

Analog Input Section

- Input method : Floating unbalanced input, insulated between channels (Terminal "b" is shared by resistance temperature detector inputs.)
- Number of inputs : 8 channels (XL101), 16 channels (XL102, XL104)
- Terminal shape : Push-lock screw (XL101, XL102), M3 screw (XL104)
- Measurement : 100 ms (only when the 8-channel terminal block is used), 200 ms, 500 ms, 1 sec, 2 sec, 5 sec, 10 sec, 20 sec, 30 sec, 1 min, 2 min, 5 min, 10 min, 20 min, 30 min, 1 hr
- Input type : TC (thermocouple), RTD (resistance temperature detector), DCV (direct-current voltage)
 - * RTD for XL101 and XL102 only
- Range and measurement range :

Reference operating conditions: Temperature (23±2°C), humidity (55±10%RH), power supply voltage (100 to 240 VAC), power supply frequency (50/60 Hz±1% or less), warm-up (30 minutes or longer), without vibration, etc. that do not affect the operation of the instrument

Input	Range	Measuring range	Measurement accuracy	Maximum resolution
DCV	100mV	-100.00 to 100.00mV	±0.1% of f.s.	10μV
	500mV	-500.0 to 500.0mV		100μV
	1V	-1.0000 to 1.0000V		100μV
	5V	-5.000 to 5.000V		1mV
	10V	-10.000 to 10.000V		1mV
	30V	-30.00 to 30.00V		10mV
	1-5V/f.s.	1.000 to 5.000V		1mV
TC	R *1	0 to 1768°C	±0.05% of f.s.±2°C *5	1°C
	S *1	0 to 1768°C		
	B *1	600 to 1800°C		
	K *1	-200.0 to 1372.0°C	±0.05% of f.s.±1°C *5	0.1°C
	E *1	-200.0 to 1000.0°C		
	J *1	-200.0 to 1200.0°C		
	T *1	-200.0 to 400.0°C		
	N *1	-200.0 to 1300.0°C		
	W *2	0 to 2315°C	±0.05% of f.s.±2°C *5	1°C
	L *3	-200.0 to 900.0°C	±0.05% of f.s.±1°C *5	0.1°C
U *3	-200.0 to 400.0°C			
RTD	Pt100 *4	-200.0 to 850.0°C	±0.05% of f.s.±0.5°C *5	0.1°C
	JPt100 *4	-200.0 to 500.0°C		

- *1 R, S, B, K, E, J, T, N : IEC584-1 (1995), DIN IEC584, JIS C 1602-1995
- *2 W : W-5% Rd/W-26% Rd (Hoskins Mfg. Co.), ASTM E988
- *3 L : Fe-CuNi, DIN43710, U : Cu-CuNi, DIN43710
- *4 Pt100 : JIS C 1604-1997, IEC 751-1995, DIN IEC751-1996
JPt100 : JIS C 1604-1989, JIS C 1606-1989
- *5 "f.s." for TC and RTD means the full scale of the measuring range.
- Reference junction compensation: Internal reference junction compensation is used.
- Reference junction compensation accuracy: ±1°C
- Maximum input voltage
 - Voltage range of 1 VDC or below and TC: ±10 VDC
 - Voltage range of 5 VDC or above: ±60 VDC
- Input resistance: Approx. 1 MΩ
- Maximum common mode voltage: 30 VACrms (50/60 Hz) or ±60 VDC
- Common mode rejection ratio
 - 100 dB or above (50/60 Hz): Digital filter OFF
 - 140 dB or above (50/60 Hz): Digital filter ON
- Measurement interval: 5 seconds (8-channel terminal block)/10 seconds (16-channel terminal block)
- Normal mode rejection ratio
 - 50 dB or above (50/60 Hz): Digital filter ON
- Measurement interval: 5 seconds (8-channel terminal block)/10 seconds (16-channel terminal block)
- Thermocouple burnout detection: Detection is turned ON constantly during thermocouple measurement (burnout upscale only). (Display: "+*****")

Calculation

- Inter-channel calculation : Inter-channel calculation is possible. (Measurement / calculation data / communication data, constant)
- Linear scaling : langes capable of scaling: DCV, TC, RTD, pulse
Available range of scaling: -30000 to 30000
Decimal point position: Selectable from 0.0000, 00.000, 000.00, 0000.0 and 00000
Unit: Can be set by the user (6 characters) or selectable from the table below.

