



MEDICAL SOLUTIONS

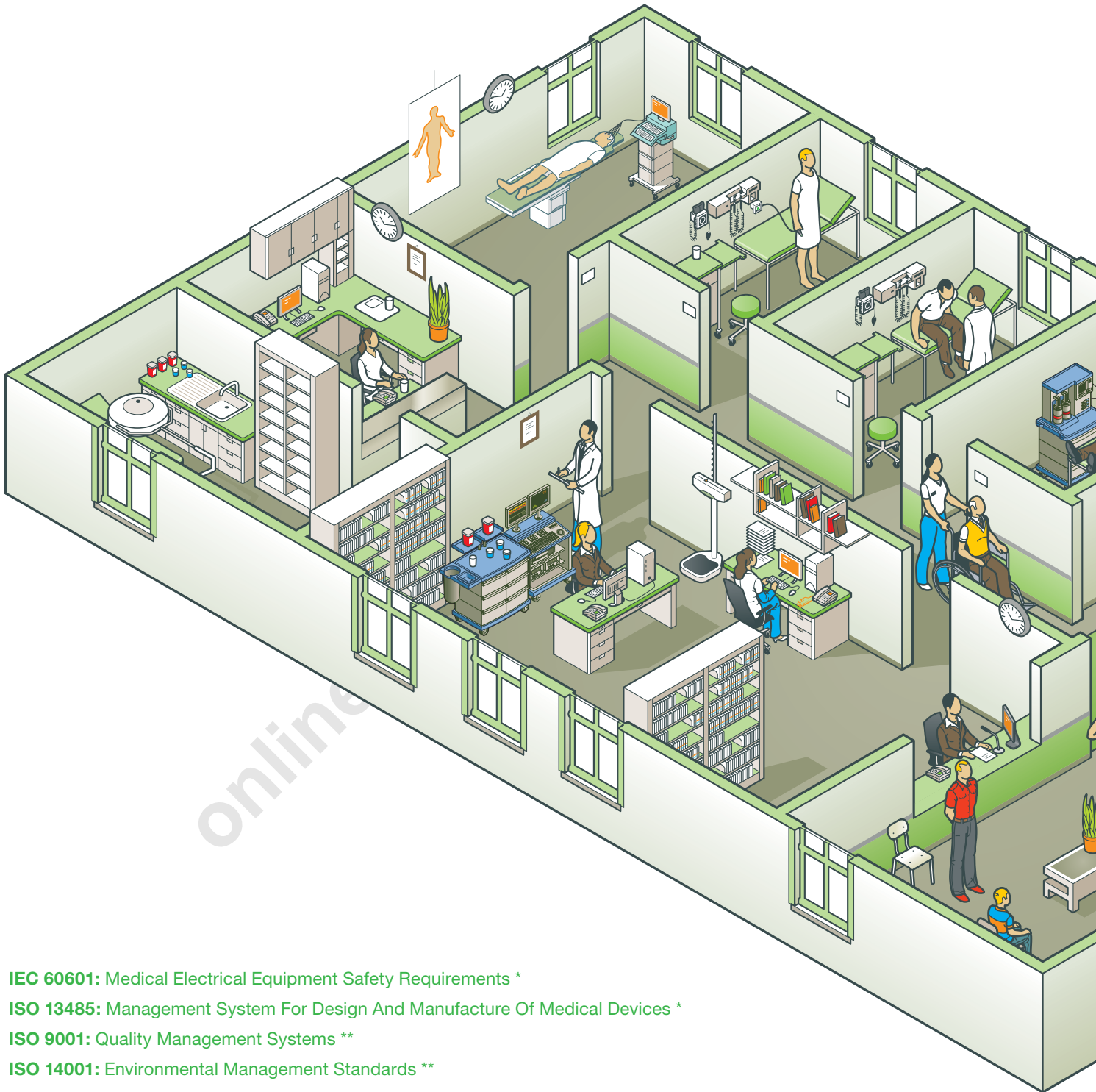
Panasonic Electric Works of America
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Panasonic ideas for life

MEDICAL SOLUTIONS

Panasonic Electric Works Corporation of America



IEC 60601: Medical Electrical Equipment Safety Requirements *

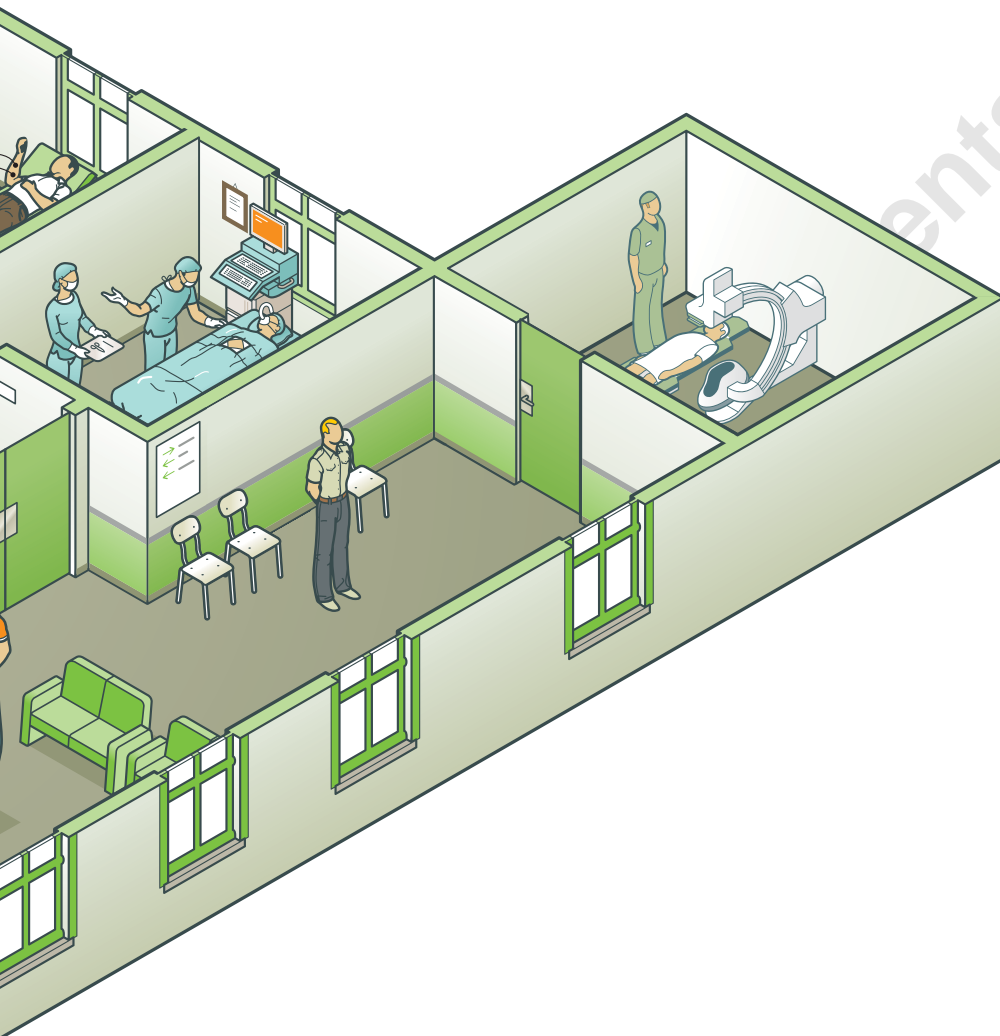
ISO 13485: Management System For Design And Manufacture Of Medical Devices *

