BrainChild

BrainChild

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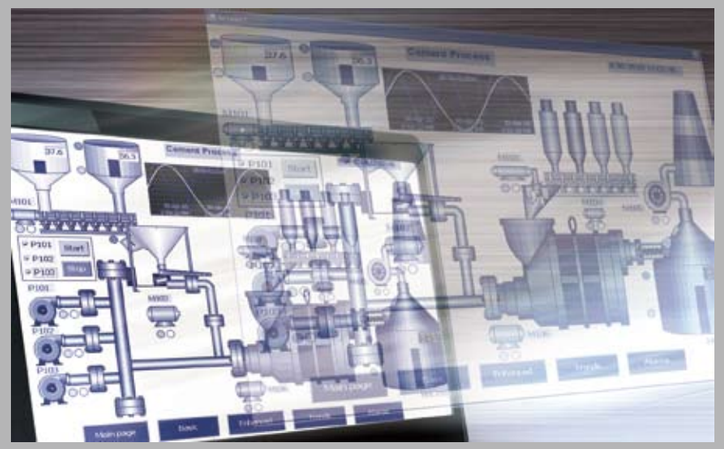
*Smart*panels
operator interfaces



human machine interfaces for all industries

Brainchild Electronic Co., Ltd. was established in 1977. We have been the largest temperature controller maker in Taiwan since then, and the only maker of paperless recorder in Taiwan since 2003. In spring 2011 Brainchild started to introduce new product line of human machine interfaces with very high performance/price ratio to markets.

TÜV Rheinland certified our factory ISO9001. A CSA certified laboratory is used to do CSA tests, plus UL and CE tests. The strong and experienced R&D team helps us to offer customers innovative and state-of-art industrial instruments. We have won good reputation by supplying quality products with better features at competitive prices. The sales network has covered over 85 countries. It is our philosophy in pursuit of perfection through continuous improvement.

At the moment we have product lines of human machine interfaces, recorders, temperature controllers, data acquisition IO modules and networking products. To keep on supporting our customers, we will continue to invest and develop new instruments surround factory automation.

hardware features

- Five models in four sizes of 4.3", 7", 10" & 15"
- Two low cost models HMI 450 & 730 and three high performance HMI 750, 1050 & 1550
- Touch panels, higher resolution and all in 65,536 colors
- Standard Ethernet, USB host, 2 Serial ports & SD Slot
- Networks of PROFIBUS-DP, PROFINET(1 or 2 ports), DeviceNet, EtherNet/IP (1 or 2 ports), CANopen, EtherCAT, CC-Link, ControlNet, CompoNet & Modbus RTU
- Advanced and reliable WinCE 6.0® platform with more features for efficient and sophisticated control solutions
- HMI 750, 1050, 1550 standard aluminum front bezels, optional stainless steel fronts for food, beverage & pharmaceutical industries
- Rugged Stainless Steel front bezels with IP66K for high protection on dust & water, and polished surface for easy cleaning
- Large memory of 128 MB Flash, 128/256MB SDRAM, sound input + output, 3DI + 3DO
- USB Host port used for Keyboard, USB stick and Mouse
- Horizontal or vertical installation and display
- Wide range of power supply 11-36 VDC or 90-250 VAC
- LED backlight for even-color displays and long lifetime
- Open WinCE 6.0® panels for OEM business

