



# SMART SWITCH BOX

## USER'S MANUAL



PLEASE READ THE INSTRUCTIONS BEFORE USE

JANUARY 2019



SIL 3

[www.smstork.com](http://www.smstork.com)

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# 1. SSB GENERAL DETAILS

## a. Intended Use of the Product

The Smart Switch Box (SSB) is a patented intelligent control box which is developed by TORK brand for pneumatic actuators within the scope of Industry 4.0 concept and IoT applications.

The smart switch boxes are products that indicate the position of the valves controlled by the pneumatic actuators and can be received contact output from the switches according to this position.

In addition to control the position of the actuators, smart switch boxes can control and monitor the status.

Smart switch box allow you to;

- Monitor the status of the actuators instantly,
- Control your actuator,
- Save energy,
- Learn the temperature value of the actuator,
- The number of times the actuator is switched on from the first day,
- Control the operability of long-time non-acting actuators (Partial Stroke Test),
- Receive information about any malfunction and, more importantly, any malfunctions that may occur before a malfunction

occurs, and maintenance without malfunction.

Control of actuator can be made by;

- Entering the user name and password online via the web,
- Entering the password on the device manually or
- Control signal

## b. Product Benefits

• By analyzing the opening time and pressure values of the actuator in the case of prolonged use, it will notice and inform you of a possible fault condition without any fault.

- Continuously measures the temperature value and warns if it is outside the temperature values you set.
- Measures both opening and closing air pressures and gives warning of any air leakage.
- With two different counters on the monitoring screen, it shows how many times has been on and off from the first day and the counter information that you can reset and count.
- Saves energy.

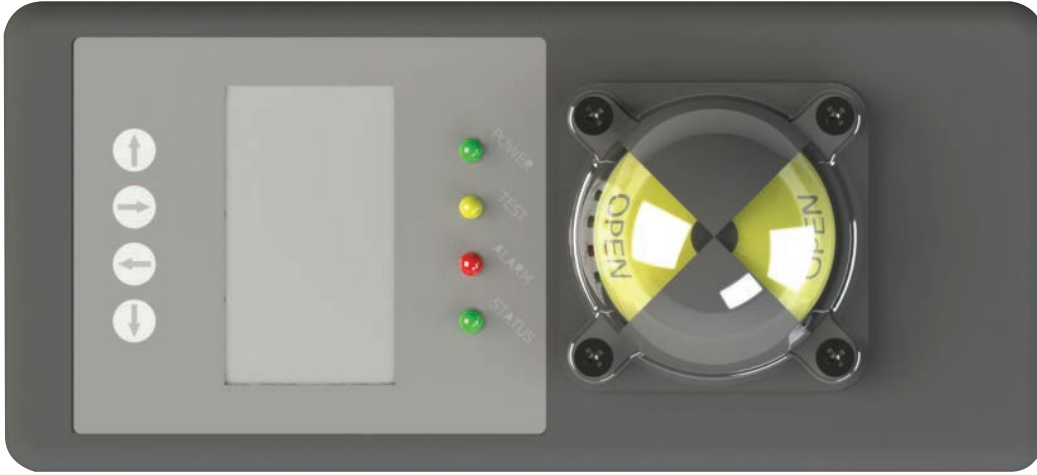
When you want to control your actuator, either the opening or the closing coils remain in continuous energy. It causes energy consumption. The smart switch box cuts off the power of the coil after switching on or off while controlling the acuator. But as the command arrives, it ensures that the actuator remains open or closed.

- It makes Partial Stroke Test (PST).

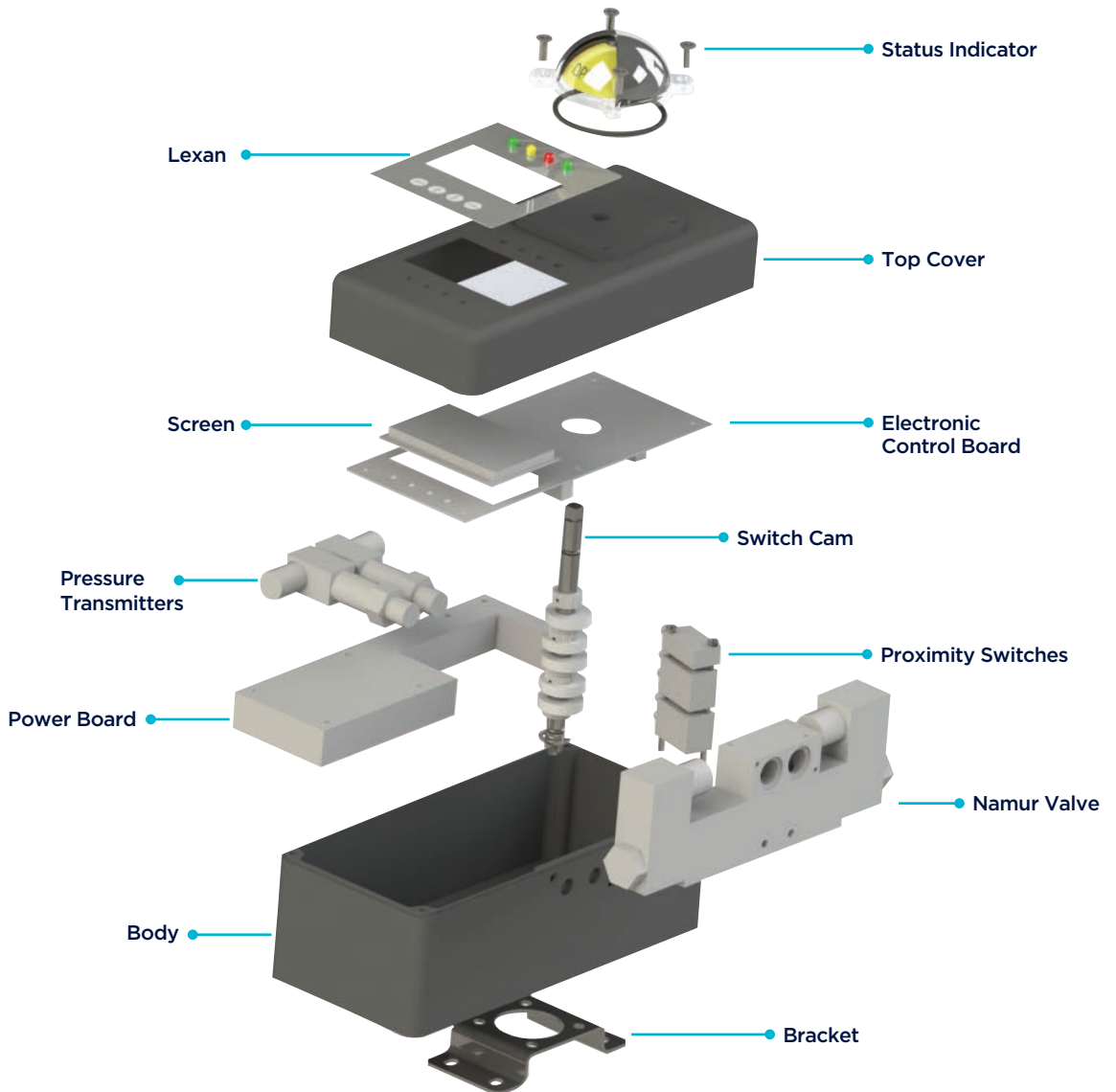
It is a method used to test whether the actuator is operating safely on valves used for safety purposes and no closure option. In this method, the actuator is brought to its semi-closed position and the test the actuator whether or not it performs its duty. In this test, the actuator is first switched to the semi-closed position. Pressure values are measured from two channels. After waiting a while, the pressure values are measured again. Any air leakage is detected and the actuator opens again. In addition, the opening time is measured to determine whether the actuator is compressed or not.

