

Programmable Logic Controller



TPO3 Series





TP03 Series

TP03 is the latest generation of PLC developed by TECO. The high-speed and high quality programmable logic controller has following features:

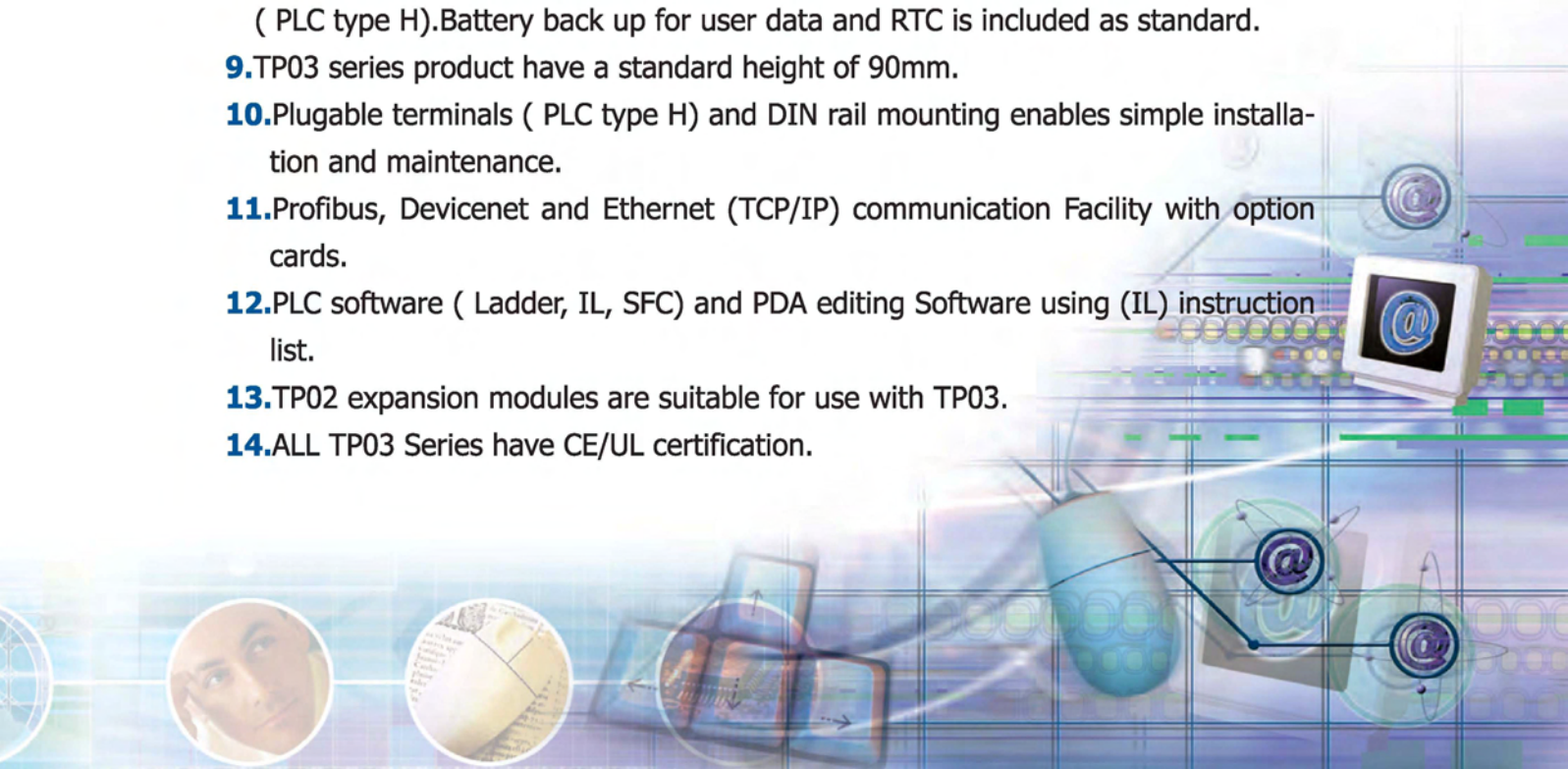
- Easy to install, maintain and program.
- Basic instructions scan time: 0.31 us /step (ANDB), 0.45 us/step (LD).
- High speed counters:(5-100KHZ) Single/Dual channel with Up/down ,Set/Reset and Interrupt features.
- High speed communication ports.
- 1ms/10ms interrupt timer.
- Built in RTC (Real Time Clock).(H type PLC only).
- PWM & two transistor type pulse outputs.
- RUN / STOP Switch.
- Two integrated external potentiometers on main unit.
- Flash memory (M type PLC), EEPROM (H type PLC).
- Various expansion modules such as A/D, D/A , Communication ,etc.

