

TopWorx™ K-Series Valve Controllers **Installation, Operation & Maintenance Manual**



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TopWorx™ K1P/K1S (Flameproof Ex d ATEX/IECEx

Safety Notice

These instructions should be read before proceeding with the installation, operation and maintenance of the product. Installation, operation or maintenance work must be performed by personnel with the necessary training and experience. If you are in doubt about any aspect of such work contact TopWorx™ before proceeding.

The product is available with a range of options including limit switches, proximity sensors and electronic interface circuitry. The certification class is dependent on the product type selected, the reference number for which is marked on the product certification label attached to the products cover. The certification class for the various product types is as follows:

EC6 - Classification Ex db IIC T6 Gb / Ex tb IIIC T85°C Db Ta -60°C to +40°C IP66/67

Type EC6.xx

EC6H - Classification Ex db IIC T6 Gb / Ex tb IIIC T85°C Db Ta -60°C to +70°C IP66/67

Type EC6H.xx

EC4 - Classification Ex db IIC T4 Ta -60°C to +80°C Gb / Ex tb IIIC T135°C Ta -60°C to +80°C Db IP66/67

Type EC4.xx

EC4H - Classification Ex db IIC T4 Gb / Ex tb IIIC T135°C Db Ta -60°C to +80°C (+120°C) IP66/67

Type EC4H.xx

If you are in any doubt as to whether the product selected is suitable for safe use in the intended area under the expected operating conditions contact TopWorx™ for guidance before proceeding.

Installation-General Guidance

The K1P/K1S is designed to monitor the position of on/off or modulating rotary or linear equipment and or pneumatically control on/off equipment such as valve actuators. The unit is **NOT** suitable for use on multi-turn rotating equipment.

The product must be installed in accordance with the requirements of relevant National and International standards for 'Electrical apparatus for potentially explosive atmospheres' and the installation of 'Flameproof apparatus'. **NOTE: The purchaser should make the manufacturer aware of any External Effects or Aggressive Substances that the equipment may be exposed to.**

WARNING - DO NOT OPEN WHEN AN EXPLOSIVE ATMOSPHERE IS PRESENT. Instructions to this effect are noted on the cover label.



Cable Entries

Cable entries must either be plugged with stopper plugs or fitted with gable glands which satisfy the certification requirements of the product, i.e. certified Exd IIC

Cable entry options

M20 x 1.5 - 6H to BS3643 : 1981

M25 x 1.5 - 6H to BS3643 : 1981

1/2" NPT ANSI/ASME B1.20.1-1983 Gauging "Flush" to "2 turns large" using an L1 plug gauge.

3/4" NPT ANSI/ASME B1.20.1-1983 Gauging "Flush" to "2 turns large" using an L1 plug gauge.

All cable entries are identified with the thread form and size of thread engraved on the products certification label.

Mounting

There are 4 off M6 x 1p x 8mm deep threaded holes on a 50mm PCD located on the underside of the base for attachment of the unit to associated bracketry. When attaching a bracket or associated equipment to the product you must ensure that the fasteners used are of a suitable length to allow clearance of one full thread between the end of the fastener and the bottom of the thread. The use of fasteners with excessive length may result in the casting being over stressed.

There are a range of drive shaft and lever options to suit rotary or linear applications. Contact TopWorx™ for further information.



IMPORTANT.

When mounting the product care must be taken to ensure that during operation the drive shaft is not subjected to excessive side loads.

Earthing

Internal and external connections are provided for the connection of earthing or equipotential bonding conductors. It is recommended that earth leads are attached to the internal connection using a crimped cable eyelet.

Assembly and Dismantling.

Other than removing and replacing of the cover for the purpose of installation and calibration this unit should not be dismantled and reassembled. If there is a need to repair the product it should be returned to TopWorx™. **Repair work carried out by unauthorized personnel may invalidate the approval of the product and render it unsafe for use.**

Maintenance of Flamepaths

Whenever there is a need to remove the cover either during installation or routine maintenance ensure that care is taken not to damage the spigot, face or bore of either the cover or base. Always place the cover on a clean surface which will not scratch the machined surface or leave deposits on the surface which

could prevent the flame path joint from being maintained. Inspect both the cover and base flange faces before assembly to ensure both faces are clean and neither face is damaged.

The cover is secured by 2 off M6 x 1.0 - 16 mm long socket cap head screws. It is essential that all screws are in place and secure to maintain the protection concept of the product. Should a fastener be lost, replacements must conform to the following standard:

M6 x 1.0 - 16 mm long - 6g to ISO 262

Socket head to ISO 4762

Thread form to ISO965

Material - Stainless steel. Grade A2 - 70 minimum

IMPORTANT

Covers fitted with a visual position indicators have a slotted indicator shaft which engages with flats on the main drive shaft (Fig 1). When fitting the cover ensure that the slot aligns with the flats before assembly. **DO NOT** pull the cover home onto the base by tightening the cover retaining screws. Press the cover home by hand before tightening the retaining screws. The cover is retained by two stainless steel M6 socket cap head screws. Two M6 tapped holes are provided in the cover flange to facilitate removal of the cover (Fig 2). Having removed the cover screws place two the screws in the tapped holes and carefully jack the cover off the base, turning the screws alternately a **maximum of one full turn** each time until the cover is released.

Fig 1

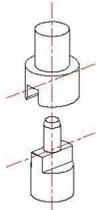
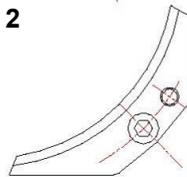


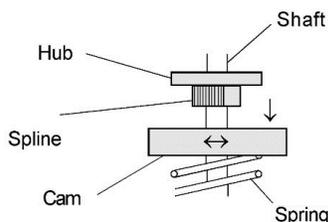
Fig 2



IMPORTANT Take note of ambient temperature and internal temperature rise when selecting suitable cable. The maximum internal temperature rise is 35°K.

Switch Cam Setting

The switch actuation cams are driven via splines located on their inner diameter which engage with the drive hub. To adjust the position of the cam slide the cam off the hub, compressing the location spring. Rotate to the desired position and release. Check that the cam has correctly re-engaged with the hub.



