

H0U Series PLC User Manual



Thank you for purchasing the H0U series programmable logic controller (PLC) independently developed by Inovance Control Technology Co., Ltd. Read the manual carefully to be familiar with the product features and be able to use the product safely.

This manual describes the specification, features and usage of the H0U series PLC. For the developing environment and design method of user programs, see the H0U Series PLC Programming Manual and the H1U/H2U Series PLC Instruction & Programming Manual issued by Inovance.

The H0U series PLC has the following features:

- ◆ It integrates PLC and TOD programs and allows programming of control logics & display interface.
- ◆ It supports all the instructions of the H1U and the CAN communication protocol.
- ◆ It reaches the user memory space of 8k steps and the maximum capacity of the user TOD programs of 56 KB.
- ◆ It has two independent communication ports (COM1, COM2), making it act as master or slave.
- ◆ It supports 6-channel high-speed inputs and 2-channel high-speed outputs (only transistor output).
- ◆ It supports display in both simplified Chinese and English, and switchover between the two languages online.
- ◆ It has a total of 25 functional keys, whose functions can be defined freely.
- ◆ It allows you to download the PLC and TOD programs via AutoShop and HTodEditor.

Safety Information and Precautions

In Design

⚠ DANGER

- ◆ Provide a safety circuit outside the PLC in the application so that the control system can still work safely even if external power failure or PLC fault occurs. Take the following aspects into considerations in the design:
- ◆ In the external circuit of the PLC, an emergency stop circuit, a protection circuit, an interlock circuit of forward/reverse rotation operation, and position upper/lower limit interlock circuit are necessary to prevent equipment damage
- ◆ To ensure safe running of the equipment, external protection circuit and safety mechanism must be designed for the output signals that may cause serious accidents.
- ◆ When the CPU of the PLC detects an abnormality of its own system, all outputs may be cut off. When a failure occurs on the controller circuit, related outputs may be out of control. Thus, an appropriate external circuit must be designed to ensure normal running of the equipment.
- ◆ When the output units such as relay or transistor are damaged, related outputs will be out of control and be continuously kept ON or OFF. Return the AC drive with damaged output unit to Inovance for repair.
- ◆ The PLC is designed for indoor electric environment. A lightning protection device must be installed for the power supply system, so that lightning overvoltage is not applied on terminals of the PLC, avoiding damage to the equipment.

During Installation

⚠ WARNING

- ◆ Install the PLC in places free from dust, oil smoke, conducting dust, corrosive gas, combustible gas, high temperature, condensation, wind & rain, vibration and shock. In addition, electric shock, fire, malfunction may also cause damage and deterioration to the equipment.
- ◆ During screw hole processing and wiring, ensure that no metal filing and cable end falls into the ventilation hole of the controller, because such stuff may causes a fire, fault, or malfunction.
- ◆ After installation of the newly purchased PLC is complete, ensure that there is no foreign stuff on the surface of ventilation. Failure to comply may result in poor cooling effect during running, which may lead to a fire, fault or malfunction.
- ◆ The installation and wiring must be secure and reliable. Poor contact may cause malfunction.

At Wiring

⚠ DANGER

- ◆ Ensure that all power supplies are cut off before installation or wiring.
- ◆ During screw hole processing and wiring, ensure that no metal filings or cable end drops into ventilation holes of the controller. Failure to comply may result in a fire, fault or malfunction.
- ◆ Perform wiring or plug/remove the cable connector only after power-off. Failure to comply may result in electric shock or damage to the circuit.

⚠ WARNING

- ◆ Don't provide external power supply to terminal 24+ of the main unit or expansion unit.
- ◆ Use shielded cables for high-frequency signal input/output in applications with severe interference to enhance anti-interference capacity of the system.

During Running and Maintenance

⚠ DANGER

- ◆ Connection or removal of the communication cable, cables of the extension card and cables of the control unit can be performed only after power-off. Failure to comply may result in damage to the equipment or malfunction.
- ◆ The operations such as online modification, forcible output, RUN and STOP can be performed only after you read the manual and guarantee safety.

⚠ WARNING

- ◆ Treat scrapped PLC as ordinary industrial waste.

