tork

valve & automation

GA 21 Gas Alarm Device

User's Manual

JANUARY 2022

PLEASE READ THE INSTRUCTIONS BEFORE USED

www.smstork.com

Read the operating instructions first.

- Follow the safety instructions.
- These operating instructions are part of the product.
- Retain operating instructions for the life of the product.
- Forward instructions to future users or owners of the product.

Target group:

- This document serves as a guide for personnel using the GA21 Gas Alarm Detector.

It cannot be used as a reference for any other device. The right to make changes is reserved.
Contains information for installation, commissioning and maintenance personnel.

INDEX

1. SAFETY INSTRUCTIONS

1.1. Security basics

• Our products are designed and manufactured in accordance with accepted standards.

• End user and contractor; must comply with requirements such as legal requirements, directives, installation guidelines, regulations and recommendations, electrical connection, commissioning, operation and installation.

• All personnel working with this device must comply with the safety and warnings specified in the safety instructions in order to prevent personal injury and damage to the product.

• Installation, electrical connection, commissioning, operation and maintenance must be performed by suitably qualified personnel authorized by the end user or contractor.

• Personnel must fully read and understand the instructions before working on this product.

• These instructions are given to know and abide by the officially recognized rules.

• Before commissioning, make sure that all settings are correct.

• Incorrect settings or connections may pose a hazard to the application or damage the installation.

• The manufacturer cannot be held responsible for any consequential damages. This risk is entirely with the user.

• Care should be taken in cases such as transportation, proper storage, assembly and installation.

• Operate the device in accordance with the instructions.

• The end user or contractor is responsible for implementing the necessary protective measures, providing and supplying guards, barriers or personal protective safety equipment for personnel.

• Maintenance and service operations should only be performed by trained and authorized personnel.

• During maintenance intervention on the faulty unit, it must be worked in accordance with the operating instructions.

• Any device changes require the manufacturer's prior written approval.

1.2. Warnings and precautions

The following warnings draw particular attention to safety-related procedures on these devices.

DANGER	WARNING	CAUTION	NOTE
Indicates an imminent dangerous situation with a high level of risk. Ignoring this warning will result in death or serious injury	Indicates a potentially hazardous situation with moderate risk. Ignoring this warning could result in death or serious injury.	Indicates a potentially dangerous situation with a low level of risk. It may cause property damage, minor or moderate injury. This warning should be heeded.	Potentially dangerous situation. Ignoring this warning does not apply to property damage and personal injury.

1.3. Considerations

CAUTION Pay attention to the following points in order to use the device safely.

- The device should not be used for any other purpose.
- Maintenance and service operations should only be performed by trained and authorized personnel.
- The device must be protected from vibrations and mechanical shocks.
- The frequency and voltage of the power line should comply with the device specifications, and it should be able to deliver sufficient current to the device.
- Devices that may cause noise should not be placed in the supply line.
- The device should not be constructed in such a way that the device's power cables, sensor cables, output connection cables, and the gas alarm device and cables to which it is connected may prevent the movements of persons.
- The device must be used with accessories and parts supplied by the manufacturer. The use of different accessories and parts may cause the device to malfunction or malfunction.
- The device and its cables should not be subjected to any mechanical stress.
- The device and its accessories should be checked at least once a year.
- If possible, a fire extinguisher should be available.
- The user must have received the necessary training and knowledge about fire extinguishing.
- After making sure that the device connections are made correctly and completely, the device should be started.

WARNING If the device gives an alarm in cases such as gas leakage detection or malfunction due to possible reasons, the following points should be paid attention to in environments where gas leakage occurs.

- First of all, stay calm.
- Heed and obey the warnings, alarms and messages specified in this instruction and the device.
- The device shuts down the energy of the relevant system connected to the output relay, in case of any malfunction, inability to detect leakage gases, or in case of alarms due to different reasons.
- Check if there is a gas leak in the environment where gas alarm detectors are located. If there is, open the doors and windows without panic, and let it ventilate.

Against the risk of fire;

- Close the gas valve, starting from the place closest to you.
- Do not plug any electrical appliances into sockets.
- Do not use electrical devices. Warn users.
- Do not use devices such as doorbells, cell phones and walkie-talkies.
- Contact a specialist from the gas distribution company in a suitable safe place.

