

The following error was found in the EX ROVR Instruction Manual. We apologize for the error and correct it. Please check back for additional details.

The explosion-proof certification has been corrected, but this is due to a change in the certification body, and there is no change in the explosion-proof performance.

List of Corrections

No.	User Manual				Page of this book
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1	(Common to all manuals)	—	1.4	1-7	1
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3	(Common to all manuals)	—	1.4.1	1-11	3
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5	(Common to all manuals)	—	1.4.2	1-12	5
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39	Operation Manual	L5-59EU024 R1	9.4.15	9-42	38
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41	Operation Manual	L5-59EU024 R1	15.4.1	15-6	40
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45	Installation and Setup Manual	L5-59EU023 R1	8.2	8-1	43

No.1 Error Correction

Common to all manuals 1.4(p.1-7)

(Incorrect)

A: Slope that can be navigated during automatic patrol

Ramps: Up to 1 m high

Slope: Up to 15°



(Correct)

A : Slope that can be navigated during automatic patrol

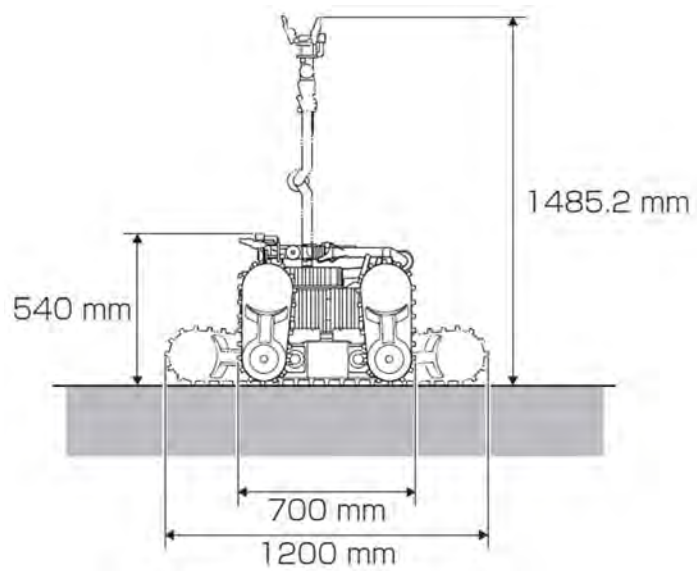
Slope: up to 30 degrees in the frontal direction (There shall be no slip when running)



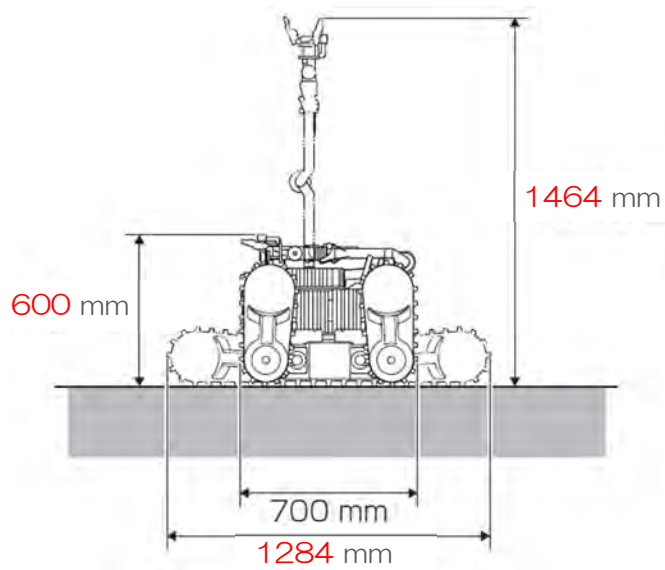
No.2 Error Correction

Common to all manuals 1.4.1 (p.1-10)

(Incorrect)



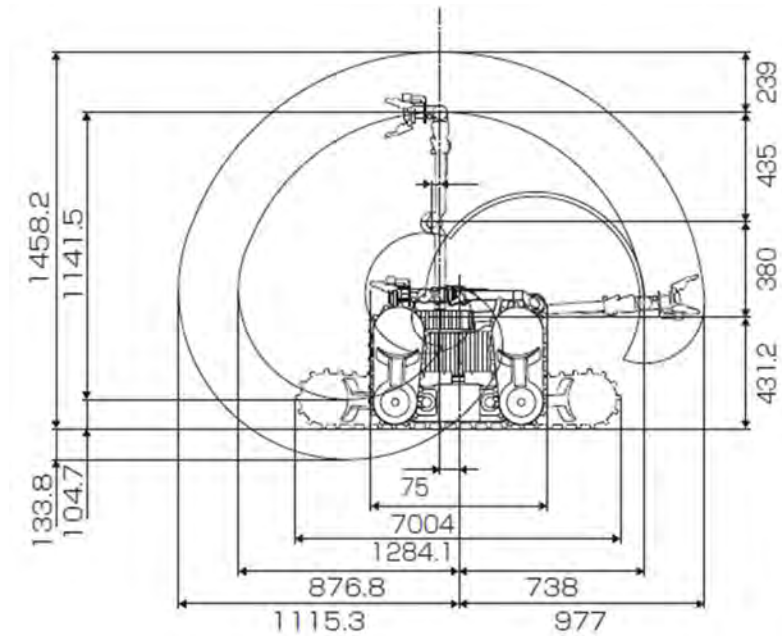
(Correct)



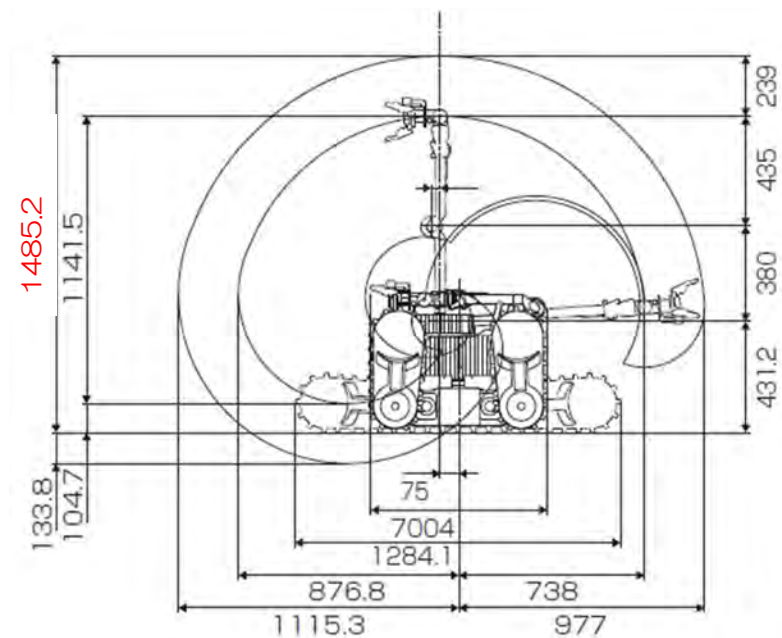
No.3 Error Correction

Common to all manuals 1.4.1 (p.1-11)

(Incorrect)



(Correct)



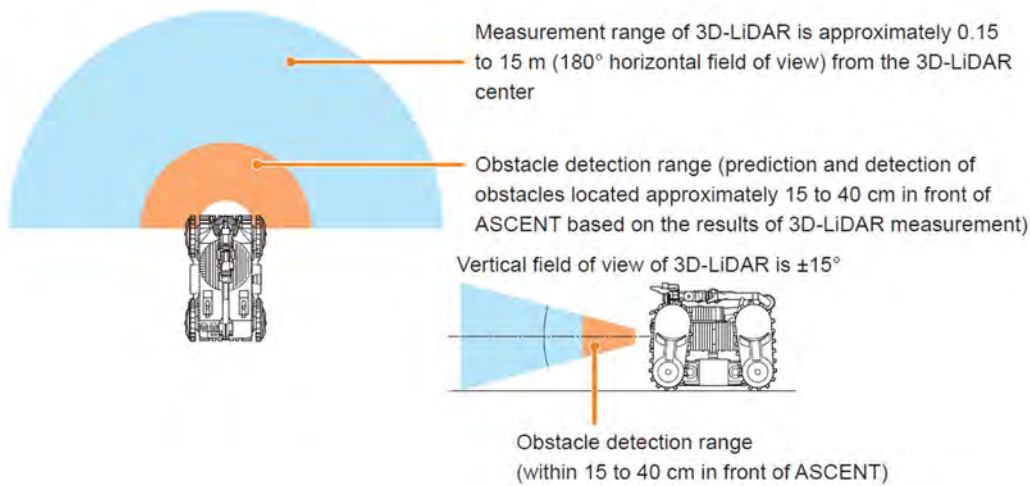
No.4 Error Correction

Common to all manuals 1.4.2(p.1-12)

(Incorrect)

ASCENT is equipped with obstacle detection that uses front-mounted 3D-LiDAR. During scenario execution, ASCENT stops immediately when an obstacle is detected. This obstacle detection function is active only during scenario execution, not during teleoperation.

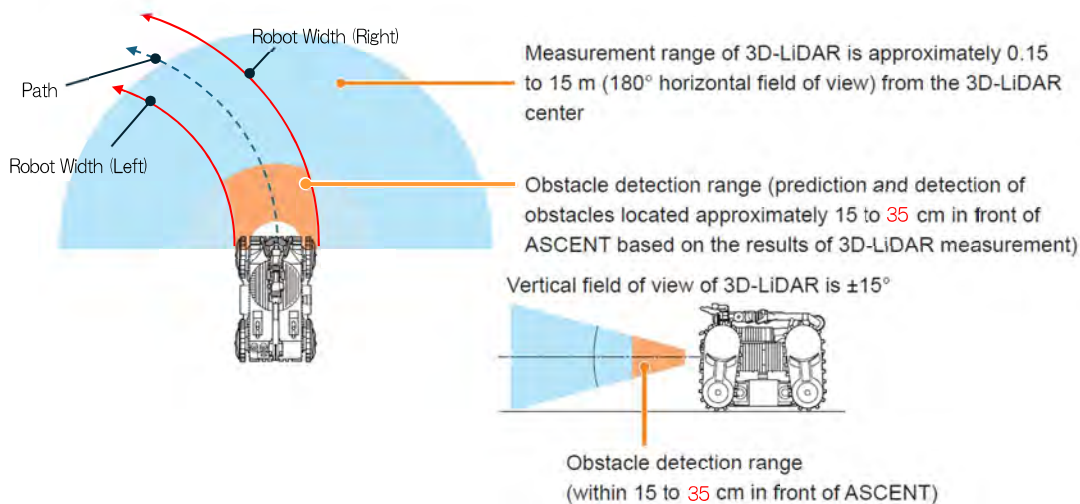
The obstacle detection function, based on 3D-LiDAR data, predicts ASCENT's position one second ahead and stops operation if an obstacle is detected at the predicted position. As shown in the figure below, the detection range is approximately 15 to 40 cm in front of ASCENT.