*Smart*panels specifications

Model	HMI 450	HMI 730	HMI 750	HMI 1050	HMI 1550
Display					
Size	4.3"	7"	7"	10"	15"
Resolution (W x H in pixels)	480 x 272	800 x 480	800 x 480	1024 x 768	1024 x 768
Display type	TFT wide touch screen	TFT wide touch screen	TFT wide touch screen	TFT touch screen	TFT touch screen
Colors	65,536	65,536	65,536	65,536	65,536
Touch screen Type	Resistive analog	Resistive analog	Resistive analog	Resistive analog	Resistive analog
Active Display Area (W x H mm)	95 x 54	152 x 91	152 x 91	203 x 152	304 x 228
Display position	Both horizontal & vertical	Both horizontal & vertical	Both horizontal & vertical	Both horizontal & vertical	Both horizontal & vertical
MTBF backlight at 25°C	30,000 hrs	50,000 hrs	50,000 hrs	50,000 hrs	50,000 hrs
Backlight	LED	LED	LED	LED	CCFL
Brightness Adjustment	Yes	Yes	Yes	Yes	Yes
Screen Saver	Yes	Yes	Yes	Yes	Yes
Language Fonts	Unicode including Simplified and Traditional Chinese, Japanese & Korean				
Main Hardware					
Processor, CPU speed	ARM 11, 533Mhz	ARM 11, 533Mhz	ARM Cortex-A8, 667Mhz	ARM Cortex-A8, 667Mhz	ARM Cortex-A8, 667Mhz
Flash Memory (ROM)	128 MB	128 MB	128 MB	128 MB	128 MB
SDRAM (RAM)	128 MB	128 MB	256 MB	256 MB	256 MB
Operation System	WinCE 6.0®	WinCE 6.0®	WinCE 6.0®	WinCE 6.0®	WinCE 6.0®
Real Time Clock	Yes	Yes	Yes	Yes	Yes
Buzzer	Yes	Yes	Yes	Yes	Yes
Sound input + output, 3DI + 3DO	N.A.	N.A.	Option	Option	Option
SD card slot	Yes	N.A.	Yes	Yes	Yes
Interfaces					
RS232C, DB9 Male	1	1	1	1	1
RS232C/ RS422/ RS485, DB25 Female	1	1	1	1	1
Ethernet 10/100 Mbps, RJ45	1	1	1	2	2
USB Host	1	1	1	1	1
Other Networks (slaves)					
PROFIBUS DP, PROFINET(1 port or 2 ports)	Option	N.A.	Option	Option	Option
DeviceNet, EtherNet/IP (1 port or 2 ports)	Option	N.A.	Option	Option	Option
CANopen, EtherCAT, Modbus RTU	Option	N.A.	Option	Option	Option
CC-Link, ControlNet, CompoNet	Option	N.A.	Option	Option	Option
General Specifications					
Power Supply	11-36VDC	11-36VDC, 90-250VAC	11-36VDC, 90-250VAC	11-36VDC, 90-250VAC	11-36VDC, 90-250VAC
Consumption (w/o sound output)	9 W	11 W	12 W	15 W	27 W
Power on LED indicator	Yes	Yes	Yes	Yes	Yes
Outer dimensions (W x H x D mm)	140 x 116 x 57	212 x 156 x 57	212 x 156 x 57	325 x 263 x 56	400 x 310 x 56
Mounting depth (mm)	51	51	51	50	50
Panel cutout (W x H mm)	123^{+1} x 99^{+1}	197^{+1} x 141^{+1}	197^{+1} x 141^{+1}	310^{+1} x 248^{+1}	367^{+1} x 289^{+1}
Protection	IP65 front, IP20 rear	IP65 front, IP20 rear	IP65 front, IP20 rear	IP65 front, IP20 rear	IP65 front, IP20 rear
Front bezel, housing	plastic, plastic	plastic, plastic	Aluminum, plastic	Aluminum, metal	Aluminum, metal
Stainless Steel front bezel (option)	N.A.	N.A.	Option, IP66K	Option, IP66K	Option, IP66K
Installation	Panel Mount	Panel Mount	Panel Mount	Panel Mount	Panel Mount
Net Weight (Kgs)	0.4	1.1	1.3	3.3	4.9

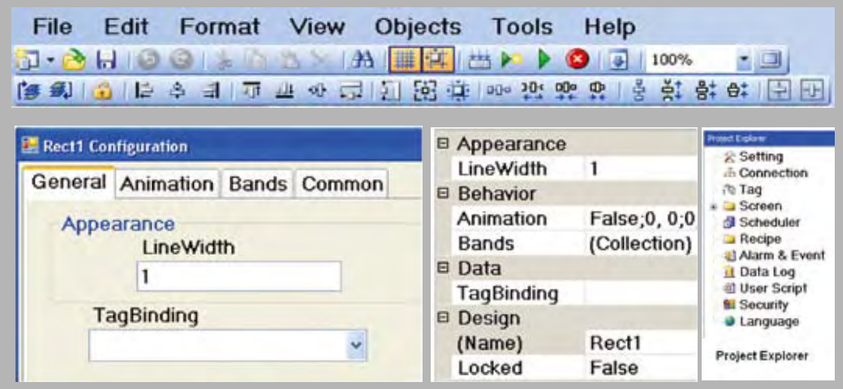
Operating temperature	0°C to 50°C
Storage temperature	-20°C to 60°C
Humidity	10% to 90 % RH
Vibration resistance	9 to 150 Hz, 9.8 m/s², X,Y & Z directions 10 times (100 min.)
Operating Shock resistance	15g at 11 msec
Altitude	2000 Meters
Safety standards	CE, UL, CSA

