

**900V**  
class

# Grid Connected Photovoltaic Central Inverter

High-efficiency



**SanRex produces a variety of equipment which range from micro to mega Photovoltaic Central Inverters, from small capacity grid connected synchronous inverters to large capacity power generation systems.**

We have developed a Photovoltaic Central Inverter for use with "Photovoltaic (PV) panels", which converts electric energy from solar light. The "Photovoltaic Central Inverter" is a "Grid-Connected Synchronous Inverter", which converts the varying DC output of the PV panels into clean, regulated and synchronous 50/60 Hertz industrial power, which when connected to an industrial power system, supplies energy to an electric power system.



# **SanRex** **Grid Connected Photovoltaic Central Inverter**

Our company has been manufacturing semiconductor devices for the electric power industry and its applied equipment for many years. We now have focused on power control devices for the consumer market and are offering power inverters in a wide range of capacities. Recently, renewable energy sources such as solar are in the limelight. This interest has spawned the industry of "Solar Energy Technologies" that harnesses this energy in a controlled manner through the technologies of power converter equipment. Fortunately SanRex has been in the business of manufacturing power conversion products for decades and has used our technologies in the manufacture of Photovoltaic Central Inverters. We have developed various products in a range of sizes to fit most applications, for example, a 3kW unit for individual households, compact type units with a 10~110kW output along with a single unit specification with a 10~75kW output and 100~500kW units for use in industrial operations and large-scale power generation.

The Photovoltaic Central Inverter enables a grid-connection with a PV system. Therefore government and municipal offices and electric power companies require products with high reliability, high quality and high efficiency.

Our company responds to their requirements of Grid-connection Code in each country with our reliable technology and craftsmanship while utilizing high efficiency technology.

Moreover, we continue to reinforce our product support programs (ex: spare parts, technical support) in the global market.

We are committed to promote the wide usage of Photovoltaic Power Generation and to contribute our technology toward a stable operation of the ever growing dispersed electric power system.



**900V  
class**

## Single large capacity High-efficiency Photovoltaic Central Inverter For photovoltaic generating system

**High-efficiency**

Our company has developed technology to produce a new single unit product with a 250kW capacity, which corresponds to "mega solar" in the Photovoltaic power generation field. This product is introduced as a "High Efficiency Model" in our product line-up. This product enables our customers to construct large scale systems (2~4MW class) efficiently.

Concerning the foreseeable high demands for large scale Photovoltaic power generation systems, we not only have introduced a 500kW single unit into our product lines, but also continued to develop a simple structured product line with large power capacity.



## Solar Plant Supervisory System

### String Monitor Box



plastic housing



Stainless steel  
housing



Control Unit

Solar Plant Supervisory System is complete solution for monitoring Solar power systems. It consists of String Monitor Boxes and Solar Control Units. String monitors control state and functionality of PV strings, fuses, surge protectors and deliver energy to inverters. Control unit is connected to monitor boxes, inverters and disconnection switches. It measures string currents, voltages, temperatures, reference cell, working hours, delivered energy, and others. It may automatically contact maintenance person if needed. Data is sent to a remote control center from where plant can be monitored.

## Power semiconductors for photovoltaic power generation



By mutually combining our technologies in Power Semiconductors and Power Supplies, we are pleased to offer various products in addition to our Photovoltaic Central Inverters. For example, power modules & discrete devices utilized in the Photovoltaic power generation conditioner, reverse-current protection diodes which are an essential component in photovoltaic modules, and bypass diodes which comply with International Standard (IEC61215 Ed2).



