Nilfisk Advance model ME401-9

Technical Manual

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Content

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Notices
Class B Statement – Notice to Users. This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the 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 communication. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
– Reorient or relocate the receiving antenna.
– Increase the separation between the equipment and the 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.
Changes and modifications not expressly approved by the manufacturer or registrant of this equipment can void your authority to operate this equipment under Federal Communications Commission rules.

Regulatory Approvals

CE
The ME401-9 product complies with the essential requirements of the R&TTE Directive 1999/5/EC as stated by the EC Declaration of Conformity (CE 0682). The ME401-9 product comply with the European Telecommunications Standards Institute Specifications EN 301 489-1 (EMC for GSM 900MHz and DCS 1800MHz Radio Equipment and Systems).

EC/ International
The ME401-9 product complies with the essential requirements of the Automotive directive 2004/104/EC clause 6.5, 6.6, 6.8 and 6.9, UN regulative ECE R10 EMC rev3.
The ME401-9 product complies with the essential requirements of the Directive 2003/37/EC and Directive 2006/42/EC.
The ME401-9 product complies with the international standards ISO-13309, ISO13766 and EN ISO-14982, for tractors, forest and agricultural machinery, moving machinery and construction machinery.
The ME401-9 product complies with the essential and environmental requirements of the Interoperability of trans-European conventional rail system 2001/16/EC and 2004/50/EC directives according to ISO 50121-3-2 and DIN EN 50125-1, when used as intended on rolling stock.
The ME401-9 complies with the essential requirements of the 2011/65/EC directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

FCC
The ME401-9 product complies with the FCC Part 15, Part 22 and Part 24, and Industry Canada requirements. The ME401family of products comply 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.
For fixed mounted operations the ME401-9 must be installed to provide a separation distance of at least 5 cm from all persons.

ME401-9 product:
FCC ID: 2A88J-ME401
IC-ID: 11495A-ME401

Introduction

This document contains the installation guide for the GSM/GPS product type series ME401-9 units. This manual is intended for use by system integrators, service providers and application developers (collectively, “Resellers”). It is not intended for end-users of the ME401-9. Any end-user documentation is to be prepared and furnished by the Resellers.

This manual covers the ME401-9 with 60.0 and later firmware and operating on 850 MHz, 900 MHz, 1800 MHz and 1900 MHz Global System for Mobile communication (GSM) networks. Data and Event Reporting support is by Short Message Service (SMS), General Packet Radio Service (GPRS), or both.

This manual describes how to set up, configure, install, operate, and troubleshoot the product. Even if you have used other GSM or Global Positioning System (GPS) products before, Nilfisk recommends that you spend some time reading this manual to learn about the special features of this product.

Nilfisk assumes that you are familiar with Microsoft Windows.

Related Information

The Nilfisk web site is found at **www.nilfisk-advance.com**. The fleet management system solution is located at http://nilfisk.trackunit.com. The ME401-9 devices are integrated into the Nilfisk fleet management system but can also be used together with third part system providers of a fleet management system.

Safety first

Simple Guidelines

Please follow these guidelines when configuring, using or recycling the ME401-9. Violating these guidelines may be dangerous, illegal or otherwise detrimental. Further detailed information is provided in this manual.

Do Not Operate Where Prohibited

Do not allow the ME401-9 unit to operate wherever wireless phone use is prohibited or when doing so may cause interference or danger. The ME401-9 cannot be turned off after installation, so any vehicle, moving machinery, construction machinery using ME401-9 etc. must not enter areas where it is prohibited to operate wireless phones as the device periodically turns on the transmitter in a short period of time to perform tracking reporting.

Examples include but are not limited to operation in hospitals, aircrafts, near blasting sites or wherever operation can cause interference.

Interference
Like all wireless devices, the ME401-9 may encounter electrical interference that may affect its performance.

Avoid Body Contact with Device during Operation
Do not operate the ME401-9 in direct contact with your body. Maintain at least 2 inches (5 cm) separation between the device and any parts of your body.

Qualified Service
Except for batteries and Subscriber Identification Module (SIM) card, the ME401-9 contains no user serviceable or replaceable parts. Non-functioning units must be returned to an authorized service center for repair or replacement.

Accessories and Batteries
Use only approved accessories or batteries. Do not connect incompatible products. There is risk of explosion or fire if an incorrect type replacement battery contacts are shorted. Do not exceed the temperature ranges or other environmental conditions specified by the battery manufacturer. Dispose of used batteries according to the instructions provided with the batteries.

