ 14 VDC - Stand by mode** **0.010 Ampere @ 14 VDC - iFamily® searching** **1.58 Ampere @ 14 VDC - Transmition mode**
Vibration	**5 to 500 Hz**

1.3.3 Long-term Memory

Memory Capacity	**32MB**
Stored Values	**All measured values from the TL elektronic instruments of the series TL-xx24 or higher**
Data Saved Endurance	**10 years**
Memory life-time	**100 000 storings**

1.3.4 GSM/GPRS Transceiver

Frequency	**Three-band 900/1800/1900MHz (World wide use)**
GSM Power Class 1	**1W conducted power maximum (30dBm +/- 2 dB), measured at the antenna port**
GSM Power Class 4	**2W conducted power maximum (33 dBm +/- 2 dB), measured at the antenna port**
Data Communication	**TCP / IP protocol, TL elektronic encrypted protocol**
EMC	**FCC Parts 15 & 24, Class B, GSM 11.10, Section 12.2** **EN 55022 Class B, FCC Part 22 for GSM 850**

1.4. LIMITED CONDITIONS

1.5. LIMITED WARRANTY

The TL elektronic company warrants this product to be free from defects in materials and manufacture for three years from the date of purchase. TL elektronic will, at its sole option, repair or replace any components that fail in normal use. Such repairs or replacement will be made at no charge to the customer for parts or labour. The customer is, however, responsible for any transportation costs. This warranty does not cover failures due to abuse, misuse, accident or unauthorized alteration or repairs.

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IN NO EVENT SHALL TL ELEKTRONIC BE LIABLE FOR ANY INCIDENTAL, SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES, WHETHER RESULTING FROM THE USE, MISUSE, OR INABILITY TO USE THIS PRODUCT OR FROM DEFECTS IN THE PRODUCT. SOME STATES DO NOT ALLOW THE EXCLUSION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATIONS MAY NOT APPLY TO YOU.

To obtain warranty service, call the TL elektronic Customer Service (+420 49 548 23 92) for a returned merchandise tracking number. The unit should be securely packaged with the tracking number clearly marked on the outside of the package and sent freight prepaid and insured to a TL elektronic warranty service station. A copy of the original sales receipt is required as the proof of purchase for warranty repairs. TL elektronic retains the exclusive right to repair or replace the unit or software or offer a full refund of the purchase price at its sole discretion.

SUCH REMEDY SHALL BE YOUR SOLE AND EXCLUSIVE REMEDY FOR ANY BREACH OF WARRANTY.

1.6. LIMITED OPERATION

This product is not TSO approved as flight equipment, therefore, the manufacturer will not be held responsible for any damage caused by its use.
The usage of this product is entirely up to the user's decision.
TL elektronic is not responsible for any possible consequences connected with the operation of this equipment in the aircraft, particularly if the equipment affected some other sensitive instruments in the aircraft, or if operation of the equipment infringed laws, regulations or generally accepted standards in some countries.

2. INSTALLATION

2.1 INTRODUCTION

Careful planning and consideration of the suggestions in this section are required to achieve the desired performance and reliability of the TL-5024.

2.2 INSTALLATION INTO PANEL

It is possible to install the GPRS Communication Module in a random place in the aircraft supposing the operation specifications are followed.
Before the very installation of the GPRS Communication Module, choose a proper place for installation of the antenna.
The GPRS antenna should be far enough from the VHF transceiver antenna, so that the undesirable interference is avoided.
During the installation of the GPRS Communication Module, keep in mind that the antenna cable should not be longer than necessary, in order to prevent high decrement that reduces the sensitivity of the GPRS Communication Module.
The antenna cable should be put separate from other cables, in order to prevent possible interference.
If it is necessary to cut the antenna cable short, contact a professional service.

