Panasonic

PROGRAMMABLE CONTROLLER

FP0H Control Unit

Programming Manual

SD Card Access Instructions

[Applicable models]

AFP0HC32ET/AFP0HC32EP

WUME-FP0HSD-02

2019.1 | panasonic.net/id/pidsx

Introduction

Thank you for buying a Panasonic product. Before you use the product, please carefully read the installation instructions and the users manual, and understand their contents in detail to use the product properly.

Types of Manual

- This manual describes the "SD Card Access Function" installed in the FP0H Control Unit.
- There are different types of users manual for the FP7 series, as listed below. Please refer to a relevant manual for the unit and purpose of your use.
- The manuals can be downloaded on our website:
  https://industrial.panasonic.com/ac/e/dl_center/manual/

Unit name or purpose of use	Manual name	Manual code
FP0H Control Unit	FP0H User's Manual (Basic)	WUME-FP0HBAS
	FP Series Programming Manual	ARCT1F313E
	FP0H Programming Manual (SD Card Access Instructions)	WUME-FP0HSD
Positioning Function/PWM Output/High-speed Counter Function	FP0H User's Manual (Positioning/PWM Output/High-speed Counter)	WUME-FP0HPOS
Serial Communication Function	FP0H User's Manual (COM Communication)	WUME-FP0HCOM
Ethernet Communication Function	FP0H User's Manual (Ethernet Communication)	WUME-FP0HET
EtherNet/IP Communication Function	FP0H User's Manual (EtherNet/IP)	WUME-FP0HEIP
Logging/Trace Function	FP0H User's Manual (Logging/Trace Function)	WUME-FP0HLOG
FP0H Extension (Communication) Cassette	FP0H User's Manual (COM Communication)	WUME-FP0HCOM
FP0H Positioning Unit	FPΣ Positioning Unit User's Manual (Note)	ARCT1F365E

(Note): For information on FP0H Positioning Unit, refer to the conventional FPΣ Positioning Unit Manual. The color of the main unit case is different (FP0H is black, and FPΣ is gray), however, the other specifications are the same.

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1.1 List of SD card access instructions

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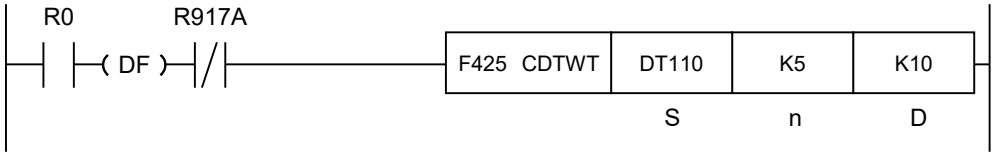
Instruction Reference

2.1 SD Card Access Instructions

2.1.1 F425 CDTWT (Operation Memory File Write in BIN Format)

■ **Instruction format**



■ **List of operands**

Operand	Explanation
S	Starting address of the memory device for operation in which data to be written is stored
n	Number of data to be written: 0 to 32767
D	File number (3 digits) given to the file name to be created or overwritten. Range: 0 to 999

■ **Available devices (●: Available)**

Operand	WX	WY	WR	WL	SV	EV	DT	LD	I	SWR	SDT	Integers			Index modifier *1
												K	H	M	
S	●	●	●	●	●	●	●	●	●						●
n	●	●	●	●	●	●	●	●	●			●	●		●
D	●	●	●	●	●	●	●	●	●			●	●		●

*1: Character constants cannot be specified.

■ **Outline of operation**

- Reads binary data of [n] words from the area starting with [S], and writes a binary format file to an SD memory card.
- The folder name is \data, and the file name is dtxxx.bin. The number specified by operand [D] is given to “xxx” of the file name.
- When there is no specified folder, create a new folder. When there is already a file in a specified folder, the file is overwritten.

■ **Example of processing**

- Reads 5 words from the device DT110 specified by [S], and writes a binary format file (bin.) to the folder \data in an SD memory card.
- The file name is "dt010.bin. The file number 10 specified by [D] is added.

[S] …DT110 [n] …K5 [D] …10

DT108	H 0108
DT109	H 0109
DT110	**H 0110**
DT111	**H 0111**
DT112	**H 0112**
DT113	**H 0113**
DT114	**H 0114**
DT115	H 0115
DT116	H 0116
DT117	H 0117
DT118	H 0118

File dt**010**.bin (16-bit binary format)

1001110112011301 1401

■ **Precautions during programming**

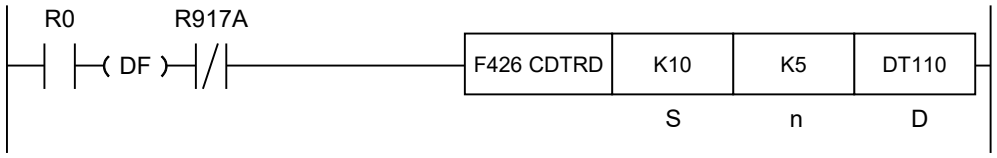
- In addition, refer to "3.1 Common Precautions for SD Card Access Instructions".
- When overwriting a file, the file cannot be overwritten if the file attribute is set to read only.
- The SD memory card access instruction active flag (R917A) turns ON after the execution condition has turned ON until the completion of the execution of the instruction. During this period, other SD memory card access instructions cannot be executed.
- Confirm that the SD memory card access instruction execution done flag (R917B) is turned OFF, and turn OFF the execution condition.

■ **Flag operations**

Name	Explanation
R917A (SD memory card access instruction active)	Turns ON when the instruction is executed. Turns OFF when the instruction is completed.
R917B (SD memory card access instruction execution done)	Turns OFF when the instruction is executed. Turns ON when the instruction is completed.
R917C (SD memory card access instruction execution result)	Reports the result when the instruction is completed. Normal completion: 0, Abnormal completion: 1
R9007 R9008 (ER)	When the device specification is indirect access (index modification), this turns ON when the specified address is outside the device range.
	Turns ON when an out-of-range value is specified for [n].
	Turns ON when an out-of-range value is specified for [D].

2.1.2 F426 CDTRD (Data Read from BIN Format File to Operation Memory)

■ **Instruction format**



■ **List of operands**

Operand	Explanation
S	File number (3 digits) in a SD memory card in which data to be read is stored. Range: 0 to 999
n	Number of data to be read. Range: 0 to 32767
D	Starting address of the device for operation in which data to be read is stored

■ **Available devices (●: Available)**

Operand	WX	WY	WR	WL	SV	EV	DT	LD	I	SWR	SDT	Integers			Index modifier *1
												K	H	M	
S	●	●	●	●	●	●	●	●	●			●	●		●
n	●	●	●	●	●	●	●	●	●			●	●		●
D		●	●	●	●	●	●	●	●						●

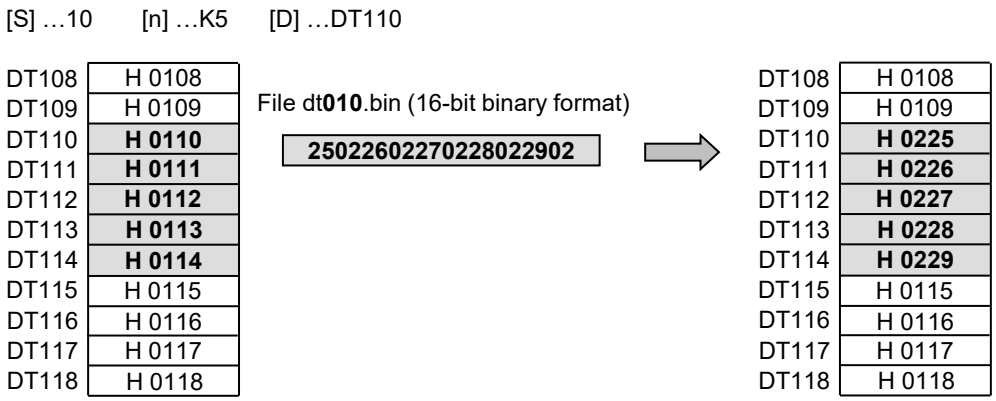
*1: Character constants cannot be specified.

■ **Outline of operation**

- Reads [n] pieces of data from the binary format file in the SD memory card, and stores it in the device of the address starting with [D].
- The folder name is \data, and the file name is dtxxx.bin. "xxx" of the file name is the file number, and specified by operand [S].

■ **Example of processing**

- Reads a binary format file from the folder \data in the SD memory card, and stores it in the device for operation starting with [D].
- The file name of the binary format file is "dt010.bin. The file number 10 specified by [D] is added.



■ **Precautions during programming**

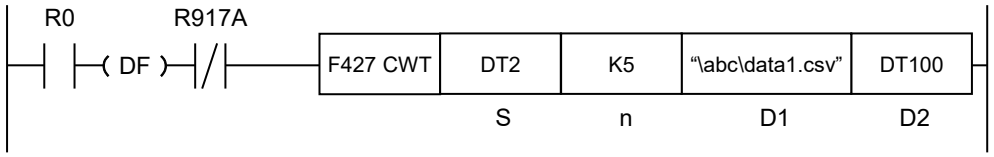
- In addition, refer to "3.1 Common Precautions for SD Card Access Instructions".
- The SD memory card access instruction active flag (R917A) turns ON after the execution condition has turned ON until the completion of the execution of the instruction. During this period, other SD memory card access instructions cannot be executed.
- During the execution of the F426 (CDTRD) instruction, data values read from the SD memory card are written from the beginning of the data device specified in order. Therefore, do not read the data in the range of the data device processed by the F426 (CDTRD) instruction until the reading process is completed.
- When the number of data of the stored file is less than the specified number of data to be read, the SD card access instruction execution result (R917C) turns ON and an execution error results..
- An error occurs when there is no folder, or no file with the specified file number in the folder.

■ **Flag operations**

Name	Explanation
R917A (SD memory card access instruction active)	Turns ON when the instruction is executed. Turns OFF when the instruction is completed.
R917B (SD memory card access instruction execution done)	Turns OFF when the instruction is executed. Turns ON when the instruction is completed.
R917C (SD memory card access instruction execution result)	Reports the result when the instruction is completed. Normal completion: 0, Abnormal completion: 1
R9007 R9008 (ER)	When the device specification is indirect access (index modification), this turns ON when the specified address is outside the device range.
	Turns ON when an out-of-range value is specified for [n].
	Turns ON when an out-of-range value is specified for [D].

2.1.3 F427 CWT (File Data Write Instruction)

■ Instruction format



■ List of operands

Operand	Explanation
S	The starting address of the device in which data to be written is stored (data format: unsigned 16-bit integer)
n	Number of written data (data format: unsigned 16-bit integer)
D1	Starting address of the device that stores the path name of the file to be written to and number of characters Specify the number of characters in [D1] and the path name (folder name + file name: maximum 256 characters) in [D1+1] and following addresses
D2	Starting address of the device where parameters related to information such as saving format are stored (data format: unsigned 16-bit integer)

■ Available devices (●: Available)

Operand	WX	WY	WR	WL	SV	EV	DT	LD	I	SWR	SDT	Integers			Index modifier *1
												K	H	M	
S	●	●	●	●	●	●	●	●	●						●
n	●	●	●	●	●	●	●	●	●			●	●		●
D1	●	●	●	●	●	●	●	●	●					●	●
D2	●	●	●	●	●	●	●	●	●						●

*1: Character constants cannot be specified.

■ Outline of operation

- Reads [n] pieces of data stored in the device address starting with [S], and writes them in the file specified by [D1] in a SD memory card according to the parameter specified by [D2].

■ [n]: Specification of the number of written data

Saving format	Set value of [D]	Setting range of [n]
16-bit data	K1, K2, K7, K11	0 to 32767
32-bit data	K3, K4, K5, K8	0 to 32766
64-bit data	K9	0 to 16383
ASCII	K10	0 to 1999

(Note) When "0" is specified for [n], each result is as follows.

1: In case of creating a new file, a 0-byte file is created.

2: In case of overwriting a file, a 0-byte file is created.

3: In case of editing a file, only the date of the file is changed.

■ [D1]: Specification of folder name and file name

Set device	Description
D1	Specify the number of characters of the folder name and the file name to be written. (Specify the full path.)
D1+1 to D1+128	Specify the folder name and the file name to be written. Specify the full path. Up to 256 characters including a folder name and file name.

Notes

1) When using the Tool Software FPWIN GR7, you can directly enter the path name (folder name and file name) using character constants.

2) If specifying data register DT or another memory area, use the F253 (SSET) instruction to store the path name (folder name and file name) with character data.

■ [D2] to [D2+6]: Parameters related to the writing format

Set device	Description
D2	Writing format
D2+1	Writing mode
D2+2	Option
D2+3	Writing position (file pointer) Number of bytes from the head or end of file
D2+4	
D2+5	Number of written data
D2+6	

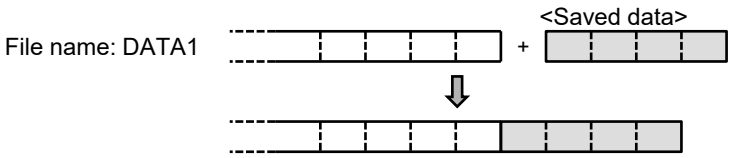
■ [D2]: Specification of the writing format

Set value of [D2]	Written contents		Fixed number of digits	Extension
K0	-	-	-	-
K1	DEC	Unsigned 16-bit integer	5	.CSV (comma-separated text)
K2		Signed 16-bit integer	6	
K3		Unsigned 32-bit integer	10	
K4		Signed 32-bit integer	11	
K5	Floating point type real numbers	32bit	13	
K7	HEX	1 word	4	
K8		2 words	8	
K9		4 words	16	
K10	ASCII	Character string	-	
K11	BIN	16bit	-	.BIN (BIN data)

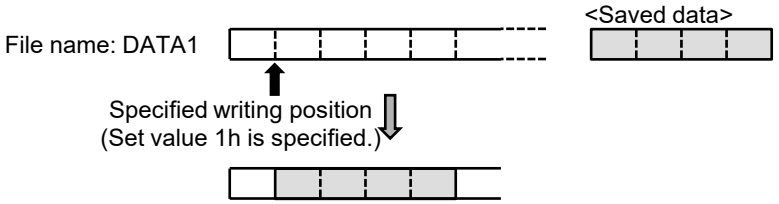
■ **[D2+1]: Specification of writing mode**

Set value of D2+1	Description
0: New file mode	Deletes the file contents and then writes data. When no file exists, creates a new file.
1: Add mode	Writes additional data from the end of a file. When no file exists, creates a new file.
2: Writing position specification mode 1	Writes data from the position offset the number of bytes stored in [D2+3] and [D2+4] from the head of the file.
3: Writing position specification mode 2	Writes data from the position offset the number of bytes stored in [D2+3] and [D2+4] from the end of the file.

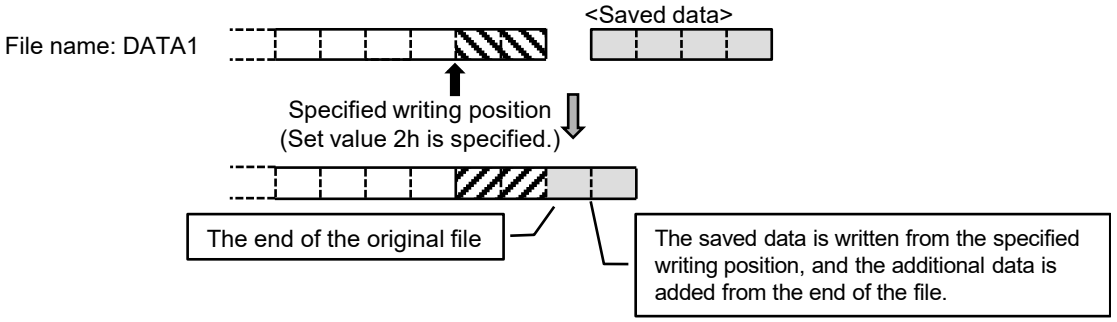
Example 1) When specifying the addition of file



Example 2) When specifying the writing position from the head of the file



Example 3) When specifying the writing position from the end of the file



■ **[D2+2]: Specification of options**

Specified bit	Description	
bit0-7	Line break	- When outputting a CSV file, set the line other than the end of the file. 0: Do not insert line breaks except at the end of the file. 1 to 255: Insert line breaks at the comma-separated data of a specified number. When K10 (ASCII) or K11 (BIN) is specified for [D2] saving method, the line break setting is invalid.
bit8	Postfix	- When outputting a CSV file, specify the data to be added to the end of the written data. 0: Insert a line break (0Dh+0Ah). 1: Insert a comma (2Ch).
bit9	Zero suppression	- Outputting a CSV file, specify wheter to perform zero suppression or not. 0: Not perform zero suppression 1: Perform zero suppression (Deletes unnecessary zero, and outputs the file right-aligned.)
bit10-15		Reserved for system (Zero is set.)