Panel Studio software features

- Free, powerful and friendly HMI editing software
- 2-editing styles in both GUI wizard and Property grid
- Lots of fine-made objects of Meters, Sliders, Digital LED, Check boxes, Combo boxes, Number Up/Down, etc.
- 112 basic symbols, high-resolution, vector format, some in 6 colors, flipped and rotatable in 4 directions in design time
- Basic symbols support moving and 32 band run-time animation on background color, visibility, flip, rotation
- Optional Symbol Factory with symbols over 4K, flipping, rotating in 4 directions, changing color in design time
- Symbol Factory control allows 50 band run-time animation, each band in different colors or blinking
- Picture box to import pictures in bmp, wmf, jpg, gif & png formats
- Dynamic objects like animating bar graph, button, bit lamp, 32-bit word lamp, drawing tools, etc.
- Drawing tools like rectangle, ellipse, etc., maximum 32 bands, each band with visible control, filling color & blinking
- Drawing tools like rectangle, ellipse, etc., with run-time animation like filling, moving & sizing
- Many PLC drivers supported on both Serial & Ethernet ports via OPC server
- Data exchange between two different PLCs as a gateway
- Diagnostic tools for drivers like OPC server & OPC client to test communication between PC and PLC directly
- IO poll groups, different scan rates for PLC tags, possible to scan tags always or only tags on active page
- Retentive and non-retentive internal variables available for mathematical calculation

- 3 types of screens in Page, Template and Pop-up
- The Scheduler to trigger actions at specific time or time intervals
- Recipe management to create data elements and data records in design time
- Recipe viewer to edit data records and transfer setpoints from HMI to PLC and vice versa in run-time
- Real-time alarms in 7 types, historical alarms and alarm management in maximum 9 groups
- Alarm banner to display the latest alarm in single line
- Real-time trends and historical trends, with maximum 24 pens for each component
- Bit-wise alarms for integer tag received from PLC
- Data stored in internal memory or optional SD card
- Data logging by 4 methods, 2 types and 10 rates
- Data acquisition software Historical Viewer to view historical data and alarms on PC
- Security management used for maximum 100 users divided by 9-authority levels
- Script/Macro programmed in C language for mathematical and logical calculation
- Run-time user administration done by user-view component
- Software in multilingual, easy for local application engineers
- Multilingual on the display, easy for users, 30 languages
- Online simulation to test application program quickly by simulating it on PC while connecting with PLC
- Offline simulation to test application program by simulating it on PC without connecting with PLC
- Copy screens between projects to save developing time
- Copy/paste animation for drawing tools like rectangle, ellipse etc., to save developing time
- Project compiler to verify the application under developing before downloading to HMI
- Message libraries via Word Lamp with animations to display various messages based on different values
- Advanced buttons with animation in 3 kinds of actions namely clicked, pressed and released with timing
- Bit-wise animation used with bit lamp for integer tag to show status of integer tag received from PLC
- Multiple sessions to open projects in design time on PC
- Handy components for tables to quickly draw rows and columns
- Project explorer and Tool box to quickly view hierarchy of all objects in software
- Flexible to call many system functions from buttons, events, schedulers, scripts, etc.
- To download application program efficiently from PC to HMI via Ethernet port, or via USB stick
- Printer drivers, Universal serial driver and HMI Remote Viewer to be available soon

