cMT X Series Data Display Machine Control User Guide

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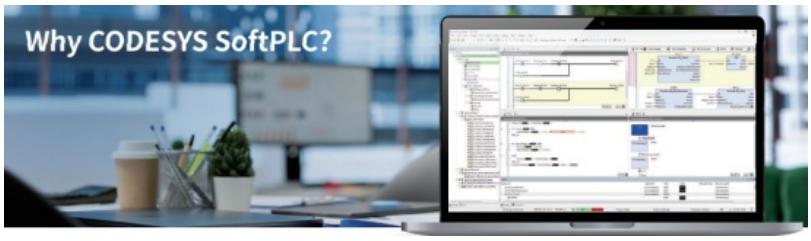
cMT X Series Data Display Machine Control

Weintek HMI + CODESYS SoftPLC

Weintek Integrates CODESYS into HMIs:

All-in-One Control for HMI + PLC + I/O Solutions

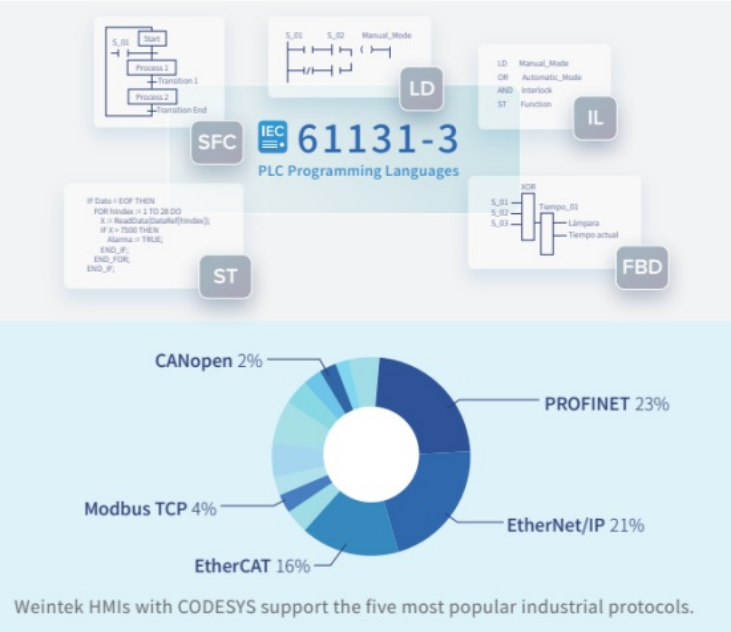
Why CODESYS Soft PLC ?



- CODESYS, the world's most widely used Soft PLC platform, supports all five IEC 61131-3 languages and integrates PLC programming, object-oriented development, visualization, motion control, and safety into one intuitive interface.
- Its open architecture and strong extensibility enable seamless integration with major industrial protocols and easy adaptation to diverse automation devices and controllers. This scalable control solution is key to smart manufacturing.
- CODESYS stands as the global Soft PLC market leader, and Soft PLC solution is set to grow steadily, securing even greater market share in the years ahead.

Key Applications:

- Factory Automation
- Mobile Automation
- Energy Automation
- Production Automation
- Building Automation



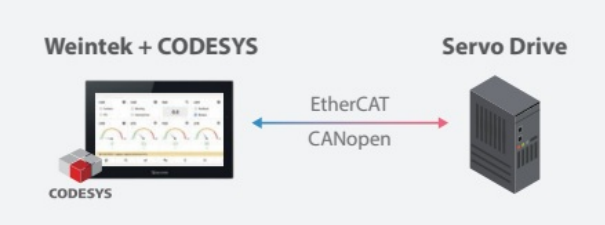
Weintek HMIs with CODESYS support the five most popular industrial protocols.

Advantages of Weintek + CODESYS Solution

1. Powerful Development Platform for Simplified Integration

CODESYS provides a universal, open development environment that supports over 500 controller brands and thousands of devices, enabling logic control on a single platform. Combined with Weintek Easy Builder Pro for HMI graphic design, it allows developers to greatly reduce time and cost for integration.

