MITSUBISHI



SAFETY CAUTIONS •

(You must read these cautions before using the product)

In connection with the use of this product, in addition to carefully reading both this manual and the related manuals indicated in this manual, it is also essential to pay due attention to safety and handle the product correctly.

The safety cautions given here apply to this product in isolation. For information on the safety of the PLC system as a whole, refer to the CPU module User's Manual.

These SAFETY CAUTIONS are classified into two grades: "DANGER" and "CAUTION".



Note that, depending on the circumstances, failing to follow a **CAUTION** may also have very serious consequences.

Both of these classes of safety caution are very important and must be observed. Store this manual carefully in a place where it is accessible for reference whenever necessary, and forward a copy of the manual to the end user. [Cautions on Design]



• An external output transistor failure may keep output ON or OFF. Add an external monitoring circuit for output signals whose incorrect exetution could result in serious accidents.

• Use the PLC in the environment indicated in the general specifications of the manual. Using this PLC in an environment outside the range of the general specifications may cause electric shock, fire, malfunction, and damage to or deterioration of the product.	
 Do not bundle control lines or communication wires together with main circuit or power lines, or lay them close to these lines. As a guide, separate the lines by a distance of at least 100 mm, otherwise malfunctions may occur due to noise. 	

[Cautions on Mounting]

• Do not touch any conductive part of the module directly. Doing so may cause malfunction or failure in the module. • Mount the module after fully inserting the fixing projection on the bottom of the module into the fixing hole in the base unit, and then tighten the module fixing screws to the specified torque. Not doing so can cause a malfunction, failure or drop of the module.

[Cautions on Wiring]

 Ground the shield wire to the encoder (relay box)(using class D (class 3) grounding or higher). Otherwise, malfunctioning will result.
 Carry out wiring to the PLC correctly, checking the rated voltage and terminal arrangement of the product. Using a power supply that does not conform to the rated voltage, or carrying out wiring incorrectly, will cause fire or failure.
 Input voltage in excess of the voltage set by the setting pin will cause failures.
 Tighten the terminal screws to the stipulated torque. Loose screws will cause short circuits, fire, or malfunctions. Overtightening may cause a short circuit or malfunctions due to a damaged screw.
 Do not install/remove the terminal block more than 50 times after the first use of the product. (IEC 61131-2 compliant)
 Make sure that no foreign matter such as chips or wiring offcuts gets inside the module. It will cause fire, failure or malfunction.

[Cautions on Startup and Maintenance]

 Do not touch terminals while the power is ON. Doing so may result in an electric shock or malfunction.

• Be sure to shut off all phases of the external power supply used by the system before cleaning or retightening the terminal screws. Carrying out this work while the power is ON will cause failure or malfunction of the module.

•	Do not disassemble or modify any module. This will cause failure, malfunction, injuries, or fire.
•	Be sure to shut off all phases of the external power supply used by the system before mounting or dismounting the module to or from the panel. Mounting or removing it with the power ON can cause failure or malfunction of the module.
•	Before handling the module, always touch grounded metal, etc. to discharge static electricity from the human body. Failure to do so can cause the module to fail or

[Cautions on Disposal]

malfunction.

• Dispose of this product as industrial waste.

REVISIONS

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Japanese Manual Version SH-3561-J

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INTRODUCTION

Thank you for purchasing the MELSEC-A series PLC. Before using the equipment, please read this manual carefully to develop full familiarity with the functions and performance of the A series PLC you have purchased, so as to ensure correct use. Please forward a copy of this manual to the end user.

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1. INTRODUCTION

This user's manual describes the specifications, handling and programming of the A1SD62/A1SD62E/A1SD62D(S1) type high-speed counter module (hereinafter called the A1SD62(E/D/D-S1)) to be used in combination with a MELSEC-A series CPU module (hereinafter called the PLC CPU).

The A1SD62, A1SD62E and A1SD62D(S1) are a DC input sink output type, a DC input source output type and a differential input sink output type, respectively.

The maximum counting speed is 100 kpps (A1SD62(E)) or 200 kpps (A1SD62D(S1)).

The A1SD62(E/D/D-S1) counts single-phase and 2-phase pulse inputs as shown below:

Single-phase pulse input multiplied by one

......... Counts at the rise or fall of the pulse.

Single-phase pulse input multiplied by two

......Counts at the rise and fall of pulse.

2-phase pulse input multiplied by one

...... Counts at the rise or fall of the phase A pulse.

2-phase pulse input multiplied by two

......Counts at the rise and fall of the phase A pulse.

2-phase pulse input multiplied by four

.....Counts at the rise and fall of the phase A and phase B pulses.

1. INTRODUCTION



The following diagram outlines how the A1SD62(E/D/D-S1) operates.

1. INTRODUCTION

1.1 Features

The following are the features of the A1SD62(E/D/D-S1):

- (1) Pulses can be counted in a wide range from 0 to 16777215. The count value is stored in 24-bit binary.
- (2) The count value can be multiplied (see Section 5).
 Multiplication by either one or two can be selected for single-phase pulse inputs, or multiplication by one, two or four for 2-phase pulse inputs.
- (3) The maximum counting speed can be switched (see Sections 3.2 and 4.3).
 Since a maximum counting speed of either 100 k or 10 k can be calcoted.

Since a maximum counting speed of either 100 k or 10 k can be selected with the A1SD62(E), or 200 k or 10 k with the A1SD62D(S1), accurate pulse counting is possible even with a slow rise/fall.

- (4) Coincidence output is available (see Section 6). ON/OFF signals are issued according to the comparison between the preset output status of a selected channel and the present counter value. One module can accept two inputs, and issues two outputs to one input, which can serve as upper and lower limit signals.
- (5) A ring counter function is available (see Section 8).
 Counting repeats between the preset value and the ring counter value, and this function is effective in controlling fixed-pitch feed.
- (6) Four counter functions are selectable (see Section 9).One of the following functions can be selected and used:

(a) Latch counter function	Latches the present counter value in response to an input signal.
(b) Sampling counter function	Counts the incoming pulses within the preset period of time from signal input.
(c) Periodic pulse counter function	Stores the present and previous counter values at preset intervals during signal input.
(d) Count disable function	Stops pulse counting with an input signal while the count enabled command is executed.

(7) The preset or counter function can be selected with an external control signal (see Section 7.3 and Section 9).

By applying voltage to the PRESET (preset) or F.START (function start) external terminal, the preset or counter function, respectively, can be executed.

These functions can be used to eliminate the influence of scan time.

2. SYSTEM CONFIGURATION

(1) Appilcable CPUs

A1SJCPU(S3)
 A2SCPU(S1)
 A52GCPU(T21B)
 A1SJHCPU(S8)
 A2SHCPU(S1)
 A2ASCPU(S1/S30)
 A1SCPUC24-R2
 A1SHCPU
 Q2ASCPU(S1)
 Q2ASHCPU(S1)

(2) Number mountable

Any number of modules can be used, provided the number of I/O points of the applicable CPU is not exceeded.

(3) Available slots

The module can be installed to any slot in the base unit with the exception of the following cases.

When installing mounting modules in an extension base unit that does not have a power supply (A1S52B(S1), A1S55B(S1), A1S58B(S1)), the power supply capacity may be insufficient. Note that.

When installing an A1SD62(E/D/D-S1) to the extension base unit that has no power supply module, select the power supply module, main base unit, extension base unit and extension cable after fully considering the following factors:

- 1) Current capacity of the power supply module on the main base unit
- 2) Voltage drop at the main base unit
- 3) Voltage drop at the extension base unit
- 4) Voltage drop in the extension base cable
- (4) Data link system

In a data link system, the module can be installed at a master station, local station, or remote I/O station. For an example of a remote I/O station program, refer to the MELSECNET, MELSECNET/B Data Link System Reference Manual.

REMARK

For Details on the ranges for the number of I/O points, and on calculating voltage drops, refer to the following manuais:

Type A1SJCPU(S3) User's Manual	IB (NA)-66446
• Type A1S/A1SC24-R2/A2SCPU(S1) User's Manual	IB (NA)-66320
Type A2ASCPU(S1) User's Manual	IB (NA)-66455
A52GCPU(T21B) User's Manual	1B-66419
A52GCPU(T21B) Reference Manual	IB-66420
• Type A1SJH(S8)/A1SH/A2SHCPU(S1) User's Manual	IB-66779
Type A2USHCPU-S1 User's Manual	IB-66789
Model Q2AS(H)CPU(S1) User's Manual	SH-3599

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3. SPECIFICATIONS

This section describes the general specifications of the A-series PLC CPUs, performance specifications of the A1SD62(E/D/D-S1), specifications of I/O signals to a PLC CPU and buffer memory.

3.1 General Specifications

Table 3.1 gives the general specifications of the A-series PLC CPUs.

Item			Specifications	3		
Operating ambient temperature	0 to 55 °C					
Storage ambient temperature	–20 to 75 °C					
Operating ambient humidity	10 to 90% RH, no	dewing	," <u>, i i i i i i i i i i i i i i i i i i </u>			
Storage ambient humidity	10 to 90% RH, no	dewing	· · · · · · · · · · · · · · · · · · ·			
			In case of inte	ermittent vibrat	ion	
		Frequency	Acceleration	Amplitude	Sweep count	
	*3	10 to 57 Hz		0.075 mm (0.003 inch)		
Vibration resistance	Conforms to JIS B 3502 and IEC 61131-2.	57 to 150 Hz	9.8m/s ²			
		In case of continuous vibration			10 times in each of X, Y and Z	
		Frequency	Acceleration	Amplitude	directions (for 80 minutes)	
		10 to 57 Hz		0.035 mm (0.0013inch)		
		57 to 150 Hz	4.9m/s ²			
Shock resistance	Shock resistance Conforms to JIS B 3502 and IEC 61131-2. (147 m/s ² , 3 times in each of three directions)					
Operating atmosphere	The atmosphere shall not contain corrosive gas.					
Operating altitude *4	2000 m (2187 yd.) or lower					
Installation site	Inside control panel					
Overvoltage category *1	II or lower					
Contamination level *2	2 or lower					

Table 3.1 General Specifications

*1 Indicates the element in the distribution system between the public electricity grid and the mechanical equipment inside the premises that the relevant device is assumed to be connected to.
 Category II applies to devices such as those that draw their power supply from fixed

installations. The surge voltage withstand capability of devices with ratings up to 300 V is 2,500 V.

- *2 This is an index which gives a measure of the incidence of conductive materials in the environment in which the device is used. A contamination level of "2" indicates an environment in which there is only contamination by non-conducting materials, but, due to occasional condensation, conductivity may occur.
- *3 JIS : Japanese Industrial Standard
- *4 Do not use or store the PLC in the environment where the applied pressure is higher than the atmospheric pressure at the altitude of 0m. Doing so may cause a malfunction. When using under such pressure, consult our representative in a branch.

3.2 Performance Specifications

Table 3.2 gives the performance specifications of the A1SD62(E), and table 3.3 gives the performance specifications of the A1SD62D(S1).

Item Specifications								
	······································					·····		
	d switching pin	100K 10K						
	occupied points	32	<u>. </u>					
Number of cha	[Two						
Count input	Phase	1-phase and 2-p	nase inp	uts				
signal	Signal levels (ØA and ØB)	5 VDC 12 VDC 24 VDC 24 VDC						
	Maximum	1-phase input	100k pr	os	10k pps			
	counting speed*	2-phase input	100k pr	os	7k pps			
	Counting range	24-bit binary 0 to 16777215	24-bit binary 0 to 16777215					
	Туре	Equipped with L	IP/DOWN	I preset counter	and ring counter funct	ions		
Sec sec						142µ sec		
Comparison 24-bit binary range								
Coincidence output	Comparison result	Set value < Count value Set value = Count value Set value > Count value						
External in-	Preset	5/12/24 VDC						
put	Function start	2 to 5 mA						
External out-	Caincidence	A1SD62 Transistor (sink type) output 12/24 VDC 0.5 A/point 2 A/common						
put	Coincidence output	A1SD62E Transistor (source type) output 12/24 VDC 0.1 A/point 0.4 A/common						
Internal power c	onsumption(5 VDC)	0.1 A						
Weight		0.25 kg						
Noise resistan	ice	Measure with a noise simulator which can generate 1500 Vp-p, 1-µs-wide, 25 to 60-Hz noise.						
Isolation specifications		Between pulse input terminal and PLC power supply Between preset input terminal and PLC power supply SMΩ or more (measured with a		Insulation resistance 5MΩ or more (measured with a 500V DC insulation resistance tester)				
Grounding	the result first Torone "Minist" Adv."	Class D grounding. Connect the grounding wire to the control box if grounding is impossible.						
Operating atm	losphere	The operating atmosphere shall not contain corrosive gases or excessive dust.						
Cooling metho	od	Self-cooling						

Table 3.2 Performance Specifications (A1SD62(E))

* The counting speed is influenced by the pulse rise/fall time. The following counting speeds are possible. If a pulse is counted with a leading edge/fall time that is too long, a counter error may be caused.