Example of option settings

- The following shows the data written by the bit0-7 values of [D2+2] in the following conditions. Writing format [D2] = 7(HEX 16 bits), bit 9 of [D2+2: = 0, Not perform zero suppression, and the written data is "1 2 3 4 5".

[D2+2] bit0-7	Written data (Additional specified data at end)								
0	0001	,	0002	,	0003	,	0004	,	0005
1	0001	0D0A	0002	0D0A	0003	0D0A	0004	0D0A	0005
2	0001	,	0002	0D0A	0003	,	0004	0D0A	0005
3	0001	,	0002	,	0003	0D0A	0004	,	0005
4	0001	,	0002	,	0003	,	0004	0D0A	0005
5	0001	,	0002	,	0003	,	0004	,	0005
6	0001	,	0002	,	0003	,	0004	,	0005

(Note) 0D0A in the table indicates a line break (0Dh+0Ah).

Example of conversion when zero suppression is ON or OFF

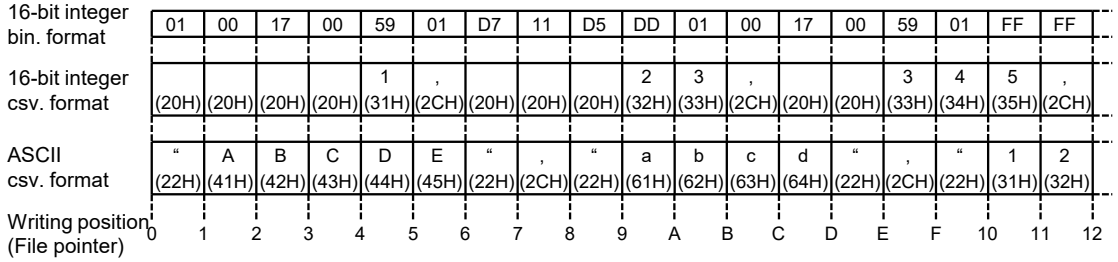
[D2] Specification of writing format		Digit number	Zero suppression: ON	Zero suppression: OFF
1	Unsigned 16-bit integer	5	␣␣␣␣**0**	**00000**
2	Signed 16-bit integer	6	␣␣␣␣␣**0** ␣␣␣␣**-1**	**␣00000** **-00001**
3	Unsigned 32-bit integer	10	␣␣␣␣␣␣␣␣␣**0**	**0000000000**
4	Signed 32-bit integer	11	␣␣␣␣␣␣␣␣␣␣**0** ␣␣␣␣␣␣␣␣␣**-1**	**␣0000000000** **-0000000001**
5	Floating-point type real number 32 bits	13	␣␣␣␣␣␣␣␣␣␣␣**0** ␣␣␣␣␣␣␣␣␣␣**-1** ␣␣␣␣␣␣␣␣**1E-10** ␣␣␣␣␣**1.234567** **-3.402823E+38**	**␣000000000000** **-000000000001** **␣00000001E-10** **␣00001.234567** **-3.402823E+38**
6	HEX 1 word	4	␣␣␣**0**	**0000**
7	HEX 2 words	8	␣␣␣␣␣␣␣**0**	**00000000**
8	HEX 4 words	16	␣␣␣␣␣␣␣␣␣␣␣␣␣␣␣**0**	**0000000000000000**

(Note) "␣" is a space (20h).

■ **[D2+3] and [D2+4]: Specification of writing position (file pointer)**

- Available when writing position specification mode is selected for [D2+1].

The setting of the writing position (file pointer) indicates the position separated by one byte from the initial (or ending) data of a stored file.



- Operation when writing to an SD memory card ends

Writing mode	Operation
Writing position specification mode 1	Stores the positions up to the head of the newly saved data in areas [D2+3] and [D2+4] counted from the beginning of the file.
Writing position specification mode 2	Stores the positions up to the end of the newly saved data in areas [D2+3] and [D2+4] counting from the end of the file.

- Operation will be as follows when writing is performed again.

Writing mode	Operation
Writing position specification mode 1	The data is written in the file from the writing position (file pointer) counted from the head of the file.
Writing position specification mode 2	The data is written in the file from the writing position (file pointer) counted from the end of the file.
New file mode	Data is always written from the head of a file. The writing position (file pointer) after the writing process is not stored.
Add mode	Data is always written from the end of a file. The writing position (file pointer) after the writing process is not stored.

■ **Number of data writable with [D2+5], [D2+6]**

- Stores the number of data that was writable as a result of writing to a file.

Example 1) When the number of written data is 40 and free space for 100 data is available in the file, 40 (the number of written data) is stored.

Example 2) When the number of written data is 40 and free space for 30 data is available in the file, 30 (the number of written data) is stored.

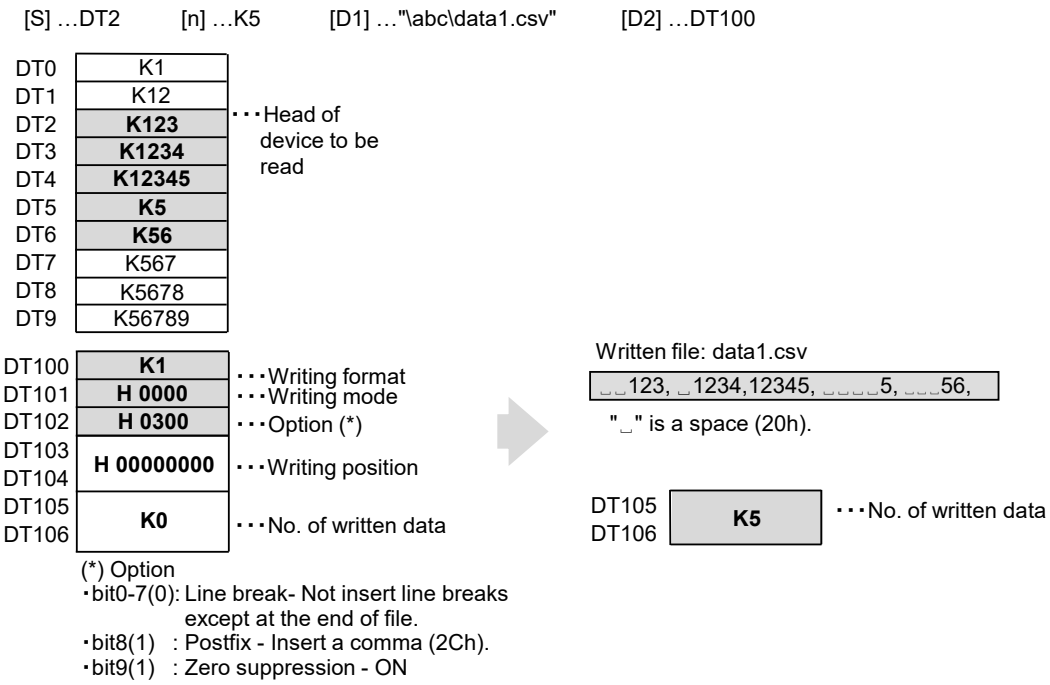
Example 3) When the number of written characters is 40 and free space for 100 characters is available in the file, 40 (the number of written characters) is stored.

Example 4) When the number of written characters is 40 and free space for 30 characters is available in the file, 30 (the number of written characters) is stored.

■ **Example of processing (csv. format file)**

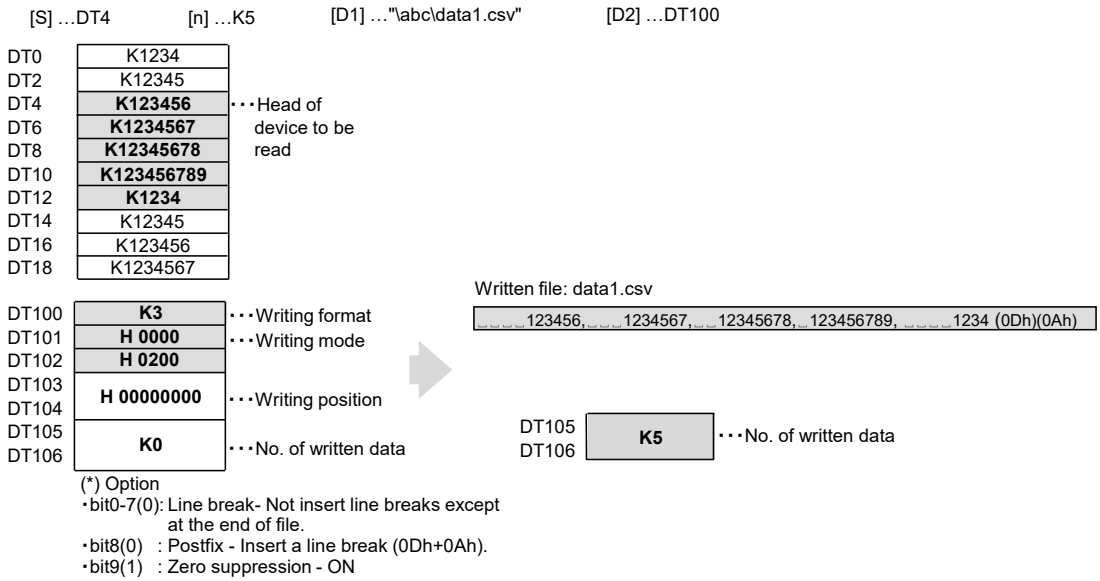
Example 1)

- Reading five data (five words) of unsigned 16-bit integer data from the area starting with device DT2. The read data is written in new mode to the file "\abc\data1.csv" in the SD memory card.
- An empty line is inserted in the data by zero suppression, and a comma (2Ch) is inserted at the end.



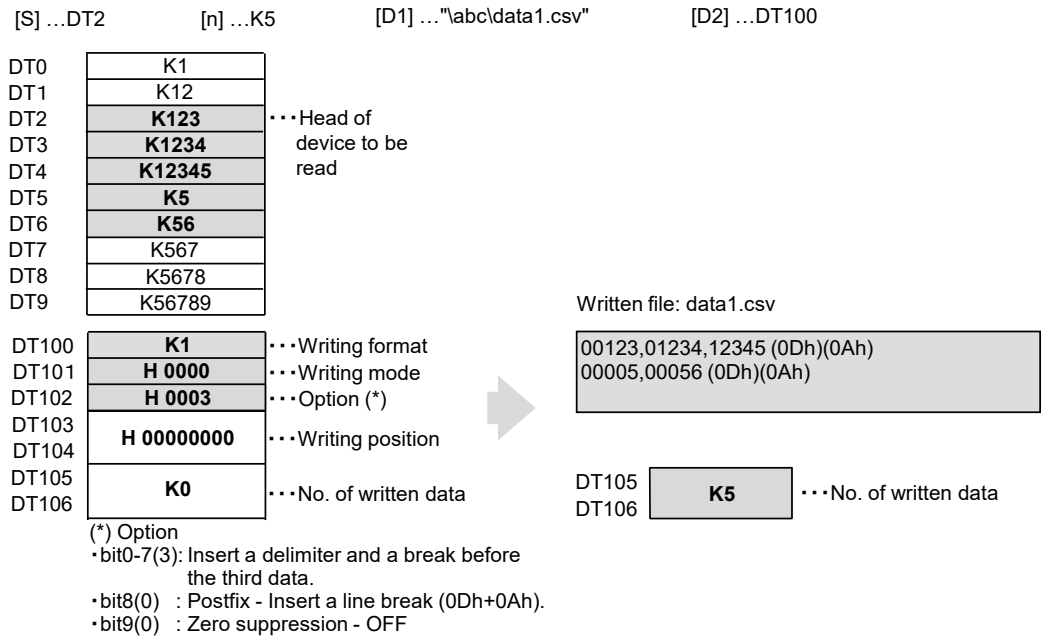
Example 2)

- Reading five data (10 words) of unsigned 32-bit integer data from the area starting with device DT4. The read data is written in new mode to the file "\abc\data1.csv" in the SD memory card.
- An empty line is inserted in the data by zero suppression, and a comma (2Ch) is inserted at the end.



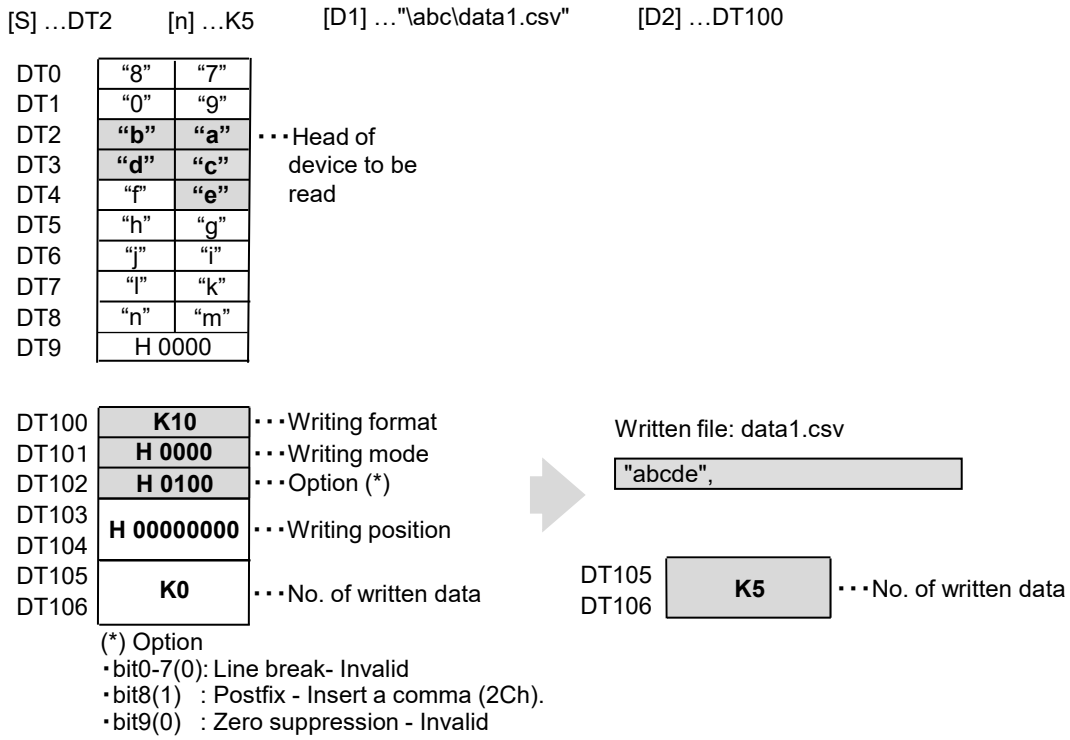
Example 3)

- Reading five data (five words) of unsigned 16-bit integer data from the area starting with device DT2. The read data is written in new file mode to the file "\abc\data1.csv" in the SD memory card.
- Insert line breaks (0Dh+0Ah) at the third data delimiter and the end of the file.



Example 4)

- Reading five data (five characters) of ASCII data from the lowest byte, from the area starting with device DT2. The read data is written in new mode to the file "\abc\data1.csv" in the SD memory card.
- Insert a comma (2Ch) at the end of the file.



(*) Option
- bit0-7(0): Line break- Invalid
- bit8(1) : Postfix - Insert a comma (2Ch).
- bit9(0) : Zero suppression - Invalid

Example 5)

- Reading six data (six characters) of ASCII data from the area starting with device DT2. The read data is written in new mode from the file pointer position of the existing file "\abc\data1.csv" in the SD memory card.
- Insert a comma (2Ch) at the end of the file.

[S] …DT2 [n] …K6 [D1] …"\abc\data1.csv" [D2] …DT100

	High	Low	
DT0	“8”	“7”	
DT1	“0”	“9”	
DT2	**“b”**	**“a”**	・・・Head of device to be read
DT3	**“d”**	**“c”**	
DT4	**“f”**	**“e”**	
DT5	“h”	“g”	
DT6	“j”	“i”	
DT7	“l”	“k”	
DT8	“n”	“m”	
DT9	H 0000		

Byte address

DT100	**K10**	・・・Writing format
DT101	**H 0002**	・・・Writing mode
DT102	**H 0100**	・・・Option (*)
DT103 DT104	**H 00000007**	・・・Writing position
DT105 DT106	**K0**	・・・No. of written data

(*) Option
・bit0-7(0): Line break- Invalid
・bit8(1) : Postfix - Insert a comma (2Ch).
・bit9(0) : Zero suppression - Invalid

Written file: data1.csv

"abcdef**ghijklmno**pqrstuvwxyz",

File pointer

Written file: data1.csv

"abcdef**"abcdef",**pqrstuvwxyz",

File pointer

DT103 DT104	**H 00000010**	・・・Writing position
DT105 DT106	**K6**	・・・No. of written data

Example 6)

- Reading 10000 data (10000 words) of signed 16-bit integer data from the area starting with device DT10000. The read data is written in CSV format in "\FP0H\DT.CSV" in a SD memory card in new file mode.
- Insert a blank line with zeros suppressed in the data, and insert lines breaks at the 10th data delimiter and the end of the file (0Dh+0Ah).

