Assembly Controller

EYFRW2

Ethernet Protocol Specification

(Release)

Ver. 2.0.0

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Panasonic Electric Works Corporation

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Revision History

Rev	Date	Changed	Background	-
1.0.0	2023/4/1	First edition		
2.0.0	2026/4/1	Added Supported MIDs		

1. Introduction

1.1. Purpose of this document

This document describes the Ethernet Protocol Specification of EYFRW2 based on the Specification Open Protocol from Atlas Copco. Only the related parts to the controller are written in this document, so please refer to the Specification Open Protocol for further information.

2.Interface

2.1. Overview

EYFRW2 supports OpenProtocolのver.1.2.14 , which is a popular communication protocol used in assembly factories. The protocol stack between the factory system and the assembly contoroller is described in **エラー! 参照元が見つかりません。**. The protocol used to communicate is TCP/IP

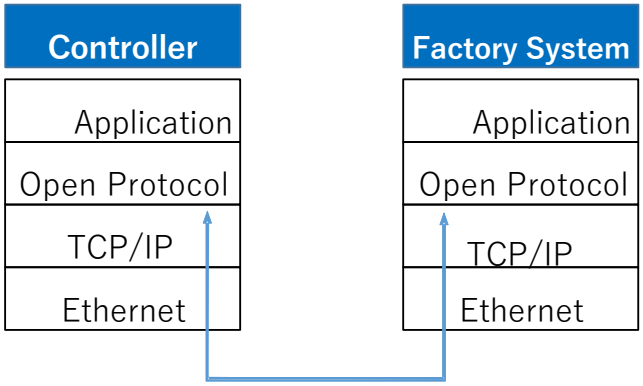


Figure 2-1 Protocol stack

Each tool is defined by Port No, and communicates separately with the factory system. Maximum of 8 Port No can be set for the tools, with the range of 1024－49151, but each tool must have a differente Port No.
The Default Port No are as below.

Tool1 ： 4545
Tool2 ： 5001
Tool3 ： 5002
Tool4 ： 5003
Tool5 ： 5004
Tool6 ： 5005
Tool7 ： 5006
Tool8 ： 5007

2.2. List of Supported MIDs

Communication is carried out by a command consisting of a 4-digit number called MID (MessageID). The MID and Rev. list of Atlas Open Protocol supported by controller is shown in Table 2-1.

Table 2-1 Supported MID

MID	Rev.	Sent by	MID Name	Content
0001	1	Factory System	Application Communication start	Communication started
0002	1	Controller	Application Communication start acknowledge	Communication Response
0003	1	Factory System	Application Communication stop	Termination of communication
0004	1	Controller	Application Command error	Command error
0005	1	Controller	Application Command accepted	Command Acceptance
0010	1	Factory System	Parameter set ID upload request	Parameter Set ID Upload Request
0011	1	Controller	Parameter set ID upload reply	Parameter Set ID Upload Response
0012	1	Factory System	Parameter set data upload request	Parameter Set Data Upload Request
0013	1	Controller	Parameter set data upload reply	Parameter Set Data Upload Response
0018	1	Factory System	Select Parameter set, Dynamic Job Included	Parameter Set Instructions
0030	1	Factory System	Job ID upload request	Job ID Upload Request
0031	1	Controller	Job ID upload reply	Job ID Upload Response
0034	1	Factory System	Job info subscribe	Job Information Upload Registration
0035	1	Controller	Job info	Job Information
0036	1	Factory System	Job info acknowledge	Job Information Response
0037	1	Factory System	Job info unsubscribe	Job Information Upload Unregister
0038	1	Factory System	Select Job	Select a job for the Controller
0039	1	Factory System	Job restart	Job Restart
0042	1	Factory System	Disable tool	Tools not available
0043	1	Factory System	Enable tool	Tools available
0050	1	Factory System	Vehicle ID Number download request	Vehicle ID Request
0051	1	Factory System	Vehicle ID Number subscribe	Vehicle ID Upload Registration
0052	1	Controller	Vehicle ID Number	Upload Vehicle ID
0053	1	Factory System	Vehicle ID Number acknowledge	Vehicle ID upload response
0054	1	Factory System	Vehicle ID Number unsubscribe	Upload Vehicle ID Cancel Registration
0060	1-10	Factory System	Last tighting result data subscribe	Final Tightening Result Data Registration
0061	1-10	Controller	Last tighting result data	Upload Tightening Results
0062	1-10	Factory System	Last tightening result data acknowledge	Tightening Result Upload Response
0070	1, 2	Factory System	Alarm subscribe	Alarm Upload Registration
0071	1, 2	Controller	Alarm	Alarm Upload
0072	1, 2	Factory System	Alarm acknowledge	Alarm Upload Response
0073	1, 2	Factory System	Alarm unsubscribe	Cancel Alarm Upload Registration
0074	1, 2	Controller	Alarm acknowledged on controller	Controller Alarm Response
0075	1, 2	Factory System	Alarm acknowledged on controller acknowledged	Factory system response to Controller alarm response.
0076	1, 2	Controller	Alarm status	Alarm status
0077	1, 2	Factory System	Alarm status acknowledge	Alarm Status Response
9999	1	Factory System	Keep alive message	Survival confirmation

2.3. List of Response Messages

The list of response messages when responding to MID from the factory system is shown in Table 2-2. Messages sent from the factory system must be in one of the following patterns: Revision000, Revision001, Revision002, or later.

Table 2-2 List of Response Messages

MID	Rev.	Revision number when responding												
		0002	0004	0005	0011	0013	0031	0035	0052	0061	0071	0074	0076	9999
0001	000	000	000	—	—	—	—	—	—	—	—	—	—	—
	001	001	001	—	—	—	—	—	—	—	—	—	—	—
	002≥	001	001	—	—	—	—	—	—	—	—	—	—	—
0003	000	—	—	000	—	—	—	—	—	—	—	—	—	—
	001	—	—	001	—	—	—	—	—	—	—	—	—	—
	002≥	—	—	001	—	—	—	—	—	—	—	—	—	—
0010	000	—	—	—	000	—	—	—	—	—	—	—	—	—
	001	—	—	—	001	—	—	—	—	—	—	—	—	—
	002≥	—	—	—	001	—	—	—	—	—	—	—	—	—
0012	000	—	000	—	—	000	—	—	—	—	—	—	—	—
	001	—	001	—	—	001	—	—	—	—	—	—	—	—
	002≥	—	001	—	—	001	—	—	—	—	—	—	—	—
0018	000	—	000	000	—	—	—	—	—	—	—	—	—	—
	001	—	001	001	—	—	—	—	—	—	—	—	—	—
	002≥	—	001	001	—	—	—	—	—	—	—	—	—	—
0030	000	—	—	—	—	—	000	—	—	—	—	—	—	—
	001	—	—	—	—	—	001	—	—	—	—	—	—	—
	002≥	—	—	—	—	—	001	—	—	—	—	—	—	—
0034	000	—	000	000	—	—	—	—	—	—	—	—	—	—
	001	—	001	001	—	—	—	—	—	—	—	—	—	—
	002≥	—	001	001	—	—	—	—	—	—	—	—	—	—
0036	000	—	—	—	—	—	—	—	—	—	—	—	—	—
	001	—	—	—	—	—	—	—	—	—	—	—	—	—
	002≥	—	—	—	—	—	—	—	—	—	—	—	—	—
0037	000	—	000	000	—	—	—	—	—	—	—	—	—	—
	001	—	001	001	—	—	—	—	—	—	—	—	—	—
	002≥	—	001	001	—	—	—	—	—	—	—	—	—	—
0038	000	—	000	000	—	—	—	—	—	—	—	—	—	—
	001	—	001	001	—	—	—	—	—	—	—	—	—	—

MID	Rev.	Revision number when responding												
		0002	0004	0005	0011	0013	0031	0035	0052	0061	0071	0074	0076	9999
	002≥	—	001	001	—	—	—	—	—	—	—	—	—	—
0039	000	—	000	000	—	—	—	—	—	—	—	—	—	—
	001	—	001	001	—	—	—	—	—	—	—	—	—	—
	002≥	—	001	001	—	—	—	—	—	—	—	—	—	—
0042	000	—	—	000	—	—	—	—	—	—	—	—	—	—
	001	—	—	001	—	—	—	—	—	—	—	—	—	—
	002≥	—	—	001	—	—	—	—	—	—	—	—	—	—
0043	000	—	000	000	—	—	—	—	—	—	—	—	—	—
	001	—	001	001	—	—	—	—	—	—	—	—	—	—
	002≥	—	001	001	—	—	—	—	—	—	—	—	—	—
0050	000	—	000	000	—	—	—	—	—	—	—	—	—	—
	001	—	001	001	—	—	—	—	—	—	—	—	—	—
	002≥	—	001	001	—	—	—	—	—	—	—	—	—	—
0051	000	—	000	000	—	—	—	—	—	—	—	—	—	—
	001	—	001	001	—	—	—	—	—	—	—	—	—	—
	002≥	—	001	001	—	—	—	—	—	—	—	—	—	—
0053	000	—	—	—	—	—	—	—	—	—	—	—	—	—
	001	—	—	—	—	—	—	—	—	—	—	—	—	—
	002≥	—	—	—	—	—	—	—	—	—	—	—	—	—
0054	000	—	000	000	—	—	—	—	—	—	—	—	—	—
	001	—	001	001	—	—	—	—	—	—	—	—	—	—
	002≥	—	001	001	—	—	—	—	—	—	—	—	—	—
0060	000	—	000	000	—	—	—	—	—	—	—	—	—	—
	001	—	001	001	—	—	—	—	—	—	—	—	—	—
	002≥	—	001	001	—	—	—	—	—	—	—	—	—	—
0061	000	—	—	—	—	—	—	—	—	000	—	—	—	—
※1	001	—	—	—	—	—	—	—	—	001	—	—	—	—
	002≥	—	—	—	—	—	—	—	—	※2	—	—	—	—
0062	000	—	—	—	—	—	—	—	—	—	—	—	—	—
	001	—	—	—	—	—	—	—	—	—	—	—	—	—
	002≥	—	—	—	—	—	—	—	—	—	—	—	—	—
0070	000	—	000	000	—	—	—	—	—	—	—	—	—	—
	001	—	001	001	—	—	—	—	—	—	—	—	—	—
	002≥	—	001	001	—	—	—	—	—	—	—	—	—	—
0072	000	—	—	—	—	—	—	—	—	—	—	—	—	—

MID	Rev.	Revision number when responding												
		0002	0004	0005	0011	0013	0031	0035	0052	0061	0071	0074	0076	9999
	001	—	—	—	—	—	—	—	—	—	—	—	—	—
	002≥	—	—	—	—	—	—	—	—	—	—	—	—	—
0073	000	—	000	000	—	—	—	—	—	—	—	—	—	—
	001	—	001	001	—	—	—	—	—	—	—	—	—	—
	002≥	—	001	001	—	—	—	—	—	—	—	—	—	—
0074	000	—	—	—	—	—	—	—	—	—	—	000	—	—
※1	001	—	—	—	—	—	—	—	—	—	—	001	—	—
	002≥	—	—	—	—	—	—	—	—	—	—	※3	—	—
0075	000	—	—	—	—	—	—	—	—	—	—	—	—	—
	001	—	—	—	—	—	—	—	—	—	—	—	—	—
	002≥	—	—	—	—	—	—	—	—	—	—	—	—	—
0076	000	—	—	—	—	—	—	—	—	—	—	—	000	—
※1	001	—	—	—	—	—	—	—	—	—	—	—	001	—
	002≥	—	—	—	—	—	—	—	—	—	—	—	※3	—
0077	000	—	—	—	—	—	—	—	—	—	—	—	—	—
	001	—	—	—	—	—	—	—	—	—	—	—	—	—
	002≥	—	—	—	—	—	—	—	—	—	—	—	—	—
9999	000	—	—	—	—	—	—	—	—	—	—	—	—	000
	001	—	—	—	—	—	—	—	—	—	—	—	—	001
	002≥	—	—	—	—	—	—	—	—	—	—	—	—	001

※1 MID0061, MID0074, and MID0076 are messages from the Controller to the factory system.
※2 Respond with the Revision number received in MID0060(Last tighting result data subscribe).
※3 Respond with the Revision number received in MID0070 (Alarm subscribe).

