Powering Business Worldwide™

2014-10-30

5011670405-PVT5

ELC/ELC2 Series

Programmable Logic Controllers

INSTRUCTION SHEET

[Applicable Controllers]

- ELC-PV28NNDR
- ELC-PV28NNDT
- ELC2-PV28NNDR
- ELC2-PV28NNDT
- ELC2-PV28NNDP

The ELC-PV/ELC2-PV series includes five 28-point (16 inputs + 12 outputs) controllers. An ELC-PV/ELC2-PV series provides various instructions, and the size of the program memory in it is 16K steps. It is able to connect to all ELC series extension modules, including digital input/output (max. 224 I/O points), analog modules (A/D, D/A transformation and temperature units) and all kinds of new high-speed extension modules. Four groups of high-speed (200KHz) pulse outputs, and two new 2-axis interpolation instructions are included. ELC-PV/ELC2-PV series controllers are small in size and, and can be installed easily..

EN ✍ ELC-PV/ELC2-PV is an OPEN-TYPE device. It should be installed in a control cabinet free of airborne dust, humidity, electric shock and vibration. To prevent non-maintenance staff from operating ELC-PV/ELC2-PV, or to prevent an accident from damaging ELC-PV/ELC2-PV, the control cabinet in which ELC-PV/ELC2-PV is installed should be equipped with a safeguard. For example, the control cabinet in which ELC-PV/ELC2-PV is installed shall require a tool or key to be opened.

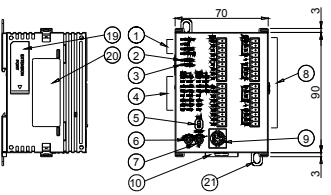
EN ✍ DO NOT connect AC power to any of I/O terminals, otherwise serious damage may occur. Please check all wiring again before ELC-PV/ELC2-PV is powered up. After ELC-PV/ELC2-PV is disconnected, Do NOT touch any terminals in a minute.

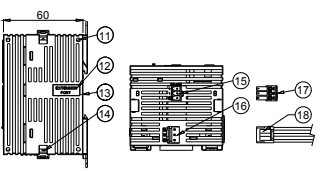
Make sure that the ground terminal ⏚ on ELC-PV/ELC2-PV is correctly grounded in order to prevent electromagnetic interference.

FR ✍ ELC-PV/ELC2-PV est un module OUVERT. Il doit être installé que dans une enceinte protectrice (boitier, armoire, etc.) saine, dépourvue de poussière, d'humidité, de vibrations et hors d'atteinte des chocs électriques. La protection doit éviter que les personnes non habilitées à la maintenance puissent accéder à l'appareil (par exemple, une clé ou un outil doivent être nécessaire pour ouvrir a protection).

FR ✍ Ne pas appliquer la tension secteur sur les bornes d'entrées/Sorties, ou l'appareil ELC-PV/ELC2-PV pourra être endommagé. Merci de vérifier encore une fois le câblage avant la mise sous tension du ELC-PV/ELC2-PV. Lors de la déconnection de l'appareil, ne pas toucher les connecteurs dans la minute suivante. Vérifier que la terre est bien reliée au connecteur de terre afin d'éviter toute interférence électromagnétique.

■ Product Profile & Outline





Unit: mm

1	Status indicators of POWER, RUN, BAT.LOW and ERROR
2	COM1(RS-232) (Rx) indicator
3	COM2(RS-485) (Tx) indicator
4	I/O point indicators
5	RUN/STOP switch
6	VR0: Start-up by M1178/D1178 corresponding value
7	VR1: Start-up by M1179/D1179 corresponding value
8	I/O terminal

9	COM1(RS-232) port
10	DIN rail clip
11	Extension module positioning hole
12	Extension port for wire to connect extension module/unit
13	DIN rail track (35mm)
14	Extension unit clip
15	RS-485 communication port (Master/Slave)
16	DC Power input
17	3 pin removable terminal (standard component)
18	Power input cable (standard accessory)
19	New high-speed extension module connection port
20	Nameplate
21	Direct fastening hole