## Single large capacity High-efficiency Photovoltaic Central Inverter For photovoltaic generating system

High-efficiency

Indoor installed type

100kW

250kW

500kW

### Characteristics

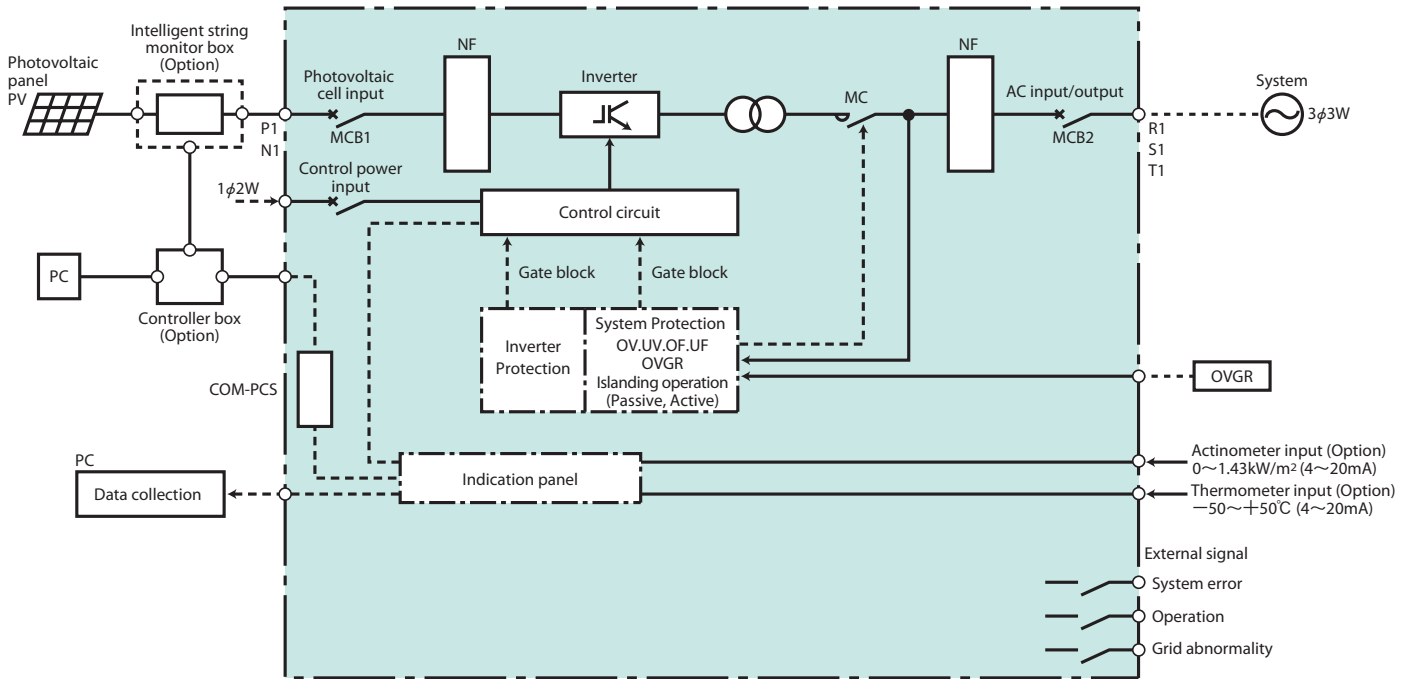
- The highest efficiency available among insulating transformer type products.**
- Large input voltage range. Units capable to accept voltage ranges within DC330~900V.**
- The smallest size in its class.**  
Minimized the installation area required for the 100kW~500kW type models.  
Minimized the heat sink by optimizing the design.
- Streamlined the maintenance process.**  
Using a unified spare parts list lends to similar maintenance process.
- TÜV - CoC**
  - prEN62109-1: 2007
  - IEC62109-1: 2007 ( 82/505/CDV )
  - IEC62109-2: 2007 ( Committee Draft )



