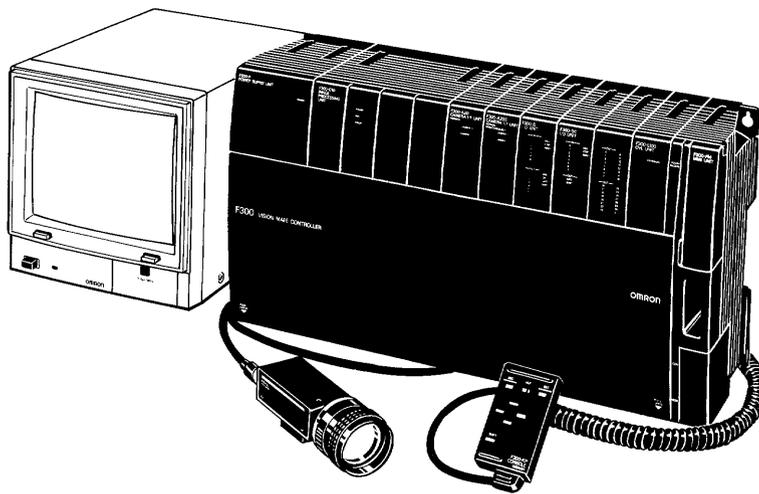


F350-C12E/C41E Visual Inspection System Setup Menu

Operation Manual

Revised August 1999



Notice:

OMRON products are manufactured for use according to proper procedures by a qualified operator and only for the purposes described in this manual.

The following conventions are used to indicate and classify precautions in this manual. Always heed the information provided with them. Failure to heed precautions can result in injury to people or damage to property.

 **DANGER** Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

 **WARNING** Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

 **CAUTION** Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury, or property damage.

OMRON Product References

All OMRON products are capitalized in this manual. The word "Unit" is also capitalized when it refers to an OMRON product, regardless of whether or not it appears in the proper name of the product.

Visual Aids

The following headings appear in the left column of the manual to help you locate different types of information.

Important Indicates information of importance that, if not heeded, could result in damage to the product, malfunction, or incorrect operation.

Note Indicates information of particular interest for efficient and convenient operation of the product.

1, 2, 3... 1. Indicates lists of one sort or another, such as procedures, checklists, etc.

© OMRON, 1995

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form, or by any means, mechanical, electronic, photocopying, recording, or otherwise, without the prior written permission of OMRON.

No patent liability is assumed with respect to the use of the information contained herein. Moreover, because OMRON is constantly striving to improve its high-quality products, the information contained in this manual is subject to change without notice. Every precaution has been taken in the preparation of this manual. Nevertheless, OMRON assumes no responsibility for errors or omissions. Neither is any liability assumed for damages resulting from the use of the information contained in this publication.

TABLE OF CONTENTS

SECTION 1

Basic Operation

- 1-1 Features
- 1-2 Applicable Manuals
- 1-3 System Configuration

SECTION 2

Installation

- 2-1 Installation Environment
- 2-2 Mounting the Units
- 2-3 Power and Protective Conductor (Earth) Wiring
- 2-4 Connecting Power Supply Unit I/O Terminals
- 2-5 OVL Unit

SECTION 3

Starting and Ending the Setup Menu

- 3-1 Starting the Setup Menu
- 3-2 Ending the Setup Menu

SECTION 4

Basic Operation of the Setup Menu

- 4-1 Input Devices
- 4-2 Screen Configuration
- 4-3 Menu Operations
- 4-4 Inputting Characters

SECTION 5

Functions and Operations of the Setup Menu

- 5-1 I.Installation
- 5-2 K.Environment
- 5-3 B.Backup
- 5-4 M.Memory Card
- 5-5 E.End

SECTION 6

Maintenance

- 6-1 Maintenance Parts and Replacement Parts
- 6-2 Inspection

SECTION 7

Troubleshooting

- 7-1 Errors
- 7-2 Error Messages

SECTION 8

Specifications

- 8-1 Specifications
- 8-2 Dimensions
- 8-3 Lens Specifications

TABLE OF CONTENTS

Appendix

- A Comparison of New and Old Models
- B RS-232C Data Transmission Program Examples

Glossary

Index

Revision History

About this Manual:

This manual describes the installation and operation of the Setup Menu of the F350 Visual Inspection System and includes the sections described below.

Please read this manual carefully and be sure you understand the information provided before attempting to install and operate the F350 Visual Inspection System.

Section 1 describes the F350 Visual Inspection System, and provides the basic information needed before performing detailed operations.

Section 2 provides the information necessary for installing an F350 Visual Inspection System. It includes system configuration, mounting instructions, wiring diagrams, and external dimensions.

Section 3 describes how to start and stop the Setup Menu.

Section 4 describes the basic operation of the Setup Menu.

Section 5 describes the functions and operation of the Setup Menu in detail.

Section 6 provides information on maintenance and inspection.

Section 7 lists the errors and their probable causes and remedies according to Unit. A list of all the error messages is also provided.

Section 8 provides the specifications of Units used with the F350 Visual Inspection System.

The **Appendices** provide examples of RS-232C data transmission programs using Quick BASIC and a glossary of terms.



WARNING Failure to read and understand the information provided in this manual may result in personal injury or death, damage to the product, or product failure. Please read each section in its entirety and be sure you understand the information provided in the section and related sections before attempting any of the procedures or operations given.

General Safety Precautions

The user must operate the product according to the performance specifications described in this manual and the operation manuals.

Make sure that the ratings and performance characteristics of the product are sufficient for the systems, machines, and equipment, and be sure to provide the systems, machines, and equipment with double safety mechanisms.

Heed the following cautions and warnings to prevent against injury or damage to the product.

-  **WARNING** **Terminal Block Cover of the Power Supply Unit**
To prevent electric shock after completing the connection of the Power Supply Unit, be sure to cover the terminal block with the terminal protection cover (the cover and screw are provided with the Unit) and fasten it using the plastic screw and the screw hole of the NC terminal.

-  **WARNING** **Earthing the Protective Conductor Terminal**
To prevent electric shock, be sure to wire the protective conductor terminal to the protective earth using a conductor at least 2 mm² (AWG14).

-  **WARNING** **Memory Card Batteries**
Do not short-circuits plus and minus battery terminals, attempt to charge batteries, take them apart, deform them, or dispose of them in a fire.
Batteries can explode, leak, or combust.

-  **WARNING** **Video Monitor**
Do not open the back cover of the Video Monitor.
High-voltage parts inside may cause an electric shock hazard.

-  **CAUTION** **Hot Lights**
Do not touch a fluorescent, halogen, or strobe light while the power is on or immediately after power is turned off. These lights can become extremely hot. Install a shield or move the light to a location where it can't be touched accidentally.

SECTION 1

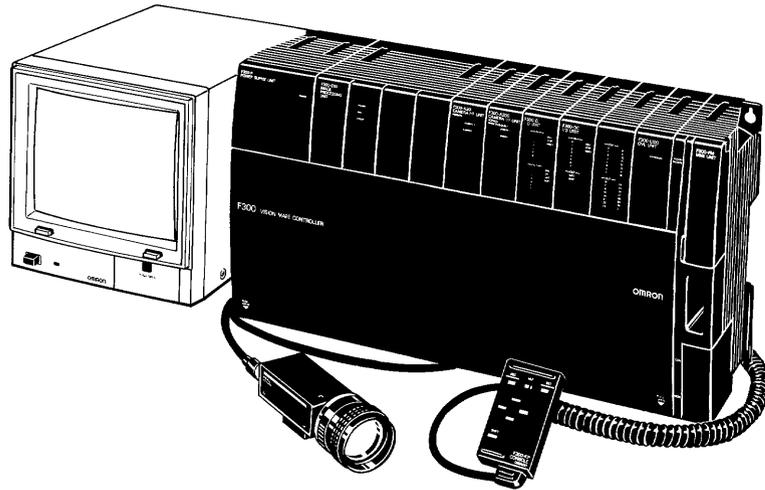
Basic Operation

This section describes the F350 Visual Inspection System, and provides the basic information needed before performing detailed operations.

- 1-1 Features
- 1-2 Applicable Manuals
- 1-3 System Configuration

1-1 Features

The F350 Visual Inspection System provides powerful support to the automation of visual inspection processes.



Application Software Developed for Easy Operation

- A suitable application program can be selected depending on the need.
- Various menus provide easy operations.

Real-time Gray Processing

- Images are processed based on gray-scale and do not require conversion into binary images.
- Hardly affected by environmental changes such as lighting, thus ensuring stable inspection results.
- Accurate inspection can be achieved even for a largely inclined workpiece.
- Position inspection is possible to the sub-pixel level of precision.
- Our exclusive algorithm permits an inspection of surface defects such as breakages, flaws, or stains, which were difficult to inspect with conventional systems.
- Twelve patterns can be simultaneously searched within the image reading time.

Selectable Units

- A camera can be selected according to the application.
- An I/O interface can be selected.
- The compact Console can be used with one hand.
- Set data can be backed up in memory cards.

1-2 Applicable Manuals

The manuals applicable to the F350 Visual Inspection System are shown in the table below, according to the procedures used. There are three kinds of F350-series manuals:

- F350 Setup Menu Operation Manual: Included with the F350-C1□E/C4□E IMP Unit.
- F350 Application Software Operation Manual: Included with the F350-U□□□E Application Software.
- F350 OVL Reference Manual: Included with F350-L1□E OVL Unit.

| Procedure | | Software | |
|-------------------------------|--|---|---|
| | | Application Programs | OVL program |
| System design | Consider the lighting environment, I/O devices, and so on, and arrange the system configuration. Design the system carefully, taking into account variations in conditions and the objects that are to be inspected. | F350-series catalog | |
| Assembly/Installation | Install the F350 Visual Inspection System by assembling the hardware and wiring the power supply and peripheral devices. | F350 Setup Menu Operation Manual | |
| Environmental settings | Start up the software and make the settings related to the F350 Visual Inspection System and the settings for starting, communicating with I/O devices, and so on. | Make the settings using the Setup Menu which is standard with the F350-C1□E/C4□E IMP Unit. (Refer to the F350 Setup Menu Operation Manual.) | Mount the F350-L1□E OVL Unit and program using OVL, a specialized BASIC programming language. (Refer to the F350 OVL Reference Manual.) |
| Inspection condition settings | Start up the software and make the settings related to inspection. Set the criteria for determining the inspection area and the acceptability of the inspected products. | Make the settings using the F350-U□□□E Application Programs. Do the actual testing according to the conditions that have been set. (Refer to the relevant F350 operation manual.) | Mount the F350-L1□E OVL Unit and program using OVL, a specialized BASIC programming language. Do the actual testing according to the conditions that have been set. (Refer to the F350 OVL Reference Manual.) |
| Testing/Inspection | Do the actual testing according to the conditions that have been set. If adjustments are required, change the settings. | | |
| Maintenance | Carry out periodic inspections. This is essential in order to maintain the F350 Visual Inspection System in optimum condition. | F350 Setup Menu Operation Manual | |

1-3 System Configuration

Hardware Configuration

Check to be sure that all of the Units required for setting up the basic system configuration are on hand. It must be noted that extension products that can be used vary depending on the type of application software. For details, refer to the Application Manual of each application software.

Basic System Configuration (Must be used.)

F300-P2 (100 to 120 VAC)
★F300-P2E (200 to 240 VAC)
Power Supply Unit

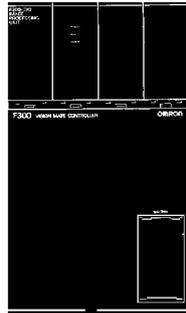
Supplies power to the entire system.



(Note: The F200-P Power Supply Unit cannot be mounted.)

★F350-C12E
F350-C41E IMP Unit

Processes images.



★F300-FM2 MMI Unit

Provides Memory Card functions and menu operations via a Video Monitor and Console.

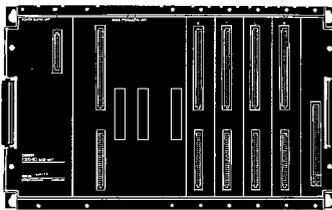


★F300-KP Console **F300-M09 Video Monitor (100 VAC)**

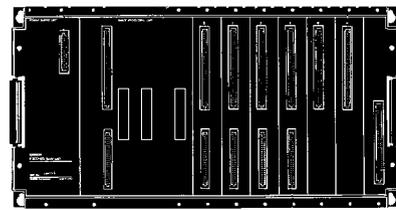
★F309-VM Monitor Cable

Standard Base Units
 Available with either 3 slots or 5 slots. Select a model according to the number of Interface Units required.

★F300-B32 (3 slots)



★F300-B52 (5 slots)



Camera I/F Units (use four maximum)

F300-A20 Normal Camera I/F Unit

For measuring stationary objects or moving objects using a strobe.



★ F309-VSR2 Camera Cable

★F300-A22S Normal Simultaneously Camera I/F Unit

For measuring stationary objects or moving objects using a strobe, and for measuring two places simultaneously using two cameras.



★ F309-VSR2 Camera Cable

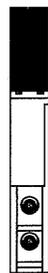
F300-A20R Shutter Camera I/F Unit

For measuring objects moving at high speed.



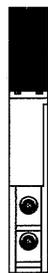
★ F300-A22RS Shutter Simultaneously Camera I/F Unit

For measuring objects moving at high speed, and for measuring two places simultaneously using two cameras.



F300-A23RS Frame Shutter Camera I/F Unit

This I/F Unit is used exclusively with the F300-S4R. For measuring objects moving at high speed, and for measuring two places simultaneously using two cameras.



★ F309-VSR2 Camera Cable

F200-S Camera



★F300-S Camera



★ F300-S2R Shutter Camera



F300-S3DR Shutter Camera



F300-S4R Frame Shutter Camera



Lens

Light

Cameras (use eight maximum) Only one F200-S Camera can be used.

Important An incorrect image may be read if different types of cameras and I/F Units are used together. Do not mix different types of cameras and I/F Units.

Some of the products listed may not be available in some countries. Please contact your nearest OMRON sales office by referring to the addresses provided at the back of this manual.

Important An “★” before the model number indicates conformance to EC Directives. Use only these Units when constructing a system that must conform to EC Directives. Refer to Appendix A for a complete list of the Units that conform to EC Directives.

F350-U□□□E Software
Select the proper application software for the desired application.

Peripheral Devices

★F300-N256/N512/N2M Memory Card



Used for storing set data or programs.

Used to create programs using OVL, a specialized BASIC programming language.

★F350-L12E OVL Unit



F300-K Keyboard

I/F Units (Use one that matches the peripheral devices connected.)



★F300-E2 RS-232C I/F Unit

For saving scene and system data and carrying out menu operations via RS-232C interface.



★F300-D2 Terminal Block Unit

For inputting measurement instructions and outputting judgement results via a terminal block.



★F300-DC2 Parallel I/O Unit

For inputting measurement instructions and outputting measurement values and judgement results via parallel I/O.



F300-FS Strobe I/F Unit

For flashing the strobe while taking images.

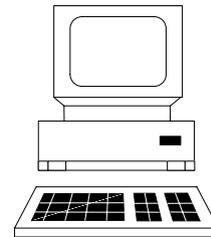


★F300-G Dummy Unit

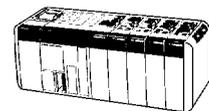
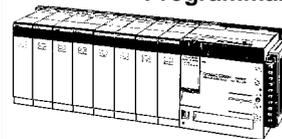
For inserting into empty slots to protect and strengthen connectors.

★F309-VR RS-232C Cable (25 pins)

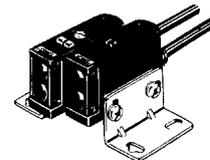
IBM PC/AT or Compatible



C200HS or CQM1 Programmable Controller

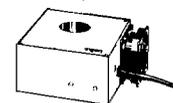


Synchronization Sensor



Strobe Device

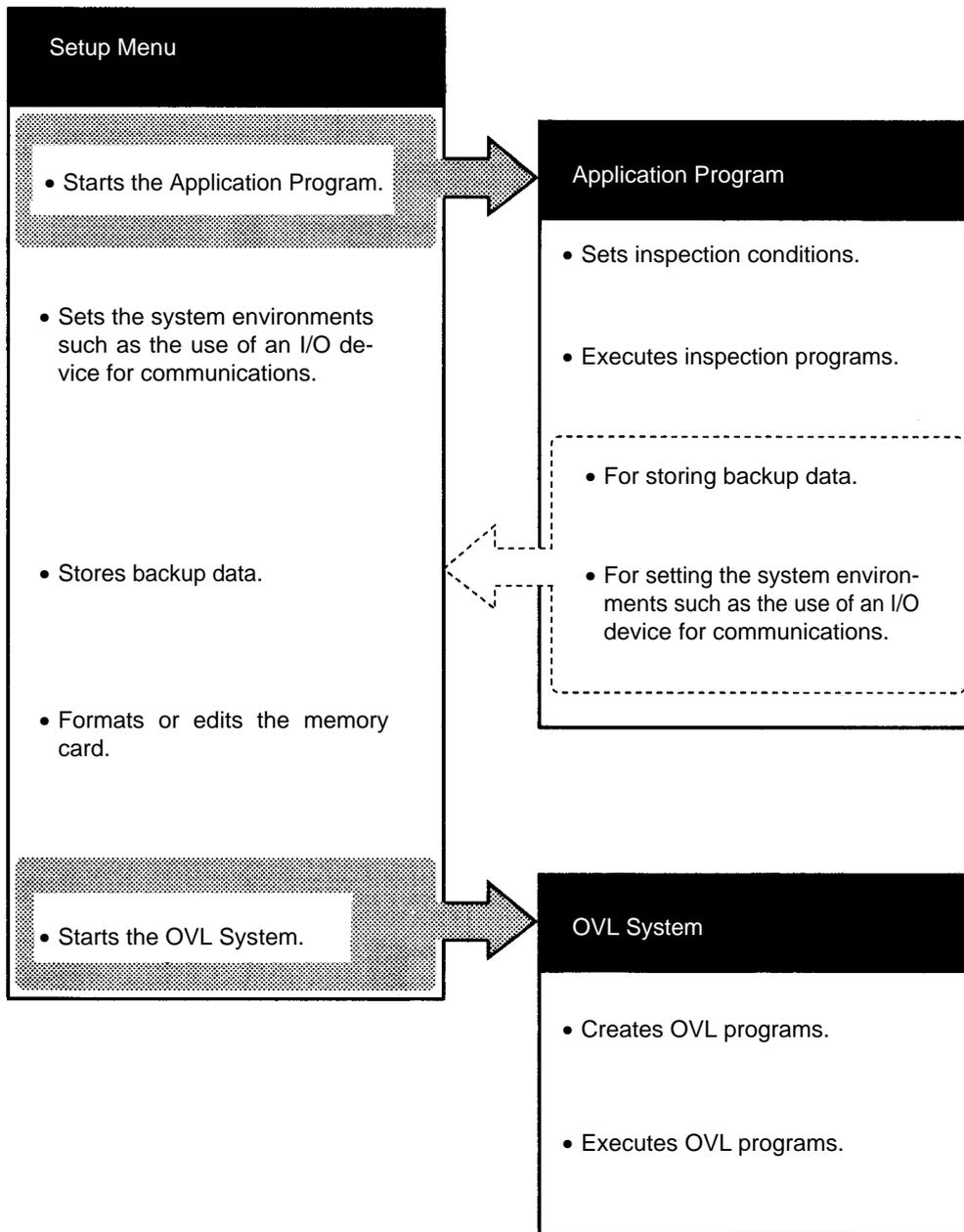
3Z4S-LT DSX-240 (100 VAC)



F309-VFS Strobe Cable

Software Configuration

The following three kinds software are available for the F350 Visual Inspection System.