Water-Resistance
The ME401-9 series is water-resistant according to the IP-67 standard. It is however recommended that it is installed where it is relatively dry and not subjected to either water streams or submersion.

Detailed Safety Information

Exposure to Radio Frequency Signals

The ME401-9 unit is a low power radio transmitter and receiver. Periodically the ME401-9 wakes up either due to activity or by a timer. When it is ON (Awake), it receives and also sends out radio frequency (RF) signals for a short period of time.

The ME401-9 unit cannot be turned off after installation; however the unit is mostly in standby waiting for activity on the acceleration sensor.
With no external power the unit is OFF. In OFF mode a sleep timer secures a periodic wake up every hours until next activity on the acceleration sensor.

The unit operation can continue for approximately 3 to 4 days depending on the charging state of the backup battery.

The ME401-9 unit is not designed to be worn on a person's body.

Electronic Devices
Most modern electronic equipment is shielded from RF signals. However, certain electronic equipment may not be shielded against the RF signals generated by the ME401-9 unit.

Pacemakers
The Health Industry Manufacturers Association recommends that a minimum separation of six (6") inches be maintained between a handheld wireless phone and a pacemaker to avoid potential interference with the pacemaker. The following precautions apply:

- The ME401-9 unit is not intended for handheld use or to be worn on the body.
- It is recommended that a minimum separation of ten (8") inches (20 cm) is to be maintained between the ME401-9 unit and any persons' body at all times. The device is SAR tested and approved for a separation distance of only (2") inches (5 cm) between the ME401-9 and any person's body.
- Do not carry the ME401-9 on your person.

Other Medical Devices
If any other personal medical devices are used in the vicinity of a ME401-9 unit, consult the manufacturers of the medical devices to determine if they are adequately shielded from external RF energy. Physicians may be able to assist in obtaining this information.

The ME401-9 unit cannot be turned off after installation, so any vehicle, moving machinery, construction machinery installed with the ME401-9 etc. must not operate near health care facilities when any regulations posted in these areas prohibit the use of wireless phones or two-way radios. Hospitals and health care facilities may be using equipment that could be sensitive to external RF energy.

Vehicles
RF signals may affect improperly installed or inadequately shielded electronic systems in motor vehicles. Check with the manufacturer or its representative regarding the vehicle. Also consult the manufacturer of any equipment that has been added to the vehicle.

Posted Facilities
The ME401-9 unit cannot be turned off after installation, so any vehicle, moving machinery, construction machinery installed with the ME401-9 etc. must not enter any facility where posted notices prohibit the use of wireless phones or two-way radios.

Aircrafts
FCC and FAA regulations prohibit using wireless phones while in the air. Do not carry the ME401-9 unit aboard an aircraft as it cannot be turned off.

Blasting Areas
The ME401-9 unit cannot be turned off after installation, so any vehicle, moving machinery, construction machinery installed with the ME401-9 etc. must not enter a "blasting area" or in areas posted "turn off two way radio" to avoid interfering with blasting operations. Obey all signs and instructions.

Potentially Explosive Atmospheres

The ME401-9 unit cannot be turned off after installation, so any vehicle, moving machinery, construction machinery installed with ME401-9 etc. must not enter any area with a potentially explosive atmosphere and obey all signs and instructions. Sparks in such areas could cause an explosion or fire resulting in bodily injury or even death.

Areas with a potentially explosive atmosphere are often, but not always, marked clearly. Potential areas may include: fueling areas (such as gasoline stations); below deck on boats; fuel or chemical transfer or storage facilities; vehicles using liquefied petroleum gas (such as propane or butane); areas where the air contains chemicals or particles (such as grain, dust, or metal powders); and any other area where it would normally be advisable to turn off motor vehicle engines it is not allowed to enter with a vehicle, moving machinery, construction machinery installed with the ME401-9.

For Vehicles Equipped with an Airbag
An airbag inflates with great force. DO NOT place objects, including the ME401-9 unit, in the area over the airbag or in the airbag deployment area. If in vehicle wireless equipment is improperly installed and the air bag inflates, serious injury could result.