3.Interface Specifications

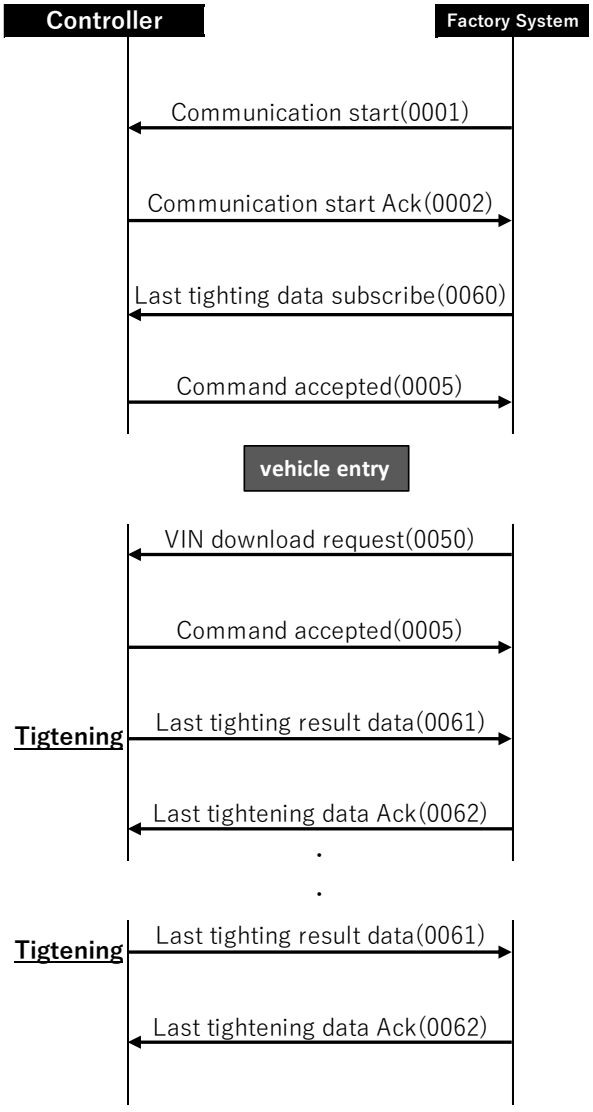
3.1.Control Modes

There are two modes in EYFRW2 to control assembly tools by using Atlas Open Protocol.

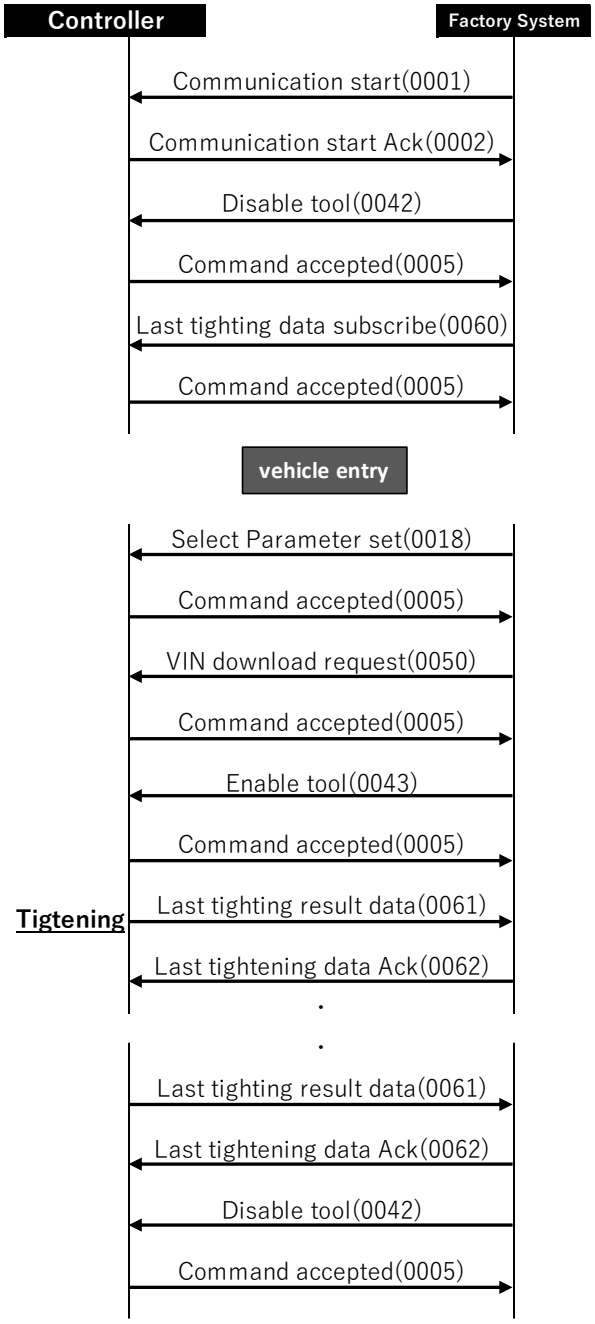
Mode①:Tigtening is performed by a parameter preset in the contoroller (without receiving a Pset from the factory system for each tightening) and uplodes each tightening result data to the factory system.

Mode②:Tigtening is performed by a Pset (or a batch) received from the factory system, and uplodes each tightening result data to the factory system.

＜Mode①＞



＜Mode②＞



3.2.Message Structure

【Structure】
The message consists of three parts “Header”, ”Data field”, and “Message end”.
・Header ： Contains 20bytes according to Table 3-1.
・Data field ： The data is represented by ASCII. Contains a list of Parameters depending on the MID.
Each parameter is represented with an ID and a parameter Value.
Please reffer to Chapter 3.3 Supported MID for details.
・Message end ： The message end is empty (NUL、ASCII 0x00)

【Header】
Each parts of the header of Atlas Open Protocol message is handled as below in this controller.

Table 3-1 Header

Bytes	Parameter	Description
1-4	Length	Byte length of the message.
5-8	MID	Message ID received or sent. When controller receives an unsupported MID, the controller responses MID0004 with an error code ”99”.
9-11	Revision	Revision of the MID received or sent. When controller receives an unsupported Revision, the controller responses MID0004 with an error code ”97”.
12	No ack flag	Setting whether to wait for ack from the factory system when the controller receives a subscription MID, or when a subscription MID is sent from the controller. This controller always waits for ack from the factory system, so it will not be sent from the controller.
13-14	Station ID	Not used in this product. Ignored when received, ”0” (ASCII 0x30) when sent.
15-16	Spindle ID	Not used in this product. Ignored when received, ”0” (ASCII 0x30) when sent.
17-18	Sequence number	Not used in this product. Ignored when received, ”0” (ASCII 0x30) when sent.
19	Number of message parts	Not used in this product. Ignored when received, ”0” (ASCII 0x30) when sent.
20	Message part number	Not used in this product. Ignored when received, ”0” (ASCII 0x30) when sent.

3.3. Supported MIDs

【MID categories】
The messages can be sorted in two categories as below.

Table 3-2 Supported MID and Categories

MID	Rev.	Sent by	MID	Message Categories	Supported Modes
0001	1	Factory System	Application Communication start	Request	Mode (1) / Mode (2)
0002	1	Controller	Application Communication start acknowledge	Request Reply	Mode (1) / Mode (2)
0003	1	Factory System	Application Communication stop	Request	Mode (1) / Mode (2)
0004	1	Controller	Application Command error	Request	Mode (1) / Mode (2)
0005	1	Controller	Application Command accepted	Request	Mode (1) / Mode (2)
0010	1	Factory System	Parameter set ID upload request	Request	Modes (2)
0011	1	Controller	Parameter set ID upload reply	Request Reply	Modes (2)
0012	1	Factory System	Parameter set data upload request	Request	Modes (2)
0013	1	Controller	Parameter set data upload reply	Request Reply	Modes (2)
0018	1	Factory System	Select Parameter set, Dynamic Job Included	Request	Modes (2)
0030	1	Factory System	Job ID upload request	Request	Modes (2)
0031	1	Controller	Job ID upload reply	Request Reply	Modes (2)
0034	1	Factory System	Job info subscribe	Event Subscription	Modes (2)
0035	1	Controller	Job info	Events	Modes (2)
0036	1	Factory System	Job info acknowledge	Event Acknowledge	Modes (2)
0037	1	Factory System	Job info unsubscribe	Event Subscription	Modes (2)
0038	1	Factory System	Select Job	Request	Modes (2)
0039	1	Factory System	Job restart	Request	Modes (2)
0042	1	Factory System	Disable tool	Request	Modes (2)
0043	1	Factory System	Enable tool	Request	Modes (2)
0050	1	Factory System	Vehicle ID number download request	Request	Mode (1) / Mode (2)
0051	1	Factory System	Vehicle ID number subscribe	Event Subscription	Mode (1) / Mode (2)
0052	1	Controller	Vehicle ID number	Events	Mode (1) / Mode (2)
0053	1	Factory System	Vehicle ID number acknowledge	Event Acknowledge	Mode (1) / Mode (2)
0054	1	Factory System	Vehicle ID number unsubscribe	Event Subscription	Mode (1) / Mode (2)
0060	1-10	Factory System	Last tighting result data subscribe	Event Subscription	Mode (1) / Mode (2)
0061	1-10	Controller	Last tighting result data	Events	Mode (1) / Mode (2)
0062	1-10	Factory System	Last tightening result data acknowledge	Event Acknowledge	Mode (1) / Mode (2)
0070	1, 2	Factory System	Alarm subscribe	Event Subscription	Mode (1) / Mode (2)
0071	1, 2	Controller	Alarm	Events	Mode (1) / Mode (2)
0072	1, 2	Factory System	Alarm acknowledge	Event Acknowledge	Mode (1) / Mode (2)
0073	1, 2	Factory System	Alarm unsubscribe	Event Subscription	Mode (1) / Mode (2)
0074	1, 2	Controller	Alarm acknowledged on controller	Events	Mode (1) / Mode (2)
0075	1, 2	Factory System	Alarm acknowledged on controller acknowledged	Event Acknowledge	Mode (1) / Mode (2)
0076	1, 2	Controller	Alarm status	Events	Mode (1) / Mode (2)
0077	1, 2	Factory System	Alarm status acknowledge	Event Acknowledge	Mode (1) / Mode (2)
9999	1	Factory System	Keep alive message	Request/ Request Reply	Mode (1) / Mode (2)

3.3.1. MID0001 Application Communication start

Message ID for Factory System → Controller
This system supports Rev.1.

Start Communication: Start communication with the Controller

Message Configuration	Parameters	Byte	Value
Header	Message length (Length)	1-4	0020
	MID	5-8	0001
	Supported versions (Revision)	9-11	001
	No ACK flag (No ack flag)	12	N/A
	Station ID (Station ID)	13-14	00-99
	Spindle ID (Spindle ID)	15-16	00-99
	Preliminary (Spare)	17-20	N/A
Data field	N/A	0	N/A
Message end		21	NULL

[Reply message from Controller]
・MID0002 if before communication start.
・MID0004(Error code “96”) if communication already started.

Refer to the Specification Open Protocol 1.2 Rev.14 for further information.

3.3.2. MID0002 Application Communication start acknowledge

Controller → Factory System Message ID
This system supports Rev.1.

Communication Response: Responds to the command to start communication from a factory system

Message Configuration	Parameters	Byte	Value
Header	Message length (Length)	1-4	0057
	MID	5-8	0002
	Supported versions (Revision)	9-11	001
	No ACK flag (No ack flag)	12	N/A
	Station ID (Station ID)	13-14	MID0001 Return the value when it was received. If the value is 0, send "0" (ASCII 0x30).
	Spindle ID (Spindle ID)	15-16	MID0001 Return the value when it was received. If the value is 0, send "0" (ASCII 0x30).
	Preliminary (Spare)	17-20	N/A
Data field	Cell ID (Cell ID)	21-22	01
		23-26	0000-9999 *Cell ID set on the Controller
	Channel ID (Channel ID)	27-28	02
		29-30	00-20 *Channel ID set on the Controller
	Controller Name (Contoroller Name)	31-32	03
		33-57	25-digit ASCII characters *Controller name set for Controller
Message end		58	NULL

See the Open Protocol Specification for further information.

3.3.3. MID0003 Application Communication stop

Message ID for the Factory System → Controller
This system supports Rev.1.

End Communication: End communication with the Controller

After receiving this command, the response to all commands except MID0001 (start communication) stops.

Message Configuration	Parameters	Byte	Value
Header	Message length (Length)	1-4	0020
	MID	5-8	0003
	Supported versions (Revision)	9-11	001
	No ACK flag (No ack flag)	12	N/A
	Station ID (Station ID)	13-14	N/A
	Spindle ID (Spindle ID)	15-16	N/A
	Preliminary (Spare)	17-20	N/A
Data field	N/A	0	N/A
Message end		21	NULL

[Reply message from Controller]
・If it is after the communication starts, the command acceptance (MID0005) response

See the Open Protocol Specification for further information.

