



Automation Expert

(EX3G HMI PLC All-in-One)

Compatible with Mitsubishi GX Developer 8.86 and WORKS 2

Heatcon EX3G HMI PLC All-in-One products. This manual mainly explains the product features, specifications and wiring methods. Detailed PLC programming. The features are as below.

● Super functions.

Its PLC is compatible with FX3G, FX3U, FX3S. It operates fast.

● Highly integration.

1. The digital points are 30 inputs and 30 outputs at most. The digital output can be transistor, relay or mixed output. Analog can reach up to 16 input and 8 output. It has 2 PLC COM port (RS232 and Mini B-type USB port), 1 downloading port and 1 USB port on HMI.

2. The PLC part of models 70KHA(S), 100HA all-in-one can optionally select one 485 port or two 485 ports (one is changed from existed 232 port). CAN, network port (not coexist with the one on HMI), Wifi (will cover the existed 232 port). The HMI part can optionally select one RS232 or one RS485, and network port (not coexist with the one on PLC).

3. The PLC part of models 43HB(HA), 43(50) KH(A) can optionally select two RS485, and HMI part can select one RS232.

● Support several high-speed counting and high-speed pulse.

1. Commonly high-speed counting is 6-channel single phase 60KHz or AB(Z) 2-channel 60KHz plus 1 channel 10KHz.

2. High-speed pulse is commonly 8 channels. HB series Y0-Y7 10KHz per channel, HA/KHA(S) series Y0-Y3 100KHz, Y4-Y7 10KHz. Acceleration and deceleration are independent.

3. The total high-speed counting and pulse can not exceed 480KHz.

● 32K steps program capacity, 32K power-off retentive registers, support interrupt, linear and circular interpolation, PID self-adjusting.

● Special encryption.

Set password as 12345678 to thoroughly prevent reading data.

● PLC is compatible with Mitsubishi programming software, and HMI is Coolmay HMI programming software.

● More models are supported to customize if bulk order.

Product Details

◆ Naming rules EX3G - 43HB-24 M RT-4AD 2DA -V -A0 -1C1 -1P - 485P/232H

- Series EX3G
- HMI 43HB/43HA/43KHB: 4.3" 50KHB: 5" 70KHA/70KHB: 7" 100HA: 10" 150HA: 15"
- Digital input and output (DI/DO) 10(5DI/5DO), 24(12DI/12DO), 44(24DI/20DO), 60(30DI/30DO), etc.
- Module type M- Main module of universal controller
- Digital output (DO) type R- relay T- transistor RT- both relay and transistor
- Analog input (AD) 4 channels for 43H, 12 for 70H/100H
- Analog output (DA) 2 channels for 43H, 8 for 70H/100H
- AI type EK- EK thermocouple (can be customized as T, S or J type), PT- Pt100, NTC- thermistor 10k, 50k, 100k A0- 0-20mA A4- 4-20mA V- 0-10V V5- 0-5V
- AO type A0- 0-20mA A4- 4-20mA V- 0-10V V5- 0-5V
- C1- single phase high-speed counting, C2- AB phase counting. Commonly it is 6-channel single phase 60KHz, or 2-channel AB(Z) phase 60KHz plus 1-channel 10KHz.
- P- high-speed pulse; Commonly EX3G-43HB is 8-channel 10KHz, and for other models, Y0-Y3 is 100KHz, Y4-Y7 is 10KHz. That high speed counting plus high speed pulse must be within 480KHz.
- Optional COM port, 485P/232P: the port is made in PLC; 485H/232H: the port is made in HMI; 43HB(HA)/43KHB/50KHB: 2x RS485 ports on PLC and 1x RS232 port on HMI are available. 70KHA(KHB)/100HA/150HA: 1x 485 or 2x 485 ports (one is changed from the existed 232 port), CAN, network port (can't coexist with HMI network port), Wifi (cover the existed 232 port) on PLC are available. 1x RS232 or RS485, network port (can't coexist with the one on PLC) on HMI are available