Specific Human Absorption Rates (SAR)
THE ME401-9 UNIT IS NOT DESIGNED TO BE WORN ON A PERSON'S BODY.
AS SUCH, BODY WORN TEST POSITIONS FOR THE ME401-9 UNIT
ARE NOT REQUIRED BY EITHER THE EN50360/1 FOR GSM 900/1800 BANDS OR FCC REQUIREMENTS FOR GSM 850/1900 BANDS.

The ME401-9 unit is not intended for handheld use or to be worn on the body. A minimum separation of ten (2") inches (5 cm) is to be maintained between the ME401-9 and any persons' body. Additional information on Specific Absorption Rates (SAR) can be found on the Cellular Telecommunications & Internet Association (CTIA) Web site at www.ctia.org.

Battery Safety Information
Adhere to the following guidelines to avoid the risk of fire or explosion:

1. Dispose of the used battery according to the instructions provided with the battery.
2. Do not drop, puncture, disassemble, mutilate, or incinerate the battery.
3. Touching both terminals of a battery with a metal object will short circuit the battery. Do not carry batteries loosely if the contacts may touch coins, keys, and other metal objects (such as in pockets or bags).
4. Do not stack batteries taken out of the carry case.
5. Do not heat the batteries to try to rejuvenate their charge.
6. Do not exceed the temperature ranges or other environmental conditions specified by the battery manufacturer.
7. Never use the ME401-9 without the battery cover installed.

Delivered standard content

The delivered standard package content includes the following items:

1 x GSM/GPS-unit of the model type ME401-9

1 x Mounting cradle

1 x Li-ion Battery (May already be mounted inside the ME401-9 unit)

1 x Fuse with fuse holder

In case the unit is delivered with SIM card from the factory (Either US or EU SIM card as indicated on the product label), then the GSM number will be indicated on the delivery note as well as on the package itself.

NOTE: In case the SIM card is delivered from factory it is mounted inside the ME401-9 unit.

Ready-to-Use, No Custom Programming Required

Simply connect the unit to supply voltage (12 to 48 V DC). In its default configuration, reports are sent nominally at 15-minute intervals or faster whenever there is motion.

Upon powering up, the device will self-initialize anywhere in the world and start transmitting if an authorized GSM network is available. While a basic understanding of the different ME401-9 operational states is helpful, configuring the ME401-9 unit does not require a highly skilled software programmer or technician.

Cost-effective, Universally Available Communications

The ME401-9 unit takes advantage of the near universal availability of GSM SMS text messaging while also leveraging cost-effective GPRS data rate plans. Typical SMS plans offer very extensive inter-network roaming capabilities, both within a host country and internationally.
SMS plans also tend to be too pricey for applications requiring more than a few reports per day. GPRS data plans, on the other hand, typically allow for lower recurring communication costs although GPRS coverage and roaming can be restricted in some areas.
The ME401-9 unit takes advantage of both technologies by automatically selecting GPRS wherever such service is available, while relying upon SMS text messages for configuration purpose only. This helps minimize recurring communication costs while allowing the greatest coverage possible.

Installing the unit

Practical installation advice

- **It is very important to be careful when installing the unit, as incorrect installation will reduce the quality of the GPS position reports (Ex. could be a jump in position or showing speed while parking) or in the worst case scenario will prevent the unit performing any position reporting at all.**

The unit must NOT be installed beneath metal plates or inside closed metal compartments. Incorrect installation will also reduce the standby time of the battery inside the unit.

- The unit must be mounted either horizontally or vertically (sideways) using either screws or strips. The unit **must not** be installed with the interface/supply cable hanging down, as this definitely will reduce the GPS sensitivity.
  Optimize the placement of the unit to increase the aerial view (through windows etc.) as much as possible. For hiding the unit, make sure it is only mounted beneath plastic parts or similar parts (wood), but not beneath metal parts.

- To reduce hum and noise in the FM radio it is recommended to place the unit at a minimum distance of 20 inches (50 cm) from the radio or the loudspeakers.

Connections

The connections depend on the type of vehicles / machines etc. in which the GSM/GPS unit is to be installed. In the table below the possible connections are listed for the ME401-9 device.

The connections may differ for other variants of the ME401-9 device. Please contact your nearest sales office, distributor or “Reseller” for further information about the availability of other variants in your area.