### Specifications for TÜV certified model

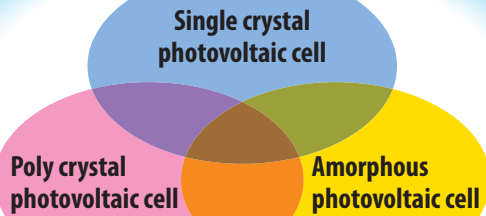
Production Lineup	HV TYPE (900V series)			HMV TYPE (900V series)		
	100kW	250kW	500kW	100kW	250kW	500kW
System type	Grid connected type					
Output nominal power (W)	100,000	250,000	500,000	100,000	250,000	500,000
Grid voltage (Within Isolation Transformer) (V)	380/ 400/ 420	380/ 400/ 420	380/ 400/ 420	380/ 400/ 420	380/ 400/ 420	380/ 400/ 420
	3Phase 3wire system					
Output nominal current (A)	151.9/ 144.3/ 137.5	379.8/ 360.9/ 343.7	759.7/ 721.7/ 687.3	151.9/ 144.3/ 137.5	379.8/ 360.9/ 343.7	759.7/ 721.7/ 687.3
Output maximum current (A)	168.8	422.0	844.1	168.8	422.0	844.1
Isolation Transformer	Within Isolation Transformer for industrial use					
AC output power factor	≥0.99	≥0.99	≥0.99	≥0.99	≥0.99	≥0.99
AC current total distortion factor (%)	≤3.0	≤3.0	≤3.0	≤3.0	≤3.0	≤3.0
Maximum D.C input voltage (max Voc) (V)	900.0	900.0	900.0	900.0	900.0	900.0
Maximum D.C input current (max Isc) (A)	240.0	600.0	1,200.0	300.0	750.0	1,500.0
Input voltage operating range (V)	440~880	440~880	440~880	330~880	330~880	330~880
Rated voltage PV field (V)	600.0	600.0	600.0	500.0	500.0	500.0
Rated input current (A)	175.4	438.6	877.2	211.0	527.0	1,050.0
D.C ripple factor (%)	≤1.0	≤1.0	≤1.0	≤1.0	≤1.0	≤1.0
Input voltage MPPT operating range (V)	450~800	450~800	450~800	340~780	340~780	340~780
Rated load efficiency (%)	—	—	—	95.2	95.4	95.5
Peak efficiency (%)	96.56	96.10	95.94	—	—	—
Weighted efficiency (CEC) (%)	95.68	95.19	95.60	—	—	—
Weighted efficiency (EU) (%)	94.79	95.13	95.53	—	—	—
Standby power (Including nighttime) (W)	≤50	≤50	≤50	≤50	≤50	≤50
Operation temperature range (°C)	-20~45	-20~45	-20~45	-20~45	-20~45	-20~45
Humidity range, non-condensing (%)	25~95	25~95	25~95	25~95	25~95	25~95
AC-Case	AC2,500V 1min	AC2,500V 1min	AC2,500V 1min	AC2,500V 1min	AC2,500V 1min	AC2,500V 1min
Dimensions W×H×D (mm)	900×2,150×900	1,300×2,150×1,000	1,600×2,350×1,300	900×2,150×900	1,300×2,150×1,000	1,600×2,350×1,300
Weight (kg)	1,300	2,000	3,500	1,300	2,000	3,500

## Schematic diagram for High-efficiency type



## High-efficiency type

Input voltage DC330~880V



Any photovoltaic crystal structures can be applied to our products.