3.3.4. MID0004 Application Command error

Controller → Factory System Message ID
This system supports Rev.1.

"Command Error": When the MID cannot be accepted, or when a MID/Rev that does not support is received, the MID replies

Message Configuration	Parameters	Byte	Value
Header	Message length (Length)	1-4	0026
	MID	5-8	0004
	Supported versions (Revision)	9-11	001
	No ACK flag (No ack flag)	12	N/A
	Station ID (Station ID)	13-14	MID0001 Return the value when it was received. If the value is 0, send "0" (ASCII 0x30).
	Spindle ID (Spindle ID)	15-16	MID0001 Return the value when it was received. If the value is 0, send "0" (ASCII 0x30).
	Preliminary (Spare)	17-20	N/A
Data field	MID number	21-24	MID4 桁 :0000-9999
	Error code	25-26	Error Code 2 Digits :00-99 *Refer to the attached table for error codes.
Message end		27	NULL

■Error Code Table

Code	Error content	Description	Target MID
01	Invalid data	Data outside the validity range	0038, etc
02	Parameter set ID not present	Parameter set ID does not exist	0012
03	Parameter set can not be set.	Parameter not configurable	0018
04	Parameter set not running	Parameter not specified	0043
06	VIN upload subscription already exists	Vehicle ID Notification Occurs when a subscription request is received again after the subscription is established	0051
07	VIN upload subscription does not exists	Vehicle ID Notification Occurs when a subscription cancellation request is received in the pre-subscription state	0054
08	VIN input source not granted	Vehicle ID Incorrect Values	0050
09	Last tightening result subscription already exists	Closure Result Notification Subscription Established	0060
11	Alarm subscription already exists	Alarm InformationNotification Subscription Established	0070
12	Alarm subscription does not exist	Alarm Notification Subscription Not Established	0073
18	Job info subscription already exists	Job Information Notification Subscription Established	0034
19	Job info subscription does not exist	Job Information Notification Subscription Not Established	0037
20	Job can not be set	Occurs when the received job ID is not created in the Controller	0038
21	Job not running	Occurs when the received job ID is not executed	0039
24	Not possible to create Pset	Parameter not set	0018
59	Tool currently in use	In Use of the Tool	0018
79	Command failed	Command failure	All
96	Client already connected	Communication has started	0001
97	MID revision unsupported	MID Unsupported Versions	All
98	Controller internal request timeout	Controller Internal Processing Timeout	All
99	Unknown MID	Unknown MID	-

・When the Controller receives a message from a Factory System, if a revision other than the corresponding revision is specified in each message, the command error response (MID0004, error code = '97') However, for the following commands, the revision limit has been relaxed for operational purposes, and all revisions are accepted.
MID005、MID0018、MID0036、MID0037、MID0050、MID0062、MID9999

・A situation where a message is received normally, but the Controller cannot process a message from a factory system. (setting change/FW update/tuning, etc.), command error response (MID0004, error code = '98')
・When receiving a message, if the data part is not specified in each message, the command error response (MID0004, error code='79')
・When receiving a message other than the corresponding message, a command error response (MID0004, error code = '99')
・In the case of fraudulent packets, the received message is discarded.
・See Specification Open Protocol for further information.

3.3.5. MID0005 Application Command accepted

Controller → Factory System Message ID
This system supports Rev.1.

"Command Acceptance": Reply with this MID when receiving a supported MID or Rev

Message Configuration	Parameters	Byte	Value
Header	Message length (Length)	1-4	0024
	MID	5-8	0005
	Supported versions (Revision)	9-11	001
	No ACK flag (No ack flag)	12	N/A
	Station ID (Station ID)	13-14	MID0001 Return the value when it was received. If the value is 0, send "0" (ASCII 0x30).
	Spindle ID (Spindle ID)	15-16	MID0001 Return the value when it was received. If the value is 0, send "0" (ASCII 0x30).
	Preliminary (Spare)	17-20	N/A
Data field	Receiving MID (MID accepted)	21-24	MID4 桁 :0000-9999
Message end		25	NULL

See Specification Open Protocol for further information.

3.3.6. MID0010 Parameter set ID upload request

Message ID for the Factory System → Controller
This system supports Rev.1.

Parameter Set ID Upload Request: A request to send an available parameter set to the Controller

Message Configuration	Parameters	Byte	Value
Header	Message length (Length)	1-4	0020
	MID	5-8	0010
	Supported versions (Revision)	9-11	001
	No ACK flag (No ack flag)	12	N/A
	Station ID (Station ID)	13-14	N/A
	Spindle ID (Spindle ID)	15-16	N/A
	Preliminary (Spare)	17-20	N/A
Data field	N/A		N/A
Message end		21	NULL

[Reply message from Controller]
• Command response with or without available parameter set IDs (MID0011)

See Specification Open Protocol for further information.

3.3.7. Mid0011 ParAmmet's Set ID Upload Reply

Controller → Factory System Message ID
This system supports Rev.1.

Parameter Set ID Upload Response: Responds to the parameter set created in the Controller

The number of parameter sets / multistage in the controller) :
The number of available jobs in the Controller (up to 10). Three-digit numbers (ASCII).
The ID of each parameter set / multistage present:
Available Parameter Set IDs created on the Controller side

Since there are parameters 1 ~ 5 and batch 1 ~ batch 5, the data part is as follows
Data Section: "010001002003004005101102103104105"

Message Configuration	Parameters	Byte	Value
Header	Message length (Length)	1-4	0023～0053
	MID	5-8	0011
	Supported versions (Revision)	9-11	001
	No ACK flag (No ack flag)	12	N/A
	Station ID (Station ID)	13-14	MID0001 Return the value when it was received. If the value is 0, send "0" (ASCII 0x30).
	Spindle ID (Spindle ID)	15-16	MID0001 Return the value when it was received. If the value is 0, send "0" (ASCII 0x30).
	Preliminary (Spare)	17-20	N/A
Data field	Number of Parameter Set IDs (The number of parameter sets / multistage in the controller)	21-23	000-999 The The maximum number is 10 (5 parameters × 5 batches, ×5 batches)
	The ID of each parameter set / multistage present.	24- (23 + number of parameter set IDs×3)	000-999
Message end		(23 + Number of Parameter Set IDs×3) +1	NULL

See Specification Open Protocol for further information.

3.3.8. MID0012 Parameter set data upload request

Message ID for the Factory System → Controller
This system supports Rev.1.

Parameter Set Data Upload Request: A request to send available parameter set data to the Controller

Message Configuration	Parameters	Byte	Value
Header	Message length (Length)	1-4	0023
	MID	5-8	0012
	Supported versions (Revision)	9-11	001
	No ACK flag (No ack flag)	12	N/A
	Station ID (Station ID)	13-14	N/A
	Spindle ID (Spindle ID)	15-16	N/A
	Preliminary (Spare)	17-20	N/A
Data field	パラメータセット ID (Parameterset ID)	21-23	000-999
Message end		24	NULL

[Reply message from Controller]
• Command response (MID0013) if an available parameter set ID is specified.

・In case of abnormality, respond with a command error (MID0004) (Error Code is as follows)
Parameter set ID not present(02) : If the received parameter set ID is not created in the Controller

See Specification Open Protocol for further information.

3.3.9. MID0013 Parameter set data upload reply

Controller → Factory System Message ID
This system supports Rev.1.

Parameter Set Data Upload Response: Responds to data from the parameter set created in the Controller

Parameter set ID : 3 digit number (ASCII).
For parameters, 100 digits are 0, and 10 digits and 1 digit are parameter numbers. For example, parameter 5 is parameter set ID "005".
For batches, 100 digits are 1, and 10 digits and 1 digits are the batch number. For example, batch 5 with parameter set ID "105".

Parameter set name: A 25-digit number (ASCII).
For parameters, Parameter001~Parameter005
For batches, Batch001~Batch005

Batch size: A two-digit number (ASCII).
For the parameter, 00
For batches, 00~99

Message Configuration	Parameters	Byte	Value
Header	Message length (Length)	1-4	0104
	MID	5-8	0013
	Supported versions (Revision)	9-11	001
	No ACK flag (No ack flag)	12	N/A
	Station ID (Station ID)	13-14	MID0001 Return the value when it was received. If the value is 0, send "0" (ASCII 0x30).
	Spindle ID (Spindle ID)	15-16	MID0001 Return the value when it was received. If the value is 0, send "0" (ASCII 0x30).
	Preliminary (Spare)	17-20	N/A
Data field	Parameter Set ID (Parameter set ID)	21-22	01
		23-25	000-999 *Parameter number created on the Controller *For parameter: 0XX (XX is the parameter number) *For batches: 1XX (XX is the batch number)
	Parameter Set Name (Parameter set name)	26-27	02
		28-52	25-digit ASCII characters Parameter001～Parameter005、 Batch001～Batch005
	Direction of rotation (Rotation direction)	53-54	03
		55	1=CW、2=CCW *1 (CW) fixed due to non-support
	Batch Size (Batch size)	56-57	04
		58-59	00-99 Two-digit ASCII characters *For parameters: 00

			*For batches: 00~99
	Lower Torque (Torque min)	60-61	05
		62-67	000000-099990 *Convert 2 decimal places to an integer and notify Configurable range: 000.0-999.9Nm for notification content: 000000-099990
	Upper Torque (Torque max)	68-69	06
		70-75	000000-099990 *Convert 2 decimal places to an integer and notify Configurable range: 000.0-999.9Nm for notification content: 000000-099990
	Target Torque (Torque final target)	76-77	07
		78-83	000000-099990 *Convert 2 decimal places to an integer and notify Configurable range: 000.0-999.9Nm for notification content: 000000-099990 *Shut-off torque (target value)
	Lower limit angle (Angle min)	84-85	08
		86-90	00000-99999 *Lower angle after sitting
	Upper Angle (Angle max)	91-92	09
		93-97	00000-99999 *Upper angle after sitting
	Target Angle (Final Angle Target)	98-99	10
		100-104	00000-99999 *00000 for non-correspondence
Message end		105	NULL

See Specification Open Protocol for further information.

3.3.10.MID0018 Select Parameter set, Dynamic Job Included

Message ID for the Factory System → Controller
This system supports Rev.1.

Parameter Set Instructions: Indicates the tightening content of the Controller (and tool)

Parameter set ID : 3 digit number (ASCII).
For parameters, 100 digits are 0, and 10 digits and 1 digit are parameter numbers. For example, parameter 5 is parameter set ID "005".

For batches, 100 digits are 1, and 10 digits and 1 digits are the batch number. For example, batch 5 with parameter set ID "105".

Message Configuration	Parameters	Byte	Value
Header	Message length (Length)	1-4	0023
	MID	5-8	0018
	Supported versions (Revision)	9-11	001
	No ACK flag (No ack flag)	12	N/A
	Station ID (Station ID)	13-14	N/A
	Spindle ID (Spindle ID)	15-16	N/A
	Preliminary (Spare)	17-20	N/A
Data field	Parameter ID (Parameter set ID)	21-23	000-999 *For parameter: 0XX (XX is the parameter number) *For batches: 1XX (XX is the batch number)
Message end		24	NULL

[Reply message from Controller]
・If the tool is unavailable, the command acceptance (MID0005) response
*Once the P set instruction command is processed and then received again, it will be updated with the content at a later date.
・Even if the tool is unusable,
・If the parameters specified in the received command are out of range, the command error response (MID0004, error code = '03')
・If the parameter number or batch number specified in the received command is not set to the set value, the command error response(MID0004, error code = '24')
・When receiving the tool in a state where the tool is available, the command error response (MID0004, error code = '59')
・See other Specification Open Protocol.

3.3.11.MID0030 Job ID upload request

Message ID for the Factory System → Controller
This system supports Rev.1.

Job ID Upload Request: A request to send available job IDs to the Controller

Message Configuration	Parameters	Byte	Value
Header	Message length (Length)	1-4	0020
	MID	5-8	0030
	Supported versions (Revision)	9-11	001
	No ACK flag (No ack flag)	12	N/A
	Station ID (Station ID)	13-14	N/A
	Spindle ID (Spindle ID)	15-16	N/A
	Preliminary (Spare)	17-20	N/A
Data field	N/A		N/A
Message end		21	NULL

[Reply message from Controller]
・Command response (MID0031) regardless of whether the job ID is registered or unregistered on the Controller

See Specification Open Protocol for further information.

3.3.12. MID0031 Job ID upload reply

Controller → Factory System Message ID
This system supports Rev.1.

Job ID Upload Response: Responds to the job ID that is created in the Controller

Number of Jobs: The number of jobs available in the Controller (up to 5). Two-digit numbers (ASCII).
Job ID of each Job present in the controller) : Available job IDs created on the Controller side

(Example) If Job 1 and Job 3 are created for Tool 1 The Data field is "020103".