[S] …DT10000 [n] …K10000 [D1] …"\FP0H\DT.CSV" [D2] …DT50

DT10000	**K10000**	・・・Head of device to be read
DT10001	**K10001**	
DT10002	**K10002**	
・		
・		
・		
DT19997	**K19997**	
DT19998	**K19998**	
DT19999	**K19999**	
DT20000	K0	

DT50	**K2**	・・・Writing format
DT51	**H 0000**	・・・Writing mode
DT52	**H 020A**	・・・Option (*)
DT53 DT54	**H 00000000**	・・・Writing position
DT55 DT56	**K0**	

(*) Option
・bit0-7(0Ah): Line break- Insert a delimiter and a break before the 10th data.
・bit8(0) : Postfix - Insert a line break (0Dh+0Ah).
・bit9(1) : Zero suppression - ON

Written file: \FP0H\DT.CSV

␣10000,␣10001,␣10002,␣10003,␣10004,␣10005,␣10006,␣10007,␣10008,␣10009 0Dh0Ah
␣10010,␣10011,␣10012,␣10013,␣10014,␣10015,␣10016,␣10017,␣10018,␣10019 0Dh0Ah
・
・
・
␣19990,␣19991,␣19992,␣19993,␣19994,␣19995,␣19996,␣19997,␣19998,␣19999 0Dh0Ah

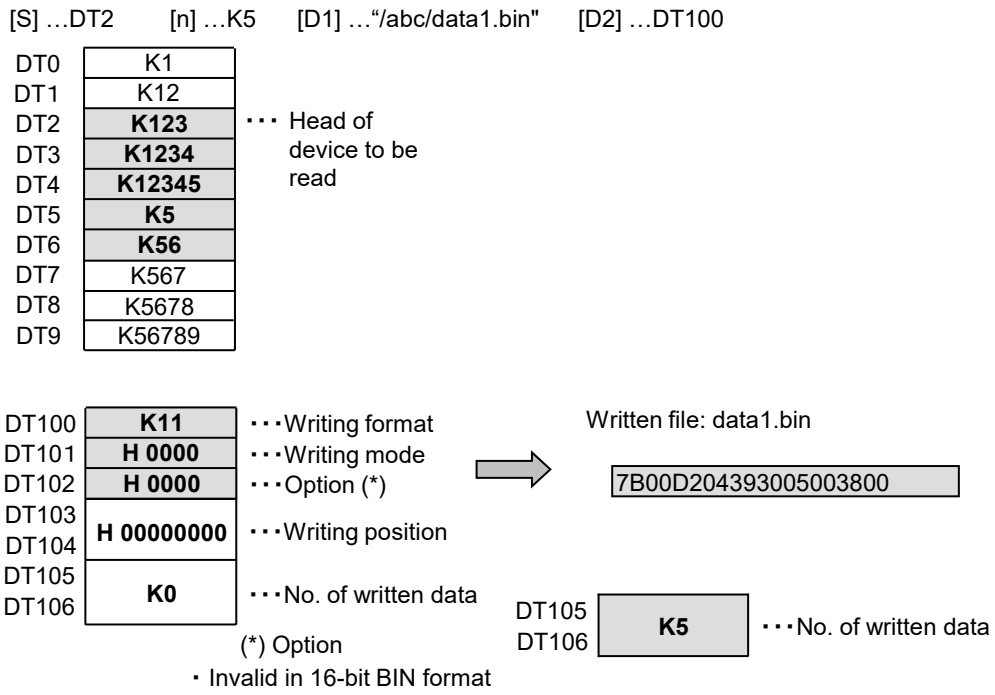
"_" is a space (20h).

DT55 DT56	**K10000**	・・・No. of written data

■ **Example of processing (bin. format file)**

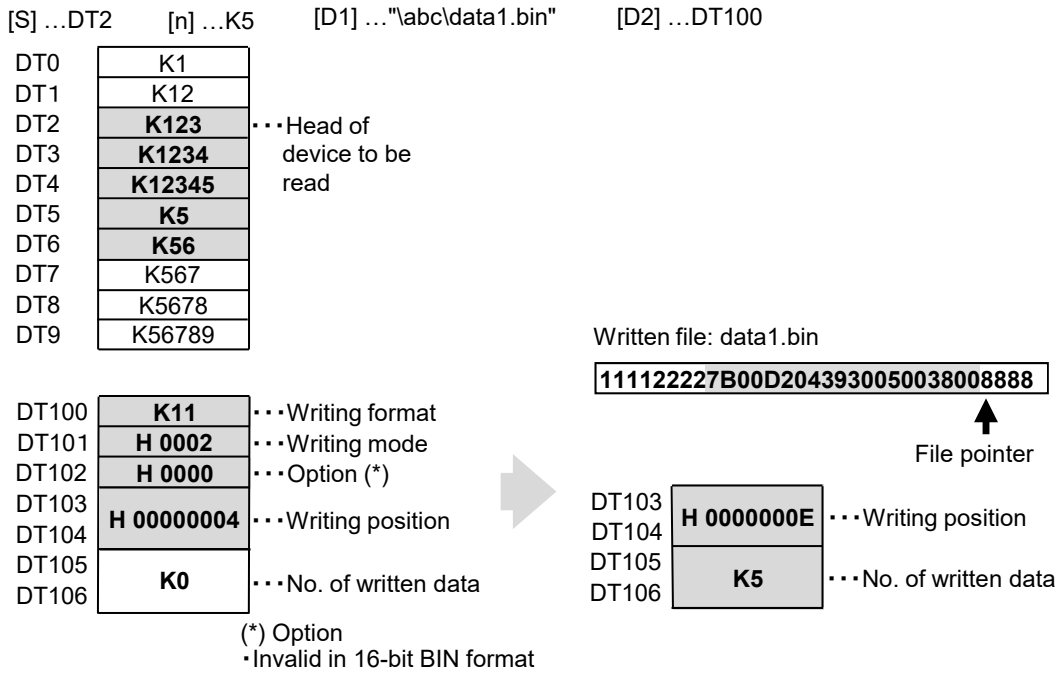
Example 1)

- Reading five data (five words) of 16-bit integer data from the area starting with device DT2. The read data is written in new file mode to the file "\abc\data1.bin" in the SD memory card.



Example 2)

- Reading five data (five words) of 16-bit data from the area starting with device DT2. The read data is written in new file mode from the file pointer position of the existing file "\abc\data1.bin" in the SD memory card.



■ **Precautions during programming**

- In addition, refer to "3.1 Common Precautions for SD Card Access Instructions".
- The SD memory card access instruction active flag (R917A) turns ON after the execution condition has turned ON until the completion of the execution of the instruction. During this period, other SD memory card access instructions cannot be executed.
- In case of the saving format 10 (ASCII string), character strings written from D2 are enclosed in double quotation marks and output.
- A double quotation mark (") in character strings is converted to two double quotation marks ("").
- When the attribute of the file to be written is set to read only, data cannot be written.

■ Flag operations

Name	Explanation
R917A (SD memory card access instruction active)	Turns ON when the instruction is executed. Turns OFF when the instruction is completed.
R917B (SD memory card access instruction execution done)	Turns OFF when the instruction is executed. Turns ON when the instruction is completed.
R917C (SD memory card access instruction execution result)	Reports the result when the instruction is completed. Normal completion: 0, Abnormal completion: 1
R9007 R9008 (ER)	When the device specification is indirect access (index modification), this turns ON when the specified address is outside the device range.
	Turns ON when an out-of-range value is specified for a parameter.
	Turns ON when an out-of-range value is specified in the area reserved for the system.

2.1.4 F428 CRD (File Data Read Instruction)

■ Instruction format

■ List of operands

Operand	Explanation
S1	Starting address of the device that stores the path name of the file to be read and number of characters Specify the number of characters in [S1] and the path name (folder name + file name: maximum 256 characters) in [S1+1] and following addresses
S2	Starting address of the device where parameters related to data to be read are stored
n	Number of read data
D	Starting address of the device where the data to be read is stored

■ Available devices (●: Available)

Operand	WX	WY	WR	WL	SV	EV	DT	LD	I	SWR	SDT	Integers			Index modifier *1
												K	H	M	
S1	●	●	●	●	●	●	●	●	●					●	●
S2	●	●	●	●	●	●	●	●	●						●
n	●	●	●	●	●	●	●	●	●			●	●		●
D		●	●	●	●	●	●	●	●						●

*1: Character constants cannot be specified.

■ Outline of operation

- [n] items of data are read from the file in the SD memory card specified by [S1] in accordance with the parameters specified by [S2]. The read data are stored in the devices starting with [D].
- The separator characters used between data and data are commas (",") and line break codes (LF or CR+LF).
- If you specified ASCII data and read an odd number of bytes, only the lowest byte of the last word is stored.
- If you specified binary data and read an odd number of bytes, H00 is stored in the highest byte of the last word.

■ [S1] and [S1+1] Specification of folder name and file name

Set device	Description
S1	Set the number of characters of the file name to be read. (Specify the full path.)
S1+1 to S1+128	Specify the file path of the file to be read. - Specify the full path. Up to 256 characters including a folder name and file name.

Notes:

1) When using the Tool Software FPWIN GR7, you can directly enter the path name (folder name and file name) as character constants.
2) If specifying data register DT or other memory area, use the F253 (SSET) instruction to store the path name (folder name and file name) as character data. [n]: Specification of the number of written data

■ [S2] to [S2+6]: Specification items of data format to be read

Set device	Description
S2	Reading format
S2+1	Reading mode
S2+2	Reserved for system
S2+3	Reading position (file pointer) Number of bytes from the head or the end of file
S2+4	
S2+5	Number of read data
S2+6	

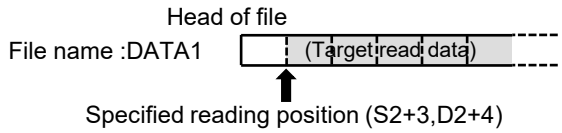
■ [S2]: Specification of reading format

Set value of S2	Read contents		Fixed number of digits	Extension
K0	-	-	-	-
K1	DEC	Unsigned 16-bit integer	5	.CSV (comma-separated text)
K2		Signed 16-bit integer	6	
K3		Unsigned 32-bit integer	10	
K4		Signed 32-bit integer	11	
K5	Floating point type real numbers	32bit	13	
K7	HEX	1 word	4	
K8		2 words	8	
K9		4 words	16	
K10	ASCII	Character string	-	
K11	BIN	16bit	-	.BIN (BIN data)

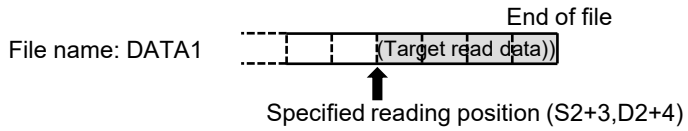
■ **[S2+1]: Specification of data format to be read**

Set value of S2+1	Description
0: Normal mode	Always reads data from the head of a file.
1: Normal mode	Always reads data from the head of a file. * The same operation as the case of 0.
2: Reading position specification mode 1	Reads data from the position offset the number of bytes stored in [S2+3] and [S2+4] from the head of the file.
3: Reading position specification mode 2	Reads data from the position offset the number of bytes stored in [S2+3] and [S2+4] from the end of the file.

Example 1) When specifying the reading position from the head of file



Example 2) When specifying the reading position from the end of file



■ **[S2+3] and [S2+4]: Specification of reading position (file pointer)**

- Available only when the Reading position specification mode 1 or mode 2 is set for [S2+1].
- When reading into the file ends, the position of the end of read data is stored at the reading position (file pointer). If the reading operation is performed again in this state, the next data will be read.

Reading mode	Description
Reading position specification mode 1	Data is read from the reading position (file pointer) counted from the head of the file.
Reading position specification mode 2	Data is read from the reading position (file pointer) counted from the end of the file.
Normal mode	This is invalid. Data is always read from the head of the file. In this case, storage to the reading position (file pointer) is not performed after the reading process.

- The reading position (file pointer) is specified in units of bytes.

■ **[S2+5], [S2+6] Number of data that could be read**

- Stores the number of data that could be read as a result of reading from the file.

Example 1) When the number of read data is 40 and 100 items of data exist in the file, the number of data 40 read from the head of the file is stored.

Example 2) When the number of read data is 40 and 30 items of data exist in the file, the number of data 30 read from the head of the file is stored.

Example 3) When the number of read characters are 40 and 100 items of characters exist in the file, the number of characters 40 read from the head of the file is stored.

Example 4) When the number of read characters are 40 and 30 items of characters exist in the file, the number of characters 30 read from the head of the file is stored.

■ **[n]: Specification of the number of reading data**

Saving format	Set value of [S2]	Setting range of [n]
16-bit data	K1, K2, K7, K11	0 to 32767
32-bit data	K3, K4, K5, K8	0 to 32766
64-bit data	K9	0 to 16383
ASCII	K10	0 to 1999

Example of processing

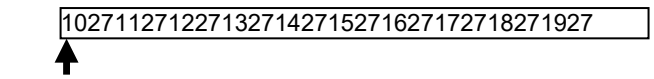
Example 1)

- Reading five data (five words) of 16-bit BIN data from the file “\abc\data1.bin” in an SD memory card. The read data are stored in the area starting from DT102.
- As the "Reading position specification mode 1" is selected, the file pointer moves after reading.

[S1] …"\abc\data1.bin" [S2] …DT50 [n] …K5 [D] …DT102

DT50	**H 000B**	・・・Reading format
DT51	**H 0002**	・・・Reading mode
DT52	**H 0000**	・・・Reserved for system
DT53 DT54	**H 00000000**	・・・Reading position
DT55 DT56	**K0**	・・・No. of read data

Data content of file "data1.bin" (16-bit BIN format)

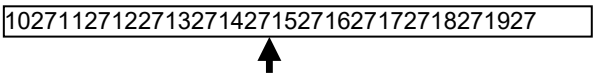


File pointer

DT100	H 0000
DT101	H 0000
DT102	H 0000
DT103	H 0000
DT104	H 0000
DT105	H 0000
DT106	H 0000
DT107	H 0000
DT108	H 0000
DT109	H 0000

DT100	H 0000
DT101	H 0000
DT102	**H 2710**
DT103	**H 2711**
DT104	**H 2712**
DT105	**H 2713**
DT106	**H 2714**
DT107	H 0000
DT108	H 0000
DT109	H 0000

Data content of file "data1.bin" (16-bit BIN format)



File pointer

Example 2)

- Reading five data from the file "\abc\data1.csv" in an SD memory card. The read data are stored in an area starting from DT102 (5 words) as 16-bit unsigned integer data.
- As the "Reading position specification mode 1" is selected, the file pointer moves after reading.

[S1] …"\abc\data1.csv" [S2] …DT50 [n] …K5 [D] …DT102

DT50	**K1**	・・・Reading format
DT51	**H 0002**	・・・Reading mode
DT52	**H 0000**	・・・Reserved for system
DT53 DT54	**H 00000000**	・・・Reading position
DT55 DT56	**K0**	・・・No. of read data

Data content of file "data1.csv" (16-bit DEC format)

12,123,1234,12345,5,56,567,5678,56789,1,

File pointer

DT100	K0
DT101	K0
DT102	K0
DT103	K0
DT104	K0
DT105	K0
DT106	K0
DT107	K0
DT108	K0
DT109	K0

DT100	K0
DT101	K0
DT102	**K12**
DT103	**K123**
DT104	**K1234**
DT105	**K12345**
DT106	**K5**
DT107	K0
DT108	K0
DT109	K0

Data content of file "data1.csv" (16-bit DEC format)

12,123,1234,12345,5,56,567,5678,56789,1,

File pointer

Example 3)

- Reading five data from the file "\abc\data1.csv" in an SD memory card. The read data are stored in the area starting from DT102 (10 words) as 32-bit unsigned integer data.
- As the "Reading position specification mode 1" is selected, the file pointer moves after reading.

