

Product Overview Chart



Model		SK	SQ	SY	SW	SE	ES	BM	TB
Application	Industry								
	Valve Type	Rotary Valves	Rotary Valves	Rotary Valves	Rotary Valves	Linear Valves	Manual Valves	External Switches General Purpose	External Switches General Purpose
Material	Housing	Aluminium	316L stainless steel	Copper free aluminium	316 stainless steel	Copper free aluminium or 316 stainless steel	Copper free aluminium or 316 stainless steel	316 stainless steel	316 stainless steel or aluminium
	Cover	Aluminium	316L stainless steel	Copper free aluminium	316 stainless steel	Copper free aluminium or 316 stainless steel	Copper free aluminium or 316 stainless steel	316 stainless steel	316 stainless steel or aluminium
Certification	IP Rating	IP 66 / 67 optional IP68	IP 66 / 67 optional IP68	IP 66 / 68	IP 66 / 68	IP67 IP 67M	IP 68	IP 68 subsea option available	IP 68
	SIL Rating up to:	SIL3	SIL3	SIL3	SIL3	SIL3	SIL3	SIL3	SIL3
	ATEX, IECEx option	Exd IIC T6	Exd IIC T6	Exd IIC T6	Exd IIC T6	–	Exd IIC T6	Exd IIC T6 Exia IIC T4	Exd IIC T6
	cULus option	Class 1/2 Div 1/2	–	Class 1/2 Div 1/2	Class 1/2 Div 1/2	–	Class 1/2 Div 1/2	Class 1/2 Div 1/2	–
	EAC option	✓	✓	✓	✓	✓	✓	✓	✓
	CCOE option	✓	✓	✓	✓	–	–	–	–
	INMETRO option	✓	✓	✓	✓	–	✓	–	–
	NEPSI option	–	–	✓	✓	–	–	–	–
Visual Position Indicator	3D	✓	✓	✓	✓	–	–	–	–
	Flat	✓	✓	✓	✓	–	–	–	–
	Multi Port Valves	✓	✓	✓	✓	–	–	–	–
	None	–	–	–	–	✓	✓	✓	✓
Electrical Feedback	Electro mechanic	✓	✓	✓	✓	–	–	–	–
	Magnetic	✓	✓	✓	✓	✓	✓	✓	✓
	Inductive	✓	✓	✓	✓	✓	–	–	–
	4-20 mA	–	–	✓	✓	–	–	–	–
	Communication Protocols	–	–	✓	✓	–	–	–	–
Features	Twin Shaft Design	✓	✓	✓	✓	–	–	–	–
	Temp. Max Range	-55 to +105 °C (-67 to +221 °F)	-55 to +105 °C (-67 to +221 °F)	-60 to +105 °C (-76 to +221 °F)	-60 to +105 °C (-76 to +221 °F)	-50 to +105 °C (-58 to +221 °F)	-65 to +150 °C (-85 to +302 °F)	-40 to +105 °C (-40 to +221 °F)	-40 to +105 °C (-40 to +221 °F)
	Integrated Mounting Kit	Optional	Optional	–	–	–	–	–	–

Model		SP	SM	SB	SF	SS	HW	SX	SH
									
Application	Industry								
	Valve Type	Rotary Valves	Rotary Valves	Rotary Valves	Rotary Valves	Rotary Valves	Rotary Valves	Rotary Valves	Rotary Valves
Material	Housing	Glass reinforced plastic	Nickel plated aluminium	Copper free aluminium	Copper free aluminium	316 stainless steel	Aluminium	Aluminium	Aluminium
	Cover	Polycarbonate	Polycarbonate	Polycarbonate	Aluminium	316 stainless steel	Aluminium	Aluminium	Aluminium
Certification	IP Rating	IP 65	IP 65	IP 67	IP 66 / 67 IP 67M	IP 66 / 67 IP 67M	IP 66 / 67	IP 66 / 67	IP 66 / 67
	SIL Rating up to:	SIL2	SIL2	SIL3	SIL3	SIL3	SIL3	SIL3	SIL3
	ATEX, IECEx option	Exia IIC T6	Exia IIC T6	Exia IIC T6	Exia IIC T6	Exia IIC T6	–	Exd IIB T6	Exd IIB+H2 T6
	cULus option	–	–	Safe area or Class1/2 Div2	Safe area or Class1/2 Div2	Safe area or Class1/2 Div2	Safe area or Class1/2 Div2	Class 1/2 Div 1/2	Class 1/2 Div 1/2
	EAC option	✓	✓	✓	✓	✓	✓	✓	✓
	CCOE option	✓	✓	✓	✓	✓	–	✓	✓
	INMETRO option	–	–	–	–	–	–	✓	✓
	NEPSI option	–	–	–	–	–	–	–	–
Visual Position Indicator	3D	✓	✓	✓	✓	✓	✓	✓	✓
	Flat	✓	✓	✓	✓	✓	✓	✓	✓
	Multi Port Valves	–	–	✓	✓	✓	✓	✓	✓
	None	–	–	–	✓	✓	✓	–	–
Electrical Feedback	Electro mechanic	✓	✓	✓	✓	✓	✓	✓	✓
	Magnetic	✓	✓	✓	✓	✓	✓	✓	✓
	Inductive	✓	✓	✓	✓	✓	✓	✓	✓
	4-20 mA	–	–	✓	✓	✓	✓	✓	✓
	Communication Protocols	–	–	✓	✓	✓	✓	✓	✓
Features	Twin Shaft Design	–	–	✓	✓	✓	✓	✓	✓
	Temp. Max Range	-20 to +80 °C (-4 to +176 °F)	-20 to +80 °C (-4 to +176 °F)	-30 to +80° C (-22 to +176 °F)	-60 to +105 °C (-76 to +221 °F)	-60 to +105 °C (-76 to +221 °F)	-60 to +105 °C (-76 to +221 °F)	-20 to +105 °C (-4 to +221 °F)	-20 to +105 °C (-4 to +221 °F)
	Integrated Mounting Kit	✓	✓	–	–	–	✓	–	–

SP - SM limit switch box series

Nomenclature

SP N1 2 H 0 - D H W 0 0 R 1

Box

SP = Glass reinforced plastic body with polycarbonate cover
SM = Aluminium body with polycarbonate cover

Switch

01 = SPDT el.mech. switch silver plated contacts
03 = SPDT el.mech. switch gold plated contacts (for Ex'ia')
1F = DPDT el.mech. switch silver plated contacts
C4 = SPDT magnetic hermetically sealed reed switch (for Ex'ia' low temperature)
N1 = SPDT magnetic hermetically sealed silver plated snap acting contacts
N3 = SPDT magnetic hermetically sealed gold plated snap acting contacts (for Ex'ia')
70 = Inductive proximity NAMUR sensor NJ2-V3-N 2 wire NC logic (for Ex'ia')
73 = Inductive proximity sensor model NBB2-V3-E2, 3 wire PNP NO

See additional information and options on pages 14-19

Switch Quantity

2 = 2 switches

Terminals

A = Screw type terminals
4 = Blue screw terminals (for Ex'ia')
0 = Screw terminals with sov connection
2 = Blue screw terminals with sov connection (for Ex'ia')

Coating

0 = Black plastic enclosure (on SP series)
N = Nickel plated aluminium body (on SM series)

Cable Entries

D = 1 cable entry 1/2" NPT
E = 1 cable entry M20 x 1.5
1 = 2 cable entries 1/2" NPT (SM series only)
2 = 2 cable entries M20 x 1.5 (SM series only)

Visual Position Indicator

H = 3D visual position indicator black and yellow
Z = Flat visual position indicator black and yellow

See additional information and options on page 11

Approval

W = Weather proof
A = ATEX certified
G = EAC certification for Russian market

See additional information and options on page 13

Marking

0 = Standard location
1 = Intrinsically safe certification

See additional information and options on page 13

IP Protection rating

0 = Weather proof IP65
7 = Nema 4 and 4X
2 = Weather proof IP67

Temperature

A = Ambient temperature range: -20 to +80 °C (-4 to +176 °F)
B = Ambient temperature range: -20 to +70 °C (-4 to +158 °F) for sensor option 73

Material

1 = Glass reinforced plastic body and polycarbonate cover (on SP series)
2 = Nickel plated aluminium body and polycarbonate cover (on SM series)

SF - SS - SB limit switch box series

Multi purpose limit switch box for safe area or Intrinsically Safe applications.

