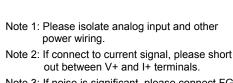


DVP-FH



2.3 External wiring

DC/DC



Note 3: If noise is significant, please connect FG to ground.

DVP04AD-H analog signal input mo

R/W

R/W

R/W To adjust GA

R/W To adjust G/

RS-485

Paramete

H 400D

H 400F

H 400F

H 4015

H 401/

H 401

#15

#20 H 401

#24 H 4018

#26

#27

#16 ~ #17

#18 H 4012

#19 H 4013

#22 ~ #23

#25 H 401

Note 4: Please connect 😑 terminal of power module and terminal of analog input module to system earth point and make system earth point be grounded or connects to machine cover

Note 5: If the noise interference from loaded wire input terminal is significant, please connect a capacitor with 0.1~0.47µF 25V for noise filtering.

Warning: DO NOT wire to the No function terminal •.

						<u> </u>	of CH4
3	ç	STANDARD SPECIFICAT	TIONS	#28 #30	3 ~ #29 H 401E	XR	Error status
3.1 Function Specification	าร			#31	H 401F	0 R/	V Communication
Analog/ Digital (4A/D) module		Voltage input	Current input	#32	H 4020		address setting
Power supply voltage		VDC(20.4VDC~28.8VDC) (-15	i%∼+20%)	#32	H 4020	⊖ R/\	rate setting
Analog input channel		hannel / each module					
Analog input range	±10		±20 mA	-			
Digital conversion range	±80		± 4000	-			
Resolution Input impedance		bits(1 _{LSB} =1.25 mV) $K\Omega$ or above	13 bits (1 _{LSB} =5 μA) 250 Ω	-			
Input Impedance		5% of full scale of 25°C(77°F)	23012	#33	H 4021	⊖ R/V	V Reset to factory
Overall accuracy		% of full scale during $0 \sim 55^{\circ}$ C (3)	2∼131 °F)				setting and set characteristics
Response time	3 m	is \times channels]			adjustable priority
Isolation Method		-	rea and analog area. There is no				
		ation among channels.					
Absolute input range	±15		±32 mA				
Digital data format		complementary of 16-bit, 13 Sig		#34	H 4022	0 R	Software version
Average function Self diagnose function		CR#2~CR#5 can be set and s per and lower bound detection /		#3	5~#48		System used
Sell diagnose function		her in ASCII or in RTU mode, co		-			latched. not latched.
			00. Communication format of ASCII		R	means o	an read data by usin
Communication mode			E 1). Communication format of				can write data by usi st Significant Bit): 1
(RS-485)	RTI	U mode is 8Bit, even bit, 1 stop	bit (8 E 1). Can't use RS-485 if the	Exp	olanation	:	
		nection to PLC MPU is in series		1.			ontent of CR#0
Connect to DVD DLC MDU			nected to MPU, the modules are est and 7 is the furthest to the MPU.				module.
Connect to DVP-PLC MPU in series	-		not occupy any digital I/O points of	2.			is used to set 4
		MPU.	not occupy any digital i/O points of				four modes to s , CH2 to mode
3.2 Other Specification				_1	•	,	1). It needs to s
		Power Specification		1			g of CR#1 is H0
			(-15%~+10%), 2W, supply from	3.	CR#2 -	~ CR#	5: it is used to s
Max. Rated Consuming Powe	er	external power	(,,,,				g is K10.
		Environment Condition		4.			#9 are the avera
Environment Condition		Follow the DVP-PLC MPU					(average time)
Spec. of Prevent Static Electr	icity	All places between terminals a	and ground comply with the spec.	5.		,), it will calculate 11, CR#16, CR
				- J. 16.			#15: display pre
4		CR (Control Registe	er)	7.			#21: the conter
DVP04AD-H analog signal input mo	dule	E	xplanation	1			or current is 0 a
RS-485				1	-5V~+5	5V(-40	00 _{LSB} ~+4000 _{LSB}
No. Parameter Latched Register n	ame	b15 b14 b13 b12 b11 b10 b9	b8 b7 b6 b5 b4 b3 b2 b1 b0	8.			#27: means an
#0 H 4000 O R Model type			04AD-H model code =H 400				tal is 4000. Volta
#1 H 4001 O R/W Input mode se	etting	Reserved CH4 Input mode setting: factory setting is H	CH3 CH2 CH1	-	VALUE	-10m/	\~+52mA(-3200)0 _{LSB} ~+12000 _{LS}
		Mode 0: input voltage mode (-10V~+	·10V).				solution of the in
		Mode 1: input voltage mode (-6V~+1 Mode 2: input current mode (-12mA~					ceeds this range
		Mode 3: input current mode (-20mA~			will be		0
#2 H 4002 O R/W CH1 average	times	Mode 4: none use.		9.			fault code. Ple
#3 H 4003 O R/W CH2 average		The number of readings used for ca	alculating "average" temperature on channels		Fault		
#4 H 4004 O R/W CH3 average		CH1~CH4. Setting range is K1~K4096	and factory setting is K10.				e abnormal
#5 H 4005 ○ R/W CH4 average #6 H 4006 × R average value		1		-			t value error
input signal					Offset		e error
#7 H 4007 🔀 R average value	of CH2						alfunction
		Display average value of CH1~CH4 in	nut signal	1	iaiuw		ananouon
input signal	of CH3	Biopialy average value of offit official	paroignai		Didital		error
#8 H 4008 X R average value input signal					Digital Avera	range	e error es setting error
#8 H 4008 X R average value						range ge tim	es setting error
input signal #8 H 4008 X R average value input signal #9 H 4009 X R average value	e of CH4	Reserved			Averag Instruc	range ge tim ction e	es setting error



