



**ME401-2**

# **Technical Manual**

**Version 1.3a, September 2012**



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### Release Notice

This document is release 1.3 of the ME401-2, Technical Manual.

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. ANY END-USER DOCUMENTATION IS TO BE PREPARED AND FURNISHED BY THE RESELLERS.

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### Product Limited Warranty

Subject to the terms and conditions set forth herein, M-Tec A/S ("*M-Tec*") makes the following warranty only to its Resellers who purchase the ME401 hardware product ("*Product*") directly from M-Tec: for a period of one (1) year from the date of shipment from M-Tec, the Product will substantially conform to M-Tec's standard published specifications for the Product and the Product hardware will be substantially free from defects in materials and workmanship. The foregoing warranty shall not apply to embedded software/firmware components.

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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 products comply with the essential requirements of the R&TTE Directive 1999/5/EC as stated by the EC Declaration of Conformity (CE0682). The ME401 products comply with the European Telecommunications Standards Institute Specifications EN 301 489-1 (EMC for GSM 900MHz and DCS 1800MHz Radio Equipment and Systems).

##### **EEC/ International**

The ME401 products comply 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 products comply with the essential requirements of the Directive 2003/37/EEC and Directive 2006/42/EEC.

The ME401 products comply with the international standards ISO-13309, ISO13766 and EN ISO-14982, for tractors, forest and agricultural machinery, moving machinery and construction machinery.

The ME401 product comply with the essential and environmental requirements for use on rolling stock according to ISO 50121-3-2 and DIN EN 50125-1.

##### **FCC**

The ME401 products comply with the FCC Part 15, Part 22 and Part 24, and Industry Canada requirements. The ME401 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 must be installed to provide a separation distance of at least 5 cm from all persons.

ME401:

FCC ID: ZMF-ME401

IC-ID: 9746A-ME401

## Introduction

This document contains the installation guide for the GSM/GPS product type series ME 401-2 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 ME401-2. Any end-user documentation is to be prepared and furnished by the Resellers.

This manual covers the ME401-2 with 59.2 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, M-Tec recommends that you spend some time reading this manual to learn about the special features of this product.

M-Tec assumes that you are familiar with Microsoft Windows.

This manual is available in portable document format (PDF) from the following web site: [www.trackunit.com](http://www.trackunit.com). Alternatively the latest version of this manual can also be downloaded from the factory website:

<http://www.m-tec.dk>

### ***Related Information***

The Trackunit Pro web site is found at [www.trackunit.com](http://www.trackunit.com). This site is dedicated to the fleet management system from M-Tec A/S called Trackunit Pro. ME401-2 devices are integrated to Trackunit Pro but can also be used together with third part system providers.

## Safety first

### ***Simple Guidelines***

Please follow these guidelines when configuring, using or recycling the ME401. 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 unit to operate wherever wireless phone use is prohibited or when doing so may cause interference or danger. The ME401 cannot be turned off after installation, so any vehicle, moving machinery, construction machinery using ME401 etc. must not enter areas where it is prohibited to operate wireless phones. 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 may encounter electrical interference that may affect its performance.

### ***Avoid Body Contact with Device during Operation***

Do not operate the ME401 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 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 series is water-resistant according to the IP-67 standard. It is however recommended that it is be used where it is relatively dry and not subjected to either water streams or submersion.

### ***Recycling***

For information on how to recycle this product in the European Union, go to either web page [www.trackunit.com](http://www.trackunit.com) or [www.m-tec.dk](http://www.m-tec.dk).

## **Detailed Safety Information**

### ***Exposure to Radio Frequency Signals***

The ME401 unit is a low power radio transmitter and receiver. When it is ON, it receives and also sends out radio frequency (RF) signals. **The ME401 unit cannot be turned off after installation, so the unit operates in an always ON mode, for approximately of 3 to 4 days depending on the charging state of the backup battery.**

The ME401 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 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 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 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 and any person's body.
- Do not carry the ME401 on your person.

### ***Other Medical Devices***

If any other personal medical devices are used in the vicinity of a ME401 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 unit cannot be turned off after installation, so any vehicle, moving machinery, construction machinery installed with the ME401 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 unit cannot be turned off after installation, so any vehicle, moving machinery, construction machinery installed with the ME401 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 unit aboard an aircraft as it cannot be turned off.