(Correct)

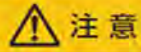
ASCENT is equipped with obstacle detection that uses front-mounted 3D-LiDAR. During scenario execution, ASCENT stops immediately when an obstacle is detected. This obstacle detection function is active only during scenario execution, not during teleoperation. In addition, the obstacle detection function is not active when the front sub-track is lowered toward the ground (less than 95 degrees) during scenario execution.

The obstacle detection function, based on 3D-LiDAR data, is designed to stop the operation of ASCENT when it detects an obstacle within approximately 15 to 35 cm in front of it, considering the width of the robot along its path.



No.5 Additional Contents

Common to all manuals 1.4.2(p.1-12)



- **Avoid relying exclusively on the obstacle detection function.**

Even if 3D-LiDAR can detect obstacles at a distance, if the robot gets closer and moves out of the detection range, the obstacle detection may fail, and the robot may collide with an obstacle.

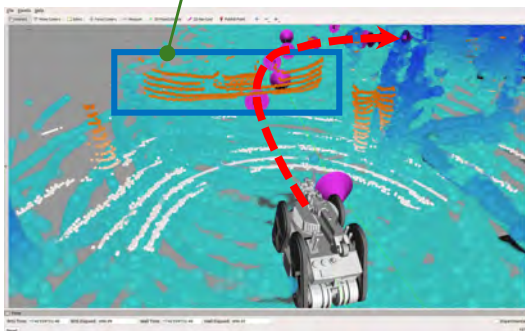


Construction vehicle parked on the route

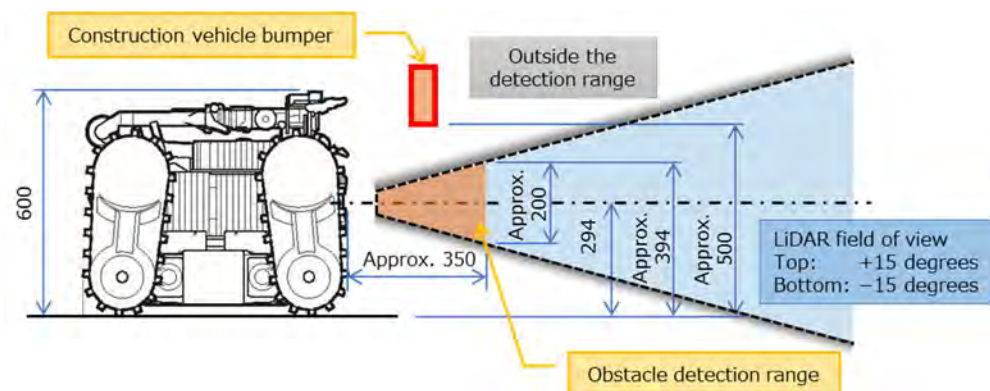
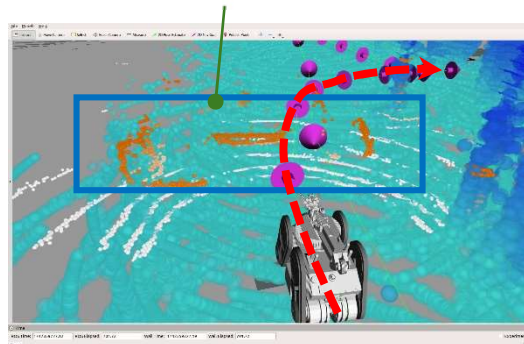
Route

As shown in the figure on the left, when a construction vehicle is parked on the route and its bumper is positioned in relation to the robot as depicted in the figure below, the bumper cannot be detected when the robot approaches because it is outside the detection range of the 3D-LiDAR.

Vehicle bumper is detected at a distance



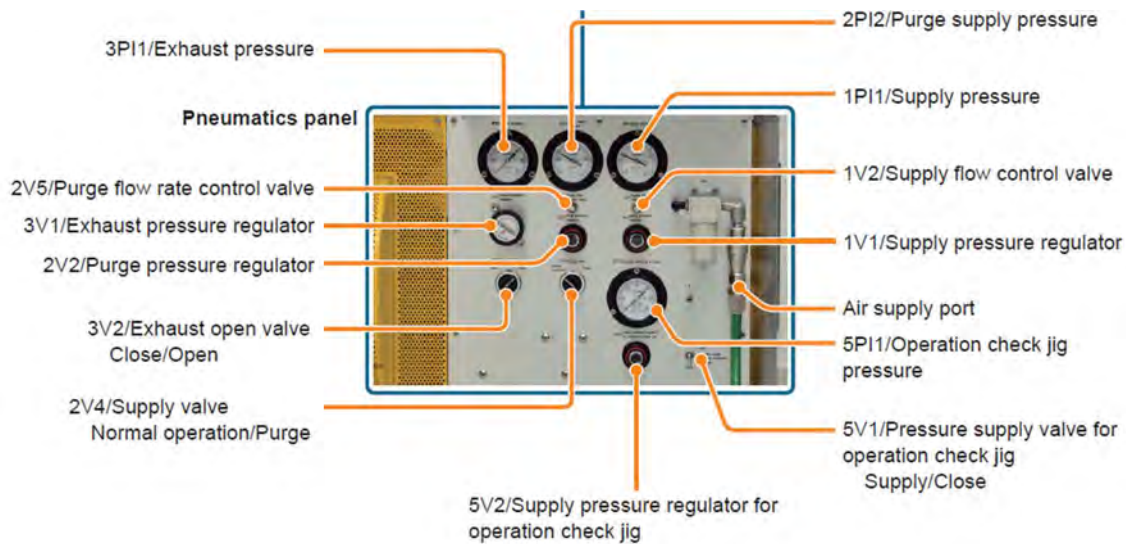
Bumper is not detected at a close position



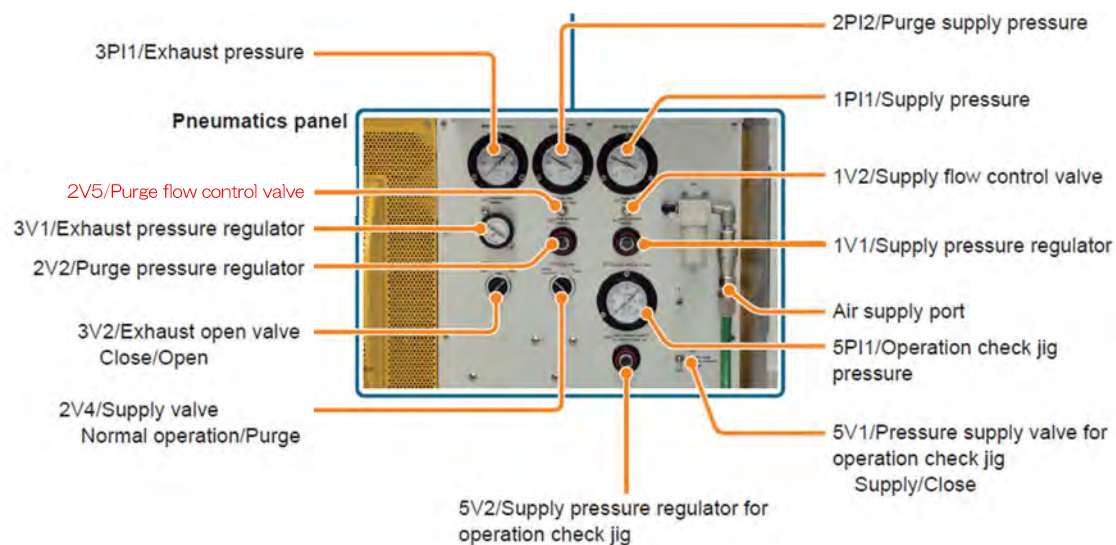
No.6 Error Correction

Common to all manuals 3.2 (p.3-5)

(Incorrect)



(Correct)



No.7 Error Correction

Common to all manuals 3.4.1 (p.3-12)

(Incorrect)

10	Operation Manual ("Delivered Robot/Account Information"* is included in the same binder)	1	
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(Correct)

10	EX ROVR Operation Manual ("Delivered Robot/Account Information"* is included in the same binder)	1	
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No.8 Additional Contents

Installation and Setup Manual	(L5-59EU023 R1)	4.2.1 (p.4-1)
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■ ASCENT

4G/LTE Frequency Bands

North America: B2/B4/B12

EMEA: B1/B3/B7/B8/B20/B28A

One or more cellular service providers that provide LTE connectivity supported by SORACOM Plan01 in the country where EX ROVR will be used

(<https://developers.soracom.io/en/docs/reference/carriers/>)

Bandwidth: Minimum 2 Mbps upload/download speed, 8 Mbps or greater for optimum performance

No.9, No.42 Additional Contents

Installation and Setup Manual	(L5-59EU023 R1)	Chapter 9 (p. 9-1)
Operation Manual	(L5-59EU024 R1)	15.4.3(p.15-8)

■ Behavior of ASCNET and the Charging Station when entering, and recovery methods

The following page shows the behavior of ASCENT and the Charging Station, recovery procedures, and a list of possible error causes when proper pressurization and charging operations fail to start upon ASCENT entering the Charging Station.

■ Behavior of ASCENT and the Charging Station, recovery procedures, and a list of possible error causes when an error occurs during entering.