A Please carefully read this instruction thoroughly prior to use the DVP04AD-H. A The DC input power must be OFF before any maintenance.

A This is an OPEN-TYPE built-in DVP04AD-H, and the DVP04AD-H is certified to meet the safety requirements of IEC 61131-2 (UL 508) when installed in the enclosure to prevent high temperature, high humidity, exceessive vibration, corrosive gases, liquids, airbome dust or metallic particles. Also, it is equipped with protective methods such as some special tool or key to open the enclosure, in order to prevent the hazard to users and the damage to the DVP04AD-H.

WARNING

- A Do not connect the AC power to any of the input/output terminals, or it may damage the DVP04AD-H. Make sure that all the wiring is well conducted prior to power on.
- A Do not touch the internal circuit for at least 1 minute after the power OFF.
- A Make sure that the DVP04AD-H is properly grounded (=), to prevent any electromagnetic noise.

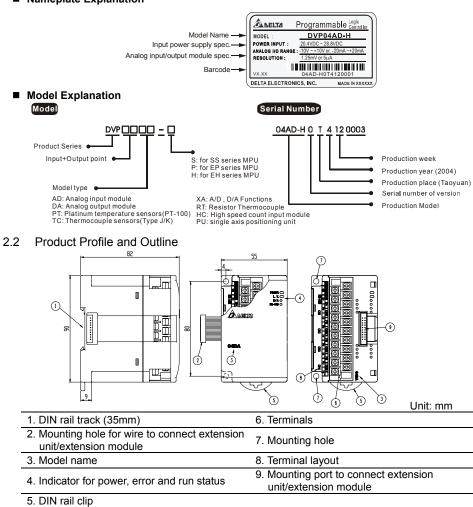
2

1

INTRODUCTION

2.1 Model Explanation and Peripherals

- Thank you for choosing DELTA's PLC DVP Series. The analog input module receives external 4-point analog signal input (voltage or current) and converts it into 14 bits digital signal. The analog input module of DVP04AD-H series can read/write the data of analog input module by using instructions FROM / TO via DVP-PLC EH Series MPU program. There are 49 CR (Control Register, each register has 16-bit) in each module.
- Software version of DVP04AD-H analog input module can be updated via RS-485 communication.
- Users can select input from voltage or current via wiring. Voltage input range is ±10V DC (resolution is 1.25 mV). Current input range is ±20 mA (resolution is 5 µA).
- Nameplate Explanation