Unique Feature

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- 1.**Main units: 20/30/40/60 I/O's expandable to 256 digital I/O's and 60/10 (12 bit)analog I/O's.
- 2.**The three programming languages: Ladder, IL(Instruction List) and SFC are all available for TP03.
- 3.**Program memory: 4 to 16k size, including basic and application instructions, such as : ADD/SUB/MUL/DIV, trigonometry as SIN/COS/TAN...,matrix input and 7-segment LED display output and PID control with floating-point calculations.
- 4.**Three communication ports on the main unit , can be used to establish Networks up to a maximum distance of 1.2 Km as follows:
 - (1)Computer link: One PC as master can control as many as 255 TP03's as slaves.
 - (2)Data Link: One TP03 as master can control up to 15 other TP03's.
 - (3)Remote I/O: One TP03 as master can control up to four TP03's as slaves, each with max 36/24 I/O's.
- 5.**PC/PDA port can be used for networking to other equipment or operator panels OP07/OP8.
- 6.**Internal high speed pulse output (Max 100KHZ) can be interface with servo controllers.
- 7.**Internal high speed counter (Max 100KHZ) can be interfaced to encoders with precise pulses.
- 8.**User program is stored in flash memory (PLC type M) and EEPROM (PLC type H).Battery back up for user data and RTC is included as standard.
- 9.**TP03 series product have a standard height of 90mm.
- 10.**Plugable terminals (PLC type H) and DIN rail mounting enables simple installation and maintenance.
- 11.**Profibus, Devicenet and Ethernet (TCP/IP) communication Facility with option cards.
- 12.**PLC software (Ladder, IL, SFC) and PDA editing Software using (IL) instruction list.
- 13.**TP02 expansion modules are suitable for use with TP03.
- 14.**ALL TP03 Series have CE/UL certification.





