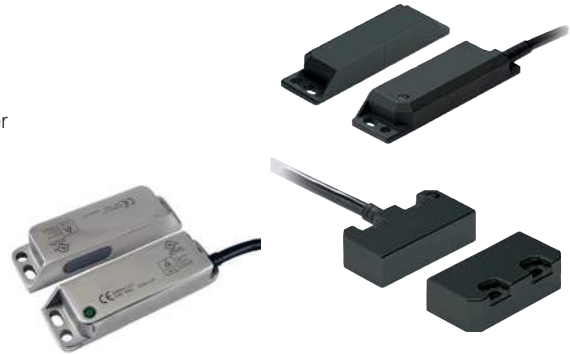


## RFID Non-contact Safety Switches

# D40R

**RFID Non-contact switches are designed to monitor hinged, sliding or removable guard doors. RFID technology provides increased tamper resistance.**

- Based on RFID technology, providing high anti-tamper resistance
- The RFID-design covers two models with anti-tamper coding:
  - B-types (Basic coded): Any sensor works with any actuator
  - U-types (Unique coded): Each sensor and actuator use a unique code. This is a solution for applications that requires even a higher anti-tamper coding
- Conforms to safety categories up to PLe acc. EN ISO 13849-1
- Connect up to 20 switches in series, up to PLd acc. EN ISO 13849-1
- LED indicates operation state
- Operates with all two-channel NC Omron safety controllers
- IP69K versions suitable for high pressure cleaning and CIP/SIP processes.
- Stainless steel version specifically designed for Food Processing applications. Can withstand high pressure washdown, high temperatures and detergents.



## Model Number Structure

D40R-□□□-21-□  
1 2 3 4

### 1. Type

- L: Elongated Sensor
- S: Small Sensor (not available in stainless steel version)

### 2. Housing Material

- P: Plastic Housing
- M: Stainless Steel Housing

### 3. Code

- B: Basic Code
- U: Unique Codes




### 4. Cable Length/Connection

- 05: 5 m Cable (not available in stainless steel version)
- 10: 10 m Cable
- M12: M12 male connector, 8 pin, fitted with 250 mm cable (not available in stainless steel version)

## Ordering Information





**Basic coded:** Any actuator will operate with any sensor (Teach process needed, if actuator will be changed: Power down - place actuator to sensor - power up).

**Unique coded:** Only one actuator fits to the code of the sensor (Replacement of only sensor OR actuator is not possible)

Polyester Housing				
Type	Cable Connection	Contact Configuration	Order Code	
			Basic Coded	Unique Coded
Elongated Sensors 	5 m pre-wired	2NC/1NO	D40R-LPB-21-05	D40R-LPU-21-05
	10 m pre-wired		D40R-LPB-21-10	D40R-LPU-21-10
	M12, 8 pin, fitted with 250 mm cable		D40R-LPB-21-M12	D40R-LPU-21-M12
Small Sensors 	5 m pre-wired		D40R-SPB-21-05	D40R-SPU-21-05
	10 m pre-wired		D40R-SPB-21-10	D40R-SPU-21-10
	M12, 8 pin, fitted with 250 mm cable		D40R-SPB-21-M12	D40R-SPU-21-M12
Stainless Steel Housing				
Type	Cable Connection	Contact Configuration	Order Code	
			Basic Coded	Unique Coded
Elongated Sensors 	10 m pre-wired	2NC/1NO	D40R-LMB-21-10	D40R-LMU-21-10

## Accessories

### Cables

Type	Cable Connection	Model
Cables (M12 Female - 8-pin to flying leads) 	5 m	D40ML-CBL-M12-05M
	10 m	D40ML-CBL-M12-10M
Cables (M12 Male to M12 Female - 8-pin) 	2 m	D40P-8PMF-M12-02M
	5 m	D40P-8PMF-M12-05M
	10 m	D40P-8PMF-M12-10M
T-Connector Connection Cable 	T-Connector for M12 cable	D40P-8PTC-M12
Shorting Plug 	M12 Shorting Plug	D40P-8PSP-M12

### Replacement Actuators

Type	Compatible Switch Model	Model
Replacement Actuators (only for basic coded types)	for D40R-LPB-__	D40R-LPB-A
	for D40R-SPB-__	D40R-SPB-A
	for D40R-LMB-__	D40R-LMB-A