2. Software-Defined Architecture for Enhanced Control Capabilities By fully software-enabling traditional PLC functions, CODESYS turns Weintek HMIs into powerful control centers—no extra PLC hardware needed. With native support for Ether CAT, CANopen, and Modbus TCP, it delivers seamless
   communication, direct servo control, and modular, high-performance motion

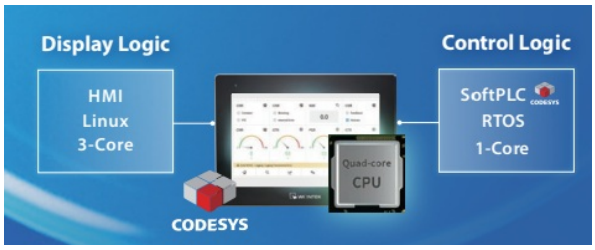


3. All-in-One Solution for Automation and IIoT Applications
   Beyond programming, visualization, and communication, CODESYS combined with Weintek's Encloud enables remote monitoring and cloud connectivity-accelerating smart manufacturing and AIoT deployment.
4. Proven Control Foundation for Global Reliability
   Trusted by hundreds of thousands of developers worldwide and adopted by leading manufacturers, CODESYS combined with Weintek Ir Series Remote 1/0 modules delivers a stable, scalable control architecture for modern automation.

Dual OS Architecture for Versatile Performance

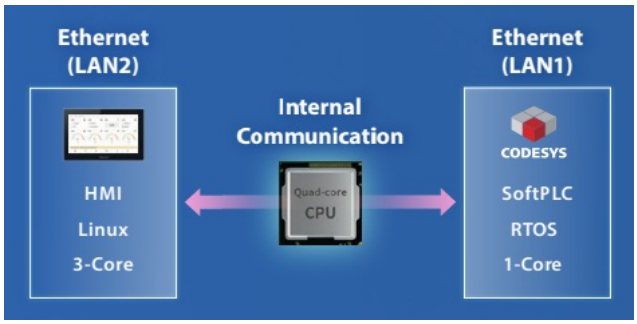
Independent Operating Systems: Linux + RTOS

An HMI with dual functionality of display and PLC control. Thanks to its independent operating system design, even if one side fails, the other can continue running normally.



Internal Communication Architecture

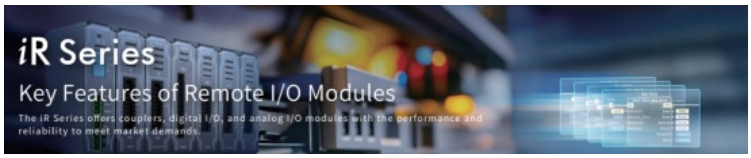
Direct internal pass-through communication between the HMI and PLC via Easy Builder Pro enables the HMI to control end machinery and equipment.



Ir Series

The iR Series offers couplers, digital I/O, and analog I/O modules with the performance and reliability to meet market demands.