Features

- Twin shaft design
- Self lubricating bushings
- Copper free aluminium or 316 stainless steel housing option for maximum corrosion protection
- 2 cable entries either metric or imperial
- Multiple indicator options
- Easy wiring through the terminal PCB board
- Position transmitter board optional
- Suitable for arctic environments

Approvals

ATEX, IECEx, EAC, CCOE:

SF-SS series (ATEX & IECEx)
Ex II 1GD Ex ia IIC T4...T6 Ga
Ex ia IIIC T95°C...T120°C Da
-60°C<Ta<+105°C

SB series (ATEX only)
Ex II 2GD Ex ia IIC T6...T4 Gb
Ex ia IIIB T44°C...T108°

UL: Class I Division 2 Groups A, B, C, D
Class II Division 2 Groups F, G

SIL certificate: Up to SIL 3 certified by TÜV

Protection rating: IP 66 / 67
Nema 4 4X on request

Temperature:
-20 to +80 °C (-4 to +176 °F) standard temperature range
-60 to +105 °C (-76 to +221 °F) available on request



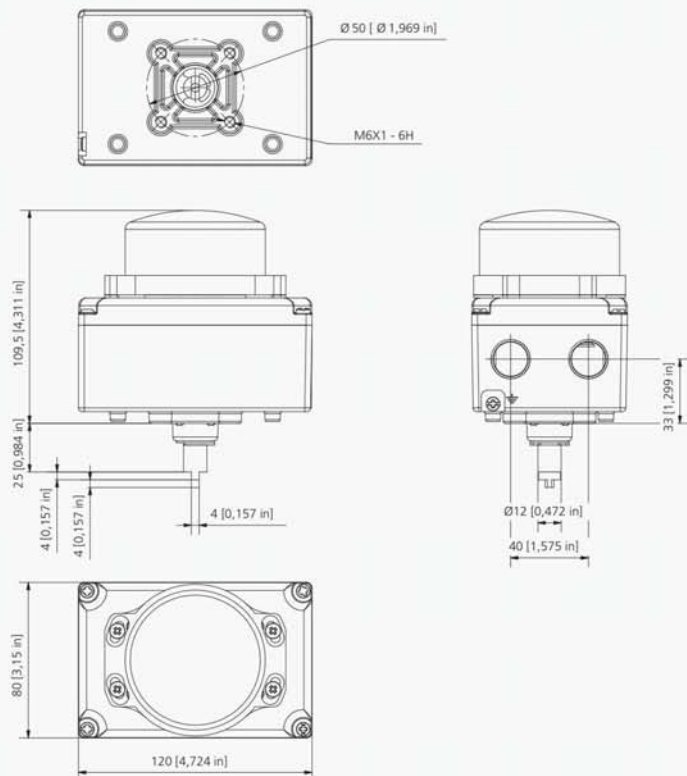
SF limit switch box



SS limit switch box



SB limit switch box



SF - SS - SB limit switch box series

Nomenclature

SB N1 2 0 0 - 1 1 X 1 1 A 4

Box

- SB = Aluminium body with polycarbonate cover
- SF = Aluminium enclosure
- SS = 316 stainless steel enclosure

Switch

- 01 = SPDT el.mech. switch silver plated contacts
- 03 = SPDT el.mech. switch gold plated contacts (for Ex'ia')
- 1F = DPDT el.mech. switch silver plated contacts
- C4 = SPDT magnetic hermetically sealed reed switch (for Ex'ia' low temperature)
- C8 = DPDT magnetic hermetically sealed reed switch (for Ex'ia' low temperature)
- N1 = SPDT magnetic hermetically sealed silver plated snap acting contacts
- N3 = SPDT magnetic hermetically sealed gold plated snap acting contacts
- N4 = DPDT magnetic hermetically sealed silver plated snap acting contacts
- 62 = Inductive proximity NAMUR sensor SJ3,5-SN 2 wire NC logic (for Ex'ia' low temperature safety function)
- 70 = Inductive proximity NAMUR sensor NJ2-V3-N 2 wire NC logic (for Ex'ia')
- 73 = Inductive proximity sensor model NBB2-V3-E2, 3 wire PNP NO, 10-30 VDC, 0-100 mA
- 86 = Inductive proximity NAMUR sensor model NJ4-12GK-SN 2 wire NC logic (for Ex'ia' safety function)
- T0 = 4-20 mA position transmitter
- H0 = 4-20 mA HART position transmitter Atex Ex ia IIC T6 / T4 certified

See additional information and options on pages 14-19

Switch Quantity

- 2 = 2 switches
- 3 = 3 switches

Terminals

- 0 = Screw terminals with extra poles for solenoid valve connection
- 2 = Blue screw type terminals with extra poles for sov connection (for Ex'ia')
- A = Screw terminal strip
- 8 = Blue cage clamp terminals (for low temperature and switch codes 62, 63, H0)
- E = Cage clamp terminals (for low temperature)

Coating

- 0 = Black powder coating
- 1 = Blue powder coating
- E = Electro polished finishing (on SS series)

Cable Entries

- 1 = 2 cable entries 1/2" NPT
- 2 = 2 cable entries M20 x 1.5p

Visual Position Indicator

- 0 = 3D plastic visual position indicator red and green
- 1 = No visual position indicator
- T = 3D stainless steel position indicator

See additional information and options on page 11

Approval

- W = Weather proof
- X = ATEX and IECEx certified box
- A = ATEX certified box
- B = ATEX certified box and SIL2 approval
- C = ATEX certified box and SIL3 approval
- G = EAC certification for Russian market
- J = CCOE certification for Indian market
- U = UL certified box

* SIL2 / SIL3 options available on request

See additional information and options on page 13

Marking

- 0 = Standard location
- 1 = Intrinsically safe certification
- 9 = cULus Class 1/2 Div 2 (with switches code: C4, C8, N1, N3)

See additional information and options on page 13

IP Protection rating

- 1 = Weather proof IP66 / IP67
- 7 = NEMA 4 and 4X

Temperature

- A = Ambient temperature range: -20 to +80 °C (-4 to +176 °F)
- L = Ambient temperature range: -40 to +80 °C (-40 to +176 °F)
- P = Ambient temperature range: -60 to +80 °C (-76 to +176 °F) for switch code C4
- U = Ambient temperature range: -20 to +40 °C (-4 to +104 °F)
- B = Ambient temperature range: -20 to +70 °C (-4 to +158 °F)

Material

- 2 = Die-cast aluminium heavy duty body and polycarbonate cover (on SB series)
- 4 = Copper free aluminium (on SF series)
- 6 = 316 stainless steel heavy duty enclosure (on SS series)

HW limit switch box series

Control unit that combines a limit switch box and solenoid valve into a single device. Maximum efficiency with minimum customer effort.

Features

- Twin shaft design
- Self lubricating bushings
- Optional integrated solenoid valve for maximum efficiency and compactness
- 3 or 5 way pneumatic valve with single or double coil configurations
- Aluminium enclosure with thick powder coat paint and integrated NAMUR mounting kit
- Up to 3 cable entries either metric or imperial
- Multiple indicator options

- Easy wiring through the terminal PCB board
- Optional position transmitter boards
- Optional Profibus communication board for complete process handling

Approvals

EAC, UL general purpose

SIL certificate: Up to SIL 2 approval on request

Protection rating: IP66 / 67

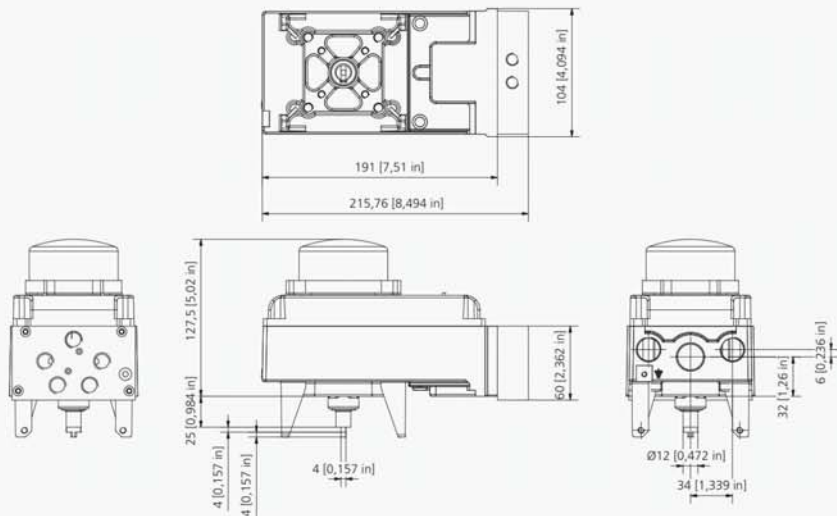
Nema 4 4X on request

Temperature:

-60 to +105 °C (-76 to +221 °F) standard temperature range



HW limit switch box



HW limit switch box series

Nomenclature

HW N1 2 2 2 - 3 T W 9 7 P 3 0 A

Box

HW = Aluminium control unit enclosure

Switch

01 = SPDT electromechanical switches, silver plated contacts
 03 = SPDT electromechanical switches, gold plated contacts
 1F = DPDT electromechanical switches silver plated contacts
 70 = NAMUR inductive proximity sensor P+F type NJ2-V3-N, NAMUR NC 2 wire (for Ex'ia')
 73 = Inductive proximity P+F NBB2-V3-E2, 3 wire PNP NO
 C4 = Magnetic SPDT hermetically sealed switch (suitable for Ex'ia')
 C8 = Magnetic DPDT hermetically sealed switch (suitable for Ex'ia')
 N1 = Magnetic proximity SPDT hermetically sealed switch, silver plated snap acting contacts
 N3 = Magnetic proximity SPDT hermetically sealed switch, gold plated snap acting contacts
 N4 = Magnetic proximity DPDT hermetically sealed switch, silver plated snap acting contacts
 DB = 3 position control system for single acting actuators, 5/3 way, double coil sov
 DA = 3 position control system for double acting actuators, 5/3 way, double coil sov
 A1 = Asi board with 2 SPDT switches and solenoid valve control
 T0 = 4-20 mA analog position transmitter
 H0 = 4-20 mA HART transmitter Exia IIC certified
 PG = Profibus communication board

See additional information and options on pages 14-19

Switch Quantity

0 = No switches for digital limit position feedback
 1 = 1 switch or sensor (for DB, DA switch options)
 2 = 2 switches or sensors
 3 = 3 switches or sensors
 4 = 4 switches or sensors

Terminals

0 = Screw type terminals with sov connection
 2 = Blue screw type terminals with sov connection

Coating

0 = Black polyester powder coating (only for aluminium)

Cable Entries

1 = 2 cable entries 1/2" NPT
 2 = 2 cable entries M20x1.5
 3 = 2 x 1/2" NPT + 1 x 3/4" NPT cable entries
 4 = 2 x M20 x 1.5p + 1 x M25 x 1.5p cable entries

Visual Position Indicator

0 = Red and green visual position indicator

See additional information and options on page 11

Approval

W = Weather proof limit switch box
 G = EAC certified box for Russian market, with RTN permit
 U = UL certified box

See additional information and options on page 13

Marking

0 = Ordinary location
 A = CULUS normally location

See additional information and options on page 13

IP Protection rating

1 = Weather proof IP66/IP67
 7 = Nema 4 4X

Temperature

5 = Ambient temperature range: -10 to +50 °C (+14 to +122 °F)
 7 = Ambient temperature range: -10 to +40 °C (+14 to +104 °F)
 5 = Ambient temperature range: -5 to +50 °C (+23 to +122 °F)
 A = Ambient temperature range: -20 to +80 °C (-4 to +176 °F) without solenoid valve

Material and solenoid valve selection

3 = Aluminium heavy duty body and cover
 A = Aluminium heavy duty body and cover die-cromated, 5/2 way aluminium solenoid valve, single coil
 B = Aluminium heavy duty body and cover die-cromated, 5/2 way aluminium solenoid valve, double coil
 C = Aluminium heavy duty body and cover die-cromated, 5/3 way aluminium solenoid valve, blocked centre, double coil (DB switch option)
 D = Aluminium heavy duty body and cover die-cromated, 5/3 way aluminium solenoid valve, exhaust centre, double coil (DA switch option)

Coil Rating

0 = No solenoid valve available
 2 = Coil rating: 12 VDC 2, 3 W
 3 = Coil rating: 24 VDC 2, 3 W
 4 = Coil rating: 24 VAC 2, 8 VA
 5 = Coil rating: 110 VAC 2, 8 VA
 6 = Coil rating: 230 VAC 2, 8 VA
 1 = Ex'ia' certified pilot valve coil rating: 6 VDC
 7 = Ex'ia' certified pilot valve coil rating: 12 VDC
 8 = Ex'ia' certified pilot valve coil rating: 24 VDC
 9 = Ex'n' certified pilot valve coil rating: 24 VDC
 A = Ex'n' certified pilot valve coil rating: 110 VAC

Pneumatical Connection

0 = No pneumatic connections
 A = 1/4" NPT/F pneumatical connections

SK - SQ limit switch box series

Compact limit switch box for hazardous areas, with explosionproof protection method.

Features

- Twin shaft design
- Metallic self lubricant bushings
- Aluminium or 316L stainless steel housing option for maximum corrosion protection
- 2 cable entries either metric or imperial
- Adjustable mounting kit for NAMUR actuators available on request
- Easy wiring through the terminal PCB board
- Suitable for arctic environments

Approvals

ATEX, IECEX, EAC, CCOE, INMETROL:

Ex II 2GD Ex db IIC T4/T5/T6 Gb
Ex tb IIIC T135/T100/T85°C Db
Ta: -55 °C ≤ Ta ≤ 105 °C / 80 °C / 60 °C

UL (available on Sk series only):

Class I Division 1 Groups A, B, C, D Division 2 Groups A, B, C, D
Class II Division 1 Groups E, F, G Division 2 Groups F, G

SIL certificate: Up to SIL 3 certified by TÜV

Protection rating: IP 66 / 67

IP 66 / 68 15 m for 100 hours

Nema 4 4X on request

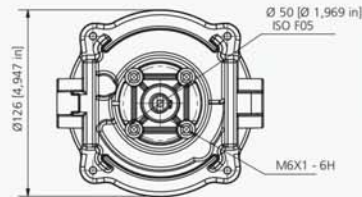
Temperature:

-20 to +80 °C (-4 to +176 °F) standard temperature range

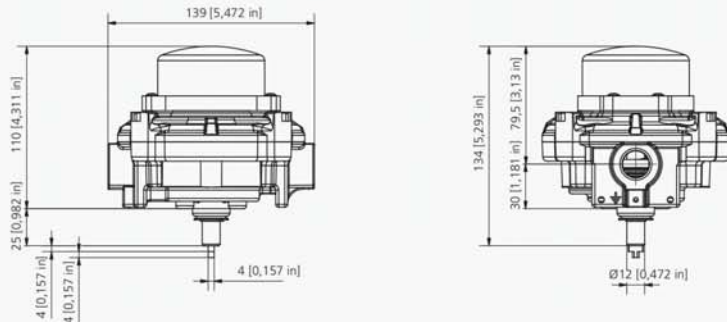
-55 to +105 °C (67 to +221 °F) available on request



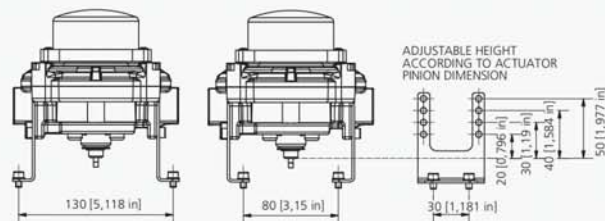
SK limit switch box



SQ limit switch box



Optional adjustable mounting kit for NAMUR actuators



SK - SQ limit switch box series

Nomenclature

SK N1 2 0 0 - 1 1 X 2 1 A 3

Box

SK = Die-cast aluminium enclosure
SQ = 316L stainless steel enclosure

Switch

01 = SPDT el.mech. switch silver plated contacts
03 = SPDT el.mech. switch gold plated contacts
1F = DPDT el.mech. switch silver plated contacts
C4 = SPDT magnetic hermetically sealed reed switch
N1 = SPDT magnetic hermetically sealed silver plated snap acting contacts
N3 = SPDT magnetic hermetically sealed gold plated snap acting contacts
73 = Inductive proximity sensor model NBB2-V3-E2, 3 wire PNP NO

See additional information and options on pages 14-19

Switch Quantity

2 = 2 switches

Terminals

0 = Screw type terminals with sov connection
E = Cage clamp terminals with sov connection (for low temp.)

