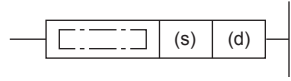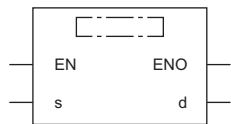# Converting time data from hour/minute/second to seconds in 32 bits

DHTOS(P)

| FX5S | FX5UJ | FX5U | FX5UC |

These instructions convert the time data stored in the device numbers starting from (s) to the time value in seconds, and store the converted data in the device numbers starting from (d) as 32-bit binary.

Ladder diagram	Structured text
[diagram: ⊢—[⌐:⌐] (s) (d)—]	ENO:=DHTOS(EN,s,d); ENO:=DHTOSP(EN,s,d);

FBD/LD
[diagram: box with EN, ENO, s, d]

Setting data

■Descriptions, ranges, and data types

Operand	Description	Range	Data type	Data type (label)
(s)	Head device number where the clock data before conversion is stored	—	16-bit signed binary	ANY16_ARRAY (Number of elements: 3)
(d)	Head device number where the clock data after conversion is stored	—	32-bit signed binary	ANY32
EN	Execution condition	—	Bit	BOOL
ENO	Execution result	—	Bit	BOOL

■Applicable devices

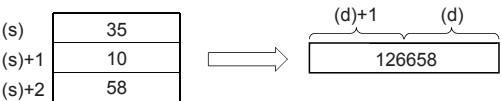| Operand	Bit	Word				Double word		Indirect specification	Constant			Others
	X, Y, M, L, SM, F, B, SB, S	T, ST, C, D, W, SD, SW, R	U□\G□	Z	LC	LZ			K, H	E	$	
(s)	○	○	○	—	—	—	○	—	—	—	—
(d)	○	○	○	○	○	○	○	—	—	—	—

Processing details

- These instructions convert the time data stored in the device numbers starting from (s) to the time value in seconds, and store the converted data in the device numbers starting from (d).

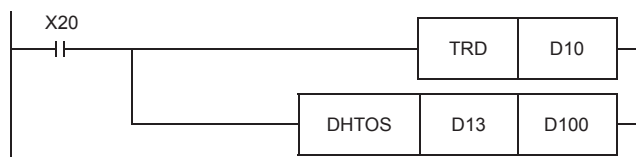| (s) | hour | (0 to 32767) |
| (s)+1 | minute | (0 to 59) |
| (s)+2 | second | (0 to 59) |

⇒

| (d)+1 | (d) |
| second |
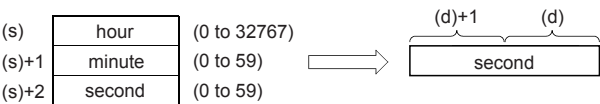
Ex.

When specifying 35 hours 10 minutes 58 seconds in (s)

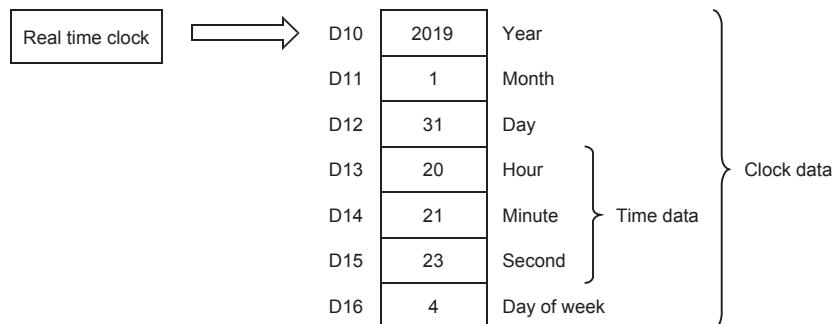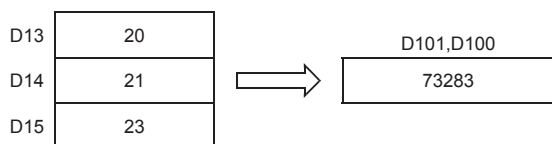| (s) | 35 |
| (s)+1 | 10 |
| (s)+2 | 58 |

⇒

| (d)+1 | (d) |
| 126658 |

Program example

In the program shown below, the time data read from the built-in CPU module real time clock is converted into data in units of "second", and stored to D100 and D101 when X20 turns ON.

```
X20
 ├─┤├────────────────┬──────┬──────┬──────┬─
 │                   │ TRD  │ D10  │      │
 │                   └──────┴──────┴──────┘
 │               ┌──────┬──────┬──────┐
 └───────────────┤ DHTOS│ D13  │ D100 │
                 └──────┴──────┴──────┘
```

• Clock data reading operation by TRD instruction

Real time clock	⟹	D10	2019	Year	
		D11	1	Month	
		D12	31	Day	
		D13	20	Hour	Time data / Clock data
		D14	21	Minute	
		D15	23	Second	
		D16	4	Day of week	

• Conversion operation into "second" by DHTOS instruction

D13	20		D101,D100
D14	21	⟹	73283
D15	23		

Operation error

Error code (SD0/SD8067)	Description
2820H	Any of the device area ranges specified in (s) and (d) exceed the corresponding device range.
3405H	A value specified by (s) is outside the following range. 0 to 32767
	Any of values specified by (s)+1 and (s)+2 is outside the following range. 0 to 59