ISO 9001: Quality Management Systems **

ISO 14001: Environmental Management Standards **

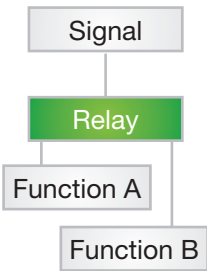
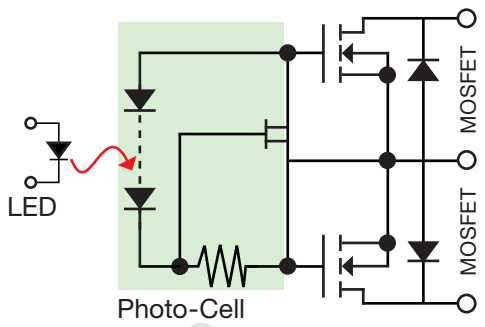
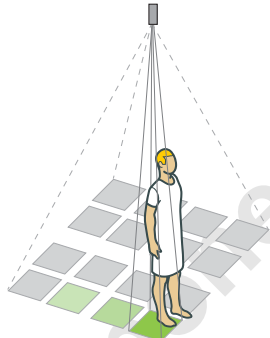
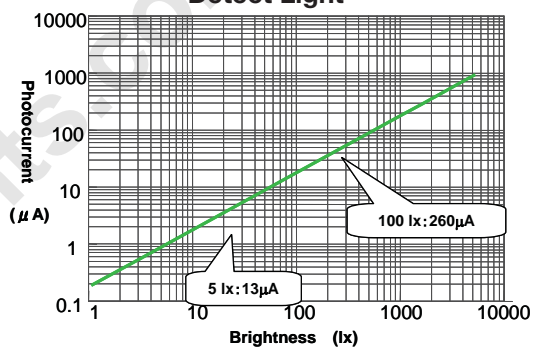
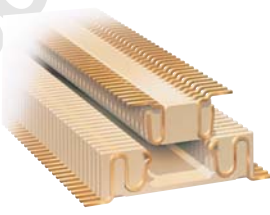

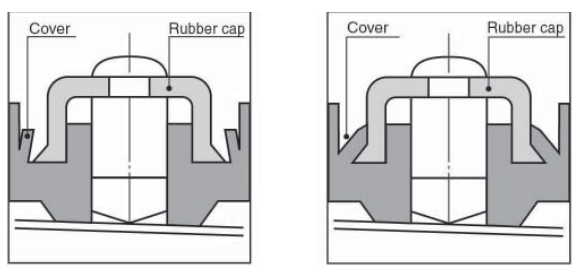
* Panasonic components enable medical devices to meet these certifications.

** Panasonic Electric Works maintains a certificate of approval for these standards.



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PRODUCTS	FUNCTION	
<p>Electromechanical, PhotoMOS® & Solid State Relays</p>	<p>Signal Routing</p> 	<p>Electrical Isolation & Protection</p>  <p>Optically Isolated PhotoMOS</p>
<p>Sensors</p> <ul style="list-style-type: none"> - Motion - Light - Pressure 	<p>Detect Motion</p> 	<p>Detect Light</p>  <p>Linear Output</p>
<p>Fine Pitch Connectors</p>	<p>Connect PCB & FPC:</p> 	<p>Reliable Connectivity</p>  <p>V-Notch construction provides increased reliability by providing high resistance to dust and foreign particles. Bellows contact provides increased tolerance to twisting and dropping.</p>
<p>Switches</p>	<p>IP67 Rated Switching</p> <p>IP67 switches allow no ingress of dust and offer complete protection against contact. In addition, the ingress of water in harmful quantity is not possible when the switch is immersed in 1m of water for 30 minutes or less.</p>	<p>Sealed Construction</p>  <p>Elastomer double molding technology is used to mold the elastomer to the switch body creating a reliable seal between the body and cover.</p>



PRODUCTS	APPLICATIONS	PAGE
	<p>Cardiac Mapping Patient Mobility Electronic Nerve Stimulation Cerebral Cortex Monitor Drug Dispensing System Imaging: CT, MRI Portable Respiratory Equipment Kidney Dialysis Equipment Robotic Lab Equipment Defibrillators Portable Patient Monitors</p>	<p>6 7 7 8 9 10 10 11 11 12 12</p>
	<p>Lateral Rotation Bed Anesthesia Delivery Unit Portable Respiratory Equipment Kidney Dialysis Equipment Operating Room Screen Control Patient Monitoring Hospital Signage Physical Rehabilitation</p>	<p>6 9 10 11 13 13 13 13</p>
	<p>Pulse Oximeter Defibrillators Portable Patient Monitors</p>	<p>8 12 12</p>
	<p>Anesthesia Delivery Unit Defibrillators</p>	<p>9 12</p>



CARDIAC MAPPING

Mapping the electrical activity of the heart is a critical component in diagnosing and treating heart disease. Signal relays are used to select between a test signal or the signal from electrodes on a catheter connected to the patient.