Editing tools & style



GUI Wizard

Property grid

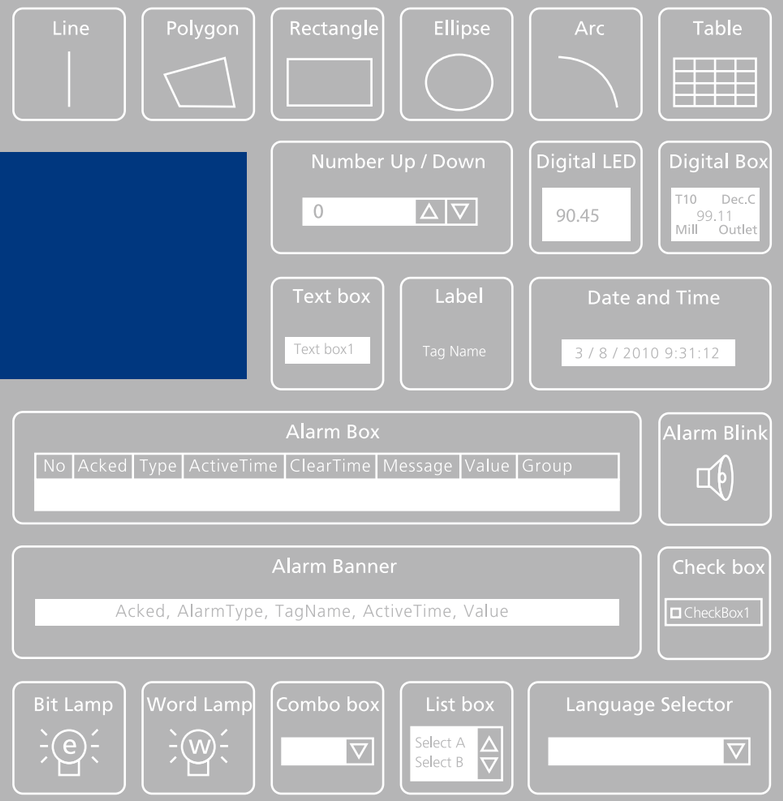
To edit properties of objects via user-friendly GUI Wizard or Property grid similar to Visual Studio® environment

Tabbed pane

To quickly retrieve tools in project explorer can be done by using tabbed pane. For example, once user has edited three pages, tag database, alarms, Scheduler, all these are available in tabbed pane for quick retrieval from Main window afterwards.

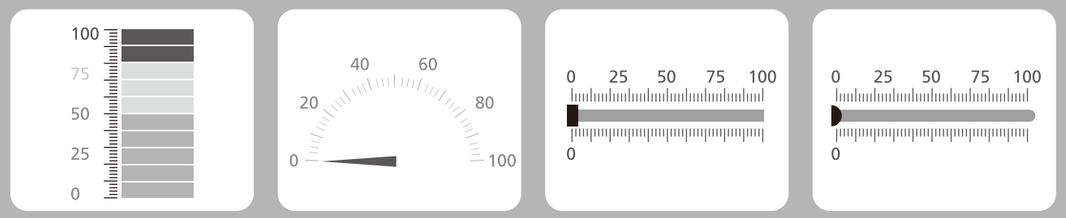
Basic objects

Line, Polygon, Rectangle, Ellipse, Arc, Table, Numerical Up/Down, Digital LED, Digital Box, Text box, Label, Date/Time Label, Alarm Box, Alarm banner, Alarm Blink, Button, Bit lamp, Word lamp, Check box, Combo box, List box, Recipe view, User view and Language selector



Enhanced objects

Level, Meter, Slider, Thermometer, Bar box, Scale, Historical Trends, Real Time Trends, Picture box

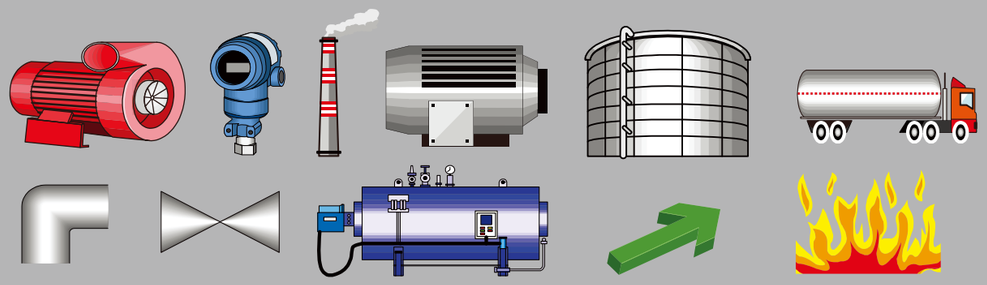


Level Meter Slider Thermometer

Basic symbols

in basic software ***Panel Studio***

Free basic symbols include 112 different ones divided by 18 popular categories.
All symbols are made in high resolution, vector wmf format in less memory.
Symbols of 10 categories are made in 6 colors of red, green, yellow, blue, brown and grey.
Transparent or color background can be selected for any symbols.
Run-time animation: moving, maximum 32 bands, animation on background color, visibility, flipped and rotated in 4 directions, linked to picture file