Message Configuration	Parameters	Byte	Value
Header	Message length (Length)	1-4	0023～0032
	MID	5-8	0031
	Supported versions (Revision)	9-11	001
	No ACK flag (No ack flag)	12	N/A
	Station ID (Station ID)	13-14	MID0001 Return the value when it was received. If the value is 0, send "0" (ASCII 0x30).
	Spindle ID (Spindle ID)	15-16	MID0001 Return the value when it was received. If the value is 0, send "0" (ASCII 0x30).
	Preliminary (Spare)	17-20	N/A
Data field	Number of job IDs (Number of Jobs)	21-22	00-99 The maximum number of jobs that can be created in the Controller is 5
	Job ID of each Job present in the controller)	23- (22 + number of job IDs × 2)	00-99
Message end		(22 + number of job IDs × 2) +1	NULL

See Specification Open Protocol for further information.

3.3.13. MID0034 Job info subscribe

Message ID for the Factory System → Controller
This system supports Rev.1.
For details of the sequence, refer to the sequence diagram in Section 3.4.

"Job Information Upload Registration": Request job information notification (respond with MID0035 from the Controller)

Message Configuration	Parameters	Byte	Value
Header	Message length (Length)	1-4	0020
	MID	5-8	0034
	Supported versions (Revision)	9-11	001
	No ACK flag (No ack flag)	12	N/A
	Station ID (Station ID)	13-14	N/A
	Spindle ID (Spindle ID)	15-16	N/A
	Preliminary (Spare)	17-20	N/A
Data field	N/A		N/A
Message end		21	NULL

[Reply message from Controller]
・Command acceptance (MID0005) response before the job information notification subscription is established
・Command error (MID0004, error code = '18') response after the job information notification subscription is established

See Specification Open Protocol for further information.

3.3.14.MID0035 Job info

Controller → Factory System Message ID
This system supports Rev.1.
For details of the sequence, refer to the sequence diagram in Section 3.4.

Upload Job Information: Notify the job information to the factory system

The Controller repeats the retransmission after the job information is uploaded until the upload response (MID0036) from the factory system is returned, or unless the upper limit of the number of retransmissions is exceeded.
Retransmission Interval : 20 sec interval
Number of retransmissions : Up to 5 times

Job status: A single-digit character (ASCII). Job status.
If the tightening operation is OK, 1 (job OK) is notified, and if the tightening operation is NOK, 2 (job NOK) is notified.
When notifying the factory after receiving the job selection (MID0038), it is notified as 0 (job not completed).

Job batch mode: Single-digit characters (ASCII). Counting method.
Since only tightening OK is counted, it is fixed to 0.

Job batch size: 4 digits of characters (ASCII). The total number of trains in the job.
The number of batches in each step is the sum of all the batches.
*MID0038 The value sent to the higher system after receiving the data is not aligned, so it responds with 0000.

Job batch counter: A four-digit character (ASCII). Number of tightenings.
Notifies the current number of tightening in the job.

Time: 19-digit characters (ASCII). moment.
- The time in the Job info sent after receiving the MID0038 (job selection) is the time when the MID0038 (job selection) was received.
・The time in the job info sent after MID0061 (tightening history) is the time of the tightening history information.

Message Configuration	Parameters	Byte	Value
Header	Message length (Length)	1-4	0063
	MID	5-8	0035
	Supported versions (Revision)	9-11	001
	No ACK flag (No ack flag)	12	N/A
	Station ID (Station ID)	13-14	MID0001 Return the value when it was received. If the value is 0, send "0" (ASCII 0x30).
	Spindle ID (Spindle ID)	15-16	MID0001 Return the value when it was received. If the value is 0, send "0" (ASCII 0x30).
	Preliminary (Spare)	17-20	N/A
Data field	Job ID (Job ID)	21-22	01
		23-24	00-99
	Job status (Job status)	25-26	02
		27	0 = Job incomplete, 1 = Job OK,

			2 = Job NOK
	Job Batch Mode (Job batch mode)	28-29	03
		30	0 fixed 0 = Only tightening OK counts, 1=Count both OK and NOK
	Job Batch Size (Job batch size)	31-32	04
		33-36	0000-9999
	Job Batch Counter (Job batch counter)	37-38	05
		39-42	0000-9999
	Moment (Time)	43-44	06
		45-63	19-digit ASCII characters YYYY-MM-DD:HH:MM:SS ~~(error occurrence time)~~
Message end		64	NULL

See Specification Open Protocol for further information.

3.3.15. MID0036 Job info acknowledge

Message ID for the Factory System → Controller
This system supports Rev.1.
For details of the sequence, refer to the sequence diagram in Section 3.4.

Job Information Upload Response: Responds to the Controller that the factory system has received the job information.

The Controller does not transmit a new MID0035 unless it receives a response (MID0036) from a factory system after transmitting the MID0035.

Message Configuration	Parameters	Byte	Value
Header	Message length (Length)	1-4	0020
	MID	5-8	0036
	Supported versions (Revision)	9-11	001
	No ACK flag (No ack flag)	12	N/A
	Station ID (Station ID)	13-14	N/A
	Spindle ID (Spindle ID)	15-16	N/A
	Preliminary (Spare)	17-20	N/A
Data field	N/A		N/A
Message end		21	NULL

See Specification Open Protocol for further information.

3.3.16. MID0037 Job info unsubscribe

Message ID for the Factory System → Controller
This system supports Rev.1.
For details of the sequence, refer to the sequence diagram in Section 3.4.

"Cancellation of Job Information Upload Registration": Canceling a Job Information Notification Request

Message Configuration	Parameters	Byte	Value
Header	Message length (Length)	1-4	0020
	MID	5-8	0037
	Supported versions (Revision)	9-11	001
	No ACK flag (No ack flag)	12	N/A
	Station ID (Station ID)	13-14	N/A
	Spindle ID (Spindle ID)	15-16	N/A
	Preliminary (Spare)	17-20	N/A
Data field	N/A		N/A
Message end		21	NULL

[Reply message from Controller]
・Command acceptance (MID0005) response after job information notification subscription is established
・Command error (MID0004, error code = '19') response before the job information notification subscription is established

See Specification Open Protocol for further information.

3.3.17.MID0038 Select Job

Message ID for the Factory System → Controller
This system supports Rev.1.

Select Controller Jobs: Select available jobs that exist within the Controller

Message Configuration	Parameters	Byte	Value
Header	Message length (Length)	1-4	0022
	MID	5-8	0038
	Supported versions (Revision)	9-11	001
	No ACK flag (No ack flag)	12	N/A
	Station ID (Station ID)	13-14	N/A
	Spindle ID (Spindle ID)	15-16	N/A
	Preliminary (Spare)	17-20	N/A
Data field	Job ID (Job ID)	21-22	00-99
Message end		23	NULL

[Reply message from Controller]
・When normal, command acceptance (MID0005) response
⇒ Controller reflects the received job ID in the "job ID" in the tightening result data sent by the MID0061.

・In case of abnormality, respond with a command error (MID0004) (Error Code is as follows)
Invalid data(01) : If the received job ID is outside the valid range
Job can not be set(20) : If the received job ID has not been created in the Controller

See Specification Open Protocol for further information.

3.3.18.MID0039 Job restart

Message ID for the Factory System → Controller
This system supports Rev.1.

"Job Restart": Request to restart (reset) the currently active job

Message Configuration	Parameters	Byte	Value
Header	Message length (Length)	1-4	0022
	MID	5-8	0039
	Supported versions (Revision)	9-11	001
	No ACK flag (No ack flag)	12	N/A
	Station ID (Station ID)	13-14	N/A
	Spindle ID (Spindle ID)	15-16	N/A
	Preliminary (Spare)	17-20	N/A
Data field	Job ID (Job ID)	21-22	00-99
Message end		23	NULL

[Reply message from Controller]
・When normal, command acceptance (MID0005) response
⇒ Controller resets the job in progress with the received job ID.

・In case of abnormality, respond with a command error (MID0004) (Error Code is as follows)
Invalid data(01) : If the received job ID is outside the valid range
Job not running(21) : If the received job ID has not been implemented (if the "Progress" in the work history information is 0)

See Specification Open Protocol for further information.

3.3.19. MID0042 Disable tool

Message ID for the Factory System → Controller
This system supports Rev.1.

"Tool Unavailable": Indicates that the tool cannot be tightened (locked)

Message Configuration	Parameters	Byte	Value
Header	Message length (Length)	1-4	0020
	MID	5-8	0042
	Supported versions (Revision)	9-11	001
	No ACK flag (No ack flag)	12	N/A
	Station ID (Station ID)	13-14	N/A
	Spindle ID (Spindle ID)	15-16	N/A
	Preliminary (Spare)	17-20	N/A
Data field	N/A		N/A
Message end		21	NULL

[Reply message from Controller]
・Regardless of the tool availability/tool not available state, see Command

Acceptance (MID0005) Response, etc. Specification Open Protocol.

3.3.20. MID0043 Enable tool

Message ID for the Factory System → Controller
This system supports Rev.1.

"Tool Available": Indicates that the tool is ready to be tightened

Message Configuration	Parameters	Byte	Value
Header	Message length (Length)	1-4	0020
	MID	5-8	0043
	Supported versions (Revision)	9-11	001
	No ACK flag (No ack flag)	12	N/A
	Station ID (Station ID)	13-14	N/A
	Spindle ID (Spindle ID)	15-16	N/A
	Preliminary (Spare)	17-20	N/A
Data field	N/A		N/A
Message end		21	NULL

[Reply message from Controller]
・After the P set instruction, the command is received (MID0005) regardless of the tool enabled or disabled
*However, if the tool is enabled, the tool will remain enabled, but the tool will not be required to be tightened.
・If it is before the P set instruction, the command error response(MID0004, error code = '04')
・See Specification Open Protocol for further information.

3.3.21. MID0050 Vehicle ID number download request

Message ID for the Factory System → Controller
This system supports Rev.1.

"Vehicle ID Acquisition Request": Indicate the vehicle identification number (VIN) (upload it in connection with the subsequent tightening results)

Vehicle ID (VIN number): Characters within 25 digits (ASCII). Body identification number.
The Controller that receives this message associates the VIN number with the subsequent tightening results.

Message Configuration	Parameters	Byte	Value
Header	Message length (Length)	1-4	0021-0045
	MID	5-8	0050
	Supported versions (Revision)	9-11	001
	No ACK flag (No ack flag)	12	N/A
	Station ID (Station ID)	13-14	N/A
	Spindle ID (Spindle ID)	15-16	N/A
	Preliminary (Spare)	17-20	N/A
Data field	Vehicle ID (VIN Number)	21-45	ASCII characters within 25 digits
Message end		46	NULL

[Reply message from Controller]
・If the specified vehicle ID is correct value, always receive commands (MID0005)
・If the specified vehicle ID is invalid, refer to the command error response (MID0004, error code = '08')
・See Specification Open Protocol for further information.

3.3.22. MID0051 Vehicle ID number subscribe

Message ID for the Factory System → Controller
This system supports Rev.1.
For details of the sequence, refer to the sequence diagram in Section 3.4.

"Vehicle ID Upload Registration": Request a Vehicle Identification Number (VIN) notification (respond with a MID0052 from the Controller)

Message Configuration	Parameters	Byte	Value
Header	Message length (Length)	1-4	0020
	MID	5-8	0051
	Supported versions (Revision)	9-11	001
	No ACK flag (No ack flag)	12	N/A
	Station ID (Station ID)	13-14	N/A
	Spindle ID (Spindle ID)	15-16	N/A
	Preliminary (Spare)	17-20	N/A
Data field	N/A		N/A
Message end		21	NULL

[Reply message from Controller]
・Vehicle Identification Number (VIN) Notification Command Acceptance (MID0005) response before subscription establishment
・Vehicle Identification Number (VIN) Notification If the subscription is established, command error (MID0004, error code = '06') response

See Specification Open Protocol for further information.

3.3.23.MID0052 Vehicle ID Number

Controller → Factory System Message ID
This system supports Rev.1.
For details of the sequence, refer to the sequence diagram in Section 3.4.

"Upload Vehicle ID ": Notify the vehicle identification number (VIN) to the factory system

After uploading the vehicle ID, the Controller repeats the retransmission until the upload response (MID0053) from the Factory System is returned, or unless the upper limit of the number of retransmissions is exceeded.
Retransmission Interval : 20 sec interval
Number of retransmissions : Up to 5 times

Vehicle ID (VIN number): 25-digit character (ASCII). Body identification number.
Notify the factory system of the VIN number received from an external input (barcode reader) or MID0050.