og s	signal input module							I	Explai	natior	1						
ed	Register name	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
२	Present value of CH2 input signal		1				1					1	1	1		1	
२	Present value of CH3 input signal		Display the present value of CH3~CH4 input signal														
२	Present value of CH4 input signal	Disp	olay tr	ie pre	sent v	alue	of CH	3~CH	14 inpi	ut sigi	nal						
	input olgridi	Res	erved														
w	To adjust OFFSET																
w	value of CH1 To adjust OFFSET																
w	value of CH2	Offset setting of CH1~CH4. Factory setting is K0 and unit is LSB. Voltage input: setting range is K-4000 ~K4000															
	To adjust OFFSET value of CH3	Curr	ent ir	iput: s	etting	rang	e is K	-4000)~K4(000							
W	To adjust OFFSET																
	value of CH4	D															
w	To adjust CAIN value	Res	erved														
	To adjust GAIN value of CH1																
w	To adjust GAIN value of CH2			ting of								nd un	it is L	SB.			
W	To adjust GAIN value of CH3			iput: s													
W	To adjust GAIN value of CH4																
		Res	erved														
२	Error status	The detail		regist	er use	ed to	save a	all erro	or sta	tus. P	lease	refer	to fau	ult coo	de cha	art for	
W	Communication address setting	Sett is K		S-485	com	nunic	ation	addre	ess. S	etting	g rang	e is C)1~25	5 and	l facto	ory se	tting
W	Communication baud	It is	use	d to :	set c	ommu	inicati	ion b	aud r	ate (4800,	960	0, 19	200,	3840	0, 57	600,
	rate setting			s). Co												it (7 E	E 1).
				catior			RTU r	node									
				0 bps							00 bps				ry set	ing)	
				00 bp 00 bp							400 bp 5200 b						
				reser		sec).			D	J. 110	200 L	nhe (p	wsec	<i>)</i> .			
				chang		and I	niah h	vte of	CRC	cher	k cod	e (on	v for	RTU	mode)	
				SCII / F									,			,	
W	Reset to factory			b13					b8	b7	b6	b5	b4	b3	b2	b1	b0
	setting and set			erved			CH4			CH3			CH2			CH1	
	characteristics	Fact	tory s	etting	is H0	000.											
	adjustable priority			settir													
				n b0=													
				1 b0=	1, inh	ibit u	iser to	o adji	ust O	FFSE	T an	d GA	IN va	lue c	of CH	1 (CF	R#18
			CR#2		if ab -	a at c	iatia -	o ai at -		tobe -	1 61	0 /60 -	ton -	attir -	- lot-	had)	h1-1
				eans		acter	istic r	egiste	er is la	itched	1. D1=	U (fac	ctory s	setting	j, latc	nea),	D1=1
				atche		010	11 00#	inge v	vill roc	ot to	factor	W 66#	ina				
ł	Software version			n b2 is decim										1A mo	ane 1	0.0	
`		IL IS	nexd(Jecim	ai 10 C	iishig	y SUIN	wale	/81510	п. го		npie.	11010	, A me	a115	.UA.	
10	System used																

ans can read data by using FROM instruction or RS-485.

eans can write data by using TO instruction or RS-485. (Least Significant Bit): 1. Voltage input: 1_{1sh}=10V/8000=2.5mV. 2. Current input: 1_{1sh}=20mA/4000=5µA

he content of CR#0 is model type, user can read the data from program to know if there

R#1 is used to set 4 internal channels working mode of analog input module. Every has four modes to set and can be set individually. For example: if setting CH1 to mode 0 000), CH2 to mode 1(b5~b3=001), CH3: mode2 (b8~b6=010), CH4: mode =011). It needs to set CR#1 to H0688 and the upper bit (b12~b15) will reserved. The etting of CR#1 is H0000.

CR#5: it is used to set average times of CH1~CH4. Setting range is K1~K4096 and

CR#9 are the average value that calculates according to the value that is set in R#5 (average time of CH1~CH4 input signal). For example, if CR#2 (the average times s 10, it will calculate the average of CH1 input signal every 10 times.

CR#11, CR#16, CR#17, CR#22, CR#23, CR#28, CR#29 reserved.

CR#15: display present value of CH1~CH4 input signal.

