REGAL

MD100P Series, Fan & Pump Variable Frequency Drive

ProfibusNet Option Manual

marathon™
—Drives

A Regal Brand

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MOTOR CONTROL

PROFIBUS-DP
Option board
MDLV-100P Series

Marathon Drives

Read this manual carefully before using the PROFIBUS-DP Option

board and follow the instructions exactly.

After reading this manual, keep it at handy for future reference.

Regalbeloit Australia

Thank you for purchase of MD100P Profibus-DP Option Board!

SAFETY PRECAUTIONS

● Always follow safety precautions to prevent accidents and potential hazards from occurring.

● Safety precautions are classified into "WARNING" and "CAUTION" in this manual.

⚠ WARNING — **Indicates a potentially hazardous situation which, if not avoided, can result in serious injury or death.**

⚠ CAUTION — **Indicates a potentially hazardous situation which, if not avoided, can result in minor to moderate injury, or serious damage to the product.**

● Throughout this manual we use the following two illustrations to make you aware of safety considerations:

⚠ Identifies potential hazards.
Read the message and follow the instructions carefully.

⚡ Identifies shock hazards.
Particular attention should be directed because dangerous voltage may be present.

● Keep this manual at handy for quick reference.

⚠ CAUTION

● **Do not touch the CMOS components unless the board is grounded.**

   ESD can cause break down of CMOS components.

● **Do not change the communication cable with the inverter power is turned on.**

   Otherwise, there is a danger of connecting error and damage to the board.

● **Make sure to precisely insert the connector of inverter and option board**

   Otherwise, there is a danger of connecting error and damage to the board.

● **Check the parameter unit when setting the parameters.**

   Otherwise, there is a danger of connecting error and damage to the board.

● **Connect terminal resistor at the last connected option board.**

1. INTRODUCTION

By using a Profibus Option board, MDLV-100P inverters can be connected to a Profibus network.

1.1. When you use the Profibus Option Card …

- Drive can be controlled and monitored by the sequence program of the PLC or other master module.
- With a single communication line, multi-units of drives can be operated simultaneously with each other, reducing the installation cost compared to that case of non-communication system set up. Also, simple wire installation can cut down installation and maintenance labor hours.
- Able to use PLCs to control the drive and can be integrated with PC to simplify the Total Factory Automation.

1.2. Kit Contents

The option board kit consists of:

- Option Board, **1** pcs
- 9 pin Connector, **1** pcs
- Mounting poles, **3** pcs
- Installation Manual

1.3. Profibus Option Board Specification

1.3.1 Communication specification

- Device Type: Profibus DP Slave
- Auto Baud Rate Detect : Supported
- Sync Mode: Supported
- Freeze Mode: Supported
- Max Input Length: 8 words
- Max Output Length: 8 words
- Max Data Length: 16 words
- Baud Rate Support: 9.6K, 19.2K, 93.75K, 187.5K, 500K, 1.5M, 3M, 6M, 12M
- Modular Station: Supported
- Max Module 2

1.3.2 Communication available distance

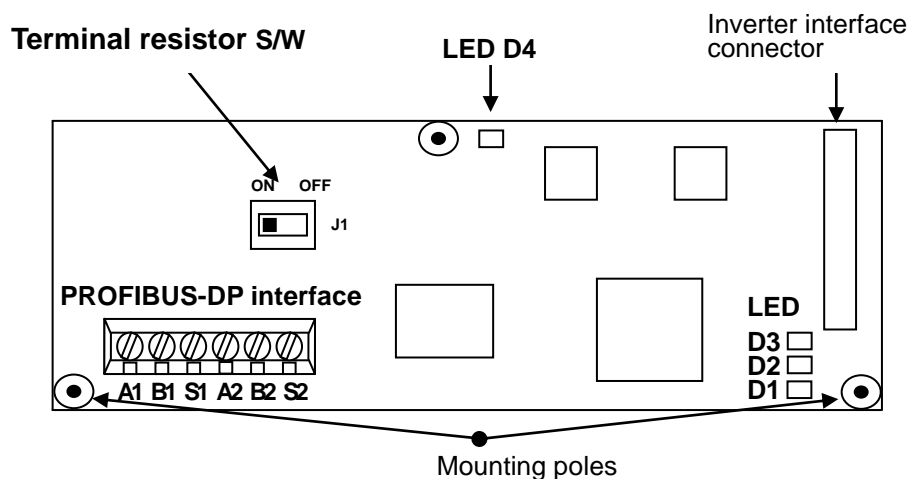| Communication speed(bps)	Max segment length	Max extention distance
9.6k ~ 187.5k	1000 m / 3278 feet	10000 m / 32786 feet
500k	400 m / 1311 feet	4000 m / 13114 feet
1.5M	200 m / 655 feet	2000 m / 6557 feet
3M ~ 12M	100 m / 327 feet	1000 m / 3278 feet

2. Layout and Installation

2.1 Layout

Fig 1. **Layout**

2.1.1 Status LED

Interface LED with drive LED(D1)	Active when the communication between drive and Profibus Option Module is operating correctly.
Heart beat LED(D2)	LED is ON with 1 sec period while option board has no problem it self.
Error LED(D3)	LED is ON with 1 sec period while it has different In/Out number of Master and Inverter..
Profibus communication status LED(D4)	Active when status of Profibus is operating correctly.

* Please refer to "5. Troubleshooting" for further details.

2.1.2 Communication Terminal
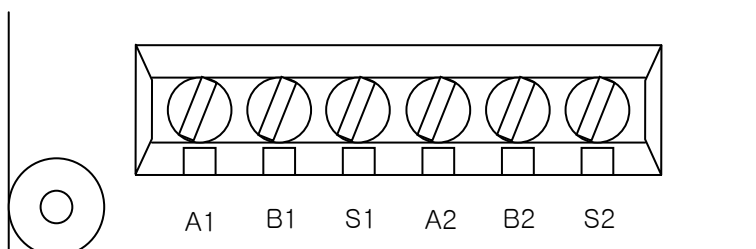
Pin No.	A1	B1	S1	A2	B2	S2
Description	Receive/ Transmit Data Plus	Receive/ Transmit Data Negative	Shield	Receive/ Transmit Data Plus	Receive/ Transmit Data Negative	Shield

2.1.3 Terminal resistor setting

Connect inner terminal resistor by trrigering Switch J1 when it is used at terminal.

ON OFF

J1 → Case that connecting resistor

ON OFF

J1 → Case that Not connecting resistor

2.2 Installation

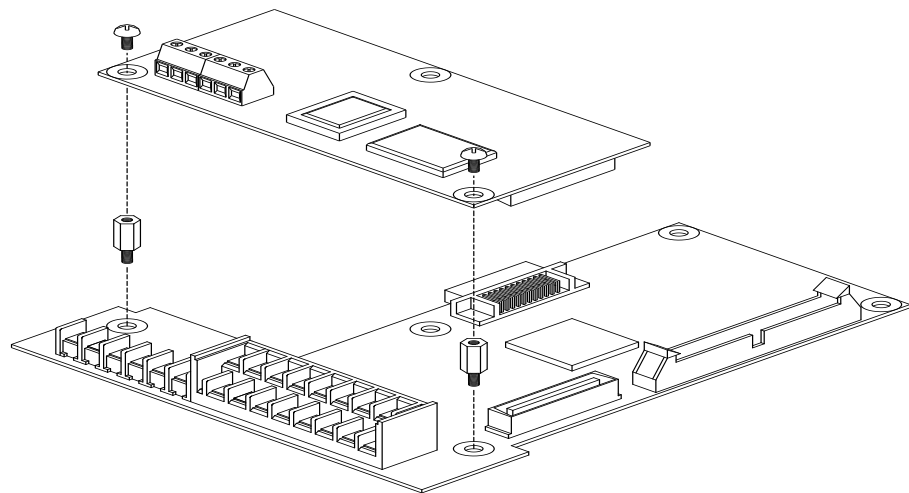## 2.2.1 Installing Profibus board on Inverter board