Product Information

Designation Rules

H0U-0808MRT-XP-6AT
1 2 3 4 5 6 7 8 9 10

- | | |
|----------------------------------|--|
| 1: Product information | H: Inovance controller |
| 2: Series No. | 0U: TOD+PLC integrated controller |
| 3: Input points | 08: 8 inputs |
| 4: Output points | 08: 8outputs |
| 5: Module classification | M: Main module of general-purpose controller |
| 6: Output type | R: Relay, T: Transistor |
| 7: Output type | Mixed output |
| 8: Reserved for future expansion | |
| 9: CPU type | XP: NXP-type CPU |
| 10: Special function | 6AT (standard): built-in analog extension card; 6ATC (customized): built-in analog extension card and CAN card; CAN (customized): built-in CAN card |

Basic Parameters

The following table describes the basic parameters of the H0U series PLC.

| PLC Model | Total I/Os | I/O Features | | | Communication interface | Built-in Analog Card | | |
|--------------------|------------|--------------|--------------------------|---------------|-------------------------|----------------------|----------------------|-----|
| | | Total Inputs | High-Speed Inputs | Total Outputs | | | | |
| H0U-0808MR-XP | 16 | 8 | 2 x 60 kHz 4 x 10 kHz | 8 | - | Relay | 2 x RS485 1 x USB | - |
| H0U-0808MRT-XP | | | | | 2 x 100 kHz | | | |
| H0U-1616MR-XP | 32 | 16 | 2 x 60 kHz 4 x 10 kHz | 16 | - | Relay | | |
| H0U-1616MRT-XP | | | | | 2 x 100 kHz | | | |
| H0U-0808MR-XP-6AT | 16 | 8 | 2 x 60 kHz 4 x 10 kHz | 8 | - | Relay | 2 x RS485 1 x USB | 6AT |
| H0U-0808MRT-XP-6AT | | | | | 2 x 100 kHz | | | |
| H0U-1616MR-XP-6AT | 32 | 16 | 2 x 60 kHz 4 x 10 kHz | 16 | - | Relay | | |
| H0U-1616MRT-XP-6AT | | | | | 2 x 100 kHz | | | |

Note

Total frequencies of high-speed inputs do not exceed 70 kHz.

The following table describes the functions of the built-in extension cards.

| Extension Card Model | Analog Input | Analog Output | Temperature Detection | CAN Communication |
|----------------------|---|---|---|--|
| 6AT | Voltage: -10 to +10 V Current: 4-20 mA Current: -20 to +20 mA They are switched over via soft component. | Voltage: -10 to +10 V Current: 4-20 mA Current: 0-20 mA They are switched over via soft component. | A total of three terminals are available, supporting 2-channel temperature detection and also PT100 and TC detection, which are switched over via software. | - |
| 6ATC | Voltage: -10 to +10 V Current: 4-20 mA Current: -20 to +20 mA They are switched over via soft component. | Voltage: -10 to +10 V Current: 4-20 mA Current: 0-20 mA They are switched over via soft component. | A total of three terminals are available, supporting 2-channel temperature detection and also PT100 and TC detection, which are switched over via software. | One CAN communication port supporting CANlink protocol |
| CAN | - | - | - | One CAN communication port supporting CANlink protocol |

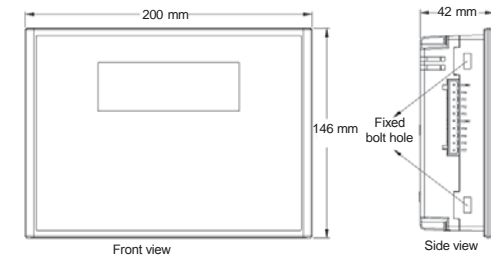
General Specifications

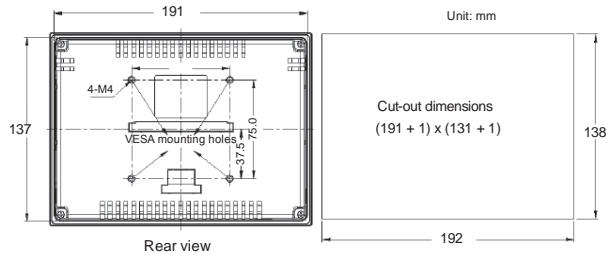
The following table describes the general specifications of the H0U series PLC.

