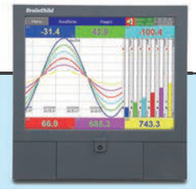
BrainChild

PR Series
Paperless Recorders

Outstanding Specifications & Features

			
	PR10	PR20	PR30
Product position	low-cost one, good for replacing 6-dotting chart recorders, and 1, 2, 3 pen recorders	medium size and powerful one, input numbers up to the highest 24 channels	big size and high-end one, good for sophisticated applications, for example power industry
Input numbers	3, 6 channels	3, 6, 12, 18, 24 channels	6, 12, 18, 24, 30, 36, 42, 48 channels
Input Signals	Thermocouples: J, K, T, E, B, R, S, N, L, U, P, W5 or C, W3, LR, A1, A2, A3, M RTD: Pt50, Pt100, Pt200, Pt500, Pt1000 (α=0.00385), Pt50, Pt100 (α=0.00391) JPt50, JPt100, JPt200, JPt500, JPt1000 (α=0.003916) Ni100, Ni200, Ni500, Ni1000 (α=0.00617) mA, V, mV		
The fastest sampling rate	to reach 100 msec / dot, default setting at 1 sec / dot		
Digital inputs / Relay outputs	Maximum 24 channels		
Analog outputs	Maximum 6 channels	Maximum 6 channels	Maximum 12 channels
Math channels (in standard firmware)	15	40	60
External channels (in plus 1/3 firmware)	24	48	96
Batch & FDA 21 CFR part 11	available in plus 1/3 firmware		
Custom display	available in plus 2/3 firmware		
Display	4.3" TFT wide touch screen	5.6" TFT touch screen	12.1" TFT touch screen
Resolution	480 x 272	640 x 480	1024 x 768
MTFB backlight at 25°C	30,000 hrs	30,000 hrs	60,000 hrs
Backlight	LED		
Screen saver, Email	Yes		
CPU	ARM Cortex-A8, 1Ghz with 256 MB RAM		
Internal Flash memory	256 MB		
Ethernet	Modbus TCP/IP		
RS-232/422/485	optional RS-232 or RS-422/485 Modbus RTU		
SD card Slot, USB host x 2	standard, one USB in the front, another USB in the back		
Pulse input	optional DI card supports pulse input up to 100 Hz		
PID Process control	Maximum 4 cards	Maximum 4 cards	Maximum 8 cards
START / STOP key	to turn on /off the system only, not the power so that a quick restart		
Calibration correction	on-site calibration possible, or using handy features of Offset and Gain for correction		
Multilingual	convenient for local users by offering languages in Brazil Portuguese, Chinese (simplified, traditional), Czech, Danish, Dutch, English, French, German, Greek, Italian, Japanese, Korean, Polish, Portuguese, Russian, Spanish, Swedish, Thai, Turkish, other languages negotiable		
PC software	standard: Historical Viewer+Configuration, optional Data Acquisition Studio for real-time monitoring & logging		
Power supply	90-250VAC or 11-36VDC		
Outer dimensions (W x H x L mm)	144 x 144 x189	144 x 144 x189	288 x 288 x 189
Shorter mounting depth (mm)	171	171	171
DIN Panel cutout (W x H mm)	137 x 137	137 x 137	281 x 281
Protection	IP65 front, IP20 rear		
Operating temperature	0°C to 50°C		
Storage temperature	-30°C to 70°C		
Safety standards	CE, UL, cUL, RoHS, WEEE (UL & cUL available only for 90-250VAC on PR10 & PR20)		

Features

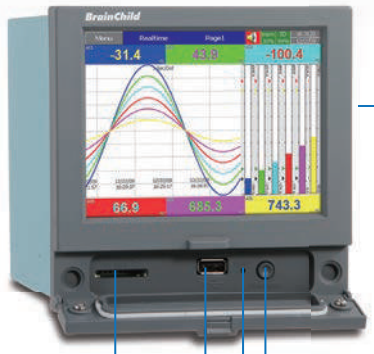
* 100 milliseconds data logging
* FDA 21 CFR part11 compliance
* Batch control, log data in batches
* Timer, Counter, Totalizer & Math channels
* Custom display pages
* PID control with profile function
* Alarms by email
* On field calibration
* Web server
* Clock synchronization via internet
* Handwriting function in historical data
* Multiple Languages
* Circular chart in PR30
* Direct printer connectivity or PDF printer
* USB barcode reader connectivity for data entry
* Dynamic data exchange (DDE) via PC software

IO modules easy for expansion

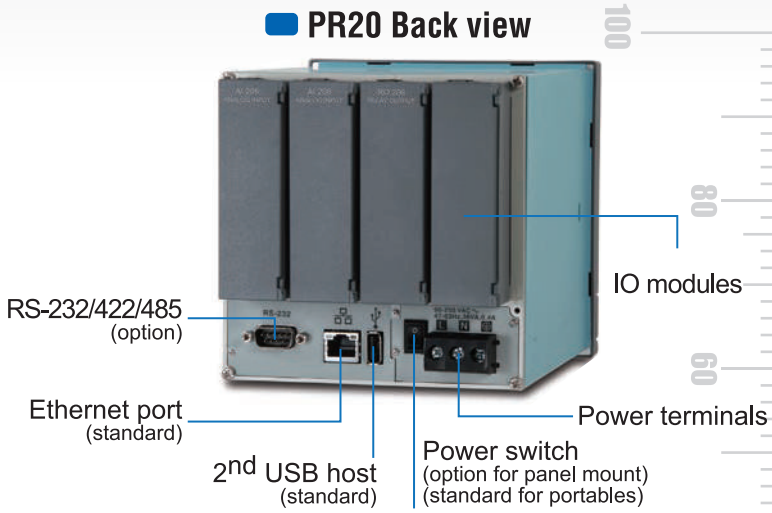
Smart Mechanism

Front view, Back view

PR20 Front view



PR20 Back view



Expandable modules of inputs & outputs

AI206
6 AI (6 analog inputs)

