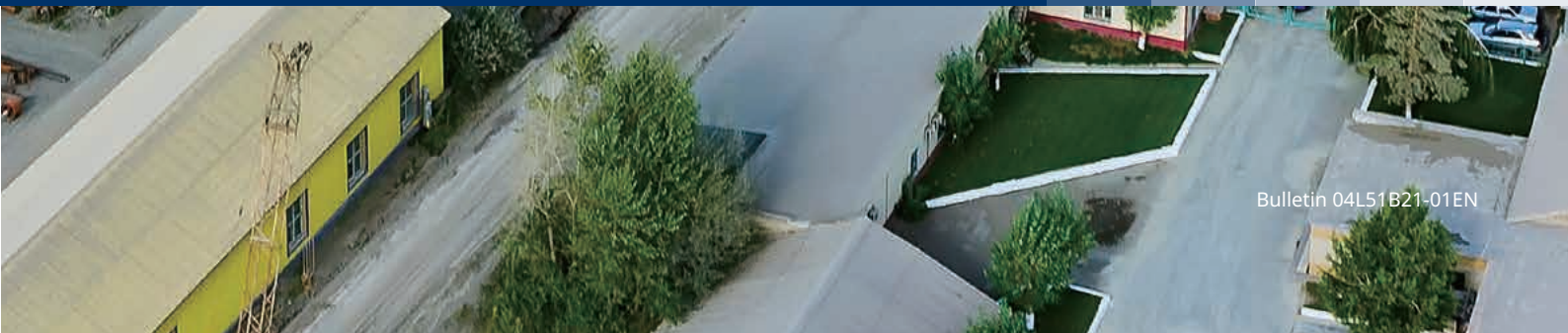**OpreX**™ Data Acquisition

# 920 MHz band wireless communication instrument series
## SMART 920

For US market only

# Want to integrate your site data and

The SMART 920 is a recorder and data logger with 920 MHz band wireless communication technology.

920 MHz wireless has a longer range than the 2.4 GHz band used in wireless LAN, and has greater reach around obstacles making it favorable for long-distances or highly obstructed environments.

**The wireless input unit (GX70SM) has expanded functionality and is easier to use.**

## It's easy to miss the forest when your data are like trees.
### *But now you see it.*

Energy

Equipment

Environment

Maintenance

Quality

Product

Safety and safety

Cost

Person

Logistics

## SMART 920 Features

- ♦ Flexible wireless (multihop) communication
- ♦ High speed, highly reliable, multichannel communication
- ♦ Communication disconnection alarms
- ♦ Wired and wireless connection
- ♦ Battery powered, installs in a variety of locations (with GX70SM)
- **NEW** ♦ Enhanced data backup function (with GX70SM)

### Realize visualization of the entire factory

With targeted use of wired and wireless you acquire more data that lets you visualize the overall factory. For example, by linking data from the main production line with environmental data, *you see the forest for the trees.*
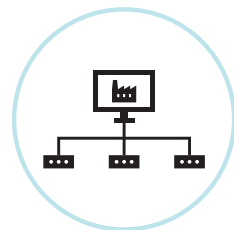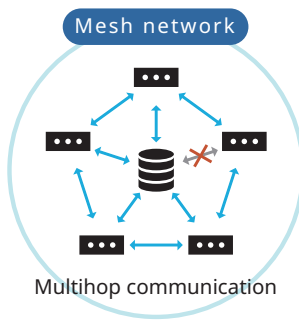
# embrace the IIoT?

## Robust communication

In a multihop network, when poor radio conditions result in lost connectivity, the signal is automatically rerouted to the optimum connection.

Mesh network

Multihop communication

## Enables long distance data acquisition

You can also send data over long distances. This allows for communication between factories and offices.

## Installation and operation made easy

Installs easily, no new network infrastructure needed. And with wireless, it's easy to move equipment around. Say goodbye to costly wiring.