Item	Default
Length	mm, cm, m, km
Area	mm2, cm2, m2
Volume	mm3, cm3, m3, cc, ml, l, kl
Speed	mm/s, mm/min, mm/h, cm/s, cm/min, cm/h, m/s, m/min, m/h, km/s, km/min, km/h
Acceleration	m/s2, km/h2, Gal, G
Frequency	mHz, Hz, kHz, rpm
Weight	mg, g, kg, t, N, kgf
Work	mW, W, kW, PS, HP, J, Wh, cal
Pressure	kg/cm2, Pa, kPa, MPa
Flow	m3/s, m3/min, m3/h, t/s, t/min, t/h, l/s, l/min, l/h, kg/s, kg/min, kg/h, kl/s, kl/min, kl/h, cc/s, cc/min, cc/h
Temperature	°C, °F
Voltage/current	mV, V, kV, mA, A, kA, MA
Electric power	mW, W, kW, MW, mvar, var, kvar, Mvar, mVA, VA, kVA, MVA, deg
Electric energy	Wh, kWh, MWh, varh, kvar, Mvar

- Statistical operation: Maximum value (MAX), minimum value (MIN), average value (AVE), peak value (P-P) and root-mean-square value (RMS) between the start and stop of logging

Digital Input Section

- Number of inputs : Pulse input: 1 channel, Logic input: 2 channels
- Input specification : Lo: Below 0.9 V or terminal short-circuited, Hi: 2.1 V or higher or terminal open
- Maximum input voltage : 10 VDC

Input	Range	Measuring range	Maximum resolution
Pulse (Instantaneous value)	None	50k/Measurement interval 0 to 50000c	1c
	50kc/f.s.	50k/Measurement interval	1c
500kc/f.s.	10c		
5Mc/f.s.	100c		
50Mc/f.s.	1kc		
500Mc/f.s.	10kc		
Pulse (Integral value)	500rpm/f.s.	50k/sec (The number of pulses per second is counted and converted to the number of revolution)	-
	5krpm/f.s.		- c : Count
	50krpm/f.s.		-
	500krpm/f.s.		-
Logic (DI)	-	-	-

Display Section

- Display unit : 3.5-inch TFT color LCD (320 x 240 pixels)
- Display color
 - Trend/bar graphs : Selectable from 16 colors (Red, green, blue, bluish purple, brown, orange, yellowish green, light blue, reddish purple, gray, lime, blue green, dark blue, yellow, olive, purple)
 - Background color : Selectable from white and black (waveform display area) Selectable from white and black (waveform display area)
- Waveform display
 - Direction of view : Horizontal
 - Number of channels : Max. 8/display (group) (excluding pulse and DI)
 - Number of displays : 4 (4 groups)
 - Line width : Selectable from 1, 2 and 3 pixels
 - Time scale display : Selectable from 1, 2, 5, 10, 20, 30 sec/div, 1, 2, 5, 10, 20, 30 min/div and 2, 5, 10, 12, 24 h/div
- Bar graph display
 - Direction of view : Horizontal
 - Number of channels : Max. 8/display (group)
 - Number of displays : 4 (4 groups)
 - Scale : Divided in 10 blocks (fixed)
 - Reference position : Edge or midpoint
- Digital display
 - Number of channels : Max. 8/display (group)
 - Number of displays : 4 (4 groups)
- Review display
 - Displays the past logging data recorded in internal memory or external storage media (in binary format only).
 - Display : Waveform and digital display only
 - Display method : Operation of certain keys or call from the alarm summary
 - Background color : White or black (Opposite color to the one selected for "Display background color")
- Information display
 - Alarm summary : Displays the information for the latest alarms.
 - Log display : Displays the following lists. Error records, communication function records, key login/logout records
- LCD setting
 - Backlight auto off : Selectable from OFF, 10 sec, 1, 2, 5, 10, 30 and 60 min (Default: 10 min)
- Update interval : Max approx. 1 sec(Measurement interval)

Storage Functions

- Internal memory: 16 MB
- External storage medium: Compact flash memory card (Type II), SD card, USB memory (Only the copy function is supported by USB memory. Only those USB memories that have been verified by YOKOGAWA are recommended.)
- Storage data type