[S1] …"\abc\data1.csv" [S2] …DT50 [n] …K5 [D] …DT102

DT50	**K3**	・・・Reading format
DT51	**H 0002**	・・・Reading mode
DT52	**H 0000**	・・・Reserved for system
DT53 DT54	**H 00000000**	・・・Reading position
DT55 DT56	**K0**	・・・No. of read data

Data content of file "data1.csv" (32-bit DEC format)

Byte address

123456,1234567,12345678,123456789,567890,5678901,・・

File pointer

DT100	K0
DT102	K0
DT104	K0
DT106	K0
DT108	K0
DT110	K0
DT112	K0
DT114	K0
DT116	K0
DT118	K0

DT100	K0
DT102	**K123456**
DT104	**K1234567**
DT106	**K12345678**
DT108	**K123456789**
DT110	**K567890**
DT112	K0
DT114	K0
DT116	K0
DT118	K0

Data content of file "data1.csv" (32-bit DEC format)

123456,1234567,12345678,123456789,567890,5678901,・・

File pointer

Example 4)

- Reads ten data (ten characters) of ASCII data from the file "\abc\data1.csv" in a SD memory card.
- Double quotation marks (") that singularly exist in character strings are not counted.
- The character data is stored in the area starting with DT102.
- As the "Reading position specification mode 1" is selected, the file pointer moves after reading.

[S1] …"\abc\data1.csv" [S2] …DT50 [n] …K10 [D] …DT102

DT50	**K10**	・・・Reading format
DT51	**H 0002**	・・・Reading mode
DT52	**H 0000**	・・・Reserved for system
DT53 DT54	**H 00000000**	・・・Reading position
DT55 DT56	**K0**	・・・No. of read data

Data content of file "data1.csv" (ASCII string format)

"ABC"DE"FGHIJ","KLMNOP",

File pointer

DT100	H 0000	
DT101	H 0000	
DT102	H 00	H 00
DT103	H 00	H 00
DT104	H 00	H 00
DT105	H 00	H 00
DT106	H 00	H 00
DT107	H 0000	
DT108	H 0000	

DT100	H 0000	
DT101	H 0000	
DT102	“B”	“A”
DT103	“D”	“C”
DT104	“F”	“E”
DT105	“H”	“G”
DT106	“J”	“I”
DT107	H 0000	
DT108	H 0000	

Data content of file "data1.csv" (ASCII string format)

"ABC"DE"FGHIJ", "KLMNOP",

File pointer

Example 5)

- Reading 10000 data from the file "\FP0H\DT.CSV" in an SD memory card. The read data are stored in the area starting from DT10000 (10000 words) as 16-bit signed integer data.
- As the "Normal mode 0" is selected, the file pointer moves after reading.

[S1] …"\FP0H\DT.CSV" [S2] …DT50 [n] …K10000 [D] …DT10000

DT50	**K2**	···Reading format
DT51	**H 0000**	···Reading mode
DT52	**H 0000**	···Reserved for system
DT53 DT54	**H 00000000**	···Reading position
DT55 DT56	**K0**	···No. of read data

Data content of file "DT.CSV" (Signed 16-bit DEC format)

_10000,_10001,_10002,_10003,·····,_199990Dh0Ah

File pointer

DT10000	K0
DT10001	K0
DT10002	K0
·	
·	
·	
DT19997	K0
DT19998	K0
DT19999	K0
DT20000	K0

DT10000	**K10000**
DT10001	**K10001**
DT10002	**K10002**
·	
·	
·	
DT19997	**K19997**
DT19998	**K19998**
DT19999	**K19999**
DT20000	K0

Data content of file "DT.CSV" (Signed 16-bit DEC format)

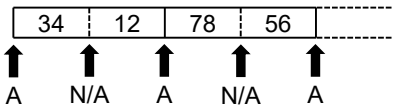
_10000,_10001,_10002,_10003,·····,_199990Dh0Ah

File pointer

■ **Precautions during programming**

- In addition, refer to "3.1 Common Precautions for SD Card Access Instructions".
- The SD memory card access instruction active flag (R917A) turns ON after the execution condition has turned ON until the completion of the execution of the instruction. During this period, other SD memory card access instructions cannot be executed.
- Successive two double quotation marks ("") in character strings are read as one character ("). Double quotation marks that singularly exist are ignored.
- If a space, comma or line break is inserted at the position of file pointer after reading a CSV file, the file pointer output to the result data is at the data position next to the comma or line break. The space, comma or line break at the end of data is skipped.
- When reading a CSV file, null fields (such as parts with successive commas) are skipped, and the data is not stored in devices. The next data to be read is stored in the next device (that is not a skipped null field). At that time, the skipped data is also counted as the number of data.
- During the execution of the F428(CRD) instruction, data values read from the SD memory card are written from the beginning of a specified device in order. Until the completion of the F428(CRD) instruction, do not read the data of the device specified by the F428(CRD) instruction.
- When reading ASCII data, correct processing may not be possible if there are delimiter characters (commas and/or linefeed codes) in the data.
- Specify the points at which each data is separated for [S2+3] and [S2+4], reading positions (file pointers). "A" in the figure below shows the positions where data can be read properly.

Example 1) 16-bit integer data (bin. format file)



Example 2) ASCII data (csv. format file)

A: Position where data can be properly read

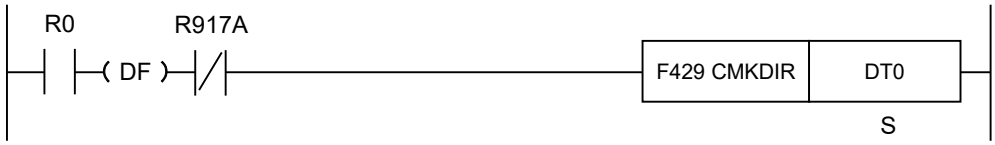
N/A: Position where data cannot be properly read

■ Flag operations

Name	Explanation
R917A (SD memory card access instruction active)	Turns ON when the instruction is executed. Turns OFF when the instruction is completed.
R917B (SD memory card access instruction execution done)	Turns OFF when the instruction is executed. Turns ON when the instruction is completed.
R917C (SD memory card access instruction execution result)	Reports the result when the instruction is completed. Normal completion: 0, Abnormal completion: 1
R9007 R9008 (ER)	When the device specification is indirect access (index modification), this turns ON when the specified address is outside the device range.
	Turns ON when an out-of-range value is specified for a parameter.
	Turns ON when an out-of-range value is specified in the area reserved for the system.

2.1.5 F429 CMKDIR (Directory Creation)

■ Instruction format



■ List of operands

Operand	Explanation
S	Starting address of the device that stores the path name of the folder being created Specify the number of characters in [S] and the path name (folder name: maximum 256 characters) in [S+1] and following addresses

■ Available devices (●: Available)

Operand	WX	WY	WR	WL	SV	EV	DT	LD	I	SWR	SDT	Integers			Index modifier *1
												K	H	M	
S	●	●	●	●	●	●	●	●	●					●	●

*1: Character constants cannot be specified.

■ Outline of operation

- Creates a folder in a SD memory card.
- Stores the number of characters of folder name in [S], and the ASCII data indicating the folder name in [S+1] and successive operand.

■ [S], [S+1]: Specification of folder name

Setting device	Description
S	Specify the number of characters of the folder name to be created. (File path specification)
S+1 to S+128	Specify the folder name to be created. ・Full path specification, folder name, up to 256 characters.

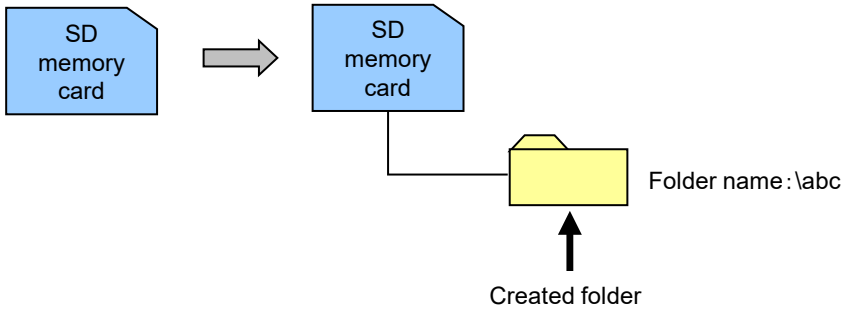
Note 1: When using the Tool Software FPWIN GR7, you can directly enter the path name (folder name) using character constants.

Note 2: If specifying data register DT or another memory area, use the F253 (SSET) instruction to store the path name (folder name) with character data.

■ **Example of processing**

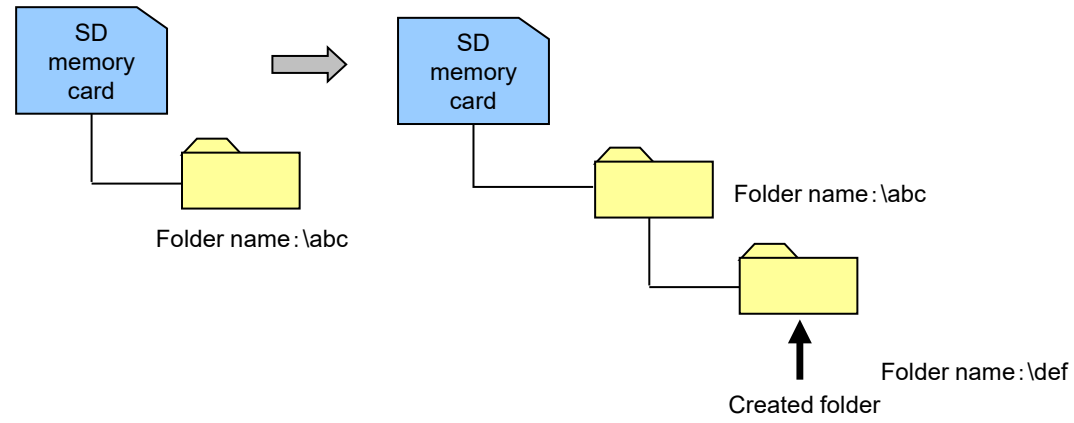
Example 1) When creating a folder "\abc" in a SD memory card

DT0	**K4**	・・・ No. of characters of folder name
DT1	**“a”** **“\”**	・・・ Folder name
DT2	**“c”** **“b”**	
DT3	H 0000	
DT4	H 0000	
DT5	H 0000	
Byte address	High Low	



Example 2) When creating a folder "\abc\def" in a SD memory card

DT0	**K8**	・・・No. of characters of folder name
DT1	**“a”** **“\”**	・・・Folder name
DT2	**“c”** **“b”**	
DT3	**“d”** **“\”**	
DT4	**“f”** **“e”**	
DT5	H 0000	
Byte address	High Low	



■ **Precautions during programming**

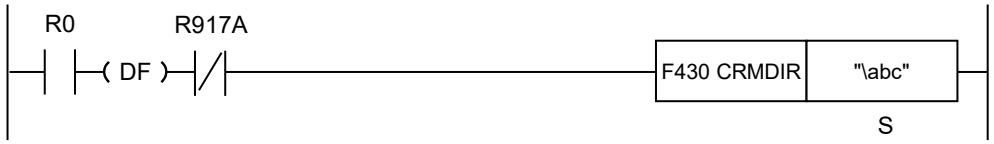
- In addition, refer to "3.1 Common Precautions for SD Card Access Instructions".
- The SD memory card access instruction active flag (R917A) turns ON after the execution condition has turned ON until the completion of the execution of the instruction. During this period, other SD memory card access instructions cannot be executed.
- To create a folder in a lower hierarchy like the folder "\abc\def", create a folder in the upper hierarchy in advance. Folders cannot be created simultaneously.
- An error occurs when a folder that is not in upper hierarchies is specified.
- When a folder to be created already exists, the operation normally ends without treatment.

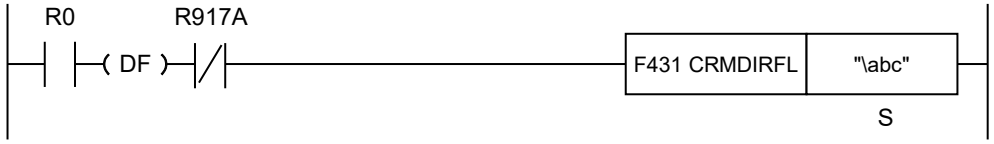
■ **Flag operations**

Name	Explanation
R917A (SD memory card access instruction active)	Turns ON when the instruction is executed. Turns OFF when the instruction is completed.
R917B (SD memory card access instruction execution done)	Turns OFF when the instruction is executed. Turns ON when the instruction is completed.
R917C (SD memory card access instruction execution result)	Reports the result when the instruction is completed. Normal completion: 0, Abnormal completion: 1
R9007 R9008 (ER)	When the device specification is indirect access (index modification), this turns ON when the specified address is outside the device range.

2.1.6 F430 CRMDIR / F431 CRMDIRFL (Directory Delete)

■ Instruction format





■ List of operands

Operand	Explanation
S	Starting address of the device that stores the path name of the folder being deleted Specify the number of characters in [S] and the path name (folder name: maximum 256 characters) in [S+1] and following addresses

■ Available devices (●: Available)

Operand	WX	WY	WR	WL	SV	EV	DT	LD	I	SWR	SDT	Integers			Index modifier *1
												K	H	M	
S	●	●	●	●	●	●	●	●	●					●	●

*1: Character constants cannot be specified.

■ Outline of operation

- Deletes the directory specified by [S] in a SD card.
- Stores the number of characters of folder name in [S], and the ASCII data indicating the folder name in [S+1] and successive operand.
- Differences between the F430 (CRMDIR) instruction and F431 (CRMDIRFL) instruction

Instruction	Differences
F430(CRMDIR) instruction	A directory cannot be deleted if files exist in the directory.
F431(CRMDIRFL) instruction	A directory can be deleted if files exist in the directory. However, a directory in which a subdirectory exists cannot be deleted.

■ [S], [S+1]: Specification of folder name

Setting device	Description
S	Specify the number of characters of the folder name to be deleted. (File path specification)
S+1 to S+128	Specify the folder name to be deleted. (Full path specification, folder name, up to 256 characters.)

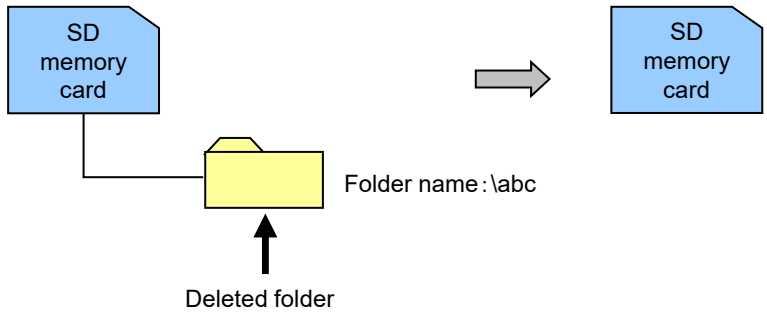
Notes:

1) When using the Tool Software FPWIN GR7, you can directly enter the path name (folder name) using character constants.
2) If specifying data register DT or another memory area, use the F253 (SSET) instruction to store the path name (folder name) with character data.

■ **Example of processing**

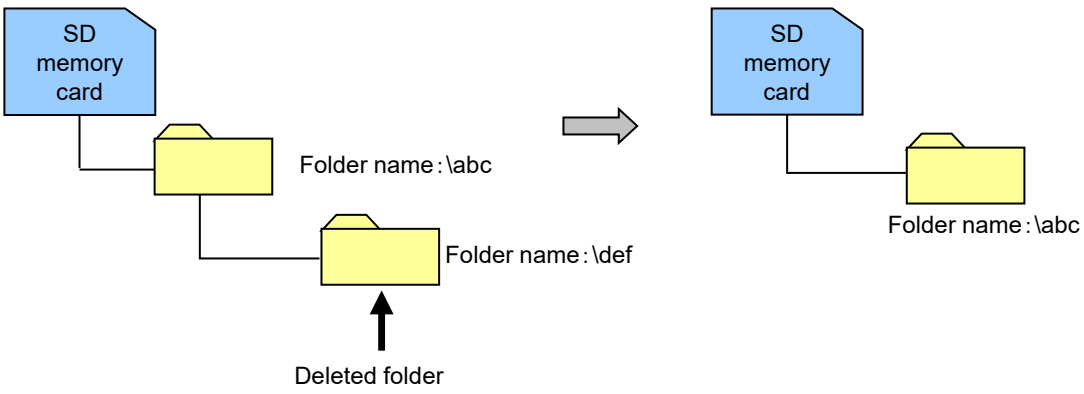
Example 1) When deleting a folder "\abc" in a SD memory card

DT0	**K4**	・・・No. of characters of folder name
DT1	**“a”** **“\”**	・・・Folder name
DT2	**“c”** **“b”**	
DT3	H 0000	
DT4	H 0000	
DT5	H 0000	
Byte address	High Low	



Example 2) When deleting a folder "\abc\def" in a SD memory card

DT0	**K8**	・・・No. of characters of folder name
DT1	**“a”** **“\”**	・・・ Folder name
DT2	**“c”** **“b”**	
DT3	**“d”** **“\”**	
DT4	**“f”** **“e”**	
DT5	H 0000	
Byte address	High Low	



■ **Precautions during programming**

- In addition, refer to "3.1 Common Precautions for SD Card Access Instructions".
- The SD memory card access instruction active flag (R917A) turns ON after the execution condition has turned ON until the completion of the execution of the instruction. During this period, other SD memory card access instructions cannot be executed.
- An error occurs when the folder to be deleted does not exist.