Data Compatibility

The following illustrations show the compatibility of data among the F350-C10E, F350-C41E, and F350-C12E.

O: Compatible. Can always be used.

Δ: Partially compatible. Can be used with conditions.

X: Incompatible. Cannot be used.

Scene Data

| | | Save source | | |
|------------------|-----------|-------------|-----------|-----------|
| | | F350-C10E | F350-C41E | F350-C12E |
| Load destination | F350-C41E | Δ | O | O |
| | F350-C12E | Δ | O | O |

Δ: Criteria must be reset after loading.

ROI Model Data

| | | Save source | | |
|------------------|-----------|-------------|-----------|-----------|
| | | F350-C10E | F350-C41E | F350-C12E |
| Load destination | F350-C41E | Δ | O | O |
| | F350-C12E | Δ | O | O |

Δ: Criteria must be reset after loading.

Search Model Data

| | | Save source | | |
|------------------|-----------|-------------|-----------|-----------|
| | | F350-C10E | F350-C41E | F350-C12E |
| Load destination | F350-C41E | O | O | O |
| | F350-C12E | O | O | O |

System Data

| | | Save source | | |
|------------------|-----------|-------------|-----------|-----------|
| | | F350-C10E | F350-C41E | F350-C12E |
| Load destination | F350-C41E | O | O | O |
| | F350-C12E | O | O | O |

Backup Data

| | | Save source | | |
|------------------|-----------|-------------|-----------|-----------|
| | | F350-C10E | F350-C41E | F350-C12E |
| Load destination | F350-C41E | X | O | X |
| | F350-C12E | X | X | O |

SECTION 2

Installation

This section provides the information necessary for installing an F350 Visual Inspection System. It includes system configuration, mounting instructions, wiring diagrams, and external dimensions. Specifications are provided in *Section 8 Specifications*.

| | |
|-------|---|
| 2-1 | Installation Environment |
| 2-1-1 | Location |
| 2-1-2 | Installation |
| 2-1-3 | Precautions |
| 2-2 | Mounting the Units |
| 2-2-1 | Mounting Positions |
| 2-2-2 | Connecting the Console |
| 2-2-3 | Connecting the Video Monitor |
| 2-2-4 | Connecting Cameras |
| 2-2-5 | Attaching the Cover |
| 2-3 | Power and Protective Conductor (Earth) Wiring |
| 2-3-1 | Power Wiring |
| 2-3-2 | Protective Conductor (Earth) Wiring |
| 2-4 | Connecting Power Supply Unit I/O Terminals |
| 2-4-1 | Power Supply Unit |
| 2-4-2 | Connecting Strobe I/F Unit |
| 2-4-3 | Connecting RS-232C I/F Units |
| 2-4-4 | Connecting Terminal Block Units |
| 2-4-5 | Connecting Parallel I/O Units |
| 2-5 | OVL Unit |

2-1 Installation Environment

The F350 System is highly reliable and resistant to environmental factors. The following guidelines, however, must be followed to ensure reliability and to get full use of the System.

Important In order to protect the Units from electrostatic discharge, operators must discharge static electricity from themselves before touching the uninsulated parts of the signal lines in the terminal block and the connector. For example, a earthed wrist strap can be used for the discharging.

2-1-1 Location

Do not install an F350 System in locations subject the following conditions:

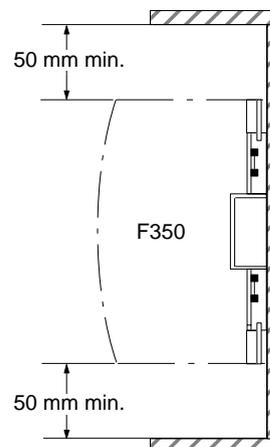
- Temperatures outside 0°C to 50°C
- Condensation due to rapid temperature fluctuations
- Relative humidity outside 35% to 85% RH
- Corrosive or flammable gas
- High concentrations of dust, salt, or iron particles
- Direct vibration or shock
- Direct sunlight
- Water, oil, or chemicals fumes or spray

2-1-2 Installation

Consider environmental factors and ease of operation and maintenance when installing the F350 System in a control box.

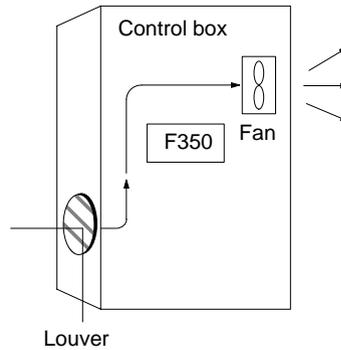
Temperature Considerations The operational temperature range of the F350 System is 0°C to 50°C. Take the following measures to maintain the F350 System in this range.

- Maintain a minimum of 50-mm clearance above and below the F350 System to improve air circulation.



- Do not install the F350 System immediately above strong heat sources, such as heaters, transformers, or large-capacity resistors.

- Provide a forced-air fan or air conditioning if the ambient temperature exceeds 50°C.

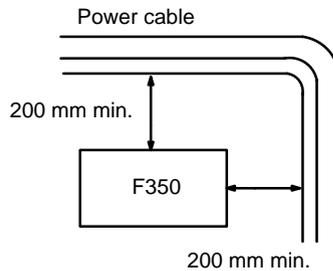


Operation and Maintenance Considerations

Keep the F350 System away from high-voltage equipment and motors to improve safety during operation and maintenance. The F350 System is easiest to work with if installed between 1.0 and 1.6 meters above the floor.

Noise Considerations

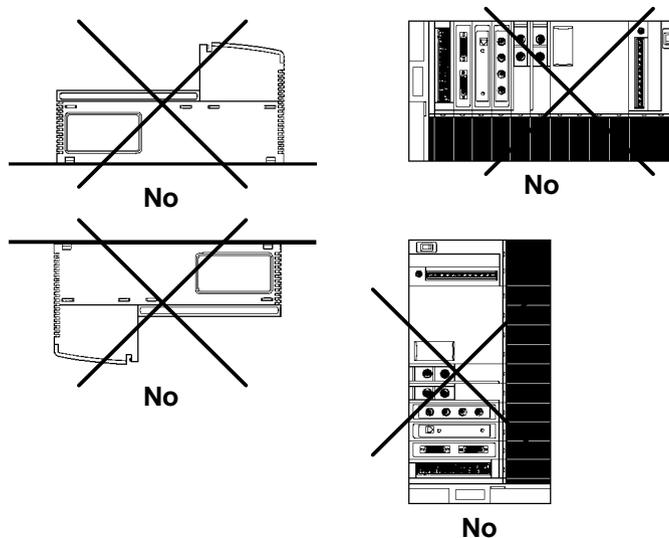
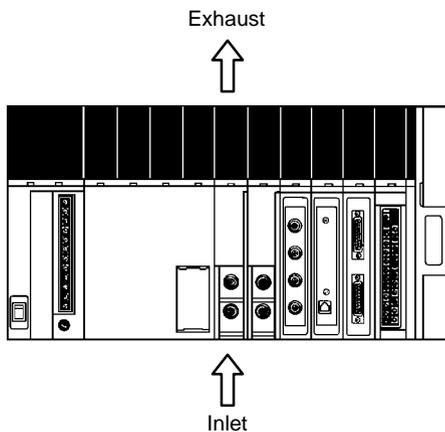
Do not install the F350 System in a cabinet containing high-voltage equipment or within 200 mm of power lines. Earth the mounting plate at a maximum earth resistance of 100 Ω.



2-1-3 Precautions

Direction of Installation

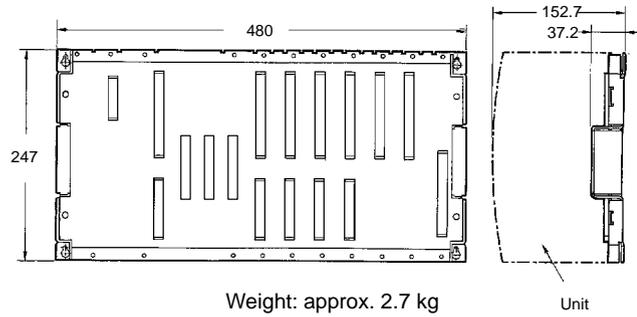
Install the Unit vertically with the vents at the top and bottom to improve air circulation and heat dissipation. Do not install as shown in the right portion of the diagram below.



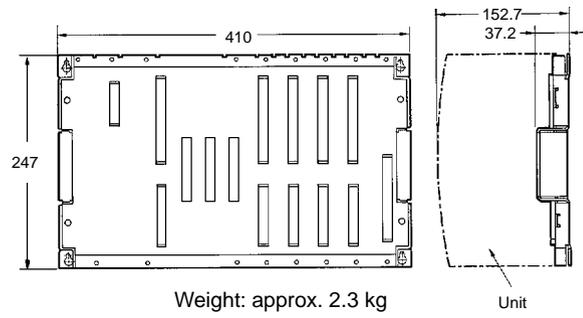
Dimensions and Weight

The following diagrams provide the weight, external dimensions, and mounting hole dimensions for the F300-B32 and -B52 Base Unit. Unless otherwise noted, all values are in millimeters (mm).

F300-B52 5-slot Base Unit

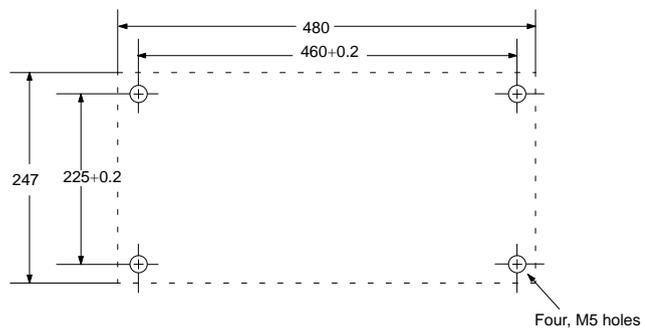


F300-B32 3-slot Base Unit

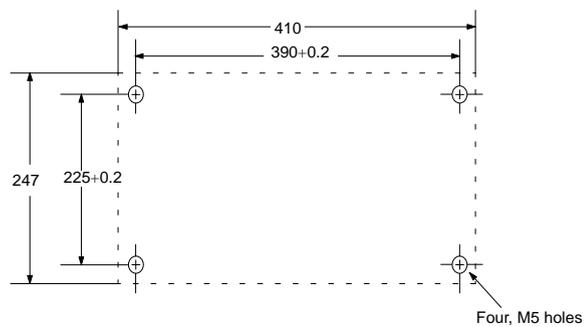


Mounting Hole Dimensions

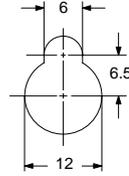
F300-B52 5-slot Base Unit



F300-B32 3-slot Base Unit



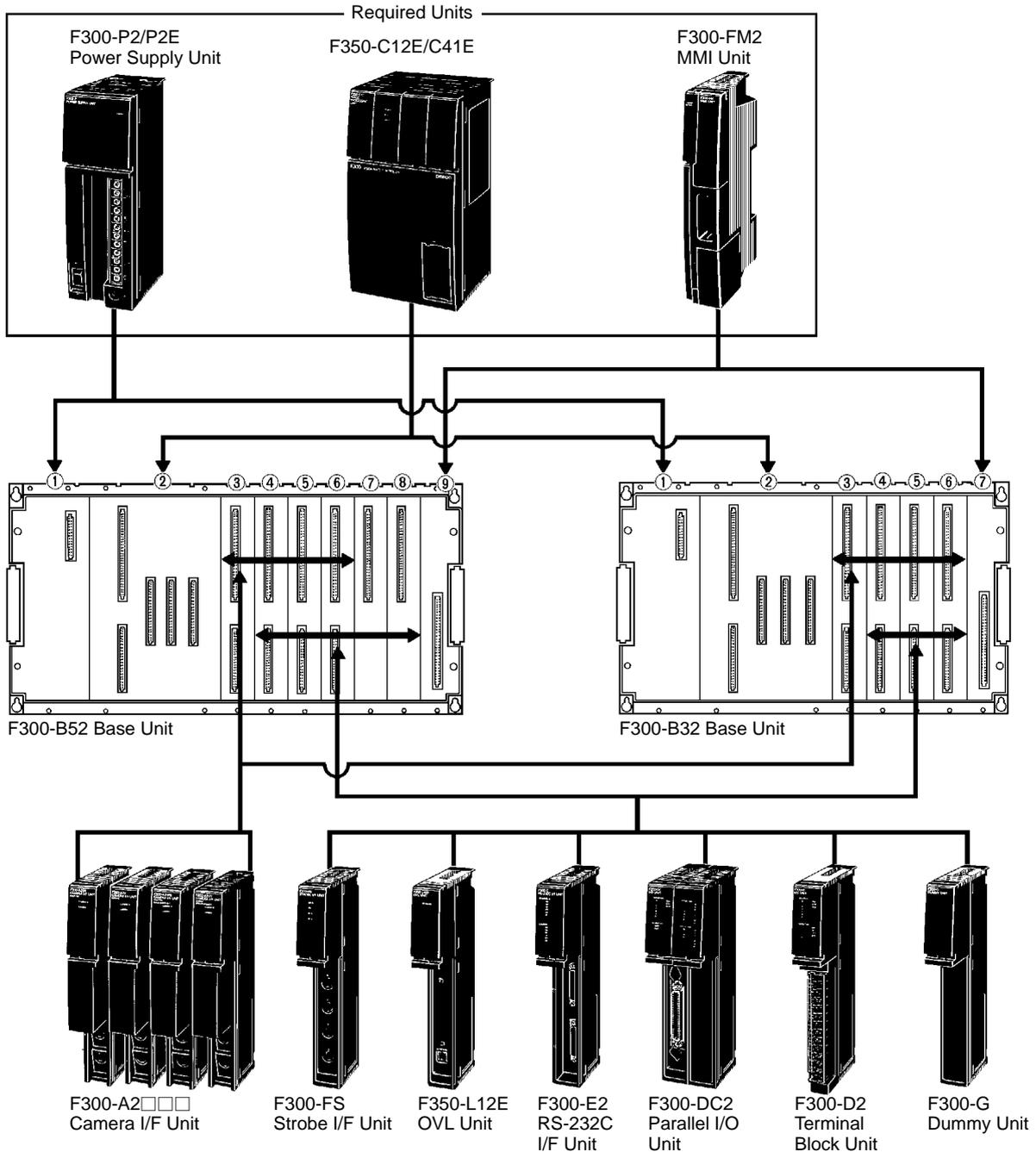
Base Unit Mounting Hole Shape



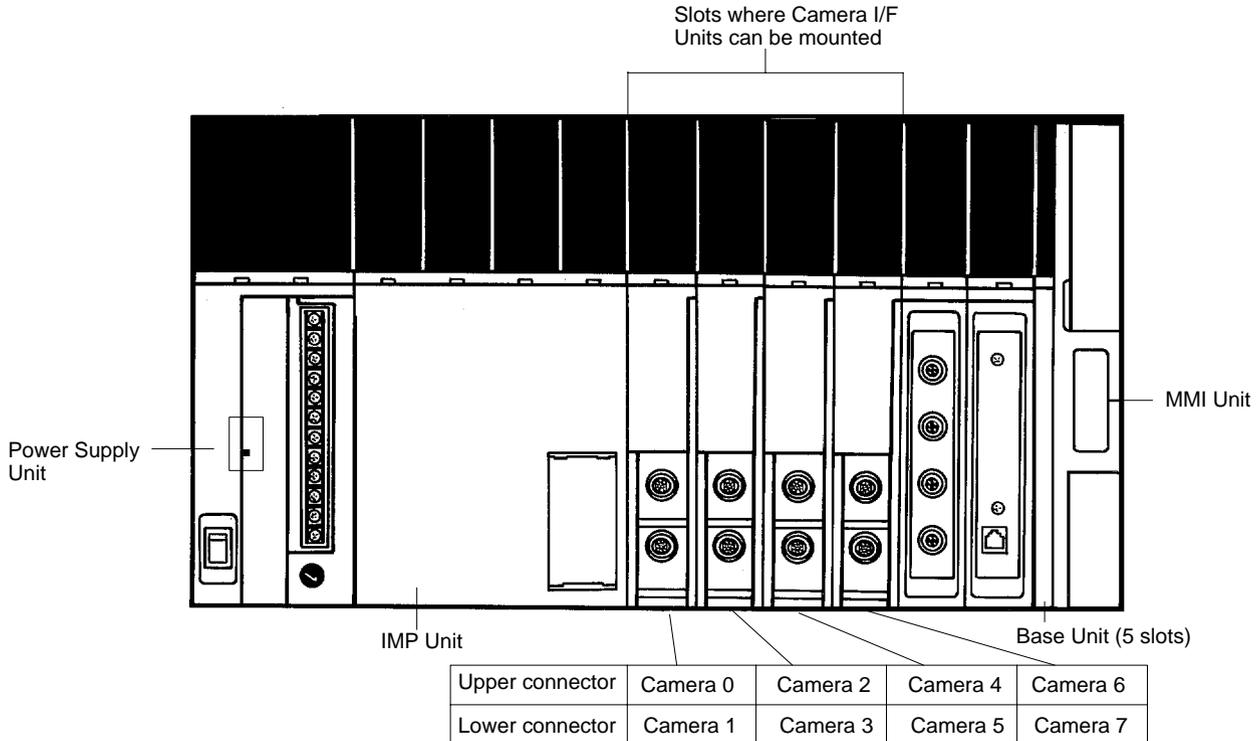
2-2 Mounting the Units

2-2-1 Mounting Positions

The Units must be mounted in the positions shown in the following illustration.

