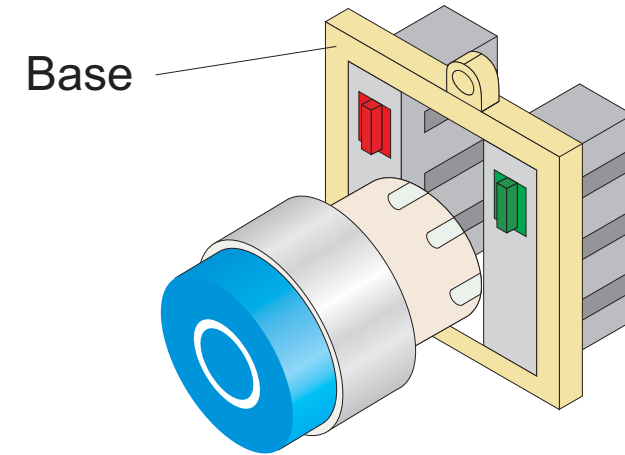
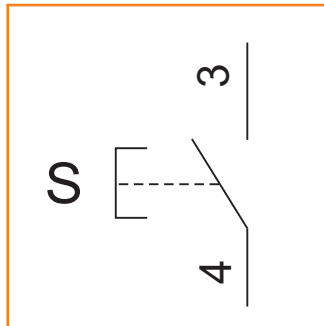


Figura 6.1. Pulsador normalmente abierto NA.



Cabeza de mando



Bloque eléctrico
(incluye terminales
y sistema de
retroceso)

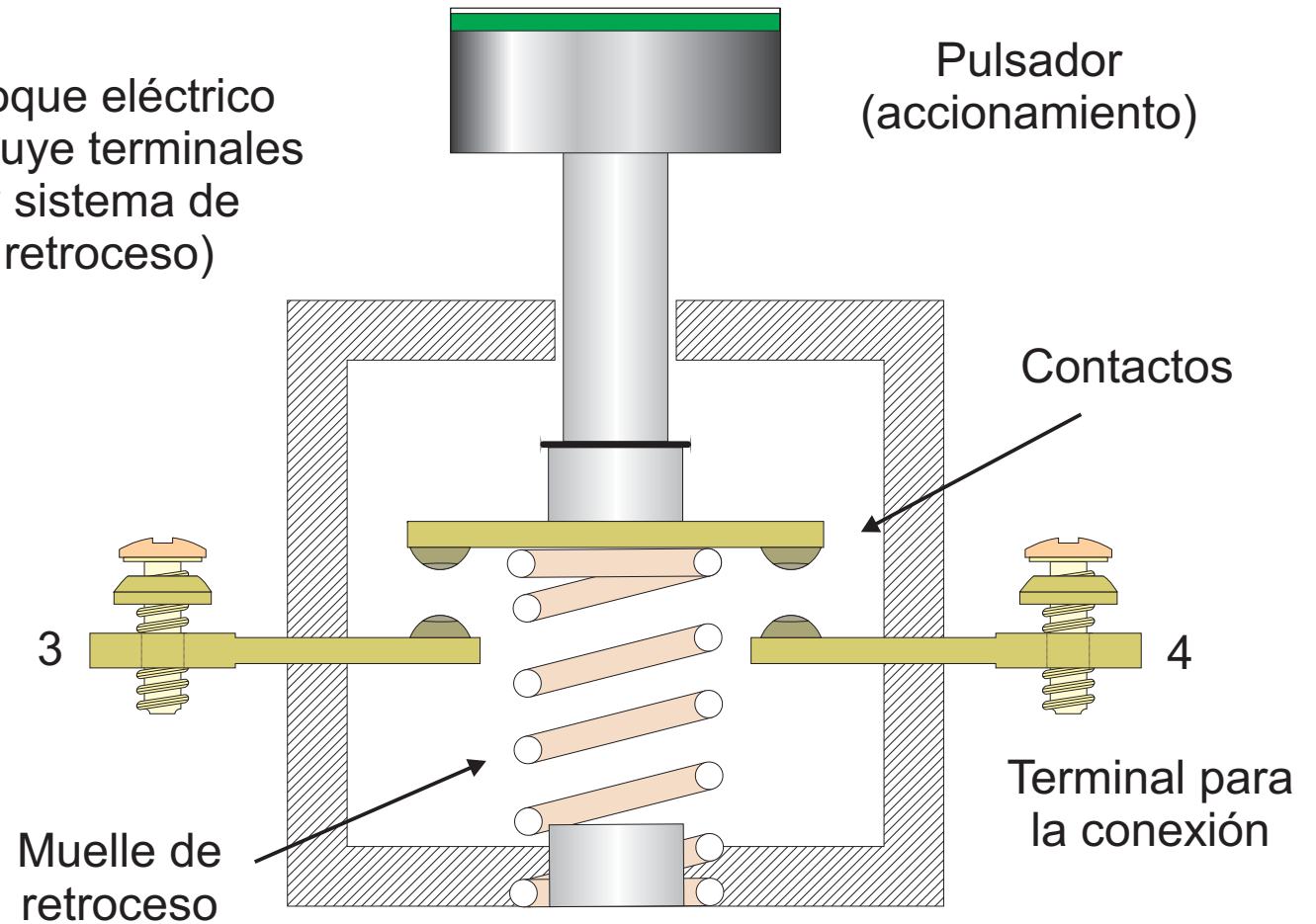


Figura 6.2. Funcionamiento del pulsador NA.

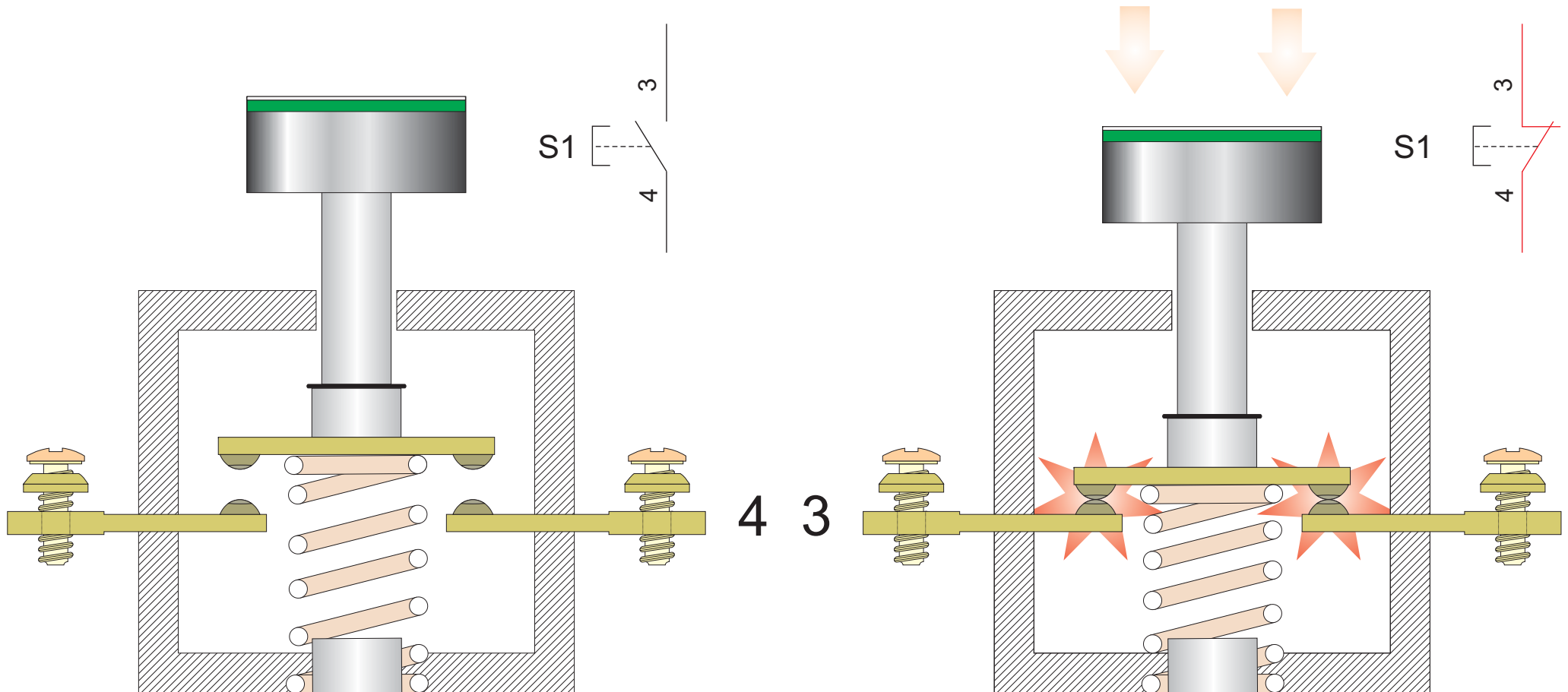
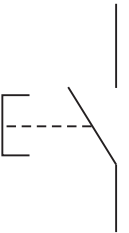
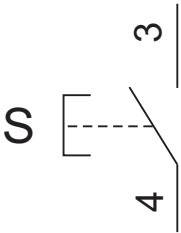
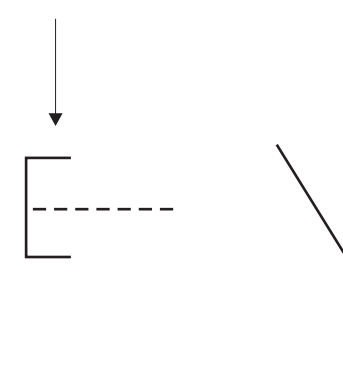


Figura 6.3. Símbolo del pulsador NA.

Símbolo	Identificador	Terminales	Final
	S		

Pulsador manual
con retorno automático



Contacto NA

Figura 6.4. Funcionamiento del pulsador NC.

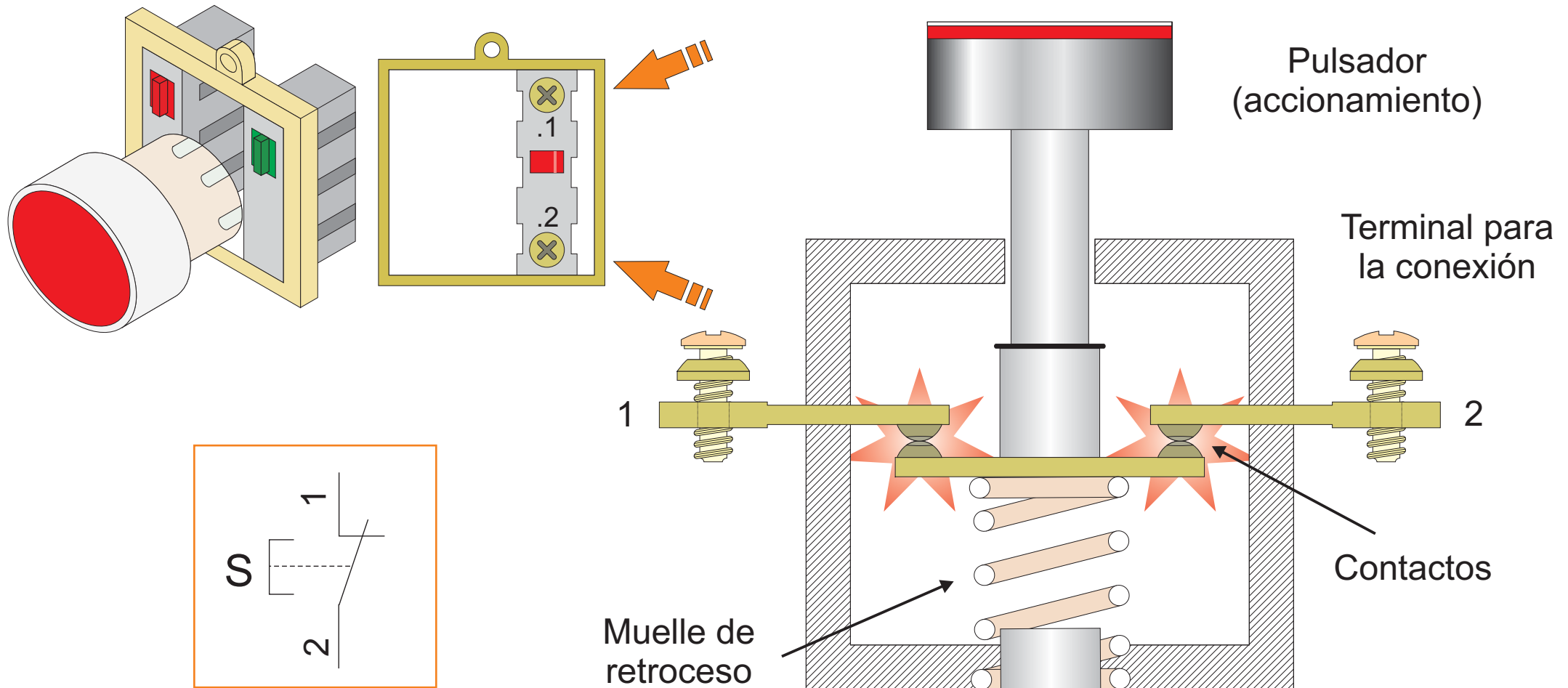


Figura 6.5. Pulsador normalmente cerrado NC.

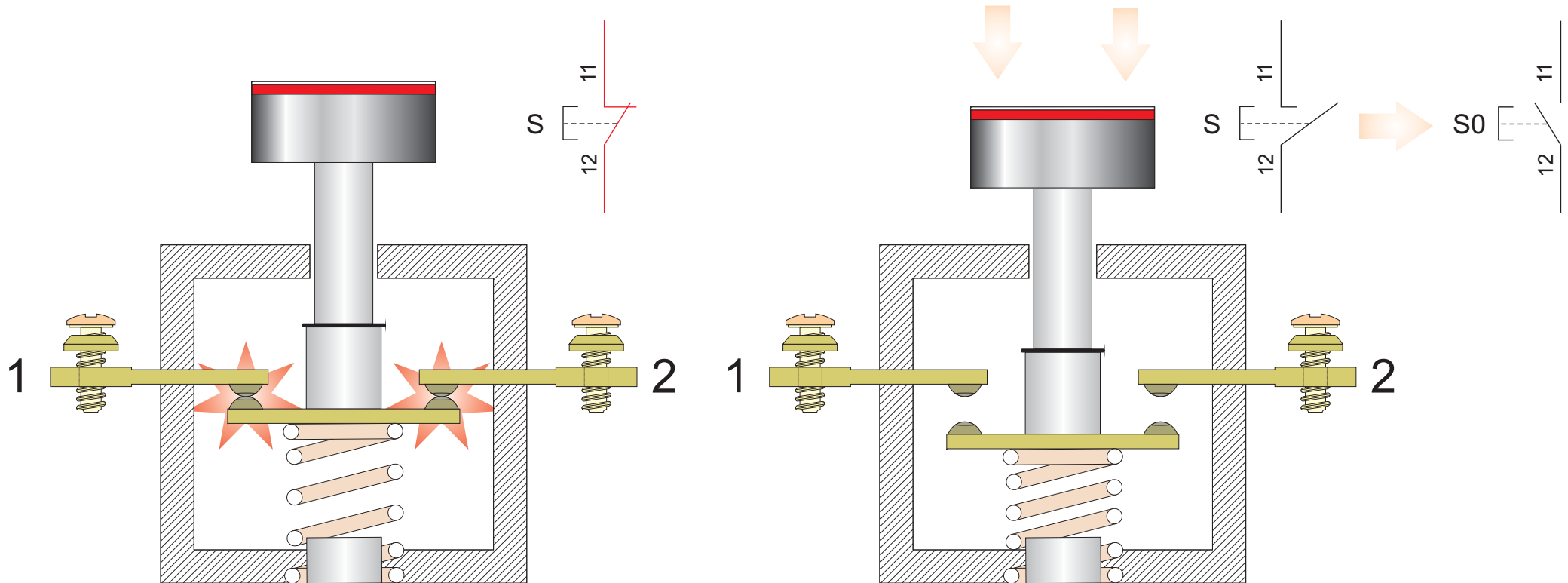
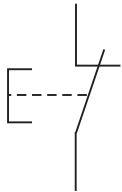
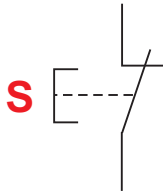
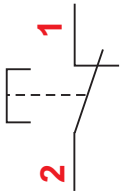
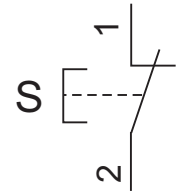


Figura 6.6. Símbolo del pulsador NC.

Símbolo	Identificador	Terminales	Final
	S 		S 

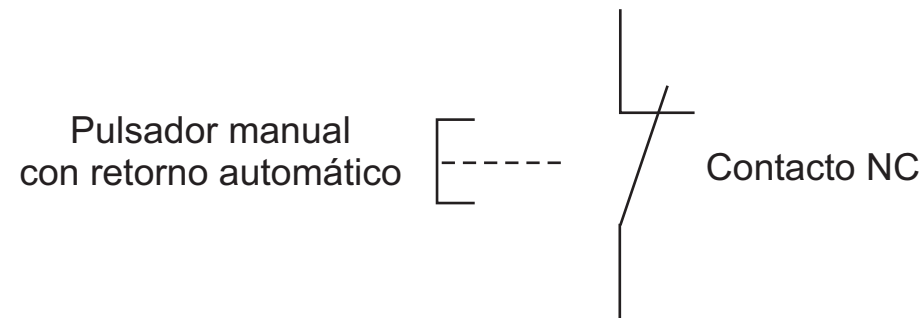


Figura 6.7. Identificación de bornes en mecanismos.

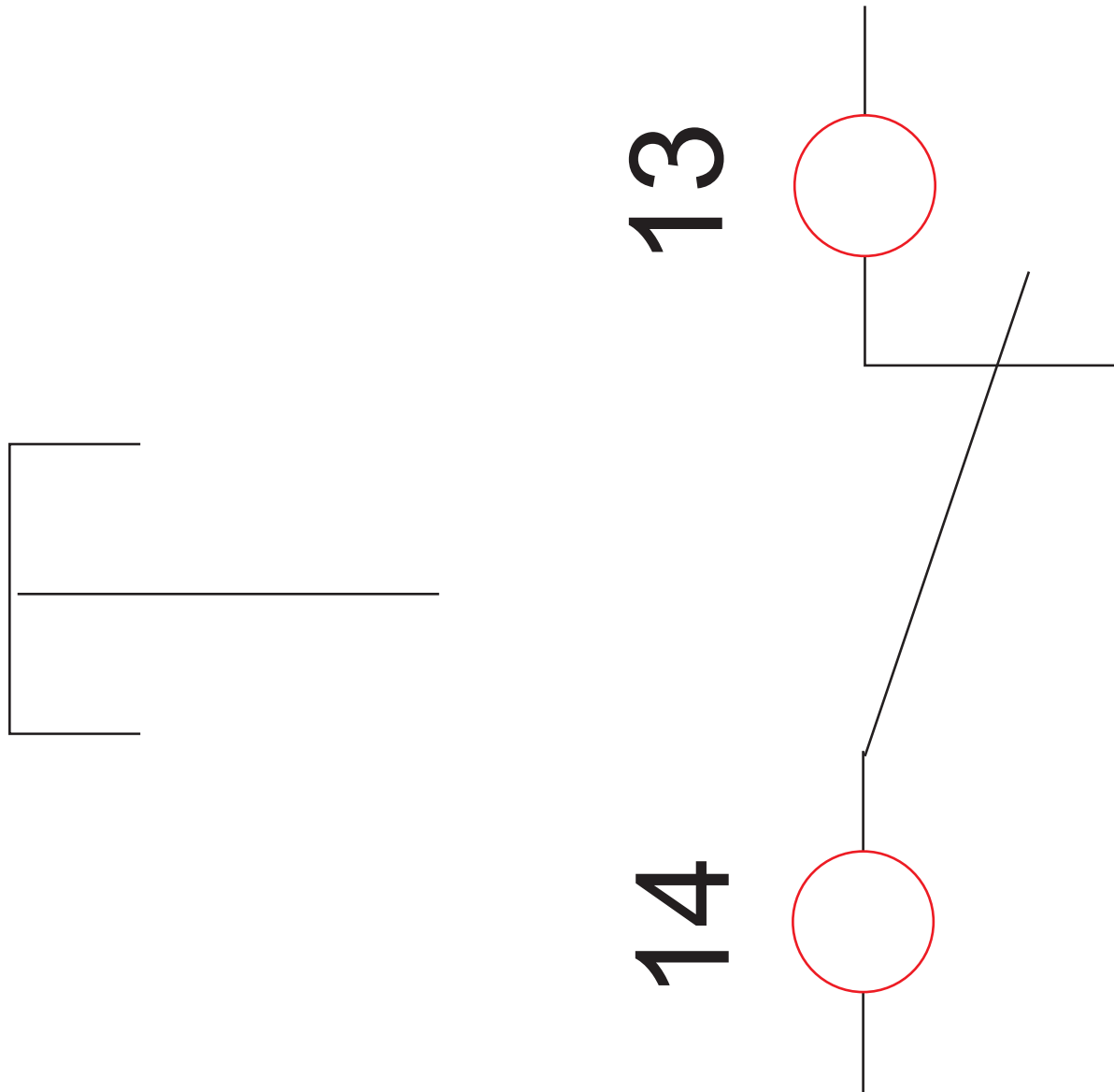


Figura 6.8. Funcionamiento del pulsador conmutador NA-NC.

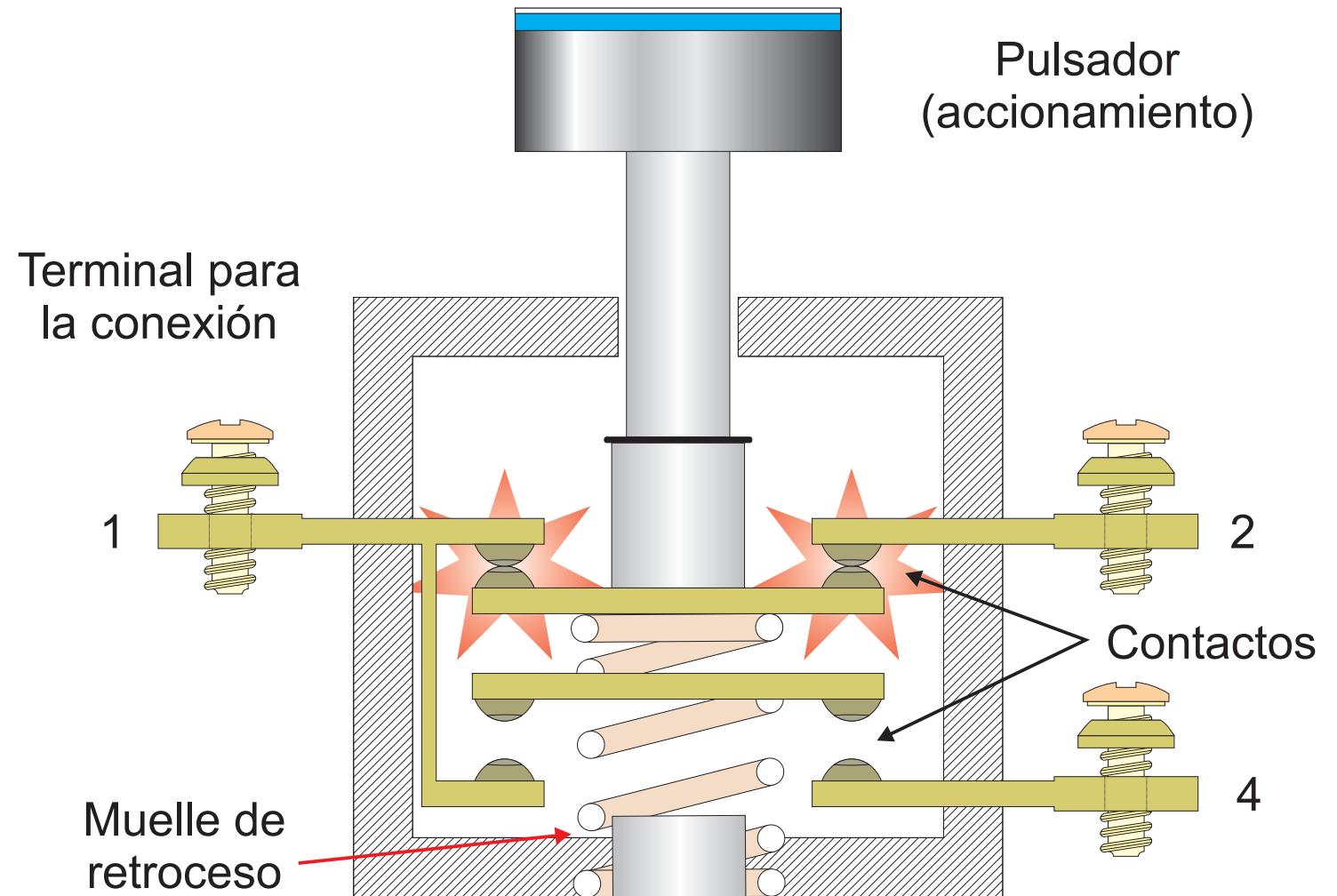
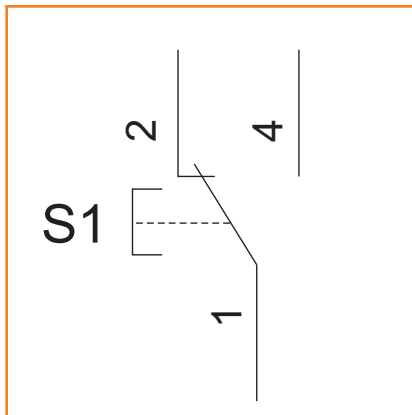
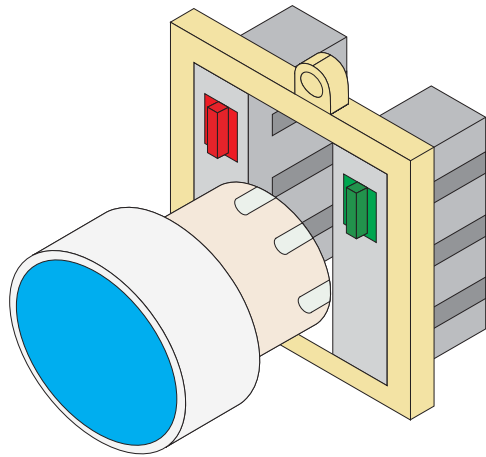


Figura 6.9. Símbolo del pulsador NA.

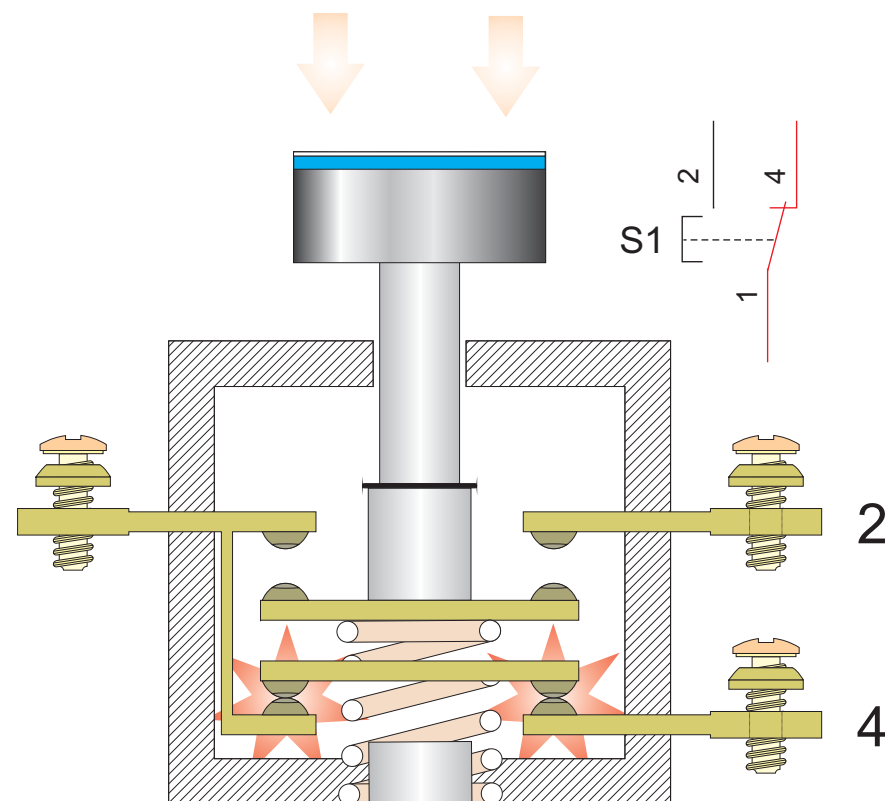
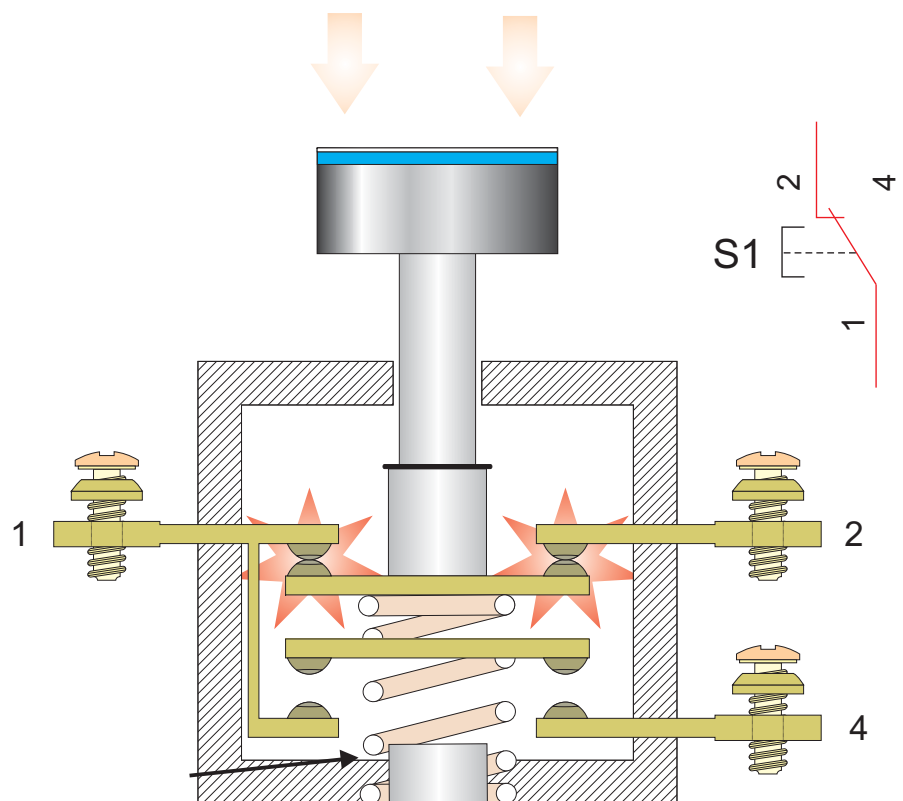
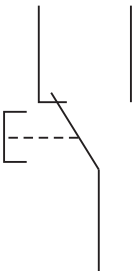
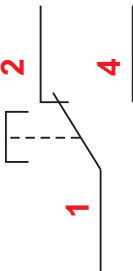
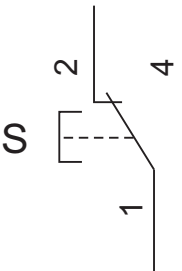


Figura 6.10. Pulsador con contactos conmutados NC-NA.

Símbolo	Identificador	Terminales	Final
	S		

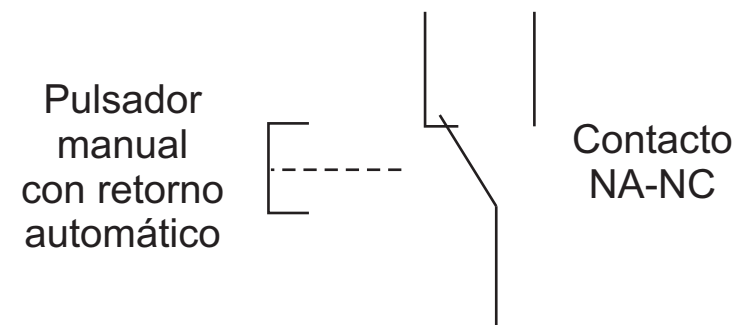


Figura 6.11. Funcionamiento del pulsador de doble cámara NC-NA.

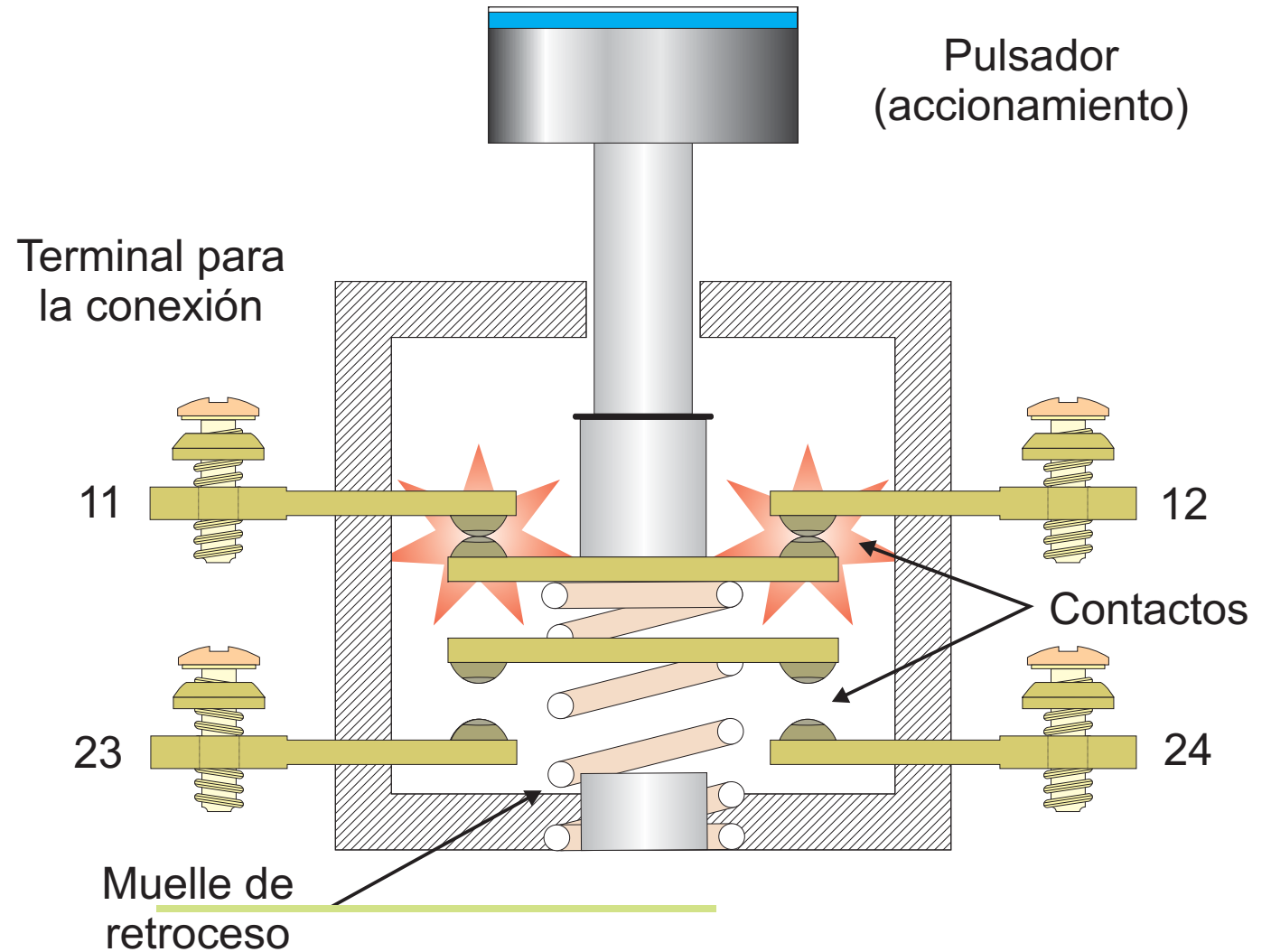
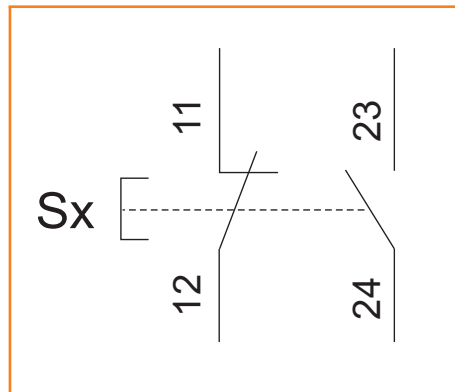
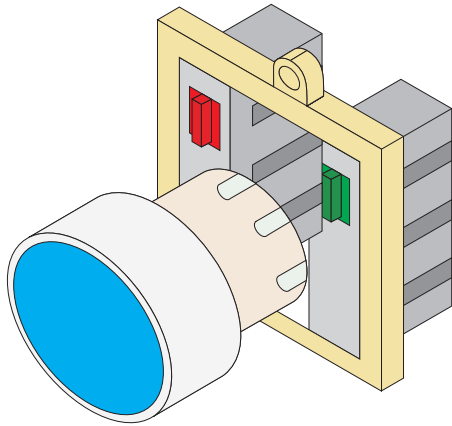


Figura 6.12. Pulsador de doble cámara.