	Causes of errors	Behavior of ASCENT/the Charging Station	Battery condition	Indicator condition of the station at the time of error	State of cylinder at the time of error	Recovery method	Details of cause/Judgment criteria	Remarks
1	Rear obstacle proximity sensor	ASCENT entering ⇒ ASCENT retries [exiting to entering] 3 times every 3 minutes ⇒ Too Many Retries result in Syscon Error 122 , causing a stop	-(Regardless)	[Standby state] Pressurizing: Off Charging: Off Running: Lit	The cylinder is compressed.	1. Clear the software error.	[Abnormality of measured value of Rear obstacle proximity sensor of ASCENT] This error occurs when 180 seconds pass without rear obstacle distance sensor falling below a certain distance while moving backward.	
2	Transmission type photoelectric sensor (input DI)	ASCENT entering ⇒ ASCENT retries [exiting to entering] 3 times every 3 minutes ⇒ Too Many Retries result in Syscon Error 122, causing a stop	-(Regardless)	[Standby state] Pressurizing: Off Charging: Off Running: Lit	The cylinder is compressed.	1. Clear the software error.	[Abnormality of transmission type photoelectric sensor (DI) of Contactless power reception unit of ASCENT] Occurred when DI (transmission type photoelectric sensor input) is left OFF for 180 seconds after ASCNET enters the Charging Station and turns servo OFF.	
3	Transmission type photoelectric sensor (output DO)	ASCENT entering ⇒ ASCENT is docked and will change to charging mode after 55 seconds. ⇒ Status changed to Navcon warning 52 after 20 seconds. ⇒ The status changed to exit mode but not exit, and stopped after 20 seconds due to Syscon error 130. (Navcon Warning 52 has ended.)	-(Regardless.)	[Standby] Pressurizing: Off Charging: Off Running: Lit	N/A	1. Turn off the Charging Station power and then turn it on 2. Clear the software error.	[Abnormality of transmission type photoelectric sensor (DO) of Contactless power reception unit of ASCENT] This occurs when the Charging Station does not receive the DO (transmission type photoelectric sensor output) of photoelectric sensors #1 and #2 even if it is turned on. *There is no problem with DI (transmission type photoelectric sensor input).	Since the extension and compression state of the cylinder in the Charging Station is unknown, ASCENT will not be remotely entered or exited. A person will turn off the power to the Charging Station, check the state, and restore it.
4	Safety relay	ASCENT entering ⇒ No error occurred	Residual voltage 30V or more	[Standby state] Pressurizing: Lit Charging: Off Running: Lit	The cylinder is extended.	1. Turn off the Charging Station power and then turn it on	[Abnormality of the safety relay of the Charging Station] This error occurs when the safety relay does not operate properly.	When the voltage is 30V or more, charging does not normally start, so ASCENT cannot detect that there is a problem. ⇒ When the voltage drops and becomes less than 30V, the behavior shifts to No. 5.
5	Safety relay	ASCENT entering ⇒ ASCENT is docked and will change to charging mode after 55 seconds. ⇒ Status changed to Navcon warning 52 after 20 seconds. ⇒ ASCENT retries [exiting to entering] 3 times. ⇒ Too Many Retries result in Navcon error 148, causing a stop.	Remaining voltage is less than 30V.	[Standby state] Pressurizing: Lit Charging: Off Running: Lit	The cylinder is extended.	1. Turn off the Charging Station power and then turn it on	[Abnormality of the safety relay of the Charging Station] This error occurs when the safety relay does not operate properly.	
6	Air source pressure, air leakage	ASCENT entering ⇒ ASCENT is docked and the cylinder retries [extension to compression] 3 times. ⇒ Too Many Retries result in Syscon error 142, causing a stop.	Residual voltage: 30V or more	[Error condition] Pressurizing: Rapid flashing	The cylinder is compressed.	1. Increase the base air pressure. 2. Clear the software error.	[Air source pressure drop] This error occurs when the air source pressure is below the specified value and the accumulator pressure switch does not turn ON. *There is a possibility of air leakage.	

	Causes of errors	Behavior of ASCENT/the Charging Station	Battery condition	Indicator condition of the station at the time of error	State of cylinder at the time of error	Recovery method	Details of cause/Judgment criteria	Remarks
7	Air source pressure, air leakage	ASCENT entering ⇒ The Cylinder retries [extension to compression] 3 times ⇒ ASCENT tries [exiting to entering] ⇒ The Cylinder retries [extension to compression] 2or3 times ⇒ Once again, ASCENT tries [exiting to entering] ⇒ Navcon error 148 occurs at the timing of the exit of the 4 th set of ASCENT. ⇒ Immediately after, it results in Syscon error 142, causing a stop.	Remaining voltage is less than 30V.	[Error condition] Pressurizing: Rapid flashing	The cylinder is compressed.	1. Increase the base air pressure. 2. Clear the software error.	[Air source pressure drop] This error occurs when the air source pressure is below the specified value and the accumulator pressure switch does not turn ON. *There is a possibility of air leakage.	The number of times of [extension to compression] of the cylinder varies slightly depending on the original pressure.
8	Limit switch	ASCENT entering ⇒ ASCENT is docked and the cylinder retries [extension to compression] 3 times. ⇒ Too Many Retries result in Syscon error 142, causing a stop.	Remaining voltage: 30V or more	[Error condition] Running: Rapid flashing	The cylinder is compressed.	1.The limit switch (dog) is restored. 2. Clear the software error.	[Abnormality of the station limit switch] This error occurs when the fixing bolt of the limit switch or dog is loose and the limit switch does not turn ON.	
9	Limit switch	ASCENT entering ⇒ The Cylinder retries [extension to compression] 3 times ⇒ ASCENT tries [exiting to entering] ⇒ The Cylinder retries [extension to compression] 2or3 times ⇒ Once again, ASCENT tries [exiting to entering] ⇒ Navcon error 148 occurs at the timing of the exit of the 4 th set of ASCENT. ⇒ Immediately after, it results in Syscon error 142, causing a stop.	Remaining voltage is less than 30V.	[Error condition] Running: Rapid flashing	The cylinder is compressed.	1.The limit switch (dog) is restored. 2. Clear the software error.	[Abnormality of the station limit switch] This error occurs when the fixing bolt of the limit switch or dog is loose and the limit switch does not turn ON.	The number of times of [extension to compression] of the cylinder varies slightly depending on the original pressure.

No.10 Additional content

Installation and Setup Manual

(L5-59EU023 R1)

Chapter 9 (p. 9-1)

■ Purging does not start, or does not complete

- Make sure the exhaust hose is connected. If the coupler is not connected properly, the switch pushed down by the coupler may be too small, resulting in insufficient air flow.

No.11 Error Correction

Installation and Setup Manual

(L5-59EU023 R1)

10.1 (p.10-1)

ASCEMT

Total Length	(Incorrect)	700 mm (with sub tracks stowed)
		1300 mm (with sub tracks extended)
	(normal)	700 mm (with sub tracks stowed)
		1284 mm (with sub tracks extended)

Overall height	(incorrect)	Approx. 600 mm (with manipulator arm stowed)
		Approx. 1300 mm (with manipulator arm stowed and sub tracks upright)
	(correct)	Approx. 600 mm (with manipulator arm stowed)
		Approx. 1756 mm (with manipulator arm extended and sub tracks upright)

No.12 Explosion-proof certification renewed

Installation and Setup Manual

(L5-59EU023 R1)

10.1 (p.10-1)

ASCENT

*[*This is a renewal due to the change of the certification body, and there is no change in explosion-proof performance.]*

(Pre-renewal)

Explosion-proof rating	IECEX	Ex db ib pxb IIB+H2 T3 Gb	
	ATEX	II 2G Ex db ib pxb IIB+H2 T3 Gb	
	Japan	Ex db pxb IIB+H2 T3 Gb	
Certification number	IECEX TIIS 22.0002X	SCA 22 ATEX 140X	TC22783X

(Post-renewal)

Explosion-proof rating	IECEX	Ex db pxb IIB+H2 T3 Gb	
	ATEX	II 2G Ex db pxb IIB+H2 T3 Gb	
	Japan	Ex db pxb IIB+H2 T3 Gb	
Certification number	IECEX TIIS 22.0002X	INERIS 24ATEX0019X	TC22965X

No.13 Error Correction

Installation and Setup Manual

(L5-59EU023 R1)

10.1 (p.10-4)

Wireless communication

Communication speed	(incorrect)	Up to 2Mbps
	(correct)	Up to 8Mbps

No.14 Error correction

Installation and Setup Manual (L5-59EU023 R1) 10.2(p.10-10)

Charging Station

Total length	(incorrect)	1070 mm
	(correct)	1913 mm

Full width	(incorrect)	962 mm
	(correct)	1200 mm

No.15 Explosion-proof certification renewed

Installation and Setup Manual (L5-59EU023 R1) 10.2(p.10-10)

Charging Station

*[*This is a renewal due to the change of the certification body, and there is no change in explosion-proof performance.]*

(Pre-renewal)

Explosion-proof rating	IECEX	Ex db eb ib mb [pxb Gb] IIB+H2 T3 Gb	
	Japan	Ex db ib [pxb Gb] IIB+H2 T3 Gb	
	Ex	II 2G Ex db eb ib mb [pxb Gb] IIB+H2 T3 Gb	
Certification number	IECEX TIIS 22.0003X	SCA 22 ATEX 141X	TC22782

(Post-renewal)

Explosion-proof rating	IECEX	Ex db ib [pxb Gb] IIB+H2 T3 Gb	
	Japan	Ex db ib [pxb Gb] IIB+H2 T3 Gb	
	ATEX	II 2G Ex db ib [pxb Gb] IIB+H2 T3 Gb	
Certification number	IECEX TIIS 22.0003X	INERIS 24ATEX0021X	TC22966X

No.16 Explosion-proof certification renewed

Installation and Setup Manual

(L5-59EU023 R1)

10.2(p.10-12)

Control panel

(Pre-renewal)

Explosion-proof rating	IECEX	ATEX	Japan
	Ex db IIA or IIB or IIB+H2 T6 or T5 or T4 or T3 Gb	II 2 G Ex db IIA or IIB or IIB+H2 T6 or T5 or T4 or T3	Ex db [ia IIA, IIB or IIC Ga] IIB+ H2T6, T5, T4 or T3
Certification number	IECEX INE 13.0078X	INERIS 13 ATEX 0058X	CML 21JPN11337X

(Post-renewal)

Explosion-proof rating	IECEX	ATEX	Japan
	Ex db [ia Ga] IIB+H2 T3 Gb	II 2G Ex db [ia Ga] IIB+H2 T3 Gb	Ex db [ia Ga] IIB+H2 T3 Gb
Certification number	IECEX INE 13.0070X	INERIS 13ATEX0022X	CML 21JPN11337X

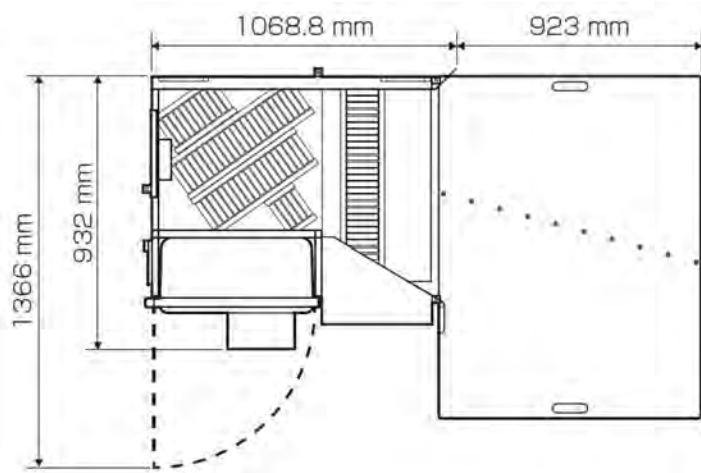
No.17 Error Correction

Installation and Setup Manual

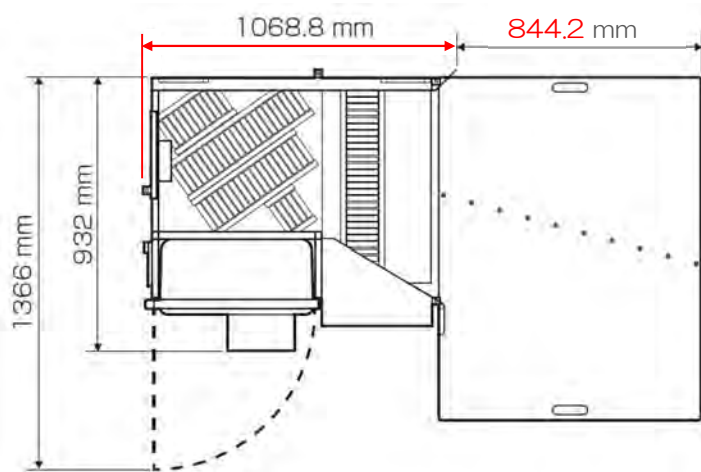
(L5-59EU023 R1)

