



# SYNTEC AUTOMATION CONTROLLER



**TRUSTED TECHNICAL SERVICE**

# SYNTEC AUTOMATION CONTROLLER

---

**SYNTEC**

# CONTENT

About Syntec	/	01
Syntec Automation Controller	/	03
Hardware Features	/	04
Develop Software	/	06
Application	/	08
Controller Specification	/	13

# ABOUT SYNTEC

26 +

Syntec 26-years  
Service Experience

1

One-Station  
Service

50 +

Worldwide  
Service Bases

NO.1

PCbaseNo.1

SYNTEC specializes in PC-based motion control through excellent research and development for 25 years.

Totally integrated automation

Supply automation, IOT, software and hardware solutions.

With 50+ service locations around the world

Made in Taiwan

Consistent production process

**Company vision:**

Trustworthy intelligent manufacturer partner

**Company mission:**

Comprehensive smart factory solution

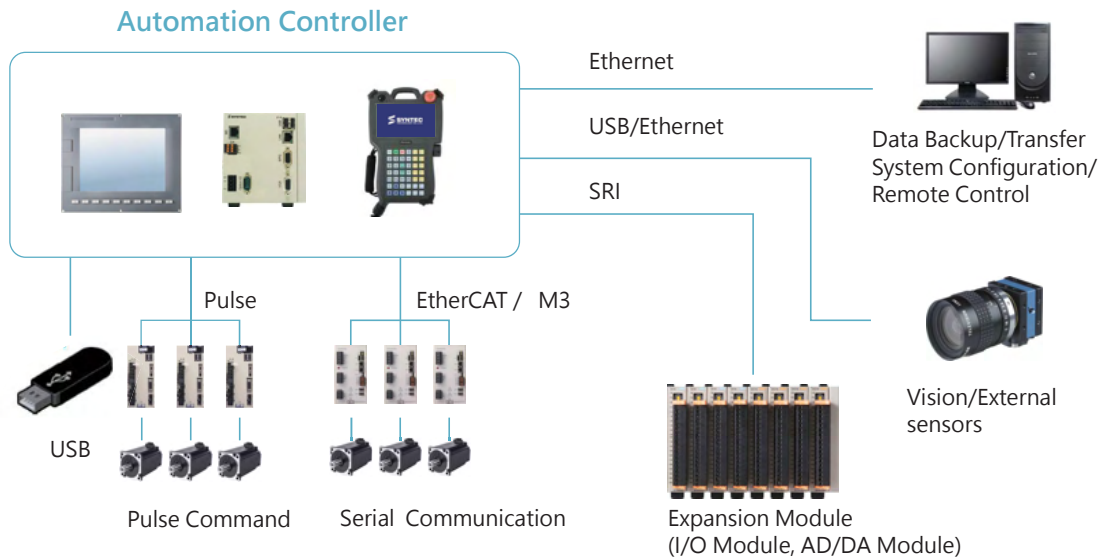
Under the industry 4.0 global trend, the industrial sector no longer relies on traditional production methods. What replaced them are diverse, customization centered, and small quantity productions. LEANTEC is able to respond to global industrial changes in providing comprehensive solutions to clients, thereby realizing our vision of achieving smart manufacturing and creating smart factories.

In moving towards industry 4.0, LEANTEC uses its smart manufacture system integration as its core advantage in accumulating experience through small quantity & diverse productions, cyber physical system integration, on-site services, and complemented by multiple sales channels, in providing one-stop comprehensive solutions.



# SYNTEC AUTOMATION CONTROLLER

## Hardware Description



## Product Highlights

- Support 5-Axes interpolation and three points circular interpolation
- M3 and EtherCAT protocol supported
- Support G code and M code
- Integrated environment for fast customization and easily develop and simulate on PC
- Various communication interface, simply integrates with sensor, such as vision device
- Support Syntec Cloud to realize smart factory monitoring



FC



eHMC

# HARDWARE FEATURES

## eHMC Controller

- **Integrated with touch-panel**  
All-in-one design that integrates with PLC and HMI
- **Multiple screen size selection**  
8/10/15 inches touch panel



eHMC

## FC Controller

- **High Flexibility**
  - Compatible with commercial touch panel
  - Support VGA port
  - Easy to setup and expansion



Serial Communication



Pulse Command

## Teach pendant Controller

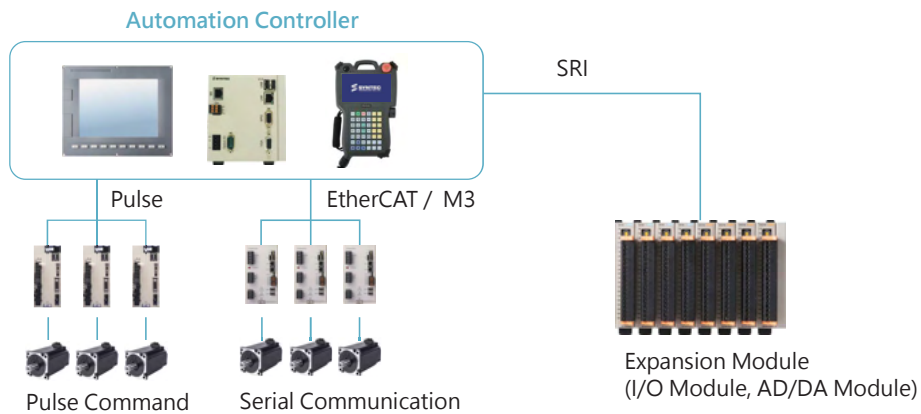
- **Flexible working distance**  
No distance restriction bwtween controller and machine
- **Mutiple function keys**
  - Button customization
  - Mode switch
  - Emergency stop
  - MPG
- **7-inch touch panel**



