

C W O'NEILL

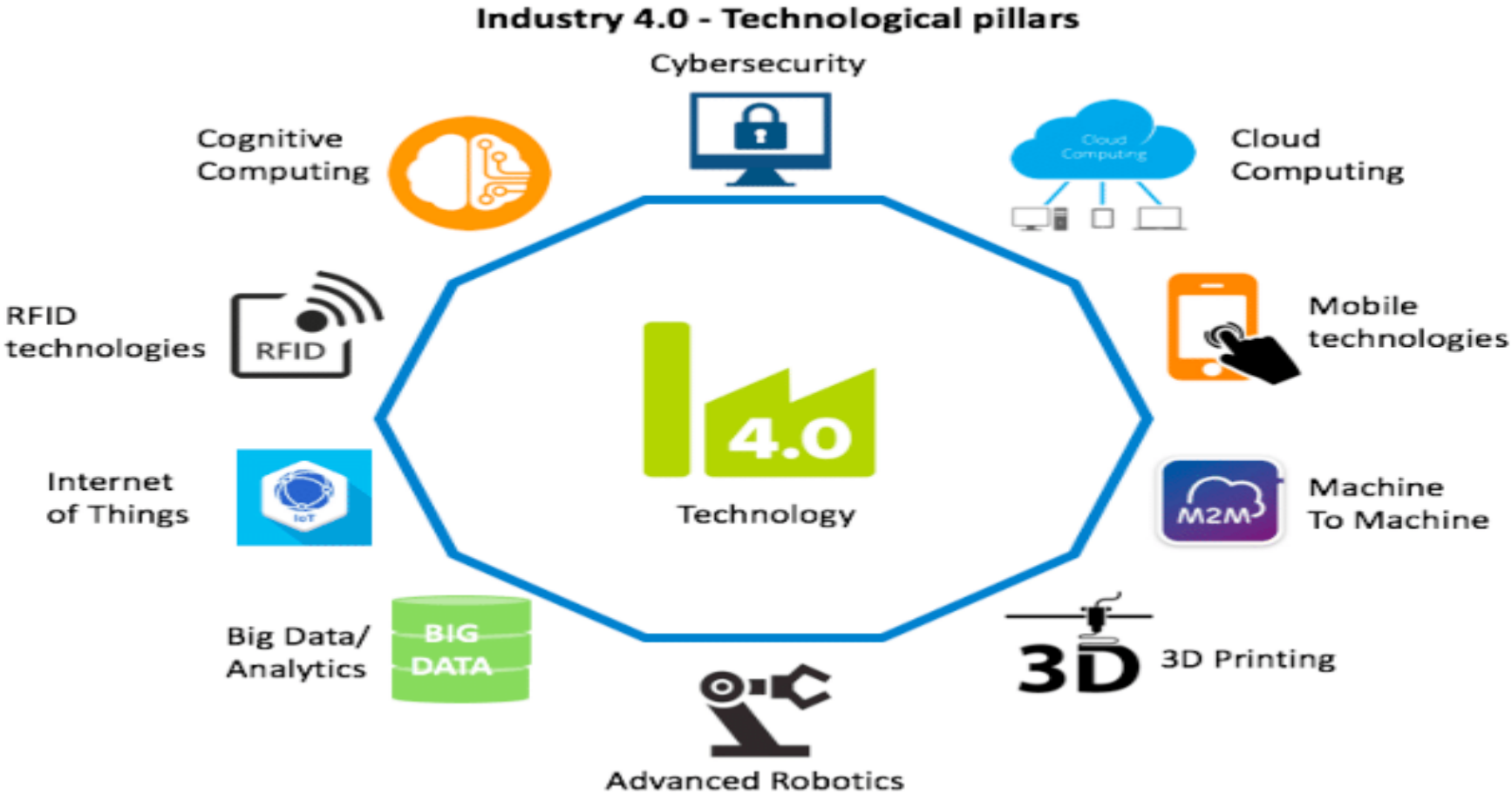
Senior Business Development Manager Europe.

INDUSTRY 4.0

March 22

INDUSTRY 4.0

WHAT DOES IT ACTUALLY MEAN ? – I KEEP SEEING “ WORK SMARTER/GREENER – WORK FASTER –BETTER WORK LIFE BALANCE”



OMRON PRINCIPLES

SINCE OMRON FOUNDER KAZUMA TATEISHI ESTABLISHED THE OMRON CORPORATE MOTTO, SAYING, “BUSINESS SHOULD CREATE VALUE FOR SOCIETY THROUGH ITS KEY PRACTICES.” IN 1959, OMRON HAS TAKEN ON THE CHALLENGE TO LEAD THE WORLD IN INNOVATION DRIVEN BY SOCIAL NEEDS TO IMPROVE LIVES AND CONTRIBUTE TO A BETTER SOCIETY.

Our Mission

To improve lives and contribute to a better society

Our Values

- **Innovation Driven by Social Needs**
Be a pioneer in creating inspired solutions for the future.
- **Challenging Ourselves**
Pursue new challenges with passion and courage.
- **Respect for All**
Act with integrity and encourage everyone’s potential.



**To improve lives and contribute to a
better society**

What we mean by Better Society

OMRON has identified factory automation, healthcare, and social solution as three business domains in which new social issues are most likely to emerge. We will pursue innovation driven by social needs in these domains, striving to contribute to a better society.

Unique OMRON Value

What We Mean by *Better Society*

Factory Automation



Innovations to manufacturing by automation



Bring innovation to manufacturing by automation, to enrich lives of people all over the world.

Healthcare



Optimal health for all through personal daily vital sign and lifestyle information



All for Healthcare
To help realize healthy and comfortable lives for people around the world

Social Solution



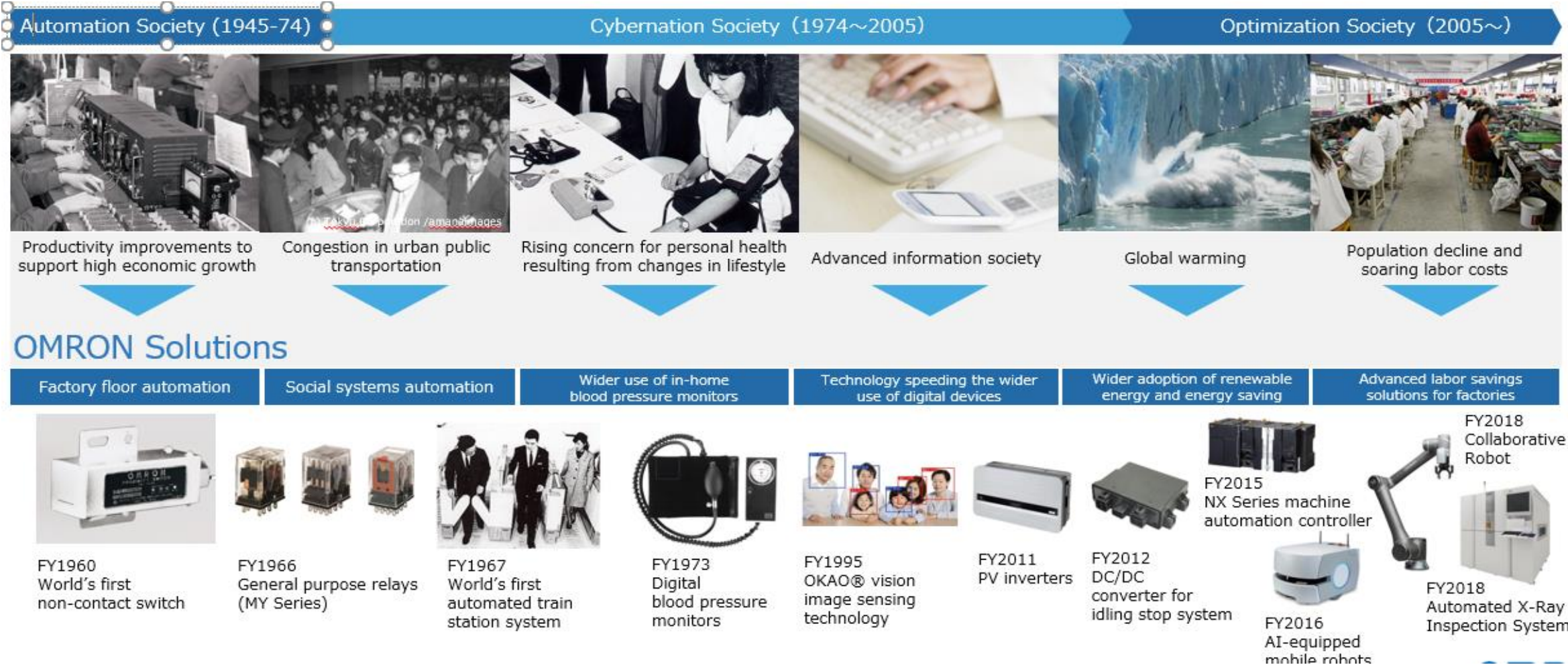
Realization of a prosperous society in which people can continue to live in safety, security and comfort



Using energy conversion and control technologies to popularize the use of renewable energy and Contribute to a sustainable society

A HISTORY OF INNOVATION

Since its founding, OMRON has pursued innovation driven by social needs, leading the world in innovative ideas. We will continue to improve lives and contribute to a better society by creating value for the future.



About Omron and who we are

History

1933 Kazuma Tateishi established Tateisi Electric Manufacturing Company in Osaka.



OMRON founder Kazuma Tateishi (1900~1991)



The product that led to OMRON's establishment was an X-ray timer, a revolutionary product at the time in that it enabled the timing of X-ray photography accurate to within 1/20th of a second.

1945 Moved its headquarters to Omuro, Kyoto.

Originally, Omuro meant Ninnaji-temple, Nowadays, it became a place name referring to the area around it.