CR #21: the content is the value of adjusting OFFSET value of CH1~CH4 if analog age or current is 0 after it transfers from analog to digital. Voltage setting range: -4000_{LSB}~+4000_{LSB}). Current setting range: -20mA~+20mA (-4000_{LSB}~+4000_{LSB}). CR #27: means analog input voltage or current when conversion value from analog digital is 4000. Voltage setting range: -4V~+20V(-3200_{LSB}~+16000_{LSB}). Current setting 6mA~+52mA(-3200LSB ~+10400LSB). But please be noticed GAIN VALUE – OFFSET $+800_{LSB}$ ~+12000_{LSB} (voltage) or $+800_{LSB}$ ~+6400_{LSB} (current). When this value under this e resolution of the input signal will be thin and the variation of value will be larger. When exceeds this range, the resolution of input signal will be thick and the variation of value

s the fault code. Fleas	e reler to the chart bei	JW.								
scription	Content b15~b8 b7 b6 b5 b4 b3								b1	b0
ource abnormal	K1(H1)		0	0	0	0	0	0	0	1
nput value error	K2(H2)		0	0	0	0	0	0	1	0
mode error	K4(H4)		0	0	0	0	0	1	0	0
ain error	K8(H8)	Reserved	0	0	0	0	1	0	0	0
re malfunction	K16(H10)	Reserveu	0	0	0	1	0	0	0	0
ange error	K32(H20)		0	0	1	0	0	0	0	0
times setting error	K64(H40)		0	1	0	0	0	0	0	0
on error	K128(H80)		1	0	0	0	0	0	0	0
ach fault code will have corresponding bit (b0~b7). Two or more faults may happen at									n at	
e same time. 0 means	normal and 1 means	having fault	-							

the fault code. Please refer to the chart below

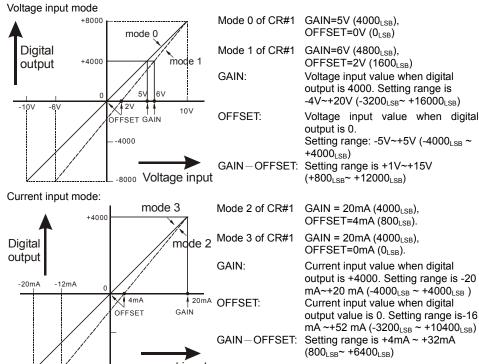
- 10. CR#31: it is used to set RS-485 communication address. Setting range is 01~255 and factory setting is K1.
- CR#32 is used to set RS-485 communication baud rate: 4800, 9600, 19200, 38400, 57600. 115200 bps. b0: 4800bps. b1: 9600bps. (factory setting) b2: 19200bps. b3: 38400 bps. b4: 57600 bps. b5: 115200 bps. b6-b13: reserved. b14: exchange low and high byte of CRC check code. (only for RTU mode) b15=0: ASCII mode. b15=1: RTU mode. Communication format: ASCII mode is 7Bit, even bit, 1 stop bit (7 E 1). Communication format of RTU mode is 8Bit, even bit, 1 stop bit (8 E 1).
- CR#33 is used to set the internal function priority, such as characteristic register. Output 12 latched function will save output setting in the inner memory before power loss.
- CR#34: software version. 13

5

- CR#35~ CR#48: system used. 14.
- 15. The corresponding parameters address H4000~H4030 of CR#0~CR#48 are provided for user to read/write data through RS-485.
 - Communication baud rate: 4800, 9600, 19200, 38400, 57600, 115200 bps.
 - Communication format: ASCII mode is 7Bit, even bit, 1 stop bit (7 E 1). Communication Β. format of RTU mode is 8Bit, even bit, 1 stop bit (8 E 1).
 - Function code: 03H-read data from register. 06H-write one WORD into register. С 10H-write multiple WORD into registers.

ADJUST A/D CONVERSION CHARACTERISTIC CURVE

5.1 Adjust A/D Conversion Characteristic Curve



4000 current input Using charts above to adjust A/D conversion characteristic curve of voltage input mode and

current input mode. Users can adjust conversion characteristic curve by changing OFFSET values (CR#18~CR#21) and GAIN values (CR#24~CR#27) depend on application.