## Specifications

### Electrical Data

		Basic Coded	Unique Coded
Sensor Technology		RFID (Code)	
Serial Switching		Connect up to 20 switches in series	
Code		Basic Coded: Every switch same code ISO 14119 Type 4 (low)	Unique Coded: 32,000,000 different codes ISO 14119 Type 4 (high)
Indicator		LED lighted (green): Door is closed and safety circuits are closed LED dark: Door is open and safety circuits are open	
Power Supply		24 VDC $\pm$ 10%	
Power Consumption	Max.	30 mA @ 24 VDC	
Dielectric Withstand		250 VAC	
Insulation Resistance		100 M $\Omega$	
Output Types	Safety Channel 1 NC Safety Channel 2 NC Auxiliary Channel NO	200 mA, max. 24 VDC, Solid State (no polarity), minimum internal resistance 8.5 $\Omega$	
Contact Release Time		<2 ms	

### Mechanical Data

		Plastic Sensors	Stainless Steel Sensor
Operating Distance	OFF $\rightarrow$ ON (Sao)	10 mm	8 mm
	ON $\rightarrow$ OFF (Sar)	20 mm	20 mm
Recommended Setting Gap		5 mm	
Actuator Approach Speed	Min.	4 mm/s	200 mm/s
	Max.	1000 mm/s	1000 mm/s
Switching Frequency	Max.	1.0 Hz	
Operating Temperature		-25 to +80°C	
Humidity		-25 to 80°C, 90% RH	
Enclosure Protection	Flying lead	IP69K	
	M12 connector	IP67	
Cable Material	Flying lead	PVC, 8 core, $\varnothing$ 6 mm o.d.	
	M12 connector	250 mm, PVC, $\varnothing$ 6 mm o.d.	
Mounting Bolts		2 $\times$ M4 (not supplied)	
Tightening Torque for Mounting Bolts		1 Nm	
Shock Resistance (IEC 68-2-27)		11 ms, 30 g	
Vibration Resistance (IEC 68-2-6)		10... 55 Hz, 1 mm	
Body Material		Polyester	Stainless Steel 316 (mirror polish finish)
Mounting Position		Any direction	

### Reliability Data

Performance Level (EN ISO 13849-1)	PLe (If both channels are used in combination with a PLe control device)
Category	Cat4
MTTFd	1100 a
Diagnostic Coverage DC	99% (high)
Safety Integrity Level (EN 62061)	SIL3 (If both channels are used in combination with a SIL3 control device)

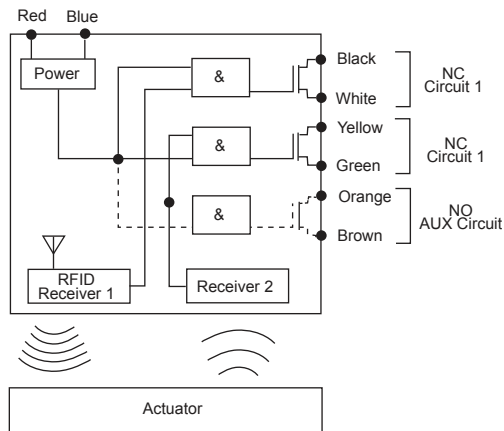
### Approved Standards

EN Standards Certified by TUV Rheinland: EN ISO13849-1, EN 60204-1, EN ISO 14119, EN/IEC 60947-5-3, UL 508, CSA C22.2.



## Circuit Schematic

The RFID non-contact switches are working with both principles, based on RFID and hall technology.



## Connection Diagram

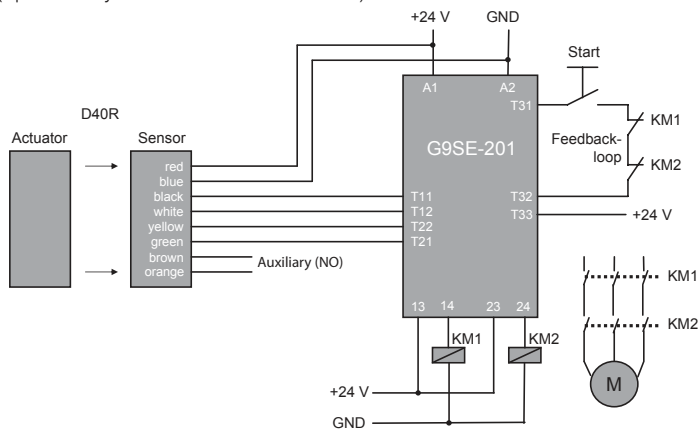
### Cable Vision

Pin No.	Signal Name
red	+24 VDC
blue	GND
black	NC Channel 1
white	NC Channel 1
yellow	NC Channel 2
green	NC Channel 2
brown	Aux. NO Channel
orange	Aux. NO Channel