Ninna-ji Temple in Kyoto

1990 Renamed company name to OMRON corporation.

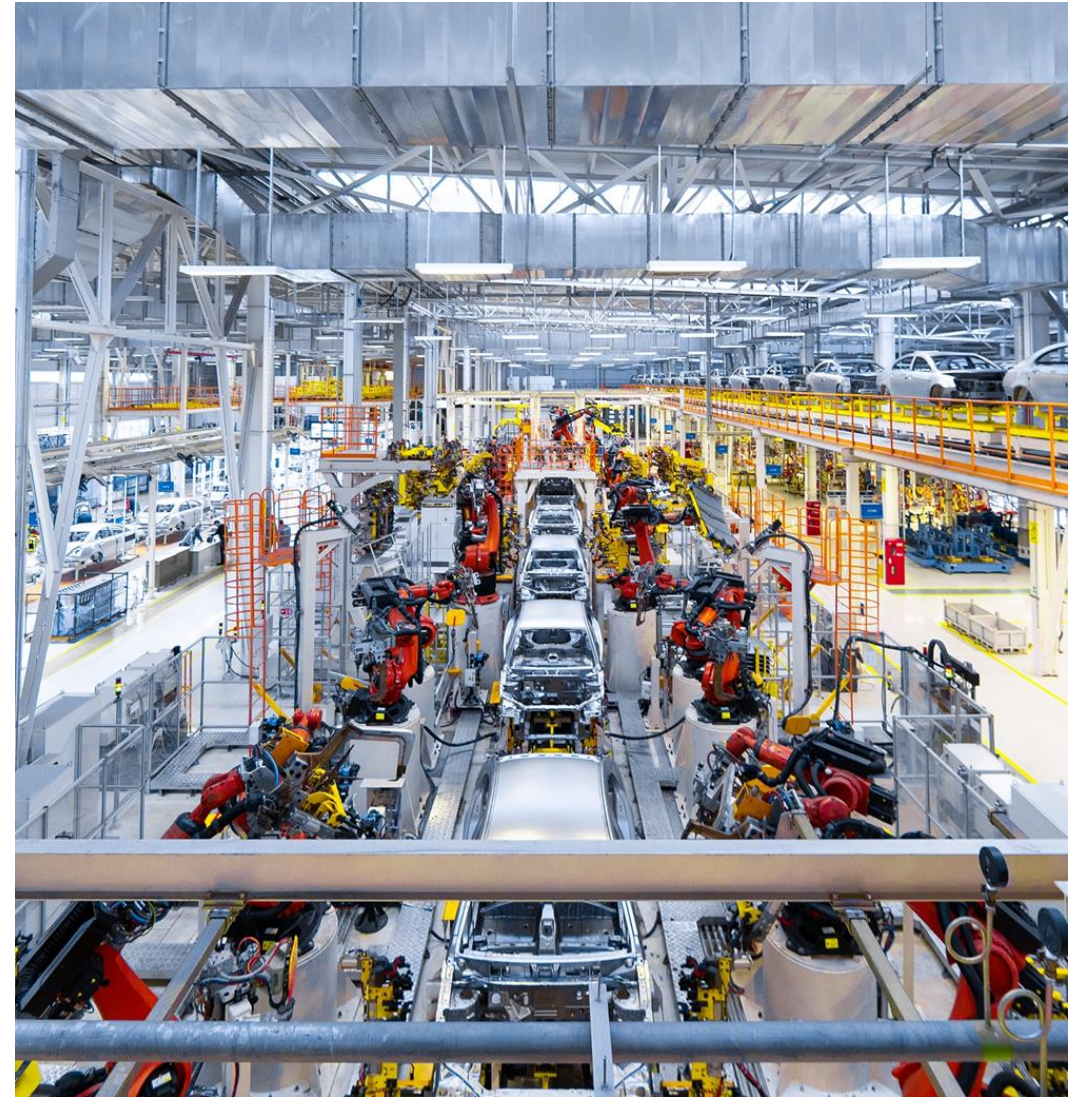


Company logo used at that time

Working towards the sustainable enhancement of its corporate value, OMRON inherit the thoughts of its principle: to improve lives and contribute to a better society.

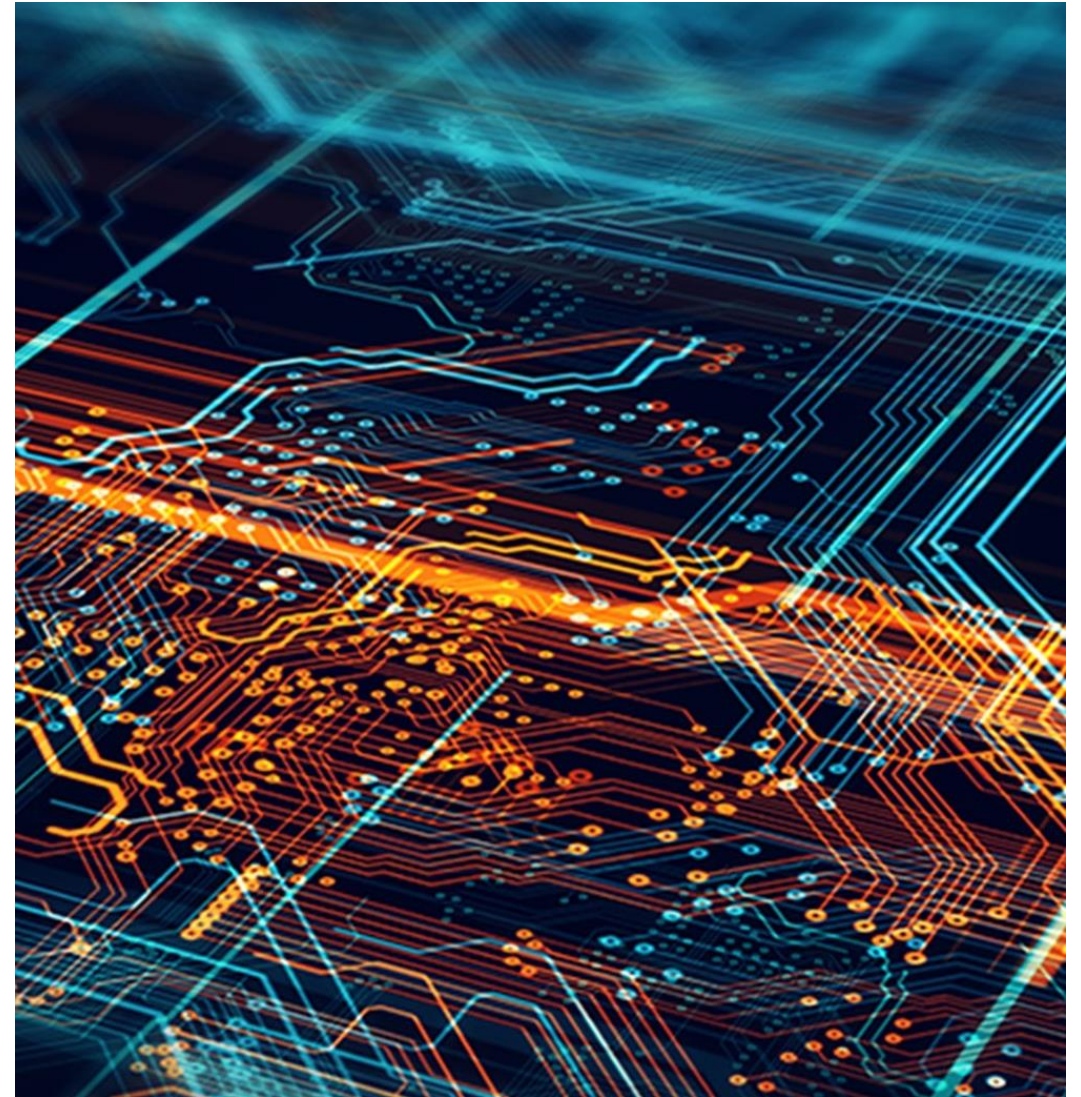
Industrial Automation -52%

Innovating production floors with cutting-edge AI, IoT, robotics technologies and unique services based on the widest range of control devices for factory automation to contribute to advancing productivity in the world's manufacturing industry.



Electronic and Mechanical Components -13%

Providing electronic and mechanical components such as relays and switches globally used in a wide range of products that support people's lives. From the production design to materials, molds, parts processing, and assembly, having strength in advanced manufacturing capabilities, this business supports OMRON's development.



Social Systems -12%

Providing solutions and services to social issues through cutting-edge AI and robotics technologies in a wide range of fields, such as public transportation, energy management, payment system, and community solutions that protect day-to-day life in rural areas.