⚠ **Never fold or curl up the odd antenna cable on a coil. Cutting the antenna cable should be always given over to a professional service.**

⚠ **A place away from heating vents or other sources of heat generation is optimal.**

2.3 CONNECTION TO AIRCRAFT POWER

For the sake of proper working of the GPRS Communication Module, it must be permanently connected with the battery. Connect the cable of the GPRS Communication Module either directly with the battery, or with the terminal box, nearest to the battery. In laminated aircrafts, also the GND cable must be put as close as possible to the battery.

⚠ **As the GPRS Communication Module is continuously being charged from the battery, it is necessary to install a wire fuse with the parameters specified on pp. 3-2.**

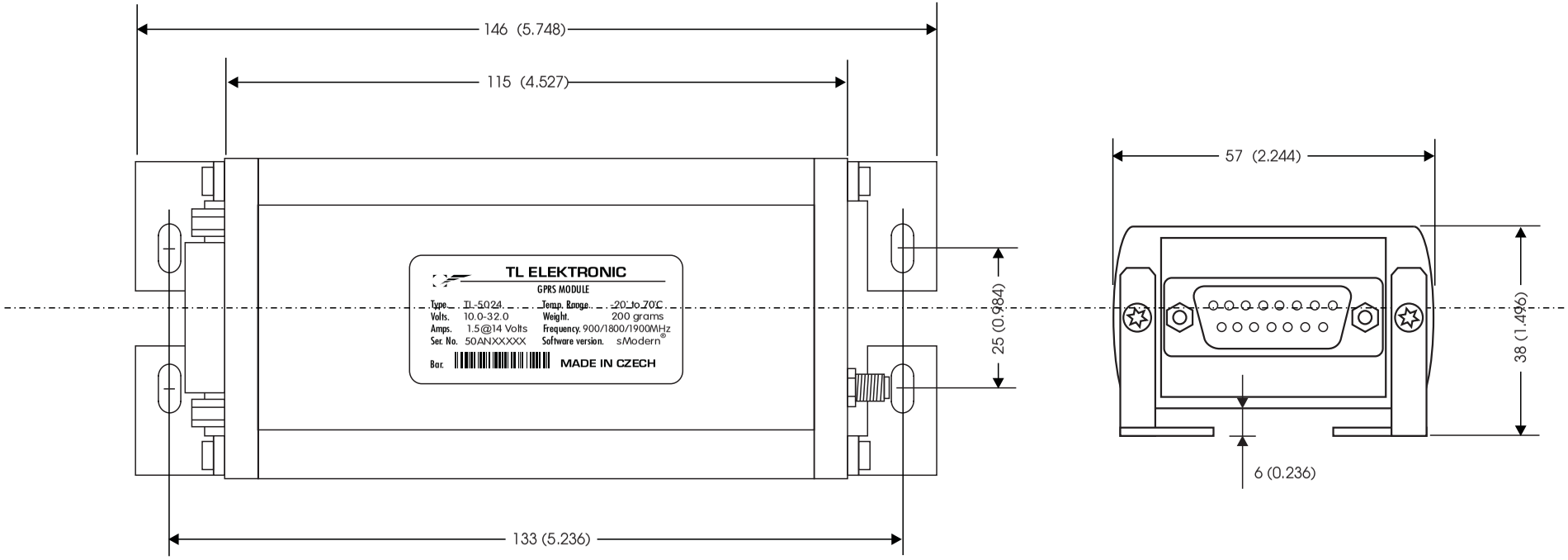
2.4 ANTENNA INSTALLATION

If it is possible, install the antenna on the bottom side of the aircraft and keep the distance of at least 80cm from the ground. If there is a transponder anntena placed on the bottom side of the aircraft, install the GPRS antenna in the distance of at least 50cm.

2.5 ALARM LOOP CONNECTION

Connect the outlet from the connector P1, pin no. 4 in the way that it creates a grounded loop. For that purpose, it is necessary to use switching contacts or loops through the connector in the way that in case of disconnecting the connector or opening the door, the loop is disconnected.
The GPRS Communication Module is delivered with the lock (key) switch that must be necessarily connected directly to the pin no. 4, and its other terminal must be connected to the skeleton.
This switch bridges the loop and, in this way, prevents the alarm activation and the subsequent sending information, including calling the phone number set by the user.
According to the diagram, it is also possible to connect a blinking control lamp, which signalizes whether the alarm is active or not.