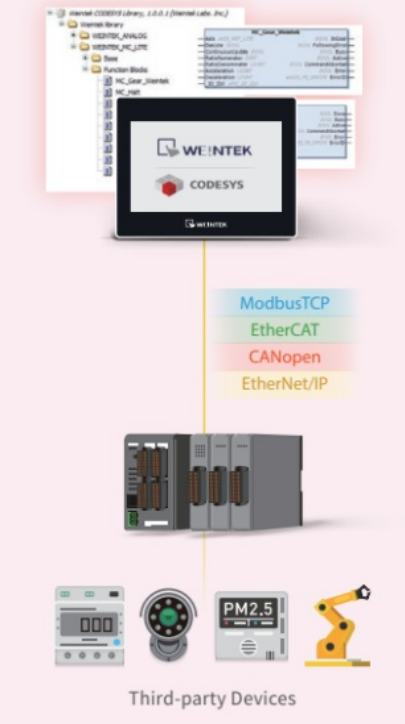
Key Features of Remote I/O Modules



Weintek Coupler	**Weintek I/O Module**
IR-ETN (Modbus TCP/Ether Net/IP) Modbus TCP: The classic protocol for industrial devices and general manufacturing automation. Ether Net/IP: Built on TCP/IP and CIP for strong compatibility, multi-topology support, and seamless IT integration-widely adopted in factory automation.	Digital Module Digital Input: Sink & Source Digital Output: Sink, Source & Relay
IR-COP (CANopen Slave) Simple structure with excellent real-time performance, ideal for embedded systems and high-reliability equipment such as medical and automotive devices.	Analog Module Wide Voltage & Current Range: Voltage: -10 to 10 V Current: -20 to 20 mA
IR-ECAT (Ether CAT Slave) Ultra-low latency with tight synchronization, supporting multi-node daisy-chain topologies-perfect for high-speed, precision motion control, robotics, and automated assembly.	Temperature Thermocouple (TC) and RTD Type Compatibility User-defined Table Support

3rd Party PROFINET Coupler High-speed real-time networking with multi-topology support and large-device capacity, suited for complex, high-speed automation systems.	Motion Control Single-Axis Motion Control Support

Exclusive Function Blocks



Industry Applications

Smart Farm Irrigation Systems

The Smart Farm Irrigation System is a mobile intelligent irrigation solution built with Weintek cT X Series HMI and CODESYS Softly. Using Modbus TCP/IP, it controls iR Series I/O modules (iR-ETN, DI, DQ, AM). Featuring modular design, high flexibility, and smart control, it is ideal for precision agriculture and environmental monitoring.

Key Benefits

	Centralized Control with Visual Interface

	Smart and Efficient Irrigation via Closed-Loop Control
	Remote Management with Instant Alerts
	Modular I/O Design for Easy and Flexible Expansion

Solutions

CMT X HMI + CODESYS Soft PLC

The CMT X HMI provides high-performance control with an intuitive graphical interface.

Modbus TCP/IP Integration + IR-ETN Coupler

iR-ETN serves as a Modbus TCP/IP slave to aggregate DI, DQ, and AM module data for the master.

Sensors + Irrigation Loop Control

DI modules read soil moisture valve on/off signal and flow-switch signals; AM modules capture analog data (e.g., humidity %, pressure); DQ modules drive valves and pumps.

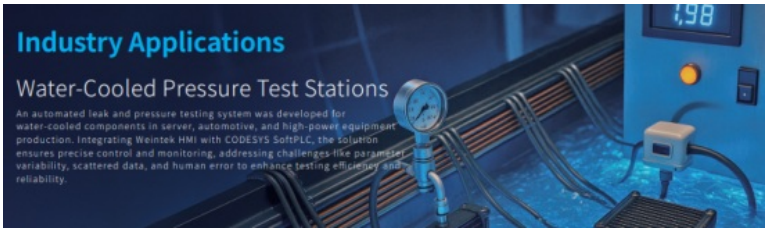
Remote Monitoring + Data Logging

The CMT X HMI supports Easy Access 2.0, multi-protocol databases, and MQTT/OPC UA to export field data to the cloud or central SCADA.

Industry Applications

Water-Cooled Pressure Test Stations

An automated leak and pressure testing system was developed for water-cooled components in server, automotive, and high-power equipment production. Integrating Weintek HMI with CODESYS Soft PLC, the solution ensures precise control and monitoring, addressing challenges like parameter variability, scattered data, and human error to enhance testing efficiency and reliability.



Key Benefits

	Streamlined Test Automation for Higher Efficiency

	Integrated Data Logging with Traceable Reporting
	Flexible Configuration for Seamless Equipment Integration
	Multi-Level Access with Visual Alerts for Error Prevention

Solutions

CMTXHMI+ Bidirectional Communication

The visual interface exchanges test data with the Soft PLC in real time and supports trend display, alarms, and logging.

CODESYS Soft PLC + Ether CAT Control

The controller serves as an Ether CAT master to control iR modules with high-speed, real-time response.

Automated Test Logic + Alarm Handling

The PLC executes staged pressure control and triggers NG alarms when faults are detected.

Sensor Integration + HMI Data Logging

The DI/AI modules collect sensor signals, while the HMI performs threshold checks and records results.