Healthcare -17%

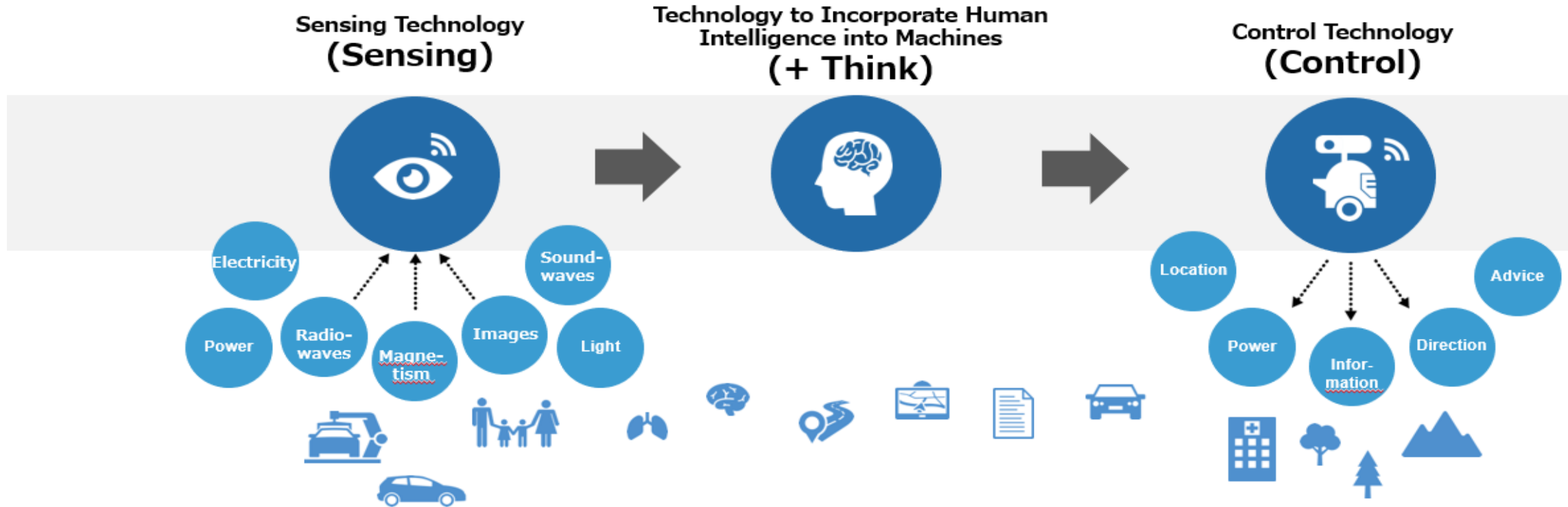
Providing numerous types of products and services such as household-use measurement devices, and healthcare management services worldwide that to measure each person's health status accurately and easily with unique biometric sensing technologies.



Omron's Core Technologies

“Sensing & Control”, which converts information into value, is OMRON’s core technology. OMRON aims to create new automation by adding “think” (human intelligence)

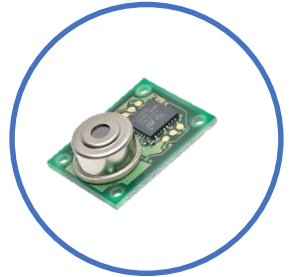
Sensing & Control + Think



Focus industry & application

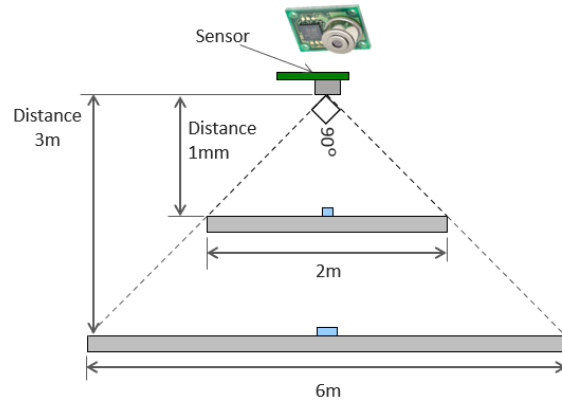
- Application Development team is focused on 6 target industries

Industry MBU	Sub category	Target application
SHB	BA HVAC Healthcare	<ul style="list-style-type: none"> ■ Lighting ■ Boiler ■ NPWT
EN (Energy)	PVGS&ESS Smart meter	<ul style="list-style-type: none"> ■ Commercial and industrial PV system ■ EV Chargers ■ Energy Storage Systems ■ Smart meter
PMT	Power Tool	<ul style="list-style-type: none"> ■ Electric tool ■ Gardening machine
FA	Controller Robot	<ul style="list-style-type: none"> ■ FA controller ■ I/O ■ Robot ■ AGV, AMR
ATE	Prober Tester	<ul style="list-style-type: none"> ■ Device prober ■ Probe guard ■ Tester
ENT (Entertainment)	e-Sports Gaming	<ul style="list-style-type: none"> ■ Gaming mouse/Keyboard/Lap top PC ■ Casino machine

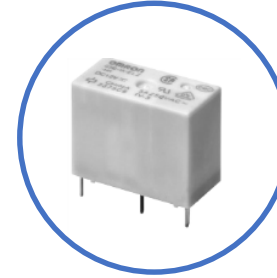


**D6T 32x32
plus algorithm**

Lighting Control:



**New G5RL-E8
Released**



**New G5Q-TV8
Latching
Under marketing
investigation**



Lighting

Promoting package offer for lighting.

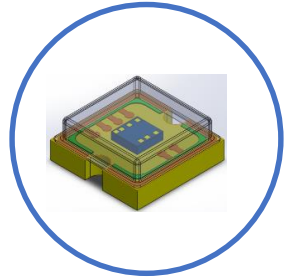


Released G5RL-EL –U type and –K type. Made promotion through distribution



Under investigation G5Q TV8 Latching

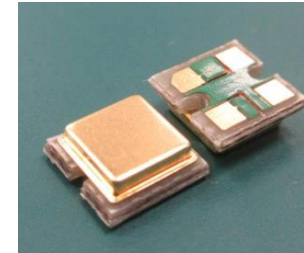
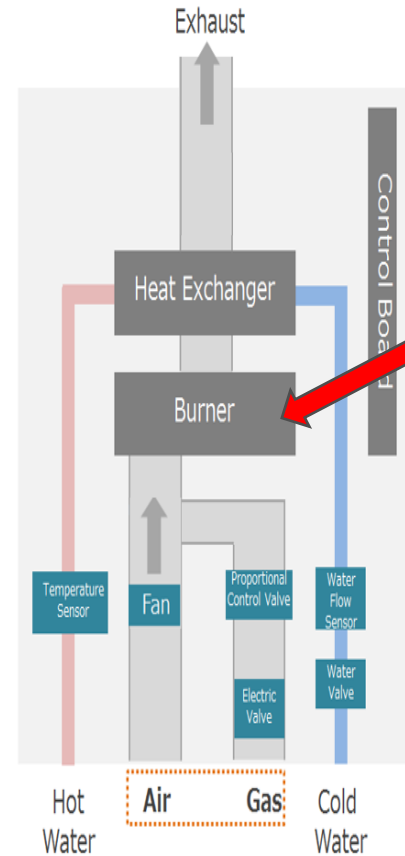




D6F for hydrogen

Target:
Define specifications of
sensor for hydrogen
for boiler market

Boiler:



Boiler



G6DN



FA:



I/O Interface

FY21 2nd H actions:

- G6DN new versions to be surveyed
- G6DN pot by customer
- Proposal for new products to be done by EU

⑤ With socket



① High temperature 105°C



② Long life 300K ops

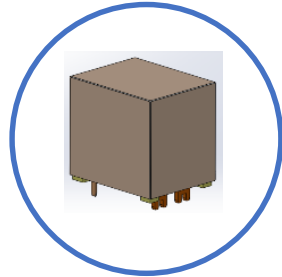


③ Right angle



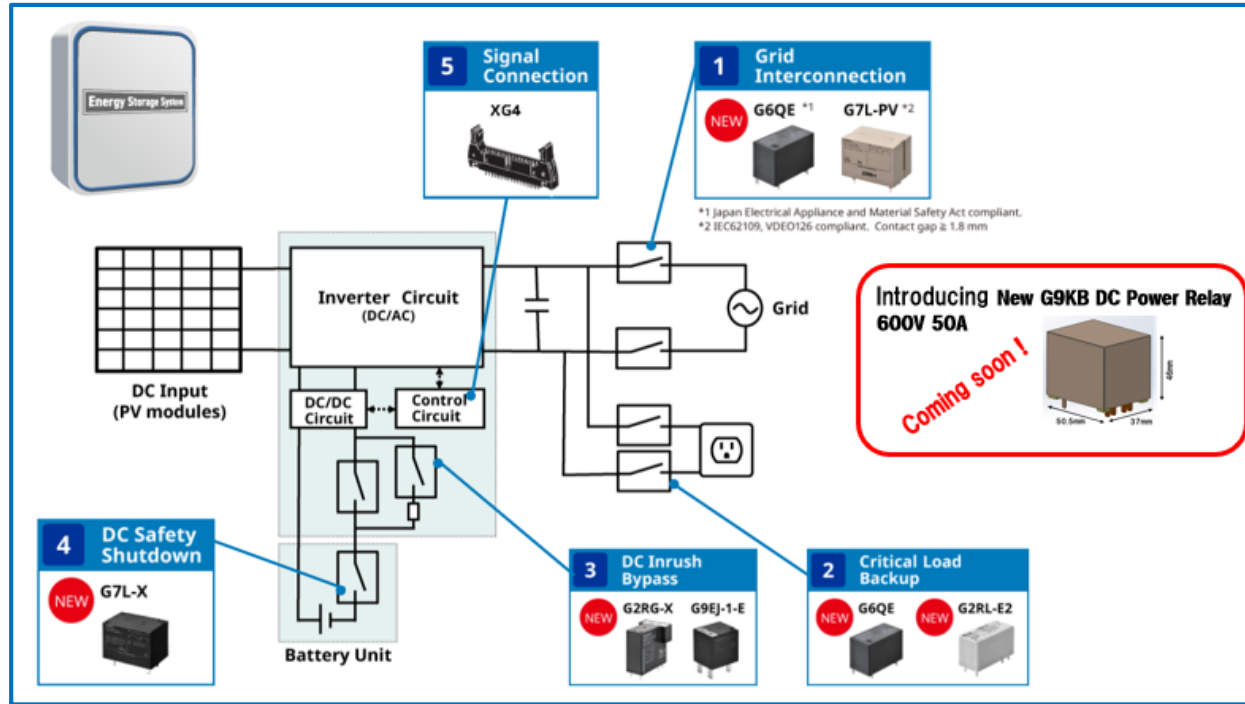
④ SMD/THR type





G9KB

Energy Storage System:



ESS

FY21 2nd H actions:

- G9KB release in March '22
- Reapproach all EU target customers with final G9KB specs and samples
- Expand promotion of G9KB including package offer for DC switching

General release
beg. APR'22

G9KB (600VDC 50A) specifications



DC Mode 4 \approx 24kW 1 & 3 Phase

item	PC1904
Contact structure	1a
Contact Gap	>3.6mm
Contact Resistance	$\leq 5m\Omega$ (*1)
Rated	DC600V/50A
E-life (Resistive load)	With rated : +/- 2,000ops DC600V/1A : +/- repeat 30,000ops
Polarity	No
Short circuit withstand	1.5kA, 1ms (reference) (non welding/burning/smoking)
Coil voltage	12VDC / 24VDC
Coil power consumption	Approx. 2.8W (Holding voltage 0.57W:45%, refer to Fig.1)
Amb. Temperature	-40°C ~ +85°C
Size	L 50.5 x W 37.0 x H 50 mm (Refer to Fig.2)
Mounting direction	Refer to Fig.3
Terminal	PCB
Structure	Flux protection
Safety standard	UL, TUV, CQC

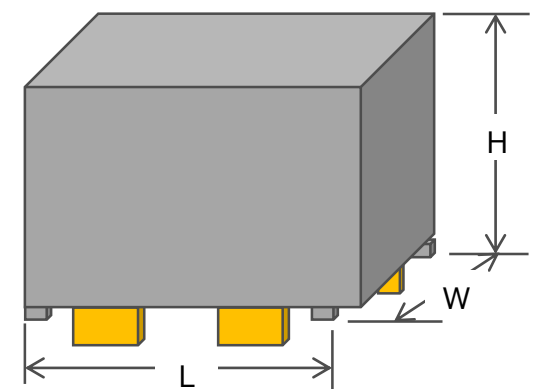


Fig.2 Size

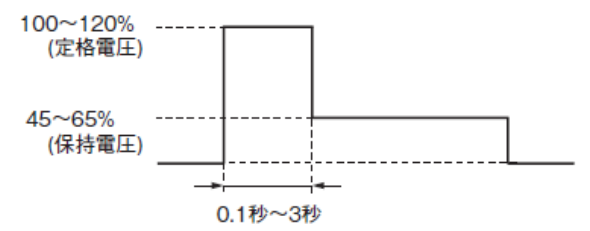
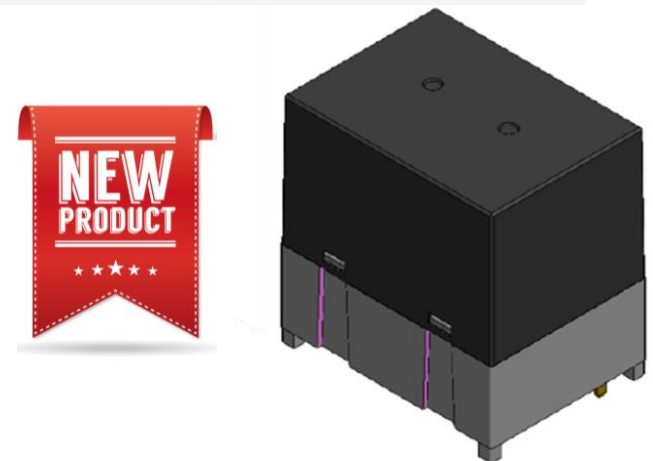


Fig.1 Holding voltage



- **Alternative to G7L-X where >25A (30A) up to 50A (typ. utilization 15 & 24kW)**
- **Full capability Bi-Di (reverse polarity)**
- **Power saving**

- **Product Specification now available**
- **Datasheet Specification coming soon**
- **Engineering samples available on special request**

(*1) Measure condition : DC6V 20A (after 5sec) Voltage drop method

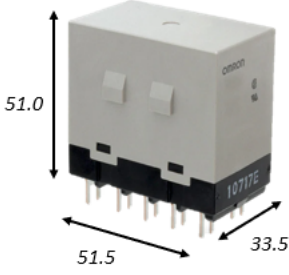


G7J

EV Chargers: DC only at moment

Under Development

New Multi pole Relay



51.0
51.5 33.5

- 1 4PST-NO Multiple contact**
Applicable for 3 Phase + Neutral load switching
- 2 AC400V 32A rating with PCB terminal**
Suitable for PCB designed Mode 3 ≤22kw models
- 3 Class leading compact size**
Contribute saving space for your smaller product design
- 4 Class leading low power consumption**
Max. 2.0W coil will help your power efficient PCB design



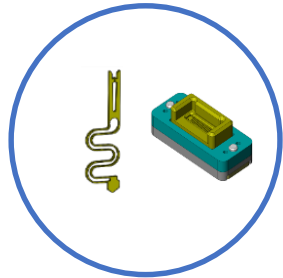
EV Charger

FY21 1st H actions:

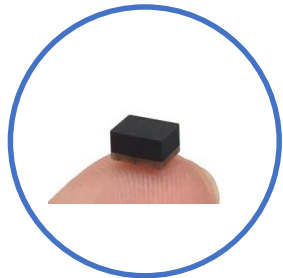
- Working on G7J 32A to compete with HE Panasonic
- Ongoing activity with Takeo on several tests (SSR, thermal endurance...)
- Found several customers interested in 4p relays which will become standard in 11KW/22KW EV charger



SPDT Module



Contact Pin Block



T Module

“To improve lives and contribute to a better society”

Automatic Test Equipment



ATE



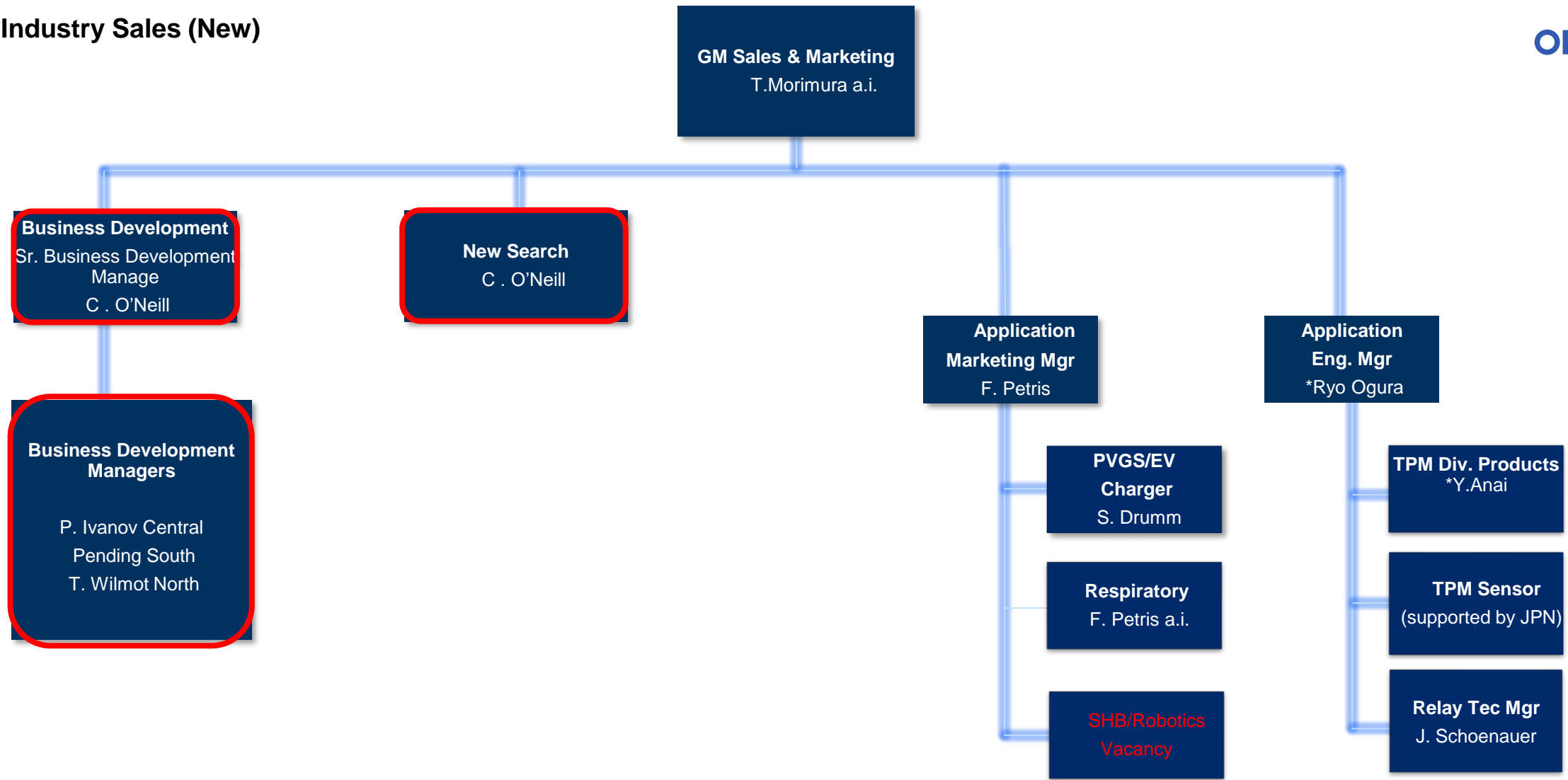
FY21 1st H actions:

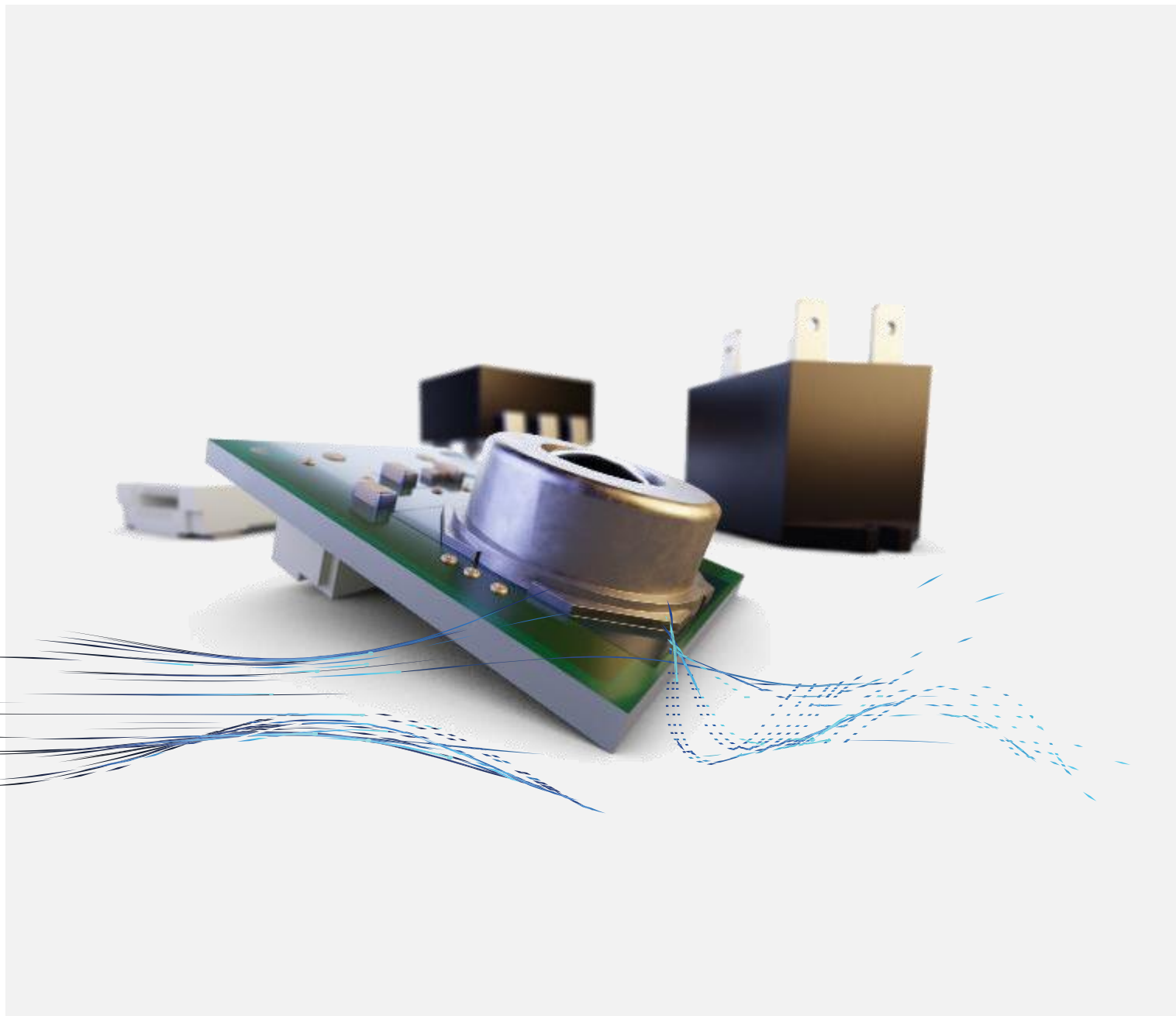
- **SPEA**

Discussion with R&D brought interest in Omron product (investigation of T-module with no specific project yet, getting share in high running business G3VM-LR, allocated via Rutronik)

Marketing

- Surveying semiconductor makers: ST, Infineon, TI
- Promotion of new products at target customers: Advantest, Tipps, Spea
- Surveying Automotive diagnostic market



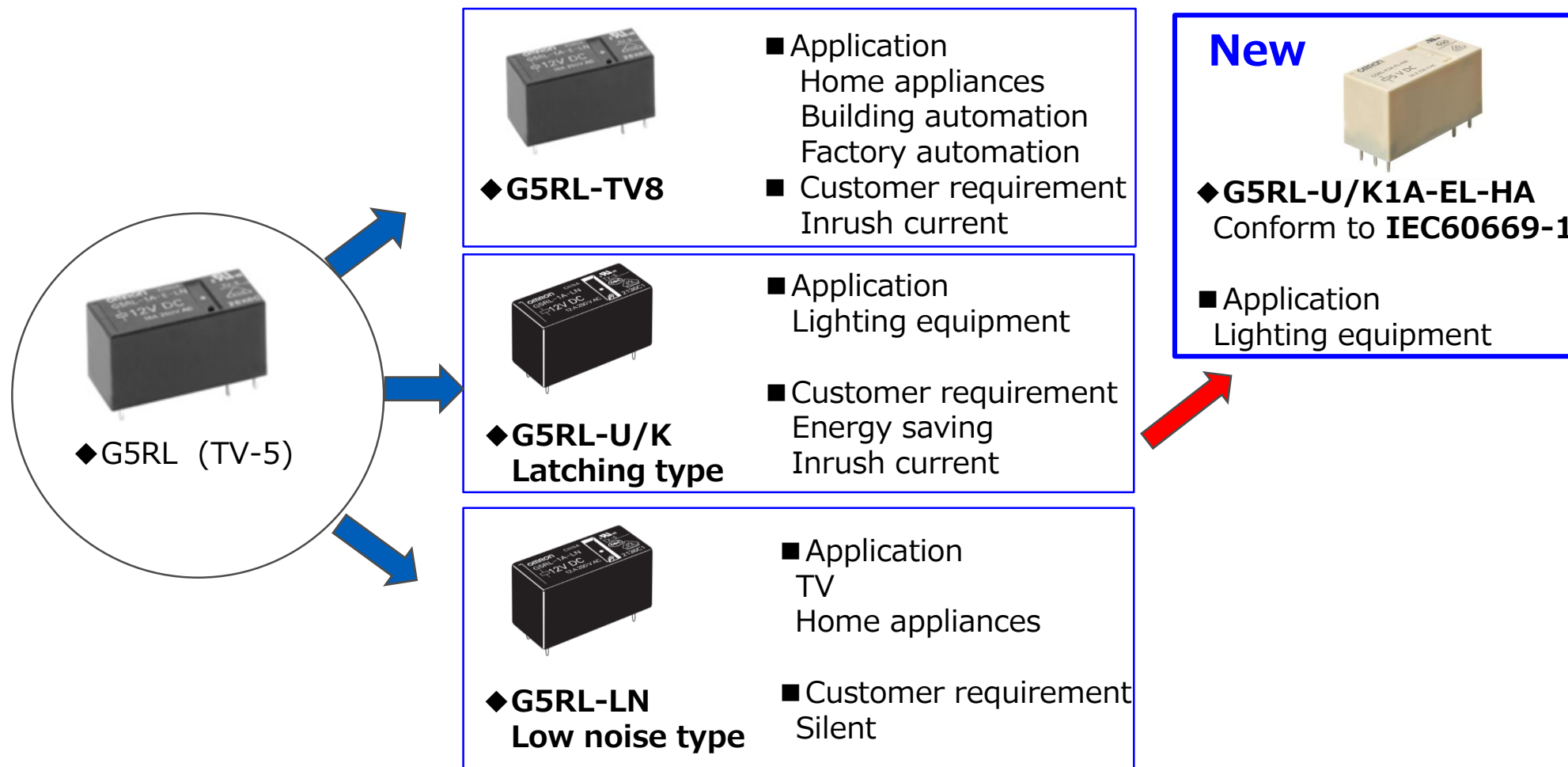


NPI'S

G5RL Series Product Lineup

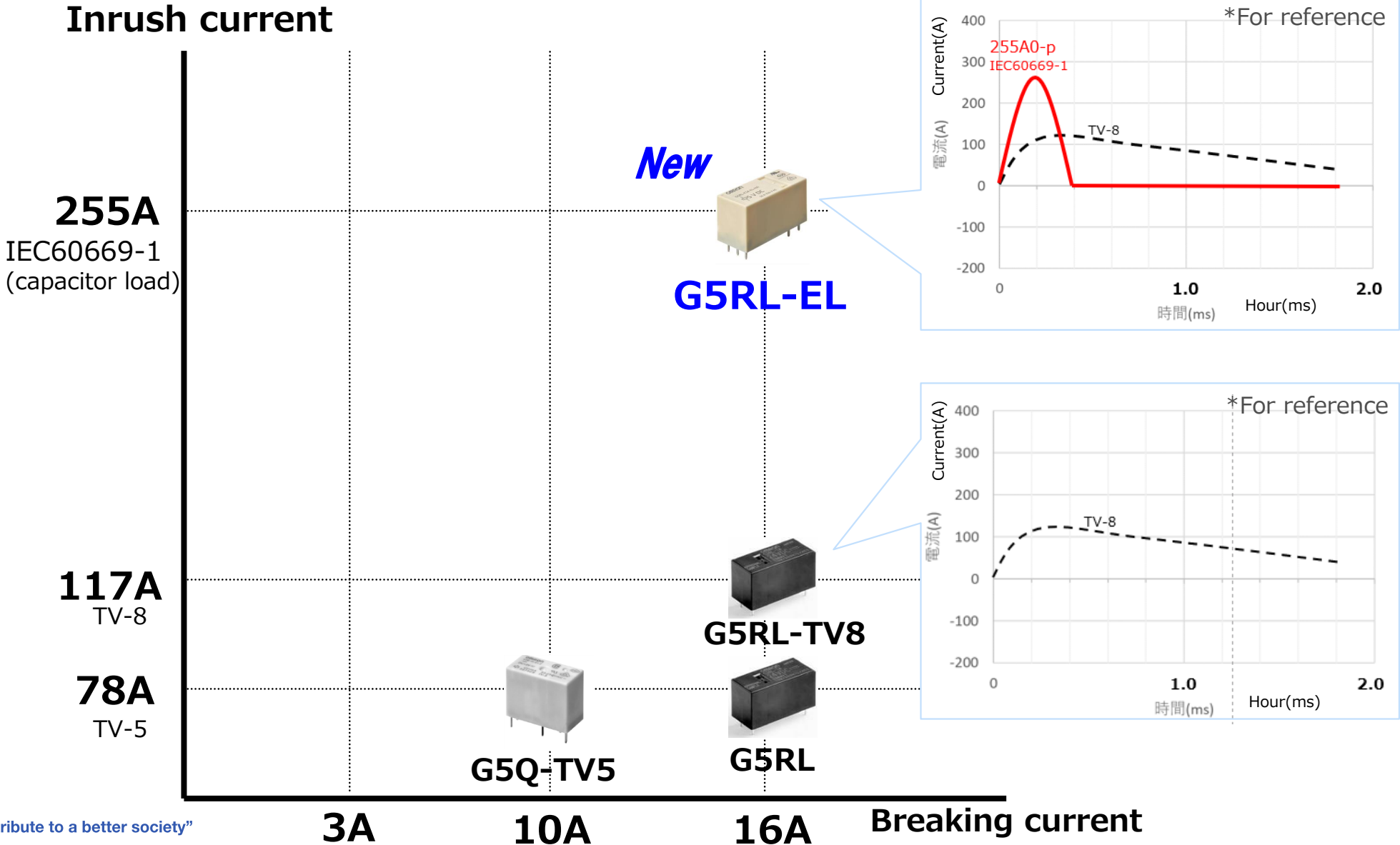
◆ Low-profile power relay specialized for high inrush performance