Mounting Rack Dimension



NOTES:

1. Dimension: mm (INCH)
2. Unit weight: 0.2 kg (0.44 lbs)
3. Mounting Rack & Hardware weight: 0.05 kg (0.11 lbs)

Figure 2. Rack Dimension

3.1 PIN FUNCTION LIST

Pin	Pin Name	I/O
1	Do not connect!	- -
2	Do not connect!	- -
3	Do not connect!	- -
4	Do not connect!	- -
5	iFamily® communication ISCL	I/O
6	Alarm input	In
7	Aircraft ground	- -
8	Aircraft power	In
9	Do not connect!	- -
10	Do not connect!	- -
11	Do not connect!	- -
12	Do not connect!	- -
13	iFamily® communication ISDA	I/O
14	Aircraft ground	- -
15	Aircraft power	In

Accessories Interconnect

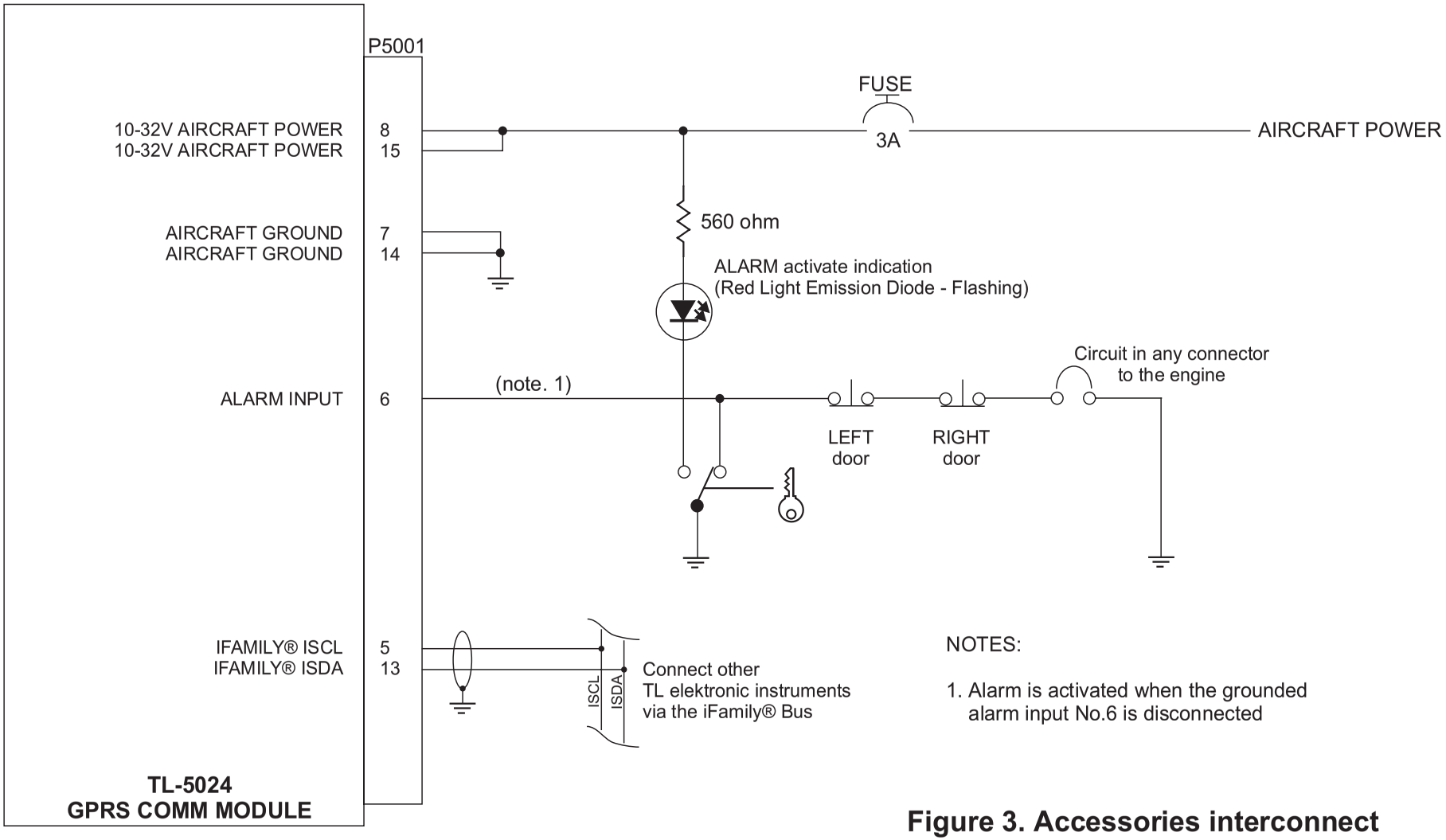
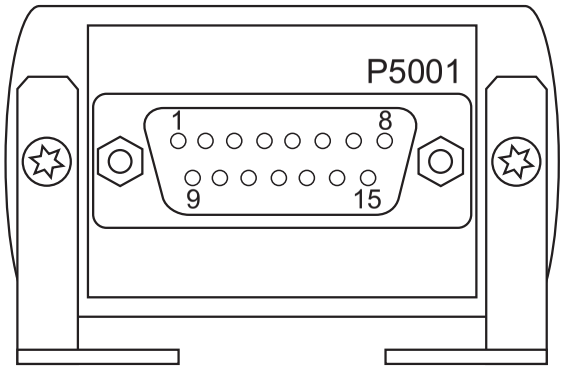