◆ Basic parameter

Chart 1: basic parameter

Specifications of HMI PLC All-in-One	Digital points		Analog points (optional)		COM port (optional)		High-speed counting (optional)			High-speed pulse (optional)
	DI	DO	AD	DA	HMI	PLC	Single	AB phase	ABZ phase	Output
EX3G-43HB(HA)/43(50)KH(A)-16M	8	8	4	2	1	1	6	2	2	1
EX3G-70KHA(S)/100HA-16M	8	8	4	2	1	1	6	2	2	1
EX3G-43HB(HA)/43(50)KH(A)-24M	12	12	12	6	1	1	6	2	2	1
EX3G-70KHA(S)/100HA-24M	12	12	12	6	1	1	6	2	2	1
EX3G-70KHA(S)/100HA-44M	24	20	12	6	1	1	6	2	2	1
EX3G-70KHA(S)/100HA-60M	30	30	12	6	1	1	6	2	2	1

EX3G-70KHA(S)/100HA: Analog quantity can be maximum 5AD/2DA if digital points are 30DI/30DO. Analog can be 16AD/8DA if digital points are 24DI/20DO.

MT is transistor output with max load 500mA. MR is relay output with max load 5A. MRT is mixed output, and can be optionally equipped as per customer's needs.

Chart 2: electric parameter

Electric parameter	
Input voltage	DC24V
Digital input indexes	
Isolation mode	Photocoupling
Input impedance	High-speed input 3.3KΩ Common input 4.3KΩ

Input ON	High-speed input: current > 5.8mA/24V	Common input: current > 9.9mA/24V
Input OFF	High-speed input: current < 4.5mA/19V	Common input: current > 4mA/17V
Filter function	With filter function, the filter time can be set among 0-60ms, defaulted as 10ms	
High-speed counting	Normally single 6-channel 60KHz or AB(Z) 2-channel 60KHz plus 1-channel 10KHz.	
Input level	Sink NPN, com isolation, S/S	

Digital relay output index	
Max current	500mA
Circuit power voltage	DC/AC 24V-220V
Circuit insulation	Relay mechanical insulation
On response time	Approx. 10ms
Mechanical life without load	10 million times
Electric life with rated load	300,000 times
Output level	Low level NPN, COM connects negative

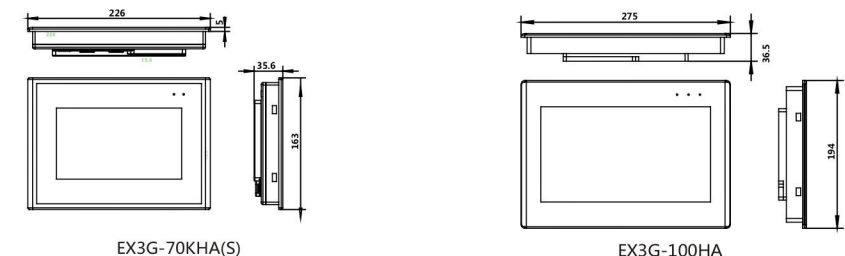
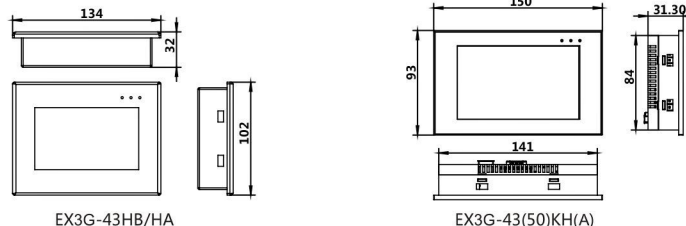
Digital transistor output index	
Max current	500mA
Circuit power voltage	DC24V
Circuit insulation	Optocoupler insulation
Isolated voltage (power-terminal)	1500VAC
On response time	High-speed output: 10 μs, and others 0.5ms
High-speed output frequency	8 channels. HB series Y0-Y7 10KHz per channel, HA/KHA(S) series Y0-Y3 100KHz, Y4-Y7 10KHz. Acceleration and deceleration are independent. The total high-speed counting and pulse can not exceed 480KHz.
Output level	Low level NPN, COM connects negative

