

POWERGAP™

Product Brochure



www.trelectronic.com/powergap

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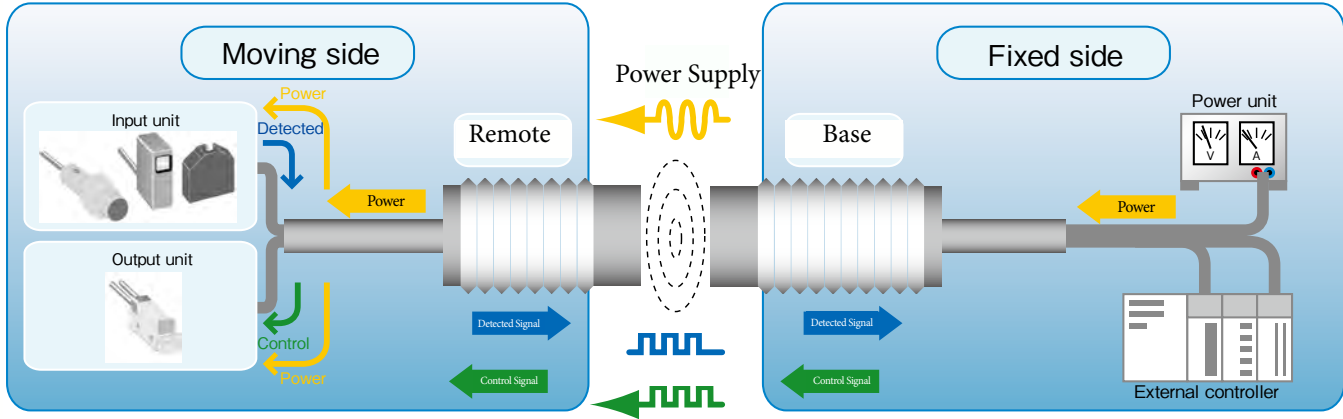


All units in this catalog are CE compliant.

Functions and Features of Power Gap

In machines or equipment which have rotating tables, moving pallets, tool changing or forming dies; it is always difficult to install sensors or other devices because the equipment movement is restricted by the fixed cabling.

Power Gap can meet customers' demands for wire free solutions. Power Gap inductively supplies power from a fixed part to a moving part and transmits signals between each.



The Power Gap System is composed of the Remote attached to the moving part and the Base attached to the fixed part.

Functions of the Remote

Accept power from the Output Sensor on fixed part and supply power to the connecting Detector or driving unit, and simultaneously communicate between the Output Sensor.

Functions of the Base

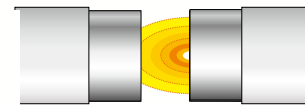
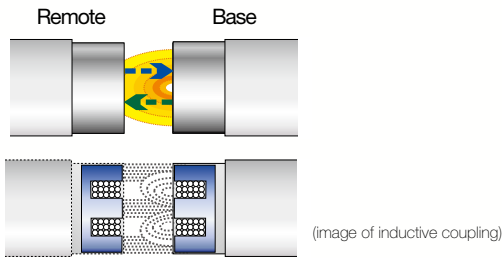
The Output Sensor is connected to 24 VDC and the controller. It inductively supplies power to the Transmitter at the moving part as well as communicates with the Transmitter and the controller.

Inductive Coupling Principle

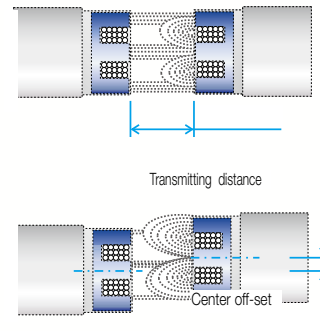
Power and signal transmission are performed by the inductive coupling principle. When the Transmitter comes into the transmittable field of the Output Sensor; inductive power is supplied, and signal transmission to the Transmitter is completed,

Power Supply

The power supplied from the Transmitter to the Signal unit is contained in this catalogue as driving voltage and driving current. Driving current varies depending on the operating distance and center off-set. The total current consumption of Sensors or driving unit should not exceed the driving current.



Driving current varies depending on the operating distance and center off-set.



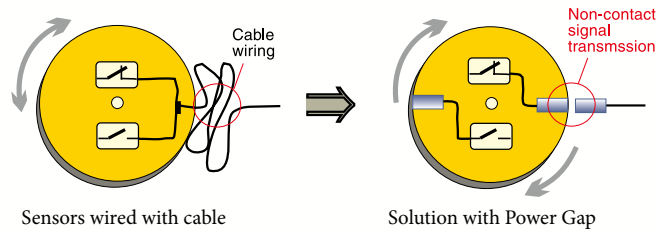
Advantages

Since Power Gap supplies power and transmits signal inductively, there are no worries of cable breakage or poor contact of the connector.