G5RL-U/K1A-EL-HA is released with improved capability against high inrush current, which is required for lighting application



High Inrush Performance

Expand high inrush model specialized in lighting industry



Main Specifications and Features

◆ **Inrush current**

IEC standard for lighting

Compatible with capacitor load (IEC60669-1)

◆ **Compatible with the safety standard (IEC60335-1)**

Compatible with the international safety standard for electrical/electronic household appliances

New



**G5RL-K1A-EL-HA
&
G5RL-U1A-EL-HA**



	Standard G5RL-U/K1A	Inrush current specialized type G5RL-U/K1A-EL-HA
Size	W12.7 mm × L29.0 mm × H15.7 mm	
Enclosure	Flux protection	Flux protection
Contact form	SPST(1a)	
Coil power consumption	U: 600 mW, K: 750 mW(5 VDC, 12 VDC), 840 mW(24 VDC)	
Rated load (Resistive)	250 VAC 16 A 24 VDC 16 A	250 VAC 16 A
Dielectric strength (Coil and contacts)	6,000 VAC, 50/60 Hz for 1 min	
Dielectric strength (contacts of same polarity)	1,000 VAC, 50/60 Hz for 1 min	1,250 VAC, 50/60 Hz for 1 min
Electrical durability	Resistive : 50k ops	Resistive : 20k ops
Ambient temperature	-40°C to 85°C	
Safety standard (Inrush)	TV5, TV8 Standard Ballast: 8 A, 250 VAC 2000 W 250 VAC(Tungsten)	IEC60669-1 :16 A, 250 VAC, Capacitor 140 uF, room temperature, 20k cycles
Safety standard	-	IEC60335-1 (GW)

G5RL-EL can support high inrush application

【Application trend and needs】

Increasing lighting load control based on IoT technology

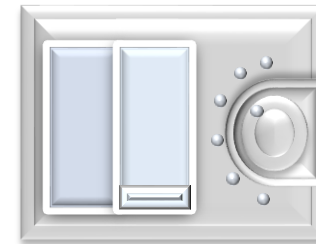
【G5RL-EL Value】

⇒ High inrush current capability with compact housing

■ Lighting controller



Lighting at office / shopping mall

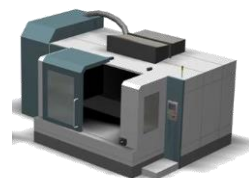


Home lighting system

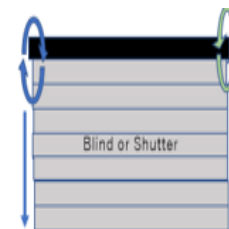
■ Factory automation / Building automation



Robot controller



Machine tools



Shutter controller



Security system

New PCB Power Relay G5PZ-1A-X Introduction

G5PZ-1A-X



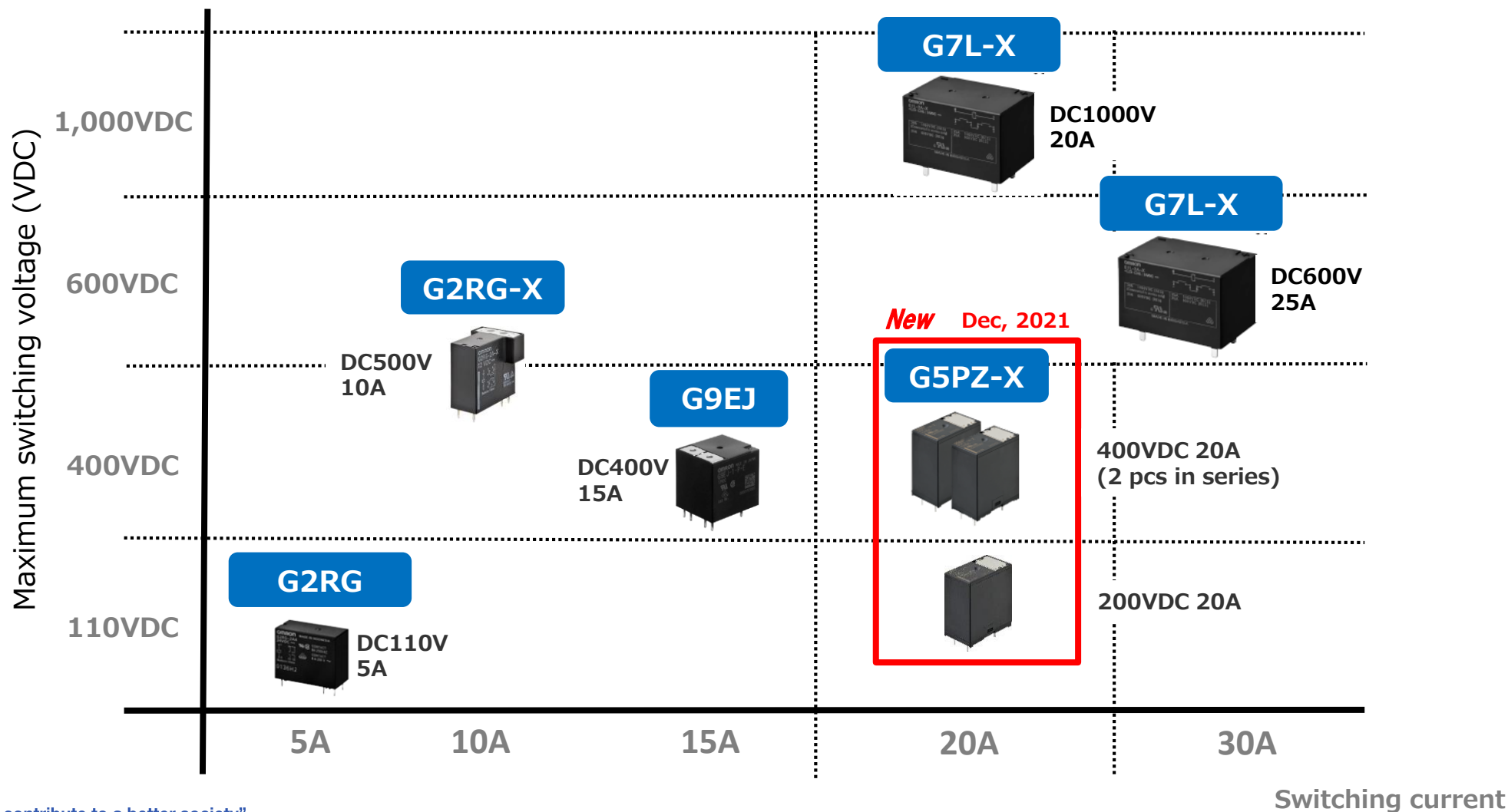
Oct 2021

Relay Application Division

OMRON

DC Power Relay Product Lineup

- ◆ A higher capacity with small-sized product addition.
- ◆ G5PZ-X covers 200VDC/20A (1 pcs use) and 400VDC/20A switching (2 pcs use in series.)



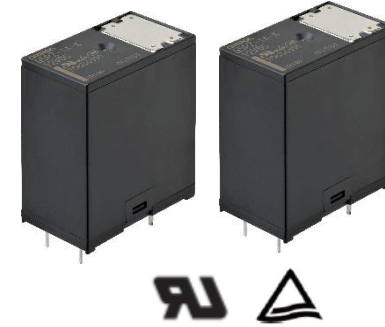
Main specifications and features

◆ **DC High Voltage**

Omron arc control technology allows reliable high DC power switching.

◆ **Compact**

Downsizing
Small footprint (15.2 x 26.4mm) saves space on PCB.



	Standard type G5PZ-1A-E	DC High Voltage Type G5PZ-1A-X
Size	W10.5mm×L24.0mm ×H25.0mm (Max)	W15.2mm×L26.4mm ×H29.5mm (Max) *1 pcs
Enclosure rating	Flux protection	Flux protection
Contact form	1a	1a
Contact polarity	-	No
Coil power consumption	530mW	
Rated load (resistive)	250VAC 20A	400VDC 20A (Connect 2 pcs in series) 200VDC 20A (1 pcs use)
Rated current	20A	
Dielectric strength (Between coil and contacts)	4,000VAC, 50/60Hz for 1 min	
Dielectric strength (Between contacts of the same polarity)	1,000VAC, 50/60 Hz for 1 min	
Electrical durability (resistive)	200k ops at 250VAC, 20A	1k ops at 400VDC, ±20A *2Connect 2 pcs in series 100k ops at 400VDC, ±0.25A *2Connect 2 pcs in series 1k ops at 200VDC, ±20A *1 pcs use 100k ops at 200VDC, ±0.25A *1 pcs use
Ambient operating temperature	-40°C to 70°C	-40°C to 85°C

Application

G5PZ-X support 400VDC 20A class high voltage applications.