PRODUCT SPOTLIGHT:

- Signal Relays



PRODUCT FEATURE:

High breakdown voltage & dielectric strength offer two significant advantages:

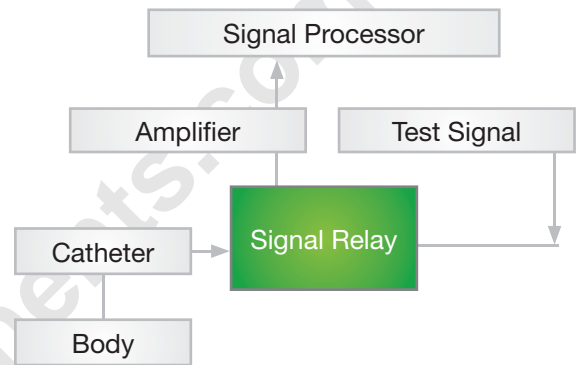
1. Protecting the patient from erratic surge voltages during measurement.
2. Maintain cardiac signal integrity from electronic circuit noise.

APPLICATION REQUIREMENTS:

- IEC 60601-2-27 Annex AA
- 3 kV Contact/Coil Surge Strength
- 200 mW Coil

PART SERIES:

- TX-D



LATERAL ROTATION BED

Lateral rotation mattress automatically turns patients up to 40° to reduce the risk of pulmonary and other serious medical complications associated with immobility. Pressure sensors provide feedback of chamber pressure to microcontroller so that proper angle is achieved.



PRODUCT SPOTLIGHT:

Pressure Sensors

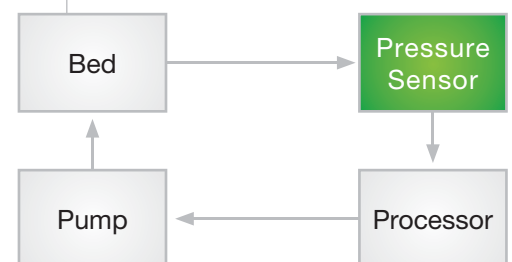
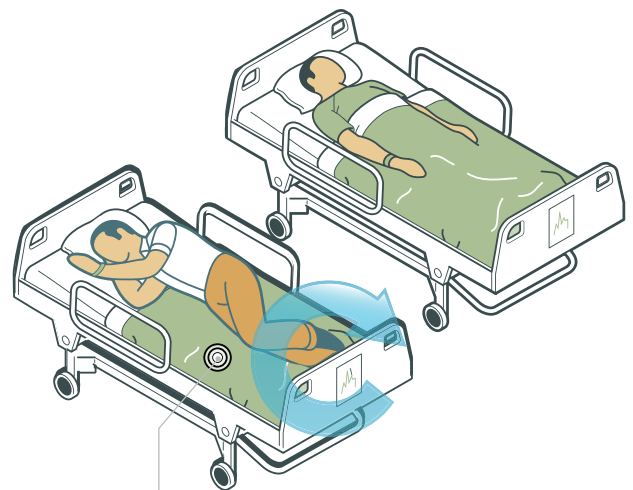
PRODUCT FEATURES:

The ADP pressure sensors offer stable offset and span voltage performance at varying temperatures, resulting in accurate pressure readings. A built-in amplifier simplifies circuit design and expedites the design process.



PART SERIES:

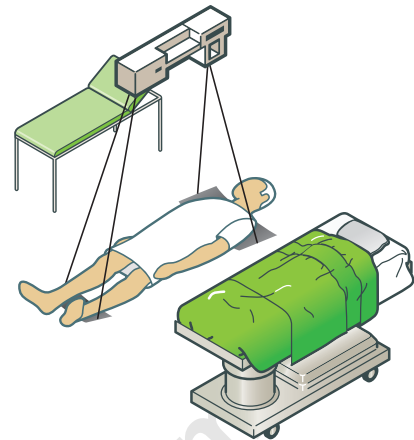
- PS-A





PATIENT MOBILITY

Patient Mobility systems are used to transfer patients easily, comfortably and safely by providing movement and a range of motion that may not be available to handicap, injured or critical patients.



PRODUCT SPOTLIGHT:

- DC Load Relays

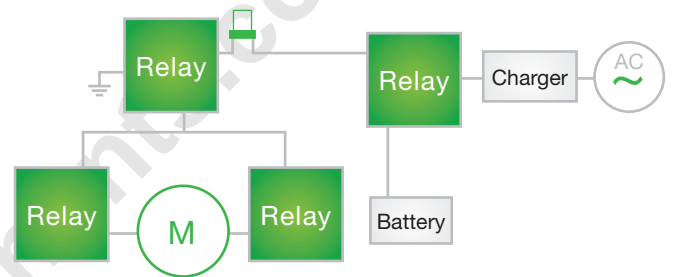
PRODUCT FEATURES:

DC relays handle high current and peak voltage required to drive motors. Twin design relays provide a circuit solution with the advantage of a 1 Form C x 2 configuration for easy implementation of an H-Bridge motor control circuit.

PART SERIES:

- CB: Motor Up & Down
- ALZ: Emergency Down
- JTN: Disconnects Battery when Charger is Plugged In
- CT/CJ: Low Voltage, Twin Design Relay for Up/Down & X/Y Movement

DC Motor Forward/Reverse Control Circuit



ELECTRONIC NERVE STIMULATION

These devices are used to treat neuropathy, the weakness or paralysis of muscle tissue by delivering gentle electrical impulses that stimulate dead or inactive nerves and activate a patient's muscles.



PRODUCT SPOTLIGHT:

- PhotoMOS Relays
- Narrow Pitch Connectors

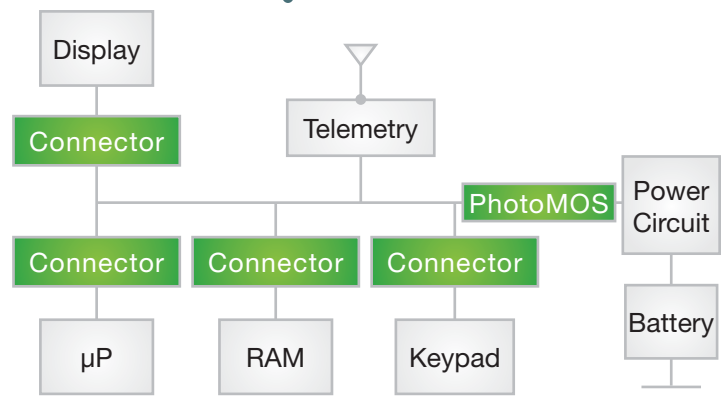
PRODUCT FEATURES:

PhotoMOS relays offer quick switching capability, feature optical isolation and are rated up to 5,000V to protect the patient. Compact dimensions and minimal power consumption make them ideal for battery powered devices.

Connectors offer a range of mating heights for design flexibility. The design ensures reliable performance with high resistance to shock & vibration, avoiding circuit disconnection.