■ Specifications

Item				Specification		Note
Operation control method				Stored program; cyclic scanning system		
I/O control method				Batch processing and refresh I/O status when END instruction is executed		With instruction that can immediately refresh I/O status
Operation processing speed				Basic instruction (min. 0.24 us)		Application instruction
Program language				Instruction + ladder diagram + SFC		With step instruction
Program capacity				ELC 15872 steps		SRAM + rechargeable battery + Flash
				ELC2 30000 steps		
Instruction type				32 basic sequential instructions (including step ladder instructions)		193 application instructions
Relay (bit)	X	External input relay		X0 ~ X377, octal encoding; 256 points	Total 512 points	Corresponds to external input points
	Y	External output relay		Y0 ~ Y377, octal encoding; 256 points		Corresponds to external output points
	M	Auxiliary relay	General purpose	M0 ~ M499, 500 points (*2)	Total 4,096 points	The contact can be On/Off in the program.
			Latched	M500 ~ M999, 500 points (*3)		
				M2000 ~ M4095, 2,096 points (*3)		
			Special purpose	M1000 ~ M1999, 1,000 points (part for latched)		
	T	Timer	100 ms	T0 ~ T199, 200 points (*2)	Total 256 points	Timer indicated by TMR instruction. If timing reaches its target, the T contact of the same No. will be On.
				T192 ~ T199 for subroutine		
				T250 ~ T255, 6 accumulative points (*4)		
			10 ms	T200 ~ T239, 40 points (*2)		
				T240 ~ T245, 6 accumulative points (*4)		
			1 ms	T246 ~ T249, 4 accumulative points (*4)		

Item				Specification		Note
Relay (bit)	C	Counter	16-bit counting up	C0 ~ C99, 100 points (*2)	Total 253 points	Counter indicated by CNT (DCNT) instruction. If counting reaches its target, the C contact of the same No. will be On.
				C100 ~ C199, 100 points (*3)		
			32-bit counting up/down	C200 ~ C219, 20 points (*2)		
				C220 ~ C234, 15 points (*3)		
			32-bit high-speed counting up/down	C235 ~ C244, 1 phase 1 input, 10 points (*3)		
				C246 ~ C249, 1 phase 2 inputs, 4 points (*3)		
				C251 ~ C254, 2 phase 2 inputs, 4 points (*3)		
	S	Step points	Initial	S0 ~ S9, 10 points (*2)	Total 1,024 points	Used for SFC Latched area setup Start: D1214 (K500) End: D1215 (K899)
			For zero return	S10 ~ S19, 10 points, used with IST instruction (*2)		
			General purpose	S20 ~ S499, 480 points (*2)		
			Latched	S500 ~ S899, 400 points (*3)		
			For alarm	S900 ~ S1023, 124 points (*3)		
Register (word data)	T	Present value in timer		T0 ~ T255, 256 points		When timing reaches the target, the contact continuity of timer appears.
	C	Present value in counter		C0 ~ C199, 16-bit counter, 200 points		When counting reaches the target, the contact continuity of counter appears.
				C200 ~ C254, 32-bit counter, 53 points		
	D	ELC data register	General purpose	D0 ~ D199, 200 points (*2)	Total 10,000 points	Memory area for data storage; can be used for special indirect indication.
			Latched	D200 ~ D999, 800 points (*3)		
				D2000 ~ D9999, 8,000 points (*3)		
			Special purpose	D1000 ~ D1999, 1,000 points		
			For indirect indication	E0 ~ E7, F0 ~ F7, 16 points (*1)		
		ELC2 data register	General purpose	D0 ~ D199, 200 points (*2)	Total 12,000 points	
			Latched	D200 ~ D999, 800 points (*3)		
				D2000 ~ D11999, 10,000 points (*3)		
			Special purpose	D1000 ~ D1999, 1,000 points		
			For indirect indication	E0 ~ E7, F0 ~ F7, 16 points (*1)		
	N/A	ELC file register		0 ~ 9,999 (10,000 points) (*4)		Extension register for data storage
		ELC2 file register		0 ~ 49999 (50,000 points) (*4)		
Index	N	For main control loop		N0 ~ N7, 8 points		Control point for main control loop
	P	For CJ, CALL instructions		P0 ~ P255, 256 points		Position index of CJ and CALL

