



TS-360

Portable Data Logger

Data logger for various on-site measurements

T-ZACCS 3: - Control unit TS-360

T-ZACCS +: - Battery unit BA-360
- Driver unit AU-50MA
- Master unit AU-50M
- Alarm unit AL-360

T-ZACCS UNIT: - Channel unit AU-10
- Channel unit AU-10-05



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])
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: 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

Pavement

- TS-360 is battery-operated, making it powerful in places where there is no power supply!
- Connecting to an external switch box, up to 1000 points can be used, making it useful for multi-point field measurements!



Slope and mountain area

- “TML-NET” can be used. Therefore, it can be used at landslide and water level observation sites where measurement points are scattered
- Supports sleep interval measurement, ideal for unattended measurement using dry cell batteries or batteries at sites that are distant or difficult to access!



Bridge

- When used in connection with an external switch box, you can have the right number of points where you need them!
- TS-360 also supports online measurement by connecting I/F (LAN, USB, RS-232C)!

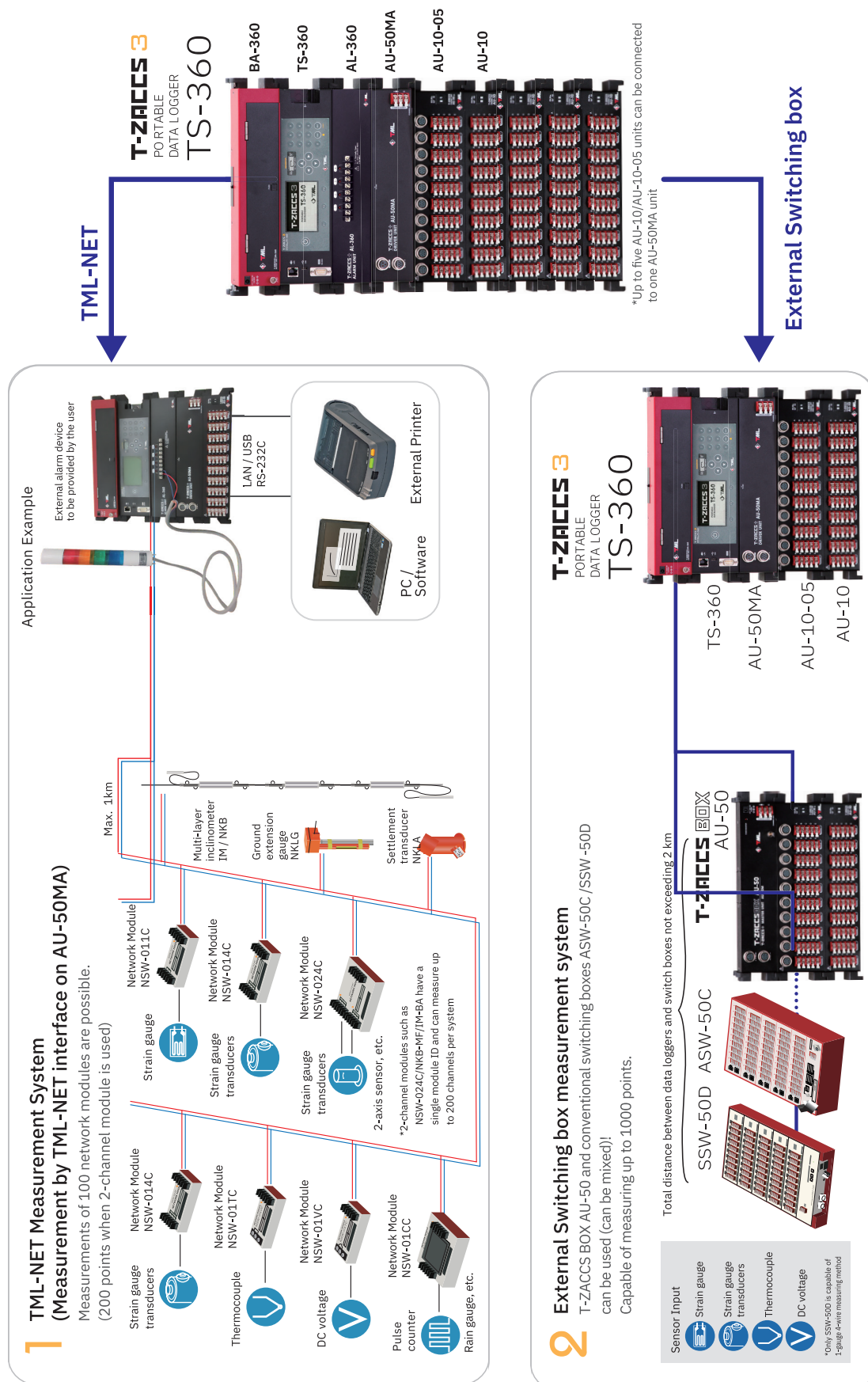


Tunnel

- TS-360 can increase the number of points and distribute placement as construction progresses!
- T-ZACCS BOX AU-50 can be connected as an external switch box. Existing switch box ASW-50C/SSW-50D can also be connected!



SYSTEM BLOCK DIAGRAM/RELATED PRODUCTS





T-ZACCS 3 / CONTROL UNIT TS-360



Measuring capacity

Number of measurement points	Up to 1000 points
Measuring speed	Scanning measurement 0.080 sec/point (50Hz)
	Monitor measurement 0.067 sec/point (60Hz)
Measurement mode	Initial, Direct, Major (Temperature measurement is direct only)
	Coefficient 1
Simple Measure	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 START key
	Automatic measurement interface Interval measurement, Comparator measurement LAN, USB, RS-232C