Office area

Production area
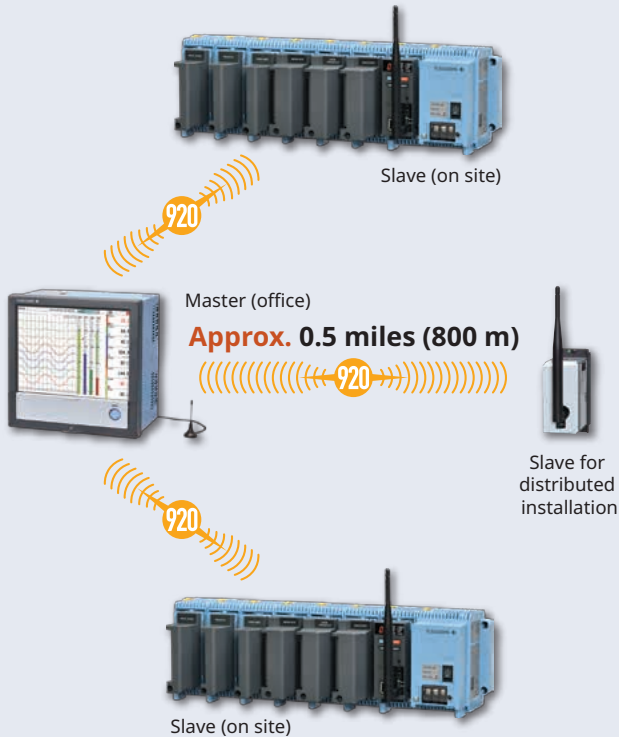
Laboratory area

Storage area
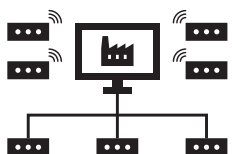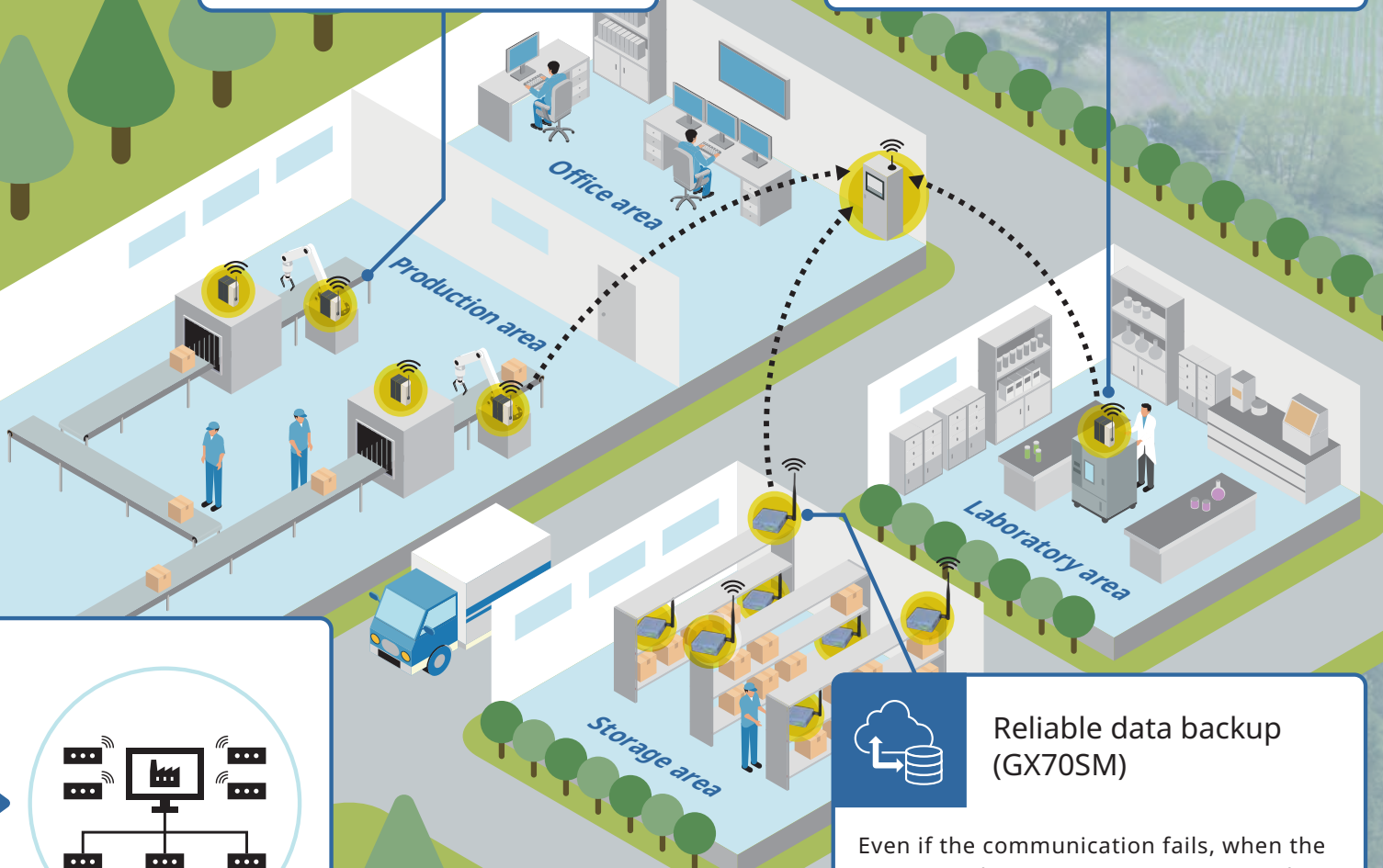
## Reliable data backup (GX70SM)

Even if the communication fails, when the interrupted communication is restored, the recorded data will be sent to the master unit and automatically restored to the PC (using the /DB option, see page 4).