Industry Applications

Cleanroom Fan Filter Unit Monitoring Systems

Designed for pharmaceutical, semiconductor, and precision industries, this cleanroom FFU and monitoring solution leverages Weintek HMI with CODESYS Soft PLC to optimize environmental control. It reduces energy waste, enables centralized monitoring, and supports remote maintenance—boosting efficiency, stability, and smart energy management.

Key Benefits

	EC Fans with Closed-Loop Control for Energy Saving
	Remote Monitoring with Historical Data Management
	Auto Alerts and Fan Calibration for Cleanroom Stability
	Graphical HMI with Role-Based Access for Easy Maintenance

Solutions

Centric Control + CODESYS Soft PLC

The CMT X HMI enables multi-zone FFU monitoring and control via touchscreen interface.

Closed-Loop Feedback + Modbus Monitoring

The system reads airflow, differential pressure, and RPM for real-time auto calibration.

Integrated Sensing + Data Logging

Temperature, humidity, pressure, and particle data are fed into the HMI for alerts and records.

Adaptive Energy Management + EC Motor Control

Smart control dynamically adjusts fan speed and air exchange rates for optimized efficiency.

IR Series Specifications

<table>
<tr><th colspan="2">Coupler Module</th><th>iR-ETN</th><th>iR-COP</th><th>iR-ECAT</th></tr>
<tr><td rowspan="4">Expansion I/O Module</td><td rowspan="4">Number of Bus Terminals Digital Input Point Digital Output Point Analog Input Channel Analog Output Channel</td><td colspan="3">Depends on Power Consumption</td></tr>
<tr><td colspan="3">Max. 256</td></tr>
<tr><td colspan="3">Max. 128</td></tr>
<tr><td colspan="3">Max. 64</td></tr>
<tr><td>Data Transfer Rate</td><td></td><td>Max. 64</td><td>10/100 Mbps</td><td>50k~1 Mbps</td><td>100 Mbps</td></tr>
</table>

Max. Number of TCP/IP Connections		8 Connections	–	–
Protocol		Modbus TCP/IP Server, Ether Net /IP adapter	CANopen Slave	Ether CAT Slave
Isolation		Network to Logic Isolation : Yes	CAN bus Isolation : Yes	Network to Logic Isolation : Yes
Power	Power Supply Power Consumption Current for Internal Bus Current Consumption Power Isolation Back-up Fuse	24 VDC (-15%/+20%)		
		Nominal 100mA@24VDC		
		Max 2A@5VDC		
		220mA@5VDC	170mA@5VDC	270mA@5VDC
		Yes		
		£ 1.6A Self-recovery		
Specification	PCB Coating Enclosure Dimensions WxHxD Weight Mount	Yes		
		Plastic		
		27 x 109 x 81 mm		
		Approx. 0.15 kg		
		35mm DIN rail mounting		
	Protection Structure Storage Temperat	IP20		
		-20° ~ 70° C (-4° ~ 158° F)		

Environment	ure Operating Temperature Relative Humidity Altitude Vibration Endurance	0° ~ 55° C (32° ~ 131° F)
		10% ~ 90% (non-condensing)
		3,000 m
		10 to 25Hz (X, Y, Z direction 2G 30 minutes)
Certification	CE	CE marked
	UL	cULus Listed

Coupler Module		**iR-ETN40R**	**iR-ETN40P**
Expansion I/O Module	No. of Bus Terminals Digital Input Point Digital Output Point Analog Input Channel Analog Output Channel Data Transfer Rate Max. Number of TCP/IP Connections Pro	Depends on Power Consumption	
		Max. 224	
		Max. 112	
		Max. 64	
		Max. 64	
Communication Interface		10/100 Mbps	
Specifications			
		8 connections	
		Modbus TCP Server, EtherNet/IP adapter	
		Yes	
		1	
		16	
		Relay	Source