Figure 3. Accessories interconnect

Rear view of connector plate



NOTES:

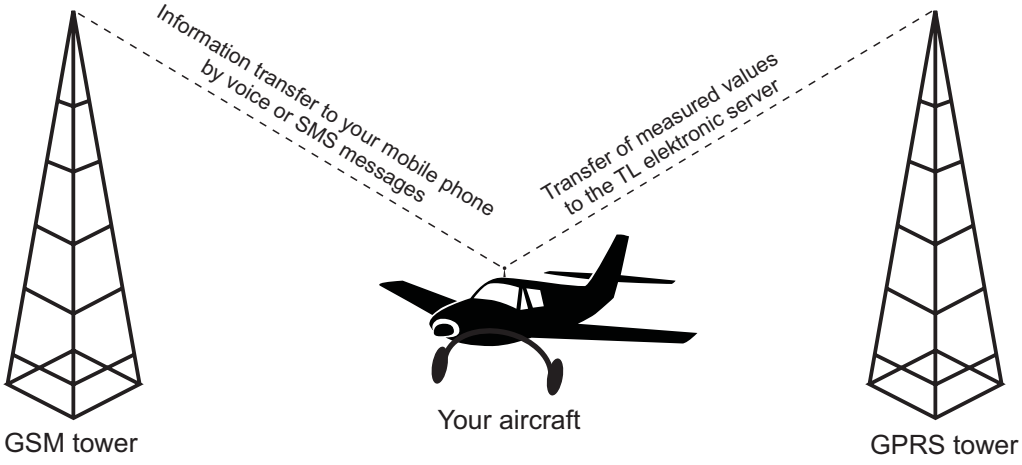
1. Secure the incoming leads to prevent their effect on the connector in the vertical direction.

Figure 4. Connectors locate

4. DESCRIPTION

4.1 How GRPS Communication Module Works

The GPRS Communication Module is a very sophisticated unit that provides the measured values from the instruments in the aircraft, information about the position of the aircraft, the condition of the battery, the aircraft temperature, danger of stealing the aircraft or its parts, and much other information.
The information can be transferred directly to your mobile phone, or this information can be displayed by an internet browser on your PC.

