

Human Machine Interfaces

Control

Human Machine Interfaces




Hardware Features and Specifications



CGHMI Features

- Six models in four sizes of 4.3", 7", 10" and 15"
- Two economical models: CGHMI 450 and 730 with optional Ethernet port and standard SD slot
- Four high-performance models: CGHMI 750, 1050, 1060, and 1550 with standard Ethernet port and SD slot
- One wide screen model: CGHMI 1060
- High resolution touch panels with 65,536 colors
- USB host, 2 serial ports and SD slot
- Networks of Profibus-DP, ProfiNet, DeviceNet, EtherNet/IP, CANopen, CC-Link
- Advanced and reliable WinCE 6.0® platform with more features for efficient and sophisticated control solutions
- CGHMI 750, 1050, 1550 provided with standard aluminum front bezels, with optional stainless steel fronts for food, beverage & pharmaceutical industries
- Rugged stainless steel front bezels with IP66K for high protection against dust and water, and polished surface for easy cleaning
- Large memory of 128MB Flash, 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 11-36VDC or 90-250 VAC
- Backlit LED display provides even color and longer lifetime
- Open WinCE 6.0® Core & Professional panels for OEMs

CGHMI Common Specifications/Approvals

Operating temperature	0°C to 50°C; 32° to 122°F
Storage temperature	-20°C to 60°C; -4° to 140°F
Humidity	10% to 90% RH
Vibration resistance	9 to 150 Hz, 9.8 m/s ² , X, Y & Z directions 10 times (100 min.)
Operating Shock resistance	15g at 11 msec
Altitude	200 Meters; 656 Feet
Safety standards	  



Model

CGHMI 450

Display Size	4.3"
Resolution (W x H in pixels)	480 x 272
Display type	TFT wide touch screen
Colors	65,536
Touch screen Type	Resistive analog
Active Display Area (WxH mm)	95 x 54
Display position	Both horizontal & vertical
MTBF backlight at 25°C	30,000 hours
Backlight	LED
Brightness Adjustment	Yes
Screen Saver	Yes
Language Fonts	Unicode (same as page 3)

Main Hardware

Processor, CPU speed	ARM Cortex-A8, 667Mhz
Flash Memory (ROM)	128MB
SDRAM (RAM)	256MB
Operation System	WinCE 6.0®
Real Time Clock	Yes
Buzzer	Yes
Sound input + output, 3DI + 3DO	N.A
SD card slot	Yes

Interfaces

RS232C, DB9 Male	1
RS232/CRS422/RS485,DB25 Female	1
Ethernet 10/100 Mbps, RJ45	Optional
USB Host	1

Other Networks

Profibus-DP, ProfiNet	Optional
DeviceNet, EtherNet/IP,	Optional
CANopen, CC-Link	Optional

General Specifications

Power Supply	11-36VDC
Consumption (w/o sound output)	10W
Power on LED indicator	Yes
Outer dimensions (WxHxD mm)	140 x 116 x 57
Mounting depth (mm)	51
Panel cutout (WxH mm)	123-124 x 99-100
Protection	IP65 front; IP20 rear
Front bezel, housing	Plastic, plastic
Stainless Steel front bezel (option)	N.A.
Installation	Panel Mount
Net Weight (Kg/Lb)	0.5Kg; 1.1Lbs



