

# F650-CK

DeviceNet I/F

## OPERATION MANUAL

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# Introduction

This material describes the Specifications of DeviceNet (Option) which connects PLC and F650-CK. You will be able to control F650-CK directly through PLC by using DeviceNet. Thus it enables you to shorten its wiring drastically.

## About copyrights and trademarks

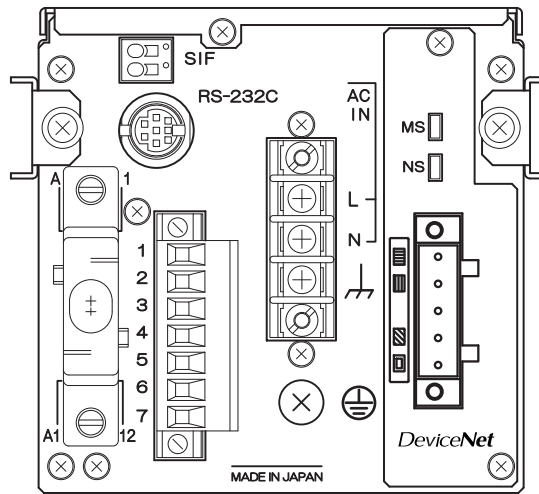
DeviceNet is a registered trademark of ODVA (Open DeviceNet Vendor Association).  
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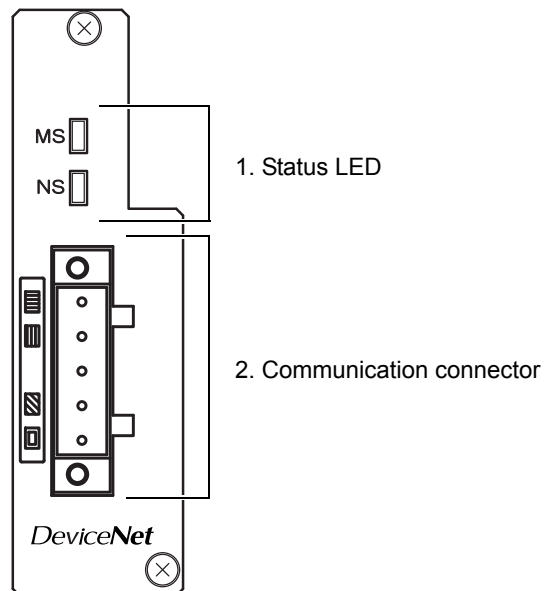
# 1. Appearance Descriptions

## 1-1. F650-CK with DeviceNet I/F



## 2. Name of Each Part

### 2-1. DeviceNet I/F



- |                            |  |
|----------------------------|--|
| 1. Status LED              | Indicating the communication status.<br>(Refer to "5.Status LED" on page 3.)                 |
| 2. Communication connector | The connector for connecting DeviceNet.<br>(Refer to "4.Communication Connector" on page 2.) |

### 3. F650-CK Setting

#### Operation

[MODE] → [OPTION]

Node address (Initial value: No.0)

No.0 to 63

Setting the node address.

Baud rate (Initial value: 500kbps)

125kbps, 250kbps, 500kbps

Deciding the communication speed.

Wgt select (Initial value: Extinput)

Network, Extinput

Selecting the external connector (extinput) or DeviceNet (network) to instruct the weighing code of F650-CK.

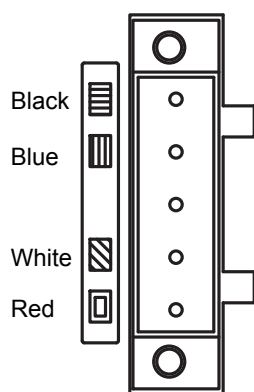
Comm. mode (Initial value: Read only)

Read only, Write En.

Setting values cannot be written in “read only” mode.

Setting values can be written in “write en.” mode.

### 4. Communication Connector



*DeviceNet*

Prepare the power source of DC24V.

Relation between each signal line and color chip are as follows.

Color	Type of signal		
Black	Power cable	- side	(V-)
Blue	Communication data	Low side	(CAN L)
—	Shield		
White	Communication data	High side	(CAN H)
Red	Power cable	+ side	(V+)

## 5. Status LED

Communication status is displayed by LED.