Digital Output	tocol Network to Logic Isolation No. of Ports Total Number of Outputs Output Type Output Voltage Output Current Response Time Isolation Total Number of Outputs Output Type Output Voltage Output Current Max. Output Frequency Isolation Total Number of Inputs Isolation Total Number of Inputs Input Type Logic 1 Input Voltage Logic 0 Input Voltage Response Time Total Number of Inputs Input Type Logic 1 Input Voltage Logic 0 Input Voltage Max. Input Frequency	250VAC/30VDC	11~28VDC
		2A per channel (Max 8A)	0.5A per channel (Max 4A)
		10 ms	OFF->ON: 100 µs, ON->OFF: 600 µs
		Yes, electromagnetic isolation	Yes, optocoupler isolation
High-speed Output		0	2
		N/A	Source
		N/A	5VDC
		N/A	50mA per channel
		N/A	40KHz
		N/A	Yes, optocoupler isolation
Digital Input		24	
		Yes, optical isolation	
General Input		20	
		Sink or Source	
		15~28 VDC	
		0~5 VDC	
		OFF->ON: 5 ms, ON->OFF: 1 ms	
High-speed Input		4	

		SINK INPUT (PNP)	
		15~28VDC	
		0~5VDC	
		20KHz	
Power	Power Supply	24 VDC (-15%/+20%)	
	Power Consumption	Nominal 255mA@24VDC, Max. 540mA@24VDC	Nominal 100mA@24VDC, Max. 530mA@24VDC
	Current for-Internal Bus	Max. 2A@5VDC	
	Current Consumption	520mA@5VDC	350mA 5VDC
	Electrical Isolation	Logic to Field Power Isolation: Yes	
	Back-up Fuse	£ 1.6A Self-recovery	
Specification	PCB Coating	Yes	
	Enclosure	Plastic	
	Dimensions WxHxD	64x 109 x 81 mm	
	Weight	Approx. 0.27 kg	
	Mount	35mm DIN rail mounting	
Environment	Protection Structure	IP20	

	Storage Temperature	-20° ~ 70° C (-4° ~ 158° F)
	Operating Temperature	-10° ~ 60° C (14° ~ 140° F)
	Relative Humidity	10% ~ 90% (non-condensing)
	Altitude	3,000 m
	Vibration Endurance	10 to 25Hz (X, Y, Z direction 2G 30 minutes)
Certification	CE	CE marked
	UL	cULus Listed
	EtherNet/IP	ODVA Conformance Test

Digital I/O Module	**iR-DI16-K**	**iR-DM16-P**	**iR-DM16-N**	**iR-DQ16-P**	**iR-DQ16-N**	**iR-DQ08-R**
Input Logic	Sink or Source	Sink or Source	Sink or Source	N/A	N/A	N/A
Number of Inputs	16	8	8	0	0	0
Output Logic	N/A	Source	Sink	Source	Sink	Relay
Number of Outputs	0	8	8	16	16	8
Current Consumption	83mA@5VDC	130mA@5VDC	130mA@5VDC	196mA@5VDC	205mA@5VDC	220mA@5VDC

HIGH Level Input Voltage		15~28V DC	15~28 VDC	15~28V DC	N/A	N/A	N/A
LOW Level Input Voltage		0~5 VDC	0~5 VDC	0~5 VDC	N/A	N/A	N/A
Output Voltage		N/A	11~28 VDC	11~28V DC	11~28V DC	11~28V DC	250VAC/ 30VDC
Output Current		N/A	0.5A per channel (Max 4A)	0.5A per channel (Max 4A)	0.5A per channel (Max 4A)	0.5A per channel (Max 4A)	2A per channel (Max 8A)
Isolation		Input: Optical Isolation Output: N/A	Input: Optical Isolation Output: Optical Isolation	Input: Optical Isolation Output: Optical Isolation	Input: N/A Output: Optical Isolation	Input: N/A Output: Optical Isolation	Input: N/A Output: Electromagnetic Isolation
Specification Environment Certifi	Enclosure Dimensions WxHxD	Plastic					
		27 x 109 x 81 mm					
	Weight	Approx. 0.12 kg	Approx. 0.12 kg	Approx. 0.12 kg	Approx. 0.12 kg	Approx. 0.12 kg	Approx. 0.13 kg
	Mount	35mm DIN rail mounting					
	Protection Structure	IP20					
	Storage Temperature	-20° ~ 70° C (-4° ~ 158° F)					
	Operating Temperature R	0° ~ 55° C (32° ~ 131° F)					

cation	elative Humidity Altitude Vibration Endurance CE UL	10% ~ 90% (non-condensing)
		3,000 m
		10 to 25Hz (X, Y, Z direction 2G 30 minutes)
		CE marked
		cULus Listed