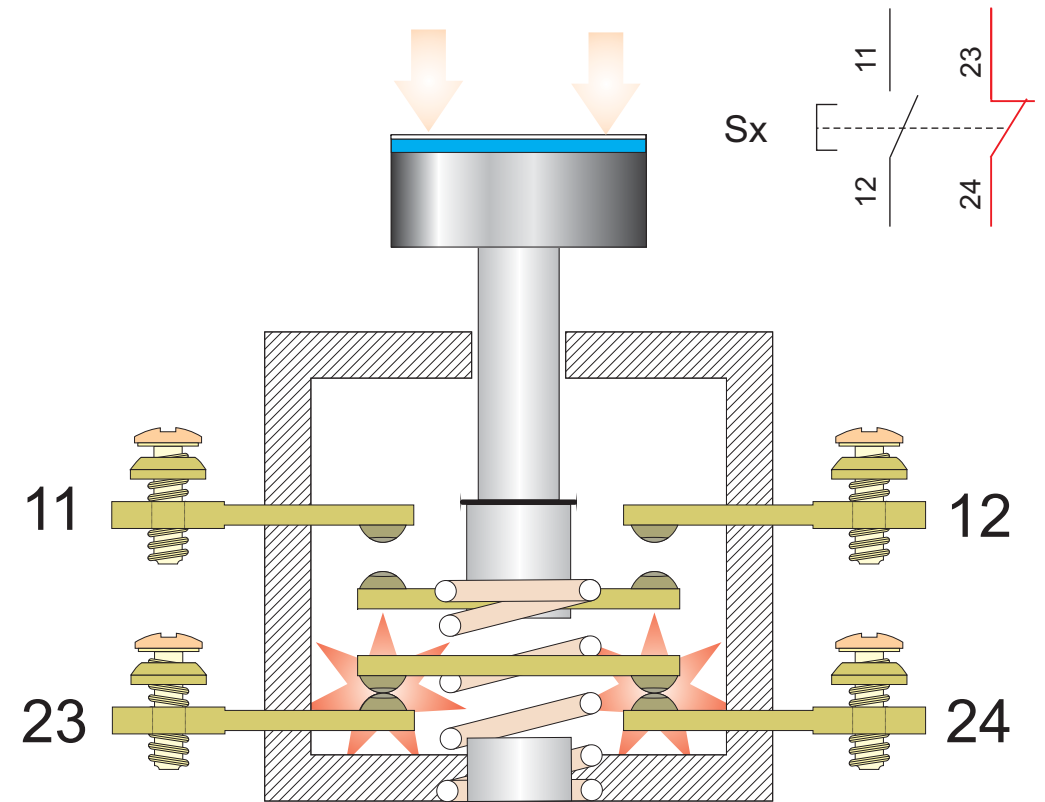
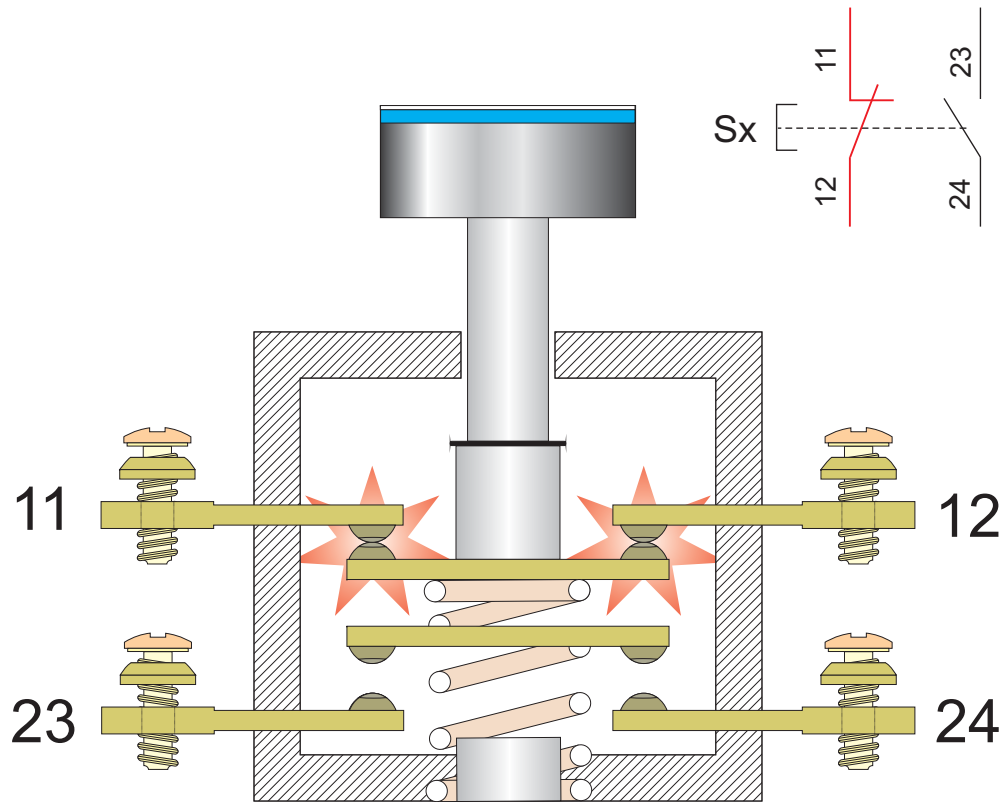
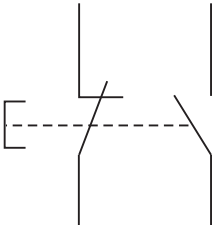
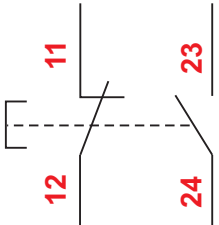
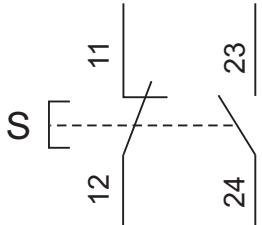


Figura 6.13. Símbolo del pulsador de doble cámara.

Símbolo	Identificador	Terminales	Final
			

Pulsador manual con retorno automático

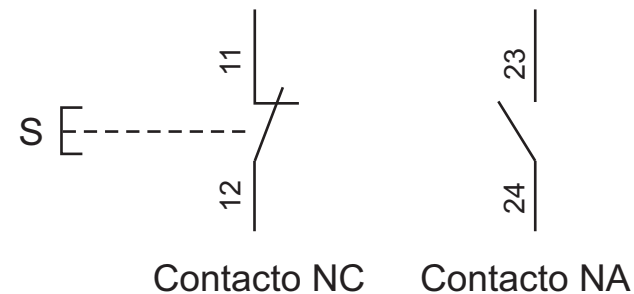


Figura 6.14. Cabezas de mando rasantes y salientes.

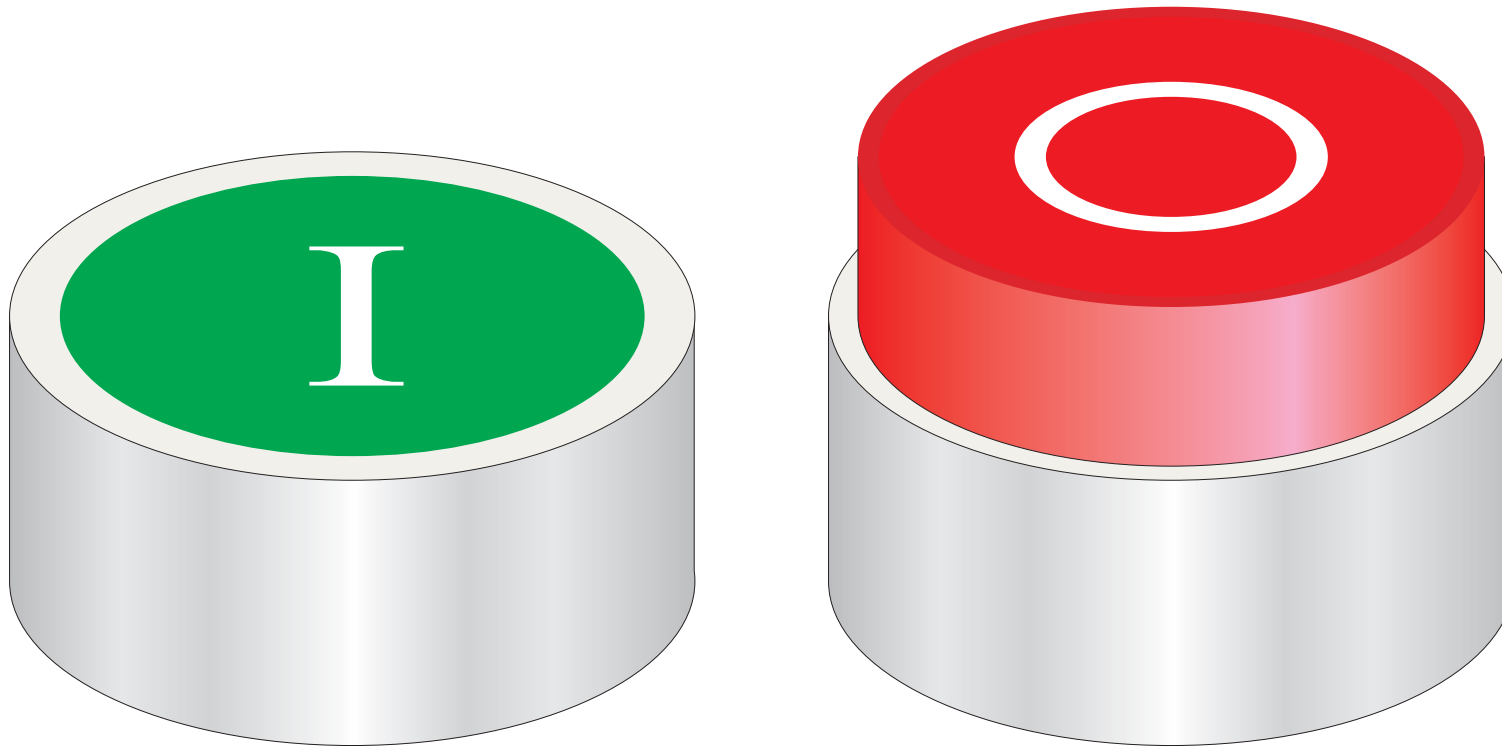


Figura 6.15. Pulsador de pedal.

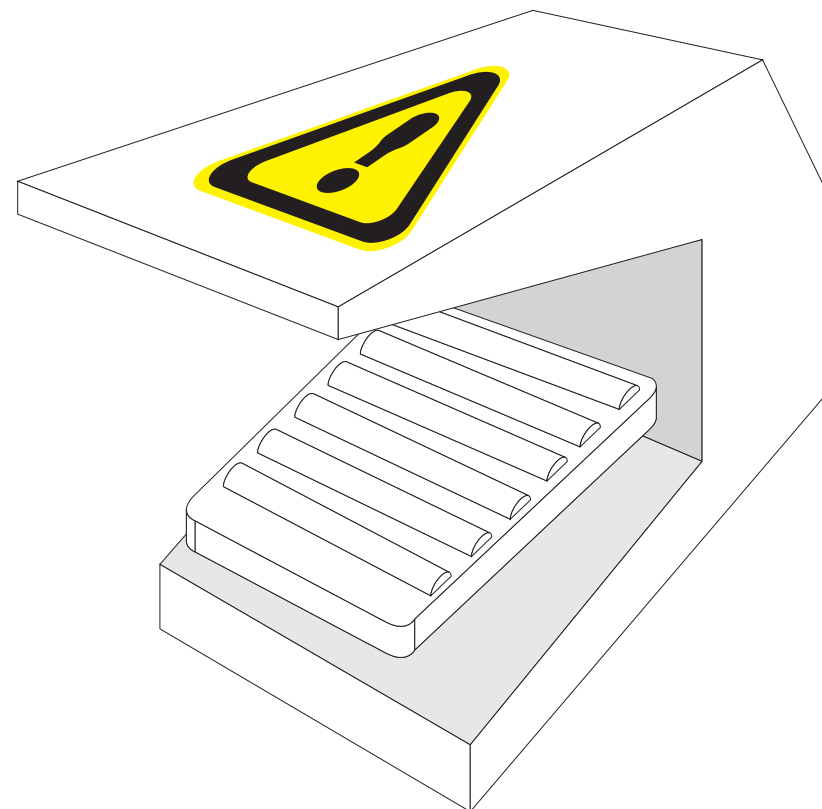
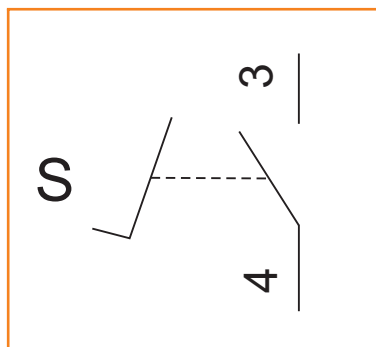
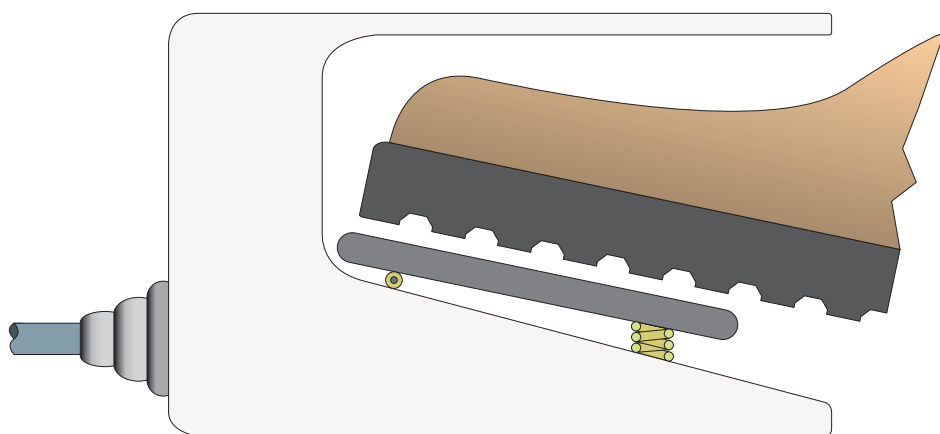


Figura 6.16. Simbología pulsador de pedal.

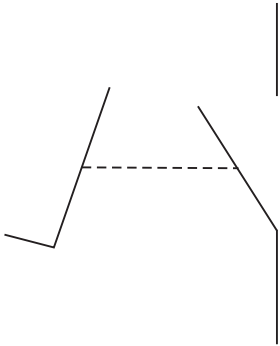
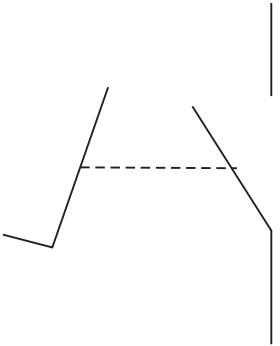
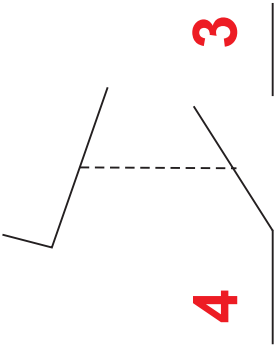
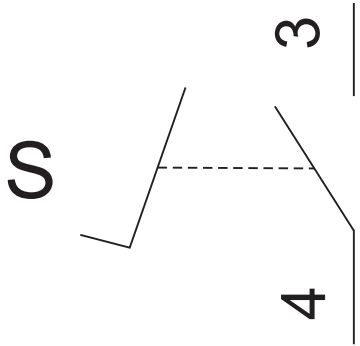
Símbolo	Identificador	Terminales	Final
	S  		S 

Figura 6.17. Pulsador por tirador.

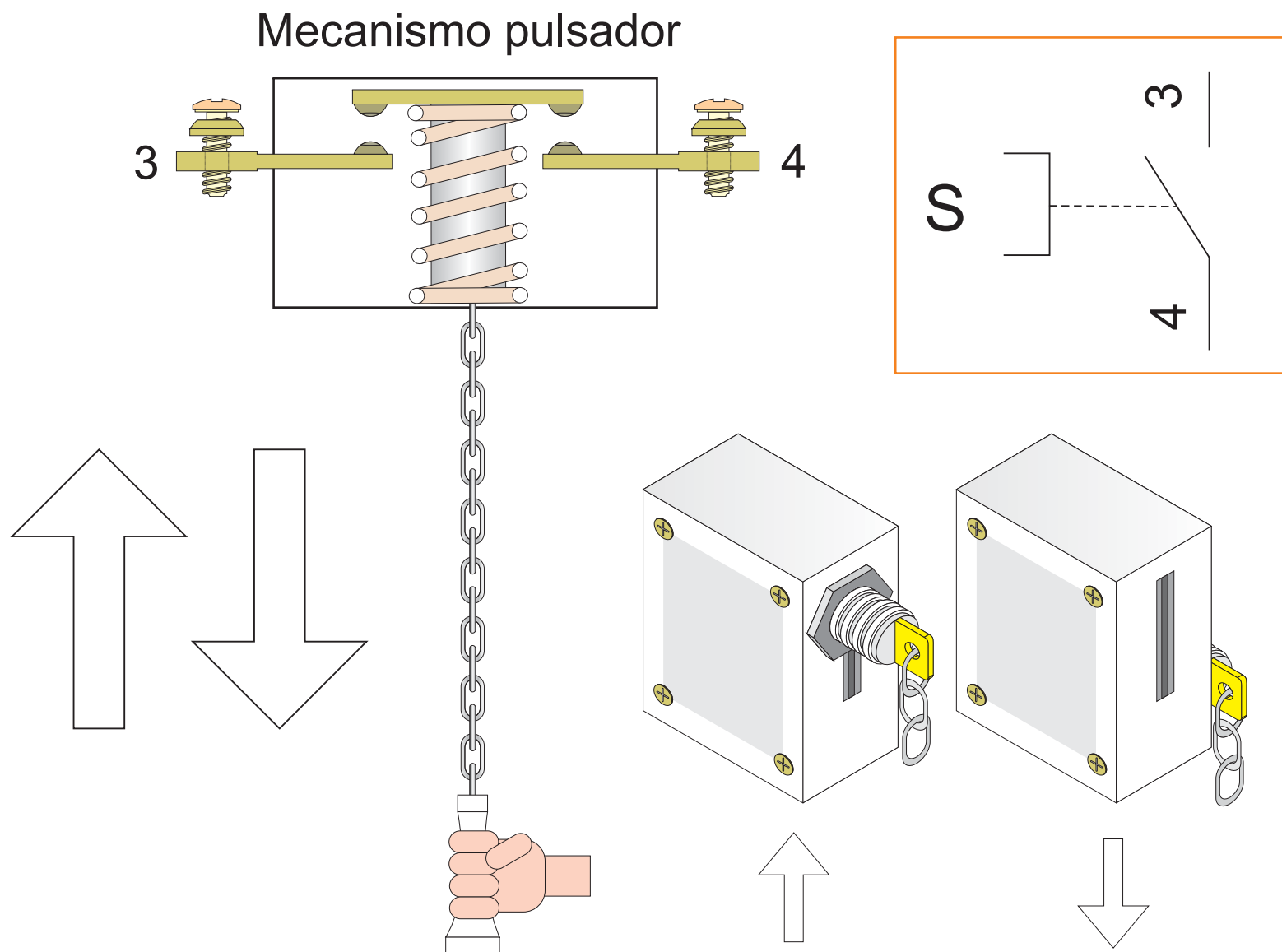


Figura 6.18. Simbología pulsador por tirador.

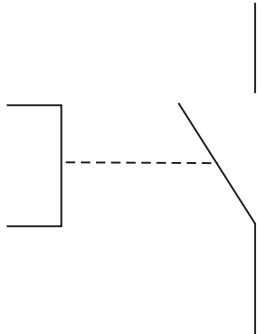
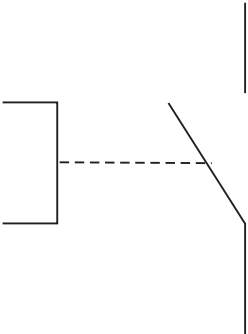
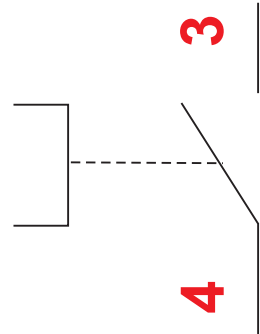
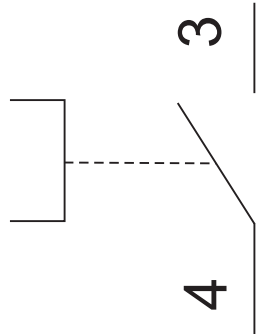
Símbolo	Identificador	Terminales	Final
	S 		S 

Figura 6.19. Interruptor tipo pulsador con retorno no automático.

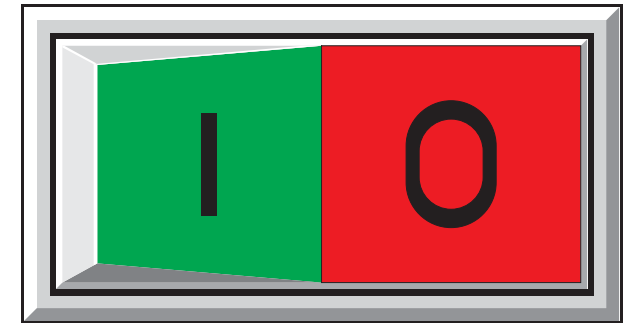
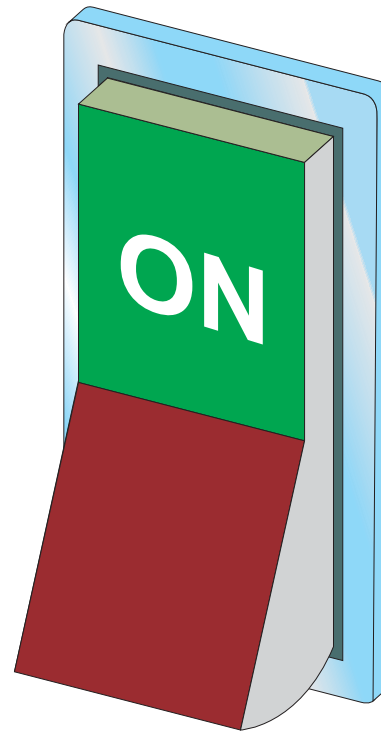
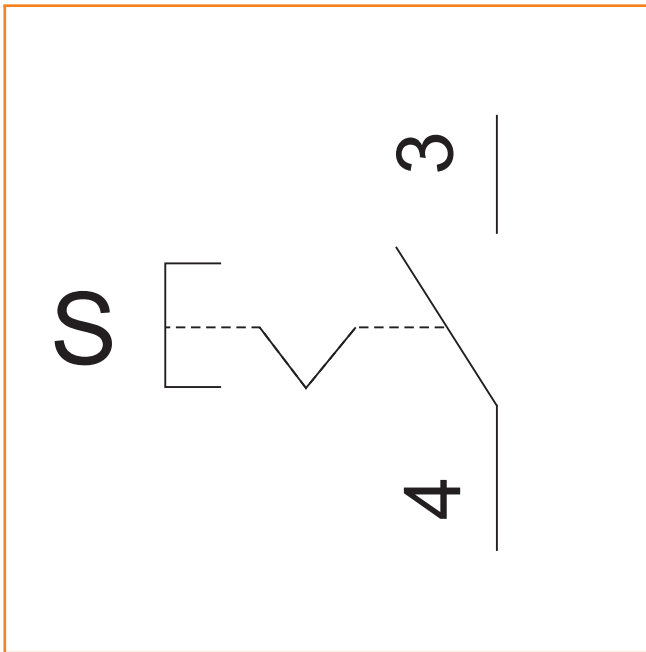


Figura 6.20. Interruptor tipo pulsador con retorno no automático.

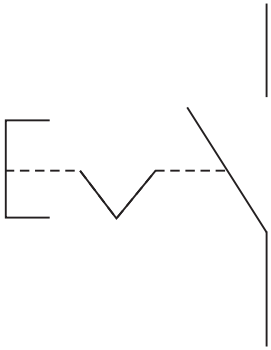
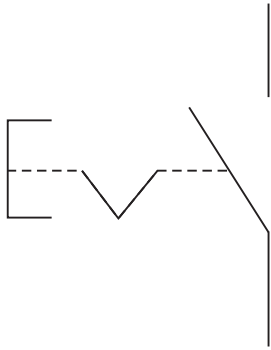
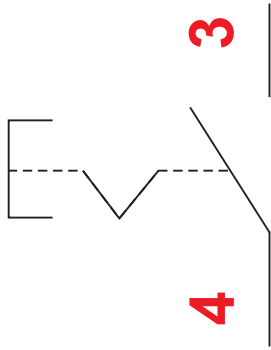
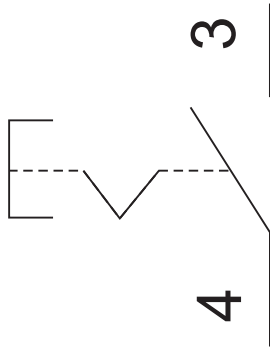
Símbolo	Identificador	Terminales	Final
	S 		S 

Figura 6.21. Interruptor tipo pulsador con retorno no automático.

Símbolo	Identificador	Terminales	Final

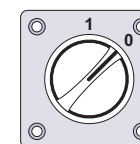
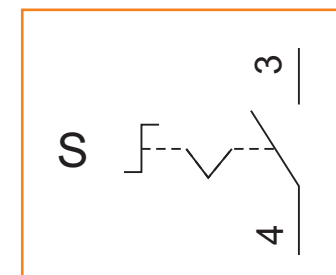
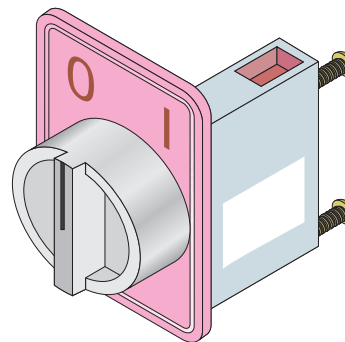


Figura 6.22. Interruptor tipo “seta de emergencia”.

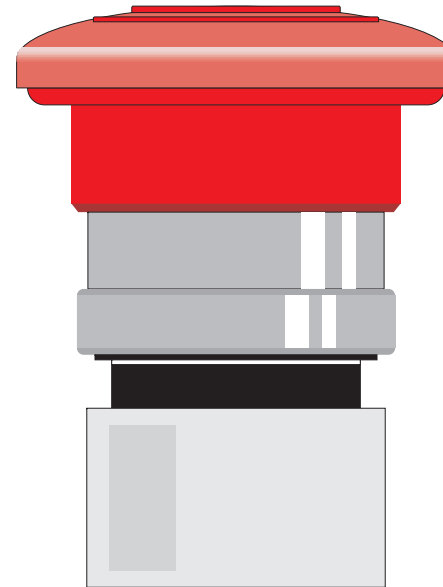
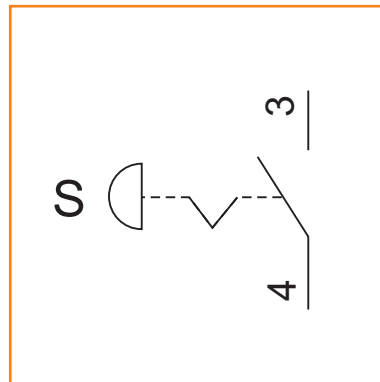


Figura 6.23. Interruptor de llave.

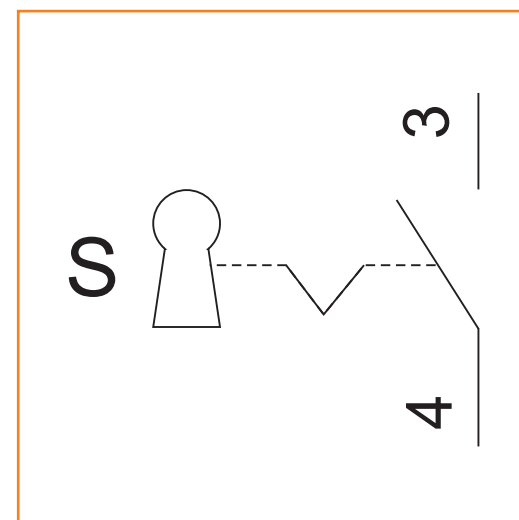
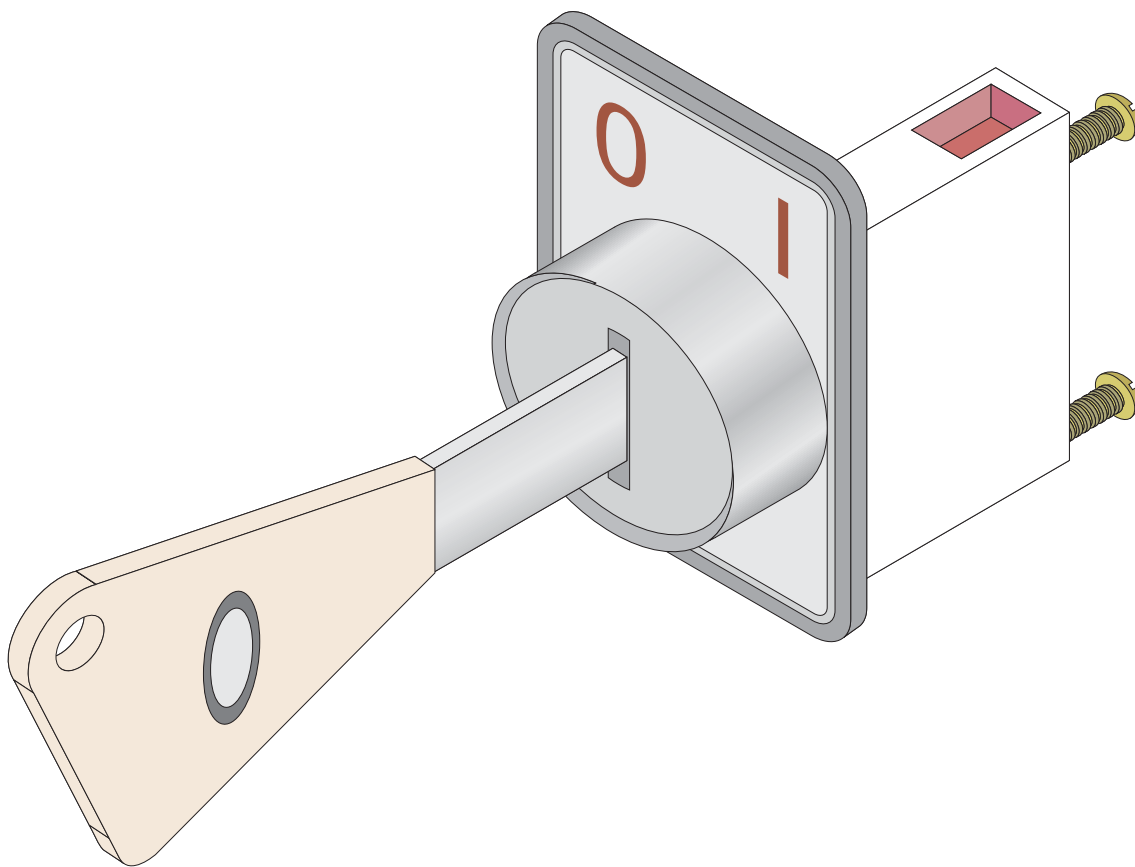


Figura 6.24. Simbología detallada del interruptor de llave.

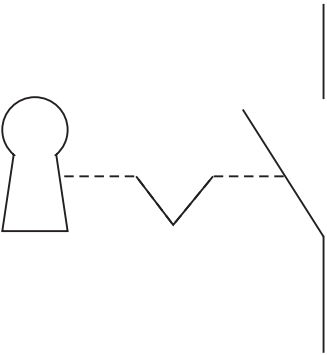
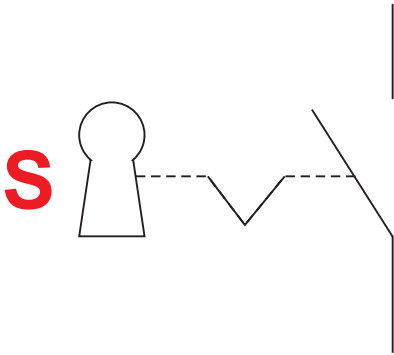
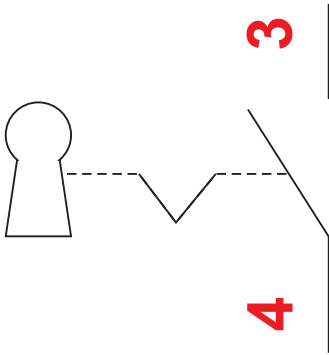
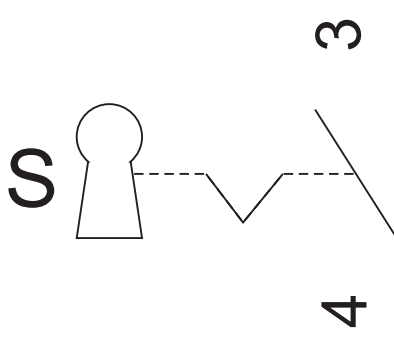
Símbolo	Identificador	Terminales	Final
			

Figura 6.25. Pulsador de llave, con retorno automático.