The ME401 unit cannot be turned off after installation, so any vehicle, moving machinery, construction machinery installed with the ME401 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 unit cannot be turned off after installation, so any vehicle, moving machinery, construction machinery installed with ME401 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.

***For Vehicles Equipped with an Airbag***

An airbag inflates with great force. DO NOT place objects, including the ME401 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 Absorption Rates (SAR)***

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

The ME401 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 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](http://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 without the battery cover installed.



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## Delivered standard content

The delivered standard package content includes the following items:

- 1 x GSM/GPS-unit of the model type ME401-2
- 1 x mounting cradle
- 1 x Li-ion Battery (May already be mounted inside the ME401-2 unit)
- 1 x Fuse with fuse holder

In case the unit is delivered with SIM card from the factory, 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 ME401-2 unit.

### ***Ready-to-Use, No Custom Programming Required***

Simply connect the unit to supply voltage (12V/24V 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 ME401-2 operational states is helpful, configuring the ME401-2 unit does not require a highly skilled software programmer or technician.

### ***Cost-effective, Universally Available Communications***

The ME401-2 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 ME401-2 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 ME401-2 device.

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

No.	Wire (color code)	ME401-2 function
1	Red	Supply voltage +12V / +24V
2	White	Digital input 1
3	Brown	Digital input 2 Ignition
4	Grey	Digital input 3 / ID06
5	Pink	Digital input 4
6	Green	1-Wire input
7	Yellow	Digital output 1
8	Blue	Common ground

### **Power supply**

The unit **must** be connected to either +12V or +24V 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 activation of a digital input requires a minimum high level voltage of 8V.

## 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 40V 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 sensor

The unit has a built-in motion 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 3' on the Trackunit portal.

## 1-Wire input

The 1-wire (Green wire) is designed to communicate with temperature sensors based on the DS18B20 or DS18S20 sensor.

The 1-wire input can also be used to read Dallas iKey for access control.

The 1-wire input is only operational when supply voltage (12V / 24V) is present. It cannot operate on internal battery alone.

## Installation of the ME401-2 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 ME401-2 for registering operating hours:

For a standard installation in machines where the unit should register the number of operating hours use the connections as follows:

No.	Wire (color code)	Connection	Description
1	Red	Power	Connect to a fixed DC supply through a fuse of 1 Amp.
2	White	Digital input 1	Connect to the operating hours counter. (Min. 8V DC voltage at the input)
3	Brown	Digital input 2	Connect to the ignition signal (Min. 8V DC voltage at the input)
4	Grey	Digital input 3	Can be connected to an external sensor or it can be connected to a ID06 Card reader. (Min. 8V DC voltage at input)
5	Pink	Digital input 4	Can be connected to an external sensor for detecting a critical running mode or an alarm (Min. 8V DC voltage at input)
6	Green	1-wire input	Can be used to connect one or two temperature sensors or a Dallas Key reader to control an immobilizer relay connected to Digital output 1
7	Yellow	Digital output 1	Can be used to control external equipment through a relay (see example in “ <b>Installation of the digital output</b> ”. Max. Load 200 mA)
8	Blue	Ground	

### Installing the ME401-2 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.	<i>MT INFILT ON</i>	<i>MTC ACK (SERIAL No.) INFILT ON</i>

**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.

## Installation of the ME401-2 in vehicles

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

No.	Wire (color code)	Connection	Description
1	Red	Power	Connect to a fixed DC supply through a 1 amp. fuse.
2	White	Digital input 1	Connect to the operating hours counter. (Min. 8V DC voltage at the input)
3	Brown	Digital input 2	Connect to the ignition signal (Min. 8V DC voltage at the input)
4	Grey	Digital input 3	Can be connected to an external sensor or it can be connected to a ID06 Card reader. (Min. 8V DC voltage at input)
5	Pink	Digital input 4	Can be connected to an external sensor for detecting a critical running mode or an alarm (Min. 8V DC voltage at input)
6	Green	1-wire input	Can be used to connect one or two temperature sensors or a Dallas Key reader to control an immobilizer relay connected to Digital output 1
7	Yellow	Digital output 1	Can be used to control external equipment through a relay (see example in “ <b>Installation of the digital output</b> ”. Max. Load 200 mA)
8	Blue	Ground	

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

## Functionality check

### LED

The ME401-2 is fitted with an LED that has the following status indications:

LED mode	Status indication
A constant green light shortly interrupted by a red blink:	The unit is attached to the GSM network and the GPS is navigating – Everything is OK.
No light:	The unit is not connected to a power supply
Constant red light:	The unit is powered up, but is not yet attached to the GSM network
Short red blink:	The unit is powered up and it is attached to the GSM network, but is not yet navigating
Constant green light:	The unit is navigating (GPS-satellite position fix)



## Status SMS Commands

In order to control if the installation of the ME401-2 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
<ul style="list-style-type: none"> <li>Is the unit powered up?</li> <li>Does the GPS receiver have sufficient reception conditions?</li> <li>Is the GSM signal coverage sufficient?</li> </ul> <p><b>NOTE: It is best to perform this check under outdoor conditions as any buildings/garage would reduce signal quality.</b></p>	<i>MT SIGNAL</i>	<p><i>MTC ACK (SERIAL No.) SIGNAL: GSM=22, SAT=8, SN=44</i></p> <p>"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.</p> <p>"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.</p> <p>"SN" is a measure for the GPS-signal strength. Should be larger than 35.</p>
<ul style="list-style-type: none"> <li>Are the digital inputs mounted correctly</li> </ul> <p><b>NOTE: This command can be send to the unit under various operational conditions like: Machine running, ignition only or off.</b></p>	<i>MT STAT</i>	<p><i>MTC ACK (SERIAL No.) INPUT STATUS: INPUT1 LOW, INPUT2 LOW, INPUT4 LOW, CHARGE VOLTAGE ON</i></p> <p><b>NOTE: An input is <i>HIGH</i> if there is more than 8V on the input – otherwise it would be <i>LOW</i></b></p>

**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.

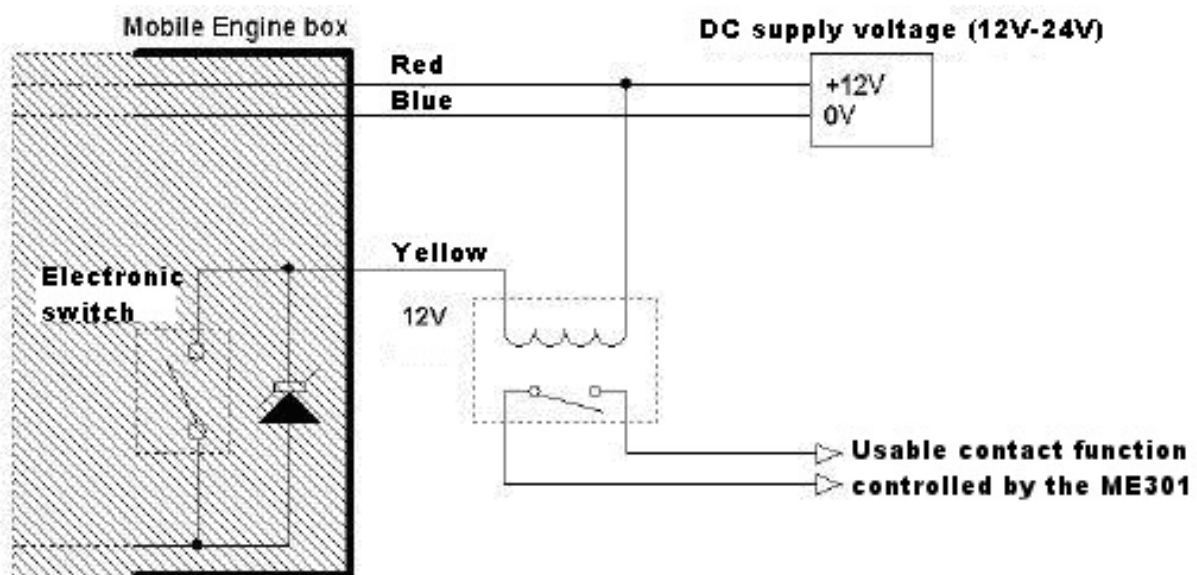
Error code	Error description	Possible solutions
F1	The unit does not answer the SMS command send to it.	<ul style="list-style-type: none"> <li>◆ Verify if the SMS messages are send to the correct GSM phone number.</li> <li>◆ Check LED status; See the “Functionality check” chapter in this manual.</li> <li>◆ If the ME401-2 unit has been delivered with the SIM card mounted. Contact M-Tec support.               <ul style="list-style-type: none"> <li>○ Or contact the mobile operator to verify if there is any problem with the SIM card.</li> </ul> </li> <li>◆ Verify if the SIM card is correctly mounted in the unit.</li> </ul>
F2	The LED in the unit is off, thus no power on the unit.	<ul style="list-style-type: none"> <li>◆ Check if the installation is performed correctly according to the guidelines of this manual.</li> </ul>
F3	The LED is constant red, thus the unit is not attached to the GSM network	<ul style="list-style-type: none"> <li>◆ If the ME401-2 unit has been delivered with the SIM card mounted. Contact M-Tec support.               <ul style="list-style-type: none"> <li>○ Or contact the mobile operator to verify if there is any problem with the SIM card.</li> </ul> </li> <li>◆ Verify if the SIM card is correctly mounted in the unit.</li> <li>◆ Verify if the PIN code has been disabled from the SIM card before it was inserted in the unit</li> </ul>
F4	The unit send reply messages but there is no GPS signal	<ul style="list-style-type: none"> <li>◆ 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.</li> <li>◆ If the machine/vehicles are located inside a building, please move the machine/vehicle outside a try again.</li> </ul>