AI203
3 AI (3 analog inputs)

RO206
6 relay outputs

DI206
6 DI (6 digital inputs)

PC201
single loop process control

AO206
6 AO (6 analog outputs)

RD233
3 relays + 3DI

PR10
(4 Slots, up to 6 AI)

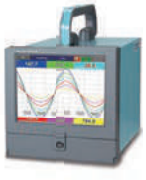
PR20
(4 Slots, up to 24 AI)

PR30
(16 Slots, up to 48 AI)

Portable recorders, Security key

Portable recorders

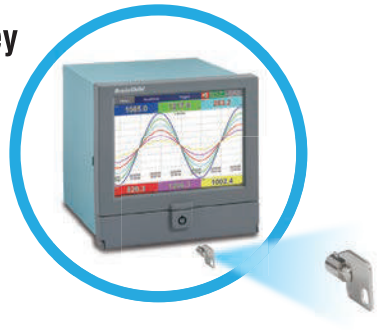
PR10



PR20

PR30

Security key



PC201: Single Loop PID Process Control Card

Input 1

Characteristics :

Type	Range	Accuracy @25°C	Input Impedance
J	-120°C -1000°C (-184°F -1832°F)	±2°C	2.2MΩ
K	-200°C -1370°C (-328°F -2498°F)	±2°C	2.2MΩ
T	-250°C -400°C (-418°F -752°F)	±2°C	2.2MΩ
E	-100°C -900°C (-148°F -1652°F)	±2°C	2.2MΩ
B	0°C -1820°C (32°F -3308°F)	±2°C (200°C - 1820°C)	2.2MΩ
R	0°C -1767.8°C (32°F -3214°F)	±2°C	2.2MΩ
S	0°C -1767.8°C (32°F -3214°F)	±2°C	2.2MΩ
N	-250°C -1300°C (-418°F -2372°F)	±2°C	2.2MΩ
L	-200°C -900°C (-328°F -1652°F)	±2°C	2.2MΩ
PT100 (DIN)	-210°C -700°C (-346°F -1292°F)	±0.4°C	1.3KΩ
PT100 (JIS)	-200°C -600°C (-328°F -1112°F)	±0.4°C	1.3KΩ
mV	-8mV -70mV	±0.05%	2.2MΩ
mA	-3mA -27mA	±0.05%	70.5Ω
V	-1.3V -11.5V	±0.05%	302KΩ

Resolution : 18 bits
Sampling Rate : 5 times / second
Maximum Rating : -2 VDC minimum, 12 VDC maximum (1 minute for mA input)
Temperature Effect : ±1.5 uV/˚C for all inputs except mA input ±3.0 uV/˚C for mA input
Sensor Lead Resistance Effect :
T/C: 0.2uV/ohm
3-wire RTD: 2.6 ˚C/Ω of resistance difference of two leads
2-wire RTD: 2.6 ˚C/Ω of resistance sum of two leads 200nA
Common Mode Rejection Ratio (CMRR) : 120dB
Normal Mode Rejection Ratio (NMRR) : 55dB
Sensor Break Detection :
Sensor open for TC, RTD and mV inputs,
below 1 mA for 4-20 mA input,
below 0.25V for 1 - 5 V input, unavailable for other inputs
Sensor Break Responding Time :
Within 4 seconds for TC, RTD and mV inputs,
0.1 second for 4-20 mA and 1 - 5 V inputs

Input 2

Resolution : 18 bits
Sampling Rate : 1.66 times / second
Maximum Rating : -2 VDC minimum, 12 VDC maximum
Temperature Effect : ±1.5uV/˚C for all inputs except mA input ±3.0uV/˚C for mA input
Common Mode Rejection Ratio (CMRR): 120dB
Normal Mode Rejection Ratio (NMRR) : 55dB
Sensor Break Detection : Below 1 mA for 4-20 mA input, below 0.25V for 1 - 5V input, unavailable for other inputs
Sensor Break Responding Time : 0.5 second
Characteristics :

Type	Range	Accuracy @25°C	Input Impedance
CT94-1	0-50.0 A	±2% of Reading ±0.2 A	302 KΩ
mA	-3mA-27mA	±0.05%	$70.5\Omega + \frac{0.8V}{\text{input current}}$
V	-1.3V-11.5V	±0.05%	302 KΩ

Input 3 (Event Input)

Logic Low : -10V minimum, 0.8V maximum.
Logic High : 2V minimum, 10V maximum
External pull-down Resistance : 400 KΩ maximum
External pull-up Resistance : 1.5 MΩ minimum

Output 1 / Output 2

Relay Rating : 2A/240 VAC, life cycles 200,000 for resistive load
Pulsed Voltage : Source Voltage 5V, current limiting resistance 66Ω
Linear Output Characteristics

Type	Zero Tolerance	Span Tolerance	Load Capacity
4-20 mA	3.6-4 mA	20-21 mA	500 Ω max.
0-20 mA	0 mA	20-21 mA	500 Ω max.
0-5 V	0 V	5-5.25 V	10 KΩ min.
1-5 V	0.9-1 V	5-5.25 V	10 KΩ min.
0-10 V	0 V	10-10.5 V	10 KΩ min.