Teach pendant controller

## Various Interface

- Support
  - Pulse, EtherCAT, M3
  - SRI: Syntec Remote Interface, high speed serial communication
  - Support serial P2P axis



## Product Highlights

- Various Module Integration

- Expand I/O and AD/DA module
- Monitoring module state on controller



Classification	Model	Specification
Power Supply Module	FC-PWR	24VDC
	FC-PWR-2DA	2 DA outputs (12bit) 1 SRI
I/O Module	FC-DI16	24VDC, 5ma, 16 channel inputs
	FC-DO16	12 to 24VDC, 2A, 16 channel outputs
	FC-DI32	2 IDC-16pin
	FC-DO32	2 IDC-16pin
AD/DA Module	FC-SLSR	1 PWM output 4 DA outputs (12bit) 8 AD inputs (12bits)
	FC-ADDA	4 DA outputs (12bit) 8 AD inputs (12bits)
	FC-LWM	1 PWM output 4 DA outputs (12bit) 8 AD inputs (12bits) 8 DO outputs (500mA) 16 DI inputs
Functional Module	FC-Resolver	ADC (16 bit)
	FC-MPG	1 MPG
	FC-KTY84	4 KTY84 temperature inputs

## Modular Design

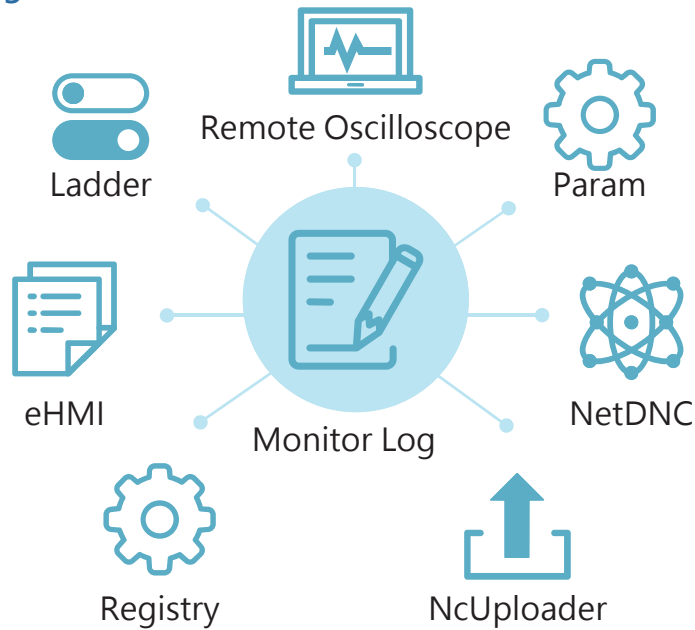




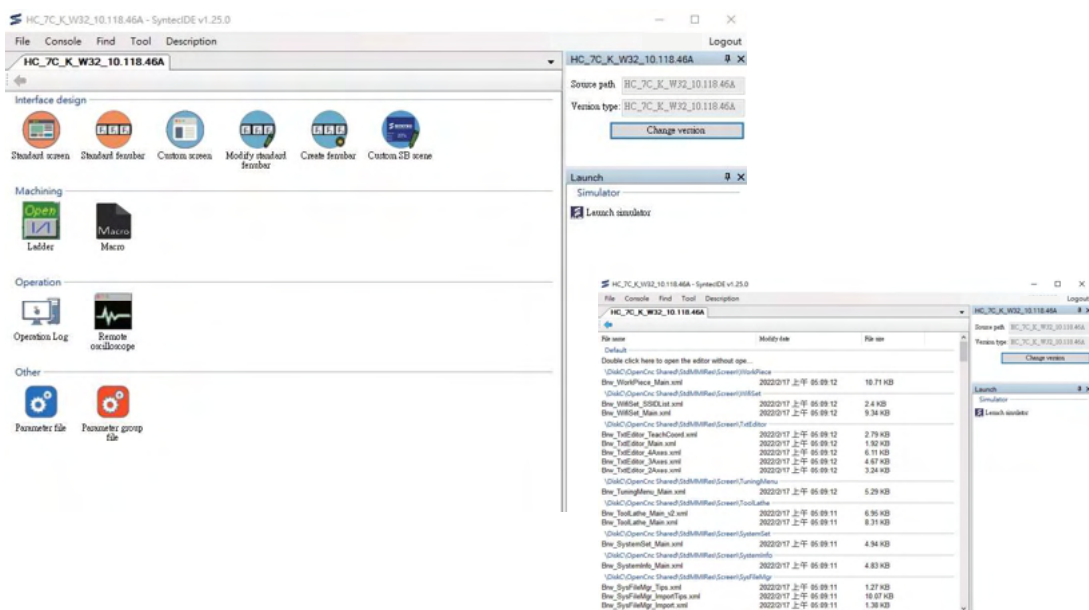
# DEVELOP SOFTWARE

## Syntec IDE Integration

- APP Management

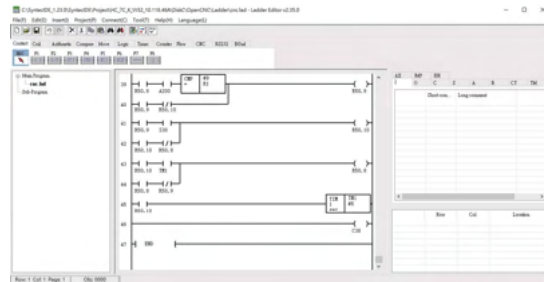


- Reduce development time by Syntec IDE



## PLC Editor - MLCedit

- **Friendly Operating Interface**
  - Support register table for checking
  - Support real-time simulation
  - Offer logic and grammar check



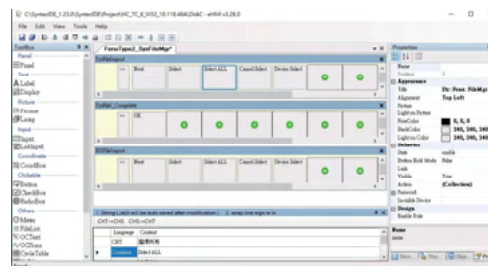
## Controller Simulator



- **Easy to Use**  
Portable software
- **Friendly file management**  
One folder to one project, easy to manage
- **Exactly the same**  
