General Purpose Relays

Exceptionally Reliable General Purpose Relay now available with Lockable Test **Button**

- IEC Rating of 7A 250 V AC 50/60 Hz, General use 100,000 cycles.
- · Mechanical indicator standard for all models.
- Optional features include lockable test button. LED indicator, diode surge suppression, varistor, reverse polarity, and alternate wiring styles.
- UL (RU/_CRU), CE and TUV approved.
- · RoHS Compliant.





Features

Two-way Action Test Button

Relay in **Normal Operation**



Operation

For Momentary

Pull down the test button to the first position, then press the yellow button with an insulated tool to operate the contact.

For Lock Operation



Pull down the test button to the second position. . (The contact is now in the locked position.)

Model Number Structure

■ Model Number Legend

MKS 1 2 3 4 5 6 7

1. Contact Form

2: DPDT

3PDT 3.

2. Terminals

P: Plug-in

3. Mechanical Indicator/Test Button

Blank: Mechanical indicator

Mechanical indicator and lockable test button

4. LED Indicator

Blank: Standard LED indicator

5. Coil Polarity

Blank: Standard

Reverse polarity (DC coil only)

6. Surge Absorption

Blank: Standard

Surge absorber diode (DC coil only) D: Surge absorber varistor (AC coil only)

7. Internal Connections DPDT

Blank: Standard Non Standard 2: Internal Connections 3PDT

5: Standard Blank: Non Standard Non Standard

8. Rated Voltage

(Refer to "Coil Ratings".)

Ordering Information

■ List of Models

Туре	Terminals	Contact form	Internal connections (See note 3.)	With mechanical indicator	With mechanical indicator and lockable test button	Coil ratings
Basic	Plug-in	DPDT	Standard	MKS2P	MKS2PI	AC/DC
Models			Non Standard	MKS2P-2	MKS2PI-2	
		3PDT	Standard	MKS3P-5	MKS3PI-5	
			Non Standard	MKS3P-2	MKS3PI-2	
				MKS3P	MKS3PI	
Models with		DPDT	Standard	MKS2PN(1)	MKS2PIN(1)	AC/DC
LED Indicator			Non Standard	MKS2PN(1)-2	MKS2PIN(1)-2	
(See note 2.)		3PDT	Standard	MKS3PN(1)-5	MKS3PIN(1)-5	
			Non Standard	MKS3PN(1)-2	MKS3PIN(1)-2	
				MKS3PN(1)	MKS3PIN(1)	1
Models with		DPDT	Standard	MKS2P(1)-D	MKS2PI(1)-D	DC
Diode (See note 2.)			Non Standard	MKS2P(1)-D-2	MKS2PI(1)-D-2	1
		3PDT	Standard	MKS3P(1)-D-5	MKS3PI(1)-D-5	1
			Non Standard	MKS3P(1)-D-2	MKS3PI(1)-D-2	
				MKS3P(1)-D	MKS3PI(1)-D	
Models with		DPDT	Standard	MKS2PN-D	MKS2PIN-D	DC
LED Indicator			Non Standard	MKS2PN-D-2	MKS2PIN-D-2	
and Diode		3PDT	Standard	MKS3PN-D-5	MKS3PIN-D-5	
			Non Standard	MKS3PN-D-2	MKS3PIN-D-2	
				MKS3PN-D	MKS3PIN-D	
Models with	1	DPDT	Standard	MKS2P-V	MKS2PI-V	AC
Varistor			Non Standard	MKS2P-V-2	MKS2PI-V-2	
		3PDT	Standard	MKS3P-V-5	MKS3PI-V-5	
			Non Standard	MKS3P-V-2	MKS3PI-V-2	
				MKS3P-V	MKS3PI-V	
Models with	1	DPDT	Standard	MKS2PN-V	MKS2PIN-V	AC
LED Indicator and Varistor			Non Standard	MKS2PN-V-2	MKS2PIN-V-2	1
and varistor		3PDT	Standard	MKS3PN-V-5	MKS3PIN-V-5	1
			Non Standard	MKS3PN-V-2	MKS3PIN-V-2	1
				MKS3PN-V	MKS3PIN-V	1

Note: 1. When ordering, add the rated voltage to the model number. Rated voltages are given in the coil ratings table in the specifications. Example: MKS2P DC48

Rated voltage

2. The DC coil comes in two types: standard coil polarity and reverse coil polarity. Refer to Terminal Arrangement and Internal Connections.