# Customize how you send key data

## Stable wireless communication function



Slave (on site)

920

Master (office)
**Approx.** 0.5 miles (800 m)

920

Slave for distributed installation

920

Slave (on site)

## Automatic channel switching with multi-hop technology

**Automatically switches communication channels**



920

920

Master

920

Slave

920

920

**Up to 16 hops**
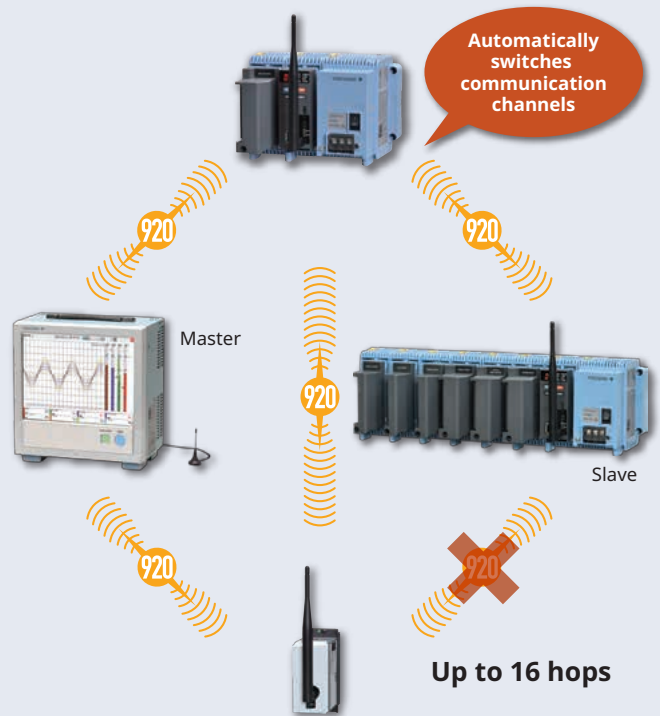
## Alarm detects and alerts when communication is lost

**Alarm detection**



920

920

**Monitoring**

Master

920

Slave

920

920

Slave
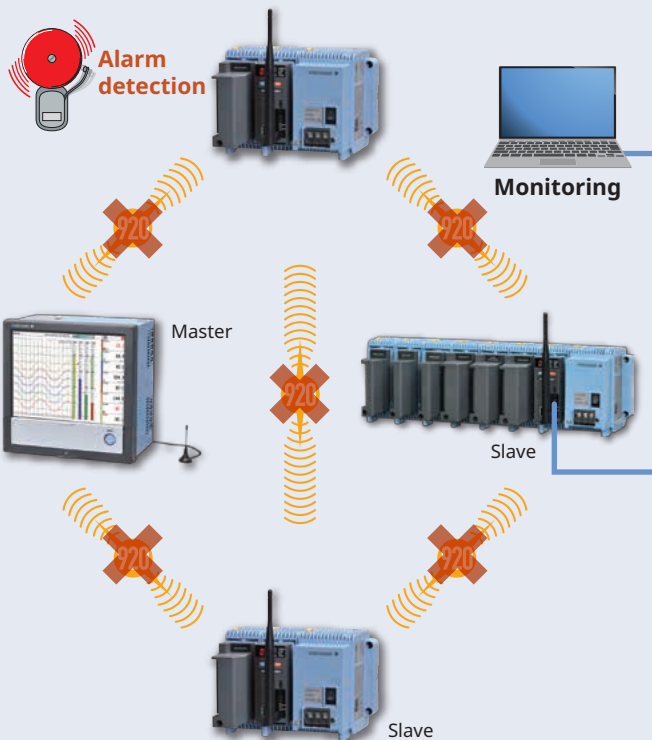
## Supports a broad range of applications from small to multi-point

Modbus master commands: Up to 100
Communication channels: Up to 500
(large memory type)

**1 sec. or less
Up to 100 units**

**Monitoring**

Slave

920

Master

920

920

920

# Enhances data visualization, status monitoring, remote monitoring, and other functions

## Features of GX70SM wireless input unit

### ● Battery powered
5-years battery life with 5 minutes scan interval (varies with operating conditions), supports USB power.