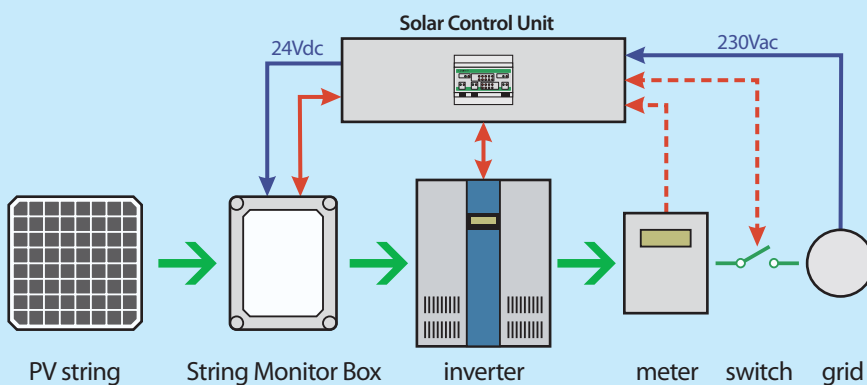
DC500V, 600V rating unit was developed

Number of photovoltaic cells in series >>> Increased

Number of photovoltaic modules in parallel >>> Decreased

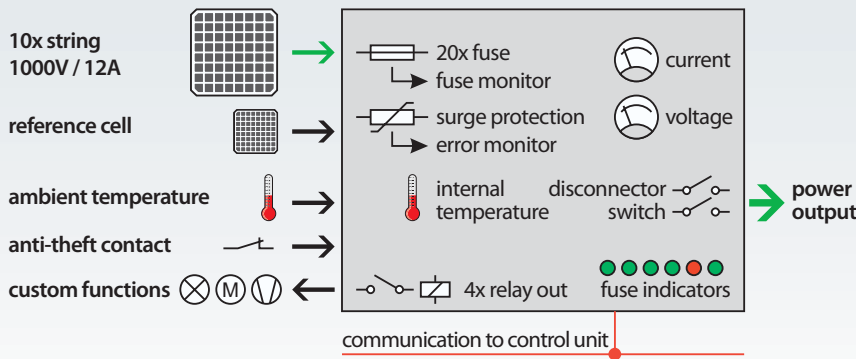
Low-loss realized

## Solar Control Unit



Solar Control Unit offers centralized monitoring and control, integrating power plant into a logical and easy-managable system. Control system draws power supply directly from the grid (blue), fully separated from the solar power (green). Communication and control signals are displayed in red.

### String Monitor Box

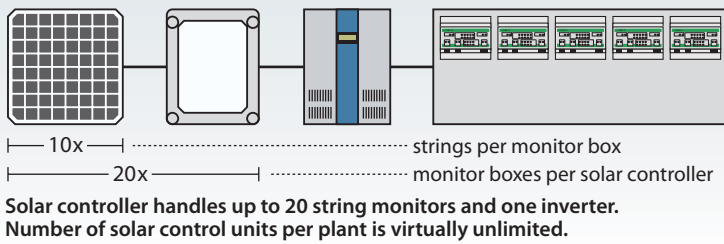


#### Technical Data

Maximum input voltage: 1000V DC  
 Maximum current per string: 12A DC  
 Number of PV strings: 10  
 Fuses: 2 per string, positive and negative  
 Maximum output current: 100A DC  
 Cable cross section: up to 120mm<sup>2</sup>  
 Power: 24V DC from solar control unit  
 Ambient temperature: -25 to +55°C, 95%rh  
 Enclosure: IP65 plastic box with transparent lid, or stainless steel box  
 Width/height/depth: 600 x 400 x 210mm  
 Weight: 11kg

String Monitor Box is intended to deliver electrical energy of up to 10 PV strings to inverter in a grid-tied system. It monitors string currents and fuses, as well the output voltage, and communicates with the supervisory system which monitors performance of solar plant.

### Scalability



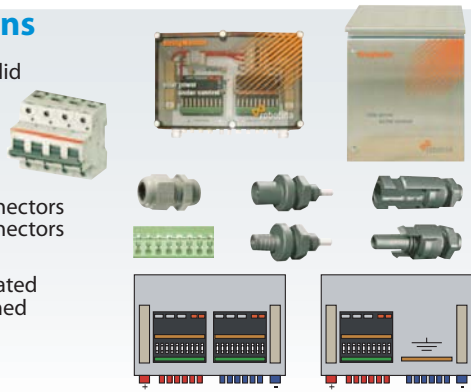
### I/O options

String monitor offers a few spare i/o lines, which may be customized for various purposes. Some examples are:

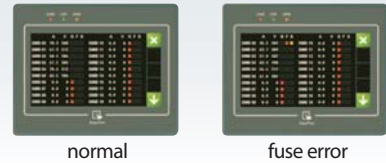
- relay:
  - panel rotation (sun tracking)
  - illumination for night maintenance
  - signal light for panel identification
  - signal light for error identification
- inputs:
  - theft protection wire (tamper switch)
  - various measurements (wind, humidity...)

### String Monitor Options

- plastic housing with transparent lid
- stainless steel housing
- no disconnect
- with disconnect switch
- cage-clamp wire terminals
- Multi-Contact Solarline MC3 connectors
- Multi-Contact Solarline MC4 connectors
- 10 or 20 strings per box
- 10+10 currents, 10+10 fuses, isolated
- 10 currents, 10 fuses, minus earthed
- side mounting ears
- pole mounting bracket



### Simple single-screen condensed status



### GSM access



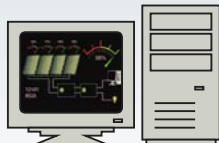
- alarm by SMS
- status and metering by SMS
- status and metering by web

### Local access



touch panel (default)

Display basic system parameters and allows to check monitor boxes and inverters.



