Oriental motor

HP-5173

Basic function

Operating method

I/O signals

Modbus RTU control (RS-485 communication)

Address codes list

Alarms and information

Extended function

Brushless Motors

BLS Series Driver

RS-485 Communication Type

OPERATING MANUAL

Function Edition

Thank you for purchasing an Oriental Motor product.
This operating manual describes product handling procedures and safety precautions.

- Please read the manual thoroughly to ensure safe operation.
- Always keep the manual where it is readily available.

3 I/O signals

4 Modbus RTU control (RS-485 communication)

6 Alarms and information

7 Extended function

1 About operating manuals

■ Related operating manuals

For operating manuals, download from Oriental Motor Website Download Page or contact your nearest Oriental Motor sales office. To use the product, read this manual together with the related operating manuals.
Search for an operating manual by the model name described on the nameplate.

- **BLS** Series Driver RS-485 Communication Type OPERATING MANUAL Function Edition (this document)
- **BLS** Series Driver DC Input RS-485 Communication Type OPERATING MANUAL Installation and Connection Edition
- **BLS** Series Motor DC Input OPERATING MANUAL

■ How to read this document

● The setting unit may vary depending on the application such as support software.

Note the setting units when setting operation data and parameters.
This manual describes using the setting units shown below.
Position: [step]
Speed: [r/min]

1 Basic function

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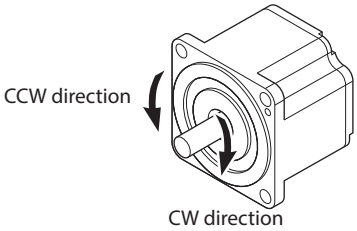
1 Motor rotation direction

The rotation direction of the motor output shaft represents the direction when viewed from the motor output shaft.



The relationship between the setting value and the motor rotation direction is shown below.

Setting value	Direction	Motor rotation direction
Positive value	FWD (forward)	CCW direction
Negative value	RVS (reverse)	CW direction

memo

- The rotation direction of the motor can be changed by the "Motor rotation direction" parameter.
- The rotation direction of the gearhead output shaft varies depending on the type or the gear ratio of the gearhead to be combined.
  Check the operating manual of the motor for the rotation direction of the gearhead output shaft.
- According to the direction of operation of the equipment, set whether the rotation direction of "positive value=FWD (forward)" is CW or CCW as desired.

Related parameter

Name	Description	Initial setting	
		Initial value	Unit
Motor rotation direction	Sets the rotation direction of the motor output shaft. **[Setting range]** 0: Non invert 1: Invert	0	–

2 User-defined velocity unit setting

If the speed reduction ratio or speed increasing ratio is set, the speed can be set or monitored as the velocity unit of the gear output shaft or mechanism.

Related parameters

Name	Description	Initial setting	
		Initial value	Unit
User-defined velocity unit setting	Sets the velocity unit. **[Setting range]** 2: 1 r/min (motor output shaft) 20: 1 r/min (driving shaft of gearbox) 21: 0.1 r/min (driving shaft of gearbox) 22: 0.01 r/min (driving shaft of gearbox)	2	–
Gear information (numerator)	Sets the numerator of gear information. **[Setting range]** 1 to 1000	1	–
Gear information (denominator)	Sets the denominator of gear information. **[Setting range]** 1 to 1000	1	–

■ Setting value of the speed reduction ratio and speed increasing ratio

The speed reduction ratio (speed increasing ratio) can be set using the "Gear information (numerator)" and "Gear information (denominator)" parameters.

$$\text{Speed reduction ratio (Speed increasing ratio)} = \frac{\text{Gear information (numerator)}}{\text{Gear information (denominator)}}$$

Setting example

- If the speed of the gear output shaft is desired to be one-twentieth that of the motor output shaft, the speed reduction ratio is 20.
  Set "20" to the "Gear information (numerator)" parameter and "1" to the "Gear information (denominator)" parameter.

- If the speed of the gear output shaft is desired to be 20 times that of the motor output shaft, the speed increasing ratio is 20.
  Set "1" to the "Gear information (numerator)" parameter and "20" to the "Gear information (denominator)" parameter.

■ User-defined velocity unit setting

Set the "User-defined velocity unit setting" parameter according to the speed reduction ratio and speed increasing ratio.
If the setting is outside the range described in the table below, information of "Unit setting" or an alarm of "Unit setting error" will be generated.

Speed reduction ratio	Speed increasing ratio	Setting of "User-defined velocity unit setting" parameter
Less than 10	Up to 600	1 r/min (driving shaft of gearbox)
Less than 100	Up to 60	0.1 r/min (driving shaft of gearbox)
Less than 1000	Up to 6	0.01 r/min (driving shaft of gearbox)

Note If the motor is operated at a setting where the rotation speed of the motor output shaft is outside the specification range, an alarm of "Abnormal operation data" will be generated.

3 Acceleration time and deceleration time

If the acceleration time and deceleration time are set, the impact applied to the load when starting, changing speed, or stopping can be suppressed.
The actual acceleration time and deceleration time vary depending on the conditions of use, load inertia, load torque, etc.

Setting range: 100 to 30,000 ms (initial value: 1,000 ms)

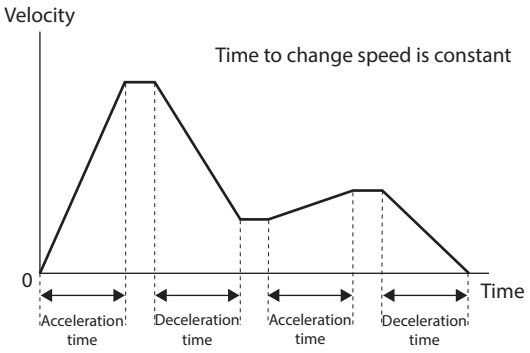
memo If the deceleration time is set shorter than the coasting stop time of the motor, the motor will not stop at the specified time.

■ "Acceleration/deceleration (time setting) reference speed" parameter

The type of speed change based on the acceleration time and the deceleration time can be set.

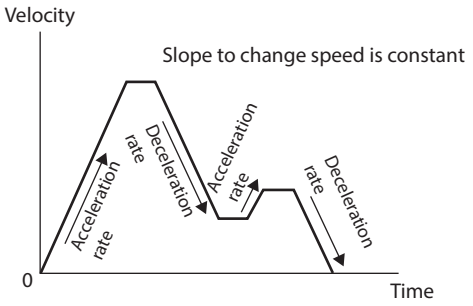
● "Acceleration/deceleration (time setting) reference speed" parameter is 0

Time taken to go from the present speed to the setting speed (target velocity)



● "Acceleration/deceleration (time setting) reference speed" parameter is 1 or more

Time taken to go from 0 to the reference speed



Acceleration rate: Rate based on acceleration time and reference speed
Deceleration rate: Rate based on deceleration time and reference speed

Related parameter

Name	Description	Initial setting	
		Initial value	Unit
Acceleration/deceleration (time setting) reference speed	Sets the type of speed change based on the acceleration time and the deceleration time. 0: Time taken to go from the present speed to the setting speed (target velocity) (The time of speed change is constant) 1 or more: Time taken to go from 0 to the reference speed (The slope of speed change is constant) **[Setting range]** 0 to 4,000,000 (User-defined velocity unit)	0	–

4 Stopping movement

4-1 Type of stop

■ Stop by stop operation

The motor decelerates to a stop according to the time set in the deceleration time.

- FW/RV operation: FW-SPD or RV-SPD is OFF, or FW-SPD and RV-SPD are ON.
- Stored data operation: The operation type is deceleration stop.
- Direct data operation operation: The type is deceleration stop.

memo If the setting speed (target velocity) is set to zero during operation, the motor will decelerate to a stop.

■ Stop by FREE input

The motor coasts to a stop. (The motor is in a non-excitation state)

■ Stop by the maintenance command "Stop operation"

The motor decelerates to a stop according to the specified stopping method.

■ Stop when an alarm is generated

Refer to p.209 for the stop when an alarm is generated.

■ Stop by STOP input

The motor decelerates to a stop according to the setting of the STOP related parameter.

Related parameters

Name	Description	Initial setting	
		Initial value	Unit
STOP input action	Sets how to stop the motor when the STOP input is turned ON. **[Setting range]** 1: Deceleration stop (according to the operation profile during operation except for the torque limiting value) 2: Deceleration stop (according to the STOP deceleration time parameter)	1	–
STOP input stopping torque limit	Sets the torque limiting value when the STOP input is turned ON. **[Setting range]** 0: According to the operation profile during operation 1 to 10,000 (1=0.1 %)	0	1=0.1 %
STOP deceleration time	Sets the deceleration time when "Deceleration stop (according to the STOP deceleration time parameter)" is selected in the "STOP input action" parameter. **[Setting range]** 100 to 30,000 ms	1,000	ms

4-2 Priority of stop action

If multiple stop commands are input to the driver, the motor will stop according to the following priority.

Priority: High ↑ Low

Stop level	Stopping movement	
0	Coasting stop	Stop by FREE input (The motor is in a non-excitation state)
1	Deceleration stop*	Stop when an alarm is generated Stop by the maintenance command "Stop operation"
2		Stop by STOP input
3		Stop by stop operation

* For the same stop level, a larger value of the deceleration rate (faster stop) is prioritized.

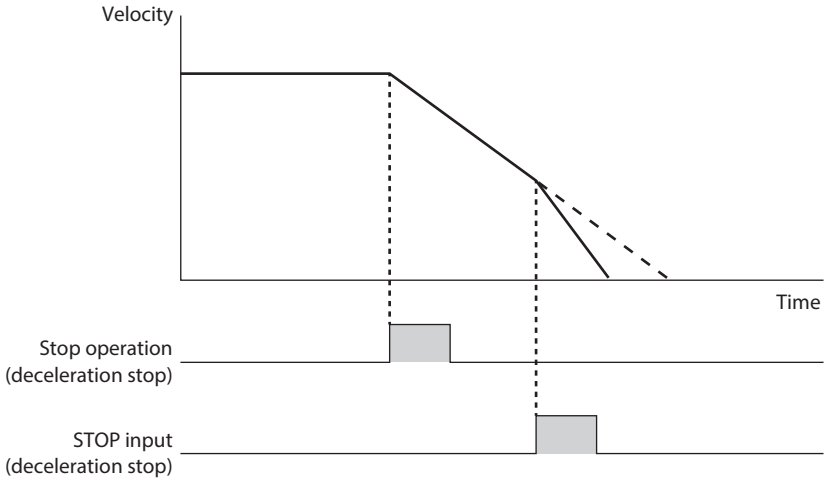
Note

In the following cases, deceleration stop of direct data operation cannot be executed.
- While the motor is operating to stop by the operation stop signal
- When the motor is operating by a method other than direct data operation

■ Example of operation

- **Operation when the STOP input is turned ON while the motor is stopped by the stop operation.**

The motor operates according to the STOP input due to the high priority input.



5 Torque limiting function

The maximum output torque of the motor can be limited.
Set when limiting the motor output torque according to a load.
The motor operates at the lowest torque limiting value among the following conditions.

Name	Description
Operation profile torque limiting	Torque limiting by the torque limiting value when operation is executed
TRQ-LMT input torque limiting	Torque limiting by the value set in the "TRQ-LMT input Torque limit value" parameter (when the TRQ-LMT input is ON)
ATL function torque limiting	Torque limiting by the ATL function (initial value: Enable)
STOP input stopping torque limit	Torque limiting by the torque limiting value when the STOP input is turned ON
Alarm torque limiting	Torque limiting when an alarm is generated (approximately 100 %)
Output power limiting	The maximum value varies depending on the motor. 25 W: 108.0 %, 40 W: 117.6 %, 90 W: 107.3 % 30 W: 200.0 %, 60 W: 200.0 %, 120 W: 200.0 %

Note If the limit is increased significantly during the torque limiting process, a large impact torque may be generated, causing damage to the motor or equipment. Be careful when changing the torque limiting value.

6 ATL function

The ATL function is a function that prevents the overload alarm by automatically adjusting the torque limiting value when the output torque increases to near the overload alarm level.

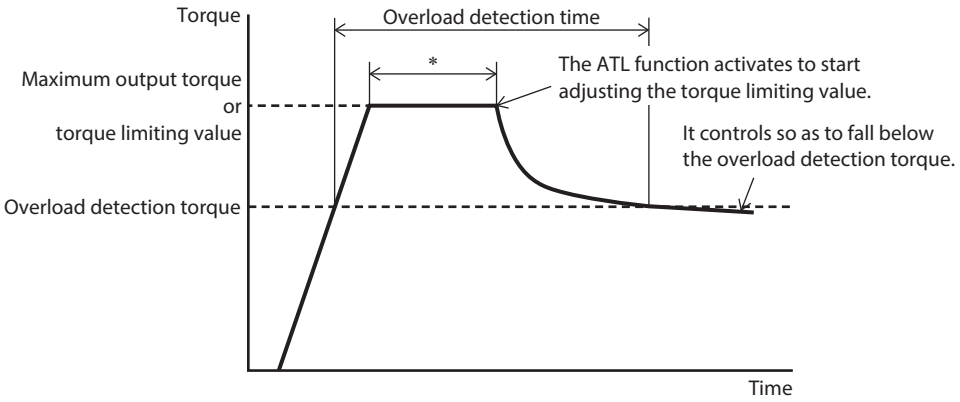
Note The ATL function is set to enable at the time of shipment. When the ATL function is activated, the output torque is automatically limited. Be sure to check beforehand that it will not cause any problems with the operation of the equipment.

memo The ATL function is not activated when a 25W, 40W, or 90W motor is used because the overload alarm is not generated.

■ When the torque limiting value larger than the overload detection torque is set

The ATL function is activated when all of the following conditions are met.

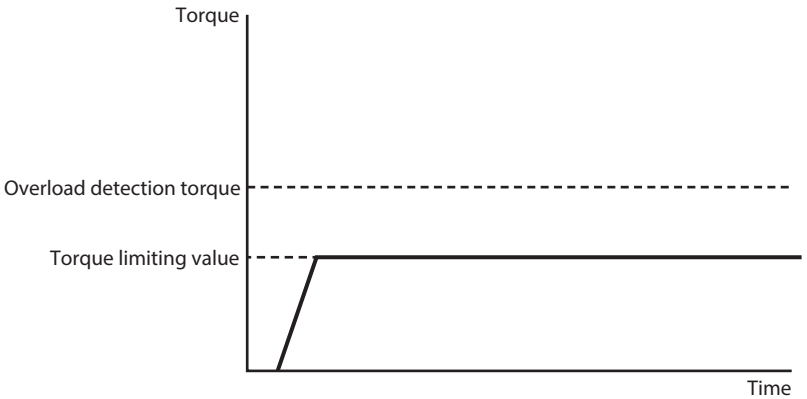
- The output torque of the motor exceeded the overload detection torque.
- The driver was estimated to exceed the overload detection time based on the output torque of the motor.



* The time varies depending on the operating condition or a load.

■ When the torque limiting value smaller than the overload detection torque is set

The ATL function is not activated because the motor output torque is smaller than the overload detection torque.



Related parameter

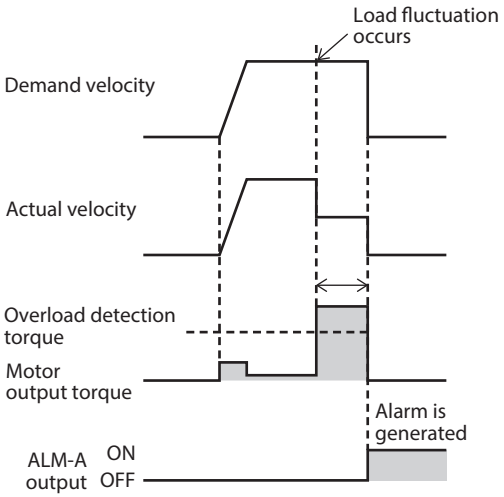
Name	Description	Initial setting	
		Initial value	Unit
ATL function mode setting	Selects the setting method of the ATL function. **[Setting range]** 0: Follow ATL-EN input 1: ATL function enabled	1	–

memo

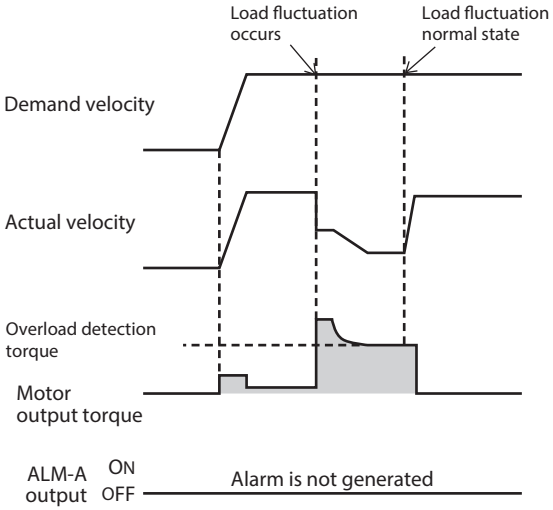
- About ATL-EN Input
  When the "ATL function mode setting" parameter is set to "Follow ATL-EN input," select whether to enable or disable the ATL function using the ATL-EN input. Turning the ATL-EN input ON enables the ATL function, and turning it OFF disables the ATL function.

- **Operation example: When load fluctuation occurs during continuous operation**

When ATL function is disabled

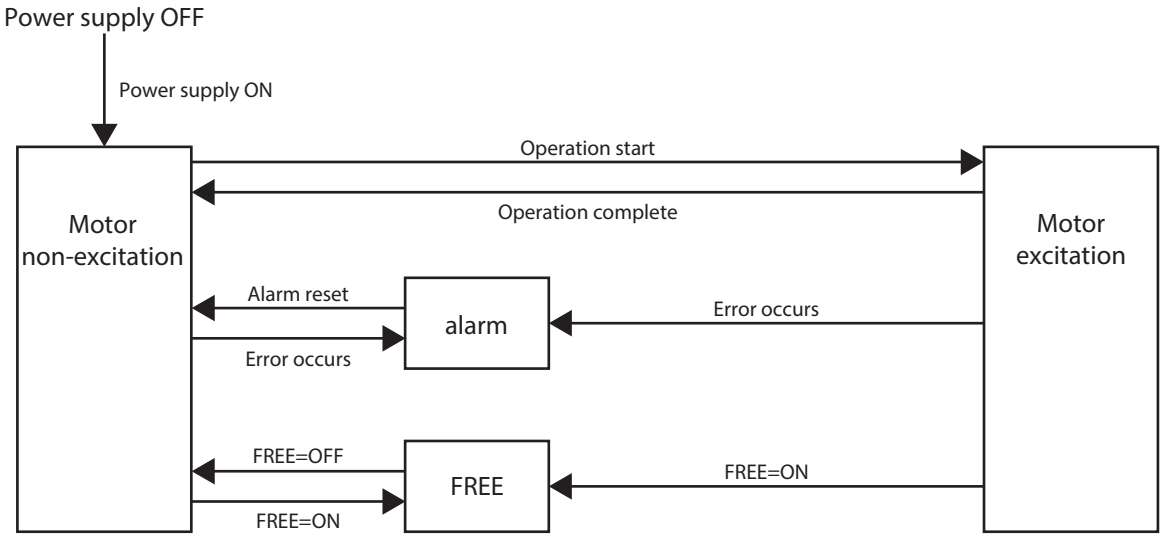


When ATL function is enabled



7 Driver status and motor excitation

■ Driver status and state transition of motor excitation



- **Motor non-excitation**

  When the power supply of the driver is turned on, the driver enters the "Motor non-excitation" state. The PWR/SYS LED is lit in white.
  The motor goes into a non-excitation state.

- **FREE**

  When the FREE input is turned ON, the driver enters the "FREE" state.
  The motor goes into a non-excitation state.
  If the FREE input is turned OFF, the driver enters the "Motor non-excitation" state.

- **Alarms**

  If the driver detects an alarm, it enters the "Alarm" state.
  The motor goes into a non-excitation state.
  If the alarm is reset, the driver enters the "Motor non-excitation" state.

memo Refer to p.209 for details on alarms.

- **Motor excitation**

  When operation starts, the driver enters the "Motor non-excitation" status.
  The motor goes into an excitation state. When the operation is completed, the driver enters the "Motor non-excitation" state.

2 Operating method

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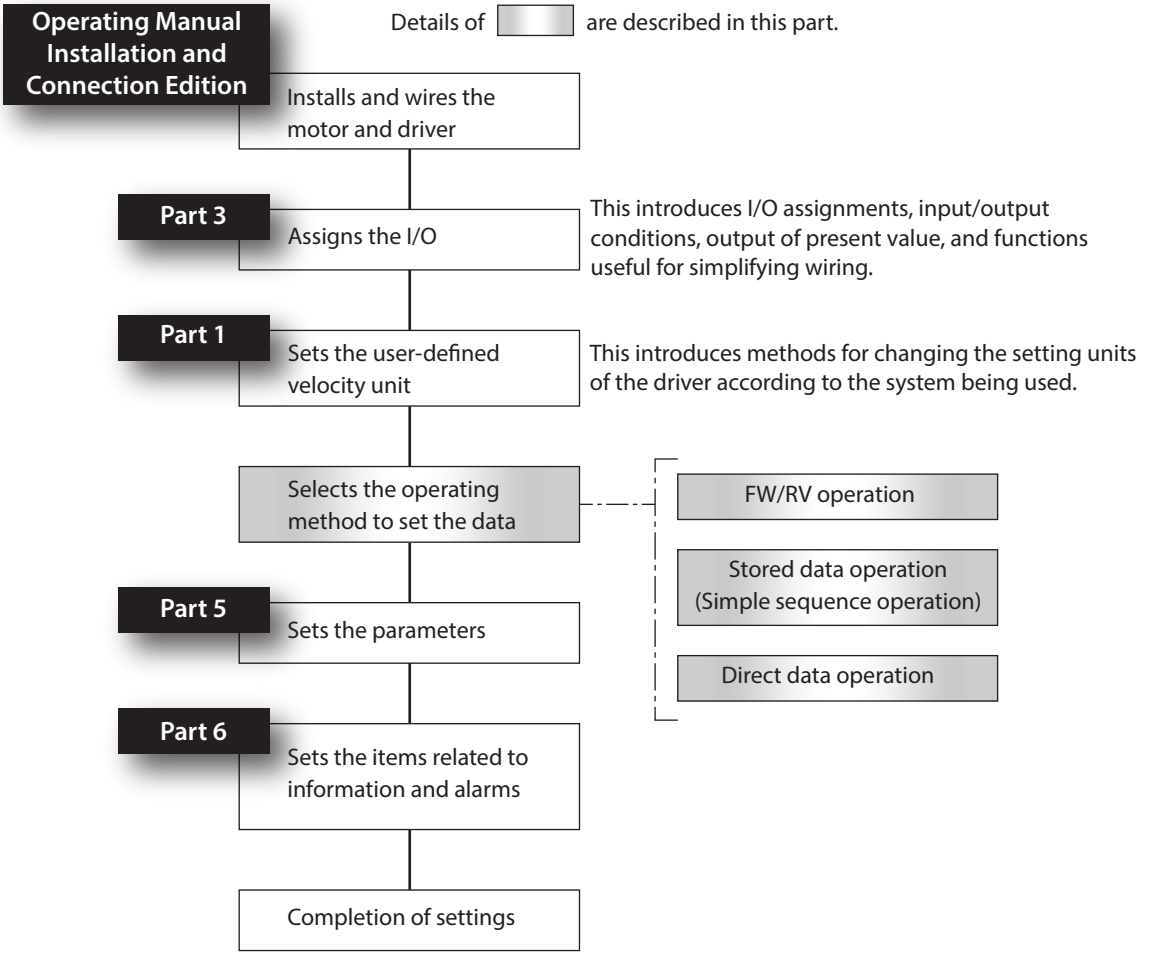
1 Flow of settings necessary for operation



2 Operation overview

■ FW/RV operation

FW/RV operation is continuous operation (speed control) by the input signal of the FW-SPD input or RV-SPD input.

■ Stored data operation

Stored data operation is operation that allows simple sequence operation by changing the operation profile such as operating velocity, with the combination of operation data. Up to 256 operation data items (No. 0 to No. 255) can be set.

■ Direct data operation

Direct data operation is a mode that allows the data to be rewritten and the operation to be started at the same time. It is suitable for applications where operation data such as operating velocity is frequently changed.

3 Operation types

3-1 Operation methods and operation types

Operation method	Operation type	Description
Stop operation	Deceleration stop (according to the specified operation profile)	The motor decelerates to a stop according to the operation profile specified. The motor goes into a non-excitation state after it stops.
	Deceleration stop (according to the operation profile during operation)	The motor decelerates to a stop according to the operation profile being operated. The motor goes into a non-excitation state after it stops.
Continuous operation	Continuous operation (speed control)	When the motor is started, it accelerates according to the specified operation profile. When the motor reaches the setting speed (target velocity), it will continue to operate with the speed maintained. If the operation profile is changed, the speed can be changed.

■ Operation profile

- **FW/RV operation, stored data operation**

  These are operations based on "Operating velocity, Acceleration time, Deceleration time, Torque limiting value" of the operation data.

- **Direct data operation**

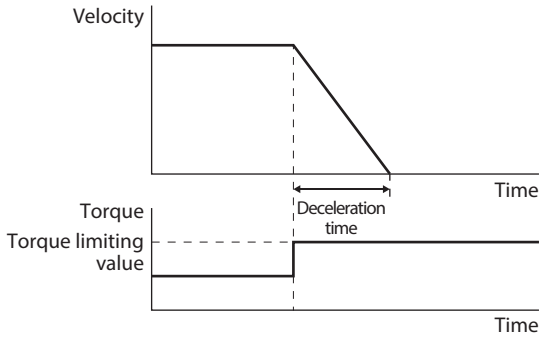
  This is the operation using "Operating velocity, Acceleration time, Deceleration time, Torque limiting value" of the direct data.

■ Stop operation

This is used to stop the operation presently performed.

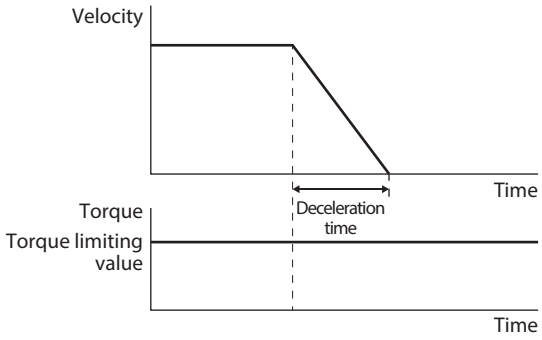
- **Deceleration stop (according to the specified operation profile)**

  [Operation profile]



- **Deceleration stop (according to the operation profile during operation)**

  [Operation profile]

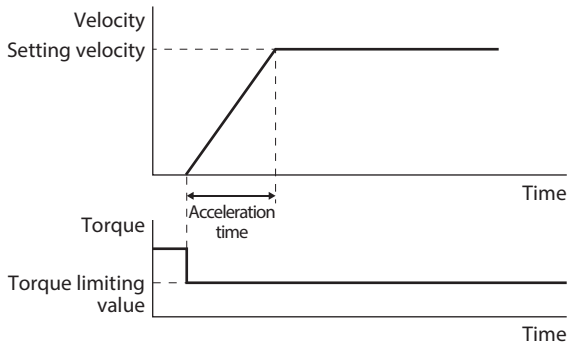


■ Continuous operation

When the motor is started, it accelerates according to the specified operation profile. When the motor reaches the setting speed (target velocity), it will continue to operate with the speed maintained.
If the operation profile is changed, the speed can be changed. If a positive value is set for the operating velocity, the motor will continue to operate at a constant speed in the forward direction. If a negative value is set, the motor will continue to operate at a constant speed in the reverse direction.

● Continuous operation (speed control)

[Operation profile]

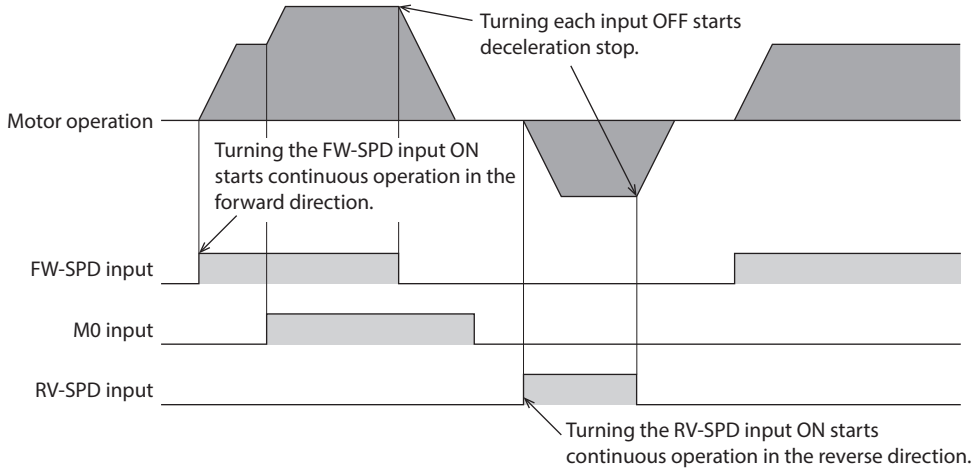


memo If the rotation direction is reversed, the motor will decelerate for the deceleration time and then accelerate for the acceleration time.

4 FW/RV operation

FW/RV operation is continuous operation (speed control) by the input signal of the FW-SPD input or RV-SPD input. When the operation data number is selected to turn the FW-SPD input or RV-SPD input ON, operation is performed according to the operation profile of the selected operation data number.
When the FW-SPD input is turned ON, the motor rotates in the forward direction. When the RV-SPD input is turned ON, the motor rotates in the reverse direction. If the FW-SPD input or RV-SPD input is turned OFF during operation, the motor will decelerate to a stop. If the signal of the same rotation direction is turned ON while the motor decelerates to a stop, the motor will accelerate again and continue to operate.
If both the FW-SPD and RV-SPD inputs are turned ON, the motor will decelerate to a stop. If the operation data number is changed during operation, the motor speed is changed according to the operation profile of the changed operation data number.

■ Operation example



Related operation data

Name	Description	Initial setting	
		Initial value	Unit
Operating velocity	Sets the operating velocity. **[Setting range]** –4,000,000 to 4,000,000 (User-defined velocity unit)	0	r/min
Acceleration time	Sets the acceleration time. **[Setting range]** 100 to 30,000 ms	1,000	ms
Deceleration time	Sets the deceleration time. **[Setting range]** 100 to 30,000 ms	1,000	ms
Torque limiting value	Sets the torque limiting value. **[Setting range]** 0 to 10,000 (1=0.1 %)*	10,000	1=0.1 %

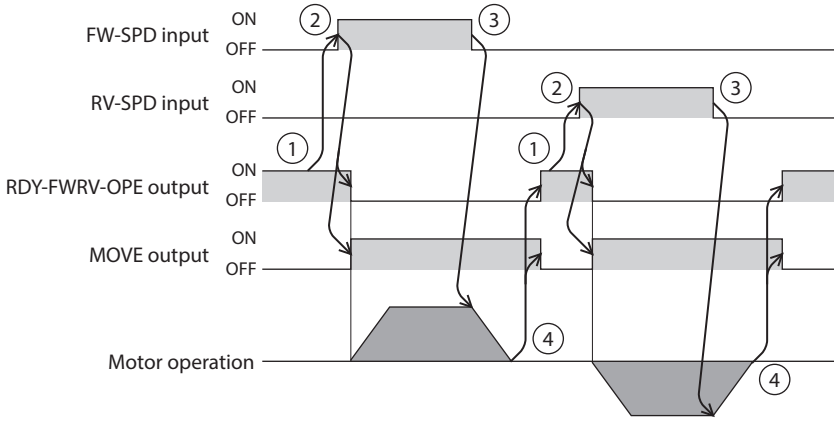
* The maximum torque limiting value varies depending on the motor. Refer to p.15 for the maximum value of each motor.

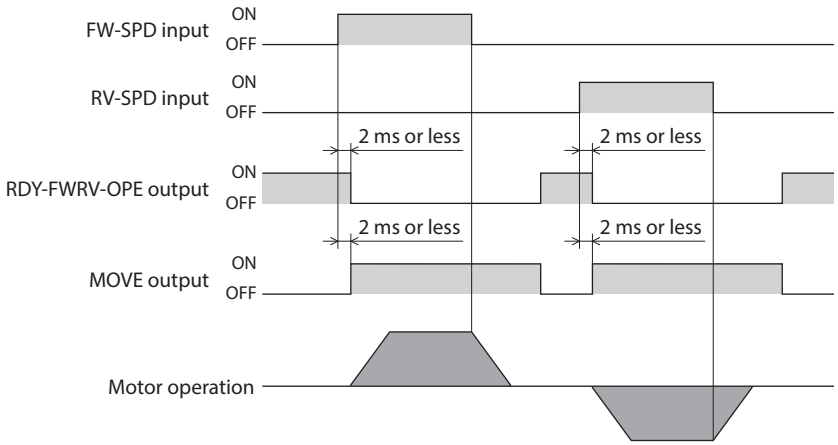
Note If the motor is operated at a rotation speed outside the specification range, an alarm of "Abnormal operation data" will be generated.

memo
- The "Operation type" of the operation data is not related to FW/RV operation.
- If the setting speed (target velocity) is set to zero during operation, the motor will decelerate to a stop.

■ Timing chart

1. Check the RDY-FWRV-OPE output is being ON.
2. Turn the FW-SPD input (or RV-SPD input) ON.
   The RDY-FWRV-OPE output is turned OFF and the MOVE output is turned ON, and the motor starts operating.
3. Turn the FW-SPD input (or RV-SPD input) OFF.
   The motor starts to decelerate to a stop.
4. When the motor stops, the RDY-FWRV-OPE output is turned ON and the MOVE output is turned OFF.





5 Stored data operation

Stored data operation is operation that allows simple sequence operation by changing the operation profile such as operating velocity, with the combination of operation data. Up to 256 operation data items (No. 0 to No. 255) can be set.

5-1 Setting the data

There are the following two types of settings for stored data operation.

- **Operation data**

  Operation type, position, operating velocity, acceleration time, deceleration time, torque limiting value, etc. required for stored data operation are set.

- **Operation I/O event**

  The condition for generating an event necessary for the event jump function, and the next data number of the operation when an event is generated, etc. are set. Use when the event jump function is used.

■ Operation data

Name	Description	Initial setting	
		Initial value	Unit
Operation type	Selects the operation type. **[Setting range]** 0: Deceleration stop (according to the specified operation profile) 31: Deceleration stop (according to the operation profile during operation) 48: Continuous operation (speed control)	0	–
Operating velocity	Sets the operating velocity. **[Setting range]** –4,000,000 to 4,000,000 (User-defined velocity unit)	0	r/min
Acceleration time	Sets the acceleration time. **[Setting range]** 100 to 30,000 ms	1,000	ms
Deceleration time	Sets the deceleration time. **[Setting range]** 100 to 30,000 ms	1,000	ms
Torque limiting value	Sets the torque limiting value. **[Setting range]** 0 to 10,000 (1=0.1 %)*	10,000	1=0.1%
Next data number	Sets the next data number. **[Setting range]** –256: Stop –22: ↓↓(+2) –1: ↓(+1) 0 to 255: Operation data number	–1	–
(Low) I/O event number	Sets the number of the operation I/O event to generate a low event. The condition to generate the event is set with the operation I/O event. **[Setting range]** –1: –(Disable) 0 to 31: Operation I/O event number	–1	–

Name	Description	Initial setting	
		Initial value	Unit
(Middle) I/O event number	Sets the number of the operation I/O event to generate a middle event. The condition to generate the event is set with the operation I/O event. **[Setting range]** –1: –(Disable) 0 to 31: Operation I/O event number	–1	–
(High) I/O event number	Sets the number of the operation I/O event to generate a high event. The condition to generate the event is set with the operation I/O event. **[Setting range]** –1: –(Disable) 0 to 31: Operation I/O event number	–1	–

* The maximum torque limiting value varies depending on the motor. Refer to p.15 for the maximum value of each motor.

Note If the motor is operated at a rotation speed outside the specification range, an alarm of "Abnormal operation data" will be generated.

- **Next data number**

  If the NEXT input is turned ON, the operation based on the operation data number set in the "Next data number" is executed continuously.

- **(Low) I/O event number, (middle) I/O event number, (high) I/O event number**

  If the (low) I/O event number, the (middle) I/O event number, the (high) I/O event number are set, the event jump function is enabled.
  When they occur simultaneously, they operate according to the following priority.
  In descending order: (High) I/O event number - (Middle) I/O event number - (Low) I/O event number

5-2 Operation I/O event

This is the operation I/O event necessary for setting the (low) I/O event number, the (middle) I/O event number, and the (high) I/O event number.
Up to 32 items of the operation I/O event can be set.

Name	Description	Initial setting	
		Initial value	Unit
Link	Sets the mode for link operation after detecting the event trigger. **[Setting range]** 0: No link 3: Continuous sequential operation	3	–
Next data number	Sets the next data number. **[Setting range]** −256: Stop −22: ↓↓(+2) −1: ↓(+1) 0 to 255: Operation data number	−256	–
Dwell	Sets the waiting time generated after detecting the event trigger. **[Setting range]** 0 to 1,000,000 ms	0	ms
Event trigger I/O	Sets the I/O to be used as an event trigger. **[Setting range]** P.49 "2 Signals list"	0: No function	–
Event trigger type	Sets the timing to detect the event trigger. **[Setting range]** 0: Not event execution 1: ON (calculated cumulative: ms) 2: ON (continuous: ms) 3: OFF (calculated cumulative: ms) 4: OFF (continuous: ms) 5: ON (form: positive edge↑) 6: OFF(form: negative edge↓) 7: ON (cumulative: ms) 8: OFF (cumulative: ms)	0	–
Event trigger count	Sets the judgment time to detect the event trigger or the number of times of detection. **[Setting range]** 0 to 1,000,000 (1=1 ms or 1=once)	0	–

- **Link, Next data number**

Set the mode for link operation and the next data number when the event trigger is detected.

- No link
  The event is ignored.
- Continuous sequential operation
  Operation based on the operation data number set in the "Next data number" is executed continuously.

5-3 Operation data number selection

There are the following three methods to select the operation data number to be started.

- Selection by NET selection number
- Direct selection (D-SEL0 to D-SEL15)
- Selection by M0 to M7 inputs

Priority is applied in the following order: NET selection number, direct selection, M0 to M7 inputs.

● NET selection number

The NET selection number is a method of setting the operation data number with the communication command. If an operation data number other than 0 to 255 is set, the NET selection number is disabled and the direct selection or the selection by the M0 to M7 inputs is enabled.

● Direct selection

Direct selection is a method in which the operation data number is set using parameters and selected using the D-SEL0 to D-SEL15 inputs.
If the D-SEL0 to D-SEL15 inputs are all turned OFF, or two or more inputs are turned ON, direct selection is disabled and selection by the M0 to M7 inputs is enabled.

Related parameters

Name	Description	Initial setting	
		Initial value	Unit
D-SEL drive start function	Sets how to start the motor when the D-SEL input is turned ON. **[Setting range]** 0: Operation data number selection only 1: Operation data number selection + START function	1	–
D-SEL0 operation number selection	Sets the corresponding operation data number to be started when each D-SEL input is turned ON. 0 to 255: Operation data number	0	–
D-SEL1 operation number selection		1	–
D-SEL2 operation number selection		2	–
D-SEL3 operation number selection		3	–
D-SEL4 operation number selection		4	–
D-SEL5 operation number selection		5	–
D-SEL6 operation number selection		6	–
D-SEL7 operation number selection		7	–
D-SEL8 operation number selection		8	–
D-SEL9 operation number selection		9	–
D-SEL10 operation number selection		10	–
D-SEL11 operation number selection		11	–
D-SEL12 operation number selection		12	–
D-SEL13 operation number selection		13	–
D-SEL14 operation number selection		14	–
D-SEL15 operation number selection		15	–

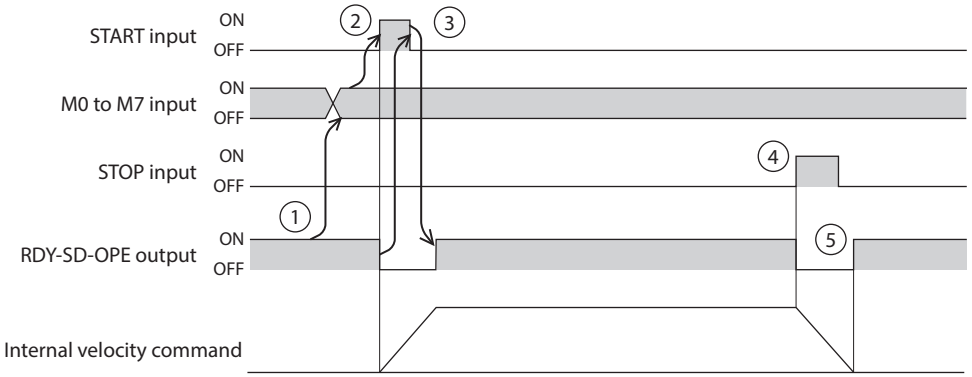
- **Selection by M0 to M7 inputs**

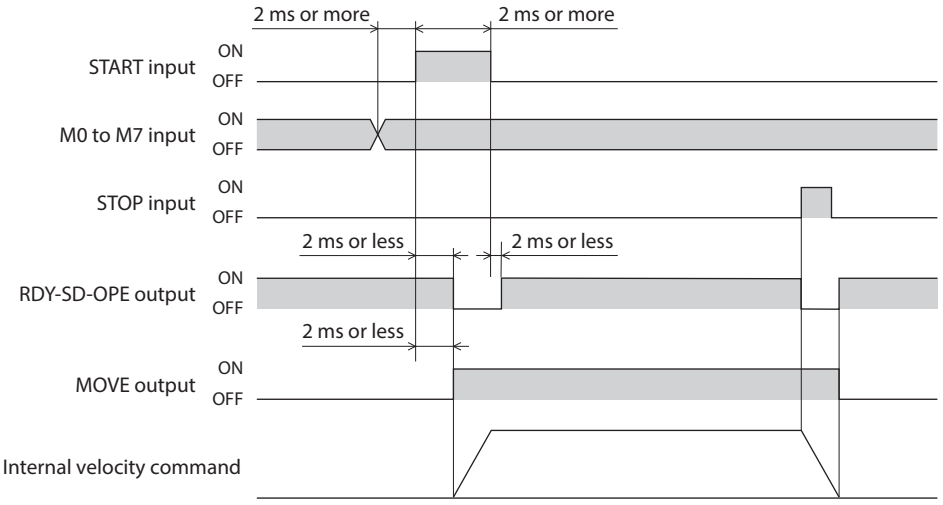
  This is a method in which a desired operation data number is selected by a combination of the ON/OFF status of the M0 to M7 inputs.

Operation data number	M7	M6	M5	M4	M3	M2	M1	M0
0	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
1	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON
2	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF
・ ・ ・	・ ・ ・	・ ・ ・	・ ・ ・	・ ・ ・	・ ・ ・	・ ・ ・	・ ・ ・	・ ・ ・
253	ON	ON	ON	ON	ON	ON	OFF	ON
254	ON	ON	ON	ON	ON	ON	ON	OFF
255	ON	ON	ON	ON	ON	ON	ON	ON

5-4 Operating method and timing chart

1. Check the RDY-SD-OPE output is being ON.
2. Select the operation data number using the M0 to M7 inputs, and turn the START input ON.
   The RDY-SD-OPE output is turned OFF and the motor starts operating.
3. Check the RDY-SD-OPE output has been turned OFF and turn the START input OFF.
   The RDY-SD-OPE output is turned ON.
4. If the STOP input is turned ON, the motor starts to decelerate to a stop.
5. When the motor stops, the RDY-SD-OPE output is turned ON.





memo The operation data number can be changed even when stored data operation is being performed.
1. Check the RDY-SD-OPE output is being ON.
2. Change the selection of the operation data number.
3. Turn the START input or D-SEL input ON.
4. The change of the operation data number is applied.

5-5 Simple sequence operation

Simple sequential operation can be performed by combining the operation of two or more operation data numbers and combining with the event jump function. If the base point for linked operation is changed using the M0 to M7 inputs or the D-SEL0 to D-SEL15 inputs, linked operation with multiple operation patterns can be set. This can be used when a different operation pattern for each load is set.
There are two types below when the timing to transition to the operation data number of the next data.

- When the NEXT input is turned ON.
- When the event jump function is executed

■ Transition by the NEXT input

After starting the operation of an operation data number that is the starting point, the operation can be moved to a desired operation data number by turning the NEXT input ON.

■ Event jump function

The event jump function is a function that branches the operation by turning ON/OFF the signal set in the "Event trigger I/O"of the operation I/O event. The operation will forcibly move to the "Next data number" when the event trigger I/O is detected during stored data operation. Three types of "(Low) I/O event number," "(Middle) I/O event number" and "(High) I/O event number" can be set for a single operation data. When they occur simultaneously, they operate according to the following priority.
In descending order: (High) I/O event number - (Middle) I/O event number - (Low) I/O event number

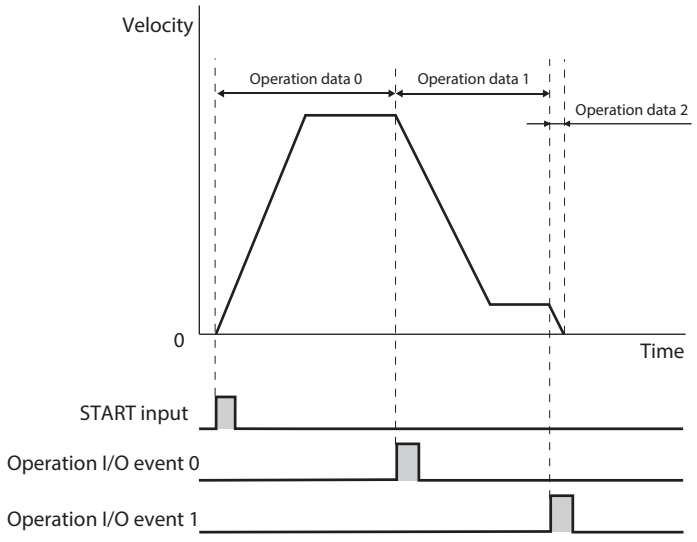
● **Transitions by event jump**

Example of operation: One way operation

Operation data number	Operation type	Operating velocity [r/min]	Acceleration time [ms]	Deceleration time [ms]	Torque limiting value [%]	(Low) I/O event number
0	Continuous operation	2,000	1,000	1,000	1,000.0	0*1
1	Continuous operation	300	1,000	1,000	1,000.0	1*2
2	Deceleration stop	0	1,000	100	1,000.0	–

*1 Next data number of operation I/O event No. 0: 1

*2 Next data number of operation I/O event No. 0: 2



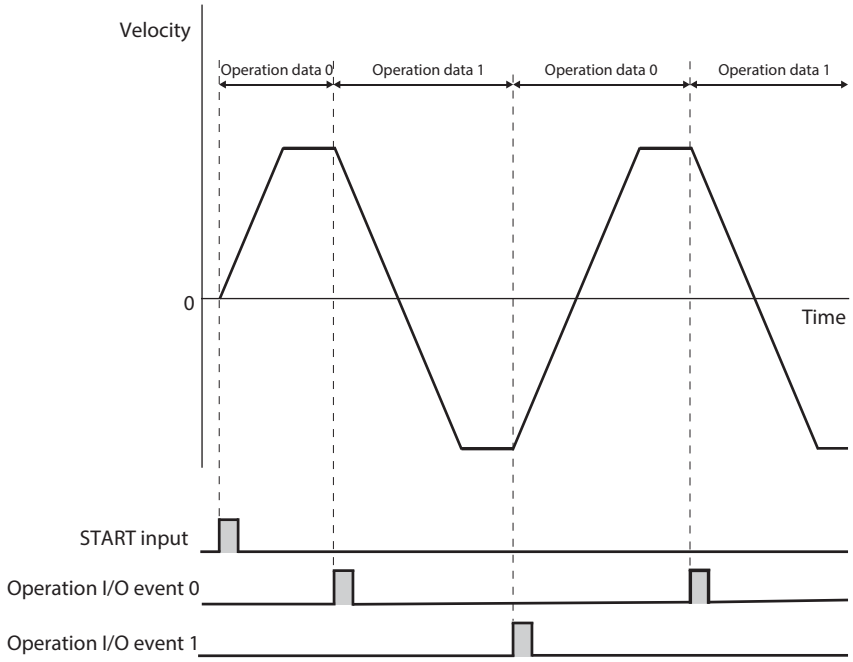
- **Transitions by event jump**

Example of operation: Repetition of back-and-forth operation

Operation data number	Operation type	Operating velocity [r/min]	Acceleration time [ms]	Deceleration time [ms]	Torque limiting value [%]	(Low) I/O event number
0	Continuous operation	1,000	1,000	1,000	1,000.0	0
1	Continuous operation	-1,000	1,000	1,000	1,000.0	1

*1 Next data number of operation I/O event No. 0: 1

*2 Next data number of operation I/O event No. 0: 0

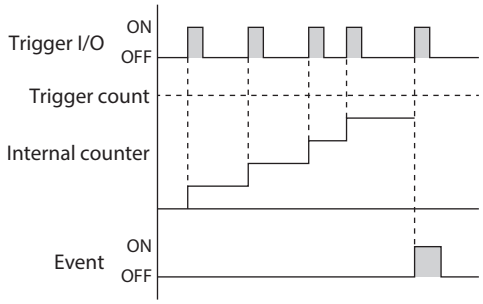


memo

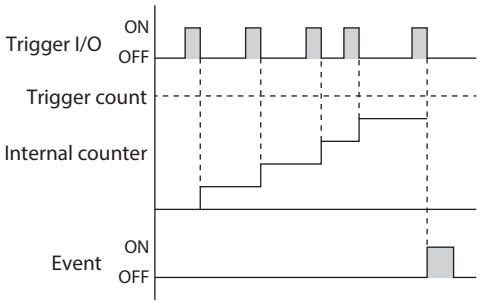
- The event jump function is set with the operation I/O event.
- The AREA output is set for the event trigger I/O and an event jump can be performed according to the amount of travel.
- The USR-OUT output corresponding to the elapsed time of continuous operation is set for the event trigger I/O and an event jump corresponding to the operating time can be performed.

● Types of event trigger

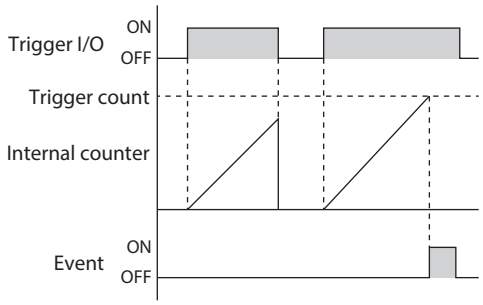
• ON (form: positive edge↑)



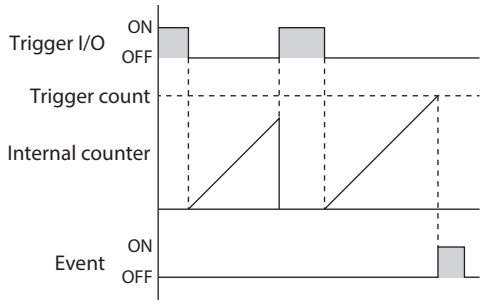
• OFF(form: negative edge↓)



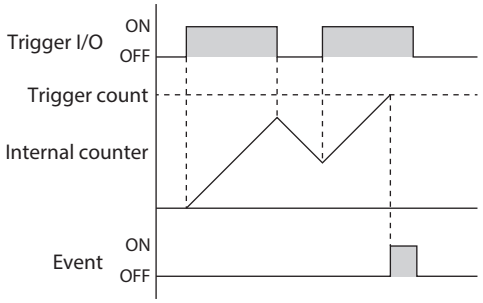
• ON (continuous: ms)



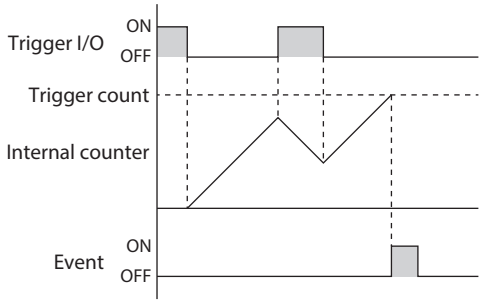
• OFF (continuous: ms)



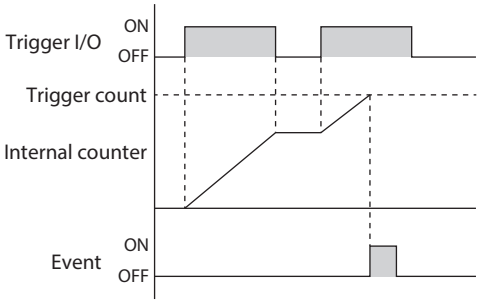
• ON (calculated cumulative: ms)



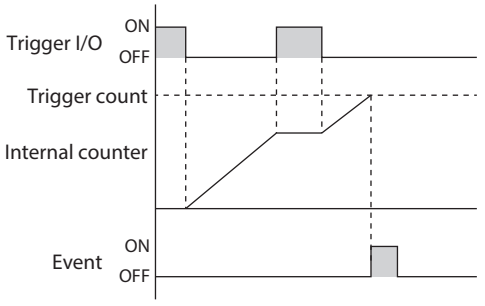
• OFF (calculated cumulative: ms)



• ON (cumulative: ms)



• OFF (cumulative: ms)



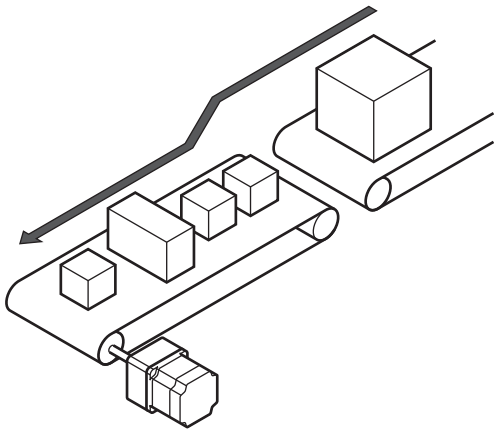
6 Direct data operation

Direct data operation is a mode that allows the data to be rewritten and the operation to be started at the same time. It is suitable for applications where operation data such as operating velocity is frequently changed.
The triggers for starting operation at the same time as rewriting of data are as follows.

- One of the following items: Operation data number, operation type, operating velocity, acceleration time, deceleration time, and torque limiting value
- The above six items are collectively rewritten

■ Application example of direct data operation

The operating velocity should be changed immediately with the touch screen because a large load is inspected at a lower rate.



Setting example

- Operating velocity: Change as desired
- Trigger: Operating velocity (setting value of trigger: –4)

Procedure

1. Write "–4" to the trigger.
2. Write the data of the operating velocity.

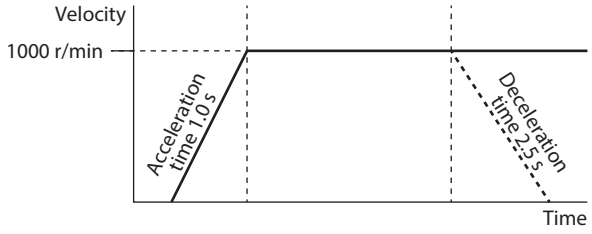
Result

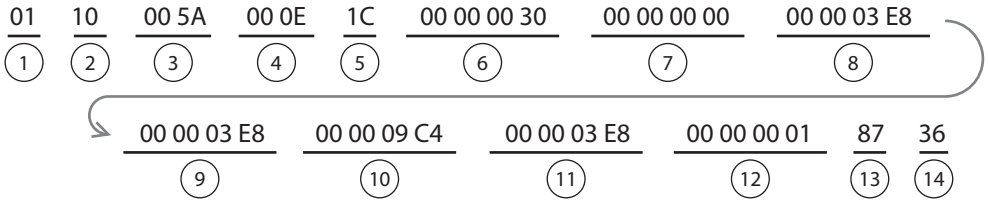
When the operating velocity is written, the changed value is immediately updated and operation is performed at the new operating velocity.

6-1 Command example of direct data operation

As an example, this section explains how to execute the following operation. The trigger is assumed to be rewritten collectively.

[Operation profile]





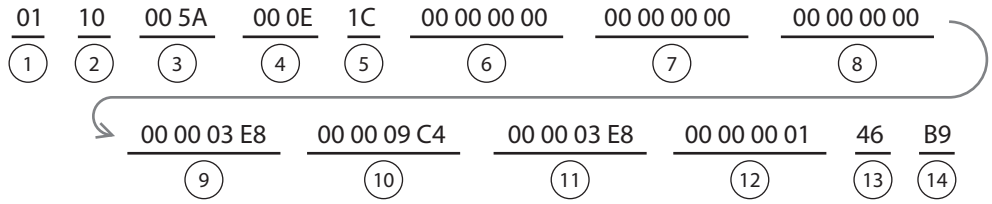
1. Send the operation data and the trigger with the following query. Operation is started at the same time as the send.