Wire (color code)	ME401-9 function
Red	Supply voltage +12 to +48 V
White	Digital input 1
Brown	Digital input 2 Ignition
Grey	Digital input 3
Pink	Digital input 4
Green	1-Wire input
Yellow	Digital output 1
Blue	Common ground

Power supply

The unit **must** be connected to a +12 to +48 V battery voltage through a 1 amp. fuse. The use of a fused supply wire is important for not damaging the wires related to the unit in case of a short circuit etc.

Digital inputs

The voltage required for activating of a digital input is dependent on the configuration of the input ports.

Digital output

The digital output has the type indication ”LO-side switch”, that connects the output to 0V “ground”, when the output is active. This output can be used to control a relay powered from an external DC supply voltage. The maximum current drawn from the output is 200mA and the voltage from the external supply voltage must not exceed 60 V DC.

The output is protected against short circuits, overload and is also protected against over voltage. For further information about connection possibilities of the digital output, see chapters about installation later in this manual.

Motion/acceleration sensor

The unit has a built-in 3 axis acceleration sensor that is able to activate the unit if it, as a consequence of disconnected supply voltage, is in stand-by mode. When motion is detected it will also cause activity on ‘Input 7’ on the ME401-9 microcontroller portal.

1-Wire input

- The 1-wire input can be used to read Dallas iButton for access control. The 1-wire input is only operational when supply voltage (12 to 48 V) is present. It cannot operate on internal battery alone.

Installation of the ME401-9 in vehicles

The standard installation for vehicles, where the unit should register operating hours the following connections are used:

Wire color		Connection	Description
Red		Power	Connect to permanent 12 to 48 V supply through a 1A fuse
White		Digital input 1	Connect to the operating hours counter **Mandatory for machines!**
Brown		Digital input 2	Connect to the ignition signal **Mandatory for vehicles and machines!**
Grey		Digital input 3	Can be connected to an external sensor for detecting a critical running mode or an alarm [3]
Pink		Digital input 4	Can be connected to an external sensor for detecting a critical running mode or an alarm [3]
Green		1-wire input	Can be connected to iButton reader or temperature sensor
Yellow		Digital output 1	Can be used to control external equipment through a relay [1] [2]
Blue		Ground	-

[1] Max. Load 200 mA
[2] Do NOT use this output to switch off vehicles and machines during operation or driving
[3] If Main Switch disconnects negative wire (chassis/GND) from battery, it might cause false input activity. To avoid that, Pink wire should be connected to the chassis/GND, Blue Wire should be connected to battery minus pole and input filtering must be activated

NOTE: It is recommended always to connect digital input 2 to the ignition signal of the vehicle as this is necessary for km recording.

Examples of input/output or interfaces

The ME401-9 can be installed with various optional interfaces added to the Input/output ports or the device:

- A one wire ibutton reader. 
- A start relay blocking function for unauthorized access.
- Alarms.
- etc.

Installation of the ME401-9 in machinery

In this section possible installation proposals are given. The installation proposals are listed as examples and can be used as a guide for inspiration for an actual installation.

Standard installation of ME401-9 for registering operating hours:

For a standard installation in machines where the unit should register the number of operating hours etc. use the connections as described in the vehicle installation section.

Installing the ME401-9 as to surpass the main switch on the machine:

In case the main switch on the machine will break the negative wire (Ground wire), the inputs may register a voltage level and start counting operating hours. To avoid this situation the digital input 4 (Pink wire) should be connected to the chassis/ground on the machine. Then send the following SMS to the unit (phone number) to activate the filtering:

Function	Send SMS	Return-SMS from the unit
Activate filter function on inputs.	*MT INFILT ON*	*MTC ACK (SERIAL No.) INFILT ON*

NOTE: Enabling the filtering function will disable the use of the alarm function on digital input 4 as listed in the standard installation proposal above.

NOTE: It is recommended always to connect digital input 2 to the ignition signal of the machine as this is necessary for km recording.

NOTE: For the “Send SMS” it is of no importance if small or capital letters are used in the command string, or a mixture hereof.

Functionality check

LED

The ME401-9 is fitted with an LED that has the following status indications:

Status	LED mode	LED color	Status indication
✓	Red flashing light and constant green light in LED		GSM network is OK and GPS has valid satellite position
!	No light in LED		No power supply
!	Constant red light and no green light in LED		Power supply is OK but NO GSM network GPS has NO satellite position
!	Red flashing light and no green light in LED		GSM network is OK GPS has NO satellite position
!	Constant red and green light in LED		Power supply is OK but NO GSM network GPS has valid satellite position

Status SMS Commands

In order to check if the installation of the ME401-9 unit has been done correctly, it is possible to send one or more check SMS messages to the GSM phone number allocated to the unit.
Please wait 1 minute after applying the power to the unit before attempting to send any SMS messages to the unit.