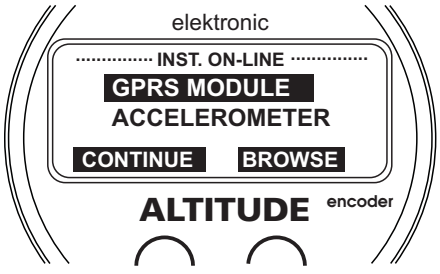


If the GPRS Communication Module is connected by the iFamily® Bus with other instruments of the series TL-xx24 or any other licensed instruments from other producers, always after turning these instruments on, the measured values will be recorded from the instruments to the GPRS Communication Module.

The list of licensed instruments/equipment (companies) can be found on the website address:

http://www.tl-elektronic.com/goto.php?goto=ifamily_en.php

4.2 GRPS Communication Module as Data-Downloading Device



If the aircraft is provided with some of our instruments, such as the RPM Meter TL-2824_SAS or the Accelerometer TL-3424_SAS, the GPRS Communication Module will use the information from the speed sensor and after finishing the flight, the measured values will be recorded from the instruments into the memory of the GPRS Communication Module.
The GPRS Communication Module is (in regular intervals) connected with the server of the company TL elektronic, in order to find out whether you asked for downloading the data from the instruments to your PC.
If you did, the GPRS Communication Module would forward this information by the protected protocol TCP/IP to the server of the company TL elektronic, which, after that, would send the measured values in a zip file directly to your e-mail box.

4.3 GRPS Communication Module as Security Device

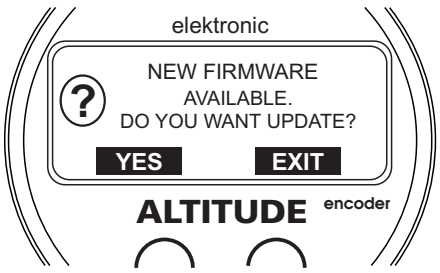
An indispensable function of the GPRS Communication Module is the security function that can secure the whole aircraft or some of its parts, such as storage compartment etc. The GPRS Communication Module is provided with a voice output that will call the phone number you have set and will inform you in several languages that somebody is trying to steal your aircraft or some of its parts. After that, the GPRS Communication Module will send this information in an SMS message to your mobile phone or in an e-mail to your PC.

This function is controlled by the pin no. 6 (see point 2.5)

4.4 Information Provided by GRPS Communication Module

It is also possible to use the GPRS Communication Module for detecting the position of the aircraft, the information about its temperature, the condition of the battery and other information described in the point 5.7

4.5 Detecting Availability of Updated Firmware of Connected Instruments



The GPRS Communication Module also detects automatically whether a new firmware version of some connected instrument is available. If the GPRS Communication Module detects a new version, this firmware will be downloaded into its memory and, as soon as you turn on the instrument the version is assigned for, the display will show a query whether you want to download this version to your instrument or not.

5. CONFIGURATION

5.1. How to Configure GPRS Communication Module

All settings are done with help of the website or the program TL-control.exe. However, if you want to use the latter, there must be at least one instrument of the series TL-xx24 on the board of the aircraft.

5.2 Main Set-up Functions' Description

The table of the equipment configuration steps is shown below (Initial - firmware version 1.0).