Message Configuration	Parameters	Byte	Value
Header	Message length (Length)	1-4	0045
	MID	5-8	0052
	Supported versions (Revision)	9-11	001
	No ACK flag (No ack flag)	12	N/A
	Station ID (Station ID)	13-14	MID0001 Return the value when it was received. If the value is 0, send "0" (ASCII 0x30).
	Spindle ID (Spindle ID)	15-16	MID0001 Return the value when it was received. If the value is 0, send "0" (ASCII 0x30).
	Preliminary (Spare)	17-20	N/A
Data field	車両 ID (VIN number)	21-45	25-digit ASCII characters
Message end		46	NULL

See Specification Open Protocol for further information.

3.3.24. MID0053 Vehicle ID number acknowledge

Message ID for the Factory System → Controller
This system supports Rev.1.
For details of the sequence, refer to the sequence diagram in Section 3.4.

Vehicle ID Upload Response: Responds to the Controller that the factory system has received the Vehicle Identification Number (VIN)

The Controller does not send a new MID0052 unless it receives a response (MID0053) from a factory system after transmitting the MID0052.

Message Configuration	Parameters	Byte	Value
Header	Message length (Length)	1-4	0020
	MID	5-8	0053
	Supported versions (Revision)	9-11	001
	No ACK flag (No ack flag)	12	N/A
	Station ID (Station ID)	13-14	N/A
	Spindle ID (Spindle ID)	15-16	N/A
	Preliminary (Spare)	17-20	N/A
Data field	N/A		N/A
Message end		21	NULL

See Specification Open Protocol for further information.

3.3.25. MID0054 Vehicle ID number unsubscribe

Message ID for the Factory System → Controller
This system supports Rev.1.
For details of the sequence, refer to the sequence diagram in Section 3.4.

"Cancel Vehicle ID Upload Registration": Cancel Vehicle Identification Number (VIN) Notification Request

Message Configuration	Parameters	Byte	Value
Header	Message length (Length)	1-4	0020
	MID	5-8	0054
	Supported versions (Revision)	9-11	001
	No ACK flag (No ack flag)	12	N/A
	Station ID (Station ID)	13-14	N/A
	Spindle ID (Spindle ID)	15-16	N/A
	Preliminary (Spare)	17-20	N/A
Data field	N/A		N/A
Message end		21	NULL

[Reply message from Controller]
・Vehicle Identification Number (VIN) Notification If the subscription is established, it will respond to the command acceptance (MID0005)
・Vehicle Identification Number (VIN) Notification If the subscription is established, command error (MID0004, error code = '07') response

See Specification Open Protocol for further information.

3.3.26.MID0060 Last tightening result data subscribe

Message ID for the Factory System → Controller
This system supports Rev.1-10.

"Final Tightening Result Data Registration": Request notification of tightening results (respond with MID0061 from the Controller)

Message Configuration	Parameters	Byte	Value
Header	Message length (Length)	1-4	0020
	MID	5-8	0060
	Supported versions (Revision)	9-11	001 - 010
	No ACK flag (No ack flag)	12	0
	Station ID (Station ID)	13-14	N/A
	Spindle ID (Spindle ID)	15-16	N/A
	Preliminary (Spare)	17-20	N/A
Data field	N/A		N/A
Message end		21	NULL

[Reply message from Controller]
・Command acceptance (MID0005) response before the subscription is established for notification of closure results
・If the Tightening Result Notification subscription is established, Command Error Response(MID0004, error code = '09') ・See other Specification Open Protocol for further information..

3.3.27. MID0061 Last tighting result data

Controller → Factory System Message ID
This system supports Rev.1-10.

"Upload Tightening Results": Notify the tightening results to the factory system

Torque Min Limit, Torque Max Limit, Shut-Off Torque (Torque Final Target),
The torque value of the resulting torque (Torque) is transmitted to the factory system after being converted in a set unit.
(See table below)

Upper and lower limits that can be sent in each unit

Units	Lower limit	Upper limit	Lower limit (Transmitted Data)	Upper limit (Transmitted Data)
Configurable range			000000	999999
Nm	000.0	999.0	000000	099990
In.lbs	000.0	8848.7	000000	884867
Ft.lbs	000.0	737.4	000000	073738
kgf・m	000.0	102.0	000000	010196
kgf・cm	000.0	10196.8	000000	999999(※1)

＊1 The upper limit of the unit of kgf/cm exceeds the 6-digit value that can be transmitted, so the upper limit of the settable range (999999) is set.
However, the upper limit in normal operation is about 250 Nm.

[For Revision1]

Message Configuration	Parameters	Byte	Value
Header	Message length (Length)	1-4	0231
	MID	5-8	0061
	Supported versions (Revision)	9-11	001
	No ACK flag (No ack flag)	12	0
	Station ID (Station ID)	13-14	MID0001 Return the value when it was received. If the value is 0, send "0" (ASCII 0x30).
	Spindle ID (Spindle ID)	15-16	MID0001 Return the value when it was received. If the value is 0, send "0" (ASCII 0x30).
	Preliminary (Spare)	17-20	N/A
Data field	Cell ID (Cell ID)	21-22	01
		23-26	0000-9999 ＊Cell ID set on the Controller
	Channel ID (Channel ID)	27-28	02
		29-30	00-20 ＊Channel ID set on the Controller
	Controller Name	31-32	03

(Contoroller Name)	33-57	25-digit ASCII characters *Controller name set for Controller
Vehicle ID (VIN Number)	58-59	04
	60-84	25-digit ASCII characters *If you have not received it, space
Job ID (Job ID)	85-86	05
	87-88	00-99 *Set the Job ID received in the MID0038, otherwise 00
Parameter ID (Parameter set ID)	89-90	06
	91-93	000-999 *For parameter: 0XX (XX is the parameter number) *For batches: 1XX (XX is the batch number)
Number of batches (Batch Size)	94-95	07
	96-99	0000-9999 *For parameters: 0000 *For batches: Number of batches 0000-0099 *In the case of jobs: Number of batches of tightening history data 0000-0099
Batch Count (Batch Counter)	100-101	08
	102-105	0000-9999 *For parameters: 0000 *For batches: Batch count 0000-0099 *For jobs: Batch count of tightening history data 0000-0099
Tightening decision (Tigtening Status)	106-107	09
	108	0:NOK 1:OK
Torque judgment (Torque Status)	109-110	10
	111	0:Low 1: OK (Torque Normal) 2: High (Torque Over)
Angle determination (Angle Status)	112-113	11
	114	0:Low (Seated Angle Under) 1: OK (normal angle after seating) 2: High (over the angle after sitting)
Lower Torque (Torque Min Limit)	115-116	12
	117-122	For data ranges, refer to "Upper and lower limits that can be transmitted in each unit" *Convert 2 decimal places to an integer and set the notification range: 000.0-999.9Nm-
Upper Torque (Torque Max Limit)	123-124	13
	125-130	For data ranges, refer to "Upper and lower limits that can be transmitted in each unit" *Convert 2 decimal places to an integer and notify
Shut-off torque	131-132	14

	(Torque Final Target)	133-138	For data ranges, refer to "Upper and lower limits that can be transmitted in each unit" *Convert 2 decimal places to an integer and notify
	Result Torque (Torque)	139-140	15
		141-146	For data ranges, refer to "Upper and lower limits that can be transmitted in each unit" *Convert 2 decimal places to an integer and notify
	Lower limit angle (Angle Min)	147-148	16
		149-153	00000-99999 *Lower angle after sitting
	Upper Angle (Angle Max)	154-155	17
		156-160	00000-99999 *Upper angle after sitting
	Target angle (Final Angle Target)	161-162	18
		163-167	00000-99999 *00000 for non-correspondence
	Result angle (Angle)	168-169	19
		170-174	00000-99999 *Angle after sitting
	Moment (Time Stamp)	175-176	20
		177-195	19-digit ASCII characters YYYY-MM-DD:HH:MM:SS
	Parameter Change Time (Date/Time of Last Change in parameter set settings)	196-197	21
		198-216	19-digit ASCII characters *0 packed due to non-correspondence
	Batch state (Batch Status)	217-218	22
		219	0: Batch not completed (batch NOK) 1: Batch completed (batch OK) 2: Batch not used *When Parameter ID is parameter indicated, it is "2" *When the Parameter ID indicates a batch instruction, "0" during the batch, "1" at the end of the batch *If the Parameter ID is 000 and the job ID is not 00, it will be "0" if the batch number and batch count do not match, and if it matches, it will be "1".
	Lockdown ID (Tightening ID)	220-221	23
		222-231	10-digit number *Closure ID (up to 4,294,967,295) *Count value of tightening history
Message end		232	NULL

[For Revision2]

Message Configuration	Parameters	Byte	Value
Header	Message length (Length)	1-4	0385
	MID	5-8	0061
	Supported versions (Revision)	9-11	002
	No ACK flag (No ack flag)	12	0
	Station ID (Station ID)	13-14	MID0001 Return the value when it was received. If the value is 0, send "0" (ASCII 0x30).
	Spindle ID (Spindle ID)	15-16	MID0001 Return the value when it was received. If the value is 0, send "0" (ASCII 0x30).
	Preliminary (Spare)	17-20	N/A
Data field	Cell ID (Cell ID)	21-22	01
		23-26	0000-9999 *Cell ID set on the Controller
	Channel ID (Channel ID)	27-28	02
		29-30	00-20 *Channel ID set on the Controller
	Controller Name (Contoroller Name)	31-32	03
		33-57	25-digit ASCII characters *Controller name set for Controller
	Vehicle ID (VIN Number)	58-59	04
		60-84	25-digit ASCII characters
	Job ID (Job ID)	85-86	05
		87-90	0000-9999 *Set the Job ID received in the MID0038, otherwise 00
	Parameter ID (Parameter set ID)	91-92	06
		93-95	000-999 *For parameter: 0XX (XX is the parameter number) *For batches: 1XX (XX is the batch number)
	Tightening method (Strategy)	96-97	07
		98-99	00-99 *Due to non-correspondence 00
	Tightening method options (Strategy Option)	100-101	08
		102-106	00000-99999 *00000 for non-correspondence
	Number of batches (Batch Size)	107-108	09
		109-112	0000-9999 *For parameters: 0000 *For batches: Number of batches 0000-0099 *In the case of jobs: Number of batches of tightening history data 0000-0099

Batch Count (Batch Counter)	113-114	10
	115-118	0000-9999 *For parameters: 0000 *For batches: Batch count 0000-0099 *For jobs: Batch count of tightening history data 0000-0099
Tightening decision (Tigtening Status)	119-120	11
	121	0:NOK 1:OK
Batch state (Batch Status)	122-123	12
	124	0: Batch not completed (batch NOK) 1: Batch completed (batch OK) 2: Batch not used *When Parameter ID is parameter indicated, it is "2" *When the Parameter ID indicates a batch instruction, "0" during the batch, "1" at the end of the batch *If the Parameter ID is 000 and the job ID is not 00, it will be "0" if the batch number and batch count do not match, and if it matches, it will be "1".
Torque judgment (Torque Status)	125-126	13
	127	0:Low 1: OK (Torque Normal) 2: High (Torque Over)
Angle determination (Angle Status)	128-129	14
	130	0:Low (Seated Angle Under) 1: OK (normal angle after seating) 2: High (over the angle after sitting)
Rundown angle judgment (Rundown Angle Status)	131-132	15
	133	0:Low 1: OK (normal angle before seating) 2: High (over the angle before sitting)
Current monitor judgment (Current Monitoring Status)	134-135	16
	136	0:Low 1:OK 2:High *Due to non-correspondence 0
Self-tap judgment (Selftap Status)	137-138	17
	139	0:Low 1:OK 2:High *Due to non-correspondence 0
Pre-baling	140-141	18