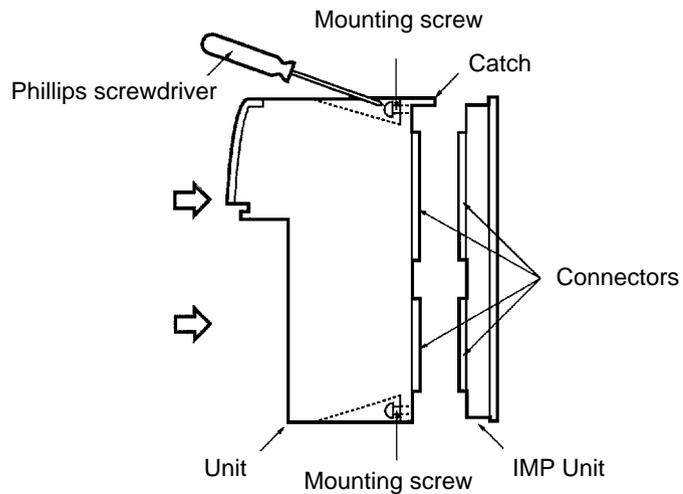


Important Camera numbers are allocated in order from the camera closest to the IMP Unit. If an additional Camera I/F Unit is mounted between two Camera I/F Units that have already been mounted, the newly mounted Camera I/F Unit and those located farther away from the IMP Unit will have new numbers. When mounting multiple Camera I/F Units, therefore, it is best to mount them in order starting from the slot closest to the IMP Unit.



Procedure

- 1, 2, 3... 1. Line up the catches at the top of the Unit with the notches at the top of the IMP Unit, and carefully match the connectors.



2. Press the Unit horizontally into the IMP Unit.
 3. With a Phillips screwdriver, tighten the mounting screws.

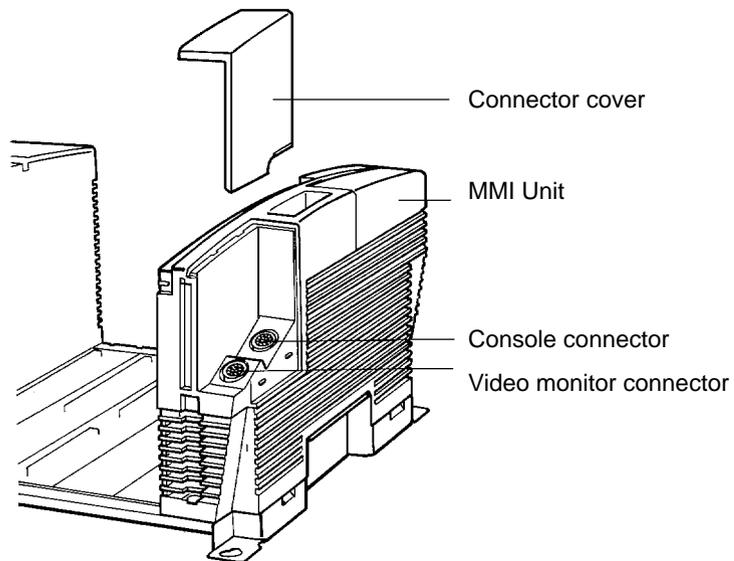
Important Be sure to turn off the power supply before mounting Units. Replacing or adding a Unit while the power is turned on may result in damage to the Unit.

2-2-2 Connecting the Console

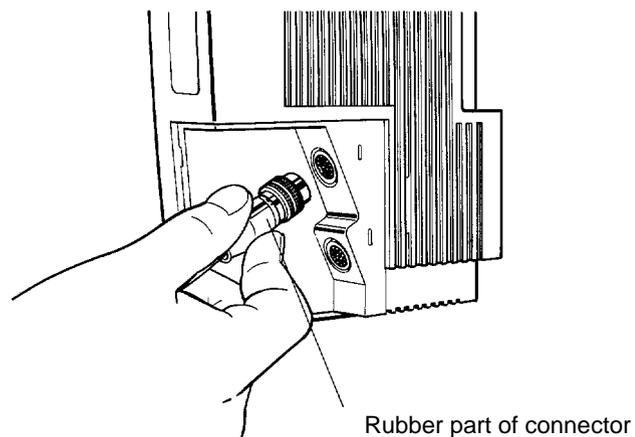
Connect the Console connector to the MMI Unit.

Inserting the Connector

- 1, 2, 3... 1. Turn off the power supply switch for the Power Supply Unit.
2. Remove the connector cover of the MMI Unit.



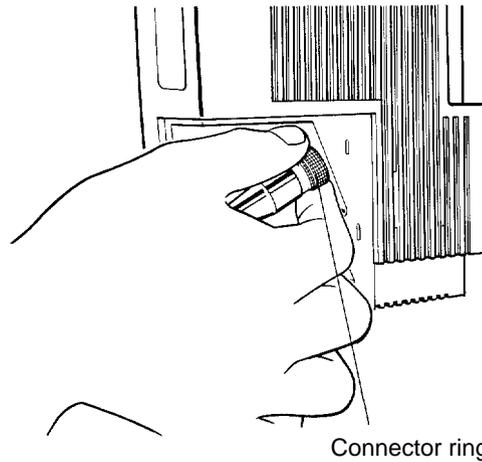
3. Holding the rubber part of the connector, push it in straight ahead until it locks in place.



Important Align the notch of the connector with the receptor when inserting the connector. Inserting the connector forcibly without lining up with the receptor may result in damage to the connector.

Removing the Connector

- 1, 2, 3... 1. Turn off the power supply switch for the Power Supply Unit.
 2. Unlock the connector by pulling lightly on the connector ring, as shown in the illustration below.

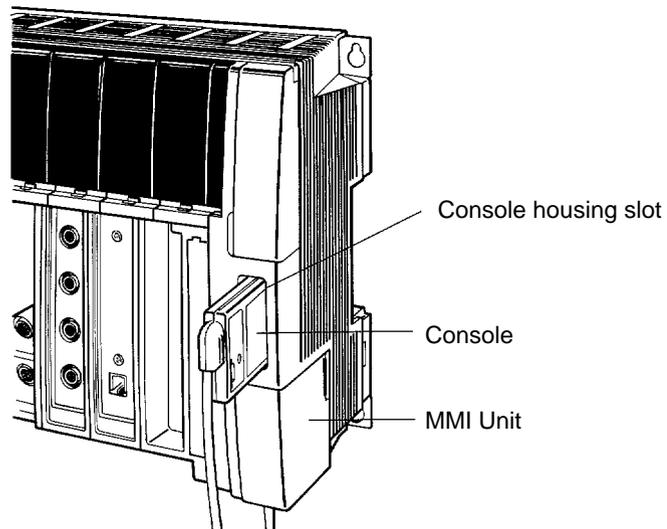


Important Do not pull on the rubber part of the connector or on the cable.

Housing the Console

When the Console is not in use, it can be housed in the MMI Unit as shown in the illustration below.

- 1, 2, 3... 1. Insert the Console into the console housing slot.
 Push it in until the Console is fully attracted by the magnetic force.



2-2-3 Connecting the Video Monitor

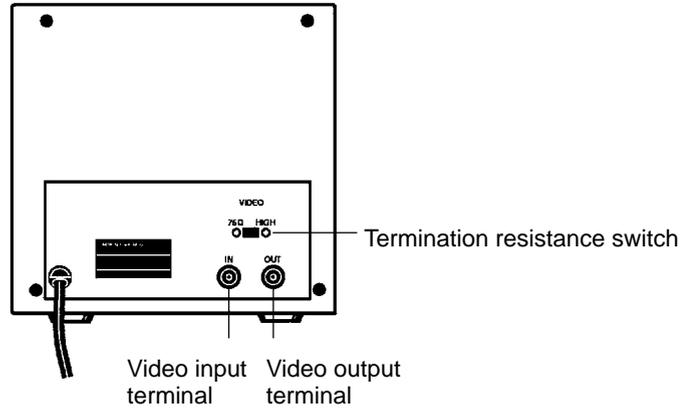
Connect the MMI Unit to the Video Monitor with the Video Monitor connector.

Connection at the Rear of the Video Monitor

Important Observe the following precautions when securing the Video Monitor:

- Don't earth the Video Monitor case.
- Make sure that there is no electrical conduction between the BNC terminals and the metallic mounting face.
- Use plastic screws if the Video Monitor is to be mounted on a metal surface.

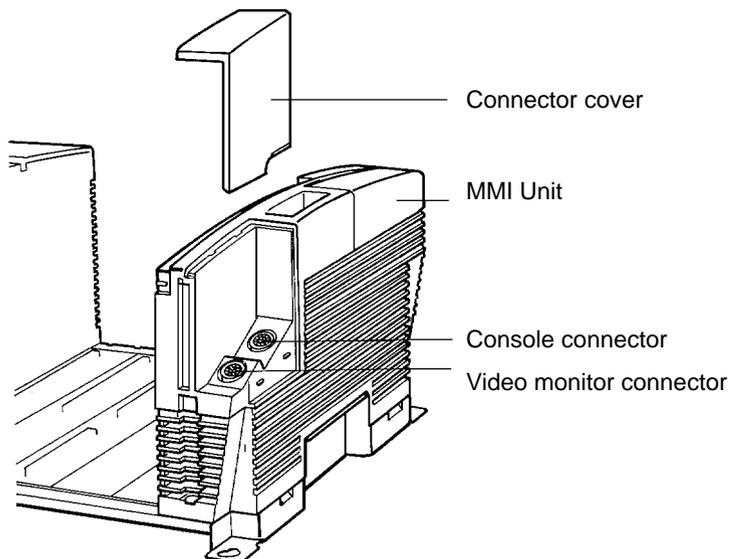
- 1, 2, 3... 1. Turn off the power supply switch for the Video Monitor.
2. Connect the BNC connector of the monitor cable to the video input terminal at the back of the Video Monitor.
3. Set the termination resistance switch to 75 Ω.



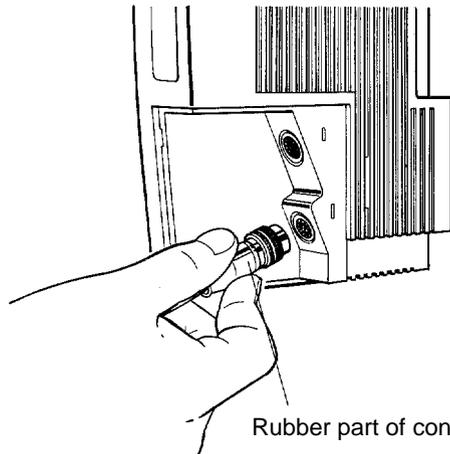
! WARNING Don't open the rear cover of the Video Monitor, or you may receive an electric shock from high tension voltage that runs through some parts behind the cover.

Connection at the MMI Unit

- 1, 2, 3... 1. Holding the rubber part of the Video Monitor connector, line the connector up with the receptor.
2. Remove the connector cover of the MMI Unit.



3. Holding the rubber part of the video monitor connector, push the connector in straight ahead until it locks in place.



Important Align the notch of the connector with the receptor when inserting the connector. Inserting the connector forcibly without lining up with the receptor may result in damage to the connector.

For removing the connector, refer to 2-2-2 *Connecting the Console*.

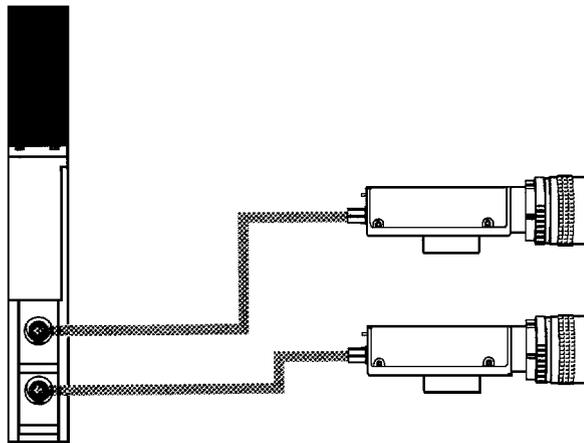
2-2-4 Connecting Cameras

Connect Cameras to a Camera I/F Unit by means of Camera Cables. A maximum of two Cameras can be connected to a Camera I/F Unit.

Important Observe the following precautions when connecting Cameras:

- Don't earth the Camera case.
- Don't remove the insulating attachment of the Camera.
- Don't remove the ferrite core that is attached to the Camera Cable.

Connection at the Rear of the Video Monitor



Connection at the Camera

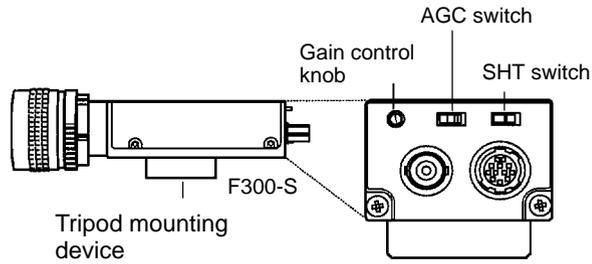
To make the connection at the Camera itself, follow one of the procedures outlined below, depending on whether a normal or shutter Camera is to be used.

Standard Cameras

- 1, 2, 3... 1. If an F300-S Camera is to be used, then check to be sure that the normal Camera switch settings are as follows:

| | |
|------------|-----|
| AGC switch | OFF |
| SHT switch | OFF |

2. Connect the “normal camera” cable socket connector to the “normal camera” connector.



Shutter Cameras

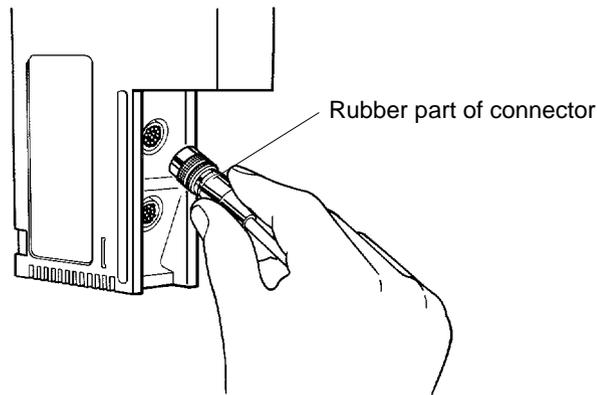
- 1, 2, 3... 1. Use the following settings for the F300-S4R:

| | |
|----------------------|-------|
| SELECT switch | 1/301 |
| GAIN switch | OFF |

2. Connect the Shutter Camera cable connector to the Camera connector. For detailed instructions, refer to the Camera operation manual.

Connection at the Camera I/F Unit

- 1, 2, 3... 1. Turn off the power supply switch for the Power Supply Unit.
2. Holding the rubber part of the Camera Cable connector, push the connector in straight ahead until it locks in place.



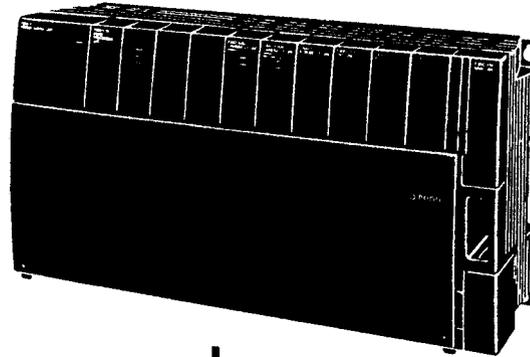
Important Align the notch of the connector with the receptor when inserting the connector. Inserting the connector forcibly without lining up with the receptor may result in damage to the connector.

For removing the connector, refer to 2-2-2 *Connecting the Console*.

2-2-5 Attaching the Cover

Attach the cover after assembling the Units in order to protect connecting cables to Units and peripheral devices, and to guard against malfunctioning.

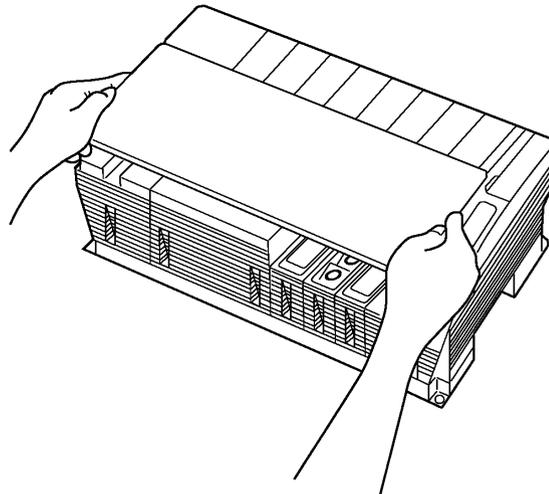
Do not force the cover into place, and do not place any heavy objects on top of the cover.