Channel setting	Coefficient $\pm (0.0000 \sim 20000.0)$
	Unit μV , mV, °C, 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
	Quarter bridge 3-wire 120/240/350Ω Strain measurement Quarter bridge 4-wire 120/240/350Ω Half bridge common dummy, Half bridge Full bridge, Full bridge constant current 350Ω
Check function	Voltage 300mV, 30V
	Temperature Thermocouple T, K, J, B, S, R, E, N
	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°C $\pm 5^\circ\text{C}$)
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	DC 9~18V50/60Hz
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Environment

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



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	
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: 400Ω or less
	Sensitivity change	Full bridge constant current 350Ω +0.1% to -0.5% for total cable resistance 100Ω
	Lead wire resistance compensation range CometB(1G3W)	Gauge resistance 120Ω : About 100Ω or less Gauge resistance 240Ω : About 200Ω or less Gauge resistance 350Ω : About 300Ω or less
	Zero stability	±1.0×10 ⁻⁶ strain/°C or less (quarter bridge) ±0.5×10 ⁻⁶ strain/°C 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 C 1602:2015 IEC 60584-1:2013
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	± 16000 0× 10 ⁻⁶ strain	
Temperature coefficient of accuracy	± 0.00 2% rdg/°C	
Aging change of accuracy	± 0.02% rdg/year	
Measuring range and resolution	Measuring range	Resolution
	± 3000 0× 10 ⁻⁶ strain	1× 10 ⁻⁶ strain
	± 30000 0× 10 ⁻⁶ strain	10× 10 ⁻⁶ strain
Accuracy (@23°C±5°C) (Except quarter bridge 4-wire)	± (0.08%rdg+1digit)	
Accuracy (@23°C±5°C) 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	± 16000 0× 10 ⁻⁶ strain	
Temperature coefficient of accuracy	± 0.00 2%rdg/°C	
Aging change of accuracy	± 0.02%rdg/year	
Measuring range and resolution	Measuring range	Resolution
	± 3000 0× 10 ⁻⁶ strain	1× 10 ⁻⁶ strain
	± 30000 0× 10 ⁻⁶ strain	10× 10 ⁻⁶ strain
Accuracy (@23°C±5°C)	± (0.08%rdg+3digit)	