Torque monitor judgment (Prevail Torque Monitoring Status)	142	0:Low 1:OK 2:High *Due to non-correspondence 0
Pre-baling Torque complement judgment (Prevail Torque Compensate Status)	143-144	19
	145	0:Low 1:OK 2:High *Due to non-correspondence 0
Tightening Error Condition (Tightening Error Status)	146-147	20
	148-157	10byte (hexadecimal number) Example: Bit3 enabled → 0000000008 *Only the following bits are supported. Bit 1 : Rundown angle max shut off (The upper limit of the angle after sitting is exceeded) Bit 2 : Rundown angle min shut off (Angle after sitting below the lower limit) Bit 3 : Torque max shut off (Result torque exceeded the upper limit) Bit 15 : Torque less than target (Torque is below the target value) - Lower limit torque abnormality Bit 16 : Tool hot (Tool is hot) - Motor is hot, battery is hot. Bit 20 : Current limit reached (Current Limit Reached) - Overcurrent Protection Bit 28 : Dynamic current monitoring min (Lower current limit reached during operation) - Low voltage protection Bit 29 : Dynamic current monitoring max (Upper current limit reached during operation) - Overcurrent protection
Lower Torque (Torque Min Limit)	158-159	21
	160-165	For data ranges, refer to "Upper and lower limits that can be transmitted in each unit" *Convert 2 decimal places to an integer and set the notification range: 000.0-999.9Nm-
Upper Torque (Torque Max Limit)	166-167	22
	168-173	For data ranges, refer to "Upper and lower limits that can be transmitted in each unit" *Convert 2 decimal places to an integer and notify
Shut-off torque	174-175	23

(Torque Final Target)	176-181	For data ranges, refer to "Upper and lower limits that can be transmitted in each unit" *Convert 2 decimal places to an integer and set the notification range: 000.0-999.9Nm-
Result Torque (Torque)	182-183	24
	184-189	For data ranges, refer to "Upper and lower limits that can be transmitted in each unit" *Convert 2 decimal places to an integer and notify
Lower limit angle (Angle Min)	190-191	25
	192-196	00000-99999 *Lower angle after sitting
Upper Angle (Angle Max)	197-198	26
	199-203	00000-99999 *Upper angle after sitting
Target angle (Final Angle Target)	204-205	27
	206-210	00000-99999 *00000 for non-correspondence
Result angle (Angle)	211-212	28
	213-217	00000-99999 *Angle after sitting
Lower Rundown Angle (Rundown Angle Min)	218-219	29
	220-224	00000-99999 *Angle before seating
Upper Rundown Angle (Rundown Angle Max)	225-226	30
	227-231	00000-99999 *Angle before seating
Rundown Angle (Rundown Angle)	232-233	31
	234-238	00000-99999 *Angle before seating
Lower limit of current monitor (Current Monitoring Min)	239-240	32
	241-243	000-999 *000 for non-correspondence
Current Monitor Upper Limit (Current Monitoring Max)	244-245	33
	246-248	000-999 *000 for non-correspondence
Current Monitor Value (Current Monitoring Value)	249-250	34
	251-253	000-999 *000 for non-correspondence
Self-tap lower limit (Selftap Min)	254-255	35
	256-261	000000-999999 *000000 for non-correspondence
Self-tap limit (Selftap Max)	262-263	36
	264-269	000000-999999 *000000 for non-correspondence
Self-Tap Torque	270-271	37

	(Selftap Torque)	272-277	000000-999999 *000000 for non-correspondence
	Pre-baling Torque monitor lower limit (Prevail Torque Monitoring Min)	278-279	38
		280-285	000000-999999 *000000 for non-correspondence
	Pre-baling Torque monitor upper limit (Prevail Torque Monitoring Max)	286-287	39
		288-293	000000-999999 *000000 for non-correspondence
	Pre-baling torque (Prevail Torque)	294-295	40
		296-301	000000-999999 *000000 for non-correspondence
	Lockdown ID (Tightening ID)	302-303	41
		304-313	10-digit number *Closure ID (up to 4,294,967,295) *Count value of tightening history
	Job Sequence Number (Job Sequence Number)	314-315	42
		316-320	00000-65535 *00000 for non-correspondence
	Synchronous Tightening ID (Sync Tightening ID)	321-322	43
		323-327	00000-65535 *00000 for non-correspondence
	Tool Serial Number (Tool Serial Number)	328-329	44
		330-343	14-digit ASCII characters *Tool identification information
	Moment (Time Stamp)	344-345	45
		346-364	19-digit ASCII characters YYYY-MM-DD:HH:MM:SS
	Parameter Change Time (Date/Time of Last Change in Parameter Set Settings)	365-366	46
		367-385	19-digit ASCII characters *0 packed due to non-correspondence
Message end		386	NULL

[For Revision3]
21byte~385byte is omitted because it is the same as Revision2.

Message Configuration	Parameters	Byte	Value
Header	Message length (Length)	1-4	0419
	MID	5-8	0061
	Supported versions (Revision)	9-11	003
	No ACK flag (No ack flag)	12	0
	Station ID (Station ID)	13-14	MID0001 Return the value when it was received. If the value is 0, send "0" (ASCII 0x30).
	Spindle ID (Spindle ID)	15-16	MID0001 Return the value when it was received. If the value is 0, send "0" (ASCII 0x30).
	Preliminary (Spare)	17-20	N/A
Data field	Parameter Set Name (Parameter set name)	386-387	47
		388-412	25-digit ASCII characters *0 (25 digits) for non-correspondence
	Torque value unit (Torque values Unit)	413-414	48
		415	1 = Nm ([Torque Unit] - [Nm]) 2 = Lbf.ft ([Torque Units] - [Ft.lbs]) 3 = Lbf.In ([Torque Unit] - [In.lbs]) 4 = Kpm([Torque Unit]-[kgf·m]) 5 = Kgf.cm ([Torque Unit] - [Kgf·cm]) 6 = ozf.in (not supported) 7 = % (not corresponding) 8 = NCM (not corresponding)
	Outcome Type (Result type)	416-417	49
		418-419	Two-digit ASCII characters *Due to non-correspondence 00
Message end		420	NULL

[For Revision4]
21byte~419byte is omitted because it is the same as Revision3.

Message Configuration	Parameters	Byte	Value
Header	Message length (Length)	1-4	0500
	MID	5-8	0061
	Supported versions (Revision)	9-11	004
	No ACK flag (No ack flag)	12	0
	Station ID (Station ID)	13-14	MID0001 Return the value when it was received. If the value is 0, send "0" (ASCII 0x30).
	Spindle ID (Spindle ID)	15-16	MID0001 Return the value when it was received. If the value is 0, send "0" (ASCII 0x30).
	Preliminary (Spare)	17-20	N/A
Data field	Identification Result 2 (Identifier result part 2)	420-421	50
		422-446	25-digit ASCII characters *0 (25 digits) for non-correspondence
	Identification Result 3 (Identifier result part 3)	447-448	51
		449-473	25-digit ASCII characters *0 (25 digits) for non-correspondence
	Identification Result 4 (Identifier result part 4)	474-475	52
		476-500	25-digit ASCII characters *0 (25 digits) for non-correspondence
Message end		501	NULL

[For Revision5]
21byte~500byte is omitted because it is the same as Revision4.

Message Configuration	Parameters	Byte	Value
Header	Message length (Length)	1-4	0506
	MID	5-8	0061
	Supported versions (Revision)	9-11	005
	No ACK flag (No ack flag)	12	0
	Station ID (Station ID)	13-14	MID0001 Return the value when it was received. If the value is 0, send "0" (ASCII 0x30).
	Spindle ID (Spindle ID)	15-16	MID0001 Return the value when it was received. If the value is 0, send "0" (ASCII 0x30).
	Preliminary (Spare)	17-20	N/A
Data field	Customer Tightening Error Codes (Customer tightening error code)	501-502	53
		503-506	4-digit ASCII characters *0000 fixed because it is not compatible
Message end		507	NULL

[For Revision6]
21byte~419byte is omitted because it is the same as Revision5.

Message Configuration	Parameters	Byte	Value
Header	Message length (Length)	1-4	0526
	MID	5-8	0061
	Supported versions (Revision)	9-11	006
	No ACK flag (No ack flag)	12	0
	Station ID (Station ID)	13-14	MID0001 Return the value when it was received. If the value is 0, send "0" (ASCII 0x30).
	Spindle ID (Spindle ID)	15-16	MID0001 Return the value when it was received. If the value is 0, send "0" (ASCII 0x30).
	Preliminary (Spare)	17-20	N/A
Data field	Priority torque correction value (Prevail Torque compensate value)	507-508	54
		509-514	Six-digit ASCII characters *000000 for non-correspondence
	Tightening Error Condition 2 (Tightening error status 2)	515-516	55
		517-526	10byte (hexadecimal number) Example: Bit3 enabled → 0000000008 *Only the following bits are supported. Bit 3: Drive hot (Motor High Temperature Protection, Battery Pack High Temperature Protection) Bit 16 : Dynamic Min. Current (Low Voltage Protection) Bit 17 : Dynamic Max. Current (Overcurrent protection).
Message end		527	NULL

[For Revision7]
21byte~526byte is omitted because it is the same as Revision6.

Message Configuration	Parameters	Byte	Value
Header	Message length (Length)	1-4	0544
	MID	5-8	0061
	Supported versions (Revision)	9-11	007
	No ACK flag (No ack flag)	12	0
	Station ID (Station ID)	13-14	MID0001 Return the value when it was received. If the value is 0, send "0" (ASCII 0x30).
	Spindle ID (Spindle ID)	15-16	MID0001 Return the value when it was received. If the value is 0, send "0" (ASCII 0x30).

	Preliminary (Spare)	17-20	N/A
Data field	Correction angle (Compensated angle)	527-528	56
		529-535	7-digit ASCII characters *0000000 for non-correspondence
	Final angle (Final Angle Decimal)	536-537	57
		538-544	7-digit ASCII characters *0000000 for non-correspondence
Message end		545	NULL

[For Revision8]
21byte~544byte is omitted because it is the same as Revision7.

Message Configuration	Parameters	Byte	Value
Header	Message length (Length)	1-4	0571
	MID	5-8	0061
	Supported versions (Revision)	9-11	008
	No ACK flag (No ack flag)	12	0
	Station ID (Station ID)	13-14	MID0001 Return the value when it was received. If the value is 0, send "0" (ASCII 0x30).
	Spindle ID (Spindle ID)	15-16	MID0001 Return the value when it was received. If the value is 0, send "0" (ASCII 0x30).
	Preliminary (Spare)	17-20	N/A
Data field	Start the final angle (Start final angle)	545-546	58
		547-552	Six-digit ASCII characters *000000 for non-correspondence
	Post-view torque actuation (Post view torque activated)	553-554	59
		555	0 = Off 1 = On 2 = Only PVTH on 3 = Only PVTL on *Due to non-correspondence 0
	Post view torque high	556-557	60
		558-563	Six-digit ASCII characters *000000 for non-correspondence
	Post view torque low	564-565	61
		566-571	Six-digit ASCII characters *000000 for non-correspondence
Message end		572	NULL

[For Revision9]
21byte~571byte is omitted because it is the same as Revision8.

Message Configuration	Parameters	Byte	Value
Header	Message length (Length)	1-4	0592
	MID	5-8	0061
	Supported versions (Revision)	9-11	009
	No ACK flag (No ack flag)	12	0
	Station ID (Station ID)	13-14	MID0001 Return the value when it was received. If the value is 0, send "0" (ASCII 0x30).
	Spindle ID (Spindle ID)	15-16	MID0001 Return the value when it was received. If the value is 0, send "0" (ASCII 0x30).
	Preliminary (Spare)	17-20	N/A
Data field	Current monitoring amplifier (Current Monitoring Amp)	572-573	62
		574-578	5-digit ASCII characters (00000~99999) *00000 for non-correspondence
	Current monitoring amplifier (minimum) (Current Monitoring Amp Min)	579-580	63
		581-585	5-digit ASCII characters (00000~99999) *00000 for non-correspondence
	Current monitoring amplifier (max) (Current Monitoring Amp Max)	586-587	64
		588-592	5-digit ASCII characters (00000~99999) *00000 for non-correspondence
Message end		593	NULL

[For Revision10]
21byte~592byte is omitted because it is the same as Revision9.

Message Configuration	Parameters	Byte	Value
Header	Message length (Length)	1-4	0662
	MID	5-8	0061
	Supported versions (Revision)	9-11	010
	No ACK flag (No ack flag)	12	0
	Station ID (Station ID)	13-14	MID0001 Return the value when it was received. If the value is 0, send "0" (ASCII 0x30).
	Spindle ID (Spindle ID)	15-16	MID0001 Return the value when it was received. If the value is 0, send "0" (ASCII 0x30).
	Preliminary (Spare)	17-20	N/A
Data field	Angle (scale factor of	593-594	65

	the molecule) (Angle numerator scale factor)	595-599	5-digit ASCII characters (00000~99999) *00001 fixed because it is not compatible
	Angle (scale factor of denominator) (Angle denominator scale factor)	600-601	66
		602-606	5-digit ASCII characters (00001~99999) *00001 fixed because it is not compatible
	Overall Angle Status (Overall Angle Status)	607-608	67
		609	0 = Low、1 = OK、2 = High *1 fixed because it is not compatible
	Overall angle minimum (Overall Angle Min)	610-611	68
		612-616	5-digit ASCII characters (-9999~99999) *00000 fixed because it is not compatible
	Overall Angle Maximum (Overall Angle Max)	617-618	69
		619-623	5-digit ASCII characters (-9999~99999) *00000 fixed because it is not compatible
	Overall Angle (Overall Angle)	624-625	70
		626-630	5-digit ASCII characters (-9999~99999) *00000 fixed because it is not compatible
	Peak Torque (Peak Torque)	631-632	71
		633-638	Six-digit ASCII characters *000000 for non-correspondence
	Residual Breakaway Torque (Residual Breakaway Torque)	639-640	72
		641-646	Six-digit ASCII characters *000000 for non-correspondence
	Rundown start angle (Start Rundown angle)	647-648	73
		649-654	Six-digit ASCII characters *000000 for non-correspondence
	Rundown completion angle (Rundown angle complete)	655-656	74
		657-662	Six-digit ASCII characters *000000 for non-correspondence
Message end		663	NULL

See Specification Open Protocol for further information.

