pantos®

U n i - C o d e r
Desktop recorder
U－６３８（00 Verion）
SPECIFICATION

Specifications are subject to change without notice.

	Drawing number	Amendment
PANTOS CO., LTD	625D09 － 00 － 0001	

Product name	Drawing name
U－638	U－638 Desktop recorder SPECIFICATIONS

1. OUTLINE

The U-638 multi-channel desk-top recorder is designed based on computing recorder Model U-636 maintaining its principal functions and easy operation that has been very popular whit the customers. Renewal of design of operation panel, high-speed performance of pen speed, adoption of electric pen lift for each pen, and further, character printing equipment and parallel interface（based on CENTRONICS） are added to the present options.

In addition, this recorder corresponds to the communication function of thermocouple/D.C. voltage input unit TCV3A which has been developed as general-purpose input unit. By mounting this input unit, the U-638 becomes possible to print the set value of measurement range of each channel in the status printing by character printing unit and to set measuring rang of each channel from the host computer via various interfaces.

The recorder consists of 6-channel servo system united by the servo mechanism and pen lift mechanism, chart cassette which allows loading of both roll chart paper and folding type chart paper, and operation panel which has been designed considering of chart speed and easy setting of pen lift, etc.

Furthermore, standard specification includes synchronizer function which automatically compensates pen clearance between channels and analog output.（See "1.1 System Configuration"）.

In addition to the above, plug-in input units are available for various kinds of measurements such as voltage, current and temperature, etc., in order to meet with diversified measuring requirements. Therefore, wide range measurements may be carried out with economical manner.
Measurement of high-speed transient phenomena is also possible making use of technology accumulated with conventional storage recorders. This is an optional item. Therefore, it may be said that this recorder is equipped with capability equivalent to those developed by high speed recorders such as pen recording type oscillograph.

As for optional items, by mounting the character printing unit, this recorder can be used as the event marker, time marker as well as the status printer for date, time and chart speed, etc.
Also, character printing from optional parallel interface（based on CENTRONICS）, GP-IB interface RS-232C interface becomes possible, with more improved automatic measuring system by the computer.

In addition the above, DC-DC converter, separate pen marker and chart take-up device, etc. are provided to expand function of recording system.

This recorder incorporates, based upon abundant recorder manufacturing technology obtained for long years, identically shaped cartridge type fiber-tip pen, compact unit of recording pen and chart drive nit which are developed by PANTOS's unique idea.