[F430 (CRMDIR) instruction]

- An error occurs when there are files or folders in a specified folder. Check the inside of the folder.

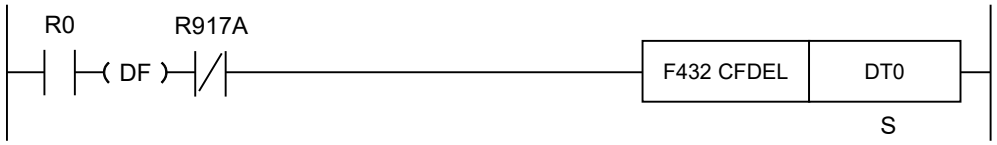
[F431 (CRMDIRFL) instruction]

- When there are files in the specified folder, the files are deleted in this case as well. An error occurs when there is a folder.
- When a file in the specified folder is open for writing, an error will occur.
- When a file in the specified folder is open for reading, the folder will be deleted. Read-open processing will result in an error.
- Flag operations

Name	Explanation
R917A (SD memory card access instruction active)	Turns ON when the instruction is executed. Turns OFF when the instruction is completed.
R917B (SD memory card access instruction execution done)	Turns OFF when the instruction is executed. Turns ON when the instruction is completed.
R917C (SD memory card access instruction execution result)	Reports the result when the instruction is completed. Normal completion: 0, Abnormal completion: 1
R9007 R9008 (ER)	When the device specification is indirect access (index modification), this turns ON when the specified address is outside the device range.

2.1.7 F432 CFDEL (File Delete)

■ Instruction format



■ List of operands

Operand	Explanation
S	Starting address of the device that stores the number of characters and the path name of the file being deleted Specify the number of characters in [S] and the path name (folder name + file name: maximum 256 characters) in [S+1] and following addresses

■ Available devices (●: Available)

Operand	WX	WY	WR	WL	SV	EV	DT	LD	I	SWR	SDT	Integers			Index modifier *1
												K	H	M	
S	●	●	●	●	●	●	●	●	●					●	●

*1: Character constants cannot be specified.

■ Outline of operation

- Deletes the file specified by [S] in a SD card.

■ [S], [S+1]: Specification of folder name and file name

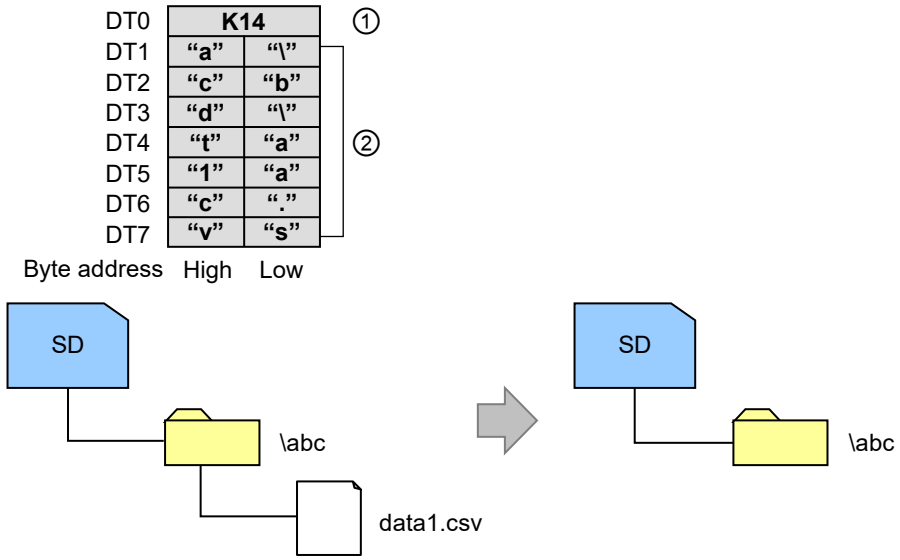
Setting device	Description
S	Specify the number of characters of the path name (folder name + file name) to be deleted. (File path specification)
S+1 to S+128	Specify the path name (folder name + file name) to be deleted. ・Full path specification, folder name, up to 256 characters.

Notes:

1) When using the Tool Software FPWIN GR7, you can directly enter the path name (folder name) using character constants.
2) If specifying data register DT or another memory area, use the F253 (SSET) instruction to store the path name (folder name) with character data.

■ **Example of processing**

Example 2) When deleting a file "\abc\data1.csv " in a SD memory card



■ **Precautions during programming**

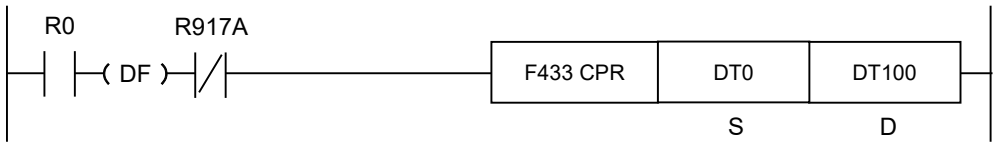
- In addition, refer to "3.1 Common Precautions for SD Card Access Instructions".
- The SD memory card access instruction active flag (R917A) turns ON after the execution condition has turned ON until the completion of the execution of the instruction. During this period, other SD memory card access instructions cannot be executed.
- An error occurs when the file to be deleted does not exist.

■ **Flag operations**

Name	Explanation
R917A (SD memory card access instruction active)	Turns ON when the instruction is executed. Turns OFF when the instruction is completed.
R917B (SD memory card access instruction execution done)	Turns OFF when the instruction is executed. Turns ON when the instruction is completed.
R917C (SD memory card access instruction execution result)	Reports the result when the instruction is completed. Normal completion: 0, Abnormal completion: 1
R9007 R9008 (ER)	When the device specification is indirect access (index modification), this turns ON when the specified address is outside the device range.

2.1.8 F433 CPR (ASCII Data Write into File)

■ Instruction format



■ List of operands

Operand	Explanation
S	Starting address of the device that stores the string data to be written, or the string Specify the number of characters in [S] and the string data (maximum 4096 characters) in [S+1] and following addresses
D	Starting address of the device that stores the path name of the file to be written to and the number of characters Specify the number of characters in [D] and the path name (folder name + file name: maximum 256 characters) in [D+1] and following addresses

■ Available devices (●: Available)

Operand	WX	WY	WR	WL	SV	EV	DT	LD	I	SWR	SDT	Integers			Index modifier *1
												K	H	M	
S	●	●	●	●	●	●	●	●	●					●	●
D	●	●	●	●	●	●	●	●	●					●	●

*1: Character constants cannot be specified.

■ Outline of operation

- Adds the character string specified by [S] to the end of the file named with the character string specified by [D].
- When the file specified by [D] does not exist, create a new file.

■ [S] to [S+1]: Specification of character string data

- Parameters related to the character string data written into a file name in a SD memory card.

Set device	Description
S	Number of characters written (maximum 4096)
S+1 or more	Character string data to be written

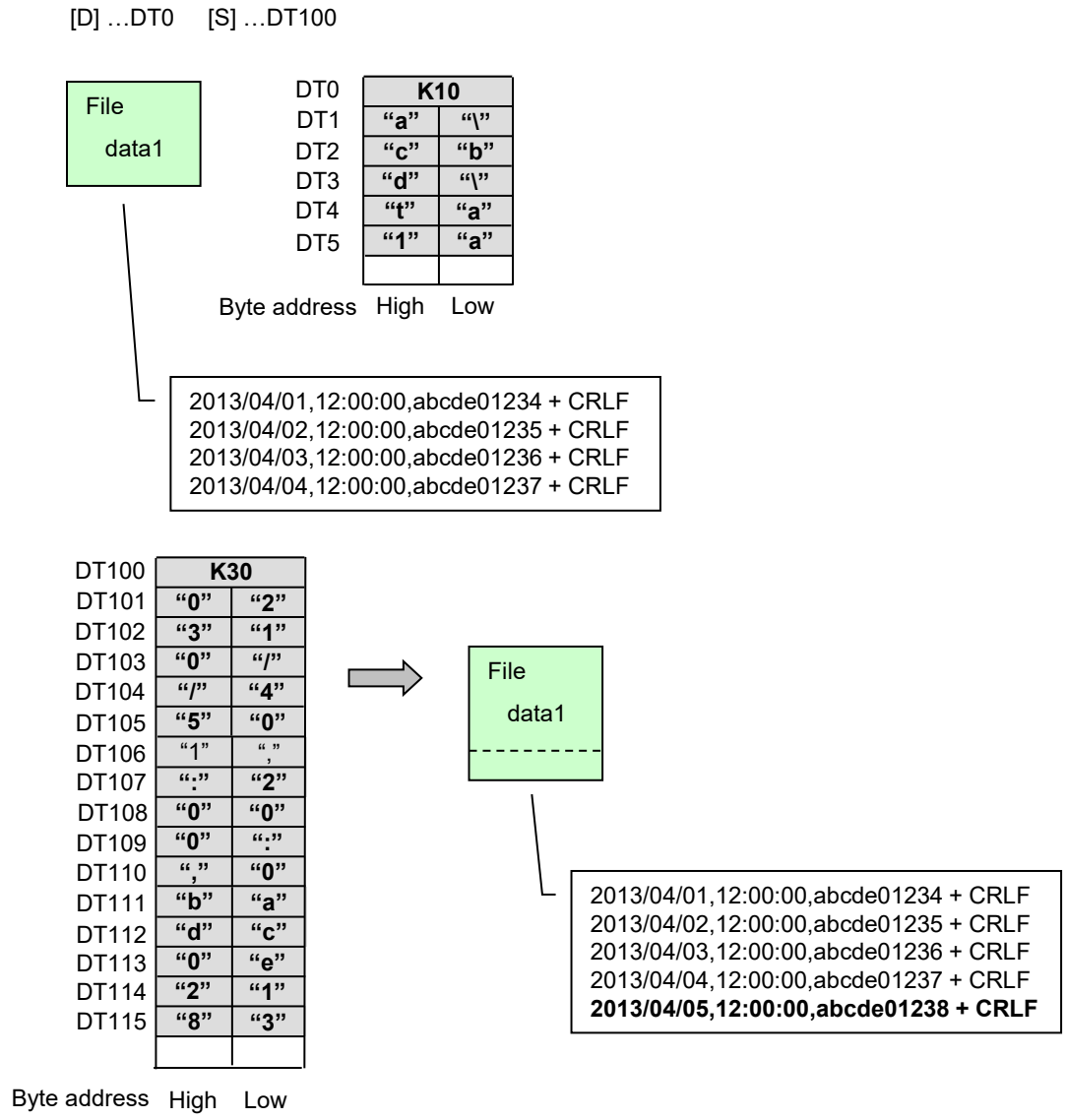
■ [D] to [D+1]: Specification of folder name and file name

- Starting device storing the file name to be written into a SD memory card (folder name + file name: 1 to 256 characters) and the number of characters.

Set device	Description
D	Specify the number of characters of the file name to be written. (Specify the full path.)
D+1 to D+128	Specify the file to be written. ・Specify the full path. Up to 256 characters including a folder name and file name.

■ **Example of processing**

When writing a character string "2013/04/05,12:00:00,abcde01238" in a file "\abc\data1".



■ **Precautions during programming**

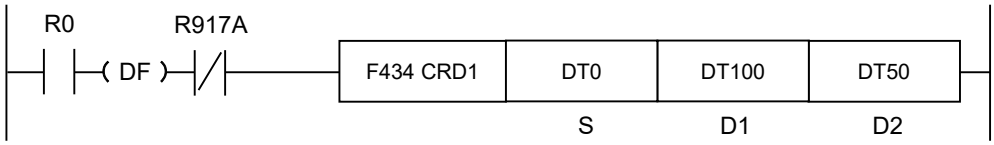
- In addition, refer to "3.1 Common Precautions for SD Card Access Instructions".
- The SD memory card access instruction active flag (R917A) turns ON after the execution condition has turned ON until the completion of the execution of the instruction. During this period, other SD memory card access instructions cannot be executed.

■ Flag operations

Name	Explanation
R917A (SD memory card access instruction active)	Turns ON when the instruction is executed. Turns OFF when the instruction is completed.
R917B (SD memory card access instruction execution done)	Turns OFF when the instruction is executed. Turns ON when the instruction is completed.
R917C (SD memory card access instruction execution result)	Reports the result when the instruction is completed. Normal completion: 0, Abnormal completion: 1
R9007 R9008 (ER)	When the device specification is indirect access (index modification), this turns ON when the specified address is outside the device range.
	This turns ON when the character string specified by [S] exceeds 4096 characters.

2.1.9 F434 CRD1 (One Line Read from File)

■ Instruction format



■ List of operands

Operand	Explanation
S	Starting address of the device that stores the path name of the file to be read and number of characters Specify the number of characters in [S] and the path name (folder name + file name: maximum 256 characters) in [S+1] and following addresses
D1	Starting address of the device where character string data to be read is stored
D2	Starting address of the device storing the parameters related to the positions and the maximum number of bytes of data to be read

■ Available devices (●: Available)

Operand	WX	WY	WR	WL	SV	EV	DT	LD	I	SWR	SDT	Integers			Index modifier *1
												K	H	M	
S	●	●	●	●	●	●	●	●	●					●	●
D1		●	●	●	●	●	●	●	●						●
D2	●	●	●	●	●	●	●	●	●						●

*1: Character constants cannot be specified.

■ Outline of operation

- The data is read from the position specified by [D2] of the file specified by [S], and is stored in the device address starting from [D1]. Reading is executed until the specified number of read bytes limit is reached, or until an LF or CR + LF is detected.

■ [S] to [S+1]: Specification of folder name and file name

- Starting device storing the folder name saved in a SD memory card (folder name + file name: 1 to 256 characters) and the number of characters.