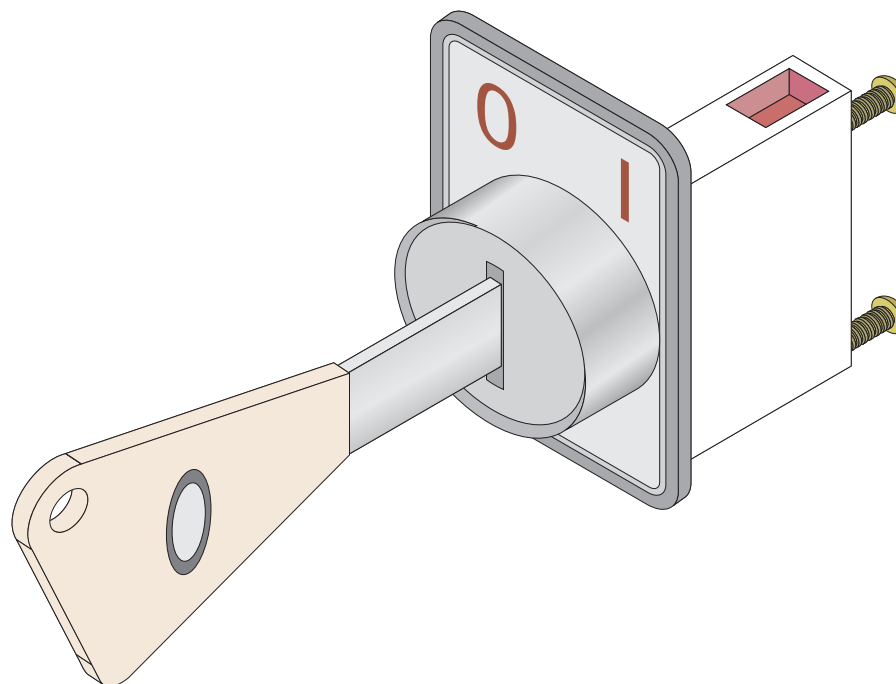
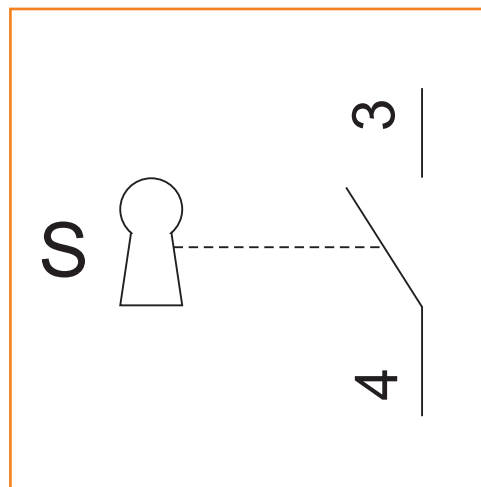


Figura 6.26. Interruptor de palanca. Una y varias posiciones.

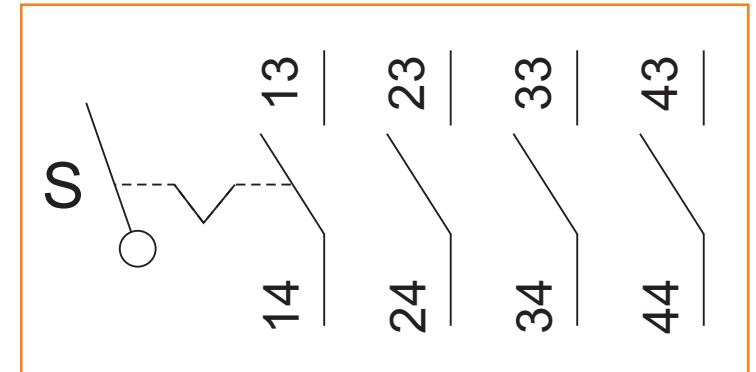
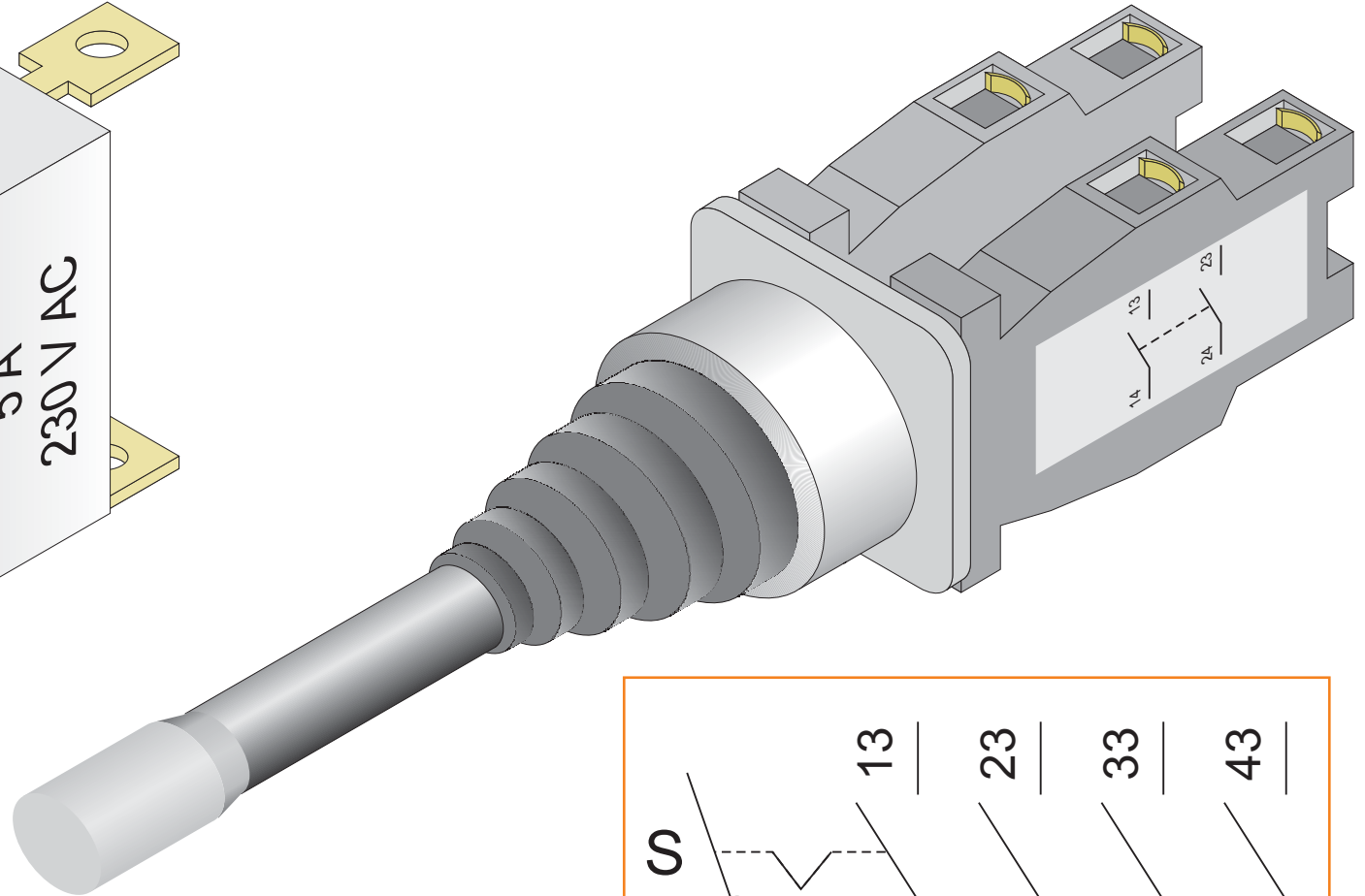
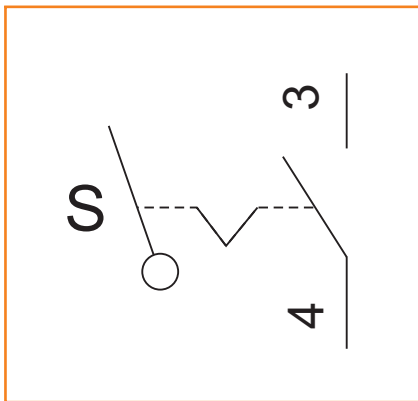
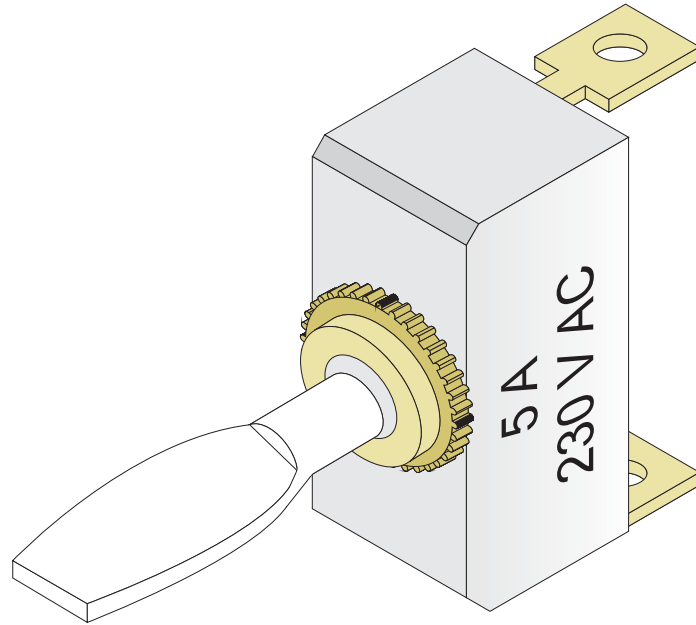
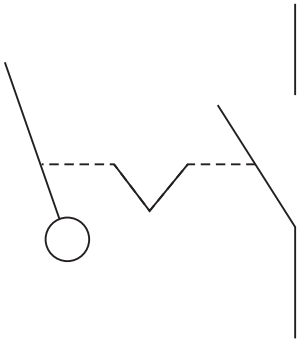
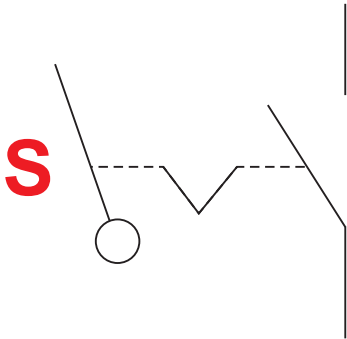
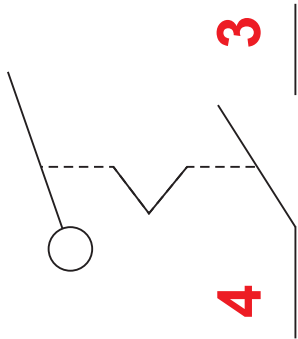
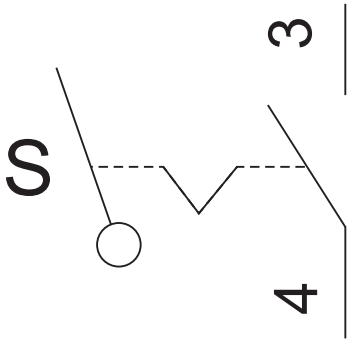


Figura 6.27.

Simbología detallada del interruptor de palanca.

Símbolo	Identificador	Terminales	Final
			

6 Captadores y sensores eléctricos

Figura 6.28. Conmutadores: de palanca y rotativo. Ejemplo de uso de conmutador, siempre estará activo uno de los dos circuitos.

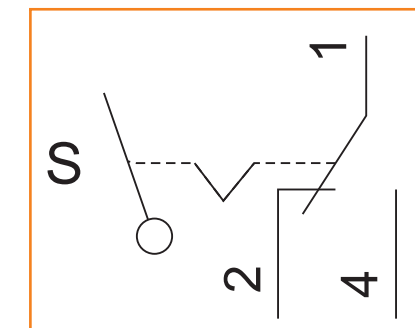
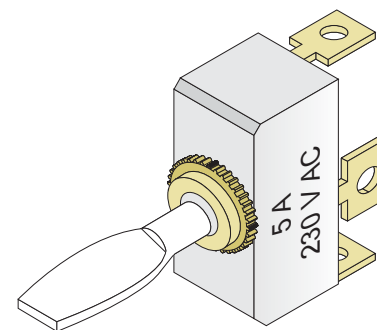
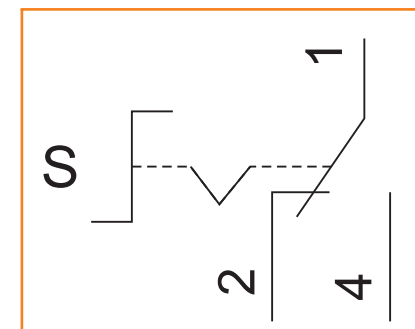
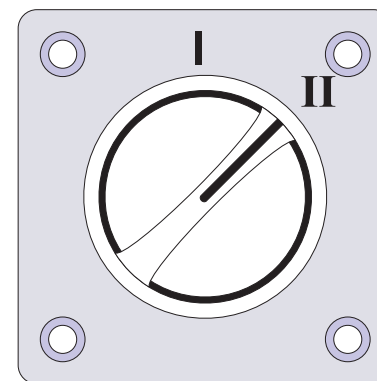
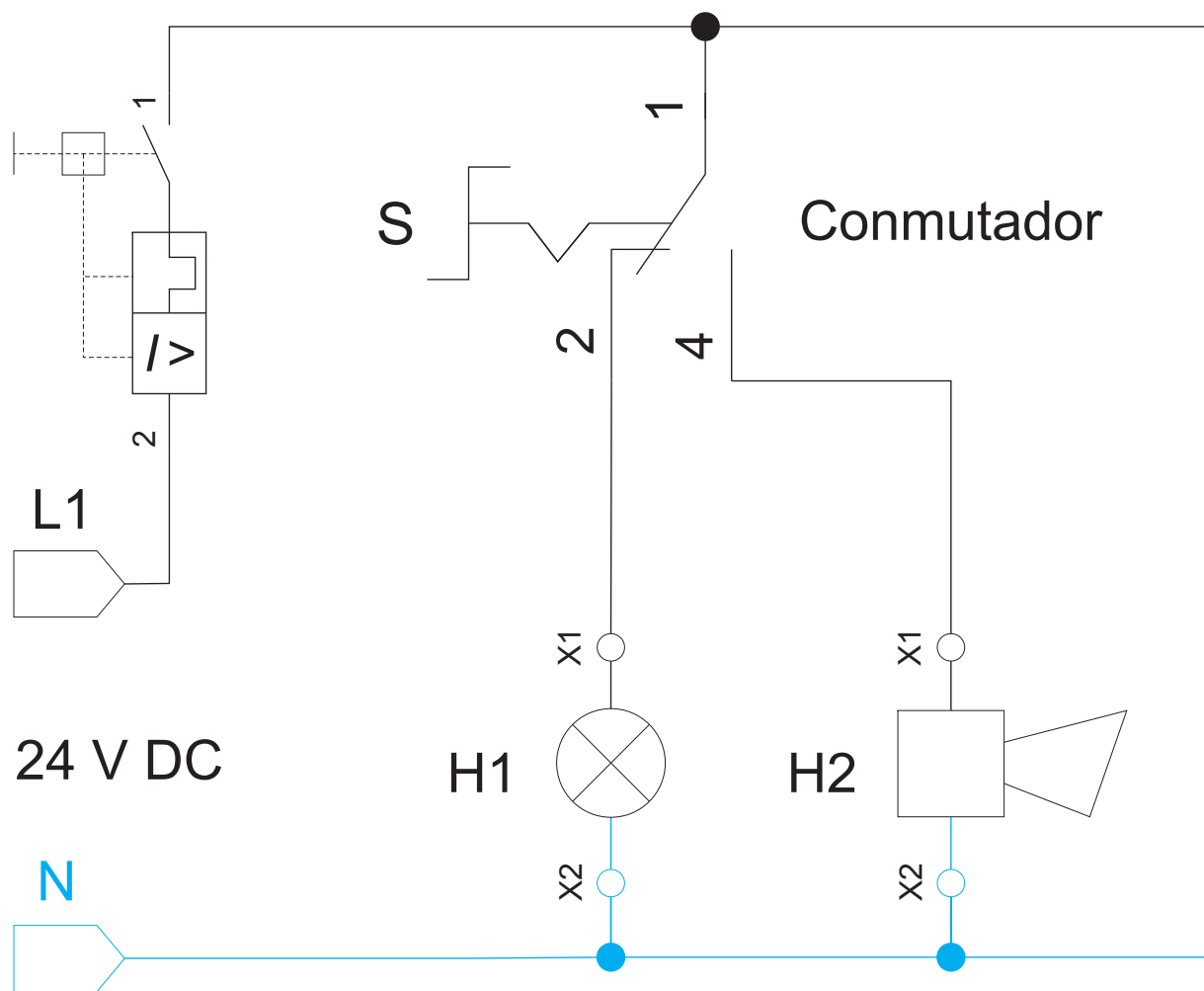


Figura 6.29. Simbología detallada del conmutador de dos posiciones.

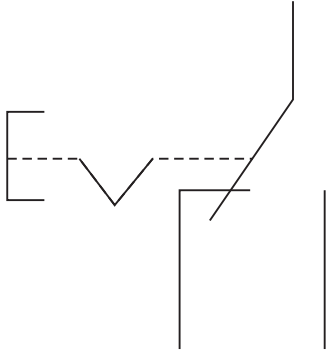
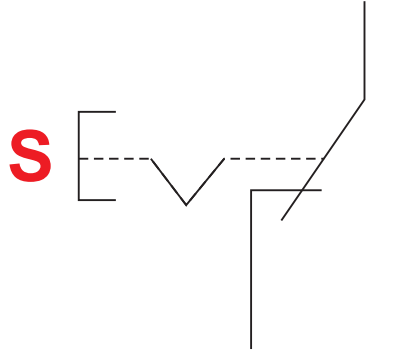
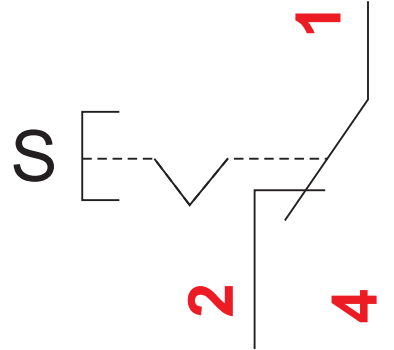
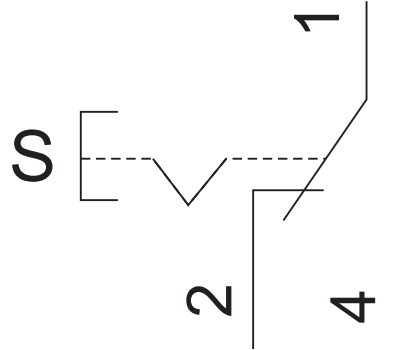
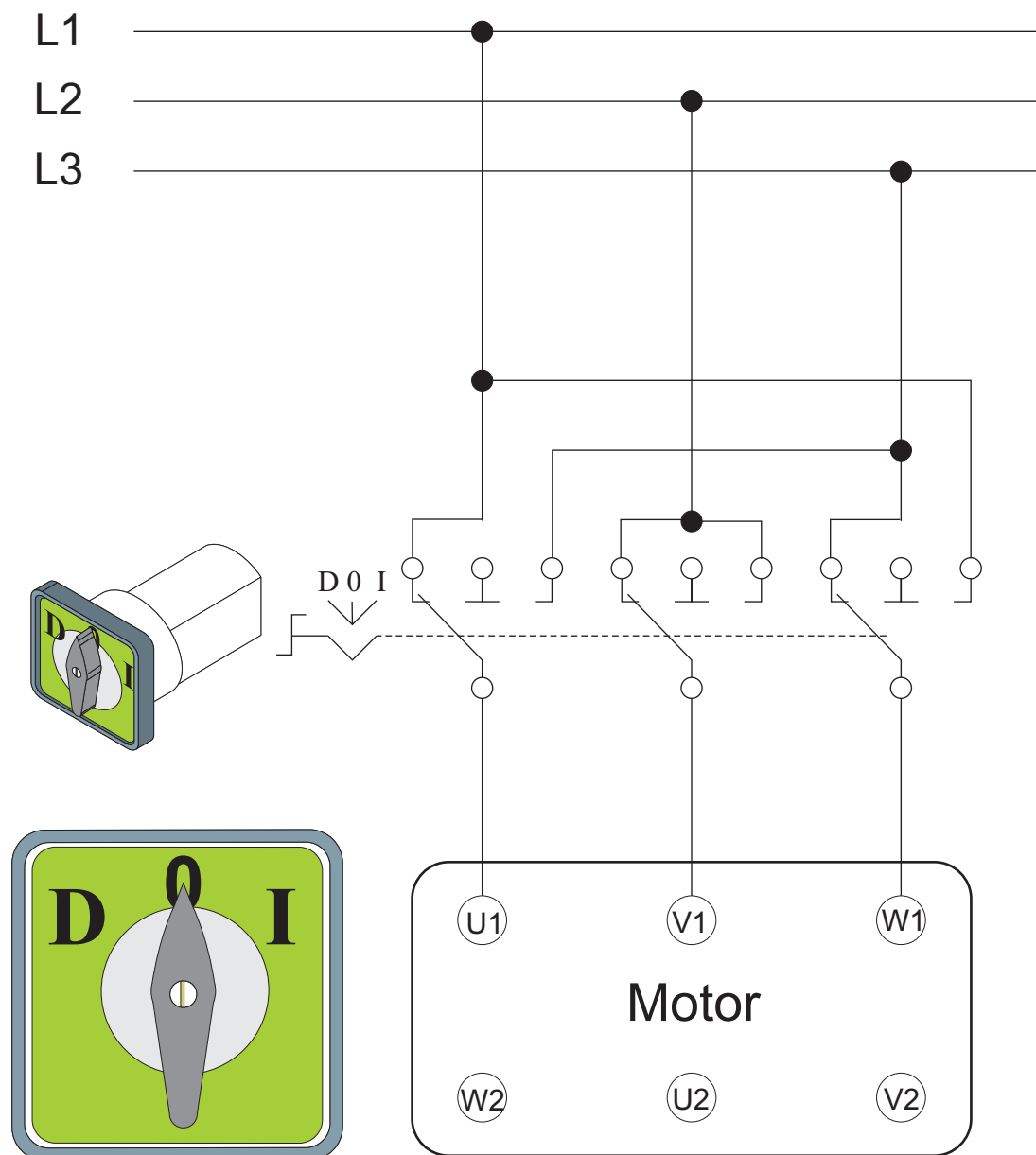
Símbolo	Identificador	Terminales	Final
	S 	S 	S 

Figura 6.30. Conmutador específico.



6 Captadores y sensores eléctricos

Figura 6.31. Conmutador con posición central a cero.

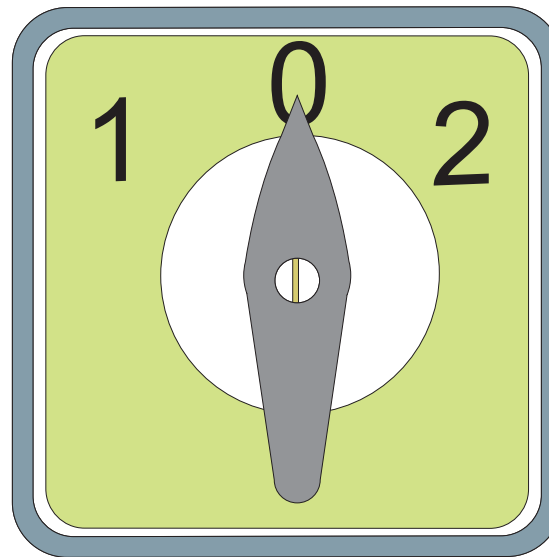
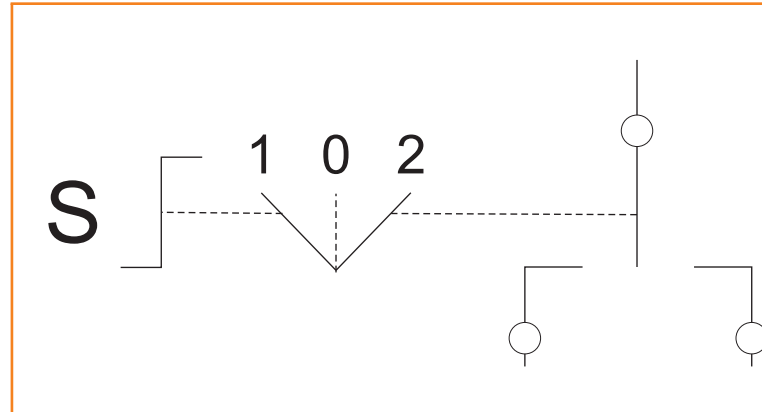


Figura 6.32. El final de carrera conmuta uno o varios contactos provocado por la acción mecánica sobre un cabezal específico.

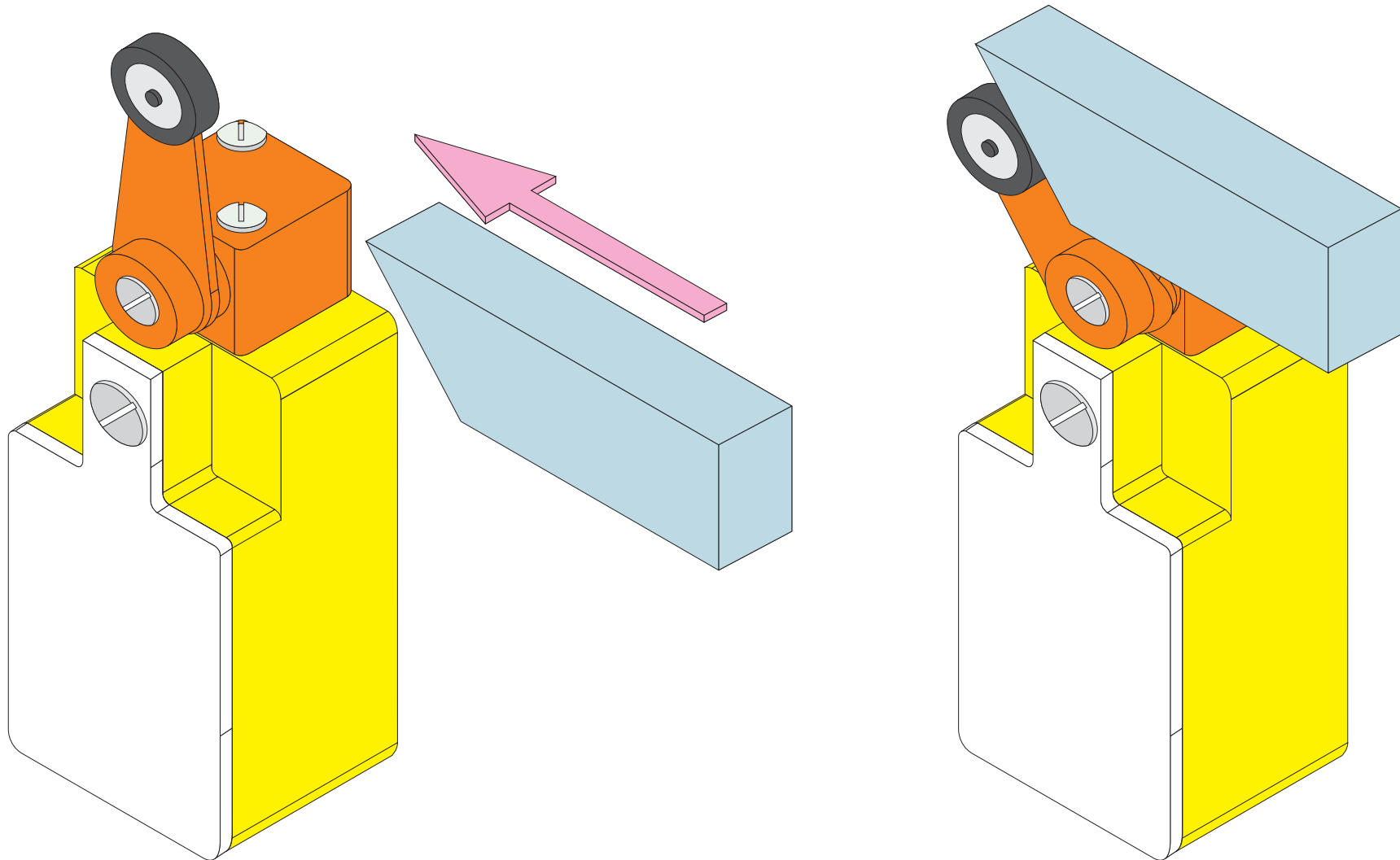


Figura 6.33. Diferentes cabezas de accionamiento para finales de carrera.

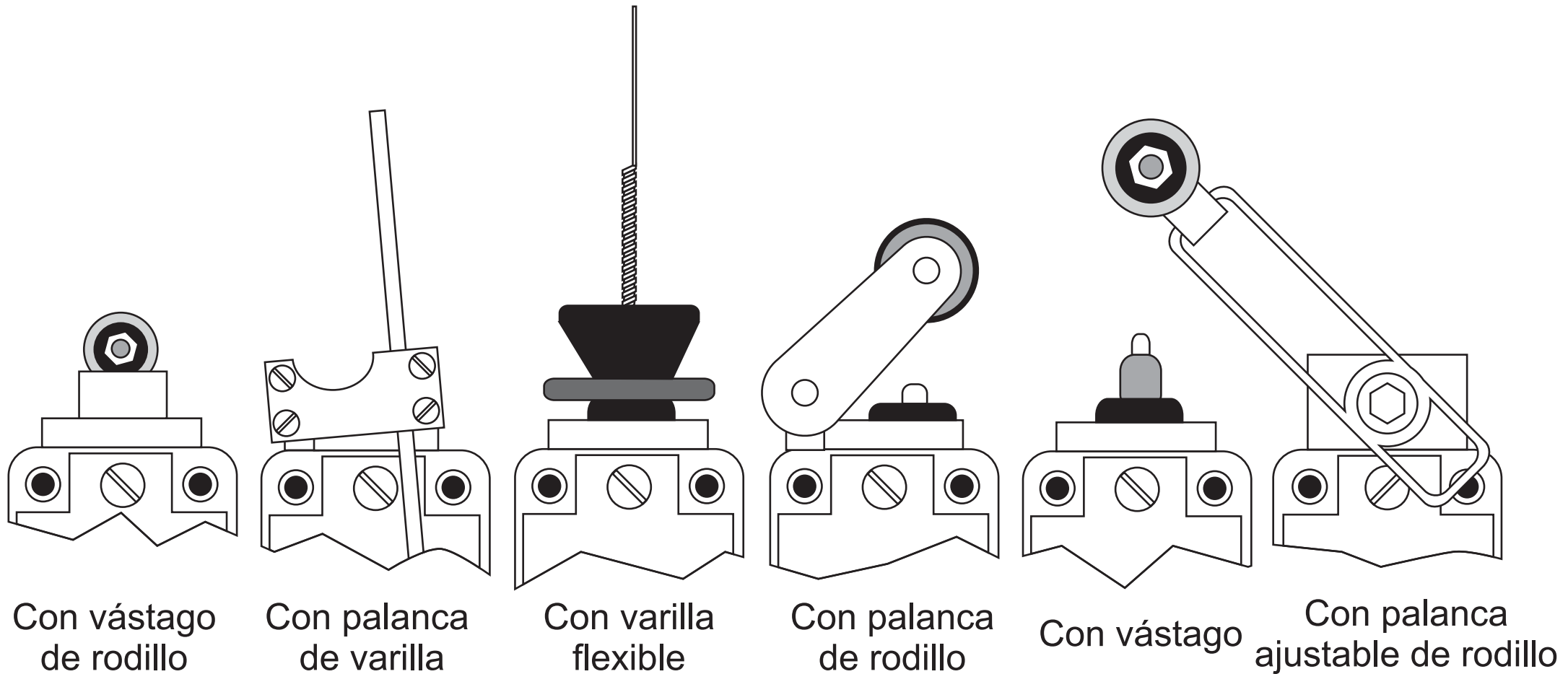


Figura 6.34. Simbología alternativa para el interruptor de posición.

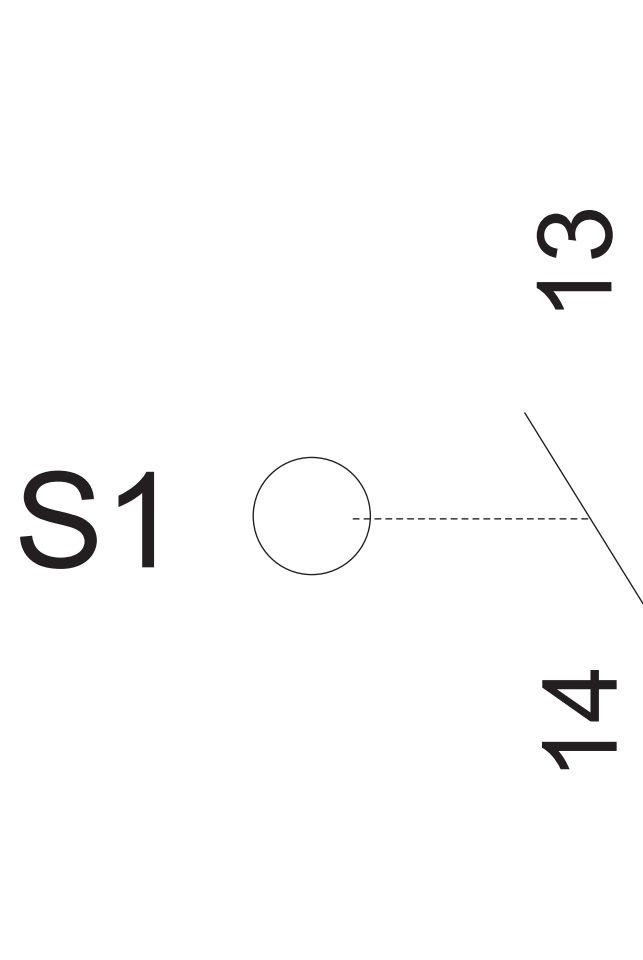


Figura 6.35. Cámara de contactos montada en cuerpo independiente.