1.1 System Configuration

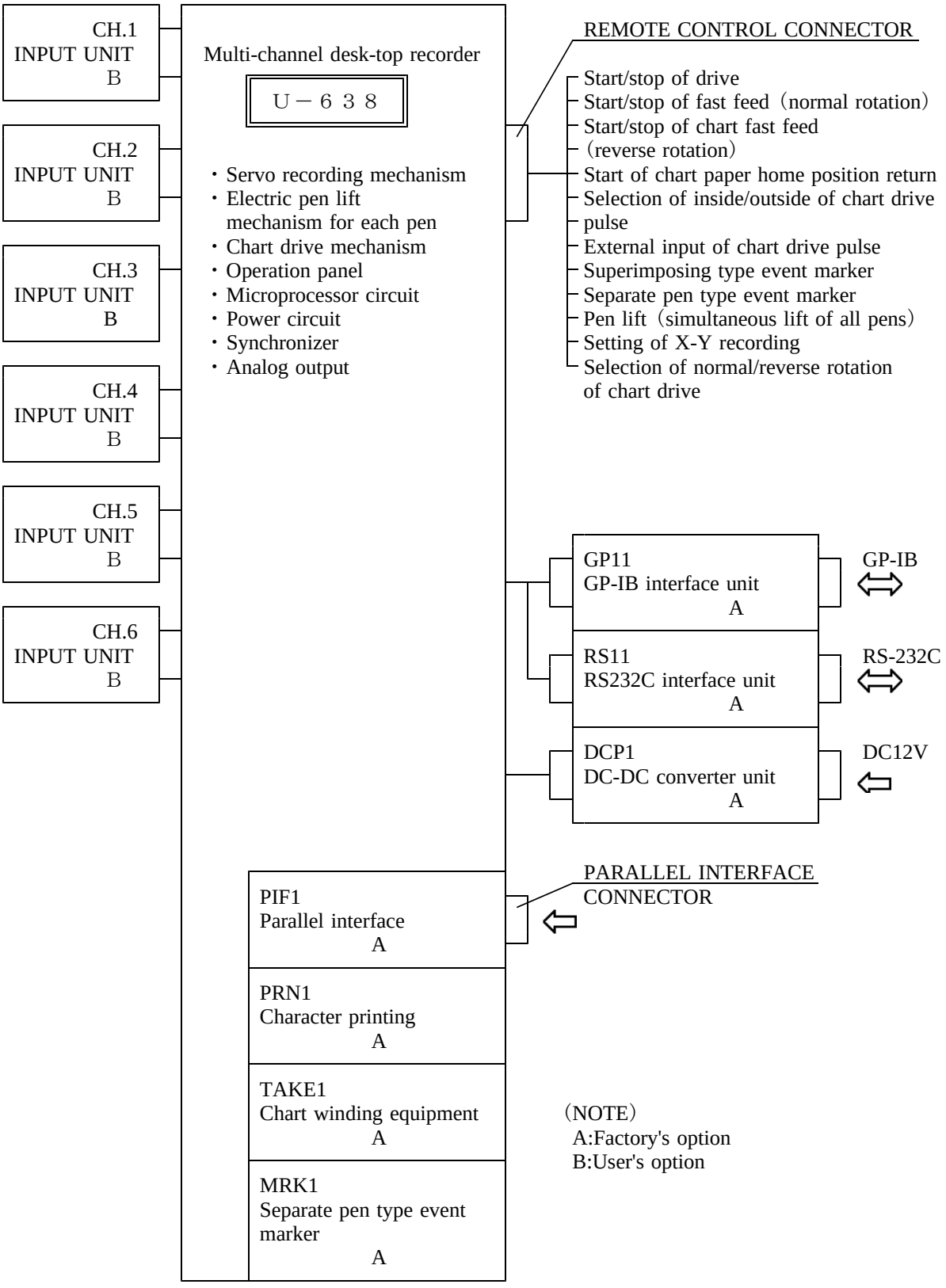

Fig. 1-1 System Construction

2. FEATURES

(1) Standard specification includes synchronizer function which automatically compensates the pen clearance between channels. Further, fine adjustment of synchronizer function can be done making use of the built-in calibration signal.

(2) Pen up and down motion, and start and stop of chart drive can be done by connecting the external control. Thus remote operation is made possible.

(3) Uniform response is obtained throughout the measurement and maintenance is made easy thanks to adoption of identically shaped cartridge type tip pen.

(4) Many input units are available which are combined appropriately according to the measuring purpose.

(5) Many optional items including GP-IB, RS232C interface unit, and parallel interface which can be used with same feeling as printer, and character printing equipment which print date, time and chart speed while performing analog recording for systematic measurement and automation are available.

(6) Realization of high-speed pen drive of 0.2 s/FS (Max. speed: approx. 1600 mm/s).

(7) Standard specification includes electric pen lift mechanism for each pen.

(8) Chart speed can be set freely ranging from ultra low speed of "1 cm/h" to high speed of "200 cm/min." by means of crystal oscillator and stepping motor.

(9) Home position return function of chart paper is provided to enable superimposing recording.

(10) Both roll type and folding type chart paper are available.

(11) By the external connector or setting from interface, this recorder is used as the X-Y recorder.

3 General Specifications

Items	Specifications	
Model number	U-638	
Number of channels	4 or 6（specified by user）	
Recording system	Automatic zero balancing, continuous-line recording	
Circuit system	Digital ・A/D Converter 12 bits ・D/A Converter 12 bits ・Maximum sampling time 8 ms	
Writing width	250 mm	
Reference point	Right hand zero of the chart paper	
Pen speed *1	Less than 0.2s/FS（max. speed: approx. 1600 mm）	
Accuracy *2	± 0.25% /FS（23 ℃）	
Dead band	± 0.1% /FS	
Chart speed	１，２，・・・・ 798, 799 cm/h １，２，・・・・ 199, 200 cm/min Chart paper feeding accuracy : 0.05 %＋（± 0.5 ㎜） Fast forward and reverse : 200 cm/min Return to home position : 200 cm/min	
Chart paper rewind	Rewinding amount ・Rolled type: 20m（total length） ・Z-folded type: Max. 1m	
Chart paper	Circular type perforation （specified by user） ・Rolled type（2501P50） ・Z-folded type（2501Z150）	20m long, right zero
	Square type perforation （specified by user） ・Rolled type（2516P50） ・Z-folded type（2516Z150）	20m long, right zero
X-Y function	X-axis input channel : Channel 1 X-axis effective recording width : 250 mm Z-axis reference point : Arbitrarily setting on the X-axis X-axis chart speed *1 : 15 s/FS X-axis accuracy *2 : ± 0.5% /FS （For one way simple increase） X-axis band *3 : ± 0.3% /FS	