## Wiring Examples

### G9SE

Single Sensor Application with G9SE-201 with Manual Reset  
(up to Safety PLe acc. EN ISO 13849-1)

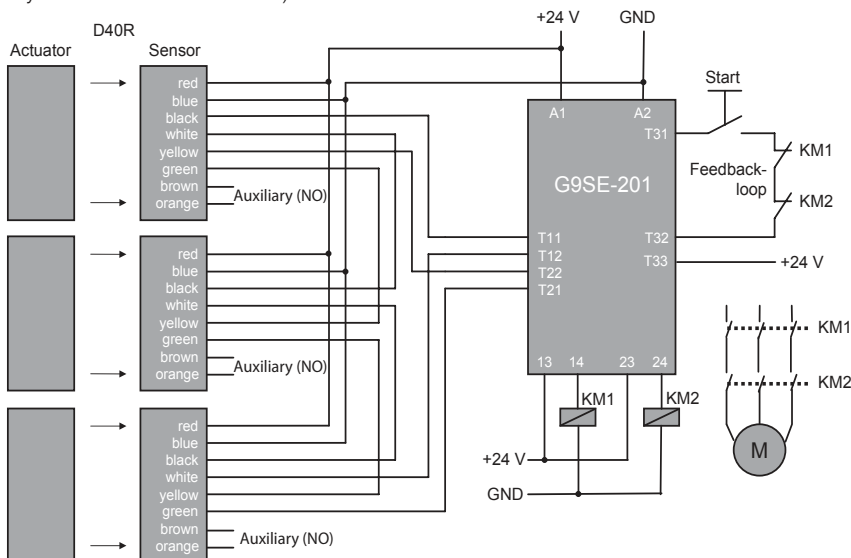


### M12-Connector version (M12 male)

Pin No. (male side)	Signal Name	Wire Color
2	+24 VDC	red
3	GND	blue
7	NC Channel 1	black
8	NC Channel 1	white
4	NC Channel 2	yellow
6	NC Channel 2	green
5	Aux. NO Channel	brown
8	Aux. NO Channel	orange

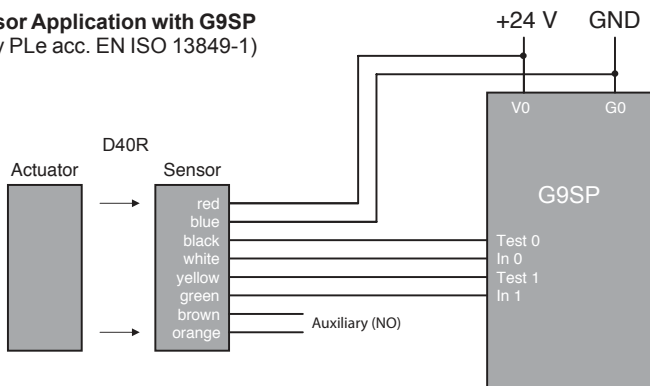
## Wiring Examples

### Series Connection Application, up to 20 Sensors with G9SE-201 with Manual Reset (up to Safety PLd acc. EN ISO 13849-1)