Number	Communication data (HEX)	Description
①	01	Address number = 1
②	10	Function code = 10h
③	00 5A	Write register lead address = 005Ah
④	00 0E	Number of write registers = 14 registers
⑤	1C	Number of write data bytes = 28 bytes
⑥	00 00 00 30	Operation type = 48: Continuous operation (speed control)
⑦	00 00 00 00	Reserved address (set to 0)
⑧	00 00 03 E8	Operating velocity = 1000 r/min
⑨	00 00 03 E8	Acceleration time = 1,000 ms
⑩	00 00 09 C4	Deceleration time = 2,500 ms
⑪	00 00 03 E8	Torque limiting value = 100.0 %
⑫	00 00 00 01	Trigger = 1: Normal start, lifetime disabled
⑬	87	Error check (lower)
⑭	36	Error check (upper)

Setting of operation profile

2. Check the motor rotates without any problem.

3. Send the operation data and the trigger with the following query. Operation is stopped at the same time as sending.



Number	Communication data (HEX)	Description
①	01	Address number = 1
②	10	Function code = 10h
③	00 5A	Write register lead address = 005Ah
④	00 0E	Number of write registers = 14 registers
⑤	1C	Number of write data bytes = 28 bytes
⑥	00 00 00 00	Operation type = 0: Deceleration stop (according to the specified operation profile)
⑦	00 00 00 00	Reserved address (set to 0)
⑧	00 00 00 00	Operating velocity = 0 r/min
⑨	00 00 03 E8	Acceleration time = 1,000 ms
⑩	00 00 09 C4	Deceleration time = 2,500 ms
⑪	00 00 03 E8	Torque limiting value = 100.0 %
⑫	00 00 00 01	Trigger = 1: Normal start, lifetime disabled
⑬	46	Error check (lower)
⑭	B9	Error check (Upper)

4. Check the motor stops without any problem.

6-2 Command necessary for direct data operation

Register address		Name	Description	Initial setting	
Upper	Lower			Initial value	Unit
88 (0058h)	89 (0059h)	Direct data operation operation data number	The operation data of the specified operation data number is transferred to the direct data operation command. Writing a value of the operation data number executes the data transfer. Commands to be transferred are as follows. • Direct data operation operation type • Direct data operation operating velocity • Direct data operation acceleration time • Direct data operation deceleration time • Direct data operation torque limiting value **[Setting range]** 0 to 255: Operation data No. 0 to No. 255	0 *1	–
90 (005Ah)	91 (005Bh)	Direct data operation operation type	Sets the operation type for direct data operation. **[Setting range]** 0: Deceleration stop (according to the specified operation profile) 31: Deceleration stop (according to the operation profile during operation) 48: Continuous operation (speed control)	0 *2	–
92 (005Ch)	93 (005Dh)	Direct data operation reserved address	This is the reserved address that is not in use. Set to 0.	0	step
94 (005Eh)	95 (005Fh)	Direct data operation operating velocity	Sets the operating velocity for direct data operation. **[Setting range]** –4,000,000 to 4,000,000 (User-defined velocity unit)	0 *2	r/min
96 (0060h)	97 (0061h)	Direct data operation acceleration time	Sets the acceleration time for direct data operation. **[Setting range]** 100 to 30,000 ms	1,000 *2	ms
98 (0062h)	99 (0063h)	Direct data operation deceleration time	Sets the deceleration time for direct data operation. **[Setting range]** 100 to 30,000 ms	1,000 *2	ms
100 (0064h)	101 (0065h)	Direct data operation torque limiting value	Sets the torque limiting value for direct data operation. **[Setting range]** 0 to 10,000 (1=0.1 %)*3	10,000*2	1=0.1 %
102 (0066h)	103 (0067h)	Direct data operation trigger	Sets the trigger and the lifetime for direct data operation. **[Setting range]** <Upper 16 bits> Lifetime setting –1, 0: Direct data operation lifetime disable 1 to 32,767: Direct data operation lifetime setting value <Lower 16 bits> Trigger setting –7: Operation data number –6: Operation type –4: Operating velocity –3: Acceleration time –2: Deceleration time –1: Torque limit value 0: Disable 1 to 3: Normal start	0	–

*1 The value set in the "Direct data operation operation parameter initial value reference data number" parameter will be the initial value.

*2 The operation data of the operation data number set in the "Direct data operation operation parameter initial value reference data number" parameter will be the initial value.

*3 The maximum torque limiting value varies depending on the motor. Refer to p.15 for the maximum value of each motor.

Note If the motor is operated at a rotation speed outside the specification range, an alarm of "Abnormal operation data" will be generated.

■ Related parameters

Register address		Name	Description	Initial setting	
Upper	Lower			Initial value	Unit
546 (0222h)	547 (0223h)	Direct data operation trigger initial value	Sets the initial value of the trigger (lower 16 bits). **[Setting range]** –7: Operation data number update –6: Operation type update –4: Speed update –3: Acceleration time update –2: Deceleration time update –1: Torque limiting value update 0: The trigger is used	0	–
550 (0226h)	551 (0227h)	Direct data operation operation parameter initial value reference data number	Sets the operation data number to be used as the initial value for direct data operation. **[Setting range]** 0 to 255: Operation data number	0	–
552 (0228h)	553 (0229h)	Direct data operation trigger automatic clear	Sets the movement when setting "Direct data operation trigger" that is set the trigger factor to transfer or update the data in the direct data operation memory area as execution data. When this parameter is set to enable, if direct data operation is started by writing to "Direct data operation trigger," the trigger (lower 16 bits) of "Direct data operation trigger" is automatically cleared to "0" regardless of whether it is successful or not. Therefore, if the same data is written, direct data operation can be started as many times as the data is written. When this parameter is set to disable, "Direct data operation trigger" is not cleared to "0" even if it is written. Therefore, direct data operation is not started even if the same data is written in succession. To restart, one of the following is required. • Write "0" to "Direct data operation trigger" and then write the value for starting. • Write a different value to "Direct data operation trigger." **[Setting range]** 0: Disable 1: Enable	1	–
572 (023Ch)	573 (023Dh)	Direct data operation lifetime initial value	Sets the initial value for direct data operation lifetime. **[Setting range]** 0: Disable 1 to 32,767 ms	0	ms

6-3 Trigger and lifetime

Sets the trigger and the lifetime for direct data operation.
Upper 16 bits: Direct data operation lifetime
Lower 16 bits: Trigger

Note If either the direct data operation lifetime or the trigger is out of the range, a communication error of "Out of setting range" will occur. In this case, both the upper and lower values are not applied.

■ Lower 16 bits: Trigger

This is a trigger to rewrite the data and start the operation at the same time for direct data operation.

■ When the trigger setting is "0" to "3"

When a value of 1 to 3 is written to the trigger, all data is written and direct data operation is started at the same time. It is not started if the same value is written. When the "Direct data operation trigger automatic clear" parameter is set to "Enable," the trigger (lower 16 bits) will automatically return to "0" regardless of whether the operation is started or not (initial value: Enable).

xxxx: If the lifetime is not used, set 0000h or FFFFh.
Set the lifetime when using it.

Setting value		Starting mode
Dec*	Hex	
0	xxxx 0000h	Not start
1 (or 2, 3)	xxxx 0001h (xxxx 0002h) (xxxx 0003h)	Normal start

* This is the value when the lifetime is not used.

■ When the trigger setting is "–1" to "–7"

Direct data operation is started when the data corresponding to the trigger is written. Even if operation is started, the setting value of the trigger is retained.

xxxx: If the lifetime is not used, set FFFFh or 0000h.
Set the lifetime when using it.

Setting value		Starting mode
Dec*	Hex	
–7	xxxx FFF9h	Start when writing the operation data number
–6	xxxx FFFAh	Start when writing the operation type
–4	xxxx FFFCh	Start when writing the speed
–3	xxxx FFFDh	Start when writing the acceleration time
–2	xxxx FFFEh	Start when writing the deceleration time
–1	xxxx FFFFh	Start when writing the torque limiting value

* This is the value when the lifetime is not used.

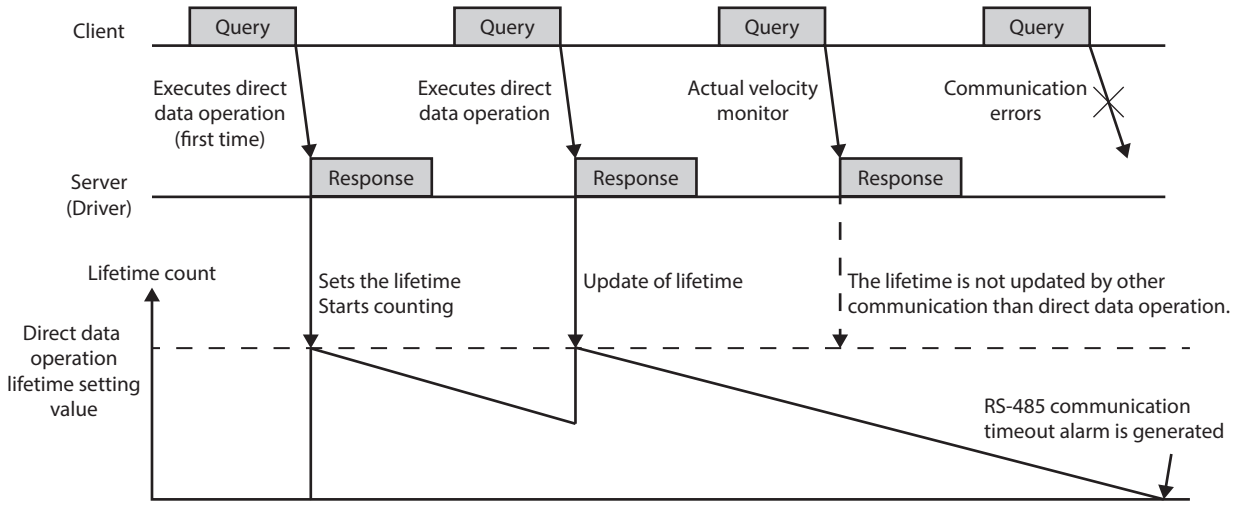
■ Setting value of xxxx (setting value of lifetime)

Setting value		Direct data operation lifetime action	Description
Dec	Hex		
–32768	8000h	Out of setting range	The direct data operation lifetime is out of the setting range. The lifetime is continued counting while being counted.
• •	• •		
–2	FFFEh		
–1	FFFFh	Stop	The direct data operation lifetime is disabled. The lifetime is stopped counting while being counted.
0	0000h		
1	0001h	Start	The setting value will be the direct data operation lifetime [ms]. The lifetime is updated while being counted.
2	0002h		
. .	. .		
32767	7FFFh		

■ Upper 16 bits: Direct data operation lifetime

● Direct data operation lifetime

The lifetime for direct data operation can be set.
Use the lifetime when direct data operation is periodically executed.
If the lifetime is set, the timer inside the driver starts counting (countdown) when direct data operation is executed.
When the count value reaches "0," an alarm of "RS-485 communication timeout" is generated and the motor stops.
The lifetime is updated when the direct data operation is executed.
It is not updated by other communication than direct data operation.



● Updates the lifetime

The lifetime is stopped counting to set again.
The lifetime is updated at the following.

- When direct data operation is executed
- When the "Direct data operation trigger" command is written

6-4 Transfer of operation data

The value is transferred from the operation data of the direct data operation operation data number to each command at the following time.

- When turning on the power or when executing Configuration
- When writing to the direct data operation operation data number

The operation data (data source) and direct data operation command (data destination) are as follows.

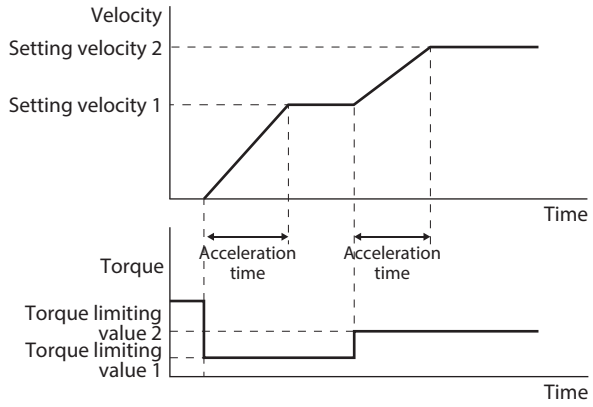
Operation data (data source)	Direct data operation command (data destination)
Operation type	Direct data operation operation type
Operating velocity	Direct data operation operating velocity
Acceleration time	Direct data operation acceleration time
Deceleration time	Direct data operation deceleration time
Torque limiting value	Direct data operation torque limiting value

6-5 Operation example when direct data has been rewritten

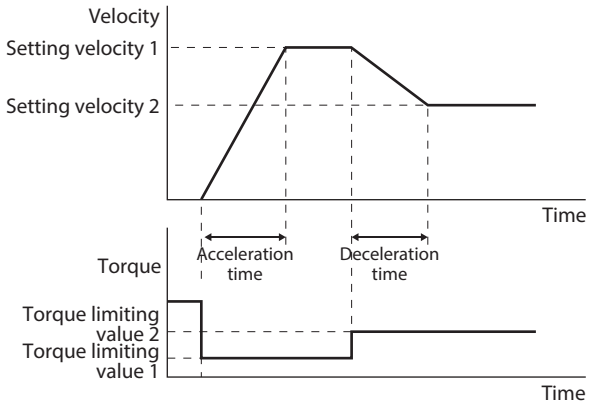
This is the operation when the direct data has been rewritten (override).
(Operation example) Operation when direct data operation 2 is rewritten while direct data operation 1 is being executed

Direct data operation 1: Continuous operation
Direct data operation 2: Continuous operation

When setting speed 2 is faster than setting speed 1



When setting speed 2 is slower than setting speed 1



Note

In direct data operation, the acceleration/deceleration slope is calculated with the time from the moment the data is written.
Therefore, if the same data is written multiple times, the acceleration/deceleration slope will be less than the first time, even if the same data is written. (*1, *2)

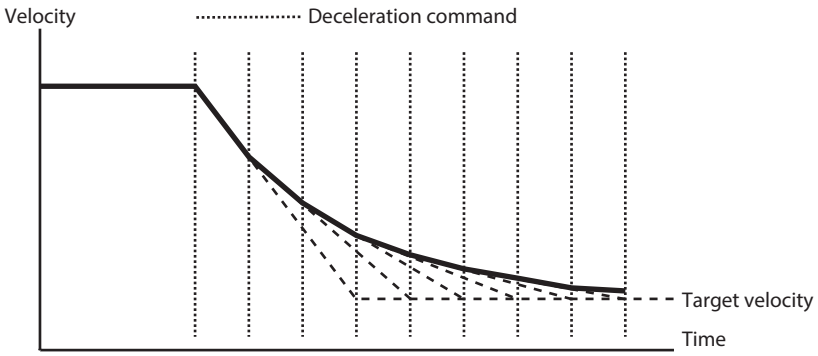
*1 This is when the demand velocity does not reach the target velocity.

*2 Sop operation is excluded.

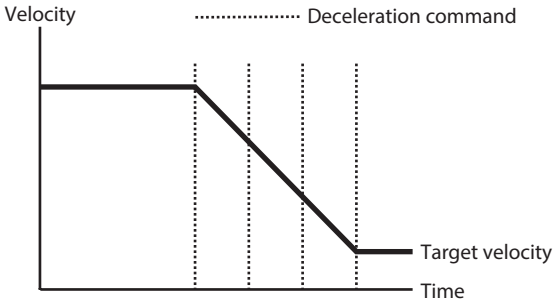
If the same data is written multiple times, it is recommended that the "Acceleration/deceleration (time setting) reference speed" parameter be set to make the acceleration/deceleration slope constant before use.

Example: If the same data is written multiple times when decelerating from high speed to low speed.

- The "Acceleration/deceleration (time setting) reference speed" parameter is set to 0 (the time of speed change is constant).

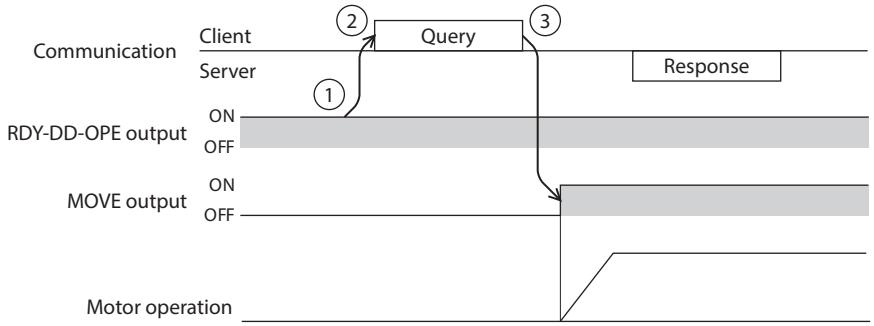


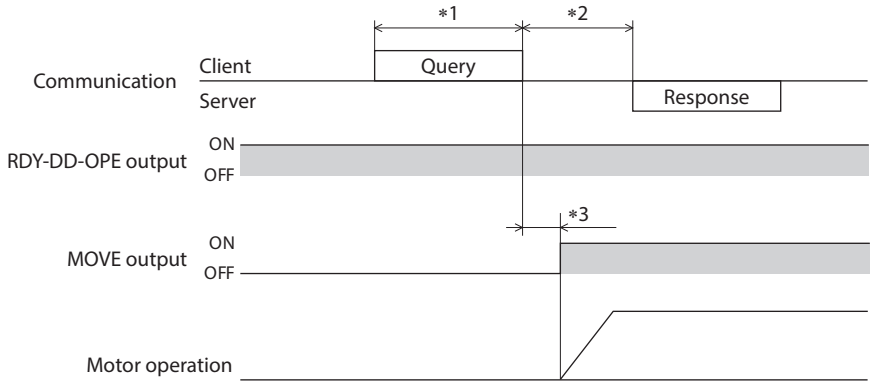
- The "Acceleration/deceleration (time setting) reference speed" parameter is set to 1 or more (the slope of speed change is constant).



6-6 Timing chart

1. Check that the RDY-DD-OPE output is being ON.
2. Send a query (including the trigger and data) to execute direct data operation.
3. When the client sends a query, the MOVE output is turned ON to start operation.





*1 Query via RS-485 communication

*2 C3.5 (silent interval) + the longer of Tb4 (query processing time) and Tb2 (transmission waiting time)

*3 C3.5 (silent interval) + Tb4 (query processing time) + 2 ms or less

3 I/O signals

This part explains input signals and output signals.

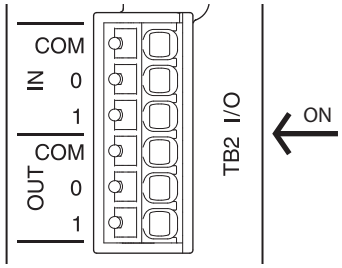
◆Table of contents

1 Overview of I/O signals

1-1 Overview of input signals

■ Direct input

Direct input (DIN) is a method in which the I/O cable is connected to the connector to input signals directly.
If the composite input function is used, a single input can turn two signals ON simultaneously, achieving saving of wiring.

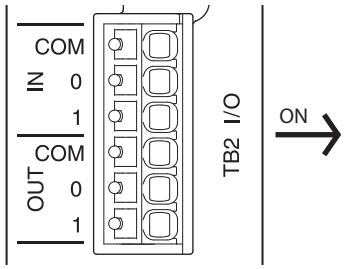


Name	Description
Input function	Selects an input signal to be assigned to DIN.
Inverting mode	The ON/OFF status of the signal can be changed.
ON signal dead-time	The input signal is turned ON when the time having set is exceeded. This can be used to take a measure to eliminate the noise or to adjust the timing between the devices.
1-shot signal	The input signal having been turned ON is automatically turned OFF after 250 μs.
Composite input function	When DIN is turned ON, the signal selected here is also turned ON.

1-2 Overview of output signals

■ Direct output

Direct output (DOUT) is a method in which the I/O cable is connected to the connector to output signals directly.
If the composite output function is used, the logical combination result of two output signals can be output in a single signal.



Name	Description
(Normal) Output function	Selects an output signal to be assigned to DOUT.
Inverting mode	The ON/OFF status of the signal can be changed.
OFF delay time	The output signal is turned OFF when the time that has been set is exceeded. This can be used to take a measure to eliminate the noise or to adjust the timing between the devices.
Composite logical combination	Sets the logical combination [AND (logical product) or OR (logical sum)] of the composite output function.
Composite output function	Selects an output signal for logical operation with the signal of DOUT. When logical combination of the two signals is established, DOUT is turned ON.
Composite inverting mode	Changes the ON/OFF status of the signal selected in the composite output function.

1-3 Setting contents of input signals and output signals

■ Direct input

● Input function

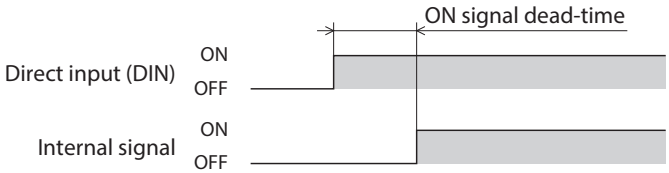
Name	Description	Initial value
DIN0 input function	Selects the input signals to be assigned to DIN0 and DIN1. **[Setting range]** ⇨P.49 "2-1 Input signal list"	58: FW-SPD
DIN1 input function		59: RV-SPD

● Changing the ON/OFF status of input signals

Name	Description	Initial value
Inverting mode	Changes the ON/OFF status of DIN0 and DIN1. **[Setting range]** 0: Non invert 1: Invert	0

● ON signal dead-time

Name	Description	Initial value
ON signal dead-time	The input signal is turned ON when the time having set is exceeded. This can be used to take a measure to eliminate the noise or to adjust the timing between the devices. **[Setting range]** 0 to 250 ms	0



● 1-shot signal

Name	Description	Initial value
1-shot signal	The signal having input to DIN0 and DIN1 is automatically turned OFF (or ON) 250 µs after input. **[Setting range]** 0: Disable 1: Enable	0

Note When the HMI input is assigned to the DIN input function, do not set the "1-shot signal" parameter to "Enable."

● Composite input function

Name	Description	Initial value
Composite input function	When either DIN0 or DIN1is turned ON, the input signals selected here are turned ON simultaneously. **[Setting range]** ⇨P.49 "2-1 Input signal list"	0: No function

■ Direct output

● (Normal) Output function

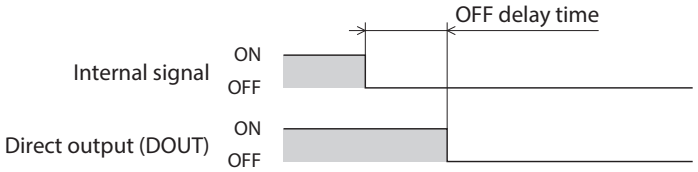
Name	Description	Initial value
DOUT0 (normal) Output function	Selects the output signals to be assigned to DOUT0 and DOUT1. **[Setting range]** ⇨P.51 "2-2 Output signal list"	130: ALM-B
DOUT1 (normal) Output function		134: MOVE

● Changing the ON/OFF status of output signals

Name	Description	Initial value
Inverting mode	Changes the ON/OFF status of DOUT0 and DOUT1. **[Setting range]** 0: Non invert 1: Invert	0

● OFF delay time

Name	Description	Initial value
OFF delay time	Sets the OFF delay time of DOUT0 and DOUT1. This can be used to take a measure to eliminate the noise or to adjust the timing between the devices. **[Setting range]** 0 to 4,000 ms	0



● Composite logical combination

Name	Description	Initial value
Composite logical combination	Sets the logical combination [AND (logical product) or OR (logical sum)] of the composite output function. **[Setting range]** 0: AND 1 OR	1

● Composite output function

Name	Description	Initial value
Composite output function	Selects the output signals for logical operation with the signals of DOUT0 and DOUT1. When logical combination of the two signals has been established, the output is turned ON. **[Setting range]** ⇨P.51 "2-2 Output signal list"	128: CONST-OFF

● Composite inverting mode

Name	Description	Initial value
Composite inverting mode	Changes the ON/OFF status of the composite output function. **[Setting range]** 0: Non invert 1: Invert	0

2 Signals list

Assign I/O signals using the support software or via industrial network.

2-1 Input signal list

To assign signals via industrial network, use the "Assignment number" in the table instead of the signal name.
Refer to P.57 "4 Input signals" for details about each signal.

Assignment number	Signal name	Function
0	No function	Set when the input terminal is not used.
1	FREE	Shut off the motor current to put the motor in a non-excitation state.
5	STOP	Stop the motor.
8	ALM-RST	Reset the alarm presently being generated.
9	P-PRESET	Clear the actual position.
11	USR-ALM	Generate the user alarm.
14	INFO-CLR	Clear the information status.
16	HMI	Release the function limitation of the support software.
18	TRQ-LMT	Enable the TRQ-LMT input torque limiting.
19	SPD-LMT	Enable the SPD-LMT input speed limit.
25	ATL-EN	Enable the ATL function.
32	START	Execute stored data operation.
34	FWRV-DIR-INV	Reverse the rotation direction for FW/RV operation.
35	NEXT	Transition to the linked operation data number forcibly.
40	M0	Select the operation data number using eight bits.
41	M1	
42	M2	
43	M3	
44	M4	
45	M5	
46	M6	
47	M7	
58	FW-SPD	Execute continuous operation (speed control) in the forward direction.
59	RV-SPD	Execute continuous operation (speed control) in the reverse direction.
80	D-SEL0	Execute operation based on the operation data number having set in the D-SEL input.
81	D-SEL1	
82	D-SEL2	
83	D-SEL3	
84	D-SEL4	
85	D-SEL5	
86	D-SEL6	
87	D-SEL7	
88	D-SEL8	
89	D-SEL9	
90	D-SEL10	
91	D-SEL11	
92	D-SEL12	

Assignment number	Signal name	Function
93	D-SEL13	Execute operation based on the operation data number having set in the D-SEL input.
94	D-SEL14	
95	D-SEL15	
96	R0	These are general signals.
97	R1	
98	R2	
99	R3	
100	R4	
101	R5	
102	R6	
103	R7	
104	R8	
105	R9	
106	R10	
107	R11	
108	R12	
109	R13	
110	R14	
111	R15	
112	R16	
113	R17	
114	R18	
115	R19	
116	R20	
117	R21	
118	R22	
119	R23	
120	R24	
121	R25	
122	R26	
123	R27	
124	R28	
125	R29	
126	R30	
127	R31	

2-2 Output signal list

To assign signals via industrial network, use the "Assignment number" in the table instead of the signal name.
Refer to P.64 "5 Output signals" for details about each signal.

Assignment number	Signal name	Function
0	No function	Set when the output terminal is not used.
1	FREE_R	Output in response to an input signal.
5	STOP_R	
8	ALM-RST_R	
9	P-PRESET_R	
11	USR-ALM_R	
14	INFO-CLR_R	
16	HMI_R	
18	TRQ-LMT_R	
19	SPD-LMT_R	
25	ATL-EN_R	
32	START_R	
34	FWRV-DIR-INV_R	
35	NEXT_R	
40	M0_R	
41	M1_R	
42	M2_R	
43	M3_R	
44	M4_R	
45	M5_R	
46	M6_R	
47	M7_R	
58	FW-SPD_R	
59	RV-SPD_R	
80	D-SEL0_R	
81	D-SEL1_R	
82	D-SEL2_R	
83	D-SEL3_R	
84	D-SEL4_R	
85	D-SEL5_R	
86	D-SEL6_R	
87	D-SEL7_R	
88	D-SEL8_R	
89	D-SEL9_R	
90	D-SEL10_R	
91	D-SEL11_R	
92	D-SEL12_R	
93	D-SEL13_R	
94	D-SEL14_R	
95	D-SEL15_R	
96	R0_R	

Assignment number	Signal name	Function
97	R1_R	Output in response to an input signal.
98	R2_R	
99	R3_R	
100	R4_R	
101	R5_R	
102	R6_R	
103	R7_R	
104	R8_R	
105	R9_R	
106	R10_R	
107	R11_R	
108	R12_R	
109	R13_R	
110	R14_R	
111	R15_R	
112	R16_R	
113	R17_R	
114	R18_R	
115	R19_R	
116	R20_R	
117	R21_R	
118	R22_R	
119	R23_R	
120	R24_R	
121	R25_R	
122	R26_R	
123	R27_R	
124	R28_R	
125	R29_R	
126	R30_R	
127	R31_R	
128	CONST-OFF	Output an OFF state at all times.
129	ALM-A	Output the alarm status of the driver (normally open).
130	ALM-B	Output the alarm status of the driver (normally closed).
131	SYS-RDY	Output when the power supply of the driver is turned on.
134	MOVE	Output while the motor operates.
135	INFO	Output the information status of the driver.
136	SYS-BSY	Output when the driver is in an internal processing state.
140	TLC	Output when the output torque reaches the maximum output torque or the torque limiting value.
141	VA	Output when the operating velocity reaches the target velocity.
146	RDY-FWRV-OPE	Output when the driver is ready to start FW/RV operation.
147	RDY-SD-OPE	Output when the driver is ready to start stored data operation.
148	RDY-DD-OPE	Output when the driver is ready to start direct data operation.
152	OPE-BSY	Output while internal oscillation is performed.
154	SEQ-BSY	Output while stored data operation is performed.

Assignment number	Signal name	Function
160	AREA0	Output when the motor is within the area.
161	AREA1	
162	AREA2	
163	AREA3	
164	AREA4	
165	AREA5	
166	AREA6	
167	AREA7	
194	ATL-MON	Output when the ATL function is enabled.
199	M-CHG	The output is inverted when operation is started, the operation data number is switched, or the operation data is overwritten (override). (Toggle action)
200	M-ACT0	Output the status of the M0 input corresponding to the operation data number during operation.
201	M-ACT1	Output the status of the M1 input corresponding to the operation data number during operation.
202	M-ACT2	Output the status of the M2 input corresponding to the operation data number during operation.
203	M-ACT3	Output the status of the M3 input corresponding to the operation data number during operation.
204	M-ACT4	Output the status of the M4 input corresponding to the operation data number during operation.
205	M-ACT5	Output the status of the M5 input corresponding to the operation data number during operation.
206	M-ACT6	Output the status of the M6 input corresponding to the operation data number during operation.
207	M-ACT7	Output the status of the M7 input corresponding to the operation data number during operation.
224	TRQ-LMTD	Output when the torque limiting by the TRQ-LMT input is enabled.
225	SPD-LMTD	Output when the speed limit by the SPD-LMT input is enabled.
228	OL-DTCT	Output when the output torque reaches the torque to detect the overload alarm.
232	USR-OUT0	Output a logical product (AND) or a logical sum (OR) of two types of output signals and the comparison result to the internal monitor group.
233	USR-OUT1	
234	USR-OUT2	
235	USR-OUT3	
236	USR-OUT4	
237	USR-OUT5	
238	USR-OUT6	
239	USR-OUT7	
250	ASG	Output the signal that repeats ON and OFF in synchronization with the rotation of the motor.
251	BSG	

Assignment number	Signal name	Function
257	INFO-START-G	Output when the corresponding information is generated. Refer to p.219 for the information list.
258	INFO-485-G	
262	INFO-MNT-G	
264	INFO-DRVTMP	
266	INFO-LOAD	
267	INFO-TRQ	
284	INFO-DSLMTD	
285	INFO-IOTEST	
286	INFO-CONFIG	
287	INFO-REBOOT	
300	INFO-SPD-H	
301	INFO-SPD-L	
304	INFO-TLC-TIME	
328	INFO-TRIP0	
329	INFO-TRIP1	
330	INFO-ODO	
333	INFO-PTIME	
334	INFO-PCOUNT	
336	INFO-485-ERR	
337	INFO-485-PRCST	
338	INFO-485-INTVL	
354	INFO-START-FWRV	
355	INFO-START-SD	
356	INFO-START-DD	
359	INFO-IODRV-DIS	
368	INFO-UNIT-E	
376	INFO-CPU-FAULT	
377	INFO-OC-FAULT	

3 Signal type

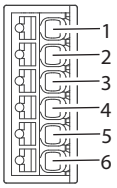
3-1 Direct I/O

Direct I/O is I/O accessed via the I/O signal connector.

■ Assignment to input terminals

Assign the input signals to the input terminals DIN0 and DIN1 using the "DIN0 input function" and "DIN1 input function" parameters.
Refer to P.49 "2-1 Input signal list" for input signals that can be assigned.

Connector terminal number	Terminal name	Initial value
2	DIN0	FW-SPD
3	DIN1	RV-SPD



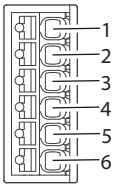
Note

- When the same input signal is assigned to multiple input terminals, the function will be executed if any of the terminals becomes active.
- When the HMI input is not assigned to an input terminal, this input will always be in an ON state. If it is assigned to both direct I/O and remote I/O, the function will be executed only when both of them are turned ON.

■ Assignment to output terminals

Assign the output signals to the output terminals DOUT0 and DOUT1 using the "DOUT0 (normal) Output function" and "DOUT1 (normal) Output function" parameters.
Refer to P.51 "2-2 Output signal list" for output signals that can be assigned.

Connector terminal number	Terminal name	Initial value
5	DOUT0	ALM-B
6	DOUT1	MOVE



3-2 Remote I/O

Remote I/O is I/O to be accessed via RS-485 communication.

■ Assignment to input signals

Assign the input signals to R-IN0 to R-IN31 of remote I/O using the "R-IN0 input function" to "R-IN31 input function" parameters. Refer to P.49 "2-1 Input signal list" for input signals that can be assigned.

Remote I/O signal name	Initial value	Remote I/O signal name	Initial value
R-IN0	FW-SPD	R-IN16	START
R-IN1	RV-SPD	R-IN17	NEXT
R-IN2	No function	R-IN18	No function
R-IN3	TRQ-LMT	R-IN19	No function
R-IN4	No function	R-IN20	P-PRESET
R-IN5	STOP	R-IN21	No function
R-IN6	FREE	R-IN22	No function
R-IN7	ALM-RST	R-IN23	No function
R-IN8	M0	R-IN24	D-SEL0
R-IN9	M1	R-IN25	D-SEL1
R-IN10	M2	R-IN26	D-SEL2
R-IN11	M3	R-IN27	D-SEL3
R-IN12	M4	R-IN28	D-SEL4
R-IN13	M5	R-IN29	D-SEL5
R-IN14	M6	R-IN30	D-SEL6
R-IN15	M7	R-IN31	D-SEL7

Note

- When the same input signal is assigned to multiple input terminals, the function will be executed if any of the terminals becomes active.
- When the HMI input is not assigned to an input terminal, this input will always be in an ON state. If it is assigned to both direct I/O and remote I/O, the function will be executed only when both of them are turned ON.

■ Assignment to output signals

Assign the output signals to R-OUT0 to R-OUT31 of remote I/O using the "R-OUT0 output function" to "R-OUT31 output function" parameters. Refer to P.51 "2-2 Output signal list" for output signals that can be assigned.

Remote I/O signal name	Initial value	Remote I/O signal name	Initial value
R-OUT0	MOVE	R-OUT16	INFO
R-OUT1	VA	R-OUT17	INFO-MNT-G
R-OUT2	TLC	R-OUT18	INFO-DRVTMP
R-OUT3	TRQ-LMTD	R-OUT19	INFO-TRQ
R-OUT4	CONST-OFF	R-OUT20	INFO-START-G
R-OUT5	STOP_R	R-OUT21	INFO-CONFIG
R-OUT6	FREE_R	R-OUT22	INFO-REBOOT
R-OUT7	ALM-A	R-OUT23	CONST-OFF
R-OUT8	SYS-BSY	R-OUT24	AREA0
R-OUT9	RDY-FWRV-OPE	R-OUT25	AREA1
R-OUT10	RDY-SD-OPE	R-OUT26	AREA2
R-OUT11	RDY-DD-OPE	R-OUT27	AREA3
R-OUT12	CONST-OFF	R-OUT28	USR-OUT0
R-OUT13	CONST-OFF	R-OUT29	USR-OUT1
R-OUT14	CONST-OFF	R-OUT30	USR-OUT2
R-OUT15	CONST-OFF	R-OUT31	USR-OUT3

4 Input signals

4-1 Excitation off signal

■ FREE input

When the FREE input is turned ON, the motor current is shut off to put the motor in a non-excitation state.

4-2 Operation stop signal

■ STOP input

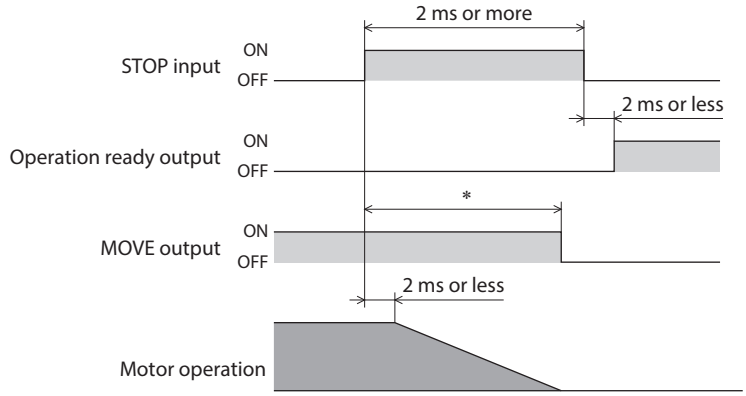
When the STOP input is turned ON, the motor stops.
The operation is stopped according to the "STOP input action" parameter.
The torque limiting value when stopped is based on the "STOP input stopping torque limit" parameter.

Related parameters

Name	Description	Initial setting	
		Initial value	Unit
STOP input action	Sets how to stop the motor when the STOP input is turned ON. **[Setting range]** 1: Deceleration stop (according to the operation profile during operation except for the torque limiting value) 2: Deceleration stop (according to the STOP deceleration time parameter)	1	–
STOP input stopping torque limit	Sets the torque limiting value when the STOP input is turned ON. **[Setting range]** 0: According to the operation profile during operation 1 to 10,000 (1=0.1 %)	0	1=0.1 %
STOP deceleration time	Sets the deceleration time when "Deceleration stop (according to the STOP deceleration time parameter)" is selected in the "STOP input action" parameter. **[Setting range]** 100 to 30,000 ms	1,000	ms

- **STOP input action (when the motor stops while the STOP input is ON)**

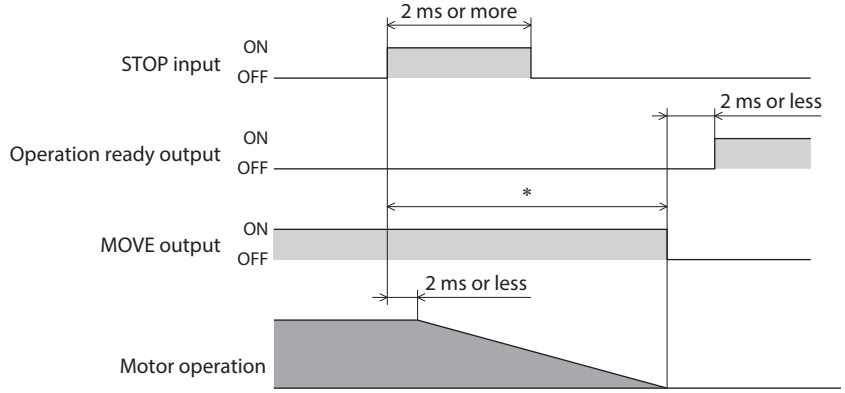
1. If the STOP input is turned ON during operation, the motor will start to stop moving.
2. If the STOP input is turned OFF, the operation ready output will be turned ON.
   (When the operation ready condition other than the STOP input is satisfied)



* It varies depending on the driving condition.

- **STOP input action (when the motor does not stop while the STOP input is ON)**

1. If the STOP input is turned ON during operation, the motor will start to stop moving.
   Even after the STOP input is turned OFF, the motor continues the deceleration operation until it stops.
2. When the motor stops, the operation ready output is turned ON.
   (When the operation ready condition other than the STOP input is satisfied)



* It varies depending on the driving condition.

4-3 Signals used for operation

■ FW-SPD, RV-SPD input

When the operation data number is selected to turn the FW-SPD input or RV-SPD input ON, continuous operation (speed control) is performed according to the operation profile of the selected operation data number. (FW/RV operation)
When the FW-SPD input is turned ON, the motor rotates in the forward direction. When the RV-SPD input is turned ON, the motor rotates in the reverse direction.
If the FW-SPD input or RV-SPD input is turned OFF during operation, the motor will decelerate to a stop.
If the signal of the same rotation direction is turned ON while the motor decelerates to a stop, the motor will accelerate again and continue to operate.
If both the FW-SPD and RV-SPD inputs are turned ON simultaneously, the motor will decelerate to a stop.
If the operation data number is changed during operation, the motor speed is changed according to the operation profile of the changed operation data number.

■ FWRV-DIR-INV input

When the FWRV-DIR-INV input is turned ON, the rotation direction of the FW-SPD input and RV-SPD input is reversed.

■ START input

When the operation data number is selected to turn the START input ON, stored data operation is started.

■ D-SEL0 to D-SEL15 inputs

When any of the D-SEL0 to D-SEL15 inputs is turned ON, stored data operation of the set operation data number is started.
Since stored data operation can be performed only by turning any of the D-SEL0 to D-SEL15 inputs ON, the steps for selecting the operation data number can be saved.

Related parameters

Name	Description	Initial setting	
		Initial value	Unit
D-SEL drive start function	Sets whether to start operation when the D-SEL input is turned ON. **[Setting range]** 0: Operation data number selection only 1: Operation data number selection + START function	1	–
D-SEL0 operation number selection	Sets the operation data number corresponding to the D-SEL input. **[Setting range]** 0 to 255: Operation data number	0	–
D-SEL1 operation number selection		1	–
D-SEL2 operation number selection		2	–
D-SEL3 operation number selection		3	–
D-SEL4 operation number selection		4	–
D-SEL5 operation number selection		5	–
D-SEL6 operation number selection		6	–
D-SEL7 operation number selection		7	–
D-SEL8 operation number selection		8	–
D-SEL9 operation number selection		9	–
D-SEL10 operation number selection		10	–
D-SEL11 operation number selection		11	–
D-SEL12 operation number selection		12	–
D-SEL13 operation number selection		13	–
D-SEL14 operation number selection		14	–
D-SEL15 operation number selection		15	–

■ NEXT input

If the NEXT input is turned ON during stored data operation, the present operation will forcibly transition to the linked operation data number.
If the next data number is not set, the present operation is continued.

■ M0 to M7 inputs

Select a desired operation data number for stored data operation or FW/RV operation based on a combination of the ON/OFF status of the M0 to M7 inputs.

Operation data number	M7	M6	M5	M4	M3	M2	M1	M0
0	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
1	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON
2	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF
3	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON
・ ・ ・	・ ・ ・	・ ・ ・	・ ・ ・	・ ・ ・	・ ・ ・	・ ・ ・	・ ・ ・	・ ・ ・
252	ON	ON	ON	ON	ON	ON	OFF	OFF
253	ON	ON	ON	ON	ON	ON	OFF	ON
254	ON	ON	ON	ON	ON	ON	ON	OFF
255	ON	ON	ON	ON	ON	ON	ON	ON

Setting example 1: When the operation data No. 8 (binary number: 0000 1000) is specified

Operation data number	M7	M6	M5	M4	M3	M2	M1	M0
8	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF

Setting example 2: When the operation data No. 116 (binary number: 0111 0100) is specified

Operation data number	M7	M6	M5	M4	M3	M2	M1	M0
116	OFF	ON	ON	ON	OFF	ON	OFF	OFF

4-4 Status release signals

These signals are used to release the signal or status that is not automatically released.

■ ALM-RST input

If an alarm is generated, the motor will stop. At this time, turning the ALM-RST input from OFF to ON will reset the alarm (the alarm is reset on the ON edge of the ALM-RST input). Be sure to correct the cause of the alarm and ensure safety before resetting the alarm.
Note that some alarms cannot be reset with the ALM-RST input.
Refer to P.209 "1-3 Alarm list" for alarms.

■ INFO-CLR input

This signal is enabled when the "Information auto clear" parameter is set to "Disable."
Turning the INFO-CLR input ON will clear the information status.

4-5 Driver function change signals

■ HMI input

When the HMI input is turned ON, the function limitation of the support software is released. When it is turned OFF, the functions are limited.
The functions that are limited are shown below.

- Remote operation
- I/O test
- Writing parameters, initializing
- Clearing various history items

Note

- If the HMI input is not assigned to direct I/O or remote I/O, this input is always set to ON. And if it is assigned to both direct I/O and remote I/O, the function will only be executed when both are turned ON.
- If the HMI input is assigned to the DIN input function, do not set the "1-shot signal" parameter to "Enable."

■ TRQ-LMT input

When the TRQ-LMT input is turned ON, the torque is limited by the value set in the "TRQ-LMT input torque limiting value" parameter.

Related parameter

Name	Description	Initial setting	
		Initial value	Unit
TRQ-LMT input torque limiting value	Sets the torque that is limited by the TRQ-LMT input. Set the percentage of the torque based on the rated torque being 100 %. **[Setting range]** 0 to 10,000 (1=0.1 %)	500	1=0.1 %

■ SPD-LMT input

When the SPD-LMT input is turned ON, the operating speed is limited.

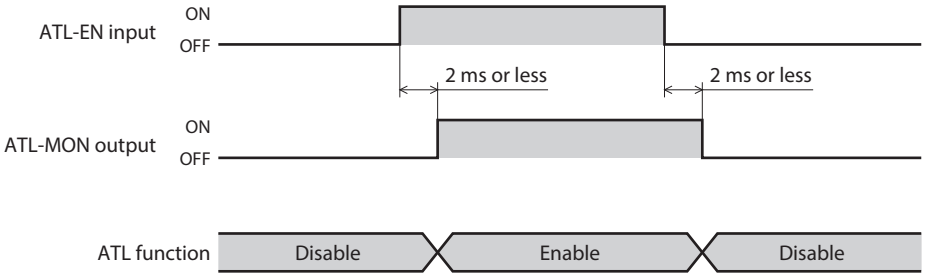
Related parameters

Name	Description	Initial setting	
		Initial value	Unit
SPD-LMT speed limit type selection	Selects the setting method of the speed limit value. **[Setting range]** 0: Ratio 1: Value	0	–
SPD-LMT speed limit ratio	Sets the percentage of the speed limit based, on the "Operating velocity" of the operation profile being 100 %. This is enabled when the "SPD-LMT speed limit type selection" parameter is set to "Ratio." **[Setting range]** 1 to 100 %	50	%
SPD-LMT speed limit value	Sets the value of the operating speed. This is enabled when the "SPD-LMT speed limit type selection" parameter is set to "Value." **[Setting range]** 1 to 4,000,000 (User-defined velocity unit)	1,000	r/min

■ ATL-EN input

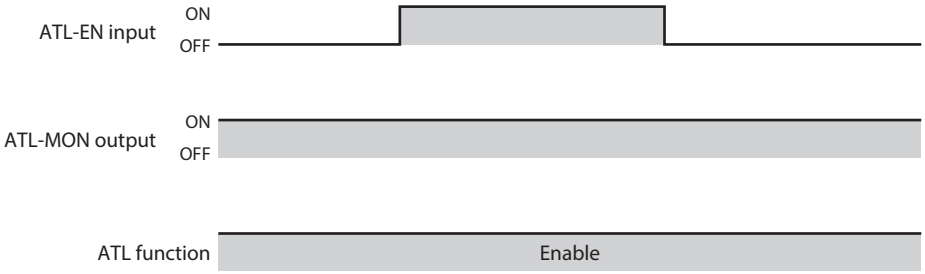
This signal is used to switch the ATL function.
When the "ATL function mode setting" parameter is set to "Follow the ATL-EN input," the ATL function will be disabled if the ATL-EN input is turned OFF, and the ATL function will be enabled if the ATL-EN input is turned ON.
Refer to p.16 for details of the ATL function.

- **When the "ATL function mode setting" parameter is set to "Follow the ATL-EN input"**



- **When the "ATL function mode setting" parameter is set to "ATL function enabled"**

The ATL-MON output is turned ON regardless of the status of the ATL-EN input.



4-6 Other signals

■ USR-ALM input

When the USR-ALM input is turned ON, the user alarm is generated.
Refer to p.208 for alarms.

■ P-PRESET input

When the P-PRESET input is turned ON, the actual position is cleared (It is enabled on the ON edge).

5 Output signals

5-1 Driver status indication signals

■ ALM-A output, ALM-B output

If an alarm is generated, the ALM-A output is turned ON and the ALM-B output is turned OFF. At the same time, the PWR/SYS LED on the driver will blink in red and the motor will stop.
The ALM-A output is normally open and the ALM-B output is normally closed.

■ SYS-RDY output

When the signal input is enabled after the main power supply is turned on, the SYS-RDY output is turned ON.

■ INFO output

If information is generated, the INFO output is turned ON.

Related parameter

Name	Description	Initial setting	
		Initial value	Unit
Information auto clear	When the condition to clear the information is satisfied, a bit output of the corresponding information is automatically turned OFF. **[Setting range]** 0: Disable 1: Enable	1	–

■ Output of information signals

If corresponding information is generated, each output signal is turned ON.
Refer to P.219 "2-4 Information list" for details on information.

■ SYS-BSY output

This signal is turned ON while the driver executes the maintenance command via communication.

5-2 Operation status indication signals

■ MOVE output

The MOVE output is turned ON while the motor operates.
It is turned OFF when the motor actually stops rotating at the deceleration stop.

■ OPE-BSY output

The OPE-BSY output is turned ON while the driver is performing internal oscillation. Internal oscillation is performed during the following operation.
• FW/RV operation
• Stored data operation
• Direct data operation

■ SEQ-BSY output

The SEQ-BSY output is turned ON while stored data operation is performed.

■ TLC output

When the output torque reaches the maximum output torque of the motor, the TLC output is turned ON.
If the torque limiting value is set to a value smaller than the maximum output torque, the TLC output is turned ON when the output torque reaches the torque limiting value.

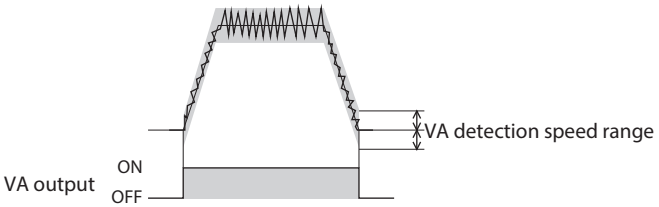
memo Refer to p.15 for the torque limiting function.

■ VA output

This signal is turned ON when the operating velocity reaches the target velocity.
The judgment criterion can be set using the "VA mode selection" parameter.

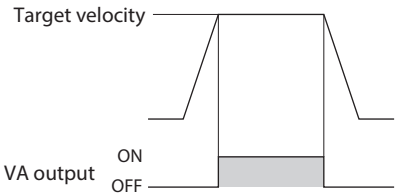
- **When the "VA mode selection" parameter is set to "Feedback speed attainment (speed at feedback position)"**

  When the motor feedback speed is within the setting range of the "VA detection speed range" parameter with the command speed as the center, the VA output is turned ON.



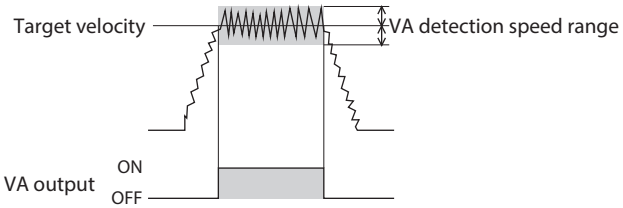
- **When the "VA mode selection" parameter is set to "Speed at command position (only internal profile)"**

  When the motor command speed matches the target speed, the VA output is turned ON.



- **When the "VA mode selection" parameter is set to "Speed at feedback position & command position (only internal profile)"**

  When the motor feedback speed is within the setting range of the "VA detection speed range" parameter with the target speed as the center, the VA output is turned ON.



Related parameters

Name	Description	Initial setting	
		Initial value	Unit
VA mode selection	Selects the judgment criterion of the VA output. **[Setting range]** 0: Feedback speed attainment (speed at feedback position) 1: Speed at command position (only internal profile) 2: Speed at feedback position & command position (only internal profile)	0	–
VA detection speed range	Sets the output range (one side) of the VA output with the target speed as the center. **[Setting range]** 0 to 65,535 (User-defined velocity unit)	15	r/min

■ TRQ-LMTD output

This signal is output when the motor output torque reaches the torque limiting value by the TRQ-LMT input.
The TRQ-LMTD output is turned ON when all of the following conditions are satisfied.

- The TRQ-LMT input is ON.
- The motor output torque reaches the value set in the "TRQ-LMT input torque limiting value" parameter.

Related parameter

Name	Description	Initial setting	
		Initial value	Unit
TRQ-LMT input torque limiting value	Sets the torque to be limited by the TRQ-LMT input. Set the percentage of the torque based on the rated torque being 100 %. **[Setting range]** 0 to 10,000 (1=0.1 %)	500	1=0.1 %

■ SPD-LMTD output

This signal is enabled when the speed limiting is being performed. If the operating speed increases equal to or higher than the value set in the "SPD-LMT speed limit ratio" parameter or the "SPD-LMT speed limit value" parameter, it is limited to turn the SPD-LMTD output ON.

Related parameters

Name	Description	Initial setting	
		Initial value	Unit
SPD-LMT speed limit type selection	Selects the setting method of the speed limit value. **[Setting range]** 0: Ratio 1: Value	0	–
SPD-LMT speed limit ratio	Sets the percentage of the speed limit based, on the "Operating velocity" of the operation profile being 100 %. This is enabled when the "SPD-LMT speed limit type selection" parameter is set to "Ratio." **[Setting range]** 1 to 100 %	50	%
SPD-LMT speed limit value	Sets the value of the operating speed. This is enabled when the "SPD-LMT speed limit type selection" parameter is set to "Value." **[Setting range]** 1 to 4,000,000 (User-defined velocity unit)	1,000	r/min

■ OL-DTCT output

When the output torque reaches the torque to detect the overload alarm, the OL-DTCT output is turned ON.
Refer to p.212 for the overload alarm.

■ M-CHG output

The ON/OFF status of the M-CHG output is inverted in the following cases. (Toggle action)

- When operation is started.
- When the operation data number is switched during operation
- When the operation data is rewritten (override)

■ M-ACT0 to M-ACT7 outputs

These signals are enabled in operations that operation data is used such as stored data operation and continuous operation of FW/RV operation.
The operation data number presently being operated is output in binary.
The operation data numbers of 0 to 255 can be checked by combining M-ACT0 to M-ACT7.

5-3 Operation ready indication signals

■ RDY-FWRV-OPE output

When FW/RV operation is ready to start, the RDY-FWRV-OPE output is turned ON.
Execute FW/RV operation after the RDY-FWRV-OPE output is turned ON.

■ RDY-SD-OPE output

When stored data operation is ready to start, the RDY-SD-OPE output is turned ON.
Execute stored data operation after the RDY-SD-OPE output is turned ON.

■ RDY-DD-OPE output

When direct data operation is ready to start, the RDY-DD-OPE output is turned ON.
Execute direct data operation after the RDY-DD-OPE output is turned ON.

[ON condition of operation ready output]

The operation ready outputs are turned ON when all of applicable conditions shown in the table are satisfied.

Condition	RDY-FWRV-OPE	RDY-SD-OPE	RDY-DD-OPE
The power is on.	○	○	○
The FREE input is OFF.	○	○	○
The STOP input is OFF.	○	○	○
No alarm is present.	○	○	○
Remote operation, data writing, or I/O test is not executed with the support software.	○	○	○
"Configuration" command, "Batch data initialization" command, "All data batch initialization" command, and "Read batch NV memory" command are not executed via communication.	○	○	○
FW/RV operation is not executed.	○	○	○
Stored data operation is not executed.	○	–	○
Direct data operation is not executed.	○	○	–
All signal inputs that start operation are OFF.	○	○	○

5-4 Function status indication signals

■ CONST-OFF output

An OFF state is output at all times.

■ ATL-MON output

The ATL-MON output is turned ON when the ATL function is enabled.

5-5 Motor position information signals

■ AREA0 to AREA7 outputs

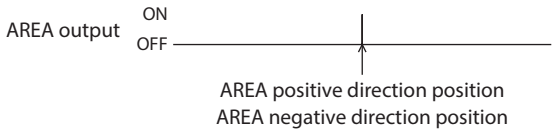
The AREA outputs are turned ON when the feedback position is within the set area.
They are turned ON when the feedback position is within the area even if the motor stops.

Related parameters

Name	Description	Initial setting	
		Initial value	Unit
AREA0 positive direction position to AREA7 positive direction position	Sets the positive direction position of the AREA0 to AREA7 outputs. **[Setting range]** -2,147,483,648 to 2,147,483,647 steps	0	step
AREA0 negative direction position to AREA7 negative direction position	Sets the negative direction position of the AREA0 to AREA7 outputs. **[Setting range]** -2,147,483,648 to 2,147,483,647 steps	0	step

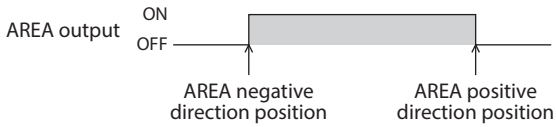
- **When the "AREA positive direction position" parameter is equal to the "AREA negative direction position" parameter**

When the feedback position, "AREA positive direction position" and "AREA negative direction position" are the same, the AREA output is turned ON.



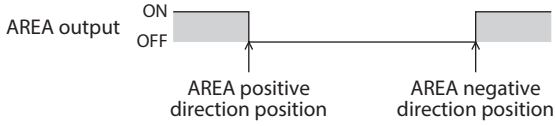
- **When the "AREA positive direction position" parameter is larger than the "AREA negative direction position" parameter**

When the feedback position is higher than the "AREA negative direction position" and lower than the "AREA positive direction position," the AREA output is turned ON.



- **When "AREA positive direction position" parameter is smaller than the "AREA negative direction position" parameter**

When the feedback position is lower than the "AREA positive direction position" or higher than the "AREA negative direction position," the AREA output is turned ON.



■ ASG output, BSG output

These are output signals that repeat ON and OFF in synchronization with the rotation of the motor.
The motor rotation speed and travel amount can be measured.
The ASG output is a signal based on the feedback position of the motor sensor (30 pulses per revolution of the motor output shaft).
The BSG output has a phase difference with respect to the ASG output.

Related parameters

Name	Description	Initial setting	
		Initial value	Unit
Division value of ASG/BSG	Sets the pulse-dividing value for the ASG and BSG outputs. The number of pulses per revolution of the motor output shaft is changed. **[Setting range]** -1: 30 pulses (180° phase-shifted pulses) 0: 15 pulses (reference, 180° phase-shifted pulses) 1 to 15: Pulse-dividing value* (90° phase-shifted pulses) *Number of pulses after dividing the pulse is equal to "15 pulses divided by (pulse-dividing value multiplied by 2)"	0	–

- **When the "Division value of ASG/BSG" parameter is "- 1"**

The ASG output is the output of 30 pulses per revolution of the motor output shaft.
The ON width of the output pulse is fixed at approximately 0.25 ms.
The BSG output is the output of a phase difference of 180° (inversion) with respect to the ASG output.
The motor rotation direction cannot be determined.

