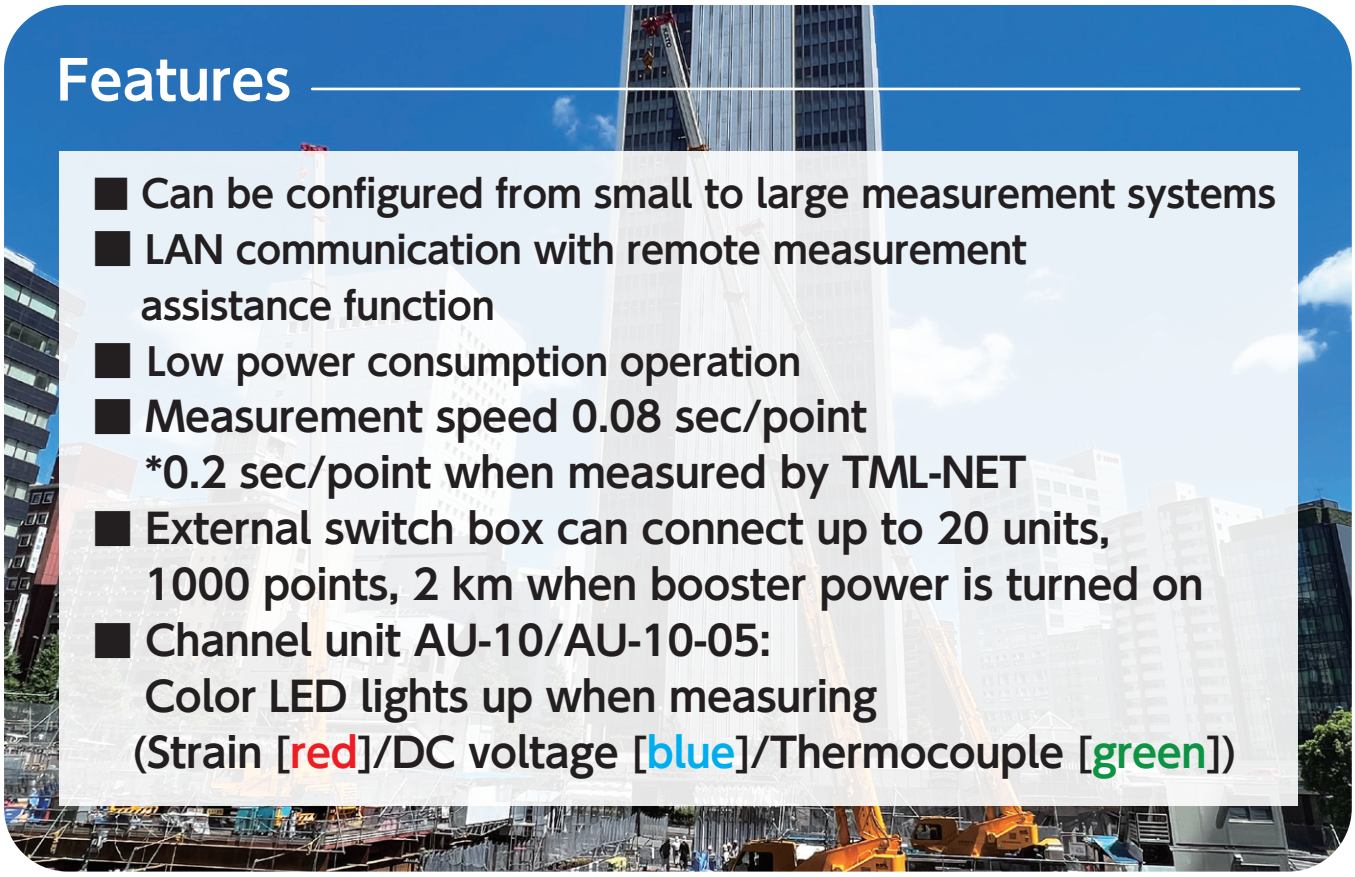
TML

Data logger for various on-site measurements

PORTABLE DATA LOGGER TS-360

Tokyo Measuring Instruments Laboratory Co., Ltd.