Counting Speed Setting Pin	100K		10K	
Leading Edge/fall Time	1-phase Input 2-phase Input		1-phase Input	2-phase Input
t=2.5 μ sec or less	100k pps	100k pps	10k pps	7k pps
t=25 μ sec or less	10k pps	10k pps	1k pps	700 pps
t=500 μ sec			500 pps	250 pps



Table 3.3 Performance Specifications (A1SD62D(S1))

ltem		Specifications				
Counting speed switching pin		200K		10K		
Number of I/O	occupied points	32				
Number of cha	innels	Тwo				
	Phase	1-phase and 2-p	phase inputs			
Count input signal	Signal levels (ØA and ØB)	EIA Standard R Differential type or equivalent}		S31 (TEXAS INSTRUMENTS)		
	Maximum	1-phase input	200k pps	10k pps		
	counting speed*	2-phase input	200k pps	7k pps		
	Counting range	24-bit binary 0 to 16777215				
	Туре	Equipped with L	JP/DOWN preset counte	r and ring counter functions		
Counter	Minimum pulse width that can be counted(Adjust so that the rise/fall time of the input is 1.25µ sec or less. Duty ratio: 50 %)	2.5µ sec	sec 2.5μ sec 2-phase inputs)	100µ sec 142µ sec 100µ sec 142µ sec 50µ 50µ 71µ 71µ sec sec 100µ sec sec 100µ sec 100µ sec 100µ sec 10µ sec		
Coincidence	Comparison range	24-bit binary				
output	Comparison result	Set value < Count value Set value = Count value Set value > Count value				
	· · · · · · · · · · · · · · · · · · ·	A1SD62D	5/12/24VDC 2 to 5m	nA		
External in- put	Preset	A1SD62D-S1	EIA Standard RS-422- (Am26LS31 or equival	A Differential type line driver level ent)		
Function start 5/12/24 VDC 2 to 5 mA						
External out- put	Coincidence output		Fransistor (sink type) output 12/24 VDC 0.5 A/point 2 A/common			
Internal power (5 VDC)	consumption	0.25 A				
Weight		0.25 kg				

3. SPECIFICATIONS

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Item		Specifications						
Noise resistance	Measure with a noise sin 60-Hz noise.	Measure with a noise simulator which can generate 1500 Vp-p, 1- μs -wide, 25 to 60-Hz noise.						
	Specific isolated area	Isolation method	Dielectric withstand voltage	Insulation resistance				
	Btween pulse input terminal and PLC power supply			5MΩ or more (measured with a 500V DC insulation resistance tester)				
Isolation specifications	Btween preset input terminal and PLC power supply	Photocoupler isolation	500VAC for 1 minute					
	Btween function start input ter- minal and PLC power supply							
	Btween coincidence output ter- minal and PLC power supply							
Grounding	Class D grounding. Con impossible.	Class D grounding. Connect the grounding wire to the control box if grounding is impossible.						
Operating atmosphere	The operating atmosphe	The operating atmosphere shall not contain corrosive gases or excessive dust.						
Cooling method	Self-cooling	Self-cooling						

* The counting speed is influenced by the pulse rise/fall time. The following counting speeds are possible. If a pulse is counted with a rise/fall time that is too long, a counter error may be caused.

Counting Speed Setting Pin	200K		10К		
Rise/fall Time	1-phase Input	2-phase Input	1-phase Input	2-phase Input	
t=1.25 μ sec or less	200k pps	200k pps	10k pps	7k pps	
t=12.5 μ sec or less	20k pps	20k pps	1k pps	700 pps	
t=250 μ sec			500 pps	250 pps	

3.3 Functions

Table 3.4 gives the functions of the A1SD62(E/D/D-S1).

Table	3.4	Function	Specifications
IUDIC	0.4	1 411011011	opcontoutions

Function		Description	Reference Section
Coincidence	output function	 Outputs an ON/OFF signal in a specified output status, comparing it with the present value of the counter. 	6
Preset		 Changes the present value of the counter. The preset operation can be done either by a sequence program or by an external preset input. 	7
Ring counter		 Counting alternates between the preset value and the ring counter value. 	8
	Count disable	Stops counting pulses while the count enable command is ON.	9.2
Counter	Latch counter	 Stores the present value of the counter into the buffer memory when the signal of the counter function selection start command is input. 	9.3
function selection	Sampling counter function	 After inputting the signal of the counter function selection start command, the input pulse is counted during a specified period and stored in the buffer memory. 	9.4
	Periodic pulse counter	 While inputting the signal of the counter function selection start command, the input pulses are stored in the buffer memory at specified intervals. 	9.5

* These functions can be used in conjunction. However, Counter function selection means that only one out of the four functions can be used.

3.4 Interfaces with External Devices

Tables 3.5, 3.6, 3.7 and 3.8 show a list of the interfaces of the A1SD62, A1SD62E and A1SD62D(S1) with external devices.

Input/ Output	Internal Circuit	Terminal No. *1	Signal Name	ON/OFF	Input Voltage (Guaranteed Value)	Operating Current (Guaranteed Value)	
	1/4W Pulse input		Phase A	ON	21.6 to 26.4 V	2 to 5 mA	
	4.7kΩ voltage setting pin		pulse input 24V	OFF	5 V or lower	0.1 mA or lower	
	2.2kΩ 1/4W 0 0	1	Phase A	ON	10.8 to 13.2 V	2 to 5 mA	
	470Ω 1/4W	(8)	pulse input 12V	OFF	4 V or lower	0.1 mA or lower	
			Phase A	ON	4.5 to 5.5 V	2 to 5mA	
			pulse input 5V	OFF	2 V or lower	0.1mA or lower	
Input		2 (9)	сом				
mput	1/4W Pulse input		Phase B	ON	21.6 to 26.4 V	2 to 5 mA	
	4.7kΩ voltage setting pin		pulse input 24V	OFF	5 V or lower	0.1mA or lower	
	2.2kΩ	3	Phase B	ON	10.8 to 13.2 V	2 to 5 mA	
	470Ω <u>1/4W</u>	(10)	pulse input 12V	OFF	4V or lower	0.1mA or lower	
			Phase B pulse input 5V	ON	4.5 to 5.5 V	2 to 5 mA	
				OFF	2 V or lower	0.1 mA or lower	
	· · · · · · · · · · · · · · · · · · ·	4 (11)	СОМ				
	$4.7k\Omega$ $1/4W$ $2.2k\Omega$ $1/4W$ 0 0 0 0 0 0 0 0 0 0	5 (12)	Preset input 24V Preset input 12V Preset input 5V	ON	21.6 to 26.4 V	2 to 5 mA	
				OFF	5 V or lower	0.1mA or lower	
				ON	10.8 to 13.2 V	2 to 5 mA	
Input				OFF	4 V or lower	0.1mA or lower	
				ON	4.5 to 5.5 V	2 to 5 mA	
				OFF	2 V or lower	0.1 mA or lower	
		6 (13)	СОМ	Response time	OFF \rightarrow ON 0.5 ms or less	ON → OFF 3 ms or less	
	4.7kΩ		Function start	ON	21.6 to 26.4 V	2 to 5 mA	
			input 24V	OFF	5 V or lower	0.1 mA or lower	
	2.2kΩ	7 (14)	Function start	ON	10.8 to 13.2 V	2 to 5 mA	
Input	470Ω <u>1/4W</u>		input 12V	OFF ON	4 V or lower	0.1 mA or lower 2 to 5 mA	
			Function start input 5V	OFF	4.5 to 5.5 V 2 V or lower	0.1 mA or lower	
				Response		ON → OFF	
	₩ <u>*_</u>			time	0.5 ms or less	3 ms or less	
	*	15 (17)	EQU1	Rated cur Maximum	Operating voltage:10.2 to 30 VRated current:0.5 A/pointMaximum rush current:4 A 10 ms		
Output		16 (18)	EQU2	Maximum voltage drop at ON:1.5 V Response time: OFF \rightarrow ON 0.1 ms or ON \rightarrow OFF 0.1 ms or ON		N 0.1 ms or less	
Į į		19	12/24 V		Input voltage: 10.2 to 30 V		
		20	OV	Current c	onsumption: 8 mA (TYI	24 VDC)	

Table 3.5 Interfaces with External Devices (A1SD62)

Input/ Output	Internal Circuit	Terminal No. *1	Signal Name	ON/OFF	Input Voltage (Guaranteed Value)	Operating Current (Guaranteed Value)
· · · · · · · · · · · · · · · · · · ·	1/4W Pulse input		Phase A	ON	21.6 to 26.4 V	2 to 5 mA
	4.7kΩ voltage setting pin		pulse input 24V	OFF	5 V or lower	0.1 mA or lower
	2.2kΩ 1/4W 0 0	1	Phase A	ON	10.8 to 13.2 V	2 to 5 mA
	470Ω <u>1/4W</u>	(8)	pulse input 12V	OFF	4 V or lower	0.1 mA or lower
			Phase A	ON	4.5 to 5.5 V	2 to 5mA
	NT		pulse input 5V	OFF	2 V or lower	0.1mA or lower
Input	l	2 (9)	сом			
mpar	1/4W Pulse input		Phase B	ON	21.6 to 26.4 V	2 to 5 mA
	4.7kΩ voltage setting pin		pulse input 24V	OFF	5 V or lower	0.1mA
	2.2kΩ	3	Phase B	ON	10.8 to 13.2 V	2 to 5 mA
	470Ω 1/4W	(10)	pulse input 12V	OFF	4 V or lower	0.1mA or lower
	47052		Phase B pulse input 5V	ON	4.5 to 5.5 V	2 to 5 mA
				OFF	2 V or lower	0.1 mA or lower
	¥V []	4 (11)	СОМ			
	$4.7k\Omega$ $4.7k\Omega$ $1/4W$ $2.2k\Omega$ $1/4W$ 5.5 470Ω $1/4W$ 5.5 5.5 470Ω $1/4W$	5 (12)	Preset input 24V Preset input 12V	ON	21.6 to 26.4 V	2 to 5 mA
				OFF	5 V or lower	0.1mA or lower
				ON	10.8 to 13.2 V	2 to 5 mA
Input			Preset input 5V	OFF ON	4 V or lower 4.5 to 5.5 V	0.1mA or lower 2 to 5 mA
				OFF	2 V or lower	0.1 mA or lower
		6 (13)	СОМ	Response	$OFF \rightarrow ON$ 0.5 ms or less	ON → OFF 3 ms or less
	4.7kΩ = 1/4W		Function start	ON	21.6 to 26.4 V	2 to 5 mA
			input 24V	OFF	5 V or lower	0.1 mA or lower
	2.2kΩ	7	Function start	ON	10.8 to 13.2 V	2 to 5 mA
Input	470Ω <u>1/4W</u>	(14)	input 12V	OFF	4 V or lower	0.1 mA or lower
			Function start input 5V	ON	4.5 to 5.5 V	2 to 5 mA
				OFF	2 V or lower OFF \rightarrow ON	0.1 mA or lower ON \rightarrow OFF
				Response time	0.5 ms or less	3 ms or less
		15 (17)	EQU1	Rated cur Maximum	Operating voltage: 10.2 to 30 V Rated current: 0.1 A/point Maximum rush current: 4 A 10 ms	
Output		16 (18)	EQU2			0.3 ms or less
		19	12/24 V	Input volta		V
	744	20	ov	Current co	onsumption: 8 mA (TYF	24 VDC)

Table 3.6 Interfaces with External Devices (A1SD62E)