°C
%RH

### ● Multi input
2 ch of universal input, 1 ch of humidity measurement (/RH option)

### ● Single/loop calibration
Supports traceability, and input calibration by user.

### ● Secure data
Wireless terminal authentication blocks unauthorized access. Encrypted communication prevents tampering and eavesdropping.

### ● Linear scaling function
Sensor signals can be measured with linear scaling.

### ● Validation documents   NEW
Additional verification protocols are available for the GX70SM wireless module. They can be combined with the SMARTDAC+ validation document (sold separately). You can reduce validation man-hours by using the GX70SM validation document, 773230/W.


NEW

Automatic warehouse temperature and humidity control

### ● Battery status display (GX/GP/GM (master))
Displays the GX70SM battery status on trends, digital, bar graph, and other monitor screens.

001-IN1
0.00
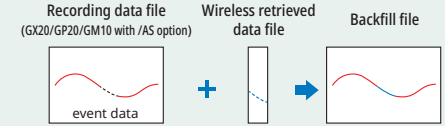
Battery low        Battery dead
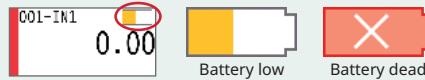
### ● Enhanced data backup function (/DB option)   NEW
The GX70SM provides redundancy for your wireless data. The module can retain 9000 points* of logged data onboard. If the wireless connection is interrupted for any reason, the missing data can be restored from the GM70SMs memory.

\* 30 days at a 5-minute scan interval

Recording data file (GX20/GP20/GM10 with /AS option)     Wireless retrieved data file      Backfill file

event data

Automatic data supplement using Interpolating PC tool (free)

### ● Installs in a variety of locations
4 installation methods
(wall mount (with screws), wall hanging, magnet, desktop)

Wall mount screw holes        Wall hanging holes

Magnet

Wall hanging holes

---
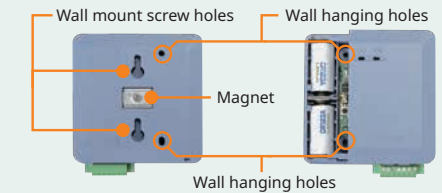
## Pharmaceutical warehouse temperature mapping and continuous monitoring

The wireless input unit (GX70SM) provides a continuous temperature mapping and recording solution in product storage areas. Plus, it can continuously monitor risk points throughout the warehouse.



Storage warehouse B        Storage warehouse C
Storage warehouse A
Wireless Input Unit (GX70SM)        Master
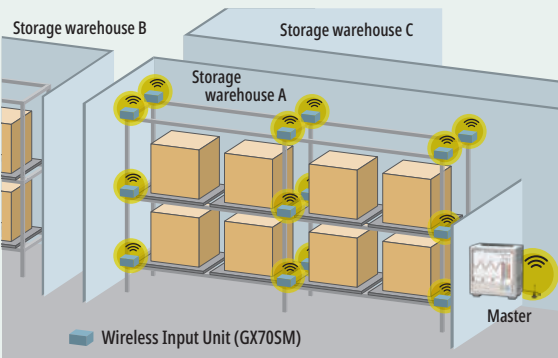
### GX70SM connectable number of units by master model

| Master | Connectable GX70SM |
|---|---|
| GX20-1 GP20-1 GM10-1 | Up to 50 units |
| GX20-2 GP20-2 GM10-2 | Up to 96 units* |

\* Max. connectable number of units of GX70SM with /DB option is 50.

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## Clean room temperature and humidity control

The GX70SM wireless input unit is battery powered, has a built-in humidity sensor, and supports user-calibration.


GX70SM

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## Measuring the WBGT value (heat index) with the SMARTDAC+

### What is the WBGT (heat index)?

This is an index proposed in the US in 1954 for preventing heatstroke.
A dedicated measuring device using a black bulb is required for accurate measurement, but in locations without direct sunlight such as factories and offices, the WBGT value can be easily determined from the temperature and humidity.