Example: MKS3PN1-5 DC24

Reverse coil polarity

3. Refer to Terminal Arrangement and Internal Connections for all wiring diagrams.

■ 10A Sockets (Order Separately)

Item	Туре	Model
Track-mounted	8-pin	PF083A-E
Socket	11-pin	PF113A-E
	8-pin	PF083A-D
	11-pin	PF113A-D
Hold-down Clip (For PF083A-E and PF	PFC-A1	

Specifications

■ Ratings

Coil Ratings

Rate	ed voltage	Rated current		Coil resistance		Must release	Max. voltage	Power
		50 Hz	60 Hz		voltage	voltage		consumption
AC	6 V	443 mA	385 mA	3.1 Ω	80% max. of rated	30% min. of rated	110% of rated volt-	P.P
	12 V	221 mA	193 mA	13.7 Ω	voltage	voltage at 60 Hz	age	at 60 Hz
24 V	110 mA	96.3 mA	48.4 Ω		25% min. of rated voltage at 50 Hz		Approx. 2.7 VA at 50 Hz	
	110 V	110 V 24.2 mA 21.0 mA 932 Ω	Voltage at 30 112		a. 55			
	120 V	22.2 mA	19.3 mA	1,130 Ω	1			Approx. 1.4 W
	220 V	12.1 mA	10.5 mA	3,550 Ω	1			
	230 V	11.5 mA	10.0 mA	4,250 Ω	1			
	240 V	11.0 mA	9.6 mA	4,480 Ω	1			
DC	6 V	224 mA	•	26.7 Ω		15% min. of rated		
	12 V	112 mA		107 Ω	1	voltage		
	24 V	55.8 mA		430 Ω				
	48 V	28.1 mA		1,710 Ω	1			
100 V	100 V	13.5 mA		7,390 Ω	1			
	110 V	12.3 mA		8,960 Ω	1			

Note: 1. The rated current and coil resistance are measured at a coil temperature of 23°C with tolerances of +15%/-20% for AC rated current and $\pm 15\%$ for DC coil resistance.

- 2. Performance characteristic data are measured at a coil temperature of 23°C.
- 3. The maximum voltage is one that is applicable instantaneously to the Relay coil at 23°C and not continuously.
- 4. For DC-operated Relays with the LED indicator built-in, add an LED current of approx. 5 mA to the rated current.

Contact Ratings

Load		Resistive load (cos ϕ = 1)	Inductive load (p.f. = 0.4)
Contact mechanism		Single	•
Contact material		AgSnIn	
Rated load		10 A, 250 VAC 10A, 30 VDC	7 A, 250 VAC
	NC	5 A, 250 VAC 5 A, 30 VDC	
Rated carry current		10 A	
Max. switching voltage		250 VAC, 250 VDC	
Max. switching current		10 A	
Max. switching capacity NO		2,500 VA/300 W	
	NC	1,250 VA/150 W	

■ Characteristics

Contact resistance	100 mΩ max.
Operate time	AC: 20 ms max.
	DC: 30 ms max.
Release time	20 ms max.(40 ms max. for built-in diode models)
Max. operating frequency	Mechanical: 18,000 operations/hr (no load) Electrical:1,800 operations/hr (at rated load)
Insulation resistance	100 MΩ min. (at 500 VDC)
Dielectric strength	2,500 VAC 50/60 Hz for 1 min. between coil and contacts 1,000 VAC 50/60 Hz for 1 min. between contacts of same polarity and terminals of the same polarity 2,500 VAC 50/60 Hz for 1 min. between current-carrying parts, non-current-carrying parts, and opposite polarity
Insulation method	Basic insulation
Impulse withstand voltage	4.5 kV between coil and contacts (with 1.2 \times 50 μ s impulse wave) 3.0 kV between contacts of different polarity (with 1.2 \times 50 μ s impulse wave)
Pollution degree	3
Rated insulation voltage	250 V
Vibration resistance	Destruction:10 to 55 Hz, 1.5 mm double amplitude Malfunction:10 to 55 Hz, 1.0 mm double amplitude
Shock resistance	Destruction:1,000 m/s² (approx. 100 G)
	Malfunction:100 m/s² (approx. 10 G)
Life expectancy	Mechanical: 5,000,000 operations min.
	Electrical:100,000 operations min.
Min. permissible load	10 mA at 1 VDC P level: λ_{60} =0.1 x 10 ⁻⁶ / ops
Ambient temperature	Operating: -40 to 60°C (with no icing or condensation)
Ambient humidity	Operating: 5% to 85%
Weight	Approx. 90 g

Note: 1. The values given above are initial values.