An overview of the SMS message commands for functionality check is given below:

Check	Send SMS	Return SMS from unit
• Is the unit powered up? • Does the GPS receiver have sufficient reception conditions? • Is the GSM signal coverage sufficient? **NOTE: It is best to perform this check under outdoor conditions as any buildings/garage would reduce signal quality.**	*MT SIGNAL*	*MTC ACK (SERIAL No.) SIGNAL: GSM=22, SAT=8, SN=44* ”GSM” is a measure for the quality of the GSM coverage. The value should be at least 10. Maximum value for GSM coverage is 31. ”SAT” is a measure for the number of GPS satellites visible to the GPS receiver. Operational minimum is 3 and the best operation is obtained from 6 and up. ”SN” is a measure for the GPS-signal strength. Should be larger than 35.
• Are the digital inputs mounted correctly **NOTE: This command can be send to the unit under various operational conditions like: Machine running, ignition only or off.**	*MT STAT*	*MTC ACK (SERIAL No.) INPUT STATUS: INPUT1 LOW, INPUT2 LOW, INPUT4 LOW, CHARGE VOLTAGE ON* **NOTE: An input is *HIGH* if there is more than 8V on the input – otherwise it would be *LOW***

NOTE: For the “Send SMS” it is of no importance if small or capital letters are used in the command string, or a mixture hereof.

Troubleshooting

Various error situations are listed below along with some possible solutions.

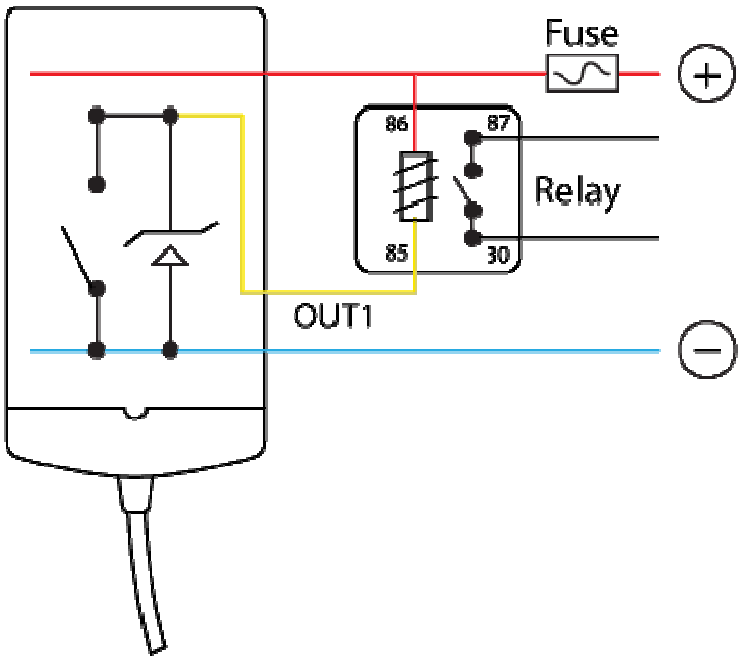
Error code	Error description	Possible solutions
F1	The unit does not answer the SMS command send to it.	♦ Verify if the SMS messages are send to the correct GSM phone number. ♦ Check LED status; See the “Functionality check” chapter in this manual. ♦ If the ME401-9 unit has been delivered with the SIM card mounted. Contact Nilfisk support. ○ Or contact the mobile operator to verify if there is any problem with the SIM card. ♦ Verify if the SIM card is correctly mounted in the unit.
F2	The LED in the unit is off, thus no power on the unit.	♦ Check if the installation is performed correctly according to the guidelines of this manual.
F3	The LED is constant red, thus the unit is not attached to the GSM network	♦ If the ME401-9 unit has been delivered with the SIM card mounted. Contact Nilfisk support. ○ Or contact the mobile operator to verify if there is any problem with the SIM card. ♦ Verify if the SIM card is correctly mounted in the unit. ♦ Verify if the PIN code has been disabled from the SIM card before it was inserted in the unit
F4	The unit send reply messages but there is no GPS signal	♦ Verify if the unit is mounted according to the instructions laid out in this manual with respect to the aerial view; see “Installing the unit” chapter. ♦ If the machine/vehicles are located inside a building, please move the machine/vehicle outside a try again.