	Table 5.7 Interfaces with External Devices (AT5D02D)							
Input/ Output	Internal Circuit	Terminal No. *1	Signal Name	ON/OFF	Input Voltage (Guaranteed Value)	Operating Current (Guaranteed Value)		
	Receiver (AM26LS32) +5V (DC/DC converter)	2 (9)	Phase 지 pulse input	{Am26LS3 equivalent V _{hvs} Hyste	EIA Standard RS-422-A line driver level {Am26LS31 (TEXAS INSTRUMENTS) or equivalent)} V _{hys} Hysteresis (V _T + -V _T -) 60mV V _{IH(E)} "H" level enable input voltage 2V or			
Input		1 (8)	Phase A pulse input	more VIL(E) "L" I Iess	evel enable input type line driver is	voltage 0.8V or		
mpar	Receiver (AM26LS32) +5V (DC/DC converter)	4 (11)	Phase B pulse input					
		3 (10)	Phase B pulse input	Same as above				
	4.7kΩ 1/4W	5 (12)	Preset input	ON	21.6 to 26.4 V	2 to 5 mA		
	2 2k0 1/4W		24V Preset input 12V	OFF	5 V or lower	0.1mA or lower		
				ON OFF	10.8 to 13.2 V	2 to 5 mA 0.1mA or lower		
Input	470Ω <u>1/4W</u>		Preset input 5V	OFF	4 V or lower 4.5 to 5.5 V	2 to 5 mA		
				OFF	2 V or lower	0.1 mA or lower		
		6 (13)	сом	Response time	$OFF \rightarrow ON$ 0.5 ms or less	$ON \rightarrow OFF$ 3 ms or less		
	4.7kΩ = ^{1/4W}		Function start	ON	21.6 to 26.4 V	2 to 5 mA		
	1/4/		input 24V	OFF	5 V or lower	0.1 mA or lower		
	2.2kΩ - 1/++V+	7	Function start	ON	10.8 to 13.2 V	2 to 5 mA		
Input	470Ω <u>1/4W</u>	(14)	input 12V	OFF	4 V or lower	0.1 mA or lower		
			Function start input 5V	ON	4.5 to 5.5 V	2 to 5 mA		
				OFF	2 V or lower	0.1 mA or lower		
				Response time	OFF → ON 0.5 ms or less	$ON \rightarrow OFF$ 3 ms or less		
	< └───	15 (17)	EQU1	Operating voltage:10.2 to 30 VRated current:0.5 A/pointMaximum rush current:4 A 10 ms		4 A 10 ms		
Output		16 (18)	EQU2		Maximum voltage drop at ON:1.5 V Response time: OFF \rightarrow ON 0.1 ms or le ON \rightarrow OFF 0.1 ms or le			
}		19	12/24 V	Input volta		V		
		20	ov	Current co	onsumption: 8 mA (TYF	° 24 VDC)		

Table 3.7 Interfaces with External Devices (A1SD62D)

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Input/ Output	Internal Circuit	Terminal No. *1	Signal Name	ON/OFF	Input Voltage (Guaranteed Value)	Operating Current (Guaranteed Value)		
	Receiver (AM26LS32) +5V (DC/DC converter)	2 (10)	Phase A pulse input	{Am26LS3 equivalent V _{hys} Hyste	EIA Standard RS-422-A line driver level {Am26LS31 (TEXAS INSTRUMENTS) or equivalent)} V _{hys} Hysteresis (V _{T+} -V _T -) 60mV			
Input		1 (9)	Phase A pulse input	more VIL(E) "L" I Iess	VIL(E) "L" level enable input voltage 0.8V or			
mput	Receiver (AM26LS32) +5V (DC/DC converter)	4 (12)	Phase B pulse input		Same as abc	we		
		3 (11)	Phase B pulse input	Same as above				
Input	Receiver (AM26LS32) +5V (DC/DC converter)	6 (14)	Preset input	Same as above				
mput		5 (13)	Preset input					
	4.7kΩ		Function start	ON	21.6 to 26.4 V	2 to 5 mA		
	2.2kΩ		input 24V	OFF	5 V or lower	0.1 mA or lower		
		7 (15)	Function start input 12V	ON OFF	10.8 to 13.2 V 4 V or lower	2 to 5 mA 0.1 mA or lower		
Input	470Ω <u>1/4W</u>	, · - /	Function start	ON	4.5 to 5.5 V	2 to 5 mA		
			input 5V	OFF	2 V or lower	0.1 mA or lower		
		8 (16)	СОМ	Response time	$OFF \rightarrow ON$ 0.5 ms or less	$ON \rightarrow OFF$ 3 ms or less		
Output		17 (18)	EQU	Operating voltage:10.2 to 30 VRated current:0.5 A/pointMaximum rush current:4 A 10 msMaximum voltage drop at ON:1.5 VResponse time:OFF \rightarrow ONON \rightarrow OFF0.1 ms or le				
		19	12/24 V	Input volt		V		
		20	0V	Current c	onsumption: 8 mA (TYF	P 24 VDC)		

Table 3.8 Interfaces with External Devices (A1SD62D-S1)

3. SPECIFICATIONS

3.5 I/O Signals from/to the PLC CPU

Table 3.9 to 3.11 show the I/O signals from the A1SD62(E/D/D-S1) to the PLC CPU.

All of the I/O signal numbers (X, Y) and I/O addresses quoted hereafter are those when the A1SD62(E/D/D-S1) is loaded in I/O slot 0 of the base unit.

Input	Signal	Signal Name	Description	Reference
CH1	CH2	PLC CPU ← A1SD62(E/D)		
X00	X04	Counter value large (point No. 1)	Turned on when the counter value is larger than set value No. 1.	
X01	X05	Counter value coincidence (point No. 1)	Turned on when the counter value matches set value No. 1, and turned off with a coincidence signal reset command.	6.1
X02			mall Turned on when the counter value is smaller than set value No. 1.	
X03	X07	External preset request detection		
X08	X0B	Counter value large (point No. 2)	Turned on when the counter value is larger than set value No. 2.	
X09	XOC	Counter value coincidence (point No.2)	Turned on when the counter value matches set value No. 2, and turned off with a coincidence signal reset command.	6.1
XOA	XOD	Counter value small (point No. 2)		
		Fuse/External power cutoff detection flag	Turned on when the limit switch output fuse has blown or when voltage is not applied to the EQU terminal.	
X0F t	o X1F		Unusable	

Table 3.9 Input Signals (A1SD62(E/D))

Table 3.10 Input Signals (A1SD62D-S1)

input	Signal	Signal Name	Description	Reference
CH1	CH2	PLC CPU ← A1SD62D-S1	Description	Section
X00	X04	Counter value large Turned on when the counter value is larger than the set value.		
X01	X05	Counter value coincidence	Latched on when the counter value equals the set value, and turned off with a coincidence signal reset command.	6.1
X02	X06 Counter value small		Counter value small Turned on when the counter value is smaller than the set value.	
X03	X07	External preset request detection	Turned on when an input preset request is issued from an external device, and turned off with an external preset detection reset command.	7.3
X08	ХОВ	••• # α από το τη τη τηματική τη τηματική τη παράτη τη παράτη τη τηματική τη τηματική τη τηματική τη τηματική 		
X09	X0C		Unusable	
X0A	XOD			
X	X0E Fuse/External power cutoff detection flag		Turned on when the limit switch output fuse is blown or voltage is not supplied to the EQU terminal.	
X0F t	o X1F		Unusable	

Output Signal		Signal Name PLC CPU → A1SD62	Operating	Description	Reference
CH1	CH2	(E/D/D-S1)	Timing	Description	Section
Y00 t	o Y0F			Unusable	
Y10	Y17	Coincidence signal reset command		The signal to reset the coincidence output No. 1 signal to the external device.	6.1
Y11	Y18	Preset command		The signal to write a preset value.	7.2.1
Y12	Y19	Coincidence signal enable command		As soon as this signal is turned on, a counter value coincidence signal is issued to the external device.	6.1
Y13	Y1A	Down count command		Countdown is performed while this signal remains ON in single-phase mode.	5
Y14	Y1B	Count enable command		Counting is enabled when this signal is ON.	
Y15	Y1C	Count value read request		The count value is written to the buffer memory at the rise of this signal.	
Y16	Y1D	Counter function selection start command		Executes counter function selection.	9.2, 9.3, 9.4, 9.5
Y1E				Unusable	
Y1F					

Table 3.11 Output Signals (A1SD62(E/D/D-S1))

REMARK

- (1) The operating timing shown in Table 3.11 is as follows:
 - _____ Valid while the signal is ON.
 - _____ Valid at the rise of the signal.

3.6 Buffer Memory Allocation

Table 3.12 and 3.13 show how the A1SD62(E/D/D-S1) buffer memory (without battery backup) is allocated.

Initial values are set in the buffer memory when the power to the A1SD62(E/D/D-S1) is turned on and the PLC CPU is reset.

Data can be read/written from/to the buffer memory with FROM/TO instructions of the PLC CPU sequence program.

Address *1	Setting			Read/Write	Reference Section
1 (33)	Preset value setting		0	· · · · · · · · · · · · · · · · · · ·	7.2.1
2 (34)		(H)		Read/Write possible	7.3.1
3 (35)	Pulse input mode setting		0		5
4 (36)	(L)			Read only	5.3
5 (37)	Present value	(H)	0	nead only	0.0
6 (38)	Coincidence output point setting No. 1	(L)	0 Read/Write	6.1	
7 (39)	Concidence output point setting No. 1	(H)		Read/Write possible	(8.1)
8 (40)	Counter function selection setting		0		9.1
9 (41)	1 to 65535 Sampling/periodic time setting [10ms incre	ements]	0		9.4, 9.5
10 (42)	External preset detection reset command Point No. 2 coincidence signal reset command			Write only	7.3
11 (43)					6.1
12 (44)	Coincidence output point setting No. 2		0	Read/Write possible	6.1
13 (45)					
14 (46)			0		
15 (47)	Latch count value	(H)	-	Read only	5.3
16 (48)		(L)	- 0		
17 (49)	Sampling count value	(H)			
18 (50)		(L)	0		
19 (51)	Periodic pulse counter previous value				
20 (52)		(L)	0		
21 (53)	Periodic pulse counter present value				
22	Sampling/periodic counter flag (for both CH1 and CH2)		0		

Table 3.12 Buffer Memory Allocation (A1SD62(E/D))

*1: The number without parentheses represents the address number of CH1, and that in parentheses indicate the address number of CH2.

Address *1	*1 Setting		Initial Value	Read/Write	Reference Section
1 (33)	Preset value setting		0	Read/Write possible	7.2.1
2 (34)					7.3.1
3 (35)	Pulse input mode setting		0		5
4 (36)			0	Read only	5.3
5 (37)	Present value	(H)	Ŭ	neau onry	
6 (38)	Coincidence output point offing	(L)	0	Read/Write possible	6.1
7 (39)	Coincidence output point setting	(H)	0		(8.1)
8 (40)	Counter function selection setting		0		9.1
9 (41)	Sampling/periodic time setting		0		9.4, 9.5
10 (42)	External preset detection reset command			Write only	7.3
11 (43)					
12 (44)	Unusable	Unusable			
13 (45)					
14 (46)	Latch count value		0		
15 (47)		(H)			
16 (48)			0		
17 (49)	Sampling count value	(H)			5.0
18 (50)	Periodic pulse counter previous value		0	Read only	5.3
19 (51)					
20 (52)	Periodic pulse counter present value		0		
21 (53)					
22	Sampling/periodic counter flag (for both CH1 and CH2)				

Table 3.13 Buffer Memory Allocation (A1SD62D-S1)

*1: The number without parentheses represents the address number of CH1, and that in parentheses indicate the address number of CH2.

3. SPECIFICATIONS

3.7 Applicable Encoders

The encoders applicable to the A1SD62(E/D/D-S1) are shown below:

- (1) Encoders connectable to the A1SD62(E)
 - (a) Open-collector type
 - (b) CMOS output type

(Make sure that the output voltage of the encoder complies with the A1SD62(E) specifications.)

- (2) Encoder connectable to the A1SD62D(S1)
 - (a) Line drive output type encoder
 (Confirm whether the encoder output voltage meets the A1SD62D
 (S1) specifications.)

POINT

The following types of encoders cannot be used with the A1SD62 (E/D/D-S1):

• TTL output type

4. INSTALLATION AND PRE-OPERATION SETTING PROCEDURE

This section describes the pre-operation procedure of the A1SD62(E/D/D-S1), the names and settings of each part of the A1SD62(E/D/D-S1), and the wiring method.

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4.1 **Pre-Operation Setting Procedure**

The pre-operation setting procedure of the A1SD62(E/D/D-S1) is shown below:



4.2 Handling Precautions

Handling precautions for the A1SD62(E/D/D-S1) are given below:

- (1) Protect the case and the terminal block from impact, since they are made from resin.
- (2) Do not remove the printed circuit board from the case. Doing so can cause a failure.
- (3) When wiring, make sure that no wire offcuts remain around the terminal block. Remove foreign matter if it has entered.
- (4) Tighten the module mounting screws and terminal screws within the following ranges.

Screw Location	Tightening Torque Range
Module mounting screw (M4 screw)	78 to 118 N∙cm
Terminal block terminal screw (M3.5 screw)	59 to 88 N•cm
Terminal block mounting screw (M4 screw)	78 to 118 N•cm

(5) Install the module on the base unit by engaging the module locking tabs in the module locking holes in the base unit and tightening the module mounting screws. To remove the module from the base unit, unfasten the module mounting screws, then disengage the module locking tabs from the module locking holes.