10.2(p.10-15)

(Incorrect)



(Correct)



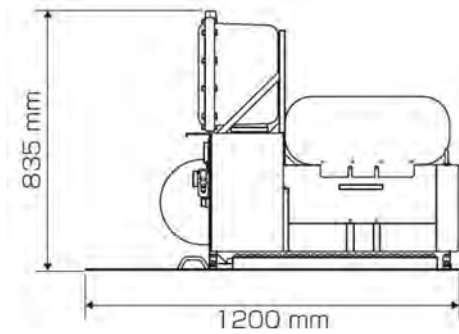
No.18 Error Correction

Installation and Setup Manual

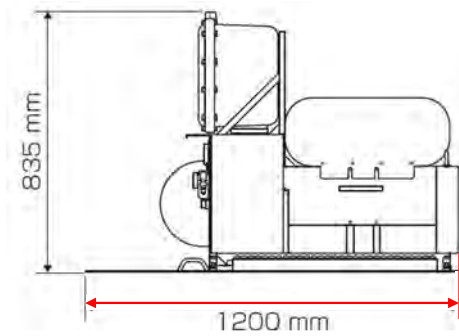
(L5-59EU023 R1)

10.2(p.10-15)

(Incorrect)



(Correct)



No.19 Error Correction

Installation and Setup Manual

(L5-59EU023 R1)

10.3(p.10-16)

Wireless communication

Communication speed	(Incorrect)	2Mbps maximum
	(correct)	8Mbps maximum

No.20 Nameplate update

Installation and Setup Manual

(L5-59EU023 R1)

Appendix B(p. B-1)

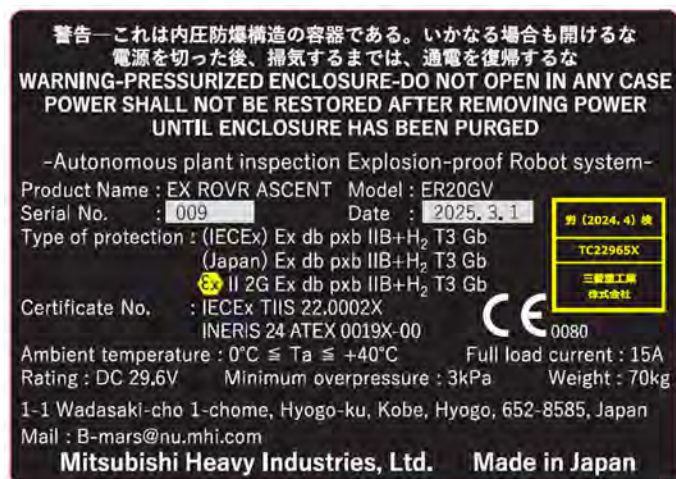
■ ASCENT nameplate

Japan/U.S.A./Europe

(Pre-update)



(Post-update)



No.21 Nameplate update

Installation and Setup Manual

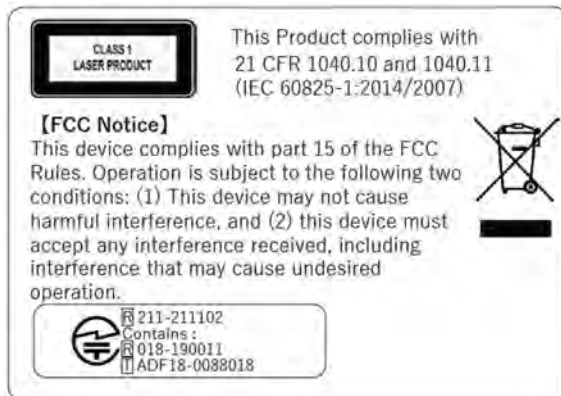
(L5-59EU023 R1)

Appendix B(p. B-1)

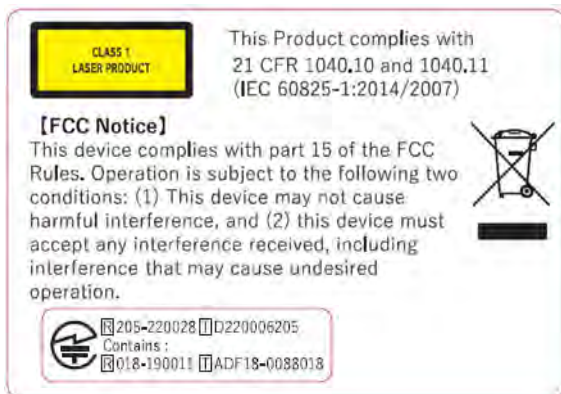
■ ASCENT nameplate

Japan

(Pre-update)



(Post-update)



No.22 Nameplate Update

Installation and Setup Manual

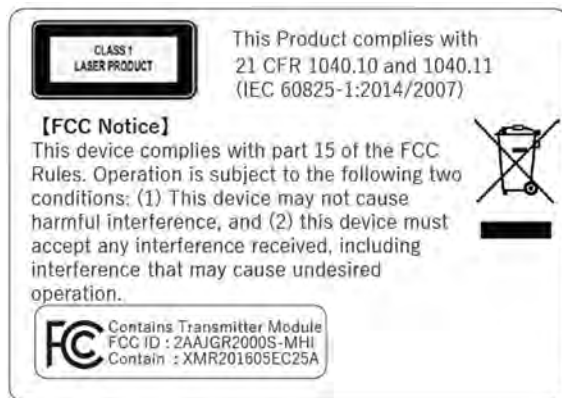
(L5-59EU023 R1)

Appendix B(p. B-1)

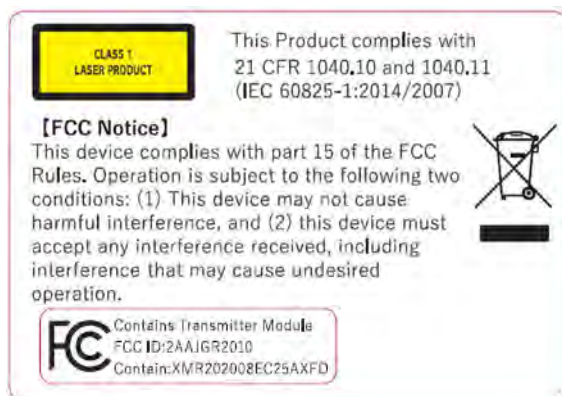
■ ASCENT Nameplate

U.S.A.

(Pre-update)



(Post-update)



No.23 Nameplate update

Installation and Setup Manual

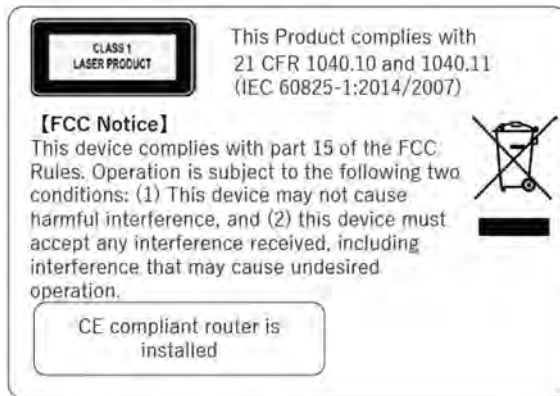
(L5-59EU023 R1)

Appendix B(p. B-1)

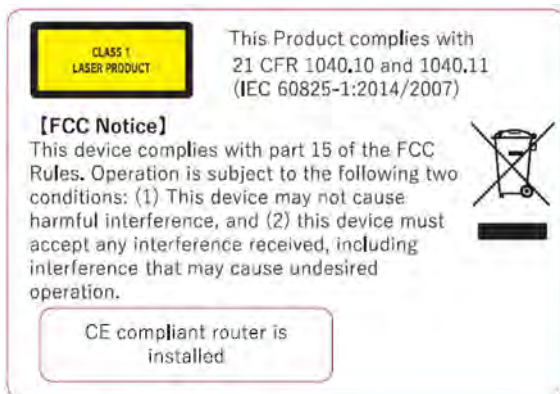
■ Nameplate ASCENT

Europe

(Pre-update)



(Post-update)



No.24 Nameplate update

Installation and Setup Manual

(L5-59EU023 R1)

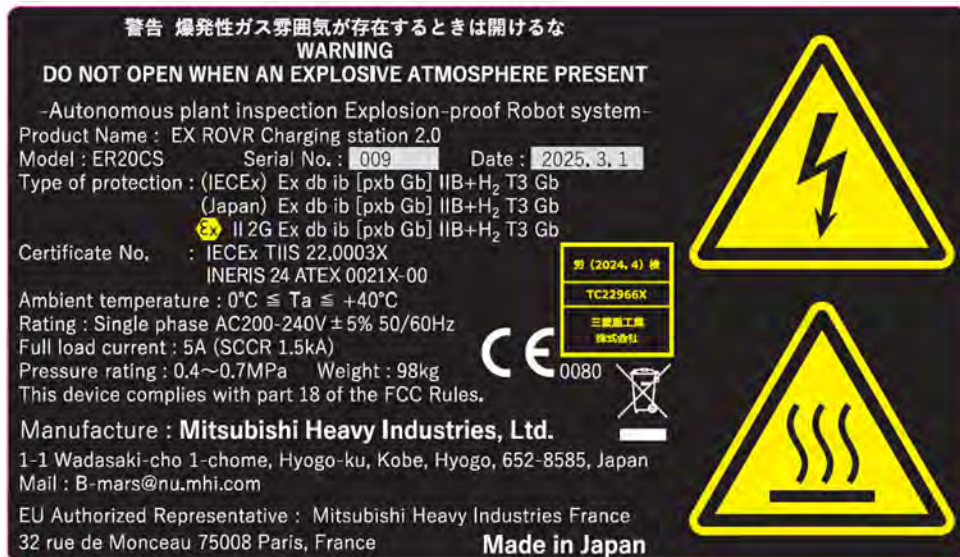
Appendix B, (p. B-2)

■ Charging Station nameplate

(Pre-update)



(Post-update)



No.25 Nameplate update

Installation and Setup Manual

(L5-59EU023 R1)

Appendix B(p. B-3)

■ Teleop terminal nameplate

Japan

(Pre-update)



(Post-update)



No.26 Nameplate update

Installation and Setup Manual

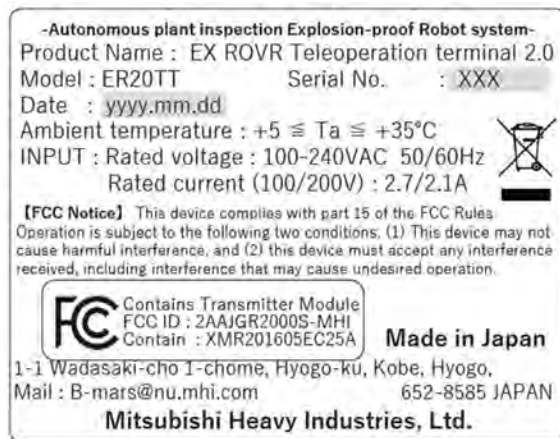
(L5-59EU023 R1)

Appendix B(p. B-3)

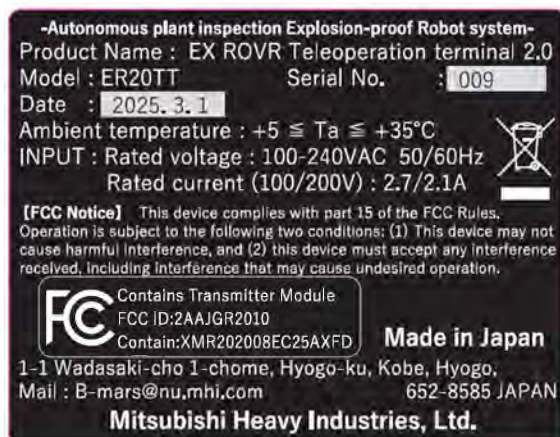
■ Teleop terminal nameplate

U.S.A.

