Laplace System

30th ANNIVERSARY

Smart terminal block

FLIPLINK

Novel and rational measuring instruments

DI
Digital Input
FLIPLINK DI

DO
Digital Output
FLIPLINK DO

AI
Analog Input
FLIPLINK AI

Wiring saving Space saving

LED display

Low cost

USB connection

Patent pending

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Product specifications are as of March 2021.
The specifications may change without prior notice.

Smart terminal block

FLIPLINK

Reduce the measurement hurdles at once

FLIPLINK is a terminal block type measuring instrument.
Taking advantage of its simplicity and compactness, we have realized a variety of measurement ideas at low cost.

Flexible scalability significantly reduces troublesome wiring work.
Especially, the compatibility with the storage panel is excellent, and an efficient measurement system can be easily constructed.

Owing to its overwhelming cost performance and ease of handling, we can dramatically reduce the hurdles of building a measurement system, which had been able to be actualized only by specialists, and enable users to devote themselves to the use of acquired data. With a wealth of software, we facilitates measurement and data analysis.

Lineup

3 types are available: Digital input (DI), Digital output (DO) and Analog input (AI).

DI	DO	AI
Digital Input	Digital Output	Analog Input
FLIPLINK DI	FLIPLINK DO	FLIPLINK AI

Future development plans
Pulse input, thermocouple, RTD

In addition, we plan to gradually expand the scope of measurement in the future.

Features of FLIPLINK

Compact

Although the dimensions and shapes are almost the same as those of ordinary terminal blocks, they have measurement functions, communication functions, and power supply functions (USB power supply), and even if they are used alone, they function as measuring instruments.

Compact yet solid specifications.
Simple, easy-to-handle, overrides the image of conventional general measuring instruments.

Specifications

FLIPLINK DI : 16 digital signals can be measured
FLIPLINK DO : 16 digital signals can be output
FLIPLINK AI : 8 analog signals of 4-20mA/1-5V can be measured

Compatible with analog-output **4-20mA / 1-5V,** which are widely used as sensor outputs and control signals

Same as the number of measurement points and output points of conventional general measuring instruments FLIPLINK AI has a resolution of 12 bits.

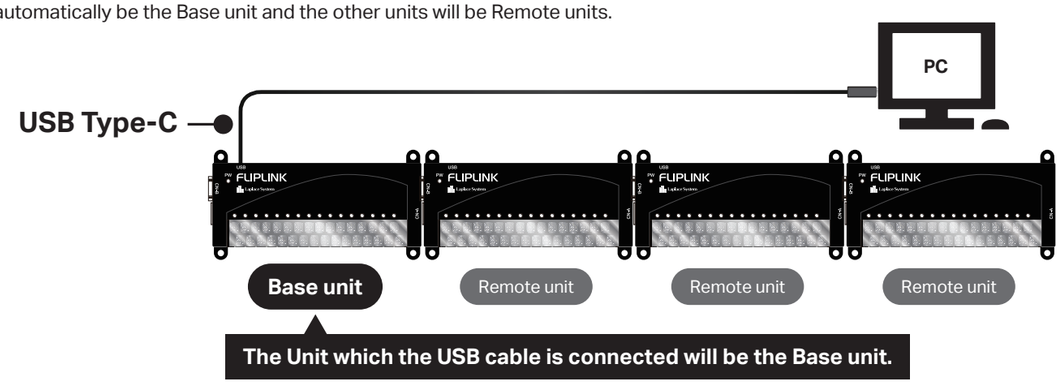
Wide range of compatible sensors

USB connection

USB connection (Type-C) , which is innovative for a measuring instrument, is used.
You can connect to any measurement terminal or PC model. Because up to 4 units can be operated by USB power supply is not required.

*A separate power supply is required for connection of more than 5 units.

