命名方式

SW-SY	xx	x	x	x	-	x	x	x	x	x	x	x	x	x	xx
系列	开关类型	开关数量	端子	涂层		电缆接口	指示器	认证	标志	IP	温度范围	材质	线圈容量	气连接	特殊配置

请先阅读本手册

为了避免严重或致命的人员伤亡，或重大财产损失，请务必阅读本手册内所有的安全说明，并始终保留本手册. 如果您需要额外的帮助, 请联系 Rotork YTC Limited。

安全说明，适用于危险区域内安装:

Soldo® 限位开关盒型号 SW (SY) 是阀位位置指示设备（用于指示阀门全开或全关位置)。

根据ATEX 2014/34/EU 指令设计制造，满 EN IEC 60079–0: 2018, EN 60079–1: 2014，EN 60079–31: 2014 标准。同时也根据IECEx 指令设计制造，满足GB/T 3836.1–2021 –IEC 60079–0: 2017, GB/T 3836–2–2021 – IEC 60079–1:2014–06 Ed.7, GB/T 3836–31–2021 – IEC 60079–31:2013 Ed.2 标准。
“ATEX” 是法语 “ATmosphere Explosive”, 的缩写，它为用于潜在爆炸性环境的设备提供了相关的技术要求。该指令有效地消除了欧盟成员国之间的技术壁垒. SW (SY) 限位开关盒必须按照适用的潜在爆炸性环境的电气应用标准进行安装和维护(例如：EN 60079–14, EN60079–17, EN50281–1–2及其他国家标准)。
请事先阅读并长期保留本安全手册。

型号选配 SW (SY)_ _ _ _ _(_表示壳体、开关、开关数量、端子排、颜色的各类选配)。
本手册涉及到满足如下认证的限位开关盒：及IECEx 认证编号 IECEx SIR 14.0038X。

1. 限位开关盒 SW (SY) 可安装在存有爆炸性气体、蒸汽、薄雾的危险环境。

Ex db IIC T4…T6 Gb
Ex tb IIIC T140℃/T110℃/T110℃ Db

这表示: (ATEX 标志) – group II (潜在爆炸性环境 — 除矿井以外的地上环境) – Ex d → 保护方式：隔爆型, IIC → 定义气体类别。

	存在爆炸性气体的危险区域对应的温度等级	存在爆炸性粉尘的危险性区域对应的表面温度
T6	$-60^{\circ}C \le T_{amb} \le +60^{\circ}C$	110°C
T5	$-60^{\circ}C \le T_{amb} \le +80^{\circ}C$	110°C
T4	$-60^{\circ}C \le T_{amb} \le +105^{\circ}C$	140°C

表 1

2. 应由接受过适当培训的人员按照适用规范进行安装。
3. 应以至少 15 Nm 的扭矩拧紧端盖。
4. 用户不得维修该设备。
5. 对应环境温度低于 –10°C 及高于 70°C，请使用满足最低及最高环境温度的电缆进行现场接线。
6. 用户应提供合适的限热方式限制来自于阀门的热量。最大环境温度不应大于标注在设备上的温度范围 (+60°C, +80°C, +105°C, 根据实际情况应用) 见表 1。
7. 电气设备必须通过接地连接进行接地。接地连接需满足 ATEX 认证，且与应用要求、材料、最大表面温度和环境温度相匹配。
8. 接地连接设计为防旋转，且提供了不锈钢螺栓和弹簧垫圈，以防止震动。该连接必须采用合适的接线端头。例如铜制环型或叉型接线端子。
9. 必须使用湿布对限位开关盒进行清洁，以防止静电积聚。用户应确保定期清洁，尤其针对可以存灰的地方，以防止灰尘堆积超过 50 mm (认证中含X标志)。
10. 用户需确保设备在维护后的安全性能。
11. 如果设备有可能接触腐蚀性物质，用户需确保采取相应的预防措施防止产生副作用，以导致保护的失效。腐蚀性物质: 例如可能影响金属的酸性液体、气体。
12. 合金外壳，在极少数情况下，由于碰撞或摩擦（可能产生火花）可能会引起点火源。当接线盒安装在II类 2G/D区域时应考虑该情况的发生。
13. 若没有安装垫片，当螺栓完全紧固在外壳盲孔内，在螺栓孔底应保证至少有一圈螺纹的空间。指示器盖螺栓其螺纹的最大长度 3mm，紧固螺栓满足 ISO 标准，最大螺纹长度 8mm。
14. 在安装前拆除外壳上的塑料堵头或塑料贴纸，这些部件没有相关认证。所有电缆接口需安装对应的防爆型堵头或转接头。“db” 和“tb” 适用于 ATEX 区域。
15. 注意: 对于特殊情况和安全使用，请参考如下的 ATEX 和 IECEx 认证说明。