PART SERIES:

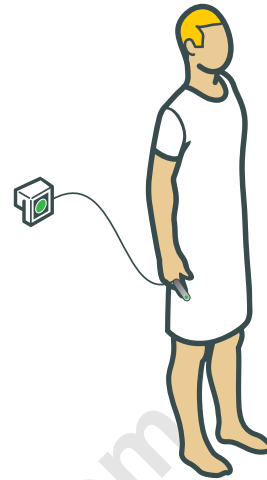
- AQV
- AXK





PULSE OXIMETER

A pulse oximeter indirectly monitors the oxygen saturation of a patient's blood and changes in blood volume in the skin, producing a photoplethysmograph. Often, it is attached to a monitor so medical staff can see a patient's oxygenation at all times. Most monitors also display the heart rate. Portable, battery-operated pulse oximeters are also available for home blood-oxygen monitoring.



PRODUCT SPOTLIGHT:

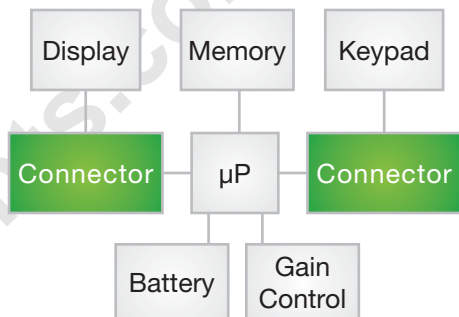
- Narrow Pitch Connectors

PRODUCT FEATURES:

Connectors offer a range of mating heights for design flexibility in portable applications. Connectors interface multiple boards & displays. Tough Contact design ensures reliable performance with high resistance to shock & vibration, avoiding circuit disconnection.

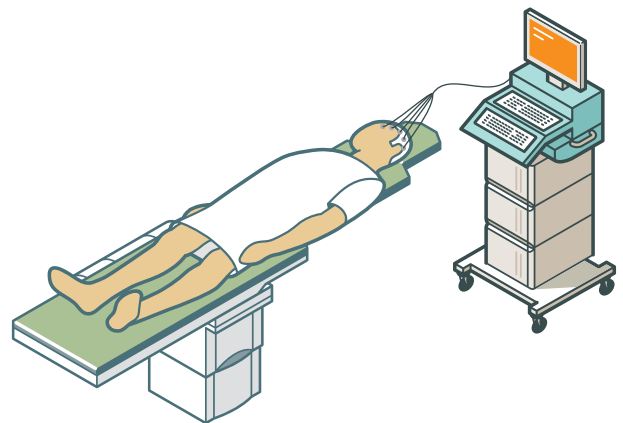
PART SERIES:

- AXK



CEREBRAL CORTEX MONITOR

Sensors are attached to the patient's scalp and the resulting electrical signals are amplified, recorded and monitored.



PRODUCT SPOTLIGHT:

- PhotoMOS
- Narrow Pitch Connectors

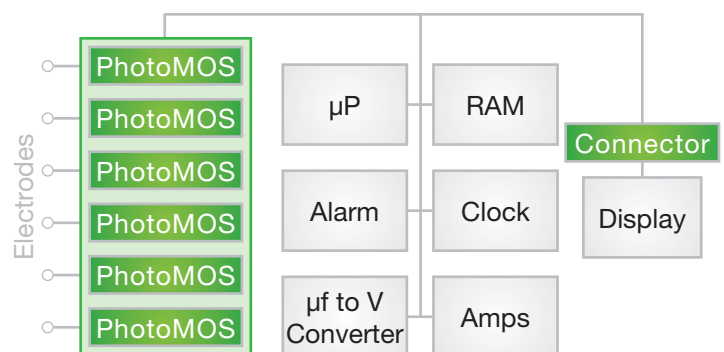
PRODUCT FEATURES:

PhotoMOS relays are used to connect / disconnect electrical signals transmitted via electrodes attached to the patient's head. Optical isolation is an important design parameter to ensure patient safety. A large number of PhotoMOS per device are required to accommodate multiple signal channels.

Connectors offer a range of mating heights for design flexibility. Connectors interface multiple boards & displays. Tough Contact design ensures reliable performance.

PART SERIES:

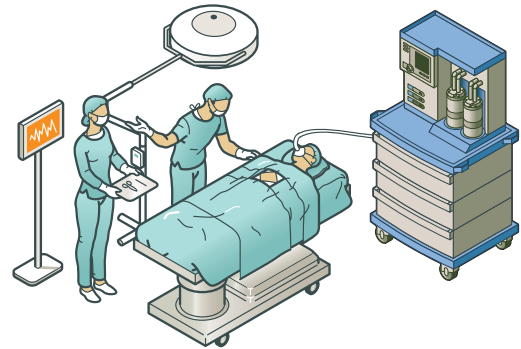
- AQY
- AXK





ANESTHESIA DELIVERY UNIT

ADU systems are designed to administer an accurate and continuous flow of medical gases using electronic controls.



PRODUCT SPOTLIGHT:

- Snap Action Switch
- Light Sensors
- Narrow Pitch Connectors
- Pressure Sensors

PRODUCT FEATURES:

Switches detect the presence of critical equipment & offer gold clad triple contacts for ideal stability in low level switching.

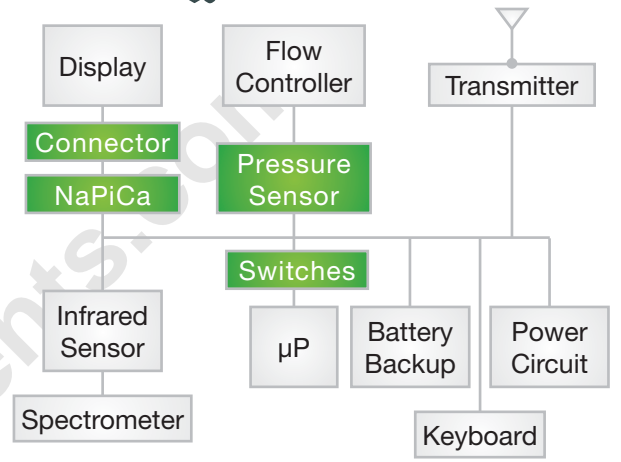
NaPiCa light sensors use a photodiode and built-in current amplifier to convert visible light into electrical current and are used to adjust LCD brightness.

Pressure sensors offer stable offset and span voltage performance at varying temperatures to provide accurate data.