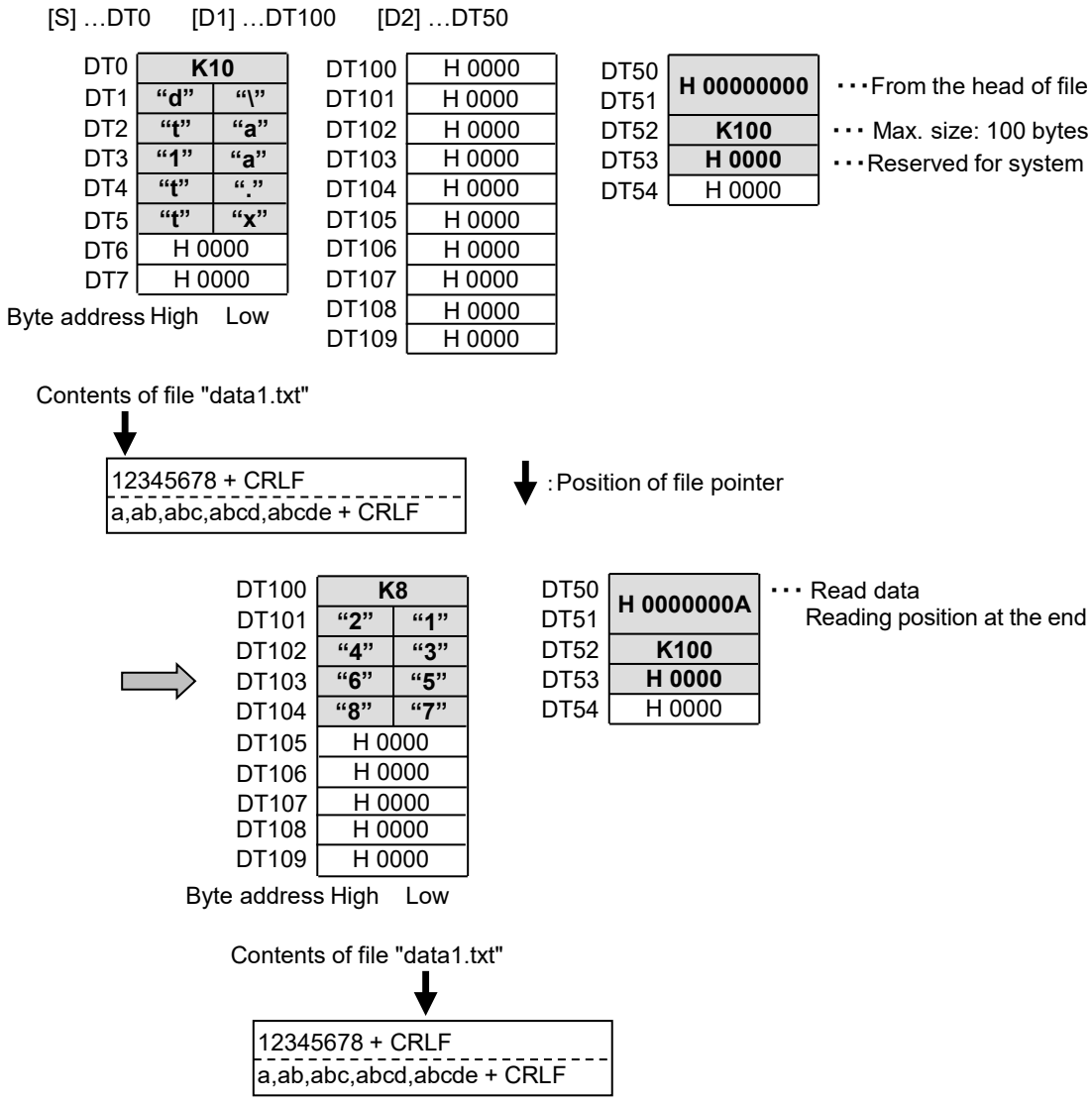
Set device	Description
S	Set the number of characters of the file name to be read. (Specify the full path.)
S+1 to S+128	Specify the file to be read. ・Specify the full path. Up to 256 characters including a folder name and file name.

■ [D2] to [D2+3]: Specification of reading position and the maximum number of bytes

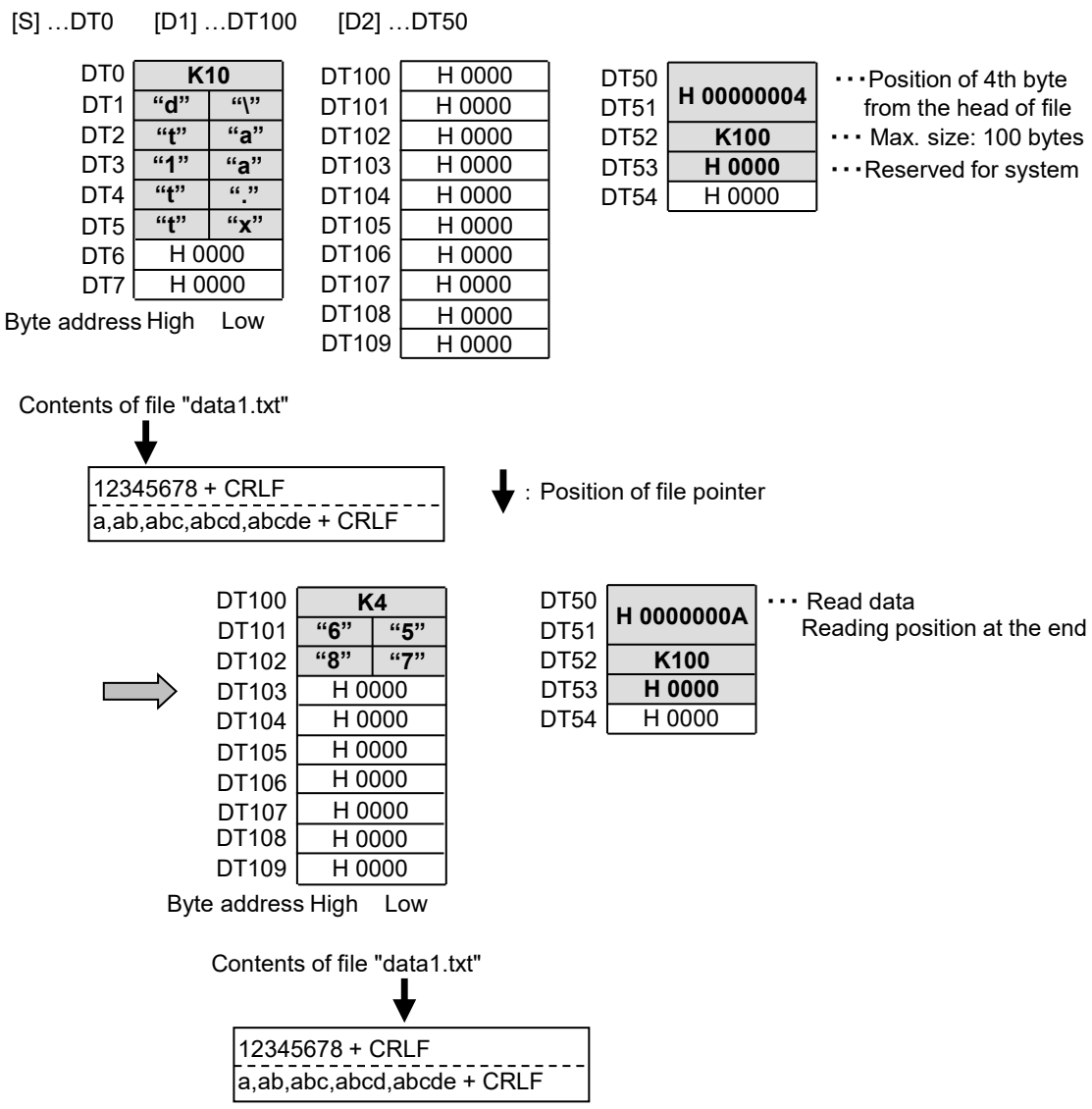
Set device	Set item	Description
D2	Reading position (file pointer)	Specify the byte position from the head of a file. Each line feed character (CR(0Dh) or LF(0Ah) is counted as one character. After the execution of the instruction, [D2, D2+1] is updated with the value that the number of read bytes is added. If the reading operation is performed again in this state, the next data will be read. The reading position can be specified by eight bits (by one byte).
D2+1		
D2+2	Maximum number of read bytes (Setting range: 1 to 4096)	Set the maximum number of bytes of data to be read. The setting range is 1 to 4096. If set to 0, will operate as 4096. When a line feed character [CR(0Dh), LF(0Ah) or CR+LF] exists before reaching the specified maximum number of bytes, the reading operation ends at that point.
D2+3	Reserved for system	Zero is set.

■ **Example of processing**

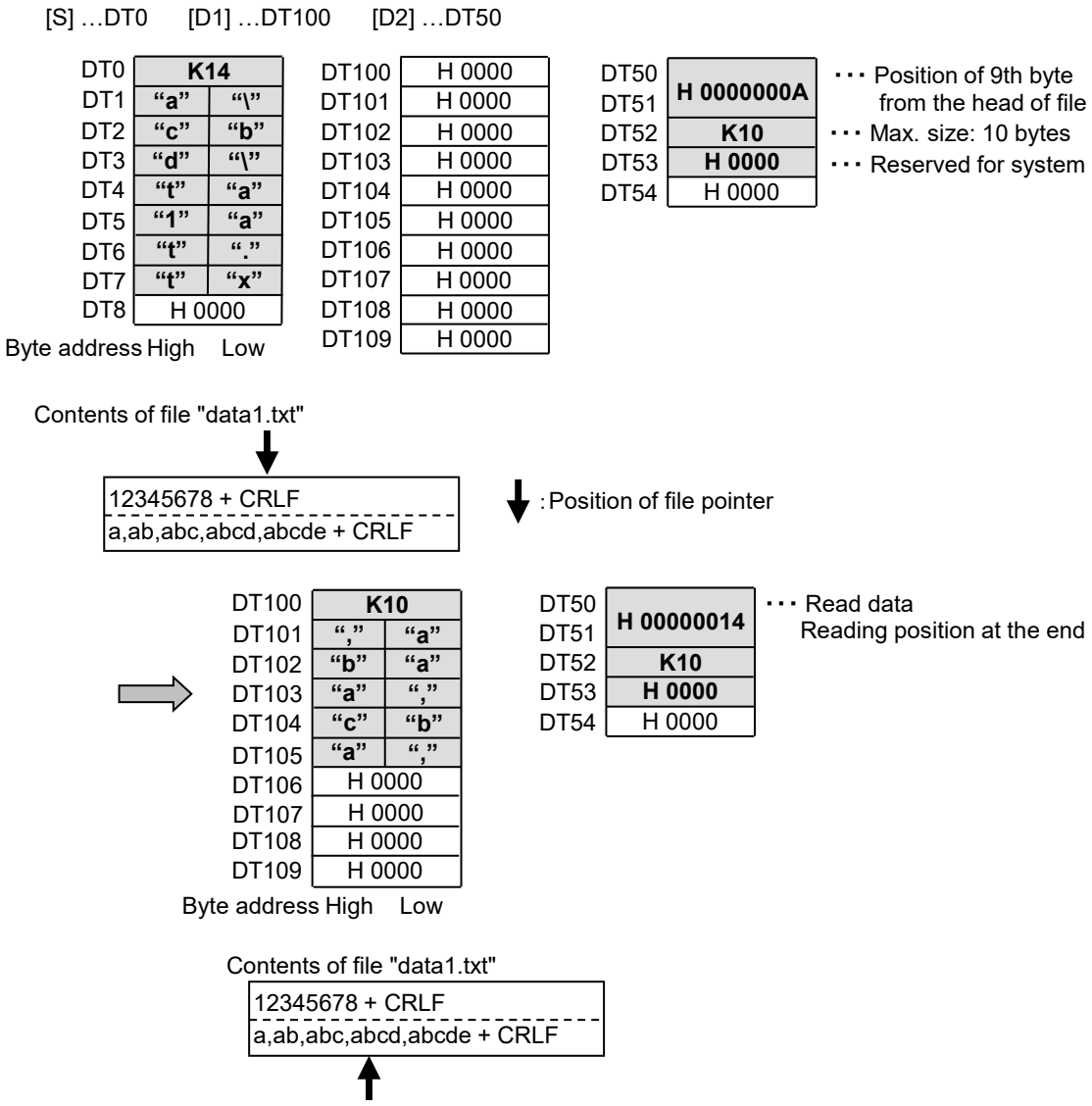
Example 1) When reading data from the file “\data1.txt”, specifying the head of the file for the reading position



Example 2) When reading data from a file "\data1.txt" specifying the 4th byte from the head of the file for the reading position



Example 3) When reading data from a file "\abc\data1.txt" specifying the 10th byte from the head of the file for the reading position



■ **Precautions during programming**

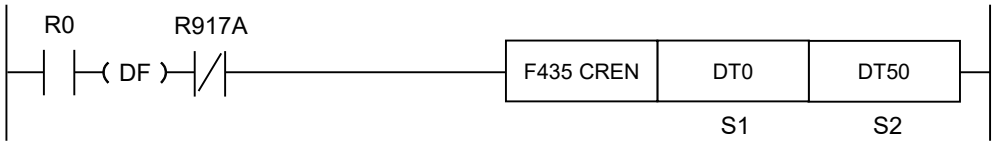
- In addition, refer to "3.1 Common Precautions for SD Card Access Instructions".
- The SD memory card access instruction active flag (R917A) turns ON after the execution condition has turned ON until the completion of the execution of the instruction. During this period, other SD memory card access instructions cannot be executed.
- During the execution of the F434(CRD1) instruction, data read from the SD memory card are written from the beginning of the data device specified in order. Therefore, do not read data in the range of the data device specified for data storage until the completion of this instruction.

■ **Flag operations**

Name	Explanation
R917A (SD memory card access instruction active)	Turns ON when the instruction is executed. Turns OFF when the instruction is completed.
R917B (SD memory card access instruction execution done)	Turns OFF when the instruction is executed. Turns ON when the instruction is completed.
R917C (SD memory card access instruction execution result)	Reports the result when the instruction is completed. Normal completion: 0, Abnormal completion: 1
R9007 R9008 (ER)	When the device specification is indirect access (index modification), this turns ON when the specified address is outside the device range.
	This turns ON when the value of [D2+2] exceeds 4096 characters.
	This turns ON when [D1]+[D2+2] is outside the device range.

2.1.10 F435 CREN (File Rename)

■ Instruction format



■ List of operands

Operand	Explanation
S1	Starting address of the device that stores the path name of the file being renamed and the number of characters Specify the number of characters in [S] and the path name (folder name + file name: maximum 256 characters) in [S+1] and following addresses
S2	Starting address of the device that stores the path name of the file that has been renamed and the number of characters Specify the number of characters in [S2] and the path name (folder name + file name: maximum 256 characters) in [S2+1] and following addresses A folder name can be omitted

■ Available devices (●: Available)

Operand	WX	WY	WR	WL	SV	EV	DT	LD	I	SWR	SDT	Integers			Index modifier *1
												K	H	M	
S1	●	●	●	●	●	●	●	●	●					●	●
S2	●	●	●	●	●	●	●	●	●					●	●

*1: Character constants cannot be specified.

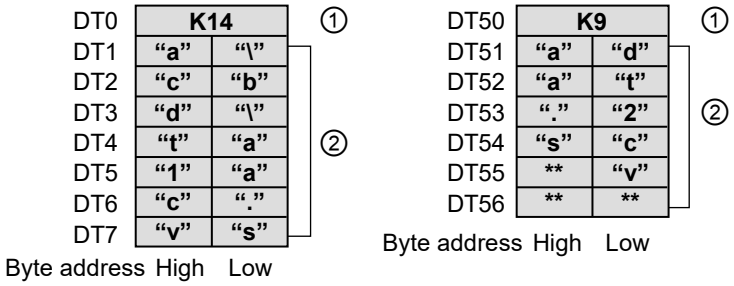
■ Outline of operation

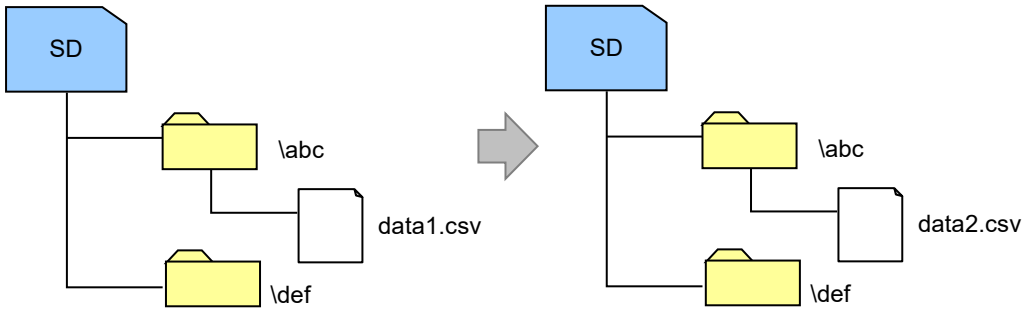
- Changes the file name specified by [S1] to the file name specified by [S2].

■ **Example of processing**

Example) When renaming a file "\abc\data1.csv " to "\abc\data2.csv "

①	Number of characters	②	Path name (folder name and file name)





■ **Precautions during programming**

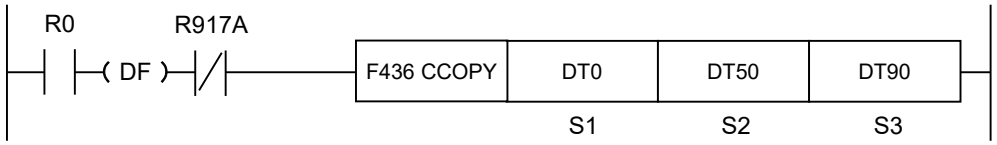
- In addition, refer to "3.1 Common Precautions for SD Card Access Instructions".
- The SD memory card access instruction active flag (R917A) turns ON after the execution condition has turned ON until the completion of the execution of the instruction. During this period, other SD memory card access instructions cannot be executed.
- The F435(CREN) instruction cannot be executed when the SD memory card access instruction is being executed.