| | Environment Parameters | | | Use Condition | Transportation Condition | Storage Condition |
|-------------------|------------------------|-------------------------------|--|--------------------|--------------------------------------|-------------------|
| | Type | Parameter | Unit | | | |
| Climate condition | Ambient temperature | Low temperature | °C | -5 | -40 | -40 |
| | | High temperature | °C | 55 | 70 | 70 |
| | Humidity | Relative humidity | % | 95 (30°C ± 2°C) | 95 (40°C ± 2°C) | - |
| | | Air pressure | Low pressure | kPa | 70 | 70 |
| High pressure | kPa | | 106 | 106 | 106 | |
| Mechanical stress | Sine vibration | Shift | mm | 3.5 (5-9 Hz) | - | - |
| | | Acceleration | m/s ² | 10 (9-150 Hz) | - | - |
| | Random vibration | Acceleration spectral density | m ² /s ³ (dB/Oct) | - | 5-20 Hz: 1.92 dB 20-200 Hz: -3 dB | - |
| | | Frequency range | Hz | - | 5-200 | - |
| | | Vibration direction | - | - | X/Y/Z | - |
| | Shock | Type | - | - | Half-sine | - |
| Acceleration | | m/s ² | - | 180 | - | |
| Dip | Dip height | m | - | 1 | - | |

Mechanical Design

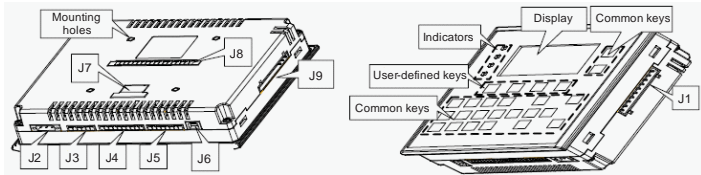
The following figure shows the installation dimensions of the H0U series PLC.





Electrical Design

The following figure shows the structure of the H0U series PLC.

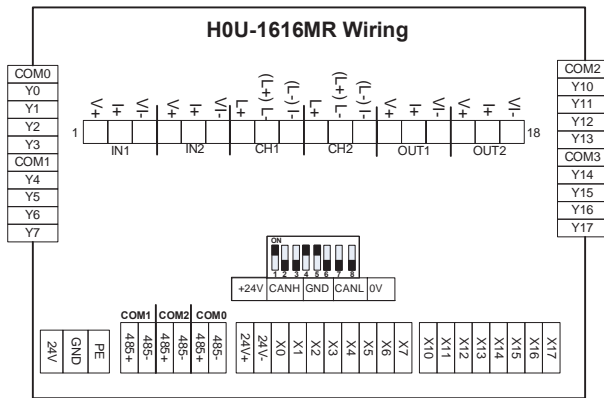


The following table describes the structure of the H0U series PLC.

| Terminal | Terminal Name | Terminal | Terminal Name |
|----------|-----------------------------------|----------|--|
| J1 | Output terminals (Y0 to Y7) | J2 | Power supply interface |
| J3 | Serial communication port (RS485) | J4 | Input terminals (X0 to X7) |
| J5 | Input terminals (X10 to X17) | J6 | USB client (Type B) |
| J7 | Used for extended CAN function | J8 | Interface for built-in analog extension card |
| J9 | Output terminals (Y10 to Y17) | | |

Hardware Wiring

The following figure shows the wiring of the H0U series PLC.



Communication Ports

The H0U series PLC has four communication ports as standard configuration. COM0, COM1 and COM2 are standard RS485 communication interfaces. COM0 is used for user program downloading, commissioning and monitoring. COM1 and COM2 are free interfaces and support the Modbus protocol, N:N protocol, parallel protocol, HMI protocol, PC link protocol, RS instruction and Modbus instruction. The other one is USB interface, which has the same function as COM0.

Power Supply Specification

The H0U series PLC adopts the DC/DC power supply.

The input voltage of the DC/DC power supply is 24 V. The outputs are +5V/+24VDD/GND and +5V/COM

respectively. +5V/+24VDD/GND provides power supply to the digital circuits and relays of the H0U, while +5V/COM provides power supply to transistor in the mixed output.

The DC/DC power supply adopts self-excitation to generate pulse width modulation (PWM) square wave and uses TL431 for feedback. The power supply voltage of the main circuit is +5V/GND.