Connectors are designed to ensure reliable performance with high resistance to shock & vibration to avoid circuit disconnection.

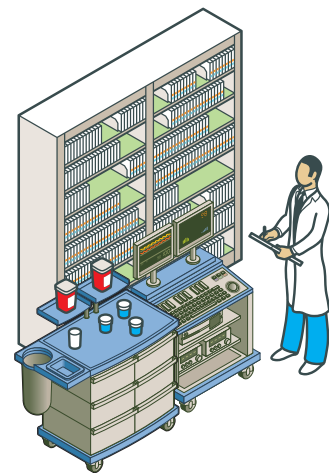
PART SERIES:

- AVT3/AVL3
- AMS
- AXK
- PS-A



DRUG DISPENSING SYSTEM

An automated process that quickly dispenses a prescription, including labeling a vial, counting pills, capping and sorting by patient's last name.



PRODUCT SPOTLIGHT:

- PhotoMOS Relays
- Narrow Pitch Connectors

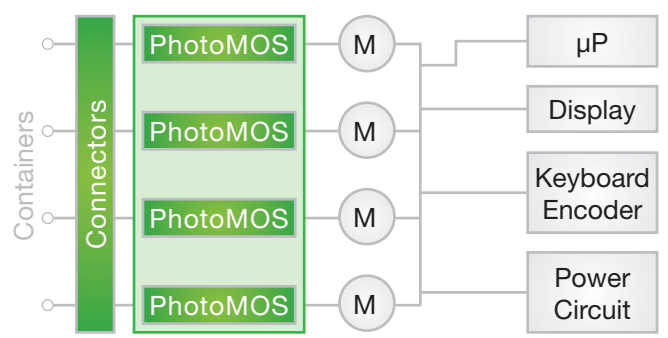
PRODUCT FEATURES:

PhotoMOS relays handle low signal levels and provide fast switching speed required for a short cycle time in processing each prescription. PhotoMOS relays consist of an LED, photocell and MOSFET resulting in fast turn-on / turn-off times.

Connectors offer a range of mating heights for design flexibility. The design ensures reliable performance with high resistance to shock & vibration, avoiding circuit disconnection.

PART SERIES:

- AQY
- AXK



IMAGING: CT, MRI

Medical imaging provides detailed images of the human body for clinical purposes or medical science.



PRODUCT SPOTLIGHT:

- Power Relays
- Polarized Power Relays
- Signal Relays
- Narrow Pitch Connectors



PRODUCT FEATURES:

Power relays offer reliable switching and agency approvals with various UL ratings.

Polarized power relays offer high power, small packages & fast switching speeds.

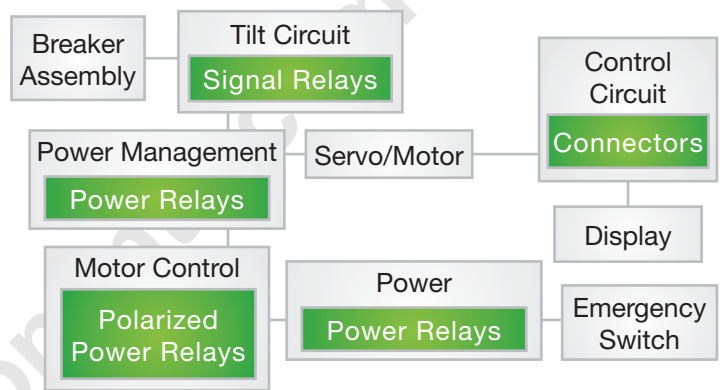
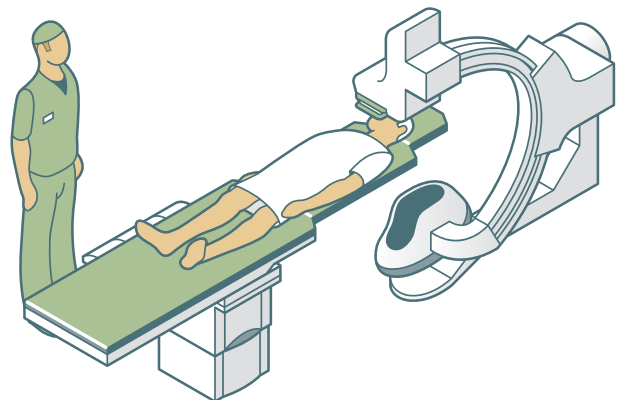
Signal relays feature Ag + Au clad contacts for stable electrical characteristics in a variety of surface mount configurations.

Connectors interface multiple boards and displays, offer a range of mating heights and the design ensures reliable performance.



PART SERIES:

- JS, JQ
- ADJ
- TX
- AXK



PORTABLE RESPIRATORY EQUIPMENT

Ranging from AMBU bags through ventilators, nebulizers and peak air flow meters, each device is essential in the treatment of patients with breathing difficulties.



PRODUCT SPOTLIGHT:

- Power Relays
- PhotoMOS Relays
- Signal Relays
- Pressure Sensors
- Connectors



PRODUCT FEATURES:

Power relays offer reliable switching and agency approvals with various UL ratings.

Quick switching PhotoMOS relays are optically isolated, rated up to 5,000V and are ideal for battery powered devices.

SMD Signal relays have Ag+Au clad contacts for stable performance.

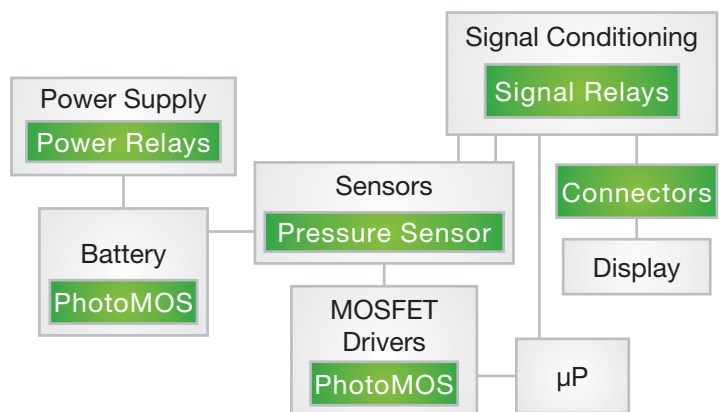
Pressure sensors offer stable offset and span voltage performance at varying temperatures to provide accurate data.

Connectors are designed to ensure reliable performance with high resistance to shock & vibration to avoid circuit disconnection.