■ **Flag operations**

Name	Explanation
R917A (SD memory card access instruction active)	Turns ON when the instruction is executed. Turns OFF when the instruction is completed.
R917B (SD memory card access instruction execution done)	Turns OFF when the instruction is executed. Turns ON when the instruction is completed.
R917C (SD memory card access instruction execution result)	Reports the result when the instruction is completed. Normal completion: 0, Abnormal completion: 1
R9007 R9008 (ER)	When the device specification is indirect access (index modification), this turns ON when the specified address is outside the device range.

2.1.11 F436 CCOPY (File Copy)

■ Instruction format



■ List of operands

Operand	Description
S1	Starting address of the device that stores the path name and number of characters of the copy source file Specify the number of characters in [S1] and the path name (folder name + file name: maximum 256 characters) in [S1+1] and following addresses
S2	Starting address of the device that stores the path name and number of characters of the copy destination file Specify the number of characters in [S2] and the path name (folder name + file name: maximum 256 characters) in [S2+2] and following addresses
S3	Setting of copy format

■ Available devices (●: Available)

Operand	WX	WY	WR	WL	SV	EV	DT	LD	I	SWR	SDT	Integers			Index modifier *1
												K	H	M	
S1	●	●	●	●	●	●	●	●	●					●	●
S2	●	●	●	●	●	●	●	●	●					●	●
S3	●	●	●	●	●	●	●	●	●			●	●		●

*1: Character constants cannot be specified.

■ Outline of operation

- Copies the file specified by [S1] to the file specified by [S2] according to the parameter specified by [S3].
- When a folder is specified for [S1], copies all files directly under the folder of [S1] into the area directly under the folder specified by [S2].
- Folders in further lower levels than the folder of [S1] are not copied.
- When [S1] and [S2] are exactly the same, an error occurs regardless of the value of [S3].
- When a file for [S1] and a folder for [S2] are specified, this copies the file specified by [S1] into the folder specified by [S2].

■ **[S1] to [S1+1]: Specification of folder name and file name of copy source**

- Starting device that stores the folder name (folder name + file name: 1 to 256 characters) and the number of characters of the copy source file.

Set device	Description
S1	Set the number of characters of the folder name to be copied. (File path specification)
S1+1 to S1+128	Specify the folder name to be copied. ・Specify the full path. Up to 256 characters including a folder name and file name.

■ **[S2] to [S2+1]: Specification of folder name and file name of copy destination**

- Starting device that stores the folder name (folder name + file name: 1 to 256 characters) and the number of characters of the copy destination file.

Set device	Description
S2	Set the number of characters of the folder name of the copy destination. (File path specification)
S2+1 to S2+128	Specify the folder name of the copy destination. ・Specify the full path. Up to 256 characters including a folder name and file name.

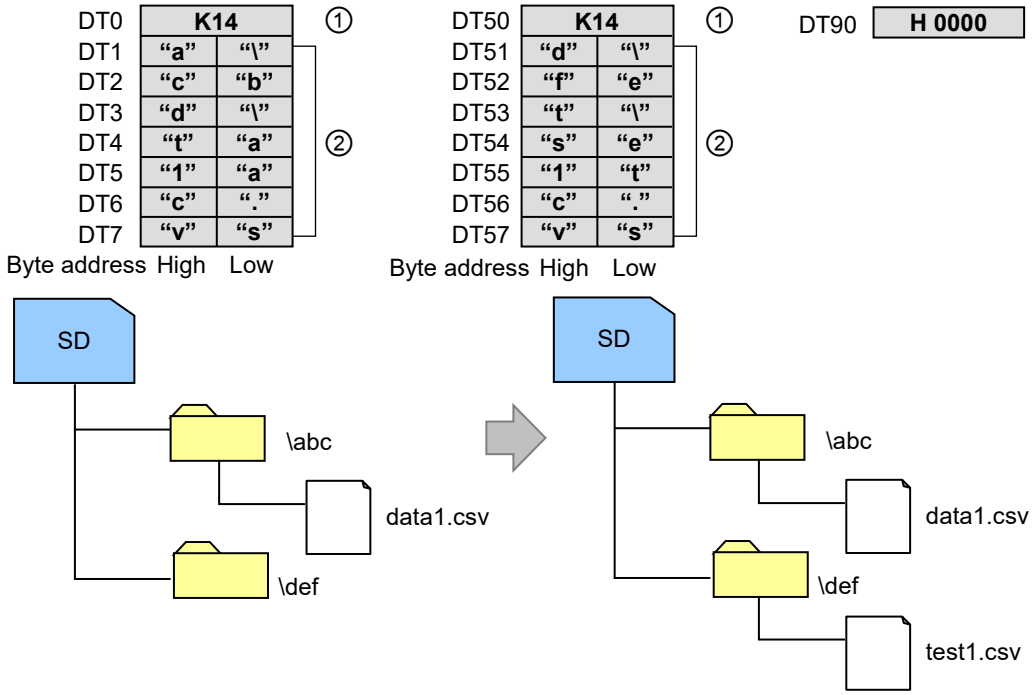
■ **[S3]: Specification of copy format**

Operand	Specified bit	Description
S3	bit0	0: Overwrites if there is a file with the same name in destination. Read-only files are not overwritten. 1: Abends without overwriting if there is a file with the same name in destination.
	bit1 to 15	(Reserved for system)

■ **Example of processing**

Example) When copying a file "abc\data1.csv " into "\def\test1.csv "

①	Number of characters	②	Path name (folder name and file name)



■ **Precautions during programming**

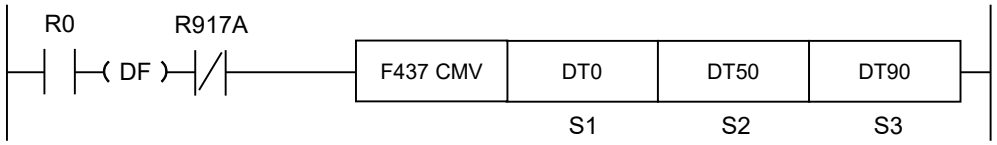
- In addition, refer to "3.1 Common Precautions for SD Card Access Instructions".
- The SD memory card access instruction active flag (R917A) turns ON after the execution condition has turned ON until the completion of the execution of the instruction. During this period, other SD memory card access instructions cannot be executed.
- When a folder is specified for [S1] and a file for [S2], "file name error" occurs.

■ **Flag operations**

Name	Explanation
R917A (SD memory card access instruction active)	Turns ON when the instruction is executed. Turns OFF when the instruction is completed.
R917B (SD memory card access instruction execution done)	Turns OFF when the instruction is executed. Turns ON when the instruction is completed.
R917C (SD memory card access instruction execution result)	Reports the result when the instruction is completed. Normal completion: 0, Abnormal completion: 1
R9007 R9008 (ER)	When the device specification is indirect access (index modification), this turns ON when the specified address is outside the device range.

2.1.12 F437 CMV (File Move)

■ **Instruction format**



■ **List of operands**

Operand	Explanation
S1	Starting address of the device that stores the number of characters and the path name of the file being moved Specify the number of characters in [S1] and the path name (folder name + file name: maximum 256 characters) in [S1+1] and following addresses
S2	Starting address of the device that stores the number of characters and the path name of the file of the move destination Specify the number of characters in [S2] and the path name (folder name + file name: maximum 256 characters) in [S2+1] and following addresses
S3	Setting of movement type

■ **Available devices (●: Available)**

Operand	WX	WY	WR	WL	SV	EV	DT	LD	I	SWR	SDT	Integers			Index modifier *1
												K	H	M	
S1	●	●	●	●	●	●	●	●	●					●	●
S2	●	●	●	●	●	●	●	●	●					●	●
S3	●	●	●	●	●	●	●	●	●			●	●		●

*1: Character constants cannot be specified.

■ **Outline of operation**

- Moves the file specified in the character string data starting with [S1] to the file path specified in the character string data starting with [S2].
- When a folder is specified for [S1], moves all files directly under the folder of [S1] to the area directly under the folder specified by [S2].
- Folders in further lower levels than the folder of [S1] are not moved.
- Read-only files remain as read-only files after move.
- When executing an instruction, more free space than the file size is necessary in the card.
- When specifying a file for [S1] and a folder for [S2], moves the file spepcified by [S1] to the folder specified by [S2].

■ **[S1] to [S1+1] :Specification of folder name and file name to be moved**

- Starting device that stores the folder name (folder name + file name: 1 to 256 characters) and the number of characters of the copy source file.

Set device	Description
S1	Specify the number of characters of the folder name to be moved. (File path specification)
S1+1 to S1+128	Specify the folder name to be moved. ・Specify the full path. Up to 256 characters including a folder name and file name.

■ **[S2] to [S2+1] :Specification of folder name and file name of the move destination**

- Starting device that stores the folder name (folder name + file name: 1 to 256 characters) and the number of characters of the copy destination file.

Set device	Description
S2	Set the number of characters of the folder name of the move destination. (Full path specification)
S2+1 to S2+128	Specify the folder name of the move destination. ・Specify the full path. Up to 256 characters including a folder name and file name.

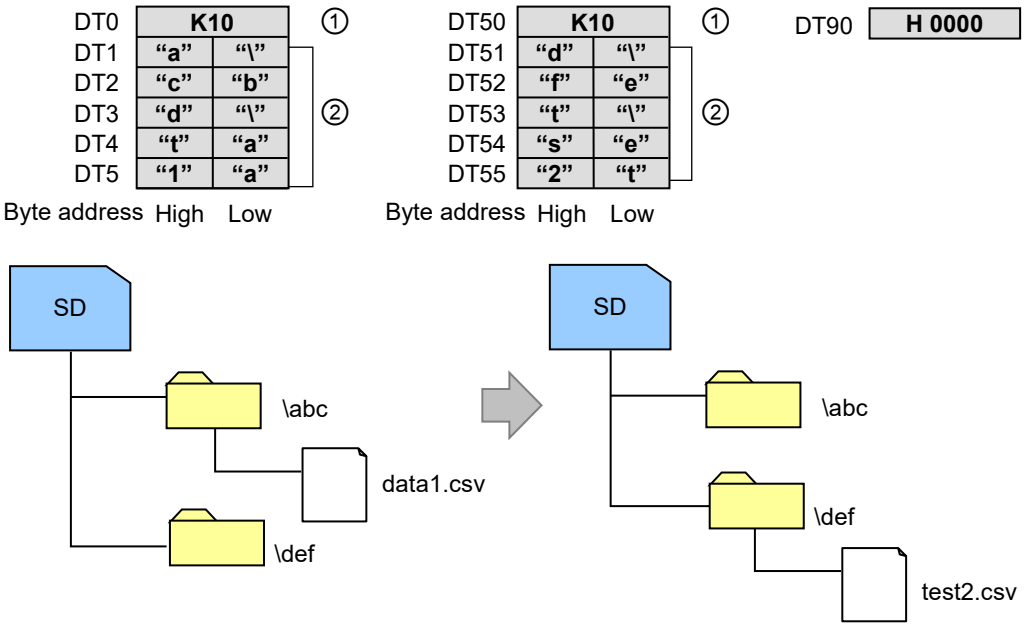
■ **[S3]: Specification of movement type**

Operand	Specified bit	Description
S3	bit0	0: Overwrites if there is a file with the same name in destination. 1: Abends without overwriting if there is a file with the same name in destination.
	bit1 to 15	(Reserved for system)

■ Example of processing

Example) When moving a file "\def\test2.csv" to "\abc\data1.csv"

①	Number of characters	②	Path name (folder name and file name)



■ Precautions during programming

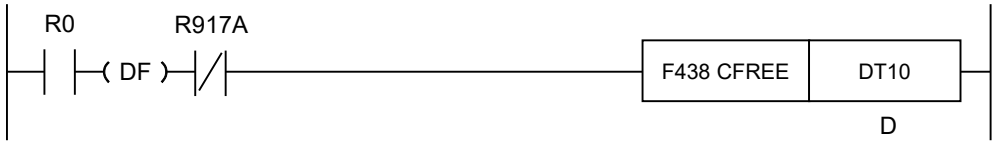
- In addition, refer to "3.1 Common Precautions for SD Card Access Instructions".
- The SD memory card access instruction active flag (R917A) turns ON after the execution condition has turned ON until the completion of the execution of the instruction. During this period, other SD memory card access instructions cannot be executed.
- When the folder specified by [S2] does not exist, "No file/folder" error occurs.
- When there is not enough free space, "memory card capacity shortage" error occurs.
- When a folder is specified for [S1] and a file for [S2], "file name error" occurs.

■ Flag operations

Name	Explanation
R917A (SD memory card access instruction active)	Turns ON when the instruction is executed. Turns OFF when the instruction is completed.
R917B (SD memory card access instruction execution done)	Turns OFF when the instruction is executed. Turns ON when the instruction is completed.
R917C (SD memory card access instruction execution result)	Reports the result when the instruction is completed. Normal completion: 0, Abnormal completion: 1
R9007 R9008 (ER)	When the device specification is indirect access (index modification), this turns ON when the specified address is outside the device range.

2.1.13 F438 CFREE (Obtainment of SD Memory Card Free Space: byte units)

■ Instruction format



■ List of operands

Operand	Explanation
D	Starting address of the device where the obtained free space is stored in byte unit

■ Available devices (●: Available)

Operand	WX	WY	WR	WL	SV	EV	DT	LD	I	SWR	SDT	Integers			Index modifier *1
												K	H	M	
D		●	●	●	●	●	●	●	●						●

*1: Character constants cannot be specified.

■ Outline of operation

- Stores a free space of SD memory card in the area specified by [D] in byte units.

Example) When 4GB free space is available in a SD memory card

[D] …DT10

DT10	**H 0000**
DT11	**H 0000**
DT12	**H 0001**
DT13	**H 0000**
DT14	H 0000
DT15	H 0000

H 1 0000 0000
(4,294,967,296 byte)

■ Precautions during programming

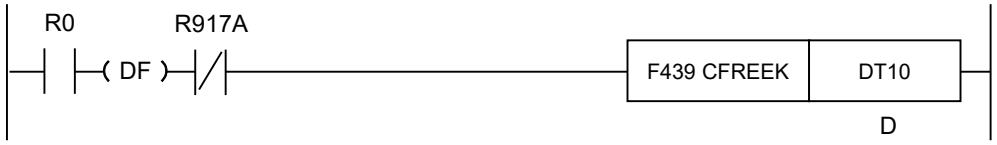
- In addition, refer to "3.1 Common Precautions for SD Card Access Instructions".
- The SD memory card access instruction active flag (R917A) turns ON after the execution condition has turned ON until the completion of the execution of the instruction. During this period, other SD memory card access instructions cannot be executed.

■ Flag operations

Name	Explanation
R917A (SD memory card access instruction active)	Turns ON when the instruction is executed. Turns OFF when the instruction is completed.
R917B (SD memory card access instruction execution done)	Turns OFF when the instruction is executed. Turns ON when the instruction is completed.
R917C (SD memory card access instruction execution result)	Reports the result when the instruction is completed. Normal completion: 0, Abnormal completion: 1
R9007 R9008 (ER)	When the device specification is indirect access (index modification), this turns ON when the specified address is outside the device range.

2.1.14 F439 CFREEK (Obtainment of SD Memory Card Free Space: KB units)

■ Instruction format



■ List of operands

Operand	Explanation
D	Starting address of the device where the obtained free space is stored in K (kilo) byte unit

■ Available devices (●: Available)

Operand	WX	WY	WR	WL	SV	EV	DT	LD	I	SWR	SDT	Integers			Index modifier *1
												K	H	M	
D		●	●	●	●	●	●	●	●						●

*1: Character constants cannot be specified.

■ Outline of operation

- Stores a free space of SD memory card in the area specified by [D] in K (kilo) byte units.

Example) When 4GB free space is available in a SD memory card

[D] …DT10

DT10	**H 0000**
DT11	**H 0040**
DT12	**H 0000**

H 0040 0000
(4,194,304 Kbyte)

■ Precautions during programming

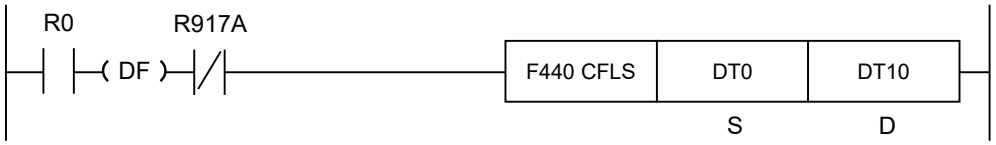
- In addition, refer to "3.1 Common Precautions for SD Card Access Instructions".
- The SD memory card access instruction active flag (R917A) turns ON after the execution condition has turned ON until the completion of the execution of the instruction. During this period, other SD memory card access instructions cannot be executed.