Installation of the digital output

According to the E1 certificate of the ME401-9 unit, it is prohibited under any circumstances to use this output to control any equipment that may influence the safety of the construction machinery and earth moving machines/vehicle operation and driving. The output must only be used to control comfort equipment.

The example below shows a relay function. Please ensure that the voltage specification of the relay matches the supply voltage. The current consumption of the relay must not exceed 200 mA (DC current) and the relay contacts must be specified to withstand the load that needs to be controlled.

NOTE: The output can only handle DC and **not** AC voltage. It is necessary to only use a DC power supply for the relay.



Important! The power supply connected to the ME401-9 GSM/GPS unit and the supply voltage for the relay mounted on the digital output must have a common ground connection.

One application example for the “Usable contact function controlled by the ME401-9” signals shown in the figure above could be a “Start Relay”, blocking function, for preventing unauthorized use of the moving machinery and construction machine or vehicle outside normal working hours etc.

SMS commands for output control

Function	Send SMS	Return SMS	Description
Time controlled activation of the output	MT OUT1=1,30	MTC ACK (SERIAL No.) OUT1 TIMER=1 MINUTES 30 SECONDS	With this command the output will be activated for a number of defined minutes. In the example 1 minute and 30 seconds was used. The output is activated immediately after the acknowledge SMS has been send out and it is deactivated automatically when the timer runs out. **NOTE:** **It is possible to break the output before the timer runs out by using the "OFF" command.**
Permanent activation of the output	MT OUT1=ON	MTC ACK (SERIAL No.) OUT1 ON	With this command the output is activated permanently. The output can be de-activated again using the "OFF" command.
Deactivation of the output	MT OUT1=OFF	MTC ACK (SERIAL No.) OUT1 OFF	With this command the output is deactivated. The command will work for any activation mode either "time controlled" or "permanent".

Warning: Do not use the above mentioned SMS commands for output control if the ME401-9 is used for immobilizer purpose, as this will interfere with the immobilizer functionality.

NOTE: For the "Send SMS" it is of no importance if small or capital letters are used in the command string, or a mixture hereof.

Safety precautions

The use of the digital output is restricted to signals/systems/components related to comfort applications in the vehicles.

Under no circumstances must it be used for purposes, which can influence the safety of the vehicle when driving.

Nilfisk holds no liability for any damages occurred to persons, vehicles, moving machines, construction machines etc. caused by wrong installation and/or faulty use of the digital output.

Warranty

Nilfisk Advance products are covered by a limited manufacturer warranty. The Nilfisk Advance warranty is limited to the warranty rules and legislation present in each country. The warranty only covers manufacturing faults.

The warranty does not cover misuse, wrong installation or damage due to a faulty installation or wrong maintenance.

The invoice act as the proof of warranty, so please keep it as reference for any warranty complaints.

Technical Assistance

If you have a problem and cannot find the information you need in the product documentation, please contact Nilfisk Advance Inc.

Nilfisk Advance Inc.
14600 21st Avenue North,
Plymouth, MN 55447

Tel: +1 763 745 3529 E-mail: **support@nilfisk-advance.com**
Fax: +1 763 745 3863 Web: **www.nilfisk-advance.com**

When contacting technical support, please be prepared to provide the information listed below:

Minimum Information Required for Technical Assistance

If you or a user reports difficulty with a ME401-9 unit (i.e. no GPS fixes, not communicating, LED not working, etc.), it is helpful to retrieve directly from the unit all current configuration settings and the message log data etc, that is accessible by the technical support when they receive the following information about the unit.

1. Unit Serial number

Return Merchandise Authorization - RMA

1. If you experience defects in your product please contact our customer support at: **support@nilfisk-advance.com** or phone +1 763 745 3529

   Your inquiry will be processed by our support team and a support ticket number will be created in our system. You will receive your ticket number by email.

2. In case your hardware needs to be sent to us you will receive a RMA form by email from our support team that you must fill out.