T-ZACCS 3 PORTABLE DATA LOGGER TS-360



Features

- Can be configured from small to large measurement systems
- LAN communication with remote measurement assistance function
- Low power consumption operation
- Measurement speed 0.08 sec/point
  *0.2 sec/point when measured by TML-NET
- External switch box can connect up to 20 units, 1000 points, 2 km when booster power is turned on
- Channel unit AU-10/AU-10-05:
  Color LED lights up when measuring
  (Strain [red]/DC voltage [blue]/Thermocouple [green])

Point

1. Up to 1000 points

Number of measurement points up to 50 points connected to the main unit

External connection: up to 1000 points total

2. LAN interface as standard

Remote control is available!

3. TML-NET Compatible

100 units can be connected with TML-NET

4. Connection to Switching box

T-ZACCS BOX AU-50, ASW-50C, and SSW-50D can be connected as an external switching box!

5. Battery-powered operation

Powered by 4 single batteries or AC adapter (12V battery).

6. Alarm output supported

Monitors the specified channel, closes the specified contact point according to the set value (relative value, upper/lower limit value), and operates rotating lights, etc.

Application

For example, you can do this!

Case 1.

Pavement

Point TS-360 is battery-operated, making it powerful in places where there is no power supply!

Point Connecting to an external switch box, up to 1000 points can be used, making it useful for multi-point field measurements!

Case 2.

Slope and mountain area

Point “TML-NET" can be used. Therefore, it can be used at landslide and water level observation sites where measurement points are scattered

Point Supports sleep interval measurement, ideal for unattended measurement using dry cell batteries or batteries at sites that are distant or difficult to access!

Case 3.

Bridge

Point When used in connection with an external switch box, you can have the right number of points where you need them!

Point TS-360 also supports online measurement by connecting I/F (LAN, USB, RS-232C)!

Case 4.

Tunnel

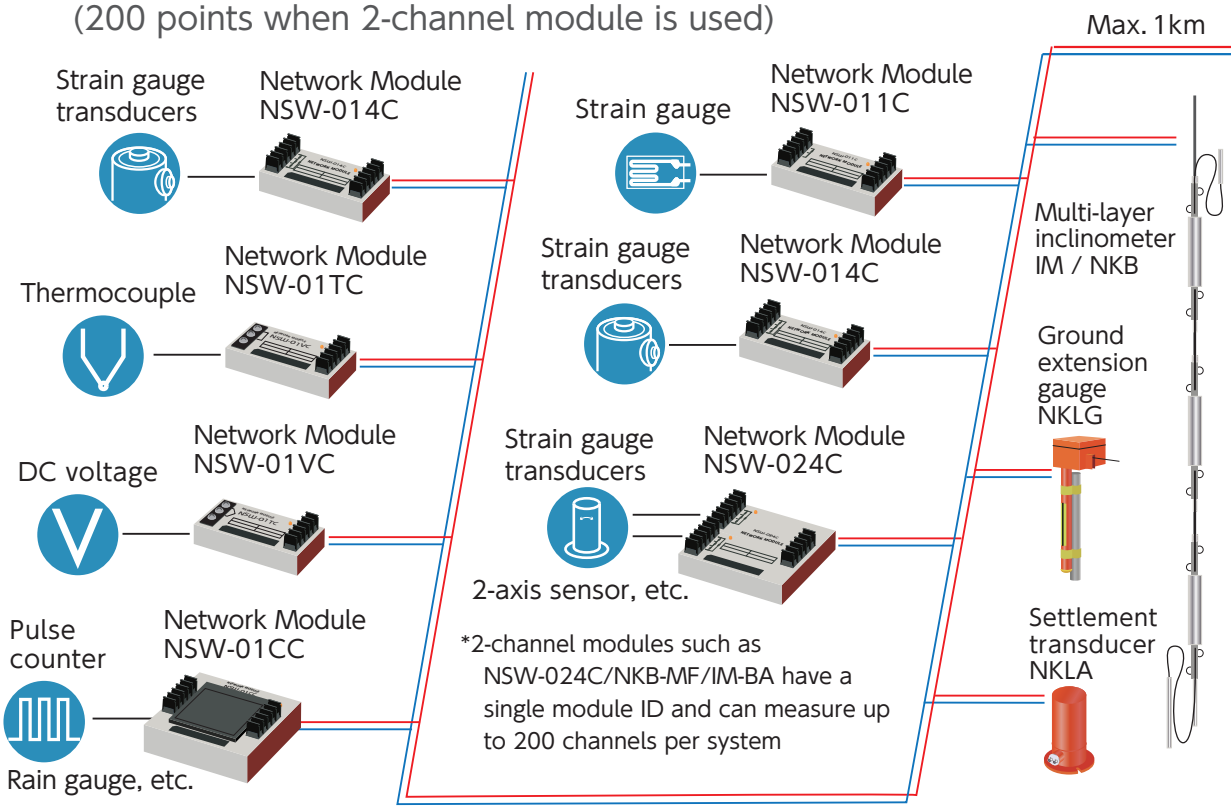
Point TS-360 can increase the number of points and distribute placement as construction progresses!