Analog input indexes	
Input signal	PT100/PT1000/thermocouple/NTC/0-10V/0-5V/0-20mA/4-20mA/ customizations.
Response time	1 scanning cycle
Analog input	0-16 channels
Precision	12 bits
Analog output indexes	
Output signal	0-5V/0-10V/0-20mA/ customizations
Analog output indexes	0-8 channels
Precision	12 bits

External port	
COM port	2 PLC programming ports (RS232-DB9 male/ Mini B-type USB). 1 HMI downloading port and 1 USB port. PLC part of 70KHA(S)/100HA all-in-one: 1x 485 or 2x 485 (one is changed from the existed 232). CAN, network port (can't coexist with the one on HMI) and wifi (cover the existed 232 port) can be optional on PLC. And 1x RS232 or RS485, network port (can't coexist with the one on PLC) can be optional on HMI. PLC part of 43HB(HA)/43(50)KH(A) all-in-one: 2x RS485 can be optional on PLC and 1x RS232 can be on HMI.

Environment	
Operating temperature	0°C~50°C
Relative humidity	5%~95%RH
Storage temperature	-20°C~70°C
Vibrational frequency	10-57Hz, amplitude 0.035mm, 57Hz-150Hz, 4.9m/s ² (10 times each on X, Y, Z, total 80 minutes each)

Mechanical Design



Graph 1 Mounting dimension

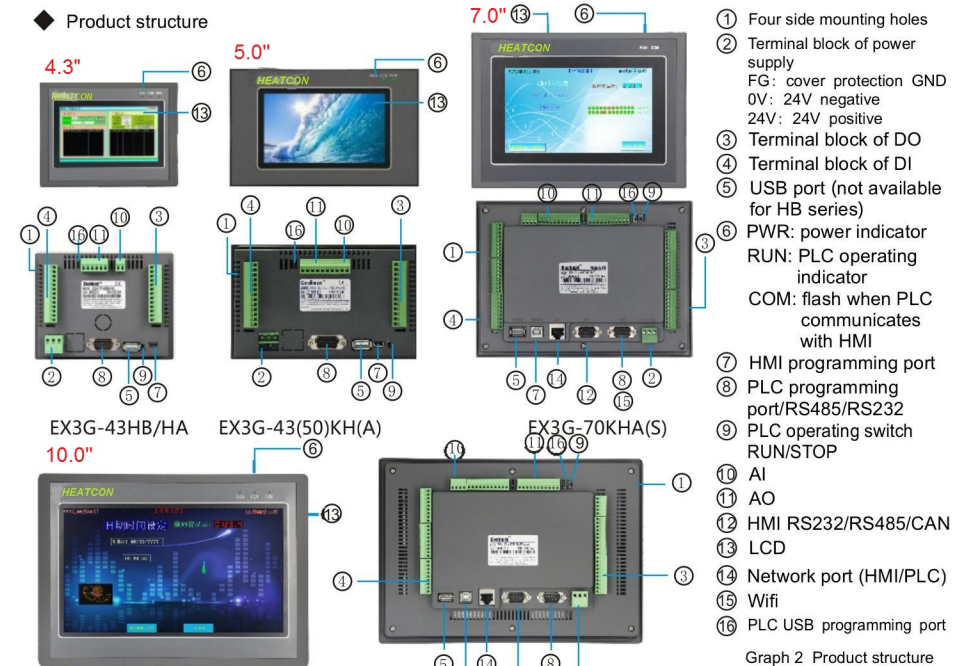
※ More specs can be customized if bulk order.