3.3.28. MID0062 Last tightening result data acknowledge

Message ID for the Factory System → Controller
This system supports Rev.1-10.

Tightening Result Upload Response: Incoming response to MID0061

The Controller does not transmit a new MID0061 unless it receives a response (MID0062) from a factory system after transmitting the MID0061.

Message Configuration	Parameters	Byte	Value
Header	Message length (Length)	1-4	0020
	MID	5-8	0062
	Supported versions (Revision)	9-11	N/A
	No ACK flag (No ack flag)	12	N/A
	Station ID (Station ID)	13-14	N/A
	Spindle ID (Spindle ID)	15-16	N/A
	Preliminary (Spare)	17-20	N/A
Data field	N/A		N/A
Message end		21	NULL

See Specification Open Protocol for further information.

3.3.29. MID0070 Alarm subscribe

Message ID for the Factory System → Controller
This system supports Rev.1 and 2.
For details of the sequence, refer to the sequence diagram in Section 3.4.

"Alarm Upload Registration": Request notification of alarm information (respond with MID0076 from the Controller)

Message Configuration	Parameters	Byte	Value
Header	Message length (Length)	1-4	0020
	MID	5-8	0070
	Supported versions (Revision)	9-11	001
	No ACK flag (No ack flag)	12	N/A
	Station ID (Station ID)	13-14	N/A
	Spindle ID (Spindle ID)	15-16	N/A
	Preliminary (Spare)	17-20	N/A
Data field	N/A		N/A
Message end		21	NULL

[Reply message from Controller]
・Alarm upload notification: Command acceptance (MID0005) response before subscription establishment
・Alarm upload notification If the subscription is established, the command error response (MID0004, error code = '11') response

See Specification Open Protocol for further information.

3.3.30.MID0071 Alarm

Controller → Factory System Message ID
This system supports Rev.1 and 2.
For details of the sequence, refer to the sequence diagram in Section 3.4.

"Alarm Upload": Notifies the alarm information to the factory system

The Controller repeats the retransmission after the alarm information is uploaded until the upload response (MID0072) from the Factory System is returned, or unless the upper limit of the number of retransmissions is exceeded.
Retransmission Interval : 20 sec interval
Number of retransmissions : Up to 5 times

Error code: 4~5 digit characters (ASCII). Notify the higher system of the error code that is occurring.
For Rev2, 5-digit characters (ASCII)
For Rev1, the 4-digit character (ASCII)

Controller ready status:
If an alarm is occurring about the controller, NOK (0) is notified. Other than that, I notify OK (1).

Tool ready status:
If an alarm about the tool occurs, NOK (0) is notified. Other than that, I notify OK (1).

Time: Notifies the time when the alarm occurs.

[For Revision1]

Message Configuration	Parameters	Byte	Value
Header	Message length (Length)	1-4	0053
	MID	5-8	0071
	Supported versions (Revision)	9-11	001
	No ACK flag (No ack flag)	12	N/A
	Station ID (Station ID)	13-14	MID0001 Return the value when it was received. If the value is 0, send "0" (ASCII 0x30).
	Spindle ID (Spindle ID)	15-16	MID0001 Return the value when it was received. If the value is 0, send "0" (ASCII 0x30).
	Preliminary (Spare)	17-20	N/A
Data field	Error Codes (Error code)	21-22	01
		23-26	4-digit ASCII characters ※table 3.3-1Error Code Table (Controller)It is located in 4-digit error code except "0x"
	Controller readiness (Controller ready status)	27-28	02
		29	1=OK、0=NOK
	Tool readiness (Tool ready status)	30-31	03
		32	1=OK、0=NOK
	Moment	33-34	04

	(Time)	35-53	19-digit ASCII characters YYYY-MM-DD:HH:MM:SS (error occurrence time)
Message end		54	NULL

See Specification Open Protocol for further information.

[For Revision2]

Message Configuration	Parameters	Byte	Value
Header	Message length (Length)	1-4	0054
	MID	5-8	0071
	Supported versions (Revision)	9-11	002
	No ACK flag (No ack flag)	12	N/A
	Station ID (Station ID)	13-14	MID0001 Return the value when it was received. If the value is 0, send "0" (ASCII 0x30).
	Spindle ID (Spindle ID)	15-16	MID0001 Return the value when it was received. If the value is 0, send "0" (ASCII 0x30).
	Preliminary (Spare)	17-20	N/A
Data field	Error Codes (Error code)	21-22	01
		23-27	5-digit ASCII characters *Initial letter E (uppercase) + 4-digit error code The error code istable 3.3-1Error Code Table (Controller)It is located in"0x"4 digits excluding
	Controller readiness (Controller ready status)	28-29	02
		30	1=OK、0=NOK
	Tool readiness (Tool ready status)	31-32	03
		33	1=OK、0=NOK
	Moment (Time)	34-35	04
		36-54	19-digit ASCII characters YYYY-MM-DD:HH:MM:SS (error occurrence time)
Message end		55	NULL

See Specification Open Protocol for further information.

3.3.31. MID0072 Alarm acknowledge

Message ID for the Factory System → Controller
This system supports Rev.1 and 2.
For details of the sequence, refer to the sequence diagram in Section 3.4.

Alarm Upload Response: Responds to the Controller that the Factory System has received the alarm

The Controller does not send a new MID0071 unless it receives a response (MID0072) from a factory system after transmitting the MID0071.

Message Configuration	Parameters	Byte	Value
Header	Message length (Length)	1-4	0020
	MID	5-8	0072
	Supported versions (Revision)	9-11	001
	No ACK flag (No ack flag)	12	N/A
	Station ID (Station ID)	13-14	N/A
	Spindle ID (Spindle ID)	15-16	N/A
	Preliminary (Spare)	17-20	N/A
Data field	N/A		N/A
Message end		21	NULL

See Specification Open Protocol for further information.

3.3.32. MID0073 Alarm unsubscribe

Message ID for the Factory System → Controller
This system supports Rev.1 and 2.
For details of the sequence, refer to the sequence diagram in Section 3.4.

"Cancel Alarm Upload Registration": Cancel the request for notification of alarm information

Message Configuration	Parameters	Byte	Value
Header	Message length (Length)	1-4	0020
	MID	5-8	0073
	Supported versions (Revision)	9-11	001
	No ACK flag (No ack flag)	12	N/A
	Station ID (Station ID)	13-14	N/A
	Spindle ID (Spindle ID)	15-16	N/A
	Preliminary (Spare)	17-20	N/A
Data field	N/A		N/A
Message end		21	NULL

[Reply message from Controller]
・Alarm information notification If the subscription is established, it will respond to the command acceptance (MID0005)
・Command error (MID0004, error code = '12') response before the alarm information notification subscription is established

See Specification Open Protocol for further information.

3.3.33.MID0074 Alarm acknowledge on controller

Controller → Factory System Message ID
This system supports Rev.1 and 2.
For details of the sequence, refer to the sequence diagram in Section 3.4.

Controller Alarm Response: Notifies the Controller that the Controller has received a MID0072 response from the Factory System

Error code: 4~5 digit characters (ASCII).
Notify the higher system again of the error code notified by the MID0071.
For Rev2, 5-digit characters (ASCII)
For Rev1, the 4-digit character (ASCII)

[For Revision1]

Message Configuration	Parameters	Byte	Value
Header	Message length (Length)	1-4	0024
	MID	5-8	0074
	Supported versions (Revision)	9-11	001
	No ACK flag (No ack flag)	12	N/A
	Station ID (Station ID)	13-14	MID0001 Return the value when it was received. If the value is 0, send "0" (ASCII 0x30).
	Spindle ID (Spindle ID)	15-16	MID0001 Return the value when it was received. If the value is 0, send "0" (ASCII 0x30).
	Preliminary (Spare)	17-20	N/A
Data field	Error Codes (Error code)	21-24	4-digit ASCII characters ※table 3.3-1Error Code Table (Controller)It is located in 4-digit error code except "0x"
Message end		25	NULL

See Specification Open Protocol for further information.

[For Revision 2]

Message Configuration	Parameters	Byte	Value
Header	Message length (Length)	1-4	0025
	MID	5-8	0074
	Supported versions (Revision)	9-11	002
	No ACK flag (No ack flag)	12	N/A
	Station ID (Station ID)	13-14	MID0001 Return the value when it was received. If the value is 0, send "0" (ASCII 0x30).

	Spindle ID (Spindle ID)	15-16	MID0001 Return the value when it was received. If the value is 0, send "0" (ASCII 0x30).
	Preliminary (Spare)	17-20	N/A
Data field	Error Codes (Error code)	21-25	5-digit ASCII characters *Initial letter E (uppercase) + 4-digit error code The error code istable 3.3-1Error Code Table (Controller)It is located in"0x"4 digits excluding
Message end		26	NULL

See Specification Open Protocol for further information.

3.3.34. MID0075 Alarm acknowledged on controller acknowledge

Message ID for the Factory System → Controller
This system supports Rev.1 and 2.
For details of the sequence, refer to the sequence diagram in Section 3.4.

Factory system response to Controller alarm response: The Factory System responds to the MID0074 from the Controller to notify that alarm was received

Message Configuration	Parameters	Byte	Value
Header	Message length (Length)	1-4	0020
	MID	5-8	0075
	Supported versions (Revision)	9-11	001
	No ACK flag (No ack flag)	12	N/A
	Station ID (Station ID)	13-14	N/A
	Spindle ID (Spindle ID)	15-16	N/A
	Preliminary (Spare)	17-20	N/A
Data field	N/A		N/A
Message end		21	NULL

See Specification Open Protocol for further information.

3.3.35.MID0076 Alarm status

Controller → Factory System Message ID
This system supports Rev.1 and 2.
For details of the sequence, refer to the sequence diagram in Section 3.4.

Alarm Status: When the Controller receives the MID0070 alarm upload registration from the Factory System, Send to factory system only for the first time

Alarm status: 4 digits of characters (ASCII).
At the time of receiving the MID0070, the alarm is notified to the factory system whether the alarm is active.

Error code: 4~5 digit characters (ASCII).
Notify the higher system of the error code that is occurring. If there are no errors, it is 0000.
For Rev2, 5-digit characters (ASCII)
For Rev1, the 4-digit character (ASCII)

Controller ready status:
If an alarm is occurring about the controller, NOK (0) is notified. Other than that, I notify OK (1).

Tool ready status:
If an alarm about the tool occurs, NOK (0) is notified. Other than that, I notify OK (1).

Time:
Notify the time when the alarm occurs.

[For Revision1]

Message Configuration	Parameters	Byte	Value
Header	Message length (Length)	1-4	0056
	MID	5-8	0076
	Supported versions (Revision)	9-11	001
	No ACK flag (No ack flag)	12	N/A
	Station ID (Station ID)	13-14	MID0001 Return the value when it was received. If the value is 0, send "0" (ASCII 0x30).
	Spindle ID (Spindle ID)	15-16	MID0001 Return the value when it was received. If the value is 0, send "0" (ASCII 0x30).
	Preliminary (Spare)	17-20	N/A
Data field	Alarm status (Alarm status)	21-22	01
		23	1 = Alarm active 0 = Alarm is inactive
	Error Codes (Error code)	24-25	02
		26-29	4-digit ASCII characters ※table 3.3-1Error Code Table (Controller)It is located in 4-digit error code except "0x"
	Controller readiness (Controller ready	30-31	03
		32	1=OK、0=NOK

	status)		
	Tool readiness (Tool ready status)	33-34	04
		35	1=OK、0=NOK
	Moment (Time)	36-37	05
		38-56	19-digit ASCII characters YYYY-MM-DD:HH:MM:SS (error occurrence time)
Message end		57	NULL

See Specification Open Protocol for further information.