Symbol Factory

in extensive software ***Panel Studio Plus***

Symbol Factory offers over 4000 high-resolution symbols with run-time animation
Transparent or color background can be selected for any symbols.
All symbols are made in high resolution and .NET components in less memory.
Run-time animations: maximum 50 bands, each band covering foreground color or blinking in different styles of shade, solid or visibility
Within Panel Studio, only 1st symbol to be selectable in each category
Within Panel Studio Plus, all symbols to be selectable

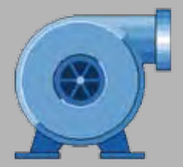
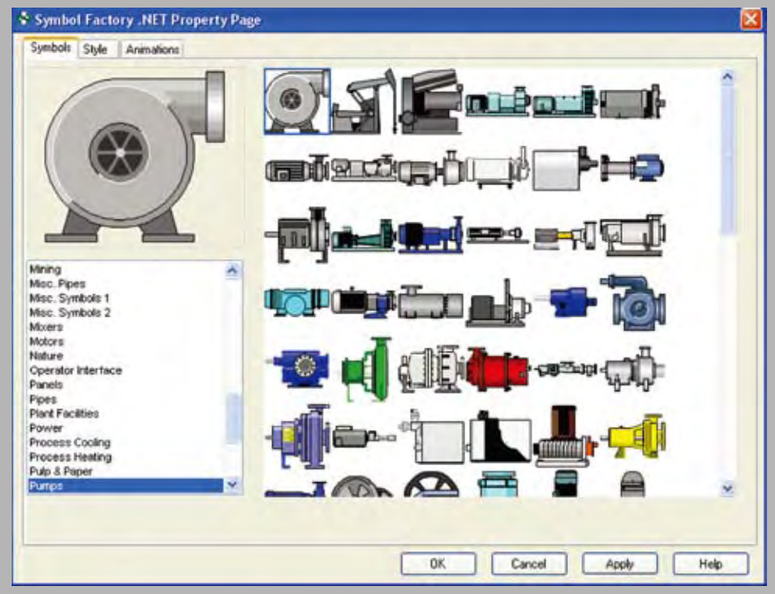


Fig: Pump



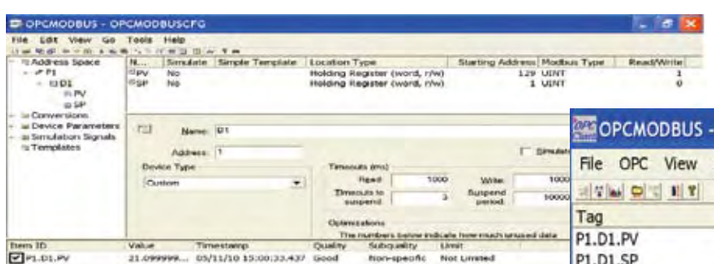
Data exchange as gateway

It is possible to exchange data from different PLCs via different ports of HMI simultaneously. Tools in HMI software are able to copy Tags from COM1 port to COM2, Ethernet, internal memory, or vice versa.

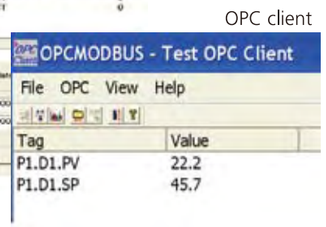
Diagnostic tools of OPC server, client

It is to test communication between PC and PLC, mainly on wirings & drivers, for quick trouble shooting and diagnostic purpose without using HMI and editing software.

OPC server



OPC client

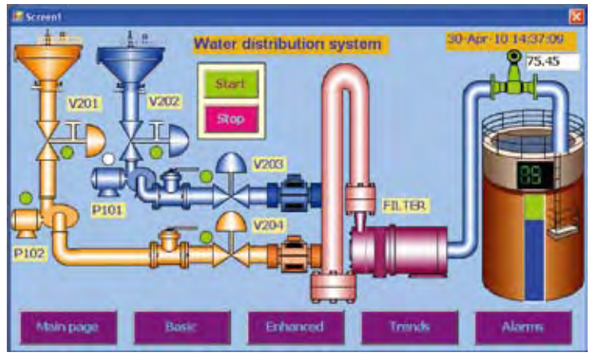


Tag database

Tag scan mode	active page or always
Tag scan rate (IO poll groups)	100 msec. to 10,000 msec.
Simulation of tag	possible
Retentive internal memory	available