The following table describes the power supply specification of the H0U series PLC

| Item | Voltage (V) | Current (mA) | Power (W) |
|--------------------|-------------|--------------|-----------|
| Input | 19.2–28.8 | - | - |
| Output | +5V | 4.5–5.5 | 800 |
| | +24VDD | 18.5–26.5 | 150 |
| | +5V | 4.5–5.5 | 100 |
| Total output power | | | 8.1 |

Input Specification

For the X terminals, the rated input voltage is 24 VDC. Relative to COM (0V), the X terminals is OFF when the input voltage is below 4.0 V, is ON when the input voltage is above 15.0 V and is not fixed when the input voltage is 4.0–15.0 V. On the condition of rated input voltage of 24 VDC, the input current is 4–6 mA.

| Item | High-speed Inputs X0 to X5 | General Inputs |
|-----------------------|---|--|
| Signal input mode | Sink input | |
| Electrical parameters | Input voltage | 24 VDC |
| | Input impedance | 3.3 kΩ |
| | Input ON | Input current > 4.5 mA |
| | Input OFF | Input current < 1.5 mA |
| Filter function | Hardware filter | The other I/O terminals except X0 to X7 are hardware filter. The filter time is about 10 ms. |
| High-speed function | The maximum frequency counted at X0 and X1 reaches up to 60 kHz. The maximum frequency counted at X2 to X5 reaches up to 10 kHz. The total frequency is not higher than 60 kHz. | |

Output Specification

For the Y terminals, the output mode is dry-contact. The output is active (state "1") when the terminal is ON and is inactive (state "0") when the terminal is OFF.

The 250 VAC reinforced insulation must be satisfied between the relay outputs and the logic circuit of the PLC. In addition, the 250 VAC reinforced insulation must be satisfied between the output terminals of different common terminals.

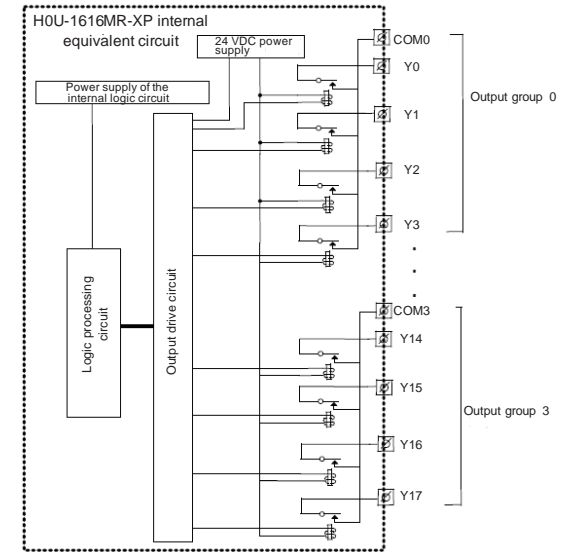
| Item | Relay Output | Transistor Output |
|---------------------------------|--|---|
| Circuit voltage | 250 VAC, 30 VDC below | 5–24 VDC |
| Circuit insulation | Relay mechanical insulation | Optically coupling insulation |
| Action indication | Output contact closing | Contact closing when optically coupling is driven |
| Leakage current at open circuit | - | < 0.1 mA/30 VDC |
| Minimum load | 2 mA/5 VDC | 5 mA (5–24 VDC) |
| Maximum output current | Resistive load | 2 A for a point 8 A for 4 points in a group sharing a common terminal 8 A for 8 points in a group sharing a common terminal |
| | Inductive load | 0.5 A for a point 0.8 A for 4 points 1.6 A for 8 points |
| ON response time | 20 ms (max.) | High-speed outputs: 7.2 W/24 VDC Others: 12 W/24 VDC |
| OFF response time | 20 ms (max.) | High-speed outputs: 10 us Others: 0.5 ms |
| High-speed output frequency | - | 100 kHz per channel (max.) |
| Output common terminal | Each group shares a common terminal COM. The groups are insulated. | |
| Fuse protection | - | |