(Pre-update)



(Post-update)



No.27 Nameplate update

Installation and Setup Manual

(L5-59EU023 R1)

Appendix B(p. B-3)

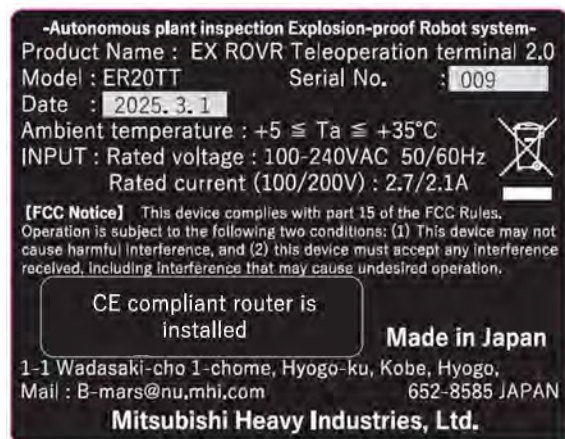
■ Teleop terminal nameplate

Europe

(Pre-update)



(Post-update)



No.28 Compliance information update

Installation and Setup Manual

(L5-59EU023 R1)

Appendix C(p. C-2~4)

Compliance information

EU



File L5-59EU034_R2

EU DECLARATION OF CONFORMITY

We hereby declare that our following products conform with the essential health and safety requirements of EU Directives.

Product: **Autonomous plant inspection Explosion-proof robot system**

Product Name: **EX ROVR 2.0**

Model: **ER20**

Components of

Product Name	Model
EX ROVR ASCENT	ER20GV
EX ROVR Charging station 2.0	ER20CS
EX ROVR Teleoperation terminal 2.0	ER20TT

Manufacturer: **Mitsubishi Heavy Industries, Ltd.**

**1-1, Wadasaki-cho 1-chome, Hyogo-ku, Kobe, Hyogo,
652-8585, Japan**

Authorized Representative:

**Mitsubishi Heavy Industries France
32 rue de Monceau 75008 Paris, France**

The above products have been evaluated for conformity with the following Directives and European Standards.

Directive:

Machinery Directive 2006/42/EC

Radio equipment Directive 2014/53/EU

EMC Directive 2014/30/EU

RoHS Directive 2011/65/EU

Applicable Standards:

Safety:	EN ISO 12100:2010 EN 60204-1:2018 EN 1175-1:1998+A1:2010 EN 62471:2008 EN 62477-1:2012/A11:2014 EN 60825-1:2014 EN ISO 4414:2010 PD CLC/TR 50427:2004	EMC:	EN 61000-6-4:2007/A1:2011 EN IEC 61000-6-2:2019 EN 55011:2016/A1:2017 EN 301 489-1 V2.2.3 EN 301 489-3 V2.1.1 EN 301 489-17 V3.1.1 EN 301 489-24 V1.5.1
RoHS:	EN IEC 63000:2018		

ATEX Directive 2014/34/EU

1) Product Name: **EX ROVR ASCENT**

Model: **ER20GV**



Certification Number: **INERIS 24ATEX0019X**

Marking:  II 2G Ex db pxb IIB+H₂ T3 Gb

Applicable Standards for ATEX Directive 2014/34/EU:

EN IEC 60079-0:2018

EN 60079-1:2014

EN 60079-2:2014/AC:2015

EN 1127-1:2019

※Refer to appendix I (L5-59EU074 DoC Battery module of EX ROVR) for Declaration of conformity of build in battery.

2) Product Name: **EX ROVR Charging station 2.0**

Model: **ER20CS**

Certification Number: **INERIS 24ATEX0021X**

Marking:  II 2G Ex db ib [pxb Gb] IIB+H₂ T3 Gb

Applicable Standards for ATEX Directive 2014/34/EU:

EN IEC 60079-0:2018

EN 60079-1:2014

EN 60079-2:2014/AC:2015

EN 60079-11:2012

EN 1127-1:2019

1) and 2) Notified Body:

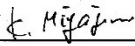
Institut national de l'environnement industriel et des risques

Parc technologique Alata, BP2, F-60550 Verneuil-en-Halatte / FRANCE

Notified Body Number: **0080**

Signed at: 16. April. 2026

Place: Kobe, Hyogo Japan

Signed by: 

Name: Keisuke Miyajima

Title: Director

Nuclear Plant Component Designing Department,

Nuclear Energy Systems

Mitsubishi Heavy Industries, Ltd.



【appendix I】

File Name: L5-59EU074 DoC Battery module of EX ROVR

Product: Battery module of EX ROVR

Model: MHI- 30V15Ah01



File No. L5-59EU074_R1

DECLARATION OF COMPLIANCE

We hereby declare that our following products conform with the standards below.

Product: Battery of the plant inspection robot system
Product Name: Battery module of EX ROVR
Model: MHI-30V15Ah01
Manufacturer: Mitsubishi Heavy Industries, Ltd.
 1-1, Wadasaki-cho 1-chome, Hyogo-ku, Kobe, Hyogo,
 652-8585, Japan

Applicable Standards:

IEC 61960:2017 *
 IEC 62619:2017
 JIS C 8715-2:2019
 UN38.3

REGULATION (EU) 2023/1542 Article 6 Restrictions on substances

note*: This standard is for use in portable applications, and industrial applications
 such as AGV are excluded, but it is declared that this battery conforms to this
 standard in terms of specifications.

The data for the compliance confirmation is listed in the Technical Documentation:

File No. L5-59EU079

Signed for and on behalf of manufacturer:

Name: Mitsubishi Heavy Industries, Ltd.

Address: 1-1, Wadasaki-cho 1-chome, Hyogo-ku, Kobe, Hyogo, 652-8585, Japan.

Signature: Kimihiko Matsuo Place & Date: Kobe, Japan, 21/Jan./2026

Name + Function: Kimihiko Matsuo

Manager,

Equipment Designing Section,

Nuclear Plant Component Designing Department,

Nuclear Energy Systems

No.29 Additional Content

Operation Manual (L5-59EU024 R1) 4.2.1 (p.4-5)

■ Emergencies and emergency attendant response

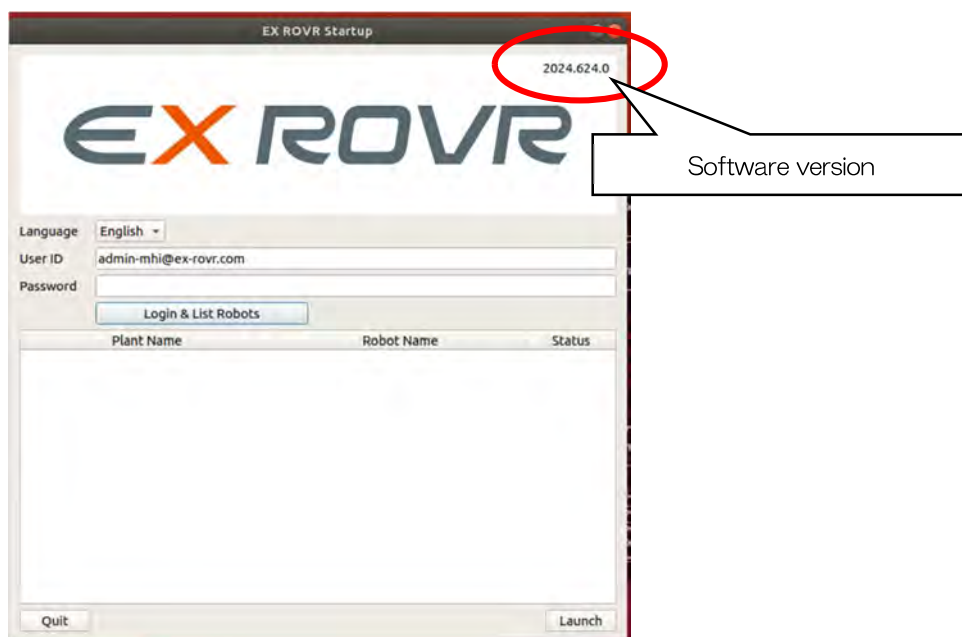
Depending on the site situation, ASCENT operation may need to be stopped immediately, in which case an attendant must press the emergency stop button (or torque off button) on the rear of ASCENT to stop its operation on the spot. **Keep pressing the button until ASCENT operation stops completely.**

No.30 Startup screen update

Operation Manual (L5-59EU024 R1) 6.3.1 (p.6-6)

■ Display of the software version

[The software version is listed on the upper right of the startup screen of EX ROVR (image update only).]