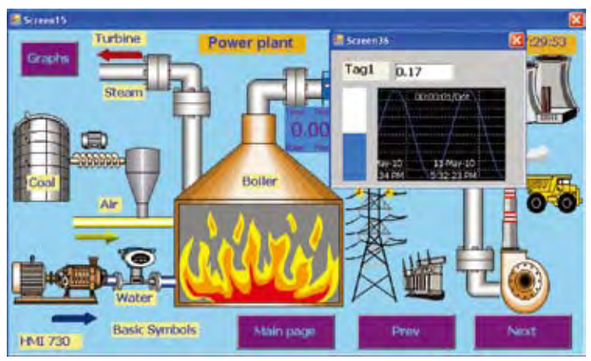
Templates

Screen can be defined as template and linked with another pages. For example, buttons, date/time etc. can be defined once and reused in other screens easily.



Pop-up screens

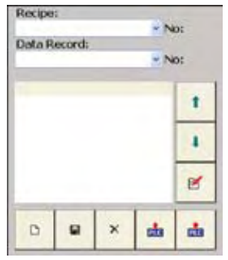
They are triggered by alarms with messages for the operator or display more information about process working area whenever the space of main screen is unavailable.



Scheduler types

Countdown	to trigger an action one time after elapse of time
Repeat countdown	to trigger an action repeatedly at certain time interval
Daily	to trigger an action at specific time daily
Weekly	to trigger an action at specific time weekly
Monthly	to trigger an action at specific time monthly

Recipe administration



Run-time
- User friendly recipe viewer
- Add data records
- Edit data records
- Save and Delete data records
- Write data records from HMI to PLC
- Read data records from PLC to HMI
- Select recipe

Design-time
- Create recipe elements
- Add data records

Alarms
real Time, historical alarms

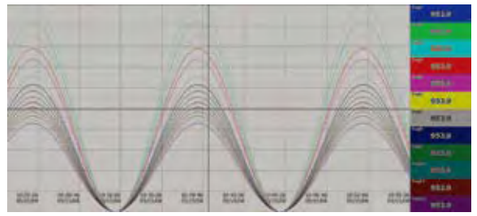
Alarm setpoint reference	constant or tag
Hysteresis	available
Alarm types	Hi, Low, High High, Low Low, Dev+ & Dev-
Alarm control functions	acknowledge, dump, clear, navigation between pages
Job types	log alarm, log auto ack.alarm and log event
Customized alarm messages	possible

Data logging

Log trigger type	by timer, by change
Timer	100 msec., 1,2,5,10,20,30 sec., 1, 5 & 10 min.
Max. data points	as per predefined set point
Data log method	Instant, average, minimum and maximum

Data acquisition software
Historical Viewer

Historical data and events are stored in internal memory or SD card first, then downloaded to USB stick. The PC software ***Historical Viewer*** is used to view historical data & events on USB stick. Features of Historical Viewer are listed below,



- display historical trend
- display historical alarms/events
- display historical values on table
- search data at a specific time, time period, event/alarm and tag wise
- view trends both horizontally and vertically
- zoom out & zoom In
- display options as x sec., min./dot, x min., hrs.,days, weeks, months/page
- display white or black background
- print trend view, event/alarm list & Tag values
- export data and alarms/events to CSV files.

Security

Numbers of users	100
Numbers of levels	9
Password expiry period	define the number of days or unlimited
Prevent operators from unauthorized access to controls and data entry.	
Run-time user administration	available

Script / Macro supported functions
C program

System functions	ack. alarms, start/stop scheduler, etc.
Math functions	Trigonometric, Log, Exp, Round, Power, etc.
Arithmetic functions	addition, subtraction, multiply, division, remainder
Logical functions	and, or, true, false, not, etc..
Shift functions	left, right
Relational functions	=, !=, >, <, <=, >=
Selection functions	If, else
Iteration functions	while, for
Jump functions	break, continue

Online simulator

It is to test HMI project on PC by connecting it with PLC directly. The online simulating software can last only for 2 hours.

Offline simulator

It is to test HMI project offline on PC without connecting with PLC. It is possible to enter tag values via Tabular column, simulate the tag values, and check the behavior of objects.

Project compile

It is to check problems in application development like syntax errors, missing tags for objects, etc. After successful compilation, it creates a build for downloading to HMI.

