### Hall Effect Coded Magnet Non-contact Safety Switches

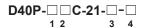
# D40P

Hall effect coded magnet non-contact switches monitor the status of guarding doors. Stainless steel housings for high hygiene demands in the food industry are available.

- Solid state design uses Hall effect technology for long life operation with no mechanical parts to wear
- LED indicates operation state
- · Operates with all OMRON safety controllers
- · Operates behind stainless steel fittings
- IP69K versions suitable for high pressure cleaning and CIP/SIP processes. Special food types have blind mounting holes to minimize debris collection.
- · Conforms to safety categories up to PLe acc. EN ISO13849-1
- Connect up to 20 switches in series, up to PLd acc. EN ISO 13849-1



### **Model Number Structure**



#### 1. Type

- L: Elongated Sensor
- S: Small Sensor
- M: Miniature Sensor
- B: Barrel Sensor

#### 2. Housing Material

- P: Plastic Housing
- M: Stainless Steel Housing
- H: Hygienic designed Stainless Steel Housing
- F: Special Food Type Stainless Steel Housing

#### 3. Cable Length/Connection

- 05: 5 m Cable
- 10: 10 m Cable
- M12: M12 male connector, 8 pin, fitted with 250 mm cable

#### 4. Cable Exit Direction\*

- L: Exit to the left
- R: Exit to the right
- \* only for D40P-MPC and D40P-MHC





Polyester Housing			
Туре	Cable Connection	Contact Configuration	Model
Elongated Sensors	5 m pre-wired		D40P-LPC-21-05
	10 m pre-wired		D40P-LPC-21-10
	M12, 8 pin, fitted with 250 mm cable		D40P-LPC-21-M12
Small Sensors	5 m pre-wired		D40P-SPC-21-05
	10 m pre-wired		D40P-SPC-21-10
	M12, 8 pin, fitted with 250 mm cable		D40P-SPC-21-M12
Miniature Sensors	5 m pre-wired cable, exit left		D40P-MPC-21-05-L
(cable exit right shown)	10 m pre-wired cable, exit left	2NC/1NO	D40P-MPC-21-10-L
	M12, 8 pin, fitted with 250 mm cable, exit left		D40P-MPC-21-M12-L
	5 m pre-wired cable, exit right		D40P-MPC-21-05-R
Supplied with screw cap covers to	10 m pre-wired cable, exit right		D40P-MPC-21-10-R
prevent contamination from food deposits	M12, 8 pin, fitted with 250 mm cable, exit right		D40P-MPC-21-M12-R
Barrel Sensors	5 m pre-wired		D40P-BPC-21-05
1 Contraction of the second se	10 m pre-wired		D40P-BPC-21-10
	M12, 8 pin, fitted with 250 mm cable		D40P-BPC-21-M12
		*	
Stainless Steel Housing (Through	hole mounting suitable for food splash zones)		
Туре	Cable Connection	Contact Configuration	Model
Elongated Sensors	5 m pre-wired		D40P-LMC-21-05
	10 m pre-wired		D40P-LMC-21-10
	M12, 8 pin, fitted with 250 mm cable		D40P-LMC-21-M12
Small Sensors	5 m pre-wired	2NC/1NO	D40P-SMC-21-05
	10 m pre-wired		D40P-SMC-21-10
Bue	M12, 8 pin, fitted with 250 mm cable		D40P-SMC-21-M12
Barrel Sensors	5 m pre-wired		D40P-BMC-21-05
MG .	10 m pre-wired		D40P-BMC-21-10
	M12, 8 pin, fitted with 250 mm cable		D40P-BMC-21-M12
Hygienic (Through M4 mounting ho	les, suitable for food contact zones)		1
Туре	Cable Connection	Contact Configuration	Model
Small Sensors	5 m pre-wired		D40P-SHC-21-05
	10 m pre-wired	- - 2NC/1NO	D40P-SHC-21-10
	M12, 8 pin, fitted with 250 mm cable		D40P-SHC-21-M12
Miniature Sensors	5 m pre-wired cable, exit left		D40P-MHC-21-05-L
(cable exit right shown)	10 m pre-wired cable, exit left		D40P-MHC-21-10-L
	M12, 8 pin, fitted with 250 mm cable, exit left	]	D40P-MHC-21-M12-L
	5 m pre-wired cable, exit right		D40P-MHC-21-05-R
	10 m pre-wired cable, exit right		D40P-MHC-21-10-R
	M12, 8 pin, fitted with 250 mm cable, exit right		D40P-MHC-21-M12-R
Special Food Type (Rear M4 moun	ting holes, suitable for food contact zones)		
Туре	Cable Connection	Contact Configuration	Model
Small Sensors	5 m pre-wired		D40P-SFC-21-05
	10 m pre-wired	2NC/1NO	D40P-SFC-21-10
	M12, 8 pin, fitted with 250 mm cable		D40P-SFC-21-M12