Precisely display the operations according to customized HMI, MACRO and PLC

## HMI Editor – eHMI

- **Intuitive Operating Interface**  
Window base interface  
Easily operate by drag and drop
- **Highly integrated with PLC**  
Able to set and display on screen
- **Customization files packing**  
Provide packing tool, making installation easier

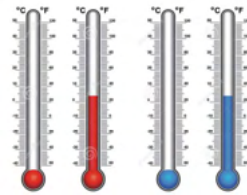


# APPLICATION

## Communication

### Support Protocol

- Modbus - RTU
- Modbus - TCP
- EtherNet/IP



### Invertor Module

- Replacing DA invertor port with RS485  
Preciser frequency control
- Support standard Inverter Interface
- Support import and export parameter



### External Sensor

- High Integration  
Sensor data can be seen and used easily on controller



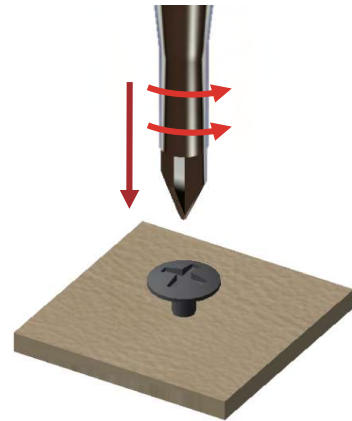
## Torque Limiter

- **Torque limit signal checking**  
Torque limits can be modified in real-time
- **Application**  
Tightening, riveting

### Application

Riveting solar panels and its base panels.  
There is minor rivet force difference on each different batch

- **Check torque arrival to control rivet force**
  - External sensor to immediately feedback torque value
  - Torque limit parameter can be easily set on customized HMI
- **Check torque arrival to prevent crashes**
  - Define torque limit for gantry path
  - Once crashed, torque arrival signal immediately cut off power for gantry



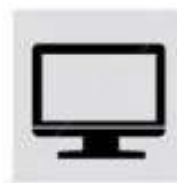
Gantry Pick and Place –  
Crash Protection