Schedule of Electrical Ratings

Electrical component summary. Option EC6 - Classification Ex db IIC T6 Gb / Ex tb IIIC T85°C Db IP66/67 Ta -60°C to +40°C		
EC6 .1 - 1 or 2 single pole switches,, Umax 275V Imax 10A	EC6 .2 -1 double pole switch, Umax 275V Imax 10A	EC6 .3 -1 or 2 proximity sensors, Umax 240V Imax 250mA
EC6 .4 - Electronic circuitry and a 1K - 5K potentiometer, Umax 36VDC - Wmax 1 watt	SC6 .5 -Up to 2 single pole switches, Umax 275V Imax 10A and a 1K - 5K potentiometer, Umax 36VDC - Wmax 1 watt	SC6 .6 - Up to 2 proximity sensors, Umax 240V Imax 250mA and a 1K - 5K potentiometer, Umax 36VDC - Wmax 1 watt
EC6 .7 - 1 or 2 single pole switches plus connections for terminating 1 remote mounted solenoid, Switches Umax 275V Imax 9A, Solenoid Umax 275V Imax 2A Diode protection across solenoid terminals optional.	SC6 .8 - 1 double pole switch plus connections for terminating 1 remote mounted solenoid, Switch Umax 275V Imax 18A, Solenoid Umax 275V Imax 2A, Diode protection across solenoid terminals optional.	SC6 .9 - 1 or 2 proximity sensors Umax 240V Imax 250mA, plus connections for terminating 1 remote mounted solenoid, Solenoid Umax 275V Imax 2A, Diode protection across solenoid terminals optional.
EC6 .1 0 - Electronic circuitry and a 1K - 5K potentiometer, Umax 36VDC - Wmax 1 watt plus connections for terminating 1 remote mounted solenoid, Solenoid Umax 275V Imax 2A, Diode protection across solenoid terminals optional.	SC6 .1 1 - Up to 2 single pole switches, Umax 275V Imax 9A and a 1K - 5K potentiometer , Umax 36VDC - Wmax 1 watt plus connections for terminating 1 remote mounted solenoid Solenoid , Umax 275V Imax 2A, Diode protection across solenoid terminal optional.	SC6 .1 2 -Up to 2 proximity sensors, Umax 240V Imax 250mA, and a 1K - 5K potentiometer , Umax 36VDC - Wmax 1 watt plus connections for terminating 1 remote mounted solenoid, Solenoid Umax 275V Imax 2A, Diode protection across solenoid terminals optional.
Option SC6H-Classification Ex db IIC T6 Gb / Ex tb IIIC T85°C Db IP66/67 Ta -60°C to +70°C		
SC6H.1 -1 or 2 single pole switches, Umax 275V Imax 5A	SC6H.2 -1 double pole switch, Umax 275V Imax 10A	SC6H.4 - Electronic circuitry and a 1K - 5K potentiometer, Umax 36VDC - Wmax 1 watt
SC6H.5 - Up to 2 single pole switches. Umax 275V Imax 5A and a 1K - 5K potentiometer, Umax 36VDC - Wmax 1 watt	SC6H.7 -1 or 2 single pole switches plus connections for terminating 1 remote mounted solenoid, Switches Umax 275V Imax 4A, Solenoid Umax 275V Imax 2A, Diode protection across solenoid terminals optional.	SC6H.8 -1 double pole switch plus connections for terminating 1 remote mounted solenoid, Switch Umax 275V Imax 8A, Solenoid Umax 275V Imax 2A, Diode protection across solenoid terminals optional.
SC6H.10 - Electronic circuitry and a 1K - 5K potentiometer, Umax 36VDC - Wmax 1 watt plus connections for terminating 1 remote mounted solenoid, Solenoid Umax 275V Imax 2A, Diode protection across solenoid terminals optional.	SC6H.11 -Up to 2 single pole switches, Umax 275V Imax 4A and a 1K - 5K potentiometer Umax 36VDC - Wmax 1 watt plus connections for terminating 1 remote mounted solenoid, Solenoid Umax 275V Imax 2A, Diode protection across solenoid terminal optional.	
Option SC4 - Classification Ex db IIC T4 Ta -60°C to +80°C Gb / Ex tb IIIC T135°C Db IP66/67 Ta -60°C to +80°C		
SC4 .1 1 - or 2 single pole switches, Umax 275V Imax 10A	SC4 .2 - 1 double pole switch, Umax 275V Imax 20A	SC4 .3 - 1 or 2 proximity sensors, Umax 240V Imax 250mA
SC4 .4 - Electronic circuitry and a 1K - 5K potentiometer, Umax 36VDC - Wmax 1 watt	SC4 .5 - Up to 2 single pole switches Umax 275V Imax 10A and a 1K - 5K potentiometer, Umax 36VDC - Wmax 1 watt	SC4 .6 - Up to 2 proximity sensors, Umax 240V Imax 250mA and a 1K - 5K potentiometer, Umax 36VDC - Wmax 1 watt
SC4 .7 - 1 or 2 single pole switches plus connections for terminating 1 remote mounted solenoid Switches Umax 275V Imax 10A,, Solenoid Umax 275V Imax 2A, Diode protection across solenoid terminals optional.	SC4 .8 - 1 double pole switch plus connections for terminating 1 remote mounted solenoid, Switch Umax 275V Imax 20A, Solenoid Umax 275V Imax 2A Diode protection across solenoid terminals optional.	SC4 .9 - 1 or 2 proximity sensors Umax 240V Imax 250mA plus connections for terminating remote mounted solenoid, Solenoid Umax 275V Imax 2A Diode protection across solenoid terminals optional.
SC4 .1 0 -Electronic circuitry and a 1K - 5K potentiometer, Umax 36VDC - Wmax 1 watt plus connections for terminating 1 remote mounted solenoid, Solenoid Umax 275V Imax 2A Diode protection across solenoid terminals optional.	SC4 .1 1 -Up to 2 single pole switches Umax 275V Imax 9A and a 1K - 5K potentiometer. Umax 36VDC - Wmax 1 watt plus connections for terminating 1 remote mounted solenoid, Solenoid Umax 275V Imax 2A Diode protection across solenoid terminal optional.	SC4 .1 2 -Up to 2 proximity sensors Umax 240V Imax 250mA and a 1K - 5K potentiometer. Umax 36VDC - Wmax 1 watt plus connections for terminating 1 remote mounted solenoid, Solenoid Umax 275V Imax 2A Diode protection across solenoid terminals optional.
Classification Ex db IIC T4 Ta -60°C to +120°C Gb/ Ex tb IIIC T135°C Db IP66/67 Ta -60°C to +80°C		
SC4H.1 1 - or 2 single pole switches, Umax 275V Imax 5A	SC4H.2 -1 double pole switch Umax 275V Imax 10A	SC4H.4 - Electronic circuitry and a 1K - 5K potentiometer, Umax 36VDC - Wmax 1 watt
SC4H.5 -Up to 2 single pole switches, Umax 275V Imax 5A and a 1K - 5K potentiometer Umax 36VDC - Wmax 1 watt	SC4H.7 -1 or 2 single pole switches plus connections for terminating 1 remote mounted solenoid, Switches Umax 275V Imax 4A, Solenoid Umax 275V Imax 2A Diode protection across solenoid terminals optional.	SC4H.8 -1 double pole switch plus connections for terminating 1 remote mounted solenoid, Switch Umax 275V Imax 4A, Solenoid Umax 275V Imax 2A, Diode protection across solenoid terminals optional.
SC4H.8 -1 double pole switch plus connections for terminating 1 remote mounted solenoid Switch, Umax 275V Imax 4A, Solenoid Umax 275V Imax 2A, Diode protection across solenoid terminals optional	SC4H.10 - Electronic circuitry and a 1K - 5K potentiometer, Umax 36VDC - Wmax 1 watt plus connections for terminating, 1 remote mounted solenoid, Solenoid Umax 275V Imax 2A, Diode protection across solenoid terminals optional.	SC4H.11 - Up to 2 single pole switches Umax 275V Imax 9A and a 1K - 5K potentiometer, Umax 36VDC - Wmax 1 watt, plus connections for terminating, 1 remote mounted solenoid, Solenoid Umax 275V Imax 2A, Diode protection across solenoid terminal optional