- **When the "Division value of ASG/BSG" parameter is "0" (number of reference pulses)**

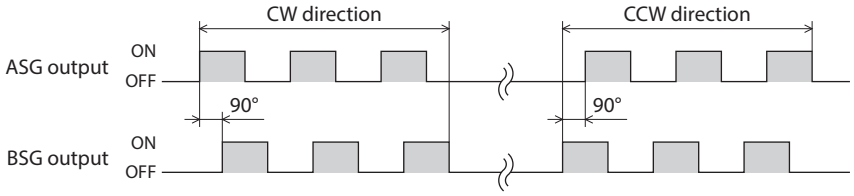
The ASG output is the output of 15 pulses per revolution of the motor output shaft.
The ON/OFF width of the output pulse depends on the speed and is approximately 50 % duty cycle at constant speed.
The BSG output is the output of a phase difference of 180° (inversion) with respect to the ASG output.
The motor rotation direction cannot be determined.

- **When the "Division value of ASG/BSG" parameter is "1 to 15"**

The ASG output is the output that divides the number of reference pulses per revolution of the motor output shaft (15 pulses).

$$\text{Number of pulses after dividing the pulse} = \frac{\text{Number of reference pulses (15 pulses)}}{\text{"Division value of ASG/BSG" parameter} \times 2}$$

The BSG output is the output of a phase difference of 90° with respect to the ASG output.
The motor rotation direction can be determined.
Refer to p.10 for the motor rotation direction.



- **Output list for the "Division value of ASG/BSG" parameter**

"Division value of ASG/BSG" parameter	Actual pulse-dividing value	ASG output	BSG output
		Number of pulses per revolution of the motor output shaft	Phase difference [°]
-1	–	30	180
0	1 (Base)	15	
1	2	7.5	90
2	4	3.75	
3	6	2.5	
4	8	1.875	
5	10	1.5	
6	12	1.25	
7	14	1.071...	
8	16	0.937...	
9	18	0.833...	
10	20	0.75	
11	22	0.681...	
12	24	0.625	
13	26	0.576...	
14	28	0.535...	
15	30	0.5	

5-6 User output signals

■ USR-OUT0 to USR-OUT7

A logical product (AND) or a logical sum (OR) of two types of output signals and the comparison result with the internal monitor group are output. Up to eight user outputs can be set.
The output condition for user outputs can be selected from the following two items.

- **Internal IO judgment**

  Assign two types of signals (A and B) to a single user output. USR-OUT is output after the logical combination of A and B is established.

- **Value judgment**

  Set the ON condition to a single user output. USR-OUT is output after the ON condition is established.

Related parameters

Name	Description	Initial setting	
		Initial value	Unit
User output operation mode	Selects the operation mode of the user output. **[Setting range]** 0: Internal IO judgment 1: Value judgment (value X, value Y) = (value A, value B) 2: Value judgment (value X, value Y) = (value of NET-ID=A, value B) 3: Value judgment (value X, value Y) = (value A, value of NET-ID=B) 4: Value Judgment (value X, value Y) = (value of NET-ID=A, value of NET-ID=B)	0	–
User output (IO) source A function	Selects the user output source A function (output signal) for USR-OUT0 to USR-OUT7. **[Setting range]** ⇨P.51 "2-2 Output signal list"	128: CONST-OFF	–

Name	Description	Initial setting	
		Initial value	Unit
User output (IO) source A inverting mode	Changes the ON/OFF status of the user output source A. **[Setting range]** 0: Non invert 1: Invert	0	–
User output (IO) source B function	Selects the user output source B function (output signal) for USR-OUT0 to USR-OUT7. **[Setting range]** ⇨P.51 "2-2 Output signal list"	128: CONST-OFF	–
User output (IO) source B inverting mode	Changes the ON/OFF status of the user output source B. **[Setting range]** 0: Non invert 1: Invert	0	–
User output (IO) logical operation	Sets the logical combination of user output source A and user output source B. **[Setting range]** 0: AND 1 OR	1	–
User output (value) ON condition	Select the ON condition of the user output when the value judgment is selected for the operation mode. **[Setting range]** 0: (value of target NET-ID + value Y) = (value X) 1: (target NET-ID value + value Y) < (value X) 2: (value of target NET-ID + value Y) ≤ (value X) 3: (value X) < (value of target NET-ID + value Y) 4: (value X) ≤ (value of target NET-ID + value Y) 5: (value of target NET-ID) < (value X) or (value Y) < (value of target NET-ID) 6: (value of target NET-ID) ≤ (value X) or (value Y) ≤ (value of target NET-ID) 7: (value X) < (value of target NET-ID) <(value Y) 8: (value X) ≤ (value of target NET-ID) ≤ (value Y) 9: (value Y) = ((value of target NET-ID) And (value X)) 10: (value Y) = ((value of target NET-ID) Or (value X)) 11: ((value of target NET-ID) And (value X)) is not 0	0	–
User output (value) target NET-ID	Sets the target NET-ID of the user output. **[Setting range]** 0 to 65,535	0	–
User output (value) value A	Sets the value A of the user output . **[Setting range]** –2,147,483,648 to 2,147,483,647	0	–
User output (value) value B	Sets the value B of the user output. **[Setting range]** –2,147,483,648 to 2,147,483,647	0	–

memo Refer to p.227 for details on the user output.

5-7 Response outputs

A response output is a signal that outputs the ON/OFF status of the corresponding input signal.
The table below shows the correspondence between input signals and output signals.

Input signal	Output signal
FREE	FREE_R
STOP	STOP_R
ALM-RST	ALM-RST_R
P-PRESET	P-PRESET_R
USR-ALM	USR-ALM_R
INFO-CLR	INFO-CLR_R
HMI	HMI_R
TRQ-LMT	TRQ-LMT_R
SPD-LMT	SPD-LMT_R
ATL-EN	ATL-EN_R
START	START_R
FWRV-DIR-INV	FWRV-DIR-INV_R
NEXT	NEXT_R
M0	M0_R
M1	M1_R
M2	M2_R
M3	M3_R
M4	M4_R
M5	M5_R
M6	M6_R
M7	M7_R
FW-SPD	FW-SPD_R
RV-SPD	RV-SPD_R
D-SEL0	D-SEL0_R

Input signal	Output signal
D-SEL1	D-SEL1_R
D-SEL2	D-SEL2_R
D-SEL3	D-SEL3_R
D-SEL4	D-SEL4_R
D-SEL5	D-SEL5_R
D-SEL6	D-SEL6_R
D-SEL7	D-SEL7_R
D-SEL8	D-SEL8_R
D-SEL9	D-SEL9_R
D-SEL10	D-SEL10_R
D-SEL11	D-SEL11_R
D-SEL12	D-SEL12_R
D-SEL13	D-SEL13_R
D-SEL14	D-SEL14_R
D-SEL15	D-SEL15_R
R0	R0_R
R1	R1_R
R2	R2_R
R3	R3_R
R4	R4_R
R5	R5_R
R6	R6_R
R7	R7_R
R8	R8_R

Input signal	Output signal
R9	R9_R
R10	R10_R
R11	R11_R
R12	R12_R
R13	R13_R
R14	R14_R
R15	R15_R
R16	R16_R
R17	R17_R
R18	R18_R
R19	R19_R
R20	R20_R
R21	R21_R
R22	R22_R
R23	R23_R
R24	R24_R
R25	R25_R
R26	R26_R
R27	R27_R
R28	R28_R
R29	R29_R
R30	R30_R
R31	R31_R

6 Using general signals

The R0 to R31 inputs are general-purpose signals. Using the R0 to R31 inputs, I/O signals of the external device can be controlled by the host controller via the driver. Direct I/O of the driver can be used as an I/O module.

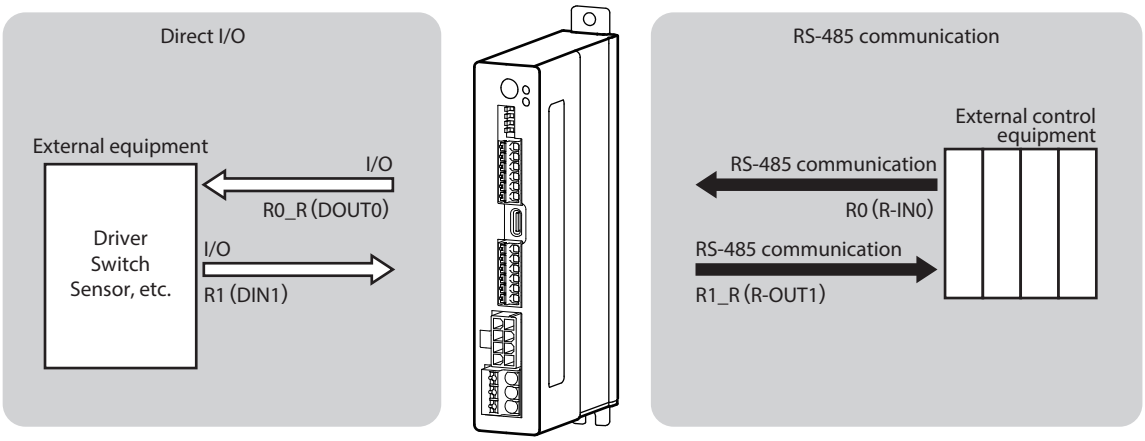
■ Example of use for general signals

- **When signals are output from the host controller to the external device**

  Assign the R0 input to R-IN0 and the R0_R output to DOUT0.
  The DOUT0 output is turned ON when R-IN0 is set to 1, and the DOUT0 output is turned OFF when R-IN0 is set to 0.

- **When signals output from the external device are input to the host controller**

  Assign the R1 input to DIN1 and the R1_R output to R-OUT1.
  R-OUT1 changes to 1 when the DIN1 input is turned ON by the external device, and R-OUT1 changes to 0 when the DIN1 input is turned OFF. The ON/OFF status of the DIN1 input can be set using the "DIN1 inverting mode" parameter.

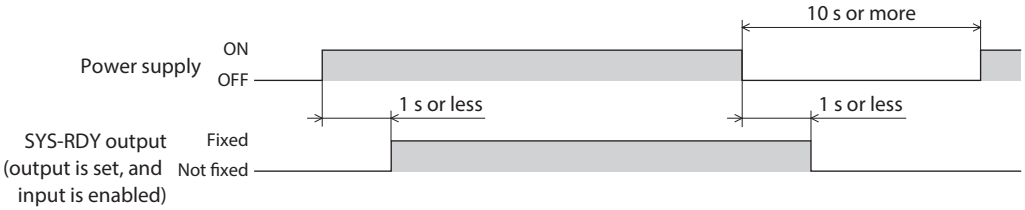


Related parameters

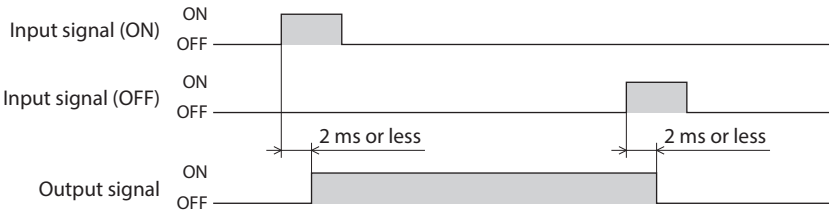
	Name	Description	Initial value
Direct-IN	Input function	Selects the input signal to be assigned to direct I/O. **[Setting range]** Input signal list⇨P.49 "2-1 Input signal list"	Varies depending on input
	Inverting mode	**[Setting Range]** 0: ON/OFF of the input signal is not inverted 1: ON/OFF of the input signal is inverted	0
Direct-OUT	Output function	Selects the output signal to be assigned to direct I/O. **[Setting range]** Output signal list⇨P.51 "2-2 Output signal list"	Varies depending on output
	Inverting mode	**[Setting Range]** 0: ON/OFF of the output signal is not inverted 1: ON/OFF of the output signal is inverted	0
Remote-I/O	Input function	Selects the input signal to be assigned to remote I/O. **[Setting range]** Input signal list⇨P.49 "2-1 Input signal list"	Varies depending on input
	Output function	Selects the output signal to be assigned to remote I/O. **[Setting range]** Output signal list⇨P.51 "2-2 Output signal list"	Varies depending on output

7 Timing chart

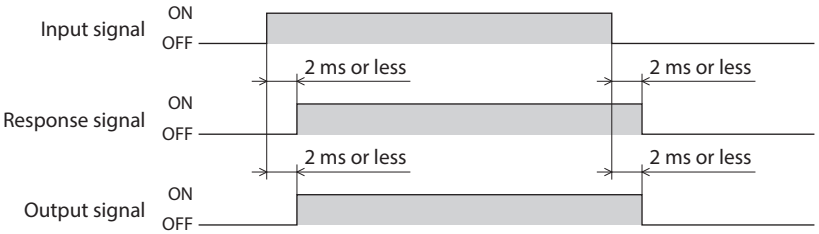
■ Power activation



■ I/O signals (when the output is switched according to the ON edge of the input signal)



■ I/O signals (when the output is switched with the ON/OFF edge of the input signal)



4 Modbus RTU control (RS-485 communication)

This part explains how to control via RS-485 communication using a host controller. The protocol used for RS-485 communication is the Modbus protocol.

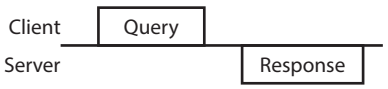
◆Table of contents

1 Modbus RTU specifications

The Modbus protocol is easy to use and its specification is open to the public, so it is widely used in industrial applications.
Modbus communication is based on the single-client/multi-server method. Only the client can issue a query (command).
Each server executes the processing requested by the query and returns a response message.
The driver supports the RTU mode only as the transmission mode. The ASCII mode is not supported.
Under this protocol, messages are sent in one of two methods.

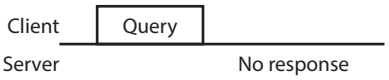
- **Unicast mode**

  The client sends a query to a single server. The server executes the processing and returns a response.



- **Broadcast mode**

  If the server address 0 is specified on the client, the client can send a command to all servers. Each server executes the processing, but does not return a response.



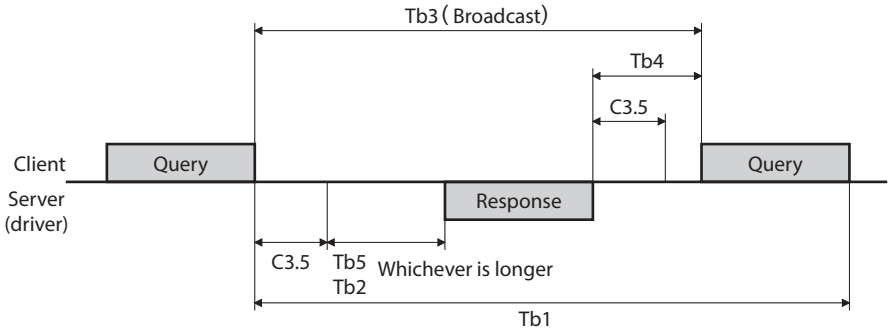
1-1 Communication specifications

Electrical characteristics	In conformance with EIA-485 Use a twisted pair cable (TIA/EIA-568B CAT5e or higher is recommended) and keep the total wiring distance including extension to 50 m (164 ft.) or less.*
Communication mode	Half duplex Asynchronous mode (data: 8 bits, stop bit: 1 bit / 2 bits, parity: none / even number / odd number)
Transmission rate	Selects from 9,600 bps, 19,200 bps, 38,400 bps, 57,600 bps, 115,200 bps (initial value), and 230,400 bps.
Protocol	Modbus RTU mode
Type of connection	Up to 31 drivers can be connected to a single host controller.

* If the motor cable or the power supply cable generates an undesirable amount of noise depending on the wiring or configuration, shield the cable or install a ferrite core.

1-2 Communication timing

The communication time monitored by the driver and the communication timing of the client are as follows.



Code	Name	Description
Tb1	Communication timeout (driver)	The driver monitors an interval between received queries. If the driver cannot receive a query after the time set in the "Communication timeout (Modbus)" parameter (initial value: Disable) has elapsed, an alarm of Communication timeout is generated. When normal messages including messages to other servers were received, an alarm of Communication timeout is not generated.
Tb2	Transmission waiting time (driver)	This is the amount of time from when the driver receives a query from the client to when it starts sending a response. Set using the "Transmission waiting time (Modbus)" parameter.
Tb3	Broadcast interval (client)	In broadcast, this is the amount of time until the client sends the next query. A time equal to or longer than the silent interval (C3.5) plus 5 ms is required.
Tb4	Transmission waiting time (client)	This is the amount of time from when the client receives the response to when it sends the next query (setting on the client side). Set it so that it is equal to or longer than the time of the silent interval (C3.5). If the "Silent interval (Modbus)" parameter is set to "0: Automatic," set the client side according to the "Estimate of transmission waiting time (client) (Tb 4)" in the table below.
Tb5	Query processing time (driver)	This is the amount of time that the driver processes a received query. The query processing time varies depending on the message structure of the received query.
C3.5	Silent interval	This is the amount of time to determine the end of a query or response message. An interval equal to or longer than the time of the silent interval (C3.5) is required when the message ends. When the "Silent interval (Modbus)" parameter of the driver is set to "0: Automatic," the silent interval (C3.5) varies depending on the transmission rate. For details, refer to the "Silent interval (C3.5)" shown in the table below.

memo To communicate with the driver periodically, set the "Communication timeout (Modbus)" parameter. If this parameter is set, an alarm of "RS-485 communication timeout" can be generated when communication between the client and the driver is lost.

■ When the "Silent interval (Modbus)" parameter is set to "Automatic"

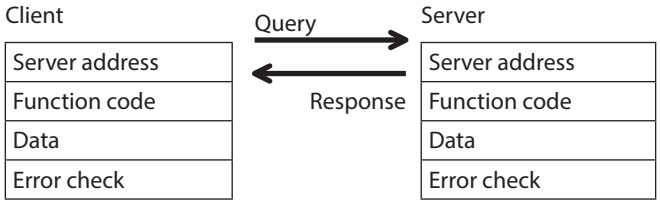
Transmission rate (bps)	Silent interval (C3.5)	Estimate of transmission waiting time (client) (Tb4)
9,600	4.0 ms or more	5.0 ms or more
19,200 or more	2.5 ms or more	3.0 ms or more

Note

- If the transmission waiting time (Tb4) of the client is shorter than the silent interval, the server discards the message and a communication error occurs. When a communication error occurs, check the silent interval of the server and set the transmission waiting time (Tb4) of the client again.
- The silent interval (C3.5) may vary depending on the connected product series. When connecting multiple product series, set the driver parameters as follows.
  - "Silent interval (Modbus)" parameter: "0: Automatic"
  - "Transmission waiting time (Modbus)" parameter: 1.0 ms or more
- In a system where only products with the "Silent interval (Modbus)" parameter are connected, the communication cycle can be improved if the setting of the "Silent interval (Modbus)" parameter is common to the connected products. Use in a state of setting to "0: Automatic" normally.

2 Message structure

The message format is shown below.



2-1 Query

The query message structure is shown below.

Server address	Function code	Data	Error check
8 bits	8 bits	Nx8 bits	16 bits

■ Server address

Specify the server address. (Unicast mode)
If the server address is set to 0 (zero), the client can send a query to all servers. (Broadcast mode)

■ Function code

The function codes and message lengths supported by the driver are as follows.

Function code	Function	Number of registers	Broadcast
03h	Reading from a holding register(s)	1 to 125	Not possible
06h	Writing to a holding register	1	Possible
08h	Diagnosis	–	Not possible
10h	Writing to multiple holding registers	1 to 123	Possible
17h	Reading/writing from/to multiple holding registers	Read: 1 to 125 Write: 1 to 121	Not possible

■ Data

Set the data related to the function code. The data length varies depending on the function code.

■ Error check

In the Modbus RTU mode, error checks are based on the CRC-16 method. The server calculates a CRC-16 of each received message and compares the result against the error check value included in the message. If the calculated CRC-16 value matches the error check value, the server determines that the message is normal.

- **CRC-16 calculation method**

1. Calculate an exclusive-OR (XOR) value of the default value of FFFFh and server address (8 bits).
2. Shift the result of step 1 to the right by 1 bit. Repeat this shift until the overflow bit becomes "1."
3. Upon obtaining "1" as the overflow bit, calculate an XOR of the result of step 2 and A001h.
4. Repeat steps 2 and 3 until a shift is performed eight times.
5. Calculate an XOR of the result of step 4 and function code (8 bits).
   Repeat steps 2 to 4 for all bytes.
   The final result gives the result of CRC-16 calculation.

- **Calculation example of CRC-16**

The table shows a calculation example when setting the server address of the first byte to 02h and the function code of the second byte to 07h.
The result of actual CRC-16 calculation is calculated including the data on and after the third byte.

Description	Result	Bit shifted out
CRC register initial value FFFFh	1111 1111 1111 1111	–
Lead byte 02h	0000 0000 0000 0010	–
Initial value FFFFh and XOR	1111 1111 1111 1101	–
First time of right shift	0111 1111 1111 1110	1
A001h and XOR	1010 0000 0000 0001 1101 1111 1111 1111	–
Second time of right shift	0110 1111 1111 1111	1
A001h and XOR	1010 0000 0000 0001 1100 1111 1111 1110	–
Third time of right shift	0110 0111 1111 1111	0
Fourth time of right shift	0011 0011 1111 1111	1
A001h and XOR	1010 0000 0000 0001 1001 0011 1111 1110	–
Fifth time of right shift	0100 1001 1111 1111	0
Sixth time of right shift	0010 0100 1111 1111	1
A001h and XOR	1010 0000 0000 0001 1000 0100 1111 1110	–
Seventh time of right shift	0100 0010 0111 1111	0
Eighth time of right shift	0010 0001 0011 1111	1
A001h and XOR	1010 0000 0000 0001 1000 0001 0011 1110	–
Next byte 07h and XOR	0000 0000 0000 0111 1000 0001 0011 1001	–
First time of right shift	0100 0000 1001 1100	1
A001h and XOR	1010 0000 0000 0001 1110 0000 1001 1101	–
Second time of right shift	0111 0000 0100 1110	1
A001h and XOR	1010 0000 0000 0001 1101 0000 0100 1111	–
Third time of right shift	0110 1000 0010 0111	1
A001h and XOR	1010 0000 0000 0001 1100 1000 0010 0110	–
Fourth time of right shift	0110 0100 0001 0011	0
Fifth time of right shift	0011 0010 0000 1001	1
A001h and XOR	1010 0000 0000 0001 1001 0010 0000 1000	–
Sixth time of right shift	0100 1001 0000 0100	0
Seventh time of right shift	0010 0100 1000 0010	0
Eighth time of right shift	0001 0010 0100 0001	0
Result of CRC-16	0001 0010 0100 0001	–

2-2 Response

Responses returned by the server are classified into three types: normal response, no response, and exception response.
The response message structure is the same as the query message structure.

Server address	Function code	Data	Error check
8 bits	8 bits	Nx8 bits	16 bits

■ Normal response

Upon receiving a query from the client, the server executes the requested processing and returns a response corresponding to the function code.

■ No response

The server may not return a response even if the the client sends a query. This state is called no response.
The causes of no response are listed below.

- **Transmission error**

The server discards the query if it detects any of the transmission errors listed in the table below. No response is returned.

Cause of transmission error	Description
Framing error	Stop bit 0 was detected.
Parity error	A mismatch with the specified parity was detected.
Mismatched CRC	The calculated value of CRC-16 was inconsistent with the error check value.
Invalid message length	The message length exceeded 256 bytes.

- **Other than transmission error**

A response may not be returned without detecting a transmission error.

Cause	Description
Broadcast	If the query was broadcast, the server executes the requested processing but does not return a response.
Mismatched server address	When the server address in the query is not matched the server address of the driver.

■ Exception response

An exception response is returned if the server cannot execute the processing requested by the query. This response is appended with an exception code that indicates the reason why the processing cannot be executed. The message structure of an exception response is as follows.

Server address	Function code	Exception code	Error check
8 bits	8 bits	8 bits	16 bits

- **Function code**

The function code in an exception response is the sum of the function code in the query and 80h.

Function code of query	Exception response
03h	83h
06h	86h
08h	88h
10h	90h
17h	97h

- **Example of exception response**

Client				Server		
Server address		01h	Query	Server address		01h
Function code		10h	→	Function code		90h
Data	Register address (upper)	00h		Data	Exception code	04h
	Register address (lower)	5Eh	←	Error check (lower)		4Dh
	Number of registers (upper)	00h	Response	Error check (upper)		C3h
	Number of registers (lower)	02h				
	Number of data bytes	04h				
	Write value of register address (upper)	00h				
	Write value of register address (lower)	00h				
	Write value of register address +1 (upper)	01h				
	Write value of register address +1 (lower)	F4h				
Error check (lower)		77h				
Error check (upper)		08h				

- **Exception code**

This code indicates the reason why the processing cannot be executed.

Exception code	Communication error code	Cause	Description
01h	88h	Invalid function	The processing could not be executed because the function code was invalid. • The function code is not supported. • The sub-function code for diagnosis (08h) is other than 00h.
02h	88h	Invalid data address	The processing could not be executed because the data address was invalid. • The register address and the number of registers exceeded FFFFh in total.
03h	8Ch	Invalid data	The processing could not be executed because the data was invalid. • The number of registers is 0. • The number of bytes is a value other than "the number of register ×2." • Invalid data length
04h	89h 8Ah 8Ch 8Dh	Server error	The processing could not be executed because an error occurred on the server. • Communication with user I/F is in progress (89h). Execute the following with the support software • Data writing (under writing to the driver) • Initialization • Configuration • I/O test or remote operation • NV memory processing in progress (8Ah) • Internal processing is in progress (SYS-BSY is ON). • An alarm of "EEPROM error" is present • Outside the parameter setting range (8Ch) The write value is outside the setting range. • Command execute disable (8Dh)

- **About server errors**

When the "Server error response mode (Modbus)" parameter is set to "0: Normal response," a normal response is returned even if a server error occurs. Set it when no exception response is required, such as in the case of a touch screen.

3 Function codes

This chapter explains the function codes supported by the driver.
Note that function codes other than those described here cannot be executed, even if they are sent.

3-1 Reading of a holding register(s) (03h)

This function code is used to read a register (16 bits). Up to 125 consecutive registers (125 × 16 bits) can be read.
Read the upper and lower data at the same time. If not, an invalid value may be read.
When multiple holding registers are read, they are read in order of register address.

■ Example of read

In this example, "Indirect reference area 0" and "Indirect reference area 1" of the server address 1 are read.

Description	Register address	Value read	Corresponding decimal
Indirect reference area 0 (upper)	1792 (0700h)	0000h	383
Indirect reference area 0 (lower)	1793 (0701h)	017Fh	
Indirect reference area 1 (upper)	1794 (0702h)	0000h	426
Indirect reference area 1 (lower)	1795 (0703h)	01AAh	

● **Query**

Field name		Data	Description
Server address		01h	Server address 1
Function code		03h	Reading from a holding register(s)
Data	Register address (upper)	07h	Register address to start reading from
	Register address (lower)	00h	
	Number of registers (upper)	00h	Number of registers to be read from the starting register address (4 registers=0004h)
	Number of registers (lower)	04h	
Error check (lower)		45h	Calculation result of CRC-16
Error check (upper)		7Dh	

● **Response**

Field name		Data	Description
Server address		01h	Same as query
Function code		03h	Same as query
Data	Number of data bytes	08h	Twice the number of registers in the query
	Read value of register address (upper)	00h	Value read from register address 0700h
	Read value of register address (lower)	00h	
	Read value of register address +1 (upper)	01h	Value read from register address 0701h
	Read value of register address +1 (lower)	7Fh	
	Read value of register address +2 (upper)	00h	Value read from register address 0702h
	Read value of register address +2 (lower)	00h	
	Read value of register address +3 (upper)	01h	Value read from register address 0703h
	Read value of register address +3 (lower)	AAh	
Error check (lower)		00h	Calculation result of CRC-16
Error check (upper)		23h	

3-2 Writing to a holding register (06h)

This function code is used to write data to a specified register address. However, since the result of combining the upper and lower data may be outside the data range, write the upper and lower data at the same time using the "Writing to multiple holding registers (10h)."

■ Example of write

Write 80 (50h) to the command filter time constant of the server address 2.

Description	Register address	Value written	Corresponding decimal
Command filter time constant (lower)	597 (255h)	0050h	80

- **Query**

Field name		Data	Description
Server address		02h	Server address 2
Function code		06h	Writing to a holding register
Data	Register address (upper)	02h	Register address to be written
	Register address (lower)	55h	
	Write value (upper)	00h	Value written to the register address
	Write value (lower)	50h	
Error check (lower)		98h	Calculation result of CRC-16
Error check (upper)		6Dh	

- **Response**

Field name		Data	Description
Server address		02h	Same as query
Function code		06h	Same as query
Data	Register address (upper)	02h	Same as query
	Register address (lower)	55h	
	Write value (upper)	00h	Same as query
	Write value (lower)	50h	
Error check (lower)		98h	Calculation result of CRC-16
Error check (upper)		6Dh	

3-3 Diagnosis (08h)

This function code is used to diagnose communication between the client and the server. Arbitrary data is sent and the result of the returned data is used to determine if the communication is normal. 00h (reply to query) is the only sub-function.

■ Example of diagnosis

Arbitrary data (1234h) is sent to the server to diagnose.

- **Query**

Field name		Data	Description
Server address		03h	Server address 3
Function code		08h	Diagnosis
Data	Sub-function code (upper)	00h	Return the query data
	Sub-function code (lower)	00h	
	Data value (upper)	12h	Arbitrary data (1234h)
	Data value (lower)	34h	
Error check (lower)		ECh	Calculation result of CRC-16
Error check (upper)		9Eh	

- **Response**

Field name		Data	Description
Server address		03h	Same as query
Function code		08h	Same as query
Data	Sub-function code (upper)	00h	Same as query
	Sub-function code (lower)	00h	
	Data value (upper)	12h	Same as query
	Data value (lower)	34h	
Error check (lower)		ECh	Same as query
Error check (upper)		9Eh	

3-4 Writing to multiple holding registers (10h)

This function code is used to write data to multiple consecutive registers. Up to 123 registers can be written.
Write the upper and lower data at the same time. If not, an invalid value may be written.
Registers are written in order of register address. Note that even when an exception response is returned because some data is invalid, such as data outside the specified range, etc., other data may have been written properly.

■ Example of write

Set the following data to the "Operating velocity, Acceleration time, and Deceleration time" of direct data operation in the server address 4.

Description	Register address	Value written	Corresponding decimal
Direct data operation operating velocity (upper)	94 (005Eh)	0000h	1,000
Direct data operation operating velocity (lower)	95 (005Fh)	03E8h	
Direct data operation acceleration time (upper)	96 (0060h)	0000h	1,000
Direct data operation acceleration time (lower)	97 (0061h)	03E8h	
Direct data operation deceleration time (upper)	98 (0062h)	0000h	2,000
Direct data operation deceleration time (lower)	99 (0063h)	07D0h	

- **Query**

Field name		Data	Description
Server address		04h	Server address 4
Function code		10h	Writing to multiple holding registers
Data	Register address (upper)	00h	Register address to start writing from
	Register address (lower)	5Eh	
	Number of registers (upper)	00h	Number of registers to be written from the starting register address (6 registers = 0006h)
	Number of registers (lower)	06h	
	Number of data bytes	0Ch	Twice the number of registers in the query
	Write value of register address (upper)	00h	Value written to register address 005Eh
	Write value of register address (lower)	00h	
	Write value of register address +1 (upper)	03h	Value written to register address 005Fh
	Write value of register address +1 (lower)	E8h	
	Write value of register address +2 (upper)	00h	Value written to register address 0060h
	Write value of register address +2 (lower)	00h	
	Write value of register address +3 (upper)	03h	Value written to register address 0061h
	Write value of register address +3 (lower)	E8h	
	Write value of register address +4 (upper)	00h	Value written to register address 0062h
	Write value of register address +4 (lower)	00h	
	Write value of register address +5 (upper)	07h	Value written to register address 0063h
	Write value of register address +5 (lower)	D0h	
Error check (lower)		43h	Calculation result of CRC-16
Error check (upper)		C0h	

- **Response**

Field name		Data	Description
Server address		04h	Same as query
Function code		10h	Same as query
Data	Register address (upper)	00h	Same as query
	Register address (lower)	5Eh	
	Number of registers (upper)	00h	Same as query
	Number of registers (lower)	06h	
Error check (lower)		21h	Calculation result of CRC-16
Error check (upper)		8Ch	

3-5 Read/write of multiple holding registers (17h)

With a single function code, reading data and writing data for multiple consecutive registers can be performed.
Data is written first, and then data is read from the specified registers.

■ Read

Data can be read from up to 125 consecutive registers.
Read the upper and lower data at the same time. If not, an invalid value may be read.
If multiple registers are read, they are read in order of register address.

■ Write

Data can be written to up to 121 consecutive registers.
Write the upper and lower data at the same time. If not, an invalid value may be written.
Registers are written in order of register address. Note that even when an exception response is returned because some data is invalid, such as data outside the specified range, etc., other data may have been written properly.

■ Example of read/write

Prepare the read address and write address in a single query.
In this example, after writing data to the "Operating velocity, Acceleration time, and Deceleration time" of direct data operation in the server address 1, "Indirect reference area 0" and "Indirect reference area 1" are read.

Description	Register address	Value written	Corresponding decimal
Direct data operation operating velocity (upper)	94 (005Eh)	0000h	1,000
Direct data operation operating velocity (lower)	95 (005Fh)	03E8h	
Direct data operation acceleration time (upper)	96 (0060h)	0000h	1,000
Direct data operation acceleration time (lower)	97 (0061h)	03E8h	
Direct data operation deceleration time (upper)	98 (0062h)	0000h	2,000
Direct data operation deceleration time (lower)	99 (0063h)	07D0h	

Description	Register address	Value read	Corresponding decimal
Indirect reference area 0 (upper)	1792 (0700h)	0000h	383
Indirect reference area 0 (lower)	1793 (0701h)	017Fh	
Indirect reference area 1 (upper)	1794 (0702h)	0000h	426
Indirect reference area 1 (lower)	1795 (0703h)	01AAh	

- **Query**

Field name		Data	Description
Server address		01h	Server address 1
Function code		17h	Reading/writing from/to multiple holding registers
Data	(Read) Register address (upper)	07h	Register address to start reading from
	(Read) Register address (lower)	00h	
	(Read) Number of registers (upper)	00h	Number of registers to be read from the starting register address (4 registers = 0004h)
	(Read) Number of registers (lower)	04h	
	(Write) Register address (upper)	00h	Register address to start writing from
	(Write) Register address (lower)	5Eh	
	(Write) Number of registers (upper)	00h	Number of registers to be written from the starting register address (6 registers = 0006h)
	(Write) Number of registers (lower)	06h	
	(Write) Number of data bytes	0Ch	Twice the number of registers in the query
	(Write) Write value of register address (upper)	00h	Value written to register address 005Eh
	(Write) Write value of register address (lower)	00h	
	(Write) Write value of register address +1 (upper)	03h	Value written to register address 005Fh
	(Write) Write value of register address +1 (lower)	E8h	
	(Write) Write value of register address +2 (upper)	00h	Value written to register address 0060h
	(Write) Write value of register address +2 (lower)	00h	
	(Write) Write value of register address +3 (upper)	03h	Value written to register address 0061h
	(Write) Write value of register address +3 (lower)	E8h	
	(Write) Write value of register address +4 (upper)	00h	Value written to register address 0062h
	(Write) Write value of register address +4 (lower)	00h	
	(Write) Write value of register address +5 (upper)	07h	Value written to register address 0063h
	(Write) Write value of register address +5 (lower)	D0h	
Error check (lower)		05h	Calculation result of CRC-16
Error check (upper)		1Bh	

- **Response**

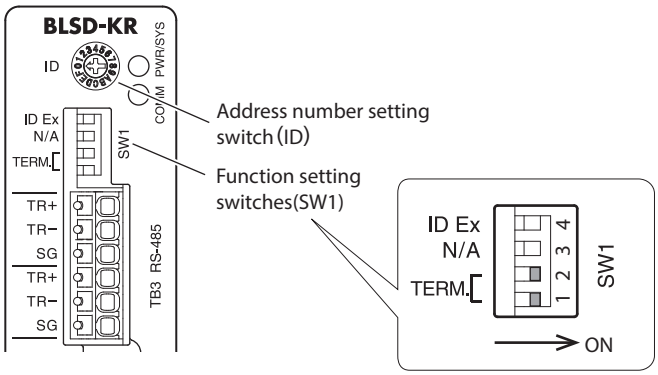
Field name		Data	Description
Server address		01h	Same as query
Function code		17h	Same as query
Data	(Read) Number of data bytes	08h	Twice the number of (Read) registers in the query
	(Read) Read value of register address (upper)	00h	Value read from register address 0700h
	(Read) Read value of register address (lower)	00h	
	(Read) Read value of register address +1 (upper)	01h	Value read from register address 0701h
	(Read) Read value of register address +1 (lower)	7Fh	
	(Read) Read value of register address +2 (upper)	00h	Value read from register address 0702h
	(Read) Read value of register address +2 (lower)	00h	
	(Read) Read value of register address +3 (upper)	01h	Value read from register address 0703h
	(Read) Read value of register address +3 (lower)	AAh	
Error check (lower)		40h	Calculation result of CRC-16
Error check (upper)		63h	

4 Setting of RS-485 communication

Set the parameters required for RS-485 communication and the termination resistor before starting communication.

4-1 Setting the switches

The address number (communication ID) and termination resistor of RS-485 communication can be set using the address number setting switch (ID) and the function setting switches (SW1).



Note Turn off the driver power before setting the switches. If the switches are set while the power is still on, the new switch settings will not be enabled.

- **Address number**

Use the address number setting switch (ID) and the function setting switch SW1-No. 4 to set the address number (communication ID).

ID Ex (SW1-No. 4)	ID	Address number (Communication ID)	ID Ex (SW1-No. 4)	ID	Address number (Communication ID)
OFF	0	0*	ON	0	16
OFF	1	1 (Factory setting)	ON	1	17
OFF	2	2	ON	2	18
OFF	3	3	ON	3	19
OFF	4	4	ON	4	20
OFF	5	5	ON	5	21
OFF	6	6	ON	6	22
OFF	7	7	ON	7	23
OFF	8	8	ON	8	24
OFF	9	9	ON	9	25
OFF	A	10	ON	A	26
OFF	B	11	ON	B	27
OFF	C	12	ON	C	28
OFF	D	13	ON	D	29
OFF	E	14	ON	E	30
OFF	F	15	ON	F	31

* In the case of the Modbus protocol, do not use the address number 0 (server address 0) because it is reserved in the broadcast.

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- The address number (communication ID) can also be set using the support software or via RS-485 communication.
- The new setting of the address number (communication ID) is enabled when the power supply is turned on.

- **Termination resistor**

  Use the function setting switches of the driver to set the termination resistor.
  Connect a termination resistor for a driver that is located at the farthest point (end position) from the host controller.

TERM. (SW1-No. 1 and No. 2)	Termination resistor (120 Ω)
OFF	OFF (factory setting)
ON	ON

memo If only one of the two switches (SW1-No. 1 or No. 2) is set to ON, a communication error may occur.

4-2 Parameters updated when the power supply is turned on

Set the following parameters using the support software or via RS-485 communication.

Register address		Name	Description	Initial setting	
Upper	Lower			Initial value	Unit
4992 (1380h)	4993 (1381h)	Server address (Modbus)*	Sets the address number (server address). **[Setting range]** −1: The switch setting is followed 1 to 31: Server address Do not use 0.	−1	–
4994 (1382h)	4995 (1383h)	Baudrate (Modbus)*	Sets the transmission rate. **[Setting range]** 0: 9,600 bps] 1: 19,200 bps 2: 38,400 bps 3: 57,600 bps 4: 115,200 bps 5: 230,400 bps	4	–
4996 (1384h)	4997 (1385h)	Byte & word order (Modbus)	Sets the byte order of 32-bit data. Set when the arrangement of communication data is different from that of the client. (Setting example⇨p.95) **[Setting range]** 0: Even Address-High Word & Big-Endian 1: Even Address-Low Word & Big-Endian 2: Even Address-High Word & Little-Endian 3: Even Address-Low Word & Little-Endian	0	–
4998 (1386h)	4999 (1387h)	Communication parity (Modbus)*	Sets the communication parity. **[Setting range]** 0: None 1: Even parity 2: Odd parity	1	–
5000 (1388h)	5001 (1389h)	Communication stop bit (Modbus)*	Sets the communication stop bit. **[Setting range]** 0: 1 bit 1: 2 bits	0	–
5006 (138Eh)	5007 (138Fh)	Transmission waiting time (Modbus)*	Sets the transmission waiting time for RS-485 communication. **[Setting range]** 0 to 10,000 (1=0.1 ms)	30	1=0.1 ms
5008 (1390h)	5009 (1391h)	Silent interval (Modbus)*	Sets the silent interval. **[Setting range]** 0: Set automatically 1 to 100 (1=0.1 ms)	0	1=0.1 ms

* When writing is performed with the support software, the value written is updated immediately.

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- These items are excluded from the Configuration.
- They are not initialized even if "Batch data initialization" of the maintenance command is executed.
- They are initialized if "All data batch initialization" of th maintenance command is executed. Turning on the power supply again after executing "All data batch initialization" may change the communication setting, thereby causing communication to be disabled.

■ Setting example of "Byte & word order (Modbus)" parameter

When 32-bit data "1234 5678h" is stored in the register address 1000h and 1001h, the arrangement changes to the following according to the setting of the parameter.

Setting of parameter	1000h (even number address)		1001h (odd number address)	
	Upper	Lower	Upper	Lower
0: Even Address-High Word & Big-Endian	12h	34h	56h	78h
1: Even Address-Low Word & Big-Endian	56h	78h	12h	34h
2: Even Address-High Word & Little-Endian	34h	12h	78h	56h
3: Even Address-Low Word & Little-Endian	78h	56h	34h	12h

memo This manual describes based on "0: Even Address-High Word & Big-Endian."

4-3 Parameters updated immediately after rewriting

Set the following parameters using the support software or via RS-485 communication.

Register address		Name	Description	Initial setting	
Upper	Lower			Initial value	Unit
5002 (138Ah)	5003 (138Bh)	Communication timeout (Modbus)	Sets the condition under which a communication timeout occurs in RS-485 communication. **[Setting range]** 0: Not monitored 1 to 10,000 ms	0	ms
5004 (138Ch)	5005 (138Dh)	Communication error alarm (Modbus)	A communication error alarm is generated when the RS-485 communication error occurs the number of times set here. **[Setting range]** 0: Disable 1 to 10 times	3	–
5010 (1392h)	5011 (1393h)	Server error response mode (Modbus)	Sets the response when the server error occurs. **[Setting range]** 0: Normal response 1: Exception response	1	–
5056 (13C0h)	5057 (13C1h)	RS-485 communication frame monitor target ID	Sets the monitor axis in the RS-485 communication monitor of the support software. **[Setting range]** 1 to 127: Server address 1 to 127	1	–

memo To communicate with the driver periodically, set the "Communication timeout (Modbus)" parameter. If this parameter is set, an alarm of "RS-485 communication timeout" can be generated when communication between the client and the driver is lost.

5 Data setting method

5-1 Overview of setting methods

There are two methods to set data via Modbus communication.
The communication specifications of Modbus allow reading/writing from/to consecutive addresses when handling multiple pieces of data.

Input method	Features
Direct reference	• This is a method to read or write by specifying the register addresses of parameters or commands directly. • Multiple times of queries are required to send when reading/writing from/to multiple register addresses. (For consecutive register addresses, sending a single query can read/write from/to multiple register addresses.)
Indirect reference	• This method requires that the register addresses to be read/written from/to are registered in indirect reference addresses. (They can also be registered using the support software or via RS-485 communication.) • Sending a single query can read/write from/to multiple register addresses because the register addresses in the indirect reference area are consecutive.

Example) When writing to the "Motor rotation direction," "Command filter time constant," and "MOVE minimum ON time" parameters.

Direct reference

To write to the parameters, a query is required to send three times.

Register address		Setting target	
Upper	Lower		
840 (0348h)	841 (0349h)	Motor rotation direction	← Query 1)
・ ・		・ ・	
596 (0254h)	597 (0255h)	Command filter time constant	← Query 2)
・ ・		・ ・	
3604 (0E14h)	3605 (0E15h)	MOVE minimum ON time	← Query 3)

Indirect reference

1. Register the "Motor rotation direction," "Command filter time constant," and "MOVE minimum ON time" parameters in indirect reference addresses.

Register address		Setting target	Parameter to be set	
Upper	Lower		Setting value*	Name
1536 (0600h)	1537 (0601h)	Indirect reference address setting (0)	420 (01A4h)	Motor rotation direction
1538 (0602h)	1539 (0603h)	Indirect reference address setting (1)	298 (012Ah)	Command filter time constant
1540 (0604h)	1541 (0605h)	Indirect reference address setting (2)	1802 (070Ah)	MOVE minimum ON time

* Set the value of NET-ID of each parameter.

2. Send a query to the indirect reference areas 0 to 2.

Register address		Setting target	
Upper	Lower		
1792 (0700h)	1793 (0701h)	Indirect reference area 0 (Motor rotation direction)	← Query*
1794 (0702h)	1795 (0603h)	Indirect reference area 1 (Command filter time constant)	
1796 (0704h)	1797 (0605h)	indirect reference area 2 (MOVE minimum ON time)	

* Sending a single query can write because the register addresses are consecutive.

memo Refer to P.106 "Setting example" for the setting example.

5-2 Direct reference

This is a method to read or write by specifying the register addresses of parameters or commands directly.
Multiple times of queries are required to send when reading/writing from/to multiple register addresses.
For consecutive register addresses, sending a single query can read/write from/to multiple register addresses.

5-3 Indirect reference

Sending a single query can read/write from/to multiple register addresses because the register addresses in the indirect reference area are consecutive.
However, this method requires to register the register addresses to be read or written in indirect reference addresses. The register addresses can be registered using the support software or via RS-485 communication.

■ Addresses and areas of indirect reference

Indirect reference has 128 addresses and areas (0 to 127).

Name	Description
Indirect reference address setting (0)	Sets parameters or commands to be read or written in indirect reference. Set the value of NET-ID of the parameters or commands to be read or written.
Indirect reference address setting (1)	
• • •	
Indirect reference address setting (126)	
Indirect reference address setting (127)	
Indirect reference area 0	This is an area to read/write from/to the parameter or command registered in the indirect reference address (0).
Indirect reference area 1	This is an area to read/write from/to the parameter or command registered in the indirect reference address (1).
• • •	• • •
Indirect reference area 126	This is an area to read/write from/to the parameter or command registered in the indirect reference address (126).
Indirect reference area 127	This is an area to read/write from/to the parameter or command registered in the indirect reference address (127).

● Indirect reference address setting

Register address		Name	Description	Initial setting	
Upper	Lower			Initial value	Unit
1536 (0600h)	1537 (0601h)	Indirect reference address setting (0)	Sets NET-ID of commands or parameters to be registered in the indirect reference addresses. **[Setting range]** 0 to 65,535 (0 to FFFFh)	0	–
1538 (0602h)	1539 (0603h)	Indirect reference address setting (1)			
1540 (0604h)	1541 (0605h)	Indirect reference address setting (2)			
1542 (0606h)	1543 (0607h)	Indirect reference address setting (3)			
1544 (0608h)	1545 (0609h)	Indirect reference address setting (4)			
1546 (060Ah)	1547 (060Bh)	Indirect reference address setting (5)			
1548 (060Ch)	1549 (060Dh)	Indirect reference address setting (6)			
1550 (060Eh)	1551 (060Fh)	Indirect reference address setting (7)			
1552 (0610h)	1553 (0611h)	Indirect reference address setting (8)			
1554 (0612h)	1555 (0613h)	Indirect reference address setting (9)			
1556 (0614h)	1557 (0615h)	Indirect reference address setting (10)			
1558 (0616h)	1559 (0617h)	Indirect reference address setting (11)			

Register address		Name	Description	Initial setting	
Upper	Lower			Initial value	Unit
1560 (0618h)	1561 (0619h)	Indirect reference address setting (12)	Sets NET-ID of commands or parameters to be registered in the indirect reference addresses. **[Setting range]** 0 to 65,535 (0 to FFFFh)	0	–
1562 (061Ah)	1563 (061Bh)	Indirect reference address setting (13)			
1564 (061Ch)	1565 (061Dh)	Indirect reference address setting (14)			
1566 (061Eh)	1567 (061Fh)	Indirect reference address setting (15)			
1568 (0620h)	1569 (0621h)	Indirect reference address setting (16)			
1570 (0622h)	1571 (0623h)	Indirect reference address setting (17)			
1572 (0624h)	1573 (0625h)	Indirect reference address setting (18)			
1574 (0626h)	1575 (0627h)	Indirect reference address setting (19)			
1576 (0628h)	1577 (0629h)	Indirect reference address setting (20)			
1578 (062Ah)	1579 (062Bh)	Indirect reference address setting (21)			
1580 (062Ch)	1581 (062Dh)	Indirect reference address setting (22)			
1582 (062Eh)	1583 (062Fh)	Indirect reference address setting (23)			
1584 (0630h)	1585 (0631h)	Indirect reference address setting (24)			
1586 (0632h)	1587 (0633h)	Indirect reference address setting (25)			
1588 (0634h)	1589 (0635h)	Indirect reference address setting (26)			
1590 (0636h)	1591 (0637h)	Indirect reference address setting (27)			
1592 (0638h)	1593 (0639h)	Indirect reference address setting (28)			
1594 (063Ah)	1595 (063Bh)	Indirect reference address setting (29)			
1596 (063Ch)	1597 (063Dh)	Indirect reference address setting (30)			
1598 (063Eh)	1599 (063Fh)	Indirect reference address setting (31)			
1600 (0640h)	1601 (0641h)	Indirect reference address setting (32)			
1602 (0642h)	1603 (0643h)	Indirect reference address setting (33)			
1604 (0644h)	1605 (0645h)	Indirect reference address setting (34)			
1606 (0646h)	1607 (0647h)	Indirect reference address setting (35)			
1608 (0648h)	1609 (0649h)	Indirect reference address setting (36)			
1610 (064Ah)	1611 (064Bh)	Indirect reference address setting (37)			
1612 (064Ch)	1613 (064Dh)	Indirect reference address setting (38)			

Register address		Name	Description	Initial setting	
Upper	Lower			Initial value	Unit
1614 (064Eh)	1615 (064Fh)	Indirect reference address setting (39)	Sets NET-ID of commands or parameters to be registered in the indirect reference addresses. **[Setting range]** 0 to 65,535 (0 to FFFFh)	0	–
1616 (0650h)	1617 (0651h)	Indirect reference address setting (40)			
1618 (0652h)	1619 (0653h)	Indirect reference address setting (41)			
1620 (0654h)	1621 (0655h)	Indirect reference address setting (42)			
1622 (0656h)	1623 (0657h)	Indirect reference address setting (43)			
1624 (0658h)	1625 (0659h)	Indirect reference address setting (44)			
1626 (065Ah)	1627 (065Bh)	Indirect reference address setting (45)			
1628 (065Ch)	1629 (065Dh)	Indirect reference address setting (46)			
1630 (065Eh)	1631 (065Fh)	Indirect reference address setting (47)			
1632 (0660h)	1633 (0661h)	Indirect reference address setting (48)			
1634 (0662h)	1635 (0663h)	Indirect reference address setting (49)			
1636 (0664h)	1637 (0665h)	Indirect reference address setting (50)			
1638 (0666h)	1639 (0667h)	Indirect reference address setting (51)			
1640 (0668h)	1641 (0669h)	Indirect reference address setting (52)			
1642 (066Ah)	1643 (066Bh)	Indirect reference address setting (53)			
1644 (066Ch)	1645 (066Dh)	Indirect reference address setting (54)			
1646 (066Eh)	1647 (066Fh)	Indirect reference address setting (55)			
1648 (0670h)	1649 (0671h)	Indirect reference address setting (56)			
1650 (0672h)	1651 (0673h)	Indirect reference address setting (57)			
1652 (0674h)	1653 (0675h)	Indirect reference address setting (58)			
1654 (0676h)	1655 (0677h)	Indirect reference address setting (59)			
1656 (0678h)	1657 (0679h)	Indirect reference address setting (60)			
1658 (067Ah)	1659 (067Bh)	Indirect reference address setting (61)			
1660 (067Ch)	1661 (067Dh)	Indirect reference address setting (62)			
1662 (067Eh)	1663 (067Fh)	Indirect reference address setting (63)			
1664 (0680h)	1665 (0681h)	Indirect reference address setting (64)			
1666 (0682h)	1667 (0683h)	Indirect reference address setting (65)			

Register address		Name	Description	Initial setting	
Upper	Lower			Initial value	Unit
1668 (0684h)	1669 (0685h)	Indirect reference address setting (66)	Sets NET-ID of commands or parameters to be registered in the indirect reference addresses. **[Setting range]** 0 to 65,535 (0 to FFFFh)	0	–
1670 (0686h)	1671 (0687h)	Indirect reference address setting (67)			
1672 (0688h)	1673 (0689h)	Indirect reference address setting (68)			
1674 (068Ah)	1675 (068Bh)	Indirect reference address setting (69)			
1676 (068Ch)	1677 (068Dh)	Indirect reference address setting (70)			
1678 (068Eh)	1679 (068Fh)	Indirect reference address setting (71)			
1680 (0690h)	1681 (0691h)	Indirect reference address setting (72)			
1682 (0692h)	1683 (0693h)	Indirect reference address setting (73)			
1684 (0694h)	1685 (0695h)	Indirect reference address setting (74)			
1686 (0696h)	1687 (0697h)	Indirect reference address setting (75)			
1688 (0698h)	1689 (0699h)	Indirect reference address setting (76)			
1690 (069Ah)	1691 (069Bh)	Indirect reference address setting (77)			
1692 (069Ch)	1693 (069Dh)	Indirect reference address setting (78)			
1694 (069Eh)	1695 (069Fh)	Indirect reference address setting (79)			
1696 (06A0h)	1697 (06A1h)	Indirect reference address setting (80)			
1698 (06A2h)	1699 (06A3h)	Indirect reference address setting (81)			
1700 (06A4h)	1701 (06A5h)	Indirect reference address setting (82)			
1702 (06A6h)	1703 (06A7h)	Indirect reference address setting (83)			
1704 (06A8h)	1705 (06A9h)	Indirect reference address setting (84)			
1706 (06AAh)	1707 (06ABh)	Indirect reference address setting (85)			
1708 (06ACh)	1709 (06ADh)	Indirect reference address setting (86)			
1710 (06AEh)	1711 (06AFh)	Indirect reference address setting (87)			
1712 (06B0h)	1713 (06B1h)	Indirect reference address setting (88)			
1714 (06B2h)	1715 (06B3h)	Indirect reference address setting (89)			
1716 (06B4h)	1717 (06B5h)	Indirect reference address setting (90)			
1718 (06B6h)	1719 (06B7h)	Indirect reference address setting (91)			
1720 (06B8h)	1721 (06B9h)	Indirect reference address setting (92)			

Register address		Name	Description	Initial setting	
Upper	Lower			Initial value	Unit
1722 (06BAh)	1723 (06BBh)	Indirect reference address setting (93)	Sets NET-ID of commands or parameters to be registered in the indirect reference addresses. **[Setting range]** 0 to 65,535 (0 to FFFFh)	0	–
1724 (06BCh)	1725 (06BDh)	Indirect reference address setting (94)			
1726 (06BEh)	1727 (06BFh)	Indirect reference address setting (95)			
1728 (06C0h)	1729 (06C1h)	Indirect reference address setting (96)			
1730 (06C2h)	1731 (06C3h)	Indirect reference address setting (97)			
1732 (06C4h)	1733 (06C5h)	Indirect reference address setting (98)			
1734 (06C6h)	1735 (06C7h)	Indirect reference address setting (99)			
1736 (06C8h)	1737 (06C9h)	Indirect reference address setting (100)			
1738 (06CAh)	1739 (06CBh)	Indirect reference address setting (101)			
1740 (06CCh)	1741 (06CDh)	Indirect reference address setting (102)			
1742 (06CEh)	1743 (06CFh)	Indirect reference address setting (103)			
1744 (06D0h)	1745 (06D1h)	Indirect reference address setting (104)			
1746 (06D2h)	1747 (06D3h)	Indirect reference address setting (105)			
1748 (06D4h)	1749 (06D5h)	Indirect reference address setting (106)			
1750 (06D6h)	1751 (06D7h)	Indirect reference address setting (107)			
1752 (06D8h)	1753 (06D9h)	Indirect reference address setting (108)			
1754 (06DAh)	1755 (06DBh)	Indirect reference address setting (109)			
1756 (06DCh)	1757 (06DDh)	Indirect reference address setting (110)			
1758 (06DEh)	1759 (06DFh)	Indirect reference address setting (111)			
1760 (06E0h)	1761 (06E1h)	Indirect reference address setting (112)			
1762 (06E2h)	1763 (06E3h)	Indirect reference address setting (113)			
1764 (06E4h)	1765 (06E5h)	Indirect reference address setting (114)			
1766 (06E6h)	1767 (06E7h)	Indirect reference address setting (115)			
1768 (06E8h)	1769 (06E9h)	Indirect reference address setting (116)			
1770 (06EAh)	1771 (06EBh)	Indirect reference address setting (117)			

Register address		Name	Description	Initial setting	
Upper	Lower			Initial value	Unit
1772 (06ECh)	1773 (06EDh)	Indirect reference address setting (118)	Sets NET-ID of commands or parameters to be registered in the indirect reference addresses. **[Setting range]** 0 to 65,535 (0 to FFFFh)	0	–
1774 (06EEh)	1775 (06EFh)	Indirect reference address setting (119)			
1776 (06F0h)	1777 (06F1h)	Indirect reference address setting (120)			
1778 (06F2h)	1779 (06F3h)	Indirect reference address setting (121)			
1780 (06F4h)	1781 (06F5h)	Indirect reference address setting (122)			
1782 (06F6h)	1783 (06F7h)	Indirect reference address setting (123)			
1784 (06F8h)	1785 (06F9h)	Indirect reference address setting (124)			
1786 (06FAh)	1787 (06FBh)	Indirect reference address setting (125)			
1788 (06FCh)	1789 (06FDh)	Indirect reference address setting (126)			
1790 (06FEh)	1791 (06FFh)	Indirect reference address setting (127)			