Point T-ZACCS BOX AU-50 can be connected as an external switch box. Existing switch box ASW-50C/SSW-50D can also be connected!

T-ZACCS 3 PORTABLE DATA LOGGER TS-360

1 TML-NET Measurement System (Measurement by TML-NET interface on AU-50MA)

Measurements of 100 network modules are possible.
(200 points when 2-channel module is used)



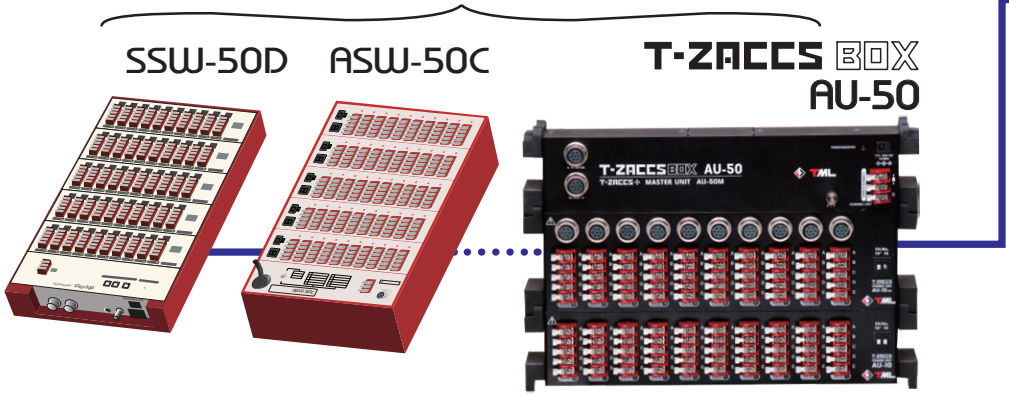
2 External Switching box measurement system

T-ZACCS BOX AU-50 and conventional switching boxes ASW-50C /SSW-50D can be used (can be mixed)!
Capable of measuring up to 1000 points.

Sensor Input
- Strain gauge
- Strain gauge transducers
- Thermocouple
- DC voltage

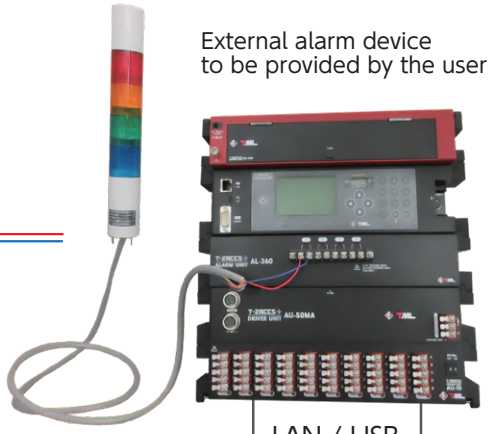
*Only SSW-50D is capable of 1-gauge 4-wire measuring method