LSB(Least Significant Bit): 1. voltage input: 1LSB=10V/8000=1.25mV. 2. current input: 1_{LSB}=20mA/4000=5µA.

5.2. Program Example for Adjusting A/D Conversion Characteristics Curve

M1002						● Writing H0 to CR#1 of analog
	то	K0	K1	H0	K1	input module no. 0 and set CH1
						to mode 0 (voltage input
	то	К0	K33	HO	K1	-10V~+10V)
			1.00			• Writing H1 to CR#33 and allow to
X0						adjust characters of CH1~CH4.
┝┤╇┝╌┰╌	то	K0	K18	K0	K1	• When X0 switches from Off to
						On, K0 _{LSB} of OFFSET value will
	то	K0	K24	K2000	K1	be wrote in CR#18 and K2000 _{LSB} of GAIN value will be wrote in
1						

Example 1: setting OFFSET value of CH1 to 0V(=K0LSB) and GAIN value of CH1 to 2.5V(=K2000LSB).

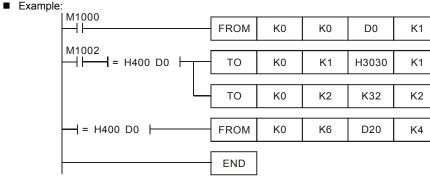


INITIAL PLC START-UP

Lamp display:

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- 1. When power is on, POWER LED will be lit and ERROR LED will be lit for 0.5 second. Normal run: POWER LED should be lit and ERROR LED should turn off. When power 2.
- supply is lower than 19.5V, ERROR LED will blink continuously till the power supply goes higher than 19.5V 3
- When it connects to PLC MPU in series, RUN LED on MPU will be lit and A/D LED or D/A LED should blink.
- After receiving the first RS-485 instruction during controlling by RS-485, A/D LED or D/A 4. LED should blink.
- After converting, ERROR LED should blink if input or output exceeds upper bound or lower 5 than lower bound



Explanation:

7

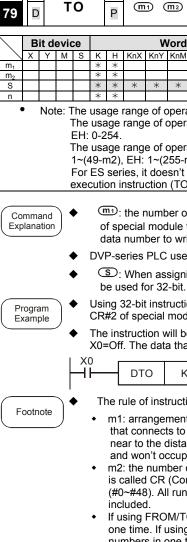
- Read the data of model type from extension module K0 and distinguish if the data is H400 (DVP04AD-H model type)
- If the model type is DVP04AD-H, M11 is on and the setting input mode is (CH1, CH3)= mode 0, (CH2, CH4)= mode 3.
- Set the number of times for average of CH1 and CH2 are K32.
- Read the input signal average value of CH1~CH4 (4 data) and saved into D20~D23.

RELATED INSTRUCTIONS EXPLANATION

AP	1		_		~							_		Re	ad	Applicable mod				
78		D	F	R	0	VI	Ρ	(m1)	(<u>m</u> 2)	▣		n				ata ES EP EH				
\setminus	Bi	t de	evi	се				۷	Vord d	levice)					16-bit instruction (9 STEPS)				
 m1	Х	Y	М	S	K *	H *	KnX	KnY	KnM	KnS	Т	С	D	E	F	FROM Continuous FROMP Pulse execution				
m ₂ D					*	*		*	*	*	*	*	*	*	*	32-bit instruction (17 STEPS)				
										DFROM Continuous DFROMP Pulse execution										
				-	0-4 The	8, E e us	EH: 0 age r	-254. ange	of ope	erand	-				:	 Flag: When M1083=On, it allows to insert interrupt during FROM/TO. 				
					ES	se	ries n	nodel	~(255 doesn tion (F	't súp						Refer to following for detail.				

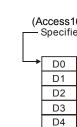
- (m_1) : the number for special module. (m_2) : the number of CR (Control Register) of Command special module that will be read. D: the location to save reading data. C: the Explanation data number of reading one time
 - DVP-series PLC uses this instruction to read CR data of special module.
 - D: When assigning bit operand, K1~K4 are used for 16-bit and K5~K8 are used ٠ for 32-bit
 - Please refer the footnote below for the calculation of special module number. ٠
 - ◆ To read the content of CR#24 of special module#0 to D0 of PLC and to read the content of CR#25 of special module#0 to D1 of PLC. It can read 2 data in one time (n=2).