[For Revision2]

Message Configuration	Parameters	Byte	Value
Header	Message length (Length)	1-4	0057
	MID	5-8	0076
	Supported versions (Revision)	9-11	002
	No ACK flag (No ack flag)	12	N/A
	Station ID (Station ID)	13-14	MID0001 Return the value when it was received. If the value is 0, send "0" (ASCII 0x30).
	Spindle ID (Spindle ID)	15-16	MID0001 Return the value when it was received. If the value is 0, send "0" (ASCII 0x30).
	Preliminary (Spare)	17-20	N/A
Data field	Alarm status (Alarm status)	21-22	01
		23	1 = Alarm active 0 = Alarm is inactive
	Error Codes (Error code)	24-25	02
		26-30	5-digit ASCII characters *Initial letter E (uppercase) + 4-digit error code The error code istable 3.3-1Error Code Table (Controller)It is located in"0x"4 digits excluding
	Controller readiness (Controller ready status)	31-32	03
		33	1=OK、0=NOK
	Tool readiness (Tool ready status)	34-35	04
		36	1=OK、0=NOK
	Moment (Time)	37-38	05
		39-57	19-digit ASCII characters YYYY-MM-DD:HH:MM:SS (error occurrence time)
Message end		58	NULL

See Specification Open Protocol for further information.

table 3.3-1Error Code Table (Controller)

Item	Error Codes	Level	Classification	Event Details
Controller	0xEF21	Warning	Hardware anomalies	Sub-CPU abnormality (failure)
	0xEF51	Warnings	Hardware anomalies	Ether0 Abnormality
	0xEF52	Warnings	Hardware anomalies	Ether1 anomaly
	0xEF61	Warnings	Hardware anomalies	WLAN module malfunction (failure)
	0xCE42	Error	Software anomalies	Abnormal configuration information
	0xCE43	Error	Software anomalies	Evacuation information anomaly
	0xEC61	Warnings	Hardware anomalies	Tightening history area No remaining capacity reached (Stopped working)
Tools	0x4301	NOTE	Software anomalies	Storage limit reached
	0x4302	NOTE	Software anomalies	Maximum accumulation of unsent results reached
	0x3303	Error	Software anomalies	Motor control, microconset detection
	0x3304	Error	Software anomalies	Torque Operation Microcon Reset Detection
	0x4305	NOTE	Software anomalies	RTC low battery
	0x4306	NOTE	Software anomalies	FW update abnormal
	0x4315	NOTE	Software anomalies	USB communication error
	0x1401	Warnings	Hardware anomalies	WLAN module abnormality
	0x1402	Warnings	Hardware anomalies	Motor control microcomputer malfunction
	0x1403	Warnings	Hardware anomalies	Torque calculation microcontroller abnormality
	0x1404	Warnings	Hardware anomalies	External Flash Abnormality
	0x1405	Warnings	Hardware anomalies	RTC abnormalities
	0x1406	Warnings	Hardware anomalies	Circuit identification anomalies
	0x1407	Warnings	Hardware anomalies	Swap Space Depletion
	0x1408	Warnings	Hardware anomalies	Parameter Area Corruption

3.3.36. MID0077 Alarm status acknowledge

Message ID for the Factory System → Controller
This system supports Rev.1 and 2.
For details of the sequence, refer to the sequence diagram in Section 3.4.

Alarm Status Response: Notifies the Controller that a MID0076 response has been received by the factory system

Message Configuration	Parameters	Byte	Value
Header	Message length (Length)	1-4	0020
	MID	5-8	0077
	Supported versions (Revision)	9-11	001
	No ACK flag (No ack flag)	12	N/A
	Station ID (Station ID)	13-14	N/A
	Spindle ID (Spindle ID)	15-16	N/A
	Preliminary (Spare)	17-20	N/A
Data field	N/A		N/A
Message end		21	NULL

See Specification Open Protocol for further information.

3.3.37. MID9999 Keep alive message

Message ID for the Factory System → Controller
This system supports Rev.1.

"Survival Confirmation": If the MID is not issued by the Factory System for further information than the time set in the Controller configuration UI (1~60 seconds, default=15 seconds), the Controller determines that the connection with the Factory System has been lost.

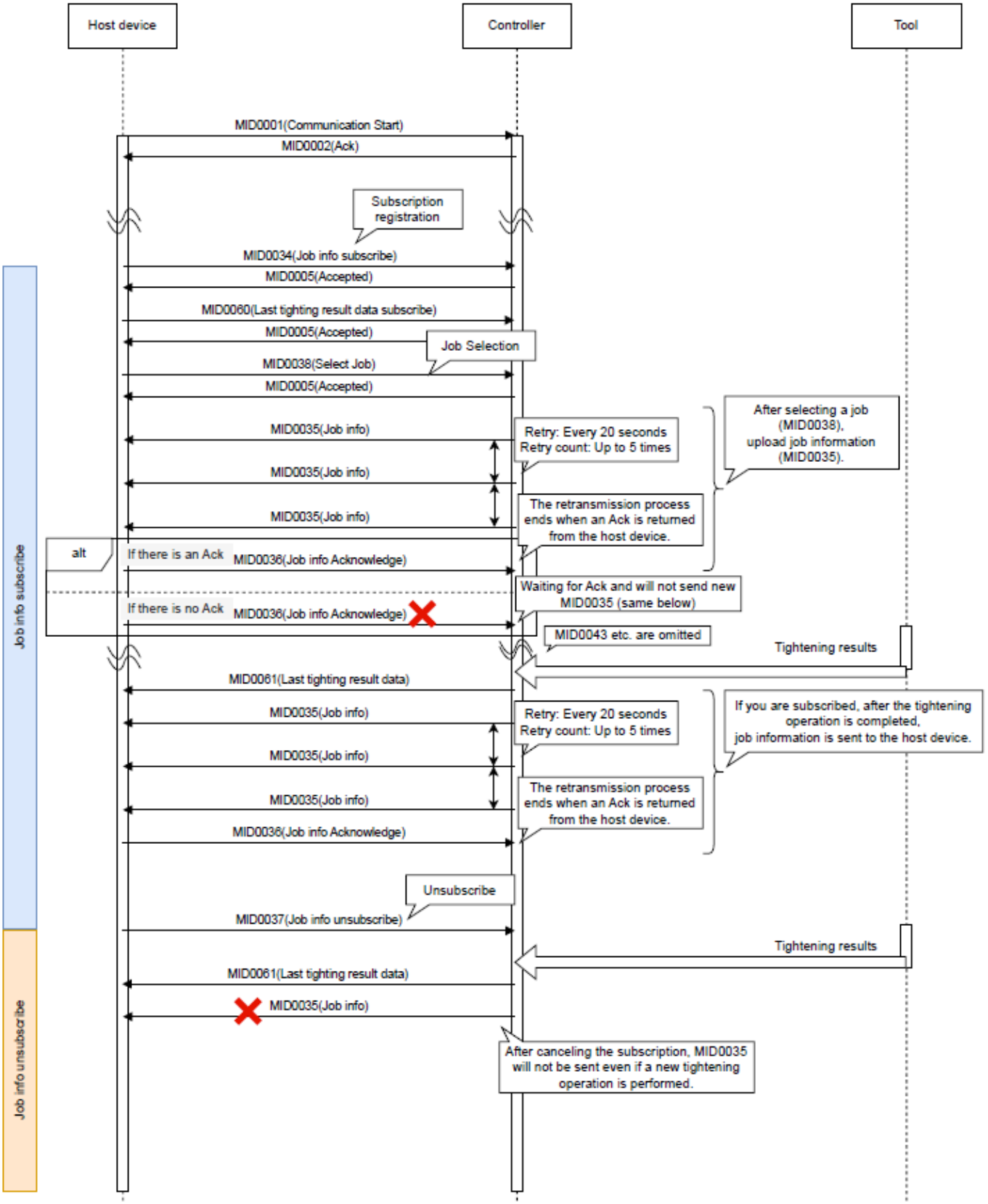
Message Configuration	Parameters	Byte	Value
Header	Message length (Length)	1-4	0020
	MID	5-8	9999
	Supported versions (Revision)	9-11	N/A
	No ACK flag (No ack flag)	12	N/A
	Station ID (Station ID)	13-14	N/A
	Spindle ID (Spindle ID)	15-16	N/A
	Preliminary (Spare)	17-20	N/A
Data field	N/A		N/A
Message end		21	NULL

[Reply message from Controller]
・Respond with MID9999 as well as the top

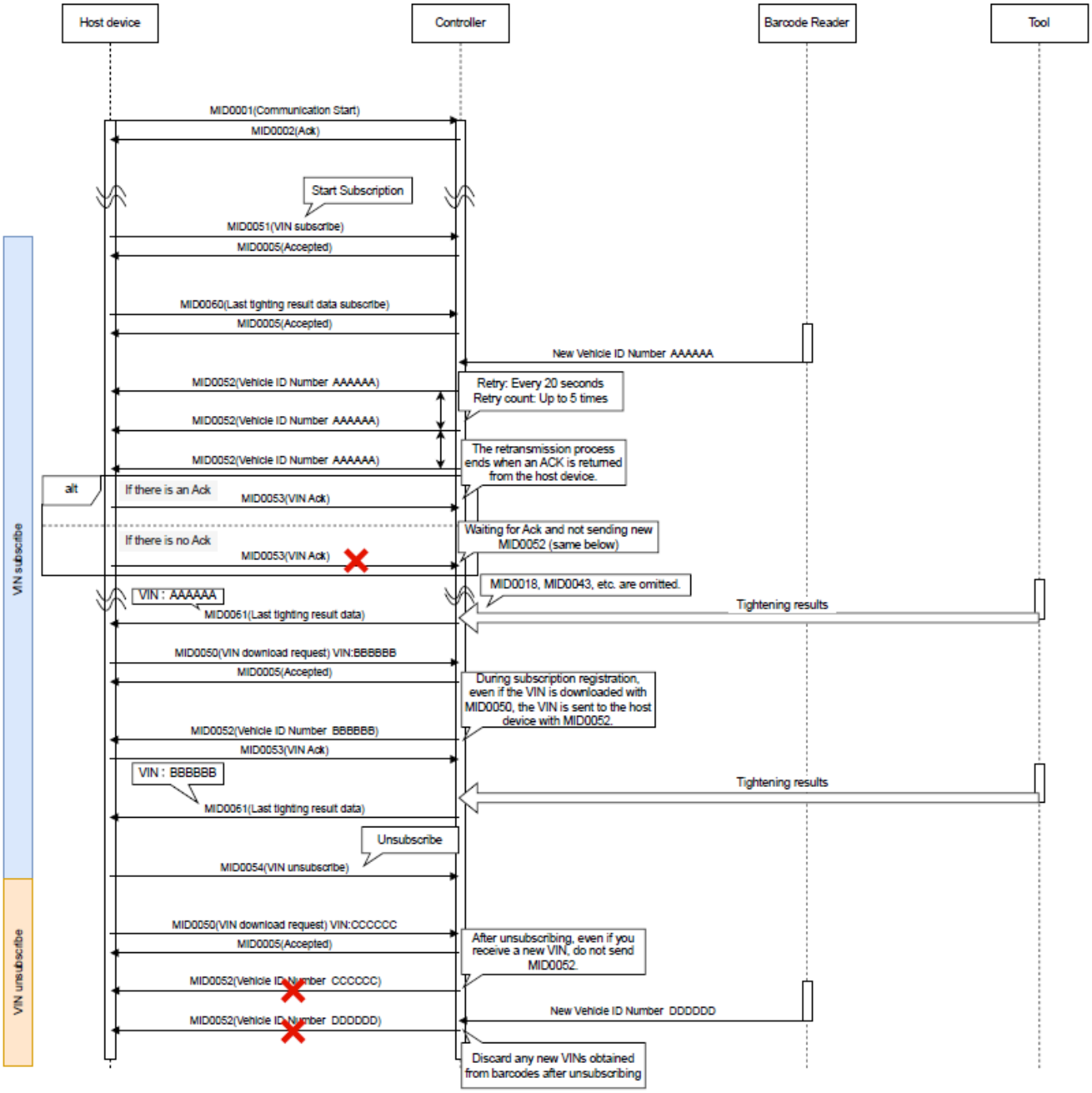
See Specification Open Protocol for further information.

3.4.Sequence diagram

3.4.1. MID0034~MID0037 (Job Information Subscription) Sequence



3.4.2. Sequence of MID0051~MID0054 (Vehicle ID (VIN) subscription)



3.4.3. Sequence of MID0070~MID0077 (alarm subscription)