用于潜在爆炸性环境的设备或保护系统”的规定, 满足IECEx 标准以及其他相关执行法规及适用的协调标准

GB 3836.1–2021 – IEC 60079–0:2017
GB/T 3836–2–2021 – IEC 60079–1:2014–06 Ed.7
GB/T 3836–31–2021 – IEC 60079–31:2013 Ed.2

2014/30/EU电磁兼容性指令
EN 61326–1:2013
2014/35/UE低压指令
EN 60529:1991/A2:2013 EN 60730–1:2011

IECEx 认证
IECEx SIR 14.0038X

生产质量保证证书
IECEx: GB/ITS/QAR09.0004

Soldo 限位开关盒型号SW (SY) 也可根据要求提供以下认证:
Gost 认证
IEx 认证
NEPSI 认证
CCOE 认证

⚠ **警告!** 危险警告，可能导致严重或致命的人员伤亡，或重大财产损害。危险电压。在维修设备前，请断开所有电源。
通电时请勿拆卸端盖。
请勿在爆炸性环境内打开。

⚠ **注意!**
请勿超过限位开关的行程限制。超过限制可能会损坏限位开关、执行器和阀门。
开关盒标配所提供的堵头仅用于运输使用。IP67的防护等级取决于电缆格兰和接线方式。限位开关盒适用于角行程阀门(90° 旋转)。
最大轴向角速度为250 rpm。
将限位开关盒投入使用前，请确保开关及指示器调整完毕。

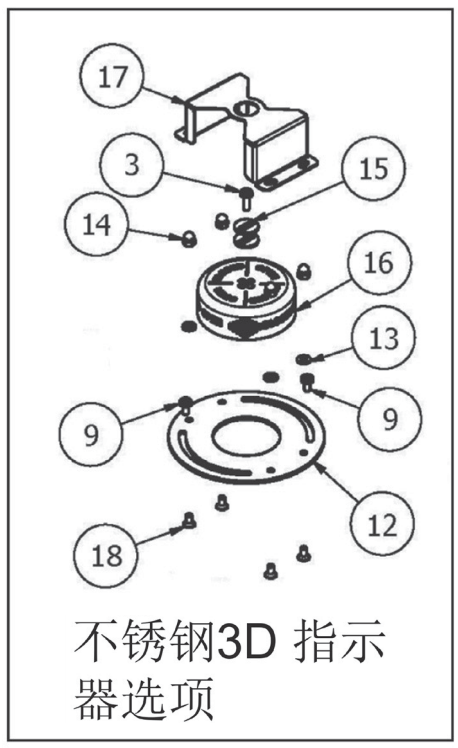
1 安装
1.1 通过四个M6X8 螺栓 (2) 将合适的安装支架 (1) 安装到开关盒上。
1.2 将执行器输出轴与轴 (5) 对准并啮合。
1.3 通过所提供的螺栓 (3) 将支架与执行器固定。