Item				Specification	Note
Index	I	Interrupt subroutine	ELC external interrupt	I000/I001 (X0), I100/I101(X1), I200/I201 (X2), I300/I301 (X3), I400/I401 (X4), I500/I501 (X5), 6 points (01: rising-edge trigger; 00: falling-edge trigger)	Position index for interrupt subroutine
			ELC2 external interrupt	I000/I001 (X0), I100/I101 (X1), I200/I201 (X2), I300/I301 (X3), I400/I401 (X4), I500/I501 (X5), I600/I601 (X6), I700/I701 (X7) I910/I911 (X10), I920/I921 (X11) I930/I931 (X12), I940/I941 (X13) I950/I951 (X14), I960/I961 (X15) I970/I971 (X16), I980/I981 (X17) 16 points (01: rising-edge trigger; 00: falling-edge trigger)	
			Time interrupt	I601~I699 (1ms), I701~I799 (1ms), I801~I899 (0.1ms)	
			Interrupt when high-speed counting reaches its target	I010, I020, I030, I040, I050, I060, 6 points	
			Interrupt during pulse output	I110, I120, I130, I140, 4 points	
			Interrupt during communication	I150, I160, I170, 3 points	
Constant	K	Decimal		K-32,768 ~ K32,767 (16-bit operation)	
				K-2,147,483,648 ~ K2,147,483,647（32-bit operation）	
	H	Hex		H0000 ~ HFFFF (16-bit operation), H00000000 ~ HFFFFFFFF (32-bit operation)	
	F	Floating point		Displaying floating points by the length of 32 bits with IEEE754 standard ±1.1755 × 10-38 ~ ±3.4028 × 10+38	
Serial communication ports (program write in/read out)				COM1: RS-232; COM2: RS-485 (Client/Server) COM1 and COM2 can be used at the same time	
Potentiometer / RTC				Built-in 2 points VR / Built-in RTC	
Special extension module				Right-side extension module and PB series share all modules (max. 8 modules extendable) Left-side can be connected with new high-speed extension modules (max. 8 module extendable)	

*1: Non-latched area cannot be modified.
*2: The preset non-latched area can be modified into latched area by setting up parameters.
*3: The preset latched area can be modified into non-latched area by setting up parameters.
*4: The fixed latched area cannot be modified.

After the 24V DC power is switched off, the data in the latched area is stored in SRAM memory which is powered by the rechargeable battery. When the battery is damaged or cannot be changed, the data in the program and latched area will be lost. If the user needs to permanently save the data in the latched area in the program and device D, please refer to “Flash ROM permanently saved and recover mechanism” as stated below.

Permanently saved mechanism:

The user can use ELCSoft (Options -> ELC<=>Flash) to indicate whether to permanently store the data in the latched area in the program (including password) and device D in Flash ROM memory (new indicated data will replace all data previously saved in the memory).

Recover mechanism:

If the rechargeable battery is in low voltage, resulting in the loss of data in the program, ELC will automatically restore the data in the latched area in the program and device D of Flash ROM into SRAM memory (M1176 = On) next time when 24V DC is re-powered. The ERROR LED flashing will remind the user that if the recorded program is able to resume its execution, the user only needs to shut down and re-power the ELC once to

restart its operation (RUN).