MS: Indicating the F650-CK status.

MS (Module Status)	LED		Status
	Red	Turns ON	Trouble
	Red	Blinks	Setting abnormal
	Green	Turns ON	Normal

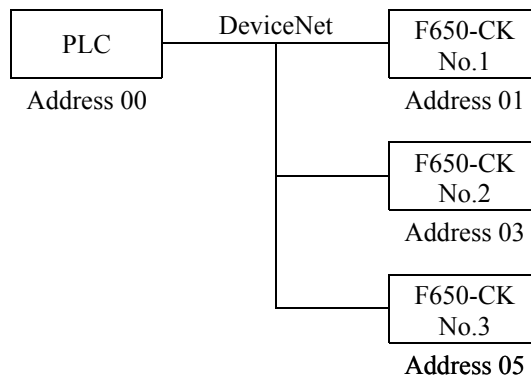
NS: Indicating the Network status.

NS (Network Status)	LED		Status
	Red	Turns ON	Bus OFF, node address overlap
	Red	Blinks	Communication time-out
	Green	Blinks	Waiting for connection fixed
	Green	Turns ON	Normal

## 6. PLC Address

When F650-CK is connected to PLC via DeviceNet, each F650-CK occupies input 2CH (words) and output 2CH (words) respectively.

Example: When you use three F650-CK (when not using configurator)



\* Address of F650-CK DeviceNet I/F should be set without overlapping as shown above when configurator is not used.

# 7. Address Map

## 7-1. Read only mode

### 7-1-1. Input data (F650-CK → PLC)

		B15	B14	B13	B12	B11	B10	B9	B8	B7	B6	B5	B4	B3	B2	B1	B0					
(Lower word)	Indicated value (x1000)					Indicated value (x100)					Indicated value (x10)								Indicated value (x1)			
	Indicated value																					
(Upper word)	Net/gross	4	2	1	OVER (RANK8)	GO (RANK4)	UNDER (RANK2)	COMPLETE (RANK1)	Bit for synchroni- zation	CPU normal	Weight abnormal	Sign	Indicated value (x10000)					Indicated value				
													Weighing code									

### 7-1-2. Output data (PLC → F650-CK)

	B15	B14	B13	B12	B11	B10	B9	B8	B7	B6	B5	B4	B3	B2	B1	B0
(Lower word)	Net/gross				Graph drawing		Measurement reset	Measurement start	Accumulation clear	Accumulation command	Gross weight switch	Net weight switch	TARE OFF	TARE ON	DZ OFF	DZ ON
(Upper word)	weight value/result	4	2	1												
		Weighing code														

### 7-1-3. Explanation of input data

#### ◎ Indicated value (20bit BCD) (\*Synchronization is required.)

	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
n ch																
n+1 ch																

Indicated values are shown. Its decimal point is ignored.

(Example)      when 50.0      →      500  
                      when 12.000      →      12000

Weight value or result can be selected at the output selection of weight value/result.

Also, for weight value, net or gross can be selected at the output selection of gross/net.

#### ◎ Sign (1bit) (\*Synchronization is required.)

	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
n ch																
n+1 ch																

Signal is expressed as below.

0:    Plus      (+)  
 1:    Minus    (-)

#### ◎ Weight abnormal (1bit) (\*Synchronization is required.)

	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
n ch																
n+1 ch																

When one of +LOAD, -LOAD, NET OVER, GROSS OVER or ZERO ALARM occurred, it became 1.

#### ◎ CPU normal (1bit)

	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
n ch																
n+1 ch																

0 and 1 are repeated for every sec. [about].

#### ◎ Bit for synchronization (1bit)

	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
n ch																
n+1 ch																

Bit for synchronization.



◎ **Comparison signal (4bit) (\*Synchronization required.)**

	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
n ch																
n+1 ch																

When the comparison mode is comp, complete, under, go and over are shown.

When the comparison mode is rank division, rank1 to 11(4bit binary) is shown.

◎ **Weighing code (3bit binary)**

	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
n ch																
n+1 ch																

The weighing code of the indicator is shown.

There are 8 types of codes: 0 to 7.