### c. Product Code

The product code of the smart switch box is designated as SSB100.



### d . Exploded Picture

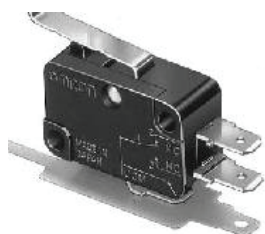


## e. Technical Details

- On-Off position indicator,
- Compact body,
- Electrostatic coated aluminium injection body,
- Two pieces cable entry M20X1.5,
- 24 VDC supply voltage
- 24 VDC on/off control
- Easy mounting with NAMUR standard, stainless steel bracket,
- Working temperature -20 °C to +70 °C,
- Mechanical switch is used as standard for output. Proximity switch can also be used on request.

## f. Switch Details

In order to get position in the smart switch box, proximity sensors are used and mechanical switches are used for output. The switch brand, model and features used are as follows;



Model	Hosense , KW7
Switch Function	Mechanical, Single Pole, Double Throw
Certifications	VDE,RU, IP65
Nominal Values	16 A, 250 V
Working Temperatures	-25 °C + 125 °C



Model	Pepper & Fuchs NBB2-V3-E2
Switch Function	Proximity, PNP, NO, 3 Cables
Certifications	UL, CSA, IP67
Nominal Values	10-30 VDC, 0-100 mA
Working Temperatures	-25 °C + 70 °C

## g. Dimensions

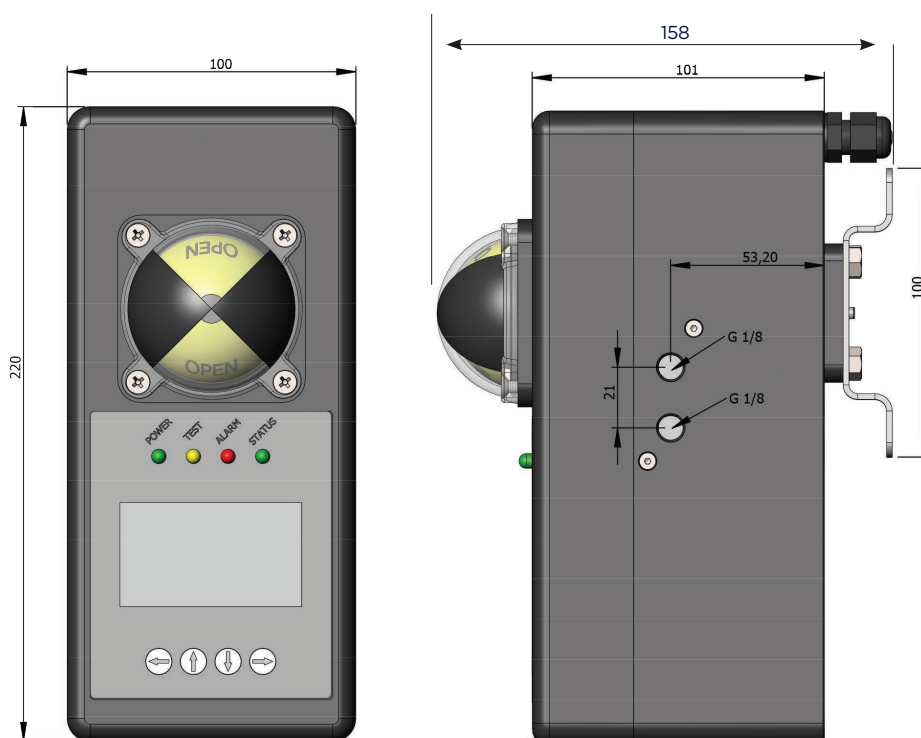
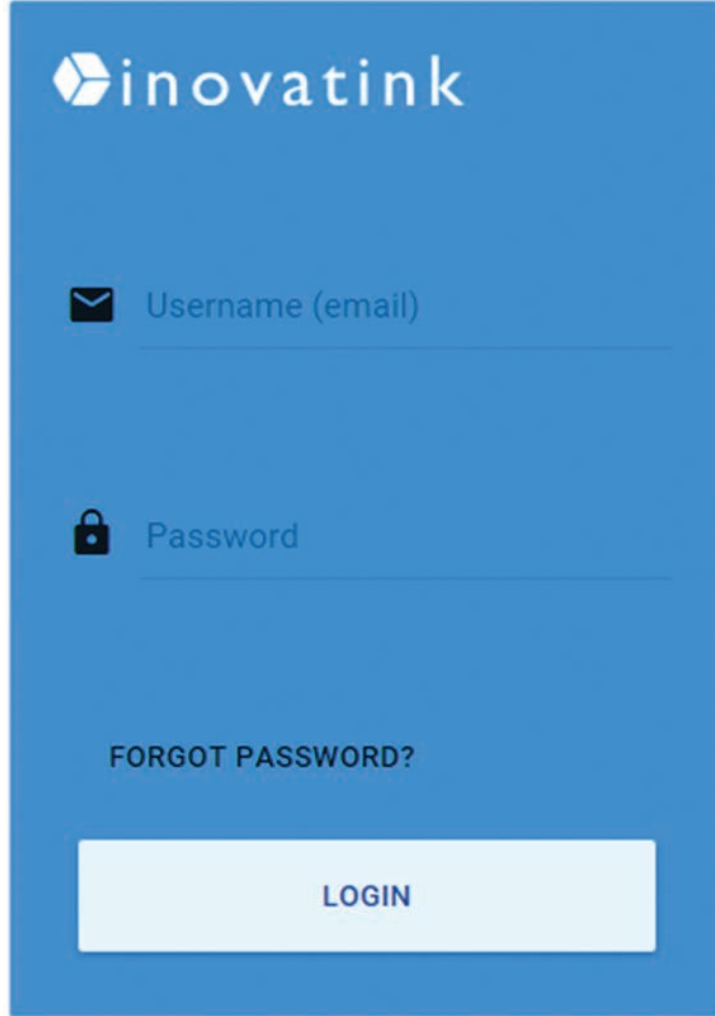


Figure 1: SSB's dimension

## 2. SSB'S WORKING

### a. Web Control

SSB can be viewed and controlled over the web. For web control, you need to login with the username and password via the link <https://cloud.inovatink.com/login>.



The image shows a user login screen for the 'inovatink' system. The background is a solid blue color. At the top left, the 'inovatink' logo is displayed in white, consisting of a stylized cube icon followed by the text 'inovatink'. Below the logo, there are two input fields. The first field is labeled 'Username (email)' and is preceded by a black envelope icon. The second field is labeled 'Password' and is preceded by a black padlock icon. Below these fields, the text 'FORGOT PASSWORD?' is displayed in white. At the bottom of the screen, there is a large, light blue rectangular button with the word 'LOGIN' in white capital letters.