↓
Cables

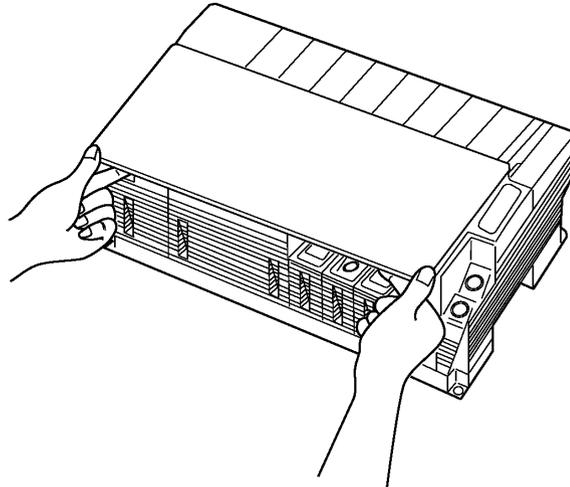
Procedure

- 1, 2, 3...**
1. Holding the bottom of the cover, insert the catches on the top of the cover into the notches on the front surface of the Units.
 2. Press the bottom of the cover against the front surface of the Unit until it locks.



Removing the Cover

- 1, 2, 3...
1. Unlock the cover by lightly lifting up from the bottom.
 2. Continue lifting the cover and remove the catches at the top of the cover from the notches in the Unit.



2-3 Power and Protective Conductor (Earth) Wiring

Connect power cables and earth cables to the Power Supply Unit terminal block. The terminal block uses M4 screw connectors. Use the crimped connectors shown in the table below.

! WARNING In order to prevent electric shock, after completing the connection of the Power Supply Unit, be sure to cover the terminal block with the terminal protection cover (attachment) and fasten it using the plastic screw (attachment) and the screw hole of the NC terminal.

Crimped Connectors



Recommended Wire Size Use 2-mm² (14AWG) insulated wire to connect the power supply and protective earth.

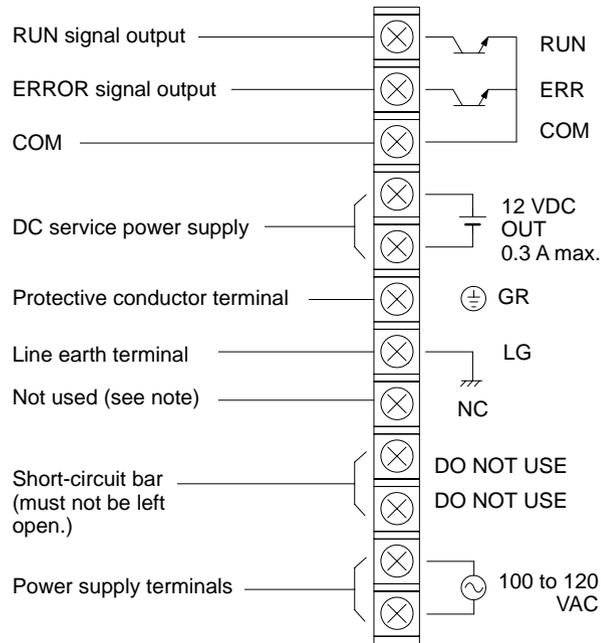
Recommended Service Amperage Connect the power supply terminals to a 15-A service amperage.

2-3-1 Power Wiring

- Important**
1. In order to avoid voltage drops, use power cables of at least 2 mm² (AWG14).
 2. To avoid interference from inductive noise, use twisted-pair cable.
 3. Wire the F350 power supply separately from other devices. In particular, wire it separately from any inductive loads.

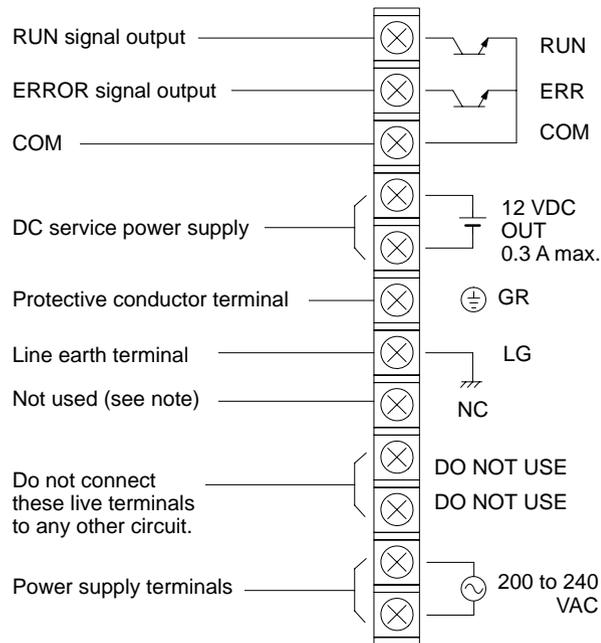
Wiring Connections

F300-P2 Power Supply Unit



Note The screw hole is for fastening the terminal protection cover (accessory).

F300-P2E Power Supply



Note The screw hole is for fastening the terminal protection cover (accessory).

Power Supply Voltage Range Use a power supply in the specified voltage range.

| Power Supply Unit | Power supply voltage | Allowable fluctuation range |
|-------------------|----------------------|-----------------------------|
| F300-P2 | 100 to 120 VAC | 85 to 132 VAC |
| F300-P2E | 200 to 240 VAC | 170 to 264 VAC |

Power Supply Capacity

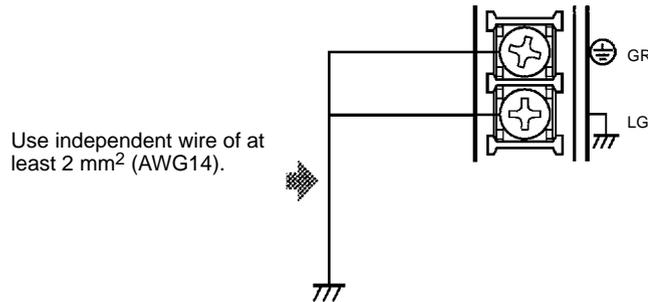
Although the current consumption should not exceed 1 A for 200 to 240 VAC operation or 2 A for 100 to 120 VAC operation, surge current flows when the power is turned on.

2-3-2 Protective Conductor (Earth) Wiring

⚠ WARNING In order to prevent electric shock, be sure to wire the protective conductor terminal to the protective earth using a conductor of at least 2 mm² (AWG14).

Important To avoid damage to the equipment due to lightning surge, short-circuit the GR and LG terminals using the short-circuiting bar (accessory).

To avoid damage to the equipment, do not share the protective conductor wiring with any other devices or wire the protective conductor terminal to the metal frame. Be sure to wire the protective conductor wiring of the equipment independently.



2-4 Connecting Power Supply Unit I/O Terminals

2-4-1 Power Supply Unit

⚠ WARNING In order to prevent electric shock, after completing the connection of the Power Supply Unit, be sure to cover the terminal block with the terminal protection cover (attachment) and fasten it using the plastic screw (attachment) and the screw hole of the NC terminal.

For the Power Supply Unit I/O wiring, use the crimped connectors shown below.

Crimped Connectors



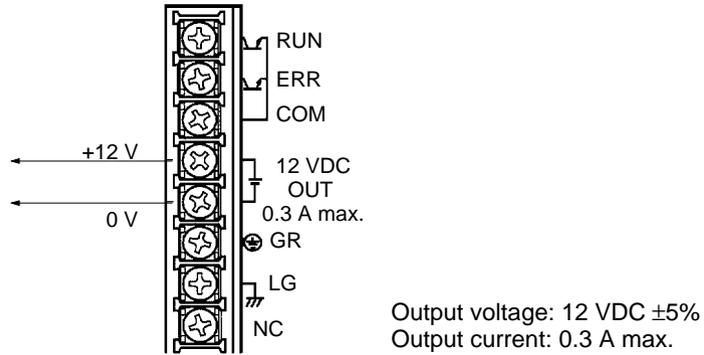
Applicable wire size: 1.04 to 2.63 mm² (13AWG to 17AWG) insulated wire.

Wiring an External Power Supply

The Power Supply Unit has a 12-VDC service power supply. Use it for the Terminal Block Unit and Parallel I/O Unit interface, and also as the power supply for external devices such as timing input sensors.

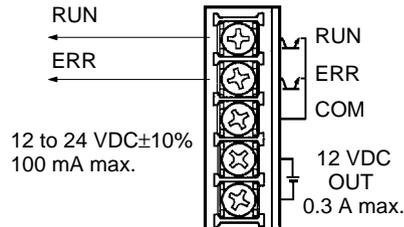
Important In the case of supplying the following terminals with an external power source, use a DC power supply with the safety extra-low voltage output.

- COM IN terminals of Terminal Block Units or Parallel I/O Units
- COM OUT terminals of Terminal Block Units or Parallel I/O Units
- COM terminals of Power Supply Units



Wiring External Outputs

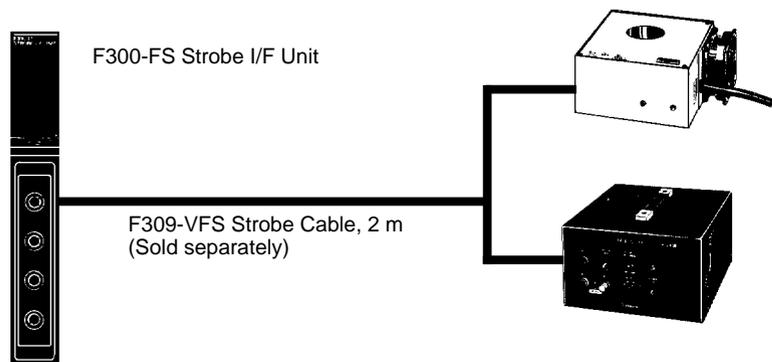
The Power Supply Unit can output RUN and ERR signals. Wire them as shown below.



| Signal | Remarks |
|--------|---|
| RUN | ON while the System is in operation. The RUN indicator on the front panel of the IMP Unit lights simultaneously with the signal output. |
| ERR | Can be turned ON when an error occurs in the System. The ERR indicator on the front panel of the IMP Unit lights simultaneously with the signal output. |

2-4-2 Connecting Strobe I/F Unit

Follow the procedure shown below to connect 3Z4SV-L1 DSX-240 Strobe Units to an F300-FS Strobe I/F Unit.

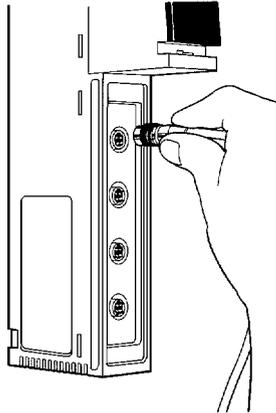


Connecting the Strobe Unit Connect the strobe cable connector to the Strobe Unit.

Connecting the Strobe I/F Unit

- 1, 2, 3... 1. Turn off the power supply switch for the Power Supply Unit.

2. Holding the rubber part of the strobe cable connector, push the connector in straight ahead until it locks in place.



Important Align the notch of the connector with the receptor when inserting the connector. Inserting the connector forcibly without lining up with the receptor may result in damage to the connector.

When the Strobe I/F Unit and the Strobe Unit are connected, the strobes automatically flash.

For removing the connector, refer to 2-2-2 *Connecting the Console*.

2-4-3 Connecting RS-232C I/F Units

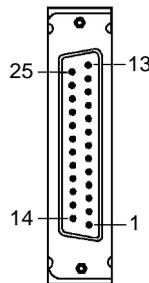
Follow the procedure shown below to connect a device with an RS-232C interface to an RS-232C I/F Unit.

Connectors

Use D-SUB25 pin connectors. The XM2A-2501 Connector (made by OMRON) is recommended. The pin numbers and names are as shown below.

Recommended Connectors:

| Manufacturer | Model |
|--------------|-----------|
| OMRON | XM2A-2501 |



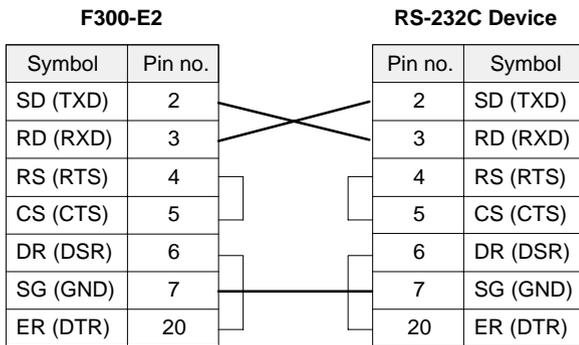
| Pin no. | Symbol | Name |
|---------|----------|---------------------|
| 1 | FG (GND) | Frame ground |
| 2 | SD (TXD) | Send Data |
| 3 | RD (RXD) | Receive Data |
| 4 | RS (RTS) | Request to Send |
| 5 | CS (CTS) | Clear to Send |
| 6 | DR (DSR) | Data Settings Ready |
| 7 | SG (GND) | Signal ground |
| 20 | ER (DTR) | Data Terminal Ready |

Wiring

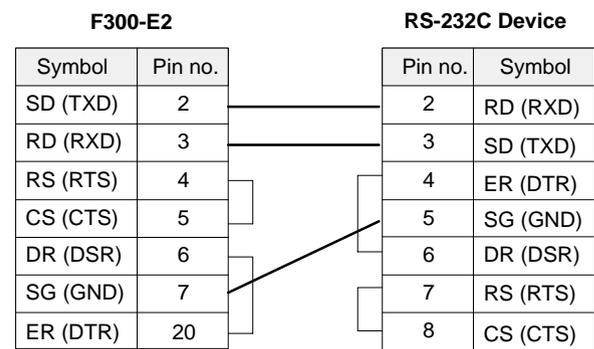
Use only shielded RS-232C cable.

Standard

25-pin Cable Connection (F309-VR)

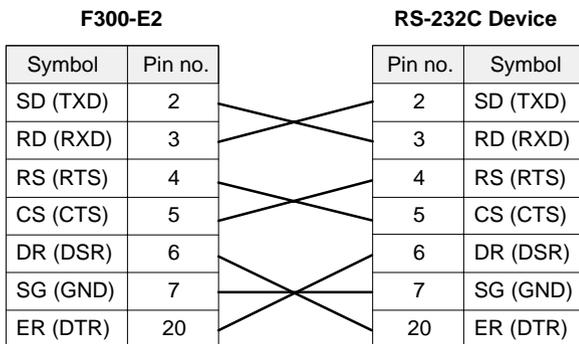


9-pin Cable Connection

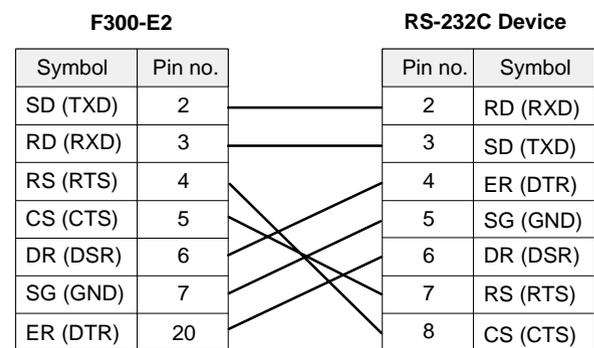


RS/CS Control

25-pin Cable Connection



9-pin Cable Connection



Connecting a Peripheral Device

- 1, 2, 3...**
1. Connect the RS-232C cable connector to the RS-232C connector of the peripheral device.
 2. Tighten the screws.
 3. Set the communications specifications.

Connecting the RS-232C I/F Unit

- 1, 2, 3...**
1. Turn off the power supply switch for the Power Supply Unit.
 2. Connect the RS-232C cable connector to the connector of the RS-232C I/F Unit.
 3. Tighten the screws.
 4. Set the communications specifications.

For instructions on setting RS-232C communications specifications, refer to *5-2-4 Setting the RS-232C Communications Specifications* and *4-3 Menu Operations*.

Disconnecting the Cable

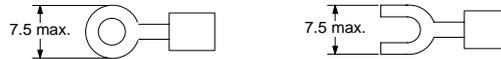
- 1, 2, 3...**
1. Turn off the power supply switch for the Power Supply Unit.
 2. Loosen the screws.
 3. Holding the connector of the cable, pull the connector straight out.

2-4-4 Connecting Terminal Block Units

Connect Terminal Block Units to the Programmable Controller or personal computer.

Crimped Connectors

Use M4 screws as the terminal screws. Use the crimped connectors shown below.



Recommended Parts

An applicable cable from 1.04 to 2.63 mm² should be used.

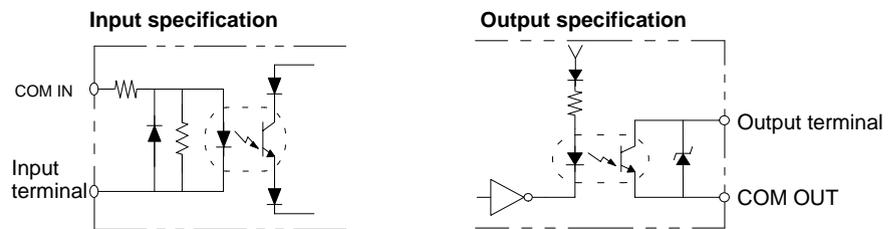
Connectors

Terminal Block connectors are removable. They can be mounted or removed with the wiring still connected. The pin numbers and names are as shown below.

Important In the case of supplying the COM IN and COM OUT terminals with an external power source, use a DC power supply with the safety extra-low voltage output.

| No. | Signal name | No. | Signal name | |
|-----|-------------|-------------|----------------------|------|
| 2 | STEP | 1 | COM IN (for input) | |
| 4 | DSA | 3 | RESET | |
| 6 | DI 1 | Data input | 5 | DI 0 |
| 8 | DI 3 | | 7 | DI 2 |
| 10 | DI 5 | | 9 | DI 4 |
| 12 | DI 7 | | 11 | DI 6 |
| 14 | GATE | | 13 | NC |
| 16 | DO 0 | Data output | 15 | BUSY |
| 18 | DO 2 | | 17 | DO 1 |
| 20 | DO 4 | | 19 | DO 3 |
| 22 | DO 6 | | 21 | DO 5 |
| 24 | AND | | 23 | DO 7 |
| 26 | OR | 25 | COM OUT (for output) | |

Internal Circuit Diagram



2-4-5 Connecting Parallel I/O Units

Connect Parallel I/O Units to the Programmable Controller or personal computer.

