TERUMO

TERUFUSION®

Communication Rack System TE-RS800

Instruction Manual

CE

Store this instruction manual in a convenient location for future reference whenever necessary.
Read and carefully follow the instructions described in this instruction manual before using this product. For safe and long-term use, perform periodic maintenance and inspection.
* For details on handling the pumps, see the instruction manual for each device.

Table of Contents

Purpose of the Product

The TERUFUSION Communication Rack System is intended for racking multiple pumps and, provides one-step attaching and detaching of the specified syringe pump and infusion pump, and supplies the AC source to the pump attached. In addition, this product mediates the communication between the pumps or the pump and an external device.

• Compatible pumps

Product name	Model	Catalogue number
TERUFUSION Infusion Pump Type LM/ TERUFUSION Infusion Pump Type LM3	TE-LM800/ TE-LM830	TE-LM8xxxxx TE*LM8xxxxx
TERUFUSION Syringe Pump Type SS/ TERUFUSION Syringe Pump Type SS3	TE-SS800/ TE-SS830	TE-SS8xxxxx TE*SS8xxxxx
TERUFUSION Syringe Pump Type SS3TCI	TE-SS830T	TE-SS8xxxxxx TE*SS8xxxxx

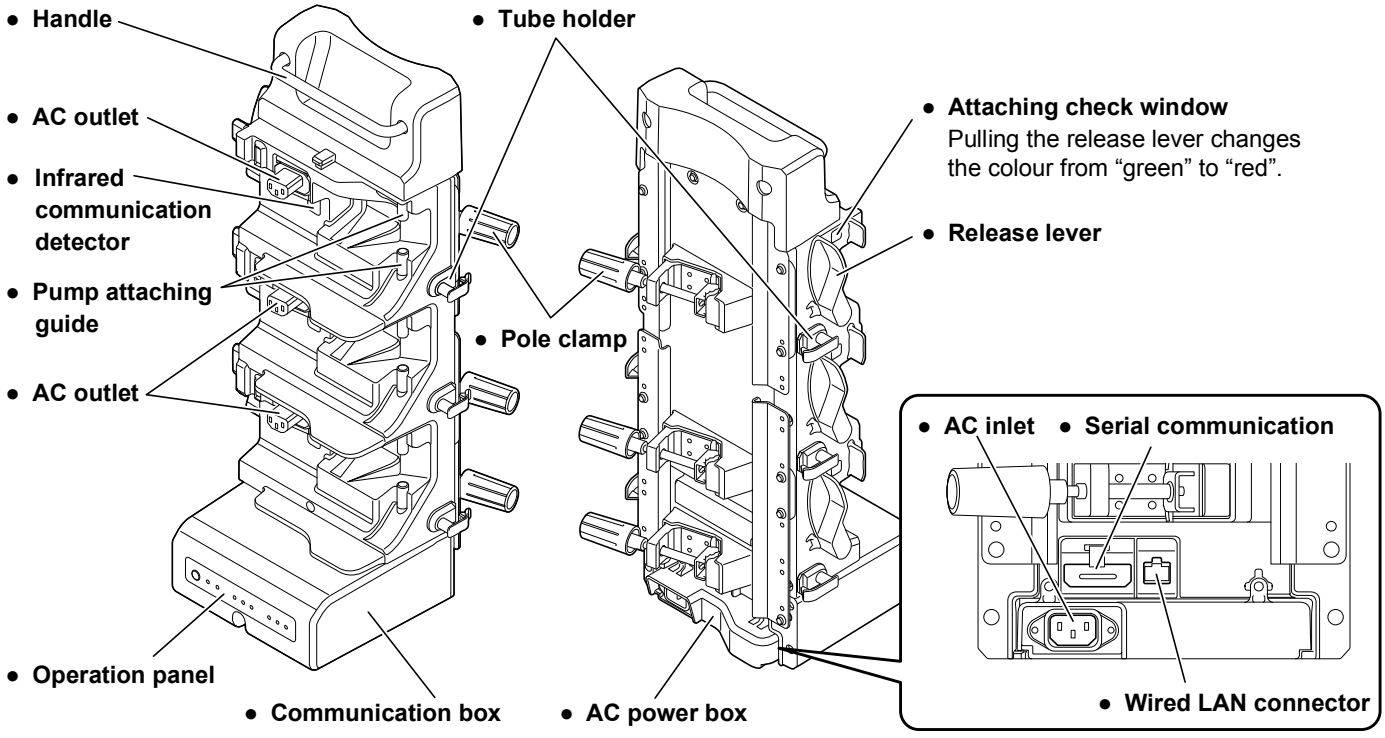
Alphanumeric characters are entered for x in the Catalogue number.

Features of the Product

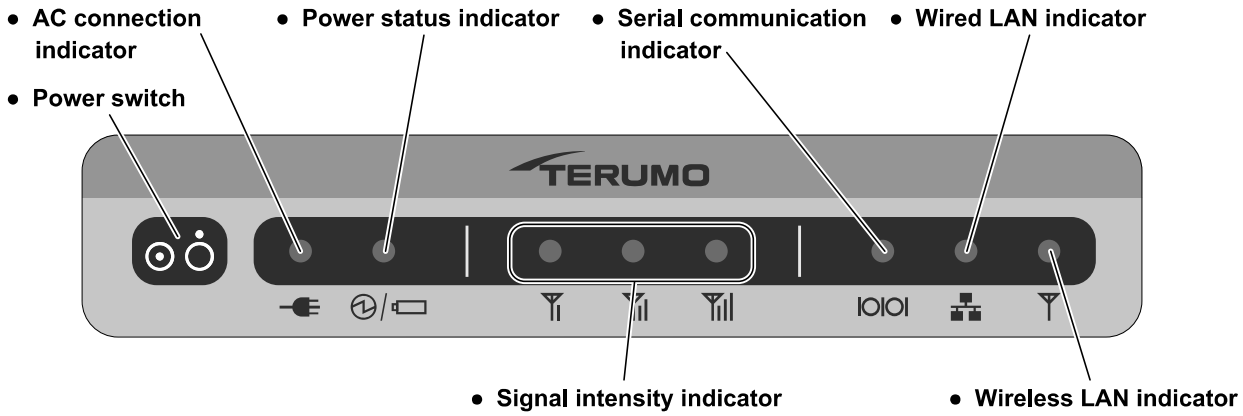
- Power supply to the combined racking system and the pumps
  The product enables up to two additional TERUFUSION Communication Rack System (Extension), which are sold separately, to be combined, and up to nine pumps to be attached and powered.
- Quick and easy to attach the pumps
  A pump can be attached in one step.
- Collection and accumulation of the operation statuses
  The operation statuses of the pump can be collected via infrared communication and accumulated for up to 255 minutes.
- External communication function (Data output in three methods)
  Data including the operation statuses of rack and pump can be output to an external device through the following communication functions: serial communication, wired LAN and wireless LAN.
- Power supply system
  The rack can be supplied with power in 2 ways; AC power supply and by the internal battery. The internal battery will automatically take over in case of AC power supply failure.
  The internal battery can provide approx. 5 hours of continuous operation (ambient temperature 25°C, new battery, at the time of full charge and no connection for external communication).
  (Note that the power supplied by the internal battery is for the operation of this product, it does not supply power to the pumps.)

Parts Description

Exterior Diagram



Operation Panel

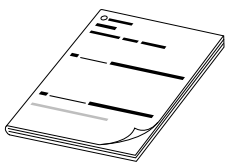


	Power switch	Turn the power ON/OFF.
	AC connection indicator	Connecting the AC power cable to the AC inlet lights the indicator.
	Power status indicator	Turning the power on by pressing the Power switch displays the charging status of the internal battery. Green lit: The internal battery is fully charged and is operating. Green flashing: The internal battery is being charged. Orange flashing: The internal battery is running low.
	Signal intensity indicator	Indicates the signal strength of the wireless LAN in 3 levels. Signal condition Poor → Strong If wireless LAN indicator only is lit, the wireless LAN is not connected.
	Serial communication indicator	Lit when serial communication is selected as the communication method.
	Wired LAN indicator	Lit when wired LAN is selected as the communication method.
	Wireless LAN indicator	Lit when wireless LAN is selected as the communication method.

If an indicator other than those listed above is lit, contact TERUMO trained service technicians.

Standard Accessory

Standard accessory supplied with this product.



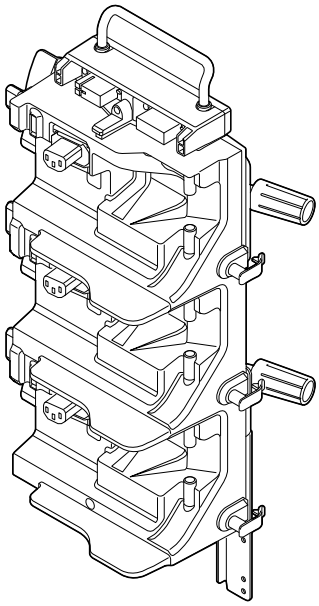
Instruction Manual

Optional Accessories

Optional accessories are sold separately.
The specifications and external appearance of the product may be changed without notice for the purpose of improvement.
For details, see the instruction manuals supplied with each product.

Name	Model	Catalogue number
TERUFUSION Communication Rack System (Extension)	TE-RS811	TE∗RS811N
TERUFUSION Drug Library Manager	TE-SW800	TE∗SW800BE
TERUFUSION Software Package	TE-SW800	TE∗SW800PE

- TERUFUSION Communication Rack System (Extension) (TE-RS811)



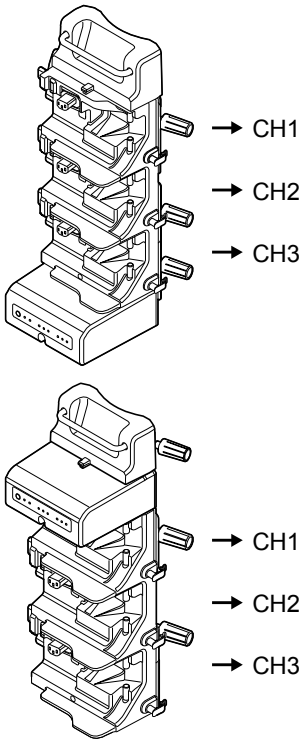
Notes

- Up to two TERUFUSION Communication Rack System (Extension) can be added, enabling up to nine pumps to be attached on the racks and supplied with power.
- When you wish to join the racks, contact TERUMO trained service technicians.