■ Flag operations

Name	Explanation
R917A (SD memory card access instruction active)	Turns ON when the instruction is executed. Turns OFF when the instruction is completed.
R917B (SD memory card access instruction execution done)	Turns OFF when the instruction is executed. Turns ON when the instruction is completed.
R917C (SD memory card access instruction execution result)	Reports the result when the instruction is completed. Normal completion: 0, Abnormal completion: 1
R9007 R9008 (ER)	When the device specification is indirect access (index modification), this turns ON when the specified address is outside the device range.

2.1.15 F440 CFLS (Obtainment of File Status)

■ Instruction format



■ List of operands

Operand	Explanation
S	Starting address of the device that stores the path name and the number of characters of the file whose state is to be acquired Specify the number of characters in [S] and the path name (folder name + file name: maximum 256 characters) in [S+1] and following addresses
D	Starting address of the device where the obtained file status is stored

■ Available devices (●: Available)

Operand	WX	WY	WR	WL	SV	EV	DT	LD	I	SWR	SDT	Integers			Index modifier *1
												K	H	M	
S	●	●	●	●	●	●	●	●	●					●	●
D		●	●	●	●	●	●	●	●						●

*1: Character constants cannot be specified.

■ Outline of operation

- Obtains the status of the file name specified by [S], and stores the result in 10-word area ([D] to [D+9]) from [D].

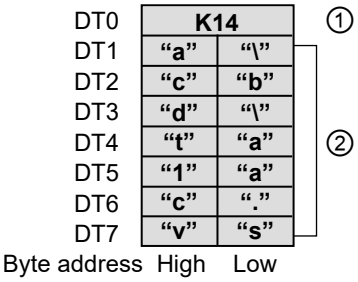
■ **Details of stored contents**

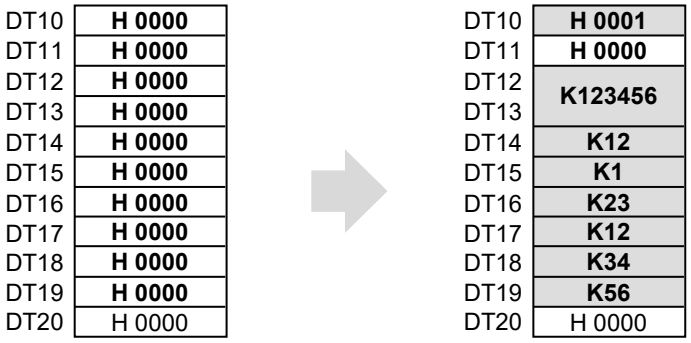
Obtained result storage device	Obtained contents		
D	File attribute	**Bit position**	**Description**
		0	For read-only file: ON
		1	For hidden file: ON
		2	For system file: ON
		3	For volume label: ON
		4	For directory: ON
		5	For archive: ON
		6 to 15	[Reserved: 0 (fixed)]
D+1	(Reserved)		
D+2	File size:Stored in decimal.		
D+3			
D+4	Last modified time:Stored in decimal.		Year (0 to 99)
D+5			Month (1 to 12)
D+6			Day (1 to 31)
D+7			Hour (0 to 23)
D+8			Minute (0 to 59)
D+9			Second (0 to 59)

■ **Example of processing**

Example) When obtaining the status of file "\abc\data1.csv "

- File attribute: Read only
- File size: 123456 bytes
- Last modified time: 12:34:56 (Hr:Min:Sec) on Jan. 23, 2012





■ **Precautions during programming**

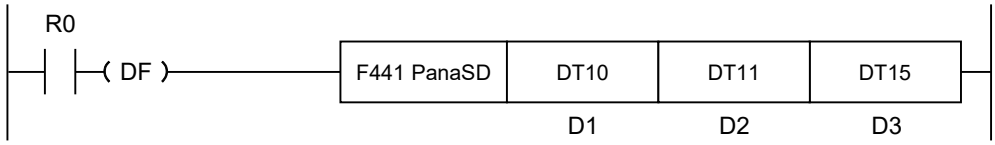
- In addition, refer to "3.1 Common Precautions for SD Card Access Instructions".
- The SD memory card access instruction active flag (R917A) turns ON after the execution condition has turned ON until the completion of the execution of the instruction. During this period, other SD memory card access instructions cannot be executed.

■ **Flag operations**

Name	Explanation
R917A (SD memory card access instruction active)	Turns ON when the instruction is executed. Turns OFF when the instruction is completed.
R917B (SD memory card access instruction execution done)	Turns OFF when the instruction is executed. Turns ON when the instruction is completed.
R917C (SD memory card access instruction execution result)	Reports the result when the instruction is completed. Normal completion: 0, Abnormal completion: 1
R9007 R9008 (ER)	When the device specification is indirect access (index modification), this turns ON when the specified address is outside the device range.

2.1.16 F441 PanaSD (Panasonic SD memory card lifetime information read)

■ Instruction format



■ List of operands

Operand	Explanation
D1	Device address that stores an execution result code
D2	Starting address of the device that stores the acquisition time of SD memory card lifetime information
D3	Device address storing the number of rewrites information

■ Available devices (●: Available)

Operand	WX	WY	WR	WL	SV	EV	DT	LD	I	SWR	SDT	Integers			Index modifier *1
												K	H	M	
D1		●	●	●	●	●	●	●	●						
D2		●	●	●	●	●	●	●	●						
D3		●	●	●	●	●	●	●	●						

*1: Character constants cannot be specified.

■ Outline of operation

- This instruction is used to read the lifetime information of a Panasonic SD memory card.
- This instruction and an SD card access instruction can be used simultaneously.
- The execution result of this instruction is stored in the area starting with [D1], [D2] and [D3].
- Redundant execution of this instruction is not possible.
- Do not use this instruction frequently. Using a differential instruction to execute this task is recommended.
- This instruction is an exclusive instruction for industrial SD memory cards made by Panasonic. This instruction cannot be used for any other SD memory cards. Panasonic industrial SD memory cards that support this instruction are indicated below. SD memory cards that support this instruction are indicated below.

■ Compatible SD memory card

Type	Series
SLC	FX/EX
MLC	GD, PC

(Note 1): Possible to use MLC type JD series.

■ **Execution result storage area**

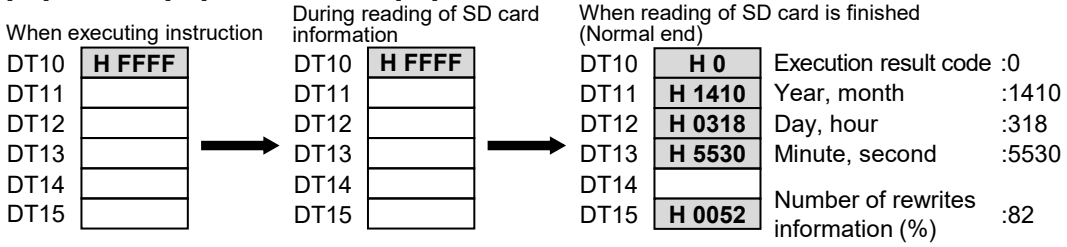
Operand	Items		Description
[D1]	Execution result code (Note 1)		The execution result code is stored. HFFFF: Execution in progress H0: Normal end H1:2 Double startup error H2: SD memory card cover open error H3: SD memory card not inserted error H4: Incompatible SD memory card error
[D2]	Acquisition time	Year, month	The acquisition time of SD memory card lifetime information is stored with BCD3 words. Example: 15:55:30 October 3, 2014 is stored as follows. [D2] H1410 [D2+1] H0315 [D2+2] H5530
[D2+1]		Day, hour	
[D2+2]		Minute, second	
[D3]	Number of rewrites information		Ratio (%) of [Average number of rewrites of management blocks] to [Max. number of possible rewrites] = Number of rewrites (average of all management blocks) / Max. number of possible rewrites x 100

(Note) The most significant bit of the execution result code can be used as an instruction active flag.

■ **Example of processing**

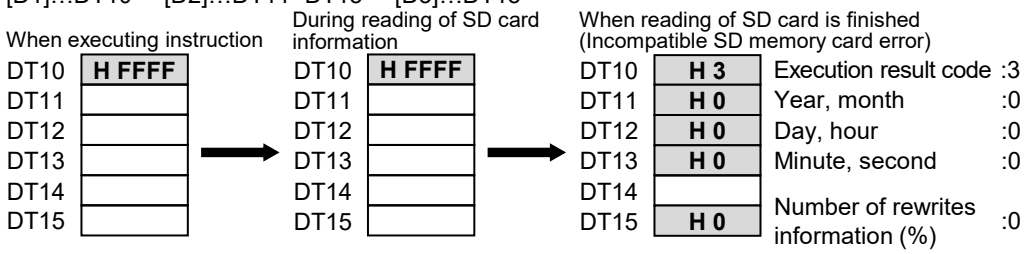
Example 1) When the execution result of the F441(PanaSD) instruction is Normal

[D1]…DT10 [D2]…DT11~DT13 [D3]…DT15



Example 2) When the execution result of the F441(PanaSD) instruction is Error.

[D1]…DT10 [D2]…DT11~DT13 [D3]…DT15



Flag operations

Name	Description
R9007	To be set when the range between [D2] to [D2+2] is out of the accessible range.
R9008 (ER)	Set when executed in an interrupt program.

3

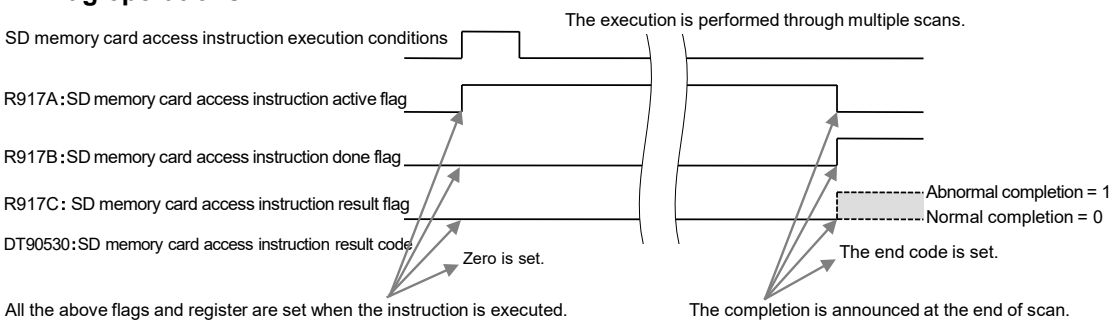
Precautions during programming

3.1 Common Precautions for SD Card Access Instructions

■ **Operations of instructions**

- At the start of instruction execution, checks are conducted, whether a SD memory card is inserted or not, if the cover is closed, and whether the card is write-protected or not.
- During the execution, the SD memory card access instruction active flag (R917A) is ON, and the execution done flag (R917B) is OFF.
- On the completion of the execution, the SD memory card access instruction active flag (R917A) is OFF, and the execution done flag (R917B) is ON.
- The execution is performed through multiple scans.
- On the completion of the execution, the SD memory card access instruction execution result flag (R917C) turns ON or OFF according to the result, and the execution end code is stored in the system data register DT90530.
- Use the execution result flag to judge whether the SD memory card access instruction is completed normally or abnormally when the execution done flag turns ON. the contents of errors are stored in the system data register DT90530.
- Only one type of SD memory card access instruction can be executed at the same time. To execute more than one instruction, perform exclusive control using flags such as the SD memory card access instruction active flag.
- If another SD memory card access instruction is being executed when starting an instruction, that insturction cannot be executed.

■ **Flag operations**



Note) When detecting errors, no SD memory card, SD memory card write protected, or improper SD memory card file name length, the completion is announced at the start of instruction execution without turning on the active flag.

■ List of error codes

Error code	Error	Cause	Types of detected instructions and the timing
0	Normal end		
1	No SD memory card	No SD memory card is inserted, or the cover is open.	All SD memory card access instructions. At the time of execution.
2	SD memory card write protection	The SD memory card is write protected.	Write, delete, move, copy and rename instructions
3	Specified file name error	Code that cannot be specified for a file name is used. There is too many hierarchies for the specified folder.	Folder access and file access instructions
4	No specified file	The specified file does not exist.	Folder access and file access instructions
5	File already exists	The specified file already exists.	Move, copy and rename instructions
6	File read error		At the time of read
7	File write error	Write protect attributes are aset for the specified file.	Write, delete, move, copy and rename instructions
8	File access position error	The reading position or writing position is incorrect.	At the time of executing F437(CWT), F428(CRD), and F434(CRD1).
9	SD memory card capacity shortage	Cannot be executed because there is not enough free space on the SD memory card.	Write, delete, move, copy and rename instructions
10	Reading format error	Error in the conversion format when reading a file.	At the time of executing F428(CRD).
11	File access competition	A file that is being logged is specified. A file that is being accessed via FTP is specified.	Write, delete, move, copy and rename instructions
12	Deleting non-empty directory	A non-empty directory is deleted.	At the time of executing F430 (CRMDIR).
-1 to -99	Others		All instructions

■ **How to specify folder/file names in SD memory card access instructions**

- Specify the full path (up to 256 characters). Do not specify the drive name.

<Example>

When specifying abc.txt directly under the root directory; \abc.txt

When specifying def.txt under the folder A; \a\def.txt

- When the F253 instruction is used and ([S1] is K1 to K32767) (storage area size specification)
  F253 SSET K8 "\abc.txt" DT0
  Specify as above, and specify DT1 in the file name specification of SD memory card access instruction.

  * DT0: Storage area size, DT1: Number of characters, DT2 and following: Because the character codes are stored.

- When the F253 instruction is used and ([S1] is H8000) (specification of no storage area size)
  F253 SSET H8000 "\abc.txt" DT0
  Specify as above, and specify DT0 in the file name specification of SD memory card access instruction.

  * DT0: Number of characters, DT1 and following: Because the character codes are stored.

- When specifying a non-existent folder with F437(CWT), F429(CMKDIR) or F433(CPR) instruction, only a subfolder directly under the parent folder can be automatically created. Two or more new folders cannot be created with one instruction. If specifying more than two files, no specified file error occurs.

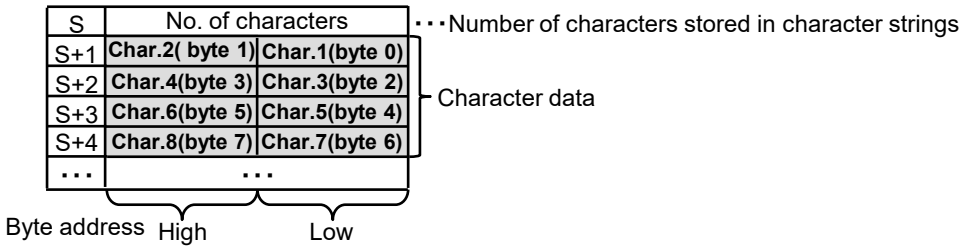
■ **SD memory card control specifications**

	SD	SDHC
File system	FAT16	FAT32
Max. length of file name	Supports long file names. (VFAT)	
Max. volume size	2GB	32GB
Max. file size	2GB	4GB
Max. number of files (8.3 format): Root directory	512	65535
Max. number of files (8.3 format): Sub directory	65534	65534
Max. number of files (long format): Root directory	170	21845
Max. number of files (long format): Sub directory	56634	65534

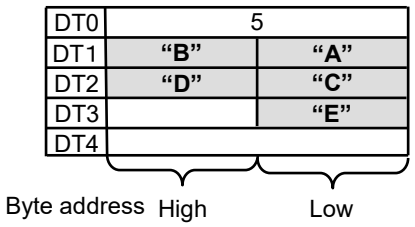
Item	Description
Long file name	256 bytes for full path (when specifying route with \, it is 255 bytes when omitting route\.)
File name/Directory name	ASCII characters (20h - 7Eh)

■ **Common precautions**

- Error flags are not cleared even when normal operation is performed. Use the F148(ERR) instruction for clearing error flags.
- A SD memory card access instruction cannot be executed when another SD memory card access instruction is already being executed. Do not execute the SD memory card access instruction until the active instruction is complete.
- It may take several scans for the processing.
- They cannot be used in interrupt programs.
- Character string data is set in the order of the number of characters and character data.



<Example> When specifying 5 for the number of characters, and "ABCDE" for character data



- Specify the extension for a file name.

■ **MEMO**

Record of changes

Manual No.	Date	Record of Changes
WUME-FP0HSD-01	Jun. 2018	1st Edition
WUME-FP0HSD-02	Jan. 2019	2nd Edition Upgrading the firmware version of the main unit (Ver. 1.3) Addition of description about supported functions • Addition of description about automatic transfer function • Instructions on SD cards

Please contact .....

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