Use the multi-conductor shielded cable for connecting the signal lines of Parallel I/O Units.

Connectors and Cable

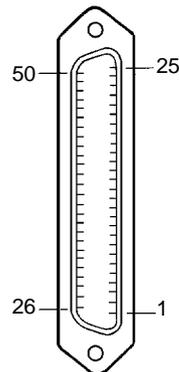
The connectors and cable shown in the table below are recommended.

| Item | Model number | Maker |
|---|--------------------------|-----------------------|
| Connectors used | 57LE-40500-7300 (D34) | Daiichi Denshi Kougyo |
| Conforming connectors (1 set per Unit is included.) | 57JE-B50H-L12 | |
| Cable | UL2464 IFS-RVV-SB series | Fujikura Densen |

For setting output specifications of the Parallel I/O Unit, refer to 5-2-5 *Setting the Output Specifications for Parallel Data*.

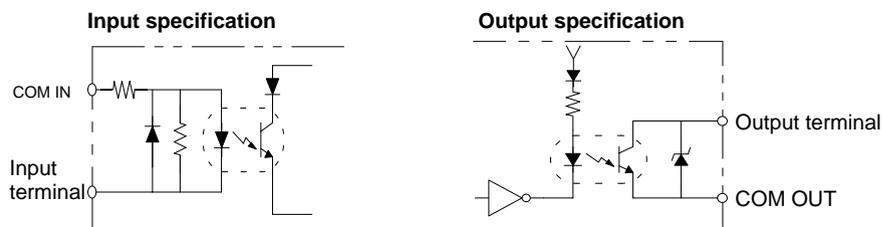
Important In the case of supplying the COM IN and COM OUT terminals with an external power source, use a DC power supply with the safety extra-low voltage output.

Terminal Arrangement



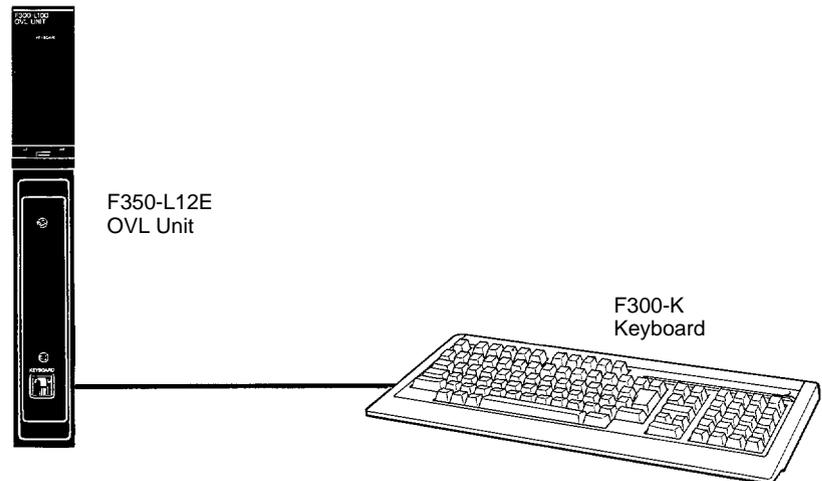
| No. | Signal name | No. | Signal name | |
|-----|----------------------|-------------|----------------------|-------|
| 1 | COM OUT (for output) | 26 | COM OUT (for output) | |
| 2 | DO 31 | Data output | 27 | DO 30 |
| 3 | DO 29 | | 28 | DO 28 |
| 4 | DO 27 | | 29 | DO 26 |
| 5 | DO 25 | | 30 | DO 24 |
| 6 | DO 23 | | 31 | DO 22 |
| 7 | DO 21 | | 32 | DO 20 |
| 8 | DO 19 | | 33 | DO 18 |
| 9 | DO 17 | | 34 | DO 16 |
| 10 | DO 15 | | 35 | DO 14 |
| 11 | DO 13 | | 36 | DO 12 |
| 12 | DO 11 | | 37 | DO 10 |
| 13 | DO 09 | | 38 | DO 08 |
| 14 | DO 07 | | 39 | DO 06 |
| 15 | DO 05 | | 40 | DO 04 |
| 16 | DO 03 | | 41 | DO 02 |
| 17 | DO 01 | | 42 | DO 00 |
| 18 | BUSY | | 43 | GATE |
| 19 | NC | Data input | 44 | DI 7 |
| 20 | DI 6 | | 45 | DI 5 |
| 21 | DI 4 | | 46 | DI 3 |
| 22 | DI 2 | | 47 | DI 1 |
| 23 | DI 0 | 48 | DSA | |
| 24 | RESET | 49 | STEP | |
| 25 | COM IN (for input) | 50 | COM IN (for input) | |

Internal Circuit Diagram



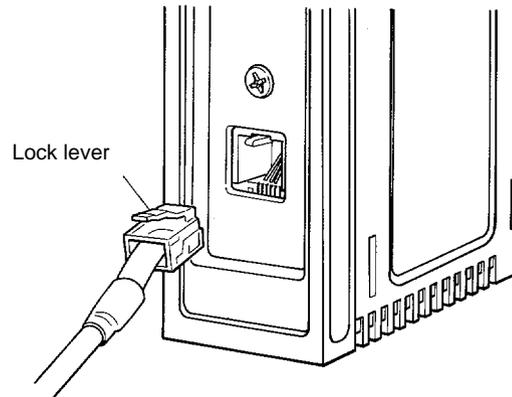
2-5 OVL Unit

Follow the procedure below to connect and disconnect the F300-K Keyboard and the OVL Unit.



Connecting the OVL Unit

- 1, 2, 3... 1. Turn off the power supply switch for the Power Supply Unit.
2. Holding the connector with the lock lever pointing up, push the connector straight in until it locks.



Disconnecting the OVL Unit

- 1, 2, 3... 1. Turn off the power supply switch for the Power Supply Unit.
2. Push down the lock lever to unlock the connector and pull the connector straight out.

SECTION 3

Starting and Ending the Setup Menu

This section describes how to start and stop the Setup Menu.

| | |
|-----|-------------------------------|
| 3-1 | Starting the Setup Menu |
| 3-2 | Ending the Setup Menu |

3-1 Starting the Setup Menu

The Setup Menu is designed to be used for installing application programs and for setting an environment such as communications specifications for I/O Units.

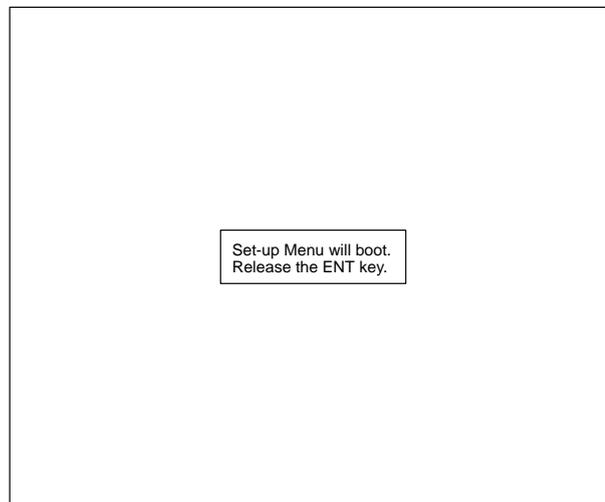
Before operating up the Setup Menu, check to be sure that the following conditions are satisfied.

- All the basic units in the configuration are properly connected.
- Power supply and earth cables are properly wired.

Procedure

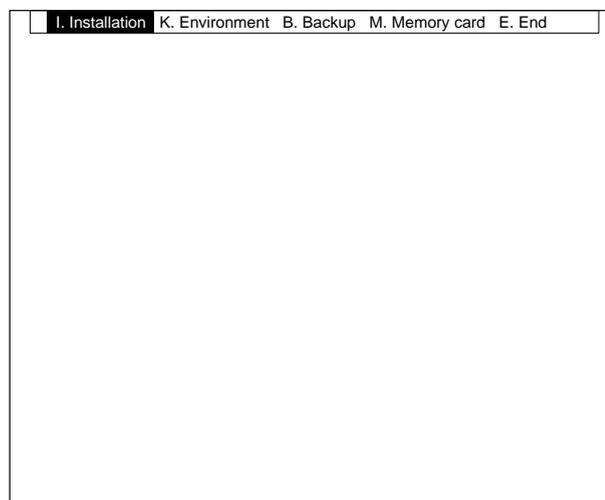
- 1, 2, 3...**
1. Turn on the power supply switch for the video monitor.
 2. While pressing the Enter Key, turn on the power supply switch for the F350 power unit.

A message confirming the startup of the Setup Menu is displayed.



3. Release the Enter Key.

The Basic Screen of the Setup Menu is displayed.



3-2 Ending the Setup Menu

Procedure

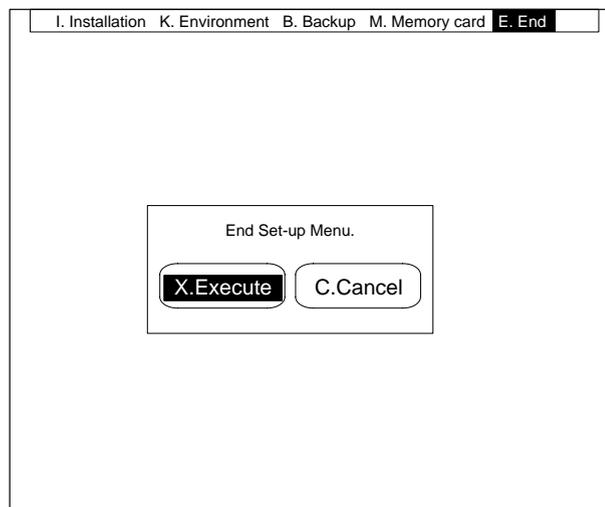
- 1, 2, 3... 1. Select "E.End."
A message is displayed asking for confirmation.
- 2. Select "X.Execute."
The Setup Menu operation ends and the System restarts according to the newly set data.

When Ending with the Power Supply Switch for the F350 Turned Off

Before ending, check to be sure that the following conditions are satisfied.

- Data loading, saving, or copying function is not being executed.
- The MMI Unit's orange Memory Card Access indicator is not lit.

Even after the power supply switch is turned off, the data set in the Setup Menu will be retained.



SECTION 4

Basic Operation of the Setup Menu

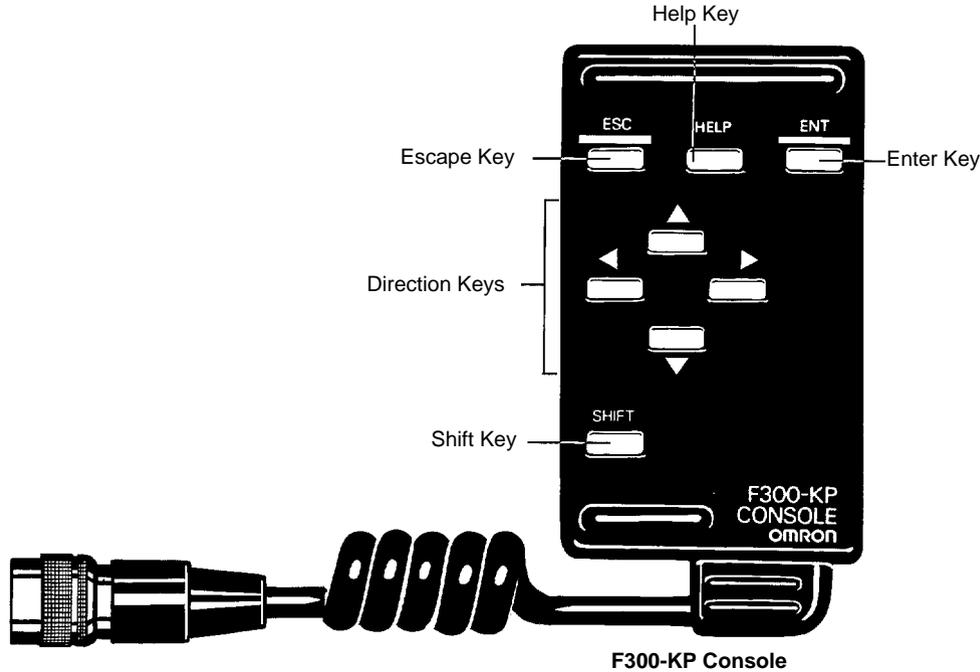
The Setup Menu is operated by means of the Console, keyboard, or RS-232C. Be sure to familiarize yourself with the operation procedures before actually operating the Menu.

| | | |
|-------|----------------------------|--|
| 4-1 | Input Devices | |
| 4-1-1 | Console Key | |
| 4-1-2 | Keyboard | |
| 4-1-3 | RS-232C | |
| 4-2 | Screen Configuration | |
| 4-3 | Menu Operations | |
| 4-3-1 | Selecting Menus | |
| 4-3-2 | Setting Data | |
| 4-3-3 | Inputting Numbers | |
| 4-4 | Inputting Characters | |

4-1 Input Devices

4-1-1 Console Key

Menus are operated by means of the Console. Be sure to familiarize yourself with Console operations before actually operating menus. Names and functions of the Console key are as shown below.



| Display | Name | Function |
|---------|------------|---|
| ESC | Escape Key | Interrupts processing and returns the user to the previous menu display. |
| HELP | Help Key | The Help Key is not used in the Setup Menu. |
| ENT | Enter Key | Executes cursor position functions. When a menu is being displayed, it displays the next level menu at the cursor position. When data is being input, it sets the data. |
| ▲ | Up Key | These two keys move the cursor up and down. |
| ▼ | Down Key | |
| ◀ | Left Key | These two keys move the cursor to the right and left. |
| ▶ | Right Key | |
| SHIFT | Shift Key | Has no effect when pressed alone. It must be used in combination with another key. |

4-1-2 Keyboard

The keys for inputting from the keyboard are shown below with their corresponding Console keys.

| Console key | Keys for inputting from the keyboard |
|-------------|--------------------------------------|
| ESC | ESC |
| HELP | HELP, CTRL+A |
| ENT | ↵, CTRL+M |
| ▲ | ↑, CTRL+E |
| ▼ | ↓, CTRL+X |
| ◀ | ←, CTRL+S |
| ▶ | →, CTRL+D |
| SHIFT | SHIFT |

4-1-3 RS-232C

The keys (codes) for inputting from RS-232C are shown below with their corresponding Console keys.

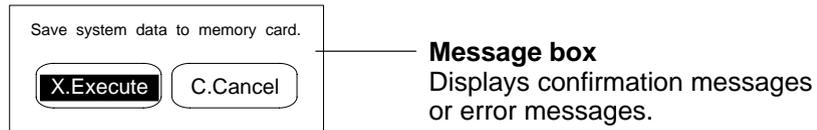
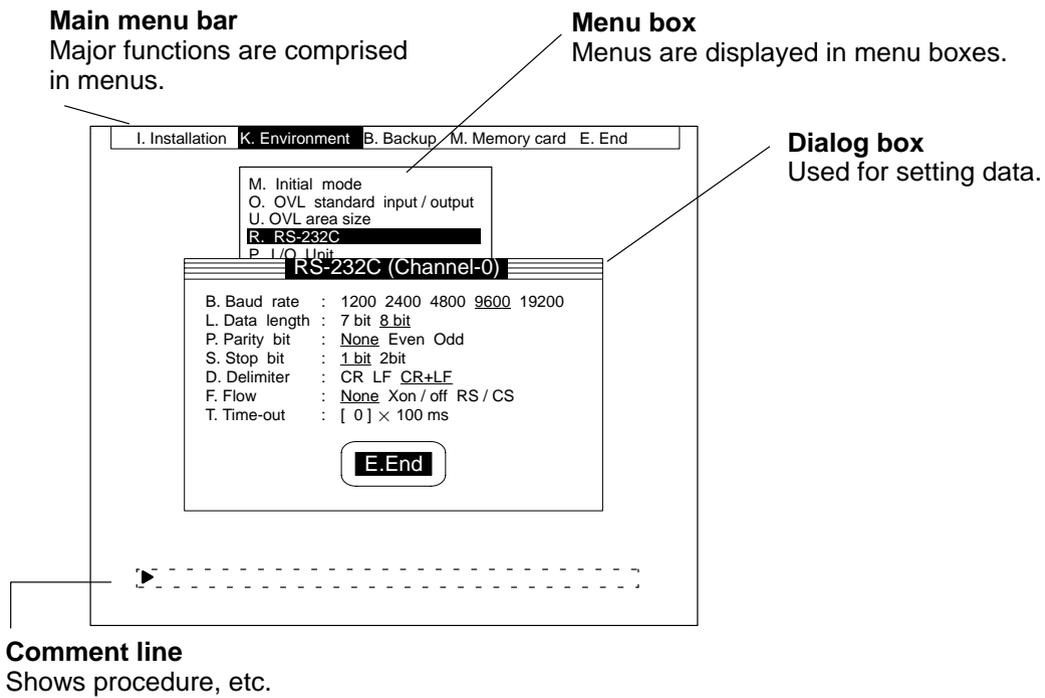
| Console key | RS-232C input code |
|-------------|--------------------|
| ESC | CTRL + [(\$1B) |
| HELP | CTRL + A(\$01) |
| ENT | CTRL + M(\$0D) |
| ▲ | CTRL + E(\$05) |
| ▼ | CTRL + X(\$18) |
| ◀ | CTRL + S(\$13) |
| ▶ | CTRL + D(\$04) |

Always Begin Operation from Channel 0.

If operation is begun from a channel 1, menu operation will not be possible. Set the communications specifications for channel 0. For details, refer to *5-2-4 Setting RS-232C Communications Specifications*.

4-2 Screen Configuration

The screen configuration of the Setup Menu is shown below.