TopWorx™ K1P/K1S (CSA Explosion proof)

CSA 19.70194963

Class I, GRP B, C and D; Class II, Gps. E, F and G, Class III; Type 4, 4X, 6 and 6P (For USA & Canada)
Type NA6.xx, NA6H.xx, NA4.xx, NA4H.xx

Ex d IIC T4/T5/T6; Ex tb IIIC T85°C /T100°C/ T135°C, Class II, Gps. E, F and G; IP66/67/68 ; and /or Type 4, 4X, 6, 6P (For Canada)
Type SC6.xx, SC6H.xx, SC4.xx, SC4H.xx

Class I, Zone 1, AEx d IIC T4/T5/T6; Zone 21, AEx tb/tD, IIIC T85°C /T100°C/ T135°C; IP66/67/68; and /or Type 4, 4X, 6, 6P (For USA)
Type SC6.xx, SC6H.xx, SC4.xx, SC4H.xx

Maintenance of flamepaths

When ever there is a need to remove the cover either during installation or routine maintenance ensure that care is taken not to damage the spigot, face or bore of either the cover or base. Always place the cover on a clean surface which will not scratch the machined surface or leave deposits on the surface which could prevent the flamepath joint from being maintained. Inspect both the cover and base flange faces before assembly to ensure both faces are clean and neither face is damaged. **COVER JOINTSMUST BE CLEANED BEFORE REPLACING COVER.**

Aluminum housings for Class I, Group B with flat joints are particularly susceptible to hot particle ejections and special care must be taken to ensure that these joints are free from metallic particles each time that the enclosure is opened.

The cover is secured by 4 off M6 x 1.0 - 16 mm long socket cap head screws. It is essential that all screws are in place and secure to maintain the protection concept of the product.

Should a fastener be lost, replacements must conform to the following standard:-

M6 x 1.0 - 16 mm long - 6g to ISO 626

Socket head to ISO 4762

Thread form to ISO965

Material - Stainless steel. Grade A2 - 70 minimum

WARNING

- DO NOT OPEN EVEN WHEN ISOLATED WHEN A FLAMMABLE ATMOSPHERE IS PRESENT.

ATTENTION : Ne pas ouvrir si la zone est connue pour être dangereuse

- A SEAL IS REQUIRED WITHIN 50mm OF THE ENCLOSURE

Isolation nécessaire sur 50mm depuis le boîtier

- DISCONNECT SUPPLY BEFORE SERVICING

Débrancher l'alimentation avant toute intervention

Instructions to this effect are noted on the certification label.

WARNING

Cable entries must either be plugged with stopper plugs or fitted with gable glands which satisfy the certification requirements of the product.

THE END USER MUST ENSURE THE ENCLOSURE IS SEALED WITH SUITABLE SEALING METHOD AS PER THE ELECTRICAL CODE.

TopWorx™ K2P/K2S (Flameproof Ex d ATEX/IECEX) Safety Notice

These instructions should be read before proceeding with the installation, operation and maintenance of the product. Installation, operation or maintenance work must be performed by personnel with the necessary training and experience. If you are in doubt about any aspect of such work contact TopWorx™ before proceeding.

The product is available with a range of options including limit switches, proximity sensors and electronic interface circuitry. The certification class is dependent on the product type selected, the reference number for which is marked on the product certification label attached to the products cover. The certification class for the various product types is as follows:

Baseefa 16ATEX0121, IECEx BAS 16.0092

**E6 - Classification Ex db IIC T6 Gb / Ex tb IIIC T85°C Db
Ta -50°C to +40°C IP66/67
Type E6.xx**

**E6H - Classification Ex db IIC T6 Gb / Ex tb IIIC T85°C Db Ta -50°C to
+70°C IP66/67
Type E6H.xx**

**E5 - Classification Ex db IIC T5 Gb / Ex tb IIIC T100°C Db Ta-50°C to
+40°C IP66/67
Type E5.xx**

**E4-Classification Ex db IIC T4 Gb / Ex tb IIIC T135°C Db -Ta-50°C to
+80°C IP66/67
Type E4.xx**

**E4H - Classification Ex db IIC T4 Gb / Ex tb IIIC T135°C Db Ta -50°C to
+120°C IP66/67
Type E4H.xx**

If you are in any doubt as to whether the product selected is suitable for safe use in the intended area under the expected operating conditions contact TopWorx™ for guidance before proceeding.