- **Indirect reference area**

Register address		Name
Upper	Lower	
1792 (0700h)	1793 (0701h)	Indirect reference area 0
1794 (0702h)	1795 (0703h)	Indirect reference area 1
1796 (0704h)	1797 (0705h)	Indirect reference area 2
1798 (0706h)	1799 (0707h)	Indirect reference area 3
1800 (0708h)	1801 (0709h)	Indirect reference area 4
1802 (070Ah)	1803 (070Bh)	Indirect reference area 5
1804 (070Ch)	1805 (070Dh)	Indirect reference area 6
1806 (070Eh)	1807 (070Fh)	Indirect reference area 7
1808 (0710h)	1809 (0711h)	Indirect reference area 8
1810 (0712h)	1811 (0713h)	Indirect reference area 9
1812 (0714h)	1813 (0715h)	Indirect reference area 10
1814 (0716h)	1815 (0717h)	Indirect reference area 11
1816 (0718h)	1817 (0719h)	Indirect reference area 12
1818 (071Ah)	1819 (071Bh)	Indirect reference area 13

Register address		Name
Upper	Lower	
1820 (071Ch)	1821 (071Dh)	Indirect reference area 14
1822 (071Eh)	1823 (071Fh)	Indirect reference area 15
1824 (0720h)	1825 (0721h)	Indirect reference area 16
1826 (0722h)	1827 (0723h)	Indirect reference area 17
1828 (0724h)	1829 (0725h)	Indirect reference area 18
1830 (0726h)	1831 (0727h)	Indirect reference area 19
1832 (0728h)	1833 (0729h)	Indirect reference area 20
1834 (072Ah)	1835 (072Bh)	Indirect reference area 21
1836 (072Ch)	1837 (072Dh)	Indirect reference area 22
1838 (072Eh)	1839 (072Fh)	Indirect reference area 23
1840 (0730h)	1841 (0731h)	Indirect reference area 24
1842 (0732h)	1843 (0733h)	Indirect reference area 25
1844 (0734h)	1845 (0735h)	Indirect reference area 26
1846 (0736h)	1847 (0737h)	Indirect reference area 27

Register address		Name
Upper	Lower	
1848 (0738h)	1849 (0739h)	Indirect reference area 28
1850 (073Ah)	1851 (073Bh)	Indirect reference area 29
1852 (073Ch)	1853 (073Dh)	Indirect reference area 30
1854 (073Eh)	1855 (073Fh)	Indirect reference area 31
1856 (0740h)	1857 (0741h)	Indirect reference area 32
1858 (0742h)	1859 (0743h)	Indirect reference area 33
1860 (0744h)	1861 (0745h)	Indirect reference area 34
1862 (0746h)	1863 (0747h)	Indirect reference area 35
1864 (0748h)	1865 (0749h)	Indirect reference area 36
1866 (074Ah)	1867 (074Bh)	Indirect reference area 37
1868 (074Ch)	1869 (074Dh)	Indirect reference area 38
1870 (074Eh)	1871 (074Fh)	Indirect reference area 39
1872 (0750h)	1873 (0751h)	Indirect reference area 40
1874 (0752h)	1875 (0753h)	Indirect reference area 41
1876 (0754h)	1877 (0755h)	Indirect reference area 42
1878 (0756h)	1879 (0757h)	Indirect reference area 43
1880 (0758h)	1881 (0759h)	Indirect reference area 44
1882 (075Ah)	1883 (075Bh)	Indirect reference area 45
1884 (075Ch)	1885 (075Dh)	Indirect reference area 46
1886 (075Eh)	1887 (075Fh)	Indirect reference area 47
1888 (0760h)	1889 (0761h)	Indirect reference area 48
1890 (0762h)	1891 (0763h)	Indirect reference area 49
1892 (0764h)	1893 (0765h)	Indirect reference area 50
1894 (0766h)	1895 (0767h)	Indirect reference area 51
1896 (0768h)	1897 (0769h)	Indirect reference area 52
1898 (076Ah)	1899 (076Bh)	Indirect reference area 53
1900 (076Ch)	1901 (076Dh)	Indirect reference area 54

Register address		Name
Upper	Lower	
1902 (076Eh)	1903 (076Fh)	Indirect reference area 55
1904 (0770h)	1905 (0771h)	Indirect reference area 56
1906 (0772h)	1907 (0773h)	Indirect reference area 57
1908 (0774h)	1909 (0775h)	Indirect reference area 58
1910 (0776h)	1911 (0777h)	Indirect reference area 59
1912 (0778h)	1913 (0779h)	Indirect reference area 60
1914 (077Ah)	1915 (077Bh)	Indirect reference area 61
1916 (077Ch)	1917 (077Dh)	Indirect reference area 62
1918 (077Eh)	1919 (077Fh)	Indirect reference area 63
1920 (0780h)	1921 (0781h)	Indirect reference area 64
1922 (0782h)	1923 (0783h)	Indirect reference area 65
1924 (0784h)	1925 (0785h)	Indirect reference area 66
1926 (0786h)	1927 (0787h)	Indirect reference area 67
1928 (0788h)	1929 (0789h)	Indirect reference area 68
1930 (078Ah)	1931 (078Bh)	Indirect reference area 69
1932 (078Ch)	1933 (078Dh)	Indirect reference area 70
1934 (078Eh)	1935 (078Fh)	Indirect reference area 71
1936 (0790h)	1937 (0791h)	Indirect reference area 72
1938 (0792h)	1939 (0793h)	Indirect reference area 73
1940 (0794h)	1941 (0795h)	Indirect reference area 74
1942 (0796h)	1943 (0797h)	Indirect reference area 75
1944 (0798h)	1945 (0799h)	Indirect reference area 76
1946 (079Ah)	1947 (079Bh)	Indirect reference area 77
1948 (079Ch)	1949 (079Dh)	Indirect reference area 78
1950 (079Eh)	1951 (079Fh)	Indirect reference area 79
1952 (07A0h)	1953 (07A1h)	Indirect reference area 80
1954 (07A2h)	1955 (07A3h)	Indirect reference area 81

Register address		Name
Upper	Lower	
1956 (07A4h)	1957 (07A5h)	Indirect reference area 82
1960 (07A8h)	1961 (07A9h)	Indirect reference area 84
1962 (07AAh)	1963 (07ABh)	Indirect reference area 85
1964 (07ACh)	1965 (07ADh)	Indirect reference area 86
1966 (07AEh)	1967 (07AFh)	Indirect reference area 87
1968 (07B0h)	1969 (07B1h)	Indirect reference area 88
1970 (07B2h)	1971 (07B3h)	Indirect reference area 89
1972 (07B4h)	1973 (07B5h)	Indirect reference area 90
1974 (07B6h)	1975 (07B7h)	Indirect reference area 91
1976 (07B8h)	1977 (07B9h)	Indirect reference area 92
1978 (07BAh)	1979 (07BBh)	Indirect reference area 93
1980 (07BCh)	1981 (07BDh)	Indirect reference area 94
1982 (07BEh)	1983 (07BFh)	Indirect reference area 95
1984 (07C0h)	1985 (07C1h)	Indirect reference area 96
1986 (07C2h)	1987 (07C3h)	Indirect reference area 97
1988 (07C4h)	1989 (07C5h)	Indirect reference area 98
1990 (07C6h)	1991 (07C7h)	Indirect reference area 99
1992 (07C8h)	1993 (07C9h)	Indirect reference area 100
1994 (07CAh)	1995 (07CBh)	Indirect reference area 101
1996 (07CCh)	1997 (07CDh)	Indirect reference area 102
1998 (07CEh)	1999 (07CFh)	Indirect reference area 103
2000 (07D0h)	2001 (07D1h)	Indirect reference area 104
2002 (07D2h)	2003 (07D3h)	Indirect reference area 105

Register address		Name
Upper	Lower	
2004 (07D4h)	2005 (07D5h)	Indirect reference area 106
2006 (07D6h)	2007 (07D7h)	Indirect reference area 107
2008 (07D8h)	2009 (07D9h)	Indirect reference area 108
2010 (07DAh)	2011 (07DBh)	Indirect reference area 109
2012 (07DCh)	2013 (07DDh)	Indirect reference area 110
2014 (07DEh)	2015 (07DFh)	Indirect reference area 111
2016 (07E0h)	2017 (07E1h)	Indirect reference area 112
2018 (07E2h)	2019 (07E3h)	Indirect reference area 113
2020 (07E4h)	2021 (07E5h)	Indirect reference area 114
2022 (07E6h)	2023 (07E7h)	Indirect reference area 115
2024 (07E8h)	2025 (07E9h)	Indirect reference area 116
2026 (07EAh)	2027 (07EBh)	Indirect reference area 117
2028 (07ECh)	2029 (07EDh)	Indirect reference area 118
2030 (07EEh)	2031 (07EFh)	Indirect reference area 119
2032 (07F0h)	2033 (07F1h)	Indirect reference area 120
2034 (07F2h)	2035 (07F3h)	Indirect reference area 121
2036 (07F4h)	2037 (07F5h)	Indirect reference area 122
2038 (07F6h)	2039 (07F7h)	Indirect reference area 123
2040 (07F8h)	2041 (07F9h)	Indirect reference area 124
2042 (07FAh)	2043 (07FBh)	Indirect reference area 125
2044 (07FCh)	2045 (07FDh)	Indirect reference area 126
2046 (07FEh)	2047 (07FFh)	Indirect reference area 127

■ Setting example

This section explains an example of sending/receiving data to/from the server address 1 using indirect reference.

● **STEP 1: Registration in indirect reference addresses**

Setting data

Indirect reference address	Register address			Data to be sent	Setting value
	Upper	Lower			
Indirect reference address setting (0)	1536 (0600h)	1537 (0601h)	←	Motor rotation direction	420 (01A4h) (Value in NET-ID of Motor rotation direction)
Indirect reference address setting (1)	1538 (0602h)	1539 (0603h)	←	Command filter time constant	298 (012Ah) (Value in NET-ID of Command filter time constant)
Indirect reference address setting (2)	1540 (0604h)	1541 (0605h)	←	MOVE minimum ON time	1802 (070Ah) (Value in NET-ID MOVE minimum ON time)

Send the following query to register the addresses of the data to be sent in indirect reference addresses.

Query

Field name		Data	Description
Server address		01h	Server address 1
Function code		10h	Writing to multiple holding registers
Data	Register address (upper)	06h	Register address to start writing from = Indirect reference address setting (0) (0600h)
	Register address (lower)	00h	
	Number of registers (upper)	00h	Number of registers to be written from the starting register address = 6 registers (0006h)
	Number of registers (lower)	06h	
	Number of data bytes	0Ch	Twice the number of registers in the query = 12
	Write value of register address (upper)	00h	Value written to register address 0600h = Motor rotation direction (NET-ID:01A4h)
	Write value of register address (lower)	00h	
	Write value of register address +1 (upper)	01h	
	Write value of register address +1 (lower)	A4h	
	Write value of register address +2 (upper)	00h	Value written to register address 0602h = Command filter time constant (NET-ID: 012Ah)
	Write value of register address +2 (lower)	00h	
	Write value of register address +3 (upper)	01h	
	Write value of register address +3 (lower)	2Ah	
	Write value of register address +4 (upper)	00h	Value written to register address 0604h = MOVE minimum ON time (NET-ID: 070Ah)
	Write value of register address +4 (lower)	00h	
	Write value of register address +5 (upper)	07h	
	Write value of register address +5 (lower)	0Ah	
Error check (lower)		E8h	Calculation result of CRC-16
Error check (upper)		54h	

- **STEP 2: Writing to indirect reference areas**

Setting data

Indirect reference area	Register address			Data to be sent	Setting value
	Upper	Lower			
Indirect reference area 0	1792 (0700h)	1793 (0701h)	←	Motor rotation direction	0 (0000h)
Indirect reference area 1	1794 (0702h)	1795 (0703h)	←	Command filter time constant	10 (000Ah)
Indirect reference area 2	1796 (0704h)	1797 (0705h)	←	MOVE minimum ON time	1 (0001h)

Send the following query to write the setting values of the data to be sent in indirect reference areas.

Query

Field name		Data	Description
Server address		01h	Server address 1
Function code		10h	Writing to multiple holding registers
Data	Register address (upper)	07h	Register address to start writing from = Indirect reference area 0 (0700h)
	Register address (lower)	00h	
	Number of registers (upper)	00h	Number of registers to be written from the starting register address = 6 registers (0006h)
	Number of registers (lower)	06h	
	Number of data bytes	0Ch	Twice the number of registers in the query = 12
	Write value of register address (upper)	00h	Value written to register address 0700h = Motor rotation direction = 0 (0000h)
	Write value of register address (lower)	00h	
	Write value of register address +1 (upper)	00h	
	Write value of register address +1 (lower)	00h	
	Write value of register address +2 (upper)	00h	Value written to register address 0702h = Command filter time constant = 10 (000Ah)
	Write value of register address +2 (lower)	00h	
	Write value of register address +3 (upper)	00h	
	Write value of register address +3 (lower)	0Ah	
	Write value of register address +4 (upper)	00h	Value written to register address 0704h = MOVE minimum ON time (0001h) = 1 (0001h)
	Write value of register address +4 (lower)	00h	
	Write value of register address +5 (upper)	00h	
	Write value of register address +5 (lower)	01h	
Error check (lower)		E1h	Calculation result of CRC-16
Error check (upper)		27h	

- **STEP 3: Reading from indirect reference areas**

  Send the following query to read the data written in indirect reference areas.

Query

Field name		Data	Description
Server address		01h	Server address 1
Function code		03h	Reading from a holding register(s)
Data	Register address (upper)	07h	Register address to start reading from = Indirect reference area 0 (0700h)
	Register address (lower)	00h	
	Number of registers (upper)	00h	Number of registers to be read from the starting register address (6 registers = 0006h)
	Number of registers (lower)	06h	
Error check (lower)		C4h	Calculation result of CRC-16
Error check (upper)		BCh	

Response

Field name		Data	Description
Server address		01h	Same as query
Function code		03h	Same as query
Data	Number of data bytes	0Ch	Twice the number of registers in the query = 12
	Read value of register address (upper)	00h	Value read from register address 0700h = Motor rotation direction = 0 (0000h)
	Read value of register address (lower)	00h	
	Read value of register address +1 (upper)	00h	
	Read value of register address +1 (lower)	00h	
	Read value of register address +2 (upper)	00h	Value read from register address 0702h = Command filter time constant = 10 (000Ah)
	Read value of register address +2 (lower)	00h	
	Read value of register address +3 (upper)	00h	
	Read value of register address +3 (lower)	0Ah	
	Read value of register address +4 (upper)	00h	Value read from register address 0704h = MOVE minimum ON time (0001h) = 1 (0001h)
	Read value of register address +4 (lower)	00h	
	Read value of register address +5 (upper)	00h	
	Read value of register address +5 (lower)	01h	
Error check (lower)		CAh	Calculation result of CRC-16
Error check (upper)		B1h	

It was found that the data had been written normally using indirect reference.

6 Group send

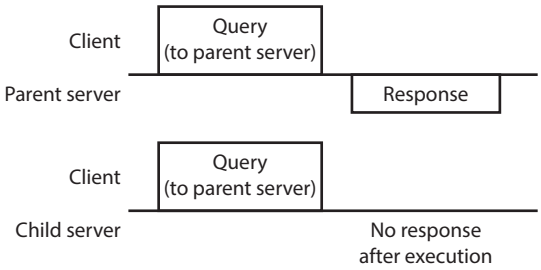
Multiple servers are made into a group and a query is sent to all servers in the group at once.

■ Group composition

A group consists of a parent server and child servers, and only the parent server returns a response.

■ Group address

To perform the group send, set a group address to the child servers to be included in the group. The child servers to which the group address has been set can receive a query sent to the parent server.
The parent server is not always required. A group can be composed by only child servers. In this case, set an unused address as an address of the group.
When a query is sent from the client to the address of the group, the child servers execute the processing.



However, no response is returned. In broadcast, all the servers execute the processing, however, the servers that execute the processing can be limited in this method.

■ Parent server

No special setting is required on the parent server to perform the group send. The address of the parent server becomes the group address. When a query is sent from the client to the parent server, the parent server executes the requested processing and returns a response. (Same as the unicast mode)

■ Child server

Servers to which the address of the parent server is set become the child servers.
When the child servers receive a query sent to the address of the group, they execute the processing. However, no response is returned.
The function code that can be executed in the group send is "Writing to multiple holding registers (10h)" only.

■ Setting of Group

Set the address of the parent server to the "Group ID" of the child servers. Change the group in the unicast mode. For reading and writing when setting the "Group ID," execute the upper and lower register addresses at the same time.

- **Related command**

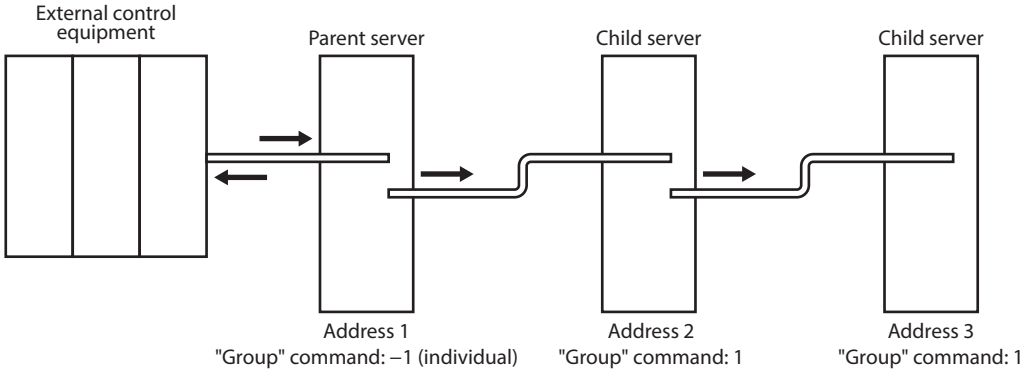
Register address		Name	Description	Initial setting	
Upper	Lower			Initial value	Unit
48 (0030h)	49 (0031h)	Group ID	Sets an address of the group. **[Setting range]** −1: No group specification (group send is not performed) 1 to 31: Address of the group (address number of the parent server)	−1	–

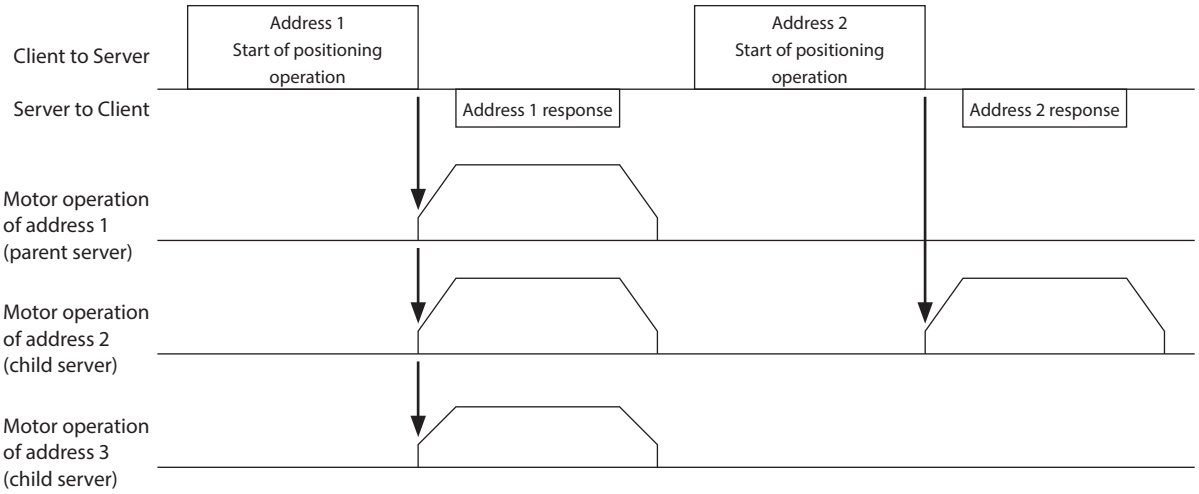
Note

- Do not set "0" to the group ID.
- Change the group address in the unicast mode.
- The group setting is stored in RAM, so the initial value is returned when the power supply of the driver is turned off.
  The initial value can be changed using the "Initial group ID (Modbus)" parameter.

- **Related parameter**

Register address		Name	Description	Initial setting	
Upper	Lower			Initial value	Unit
5012 (1394h)	5013 (1395h)	Initial group ID (Modbus)	Sets the address of a group (address number of parent server). **[Setting range]** −1: Disable (no group transmission) 1 to 31: Group ID Do not use 0.	−1	–





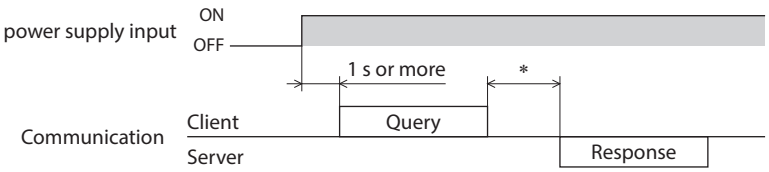
7 RS-485 communication monitor

This chapter indicates items that can be monitored via RS-485 communication. They can also be checked using the "RS-485 communication status monitor" of the support software.

Register address		Name	Description	Initial setting	
Upper	Lower			Initial value	Unit
172 (00ACh)	173 (00ADh)	Present communication error	Indicates the communication error code received last time.	–	–
340 (0154h)	341 (0155h)	RS-485 communication reception byte counter	Indicates the number of bytes received.	–	–
342 (0156h)	343 (0157h)	RS-485 communication transmission byte counter	Indicates the number of bytes transmitted.	–	–
344 (0158h)	345 (0159h)	RS-485 communication normal reception frame counter (All)	Indicates the number of normal frames received.	–	–
346 (015Ah)	347 (015Bh)	RS-485 communication normal reception frame counter (Only own address)	Indicates the number of normal frames received to own address.	–	–
348 (015Ch)	349 (015Dh)	RS-485 communication abnormal reception frame counter (All)	Indicates the number of abnormal frames received.	–	–
350 (015Eh)	351 (015Fh)	RS-485 communication transmission frame counter	Indicates the number of frames transmitted.	–	–
352 (0160h)	353 (0161h)	RS-485 communication register write error counter	Indicates the number of times the register write error occurred.	–	–
354 (0162h)	355 (0163h)	RS-485 communication valid frame/second	Indicates the number of valid frames per second.	–	–
356 (0164h)	357 (0165h)	RS-485 communication processing time	Indicates the communication processing time for RS-485 communication.	–	ms
358 (0166h)	359 (0167h)	RS-485 communication maximum processing time	Indicates the maximum communication processing time after the power is turned on.	–	ms
360 (0168h)	361 (0169h)	RS-485 communication interval	Indicates the communication interval for RS-485 communication.	–	ms
362 (016Ah)	363 (016Bh)	RS-485 communication maximum interval	Indicates the maximum communication interval for RS-485 communication.	–	ms

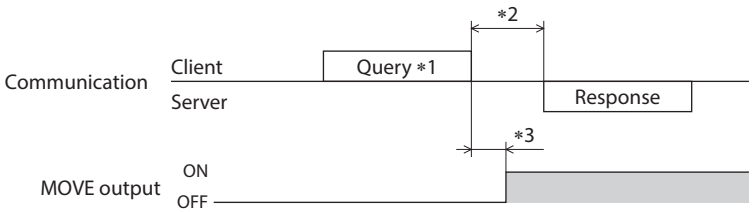
8 Timing chart

8-1 Communication start



* C3.5 (silent interval) + the longer of Tb5 (query processing time (driver)) and Tb2 (transmission waiting time (driver side))

8-2 Operation start

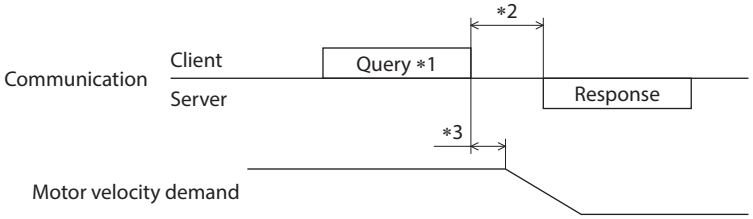


*1 A message including a query to start operation via RS-485 communication

*2 C3.5 (silent interval) + the longer of Tb5 (query processing time (driver)) and Tb2 (transmission waiting time (driver side))

*3 C3.5 (silent interval) + Tb5 (query processing time (driver)) + 2 ms or less

8-3 Operation stop, speed change

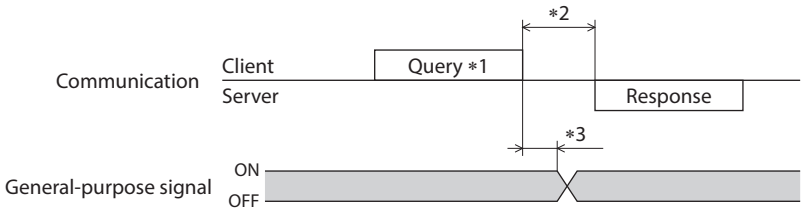


*1 A message including a query to stop operation and another to change the speed via RS-485 communication

*2 C3.5 (silent interval) + the longer of Tb5 (query processing time (driver)) and Tb2 (transmission waiting time (driver side))

*3 C3.5 (silent interval) + Tb5 (query processing time (driver)) + 2 ms or less

8-4 General signal

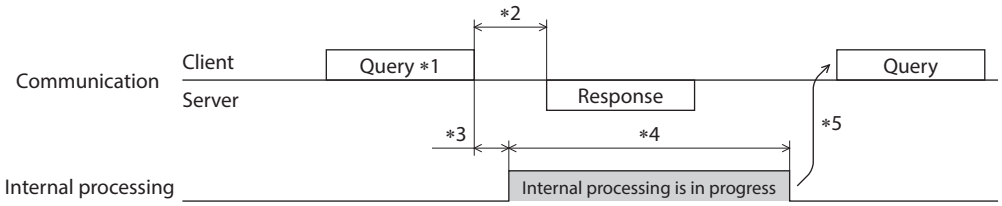


*1 A message including a query for remote output via RS-485 communication

*2 C3.5 (silent interval) + the longer of Tb5 (query processing time (driver)) and Tb2 (transmission waiting time (driver side))

*3 C3.5 (silent interval) + Tb5 (query processing time (driver)) + 2 ms or less

8-5 Configuration



*1 A message including a query for configuration via RS-485 communication

*2 C3.5 (silent interval) + the longer of Tb5 (query processing time (driver)) and Tb2 (transmission waiting time (driver side))

*3 C3.5 (silent interval) + Tb5 (query processing time (driver)) + 2 ms or less

*4 1 s or less

*5 Do not execute writing while configuration is executed.

9 Detection of communication errors

This is a function to detect abnormalities that may occur in RS-485 communication, including two types: communication errors and alarms.

9-1 Communication errors

If the communication error with error code 84h occurs, the COMM LED on the driver is lit in red.
For communication errors other than 84h, the LED will not be lit or blink.
The communication error can be checked using the "Communication error history" command via RS-485 communication or using the support software.

Note The communication error history is cleared when the power supply of the driver is turned off because it is stored in RAM.

■ Communication error list

Type of communication error	Error code	Cause
RS-485 communication error	84h	A transmission error has been detected. (Reference ⇨ p.84)
Command not yet defined	88h	An exception response (exception code 01h, 02h) has been detected. (Reference ⇨ p.84)
Execution disable due to user I/F communication in progress	89h	An exception response (exception code 04h) has been detected. (Reference ⇨ p.84)
Execution disable due to non-volatile memory processing in progress	8Ah	
Out of setting range	8Ch	An exception response (exception code 03h, 04h) has been detected. (Reference ⇨ p.84)
Command execute disable	8Dh	An exception response (exception code 04h) has been detected. (Reference ⇨ p.84)

9-2 Alarms related to RS-485 communication

If an alarm related to RS-485 communication is generated, the ALM-A output is turned ON and the ALM-B output is turned OFF to stop the motor.
The PWR/SYS LED on the driver will blink in red.

■ Alarm list related to RS-485 communication

Alarm code	Alarm type	Cause
84h	RS-485 communication error	The RS-485 communication error has occurred consecutively for the number of times set in the "Communication error alarm (Modbus)" parameter.
85h	RS-485 communication timeout	The time set in the "Communication timeout (Modbus)" parameter has elapsed and communication with the host controller has still not been established.

9-3 Information related to RS-485 communication

If information related to RS-485 communication is generated, the motor will continue operating and the PWR/SYS LED on the driver will blink in blue.

■ RS-485 communication error information

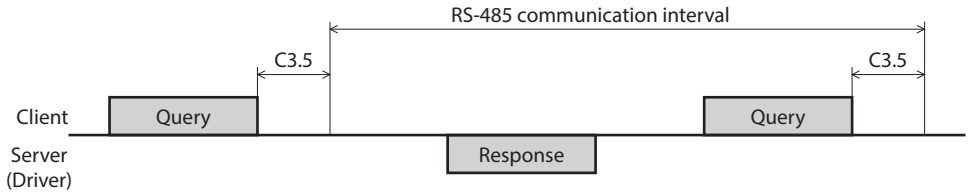
If the RS-485 communication error occurs consecutively more than the number of times set in the "RS-485 communication error information (INFO-485-ERR)" parameter, information will be generated.
When the communication is performed properly, the number of times counted is reset.

■ RS-485 communication processing time information

If the RS-485 communication processing time exceeds the time set in the "RS-485 communication processing time information (INFO-485-PRCST)" parameter, information will be generated.

■ RS-485 communication interval information

If the RS-485 communication interval exceeds the time set in the "RS-485 communication interval information (INFO-485-INTVL)" parameter, information will be generated.



5 Address codes list

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1 Timing for parameter update

All data used by the driver is 32 bits wide. Therefore, when accessed with NET-ID, a single register represents a single piece of data.
With the Modbus protocol, since the register is 16 bits wide, two registers represent a single piece of data.

Parameters are stored in RAM or non-volatile memory. The parameters stored in RAM are erased when the power supply is shut off, but those stored in non-volatile memory are retained even if the power supply is shut off.
When the power supply of the driver is turned on, the parameters stored in non-volatile memory are sent to RAM, and recalculation and setup for the parameters are performed in RAM.
When parameters are set via communication, they are stored in RAM. To save the parameters stored in RAM to non-volatile memory, execute "Write batch NV memory" of the maintenance command.
The parameters set with the support software will be saved to non-volatile memory if "Data writing" is performed.

When a parameter is changed, the timing for updating the new value varies depending on the parameter. See the following four types.

- Update immediately ..... Recalculation and setup are immediately executed when the parameter is written.
- Update after stopping the operation ..... Recalculation and setup are executed when the operation is stopped.
- Update after executing Configuration ..... Recalculation and setup are executed after Configuration is executed or the power is turned off and on again.
- Update after turning the power off and on again ..... Recalculation and setup are executed after the power is turned off and on again.

memo

- Parameters set via communication are stored in RAM. When changing a parameter that requires the power to be turned off and on again to update the data, be sure to save it to non-volatile memory before turning off the power.
- Non-volatile memory can be rewritten approximately 100,000 times.

■ Notation rules

In this manual, each update timing is represented in an alphabet.

A: Update immediately
B: Update after stopping the operation
C: Update after Configuration is executed or the power is turned off and on again
D: Update after turning the power off and on again

READ/WRITE may be represented as "R/W" in this part.

2 I/O commands

These are commands related to I/O (input and output). The set value is stored in RAM.

Modbus communication Register address		Name	Description	R/W	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
114 (0072h)	115 (0073h)	NET selection number	Selects the operation data number. Operation data can be sent at the same time as "Driver input command (2nd)."	R/W	–1	–	57 (0039h)
116 (0074h)	117 (0075h)	Driver input command (2nd)	The same input command as "Driver input command (reference)" is automatically set.	R/W	0	–	58 (003Ah)
118 (0076h)	119 (0077h)	NET selection number	Selects the operation data number. Operation data can be sent at the same time as "Driver input command (automatic OFF)."	R/W	–1	–	59 (003Bh)
120 (0078h)	121 (0079h)	Driver input command (automatic OFF)	The same input command as "Driver input command (reference)" is automatically set. If the input signal is turned ON with this command, it is automatically turned OFF after 250 µs.	R/W	0	–	60 (003Ch)
122 (007Ah)	123 (007Bh)	NET selection number	Selects the operation data number. Operation data can be sent at the same time as "Driver input command (reference)."	R/W	–1	–	61 (003Dh)
124 (007Ch)	125 (007Dh)	Driver input command (reference)	Sets the input command to the driver. (Details of bits arrangement ⇨ Next section)	R/W	0	–	62 (003Eh)
126 (007Eh)	127 (007Fh)	Driver output status	Reads the output status of the driver. (Details of bits arrangement ⇨p.120)	R	–	–	63 (003Fh)

■ Driver input commands

These are the driver input signals that can be accessed via Modbus communication. They can also be accessed in units of one register (16 bits).
Values in brackets [ ] are initial values. They can be changed using the parameter. (Parameters ⇨p.175, assignment of input signals ⇨p.49)

● Upper

Register address	Description							
124 (007Ch)	bit 15	bit 14	bit 13	bit 12	bit 11	bit 10	bit 9	bit 8
	R-IN31 [D-SEL7]	R-IN30 [D-SEL6]	R-IN29 [D-SEL5]	R-IN28 [D-SEL4]	R-IN27 [D-SEL3]	R-IN26 [D-SEL2]	R-IN25 [D-SEL1]	R-IN24 [D-SEL0]
	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
	R-IN23 [No function]	R-IN22 [No function]	R-IN21 [No function]	R-IN20 [P-PRESET]	R-IN19 [No function]	R-IN18 [No function]	R-IN17 [NEXT]	R-IN16 [START]

● **Lower**

Register address	Description							
125 (007Dh)	bit 15	bit 14	bit 13	bit 12	bit 11	bit 10	bit 9	bit 8
	R-IN15 [M7]	R-IN14 [M6]	R-IN15 [M5]	R-IN14 [M4]	R-IN15 [M3]	R-IN14 [M2]	R-IN15 [M1]	R-IN14 [M0]
	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
	R-IN7 [ALM-RST]	R-IN6 [FREE]	R-IN5 [STOP]	R-IN4 [No function]	R-IN3 [TRQ-LMT]	R-IN2 [No function]	R-IN1 [RV-SPD]	R-IN0 [FW-SPD]

memo Input "0" for the bit that "No function" is set.

■ Driver output status

These are the driver output signals that can be accessed via Modbus communication. They can also be accessed in units of one register (16 bits).
Values in brackets [ ] are initial values. They can be changed using the parameter. (Parameters ⇨p.175, assignment of output signals ⇨p.51)

● **Upper**

Register address	Description							
126 (007Eh)	bit 15	bit 14	bit 13	bit 12	bit 11	bit 10	bit 9	bit 8
	R-OUT31 [USR-OUT3]	R-OUT30 [USR-OUT2]	R-OUT29 [USR-OUT1]	R-OUT28 [USR-OUT0]	R-OUT27 [AREA3]	R-OUT26 [AREA2]	R-OUT25 [AREA1]	R-OUT24 [AREA0]
	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
	R-OUT23 [CONST-OFF]	R-OUT22 [INFO-REBOOT]	R-OUT21 [INFO-CONFIG]	R-OUT20 [INFO-START-G]	R-OUT19 [INFO-TRQ]	R-OUT18 [INFO-DRVTMP]	R-OUT17 [INFO-MNT-G]	R-OUT16 [INFO]

● **Lower**

Register address	Description							
127 (007Fh)	bit 15	bit 14	bit 13	bit 12	bit 11	bit 10	bit 9	bit 8
	R-OUT15 [CONST-OFF]	R-OUT14 [CONST-OFF]	R-OUT15 [CONST-OFF]	R-OUT14 [CONST-OFF]	R-OUT15 [RDY-SD-OPE]	R-OUT14 [RDY-DD-OPE]	R-OUT15 [RDY-FWRV-OPE]	R-OUT14 [SYS-BSY]
	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
	R-OUT7 [ALM-A]	R-OUT6 [FREE_R]	R-OUT5 [STOP_R]	R-OUT4 [CONST-OFF]	R-OUT3 [TRQ-LMTD]	R-OUT2 [TLC]	R-OUT1 [VA]	R-OUT0 [MOVE]

3 Group command

This is a command related to group send. The set value is stored in RAM.

Modbus communication Register address		Name	Description	R/W	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
48 (0030h)	49 (0031h)	Group ID	Sets an address of the group.* 1 [**Setting range**] −1: No group specification (group send is not performed) 1 to 31: The address of the group (address number of the parent server)	R/W	−1*2	–	24 (0018h)

*1 Do not set "0" to the group ID.

*2 The initial value can be changed using the "Initial group ID (Modbus)" parameter.

4 Protect release command

The key code to release the function limitation by the HMI input is set.

Modbus communication Register address		Name	Description	R/W	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
68 (0044h)	69 (0045h)	HMI release key	Inputs the key code to release the limitation by the HMI input. (Key code ⇨ Next table)	R/W	0	–	34 (0022h)

Key code table

Process that requires protect release	Command name	Key code
Release of limitation by HMI input	HMI release key	864617234 (33890312h)

5 Direct data operation commands

These are commands used when direct data operation is performed. The set value is stored in RAM.
All commands can be read and written (READ/WRITE).

Modbus communication Register address		Name	Description	R/W	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
88 (0058h)	89 (0059h)	Direct data operation operation data number	The operation data of the specified operation data number is transferred to the direct data operation command. Writing a value of the operation data number executes the data transfer. Commands to be transferred are as follows. • Direct data operation operation type • Direct data operation operating velocity • Direct data operation acceleration time • Direct data operation deceleration time • Direct data operation torque limiting value [**Setting range**] 0 to 255: Operation data No. 0 to No. 255	R/W	0*1	–	44 (002Ch)
90 (005Ah)	91 (005Bh)	Direct data operation operation type	Sets the operation type for direct data operation. [**Setting range**] 0: Deceleration stop (according to the specified operation profile) 31: Deceleration stop (according to the operation profile during operation) 48: Continuous operation (speed control)	R/W	0*2	–	45 (002Dh)
92 (005Ch)	93 (005Dh)	Reserved address	–	–	–	–	46 (002Eh)
94 (005Eh)	95 (005Fh)	Direct data operation operating velocity	Sets the operating velocity for direct data operation. [**Setting range**] –4,000,000 to 4,000,000 (User-defined velocity unit)	R/W	0*2	r/min	47 (002Fh)
96 (0060h)	97 (0061h)	Direct data operation acceleration time	Sets the acceleration time for direct data operation. [**Setting range**] 100 to 30,000 ms	R/W	1,000*2	ms	48 (0030h)
98 (0062h)	99 (0063h)	Direct data operation deceleration time	Sets the deceleration time for direct data operation. [**Setting range**] 100 to 30,000 ms	R/W	1,000*2	ms	49 (0031h)
100 (0064h)	101 (0065h)	Direct data operation torque limiting value	Sets the torque limiting value for direct data operation. [**Setting range**] 0 to 10,000 (1=0.1 %)*3	R/W	10,000*2	1=0.1 %	50 (0032h)

Modbus communication Register address		Name	Description	R/W	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
102 (0066h)	103 (0067h)	Direct data operation trigger	Sets the trigger and the lifetime for direct data operation. [**Setting range**] <Upper 16 bits> lifetime setting –1, 0: Direct data operation lifetime disable 1 to 32767: Direct data operation lifetime setting value [ms] <Lower 16 bits> Trigger setting –7: Operation data number. –6: Operation type –4: Operating velocity –3: Acceleration time –2: Deceleration time –1: Torque limiting value 0: Disable 1to3: Normal start	R/W	0	–	51 (0033h)

*1 The value set in the "Direct data operation operation parameter initial value reference data number" parameter will be the initial value.

*2 The operation data of the operation data number set in the "Direct data operation operation parameter initial value reference data number" parameter will be the initial value.

*3 The maximum torque limiting value varies depending on the motor. Refer to p.15 for the maximum value of each motor.

6 Modbus indirect reference commands

These are commands used when indirect reference is performed via Modbus RTU communication. The set value is stored in RAM.
All commands can be read and written (READ/WRITE).

Modbus communication Register address		Name	Description	R/W	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
1792 (0700h)	1793 (0701h)	Indirect reference area 0	This is an area to read/write from/to the parameter or command registered in the indirect reference address (0).	R/W	–	–	896 (0380h)
1794 (0702h)	1795 (0703h)	Indirect reference area 1	This is an area to read/write from/to the parameter or command registered in the indirect reference address (1).	R/W	–	–	897 (0381h)
1796 (0704h)	1797 (0705h)	Indirect reference area 2	This is an area to read/write from/to the parameter or command registered in the indirect reference address (2).	R/W	–	–	898 (0382h)
1798 (0706h)	1799 (0707h)	Indirect reference area 3	This is an area to read/write from/to the parameter or command registered in the indirect reference address (3).	R/W	–	–	899 (0383h)
1800 (0708h)	1801 (0709h)	Indirect reference area 4	This is an area to read/write from/to the parameter or command registered in the indirect reference address (4).	R/W	–	–	900 (0384h)
1802 (070Ah)	1803 (070Bh)	Indirect reference area 5	This is an area to read/write from/to the parameter or command registered in the indirect reference address (5).	R/W	–	–	901 (0385h)
1804 (070Ch)	1805 (070Dh)	Indirect reference area 6	This is an area to read/write from/to the parameter or command registered in the indirect reference address (6).	R/W	–	–	902 (0386h)
1806 (070Eh)	1807 (070Fh)	Indirect reference area 7	This is an area to read/write from/to the parameter or command registered in the indirect reference address (7).	R/W	–	–	903 (0387h)
1808 (0710h)	1809 (0711h)	Indirect reference area 8	This is an area to read/write from/to the parameter or command registered in the indirect reference address (8).	R/W	–	–	904 (0388h)
1810 (0712h)	1811 (0713h)	Indirect reference area 9	This is an area to read/write from/to the parameter or command registered in the indirect reference address (9).	R/W	–	–	905 (0389h)
1812 (0714h)	1813 (0715h)	Indirect reference area 10	This is an area to read/write from/to the parameter or command registered in the indirect reference address (10).	R/W	–	–	906 (038Ah)
1814 (0716h)	1815 (0717h)	Indirect reference area 11	This is an area to read/write from/to the parameter or command registered in the indirect reference address (11).	R/W	–	–	907 (038Bh)
1816 (0718h)	1817 (0719h)	Indirect reference area 12	This is an area to read/write from/to the parameter or command registered in the indirect reference address (12).	R/W	–	–	908 (038Ch)
1818 (071Ah)	1819 (071Bh)	Indirect reference area 13	This is an area to read/write from/to the parameter or command registered in the indirect reference address (13).	R/W	–	–	909 (038Dh)
1820 (071Ch)	1821 (071Dh)	Indirect reference area 14	This is an area to read/write from/to the parameter or command registered in the indirect reference address (14).	R/W	–	–	910 (038Eh)

Modbus communication Register address		Name	Description	R/W	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
1822 (071Eh)	1823 (071Fh)	Indirect reference area 15	This is an area to read/write from/to the parameter or command registered in the indirect reference address (15).	R/W	–	–	911 (038Fh)
1824 (0720h)	1825 (0721h)	Indirect reference area 16	This is an area to read/write from/to the parameter or command registered in the indirect reference address (16).	R/W	–	–	912 (0390h)
1826 (0722h)	1827 (0723h)	Indirect reference area 17	This is an area to read/write from/to the parameter or command registered in the indirect reference address (17).	R/W	–	–	913 (0391h)
1828 (0724h)	1829 (0725h)	Indirect reference area 18	This is an area to read/write from/to the parameter or command registered in the indirect reference address (18).	R/W	–	–	914 (0392h)
1830 (0726h)	1831 (0727h)	Indirect reference area 19	This is an area to read/write from/to the parameter or command registered in the indirect reference address (19).	R/W	–	–	915 (0393h)
1832 (0728h)	1833 (0729h)	Indirect reference area 20	This is an area to read/write from/to the parameter or command registered in the indirect reference address (20).	R/W	–	–	916 (0394h)
1834 (072Ah)	1835 (072Bh)	Indirect reference area 21	This is an area to read/write from/to the parameter or command registered in the indirect reference address (21).	R/W	–	–	917 (0395h)
1836 (072Ch)	1837 (072Dh)	Indirect reference area 22	This is an area to read/write from/to the parameter or command registered in the indirect reference address (22).	R/W	–	–	918 (0396h)
1838 (072Eh)	1839 (072Fh)	Indirect reference area 23	This is an area to read/write from/to the parameter or command registered in the indirect reference address (23).	R/W	–	–	919 (0397h)
1840 (0730h)	1841 (0731h)	Indirect reference area 24	This is an area to read/write from/to the parameter or command registered in the indirect reference address (24).	R/W	–	–	920 (0398h)
1842 (0732h)	1843 (0733h)	Indirect reference area 25	This is an area to read/write from/to the parameter or command registered in the indirect reference address (25).	R/W	–	–	921 (0399h)
1844 (0734h)	1845 (0735h)	Indirect reference area 26	This is an area to read/write from/to the parameter or command registered in the indirect reference address (26).	R/W	–	–	922 (039Ah)
1846 (0736h)	1847 (0737h)	Indirect reference area 27	This is an area to read/write from/to the parameter or command registered in the indirect reference address (27).	R/W	–	–	923 (039Bh)
1848 (0738h)	1849 (0739h)	Indirect reference area 28	This is an area to read/write from/to the parameter or command registered in the indirect reference address (28).	R/W	–	–	924 (039Ch)
1850 (073Ah)	1851 (073Bh)	Indirect reference area 29	This is an area to read/write from/to the parameter or command registered in the indirect reference address (29).	R/W	–	–	925 (039Dh)
1852 (073Ch)	1853 (073Dh)	Indirect reference area 30	This is an area to read/write from/to the parameter or command registered in the indirect reference address (30).	R/W	–	–	926 (039Eh)
1854 (073Eh)	1855 (073Fh)	Indirect reference area 31	This is an area to read/write from/to the parameter or command registered in the indirect reference address (31).	R/W	–	–	927 (039Fh)
1856 (0740h)	1857 (0741h)	Indirect reference area 32	This is an area to read/write from/to the parameter or command registered in the indirect reference address (32).	R/W	–	–	928 (03A0h)

Modbus communication Register address		Name	Description	R/W	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
1858 (0742h)	1859 (0743h)	Indirect reference area 33	This is an area to read/write from/to the parameter or command registered in the indirect reference address (33).	R/W	–	–	929 (03A1h)
1860 (0744h)	1861 (0745h)	Indirect reference area 34	This is an area to read/write from/to the parameter or command registered in the indirect reference address (34).	R/W	–	–	930 (03A2h)
1862 (0746h)	1863 (0747h)	Indirect reference area 35	This is an area to read/write from/to the parameter or command registered in the indirect reference address (35).	R/W	–	–	931 (03A3h)
1864 (0748h)	1865 (0749h)	Indirect reference area 36	This is an area to read/write from/to the parameter or command registered in the indirect reference address (36).	R/W	–	–	932 (03A4h)
1866 (074Ah)	1867 (074Bh)	Indirect reference area 37	This is an area to read/write from/to the parameter or command registered in the indirect reference address (37).	R/W	–	–	933 (03A5h)
1868 (074Ch)	1869 (074Dh)	Indirect reference area 38	This is an area to read/write from/to the parameter or command registered in the indirect reference address (38).	R/W	–	–	934 (03A6h)
1870 (074Eh)	1871 (074Fh)	Indirect reference area 39	This is an area to read/write from/to the parameter or command registered in the indirect reference address (39).	R/W	–	–	935 (03A7h)
1872 (0750h)	1873 (0751h)	Indirect reference area 40	This is an area to read/write from/to the parameter or command registered in the indirect reference address (40).	R/W	–	–	936 (03A8h)
1874 (0752h)	1875 (0753h)	Indirect reference area 41	This is an area to read/write from/to the parameter or command registered in the indirect reference address (41).	R/W	–	–	937 (03A9h)
1876 (0754h)	1877 (0755h)	Indirect reference area 42	This is an area to read/write from/to the parameter or command registered in the indirect reference address (42).	R/W	–	–	938 (03AAh)
1878 (0756h)	1879 (0757h)	Indirect reference area 43	This is an area to read/write from/to the parameter or command registered in the indirect reference address (43).	R/W	–	–	939 (03ABh)
1880 (0758h)	1881 (0759h)	Indirect reference area 44	This is an area to read/write from/to the parameter or command registered in the indirect reference address (44).	R/W	–	–	940 (03ACh)
1882 (075Ah)	1883 (075Bh)	Indirect reference area 45	This is an area to read/write from/to the parameter or command registered in the indirect reference address (45).	R/W	–	–	941 (03ADh)
1884 (075Ch)	1885 (075Dh)	Indirect reference area 46	This is an area to read/write from/to the parameter or command registered in the indirect reference address (46).	R/W	–	–	942 (03AEh)
1886 (075Eh)	1887 (075Fh)	Indirect reference area 47	This is an area to read/write from/to the parameter or command registered in the indirect reference address (47).	R/W	–	–	943 (03AFh)
1888 (0760h)	1889 (0761h)	Indirect reference area 48	This is an area to read/write from/to the parameter or command registered in the indirect reference address (48).	R/W	–	–	944 (03B0h)
1890 (0762h)	1891 (0763h)	Indirect reference area 49	This is an area to read/write from/to the parameter or command registered in the indirect reference address (49).	R/W	–	–	945 (03B1h)
1892 (0764h)	1893 (0765h)	Indirect reference area 50	This is an area to read/write from/to the parameter or command registered in the indirect reference address (50).	R/W	–	–	946 (03B2h)

Modbus communication Register address		Name	Description	R/W	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
1894 (0766h)	1895 (0767h)	Indirect reference area 51	This is an area to read/write from/to the parameter or command registered in the indirect reference address (51).	R/W	–	–	947 (03B3h)
1896 (0768h)	1897 (0769h)	Indirect reference area 52	This is an area to read/write from/to the parameter or command registered in the indirect reference address (52).	R/W	–	–	948 (03B4h)
1898 (076Ah)	1899 (076Bh)	Indirect reference area 53	This is an area to read/write from/to the parameter or command registered in the indirect reference address (53).	R/W	–	–	949 (03B5h)
1900 (076Ch)	1901 (076Dh)	Indirect reference area 54	This is an area to read/write from/to the parameter or command registered in the indirect reference address (54).	R/W	–	–	950 (03B6h)
1902 (076Eh)	1903 (076Fh)	Indirect reference area 55	This is an area to read/write from/to the parameter or command registered in the indirect reference address (55).	R/W	–	–	951 (03B7h)
1904 (0770h)	1905 (0771h)	Indirect reference area 56	This is an area to read/write from/to the parameter or command registered in the indirect reference address (56).	R/W	–	–	952 (03B8h)
1906 (0772h)	1907 (0773h)	Indirect reference area 57	This is an area to read/write from/to the parameter or command registered in the indirect reference address (57).	R/W	–	–	953 (03B9h)
1908 (0774h)	1909 (0775h)	Indirect reference area 58	This is an area to read/write from/to the parameter or command registered in the indirect reference address (58).	R/W	–	–	954 (03BAh)
1910 (0776h)	1911 (0777h)	Indirect reference area 59	This is an area to read/write from/to the parameter or command registered in the indirect reference address (59).	R/W	–	–	955 (03BBh)
1912 (0778h)	1913 (0779h)	Indirect reference area 60	This is an area to read/write from/to the parameter or command registered in the indirect reference address (60).	R/W	–	–	956 (03BCh)
1914 (077Ah)	1915 (077Bh)	Indirect reference area 61	This is an area to read/write from/to the parameter or command registered in the indirect reference address (61).	R/W	–	–	957 (03BDh)
1916 (077Ch)	1917 (077Dh)	Indirect reference area 62	This is an area to read/write from/to the parameter or command registered in the indirect reference address (62).	R/W	–	–	958 (03BEh)
1918 (077Eh)	1919 (077Fh)	Indirect reference area 63	This is an area to read/write from/to the parameter or command registered in the indirect reference address (63).	R/W	–	–	959 (03BFh)
1920 (0780h)	1921 (0781h)	Indirect reference area 64	This is an area to read/write from/to the parameter or command registered in the indirect reference address (64).	R/W	–	–	960 (03C0h)
1922 (0782h)	1923 (0783h)	Indirect reference area 65	This is an area to read/write from/to the parameter or command registered in the indirect reference address (65).	R/W	–	–	961 (03C1h)
1924 (0784h)	1925 (0785h)	Indirect reference area 66	This is an area to read/write from/to the parameter or command registered in the indirect reference address (66).	R/W	–	–	962 (03C2h)
1926 (0786h)	1927 (0787h)	Indirect reference area 67	This is an area to read/write from/to the parameter or command registered in the indirect reference address (67).	R/W	–	–	963 (03C3h)
1928 (0788h)	1929 (0789h)	Indirect reference area 68	This is an area to read/write from/to the parameter or command registered in the indirect reference address (68).	R/W	–	–	964 (03C4h)

Modbus communication Register address		Name	Description	R/W	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
1930 (078Ah)	1931 (078Bh)	Indirect reference area 69	This is an area to read/write from/to the parameter or command registered in the indirect reference address (69).	R/W	–	–	965 (03C5h)
1932 (078Ch)	1933 (078Dh)	Indirect reference area 70	This is an area to read/write from/to the parameter or command registered in the indirect reference address (70).	R/W	–	–	966 (03C6h)
1934 (078Eh)	1935 (078Fh)	Indirect reference area 71	This is an area to read/write from/to the parameter or command registered in the indirect reference address (71).	R/W	–	–	967 (03C7h)
1936 (0790h)	1937 (0791h)	Indirect reference area 72	This is an area to read/write from/to the parameter or command registered in the indirect reference address (72).	R/W	–	–	968 (03C8h)
1938 (0792h)	1939 (0793h)	Indirect reference area 73	This is an area to read/write from/to the parameter or command registered in the indirect reference address (73).	R/W	–	–	969 (03C9h)
1940 (0794h)	1941 (0795h)	Indirect reference area 74	This is an area to read/write from/to the parameter or command registered in the indirect reference address (74).	R/W	–	–	970 (03CAh)
1942 (0796h)	1943 (0797h)	Indirect reference area 75	This is an area to read/write from/to the parameter or command registered in the indirect reference address (75).	R/W	–	–	971 (03CBh)
1944 (0798h)	1945 (0799h)	Indirect reference area 76	This is an area to read/write from/to the parameter or command registered in the indirect reference address (76).	R/W	–	–	972 (03CCh)
1946 (079Ah)	1947 (079Bh)	Indirect reference area 77	This is an area to read/write from/to the parameter or command registered in the indirect reference address (77).	R/W	–	–	973 (03CDh)
1948 (079Ch)	1949 (079Dh)	Indirect reference area 78	This is an area to read/write from/to the parameter or command registered in the indirect reference address (78).	R/W	–	–	974 (03CEh)
1950 (079Eh)	1951 (079Fh)	Indirect reference area 79	This is an area to read/write from/to the parameter or command registered in the indirect reference address (79).	R/W	–	–	975 (03CFh)
1952 (07A0h)	1953 (07A1h)	Indirect reference area 80	This is an area to read/write from/to the parameter or command registered in the indirect reference address (80).	R/W	–	–	976 (03D0h)
1954 (07A2h)	1955 (07A3h)	Indirect reference area 81	This is an area to read/write from/to the parameter or command registered in the indirect reference address (81).	R/W	–	–	977 (03D1h)
1956 (07A4h)	1957 (07A5h)	Indirect reference area 82	This is an area to read/write from/to the parameter or command registered in the indirect reference address (82).	R/W	–	–	978 (03D2h)
1958 (07A6h)	1959 (07A7h)	Indirect reference area 83	This is an area to read/write from/to the parameter or command registered in the indirect reference address (83).	R/W	–	–	979 (03D3h)
1960 (07A8h)	1961 (07A9h)	Indirect reference area 84	This is an area to read/write from/to the parameter or command registered in the indirect reference address (84).	R/W	–	–	980 (03D4h)
1962 (07AAh)	1963 (07ABh)	Indirect reference area 85	This is an area to read/write from/to the parameter or command registered in the indirect reference address (85).	R/W	–	–	981 (03D5h)
1964 (07ACh)	1965 (07ADh)	Indirect reference area 86	This is an area to read/write from/to the parameter or command registered in the indirect reference address (86).	R/W	–	–	982 (03D6h)

Modbus communication Register address		Name	Description	R/W	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
1966 (07AEh)	1967 (07AFh)	Indirect reference area 87	This is an area to read/write from/to the parameter or command registered in the indirect reference address (87).	R/W	–	–	983 (03D7h)
1968 (07B0h)	1969 (07B1h)	Indirect reference area 88	This is an area to read/write from/to the parameter or command registered in the indirect reference address (88).	R/W	–	–	984 (03D8h)
1970 (07B2h)	1971 (07B3h)	Indirect reference area 89	This is an area to read/write from/to the parameter or command registered in the indirect reference address (89).	R/W	–	–	985 (03D9h)
1972 (07B4h)	1973 (07B5h)	Indirect reference area 90	This is an area to read/write from/to the parameter or command registered in the indirect reference address (90).	R/W	–	–	986 (03DAh)
1974 (07B6h)	1975 (07B7h)	Indirect reference area 91	This is an area to read/write from/to the parameter or command registered in the indirect reference address (91).	R/W	–	–	987 (03DBh)
1976 (07B8h)	1977 (07B9h)	Indirect reference area 92	This is an area to read/write from/to the parameter or command registered in the indirect reference address (92).	R/W	–	–	988 (03DCh)
1978 (07BAh)	1979 (07BBh)	Indirect reference area 93	This is an area to read/write from/to the parameter or command registered in the indirect reference address (93).	R/W	–	–	989 (03DDh)
1980 (07BCh)	1981 (07BDh)	Indirect reference area 94	This is an area to read/write from/to the parameter or command registered in the indirect reference address (94).	R/W	–	–	990 (03DEh)
1982 (07BEh)	1983 (07BFh)	Indirect reference area 95	This is an area to read/write from/to the parameter or command registered in the indirect reference address (95).	R/W	–	–	991 (03DFh)
1984 (07C0h)	1985 (07C1h)	Indirect reference area 96	This is an area to read/write from/to the parameter or command registered in the indirect reference address (96).	R/W	–	–	992 (03E0h)
1986 (07C2h)	1987 (07C3h)	Indirect reference area 97	This is an area to read/write from/to the parameter or command registered in the indirect reference address (97).	R/W	–	–	993 (03E1h)
1988 (07C4h)	1989 (07C5h)	Indirect reference area 98	This is an area to read/write from/to the parameter or command registered in the indirect reference address (98).	R/W	–	–	994 (03E2h)
1990 (07C6h)	1991 (07C7h)	Indirect reference area 99	This is an area to read/write from/to the parameter or command registered in the indirect reference address (99).	R/W	–	–	995 (03E3h)
1992 (07C8h)	1993 (07C9h)	Indirect reference area 100	This is an area to read/write from/to the parameter or command registered in the indirect reference address (100).	R/W	–	–	996 (03E4h)
1994 (07CAh)	1995 (07CBh)	Indirect reference area 101	This is an area to read/write from/to the parameter or command registered in the indirect reference address (101).	R/W	–	–	997 (03E5h)
1996 (07CCh)	1997 (07CDh)	Indirect reference area 102	This is an area to read/write from/to the parameter or command registered in the indirect reference address (102).	R/W	–	–	998 (03E6h)
1998 (07CEh)	1999 (07CFh)	Indirect reference area 103	This is an area to read/write from/to the parameter or command registered in the indirect reference address (103).	R/W	–	–	999 (03E7h)
2000 (07D0h)	2001 (07D1h)	Indirect reference area 104	This is an area to read/write from/to the parameter or command registered in the indirect reference address (104).	R/W	–	–	1000 (03E8h)

Modbus communication Register address		Name	Description	R/W	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
2002 (07D2h)	2003 (07D3h)	Indirect reference area 105	This is an area to read/write from/to the parameter or command registered in the indirect reference address (105).	R/W	–	–	1001 (03E9h)
2004 (07D4h)	2005 (07D5h)	Indirect reference area 106	This is an area to read/write from/to the parameter or command registered in the indirect reference address (106).	R/W	–	–	1002 (03EAh)
2006 (07D6h)	2007 (07D7h)	Indirect reference area 107	This is an area to read/write from/to the parameter or command registered in the indirect reference address (107).	R/W	–	–	1003 (03EBh)
2008 (07D8h)	2009 (07D9h)	Indirect reference area 108	This is an area to read/write from/to the parameter or command registered in the indirect reference address (108).	R/W	–	–	1004 (03ECh)
2010 (07DAh)	2011 (07DBh)	Indirect reference area 109	This is an area to read/write from/to the parameter or command registered in the indirect reference address (109).	R/W	–	–	1005 (03EDh)
2012 (07DCh)	2013 (07DDh)	Indirect reference area 110	This is an area to read/write from/to the parameter or command registered in the indirect reference address (110).	R/W	–	–	1006 (03EEh)
2014 (07DEh)	2015 (07DFh)	Indirect reference area 111	This is an area to read/write from/to the parameter or command registered in the indirect reference address (111).	R/W	–	–	1007 (03EFh)
2016 (07E0h)	2017 (07E1h)	Indirect reference area 112	This is an area to read/write from/to the parameter or command registered in the indirect reference address (112).	R/W	–	–	1008 (03F0h)
2018 (07E2h)	2019 (07E3h)	Indirect reference area 113	This is an area to read/write from/to the parameter or command registered in the indirect reference address (113).	R/W	–	–	1009 (03F1h)
2020 (07E4h)	2021 (07E5h)	Indirect reference area 114	This is an area to read/write from/to the parameter or command registered in the indirect reference address (114).	R/W	–	–	1010 (03F2h)
2022 (07E6h)	2023 (07E7h)	Indirect reference area 115	This is an area to read/write from/to the parameter or command registered in the indirect reference address (115).	R/W	–	–	1011 (03F3h)
2024 (07E8h)	2025 (07E9h)	Indirect reference area 116	This is an area to read/write from/to the parameter or command registered in the indirect reference address (116).	R/W	–	–	1012 (03F4h)
2026 (07EAh)	2027 (07EBh)	Indirect reference area 117	This is an area to read/write from/to the parameter or command registered in the indirect reference address (117).	R/W	–	–	1013 (03F5h)
2028 (07ECh)	2029 (07EDh)	Indirect reference area 118	This is an area to read/write from/to the parameter or command registered in the indirect reference address (118).	R/W	–	–	1014 (03F6h)
2030 (07EEh)	2031 (07EFh)	Indirect reference area 119	This is an area to read/write from/to the parameter or command registered in the indirect reference address (119).	R/W	–	–	1015 (03F7h)
2032 (07F0h)	2033 (07F1h)	Indirect reference area 120	This is an area to read/write from/to the parameter or command registered in the indirect reference address (120).	R/W	–	–	1016 (03F8h)
2034 (07F2h)	2035 (07F3h)	Indirect reference area 121	This is an area to read/write from/to the parameter or command registered in the indirect reference address (121).	R/W	–	–	1017 (03F9h)
2036 (07F4h)	2037 (07F5h)	Indirect reference area 122	This is an area to read/write from/to the parameter or command registered in the indirect reference address (122).	R/W	–	–	1018 (03FAh)

Modbus communication Register address		Name	Description	R/W	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
2038 (07F6h)	2039 (07F7h)	Indirect reference area 123	This is an area to read/write from/to the parameter or command registered in the indirect reference address (123).	R/W	–	–	1019 (03FBh)
2040 (07F8h)	2041 (07F9h)	Indirect reference area 124	This is an area to read/write from/to the parameter or command registered in the indirect reference address (124).	R/W	–	–	1020 (03FCh)
2042 (07FAh)	2043 (07FBh)	Indirect reference area 125	This is an area to read/write from/to the parameter or command registered in the indirect reference address (125).	R/W	–	–	1021 (03FDh)
2044 (07FCh)	2045 (07FDh)	Indirect reference area 126	This is an area to read/write from/to the parameter or command registered in the indirect reference address (126).	R/W	–	–	1022 (03FEh)
2046 (07FEh)	2047 (07FFh)	Indirect reference area 127	This is an area to read/write from/to the parameter or command registered in the indirect reference address (127).	R/W	–	–	1023 (03FFh)

7 General purpose registers

These are commands to access the general registers. The set value is stored in RAM.
All commands can be read and written (READ/WRITE).