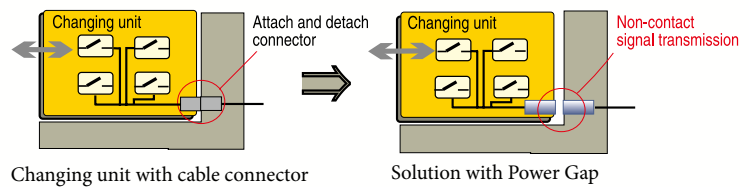
Rotating Table:

360 degree rotation is possible, no need to reverse the table movement.
No bending cable that causes cable breakage.
No tangled cable.
No Slip Rings or Wearing Contacts.



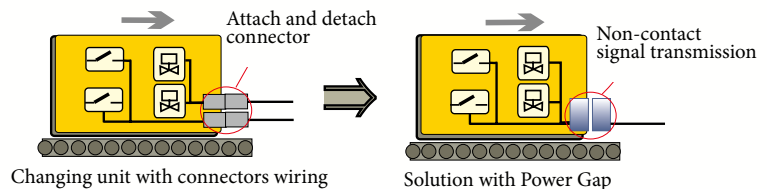
Removable unit:

The loss time of connector attachment or detachment is reduced.
Resolve troubles such as poor contact of the connector.



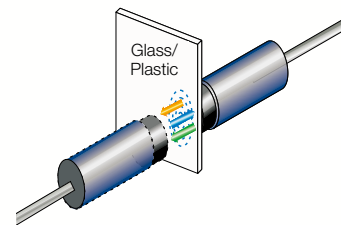
Moving work pallet:

Power supply and signal transmission start as soon as a pallet arrives.
As electrical part is not exposed, it is safer for operators.

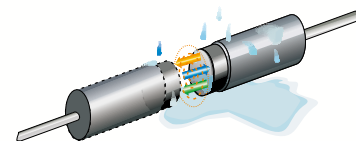


Features

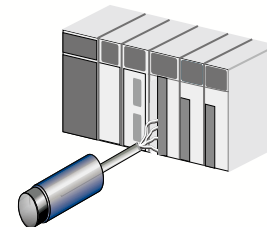
The existence of plastic or glass in the air gap will not influence the effectiveness of power supply or signal transmission.



Protection class of our Power Gap System is IP67, and can be used under heavy duty factory automation conditions. (with minor exceptions)



Input and Output signals can be connected directly to I/O card on PLC.



If Remote, comes in the transmission area of Base, it outputs an In-Zone signal and begins transmission of signal input, output and power.



Note: Remote and Base must be used in the correct combination as in this catalogue.

Power Gap Power System



Power Gap Power System inductively transmits power from Base to Remote.

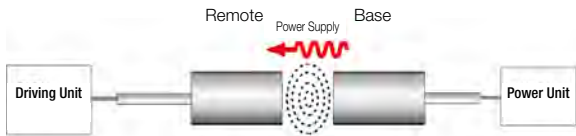
Supply power function

Voltage 24 V DC in / 24 V DC out
Current 1A...2A

Voltage 100 V AC in / 28 V DC out
5 A

Voltage 100 V AC in / 28 V DC out (charging)
4 A

System configuration



All units in this catalog are CE compliant.

Power Gap Sensor System







Simultaneously supply operation power to the sensor, switch, etc., and transmit detected signals to a controller.