Linear Output
Resolution : 15 bits
Output Regulation : 0.01 % for full load change
Output Settling Time : 0.1 sec. (stable to 99.9 %)
Isolation Breakdown Voltage : 1000 VAC
Temperature Effect : ±0.0025 % of SPAN / ˚C
Triac (SSR) Output
Rating : 1A / 240 VAC
Inrush Current : 20A for 1 cycle
Min. Load Current : 50 mA rms
Max. Off-state Leakage : 3 mA rms
Max. On-state Voltage : 1.5 V rms
Insulation Resistance : 1000 MΩ min. at 500 VDC
Dielectric Strength : 2500 VAC for 1 minute
DC Voltage Supply Characteristics (Installed at Output 2)

Type	Tolerance	Max. Output Current	Ripple Voltage	Isolation Barrier
20 V	±0.1 V	25 mA	0.2 Vp-p	500 VAC
12 V	±0.6 V	40 mA	0.1 Vp-p	500 VAC
5 V	±0.25 V	80 mA	0.05 Vp-p	500 VAC

Alarm 1/ Alarm 2 (Output 2)

Alarm 1 Relay :
Form C, life cycles 200,000 for resistive load
Alarm 2 Relay :
Form A, Max. rating 2A / 240VAC, life cycles 200,000 for resistive load
Dwell Timer : 0 - 6553.5 minutes

Control Mode

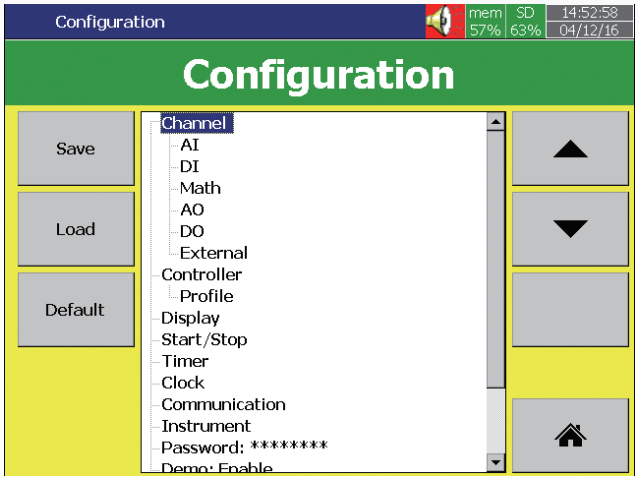
Output 1 : Reverse (heating) or direct (cooling) action
Output 2 : PID cooling control, cooling P band 1 ~ 255% of PB
ON-OFF : 0.1-100.0˚C (0.1-100.0˚F) hysteresis control (P band = 0)
P or PD : 0 - 100.0 % offset adjustment
PID : Fuzzy logic modified , Proportional band 0 ~ 500.0 ˚C , Integral time 0 - 1000 seconds , Derivative time 0 - 360.0 seconds
Cycle Time : 0.1 - 100.0 seconds
Manual Control : Heat (MV1) and Cool (MV2)
Auto-tuning : Cold start and warm start
Self-tuning : Select None and YES
Failure Mode : Auto-transfer to manual mode while sensor break or A-D converter damage
Ramping Control : 0-500.0˚C (0 - 900.0˚F) / minute or 0-500.0˚C (0 - 900.0˚F) / hour ramp rate
Sleep Mode : Enable or Disable
Power Limit : 0 - 100 % output 1 and output 2
Pump / Pressure Control : Sophisticated functions provided
Remote Set Point : Programmable range for voltage or current input
Differential Control : Control PV1 - PV2 at set point
Digital Filter
Function : First order
Time Constant : 0, 0.2, 0.5, 1, 2, 5, 10, 20, 30, 60 seconds programmable

Profiler

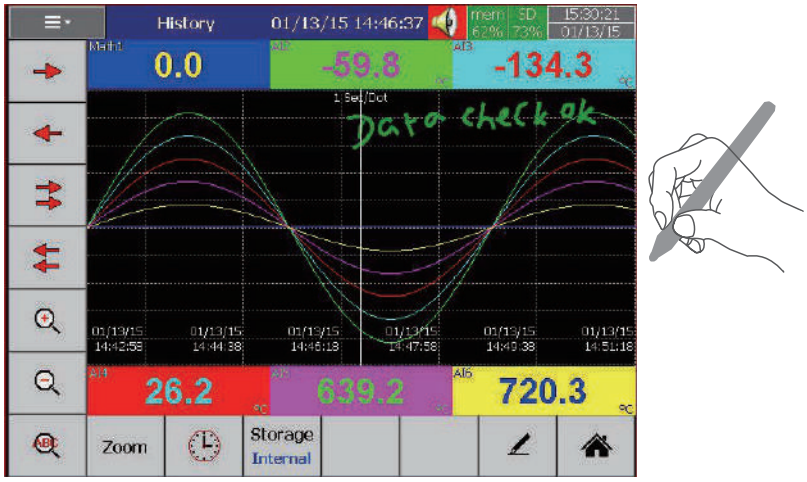
Number of Profiles : 50 per recorder
Number of Segments per Profile : 32
Note : Total Segments are limited to 1000 Segments