### Relationship between the WBGT value and temperature and humidity

| Temperature (°C) \ Relative humidity (%RH) | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 40 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 |
| 39 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 |
| 38 | 28 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 |
| 37 | 27 | 28 | 29 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 35 | 36 | 37 | 38 | 39 | 40 | 41 |
| 36 | 26 | 27 | 28 | 29 | 29 | 30 | 31 | 32 | 33 | 34 | 34 | 35 | 36 | 37 | 38 | 39 | 39 |
| 35 | 25 | 26 | 27 | 28 | 28 | 29 | 30 | 31 | 32 | 33 | 33 | 34 | 35 | 36 | 37 | 37 | 38 |
| 34 | 25 | 25 | 26 | 27 | 28 | 29 | 29 | 30 | 31 | 32 | 33 | 33 | 34 | 35 | 36 | 37 | 37 |
| 33 | 24 | 25 | 25 | 26 | 27 | 28 | 29 | 29 | 30 | 31 | 32 | 32 | 33 | 34 | 35 | 35 | 36 |
| 32 | 23 | 24 | 25 | 25 | 26 | 27 | 28 | 28 | 29 | 30 | 31 | 31 | 32 | 33 | 34 | 34 | 35 |
| 31 | 22 | 23 | 24 | 24 | 25 | 26 | 27 | 28 | 28 | 29 | 30 | 30 | 31 | 32 | 33 | 33 | 34 |
| 30 | 21 | 22 | 23 | 24 | 24 | 25 | 26 | 26 | 27 | 28 | 29 | 29 | 30 | 31 | 32 | 32 | 33 |
| 29 | 21 | 21 | 22 | 23 | 24 | 24 | 25 | 26 | 26 | 27 | 28 | 28 | 29 | 30 | 31 | 31 | 32 |
| 28 | 20 | 21 | 21 | 22 | 23 | 23 | 24 | 25 | 25 | 26 | 27 | 28 | 28 | 29 | 30 | 30 | 31 |
| 27 | 19 | 20 | 21 | 21 | 22 | 23 | 23 | 24 | 25 | 25 | 26 | 27 | 27 | 28 | 29 | 29 | 30 |
| 26 | 18 | 19 | 20 | 20 | 21 | 22 | 22 | 23 | 24 | 24 | 25 | 26 | 26 | 27 | 28 | 28 | 29 |
| 25 | 18 | 18 | 19 | 20 | 20 | 21 | 22 | 22 | 23 | 23 | 24 | 25 | 25 | 26 | 27 | 27 | 28 |
| 24 | 17 | 18 | 18 | 19 | 19 | 20 | 21 | 21 | 22 | 22 | 23 | 24 | 24 | 25 | 26 | 26 | 27 |
| 23 | 16 | 17 | 17 | 18 | 19 | 19 | 20 | 20 | 21 | 22 | 22 | 23 | 23 | 24 | 25 | 25 | 26 |
| 22 | 15 | 16 | 17 | 17 | 18 | 18 | 19 | 19 | 20 | 21 | 21 | 22 | 22 | 23 | 24 | 24 | 25 |
| 21 | 15 | 15 | 16 | 16 | 17 | 17 | 18 | 18 | 19 | 19 | 20 | 20 | 21 | 21 | 22 | 23 | 24 |

| WBGT value | Alarm 25°C~ | Critical alarm 28°C~ | Danger 31°C~ |
|---|---|---|---|

\* From the Japan Society of Biometeorology "Preventative index for heat stroke in daily life" version 3

### Improve the factory working environment


GX70SM

Superior response to sharp temperature changes. Contributes to temperature and humidity control, and helps prevent heatstroke.
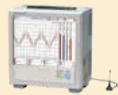
# Select from the lineup according to your installation environment

■ **As a parent device...** **GX20**     **GP20**     **GM10**

A 920 MHz wireless communication parent device can easily acquire and record data wirelessly from child devices.

■ **As a relay...** **GM10**     **UT52A/UT32A**

Comes with relay functionality.

■ **As a child device...** **GX70SM**     **GM10**     **UT52A/UT32A**

Wirelessly transmits measured data to a parent device or relay. Wall mount, desktop, and other space-saving installation options available. (GX70SM)
Multi-function I/O device for wireless monitoring (PID control or ladder program computation function, and a serial gateway function). (UT52A/UT32A)