Coating

0 = Black powder coating (SK Series) Aluminium
E = Electro polish finishing (SQ Series) Stainless Steel

Cable Entries

1 = 2 cable entries 1/2" NPT
2 = 2 cable entries M20 x 1.5

Visual Position Indicator

0 = 3D plastic visual position indicator red and green
T = 3D stainless steel position indicator

See additional information and options on page 11

Approval

X = ATEX and IECEx certified box
D = ATEX and IECEx certified box with SIL2 approval
E = ATEX and IECEx certified box with SIL3 approval
G = EAC certification for Russian market
I = INMETRO certification for Brazilian market
N = NEPSI certification for Chinese market
J = CCOE certification for Indian market
U = UL certified box (only for SK series)
W = Weather proof

* SIL2 / SIL3 options available on request

See additional information and options on page 13

Marking

0 = Standard location
2 = Certification marking: Ex II 2GD Exd IIC
7 = cULus Class 1/2 Div1 (only for SK series)
8 = cULus Class 1/2 Div 1/2 with switches code: C4, N1, N3. (Only for SK series)

See additional information and options on page 13

IP Protection rating

1 = Weather proof IP66/IP67
3 = Weather proof IP66/IP68
7 = Nema 4 and 4X

Temperature

A = Ambient temperature range: -20 to +80 °C (-4 to +176 °F)
L = Ambient temperature range: -40 to +80 °C (-40 to +176 °F)
N = Ambient temperature range: -55 to +80 °C (-67 to +176 °F) for switch code C4

Material

3 = Die-cast aluminium heavy duty body and cover (on SK series)
7 = 316L Stainless steel heavy duty enclosure (on SQ series)

Note: Optional mounting kit for NAMUR actuators ordering code: KN07

SY - SW limit switch box series

Limit switch box for heavy duty explosionproof applications in the oil & gas and petrochemical industries, both on-shore and off-shore.

Features

- Twin shaft design
- Metallic self lubricating bushings
- Copper free aluminium or 316 stainless steel housing option for maximum corrosion protection
- Up to 4 cable entries either metric or imperial
- Multiple indicator options
- Easy wiring through the terminal PCB board
- High volume for the maximum wiring comfort
- Optional position transmitter board
- Suitable for arctic environments

Approvals

ATEX, IECEx, EAC, CCOE, INMETRO, NEPSI:

Ex II 2GD Ex db IIC T4/T5/T6 Gb
Ex tb IIIC T140/T110/T110°C Db
Ta: -60 °C ≤ Ta ≤ 105 °C / 80 °C / 60 °C

UL:

Class I Division 1 Groups B,C,D Division 2 Groups A, B, C, D
Class II Division 1 Groups E,F,G Division 2 Groups F, G

SIL certificate: Up to SIL 3 certified by TÜV

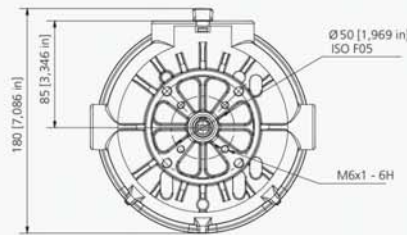
Protection rating: IP 66 / 68 10 m for 48 hours
Nema 4 4X on request

Temperature:

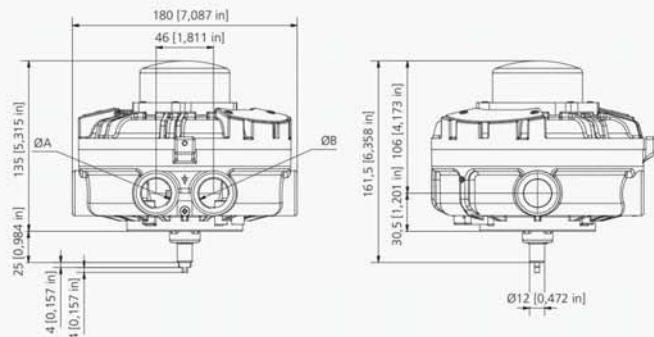
-20 to +80 °C (-4 to +176 °F) as standard temperature range
-60 to +105 °C (-76 to +221 °F) available on request



SY limit switch box



SW limit switch box



SY - SW limit switch box series

Nomenclature

SY N1 2 0 0 - 1 0 X 2 3 A 4

Box

SY = Copper free aluminium enclosure
SW = Stainless steel 316 enclosure

Switch

01 = SPDT electro-mechanical switch silver plated contacts
1F = DPDT electro-mechanical switch silver plated contacts
C4 = SPDT magnetic hermetically sealed reed switch
C8 = DPDT magnetic hermetically sealed reed switch
N1 = SPDT magnetic hermetically sealed silver plated snap acting contacts
N4 = DPDT magnetic hermetically sealed silver plated snap acting contacts
32 = Inductive proximity sensor model NBN4-12GM40-Z0 2 wire
73 = Inductive proximity sensor model NBB2-V3-E2, 3 wire PNP NO
T0 = 4-20 mA position transmitter
H0 = 4-20 mA HART position transmitter Atex EEx ia IIC T6 / T4 certified
P0 = Partial Stroke Test device with either remote or local magnetic key activation

See additional information and options on pages 14-19

Switch Quantity

2 = 2 switches
4 = 4 switches
6 = 6 switches

Terminals

0 = Screw type terminals with sov connection
A = Screw type terminals
E = Cage clamp terminals with sov connection (for low temperature)
D = Cage clamp terminals (for low temperature)

Coating

0 = Black powder coating (SY Series)
E = Electro polish finishing (SW Series)

Cable Entries

1 = 2 cable entries 1/2" NPT
2 = 2 cable entries M20 x 1.5p
T = 4 cable entries 1/2" NPT
U = 4 cable entries M20 x 1.5p

Visual Position Indicator

0 = 3D plastic visual position indicator red and green
2 = 3-position indicator (T-port 180 deg. Blocked centre)
A = 3-position indicator (L-port)
B = 3-position indicator (T-port 180 deg.)
T = 3D stainless steel position indicator

See additional information and options on page 11

Approval

X = ATEX and IECEx certified box
D = ATEX and IECEx certified box with SIL2 approval
E = ATEX and IECEx certified box with SIL3 approval
G = EAC certification for Russian market
I = INMETRO certification for Brazilian market
N = NEPSI certification for Chinese market
J = CCOE certification for Indian market
U = UL certified box
W = Weather proof
* SIL2 / SIL3 options available on request

See additional information and options on page 13

Marking

0 = Standard location
2 = Certification marking: Ex II 2GD Exd IIC
7 = cULus Class 1/2 Div1
8 = cULus Class 1/2 Div 1/2 with (with switches code: C4,C8,N1,N3)

See additional information and options on page 13

IP Protection rating

3 = Weather proof IP66 / IP68
7 = Nema 4 and 4X

Temperature

A = Ambient temperature range: -20 to + 80 °C (-4 to +176 °F)
L = Ambient temperature range: -40 to + 80 °C (-40 to +176 °F)
P = Ambient temperature range: -60 to + 80 °C (-76 to +176 °F) for switch codes C4 and C8

Material

4 = Copper free aluminium heavy duty body and cover (SY series)
6 = 316 stainless steel heavy duty enclosure (SW series)

SX - SH limit switch box series

Limit switch box designed for explosionproof applications.

Features

- Twin shaft design
- Metallic self lubricating bushings
- Aluminium enclosure with thick protective powder coating
- Up to 3 cable entries either metric or imperial
- Multiple indicator options
- Easy wiring through the terminal PCB board

Approvals

ATEX, IECEx, EAC, CCOE, INMETRO:

Ex II 2GD Ex db IIB T4/T5/T6 Gb (SX series)
Ex II 2GD Ex db IIB + H2 T4/T5/T6 Gb (SH series)
Ex tb IIIC T135/T100/T85°C Db
Ta: -20 °C ≤ Ta ≤ 105 °C / 75 °C / 60 °C

UL:

Class I Division 1 Groups C, D Division 2 Groups A, B, C, D
Class II Division 1 Groups E, F, G Division 2 Groups F, G

SIL certificate: Up to SIL 3 certified by TÜV

Protection rating: IP 66 / 67

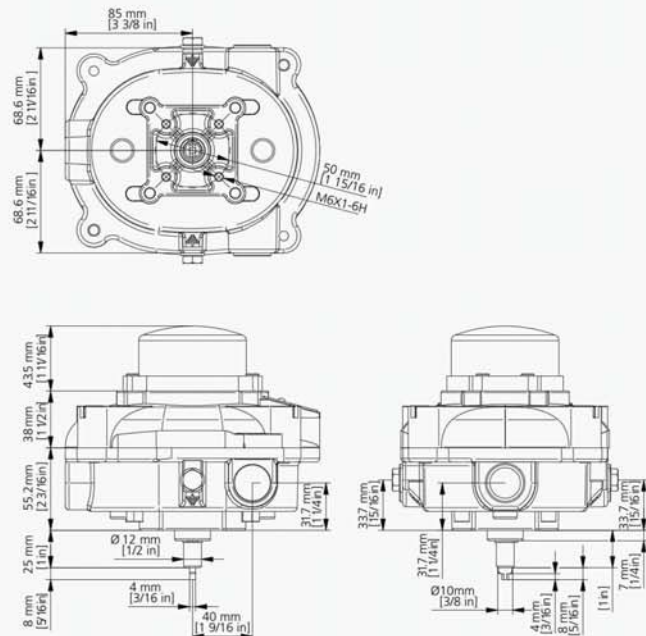
Nema 4 4X on request

Temperature:

-20 to +80 °C (-4 to +176 °F) standard temperature range



SX limit switch box



SX - SH limit switch box series

Nomenclature

SX N1 2 0 0 - 1 0 X 3 2 A 4

Box

SX = Exd IIB applications
SH = Exd IIB+H2 applications

Switch

01 = SPDT elec.mech. switch silver plated contacts
1F = DPDT elec.mech. switch silver plated contacts
C4 = SPDT magnetic hermetically sealed reed switch
C8 = DPDT magnetic hermetically sealed reed switch
N1 = SPDT magnetic hermetically sealed silver plated snap acting contacts
N4 = DPDT magnetic hermetically sealed silver plated snap acting contacts
32 = Inductive proximity sensor model NBN4-12GM40-Z0 2 wire
73 = Inductive proximity sensor model NBB2-V3-E2, 3 wire PNP NO
T0 = 4-20 mA position transmitter
H0 = 4-20 mA HART position transmitter Atex EEx ia IIC T6 / T4 certified
P0 = Partial Stroke Test device with magnetic key

See additional information and options on pages 14-19

Switch Quantity

2 = 2 switches
4 = 4 switches (on Exd IIB certification)

Terminals

0 = Screw type terminals with sov connection
A = Screw type terminals
E = Cage clamp terminals with sov connection (for low temperature)
D = Cage clamp terminals (for low temperature)

Coating

0 = Black powder coating

Cable Entries

1 = 2 cable entries 1/2" NPT
2 = 2 cable entries M20x1.5
3 = 2 x 1/2" NPT + 1 x 3/4" NPT cable entries

Visual Position Indicator

0 = 3D plastic visual position indicator red and green
2 = 3-position indicator (T-port 180 deg. Blocked centre)
A = 3-position indicator (L-port)
B = 3-position indicator (T-port 180 deg.)
T = 3D stainless steel position indicator

See additional information and options on page 11

Approval

X = ATEX and IECEx certified box
D = ATEX and IECEx certified box with SIL2 approval
E = ATEX and IECEx certified box with SIL3 approval
G = EAC certification for Russian market
I = INMETRO certification for Brazilian market
N = NEPSI certification for Chinese market
J = CCOE certification for Indian market
U = UL certified box
W = Weather proof
* SIL2 / SIL3 options available on request

See additional information and options on page 13

Marking

0 = Standard location
3 = Certification marking: Ex II 2GD Exd IIB
4 = Certification marking: Ex II 2GD Exd IIB + H2
7 = cULus Class1/2 Div 1
8 = cULusClass 1/2 Div 1/2 (with switches code: C4, C8, N1, N3)

See additional information and options on page 13

IP Protection rating

1 = Weather proof IP 66/67
7 = Nema 4 and 4X

Temperature

A = Ambient temperature -20 to +80 °C (-4 to +176 °F)
E = -25 to +80°C (-13 to +176 °F) UL approval only

Material

3 = Die cromated aluminium heavy duty body and cover

BM - TB limit switch box series

Limit switches for hazardous areas with Exd or Exia protection methods. Designed for linear valves and general purpose applications.

Features

- AISI 316 stainless steel rugged BM series enclosure
- Standard 450 mm flying leads
- Stainless steel or aluminium materials for optional junction box with TB series
- Magnetic or ferrous sensing capabilities
- Subsea application on request, tested up to 300 bar
- Optional subsea cable and connector for underwater link

Approvals

ATEX, EAC, INMETRO:

Ex II 2GD Ex d IIC T6/T5/T4 Gb
Ex tb IIIC T80°C/T95°C/T115°C Db
ATEX, IECEx Ex II 1GD Exia IIC T4 Ga Exia IIIC T135°C Da
Ta = -40 °C ≤ Ta ≤ 90 °C

UL: only available on BMC4

Class I, Division 1 and 2, Groups A, B, C and D
Class II, Division 1 Groups E, F and G
Class II Division 2, Groups F and G

SIL certificate: Up to SIL 3 approval on request

Protection rating: BM: IP66 / 68

TB: IP67 / 68

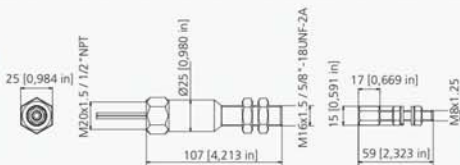
Nema 4 4X on request



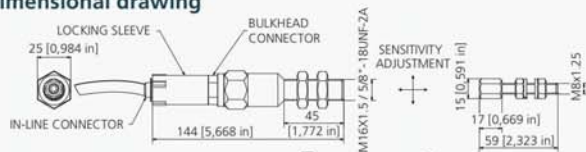
BM limit switch box



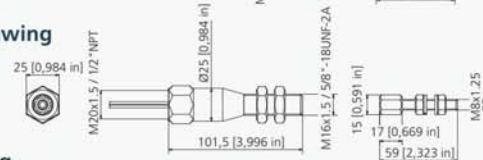
BM dimensional drawing



BM Subsea dimensional drawing



BM UL dimensional drawing

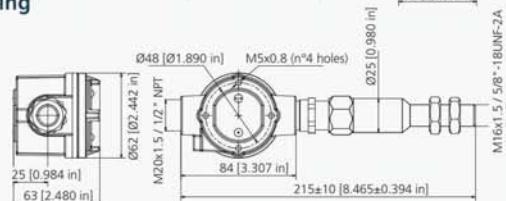


TB limit switch box

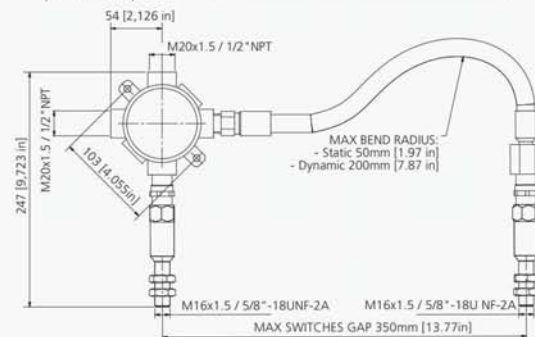


TB dimensional drawing

Option 1



Option 2



BM - TB limit switch box series

Nomenclature

BM N1 1 1 E - E 1 A 2 3 A 6

Box

BM = Proximity bolt switch
TB = Proximity bolt switch with integrated junction box

Switch

C4 = Magnetic SPDT hermetically sealed switch (suitable for Ex'ia')
N1 = Magnetic proximity SPDT hermetically sealed switch, silver plated snap acting contacts

Switch Quantity

1 = 1 switch or sensor
2 = 2 switches (for TB series only)

Terminals

A = Screw type terminals (for TB series)
1 = Flying leads (for BM series)

Coating

0 = Black polyester powder coating (for aluminium TB series)
E = Stainless steel finishing

Cable Entries

1 = 2 x 1/2" NPT cable entries (for TB series with 2 switches)
2 = 2 x M20 x 1.5p cable entries (for TB series with 2 switches)
E = 1 x M20 x 1.5p cable entry
D = 1 x 1/2" NPT cable entry

Visual Position Indicator

1 = No visual position indicator
6 = LED Indicator (available for UL approval only)

Approval*

W = Weather proof limit switch box
A = ATEX certified box
G = EAC certified box for Russian market, with RTN permit
U = UL certified box (available on BMC4 option)
X = ATEX IECEx certification

See additional information and options on page 13

Marking

0 = Standard location
1 = Certification marking: Ex II 2 GD Exia IIC (available for C4 switch option)
2 = Certification marking: Ex II 2GD Exd IIC
7 = CULUS Class1/2 Div1 (available on BMC4 option)
8 = CULUS Class1/2 Div 1/2 (available on BMC4 option)

See additional information and options on page 13

IP Protection rating

2 = Weather Proof 67 (available on TB series)
3 = Weather Proof IP66/68 (available on BM series)
6 = Subsea application up to -40 meters (available on BM series)**
7 = Nema 4 4X (available on BMC4 option)

Temperature

A = Ambient temperature range: -20 to +80 °C (-4 to +176 °F)
L = Ambient temperature range: -40 to +80 °C (-40 to +176 °F)

Material

6 = 316 stainless steel heavy duty enclosure
8 = 316 stainless steel with aluminium junction box (only for TB series)
3 = Aluminium (available for UL approval only)

* SIL2 and SIL3 available on request

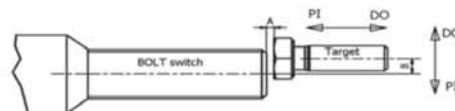
** Subsea cable with fast connector with standard length as follow: 5, 20, 40 mt

Sensing Distance Chart

Sensing Distance	Switch	Direction A [Values in mm]		Direction B [Values in mm]			
				Target distance: 2 mm		Target distance: 1 mm	
	BMN1	PI : Max 2	DO : 6	PI : 3	DO : 12	PI : 7	DO : 12
	BMC4	PI : 3,6	DO : 6	PI : 4	DO : 5	PI : 4,5	DO : 7
Frequency Range	BMN1	Max 30 Hz					
	BMC4	Max 100 Hz					
Response Time	BMN1	Single operation < 2ms		Operation in frequency (10÷30 Hz) < 1 ms			
	BMC4	2 ms					

Notes:

PI: Is the point where the switch first operates.
DO: Is the point where the switch is released.
PI & DO values refers to the distance between the 2 axis of BOLT switch and target.
Target distance refers to the distance between the 2 opposite faces of BOLT switch and target.
For BMN1 switch the maximum operating distance is 2 mm using a properly size ferrous target.
This distance may be increased using a magnetic target (optional).
BMC4 switch is supplied with its standard magnetic target.
Optional magnetic target to increase the sensing range of the switch are available. For any kind of request please contact SOLDI.