CGHMI 730	CGHMI 750	CGHMI 1050	CGHMI 1060	CGHMI 1550
7"	7"	10"	10"	15"
800 x 480	800 x 480	1024 x 768	1280 x 800	1024 x 768
TFT wide touch screen	TFT wide touch screen	TFT touch screen	TFT wide touch screen	TFT touch screen
		65,536		
		Resistive analog		
152 x 91	152 x 91	203 x 152	217 x 135	304 x 228
		Both Horizontal & Vertical		
		50,000 hours		
LED	LED	LED	LED	CCFL
Yes	Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes	Yes
*Unicode including simplified and traditional Chinese, Japanese & Korean				
ARM Cortex-A8, 667Mhz	ARM Cortex-A8, 1Ghz	ARM Cortex-A8, 1Ghz	ARM Cortex-A8, 1Ghz	ARM Cortex-A8, 1Ghz
128MB	128MB	128MB	128MB	128MB
256MB	256MB	256MB	256MB	256MB
WinCE 6.0®	WinCE 6.0®	WinCE 6.0®	WinCE 6.0®	WinCE 6.0®
Yes	Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes	Yes
N.A.	Optional	Optional	Optional	Optional
Yes	Yes	Yes	Yes	Yes
1	1	1	1	1
1	1	1	1	1
Optional	1	2	2	2
1	1	1	1	1
N.A.	Optional	Optional	Optional	Optional
N.A.	Optional	Optional	Optional	Optional
N.A.	Optional	Optional	Optional	Optional
11-36VDC, 90-250VAC	11-36VDC, 90-250VAC	11-36VDC, 90-250VAC	11-36VDC, 90-250VAC	11-36VDC, 90-250VAC
12W	13W	15W	15W	27W
Yes	Yes	Yes	Yes	Yes
212 x 156 x 57	212 x 156 x 57	325 x 263 x 56	275 x 179 x 63	400 x 310 x 56
51	51	50	51	50
197-198 x 141-142	197-198 x 141-142	310-311 x 248-249	197 x 141	367-378 x 289-290
IP65 front; IP20 rear	IP65 front; IP20 rear	IP65 front; IP20 rear	IP65 front; IP20 rear	IP65 front; IP20 rear
Plastic, plastic	Aluminum, plastic	Aluminum, metal	Plastic	Aluminum, metal
N.A.	Optional with IP66K	Optional with IP66K	N.A.	Optional with IP66K
Panel Mount	Panel Mount	Panel Mount	Panel Mount	Panel Mount
1.2Kg; 2.65Lbs	1.4Kg; 3.09Lbs	3.6Kg; 7.94Lbs	1.4Kg; 3.09Lbs	5.1Kg; 11.24Lbs

Human Machine Interfaces

CG Design Studio Software Features



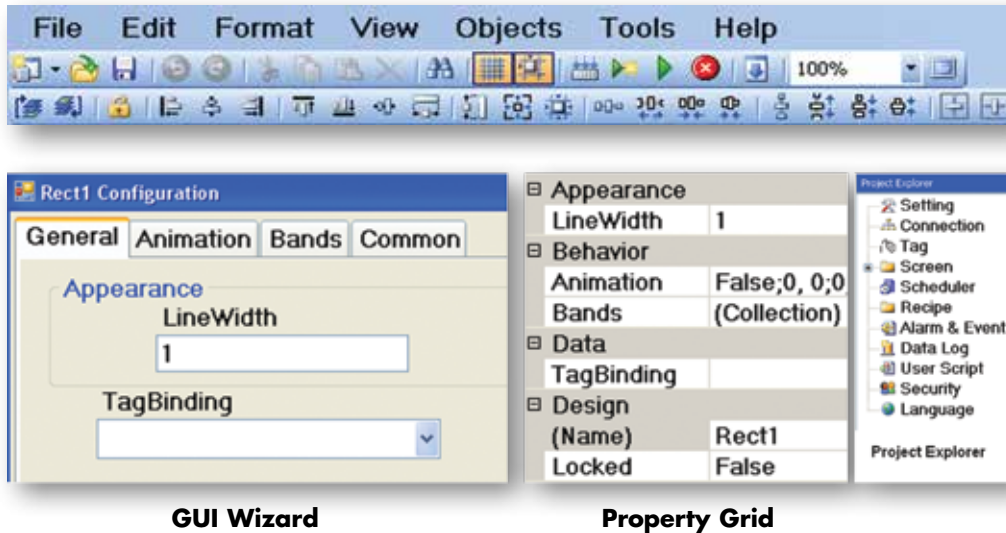
- Free, powerful and friendly CGHMI editing software
- 2-editing styles in both GUI Wizard and Property Grid
- Plenty of intricate objects, such as Meters, Sliders, Digital LED, Check Boxes, Combo Boxes, Number Up/Down, etc.
- 112 basic symbols, high-resolution, vector format, some in 6 colors, flipped 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 and png formats
- Dynamic objects such as animated 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 and sizing
- Many PLC drivers supported on both Serial and Ethernet ports via OPC server
- Data exchange between two different PLCs as a gateway
- Diagnostic tools for drivers, like OPC server and OPC client, to test communications 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 calculations