SPSS gadget (default)

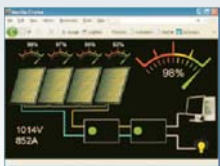
PC program to display system parameters and configuration options.



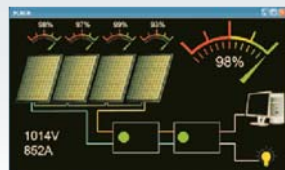
custom SCADA/OPC (optional)

Fully customized solution to display required information and graphs.

### External access



remote web server



remote SCADA/OPC custom solution

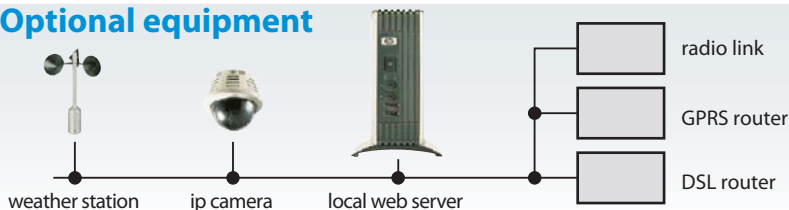


SMS access

#### Available data:

- current meter state
- current system state
- data log
- alarm log
- performance graphs
- statistical data

### Optional equipment



### Solar Control Unit with Display basic system





## Power semiconductors for photovoltaic power generation

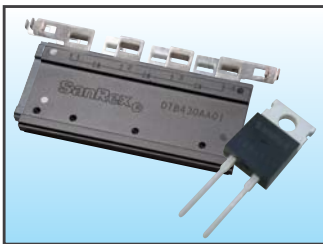
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### Power module

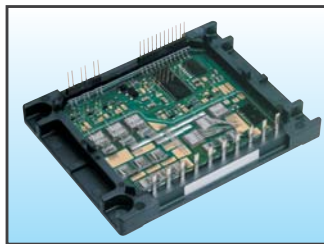
We tailor the specifications based on our customer's needs and are proud of our technological expertise in the development of our power supply equipment business. For example, our FRD (Fast Recovery Diode) corresponds to the latest HF inverter technology while our SBD (Schottky Barrier Diode) has diminished losses. Please consider our various devices which are designed and produced by the combined efforts of our two R&D business units, Power Supply Division and Semiconductor Division of Sansha Electric Mfg Co. Ltd.

### Bypass diode



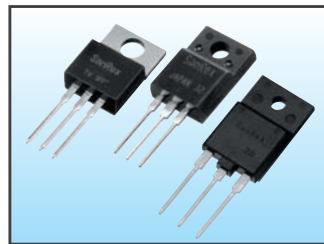
- 3 diode, 4 terminal, frame mounted panel type  
Model: DTB430AA01  
Rating: Tj=175°C 35A withstand voltage up to 1000V  
IEC61215 Ed2
- Discrete diode (TO-220)  
Model: DMG35AA100  
Rating: Tj=180°C 35A withstand voltage up to 1000V  
IEC61215 Ed2

### IPM (Intelligent Power Module)



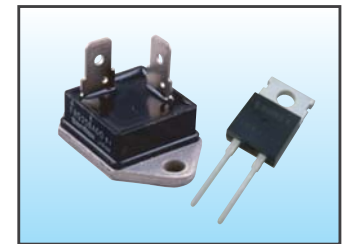
- Equivalent for 1.5kVA
- Circuit structure  
Voltage chopper + inverter + drive circuit