Chart 3: Mounting dimension

Model	Max digital points	Max analog quantity	Mounting dimension		Boundary dimension W*H*D(mm)
			A(mm)	B(mm)	
EX3G-43HB/HA	12DI/12DO	4AD/2DA	119	93	134*102*30
EX3G-43KH(50)KH(A)	12DI/12DO	4AD/2DA	143	86	150*93*32
EX3G-70KHA(S)	30DI/30DO	16AD/8DA	218	153	226*163*35.6
EX3G-100HA	30DI/30DO	16AD/8DA	261	180	275*194*36

Electric Design

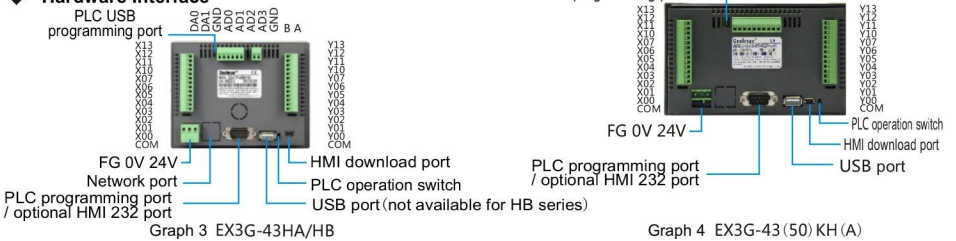
◆ Product structure



- Four side mounting holes
- Terminal block of power supply FG: cover protection GND 0V: 24V negative 24V: 24V positive
- Terminal block of DO
- Terminal block of DI
- USB port (not available for HB series)
- PWR: power indicator RUN: PLC operating indicator COM: flash when PLC communicates with HMI
- HMI programming port
- PLC programming port/RS485/RS232
- PLC operating switch RUN/STOP
- AI
- AO
- HMI RS232/RS485/CAN
- LCD
- Network port (HMI/PLC)
- Wifi
- PLC USB programming port

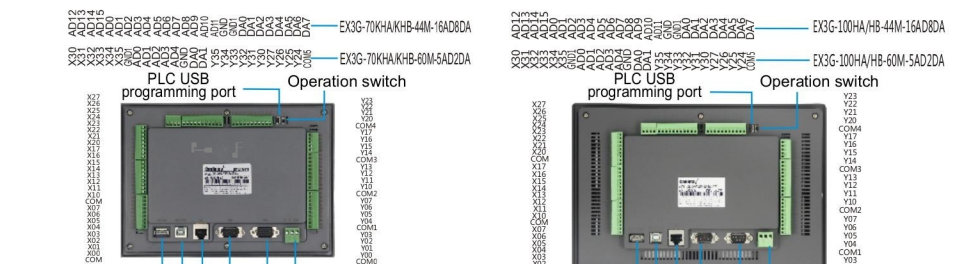
Graph 2 Product structure

◆ Hardware Interface



Graph 3 EX3G-43HA/HB

Graph 4 EX3G-43(50)KH(A)



Graph 5 EX3G-70KHA(S)

Graph 6 EX3G-100HA

Wiring spec of terminal: 22-14AWG wire. The terminals of this serial are all pluggable ones.

Definition of communication interface. The machine has 2 PLC programming ports (RS232-DB9 male/ Mini B-type USB). 1 HMI downloading port and 1 USB port. 43HB(HA)/43(50)KH(A) all-in-one: 2x RS485 can be optional on PLC and 1x RS232 can be on HMI. PLC of 70KHA(S)/100HA/150HA all-in-one: 1x 485 or 2x 485 (one is changed from the existed 232). CAN, network port (can't coexist with the one on HMI) and wifi (cover the existed 232 port) can be optional on PLC. And 1x RS232 or RS485, network port (can't coexist with the one on PLC) can be optional on HMI.