DC voltage measurement

Initial value storage range		
V1/1	± 160.000mV	
V1/100	± 16.0000V	
Temperature coefficient of accuracy	± 0.002 4%rdg/°C	
Aging change of accuracy	± 0.02 4%rdg/year	
Measuring range and resolution	V1/1	Measuring range
		Resolution
	V1/100	± 30.000mV
		0.001mV
		± 300.000mV
		0.010mV
Accuracy (@23°C±5°C)	V1/100	± 3.0000V
		0.0001V
	V1/1	± 30.0000V
		0.0010V
	V1/1	± (0.08%rdg+3digit)
		± (0.08%rdg+2digit)

Thermocouple measurement accuracy

Type	Measuring range	Resolution	Accuracy (@23±5Ω)	
			External reference junction	Internal reference junction
T	-250~-200°C	0.1°C	± (0.38%rdg+0.6°C)	± (0.38%rdg+3.9°C)
	-200~-100°C	0.1°C	± (0.15%rdg+0.2°C)	± (0.15%rdg+1.4°C)
	-100~-400°C	0.1°C	± (0.10%rdg+0.2°C)	± (0.10%rdg+0.8°C)
K	-210~-160°C	0.1°C	± (0.19%rdg+0.3°C)	± (0.19%rdg+1.6°C)
	-160~ 0°C	0.1°C	± (0.12%rdg+0.2°C)	± (0.12%rdg+1.0°C)
	0~+96 0°C	0.1°C	± (0.08%rdg+0.1°C)	± (0.08%rdg+0.5°C)
J	+960~+1370°C	0.1°C	± (0.10%rdg+0.9°C)	± (0.10%rdg+1.4°C)
	-200~-160°C	0.1°C	± (0.16%rdg+0.2°C)	± (0.16%rdg+1.2°C)
	-160~ 0°C	0.1°C	± (0.12%rdg+0.1°C)	± (0.12%rdg+0.8°C)
B	0~+700°C	0.1°C	± (0.08%rdg+0.1°C)	± (0.08%rdg+0.5°C)
	+700~+1200°C	0.1°C	± (0.08%rdg+0.6°C)	± (0.08%rdg+0.9°C)
S	+200~+280°C	0.5~0.4°C	± (0.04%rdg+4.0°C)	± (0.04%rdg+4.0°C)
	+280~+800°C	0.3~0.1°C	± (0.04%rdg+1.2°C)	± (0.04%rdg+1.2°C)
	+800~+1760°C	0.1°C	± (0.05%rdg+0.4°C)	± (0.05%rdg+0.4°C)
R	-10~+200°C	0.1°C	± (0.09%rdg+0.6°C)	± (0.09%rdg+1.2°C)
	+200~+1760°C	0.1°C	± (0.07%rdg+0.4°C)	± (0.07%rdg+0.7°C)
	-10~+150°C	0.1°C	± (0.09%rdg+0.7°C)	± (0.09%rdg+1.2°C)
E	+150~+1760°C	0.1°C	± (0.07%rdg+0.4°C)	± (0.07%rdg+0.7°C)
	-210~+550°C	0.1°C	± (0.17%rdg+0.2°C)	± (0.17%rdg+1.4°C)
	+550~+1000°C	0.1°C	± (0.09%rdg+0.4°C)	± (0.09%rdg+0.8°C)
N	-200~ 0°C	0.1°C	± (0.18%rdg+0.4°C)	± (0.18%rdg+1.6°C)
	0~+1090°C	0.1°C	± (0.08%rdg+0.2°C)	± (0.08%rdg+0.6°C)
	+1090~+1300°C	0.1°C	± (0.08%rdg+0.9°C)	± (0.08%rdg+1.2°C)

*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
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Environment

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

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

Standard accessories

Warranty card	1 copy
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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°C)
Operating temperature/humidity range	-10~+50 °C 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

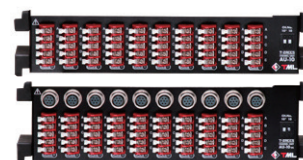


1 to 5 channel units
can be added to the
Master unit



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 °C 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