Figure 2: User Login Screen

After the entry, all devices belonging to the company will be displayed on the map and in the list. This screen also contains warning information for all devices. The switch box of the valve to be controlled from the list is selected by double-clicking.

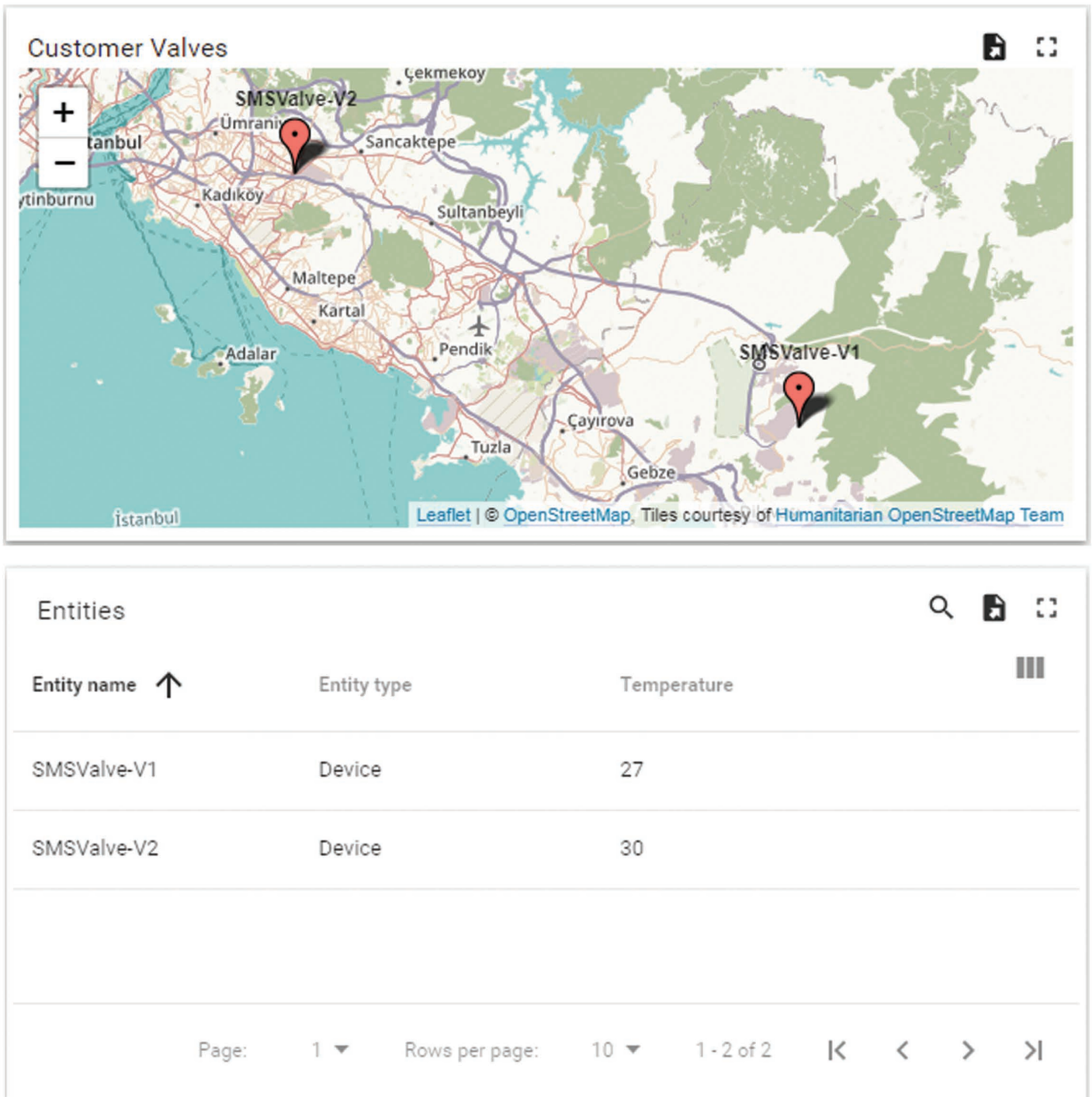


Figure 3: Device List Screen

All information and warnings of the device and special settings for the device are displayed on the control screen. By clicking on the buttons, opening, closing and status monitoring is done. The following information is displayed on the control screen.

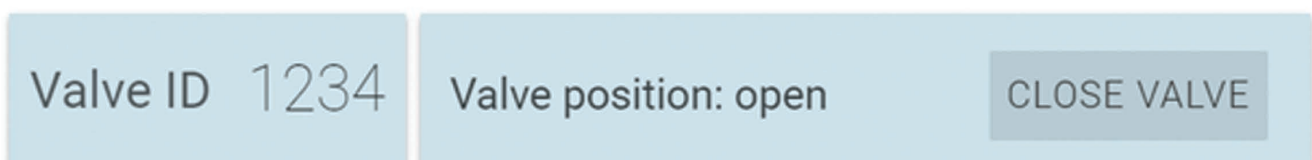


Figure 4: Device ID number and valve position and command display screen



Figure 5: Port A and Port B pressure gauges

The green areas show the required pressure range for the actuators to operate safely, while the yellow areas indicate that the normal operating pressure values are exceeded. °C

Pneumatic actuators generally operate normally between -20 °C to +80 °C. Special designed actuators are used at temperatures higher than 80 °C. In addition, these temperature values are outside the operational values of SSB.

**Temperature**

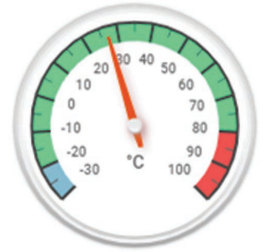


Figure 6: Temperature gauges

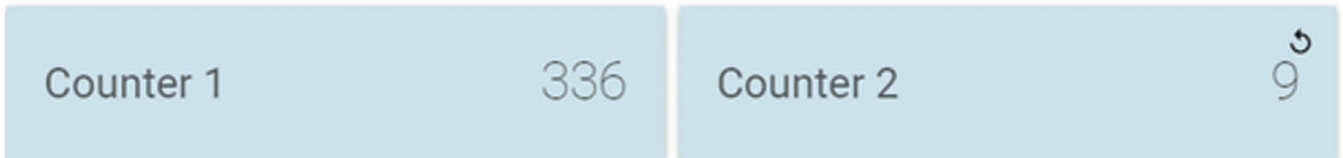
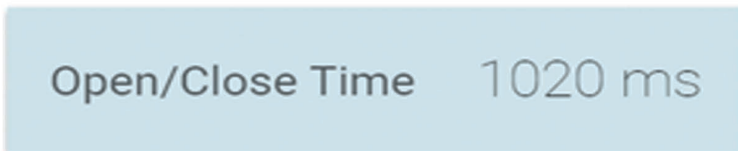


Figure 7: Counter 1 and Counter 2 gauges

Counter 1 shows the counter values that cannot be reset, information of number of times made on-off since the first use, Counter 2 shows the counter values that can be reset. Counter 2 value can be reset after confirmation from the confirmation screen after clicking the arrow on the counter 2 indicator.