## GX20 Model and Suffix code

| Model | Suffix Code | Optional code | Description |
|---|---|---|---|
| GX20 | | | Paperless recorder (Panel mount type, Large display) [*1] |
| Type | -1 | | Standard (Max. measurement channels: 100 ch) |
| | -2 | | Large memory (Max. measurement channels: 500 ch) |
| Display language | E | | English, degF, DST (summer/winter time) [*2] |
| Optional features | | /AH | Aerospace heat treatment |
| | | /AS | Advanced security function (Part 11) |
| | | /BC | Black cover |
| | | /BT | Multi-batch function |
| | | /C2 | RS-232 [*3] |
| | | /C3 | RS-422/485 [*3] |
| | | /CG | Custom display [*4] |
| | | /D5 | VGA output |
| | | /E1 | EtherNet/IP communication (PLC communication protocol) |
| | | /E2 | WT communication [*5] |
| | | /E3 | OPC-UA server |
| | | /E4 | SLMP communication (Mitsubishi PLC) |
| | | /FL | Fail output, 1 point |
| | | /LG | Log scale |
| | | /MT | Mathematical function (with report function) [*6][*7] |
| | | /MC | Communication channel function [*8] |
| | | /P1 | 24 V DC/AC power supply |
| | | /PG | Program control function |
| | | /UH | USB interface (Host 2 ports) |
| | | /CM2 | 920 MHz wireless communication (master function) [*3][*8] |

*1 To connect an expandable I/O, GM sub unit, you will need one expansion module for the GX.
*2 The Display language is selectable.
    To confirm the current available languages, please visit the following website.
    URL: http://www.yokogawa.com/ns/language/
*3 /C2, /C3 and /CM2 cannot be specified together.
*4 Creating custom displays requires DXA170 DAQStudio (sold separately). (GX does not have a creation function.)
*5 /MC option must be separately specified when the WT communication is selected.
*6 Optional code /MT (MATH) required if using the GX90XD's or GX90WD's pulse input.
*7 The /MT option (computation) is required to perform pulse integration on GX90XP pulse input modules.
*8 If you want to load data from other devices into the GX using Modbus client, a communication channel (/MC) is required.

## GP20 Model and Suffix code

| Model | Suffix Code | Optional code | Description |
|---|---|---|---|
| GP20 | | | Paperless recorder (Panel mount type, Large display) [*1] |
| Type | -1 | | Standard (Max. measurement channels: 100 ch) |
| | -2 | | Large memory (Max. measurement channels: 500 ch) |
| Display language | E | | English, degF, DST (summer/winter time) [*2] |
| Power supply | 1 | | 100 V AC, 240 V AC |
| Power cord | D | | Power cord UL/CSA standard |
| Optional features | | /AH | Aerospace heat treatment |
| | | /AS | Advanced security function (Part 11) |
| | | /BT | Multi-batch function |
| | | /C2 | RS-232 [*3] |
| | | /C3 | RS-422/485 [*3] |
| | | /CG | Custom display [*4] |
| | | /D5 | VGA output |
| | | /E1 | EtherNet/IP communication (PLC communication protocol) |
| | | /E2 | WT communication [*5] |
| | | /E3 | OPC-UA server |
| | | /E4 | SLMP communication (Mitsubishi PLC) |
| | | /FL | Fail output, 1 point |
| | | /LG | Log scale |
| | | /MT | Mathematical function (with report function) [*6][*7] |
| | | /MC | Communication channel function [*8] |
| | | /UH | USB interface (Host 2 ports) |
| | | /CM2 | 920 MHz wireless communication (master function) [*3][*8] |

*1 To connect an expandable I/O, GM sub unit, you will need one expansion module for the GP.
*2 The Display language is selectable.
    To confirm the current available languages, please visit the following website.
    URL: http://www.yokogawa.com/ns/language/
*3 /C2, /C3 and /CM2 cannot be specified together.
*4 Creating custom displays requires DXA170 DAQStudio (sold separately). (GX does not have a creation function.)
*5 /MC option must be separately specified when the WT communication is selected.
*6 Optional code /MT (MATH) required if using the GX90XD's or GX90WD's pulse input.
*7 The /MT option (computation) is required to perform pulse integration on GX90XP pulse input modules.
*8 If you want to load data from other devices into the GX using Modbus client, a communication channel (/MC) is required.

## I/O module

Inputs and outputs of SMARTDAC+ series GX/GP/GM are modular for easy expandability.
For the GX90□□I/O modules, GX60 expansion unit, GX90EX expansion modules, GM90MB moule base, add-ons and accessories, see the GX/GP or GM catalogs. GX/GP catalogs No.: Bulletin 04L51B01-01EN
GM catalogs No.: Bulletin 04L55B01-01EN