Installation-General Guidance

The K2P/K2S is designed to monitor the position of on/off or modulating rotary or linear equipment and or pneumatically control on/off equipment such as valve actuators. The unit is **NOT** suitable for use on multi-turn rotating equipment.

The product must be installed in accordance with the requirements of relevant National and International standards for 'Electrical apparatus for potentially explosive atmospheres' and the installation of 'Flameproof apparatus'.

NOTE: The purchaser should make the manufacturer aware of any External Effects or Aggressive Substances that the equipment may be exposed to.



WARNING - DO NOT OPEN WHEN AN EXPLOSIVE ATMOSPHERE IS PRESENT. Instructions to this effect are noted on the cover label.

Cable Entries

Cable entries must either be plugged with stopper plugs or fitted with gable glands which satisfy the certification requirements of the product, i.e. certified Exd IIC

Cable entry options: M20 x 1.5 - 6H to BS3643 : 1981
 M25 x 1.5 - 6H to BS3643 : 1981

1/2" NPT ANSI/ASME B1.20.1-1983 Gauging "Flush" to "2 turns large" using an L1 plug gauge.

3/4"NPTANSI/ASME B1.20.1-1983 Gauging "Flush" to "2 turns large" using an L1 plug gauge.

All cable entries are identified with the thread form and size of thread engraved on the products certification label.

Mounting

There are 4 off M6 x 1p x 8mm deep threaded holes on a 50mm PCD located on the underside of the base for attachment of the unit to associated bracketry. When attaching a bracket or associated equipment to the product you must ensure that the fasteners used are of a suitable length to allow clearance of one full thread between the end of the fastener and the bottom of the thread. The use of fasteners with excessive length may result in the casting being over stressed.

There are a range of drive shaft and lever options to suit rotary or linear applications. Contact TopWorx™ for further information.



IMPORTANT-When mounting the product care must be taken to ensure that during operation the drive shaft is not subjected to excessive side loads.

Earthing

Internal and external connections are provided for the connection of earthing or equipotential bonding conductors. It is recommended that earth leads are attached to the internal connection using a crimped cable eyelet.

Assembly and Dismantling.

Other than removing and replacing of the cover for the purpose of installation and calibration this unit should not be dismantled and reassembled. If there is a need to repair the product it should be returned to TopWorx™. **Repair work carried out by unauthorized personnel may invalidate the approval of the product and render it unsafe for use.**

Maintenance of Flamepaths

Whenever there is a need to remove the cover either during installation or routine maintenance ensure that care is taken not to damage the spigot, face or bore of either the cover or base. Always place the cover on a clean surface which will not scratch the machined surface or leave deposits on the surface which could prevent the flame path joint from being maintained. Inspect both the cover and base flange faces before assembly to ensure both faces are clean and neither face is damaged.

The cover is secured by 4 off M6 x 1.0 - 16 mm long socket cap head screws. It is essential that all screws are in place and secure to maintain the protection concept of the product. Should a fastener be lost, replacements must conform to the following standard:

- M6 x 1.0 - 16 mm long - 6g to ISO 262
- Socket head to ISO 4762
- Thread form to ISO965
- Material - Stainless steel. Grade A2 - 70 minimum

IMPORTANT

Covers fitted with a visual position indicators have a slotted indicator shaft which engages with flats on the main drive shaft (Fig 1). When fitting the cover ensure that the slot aligns with the flats before assembly.

DO NOT pull the cover home onto the base by tightening the cover retaining screws. Press the cover home by hand before tightening the retaining screws. The cover is retained by four stainless steel M6 socket cap head screws. Two M6 tapped holes are provided in the cover flange to facilitate removal of the cover (Fig 2). Having removed the cover screws place two the screws in the tapped holes and carefully jack the cover off the base, turning the screws alternately a **maximum of one full turn** each time until the cover is released.

Fig 1

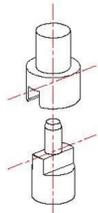
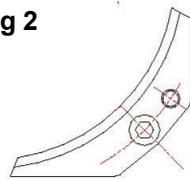


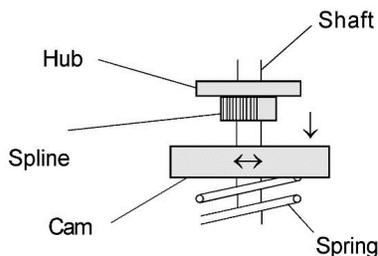
Fig 2



IMPORTANT Take note of ambient temperature and internal temperature rise when selecting suitable cable. The maximum internal temperature rise is 35°C.

Switch Cam Setting

The switch actuation cams are driven via splines located on their inner diameter which engage with the drive hub. To adjust the position of the cam slide the cam off the hub, compressing the location spring. Rotate to the desired position and release. Check that the cam has correctly reengaged with the hub.