## Various ways of axis control

Support PC software, Teach pendant, Joystick



Joystick



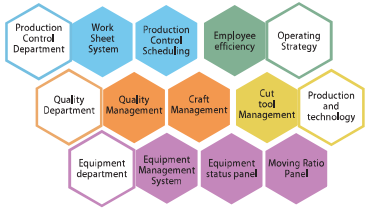
PC



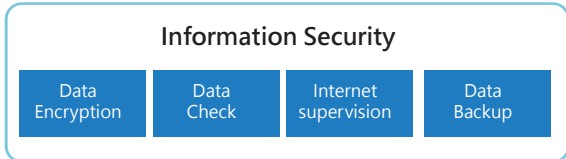
Teach pendant

# Factory monitoring and control via Syntec Cloud

## Application



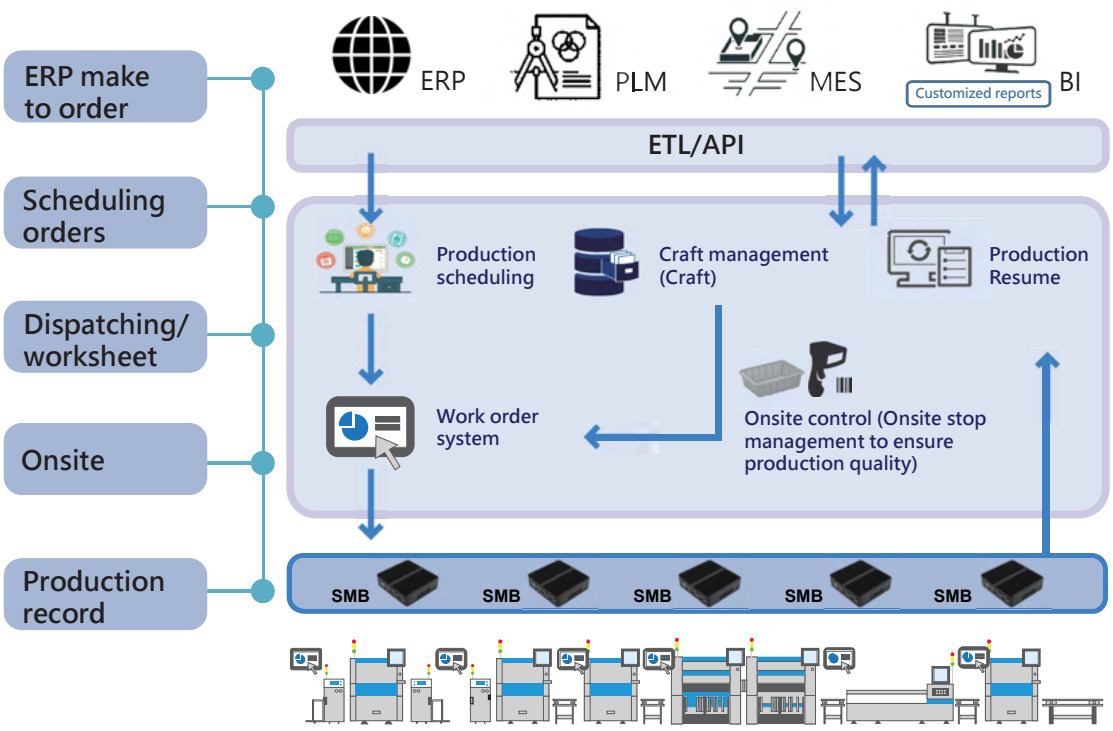
## Information equipments



## Production Equipments

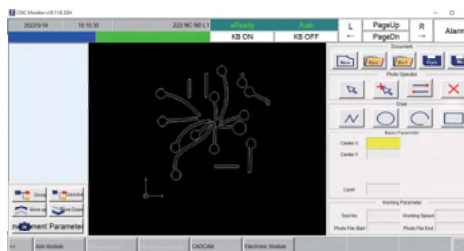


## SynFactory Production Smart Cloud



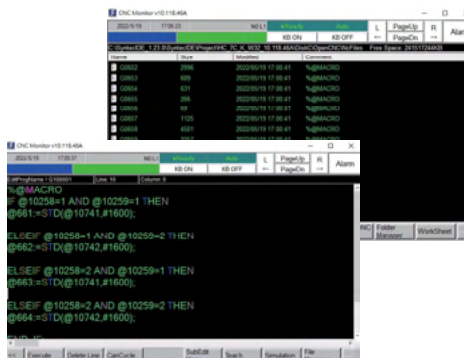
## APP functional module

- Concept of APP design**  
 Based on the user' s need, directly select and apply the corresponding functional module
- Save time in automation development**  
 Start develop from existed modules could highly improve efficiency
- CAD/CAM Import**  
 Support various industries CAD/CAM developed by Syntec



## File Management

- Program management**  
 Easy to extract and manage program and information
- Friendly recipe management**  
 Improve efficiency and reduce error operation

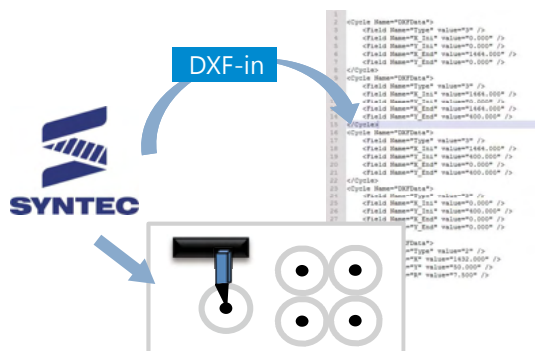


## DXF - in

- Convert DXF to NC**  
 Directly convert DXF into G-code, greatly reduce time on editing program
- High flexibility**  
 Processing data can be extracted after importing DXF

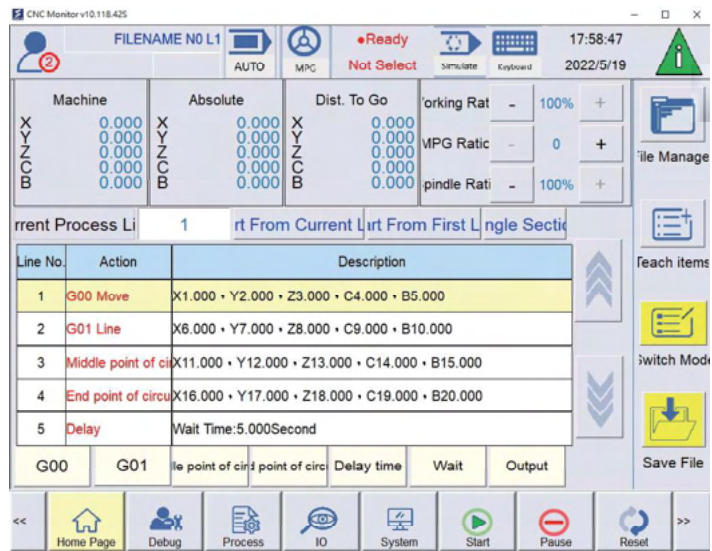
## Application

- DXF-in driller solution**  
 DXF-in extracts information of the circle, and then define the center point  
 Machine moves directly to the center for tapping