Note

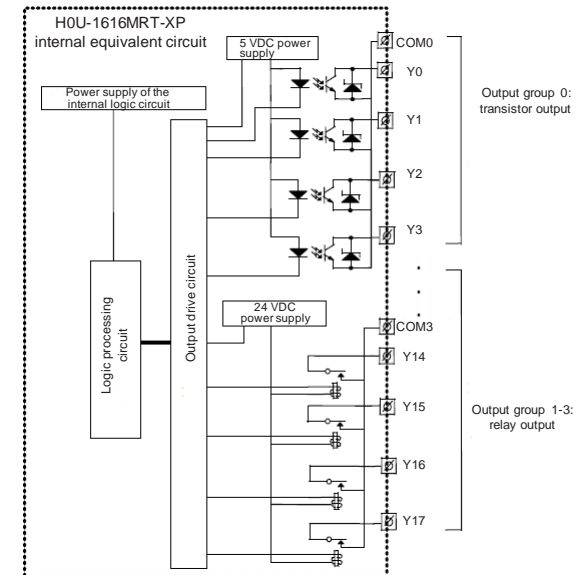
When some or all transistors in each group are with load, the average current for each channel must not exceed 0.2 A. The maximum current for a single channel must not exceed 0.5 A.

Internal Equivalent Circuit

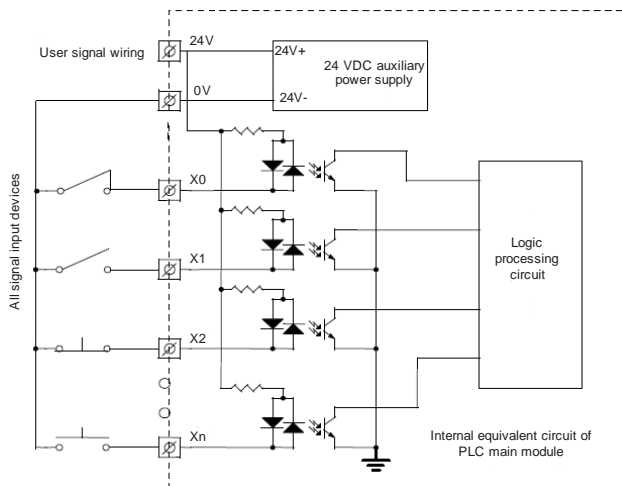
The following figure shows the internal equivalent circuit of relay output. Output terminals are divided into several groups, with each group electrically isolated. The output contacts of different groups are connected to different power circuits.



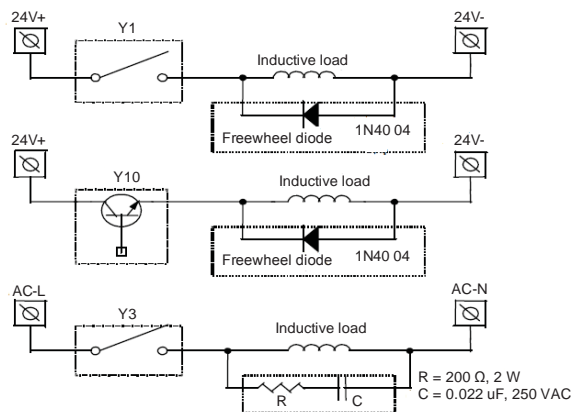
The following figure shows the internal equivalent circuit of mixed output of transistor and relay. Output terminals are divided into several groups, with each group electrically isolated. The output contacts of different groups are connected to different power circuits. Transistor output can be applied only to 24 VDC load circuit.



The following figure shows the internal equivalent circuit of PLC signal input. The user circuit is connected to the internal PLC circuit via wiring terminals. Sink input wiring is always used for H0U.



For the inductive load connected to the AC circuit, use the RC instantaneous voltage snubber circuit for the external circuit. For the inductive load connected to the DC circuit, add a flywheel diode, as shown in the following figure.



Programming Reference

Basic Specifications of the Integrated Equipment

1. Text specifications

| Item | Specifications | |
|------------------|---------------------|--|
| Display property | Display area | 192 x 64 |
| | LCD type | Yellow green background, dark blue character |
| | Background light | Yellow green LED background light |
| | Language | English/Chinese |
| | Physical dimensions | 130 x 65 mm |
| | Display size | 104 x 39 mm |
| | Weight | 105 g |
| Storage | Power supply | 3.3 V |
| | Flash | 56 KB |

2. PLC specifications

| Item | Specifications |
|----------------------------------|---|
| Program execution mode | Cycling scanning |
| Programming mode | Ladder logic diagram, instruction list, SFC |
| Processing speed | 0.26 ns (basic instruction) |
| Retentive at power failure | Flashrom retentive |
| User program capacity | 8 k steps |
| I/O points | 8 inputs 8 outputs, 16 inputs 16 outputs |
| High-speed processing capability | 2-channel high-speed counting, 2 pulse output |
| Communication function | RS485/USB communication |

Description of Keys on the Operation Panel

1. Key setting

The operation panel consists of 25 keys. The functions of the keys are the same as those of the HMI.

