http://www.delta.com.tw/industrialautomation/

DOP *Extension Digital I/O Module*

Instruction Sheet

Warning

- ✓ *Please read this instruction carefully before use.*
- ✓ *DOP series Extension Digital I/O Module should be used with DOP-AE series HMI product. Ensure to switch off the power before wiring.*
- ✓ *Please install this DOP series Extension Digital I/O Module in an enclosure free of airborne dust, humidity, electric shock and vibration. The enclosure should prevent non-maintenance staff from operating the device (e.g. key or specific tools are required for opening the enclosure) in case danger and damage on the device may occur.*
- ✓ *DO NOT connect input AC power supply to any of the I/O terminals; otherwise serious damage may occur. Check all the wiring again before switching on the power.*
- ✓ *DO NOT touch any internal circuit in 1 minute after the power is switched off. Do NOT touch any terminal when the power is switched on.*
- ✓ *Make sure the ground terminal ⏚ is correctly grounded in order to prevent electromagnetic interference.*
- ✓ *DO NOT place any heavy objects on the connection port of DOP series Extension Digital I/O Module. Doing so may damage the product.*

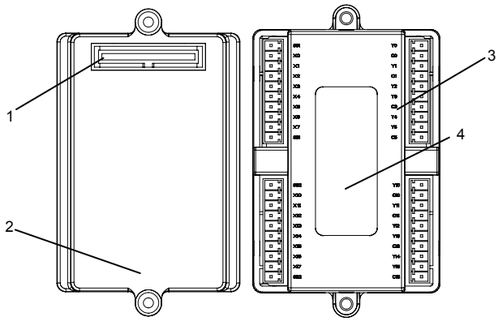
❶ Introduction

1.1 Model Explanation

DOP	-	EXIO	14	R	AE
(1)		(2)	(3)	(4)	(5)

(1) Product Name	DOP: Delta Operation Panel
(2) Series	EXIO: Extension Digital I/O
(3) Input / Output Point	14: 8 input points / 6 output points 28: 16 input points / 12 output points
(4) Output Contact Type	R: Relay
(5) Applicable HMI Series	AE: DOP-AE Series HMI

1.2 Product Outline



1. Connection Port
2. Direct Mounting Hole
3. Input / Output Terminals
4. Nameplate

1.3 Model Name

Model Name	Input / Output				
	Power	Input Unit		Output Unit	
		Point	Type	Point	Type
DOP-EXIO14RAE	5VDC, supplied by HMI	8	DC Type Sink or Source	6	Relay
DOP-EXIO28RAE		16		12	Relay

❷ Function Specifications

Item	Specifications	Remark
Control Method	Stored program, cyclic scan system	-
I/O Processing Method	Batch I/O (refresh)	Immediate refresh command available only with I/O of the MPU
Execution Speed	Basic command (average approx. 30 us)	Application command (30 ~ hundreds us)
Program Language	Commands + Ladder Diagram + SFC	Step commands included

Item		Specifications	Remark
Program Capacity		999 Steps	Built-in EEPROM
Commands		Basic commands: 32 (including the STL commands)	Application commands: 59
Step Relay (Latched)	General Step Point	128 Points	S10 ~ S127
Auxiliary Relay	General	1280 Points	M0 ~ M511, M768 ~ M999, 744 points; M1000 ~ M1279, 280 points*1
	Latched	256 Points	M512 ~ M767
Timer	Digital	64 Points	T0~T63 (100 ms time base)
		63 Points	T64~T126 (10 ms time base)
		1 Points	T127 (1 ms time base)
Counter	General	112 Points	C0 ~ C111
	Latched	16 Points	C112 ~ C127
	32bit	13 Points	C235,C236,C237,C238,C241,C242, C244,C246,C247,C249,C251,C252, C254 (all of them are latched type)
Data Register	General	408 Points	D0 ~ D407
	Latched	192 Points	D408 ~ D599
Pointer	P	64 Points	P0 ~ P63
Index Register	E / F	2	E, F
Constant	Decimal K	16bit: -32768 ~ +32767	32bit: -2147483648 ~ +2147483647
	Hexadecimal H	16bit: 0000 ~ FFFF	32bit: 00000000 ~ FFFFFFFF
Self Diagnosis / Protection		I/O check, system execution timeout check, invalid command check, program check and password settings	
Monitor / Debug		Program execution time display, bit / word, device settings	

*1: M1000, M1001, M1002, M1003, M1020, M1021, M1022, M1067, M10068, and M1161 are the special auxiliary relays (special M).