Schedule of Electrical Ratings

Option E6.x - Classification Ex db IIC T6 Gb / Ex tb IIIC T85°C Db Ta -50°C to +40°C IP66/67/68	
E6.1 - 1 or 2 single pole switches, Umax 275V Imax 10A	E6.2 - Up to 4 single pole switches, Umax 275V Imax 5A
E6.3 - 1 or 2 double pole switches, Umax 275V Imax 5A	E6.4 - Up to 4 proximity sensors, Umax 240V Imax 250mA
E6.5 - 1 or 2 single pole switches, Umax 275V Imax 10A, Plus electronic circuitry and or 1-5K potentiometer, Umax 36VDC - Wmax 1 watt	E6.6 - 1 or 2 proximity sensors, Umax 240V Imax 250mA, Plus electronic circuitry and or 1-5K potentiometer, Umax 36VDC - Wmax 1 watt
E6.7 - 1 or 2 single pole switches plus connections for terminating 1 or 2 remote mounted solenoids, Switches Umax 275V Imax 8A, Solenoids Umax 275V Imax 2A, Diode protection across solenoid terminals optional.	E6.8 - Up to 4 single pole switches plus connections for terminating 1 or 2 remote mounted solenoids, Switches Umax 275V Imax 4A, Solenoids Umax 275V Imax 2A, Diode protection across solenoid terminals optional.
E6.9 - 1 or 2 double pole switches plus connections for terminating 1 or 2 remote mounted solenoids, Switches Umax 275V Imax 4A, Solenoids Umax 275V Imax 2A, Diode protection across solenoid terminals optional.	E6.10 - Up to 4 proximity sensors plus connections for terminating 1 or 2 remote mounted solenoids, Sensors Umax 240V Imax 250mA, Solenoids Umax 275V Imax 2A, Diode protection across solenoid terminals optional.
E6.11 - 1 or 2 single pole switches Umax 275V Imax, 5A Plus electronic circuitry and or 1-5K potentiometer, Umax 36VDC - Wmax 1 watt, plus connections for terminating 1 or 2, remote mounted solenoids Umax 275V Imax 2A, Diode protection across solenoid terminals optional.	E6.12 - 1 or 2 proximity sensors Umax 240V Imax 250mA, Plus electronic circuitry and or 1-5K potentiometer, Umax 36VDC - Wmax 1 watt plus connections for terminating 1 or 2 remote mounted solenoids Umax 275V Imax 2A, Diode protection across solenoid terminals optional.
E6.13 - Up to 4 single pole switches, Umax 275V Imax 4A, Plus electronic circuitry and or 1-5K potentiometer, Umax 36VDC - Wmax 1 watt	E6.14 - Up to 4 proximity sensors, Umax 240V Imax 250mA, Plus electronic circuitry and or 1-5K potentiometer, Umax 36VDC - Wmax 1 watt
E6.15 - Up to 2 single pole switches, Umax 275V Imax 5A, Plus electronic circuitry and or 1-5K potentiometer, Umax 36VDC - Wmax 1 watt, Plus one 1-5K potentiometer: Umax 16VDC, Wmax 0.25W	E6.16 - Up to 2 proximity sensors, Umax 240V Imax 250mA, Plus electronic circuitry and or 1-5K potentiometer Umax 36VDC - Wmax 1 watt, Plus one 1-5K potentiometer: Umax 16VDC, Wmax 0.25W
Option E6H.x - Classification, Ex db IIC T6 Gb / Ex tb IIIC T85°C Db Ta -50°C to +70°C IP66/67/68	
E6H.1 - 1 or 2 single pole switches Umax 275V Imax 5A	E6H.2 - Up to 4 single pole switches Umax 275V Imax 2.5A
E6H.3 - 1 or 2 double pole switches Umax 275V Imax 5A	E6H.5 - 1 or 2 single pole switches, Umax 275V Imax 5A, Plus electronic circuitry and or 1-5K potentiometer, Umax 36VDC - Wmax 1 watt
E6H.7 - 1 or 2 single pole switches plus connections, for terminating 1 or 2 remote mounted solenoids, Switches Umax 275V Imax 3A, Solenoids Umax 275V Imax 2A, Diode protection across solenoid terminals optional.	E6H.8 - Up to 4 single pole switches plus connections, for terminating 1 or 2 remote mounted solenoids, Switches Umax 275V Imax 1.5A, Solenoids Umax 275V Imax 2A, Diode protection across solenoid terminals optional.
E6H.9 - 1 or 2 double pole switches plus connections for terminating 1 or 2 remote mounted solenoids, Switches Umax 275V Imax 3A, Solenoids Umax 275V Imax 2A, Diode protection across solenoid terminals optional	E6H.11 - 1 or 2 single pole switches, Umax 275V Imax 3A, Plus electronic circuitry and or 1-5K potentiometer, Umax 36VDC - Wmax 1 watt, plus connections for terminating 1 or 2, remote mounted solenoids Umax 275V Imax 2A, Diode protection across solenoid terminals optional.
E6H.13 - Up to 4 single pole switches, Umax 275V Imax 2A, Plus electronic circuitry and or 1-5K potentiometer, Umax 36VDC - Wmax 1 watt	