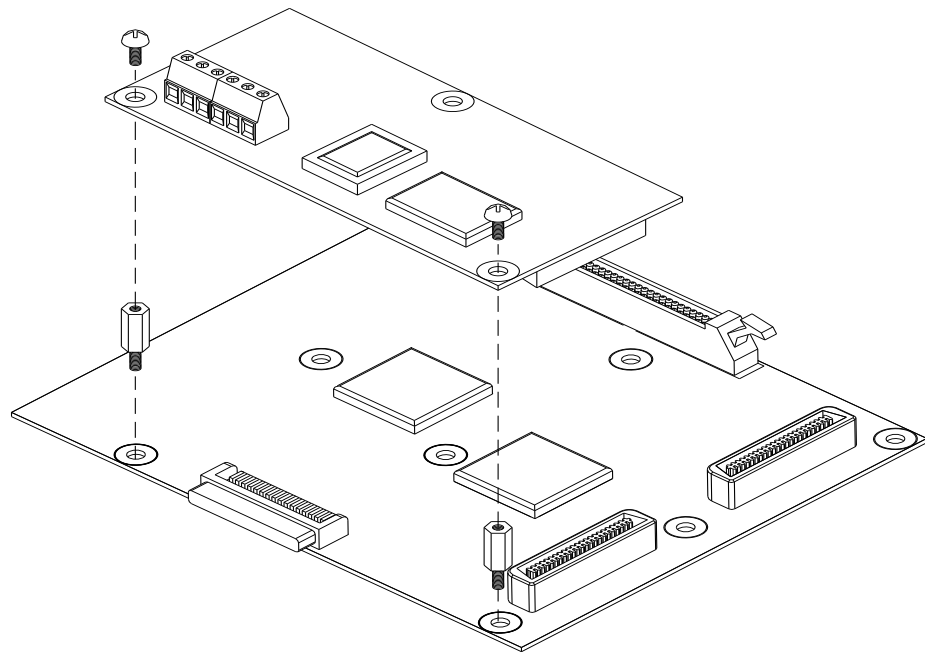Fig 2. Installing MDLV-100P Profibus DP on Inverter board

Fig 3. Installing MDLV-100P Profibus DP on Inverter board

2.3 Profibus DP Parameter Setting

2.3.1 MAC ID(Media Access Control Identifier) Setting

1. MAC ID(Media Access Control Identifier) has different unique value which can distinguishing the each Node in Profibus Network. Therefore, it is impossible to share at each different device.
2. MAC ID is changable by Keypad.
3. Default value is "1". If any trouble in DPRAM communication between inverter and option card, default value is 127.

Inverter	Display	Minimum	Maximum	Parameter Location
MDLV-100P	Profi MAC ID	1	127	COM Group, # 20
				COM Group, # 20
				EXT_09

2.3.2 Setting the Number of output Data

1. Setting the number of monitoring data

Inverter	Display	Minimum	Maximum	Parameter Location
MDLV-100P	OutPut Num	1	8	COM Group, # 30
				COM Group, # 30
				EXT_10

2.3.3 Setting the number of input data

1. Setting the number of external command data

Inverter	Display	Minimum	Maximum	Parameter Location
MDLV-100P	InPut Num	1	8	COM Group, # 40
				COM Group, # 40
				EXT_19

2.3.4 Setting the addresses of output data

1. Setting the addresses as many as the number of output data.

Inverter	Display	Minimum	Maximum	Parameter Location
MDLV-100P	OutPut 0~7	0000h	FFFFh	COM Group, # 30~38
		0000h	FFFFh	COM Group, # 31~38
		0000h	7C3Bh	EXT_11~18

2.3.5 Setting the addresses of input data

1. Setting the addresses as as many as the number of input data.

Inverter	Display	Minimum	Maximum	Parameter Location

		0000h	FFFFh	COM Group, # 41~48
MDLV-100P	InPut 0~7	0000h	FFFFh	COM Group, # 40~48
		0000h	7C3Bh	EXT_20~27

3 I/O Data Transmit/Receive

Output data set by Keypad is transmitted to Profibus Master Module (PLC or PC) through Profibus Option Module. On the contrary, input data is received from Profibus Master Module(PLC or PC) through Profibus Option Module.

4 Operation

4.1 When power-up or reset.

- After self-testing, Heart beat LED(D2) blinks when no fault occurs . If any fault is detected, Heart beat LED(D2) is off or Error LED(D3) is turned on.
- After trying to get correct configuration parameter (Station Address, Out data No, In Data No, Out Data Address1~8, In Data Address1~8 set by Keypad) by DPRAM with drive, configure profibus and start the communication. Interface LED(D1) blinks whenever communicating to drive.
- Profibus communication status LED(D4) is deactivated when communication with Master starts as correct configuration.

5 Troubleshooting

LEDs (Profibus communication status LED, Interface LED with drive, Heart beat LED, Error LED) indicate the status of device and network.

< Profibus communication status LED(D4) >

LED	Status	Cause	Help
Off	Off-Line	Misconnection with connector	Check pin number of connector and connection of terminate resistor
		There is no MASTER in this network	Check master status or master existence
		Wrong address	Check the address in Keypad is equal to that of MD100P Profibus Option Module using Configuration Tool, and unique number in network.
		Network Configuration problem	Check the maximum length of segment. Check the numbers of node include repeater in segment. Number of node must be 32 or above in segment. Check the numbers of node include repeater in Network. Number of node must be 126 or above in network.

On	On-Line	Network, address, Parameterization, Configuration is operating correctly.	

< Interface with drive LED >

LED	Status	Cause	Help
Off	DPRAM Interface error	Interface between drive and DPRAM is not available.	Check the power of drive. Check the fault status of drive. Check the connector to drive
On	Normal	Operating correctly	

< Heart Beat LED >

LED	Status	Cause	Help
Off	Option Module error	Operating of option Module is not available	Check the power of drive. Check the fault status of drive. Check the connector to drive
Blink about 1 sec period	Normal	Operating correctly	

< Error LED >

LED	Status	Cause	Help
On	Option Module error	Operating of option Module is not available.	Check the fault status of drive. Check the connector to drive.
Off	Normal	Operating correctly	

6 EDS file (Electronic Data Sheets)

This is a file that contains drive parameter data. In order to control the parameter of MDLV-100P, the EDS file for iS5/100P drive must be installed (EDS file is downloadable at MD Homepage www.regalaustralia.com.au)

7 Parameter Code (Hex)

Common Area: Area accessible regardless of inverter models, There are some address for special Inverter model.[(Note1)]

Note1) The changed value in Common affects the current setting but returns to the previous setting when power is cycled or Inverter is reset. However, changing value is immediately reflected in other parameter groups even in the case of Reset or Power On/Off.

7.1 MDLV-iS5 Parameter Code

7.1.1 Common area for MDLV- iS5

Parameter Address	Parameter Name	Unit	Read/Write	Data Value (Hex)
0x0000	Drive model	-	R	4: MDLV-iS5
0x0001	Drive capacity	-	R	0: 0.75 1:1.5 2:2.2 3: 3.7 4: 5.5 5: 7.5 6: 11 7: 15 8: 18.5 9: 22 A: 30 B:37 C:45 D: 55 E: 75 F: 90 10: 110 11: 132 12: 160 13: 200 14:220 15:280 16:375 (Unit : kW)
0x0002	Drive Input Voltage	-	R	0: 220V 1: 440V
0x0003	S/W Version	-	R	0100: Ver. 1.00, 0101: Ver 1.01
0x0005	Frequency Reference	0.01Hz	R/W	
0x0006	Run Command	-	R/W	Bit 0: Stop Bit 1: Forward Run Bit 2: Reverse Run Bit 3: Fault Reset Bit 4: Emergency Stop
0x0007	Acceleration Time	0.1 sec	R/W	
0x0008	Deceleration Time	0.1 sec	R/W	
0x0009	Output Current	0.1 A	R	
0x000A	Output Frequency	0.01 Hz	R	
0x000B	Output Voltage	0.1 V	R	
0x000C	DC Link Voltage	0.1 V	R	
0x000D	Output Power	0.1 kW	R	
0x000E	Sequence Monitor	-	R	BIT 0 : Stop BIT 1 : Forward Run BIT 2 : Reverse Run BIT 3 : Fault (Trip) BIT 4 : Accelerating BIT 5 : Decelerating BIT 6 : Output Frequency Arrival BIT 7 : DC Braking BIT 8 : Stopping BIT 9 :Not Available BIT 10 : BrakeOpen BIT 11: Forward Run Command BIT 12 : Reverse Run Command BIT 13 : Rem, Run/Stop BIT 14 : Rem, Freq. Cmd
0x000F	Trip information	-	R	Bit 0:OCT1, Bit 1: OV, Bit 2: EXT-A Bit 3: BX, Bit 4:OCT2, Bit 5: GF, Bit 6: OH,Bit 7: ETH, Bit 8: OLT, Bit 9: HW-diag,Bit10:EXT-B,Bit11:FO Bit12:OPT,Bit13:POBit,14:IOLT, Bit15:LV
0x0010	Input Terminal Status	-	R	Bit 0: P1, Bit 1: P2, Bit 2: P3 Bit 3: P4, Bit 4: P5, Bit 5: P6,

Parameter Address	Parameter Name	Unit	Read/Write	Data Value (Hex)
				Bit 6: RST, Bit 7: BX, Bit 8: JOG, Bit 9: FX, Bit 10: RX
0x0011	Output Terminal Status	-	R	Bit 0: Q1 (OC1) , Bit 1: Q2 (OC2) Bit 2: Q3 (OC3), Bit 3: AUX Bit 4: 30AC
0x0012	V1	-	R	0000h – FFC0h
0x0013	V2	-	R	0000h – FFC0h
0x0014	I	-	R	0000h – FFC0h
0x0015	RPM	-	R	