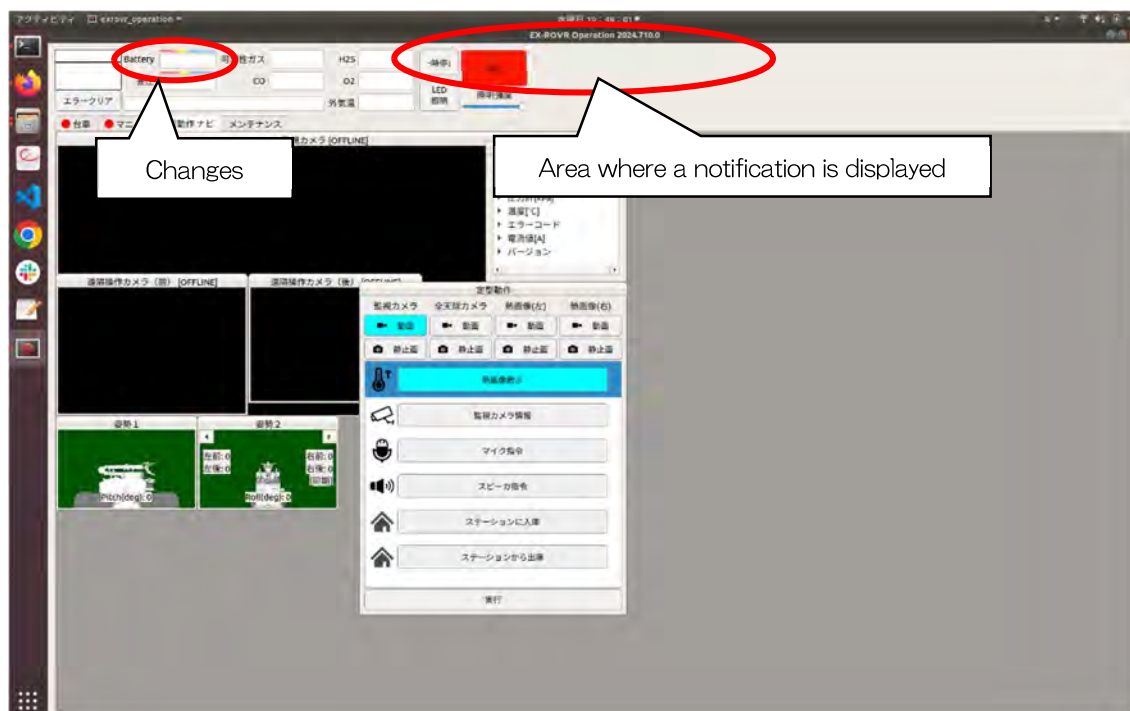


No.31 Additional Contents

Operation Manual (L5-59EU024 R1) 7.2(p.7-7)

Battery level checking

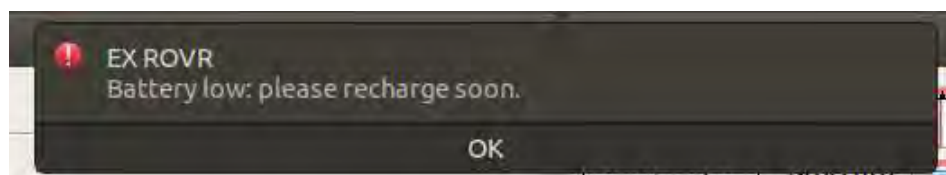
A notification is displayed on the Teleop screen when the battery is low. ASCENT also generates an alarm (warning sound). The judgment value for generation is 26V or less.



When the battery is low, the background of the battery indicator flashes between white and red.



A notification is displayed. The notification disappears when you press [OK].



ASCENT generates an alarm (warning sound). The warning sound disappears when ASCENT enters the Charging Station.

No.32 Additional Functions

Operation Manual (L5-59EU024 R1) 8.1 (p.8-2)

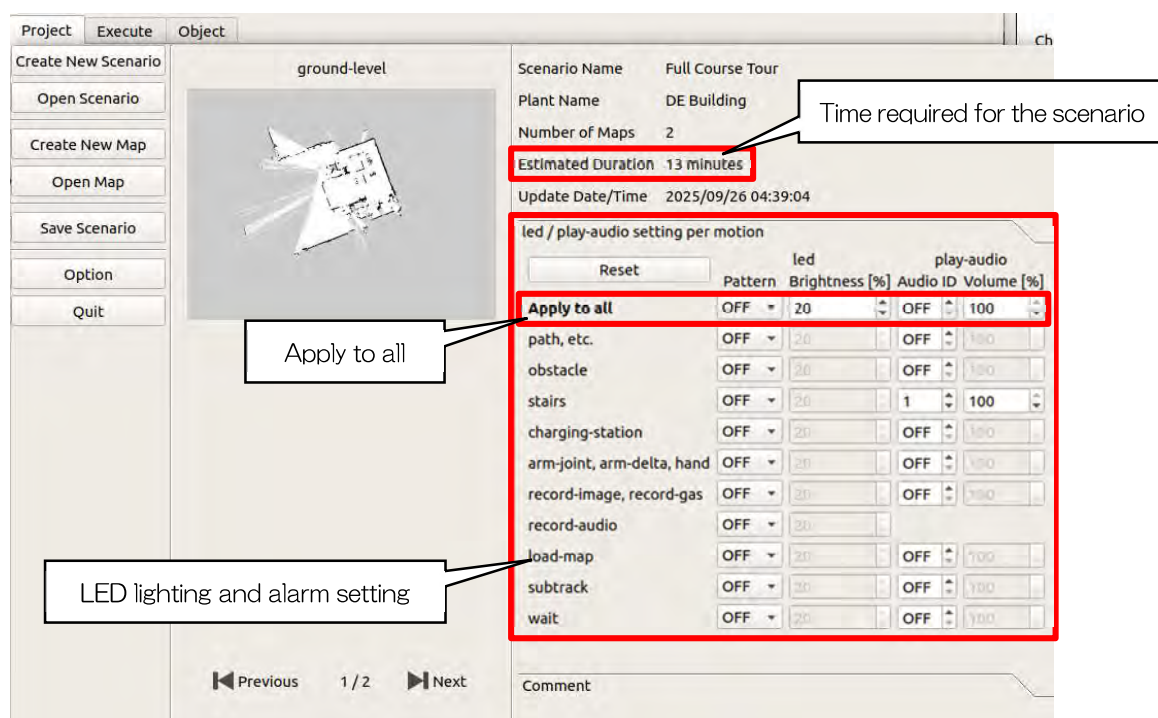
■ [Project] tab

- Scenario time calculation function

The time required to execute the scenario displayed in the Scenario tab is calculated and displayed.

- LED lighting function and alarm function during scenario execution

During scenario execution, the LED at the end of the manipulator can be lit and an alarm sound can be emitted from the speaker. Settings can also be made for each individual motion. The LED pattern and sound source can be selected from a selection of led motion and play-audio motion.



By using the "Apply to all" function, the values are copied to each individual motion listed below and applied simultaneously.

In addition, by setting for each motion (Running, steps, stairs, etc.), the LED pattern and sound source number can be set individually.

Note: The screen display on the [Project] tab will also be changed accordingly on the following pages: p.7-11、 p.7-66、 p.9-3

No.33 Additional Functions

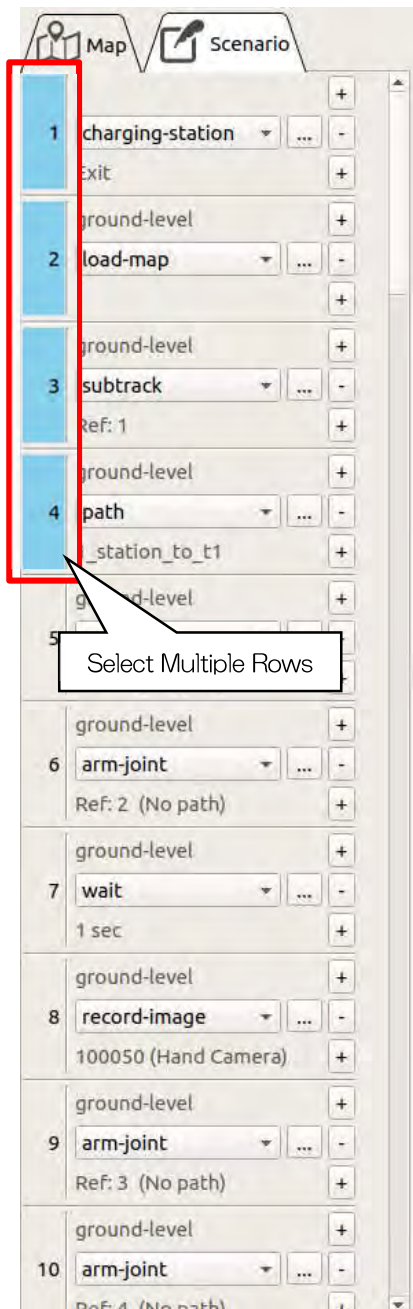
Operation Manual (L5-59EU024 R1)

9.3.3(p.9-11)

■ Executing Multiple Consecutive Rows with “Execute Selected Rows”

Shift-click to select multiple motions.

Then, click [Execute Selected Line(s)] to execute the selected range.



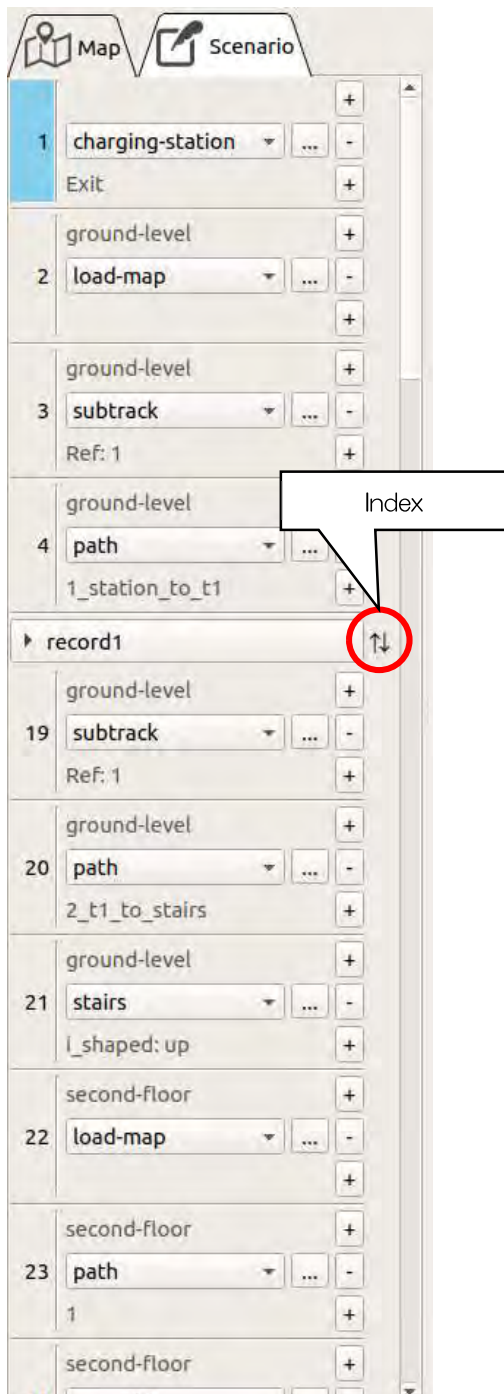
No.34 Additional Functions

Operation Manual (L5-59EU024 R1)

9.3.3(p.9-11)

■ Move the group position

Drag the group index with the mouse to move its position.