Button function editor

Advanced buttons with 3 kinds actions namely clicked, pressed and released with timing
Hold time to stay the command by predefined time after clicking button, and repeat time for pressed button

Page control functions	Navigate to various pages- 1st, next, last, previous, by number, pop-up
Alarm control functions	dump, clear, Ack, move to 1st page, last page, PageUp and PageDown
Historical trend control	zoom in, out, all, move to 1st page, previous page, next page, last page
Data log control	start/stop data logging, dump, clear
Scheduler control	start/stop at a specific time
On/Off	turn bit on, turn bit off, toggle bit
Math	set value to Tag, add value on Tag, subtract value from Tag, copy TagB to TagA, add TagB on TagA, subtract TagB from TagA, swap TagA for TagB
Others	log in/out, shut down, audio functions, recipe functions

Multiple sessions

Two projects can be opened simultaneously on PC and copy screen from project 1 to project 2. It saves time and the cost for the programmer.

Download the projects

via Ethernet port or USB stick

The application

PC

Wireless device

PLC

Ethernet

* Ethernet 10/100 BaseT, One standard port
* To connect with various PLC's, Inverters etc.
  (See driver list for supported protocols)
* To download application program from PC to HMI

USB Disk

USB, Host

* To transfer historical data, historical alarms
* Upload firmware and application program
* Connect with Mouse / Keyboard

SD Card

SD slot

* SD card
* To store historical data and alarms

Speaker

Sound input + output ,3DI + 3DO

* Sound input (record messages
  for other operators)
* Sound output (to speaker)

Networks (slaves)

* Profibus DP/ Profinet IO/ DeviceNet/
  EtherNet/IP/ CANopen/ EtherCAT/ CC-Link/
  ControlNet/ CompoNet/ Modbus RTU

PLC

COM1

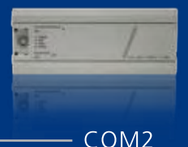
* COM1 (RS232C), DB9 male
* To connect with various PLC's, Inverter's, Controllers etc.
  (See driver list for supported protocols)

Inverter

Controller

IO module

PLC



COM2

* COM2 (RS232C/ RS422/ RS485), DB25 female
* To connect with various PLC's, Inverter's, Controllers
  etc. (See driver list for supported protocols)

Drivers of PLC & inverters

OPC server within Panel Studio includes many drivers for PLCs, inverters and 3rd party devices for both Serial (RS232, RS422, RS485) and Ethernet ports. HMI is able to communicate on both ports simultaneously.

Serial drivers

Manufacturers	Protocols	Models
Allen Bradley	DF1 protocol	SLC 500 series, MicroLogix, CompactLogix, ControlLogix, PLC5 series
Allen Bradley	DH485	SLC 500 series, MicroLogix
Beckhoff serial	KS8000 protocol	CX 90x0, & CX10x0 series
Danfoss (inverter)	FC protocol	FC series for AutomationDrive / HVAC Drive
Delta	DVP serial	DVP-ES, DVP-EX, DVP-SS, DVP-SA, DVP-SX, DVP-SC, DVP-EH, DVP-EH2, DVP-SV, DVP-PM
Fatek	Fatek	FB series
Festo	CI Command	FEC series
Fuji	T-Link protocol	Micrex- F series
Fuji	Micrex Series protocol	SPH 200, SPH 300, SPH 300EX, SPH 2000
GE Fanuc	Series Ninety protocol (SNP)	Micro PLC, GE 90-30/ 90-70, Versa Max
GE Fanuc	SNP-X protocol	Micro PLC, GE 90-30/ 90-70, Versa Max
Hitachi	Hitachi Hi protocol	Micro EH, EH, EHV & H series PLC's
IDEC IZUMI	Data Link	MicroSmart,OpenNet Controller,Micro3
Keyence	ASCII	KV 700, KV1000, KV3000 & KV5000
Koyo	Direct Net	DL05, 06, 105, 205, 305 & 405 series
Koyo	K Sequence	DL05, 06, 105, 205 & 405 series
Lenze (inverter)	LECOM	8200/ 9300 Vector, 9300 Servo controller, 9300 Servo PLC, Driver PLC, 8200 Motec
LG	LG Cnet	GM series, MK series-K80S, K120S, K200S, K300S, K1000S, XGB & XGK series
Matsushita (Panasonic)	Mewtocol	FP series-FP0, FP2, FP-X, FP-Sigma, FP2SH
Messung	Modbus RTU	Nextgen 2000, 5000 series
Mitsubishi	Melsec	FX, A, QnA & Q series, FX direct CPU port
Modicon	Modbus ASCII, RTU Master	Any device
Moeller	CANopen	XC100, XC200 series (Via CANopen option converter)
Omron	HostLink	CV, CVMX, CX, CH, CS, CJ, CQM1H series
Omron	Fins	CP, CS, CJ series
Schneider	UniTeleway	TSX-Micro & TSX series
Siemens	PPI	S7-200
Siemens	MPI	S7-300/400
Toshiba	Computer link,T series serial	S2E/ST2 series
Toshiba	T1-micro series serial	T1-Micro
Vigor	Vigor Serial	M, VB, VH series
Vipa	MPI	100V,200V,300V,300S,500S
Yaskawa	Memobus- MP Serial	Memocon, MP-900 & MP-2000 series
Yaskawa (inverter)	Memobus-Inverter serial	F1000, V1000, T1000, A1000
Yokogawa	Factory Ace FA-M3 serial	FA-M3 model F3SPX series