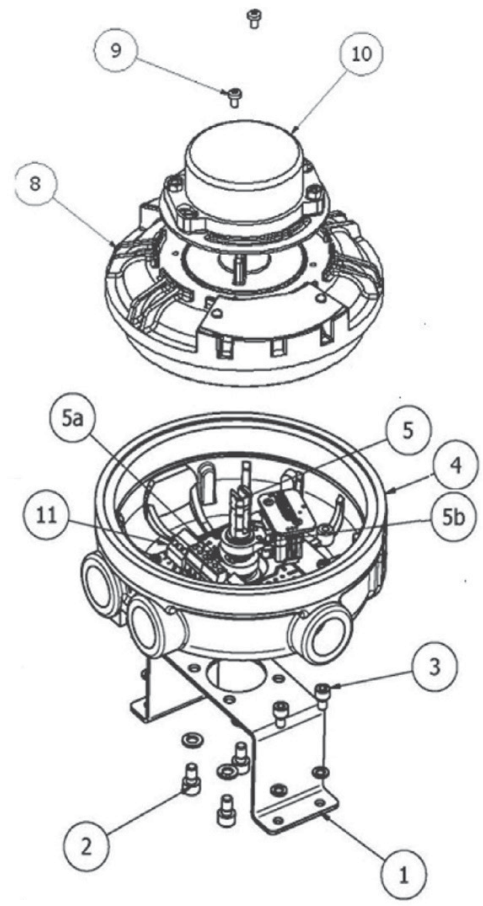
2 调整开关
2.1 松开端盖 (8) 螺栓使其自由旋转。
2.2 逆时针旋转端盖 (8) 直到壳体完全打开，然后拆卸下端盖 (8) 。
2.3 按照 下面的“凸轮调整”进行。
2.4 带有3–4个开关的开关盒，将执行器设定至需要信号的位置，并根据 “凸轮调整”设定开关3和4的凸轮。
2.5 在装回端盖前:
– 清理螺纹上可能存在的障碍（灰尘、石屑），避免合上时造成卡涩。
– 检查螺纹上的润滑脂或直接添加 (NYE LUBRICANTS, NYOGEL 760G 适用温度 –40°C 值 +110°C – NYE LUBRICANTS UNIFLOR 8512R 适用于 –65°C 至 –45°C)。
2.6 装回端盖 (8) ，请注意轴 (5) 与端盖轴匹配完好。警告：请检查密封圈在凹槽安装到位。
2.7 手动将端盖 (8) 顺时针旋转到壳体 (4) 上，直到两部分完全紧固。紧固埋头螺栓(19防反转) 以防止松脱.

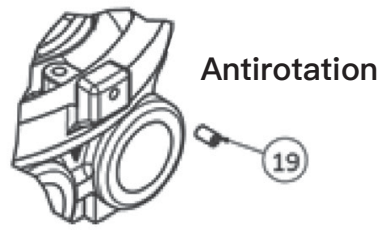
3 3D 指示器设定
3.1 在限位开关盒端盖 (8) 紧固在壳体上时，将两个螺栓 (9) 松开并提起不锈钢法兰 (12)。
3.2 旋转透明的聚碳酸酯端盖 (10) 或 3D 不锈钢执行器端盖 (17) 直到开关位置与阀位匹配。可顺时针或逆时针旋转。
3.3 将两个螺栓 (9) 紧固至壳体 (8).