• If there is a flame, put it out. If there is a natural gas sourced flame, it is useless and dangerous to try to extinguish the flame without closing the gas valve. If the flame size is large, immediately inform service units such as fire extinguishing, fire brigade and take action.

• If electrical equipment is on fire, do not try to extinguish it with water. Use a fire extinguisher.

• If you smell gas before the device alarms, intervene appropriately by following the warnings and instructions without waiting for the device to alarm.

• If the cause of the alarm cannot be found even though the gas leak continues, leave the area for precaution. Contact the gas distribution company to check the parts, make them safe and make the necessary maintenance and repairs. If there is a device problem, inform the manufacturer.

• Check all accessories and connections before using the device. Do not use damaged accessories and cables. Improper accessories, faulty or poor connections can cause unexpected potential problems such as electrical shocks.

• Before commissioning the device, make the necessary settings on the device, make sure that it detects gas, that the output control relays work, that the buzzer (audible warning) and signal output work.

• When the device needs to be tested with gas, first check if there are gas leaks or situations that may cause danger in the environment. If there is a danger, cut the power of the device and take it to a safe environment and perform the test procedures there.

• During installation/assembly and commissioning, the user must use appropriate assembly tools and avoid any actions that may endanger his own safety.

1.4. References and symbols

The following references and symbols are used in this instruction and on the electronic boards.

MARKINGS/SYMBOLS	DESCRIPTIONS
+24V	+24V port on DC voltage supplies
+12V	+12V port on DC voltage supplies
+5V	+5V port on DC voltage supplies
+V	DC voltage supply + voltage port
-V	DC voltage supply - voltage port
+S	Analog signal output port
GND	0V port on DC voltage supplies
VIN	AC or DC voltage supply port
S1	Analog signal output port
COM	Relay outputs port common contact terminal
NO	Relay outputs port common contact terminal
NC	Relay outputs port common contact terminal
Grounding Symbol	The port where the grounding connection of the device will be made

Table 1:Symbols

2. Identity

2.1. Description of the device

The GA21 gas alarm detector is a device that detects explosive gases in the environment. 1.5 minutes after the supply voltage is applied, the sensor warms up and reaches the normal detection level. It is not recommended to test with any gas before this period expires. If the gas leakage level is above the set limit value, the device gives an alarm. As long as the gas leakage is above the limit level, the device continues to alarm. When the gas leakage falls below the set limit level, it automatically shuts down the alarm and relays and cuts off the energy of the connected systems.

If the gas valve is to be closed or the gas to be evacuated from the environment under alarm conditions, the desired system can be controlled by using the output relays of the gas alarm device. Analog output signals in the device PLC etc. It can be controlled by connecting to systems such as By changing the sensor head, different gases can be detected. It is a general-purpose, simple and easy-to-use device that can output mA or volts, control the systems connected to the output relays, and give audible and visual warnings.

Developed considering the needs of the user, the GA21 gas alarm detector has a structure that simplifies and strengthens the communication between the user and the device. The device contains 2 output control relays, 1 gas level output (mA and Volt), 1 buzzer (audio warning), Zero, Span and offset (%LEL adjustment) trimpots and electronic board.

2.2. Intended use of the device

GA21 gas alarm detector is connected to the level signal output and connected to intelligent and controllable systems (PLC etc.) (0-20, 4-20, 0-10, 2-10 mA, 0-5, 1-5, 0-10, 2 -10 VDC) sends analog signals. It is a product that aims to warn the user with sound and light by controlling the gas level in the environment, to send signals to the connected systems, to control, to use the systems it controls safely and to prevent possible dangers.

2.3. Reasons for use

- Long life
- Being ExProof
- Less energy consumption
- Modular design structure
- Easy assembly and disassembly
- Ease of adjustment and flexible operation
- Robust and lightweight construction
- Informing the user with the alarm

2.4. General View

The figure given below is given to inform the user about the structure of the device. It is produced in two according to their features. is that there is no relay and buzzer in the non-relay type. The electrical-electronic and mechanical components of the GA21 gas alarm device are given in Figure 1, Figure 2 and Figure 3.