4.3 Part Names and Settings

The names of each part of the A1SD62(E/D/D-S1) and the settings are shown below:

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*The portion of (7) of the A1SD62E is as shown in the following figure:



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4. INSTALLATION AND PRE-OPERATION SETTING PROCEDURE MELSEC-A

No.	Na	ame	Description
(1)	Counting speed sw	itch setting pin	 100 k : Counts single-phase/2-phase pulse inputs at a speed of up to 100 kpps. 10 k : Counts single-phase pulse inputs at a speed of up to 10 kpps, and 2-phase pulse inputs at a speed of up to 7 kpps. (Factory setting: 100k) (Set using a jumper)
(2)	Pulse input voltage setting pin CH1 CH2 CH1 CH2 ØA ØB ØB ØB O 5V O 5V O O 12V O O 12V O O 24V O O 24V O		Used to set the pulse input voltage to phase A/phase B. (Factory setting: 24 V) (Set using a jumper)
(3)	External input voltage setting pin PRE FST 0 0 5V 0 0 5V 0 0 0 12V 0 0 12V 0 0 12V 0 0 0 24V 0 0 24V 0 0 24V 0 0 CH1 CH2 CH1 CH2 CH1 CH2 CH1 CH2		Used to set the input voltage to be applied to the PRESET/F.START terminals. (Factory setting: 24 V) (Set using a jumper)
(4)	 Ring counter setting pin ON ON ON CH2 OO CH1 RING OFF OFF 		Used to set whether to use the ring counter function. (Factory setting: OFF) (Set using a jumper)
(5)	LED indicators	ØA	Remains lit while voltage is applied to the phase A pulse input terminal.
		ØB	Remains lit while voltage is applied to the phase B pulse input terminal.
		DEC	Remains lit during subtraction.
		PRESET	Remains lit while voltage is applied to the PRESET terminal, and goes off with an external preset detection reset command (write to buffer memory addresses 10 and 42).
		FUNCTION	Remains lit while voltage is applied to the F.START terminal.
		EQU1	Remains lit while external coincidence output from CH1 is executed.
		EQU2	Remains lit while external coincidence output from CH2 is executed.
(6)	Input terminals	ØA/ØB	Pulse input terminal
		PRST	The terminal to which voltage is applied to execute presetting in response to an external preset command.
		FST	The terminal to which voltage is applied to select a counter function.
(7)	Output terminals	EQU1 to EQU2	External output terminals for coincidence output. The coincidence signal is held until writing to the output signal Y10 (Y17) is performed.

4. INSTALLATION AND PRE-OPERATION SETTING PROCEDURE

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4. INSTALLATION AND PRE-OPERATION SETTING PROCEDURE MELSEC-A

No.	Na	ame	Description
(1)	Counting speed switch setting pin 10k 10k 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		 200 k : Counts single-phase/2-phase pulse inputs at a speed of up to 200 kpps. 10 k : Counts single-phase pulse inputs at a speed of up to 10 kpps, and 2-phase pulse inputs at a speed of up to 7 kpps. (Factory setting: 200 k) (Set using a jumper)
(2)	PRE FST 0 0 5V 0 0 5V 0 0 0 0 12V 0 0 12V 0 0 12V 0 0 0 0 24V 0 0 0 24V 0 0 CH1 CH2 CH1 CH2 CH1 CH2		Used to set the input voltage to be applied to the PRESET/F.START terminals. (Factory setting: 24 V) (Set using a jumper)
(3)	Ring counter setting pin		Used to set whether to use the ring counter function. (Factory setting: OFF) (Set using a jumper)
(4)	LED indicators	ØA	Remains lit while voltage is applied to the phase A pulse input terminal.
		ØB	Remains lit while voltage is applied to the phase B pulse input terminal.
		DEC	Remains lit during subtraction.
		PRESET	Remains lit while voltage is applied to the PRESET terminal, and goes off with an external preset detection reset command (write to buffer memory addresses 10 and 42).
		FUNCTION	Remains lit while voltage is applied to the F.START terminal.
		EQU1	Remains lit while external coincidence output from CH1 is executed.
		EQU2	Remains lit while external coincidence output from CH2 is executed.
(5)	Input terminals	ØA/ØB	Pulse input terminal
		PRST	The terminal to which voltage is applied to execute presetting in response to an external preset command.
		FST	The terminal to which voltage is applied to select a counter function.
(6)	Output terminals	EQU1 to EQU2	External output terminals for coincidence output The coincidence signal is held until writing to the output signal Y10 (Y17) is performed.

4. INSTALLATION AND PRE-OPERATION SETTING PROCEDURE

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4. INSTALLATION AND PRE-OPERATION SETTING PROCEDURE MELSEC-A

No.	Na	ame	Description
(1)	Counting speed switch setting pin 10K 10K 10K 10K 10K 10K 10K 10K 10K		 200 k : Counts single-phase/2-phase pulse inputs at a speed of up to 200 kpps. 10 k : Counts single-phase pulse inputs at a speed of up to 10 kpps, and 2-phase pulse inputs at a speed of up to 7 kpps. (Factory setting: 200 k) (Set using a jumper)
(2)	External input voltage setting pin FST O O 5V O O O O 12V O O CH1 CH2		Used to set the input voltage to be applied to the F.START terminal. (Factory setting: 24 V) (Set using a jumper)
(3)	Ring counter setting pin		Used to set whether to use the ring counter function. (Factory setting: OFF) (Set using a jumper)
(4)	LED indicators	ØA	Remains lit while voltage is applied to the phase A pulse input terminal.
		ØB	Remains lit while voltage is applied to the phase B pulse input terminal.
		DEC	Remains lit during subtraction.
		PRESET	Remains lit while voltage is applied to the PRESET terminal, and goes off with an external preset detection reset command (write to buffer memory addresses 10 and 42).
		FUNCTION	Remains lit while voltage is applied to the F.START terminal.
		EQU	Remains lit while external coincidence output from channel is executed.
(5)	Input terminals	ØA/ØB	Pulse input terminal
		PRST	The terminal to which voltage is applied to execute presetting in response to an external preset command.
		FST	The terminal to which voltage is applied to select a counter function.
(6)	Output terminals	EQU	External output terminals for coincidence output The coincidence signal is held until writing to the output signal Y10 (Y17) is performed.

4.4 Wiring

Details on how to wire a pulse generator device to the A1SD62(E/D/D-S1) are described below:

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4.4.1 Wiring preconditions

The preconditions when a pulse generator device is wired to the A1SD62 (E/D/D-S1) are described below:

- (1) For a high-speed pulse input, take the following counter measures against noise:
 - (a) Be sure to use shielded twisted pair cables. Also, make sure it is grounded to Class 3 specifications.
 - (b) Do not run a twisted pair cable in parallel with power cables or other I/O lines which may generate noise. Run cables at least 150 mm (5.91 in.) away from the above-mentioned lines and over the shortest distance possible.
- (2) For 1-phase input, connect count input signal to phase A only.
- (3) If the A1SD62(E/D/D-S1) picks up pulse noise, it will count incorrectly.
- (4) The specific measures against noise are shown below:



• Ground twisted shielded wire on the encoder side (joint box). (This is a connection example for 24 V sink loading.)



The shielded wire for the encoder and twisted pair shielded wire are connected inside the joint box. If the shielded wire for the encoder is not grounded inside the encoder, ground it in the joint box, as indicated by the dotted line.
4. INSTALLATION AND PRE-OPERATION SETTING PROCEDURE

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(b) For A1SD62(S1)

4.4.2 Wiring example of module and pulse generator

(1) Wiring example for connection with open collector output type pulse generator (24VDC)



4. INSTALLATION AND PRE-OPERATION SETTING PROCEDURE MELSEC-A

REMARK

1) * Set the pulse input voltage setting pin to the position.

(2) Connection of a voltage output pulse generator (5 VDC)

A1SD62(E)



1) * Set the pulse input voltage setting pin to the position.

4. INSTALLATION AND PRE-OPERATION SETTING PROCEDURE

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(3) Wiring example for connection with pulse generator of line driver (Am26LS31 or equivalent)

(a) For A1SD62D



4. INSTALLATION AND PRE-OPERATION SETTING PROCEDURE MELSEC-A

(b) For A1SD62D-S1



4. INSTALLATION AND PRE-OPERATION SETTING PROCEDURE

4.4.3 Wiring example for the connection of a controller to external input terminals (PRESET and F.START)

(1) For A1SD62(E/D)

(a) When a controller (sink load type) is supplied with 12 V:



This diagram assumes that the internal circuit is set to PRESET.

(b) When a controller (source load type) is supplied with 5 V:



This diagram assumes that the internal circuit is set to PRESET.



(1) * Set the external input voltage setting pin to the

position.

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4. INSTALLATION AND PRE-OPERATION SETTING PROCEDURE

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- For A1SD62D-S1 (2)
 - (a) When a controller (sink load type) is supplied with 12 V:



This diagram assumes that the internal circuit is set to PRESET.

(b) When a controller (source load type) is supplied with 5 V:



This diagram assumes that the internal circuit is set to PRESET.

REMARK

(1) * Set the external input voltage setting pin to the position.

4.4.4 Wiring examples at external output terminals (EQU)

To use an EQU terminal, the internal photocoupler should be activated. For this example, 10.2 to 30 VDC external power is necessary. Connection methods are as follows:

(1) A1SD62(D)





(3) A1SD62D-S1



5. PULSE INPUT AND COUNTING METHOD

This section describes the pulse input and counting method of the A1SD62 (E/D/D-S1).

(1) The pulse input mode is classified into single-phase pulse input and 2-phase pulse input. Single-phase pulse input is subdivided into multiplication by one and multiplication by two, whereas 2-phase pulse input covers multiplication by one, two and four.

Table 5.1 shows the pulse input modes and the count timing.

Pulse Input Mode	Count Timing			
Single-phase,	In up count	ØA ØB Y13 (Y1A)	Counts a pulse at ↑ of ØA. Ø B, Y13 (Y1A) are OFF.	
multiplied by one	In down count	ØA ØB Y13 (Y1A)	Counts a pulse at ↓ of ØA. Ø B, Y13 (Y1A) are ON.	
Single-phase,	In up count	ØA ØB Y13 (Y1A)	Counts a pulse at ↑ and ↓ of ØA. Ø B, Y13 (Y1A) are OFF.	
multiplied by two	In down count	ØA ØB Y13 (Y1A)	Counts a pulse at ↑ and ↓ of ØA.Ø B, Y13 (Y1A) are ON.	
2-phase,	In up count	ØА ØВ	Counts a pulse at ↑ of ØA. The pulse count increases in response to the phase difference between ØA and ØB.	
multiplied by one	In down count	ØA ØB	Counts a pulse at ↓ of ØA. The pulse count decreases in response to the phase difference between ØA and ØB.	
2-phase,	In up count	ØA	Counts a pulse at ↑ and ↓ of ØA. The pulse count increases in response to the phase difference between ØA and ØB.	
multiplied by two	In down count	ØA ØB	Counts a pulse at ↑ and ↓ of ØA. The pulse count decreases in response to the phase difference between ØA and ØB.	

Table 5.1 Pulse Input mode and Count Timing

5. PULSE INPUT AND COUNTING METHOD

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Pulse Input Mode		Count Timing		
2-phase,	In up count	ØA ØB	Counts a pulse at \uparrow and \downarrow of ØA and ØB. The pulse count increases in response to the phase difference between ØA and ØB.	
multiplied by four	In down count	ØA ØB	Counts a pulse at ↑ and ↓ of ØA and ØB. The pulse count decreases in response to the phase difference between ØA and ØB.	

(2) If the pulse input mode is changed, counting will continue from the last value before the mode change.

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5.1 Single-Phase Pulse Input

In single-phase pulse input, multiplication by one or two can be selected for counting.

(1) The following figure shows the relationship between phase A pulse input and a down count command.



(2) Counting mode setting

To use this counting mode, set the pulse input mode setting buffer memory {address 3 (35)} of the A1SD62(E/D/D-S1) using the sequence program.

Counting Mode	Set Value
Multiplication by one	KO
Multiplication by two	K8

[Sequence program]



REMARKS

- (1) In [][], set the first two digits of the hexadecimal three-digit first I/O number allocated to the A1SD62(E/D/D-S1).
- (2) Set 3 in [] for CH1, or 35 for CH2.
- (3) In S, set K0 representing multiplication by one, or K8 for multiplication by two.

5.2 Counting at 2-Phase Pulse Input

When the 2-phase pulse input is done, the counting mode can be selected from multiplication by one, two, and four.

(1) The relationship between the phase A pulse input and the phase B pulse input is given below:



(2) Counter processing mode setting

When using any of these counting modes, set the following value to the pulse input mode setting buffer memory {address 3 (35)} of the A1SD62(E/D/D-S1) in the sequence program.