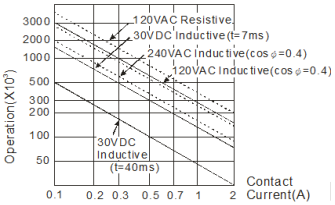
■ Electrical Specifications

Item \ Model	ELC-PV28NNDR	ELC2-PV28NNDR	ELC-PV28NNDT	ELC2-PV28NNDT ELC2-PV28NNDP
Power supply voltage	24 Vdc (-15% ~ 20%) (with reverse polarity protection on the DC input power)			
Inrush current	Max. 2.2A@24 Vdc			
Fuse capacity	2.5A/30 Vdc, Polyswitch			
Power consumption	6W			
Insulation resistance	> 5MΩ (all I/O point-to-ground: 500 Vdc)			
Noise immunity	ESD (IEC 61131-2, IEC 61000-4-2): 8kV Air Discharge EFT (IEC 61131-2, IEC 61000-4-4): Power Line: 2kV, Digital I/O: 1kV, Analog & Communication I/O: 1kV Damped-Oscillatory Wave: Power Line: 1kV, Digital I/O: 1kV RS (IEC 61131-2, IEC 61000-4-3): 26MHz ~ 1GHz, 10V/m			
Grounding	The diameter of grounding wire shall not be less than that of the wiring terminal of the power. (When ELCs are in use at the same time, please make sure every ELC is properly grounded.)			
Operation / storage	Operation: 0ºC ~ 55ºC (temperature); 5 ~ 95% (humidity); pollution degree 2 Storage: -25ºC ~ 70ºC (temperature); 5 ~ 95% (humidity)			
Agency approvals	UL508 European community EMC Directive 89/336/EEC and Low Voltage Directive 73/23/EEC			
Vibration / shock immunity	International standards: IEC61131-2, IEC 68-2-6 (TEST Fc)/IEC61131-2 & IEC 68-2-27 (TEST Ea)			
Weight (g)	260	260	240	240(T) 230(P)

Items \ Spec.	Input Point			
	24 Vdc single common port input			
	200kHz		20kHz	10kHz
Input No.	X0, X1, X4, X5		X10, X11, X14, X15	X2, X3, X6, X7, X12, X13, X16, X17
Input voltage (±10%)	24 Vdc, 5mA			
Input impedance	4.7kΩ		3.3kΩ	4.7kΩ
Action level	Off→On	> 4mA (16.5V)	> 6mA (18.5V)	> 4mA (16.5V)
	On→Off	< 1.5mA (8V)	< 2.2mA (8V)	< 1.5mA (8V)
Response time	Off→On	< 150ns	< 3.5μs	< 8μs
	On→Off	< 3μs	< 20μs	< 60μs
Filter time	Adjustable within 10 ~ 60ms by D1020, D1021 (Default: 10ms)			

Items \ Spec.		Output Point		
		Relay	Transistor (NPN, PNP)	
			High-speed	Low-speed
Output No.		Y0 ~ Y7, Y10 ~ Y13	Y0 ~ Y4, Y6	Y5, Y7, Y10 ~ Y13
Max. frequency		1Hz	200kHz	10kHz
Working voltage		250 ac, < 30 Vdc	30 Vdc	
Max. load	Resistive	1.5A/1 point (5A/COM)	0.3A/1 point @ 40°C	
Max. load	Inductive	#1	9W (30 Vdc)	
	Lamp	20WDC/100WAC	1.5W (30 Vdc)	
Response time	Off→On	Approx. 10ms	0.2μs	20μs
	On→Off		0.2μs	30μs