- 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
- Bit-wise alarms for integer tag received from PLC
- Alarm banner to display the latest alarm in single line
- Real-time trends and historical trends, with maximum 24 pens for each component.
- Data stored in internal memory or standard 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 CGHMI
- 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 systems functions from buttons, events, schedulers, scripts, etc.
- To download application program efficiently from PC to CGHMI via Ethernet port, or via USB stick
- Printer drivers, Universal serial driver and CGHMI Remote Viewer

Human Machine Interfaces

CG Design Studio Software Features

Editing tools & style



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

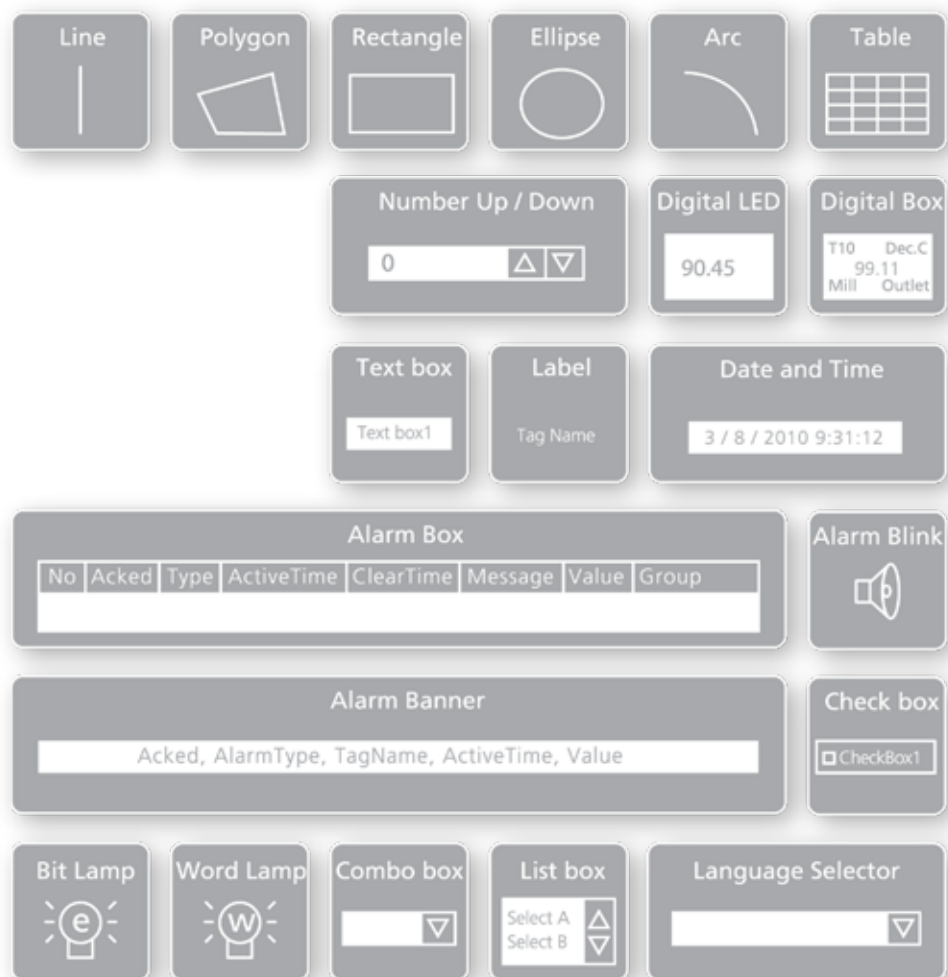
Tabbed pane



Quickly retrieve tools in the project explorer by using tabbed pane. For example, once the 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 and Picture Box