   Print out the RMA and pack it together with the faulty product and send both to the following address:

   Nilfisk Advance Inc.
   14600 21st Avenue North,
   Plymouth, MN 55447

   Attention: Service

Technical Specifications

Product specifications

The ME401-9 unit is a GSM/GPRS quad-band-unit with GPS, integrated antennas and a backup battery

Connections:

Operational voltage (supply voltage):	12 - 48 V DC
Absolute maximum voltage range:	9 - 60 V DC
Standby consumption (GSM-receiver active)	20 mA / 10 mA (average, at 12V / 24V)
Consumption during charging on an empty battery	225 mA / 115 mA (max, at 12V / 24V)
Standby time on the backup-battery	48 – 96 hours (Bad – optimum installation)
Charging time for an empty backup-battery	3 hours at 25 ºC
Expected lifetime of the backup-battery	3 years
Digital inputs	4
Digital outputs	1

Temperature range:

In active running mode	-30ºC to +60ºC
Storage	-40ºC to +70ºC

GSM/GPRS-specifications:

EGSM/GPRS/EGPRS 900/1800/850/1900

Maximum output power at EGSM-GPRS 900 MHz: 2.0W
Maximum output power at GSM-GPRS 850 MHz: 1.6W
Maximum output power at GSM-GPRS 1800/1900 MHz: 1.0W

GPRS-class 10 device

Mechanical specifications

Dimensions:
- Length: 92 mm
- Width: 45 mm (49 mm incl. mounting cradle)
- Height: 18 mm (23 mm incl. mounting cradle)
- Cable length: 170 cm

Environmental class: IP67
Enclosure material: Non-flammable ABS

Weight: 63 g (excluding the cable)

Approvals and certificates

The ME401-9 product is certified according to the following recommendations:

E1 **10 R – 03 6585** CE **0682**

FCC-ID: 2AA8J-ME401
IC-ID: 11495A-ME401

FCC and IC Statements
The ME401-9 product contains radio transmitters that comply with CFR 47 Part 15, Part 22 and Part 24 of the FCC rules and with RSS-GEN, RSS-102, RSS-132, RSS-133 and RSS-210 of Industry Canada requirements.

Statements according to CFR 47 Part 15.19 / RSS-210:
The ME401-9 product complies with Part 15 of the FCC rules and RSS-210 of Industry Canada. 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.

Statements according to CFR 47 Part 15.21:
Changes or modifications made to this equipment not expressly approved by Nilfisk Advance may void the FCC authorization to operate this equipment.

Statements according to CFR 47 Part 2.1091 / 2.1093 and OET bulletin 65 / RSS-102:
With respect to radiofrequency radiation exposure Information it is declared that this equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance of [5] cm between the radiator and your body.
This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

EC/ International

- The ME401-9 product complies with the essential requirements of the Automotive Directive 2004/104/EEC - UN regulative ECE R10 EMC rev. 3
- The ME401-9 product complies with the essential requirements of the Directive 2003/37/EEC and Directive 2006/42/EEC
- The ME401-9 product complies with the essential requirements of the R&TTE directive 1999/05/EEC directive with respect to the EMC requirements, safety and radio spectrum matters.

- The ME401-9 product complies with the essential and environmental requirements of the Interoperability of trans-European conventional rail system 2001/16/EC and 2004/50/EC directives, when used as intended on rolling stock.
- The ME401-9 complies with the essential requirements of the 2011/65/EC directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

Including:

ISO 13309:2010	Construction machinery
ISO 13766:2006	Earth-moving machinery
EN/ISO 14982:2010	Agricultural and forestry machines
EN/IEC 60950-1:2009 + A11, A1 and A12	ITE Safety
EN/ISO 50121-3-2:2006	EMC for apparatus on rolling stock

And environmental:

EN/IEC 60068-2-1:2007	Cold
EN/IEC 60068-2-2:2007	Dry Heat
EN/IEC 60068-2-27	Shock
EN/IEC 60068-2-64	Random vibration
EN/IEC 60068-2-78:2001	Damp heat steady state
DIN EN 50125-1:2000	Railway – Environmental conditions for equipment on rolling stock

CE
The ME401-9 product complies with the essential requirements of the R&TTE Directive 1999/5/EC as stated by the EC Declaration of Conformity.

Certificates and Declaration of conformity (DOC) statements can be downloaded from the Nilfisk website:

http://www.nilfisk-advance.com/en/nilfisk/approvals/approvals.htm

Nilfisk Advance
setting standards

OUR MISSION