#1: Life curves



■ Model Name & I/O Configuration

Standard functional ELC

Model	Power	Input		Output		I/O configuration		
		Point	Type	Point	Type	Relay	Transistor (NPN)	Transistor (PNP)
ELC-PV28NNDR ELC2-PV28NNDR	24VDC	16	DC (Sink or source)	12	Relay	S/S C0 X0 Y0 X1 Y1 X2 Y2 X3 ● X4 C1 X5 Y3 X6 Y4 X7 Y5 S/S C2 X10 Y6 X11 Y7 X12 Y10 X13 ● X14 C3 X15 Y11 X16 Y12 X17 Y13	S/S C0 X0 Y0 X1 Y1 X2 C1 X3 Y2 X4 Y3 X5 C2 X6 Y4 X7 Y5 S/S C3 X10 Y6 X11 Y7 X12 ● X13 C4 X14 Y10 X15 Y11 X16 Y12 X17 Y13	S/S C0 X0 UP0 X1 ZP0 X2 Y1 X3 Y2 X4 Y3 X5 Y4 X6 Y5 X7 Y6 S/S Y7 X10 ● X11 ● X12 UP1 X13 ZP1 X14 Y10 X15 Y11 X16 Y12 X17 Y13
ELC-PV28NNDT ELC2-PV28NNDT					Transistor (NPN)			
ELC2-PV28NNDP					Transistor (PNP)			

■ Installation & Wiring

◆ Mounting & Wiring

The ELC/ELC2 can be secured to a cabinet by using the DIN rail of 35mm in height and 7.5mm in depth. When mounting ELC/ELC2 to DIN rail, be sure to use the end bracket to stop any side-to-side movement of ELC/ELC2 and reduce the chance of wires being loose. A small retaining clip is at the bottom of ELC/ELC2. To secure ELC/ELC2 to DIN rail, place the clip onto the rail and gently push it up. To remove it, pull the retaining clip down and gently remove ELC/ELC2 from DIN rail, as shown in figure 1.
Please use M4 screw (see figure 2) according to the dimension of the product. Please install ELC/ELC2 in an enclosure with sufficient space around it to allow heat dissipation (see figure 3).

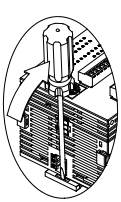


Figure 1

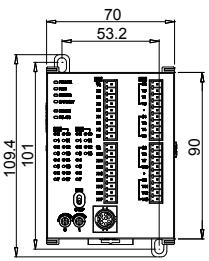


Figure 2 (Unit: mm)

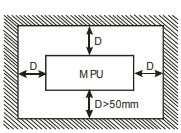
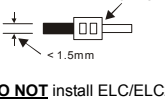


Figure 3

◆ Wiring



1. Use 22-16AWG (1.5mm) single or multiple core wire on I/O wiring terminals. The specification of the terminal is shown in the figure on the left. The ELC/ELC2 terminal screws shall be tightened to 1.95 kg-cm (1.7 in-lbs).
2. DO NOT place the I/O signal wires and power supply wire in the same wiring duct.
3. Use 60/75 ºC copper wires only.

DO NOT install ELC/ELC2 in an environment with:

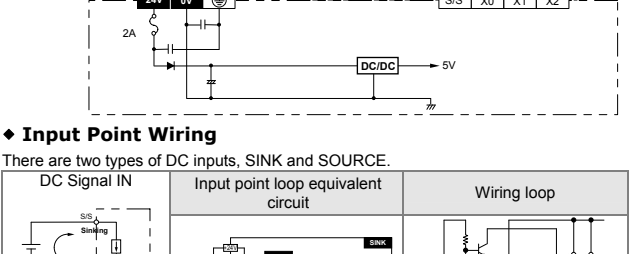
1. Dust, smoke, metallic debris, corrosive or flammable gas
2. High temperature, humidity
3. Direct shock and vibration

◆ Power Input Wiring

The power input of ELC-PV/ELC2-PV series is DC. When operating ELC-PV/ELC2-PV series, please make sure that:

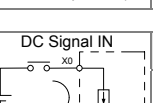
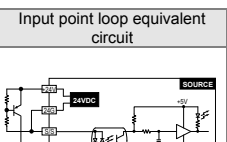
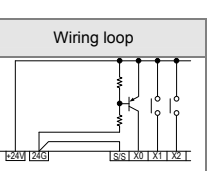
1. The power is connected to the two terminals, 24VDC and 0V, and the range of power is 20.4 ~ 28.8 Vdc. If the power voltage is less than 20.4 Vdc, ELC-PV/ELC2-PV will stop running, all outputs will go “Off” and ERROR indicator will flash continuously.
2. A power shutdown of less than 10 ms will not affect the operation of ELC-PV/ELC2-PV. However, a shutdown time that is too long or a drop of power voltage will stop the operation of ELC-PV/ELC2-PV and all outputs will go off. When the power supplied again, ELC-PV/ELC2-PV will automatically return to its operation. (Please be aware of the latched auxiliary relays and registers inside ELC-PV/ELC2-PV when programming.)

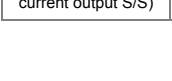
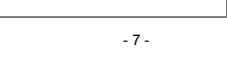
DC power input



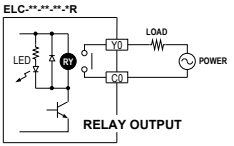
◆ Input Point Wiring

There are two types of DC inputs, SINK and SOURCE.

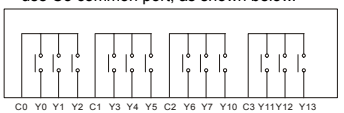
DC Signal IN	Input point loop equivalent circuit	Wiring loop
 **SINK** mode (common port for current input S/S)		

DC Signal IN	Input point loop equivalent circuit	Wiring loop
 **SOURCE** mode (common port for current output S/S)		

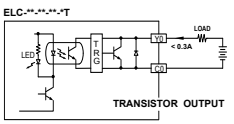
◆ Output Point Wiring



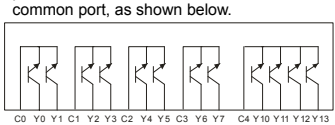
1. ELC-PV/ELC2-PV series controllers have either relay or transistor outputs. See “Function Specifications” for their specifications.
2. Please note the connection of shared terminals when wiring output terminals.
3. Output terminals, Y0, Y1, and Y2, of relay models use C0 common port; Y3, Y4, and Y5 use C1 common port; Y6, Y7, and Y10 use C2 common port; Y11, Y12, and Y13 use C3 common port, as shown below.



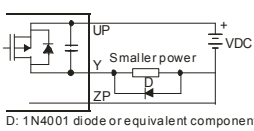
When output points are enabled, their corresponding indicators on the front panel will be on.



4. Output terminals, Y0 and Y1, of transistor models use C0 common port; Y2 and Y3 use C1 common port; Y4 and Y5 use C2 common port; Y6 and Y7 use C3 common port; Y10, Y11, Y12 and Y13 use C4 common port, as shown below.

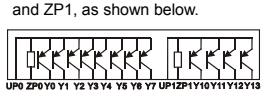


5. Isolation circuit: The optical coupler is used to isolate signals between the circuit inside ELC and input modules.

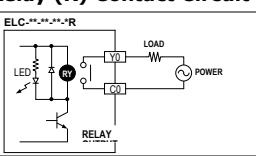


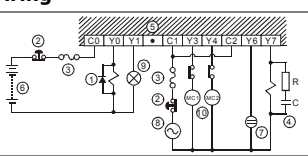
D: 1N4001 diode or equivalent component

6. The output terminals Y0~Y7 on the transistor (PNP) model are connected to the common terminals UP0 and ZP0. Y10~Y13 are connected to the common terminals UP1 and ZP1, as shown below.