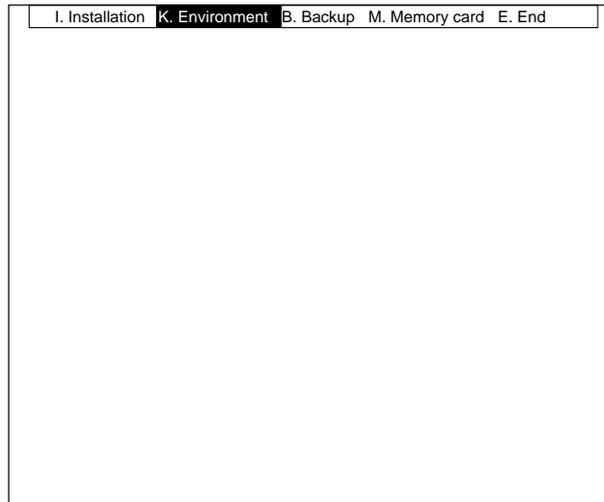
4-3 Menu Operations

4-3-1 Selecting Menus

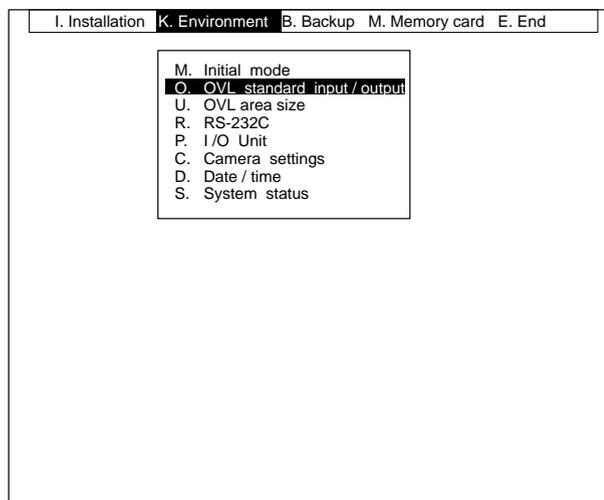
F350 menus are hierarchical, so it is necessary to move through related menus to select the desired menu. The procedure for moving through the menu hierarchy is explained here.

Procedure

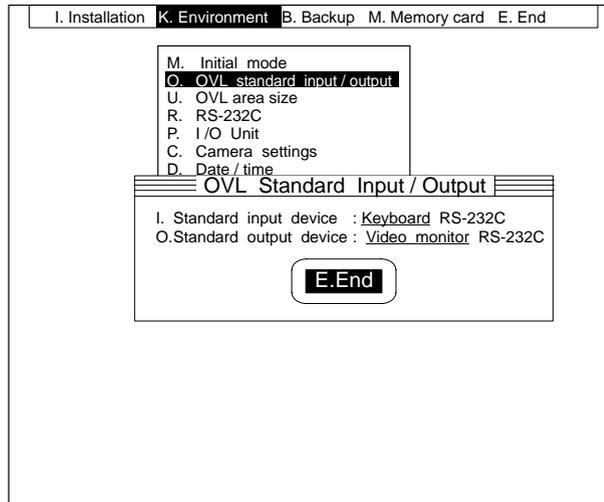
- 1, 2, 3... 1. Move the cursor to the desired function.



2. Press the Enter Key. The next menu in the hierarchy will then be displayed.
3. Move the cursor to the name of the desired menu.



- Press the Enter Key. The menu will then be displayed. Repeat the above steps 3 and 4 to move to the next menu in the hierarchy.



- Press the Escape Key to return to the previous menu in the hierarchy. Repeat this step to return to the menu before that. This operation can be executed repeatedly until the Basic Screen appears.

The keyboard and RS-232C have the following functions.

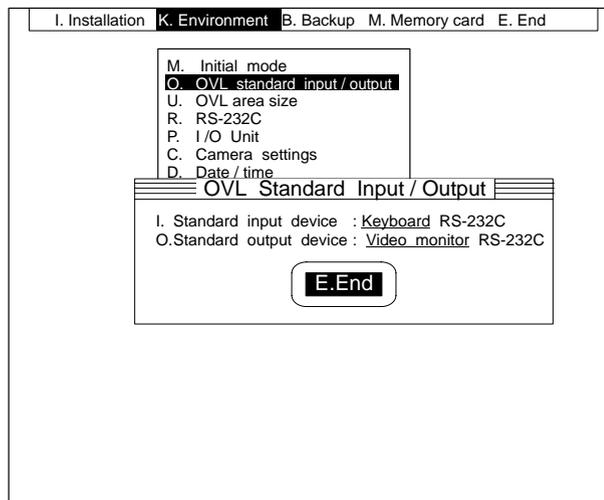
| Inputting from the keyboard | Inputting from RS-232C | Function |
|-----------------------------|--|---|
| A to Z, 0 to 9 | A to Z, 0 to 9 (\$41 to \$5A, \$30 to \$39) | Changes to the next menu in the hierarchy indicated by the abbreviated operation character. |
| F1 to F6 | --- | Displays the lower level menu in the hierarchy for the menu bar item that corresponds with the function number. |
| HOME CLR | --- | Displays the Basic Screen with the menu bar alone. |

4-3-2 Setting Data

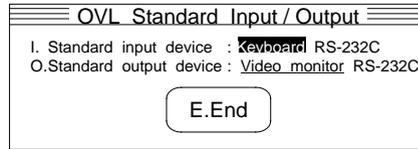
In the data setting screen, make several data settings and then select “E.End” to enter them all at once. At the time of shipping, the default value is set for each data.

Procedure

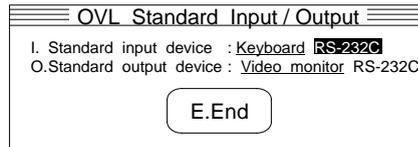
- 1, 2, 3... 1. Move the cursor to the menu that you wish to change. The current settings will be underlined.



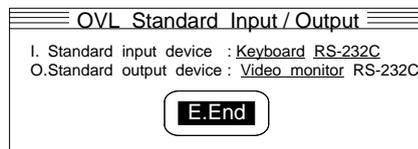
2. Move the cursor to the setting that is to be changed.



3. Move the cursor to the desired setting.



4. Move the cursor to "E.End." The new settings will be underlined.



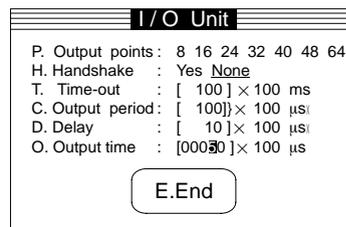
5. Press the Enter Key. The changed data will be set.

4-3-3 Inputting Numbers

The methods for inputting numbers required for designating communications specifications in data setting operations. There are two ways to input numbers. One is to change numbers incrementally or decrementally the digit, and the other is to input numbers directly using the keyboard or RS-232C.

Changing Numbers Incrementally or Decrementally

- 1, 2, 3... 1. Move the cursor to the item for which the number is to be changed and press the Enter Key. The numeric input mode will be displayed.
2. Move the cursor to the digit that is to be changed.



3. Press the Up Key or Down Key to change the number.

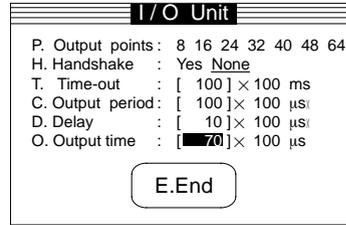
| Key | Function |
|-----|---------------------|
| ▲ | Incremented by one. |
| ▼ | Decrement by one. |

Note Entering a Minus Sign:

Move the cursor to the leftmost digit. Press the Up and Down Keys, and the minus sign will be entered.

When changing more than one digit, repeat the above steps 2 and 3.

4. Press the Enter Key. The number will be changed.



Clearing a Number to 0

Press the Shift and Enter Keys simultaneously in the numeric input mode.

Making Fine Adjustments

Increment or decrement the number by one. Move the cursor to the item that is to be changed.

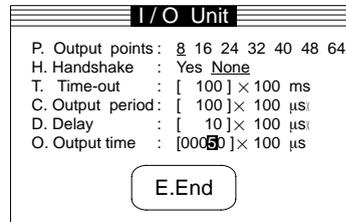
| Key | Function |
|----------|---|
| ▶ | The smallest unit will be incremented by one. |
| ◀ | The smallest unit will be decremented by one. |
| SHIFT+ ▶ | The digit ten times larger than the smallest unit will be incremented by one. |
| SHIFT+ ◀ | The digit ten times larger than the smallest unit will be decremented by one. |

Inputting Numbers Directly

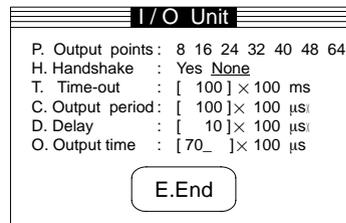
Numbers can be input directly by means of the keyboard or RS-232C.

1, 2, 3...

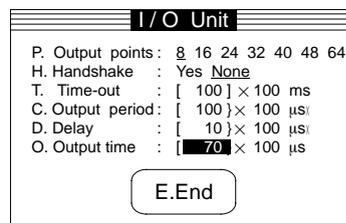
1. Move the cursor to the item for which the number is to be changed and press the Enter Key. The numeric input mode will be displayed.



2. Input a number to be newly set. Enter a new number including the decimal point.



3. Press the Enter Key. The number will be changed.



The following function is available when inputting numbers by means of the keyboard or RS-232C.

| Inputting from the keyboard | Inputting from RS-232C | Function |
|-----------------------------|------------------------|---|
| BS | CTRL+H (\$08) | Deletes the number just to the left of the cursor position. |

4-4 Inputting Characters

The methods for inputting characters for filenames, and so on, are explained here. There are two methods for inputting characters. One is to select characters from the character list displayed on the screen and the other is to directly input characters by means of the keyboard or RS-232C.

Selecting from the Character List

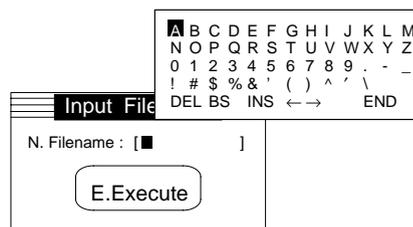
The following characters can be selected.

| | | | | | | | | | | | | |
|-----|----|-----|---|---|---|---|---|---|---|---|---|-----|
| A | B | C | D | E | F | G | H | I | J | K | L | M |
| N | O | P | Q | R | S | T | U | V | W | X | Y | Z |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | . | - | - |
| ! | # | \$ | % | & | ' | (|) | ^ | ' | \ | | |
| DEL | BS | INS | | ← | → | | | | | | | END |

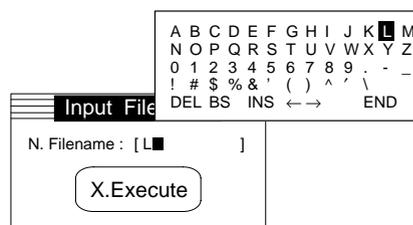
In addition to these characters, the following functions are available.

| Display | Operation |
|---------|---|
| DEL | Deletes the character at the cursor position. |
| BS | Deletes the character just to the left of the cursor position. |
| INS | Toggles between insert and overwrite mode. (The default is overwrite mode.) |
| ← | Moves the cursor to the left. |
| → | Moves the cursor to the right. |
| END | Ends the character input operation. |

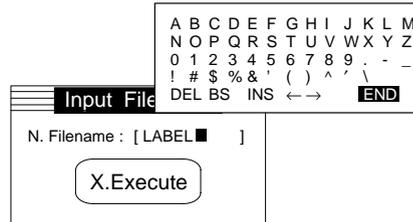
- 1, 2, 3...
1. Move the cursor to the item for which characters are to be entered and press the Enter Key. The screen will display the character input mode and the characters that can be input.



2. Move the cursor to the character that is to be entered.
3. Press the Enter Key. The selected character will be entered. If more than one character needs to be entered, repeat the steps 2 and 3 for each additional character.



- When all the desired characters have been entered, move the cursor to END and press the Enter Key or press the Escape Key. The newly entered characters will be set and the character input mode will be exited.



Deleting All Characters

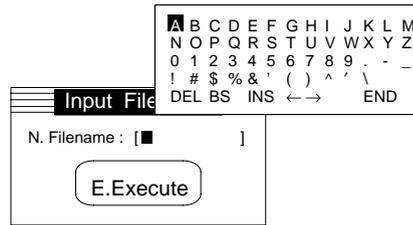
Press the Shift Key and Enter Key simultaneously in the character input mode.

Inserting Characters

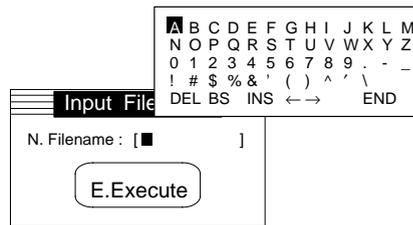
Move the cursor to INS and select either the insert mode or the overwrite mode. When the insert mode is selected, the cursor will become an underline. When the overwrite mode is selected, the underline will change back to cursor.

Directly Inputting Characters Characters can be input directly by means of the keyboard or RS-23SC.

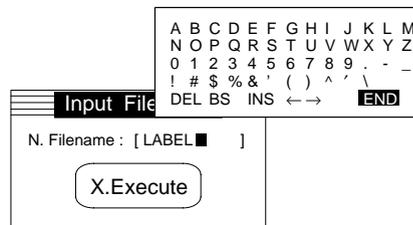
- 1, 2, 3... 1. Move the cursor to the item for which characters are to be entered and press the Enter Key. The screen will display the character input mode.



2. Enter the desired characters.



3. When all the desired characters have been entered, move the cursor to END and press the Enter Key or press the Escape Key. The newly entered characters will be set and the character input mode will be exited.



The following functions are available when inputting characters by means of the keyboard or RS-232C.

| Inputting from the keyboard | Inputting from RS-232C | Function |
|------------------------------------|-------------------------------|--|
| DEL | --- | Deletes the character at the cursor position. |
| BS | CTRL+H (\$08) | Deletes the character just to the left of the cursor position. |
| INS | --- | Changes between the insert mode and overwrite mode. |

SECTION 5

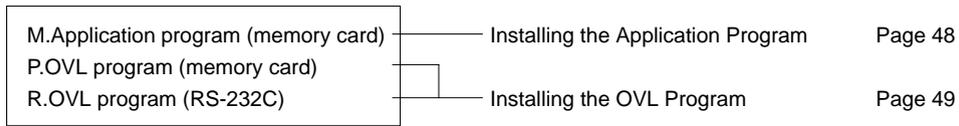
Functions and Operations of the Setup Menu

This section describes the functions and operation of the Setup Menu in detail.

| | |
|-------|--|
| 5-1 | I.Installation |
| 5-1-1 | Installing the Application Program: M.Application program |
| 5-1-2 | Installing the OVL Program: P(R).OVL program |
| 5-2 | K.Environment |
| 5-2-1 | Designating Startup Operations: M.Initial mode |
| 5-2-2 | Setting the OVL Standard I/O Devices: O.OVL standard input/output |
| 5-2-3 | Changing the OVL Area Size: U.OVL area size |
| 5-2-4 | Setting the RS-232C Communications Specifications: R.RS-232C |
| 5-2-5 | Setting the Output Specifications for Parallel Data: P.I/O Unit |
| 5-2-6 | Setting Specifications of the Camera to be Connected: C.Camera setting |
| 5-2-7 | Setting the Date and Time for the Timer: D.Date/Time |
| 5-2-8 | Checking the System Status: S.System status |
| 5-3 | B.Backup |
| 5-3-1 | Loading or Saving the System Data: S.Loading/Saving System Data |
| 5-3-2 | Loading/Saving the Model Data: M.Loading/Saving Model Data |
| 5-3-3 | Loading/Saving the Backup Data: B.Loading/Saving Backup Data |
| 5-4 | M.Memory Card |
| 5-4-1 | Initializing the Memory Card or RAM Disk: F.Format |
| 5-4-2 | Editing the Memory Card or RAM Disk: E.Edit |
| 5-4-3 | Starting Up Application Programs (*.VEX): X.Execute |
| 5-5 | E.End |

5-1 I.Installation

Install a program for executing inspection on the F350 and run the program.



5-1-1 Installing the Application Program: M.Application program

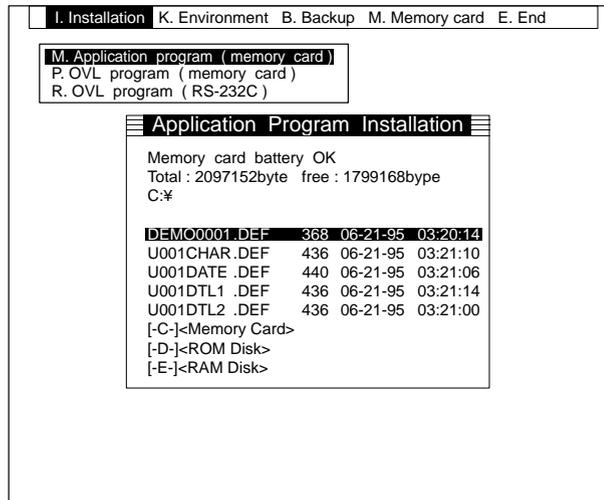
A program specially designed for applications is called an Application Program. Using the installed Application Program, set the inspection conditions and execute the inspection. Set in advance the F350-U★★★E System Memory Card that contains the Application Program.

Once the Application Program is installed by means of this function, the “K.Environment/M.Initial mode” is automatically set to “Automatic execution.” When the power is turned on the next time, the Application Program will start up automatically. Refer to 5-2-1 Designating Startup Operations.

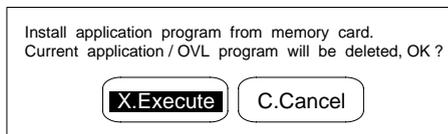
Note Be sure to first save any essential data before installing the Application Program. When the installation is executed, the software that was previously installed will be removed from memory, along with its associated set data. In addition, when an F350-C4★E IMP Unit is used, the data saved to the RAM Disk will be completely deleted. Refer to 5-3 B.Backup.

Procedure

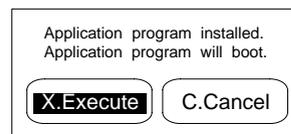
- 1, 2, 3... 1. Select the “M.Application program (memory card).” Application Program files in the root directory on the Memory Card will be displayed. If a subdirectory is provided, subdirectory names will also be displayed.