7.1.2 MDLV-iS5 Function code

< DRV Group >

Address	No.	Parameter	Default	Max	Min	Unit
5100	DRV #00	Cmd. freq	0	MaxFreq	0	0.01Hz
5101	DRV #01	Acc. Time	100	6000	0	0.1sec
5102	DRV #02	Dec. Time	200	6000	0	0.1sec
5103	DRV #03	Drive mode	1	2	0	
5104	DRV #04	Freq. mode	0	4	0	
5105	DRV #05	Step freq - 1	1000	MaxFreq	Start freq	0.01Hz
5106	DRV #06	Step freq - 2	2000	MaxFreq	Start freq	0.01Hz
5107	DRV #07	Step freq - 3	3000	MaxFreq	Start freq	0.01Hz
5108	DRV #08	Current	-	-	-	0.1A
5109	DRV #09	Speed	-	-	-	1rpm
510A	DRV #10	DC Link Voltage	*	-	-	V
5110	DRV #16	Hz/Rpm Disp	*	-	-	Hz/Rpm

< FU1 Group >

Address	No.	Parameter	Default	Max	Min	Unit
5203	FU1 #03	Run prohibit	0	2	0	
5205	FU1 #05	Acc. pattern	0	4	0	
5206	FU1 #06	Dec. pattern	0	4	0	
5207	FU1 #07	Stop mode	0	2	0	
5208	FU1 #08	DcBr freq.	500	5000	Start freq	0.01Hz
5209	FU1 #09	DcBlk time	10	6000	0	0.01sec
520A	FU1 #10	DcBr value	50	200	0	%
520B	FU1 #11	DcBr time	10	600	0	0.1sec
520C	FU1 #12	DcSt value	50	200	0	%
520D	FU1 #13	DcSt time	0	600	0	0.1sec

520E	FU1 #14	PreExTime	10	600	0	0.1sec
520F	FU1 #15	Hold time	1000	10000	0	1msec
5210	FU1 #16	Flux Force	1000	5000	1000	0.1%
5214	FU1 #20	Max freq.	5000	40000	4000	0.01Hz
5215	FU1 #21	Base freq.	5000	Max freq	3000	0.01Hz
5216	FU1 #22	Start freq.	50	5000	1	0.01Hz
5217	FU1 #23	Freq limit	0	1	0	
5218	FU1 #24	F-limit Lo.	50	highFreq	Start freq	0.01Hz
5219	FU1 #25	F-limit Hi.	5000	Max freq	lowFreq	0.01Hz
521A	FU1 #26	Torque boost	0	1	0	
521B	FU1 #27	Fwd boost	20	150	0	0.1%
521C	FU1 #28	Rev boost	20	150	0	0.1%
521D	FU1 #29	V/F pattern	0	2	0	
521E	FU1 #30	User freq. 1	1500	Max freq	0	0.01Hz
521F	FU1 #31	User volt. 1	25	100	0	%
5220	FU1 #32	User freq. 2	3000	Max freq	0	0.01Hz
5221	FU1 #33	User volt. 2	50	100	0	%
5222	FU1 #34	User freq. 3	4500	Max freq	0	0.01Hz
5223	FU1 #35	User volt. 3	75	100	0	%
5224	FU1 #36	User freq. 4	5000	Max freq	0	0.01Hz
5225	FU1 #37	User volt. 4	100	100	0	%
5226	FU1 #38	Volt control	1000	1100	400	0.1%
5227	FU1 #39	Energy save	0	30	0	%
5232	FU1 #50	ETH select	0	1	0	
5233	FU1 #51	ETH 1min	180	200	ETH Cont	%
5234	FU1 #52	ETH Cont	100	150	50	%
5235	FU1 #53	Motor type	0	1	0	
5236	FU1 #54	OL level	150	150	30	%
5237	FU1 #55	OL time	100	300	0	0.1sec
5238	FU1 #56	OLT select	1	1	0	
5239	FU1 #57	OLT level	180	200	30	%
523A	FU1 #58	OLT time	600	600	0	0.1sec
523B	FU1 #59	Stall prev.	0	7	0	
523C	FU1 #60	Stall level	180	250	30	%

< FU2 Group >

Address	No.	Parameter	Default	Max	Min	Unit
5307	FU2 #07	Dwell freq	500	Max freq	Start freq	0.01Hz
5308	FU1 #08	Dwell time	0	100	0	0.1sec

530A	FU2 #10	Jump freq	0	1	0	
530B	FU2 #11	jump lo 1	1000	jump Hi 1	Start freq	0.01Hz
530C	FU2 #12	jump Hi 1	1500	Max freq	jump Lo 1	0.01Hz
530D	FU2 #13	jump lo 2	2000	jump Hi 2	Start freq	0.01Hz
530E	FU2 #14	jump Hi 2	2500	Max freq	jump Lo 2	0.01Hz
530F	FU2 #15	jump lo 3	3000	jump Hi 3	Start freq	0.01Hz
5310	FU2 #16	jump Hi 3	3500	Max freq	jump Lo 3	0.01Hz
5311	FU2 #17	Start Curve	40	100	1	%
5312	FU2 #18	End Curve	40	100	1	%
5313	FU2 #19	Trip select	0	3	0	BIT
5314	FU2 #20	Power-on run	0	1	0	
5315	FU2 #21	RST restart	0	1	0	
5316	FU2 #22	Speed Search	0	15	0	BIT
5317	FU2 #23	SS Sup-Curr	100	200	80	
5318	FU2 #24	SS P-gain	100	9999	0	
5319	FU2 #25	SS I-gain	1000	9999	0	
531A	FU2 #26	Retry number	0	10	0	
531B	FU2 #27	Retry delay	10	600	0	0.1sec
531C	FU2 #28	SS blk time	10	600	0	0.1sec
531E	FU2 #30	Motor select	0	9	0	
531F	FU2 #31	Pole number	4	12	2	
5320	FU2 #32	Rated-Slip	(Note2)	1000	0	0.01Hz
5321	FU2 #33	Rated-Curr	(Note2)	2000	10	0.1A
5322	FU2 #34	Noload-Curr	(Note2)	2000	5	0.1A
5323	FU2 #35	Motor Volt	(Note3)	460	180	V
5324	FU2 #36	Efficiency	(Note2)	100	70	%
5325	FU2 #37	Inertia rate	0	1	0	
5326	FU2 #38	Carrier freq	50	150	10	0.1kHZ
5327	FU2 #39	Control mode	0	5	0	
5328	FU2 #40	Auto tuning	0	4	0	
5329	FU2 #41	Rs	(Note4)	9999	0	0.001ohm
532A	FU2 #42	Lsigma	(Note5)	9999	0	0.001mH
532B	FU2 #43	Ls	(Note6)	9999	0	0.001mH
532C	FU2 #44	Tr	(Note7)	5000	25	0.1msec
532D	FU2 #45	SL P-gain	1000	32767	0	
532E	FU2 #46	SL I-gain	100	32767	0	
532F	FU2 #47	proc PI mode	0	1	0	
5330	FU2 #48	PID F-gain	0	9999	0	0.1%
5331	FU2 #49	Aux Ref Mode	0	5	0	
5332	FU2 #50	PID Out Dir	1	1	0	

Address	No.	Parameter	Default	Max	Min	Unit
5333	FU2 #51	PID F/B	0	2	0	
5334	FU2 #52	PID P-gain	3000	9999	0	0.1%
5335	FU2 #53	PID I-time	300	320	0	0.1sec
5336	FU2 #54	PID D-time	0	9999	0	0.1msec
5337	FU2 #55	PID limit-H	5000	Max freq	0	0.01Hz
5338	FU2 #56	PID limit-L	0	Max freq	0	0.01Hz
5339	FU2 #57	PID Out Inv	0	1	0	
533A	FU2 #58	PID OutScale	1000	9999	1	0.1%
533B	FU2 #59	PID P2-gian	1000	9999	0	0.1%
533C	FU2 #60	P-gain Scale	1000	1000	0	0.1%
5345	FU2 #69	Acc/Dec ch F	0	Max freq	0	0.01Hz
5346	FU2 #70	Acc/Dec freq	0	1	0	
5347	FU2 #71	Time scale	1	2	0	
5348	FU2 #72	PowerOn disp	0	12	0	
5349	FU2 #73	User disp	0	2	0	
534A	FU2 #74	RPM factor	100	1000	1	%
534B	FU2 #75	DB mode	1	2	0	
534C	FU2 #76	DB %ED	10	30	0	%
5351	FU2 #81	2nd Acc time	50	6000	0	0.1sec
5352	FU2 #82	2nd Dec time	100	6000	0	0.1sec
5353	FU2 #83	2nd BaseFreq	5000	Max freq	3000	0.01Hz
5354	FU2 #84	2nd V/F	0	2	0	
5355	FU2 #85	2nd F-boost	20	150	0	0.1%
5356	FU2 #86	2nd R-boost	20	150	0	0.1%
5357	FU2 #87	2nd Stall	150	150	30	%
5358	FU2 #88	2nd ETH 1min	150	200	2nd ETH Cont	%
5359	FU2 #89	2nd ETH Cont.	100	2nd ETH 1min	50	%
535A	FU2 #90	2nd R-Curr	36	2000	10	0.1A
535D	FU2 #93	Para. Init	0	8	0	

Note2,3) It depends on Motor capacity and voltage.