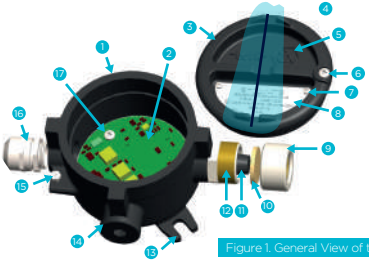


Figure 1. General View of the Device

DEFINITIONS

1. Body
2. Electronic Card
3. Cover
4. Cover Opening Place
5. ExProof Icon
6. Cover Fixing Screw
7. Label Fixing Screw
8. Label
9. Sensor Housing Cover
10. Sintered Filter(IP55)
11. Sensor
12. Sensor Housing Connector
13. Body Fixing Leg
14. Stopper
15. Ground Screw
16. Cable Entry Connector
17. Electronic Card Fixing Screw

2.4.1. Relay type electronic board

The electronic card image of the GA21 series gas alarm detectors with relay is given in the figure below. Here, the electronic card structure and electrical-electronic components are defined. It is recommended that the user be familiar with these components and technical specifications. (See 2.6. Technical specifications Table 3) When valves, sirens or other systems are connected to the relay contacts, the current value that can pass through the contacts must be taken into account. In case of connecting systems that draw excessive current, it may cause unexpected possible malfunctions in the relay or components on the electronic board. At the same time, Low level adjustment can be made with ZERO trimpot and High level adjustment can be made with SPAN trimpot. Alarm trimpot is also used to determine the alarm level of the device. According to the gas density in the environment, it can be monitored with the analog signals produced by the devices or it can control the systems it is connected to. When the output signals reach the alarm level, it gives an audible alarm with a buzzer.

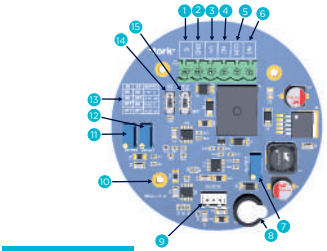


Figure 2: Relay Type

DEFINITIONS

1. Signal Output
2. Supply Voltage
3. Supply Voltage
4. Relay Contact (NC)
5. Relay Contact (COM)
6. Relay Contact (NO)
7. Alarm Level Adjustment Trimpot
8. Buzzer
9. Sensor Socket
10. Fixing Holes
11. Span Trimpot
12. Zero Trimpot
13. Output Signal Selection Table
14. Signal Selection Switch 1
15. Signal Selection Switch 2

2.4.2. Non-relay type electronic board

In the picture below, the components of the relayless type GA21 gas alarm device electronic card are given and defined according to their functions. It can give more than one different output control signal. The user can adjust the low and high sensitivity settings with the zero and span trimpots, and the output control signal can be selected from Table 2 with the signal selection switches.

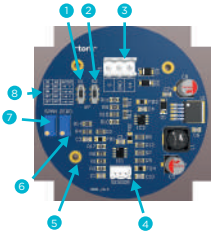


Figure 3: Non-relay Type

DEFINITIONS

1. Signal Selection Switch
2. Signal Selection Switch
3. Signal and Supply Voltage Terminal
4. Sensor Socket
5. Electronic Card Fixing Hole
6. Zero Trimpot
7. Span Trimpot
8. Signal Selection Table

S1	S2	Output Signal
ON	ON	1-5 Volt
ON	OFF	2-10 mA
OFF	ON	2-10 Volt
OFF	OFF	4-20 mA

Table 2: Signal Selecction Table

2.5. Label Information

Figure 4: Output Connection Terminals

2.6. Technical Features

TECHNICAL FEATURES	
Body protection class	: IP54
Body material	: ABS
Dimension	: 72x144x115mm
Weight	: 515 gr
Supply voltage	: 24VDC
Gas detector supply voltage	: 12VDC
Tank level sensor supply voltage	: 12VDC, 5VDC
Power consumption	: 1.5W
Output control relat	: Gas control relays(2 Number), siren relay, Tank1 relays(AL and UL), Tank2 relays (AL and UL)
Output control relays maximum current carrying capacity	28VDC 10A, 250V AC 7A
Gas level detect input	8 number
Tank level detect input	2 number
Gas level input control signals	0/4-20 mA, 0/2-10 mA, 0/2-10V DC, 0/1-5V DC
Gas level input control signals	0/4-20 mA, 0/2-10 mA, 0/2-10V DC, 0/1-5V DC
Environment temperature	-10°C - +50 °C
Sound intensity	85dB
Alarm	Audible, light and can be viewed on the screen
Relative humidity	30 - 75 %
Language	Turkish-English(blue-white),
User interface	Keys and warning leds