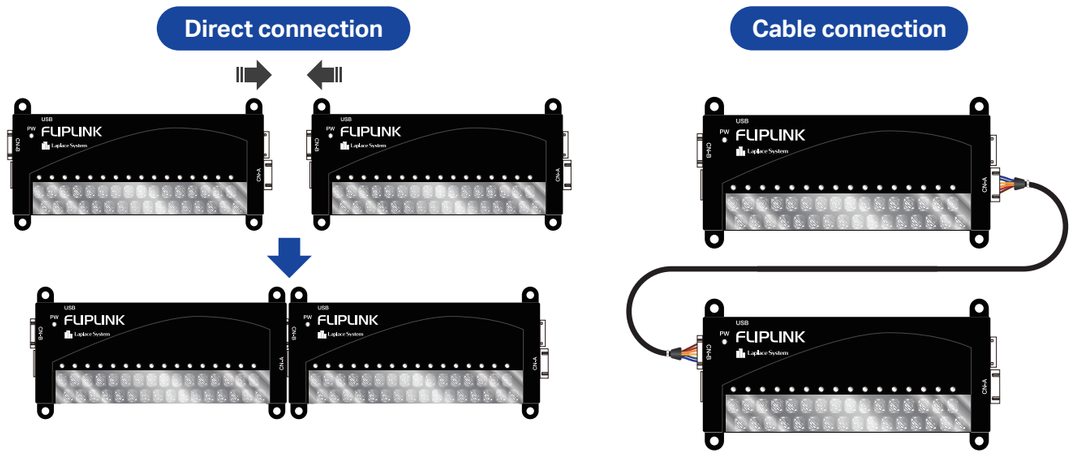
If 2 or more units are connected, USB cabling can be connected to one of the units, and it will automatically be the Base unit and the other units will be Remote units.



Features of FLIPLINK

Interconnection

Direct connection or cable connection between the main units is possible, and special equipment for connection is unnecessary. Different types can be connected, and the system can be configured freely and flexibly.



Can be connected in a mixture of different types

Connection example

▲ Analog input: 16 points, digital input: 16 points

▲ Digital input:32 points, digital output: 16 points

LED display

The presence or absence of a signal is grasped at a glance by LED on the signal terminal.
In analog measurement, the signal level is expressed in different colors.

Digital signal

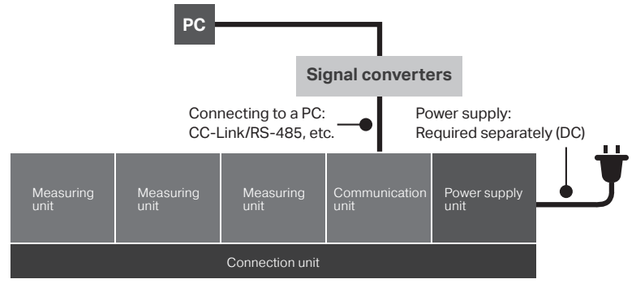
Check the status of the input signal.

Analog signal

Lighting color changes according to signal level.

Comparison with conventional general measuring instruments

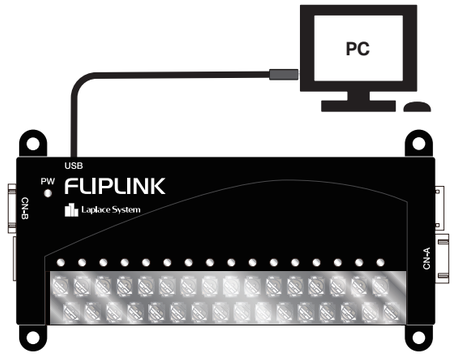
Conventional general measuring instruments



- In addition to the measurement unit, a combination of multiple units such as communication (CPU)/ power supply/base unit are required.
- Communication standards are often CC-Link and RS-485, and signal converters are required for communication with PCs.
- A separate DC power supply is required.
- Limit the number of connections

FLIPLINK

Compared with conventional general measuring instruments, the scalability is high, and the combination and connection are flexible.



USB connection / Up to 4 units powered with 1 power supply

- No need for communication, power supply, base unit, etc
- Up to 4 units are powered by USB with 1 power supply
- Connect to PC with USB cable (no need for signal converter, etc.)
- Direct connection between units (cable connection is also possible)
- Base unit can be changed by USB connection
- By freely combining different types in different orders

Lower Price

By simplifying the design, the cost is lower than that of conventional general measuring instruments. No additional units are required. Furthermore, the integration of the measuring instrument and terminal block eliminates the need for an enormous amount of signal lines, greatly reducing cable costs.