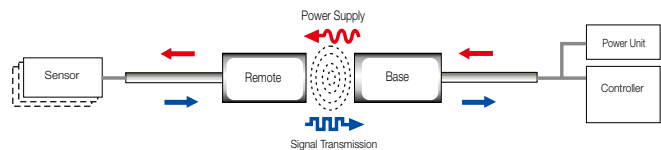
Supply power function

12 VDC or 24 VDC
5mA...300 mA

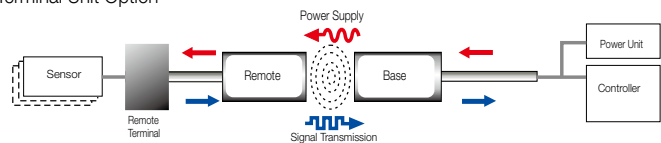
Signal transmission function

Detected signal	
<ul style="list-style-type: none"> Switch signal  <p>Sensor (Inductive, photoelectric or magnetic switch)</p>	<ul style="list-style-type: none"> Transmitting signals 1,8,16 sensors Interface between the controller NPN or PNP parallel output
<ul style="list-style-type: none"> Analog signal  <p>Sensor Analog Type</p>	<ul style="list-style-type: none"> Transmitting signals 1 sensor Interface Analog 0...10V
<ul style="list-style-type: none"> Thermocouple 	<ul style="list-style-type: none"> Transmitting signals 2 J Type/K Type
<ul style="list-style-type: none"> RFID 	<ul style="list-style-type: none"> Transmitting signals 1-256 Interface Discrete PNP or NPN Parallel output

System configuration



Terminal Unit Option



Power Gap Coupler System



Simultaneously supply operation power to sensors and/or actuators, while transmitting detected signals and control signals, and outputting to the external device.

Power Gap Link System



Supply power function

24 VDC
300 mA...2A

Signal transmission function

Detected signal and control signal

Switch signal



Sensor (inductive, photoelectric or magnetic switch etc.)
Actuator (solenoid valve, fan etc.)

Transmitting signals

- Interface between the controller NPN or PNP parallel output

Remarks: Solenoid valve, motor or fan etc. can also be connected to Power Gap to be driven and controlled.

Data transmission

Data



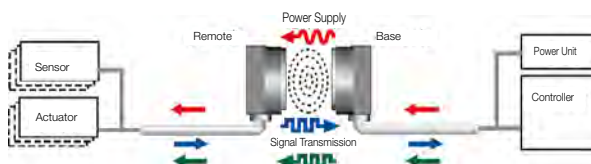
CC-Link data
DeviceNet data



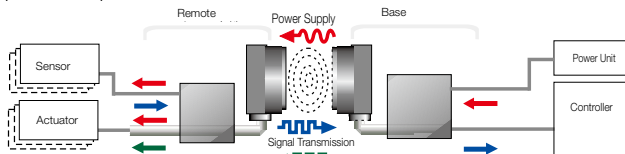
RS-232C
Transmission

Remarks: CC-Link data transmission is performed by optical transmission principle, using inductive technology.

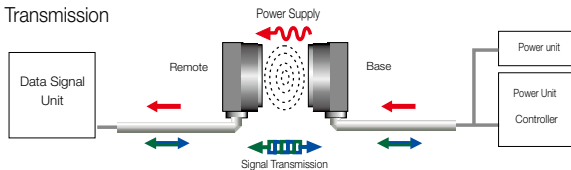
System configuration



Separated Amplifier



Data Transmission



Power Gap Link allows the simultaneous connection of Sensors and/or Actuators to I/O units for transmitting signals at the same time providing power to the Sensors and Actuators.

Supply power function

Voltage 24 V DC
Current 2A

Signal transmission function

Detected signal and control signal

Switch signal



Sensor (inductive, photoelectric or magnetic switch etc.)
Actuator (solenoid valve, fan etc.)

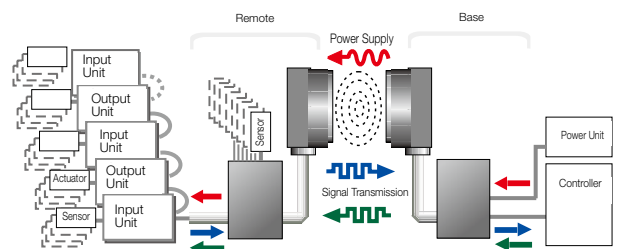
Transmitting signals

64 sensors + 32 actuators

- Interface between the controller NPN or PNP Parallel output, DeviceNet, EtherNet/IP, CC-Link

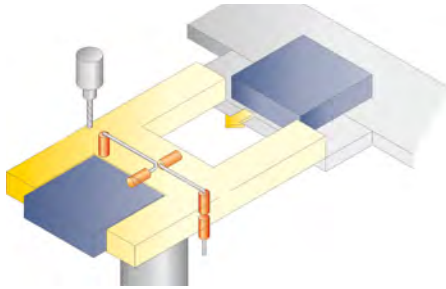
System configuration

Separated Amplifier



Rotary Tables & Jigs | Check pallet positioning on rotating jig

rotating



Jig rotates continuously, processing one side while a workpiece is loaded/unloaded on the other side.