2. Ambient temperature of models with LED indicator is -25 to 60°C.

■ Approved Standards

UL Recognized (File No. E41515) - - Ambient Temp. = 40°C

Coil ratings		Contact ratings	Operations
6 to 110 VDC N.O. 6 to 240 VAC contact		10 A, 250 V AC 50/60 Hz (Resistive) 10 A, 30 V DC (Resistive) 7 A, 250 V AC 50/60 Hz (General Use)	100,000
		10 A, 250 V AC 50/60 Hz (Resistive) 10 A, 30 V DC (Resistive) 7 A, 250 V AC 50/60 Hz (General Use)	100,000

Note: 10A UL ratings are with no load on the other contact set.

CSA Certified by c Sus

IEC Standard/TUV Certification: IEC61810-1 (Certification No. R50104853)

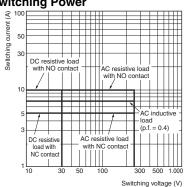
Coil ratings		Contact ratings	Operations
6, 12, 24, 48, 100, 110 VDC 6, 12, 24, 100,		10 A, 250 V AC 50/60 Hz (Resistive) 10 A, 30 V DC (Resistive) 7 A, 250 V AC 50/60 Hz (General Use)	100,000
	N.C. contact	5 A, 250 V AC 50/60 Hz (Resistive) 5 A, 30 V DC (Resistive) 7 A, 250 V AC 50/60 Hz (General Use)	100,000

Note: Maximum carrying current per TUV Certification is 9 A when new MK-S relays are mounted in PF083A-E or PF113A-E Sockets.

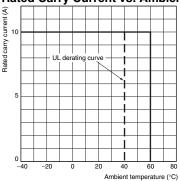
Engineering Data

■ Reference Data

Maximum Switching Power



Rated Carry Current vs. Ambient Rated Temperature

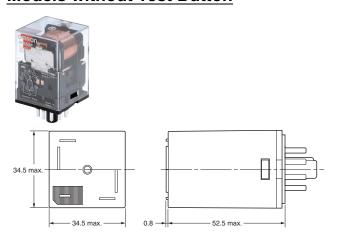


Note: The lower limit of the ambient operating temperature for models with built-in operation indicators is -25°C.

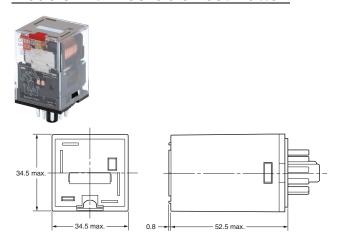
Dimensions

Note: All units are in millimeters unless otherwise indicated.

Models without Test Button



Models with Lockable Test Button



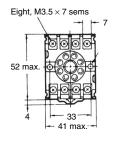
Track Mounted Sockets

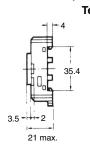
See below for Socket dimensions.

Poles	Finger-prote	_	
Maximum carry current	10 A		5 A
2 poles	PF083A-E	PF083A-D	PF083A
3 poles	PF113A-E	PF113A-D	PF113A

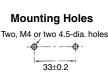
Note: If using the PF083A or PF113A Sockets, be sure the maximum carrying current is 5 A or less. When using finger-protection sockets, make sure the connecting wire terminals are Y-shaped.

PF083A-E (Conforming to EN 50022)

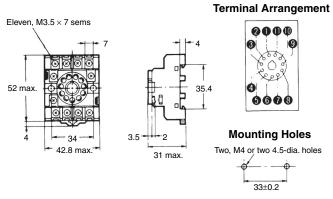




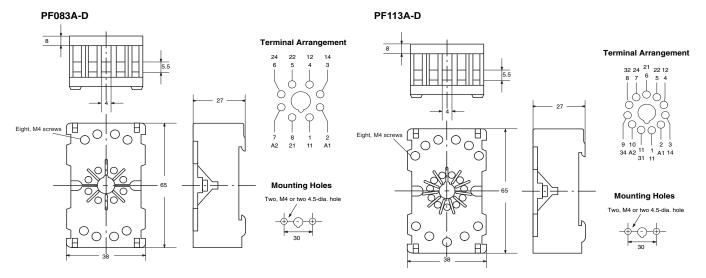
Terminal Arrangement 8000



PF113A-E (Conforming to EN 50022)

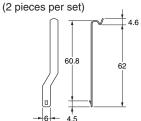






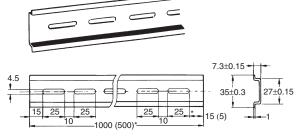
Hold-down Clips

PFC-A1



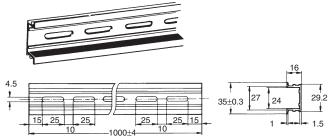
Mounting Tracks

PFP-100N, PFP-50N (Conforming to EN 50022)

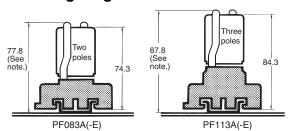


^{*} The figure in parenthesis is for PFP-50N.