0	PASSWORD	Enter your password.
1	CONNECTION PERIODE	Set the interval for connecting the TL-5024 to the server of the TL elektronic company.
2	ALARM FUNCTION	Select **ENABLE** = in case of the disconnected loop, the TL-5024 will send an SMS message and call the set mobile phone number to inform on possible stealing of your aircraft. Or, select **DISABLE** = the loop will not be checked.
3	STATUS MESAGE	Select **ENABLE** = always before connecting the TL-5024 to the server of the TL elektronic company, the information on the position, battery condition etc. will be sent to the set mobile phone number. Or, select **DISABLE** = status message will not be sent. The interval for sending the STATUS MESSAGE is according to the „CONNECTION PERIODE" set by you.. The information from the STATUS MESSAGE are available on the server of the TL elektronic company anytime the TL-5024 is connected.
4	YOUR MOBILE NUMBER	Enter your mobile phone number.
5	NO. OF SMS CENTER	Enter the number of the SMS center of your operator (get this information from the provider).
6	YOUR EMAIL	Enter the e-mail address to which the TL elektronic company can send you the data downloaded from your instruments.
7	VOICE WARNING	Enable or disable the voice warning about operation and errors of the TL-5024 into your headphones (Only with use of our Intercom TL-2424 or Voice Module).

All information on this page is subject to change without prior notice. Download the latest version of the manual from www.tl-elektronic.com and compare with you version of firmware.

5.3. How to Set Parameters in GPRS Communication Module

First of all, it is necessary to register the GPRS Communication Module in the GPRS server of the company TL elektronic.
Fill in the form on the website address:

http://www.tl-elektronic.com/goto.php?goto=gprs_en_login.php
Login: **gprs**
Password: **member**

and follow the next instructions.
If you have purchased more GPRS Communication Modules that are to be owned by one user only, it will be more appropriate if the information about all modules is shown simultaneously. To ensure this, in the registration form enter the assigned registration number of any GPRS Communication Module and register the other GPRS Communication Modules in the section "Registration of other GPRS Communication Modules", which is to be found in the detailed information about the user.

5.4. How to Edit Detailed Information about User

After registering, click on the icon next to the name of the aircraft's user. After that, a window shows where you have to fill in the e-mail address, to which the GPRS Communication Module will send the error messages and other information. Here you can also add or delete the GPRS Communication Modules or edit some other information.

5.5. How to Set Interval of GPRS Communication Module‘s Connection

The interval for sending these messages can be set from 1 minute up to 1 month. It is also possible to set the interval for the frequency of connecting the GPRS Communication Module with the server of the company TL elektronic. This interval can be set from 5 minutes up to 5 hours.

⚠ **Remember that if you set a longer interval, the response to your request for downloading the data will depend on this interval. This interval does not affect, however, the immediate response in the case that somebody wants to steal your aircraft or some of its parts. You should also remember that a short interval may cause faster discharge of your battery.**

5.6. How to Set Parameters of Instruments

After registering in the „Download“, click on the icon next to the instrument. After that, a window shows, where you can set some parameters of the instrument, delete maximum values etc.

⚠ **Remember that the performed changes will be accomplished after registering the GPRS Communication Module in the server of the company TL elektronic. As soon as the GPRS Communication Module loads the requests for changing the parameters in the instrument, the changes or the settings will be accomplished in the instrument. If the instrument is off, the changes will be accomplished after the turn-on.**

5.7. How to Ask for Downloading Latest Version of Firmware to Instrument

The GPRS Communication Module detects automatically whether a new version of firmware is available. So the user receives the information about the possibility of downloading the updated software directly on the display of the instrument the firmware is assigned for. The user can either confirm or reject downloading the firmware by pressing the particular button on the instrument. If the user does not want the latest firmware of the instruments to be downloaded to the GPRS Communication Module, the box "Not download firmware to instrument" (in the section of detailed information about the aircraft) should be ticked.

5.8 How to Set Detailed Information about Aircraft

After registering in the „Download“, click on the icon next to the identification mark of the aircraft. After that, a window shows where you have to fill in the e-mail address, to which the GPRS Communication Module will send the information and the data from the instruments. It is also necessary to enter the phone number, which the GPRS Communication Module will call and send SMS messages to - the information about temperature, voltage of the battery etc., or in case that somebody wants to steal your aircraft or some of its parts.

The SMS message you will get is in the following form:
Aircraft: OK-CZE, Position: Airport, Prague,
Temperature: 26°C, Battery: 12.6 Volts,
Signal quality: 65%, Alarm status: OK

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