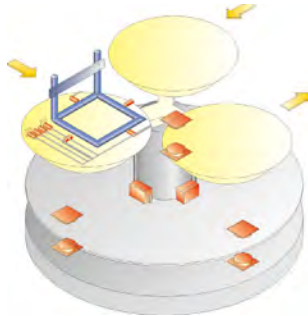
- Advantages**
- Can be used without wires/cables getting tangled.
 - Eliminates need for complex slip rings.
 - No wear and tear, reducing maintenance.

Solution

Power Gap Sensor System

Removable Workpiece | Identify and check workpiece positioning on dial table

rotating



Set a workpiece, manufacture with it on a rotary table, and then remove.

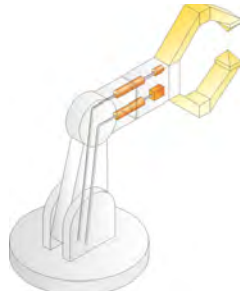
- Advantages**
- Can be used without wires/cables getting tangled.
 - Eliminates need for complex slip rings.
 - No wear and tear, reducing maintenance.

Solution

Power Gap Sensor System / Power Gap Coupler System

Robotic End of Arm Tooling | Non-contact connection for robotic cells with end of arm tools

removable



Sensors can be integrated into end of arm tooling.

- Advantages**
- Automated tooling changes.
 - Eliminates manual exchange processes by an operator.
 - Reduces maintenance and downtime while improving change-over time.

Solution

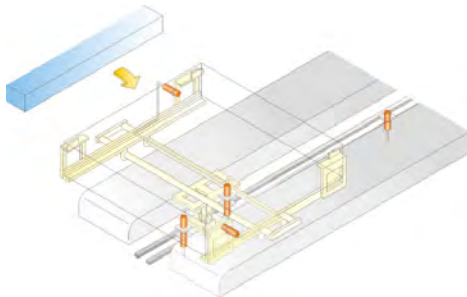
Power Gap Sensor System

Conveyor Holders | Check the positioning of a workpiece on conveyor holder

moving



removable



Transmit signals inductively at multiple locations/steps in a process, with intelligent work holders. A work holder can be interchanged depending on panel size, and moved between stations on a manufacturing line.

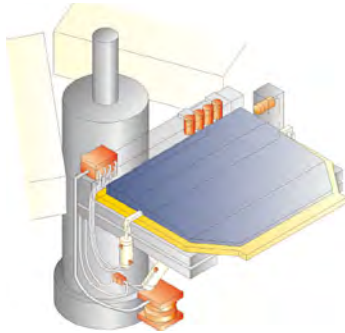
- Advantages**
- Reduces maintenance and downtime while improving change-over time.
 - Multiple workholder designs can be used on the same line.

Solution

Power Gap Sensor System

Rotating Jigs | Identify workpiece, check positioning, and supply power/control for solenoid valves on a rotating jig

rotating



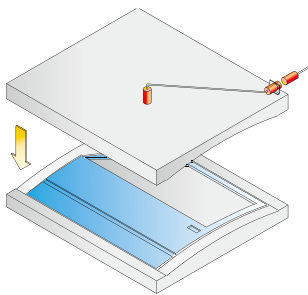
Rotate a processing plate with 3 jigs; set a workpiece, process it and then unload. Jigs are interchangeable depending on the workpiece. Inductive sensors used for identification, an opto sensor for presence, detection, cylinder switches and solenoid valves for controlling cylinders mounted on each jig.

- Advantages**
- Can be used without wires/cables getting tangled.
 - Eliminates need for complex slip rings.
 - No wear and tear, reducing maintenance.

Solution
Power Gap Coupler System

Workpiece Presence | Press or Die | Check the presence of workpieces on a press or die

removable



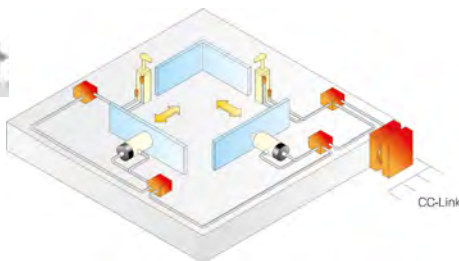
The sensor mounted on the upper-die detects if the workpiece is left in the die after press operation, an alarm signal prohibits feeding of the next workpiece.

- Advantages**
- No direct cable connection, therefore no possibility of cable wear and breakage.
 - Eliminates manual cable connection at die change-outs.
 - The die-exchange work becomes more efficient and can be automated.