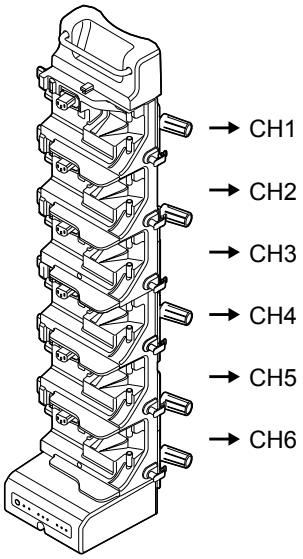
Position allocation of pumps in combined racks

For combined racks, the channels are set as follows:

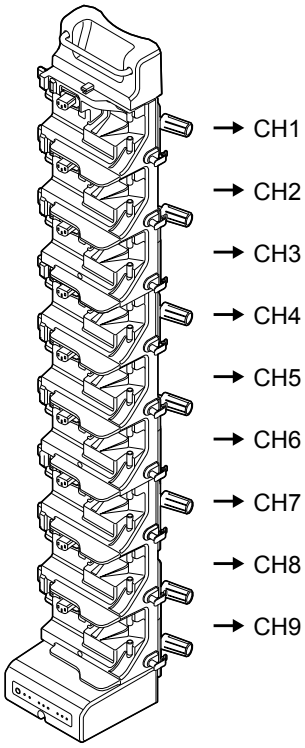
e.g.: When using one rack



e.g.: When using two combined racks



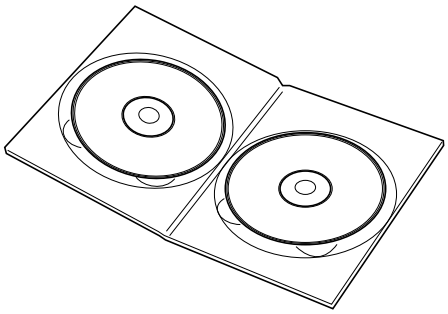
e.g.: When using three combined racks



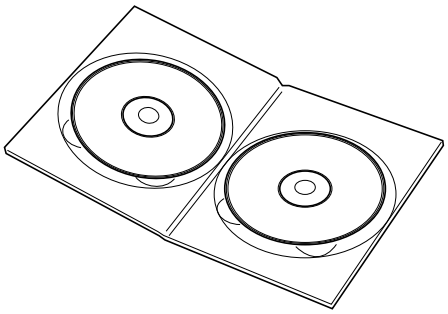
Notes

- The communication box can be attached to the top.
- For details, contact TERUMO trained service technicians.

- TERUFUSION Drug Library Manager (TE-SW800)



- TERUFUSION Software Package (TE-SW800)



Precautions

To ensure safe and correct use of this system, please be sure to observe all precautions.
Non-compliance with precautions and incorrect system use may result in damage or injury.
The following are signs used in this manual and their meanings:

Warning

This label preceding a precaution indicates that there will be a possible risk of death or personal injury if the precaution given is not complied with.

Caution

This label preceding a precaution indicates that there will be a possible risk of personal injury or property damage if the precaution given is not complied with.

Use

Warnings

- Since this product does not have an airtight structure, it should not be used or stored in an active gas environment (including sterilizer gas), nebulizer-sprayed environment, high-humidity environment, etc. It should not be submerged into water. [The electronic components inside the device are affected, and any subsequent damage and time degradation will cause failure of this product.]
- Periodically check that no malfunction is observed in the operation of this product and the devices being used. If any malfunction is observed, take appropriate actions, such as immediately stopping the operation. [This product is not equipped with the function that indicates that an alarm has been issued at the pumps.]
- The product should not be used or stored in a flammable environment. [This may lead to ignition or explosion of the product.]
- Attach this product to the IV pole with the pole being same diameter. [Otherwise this product may be damaged or drop.]

Cautions

- When attaching this product to the IV pole, check the withstand load and the stability. Do not release hands until securely fixed and confirmed. Also, when attaching a pump to this product, be sure to fix firmly. [Otherwise this product or the pump may drop or the IV pole, may be damaged.]
- When this product is fixed to IV pole, ensure that the IV pole is on a stable surface to prevent it from falling down.
- Do not use this product placed or laid on the floor or a desk. [The product may fall. Also, the drip-proof function cannot be guaranteed.]
- Disconnect the AC power cable from this product to remove it from the AC power source. Do not place this product in an area with obstacles that block the AC power cable from being disconnected.
- Do not use any pump other than that specified for this product. Read the instruction manual of the specified pump. [Using a pump other than that specified may not allow this product to work properly.]
- Use the AC power cable supplied with the pump. Connect to an AC outlet that is earthed at all times. [Using an AC power cable other than one supplied with the pump may result in failure of this product. In addition, if used without an earth connection, the electrical safety of this product cannot be guaranteed.]
- Attach the provided pole clamps to the pump before attaching it to the product. [Otherwise the pump cannot be properly fixed to the product and may drop.]
- When attaching the pump to this product, check that fingers, the tube attached to the pump or the cord of the drip sensor are not caught between this product and the pump.
- After attaching the pump to this product, check that the tube of the pump is not caught or tangled. [Otherwise the tube may be deformed or occluded, thus causing a flow rate error or Occlusion alarm.]
- When attaching/detaching a pump to/from the product, a sudden drop or oscillation may occur on the pump. Be careful about this. [A sudden drop or oscillation affects the accuracy of the flow rate of the pump and the alarm function.]
- When attaching/detaching a pump to/from the product, check that the pump does not contact another pump attached to the product. [Otherwise the pump may be damaged.]
- When attaching/detaching a syringe pump to/from the product, be very careful not to touch the syringe. [Touching the syringe may cause an unexpected operation of the syringe pump (alarm issuance, flow rate error, etc.).]
- When attaching/detaching a pump to/from the product, do not touch the LCD and the switches. [Otherwise the LCD of the pump may be damaged or an unexpected operation (power on/off, stop, start, rapid infusion, etc.) may occur.]

Cautions

- After attaching a pump on this product, check that the AC icon is lit on LCD of the pump. [The AC icon that is not lit indicates that the pump is operating on the battery, possibly causing the pump to become unavailable in case of emergency.]
- When detaching the pump with the infusion set from this product, check that the tube is not caught by the tube holder or other parts of the product. [If caught, the tube is pulled, possibly causing the IV pole to fall down or the tube to be damaged.]
- This product should not be brought into a control area for radiation devices/MRI or inside a hyperbaric oxygen therapy room. If this product is accidentally brought into such an environment, immediately stop using it and report to TERUMO trained service technicians.
- Since this product is precision equipment, it should not be used if it has received any impact (drop to floor, falling the IV pole, violent shock). Even though no fault is observed in the product appearance, the original functionality or performance (pump holding, power supply or the communication function) of this product may not be achieved due to internal damage. In such cases, inspection and checking are required.
- Use the AC supply with earth connection for normal use. The internal battery is an auxiliary power source in the case that AC power supply is not available such a during transportation, power failure, etc. [The internal battery of this product does not supply power to the pumps.]
- Before use, check the instruction manual of the medical supplies, medical equipment and combined equipment. (The IV pole, etc.)
- This product should only be operated by skilled personnel.
- Prior-to-use inspections must be conducted for this product. If any fault is observed, do not use this product and request an inspection and repair.
- In order to use the product safely, regularly conduct maintenance and inspection. [If an abnormality is found during any of the checkups, immediately stop using the product.]
- Attention is required not to apply any strong static electricity. [It may result in failure or malfunction.]
- Hold the handle of the TERUFUSION Communication Rack System (Model: TE-RS800N) to transport it. When the TERUFUSION Communication Rack System (Extension) (TE-RS811N) is combined with the TERUFUSION Communication Rack System (Model: TE-RS800), hold the back side or the bottom to transport them.
- In case of the first use after purchase or after a long unused period, connect this product to AC power supply (earthed) and provide a sufficient recharge (15 hours or more) while it is tuned off. [If not sufficiently recharged, it may not be able to operate on the internal battery during a power failure, etc.]
- Even within the use conditions, this product should not be used under conditions that cause a sharp temperature change. [Condensation inside the device results in damage and time degradation, and thus the original functionality or performance of this product may not be achieved.]
- The communication cable or AC power cable used for this product should not be pinched with forceps, equipment e.g. caster or punctured with a needle. In addition, when the cables are laid on the floor, they should not be stepped on by a caster, etc. [Damaging the cables may lead to electric shock or fire. In addition, the original functionality or performance of this product will not be achieved.]
- This product should not be used in a place where vibration, dust, mist or corrosive gas occurs or in a place where the product is sprayed with liquid. If this product is sprayed with liquid, thoroughly wipe off the liquid with a dry soft cloth.
- Since dripping drug solution may result in a short circuit by wetting the AC outlet, make sure that the connecting section is not wet when connecting. If moisture is present, make sure that the AC power cable is plugged out, and then thoroughly wipe it off with a dry cloth immediately. [Since this product does not have a waterproof structure, the components inside may be affected, resulting in device failure.]
- When moving the product fixed to the IV pole, be careful with slopes and uneven surfaces on the floor, and make sure not to run over any cables. [The product may drop or the IV pole may fall down.]
- When this product is transported while it is in use, do not touch the switches, etc. [An unexpected operation (power on or off) may occur.]
- If not using the connector (for serial communication, etc.) of this product, put the attached cover on it.
- The operation panel (switch etc.) should not be pressed with excessive force and should not be picked or operated with a ball-point pen, nail, hard object, or sharp tip. [It may cause damage to or failure of the operation panel.]
- Do not disassemble, make alterations to, or repair this product (including actions that interfere with the functionality or performance such as taping the operation panel or a movable part). [It may result in failure, damage or device performance degradation for this product.]
- This product should be used only after the power supply is confirmed to be sufficient. [If the power supply is not sufficient, this product and the pumps operate on each internal battery, resulting in making it unavailable in emergency situations. In the case that the supply capability is exceeded by connecting this product, it may affect other equipment.]
- Time degradation of the internal battery will cause shorter operating time. It should be replaced every year.
- Do not block or contaminate the infrared communication detector of this product or the pump. [Communication may not be properly performed.]

Cautions

- When this product is turned off, the information on the pump attached on the product cannot be collected or accumulated.
- If this product is turned off or the internal battery is shut down, pump information that has been accumulated in this product is not saved.
- If the pump switch is operated within a short period of time (within approx. 3 seconds), the operation may not be recorded as the operating information. (Example: Repeating stop/start of the pump, or pressing momentarily the Purge switch)
- When using this product for long periods, turn off the power, and then turn it on again. [Otherwise the system may unexpectedly terminate.]
- This product is precision equipment. Do not turn on the product immediately after turning it off.
- When using devices (mobile phones, radio devices, radio knives, defibrillators, etc.) that emit an electromagnetic wave within the area of this product, they should be used as far away as possible and you should verify the normal operation of this product in the configuration it is used.
- When used within the vicinity area of a radio knife: Medical radio knives are surgical equipment for incision and coagulation by high energy radiofrequency current. When this product is used in combination within the vicinity area of a radio knife, check the following before use.
  (1) Radio knives have a different level of high-frequency noise emission depending on the types, and using old models (vacuum tube gap type) in combination should be particularly avoided as the noise levels from those are higher.
  (2) The distance from the radio knife cord (knife holder, knife cord and return electrode cord) and radio knife body to this product should be kept 25 cm or more.
  (3) The radio knife and this product should be operated by a power supply from a different system, and both should be securely earthed.
- When connecting this product with other medical equipment or network system (e.g. monitor system or CIS), ensure of its conformance to IEC 60601-1:2005+A1:2012 (EN 60601-1:2006+A1:2013) and IEC 60601-1-2:2007 (EN 60601-1-2:2007) prior to use in order to ensure the system safety.
- When connecting this product with a network system etc., ensure the system safety by checking the manufacturer specifications. In addition, use EMI compliant products for the connection cable.
- When using the external communication function, please note the system is more susceptible to the effect from a radio knife, mobile phone, radio device, defibrillator etc. Check regularly for the normal operation of this product.
- When using the wireless LAN communication function, the effect on other equipment by radio interference should be considered as may affect other equipment.
- When connecting this product with a network, the settings of this product and network setting need to be changed. Check with a vendor specialist and allow only the system administrator. [Failure to connect with correct settings may result in interfering with the original functionality or performance of this product and affecting the system of network setting.]
- Connection to a network including other devices may cause unpredicted and unacceptable risks for the patient, the user, or a third person. Be sure to identify, analyze, evaluate, and control those risks.
- Subsequent changes to the IT-network could introduce new risks and require additional analysis.
  - Changes to the IT-network include:
    (1) Changes in the IT-network configuration.
    (2) Connection of additional items to the IT-network.
    (3) Disconnecting items from the IT-network.
    (4) Update of equipment connected to the IT-network.
    (5) Upgrade of equipment connected to the IT-network.