On-off time of the actuators are displayed in ms.

Figure 8: Valve opening and closing time display

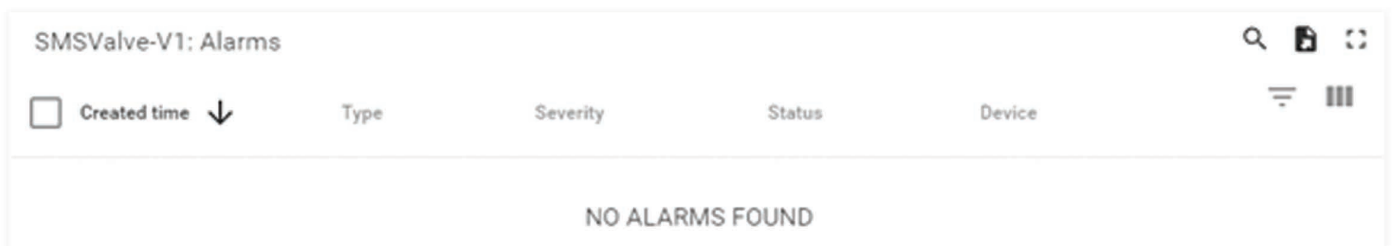


Figure 9: Warning screen

All warnings and faults that occur in the actuator are included in the warnings area. Faults continue to remain as long as they continue.





Figure 10: Maintenance and testing commanding, removal screen

Maintenance warning is activated when Counter 1 has reached the specified opening value of the actuator and has reached 2 years of service life. It is closed after maintenance by the technical service.

Early maintenance warning is activated when any internal or external air leakage occurs, the switch-off time is exceeded or the switch-off cannot be made. This warning can be switched off by pressing the button after maintenance.

When you want to perform partial stroke test, you can start the test by activating the Perform PST test key. The command must be withdrawn after the test is over.

Counter 1 value is the value entered by the user to set for the maintenance warning after how many times switching on-off. After this value is exceeded, the maintenance warning will be activated.

Threshold on/off time is the value to provide an early maintenance warning if the actuator switches on-off more than the value. When entering this value, it is useful to calculate the safety margin. If the actuator switch on-of under this value, warning will be removed automatically.



Figure 11: Reference value input screen for maintenance warning

Switch on-ff times during the operating time of the actuator can be seen in detail from this graph.



Figure 12: On/Off time graph screen

## b. Manual Control with Buttons

It is controlled manually with 4 buttons on the Smart Switch Box and necessary settings can be made. Also, status information is given with LEDs on the top of the screen visually. The control method is described in detail in Chapter 3.

## c. Control with Control Signal

The smart switch box can send on or off command by applying +24 VDC voltage to the EXT\_OPN and EXT\_CLS terminals on the electronic board. When +24 VDC is applied to the EXT\_OPN terminal, the valve will open and the valve will close when +24 VDC is applied to the EXT\_CLS terminal.

### 3. SSB'S MENU AND FUNCTIONS

There are 4 buttons and 4 LEDs for control on SSB. The meanings of LEDs are given below.

The POWER led is continuously lit when the product is energized.

The TEST led is lit yellow during the testing process when the PST test is performed.

ALARM led give red alert in any warning situation.

STATUS led is red when the actuator is open, green when it is closed and blue when it is on the center.

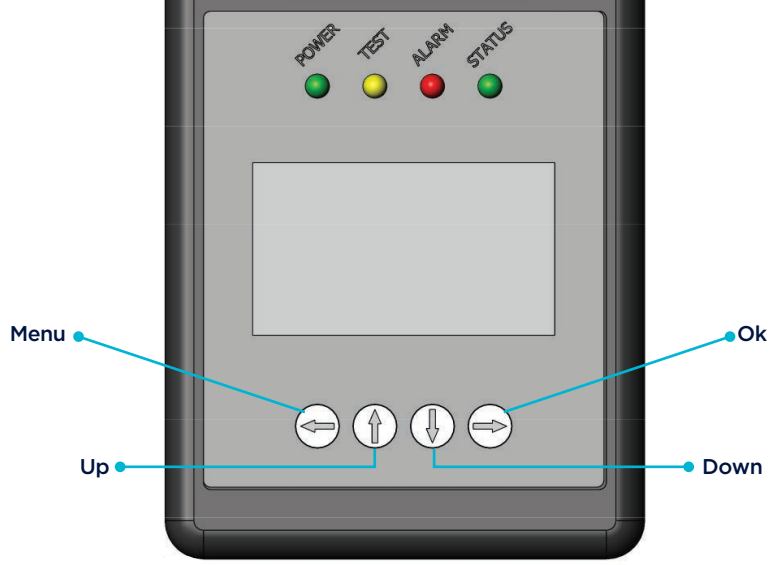


Figure 13: SSB control screen and keys

Press MENU, UP, DOWN and OK arrow keys to switch between menus.

#### a. Opening

The TORK logo is opened when the SSB is energized. For the first used language selection is queried. Switches directly to the monitoring screen if it is not first use.



Figure 14: TORK logo

Caution: If no key is pressed for 5 seconds while switching between menus, the screen is automatically switched to the monitoring screen.

#### b. Language Selection

For the first time, the language selection is queried. In the next use, language query is not performed at the beginning. To select the language, press the MENU button for 3 seconds to switch to the Main Menu screen. Press the DOWN arrow button to select the LANGUAGE tab. Language is selected by pressing OK.



Figure 15: LANGUAGE tab



Figure 16: Language selection screen

### c. Monitoring Screen

The monitor screen is continuously active. If no button is pressed for 5 seconds in any menu, the screen is switched to this. From this screen, you can switch to the main menu screen and operate on other menus. You need to press the MENU button for 3 seconds to exit the monitoring screen.



Figure 17: Monitoring Screen

**Id:** The Device ID is located in the upper left corner of the monitoring screen. The device ID is initially set to 1234. The device ID is the identity of the device. On the web application control is provide over the Device ID. Device ID can be changed by entering password from settings tab.

**Bgl.:** The connection information is located in the upper right corner of the monitoring screen. When the device is connected to the internet, **ONLINE** will display, **OFFLINE** when the connection is lost. If there is no connection, the device is in a position that cannot make GSM connection or there may be a problem with the connection of the GSM antenna.

**S1:** Counter 1 shows, how many times the device has switched on and off from the first time it is used. It cannot be reset.

**S2:** Counter 2 shows, how many times the device has switched on after it has been reset. A reset can be made in the settings menu.

**P1:** Indicates air pressure in device's port A.

**P2:** Indicates air pressure in device's port B.

Displays the position of the valve in **OPEN**, **CLOSE** or **HALF**.

Show actuator's temperature value at °C.

Shows actuators on and off time at second (sec) and millisecond (msec)

#### d. Settings

All the settings of the device are made on this screen. Temperature settings can be set in the Settings screen for Partial Control Test (PST), Counter 2 reset, Product ID and password change, manual control and warning. Each setting is described in detail in the following sections.