Modbus communication Register address		Name	Description	R/W	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
2112 (0840h)	2113 (0841h)	General register 0	This is the general purpose register 0.	R/W	–	–	1056 (0420h)
2114 (0842h)	2115 (0843h)	General register 1	This is the general purpose register 1.	R/W	–	–	1057 (0421h)
2116 (0844h)	2117 (0845h)	General register 2	This is the general purpose register 2.	R/W	–	–	1058 (0422h)
2118 (0846h)	2119 (0847h)	General register 3	This is the general purpose register 3.	R/W	–	–	1059 (0423h)
2120 (0848h)	2121 (0849h)	General register 4	This is the general purpose register 4.	R/W	–	–	1060 (0424h)
2122 (084Ah)	2123 (084Bh)	General register 5	This is the general purpose register 5.	R/W	–	–	1061 (0425h)
2124 (084Ch)	2125 (084Dh)	General register 6	This is the general purpose register 6.	R/W	–	–	1062 (0426h)
2126 (084Eh)	2127 (084Fh)	General register 7	This is the general purpose register 7.	R/W	–	–	1063 (0427h)
2128 (0850h)	2129 (0851h)	General register 8	This is the general purpose register 8.	R/W	–	–	1064 (0428h)
2130 (0852h)	2131 (0853h)	General register 9	This is the general purpose register 9.	R/W	–	–	1065 (0429h)
2132 (0854h)	2133 (0855h)	General register 10	This is the general purpose register 10.	R/W	–	–	1066 (042Ah)
2134 (0856h)	2135 (0857h)	General register 11	This is the general purpose register 11.	R/W	–	–	1067 (042Bh)
2136 (0858h)	2137 (0859h)	General register 12	This is the general purpose register 12.	R/W	–	–	1068 (042Ch)
2138 (085Ah)	2139 (085Bh)	General register 13	This is the general purpose register 13.	R/W	–	–	1069 (042Dh)
2140 (085Ch)	2141 (085Dh)	General register 14	This is the general purpose register 14.	R/W	–	–	1070 (042Eh)
2142 (085Eh)	2143 (085Fh)	General register 15	This is the general purpose register 15.	R/W	–	–	1071 (042Fh)
2144 (0860h)	2145 (0861h)	General register 16	This is the general purpose register 16.	R/W	–	–	1072 (0430h)
2146 (0862h)	2147 (0863h)	General register 17	This is the general purpose register 17.	R/W	–	–	1073 (0431h)
2148 (0864h)	2149 (0865h)	General register 18	This is the general purpose register 18.	R/W	–	–	1074 (0432h)
2150 (0866h)	2151 (0867h)	General register 19	This is the general purpose register 19.	R/W	–	–	1075 (0433h)
2152 (0868h)	2153 (0869h)	General register 20	This is the general purpose register 20.	R/W	–	–	1076 (0434h)
2154 (086Ah)	2155 (086Bh)	General register 21	This is the general purpose register 21.	R/W	–	–	1077 (0435h)

Modbus communication Register address		Name	Description	R/W	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
2156 (086Ch)	2157 (086Dh)	General register 22	This is the general purpose register 22.	R/W	–	–	1078 (0436h)
2158 (086Eh)	2159 (086Fh)	General register 23	This is the general purpose register 23.	R/W	–	–	1079 (0437h)
2160 (0870h)	2161 (0871h)	General register 24	This is the general purpose register 24.	R/W	–	–	1080 (0438h)
2162 (0872h)	2163 (0873h)	General register 25	This is the general purpose register 25.	R/W	–	–	1081 (0439h)
2164 (0874h)	2165 (0875h)	General register 26	This is the general purpose register 26.	R/W	–	–	1082 (043Ah)
2166 (0876h)	2167 (0877h)	General register 27	This is the general purpose register 27.	R/W	–	–	1083 (043Bh)
2168 (0878h)	2169 (0879h)	General register 28	This is the general purpose register 28.	R/W	–	–	1084 (043Ch)
2170 (087Ah)	2171 (087Bh)	General register 29	This is the general purpose register 29.	R/W	–	–	1085 (043Dh)
2172 (087Ch)	2173 (087Dh)	General register 30	This is the general purpose register 30.	R/W	–	–	1086 (043Eh)
2174 (087Eh)	2175 (087Fh)	General register 31	This is the general purpose register 31.	R/W	–	–	1087 (043Fh)

8 Maintenance commands

Maintenance commands are used to execute resetting alarms, batch processing of non-volatile memory or the like. All commands can be read and written (READ/WRITE).

Note The maintenance commands include processing in which the memory is operated, such as batch processing of non-volatile memory. Make sure not to successively execute them unnecessarily.

Modbus communication Register address		Name	Description	R/W	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
384 (0180h)	385 (0181h)	Alarm reset	Resets the alarm being generated presently. Some alarms cannot be reset.	R/W	–	–	192 (00C0h)
388 (0184h)	389 (0185h)	Clear alarm history	Clears the alarm history.	R/W	–	–	194 (00C2h)
392 (0188h)	393 (0189h)	Clear communication error history	Clears the communication error history.	R/W	–	–	196 (00C4h)
394 (018Ah)	395 (018Bh)	P-PRESET execution	Clear the actual position.	R/W	–	–	197 (00C5h)
396 (018Ch)	397 (018Dh)	Configuration	Executes recalculation and setup of the parameter.	R/W	–	–	198 (00C6h)
398 (018Eh)	399 (018Fh)	Batch data initialization (excluding communication parameters)	Restores the parameters stored in non-volatile memory to their initial values. (Excluding parameters related to communication setting)	R/W	–	–	199 (00C7h)
400 (0190h)	401 (0191h)	Read batch NV memory	Reads the parameters stored in non-volatile memory to RAM. All operation data and parameters stored in RAM are overwritten.	R/W	–	–	200 (00C8h)
402 (0192h)	403 (0193h)	Write batch NV memory	Writes the parameters stored in RAM to non-volatile memory. Non-volatile memory can be rewritten approximately 100,000 times.	R/W	–	–	201 (00C9h)
404 (0194h)	405 (0195h)	All data batch initialization (including communication parameters)	Resets all parameters stored in non-volatile memory to their initial values.	R/W	–	–	202 (00CAh)
412 (019Ch)	413 (019Dh)	Clear sequence history	Clears the sequence history.	R/W	–	–	206 (00CEh)
414 (019Eh)	415 (019Fh)	Clear tripmeter 0/1	Clears the tripmeter 0 and the tripmeter 1.	R/W	–	–	207 (00CFh)
422 (01A6h)	423 (01A7h)	Clear information	Clears the information.	R/W	–	–	211 (00D3h)
424 (01A8h)	425 (01A9h)	Clear information history	Clears the information history.	R/W	–	–	212 (00D4h)
430 (01AEh)	431 (01AFh)	Clear tripmeter 0	Clears the tripmeter 0.	R/W	–	–	215 (00D7h)
432 (01B0h)	433 (01B1h)	Clear tripmeter 1	Clears the tripmeter 1.	R/W	–	–	216 (00D8h)
444 (01BCh)	445 (01BDh)	Reset communication	Resets the communication.	R/W	–	–	222 (00DEh)

Modbus communication Register address		Name	Description	R/W	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
446 (01BEh)	447 (01BFh)	Stop operation	Stops the operation. [**Setting range**] 1: Deceleration stop (according to the operation profile during operation) 2: Follow STOP setting	R/W	–	–	223 (00DFh)

8-1 How to execute the maintenance commands

■ To execute via Modbus communication

Reading or writing data can be executed. There are two types of execution methods. Use them selectively in accordance with the intended use.

- **Write "1" to data (recommended)**

  When data is changed from 0 to 1 after 1 is written to it, the command is executed.
  To execute the same command again, restore the data to 0 and then write 1. It is safe because the command will not be executed consecutively even if 1 is written continuously from the client.

- **Write "2" to data**

  When 2 is written to data, the command is executed. After execution, the data is restored to 1 automatically. Data does not need to be restored to 1 and can be written consecutively.
  If commands that take time to write to non-volatile memory, such as the "Write batch NV memory" command, are executed consecutively, increase the length of the intervals between commands.

memo In the case of the stop operation, writing a value according to the stopping method executes the command. The value will automatically return to "0" after executed.

8-2 Reset communication

If the maintenance command "Reset communication" is executed, the resetting of the parameters related to communication is performed after the switch setting status is read.

Parameters for which resetting is performed

- Server address (Modbus)
- Transmission rate (Modbus)
- Byte & word order (Modbus)
- Communication parity (Modbus)
- Communication stop bit (Modbus)
- Transmission waiting time
- Silent interval

9 Monitor commands

Monitor commands are used to monitor the demand position, demand velocity, alarm and information history and others.
All commands can be read (READ).

Modbus communication Register address		Name	Description	R/W	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
128 (0080h)	129 (0081h)	Present alarm	Indicates the alarm code presently being generated.	R	–	–	64 (0040h)
130 (0082h)	131 (0083h)	Alarm history 1	Indicates the most recent alarm history. When an alarm is being generated, its code is also displayed on the alarm history 1 simultaneously.	R	–	–	65 (0041h)
132 (0084h)	133 (0085h)	Alarm history 2	Indicates the alarm history.	R	–	–	66 (0042h)
134 (0086h)	135 (0087h)	Alarm history 3		R	–	–	67 (0043h)
136 (0088h)	137 (0089h)	Alarm history 4		R	–	–	68 (0044h)
138 (008Ah)	139 (008Bh)	Alarm history 5		R	–	–	69 (0045h)
140 (008Ch)	141 (008Dh)	Alarm history 6		R	–	–	70 (0046h)
142 (008Eh)	143 (008Fh)	Alarm history 7		R	–	–	71 (0047h)
144 (0090h)	145 (0091h)	Alarm history 8		R	–	–	72 (0048h)
146 (0092h)	147 (0093h)	Alarm history 9		R	–	–	73 (0049h)
148 (0094h)	149 (0095h)	Alarm history 10	Indicates the oldest alarm history.	R	–	–	74 (004Ah)
156 (009Ch)	157 (009Dh)	Target velocity (User-defined velocity unit)	Indicates the present target velocity. (User-defined velocity unit)	R	–	–	78 (004Eh)
158 (009Eh)	159 (009Fh)	Demand velocity (User-defined velocity unit)	Indicates the present demand velocity. (User-defined velocity unit)	R	–	–	79 (004Fh)
160 (00A0h)	161 (00A1h)	Actual velocity (User-defined velocity unit)	Indicates the present actual velocity. (User-defined velocity unit)	R	–	–	80 (0050h)
172 (00ACh)	173 (00ADh)	Present communication error	Indicates the communication error code received last time.	R	–	–	86 (0056h)
174 (00AEh)	175 (00AFh)	Communication error history 1	Indicates the most recent communication error code history. When a communication error is present, the code is also displayed in the communication error history 1 at the same time.	R	–	–	87 (0057h)

Modbus communication Register address		Name	Description	R/W	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
176 (00B0h)	177 (00B1h)	Communication error history 2	Indicates the communication error code history.	R	–	–	88 (0058h)
178 (00B2h)	179 (00B3h)	Communication error history 3		R	–	–	89 (0059h)
180 (00B4h)	181 (00B5h)	Communication error history 4		R	–	–	90 (005Ah)
182 (00B6h)	183 (00B7h)	Communication error history 5		R	–	–	91 (005Bh)
184 (00B8h)	185 (00B9h)	Communication error history 6		R	–	–	92 (005Ch)
186 (00BAh)	187 (00BBh)	Communication error history 7		R	–	–	93 (005Dh)
188 (00BCh)	189 (00BDh)	Communication error history 8		R	–	–	94 (005Eh)
190 (00BEh)	191 (00BFh)	Communication error history 9		R	–	–	95 (005Fh)
192 (00C0h)	193 (00C1h)	Communication error history 10	Indicates the oldest communication error code history.	R	–	–	96 (0060h)
194 (00C2h)	195 (00C3h)	Present selected data number	Indicates the operation data number presently selected. The priority is in order of the NET selection number, the direct selection (D-SEL), and the M0 to M7 inputs.	R	–	–	97 (0061h)
196 (00C4h)	197 (00C5h)	Present operation data number	Indicates the operation data number presently being operated in stored data operation or continuous operation. In operation without using operation data, –1 is displayed. –1 is also displayed during stop.	R	–	–	98 (0062h)
200 (00C8h)	201 (00C9h)	Demand velocity (r/min)	Indicates the present demand velocity. (r/min)	R	–	r/min	100 (0064h)
204 (00CAh)	205 (00CBh)	Actual position (step)	Indicates the present actual position. (step)	R	–	step	102 (0066h)
206 (00CEh)	207 (00CFh)	Actual velocity (r/min)	Indicates the present actual velocity. (r/min)	R	–	r/min	103 (0067h)
212 (00D4h)	213 (00D5h)	Direct I/O	Indicates the status of direct I/O. (Arrangement of bits ⇨p.149)	R	–	–	106 (006Ah)
214 (00D6h)	215 (00D7h)	Torque monitor	Indicates the output torque presently generated as a percentage of the rated torque.	R	–	1=0.1 %	107 (006Bh)
216 (00D8h)	217 (00D9h)	Load factor monitor	Indicates the output torque presently generated as a percentage of the maximum torque in the continuous duty region.	R	–	1=0.1 %	108 (006Ch)
220 (00DCh)	221 (00DDh)	Torque limiting value	Indicates the present torque limiting value. (1=0.1 %)	R	–	1=0.1 %	110 (006Eh)
224 (00E0h)	225 (00E1h)	Next number	Indicates the operation data number specified in "Next data number" of the operation data in operation. The value is latched even after the operation is completed. When "Next data number" is set to "Stop,""–1" is displayed.	R	–	–	112 (0070h)

Modbus communication Register address		Name	Description	R/W	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
240 (00F0h)	241 (00F1h)	Overload factor monitor	Indicates the overload alarm status. The overload alarm is generated when 100 % is reached.	R	–	1=0.1 %	120 (0078h)
244 (00F4h)	245 (00F5h)	Tripmeter 1	Indicates the travel distance of the motor in revolutions. (1=0.1 krev) This can be cleared by the customer.	R	–	1=0.1 krev	122 (007Ah)
248 (00F8h)	249 (00F9h)	Driver temperature	Indicates the present driver temperature. (1=0.1 °C)	R	–	1=0.1 °C	124 (007Ch)
252 (00FCh)	253 (00FDh)	Odometer	Indicates the cumulative travel distance of the motor in revolutions. (1=0.1 krev) This cannot be cleared by the customer.	R	–	1=0.1 krev	126 (007Eh)
254 (00FEh)	255 (00FFh)	Tripmeter 0	Indicates the travel distance of the motor in revolutions. (1=0.1 krev) This can be cleared by the customer.	R	–	1=0.1 krev	127 (007Fh)
256 (0100h)	257 (0101h)	Sequence history 1	Indicates the history of the operation data numbers that have been executed so far. –1 is always displayed when stopped. During operation, the value same as the "Present operation data number" is also displayed in the sequence history 1.	R	–	–	128 (0080h)
258 (0102h)	259 (0103h)	Sequence history 2	Indicates the history of the operation data numbers that have been executed so far. –1 is always displayed when stopped.	R	–	–	129 (0081h)
260 (0104h)	261 (0105h)	Sequence history 3		R	–	–	130 (0082h)
262 (0106h)	263 (0107h)	Sequence history 4		R	–	–	131 (0083h)
264 (0108h)	265 (0109h)	Sequence history 5		R	–	–	132 (0084h)
266 (010Ah)	267 (010Bh)	Sequence history 6		R	–	–	133 (0085h)
268 (010Ch)	269 (010Dh)	Sequence history 7		R	–	–	134 (0086h)
270 (010Eh)	271 (010Fh)	Sequence history 8		R	–	–	135 (0087h)
272 (0110h)	273 (0111h)	Sequence history 9		R	–	–	136 (0088h)
274 (0112h)	275 (0113h)	Sequence history 10		R	–	–	137 (0089h)
276 (0114h)	277 (0115h)	Sequence history 11		R	–	–	138 (008Ah)
278 (0116h)	279 (0117h)	Sequence history 12		R	–	–	139 (008Bh)
280 (0118h)	281 (0119h)	Sequence history 13		R	–	–	140 (008Ch)
282 (011Ah)	283 (011Bh)	Sequence history 14		R	–	–	141 (008Dh)
284 (011Ch)	285 (011Dh)	Sequence history 15		R	–	–	142 (008Eh)

Modbus communication Register address		Name	Description	R/W	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
286 (011Eh)	287 (011Fh)	Sequence history 16	Indicates the oldest operation data number among the data executed so far. −1 is always displayed when stopped.	R	–	–	143 (008Fh)
322 (0142h)	323 (0143h)	Total uptime	Indicates the amount of time that has elapsed since the power supply has been turned on. (min)	R	–	min	161 (00A1h)
324 (0144h)	325 (0145h)	Number of boots	Indicates the total number of times that the driver was started.	R	–	–	162 (00A2h)
326 (0146h)	327 (0147h)	Inverter voltage	Indicates the inverter voltage of the driver. (1=0.1 V)	R	–	1=0.1 V	163 (00A3h)
328 (0148h)	329 (0149h)	Power supply voltage	Indicates the power supply voltage. (1=0.1 V)	R	–	1=0.1 V	164 (00A4h)
338 (0152h)	339 (0153h)	Continuous uptime	Indicates the time at which the power supply is supplied continuously. (ms)	R	–	ms	169 (00A9h)
340 (0154h)	341 (0155h)	RS-485 communication reception byte counter	Indicates the number of bytes received.	R	–	–	170 (00AAh)
342 (0156h)	343 (0157h)	RS-485 communication transmission byte counter	Indicates the number of bytes transmitted.	R	–	–	171 (00ABh)
344 (0158h)	345 (0159h)	RS-485 communication normal reception frame counter (All)	Indicates the number of normal frames received.	R	–	–	172 (00ACh)

Modbus communication Register address		Name	Description	R/W	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
346 (015Ah)	347 (015Bh)	RS-485 communication normal reception frame counter (Only own address)	Indicates the number of normal frames received to own address.	R	–	–	173 (00ADh)
348 (015Ch)	349 (015Dh)	RS-485 communication abnormal reception frame counter (All)	Indicates the number of abnormal frames received.	R	–	–	174 (00AEh)
350 (015Eh)	351 (015Fh)	RS-485 communication transmission frame counter	Indicates the number of frames transmitted.	R	–	–	175 (00AFh)
352 (0160h)	353 (0161h)	RS-485 communication register write error counter	Indicates the number of times the register write error occurred.	R	–	–	176 (00B0h)
354 (0162h)	355 (0163h)	RS-485 communication valid frame/second	Indicates the number of valid frames per second.	R	–	–	177 (00B1h)
356 (0164h)	357 (0165h)	RS-485 communication processing time	Indicates the communication processing time for RS-485 communication.	R	–	ms	178 (00B2h)
358 (0166h)	359 (0167h)	RS-485 communication maximum processing time	Indicates the maximum communication processing time after turning on the power.	R	–	ms	179 (00B3h)
360 (0168h)	361 (0169h)	RS-485 communication interval	Indicates the communication interval for RS-485 communication.	R	–	ms	180 (00B4h)
362 (016Ah)	363 (016Bh)	RS-485 communication maximum interval	Indicates the maximum communication interval for RS-485 communication.	R	–	ms	181 (00B5h)
368 (0170h)	369 (0171h)	I/O status 1	Indicates the ON-OFF status of the internal I/O. (Arrangement of bits ⇨p.149)	R	–	–	184 (00B8h)
370 (0172h)	371 (0173h)	I/O status 2		R	–	–	185 (00B9h)
372 (0174h)	373 (0175h)	I/O status 3		R	–	–	186 (00BAh)
374 (0176h)	375 (0177h)	I/O status 4		R	–	–	187 (00BBh)
376 (0178h)	377 (0179h)	I/O status 5		R	–	–	188 (00BCh)
378 (017Ah)	379 (017Bh)	I/O status 6		R	–	–	189 (00BDh)
380 (017Ch)	381 (017Dh)	I/O status 7		R	–	–	190 (00BEh)
382 (017Eh)	383 (017Fh)	I/O status 8		R	–	–	191 (00BFh)
2624 (0A40h)	2625 (0A41h)	Information time history 1	Indicates the history of the time when the most recent information was generated. When information is being generated, the time when the present information was generated is displayed. (ms)	R	–	–	1312 (0520h)

Modbus communication Register address		Name	Description	R/W	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
2626 (0A42h)	2627 (0A43h)	Information time history 2	Indicates the history of the time when information was generated. (ms)	R	–	–	1313 (0521h)
2628 (0A44h)	2629 (0A45h)	Information time history 3		R	–	–	1314 (0522h)
2630 (0A46h)	2631 (0A47h)	Information time history 4		R	–	–	1315 (0523h)
2632 (0A48h)	2633 (0A49h)	Information time history 5		R	–	–	1316 (0524h)
2634 (0A4Ah)	2635 (0A4Bh)	Information time history 6		R	–	–	1317 (0525h)
2636 (0A4Ch)	2637 (0A4Dh)	Information time history 7		R	–	–	1318 (0526h)
2638 (0A4Eh)	2639 (0A4Fh)	Information time history 8		R	–	–	1319 (0527h)
2640 (0A50h)	2641 (0A51h)	Information time history 9		R	–	ms	1320 (0528h)
2642 (0A52h)	2643 (0A53h)	Information time history 10		R	–	ms	1321 (0529h)
2644 (0A54h)	2645 (0A55h)	Information time history 11		R	–	ms	1322 (052Ah)
2646 (0A56h)	2647 (0A57h)	Information time history 12		R	–	ms	1323 (052Bh)
2648 (0A58h)	2649 (0A59h)	Information time history 13		R	–	ms	1324 (052Ch)
2650 (0A5Ah)	2651 (0A5Bh)	Information time history 14		R	–	ms	1325 (052Dh)
2652 (0A5Ch)	2653 (0A5Dh)	Information time history 15		R	–	ms	1326 (052Eh)
2654 (0A5Eh)	2655 (0A5Fh)	Information time history 16	Indicates the history of the time when the oldest information was generated. (ms)	R	–	ms	1327 (052Fh)
2656 (0A60h)	2657 (0A61h)	Information history 1	Indicates the most recent information history. If information is present, the information status is also indicated on the information history 1. (Arrangement of bits ⇨p.147)	R	–	–	1328 (0530h)
2658 (0A62h)	2659 (0A63h)			R			1329 (0531h)
2660 (0A64h)	2661 (0A65h)			R			1330 (0532h)
2662 (0A66h)	2663 (0A67h)			R			1331 (0533h)

Modbus communication Register address		Name	Description	R/W	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
2664 (0A68h)	2665 (0A69h)	Information history 2	Indicates the information history. (Arrangement of bits ⇨p.147)	R	–	–	1332 (0534h)
2666 (0A6Ah)	2667 (0A6Bh)			R			1333 (0535h)
2668 (0A6Ch)	2669 (0A6Dh)			R			1334 (0536h)
2670 (0A6Eh)	2671 (0A6Fh)			R			1335 (0537h)
2672 (0A70h)	2673 (0A71h)	Information history 3		R	–	–	1336 (0538h)
2674 (0A72h)	2675 (0A73h)			R			1337 (0539h)
2676 (0A74h)	2677 (0A75h)			R			1338 (053Ah)
2678 (0A76h)	2679 (0A77h)			R			1339 (053Bh)
2680 (0A78h)	2681 (0A79h)	Information history 4		R	–	–	1340 (053Ch)
2682 (0A7Ah)	2683 (0A7Bh)			R			1341 (053Dh)
2684 (0A7Ch)	2685 (0A7Dh)			R			1342 (053Eh)
2686 (0A7Eh)	2687 (0A7Fh)			R			1343 (053Fh)
2688 (0A80h)	2689 (0A81h)	Information history 5		R	–	–	1344 (0540h)
2690 (0A82h)	2691 (0A83h)			R			1345 (0541h)
2692 (0A84h)	2693 (0A85h)			R			1346 (0542h)
2694 (0A86h)	2695 (0A87h)			R			1347 (0543h)
2696 (0A88h)	2697 (0A89h)	Information history 6		R	–	–	1348 (0544h)
2698 (0A8Ah)	2699 (0A8Bh)			R			1349 (0545h)
2700 (0A8Ch)	2701 (0A8Dh)			R			1350 (0546h)
2702 (0A8Eh)	2703 (0A8Fh)			R			1351 (0547h)

Modbus communication Register address		Name	Description	R/W	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
2704 (0A90h)	2705 (0A91h)	Information history 7	Indicates the information history. (Arrangement of bits ⇨p.147)	R	–	–	1352 (0548h)
2706 (0A92h)	2707 (0A93h)			R			1353 (0549h)
2708 (0A94h)	2709 (0A95h)			R			1354 (054Ah)
2710 (0A96h)	2711 (0A97h)			R			1355 (054Bh)
2712 (0A98h)	2713 (0A99h)	Information history 8		R	–	–	1356 (054Ch)
2714 (0A9Ah)	2715 (0A9Bh)			R			1357 (054Dh)
2716 (0A9Ch)	2717 (0A9Dh)			R			1358 (054Eh)
2718 (0A9Eh)	2719 (0A9Fh)			R			1359 (054Fh)
2720 (0AA0h)	2721 (0AA1h)	Information history 9		R	–	–	1360 (0550h)
2722 (0AA2h)	2723 (0AA3h)			R			1361 (0551h)
2724 (0AA4h)	2725 (0AA5h)			R			1362 (0552h)
2726 (0AA6h)	2727 (0AA7h)			R			1363 (0553h)
2728 (0AA8h)	2729 (0AA9h)	Information history 10		R	–	–	1364 (0554h)
2730 (0AAAh)	2731 (0AABh)			R			1365 (0555h)
2732 (0AACh)	2733 (0AADh)			R			1366 (0556h)
2734 (0AAEh)	2735 (0AAFh)			R			1367 (0557h)
2736 (0AB0h)	2737 (0AB1h)	Information history 11		R	–	–	1368 (0558h)
2738 (0AB2h)	2739 (0AB3h)			R			1369 (0559h)
2740 (0AB4h)	2741 (0AB5h)			R			1370 (055Ah)
2742 (0AB6h)	2743 (0AB7h)			R			1371 (055Bh)
2744 (0AB8h)	2745 (0AB9h)	Information history 12		R	–	–	1372 (055Ch)
2746 (0ABAh)	2747 (0ABBh)			R			1373 (055Dh)
2748 (0ABCh)	2749 (0ABDh)			R			1374 (055Eh)
2750 (0ABEh)	2751 (0ABFh)			R			1375 (055Fh)

Modbus communication Register address		Name	Description	R/W	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
2752 (0AC0h)	2753 (0AC1h)	Information history 13	Indicates the information history. (Arrangement of bits ⇨p.147)	R	–	–	1376 (0560h)
2754 (0AC2h)	2755 (0AC3h)			R			1377 (0561h)
2756 (0AC4h)	2757 (0AC5h)			R			1378 (0562h)
2758 (0AC6h)	2759 (0AC7h)			R			1379 (0563h)
2760 (0AC8h)	2761 (0AC9h)	Information history 14		R	–	–	1380 (0564h)
2762 (0ACAh)	2763 (0ACBh)			R			1381 (0565h)
2764 (0ACCh)	2765 (0ACDh)			R			1382 (0566h)
2766 (0ACEh)	2767 (0ACFh)			R			1383 (0567h)
2768 (0AD0h)	2769 (0AD1h)	Information history 15		R	–	–	1384 (0568h)
2770 (0AD2h)	2771 (0AD3h)			R			1385 (0569h)
2772 (0AD4h)	2773 (0AD5h)			R			1386 (056Ah)
2774 (0AD6h)	2775 (0AD7h)			R			1387 (056Bh)
2776 (0AD8h)	2777 (0AD9h)	Information history 16	Indicates the oldest information history. (Arrangement of bits⇨p.147)	R	–	–	1388 (056Ch)
2778 (0ADAh)	2779 (0ADBh)			R			1389 (056Dh)
2780 (0ADCh)	2781 (0ADDh)			R			1390 (056Eh)
2782 (0ADEh)	2783 (0ADFh)			R			1391 (056Fh)
2784 (0AE0h)	2785 (0AE1h)	Information status 0	Indicates the information status presently being generated. (Arrangement of bits ⇨p.148)	R	–	–	1392 (0570h)
2786 (0AE2h)	2787 (0AE3h)	Information status 1		R			1393 (0571h)
2788 (0AE4h)	2789 (0AE5h)	Information status 2		R			1394 (0572h)
2790 (0AE6h)	2791 (0AE7h)	Information status 3		R			1395 (0573h)
2792 (0AE8h)	2793 (0AE9h)	Information count	Indicates the number of times that information was generated.	R	–	–	1396 (0574h)
3238 (0CA6h)	3239 (0CA7h)	Continuous operating time	Indicates the time that has elapsed since the operation was started. 0 is displayed while operation is stopped.	R	–	ms	1619 (0653h)
3240 (0CA8h)	3241 (0CA9h)	Continuous operating time buffer	Indicates the time that has elapsed since the operation was started. The value is maintained until the operation is started.	R	–	ms	1620 (0654h)

■ Information history

Modbus communication Register address	Description							
2656 (0A60h) + (Revision number −1) x 8	bit 15	bit 14	bit 13	bit 12	bit 11	bit 10	bit 9	bit 8
	INFO-REBOOT	INFO-CONFIG	INFO-IOTEST	INFO-DSLMTD	–	–	–	–
	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
	–	–	–	–	–	–	–	–
2657 (0A61h) + (Revision number −1) x 8	bit 15	bit 14	bit 13	bit 12	bit 11	bit 10	bit 9	bit 8
	–	–	–	–	INFO-TRQ	INFO-LOAD	–	INFO-DRVTMP
	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
	–	INFO-MNT-G	–	–	–	INFO-485-G	INFO-START-G	–
2658 (0A62h) + (Revision number −1) x 8	bit 15	bit 14	bit 13	bit 12	bit 11	bit 10	bit 9	bit 8
	–	–	–	–	–	–	–	–
	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
	–	–	–	–	–	–	–	INFO-TLC-TIME
2659 (0A63h) + (Revision number −1) x 8	bit 15	bit 14	bit 13	bit 12	bit 11	bit 10	bit 9	bit 8
	–	–	INFO-SPD-L	INFO-SPD-H	–	–	–	–
	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
	–	–	–	–	–	–	–	–
2660 (0A64h) + (Revision number −1) x 8	bit 15	bit 14	bit 13	bit 12	bit 11	bit 10	bit 9	bit 8
	–	–	–	–	–	–	–	–
	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
	–	–	–	–	–	INFO-485-INTVL	INFO-485-PRCST	INFO-485-ERR
2661 (0A65h) + (Revision number −1) x 8	bit 15	bit 14	bit 13	bit 12	bit 11	bit 10	bit 9	bit 8
	–	INFO-PCOUNT	INFO-PTIME	–	–	INFO-ODO	INFO-TRIP1	INFO-TRIP0
	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
	–	–	–	–	–	–	–	–
2662 (0A66h) + (Revision number −1) x 8	bit 15	bit 14	bit 13	bit 12	bit 11	bit 10	bit 9	bit 8
	–	–	–	–	–	–	INFO-OC-FAULT	INFO-CPU-FAULT
	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
	–	–	–	–	–	–	–	INFO-UNIT-E
2663 (0A67h) + (Revision number −1) x 8	bit 15	bit 14	bit 13	bit 12	bit 11	bit 10	bit 9	bit 8
	–	–	–	–	–	–	–	–
	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
	INFO-IODRV-DIS	–	–	INFO-START-DD	INFO-START-SD	INFO-START-FWRV	–	–

memo A bit that "-" is indicated will be indefinite (0 or 1) if read.

■ Information status

Modbus communication Register address	Description							
2784 (0AE0h)	bit 15	bit 14	bit 13	bit 12	bit 11	bit 10	bit 9	bit 8
	INFO-REBOOT	INFO-CONFIG	INFO-IOTEST	INFO-DSLMTD	–	–	–	–
	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
	–	–	–	–	–	–	–	–
2785 (0AE1h)	bit 15	bit 14	bit 13	bit 12	bit 11	bit 10	bit 9	bit 8
	–	–	–	–	INFO-TRQ	INFO-LOAD	–	INFO-DRVTMP
	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
	–	INFO-MNT-G	–	–	–	INFO-485-G	INFO-START-G	–
2786 (0AE2h)	bit 15	bit 14	bit 13	bit 12	bit 11	bit 10	bit 9	bit 8
	–	–	–	–	–	–	–	–
	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
	–	–	–	–	–	–	–	INFO-TLC-TIME
2787 (0AE3h)	bit 15	bit 14	bit 13	bit 12	bit 11	bit 10	bit 9	bit 8
	–	–	INFO-SPD-L	INFO-SPD-H	–	–	–	–
	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
	–	–	–	–	–	–	–	–
2788 (0AE4h)	bit 15	bit 14	bit 13	bit 12	bit 11	bit 10	bit 9	bit 8
	–	–	–	–	–	–	–	–
	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
	–	–	–	–	–	INFO-485-INTVL	INFO-485-PRCST	INFO-485-ERR
2789 (0AE5h)	bit 15	bit 14	bit 13	bit 12	bit 11	bit 10	bit 9	bit 8
	–	INFO-PCOUNT	INFO-PTIME	–	–	INFO-ODO	INFO-TRIP1	INFO-TRIP0
	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
	–	–	–	–	–	–	–	–
2790 (0AE6h)	bit 15	bit 14	bit 13	bit 12	bit 11	bit 10	bit 9	bit 8
	–	–	–	–	–	–	INFO-OC-FAULT	INFO-CPU-FAULT
	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
	–	–	–	–	–	–	–	INFO-UNIT-E
2791 (0AE7h)	bit 15	bit 14	bit 13	bit 12	bit 11	bit 10	bit 9	bit 8
	–	–	–	–	–	–	–	–
	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
	INFO-IODRV-DIS	–	–	INFO-START-DD	INFO-START-SD	INFO-START-FWRV	–	–

memo A bit that "-" is indicated will be indefinite (0 or 1) if read.

■ Direct I/O

The arrangement of bits for direct I/O is indicated.

Modbus communication Register address	Description							
212 (00D4h)	bit 15	bit 14	bit 13	bit 12	bit 11	bit 10	bit 9	bit 8
	–	–	–	–	–	–	–	–
	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
	–	–	–	–	–	–	DOUT1	DOUT0
213 (00D5h)	bit 15	bit 14	bit 13	bit 12	bit 11	bit 10	bit 9	bit 8
	–	–	–	–	–	–	–	–
	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
	–	–	–	–	–	–	DIN1	DIN0

■ I/O status

The arrangement of bits for internal I/O is indicated.

● Input signals

Modbus communication Register address	Description							
368 (0170h)	bit 15	bit 14	bit 13	bit 12	bit 11	bit 10	bit 9	bit 8
	–	–	–	–	–	–	ATL-EN	–
	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
	–	–	–	–	SPD-LMT	TRQ-LMT	–	HMI
369 (0171h)	bit 15	bit 14	bit 13	bit 12	bit 11	bit 10	bit 9	bit 8
	–	INFO-CLR	–	–	USR-ALM	–	P-PRESET	ALM-RST
	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
	–	–	STOP	–	–	–	FREE	No function
370 (0172h)	bit 15	bit 14	bit 13	bit 12	bit 11	bit 10	bit 9	bit 8
	–	–	–	–	RV-SPD	FW-SPD	–	–
	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
	–	–	–	–	–	–	–	–
371 (0173h)	bit 15	bit 14	bit 13	bit 12	bit 11	bit 10	bit 9	bit 8
	M7	M6	M5	M4	M3	M2	M1	M0
	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
	–	–	–	–	NEXT	FWRV-DRV-INV	–	START
372 (0174h)	bit 15	bit 14	bit 13	bit 12	bit 11	bit 10	bit 9	bit 8
	D-SEL15	D-SEL14	D-SEL13	D-SEL12	D-SEL11	D-SEL10	D-SEL9	D-SEL8
	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
	D-SEL7	D-SEL6	D-SEL5	D-SEL4	D-SEL3	D-SEL2	D-SEL1	D-SEL0
373 (0175h)	bit 15	bit 14	bit 13	bit 12	bit 11	bit 10	bit 9	bit 8
	–	–	–	–	–	–	–	–
	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
	–	–	–	–	–	–	–	–
374 (0176h)	bit 15	bit 14	bit 13	bit 12	bit 11	bit 10	bit 9	bit 8
	R31	R30	R29	R28	R27	R26	R25	R24
	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
	R23	R22	R21	R20	R19	R18	R17	R16
375 (0177h)	bit 15	bit 14	bit 13	bit 12	bit 11	bit 10	bit 9	bit 8
	R15	R14	R13	R12	R11	R10	R9	R8
	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
	R7	R6	R5	R4	R3	R2	R1	R0

● **Output signals**

Modbus communication Register address	Description							
376 (0178h)	bit 15	bit 14	bit 13	bit 12	bit 11	bit 10	bit 9	bit 8
	–	–	–	–	–	–	–	–
	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
	–	–	–	RDY-DD-OPE	RDY-SD-OPE	RDY-FWRV-OPE	–	–
377 (0179h)	bit 15	bit 14	bit 13	bit 12	bit 11	bit 10	bit 9	bit 8
	–	–	VA	TLC	–	–	–	SYS-BSY
	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
	INFO	MOVE	–	–	SYS-RDY	ALM-B	ALM-A	CONST-OFF
378 (017Ah)	bit 15	bit 14	bit 13	bit 12	bit 11	bit 10	bit 9	bit 8
	–	–	–	–	–	–	–	–
	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
	–	–	–	–	–	–	–	–
379 (017Bh)	bit 15	bit 14	bit 13	bit 12	bit 11	bit 10	bit 9	bit 8
	–	–	–	–	–	–	–	–
	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
	AREA7	AREA6	AREA5	AREA4	AREA3	AREA2	AREA1	AREA0
380 (017Ch)	bit 15	bit 14	bit 13	bit 12	bit 11	bit 10	bit 9	bit 8
	–	–	–	–	–	–	–	–
	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
	–	–	–	–	–	–	–	–
381 (017Dh)	bit 15	bit 14	bit 13	bit 12	bit 11	bit 10	bit 9	bit 8
	M-ACT7	M-ACT6	M-ACT5	M-ACT4	M-ACT3	M-ACT2	M-ACT1	M-ACT0
	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
	M-CHG	–	–	–	–	ATL-MON	–	–
382 (017Eh)	bit 15	bit 14	bit 13	bit 12	bit 11	bit 10	bit 9	bit 8
	–	–	–	–	BSG	ASG	–	–
	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
	–	–	–	–	–	–	–	–
383 (017Fh)	bit 15	bit 14	bit 13	bit 12	bit 11	bit 10	bit 9	bit 8
	USR-OUT7	USR-OUT6	USR-OUT5	USR-OUT4	USR-OUT3	USR-OUT2	USR-OUT1	USR-OUT0
	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
	–	–	–	OL-DTCT	–	–	SPD-LMTD	TRQ-LMTD

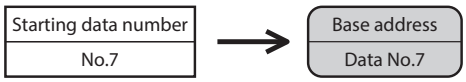
memo A bit that "-" is indicated will be indefinite (0 or 1) if read.

10 Operation data R/W commands

The operation data is set with the operation data R/W commands. There are two methods for setting the operation data, "direct reference" and "offset reference." Although addresses are different, the stored area is the same. Use them selectively according to their intended use.

10-1 Direct reference

Direct reference is a method that specifies the register address (base address) of the operation data number to be a reference point and inputs. Use the direct reference via Modbus communication.



■ Base address of each operation data number

Modbus communication Base address		Operation data number	Modbus communication Base address		Operation data number	Modbus communication Base address		Operation data number	Modbus communication Base address		Operation data number
Dec	Hex		Dec	Hex		Dec	Hex		Dec	Hex	
6144	1800	No. 0	8000	1F40	No. 29	9856	2680	No. 58	11712	2DC0	No. 87
6208	1840	No. 1	8064	1F80	No. 30	9920	26C0	No. 59	11776	2E00	No. 88
6272	1880	No. 2	8128	1FC0	No. 31	9984	2700	No. 60	11840	2E40	No. 89
6336	18C0	No. 3	8192	2000	No. 32	10048	2740	No. 61	11904	2E80	No. 90
6400	1900	No. 4	8256	2040	No. 33	10112	2780	No. 62	11968	2EC0	No. 91
6464	1940	No. 5	8320	2080	No. 34	10176	27C0	No. 63	12032	2F00	No. 92
6528	1980	No. 6	8384	20C0	No. 35	10240	2800	No. 64	12096	2F40	No. 93
6592	19C0	No. 7	8448	2100	No. 36	10304	2840	No. 65	12160	2F80	No. 94
6656	1A00	No. 8	8512	2140	No. 37	10368	2880	No. 66	12224	2FC0	No. 95
6720	1A40	No. 9	8576	2180	No. 38	10432	28C0	No. 67	12288	3000	No. 96
6784	1A80	No. 10	8640	21C0	No. 39	10496	2900	No. 68	12352	3040	No. 97
6848	1AC0	No. 11	8704	2200	No. 40	10560	2940	No. 69	12416	3080	No. 98
6912	1B00	No. 12	8768	2240	No. 41	10624	2980	No. 70	12480	30C0	No. 99
6976	1B40	No. 13	8832	2280	No. 42	10688	29C0	No. 71	12544	3100	No. 100
7040	1B80	No. 14	8896	22C0	No. 43	10752	2A00	No. 72	12608	3140	No. 101
7104	1BC0	No. 15	8960	2300	No. 44	10816	2A40	No. 73	12672	3180	No. 102
7168	1C00	No. 16	9024	2340	No. 45	10880	2A80	No. 74	12736	31C0	No. 103
7232	1C40	No. 17	9088	2380	No. 46	10944	2AC0	No. 75	12800	3200	No. 104
7296	1C80	No. 18	9152	23C0	No. 47	11008	2B00	No. 76	12864	3240	No. 105
7360	1CC0	No. 19	9216	2400	No. 48	11072	2B40	No. 77	12928	3280	No. 106
7424	1D00	No. 20	9280	2440	No. 49	11136	2B80	No. 78	12992	32C0	No. 107
7488	1D40	No. 21	9344	2480	No. 50	11200	2BC0	No. 79	13056	3300	No. 108
7552	1D80	No. 22	9408	24C0	No. 51	11264	2C00	No. 80	13120	3340	No. 109
7616	1DC0	No. 23	9472	2500	No. 52	11328	2C40	No. 81	13184	3380	No. 110
7680	1E00	No. 24	9536	2540	No. 53	11392	2C80	No. 82	13248	33C0	No. 111
7744	1E40	No. 25	9600	2580	No. 54	11456	2CC0	No. 83	13312	3400	No. 112
7808	1E80	No. 26	9664	25C0	No. 55	11520	2D00	No. 84	13376	3440	No. 113
7872	1EC0	No. 27	9728	2600	No. 56	11584	2D40	No. 85	13440	3480	No. 114
7936	1F00	No. 28	9792	2640	No. 57	11648	2D80	No. 86	13504	34C0	No. 115

Modbus communication Base address		Operation data number
Dec	Hex	
13568	3500	No. 116
13632	3540	No. 117
13696	3580	No. 118
13760	35C0	No. 119
13824	3600	No. 120
13888	3640	No. 121
13952	3680	No. 122
14016	36C0	No. 123
14080	3700	No. 124
14144	3740	No. 125
14208	3780	No. 126
14272	37C0	No. 127
14336	3800	No. 128
14400	3840	No. 129
14464	3880	No. 130
14528	38C0	No. 131
14592	3900	No. 132
14656	3940	No. 133
14720	3980	No. 134
14784	39C0	No. 135
14848	3A00	No. 136
14912	3A40	No. 137
14976	3A80	No. 138
15040	3AC0	No. 139
15104	3B00	No. 140
15168	3B40	No. 141
15232	3B80	No. 142
15296	3BC0	No. 143
15360	3C00	No. 144
15424	3C40	No. 145
15488	3C80	No. 146
15552	3CC0	No. 147
15616	3D00	No. 148
15680	3D40	No. 149
15744	3D80	No. 150

Modbus communication Base address		Operation data number
Dec	Hex	
15808	3DC0	No. 151
15872	3E00	No. 152
15936	3E40	No. 153
16000	3E80	No. 154
16064	3EC0	No. 155
16128	3F00	No. 156
16192	3F40	No. 157
16256	3F80	No. 158
16320	3FC0	No. 159
16384	4000	No. 160
16448	4040	No. 161
16512	4080	No. 162
16576	40C0	No. 163
16640	4100	No. 164
16704	4140	No. 165
16768	4180	No. 166
16832	41C0	No. 167
16896	4200	No. 168
16960	4240	No. 169
17024	4280	No. 170
17088	42C0	No. 171
17152	4300	No. 172
17216	4340	No. 173
17280	4380	No. 174
17344	43C0	No. 175
17408	4400	No. 176
17472	4440	No. 177
17536	4480	No. 178
17600	44C0	No. 179
17664	4500	No. 180
17728	4540	No. 181
17792	4580	No. 182
17856	45C0	No. 183
17920	4600	No. 184
17984	4640	No. 185

Modbus communication Base address		Operation data number
Dec	Hex	
18048	4680	No. 186
18112	46C0	No. 187
18176	4700	No. 188
18240	4740	No. 189
18304	4780	No. 190
18368	47C0	No. 191
18432	4800	No. 192
18496	4840	No. 193
18560	4880	No. 194
18624	48C0	No. 195
18688	4900	No. 196
18752	4940	No. 197
18816	4980	No. 198
18880	49C0	No. 199
18944	4A00	No. 200
19008	4A40	No. 201
19072	4A80	No. 202
19136	4AC0	No. 203
19200	4B00	No. 204
19264	4B40	No. 205
19328	4B80	No. 206
19392	4BC0	No. 207
19456	4C00	No. 208
19520	4C40	No. 209
19584	4C80	No. 210
19648	4CC0	No. 211
19712	4D00	No. 212
19776	4D40	No. 213
19840	4D80	No. 214
19904	4DC0	No. 215
19968	4E00	No. 216
20032	4E40	No. 217
20096	4E80	No. 218
20160	4EC0	No. 219
20224	4F00	No. 220

Modbus communication Base address		Operation data number
Dec	Hex	
20288	4F40	No. 221
20352	4F80	No. 222
20416	4FC0	No. 223
20480	5000	No. 224
20544	5040	No. 225
20608	5080	No. 226
20672	50C0	No. 227
20736	5100	No. 228
20800	5140	No. 229
20864	5180	No. 230
20928	51C0	No. 231
20992	5200	No. 232
21056	5240	No. 233
21120	5280	No. 234
21184	52C0	No. 235
21248	5300	No. 236
21312	5340	No. 237
21376	5380	No. 238
21440	53C0	No. 239
21504	5400	No. 240
21568	5440	No. 241
21632	5480	No. 242
21696	54C0	No. 243
21760	5500	No. 244
21824	5540	No. 245
21888	5580	No. 246
21952	55C0	No. 247
22016	5600	No. 248
22080	5640	No. 249
22144	5680	No. 250
22208	56C0	No. 251
22272	5700	No. 252
22336	5740	No. 253
22400	5780	No. 254
22464	57C0	No. 255

memo NET-ID of the base address is half the value of the Modbus communication base address.

■ Register address

The setting items of operation data are set with the operation data R/W commands. The register addresses for the setting items are arranged based on the base address of the operation data number.
(Base address ⇨p.151)
For example, in the case of the setting item "Operating velocity," adding 4 and 5 to the base address will be the upper address and the lower address, respectively.

Modbus communication Register address	Name	Description	Initial setting		Update
			Initial value	Unit	
Base address +0 (upper) Base address +1 (lower)	Operation type	Selects the operation type. [**Setting range**] 0: Deceleration stop (according to the specified operation profile) 31: Deceleration stop (according to the operation profile during operation) 48: Continuous operation (speed control)	0	–	B
Base address +4 (upper) Base address +5 (lower)	Operating velocity	Sets the operating velocity. [**Setting range**] –4,000,000 to 4,000,000 (User-defined velocity unit)	0	r/min	B *2
Base address +10 (upper) Base address +11 (lower)	Torque limiting value	Sets the torque limiting value. [**Setting range**] 0 to 10,000 (1=0.1 %)*1	10,000	1=0.1 %	B *2
Base address +12 (upper) Base address +13 (lower)	Acceleration time	Sets the acceleration time. [**Setting range**] 100 to 30,000 ms	1,000	ms	B
Base address +14 (upper) Base address +15 (lower)	Deceleration time	Sets the deceleration time. [**Setting range**] 100 to 30,000 ms	1,000	ms	B
Base address +20 (upper) Base address +21 (lower)	Next data number	Sets the next data number. [**Setting range**] –256: Stop –22: ↓↓ (-2) –1: ↓ (+1) 0 to 255: Operation data number	–1	–	B
Base address +32 (upper) Base address +33 (lower)	(Low) I/O event number	Sets the number of the operation I/O event to generate a low event. The condition to generate the event is set with the operation I/O event. [**Setting range**] –1: – (Disable) 0 to 31: Operation I/O event number	–1	–	B
Base address +34 (upper) Base address +35 (lower)	(Middle) I/O event number	Sets the number of the operation I/O event to generate a middle event. The condition to generate the event is set with the operation I/O event. [**Setting range**] –1: – (Disable) 0 to 31: Operation I/O event number	–1	–	B
Base address +36 (upper) Base address +37 (lower)	(High) I/O event number	Sets the number of the operation I/O event to generate a high event. The condition to generate the event is set with the operation I/O event. [**Setting range**] –1: – (Disable) 0 to 31: Operation I/O event number	–1	–	B

*1 The maximum torque limiting value varies depending on the motor. Refer to p.15 for the maximum value of each motor.
*2 "Update immediately" is applied in the case of continuous operation of FW/RV operation.

■ Setting example

As an example, this section explains how to set the data in the operation data No. 0 to No. 2.

● Setting of operation data No. 0

The table on p.151 shows that the base address of operation data No. 0 is "6144 (1800h)."
Based on this base address, the register addresses for the setting items are calculated from the table on p.153.

Base address
6144 (1800h)

Setting item	Modbus communication register address			Setting value
	Calculation method	Dec	Hex	
Operation type	Upper: Base address +0	6144 + 0 = 6144	1800h	48
	Lower: Base address +1	6144 + 1 = 6145	1801h	
Operating velocity	Upper: Base address +4	6144 + 4 = 6148	1804h	500
	Lower: Base address +5	6144 + 5 = 6149	1805h	

● Setting of operation data No. 1

The table on p.151 shows that the base address of operation data No. 1 is "6208 (1840h)."
Based on this base address, the register addresses for the setting items are calculated from the table on p.153.

Base address
6208 (1840h)

Setting item	Modbus communication register address			Setting value
	Calculation method	Dec	Hex	
Operation type	Upper: Base address +0	6208 + 0 = 6208	1840h	48
	Lower: Base address +1	6208 + 1 = 6209	1841h	
Operating velocity	Upper: Base address +4	6208 + 4 = 6212	1844h	1,000
	Lower: Base address +5	6208 + 5 = 6213	1845h	

● Setting of operation data No. 2

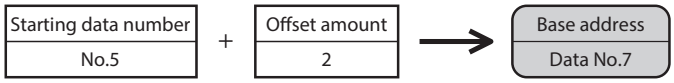
The table on p.151 shows that the base address of operation data No. 2 is "6272 (1880h)."
Based on this base address, the register addresses for the setting items are calculated from the table on p.153.