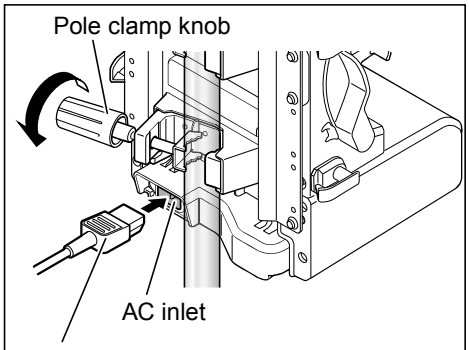
Operation Procedure

* Below, this product (Communication Rack System) will be referred as rack.

Prior to the TERUFUSION Communication Rack System being Used

Connect to the AC power supply and charge (15 hours or more) with the power turned off.

Attaching and Connecting the TERUFUSION Communication Rack System



1) Fix the rack firmly to the IV pole by using all the pole clamps on the back side of the product.

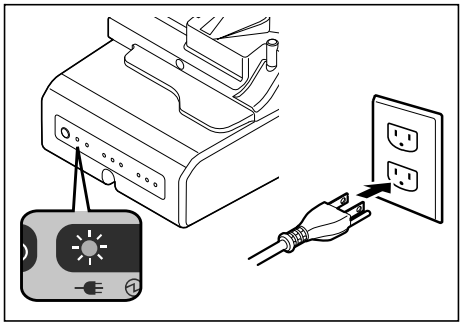
Warning

- Attach this product to the IV pole with the pole being same diameter. [Otherwise this product may be damaged or dropped.]

Caution

- Check the withstand load and the stability of the IV pole, and do not release hands until securely fixed and checked.

2) Firmly connect the AC power cable supplied with the pump into the AC inlet on the back of the AC power box.



3) Insert the plug into the AC outlet with an earth connection.

Check

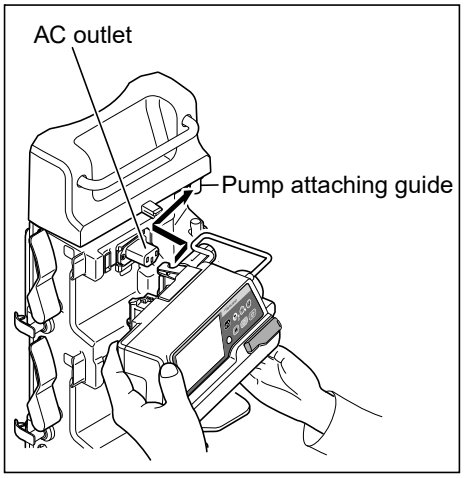
- The AC connection indicator of the communication box is lit green.

Caution

- Use the AC power cable supplied with the pump. Connect to an AC outlet that is earthed at all times. [Using an AC power cable other than one supplied with the pump may result in failure of this product. In addition, if used without an earth connection, the electrical safety of this product cannot be guaranteed.]

Attaching/Detaching a Pump

Attaching a Pump

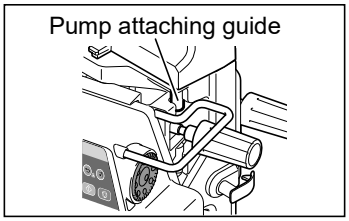


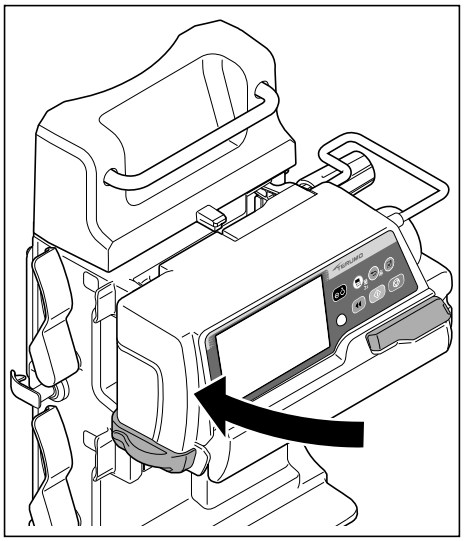
1) Remove the cover from the AC outlet.

Caution

- Keep the supplied cover attached to the AC outlet when not in use.

2) Hold the pump with both hands and align the pole clamp of the pump with the pump attaching guide.

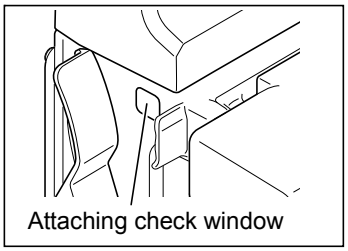




3) Push the pump into the holder.

Checks

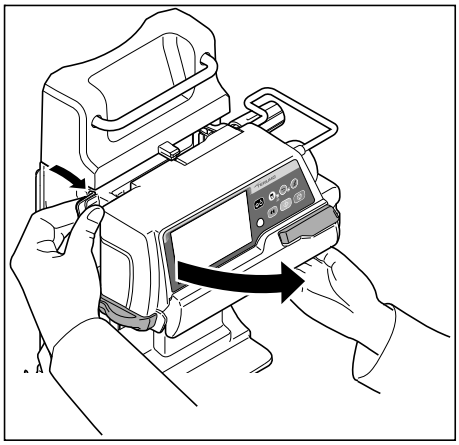
- The pump is pressed until it makes a click and is firmly fixed.
- The AC icon of the pump is lit.
- The Attaching check window is complete green.



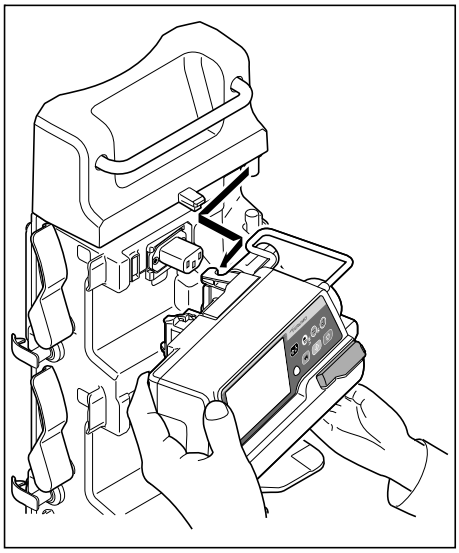
Note

- A “red” Attaching check window indicates that the pump is not firmly fixed. Repeat the procedure from step 1) to firmly attach the pump.

Detaching a Pump



1) Pulling the release lever makes the pump come out forward.

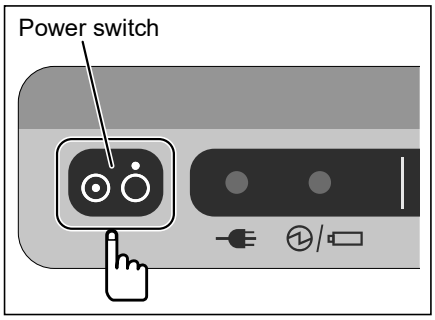


2) Hold the pump with both hands and detach it.

Cautions

- Use both hands to attach/detach a pump to/from the product.
- After attaching the pump on this product, check that the AC icon is lit on LCD of the pump. [The AC icon that is not lit indicates that the pump is operating on the battery, possibly causing the pump to become unavailable in the case of an emergency.]
- When attaching the pump to this product, check that fingers, the tube attached to the pump or the cord of the drip sensor are not caught between this product and the pump. [Otherwise the pump may drop from the product. Also, the cord, etc. may be damaged or the tube may be damaged or deformed, and therefore the accuracy of the flow rate of the pump and the alarm functions cannot be guaranteed.]
- Attach the provided pole clamps to the pump before attaching it to this product. [Otherwise the pump cannot be properly fixed to the product and may drop.]
- After attaching the pump to this product, check that the tube of the pump is not caught or tangled. [Otherwise the tube may be deformed or occluded, thus causing the flow rate error or Occlusion alarm.]
- When attaching/detaching a pump to/from the product, a sudden drop or oscillation may occur on the pump. Be careful about this. [A sudden drop or oscillation affects the accuracy of the flow rate of the pump and the alarm function.]
- When attaching/detaching a syringe pump to/from the product, be very careful not to touch the syringe. [Touching the syringe may cause an unexpected operation of the syringe pump (alarm issuance, flow rate error, etc.).]
- When attaching/detaching a pump to/from the product, do not touch the LCD and the switches. [Otherwise the LCD of the pump may be damaged or an unexpected operation (power on/off, stop, start, rapid infusion, etc.) may occur.]
- When attaching/detaching a pump to/from the product, check that the pump does not contact another pump attached to the product. [Otherwise the pump may be damaged.]
- When detaching the pump with the infusion set from this product, check that the tube is not caught by the tube holder or other parts of the product. [If caught, the tube is pulled, possibly causing the IV pole to fall down or the tube to be damaged.]
- Since dripping drug solution may result in a short circuit by wetting the AC outlet, make sure that the connecting section is not wet when connecting. If moisture is present, make sure that the AC power cable is plugged out, and then thoroughly wipe it off with a dry cloth immediately. [Since this product does not have a waterproof structure, the components inside may be affected, resulting in device failure.]

Communication Box



1) Turn on the communication box.

Press and hold the Power switch for 1 second or more to turn the power on.

Checks

- The self-check operation is properly conducted.
  1. The power status indicator on the operation panel lights once in orange.
  2. The signal intensity indicator, the serial communication indicator, the wired LAN indicator, and the wireless LAN indicator light once in green.
  3. Buzzer sounds.
- The power status indicator lights or flashes.
- When the pump is turned on, the communication icon is displayed on LCD.

Notes

- When the communication with the pump is established, the system automatically starts to collect and accumulate pump information.
- For details, contact TERUMO trained service technicians.

2) Turn off the communication box.

When the operation is completed, press and hold the Power switch for 1 second or more to turn the power off.

External Communication Functions

Overview

Use serial communication, wired LAN or wireless LAN to output the status of the rack and the attached pumps to a network system. (e.g. monitor system or CIS) (The status of the rack cannot be changed from a network system.) Ensure to use the network system and the rack are under the same communication conditions.

List of communication specifications

Communication method	External communication (RS-232C)	Wired LAN	Wireless LAN
Transmission rate	115200bps	100Mbps	1Mbps to 11Mbps
Data length	8 bits	–	–
Start bit	1 bit	–	–
Stop bit	1 bit	–	–
Parity check	None	–	–
Frequency (Europe)	–	–	2412 MHz (ch1) to 2472 MHz (ch13)
Encryption scheme	–	–	WPA2 (AES/TKIP), WPA (AES/TKIP), WEP
Operational mode	–	–	Infrastructure mode
LAN Standard	–	100Base-TX	IEEE802.11b

Notes

- Up to 255 minutes of pump information can be accumulated.
- Even if AC power is not supplied to this product, the internal battery can be used to collect and accumulate pump information.
- Operating time using the internal battery is decreased when using external communication.
- TERUMO cannot guarantee connections to external communication.
- RS-232C, wired LAN and wireless LAN cannot be used simultaneously.