Schedule of Electrical Ratings Continued

Option - E5.x Classification Ex db IIC T5 Gb / Ex tb IIIC T100°C Db Ta-50°C to +40°C IP66/67/68		
E5.1 - Up to 4 single pole switches Umax 275V Imax 10A	E5.2 - 1 or 2 double pole switches Umax 275V Imax 10A	E5.3 - Up to 3 single pole switches Umax 275V Imax 10A, Plus electronic circuitry and or 1-5K potentiometer, Umax 36VDC - Wmax 1 watt
E5.4 - Up to 3 proximity sensors, Umax 240V Imax 250mA, Plus electronic circuitry and or 1-5K potentiometer, Umax 36VDC - Wmax 1 watt	E5.5 - 1 or 2 single pole switches plus connections for terminating 1 or 2 remote mounted solenoids, Switches Umax 275V Imax 10A, Solenoids Umax 275V Imax 2A, Diode protection across solenoid terminals optional.	E5.6 - Up to 4 single pole switches plus connections for terminating 1 or 2 remote mounted solenoids, Switches Umax 275V Imax 10A, Solenoids Umax 275V Imax 2A, Diode protection across solenoid terminals optional.
E5.7 - 1 or 2 double pole switches plus connections for terminating 1 or 2 remote mounted solenoids, Switches Umax 275V Imax 9A, Solenoids Umax 275V Imax 2A Diode protection across solenoid terminals optional.	E5.8 - Up to 3 single pole switches, Umax 275V Imax 10A, Plus electronic circuitry and or 1-5K potentiometer, Umax 36VDC - Wmax 1 watt plus connections for terminating 1 or 2 remote mounted solenoids Umax 275V Imax 2A, Diode protection across solenoid terminals optional.	E5.9 - Up to 3 proximity sensors, Umax 240V Imax 250mA, Plus electronic circuitry and or 1-5K potentiometer, Umax 36VDC - Wmax 1 watt plus connections for terminating 1 or 2 remote mounted solenoids Umax 275V Imax 10A, Diode protection across solenoid terminals optional.
Option - E4.x Classification Ex db IIC T4 Gb / Ex tb IIIC T135°C Db Ta-50°C to +80°C IP66/67/68		
E4.1 - Up to 4 single pole switches Umax 275V Imax 10A	E4.2 - 1 or 2 double pole switches Umax 275V Imax 10A	E4.3 - Up to 4 proximity sensors Umax 240V Imax 250mA
E4.4 - Up to 3 single pole switches Umax 275V Imax 10A, Plus electronic circuitry and or 1-5K potentiometer, Umax 36VDC - Wmax 1 watt	E4.5 - Up to 3 proximity sensors Umax 240V Imax 250mA, Plus electronic circuitry and or 1-5K potentiometer, Umax 36VDC - Wmax 1 watt	E4.6 - 1 or 2 single pole switches plus connections for terminating 1 or 2 remote mounted solenoids, Switches Umax 275V Imax 10A, Solenoids Umax 275V Imax 2A, Diode protection across solenoid terminals optional.
E4.7 - Up to 4 single pole switches plus connections for terminating 1 or 2 remote mounted solenoids Switches Umax 275V Imax 9A Solenoids Umax 275V Imax 2A Diode protection across solenoid terminals optional.	E4.8 - 1 or 2 double pole switches plus connections for terminating 1 or 2 remote mounted solenoids Switches Umax 275V Imax 9A Solenoids Umax 275V Imax 2A Diode protection across solenoid terminals optional.	E4.9 - Up to 4 proximity sensors plus connections for terminating 1 or 2 remote mounted solenoids Sensors Umax 240V Imax 250mA Solenoids Umax 275V Imax 2A Diode protection across solenoid terminals optional.
E4.10 - Up to 3 single pole switches Umax 275V Imax 10A Plus electronic circuitry and or 1-5K potentiometer Umax 36VDC - Wmax 1 watt plus connections for terminating 1 or 2 remote mounted solenoids Umax 275V Imax 2A Diode protection across solenoid terminals optional.	E4.11 - Up to 3 proximity sensors Umax 240V Imax 250mA Plus electronic circuitry and or 1-5K potentiometer Umax 36VDC - Wmax 1 watt plus connections for terminating 1 or 2 remote mounted solenoids Umax 275V Imax 2A Diode protection across solenoid terminals optional.	E4.12 - Up to 4 single pole switches Umax 275V Imax 9A Plus electronic circuitry and or 1-5K potentiometer Umax 36VDC - Wmax 1 watt
E4.13 - Up to 4 proximity sensors Umax 240V Imax 250mA Plus electronic circuitry and or 1-5K potentiometer Umax 36VDC - Wmax 1 watt	E4.14 - Up to 4 single pole switches Umax 275V Imax 5A Plus electronic circuitry and or 1-5K potentiometer Umax 36VDC - Wmax 1 watt Plus one 1-5K potentiometer: Umax 16VDC, Wmax 0.25W	E4.15 - Up to 4 proximity sensors Umax 240V Imax 250mA, Plus electronic circuitry and or 1-5K potentiometer, Umax 36VDC - Wmax 1 watt, Plus one 1-5K potentiometer: Umax 16VDC, Wmax 0.25W
Option - E4H Classification Ex db IIC T4 Gb / Ex tb IIIC T135°C Db Ta -50°C to +120°C IP66/67/68		
E4H.1 - Up to 4 single pole switches Umax 275V Imax 2.5A	E4H.2 - 1 or 2 double pole switches Umax 275V Imax 5A	E4H.4 - Up to 3 single pole switches Umax 275V Imax 3A, Plus electronic circuitry and or 1-5K potentiometer, Umax 36VDC - Wmax 1 watt
E4H.6 - 1 or 2 single pole switches plus connections for terminating 1 or 2 remote mounted solenoids Switches Umax 275V Imax 3A Solenoids Umax 275V Imax 2A Diode protection across solenoid terminals optional.	E4H.7 - Up to 4 single pole switches plus connections for terminating 1 or 2 remote mounted solenoids Switches Umax 275V Imax 1.5A Solenoids Umax 275V Imax 2A Diode protection across solenoid terminals optional.	E4H.8 - 1 or 2 double pole switches plus connections, for terminating 1 or 2 remote mounted solenoids, Switches Umax 275V Imax 3A Solenoids Umax 275V Imax 2A Diode protection across solenoid terminals optional.
E4H.10 - Up to 3 single pole switches Umax 275V Imax 2A, Plus electronic circuitry and or 1-5K potentiometer, Umax 36VDC - Wmax 1 watt, plus connections for terminating 1 or 2, remote mounted solenoids Umax 275V Imax 2A, Diode protection across solenoid terminals optional.	E4H.12 - Up to 4 single pole switches Umax 275V Imax 2.25A Plus electronic circuitry and or 1-5K potentiometer Umax 36VDC - Wmax 1 watt	

TopWorx™ K2P/K2S (CSA Explosion proof)

CSA 19.70194963

Class I, GRP B, C and D; Class II, Gps. E, F and G, Class III; Type 4, 4X, 6 and 6P (For USA & Canada)

Type NE6.xx, NE6H.xx, NE5.xx, NE4.xx, NE4H.xx

Ex d IIC T4/T5/T6; Ex tb IIIC T85°C /T100°C/ T135°C, Class II, Gps. E, F and G; IP66/67/68 ; and /or Type 4, 4X, 6, 6P (For Canada)

Type C6.xx, C6H.xx, C5.xx, C4.xx, C4H.xx

Class I, Zone 1, AEx d IIC T4/T5/T6; Zone 21, AEx tb/tD, IIIC T85°C /T100°C/ T135°C; IP66/67/68; and /or Type 4, 4X, 6, 6P (For USA)

Type C6.xx, C6H.xx, C5.xx, C4.xx, C4H.xx

Maintenance of flamepaths

When ever there is a need to remove the cover either during installation or routine maintenance ensure that care is taken not to damage the spigot, face or bore of either the cover or base. Always place the cover on a clean surface which will not scratch the machined surface or leave deposits on the surface which could prevent the flamepath joint from being maintained. Inspect both the cover and base flange faces before assembly to ensure both faces are clean and neither face is damaged. **COVER JOINTSMUST BE CLEANED BEFORE REPLACING COVER.**

Aluminum housings for Class I, Group B with flat joints are particularly susceptible to hot particle ejections and special care must be taken to ensure that these joints are free from metallic particles each time that the enclosure is opened.