PFP-100N2 (Conforming to EN 50022)



Mounting Height with Sockets



Note: PF083A(-E) and PF113A(-E) allow either track or screw mounting.

Terminal Arrangement/Internal Connection (Bottom View)

Basic Models (AC/DC Coil)

MKS2P(I)	MKS2P(I)-2	MKS3P(I)	MKS3P(I)-2	MKS3P(I)-5
4 5 6 7 7 1 8 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1				\$ 6 7 8 8 9 10 10 10 10 10 10 10 10 10 10 10 10 10

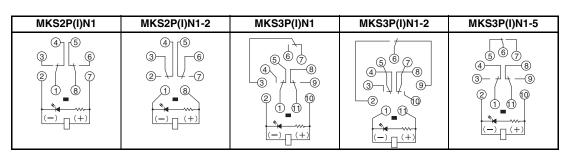
LED Indicator Type (AC Coil)

MKS2P(I)N	MKS2P(I)N-2	MKS3P(I)N	MKS3P(I)N-2	MKS3P(I)N-5
				\$ 6 7 8 3 4 4 9 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1

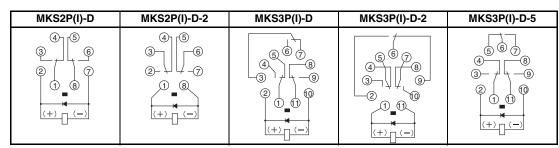
LED Indicator Type (DC Coil: Standard Polarity)

MKS2P(I)N	MKS2P(I)N-2	MKS3P(I)N	MKS3P(I)N-2	MKS3P(I)N-5
				\$ 6 7 8 3 - 1 9 10 10 10 10 10 10 10 10 10 10 10 10 10

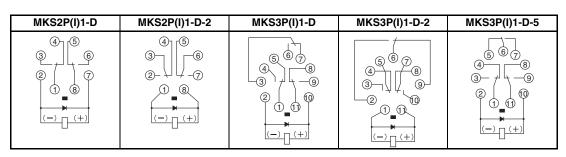
LED Indicator Type (DC Coil: Reverse Polarity)



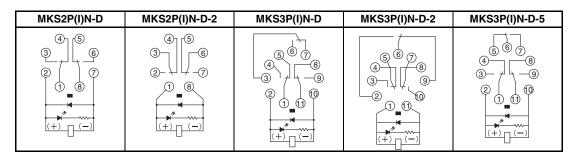
Diode Type (DC Coil: Standard Polarity)



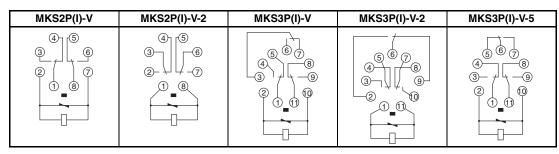
Diode Type (DC Coil: Reverse Polarity)



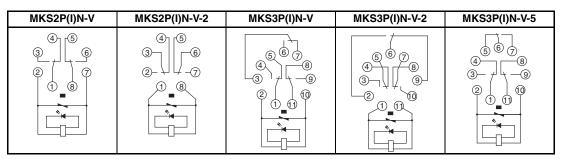
LED Indicator and Diode Type (DC Coil)



Varistor Type (AC Coil)



LED Indicator and Varistor Type (AC Coil)



Safety Precautions

■ Safety Precautions for Correct Use

Installation

Recommend mounting MK-S Relay so that side with wiring diagram is facing down.

Handling

Check coil polarity when wiring LED Indicator and Diode Models.

Test Button

Do not use the test button for any purpose other than testing. Be sure not to touch the test button accidentally as this will turn the contacts ON. Before using the test button, confirm that circuits, the load, and any other connected item will operate safely.

Check that the test button is released before turning ON relay circuits.

If the test button is pulled out too forcefully, it may bypass the momentary testing position and go straight into the locked position.

Use an insulated tool when you operate the test button.