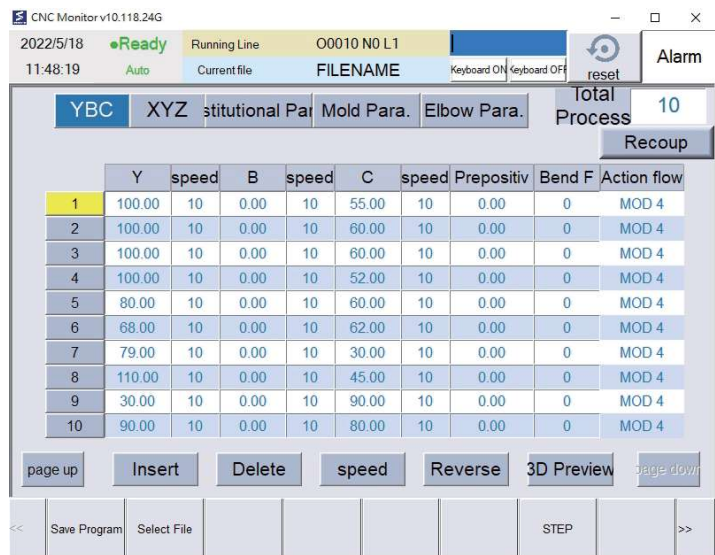
## Table Teaching

- **Table Teaching** : Points could be teach or edited
- **Generate program** : Automatically transfer form table to program
- **Customization** : Table is able to be customized



## Recipe Function

- **Multi data accessor**
  - **Use in real-time** : Flexibly change craft parameter
  - **Multiple storage** : Support up to 5 sets of recipe
  - **One set with mass data** : Up to 8192 parameters in one set



# CONTROLLER SPECIFICATION



## eHMC naming conventions

**HC – 10 E – K**

eHMC      1<sup>st</sup>      2<sup>nd</sup>      3<sup>rd</sup>



	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>
Item	Screen size	Axis Communication Interface	Appearance
Definition	8 : 8 inches 10 : 10 inches 15 : 15 inches	A : Pulse type C : Serial E : Serial S : Pulse type (without feedback)	K : Without function keys S : Without function keys E : Without screen

## eHMC - A



Model		HC-8A	HC-10A	HC-8A	HC-10A	Appearance icon
		-K		-S		
Control Axis	Standard	4 (3 axes for HC-8A)				
	Optional	-				
	Spindle No.	6				
Hardware	Axis Communication Interface	pulse				
	I/O	32/32				
	DA	2				
Front Interface	USB	1		0		
	RJ-45	1 (LAN)				
Back Interface	RS-485	1				
	MPG	1				
	USB	0		2		
	KB	1				
	H/K	1				
	5v output	1				





## eHMC - C

Model		HC-10C	HC-8C	HC-10C	HC-15C	Appearance icon
		-K	-S			
Control Axis	Standard	4				
	Optional	18				
	Spindle No.	6				
Hardware	Axis Communication Interface	M3/EtherCAT				
	I/O number	-				
	DA	-				
Front Interface	USB	2	0			
Back Interface	RJ-45	3 (LAN*2,M3*1)				
	RIO	1				
	Option I/O	1 (RS-485,SRI)				
	USB	2				
	KB	1				



## eHMC - E

Model		HC-8E	HC-10E	HC-8E	HC-10E	HC-15E	Appearance icon
		-K		-S			
Control Axis	Standard	4					
	Optional	18					
	Spindle No.	10					
Hardware	Axis Communication Interface	M3/EtherCAT					
	I/O	32/32					
	DA	2					
Front Interface	USB	1	0				
Back Interface	RJ-45	2 (LAN*1,M3*1)					
	Option I/O	1 (RS-485,SRI)					
	MPG	1					
	USB	0	2				
	KB	1					
	H/K	1					
	5V output	1 (HC-8E not supported)					

## eHMC - S

Model		HC-8S		Appearance icon
		-S	-E	
Control Axis	Standard	5		HC-8S-S: 
	Optional	-		
	Spindle No.	6		
Hardware	Axis Communication Interface	pulse (not support feedback)		HC-8S-E: 
	I/O	16/4		
	DA	-		
Back Interface	RJ-45	2 (LAN*2)		
	Option I/O	1 (RS-485,SRI)		
	USB	2		