- Writing H18 to CR#1 of analog input mode no. 0 and set CH2 to mode 3 (current input: -20 mA ~ +20mA)
- Writing H0 to CR#33 and allow to adjust characteristics of CH4.
- When X0 switches from Off to On, K400_{LSB} of OFFSET value will be wrote in CR#19 and K3600_{LSB} of GAIN value will be wrote in CR#25



X0

API



- series models:

D5

- b.

Program Example

CR#24 Example 2: setting OFFSET value of CH2 to 2mA(=K400 LSB) and GAIN value of CH2 to 18 mA

(=K3600_{LSB})

◆ The instruction will be executed when X0=On. The instruction won't be executed when X0=Off and the content of previous reading data won't change.

FROM	K0	K24	D0	K2
------	----	-----	----	----

Specia								I module CR Applicable model						
n1 m2 S n data wr									ES EP		EH			
					u	ald	VVI		✓	✓	✓			
۱	Nord	devi	се											
KnY	KnM	KnS	Т	С	D	Е	F	16-bit instruction		<u> </u>				
								TO Continuou	^s то	Pul	se			
								execution	10	' exe	cution			
*	*	*	*	*	*									
								32-bit instruction (17 STEPS)						
Je of operand m_1 is 0~7. Ge of operand m_2 : ES/EP: 0-48,								DTO Continuou execution	IS DTO	OP Pul	se cution			
: 1~() it doe	opera 255-n esn't : n (TO	n2). supp	ort	puls		=ו		FROM	ert interr I/TO.	=On, it rupt duri ving for	ing			

(m1): the number of special module. (m2): the number of CR (Control Register) of special module that will be wrote in. (S): the data to write in CR. (n): the data number to write in one time

• DVP-series PLC uses this instruction to write data into CR of special module.

(S): When assigning bit operand, K1~K4 can be used for 16-bit and K5~K8 can

Using 32-bit instruction DTO, program will write D11 and D10 into CR#3 and CR#2 of special module#0. It only writes a group of data in one time (n=1).

The instruction will be executed when X0=On and it won't be executed when X0=Off. The data that wrote in previous won't have any change.

О КО К2 D0 К1

The rule of instruction operand:

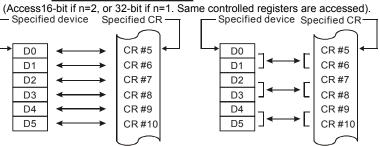
m1: arrangement number of special module. The number of special module that connects to PLC MPU. The numbering order of special module from the near to the distant of MPU is from 0 to 7. The maximum is 8 special modules and won't occupy I/O point.

m2: the number of CR. Built in 16-bit of 49 groups memory of special module is called CR (Control Register). The number of CR uses decimal digital (#0~#48). All running status and setting values of special module has

If using FROM/TO instruction, the unit of read/write of CR is one number for one time. If using DFROM/DTO instruction, the unit of read/write of CR is two numbers in one time.

Upper 16-bit Lower 16-bit

CR #10 CR #9 Specified CR number



16-bit command when n=6

32-bit command when n=3

♦ In ES series models, flag M1083 is not provided. When FROM/TO instruction is executed, all interrupts (including external or internal interrupt subroutines) will be disabled. All interrupts will be executed after completing FROM/TO instruction. Besides, FROM/TO instruction also can be executed in the interrupt subroutine.

◆ The function of the flag M1083 (FROM/TO mode exchange) provided in EP/EH

a. When M1083=Off, all interrupts (including external or internal interrupt subroutines) will be disabled when FROM/TO instruction is executed. The Interrupts will resumed after FROM/TO instruction complete. Please be advised FROM/TO instruction can be executed in the interrupt subroutine. When M1083=On, if an interrupt enable occurs while FROM/TO instruction are executing, the interrupt FROM/TO instruction will be blocked till the requested interrupt finish. Unlike M1080 off situation, FROM/TO instruction cannot be executed in the interrupt subroutine.