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Items	Specifications
Synchronizer	Method : Digital memory Time axis resolution : 30 words/4 mm（0.133 mm） Time axis fine adjustment ・Resolution : 0.266 mm/step ・Adjustment range : ±4 steps（approx. ±1 mm）
Recording pens	Cartridge type identical shaped fiber tip pens
Ink color	Channel 1 : Red　Channel 4 : Yellow green Channel 2 : Green　Channel 5 : Blue Channel 3 : Brown　Channel 6 : Orange
Distance between pens	4 mm
Pen lift	Individually and electrically operated
Chart end alarm	Alarm by buzzer and blinking display by the numeral display unit Stop of chart drive Stop of recording pen UP of pen lift
Superimposing type event marker	Superimposing on the recording pen ・Synchronizer OFF : All channels ・Synchronizer ON : Last channel only ・Amplitude : +3.5 graduation ・Time : 0.3 sec.
Analog output	Output voltage : 1 - 9V/0 - 100% Output impedance : 2.2 k ohm Accuracy : ± 0.5%
External operation	Start/stop of chart drive Start/stop of chart fast feed（Normal rotation） Start/stop of chart fast feed（Reverse rotation） Start of chart home position return Selection of chart drive normal/reverse rotation Selection of chart drive pulse external/internal Pulse input of external chart drive ・Chart speed : 1/30 mm/pulse Maximum 1000 pps （200 cm/min） ・Signal wave form : Pulse, sign wave, quadrant wave, triangle wave （pulse wave more than 50 us） Superimposing type event marker Separate event type marker Pen lift（simultaneously all pens） Setting of X-Y recording
	External signal input ・Input impedance : 4.7 k ohm ・Voltage : High level +2 V to +20 V Low level ± 0.8 V to - 20 V （Operation is possible by TTL level and transistor switch）

Product name	Drawing name
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Items	Specifications			
Environment	Temperature : 0 to 45 ℃ Humidity : 45 to 85%			
Insulation resistance	Power-chassis（GND） Over 20 M ohm（500 V DC megger）			
Dielectric strength	Power-chassis（GND） 1500 V AC for 1 minute			
Power supply	Ranges of voltage（5 ranges） 100, 115, 200, 220, 240 V AC ± 10%			
	Frequency Both for 50 and 60 Hz			
	Power consumption TYP.	Number of channels	4	6
		Balanced	54 VA	64 VA
		Maximum	180 VA	230 VA
External dimensions	445（W） × 250（H） × 428（D）mm			
Weight *4 Accessories	Number of channels		4	6
	Weight		approx. 17.5kg	approx. 19kg
Accessories	Chart paper 1 Chart holder one each for left and right Recording pen ・for channel 1（Red） NDH-01 1 ・for channel 2（Green） NDH-02 1 ・for channel 3（Brown） NDH-03 1 ・for channel 4（Yellow green） NDH-04 1 （In case of 6-channel） ・for channel 5（Blue） NDH-05 1 （In case of 6-channel） ・for channel 6（Orange） NDH-6 1 Power cable 1 fuse 1.5A 1 fuse 3A 1 Instruction manual			

Cautions: *1 Time required for driving 99% of input signal.

*2 Accuracy including the linearity when the polarity selection switch of standard input unit DV1（101 version） is set at "+" position and measured at maximum sensitivity range.

*3 Accuracy within 3 times repeats on the X-axis.

*4 Weight including the input unit DV1（101 versions） equivalent to number of channels.

4. Option

For U-638 recorder, following optional items are available. Factory option shows the optional items which can be attached at shipment from factory, user option shows the optional items which can be attached after purchased.

Factory option

No.	Items
1	Chart take-up device
2	Separate pen type event marker
3	DC-DC converter unit
4	GP-IB interface unit
5	RS232C interface unit
6	Parallel interface（conforms to CENTRONICS）
7	Character printing unit

Caution: Character printing unit and separate pen event marker cannot be mounted together.