PART SERIES:

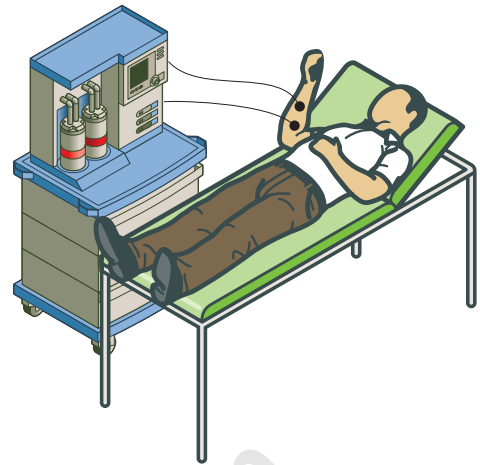
- JS, JQ
- AXK
- PS-A
- TX
- AQY





KIDNEY DIALYSIS EQUIPMENT

Dialysis machines process blood in order to remove waste and excess water by pumping and filtering blood through solutes and across a semi-permeable membrane.



PRODUCT SPOTLIGHT:

- Pressure Sensors
- Power Relays
- Polarized Power Relays
- PhotoMOS
- Connectors

PRODUCT FEATURES:

Pressure sensors are used to monitor the dialysate solution's pressure inside the dialyzer, where decreased pressure results in faster filtration.

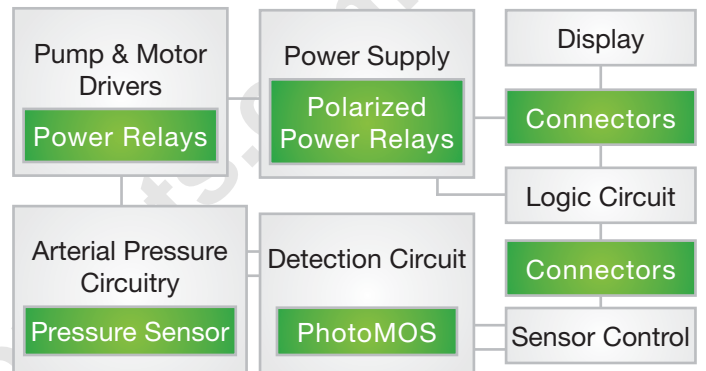
Power relays offer reliable switching and agency approvals with various UL ratings. Polarized power relays provide low operating power for Pump/Motor control.

Quick switching PhotoMOS relays are optically isolated, rated up to 5,000V.

Connectors are designed to ensure reliable performance, resistant to shock and vibration to avoid circuit disconnection.

PART SERIES:

- PS-A
- ADJ
- AXK
- JS
- AQY



ROBOTIC LAB EQUIPMENT

Robotic Lab Equipment encompasses smart, embedded mechanical and mechatronic systems. Advanced medical and laboratory robotics have been implemented in a variety of emergent applications found in operating rooms, gene sequencing labs and pharmaceutical research centers.



PRODUCT SPOTLIGHT:

- Solid State Relays
- Power Relays

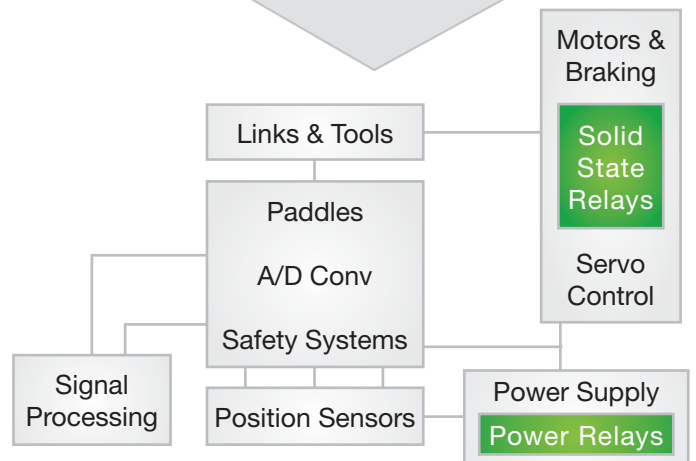
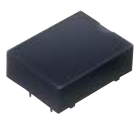
PRODUCT FEATURES:

Solid State relays feature triac based outputs with an option for a zero-cross circuit. Zero-cross turns on the triac with the AC load voltage at zero phase, providing a solution for precise motor control applications.

Power relays are especially suited for main power on/off functions and meet agency approvals with various UL ratings.

PART SERIES:

- AQ-J
- AQ-H
- ADW





DEFIBRILLATORS

Defibrillators administer an electric shock of preset voltage to the heart through the chest in an attempt to restore normal rhythm to the heart during ventricular fibrillation.



PRODUCT SPOTLIGHT:

- PhotoMOS Relays
- Polarized Power Relays
- Connectors
- Switches



PRODUCT FEATURES:

PhotoMOS relays provide fast turn-on and turn-off time with high dielectric strength to protect the electronic controller circuit.

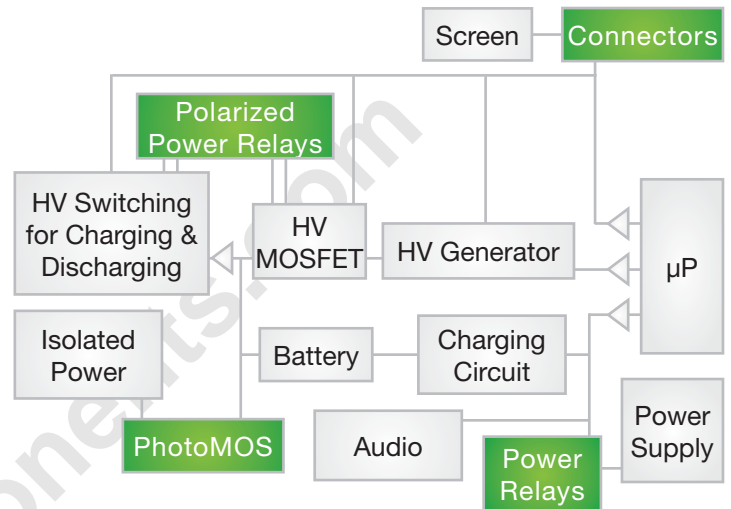
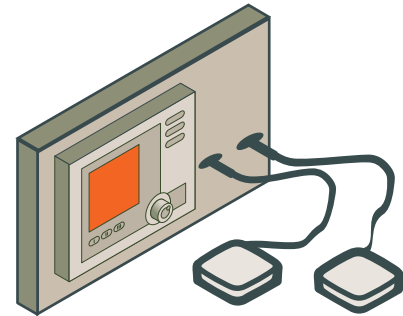
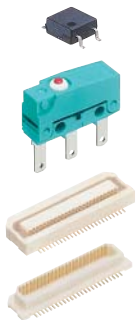
Polarized Power Relays are used to control leakage factors from other components in circuit switching.