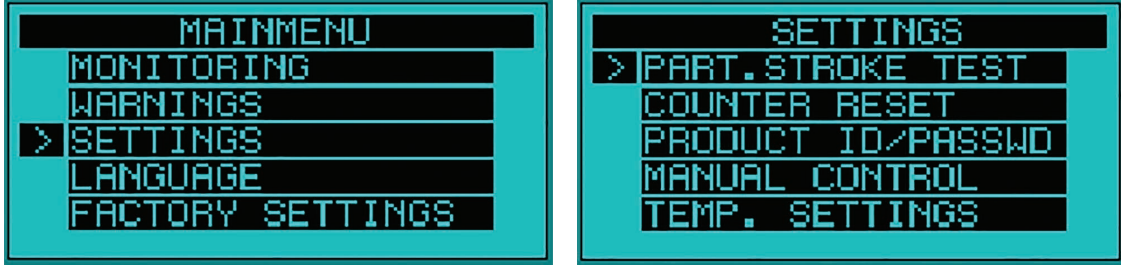


Figure 18: Settings screen

#### e. Partial Stroke Test (PST)

It is a method used to test whether the actuator is operating safely on valves used for safety purposes and no closure option.

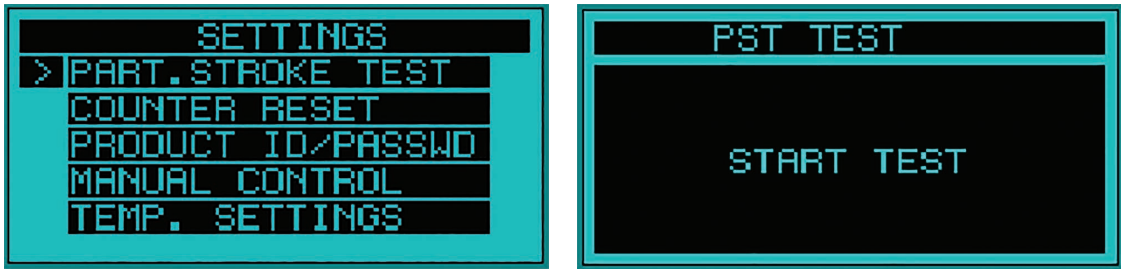


Figure 19: Partial stroke test start screen

The point that needs attention is that the valve must be open when the PST test is performed. When testing the closed valves, the valve must first be opened.

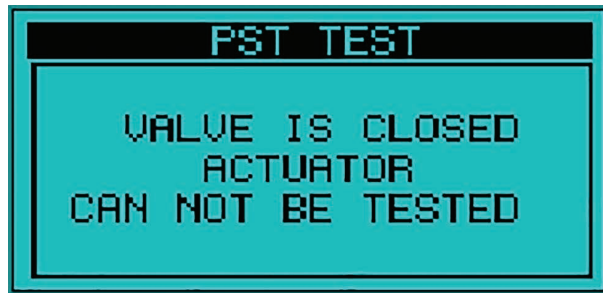


Figure 20: PST test initial condition screen

After starting the test, the valve is switched to half-closed. Test whether the closing task is performed or not. The closing time is measured and gives a fault indication if the value is outside of the specified limit. In the next step, pressure values are measured from two channels. After waiting for 10 sec, the pressure values are measured again. In this way it is determined whether there is any air leakage. The valve opens again. The opening time is measured and gives a fault indication if the value is outside of the specified limit. The opening and closing time measurements are made to determine whether the actuator is squeezed or strained. In case of passing all tests, the test successful letter will remain on the screen for 3 sec and switched to the monitoring screen.

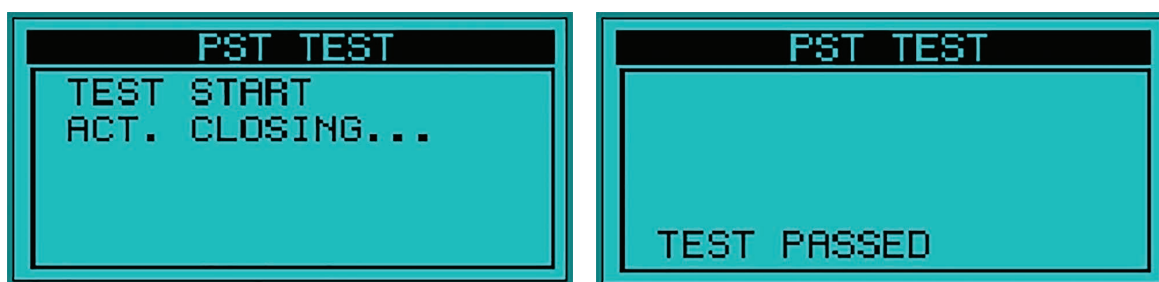


Figure 21: PST test result screen

If the test fails at any step, the Test Fail message and the remaining test remain on the screen for 3 seconds and switched to monitoring screen. In addition, fault information will be on the Alerts screen and the ALARM led displays a red warning.

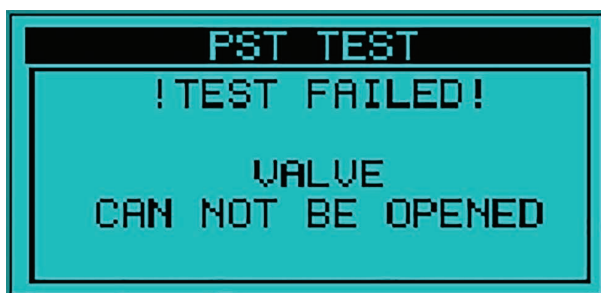


Figure 22: PST test result screen

## f. Counter reset

There are two counters on the SSB. The S2 counter can be reset to determine how many times it performs a task. You can switch to the Settings menu for resetting. Resetting is performed by answering the query with the OK button on the counter reset tab.

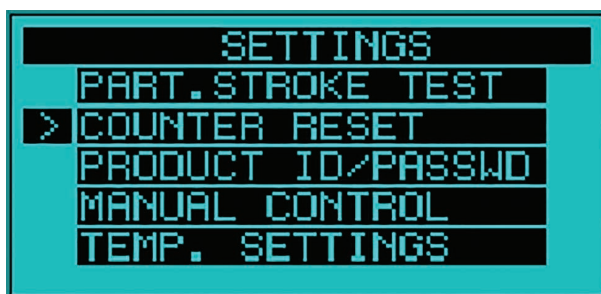


Figure 23: Counter reset screen



Figure 24: Counter reset result screen

## g. Product ID / Change password

To change the ID information of the device and to control manually, password must be entered. The first device password is given as **1111**. However, it is recommended to change the password for security reasons.

To change the device password, enter the PRODUCT ID / PASSWORD tab from the SETTINGS screen.

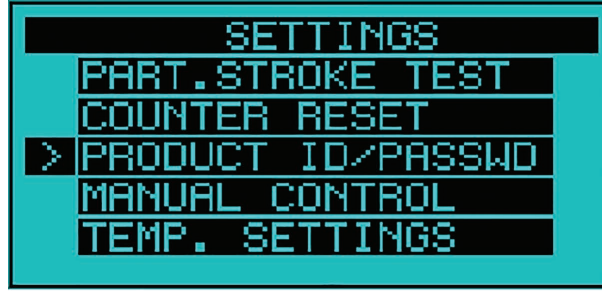


Figure 25: PRODUCT ID/ PASSWORD tab

The NEW PASSWORD tab is selected. To change the password, the current password must be entered correctly. Use DOWN and UP keys to enter the password. After entering the correct number, press OK button to enter other digits. After entering the correct password, the new password is entered in the same way and OK button is pressed.