- ☑ **Simple design**
- ☑ **Compact storage panel**
- ☑ **No need for additional units**
- ☑ **No need for terminal block**
- ☑ **Significant reduction in wiring labor costs**
- ☑ **Significant reduction in cable costs**

Embedding in the storage panel

Necessity of the storage panel

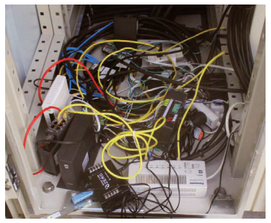
Direct wiring of signal wires to bare measuring instruments is rare for continuous and long-term measurement sites.
It is common to store the measuring instrument, etc. in the storage panel and receive the signal line with the terminal block for wiring.

When not installed in the storage panel

Occurrence of human-induced troubles

Obstacles such as dust

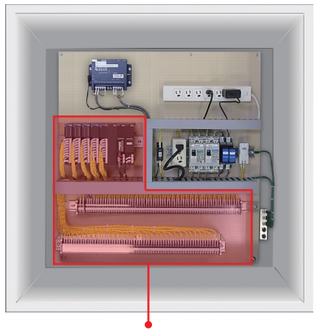
could be caused



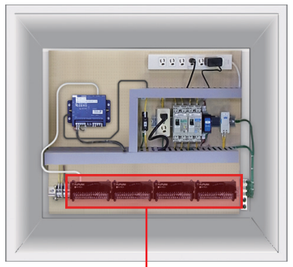
Possibility of human-induced troubles

Downsizing the storage panel

The size of the storage panel can be reduced by integrating the measuring instrument with the terminal block.



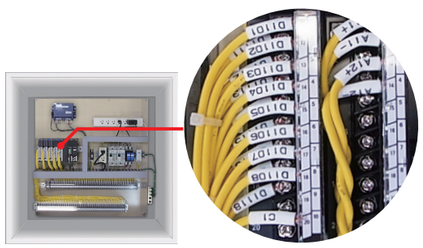
64-points measurement



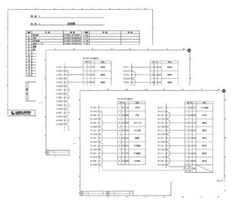
64-points measurement

Abbreviation of wiring work

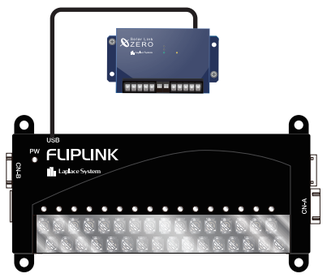
Wiring of signal lines in the panel is unnecessary, which helps to save labor and reduce wiring errors. USB connection to the measurement terminal is possible, and direct connection between FLIPLINK is possible.



Extensive signal lines are required



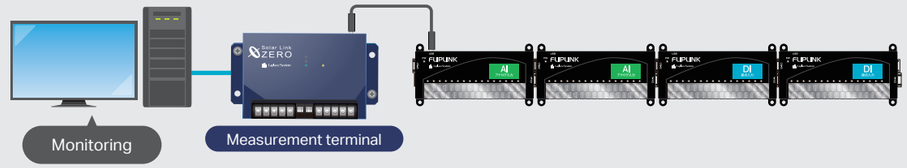
Signal wiring diagram



Signal lines and wiring diagrams are not required.

Ideas for FLIPLINK use

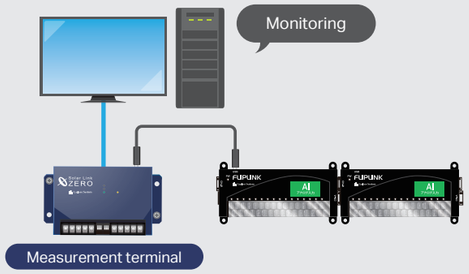
Central monitoring of buildings



Digital 32 points
Analog 16 points

1 floor measurement	**Digital monitoring 20 points** Breaker 10 points, safety 4 points, opening/closing of door 6 points	**Analog monitoring 10 points** CT power consumption 6 points and room temperature monitoring 4 points
2 floor measurement	**Digital monitoring 12 points** Breaker 8 points, safety 2 points, opening/closing of door 2 points	**Analog monitoring 6 points** CT power consumption 4 points and room temperature monitoring 2 points