User option

No.	Items
1	Input unit （Specification sheet is separately available.）
2	starage・unit （Specification sheet is separately available.）

Chart take-up device

Items	Specifications	
Model	U-638-TAK1 （000 version）	U-638-TAK1 （001 version）
Applicable chart paper	2501P50 25014TR50（Thermal） Rolled chart paper of 20m （Round perforation）	2501P50 25003TP50（Thermal） Rolled chart paper of 20m （Square perforation）
Operation	Interlocked with the chart drive mechanism of the recorder	
Weight	Approx. 250g	
Accessories	Chart take-up bobbin : 1 Chart holder : each 1 for left and right	

Product name	Drawing name
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Separate pen type event marker

Items	Specifications
Model	U-638-MRK1
Function	(1) Event marker function (2) Time marker function
Operation	(1) Event marker ・Direct operation with the operation panel key ・Operation with the external control connector (2) Time marker ・Unit of setting time is interlocked with unit of chart speed. Unit of chart speed / Range of setting time cm/min : 1 - 999 s cm/h : 1 - 999 m
Operating position	・Reference position (when stopped) Y-axis : Round perforation chart paper A position 3 mm right from the reference point of the chart paper. : Square perforation chart paper The right end in the marker space of the chart paper. T-axis : Round type perforation chart paper Position at 3 mm from reference point of chart paper to right. : Square type perforation chart paper On the same time axis of the last channel recording pen. ・Amplitude 2 mm left from the above reference position.
External control	・Input impedance : Over 4.7K ohm ・Signal : TTL level, transistor switch ("ON" in the low level)
Marker pen	Cartridge type fiber tip pen No. 4695 (red)
Pen lift	Channel 1 Interlocked with the recording pen.
Weight	Approx. 220g
Accessories	Marker pen 1

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DC/DC Inverter Unit（Factory's Option）

Items	Specifications		
Model	Ｕ－６３８－ＤＣＰ１		
Circuit System	Switching system		
Input voltage	12V DC（9V ～ 15V DC）		
Under Input Voltage/ Overvoltage Protection	Operates only within the normal range of voltage		
Protection against Inverted Connection of Input Voltage	With protection circuit		
Range of Service Temperature and Humidity	In conformity to those for main body		
Power Consumption	Number of channels	4	6
	When balanced	45w	53w
	Maximum	110w	144w
Insulation Resistance	Power-chassis（GND） More than 50 M Ω （DC 250V Megger）		
Dielectric Strength	Power-chassis（GND） DC 250v（one minute）		
External Dimensions	300（W） × 126（H） × 50（D） mm		
Weight	Approx. 1.5kg		
Accessories	Fuse 20A 1 Power cable（for DC） 1		

Product name	Drawing name
U－６３８	U－６３８ Desktop recorder SPECIFICATIONS

GP-IB interface unit

General specifications

Items	Specifications	
Model	Ｕ－６３８－ＧＰ１１	
Type	Electric specification	ＩＥＥＥ Std 488 － 1978 It applies to a standard correspondingly.
	Mechanical specification	〃
Interface function	SH1, AH1, T5, L3, SR1, RL0, PP0, DC0, DT1, C0	
Circuit System	The system which constitutes from an electronic circuit and is combined as an extended function of a main part microprocessor.	
Power Consumption	５ＶＡ（ＴＹＰ.）	
External Dimensions	300(W) × 126(H) × 25(D) mm	
Weight	Approx. 520g	

Function specifications

Items	Specifications	
Listeners function	A setup of character printing ／ Control	
	Status printing	ON of a manual status printing
	Character printing	A setup of a character input ／ Release Registration of a character input code （Character code : JIS 158 character） （JIS X 0201 Conform）
	A setup of analog record ／ Control	
	A setup of a mode	Recording mode Transmitting mode of Starage data
	A setup of a function	Ｔ－Ｙ Recording　　Synchronizer ＯＮ 〃　　〃　　ＯＦＦ Ｘ－Ｙ Recording
	Date	Receiver record ／ Release （Input code : JIS X 0201 Conform） Scaling of transceiver data Designate of a transmitting channel Request to send
	Chart paper feeding	ON ／ OFF of drive ON ／ OFF of chart fast feed(normal/reverse) ON of chart paper home position return A setup of home position A setup of speed
	Pen lift	UP ／ DOWN of a record pen