## Installation of the digital output

According to the E1 certificate of the ME401-2 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 12V relay function with a 12V DC supply voltage. It is also possible to use a 24V relay with a 24V DC 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 ME401-2 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 ME401-2” 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***

<b>Function</b>	<b>Send SMS</b>	<b>Return SMS</b>	<b>Description</b>
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. <b>NOTE:</b> <b>It is possible to break the output before the timer runs out by using the "OFF" command.</b>
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".

**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.

M-Tec 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

M-Tec A/S products are covered by a limited manufacturer warranty. The M-tec A/S 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 M-Tec A/S

M-Tec A/S  
Industrivej 10  
9490 Pandrup  
Tel: +45 99 73 00 20  
Fax: +45 96 73 74 07

E-mail: [support@m-tec.dk](mailto:support@m-tec.dk)  
<http://www.m-tec.dk/en/>  
[www.trackunit.com](http://www.trackunit.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 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

## ***Complaints***

Return of faulty products must always be accompanied by a complaint note.  
The template for returning complaints can be downloaded from the M-Tec website:

[http://www.m-tec.dk/en/gsm\\_applications/rma/](http://www.m-tec.dk/en/gsm_applications/rma/)

If a returned product that was announced faulty, turns out not to have any errors when tested at the factory, an examination invoice with a fee of DKR 250,- per product plus return freight costs will be issued – not taken into consideration the original purchase costs.

Try to make the error description as detailed as possible. Insufficient error descriptions will extend the service time. The terms “Defective”, “Does not work”, “Dead” etc. are not accepted as a detailed error description.

When the complaint note has been filled out, please send it to our service department. At the following e-mail address:

[service@m-tec.dk](mailto:service@m-tec.dk)

Print out the complaint note and pack it together with the faulty product and send both to the following address.

M-Tec A/S  
Industrivej 10  
DK-9490 Pandrup  
Denmark  
Attention: Service

## Specifications

### *Product specifications*

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

#### Connections:

Operational voltage (supply voltage):	12 - 24 V DC
Absolute maximum voltage range:	9 - 65 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 °C
Expected lifetime of the backup-battery	3 years
Digital inputs	Up to 6
Digital outputs	Up to 2

#### Temperature range:

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

#### 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)
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## Approvals and certificates

The ME401 product is certified according to the following recommendations:



FCC-ID: ZMF-ME401  
IC-ID: 9746A-ME401

### FCC

The ME401 product complies with FCC Part 15, FCC Part 24, and Industry Canada requirements.

The ME401 product complies with Part 15 of the FCC rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) This device must accept any interference received, including interference that may cause undesired operation.

### EEC/ International

- The ME401 product complies with the essential requirements of the Automotive Directive 2004/104/EEC - UN regulative ECE R10 EMC rev. 3
- The ME401 product complies with the essential requirements of the Directive 2003/37/EEC and Directive 2006/42/EEC
- The ME401 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.

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



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DIN EN 50125-1:2000

Railway – Environmental conditions for  
equipment on rolling stock

**CE**

The ME401 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 M-Tec website:

[http://www.m-tec.dk/en/gsm\\_applications/certificates/](http://www.m-tec.dk/en/gsm_applications/certificates/)