ES Easy limit switch box

Limit switch box created and engineered for manual valve application in explosionproof environments.

Features

- Proximity non-contact design
- Easy to install and simple to maintain
- Copper free aluminium or 316 stainless steel housing option for maximum corrosion protection
- Single or double cable entries options either metric or imperial
- Easy wiring through terminal PCB board
- Suitable for arctic environments

Approvals

ATEX, IECEX, EAC, INMETRO:

Ex II 2GD
Ex db IIC T6/T5/T4 Gb
Ex tb IIIC T85/T100/T120 °C Db
 $T_a = -65\text{ °C} \leq T_a \leq 105\text{ °C}$

UL:

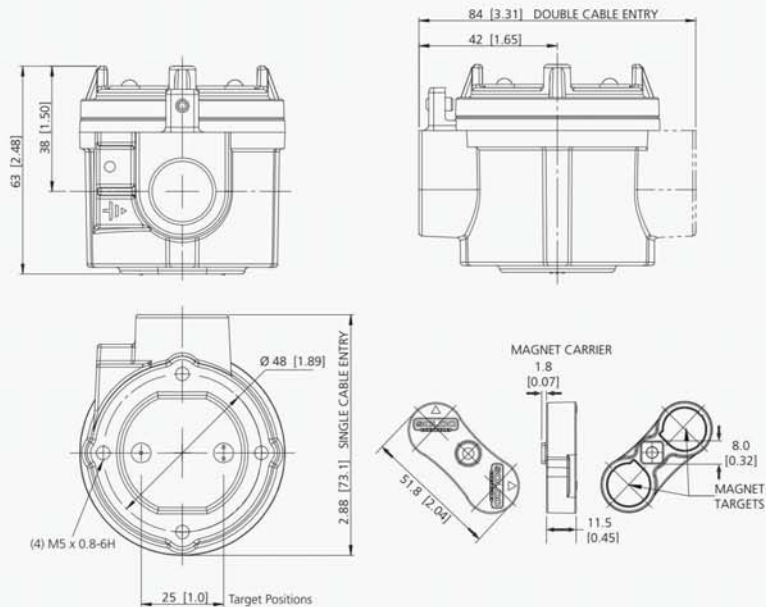
Class I, Division 1 and 2, Groups A, B, C and D
Class II, Division 1 Groups E, F and G
Class II Division 2, Groups F and G

SIL certificate: Up to SIL 2 approval on request

Protection rating: IP66 / 67
IP66 / 68 15 m for 70 hours
Nema 4 4X on request



ES Easy limit switch box



ES Easy limit switch box

Nomenclature

ES N1 2 0 0 - 1 1 X 2 1 A 4

Box

ES = Manual valve magnetic switch box

Switch

N1 = Snap acting, hermetically sealed, silver contacts SPDT switch, rating max

N3 = Snap acting, hermetically sealed, gold contacts SPDT switch, rating max

C4 = Inert gas hermetically sealed, rhodium contacts SPDT switch, rating max

See additional information and options on pages 14-19

Switch Quantity

2 = Quantity of switch

Terminals

0 = Screw Terminal Strips

Coating

0 = Black powder coating

E = Electro polish finishing

Cable Entries

1 = 2 x 1/2" NPT cable entries

2 = 2 x M20 x 1.5p cable entries

D = 1 x 1/2" NPT cable entry (standard option)

E = 1 x M20 x 1.5p cable entry

Visual Position Indicator

1 = No Visual Position Indicator

Approval

U = UL certification

S = UL certification with SIL2 approval

X = ATEX and IECEx certification

D = ATEX and IECEx certification with SIL2 approval

See additional information and options on page 13

Marking

2 = Certification marking: Ex II 2GD Exd IIC

See additional information and options on page 13

IP Protection rating

1 = IP66 / 67 (standard option)

2 = IP66 / 68 15 m for 70 hours

Temperature

A = Ambient temperature range: -20 to +80 °C (-4 to +176 °F) standard

L = Ambient temperature range: -40 to +80 °C (-40 to +176 °F)

P = Ambient temperature range: -60 to +80 °C (-76 to +176 °F) for switch code C4

Material

4 = Copper free aluminium body and cover

6 = 316 stainless steel body and cover

Mounting Kits

The Rotork Instruments KN and KNC mounting kit series have been designed to mount almost any device on a NAMUR pattern actuator.

KN and KNC mounting kits are made from AISI 304 stainless steel to provide a reliable solution to install your ISO F05 drilled device to complete the automated valve package.

NAMUR pattern VDI / VDE 3845	KN	KNC	KN07
30 x 80 pinion height 20 mm	01	01	OK
30 x 130 pinion height 30 mm	02	02	OK
30 x 80 pinion height 30 mm	03	03	OK
30 x 130 pinion height 50 mm	04	04	OK
30 x 80 pinion height 40 mm	05	—	OK
30 x 130 pinion height 40 mm	—	05	OK
25 x 50 pinion height 20 mm	—	32	—
Mounting kit dedicated to all Soldo limit switch box series (excluding SP, SM series)			—
Adjustable mounting kit dedicated to SK and SQ series only	—	—	

Mounting Kits

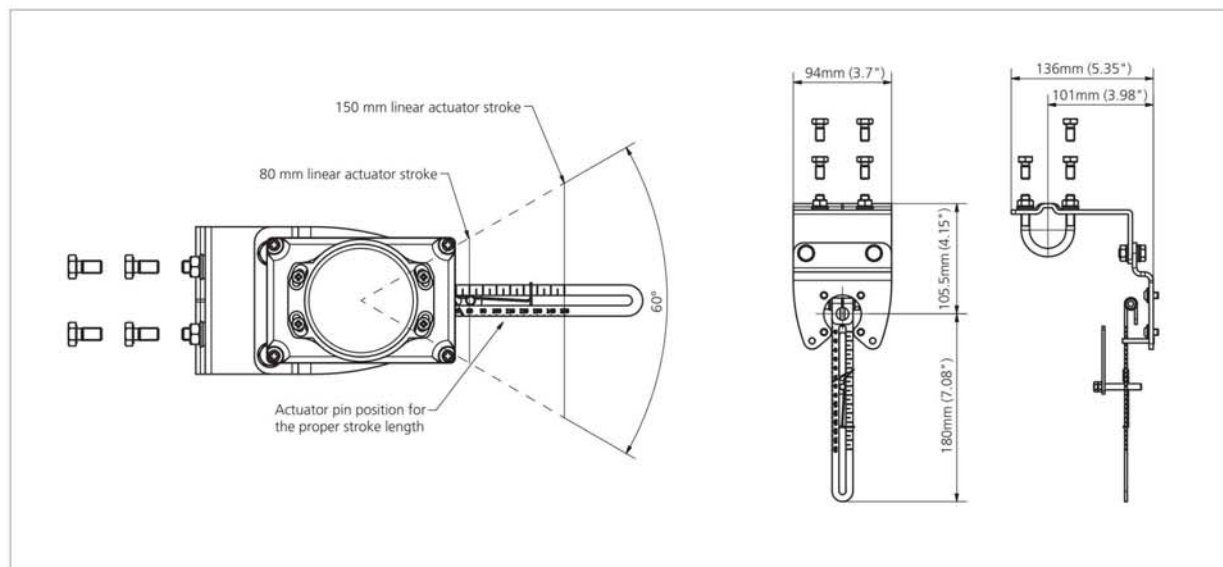
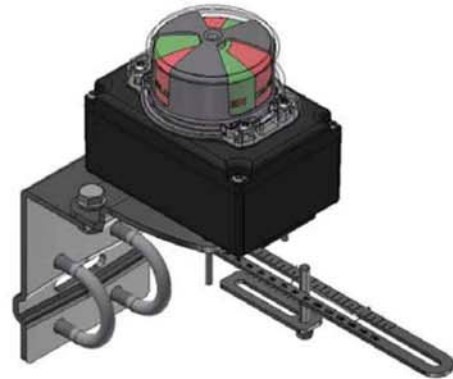
Linear Mounting Kit

Linear diaphragm and piston actuators have always been problematic to mount, often requiring external switches to indicate position, therefore losing the flexibility and benefits of a limit switch box.