Base address
6272 (1880h)

Setting item	Modbus communication register address			Setting value
	Calculation method	Dec	Hex	
Operation type	Upper: Base address +0	6272 + 0 = 6272	1880h	0
	Lower: Base address +1	6272 + 1 = 6273	1881h	
Operating velocity	Upper: Base address +4	6272 + 4 = 6276	1884h	0
	Lower: Base address +5	6272 + 5 = 6277	1885h	

10-2 Offset reference

Offset reference is a method that an operation data number to be the starting point (starting data number) is set and an offset from the starting data number is specified to input. Set the the starting data number with the "DATA offset reference origin" parameter.
(Base address ⇨p.151)



The offset reference can be conveniently used for Modbus communication because the address of the setting item does not need to be changed if only the data number of the starting point is changed. Use it to edit a large amount of operation data, for example, on the touch screen.

Related parameter

Modbus communication Register address		Name	Description	R/W	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
6142 (17FEh)	6143 (17FFh)	DATA offset reference origin	Sets the operation data number that is the starting point of offset reference. [**Setting range**] 0 to 255: Operation data number	R/W	0	–	3071 (0BFFh)

memo The setting value of the "DATA offset reference origin" parameter is stored in RAM.

11 Operation I/O event R/W commands

If a specified event (ON-OFF of I/O) is generated during operation of the motor, another operation can be started. This is called operation I/O event. This chapter explains the address to execute the operation I/O event.

11-1 Setting method

As with the setting of operation data, there are "direct reference" and "offset reference" in the operation I/O event.
Direct reference is a method that an address of the event number to be a reference point (base address) is specified to access.
(Reference ⇨ Next section)
Offset reference is a method that an event number to be the starting point (starting event number) is set and an offset from the starting event number is specified to access. Set the starting event number with the "Event offset reference origin" parameter.
(Reference ⇨ p.137)

memo The setting value of the "Event offset reference origin" parameter is stored in RAM.

11-2 Direct reference

Direct reference is a method that an address of the operation I/O event number to be a reference point (base address) is specified to access.

■ Base address of operation I/O event

Modbus communication base address	Operation I/O event number	Modbus communication base address	Operation I/O event number
5120 (1400h)	0	5376 (1500h)	16
5136 (1410h)	1	5392 (1510h)	17
5152 (1420h)	2	5408 (1520h)	18
5168 (1430h)	3	5424 (1530h)	19
5184 (1440h)	4	5440 (1540h)	20
5200 (1450h)	5	5456 (1550h)	21
5216 (1460h)	6	5472 (1560h)	22
5232 (1470h)	7	5488 (1570h)	23
5248 (1480h)	8	5504 (1580h)	24
5264 (1490h)	9	5520 (1590h)	25
5280 (14A0h)	10	5536 (15A0h)	26
5296 (14B0h)	11	5552 (15B0h)	27
5312 (14C0h)	12	5568 (15C0h)	28
5328 (14D0h)	13	5584 (15D0h)	29
5344 (14E0h)	14	5600 (15E0h)	30
5360 (14F0h)	15	5616 (15F0h)	31

memo NET-ID of the base address is half the value of the Modbus communication base address.

■ Addresses of operation I/O event R/W commands

The setting items of operation I/O event are set with the operation I/O event R/W command.
The addresses of the setting items are arranged based on the base address of the operation I/O event (base command code).
(Base address of operation I/O event ⇨p.156)
For example, in the case of Modbus communication, if 4 and 5 are added to the base address, the setting item of "Dwell" will be the upper address and the lower address, respectively.

Modbus communication Register address	Name	Description	Initial setting		Update
			Initial value	Unit	
Base address +0 (upper) Base address +1 (lower)	Link	Sets the mode for link operation after detecting the event trigger. [**Setting range**] 0: No link 3: Continuous sequential operation	3	–	B
Base address +2 (upper) Base address +3 (lower)	Next data number	Sets the next data number. [**Setting range**] −256: Stop −22: ↓↓(+2) −1: ↓(+1) 0 to 255: Operation data number	−256	–	B
Base address +4 (upper) Base address +5 (lower)	Dwell	Sets the waiting time generated after detecting the event trigger. [**Setting range**] 0 to 1,000,000 ms	0	ms	B
Base address +6 (upper) Base address +7 (lower)	Event trigger I/O	Sets the I/O to be used as an event trigger. [**Setting range**] P.49 "2-1 Input signal list"	0: No function	–	B
Base address +8 (upper) Base address +9 (lower)	Event trigger type	Sets the timing to detect the event trigger. [**Setting range**] 0: Not event execution 1: ON (calculated cumulative: ms) 2: ON (continuous: ms) 3: OFF (calculated cumulative: ms) 4: OFF (continuous: ms) 5: ON (form: positive edge↑) 6: OFF(form: negative edge↓) 7: ON (cumulative: ms) 8: OFF (cumulative: ms)	0	–	B
Base address +10 (upper) Base address +11 (lower)	Event trigger count	Sets the decision time to detect the event trigger or the number of times of detection. [**Setting range**] 0 to 1,000,000 (1=1 ms or 1=once)	0	–	B

11-3 Offset reference

Offset reference is a method that an event number to be the starting point (starting event number) is set and an offset from the starting event number is specified to access. Set the starting event number with the "Event offset reference origin" parameter.

Related parameter

Modbus communication Register address		Name	Description	R/W	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
5118 (13FEh)	5119 (13FFh)	Event offset reference origin	Sets the I/O event number that is the starting point of offset reference. [**Setting range**] 0 to 31: I/O event number	R/W	0	–	2559 (09FFh)

memo The setting value of the "Event offset reference origin" parameter is stored in RAM.

■ Address of setting item

Modbus communication register address		Setting item
Upper	Lower	
5120 (1400h)	5121 (1401h)	Link
5122 (1402h)	5123 (1403h)	Next data number
5124 (1404h)	5125 (1405h)	Dwell
5126 (1406h)	5127 (1407h)	Event trigger I/O
5128 (1408h)	5129 (1409h)	Event trigger type
5130 (140Ah)	5131 (140Bh)	Event trigger count

■ Setting example

As an example, this section explains the setting address when the event No. 0, No. 1, and No. 10 are set as the starting event.
The offset reference is not required to change the address of the setting item if only the event number of the starting point is changed.
This is a convenient access method for editing a large amount of operation data, for example, on the touch screen.

- **Starting event No. 0 (initial value)**

Modbus communication base address	Operation I/O event number
5120 (1400h)	Starting event number +0 = 0
5136 (1410h)	Starting event number +1 = 1
•••	•••
5376 (1500h)	Starting event number +16 = 16
5392 (1510h)	Starting event number +17 = 17

- **Starting event No. 1**

Modbus communication base address	Operation I/O event number
5120 (1400h)	Starting event number +0 = 1
5136 (1410h)	Starting event number +1 = 2
• • •	• • •
5376 (1500h)	Starting event number +16 = 17
5392 (1510h)	Starting event number +17 = 18

- **Starting event No. 10**

Modbus communication base address	Operation I/O event number
5120 (1400h)	Starting event number +0 = 10
5136 (1410h)	Starting event number +1 = 11
• • •	• • •
5376 (1500h)	Starting event number +16 = 26
5392 (1510h)	Starting event number +17 = 27

12 Parameter R/W commands

These commands are used to read or write parameters. All commands can be read and written (READ/WRITE).

12-1 Basic setting and operation setting

Modbus communication Register address		Name	Description	Update	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
662 (0296h)	663 (0297h)	ATL function mode setting	Selects the setting method of the ATL function. [**Setting Range**] 0: Follow ATL-EN input 1: ATL function enabled	A	1	–	331 (014Bh)
666 (029Ah)	667 (029Bh)	Acceleration/ deceleration (time setting) reference speed	Sets the type of speed change by the acceleration time and deceleration time. 0: Time taken from the present speed to the setting speed (target velocity) (time to change speed is constant) 1 or more: Time taken from 0 to reference speed (slope to change speed is constant) [**Setting range**] 0 to 4,000,000 (User-defined velocity unit)	A	0	–	333 (014Dh)
840 (0348h)	841 (0349h)	Motor rotation direction	Sets the rotation direction of the motor output shaft. [**Setting range**] 0: Non invert 1: Invert	C	0	–	420 (01A4h)
834 (0342h)	835 (0343h)	User-defined velocity unit	Sets the velocity unit. [**Setting range**] 2: 1 r/min (motor output shaft) 20: 1 r/min (driving shaft of gearbox) 21: 0.1 r/min (driving shaft of gearbox) 22: 0.01 r/min (driving shaft of gearbox)	C	2	–	417 (01A1h)
856 (0358h)	857 (0359h)	Gear information (numerator)	Sets the numerator of gear information. [**Setting range**] 1 to 1,000	C	1	–	428 (01ACh)
858 (035Ah)	859 (035Bh)	Gear information (denominator)	Sets the denominator of gear information. [**Setting range**] 1 to 1,000	C	1	–	429 (01ADh)
546 (0222h)	547 (0223h)	Direct data operation trigger initial value	Sets the initial value of the trigger (lower 16 bits). [**Setting range**] –7: Operation data number update –6: Operation type update –4: Speed update –3: Acceleration time update –2: Deceleration time update –1: Torque limiting value update 0: The trigger is used	A	0	–	273 (0111h)
550 (0226h)	551 (0227h)	Direct data operation operation parameter initial value reference data number	Sets the operation data number to be used as the initial value for direct data operation. [**Setting range**] 0 to 255: Operation data number	A	0	–	275 (0113h)

Modbus communication Register address		Name	Description	Update	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
552 (0228h)	553 (0229h)	Direct data operation trigger automatic clear	Sets the movement when setting "Direct data operation trigger" that is set the trigger factor to transfer or update the data in the direct data operation memory area as execution data. When this parameter is set to enable, if direct data operation is started by writing to "Direct data operation trigger," the trigger (lower 16 bits) of "Direct data operation trigger" is automatically cleared to "0" regardless of whether it is successful or not. Therefore, if the same data is written, direct data operation can be started as many times as the data is written. When this parameter is set to disable, "Direct data operation trigger" is not cleared to "0" even if it is written. Therefore, direct data operation is not started even if the same data is written in succession. To restart, one of the following is required. • Write "0" to "Direct data operation trigger" and then write the value for starting. • Write a different value to "Direct data operation trigger." [**Setting range**] 0: Disable 1: Enable	A	1	–	276 (0114h)
572 (023Ch)	573 (023Dh)	Direct data operation lifetime initial value	Sets the initial value for direct data operation lifetime. [**Setting range**] 0: Disable 1 to 32,767 ms	A	0	ms	286 (011Eh)

12-2 Communication setting (Modbus)

Modbus communication Register address		Name	Description	Update	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
4992 (1380h)	4993 (1381h)	Server address (Modbus)	Sets the address number (server address). [**Setting range**] −1: The switch setting is followed 1 to 31: Server address Do not use 0.	D*	−1	–	2496 (09C0h)
4994 (1382h)	4995 (1383h)	Baudrate (Modbus)	Sets the transmission rate. [**Setting range**] 0: 9,600 bps 1: 19,200 bps 2: 38,400 bps 3: 57,600 bps 4: 115,200 bps 5: 230,400 bps	D*	4	–	2497 (09C1h)
4996 (1384h)	4997 (1385h)	Byte & word order (Modbus)	Sets the byte order of 32-bit data. Set when the arrangement of communication data is different from that of the client. (Setting example⇨p.95) [**Setting range**] 0: Even Address-High Word & Big-Endian 1: Even Address-Low Word & Big-Endian 2: Even Address-High Word & Little-Endian 3: Even Address-Low Word & Little-Endian	D*	0	–	2498 (09C2h)
4998 (1386h)	4999 (1387h)	Communication parity (Modbus)	Sets the communication parity. [**Setting range**] 0: None 1: Even parity 2: Odd parity	D*	1	–	2499 (09C3h)
5000 (1388h)	5001 (1389h)	Communication stop bit (Modbus)	Sets the communication stop bit. [**Setting range**] 0: 1 bit 1: 2 bits	D*	0	–	2500 (09C4h)
5002 (138Ah)	5003 (138Bh)	Communication timeout (Modbus)	Sets the condition under which a communication timeout occurs in RS-485 communication. [**Setting range**] 0: Not monitored 1 to 10,000 ms	A	0	–	2501 (09C5h)
5004 (138Ch)	5005 (138Dh)	Communication error alarm (Modbus)	A communication error alarm is generated when the RS-485 communication error occurs the number of times set here. [**Setting range**] 0: Disable 1 to 10 times	A	3	–	2502 (09C6h)
5006 (138Eh)	5007 (138Fh)	Transmission waiting time (Modbus)	Sets the transmission waiting time. [**Setting range**] 0 to 10,000 (1=0.1 ms)	D*	30	1=0.1 ms	2503 (09C7h)
5008 (1390h)	5009 (1391h)	Silent interval (Modbus)	Sets the silent interval. [**Setting range**] 0: Set automatically 1 to 100 (1=0.1 ms)	D*	0	–	2504 (09C8h)

Modbus communication Register address		Name	Description	Update	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
5010 (1392h)	5011 (1393h)	Server error response mode (Modbus)	Sets the response when the server error occurs. [**Setting range**] 0: Normal response 1: Exception response	A	1	–	2505 (09C9h)
5012 (1394h)	5013 (1395h)	Initial group ID (Modbus)	Sets the address of a group (address number of parent server). [**Setting range**] –1: Disable (no group transmission) 1 to 31: Group ID *Do not use 0.	C	–1	–	2506 (09CAh)
5056 (13C0h)	5057 (13C1h)	RS-485 communication frame monitor target ID	Sets the monitor axis in the RS-485 communication frame monitor of the support software. [**Setting range**] 1 to 127: Server address 1 to 127	A	1	–	2528 (09E0h)

* When writing is performed with the support software, the value written is updated immediately.

Modbus communication Register address		Name	Description	Update	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
1536 (0600h)	1537 (0601h)	Indirect reference address setting (0)	Sets NET-ID of commands or parameters to be registered in the indirect reference addresses. [**Setting range**] 0 to 65,535 (0 to FFFFh)	A	0	–	768 (0300h)
1538 (0602h)	1539 (0603h)	Indirect reference address setting (1)		A	0	–	769 (0301h)
1540 (0604h)	1541 (0605h)	Indirect reference address setting (2)		A	0	–	770 (0302h)
1542 (0606h)	1543 (0607h)	Indirect reference address setting (3)		A	0	–	771 (0303h)
1544 (0608h)	1545 (0609h)	Indirect reference address setting (4)		A	0	–	772 (0304h)
1546 (060Ah)	1547 (060Bh)	Indirect reference address setting (5)		A	0	–	773 (0305h)
1548 (060Ch)	1549 (060Dh)	Indirect reference address setting (6)		A	0	–	774 (0306h)
1550 (060Eh)	1551 (060Fh)	Indirect reference address setting (7)		A	0	–	775 (0307h)
1552 (0610h)	1553 (0611h)	Indirect reference address setting (8)		A	0	–	776 (0308h)
1554 (0612h)	1555 (0613h)	Indirect reference address setting (9)		A	0	–	777 (0309h)
1556 (0614h)	1557 (0615h)	Indirect reference address setting (10)		A	0	–	778 (030Ah)
1558 (0616h)	1559 (0617h)	Indirect reference address setting (11)		A	0	–	779 (030Bh)
1560 (0618h)	1561 (0619h)	Indirect reference address setting (12)		A	0	–	780 (030Ch)
1562 (061Ah)	1563 (061Bh)	Indirect reference address setting (13)		A	0	–	781 (030Dh)
1564 (061Ch)	1565 (061Dh)	Indirect reference address setting (14)		A	0	–	782 (030Eh)
1566 (061Eh)	1567 (061Fh)	Indirect reference address setting (15)		A	0	–	783 (030Fh)
1568 (0620h)	1569 (0621h)	Indirect reference address setting (16)		A	0	–	784 (0310h)
1570 (0622h)	1571 (0623h)	Indirect reference address setting (17)		A	0	–	785 (0311h)
1572 (0624h)	1573 (0625h)	Indirect reference address setting (18)		A	0	–	786 (0312h)
1574 (0626h)	1575 (0627h)	Indirect reference address setting (19)		A	0	–	787 (0313h)
1576 (0628h)	1577 (0629h)	Indirect reference address setting (20)		A	0	–	788 (0314h)
1578 (062Ah)	1579 (062Bh)	Indirect reference address setting (21)		A	0	–	789 (0315h)
1580 (062Ch)	1581 (062Dh)	Indirect reference address setting (22)		A	0	–	790 (0316h)
1582 (062Eh)	1583 (062Fh)	Indirect reference address setting (23)		A	0	–	791 (0317h)
1584 (0630h)	1585 (0631h)	Indirect reference address setting (24)		A	0	–	792 (0318h)

Modbus communication Register address		Name	Description	Update	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
1586 (0632h)	1587 (0633h)	Indirect reference address setting (25)	Sets NET-ID of commands or parameters to be registered in the indirect reference addresses. [**Setting range**] 0 to 65,535 (0 to FFFFh)	A	0	–	793 (0319h)
1588 (0634h)	1589 (0635h)	Indirect reference address setting (26)		A	0	–	794 (031Ah)
1590 (0636h)	1591 (0637h)	Indirect reference address setting (27)		A	0	–	795 (031Bh)
1592 (0638h)	1593 (0639h)	Indirect reference address setting (28)		A	0	–	796 (031Ch)
1594 (063Ah)	1595 (063Bh)	Indirect reference address setting (29)		A	0	–	797 (031Dh)
1596 (063Ch)	1597 (063Dh)	Indirect reference address setting (30)		A	0	–	798 (031Eh)
1598 (063Eh)	1599 (063Fh)	Indirect reference address setting (31)		A	0	–	799 (031Fh)
1600 (0640h)	1601 (0641h)	Indirect reference address setting (32)		A	0	–	800 (0320h)
1602 (0642h)	1603 (0643h)	Indirect reference address setting (33)		A	0	–	801 (0321h)
1604 (0644h)	1605 (0645h)	Indirect reference address setting (34)		A	0	–	802 (0322h)
1606 (0646h)	1607 (0647h)	Indirect reference address setting (35)		A	0	–	803 (0323h)
1608 (0648h)	1609 (0649h)	Indirect reference address setting (36)		A	0	–	804 (0324h)
1610 (064Ah)	1611 (064Bh)	Indirect reference address setting (37)		A	0	–	805 (0325h)
1612 (064Ch)	1613 (064Dh)	Indirect reference address setting (38)		A	0	–	806 (0326h)
1614 (064Eh)	1615 (064Fh)	Indirect reference address setting (39)		A	0	–	807 (0327h)
1616 (0650h)	1617 (0651h)	Indirect reference address setting (40)		A	0	–	808 (0328h)
1618 (0652h)	1619 (0653h)	Indirect reference address setting (41)		A	0	–	809 (0329h)
1620 (0654h)	1621 (0655h)	Indirect reference address setting (42)		A	0	–	810 (032Ah)
1622 (0656h)	1623 (0657h)	Indirect reference address setting (43)		A	0	–	811 (032Bh)
1624 (0658h)	1625 (0659h)	Indirect reference address setting (44)		A	0	–	812 (032Ch)
1626 (065Ah)	1627 (065Bh)	Indirect reference address setting (45)		A	0	–	813 (032Dh)
1628 (065Ch)	1629 (065Dh)	Indirect reference address setting (46)		A	0	–	814 (032Eh)
1630 (065Eh)	1631 (065Fh)	Indirect reference address setting (47)		A	0	–	815 (032Fh)
1632 (0660h)	1633 (0661h)	Indirect reference address setting (48)		A	0	–	816 (0330h)
1634 (0662h)	1635 (0663h)	Indirect reference address setting (49)		A	0	–	817 (0331h)

Modbus communication Register address		Name	Description	Update	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
1636 (0664h)	1637 (0665h)	Indirect reference address setting (50)	Sets NET-ID of commands or parameters to be registered in the indirect reference addresses. [**Setting range**] 0 to 65,535 (0 to FFFFh)	A	0	–	818 (0332h)
1638 (0666h)	1639 (0667h)	Indirect reference address setting (51)		A	0	–	819 (0333h)
1640 (0668h)	1641 (0669h)	Indirect reference address setting (52)		A	0	–	820 (0334h)
1642 (066Ah)	1643 (066Bh)	Indirect reference address setting (53)		A	0	–	821 (0335h)
1644 (066Ch)	1645 (066Dh)	Indirect reference address setting (54)		A	0	–	822 (0336h)
1646 (066Eh)	1647 (066Fh)	Indirect reference address setting (55)		A	0	–	823 (0337h)
1648 (0670h)	1649 (0671h)	Indirect reference address setting (56)		A	0	–	824 (0338h)
1650 (0672h)	1651 (0673h)	Indirect reference address setting (57)		A	0	–	825 (0339h)
1652 (0674h)	1653 (0675h)	Indirect reference address setting (58)		A	0	–	826 (033Ah)
1654 (0676h)	1655 (0677h)	Indirect reference address setting (59)		A	0	–	827 (033Bh)
1656 (0678h)	1657 (0679h)	Indirect reference address setting (60)		A	0	–	828 (033Ch)
1658 (067Ah)	1659 (067Bh)	Indirect reference address setting (61)		A	0	–	829 (033Dh)
1660 (067Ch)	1661 (067Dh)	Indirect reference address setting (62)		A	0	–	830 (033Eh)
1662 (067Eh)	1663 (067Fh)	Indirect reference address setting (63)		A	0	–	831 (033Fh)
1664 (0680h)	1665 (0681h)	Indirect reference address setting (64)		A	0	–	832 (0340h)
1666 (0682h)	1667 (0683h)	Indirect reference address setting (65)		A	0	–	833 (0341h)
1668 (0684h)	1669 (0685h)	Indirect reference address setting (66)		A	0	–	834 (0342h)
1670 (0686h)	1671 (0687h)	Indirect reference address setting (67)		A	0	–	835 (0343h)
1672 (0688h)	1673 (0689h)	Indirect reference address setting (68)		A	0	–	836 (0344h)
1674 (068Ah)	1675 (068Bh)	Indirect reference address setting (69)		A	0	–	837 (0345h)
1676 (068Ch)	1677 (068Dh)	Indirect reference address setting (70)		A	0	–	838 (0346h)
1678 (068Eh)	1679 (068Fh)	Indirect reference address setting (71)		A	0	–	839 (0347h)
1680 (0690h)	1681 (0691h)	Indirect reference address setting (72)		A	0	–	840 (0348h)
1682 (0692h)	1683 (0693h)	Indirect reference address setting (73)		A	0	–	841 (0349h)
1684 (0694h)	1685 (0695h)	Indirect reference address setting (74)		A	0	–	842 (034Ah)

Modbus communication Register address		Name	Description	Update	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
1686 (0696h)	1687 (0697h)	Indirect reference address setting (75)	Sets NET-ID of commands or parameters to be registered in the indirect reference addresses. [**Setting range**] 0 to 65,535 (0 to FFFFh)	A	0	–	843 (034Bh)
1688 (0698h)	1689 (0699h)	Indirect reference address setting (76)		A	0	–	844 (034Ch)
1690 (069Ah)	1691 (069Bh)	Indirect reference address setting (77)		A	0	–	845 (034Dh)
1692 (069Ch)	1693 (069Dh)	Indirect reference address setting (78)		A	0	–	846 (034Eh)
1694 (069Eh)	1695 (069Fh)	Indirect reference address setting (79)		A	0	–	847 (034Fh)
1696 (06A0h)	1697 (06A1h)	Indirect reference address setting (80)		A	0	–	848 (0350h)
1698 (06A2h)	1699 (06A3h)	Indirect reference address setting (81)		A	0	–	849 (0351h)
1700 (06A4h)	1701 (06A5h)	Indirect reference address setting (82)		A	0	–	850 (0352h)
1702 (06A6h)	1703 (06A7h)	Indirect reference address setting (83)		A	0	–	851 (0353h)
1704 (06A8h)	1705 (06A9h)	Indirect reference address setting (84)		A	0	–	852 (0354h)
1706 (06AAh)	1707 (06ABh)	Indirect reference address setting (85)		A	0	–	853 (0355h)
1708 (06ACh)	1709 (06ADh)	Indirect reference address setting (86)		A	0	–	854 (0356h)
1710 (06AEh)	1711 (06AFh)	Indirect reference address setting (87)		A	0	–	855 (0357h)
1712 (06B0h)	1713 (06B1h)	Indirect reference address setting (88)		A	0	–	856 (0358h)
1714 (06B2h)	1715 (06B3h)	Indirect reference address setting (89)		A	0	–	857 (0359h)
1716 (06B4h)	1717 (06B5h)	Indirect reference address setting (90)		A	0	–	858 (035Ah)
1718 (06B6h)	1719 (06B7h)	Indirect reference address setting (91)		A	0	–	859 (035Bh)
1720 (06B8h)	1721 (06B9h)	Indirect reference address setting (92)		A	0	–	860 (035Ch)
1722 (06BAh)	1723 (06BBh)	Indirect reference address setting (93)		A	0	–	861 (035Dh)
1724 (06BCh)	1725 (06BDh)	Indirect reference address setting (94)		A	0	–	862 (035Eh)
1726 (06BEh)	1727 (06BFh)	Indirect reference address setting (95)		A	0	–	863 (035Fh)
1728 (06C0h)	1729 (06C1h)	Indirect reference address setting (96)		A	0	–	864 (0360h)
1730 (06C2h)	1731 (06C3h)	Indirect reference address setting (97)		A	0	–	865 (0361h)
1732 (06C4h)	1733 (06C5h)	Indirect reference address setting (98)		A	0	–	866 (0362h)
1734 (06C6h)	1735 (06C7h)	Indirect reference address setting (99)		A	0	–	867 (0363h)

Modbus communication Register address		Name	Description	Update	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
1736 (06C8h)	1737 (06C9h)	Indirect reference address setting (100)	Sets NET-ID of commands or parameters to be registered in the indirect reference addresses. [**Setting range**] 0 to 65,535 (0 to FFFFh)	A	0	–	868 (0364h)
1738 (06CAh)	1739 (06CBh)	Indirect reference address setting (101)		A	0	–	869 (0365h)
1740 (06CCh)	1741 (06CDh)	Indirect reference address setting (102)		A	0	–	870 (0366h)
1742 (06CEh)	1743 (06CFh)	Indirect reference address setting (103)		A	0	–	871 (0367h)
1744 (06D0h)	1745 (06D1h)	Indirect reference address setting (104)		A	0	–	872 (0368h)
1746 (06D2h)	1747 (06D3h)	Indirect reference address setting (105)		A	0	–	873 (0369h)
1748 (06D4h)	1749 (06D5h)	Indirect reference address setting (106)		A	0	–	874 (036Ah)
1750 (06D6h)	1751 (06D7h)	Indirect reference address setting (107)		A	0	–	875 (036Bh)
1752 (06D8h)	1753 (06D9h)	Indirect reference address setting (108)		A	0	–	876 (036Ch)
1754 (06DAh)	1755 (06DBh)	Indirect reference address setting (109)		A	0	–	877 (036Dh)
1756 (06DCh)	1757 (06DDh)	Indirect reference address setting (110)		A	0	–	878 (036Eh)
1758 (06DEh)	1759 (06DFh)	Indirect reference address setting (111)		A	0	–	879 (036Fh)
1760 (06E0h)	1761 (06E1h)	Indirect reference address setting (112)		A	0	–	880 (0370h)
1762 (06E2h)	1763 (06E3h)	Indirect reference address setting (113)		A	0	–	881 (0371h)
1764 (06E4h)	1765 (06E5h)	Indirect reference address setting (114)		A	0	–	882 (0372h)
1766 (06E6h)	1767 (06E7h)	Indirect reference address setting (115)		A	0	–	883 (0373h)
1768 (06E8h)	1769 (06E9h)	Indirect reference address setting (116)		A	0	–	884 (0374h)
1770 (06EAh)	1771 (06EBh)	Indirect reference address setting (117)		A	0	–	885 (0375h)
1772 (06ECh)	1773 (06EDh)	Indirect reference address setting (118)		A	0	–	886 (0376h)
1774 (06EEh)	1775 (06EFh)	Indirect reference address setting (119)		A	0	–	887 (0377h)
1776 (06F0h)	1777 (06F1h)	Indirect reference address setting (120)		A	0	–	888 (0378h)
1778 (06F2h)	1779 (06F3h)	Indirect reference address setting (121)		A	0	–	889 (0379h)
1780 (06F4h)	1781 (06F5h)	Indirect reference address setting (122)		A	0	–	890 (037Ah)
1782 (06F6h)	1783 (06F7h)	Indirect reference address setting (123)		A	0	–	891 (037Bh)
1784 (06F8h)	1785 (06F9h)	Indirect reference address setting (124)		A	0	–	892 (037Ch)

Modbus communication Register address		Name	Description	Update	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
1786 (06FAh)	1787 (06FBh)	Indirect reference address setting (125)	Sets NET-ID of commands or parameters to be registered in the indirect reference addresses. [**Setting range**] 0 to 65,535 (0 to FFFFh)	A	0	–	893 (037Dh)
1788 (06FCh)	1789 (06FDh)	Indirect reference address setting (126)		A	0	–	894 (037Eh)
1790 (06FEh)	1791 (06FFh)	Indirect reference address setting (127)		A	0	–	895 (037Fh)

12-3 I/O operation and function

Modbus communication Register address		Name	Description	Update	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
3594 (0E0Ah)	3595 (0E0Bh)	D-SEL drive start function	Sets whether to start operation when the D-SEL input is turned ON. [**Setting range**] 0: Operation data number selection only 1: Operation data number selection + START function	A	1	–	1797 (0705h)
3604 (0E14h)	3605 (0E15h)	MOVE minimum ON time	Sets the minimum time the MOVE output will remain ON. The minimum ON time is guaranteed when the output time of the MOVE signal is short, such as when the operating time is short. [**Setting range**] 0 to 255 ms	A	0	ms	1802 (070Ah)
3610 (0E1Ah)	3611 (0E1Bh)	TRQ-LMT input torque limiting value	Sets the torque to be limited by the TRQ-LMT input. Set the percentage of the torque based on the rated torque being 100 %. [**Setting range**] 0 to 10,000 (1=0.1 %)	A	500	1=0.1 %	1805 (070Dh)
3612 (0E1Ch)	3613 (0E1Dh)	SPD-LMT speed limit type selection	Selects the setting method of the speed limit value. [**Setting range**] 0: Ratio 1: Value	A	0	–	1806 (070Eh)
3614 (0E1Eh)	3615 (0E1Fh)	SPD-LMT speed limit ratio	Sets the percentage of the speed to limit, based on the "Operating velocity" of the operation profile being 100 %. This is enabled when the "SPD-LMT speed limit type selection" parameter is set to "Ratio." [**Setting range**] 1 to 100 %	A	50	%	1807 (070Fh)
3616 (0E20h)	3617 (0E21h)	SPD-LMT speed limit value	Sets the value of the operating speed. This is enabled when the "SPD-LMT speed limit type selection" parameter is set to "Value." [**Setting range**] 1 to 4,000,000 (User-defined velocity unit)	A	1000	r/min	1808 (0710h)
3632 (0E30h)	3633 (0E31h)	VA mode selection	Selects the judgment criterion of the VA output. [**Setting range**] 0: Feedback speed attainment 1: Profile command speed attainment 2: Speed attainment (feedback speed & profile command speed)	A	0	–	1816 (0718h)
3634 (0E32h)	3635 (0E33h)	VA detection speed range	Sets the output range (one side) of the VA output with the target speed as the center. [**Setting range**] 0 to 65,535 (User-defined velocity unit)	A	15	r/min	1817 (0719h)

Modbus communication Register address		Name	Description	Update	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
3646 (0E3Eh)	3647 (0E3Fh)	Division value of ASG/BSG	Sets the pulse-dividing value for the ASG output and the BSG output. The number of pulses per revolution of the motor output shaft is changed. [**Setting range**] −1: 30 pulses (180° phase-shifted pulses) 0: 15 pulses (reference, 180° phase-shifted pulses) 1 to 15: Pulse-dividing value* (90° phase-shifted pulses) *Number of pulses after dividing the pulse is equal to "15 pulses divided by (pulse-dividing value multiplied by 2)"	C	0	–	1823 (071Fh)
3680 (0E60h)	3681 (0E61h)	STOP input action	Sets how to stop the motor when the STOP input is turned ON. [**Setting range**] 1: Deceleration stop (according to the operation profile during operation except for the torque limiting value) 2: Deceleration stop (according to the STOP deceleration time parameter)	A	1	–	1840 (0730h)
3682 (0E62h)	3683 (0E63h)	STOP input stopping torque limiting value	Sets the torque limiting value when the STOP input is turned ON. [**Setting range**] 0: According to the operation profile during operation 1 to 10,000 (1=0.1 %)	A	0	1=0.1 %	1841 (0731h)
3692 (0E6Ch)	3693 (0E6Dh)	STOP deceleration time	Sets the deceleration time when "Deceleration stop (according to the STOP deceleration time parameter)" is selected in the "STOP input action" parameter. [**Setting range**] 100 to 30,000 ms	A	1000	ms	1846 (0736h)
3712 (0E80h)	3713 (0E81h)	AREA0 positive direction position	Sets the positive direction position or the negative direction position for the AREA output. [Setting range] -2,147,483,648 to 2,147,483,647	A	0	step	1856 (0740h)
3714 (0E82h)	3715 (0E83h)	AREA0 negative direction position		A	0	step	1857 (0741h)
3716 (0E84h)	3717 (0E85h)	AREA1 positive direction position		A	0	step	1858 (0742h)
3718 (0E86h)	3719 (0E87h)	AREA1 negative direction position		A	0	step	1859 (0743h)
3720 (0E88h)	3721 (0E89h)	AREA2 positive direction position		A	0	step	1860 (0744h)
3722 (0E8Ah)	3723 (0E8Bh)	AREA2 negative direction position		A	0	step	1861 (0745h)
3724 (0E8Ch)	3725 (0E8Dh)	AREA3 positive direction position		A	0	step	1862 (0746h)
3726 (0E8Eh)	3727 (0E8Fh)	AREA3 negative direction position		A	0	step	1863 (0747h)
3728 (0E90h)	3729 (0E91h)	AREA4 positive direction position		A	0	step	1864 (0748h)
3730 (0E92h)	3731 (0E93h)	AREA4 negative direction position		A	0	step	1865 (0749h)

Modbus communication Register address		Name	Description	Update	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
3732 (0E94h)	3733 (0E95h)	AREA5 positive direction position	Sets the positive direction position or the negative direction position for the AREA output. [Setting range] -2,147,483,648 to 2,147,483,647	A	0	step	1866 (074Ah)
3734 (0E96h)	3735 (0E97h)	AREA5 negative direction position		A	0	step	1867 (074Bh)
3736 (0E98h)	3737 (0E99h)	AREA6 positive direction position		A	0	step	1868 (074Ch)
3738 (0E9Ah)	3739 (0E9Bh)	AREA6 negative direction position		A	0	step	1869 (074Dh)
3740 (0E9Ch)	3741 (0E9Dh)	AREA7 positive direction position		A	0	step	1870 (074Eh)
3742 (0E9Eh)	3743 (0E9Fh)	AREA7 negative direction position		A	0	step	1871 (074Fh)
3840 (0F00h)	3841 (0F01h)	D-SEL0 operation number selection	Sets the operation data number corresponding to the D-SEL input. [**Setting range**] 0 to 255: Operation data number	A	0	–	1920 (0780h)
3842 (0F02h)	3843 (0F03h)	D-SEL1 operation number selection		A	1	–	1921 (0781h)
3844 (0F04h)	3845 (0F05h)	D-SEL2 operation number selection		A	2	–	1922 (0782h)
3846 (0F06h)	3847 (0F07h)	D-SEL3 operation number selection		A	3	–	1923 (0783h)
3848 (0F08h)	3849 (0F09h)	D-SEL4 operation number selection		A	4	–	1924 (0784h)
3850 (0F0Ah)	3851 (0F0Bh)	D-SEL5 operation number selection		A	5	–	1925 (0785h)
3852 (0F0Ch)	3853 (0F0Dh)	D-SEL6 operation number selection		A	6	–	1926 (0786h)
3854 (0F0Eh)	3855 (0F0Fh)	D-SEL7 operation number selection		A	7	–	1927 (0787h)
3856 (0F10h)	3857 (0F11h)	D-SEL8 operation number selection		A	8	–	1928 (0788h)
3858 (0F12h)	3859 (0F13h)	D-SEL9 operation number selection		A	9	–	1929 (0789h)
3860 (0F14h)	3861 (0F15h)	D-SEL10 operation number selection		A	10	–	1930 (078Ah)
3862 (0F16h)	3863 (0F17h)	D-SEL11 operation number selection		A	11	–	1931 (078Bh)
3864 (0F18h)	3865 (0F19h)	D-SEL12 operation number selection		A	12	–	1932 (078Ch)
3866 (0F1Ah)	3867 (0F1Bh)	D-SEL13 operation number selection		A	13	–	1933 (078Dh)
3868 (0F1Ch)	3869 (0F1Dh)	D-SEL14 operation number selection		A	14	–	1934 (078Eh)
3870 (0F1Eh)	3871 (0F1Fh)	D-SEL15 operation number selection		A	15	–	1935 (078Fh)

12-4 Direct-IN function selection (DIN)

Modbus communication Register address		Name	Description	Update	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
4224 (1080h)	4225 (1081h)	DIN0 input function	Selects the input signals to be assigned to DIN0 and DIN1. [**Setting range**] ⇨p.49 "2-1 Input signal list"	C	58: FW-SPD	–	2112 (0840h)
4226 (1082h)	4227 (1083h)	DIN1 input function		C	59: RW-SPD	–	2113 (0841h)
4256 (10A0h)	4257 (10A1h)	DIN0 inverting mode	Changes the ON/OFF status of DIN0 and DIN1. [**Setting range**] 0: Non invert 1: Invert	C	0	–	2128 (0850h)
4258 (10A2h)	4259 (10A3h)	DIN1 inverting mode		C	0	–	2129 (0851h)
4352 (1100h)	4353 (1101h)	DIN0 composite input function	When either DIN0 or DIN1is turned ON, the input signals selected here are turned ON simultaneously. [**Setting range**] ⇨p.49 "2-1 Input signal list"	C	0: No function	–	2176 (0880h)
4354 (1102h)	4355 (1103h)	DIN1 composite input function		C	0: No function	–	2177 (0881h)
4480 (1180h)	4481 (1181h)	DIN0 ON signal dead-time	The input signal is turned ON when the time having set is exceeded. This can be used to take a measure to eliminate the noise or to adjust the timing between the devices. [**Setting range**] 0 to 250 ms	C	0	ms	2240 (08C0h)
4482 (1182h)	4483 (1183h)	DIN1 ON signal dead-time		C	0	ms	2241 (08C1h)
4512 (11A0h)	4513 (11A1h)	DIN0 1 shot signal	Automatically turns OFF (or ON) the signal input to DIN0 to DIN1, 250 µs after the input. [**Setting range**] 0: Disable 1: Enable	C	0	–	2256 (08D0h)
4514 (11A2h)	4515 (11A3h)	DIN1 1 shot signal		C	0	–	2257 (08D1h)

12-5 Direct-OUT function selection (DOUT)

Modbus communication Register address		Name	Description	Update	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
4288 (10C0h)	4289 (10C1h)	DOUT0 (Normal) output function	Selects the output signals to be assigned to DOUT0 and DOUT1. [**Setting range**] ⇨p.51 "2-2 Output signal list"	C	130: ALM-B	–	2144 (0860h)
4290 (10C2h)	4291 (10C3h)	DOUT1 (Normal) output function		C	134: MOVE	–	2145 (0861h)
4320 (10E0h)	4321 (10E1h)	DOUT0 inverting mode	Changes the ON/OFF status of DOUT0 and DOUT1. [**Setting range**] 0: Non invert 1: Invert	C	0	–	2160 (0870h)
4322 (10E2h)	4323 (10E3h)	DOUT1 inverting mode		C	0	–	2161 (0871h)
4384 (1120h)	4385 (1121h)	DOUT0 composite output function	Selects the output signals for logical operation with the signals of DOUT0 and DOUT1. When logical combination of the two signals has been established, the output is turned ON. [**Setting range**] ⇨p.51 "2-2 Output signal list"	C	128: CONST-OFF	–	2192 (0890h)
4386 (1122h)	4387 (1123h)	DOUT1 composite output function		C	128: CONST-OFF	–	2193 (0891h)
4416 (1140h)	4417 (1141h)	DOUT0 composite inverting mode	Changes the ON/OFF status of the composite output function. [**Setting range**] 0: Non invert 1: Invert	C	0	–	2208 (08A0h)
4418 (1142h)	4419 (1143h)	DOUT1 composite inverting mode		C	0	–	2209 (08A1h)
4448 (1160h)	4449 (1161h)	DOUT0 composite logical combination	Sets the logical combination [AND (logical product) or OR (logical sum)] of the composite output function. [**Setting range**] 0: AND 1 OR	C	1	–	2224 (08B0h)
4450 (1162h)	4451 (1163h)	DOUT1 composite logical combination		C	1	–	2225 (08B1h)
4544 (11C0h)	4545 (11C1h)	DOUT0 OFF delay time	The output signal is turned OFF when the time that has been set is exceeded. This can be used to take a measure to eliminate the noise or to adjust the timing between the devices. [**Setting range**] 0 to 4,000 ms	C	0	ms	2272 (08E0h)
4546 (11C2h)	4547 (11C3h)	DOUT1 OFF delay time		C	0	ms	2273 (08E1h)

12-6 Remote-I/O function selection (R-I/O)

Modbus communication Register address		Name	Description	Update	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
34816 (8800h)	34817 (8801h)	R-IN0 input function	Selects the input signals to be assigned to R-IN0 to R-IN31. [**Setting range**] ⇨p.49 "2-1 Input signal list"	C	58: FW-SPD	–	17408 (4400h)
34818 (8802h)	34819 (8803h)	R-IN1 input function		C	59: RV-SPD	–	17409 (4401h)
34820 (8804h)	34821 (8805h)	R-IN2 input function		C	0: No function	–	17410 (4402h)
34822 (8806h)	34823 (8807h)	R-IN3 input function		C	18: TRQ-LMT	–	17411 (4403h)
34824 (8808h)	34825 (8809h)	R-IN4 input function		C	0: No function	–	17412 (4404h)
34826 (880Ah)	34827 (880Bh)	R-IN5 input function		C	5: STOP	–	17413 (4405h)
34828 (880Ch)	34829 (880Dh)	R-IN6 input function		C	1: FREE	–	17414 (4406h)
34830 (880Eh)	34831 (880Fh)	R-IN7 input function		C	8: ALM-RST	–	17415 (4407h)
34832 (8810h)	34833 (8811h)	R-IN8 input function		C	40: M0	–	17416 (4408h)
34834 (8812h)	34835 (8813h)	R-IN9 input function		C	41: M1	–	17417 (4409h)
34836 (8814h)	34837 (8815h)	R-IN10 input function		C	42: M2	–	17418 (440Ah)
34838 (8816h)	34839 (8817h)	R-IN11 function selection		C	43: M3	–	17419 (440Bh)
34840 (8818h)	34841 (8819h)	R-IN12 input function		C	44: M4	–	17420 (440Ch)
34842 (881Ah)	34843 (881Bh)	R-IN13 input function		C	45: M5	–	17421 (440Dh)
34844 (881Ch)	34845 (881Dh)	R-IN14 input function		C	46: M6	–	17422 (440Eh)
34846 (881Eh)	34847 (881Fh)	R-IN15 input function		C	47: M7	–	17423 (440Fh)
34848 (8820h)	34849 (8821h)	R-IN16 input function		C	32: START	–	17424 (4410h)
34850 (8822h)	34851 (8823h)	R-IN17 input function		C	35: NEXT	–	17425 (4411h)
34852 (8824h)	34853 (8825h)	R-IN18 input function		C	0: No function	–	17426 (4412h)
34854 (8826h)	34855 (8827h)	R-IN19 input function		C	0: No function	–	17427 (4413h)
34856 (8828h)	34857 (8829h)	R-IN20 input function		C	9: P-PRESET	–	17428 (4414h)
34858 (882Ah)	34859 (882Bh)	R-IN21 input function		C	0: No function	–	17429 (4415h)
34860 (882Ch)	34861 (882Dh)	R-IN22 input function		C	0: No function	–	17430 (4416h)
34862 (882Eh)	34863 (882Fh)	R-IN23 input function		C	0: No function	–	17431 (4417h)
34864 (8830h)	34865 (8831h)	R-IN24 input function		C	80: D-SEL0	–	17432 (4418h)

Modbus communication Register address		Name	Description	Update	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
34866 (8832h)	34867 (8833h)	R-IN25 input function	Selects the input signals to be assigned to R-IN0 to R-IN31. [**Setting range**] ⇨p.49 "2-1 Input signal list"	C	81: D-SEL1	–	17433 (4419h)
34868 (8834h)	34869 (8835h)	R-IN26 input function		C	82: D-SEL2	–	17434 (441Ah)
34870 (8836h)	34871 (8837h)	R-IN27 input function		C	83: D-SEL3	–	17435 (441Bh)
34872 (8838h)	34873 (8839h)	R-IN28 input function		C	84: D-SEL4	–	17436 (441Ch)
34874 (883Ah)	34875 (883Bh)	R-IN29 function selection		C	85: D-SEL5	–	17437 (441Dh)
34876 (883Ch)	34877 (883Dh)	R-IN30 function selection		C	86: D-SEL6	–	17438 (441Eh)
34878 (883Eh)	34879 (883Fh)	R-IN31 input function		C	87: D-SEL7	–	17439 (441Fh)
34880 (8840h)	34881 (8841h)	R-OUT0 output function	Selects the output signals to be assigned to R-OUT0 to R-OUT31. [**Setting range**] ⇨p.51 "2-2 Output signal list"	C	134: MOVE	–	17440 (4420h)
34882 (8842h)	34883 (8843h)	R-OUT1 output function		C	141: VA	–	17441 (4421h)
34884 (8844h)	34885 (8845h)	R-OUT2 output function		C	140: TLC	–	17442 (4422h)
34886 (8846h)	34887 (8847h)	R-OUT3 output function		C	224: TRQ-LMTD	–	17443 (4423h)
34888 (8848h)	34889 (8849h)	R-OUT4 output function		C	128: CONST-OFF	–	17444 (4424h)
34890 (884Ah)	34891 (884Bh)	R-OUT5 output function		C	5: STOP_R	–	17445 (4425h)
34892 (884Ch)	34893 (884Dh)	R-OUT6 output function		C	1: FREE_R	–	17446 (4426h)
34894 (884Eh)	34895 (884Fh)	R-OUT7 output function		C	129: ALM-A	–	17447 (4427h)
34896 (8850h)	34897 (8851h)	R-OUT8 output function		C	136: SYS-BSY	–	17448 (4428h)
34898 (8852h)	34899 (8853h)	R-OUT9 output function		C	146: RDY-FWRV-OPE	–	17449 (4429h)
34900 (8854h)	34901 (8855h)	R-OUT10 output function		C	147: RDY-SD-OPE	–	17450 (442Ah)
34902 (8856h)	34903 (8857h)	R-OUT11 output function		C	148: RDY-DD-OPE	–	17451 (442Bh)
34904 (8858h)	34905 (8859h)	R-OUT12 output function		C	128: CONST-OFF	–	17452 (442Ch)
34906 (885Ah)	34907 (885Bh)	R-OUT13 output function		C	128: CONST-OFF	–	17453 (442Dh)
34908 (885Ch)	34909 (885Dh)	R-OUT14 output function		C	128: CONST-OFF	–	17454 (442Eh)
34910 (885Eh)	34911 (885Fh)	R-OUT15 output function		C	128: CONST-OFF	–	17455 (442Fh)
34912 (8860h)	34913 (8861h)	R-OUT16 output function		C	135: INFO	–	17456 (4430h)
34914 (8862h)	34915 (8863h)	R-OUT17 output function		C	262: INFO-MNT-G	–	17457 (4431h)
34916 (8864h)	34917 (8865h)	R-OUT18 output function		C	264: INFO-DRVTMP	–	17458 (4432h)

Modbus communication Register address		Name	Description	Update	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
34918 (8866h)	34919 (8867h)	R-OUT19 output function	Selects the output signals to be assigned to R-OUT0 to R-OUT31. [**Setting range**] ⇨p.51 "2-2 Output signal list"	C	267: INFO-TRQ	–	17459 (4433h)
34920 (8868h)	34921 (8869h)	R-OUT20 output function		C	257: INFO-START-G	–	17460 (4434h)
34922 (886Ah)	34923 (886Bh)	R-OUT21 output function		C	286: INFO-CONFIG	–	17461 (4435h)
34924 (886Ch)	34925 (886Dh)	R-OUT22 output function		C	287: INFO-REBOOT	–	17462 (4436h)
34926 (886Eh)	34927 (886Fh)	R-OUT23 output function		C	128: CONST-OFF	–	17463 (4437h)
34928 (8870h)	34929 (8871h)	R-OUT24 output function		C	160: AREA0	–	17464 (4438h)
34930 (8872h)	34931 (8873h)	R-OUT25 output function		C	161: AREA1	–	17465 (4439h)
34932 (8874h)	34933 (8875h)	R-OUT26 output function		C	162: AREA2	–	17466 (443Ah)
34934 (8876h)	34935 (8877h)	R-OUT27 output function		C	163: AREA3	–	17467 (443Bh)
34936 (8878h)	34937 (8879h)	R-OUT28 output function		C	232: USR-OUT0	–	17468 (443Ch)
34938 (887Ah)	34939 (887Bh)	R-OUT29 output function		C	233: USR-OUT1	–	17469 (443Dh)
34940 (887Ch)	34941 (887Dh)	R-OUT30 output function		C	234: USR-OUT2	–	17470 (443Eh)
34942 (887Eh)	34943 (887Fh)	R-OUT31 output function		C	235: USR-OUT3	–	17471 (443Fh)
35008 (88C0h)	35009 (88C1h)	R-OUT0 OFF delay time	Sets the OFF delay time for R-OUT0 to R-OUT31. [**Setting range**] 0 to 4,000 ms	C	0	ms	17504 (4460h)
35010 (88C2h)	35011 (88C3h)	R-OUT1 OFF delay time		C	0	ms	17505 (4461h)
35012 (88C4h)	35013 (88C5h)	R-OUT2 OFF delay time		C	0	ms	17506 (4462h)
35014 (88C6h)	35015 (88C7h)	R-OUT3 OFF delay time		C	0	ms	17507 (4463h)
35016 (88C8h)	35017 (88C9h)	R-OUT4 OFF delay time		C	0	ms	17508 (4464h)
35018 (88CAh)	35019 (88CBh)	R-OUT5 OFF delay time		C	0	ms	17509 (4465h)
35020 (88CCh)	35021 (88CDh)	R-OUT6 OFF delay time		C	0	ms	17510 (4466h)
35022 (88CEh)	35023 (88CFh)	R-OUT7 OFF delay time		C	0	ms	17511 (4467h)
35024 (88D0h)	35025 (88D1h)	R-OUT8 OFF delay time		C	0	ms	17512 (4468h)
35026 (88D2h)	35027 (88D3h)	R-OUT9 OFF delay time		C	0	ms	17513 (4469h)
35028 (88D4h)	35029 (88D5h)	R-OUT10 OFF delay time		C	0	ms	17514 (446Ah)
35030 (88D6h)	35031 (88D7h)	R-OUT11 OFF delay time		C	0	ms	17515 (446Bh)
35032 (88D8h)	35033 (88D9h)	R-OUT12 OFF delay time		C	0	ms	17516 (446Ch)

Modbus communication Register address		Name	Description	Update	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
35034 (88DAh)	35035 (88DBh)	R-OUT13 OFF delay time	Sets the OFF delay time for R-OUT0 to R-OUT31. [**Setting range**] 0 to 4,000 ms	C	0	ms	17517 (446Dh)
35036 (88DCh)	35037 (88DDh)	R-OUT14 OFF delay time		C	0	ms	17518 (446Eh)
35038 (88DEh)	35039 (88DFh)	R-OUT15 OFF delay time		C	0	ms	17519 (446Fh)
35040 (88E0h)	35041 (88E1h)	R-OUT16 OFF delay time		C	0	ms	17520 (4470h)
35042 (88E2h)	35043 (88E3h)	R-OUT17 OFF delay time		C	0	ms	17521 (4471h)
35044 (88E4h)	35045 (88E5h)	R-OUT18 OFF delay time		C	0	ms	17522 (4472h)
35046 (88E6h)	35047 (88E7h)	R-OUT19 OFF delay time		C	0	ms	17523 (4473h)
35048 (88E8h)	35049 (88E9h)	R-OUT20 OFF delay time		C	0	ms	17524 (4474h)
35050 (88EAh)	35051 (88EBh)	R-OUT21 OFF delay time		C	0	ms	17525 (4475h)
35052 (88ECh)	35053 (88EDh)	R-OUT22 OFF delay time		C	0	ms	17526 (4476h)
35054 (88EEh)	35055 (88EFh)	R-OUT23 OFF delay time		C	0	ms	17527 (4477h)
35056 (88F0h)	35057 (88F1h)	R-OUT24 OFF delay time		C	0	ms	17528 (4478h)
35058 (88F2h)	35059 (88F3h)	R-OUT25 OFF delay time		C	0	ms	17529 (4479h)
35060 (88F4h)	35061 (88F5h)	R-OUT26 OFF delay time		C	0	ms	17530 (447Ah)
35062 (88F6h)	35063 (88F7h)	R-OUT27 OFF delay time		C	0	ms	17531 (447Bh)
35064 (88F8h)	35065 (88F9h)	R-OUT28 OFF delay time		C	0	ms	17532 (447Ch)
35066 (88FAh)	35067 (88FBh)	R-OUT29 OFF delay time		C	0	ms	17533 (447Dh)
35068 (88FCh)	35069 (88FDh)	R-OUT30 OFF delay time		C	0	ms	17534 (447Eh)
35070 (88FEh)	35071 (88FFh)	R-OUT31 OFF delay time		C	0	ms	17535 (447Fh)

12-7 Adjustment and function

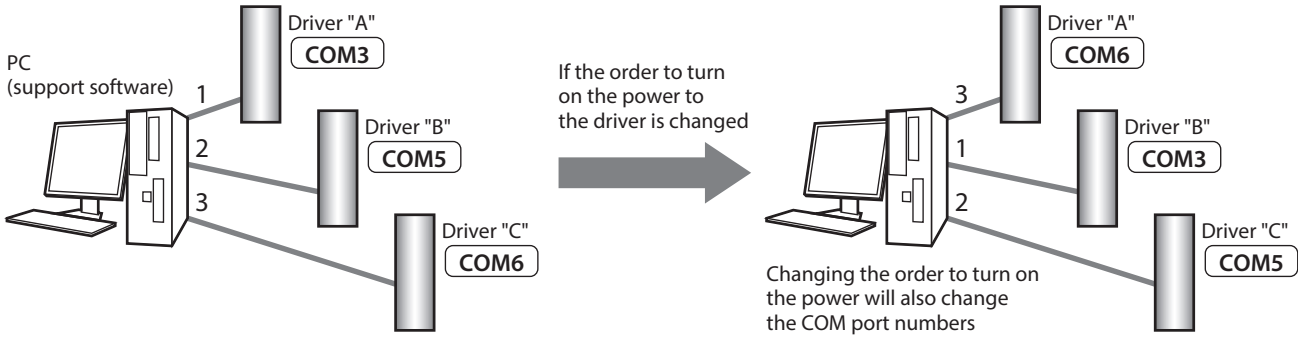
Modbus communication Register address		Name	Description	Update	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
996 (03E4h)	997 (03E5h)	USB-ID enable	Sets the "USB-ID enable" to fix the COM port. (⇨p.180) [**Setting range**] 0: Disable 1: Enable	D	1	–	498 (01F2h)
998 (03E6h)	999 (03E7h)	USB-ID	This can be set when the "USB-ID enable" parameter is set to "Enable." Sets the ID to the COM port. (⇨p.180) [**Setting range**] 0 to 999,999,999	D	0	–	499 (01F3h)
1000 (03E8h)	1001 (03E9h)	USB-PID	Sets the product ID to be displayed in the COM port. (⇨p.180) [Setting range] 0 to 31	D	0	–	500 (01F4h)
594 (0252h)	595 (0253h)	Command filter setting	Selects the command filter to activate for the operation command. [**Setting range**] 1: LPF (speed filter) 2: Moving average filter	B	1	–	297 (0129h)
596 (0254h)	597 (0255h)	Command filter time constant	Sets the time constant for the command filter to adjust the motor response. [**Setting range**] 0 to 200 ms	B	1	ms	298 (012Ah)
5062 (13C6h)	5063 (13C7h)	Velocity detection monitor time constant	Sets the time constant of the velocity monitor. [**Setting range**] 1 to 1,000 ms	A	5	ms	2531 (09E3h)
5064 (13C8h)	5065 (13C9h)	Torque monitor time constant	Sets the time constant of the torque monitor. [**Setting range**] 0 to 1,000 ms	A	5	ms	2532 (09E4h)

■ USB-ID

The USB-ID is a parameter to associate the USB port (COM port number) of a PC with the driver. The COM port number is used when the communication port is set with the support software.
If multiple drivers are connected to a PC, the PC assigns empty COM ports to the drivers in the order they are connected. If the driver power is turned on again, or if the USB cable is disconnected and reconnected, the assigned COM port numbers may change because the order in which the connection is recognized by the PC is changed.