The cover is secured by 4 off M6 x 1.0 - 16 mm long socket cap head screws. It is essential that all screws are in place and secure to maintain the protection concept of the product.

Should a fastener be lost, replacements must conform to the following standard:-

M6 x 1.0 - 16 mm long - 6g to ISO 626

Socket head to ISO 4762

Thread form to ISO965

Material - Stainless steel. Grade A2 - 70 minimum

WARNING

- DO NOT OPEN EVEN WHEN ISOLATED WHEN A FLAMMABLE ATMOSPHERE IS PRESENT.

ATTENTION : Ne pas ouvrir si la zone est connue pour être dangereuse

- A SEAL IS REQUIRED WITHIN 50mm OF THE ENCLOSURE

Isolation nécessaire sur 50mm depuis le boîtier

- DISCONNECT SUPPLY BEFORE SERVICING

Débrancher l'alimentation avant toute intervention

Instructions to this effect are noted on the certification label.

WARNING

Cable entries must either be plugged with stopper plugs or fitted with gable glands which satisfy the certification requirements of the product.

THE END USER MUST ENSURE THE ENCLOSURE IS SEALED WITH SUITABLE SEALING METHOD AS PER THE ELECTRICAL CODE.

TopWorx™ K1/K2 (Ex ia) Intrinsically Safe ATEX/IECEX Safety Notice

These instructions should be read before proceeding with the installation, operation and maintenance of the product. Installation, operation or maintenance work must be performed by personnel with the necessary training and experience. If you are in doubt about any aspect of such work contact TopWorx™ before proceeding.

The product is available with a range of options including limit switches, proximity sensors and electronic interface circuitry. The certification class is dependent on the product type selected, the reference number for which is marked on the product certification label attached to the products cover. The certification class for the various product types is reflected on the product label. Reference product label for type reference, equipment marking, and ambient temperature.

There are a range of drive shaft and lever options to suit rotary or linear applications. Contact TopWorx™ for further information.

Installation-General Guidance

The K1/K2 is must be installed in accordance with the requirements of relevant National and International standards for 'Electrical apparatus for potentially explosive atmospheres' and the installation of 'Intrinsically Safe Equipment.

NOTE: The purchaser should make the manufacturer aware of any External Effects or Aggressive Substances that the equipment may be exposed to.



IMPORTANT.

When mounting the product care must be taken to ensure that during operation the drive shaft is not subjected to excessive side loads.

Cable Entries

External electrical connections are made via up to four tapped cable entries. The installation of the external connections and plugging of the unused entry must be carried out using appropriate IP6X cable glands and blanking plugs.

All cable entries are identified with the thread form and size of thread marked on the product label.

Product Certification

The K1 and K2 series are constructed in accordance with the following standards and are certified for use in non-mining applications where an explosive atmosphere is likely to occur in normal service.

EN 60079-0:2012 + A11:2013 Electrical equipment for potentially explosive atmospheres - General requirements EN60079-11:2012 Electrical equipment for potentially explosive atmospheres - Intrinsic Safety 'i'

EN 60079-31:2014 Explosive Atmospheres - Part 31: Equipment Dust Ignition Protection By Enclosure "t"

IEC 60079-0:2011 Electrical equipment for potentially explosive atmospheres - General requirements Edition: 6.0

IEC 60079-11:2011 Electrical equipment for potentially explosive atmospheres - Intrinsic Safety 'i'. Edition: 6.0

EN 60079-31:2013 Explosive Atmospheres - Part 31: Equipment Dust Ignition Protection By Enclosure "t". Edition 2.0



If you are in any doubt as to whether the product selected is suitable for safe use in the intended area under the expected operating conditions contact TopWorx™ for guidance before proceeding.

Assembly and Dismantling.

Other than removing and replacing of the cover for the purpose of installation and calibration this unit should not be dismantled and reassembled. If there is a need to repair the product it should be returned to TopWorx™. **Repair work carried out by unauthorized personnel may invalidate the approval of the product and render it unsafe for use.**

Electrical Termination Details

A label detailing electrical terminations can be found on the underside of the Switchbox Cover.

This apparatus may contain a number of intrinsically safe (IS) circuits. Combination of these circuits may create an incendive circuit. It should be assumed that each IS circuit must be separated from other IS circuits by the requirements of EN 60079- 11:2007 (or later versions).

Individual switches/sensors etc. have specific intrinsically safe input parameters. Care must be taken to ensure that only circuits with the correct output parameters are to be connected to these switches/sensors etc. See previous paragraphs and the internal label for full details of these parameters.

Customer/user wiring should be individually sleeved with a radial thickness of at least 0.25mm.

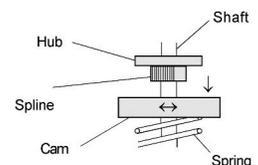
Customer/user wiring must only be connected to the customer/ user terminals within this apparatus. Connection to the apparatus-side of the terminals is forbidden.

Customer/user wiring into the terminal must be kept as short and tidy as reasonably possible and should be kept at least 3mm from any internal wiring/switches etc.

Switch Cam Setting

The switch actuation cams are driven via splines located on their inner diameter which engage with the drive hub. To adjust the position of the cam slide the cam off the hub, compressing the location spring. Rotate to the desired position and release. Check that the cam has correctly re-engaged with the hub.