◎ **Net/gross (1bit)**

	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
n ch																
n+1 ch																

The weight specified at the output selection of net/gross is shown.

Turns to 1 when net and 0 when gross.

(\*Synchronization required)      Adopt synchronization of 32 bit for the data synchronization required.  
(Refer to "7-3.Synchronization" on page 14.)

## 7-1-4. Explanation of output data

◎ **DZ ON (1bit)**

	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
m ch																
m+1 ch																

Digital zero is performed by ON edge.

◎ **DZ OFF (1bit)**

	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
m ch																
m+1 ch																

Digital zero is reset by ON edge.

◎ **TARE ON (1bit)**

	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
m ch																
m+1 ch																

Tare subtraction is performed by ON edge.

## ◎ TARE OFF (1bit)

	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
m ch																
m+1 ch																

Tare subtraction is reset by ON edge.

## ◎ Net weight switch (1bit)

	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
m ch																
m+1 ch																

The display of the main unit is changed to net by ON edge.

## ◎ Gross weight switch (1bit)

	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
m ch																
m+1 ch																

The display of the main unit is changed to gross by ON edge.

## ◎ Accumulation command (1bit)

	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
m ch																
m+1 ch																

Accumulation command is performed by ON edge.

## ◎ Accumulation clear (1bit)

	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
m ch																
m+1 ch																

Accumulation clear of codes (weighing code) being weighed by ON edge is performed.

## ◎ Measurement start (1bit)

	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
m ch																
m+1 ch																

Turns to measurement start signal by ON edge.

## ◎ Measurement reset (1bit)

	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
m ch																
m+1 ch																

Turns to measurement reset signal by ON edge.

© Graph drawing (1bit)

	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
m ch																
m+1 ch																

Turns to drawing start by ON edge.

Turns to drawing stop by OFF edge.

© Net/gross output selection (1bit)

	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
m ch																
m+1 ch																

When the indicated value display is weight value, net is output by ON and gross is output by OFF.

© Weight value/result output selection (1bit)

	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
m ch																
m+1 ch																

Weight value is output when it is ON, and result is output when it is OFF.

© Weighing code (3bit binary)

	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
m ch																
m+1 ch																

The code for the indicator to make a comparison is indicated.

The weighing code selection should be “communications”.

7-2. Write enable mode

7-2-1. Input data (F650-CK → PLC)

		B15	B14	B13	B12	B11	B10	B9	B8	B7	B6	B5	B4	B3	B2	B1	B0		
(Lower word)	Indicated value (x1000)					Indicated value (x100)					Indicated value (x10)					Indicated value (x1)			
	Indicated value																		
(Upper word)	Net/gross	4	2	1	OVER (RANK8)		GO (RANK4)	UNDER (RANK2)	COMPLETE (RANK1)	Bit for synchronization	Response	Weight abnormal	Sign	Indicated value (x10000)					
		CODE												Indicated value					

7-2-2. Output data (PLC → F650-CK)

		B15	B14	B13	B12	B11	B10	B9	B8	B7	B6	B5	B4	B3	B2	B1	B0		
(Lower word)		Setting value (x1000)					Setting value (x100)					Setting value (x10)					Setting value (x1)		
		Setting value																	
(Upper word)	Net/gross	4	2	1	Display switch		TARE ON	DZ ON	Request	Setting value selection 3	Setting value selection 2	Setting value selection 1	Setting value selection 0	Setting value (x10000)					
		CODE												Setting value					

### 7-2-3. Explanation of input data

#### ◎ Indicated value (20bit BCD) (\*Synchronization is required.)

	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
n ch																
n+1 ch																

Indicated values are shown. Its decimal point is ignored.

(Example)      when 50.0      →      500  
                      when 12.000      →      12000

Weight value or result can be selected at the output selection of weight value/result.

Also, for weight value, net or gross can be selected at the output selection of gross/net.

#### ◎ Sign (1bit) (\*Synchronization is required.)

	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
n ch																
n+1 ch																

Signal is expressed as below.

0:    Plus      (+)  
 1:    Minus    (-)

#### ◎ Weight abnormal (1bit) (\*Synchronization is required.)

	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
n ch																
n+1 ch																

When one of +LOAD, -LOAD, NET OVER, GROSS OVER or ZERO ALARM occurred, it became 1.