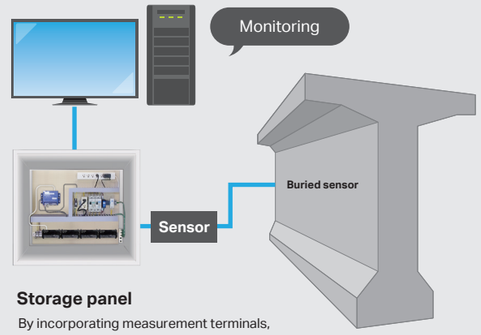
Monitoring in green houses



Analog monitoring 13 points

Pyrheliometer 1 point, thermometer 4 points, CO_2 densitometer 1 point, Soil moisture meter 4 points, EC meter 3 points

Corrosion monitoring



Storage panel

By incorporating measurement terminals, FLIPLINK and other required equipment

Other examples of use

Agriculture

Target **Solar radiation intensity, temperature, soil moisture, pH**

In order to equalize the amount and quality of crops, environmental information on scattered agricultural land is collected and analyzed, and farming independent of experience value is carried out.

Factory

Target **Pump pressure, fan air volume, hydraulic pressure, torque rotation, motor vibration**

Measuring component movements of equipment leads to the maintenance of machineries and equipment and the hazard prediction.

Refrigerated warehouses, trucks, restaurants

Target **Temperature, opening/closing of door**

For appropriate temperature control of foodstuffs, temperature and opening/closing of door information in freezers and refrigerators will be summarized and used for appropriate equipment maintenance and history information publication, etc.

Target **Intrusion sensor (digital input), patrol light (digital output)**

By cooperating with the intrusion sensor, the intrusion of the offender is detected, and the lighting of the patrol light and the notification of an abnormal situation are carried out.

Station

Target **Operating hours, operating conditions, faults, and number of operations**

Monitoring and maintenance of automatic platform gates installed at stations

Local governments

Target **Strain, temperature and humidity**

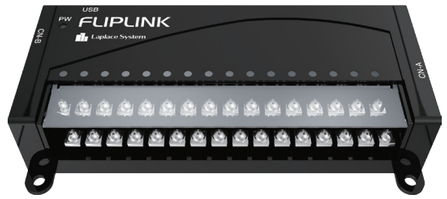
In order to reduce the maintenance and management costs of infrastructure (bridges, roads, tunnels, etc.) and to save labor, collect information scattered throughout the area and carry out efficient maintenance.

Patterns of providing

FLIPLINK alone

For the development of original monitoring and control systems

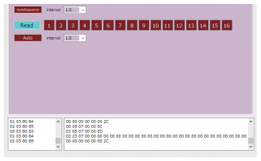
By using FLIPLINK protocol that is disclosed, you can develop the software freely according to your application.
User tools that can be used to develop software and monitoring software that can be easily measured and displayed can also be provided.



User Tools

Provide tools to support software development

FLIPLINK operation can be checked with a dedicated tool.
In addition to the common screen, the dedicated screen matches the device connected to the PC (DI/DO/AI) is displayed to check whether communication status and the input/output status of the terminals.



DO-dedicated screen

AI-dedicated screen

User Tool (when FLIPLINK DI is connected)

Monitoring software

Under development

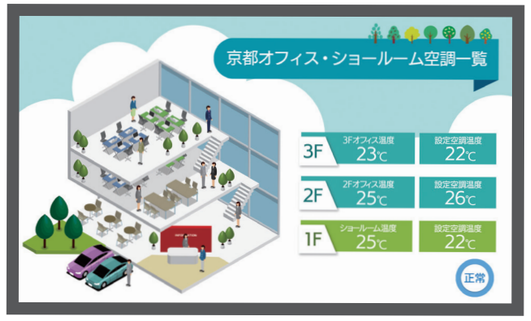
Provide software that allows easy measurement and display

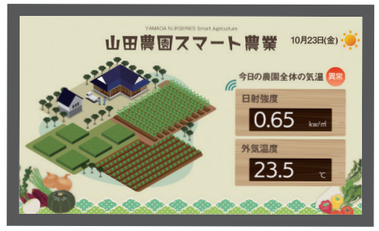
Monitoring software is offered to those who wish to carry out simple measurement and display. You can start monitoring immediately by downloading the software to your PC and connecting FLIPLINK to your PC.