## Teach pendant




Model		HC-7C	Appearance icon
Control Axis	Standard	4	
	Optional	18	
	Spindle No.	6	
Hardware	Axis Communication Interface	M3/EtherCAT	
	I/O	-	
	DA	-	
Back Interface	USB	1	
HHB Module	RJ-45	2 (LAN*1,M3*1)	

## FC naming conventions

**FC – A**  
 FC      1<sup>st</sup>

	1 <sup>st</sup>
Item	Communication protocol
Definition	A : Pulse type B : Serial C : Serial

## FC Model

Model		FC-A	FC-B	FC-C	Appearance icon
Control Axis	Standard	4	4	6	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p>FC-A</p> </div> <div style="text-align: center;">  <p>FC-B</p> </div> </div>
	Optional	-	18		
	Spindle No.	6			
Hardware	Axis Communication Interface	pulse	M3/EtherCAT		
	I/O	-			
	DA	0	2		
Front Interface	RJ-45	1 (LAN)	2 (LAN*1, M3*1)		
	Option I/O	1 (RS-485, SRI)			
	MPG	1			
	USB	2			
	VGA	1			
					 <p>FC-C</p>

## TAIWAN

### Taiwan (Hsinchu)

**SYNTEC TECHNOLOGY Co., Ltd**  
ADD : No.25, Yanfa 2nd Rd., East Dist.,  
Hsinchu City 300, Taiwan (R.O.C.)  
TEL : +886-3-6663553  
FAX : +886-3-6663505  
EMAIL : sales@syntecclub.com.tw

### Taichung

**SUN-CNC Co., Ltd**  
ADD : No. 22, Lane 428, Section 1, Fengyuan  
Boulevard, Fengyuan District  
TEL : +886-4-25337731  
TAX : +886-4-25349224

**TANLU-CNC Co., Ltd**  
ADD : No. 42, Jingming Road, Xitun District,  
Taichung City, Taiwan (R.O.C.)  
TEL : +886-4-23102626  
TAX : +886-4-23102636

### Tainan

ADD : No. 218, Denan Road, Rende District,  
Tainan City, Taiwan (R.O.C.)  
TEL : +886-6-2796707  
TAX : +886-6-2796705

## CHINA

### Jiangsu

**SYNTEC TECHNOLOGY(Suzhou)CO.,Ltd**  
ADD : Building B, No.9 Chunhui Road,Suzou Industrial  
Park,China  
TEL : 0512-69008860  
FAX : 0512-65246029

**Suzhou Huaxin of CNC Equipment Co., Ltd.**  
ADD : Building A, No.9 Chunhui Road,Suzou  
Industrial Park,China  
TEL : 0512-69560828  
FAX : 0512-69560818

**SYNTEC TECHNOLOGY(Suzhou)CO.,Ltd WuXi  
Office**  
ADD : B906, Yuye Network Building, 68 Exploration  
Road, Huishan District, Wuxi City, Jiangsu Province,  
China  
TEL : 15295664580

**SYNTEC TECHNOLOGY(Suzhou)CO.,Ltd  
Changzhou Office**  
ADD : Room 2217, Yatal Fortune Center, No. 1  
Huayuan Street, Hutang Town, Wujin District,  
Changzhou City, Jiangsu Province, China  
TEL : 18168828572

**SYNTEC TECHNOLOGY(Suzhou)CO.,Ltd  
Xuzhou Branch**  
ADD : Room 1503, South of Territorial Sea Office  
Building, No. 66, Kunpeng Road, Xuzhou Economic  
Development Zone, Jiangsu Province, China  
TEL : 13656201020

**SYNTEC TECHNOLOGY(Suzhou)CO.,Ltd  
NanJingBranch**  
ADD : Room 712, Research Building 1, Lianggang  
Park, 117 Suyuan Avenue, Jiangning District, Nanjing  
City, Jiangsu Province, China  
TEL : 025-52717702  
FAX : 025-52717710

**SYNTEC TECHNOLOGY(Suzhou)CO.,Ltd  
NanTong Branch**  
ADD : Room T3-1301, No. 108, Gangzha District,  
North Street, Nantong City, Jiangsu Province, China  
TEL : 0513-89077025  
FAX : 0513-89072057

**SYNTEC TECHNOLOGY(Suzhou)CO.,Ltd  
NanTong Branch Yanchen Office**  
ADD : Room 401, building 13, phase 9, Zhongnan  
Century City, Yandu District, Yancheng City, Jiangsu  
Province  
TEL : 18625235150

### Shaanxi

**SYNTEC TECHNOLOGY(Suzhou)CO.,Ltd XiAn  
Branch**  
ADD : Room 1, 1328, Building 4, Yicui Garden I  
Duhui, No. 10, South Tangyan Road, Xi'an  
High-tech Zone  
TEL : 029-88287423

**SYNTEC TECHNOLOGY(Suzhou)CO.,Ltd BaoJi  
Office**  
ADD : Room 1702, Unit 3, Building 8, Dongling Xinshiji,  
Binhe North Road, Jintai District, Baoji, Shaanxi  
Province, China

## AROUND THE WORLD

### Malaysia

ADD : No.2, Jalan Astana 1D,41050 Shah Alama,  
Selangor, Malaysia.  
TEL : +603-33115887/+617-674 3282  
EMAIL : otis.slah@syntecclub.com.tw,  
yeneam.teoh@syntecclub.com.tw