#### ◎ Response (1bit)

	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
n ch																
n+1 ch																

It is used for confirmation when transmitting the setting value.

#### ◎ Bit for synchronization (1bit)

	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
n ch																
n+1 ch																

Bit for synchronization.

◎ **Comparison signal (4bit) (\*Synchronization required.)**

	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
n ch																
n+1 ch																

When the comparison mode is comp, complete, under, go and over are shown.

When the comparison mode is rank division, rank1 to 11(4bit binary) is shown.

◎ **Weighing code (3bit binary)**

	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
n ch																
n+1 ch																

The weighing code of the indicator is shown.

There are 8 types of codes: 0 to 7.

◎ **Net/Gross (1bit)**

	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
n ch																
n+1 ch																

The weight specified at the output selection of net/gross is shown.

Turns to 1 when net and 0 when gross.

(\*Synchronization required)      Adopt synchronization of 32 bit for the data synchronization required.  
(Refer to "7-3.Synchronization" on page 14.)

## 7-2-4. Explanation of output data

◎ **Setting value (20bit BCD)**

	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
m ch																
m+1 ch																

Set the setting value. Its decimal point is ignored.

◎ **Sign (1bit)**

	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
m ch																
m+1 ch																

Setting the sign of setting value as follows.

0:    Plus    (+)  
1:    Minus   (-)

\* Because there is no negative setting value under the current condition, set to 0 all the time.

## ◎ Request (1bit)

	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
m ch																
m+1 ch																

Setting value is transmitted to F650-CK at the start of request bit.

## ◎ Setting value selection 0, 1, 2, 3 (4bit binary)

	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
m ch																
m+1 ch																

Selecting the setting of transmission.

Setting value	Setting value selection 3	Setting value selection 2	Setting value selection 1	Setting value selection 0
STANDARD	0	0	0	0
OVER	0	0	0	1
UNDER	0	0	1	0
BOUNDARY 0	0	0	1	1
BOUNDARY 1	0	1	0	0
BOUNDARY 2	0	1	0	1
BOUNDARY 3	0	1	1	0
BOUNDARY 4	0	1	1	1
BOUNDARY 5	1	0	0	0
BOUNDARY 6	1	0	0	1
BOUNDARY 7	1	0	1	0
BOUNDARY 8	1	0	1	1
BOUNDARY 9	1	1	0	0
UPPER	1	1	0	1
LOWER	1	1	1	0

## ◎ DZ ON (1bit)

	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
m ch																
m+1 ch																

Digital zero is performed by ON edge.

## ◎ TARE ON (1bit)

	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
m ch																
m+1 ch																

Tare subtraction is performed by ON edge.

### ◎ Display switch (1bit)

	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
m ch																
m+1 ch																

The display of the main unit is changed to net by ON edge, and gross by OFF edge.

### ◎ CODE No. (3bit binary)

	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
m ch																
m+1 ch																

Code No. to be compared is instructed by the indicator.

Select “network” for the weighing select code.

It is also utilized for setting the code of transmitting setting value.

Weighing select code can be conducted by “network” or “extinput”.

### ◎ Gross/net (1bit)

	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
m ch																
m+1 ch																

The weight to be output by the indicator is changed to net when it is “1”, and gross when it is “0”.

## 7-2-5. Transmitting setting value

The setting value can be sent to F650-CK from PLC. It is the function of only write enable mode. The code to be written in is indicated with the code No.

(The bit for upper word will be from bit 12 to bit 14.)