Snap-action switches can be used to detect when the cover is open.

Connectors are designed to ensure reliable performance with high resistance to shock & vibration to avoid circuit disconnection.

PART SERIES:

- AQV • AXK
- ADJ • ABS



PORTABLE PATIENT MONITORS

Portable patient monitors offer medical staff a clear visual, auditory or data representation of a patient's vital signs. Devices are designed to satisfy requirements for compact dimensions to provide unobtrusive patient monitoring.



PRODUCT SPOTLIGHT:

- PhotoMOS Relays
- Narrow Pitch Connectors



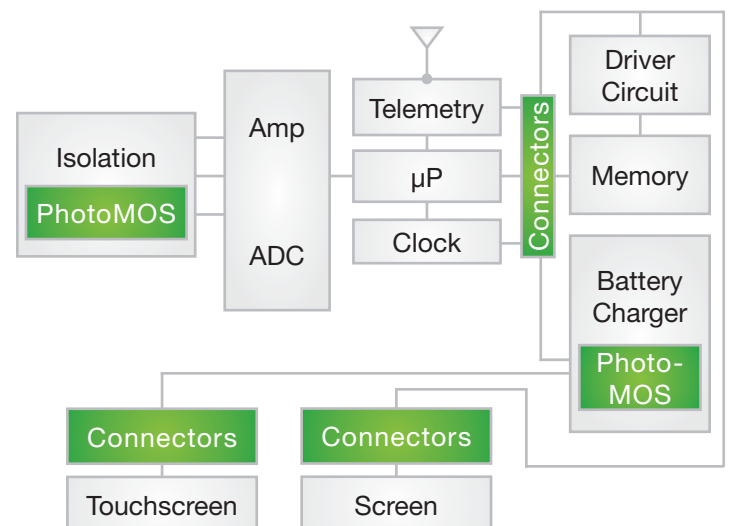
PRODUCT FEATURES:

PhotoMOS provide optical isolation between input and output rated up to 5,000V to protect the patient. Compact dimensions & minimal power consumption make it ideal for battery powered devices.

Narrow pitch connectors offer a range of mating heights for design flexibility to interface multiple boards & displays. Tough Contact structure ensures reliable performance with high resistance to vibration avoiding circuit disconnection.

PART SERIES:

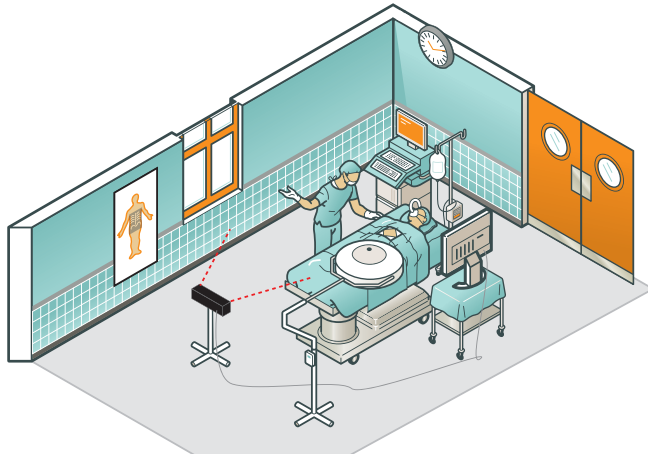
- AQV
- AXK





OPERATING ROOM SCREEN CONTROL

A sterile environment is paramount in operating rooms and advanced hospitals are turning to gesture recognition interfaces. Minimal intrusion from computer interfaces allows surgeons and doctors to access information while maintaining sterile conditions.



RECOMMENDED PART NUMBER

D-IMager: EKL3104



SPECIAL REQUIREMENTS

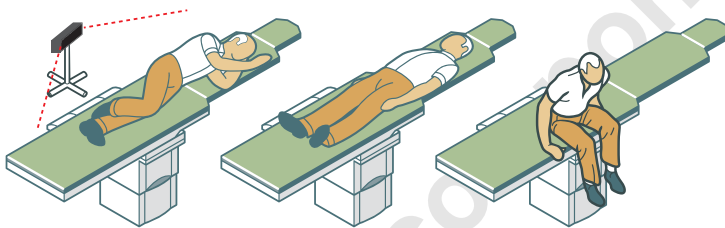
- Precision Motion Detection
- High Ambient Lighting (100K lx)
- 10 Year Operating Life
- Unaffected by Shadows/Reflections

PRODUCT FEATURE

CCD based 3D image sensor providing measurements that are independent of external reference points.

PATIENT MONITORING

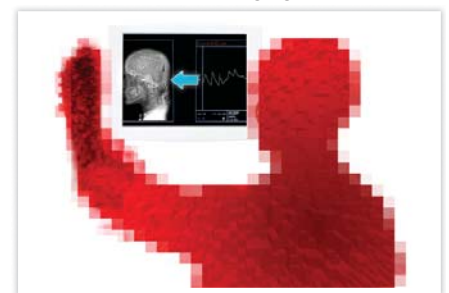
D-IMager captures real-time spatial information to detect the movements of a patient in a hospital bed. Permissible movement is defined to ensure the patient does not exceed the safety level of programmed thresholds.



3D CONVERSION



Arm in motion.



Arm in motion as detected in 3D.



Display changes in reaction to surgeon's arm motion.

HOSPITAL SIGNAGE

Hospitals often present a challenge in navigating large facilities that require a high level of cleanliness to contain the spread of germs. An interesting solution involves gesture recognition software in conjunction with interactive signage applications including maps, directories and menus.



PHYSICAL REHABILITATION

D-IMager is an ideal solution to aid in physical therapy by providing a quantitative feedback system that measures progress and is engaging.