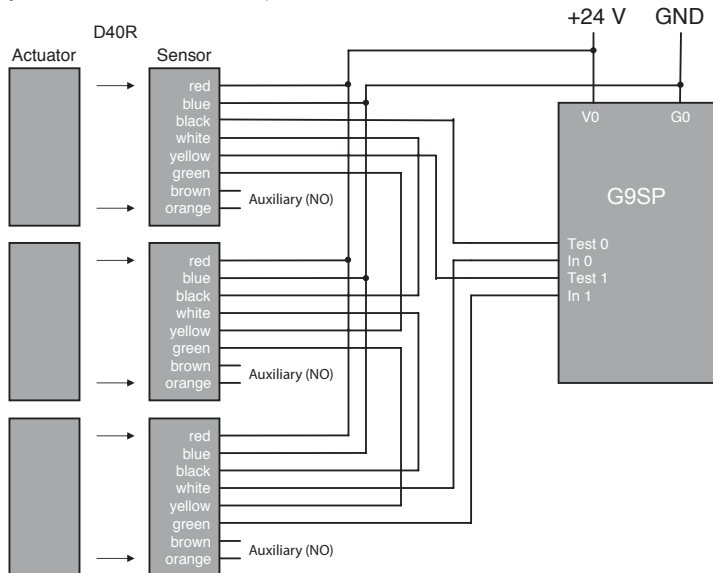


NOTE: For automatic reset connect the feedback loop between T31 and T33. Connect T32 to +24 VDC.