User friendly functions in recorders

Configuration in Tree Layout is easy for operation

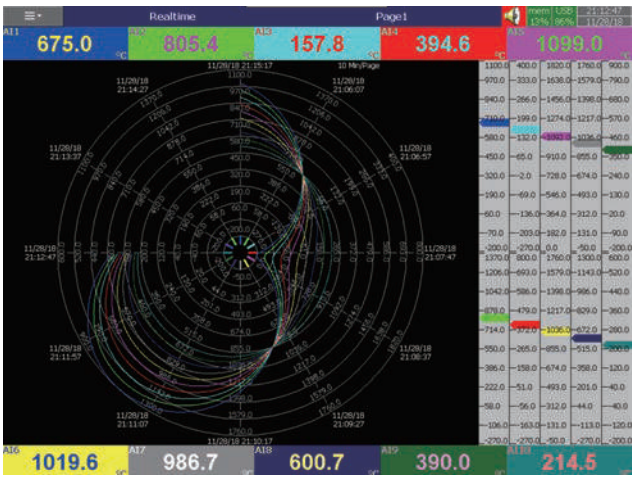


Handwriting messages are handy for users



Circular display (PR30 only)

For some industries preferred circular display, PR30 can offer this unique feature and set the display speed for each page/circle in 30 minutes, 1, 2, 4, 8, 12 hours,1, 2 days, or 1, 2, 4 weeks.



Standard version of Firmware

AI: Analog input is offered various log speed in 100ms, 1, 2, 5, 10, 20, 30 Sec, 1, 2 Min/Dot.

DI: Digital input is offered either normal Logic or high frequency Pulse.

AO: In analog output, mA or V and its Expression can be defined.

DO: Digital output/relay output can be enabled. Each DO card has 6 relays.

Display: Various display speeds are available in 100ms, 1, 2, 5, 10, 20, 30 Sec/Dot, or 1, 2, 10, 30 Min/Page, 1, 2, 4, 8, 12 Hour/Page, or 1 Day/Page.

Timer: Timer in Countdown, Repeat Countdown, Daily, Weekly or Monthly base, and various jobs can be defined.

Clock: Date Style of MM/dd/yy or dd/MM/yy, Time Synchronize via Internet, and Summer Saving Time can be defined.

Communication: Web Server and Email functions are available in Communication in Standard firmware.

Instrument: Brightness adjustment and Screen Saver are available in Instrument.

Password: If Normal Security is chosen, then only one password is offered. If high Security of CFR-21 is chosen, then 9 levels of password can be defined.

Demo: Enable or disable the demonstration.

Auto-output: Automatic output can be set to specify the printer, to print Historical data & Report data in specified period of time.

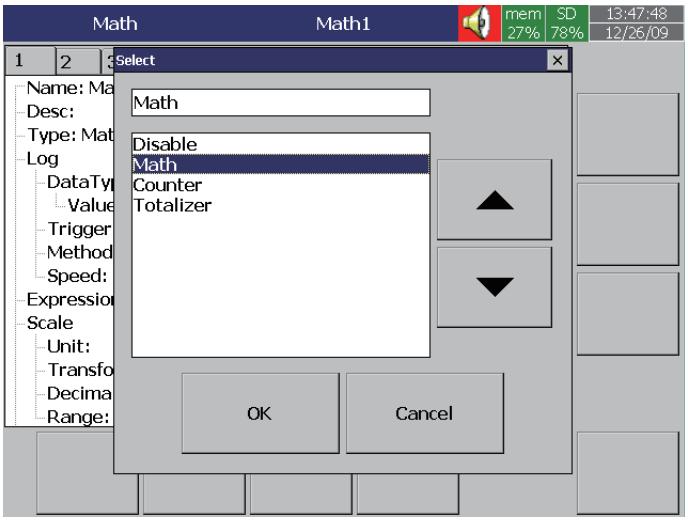
System information: It gives Firmware version number, Internal & External memory status, IP address, and IO card status of each Slot.

Calibrate: Sometimes the field calibration is required for high accuracy. In this case, a qualified engineer can do the necessary calibration.

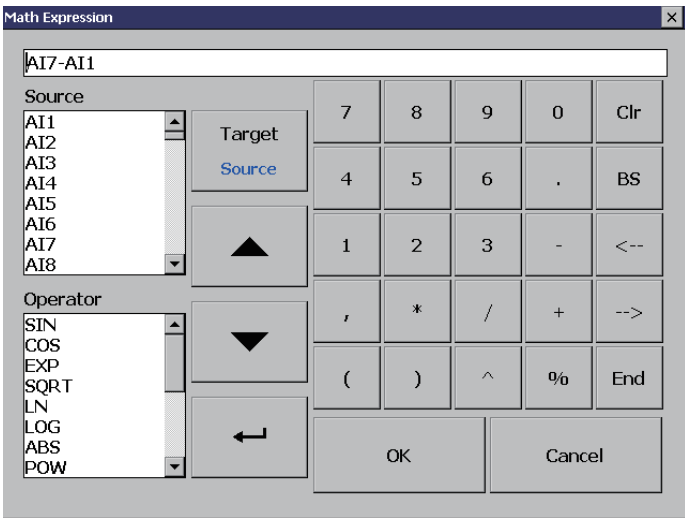
User friendly functions in recorders

Math: Standard version includes mathematics

Math: It includes Math, Counter & Totalizer.