## GM10 Model and Suffix code

| Model | Suffix code | | Optional code | Description |
|---|---|---|---|---|
| GM10 | | | | Data Acquisition Module for SMARTDAC+ GM |
| Type | -1 | | | Standard (Max. measurement channels: 100 ch) |
| | -2 | | | Large memory (Max. measurement channels: 500 ch) |
| Area | E | | | General |
| – | | 0 | | Always zero |
| Optional features | | | /AH | Aerospace heat treatment |
| | | | /AS | Advanced security function |
| | | | /BT | Multi-batch function |
| | | | /C3 | RS-422/485 [*1] |
| | | | /C8 | Bluetooth |
| | | | /E1 | EtherNet/IP communication (PLC communication protocol) |
| | | | /E2 | WT communication [*2] |
| | | | /E3 | OPC-UA sever |
| | | | /E4 | SLMP communication (Mitsubishi PLC) |
| | | | /MT | Mathematical function (with report function) [*3][*4] |
| | | | /MC | Communication channel function [*5] |
| | | | /LG | Log scale |
| | | | /PG | Program control function |
| | | | /CM2 | 920 MHz wireless communication (master function) [*1][*5] |
| | | | /CS2 | 920 MHz wireless communication (slave function) [*1][*5] |
| | | | /WH | Integration bar graph function [*6] |

*1 /C3, /CM2 and /CS2 cannot be specified together.
*2 Communication channel function (/MC option) must be specified at the same time with WT communication.
*3 Optional code /MT (MATH) required if using the GX90XD's or GX90WD's pulse input.
*4 Optional code /MT (MATH) required if using the GX90XP's pulse integration.
*5 If you want to load data from other devices into the GM using Modbus client, a communication channel (/MC) is required.
*6 If you specify /WH option, you must also specify the communication channel function (/MC option) and the mathematical function (/MT option).

## GM90PS Model and Suffix code

For 100–240 VAC power (inlet), GM90PS-1N1D0/W
For 100–240 VAC power (M4 screw), GM90PS-1N1W0/W
For 12 -28 VDC power (M4 screw), GM90PS-1N2W0/W

When using with GM10 (/WH option), it is necessary to specify the /WH option (for integrated bar graph function) for GM90PS.

## UT52A Model and Suffix code

**UT52A-00B-11-00/MDL**
Optional suffix codes : /DC, /CT

* For details on the UT52A, see the UT52A (DIN rail type) general specifications (GS 05P01C81-01EN).

## UT32A Model and Suffix code

**UT32A-00B-11-00/MDL**
Optional suffix codes : /DC, /CT, /CV

* For details on the UT32A, see the UT32A (DIN rail type) general specifications (GS 05P01C81-01EN).

## Validation document (for the GX70SM)

Additional verification protocols are available for the GX70SM wireless module. They can be combined with the SMARTDAC+ validation document (sold separately). You can reduce validation man-hours by using the GX70SM validation document, 773230/W.

## GX70SM Model and Suffix code

| Model | Suffix code | | Optional code | Description |
|---|---|---|---|---|
| GX70SM | | | | Wireless Input Unit |
| Number of channels | -2 | | | 2 channels |
| Type | -L0 | | | Universal input, scanner type (isolation between channels) |
| – | | N | | Always N |
| Terminal type | | -C | | Clamp terminal |
| Area | | | A | US, FCC approved product |
| Option | | | /RH | Built-in humidity sensor, 1 channel |
| | | | /DB | Enhanced data backup function [*1] |

*1 To use the backfill function, the following conditions are required for the master unit (GX20, GP20 or GM10).
  • Firmware version R4.09 or later
  • Wireless communications module version v4.4.0 or later
  • /AS option enabled
Standard Accessories: Manual, Magnet, Screw
* Batteries are not included. Please obtain them separately (recommended battery anufacturer: Panasonic)

## Accessories

**Sleeve antenna**
(Part no. : A1061ER)

Connectable models:
GX20/GP20, GM10, GX70SM, UT52A/UT32A

Used when installing with the main unit, such as inside the casing. For indoor use.

**Rooftop antenna**
(Part no. : A1062ER)

Connectable models:
GX20/GP20, GM10, GX70SM, UT52A/UT32A

For use when installing separately from the main unit. Can be used outdoors.

**Input terminal block**
(Part no. : A2226JT)

The input terminals on the GX70SM wireless input unit. (1 comes standard with the wireless input unit GX70SM)

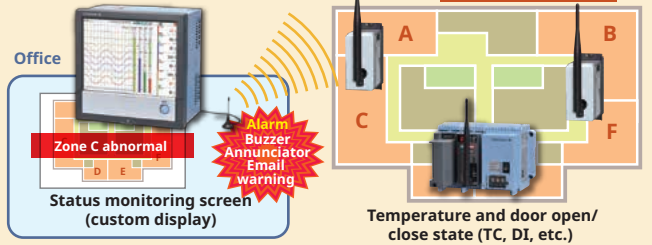**Wall Mount Bracket for UT52A/UT32A** (Model: UTAP005)