Product name	Drawing name
U－６３８	U－６３８ Desktop recorder SPECIFICATIONS

Items	Specifications	
Listeners function	A setup of analog record ／ Control	
	Marker	ON of Superimposing type marker ON ／ OFF of a Separate pen type marker ON ／ OFF of a Time marker Time set of a Time marker
	Input unit	Ａ setup of a ＴＣＶ３Ａ
	Starage unit	Clear of ＳＵ－１１２
	Other setup	
	Status	Request to Send
	Initialization	Initialization
Torca function	Date	Data transmission of a record pen position （Transmission code : JIS X 0201 Conform ）
	Status	Status transmission of U-638
Service request	Starage unit	READY of SU-112
	Chart paper	ＥＮＤ
	Error information	The header error of a format When exceeding the numerical range of the format The form error of a format When exceeding the number of character of the format When the printer is not equipped The setting position error of a printing mode switch

Product name	Drawing name
U－６３８	U－６３８ Desktop recorder SPECIFICATIONS

RS-232C interface unit

General specifications

Items	Specifications
Model	Ｕ－６３８－ＲＳ１１
Type	ＥＩＡ　ＲＳ－２３２Ｃ　　It applies to a standard correspondingly. （ＪＩＳ　Ｃ　６３６１　　〃　　）
Circuit System	The system which constitutes from an electronic circuit and is combined as an extended function of a main part microprocessor.
Synchronous system ※１ ※１	Start － Stop type The number of start bits　１ The number of data bits　７ or ８ The number of stop bits　１，１ １／２ or ２
Data signal speed ※１ （Baud rate）	75，110，150，300，600，1.2k，2.4k，4.8k，9.6k bits／s
Communication system	Only one direction can be communicated simultaneously. （Half duplex）
Error detection ※１	Horizontal parity （Nothing ・Odd number ・Even number）
Power Consumption	５ＶＡ（ＴＹＰ.）
External Dimensions	300(W) × 126(H) × 25(D) mm
Weight	Approx. 520g

※１ : It chooses with a DIP switch.

Product name	Drawing name
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Function specifications

Items	Specifications	
Listeners function	A setup of character printing ／ Control	
	Status printing	ON of a manual status printing
	Character printing	A setup of a character input ／ Release Registration of a character input code （Character code : JIS 158 character） （JIS X 0201 Conform）
	A setup of analog record ／ Control	
	A setup of a mode	Recording mode Transmitting mode of Starage data
	A setup of a function	Ｔ－Ｙ Recording　　Synchronizer ＯＮ 〃　　〃　　ＯＦＦ Ｘ－Ｙ Recording
	Date	Receiver record ／ Release （Input code : JIS X 0201 Conform） Scaling of transceiver data Designate of a transmitting channel Request to send
	Chart paper feeding	ON ／ OFF of drive ON ／ OFF of chart fast feed（normal/reverse） ON of chart paper home position return A setup of home position A setup of speed
	Pen lift	UP ／ DOWN of a record pen
	Marker	ON of Superimposing type marker ON ／ OFF of a Separate pen type marker ON ／ OFF of a Time marker Time set of a Time marker
	Input unit	Ａ setup of a ＴＣＶ３Ａ
	Starage unit	Clear of ＳＵ－１１２
	Other setup	
	Status	Request to Send
	Initialization	Initialization

Product name	Drawing name
U－６３８	U－６３８ Desktop recorder SPECIFICATIONS

Function specifications

Items	Specifications	
Transmitting function	Date	Data transmission of a record pen position （Transmission code : JIS X 0201 Conform ）
	Status	Status transmission of U-638
Error information	Chart paper	ＥＮＤ
	Error information	The header error of a format When exceeding the numerical range of the format The form error of a format When exceeding the number of character of the format When the printer is not equipped The setting position error of a printing mode switch

Product name	Drawing name
U－６３８	U－６３８ Desktop recorder SPECIFICATIONS

Parallel interface
General specifications

Items	Specifications
Model	Ｕ－６３８－ＰＩＦ１
Type	It is based on Centronics. The parallel interface of 8 bit TTL
Circuit System	The system which constitutes from an electronic circuit and is combined as an extended function of a main part microprocessor.
External Dimensions	Main part built-in