D40P



### Accessories

### Cables

Туре	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**

Туре	Compatible Switch Model	Model
Replacement Actuators	for D40P-LP	D40P-LPC-A
	for D40P-SP	D40P-SPC-A
	for D40P-MP	D40P-MPC-A
	for D40P-CP	D40P-CPC-A
	for D40P-WP	D40P-WPC-A
	for D40P-BP	D40P-BPC-A
	for D40P-LM	D40P-LMC-A
	for D40P-SM	D40P-SMC-A
	for D40P-BM	D40P-BMC-A
	for D40P-SH	D40P-SHC-A
	for D40P-SF	D40P-SFC-A
	for D40P-MH	D40P-MHC-A



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### **Specifications**

### **Electrical Data**

		Plastic Housing	Stainless Steel/Food/Hygienic Housings	
Sensor Technology		Hall Effect	Hall Effect	
Serial Switching		up to 20 switches in series	up to 20 switches in series	
Power Supply		24 VDC ±10%		
Rated Loads	NC Contacts Max.	0.2 A @ 24 VDC (min. internal resistance 8.5Ω)		
	NO Contact Max.	0.2 A @ 24 VDC		
Dielectric Withstand		250 VAC	250 VAC	
Insulation Resistance		100 ΜΩ	100 ΜΩ	

### **Mechanical Data**

		Plastic Housing	Stainless Steel/Food/Hygienic Housings	
Indicator		LED		
Operating Distance	OFF → ON (Sao)	8 mm	8 mm	
	ON → OFF (Sar)	20 mm	20 mm	
Recommended Setting Gap		5 mm		
Actuator Approach Speed	Min.	200 mm/s		
	Max.	1,000 mm/s		
Switching Frequency	Max.	1.0 Hz		
Operating Temperature		–25 to 80°C	–25 to 105°C	
Enclosure Protection	Flying Lead	IP67	IP69K	
	M12 Connector	IP67		
Cable Material	Flying Lead	PVC, 8 core, Ø 6 mm o.d.		
	M12 Connector	250 mm, PVC, Ø 6 mm o.d.		
Mounting Bolts		2 × M4 (not supplied)		
Tightening Torque for Mounting Bolts	Max.	1 Nm		
Shock Resistance (IEC 68-2-27)		11 ms, 30 g		
Vibration Resistance (IEC 68-2-6)		10 to 55 Hz, 1 mm		
Material		Black Polyester	Stainless Steel 316 (mirror polish)	

### Reliability Data

	Plastic Housing	Stainless Steel/Food/Hygienic Housings
EN ISO 13849-1	up to PLe Category 4 (if both channels are used with a PLe control device)	
PFHd	2.6 × 10 <sup>-10</sup> (1/h)	
Proof Test Interval (Life) 47 Years	20 years	
MTTFd	866 years	

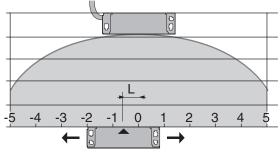
### **Approved Standards**

EN Standards Certified by TUV Rheinland: EN ISO13849-1, EN 60204-1, EN ISO 14119 (Type 4 Interlocking Device), EN/IEC 60947-5-3, UL 508, CSA C22.2.