Table 3: Technical Features

2.7. Technical Dimensions

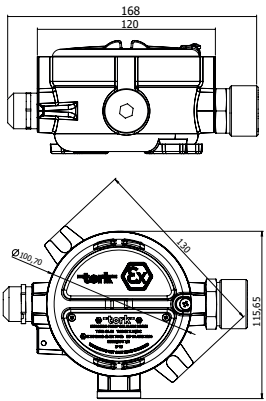


Figure 5: Technical Dimensions

3.Transport, Storage, Packaging, Warranty and Protection measures

3.1. Transport

During the transportation of the GA21 gas alarm device, consider all kinds of variable transportation conditions such as impact, vibration, falling, rain, transportation that may damage it. Pack it well so that it reaches the installation site securely.

CAUTION A dangerous situation due to improper transport.

- Check the packaging.
- Observe the signs and symbols on the packaging.
- Make sure that the signs and symbols on the packaging are visible.

3.2. Storage

NOTE **Risk of corrosion and deterioration due to improper storage.**

- Store in a well-ventilated dry place (maximum humidity 75%).
- Protect against dust and dirt.
- Protect against ground moisture by storing on a shelf or on a wooden pallet.
- Protect against excessive temperature, humidity and water.
- Keep away from harmful oscillations such as magnetic field, radiation.

3.3. Packaging

Our products are protected by special packaging for transportation when leaving the factory. The packaging materials used in packaging consists of environmentally friendly materials that can be easily cleaned. It should be separated and recycled. Packaging materials such as wood, cardboard, paper, PE foil are used. TORK recommends recycling and collection centers for the disposal of packaging materials.

3.4. Warranty

- The warranty period starts from the delivery date of the product and the warranty period is 2 years.
- The entire product, including all its parts (against failures that may arise from our production and assembly errors and/or defective parts), is within the scope of our company's warranty.
- If the product fails within the scope of warranty;

The time spent in repair is added to the warranty period. The repair period of the product is maximum 20 business days.

• The warranty starts from the date of notification of the product defect to the TORK authorized service, or in the absence of an authorized service station, to the seller, dealer, agency, representative, importer or manufacturer of the product. The consumer can make the failure notification via telephone, fax, e-mail, registered letter with return receipt or similar, but in case of conflict, the burden of proof rests with the consumer.

• The product;

• In the event that it breaks down at least four times within a year or six times within the warranty period determined by the manufacturer and/or importer, provided that it remains within the warranty period, from the date it is delivered to the consumer, and if the user is not able to benefit from this product due to these faults,

• In case of exceeding the maximum time required for repair,

• If it is determined that the repair of the malfunction is not possible with a report prepared by the seller, dealer, agency, representative or one of our company's officials, respectively, if the service station is not available, the product will be replaced free of charge.

• The warranty period of the product that has been changed during the warranty period, the purchased product, TORK Industrial Automation Products San. Trade Ltd. St. limited to the remaining warranty period provided by

• Free repair and product replacement obligations are eliminated in the following cases.

• Failure of the product due to use contrary to the methods or conditions specified in the user manual,

• The product and the warranty labels on its contents are damaged/torn,

• If it is determined or noticed that the product has been opened/repaired before, other than TORK Authorized Service personnel,

• In case the outer surfaces of the product and its components are broken within the customer's

responsibility,

• Incorrect handling (bump, drop, impact), inadequate maintenance, abuse, use contrary to the environmental characteristics specified in the user manual, use of the product in excessively humid, dusty or hot environments, use in environments that are damaging to electronic circuits and corrosive, failures caused by accidents, impacts, electricity (voltage changes), natural disasters,

• Malfunctions or damages during transportation that are not under the responsibility of SMS Sanayi Malzemeleri Üretim ve Satası A.S.,

• In case the defective part is replaced with parts other than TORK Authorized technical services and/or parts without SMSTORK warranty

• If it is determined by a report to be issued by the TORK authorized service, whether the malfunctions occur as a result of usage error or not.

• If the device fails after the warranty period, if you have a service agreement with TORK, request the type of service available in this agreement. If you do not have a service agreement, you can get service by contacting the TORK dealer or customer service center.

• Use original packaging materials whenever possible. The responsibility of the damages that may occur during shipment due to improper packaging belongs to the customer.