2. Select a filename. A message will be displayed asking for confirmation.



3. Select “X.Execute.” The selected program file will be installed.



4. Select "X.Execute." The Application Program will start up. Select "C.Cancel" to return to the Basic Screen of the Setup Menu.

Important Do not turn off the power while installation is in progress. This will cause the data in the F350 memory to be destroyed, resulting in a malfunction at the next start-up operation.

5-1-2 Installing the OVL Program: P(R).OVL program

Programs can be created using the OVL. These programs are called OVL programs.

Intalling the OVL Program from the Memory Card

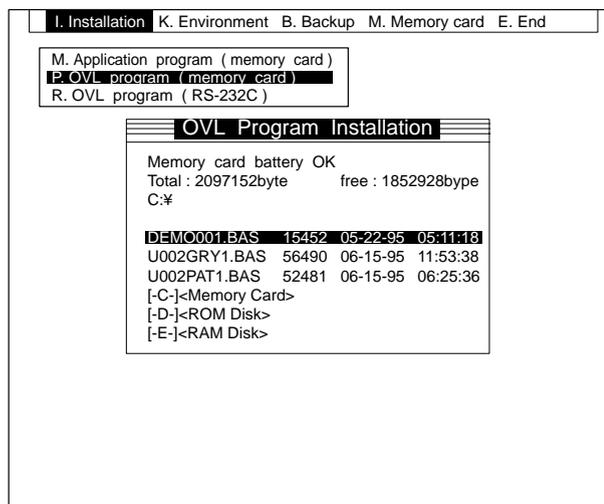
Install the OVL program saved on the Memory Card. Set in advance the Memory Card that contains the OVL program.

Once the OVL program is installed, the "K.Environment/M.Initial mode" is automatically set to "Automatic execution." When the power is turned on the next time, the OVL system will start up and OVL program will be executed automatically. Refer to 5-2-1 Designating Startup Operations.

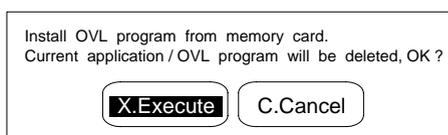
Note Be sure to first save any essential data before installing the OVL Program. When the installation is executed, the software that was previously installed will be removed from memory, along with its associated set data. In addition, when an F350-C4★E IMP Unit is used, the data saved to the RAM Disk will be completely deleted. Refer to 5-3 B.Backup.

Procedure

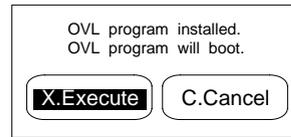
- 1, 2, 3... 1. Select the "P.OVL program (memory card)." OVL program files in the root directory on the Memory Card will be displayed. If a subdirectory is provided, subdirectory names will also be displayed.



2. Select a filename. A message will be displayed asking for confirmation.



- 3. Select "X.Execute." The selected program file will be installed. When installation is complete, a message will be displayed asking for confirmation.



- 4. Select "X.Execute." The OVL system will start up and the OVL program will be executed automatically. Select "C.Cancel" to return to the Basic Screen of the Setup Menu.

Important Do not turn off the power while installation is in progress. Otherwise, the data in the F350 memory will be destroyed, resulting in a malfunction at the next startup operation.

Installing the OVL Program via RS-232C

Install the OVL program via RS-232C.

Match the Communications Specifications for the F350 with Those for the External Devices.

Refer to 5-2-4 *Setting the RS-232C Communications Specifications.*

Be Sure to Use Channel 0

The OVL program cannot be installed via Channel 1.

Transmission Program at the External Device

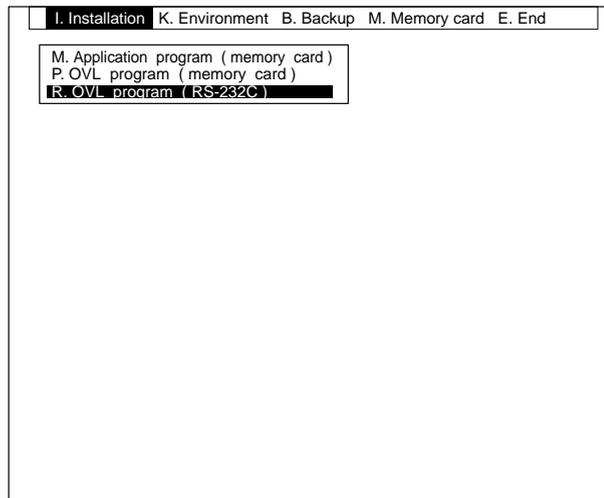
Examples of transmission programs using Quick BASIC are shown in *Appendix B RS-232C Data Transmission Program Examples.*

Once the OVL program is installed, the "K.Environment/M.Initial mode" is automatically set to "Automatic execution." When the power is turned on the next time, the OVL system will start up and OVL program will be executed automatically. Refer to 5-2-1 *Designating Startup Operations.*

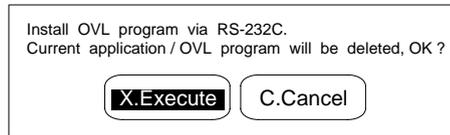
Note Be sure to first save any essential data before installing the OVL Program. When the installation is executed, the software that was previously installed will be removed from memory, along with its associated set data. In addition, when an F350-C4★E IMP Unit is used, the data saved to the RAM Disk will be completely deleted. Refer to 5-3 *B.Backup.*

Procedure

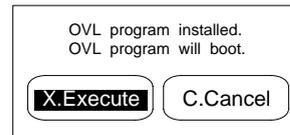
- 1, 2, 3... 1. Select "P.OVL program (RS-232C)." A message will be displayed asking for confirmation.



2. Transmit the OVL program from an external device.



3. Select "X.Execute." During installation, a message indicating transmission is in progress will be displayed. When installation is complete, a message will be displayed asking for confirmation.



4. Select "X.Execute." The OVL system will start up and the OVL program will be executed automatically. Select "C.Cancel" to return to the Basic Screen of the Setup Menu.

Important Do not turn off the power while installation is in progress. Otherwise, the data in the F350 memory will be destroyed, resulting in a malfunction at the next startup operation.

5-2 K.Environment

"K.Environment" is used for setting the communications specifications of the I/O devices or for setting startup operations. All the data set under "K.Environment" can be loaded or saved as the system data in the Memory Card or via the RS-232C. The date and time settings for the timer are updated starting from the set data and, therefore, not included in the system data.

| | | |
|-----------------------------|--|---------|
| M.Initial mode | Designating Startup Operations | Page 51 |
| O.OVL standard input/output | Setting the OVL Standard I/O Devices | Page 52 |
| U.OVL area size | Changing the OVL Area Size | Page 53 |
| R.RS-232C | Setting the RS-232C Communications Specifications | Page 54 |
| P.I/O Unit | Setting the Output Specifications for Parallel Data | Page 57 |
| C.Camera settings | Setting Specifications of the Camera to be Connected | Page 60 |
| D.Date/time | Setting the Date and Time for the Timer | Page 61 |
| S.System status | Checking the System Status | Page 62 |

5-2-1 Designating Startup Operations: M.Initial mode

Set the operations executed when the power is turned on.

| Mode | Startup operation |
|---------------------|--|
| OVL prompt | OVL system starts up and OVL prompt is displayed. |
| Automatic execution | <p>If the Application Program has been installed, the program will be started.</p> <p>If the OVL program has been installed, the OVL system will start up and the OVL program will be executed automatically.</p> <p>When canceling the automatic execution of OVL program, bring up the Setup Menu and change the "K.Environment/M.Initial mode" to "OVL prompt." Refer to 3-1 Starting the Setup Menu.</p> |

Note 1. **When Set to "OVL prompt"**
The OVL system doesn't start if the standard input device (keyboard or RS-232C) is not connected. Turn off the power and connect either the OVL Unit or RS-232C I/F Unit.

2. When Set to “Automatic execution”

Automatic execution will not function unless the Application Program or OVL program is installed.

If the “K.Environment/O.OVL standard input/output/I.Standard input device” is set to “Keyboard,” the OVL system starts. However, operations cannot be executed unless the keyboard is connected.

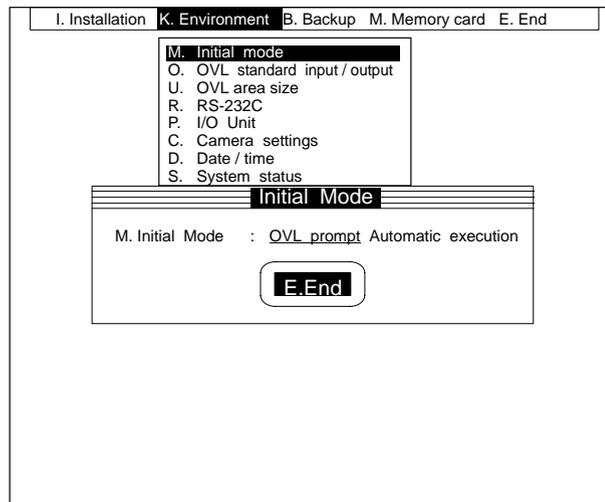
Turn off the power, start the Setup Menu and install either the Application Program or OVL program.

Refer to 3-1 *Starting the Setup Menu*.

The initial mode of the F350 can be set not only by the Setup Menu but also by using the IPL command of the OVL. The last settings set by either method remain valid as the initial mode of the F350.

Procedure

- 1, 2, 3... 1. Select “M.Initial mode.”
2. Select the initial mode.



3. Select “E.End.” When the power is turned on the next time, the system will start up in the set initial mode.

5-2-2 Setting the OVL Standard I/O Devices: O.OVL standard input/output

Set the I/O devices when using the OVL.

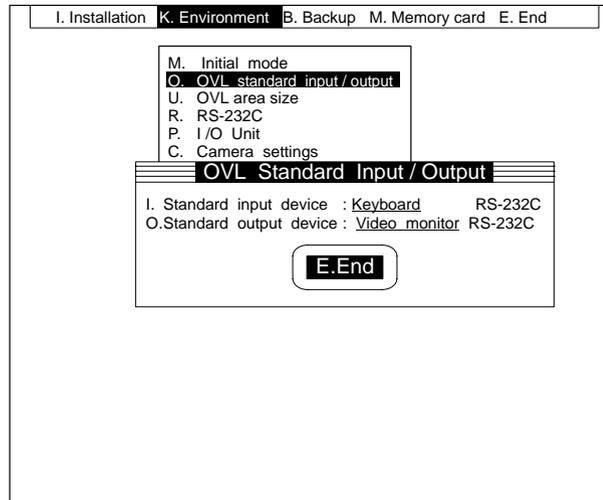
Normally, the keyboard is used as an input device and the video monitor as an output device. The RS-232C can be used as an I/O device if the F350 is located beyond one's reach or if the video monitor is located in a place where it cannot be easily monitored.

When using the Application Software, set the Video Monitor as a standard output device. If RS-232C is set, correct messages will not appear on the Video Monitor.

Important The OVL standard I/O devices can be set not only by the Setup Menu but also by using the IPL command of the OVL. The last settings set by either method remain valid as the OVL standard I/O devices.

Procedure

- 1, 2, 3... 1. Select "O.OVL standard input/output."
2. Determine the settings for "I.Standard input device" and "O.Standard output device."



3. Select "E.End."

5-2-3 Changing the OVL Area Size: U.OVL area size

The "U.OVL area size" menu can be used to change, in units of 1 Kbyte, the sizes of the text area, the user area, and the RAM Disk area in memory. No RAM Disk area is available with the F350-C1★E.

When the settings are changed, the data that was previously set for the text area and the user area is cleared and the RAM Disk area is formatted.

When the Application Program is installed, the sizes of the text area, user area, and RAM Disk area are all automatically changed to the sizes required for the installation.

The sizes for all of these areas vary depending on the IMP Unit that is used, as shown in the following tables.

• **F350-C1★E IMP Unit**

Set as follows: Text area + User area = 256 Kbytes.

| Area | Size | Default |
|-----------|-----------------|------------|
| Text area | 2 to 256 Kbytes | 96 Kbytes |
| User area | 0 to 254 Kbytes | 160 Kbytes |

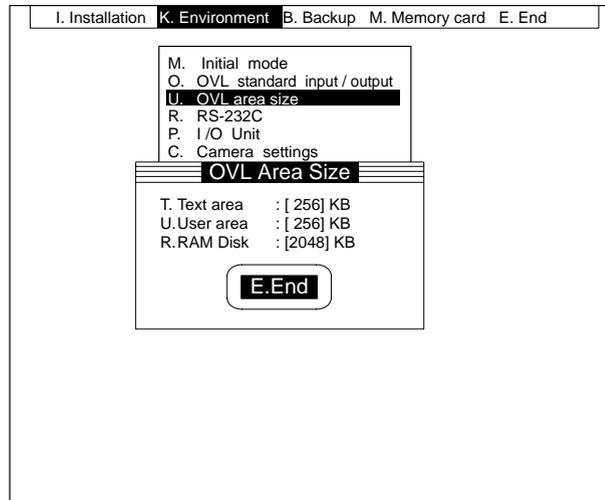
• **F350-C4★E IMP Unit**

Set as follows: Text area + User area + RAM Disk area = 2,560 Kbytes.

| Area | Size | Default |
|---------------|-------------------|--------------|
| Text area | 2 to 2,560 Kbytes | 256 Kbytes |
| User area | 0 to 2,558 Kbytes | 256 Kbytes |
| RAM Disk area | 0 to 2,558 Kbytes | 2,048 Kbytes |

Procedure

- 1, 2, 3... 1. Select "U.OVL area size." Set the size for each area.



2. Select "E.End."

5-2-4 Setting the RS-232C Communications Specifications: R.RS-232C

It is necessary to set the RS-232C communications specifications in the following cases.

- When operations are executed via the RS-232C.
- When commands are input via the RS-232C.
- When inspection results are output via the RS-232C.
- When data is loaded or saved via the RS-232C.

The F350 uses the XMODEM/128(SUM) system as the communications protocol for loading or saving the system data, model data, or backup data. Therefore, set the data length and flow control for the RS-232C as shown in the following table.

| Item | Settings |
|---------------|-------------|
| L.Data length | 8 bits |
| F.Flow | None, RS/CS |

When transmitting data via a communication software on the external device, set its protocol to the XMODEM/128(SUM) system. The time-out function set in the F350 remains valid. If not using any communications software on the external device side, create a data transmission program suitable for the XMODEM/128(SUM) system.

Examples of transmission programs using Quick BASIC are shown in *Appendix B RS-232C Data Transmission Program Examples*.

Setting the Communications Specifications

Set Channels 0 and 1. Set to specifications according to the devices to be connected.

| Item | Settings |
|---------------|--|
| B.Baud rate | 1200, 2400, 4800, 9600, 19200 (bps) |
| L.Data length | 7, 8 (bits) |
| P.Parity | None, even, odd |
| S.Stop bit | 1, 2 (bits) |
| D.Delimiter | CR, LF, CR+LF |
| F.Flow | <p>None, Xon/off, RS/CS</p> <p>Xon/off Flow control is performed using the software program.</p> <ul style="list-style-type: none"> • When loading, Xon/off control is performed according to the receiving status of the F350. • When saving, data is transmitted according to the Xon/off status of the external device. <p>RS/CS Flow control is performed using hardware. Be sure to use the cables that connect the F350 to the RS and CS signals of the external device.</p> <ul style="list-style-type: none"> • When saving, data is transmitted according to the ON/OFF control of the SC signal from the external device. |
| T.Time-out | <p>Can be set in units of 100 ms.</p> <p>Input a number between 1 and 255. Inputting "0" means that the time-out function is not executed.</p> |

Time-out Function

When set to "F.Flow," time-out errors may occur under the following conditions.

Xon/off: When loading, data is not transmitted from the external device within the time-out period.

When saving, the external device is not set to Xon within the time-out period.

RS/CS: When loading, data is not transmitted from the external device within the time-out period.

When saving, the CS signal doesn't turn on at the external device within the time-out period.

None: When loading, data is not transmitted from the external device within the time-out period.

When data is transmitted using the XMODEM/128(SUM) system, a time-out error occurs under the following conditions regardless of the "F.Flow" settings.

When Loading:

Data is not transmitted from the external device within the time-out period following the transmission of NAK(\$15) from the F350.

Data is not transmitted from the external device within the time-out period following the transmission of ACK(\$06) from the F350.

When Saving:

NAK(\$15) is not transmitted from the external device within the time-out period following the moment when the F350 is set to the transmission state.

ACK(\$06) is not transmitted from the external device within the time-out period following the moment when the F350 completes one-block transmission.

Combinations of Settings

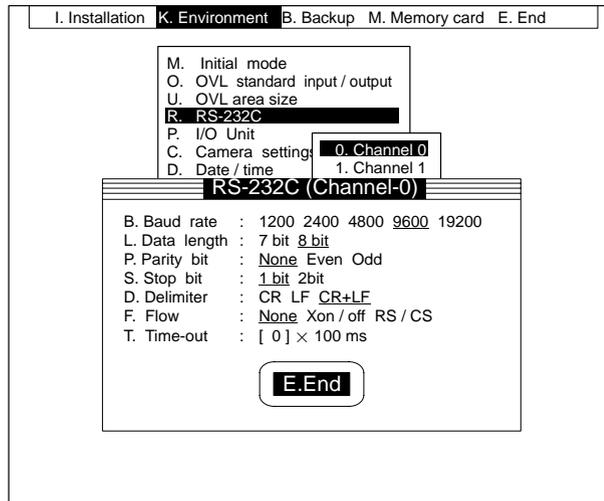
Set the stop bit, data length and parity to one of the following combinations.

| Stop bit | Data length | Parity |
|----------|-------------|--------|
| 1 bit | 7 bits | Odd |
| | | Even |
| | 8 bits | None |
| | | Odd |
| | | Even |
| | 2 bits | 7 bits |
| Even | | |
| 8 bits | | None |

Communications specifications set under the Setup Menu become the initial values for the OPEN command of the OVL.