No.35 Additional Functions

Operation Manual (L5-59EU024 R1) 9.4.3(p.9-17)

12 To change ASCENT's heading when it stops

After moving, change ASCENT to the desired orientation, and then click [Acquire current] for [Final Heading]. [Final Heading] generates rotate-to-heading motion.

When [Final Heading] is specified, ASCENT will rotate to the specified orientation and stop after moving to the destination during scenario execution.

The screenshot shows the 'Path Settings' dialog box with the following fields and controls:

- Reference Path:** A dropdown menu with an 'Edit' button.
- Speed:** A dropdown menu set to '0.2' with the unit 'm/sec'.
- Start:** A 'Reset' button, a 'select from map' button, and a value of '0 m'.
- End:** A 'Reset' button, a 'select from map' button, and a value of '0 m'.
- Goal Tolerance:** A text input field set to '0.1' with the unit 'm'.
- Obstacle Detection:** Radio buttons for 'Enabled' (selected) and 'Disabled'.
- Final Heading:** A 'Reset' button, a red-bordered 'Acquire Current' button, and the unit 'deg'. A callout box points to the 'Acquire Current' button with the text 'Set to Current Angle'.
- Rotation Speed:** A text input field set to '20' with the unit 'deg/sec'.
- Buttons:** 'Cancel' and 'OK' buttons at the bottom.

Note: The screen display and explanations related to the "path" motion will also be changed accordingly on the following pages:

p.7-31、p.7-32、p.7-51、p.7-64、p.7-75、p.9-17、p.9-18、p.9-24

In addition, regarding the change of stop orientation from "rotate-to-point" to "rotate-to-heading," the screen display and explanations on the following pages will also be changed accordingly:

p.7-32、p.7-33、p.7-34、p.7-35、p.7-36、p.7-41、p.7-42、p.7-43、p.7-47、
p.7-48、p.7-52、p.7-54、p.7-57、p.7-58、p.7-73、p.7-74、p.7-76、p.7-79、
p.7-81、p.7-82、p.7-83、p.7-84、p.7-90、p.7-91、p.7-102、p.7-103、p.9-20

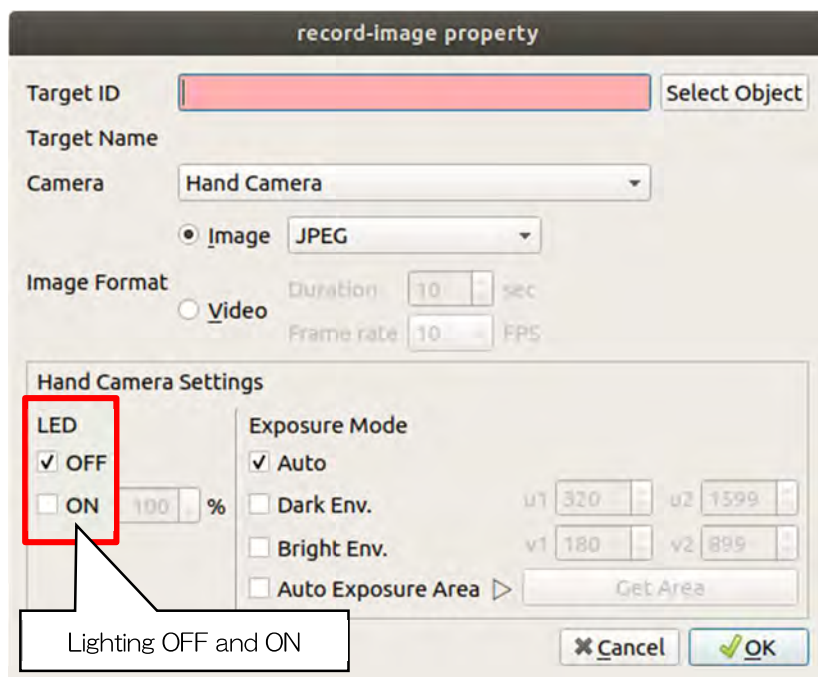
No.36 Additional Functions

Operation Manual (L5-59EU024 R1)

9.4.8(p.9-34)

6 Set the imaging mode in [Hand Camera Settings].

It is possible to capture images in both lighting OFF and ON conditions within a single motion. When both OFF and ON are checked, images will be captured in both lighting OFF and ON conditions.



Note: The screen display and explanations related to the "record-image" motion will also be changed accordingly on the following pages:

p.7-43、 p.7-47、 p.9-35、 p.9-35

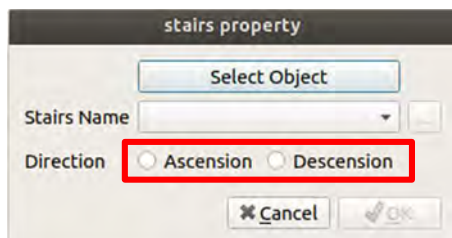
No.37 Modify Initial Settings

Operation Manual

(L5-59EU024 R1)

9.4.13(p.9-40)

■ "stairs" motion

[Initial value (Ascension/Descension) is not selected]

Note: The screen display related to the "stairs" motion will also be changed accordingly on the following pages:

p.7-77, p.7-82.

No.38 Additional Functions

Operation Manual (L5-59EU024 R1)

9.4.14(p.9-41)

■ Running a slope

Slope running can be set from the "obstacle" motion.

First, choose between a step or a slope, and enter the slope dimensions in the blank.

Step Setting

☒ Step ☐ Slope

X Coordinate (m) -6.230
Y Coordinate (m) -4.616
Angle (deg) 0.000

Height A 0 Slope Length A
Height B 0 Slope Length
Depth 0 (Unit: mm)

Select a slope

Direction of Travel →

Cancel OK

Step Setting

☐ Step ☒ Slope

X Coordinate (m) -6.230
Y Coordinate (m) -4.616
Angle (deg) 0.000

Height A 0 Slope Length A 0
Height B 0 Slope Length B 0
Depth 0 (Unit: mm)

Enter dimensions

Direction of Travel →

Cancel OK

obstacle property

Select Object

Direction of Travel

☒ A → B

☐ B → A

Ascension Descension

Height 0 mm

Slope Length 0 mm

Depth 0 mm

Cancel OK

Note: The screen display and explanations related to step objects and the “obstacle” motion will also be changed accordingly on the following pages:

p.7-23、 p.7-34、 p.8-23、 p.9-4

No.39 Additional Functions

Operation Manual

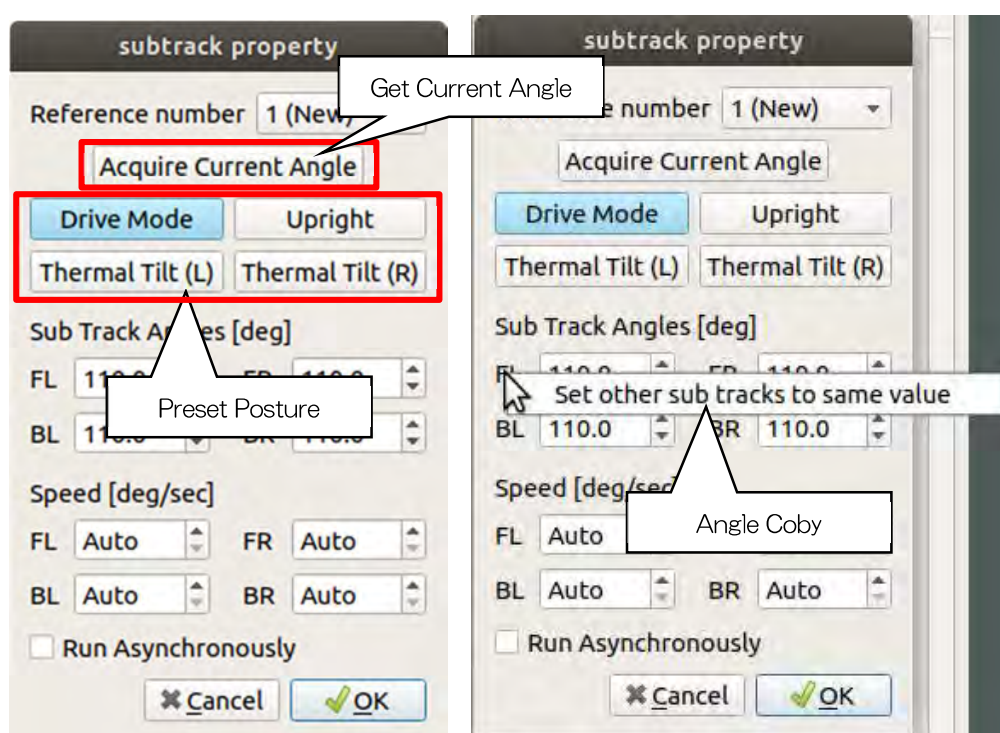
(L5-59EU024 R1)

9.4.15(p.9-42)

■ Setting the sub track angle from a preset posture

In the “subtrack” motion, selecting [Drive Mode], [Upright], [Thermal Tilt (L)], or [Thermal Tilt (R)] allows you to configure the angle of the preset posture.

To set the sub track angle, click [Acquire Current Angle] to set it to the current angle. When you right-click the label of the target angle (e.g., FL, FR, etc.), a menu appears that allows you to copy the value to another angle.



[Preset Posture List]

- Drive Mode: All 110 degrees (Attitude when driving. It's the most compact.)
- Upright: All -60 degrees (Lift the entire body with the sub track.)
- Thermal Tilt (L): 10 degrees, others: 110 degrees (When using the left thermal imaging camera, the sub track may enter the camera's field of view, so it is lowered.)
- Thermal Tilt (R): FR: 10 degrees, others: 110 degrees

No.40 Additional Functions

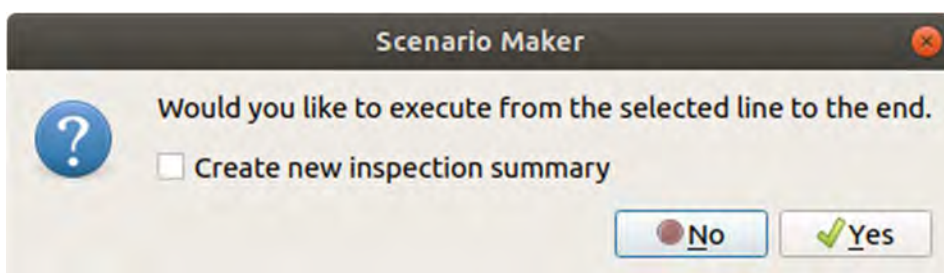
Operation Manual (L5-59EU024 R1) 9.6(p.9-48)

■ [Execute] tab

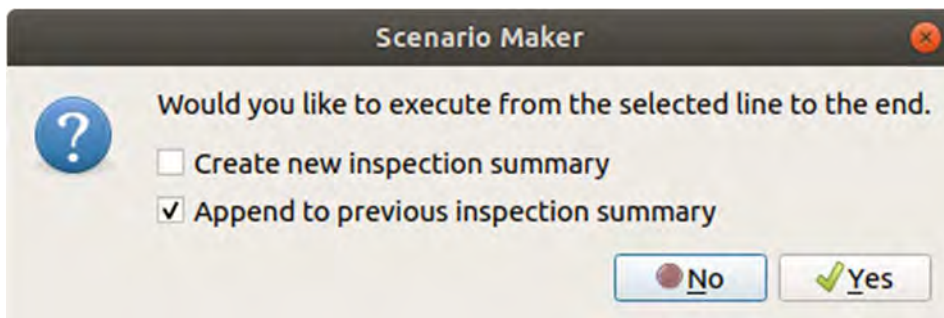
Click [Execute to End] button to create a inspection summary.