NOTE: The K-Series 4-20mA Transmitter and the 4-20mA HART Transmitter IOM's can be found at TopWorx.com



TopWorx™ K5L/K7L Intrinsically Safe EX ia ATEX/IECEX Safety Notice

These instructions should be read before proceeding with the installation, operation and maintenance of the product. Installation, operation or maintenance work must be performed by personnel with the necessary training and experience. If you are in doubt about any aspect of such work contact TopWorx™ before proceeding.

The product is available with a range of options including limit switches, proximity sensors and electronic interface circuitry. The certification class is dependent on the product type selected, the reference number for which is marked on the product certification label attached to the products cover. The certification class for the various product types is reflected on the product label. Reference product label for type reference, equipment marking, and ambient temperature.

If you are in any doubt as to whether the product selected is suitable for safe use in the intended area under the expected operating conditions contact TopWorx™ for guidance before proceeding.

Installation-General Guidance

The K5L/K7L is designed to monitor the position of on/off or modulating rotary or linear equipment and or pneumatically control on/off equipment such as valve actuators. The unit is **NOT** suitable for use on multi-turn rotating equipment.

The product must be installed in accordance with the requirements of relevant National and International standards for 'Electrical apparatus for potentially explosive atmospheres' and the installation of 'Intrinsically Safe Equipment'.

NOTE: The purchaser should make the manufacturer aware of any External Effects or Aggressive Substances that the equipment may be exposed to.

Cable Entries

External electrical connections are made via up to four tapped cable entries. The installation of the external connections and plugging of the unused entry must be carried out using appropriate IP6X cable glands and blanking plugs. All cable entries are identified with the thread form and size of thread marked on the product label.

Mounting

There are a range of drive shaft and lever options to suit rotary or linear applications. Contact TopWorx™ for further information.

IMPORTANT.



When mounting the product care must be taken to ensure that during operation the drive shaft is not subjected to excessive side loads.

Product Certification

The K5L/K7L is constructed in accordance with the following standards and is certified for use in non-mining applications where an explosive atmosphere is likely to occur in normal service.

EN 60079-0:2012 + A11:2013 Electrical equipment for potentially explosive atmospheres - General requirements

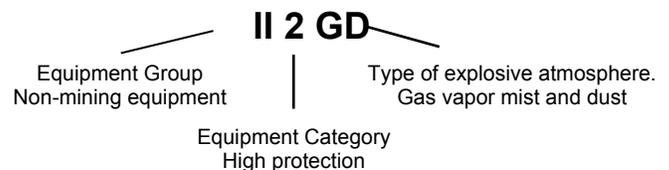
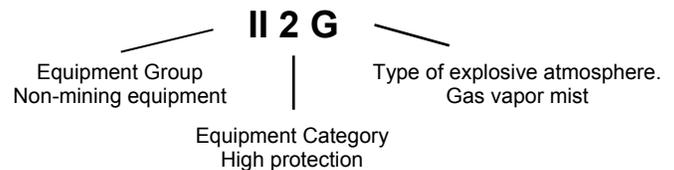
EN60079-11:2012 Electrical equipment for potentially explosive atmospheres - Intrinsic Safety 'i'

EN 60079-31:2014 Explosive Atmospheres - Part 31: Equipment Dust Ignition Protection By Enclosure "t"

IEC 60079-0:2012 + A11:2013 Electrical equipment for potentially explosive atmospheres - General requirements Edition: 6.0

IEC 60079-11:2012 Electrical equipment for potentially explosive atmospheres - Intrinsic Safety 'i'. Edition: 6.0

IEC 60079-31:2013 Explosive Atmospheres - Part 31: Equipment Dust Ignition Protection By Enclosure "t". Edition 2.0



Based on the TopWorx™ product configured the equipment is certified for use in a Gas only atmosphere or a Gas and Dust atmosphere. Reference above marking on the product nameplate for the environmental certifications of the product.

Assembly and Dismantling.

Other than removing and replacing of the cover for the purpose of installation and calibration this unit should not be dismantled and reassembled. If there is a need to repair the product it should be returned to TopWorx™. **Repair work carried out by unauthorized personnel may invalidate the approval of the product and render it unsafe to use.**

Switch Cam Setting

The switch actuation cams are driven via splines located on their inner diameter which engage with the drive hub. To adjust the position of the cam slide the cam off the hub, compressing the location spring. Rotate to the desired position and release.

Check that the cam has correctly re-engaged with the hub. **Electrical Termination Details** A label detailing electrical terminations can be found on the underside of the Switchbox Cover. This apparatus may contain a number of intrinsically safe (IS) circuits. Combination of these circuits may create an incensive circuit. It should be assumed that each IS circuit must be separated from other IS circuits by the requirements of EN 60079-11: 2007 (or later versions).

Individual switches/ sensors etc. have specific intrinsically safe input parameters. Care must be taken to ensure that only circuits with the correct output parameters are to be connected to these switches/ sensors etc. See paragraph above and internal label for full details of these parameters. Customer/user wiring should be individually sleeved with a radial thickness of at least 0.25mm. Customer/user wiring must only be connected to the customer/ user terminals within this apparatus. Connection to the apparatus side of the terminals is forbidden. Customer/user wiring into the terminal must be kept as short and tidy as reasonably possible and should be kept at least 3mm from any internal wiring/switches etc.

NOTE: The K-Series 4-20mA Transmitter and the 4-20mA HART Transmitter IOM's can be found at TopWorx.com

About Emerson-TopWorx

Emerson Process Management, is the global leader in valve control and position sensing for the process industries. Our solutions enable management and controlling of operations more intelligently and efficiently under the most demanding and extreme conditions.

TopWorx™ discrete valve controllers enable automated on/off valves to communicate via FOUNDATION Fieldbus, Profibus, DeviceNet, AS-Interface, and HART protocols. They attach to all rotary and linear valves and actuators and carry a variety of global certifications.

GO™ Switch proximity sensors and limit switches provide the ultimate position sensing reliability and durability in extremely hot, wet, cold, dirty, abusive, corrosive, and explosive environments.

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Visit www.topworx.com for comprehensive information on our company, capabilities, and products – including model numbers, data sheets, specifications, dimensions, and certifications.

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