Note4,5,6,7) It depends on motor capacity and Auto Tunning.

< I/O 그룹 >

Address	No.	Parameter	Default	Max	Min	Unit
5401	I/O #01	V1 filter	10	9999	0	ms
5402	I/O #02	V1 volt x1	0	V1 vort x2	0	0.01V
5403	I/O #03	V1 freq y1	0	Max freq	0	0.01Hz
		/ V1 % y1	0	1500	0	0.1%
5404	I/O #04	V1 volt x2	1000	1000	V1 volt x1	0.01V

5405	I/O #05	V1 freq y2/ V1 % y2	5000	Max freq	0	0.01Hz
			1500	1500	0	0.1%
5406	I/O #06	I filter	10	9999	0	ms
5407	I/O #07	I curr x1	400	I curr x2	0	0.01mA
5408	I/O #08	I freq y1	0	Max freq	0	0.01Hz
5409	I/O #09	I curr x2	2000	2000	I curr x1	0.01mA
540A	I/O #10	I freq y2	5000	Max freq	0	0.01Hz
540B	I/O #11	Wire broken	0	2	0	
540C	I/O #12	P1 define	0	42	0	
540D	I/O #13	P2 define	1	42	0	
540E	I/O #14	P3 define	2	42	0	
5411	I/O #17	Ti Filt Num	15	50	2	
5414	I/O #20	Jog freq	1000	Max freq	Start freq	0.01Hz
5415	I/O #21	Step freq - 4	4000	Max freq	Start freq	0.01Hz
5416	I/O #22	Step freq - 5	5000	Max freq	Start freq	0.01Hz
5417	I/O #23	Step freq - 6	4000	Max freq	Start freq	0.01Hz
5418	I/O #24	Step freq - 7	3000	Max freq	Start freq	0.01Hz
5419	I/O #25	Acc time– 1	200	6000	0	0.1sec
541A	I/O #26	Dec time – 1	200	6000	0	0.1sec
541B	I/O #27	Acc time – 2	300	6000	0	0.1sec
541C	I/O #28	Dec time – 2	300	6000	0	0.1sec
541D	I/O #29	Acc time – 3	400	6000	0	0.1sec
541E	I/O #30	Dec time - 3	400	6000	0	0.1sec
541F	I/O #31	Acc time – 4	500	6000	0	0.1sec
5420	I/O #32	Dec time – 4	500	6000	0	0.1sec
5421	I/O #33	Acc time – 5	400	6000	0	0.1sec
5422	I/O #34	Dec time – 5	400	6000	0	0.1sec
5423	I/O #35	Acc time – 6	300	6000	0	0.1sec
5424	I/O #36	Dec time – 6	300	6000	0	0.1sec
5425	I/O #37	Acc time – 7	200	6000	0	0.1sec
5426	I/O #38	Dec time – 7	200	6000	0	0.1sec
5428	I/O #40	FM mode	0	4	0	
5429	I/O #41	FM adjust	100	200	10	%
542A	I/O #42	FDT freq	3000	Max freq	0	0.01Hz
542B	I/O #43	FDT band	1000	Max freq	0	0.01Hz
542C	I/O #44	Aux mode	12	25	0	
542D	I/O #45	Relay mode	2	7	0	BIT3
542E	I/O #46	Inv No.	1	31	1	
542F	I/O #47	Baud rate	3	4	0	
5430	I/O #48	Lost command	0	2	0	

5431	I/O #49	Time out	10	1200	1	0.1sec

< Note > Please contact us(www.regalaustralia.com.au) requiring parameter addresses for Auto area

< EXT Group >

Address	No.	Parameter	Default	Max	Min	Unit
5501	EXT #01	Sub B/D	0	8	0	
5502	EXT #02	P4 define	3	42	0	
5503	EXT #03	P5 define	4	42	0	
5504	EXT #04	P6 define	5	42	0	
5505	EXT #05	V2 mode	0	2	0	
5506	EXT #06	V2 filter	10	9999	0	msec
5507	EXT #07	V2 volt x1	0	V2 volt x2	0	0.01V
5508	EXT #08	V2 freq y1	0	Max freq	0	0.01Hz
5509	EXT #09	V2 volt x2	1000	1000	V2 volt x1	0.01V
550A	EXT #10	V2 freq y2	5000	Max freq	0	0.01Hz
550C	EXT #12	F mode	0	2	0	
550F	EXT #15	F pulse set	0	2	0	
5510	EXT #16	F pulse num	1024	4096	360	
5511	EXT #17	F filter	10	9999	0	msec
5512	EXT #18	F pulse x1	0	F pulse x2	0	0.1kHz
5513	EXT #19	F freq y1	0	Max freq	0	0.01Hz
5514	EXT #20	F pulse x2	100	1000	F pulse x1	0.1kHz
5515	EXT #21	F freq y2	5000	Max freq	0	0.01Hz
5516	EXT #22	PG P-gain	3000	9999	0	
5517	EXT #23	PG I-gain	50	9999	0	
5518	EXT #24	PG Slip Freq	100	200	0	%
5519	EXT #25	ASR P-Gain	1000	5000	100	0.1%
551A	EXT #26	ASR I-Gain	200	9999	10	msec
551B	EXT #27	Trq + Limit	180	200	0	%
551C	EXT #28	Trq - Limit	180	200	0	%
551E	EXT #30	Q1 define	0	23	0	
551F	EXT #31	Q2 define	1	23	0	
5520	EXT #32	Q3 define	2	23	0	
5522	EXT #34	LM mode	1	3	0	
5523	EXT #35	LM adjust	100	200	10	%
5528	EXT #40	AM1 mode	0	3	0	
5529	EXT #41	AM1 adjust	100	200	10	%
552A	EXT #42	AM2 mode	3	3	0	
552B	EXT #43	AM2 adjust	100	200	10	%
5532	EXT #50	Speed Limit	100	200	0	%

5533	EXT #51	Speed Bias	100	200	0	%
5534	EXT #52	Speed Gain	1	10	1	
5535	EXT #53	Speed Dir	1	1	0	
5536	EXT #54	ZSD Level	200	12000	0	0.01Hz
5537	EXT #55	ZSD Band	100	500	0	0.01Hz
5538	EXT #56	TD Level	1000	1500	0	0.1%
5539	EXT #57	TD Band	50	100	0	0.1%

< COM Group >

Address	No.	Parameter	Default	Max	Min	Unit
5601	COM #01	Opt B/D	0	7	0	
5602	COM #02	Opt mode	0	3	0	
5603	COM #03	Opt version	x.x			
5614	COM #20	Profi MAC ID	1	127	1	
561E	COM #30	Output Num	3	8	0	
561F	COM #31	Output 1	000A	FFFF	0000	HEX
5620	COM #32	Output 2	000E	FFFF	0000	HEX
5621	COM #33	Output 3	000F	FFFF	0000	HEX
5622	COM #34	Output 4	0000	FFFF	0000	HEX
5623	COM #35	Output 5	0000	FFFF	0000	HEX
5624	COM #36	Output 6	0000	FFFF	0000	HEX
5625	COM #37	Output 7	0000	FFFF	0000	HEX
5626	COM #38	Output 8	0000	FFFF	0000	HEX
5628	COM #40	Input Num	2	8	0	
5629	COM #41	Input 1	0005	FFFF	0000	HEX
562A	COM #42	Input 2	0006	FFFF	0000	HEX
562B	COM #43	Input 3	0000	FFFF	0000	HEX
562C	COM #44	Input 4	0000	FFFF	0000	HEX
562D	COM #45	Input 5	0000	FFFF	0000	HEX
562E	COM #46	Input 6	0000	FFFF	0000	HEX
562F	COM #47	Input 7	0000	FFFF	0000	HEX
5630	COM #48	Input 8	0000	FFFF	0000	HEX

< APP Group >

Address	No.	Parameter	Default	Max	Min	Unit
5701	APP #01	APP mode	0	3	0	
5702	APP #02	Trv. Amp[%]	0	200	0	0.1%
5703	APP #03	Trv. Scr	0	500	0	0.1%
5704	APP #04	Trv Acc Time	20	6000	1	0.1sec
5705	APP #05	Trv Dec Time	30	6000	1	0.1sec