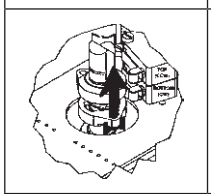
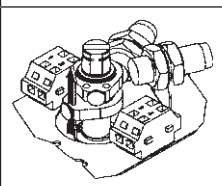
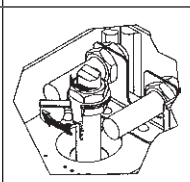
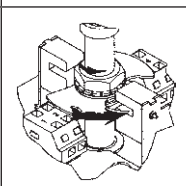
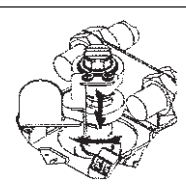
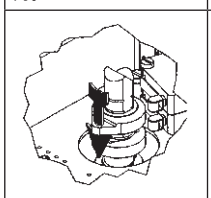
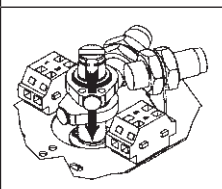
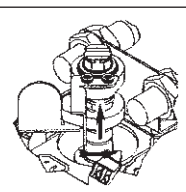
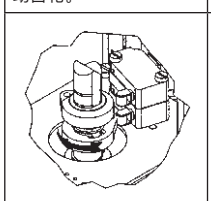
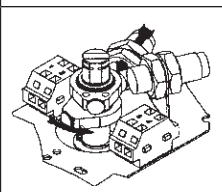
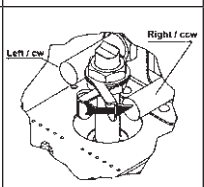
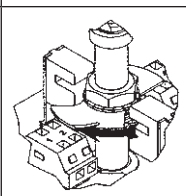
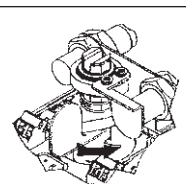
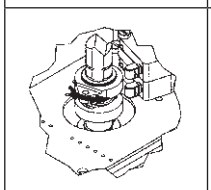
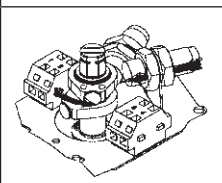
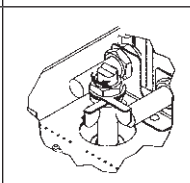
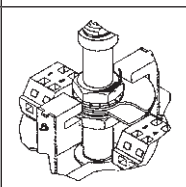
4 电气连接
4.1 参照2.1和2.2拆卸端盖 (8)。
4.2 卸下电缆接口上的堵头并更换成合适的电缆格兰或堵头。
4.3 根据限位开关盒上的接线图连接端子 (11)。
4.4 参照 2.5 和 2.6 装回端盖 (8)。
4.5 用 0,45 ÷ 0,6Nm 力矩紧固端子螺栓。

5 产品储存
5.1 开关盒应远离紫外线及大气臭氧，环境温度 0°C – 40°C。







凸轮调整 / 凸轮类型				
A	**B**	**C**	**D**	**E**
1. 顺时针旋转执行器传动齿轮。	**1.** 顺时针旋转执行器传动齿轮。	**1.** 顺时针旋转执行器传动齿轮。	**1.** 顺时针旋转执行器传动齿轮。	**1.** 将凸轮从齿轮套筒中脱离至 45° 位置。
				
2. 将凸轮脱离齿轮套筒。	**2.** 将凸轮脱离齿轮套筒。	**2.** 松开 (使用 19 扳手) 顶轴螺母。	**2.** 松开 (使用 19 扳手) 顶轴螺母。	**2.** 啮合齿轮套筒并顺时针旋转执行器传动齿轮。
				
3. 继续旋转直到开关被激活，然后将凸轮放回齿轮套筒。	**3.** 继续旋转直到开关被激活，然后将凸轮放回齿轮套筒。通过调节凸轮与感应传感器之间的距离调整灵敏度。	**3.** 将凸轮旋转至传感器前。	**3.** 将凸轮旋转至传感器前。	**3.** 将凸轮脱离齿轮套筒并旋转凸轮至传感器前。 **4.** 然后将凸轮与挡圈重新啮合。
4. 逆时针旋转执行器传动齿轮。	**4.** 逆时针旋转执行器传动齿轮。	**4.** 逆时针旋转执行器传动齿轮。	**4.** 逆时针旋转执行器传动齿轮。	**5.** 逆时针旋转执行器传动齿轮。
				
5. 将凸轮脱离齿轮套筒。	**5.** 将凸轮脱离齿轮套筒。	**5.** 将凸轮旋转至传感器前。	**5.** 将凸轮旋转至传感器前。	**6.** 将凸轮脱离齿轮套筒并旋转凸轮至传感器前，然后将凸轮 与挡圈重新啮合。
				
6. 按图示旋转直到开关被激活，然后将凸轮放回齿轮套筒。	**6.** 继续旋转直到开关被激活，然后将凸轮放回齿轮套筒。通过调节凸轮与感应传感器之间的距离调整灵敏度。	**6.** 紧固 (使用 19 扳手) 顶轴螺母。	**6.** 紧固 (使用 19 扳手) 顶轴螺母。	**7.** ⚠ **注意:** 请确保凸轮与传感器没有接触，否则可能造成 损坏。