Cautions

- When this product is connected with other devices, particularly note the following:
  1. When connecting this product with other medical equipment or network system (e.g. monitor system or CIS), ensure of its conformance to IEC 60601-1:2005+A1:2012 (EN 60601-1:2006+A1:2013) and IEC 60601-1-2:2007 (EN 60601-1-2:2007) prior to use in order to ensure the system safety.
  2. When connecting this product with a network system etc., ensure the system safety by checking the manufacturer specifications. In addition, use EMI compliant products for the connection cable.
  3. When using the external communication function, please note the system is more susceptible to the effect from a radio knife, mobile phone, radio device, defibrillator etc. Check regularly for the normal operation of this product.
  4. When using the wireless LAN communication function, the effect on other equipment by radio interference should be considered as may affect other equipment.
  5. When connecting this product with a network, the settings of this product and network setting need to be changed. Check with a vendor specialist and allow only the system administrator. [Failure to connect with correct settings may result in interfering with the original functionality or performance of this product and affecting the system of network setting.]
- If not using the connector (for serial communication, etc.) of this product, put the attached cover on it.
- If this product is turned off or the internal battery is shut down, pump information that has been accumulated in this product is not saved.
- When this product is turned off, pump information attached on this product cannot be collected or accumulated.
- Connection to a network including other devices may cause unpredicted and unacceptable risks for the patient, the user, or a third person. Be sure to identify, analyze, evaluate, and control those risks.
- Subsequent changes to the IT-network could introduce new risks and require additional analysis.
  - Changes to the IT-network include:
    1. Changes in the IT-network configuration.
    2. Connection of additional items to the IT-network.
    3. Disconnecting items from the IT-network.
    4. Update of equipment connected to the IT-network.
    5. Upgrade of equipment connected to the IT-network.

Network System Connection

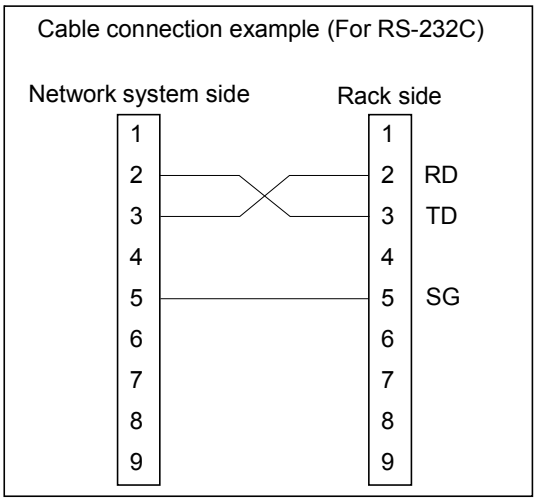
Procedure for Connecting the Network System

<RS-232C (For Network system)>

1) Check that all the devices are powered off.

2) Connect the cable.

3) Turn on the devices.

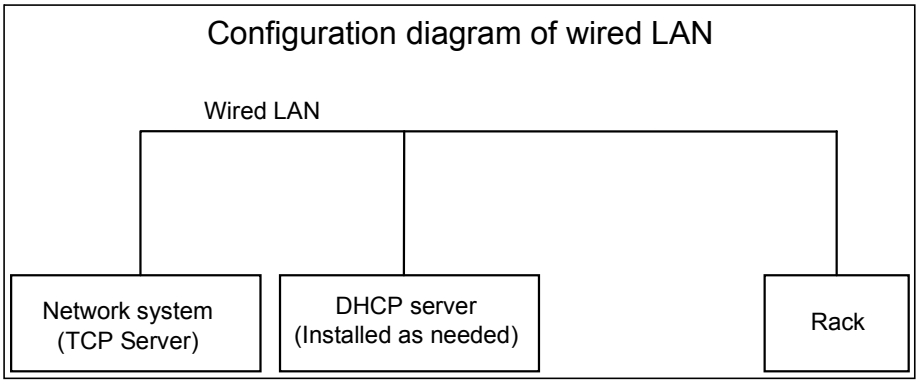


<Wired LAN>

1) Use the TERUFUSION Drug Library Manager or TERUFUSION Software Package to set the communication environment on the rack.

2) Select a communication environment setting to be used for the rack.

3) Enable the wired LAN of the rack.



Note

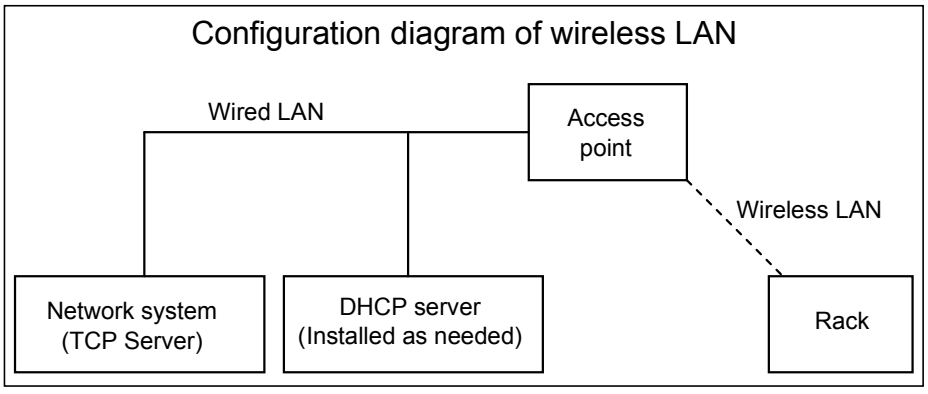
- For wired LAN communication, contact TERUMO trained service technicians.

<Wireless LAN>

1) Use the TERUFUSION Drug Library Manager or TERUFUSION Software Package to set the communication environment in the rack.

2) Select a communication environment setting to be used for the rack.

3) Enable the wireless LAN of the rack.

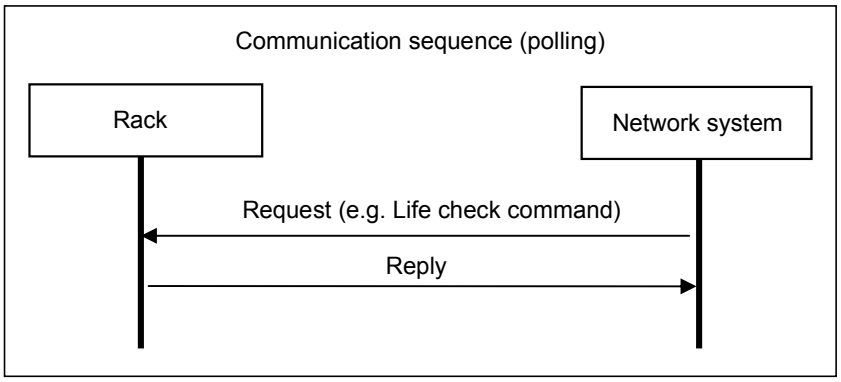


Note

- For wireless LAN communication, contact TERUMO trained service technicians.

Transmission Procedure

When the network system sends an instruction (REQ: REQUEST) to the rack, the rack replies (REP: REPLY) to the instruction. The rack communicates with the network system on the predefined network over RS-232C, wired LAN or Wireless LAN. The following shows an example of the communication sequence.



Notes

- If the received content has not been addressed to oneself, or if the data does not have a corresponding device ID (identification information), it should not be responded.
- RS-232C, wired LAN and wireless LAN cannot be used simultaneously.

Packet

<Packet format>

The following shows the packet format.

Packet format

STX 0x02	Packet data (xml format) (Arbitrary size)	CRC16 (4byte)	ETX 0x03

(Packet data and CRC16 use ASCII code.)

- STX
  0x02 (Fixed)
- Packet data
  Data division written in XML format. (For details, see “Packet data”.)
- CRC16
  Error detection calculation for the packet data division. The polynomial to be used is CRC-16-CCITT.
- ETX
  0x03 (Fixed)
- Measures for a packet error
  If the rack receives data without STX and/or ETX, the data previously received become invalid.
  If the rack receives data with the CRC error, the data previously received become invalid.

<Packet data>

For the XML declaration statement, only <?xml version="1.0"?> is allowed.
Do not use the DOCTYPE declaration.
A space, a tab and any control code including a line break are not allowed.
XML entity reference notation is not supported.

- **Request packet format**
  The following shows the request packet format used when a network system makes a request to the rack.

Request packet format

```
<?xml version="1.0"?>
<REQ>
    <DEVID></DEVID>  <SEQ_NO></SEQ_NO>
    <RAC_CMD></RAC_CMD>  <RAC_DAT></RAC_DAT>
</REQ>
```

Note: The tabs and line breaks are added for display purposes only. The actual code includes no tabs or line breaks.

- REQ tag:
  This tag and its element are required.
  This indicates a request packet from network system to the rack.
  The rack does not reply to a request without this tag.
- DEVID tag:
  This tag is required.
  This tag indicates the device ID of the rack.
  The rack replies when the device ID of the element matches that of the rack.
  When the network system obtains the device ID of the rack, the element is omitted. If element is omitted, the rack replies to only the DEVID tag without conditions, and sends its own device ID as the reply data.
- SEQ_NO tag
  This tag indicates the sequence number showing the relationship between the request and the response.
  As the element, a four-digit number is transmitted while being incremented for each packet transmission (The number after 9999 is 0000).
- RAC_CMD tag
  This tag indicates the command issued to the rack.
  The rack responds to one RAC_CMD tag at a time.
  For details on the element of a command, see page 17 “Command Format”.
- RAC_DAT tag
  This tag indicates the data sent to the rack.
  The rack responds to the RAC_DAT tag corresponding to a RAC_CMD tag.
  For details on data of the element, see page 17 “Command Format”.

- **Reply packet format**
  The following shows the reply packet format used when the rack replies to a request packet.

Reply packet format

```
<?xml version="1.0"?>
<REP>
    <DEVID></DEVID>  <SEQ_NO></SEQ_NO>
    <RAC_CMD></RAC_CMD>  <RAC_DAT></RAC_DAT>
</REP>
```

Note: The tabs and line breaks are added for display purposes only. The actual code includes no tabs or line breaks.

- REP tag:
  This tag indicates the reply from the rack to the request command sent by network system.
- DEVID tag:
  This tag indicates the device ID of the rack.
- SEQ_NO tag:
  This tag indicates SEQ_NO of the request packet received by the rack.
- RAC_CMD tag:
  This tag indicates the command from the rack responded to the request command.
  For details on the element commands, see page 17 “Command Format”.
- RAC_DAT tag:
  This tag indicates the data from the rack to the request command.
  For details on the element data, see page 17 “Command Format”.
- ERR tag:
  If the request command does not include the required tag, use the ERR tag instead of the RAC_CMD tag and the RAC_DAT tag.

ERR element

Value	Description
“1”	No required tag is included.

Command Format

For details on Command Format, contact TERUMO trained service technicians.

<Life check command>

This command is used to obtain the current status of the rack.

- Request
  RAC_CMD element: LIFECHK
  RAC_DAT element: None

Life check command (Request)

```
<?xml version="1.0"?>
<REQ>
  <DEVID>Device ID</DEVID>
  <SEQ_NO>Sequence No</SEQ_NO>
  <RAC_CMD>LIFECHK</RAC_CMD>
  <RAC_DAT></RAC_DAT>
</REQ>
```

- Reply
  RAC_CMD element: LIFECHK
  RAC_DAT element: The following shows the data structure of a response.