【Application Trend and Needs】

Downsizing of equipment
Storage battery capacity increasing

【Values】

>>> Small size
>>> Higher voltage & current

【Example】

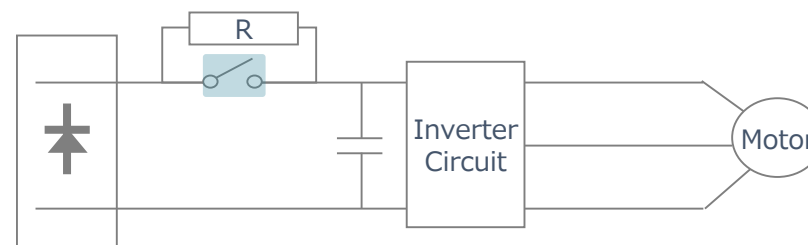
- Energy Storage System (ESS)
- V2H (Vehicle to Home)
- FA (Inverter/Servo)
- Power supply, UPS

【Relay function】

- Power supply, Inverter switching
(For main circuit shutdown, inrush protection circuit)



Inverter circuit example



*Note: In each case, the customer should check if it is applicable to the actual device.



Cross reference

- The main competitor is Fujitsu (main circuit shutdown: FTR-E1, inrush prevention circuit: FTR-J1).
- G5PZ-X differentiation point is its high capacity switching with small package.

Specification comparison				Values	
Company /Type	OMRON G5PZ-X	FUJITSU FTR-J2	FUJITSU FTR-E1	Bi-directional switching	FTR-J2 : 10A switching
Contact form	1a	1a x2 *2-pole series wiring	1a		G5PZ-X : 20A switching
Polarity	No	With polarity	No	Small size	FTR-E1: Length:43.6mm
Rated load (resistive)	400VDC ±20A *Connect 2 pcs in series	450VDC 10A	450VDC ±20A		G5PZ-X: Length:26.4mm
Electrical durability	1k ops Min *Connect 2 pcs in series	10k ops Min *2-pole series wiring	10k ops Min		
Coil power consumption	1.06W (2 Coils)	1.1W (2 Coils)	0.9W		
Ambient operating temperature	-40~ +85°C	-40~ +85°C	-40~ +85°C		
Size (mm)	L26.5 × W30.4 × H29.5 *2 pcs use	L24 × W23.5 × H27	L43.6 × W28.3 × H36.8		

DC CHARGER MODE 4 ≈ 24KW

Focus

						
	AC-charging Wall outlet	AC-charging Wall outlet IC-CPD	AC-charging Wallbox	AC- public charging-station	Inductive charging	DC-charging
Mode	1	2	3		-	4
Standard		IEC 62752/UL 2231	IEC 61851-1/-21/-22		IEC 61980-3	IEC 61851-23
Power class	max. 1ph 16A (3.7 kW) max. 3ph 16A (11 kW) max. 3ph 32A (22 kW)		max. 1ph 16A (3.7 kW) max. 3ph		2... 5 kW 11 kW	25 kW-400 kW
Connection	Schuko	Schuko	CCE		Schuko / CCE	
Communication	none	Control Pilot	Control Pilot / Power Line		Wireless	Power Line

N.B. Currently Omron provides solutions only for stationary Wall box and Pedestal Chargers. i.e. we do not offer AC disconnect solutions including Mobile (Cable Chargers) Mode 1 and 2 (IC-CPD) however we consider any request case by case

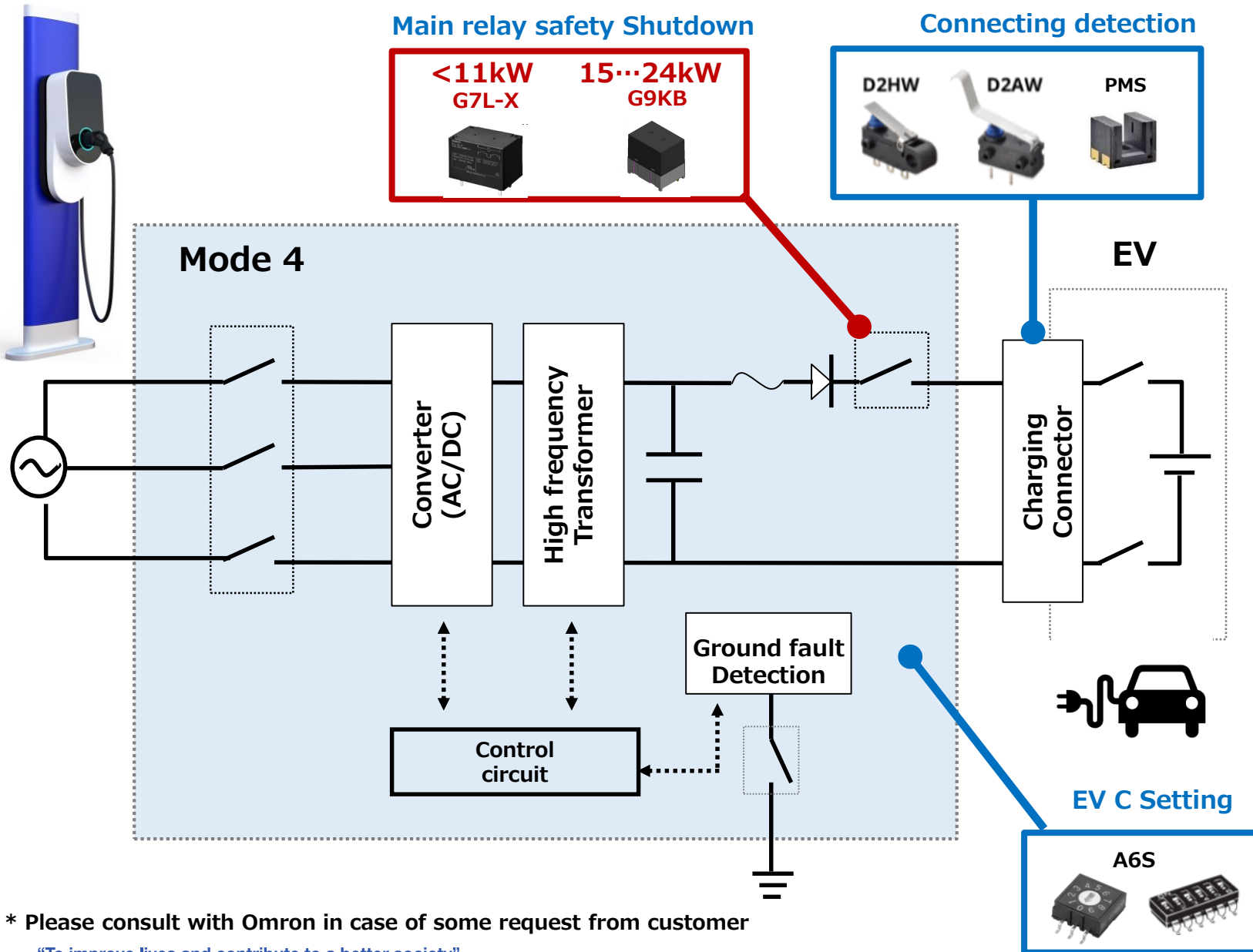
DC Mode 4: ≈ 24kW (typ. 11, 15 & 24kW)

A new market segment

- Focus to stationary, permanently wired DC Wallbox and Pedestal Charger infrastructure
- **DC Mode 4 ≈ 24kW** is the *new fast growing* residential prosumer, commercial and Public Charger market
- DC offers high efficiency charging for conventional use and versatile new connectivity for *Vehicle to Home (V2H)* and *Vehicle to Grid (V2G)*

Solutions for Wallbox and Pedestal Fast DC Chargers

MODE 4 ≈24KW CONVENTIONAL CHARGER



Relays for Conventional Charger

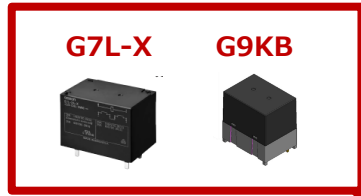
- One direction only: Charger>Battery (Vehicle)
- Min. DC disconnect configuration: SPST-NO in Positive rail
- DC disconnect in negative also possible
- Main relay function: *carry* charging current with emergency disconnect
- Relay makes and breaks charge circuit under IEC signal regulated signal protocol - normally switching low or zero load
- **Charger manufacturer determines durability specification to follow including safety isolation and any approval certification***

* Please consult with Omron in case of some request from customer

MODE 4 ≈24KW VEHICLE TO HOME (V2H)