• Regarding the Warranty Certificate; For problems that may arise, an application can be made to the Ministry of Customs and Trade, General Directorate of Consumer Protection and Market Surveillance.

3.5. Protection measures

Before each use of the device, take precautions against damage such as rupture, crushing, cracking in the connections, that the device connections are in accordance with the instructions for use, electrical leakages, liquid leaks and accumulations.

4. Control Parameters

4.1. Possible malfunctions and solutions

Before connecting and commissioning the GA21 gas alarm device, the user should have information about the device in hand. The table below gives information about corrective actions when a problem occurs with the device.

NOT If there is a voltage fluctuation in the mains line, regulate the voltage fluctuation so that the device can measure correctly. Safety principles should never be compromised as the gas industry is in a dangerous industrial sector group.

Types of Failure	Corrective Interventions
The device does not turn on	Disconnect the supply voltage cable from the mains. Check if there is electricity coming from the cable with the help of a measuring instrument. Check the power supply. If problematic, replace cable or power supply. If the problem persists, inform the company by taking the necessary measures.
Device gives alarm continuously	The OFFSET trimpot of the device may not be adjusted properly. Adjust with the OFFSET Trimpot. The sensor may be broken. Replace with new one.
The device works but does not give any alarms	Check the electronic board, the cables to which the output signal is connected, the sensor and the terminal connections. Gas detection sensor or electronic board may be broken. If the problem persists, contact the manufacturer.
Device does not output signal	Check the electronic board, the cables to which the output signal is connected, and the terminal points. Gas detection sensor or electronic board may be broken. If the problem persists, contact the manufacturer.
OFFSET setting cannot be made	Check the OFFSET trimpot. It may be corrupted. Solve the problem by contacting the manufacturer.
Unable to set Zero and Span	Check the Zero or Span trimpots. It may be corrupted. Solve the problem by contacting the manufacturer.

Table 4: Possible malfunctions and solutions

4.2. Power cut

NOTE When the power is cut off, the device will turn off. Since similar systems such as the gas shut-off valve connected to the device output will close it, it will stop the gas passage. When the power comes on, the device will turn on and the device will continue to work normally. The user must activate the closed valve and similar mechanical systems.

4.3. Making the settings

GA21 gas alarm devices are offered to the user in the form of relay and non-relay types. Offset, Zero, Span settings are adjusted with the trimpots on the electronic board, and output signal selection can be made with the sliding switches.

OFFSET Trimpot; It is the alarm level adjustment trimpot. With this trimpot, the user can set the alarm limit level of the device in %LEL.

SPAN Trimpot; It is used to adjust the upper limit level of the 4-20 mA signal when needed.

ZERO Trimpot; It is used to set the lower limit level of the 4-20 mA signal.

SLIDING Switches; It is used to select the output signal and the type of output signal as mA or voltage.

4.4. Installation/Assembly

- Make sure the device is intact before performing the Device Setup.
- Review the cables and ports for the device.
- Do not mount in a way that narrows the user's work area.
- In case of emergency, install it in such a way that it is easily accessible and easy to intervene.
- The lower explosion limit of % lel (APS) differs according to the type of gas used. Have a measuring device available.
- Set the alarm level of the device with the OFFSET Trimpot.
- Identify areas that may pose a hazard as a result of gas leakage.
- Determine the places where the device will be mounted.
- Follow the instructions when performing the Installation/Assembly process.

5. Electrical Connections

5.1. Connection of GA21 gas alarm detector to GAP30 gas alarm control panel

The connection diagram below shows the connection of the GA21 gas alarm detector to the GAP30 gas alarm control panel, as an example.

- Power supply is connected to pins 1 and 2 of GAP30 gas alarm panel.
- Two GA21 gas alarm detectors are connected. The supply voltage of one of the GA21 gas alarm detectors is taken from pins 11,12, and the signal cable is connected to pin 15. The supply voltage of the other GA21 gas alarm detector is taken from pins 17,18, and the signal cable is connected to pin 25.