Motion Control Module		**iR-PU01-P**	
		Digital input/ output	Differential input/ output
Input Logic		Sink Input	Differential Input
Number of Inputs		4	3 (A/B/Z phase)
Output Logic		Source Output	Differential Output
Number of Outputs		4	2 (A/B phase)
HIGH Level Input Voltage		15~28 VDC	–
LOW Level Input Voltage		0~5 VDC	–
Input current		24 VDC, 5 mA	Meets the Requirements of ANSI Standards TIA/EIA-485-A

Input Impedance		3 KW	–
Indicators		Red LED Input State	
Output Voltage		24VDC	Meets the Requirements of ANSI Standards TIA/EIA-485-A
Output Current		50 mA	
Max. input frequency		200KHz	2MHz
Max. Output frequency		40KHz	2MHz
Number of Axis Specification	PCB Coating Enclosure Dimensions WxHxD Weight Mount Protection Structure Storage Temperature Operating Temperature Relative Humidity Altitude Vibration Endurance	1- Axis	
		Yes	
		Plastic	
		27 x 109 x 81 mm	
		Approx. 0.12 kg	
		35mm DIN rail mounting	
Environment		IP20	
		-20° ~ 70° C (-4° ~ 158° F)	
		0° ~ 55° C (32° ~ 131° F)	
		10% ~ 90% (non-condensing)	
		3,000 m	
		10 to 25Hz (X, Y, Z direction 2G 30 minutes)	

Certification		CE marked
		cULus Listed

Analog I/O Module		**iR-AI04-VI**	**iR-AM06-VI**	**iR-AQ04-VI**
Number of Analog Inputs Number of Analog outputs Current Consumption Analog Power Supply		4 (±10V/ ±20 mA)	4 (±10V/ ±20m A)	0
		0	2 (±10V/ ±20m A)	4 (±10V/ ±20mA)
		70mA@5VD C	70mA@5VDC	65mA@5VDC
		24 VDC(20.4 VDC~28.8 VDC) (-15%~+20%)		
Specification Environment Certification	PCB Coating Enclosure Dimensions WxHxD Weight Mount Protection Structure Storage Temperature Operating Temperature Relative Humidity Altitude Vibration Endurance	Yes		
		Plastic		
		27 x 109 x 81 mm		
		Approx. 0.12 kg		
		35mm DIN rail mounting		
		IP20		
		-20° ~ 70° C (-4° ~ 158° F)		
		0° ~ 55° C (32° ~ 131° F)		
		10% ~ 90% (non-condensing)		
		3,000 m		
		10 to 25Hz (X, Y, Z direction 2G 30 minutes)		

		CE marked
		cULus Listed

Temperature Module	**iR-AI04-TR**
Number of Input Channels	4 (RTD/Thermocouple)
Current Consumption	65mA@5VDC
Analog Power Supply	24 VDC(20.4 VDC~28.8 VDC) (-15% ~+20%)
Specification PCB Coating Enclosure Dimensions WxHxD Weight Mount **Environment** Protection Structure Storage Temperature Operating Temperature Relative Humidity Altitude Vibration Endurance **Certification** CE UL	Yes
	Plastic
	27 x 109 x 81 mm
	Approx. 0.12 kg
	35mm DIN rail mounting
	IP20
	-20° ~ 70° C (-4° ~ 158° F)
	0° ~ 55° C (32° ~ 131° F)
	10% ~ 90% (non-condensing)
	3,000 m
	10 to 25Hz (X, Y, Z direction 2G 30 minutes)
	CE marked
	cULus Listed

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Documents / Resources

	WEINTEK cMT X Series Data Display Machine Control [pdf] User Guide cMT X Series, cMT X Series Data Display Machine Control, Data Display Machine Control, Display Machine Control, Machine Control

References

- User Manual

WEINTEK

cMT X Series, cMT X Series Data Display Machine Control, Data Display Machine Control, Display Machine Control, Machine Control, WEINTEK

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