Models with test buttons or LED indicators fulfill the requirements for reinforced insulation between live parts and the front of cover only when the Relay is in a complete condition, i.e. with the nameplate, nameplate frame, test button, and slider in place. If any of these parts are removed, only the requirements for basic insulation are fulfilled.

Omron Electronic Components, LLC

Terms and Conditions of Sales

I. GENERAL

Definitions: The words used herein are defined as follows.

Terms: These terms and conditions

(b) Seller: Omron Electronic Components LLC and its subsidiaries

The buyer of Products, including any end user in section III through VI Buyer: (c)

Products: Products and/or services of Seller Including without limitation Including:

Offer: Acceptance: These Terms are deemed part of all quotations, acknowledgments, invoices, purchase orders and other documents, whether electronic or in writing, relating to the sale of Products by Seller. Seller hereby objects to any Terms proposed in Buyer's purchase order or other documents which are inconsistent with, or in addition to, these

<u>Distributor</u>: Any distributor shall inform its customer of the contents after and including section III of these Terms.

- Prices: Payment: All prices stated are current, subject to change without notice by Seller. Buyer agrees to pay the price in effect at the time the purchase order is accepted by Seller. Payments for Products received are due net 30 days unless otherwise stated in the invoice. Buyer shall have no right to set off any amounts against the amount owing in respect of this 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 (a) the invoice is paid according to Seller's payment terms and (b) Buyer has no past due amounts owing to Seller.
- Interest: Seller, at its option, may charge Buyer 1.5% interest per month or the maximum legal rate, whichever is less, on any balance not paid within the stated terms. Orders: Seller will accept no order less than 200 U.S. dollars net billing.

- Currencies: If the prices quoted herein are in a currency other than U.S. dollars, Buyer shall make remittance to Seller at the then current exchange rate most favorable to Seller; provided that if remittance is not made when due, Buyer will convert the amount to U.S. dollars at the then current exchange rate most favorable to Seller available during the period between the due date and the date remittance is actually made.
- Governmental Approvals: Buyer shall be responsible for all costs involved in obtaining any government approvals regarding the importation 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 Seller or required to be collected directly or indirectly by Seller for the manufacture, production, sale, delivery, importation, 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 Seller.
- Financial: If the financial position of Buyer at any time becomes unsatisfactory to Seller, Seller 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, Seller may (without liability and in addition to other remedies) cancel any unshipped portion of Products 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
- Cancellation; Etc: Orders are not subject to rescheduling or cancellation unless Buyer indemnifies Seller fully against all costs or expenses arising in connection therewith.
- Force Majeure: Seller 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 machinery, acts of sabotage, riots, delay in or lack of transportation or the requirements of any government authority.

Shipping: Delivery: Unless otherwise expressly agreed in writing by Seller:
(a) All sales and shipments of Products shall be FOB shipping point (unless otherwise stated in writing by Seller), at which point title to and all risk of loss of the Products shall pass from Seller to Buyer, provided that Seller shall retain a security interest in the Products until the full purchase price is paid by Buyer;

Delivery and shipping dates are estimates only; and

- Seller will package Products as it deems proper for protection against normal handling and extra charges apply to special conditions.
- 12. Claims: Any claim by Buyer against Seller for shortage or damage to the Products occurring before delivery to the carrier or any claim related to pricing or other charges must be presented in detail in writing to Seller within 30 days of receipt of shipment.

III. PRECAUTIONS

- Suitability: IT IS THE BUYER'S SOLE RESPOINSIBILITY TO ENSURE THAT ANY OMRON PRODUCT IS FIT AND SUFFICIENT FOR USE IN A MOTORIZED VEHICLE APPLICATION. BUYER SHALL BE SOLELY RESPONSIBLE FOR DETERMINING APPROPRIATENESS OF THE PARTICULAR PRODUCT WITH RESPECT TO THE BUYER'S APPLICATION INCLUDING (A) ELECTRICAL OR ELECTRONIC COMPONENTS. (B) CIRCUITS, (C) SYSTEM ASSEMBLIES, (D) END PRODUCT, (E) SYSTEM (E) MATERIALS OR SUBSTANCES OR (C) OPERATING ENVIRONMENT SYSTEM, (F) MATÉRIALS OR SUBSTANCES OR (G) OPERATING ENVIRONMENT. Buyer acknowledges that it alone has determined that the Products will meet their requirements of the intended use in <u>all</u> cases. Buyer must know and observe all prohibitions of use applicable to the Product/s.
- Use with Attention: The followings are some examples of applications for which particular attention must be given. This is not intended to be an exhaustive list of all possible use of any Product, nor to imply that any use listed may be suitable for any Product:
 - Outdoor use, use involving potential chemical contamination or electrical interference.