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NOMENCLATURE

SW-SY	xx	x	x	x	-	x	x	x	x	x	x	x	x	x	xx
Series	Type of Switches	Quantity of switches	Terminals	Painting		Cable entry	Indicator	Approval	Marking	IP	Temp. range	Material and sov	Coil rating	Pneumatic connection	Special execution

READ THIS INSTRUCTION FIRST

To avoid serious or fatal personal injury or major property damage, read and follow all safety instructions in this manual. If you require additional instructions, please contact Rotork YTC Limited.

Safety instructions for hazardous area installation:

Soldo® limit switch box model SW (SY) are valve position indication devices (indication of valve open or close).

Projected and built according to directive ATEX 2014/34/EU with reference to standard EN 60079-0: 2018, EN 60079-1: 2014, EN 60079-31: 2014 and to directive IECEx with reference to standard GB/T 3836.1-2021 -IEC 60079-0: 2017, GB/T 3836-2-2021, IEC 60079-1: 2014-06 Ed.7, GB/T 3836-31-2021, IEC 60079-31: 2013 Ed.2.
"ATEX" by the French "ATmosphere Explosive", provides the technical requirements to be applied to equipment intended for use in potentially explosive atmospheres. The scope of directive is to remove technical barriers between Member State of European Community. The SW (SY) limit switch boxes device must be installed and maintained according to suitable standards for electrical application in potentially explosive atmospheres (example: EN 60079-14, EN60079-17, EN50281-1-2 or other national standards).
Read this first and keep this instruction manual always available.

Model option SW (SY)_ _ _ _ _ (_indicates options in housing configuration, switches, switches quantity, terminal strip, colour). This instruction refers to certified limit switch boxes covered by the certificate number IECEx SIR 14.0038X.

1. Limit switch box SW (SY) may be installed in hazardous areas where explosive gas, steam, and mist exist.

Ex db IIC T4...T6 Gb
Ex tb IIIC T110°C/T110°C/T140°C Db

It means: (European community logo for ATEX applications) - group II (potentially explosive atmospheres – surface application OTHER than mines) - Ex d → Protection mode: flameproof type, IIC → defines the gas category.

	Temp. Class for hazardous location due to presence of hazardous gas	Superficial temp. for hazardous location due to presence of hazardous powder
T6	-60°C ≤ T_{amb} ≤ +60°C	110°C
T5	-60°C ≤ T_{amb} ≤ +80°C	110°C
T4	-60°C ≤ T_{amb} ≤ +105°C	140°C

Table 1

2. Suitably trained personnel shall carry out installation according with applicable code of practice.
3. Cover must be tightened with a torque of at least 15 Nm.
4. The user should not repair this equipment.
5. For ambient temperatures below -10°C and above 70°C use field wiring suitable for both minimum and maximum ambient temperature.
6. The user should provide suitable systems to limit heating coming from valve; max ambient temp should be no higher than the ambient marked on the equipment (+60°C, +80°C, +105°C, as applicable) as per Table 1.
7. The electrical devices must be grounded using their grounding connections. The grounding connection must be Atex certified, suitable for the application required, substances, maximum superficial temperature and ambient temperature.
8. Grounding connection has been designed to be anti-rotation and it is provided with a screw and grower washer in stainless steel to be anti-vibration. Suitable cable lugs have to be used for this connection. For example ring, fork wire terminal in copper or equivalent.
9. Cleaning the limit switch box must be done with a moist cloth to prevent build up of electrostatic charges. The user should guarantee periodic cleaning of the places where dust can accumulate to avoid that dust layer exceeds 50 mm (Symbol X into certificate).
10. The user shall ensure that maintenance does not affect the safety features of the equipment.
11. If the equipment is likely to come in to contact with aggressive substances, it is the responsibility of the user to take suitable precautions that prevent it from being adversely affected, thus ensuring that the type of protection is not compromised. Aggressive substances: example Acids, liquids, gases which can affect metals.
12. The metallic alloy used for the enclosure, in the event of a rare accident, could cause ignition sources due to impact or friction (sparks may occur). This shall be considered when the box is installed in group II category 2G/D areas.
13. When screws are fully tightened into blind holes in enclosure walls, with no washer fitted, at least one full thread shall remain free at the base of the hole, for indicator cover (12) the max length of the screw under head shall be 7mm, while to fix the box with ISO standard the max length of the screw under head shall be 8mm.
14. Remove plastic plugs or plastic stickers supplied with enclosure before installation, these components aren't certified. All cables entry devices and blanking elements shall be certified as explosion protection flameproof type. "d" and "tb" are suitable for use in ATEX areas when correctly installed.
15. **ATTENTION:** Please refer to the ATEX and IECEx Certificates for special conditions and for safe use.