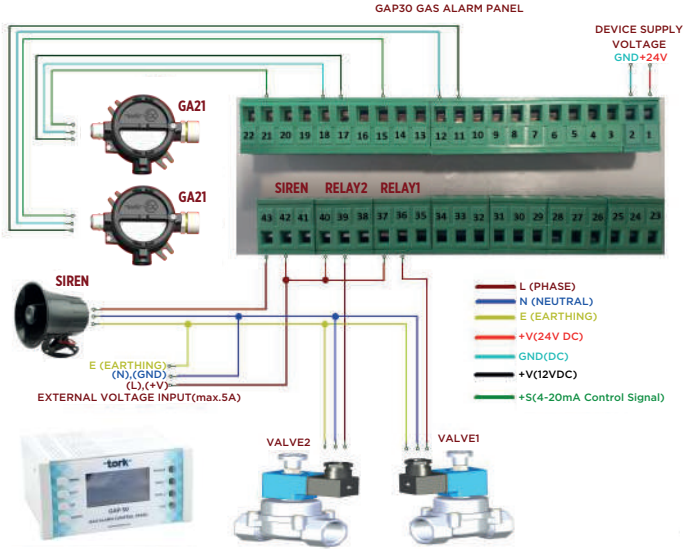
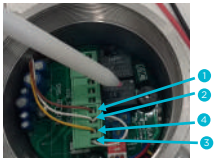


Figure 6: Connection of GA21 Gas Alarm Detector to GAP30 gas alarm panel

NOTE Relay outputs of GA21 gas alarm detectors have a dry contact structure. It needs external voltage from outside. E.g; If the system to be controlled (valve siren etc.) will operate with 230VAC voltage, the user must pass 230V AC voltage through the relay contacts.

5.2. Connection of GA21 gas alarm detector to another gas alarm control panel

AC or DC voltage can be supplied to the VIN inputs of GA21 gas alarm detectors. The power supply used must be at a level that can meet the sufficient voltage and current requirements of the detectors. When the device is operated with an AC voltage output power supply, do not short-circuit the GND pin on the signal output to the VIN pin or bridge it. Connect the GND and +S terminals directly to your system. When the device is operated with a DC voltage output power supply, the GND pin on the signal outputs must be connected or bridged to the V terminal of the supply voltage from inside the device.



DEFINITIONS

1. VIN(Supply Voltage WC or DC) Pin
2. VIN(Supply Voltage WC or DC) Pin
3. Signal Output (GND) Pin
4. Signal Output(+IOUT) Pin

Figure 7: Connection of GA21 Gas Alarm Detector to another gas alarm panel

5.3. Multiple connection diagram of GA21 gas alarm detectors

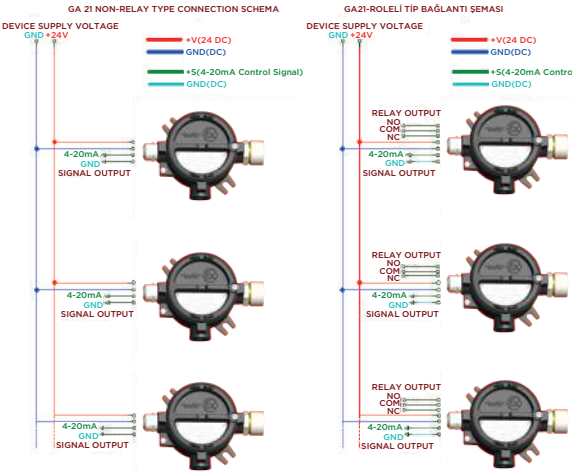


Figure 8: Multi-connection of GA21 gas alarm detectors


T.C.
SANAYİ VE TİCARET BAKANLIĞI
GARANTİ BELGESİ
TÜRK LOYDU
TYPE APPROVAL CERTIFICATE
TÜV CERT
ZERTIFIKAT
Certificate
CERTIFICADO • CERTIFICAT
bsi.
Certificate of Registration
QUALITY MANAGEMENT SYSTEM - ISO 9001:2008
FM 647592
IAF
ANAB

NOTE

HEAD OFFICE Bostancı Yolu Cad. Kuru Sok. No:16 Y. Dudullu, 34776 Ümran_ye İstanbul - TURKEY
FACTORY Çerkeşli OSB Mah. İmes-2 Cad. No:5 Dilovası Kocaeli TURKEY

P +90 216 364 34 05 **F** +90 216 364 37 57
P +90 262 290 20 20 **F** +90 262 290 20 21

SMS-TORK Endüstriyel Otomasyon Ürünleri San. Tic. Ltd. Şti.
/SMSTORK /sms-tork **www.smstork.com**

KUL.GA21/06.07.2022/Rev.04en