(b) Use in consumer Products or any use in significant quantities.

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.

(d) Systems, machines, and equipment that could present a risk to life or property.

Prohibited Use: NEVER USE THE PRODUCT FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE PRODUCT IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

Motorized Vehicle Application: USE OF ANY PRODUCT/S FOR A MOTORIZED VEHICLE APPLICATION MUST BE EXPRESSLY STATED IN THE SPECIFICATION BY

SELLER.

<u>Programmable Products:</u> Seller shall not be responsible for the Buyer's programming of a programmable Product.

IV. WARRANTY AND LIMITATION

- Warranty: Seller's exclusive warranty is that the Products will be free from defects in materials and workmanship for a period of twelve months from the date of sale by Seller (or such other period expressed in writing by Seller). SELLER MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, ABOUT ALL OTHER WARRANTIES, NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OF THE PRODUCTS.
- Buyer Remedy: Seller's sole obligation hereunder shall be to replace (in the form originally shipped with Buyer responsible for labor charges for removal or replacement thereof) the non-complying Product or, at Seller's election, to repay or credit Buyer an amount equal to the purchase price of the Product; provided that there shall be no liability for Seller or its affiliates unless Seller's analysis confirms that the Products were correctly 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 Seller before shipment.

 <u>Limitation on Liability</u>: SELLER AND ITS AFFILIATES SHALL NOT BE LIABLE FOR SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR PRODUCTION OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCTS, WHETHER SUCH CLAIM IS BASED IN CONTRACT, WARRANTY, NEGLIGENCE OR STRICT LIABILITY. FURTHER, IN NO EVENT SHALL LIABILITY OF SELLER OR ITS AFFILITATES EXCEED THE INDIVIDUAL PRICE OF THE PRODUCT ON WHICH LIABILITY IS ASSERTED.
- Indemnities: Buyer shall indemnify and hold harmless Seller, its affiliates and its employees from and against all liabilities, losses, claims, costs and expenses (including attorney's fees and expenses) related to any claim, investigation, litigation or proceeding (whether or not Seller is a party) which arises or is alleged to arise from Buyer's acts or omissions under these Terms or in any way with respect to the Products.

V. INFORMATION; ETC.

- Intellectual Property: The intellectual property embodied in the Products is the exclusive property of Seller and its affiliates and Buyer shall not attempt to duplicate it in any way without the written permission of Seller. Buyer (at its own expense) shall indemnify and hold harmless Seller and defend or settle any action brought against Seller to the extent that it is based on a claim that any Product made to Buyer specifications infringed intellectual property rights of another party.
- Property: Confidentiality: Notwithstanding any charges to Buyer for engineering or tooling, all engineering and tooling shall remain the exclusive property of Seller. All information and materials supplied by Seller to Buyer relating to the Products are confidential and proprietary, and Buyer shall limit distribution thereof to its trusted employees and strictly prevent disclosure to any third party.

 Performance Data: Performance data is provided as a guide in determining suitability

and does not constitute a warranty. It may represent the result of Seller's test conditions, and the users must correlate it to actual application requirements.

- Change In Specifications: Product specifications and descriptions may be changed at any time based on improvements or other reasons. It is Seller's practice to change part numbers when published ratings or features are changed, or when significant engineering changes are made. However, some specifications of the Product may be changed without any notice.
- Errors And Omissions: The information on Seller's website or in other documentation has been carefully checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical or proofreading errors or omissions.
- Export Controls: Buyer shall comply with all applicable laws, regulations and licenses regarding (a) export of the Products or information provided by Seller; (b) sale of Products to forbidden or other proscribed persons or organizations; (c) disclosure to noncitizens of regulated technology or information.

VI. MISCELLANEOUS

- <u>Waiver</u>: No failure or delay by Seller in exercising any right and no course of dealing between Buyer and Seller shall operate as a waiver of rights by Seller.
- Assignment: Buyer may not assign its rights hereunder without Seller's written consent. Law: These Terms are governed by Illinois law (without regard to conflict of laws). Federal and state courts in Cook County, Illinois have exclusive jurisdiction for any dispute hereunder.
- Amendment: These Terms constitute the entire agreement between Buyer and Seller relating to the Products, and no provision may be changed or waived unless in writing signed by the parties.
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