### High speed diode



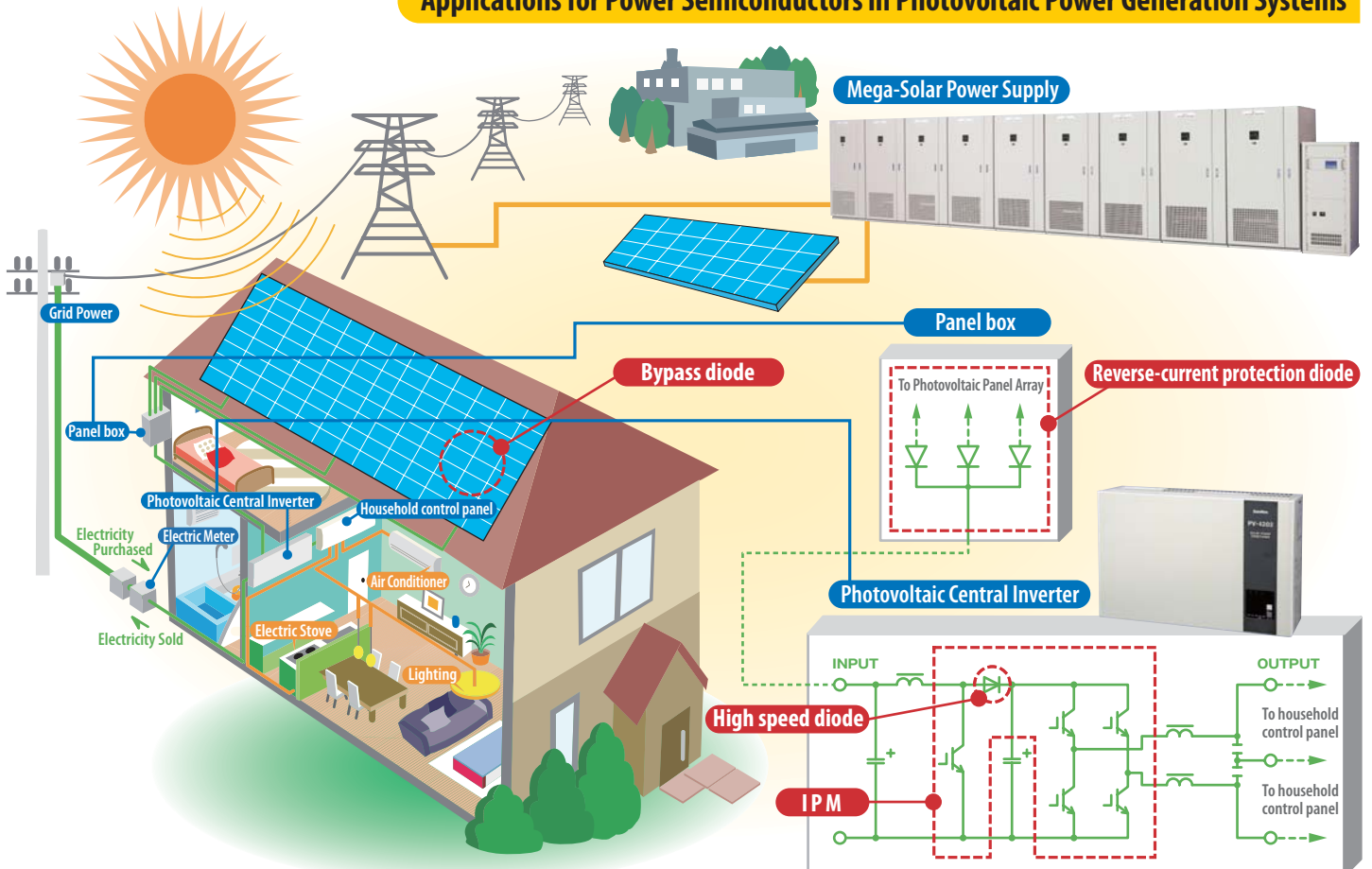
- TO-220 / TO-220F / TO-3PF
- Mainly used in chopper
- 10A 2in1 withstand voltage up to 600V

### Reverse-current protection diode



- Faston type / Panel box
- Model: DG20AA80/120
- Rating: 20A 800V/1200V
- Discrete TO-220
- Model: DMG35AA100
- Rating: 35A withstand voltage up to 1000V

## Applications for Power Semiconductors in Photovoltaic Power Generation Systems



●Osaka Plant (Small & Middle power equipment)



●Shiga Plant (Large power equipment)



●Okayama Plant (Power semiconductors)



●FOSHAN CITY SHUNDE SANREX LIMITED (China)



## Caution

Read and understand the entire Operating Manual and your employer's safety practices before installing, or using the equipment. Do not install the equipment in an area where water, high humid, steam, dust or oil are located. It may cause damage to the equipment or result in a fire or electrical shock.

- Please note that the parts such as fan or fuse needed to be replaced are chargeable when replacing. Also, keep accessory parts in a safe place.
- Please contact us if the equipment is used for any other applications not specified in this brochure.
- Specifications are subject to change without any notice.

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