Total distance between data loggers and switch boxes not exceeding 2 km



System Block Diagram/Related Products

Application Example



External alarm device
to be provided by the user

LAN / USB
RS-232C

PC /
Software

External Printer

TML-NET

T-ZACCS 3
PORTABLE
DATA LOGGER
TS-360

BA-360

TS-360

AL-360

AU-50MA

AU-10-05

AU-10

*Up to five AU-10/AU-10-05 units can be connected to one AU-50MA unit

T-ZACCS 3
PORTABLE
DATA LOGGER
TS-360

TS-360

AU-50MA

AU-10-05

AU-10

External Switching box

T-ZACCS 3 PORTABLE DATA LOGGER TS-360

T-ZACCS 3

Control unit TS-360

Measuring capacity

Number of measurement points		Up to1000 points
Measuring speed	Scanning measurement	0.080 sec/point (50Hz) 0.067 sec/point (60Hz)
	Monitor measurement	0.5 sec/point
Measurement mode		Initial, Direct, Major (Temperature measurement is direct only)
Simple Measure		Coefficient 1 Unit Linked to sensor mode Decimal point Linked to sensor mode
Comet setting		Comet NON, Comet A, Comet B
Monitor	Display mode	OFF, numerical value, scan
	Display channel	numeric representation 1 to 8 points Scanning display 1 to 1000 points
measurement	Manual Measurement Automatic measurement interface	START key Interval measurement, Comparator measurement LAN, USB, RS-232C
Channel setting	Coefficient	± (0.00000~200000)
	Unit	με, mV, ℃, kgf, mm etc.,
	Decimal point	Decimal point display can be set to 0 to 5 optional digits
	Offset	Writing for each arbitrary measurement channel
	Sensor mode	Set the type of sensor to be connected
		Strain measurement: Quarter bridge 3-wire 120/240/350Ω, Quarter bridge 4-wire120/240/350Ω, Half bridge common dummy, Half bridge Full bridge, Full bridge constant current350Ω
		Voltage 300mV, 30V
		Temperature Thermocouple T, K, J, B, S, R, E, N
Check function	During measurement	Open check
	Sensor	Insulation check, sensitivity check, variation check, thermocouple disconnection check, lead wire resistance check, bridge output check, coefficient check
	Display setting list	Initial value, lead wire resistance

*Quarter bridge 4-wire is available only for SSW-50D. (As of February 2024)

Interval measurement

Function	Recording of measurement values at set time interval and time
Time interval	Hours, minutes, seconds, up to 99 hours 59 minutes 59 seconds Can be set for each step
Real time start	Start time (hour, minute, seconds) can be set for each step
Number of start	Up to 9999 times per step or infinite
Number of steps	Programmable up to 10 steps
GOTO step	Program loop possible to one of the previous steps
GOTO comparator	Go to step 1 of the comparator
Sleep function	Automatically turns power on and off at intervals of 1 minute or more between the end of a scan and the start of the next scan

Comparator measurement

Function	Automatic measurement by the amount of change in the setting of any channel (one point)
Comparative amount	Up to ±999999 settable per step
Comparison method	Upper/lower limits, relative values
Number of start	Up to 9999 times per step or infinite
Number of steps	Programmable up to 10 steps
GOTO step	Program loop possible to one of the previous steps
GOTO interval	Go to step 1 of the interval

Time

Setting	Year, month, day, hour, minute, seconds
Accuracy	Daily error: ± 1 seconds (@23℃ ± 5℃)
Retention	Approx. 30 days (with full charge)

Display and Operation

Display	Display unit	LCD panel	3.0 semi-transmissive monochrome STN LED backlight
		Resolution	255×160 dots
		Point defect	10 dots or less (excluding aging deterioration)
Operation			POWER, START, ESC, ENT, 0 to 9, F1, F2, F3