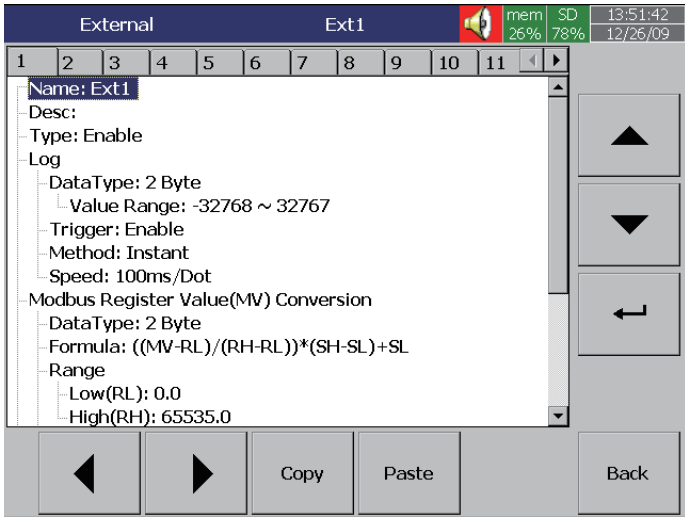
Math Expression is keyed in an easy way.



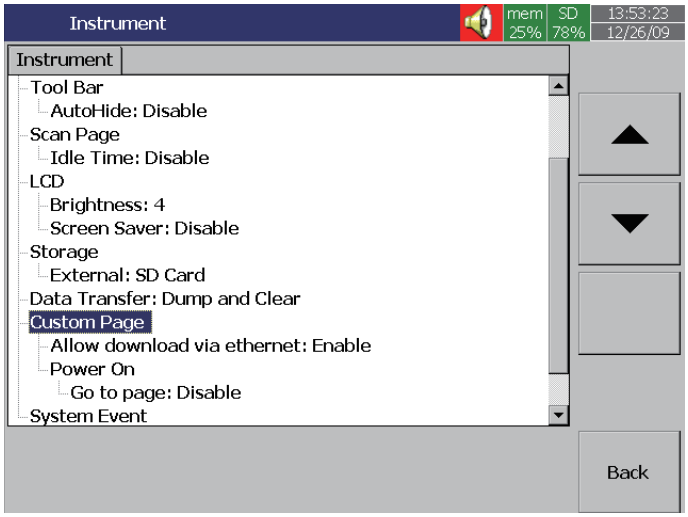
Plus version of Firmware

Plus versions offer more features of External Channels, Custom Display, Batch, FDA 21 CFR part 11.

External Channels: Besides AI & DI inputs, PR recorders accept inputs through communication called External Channels. PR10, PR20 & PR30 can work External Channels maximum up to 24, 48 & 96 respectively.



Custom Edited Display: In Plus versions, PC software Panel Studio allows users to edit the specific display instead of standard one, and then download it onto PR recorders.



Batch: Batch production record is constantly required for more strict production, for example food and drugs.

FDA 21 CFR part 11: This feature is complied with U.S. Food and Drug Administration with human health concern. All data should be avoided from manipulating after recording.

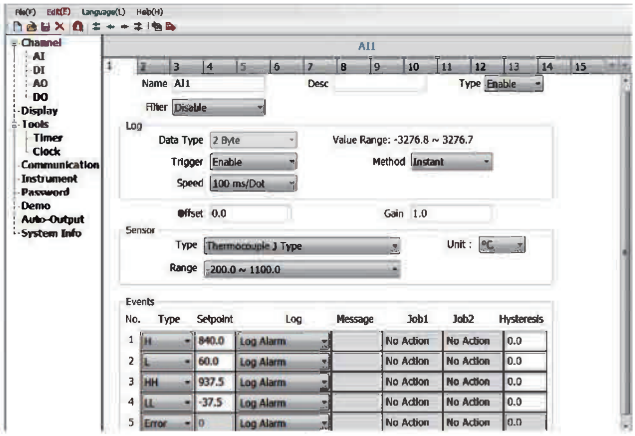
Powerful functions in PC Software

Free basic software

It consists of two parts, which are Configuration and Historical Viewer.