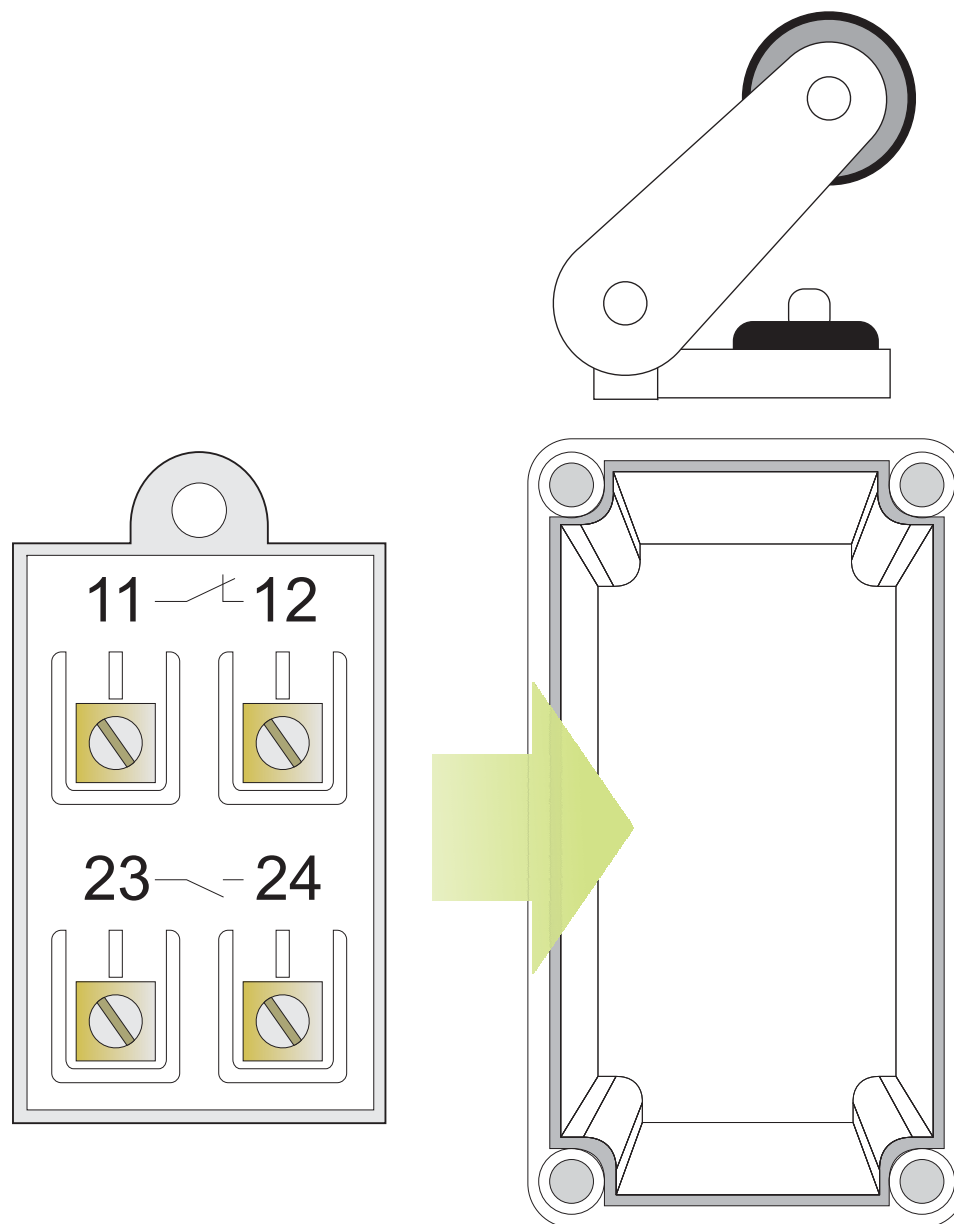


Figura 6.36. Interruptor de posición para un contacto.

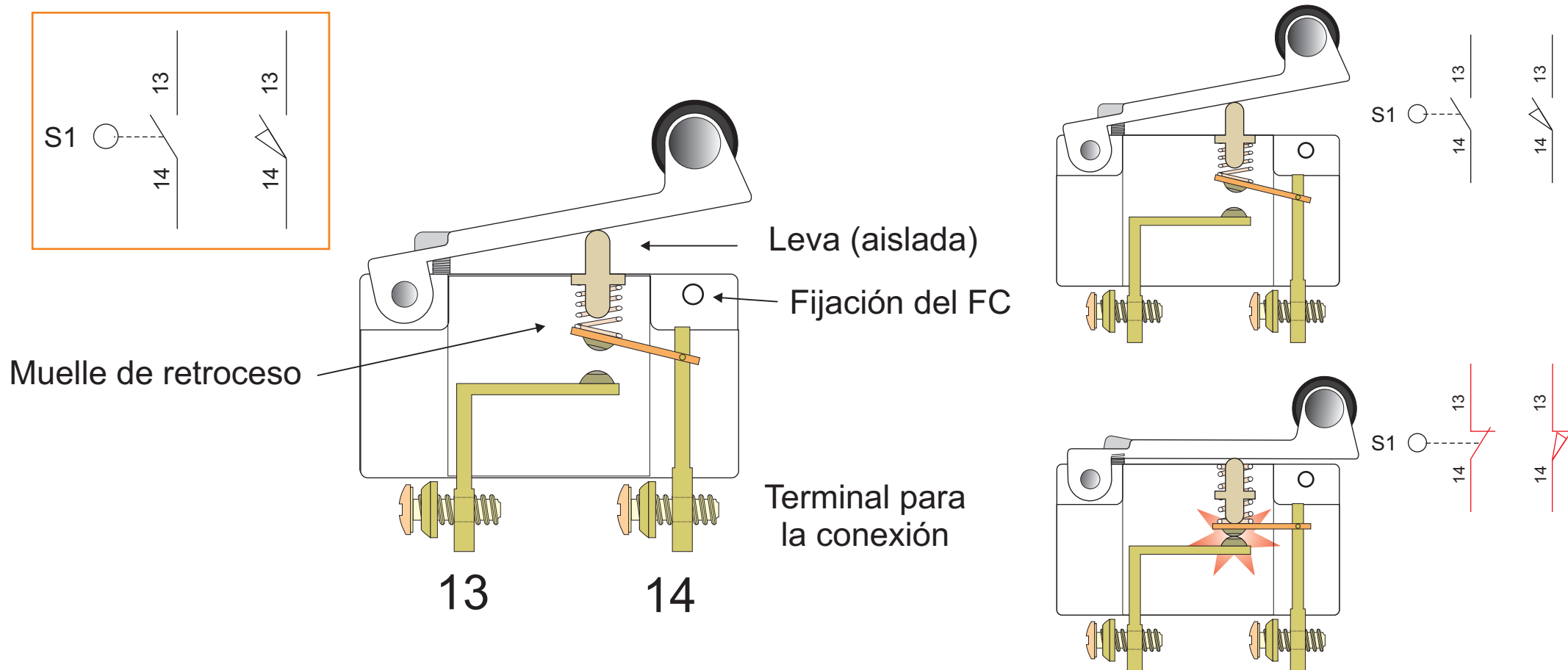


Figura 6.37. Simbología detallada del interruptor de posición.

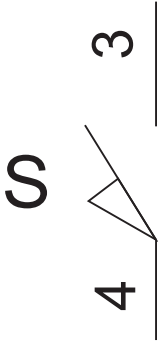
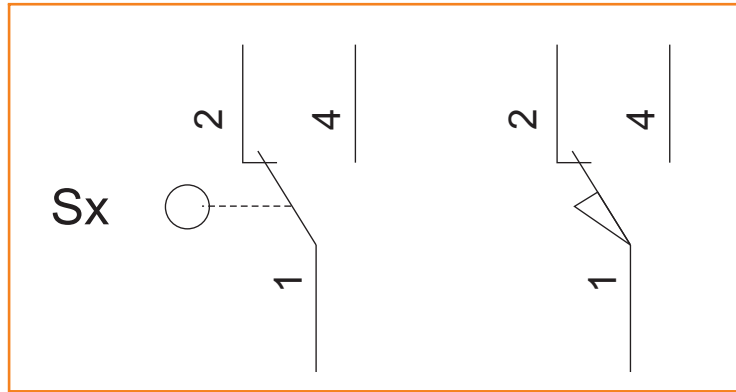
Símbolo	Identificador	Terminales	Final
			

Figura 6.38. Final de carrera con contactos conmutados.



Muelle de forzado

Muelle de retroceso

Leva (aislada)

Fijación del FC

Terminales para la conexión

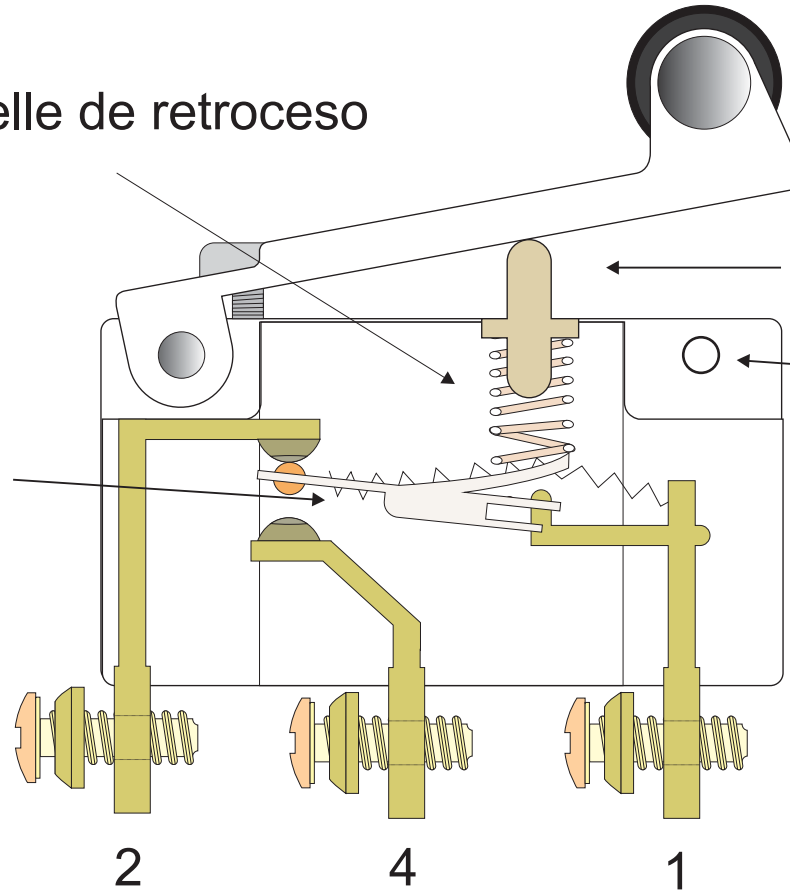


Figura 6.39. Simbología del final de carrera con contactos conmutados.

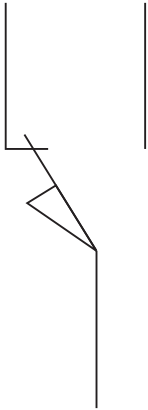
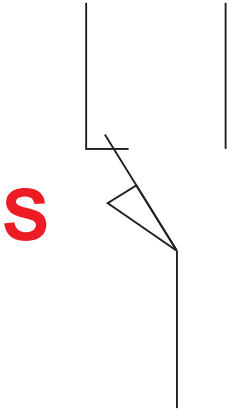
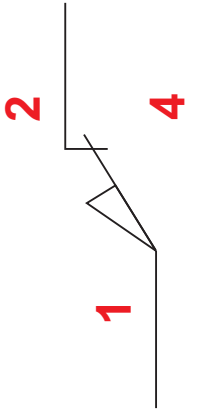
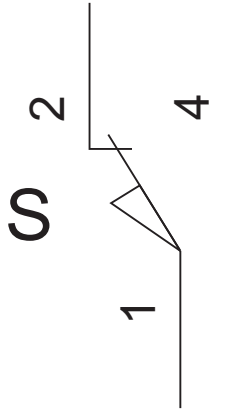
Símbolo	Identificador	Terminales	Final
			

Figura 6.40. Final de carrera con cabezal escamoteable.

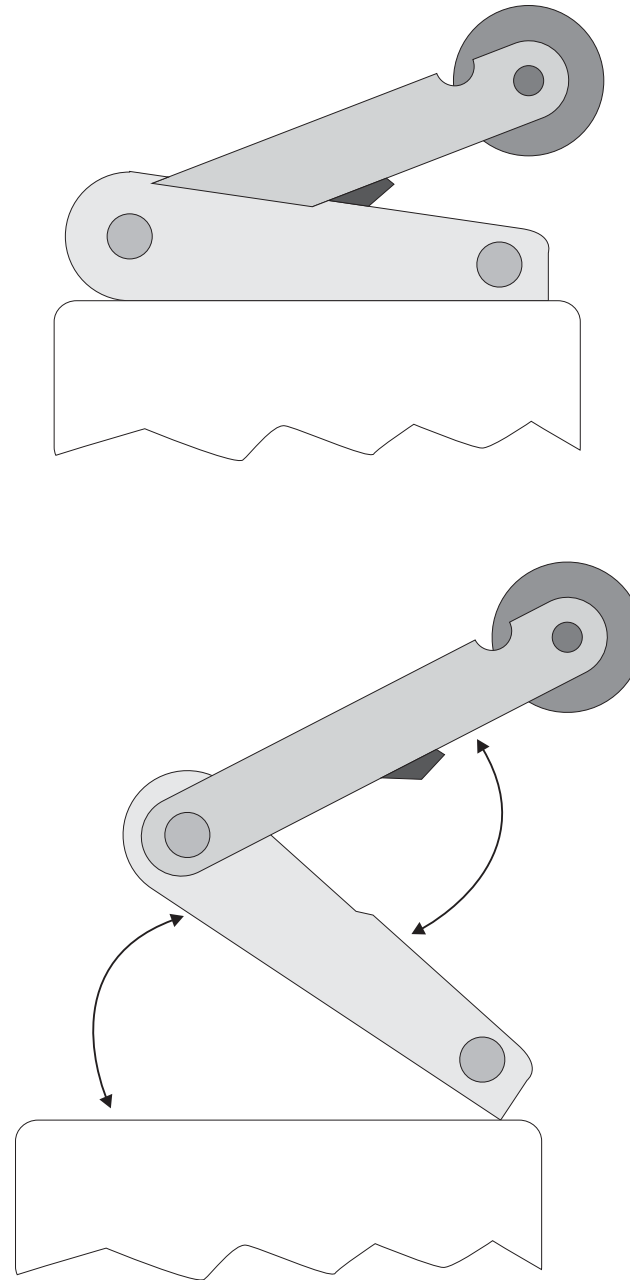
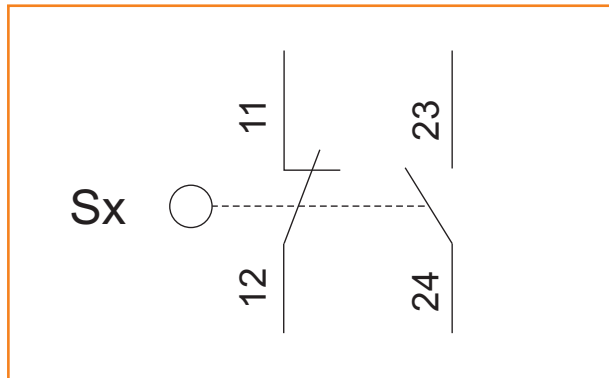


Figura 6.41. Final de carrera con varias cámaras de contactos.



Muelle de retroceso

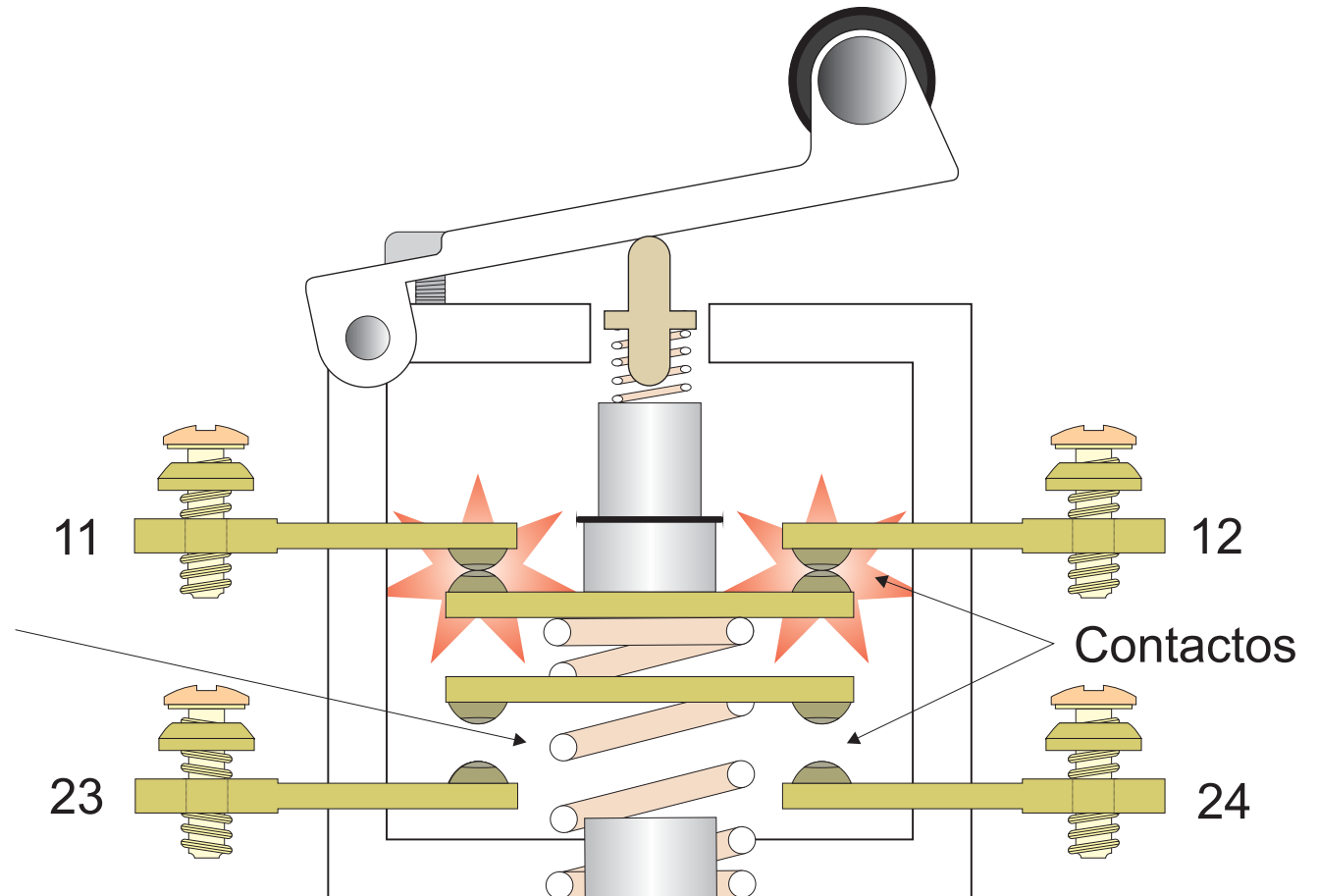


Figura 6.42. Simbología alternativa final de carrera con varias cámaras.

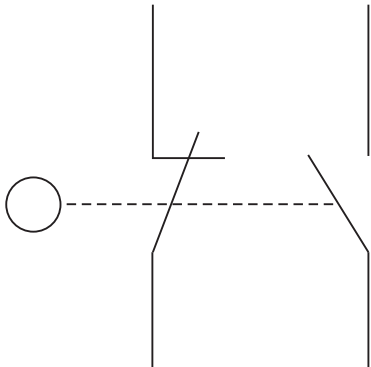
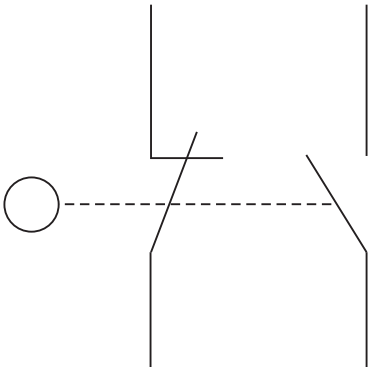
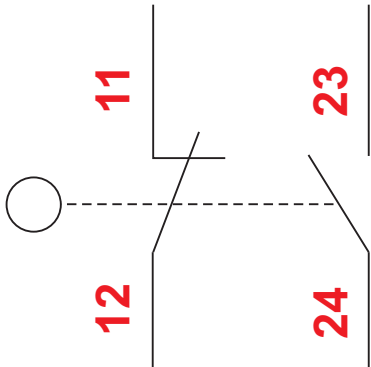
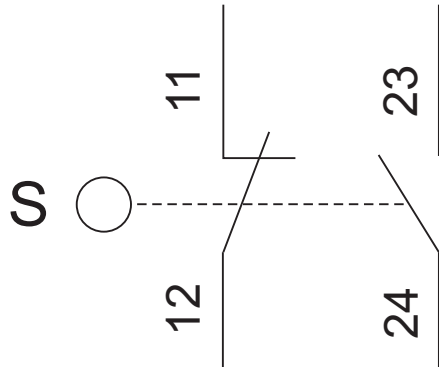
Símbolo	Identificador	Terminales	Final
	S 		

Figura 6.43. Dos ejemplos de uso para sensores de proximidad.

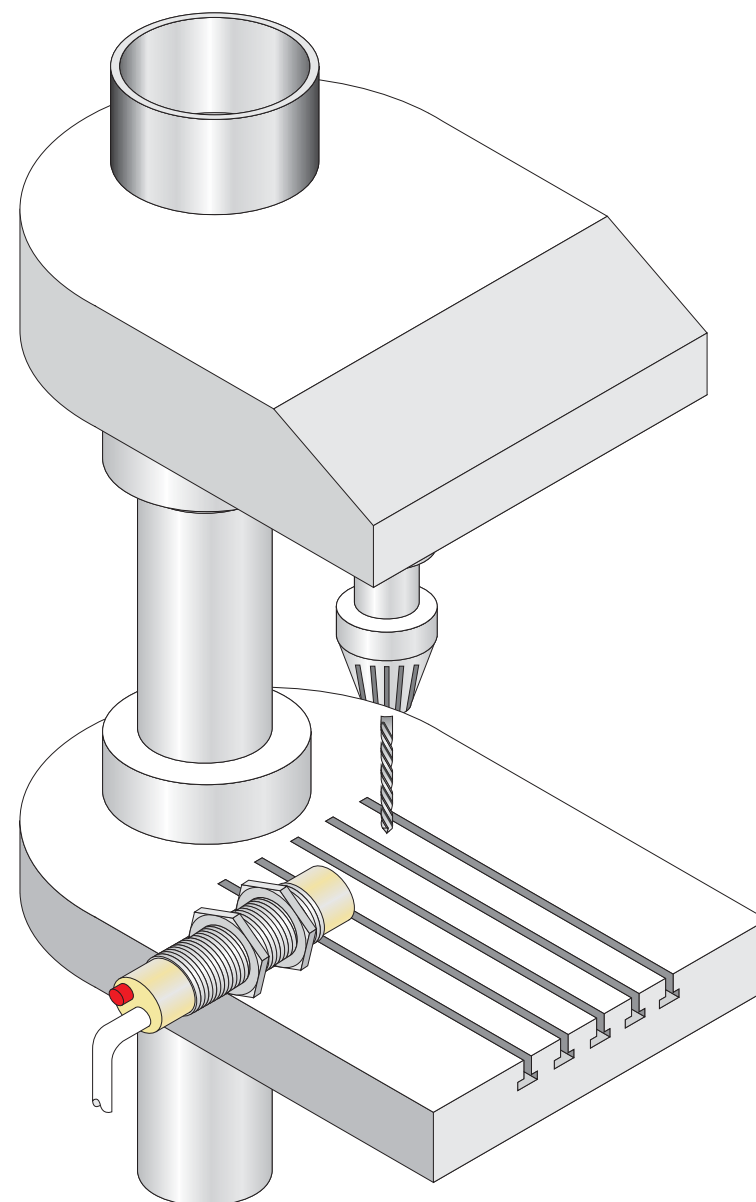
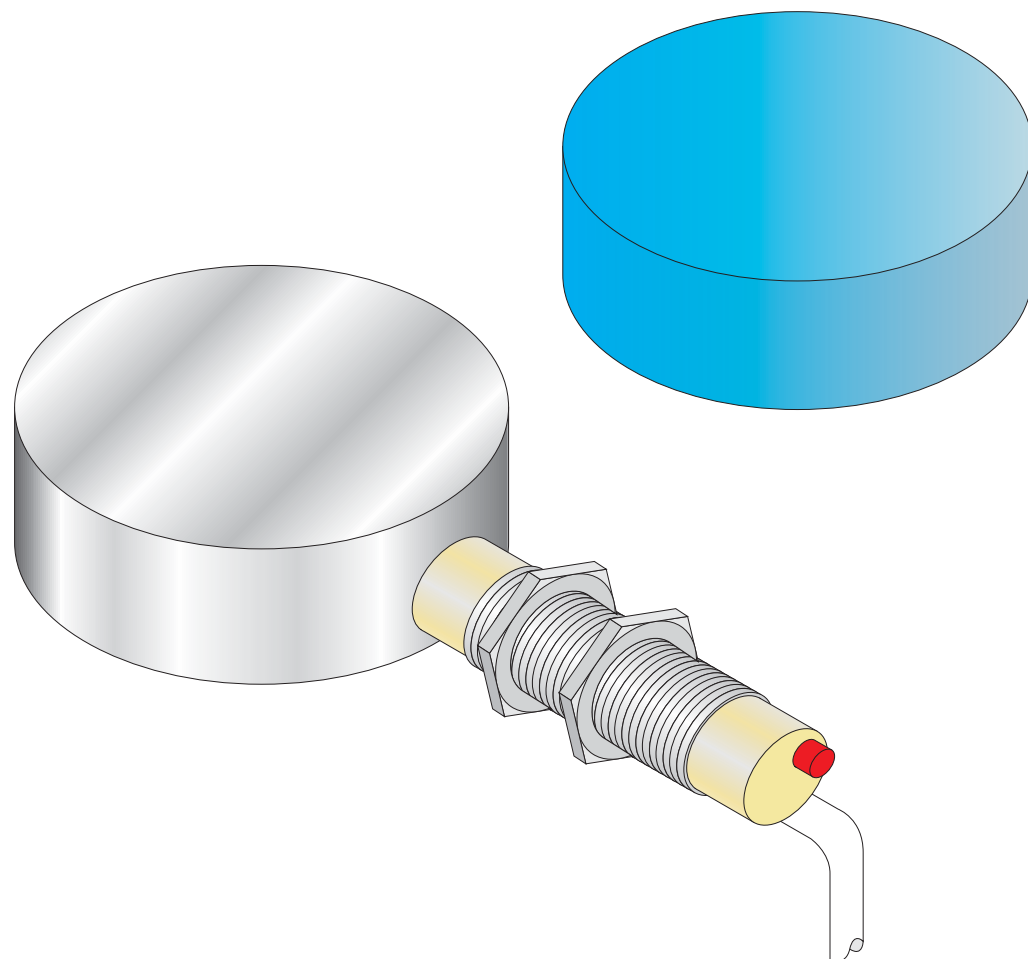


Figura 6.44. Un material metálico altera el campo magnético generado por un circuito.

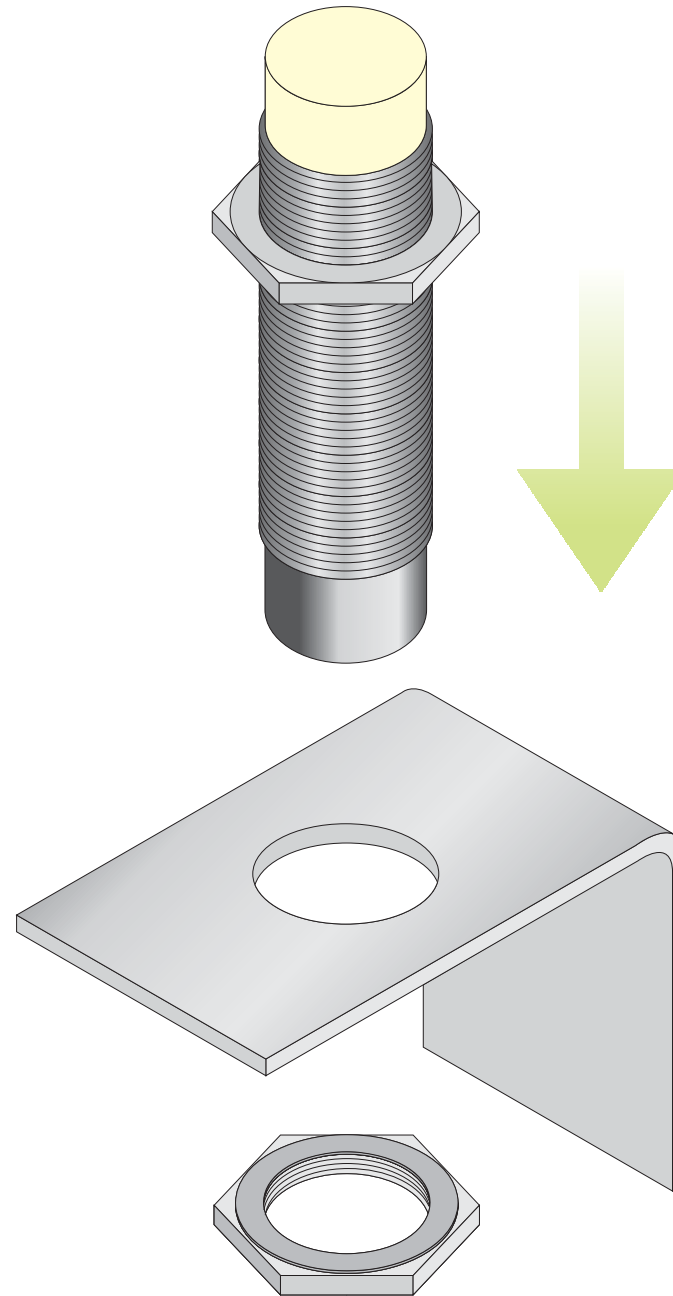


Figura 6.45.

El encapsulado roscado de los detectores, permite una fácil disposición.

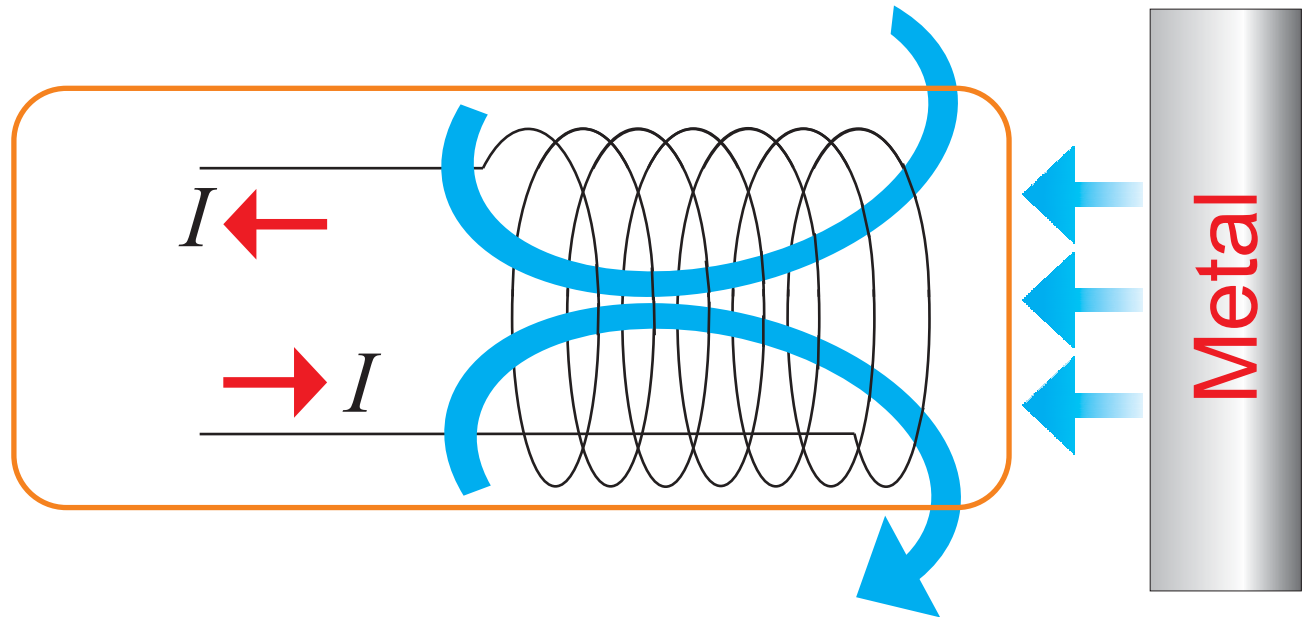
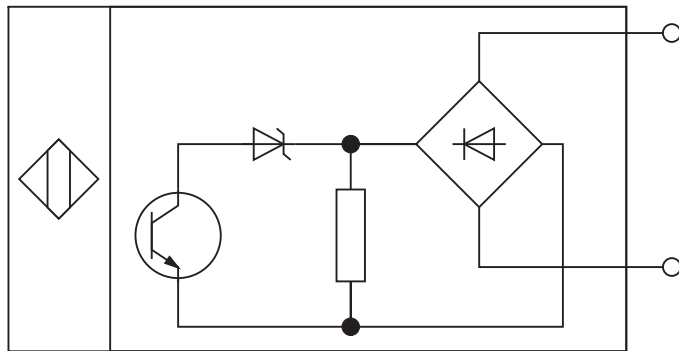


Figura 6.46. Conexión de detectores inductivos a dos hilos.