Life check command (Reply example when the drug library is used)

```
<?xml version="1.0"?>
<REP>
  <DEVID>Device ID</DEVID>
  <SEQ_NO>Sequence No</SEQ_NO>
  <RAC_CMD>LIFECHK</RAC_CMD>
  <RAC_DAT>
    <SOFTVER>Software Ver</SOFTVER>
    <RACTIME>Operation time</RACTIME>
    <RACSTATUS>Operating condition</RACSTATUS>
    <NOFORWARDING>Latest unsent pump information time</NOFORWARDING>
    <CH1>
      <DEVID>Pump device ID</DEVID>
      <NORMSTATUS>Operating condition</NORMSTATUS>
      <VTBISET>VTBI value</VTBISET>
      <DOSESET>
        <LIBVER>Drug library Ver</LIBVER>
        <LIBNUM>Drug library No</LIBNUM>
        <HOTCODE>Drug code</HOTCODE>
        <DOSENAME>Drug name</DOSENAME>
        <DOSEUNIT>Dose unit type</DOSEUNIT>
        <DOSELIMIT>Flow rate limit value</DOSELIMIT>
        <DOSESTATUS>Drug setting information</DOSESTATUS>
      </DOSESET>
    </CH1>
    :
    :
    <CH9>Pump information</CH9>
  </RAC_DAT>
</REP>
```

The following shows the descriptions of the underlined items above:

- SOFTVER tag:
  The software version of the rack
- RACTIME tag:
  The current time of the rack (“YYYY/MM/DD,hh:mm:ss”)

• RACSTATUS tag:
This tag indicates the information of the rack, such as the operating information.
Example of items description: “Rack operation status, 0, Power type, Battery status, 0”
The rack operation status indicates the response including error information.

Code of rack operation status

Value	Description
“OK0”	Normal operation
“BSY”	Inexecutable due to the BUSY status
“E00”	Failure due to a command or parameter error
“E01”	Failure because the execution condition was not met
“E02”	Failure due to internal processing error
“E03”	Response timeout due to the error tag, <ERR>, sent from outside
“E04”	Mismatching with the execution error internal data
“E0M”	Internal memory overflow
“SEQ”	Sequence number error

Code of power type

Value	Description
“0”	Battery operation
“1”	AC drive

Code of battery status

Value	Description
“0”	Battery operation, or fully charged
“1”	During charging
“2”	Low battery

• NOFORWARDING tag:
This tag indicates the latest time of unsent pump information (“YYYY/MM/DD,hh:mm”).
• CH tag:
This tag indicates the pump information for each channel from 1 to 9.
• DEVID tag:
This tag indicates the device ID of the pump.

Code of pump attached

Value	Description
(device ID)	Device ID of the pump attached in the channel
“X”	Unconnected
“?”	Unknown model. Or the detached status is detected for one minute (For pump information collecting command).

• NORMSTATUS tag:
This tag indicates the current pump operation status.
Example of items description: “Start seconds - end seconds, Operation status, 0, 0, Set flow rate, Increment in volume delivered, Alarm condition”
The unit of the set flow rate is mL/h.

Code of operation status

Value	Description
“0”	Stop
“1”	Start of solution delivery
“4”	Purge
“5”	Bolus
“6”	Power off
“7”	Error

Code of alarm status

Value	Description	Value	Description
“NO”	No alarm	“SV”	Maintenance timer
“BP”	Shutdown Notice	“BR”	Battery Replacement Time/Failure alarm
“OL”	Occlusion alarm (Lower for the infusion pump)	“DS”	Drip Sensor Dislocation alarm
“SY”	Syringe Displacement alarm	“CL”	Clip Detection Failure alarm
“PD”	Plunger Displacement alarm	“FF”	Free Flow alarm
“CD”	Clutch Displacement alarm	“AF”	Flow Rate Abnormality alarm
“CQ”	Link Interruption alarm	“EM”	Line Empty alarm
“IC”	Completion alarm	“AL”	Air-in-line alarm
“LB”	Battery alarm	“UO”	Occlusion alarm (upper)
“SR”	Start Reminder	“DO”	Door alarm
“NE”	Nearly Empty alarm	“PF”	Power Failure alarm
“OP”	Pressure alarm		

- VTBISET tag:
  This tag indicates the value of VTBI.
  Example of items description: “Voluem derivered,VTBI”
  The unit of the volume is mL.
- DOSESET tag:
  This tag indicates the current information of the drug library set for the pump.
- LIBVER tag:
  This tag indicates the current version of the drug library set for the pump.
- LIBNUM tag:
  This tag indicates the current number of the drug library set for the pump.
- HOTCODE tag:
  This tag indicates the current code of the drug library set for the pump.
- DOSENAME tag:
  This tag indicates the current name of the drug library set for the pump.
- DOSEUNIT tag:
  This tag indicates the current dose unit of the drug library set for the pump.

Code of dose unit

Value	Description
“00”	mL/h
“04”	μg/kg/min
“08”	mg/kg/h

- DOSELIMIT tag:
  This tag indicates the current upper and lower limits of the flow rate of the drug library set for the pump.
  Example of items description: “Upper limit of the flow rate (hard limit), Lower limit of the flow rate (hard limit), Upper limit of the flow rate (soft limit), Lower limit of the flow rate (soft limit)”
  For the unit of the flow rate, follow DOSEUNIT.
- DOSESTATUS tag:
  This tag indicates the current settings of the drug library set for the pump.
  Example of items description: “Start seconds - end seconds, Dilution, Dilution unit, dosage, weight”
  For the unit of the dosage, follow DOSEUNIT.
  The unit of the body weight is kg.

Code of dilution unit

Value	Description
“00”	For an invalid value
“12”	μg/mL
“13”	mg/mL

<Pump information collecting command>

This command is used to obtain the pump information saved in the rack. You can retrieve the information for a specified time or the last minute.

- Request
  RAC_CMD element: GETPMPLOG
  RAC_DAT element: The following shows the data structure of a request.

Pump information collecting command (Request)

```
<?xml version="1.0"?>
<REQ>
  <DEVID>Device ID</DEVID>
  <SEQ_NO>Sequence No</SEQ_NO>
  <RAC_CMD>GETPMPLOG</RAC_CMD>
  <RAC_DAT>
    <RECTIME>Time information of pump information</RECTIME>
  </RAC_DAT>
</REQ>
```

The following shows the descriptions of the underlined items above:

- RECTIME tag:
  This tag indicates the time of pump information that the rack is requested to send (“YYYY/MM/DD,hh:mm”).
  If no element is specified, the rack returns the pump information for the last minute.

- Reply
  RAC_CMD element: GETPMPLOG
  RAC_DAT element: The following shows the data structure of a response.

Pump information collecting command (Reply example when the drug library is used)

```
<?xml version="1.0"?>
<REP>
 <DEVID>Device ID</DEVID>
 <SEQ_NO>Sequence No</SEQ_NO>
 <RAC_CMD>GETPMPLOG</RAC_CMD>
 <RAC_DAT>
  <SOFTVER>Software Ver</SOFTVER>
  <RACTIME>Operation time</RACTIME>
  <RACSTATUS>Operating condition</RACSTATUS>
  <NOFORWARDING>Latest unsent pump information time</NOFORWARDING>
  <RECTIME>Time information of pump information</RECTIME>
  <CH1>
   <DEVID>Pump device ID</DEVID>
   <ADDUPVOL>Increment of volume delivered</ADDUPVOL>
   <HISTORY>Detailed log information</HISTORY>
   <PREHISTORY>Detailed log information one minute ago</PREHISTORY>
   <DOSELOG>
    <LIBVER>Drug library Ver</LIBVER>
    <LIBNUM>Drug library No</LIBNUM>
    <HOTCODE>Drug code</HOTCODE>
    <DOSENAME>Drug name</DOSENAME>
    <DOSEUNIT>Dose unit type</DOSEUNIT>
    <DOSELIMIT>Flow rate limit value</DOSELIMIT>
    <DOSEADDUP>Volume delivered of increments of the drug above</DOSEADDUP>
    <DOSEHIST>Period during which the drug above is selected</DOSEHIST>
   </DOSELOG>
  </CH1>
  :
  :
  <CH9>Pump information</CH9>
 </RAC_DAT>
</REP>
```

The following shows the descriptions of the underlined items above:

- SOFTVER tag:
  The software version of the rack
- RACTIME tag:
  The current time of the rack (“YYYY/MM/DD,hh:mm:ss”)
- RACSTATUS tag:
  This tag indicates the information on the rack, such as the operating information.
  Example of items description: “Rack operation status, 0, Power type, Battery status, 0”
  The rack operation status indicates the response including error information.
- NOFORWARDING tag:
  This tag indicates the latest time of unsent pump information (“YYYY/MM/DD,hh:mm”).
- RECTIME tag:
  This tag indicates the time of pump information that the rack responds (“YYYY/MM/DD,hh:mm”).
- CH tag:
  This tag indicates the pump information for each channel from 1 through 9.
  - DEVID tag:
    This tag indicates the device ID of the pump.
  - ADDUPVOL tag:
    This tag indicates the volume delivered for one minute at the channel in mL.
  - HISTORY tag:
    This tag indicates the operation status of the pump attached in the channel for one minute specified in RECTIME.
    Example of items description (for other than “purge”): “Start seconds - end seconds, Operation status, 0, 0, Set flow rate, Increment in volume delivered, Alarm status;”
    Example of items description (for “purge”): “Start seconds - end seconds, Operation status, 0, 0, 0.00, Increment in volume delivered during purge, Alarm status;”
    For details on the operation status and the alarm status, see “Command format <Life check command> NORMSTATUS tag”.
    The unit of the increment in volume delivered is mL.

- PREHISTORY tag:
  This tag indicates the last HISTORY information for one minute before the time specified in RECTIME.
- DOSELOG tag:
  This tag repeats a set of the following tags, from LIBVER through DOSEHIST, at every time a drug library is newly selected:
  - LIBVER tag:
    This tag indicates the current version of the drug library set for the pump.
  - LIBNUM tag:
    This tag indicates the current number of the drug library set for the pump.
  - HOTCODE tag:
    This tag indicates the current code of the drug library set for the pump.
  - DOSENAME tag:
    This tag indicates the current name information of the drug library set for the pump.
  - DOSEUNIT tag:
    This tag indicates the current dose unit of the drug library set for the pump.
  - DOSELIMIT tag:
    This tag indicates the current upper and lower limits of the flow rate of the drug library set for the pump.
    Example of items description: “Upper limit of the flow rate (hard limit), Lower limit of the flow rate (hard limit), Upper limit of the flow rate (soft limit), Lower limit of the flow rate (soft limit)”
    For the unit of the flow rate, follow DOSEUNIT.
  - DOSEADDUP tag:
    This tag indicates the volume delivered in mL during the period when the drug library is selected.
  - DOSEHIST tag:
    This tag repeats the following information whenever the setting of the drug library is changed.
    Example of items description: “Start seconds - end seconds, Dilution, Dilution unit, dosage, weight”
    See “Command format <Life check command> DOSESTATUS tag”.

<Pump information deleting command>

This command is used to delete all the pump information saved in the rack, and to set the time.

- Request
  RAC_CMD element: CLRPMPLOG
  RAC_DAT element: The following shows the data structure of a request.