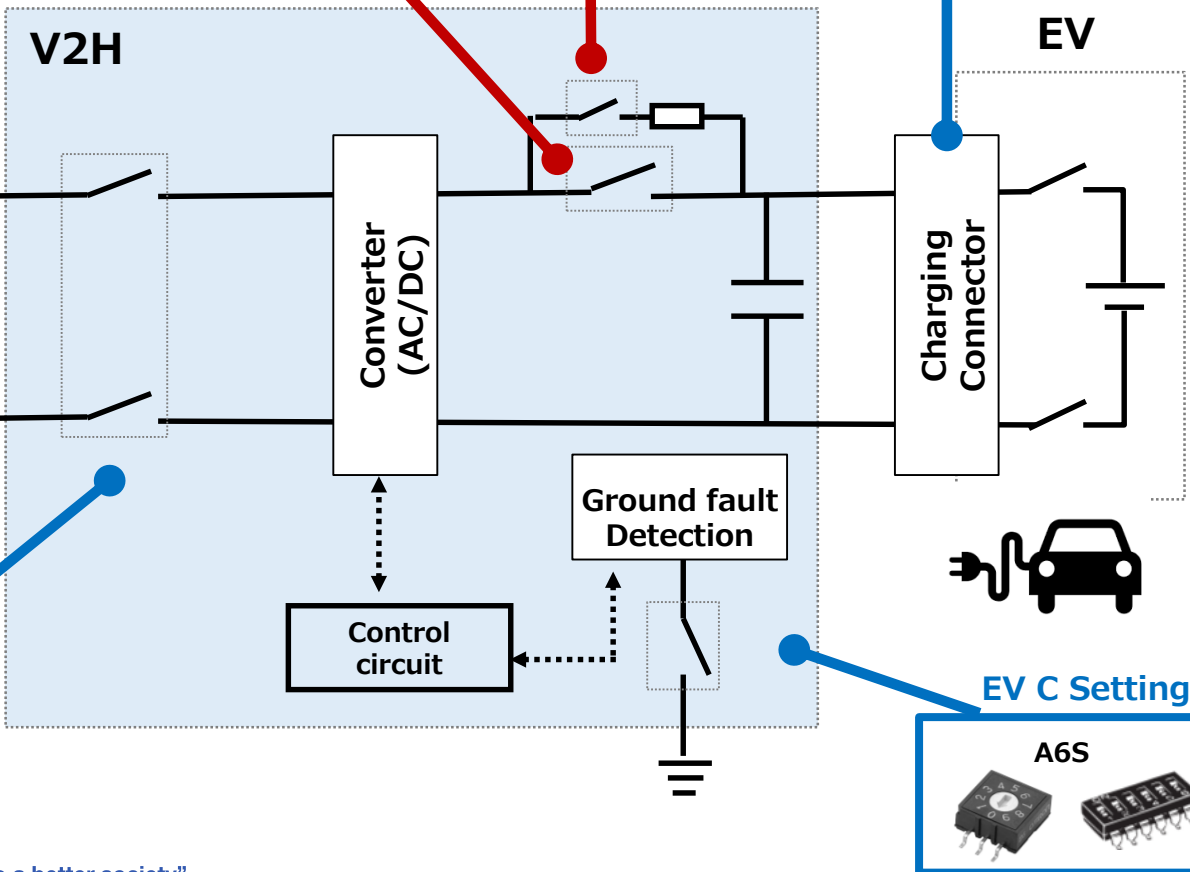
DC Safety Shutdown (Bidirectional)



DC Inrush bypass



Connecting detection



Grid disconnection

G7L-PV

EV C Setting

A6S

Relays for V2H or V2G charger

- **V2H: residential system only** allowing the EV's battery to operate as a source within the household's electricity system
- **Bi-directional (normal and reverse current polarity disconnection with main relay G7L-X or coming new G9KB)**
- **Min. disconnect configuration: 1 NO contact in Positive rail but disconnect also possible in negative**
- **Function as conventional but also providing carry and break from current flowing from the vehicle battery system**
- **DC Inrush bypass may be optionally included to achieve optimized contact electrical life of main relay**
- **Vehicle to Grid (V2G) is similar but allows the EV's battery to operate with the grid (exporting the energy instead of in home consumption)**

G7L-X

Focus

DC Mode 4 \approx 11kW 1 & 3 Phase



Mode 4

DC-charging

4

IEC 61851-23

25 kW-400 kW

Power Line



Working samples
available on request

G7L-2A-X

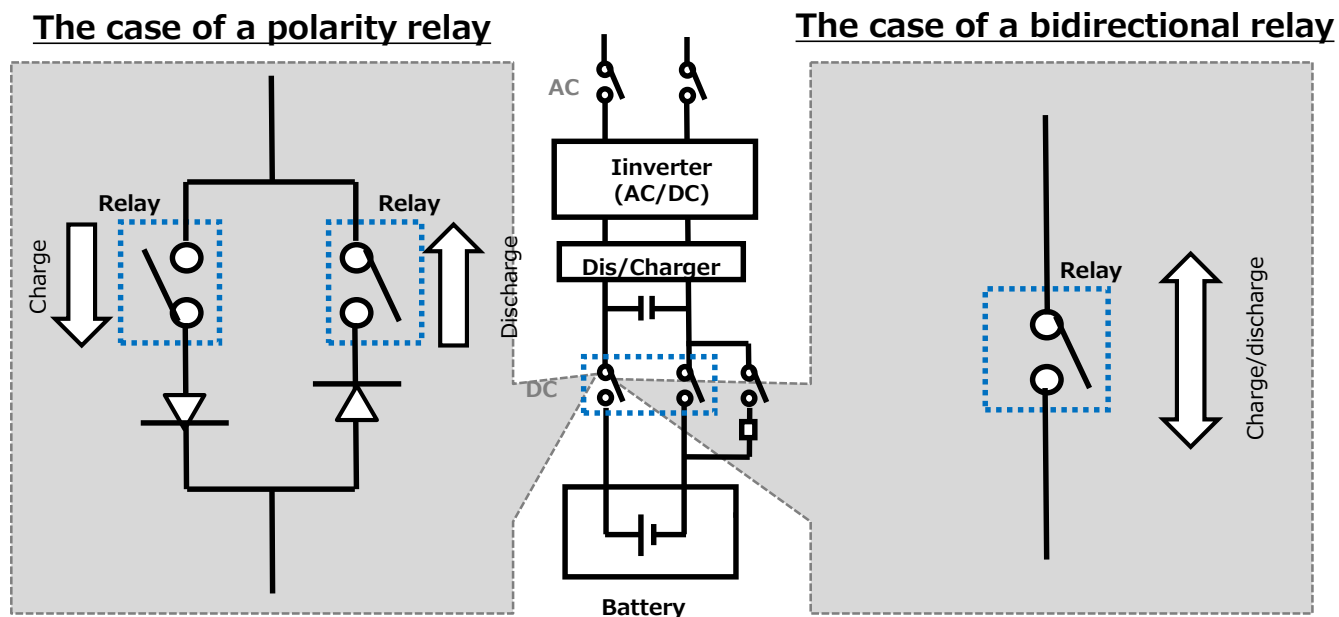
- 25A* carry current capability
- High capacity switching, normal and reverse polarity
- Two poles wired in series can break up *1000 VDC
- Low power consumption 600mW; (50% reduced coil voltage)
- 6 mm contact gap (two-pole in series wiring)
- Conformity to UL and EN

Durable relay solutions for DC disconnect in Fast Charger

PCB High Power Relay G9KB 600V/50A High Power Relay

Difference between “a polarity relay” and “a bidirectional relay”

- In case of polarity relay (without bidirectional switching capability), 2 relays are necessary in order to switch bidirectional load.
- On the other hand, in case of bidirectional relay(G9KB), 1 relay can switch the reverse load as well. So design will be more simple, and you can save more space on PCB by using G9KB!



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Optimal devices and modules provide solutions for a variety of applications and evolving customer needs

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PRODUCTS

Products OMRON

- > RELAYS
- > SWITCHES
- > CONNECTORS
- > SENSORS

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- <https://components.omron.com/eu-en/>

QUESTIONS?

Feel free to contact us!

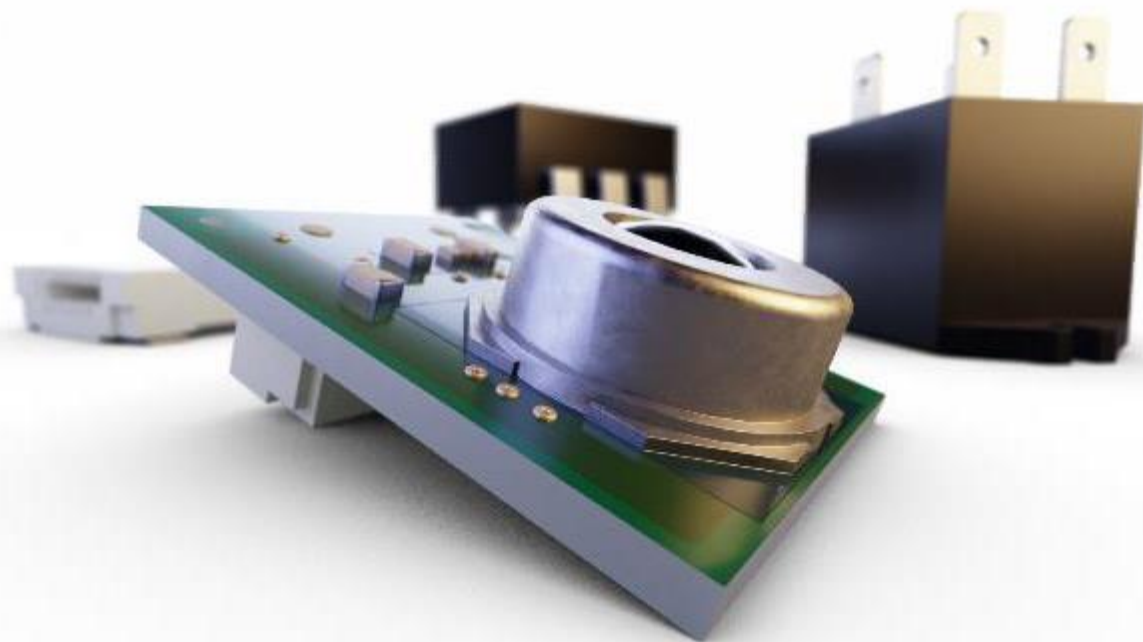
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THANK YOU!