2. Functions of the keys

| Key | Name | Function Description |
|-----|-------------|--|
| | ESC | On the default interface, press this key to enter the main menu. When an alarm occurs, press this key to return to the interface before occurrence of the alarm. In the menu mode or parameter edit mode, press this key to return to the previous operation or give up the current operation. |
| | SET | When an editable register parameter exists and allows edition, press this key to enter the editing mode. In the parameter editing mode, press this key to give up editing of this parameter and go to the next parameter. If there is no next parameter to be edited, the editing mode will be exited. If there is no editable parameter or the parameters do not allow edition, pressing this key is invalid. |
| | Down | In the menu control, if there is a cursor line, press this key to move the cursor down to the next cursor line. If a parameter is being set, press this key to increase the value where the cursor is located by 1. |
| | Up | In the menu control, if there is a cursor line, press this key to move the cursor up to the previous cursor line. If a parameter is being set, press this key to decrease the value where the cursor is located by 1. |
| | Left | If there is a cursor during parameter or item setting, press this key to move the cursor left. |
| | Right | If there is a cursor during parameter or item setting, press this key to move the cursor right. |
| | Confirm | In the menu mode with a cursor line, press this key to go to the next-level menu or view parameter information of the selected item. In the parameter editing state, press this key to confirm edition of the parameter and enter the editing state of the next parameter. |
| | Numbers 0-9 | Press these keys to enter the corresponding number when setting parameters. |
| | +/- | Press this key to set the positive or negative value of the data. |
| | CLR | Press this key to clear the setting. |

Note

Besides the default functions, basic function keys can also be used as user-defined keys, and you can define their functions by using the background software.

3. User-defined keys

Another six user-defined keys are available, including F1 to F4, RUN, and STOP. You can define the functions of these keys by using the background software. The functions include coil setting, page skip, and register setting.

4. Indicators

The H0U has four indicators, as described in the following table.

| Indicator | State | Description |
|-------------------|-----------|---|
| POWER | OFF | There is no power supply. |
| | Steady ON | The system is powered on. |
| RUN | OFF | The H0U is partially stopped. |
| | Steady ON | The H0U is partially running. |
| ALARM | OFF | The system is in normal state without fault, or the faults have been rectified. |
| | Steady ON | The system is faulty with alarm. |
| Standby indicator | N/A | N/A |

H0U Soft Component

The use of soft components of the H0U series PLC is the same as that of the H1U series PLC.

PLC Instruction List

The basic PLC instructions of H0U are the same as those of H1U.

Inovance Warranty Agreement

- The warranty period of the product is 2 years (refer to the barcode on the equipment). During the warranty period, if the product fails or is damaged under the condition of normal use by following the instructions, Inovance will be responsible for free maintenance.
- Within the warranty period, maintenance will be charged for the damages caused by the following reasons:
 - Improper use or repair/modification without prior permission
 - Fire, flood, abnormal voltage, other disasters and secondary disaster
 - Hardware damage caused by dropping or transportation after procurement
 - Improper operation
 - Trouble out of the equipment (for example, external device)
- If there is any failure or damage to the product, please correctly fill out the Product Warranty Card in detail.
- The maintenance fee is charged according to the latest Maintenance Price List of Inovance.
- The Product Warranty Card is not re-issued. Please keep the card and present it to the maintenance personnel when asking for maintenance.
- If there is any problem during the service, contact Inovance's agent or Inovance directly.
- This agreement shall be interpreted by Shenzhen Inovance Technology Co., Ltd.

Inovance Product Warranty Card

| | | |
|----------------------|---------------------------------|-----------------|
| Customer information | Add. of unit: | |
| | Name of unit: | Contact person: |
| | P.C.: | Tel.: |
| Product information | Product model: | |
| | Body barcode (Attach here): | |
| Failure information | Name of agent: | |
| | (Maintenance time and content): | |
| | Maintenance personnel: | |

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