5706	APP #06	Trv Off Hi	0	200	0	0.1%
5707	APP #07	Trv Off Lo	0	200	0	0.1%
5708	APP #08	Aux Mot Run	0	4	0	
5709	APP #09	Starting Aux	1	4	1	
570A	APP #10	Auto Op Time	0	5940	0	
570B	APP #11	Start freq1	4999	Max freq	0	0.01Hz
570C	APP #12	Start freq2	4999	Max freq	0	0.01Hz
570D	APP #13	Start freq3	4999	Max freq	0	0.01Hz
570E	APP #14	Start freq4	4999	Max freq	0	0.01Hz
570F	APP #15	Stop freq1	1500	Max freq	0	0.01Hz
5710	APP #16	Stop freq2	1500	Max freq	0	0.01Hz
5711	APP #17	Stop freq3	1500	Max freq	0	0.01Hz
5712	APP #18	Stop freq4	1500	Max freq	0	0.01Hz
5713	APP #19	Aux start DT	600	9999	0	0.1sec
5714	APP #20	Aux stop DT	600	9999	0	0.1sec
5715	APP #21	Nbr Aux'	4	4	0	
5716	APP #22	Regul Bypass	0	1	0	
5717	APP #23	Sleep Delay	600	9999	0	0.1sec
5718	APP #24	Sleep Freq	19	Max freq	0	0.01Hz
5719	APP #25	WakeUp level	35	100	0	1%
571A	APP #26	AutoCh_Mode	1	2	0	
571B	APP #27	AutoEx intv	4320	5940	0	0.1sec
571C	APP #28	AutoEx level	20	100	0	1%
571D	APP #29	Inter-lock	0	1	0	
571E	APP #30	ActualF/P	*	100	0	%
571F	APP #31	Actual B/kPa	*	65472	0	Bar/Pa
5720	APP #32	Scale Disp	1000	50000	0	
5721	APP #33	Draw mode	0	3	0	
5722	APP #34	DrawPerc	100	150	0	1%

7.1.3 MDLV-iS5 Communication option setting

COM-01 [Opt B/D]

● Indicates Option boards installed. This value is automatically set when the boards are installed.

COM-02 [Opt Mode]

● Determines whether Run/Stop/Reference Frequency is set via Communication.

Value	Display	Description
0	None	Disabled
1	Command	Run/Stop setting via Communication
2	Freq	Frequency setting via Communication
3	Cmd + Freq	Run/Stop/Reference Frequency via Communication

COM-03 [Opt Version]

● Displays version of Option Board.

COM-20 [Profi MAC ID]

● Sets MAC ID of profibus. The MAC ID must have a unique value in network.

COM-30 [Output Num]

● Sets the number of Read area address only.

● Arrange COM #31~38 for using and set 1 to 8

COM-40 [Input Num]

● Sets the number of Write area address only.

● Arrange COM #41~48 for using and set 1 to 8

<I/O Group>

Address	No	Description	Factory default	Setting range
5430	I/O #48	Driving method when lost Communication Cmd	0 (None)	0 :None(Keep RUN) 1 :Free Run/ Stop 2 :Decel Stop
5431	I/O #49	Decision time for Communication Cmd lost	1.0s	1.0~120.0s

● In case that COM #02 1(Command) ~ 3 (Cmd + Freq), it drives by setting value of I/O #48 during

the time of I/O #49 while lost communication command..

7.2 MDLV-100P Parameter Code

7.2.1 Common area for MDLV- 100P

Address	Parameter	Unit	Unit	R/W	Data value
0x0000	Inverter model			R	9 : MDLV-100P
0x0001	Inverter capacity			R	MDLV-100P 4: 5.5kW 5: 7.5kW 6: 11kW 7: 15kW 8: 18.5kW 9: 22kW A: 30kW B: 37kW C: 45kW D: 55kW E: 75kW F: 90kW 10: 110kW 11: 132kW 12: 160kW 13: 220kW 14: 280kW 15: 315kW 16: 375kW 17: 450kW
0x0002	Inverter Input Voltage			R	0 : 220V Class 1 : 400V Class
0x0003	S/W Version			R	(Ex) 0x0100 : Version 1.00 0x0110 : Version 1.10
0x0005	Frequency Reference	0.01	Hz	R/W	
0x0006	Run Command			R/W	BIT 0: Stop (S) BIT 1: Forward run (F) BIT 2: Reverse run (R) BIT 3: Fault reset (0->1) BIT 4: Emergency stop BIT 5: Not used
				R	BIT 6, BIT 7: Run/Stop command source 0(Terminal), 1(Keypad), 2(Option) 3: Int. 485 BIT 8 ~12: Freq. reference 0 ~ 16: Multi-step speed freq. (0, 2~16) 17 ~ 19: UpDown (Up, Down, UD Zero) 20 ~ 21: RESERVED 22 ~ 25: Analog (V1, V1S, I, V1I) 26: Pulse 27: Sub 28: Int. 485 29: Option, 30: Jog, 31 : PID BIT 15: set when Network error
0x0007	Acceleration Time	0.1	sec	R/W	
0x0008	Deceleration Time	0.1	sec	R/W	
0x0009	Output Current	0.1	A	R	
0x000A	Output Frequency	0.01	Hz	R	
0x000B	Output Voltage	0.1	V	R	

Address	Parameter	Unit	Unit	R/W	Data value
0x000C	DC Link voltage	0.1	V	R	
0x000D	Output power	0.1	kW	R	
0x000E	Operating status of Inverter			R	BIT 0: Stop BIT 1: Forward running BIT 2: Reverse running BIT 3: Fault (Trip) BIT 4: Accelerating BIT 5: Decelerating BIT 6: speed arrival BIT 7: DC Braking BIT 8: Stopping Bit 9: not Used BIT10: Brake Open BIT11: Forward run command BIT12: Reverse run command BIT13: REM. R/S (Int. 485, OPT) BIT14: REM. Freq.　(Int. 485, OPT) BIT15: Not Used
0x000F	Trip information			R	BIT 0 : OCT1 BIT 1 : OV BIT 2 : EXT-A BIT 3 : BX BIT 4 : LV BIT 5 : RESERVE BIT 6 : GF(Ground Fault) BIT 6: OHT (Inverter overheat) BIT 7: ETH (Motor overheat) BIT 8: OLT (Overload trip) BIT10: HW-Diag BIT11: RESERVE BIT12: OCT2 BIT13: OPT (Option error) BIT14 : PO (Phase Open) BIT15: IOLT
0x0010	Input terminal status			R	BIT 0 : M1 BIT 1 : M2 BIT 2 : M3 BIT 3 : M4 BIT 4 : M5

Address	Parameter	Unit	Unit	R/W	Data value
			`		BIT 5 : M6
					BIT 6 : M7
					BIT 7 : M8
					BIT 8 : P4
					BIT 9 : P5
					BIT 10 : P6
					BIT11~15 : Not used
0x0011	Output terminal status			R	BIT 0 : AUX1
					BIT 1 : AUX2
					BIT 2 : AUX3
					BIT 3 : AUX4
					BIT 4 : Q1 (OC1)
					BIT 5 : Q2 (OC2)
					BIT 6 : Q3 (OC3)
					BIT 7 : 30AC
					BIT8~15 : Not used
0x0012	V1	0~10V		R	0000h ~FFC0h
0x0013	V2	0~10V		R	0000h ~FFC0h
0x0014	I	0~20mA		R	0000h ~FFC0h
0x0015	RPM			R	
0x001A	Unit display			R	0 : Hz, 1 : Rpm
0x001B	Pole number			R	
0x001C	Custom Version			R	

7.2.2 MDLV-100P Communication Setting

< COM Group >

Address	NO.	Description	Default	Maximum	Minimum	Unit
9601	COM-01	Opt B/D	0	7	0	
9602	COM-02	Opt mode	0	3	0	
9603	COM-03	Opt Version	0012 : Ver 1.2	-	-	HEX
9614	COM-20	Profi MAC ID	1	127	1	
961E	COM-30	Output Num	3	8	0	
961F	COM-31	Output 1	000A	FFFF	0000	HEX
9620	COM-32	Output 2	000E	FFFF	0000	HEX
9621	COM-33	Output 3	000F	FFFF	0000	HEX
9622	COM-34	Output 4	0000	FFFF	0000	HEX
9623	COM-35	Output 5	0000	FFFF	0000	HEX
9624	COM-36	Output 6	0000	FFFF	0000	HEX

Address	NO.	Description	Default	Maximum	Minimum	Unit
9625	COM-37	Output 7	0000	FFFF	0000	HEX
9626	COM-38	Output 8	0000	FFFF	0000	HEX
9628	COM-40	Input Num	2	8	0	
9629	COM-41	Input 1	0005	FFFF	0000	HEX
962A	COM-42	Input 2	0006	FFFF	0000	HEX
962B	COM-43	Input 3	0000	FFFF	0000	HEX
962C	COM-44	Input 4	0000	FFFF	0000	HEX
962D	COM-45	Input 5	0000	FFFF	0000	HEX
962F	COM-46	Input 6	0000	FFFF	0000	HEX
9630	COM-47	Input 7	0000	FFFF	0000	HEX
9631	COM-48	Input 8	0000	FFFF	0000	HEX
9643	COM-67	Comm Update	0	1	0	

COM-01 [Opt B/D]
- Indicates Option boards installed. This value is automatically set when the boards are installed.