Solution
Power Gap Sensor System

Jig Alignment / Adjustment on a Line | Jig adjustment on assembly line

moving



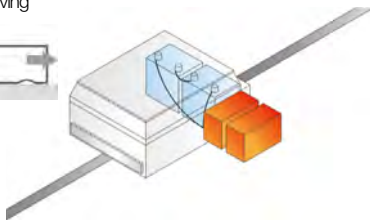
Holders of processing pallets are adjusted depending on a workpiece. The fieldbus control motors and encoders are used to adjust the holder as well as switches and solenoid valves for the cylinders.

- Advantages**
- Power is automatically supplied and fieldbus communication starts as soon as Power Gap is In-Zone.
 - As holders are adjusted depending on a workpiece, there is no need to interchange jigs.
 - No direct cable connection, therefore no possibility of cable wear and breakage can occur.

Solution
Power Gap Coupler System

Wireless Charging of AGV's | Charge station of automated guided vehicle (AGV)

moving



Automated charging of batteries on automated guided vehicles.

- Advantages**
- No physical cable connection, therefore no requirement for operator involvement.
 - Increased operator safety as all current carrying components are covered.

Solution
Power Gap Power System

Product Selection Guide

PowerGap System	Sensor Type	Description	Number of Signals	Max Operating Distance	Housing Size	Remote Signal Type	Base Signal Type	In-Zone Signal	Base Current	Base Voltage	Max Remote Current	Remote Voltage	
PowerGap Power System	-	Power Transfer	-	10mm	M30	Power	Power	-	3 A	24 VDC	1 A	24 VDC	
	-		-	9mm	90x90 mm	Power	Power	-	4 A	24 VDC	2 A	24 VDC	
	-		-	10mm	150x200 mm	Power	Power	Yes	3 A	100 VAC	5 A	24 VDC	
	-	AGV Charging	-	10mm	150x200 mm	Power	Power	Yes	3 A	100 VAC	4 A	28 VDC	
PowerGap Sensor System	Discrete	DC 3-Wire	1	4 mm	M18	PNP	PNP	-	150 mA	24 VDC	30 mA	12 VDC	
				NPN	NPN	-							
				8 mm	M30	PNP	PNP	-					
				NPN	NPN	-							
			8	5 mm	M30	PNP	PNP	Yes	400 mA	24 VDC	150 mA	12 VDC	
				NPN	NPN	Yes	1 A	24 VDC	300 mA	24 VDC			
			12 mm	90x90 mm	PNP	PNP	Yes	1 A	24 VDC	300 mA	24 VDC		
				NPN	NPN	Yes	500 mA	24 VDC	120 mA	22 VDC			
			8	8 mm	M30	PNP	PNP	Yes	500 mA	24 VDC	120 mA	22 VDC	
						NPN	NPN	Yes			120 mA	22 VDC	
	16	8 mm	M30	PNP	PNP	Yes	500 mA	24 VDC	120 mA	22 VDC			
				NPN	NPN	Yes			120 mA	22 VDC			
	Analog	Thermcouple (J & K)	1	2.5 mm	M18	0-10 VDC	0-10 VDC	Yes	150 mA	24 VDC	10 mA	20 VDC	
			2	4 mm	M18	J-Type	4-20 mA	Yes	150 mA	24 VDC	-	-	
		K-Type											
Discrete	DC 2-Wire	Available Upon Request											
RFID	8-Bit	256	*1	0-22 mm	M30	PNP	Disk	Yes	50 mA	24 VDC	-	-	
						NPN							
PowerGap Coupler System	Discrete	DC-3 Wire	4 in / 4 out	10 mm	90x90 mm	PNP	PNP	Yes	1.5 A	24 VDC	300 mA	24 VDC	
		NPN	NPN										
	Serial	RS-232C	1	10 mm	90x90 mm	RS-232C	RS-232C	-	3 A	24 VDC	1 A	24 VDC	
Bus	DeviceNet	1	5 mm	97x90 mm	DeviceNet	DeviceNet	-	3 A	24 VDC	2 A	24 VDC		
PowerGap Link System (*3 Requirements)	Discrete	I/O	8 in / 8 out	9 mm	90 x 90 mm	PNP	PNP	Yes	4 A	24 VDC	2 A	24 VDC	
			NPN		NPN	Yes							
	Parallel	90 x 90 mm	PNP		PNP	Yes							
		NPN	NPN		Yes								
	Bus	DeviceNet	64 in / 32 out		90 x 90 mm	PNP	DeviceNet	Yes					
					NPN	DeviceNet	Yes						
	Network	Ethernet/IP			90 x 90 mm	PNP	Ethernet/IP	Yes					
						NPN	Ethernet/IP	Yes					
CC-Link		90 x 90 mm		PNP	CC-Link	Yes							
				NPN	CC-Link	Yes							

*1 - Distance Dependant on Disk Type. See Data Sheet For Further Details.