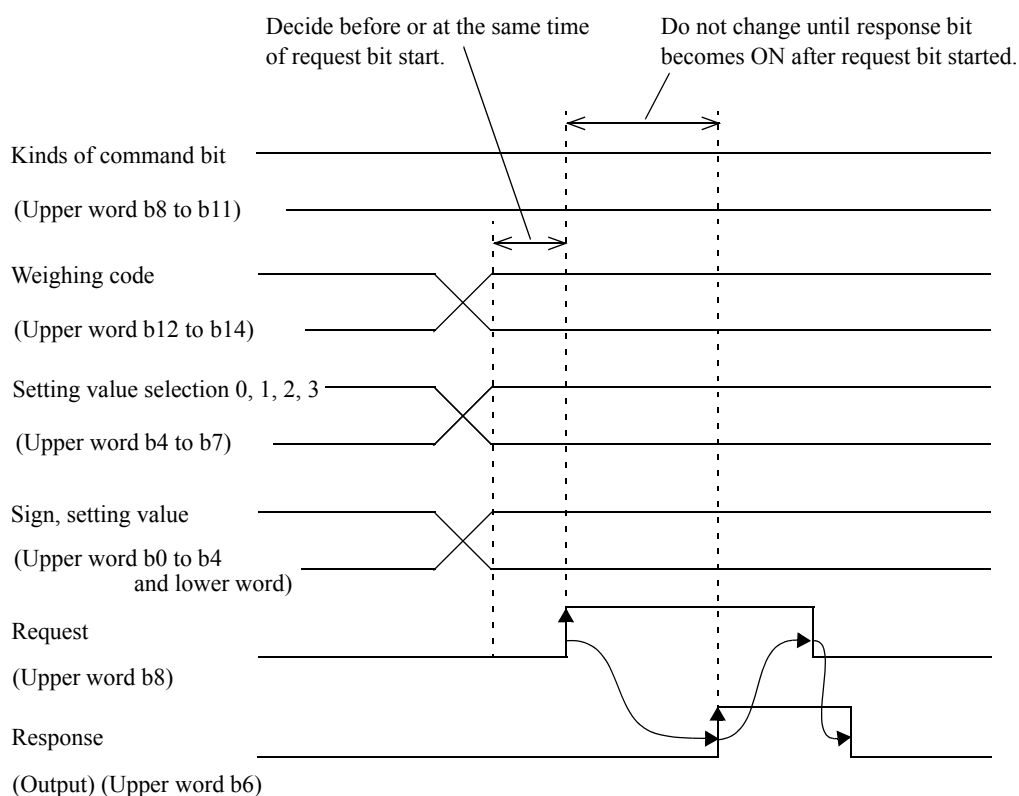
As the transmission will be operated at the start of request bit, decide the code No., setting value, selection of 0, 1, 2 or 3, value of setting and sign before giving the information of the request bit at start.

Confirm the response bit OFF before turning request bit ON.

When request bit becomes ON response bit also becomes ON. After confirming both of them are ON, turn OFF the request bit. During the operation, do not change any output data of 32 bit.

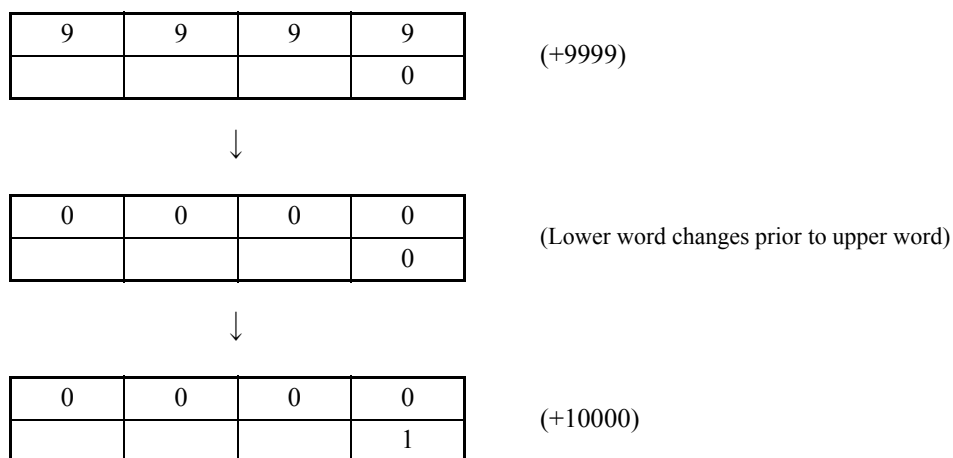
When request bit becomes OFF, response bit also becomes OFF.