Equipment or protective systems intended for use in potentially explosive atmospheres, with IECEx rules and with national implementing legislation and that appropriate harmonized standards have been applied:

GB/T 3836.1-2021 - IEC 60079-0: 2017
GB/T 3836.2-2021 - IEC 60079-1:2014-06 Ed.7
GB/T 3836.31-2021 - IEC 60079-31:2013 Ed.2

2014/30/EU Electromagnetic compatibility
EN 61326-1:2013
2014/35/UE Low voltage
EN 60529:1991/A2:2013 EN 60730-1:2011

IECEx conformity certificate
IECEx SIR 14.0038X

Production quality assurance notification
IECEx: GB/ITS/QAR09.0004

Soldo limit switch boxes models SW (SY) are also available, on request, with the following certifications Gost conformity certificate
IEx conformity certificate
NEPSI conformity certificate
CCOE conformity certificate

⚠ **WARNING!** Warns of hazard that MAY cause serious personal injury, death or major property damage. HAZARDOUS VOLTAGE. Disconnect all power before servicing equipment. DO NOT REMOVE COVER WHEN ENERGISED.
DO NOT OPEN WHEN AN EXPLOSIVE ATMOSPHERE IS PRESENT.

⚠ **CAUTION:**
Do not exceed the limit switch performance limitation. Exceeding the limitation may cause damage to the limit switch, actuator and valve. The conduit plug supplied with the switch boxes are for transit purposes only. IP67 protection depends on cable gland and cabling methods used. Limit switchbox for quarter-turn valve device (90° rotation). Maximum shaft angular velocity 250 rpm. Follow switch adjustment & indicator setting before servicing the limit switch box.

1 INSTALLATION
1.1 Attach proper mounting bracket (1) to the box (4) housing using four M6x8 bolts (2).
1.2 Align shaft (5) to actuator shaft and engage it.
1.3 Attach bracket to actuator using hardware provided (3).

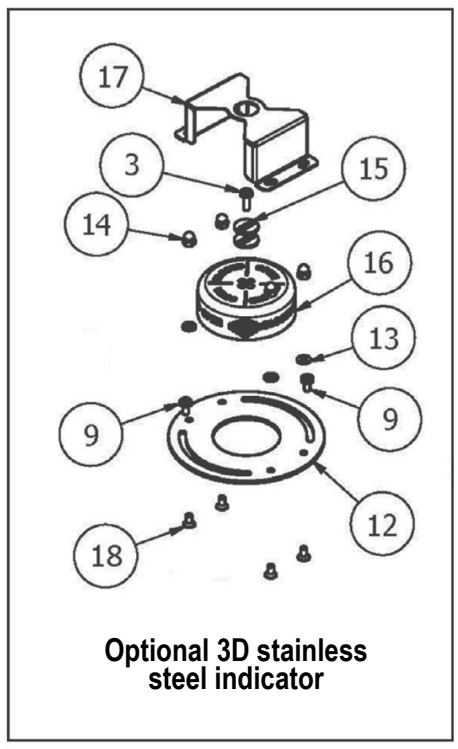
2 SWITCH ADJUSTMENT
2.1 Loosen the screws to allow free cover (8) rotation.
2.2 Counter clockwise rotate cover (8) until complete unit opening and then remove cover (8).
2.3 Follow instructions in "Cams setting".
2.4 Box with 3-4 switches, set the actuator in the required signal position and set cams according to instructions in "Cams setting".
2.5 Before refitting the cover:
- Remove possible obstructions between threads (dust, stones) that can cause lock after closure.
- Check the grease on threads or add it if required (NYE LUBRICANTS, NYOGEL 760G to use from -40°C to +110°C - NYE LUBRICANTS UNIFLOR 8512R from -65°C to -45°C).