Counting Mode	Setting Value
Multiplied by one	К2
Multiplied by two	K10
Multiplied by four	K18

[Sequence program]



REMARKS

- 1) In [][], set the first two digits of the hexadecimal three-digit first I/O number allocated to the A1SD62(E/D/D-S1).
- 2) Set 3 in [] for CH1, or 35 for CH2.
- In S, set K2 representing multiplication by one, K10 for multiplication by two, or K18 for multiplication by four.

This section gives details on the present value stored in the A1SD62(E/D/D-S1)'s present value storage buffer memory {addresses 4 to 5 (36 to 37)}, and how to read it.

(1) The present value storage buffer memory stores the present value when any function is used.

When the latch counter, sampling counter or periodic pulse counter function is executed, the count value is stored into the counter function selection count value storage buffer memory indicated in table 5.2, aside from the present value storage buffer memory. (Refer to Chapter 9.)

Description		Latch Sampling Count Count Value Value		Periodic Pulse Count Previous Value	Periodic Pulse Count Present Value	
Buffer	CH1	14 to 15	16 to 17	18 to 19	20 to 21	
memory address	CH2	46 to 47	48 to 49	50 to 51	52 to 53	

Table 5.3 Counter Function Selection Count Value Storage Buffer Memory

- (2) The present value (0 to 16777215) is stored in 24-bit binary in the present value storage buffer memory.
- (3) In up count, the present value storage buffer memory returns to 0 when the count value reaches 16777215. In down count, the buffer memory returns to 16777215 when the count value reaches 0.

- (4) Shown below is the sequence program to read the present value stored in the present value storage buffer memory.
 - (a) Reading using FROM/TO instructions (when the direct method is selected as the PLC CPU I/O control method)



Set data

n	A1SD62(E/D/D-S1)'s first I/O number from which the present value will be read
D	First device number to store the read present value

- Set a count value read request Y(n + 15) (for channel 1) or Y(n+1C) (for channel 2).
- 2) The present value is read from the I/O number of the A1SD62(E/D/D-S1) set for (n), and is stored in the device set for (D). In present value reading, data is read directly from A1SD62(E/D/D-S1)'s buffer memory addresses No. 4 and No. 5 (for CH1) or No. 36 and No. 37 (for CH2).
- Reset the count value read request Y(n + 15) (for channel 1) or Y(n+1C) (for channel 2).

5. PULSE INPUT AND COUNTING METHOD

(b) Reading using FROM/TO instructions (when the refresh method is selected as the PLC CPU I/O control method)

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Set data

0	A1SD62(E/D/D-S1)'s first I/O number from which the present value will be read
D	First device number to store the read present value

- 1) Designate partial refresh.
- Set a count value read request Y(n + 15) (for channel 1) or Y(n+1C) (for channel 2).
- 3) Y(n+10) to Y(n+1F) are partially refreshed.
- 4) The present value is read from the I/O number of the A1SD62(E/D/D-S1) set for (n), and is stored in the device set for (D).
 In present value reading, data is read directly from A1SD62(E/D/D-S1)'s buffer memory addresses No. 4 and No. 5 (for CH1) or No. 36 and No. 37 (for CH2).
- 5) Reset the count value read request Y(n + 15) (for channel 1) or Y(n+1C) (for channel 2).
- 6) Y(n+10) to Y(n+1F) are partially refreshed.

5. PULSE INPUT AND COUNTING METHOD

(c) Reading using an A2ASCPU(S1/S30)/A2USHCPU-S1 dedicated instruction



Instruction symbol in



Set data

0	A1SD62(E/D/D-S1)'s first I/O number from which the present value will be read
0	First device number to store the read present value.

1) The present value is read from the I/O number of the A1SD62(E/D/D-S1) set for (n), and is stored to the device set for(D).

In present value reading, data is read directly from

A1SD62(E/D/D-S1)'s buffer memory addresses No. 4 and No. 5 (for CH1) or No. 36 and No. 37 (for CH2).

The channel for present value reading depends on the instruction to be used.

PVRD1 instructionFor CH1 PVRD2 instructionFor CH2

2) In present value reading using a PVRD1 or PVRD2 instruction, ON/OFF control of the A1SD62(E/D/D-S1) I/O signals Y(n+15), Y(n+1C) (count value read request) is automatically executed internally, which means that the user does not have to execute it.

POINT

To perform communications with a special function module using an A2ASCPU(S1/S30)/A2USHCPU-S1 dedicated instruction, register AD61 as the module type when setting parameters.

Read command	G.[] Un	D-	[Execution]
Read command	GP.[] Un	0	<u> </u>
Instruction symbol in		ſ	

(d) Reading using an Q2AS(H)CPU(S1) dedicated instruction

Set data

Un	A1SD62(E/D/D-S1)'s first I/O number from which the present value will be read	
D	First device number to store the read present value.	

 The present value is read from the I/O number of the A1SD62(E/D/D-S1) set for (n), and is stored to the device set for (D).
 In present value reading, data is read directly from A1SD62(E/D/D-S1)'s buffer memory addresses No. 4 and No.

A1SD62(E/D/D-S1)'s buffer memory addresses No. 4 and No. 5 (for CH1) or No. 36 and No. 37 (for CH2). The channel for present value reading depends on the instruc-

tion to be used. PVRD1 instructionFor CH1 PVRD2 instructionFor CH2

2) In present value reading using a PVRD1 or PVRD2 instruction, ON/OFF control of the A1SD62(E/D/D-S1) I/O signals Y(n+15), Y(n+1C) (count value read request) is automatically executed internally, which means that the user does not have to execute it.

POINT

To perform communications with a special function module using an Q2AS(H)CPU(S1) dedicated instruction, register AD61 as the module type when setting parameters

6. EXECUTING THE COINCIDENCE OUTPUT FUNCTION

This section describes the coincidence output function.

6.1 Coincidence Output Function

The coincidence output function issues a signal when a preset count value is compared with and matches the present counter value.

For coincidence output, two points can be set to the A1SD62(E/D), and one point to the A1SD62D-S1.

To use the coincidence output function, set the coincidence signal enable command to ON.

[Example of how to use the coincidence output function]

The following is an example for the use of the A1SD62(E/D). Manufacturing products by performing each machining operation in response to a coincidence output in a machining line system.

- (1) The material is conveyed by a belt conveyor.
- (2) The material position can be identified as the present count value which is determined by a pulse sent to the A1SD62(E/D).
- (3) As soon as the material is located at each specified position, the relevant machining operation takes place in response to a coincidence output (EQU1, EQU2) from the A1SD62(E/D).





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6.1.1 Coincidence output function operation



- (1) ... The set coincidence output point value is written in 24-bit binary to the coincidence output point setting No. 1 buffer memory {addresses 6 to 7 (38 to 39)} of the A1SD62(E/D/D-S1) in advance.
- (2) ... When the counter value reaches the set coincidence output point value, the counter value small signal is turned off, and the counter value coincidence signal is turned on.
- (3) ... The coincidence signal reset command is turned on, and the counter value coincidence signal is reset.
 The subsequent coincidence signal output does not take place as long as the counter value coincidence signal remains on.
 (Point No. 2 is reset by writing to the buffer memory address 11 (43). Any value may be written.)
- (4) ... When the counter value is larger than the set coincidence output point value, the counter value large signal is turned on.

6.1.2 Program Examples

The following program is designed to count pulses in the 2-phase pulse input multiplied by one mode using CH1, and execute the coincidence output function.

[System configuration]

			X00 to X1F Y00 to Y1F	X20 to X3F	
A	1S62P	A1SCPU	A1SD62 (E/D/ D-S1)	A1S X41	

[Devices to be used]

(1) Execution commands

(a) Pulse input mode setting command	M9038
(b) Counting start command	X20
(c) Present value read command	X21
(d) Coincidence output data setting command	X22
(e) Coincidence output command	X23
(f) Coincidence signal reset command	X24
(g) Counting stop command	X25

(2) Relationship between data registers (D0 to D4) and the buffer memory



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(a) Execution using FROM/TO instructions (when the direct method is selected as the PLC CPU I/O control method)



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(b) Execution using FROM/TO instructions (when the refresh method is selected as the PLC CPU I/O control method)

The portions of the program example shown in (a) enclosed by the broken and dotted lines must be replaced with the following:



(c) Execution using A2ASCPU(S1/S30)/A2USHCPU-S1 dedicated instructions

As shown below, AnUSCPU dedicated instructions can be used in place of the portion of the program example shown in (a) enclosed by the broken line.

Present value read



POINT

- To perform communications with a special function module using an A2ASCPU(S1/S30)/A2USHCPU-S1 dedicated instruction, register AD61 as the module type when setting parameters.
- Dedicated instructions cannot be used for the coincidence output point setting No. 2.

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(d) Execution using Q2AS(H)CPU(S1) dedicated instructions

As shown below, Q2AS(H)CPU(S1) dedicated instructions can be used in place of the portion of the program example shown in (a) enclosed by the broken line.



• Dedicated instructions cannot be used for the coincidence output point setting No. 2.

7. EXECUTING THE PRESET FUNCTION

This section explains the preset function.

7.1 Preset Function

The preset function is used for converting the counter's present value to a different value.

This changed value is called the preset value.

The preset function can be used when a pulse count is started from the set value.

The preset function consists of two modes: preset by the sequence program and preset from the external control signal (applying the voltage to the external terminal).

[Preset function application example]

By using the preset function, the production count can be continued from the previous day.

- (1) The production volume of the previous day is "preset" from the PLC CPU to the A1SD62(E/D/D-S1).
- (2) Products are carried by a conveyor.
- (3) The production volume is counted by inputting the pulse from the photoelectric switch.
- (4) At the end of the daily production, the counter value in the buffer memory is stored to a word device (D, W, etc.) in the PLC CPU latch range.



7.2 Preset Using the Sequence Program

The following describes the preset function executed by the sequence program.

7.2.1 Executing the preset function using the sequence program

Turn ON the preset command $\{Y11 (Y18)\}$ in the sequence program to execute the preset.



- 1) Write a given value to the preset value setting buffer memory {addresses 1 to 2 (33 to 34)} of the A1SD62(E/D/D-S1) in 24-bit binary format.
- 2) At the rise (OFF to ON) of the preset command {Y11 (Y18)}, the preset value in the preset value setting buffer memory is preset to the present value storing buffer memory.

The preset function can be used whether the count enable command $\{Y14(Y1B)\}$ is ON or OFF.

7.2.2 Example program

The following program is to count pulses in 2-phase pulse input multiplied by one mode using CH1 and execute the preset function using the sequence program.

[System configuration]

		X00 to X1F Y00 to Y1F	X20 to X3F	
A1S62P	A1SCPU	A1S D62 (E/D/ D-S1)	A1S X41	

[Devices to be used]

(1) Execution commands

- (a) Pulse input mode setting command......M9038
- (b) Count operation start commandX20
- (c) Present value read commandX21
- (d) Preset value write command......X22
- (e) Preset command......X23
- (f) Count operation stop commandX24

(2) Relationship between data register (D0 to D4) and buffer memory



Buffer memory

(a) Execution using FROM/TO instructions (when the direct method is selected as the PLC CPU I/O control method)

[Program]



(b) Execution using FROM/TO instructions (when the refresh method is selected as the PLC CPU I/O control method)

The portion of the program example shown in (a) enclosed by the broken line must be replaced with the following:



(c) Execution using A2ASCPU(S1/S30)/A2USHCPU-S1 dedicated instructions

As shown below, A2ASCPU(S1/S30)/A2USHCPU-S1 dedicated instructions can be used in place of the portion of the program example shown in (a) enclosed by the broken line.



Preset command



POINT

To perform communications with a special function module using an A2ASCPU(S1/S30)/A2USHCPU-S1 dedicated instruction, register AD61 as the module type when setting parameters.

(d) Execution using Q2AS(H)CPU(S1) dedicated instructions

As shown below, Q2AS(H)CPU(S1) dedicated instructions can be used in place of the portion of the program example shown in (a) enclosed by the broken line.



POINT

To perform communications with a special function module using an Q2AS(H)CPU(S1) dedicated instruction, register AD61 as the module type when setting parameters.

The following describes the preset by the external control signal.

7.3.1 When the preset is executed by external control signal

Execute the preset by applying the voltage to the external input PRESET terminal.

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- 1) Write a given value to the preset value setting buffer memory {addresses 1 to 2 (33 to 34)} of the A1SD62(E/D/D-S1) in 24-bit binary format.
- 2) Executing the preset command (applying the voltage to the PRE-SET terminal) sets the preset value in the buffer memory to the present value buffer memory.
- 3) The preset function can be used whether the count enable command {Y14 (Y1B)} is ON or OFF.

POINT

(1) When the external preset detection flag {X03 (X07)} is ON (see (4) in the above-indicated diagram), even if the voltage is applied to the PRESET terminal, the preset function cannot be executed.