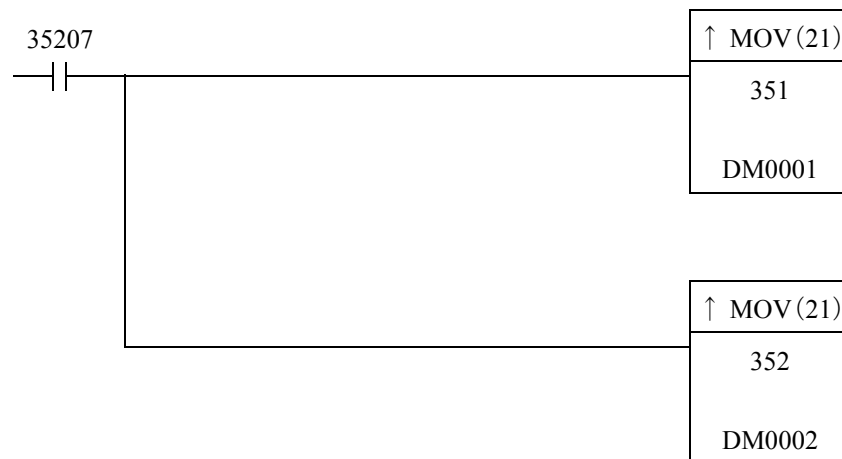
**Time chart****7-3. Synchronization**

The synchronization of output data 32 bits is guaranteed for each 1 word unit but the data of upper word and lower word can not be guaranteed its synchronization.

For example when the indicated value changes “from +9999 to 10000”, status of “+0” can be occurred in an instant in PLC. In this case if the data is collected at random, abnormal indicated value can be taken in by chance. (refer to chart below.)



Preventing these phenomenon, collect the data to adopt the synchronization of 32 bits as follows.

**Omron PLC C200HE (example)**

Node address is set to 1.

351 is a data of lower word and 352 is a data of upper word.

35207 is a synchronizing bit. Take in the data of 32 bits, 2 words at start of this bit.

## 8. Device Profiles and Object Implementation

### 8-1. Device profiles

General data	Corresponding specification for DeviceNet	Volume 1 release2.0 Volume 2 release2.0
	Vender ID	135
	Device type	Generic device type No:0
	Produce code	17
Physical conformance data	Current consumption by net work	About 30mA (at DC24V)
	Connector type	The open pug type
	With or without insulation for physical layer	The use of insulation
	Supported LED	Module Network
	MAC ID setting	Setting by touch panel
	Default MAC ID	00
	Transmission baud rate setting	Setting by touch panel
	Supported baud rate	125kbit/s, 250kbit/s, 500kbit/s
Communication data	Predefined master/slave connection set	Group 2 only server
	Support for dynamic connection (UCMM)	Not available
	Fragmentation of explicit message	Available

### 8-2. Implementation of objects

#### 8-2-1. Dentity object (01H)

Object class	Attribute	Not supported
	Service	Not supported

Object instance	Attribute	ID Description	GET	SET	Value	
		1 Vendor	○	×	135	
		2 Device type	○	×	0	
		3 Product code	○	×	17	
		4 Revision	○	×	1	
		5 Status (bits supported)	○	×	bit 0 only	
		6 Serial number	○	×	Each unit	
		7 Product name	○	×	F650CK	
		8 State	×	×		
		9 Configuration consistency value	×	×		
		10 Heartbeat interval	×	×		
	Service	DeviceNet service		Parameter option		
		05H Reset	Not available			
		0EH Get_Attribute_Single	Not available			

**8-2-2. Message router object (02H)**

Object class	Attribute	Not supported
	Service	Not supported
Object instance	Attribute	Not supported
	Service	Not supported
Addition of vendor-specific specification		Not available

**8-2-3. Devicenet objects (03H)**

Objects class	Attribute	ID description	GET	SET	Value
		1 Revision	○	×	02H
	Service	DeviceNet service	Parameter option		
		0EH Get_Attribute_Single	Not available		

Object instance	Attribute	ID description	GET	SET	Value
		1 MAC ID	○	×	
		2 Baud rate	○	×	
		3 BOI	○	×	00H
		4 Bus-off counter	×	×	
		5 Allocation information	○	×	
		6 MAC ID switch changed	×	×	
		7 Baud rate switch changed	×	×	
		8 MAC ID switch value	×	×	
		9 Baud rate switch value	×	×	
	Service	DeviceNet service	Parameter option		
		0EH Get_Attribute_Single	Not available		
		4BH Allocate master/ Slave_Connection set	Not available		
		4CH Release master/ Slave_Connection set	Not available		