*2 - Standard cable length: 1m for Remote/ 2m for Base - Other lengths available upon request.

*3 - Remote Amplifier and Base Amplifier are Required.

Wiring Type	Remote Unit	Multi-Plexing Terminal Block Required	Remote Multi-Plexing Terminal Block	Remote Amplifier	Remote Amplifier I/P Module	Remote Amplifier O/P Module	Base Unit	Base Amplifier	
² Flying Lead	PGP-R30M10-01	-	-	-	-	-	PGP-B30M10-02	-	
² Flying Lead	PGP-R90Q08-01	-	-	-	-	-	PGP-B90Q08-02	-	
² Flying Lead	PGP-R200 24/5 Q10-01	-	-	-	-	-	PGP-B200ACQ10-02	-	
² Flying Lead	PGP-R200 28/4 Q10-01	-	-	-	-	-	PGP-B200ACQ10-02	-	
² Flying Lead	PGS-1-R18M04P-01	-	-	-	-	-	PGS-1-B18M04P-02	-	
	PGS-1-R18M04N-01	-	-	-	-	-	PGS-1-B18M04N-02	-	
	PGS-1-R20M08P-01	-	-	-	-	-	PGS-1-B30M08P-02	-	
	PGS-1-R30M08N-01	-	-	-	-	-	PGS-1-B30M08N-02	-	
	PGS-8-R30M05-01	-	-	-	-	-	-	PGS-8-B30M05P-02	-
		-	-	-	-	-	-	PGS-8-B30M05N-02	-
PGS-8-R90Q12-01	-	-	-	-	-	PGS-8-B90Q12P-02	-		
Connector	PGT-8-R30M08P-01C	Yes	PGS-8-RBLOCK	-	-	-	PGS-8-B30M08P-02	-	
	-		-	-	-	-	PGS-8-B30M08N-02	-	
Connector	PGT-16-R30M08P-01C	Yes	PGS-16-RBLOCK	-	-	-	PGS-16-B30M08P-02	-	
	-		-	-	-	-	PGS-16-B30M08N-02	-	
² Flying Lead	PGS-1-R18M03A-01	-	-	-	-	-	PGS-1-B18M03A-02	-	
² Flying Lead	PGS-2-R18M04J300-01	-	-	-	-	-	PGS-2-B18M04TC-02	-	
	PGS-2-R18M04K1000-01	-	-	-	-	-		-	
Available Upon Request									
² Flying Lead	-	-	-	-	-	-	PGRF-8-B30M05P-02	-	
		-	-	-	-	-	PGRF-8-B30M05N-02	-	
² Flying Lead	PGC-44-R90Q10P-01	-	-	-	-	-	PGC-44-B90Q10P-02	-	
	PGC-44-R90Q10N-01	-	-	-	-	-	PGC-44-B90Q10N-02	-	
² Flying Lead	PGC-RS-R90Q06-01	-	-	-	-	-	PGC-RS-B90Q06-02	-	
Connector	PGC-DN-R90Q05	-	-	-	-	-	PGC-DN-B90Q05	-	
-	PGL-R90Q08-01	-	-	PGL-88-RAIOP	-	-	PGL-B90Q08-02	PGL-88-BAIOP	
-		-	-	PGL-88-RAION	-	-		PGL-88-BAION	
-		-	-	PGL-32-RAP	PGL-8-RIP	PGL-4-ROP		PGL-BAPP	
-		-	-	PGL-32-RAN	PGL-8-RIN	PGL-4-RON		PGL-BAPN	
-		-	-	PGL-32-RAP	PGL-8-RIP	PGL-4-ROP		PGL-BADN	
-		-	-	PGL-32-RAN	PGL-8-RIN	PGL-4-RON			
-		-	-	PGL-32-RAP	PGL-8-RIP	PGL-4-ROP		PGL-BAEI	
-		-	-	PGL-32-RAN	PGL-8-RIN	PGL-4-RON			
-		-	-	PGL-32-RAP	PGL-8-RIP	PGL-4-ROP		PGL-BACL	
-		-	-	PGL-32-RAN	PGL-8-RIN	PGL-4-RON			



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