In this case, by turning ON (see (5) in the above-indicated diagram) the external preset command detection reset command {resetting is executed in response to writing to address 10 (42)} and turning OFF the external preset command detection flag {X03 (X07), the preset function can be executed.

7.3.2 Example program

The following program is to count pulses in 2-phase pulse input multiplied by one mode using CH1 and execute the preset function in response to external input.

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[System configuration]



[Devices to be used]

(1) Execution commands

(a) P	ulse input	mode setti	ng comman	dM9038
• •	•		U	

- (b) Count operation start commandX20
- (c) Present value read command.....X21
- (d) Preset value write command......X22
- (e) External preset request detection flag reset command......X03
- (f) Count operation stop commandX23

(2) Relationship between data register (D0 to D4) and buffer memory



Buffer memory

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(a) Execution using FROM/TO instructions (when the direct method is selected as the PLC CPU I/O control method)

[Program]



(b) Execution using FROM/TO instructions (when the refresh method is selected as the PLC CPU I/O control method)

The portion of the program example shown in (a) enclosed by the broken line must be replaced with the following:



(c) Execution using A2ASCPU(S1/S30)/A2USHCPU-S1 dedicated instructions

As shown below, A2ASCPU(S1/S30)/A2USHCPU-S1 dedicated instructions can be used in place of the portion of the program example shown in (a) enclosed by the broken line.



POINT

To perform communications with a special function module using an A2ASCPU(S1/S30)/A2USHCPU-S1 dedicated instruction, register AD61 as the module type when setting parameters.
(d) Execution using Q2AS(H)CPU(S1) dedicated instructions

As shown below, Q2AS(H)CPU(S1) dedicated instructions can be used in place of the portion of the program example shown in (a) enclosed by the broken line.



POINT

To perform communications with a special function module using an Q2AS(H)CPU(S1) dedicated instruction, register AD61 as the module type when setting parameters.

8. EXECUTING THE RING COUNTER FUNCTION

This section describes the ring counter function.

8.1 Ring Counter Function

The ring counter function allows repeated pulse counting between the preset value and ring counter value set with the ring counter command.

The ring counter can be used for a control such as fixed-pitch feed.

[Ring counter function application example]

Using a system to cut a sheet to a specified size, adjust its rollers by setting the ring counter value, and cut the sheet to the specified size.

- 1) Set the preset and ring counter values to execute the ring counter function.
- 2) Turn on the motor to operate the rollers.
- 3) Operate the rollers so that the sheet can be cut to the specified size.
- 4) Cut the sheet.
- 5) Repeat steps 2 to 4.



8.1.1 Ring counter function operation

To use the ring counter function, set the ring counter setting pin on the A1SD62(E/D/D-S1) circuit board to ON in advance.

Set the preset value and the ring count value in the buffer memory.



- (1).... The preset value is written in 24-bit binary to the preset value setting buffer memory {addresses 1 to 2 (33 to 34)} of the A1SD62(E/D/D-S1) in advance.
- (2).... The ring counter value is written in 24-bit binary to the coincidence output point setting No. 1 buffer memory {addresses 6 to 7 (38 to 39)} of the A1SD62(E/D/D-S1) in advance.
- (3).... At the rise (OFF to ON) of the preset command {Y11 (Y18)}, the preset value in the preset value setting buffer memory is preset to the present value storing buffer memory.
 The preset function can be used whether the count enable command {Y14 (Y1B)} is ON or OFF.
- (4).... When the counter value reaches the ring counter value, the counter value coincidence signal is turned on to execute presetting. By reading the present value during presetting, the ring counter value or preset value is read.
- (5).... The coincidence signal reset command is turned on, and the counter value coincidence signal is reset.If the counter value coincidence signal remains ON, the next preset cannot be executed.

8.1.2 Count range

As shown below, the count range of the ring counter function differs depending on the relationship between the preset value, the ring counter value, the present value and the counting mode (up count/down count).

- (1) When preset value ≤ present value ≤ ring counter value If the ring counter function is executed when the preset value is 0, the ring counter value is 2000, and the present value is 500, the following events occur:
 - 1) In up count, the present value becomes equivalent to the preset value (0) as soon as it is counted up to the ring counter value (2000).



reached the preset value (0). Then, when the present value is counted down to the ring counter value (2000), it becomes equivalent to the preset value (0).

500	499	to	0	167772	15 to	2002	20	001 2	2000/0	0 1677	7215

- (2) When preset value ≤ ring counter value ≤ present value If the ring counter function is executed when the preset value is 0, the ring counter value is 2000, and the present value is 3000, the following events occur:
 - 1) In up count, the present value returns to the minimum value (0) after it has reached the maximum value (16777215). Then, when the present value is counted up to the ring counter value (2000), it becomes equivalent to the preset value (0).



Do not write the preset and ring count values during execution of the ring counter function.

8.1.3 Example Program

The following program is to count pulses in 2-phase pulse input multiplied by one mode using CH1 and execute the ring counter function.

[System configuration]

		X00 to X1F Y00 to Y1F	X20 to X3F	
A1S62P	A1SCPU	A1S D62 (E/D/ D-S1)	A1S X41	

[Devices to be used]

(1) Execution commands

(a) Pulse input mode setting command	M9038
(b) Count operation start command	X20
(c) Present value read command	X21
(d) Preset value write command	X22
(e) Ring counter write command	X23
(f) Count operation stop command	X24
(g) Present counter value change command	X25

(2) Relationship between the data register (D0 to D6) and the buffer memory



8. EXECUTING THE RING COUNTER FUNCTION

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(a) Execution using FROM/TO instructions (when the direct method is selected as the PLC CPU I/O control method)

Pulse input mode setting	[Program]						
M9038			P	K			
			[MOV	2	D0		Set the pulse input mode of the 2-phase pulse input
	۲ TO]		К З	D0	K 1	ЪÌ	multiplied by one.
Start the count operation.							
X020			[SET	Y014][Start the pulse count with the count enable command (SET).
Present value read							· · · · · · · · · · · · · · · · · · ·
X021			[SET	Y015	3-4	i i
		н	к		к		Dood the propert value
			4	D1		3	Read the present value and store it to devices D1 to D2.
			[RST	Y015	Щ	
Preset value setting							
X022		···	P DMOV	к о	D3		
	p		K	Ũ	ĸ		Store the preset value 0 to buffer memory addresses
	{ DTO	0000	1	D3	1	J	1 to 2.
Present counter value change con	nmand						
X025			ſ	SET	Y011	L	1
			L	061	1011		Change the present
				RST	Y011		preset value.
1			L	1101	1011		
Ring counter value setting			P	ĸ			:
X023		{	DMOV	2000	D5	Н	
	p		к		к		Store the ring counter value 2000 to buffer
	[DTO		6	D5	1		memory addresses 6 to 7.
Coincidence signal reset						ļ	
X001	······································			-[SET	Y010	Ц	1 1
							Reset the coincidence
				-{ RST	Y010]	signal.
Count operation stop							
Y024				D.0.7	Voit	,	Stop the pulse count
			Į	821	Y014		by the count enable command (RST).
CIRCUIT END							· · /

(b) Execution using FROM/TO instructions (when the refresh method is selected as the PLC CPU I/O control method)

The portion of the program example shown in (a) enclosed by the broken line must be replaced with the following:



(c) Execution using A2ASCPU(S1/S30)/A2USHCPU-S1 dedicated instructions

As shown below, A2ASCPU(S1/S30)/A2USHCPU-S1 dedicated instructions can be used in place of the portion of the program example shown in (a) enclosed by the broken line.



AD61 as the module type when setting parameters.

(d) Execution using Q2AS(H)CPU(S1) dedicated instructions

As shown below, Q2AS(H)CPU(S1) dedicated instructions can be used in place of the portion of the program example shown in (a) enclosed by the broken line.



POINT

To perform communications with a special function module using an Q2AS(H)CPU(S1) dedicated instruction, register AD61 as the module type when setting parameters.

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9. SELECTING AND EXECUTING THE COUNTER FUNCTION

9.1 Selecting a Counter Function

Select one of the four counter functions and execute it.

Execute the selected function by turning ON the counter function selection start command $\{Y16(Y1D)\}$ or applying voltage to the external F.START terminal.

1) Count disable function: See section 9.2.

Inputs the signals when the count enable command is ON, stopping the pulse count.



 (1) Select a counter function by writing a value to the counter setting buffer memory {address 8(40)} as shown in the following table:

However, when the counter function is changed, make sure that the counter start command {Y16(Y1D), F.START terminal} is OFF.

Counter Function Selection	Setting Value
Count disable function	0
Latch counter function	1
Sampling counter function	2
Periodic pulse counter function	3

(2) The counter function can be selected by using either the counter start command {Y16(Y1D)} or the F.START terminal (external input).

When both of the signals are input during a certain period, priority is given to the first signal input.

(3) Set the sampling counter function/periodic pulse counter function time between 1 and 65535.
 The time can be set in 10ms increments and the accuracy is less than 1 count.

Example) When 420 is set to the sampling/periodic time setting buffer memory

420 x 10 = 4200 [ms]

9.1.1 Reading the counter function selection count value

The counter function selection counter value means the count value when the counter function is selected.

This section describes how to read the counter function selection count value.

(1) The counter function selection count value is stored in the buffer memory shown in Table 9.1.

 Table 9.1 Counter Function Selection Count Value

 Storage Buffer Memory

Descrip	otion	Latch Count Value	Sampling Count Value	Periodic Pulse Count Previous Value	Periodic Pulse Count Present Value
Buffer	CH1	14 to 15	16 to 17	18 to 19	20 to 21
memory address	CH2	46 to 47	48 to 49	50 to 51	52 to 53

- (2) The counter function selection count value (0 to 16777215) is stored in 24-bit binary.
- (3) In up count, the counter function selection count value returns to 0 after it has reached 16777215. In down count, the counter function selection count value returns to 16777215 after it has reached 0.

- (4) Shown below is the sequence program to read the counter function selection count value:
 - (a) Reading using FROM/TO instructions (when the direct method is selected as the PLC CPU I/O control method)



- Set a count value read request Y(n + 15) (for channel 1) or Y(n+1C) (for channel 2).
- 2) The counter function selection count value is read from the I/O number set for (n) of the A1SD62(E/D/D-S1)'s buffer memory address specified for (a), and is stored in the device set for (D).
- 3) Reset the count value read request Y(n + 15) (for channel 1) or Y(n+1C) (for channel 2).

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(b) Reading using FROM/TO instructions (when the refresh method is selected as the PLC CPU I/O control method)



- 1) Designate partial refresh.
- 2) Set a count value read request Y(n + 15) (for channel 1) or Y(n+1C) (for channel 2).
- 3) Y(n+10) to Y(n+1F) are partially refreshed.
- 4) The counter function selection count value is read from the I/O number set for n of the A1SD62(E/D/D-S1)'s buffer memory address specified for a, and is stored in the device set for D.
- 5) Reset the count value read request Y(n + 15) (for channel 1) or Y(n+1C) (for channel 2).
- 6) Y(n+10) to Y(n+1F) are partially refreshed.

9.1.2 Count errors

When the counter function selection is executed by the external input (applying the voltage to the F.START terminal) or by the sequence program (turning ON the counter function selection start command), there is an error in counting.

MELSEC-A

(1) The error range when the counter function is executed by the external input is shown below:

[Max. count error]

(s] x pulse input speed [PPS] x multiplication number [count]

[Min. count error]

 $\left(\frac{0.1 \text{ [ms]}}{1000}\right)$ [s] x pulse input speed [PPS] x multiplication number [count]

- (2) When the counter function is executed by the sequence program, there is an additional error for one scan of the PLC CPU besides the error as shown in (1).
- (3) The internal clock error can be calculated as follows:

Sampling/periodic setting value x 10 [ms]Error in parts dimensions, 100 [ppm]1000[s] x

x pulse input speed [PPS] x multiple [count]

(Sample/periodic setting value (unit: 10ms)) x pulse input speed [PPS] x multiple [count] 1000000

POINT

Mitsubishi recommends that the counter function selection should be executed by the external input.

9.2 Count Disable Function

Stop the count operation while the count enable command is ON.

The relationships between the count enable command and the counter start command and between them and the counter present value are shown below:



9.2.1 Example program

The following program is to count pulses in 2-phase pulse input multiplied by one mode using CH1 and execute count disable.