Recording

Built-in	Function	Recording and reproduction of measurement data Saving of setting file
	Recording format	CSV format, TDS format
	Capacity	16 GB
SD card	Function	Recording, reproduction, copying of measurement data Saving of setting file
	Physical format	FAT32
	Recording format	CSV format, TDS format
	Capacity	16 GB (Designated by us)

Interface

LAN	10BASE-T/100BASE-TX General-purpose command port server function (various settings, measurement, data collection)
USB	USB 2.0 protocol compatible Various settings, measurements, data collection
RS-232C	RS-232C compliant Baud rate 9600, 38400, 115200 bps Various settings, measurements, data collection

Power supply

Power supply voltage	DC9~18V50/60Hz

Environment

Operating temperature/humidity range	-10~+50℃ 85%RH or less (No condensation)

Others

External dimensions	280(W)×45(H)×80(D)mm (Excluding rubber protectors and protrusions)
weight	Approx. 800g

Standard accessories

instruction manual for standard accessories(CD)	1
SD card	1
Phillips screwdriver	1
Warranty card	1 copy

Options

SD card	16 GB (Designated by us)
AC adapter	CR-1867
RS-232C Cable	CR-5360
USB cable	Type C USB Cable
External Printer	DPU-S245 (RS-232C connection)

Specification

T-ZACCS+

Driver unit AU-50MA

Measurement capability

Number of measurement points	When using box connection	Up to 1000 points	
	When using box connection and built-in measurement unit together		
	Channel unit connection	Up to 50 points	
Data update cycle		0.080 sec/point (50Hz) 0.067 sec/point (60Hz)	
Measurement Mode		Direct	
Strain measurement	Applicable wiring methods, gauge resistance	Quarter bridge 3-wire	120/240/350Ω
		Half bridge	120～1000Ω
		Half bridge common dummy	120～1000Ω
		Full bridge	120～1000Ω
		Full bridge constant current	350Ω
	Sensor cable extension range	Full bridge constant current 350Ω	Total cable resistance: 400 Ω or les
	Sensitivity change	Full bridge constant current 350Ω	+0.1% to -0.5% for total cable resistance 100 Ω
	Lead wire resistance compensation range	Gauge resistance 120Ω	: About 100Ω or less
		Gauge resistance 240Ω	: About 200Ω or less
	Comet B (1G3W)	Gauge resistance 350Ω	: About 300Ω or less
	Zero stability	±1.0×10^{-6} strain/℃ or less (quarter bridge) ±0.5×10^{-6} strain/℃ or less (half bridge)	
	Initial unbalance	±750×10^{-6} strain or less (quarter bridge 3-wire) ±500×10^{-6} strain or less (half bridge)	
DC voltage measurement	Input impedance	1MΩ or more	
	Allowable input voltage between B and D	DC±50V MAX	
Thermocouple temperature measurements		T, K, J, B, S, R, E, N JIS C1602:2015 IEC60584-1:2013	
Check function	During measurement	Open check	
	sensor	Insulation check, sensitivity check, variation check, thermocouple disconnection check, lead wire resistance check, bridge output check	

Strain measurement

Bridge power supply	DC2V 24ms(50Hz)	
Initial value storage range	±160000×10^{-6} strain	
Temperature coefficient of accuracy	±0.002% rdg/℃	
Aging change of accuracy	±0.02% rdg/year	
Measuring range and resolution	Measuring range	Resolution
	± 30000×10^{-6} strain	1×10^{-6} strain
	±300000×10^{-6} strain	10×10^{-6} strain
Accuracy (@23℃±5℃) (Except quarter bridge 4-wire)	±(0.08%rdg+1digit)	
Accuracy (@23℃±5℃) Quarter bridge 4-wire	±(0.28%rdg+1digit)	

Constant current strain measurement (Full bridge)

Bridge Power Supply	DC6mA 24ms(50Hz)	
Bridge resistance	350Ω	
Initial value storage range	±160000×10^{-6} strain	
Temperature coefficient of accuracy	±0.002%rdg/℃	
Aging change of accuracy	±0.02%rdg/year	
Measuring range and resolution	Measuring range	Resolution
	± 30000×10^{-6} strain	1×10^{-6} strain
	±300000×10^{-6} strain	10×10^{-6} strain
Accuracy (@23℃±5℃)	±(0.08%rdg+3digit)	