	Series	Contact Arrangement	Nominal Switching Capacity (A)	Max. Switching Voltage (V)	Latching Type	Nominal Operating Power
Signal Relays	TX-D	2C	2A 30VDC 1A 30VDC	220 VDC	Single Side Stable	200mW (1.5~12VDC) 230 mW (24VDC)
					1 Coil Latching	150mW (1.5~12VDC) 170mW (24VDC)
		2D (M.B.B.)	1A 30VDC	110 VDC	Single Side Stable	250mW (1.5~12VDC) 170mW (24VDC)
	TX	2C	2A 30VDC 1A 30VDC	220 VDC	Single Side Stable	140mW (1.5~24VDC) 270 mW (48VDC)
					1 Coil Latching	100mW (1.5~24VDC)
					2 Coil Latching	200mW (1.5~24VDC)
Power Relays	CB	1a (high capacity)	70A 14VDC	16VDC (12V)	-	1.4W, 1.8W
		1a	40A 14VDC	32VDC (24V)	-	
		1 c N.O.	40A 14VDC		-	
		1 c N.C.	30A 14VDC		-	
	CT	1c	20A 14VDC (N.O.)	-	-	800mW
		1cx2	10A 14VDC (N.C.)	-	-	
	CT (Power Series)	1c	30A 14VDC (N.O.)	-	-	1000mW
		1cx2	10A 14VDC (N.C.)	-	-	
	CJ	1c	20A 14VDC (N.O.)	14VDC	-	640/800mW
		1cx2	10A 14VDC (N.C.)	-	-	
	ALZ	1a, 1c	16A 250 VAC	440VAC	-	400mW
	JTN	1a, 1c	20 A 277VAC (1a, 1c NO)	277VAC	-	800mW
			10 A 277VAC (1c NC)		-	
	JS	1a, 1c, 1a (long life)	1a, 1c: 5A 30VDC, 6A 277VAC, 10A 125VAC, 10A 250VAC (NO)	250VAC, 100VDC (0.5A)	-	360mW
			1a (long life): 10A 250/277VAC, 5A 30VDC		-	
JQ	1a 1a (high capacity) 1c 1c (high capacity)	1a standard: 2A 250VAC, 5A 30VDC/125VAC	250 VAC, 110VDC (0.3A)	Single Side Stable	200 mW (1a, 1a high capacity)	
		1c standard NO: 2A 250VAC, 3A 30VAC, 5A 125VAC			400 mW (1c, 1c high capacity)	
		1c standard NC: 1A 30VDC, 1A 250VAC, 2A 125VAC				
		1a high capacity: 5A 30VDC/250VAC, 10A 125VAC				
		1c high capacity NO: 5A 30VAC/250VAC, 10A 125VAC				
		1c high capacity NC: 1A 30VDC, 2A 250VAC, 3A 125VAC				
DW	1a	8A 250VAC	250VAC	1L, 2L	200 (1L) mW 400 (2L) mW	
ADJ	1a, 1b, 1c, 1a1b, 2a, 2b, 2c	16A 250VAC (1a, 1b, 1c)	250 VAC	Single Side Stable, 1L, 2L	1L: 150 mW SSS, 2L: 250 mW	
		10A 250VAC (1a1b, 2a, 2b, 2c)				

Panasonic Electric Works: Medical Solutions



PhotoMOS Relays	I/O Isolation	Form Factor	Output Rating		Package	Part Number			
			Load Voltage	Load Current		Through Hole	Surface Mount		
						Tube Packaging	Tape & Reel		
			1/2(3) Pin side	4/5(6) Pin Side					
Reinforced 5,000V	1 Form A	400 V	120 mA	DIP 6-Pin	AQV214EH	AQV214EHA	AQV214EHAX	AQV214EHAZ	
Standard 1,500 V	1 Form B	350 V	120 mA	SOP 4-Pin	AQY410S		AQY410SX	AQY410SZ	
Standard 1,500 V	1 Form A	350 V	120 mA	SOP 4-Pin	AQY210S		AQY210SX	AQY210SZ	
Reinforced 5,000V	1 Form A	350 V	130 mA	DIP 4-Pin	AQY210EH	AQY210EHA	AQY210EHAX	AQY210EHAZ	

Solid State Relays	Series	Installation Method / Shape	Load Current	Load Voltage	Non-Repetitive Surge Current	Size mm (L x W x H)	Repetitive Peak OFF-State Voltage	Breakdown Voltage
	AQ-H	PC Board Terminal, DIP8	0.3 A	-	3 A	9.78 x 6.4 x 3.9	600 V	5,000 VAC
			0.6 A	-	6 A	9.78 x 6.4 x 3.6		
			0.9 A	-	9 A	-		
1.2 A			-	12 A	-			
AQ-J	DIN Rail Mounting, Hockey Puck Type	10 A	75 - 264 VAC	100 A	100 x 28 x 113	-	3,000 Vrms (between input & output)	
		20 A		250 A				
		15 A		100 A				
	Screw Mounting, Hockey Puck Type (Tab Terminal)	10 A		100 A	38 x 28 x 17			2,500 Vrms (between input, output & case)
		15 A		150 A				
		25 A		250 A				

Pressure Sensors

Series	Rated Pressure	Terminal Direction	Pressure Inlet Hole Length	Description
PS-A	±100°, -100, 25, 50, 100, 200, 500, 1000 *40kPa	Opposite of the pressure inlet direction	3 mm 5 mm	Compact pressure sensor with built-in amplification and temperature compensation circuit

NaPiCa Light Sensors

Part Number	Reverse Voltage	Photocurrent	Power Dissipation	Operating Temp.	Storage Temp.
AMS104 AMS302	-0.5 - 8V	5 mA	40 mA	-30 - +85°C -22 - +185°F	-40 - +100°C -40 - +176°F
AMS402	-0.5 - 8V	1 mA	6 mA	-30 - +85°C -22 - +185°F	-40 - +100°C -40 - +176°F

Switches

Series	Contact Arrangement	Operating Force Range	Contact Rating
AVT/AVL3	1c	0.078N - 1.47N	Standard: 0.1A (Resistive) 30 VDC, 125/250 VAC
			Standard: 2A (Inductive) 3A (Resistive) 30 VDC, 125/250 VAC
			Standard: 0.05A (Inductive) 0.4A (Resistive) 125 VAC
			Long Life: 0.1A (Resistive) 30 VDC, 125/250 VAC
			Long Life: 3A (Inductive) 5A (Resistive) 30 VDC, 125/250 VAC
			Long Life: 0.05A (Inductive) 0.4A (Resistive) 125 VDC

Connectors

Series	Number of Contacts	Mated Height	Rated Current/Contact	Terminal Pitch	Insertion/Removal Life
P5	100	5.0 mm	0.2 A	0.5 mm	20 Times



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