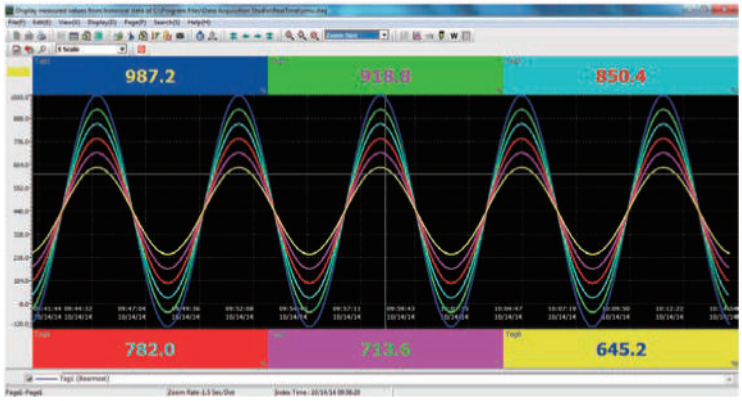
I. Configuration

It is easy to do recorder configuration on PC.
Then, send the configuration files from PC to recorder.



II. Historical Viewer

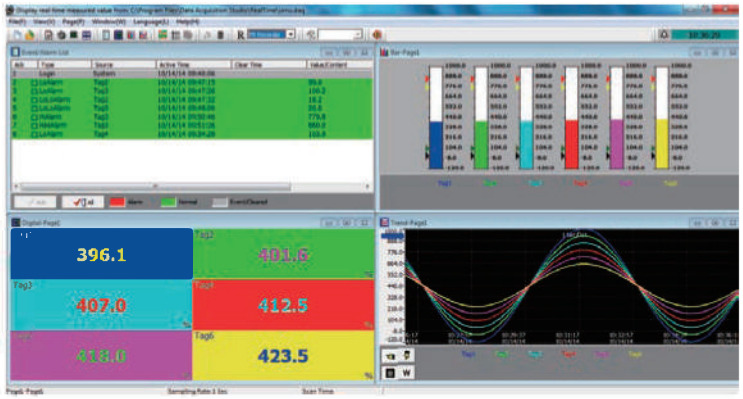
It can display historical trends, historical alarms, events, and then print it. It can search data by time, time period, tag, alarm, events and remarks. It also can export data in CSV format.



Extensive software Data Acquisition Studio

III. RealTime Viewer

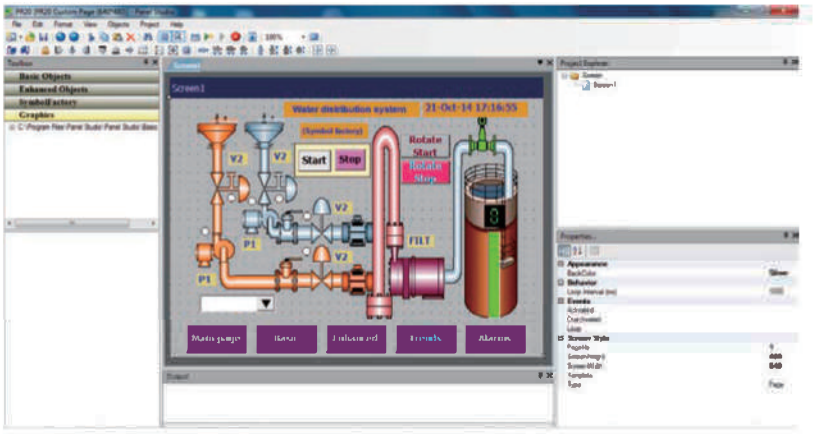
Besides Configuration & Historical Viewer, it offers additional software RealTime Viewer for real-time monitoring.



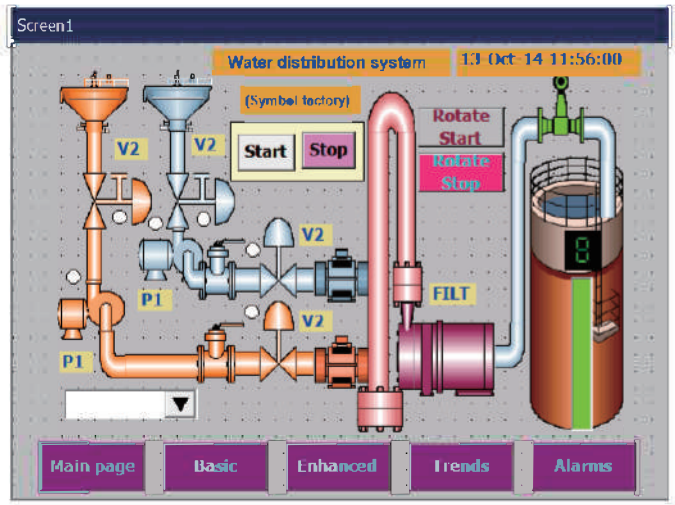
IV. Panel Studio

If Plus version 2 or 3 of Firmware is purchased, additional software Panel Studio is offered for editing custom display. The users can use it to edit specific displays on PC first, and then download it onto recorders. The custom edited displays will be additional pages to standard ones.