### **Operating Characteristics**



5 mm misalignment tolerance after setting

### **Connection Diagram**

#### M12-Connector Version (M12 male) **Cable Version** Wire Color Signal Name Pin No. Signal Name Wire Color (male side) +24 VDC GND +24 VDC - red NC Channel 1 GND blue NC Channel 1 NC Channel 1 black NC Channel 2 NC Channel 1 white NC Channel 2 NC Channel 2 yellow Aux. NO Channel NC Channel 2 — green 5 8 Aux. NO Channel Aux. NO Channel - brown Aux. NO Channel - orange





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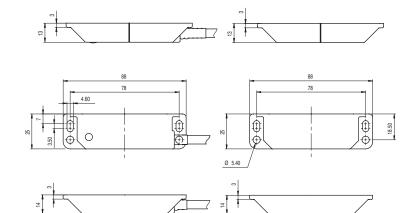
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### Elongated Sensor (Sensor/Actuator) D40P-LPC



D40P-LMC





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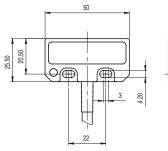
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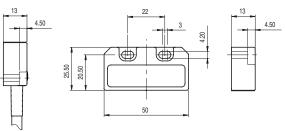
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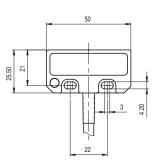






D40P-SMC

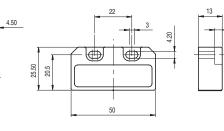


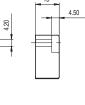


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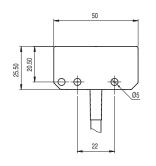


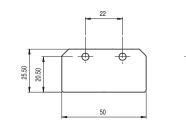


D40P-SHC

SHE SAFETY, TECHNOLOGY & INNOVATION









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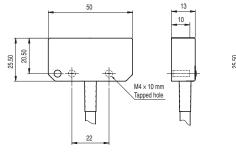
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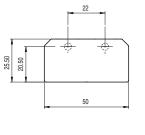
### D40P (Unit: mm)

### Dimensions

D40P-SFC



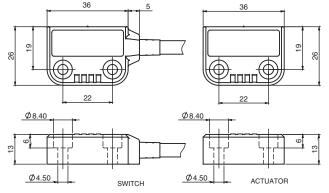




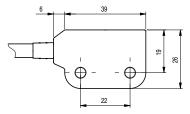


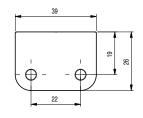
Miniature Sensor (Sensor/Actuator, right side version) D40P-MPC

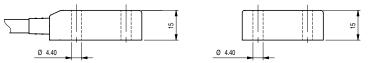


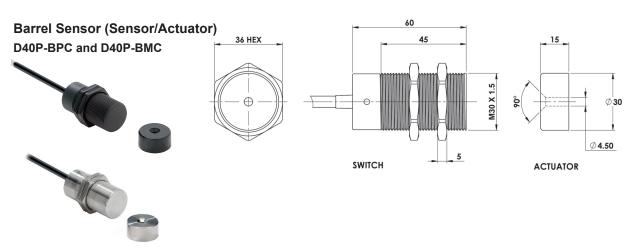


D40P-MHC









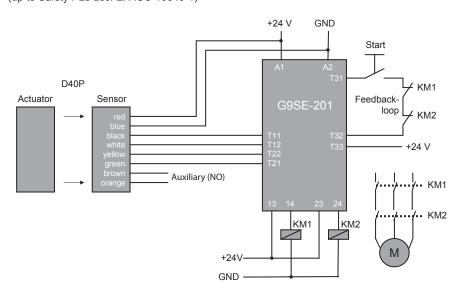




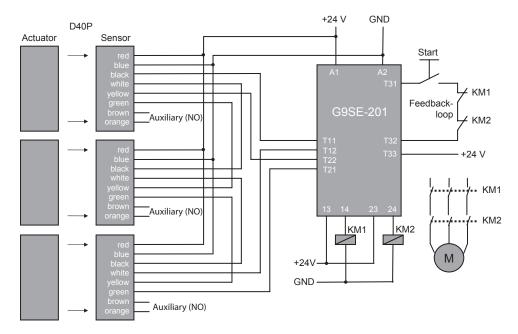
### Wiring Examples

### G9SE

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



### Series Connection Application Example of 3 Sensors with G9SE-201 with Manual Reset (up to Safety PLd acc. EN ISO 13849-1)

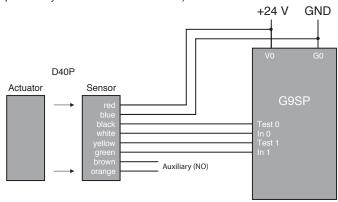


NOTE: For automatic reset connect the feedback loop between T31 and T33. Connect T32 to +24 VDC.