[System configuration]

X00 to X1F Y00 to Y1F X20 to X3F

	A1S A1S D62 (E/D/ D-S1)	A1S X41	
--	----------------------------------	------------	--

[Devices to be used]

- (1) Execution commands

(2) Relationship between the data register (D0 to D3) and the buffer memory



MELSEC-A

(a) Execution using FROM/TO instructions (when the direct method is selected as the PLC CPU I/O control method)



 (b) Execution using FROM/TO instructions (when the refresh method is selected as the PLC CPU I/O control method) The portion of the program example shown in (a) enclosed by the

broken line must be replaced with the following:

MELSEC-A



(c) Execution using A2ASCPU(S1/S30)/A2USHCPU-S1 dedicated instructions

As shown below, A2ASCPU(S1/S30)/A2USHCPU-S1 dedicated instructions can be used in place of the portion of the program example shown in (a) enclosed by the broken line.



POINT

To perform communications with a special function module using an A2ASCPU(S1/S30)/A2USHCPU-S1 dedicated instruction, register AD61 as the module type when setting parameters.

MELSEC-A

(d) Execution using Q2AS(H)CPU(S1) dedicated instructions

As shown below, Q2AS(H)CPU(S1) dedicated instructions can be used in place of the portion of the program example shown in (a) enclosed by the broken line.



POINT

To perform communications with a special function module using an Q2AS(H)CPU(S1) dedicated instruction, register AD61 as the module type when setting parameters.

9.3 Latch Counter Function

Latch the present value of the counter when a signal input is done.

The relationships between the counter present value and the counter start command and between the present value and the latch count value storage buffer memory are shown below:



At the rise of the counter function selection start command {Y16(Y1D), F.START terminal} (corresponding to 1) to 4) in the above diagram), the counter present value is stored to Latch count value storage buffer memory {addresses 14 to 15 (46 to 47)}.

The latch counter function works whether the count enable command {Y14(Y1B)} is ON or OFF.

9.3.1 Example program

The following program is to count pulses in 2-phase pulse input multiplied by one mode using CH1 and execute latch count.

MELSEC-A

[System configuration]

X00 to X1F Y00 to Y1F X20 to X3F

A1S A1S 62P CPU	A1S D62 (E/D/ D-S1)	A1S X41	
--------------------	------------------------------	------------	--

[Devices to be used]

(1) Execution commands

(a) Pulse input mode setting command	M9038
(b) Count operation start command	X20
(c) Present value read command	X21
(d) Latch count value read command	X22
(e) Latch counter function setting comman	ndX23
(f) Latch counter execution command	X24
(g) Count operation stop command	X25

(2) Relationship between the data register (D0 to D5) and the buffer memory



Buffer memory

MELSEC-A

(a) Execution using FROM/TO instructions (when the direct method is selected as the PLC CPU I/O control method)

[Program]



MELSEC-A

(b) Execution using FROM/TO instructions (when the refresh method is selected as the PLC CPU I/O control method)
 The portions of the program example shown in (a) enclosed by the broken and dotted lines must be replaced with the following:



(c) Execution using A2ASCPU(S1/S30)/A2USHCPU-S1 dedicated instructions

As shown below, A2ASCPU(S1/S30)/A2USHCPU-S1 dedicated instructions can be used in place of the portion of the program example shown in (a) enclosed by the broken line.



POINT

To perform communications with a special function module using an A2ASCPU(S1/S30)/A2USHCPU-S1 dedicated instruction, register AD61 as the module type when setting parameters.

MELSEC-A

(d) Execution using Q2AS(H)CPU(S1) dedicated instructions

As shown below, Q2AS(H)CPU(S1) dedicated instructions can be used in place of the portion of the program example shown in (a) enclosed by the broken line.



POINT

To perform communications with a special function module using an Q2AS(H)CPU(S1) dedicated instruction, register AD61 as the module type when setting parameters.

9.4 Sampling Counter Function

Count the pulses when a sampling time is specified.

The sampling time is set in 10ms increments and the accuracy is less than 1 count.

The relationship between each signal and the buffer memory is shown below:



- 1) Starts counting input pulses from 0 at the rise of the counter function command {Y16(Y1D), F.START terminal}.
- 2) Stops counting after the specified sampling time.
- 3) One of the following values is stored to the sampling/cycle counter flag storage buffer memory during execution of the sampling counter function:

Operating Status	When Only CH1 is Executing Function	When Only CH2 is Executing Function	When Both CH1 and CH2 are Executing Function
Buffer memory address (22)	K1	K2	КЗ

- 4) Retains the value stored in the sampling count value storage buffer memory after completing the sampling counter function.
- 5) The sampling counter function works whether the count enable command {Y14(Y1B)} is ON or OFF.

9.4.1 Example program

The following program is to count pulses in 2-phase pulse input multiplied by one mode using CH1 and execute the sampling counter function.

[System configuration]

		X00 to X1F Y00 to Y1F	X20 to X3F	
A1S 62P	A1S CPU	AIS D62 (E/D/ D-S1)	A1S X41	

[Devices to be used]

(1) Execution commands

(a) Pulse input mode setting command	M9038
(b) Count operation start command	X20
(c) Present value read command	X21
(d) Sampling count value read command	X22
(e) Sampling counter function setting command	X23
(f) Sampling time setting command	X24
(g) Sampling counter execution command	X25

(h) Count operation stop command:X26

(2) Relationship between the data register (D0 to D6) and the buffer memory

Buffer memory



MELSEC-A

(a) Execution using FROM/TO instructions (when the direct method is selected as the PLC CPU I/O control method)

[Program] Pulse input mode setting Κ P M9038 ſ MOV 2 D0 7 Set the pulse input mode of the 2-phase Ρ Κ к Н pulse input multiplied то 0000 3 D0 by one. 1 7ſ Count operation start. X020 Start the pulse count with SET Y014 the count enable command]-(SET). Present value read X021 -{ SET Y015]--К Н Κ Read the present -[DFRO 0000 4 D1 1 value and store it to } devices D1 to D2. { RST Y015 沪 Sampling counter command X022 Y015 --{ SET -11-Н Κ Κ Read the sampling count value, and -{ DFRO 0000 16 D3 1 7 store it to D3 to D4. RST Y015 }-Ł Ρ κ X023 - MOV 2 D5 7 Set the sampling counter Ρ Н Κ Κ function. ΤO 0000 8 D5 1 -[Ъ X024 Ρ Κ MOV 1000 -{ D6 7-Ρ Н к Κ Set the sampling time. то 0000 9 ---[D6 1 7 X025 Execute the sampling PLS Y016 -{ }counting. Count operation stop Stop the pulse count with the count enable com-mand (RST). X026 Y014 _-–[RST CIRCUIT END

 (b) Execution using FROM/TO instructions (when the refresh method is selected as the PLC CPU I/O control method)
 The portions of the program example shown in (a) enclosed by the broken and dotted lines must be replaced with the following:



(c) Execution using A2ASCPU(S1/S30)/A2USHCPU-S1 dedicated instructions

As shown below, A2ASCPU(S1/S30)/A2USHCPU-S1 dedicated instructions can be used in place of the portion of the program example shown in (a) enclosed by the broken line.



POINT

To perform communications with a special function module using an A2ASCPU(S1/S30)/A2USHCPU-S1 dedicated instruction, register AD61 as the module type when setting parameters.

MELSEC-A

 (d) Execution using Q2AS(H)CPU(S1) dedicated instructions As shown below, Q2AS(H)CPU(S1) dedicated instructions can be

used in place of the portion of the program example shown in (a) enclosed by the broken line.



POINT

To perform communications with a special function module using an Q2AS(H)CPU(S1) dedicated instruction, register AD61 as the module type when setting parameters.

9.5 Periodic Pulse Counter Function

The periodic pulse counter function allows the present and previous counter values to be stored into the storage addresses for respective periodic pulse count values at intervals of the preset cycle time (T).

MELSEC-A

The cycle time is set in 10ms increments and the accuracy is less than 1 count.

The relationships between each signal and each buffer memory when the periodic pulse counter function is executed are shown below:



MELSEC-A

- (1).... The present counter value 0 is stored to the periodic pulse count present value storage buffer memory {addresses 20 to 21 (52 to 53)} (hereinafter called the present value buffer memory).
- (2).... The present counter value 200 is stored to the present value buffer memory.

The count value 0, which has been stored in the present value buffer memory, is written to the periodic pulse count previous value storage buffer memory {addresses 18 to 19 (50 to 51)} (hereafter called the pre vious value buffer memory).

(3).... The present counter value 20 is stored to the present value buffer memory.

The count value 200, which has been stored in the present value buffer memory, is written to the previous value buffer memory.

(4).... The present counter value 100 is stored to the present value buffer memory.

The count value 20, which has been stored in the present value buffer memory, is written to the previous value buffer memory.

(5).... The present counter value 50 is stored to the present value buffer memory.

The count value 100, which has been stored in the present value buffer memory, is written to the previous value buffer memory.

- (6).... The periodic pulse counter function is executed whether the count enable command {Y14 (Y1B)} is ON or OFF.
- (7).... One of the following values is stored to the sampling/cycle counter flag storage buffer memory during execution of the periodic pulse counter function:

Operating Status	When Only CH1 is Executing Function	When Only CH2 is Executing Function	When Both CH1 and CH2 are Executing Function
Buffer memory address (22)	К1	K2	КЗ

POINT

Depending on the relation between the update timings of the previous and present periodic pulse count values inside the module and the read timing in the sequence program, the previous value may be the same as the present value.

If this has occurred, execute the reading again.

9.5.1 Example program

The following program is to count pulses in 2-phase pulse input multiplied by one mode using CH1 and execute the periodic pulse counter function.

[System configuration]

		X00 to X1F Y00 to Y1F	X20 to X3F	
A1S 62P	A1S CPU	A1S D62 (E/D/ D-S1)	A1S X41	

[Devices to be used]

(1) Execution commands

(a) Pulse input mode setting command	M9038
(b) Count operation start command	X20
(c) Present value read command	X21
(d) Periodic pulse count value read command	X22
(e) Periodic pulse counter function setting command	X23
(f) Periodic time setting command	X24
(g) Periodic pulse counter execution command	X25
(h) Count operation stop command	X26

(2) Relationship between the data register (D0 to D8) and the buffer memory


9. SELECTING AND EXECUTING THE COUNTER FUNCTION

MELSEC-A

(a) Execution using FROM/TO instructions (when the direct method is selected as the PLC CPU I/O control method)

[Program]



9. SELECTING AND EXECUTING THE COUNTER FUNCTION

(b) Execution using FROM/TO instructions (when the refresh method is selected as the PLC CPU I/O control method)
 The portions of the program example shown in (a) enclosed by the broken and dotted lines must be replaced with the following:

MELSEC-A



9. SELECTING AND EXECUTING THE COUNTER FUNCTION

MELSEC-A

(c) Execution using A2ASCPU(S1/S30)/A2USHCPU-S1 dedicated instructions

As shown below, A2ASCPU(S1/S30)/A2USHCPU-S1 dedicated instructions can be used in place of the portion of the program example shown in (a) enclosed by the broken line.



POINT

To perform communications with a special function module using an A2ASCPU(S1/S30)/A2USHCPU-S1 dedicated instruction, register AD61 as the module type when setting parameters.

9. SELECTING AND EXECUTING THE COUNTER FUNCTION MELSEC-A

(d) Execution using Q2AS(H)CPU(S1) dedicated instructions
 As shown below, Q2AS(H)CPU(S1) dedicated instructions can be used in place of the portion of the program example shown in (a) enclosed by the broken line.



POINT

To perform communications with a special function module using an Q2AS(H)CPU(S1) dedicated instruction, register AD61 as the module type when setting parameters.

10. PROGRAMMING FOR USE OF A1SD62(E/D/D-S1) ON REMOTE I/O STATION

This section describes programming for use of the A1SD62(E/D/D-S1) on a remote I/O station.

 When the A1SD62(E/D/D-S1) is used with a remote I/O station, all data and I/O signals are processed through a link unit. Communication with this link unit takes place only once after the END instruction of the sequence program has been executed. Thus, several scan times are required to complete all handshake signals between the A1SD62(E/D/D-S1) and the PLC CPU. As an example, resetting a counter coincidence signal(X01) with a coincidence signal reset command(Y10) is described below, on the assumption that the A1SD62(E/D/D-S1) is allocated to the slot corresponding to the first I/O numbers X100 and Y100 and the set coincidence



Since the time the counter requires to count from 0 to the set coincidence output point value(10000) is longer than the handshake signal processing time between the A1SD62(E/D/D-S1) and the PLC CPU, A1SD62(E/D/D-S1) operates normally.

However, if the counting time is shorter than the handshake signal processing time (the set coincidence output point value is smaller than 10000, or the pulse frequency to be counted is large), the A1SD62(E/D/D-S1) performs incorrect operations, or counts a larger value than the set value. (In such a case, the A1SD62(E/D/D-S1) cannot be used with a remote I/O station. Mount it at the master station or a local station.)

The above factors may make it difficult to use the A1SD62(E/D/D-S1) for a remote I/O station. Consider the program scan time, link scan time and count-up time carefully to allow the A1SD62(E/D/D-S1) to operate properly.