General specification

Item \ Type		14S	20S	20M	30M	20H	30H	40H	60H
Basic unit outline		Brick type							
Operation control		Cyclic scanning of user program							
Input/ output		Cyclic scanning of user program and input and output							
Program language		Ladder /IL(Instruction List)/SFC							
Digital I/O	Digital input	8	12	12	16	12	16	24	36
	Digital output	6	8	8	14	8	14	16	24
Expansion module	Digital module	Expandable to 64 points			Expandable to 32 points			Expandable to 256 points	
	Analog module	2x4AD ⁺ & 1x2DA ⁺ or 1x8AD & 1x2DA						1x4AD ⁺ & 1x2DA ⁺ & 7x8AD & 4x2DA	
Max Analog I/O		8 input channels /2 output channels						60 input channels /10 output channels	
Scan time	Basic instruction	36						36	
		ANB/ORB ...etc.: 0.62 μs/ step						ANB/ORB ...etc.: 0.31 μs/ step	
	LD/AND/OR...etc.: 0.9 μs/ step						LD/AND/OR...etc.: 0.36 --0.45 μs/ step		
Application Instruction		121		133		139			
Digital I/O relay		X000~X377(256 points) / Y000~Y377(256 points)							
Auxiliary relay		General auxiliary relay: M0~M1535 (1536 points)			General auxiliary relay: M0~M7679 (7680 points)				
Step relay		S0~S1023 (1024 points)			S0~S4095 (4096 points)				
Relay and register	Timer	100 points (100ms:44 points ; 10ms: 46 points ; 1ms with accumulating function: 4 points ; 100 ms with accumulating function: 6)			512 points (100ms: 200 points ; 10ms: 46 points ; 1ms with accumulating function: 4 points ; 100 ms with accumulating function: 6 points ; 1ms: 256 points) . Analog potentiometer timer: 2 points				
	Counter	136 points (16 bit:100 points, 32bit: 36 points)			256 points (16 bit: 200 points, 32bit: 56 points)				
	Data register	General register: D0~D511(512points)			General register:D0000~D7999(8000points); File register:D2000~D3299 (1300 points)				
Index register		Special register: D8000~D8511 (512points) 32points: V000~V0015 / Z000~Z0015							
Relay and register	Stack pointer	Mark: N0~N7 (8points), pointerP0~P127(128points), input interruption pointer: I00~I30(4points), timer interruption pointer: I6**~I8** (3points),counter interruption pointer I010~I060 (6points)			Mark: N0~N7 (8points), pointer P0~P255 (256 points), input interruption pointer: I00~I50 (6points), timer interruption pointer: I6**~I8** (3points), counter interruption pointer I010~I060 (6points)				
		decimal (K)		16 Bit : -32,768~32,768 ; 32 Bit : -2,147,483,648~2,147,483,648					
Constant		Hex (H)		16 Bit : 0~FFFFH ; 32 Bit : 0~FFFFFFFFH					
RTC		N.A			Built-in: Second (D8013), Minute (D8014), Hour (D8015), Day(D8016), Month (D8017),Year (D8018), week(D8019) And with 30s offset				
Run/stop Switch		Built-in							
Potentiometer		N.A			2 points built-in and 6 points expansible (TP03~6AV optional)				
High speed input (X0~X5)	High speed counter	Single channel:4 points 10KHz max			Single channel : 4points 10KHz and 2 points 5KHz max.		Single channel : 4points 100KHz and 2 points 5KHz max.		
		Dual Channel: 2 points 10KHz							
High speed input (X0~X5)	Interrupt input	4points (corresponding to I00~I30) ; Minimum pulse width 50 μs			6points (corresponding to I00~I50) ; Minimum pulse width 50 μs		6points (corresponding to I00~I50) ; Minimum pulse width 5 μs		
		Pulse output		2 points: Y0/Y1 with acceleration/ deceleration					
Pulse output	PWM output	N.A		1KHz max.		100KHz max.			
	Frequency	N.A		1KHz max.		100KHz max.			
Communication port	PC/PDA	RS232, for upload/download program to/from TP03							
	RS485 Communication	Built-in 1 communication port for Data Link, Remote I/O or Computer Link, max. 307.2k bps			N.A		Built-in 1 communication port for Data Link, Remote I/O or Computer Link,max. 307.2k bps		
	Expansion card	N.A			Either RS485 or RS232 communication card is available for the port and both have Modbus communication protocol, max. 307.2k bps.				
Self-diagnosis		Input/output inspection, system processing time out inspection, illegal instruction inspection, program language syntax inspection and password setting							
Supervise/ Troubleshoot		Display processing time, byte/bit character or device set							
Terminal block		Fixed, unremovable					Removable		
Dimension		116 x 90 x 64 mm			116 x 90 x 83 mm		177 x 90 x 83 mm		



Main modules

Type	Rated Voltage	User 24Vdc	Input point			Output point			Dimension
			point	type	Input current	point	type	Max output current	
TP03-14SR-A	100~240 VAC	250mA	8	24VDC	7mA	6	Relay	2A/point	116×90×64mm See Fig1
TP03-20SR-A			12			8			
TP03-20MR-A			12			8			
TP03-30MR-A			16			14			
TP03-20HR-A		300mA	12			8			
TP03-30HR-A			16			14			
TP03-40HR-A			24			16			
TP03-60HR-A		500mA	36			24			
TP03-40HR-D			24			16			
TP03-60HR-D		36	24			16			
TP03-20MT-A	19.2~28.8 VDC	N. A	12	24VDC	7mA	8	Transistor	0.3A/point	116×90×83mm See Fig2
TP03-30MT-A			16			14			
TP03-20HT-A			12			8			
TP03-30HT-A			16			14			
TP03-40HT-A			500mA			24			16
TP03-60HT-A						36			24

Profile



Fig 1



Fig 2



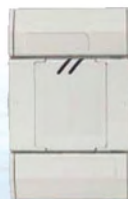
Fig 3



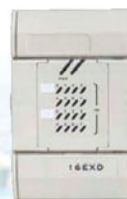
Expansion module

Type No.	Power	In/Out point	Description	Dimension	Remark
TP03-01SPS-A	100~240VAC	N.A	Power source for expansion modules	57 x 90 x 83 mm	Under development
TP03-4RD	24Vdc	4 / 0	PT-100 temperature input * 4 channel		
TP03-4TM		4 / 0	J/K temperature input * 4 channel		
TP03-2DA		0 / 2	0~10v, 0~20mA analog input * 2 channel		
TP03-3MA		2 / 1	±20mA analog input * 2 channel ±20mA analog input * 1 channel		
TP03-8AD		8 / 0	±20mA analog input * 8 channel		
TP03-16EMR	N.A	8 / 8	8 points DC input & 8 points relay output		
TP03-16EXD		16 / 0	16 points Digital input		
TP03-16EYR		0 / 16	16 points Digital output		