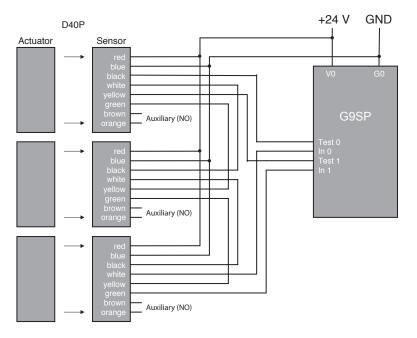


### G9SP

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



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



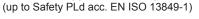


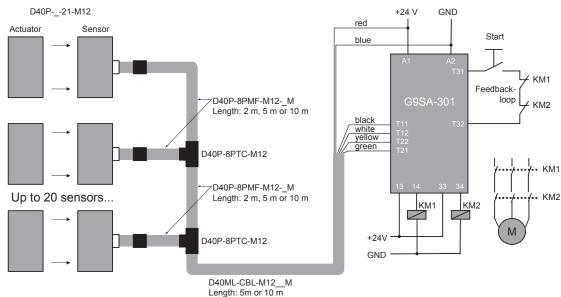


### Wiring Examples

### T-Connector and Connection Cable

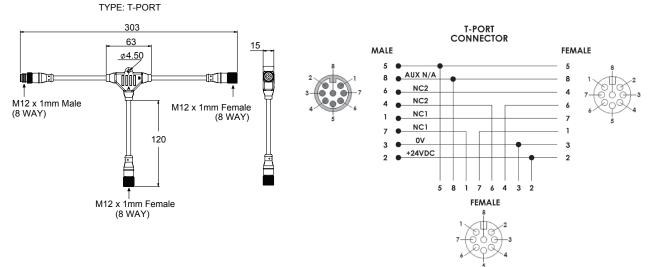
Connection Application Example of 3 Sensors



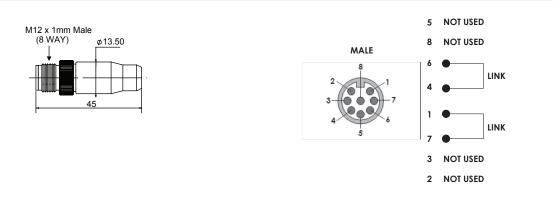


### **T-Connector Dimensions and Wiring**

(Unit: mm)



### **Shorting Plug Dimensions and Wiring**





### **Safety Precautions**

### 

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 esult 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 appropiate 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.

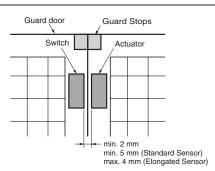
### Solvents

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

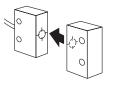
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Use guard stops in the way shown below to ensure that the switch and actuator do not make contact when the guard door is closed.

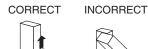


### **Mounting Direction**

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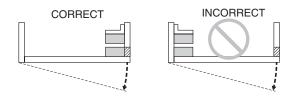
CORRECT





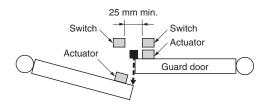
### Using for Hinged Doors

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



### **Mutual Interferance**

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





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## Terms and Conditions of Sale