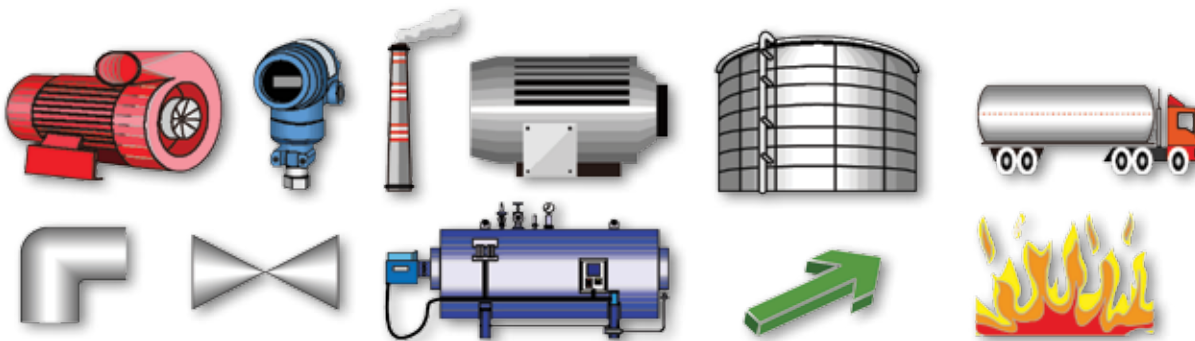
Human Machine Interfaces

CG Design Studio Software Features

Basic symbols

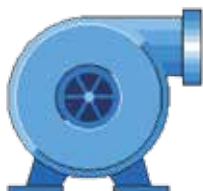
In basic software CG Design Studio

- Free basic symbols include 112 different ones divided by 18 popular categories
- All symbols are made in high resolution, vector wmf format which requires 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



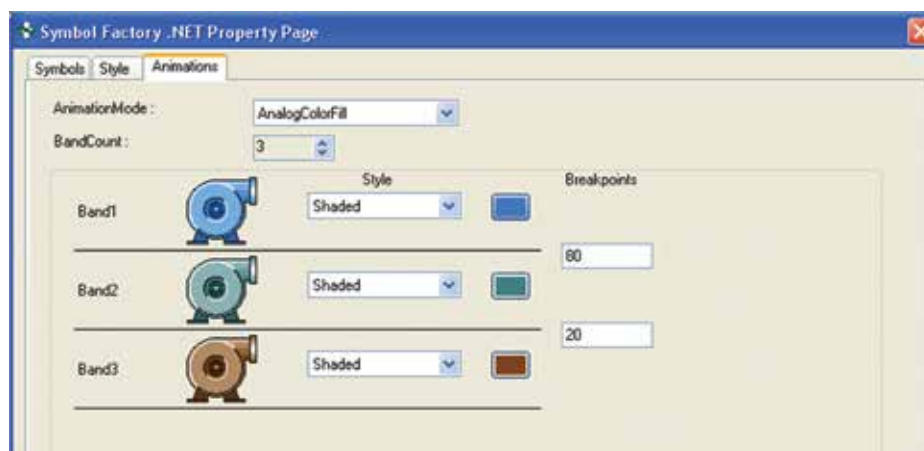
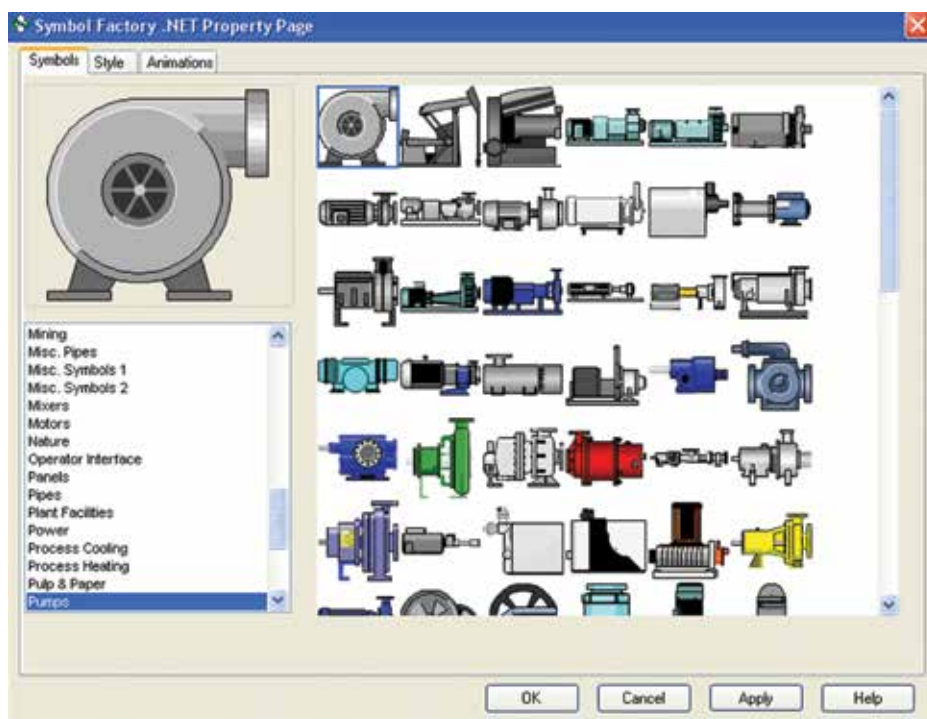
Symbol Factory