DC voltage measurement

Initial value storage range			
V1/1		±160.000mV	
V1/100		±16.0000V	
Temperature coefficient of accuracy		±0.0024%rdg/℃	
Aging change of accuracy		±0.024%rdg/year	
Measuring range and resolution	V1/1	Measuring range	Resolution
		± 30.000mV	0.001mV
		±300.000mV	0.010mV
	V1/100	± 3.0000V	0.0001V
		±30.0000V	0.0010V
Accuracy (@23℃±5℃)	V1/1	±(0.08%rdg+3digit)	
	V1/100	±(0.08%rdg+2digit)	

Thermocouple measurement accuracy

Type	Measuring range	Resolution	Accuracy (@23℃±5℃) External reference junction	Accuracy (@23℃±5℃) Internal reference junction
T	-250～-200℃	0.1℃	±(0.38%rdg+0.6℃	±(0.38%rdg+3.9℃)
	-200～-100℃	0.1℃	±(0.15%rdg+0.2℃)	±(0.15%rdg+1.4℃)
	-100～+400℃	0.1℃	±(0.10%rdg+0.2℃)	±(0.10%rdg+0.8℃)
K	-210～-160℃	0.1℃	±(0.19%rdg+0.3℃)	±(0.19%rdg+1.6℃)
	-160～0℃	0.1℃	±(0.12%rdg+0.2℃)	±(0.12%rdg+1.0℃)
	0～+960℃	0.1℃	±(0.08%rdg+0.1℃)	±(0.08%rdg+0.5℃)
	+960～+1370℃	0.1℃	±(0.10%rdg+0.9℃)	±(0.10%rdg+1.4℃)
J	-200～-160℃	0.1℃	±(0.16%rdg+0.2℃)	±(0.16%rdg+1.2℃)
	-160～0℃	0.1℃	±(0.12%rdg+0.1℃)	±(0.12%rdg+0.8℃)
	0～+700℃	0.1℃	±(0.08%rdg+0.1℃)	±(0.08%rdg+0.5℃)
	+700～+1200℃	0.1℃	±(0.08%rdg+0.6℃)	±(0.08%rdg+0.9℃)
B	+200～+280℃	0.5～0.4℃	±(0.04%rdg+4.0℃)	±(0.04%rdg+4.0℃)
	+280～+800℃	0.3～0.1℃	±(0.04%rdg+1.2℃)	±(0.04%rdg+1.2℃)
	+800～+1760℃	0.1℃	±(0.05%rdg+0.4℃)	±(0.05%rdg+0.4℃)
S	-10～+200℃	0.1℃	±(0.09%rdg+0.6℃)	±(0.09%rdg+1.2℃)
	+200～+1760℃	0.1℃	±(0.07%rdg+0.4℃)	±(0.07%rdg+0.7℃)
R	-10～+150℃	0.1℃	±(0.09%rdg+0.7℃)	±(0.09%rdg+1.2℃)
	+150～+1760℃	0.1℃	±(0.07%rdg+0.4℃)	±(0.07%rdg+0.7℃)
E	-210～+550℃	0.1℃	±(0.17%rdg+0.2℃)	±(0.17%rdg+1.4℃)
	+550～+1000℃	0.1℃	±(0.09%rdg+0.4℃)	±(0.09%rdg+0.8℃)
N	-200～0℃	0.1℃	±(0.18%rdg+0.4℃)	±(0.18%rdg+1.6℃)
	0～+1090℃	0.1℃	±(0.08%rdg+0.2℃)	±(0.08%rdg+0.6℃)
	+1090～+1300℃	0.1℃	±(0.08%rdg+0.9℃)	±(0.08%rdg+1.2℃)

*The accuracy of sensor is not included, and thermocouple B does not use a reference junction