- 1. Offer: Acceptance. These terms and conditions (these "Terms") are deemed Oner, Acceptative: These terms and conducts (these <u>Terms</u>) are deemed part of all quotes, agreements, purchase orders, acknowledgments, price lists, catalogs, manuals, brochures and other documents, whether electronic or in writing, relating to the sale of products or services (collectively, the "Products") by Omron Electronics LLC and its subsidiary companies ("Omron"). Omron objects to any terms or conditions proposed in Buyer's purchase order or other decomparise the terms of the sale of products with the terms of terms of the terms of the terms of term documents which are inconsistent with, or in addition to, these Terms.
- Prices; Payment Terms. All prices stated are current, subject to change with-out notice by Omron. Omron reserves the right to increase or decrease prices on any unshipped portions of outstanding orders. Payments for Products are due net 30 days unless otherwise stated in the invoice.
- Discounts. Cash discounts, if any, will apply only on the net amount of invoices sent to Buyer after deducting transportation charges, taxes and duties, and will be allowed only if (i) the invoice is paid according to Omron's payment terms and (ii) Buyer has no past due amounts.
- Interest. Omron, at its option, may charge Buyer 1-1/2% interest per month or the maximum legal rate, whichever is less, on any balance not paid within the stated terms.
- Orders. Omron will accept no order less than \$200 net billing. <u>Governmental Approvals.</u> Buyer shall be responsible for, and shall bear all costs involved in, obtaining any government approvals required for the impor-6 tation or sale of the Products.
- Taxes. All taxes, duties and other governmental charges (other than general real property and income taxes), including any interest or penalties thereon, imposed directly or indirectly on Omron or required to be collected directly or 7 indirectly by Omron for the manufacture, production, sale, delivery, importa-tion, consumption or use of the Products sold hereunder (including customs duties and sales, excise, use, turnover and license taxes) shall be charged to and remitted by Buyer to Omron. <u>Financial.</u> If the financial position of Buyer at any time becomes unsatisfactory
- to Omron, Omron reserves the right to stop shipments or require satisfactory security or payment in advance. If Buyer fails to make payment or otherwise comply with these Terms or any related agreement, Omron may (without liability and in addition to other remedies) cancel any unshipped portion of Prod-ucts sold hereunder and stop any Products in transit until Buyer pays all amounts, including amounts payable hereunder, whether or not then due, which are owing to it by Buyer. Buyer shall in any event remain liable for all unpaid accounts
- Cancellation: Etc. Orders are not subject to rescheduling or cancellation unless Buyer indemnifies Omron against all related costs or expenses. 9
- Force Majeure. Omron shall not be liable for any delay or failure in delivery resulting from causes beyond its control, including earthquakes, fires, floods, strikes or other labor disputes, shortage of labor or materials, accidents to 10.
- anchinery, acts of sabotage, riots delay in or lack of transportation or the requirements of any government authority.
  11. Shipping: Delivery. Unless otherwise expressly agreed in writing by Omron:

  a. Shipments shall be by a carrier selected by Omron; Omron will not drop ship except in "break down" situations.
  - b. Such carrier shall act as the agent of Buyer and delivery to such carrier shall constitute delivery to Buyer;
     c. All sales and shipments of Products shall be FOB shipping point (unless oth-
  - erwise stated in writing by Omron), at which point title and risk of loss shall pass from Omron to Buyer; provided that Omron shall retain a security interest in the Products until the full purchase price is paid; d. Delivery and shipping dates are estimates only; and e. Omron will package Products as it deems proper for protection against nor-
- mal handling and extra charges apply to special conditions. 12. <u>Claims.</u> Any claim by Buyer against Omron for shortage or damage to the
- Products occurring before delivery to the carrier must be presented in writing to Omron within 30 days of receipt of shipment and include the original trans-portation bill signed by the carrier noting that the carrier received the Products from Omron in the condition claimed. 13. Warranties. (a) Exclusive Warranty. Omron's exclusive warranty is that the
- roducts will be free from defects in materials and workmanship for a period of twelve months from the date of sale by Omron (or such other period expressed in writing by Omron). Omron disclaims all other warranties, express or implied. (b) <u>Limitations</u>. OMRON MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, ABOUT NON-INFRINGEMENT, MERCHANTABIL-

## Certain Precautions on Specifications and Use

- Suitability of Use. Omron Companies shall not be responsible for conformity 1. with any standards, codes or regulations which apply to the combination of the Product in the Buyer's application or use of the Product. At Buyer's request, Omron will provide applicable third party certification documents identifying ratings and limitations of use which apply to the Product. This information by itself is not sufficient for a complete determination of the suitability of the Prod-uct in complete determination of the suitability of the Prod-uct in complete determination events or other application. uct in combination with the end product, machine, system, or other application or use. Buyer shall be solely responsible for determining appropriateness of the particular Product with respect to Buyer's application, product or system. Buyer shall take application responsibility in all cases but the following is a non-exhaustive list of applications for which particular attention must be given: Outdoor use, uses involving potential chemical contamination or electrical interference, or conditions or uses not described in this document.