### Thailand

ADD : 78/38 Kheha Romkiao Rd., Khlong Song Ton Nun,  
Lat Krabang Bangkok, 10520  
TEL : +662-006-5793  
EMAIL : thanawat@syntecclub.com.tw

### Vietnam

ADD : 3F, No. 36, A4 Street, Ward 12, Tan Binh District,  
Ho Chi Minh City, VietNam  
TEL : +84938332829  
FAX : +842822535556  
EMAIL : andyngo@vnsyntec.com.vn

### Turkey

ADD : Kucukbakkalkoy Mah. Vedat Gunloy Cd. Defne Sok.  
No:1 D:1502 Flora Residence,34750 Atasehir/Istanbul, Turkiye  
TEL : +90-216-2662475  
EMAIL : daisy.cheng@syntecclub.com.tw

### USA (South California)

ADD : 766 Pinefalls Ave.Walnut,CA 91789  
TEL : +1909-551-0187  
EMAIL : info@syntecamerica.com

### Indonesia

**PT. OTOMASI BERSAMA INDONESIA**  
ADD : Ruko Arcadia Mataram Blok B, No 15, Kelurahan  
Cibatu, Kecamatan Cikarang selatan, 17530, Indonesia  
TEL : +6221 2210 4832  
EMAIL : yulius@otomasi.co

### India (Distributor)

**Luna Technologies Pvt. Ltd**  
ADD : W-200 TTC Industrial Estate, Khairne,  
Thane Belapur Road, Navi Mumbai -400708  
TEL : +91-22-61788110  
E-mail : sales@unabearings.com

### Guangdong

**SYNTEC TECHNOLOGY(Suzhou)CO.,Ltd GuangDong  
Branch**  
ADD : Factory 201or 301, Building A, No.10 Nanjiang  
Third Road, Zhuijiang Street, Nansha District, Guangzhou  
City  
TEL : 020-39089367  
FAX : 020-39089791

**SYNTEC TECHNOLOGY(Suzhou)CO.,Ltd DongGuan  
Branch**  
ADD : 0769-81661ing 1, Mobile Park, No. 522, Zhen  
'an East Road, Chang'an Town, Dongguan City,  
Guangdong Province, China  
TEL : 0769-81660318

**SYNTEC TECHNOLOGY(Suzhou)CO.,Ltd GuangZhou  
Branch**  
ADD : Room 404, Building 2, Seven Friendship Building,  
No. 8 Luojiacun Section, Fuyi Road, Dalong Street,  
Panyu District, Guangzhou City, Guangdong Province  
TEL : 020-34583040  
FAX : 020-34583220

**SYNTEC TECHNOLOGY(Suzhou)CO.,Ltd ChangPing  
Branch**  
ADD : Floor 5, Huilong Building, No. 8, Zhongnan 1st  
Road, Banshi Village, Changping Town, Dongguan City,  
Guangdong Province, China  
TEL : 0769-82826802  
FAX : 0769-82826820

**SYNTEC TECHNOLOGY(Suzhou)CO.,Ltd ShenZhen  
Branch**  
ADD : 406, Block E, Haowei new material industrial  
park, No. 8, Qinglan 1st Road, Zhukeng community,  
Longtian street, Pingshan District, Shenzhen,  
Guangdong  
TEL : 0755-84320380  
FAX : 0755-84559490

**SYNTEC TECHNOLOGY(Suzhou)CO.,Ltd JiangMen  
Branch**  
ADD : Room 02, 7th Floor, Torch Building, Hi-Tech  
Zone, 288 Jinou Road, Jianghai District, Jiangmen City,  
Guangdong Province, China  
TEL : 0750-3762143

### Henan

**SYNTEC TECHNOLOGY(Suzhou)CO.,Ltd LuoYang  
Branch**  
ADD : Room 704, Runsheng Building, Intersection of  
Heluo Road and Sanshan Road, Hi-Tech Zone, Luoyang,  
Henan Province, China  
TEL : 0379-65110352  
FAX : 0379-65110352

**SYNTEC TECHNOLOGY(Suzhou)CO.,Ltd  
ShiJiaZhuang Office**  
ADD : 4-3-801, Reyi Community, No. 8 Huaxing Road,  
Qiaoxi District, ShiJiaZhuang City, Hebei Province, China  
TEL : 1862728669  
FAX : 0379-65110352

### Fujian

**SYNTEC TECHNOLOGY(Suzhou)CO.,Ltd XiaMen  
Branch**  
ADD : Floor 3, No. 2, Jixiang West Road, Xinmin Town,  
Tong'an District, Xiamen City, Fujian Provinc  
TEL : 0592-7191901  
FAX : 0592-7220536

### Zhejiang

**SYNTEC TECHNOLOGY(Suzhou)CO.,Ltd HangZhou  
Branch**  
ADD : 1202, Unit 2, Building 1, Dikai Building, No.471  
Jincheng Road, Xiaoshan District, Hangzhou City,  
Zhejiang Province, China  
TEL : 0571-82751187