Figure 26: PRODUCT ID/ PASSWORD screen

A unique ID number can be given to each device. Initially, the ID number of all devices is 1234. In case of controlling via Web, it is recommended to set a different ID for each product as it can be controlled via Device ID.

To change the device ID, enter the PRODUCT ID / PASSWORD tab from the SETTINGS screen. The NEW ID tab is selected from the NEW ID screen. Password must be entered after selection. After entering the correct password, enter the new product ID and press OK button. Product ID information can be verified from the monitoring screen.

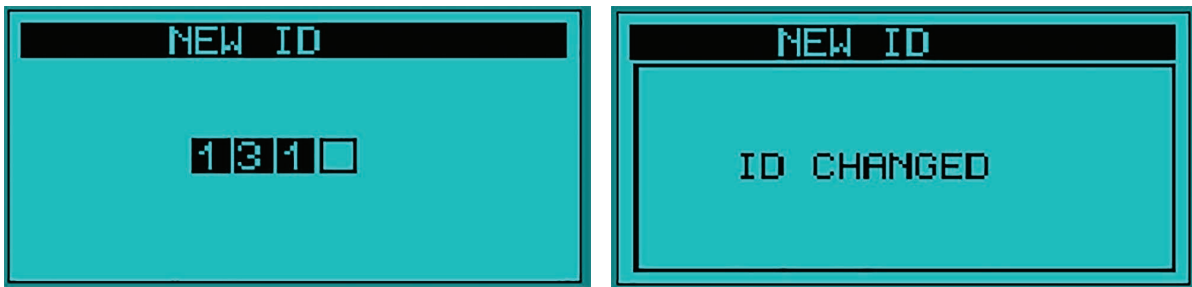


Figure 27: New Product ID entrance screen

## h. Manual Control

For valve maintenance or any other reason which needed to be controlled manually, it can be controlled manually. When switched to the manual control, product control is not allowed in any way except buttons. In other words, it does not process the control signals and commands coming from the web. The purpose of this is to prevent the danger by any external intervention during maintenance. Manual control tab must be selected from the Settings screen to switch to manual control.

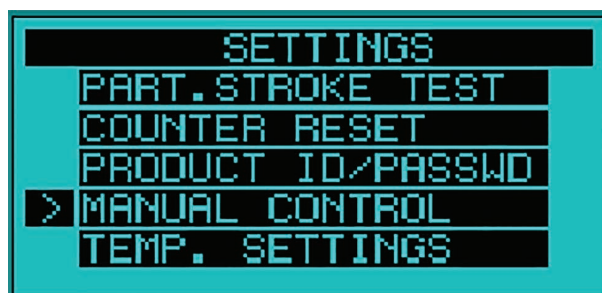


Figure 28: Manual control setting screen



In order to switch to manual control, it is necessary to enter with the operator password for safety reasons. When the correct password is entered, manual control is started and on/off would be possible.



Figure 29: Manual control password entrance screen

After entering the correct password, the control screen will open. By pressing the OK button, the on/off command can be given. To exit manual control, press the MENU button. Otherwise the product will remain in manual control and will not respond to external commands.

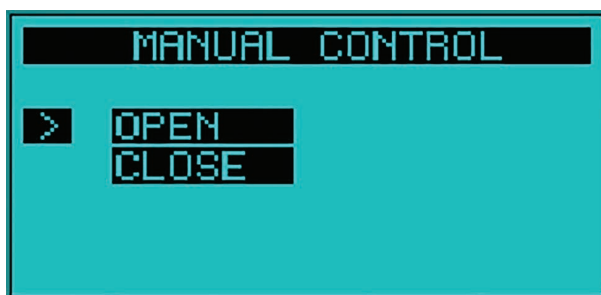


Figure 30: Manual control screen

## i. Temperature Settings

SSB gives a warning when the temperature value of the actuator which it is connected out of the specified values. These limit values can be determined by the user. In case the temperature change is sensitive, the limit temperature values need to be updated. In this case, the Temperature Settings tab should be selected in the Settings screen.



Figure 31: Temperature limit setting tab

Select one of the lower and upper limit tabs using the arrow keys. Press OK to select the limit value screen. After the selection is made, it is set to the desired value by using direction buttons. Press OK to save. When the measured temperature values are outside the specified values, it starts to give warning.

## j. Warnings

The warning led lights up in any fault and error condition in the actuator or SSB. If the warning light is lit, warning reason can be seen on the warnings screen. Alert deletion is not performed. Alerts continue to be displayed on this screen during the time the warning is in progress. However, if the problem that caused the warning is removed, the warning will be removed.



Figure 32: Warning screen

The warnings on the warning screen are listed below.

**CONNECTION ERROR:** When the Internet connection is lost,

**HIGH TEMPERATURE:** If the actuator temperature is above the set value,

**LOW TEMPERATURE:** If the actuator temperature is below the set value,

**P1 PRESSURE LEAK:** When the opening air pressure drops,

**P2 PRESSURE LEAK:** When the closing air pressure drops,

**CLOSE TIME OVER:** If the closing time is longer than the setting closing time,

**OPEN TIME OVER:** If the opening time is longer than the set opening time,

**PST TEST FAIL:** If any error is encountered when performing a partial stroke test,

**CARE WARNING:** Before the malfunction occurred, but high possibility to occur malfunction

**SERVICE REQUIRED:** Starts warning when exceed specified number of on/off or when general maintenance is required at specified periods

## k. Factory Settings

When return to factory settings, all settings other than Counter 1 are assigned the initial value. Password must be entered correctly to return to factory settings.



Figure 33: Factory settings screen



## 4. SSB INSTALLATION

### a. Mounting of SSB to Actuator

Check the position of the actuator shaft and the position indicator before installing the switch box on the actuator.

Mount the switch box to actuator with its bracket and screws.