Profile



TP03-01SPS-A
TP03-4RD/
TP03-4TM/
TP03-2DA/
TP03-3MA/
TP03-8AD/



TP03-16EMR/
TP03-16EXD
TP03-16EYR/





Expansion Cards

Type No.		Description	Remark
TP03-0CV	Built-in	Standard cover	
TP03-485RS	Optional	RS485 Multi-function communication port	
TP03-2AI		0~10V analog input port*2(10bit)	
TP03-2TI		Timer(0~30s)input port*2	
TP03-6AV		Analog potential meter input port*6	

Profile



TP03-0CV



TP03-485RS



TP03-2AI



TP03-2TI



TP03-6AV



Expansion peripheral equipment

Type No.	Power	Description	Remark
OP07	N.A	2 line LCD ,timer and counter setting device	See Fig4
OP08	24Vdc	2 line LCD ,timer and counter setting device	See Fig4
OP10	24Vdc	4 line LCD ,timer and counter setting device	Under development
PC06	N.A	TP03 PLC PC software	See Fig5
TP03-PDA06	N.A	TP03 PLC PDA software	See Fig5

Profile

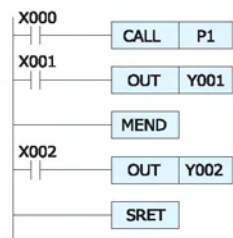
OP07/OP08 Fig4



PC06/PDA06 Fig5



PLC software



Communication module

Type No.	Power	Description	Dimension	Remark
TP03-DNet	24Vdc	DeviceNet slave	38 x 90 x 59mm	Under development
TP03-PBus		Profibus - DP slave		
EN01		TCP/IP		

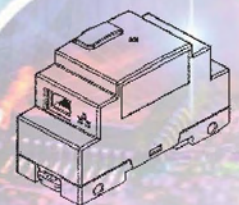
Profile



TP03-DNET



TP03-PBUS



EN01



Basic programming instruction list

Basic instruction list

Mnemonic	Function	Component	Mnemonic	Function	Component
LD	Initial logical operation contact type (normal open)	X,Y,M,S,T,C	ANB	Serial connection of multiple contacts circuits	-
LDI	Initial logical operation contact type (normal closed)	X,Y,M,S,T,C	ORB	Parallel connection of multiple contacts circuits	-
AND	Serial connection of contacts(normal open)	X,Y,M,S,T,C	MPS	Stores the current result of the internal PLC operations	-
ANI	Serial connection of contacts(normal closed)	X,Y,M,S,T,C	MRD	Reads the current result of the internal PLC operations	-
OR	Parallel connection of contacts(normal open)	X,Y,M,S,T,C	MPP	Pops(recalls and removes)the currently stored result	-
ORI	Parallel connection of contacts(normal close)	X,Y,M,S,T,C	INV	Inverse	-
LDP	Initial logical operation Rising edge pulse	X,Y,M,S,T,C	MC	Denotes the start of a master control block	-
LDF	Initial logical operation Falling/trailing edge pulse	X,Y,M,S,T,C	MCR	Denotes the end of a master control block	-
ANDP	Serial connection of Rising edge pulse	X,Y,M,S,T,C	NOP	No operation	-
ANDF	Serial connection of Falling/trailing edge pulse	X,Y,M,S,T,C	END	Program end	-
ORP	Parallel connection of Rising edge pulse	X,Y,M,S,T,C	SMCS	Master control set	-
ORF	Parallel connection of Falling/trailing edge pulse	X,Y,M,S,T,C	SMCR	Master control reset	-
PLS	Rising edge pulse	-	JCS	Jump control set	-
PLF	Falling/Trailing edge pulse	-	JCR	Jump control reset	-
OUT			RST	Reset a bit device permanently OFF	-
OUTI					
OUTT	Driving timer or counter coils	X,Y,M,S,T,C			
OUT C					
OUT S					
SET	Sets a bit device permanently ON	-			