 (ii) Use in consumer products or any use in significant quantities.
 (iii) Energy control systems, combustion systems, railroad systems, aviation systems, medical equipment, amusement machines, vehicles, safety equipment, and installations subject to separate industry or government regulations. (iv) Systems, machines and equipment that could present a risk to life or property. Please know and observe all prohibitions of use applicable to this Product

NEVER USE THE PRODUCT FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY OR IN LARGE QUANTITIES WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO

ITY OR FITNESS FOR A PARTICULAR PURPOSE OF THE PRODUCTS. BUYER ACKNOWLEDGES THAT IT ALONE HAS DETERMINED THAT THE PRODUCTS WILL SUITABLY MEET THE REQUIREMENTS OF THEIR INTENDED USE. Omron further disclaims all warranties and responsibility of any type for claims or expenses based on infringement by the Products or oth-erwise of any intellectual property right. (c) <u>Buyer Remedy</u>. Omron's sole obli-gation hereunder shall be, at Omron's election, to (i) replace (in the form originally shipped with Buyer responsible for labor charges for removal or replacement thereof) the non-complying Product, (ii) repair the non-complying Product, or (iii) repair, indemnity or any other claims or expenses regarding the Product, university or credit Buyer an amount equal to the purchase price of the non-complying Product; provided that in no event shall Omron be responsi-ble for warranty, repair, indemnity or any other claims or expenses regarding the Products unless Omron's analysis confirms that the Products were prop-erly handled, stored, installed and maintained and not subject to contamination, abuse, misuse or inappropriate modification. Return of any Products by Buyer must be approved in writing by Omron before shipment. Omron Compa-nies shall not be liable for the suitability or unsuitability or the results from the use of Products in combination with any electrical or electronic components, circuits, system assemblies or any other materials or substances or environ-ments. Any advice, recommendations or information given orally or in writing, are not to be construed as an amendment or addition to the above warranty. See http://www.omron247.com or contact your Omron representative for published information.

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- Miscentaneous. (a) watver, No failure of delay by Offron in exercising any fight and no course of dealing between Buyer and Omron shall operate as a waiver of rights by Omron. (b) <u>Assignment</u>. Buyer may not assign its rights hereunder without Omron's written consent. (c) <u>Law</u>. These Terms are governed by the law of the jurisdiction of the home office of the Omron company from which Buyer is purchasing the Products (without regard to conflict of law princi-Buyer is parchasing the Products (without regard to conflict of hav principles). (d) <u>Amendment</u>. These Terms constitute the entire agreement between Buyer and Omron relating to the Products, and no provision may be changed or waived unless in writing signed by the parties. (e) <u>Severability</u> If any provi-sion hereof is rendered ineffective or invalid, such provision shall not invalidate any other provision. (f) <u>Setoff</u>. Buyer shall have no right to set off any amounts argient the empeuter without is concerned to this invalid. (a) Definitions (b) and (b) and (c) against the amount owing in respect of this invoice. (g) <u>Definitions</u> As used herein, "<u>including</u>" means "including without limitation"; and "<u>Omron Compa-nies</u>" (or similar words) mean Omron Corporation and any direct or indirect subsidiary or affiliate thereof.

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- <u>Programmable Products</u>. Omron Companies shall not be responsible for the user's programming of a programmable Product, or any consequence thereof. <u>Performance Data</u>. Data presented in Omron Company websites, catalogs and other materials is provided as a guide for the user in determining suitabil-ity and does not constitute a warranty. It may represent the result of Omron's test conditions, and the user must correlate it to actual application require-ments. Actual performance is subject to the Omron's Warranty and Limitations of Liability.
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