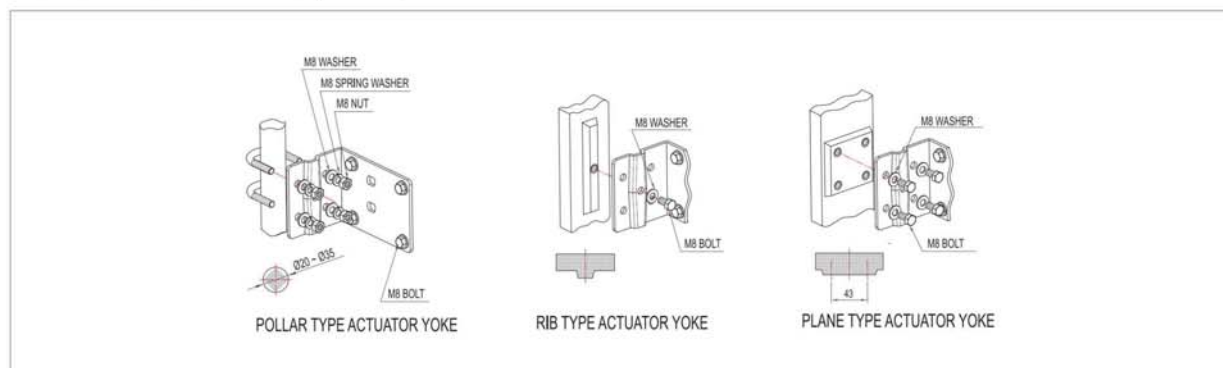
With the new linear universal mounting kit, Rotork Instruments provides a proven system to fit every limit switch box in our range to a linear valve from 20 up to 250 mm stroke with two different kit layouts: 20-150 mm stroke; 100-250 mm stroke.

The mounting kit includes a specific position dome indicator, perfectly showing the open/close position status.

The graduated lever system, combined with the remote pin connection, offers great flexibility to fit a huge variety of systems and offers precise adjustment on the go.



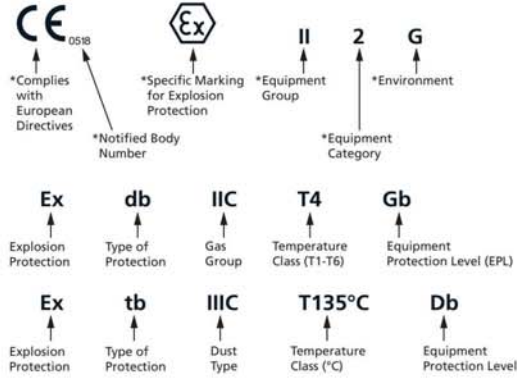
Actuator Mount Patterns Compatibility



Appendix A: Equipment Certification Requirements for Hazardous Locations

ATEX & IECEx

Typical ATEX & IECEx Marking [*ATEX only]

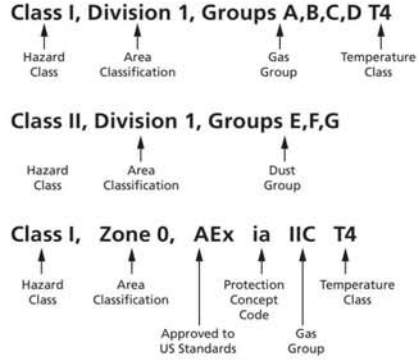


Protection Concepts

Type of Protection	Symbol	Typical IEC EPL	Typical Zone(s)	IEC Standard	Basic Concept of Protection
Electrical Equipment for Gases, Vapours and Mists (G)					
General Requirements	-	-	-	IEC 60079-0	-
Optical Radiation	Op pr Op sh Op is	Gb Ga Ga	1, 2 0, 1, 2 0, 1, 2	IEC 60079-28	Protection against ignitions from optical radiation
Increased Safety	eb ec	Gb Gc	1, 2 2	IEC 60079-7	No arcs, sparks or hot surfaces. Enclosure IP54 or better
Type 'n' (non-sparking)	nA	Gc	2	IEC 60079-15	
Flameproof	da db dc	Ga Gb Gc	0, 1, 2 1, 2 2	IEC 60079-1	Contain the explosion, quench the flame
Type 'n' (enclosed break)	nC	Gc	2	IEC 60079-15	
Quartz / Sand Filled	q	Gb	1, 2	IEC 60079-5	Quench the flame
Intrinsic Safety	ia ib ic	Ga Gb Gc	0, 1, 2 1, 2 2	IEC 60079-11	Limit the energy of sparks and surface temperatures
Type 'n' (sealing & hermetic sealing)	nC	Gc	2	IEC 60079-15	
Type 'n' (restricted breathing)	nR	Gc	2	IEC 60079-15	Keep the flammable gas out
Encapsulation	ma mb mc	Ga Gb Gc	0, 1, 2 1, 2 2	IEC 60079-18	
Electrical Equipment for Combustible Dusts (D)					
General Requirements	-	-	-	IEC 60079-0	-
Optical Radiation	Op pr Op sh Op is	Db Da Da	21, 22 20, 21, 22 20, 21, 22	IEC 60079-28	Protection against ignitions from optical radiation
Enclosure	ta tb tc	Da Db Dc	20, 21, 22 21, 22 22	IEC 60079-31	Standard protection for dusts, rugged tight enclosure
Intrinsic Safety	ia ib ic	Da Db Dc	20, 21, 22 21, 22 22	IEC 60079-11	Limit the energy of sparks and surface temperatures
Encapsulation	ma mb mc	Da Db Dc	20, 21, 22 21, 22 22	IEC 60079-18	Protection by encapsulation of incandescent parts
Electrical Equipment for Combustible Dusts (D)					
General Requirements	-	-	-	EN 13463-1	Low potential energy
	h	Ga, Gb, Gc Da, Db, Dc	0, 1, 2 20, 21, 22	IEC 80079-36	
Flow Restricted Enclosure	fr	-	-	EN 13463-2	Relies on tight seals, closely matched joints and tough enclosures to restrict the breathing of the enclosure
Flameproof Enclosure	d	-	-	EN 13463-3	
Constructional Safety	c	-	0, 1, 2 20, 21, 22	EN 13463-5	Ignition hazards eliminated by good engineering methods
	h	Ga, Gb, Gc Da, Db, Dc	0, 1, 2 20, 21, 22	IEC 80079-37	
Control of Ignition Source	b	-	-	EN 13463-6	Control equipment fitted to detect malfunctions
	h	Ga, Gb, Gc Da, Db, Dc	0, 1, 2 20, 21, 22	IEC 80079-37	

cCS Aus

Typical North American Marking (CSA)