COM-02 [Opt Mode]
- Determines whether Run/Stop/Reference Frequency is set via Communication.

Value	Display	Description
0	None	Disabled
1	Command	Run/Stop setting via Communication
2	Freq	Frequency setting via Communication
3	Cmd + Freq	Run/Stop/Reference Frequency via Communication

COM-03 [Opt Version]
- Displays version of Option Board.

COM-20 [Profi MAC ID]
- Sets MAC ID of profibus. The MAC ID must have a unique value in network.

COM-30 [Output Num]
- Sets the number of Read area address only.
- Arrange COM #31~38 for using and set 1 to 8

COM-40 [Input Num]
- Sets the number of Write area address only.
- Arrange COM #41~48 for using and set 1 to 8

COM-67 [Comm Update]
- In case of changing parameter concerned with communication, the changing contents use as updating.

<I/O Group>

Address	No	Description	Factory default	Setting range
945C	I/O #92	Driving method when lost Communication Cmd	0 (None)	0 :None(Keep RUN) 1 :Free Run/ Stop 2 :Decel Stop
945D	I/O #93	Decision time of Communication Cmd lost	1.0s	1.0~120.0s

● In case that COM #02 1(Command) ~ 3 (Cmd + Freq), it drives by setting value of I/O #48 during the time of I/O #49 while lost communication command.

7.3. MDLV-iV5 Parameter Code

7.3.1 Common area for MDLV-iV5

Description		Unit	R/W	Data value	
0x0000	Inverter model	-	R	5: MDLV-iV5	
0x0001	Inverter capacity	-	R	MDLV-iV5 2:2.2 3:3.7 4:5.5 5:7.5 6:11 7:15 8:18.5 9:22 A:30 B:37 C:45 D:55 E:75 F:90 10:110 11:132 12:160 14:220 (unit : kW)	
0x0002	Inverter input voltage	-	R	0: 220V Class 1: 440V Class	
0x0003	Version	-	R	0100h : Ver 1.00 0110h : Ver 1.10	
0x0005	Frequency Cmd	0.01Hz	R/W	Use 0x0502 instead of Not Used	
0x0006	Operation Cmd	-	R/W	Use 0x0500 instead of Not Used	
0x0007	Accel Time	0.1 sec	R/W	MDLV-iV5 : Used in Device Net [Note6]	
0x0008	Decel Time	0.1 sec	R/W	MDLV-iV5 : Used in Device Net [Note6]	
0x0009	Output current	0.1 A	R		
0x000A	Output Frequency	0.01 Hz	R	MDLV-iV5 :Used in Device Net [Note7]	
0x000B	Output Voltage	0.1 V	R		
0x000C	DC Link voltage	0.1 V	R		
0x000D	Output Power	0.1 kW	R	[Note8]	
0x000E	Operation Status	-	R	Bit00	Stop
				Bit01	Forward Operation(FX)
				Bit02	Reverse Operation(RX)
				Bit03	Fault(Trip)
				Bit04	Under Accelerating
				Bit05	Under Decelerating
				Bit06	Speed arrival
				Bit07	Inverter Operation ready [Note9]
				Bit08	Under Stop
				Bit09	Encoder direction Check [Note10]
				Bit10	Under Torque Limit
				Bit11	Forward Cmd [Note11]
				Bit12	Reverse Cmd [Note11]
				Bit13	Option Run/Stop Cmd

					Bit14	Option Frequency Cmd	
					Bit15	PID Enable [Note12)]	
0x000F	Trip Information	-	R		Bit00	Over Current1(OCT U, V, W)	
					Bit01	Over Voltage(OV)	
					Bit02	Not Used	
					Bit03	BX	
					Bit04	Low Voltage(LV)	
					Bit05	Fuse Open(FO)	
					Bit06	Ground Fault(GF)	
					Bit07	Inverter Over Heat(IOH)	
					Bit08	E-Thermal(ETH)	
					Bit09	Over Load(OLT)	
					Bit10	HW-Diag	
					Bit11	External-B(EXT-B)	
					Bit12	Over Current2 (Arm Short U, V, W)	
					Bit13	Option Error	
					Bit14	Encoder Error	
					Bit15	Inverter Over Load(IOLT)	
0x0010	Input Terminal Information	-	R		Bit00	FX	
					Bit01	RX	
					Bit02	BX	
					Bit03	RST	
					Bit04	Not Used	
					Bit05	Not Used	
					Bit06	Not Used	
					Bit07	Not Used	
					Bit08	P1	
					Bit09	P2	
					Bit10	P3	
					Bit11	P4	
					Bit12	P5	
					Bit13	P6	
					Bit14	P7	
					Bit15	Not Used	
0x0011	Output Terminal Information	-	R		Bit00	30A – 30C	
					Bit01	1A – 1B	
					Bit02	2A – 2B	
					Bit03	OC1 - EG	
					Bit04~15	Not Used	

0x0012	Analog Input 1	-	R	Analog Input 1(User Manual Ai1) -100.0%(FC17h).~.100.0%(03E8h)
0x0013	Analog Input 2	-	R	Analog Input 2(User Manual Ai2) -100.0%(FC17h) ~ 100.0%(03E8h)
0x0014	Analog Input 3	-	R	Analog Input 3(User Manual Ai3) -100.0%(FC17h) ~ 100.0%(03E8h)
0x0015	RPM	-	R	Reverse speed is conservative operation of 1 [Note13]
0x0017	Speed Cmd	Hz	R/W	MDLV-iV5 : Used in Device Net [Note 14]
0x001D	Speed Cmd1	RPM	R	Target Speed Cmd
0x001E	Speed Cmd2	RPM	R	Ramp Speed Cmd [Note 15]
0x001F	Speed control input Cmd	RPM	R	Speed controller Reference speed [Note 16]
0x0020	Motor Speed	RPM	R	[Note 13]
0x0021	Torque Reference	0.1%	R	Torque Reference [Note 17]
0x0022	Torque Feedback	0.1%	R	Torque Feedback [Note 18]
0x0023	No-load Current	0.1%	R	Percentage of PAR_26 Flux-Curr (Read Under driving : Refer to 0x050A [Note 32])
0x0024	PID Reference	0.1%	R	PID Reference [Note 19]
0x0025	PID Feedback	0.1%	R	PID Feedback [Note 20]
0x0026	PID Output	0.1%	R	PID Output [Note 21]
0x0027	Inverter Temp	deg	R	Inverter Temp
0x0028	Line Speed	0.1%	R	Motor speed when WEB Control [Note 22]
0x0029	Diameter	0.1%	R	Calculated diameter when WEB Control [Note 23]
0x002A	Tension output	0.1%	R	Tension output when WEB Control [Note 24]
0x002B	Dancer Input	0.1%	R	Dancer Input when WEB Control [Note 25]
0x002C	Taper Input	0.1%	R	WEB Control 시 Taper Input [Note 26]

[Note] 6) In case of acceleration/deceleration time they were used in the same address, as the addresses of 0x0007 and 0x0008 are used by the other types (iS5, iG5…etc) in the device net. In case of MDLV-iV5 in fact, you may use acceleration/deceleration time of the addresses for 0x0503, 0x0504 in the rest except the device net.

[Note] 7) Only when using the device net, Frequency(Hz) is displayed for the motor speed feedback during communication.

[Note] 8) Negative output is calculated in 2's complement. For the calculation method, please refer to [Note] 17.

[Note] 9) It indicates the state where the inverter can be operated without trip. In this case, it indicates the all the states during operation, before and after operation as '1'.

[Note] 10) It indicates each state as follow; Stop (bit 0='1') as '0', Rotating in Forward Direction during Operation as '1', Rotating in Reverse Direction during Operation as '0'.
In case of connection error, it indicates as follows; Rotating in Forward Direction during Operation as '0', Rotating in Reverse Direction during Operation as '1'..

[Note] 11) Relationships between Bit10 Forward Direction Command / Bit11 Reverse Direction Command, and Bit01 Forward Direction Operation (FX) / Bit02 Reverse Direction Operation (RX) are as follows:
Bit10 and Bit11 show current operation command information, while Bit01 and Bit02 show current operation state. For example, in case of inputting stop command during forward direction operation, Bit11 forward direction command becomes '0', but Bit01 forward direction operation (FX) becomes '1' during deceleration and '0' after stop mode.

For the other example, in case of inputting reverse direction operation command during forward direction 1800 RPM operation, it conducts deceleration at 1,800 RPM and Bit11 Reverse Direction Command is remained '1' and Bit01 Forward Direction operation (FX) being '1' until the motor rotating direction will be changed.

[Note] 12) In case CON_20 Proc PID Enb(0x7514) is set to Enable('1'), it shows '1' during operation (bit13='1'). While showing '0' during STOP mode.