Pump information deleting command (Request)

```
<?xml version="1.0"?>
<REQ>
  <DEVID>Device ID</DEVID>
  <SEQ_NO>Sequence No</SEQ_NO>
  <RAC_CMD>CLRPMPLOG</RAC_CMD>
  <RAC_DAT>
    <TIME>Time setting information</TIME>
  </RAC_DAT>
</REQ>
```

- TIME tag:
  This tag indicates the time that the rack is requested to set to (“YYYY/MM/DD,hh:mm:ss”).
  To not set the time, do not include this tag.

• Reply
RAC_CMD element: CLRPMPLOG
RAC_DAT element: The following shows the data structure of a response.

Pump information deleting command (Reply)

```
<?xml version="1.0"?>
<REP>
  <DEVID>Device ID</DEVID>
  <SEQ_NO>Sequence No</SEQ_NO>
  <RAC_CMD>CLRPMPLOG</RAC_CMD>
  <RAC_DAT>
    <SOFTVER>Software Ver</SOFTVER>
    <RACTIME>Operation time</RACTIME>
    <RACSTATUS>Operating condition</RACSTATUS>
    <NOFORWARDING>Latest unsent pump information time</NOFORWARDING>
  </RAC_DAT>
</REP>
```

The following shows the descriptions of the underlined items above:
• SOFTVER tag:
The software version of the rack
• RACTIME tag:
The current time of the rack (“YYYY/MM/DD,hh:mm:ss”)
• RACSTATUS tag:
This tag indicates the information of the rack, such as the operating information.
Example of items description: “Rack operation status, 0, Power type, Battery status, 0”
The rack operation status indicates the response including error information.
• NOFORWARDING tag:
This tag indicates the time of pump information that has not been sent (“YYYY/MM/DD,hh:mm”).

Explanation of Transmitted and Received Data

<Example of operation flow>
The following procedure shows an example of the operation when a network system communicates with the rack.
This is an operation example in the case where the device starts to communicate, and periodically collects the pump information saved by the rack.

- Connect the pump and AC cable to this product, and press the Power switch of the communication box to turn on.
- Check that the rack starts. Request a device ID to obtain.
- Send <Life check command>, and check the time of the rack.
  If the time of the rack is not correct, the pump information is not saved with the correct time. Send <Pump information deleting command>, and set the time.
  (In such case, the saved information is deleted after the power is turned on. Retrieve the information in advance.)
  1) To check current pump information, send <Life check command>.
  2) To obtain past pump information, specify the time, and send <Pump information collecting command>.
     To obtain any other past information, specify the time again, and send <Pump information collecting command>.

<Example of operation flow data>
Taking the operation flow shown above as an example, the following shows a typical example of the communication data:

1. Device ID request (network system → rack)

Data example

```
[STX]<?xml version="1.0"?><REQ><DEVID></DEVID></REQ>8411[ETX]
```

Note) [STX]: 0x02, [ETX]: 0x03

* In this case, CRC is “8411”.

2. Device ID reply (rack → network system)

Data example

```
[STX]<?xml version="1.0"?><REP><DEVID>00010102000000120501000 7</DEVID></REP>A31F[ETX]
```

Note) [STX]: 0x02, [ETX]: 0x03

* This is an example of the reply where the device ID is “00010102000000120501000 7”.
  In this case, CRC is “A31F”.

3. Life check command request (network system → rack)

Data example

```
[STX]<?xml version="1.0"?><REQ><DEVID>00010102000000120501000 7</DEVID><SEQ_NO>1234</SEQ_NO><RAC_
CMD>LIFECHK</RAC_CMD><RAC_DAT></RAC_DAT></REQ>37fb[ETX]
```

Note) [STX]: 0x02, [ETX]: 0x03

* This is a request example when the device ID is “00010102000000120501000 7” and the sequence number is “1234”.
  In this case, CRC is “37fb”.

4. Life check command reply (rack → network system)

Data example

```
[STX]<?xml version="1.0"?><REP><DEVID>00010102000000012050100 07</DEVID><SEQ_NO>1234</
SEQ_NO><RAC_CMD>LIFECHK</RAC_CMD><RAC_DAT><SOFTVER>0045</SOFTVER><RACTI
ME>2017/03/06,11:24:57</RACTIME><RACSTATUS>OK0,0,1,0,0</RACSTATUS><NOFORWARDING>2017/03/06,11:23</
NOFORWARDING><CH1><DEVID>X</DEVID></CH1><CH2><DEVID>X</DEVID></CH2><CH3><DEVID>X</
DEVID></CH3><CH4><DEVID>00010050000000160101012 1</DEVID><NORMSTATUS>55-55,0,0,0,0.00,0.00,NO;</
NORMSTATUS><VTBISET>0.00,0.0</VTBISET></CH4><CH5><DEVID>00010070000000160401012 0</
DEVID><NORMSTATUS>55-55,0,0,0,0.00,0.00,NE;</NORMSTATUS><VTBISET>0.00,0.0</VTBISET></
CH5><CH6><DEVID>00010070000000160401011 9</DEVID><NORMSTATUS>55-55,0,0,0,0.00,0.00,NO;</
NORMSTATUS><VTBISET>0.00,0.0</VTBISET></CH6><CH7><DEVID>X</DEVID></CH7><CH8><DEVID>X</DEVID></
CH8><CH9><DEVID>X</DEVID></CH9></RAC_DAT></REP>7B85[ETX]
```

Note) [STX]: 0x02, [ETX]: 0x03

* This is a response example in the case where the pump with the Nearly Empty alarm (device ID: “00010070000000160401012 0”) is installed during the rack is stopped at CH5, and the unsent pump information as of 2017/03/06,11:23 is saved.
  In this case, CRC is “279F”.

5. Pump information deleting command request (network system → rack)

Data example

```
[STX]<?xml version="1.0"?><REQ><DEVID>00010102000000120501000 7</DEVID><SEQ_NO>1235</SEQ_NO><RAC_
CMD>CLRPMPLOG</RAC_CMD><RAC_DAT><TIME>2017/03/06,12:47:30</TIME></RAC_DAT></REQ>4E39[ETX]
```

Note) [STX]: 0x02, [ETX]: 0x03

* This is a request example in the case where the pump information is deleted and the time is set to “2017/03/06,12:47:30”.
  In this case, CRC is “4E39”.

6. Pump information deleting command reply (rack → network system)

Data example

[STX]<?xml version="1.0"?><REP><DEVID>00010102000000120501000 7</DEVID><SEQ_NO>1235</SEQ_NO><RAC_CMD>CLRPMPLOG</RAC_CMD><RAC_DAT><SOFTVER>0045</SOFTVER><RACTIME>2017/03/06,12:47:30</RACTIME><RACSTATUS>OK0,0,1,0,0</RACSTATUS><NOFORWARDING>NONE</NOFORWARDING></RAC_DAT></REP>925B[ETX]

Note) [STX]: 0x02, [ETX]: 0x03

* This is a reply example in the case where the pump information is deleted and the time is set to “2017/03/06,12:47:30”.
  In this case, CRC is “925B”.

7. Pump information collecting command request (network system → rack)

Data example

[STX]<?xml version="1.0"?><REQ><DEVID>00010102000000120501000 7</DEVID><SEQ_NO>1236</SEQ_NO><RAC_CMD>GETPMPLOG</RAC_CMD><RAC_DAT><RECTIME>2017/03/06,12:52</RECTIME></RAC_DAT></REQ>ED78[ETX]

Note) [STX]: 0x02, [ETX]: 0x03

* This is a request example in the case where the rack is requested to send the pump information as of “2017/03/06,12:52”.
  In this case, CRC is “ED78”.

8. Pump information collecting command reply (rack → network system)

Data example

[STX]<?xml version="1.0"?><REP><DEVID>00010102000000120501000 7</DEVID><SEQ_NO>1236</SEQ_NO><RAC_CMD>GETPMPLOG</RAC_CMD><RAC_DAT><SOFTVER>0045</SOFTVER><RACTIME>2017/03/06,12:54:09</RACTIME><RACSTATUS>OK0,0,1,0,0</RACSTATUS><NOFORWARDING>2017/03/06,12:53</NOFORWARDING><RECTIME>2017/03/06,12:52</RECTIME><CH1><DEVID>X</DEVID></CH1><CH2><DEVID>X</DEVID></CH2><CH3><DEVID>X</DEVID></CH3><CH4><DEVID>00010050000000160101012 1</DEVID><ADDUPVOL>0.00</ADDUPVOL><HISTORY>-,0,0,0,0.00,0.00,NO;</HISTORY><PREHISTORY>-,0,0,0,0.00,0.00,NO;</PREHISTORY></CH4><CH5><DEVID>00010070000000160401012 0</DEVID><ADDUPVOL>1.40</ADDUPVOL><HISTORY>-38,0,0,0,0.00,0.00,NO;39-,1,0,0,240.00,1.40,NO;</HISTORY><PREHISTORY>-,0,0,0,0.00,0.00,NO;</PREHISTORY><DOSELOG><LIBVER>0119</LIBVER><LIBNUM>22</LIBNUM><HOTCODE>00000123456856</HOTCODE><DOSENAME>pV_8692</DOSENAME><DOSEUNIT>08</DOSEUNIT><DOSELIMIT>300,2,50,10</DOSELIMIT><DOSEADDUP>1.40</DOSEADDUP><DOSEHIST>30-38,5.00,13,20.00,60.0;39-,5.00,13,20.00,60.0;</DOSEHIST></DOSELOG></CH5><CH6><DEVID>00010070000000160401011 9</DEVID><ADDUPVOL>0.00</ADDUPVOL><HISTORY>-,0,0,0,0.00,0.00,NO;</HISTORY><PREHISTORY>-,0,0,0,0.00,0.00,NO;</PREHISTORY></CH6><CH7><DEVID>X</DEVID></CH7><CH8><DEVID>X</DEVID></CH8><CH9><DEVID>X</DEVID></CH9></RAC_DAT></REP>6637[ETX]

Note) [STX]: 0x02, [ETX]: 0x03

* This is a reply example in the case where the rack is requested to send the pump information as of “2017/03/06,12:52”.
  This is a response example in the case where the drug library “pV_8692” is set in the pump (device ID: “00010070000000160401012 0”) installed in ch5, and solution delivery at 240.00mL/h (dosage: 20.00mg/kg/h, dilution: 5.00mg/mL, body weight: 60.0kg) started at 12:52:39.
  In this case, CRC is “6637”.

Measures when an Error Occurs

If either of the following errors occurs, execute resending. If no response to the resending request is returned, the communication is considered to be disconnected.

- If STX/ETX does not exist or the CRC error is received, the rack sends no response.
- If the device ID differs from that of the rack, the rack sends no response.

Either of the following errors occurs because the data sent to the rack is not suitable for the status of the rack. In this case, execute resending with the correct data accordingly.

- If the required tag does not exist (no start tag or end tag), the rack returns an error with the ERR tag.
- If no element of the SEQ_NO, RAC_CMD, or RAC_DAT tag exists or the element is not correct, the rack returns an error with the RACSTATUS tag.

After Use

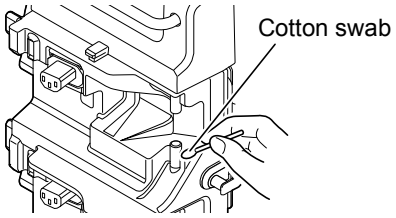
Cleaning

- Clean this product by regularly. When disinfecting, use a gauze (damp with antiseptic solution) to wipe off the product, and wipe off the antiseptic solution with a gauze (damp with cold/lukewarm water), and then thoroughly wipe off any moisture with a dry soft cloth. Follow the instruction manual for the dilution ratio. Examples of disinfectants (ingredient names) which can be used are listed below.