Step instruction		
Mnemonic	Function	Component
STL	Step ladder	-
RET	Set ladder return	-

Advance instruction list

Instruction Type	Func. No.	Mnemonic	Function	Instruction Type	Func. No.	Mnemonic	Function	Instruction Type	Func. No.	Mnemonic	Function	
Program flow	00	CJ	Conditional Jump	Data operation	47	ANR	Annunciator reset	Float points and trigonometry	130	SIN	Sine	
	01	CALL	Call subroutine		48	SQR	Square root		131	COS	Cosine	
	02	SRET	Subroutine return		49	FLT	Float point		132	TAN	Tangent	
	03	IRET	Interrupt return		50	REF	Refresh		133	ASIN	Arc sine	
	04	EI	Enable interrupt		52	MTR	Input matrix		134	ACOS	Arc cosine	
	05	DI	Disable interrupt		53	HSCS	High speed counter set		135	ATAN	Arc tangent	
	06	FEND	First end		54	HSCR	High speed counter reset		136	RAD	Degree · · RAD	
	07	WDT	Watchdog timer		55	HSZ	High speed counter zone compare		137	GRE	RAD · · Degree	
	08	FOR	Start a for/next loop		56	SPD	Speed detect		147	SWAP	Float to Scientific	
Move and compare	09	NEXT	End a for/next loop	High speed processing	57	HSZ	High speed counter zone compare	Position	156	ZRN	Zero return	
	10	CMP	Compare		58	PLSY	Pulse Y output		157	PLSV	Pulse V	
	11	ZCP	Zone compare		59	PWM	Pulse width modulation		158	DRVI	Drive to increment	
	12	MOV	Move		60	PLSR	Ramp pulse output		159	DRVA	Drive to absolute	
	13	SMOV	Shift move		61	IST	Initial state		160	TCMP	Time compare	
	14	CML	Complement		62	SER	Search		161	TZCP	Time zone compare	
	15	BMOV	Block move		63	ABSD	Absolute drum		162	TADD	Time add	
	16	FMOV	Fill move		64	INCD	Incremental drum		163	TSUB	Time subtract	
	17	XCH	Exchange		65	TTMR	Teaching timer		166	TRD	Read RTC data	
Arithmetic and logic operations	18	BCD	BCD binary coded decimal	Handy instruction	66	STMR	Special timer-definable	Real time	167	TWR	Setting RTC data	
	19	BIN	BIN binary		67	ALT	Alternate state		170	GRY	Decimal to Gary code	
	20	ADD	Addition		68	RAMP	Ramp-variable value		171	GBIN	Gary code to Decimal	
	21	SUB	Subtraction		69	ROT	Rotary table control		Communication	188	CRC	Cyclical Redundancy check
	22	MUL	Multiplication		70	RTY	Ten key input			190	DLK	Data link
	23	DIV	Division		71	HKY	Hexadecimal input			191	RMIO	Remote I/O
	24	INC	Increment		72	DSW	Digital switch			192	TEXT	OP07/08 text
	25	DEC	Decrement		73	SEGD	Seven segment decoder			224	LD=	(S1)=(S2)
	26	WAND	Word and		74	SEGL	Seven segment with latch			225	LD>	LD(S1)>(S2)
27	WOR	Word or	75	ARWS	Arrow switch	226	LD<	LD(S1)<(S2)				
28	WXOR	Word exclusive or	76	ASC	ASCII code	228	LD<>	LD(S1)≠(S2)				
29	NEG	Negation	77	PR	Print to a display	229	LD<=	LD(S1) · · (S2)				
Rotation and shift	30	ROR	Rotation right	External I/O device	80	RS	RS communication	In line Comparison	230	LD>=	LD(S1) · · (S2)	
	31	ROL	Rotation left		81	PRUN	Octal Transmission		232	AND=	AND(S1)=(S2)	
	32	RCR	Rotation right with carry		82	ASCI	HEX-ASCII		233	AND>	AND(S1)>(S2)	
	33	RCL	Rotation left with carry		83	HEX	ASCII-HEX		234	AND<	AND(S1)<(S2)	
	34	SFTR	Bit shift right		84	CCD	Check code		236	AND<>	AND(S1)≠(S2)	
	35	SFTL	Bit shift left		85	VRRD	Volume read		237	AND<=	AND(S1) · · (S2)	
	36	WSFR	Word shift right		86	VRSC	Volume scale		238	AND>=	AND(S1) · · (S2)	
	37	WSFL	Word shift left		87	MBUS	MODBUS		240	OR=	OR(S1)=(S2)	
	38	SFWR	Shift register write		88	PID	PID control loop		241	OR>	OR(S1)>(S2)	
Data operation	39	SFRD	Shift register read	External serial device	89	EPSC	Option card set	242	OR<	OR(S1)<(S2)		
	40	ZRST	Zinc reset		110	ECMP	Float compare	244	OR<>	OR(S1)≠(S2)		
	41	DECO	Decode		111	EZCP	Float zone compare	245	OR<=	OR(S1) · · (S2)		
	42	ENCO	Encode		118	EBCD	Float to scientific	246	OR>=	OR(S1) · · (S2)		
	43	SUM	Sum of active bits		119	EBIN	Scientific to float					
	44	BON	Check specified but status		120	EADD	Float add					
	45	MEAN	Mean		121	ESUB	Float subtract					
	46	ANS	Timed annunciator set		122	EMUL	Float multiplication					
					123	EDIV	Float division					
			127	ESQR	Float square root							
			129	INT	Float-integer							