[Note] 13) In case of MDLV-iV5, positive direction speed and negative direction speed are shown. Positive direction speed is displayed in 0708h at 1800RPM, representing 1800 when expressed in decimal number. In this case you may read it as it is. Negative direction speed is displayed, for example, 'F8F7h at -1800RPM' where the most significant bit is expressed in 'F' letter, which represents the negative number as 1's complement notation. Therefore the absolute value is calculated as follow;

(FFFFh – F8F7h) $_{(10)}$ = 0708h$_{(10)}$ = 1800

Then,–1800RPM comes out after result of adding negative sign (-) to this absolute value.

The formula to calculate the speed in negative form can be expressed as follow;

Speed(RPM) = (FFFFh – FXXXh (Minus Speed Data Obtained))$_{(10)}$ × (-1)

[Note] 14) Speed command is instructed in Hz during device net communication.

[Note] 15) This is the PostRamp Ref value verified during operation mode. Speed is expressed in the absolute value.

[Note] 16) This is the PreRamp Ref value verified during operation mode. Speed is indicated divided by notations. Please refer to (Note 13).

[Note] 17) This is the Torque Ref value of DIS_01 verified during operation mode. As it generates the minus torque value during reverse direction operation, please calculate it in 2's complement.

Ex) If it is read FE0Ch, calculate as follow;

Torque (%)=(FFFFh-FE0Ch + 0001h)$_{(10)}$ × (-1)

=(01F3h + 0001h)$_{(10)}$ × (-1)

=(01F4h)$_{(10)}$ × (-1)

=-500

As the unit is 0.1%, it becomes –50%.

Accordingly the formula for calculation is as follow;

Torque(%) = (FFFFh – FXXXh (Minus Torque Data Obtained) + 0001h)$_{(10)}$ × (-1)

[Note] 18) This is Tq on the basic display screen during operation mode. For the calculation method, please refer to (Note 17).

[Note] 19) When CON_20 Proc PID Enb is set to Enable, it reads and stores the value of 0x050B PID input command during operation mode. In this case, this can be verified from the process PID command value from DIS_04 Process PID output controller. As the value of 0x050B PID input command is read and stored during operation mode only, the previous command value can be found through 0x0024 PID reference value even if 0x050B PID input command value was changed during STOP mode. In this case, the value other than the process PID command value of DIS_04 is stored. In case it starts operation, it reads the value from 0x050B again, and then stores the same value as the process PID command value of DIS_04.

[Note] 20) In case CON_20 Proc PID Enb is set to Enable, it is the Process PID F/B value of DIS_04 Process

PID output controller verified during operation mode.

^{Note} 21) In case CON_20 Proc PID Enb is set to Enable, it is the process PID output value of DIS_04 process PID output controller verified during operation mode.

^{Note} 22) Line Speed means the value of max. line speed expressed in % during WEB control.

^{Note} 23) Tension output means the total sum of tension outputs including WEB_19 Tension Input, Analog Input, 0x0511 Tension Input Command during tension control mode with load cell used, where Taper, Stall and Boost are taken into account, that is, the final reference of PID control during tension control mode.

^{Note} 24) These are DIS_01 Diameter and WEB_01 Diameter.

^{Note} 23) These are DIS_01 Diameter and WEB_01 Diameter.

^{Note} 24) Tension output means the total sum of tension inputs including WEB_19 Tension Input, Analog Input, 0x0511 Tension Input Command during tension control mode with load cell used, where Taper, Stall and Boost are taken into account, that is, the final reference of PID control during tension control mode. Negative number is calculated in 2's compliment.

^{Note} 25) Dancer Input is the sum of WEB_29 Dancer Pos, Analog Input and 0x0512 Dancer Input during dancer control mode, that is, the final reference of PID control during dancer control mode. Negative number is calculated in 2's compliment.

^{Note} 26) Taper Input is the sum of WEB_21 Taper Input, Analog Input and 0x0514 Taper Input when taper function is used, that is, the number of final taper. Negative number is calculated in 2's compliment.

7.3.2 <Reference Data(Write Data)> Region : MDLV-iV5 Communication Command region

Address	Description	Unit	R/W	Data value	
0x0500	Input terminal Cmd ^{Note 27)}	-	R/W	Bit00	Stop
				Bit01	FX
				Bit02	RX
				Bit03	RST
				Bit04	BX
				Bit05	Not Used
				Bit06	Not Used
				Bit07	Not Used
				Bit08	P1
				Bit09	P2
				Bit10	P3
				Bit11	P4
				Bit12	P5
				Bit13	P6
				Bit14	P7
				Bit15	Not Used
0x0501	Output terminal Cmd ^{Note 28)}	-	R/W	Bit00	1A – 1B

				Bit01	2A – 2B
				Bit02	OC1 – EG
				Bit03~15	Not Used
0x0502	Speed Cmd	0.1RPM	R/W	Speed Cmd FUN_02 is Option(DIS_01 PreRamp Ref) [Note 29)]	
0x0503	Accel time	0.1sec	R/W	Set Main Accel time [Note 30)]	
0x0504	Decel time	0.1sec	R/W	Set Main Decel time [Note 30)]	
0x0505	Torque Cmd	0.1%	R/W	Torque Cmd when CON_26 is Option [Note 31)]	
0x0506	Forward torque limit	0.1%	R/W	Forward torque limit [Note 32)]	
0x0507	Reverse torque limit	0.1%	R/W	Reverse torque limit [Note 32)]	
0x0508	Regeneration torque limit	0.1%	R/W	Regeneration torque limit [Note 32)]	
0x0509	Torque bias	0.1%	R/W	Torque bias [Note 33)]	
0x050A	No-load current Cmd	0.1%	R/W	No-load current Cmd [Note 34)]	
0x050B	PID input Cmd	0.1%	R/W	PID input Cmd [Note 35)]	
0x050C	Draw input Cmd	0.1%	R/W	Draw input Cmd [Note 36)]	
0x050D	Line Speed Cmd	01.%	R/W	Line Speed Cmd [Note 37)]	
0x050E	WEB Accel Time	0.01sec	R/W	Accel Time When WEB Control [Note 38)]	
0x050F	WEB Decel Time	0.01sec	R/W	Decel Time When WEB Control [Note 38)]	
0x0510	Diameter Preset	0.1%	R/W	Diameter Preset [Note 39)]	
0x0511	Tension input Cmd	0.1%	R/W	Tension input Cmd [Note 40)]	
0x0512	Dancer input Cmd	0.1%	R/W	Dancer input Cmd [Note 41)]	
0x0513	Tension Feedback	0.1%	R/W	Tension Feedback [Note 42)]	
0x0514	Taper input Cmd	0.1%	R/W	Taper input Cmd [Note 43)]	
0x0515	WEB PID P1 Gain	0.1%	R/W	WEB PID P1 Gain set [Note 44)]	
0x0516	WEB PID I1 Gain	0.1sec	R/W	WEB PID I1 Gain set [Note 44)]	
0x0517	WEB PID D Gain	0.1%	R/W	WEB PID D Gain set [Note 44)]	
0x0518	WEB PID Rewind Output Gain	0.1%	R/W	WEB PID Rewind Output Gain set [Note 44)]	
0x0519	WEB PID Unwind Output Gain	0.1%	R/W	WEB PID Unwind Output Gain set [Note 44)]	
0x051A	WEB Jog Accel Time	0.1sec	R/W	WEB Jog Accel Time set [Note 38)]	
0x051B	WEB Jog Decel Time	0.1sec	R/W	WEB Jog Decel Time set [Note 38)]	

[Note] 27) It is possible to RUN and Multi-Function input Cmd by Communication. Note that If you try to use Multi-Function input Cmd(P1 ~P7), it must be defined that Multi-Function Input of DIO_01 ~ DIO_07.

[Note] 28) If you try to output terminal Cmd, Set the corresponding terminal into "Not Used" among the multi-function output terminals(DIO_41 ~ DIO_43).

[Note] 29) As Input value, positive is available only and DIS_01 PreRamp Ref is changed whether it is positive or negative according to RUN direction. Max value is limited by FUN_04 Max Speed.

Ex) FUN_04 Max Speed = 1800RPM이면, 단위가 0.1RPM이므로 18000 -> 4650h

[Note] 30) 0x0503 Acc Time is saved at FUN_40 Acc Time-1(0x7428).

```
FUN▶ Acc  Time-1
40        10.00 sec
```

```
FUN▶ Acc  Time-1
40        600.0 sec
```

In case that the unit of FUN_40 Acc Time-1 is 0.01sec as like left figure, the set range of 0x0503 is 0.0sec(0000h) ~ 599.9sec(176Fh).

In order to set over 600sec, set FUN_40 Acc Time-1 to 600.0sec and changes the unit into 0.1sec. the set range of 0x0503 is 600.0sec(1770h) ~ 6000.0sec(EA60h) in this case.

FUN_40 activates writing action when new value is inserted in 0x0503. FUN_40 is saved and it is possible to read at 0x0503.

0x0504 Dec time and FUN_41 Dec Time-1(0x7429) have same relation and possible to input Dec time by same manner with setting input range of 0x0504.

Note 31) Torque Cmd, CON_01 is "Torque", CON_26 is set to "Option" and can be settable when driving.