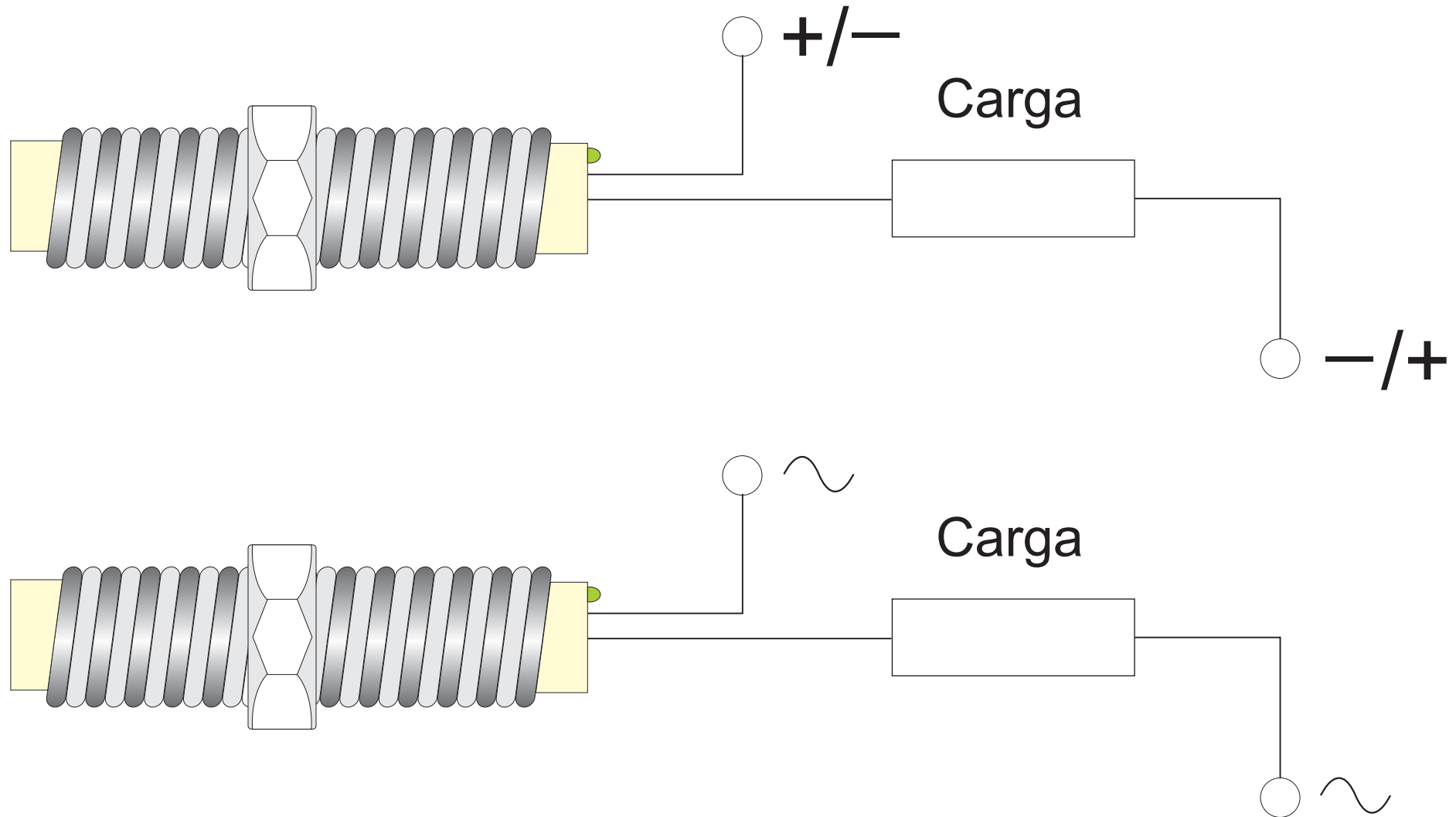
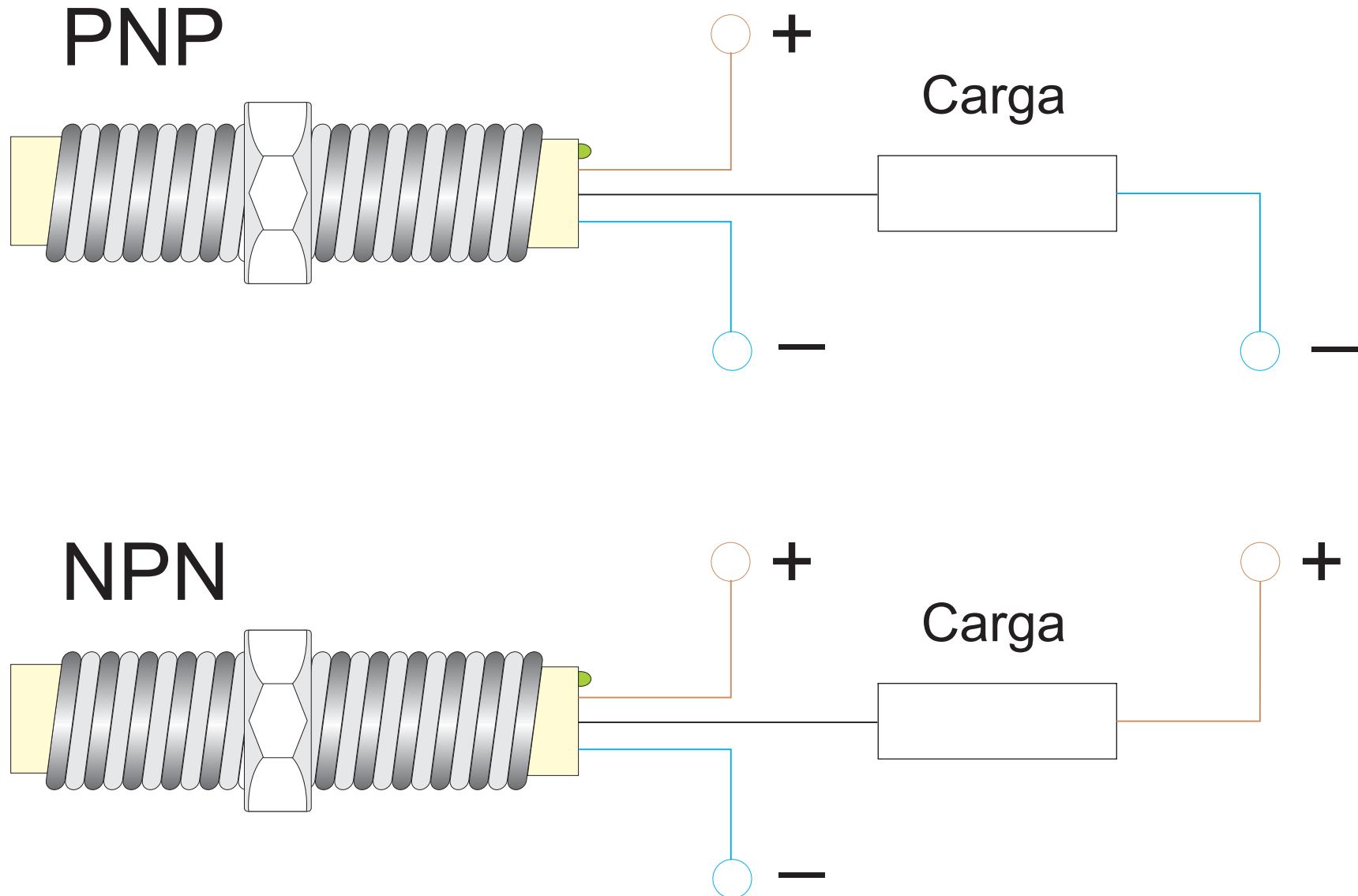


Figura 6.47. Conexión de detectores inductivos a tres hilos.



*Figura 6.48. Un relé de corriente continua es excitado por el detector inductivo.
El relé cuenta a su vez con cuatro contactos conmutados.*

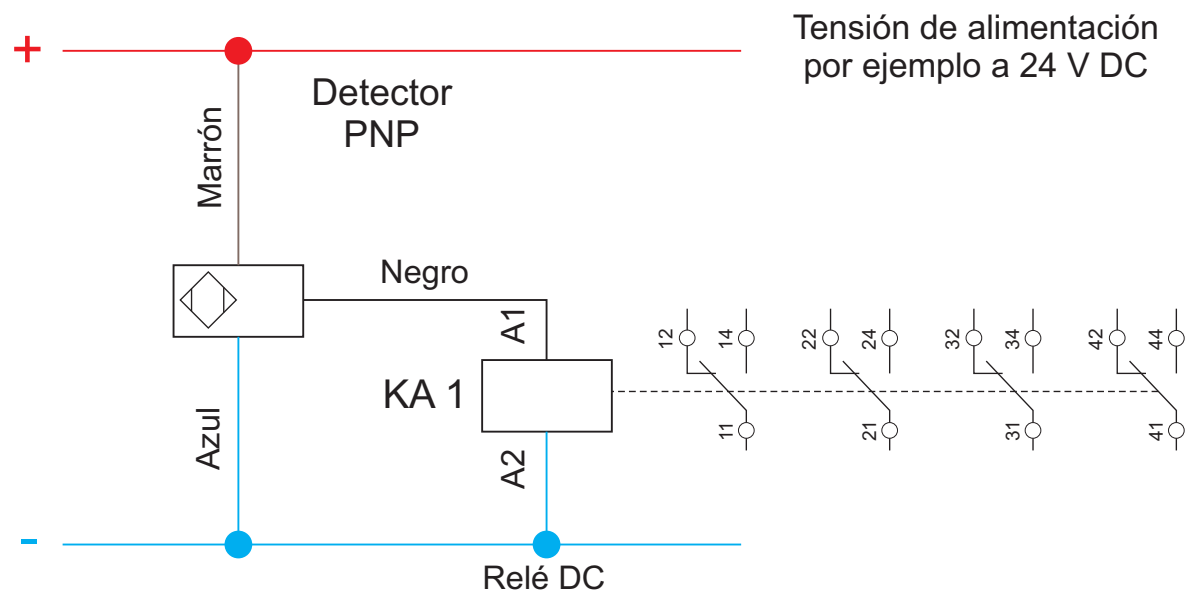
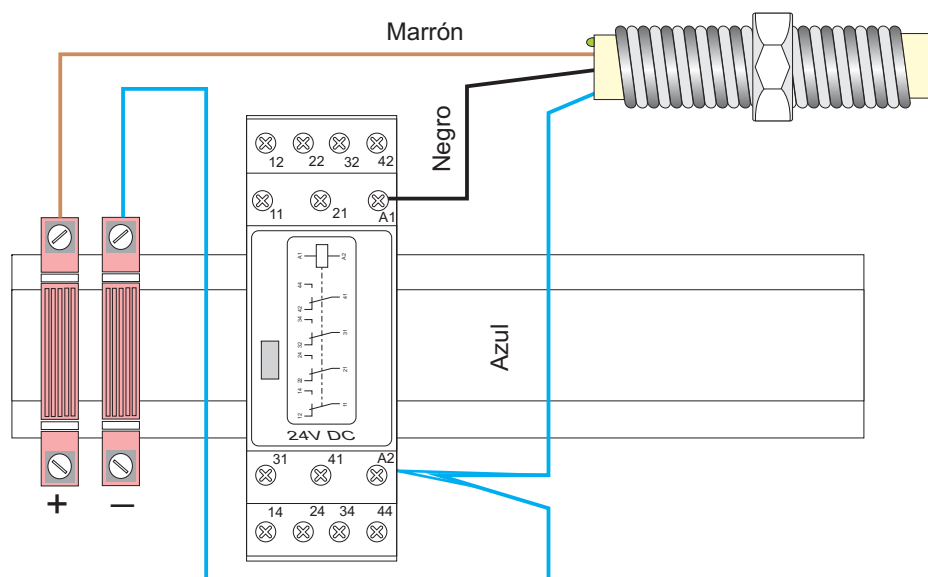


Figura 6.49. Detector a 4 hilos.

Señales directa y
complementaria
NC / NA

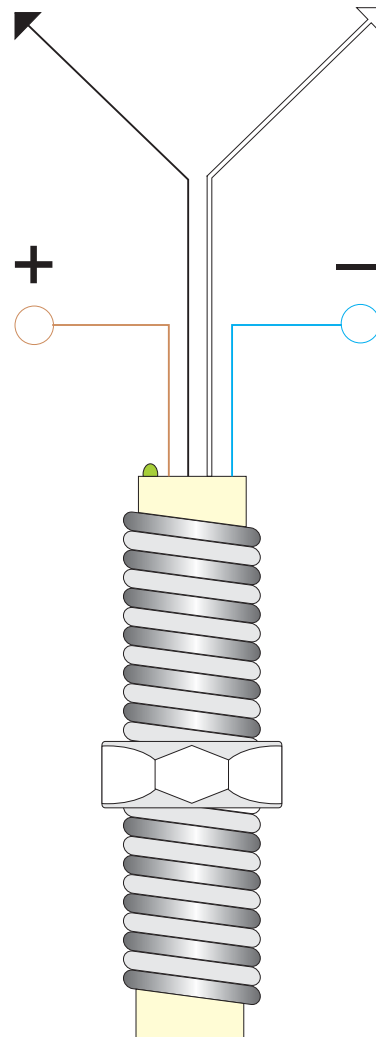


Figura 6.50. Simbología del detector inductivo.

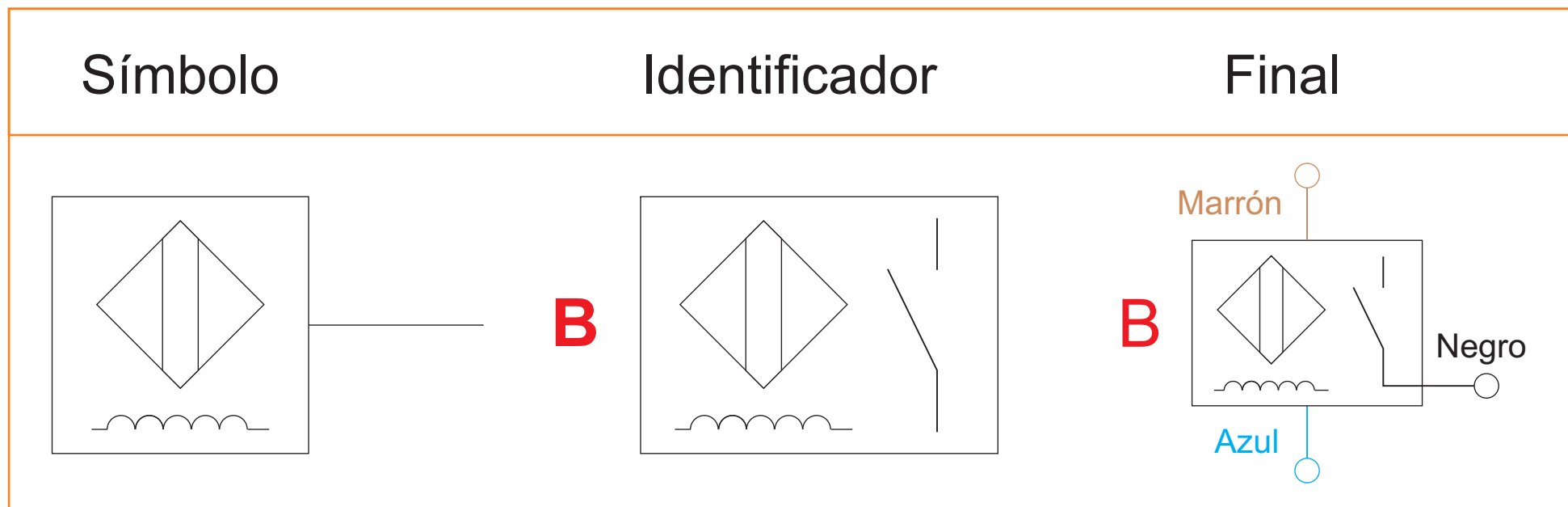


Figura 6.51. Los colores de los conductores aportan información del detector.

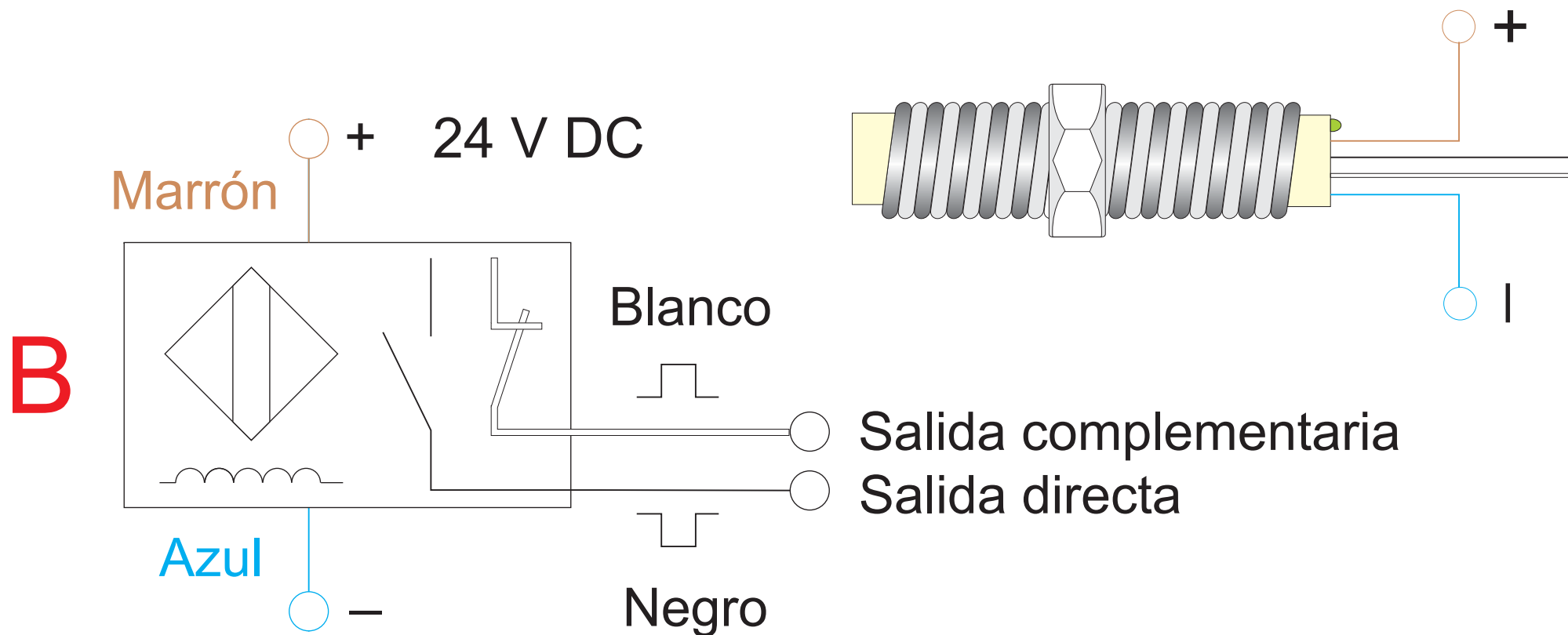


Figura 6.52. Simbología detector capacitivo.

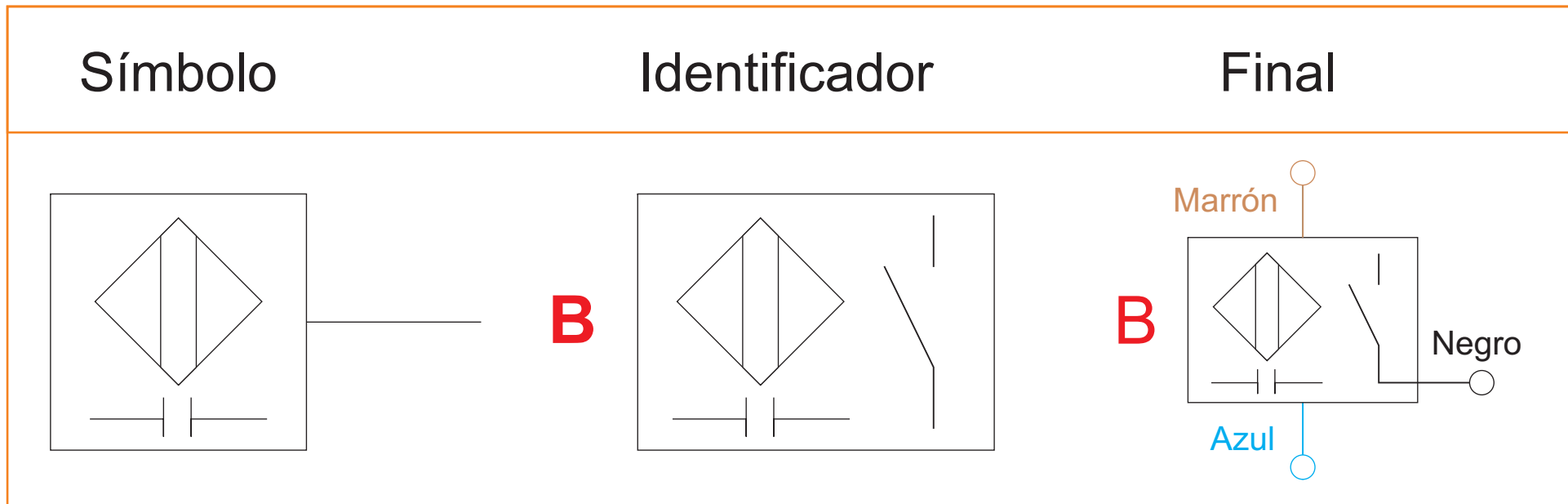


Figura 6.53.

Módulo amplificador para sensores capacitivos con control de máximo y mínimo.

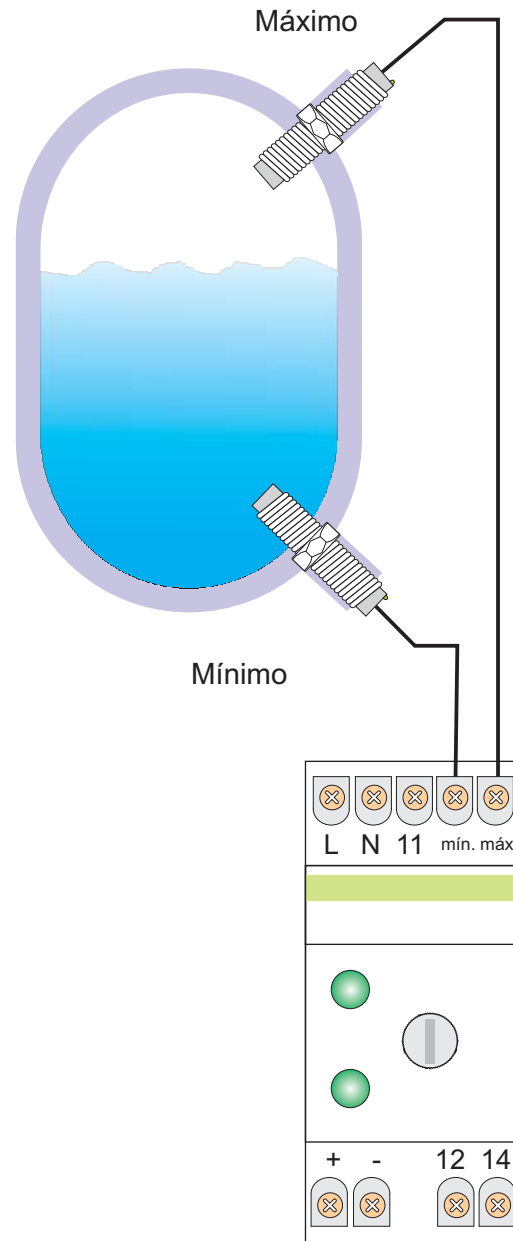


Figura 6.54. Módulo amplificador para un detector.

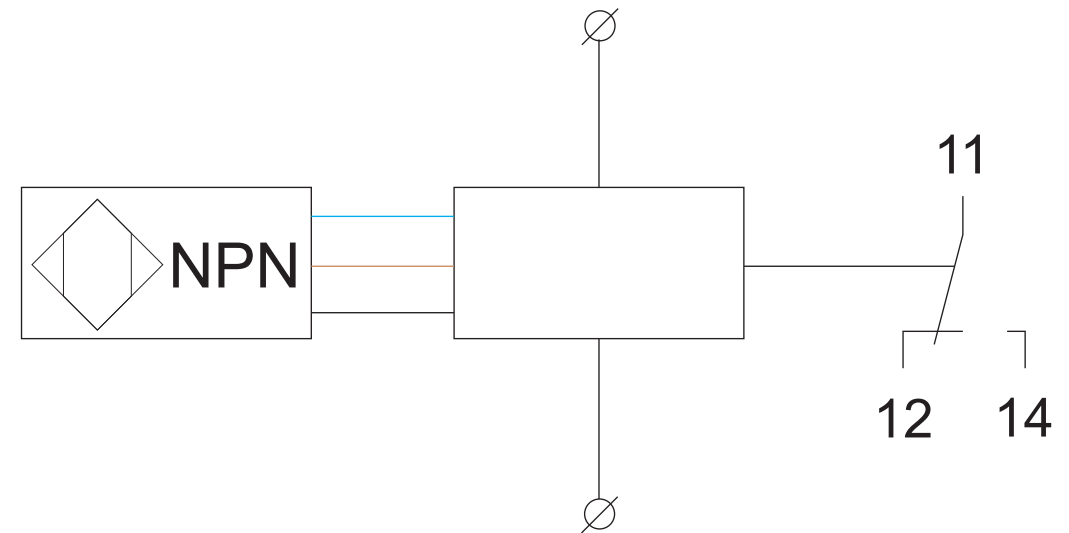
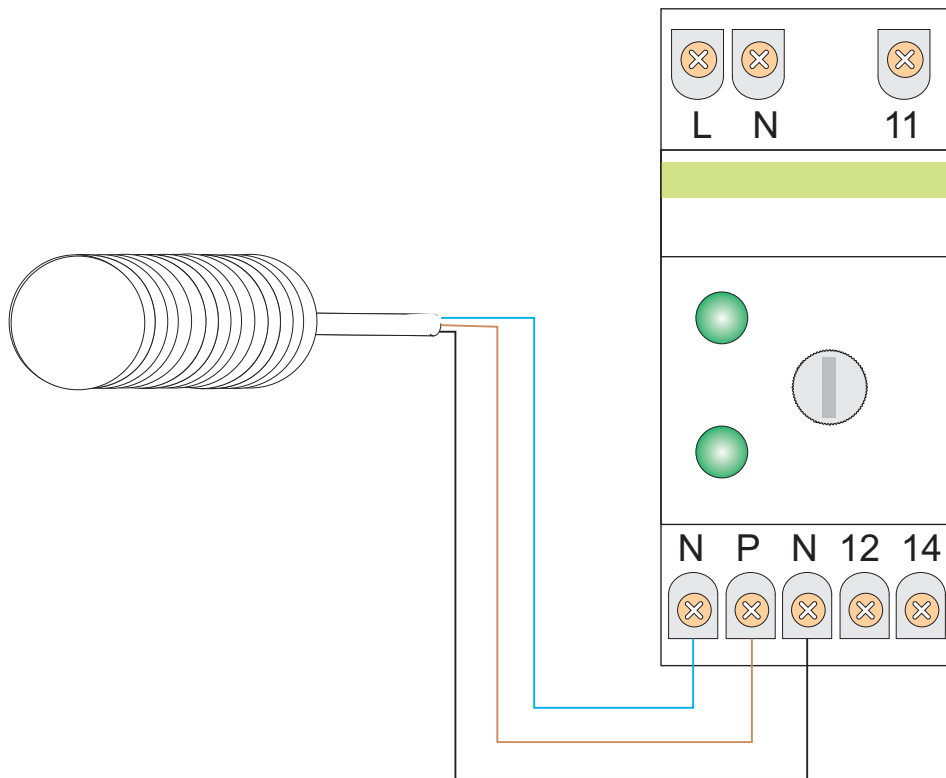


Figura 6.55. Asociación de detectores en serie, paralelo y ejemplo de uso.

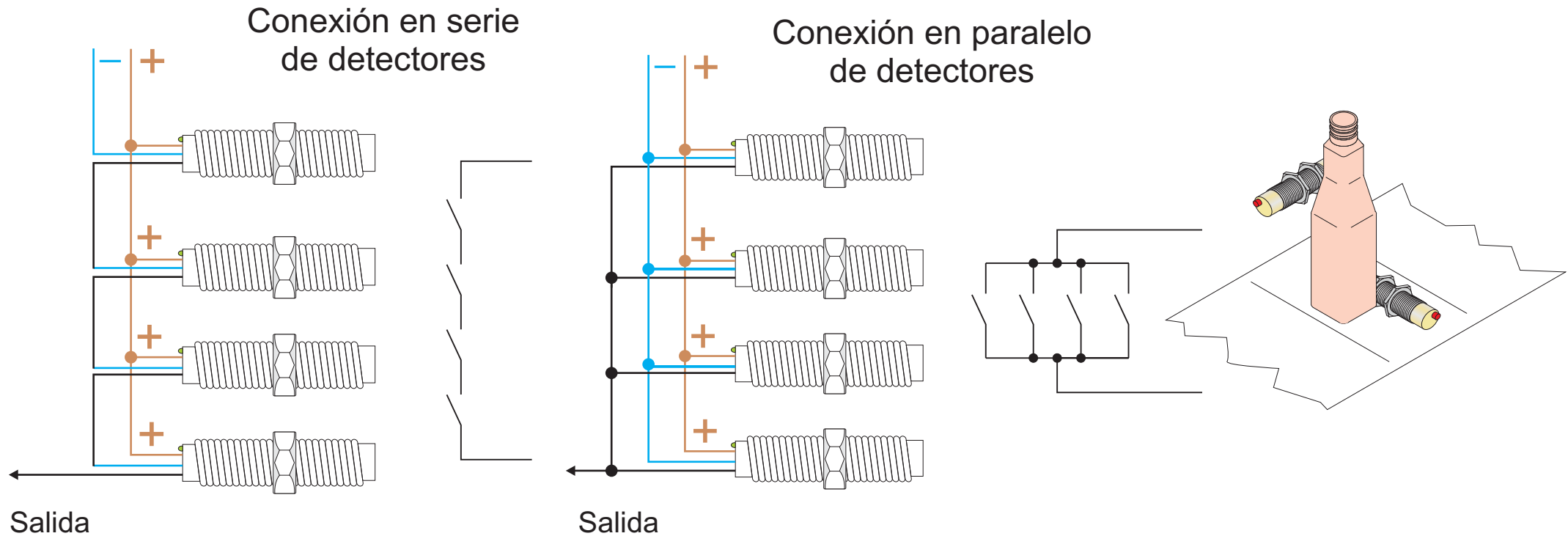


Figura 6.56. Detector fotoeléctrico de barrera.

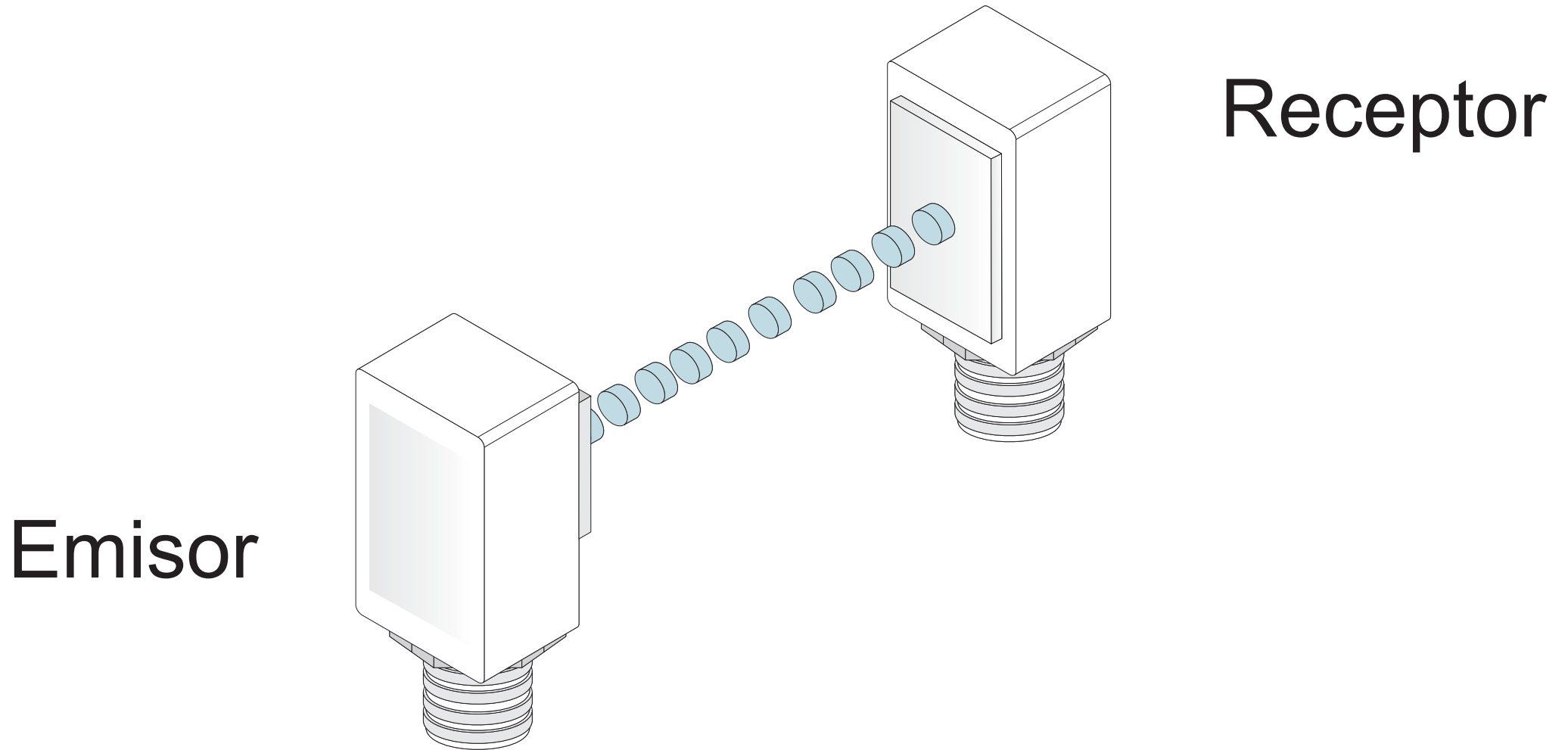


Figura 6.57. Detector fotoeléctrico réflex.

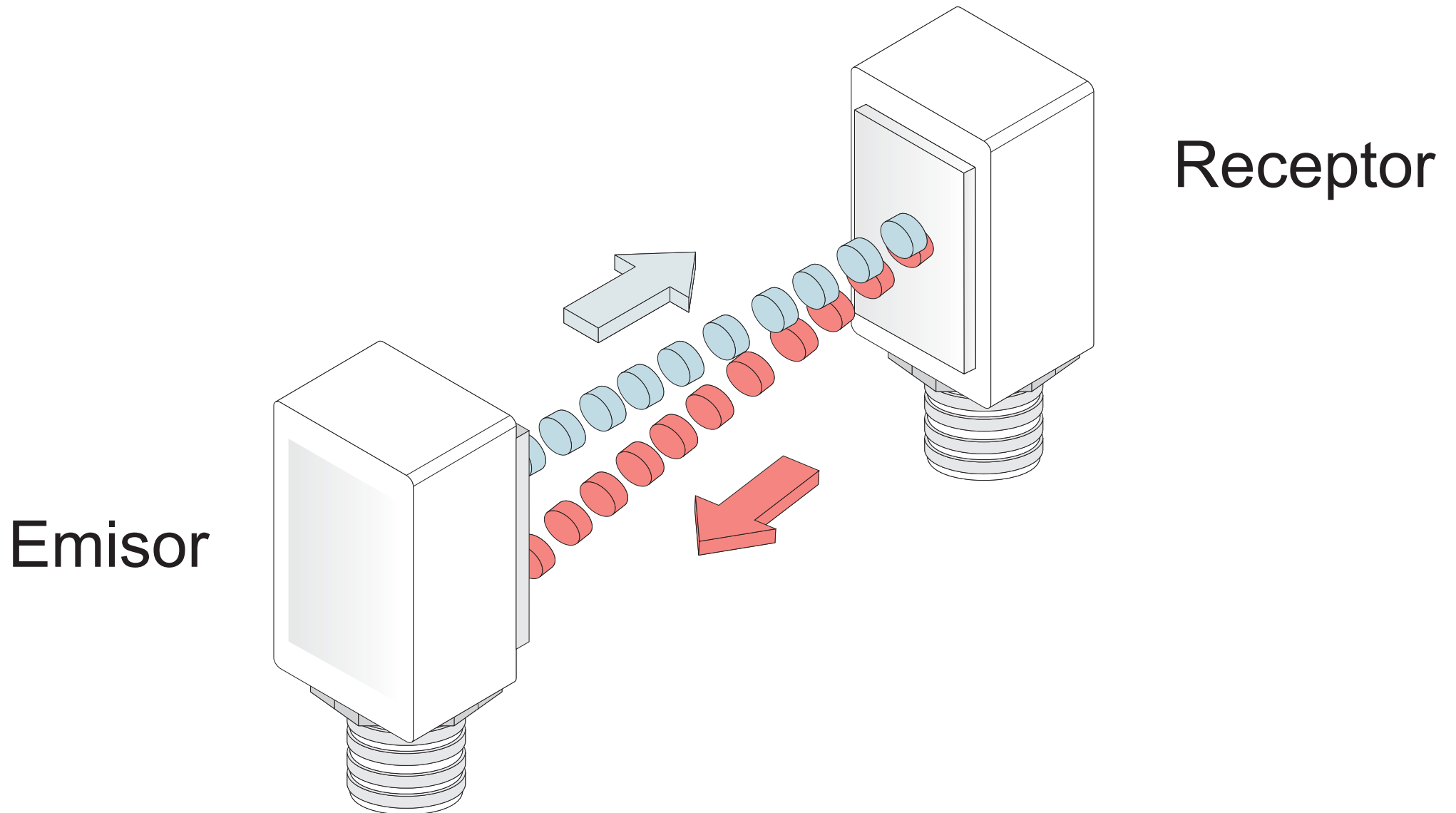
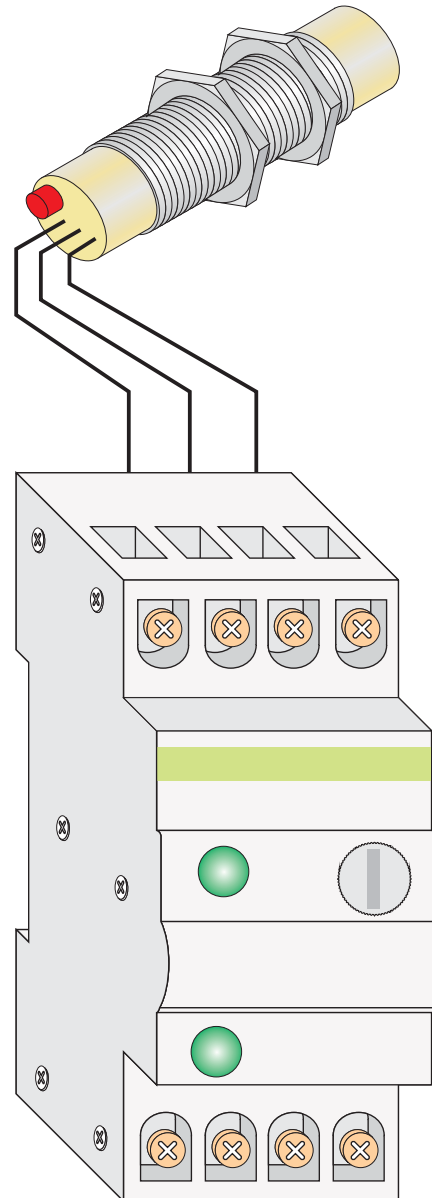


Figura 6.58.