Function specifications

Items	Specifications	
Listeners function	A setup of character printing ／ Control	
	Status printing	ON of a manual status printing
	Character printing	A setup of a character input ／ Release Registration of a character input code （Character code : JIS 158 character） （JIS X 0201 Conform）
	A setup of analog record ／ Control	
	A setup of a function	Ｔ－Ｙ Recording　　Synchronizer ＯＮ 〃　　〃　　ＯＦＦ Ｘ－Ｙ Recording
	Date	Scaling of receiving data
	Chart paper feeding	ON ／ OFF of drive ON ／ OFF of chart fast feed（normal/reverse） ON of chart paper home position return A setup of home position A setup of speed
	Pen lift	UP ／ DOWN of a record pen
	Marker	ON of Superimposing type marker ON ／ OFF of a Separate pen type marker ON ／ OFF of a Time marker Time set of a Time marker
	Other setup	
	Initialization	Initialization
Signal output	Recording form end ON/OFF state of a synchronizer	

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Character printing unit

Date, status or marker can be printed in the blank of right end the chart paper in a row.

Connection with the host computer enabled character printing by character code input.

Items	Specifications
Model	U-638-PRN1
Printing method	Wire-dot
Print head	Thermal・serial・head（８ dot）
Effective printing width	Approx. ３㎜
Printing position	Between the base line at the right（scale ０%） end of a recording form and perforation
Chart paper	Circular type perforation 20m long, right zero ・Thermal Rolled type No. 25014TP50 ・thermal Z-folded type No. 25014TZ150 Square type perforation 20m long, right zero ・Thermal Rolled type No. 25003TP50 ・thermal Z-folded type No. 25003TZ150
Printing mode	Status printing ・Repeat printing ・Manual printing Marker printing ・Event marker ・Time marker （As to interval, refer to the item for separate pen type event marker.） Character printing ・Input printing of character code from the host computer JIS 158 characters（conforms to JIS X 0201） Refer to character code table.
Character composition	ANK : 5 × 7 dots
Character size	ANK : 1.8 × 2.8 mm
Character interval	2.117 ㎜ （12 Character ／ Inch）
Printing speed	It is dependent on recording form sending speed.

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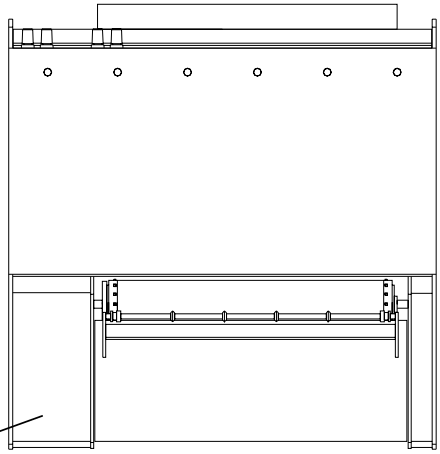
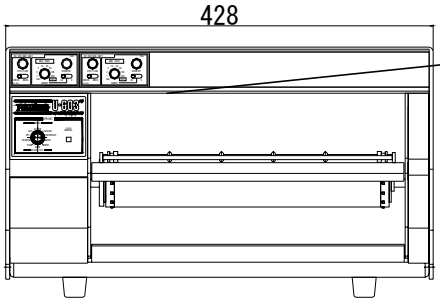
5. EXTERNAL VIEW

Top view



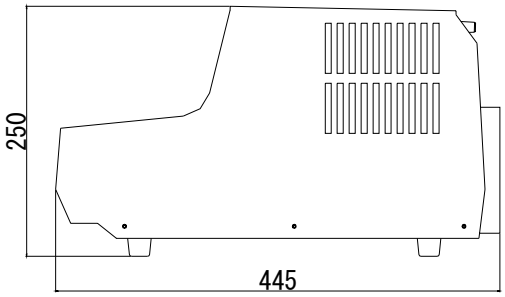
Operation Panel

Front panel



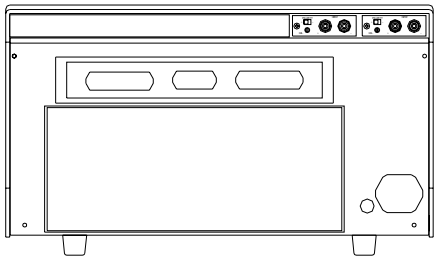
Input unit

Left side view



DC-DC Inverter Unit,
GP-IB Interface Unit, etc.
（Options）

Rear Panel



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