### G9SP Single Sensor Application with G9SP (up to Safety PLe acc. EN ISO 13849-1)

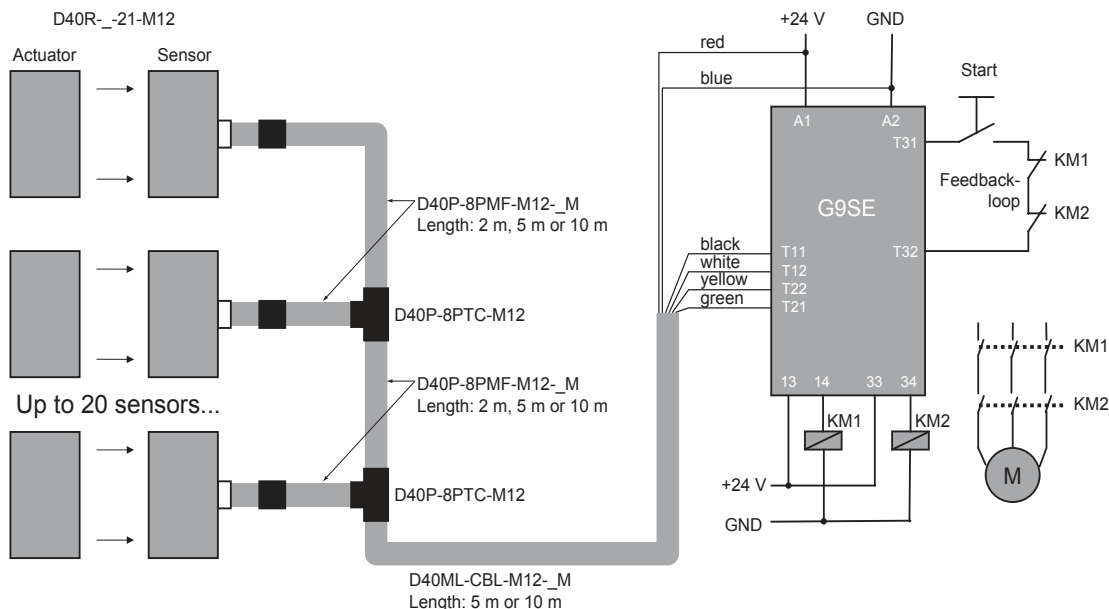


### Series Connection Application, up to 3 Sensors with G9SP (up to Safety PLd acc. EN ISO 13849-1)

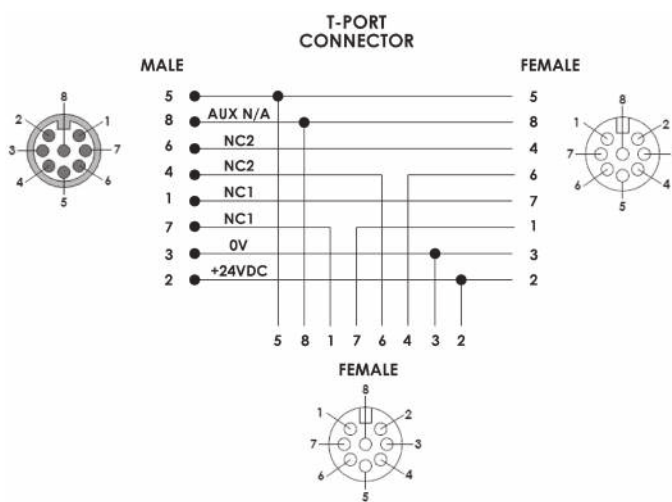
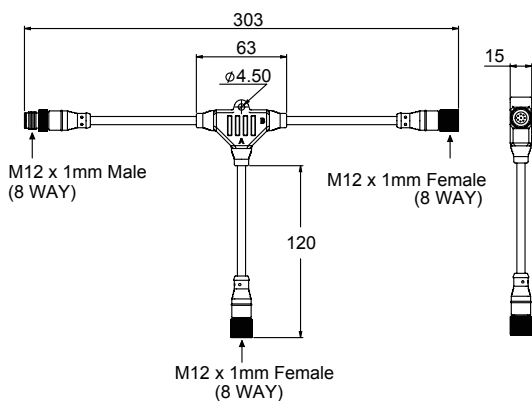


## Wiring Examples

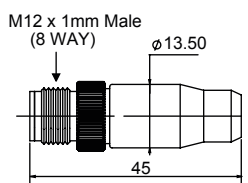
**T-Connector and Connection Cable**  
**Series connection with 3 Sensors for example with G9SE**  
 (up to Safety PLd acc. EN ISO 13849-1)



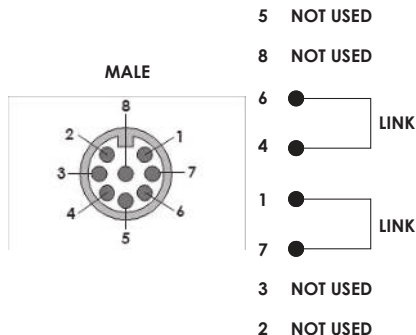
## T-Connector Dimensions and Wiring



## Shorting Plug Dimensions and Wiring



\*Use Shorting Plug to terminate T-tap if port is not used.



## Safety Precautions

### ⚠ WARNING

Be sure to turn OFF the power before performing wiring.  
Do not touch charge parts (e.g., terminals) while power is on.  
Doing so may result in electric shock.



Do not allow the actuator to come close to the switch with the door open. Doing so may cause machinery to start operating and may result in injury.



Keep actuators (magnets) away from magnetically sensitive equipment like PC harddisks, floppy disks etc. The magnetic field of the magnet will damage existing data.



### Application Precautions

- Do not use the product in locations subject to explosive or flammable gases.
- Do not use load currents exceeding the rated value.
- Be sure to wire each conductor correctly.
- Be sure to confirm correct operation after completing mounting and adjustment.
- Do not drop or attempt to disassemble the product.
- Be sure to use the correct combination of switch and actuator.
- Use a power supply of the specified voltage. Do not use power supplies with large ripples or power supplies that intermittently generate incorrect voltages.
- Capacitors are consumable and require regular maintenance and inspection.

### Installation Locations

Do not install the product in the following locations. Doing so may result in product failure or malfunction.

- Locations subject to direct sunlight
- Locations subject to humidity levels outside the range 35% to 85% or subject to condensation due to extreme temperature changes
- Locations subject to corrosive or flammable gases
- Locations subject to shocks or vibration in excess of the product ratings
- Locations subject to dust (including iron dust) or salts

Take appropriate and sufficient countermeasures when using the product in the following locations.

- Locations subject to static electricity or other forms of noise
- Locations subject to possible exposure to radioactivity
- Locations subject to power supply lines
- It is advisable to mount the switches on non ferrous materials. The presence of ferrous material can effect switching sensitivity.

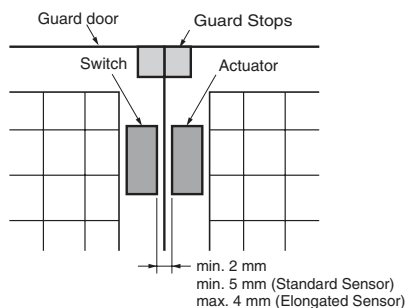
### Solvents

Ensure that solvents, such as alcohol, thinner, trichloroethane, or gasoline do not adhere to the product. Solvents may cause markings to fade and components to deteriorate.