Note 32) Only when CON_28 Trq Lmt Src is set to Option (Opt Opt Opt), torque limits can be set through communication. You can verify the value from DIS_01 PosTrq Limit, NegTrq Limit, RegTrq Limit .

Note 33) If CON_32 Trq Bias Src is set to Option, you can verify from DIS_01 Torque Bias.

Note 34) Unloaded current command can be commanded in the value set in PAR_26 in % through communication. In this case, the value set in PAR_26 means 100%. The value equal to or less than 100% can be set. The value input is DIS_01 Flux Ref that can be verified during operation mode.

Note 35) This can be verified from DIS_04 Process PID controller. Feedback and output can be verified during operation mode.

Note 36) Only in case of giving the value through analog input or communication after setting CON_22 to a certain value, draw function can be used. In this case, communication means to replace the analog input value with communication, not to change the draw of CON_22. Accordingly it cannot be identified from the loader, but from the value of address changed.

Note 37) When commanding the line speed through communication, FUN_02 Spd Ref Sel should be set to Line SPD Opt. In this case, the % value for the maximum line speed is input. For example, Max. line speed is 100[m/m], the line speed at the time of 100% Input is 100[m/m]. This can be verified from DIS_01 Line SPD CMD.

Note 38) When WEB_11 AccDecWeb is set to "No" during WEB control mode, acceleration/deceleration time is operated depending on the acceleration/deceleration time of FUN_40 and FUN_41. If WEB_11 AccDecWeb is set to "Yes", the acceleration/deceleration time of FUN_40 and FUN_41 is disregarded, and it is operated based on the setting of WEB acceleration/deceleration time. If WEB_56 JogTime Sel is set to "No", acceleration/deceleration time of jog speed is operated based on the acceleration/deceleration time of FUN_40 and FUN_41. In case of setting WEB_56 JogTime Sel to "Yes", the acceleration/deceleration time of FUN_40 and FUN_41 is disregarded. Jog operation is conducted by the setting of WEB Jog acceleration/deceleration time. WEB acceleration/deceleration time is stored in WEB_12 AccTimeWeb(0x7C0C), WEB_13 DecTimeWeb(0x7C0D) respectively, and the characteristics during Write Operation mode are same as 0x0503 and FUN_40 Acc Time-1 in (Note 30). Jog acceleration/deceleration time is stored in WEB_57 JogAcc Time(0x7C39) and WEB_58 JogDec Time (0x7C3A) respectively, and for the characteristics during Write Operation mode, please refer to (Note 30) same as WEB acceleration/deceleration time.

^{Note} 39) This is the diameter initialization through communication. When setting one of DIO_01~07 to Dia Preset with power ON, you can conduct initialization. Setting range is WEB_10 Min Diameter ~ 100.0%(03E8h).

This can be verified from WEB_01 Diameter.

^{Note} 40) Tension input command means the tension input carried out through communication when load cell is used.

When WEB_28 PIDRef Sel is set to "Taper Out", it can be verified from Process PID Command value of IS_04 Process PID output controller during operation mode. In this case, the process PID command value can be influenced by the setting of (Note 26) Taper Input Value.

Input range is -100.0% (FC17h) ~ 100.0% (03E8h).

^{Note} 41) Dancer input command means the dancer inputs carried out through communication when dancer is used.

When WEB_28 PIDRef Sel is set to "Dancer Pos", it can be verified from Process PID command value of DIS_04 Process PID output controller during operation mode.

In this case, the process PID command value is the sum of WEB_29 dancer Pos, analog input and communication command value.

Input range is -100.0%(FC17h) ~ 100.0%(03E8h).

^{Note} 42) In case of conducting tension feedback through communication, WEB_47 PID F/B Src should be set to "Option". It can be verified from Process PID F/B value of DIS_04 Process PID Output controller. The input range is -150.0%(FA23h) ~ 150.0%(05DCh).

To conduct tension feedback in analog, you should set to "Analog" . If set to "None", tension feedback becomes 0. If tension feedback set to "Option", the communication cycle should be done in 10[ms] or less.

In case of the warper, it requires the tension control mode using the encoder, where the encoder pulse should be counted to use it as tension feedback. In this case, the inverter has no function of counting the pulse number, and therefore PLC counts the Encoder Pulse, calculates it into speed, converts it into %, and finally it should be communicated as tension feedback. For example, Max. Line Speed = 100[m/m], Gear Ratio = 1,

When assuming that, Diameter = 100[mm], Encoder Pulse = 1024, Communication Cycle 10[ms], The formula will be expressed as follow;

$$Speed = \frac{LineSpeed}{Diameter \times \pi} = \frac{100}{0.1 \times \pi} = 318.3\,[rpm]$$

$318.3 \times \frac{1024}{60} \times \frac{1}{100} = 54.32$ will be the maximum pulse number that is received at every 10[ms]..

Address 0x050D ~ 0x051B can be communicated only when CON_02 Application is set to "WEB Control".

^{Note} 43) Taper input command means the taper inputs carried out through communication. When having the other value than 'None' of WEB_20 Taper Type, it is added to the taper inputs carried out through WEB_21 Taper Input and Analog input, and then the final tapers are determined. When inputting the negative number, you may input it in 2's complement.

Input Range is -100.0%(FC17h) ~ 100.0%(03E8h).

Note 44) The value of 0x0515~0x0519 is stored in WEB_30 ProcPID Kp1(0x7C1E), WEB_32 ProcPID Ki1(0x7C20), WEB_37 ProcPID Kd(0x7C25), WEB_42 PIDOGainRe(0x7C2A) and WEB_43PIDOGainUn respectively. For the characteristics when the equal value is repeatedly input, please refer to (Note 30).

When inputting the negative number in 0x0518 and 0x0519, you may input it in 2's compliment. Input range is -250.0%(F63Ch) ~ 250.0%(09C4h).

7.3.3 MDLV-iV5 Communication option setting

<FUN Group>

Address	No	Description	Set value
7401	FUN_01	Selection of Run/Stop	Set by 3 (Option)
7402	FUN_02	Selection of Speed Cmd	Set by 3 (Option)
		Selection of Line Speed Cmd	Ser by 7 (Line SPD Opt)

● The set of Run/Speed Cmd in option through communication is decided by FUN_01, 02.

 * RUN Cmd by option uses 0x0500 of Reference Data region.

 * Speed Cmd by option uses 0x0502 of Reference Data region.

 * Line Speed Cmd by option uses 0x050D of Reference Data region.

<DIO Group>

Address	No	Description	Default	Setting Range
7261	DIO_97	Operation when lost Communication Cmd	0 (None)	0 (None: Keep RUN) 1 (Free Run/Stop) 2 (Decel Stop)
7262	DIO_98	Decision time for Communication Cmd lost	1.0sec	1.0~30.0sec

●In case that FUN_01 is 3(Option) or FUN_02 is 3 (Option), it drives by the setting value of DIO_97 during the time of DIO_98 while lost communication command.

< EXT Group >

Address	No	Description	Default	Max	Min	Unit
7601	EXT_01	Opt B/D	0	7	0	
7602	EXT_02	Opt Version	0022 : Ver 2.2	-	-	HEX
7609	EXT_09	Profi MAC ID	1	127	1	
760A	EXT_10	Output Num	3	8	0	
760B	EXT_11	Output 1	0020	7C3B	0000	HEX
760C	EXT_12	Output 2	000E	7C3B	0000	HEX
760D	EXT_13	Output 3	000F	7C3B	0000	HEX
760E	EXT_14	Output 4	-	7C3B	0000	HEX
760F	EXT_15	Output 5	-	7C3B	0000	HEX
7610	EXT_16	Output 6	-	7C3B	0000	HEX
7611	EXT_17	Output 7	-	7C3B	0000	HEX

7612	EXT_18	Output 8	-	7C3B	0000	HEX
7613	EXT_19	Input Num	2	8	0	
7614	EXT_20	Input 1	0502	7C3B	0000	HEX
7615	EXT_21	Input 2	0500	7C3B	0000	HEX
7616	EXT_22	Input 3	-	7C3B	0000	HEX
7617	EXT_23	Input 4	-	7C3B	0000	HEX
7618	EXT_24	Input 5	-	7C3B	0000	HEX
7619	EXT_25	Input 6	-	7C3B	0000	HEX
761A	EXT_26	Input 7	-	7C3B	0000	HEX
761B	EXT_27	Input 8	-	7C3B	0000	HEX

COM-01 [Opt B/D]
- Indicates Option boards installed. This value is automatically set when the boards are installed.

COM-02 [Opt Version]
- Displays version of Option Board.

COM-09 [Profi MAC ID]
- Sets MAC ID of profibus. The MAC ID must have a unique value in network.

COM-10 [Output Num]
- Sets the number of Read area address only.
- Arrange EXT #11~18 for using and set 1 ~ 8

COM-19 [Input Num]
- Sets the number of Write area address only.
- Arrange EXT #20~27 for using and set 1 ~ 8

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