Examples of Cleaning Disinfectants (Ingredient Names)

Ingredient Name	Dilution (e.g.)
Chlorhexidine gluconate	5%
Benzalkonium chloride	10%
Ethanol	76.9 - 81.4vol%

When using disinfectant, follow the instruction manual of each disinfectant (regarding degree of dilution, etc.).



Cautions

- When disinfecting, do not use a sterilizer. Use a gauze (damp with antiseptic solution) to wipe off the product, and wipe off the antiseptic solution with a gauze (damp with cold/lukewarm water), and then thoroughly wipe off any moisture with a dry soft cloth. For the dilution ratio of the antiseptic solution, refer to the instructions for use of the antiseptic solution. Examples of the available antiseptic solutions (component name) are as follows:
  Chlorhexidine gluconate/Benzalkonium chloride/Ethanol
- Before cleaning, always turn off the power and disconnect the AC power cable, communication cable and pump. [Failure to do so may lead to failure of this product or electric shock etc.]
- If any adhered drug solution is present, the movable parts, such as the release lever, may not properly operate. If any drug solution is present, immediately conduct cleaning such as wiping off the dirt with a cotton swab. (See figure above.)
- Do not wipe with undesignated alcohol, other organic solvents such as thinner, or povidone-iodine. Using organic solvent or any antiseptic solution other than those permitted for use may result in damage to or failure of this product.
- Do not use any replacement parts other than those specified. [The original functionality or performance of this product may not be achieved.]
- Do not use an electric dryer to dry this product. [This product may be damaged.]
- Do not wash this product with running water or immerse in water. [Since this product does not have a waterproof structure, it may result in damage or failure.]
- Do not store the battery of this product in a discharge status.
- Before wiping off dirt, remove the pumps, the AC power cable and the communication cable from the product. [If drug solution or other liquid adheres to the AC outlet, a short circuit may occur.]

Storage

Warning

- The product should not be used or stored in a flammable environment. [This may lead to ignition or explosion of the product.]

Cautions

- Do not store this product in a place with a high level of vibration, dust, mist or corrosive gas.
- Do not expose this product to the sunlight or ultraviolet irradiation for a long time. [The exterior may experience colour change, deformation or deterioration.]
- Do not store this product in a place where an environment of atmospheric pressure, temperature, humidity, ventilation, salt content or sulfur content may cause an adverse effect.
- Do not store this product in a storage area for chemicals or in a place that generates gases.

Cautions

- When transporting this product, avoid any shock, vibration, dust and/or high temperatures and high humidity. Transport conditions: Temperature: -20 to 60°C, Humidity: 10 to 95%RH (non-condensing), Atmospheric pressure: 50 to 106kPa (500 to 1060hPa)

Maintenance and Inspections

In order to ensure safe use of the product for an extended time, regularly conduct maintenance and inspection. If a fault is found during any of the checkups, immediately stop using the product and contact TERUMO trained service technicians.

Cautions

- Since this product is precision equipment, it should not be used if it has received any impact (drop to floor, falling the IV pole, violent shock). Even though no fault is observed in the product appearance, the original functionality or performance (pump holding, power supply or the communication function) of this product may not be achieved due to internal damage. In such cases, inspection and checking are required.
- In order to use the product safely, regularly conduct maintenance and inspection. If a fault is found during any of the checkups, immediately stop using the product.
- Do not disassemble, make alterations to, or repair this product (including actions that interfere with the functionality or performance such as taping the operation panel or a movable part). [It may result in failure, damage or device performance degradation for this product.]

Users Inspection

Pre-use Inspection

1) The appearance of the body is not damaged.

2) The movable parts including the AC outlet move smoothly.

(Check when no current is being supplied to the product.)

3) When the release lever is not operated, the colour of the Attaching check window changes to “green”; when operated, to “red”.

4) This product can be firmly fixed to the IV pole with no rattling.

5) The pumps can be firmly fixed to this product with no rattling.

6) Connecting the AC power cables lights the AC connection indicator.

7) Turning on the Power switch starts the following self-check operation:

1. The power status indicator on the operation panel lights once in orange.
2. The signal intensity indicator, the serial communication indicator, the wired LAN indicator, and the wireless LAN indicator light once in green.
3. Buzzer sounds.

8) The internal battery is sufficiently charged.

The power status indicator is not lit orange.

Maintenance and Inspection Items by TERUMO Certified Service Technicians

Periodic Maintenance

Perform a periodic maintenance inspection to ensure safe operation and the longest possible life of the rack. Contact your local distributor for details of the maintenance inspection.

From TERUMO

When ordering repairs or maintenance inspections, if there is a possibility of infection, disinfect the product in advance.

Battery Replacement

Periodically replaced parts

Over period time, the battery will gradually deteriorate. Please see chart below for replacement schedule.

Part name	Elapsed years
Battery (internal battery)	1 - 1.5 year

- Depending on frequency of use and usage environment, the time for replacement for each part may change and replacement of parts other than those scheduled for replacement may also be required. Consult TERUMO trained service technicians regarding necessity and conduction of replacement.
- The life span of the equipment is at least 6 years in case of standard use.

Fuse replacement

This product incorporates a fuse inside the structure. For replacement, contact TERUMO trained service technicians.

Waste and Recycle

Electrical and electronic equipment (EEE) and batteries contain materials, components and substances which can be dangerous to the environment and harmful to human health if waste electrical and electronic equipment (WEEE) and batteries are not disposed of correctly.

Waste electrical and electronic equipment and batteries must not be disposed of with the remainder of unseparated waste, but should instead be collected separately. In this way, the environmental impact associated with disposal of WEEE and batteries is reduced and there will be more opportunity for reusing, recycling and recovering WEEE and recycling batteries.

The Ni-MH battery should be removed from the equipment by trained Terumo service technicians.
Please contact your local distributor.

At the end of life, please dispose of this equipment and batteries according to your local regulations. Contact your local distributor or municipality for details of the available collection schemes.

廢電池請回收

Troubleshooting

Keyword	Occurrence	Cause	Action
Unable to charge the battery Not operate on AC power	• Connecting to the AC power does not charge the battery. • The AC connection indicator does not light.	The AC power cable is not properly connected to the AC inlet.	Check the connection of the AC power cable.
		The AC power cable is damaged.	Replace the AC power cable.

Keyword	Occurrence	Cause	Action
Battery	• The indication of the power status indicator does not match the standard of the operating time (5 hours of continuous operation). • The power status indictor does not light green. (After charging for 15 hours or more)	The battery has deteriorated or failed.	Contact TERUMO trained service technicians.
Indicator	After the power is turned on, the indicator does not light or flash.	The equipment may have failed.	Contact TERUMO trained service technicians.
Infrared communication	The communication icon of the pump does not light.	The infrared communication detector is not clean.	Clean by following page 25 “Cleaning”.
		The pump is not properly attached.	Attach the pump properly.
		The communication box is not turned on.	Turn on the communication box.
		The pump is not turned on.	Turn on the pump.
		The equipment may have failed.	Contact TERUMO trained service technicians.
External communication	No communication is available. (RS-232C)	The baud rate, stop bit, parity or device ID may not be appropriate.	Check the settings of the connection target or this product.
		An incorrect cable is used.	Use the specified cable.
		Loose connection of Serial communication connector	Re-connect the cable properly.
		The equipment may have failed.	Contact TERUMO trained service technicians.
	No communication is available. (Wired LAN)	IP address, subnet mask, default GW, IP address of the connection target, communication port, or device ID may not be appropriate.	Check the settings of the connection target or this product.
		An incorrect cable is used.	Use the specified cable.
		Loose connection of Wired LAN connector	Re-connect the cable properly.
		The equipment may have failed.	Contact TERUMO trained service technicians.
	Wired LAN Indicator flashes.	The equipment may have failed.	Contact TERUMO trained service technicians.
	No communication is available. (Wireless LAN)	SSID, encryption setting, IP address, subnet mask, default GW, IP address of the connection target, communication port, or device ID may not be appropriate.	Check the settings of the connection target or this product.
		The equipment may have failed.	Contact TERUMO trained service technicians.
	Wireless LAN Indicator flashes.	The equipment may have failed.	Contact TERUMO trained service technicians.
Attaching of the pump	The pump cannot be attached.	The pole clamp of the pump is not correctly attached.	Re-attach the pole clamp correctly.
		A drug solution is adhered to the movable part.	Clean by following page 25 “Cleaning”.

Specifications

Product name		TERUFUSION Communication Rack System
Model		TE-RS800
Catalogue number		TE∗RS800N, TE∗RS800N03
Functions		• Power output: Supplies AC power source to the attached pumps. • Power status display: Displays the power on/off status and the internal battery charging status (when the power is on). • Communication method selection/display: Enables users to select a method of communicating with an external device, and displays the communication method. • Signal intensity indication: Indicates the signal intensity of the wireless LAN. • Pump status recording/transmission: Periodically monitors and records the statuses of the pump, and transmits them to an external device. • Command pass-through: Enables communication between an external device and a pump via this product.
Communication function		Infrared communication is available with a pump having the infrared communication function (Max. 9 channels). Communication with an external device is available via serial communication. Communication with an external device is available via wired LAN. Communication with an external device is available via wireless LAN.
Use conditions		Temperature: 5 to 40°C, Humidity: 20 to 90%RH (no condensation), Atmospheric pressure: 70 to 106kPa (700 to 1060hPa)
Storage conditions[*1]		Temperature: -20 to 45°C, Humidity: 10 to 95%RH (no condensation), Atmospheric pressure: 50 to 106kPa (500 to 1060hPa)
Transport conditions		Temperature: -20 to 60°C, Humidity: 10 to 95%RH (no condensation), Atmospheric pressure: 50 to 106kPa (500 to 1060hPa)
Power source		AC 100-240V, 50-60Hz Internal battery (Ni-MH battery) The power supplied by the internal battery is for the operation of this product, not for the attached pumps. • Continuous hours of use: approx. 5 hours (With the ambient temperature of 25°C, a new battery, fully charged, nine pumps attached and no connection for external communication) • Charging time: 15 hours or more (When charged from AC power source with the power off)
Rated voltage/Rated current/ Rated frequency		AC 100-240V, 2.0-1.4A, 50-60Hz (Up to nine pumps can be supplied with power[*2])
Power consumption		Communication Rack System x1: Max.152VA (When three pumps are attached[*2]) Communication Rack System x1 + Communication Rack System (extension) x1: Max.236VA (When six pumps are attached[*2]) Communication Rack System x1 + Communication Rack System (extension) x2: Max.320VA (When nine pumps are attached[*2])
Classification	**Electric shock protection**	Class I equipment and internally powered equipment
	Mode of operation	Continuous operation
	Protection against harmful ingress of water or particulate matter	IP22
Wireless LAN		Hereby, TERUMO CORPORATION declares that this Communication Rack System is in compliance with the essential requirements and other relevant provisions of Directive 2014/53/EU. • Transmit frequency or frequency band: 2412 – 2472 MHz • Type of modulation and frequency characteristics: • DBPSK(Differential Binary Phase Shift Keying) • DQPSK(Differential Quadrature Phase Shift Keying) • DSSS(Direct Sequence Spread Spectrum) • CCK(Complementary code keying) • Effective radiated power: 10.7 dBm

*1: A state in which the equipment is unpacked and stored for subsequent use with the main power supply unplugged.
*2: Up to three racks can be combined and up to nine pumps can be attached at a time.