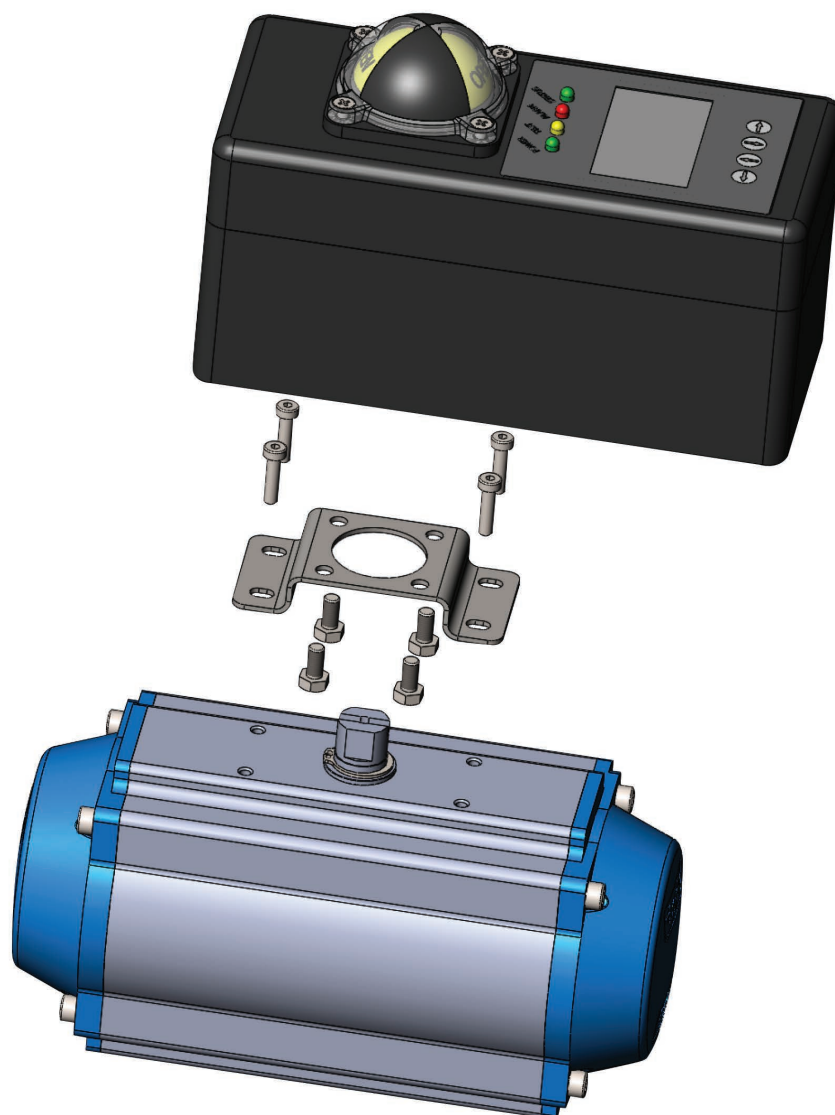


Figure 34: Mounting of SSB to actuator

## b. Electrical Connection

The supply voltage of the SSB is 24 VDC. The auxiliary contacts that can be output can switch AC / DC voltages. On request; mechanical can be replaced with proximity sensors.

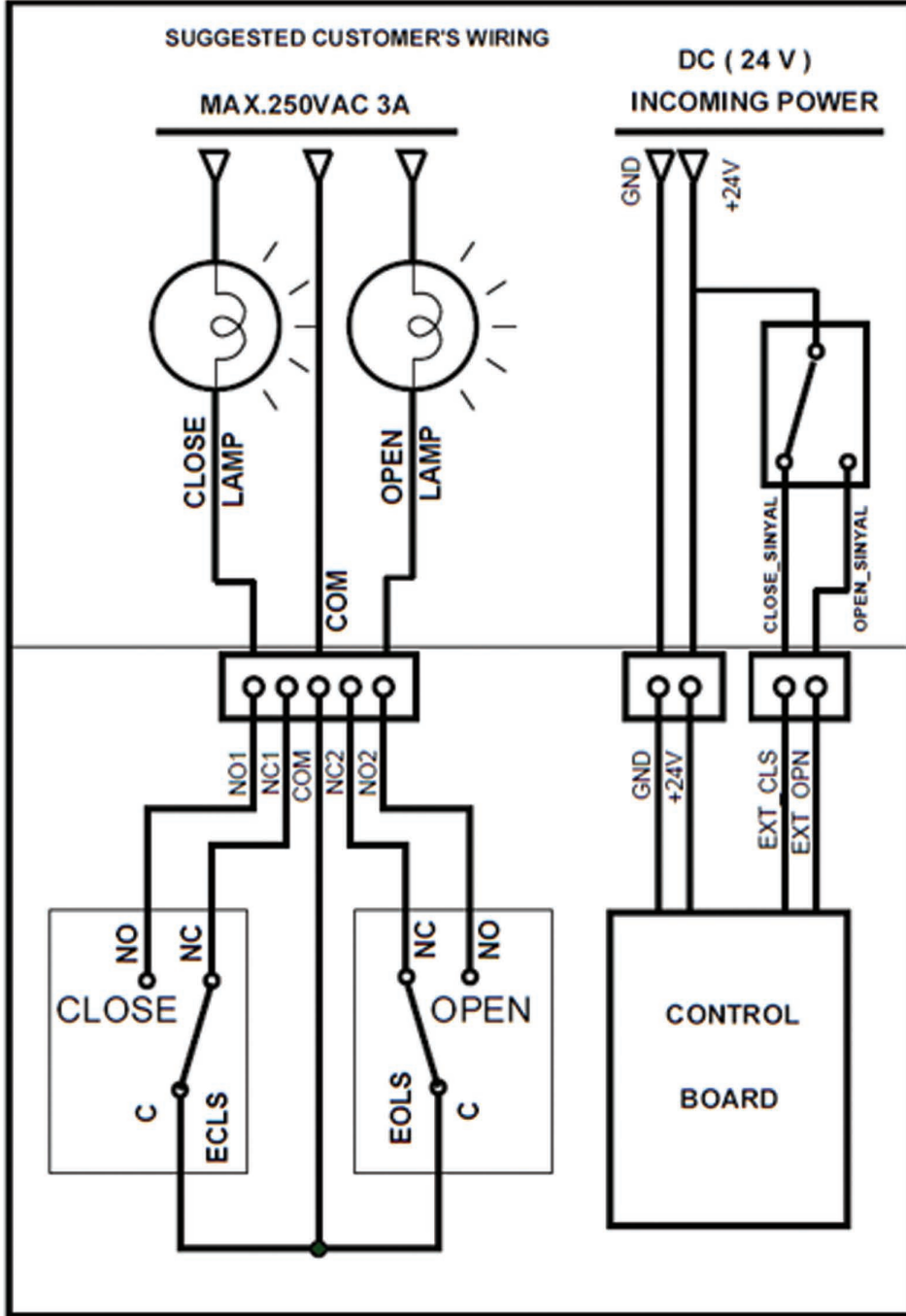


Figure 35: SSB electrical connection schema

## 7. SSB SPARE PARTS

SSB's spare parts;

- Electronic Control Cards
- Position Indicators
- Antenna
- Air gland

- Namur solenoid valve
- Switch cam
- Pressure transmitters

Please contact the company for detailed information and spare parts.

## 8. PRODUCT TRANSPORTATION

During transportation, ensure that the smart switch box does not fall to the ground and is not exposed to strong impacts. Do not put much weight on the smart switch boxes. Smart switch boxes must be carried in original carton boxes.