**SYNTEC TECHNOLOGY(Suzhou)CO.,Ltd HangZhou  
Branch Jinhua Office**  
ADD : Room G204, No. 1729, Dongshi North Street,  
Wucheng District, Jinhua City, Zhejiang  
Province  
TEL : 1599-0026533

**SYNTEC TECHNOLOGY(Suzhou)CO.,Ltd WenZhou  
Branch**  
ADD : 1205-3, Honghai building, Ouhai District,  
Wenzhou City, Zhejiang Province  
TEL : 0577-86158619

**SYNTEC TECHNOLOGY(Suzhou)CO.,Ltd NingBo  
Branch**  
ADD : Room 1207, Ivy league Building, No.262, Lane  
416, Zhaohui Road, Jiangdong-District, Ningbo City,  
Zhejiang Province, China  
TEL : 0574-87763035

**SYNTEC TECHNOLOGY(Suzhou)CO.,Ltd WenLing  
Branch**  
ADD : Room 509, Haocheng Service Building, No. 838,  
Wanchang Middle Road, Chengdong Street, Wenling  
City, Taizhou City, Zhejiang Province, China  
TEL : 0576-86138372  
FAX : 0576-86119106

**SYNTEC TECHNOLOGY(Suzhou)CO.,Ltd YuHuan  
Office**  
ADD : Room 302, Unit 2, Building 1, Hualong Times  
Square, 226 Provincial Road, Chunmen Town, Yuhuan  
County, Taizhou City, Zhejiang Province, China  
TEL : 130888636567

### Chongqing

**SYNTEC TECHNOLOGY(Suzhou)CO.,Ltd ChongQing  
Branch**  
ADD : 1007, Building 4, No.62, East Section of Taishan  
Avenue, Yubei District, Chongqing  
TEL : 023-67913296  
FAX : 023-67634382

**SYNTEC TECHNOLOGY(Suzhou)CO.,Ltd ChengDu  
Office**  
ADD : ADD : Room102, Unit 1, Building 24, JiAZhaoye  
Modern City, No.898, Section 2, Xingxing Road,  
Dongsheng Street, Shuangliu District, Chengdu City,  
Sichuan Province, China  
TEL : 18302866229

### Tianjin

**SYNTEC TECHNOLOGY(Suzhou)CO.,Ltd TianJin  
Branch**  
ADD : No.37, Area A, Qiao RuiFeng Garden, No.7  
Waihuian West Road, Xiqing District, Tianjin, China  
TEL : 022-23739192

### Shandong

**SYNTEC TECHNOLOGY(Suzhou)CO.,Ltd JINan  
Branch**  
ADD : 502, Unit 3, Building 11, Luneng Kanggiao, No.  
28, Sankongqiao Street, Tianqiao District, Jinan,  
Shandong  
TEL : 0531-85907208  
FAX : 0531-85905708

**SYNTEC TECHNOLOGY(Suzhou)CO.,Ltd QingDao  
Office**  
ADD : Room 1004, Unit 2, Building 14, Jinri Zidu,  
Tianshan Road, Chengyang District, Qingdao,  
Shandong  
TEL : 18663779803

**SYNTEC TECHNOLOGY(Suzhou)CO.,Ltd TengZhou  
Office**  
ADD : 13 households, row 1, Xiaokang village, Yucai  
Road community, Beixin street, Tengzhou City,  
Shandong Province  
TEL : 15089706233

### Hubei

**SYNTEC TECHNOLOGY(Suzhou)CO.,Ltd WuHan  
Branch**  
ADD : 2003-2006, Building A, Optics Valley  
International, Jiayuan Road, No.456 East Luoyu Road,  
Hongshan District, Wuhan City, Hubei Province, China  
TEL : 027-87638876  
FAX : 027-87204137

### Liaoning

**SYNTEC TECHNOLOGY(Suzhou)CO.,Ltd ShenYang  
Branch**  
ADD : Room 1212, Tianxin Building, 17 Jianshe West  
Road, Tiexi District, Shenyang City, Liaoning Province,  
China, China  
TEL : 186980806526

### Anhui

**SYNTEC TECHNOLOGY(Suzhou)CO.,Ltd ShenYang  
Branch**  
ADD : Room 1005, block B, Wanda Ginza, rongchuang  
Mao, Binhu, Hefei, Anhui Province,China.  
TEL : 0551-63814183  
FAX : 0551-63814183



SYNTEC Technology Co., Ltd.  
No.25, Yanfa 2nd Rd., East Dist.,  
Hsinchu City 300, Taiwan (R.O.C.)

☎ 886-3-6663553  
☎ 886-3-6663505  
✉ sales@syntecclub.com.tw

Suzhou SYNTEC Equipment Co.,Ltd.  
No. 9th, Chun Hui Road, Suzhou  
Industrial Park, Jiangsu Province

☎ 86-512-69008860  
☎ 86-512-65246029  
✉ service@syntecclub.com.cn



<http://www.syntecclub.com.tw>

\*SYNTEC reserves the right to revise catalog information at any time without notice due to typographical errors or any errors.

Copyright © SYNTEC Technologies Corp.  
©2022.05\_rev.1 (PRINTED IN TAIWAN)