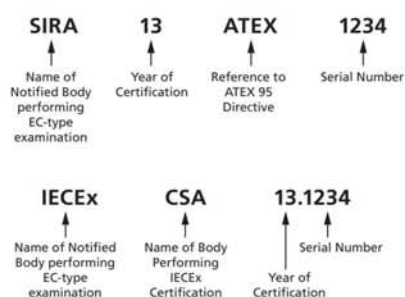


Protection Concepts

Type of Protection	Code	Country	Class	Division / Zone	Standard	Basic Concept of Protection
Electrical Equipment for Flammable Gas, Vapors and Mists - Class I						
General Requirements	AEx Ex	US CA US CA	Class I Class I Class I Class I	Division 1 & 2 Division 1 & 2 Zone 1 & 2 Zone 1 & 2	FM 3600 - ISA 60079-0 CSA 60079-0	
Increased Safety	AEx e Ex e	US CA	Class I Class I	Zone 1 Zone 1	ISA 60079-7 CSA C22.2 No. 60079-7	No arcs, sparks or hot surfaces
Non-Incendive	(NI) (NI)	US CA	Class I Class I	Division 2 Division 2	ISA 12.12.01 / FM 3611 C22.2 No. 213	
Non-Sparking	AEx nA Ex nA	US CA	Class I Class I	Zone 2 Zone 2	ISA 60079-15 CSA C22.2 No. 60079-15	
Explosion Proof	(XP) (XP)	US CA	Class I Class I	Division 1 Division 1	UL 1203 / FM 3615 C22.2 No. 30	Contain the explosion and extinguish the flame
Flameproof	AEx d Ex d	US CA	Class I Class I	Zone 1 Zone 1	ISA 60079-1 UL 1203 / FM 3615 CSA 60079-1	
Enclosed Break	AEx nC Ex nC	US CA	Class I Class I	Zone 2 Zone 2	ISA 60079-15 CSA C22.2 No. 60079-15	
Intrinsic Safety	(IS) (IS) AEx ia AEx ib EX ia EX ib	US CA US CA US CA	Class I Class I Class I Class I Class I Class I	Division 1 Division 1 Zone 0 Zone 1 Zone 0 Zone 1	UL 913 / FM 3610 C22.2 No. 157 ISA 60079-11 / FM 3610 ISA 60079-11 / FM 3610 CSA C22.2 No. 60079-11 CSA C22.2 No. 60079-11	Limit energy of sparks and surface temperature
Limited Energy	AEx nC Ex nC	US CA	Class I Class I	Zone 2 Zone 2	ISA 60079-15 CSA C22.2 No. 60079-15	
Restricted Breathing	AEx nR Ex nR	US CA	Class I Class I	Zone 2 Zone 2	ISA 60079-15 CSA C22.2 No. 60079-15	Keep flammable gas out
Encapsulated	AEx ma AEx m Ex m AEx mb	US US CA US	Class I Class I Class I Class I	Zone 0 Zone 1 Zone 1 Zone 1	ISA 60079-18 ISA 60079-18 CSA C22.2 No. 60079-18 ISA 60079-18	
Electrical Equipment for Flammable Gas, Vapors and Mists - Class I						
General Requirements	Ex	US CA US CA US	Class II Class II Class II Class II Class II	Division 1 & 2 Division 1 & 2 Division 1 & 2 Division 1 & 2 Zone 20, 21, 22	FM 3600 CSA C22.2 No.0 FM 3600 CSA C22.2 No.0 ISA 60079-0	
Dust Ignition Proof	-	US CA	Class II Class II	Division 1 Division 1	UL 1203 / FM 3616 CSA C22.2 No. 25	
Dust Protected	-	US CA	Class II Class II	Division 2 Division 2	ISA 12.12.01 / FM 3611 CSA C22.2 No. 25	
Protection by Enclosure	AEx ta AEx tb AEx tc Ex ta Ex tb Ex tc	US US US CA CA CA	Class II Class II Class II Class II Class II Class II	Zone 20 Zone 21 Zone 22 Zone 20 Zone 21 Zone 22	ISA 60079-31 ISA 60079-31 ISA 60079-31 CSA C22.2 No. 60079-31 CSA C22.2 No. 60079-31 CSA C22.2 No. 60079-31	Keep combustible dust out
Encapsulation	AEx maD AEx mbD	US US	Class II Class II	Zone 20 Zone 21	ISA 60079-18 ISA 60079-18	
Intrinsic Safety	(IS) (IS) AEx iaD AEx ibD (IS) (IS)	US CA US US US CA	Class II Class II Class II Class II Class II Class II	Division 1 Division 1 Zone 20 Zone 21 Division 1 Division 1	UL 913 / FM 3610 CSA C22.2 No. 157 ISA 60079-11 ISA 60079-11 UL 913 / FM 3610 CSA C22.2 No. 157	Limit energy of sparks and surface temperature

Appendix A: Equipment Certification Requirements for Hazardous Locations

ATEX & IECEx Certificate Number



Suffixes: U – component certification
 X – special conditions for safe use apply

Apparatus Groups [ATEX and IECEx]

Group	Environment	Location	Typical Substance
I		Coal Mining	Methane (Fire damp)
IIA	Gases, Vapours	Surface and other locations	Acetic acid, Acetone, Ammonia, Butane, Cyclohexane, Gasoline (petrol), Kerosene, Methane (natural gas) (non-mining), Methanol (methyl alcohol), Propane, Propan-2-ol (iso-propyl alcohol), Toluene, Xylene
IIB			Di-ethyl ether, Ethylene, Methyl ethyl ketone (MEK), Propan-1-ol (n-propyl alcohol), Ethanol (ethyl alcohol)
IIC			Acetylene, Hydrogen, Carbon disulphide
IIIA	Combustible Dusts	Surface and other locations	Combustible flyings
IIIB			Non-conductive
IIIC			Conductive

Apparatus Groups (US / CAN)

Substance	Hazard Class	NEC 500	NEC 505
Acetylene	Class I Flammable Gases	Group A	IIC
Hydrogen		Group B	IIC
Ethylene		Group C	IIB
Propane		Group D	IIA
Methane (mining)	Class II Combustible Dusts	Group D	-
Combustible Metal Dusts		Group E	-
Combustible Carbonaceous Dusts		Group F	-
Combustible Dusts not in Group E or F (Flour, Grain, Wood, Plastics, Chemicals)		Group G	-
Combustible Fibers and Flyings	Class III Fibers and Flyings	-	-

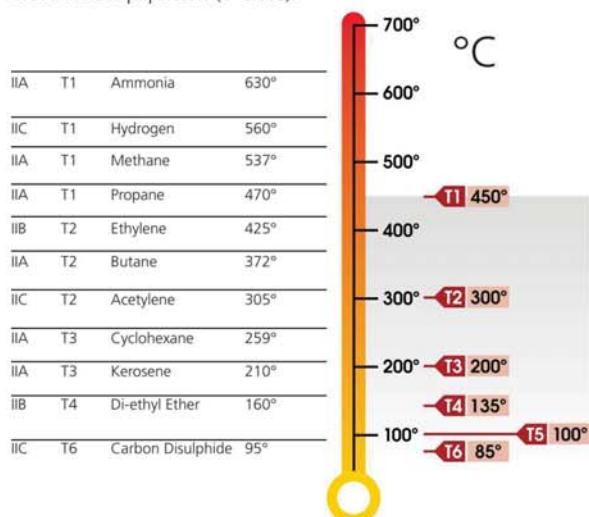
Classification of Divisions and Zones

Type of Area	NEC and CEC*	ATEX and IEC	Definitions
Continuous hazard	Division 1	Zone 0 / Zone 20 Cat 1	A place in which an explosive atmosphere is continuously present
Intermittent hazard	Division 1	Zone 1 / Zone 21 Cat 2	A place in which an explosive atmosphere is likely to occur in normal operation
Hazard under abnormal conditions	Division 2	Zone 2 / Zone 22 Cat 3	A place in which an explosive atmosphere is not likely to occur in normal operation, but may occur for short periods

* On occasion the ATEX and IEC Zones may be used in the corresponding NEC and CEC system

Temperature Classification

Classification of maximum surface temperatures for Group II Electronic Equipment (T Class).



Dusts Typical Ignition Temperatures

Dusts	Cloud	Layer
Aluminium	590 °C (1,094 °F)	>450 °C (842 °F)
Coal dust (lignite)	380 °C (716 °F)	225 °C (437 °F)
Flour	490 °C (914 °F)	340 °C (644 °F)
Grain dust	510 °C (950 °F)	300 °C (572 °F)
Methyl cellulose	420 °C (788 °F)	320 °C (608 °F)
Phenolic resin	530 °C (986 °F)	>450 °C (842 °F)
Polythene	420 °C (788 °F)	(melts) °C
PVC	700 °C (1,292 °F)	>450 °C (842 °F)
Soot	810 °C (1,490 °F)	570 °C (1,058 °F)
Starch	460 °C (860 °F)	435 °C (815 °F)
Sugar	490 °C (914 °F)	460 °C (860 °F)

Ingress Protection Codes

First Number (protect from solid bodies)		Second Number (protect from water)	
0	No protection	0	No protection
1	Objects > 50mm	1	Vertical drip
2	Objects > 12.5mm	2	Angled drip
3	Objects > 2.5mm	3	Spraying
4	Objects > 1.0mm	4	Splashing
5	Dust-protected	5	Jetting
6	Dust-tight	6	Powerful jetting
		7	Temporary immersion
		8	Continuous immersion

Enclosure Type Ratings (NEMA / CSA / UL)

Type	Area	Brief Definition
1	Indoor	General purpose
2	Indoor	Protection against angled dripping water
3, 3R, 3S	Indoor / Outdoor	Protection against rain, snow
4, 4X	Indoor / Outdoor	Protection against rain, snow, hose directed water
5	Indoor	Protection against angled dripping water, dust, fibers, flyings
6	Indoor / Outdoor	Protection against temporary submersion
6P	Indoor / Outdoor	Protection against prolonged submersion
12, 12K	Indoor	Protection against circulating dust, fibers, flyings
13	Indoor	Protection against circulating dust, fibers, flyings, seepage

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