El módulo amplificador, aporta los valores eléctricos que necesitan los sensores.



*Figura 6.59. El detector fotoeléctrico réflex,
Dispone de un contacto conmutado, libre de potencial.*

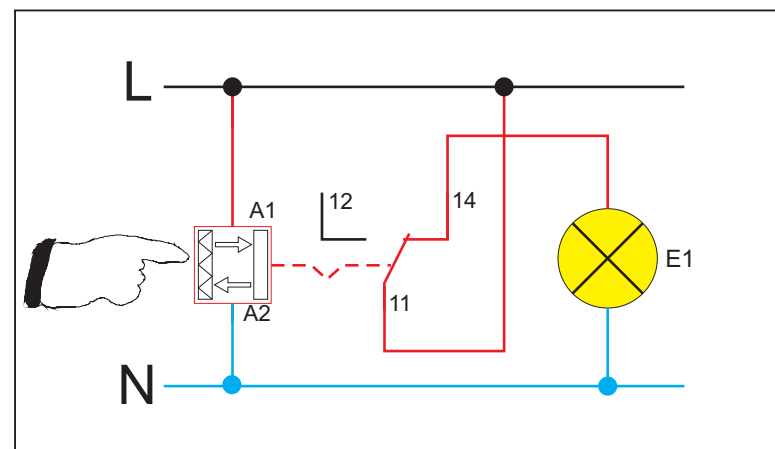
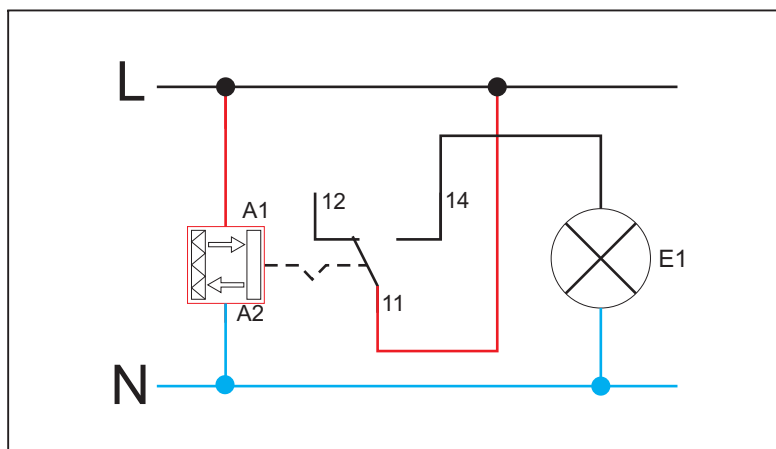
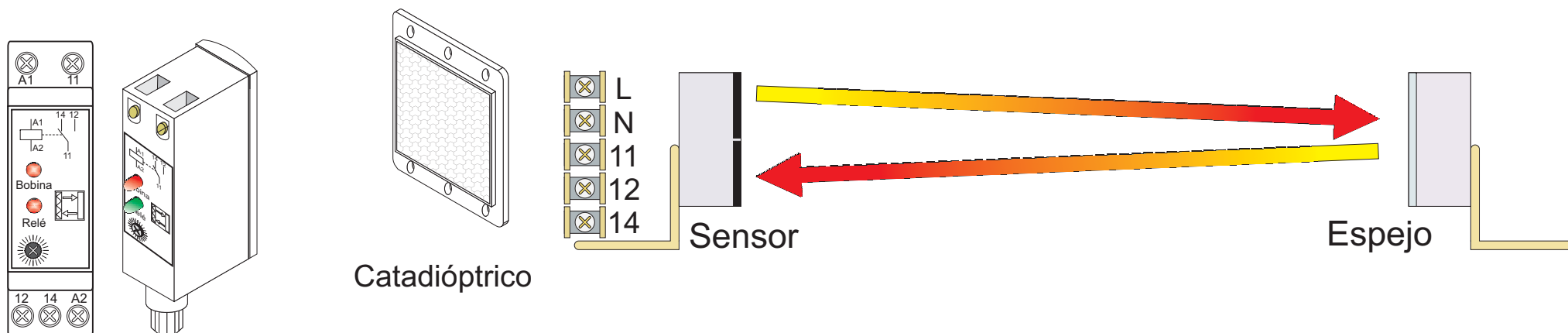
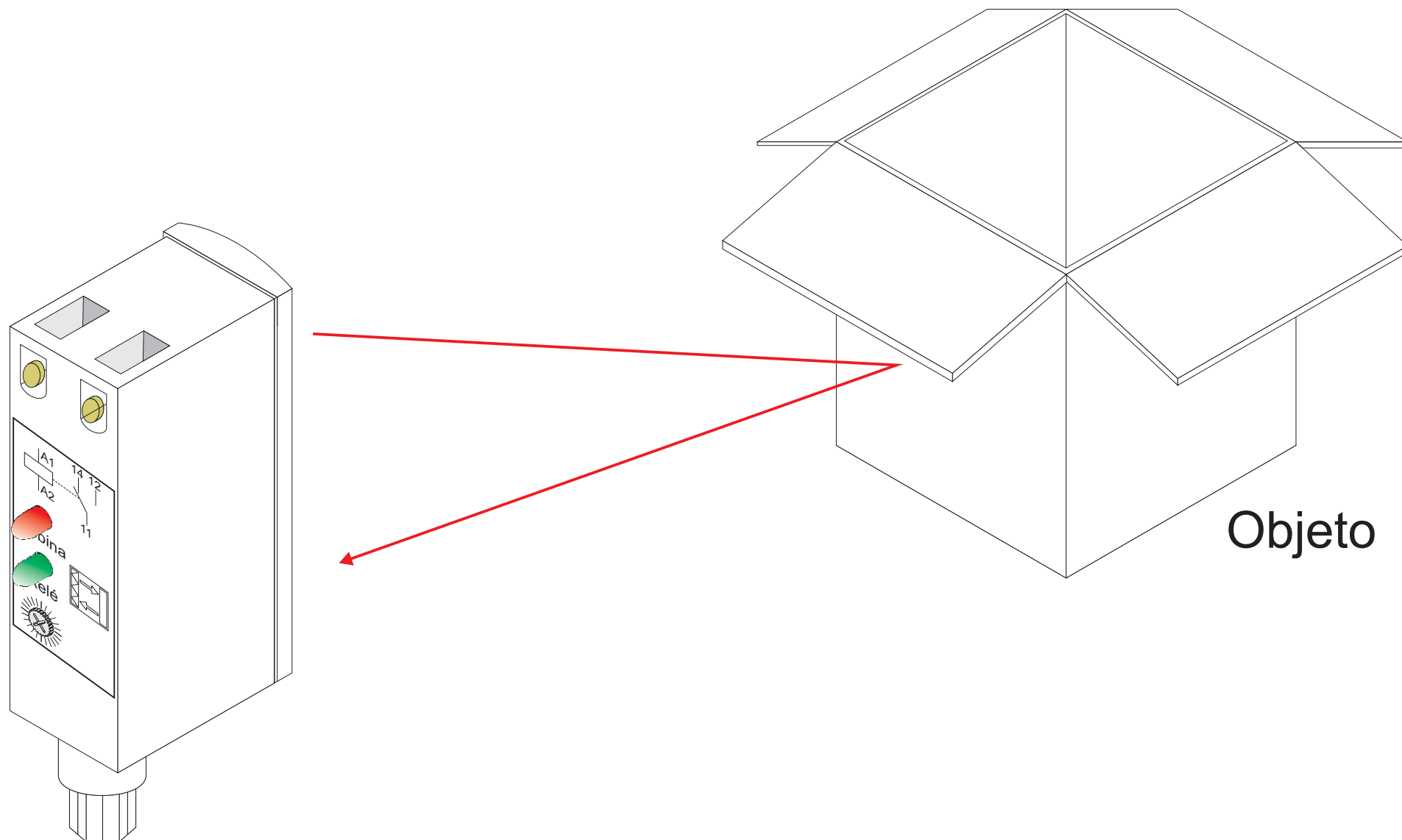


Figura 6.60. El detector fotoeléctrico de proximidad, utiliza el propio objeto como reflectante.



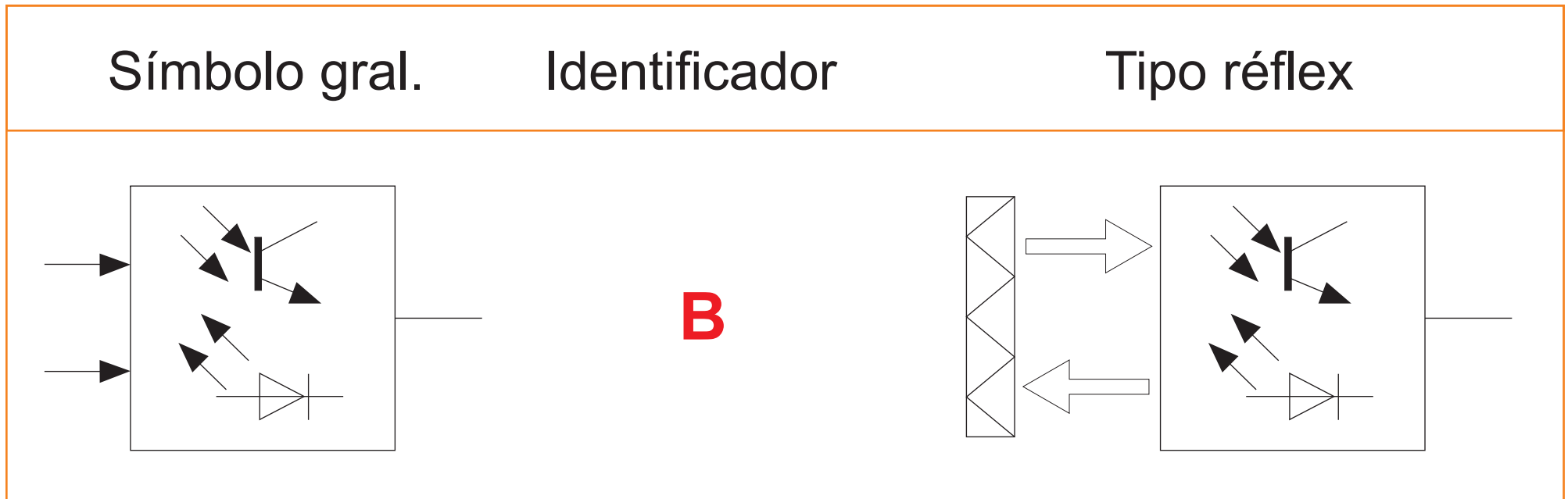


Figura 6.62.

Esquema eléctrico de un detector fotoeléctrico réflex de uso común.

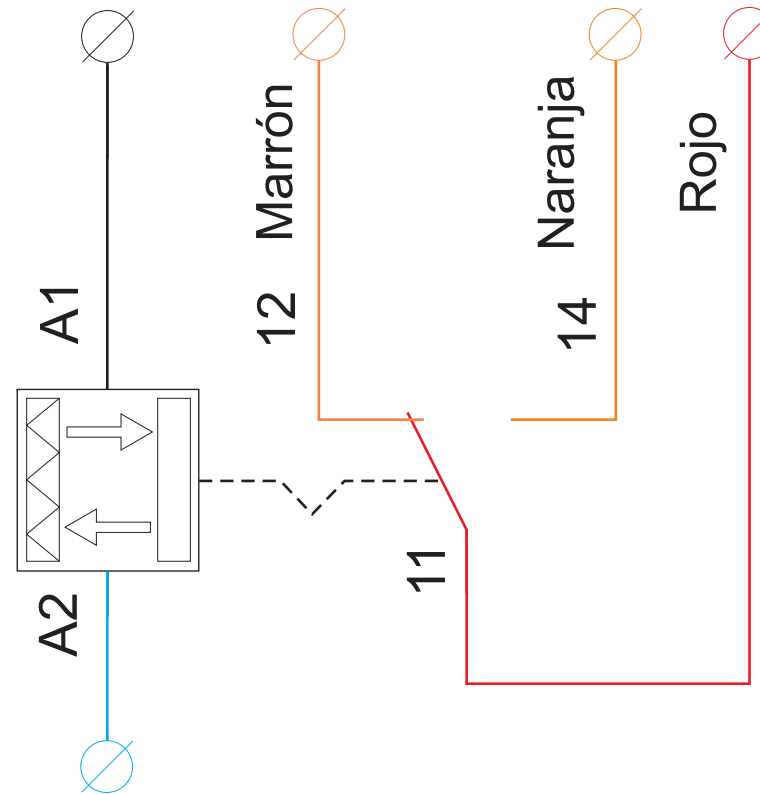


Figura 6.63. Visera para detector fotoeléctrico.

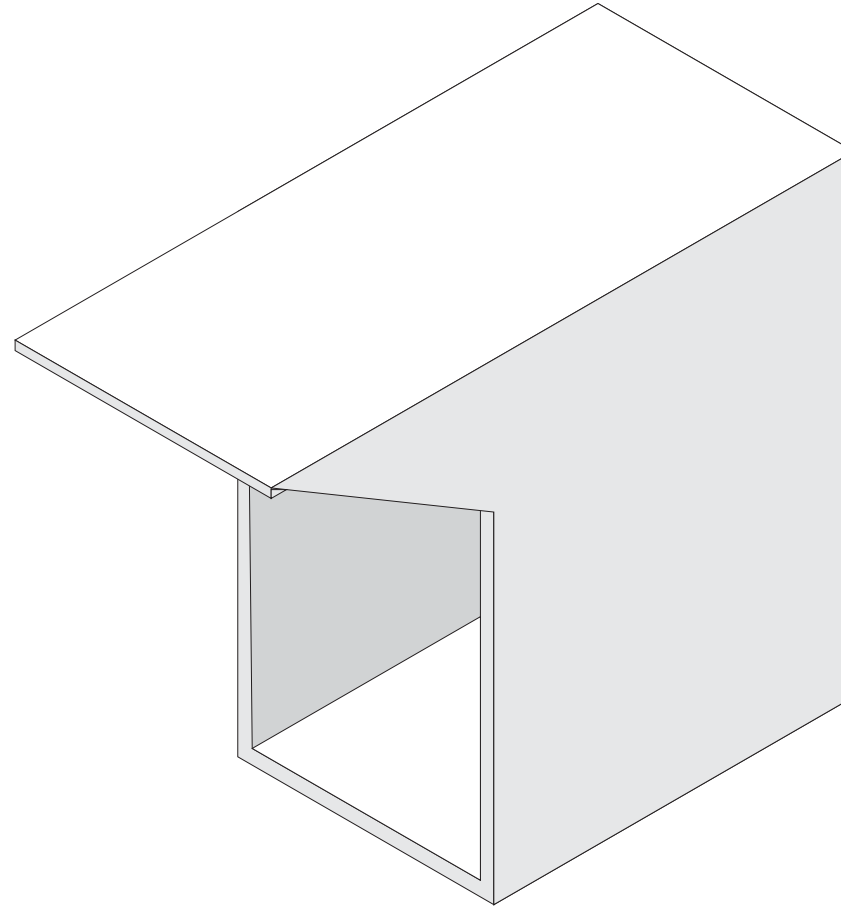


Figura 6.64. Sensor ultrasónico y campo de actuación.

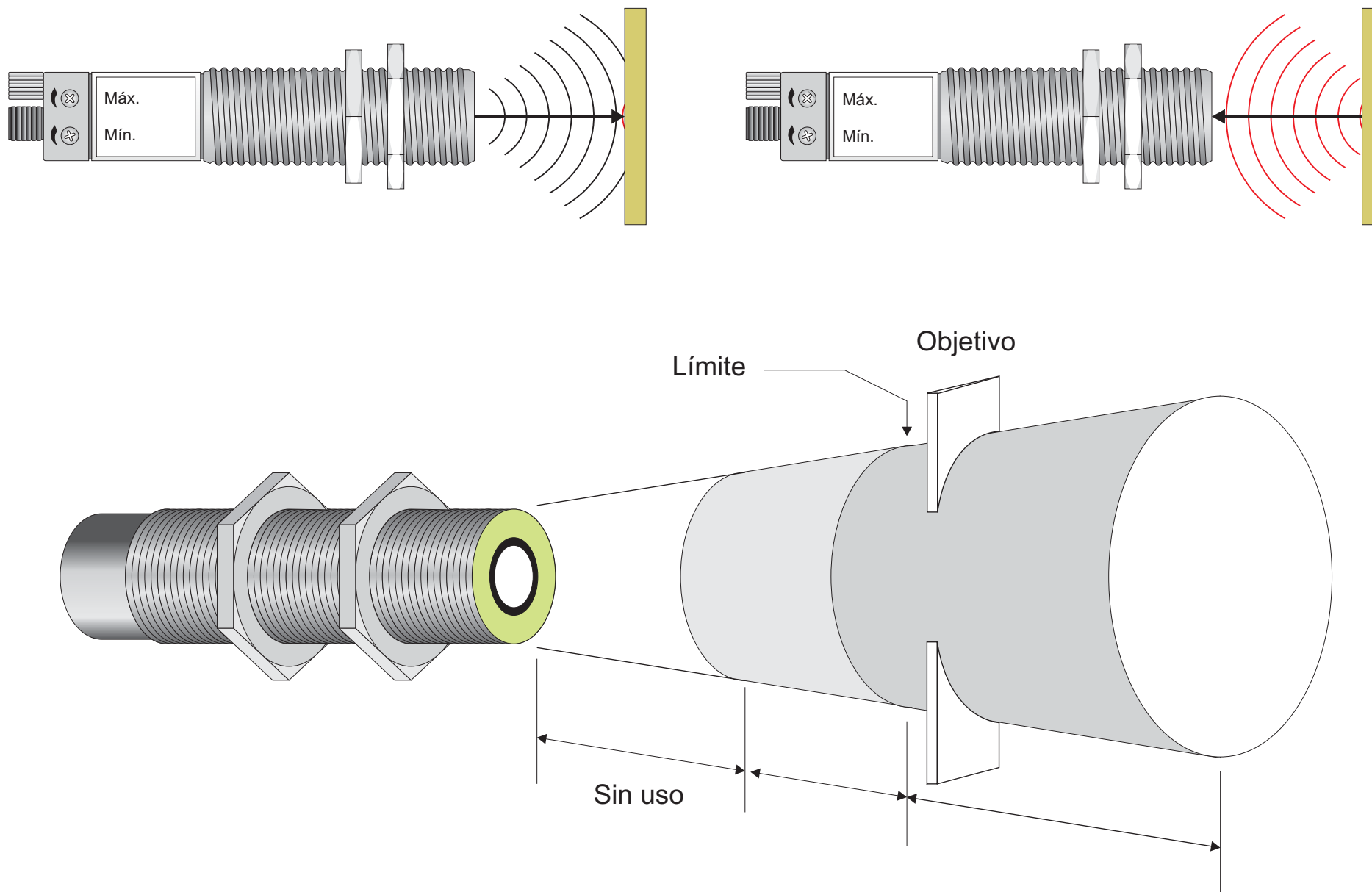
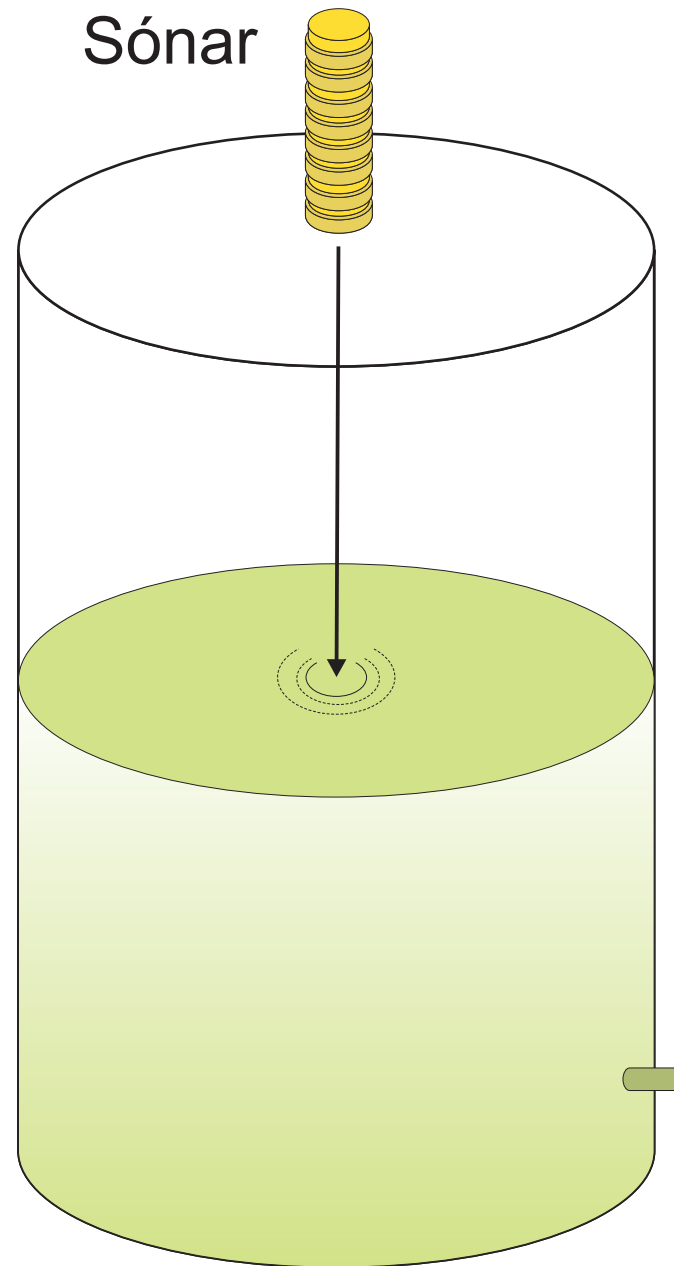
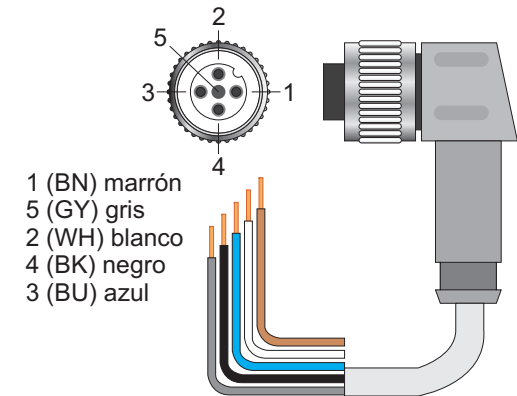
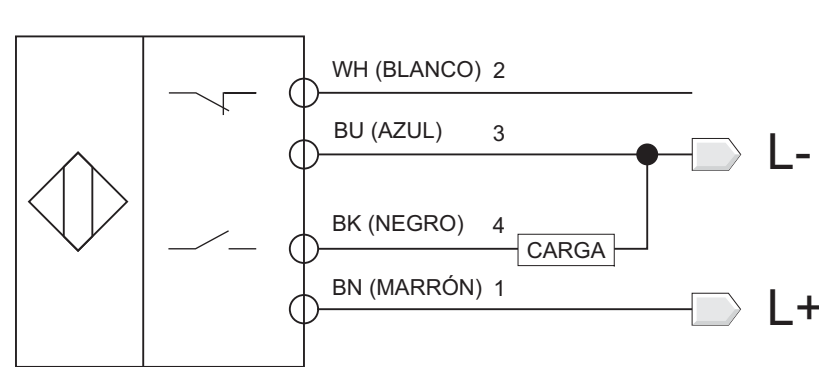
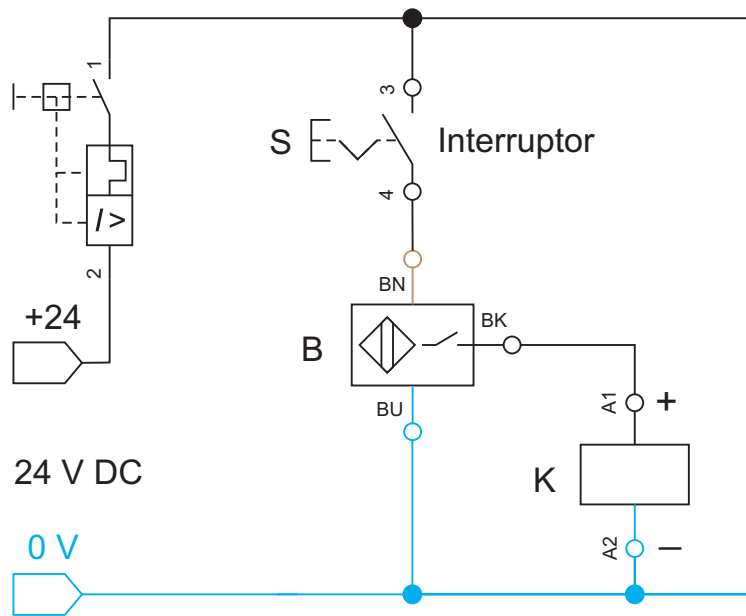


Figura 6.65. Medida de volumen con sónar.



6 Captadores y sensores eléctricos

Figura 6.66. Conexión típica de un sensor por ultrasonidos, y un esquema de puesta en marcha del mismo a modo de ejemplo.



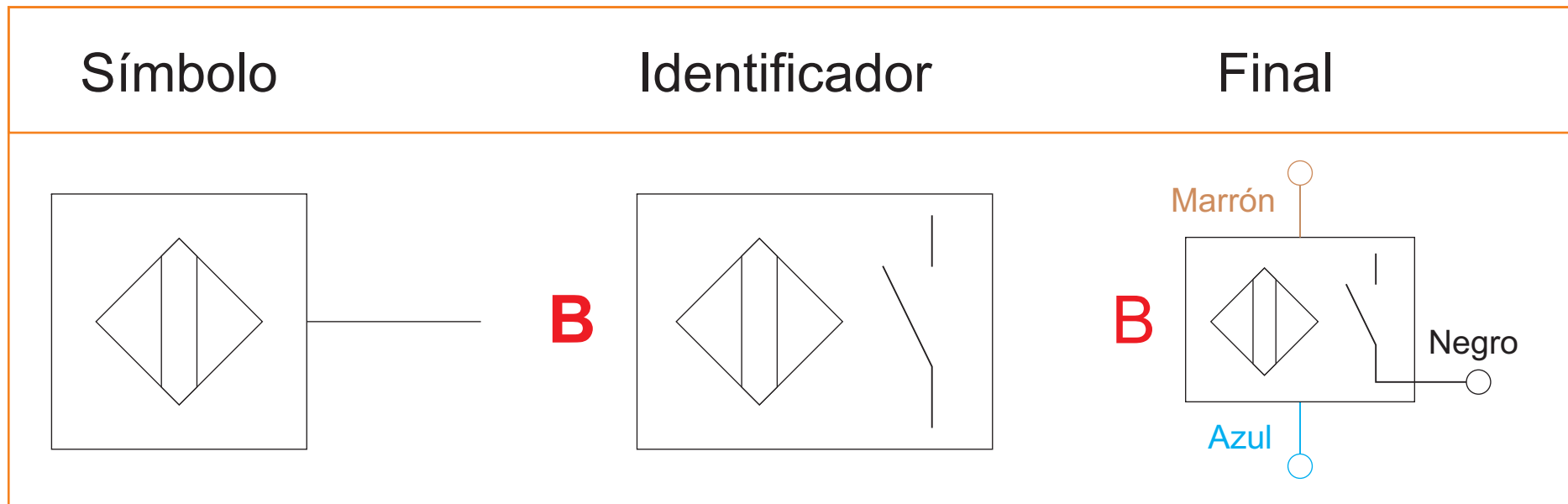


Figura 6.68. Sensor de fibra óptica y detalle de un conducto.

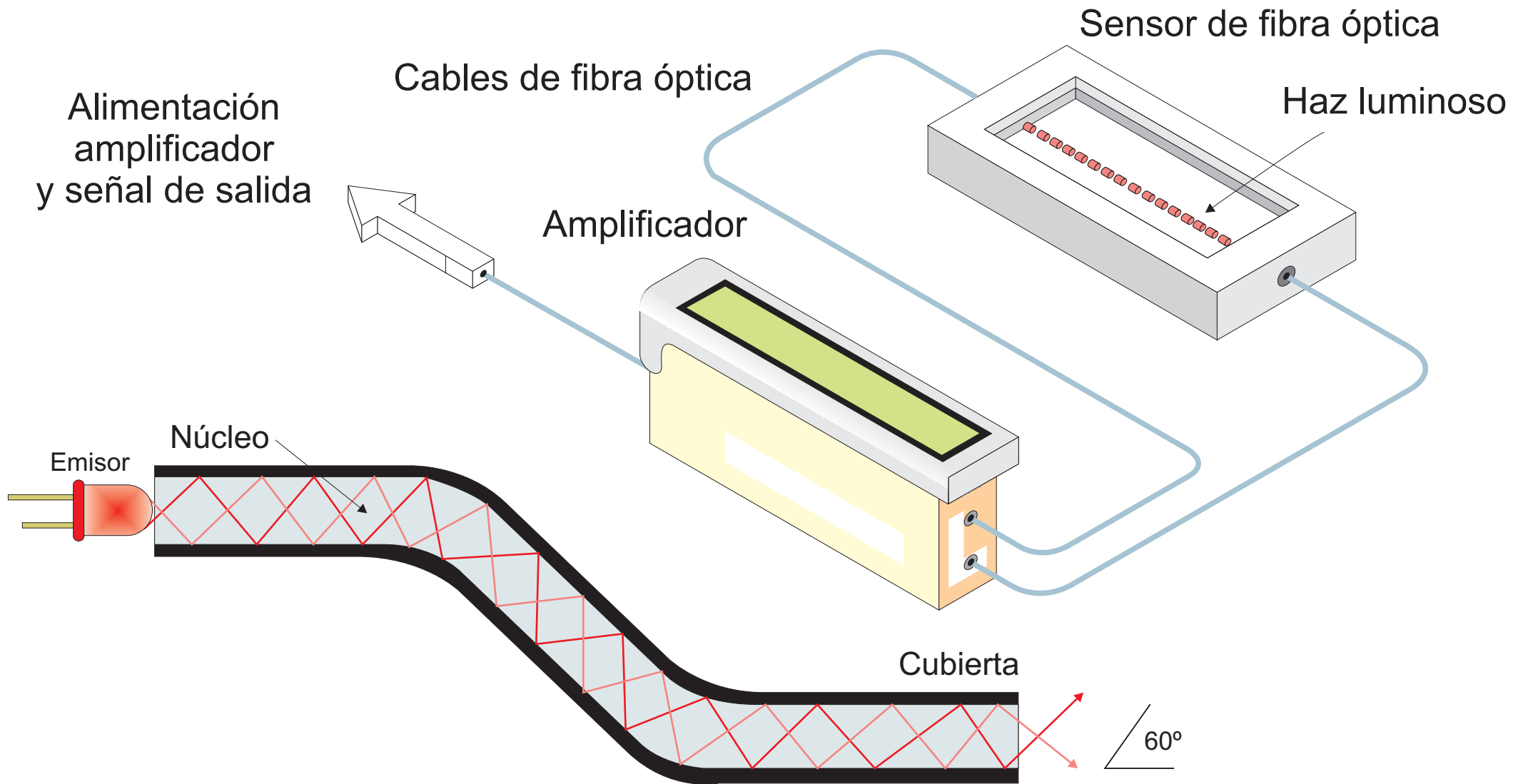


Figura 6.69. Cables de fibra óptica.