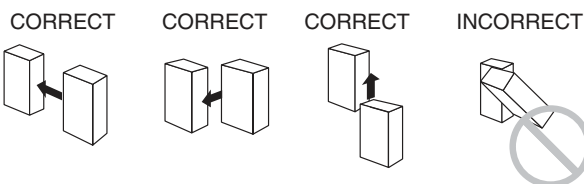
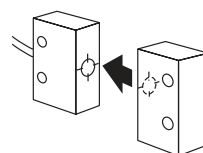
### Guard Stops

### ⚠ CAUTION

Use guard stops in the way shown below to ensure that the switch and actuator do not make contact when the guard door is closed.

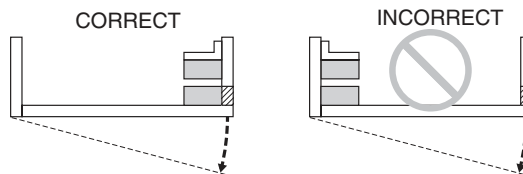


### Mounting Direction



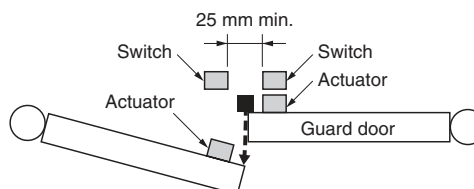
### Using for Hinged Doors

On hinged doors, install the Sensor at an opening edge as shown below.



### Mutual Interference

If the switch and actuator are mounted in parallel, be sure to separate them by at least 25 mm, as shown below.





**OMRON AUTOMATION AMERICAS HEADQUARTERS** • Chicago, IL USA • 847.843.7900 • 800.556.6766 • [www.omron247.com](http://www.omron247.com)

**OMRON CANADA, INC. • HEAD OFFICE**

Toronto, ON, Canada • 416.286.6465 • 866.986.6766 • [www.omron247.com](http://www.omron247.com)

**OMRON ELECTRONICS DE MEXICO • HEAD OFFICE**

México DF • 52.55.59.01.43.00 • 01-800-226-6766 • [mela@omron.com](mailto:mela@omron.com)

**OMRON ELECTRONICS DE MEXICO • SALES OFFICE**

Apodaca, N.L. • 52.81.11.56.99.20 • 01-800-226-6766 • [mela@omron.com](mailto:mela@omron.com)

**OMRON ELETRÔNICA DO BRASIL LTDA • HEAD OFFICE**

São Paulo, SP, Brasil • 55.11.2101.6300 • [www.omron.com.br](http://www.omron.com.br)

**OMRON ARGENTINA • SALES OFFICE**

Cono Sur • 54.11.4783.5300

**OMRON CHILE • SALES OFFICE**

Santiago • 56.9.9917.3920

**OTHER OMRON LATIN AMERICA SALES**

54.11.4783.5300

**OMRON EUROPE B.V.** • Wegalaan 67-69, NL-2132 JD, Hoofddorp, The Netherlands. • +31 (0) 23 568 13 00 • [www.industrial.omron.eu](http://www.industrial.omron.eu)

*Authorized Distributor:*

**Controllers & I/O**

- Machine Automation Controllers (MAC) • Motion Controllers
- Programmable Logic Controllers (PLC) • Temperature Controllers • Remote I/O

**Robotics**

- Industrial Robots • Mobile Robots

**Operator Interfaces**

- Human Machine Interface (HMI)

**Motion & Drives**

- Machine Automation Controllers (MAC) • Motion Controllers • Servo Systems
- Frequency Inverters

**Vision, Measurement & Identification**

- Vision Sensors & Systems • Measurement Sensors • Auto Identification Systems

**Sensing**

- Photoelectric Sensors • Fiber-Optic Sensors • Proximity Sensors
- Rotary Encoders • Ultrasonic Sensors

**Safety**

- Safety Light Curtains • Safety Laser Scanners • Programmable Safety Systems
- Safety Mats and Edges • Safety Door Switches • Emergency Stop Devices
- Safety Switches & Operator Controls • Safety Monitoring/Force-guided Relays

**Control Components**

- Power Supplies • Timers • Counters • Programmable Relays
- Digital Panel Meters • Monitoring Products

**Switches & Relays**

- Limit Switches • Pushbutton Switches • Electromechanical Relays
- Solid State Relays

**Software**

- Programming & Configuration • Runtime