Edit it on PC



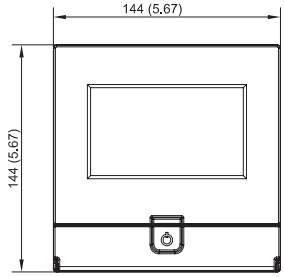
Download it onto recorders

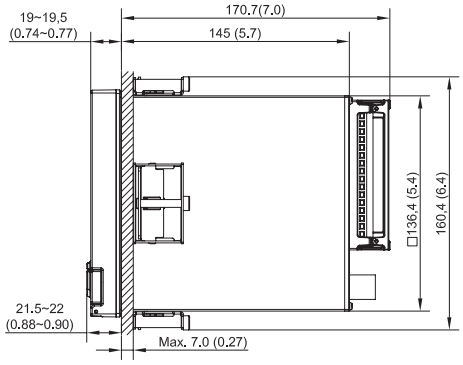


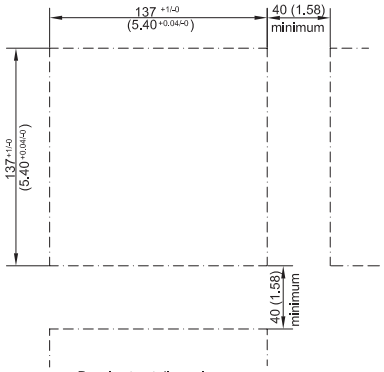
Installation

Dimensions in mm (in.)

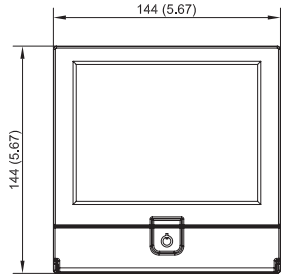
PR10

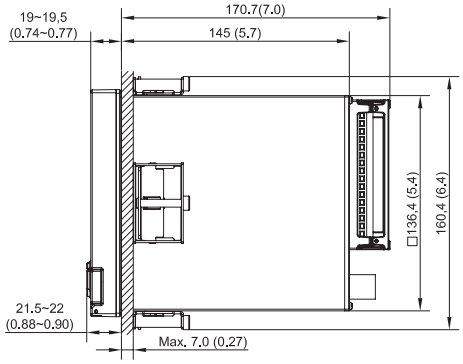


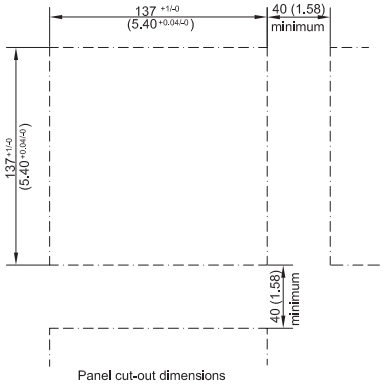




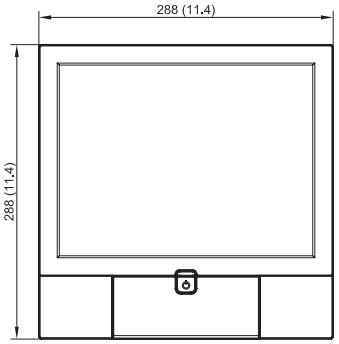
PR20

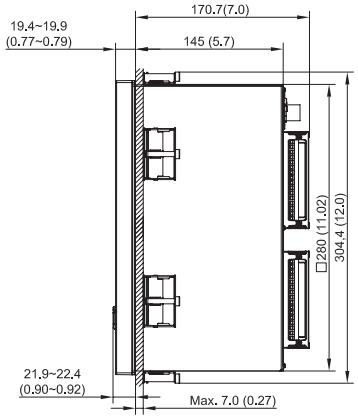


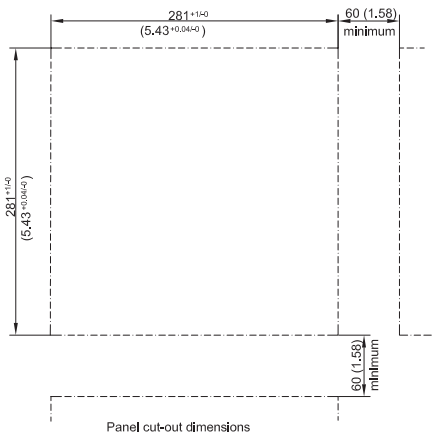




PR30







Ordering Code

PR10 Ordering Code

PR1003 – □ □ □ □ □ □ □□
(3 analog inputs)

Other inputs & outputs*
0: none
6: 3 relays + 3 DI

PR1006
(6 analog inputs)

Other inputs & outputs*
0: none
1: 6 relays
3: 6 DI
6: 3 relays + 3 DI
7: 6 relays + 6 DI

Power
A: 90-250 VAC, 50/60 Hz
D: 11-36 VDC

Communication
0: standard Ethernet
1: Ethernet + RS232
2: Ethernet + RS-422/485

Firmware
0: standard version with mathematics
1: Plus version 1 with external channels, batch & FDA 21 CFR part 11
2: Plus version 2 with custom edited display, an editing software Panel Studio to be supplied
3: Plus version 3 including Plus version 1+2 above

PC software
1: free basic software of Historical Viewer & Configuration
2: extensive software Data Acquisition Studio (RealTime Viewer + Historical Viewer + Configuration)

Mounting types, power cord & switch
0: panel mount, no power cord, no power switch
1: panel mount, no power cord, power switch
2: portable, UL & CSA power cord, power switch
3: portable, VDE power cord, power switch
4: portable, SAA power cord, power switch
5: portable, BS power cord, power switch
6: portable, no power cord, power switch
7: panel mount, UL & CSA power cord, power switch
8: panel mount, VDE power cord, power switch
9: panel mount, SAA power cord, power switch
A: panel mount, BS power cord, power switch