Ethernet drivers

Manufacturers	Protocols	Models
Allen Bradley Ethernet	Ethernet/IP, CIP	SLC 500 series, MicroLogix, CompactLogix,ControlLogix,PLC5 series
Beckhoff Ethernet	Beckhoff Ethernet	CX90x0, CX10x0 series
Delta Ethernet	Delta Ethernet Protocol	DVP-SV series
Fatek Ethernet	Fatek Ethernet	FB series
Festo-Ethernet	Ethernet CI Command	FEC series
GE Ethernet	SRTP	GE 90-30/ 90-70, Versa Max
Hitachi Ethernet	H series Ethernet	EH, EHV and H series PLC
Keyence Ethernet	Keyence Ethernet	KV 700, KV1000, KV3000 & KV5000
Koyo Ethernet	Direct ECOM	DL05,06, 205, 405
LG Ethernet	LG Fast Ethernet	GM series, MK series 200S, 300S, 1000S, XGB & XGK series
Mitsubishi Ethernet	A, Q, QnA & FX Ethernet	A, Q, QnA & FX series PLC
Modicon	Modbus TCP Master	Any device
Omron Ethernet	FINS UDP	CH,CS & CJ Series
Siemens S7 Ethernet	Siemens TCP/IP	S7-200,300, 400 (Connection Via CP card at PLC),S7-1200
Toshiba Ethernet	Toshiba Ethernet	T series, V series
Vipa	TCP/IP	200V,300S,500S
Yaskawa MP Ethernet	Memobus Ethernet	MP-900 & MP- 2000 series
Yokogawa Ethernet	Yokogawa FA-M3 Ethernet	FA-M3 model F3SPX series

Networking Options

The networking cards with slave function are easily inserted in.
Available Networks: PROFIBUS-DP, PROFINET (1, 2 ports), DeviceNet, EtherNet/IP (1, 2 ports), CANopen, EtherCAT, CC-Link, ControlNet, CompoNet and Modbus RTU

Ordering Code

HMI 450	1	0	1			0
HMI 730		0	0	0		0
HMI 750			1			
HMI 1050			1			
HMI 1550			1			

Power supply
1: 11 to 36 VDC
2: 90 to 250 VAC

Sound input + output, 3DI+3DO
0: none
1: yes

SD card Slot
0: none
1: yes

Network (slave)
0: none

1: PROFIBUS DP	6: CANopen	B: Modbus RTU
2: PROFINET (1 port)	7: EtherCAT	C: EtherNet/IP (2 ports)
3: PROFINET (2 ports)	8: CC-Link	
4: DeviceNet	9: ControlNet	
5: EtherNet/IP (1 port)	A: CompoNet	

Software
0: none
1: free basic editing & data acquisition software ***Panel Studio***
2: extensive software ***Panel Studio Plus*** with Symbol Factory

Enclosure

0: Standard	HMI 450, 730: all plastic, 750: aluminum front, plastic rear, HMI 1050, 1550: aluminum front, metal rear
1: Option	HMI 750, 1050, 1550 only, stainless steel front, high pressure water protection IP66K, good for food, beverage, tobacco & pharmaceutical industries

Optional Accessories

Part Number	Description
CA-PC3-80	program download cable from PC to HMI, RJ45, Ethernet cross over

Note: Please refer part numbers of PLC cables to a separated list.