Type	Description	Format
Logging data	Measurement is performed at specified intervals in logging mode. / Instantaneous values (calculation data) are saved.	Binary or ASCII
Manual sampling data	Measurement is performed for all channels in free running mode when a certain key is operated. / Calculation data (instantaneous values) is saved.	ASCII
Alarm data	The same contents as the alarm summary are saved in logging mode each time an alarm occurs.	ASCII
Screen image data	The image data of the currently displayed screen is saved when a certain key is operated.	BMP
Setting data	The settings made to the instrument are saved when a certain key is operated.	Binary
Log data	The same contents as the log display are saved when a certain key is operated.	ASCII
Backup file	When data is not saved properly to the internal memory, CF or SD card in logging mode (since, for instance, no card has been inserted or the card is full), the data is saved to the backup memory.	Same format as logging data

Alarm Functions (Alarm Output)

- Alarm type : Hi (high limit), Lo (low limit), window-in (within specified upper/lower range), window-out (outside specified upper/lower range) (Only Hi and Lo are available for logic inputs.)
- Alarm delay time : Number of measurements: 0 to 36,000
- Display : Alarm status is displayed in the status display area and measured values are displayed in red when an alarm occurs. (Selectable from non-hold and hold-type)
- Hysteresis : ON/OFF switchable (0.5% of span fixed, common to all channels) 4 channels (not insulated)
- Buzzer : ON/OFF switchable when being output
- Recording : Up to 120 sets of latest information can be recorded.
- Output format : Open collector, 5 V pull-up resistor (100 k Ω)
- Contact capacity : 5 to 40 V, 100 mA

Trigger Functions

- Type : Input to the external trigger input terminal, level (high limit, low limit, window-in, window-out), alarm occurrence, time, timer (timer can only be used to stop logging) For level, the trigger target channels must be specified.
- Mode: Single trigger (ends when the stop trigger is caused)
Continuous trigger (creates a file each time the trigger is caused)
- Pre-trigger/trigger delay
 - Pre-trigger : The data before the trigger is saved.
 - Trigger delay : Data is saved when sampling has been performed the specified number of times following the trigger.

Filter Functions (Analog Input)

Selectable from among OFF, 50 Hz and 60 Hz

Average Functions (Analog Input)

Moving average calculation ON/OFF, selectable from 1, 2, 5, 10 and 20 times

Automatic Measurement Functions

The setting file (AUTORUN.SET) saved in the CF card, SD card or USB memory is loaded automatically, and recording starts according to the contents of the file.

Communication Functions (One of Ethernet, USB, RS-232 and RS-485 can be used)

- Ethernet (10BASE-T/100BASE-TX)
 - Protocol : SMTP, HTTP, FTP, TCP/IP (IPv4/IPv6), SNMP
 - E-mail delivery function : E-mail is delivered when an alarm occurs, when alarm is cleared, when power is restored from power failure, or when a medium related error or FTP client related error occurs. E-mail can also be delivered at the specified time.
 - Web server function : Displays screen images using Browser software. Two modes are available: monitor mode to view the screen, and operator mode to operate the screen and change settings. A password can be set individually.
 - FTP client function : Transfers data files (measurement, alarm, log) created in the internal memory or external storage medium to the specified FTP server.
 - FTP server function : Outputs lists of directories and files present in the internal memory or external storage medium, transfers files and deletes files.
 - Time synchronization function : The instrument is connected to SNTP server at the specified interval (1 to 24 hrs.) for time synchronization.
 - User verification : Permit access only to pre-registered users to prevent operation by third parties. Can be used with web and FTP servers.
- USB
 - Number of ports : 1
 - Electrical/mechanical specifications : Conforms to USB Rev 1.1.
 - Connector : Mini B-type 5-pin (receptacle)
 - System requirements : Personal computer (running on Windows 2000* or Windows XP*) with USB port
* Windows 2000 and Windows XP are registered trademarks of Microsoft Corporation.
- RS-232
 - Connector : Mini DIN 8-pin
 - Synchronization method : Start-stop synchronization
 - Communication method : Full duplex point-to-point
 - Baud speed : 2400, 4800, 9600, 19200, 38400bps
 - Start bit : 1 bit (fixed)
 - Data length : 7/8 bits
 - Parity : Odd, Even, None
 - Stop bit : 1/2 bits
 - Handshaking : RTS/CTS, Xon/Xoff
- RS-485
 - Terminal block : 3 terminal points with M3 fixing screw
 - Synchronization method : Start-stop synchronization
 - Communication method : Half duplex multi-drop (1:N (N = 1 to 31))
 - Baud speed : 2400, 4800, 9600, 19200, 38400, 57600, 115200bps
 - Start bit : 1 bit (fixed)
 - Data length : 7/8 bits
 - Parity : Odd, Even, None
 - Stop bit : 1/2 bits
 - Communication distance : 1.2 km (When two pairs of shielded twisted pair cables (24AWG) are used)
 - Terminating resistor : 120 Ω , 1/2 W (External connection recommended) (Between terminals A and B)