Use for wall-mounting the UT52A/UT32A.
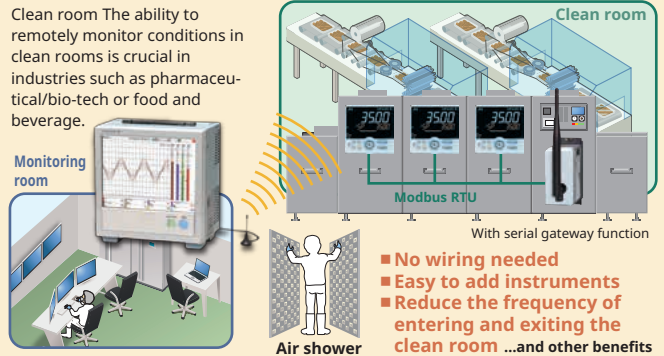
# Visualization at various sites

## Storage warehouse door state and temperature monitoring

Monitor the temperature of the warehouse and check whether the door is open right from the office. Customize your display for immediate grasp of conditions.

**Office**

**Status monitoring screen (custom display)**

Zone C abnormal

Alarm Buzzer Annunciator Email warning

**Storage warehouse**

Handling precautions

A    B
C    F

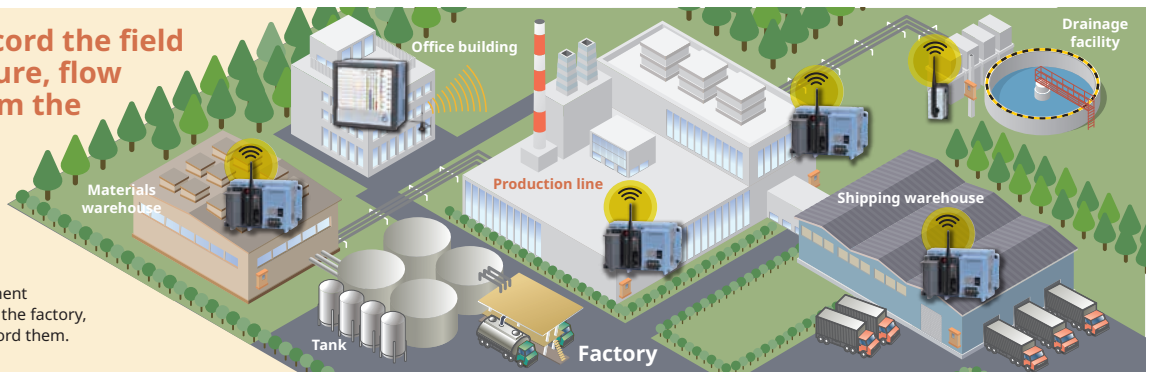**Temperature and door open/close state (TC, DI, etc.)**

## Remotely Monitor Operating Conditions

Clean room The ability to remotely monitor conditions in clean rooms is crucial in industries such as pharmaceutical/bio-tech or food and beverage.

**Monitoring room**

**Clean room**

Modbus RTU

With serial gateway function

**Air shower**

- No wiring needed
- Easy to add instruments
- Reduce the frequency of entering and exiting the clean room ...and other benefits

## Monitor and record the field data (temperature, flow and pH etc.) from the office building

Wirelessly connect to the temperature, flow, and pH values displayed on measurement panels distributed throughout the factory, and remotely monitor and record them.

**Office building**

**Drainage facility**

**Materials warehouse**

**Production line**

**Shipping warehouse**

**Tank**

**Factory**

**Notes on 920 MHz Wireless Communication**
This equipment is designed for use in the US only and cannot be used in any other country.
- Communication may not be possible in the following locations due to radio signal reflection.
  - Where strong magnetic field, static electricity, or radio interference occurs.
  - Rooms with metallic walls (including concrete containing metal reinforcement material), inside cabinets, etc.
- If another wireless device using the same radio frequency band as this product is present in the communication area of this product, data rate degradation or communication errors may occur, preventing normal communication.
- This product has obtained KC marking. As such, the following acts may be punishable by law.
  - Disassembling or altering the product.
  - Removing the certification label.
  - Using an antenna other than the specified option.
- Because this product uses radio signals, bear in mind that communication may be intercepted by third parties.

## Web site
**https://www.yokogawa.com/ns/smart920/**

## User Registration Request

Thank you for purchasing YOKOGAWA products. Please register to the following Partner Portal Member Site. You can use various services such as confirmation of purchased product information, download of related materials, and newsletter. **https://partner.yokogawa.com/global/**

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