In extensive software CG Design Studio Plus



Pump Symbol

- Symbol Factory offers over 4,000 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 CG Design Studio, only first symbol to be selectable in each category
- Within CG Design Studio Plus, all symbols are easily selectable



Human Machine Interfaces

CG Design Studio Software Features

Data exchange as a gateway

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

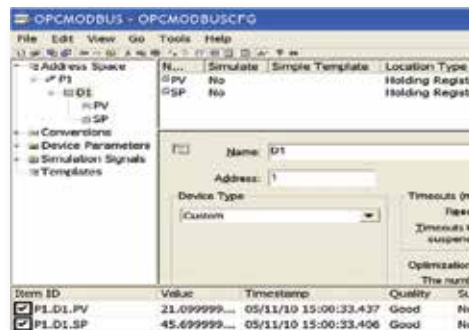


Diagnostic tools of OPC server, client

Diagnostic tools test communications between the PC and PLC, the wiring and drivers; and provide quick troubleshooting and diagnostics without using the CGHMI and editing software.



OPC server



OPC server

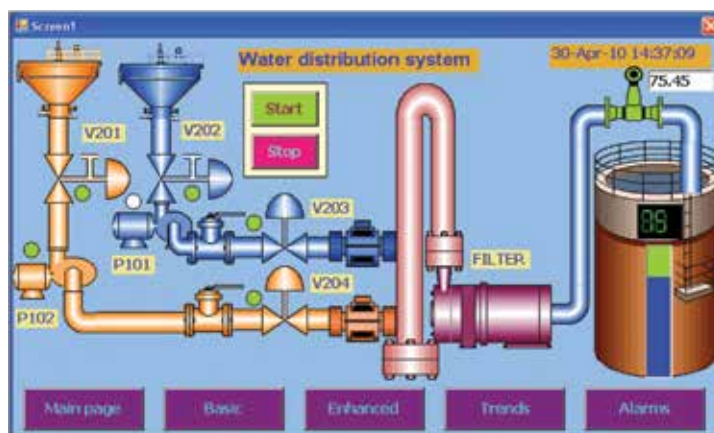
Tag	Value
P1.D1.PV	22.2
P1.D1.SP	45.7

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

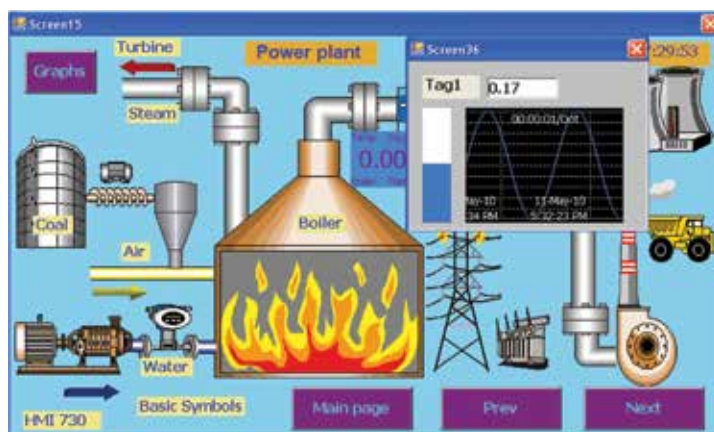
Templates

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



Pop-up screens

Pop-up screens are triggered by alarms with messages for the operator, which display more information about the working process area, should space on the main screen be unavailable.