Switching box drive unit

Compatible model		SSW-50D, ASW-50C AU-50M
No. of units connected	Without booster power	8 units connected, 400 points
	Booster power available	20 units connected, 1000 points
Extension distance	Without booster power	120m
	Booster power available	2km
Connection cable		Switch box cable (CR-65) or switching box extension cable (CR-800)

Compatible model		NSW series/TML-NET compatible transducers
No. of units connected	Low consumption type	Up to 100 units
	Existing type	Up to 20 units (150m or less)
Extension distance	Low consumption type	2km
	Existing type	Within 1 km (10 units or less)
Connection cable		Dedicated 2-conductor shielded cable

Channel unit connection

Compatible model	AU-10/AU-10-05
No. of units connected	Up to 5 units
Connectors	Dedicated connector for unit connection

Power

Supply power	Supplied by TS-360

Environment

Operating temperature/humidity range	-10～+50℃ 85% RH or less (excluding condensation)

Other

External dimensions	280 (W)×45 (H)×60 (D) mm (Excluding rubber protectors and protrusions)
Weight	Approx. 800g

Standard accessories

Warranty card	1 copy

T-ZACCS 3 Specification

T-ZACCS+

Battery unit BA-360

Function	Ability to run TS-360 on a single battery
Batteries	4 single alkaline dry cells
Usable time	Continuous usage : Approx. 40 hours At 1-hour interval : Approx. 8 months (10 channels, scan, sleep on, 23±5℃)
Operating temperature/humidity range	-10~+50℃ 85% RH or less (excluding condensation)
External dimensions	280(W)×60(H)×60(D)mm (Excluding rubber protector and projection)
Weight	Approx. 1.2 kg (including 4 single dry cells)
Standard accessories	Single alkaline dry cell 4 Warranty card 1 copy

T-ZACCS+

Alarm unit AL-360

Number of contact points	4
Contact point	Semiconductor relay (a-contact: normally open) Contact capacity 140V AC / 200V DC MAX Rated current 0.6A MAX Inrush current 1.8A MAX ON resistance 2Ω MAX
Display	Status LED Lights up when each contact is closed
Comparison method	Relative value, upper/lower bounds
Number of setting tables	1000
Other Function	Alarm test
Power	Supplied via TS-360
Operating temperature and humidity range	-10 to +50° C 85%RH or less (excluding condensation)
External dimensions	280(W)×45(H)×60(D)mm (excluding rubber protectors and protrusions)
Weight	Approx. 600g

Protective Cover
TS-360 Upper Cover

Protective cover for easy installation and removal.

Type name : TS-360-F60 (for AU-10)
TS-360-F80 (for AU-10-05)

Main unit TS-360 and channel unit AU-10/-10-05

Expandable by unit! 「T-ZACCS BOX AU-50」

The AU-50 consists of a master unit and a channel unit.
It can be used with TS-360, TDS-540, etc. and can be mixed with conventional switchboxes ASW-50C/SSW-50D.

T-ZACCS+

Master unit AU-50M

1 to 5 channel units can be added to the Master unit

T-ZACCS UNIT

Channel unit AU-10/AU-10-05

Number of measuring point	10
input terminal	Dual-use screw and solder type
One-touch connector	NDIS One-touch connector(AU-10-05 only)
Measuring capacity	Equivalent to AU-50MA/AU-50M
Supply power	Supplied by AU-50MA/AU-50M
Operating temperature/humidity range	-10~+50℃ 85% RH or less (excluding condensation)
External dimensions	AU-10 280(W)×45(H)×60(D)mm AU-10-05 280(W)×45(H)×80(D)mm (Excluding rubber protector and projection)
Weight	AU-10 Approx. 900g AU-10-05 Approx. 1.2kg
Standard accessories	Warranty card 1 copy

The contents of this catalog are subject to change without prior notice.
The contents of this catalog are as of August 2025. TML Pam E3021F.

Approval Certificate **ISO9001**
Design and manufacture of strain gauges, strain measuring equipment and transducers

TML URL www.tml.jp/e

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