*PC is not included in the offering

Image of the monitoring screen

*May differ from the actual specifications.





The display contents can be edited by the customer.
In addition to numerical display of measured data, it is also possible to output forms.

Package

Under development

Provide a suite of measuring instruments together

FLIPLINK and other measuring instruments are installed in the storage panel.

Storage panel (FLIPLINK + a set of measuring instruments)

- FLIPLINK (Up to 2 units)
- A set of measuring instruments (measurement terminal, power supply)

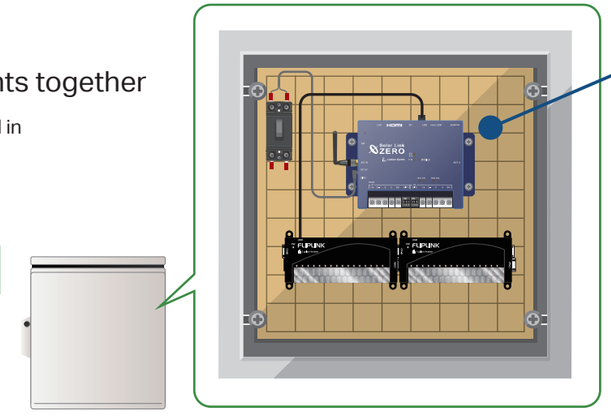


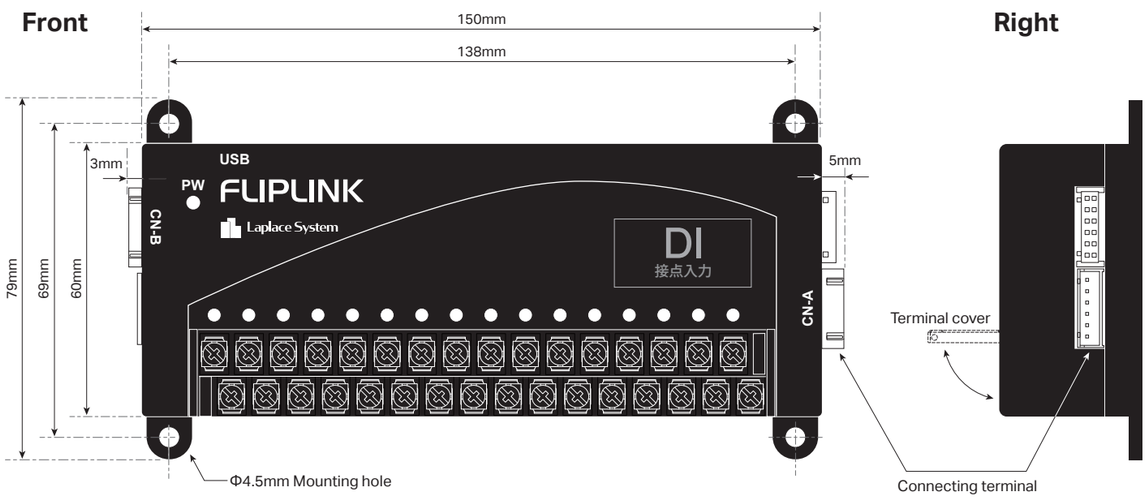
Image of the storage panel (for FLIPLINK 2 units)

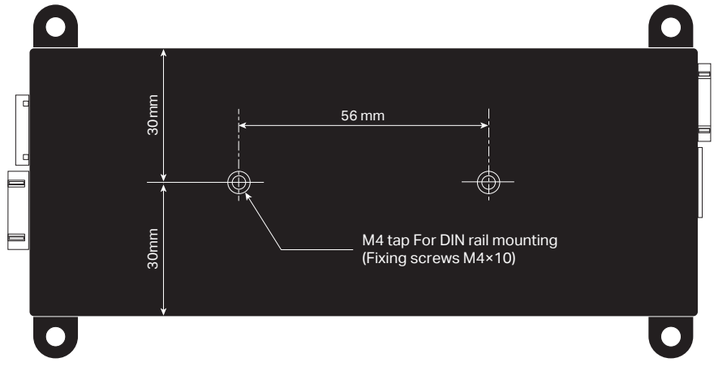
Provided with a compact measurement terminal

This system incorporates a compact measurement terminal that can be placed in a storage panel. If you use the measurement terminal, it is unnecessary to keep the PCs running to receive FLIPLINK measurement values at all times.