◆ Relay (R) Contact Circuit Wiring

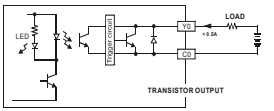
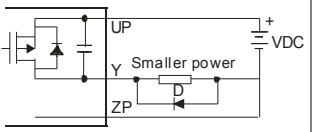
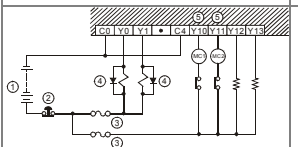
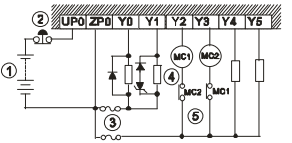




①	Flywheel diode (SB360 3A 60V): To extend the life span of contact	②	Emergency stop: Uses external switch
③	Fuse: Uses 5 ~ 10A fuse at the common port of output contacts to protect the output circuit.		
④	Varistor: To reduce the interference on AC load (R=100~120Ω, C=0.1~0.2uF)	⑤	Empty terminal: not in use
⑥	DC power supply	⑦	Neon indicator

⑧	AC power supply	⑨	Incandescent light (resistive load)
⑩	Manually exclusive output: Uses external circuit and forms an interlock, together with the ELC internal program, to ensure safety protection in case of any unexpected errors.		

◆ Transistor (NPN & PNP) Contact Circuit Wiring

Transistor output (NPN)	Transistor output (PNP)
	 D: 1N4001 diode or equivalent component
	

①	DC power supply	②	Emergency stop
③	Circuit protection fuse	④	Flywheel diode (SB360 3A 60V) + inductive load
⑤	Manually exclusive output: Uses external circuit and forms an interlock, together with the ELC internal program, to ensure safety protection in case of any unexpected errors.		

■ Trial Run

◆ Preparation

1. Prior to applying power, please verify that the power lines and the input/output wiring are correct. And be advised not to supply 110V AC or 220V AC into the I/O terminals, or it might short-circuit the wiring and would cause direct damage to the ELC.
2. After using the peripheral devices to write the program into the ELC and that the ERROR LED of the ELC is not on, it means that the program in use is legitimate, and it is now waiting for the user to give the RUN command.
3. Use ELC-HHP to execute the forced On/Off test of the output contact.

◆ Operation & Test

1. If the ERROR indicator does not flash, you can use the RUN/STOP switch or a peripheral device (ELC-HHP or ELCSoft) to give a RUN instruction. The RUN indicator should be continuously on at this time. That the RUN indicator does not flash indicates ELC has no program in it.
2. When ELC is in operation, use ELC-HHP or ELCSoft to monitor the set value or temporarily saved value in timer (T), counter (C), and register (D) and force On/Off of output contacts. That the ERROR indicator is on (not flashes) indicates that part of the program exceeds the preset time-out. In this case, you have to set the RUN/STOP switch as STOP first, check special register D1008 and obtain the location in the program where time-out takes place. Please refer to the WDT instruction to solve this problem.

◆ Operation of ELC Basic Sequential Instructions & Application Instructions

1. The basic sequential instructions and application instructions of ELC-PV/ELC2-PV series are compatible with all ELC series ELCs. See Eaton “ELC System Manual” for relevant information.
2. All ELC series ELCs are compatible with ELC-HHP handheld programming panel,

ELCSoft ladder diagram for program editing and exclusive transmission cables to connect with ELC-PV/ELC2-PV for program transmission, ELC control, program monitoring and so on.

■ Troubleshooting & Indicator Description

Based on the indicators on the front panel, please check the following for errors:

☼ POWER indicator

When ELC-PV/ELC2-PV is powered, the POWER LED indicator on the front panel will be on (in green). If this indicator is not on or the ERROR indicator keeps flashing when ELC-PV/ELC2-PV is powered indicates that the power supply +24V are insufficient or DC power supply 24V is overloaded. In this case, change another 24V DC power supply. If the indicator is still off at this time, your ELC-PV/ELC2-PV is malfunctioned. Send your ELC-PV/ELC2-PV back to your distributor for repair.