2.6 Replace box cover (8) paying attention that body shaft (5) properly fits in cover shaft. WARNING: check seal is properly fitted in slot.
2.7 Manually turn cover (8) clockwise on body (4) until they are completely tightened. Tighten the grub screw (19 Anti-rotation) to prevent rotation.

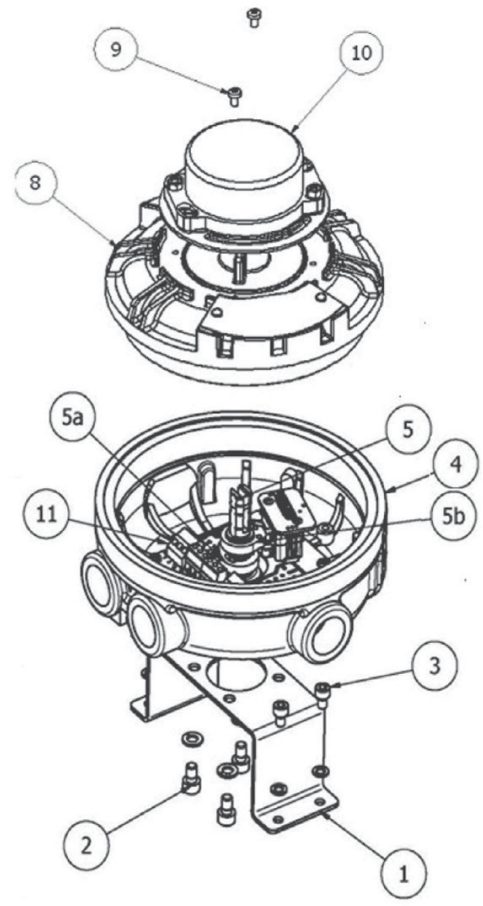
3 3D INDICATOR SETTING
3.1 When the limit switch box cover (8) is secured to the body, loosen the two screws (9) and lift up the stainless steel flange (12).
3.2 Rotate transparent polycarbonate cover (10) or 3D stainless steel indicator cover (17) until the open closed indication matches with valve position. Rotation can be clockwise or counter clockwise.
3.3 Tighten two (9) screws to the body (8). Warning! Do not exceed the max torque force of 0.8Nm for the plastic version.

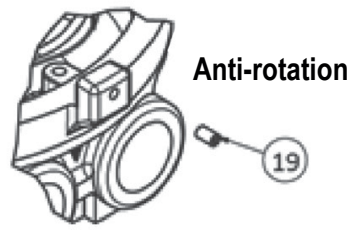
4 ELECTRICAL WIRING
4.1 Remove cover (7) according to points 2.1 and 2.2.
4.2 Remove protection plugs from cable entries and substitute them with cable glands or plugs suitable for type of protection required.
4.3 Connect terminal strip (11) according to the wiring diagram on the label on the limit switch box. Reassemble cover (8) according to points 2.5 and 2.6.
4.4 Tighten terminal strip's screws using values of torque between 0,45÷0,6Nm.

5 PRODUCT'S STORAGE
5.1 Keep the boxes away from UV rays and atmospheric agents, in an environment with temperature between 0°C and 40°C.