Special options
00: none
S1: 16G SD card
S2: 32G SD card

*Note: DI - digital inputs
PID Process control card can be purchased separately

Process Control card Ordering Code

PC201 – □ □ □ □

Output 1
0: None
1: Relay 2A/240VAC
2: Pulse voltage to drive SSR, 5V/30mA
3: Isolated 4-20mA/0-20mA (OM95-3)
4: Isolated 1-5V/0-5V (OM95-4)
5: Isolated 0-10V (OM95-5)
6: Triac output 1A/240VAC,SSR
C: Pulse voltage to drive SSR, 14V/40mA (OM94-7)

Output 2
0: None
1: Relay 2A/240VAC
2: Pulse voltage to drive SSR, 5V/30mA
3: Isolated 4-20mA/0-20mA (OM95-3)
4: Isolated 1-5V/0-5V (OM95-4)
5: Isolated 0-10V (OM95-5)
6: Triac output 1A/240VAC,SSR
7: Isolated 20VDC/25mA power supply (DC94-1)
8: Isolated 12VDC/40mA power supply (DC94-2)
9: Isolated 5VDC/80mA power supply (DC94-3)
C: Pulse voltage to drive SSR, 14V/40mA (OM94-7)

Alarm 1
0: None
1: Form C relay 2A/240VAC

Alarm 2
0: None
1: Form A relay 2A/240VAC

PR20 Ordering Code

PR2003
(3 analog inputs)

Other inputs & outputs*
0: none
6: 3 relays + 3 DI
C: 3 relays + 3 DI + 6 AO

PR2006
(6 analog inputs)

Other inputs & outputs*
0: none
1: 6 relays
3: 6 DI
5: 6 AO
6: 3 relays + 3 DI
7: 6 relays + 6 DI
A: 6 relays + 6 AO
B: 6 DI + 6 AO
C: 3 relays + 3 DI + 6 AO
D: 6 relays + 6 DI + 6 AO

PR2009/12
(9/12 analog inputs)

Other inputs & outputs*
0: none
1: 6 relays
2: 12 relays
3: 6 DI
4: 12 DI
5: 6 AO
6: 3 relays + 3 DI
7: 6 relays + 6 DI
8: 9 relays + 3 DI
9: 3 relays + 9 DI
A: 6 relays + 6 AO
B: 6 DI + 6 AO
C: 3 relays + 3 DI + 6 AO

PR2015/18
(15/18 analog inputs)

Other inputs & outputs*
0: none
1: 6 relays
3: 6 DI
5: 6 AO
6: 3 relays + 3 DI

PR2021/24
(21/24 analog inputs)

Other inputs & outputs*
0: none

Power

A: 90-250 VAC, 50/60 Hz
D: 11-36 VDC

Communication

0: standard Ethernet
1: Ethernet + RS232
2: Ethernet + RS-422/485

Firmware

0: standard version with mathematics
1: Plus version 1 with external channels batch & FDA 21 CFR part 11
2: Plus version 2 with custom edited display, an editing software Panel Studio to be supplied
3: Plus version 3 including Plus version 1+2 above

PC software

1: free basic software of Historical Viewer & Configuration
2: extensive software Data Acquisition Studio (RealTime Viewer + Historical Viewer + Configuration)

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4: portable, SAA power cord, power switch
5: portable, BS power cord, power switch
6: portable, no power cord, power switch
7: panel mount, UL & CSA power cord, power switch
8: panel mount, VDE power cord, power switch
9: panel mount, SAA power cord, power switch
A: panel mount, BS power cord, power switch

Special options

00: none
S1: 16G SD card
S2: 32G SD card

**Note: DI - digital inputs*
AO - analog retransmission output
PID Process control card can be purchased separately
Process control card cannot be chosen together with PR2003, PR2006, PR2012, PR2018 order codes 5, A, B, C, D nor with PR2024 (24 analog inputs)

PR30 Ordering Code

PR3006 (6 analog inputs)
PR3012 (12 analog inputs)
PR3018 (18 analog inputs)
PR3024 (24 analog inputs)
PR3030 (30 analog inputs)
PR3036 (36 analog inputs)
PR3042 (42 analog inputs)
PR3048 (48 analog inputs)

Relay outputs

0: none
1: 6 relays
2: 12 relays
3: 18 relays
4: 24 relays

Digital inputs

0: none
1: 6 channels
2: 12 channels
3: 18 channels

Analog outputs

0: none
1: 6 channels
2: 12 channels

Power

A: 90-250 VAC, 50/60 Hz
D: 11-36 VDC

Communication

0: standard Ethernet
1: Ethernet + RS232
2: Ethernet + RS-422/485

Firmware

0: standard version with mathematics
1: Plus version 1 with external channels, batch & FDA 21 CFR part 11
2: Plus version 2 with custom edited display, an editing software Panel Studio to be supplied
3: Plus version 3 including Plus version 1+2 above

PC software

1: free basic software of Historical Viewer & Configuration
2: extensive software Data Acquisition Studio (RealTime Viewer + Historical Viewer + Configuration)

Mounting types, power cord & switch

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7: panel mount, UL & CSA power cord, power switch
8: panel mount, VDE power cord, power switch
9: panel mount, SAA power cord, power switch
A: panel mount, BS power cord, power switch

Special options

00: none
S1: 16G SD card
S2: 32G SD card

**Note: PID Process control card can be purchased separately*