Human Machine Interfaces

CG Design Studio Software Features

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	Design-time
User friendly recipe viewer	Create recipe elements
Add data records	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	

Alarms

Real time and/or 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

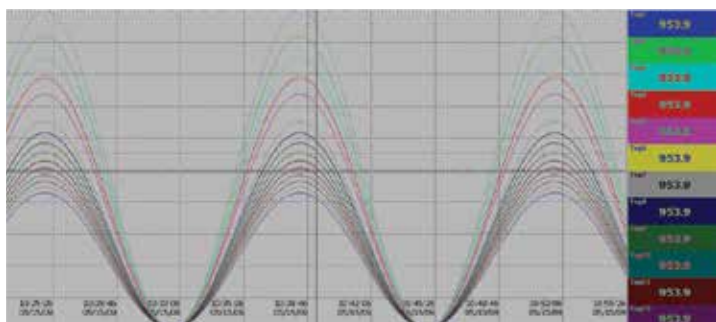
Data logging

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 the 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 and 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
Loop functions	While, for
Jump functions	Break, continue

Human Machine Interfaces

CG Design Studio Software Features

Online simulator

Test the CGHMI project on a PC by connecting directly to a PLC. The online simulating software will last only two hours.



Offline simulator

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



Output
Preparing
Page1
Page2
Page3
Page4

Build started
Build succeeded

Project compile

Check for problems in the application development like syntax errors, missing tags for objects, etc. After successful compilation, it creates a build for downloading to CGHMI.

Button function editor

Advanced buttons with three kinds of 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 a PC and a 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



CGHMI Remote Viewer



Human Machine Interfaces

The Application



Networks (all slaves)

- Profibus-DP, ProfiNet, DeviceNet, EtherNet/IP, CANopen, CC-Link

PLC



COM1

- COM1 (RS232C), DB9 male
- To connect with various PLCs, inverters, controllers, etc. (See driver list for supported protocols)

Inverter



Controller



IO module



PLC



COM2

- COM2 (RS232C/RS422/RS485), DB25 female
- To connect with various PLCs, inverters, controllers, etc. (See driver list for supported protocols)

Human Machine Interfaces

Drivers for PLCs and Inverters

OPC server within CG Design Studio includes many drivers for PLCs, inverters and 3rd party devices for both Serial (RS232, RS422, RS485) and Ethernet ports. The CGHMI is capable of communicating 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	TLink 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	KV700, 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 & XGX 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-Mico & TSX series
Siemens	PPI	S7-200
Siemens	MPI	S7-300/400
Teco	Modbus RTU	TP03
Teco (inverter)	Modbus RTU	MA, CV series
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, A 1000
Yokogawa	Factory Ace FA-M3 serial	FA-M3 model F3SPX

Ethernet drivers

Manufacturers	Protocols	Models
Allen Bradley Ethernet	Ethernet/IP, CIP	SLC 500 series, MicroLogix, CompactLogix, ControlLogix, PLC5 series
Beckhoff	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, DeviceNet, EtherNet/IP, CANopen, CC-Link

The Complete Product Package

Sensors

Inductive and Capacitive Sensors
Photoelectric Sensors
Ultrasonic Sensors
Wind Sensors
Radar Sensors
Motion/Presence Vision Sensors
Conductive Level Sensors
Magnetic Switches
Safety Interlocks and Light Curtains

Switches

Solid State Relays
Contactors and Overloads
Manual Motor Starters/Protectors
Circuit and Motor Protection
Soft Starters
Variable Frequency Drives
Hybrid Relays
Electromechanical Relays
Limit Switches
Push Buttons and Pilot Lights

Controls

Energy Management
Switching Power Supplies
Timers and Counters
Monitoring Controls and CTs
Human Machine Interfaces
Digital Panel Meters
PID Controllers
PV String Monitoring
Safety Control Modules
Solar Monitoring and Control

Fieldbuses

Dupline® Field and Installation Bus
Building Automation Systems
Parking Guidance Systems
Elevator Systems
DuplineSafe Mining Systems
Irrigation Systems

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