## 9. WARRANTY CONDITIONS

- 1) The period of warranty shall start from the date of delivery of the product to the customer and shall cover a period of 2 years.
- 2) Every and all parts of the product are under SMS Sanayi Malzemeleri Üretim ve Satışı A.Ş. warranty coverage. (against any defect that may occur during production, assembly and/or defective parts)
- 3) In the case that the product fails within warranty period, the time spent on the repair work is added to the warranty period. Repair time of the product is maximum 20 (twenty) working days. This time starts from the date on which the failure concerning the product is notified to the service station and to seller of the product, dealer, agency, representative, importer or producer. It is possible to make the consumer failure notification by telephone, fax, e-mail, registered mail or similar. However, in case of disagreement, the obligation of proof belongs to the consumer.
- 4) Product replacement or refund is mandatory depending on the choice of the consumer in case one of the conditions below:
  - a) If failure occurs in the product at least four times in one year or six times with the condition of being within the warranty period.
  - b) If the maximum time for its repair is exceeded.
  - c) In case a service station is not exist by a report issued by seller, dealer, agency, representative, importer or producer respectively that, repair of the failure is not possible, exchange process will be carried out free of charge.
  - d) The warranty period of the products changed during the warranty condition is limited to the remaining warranty period of the purchased products.
- 5) Free repair and product exchange obligations will be annulled under the following conditions:
  - a) If the product becomes faulty due to use contrary to the terms or conditions stated in the user guide,
  - b) If the product serial number has been altered or removed
  - c) The warranty labels have been destroyed,
  - d) If the product has been opened, used, or previously repaired by unauthorized persons,
  - e) Use of the product by plugging into inappropriate voltages or with faulty electric installation without the prior knowledge of our authorized services,
  - f) If the fault or damage to the product occurred during the transportation outside of the responsibility of SMS Sanayi Malzemeleri Üretim ve Satışı A.Ş.,
  - g) When our product is damaged due to use with accessories or devices purchased from other firms or unauthorized services,
  - h) Those damages caused by natural disasters such as fire, lightning, flood, earthquake, etc.
- 6) A report prepared by the SMS Sanayi Malzemeleri Üretim ve Satışı A.Ş. will determine whether the damage was caused by improper use.
- 7) The warranty certificate should be kept throughout the warranty period. The customer must provide the warranty certificate during request for repair. Otherwise, the cost of repair will be charged.
- 8) The warranty certificate attached to the product during sale should be fully completed by the retailer and customer, signed and stamped. The customer copy must be immediately provided to the customer, followed by the other piece to be mailed out to SMS Sanayi Malzemeleri Üretim ve Satışı A.Ş. by the retailer.
- 9) In the case when you send the product via courier, please remember to add a description your complaint, the photocopy of your warranty certificate, your address and telephone number.
- 10) For possible problems which may arise concerning the warranty certificate, it can be applied to the Ministry of Customs and Trade, Directorate General of Consumer Protection and Market Surveillance.



SECTOR  
LEADER WITH  
**30 YEARS**  
**EXPERIENCE**







T.C. SANAYİ VE TİCARET BAKANLIĞI  
Ticaret Bakanlığı  
SATIŞ SONRASI HİZMETLERİ

TÜRK STANDARDLARI ENSTİTÜSÜ  
HİZMET YETERLİLİK BELGESİ

T.C. SANAYİ VE TİCARET BAKANLIĞI  
SİGORTA, SANAYİ VE TİCARET MÜHÜRLEĞİ  
GARANTİ BELGESİ

TÜRK STANDARDLARI ENSTİTÜSÜ  
İMALATA YETERLİLİK BELGESİ

**TÜRK LOYDU**  
TİCARİ YETERLİLİK  
**TYPE APPROVAL CERTIFICATE**  
Certificate No: T01DEB.04.1501/01  
This Certificate consist of 2 Pages  
This is to certify that the  
**PNEUMATIC ACTING ACTUATOR**  
With type designations  
Manufactured in  
**SMS SANAYİ MALZEMELERİ ÜRETİM VE SATIŞ A.Ş.**  
DUDULLU - İSTANBUL / TURKEY  
Is found to comply with  
The Loydu Rules for Classification  
Application

**TÜV CERT**  
**ZERTIFIKAT Certificate**  
Internes Fertigungskontrolle mit Überwachung der Abnahme (Modul A1) nach  
Richtlinie 87/22/EEC  
Internal manufacturing control with monitoring of the final assessment (Module A1) according to  
Directive 87/22/EEC  
Zertifikat-Nr.:  
Certificate No.:  
Name und Anschrift des Herstellers:  
Name and Postal Address of Manufacturer:  
SMS Sanayi Malzemeleri Üretim ve  
Satış A.Ş.  
Sancaktepe Yolu Kuru Sokak No: 16 34776  
Bostancı/İstanbul - İSTANBUL.  
This certifies, for the von den in  
der die CE-Kennzeichnung mit  
gewährt wird, dass die pressure equipment  
and its classification number as den

CHİTİM  
T.C.  
CE

TYPE	PE-BAR	TORQUE	Nil

**TÜRK Ex KALİTİMİZ**  
BELGE NO: 1501/01  
ENSTİTÜSÜ İSTANBUL'DA  
SMS SANAYİ MALZEMELERİ ÜRETİM VE SATIŞ A.Ş.  
ARABINDA İŞLEMLERİN GÜVENLİĞİNİ KAMU  
BÜYÜKLERİNE İSTİSNAİ KULLANILAN  
PNEUMATİK DAZ ÇIKARILANINDA İMALAT  
TERKİBİ ÖZELLİKLERİNE UYGUN OLARAK İMAL  
" TÜRK " MARKALI İMALAT ÜRETİMİNE TSE - Ex BAR  
YETERLİLİK BELGESİNE BU MARKA ÜRETİMİNE  
KULLANILAN İMALAT ÜRETİMİNE ESAS  
UYGUNLUĞUNU İPANE EDEN  
Hüseyin GÜNGÖR  
Belge Sorumlusu

**bsi.**  
By Royal Charter  
**Certificate of Registration**  
QUALITY MANAGEMENT SYSTEM - ISO 9001:2008  
This is to certify that:  
SMS-Tork Endüstriyel Otomasyon Ürünleri  
Sanayi ve Ticaret Ltd. Şti.  
Bostancı Yolu Kuru Sokak No : 16  
Yukarı Dudullu  
Ümraniye/İstanbul  
34776  
Turkey  
Holds Certificate No: **FM 647592**  
and operates a Quality Management System which complies with the requirements of ISO 9001:2008 for the following scope:  
Design, production and sales of industrial valves, automation, control and measurement equipment  
For and on behalf of BSI:  
Frank Lee, EMEA Compliance & Risk Director  
Original Registration Date: 04/06/2013  
Latest Revision Date: 31/05/2016  
Effective Date: 31/05/2016  
Expiry Date: 31/05/2018  
Page: 1 of 2  
...making excellence a habit.  
This certificate was issued electronically and remains the property of BSI and is bound by the conditions of contract.  
An electronic certificate can be authenticated online.  
Printed copies can be validated at [www.bsi-global.com/ClientDirectory](http://www.bsi-global.com/ClientDirectory) or telephone +91 (4) 3364917.  
Information and Contact: BSI, Kitemark Court, Davy Avenue, Knebworth, Herts SG9 9FQ, UK. Tel: +44 (0) 800 9000  
BSI Assurance UK Limited, registered in England under number 7605521 at 389 Chiswick High Road, London W4 4AL, UK.

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valve & automation

KUL45-SSB100/08.02.2019/REV.00.EN

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SMS-TORK Endüstriyel Otomasyon Ürünleri San. Tic. Ltd. Şti

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