❸ Electrical Specifications

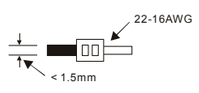
Item / Model Name	DOP-EXIO14RAE	DOP-EXIO28RAE
Power Supply Voltage	5VDC, 1A (supplied by HMI)	
Power Consumption	0.25W	0.5W
Noise Immunity	RS: Frequency: 80MHz ~ 1GHz, 1.4GHz ~ 2.0GHz, Test level 10V/m CS: Frequency: 0.15MHz ~ 80MHz, Test level 10V (HMI power port & I/O line) ESD: Air discharge ±8KV EFT: ±1.5KV (HMI power port) ±1KV (I/O line) Surge: ±2KV (HMI power port)	
Ambient Temperature / Humidity	Operation: 0°C ~ 50°C (Temperature), 10 ~ 90% (Humidity), Storage: -40°C ~ 85°C (Temperature), 10 ~ 90% (Humidity)	
Vibration / Shock	IEC 61131-2 Compliant 5Hz≦f＜9Hz = Continuous: 1.75mm / Occasional: 3.5mm 9Hz≦f≦150Hz = Continuous: 0.5g / Occasional: 1.0g X, Y, Z directions for 10 times	
Weight	Approx. 95.5g	Approx. 116g

Input Point Electric Specifications	
Input Type	DC (SINK or SOURCE)
Input Voltage	24VDC (5mA)
Active Level	Off→On, above 16VDC
	On→Off, below 14.4VDC
Response Time	Approx. 10ms

Output Point Electric Specifications	
Output Type	Relay-R
Current Specifications	1.5A / 1 Point (5A/COM)
Voltage Specifications	250VAC, below 30VDC
Maximum Loading	75VA (Inductive)
	90 W (Resistive)
Response Time	Approx. 10 ms
Mechanical Life	2×10^7 times (without load)
Electrical Life	100,000 times (3A 250VAC/30VDC) 6,000 times (5A 250VAC/30VDC)

❹ Installation & Wiring

4.1 Wiring



1. Please use the 28-16 AWG (1.5mm^2) single-core bare wire (Solid type) or the multi-core wire (Stranded type) for the I/O wiring. The stripped length of the wire should be 6-7mm, and the torque specification of the screw for the terminal is 4.5lb-in. Please refer to the specifications of the terminal shown in the figure on the left.
2. DO NOT place the I/O signal wires and power supply wire in the same wiring duct.

4.2 Caution

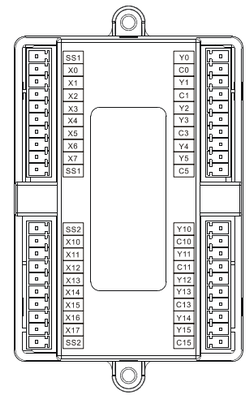
❖ **Environment**

1. DO NOT install the Extension Digital I/O Module in a place subjected to corrosive or flammable gases, liquids, or airborne dust or metallic particles.
2. DO NOT install the Extension Digital I/O Module in a location high temperature and high humidity (where temperature and humidity will exceed specification).
3. DO NOT install the Extension Digital I/O Module in a location where vibration and shock will exceed specification.

❖ **Wiring Note**

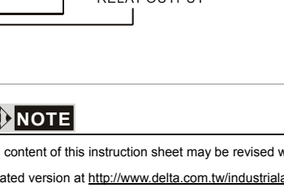
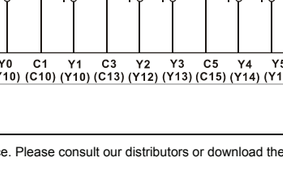
1. Please avoid any conductive debris and tiny metal materials enter the Extension Digital I/O Module when screwing and wiring.
2. Allow a minimum space of 50mm between the Extension Digital I/O Module and other control devices, and keep the Extension Digital I/O Module away from the high-voltage lines or any power equipment.

4.3 Terminal Identification

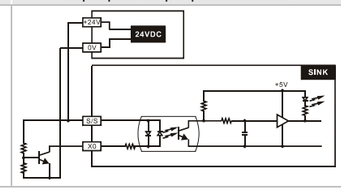
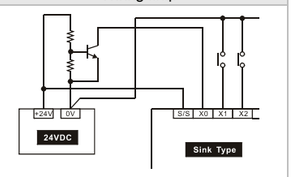


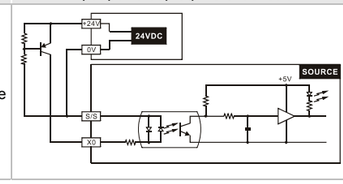
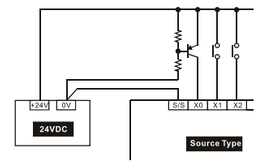
4.4 Wiring

❖ **There are two types of DC inputs, SINK and SOURCE, and they are defined as follows:**

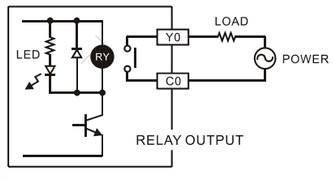
Sink = (common port for current input S/S)	Source = (common port for current output S/S)
	

❖ **Input Point Wiring (S/S shown in the wiring diagrams indicates SS1 or SS2 contact)**

DC Signal IN	Input point loop equivalent circuit	Wiring loop
SINK mode		

DC Signal IN	Input point loop equivalent circuit	Wiring loop
SOURCE mode		

❖ **Output Point Wiring**



Be careful with the connection of the common terminals when wiring outputs. For example, when wiring DOP-EXIO14RAE (DOP-EXIO28RAE), output terminal Y0 (Y10) uses C0 (C10), Y1 (Y11) uses C1 (C11), Y2 ~ Y3 (Y12 ~ Y13) uses C3 (C13), Y4 ~ Y5 (Y14 ~ Y15) uses C5 (C15), as shown below:

NOTE

1) The content of this instruction sheet may be revised without prior notice. Please consult our distributors or download the most updated version at http://www.delta.com.tw/industrialautomation.