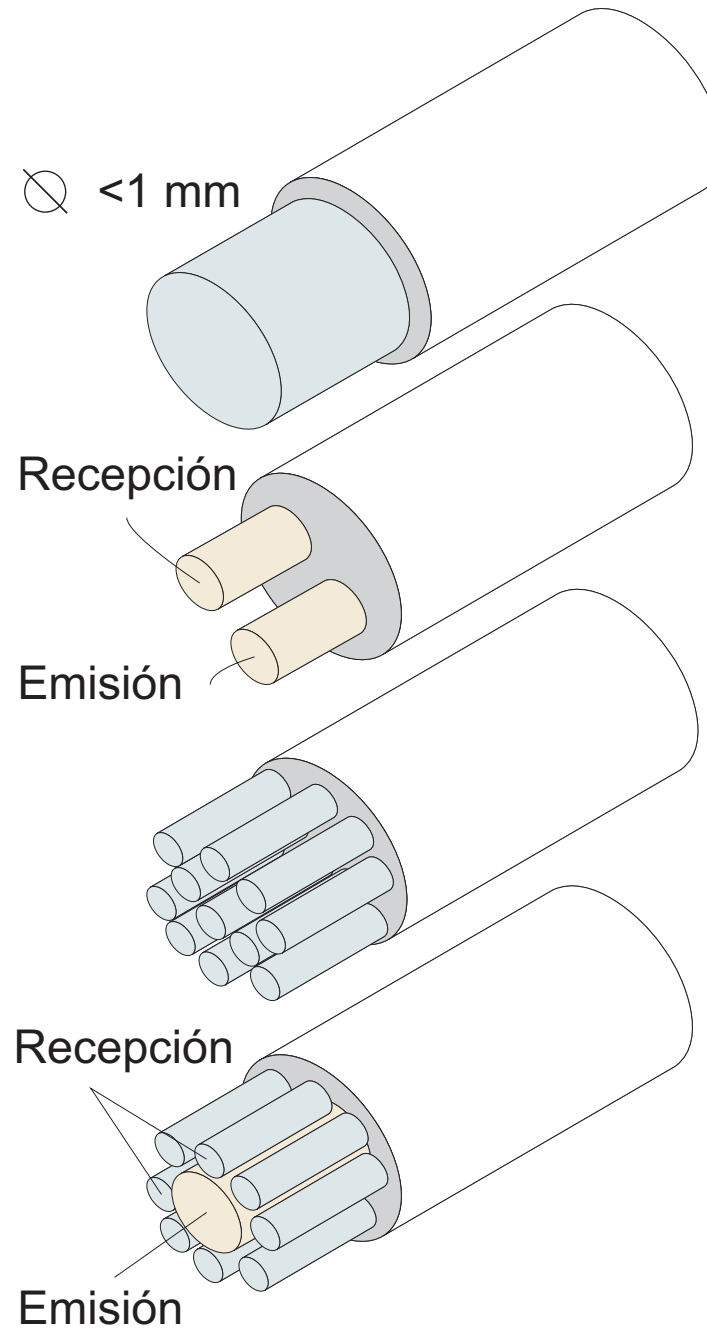
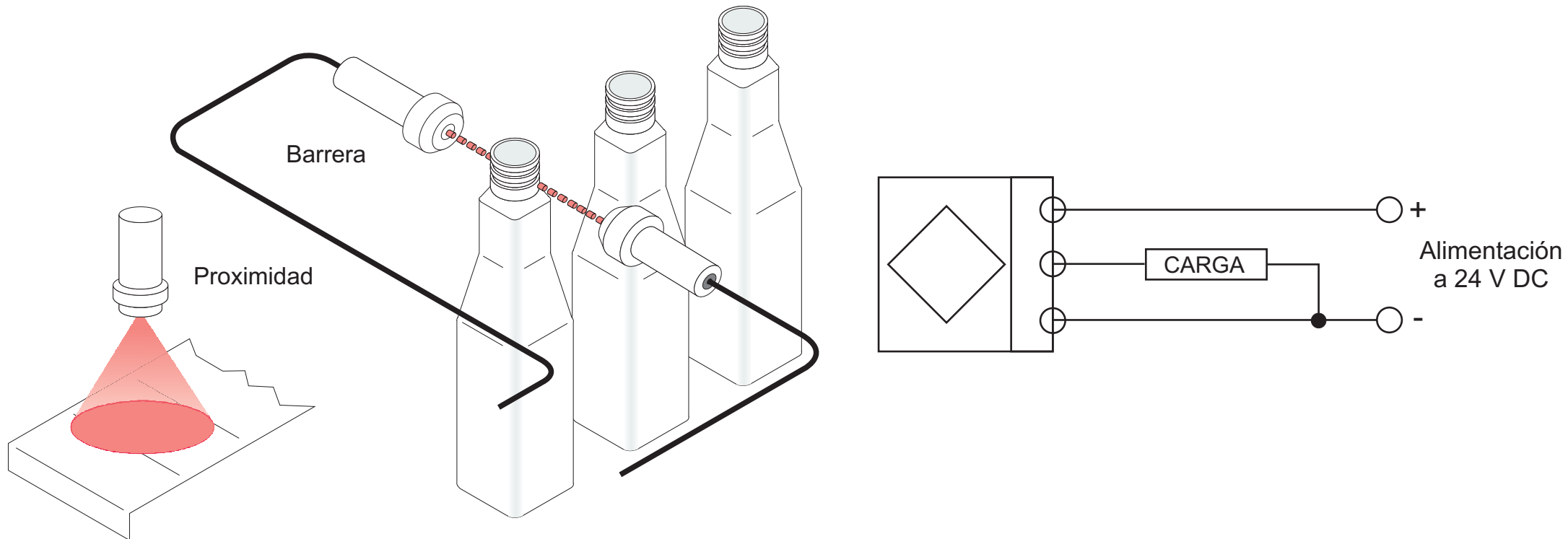


Figura 6.70. Ejemplo sensor de barrera, de proximidad, y conexionado eléctrico.



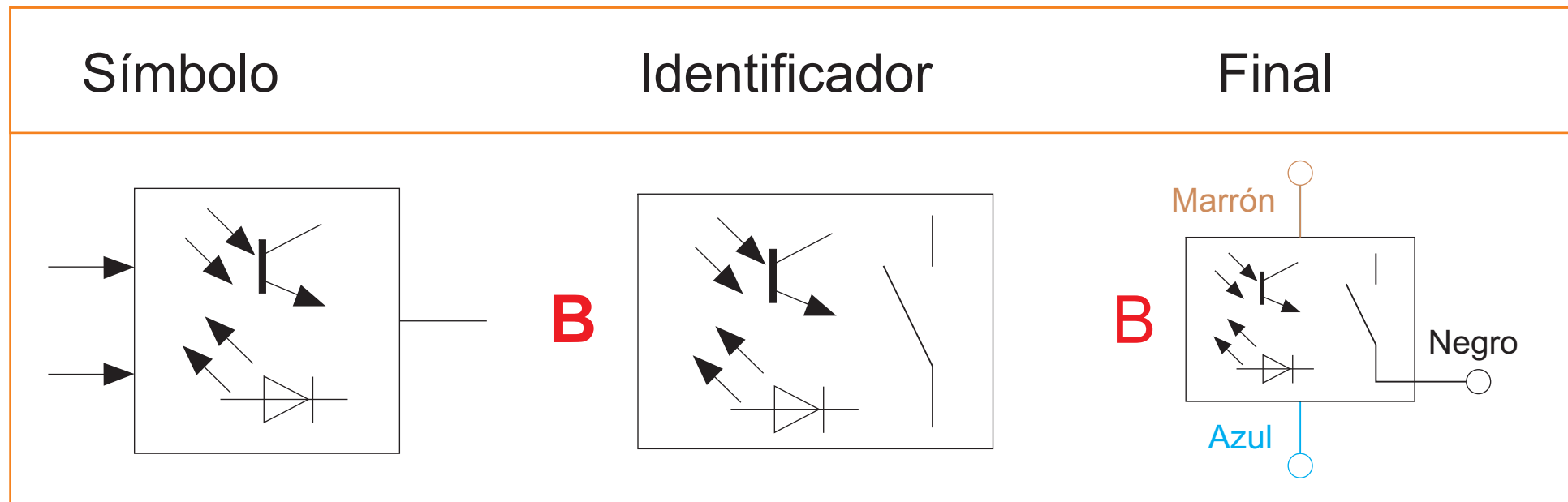


Figura 6.72. El presostato mide la presión en un punto determinado del tanque.

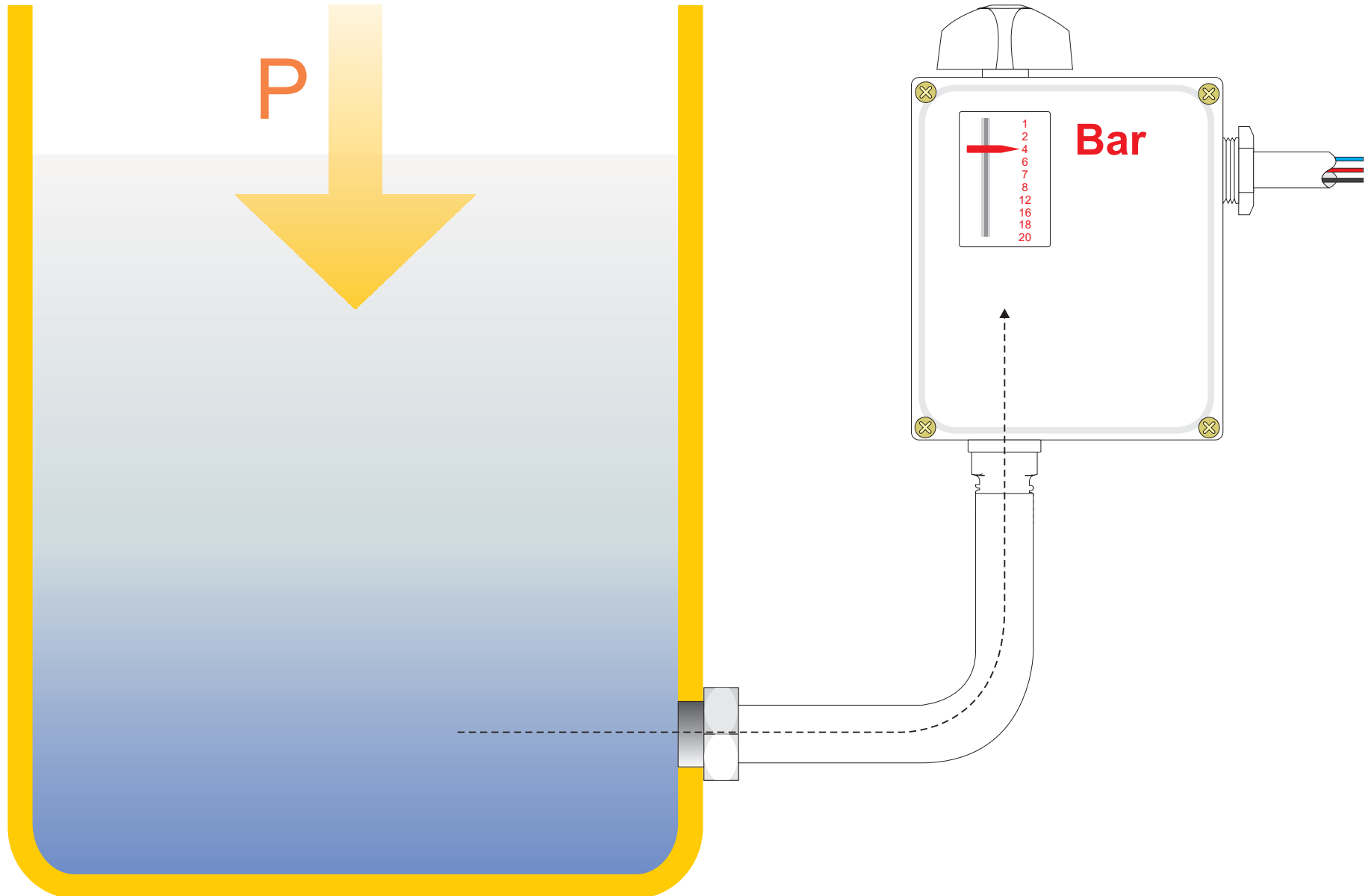


Figura 6.73.

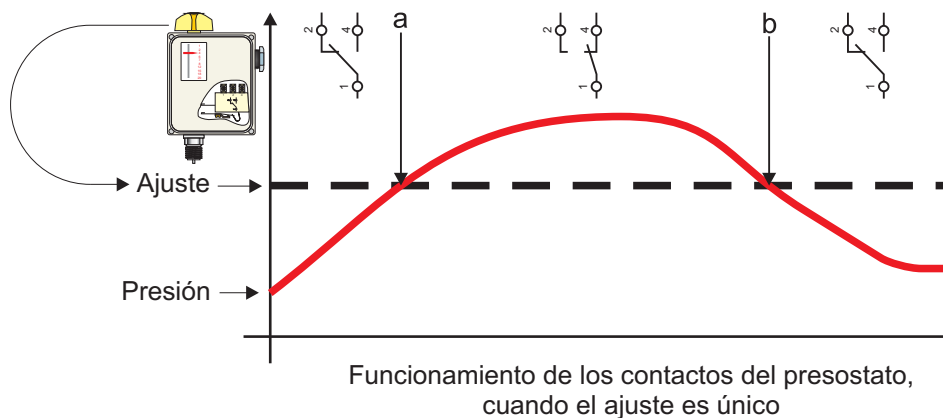


Figura 6.74.

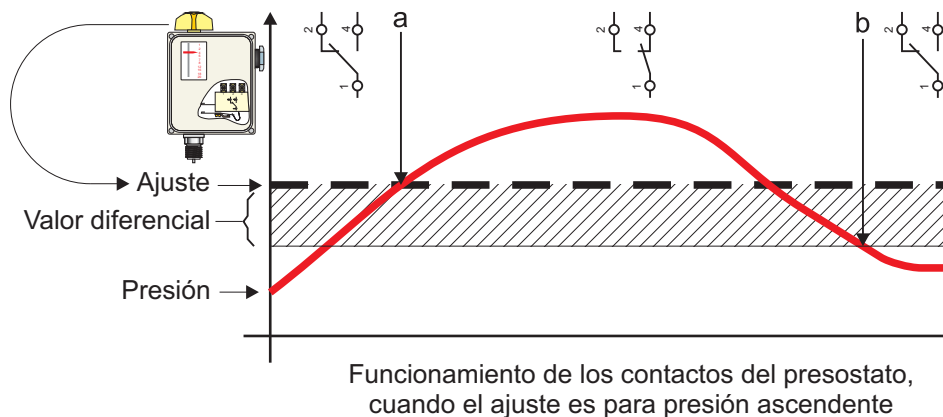


Figura 6.75.

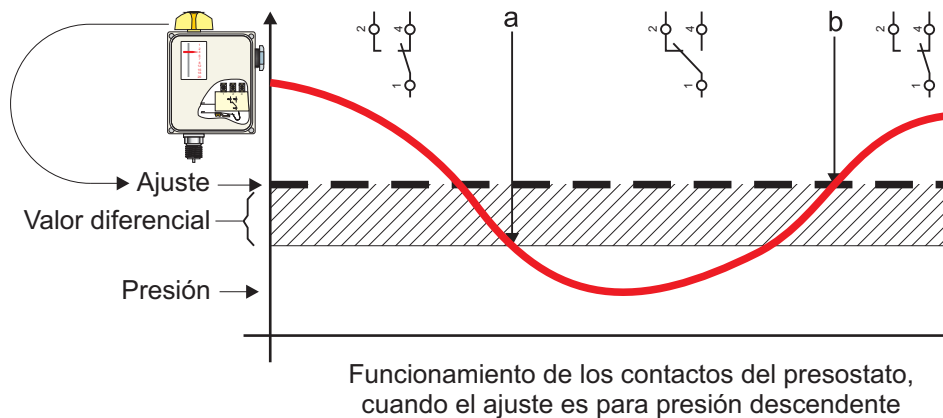


Figura 6.76. Algunas partes del presostato.

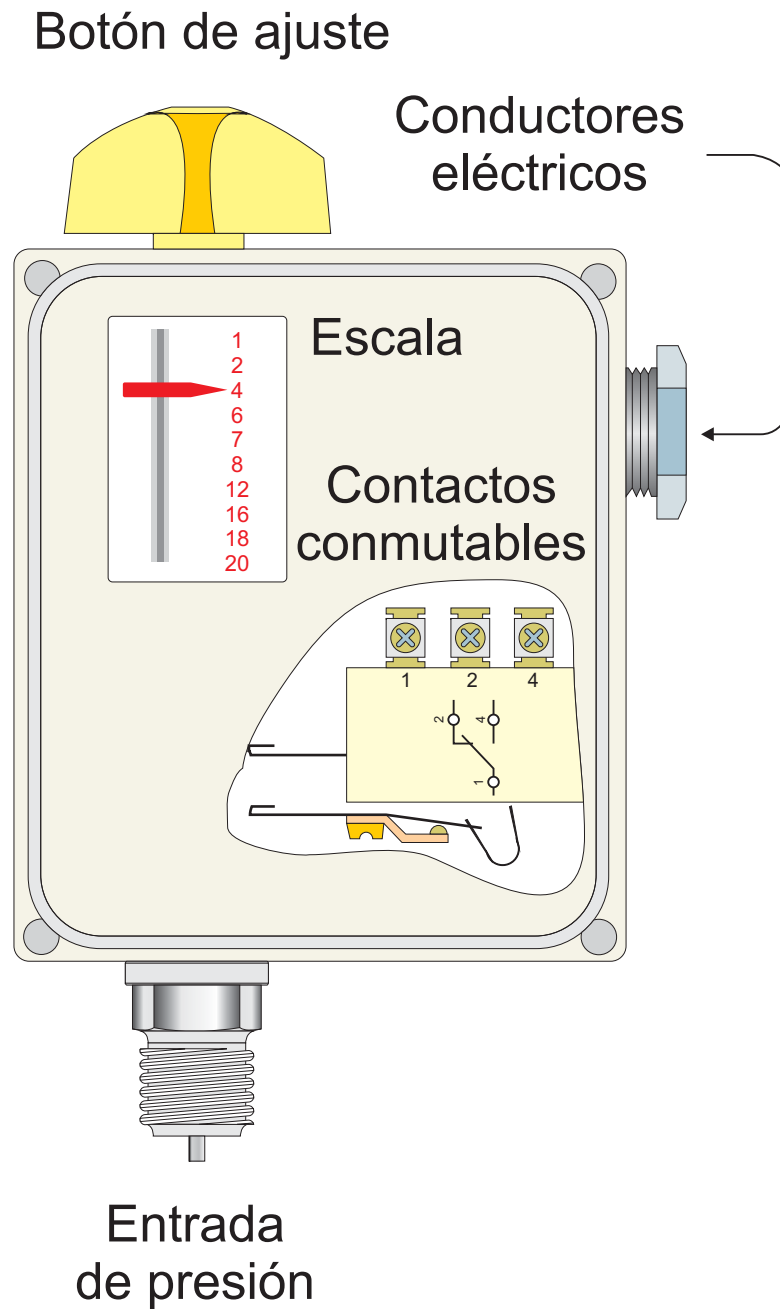


Figura 6.77. Sistema para extracción de agua protegido por presostato. Mecanismos.

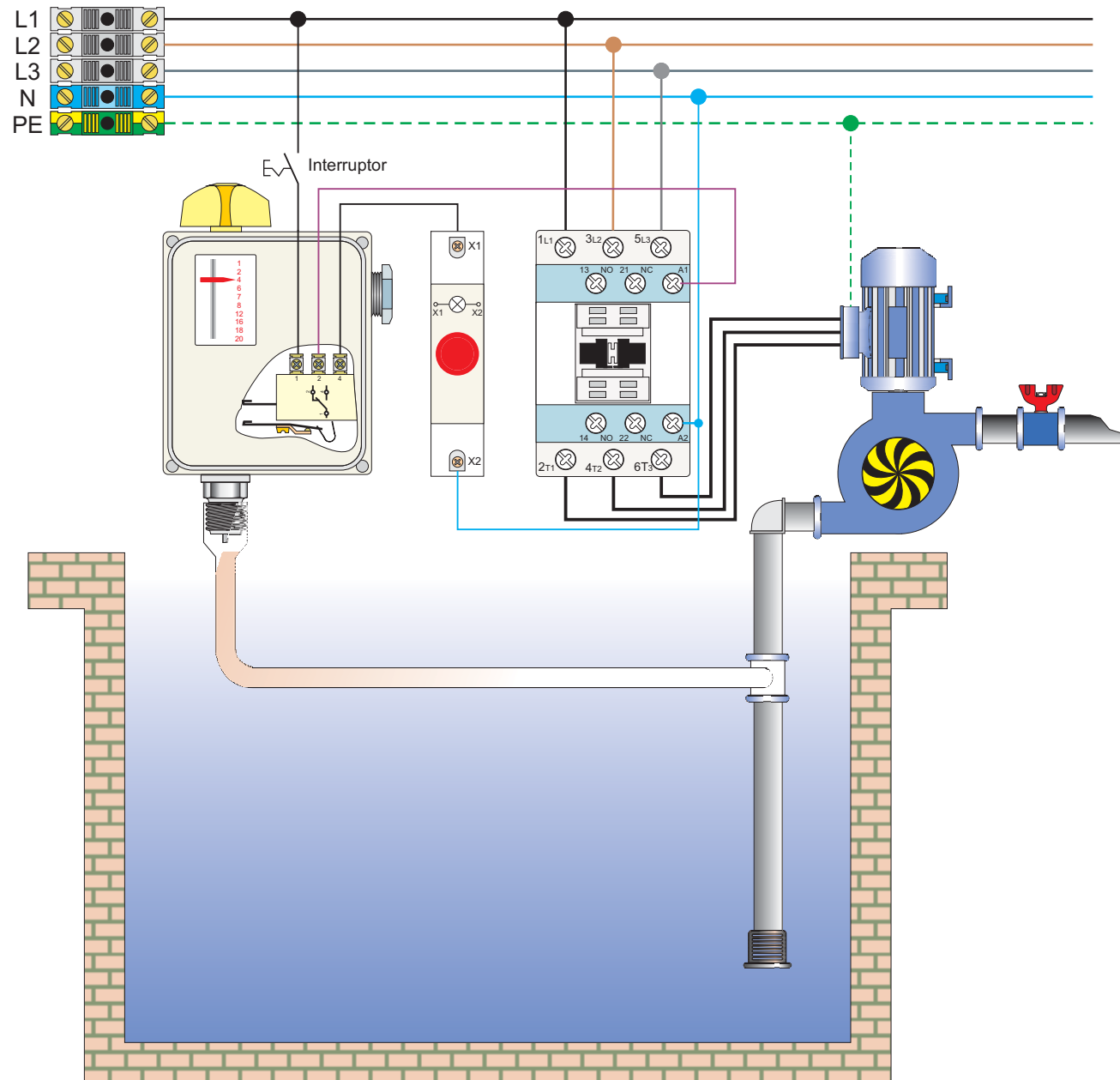


Figura 6.78. Sistema para extracción de agua protegido por presostato.
Esquemas eléctricos.

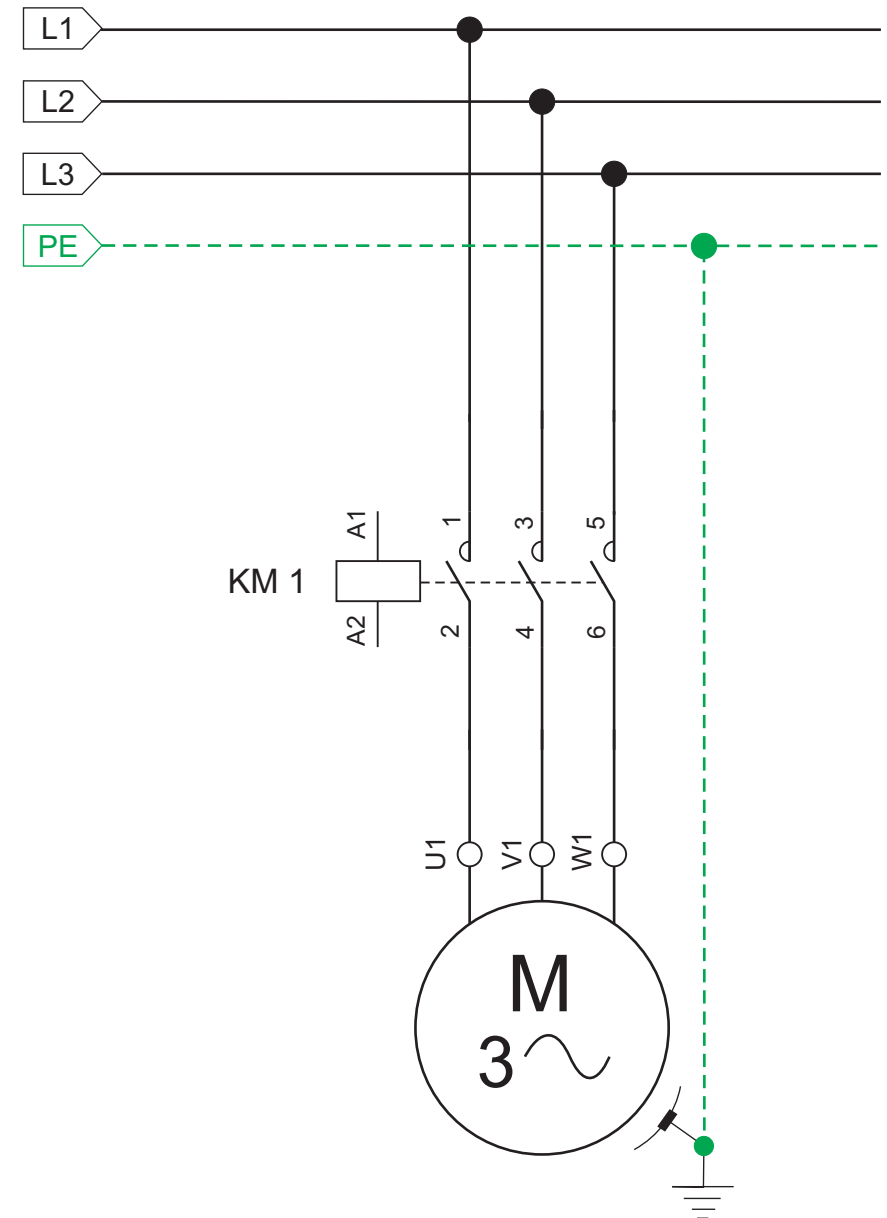
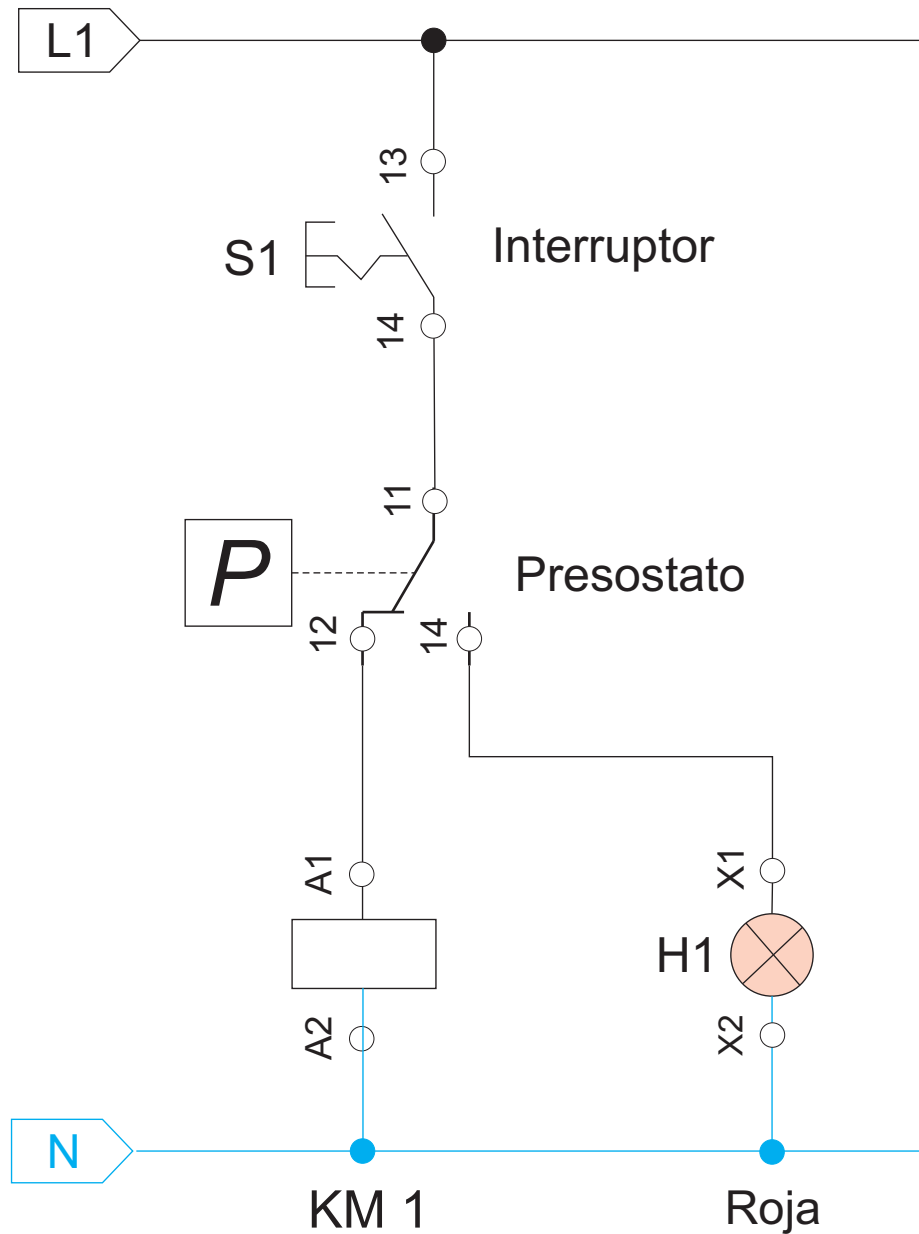


Figura 6.79. Simbología presostato.

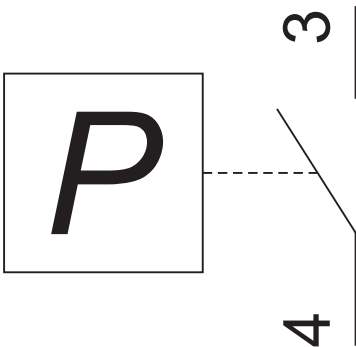
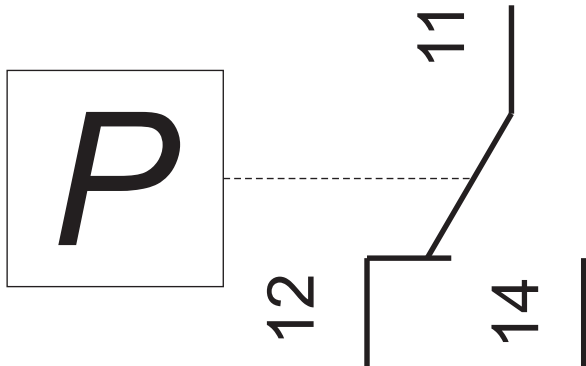
Símbolo	Identificador	NA	NC-NA
	B		

Figura 6.80. Termostato con sensor cilíndrico remoto.

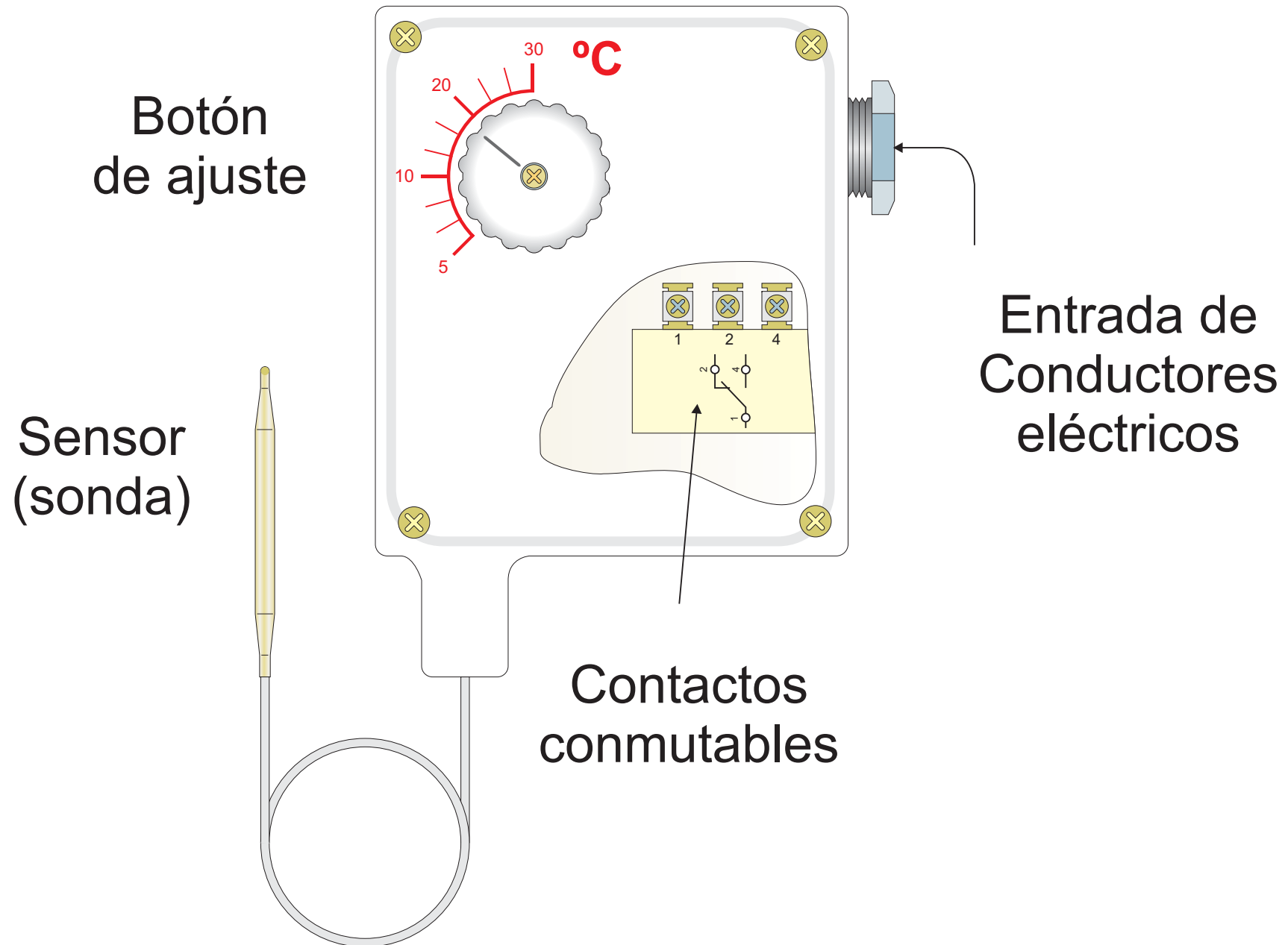


Figura 6.81. Actuación del contacto conmutado cuando la temperatura alcanza el valor prefijado por el botón del termostato.

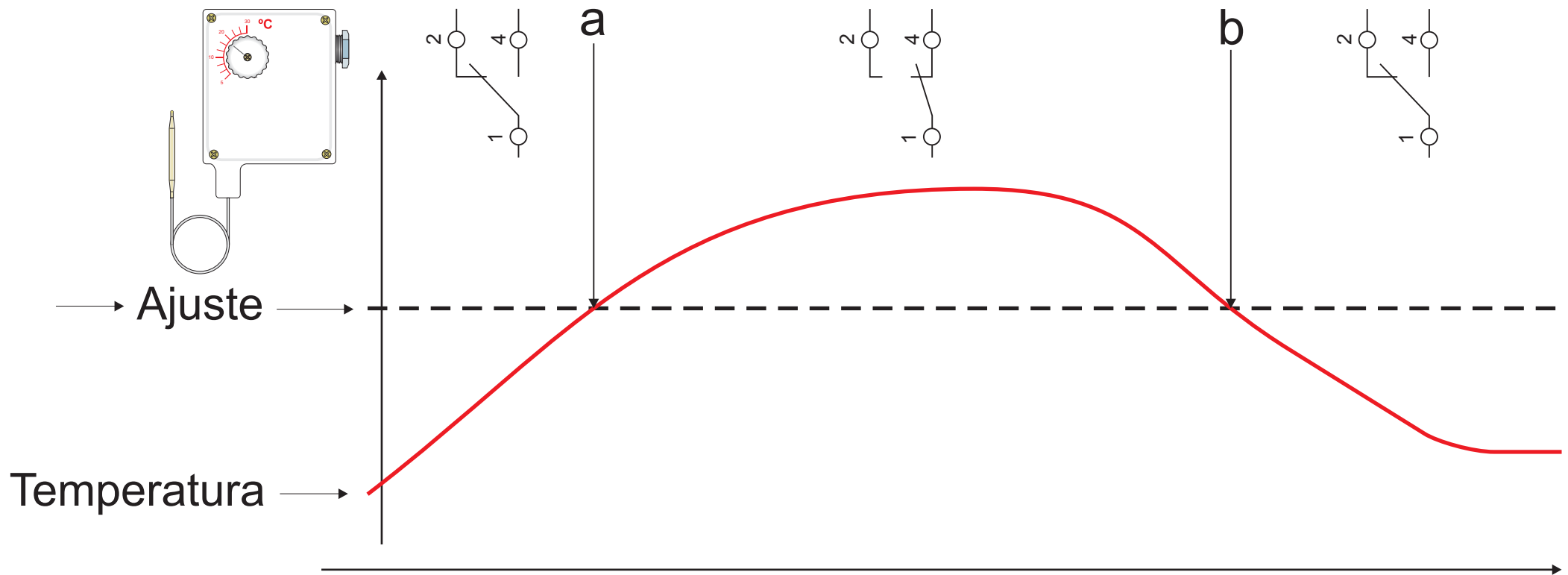


Figura 6.82. Simbología del termostato.