You can check the inspection summary by accessing the cloud.

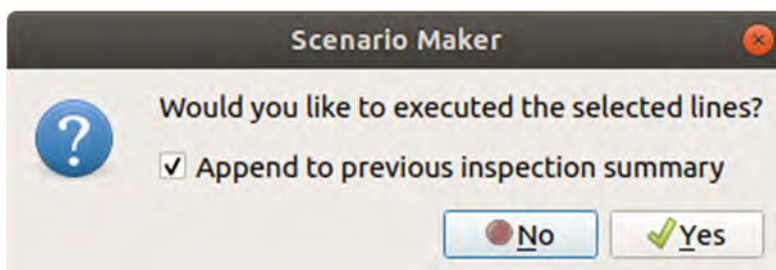
After performing [Execute to End], if the checkbox is selected, a new inspection summary will be created.



If you pause once during inspection summary creation, you can continue appending from where you left off by using [Execute to End].



You can append from the same state by using [Execute Selected Line(s)].



No.41 Additional Contents

Operation Manual (L5-59EU024 R1) 15.4.1 (p.15-6)

■ **Robot Temporarily Pauses or Appears to Move Slightly Backward During Stair Climbing.**

During stair climbing, when excessive load occurs in the motor, the robot moves back a few millimeters before proceeding again. If the load continues to increase, a main track error (162 for right or 163 for left) will be triggered, causing the robot to stop in place.

The temporary stop followed by resuming movement is not an abnormal condition, and the robot can continue its operation.

[This is a measure to reduce the occurrence frequency of main track error]

■ **Error stop at the timing of starting stair ascending/descending**

The interlock function may be activating during stair ascending/descending.

- When issuing a stair ascending command, the operation starts after detecting the stairs ahead at the time of execution. If detection fails, the operation will stop with an error. ⇒ Navcon error 154
- When issuing a stair descending command, conversely, the absence of stairs (objects) is confirmed. If stairs (objects) are detected, a Navcon error 154 will occur similarly.

[This interlock serves as a countermeasure against incorrect operations in the scenario maker, such as issuing a stair ascending command when the robot should be descending.]

Reference: Parameter (search range of stairs) * The origin is set to LiDAR.

0.1~1.1 m ahead

Height ± 0.15 m

Left and right ± 0.14 m

Score: Judged as normal if the score is 50 or above.

■ **Unable to Land Smoothly on the Landing After Ascending Stairs**

The reflector may not be detected correctly.

Please readjust the position of the reflector. Attaching reflectors on both sides of the stairs is also effective. Note that even if detection failures occur, operation may continue as long as safe patrol can be resumed.

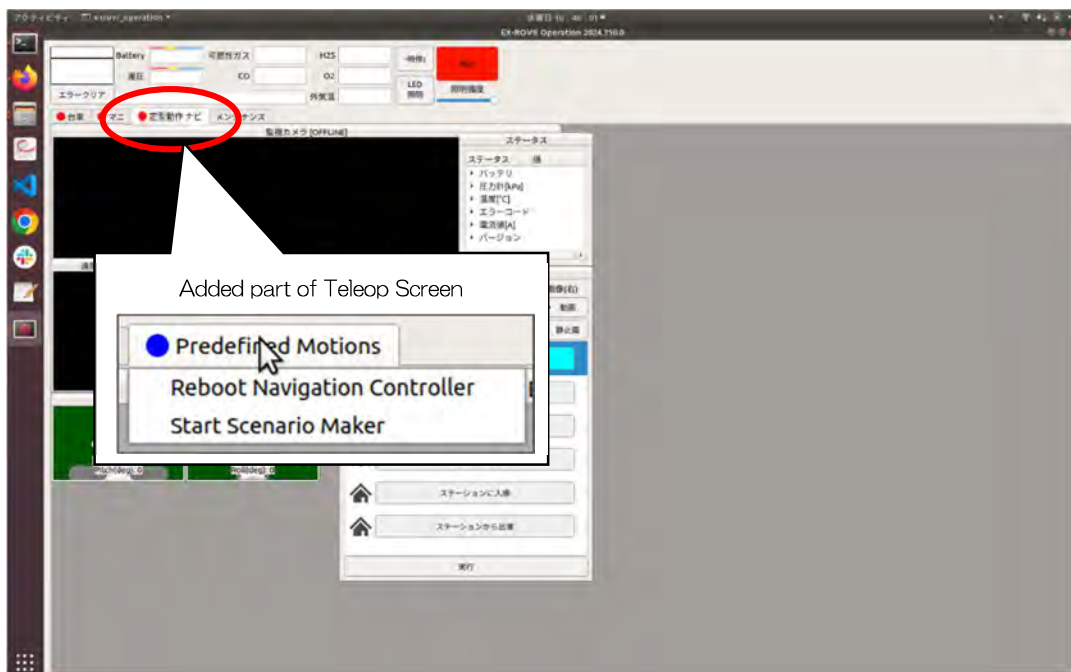
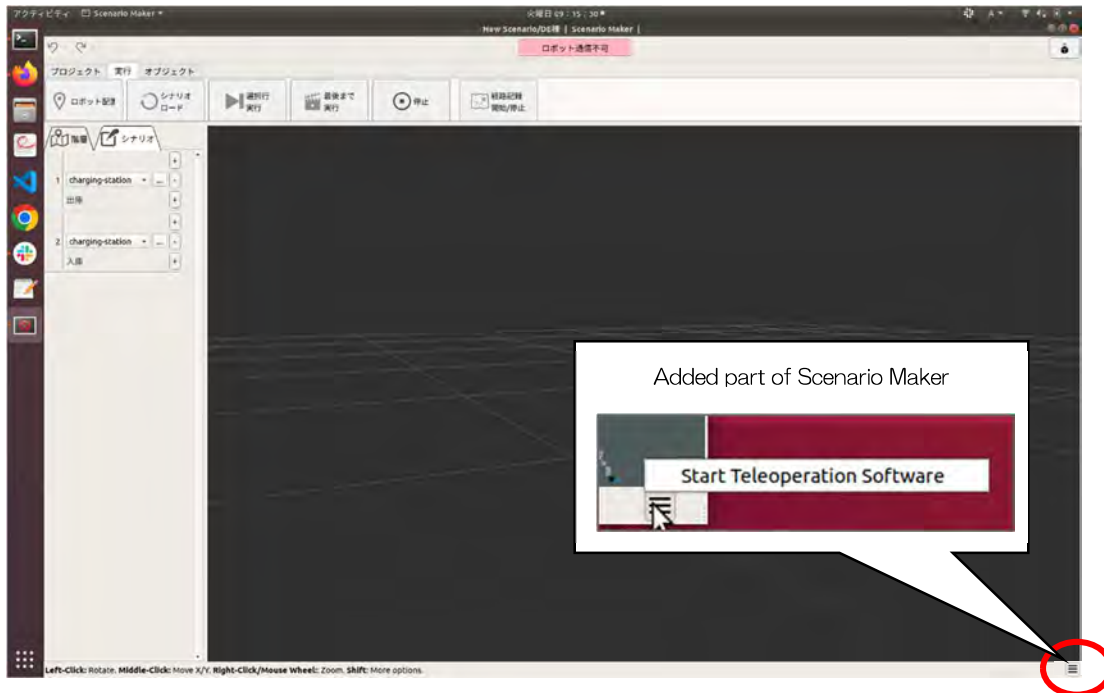
[Previously, Navcon error 160 occurred, causing the system to stop at the stair landing. This measure is implemented to allow patrol to continue.]

No.43 Additional Functions

Operation Manual (L5-59EU024 R1) 15.4.4(p.15-9)

■ Mutually Launching the Scenario Maker and Operation (Teleop Screen)

The Scenario Maker and Operation (Teleop Screen) can be launched mutually from each other.



No.44 Additional Contents

Operation Manual (L5-59EU024 R1)

15.5.1 (p.15-10)

■ Navigation control errors (incident class: Navcon)

Error Code	Cause	Recovery Method
45	Gas detector restarting	The operation will continue with the warning.
53	Recovering from main track current limit.	
61	Marker detection failure	
154	Diagnostics before stairs: Stair detection error	- Click [Clear Error]. - Ensure that the settings for "ascending" or "descending" stairs correspond accurately to the actual environment. - Rerun the scenario and ensure the behavior. - If it recurs, write down the error number and contact the maintenance company.
161	Main Track Current Limit Recovery Failure	- Click [Clear Error]. - Ensure the track's appearance for any abnormalities. - In the case of stairs, move the robot to a safe location and ensure that the stairs have a maximum angle of 46 degrees or less. - If the robot is turning, adjust the robot's turning position. - Rerun the scenario and ensure the behavior. - If it recurs, write down the error number and contact the maintenance company.
162	Repeated Main Track Current Limit	

No.45 Additional Contents

Installation and Setup Manual

(L5-59EU023 R1)

8.2(p.8-1)

8.2 When Moving This Product from its Installation Location to Another Location for Storage

- When moving ASCENT and the Charging Station from their installation locations, be sure to turn off the power of each device and confirm safety. The power of ASCENT is turned off by pressing the emergency stop button.

NOTE

Do not turn off the Charging Station or cut off the air supply without turning off ASCENT.
If only ASCENT's power remains on, the battery may become depleted, and in some cases, the battery may be over-discharged.

- Moving ASCENT and its Charging Station from their place of installation to another location for extended storage may result in over-discharge of ASCENT's battery. If you need to take such action, please consult the manufacturer, your distributor, or maintenance partner in advance.
- When moving ASCENT and its Charging Station from their places of installation, transport them in accordance with their respective transport procedures (page 5-5, page 6-2).

**WARNING**

- **Do not store in any place that is humid, exposed to direct sunlight, or subject to temperatures outside the range from -20 to 50 °C.**

Storage under such conditions may result in malfunction. Furthermore, leaving the product in an extremely hot location may cause the built-in battery to rupture or catch fire.

NOTE

Do not store ASCENT with the power turned off for an extended period.

If long-term storage is unavoidable, fully charge the battery once every three months, then press the emergency stop button to turn off the power. Keep the battery charged to avoid battery over-discharge.