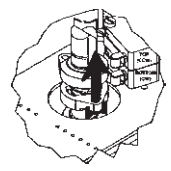
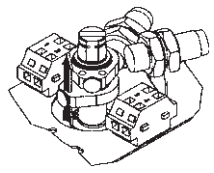
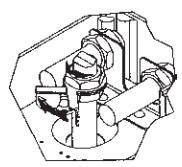
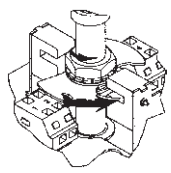
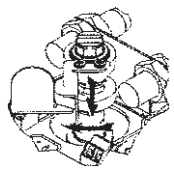
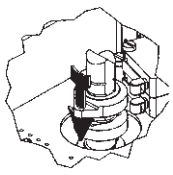
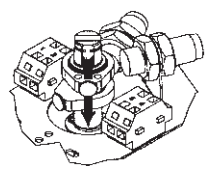
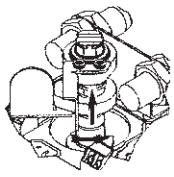
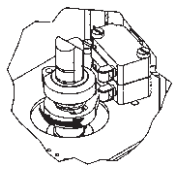
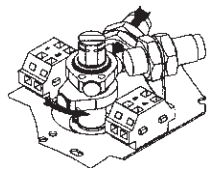
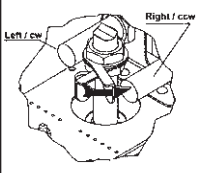
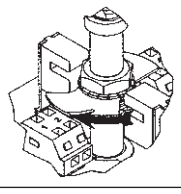
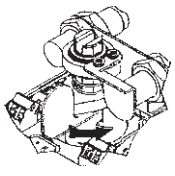
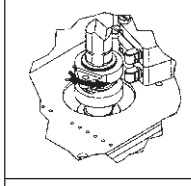
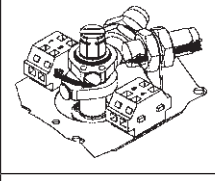
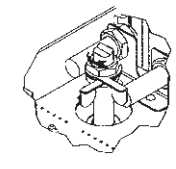
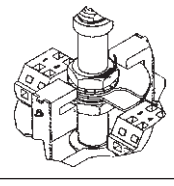


Optional 3D stainless steel indicator





Anti-rotation

Cams setting / Cams type				
A	**B**	**C**	**D**	**E**
1. Turn actuator pinion clockwise.	**1.** Turn actuator pinion clockwise.	**1.** Turn actuator pinion clockwise.	**1.** Turn actuator pinion clockwise.	**1.** Disengage cams from splined retainer to position 45 °.
				
2. Disengage cam from splined retainer.	**2.** Disengage cam from splined retainer.	**2.** Loosen (using a 19 wrench) top nut.	**2.** Loosen (using a 19 wrench) top nut.	**2.** Engage into splined retainer and turn actuator pinion clockwise.
				
3. Turn, until switch is activated, then engage into splined retainer.	**3.** Turn, until switch is activated, then engage into splined retainer. Adjust the sensitivity by regulating the distance between the cam and the inductive sensor.	**3.** Rotate cam and fit in front of sensor.	**3.** Rotate cam and fit in front of sensor.	**3.** Disengage cams from splined retainer. **4.** Rotate cam and fit in front of sensor then engage into splined retainer.
4. Turn actuator pinion counterclockwise.	**4.** Turn actuator pinion counterclockwise.	**4.** Turn actuator pinion counterclockwise.	**4.** Turn actuator pinion counterclockwise.	**5.** Turn actuator pinion counterclockwise.
				
5. Disengage cam from splined retainer.	**5.** Disengage cam from splined retainer.	**5.** Rotate cam and fit in front of sensor.	**5.** Rotate cam and fit in front of sensor.	**6.** Disengage cam from splined retainer and rotate cam and fit in front of sensor then engage into splined retainer then engage.
				
6. Turn, in the way shown, until switch is activated, then engage into retainer.	**6.** Turn, in the way shown, until switch is activated, then engage into retainer. Adjust the sensitivity by regulating the distance between the cam and the inductive sensor.	**6.** Fasten (using a 19 wrench) top shaft nut.	**6.** Fasten (using a 19 wrench) top shaft nut.	**7.** ⚠ **CAUTION**: Make sure that the cams do not come in contact with the sensor possible breakage.