- Serial communication Modbus protocol
 - Transmission medium : RS-232 or RS-485
 - Transmission mode : RTU mode, ASCII mode

Power Supply Section

- AC power supply
 - Rated supply voltage : 100 to 240 VAC
 - Operating voltage range : 90 to 132, 180 to 264 VAC
 - Rated supply frequency : 50/60 Hz
- Battery
 - Battery used : Dedicated lithium ion battery (2,400 mAh, 7.4 V)
 - Operation : The battery can be charged on the main unit only. The instrument runs on the AC adapter when both battery and AC adapter are used.
- Charging function : The battery can be charged while the instrument is in use. Charging takes approximately 8 hours.
- Continuously operable time : Approx. 7 hours (When used at 25°C, with measurement interval of 5 minutes or longer, backlight auto-off set to 5 minutes or less, and no communication)

Other

- Clock function : Time (year, month, day, hour and minute) can be set in 24-hour system. Accuracy: ± 10 ppm (at 25°C)
- Key lock function : Operations (excluding those for which key lock function is not set) can be disabled by using certain keys.
- Key login function : Entry of the user name and password is required at the end of self test following power-ON.
- Display hold : displayed values can be held when certain keys are operated.
- Beep sound : A beeping sound is caused when the ON/OFF key is pressed.
- Data storage time display : The data storage time is displayed based on the remaining memory capacity in the selected data storage.
- Printer output : Can be printed to the dedicated printer (97010).

General Specifications

- Location for use: Indoor, at an altitude of 2000 meters or less
- Operating temperature/humidity range: 0 to 50°C (0 to 40°C if a battery is used), 5 to 85%RH (no condensation)
- Storage temperature/humidity range: -20 to 60°C, 90%RH or less (no condensation)
- Insulation resistance
 - Between each input terminal and frame : 20 M Ω or higher (500 VDC)
 - Between input terminals (except for terminal b) : 20 M Ω or higher (100 VDC)
 - Between each input terminal and digital input/output : 20 M Ω or higher (100 VDC)
- Withstanding voltage
 - Between each input terminal and frame : 350 Vp-p (50/60 Hz), 1 min.
 - Between input terminals (except for terminal b) : 350 Vp-p (50/60 Hz), 1 min.
 - Between each input terminal and digital input/output: 350 Vp-p (50/60 Hz), 1 min.
- Size : Approx. 155 (W) x 155 (H) x 55 (D) mm (Without projecting parts and rubber boot)
- Weight : Approx. 800 g (Without battery and rubber boot)
- Safety standards
 - Complying standard: EN61010-1
Measurement category I (circuit voltage used: ± 60 VDC)
Pollution degree 2
Rated transient overvoltage 350 Vp-p
- Emission
 - Complying standard: EN61326 Class A, EN55011 Class A Group 1
EN61000-3-2, EN61000-3-3
This product class A for use in an industrial environment and may cause radio interference if used for domestic use. Therefore, appropriate measures must be taken when using it for domestic use.

Cable condition:

- RS-232
Use the communication cable (91011).
- Pulse input, logic input and alarm output
Use the digital I/O cable (91029).
- Ethernet
Use category 5 Ethernet cable or better cable.
- Other (communications and I/O)
Shielded cable, less than 3m.

Immunity

- Complying standard: EN61326 Annex A
Immunity test requirement for equipment used in commercial environment.
Performance criterion under immunity test environments: B (self-returnable performance deterioration)

Cable condition:

Same as the cable condition for emission.

Standard Accessories

- Terminal block : 8 channels (95052) or 16 channels (95053, 95055)
- AC adapter : For use in Japan (for 100 VAC)
- Rubber boot : Impact-Protection (93036)
- Screwdriver : For push-lock screws on the terminal block
- Quick manual : x1
- CD-ROM : Standard software, USB driver, instruction manual, communication function manual, quick manual