Specification

Appearance and name of each section

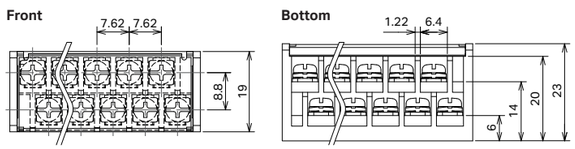




Details

Common specification

Controller	32 bits ARM MCU 96MHz Clock, 256KB flash, 96KB SRAM, USB2.0
Interface to the host	USB Type-C connector × 1 (Communication with measurement terminal and power supply)
Power	DC5V(Allowable range 4.5 to 5.25V) Up to 4 units can be operated by supplying 500mA from USB connector
Power consumption	AI/DI: 0.6 W or less (5V 120mA) DO : 0.5 W or less (5V 100mA)
Connection terminal	6 poles × 4 (Communication and Power Supply between units)
Consolidated units	4 units
Connection method	Connecting the main unit using the right and left connecting terminals, or connecting the main unit using a dedicated cable
I/O terminals	32 poles (Refer to type-specific specifications for terminal assignment) Biss Size: M3 (Recommended Tightening Torque: 0.5N・m) Pitch between terminals: 7.62mm (Size of pressure terminals is less than 6.4mm)



External dimensions (mm)	W150×H60×D32 (Excluding the protrusion of the mounting-hole ear and connecting)
Mass	Approx. 170 g
Material	Body: Polycarbonate + ABS resin Terminal block cover/Light guide rod: Polycarbonate
Degree of protection	IP20 equivalent
Operation Storage Environment	Temperature range:-20 to 60℃ (No condensation) Humidity range: 10 to 90% RH (No condensation)
Conforming standard	RoHS2
Insulation performance (Insulation method)	Isolate the photocoupler between the I/O terminals and the control circuit (Not isolated between the I/O terminals) Isolated DC/DC is applied to the power supply
PW LED(Yellow green)	Display the status by lighting or blinking (Control by controller)
Status display LED	DI : 16 pieces in red (Corresponding LED lights when digital input signal is ON) DO : 16 pieces in red (Corresponding LED lights when digital output signal is ON) AI : 8 pieces in RGB (Corresponding LED lights up when a signal within the measuring range is received)
Installation method	Screw-in or DIN-rail mounting using OMRON's Y92F-90

Specifications by type

Digital input (DI) FLIP-DI16A	
Input signal	Non-voltage digital input Internal power supply: DC3OOB, 3mA
ON voltage ON current	3V or less/3 mA or more
OFF voltage OFF current	4V or more/0.3mA or less
Number of input channels	16ch Not isolated between channels, negative common
Power consumption	0.6W or less (5V 120mA)
Input terminal specifications	16ch × 2 poles each

Digital output (DO) FLIP-DO16A	
Output signal	Open drain non-voltage digital output
Output ratings	DC 30V total 1.3W(max/25℃) (e.g.) 24V 0.05A or less 12V 0.1A or less 5V 0.26A or less
ON resistance	29mΩ or less
Number of output channels	16ch Not isolated between channels, negative common
Power consumption	0.5W or less (5V 100mA)
Output terminal specifications	16ch × 2 poles each

Analog input (AI) FLIP-AI08A	
Input signal	Direct current DC4～20mA input resistance approx. 240Ω DC voltage DC1 to 5V Input impedance 1MΩ or more
Number of input channels	8ch (Non-isolated, current and voltage between each channel are switched mode by software)
AD converter	12bit
Input accuracy	±0.2%fs or less *fs represents full scale, each value indicates the error at the maximum range
Temperature coefficient	±0.005%/℃ *For input accuracy with 25℃ as standard, an error equivalent to the input accuracy is added for a temperature change of 1℃
Power consumption	0.6W or less (5V 120mA)
Input terminal specifications	8ch × 2 poles each (16 poles are NC)

Operation Check Environment

*No inspection or operation check has been performed under other environments.

FLIPLINK

OS : Windows10

User Tools

OS : Windows10

PC : Amount of CPU/ memory/ HDD that the above OS operates comfortably