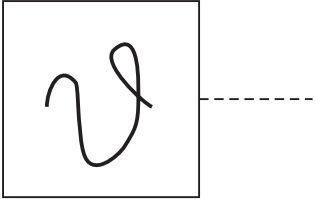
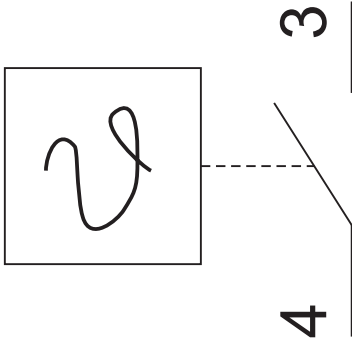
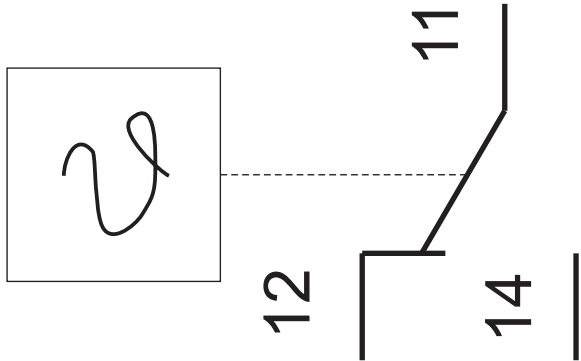
Símbolo	Identificador	NA	NC-NA
	B		

Figura 6.83. Termostato con sensor de ambiente.

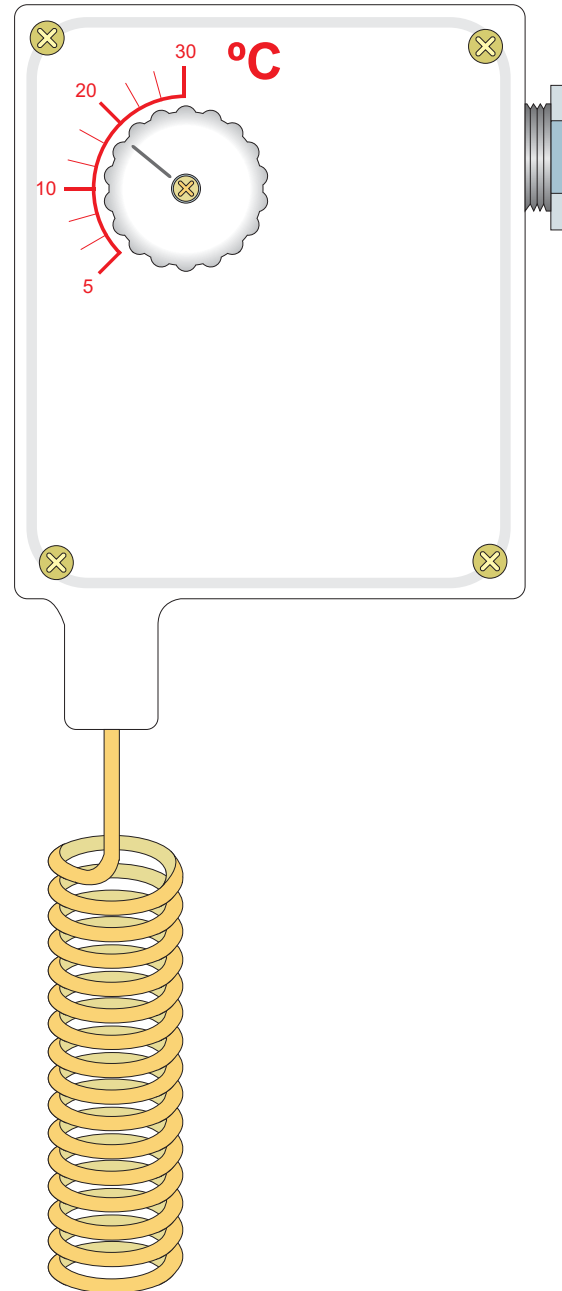


Figura 6.84. Control de fluidos con dos electrodos. a) Colgantes b) Roscados.

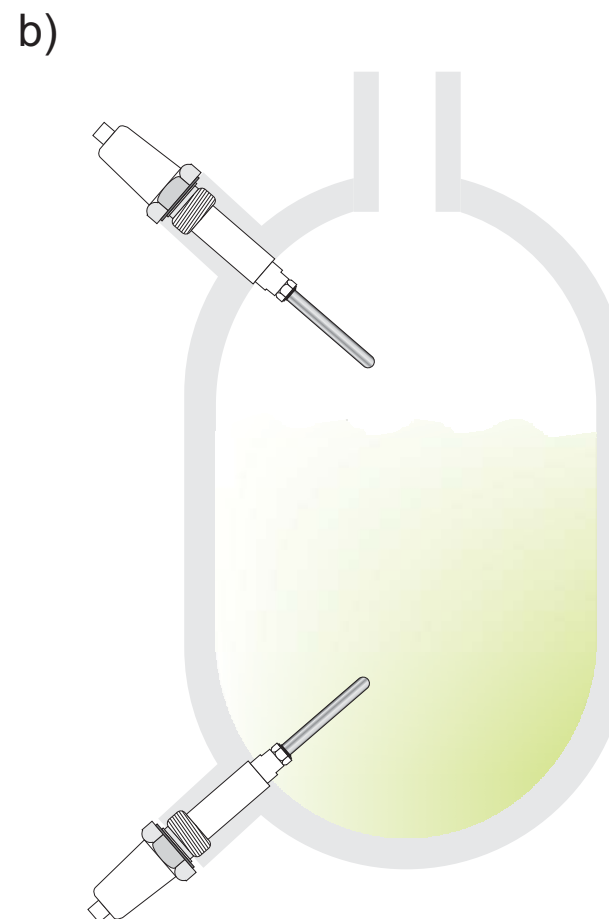
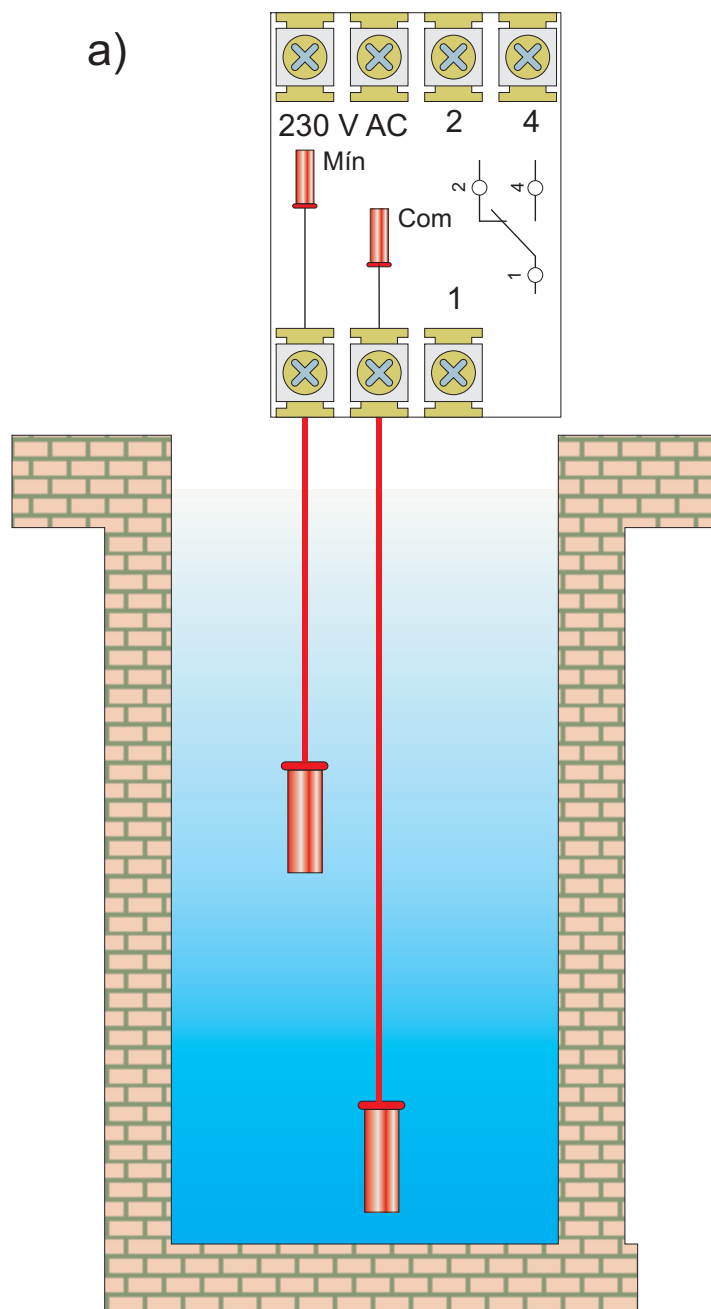
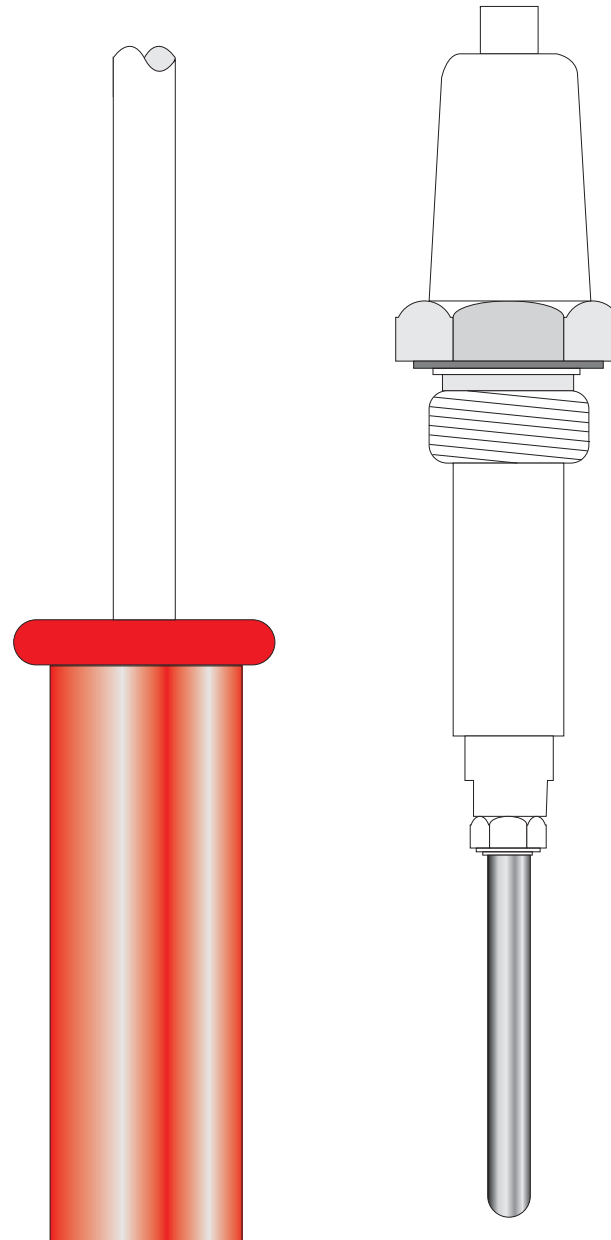
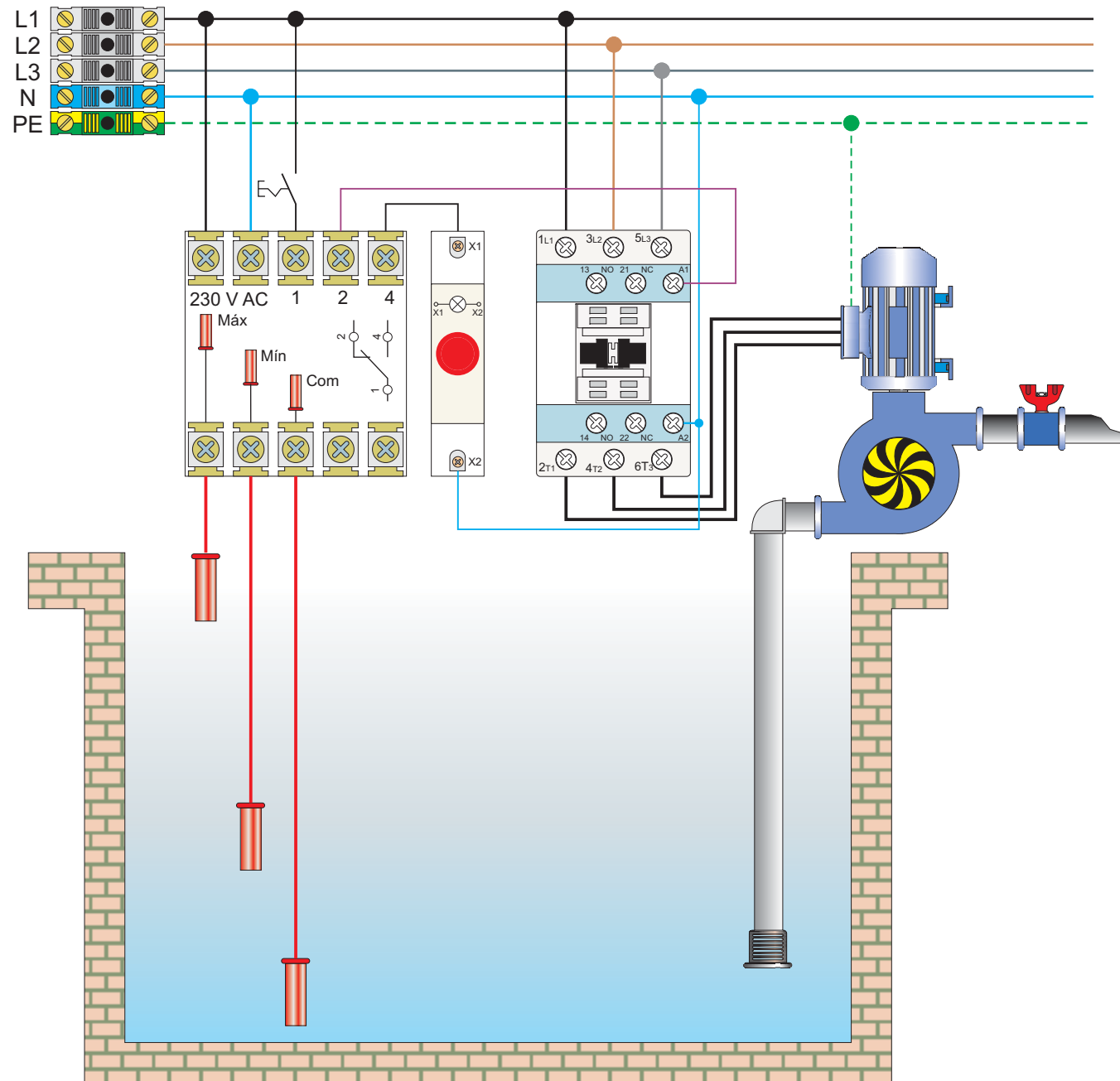


Figura 6.85. Electrodo, colgante y roscado.



6 Captadores y sensores eléctricos

Figura 6.86. Control de fluidos con sistema de tres sondas.



6 Captadores y sensores eléctricos

Figura 6.87. Ejemplo de uso de un relé electrónico.

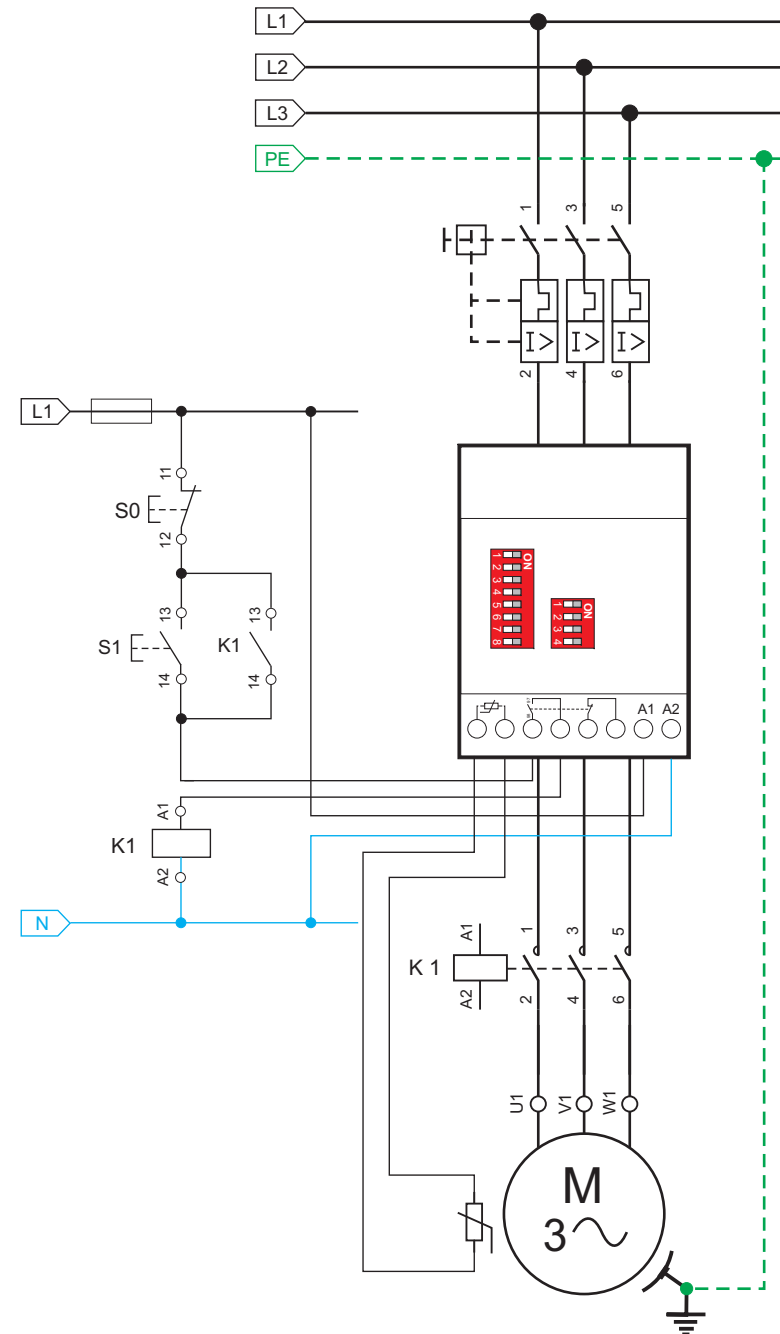


Figura 6.88. Relé electrónico para el control de motores.

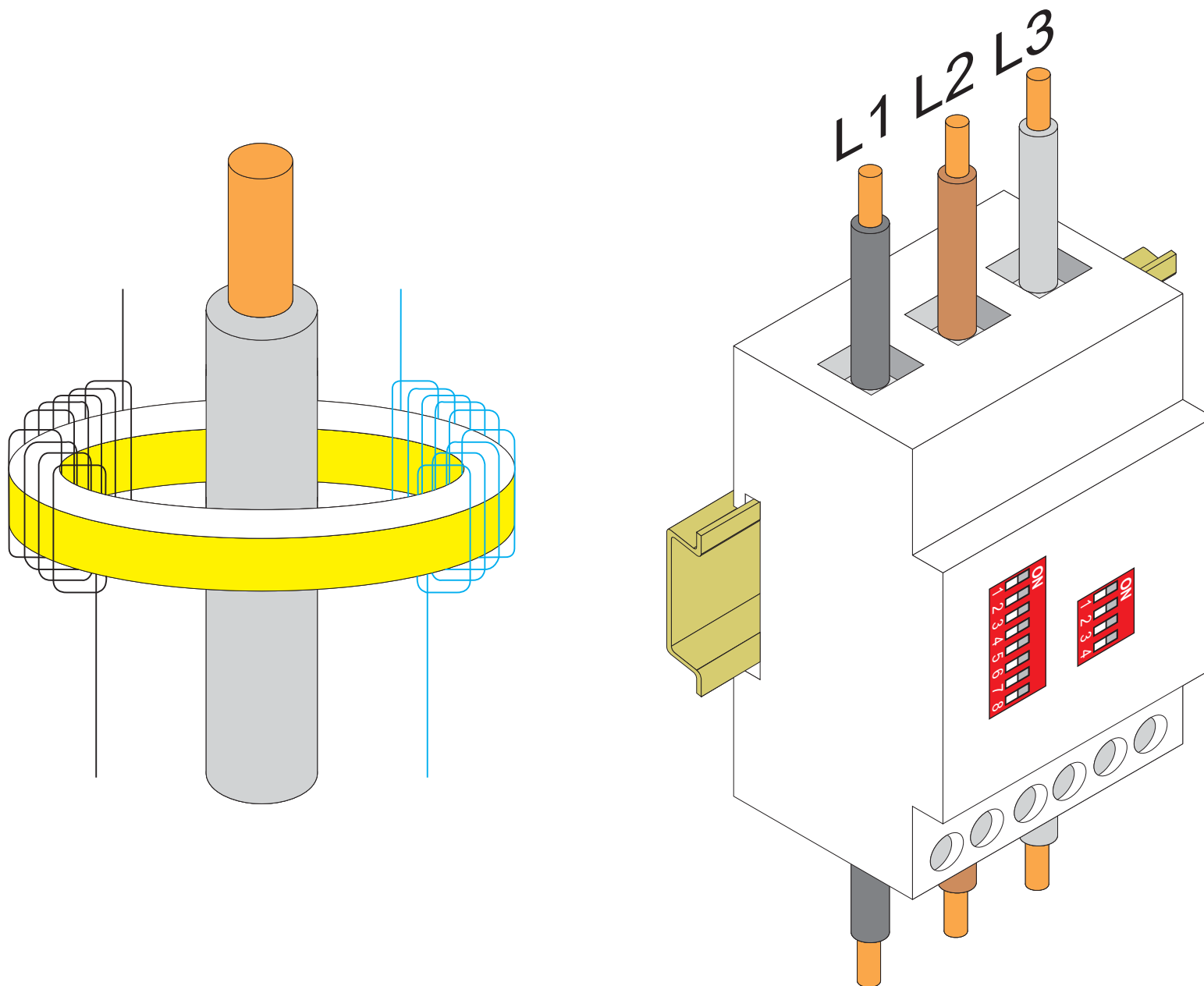


Figura 6.89. Símbolo resistencia PTC.

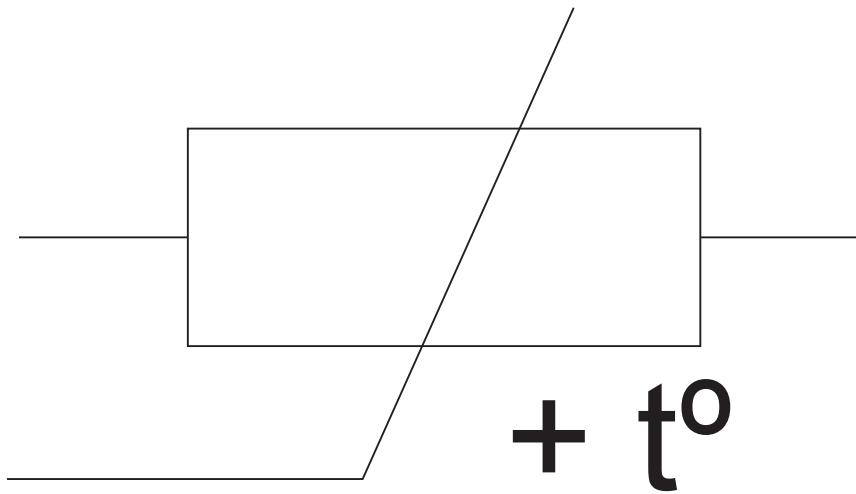


Figura 6.90. Símbolo resistencia NTC.

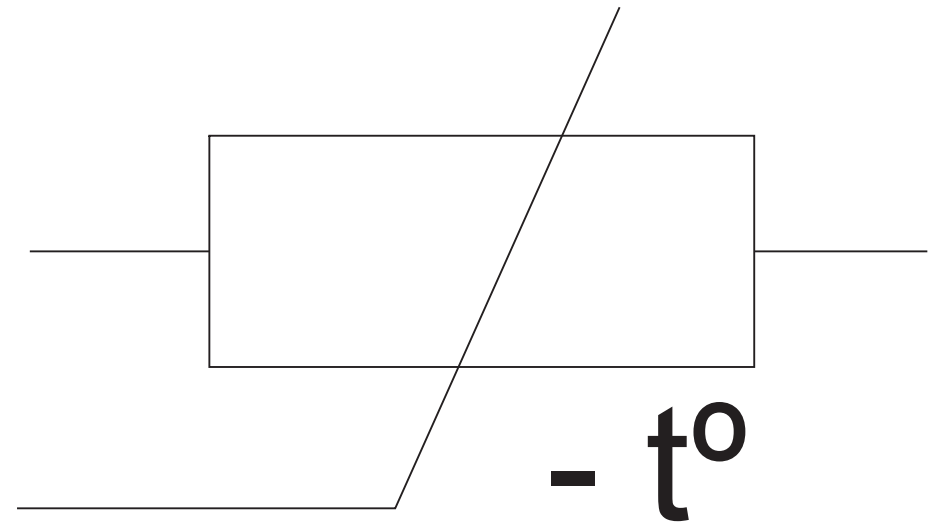
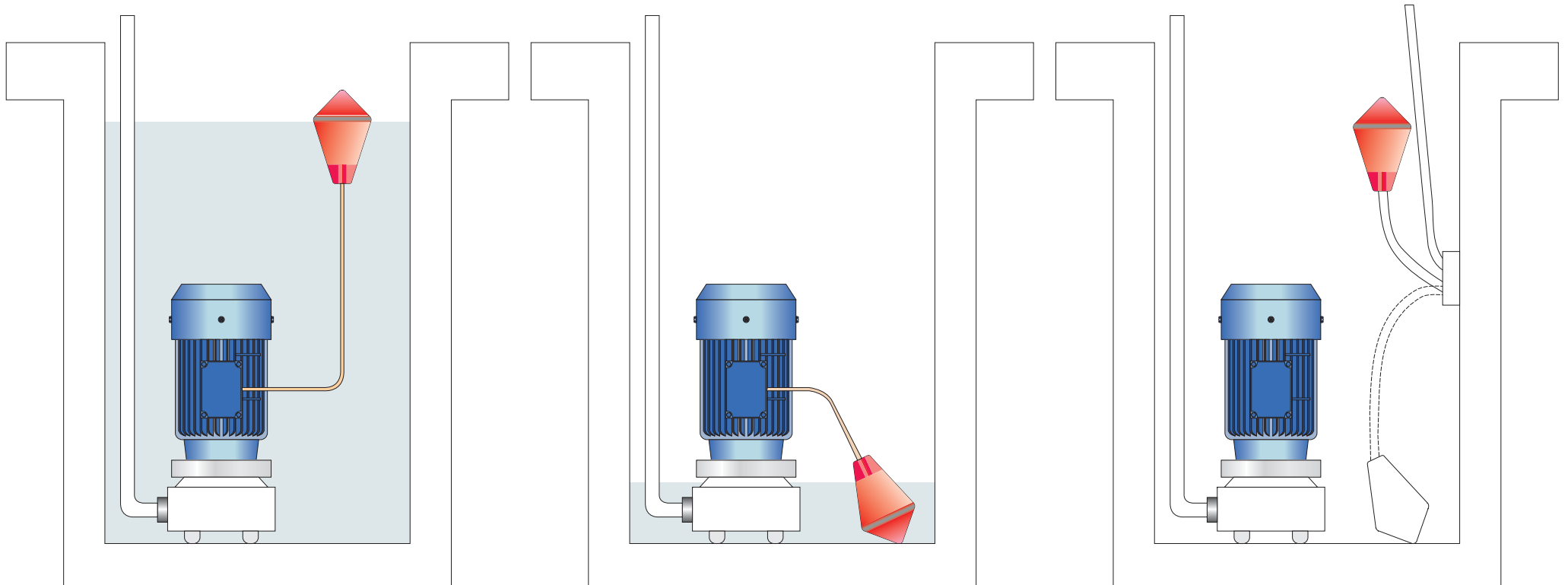


Figura 6.91. Control de fluidos por flotador.



6 Captadores y sensores eléctricos

Figura 6.92. Esquema eléctrico para la puesta en marcha de un electro-motor, con protección por flotador.

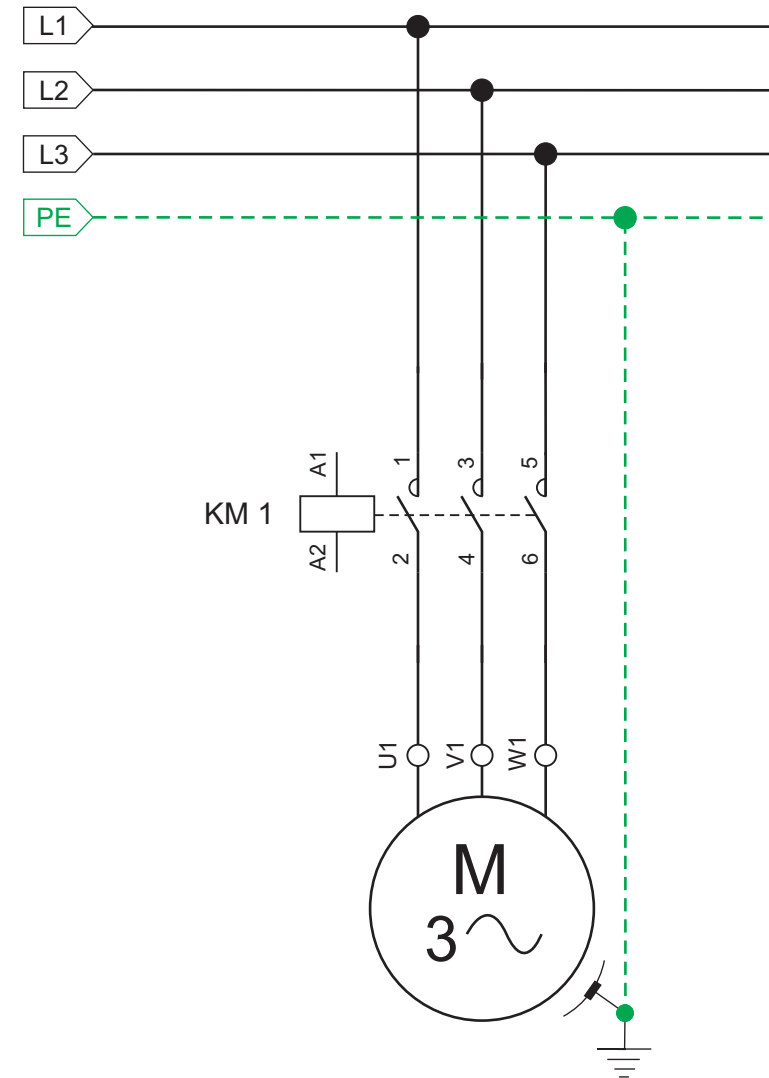
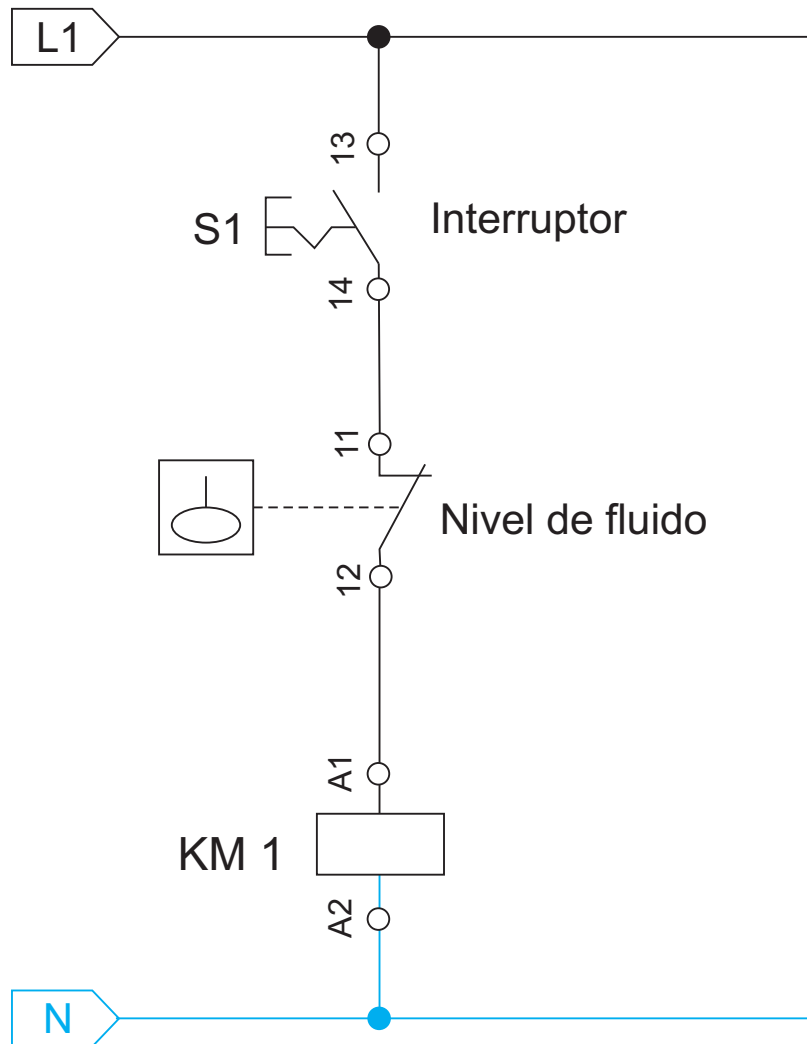


Figura 6.93. Simbología control de nivel por fluido.

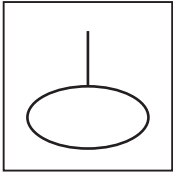
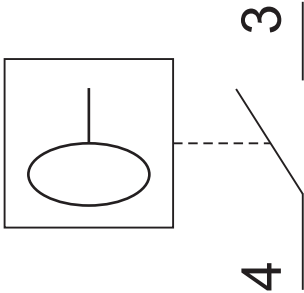
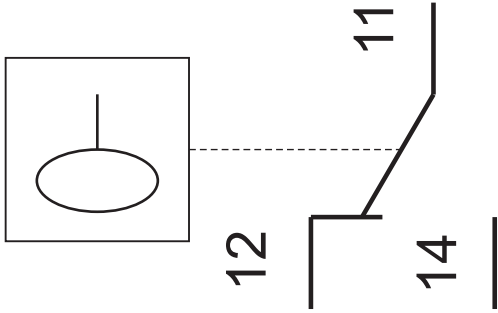
Símbolo	Identificador	NA	NC-NA
	B		

Figura 6.94. La boya será guiada.