Dimensions	Communication Rack System x1: 220 mm (W) x 559 mm (H) x 199 mm (D) (Approx.) Communication Rack System x1 + Communication Rack System (extension) x1: 220 mm (W) x 946 mm (H) x 199 mm (D) (Approx.) Communication Rack System x1 + Communication Rack System (extension) x2: 220 mm (W) x 1333 mm (H) x 199 mm (D) (Approx.)
Weight	Communication Rack System x1: Approx. 6.2 kg Communication Rack System x1 + Communication Rack System (extension) x1: Approx. 9.9 kg Communication Rack System x1 + Communication Rack System (extension) x2: Approx. 13.6 kg
Standard accessory	Instruction manual

- This product is in compliance with EMC (electromagnetic compatibility) standard IEC 60601-1-2:2007 (EN 60601-1-2:2007) (CISPR group classification and class classification are Group 1 and Class B). It is also in compliance with the EMC level required by IEC 60601-2-24:2012 (EN 60601-2-24:2015).

- Conformity standard and directive
  IEC 60601-1:2005+A1:2012 (EN 60601-1:2006+A1:2013)
  IEC 60601-1-2:2007 (EN 60601-1-2:2007)
  IEC 60601-1-6:2010+A1:2013 (EN 60601-1-6:2010+A1:2015)
  IEC 60601-1-8:2006+A1:2012 (EN 60601-1-8:2007+A1:2013)
  IEC 60601-2-24:2012 (EN 60601-2-24:2015)
  MDD (Medical Device Directive) 93/42/EEC (Class IIb)

For Medical Staff

EMC Technical Information

Medical electrical equipment requires particular care in regards to EMC, and it is necessary to install and use the equipment in accordance with the following EMC information.

Cautions

- Make sure to use the AC power cable supplied with the pump. If not, this product's emissions may increase and its immunity may decrease.
- When using this product in combination with other equipment such as a network system, do not place the pieces of equipment next to each other or stack them together. It may cause malfunctioning due to electromagnetic interference.

Table 1 – Guidance and manufacturer's declaration – electromagnetic emissions –
for all EQUIPMENT and SYSTEMS (see 5.2.2.1 c))

Guidance and manufacturer's declaration – electromagnetic emissions		
The TERUFUSION Communication Rack System is intended for use in the electromagnetic environment specified below. The customer or the user of the TERUFUSION Communication Rack System should assure that it is used in such an environment.		
Emissions test	**Compliance**	**Electromagnetic environment-guidance**
RF emissions CISPR 11	Group 1	The TERUFUSION Communication Rack System uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions CISPR 11	Class [B]	The TERUFUSION Communication Rack System is suitable for use in all establishments, including domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Harmonic emissions IEC 61000-3-2	Class [A]	
Voltage fluctuations/ flicker emissions IEC 61000-3-3	Complies	

Table 2 – Guidance and manufacturer's declaration – electromagnetic immunity – for all EQUIPMENT and SYSTEMS (see 5.2.2.1 f))

Guidance and manufacturer's declaration – electromagnetic immunity			
The TERUFUSION Communication Rack System is intended for use in the electromagnetic environment specified below. The customer or the user of the TERUFUSION Communication Rack System should assure that it is used in such an environment.			
Immunity test	**IEC 60601 test level**	**Compliance level**	**Electromagnetic environment-guidance**
Electrostatic discharge (ESD) IEC 61000-4-2	± 6kV contact ± 8kV air	±8 kV contact ±15 kV air (*)	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast transient/ burst IEC 61000-4-4	±2 kV for power supply lines ±1 kV for input/output lines	±2 kV for power supply lines ±1 kV for input/ output lines	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	±1 kV line(s) to line(s) ±2 kV line(s) to earth	±1 kV line(s) to line(s) ±2 kV line(s) to earth	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	<5% U_T (>95% dip in U_T) for 0.5 cycle 40% U_T (60% dip in U_T) for 5 cycles 70% U_T (30% dip in U_T) for 25 cycles <5% U_T (>95% dip in U_T) for 5 s	<5% U_T (>95% dip in U_T) for 0.5 cycle 40% U_T (60% dip in U_T) for 5 cycles 70% U_T (30% dip in U_T) for 25 cycles <5% U_T (>95% dip in U_T) for 5 s	Mains power quality should be that of a typical commercial or hospital environment. If the user of the TERUFUSION Communication Rack System requires continued operation during power mains interruptions, it is recommended that the TERUFUSION Communication Rack System be powered from an uninterruptible power supply or a battery.
Power frequency (50-60 Hz) magnetic field IEC 61000-4-8	3 A/m	3 A/m (*)	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.
Note • U_T is the a.c. mains voltage prior to application of the test levels.			

* The TERUFUSION Communication Rack System complies with the more stringent levels of IEC 60601-2-24:2012 (EN 60601-2-24:2015).

Table 3 – Guidance and manufacturer's declaration – electromagnetic immunity –
for LIFE-SUPPORTING EQUIPMENT and SYSTEMS (see 5.2.2.2)

Guidance and manufacturer's declaration – electromagnetic immunity			
The TERUFUSION Communication Rack System is intended for use in the electromagnetic environment specified below. The customer or the user of the TERUFUSION Communication Rack System should assure that it is used in such an environment.			
Immunity test	**IEC 60601 test level**	**Compliance level**	**Electromagnetic environment-guidance**
			Portable and mobile RF communications equipment should be used no closer to any part of the TERUFUSION Communication Rack System, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter.
Conducted RF IEC 61000-4-6	3 Vrms 150 kHz to 80 MHz outside ISM bands[a]	3 Vrms	**Recommended separation distance** $d=1.2\sqrt{P}$
	10 Vrms 150 kHz to 80 MHz in ISM bands[a]	10 Vrms	$d=1.2\sqrt{P}$
Radiated RF IEC 61000-4-3	10 V/m 80 MHz to 2.5 GHz	10 V/m	$d=1.2\sqrt{P}$ 80 MHz to 800 MHz $d=2.3\sqrt{P}$ 800 MHz to 2.5 GHz where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in metres (m).[b] Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey[c], should be less than the compliance level in each frequency range[d]. Interference may occur in the vicinity of equipment marked with the following symbol: 

Notes

1. At 80 MHz and 800MHz, the higher frequency range applies.
2. These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

a. The ISM (industrial, scientific and medical) bands between 150 kHz and 80 MHz are 6.765 MHz to 6.795 MHz; 13.553 MHz to 13.567 MHz; 26.957 MHz to 27. 283 MHz; and 40.66 MHz to 40.70 MHz.

b. The compliance levels in the ISM frequency bands between 150 kHz and 80 MHz and in the frequency range 80 MHz to 2.5 GHz are intended to decrease the likelihood that mobile/portable communications equipment could cause interference if it is inadvertently brought into patient areas. For this reason, an additional factor of 10/3 is used in calculating the recommended separation distance for transmitters in these frequency ranges.

c. Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the TERUFUSION Communication Rack System is used exceeds the applicable RF compliance level above, the TERUFUSION Communication Rack System should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the TERUFUSION Communication Rack System.

d. Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m.

Table 5 – Recommended separation distances between portable and mobile RF communications equipment and the EQUIPMENT or SYSTEM–for LIFESUPPORTING EQUIPMENT and SYSTEMS (see 5.2.2.2)

Recommended separation distances between portable and mobile RF communications equipment and the TERUFUSION Communication Rack System				
The TERUFUSION Communication Rack System is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the TERUFUSION Communication Rack System can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the TERUFUSION Communication Rack System as recommended below, according to the maximum output power of the communications equipment.				
Separation distance according to frequency of transmitter m				
Rated maximum output power of transmitter W	150 kHz to 80 MHz outside ISM bands $d=1.2\sqrt{P}$	150 kHz to 80 MHz in ISM bands $d=1.2\sqrt{P}$	80 MHz to 800 MHz $d=1.2\sqrt{P}$	800 MHz to 2.5 GHz $d=2.3\sqrt{P}$
0.01	0.12	0.12	0.12	0.23
0.1	0.38	0.38	0.38	0.73
1	1.2	1.2	1.2	2.3
10	3.8	3.8	3.8	7.3
100	12	12	12	23
For transmitters rated at a maximum output power not listed above, the recommended separation distance d in metres (m) can be determined using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.				

Notes

1. At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.
2. The ISM (industrial, scientific and medical) bands between 150 kHz and 80 MHz are 6.765 MHz to 6.795 MHz; 13.553 MHz to 13.567 MHz; 26.957 MHz to 27.283 MHz; and 40.66 MHz to 40.70 MHz.
3. An additional factor of 10/3 is used in calculating the recommended separation distance for transmitters in the ISM frequency bands between 150 kHz and 80 MHz and in the frequency range 80 MHz to 2.5 GHz to decrease the likelihood that mobile/ portable communications equipment could cause interference if it is inadvertently brought into patient areas.
4. These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

Other Information

Simplified EU Declaration of Conformity (Radio Equipment Directive, 2014/53/EU)

Simplified EU Declaration of Conformity (Radio Equipment Directive, 2014/53/EU)

Hereby, TERUMO CORPORATION declares that the radio equipment type TERUFUSION Communication Rack System is in compliance with Directive 2014/53/EU.

The full text of the EU declaration of conformity is available at the following internet address:

http://www.terumo-europe.com

Symbols

Symbol	Description of Symbols	Symbol	Description of Symbols
CE	"CE" means compliance with the Medical Device Directive, 93/42/EEC and the European Directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment as well as with the essential requirements and other relevant provisions of Directive 2014/53/EU (selfdeclaration).		"on" (for a part of equipment)
			AC Power plug
			Electric energy
			Indicates that a connection to wireless LAN is selected
EC REP	Authorized Representative in the European Community		Battery
SN	Serial number		Indicates the wireless LAN signal intensity in three levels
REF	Catalogue number		Indicates that a connection to serial communication is selected
	Date of Manufacture		Indicates that a connection to wired LAN is selected
	Manufacturer		Non-ionizing electromagnetic radiation
IP22	IEC 60529 Degrees of protection provided by enclosures (IP code)		Warning: Ensure that the IV pole is on a stable surface to prevent it from falling.
	Consult instructions for use		Warning: Do not exceed the withstand load of the IV pole to prevent it from falling.
	Follow instructions for use		Warning: Fix the pole clamp securely to prevent the rack from falling.
	Warning		Up to three rack systems can be connected
	Alternating current		This way up
	DC power supply		Fragile, handle with care
	Separate collection of electrical and electronic equipment, European Community		Keep dry
	Separate collection of accumulators and batteries		Keep away from sunlight
	"off" (for a part of equipment)		Temperature limit

Symbol	Description of Symbols	Symbol	Description of Symbols
	Humidity limitation		Contents
	Atmospheric pressure limitation		Recyclable (Nickel-metal-hydride battery) Taiwan
	Stacking limit by number		TISI mark (Nickel-metal-hydride battery) Thailand

Note

- See page 3 for symbols on the operation panel.

FOR INFORMATION ABOUT TERUMO PRODUCTS

- If this product should fail to perform as intended, immediately stop using the product and contact the nearest branch or sales office of TERUMO.

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As of August, 2017

Original instructions

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