Interface & accessory list

Model	Accessory	Description	Type No.	Remark
Main module	included as standard	I/O termination connector	TP-200EC	install TP-200EC into the connector in the last expansion module in order to form a I/O loop
		Battery (for 5 years)		
		RS485 Built-in(H type only)		
		Standard cover for expansion card	TP03-0CV	
		Installation manual		
PC06	included as standard	1.8M cable(black)	TP03-302PC	Instruction /Operation manuals for TP03-PC and TP03-PDA are in PDF format
		Compact Disk	TP03-PC06	
OP07/OP08/OP10	included as standard	1.8M cable(grey)	TP03-302MC	
TP03 Expansion module	included as standard	4cm cable for expansion module	TP03-304EC	26 pins , only for TP03 expansion module
PDA06	Option	PDA adapter	JNSWPDA	
OP08/OP10	Option	5M cable(grey)	TP03-305MC	Only for OP08/OP10
TP03 Expansion module	Option	40cm cable for expansion module	TP03-340EC	26 pins , only for TP03 expansion module

Profile



TP-200EC
I/O termination
connector



TP03-304EC(4cm)/
TP03-340EC(40cm)
Expansion module ribbon cable



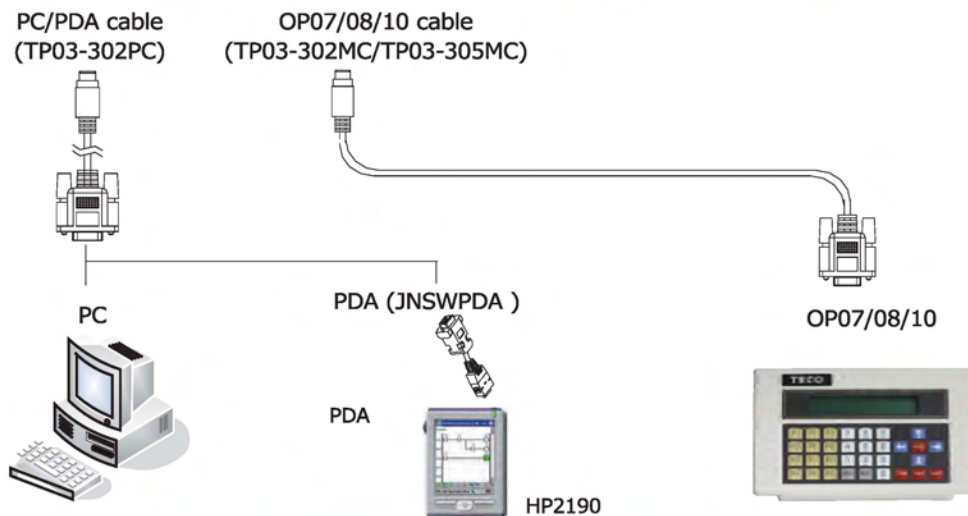
PDA adapter
(JNSWPDA)



TP03-302PC(Black) / TP03-302MC(Gray)
(Both with different outline and wiring)
TP03-305MC(Gray)
(Same out line as TP03-302 MC but different length & wiring)



System configuration



Distributor



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