To operate the A1SD62(E/D/D-S1) through a data link, it is advisable to use it with the master station or a local station.

(When using the A1SD62(E/D/D-S1) with a remote I/O station, examine the above handshake sequence with extreme care.)

10. PROGRAMMING FOR USE OF A1SD62(E/D/D-S1) ON REMOTE I/O STATION

MELSEC-A

(2) When creating a program for the remote I/O station, use RTOP as an instruction to write to the A1SD62(E/D/D-S1) and RFRP as an instruction to read from the A1SD62(E/D/D-S1).

These instructions are executed in the same way as TO and FROM, however, the following points are different.

Although the first I/O number of the A1SD62(E/D/D-S1) is usually specified with the first two digitals, use all digits in this case.

(See the MELSECNET and MELSECNET/B Data Link System Reference Manual.)

<Example> When the first I/O number of the A1SD62(E/D/D-S1) is allocated to X100/Y100 to X11F/Y11F



All data is processed through link registers, W, and it is necessary to set the link registers when setting the PLC CPU parameters.

POINT

To execute the RFRP/RTOP instructions, the system uses the corresponding number of points to the number of special function modules loaded in the remote I/O station from the first device in the $M \rightarrow R$ area of the link register.

Set the link register to be used for the RTOP instruction so that it will not conflict with that for the system. (See the MELSECNET and MEL-SECNET/B Data Link System Reference Manual.)

11. TROUBLE SHOOTING

This section describes error information detected by the A1SD62(E/D/D-S1) and troubleshooting for count errors.

11.1 Error Information

The A1SD62(E/D/D-S1) turns on the fuse/external power cutoff detection flag (X0E) when the coincidence output fuse has blown or voltage is not applied to the EQU terminals.

11.2 Counter Value is Incorrect

Check Item	Corrective Action				
Is the pulse input method same with the pulse input mode setting in the buffer memory?	Match the pulse input method with the pulse input mode setting in the buffer memory (refer to Chapter 5).				
Is the sequence program data treated in 24-bit binary?	Correct the sequence program so that the data can be treated in 24-bit binary.				
Is the shielded twisted pair cable used for pulse input wiring?	Use the shielded twisted pair cable for pulse input wiring.				
Doesn't any noise come from the ground	• Separate the ground cable of the A1SD62(E/D/D-S1) from the ground part.				
part of the A1SD62(E/D/D-S1)?	 When the A1SD62(E/D/D-S1) case touches to the ground part, separate it. 				
Has the measures against noise been taken to the adjacent devices and inside the control panel?	Take noise reduction measures (e.g. attach a CR surge suppressor to the magnet switch).				
Is the distance between the high voltage equipment and pulse input line kept enough?	Bundle the pulse input lines and put them in a single tube, and keep a distance of 150 mm (5.91 inch) or more with the power line even inside the control panel.				
Is the count value the same at CH1 and CH2 after the same count value was en- tered?	If they differ, it is a hardware failure. Please consult your local Mitsubishi representative, explaining a detailed description of the problem.				
Does the input pulse waveform meet the performance specifications?	Check the pulse waveform with synchronoscope. When the input pulse does not meet the performance specifications, input the pulse which meets the performance specifications.				

11.3 Count Cannot be Made

Check Item	Corrective Action			
Is the external wiring of $\varnothing A$ and ϑB normal?	Check the external wiring and correct the error.			
Do the LEDs of \varnothing A and \varnothing B turn ON by directly applying voltage to pulse input terminals of \varnothing A and \varnothing B?	If they turn ON, check the external wiring and encoder side and correct the error. If they remain OFF, it is a hardware failure. Please consult your local Mitsubishi representative, explaining a detailed description of the problem.			
Is the count enable command {Y14 (Y1B)} ON?	Turn ON the count enable command {Y14 (Y1B)} with the sequence program.			
Is the count value read request {Y15 (Y1C)} set or reset?	Set or reset the count value read request {Y15 (Y1C)} with the sequence program.			
Doesn't the PLC CPU indicate an error?	If the PLC CPU is an error, correct the error with reference to troubleshooting in the PLC CPU's manual for normal operation.			
Is the counter function selection start command {Y16 (Y1D)} ON or isn't the voltage being applied to the F.START terminal?	When the counter disable function has been set by the counter function selection, turn OFF {Y16 (Y1D)} or the F.START terminal.			

APPENDICES

Appendix 1 PERFORMANCE COMPARISON BETWEEN THE A1SD62(E/D/D-S1), THE A1SD61, AND THE AD61(S1)

Item		Specifications							
		A1SD62D(S1)			A1SD62 (E)				
Counting Speed Setting Pin		200K		10K	100K		10K		
Number of occ	cupied I/O poi	nts	32 points						
Number of channels		2 channels							
Count input signal	Phase		1-phase input, 2-phase input						
	Signal level (ØA, ØB)		EIA Standard RS-422-A Differential type line driver level (Am26LS31 or equivalent)			5 VDC 12 VDC 24 VDC 24 VDC			
Counter	Counting speed *(maximum)	1-Phase input	200k	pps	10k pps 1001		pps	10k pps	
		2-Phase input	200k pps		7k pps	100k pps		7k pps	
	Count range		24-bit binary 0 to 16777215						
	Туре		UP/DOWN preset counter + ring counter functions						
	Minimum count pulse width (Duty ratio = 50 %)		2.5µs 2.5µs (1-phase/2-phase input)		100 μs 142 μ	$10\mu s$ $10\mu s$ $5\mu s$ $5\mu s$ $5\mu s$ $(1-phase/2-phase input)$		100 μs 142 μs 142 μs 147 μs 147 μs 147 μs 147 μs 142 μs 147 μ	
	Comparison range		24-bit binary						
Comparison output	Comparison result		Set value < Count value Set value = Count value Set value > Count value						
External input			A1SD62D	5/12/24 VDC 2 to 5 mA					
		Preset	A1SD62D- S1	EIA Standard RS-422-A Differential type line driver level (Am26LS31 or equivalent)	5/12/24 VDC 2 to 5 mA		C 2 to 5 mA		
		Function start	5/12/24 VDC 2 to 5 mA						
External output		Coincidence Transistor (s output 12/24 VDC, 0		sink type) output	Coincidence output	A1SD62	Transistor (sink type) output 12/24 VDC, 0.5 A/point, 2 A/common		
				0.5 Á/point, 2 A/common		A1SD62E	Transistor (sink type) output 12/24 VDC, 0.1 A/point, 0.4 A/common		
Internal current consumption (5 VDC)		0.25A			0.1A				

Table APP-1 Performance Comparison

Item		Specifications						
item			A1SD61			AD	61	AD61-S1
Counting Speed Setting Pin			501	K	10K		- 11 ¹¹	
Number of I/O occupied points		32 points						
Number of channels		1 channel			2 channels			
Count input signal	Phase		1-phase input					
	Signal level (øA, øB)		5 VDC 12 VDC 24 VDC } 2 to 5 mA					
Counter	Counting speed	1-Phase input	50k pps		10k pps	50k	ops	10k pps
		2-Phase input	50k p	ops	7k pps	50k pps		7k pps
	Counting Range		Signed 32-bit binary -2147483648 to 2147483647			24-bit binary 0 to 16777215		
	Туре				UP/DOWN preset counter	+ ring counter function		
	Minimum count pulse width (Duty ratio = 50 %)		20#s 10#s 10# (1-phase input	→ → s , 2-phase input)	100 µs 142 µs			i=+ i=+ i=+++++ i=+++++ 50 50 71 71 μs μs μs μs
	Comparison range		Signed 32-bit binary			24-bit binary		
Comparison output	Comparison results		Limit switch output A contact operation: Dog ON address ≤ Counter value ≤ Dog OFF ad- dress B contact operation: Dog OFF address ≤ Counter value ≤ Dog ON address			Set value < Counter value Set value = Counter value Set value > Counter value		
			Preset			Preset		
External input		Function start	12/24 VDC, 3/6 mA 5 VDC, 5 mA		Count disable	12/24 VDC, 3/6 mA 5 VDC, 5 mA		
External output		Comparison output	Transistor (open colle tor) output 12/24 VDC, 0.1 A/point, 0.8 A/common		Coincidence output	Transistor (open collector) output 12/24 VDC, 5mA		
Internal current consumption (5 VDC)		0.35 A			0.3 A			

Appendix 2 EXTERNAL DIMENSIONS



APP - 3

WARRANTY

Please confirm the following product warranty details before using this product.

1. Gratis Warranty Term and Gratis Warranty Range

If any faults or defects (hereinafter "Failure") found to be the responsibility of Mitsubishi occurs during use of the product within the gratis warranty term, the product shall be repaired at no cost via the sales representative or Mitsubishi Service Company.

However, if repairs are required onsite at domestic or overseas location, expenses to send an engineer will be solely at the customer's discretion. Mitsubishi shall not be held responsible for any re-commissioning, maintenance, or testing onsite that involves replacement of the failed module.

[Gratis Warranty Term]

The gratis warranty term of the product shall be for one year after the date of purchase or delivery to a designated place.

Note that after manufacture and shipment from Mitsubishi, the maximum distribution period shall be six (6) months, and the longest gratis warranty term after manufacturing shall be eighteen (18) months. The gratis warranty term of repair parts shall not exceed the gratis warranty term before repairs.

[Gratis Warranty Range]

- (1) The range shall be limited to normal use within the usage state, usage methods and usage environment, etc., which follow the conditions and precautions, etc., given in the instruction manual, user's manual and caution labels on the product.
- (2) Even within the gratis warranty term, repairs shall be charged for in the following cases.
 - 1. Failure occurring from inappropriate storage or handling, carelessness or negligence by the user. Failure caused by the user's hardware or software design.
 - 2. Failure caused by unapproved modifications, etc., to the product by the user.
 - 3. When the Mitsubishi product is assembled into a user's device, Failure that could have been avoided if functions or structures, judged as necessary in the legal safety measures the user's device is subject to or as necessary by industry standards, had been provided.
 - 4. Failure that could have been avoided if consumable parts (battery, backlight, fuse, etc.) designated in the instruction manual had been correctly serviced or replaced.
 - 5. Failure caused by external irresistible forces such as fires or abnormal voltages, and Failure caused by force majeure such as earthquakes, lightning, wind and water damage.
 - 6. Failure caused by reasons unpredictable by scientific technology standards at time of shipment from Mitsubishi.
 - 7. Any other failure found not to be the responsibility of Mitsubishi or that admitted not to be so by the user.

2. Onerous repair term after discontinuation of production

- (1) Mitsubishi shall accept onerous product repairs for seven (7) years after production of the product is discontinued. Discontinuation of production shall be notified with Mitsubishi Technical Bulletins, etc.
- (2) Product supply (including repair parts) is not available after production is discontinued.

3. Overseas service

Overseas, repairs shall be accepted by Mitsubishi's local overseas FA Center. Note that the repair conditions at each FA Center may differ.

4. Exclusion of loss in opportunity and secondary loss from warranty liability

Regardless of the gratis warranty term, Mitsubishi shall not be liable for compensation of damages caused by any cause found not to be the responsibility of Mitsubishi, loss in opportunity, lost profits incurred to the user by Failures of Mitsubishi products, special damages and secondary damages whether foreseeable or not, compensation for accidents, and compensation for damages to products other than Mitsubishi products, replacement by the user, maintenance of on-site equipment, start-up test run and other tasks.

5. Changes in product specifications

The specifications given in the catalogs, manuals or technical documents are subject to change without prior notice.

6. Product application

- (1) In using the Mitsubishi MELSEC programmable controller, the usage conditions shall be that the application will not lead to a major accident even if any problem or fault should occur in the programmable controller device, and that backup and fail-safe functions are systematically provided outside of the device for any problem or fault.
- (2) The Mitsubishi programmable controller has been designed and manufactured for applications in general industries, etc. Thus, applications in which the public could be affected such as in nuclear power plants and other power plants operated by respective power companies, and applications in which a special quality assurance system is required, such as for Railway companies or Public service purposes shall be excluded from the programmable controller applications.

In addition, applications in which human life or property that could be greatly affected, such as in aircraft, medical applications, incineration and fuel devices, manned transportation, equipment for recreation and amusement, and safety devices, shall also be excluded from the programmable controller range of applications.

However, in certain cases, some applications may be possible, providing the user consults their local Mitsubishi representative outlining the special requirements of the project, and providing that all parties concerned agree to the special circumstances, solely at the users discretion.

High Speed Counter Module Type A1SD62, A1SD62E, A1SD62D(S1)

User's Manual

A1SD62-U-E

MODEL

MODEL CODE

13J816

IB(NA)-66593-E(0707)MEE

MITSUBISHI ELECTRIC CORPORATION

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