**8-2-4. Assembly object (04H)**

Object class	Attribute	Not supported
	Service	Not supported

Object instance 1	Section	Information	Max. number of instances		
	Instance type	Static I/O	1		
	Attribute	Description	GET	SET	Value
		1 Number of members in list	×	×	
		2 Member list	×	×	
		3 Data	○	×	
	Service	DeviceNet service	Parameter option		
		0EH Get_Attribute_Single	Not available		

**8-2-5. Connection object (05H)**

Object class	Attribute	Not supported
	Service	Not supported
	Max. number of active connections	1

Object Instance 1	Section	Information	Max. number of instances		
	Instance type	Explicit message	1		
	Production trigger	Cyclic			
	Transport type	Server			
	Transport class	3			
	Attribute	ID description	GET	SET	Value
		1 State	○	×	
		2 Instance type	○	×	00H
		3 Transport class trigger	○	×	83H
		4 Produced connection ID	○	×	
		5 Consumed connection ID	○	×	
		6 Initial comm. characteristics	○	×	21H
		7 Produced connection size	○	×	1100H
		8 Consumed connection size	○	×	1100H
		9 Expected packed rate	○	○	
		12 Watchdog time-out action	○	○	One of 01,03
		13 Produced connection path length	○	×	00
		14 Produced connection path	○	×	
		15 Consumed connection path length	○	×	00
		16 Consumed connection path	○	×	
		17 Production inhibit time	○	×	00
	Service	DeviceNet service	Parameter option		
		05H Reset	Not available		
		0EH Get_Attribute_Single	Not available		
		10H Set_Attribute_Single	Not available		

Object Instance 2	Section	Information	Max. number of instances		
	Instance type	Polled I/O	1		
	Production trigger	Cyclic			
	Transport type	Server			
	Transport class	2			
	Attribute	ID description	GET	SET	Value
	1	State	○	×	
	2	Instance type	○	×	01H
	3	Transport class trigger	○	×	82H
	4	Produced connection ID	○	×	
	5	Consumed connection ID	○	×	
	6	Initial comm. characteristics	○	×	01H
	7	Produced connection size	○	×	0400H
	8	Consumed connection size	○	×	0400H
	9	Expected packed rate	○	○	
	12	Watchdog time-out action	○	×	00
	13	Produced connection path length	○	×	6
	14	Produced connection path	○	×	20_04_24_01_30_03
	15	Consumed connection path length	○	×	6
	16	Consumed connection path	○	×	20_04_24_01_30_03
	17	Production inhibit time	○	×	00
	Service	DeviceNet service	Parameter option		
	05H	Reset	Not available		
	0EH	Get_Attribute_Single	Not available		
	10H	Set_Attribute_Single	Not available		

Object instance 3	Section	Information	Max. number of instances		
	Instance type	Bit strobed I/O	1		
	Production trigger	Cyclic			
	Transport type	Server			
	Transport class	2			
	Attribute	ID description	GET	SET	Value
	1	State	○	×	
	2	Instance type	○	×	01H
	3	Transport class trigger	○	×	82H
	4	Produced connection ID	○	×	
	5	Consumed connection ID	○	×	
	6	Initial comm. characteristics	○	×	01H
	7	Produced connection size	○	×	0400H
	8	Consumed connection size	○	×	0800H
	9	Expected packed rate	○	○	
	12	Watchdog time-out action	○	×	00
	13	Produced connection path length	○	×	6
	14	Produced connection path	○	×	20_04_24_01_30_03
	15	Consumed connection path length	○	×	6
	16	Consumed connection path	○	×	20_04_24_01_30_03
	17	Production inhibit time	○	×	00
	Service	DeviceNet service	Parameter option		
	05H	Reset	Not available		
	0EH	Get_Attribute_Single	Not available		
	10H	Set_Attribute_Single	Not available		

## 9. Alarm Codes

The alarm codes appearing at the lower right of the DeviceNet setting screen are as shown in the table below.

Code	Status
0	Normal status
1	Memory error
2	Hardware error
3	Network error
4	Setting error
7	Other error