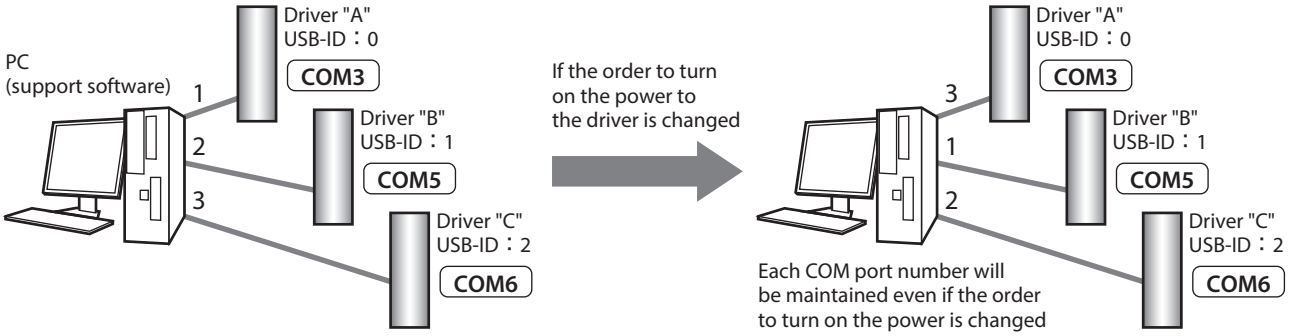
● When the USB-ID is not set

COM port number	Connection status	
1	Connected	
2	Connected	
3	Empty	← COM port on the driver that the power was supplied first
4	Connected	
5	Empty	← COM port on the driver that the power was supplied second
6	Empty	← COM port on the driver that the power was supplied third



● When the USB-ID is set

If the "USB-ID" parameter is set, the same COM port numbers are always displayed regardless of the order of connection because the COM port number is fixed to each driver.
(The USB-ID and the COM port number may not match because a PC assigns empty COM port numbers in descending order.)



Note The COM port number set with the "USB-ID" parameter is disabled if the PC is changed.

■ USB-PID

Although the USB-ID can fix the COM port number to each driver, changing the PC will also change and disable the COM port numbers.
Meanwhile, the USB-PID is a parameter to set an ID number to the driver itself. Even if the PC or the COM port number is changed, the product can easily be distinguished using the support software because the ID number of the driver is not changed.

memo If the USB-PID with the same number is set to multiple drivers, the COM port numbers are assigned in the order they are connected.

12-8 Information setting

Modbus communication Register address		Name	Description	Update	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
36354 (8E02h)	36355 (8E03h)	INFO action (Start operation group information (INFO-START-G))	Sets whether or not to apply to the group output, INFO output, and LED blinking when information is generated. [**Setting range**] 0: INFO action is not applied* 1: INFO action is applied * The information history is left.	A	1	–	18177 (4701h)
36356 (8E04h)	36357 (8E05h)	INFO action (RS-485 communication group information (INFO-485-G))		A	1	–	18178 (4702h)
36364 (8E0Ch)	36365 (8E0Dh)	INFO action (Maintenance group information (INFO-MNT-G))		A	1	–	18182 (4706h)
36368 (8E10h)	36369 (8E11h)	INFO action (Driver temperature information (INFO-DRVTMP))		A	1	–	18184 (4708h)
36372 (8E14h)	36373 (8E15h)	INFO action (Load factor information (INFO-LOAD))		A	1	–	18186 (470Ah)
36374 (8E16h)	36375 (8E17h)	INFO action (Torque information (INFO-TRQ))		A	1	–	18187 (470Bh)
36408 (8E38h)	36409 (8E39h)	INFO action (Start operation restricted mode information (INFO-DSLMTD))		A	1	–	18204 (471Ch)
36410 (8E3Ah)	36411 (8E3Bh)	INFO action (I/O test mode information (INFO-IOTEST))		A	1	–	18205 (471Dh)
36412 (8E3Ch)	36413 (8E3Dh)	INFO action (Configuration request information (INFO-CONFIG))		A	1	–	18206 (471Eh)
36414 (8E3Eh)	36415 (8E3Fh)	INFO action (Reboot request information (INFO-REBOOT))		A	1	–	18207 (471Fh)
36440 (8E58h)	36441 (8E59h)	INFO action (Upper speed information (INFO-SPD-H))		A	1	–	18220 (472Ch)
36442 (8E5Ah)	36443 (8E5Bh)	INFO action (Lower speed information (INFO-SPD-L))		A	1	–	18221 (472Dh)
36448 (8E60h)	36449 (8E61h)	INFO action (Torque limiting time information (INFO-TLC-TIME))		A	1	–	18224 (4730h)
36496 (8E90h)	36497 (8E91h)	INFO action (Tripmeter 0 information (INFO-TRIP0))		A	1	–	18248 (4748h)
36498 (8E92h)	36499 (8E93h)	INFO action (Tripmeter 1 information (INFO-TRIP1))		A	1	–	18249 (4749h)
36500 (8E94h)	36501 (8E95h)	INFO action (Odometer information (INFO-ODO))		A	1	–	18250 (474Ah)

Modbus communication Register address		Name	Description	Update	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
36506 (8E9Ah)	36507 (8E9Bh)	INFO action (Total uptime information (INFO-PTIME))	Sets whether or not to apply to the group output, INFO output, and LED blinking when information is generated. [**Setting range**] 0: INFO action is not applied* 1: INFO action is applied * The information history is left.	A	1	–	18253 (474Dh)
36508 (8E9Ch)	36509 (8E9Dh)	INFO action (Number of boots information (INFO-PCOUNT))		A	1	–	18254 (474Eh)
36512 (8EA0h)	36513 (8EA1h)	INFO action (RS-485 communication error information (INFO-485-ERR))		A	1	–	18256 (4750h)
36514 (8EA2h)	36515 (8EA3h)	INFO action (RS-485 communication processing time information (INFO-485-PRCST))		A	1	–	18257 (4751h)
36516 (8EA4h)	36517 (8EA5h)	INFO action (RS-485 communication interval information (INFO-485-INTVL))		A	1	–	18258 (4752h)
36548 (8EC4h)	36549 (8EC5h)	INFO action (Start FW/RV operation error information (INFO-START-FWRV))		A	1	–	18274 (4762h)
36550 (8EC6h)	36551 (8EC7h)	INFO action (Start stored data operation error information (INFO-START-SD))		A	1	–	18275 (4763h)
36552 (8EC8h)	36553 (8EC9h)	INFO action (Start direct data operation error information (INFO-START-DD))		A	1	–	18276 (4764h)
36558 (8ECEh)	36559 (8ECFh)	INFO action (I/O operation disabled information (INFO-IODRV-DIS))		A	1	–	18279 (4767h)
36576 (8EE0h)	36577 (8EE1h)	INFO action (Unit setting information (INFO-UNIT-E))		A	1	–	18288 (4770h)
36592 (8EF0h)	36593 (8EF1h)	INFO action (CPU fault information (INFO-CPU-FAULT))		A	1	–	18296 (4778h)
36594 (8EF2h)	36595 (8EF3h)	INFO action (Overcurrent fault information (INFO-OC-FAULT))		A	1	–	18297 (4779h)
36616 (8F08h)	36617 (8F09h)	Information LED condition	Sets the LED status when information is generated. [**Setting range**] 0: Disable 1: Enable	A	1	–	18308 (4784h)

Modbus communication Register address		Name	Description	Update	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
36618 (8F0Ah)	36619 (8F0Bh)	Information auto clear	When the condition to clear the information is met, a bit output of the corresponding information is automatically turned OFF. [**Setting range**] 0: Disable 1: Enable	A	1	–	18309 (4785h)
36656 (8F30h)	36657 (8F31h)	Driver temperature information (INFO-DRVTMP)	Sets the condition under which the driver temperature information is generated. [**Setting range**] 0: Disable 1 to 120 °C	A	0	°C	18328 (4798h)
36674 (8F42h)	36675 (8F43h)	Upper speed information (INFO-SPD-H)	Sets the condition under which the upper speed information is generated. [**Setting range**] 0: Disable 1 to 4,000,000 (User-defined velocity unit)	A	0	r/min	18337 (47A1h)
36676 (8F44h)	36677 (8F45h)	Lower speed information (INFO-SPD-L)	Sets the condition under which the lower speed information is generated. [**Setting range**] 0: Disable 1 to 4,000,000 (User-defined velocity unit)	A	0	r/min	18338 (47A2h)
36686 (8F4Eh)	36687 (8F4Fh)	Load factor information (INFO-LOAD)	Sets the condition under which the load factor information is generated. [**Setting range**] 0: Disable 1 to 10,000 (1=0.1 %)	A	0	1=0.1 %	18343 (47A7h)
36688 (8F50h)	36689 (8F51h)	Torque information (INFO-TRQ)	Sets the condition under which the torque information is generated. [**Setting range**] 0: Disable 1 to 10,000 (1=0.1 %)	A	0	1=0.1 %	18344 (47A8h)
36692 (8F54h)	36693 (8F55h)	Torque limiting time information (INFO-TLC-TIME)	Sets the condition under which the torque limiting time information is generated. [**Setting range**] 0: Disable 1 to 10,000 ms	A	0	ms	18346 (47AAh)
36732 (8F7Ch)	36733 (8F7Dh)	Tripmeter 0 information (INFO-TRIP0)	Sets the condition under which the tripmeter 0 information is generated. [**Setting range**] 0: Disable 1 to 2,147,483,647 (1=0.1 krev)	A	0	1=0.1 krev	18366 (47BEh)

Modbus communication Register address		Name	Description	Update	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
36734 (8F7Eh)	36735 (8F7Fh)	Tripmeter 1 information (INFO-TRIP1)	Sets the condition under which the tripmeter 1 information is generated. [**Setting range**] 0: Disable 1 to 2,147,483,647 (1=0.1 krev)	A	0	1=0.1 krev	18367 (47BFh)
36736 (8F80h)	36737 (8F81h)	Odometer information (INFO-ODO)	Sets the condition under which the odometer information is generated. [**Setting range**] 0: Disable 1 to 2,147,483,647 (1=0.1 krev)	A	0	1=0.1 krev	18368 (47C0h)
36750 (8F8Eh)	36751 (8F8Fh)	RS-485 communication error information (INFO-485-ERR)	Sets the condition under which the RS-485 communication error information is generated. [**Setting range**] 0: Disable 1 to 10 times	A	0	–	18375 (47C7h)
36752 (8F90h)	36753 (8F91h)	RS-485 communication processing time information (INFO-485-PRCST)	Sets the condition under which the RS-485 communication processing time information is generated. [**Setting range**] 0: Disable 1 to 10,000 ms	A	0	ms	18376 (47C8h)
36754 (8F92h)	36755 (8F93h)	RS-485 communication interval information (INFO-485-INTVL)	Sets the condition under which the RS-485 communication interval information is generated. [**Setting range**] 0: Disable 1 to 10,000 ms	A	0	ms	18377 (47C9h)
36778 (8FAAh)	36779 (8FABh)	Total uptime information (INFO-PTIME)	Sets the condition under which the total uptime information is generated. [**Setting range**] 0: Disable 1 to 30,000,000 times	A	0	min	18389 (47D5h)
36780 (8FACh)	36781 (8FADh)	Number of boots information (INFO-PCOUNT)	Sets the condition under which the number of boots information is generated. [**Setting range**] 0: Disable 1 to 2,147,483,647 times	A	0	–	18390 (47D6h)

12-9 User output function selection

Modbus communication Register address		Name	Description	Update	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
35840 (8C00h)	35841 (8C01h)	User output (USR-OUT0) (IO) operation mode	Selects the operation mode of the user output. [**Setting range**] 0: Internal IO judgment 1: Value judgment (value X, value Y) = (value A, value B) 2: Value judgment (value X, value Y) = (value of NET-ID=A, value B) 3: Value judgment (value X, value Y) = (value A, value of NET-ID=B) 4: Value judgment (value X, value Y) = (value of NET-ID=A, value of NET-ID=B)	C	0	–	17920 (4600h)
35842 (8C02h)	35843 (8C03h)	User output (USR-OUT1) (IO) operation mode		C	0	–	17921 (4601h)
35844 (8C04h)	35845 (8C05h)	User output (USR-OUT2) (IO) operation mode		C	0	–	17922 (4602h)
35846 (8C06h)	35847 (8C07h)	User output (USR-OUT3) (IO) operation mode		C	0	–	17923 (4603h)
35848 (8C08h)	35849 (8C09h)	User output (USR-OUT4) (IO) operation mode		C	0	–	17924 (4604h)
35850 (8C0Ah)	35851 (8C0Bh)	User output (USR-OUT5) (IO) operation mode		C	0	–	17925 (4605h)
35852 (8C0Ch)	35853 (8C0Dh)	User output (USR-OUT6) (IO) operation mode		C	0	–	17926 (4606h)
35854 (8C0Eh)	35855 (8C0Fh)	User output (USR-OUT7) (IO) operation mode		C	0	–	17927 (4607h)
35872 (8C20h)	35873 (8C21h)	User output (USR-OUT0) (IO) source A function	Selects the user output source A function (output signal) for USR-OUT0 to USR-OUT7. This is the setting when the operation mode is set to internal IO judgment. [**Setting range**] ⇨p.51 "2-2 Output signal list"	C	128: CONST-OFF	–	17936 (4610h)
35874 (8C22h)	35875 (8C23h)	User output (USR-OUT1) (IO) source A function		C	128: CONST-OFF	–	17937 (4611h)
35876 (8C24h)	35877 (8C25h)	User output (USR-OUT2) (IO) source A function		C	128: CONST-OFF	–	17938 (4612h)
35878 (8C26h)	35879 (8C27h)	User output (USR-OUT3) (IO) source A function		C	128: CONST-OFF	–	17939 (4613h)
35880 (8C28h)	35881 (8C29h)	User output (USR-OUT4) (IO) source A function		C	128: CONST-OFF	–	17940 (4614h)
35882 (8C2Ah)	35883 (8C2Bh)	User output (USR-OUT5) (IO) source A function		C	128: CONST-OFF	–	17941 (4615h)
35884 (8C2Ch)	35885 (8C2Dh)	User output (USR-OUT6) (IO) source A function		C	128: CONST-OFF	–	17942 (4616h)
35886 (8C2Eh)	35887 (8C2Fh)	User output (USR-OUT7) (IO) source A function		C	128: CONST-OFF	–	17943 (4617h)

Modbus communication Register address		Name	Description	Update	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
35904 (8C40h)	35905 (8C41h)	User output (USR-OUT0) (IO) source A inverting mode	Changes the ON/OFF status of the user output source A. This is the setting when the operation mode is set to internal IO judgment. [**Setting range**] 0: Non invert 1: Invert	C	0	–	17952 (4620h)
35906 (8C42h)	35907 (8C43h)	User output (USR-OUT1) (IO) source A inverting mode		C	0	–	17953 (4621h)
35908 (8C44h)	35909 (8C45h)	User output (USR-OUT2) (IO) source A inverting mode		C	0	–	17954 (4622h)
35910 (8C46h)	35911 (8C47h)	User output (USR-OUT3) (IO) source A inverting mode		C	0	–	17955 (4623h)
35912 (8C48h)	35913 (8C49h)	User output (USR-OUT4) (IO) source A inverting mode		C	0	–	17956 (4624h)
35914 (8C4Ah)	35915 (8C4Bh)	User output (USR-OUT5) (IO) source A inverting mode		C	0	–	17957 (4625h)
35916 (8C4Ch)	35917 (8C4Dh)	User output (USR-OUT6) (IO) source A inverting mode		C	0	–	17958 (4626h)
35918 (8C4Eh)	35919 (8C4Fh)	User output (USR-OUT7) (IO) source A inverting mode		C	0	–	17959 (4627h)
35936 (8C60h)	35937 (8C61h)	User output (USR-OUT0) (IO) source B function	Selects the user output source B function (output signal) for USR-OUT0 to USR-OUT7. This is the setting when the operation mode is set to internal IO judgment. [**Setting range**] ⇨p.49 "2-2 Output signal list"	C	128: CONST-OFF	–	17968 (4630h)
35938 (8C62h)	35939 (8C63h)	User output (USR-OUT1) (IO) source B function		C	128: CONST-OFF	–	17969 (4631h)
35940 (8C64h)	35941 (8C65h)	User output (USR-OUT2) (IO) source B function		C	128: CONST-OFF	–	17970 (4632h)
35942 (8C66h)	35943 (8C67h)	User output (USR-OUT3) (IO) source B function		C	128: CONST-OFF	–	17971 (4633h)
35944 (8C68h)	35945 (8C69h)	User output (USR-OUT4) (IO) source B function		C	128: CONST-OFF	–	17972 (4634h)
35946 (8C6Ah)	35947 (8C6Bh)	User output (USR-OUT5) (IO) source B function		C	128: CONST-OFF	–	17973 (4635h)
35948 (8C6Ch)	35949 (8C6Dh)	User output (USR-OUT6) (IO) source B function		C	128: CONST-OFF	–	17974 (4636h)
35950 (8C6Eh)	35951 (8C6Fh)	User output (USR-OUT7) (IO) source B function		C	128: CONST-OFF	–	17975 (4637h)

Modbus communication Register address		Name	Description	Update	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
35968 (8C80h)	35969 (8C81h)	User output (USR-OUT0) (IO) source B inverting mode	Changes the ON/OFF status of the user output source B. This is the setting when the operation mode is set to internal IO judgment. [**Setting range**] 0: Non invert 1: Invert	C	0	–	17984 (4640h)
35970 (8C82h)	35971 (8C83h)	User output (USR-OUT1) (IO) source B inverting mode		C	0	–	17985 (4641h)
35972 (8C84h)	35973 (8C85h)	User output (USR-OUT2) (IO) source B inverting mode		C	0	–	17986 (4642h)
35974 (8C86h)	35975 (8C87h)	User output (USR-OUT3) (IO) source B inverting mode		C	0	–	17987 (4643h)
35976 (8C88h)	35977 (8C89h)	User output (USR-OUT4) (IO) source B inverting mode		C	0	–	17988 (4644h)
35978 (8C8Ah)	35979 (8C8Bh)	User output (USR-OUT5) (IO) source B inverting mode		C	0	–	17989 (4645h)
35980 (8C8Ch)	35981 (8C8Dh)	User output (USR-OUT6) (IO) source B inverting mode		C	0	–	17990 (4646h)
35982 (8C8Eh)	35983 (8C8Fh)	User output (USR-OUT7) (IO) source B inverting mode		C	0	–	17991 (4647h)
36000 (8CA0h)	36001 (8CA1h)	User output (USR-OUT0) (IO) logical operation	Sets the logical combination of user output source A and user output source B. This is the setting when the operation mode is set to internal IO judgment. [**Setting range**] 0: AND 1 OR	C	1	–	18000 (4650h)
36002 (8CA2h)	36003 (8CA3h)	User output (USR-OUT1) (IO) logical operation		C	1	–	18001 (4651h)
36004 (8CA4h)	36005 (8CA5h)	User output (USR-OUT2) (IO) logical operation		C	1	–	18002 (4652h)
36006 (8CA6h)	36007 (8CA7h)	User output (USR-OUT3) (IO) logical operation		C	1	–	18003 (4653h)
36008 (8CA8h)	36009 (8CA9h)	User output (USR-OUT4) (IO) logical operation		C	1	–	18004 (4654h)
36010 (8CAAh)	36011 (8CABh)	User output (USR-OUT5) (IO) logical operation		C	1	–	18005 (4655h)
36012 (8CACh)	36013 (8CADh)	User output (USR-OUT6) (IO) logical operation		C	1	–	18006 (4656h)
36014 (8CAEh)	36015 (8CAFh)	User output (USR-OUT7) (IO) logical operation		C	1	–	18007 (4657h)

Modbus communication Register address		Name	Description	Update	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
36032 (8CC0h)	36033 (8CC1h)	User output (USR-OUT0) (value) ON condition	Selects the ON condition of the user output. This is the setting when the operation mode is set to value judgment. [**Setting range**] 0: (value of target NET-ID + value Y) = (value X) 1: (target NET-ID value + value Y) < (value X) 2: (value of target NET-ID + value Y) ≤ (value X) 3: (value X) < (value of target NET-ID + value Y) 4: (value X) ≤ (value of target NET-ID + value Y) 5: (value of target NET-ID) < (value X) or (value Y) < (value of target NET-ID) 6: (value of target NET-ID) ≤ (value X) or (value Y) ≤ (value of target NET-ID) 7: (value X) < (value of target NET-ID) <(value Y) 8: (value X) ≤ (value of target NET-ID) ≤ (value Y) 9: (value Y) = ((value of target NET-ID) And (value X)) 10: (value Y) = ((value of target NET-ID) Or (value X)) 11: ((value of target NET-ID) And (valueX)) is not 0	C	0	–	18016 (4660h)
36034 (8CC2h)	36035 (8CC3h)	User output (USR-OUT1) (value) ON condition		C	0	–	18017 (4661h)
36036 (8CC4h)	36037 (8CC5h)	User output (USR-OUT2) (value) ON condition		C	0	–	18018 (4662h)
36038 (8CC6h)	36039 (8CC7h)	User output (USR-OUT3) (value) ON condition		C	0	–	18019 (4663h)
36040 (8CC8h)	36041 (8CC9h)	User output (USR-OUT4) (value) ON condition		C	0	–	18020 (4664h)
36042 (8CCAh)	36043 (8CCBh)	User output (USR-OUT5) (value) ON condition		C	0	–	18021 (4665h)
36044 (8CCCh)	36045 (8CCDh)	User output (USR-OUT6) (value) ON condition		C	0	–	18022 (4666h)
36046 (8CCEh)	36047 (8CCFh)	User output (USR-OUT7) (value) ON condition		C	0	–	18023 (4667h)
36064 (8CE0h)	36065 (8CE1h)	User output (USR-OUT0) (value) target NET-ID	Sets the target NET-ID of the user output. This is the setting when the operation mode is set to value judgment. [**Setting range**] 0 to 65,535	C	0	–	18032 (4670h)
36066 (8CE2h)	36067 (8CE3h)	User output (USR-OUT1) (value) target NET-ID		C	0	–	18033 (4671h)
36068 (8CE4h)	36069 (8CE5h)	User output (USR-OUT2) (value) target NET-ID		C	0	–	18034 (4672h)
36070 (8CE6h)	36071 (8CE7h)	User output (USR-OUT3) (value) target NET-ID		C	0	–	18035 (4673h)
36072 (8CE8h)	36073 (8CE9h)	User output (USR-OUT4) (value) target NET-ID		C	0	–	18036 (4674h)
36074 (8CEAh)	36075 (8CEBh)	User output (USR-OUT5) (value) target NET-ID		C	0	–	18037 (4675h)
36076 (8CECh)	36077 (8CEDh)	User output (USR-OUT6) (value) target NET-ID		C	0	–	18038 (4676h)
36078 (8CEEh)	36079 (8CEFh)	User output (USR-OUT7) (value) target NET-ID		C	0	–	18039 (4677h)

Modbus communication Register address		Name	Description	Update	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
36096 (8D00h)	36097 (8D01h)	User output (USR-OUT0) (value) value A	Sets the value A of the user ID. This is the setting when the operation mode is set to value judgment. [**Setting range**] −2,147,483,648 to 2,147,483,647	A	0	–	18048 (4680h)
36098 (8D02h)	36099 (8D03h)	User output (USR-OUT1) (value) value A		A	0	–	18049 (4681h)
36100 (8D04h)	36101 (8D05h)	User output (USR-OUT2) (value) value A		A	0	–	18050 (4682h)
36102 (8D06h)	36103 (8D07h)	User output (USR-OUT3) (value) value A		A	0	–	18051 (4683h)
36104 (8D08h)	36105 (8D09h)	User output (USR-OUT4) (value) value A		A	0	–	18052 (4684h)
36106 (8D0Ah)	36107 (8D0Bh)	User output (USR-OUT5) (value) value A		A	0	–	18053 (4685h)
36108 (8D0Ch)	36109 (8D0Dh)	User output (USR-OUT6) (value) value A		A	0	–	18054 (4686h)
36110 (8D0Eh)	36111 (8D0Fh)	User output (USR-OUT7) (value) value A		A	0	–	18055 (4687h)
36128 (8D20h)	36129 (8D21h)	User output (USR-OUT0) (value) value B	Sets the value B of the user output. This is the setting when the operation mode is set to value judgment. [**Setting range**] −2,147,483,648 to 2,147,483,647	A	0	–	18064 (4690h)
36130 (8D22h)	36131 (8D23h)	User output (USR-OUT1) (value) value B		A	0	–	18065 (4691h)
36132 (8D24h)	36133 (8D25h)	User output (USR-OUT2) (value) value B		A	0	–	18066 (4692h)
36134 (8D26h)	36135 (8D27h)	User output (USR-OUT3) (value) value B		A	0	–	18067 (4693h)
36136 (8D28h)	36137 (8D29h)	User output (USR-OUT4) (value) value B		A	0	–	18068 (4694h)
36138 (8D2Ah)	36139 (8D2Bh)	User output (USR-OUT5) (value) value B		A	0	–	18069 (4695h)
36140 (8D2Ch)	36141 (8D2Dh)	User output (USR-OUT6) (value) value B		A	0	–	18070 (4696h)
36142 (8D2Eh)	36143 (8D2Fh)	User output (USR-OUT7) (value) value B		A	0	–	18071 (4697h)

12-10 Virtual input function selection (VIN)

Modbus communication Register address		Name	Description	Update	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
35328 (8A00h)	35329 (8A01h)	Virtual input (VIR-IN0) function (link)	Selects the input signals to be assigned to VIR-IN0 to VIR-IN7. [**Setting range**] ⇨p.49 "2-1 Input signal list"	C	0: No function	–	17664 (4500h)
35330 (8A02h)	35331 (8A03h)	Virtual input (VIR-IN1) function (link)		C	0: No function	–	17665 (4501h)
35332 (8A04h)	35333 (8A05h)	Virtual input (VIR-IN2) function (link)		C	0: No function	–	17666 (4502h)
35334 (8A06h)	35335 (8A07h)	Virtual input (VIR-IN3) function (link)		C	0: No function	–	17667 (4503h)
35336 (8A08h)	35337 (8A09h)	Virtual input (VIR-IN4) function (link)		C	0: No function	–	17668 (4504h)
35338 (8A0Ah)	35339 (8A0Bh)	Virtual input (VIR-IN5) function (link)		C	0: No function	–	17669 (4505h)
35340 (8A0Ch)	35341 (8A0Dh)	Virtual input (VIR-IN6) function (link)		C	0: No function	–	17670 (4506h)
35342 (8A0Eh)	35343 (8A0Fh)	Virtual input (VIR-IN7) function (link)		C	0: No function	–	17671 (4507h)
35392 (8A40h)	35393 (8A41h)	Virtual input (VIR-IN0) source A function	Selects the virtual input source A function (output signal) for VIR-IN0 to VIR-IN7. [**Setting range**] ⇨p.51 "2-2 Output signal list"	C	128: CONST-OFF	–	17696 (4520h)
35394 (8A42h)	35395 (8A43h)	Virtual input (VIR-IN1) source A function		C	128: CONST-OFF	–	17697 (4521h)
35396 (8A44h)	35397 (8A45h)	Virtual input (VIR-IN2) source A function		C	128: CONST-OFF	–	17698 (4522h)
35398 (8A46h)	35399 (8A47h)	Virtual input (VIR-IN3) source A function		C	128: CONST-OFF	–	17699 (4523h)
35400 (8A48h)	35401 (8A49h)	Virtual input (VIR-IN4) source A function		C	128: CONST-OFF	–	17700 (4524h)
35402 (8A4Ah)	35403 (8A4Bh)	Virtual input (VIR-IN5) source A function		C	128: CONST-OFF	–	17701 (4525h)
35404 (8A4Ch)	35405 (8A4Dh)	Virtual input (VIR-IN6) source A function		C	128: CONST-OFF	–	17702 (4526h)
35406 (8A4Eh)	35407 (8A4Fh)	Virtual input (VIR-IN7) source A function		C	128: CONST-OFF	–	17703 (4527h)

Modbus communication Register address		Name	Description	Update	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
35456 (8A80h)	35457 (8A81h)	Virtual input (VIR-IN0) source A inverting mode	Changes the ON/OFF status of the virtual input source A. [**Setting range**] 0: Non invert 1: Invert	C	0	–	17728 (4540h)
35458 (8A82h)	35459 (8A83h)	Virtual input (VIR-IN1) source A inverting mode		C	0	–	17729 (4541h)
35460 (8A84h)	35461 (8A85h)	Virtual input (VIR-IN2) source A inverting mode		C	0	–	17730 (4542h)
35462 (8A86h)	35463 (8A87h)	Virtual input (VIR-IN3) source A inverting mode		C	0	–	17731 (4543h)
35464 (8A88h)	35465 (8A89h)	Virtual input (VIR-IN4) source A inverting mode		C	0	–	17732 (4544h)
35466 (8A8Ah)	35467 (8A8Bh)	Virtual input (VIR-IN5) source A inverting mode		C	0	–	17733 (4545h)
35468 (8A8Ch)	35469 (8A8Dh)	Virtual input (VIR-IN6) source A inverting mode		C	0	–	17734 (4546h)
35470 (8A8Eh)	35471 (8A8Fh)	Virtual input (VIR-IN7) source A inverting mode		C	0	–	17735 (4547h)
35520 (8AC0h)	35521 (8AC1h)	Virtual input (VIR-IN0) source B function	Selects the virtual input source B function (output signal) for VIR-IN0 to VIR-IN7. [**Setting range**] ⇨p.51 "2-2 Output signal list"	C	128: CONST-OFF	–	17760 (4560h)
35522 (8AC2h)	35523 (8AC3h)	Virtual input (VIR-IN1) source B function		C	128: CONST-OFF	–	17761 (4561h)
35524 (8AC4h)	35525 (8AC5h)	Virtual input (VIR-IN2) source B function		C	128: CONST-OFF	–	17762 (4562h)
35526 (8AC6h)	35527 (8AC7h)	Virtual input (VIR-IN3) source B function		C	128: CONST-OFF	–	17763 (4563h)
35528 (8AC8h)	35529 (8AC9h)	Virtual input (VIR-IN4) source B function		C	128: CONST-OFF	–	17764 (4564h)
35530 (8ACAh)	35531 (8ACBh)	Virtual input (VIR-IN5) source B function		C	128: CONST-OFF	–	17765 (4565h)
35532 (8ACCh)	35533 (8ACDh)	Virtual input (VIR-IN6) source B function		C	128: CONST-OFF	–	17766 (4566h)
35534 (8ACEh)	35535 (8ACFh)	Virtual input (VIR-IN7) source B function		C	128: CONST-OFF	–	17767 (4567h)

Modbus communication Register address		Name	Description	Update	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
35584 (8B00h)	35585 (8B01h)	Virtual input (VIR-IN0) source B inverting mode	Changes the ON/OFF status of the virtual input source B. [**Setting range**] 0: Non invert 1: Invert	C	0	–	17792 (4580h)
35586 (8B02h)	35587 (8B03h)	Virtual input (VIR-IN1) source B inverting mode		C	0	–	17793 (4581h)
35588 (8B04h)	35589 (8B05h)	Virtual input (VIR-IN2) source B inverting mode		C	0	–	17794 (4582h)
35590 (8B06h)	35591 (8B07h)	Virtual input (VIR-IN3) source B inverting mode		C	0	–	17795 (4583h)
35592 (8B08h)	35593 (8B09h)	Virtual input (VIR-IN4) source B inverting mode		C	0	–	17796 (4584h)
35594 (8B0Ah)	35595 (8B0Bh)	Virtual input (VIR-IN5) source B inverting mode		C	0	–	17797 (4585h)
35596 (8B0Ch)	35597 (8B0Dh)	Virtual input (VIR-IN6) source B inverting mode		C	0	–	17798 (4586h)
35598 (8B0Eh)	35599 (8B0Fh)	Virtual input (VIR-IN7) source B inverting mode		C	0	–	17799 (4587h)
35648 (8B40h)	35649 (8B41h)	Virtual input (VIR-IN0) logical operation	Sets the logical combination of virtual input source A and virtual input source B. [**Setting range**] 0: AND 1 OR	C	1	–	17824 (45A0h)
35650 (8B42h)	35651 (8B43h)	Virtual input (VIR-IN1) logical operation		C	1	–	17825 (45A1h)
35652 (8B44h)	35653 (8B45h)	Virtual input (VIR-IN2) logical operation		C	1	–	17826 (45A2h)
35654 (8B46h)	35655 (8B47h)	Virtual input (VIR-IN3) logical operation		C	1	–	17827 (45A3h)
35656 (8B48h)	35657 (8B49h)	Virtual input (VIR-IN4) logical operation		C	1	–	17828 (45A4h)
35658 (8B4Ah)	35659 (8B4Bh)	Virtual input (VIR-IN5) logical operation		C	1	–	17829 (45A5h)
35660 (8B4Ch)	35661 (8B4Dh)	Virtual input (VIR-IN6) logical operation		C	1	–	17830 (45A6h)
35662 (8B4Eh)	35663 (8B4Fh)	Virtual input (VIR-IN7) logical operation		C	1	–	17831 (45A7h)

Modbus communication Register address		Name	Description	Update	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
35712 (8B80h)	35713 (8B81h)	Virtual input (VIR-IN0) ON signal dead-time	Sets the ON signal dead-time for VIR-IN0 to VIR-IN7. (The input signal is turned ON when the time having set is exceeded.) [**Setting range**] 0 to 4,000 ms	C	0	ms	17856 (45C0h)
35714 (8B82h)	35715 (8B83h)	Virtual input (VIR-IN1) ON signal dead-time		C	0	ms	17857 (45C1h)
35716 (8B84h)	35717 (8B85h)	Virtual input (VIR-IN2) ON signal dead-time		C	0	ms	17858 (45C2h)
35718 (8B86h)	35719 (8B87h)	Virtual input (VIR-IN3) ON signal dead-time		C	0	ms	17859 (45C3h)
35720 (8B88h)	35721 (8B89h)	Virtual input (VIR-IN4) ON signal dead-time		C	0	ms	17860 (45C4h)
35722 (8B8Ah)	35723 (8B8Bh)	Virtual input (VIR-IN5) ON signal dead-time		C	0	ms	17861 (45C5h)
35724 (8B8Ch)	35725 (8B8Dh)	Virtual input (VIR-IN6) ON signal dead-time		C	0	ms	17862 (45C6h)
35726 (8B8Eh)	35727 (8B8Fh)	Virtual input (VIR-IN7) ON signal dead-time		C	0	ms	17863 (45C7h)
35776 (8BC0h)	35777 (8BC1h)	Virtual input (VIR-IN0) 1 shot signal mode	Enables the 1-shot signal function for VIR-IN0 to VIR-IN7. (The input signal having been turned ON is automatically turned OFF after 250 µs.) [**Setting range**] 0: Disable 1: Enable	C	0	–	17888 (45E0h)
35778 (8BC2h)	35779 (8BC3h)	Virtual input (VIR-IN1) 1 shot signal mode		C	0	–	17889 (45E1h)
35780 (8BC4h)	35781 (8BC5h)	Virtual input (VIR-IN2) 1 shot signal mode		C	0	–	17890 (45E2h)
35782 (8BC6h)	35783 (8BC7h)	Virtual input (VIR-IN3) 1 shot signal mode		C	0	–	17891 (45E3h)
35784 (8BC8h)	35785 (8BC9h)	Virtual input (VIR-IN4) 1 shot signal mode		C	0	–	17892 (45E4h)
35786 (8BCAh)	35787 (8BCBh)	Virtual input (VIR-IN5) 1 shot signal mode		C	0	–	17893 (45E5h)
35788 (8BCCh)	35789 (8BCDh)	Virtual input (VIR-IN6) 1 shot signal mode		C	0	–	17894 (45E6h)
35790 (8BCEh)	35791 (8BCFh)	Virtual input (VIR-IN7) 1 shot signal mode		C	0	–	17895 (45E7h)

12-11 Data transfer

Modbus communication Register address		Name	Description	Update	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
33792 (8400h)	33793 (8401h)	Data transfer (DTF0) trigger IO	Selects the output signal to be the trigger for data transfer. [**Setting range**] ⇨p.51 "2-2 Output signal list"	C	0: No function	–	16896 (4200h)
33794 (8402h)	33795 (8403h)	Data transfer (DTF1) trigger IO		C	0: No function	–	16897 (4201h)
33796 (8404h)	33797 (8405h)	Data transfer (DTF2) trigger IO		C	0: No function	–	16898 (4202h)
33798 (8406h)	33799 (8407h)	Data transfer (DTF3) trigger IO		C	0: No function	–	16899 (4203h)
33800 (8408h)	33801 (8409h)	Data transfer (DTF4) trigger IO		C	0: No function	–	16900 (4204h)
33802 (840Ah)	33803 (840Bh)	Data transfer (DTF5) trigger IO		C	0: No function	–	16901 (4205h)
33804 (840Ch)	33805 (840Dh)	Data transfer (DTF6) trigger IO		C	0: No function	–	16902 (4206h)
33806 (840Eh)	33807 (840Fh)	Data transfer (DTF7) trigger IO		C	0: No function	–	16903 (4207h)
33808 (8410h)	33809 (8411h)	Data transfer (DTF8) trigger IO		C	0: No function	–	16904 (4208h)
33810 (8412h)	33811 (8413h)	Data transfer (DTF9) trigger IO		C	0: No function	–	16905 (4209h)
33812 (8414h)	33813 (8415h)	Data transfer (DTF10) trigger IO		C	0: No function	–	16906 (420Ah)
33814 (8416h)	33815 (8417h)	Data transfer (DTF11) trigger IO		C	0: No function	–	16907 (420Bh)
33816 (8418h)	33817 (8419h)	Data transfer (DTF12) trigger IO		C	0: No function	–	16908 (420Ch)
33818 (841Ah)	33819 (841Bh)	Data transfer (DTF13) trigger IO		C	0: No function	–	16909 (420Dh)
33820 (841Ch)	33821 (841Dh)	Data transfer (DTF14) trigger IO		C	0: No function	–	16910 (420Eh)
33822 (841Eh)	33823 (841Fh)	Data transfer (DTF15) trigger IO		C	0: No function	–	16911 (420Fh)
33824 (8420h)	33825 (8421h)	Data transfer (DTF16) trigger IO		C	0: No function	–	16912 (4210h)
33826 (8422h)	33827 (8423h)	Data transfer (DTF17) trigger IO		C	0: No function	–	16913 (4211h)
33828 (8424h)	33829 (8425h)	Data transfer (DTF18) trigger IO		C	0: No function	–	16914 (4212h)
33830 (8426h)	33831 (8427h)	Data transfer (DTF19) trigger IO		C	0: No function	–	16915 (4213h)
33832 (8428h)	33833 (8429h)	Data transfer (DTF20) trigger IO		C	0: No function	–	16916 (4214h)
33834 (842Ah)	33835 (842Bh)	Data transfer (DTF21) trigger IO		C	0: No function	–	16917 (4215h)
33836 (842Ch)	33837 (842Dh)	Data transfer (DTF22) trigger IO		C	0: No function	–	16918 (4216h)
33838 (842Eh)	33839 (842Fh)	Data transfer (DTF23) trigger IO		C	0: No function	–	16919 (4217h)

Modbus communication Register address		Name	Description	Update	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
33840 (8430h)	33841 (8431h)	Data transfer (DTF24) trigger IO	Selects the output signal to be the trigger for data transfer. [**Setting range**] ⇨p.51 "2-2 Output signal list"	C	0: No function	–	16920 (4218h)
33842 (8432h)	33843 (8433h)	Data transfer (DTF25) trigger IO		C	0: No function	–	16921 (4219h)
33844 (8434h)	33845 (8435h)	Data transfer (DTF26) trigger IO		C	0: No function	–	16922 (421Ah)
33846 (8436h)	33847 (8437h)	Data transfer (DTF27) trigger IO		C	0: No function	–	16923 (421Bh)
33848 (8438h)	33849 (8439h)	Data transfer (DTF28) trigger IO		C	0: No function	–	16924 (421Ch)
33850 (843Ah)	33851 (843Bh)	Data transfer (DTF29) trigger IO		C	0: No function	–	16925 (421Dh)
33852 (843Ch)	33853 (843Dh)	Data transfer (DTF30) trigger IO		C	0: No function	–	16926 (421Eh)
33854 (843Eh)	33855 (843Fh)	Data transfer (DTF31) trigger IO		C	0: No function	–	16927 (421Fh)
33856 (8440h)	33857 (8441h)	Data transfer (DTF0) trigger form	Selects the edge shape to be the trigger. [**Setting range**] 0: Positive-Edge 1: Negative-Edge 2: Double-Edge	C	0	–	16928 (4220h)
33858 (8442h)	33859 (8443h)	Data transfer (DTF1) trigger form		C	0	–	16929 (4221h)
33860 (8444h)	33861 (8445h)	Data transfer (DTF2) trigger form		C	0	–	16930 (4222h)
33862 (8446h)	33863 (8447h)	Data transfer (DTF3) trigger form		C	0	–	16931 (4223h)
33864 (8448h)	33865 (8449h)	Data transfer (DTF4) trigger form		C	0	–	16932 (4224h)
33866 (844Ah)	33867 (844Bh)	Data transfer (DTF5) trigger form		C	0	–	16933 (4225h)
33868 (844Ch)	33869 (844Dh)	Data transfer (DTF6) trigger form		C	0	–	16934 (4226h)
33870 (844Eh)	33871 (844Fh)	Data transfer (DTF7) trigger form		C	0	–	16935 (4227h)
33872 (8450h)	33873 (8451h)	Data transfer (DTF8) trigger form		C	0	–	16936 (4228h)
33874 (8452h)	33875 (8453h)	Data transfer (DTF9) trigger form		C	0	–	16937 (4229h)
33876 (8454h)	33877 (8455h)	Data transfer (DTF10) trigger form		C	0	–	16938 (422Ah)
33878 (8456h)	33879 (8457h)	Data transfer (DTF11) trigger form		C	0	–	16939 (422Bh)
33880 (8458h)	33881 (8459h)	Data transfer (DTF12) trigger form		C	0	–	16940 (422Ch)
33882 (845Ah)	33883 (845Bh)	Data transfer (DTF13) trigger form		C	0	–	16941 (422Dh)
33884 (845Ch)	33885 (845Dh)	Data transfer (DTF14) trigger form		C	0	–	16942 (422Eh)
33886 (845Eh)	33887 (845Fh)	Data transfer (DTF15) trigger form		C	0	–	16943 (422Fh)
33888 (8460h)	33889 (8461h)	Data transfer (DTF16) trigger form		C	0	–	16944 (4230h)

Modbus communication Register address		Name	Description	Update	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
33890 (8462h)	33891 (8463h)	Data transfer (DTF17) trigger form	Selects the edge shape to be the trigger. [**Setting range**] 0: Positive-Edge 1: Negative-Edge 2: Double-Edge	C	0	–	16945 (4231h)
33892 (8464h)	33893 (8465h)	Data transfer (DTF18) trigger form		C	0	–	16946 (4232h)
33894 (8466h)	33895 (8467h)	Data transfer (DTF19) trigger form		C	0	–	16947 (4233h)
33896 (8468h)	33897 (8469h)	Data transfer (DTF20) trigger form		C	0	–	16948 (4234h)
33898 (846Ah)	33899 (846Bh)	Data transfer (DTF21) trigger form		C	0	–	16949 (4235h)
33900 (846Ch)	33901 (846Dh)	Data transfer (DTF22) trigger form		C	0	–	16950 (4236h)
33902 (846Eh)	33903 (846Fh)	Data transfer (DTF23) trigger form		C	0	–	16951 (4237h)
33904 (8470h)	33905 (8471h)	Data transfer (DTF24) trigger form		C	0	–	16952 (4238h)
33906 (8472h)	33907 (8473h)	Data transfer (DTF25) trigger form		C	0	–	16953 (4239h)
33908 (8474h)	33909 (8475h)	Data transfer (DTF26) trigger form		C	0	–	16954 (423Ah)
33910 (8476h)	33911 (8477h)	Data transfer (DTF27) trigger form		C	0	–	16955 (423Bh)
33912 (8478h)	33913 (8479h)	Data transfer (DTF28) trigger form		C	0	–	16956 (423Ch)
33914 (847Ah)	33915 (847Bh)	Data transfer (DTF29) trigger form		C	0	–	16957 (423Dh)
33916 (847Ch)	33917 (847Dh)	Data transfer (DTF30) trigger form		C	0	–	16958 (423Eh)
33918 (847Eh)	33919 (847Fh)	Data transfer (DTF31) trigger form		C	0	–	16959 (423Fh)

Modbus communication Register address		Name	Description	Update	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
33920 (8480h)	33921 (8481h)	Data transfer (DTF0) transfer mode	Selects the transfer mode of data transfer. [**Setting range**] 0: Transfers the value of the argument NET-ID to the target NET-ID 1: Transfers the value of the argument NET-ID to the target NET-ID with AND-Logic synthesis 2: Transfers the value of the argument NET-ID to the target NET-ID with OR-Logic synthesis 3: Transfers the value of the argument NET-ID to the target NET-ID with CLR-Logic synthesis 4: Transfers the value of the argument NET-ID to the target NET-ID with Additive function 8: Transfers the value of the argument to the target NET-ID 9: Transfers the value of the argument to the target NET-ID with AND-Logic synthesis 10: Transfers the value of the argument to the target NET-ID with OR-Logic synthesis 11: Transfers the value of the argument to the target NET-ID with CLR-Logic synthesis 12: Transfers the value of the argument to the target NET-ID with Additive function	C	0	–	16960 (4240h)
33922 (8482h)	33923 (8483h)	Data transfer (DTF1) transfer mode		C	0	–	16961 (4241h)
33924 (8484h)	33925 (8485h)	Data transfer (DTF2) transfer mode		C	0	–	16962 (4242h)
33926 (8486h)	33927 (8487h)	Data transfer (DTF3) transfer mode		C	0	–	16963 (4243h)
33928 (8488h)	33929 (8489h)	Data transfer (DTF4) transfer mode		C	0	–	16964 (4244h)
33930 (848Ah)	33931 (848Bh)	Data transfer (DTF5) transfer mode		C	0	–	16965 (4245h)
33932 (848Ch)	33933 (848Dh)	Data transfer (DTF6) transfer mode		C	0	–	16966 (4246h)
33934 (848Eh)	33935 (848Fh)	Data transfer (DTF7) transfer mode		C	0	–	16967 (4247h)
33936 (8490h)	33937 (8491h)	Data transfer (DTF8) transfer mode		C	0	–	16968 (4248h)
33938 (8492h)	33939 (8493h)	Data transfer (DTF9) transfer mode		C	0	–	16969 (4249h)
33940 (8494h)	33941 (8495h)	Data transfer (DTF10) transfer mode		C	0	–	16970 (424Ah)
33942 (8496h)	33943 (8497h)	Data transfer (DTF11) transfer mode		C	0	–	16971 (424Bh)
33944 (8498h)	33945 (8499h)	Data transfer (DTF12) transfer mode		C	0	–	16972 (424Ch)
33946 (849Ah)	33947 (849Bh)	Data transfer (DTF13) transfer mode		C	0	–	16973 (424Dh)
33948 (849Ch)	33949 (849Dh)	Data transfer (DTF14) transfer mode		C	0	–	16974 (424Eh)
33950 (849Eh)	33951 (849Fh)	Data transfer (DTF15) transfer mode		C	0	–	16975 (424Fh)
33952 (84A0h)	33953 (84A1h)	Data transfer (DTF16) transfer mode		C	0	–	16976 (4250h)
33954 (84A2h)	33955 (84A3h)	Data transfer (DTF17) transfer mode		C	0	–	16977 (4251h)
33956 (84A4h)	33957 (84A5h)	Data transfer (DTF18) transfer mode		C	0	–	16978 (4252h)
33958 (84A6h)	33959 (84A7h)	Data transfer (DTF19) transfer mode		C	0	–	16979 (4253h)
33960 (84A8h)	33961 (84A9h)	Data transfer (DTF20) transfer mode		C	0	–	16980 (4254h)

Modbus communication Register address		Name	Description	Update	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
33962 (84AAh)	33963 (84ABh)	Data transfer (DTF21) transfer mode	Selects the transfer mode of data transfer. [**Setting range**] 0: Transfers the value of the argument NET-ID to the target NET-ID 1: Transfers the value of the argument NET-ID to the target NET-ID with AND-Logic synthesis 2: Transfers the value of the argument NET-ID to the target NET-ID with OR-Logic synthesis 3: Transfers the value of the argument NET-ID to the target NET-ID with CLR-Logic synthesis 4: Transfers the value of the argument NET-ID to the target NET-ID with Additive function 8: Transfers the value of the argument to the target NET-ID 9: Transfers the value of the argument to the target NET-ID with AND-Logic synthesis 10: Transfers the value of the argument to the target NET-ID with OR-Logic synthesis 11: Transfers the value of the argument to the target NET-ID with CLR-Logic synthesis 12: Transfers the value of the argument to the target NET-ID with Additive function	C	0	–	16981 (4255h)
33964 (84ACh)	33965 (84ADh)	Data transfer (DTF22) transfer mode		C	0	–	16982 (4256h)
33966 (84AEh)	33967 (84AFh)	Data transfer (DTF23) transfer mode		C	0	–	16983 (4257h)
33968 (84B0h)	33969 (84B1h)	Data transfer (DTF24) transfer mode		C	0	–	16984 (4258h)
33970 (84B2h)	33971 (84B3h)	Data transfer (DTF25) transfer mode		C	0	–	16985 (4259h)
33972 (84B4h)	33973 (84B5h)	Data transfer (DTF26) transfer mode		C	0	–	16986 (425Ah)
33974 (84B6h)	33975 (84B7h)	Data transfer (DTF27) transfer mode		C	0	–	16987 (425Bh)
33976 (84B8h)	33977 (84B9h)	Data transfer (DTF28) transfer mode		C	0	–	16988 (425Ch)
33978 (84BAh)	33979 (84BBh)	Data transfer (DTF29) transfer mode		C	0	–	16989 (425Dh)
33980 (84BCh)	33981 (84BDh)	Data transfer (DTF30) transfer mode		C	0	–	16990 (425Eh)
33982 (84BEh)	33983 (84BFh)	Data transfer (DTF31) transfer mode		C	0	–	16991 (425Fh)
33984 (84C0h)	33985 (84C1h)	Data transfer (DTF0) argument	Sets the value or NET-ID (data source) to be transferred in data transfer. [**Setting range**] −2,147,483,648 to 2,147,483,647	A	0	–	16992 (4260h)
33986 (84C2h)	33987 (84C3h)	Data transfer (DTF1) argument		A	0	–	16993 (4261h)
33988 (84C4h)	33989 (84C5h)	Data transfer (DTF2) argument		A	0	–	16994 (4262h)
33990 (84C6h)	33991 (84C7h)	Data transfer (DTF3) argument		A	0	–	16995 (4263h)
33992 (84C8h)	33993 (84C9h)	Data transfer (DTF4) argument		A	0	–	16996 (4264h)
33994 (84CAh)	33995 (84CBh)	Data transfer (DTF5) argument		A	0	–	16997 (4265h)
33996 (84CCh)	33997 (84CDh)	Data transfer (DTF6) argument		A	0	–	16998 (4266h)
33998 (84CEh)	33999 (84CFh)	Data transfer (DTF7) argument		A	0	–	16999 (4267h)
34000 (84D0h)	34001 (84D1h)	Data transfer (DTF8) argument		A	0	–	17000 (4268h)
34002 (84D2h)	34003 (84D3h)	Data transfer (DTF9) argument		A	0	–	17001 (4269h)

Modbus communication Register address		Name	Description	Update	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
34004 (84D4h)	34005 (84D5h)	Data transfer (DTF10) argument	Sets the value or NET-ID (data source) to be transferred in data transfer. [**Setting range**] –2,147,483,648 to 2,147,483,647	A	0	–	17002 (426Ah)
34006 (84D6h)	34007 (84D7h)	Data transfer (DTF11) argument		A	0	–	17003 (426Bh)
34008 (84D8h)	34009 (84D9h)	Data transfer (DTF12) argument		A	0	–	17004 (426Ch)
34010 (84DAh)	34011 (84DBh)	Data transfer (DTF13) argument		A	0	–	17005 (426Dh)
34012 (84DCh)	34013 (84DDh)	Data transfer (DTF14) argument		A	0	–	17006 (426Eh)
34014 (84DEh)	34015 (84DFh)	Data transfer (DTF15) argument		A	0	–	17007 (426Fh)
34016 (84E0h)	34017 (84E1h)	Data transfer (DTF16) argument		A	0	–	17008 (4270h)
34018 (84E2h)	34019 (84E3h)	Data transfer (DTF17) argument		A	0	–	17009 (4271h)
34020 (84E4h)	34021 (84E5h)	Data transfer (DTF18) argument		A	0	–	17010 (4272h)
34022 (84E6h)	34023 (84E7h)	Data transfer (DTF19) argument		A	0	–	17011 (4273h)
34024 (84E8h)	34025 (84E9h)	Data transfer (DTF20) argument		A	0	–	17012 (4274h)
34026 (84EAh)	34027 (84EBh)	Data transfer (DTF21) argument		A	0	–	17013 (4275h)
34028 (84ECh)	34029 (84EDh)	Data transfer (DTF22) argument		A	0	–	17014 (4276h)
34030 (84EEh)	34031 (84EFh)	Data transfer (DTF23) argument		A	0	–	17015 (4277h)
34032 (84F0h)	34033 (84F1h)	Data transfer (DTF24) argument		A	0	–	17016 (4278h)
34034 (84F2h)	34035 (84F3h)	Data transfer (DTF25) argument		A	0	–	17017 (4279h)
34036 (84F4h)	34037 (84F5h)	Data transfer (DTF26) argument		A	0	–	17018 (427Ah)
34038 (84F6h)	34039 (84F7h)	Data transfer (DTF27) argument		A	0	–	17019 (427Bh)
34040 (84F8h)	34041 (84F9h)	Data transfer (DTF28) argument		A	0	–	17020 (427Ch)
34042 (84FAh)	34043 (84FBh)	Data transfer (DTF29) argument		A	0	–	17021 (427Dh)
34044 (84FCh)	34045 (84FDh)	Data transfer (DTF30) argument		A	0	–	17022 (427Eh)
34046 (84FEh)	34047 (84FFh)	Data transfer (DTF31) argument		A	0	–	17023 (427Fh)

Modbus communication Register address		Name	Description	Update	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
34048 (8500h)	34049 (8501h)	Data transfer (DTF0) target NET-ID	Sets the NET-ID (data destination) to be transferred in data transfer. [**Setting range**] 0 to 65,535	A	0	–	17024 (4280h)
34050 (8502h)	34051 (8503h)	Data transfer (DTF1) target NET-ID		A	0	–	17025 (4281h)
34052 (8504h)	34053 (8505h)	Data transfer (DTF2) target NET-ID		A	0	–	17026 (4282h)
34054 (8506h)	34055 (8507h)	Data transfer (DTF3) target NET-ID		A	0	–	17027 (4283h)
34056 (8508h)	34057 (8509h)	Data transfer (DTF4) target NET-ID		A	0	–	17028 (4284h)
34058 (850Ah)	34059 (850Bh)	Data transfer (DTF5) target NET-ID		A	0	–	17029 (4285h)
34060 (850Ch)	34061 (850Dh)	Data transfer (DTF6) target NET-ID		A	0	–	17030 (4286h)
34062 (850Eh)	34063 (850Fh)	Data transfer (DTF7) target NET-ID		A	0	–	17031 (4287h)
34064 (8510h)	34065 (8511h)	Data transfer (DTF8) target NET-ID		A	0	–	17032 (4288h)
34066 (8512h)	34067 (8513h)	Data transfer (DTF9) target NET-ID		A	0	–	17033 (4289h)
34068 (8514h)	34069 (8515h)	Data transfer (DTF10) target NET-ID		A	0	–	17034 (428Ah)
34070 (8516h)	34071 (8517h)	Data transfer (DTF11) target NET-ID		A	0	–	17035 (428Bh)
34072 (8518h)	34073 (8519h)	Data transfer (DTF12) target NET-ID		A	0	–	17036 (428Ch)
34074 (851Ah)	34075 (851Bh)	Data transfer (DTF13) target NET-ID		A	0	–	17037 (428Dh)
34076 (851Ch)	34077 (851Dh)	Data transfer (DTF14) target NET-ID		A	0	–	17038 (428Eh)
34078 (851Eh)	34079 (851Fh)	Data transfer (DTF15) target NET-ID		A	0	–	17039 (428Fh)
34080 (8520h)	34081 (8521h)	Data transfer (DTF16) target NET-ID		A	0	–	17040 (4290h)
34082 (8522h)	34083 (8523h)	Data transfer (DTF17) target NET-ID		A	0	–	17041 (4291h)
34084 (8524h)	34085 (8525h)	Data transfer (DTF18) target NET-ID		A	0	–	17042 (4292h)
34086 (8526h)	34087 (8527h)	Data transfer (DTF19) target NET-ID		A	0	–	17043 (4293h)
34088 (8528h)	34089 (8529h)	Data transfer (DTF20) target NET-ID		A	0	–	17044 (4294h)

Modbus communication Register address		Name	Description	Update	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
34090 (852Ah)	34091 (852Bh)	Data transfer (DTF21) target NET-ID	Sets the NET-ID (data destination) to be transferred in data transfer. [**Setting range**] 0 to 65,535	A	0	–	17045 (4295h)
34092 (852Ch)	34093 (852Dh)	Data transfer (DTF22) target NET-ID		A	0	–	17046 (4296h)
34094 (852Eh)	34095 (852Fh)	Data transfer (DTF23) target NET-ID		A	0	–	17047 (4297h)
34096 (8530h)	34097 (8531h)	Data transfer (DTF24) target NET-ID		A	0	–	17048 (4298h)
34098 (8532h)	34099 (8533h)	Data transfer (DTF25) target NET-ID		A	0	–	17049 (4299h)
34100 (8534h)	34101 (8535h)	Data transfer (DTF26) target NET-ID		A	0	–	17050 (429Ah)
34102 (8536h)	34103 (8537h)	Data transfer (DTF27) target NET-ID		A	0	–	17051 (429Bh)
34104 (8538h)	34105 (8539h)	Data transfer (DTF28) target NET-ID		A	0	–	17052 (429Ch)
34106 (853Ah)	34107 (853Bh)	Data transfer (DTF29) target NET-ID		A	0	–	17053 (429Dh)
34108 (853Ch)	34109 (853Dh)	Data transfer (DTF30) target NET-ID		A	0	–	17054 (429Eh)
34110 (853Eh)	34111 (853Fh)	Data transfer (DTF31) target NET-ID		A	0	–	17055 (429Fh)

12-12 General purpose registers

Modbus communication Register address		Name	Description	Update	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
2048 (0800h)	2049 (0801h)	General register 0 default value	Sets the initial value of the general register. [**Setting range**] –2,147,483,648 to 2,147,483,647	A	0	–	1024 (0400h)
2050 (0802h)	2051 (0803h)	General register 1 default value		A	0	–	1025 (0401h)
2052 (0804h)	2053 (0805h)	General register 2 default value		A	0	–	1026 (0402h)
2054 (0806h)	2055 (0807h)	General register 3 default value		A	0	–	1027 (0403h)
2056 (0808h)	2057 (0809h)	General register 4 default value		A	0	–	1028 (0404h)
2058 (080Ah)	2059 (080Bh)	General register 5 default value		A	0	–	1029 (0405h)
2060 (080Ch)	2061 (080Dh)	General register 6 default value		A	0	–	1030 (0406h)
2062 (080Eh)	2063 (080Fh)	General register 7 default value		A	0	–	1031 (0407h)
2064 (0810h)	2065 (0811h)	General register 8 default value		A	0	–	1032 (0408h)
2066 (0812h)	2067 (0813h)	General register 9 default value		A	0	–	1033 (0409h)
2068 (0814h)	2069 (0815h)	General register 10 default value		A	0	–	1034 (040Ah)
2070 (0816h)	2071 (0817h)	General register 11 default value		A	0	–	1035 (040Bh)
2072 (0818h)	2073 (0819h)	General register 12 default value		A	0	–	1036 (040Ch)
2074 (081Ah)	2075 (081Bh)	General register 13 default value		A	0	–	1037 (040Dh)
2076 (081Ch)	2077 (081Dh)	General register 14 default value		A	0	–	1038 (040Eh)
2078 (081Eh)	2079 (081Fh)	General register 15 default value		A	0	–	1039 (040Fh)
2080 (0820h)	2081 (0821h)	General register 16 default value		A	0	–	1040 (0410h)
2082 (0822h)	2083 (0823h)	General register 17 default value		A	0	–	1041 (0411h)
2084 (0824h)	2085 (0825h)	General register 18 default value		A	0	–	1042 (0412h)
2086 (0826h)	2087 (0827h)	General register 19 default value		A	0	–	1043 (0413h)
2088 (0828h)	2089 (0829h)	General register 20 default value		A	0	–	1044 (0414h)
2090 (082Ah)	2091 (082Bh)	General register 21 default value		A	0	–	1045 (0415h)
2092 (082Ch)	2093 (082Dh)	General register 22 default value		A	0	–	1046 (0416h)
2094 (082Eh)	2095 (082Fh)	General register 23 default value		A	0	–	1047 (0417h)

Modbus communication Register address		Name	Description	Update	Initial setting		NET-ID
Upper	Lower				Initial value	Unit	
2096 (0830h)	2097 (0831h)	General register 24 default value	Sets the initial value of the general register. [**Setting range**] –2,147,483,648 to 2,147,483,647	A	0	–	1048 (0418h)
2098 (0832h)	2099 (0833h)	General register 25 default value		A	0	–	1049 (0419h)
2100 (0834h)	2101 (0835h)	General register 26 default value		A	0	–	1050 (041Ah)
2102 (0836h)	2103 (0837h)	General register 27 default value		A	0	–	1051 (041Bh)
2104 (0838h)	2105 (0839h)	General register 28 default value		A	0	–	1052 (041Ch)
2106 (083Ah)	2107 (083Bh)	General register 29 default value		A	0	–	1053 (041Dh)
2108 (083Ch)	2109 (083Dh)	General register 30 default value		A	0	–	1054 (041Eh)
2110 (083Eh)	2111 (083Fh)	General register 31 default value		A	0	–	1055 (041Fh)

13 I/O signals assignment list

13-1 Input signals

To assign signals via industrial network, use the "Assignment number" in the table instead of the signal name.