☼ RUN indicator

Check your ELC-PV/ELC2-PV status. When ELC-PV/ELC2-PV is running, this indicator will be on. You can use ELC-HHP, the ladder diagram editing program or the switch on the panel to RUN or STOP ELC-PV/ELC2-PV.

☼ ERROR indicator

If you enter an incorrect program into ELC-PV/ELC2-PV or use instructions or devices that exceed their range, this indicator will flash (approx. every 1 second). When this happens, you have to obtain the error code from D1004 and save the address where the error occurs in register D1137 (if the error is a general circuit error, the address of D1137 will be invalid). Find out the cause of the error, amend the program and resend the program to ELC-PV/ELC2-PV. If you cannot connect to ELC-PV/ELC2-PV and this indicator keeps flashing quickly (approx. every 0.2 second), it means that the 24 Vdc power voltage is insufficient. Please check if the 24V DC power supply is overloaded.

If the ERROR indicator is on, you have to check the special relay M1008. If M1008 is on, it indicates that the execution time of program loop exceeds the preset time-out (in D1000). In this case, turn the RUN/STOP switch to STOP, check the special register D1008 and obtain the location in the program where the time-out takes place. Please refer to the WDT instruction to solve this problem. After amending the program, you only need to resend the program to stop the indicator from flashing. If the indicator still keeps flashing at this time, switch off the power and check if there is any interference existing or conductive matter inside ELC-PV/ELC2-PV.

For details of error codes (in D1004, hex coding), see “ELC System Manual: Programming”.

☼ BAT.LOW indicator

The rechargeable lithium-ion battery in ELC-PV/ELC2-PV is mainly used on the latched procedure and data storage.

The lithium-ion battery has been fully charged in the factory and is able to retain the latched procedure and data storage for 6 months. If ELC-PV/ELC2-PV has not been powered for less than 3 months, the life of the battery does not decrease. To prevent the electricity emitted by the battery from resulting in short life of the battery, before disconnecting ELC-PV/ELC2-PV for a long time, you need to power ELC-PV/ELC2-PV for 24 hours to charge the battery.

If the lithium-ion battery is put in an environment in which temperature is above 40 ˚C, or if it is charged for more than 1000 times, its effect becomes bad, and the time for which the data can be stored is less than 6 moths.

The lithium-ion battery is rechargeable, and has a longer life span than an ordinary battery. However, it still has its own life cycle. When the power in the battery is not sufficient to retain the data in the latched area, please send it to the distributor for repair.

Please be aware of the date of manufacturing. The charged battery can sustain for 6 months from its date of manufacture. If you find that the BAT.LOW indicator stays on after ELC is powered, it means the battery voltage is low and the battery is being charged. ELC-PV/ELC2-PV has to remain on for more than 24 hours to fully charge the battery. If the indicator turns from on to “flash” (every 1 second), it means that the battery cannot be charged anymore. Please correctly process your data in time and send the ELC back to the distributor for repair.

Precision of calendar timer:
At 0°C/32°F, less than –117 seconds error per month.
At 25°C/77°F, less than 52 seconds error per month.
At 55°C/131°F, less than –132 seconds error per month.

☼ Input indicator

On/Off of input point is indicated by input indicator or monitored by ELC-HHP. When the action condition of the input point is true, this indicator will be on. If abnormality is identified, check if the indicator and input circuit are normal. Use of electronic switch with too much electricity leakage often results in unexpected actions of the input point.

☼ Output indicator

On/Off of output point is indicated by the output indicator. When the output indicator (On/Off) does not correspond to the action of its load, please be aware of the following:

1. The output contact may be melted or blocked due to an over loaded or short-circuited load, which will result in poor contact.
2. If you are suspicious that the output point may execute an undesired action, check the output wiring circuit and whether the screw is properly tightened.

☼ COM1 and COM2 indicators

If the RS232 LED indicator is On, it means that COM1 is receiving data.
If the RS485 LED indicator is On, it means that COM2 is sending data.