Assignment number	Signal name
0	No function
1	FREE
5	STOP
8	ALM-RST
9	P-PRESET
11	USR-ALM
14	INFO-CLR
16	HMI
18	TRQ-LMT
19	SPD-LMT
25	ATL-EN
32	START
34	FWRV-DIR-INV
35	NEXT
40	M0
41	M1
42	M2
43	M3
44	M4
45	M5
46	M6
47	M7
58	FW-SPD
59	RV-SPD

Assignment number	Signal name
80	D-SEL0
81	D-SEL1
82	D-SEL2
83	D-SEL3
84	D-SEL4
85	D-SEL5
86	D-SEL6
87	D-SEL7
88	D-SEL8
89	D-SEL9
90	D-SEL10
91	D-SEL11
92	D-SEL12
93	D-SEL13
94	D-SEL14
95	D-SEL15
96	R0
97	R1
98	R2
99	R3
100	R4
101	R5
102	R6
103	R7

Assignment number	Signal name
104	R8
105	R9
106	R10
107	R11
108	R12
109	R13
110	R14
111	R15
112	R16
113	R17
114	R18
115	R19
116	R20
117	R21
118	R22
119	R23
120	R24
121	R25
122	R26
123	R27
124	R28
125	R29
126	R30
127	R31

13-2 Output signals

To assign signals via industrial network, use the "Assignment number" in the table instead of the signal name.

Assignment number	Signal name
1	FREE_R
5	STOP_R
8	ALM-RST_R
9	P-PRESET_R
11	USR-ALM_R
14	INFO-CLR_R
16	HMI_R
18	TRQ-LMT_R
19	SPD-LMT_R
25	ATL-EN_R
32	START_R
34	FWRV-DIR-INV_R
35	NEXT_R
40	M0_R
41	M1_R
42	M2_R
43	M3_R
44	M4_R
45	M5_R
46	M6_R
47	M7_R
58	FW-SPD_R
59	RV-SPD_R
80	D-SEL0_R
81	D-SEL1_R
82	D-SEL2_R
83	D-SEL3_R
84	D-SEL4_R
85	D-SEL5_R
86	D-SEL6_R
87	D-SEL7_R
88	D-SEL8_R
89	D-SEL9_R
90	D-SEL10_R
91	D-SEL11_R
92	D-SEL12_R
93	D-SEL13_R
94	D-SEL14_R
95	D-SEL15_R
96	R0_R
97	R1_R
98	R2_R
99	R3_R
100	R4_R

Assignment number	Signal name
101	R5_R
102	R6_R
103	R7_R
104	R8_R
105	R9_R
106	R10_R
107	R11_R
108	R12_R
109	R13_R
110	R14_R
111	R15_R
112	R16_R
113	R17_R
114	R18_R
115	R19_R
116	R20_R
117	R21_R
118	R22_R
119	R23_R
120	R24_R
121	R25_R
122	R26_R
123	R27_R
124	R28_R
125	R29_R
126	R30_R
127	R31_R
128	CONST-OFF
129	ALM-A
130	ALM-B
131	SYS-RDY
134	MOVE
135	INFO
136	SYS-BSY
140	TLC
141	VA
146	RDY-FWRV-OPE
147	RDY-SD-OPE
148	RDY-DD-OPE
152	OPE-BSY
154	SEQ-BSY
160	AREA0
161	AREA1
162	AREA2

Assignment number	Signal name
163	AREA3
164	AREA4
165	AREA5
166	AREA6
167	AREA7
194	ATL-MON
199	M-CHG
200	M-ACT0
201	M-ACT1
202	M-ACT2
203	M-ACT3
204	M-ACT4
205	M-ACT5
206	M-ACT6
207	M-ACT7
224	TRQ-LMTD
225	SPD-LMTD
228	OL-DTCT
232	USR-OUT0
233	USR-OUT1
234	USR-OUT2
235	USR-OUT3
236	USR-OUT4
237	USR-OUT5
238	USR-OUT6
239	USR-OUT7
250	ASG
251	BSG
257	INFO-START-G
258	INFO-485-G
262	INFO-MNT-G
264	INFO-DRVTMP
266	INFO-LOAD
267	INFO-TRQ
284	INFO-DSLMTD
285	INFO-IOTEST
286	INFO-CONFIG
287	INFO-REBOOT
300	INFO-SPD-H
301	INFO-SPD-L
304	INFO-TLC-TIME
328	INFO-TRIP0
329	INFO-TRIP1
330	INFO-ODO

Assignment number	Signal name
333	INFO-PTIME
334	INFO-PCOUNT
336	INFO-485-ERR
337	INFO-485-PRCST
338	INFO-485-INTVL
354	INFO-START-FWRV
355	INFO-START-SD
356	INFO-START-DD
359	INFO-IODRV-DIS
368	INFO-UNIT-E
376	INFO-CPU-FAULT
377	INFO-OC-FAULT

6 Alarms and information

This part explains the alarm and information functions. It also describes functions useful for maintenance of equipment.

◆Table of contents

1 Alarms

This driver is equipped with the alarm function to protect against temperature rise, poor connection, operation error, and the like.
If an alarm is generated, the ALM-A output is turned ON and the ALM-B output is turned OFF to stop the motor. At the same time, the PWR/SYS LED blinks in red.
The present alarm can be checked by counting the number of times the LED blinks, using the support software, or via communication.

1-1 Alarm reset

Before resetting an alarm, always correct the cause of the alarm and ensure safety, and perform one of the reset operations specified below.
(Timing chart ⇨p.214)

- Turn the ALM-RST input ON. (It is enabled at the ON edge.)
- Execute the alarm reset via communication.
- Execute the alarm reset using the support software.
- Turn the power supply off and on again.

Note Some alarms cannot be reset with the ALM-RST input, the support software, or communication. Check the P.209 "Alarm list" To reset these alarms, turn off the power supply and turn on it again.

1-2 Alarm history

Up to 16 generated alarm items are stored in non-volatile memory in order from most recent to oldest. The alarm history stored in non-volatile memory can be read and cleared when one of the following items is performed.

- Read the alarm history with the monitor command via communication.
- Clear the alarm history with the maintenance command via communication.
- Read and clear the alarm history using the support software.

1-3 Alarm list

Alarm code	Number of LED blinks	Alarm type	Cause	Remedial action	Reset by the ALM-RST input	Motor excitation*
20h	9	Overcurrent	The motor, the cable, and the driver output circuit were short-circuited.	Turn off the power supply and make sure the motor, cable, and driver are not damaged before turning on the power again. If the alarm still does not reset, the motor, the cable, or the driver may be damaged. Contact your nearest Oriental Motor sales office.	Not possible	Non-excitation
21h	7	Main circuit overheat	The internal temperature of the driver exceeded 95 °C (203 °F).	• Reconsider the ambient temperature. • Reconsider the ventilation condition. • Reconsider the operating condition.	Possible	Non-excitation after deceleration
22h	5	Overvoltage	The internal voltage of the driver exceeded 44 VDC.	• Check the power supply voltage. • If the motor is rotated by an external force, reconsider the use or the environment.	Possible	Non-excitation
25h	5	Undervoltage	The internal voltage of the driver fell below 18 VDC.	• Check the power supply voltage. • Check the wiring of the power supply cable.	Possible	Non-excitation after deceleration
28h	2	Sensor error	• An error of the sensor was detected during operation. • The sensor line in the motor cable was disconnected during operation or the motor cable was come off.	Check the connection between the driver and the motor.	Not possible	Non-excitation
29h	9	Internal circuit error	The CPU peripheral circuit was damaged.	Turn the power off and on again. If the alarm still does not reset, the driver may be damaged. Contact your nearest Oriental Motor sales office.	Not possible	Non-excitation
2Dh	2	Motor connection error	An abnormality was detected in the motor power line.	• Check the connection between the motor and the driver. • If the motor is rotated by an external force, reconsider the use or the environment.	Not possible	Non-excitation
30h	7	Overload	A load exceeding the rated torque was applied for more than the specified time. (30 W, 60 W, and 120 W only) Refer to p.212 for the specified time.	• Decrease the load. • Reconsider operating conditions such as the acceleration time and deceleration time. • If the alarm is generated at a low temperature, warm up.	Possible	Non-excitation after deceleration

Alarm code	Number of LED blinks	Alarm type	Cause	Remedial action	Reset by the ALM-RST input	Motor excitation*
31h	7	Overspeed	The motor rotation speed exceeded the specification value.	• Reduce the load. • Reconsider operating conditions such as the acceleration time and deceleration time. • If the motor is rotated by an external force, reconsider the use or the environment. • Check the power supply voltage.	Possible	Non-excitation
41h	9	EEPROM error	The data stored in the driver was damaged.	Initialize all parameters, and then turn the power supply off and on again. If the alarm still does not reset, the driver may be damaged. Contact your nearest Oriental Motor sales office.	Not possible	Non-excitation
42h	2	Sensor error at power-on	• An error in the sensor was detected when the power supply was turned on. • The sensor wire in the motor cable was disconnected when the power supply was turned on. Or the motor cable was come off.	Check the connection between the driver and the motor.	Not possible	Non-excitation
45h	2	Motor combination error	A motor not supported by the driver was connected.	Check the motor model and the driver model, and connect them in the correct combination.	Not possible	Non-excitation
6Eh	1	User alarm	The USR-ALM input was turned ON.	Turn the USR-ALM input OFF.	Possible	Non-excitation after deceleration
70h	6	Abnormal operation data	The motor was operated at a rotation speed outside the specification range.	Check the setting of the rotation speed.	Possible	Non-excitation after deceleration
71h	6	Unit setting error	The velocity unit outside the specification range was set.	Reconsider the setting of the user-defined velocity unit.	Not possible	Non-excitation
84h	8	RS-485 communication error	The number of consecutive Modbus communication errors reached the value set in the "Communication error alarm (Modbus)" parameter.	• Check the connection between the driver and the host controller. • Check the setting of RS-485 communication.	Possible	Non-excitation after deceleration
85h	8	RS-485 communication timeout	• The time set in the "Communication timeout (Modbus)" parameter has elapsed and communication with the host controller has still not been established. • The direct data operation lifetime has been activated.	Check the connection between the driver and the host controller.	Possible	Non-excitation after deceleration
F0h	Light	CPU error	CPU has malfunctioned.	Turn the power off and on again.	Not possible	Non-excitation

Alarm code	Number of LED blinks	Alarm type	Cause	Remedial action	Reset by the ALM-RST input	Motor excitation*
F3h	6	CPU overload	A load of CPU exceeded the permissible value.	Reconsider the extended function used.	Not possible	Non-excitation

* An excitation state of the motor when an alarm is generated is as follows.
Non-excitation: If an alarm is generated, the motor current will be cut off.
Non-excitation after deceleration: If an alarm is generated, the motor will decelerate to a stop. After deceleration to a stop, the motor current will be cut off.

■ Items that can be checked in the alarm history

Item	Description
Code	This is an alarm code.
Alarm message	This is the description of the alarm.
Sub code	This is the code to be checked by Oriental Motor.
Driver temperature	This is the driver temperature when an alarm is generated.
Inverter voltage	This is the inverter voltage when an alarm is generated.
Power supply voltage	This is the power supply voltage when an alarm is generated.
Physical I/O input	Indicates the input status of the direct I/O when an alarm is generated in hexadecimal.
R-I/O input	Indicates the input status of the remote I/O when an alarm is generated in hexadecimal.
R-I/O output	Indicates the output status of the remote I/O when an alarm is generated in hexadecimal.
Continuous uptime	This is the elapsed time from when the power supply was turned on to when an alarm was generated.
Continuous operating time	This is the elapsed time from when the operation was started to when an alarm was generated.
Total operating time (within continuous uptime)	This is the total operating time when an alarm was generated.
Total uptime	This is the total uptime when an alarm was generated.
Number of boots	This is the number of boots when an alarm was generated.
Demand velocity	This is the demand velocity when an alarm was generated.
Actual velocity	This is the actual velocity when an alarm was generated.
Actual position	This is the actual position when an alarm was generated.
Torque	This is the torque when an alarm was generated.
Torque limiting value	This is the torque limiting value when an alarm was generated.
Motor model	This is the motor model of the motor connected when an alarm was generated.

memo If an alarm is generated immediately after the power supply is turned on, the detected information such as temperature may be indefinite.

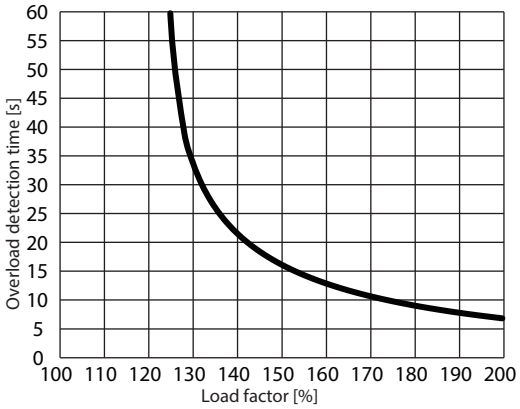
1-4 Generation conditions of alarms

■ Characteristics of the overload alarm (30 W, 60 W, 120W only)

The time when the overload alarm is detected varies according to the load factor of the motor.
The present overload condition can be checked by the load factor monitor and the overload factor monitor.
Refer to p.230 for the load factor and the overload factor.

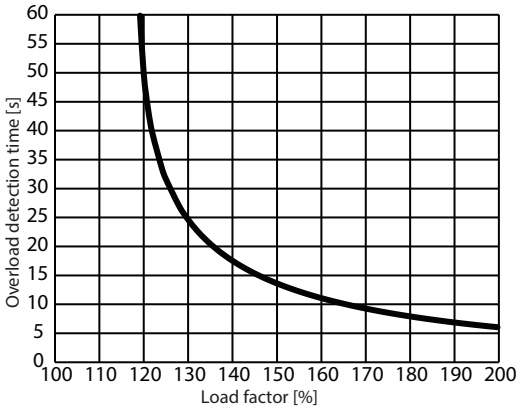
- **30 W type motor**

Load factor	Overload detection time (reference)
120 %	Not detected
125 %	About 57 seconds
140 %	About 21 seconds
160 %	About 12 seconds
180 %	About 9.0 seconds
200 %	About 6.7 seconds



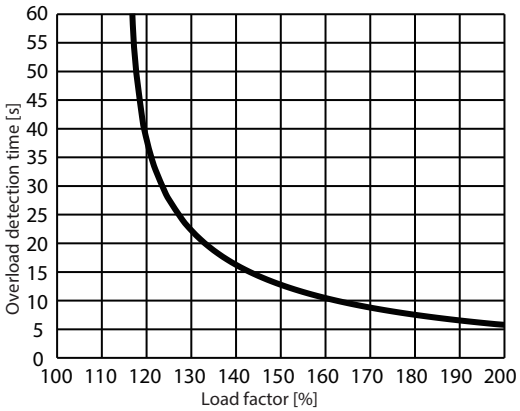
- **60 W type motor**

Load factor	Overload detection time (reference)
115 %	Not detected
119 %	About 62 seconds
140 %	About 17 seconds
160 %	About 11 seconds
180 %	About 7.9 seconds
200 %	About 6.0 seconds



- **120 W type motor**

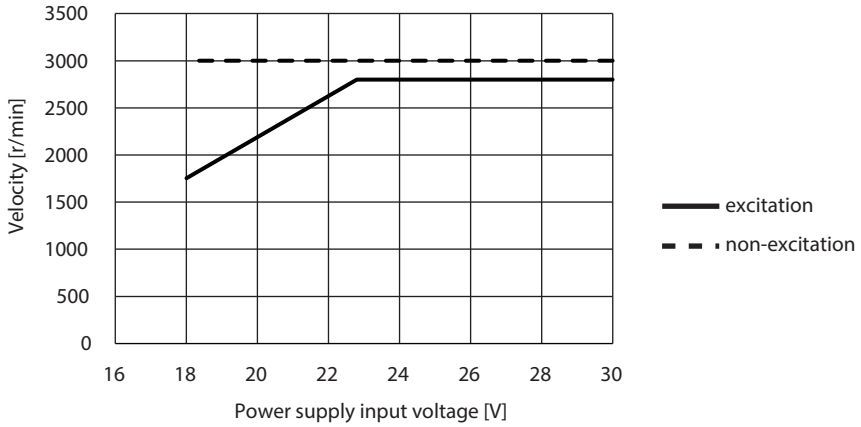
Load factor	Overload detection time (reference)
115 %	Not detected
117 %	About 57 seconds
140 %	About 16 seconds
160 %	About 10 seconds
180 %	About 7.5 seconds
200 %	About 5.7 seconds



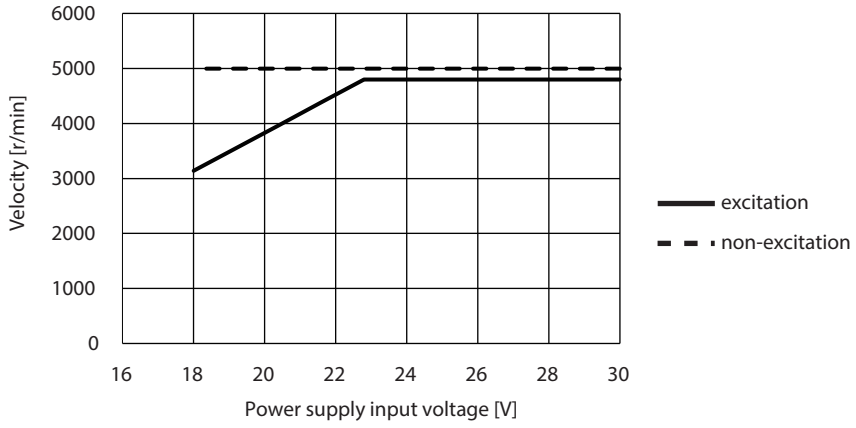
■ Speed to detect the overspeed alarm

The condition under which the overspeed alarm is generated varies depending on the motor excitation state and the power supply input voltage.

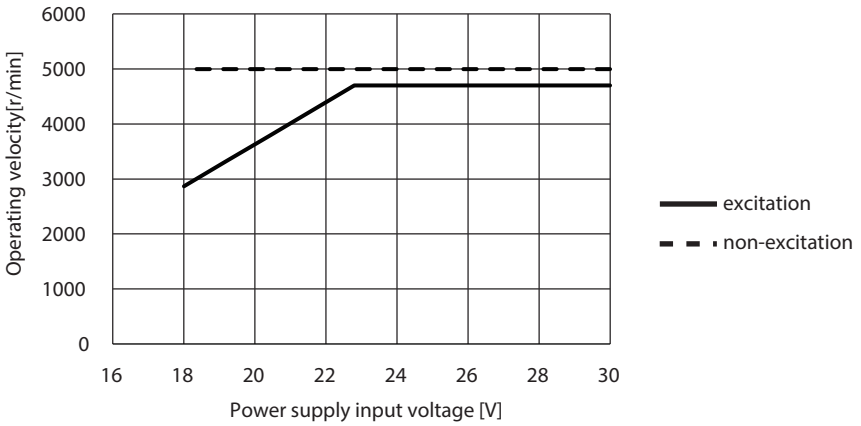
● 25 W, 40 W, and 90 W type motors



● 30 W and 60 W type motors



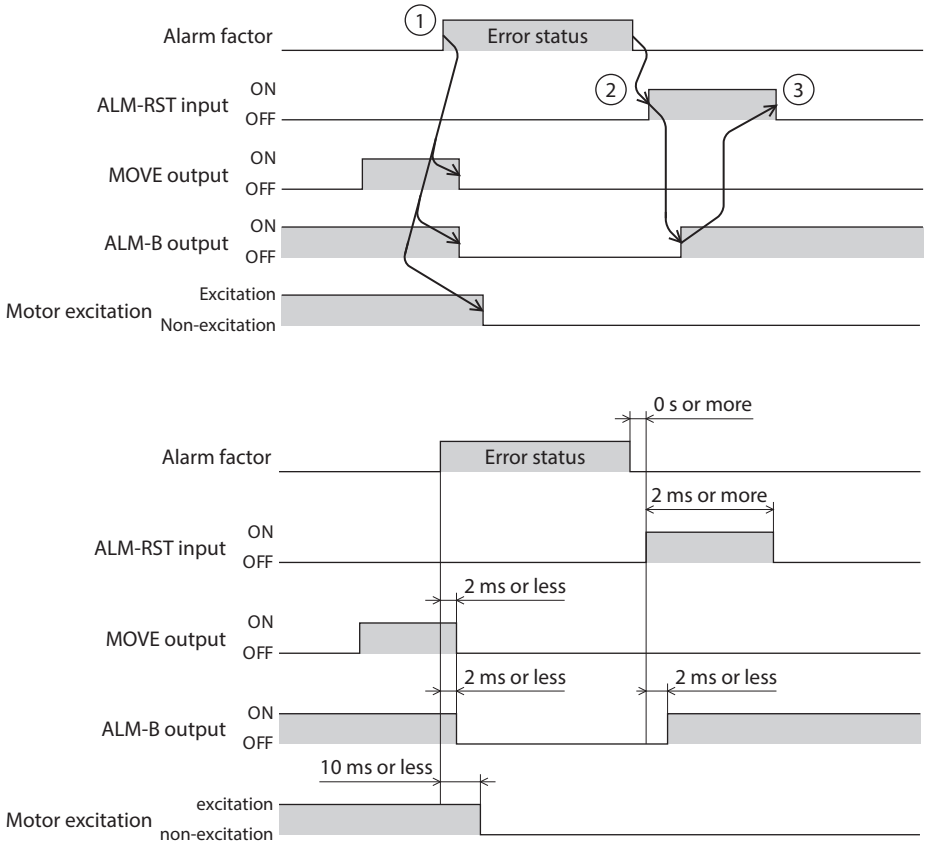
● 120 W type motor



1-5 Timing chart

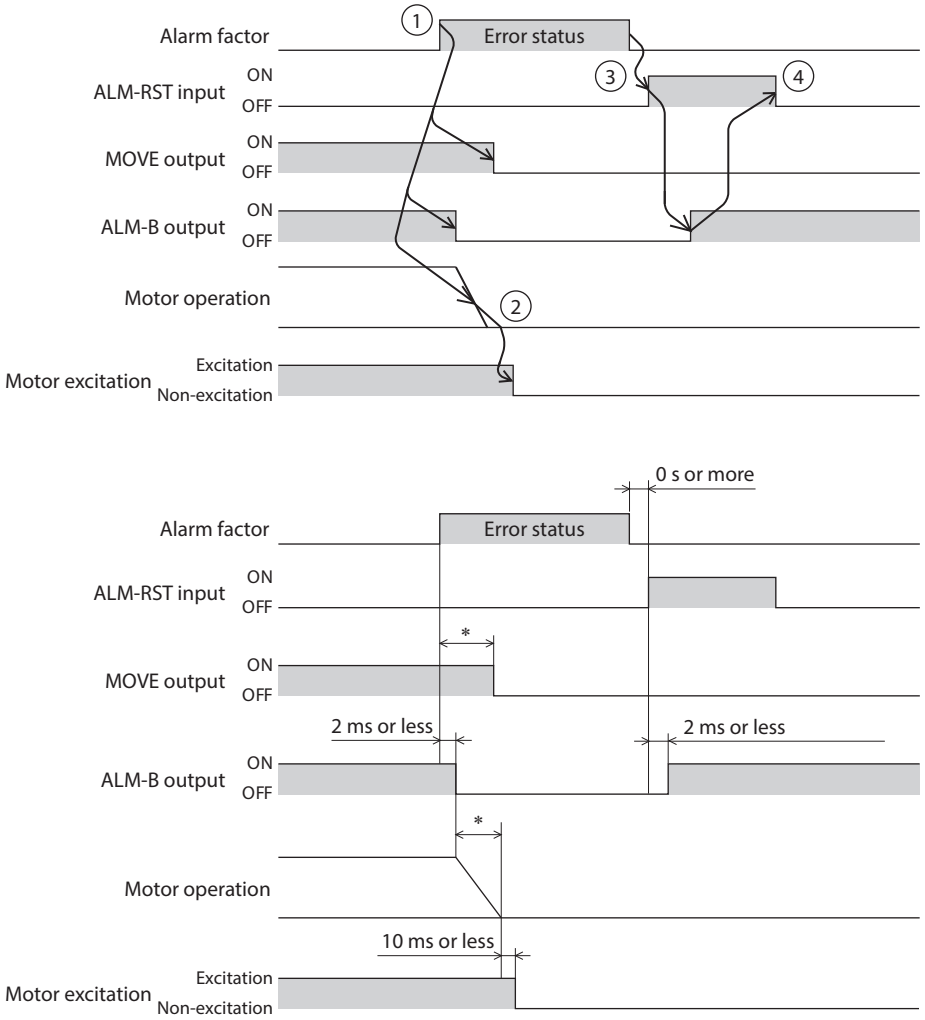
■ When an alarm whose motor excitation state is "Non-excitation" is generated.

1. If an error occurs, the ALM-B output and the MOVE output are turned OFF.
   At the same time, the motor goes into a non-excitation state.
2. Remove the cause of the alarm before turning the ALM-RST input ON.
   The alarm is reset, and the ALM-B output is turned ON.
3. Check that the ALM-B output has been turned ON, and then turn the ALM-RST input OFF.



■ When an alarm whose motor excitation state is "Non-excitation after deceleration" is generated.

1. If an error occurs, the ALM-B output is turned OFF.
   The motor decelerates to a stop at the same time.
2. When the motor stops, it goes into a non-excitation state.
3. Remove the cause of the alarm before turning the ALM-RST input ON.
   The alarm is reset, and the ALM-B output is turned ON.
4. Check the ALM-B output has been turned ON, and then turn the ALM-RST input OFF.



* It varies depending on the driving condition.
  If the motor is not stopped for more than about five seconds, the MOVE output will be turned OFF and the motor will go into the non-excitation state.

2 Information

The driver is equipped with a function to generate information output before an alarm is generated.
If information is generated, a bit output of the corresponding information is turned ON.
At the same time, the PWR/SYS LED blinks in blue.
This function can be used for periodic maintenance of equipment by setting an appropriate value in the parameter of each information.
For example, using the "Driver temperature information" parameter can prevent equipment malfunction or production stoppage due to driver overheating.

memo Unlike in the case of an alarm, the motor continues to operate during information.

2-1 Information output

There are three types of information output as shown below.

- **Information bit output**

  If information is generated, a bit output (INFO-** output) of the corresponding information is turned ON.

- **Information group output**

  If any of the bit outputs of information in the group is turned ON, an information group output (INFO-**-G output) is turned ON.
  When all bit outputs of information in the group are turned OFF, the group output is turned OFF.

- **Information output (INFO output)**

  If any of the bit outputs of information is turned ON, the INFO output is turned ON.
  When all bit outputs of information are turned OFF, the INFO output is turned OFF.

Example: When the "Total uptime" information has been generated

- INFO output = ON
- INFO-MNT-G output = ON
- INFO-PTIME output = ON

Relationship for each information output

Information output	Group output signal		Bit output signal	
	Description	Name	Description	Name
INFO	Start operation	INFO-START-G	Start FW/RV operation error	INFO-START-FWRV
			Start stored data operation error	INFO-START-SD
			Start direct data operation error	INFO-START-DD
			I/O operation disabled	INFO-IODRV-DIS
	RS-485 communication	INFO-485-G	RS-485 communication error	INFO-485-ERR
			RS-485 communication processing time	INFO-485-PRCST
			RS-485 communication interval	INFO-485-INTVL
	Maintenance	INFO-MNT-G	Tripmeter 0	INFO-TRIP0
			Tripmeter 1	INFO-TRIP1
			Odometer	INFO-ODO
			Total uptime	INFO-PTIME
			Number of boots	INFO-PCOUNT

Information output	Group output signal		Bit output signal	
	Description	Name	Description	Name
INFO	There is no corresponding group output.		Driver temperature	INFO-DRVTMP
			Load factor	INFO-LOAD
			Torque	INFO-TRQ
			Start operation restricted mode	INFO-DSLMTD
			I/O test mode	INFO-IOTEST
			Configuration request	INFO-CONFIG
			Reboot request	INFO-REBOOT
			Upper speed	INFO-SPD-H
			Lower speed	INFO-SPD-L
			Torque limiting time	INFO-TLC-TIME
			Unit setting	INFO-UNIT-E
			CPU error	INFO-CPU-FAULT
			Overcurrent error	INFO-OC-FAULT

2-2 Clearing information

How to clear the information can be set with the "Information auto clear" parameter.

- **When the "Information auto clear" parameter is set to "1: Enable" (factory setting)**
  The generated information will automatically be cleared if the condition to clear information is met.
- **When the "Information auto clear" parameter is set to "0: Disable"**
  Even if the condition to clear information is met, the information remains generated. The information can be cleared if one of the following is performed in a state where the condition to clear information is met.
  - Execute the Clear information with the maintenance command via communication.
  - Execute the Clear information on the information monitor of the support software.
  - Turn the INFO-CLR input ON.
  - Turn the power supply off and on again.

■ Related parameter

Name	Description	Initial setting	
		Initial value	Unit
Information auto clear	When the condition to clear the information is met, a bit output of the corresponding information is automatically turned OFF. **[Setting range]** 0: Disable 1: Enable	1	–

2-3 Information history

Up to 16 generated information items are stored in RAM in order from most recent to oldest. Information items stored as the information history are the information status and generation time.
The information history stored can be read or cleared when one of the following is performed.

- Read the information history with the monitor command via communication.
- Clear the information history with the maintenance command via communication.
- Read or clear the information history using the support software.

Note Information history is stored in RAM, so it is cleared when the power supply of the driver is turned off.

2-4 Information list

Information item	Information bit output signal	Cause	Condition to clear
Driver temperature	INFO-DRVTMP	The internal temperature of the driver increased to the value set in the "Driver temperature information" parameter or higher.	The internal temperature of the driver fell below the value set in the "Driver temperature information" parameter.
Load factor	INFO-LOAD	The load factor of the motor increased to the value set in the "Load factor information" parameter or more.	The load factor of the motor fell below the value set in the "Load factor information" parameter.
Torque	INFO-TRQ	The detection torque of the motor increased to the value set in the "Torque information" parameter or more.	The detection torque of the motor fell below the value set in the "Torque information" parameter.
Start operation restricted mode	INFO-DSLMTD	• "Remote operation" was executed with the support software. • Configuration was executed. • Data was written to the driver from the support software. • "Reset" was executed with the support software.	• Remote operation was canceled. • Configuration was completed. • Writing data was completed. • Data was restored to the factory setting.
I/O test mode	INFO-IOTEST	• "I/O test" was executed with the support software. • Configuration was executed.	• The I/O test mode was canceled. • Configuration was completed.
Configuration request	INFO-CONFIG	The parameter that required executing Configuration was changed.	Configuration was executed.
Reboot request	INFO-REBOOT	A parameter that requires the power supply to be turned on again was changed.	The power supply was turned on again.
Upper speed	INFO-SPD-H	The actual velocity of the motor increased to the value set in the "Upper speed information" parameter or more.	The actual velocity of the motor fell below the value set in the "Upper speed information" parameter.
Lower speed	INFO-SPD-L	When the demand velocity reaches the target velocity, the actual velocity of the motor decreased to the value set in the "Lower speed information" parameter or less.	• The actual velocity of the motor exceeded the value set in the "Lower speed information" parameter. • The target velocity was changed.
Torque limiting time	INFO-TLC-TIME	The ON time of the TLC output increased to the value set in the "Torque limiting time information" parameter or more.	The TLC output was turned OFF.
Tripmeter 0	INFO-TRIP0	The travel distance of the motor increased to the value set in the "Tripmeter 0 information" parameter or more.	• A value larger than the travel distance of the motor was set to the "Tripmeter 0 information" parameter again. • The tripmeter 0 was cleared using the support software or via communication.
Tripmeter 1	INFO-TRIP1	The travel distance of the motor increased to the value set in the "Tripmeter 1 information" parameter or more.	• A value larger than the travel distance of the motor was set to the "Tripmeter 1 information" parameter again. • The tripmeter 1 was cleared using the support software or via communication.

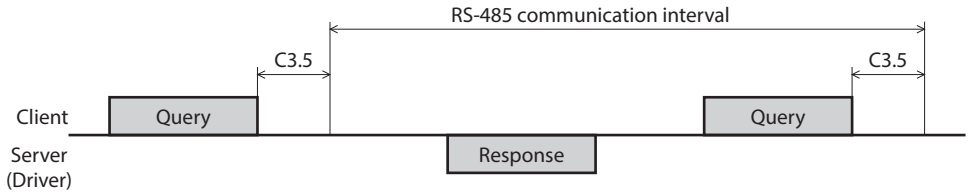
Information item	Information bit output signal	Cause	Condition to clear
Odometer	INFO-ODO	The cumulative travel distance of the motor increased to the value set in the "Odometer information" parameter or more.	A value larger than the cumulative travel distance of the motor was set to the "Odometer information" parameter again.
Total uptime	INFO-PTIME	The total operation time of the driver increased to the value set in the "Total uptime information" parameter or more.	A value larger than the total operation time of the driver was set to the "Total uptime information" parameter again.
Number of boots	INFO-PCOUNT	The number of times the driver was started increased to the value set in the "Number of boots information" parameter or more.	A value larger than the number of times the driver was started was set to the "Number of boots information" parameter again.
RS-485 communication error	INFO-485-ERR	The RS-485 communication error was consecutively detected equal to or more than the value set in the "RS-485 communication error information" parameter.	RS-485 communication was performed properly.
RS-485 communication processing time	INFO-485-PRCST	The communication processing time of RS-485 communication increased to the value set in the "RS-485 communication processing time information" parameter or more.	The communication processing time of RS-485 communication fell below the value set in the "RS-485 communication processing time information" parameter.
RS-485 communication interval	INFO-485-INTVL	The communication interval of RS-485 communication increased to the value set in the "RS-485 communication interval information" parameter or more.	The communication interval of RS-485 communication fell below the value set in the "RS-485 communication interval information" parameter.
Start FW/RV operation error	INFO-START-FWRV	FW/RV operation was executed when the RDY-FWRV-OPE output was OFF.	Operation was started properly.
Start stored data operation error	INFO-START-SD	Stored data operation was executed when the RDY-SD-OPE output was OFF.	Operation was started properly.
Start direct data operation error	INFO-START-DD	Direct data operation was executed when the RDY-DD-OPE output was OFF.	Operation was started properly.
I/O operation disabled	INFO-IODRV-DIS	An operation start signal is being ON when "I/O test" or "remote operation" of the support software has been completed.	All operation start signal were turned OFF.
Unit setting	INFO-UNIT-E	The velocity unit outside the specification range was set.	The velocity unit was set within the range of the specification.
CPU error	INFO-CPU-FAULT	The CPU overload alarm was generated.	The power supply was turned on again.
Overcurrent error	INFO-OC-FAULT	The overcurrent alarm was generated.	The power supply was turned on again.

■ Related parameters

Name	Description	Initial setting	
		Initial value	Unit
INFO action (Start operation group information (INFO-START-G))	Sets whether or not to apply to the group output, INFO output, and LED blinking when information is generated. **[Setting range]** 0: INFO action is not applied* 1: INFO action is applied * The information history is left.	1	–
INFO action (RS-485 communication group information (INFO-485-G))			
INFO action (Maintenance group information (INFO-MNT-G))			
INFO action (Driver temperature information (INFO-DRVTMP))			
INFO action (Load factor information (INFO-LOAD))			
INFO action (Torque information (INFO-TRQ))			
INFO action (Start operation restricted mode information (INFO-DSLMTD))			
INFO action (I/O test mode information (INFO-IOTEST))			
INFO action (Configuration request information (INFO-CONFIG))			
INFO action (Reboot request information (INFO-REBOOT))			
INFO action (Upper speed information (INFO-SPD-H))			
INFO action (Lower speed information (INFO-SPD-L))			
INFO action (Torque limiting time information (INFO-TLC-TIME))			
INFO action (Tripmeter 0 information (INFO-TRIP0))			
INFO action (Tripmeter 1 information (INFO-TRIP1))			
INFO action (Odometer information (INFO-ODO))			
INFO action (Total uptime information (INFO-PTIME))			
INFO action (Number of boots information (INFO-PCOUNT))			
INFO action (RS-485 communication error information (INFO-485-ERR))			
INFO action (RS-485 communication processing time information (INFO-485-PRCST))			
INFO action (RS-485 communication interval information (INFO-485-INTVL))			
INFO action (Start FW/RV operation error information (INFO-START-FWRV))			
INFO action (Start stored data operation error information (INFO-START-SD))			
INFO action (Start direct data operation error information (INFO-START-DD))			
INFO action (I/O operation disabled information (INFO-IODRV-DIS))			
INFO action (Unit setting information (INFO-UNIT-E))			
INFO action (CPU fault information (INFO-CPU-FAULT))			
INFO action (Overcurrent fault information (INFO-OC-FAULT))			

Name	Description	Initial setting	
		Initial value	Unit
Driver temperature information (INFO-DRVTMP)	Sets the condition under which the driver temperature information is generated. **[Setting range]** 0: Disable 1 to 120 °C	0	°C
Upper speed information (INFO-SPD-H)	Sets the condition under which the upper speed information is generated. **[Setting range]** 0: Disable 1 to 4,000,000 (User-defined position unit)	0	r/min
Lower speed information (INFO-SPD-L)	Sets the condition under which the lower speed information is generated. **[Setting range]** 0: Disable 1 to 4,000,000 (User-defined position unit)	0	r/min
Load factor information (INFO-LOAD)	Sets the condition under which the load factor information is generated. **[Setting range]** 0: Disable 1 to 10,000 (1=0.1 %)	0	1=0.1 %
Torque information (INFO-TRQ)	Sets the condition under which the torque information is generated. **[Setting range]** 0: Disable 1 to 10,000 (1=0.1 %)	0	1=0.1 %
Torque limiting time information (INFO-TLC-TIME)	Sets the condition under which the torque limiting time information is generated. **[Setting range]** 0: Disable 1 to 10,000 ms	0	ms
Tripmeter 0 information (INFO-TRIP0)	Sets the condition under which the tripmeter 0 information is generated. **[Setting range]** 0: Disable 1 to 2,147,483,647 (1=0.1 krev)	0	1=0.1 krev
Tripmeter 1 information (INFO-TRIP1)	Sets the condition under which the tripmeter 1 information is generated. **[Setting range]** 0: Disable 1 to 2,147,483,647 (1=0.1 krev)	0	1=0.1 krev
Odometer information (INFO-ODO)	Sets the condition under which the odometer information is generated. **[Setting range]** 0: Disable 1 to 2,147,483,647 (1=0.1 krev)	0	1=0.1 krev
RS-485 communication error information (INFO-485-ERR)	Sets the condition under which the RS-485 communication error information is generated. **[Setting range]** 0: Disable 1 to 10 times	0	–

Name	Description	Initial setting	
		Initial value	Unit
RS-485 communication processing time information (INFO-485-PRCST)	Sets the condition under which the RS-485 communication processing time information is generated. **[Setting range]** 0: Disable 1 to 10,000 ms	0	ms
RS-485 communication interval information (INFO-485-INTVL)	Sets the condition under which the RS-485 communication interval information is generated. **[Setting range]** 0: Disable 1 to 10,000 ms	0	ms
Total uptime information (INFO-PTIME)	Sets the condition under which the total uptime information is generated. **[Setting range]** 0: Disable 1 to 30,000,000 min	0	min
Number of boots information (INFO-PCOUNT)	Sets the condition under which the number of boots information is generated. **[Setting range]** 0: Disable 1 to 2,147,483,647	0	–



2-5 Information status

The information presently being generated can be checked using the "information status."
If information is generated, a bit corresponding to the information status is turned ON.
Information status 0 to 3 are provided and the total is 128 bits. (32 bits × 4)
Refer to p.148 for bit arrangements of the information status.

2-6 LED indication for information

If information is generated, the PWR/SYS LED blinks in blue.
Changing the "Information LED condition" parameter can set the LED not to blink.

■ Related parameter

Name	Description	Initial setting	
		Initial value	Unit
Information LED condition	Sets the LED status when information is generated. **[Setting range]** 0: Disable 1: Enable	1	–

7 Extended function

◆Table of contents

1 Virtual input

The virtual input (VIR-IN) is a function that uses the output signal assigned to the virtual input source to configure the input to the set input signal. Assign two output signals (A and B) to one virtual input. VIR-IN is input after the logical combination of A and B is established.
No wiring is required and this function can be used together with direct I/O because of the input method using the internal I/O. Up to eight virtual inputs can be set.

Related parameters

Name	Description	Initial setting	
		Initial value	Unit
Virtual input function (link)	Selects the input signals to be assigned to VIR-IN0 to VIR-IN7. **[Setting range]** ⇨P.49 "2-1 Input signal list"	0: No function	–
Virtual input source A function	Selects the virtual input source A function (output signal) for VIR-IN0 to VIR-IN7. **[Setting range]** ⇨P.51 "2-2 Output signal list"	128: CONST-OFF	–
Virtual input source A inverting mode	Changes the ON/OFF status of the virtual input source A. **[Setting range]** 0: Non invert 1: Invert	0	–
Virtual input source B function	Selects the virtual input source B function (output signal) for VIR-IN0 to VIR-IN7. **[Setting range]** ⇨P.51 "2-2 Output signal list"	128: CONST-OFF	–
Virtual input source B inverting mode	Changes the ON/OFF status of the virtual input source B. **[Setting range]** 0: Non invert 1: Invert	0	–
Virtual input logical operation	Sets the logical combination of virtual input source A and virtual input source B. **[Setting range]** 0: AND 1 OR	1	–
Virtual input ON signal dead time	Sets the ON signal dead-time for VIR-IN0 to VIR-IN7. (The input signal is turned ON when the time having set is exceeded.) **[Setting range]** 0 to 4,000 ms	0	ms
1-shot signal	Enables the 1-shot signal function for VIR-IN0 to VIR-IN7. (The input signal having been turned ON is automatically turned OFF after 250 μs.) **[Setting range]** 0: Disable 1: Enable	0	–

■ Setting example

When the TLC output is turned ON using VIR-IN0, turn the STOP input ON to stop the motor.

	Virtual input function (link)	Virtual input source A function	Virtual input source A inverting mode	Virtual input source B function	Virtual input source B inverting mode	Virtual input logical operation	Virtual input ON signal dead time	1-shot signal
VIR-IN0	STOP	TLC	Non invert	CONST-OFF	Non invert	OR	0	Enable

2 User output

The user output (USR-OUT) is a function that controls the output based on a logical product or a logical sum of two types of output signals and the comparison result with the internal monitor group.
Up to eight user outputs can be set.
The output condition for user outputs can be selected from the following two items.

■ Internal IO judgment

Assign two types of signals (A and B) to a single user output. USR-OUT is output after the logical combination of A and B is established.

■ Value judgment

Set the ON condition to a single user output. USR-OUT is output after the ON condition is established.

Related parameters

Name	Description	Initial setting	
		Initial value	Unit
User output operation mode	Selects the operation mode of the user output. **[Setting range]** 0: Internal IO judgment 1: Value judgment (value X, value Y) = (value A, value B) 2: Value judgment (value X, value Y) = (value of NET-ID=A, value B) 3: Value judgment (value X, value Y) = (value A, value of NET-ID=B) 4: Value Judgment (value X, value Y) = (value of NET-ID=A, value of NET-ID=B)	0	–
User output (IO) source A function	Selects the user output source A function (output signal) for USR-OUT0 to USR-OUT7. **[Setting range]** ⇨P.51 "2-2 Output signal list"	128: CONST-OFF	–
User output (IO) source A inverting mode	Changes the ON/OFF status of the user output source A. **[Setting range]** 0: Non invert 1: Invert	0	–
User output (IO) source B function	Selects the user output source B function (output signal) for USR-OUT0 to USR-OUT7. **[Setting range]** ⇨P.51 "2-2 Output signal list"	128: CONST-OFF	–
User output (IO) source B inverting mode	Changes the ON/OFF status of the user output source B. **[Setting range]** 0: Non invert 1: Invert	0	–
User output (IO) logical operation	Sets the logical combination of user output source A and user output source B. **[Setting range]** 0: AND 1 OR	1	–

Name	Description	Initial setting	
		Initial value	Unit
User output (value) ON condition	Select the ON condition of the user output when the value judgment is selected for the operation mode. **[Setting range]** 0: (value of target NET-ID + value Y) = (value X) 1: (target NET-ID value + value Y) < (value X) 2: (value of target NET-ID + value Y) ≤ (value X) 3: (value X) < (value of target NET-ID + value Y) 4: (value X) ≤ (value of target NET-ID + value Y) 5: (value of target NET-ID) < (value X) or (value Y) < (value of target NET-ID) 6: (value of target NET-ID) ≤ (value X) or (value Y) ≤ (value of target NET-ID) 7: (value X) < (value of target NET-ID) <(value Y) 8: (value X) ≤ (value of target NET-ID) ≤ (value Y) 9: (value Y) = ((value of target NET-ID) And (value X)) 10: (value Y) = ((value of target NET-ID) Or (value X)) 11: ((value of target NET-ID) And (value X)) is not 0	0	–
User output (value) target NET-ID	Sets the target NET-ID of the user output. **[Setting range]** 0 to 65,535	0	–
User output (value) value A	Sets the value A of the user ID. **[Setting range]** –2,147,483,648 to 2,147,483,647	0	–
User output (value) value B	Sets the value B of the user output. **[Setting range]** –2,147,483,648 to 2,147,483,647	0	–

■ Setting example

When the continuous operation time [NET-ID: 1619 (0653h)] has elapsed for five seconds, USR-OUT is output.

	User output operation mode	User output (value) ON condition	User output (value) target NET-ID	User output (value) value A
USR-OUT0	1: Value judgment (value X, value Y) = (value A, value B)	3: (value X) < (value of target NET-ID + value Y)	1619 (0653h)	5000 (ms)

3 Data transfer

The data transfer (DTF) is a function that transfers the data (value) to a specified NET-ID using internal I/O.
Up to 32 items can be set.

Related parameters

Name	Description	Initial setting	
		Initial value	Unit
Data transfer trigger IO	Selects the output signal to be the trigger for data transfer. **[Setting range]** ⇨P.51 "2-2 Output signal list"	0: No function	–
Data transfer trigger form	Selects the edge shape to be the trigger. **[Setting range]** 0: Positive-Edge 1: Negative-Edge 2: Double-Edge	0	–
Data transfer transfer mode	Selects the transfer mode of data transfer. **[Setting range]** 0: Transfers the value of the argument NET-ID to the target NET-ID 1: Transfers the value of the argument NET-ID to the target NET-ID with AND-Logic synthesis 2: Transfers the value of the argument NET-ID to the target NET-ID with OR-Logic synthesis 3: Transfers the value of the argument NET-ID to the target NET-ID with CLR-Logic synthesis 4: Transfers the value of the argument NET-ID to the target NET-ID with Additive function 8: Transfers the value of the argument to the target NET-ID 9: Transfers the value of the argument to the target NET-ID with AND-Logic synthesis 10: Transfers the value of the argument to the target NET-ID with OR-Logic synthesis 11: Transfers the value of the argument to the target NET-ID with CLR-Logic synthesis 12: Transfers the value of the argument to the target NET-ID with Additive function	0	–
Data transfer argument	Sets the value or NET-ID (data source) to be transferred in data transfer. **[Setting range]** –2,147,483,648 to 2,147,483,647	0	–
Data transfer target NET-ID	Sets the NET-ID (data destination) to be transferred in data transfer. **[Setting range]** 0 to 65,535	0	–

■ Setting example

When the AREA0 output is turned ON, the operating velocity [NET-ID:3074 (02 h)] of the operation data 0 is set to 2000 r/min.

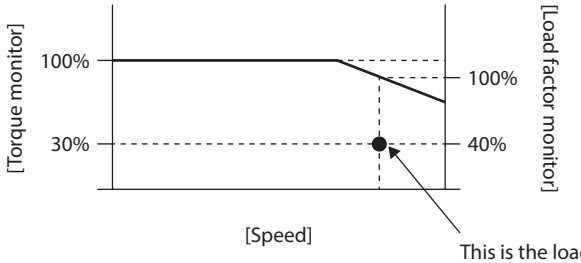
	Data transfer trigger IO	Data transfer trigger form	Data transfer argument	Data transfer target NET-ID
DTF0	160: AREA0	0: Positive-Edge	2000 (r/min)	3074 (0C02h)

4 Load status monitor

4-1 Load status monitor

There are two methods to monitor the load status of the motor as shown below.

- Torque monitor: This indicates the output torque presently generated as a percentage of the rated torque being 100 %.
- Load factor monitor: This indicates the output torque presently generated as a percentage of the maximum torque in the continuous duty region being 100 %.



This is the load condition when the torque monitor shows 30.0% and the load factor monitor shows 40.0% at a certain velocity.

memo For the motor specifications where the maximum torque decreases in the continuous duty region, the load factor monitor will be the value offset by the decrease in the maximum torque in the continuous duty region when the rated rotation speed is exceeded. The offset value varies depending on the motor specification and the rotation speed.
Example of a no-load condition: Torque monitor value = 0 %, load factor monitor value = 30 %

4-2 Overload factor monitor

The overload alarm is determined according to the value that has been filtered based on the load factor.
Refer to P.212 "1-4 Generation conditions of alarms" for the detection load factor and the detection time.
The overload factor monitor indicates the status of the overload alarm after filter processing. The overload alarm is generated when the overload factor reaches 100 %.

5 Setting of filter for monitor

The actual velocity and the filter time constant (LPF) of the torque monitor can be changed.

Related parameters

Name	Description	Initial setting	
		Initial value	Unit
Velocity detection monitor time constant	Sets the time constant of the actual velocity monitor. **[Setting range]** 1 to 1,000 ms	5	ms
Torque monitor time constant	Sets the time constant of the torque monitor. **[Setting range]** 0 to 1,000 ms	5	ms

Related monitor commands

Name	Description	Initial setting	
		Initial value	Unit
Actual velocity (User-defined velocity unit)	Indicates the present actual velocity. (User-defined velocity unit)	–	r/min
Actual velocity (r/min)	Indicates the present actual velocity. (r/min)	–	r/min
Torque monitor	Indicates the output torque presently generated as a percentage of the rated torque.	–	1=0.1 %
Load factor monitor	Indicates the output torque presently generated as a percentage of the maximum torque in the continuous duty region.	–	1=0.1 %

Related functions

- VA output
- OL-DTCT output
- INFO-SPD-H output
- INFO-SPD-L output
- INFO-TRQ output
- INFO-LOAD output

6 Command filter

If the command filter that adjusts the motor response is used, the impact applied to the transferred load when starting, changing speed, or stopping can be suppressed. Set it as necessary.
There are two types of command filters, LPF (speed filter) and moving average filter.

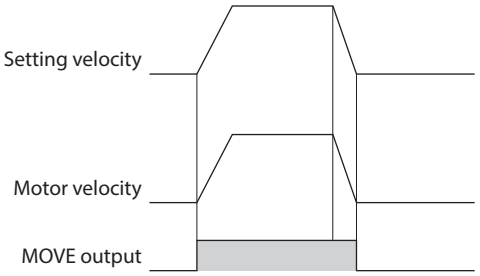
Related parameters

Parameter name	Description	Initial setting	
		Initial value	Unit
Command filter setting	Selects the command filter to be activated for the operation command. **[Setting range]** 1: LPF (speed filter) 2: Moving average filter	1	–
Command filter time constant	Sets the time constant for the command filter to adjust the motor response. **[Setting range]** 0 to 200 ms	1	ms

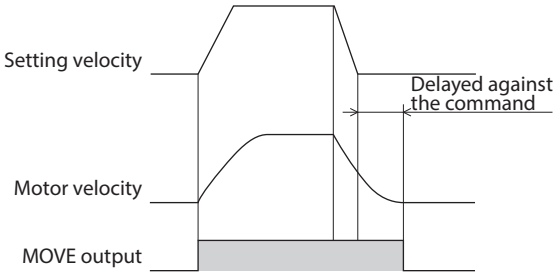
■ LPF (speed filter)

Select "LPF (speed filter)" in the "Command filter setting" parameter, and set the "Command filter time constant" parameter.
Increasing the value in the "Command filter time constant" parameter can make the motor movement smoother. However, setting the time constant too high will reduce synchronization performance in response to the command. Set an appropriate value according to the load or application.

• When the "Command filter time constant" parameter is set to 0 ms

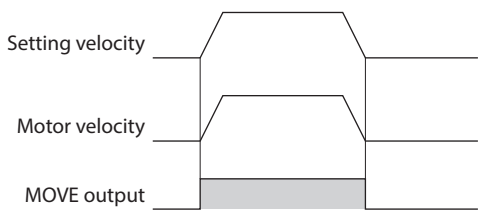
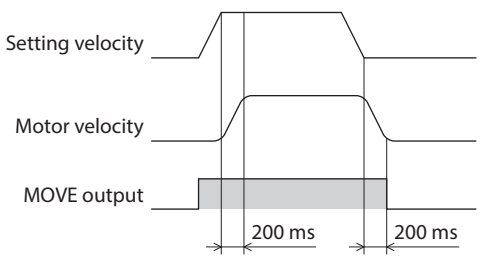


• When the "Command filter time constant" parameter is set to 200 ms



■ Moving average filter

Select "Moving average filter" in the "Command filter setting" parameter and set the "Command filter time constant" parameter.
The motor response can be adjusted. Set an appropriate value according to the load or operating condition.

When the "Command filter time constant" parameter is set to 0 ms	When the "Command filter time constant" parameter is set to 200 ms
	

7 Actual position

The actual position is the position information synchronized with the rotation of the motor. (Unit: step)
It counts up in the forward direction and counts down in the reverse direction.

Resolution: 30 [P/R] (1 step = 12 degrees on motor output shaft)

memo

- If the AREA output (p.69) is used, an output signal corresponding to the actual position can be generated.
- The maximum error of the actual position is approximately 12 degrees.
- The actual position when power is on is a value in the range of minus 5 to plus 5, depending on the motor position.

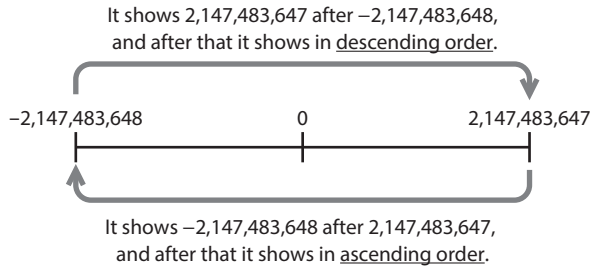
■ Clearing the actual position

The actual position can be cleared by the following methods.

- Turn the P-PRESET input ON (enable at the ON edge).
- Execute "P-PRESET execution" of the maintenance command.
- Execute Configuration.

■ Range of the actual position

The actual position goes around between –2,147,483,648 and 2,147,483,647.



■ Revision history

Version	Contents of revision
First edition	

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Published in April 2025

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