Procedure

- 1, 2, 3... 1. Select "R.RS-232C."
2. Select the channel to be set. The communications specifications setting screen will be displayed.
3. Set communications specifications.

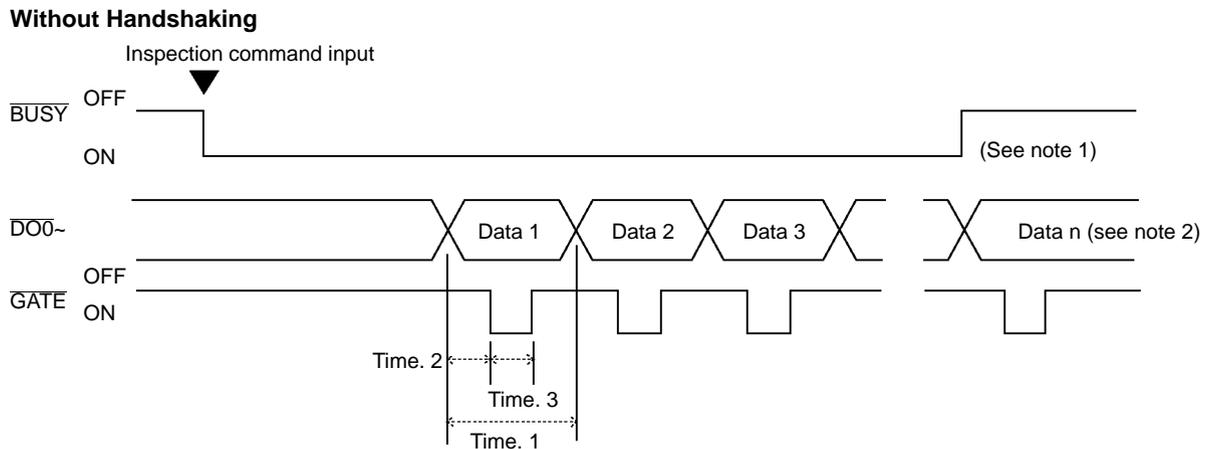


4. Select "E.End."

5-2-5 Setting the Output Specifications for Parallel Data: P.I/O Unit

For outputting inspection results to the I/O Unit or Terminal Block Unit, parallel data output specifications need to be set. The output time chart is as shown below.

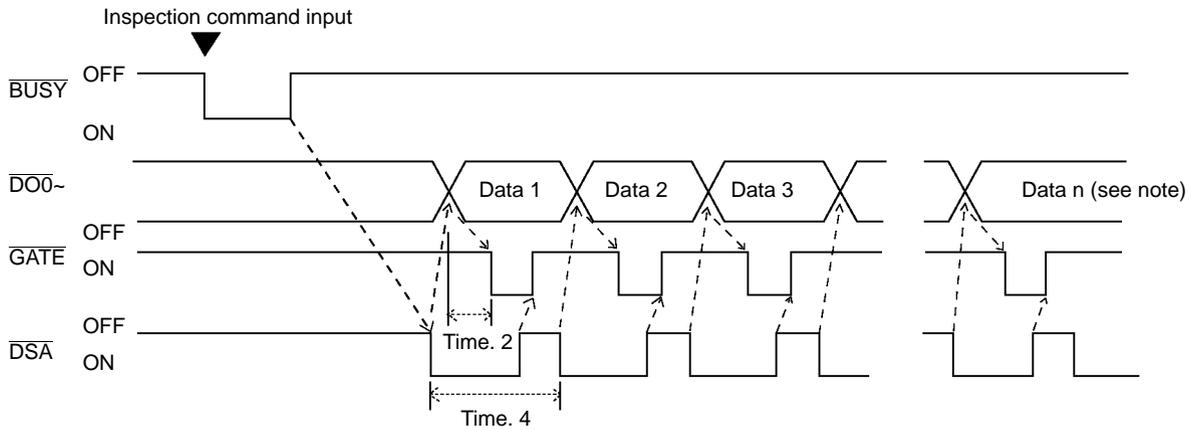
Output Time Chart



- Note**
1. The relationship between the timing when the BUSY signal changes from ON to OFF and the timing when the data output starts varies depending on the inspection conditions.
 2. The number of data “n” varies depending on the measuring conditions.

| Terminal | Function |
|----------|--|
| BUSY | Turns on while processing the command. Important Do not input the next command while the BUSY signal is on. Otherwise, the command under processing or the newly input command may not be properly executed. |
| DO | Outputs data. For output formats, refer to the operation manual of each application software. |
| GATE | Used to control the timing for obtaining data. Set the output period, the delay time, and the output time, and keep it on for a period long enough so that the data is obtained completely. Time 1: Output period Sets the data outputting period. Time 2: Delay Sets the time from the moment when data is output to the moment when the GATE signal is turned on. Time 3: Output time Sets the time during which the GATE signal is turned on. Obtain data while the GATE signal is turned on. |

With Handshaking



Note The number of data “n” varies depending on the measuring conditions.

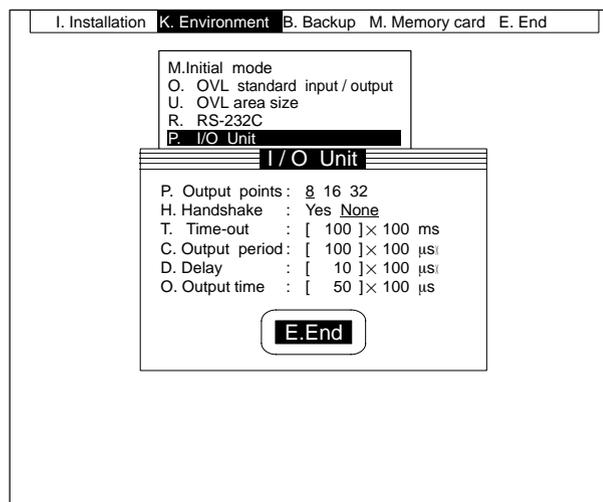
| Terminal | Function |
|----------|--|
| BUSY | Turns on while processing the command. Important Do not input the next command while the BUSY signal is on. Otherwise, the command under processing or the newly input command may not be properly executed. |
| DO | Outputs data. For output formats, refer to the operation manual of each application software. |
| GATE | Used to control the timing for obtaining data. Sets the delay time and turns on when the data can be obtained completely. Time 2: Delay Sets the time from the moment when the data is output to the moment when the GATE signal is turned on. Obtain data while the GATE signal is turned on. |
| DSA | Used to request the next data output from the external device. Turn this on when the external device is ready to receive the next data. The F350 doesn't output data until the DSA signal changes from OFF to ON (i.e., until rise is detected). If the time-out function is set, a time-out error occurs under the following condition. The DSA signal doesn't change from off to on within the time-out period. Time 4: Time-out period Sets the period from the moment when the DSA signal turns on to the moment when the DSA signal turns on again. |

Setting Output Specifications

| Item | Settings |
|--|--|
| P.Output points | 8, 16, 32 |
| H.Handshake | <p>Yes: Inspection results are output while synchronizing the F350 with an external device.</p> <p>No: Inspection results are output without synchronizing the F350 with an external device. The F350 outputs inspection results to the Terminal Block Unit or Parallel I/O Unit and then turns ON the GATE signal. With the external device, control the timing for reading inspection results upon reading the GATE signal.</p> |
| T.Time-out (Time 4) Valid when the handshake is set to "Yes." | <p>Set the time in units of 100 μs from the moment when the DSA signal of an external device turns ON to the moment when the DSA signal turns ON again. If the DSA signal does not change from OFF to ON within the time-out time, the F350 will generate a time-out error.</p> <p>Default setting is 100. Enter a number between 0 and 65535. Inputting "0" doesn't execute the time-out function. This value will be ignored if the handshake is set to "No."</p> |
| C.Output period (Time 1) Valid when the handshake is set to "No." | <p>Set the period for outputting inspection results in units of 100 μs. Set to a value that exceeds the delay plus the output time. Default setting is 100. Enter a number between 3 and 65535. This value will be ignored when the handshake is set to "Yes."</p> |
| D.Delay (Time 2) | <p>Set the time in units of 100 μs from the moment when measurements results are output to DO to the moment when the GATE signal changes from OFF to ON. If inspection results are output to DO at the same time as when the GATE signal changes from OFF to ON, an external device may try to retrieve inspection results before output has been established. The GATE signal, therefore, must be changed from OFF to ON after an output to DO has been established.</p> <p>Default setting is 50. Enter a number between 1 and 65535.</p> |
| O.Output time (Time 3) Valid when the handshake is set to "No." | <p>Set the time in units of 100 μs for which GATE signal remains ON. Set the time required for an external device to read inspection results.</p> <p>Default setting is 50. Enter a number between 1 and 65535. This value will be ignored when the handshake is set to "Yes."</p> |

Procedure

- 1, 2, 3... 1. Select "P.I/O Unit." The output specifications setting screen will be displayed.
2. Set the output format.



3. Select "E.End."

Output specifications set under the Setup Menu become the initial values for the DBOUT command of the OVL.

5-2-6 Setting Specifications of the Camera to be Connected: C.Camera setting

Set the specifications of the Camera and Camera I/F Unit.

If the settings differ from the specifications of the mounted Camera and Camera I/F Unit, correct picture images cannot be taken. Make sure that the specifications are correctly set.

| Item | Settings | | |
|-------------------------------|---|---|--|
| U.Camera I/F Unit | Automatically recognizes the Camera I/F Unit currently mounted and displays the model. If one of the following Camera I/F Units is mounted, the displayed model will differ from the actual model. | | |
| | Mounted Camera I/F Unit | | Display |
| | Simultaneous Normal Camera I/F Unit | F300-A22S | F300-A20S |
| | Simultaneous Shutter Camera I/F Unit | F300-A22RS | F300-A20RS/A21RS (Select F300-A20RS) |
| | Frame Shutter Camera I/F Unit | F300-A23RS | F300-A20S |
| C.Camera | A list of Cameras that can be used for the Camera I/F Unit currently mounted is displayed. Select the Camera to be used. See the table below for a list of Cameras. | | |
| | Mounted Camera I/F Unit | | Camera |
| | Normal Camera I/F Unit | F300-A20 | F200-S, F300-S |
| | Simultaneous Normal Camera I/F Unit | F300-A22S | F300-S |
| | Shutter Camera I/F Unit | F300-A20R | PJLG-50/55/60-Z (Select "O. Other" when using F300-S2R/S3DR.) |
| | | Simultaneous Shutter Camera I/F Unit | F300-A22RS |
| | | | F300-A21RS |
| Frame Shutter Camera I/F Unit | F300-A23RS | Displayed F300-S cannot be used. Select "O. Other" when using F300-S4R. | |
| Y.Camera sync | When F200-S, F300-S, or PJLG-50/55/60-Z is selected, synchronizing method suitable for the mounted Camera is automatically displayed. When using F300-S2R/S3DR/S4R, set to external synchronization. | | |
| S.Strobe disable, start | When F200-S, F300-S, or PJLG-50/55/60-Z is selected, strobe disable start and end values suitable for the mounted Camera are automatically displayed. When using F300-S2R/S3DR/S4R, set the strobe disable start and end values according to the shutter speed. | | |
| G.Strobe disable, end | | | |

The following table shows the strobe disable start and stop values when F300-S2R/S3DR/S4R has been selected for the "C. Camera."

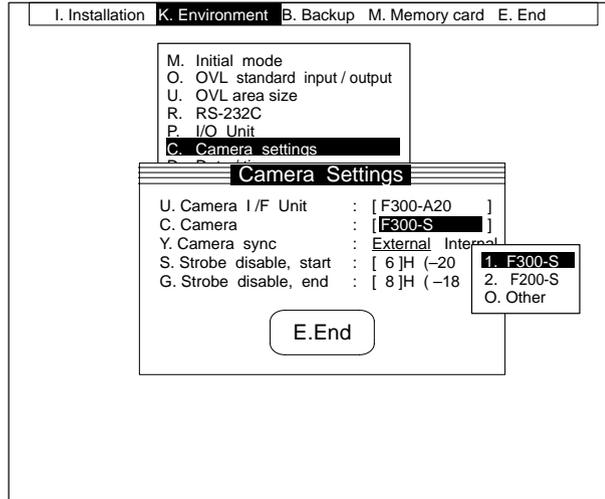
| Shutter speed (s) | F300-S2R | | F300-S3DR | | F300-S4R | |
|-------------------------|----------|-----|-----------|-----|----------|-----|
| | Start | End | Start | End | Start | End |
| 1/1,000 | -8 | -6 | -10 | -8 | -16 | -14 |
| 1/1,500 | --- | --- | --- | --- | -11 | -9 |
| 1/2,000 (initial value) | -2 | 0 | -2 | 0 | -8 | -6 |
| 1/3,000 | --- | --- | --- | --- | -6 | -4 |
| 1/4,000 | -2 | 0 | 3 | 5 | -5 | -3 |
| 1/6,000 | --- | --- | --- | --- | -3 | -1 |
| 1/8,000 | --- | --- | --- | --- | -3 | -1 |
| 1/10,000 | -2 | 0 | 5 | 7 | -2 | 0 |
| 1/30,000 | --- | --- | --- | --- | -2 | 0 |
| 1/50,000 | --- | --- | --- | --- | -2 | 0 |

Important Operations cannot be guaranteed for any camera other than those mentioned above. If you wish to use a camera other than one of those, please consult your nearest OMRON representative.

Production of the F300-A21RS Shutter Simultaneously Camera I/F Unit and PJLG-50/55/60/70-Z will stop in March 1997.

Procedure

- 1, 2, 3... 1. Select "C. Camera."
2. Set the specifications.



3. Select "E.End."

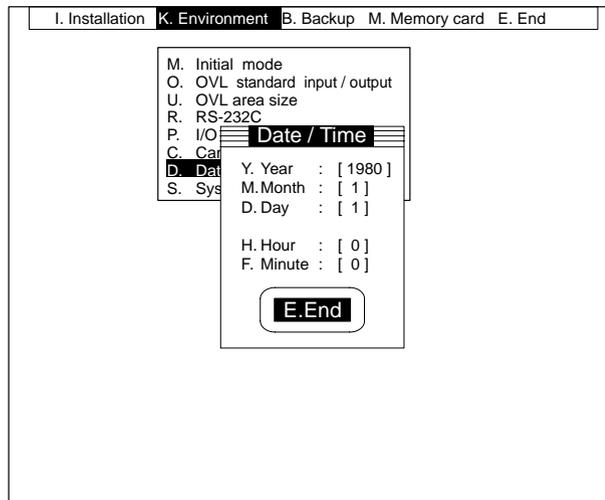
5-2-7 Setting the Date and Time for the Timer: D.Date/Time

Set the date and time for the timer on the F350. Its default setting is January 1, 1980, 0 hours, 0 minutes.

| Item | Settings |
|----------|--|
| Y.Year | Enter a number between 1980 and 2079. |
| M.Month | Enter a number between 1 and 12. |
| D.Day | Enter a number between 1 and 31. (Enter a calendar day depending on the month set for the "M.Month.") |
| H.Hour | Enter a number between 0 and 23. |
| F.Minute | Enter a number between 0 and 59. |

Procedure

- 1, 2, 3... 1. Select "D.Date/time."
2. Set the date and time.



3. Select "E.End."

5-2-8 Checking the System Status: S.System status

The system status of the F350 is displayed.

Check the remaining number of models that can be registered, status of the Memory Card, status of the battery, etc.

Search Model
The number of search models already registered and the remaining number of models that can be registered are displayed here.

ROI Model
The number of ROI models already registered and the remaining number of models that can be registered are displayed here.

Memory Card
The total capacity and available capacity of the Memory Card as well as the status (ON/OFF) of the write protect are displayed here when the Memory Card is mounted.
If the Memory Card is not mounted: Not inserted
If the Memory Card is not initialized: Not initialized

Version
The ROM version of the F350 is displayed here.

RAM Disk
Data can be saved to or loaded from the RAM Disk when an F350-C40E IMP Unit is used. The total capacity and available capacity of the RAM Disk are displayed here.

System Status

| | | | |
|--|--------------------------|---------------------|--|
| I. Installation K. Environment B. Backup M. Memory card E. End | | | |
| M. Initial mode | | | |
| O. OVL standard input/output | | | |
| System Status | | | |
| Version | : Main CPU Ver. 2.00-000 | 1995.06.06 13:51:14 | |
| | : Sub CPU Ver. 2.00 | | |
| Search model | : 0 registered | 436 not registered | |
| ROI model | : 0 registered | 1024 not registered | |
| Memory card | : Capacity 2048KB | Available 1809KB | |
| | : Write-protect Off | | |
| RAM disk | : Capacity 2048KB | Available 1900KB | |
| Battery | : System | OK | |
| | : Memory card | OK | |
| O. OK | | | |

Battery Voltage

The status of the battery voltage for backing up the memory of the IMP Unit is displayed here.

- When the battery voltage is sufficient: OK
 - When the battery voltage has dropped: Needs replacement
- The status of the battery voltage is displayed when the Memory Card is mounted.
- When the battery voltage is sufficient: OK
 - When the battery voltage has dropped: Needs replacement

Procedure

- 1, 2, 3... 1. Select "S.System status."
The system status is displayed.
2. Select "O.OK."

5-3 B.Backup

The data set in the F350 can be loaded or saved via the Memory Card or RS-232C.

| | | |
|------------------------------|---|---------|
| S.Loading/saving system data | ————— Loading or Saving the System Data | Page 63 |
| M.Loading/saving model data | ————— Loading/saving the Model Data | Page 67 |
| B.Loading/saving backup data | ————— Loading/saving the Backup Data | Page 74 |

5-3-1 Loading or Saving the System Data: S.Loading/Saving System Data

The data set under “K.Environment” is called the system data. This data can be saved or loaded via the Memory Card or RS-232C. The date and time settings for the timer are updated starting from the set data and, therefore, not included in the system data.

Note Data can be saved to or loaded from the RAM Disk when an F350-C4★E IMP Unit is used.

Loading from the Memory Card or RAM Disk

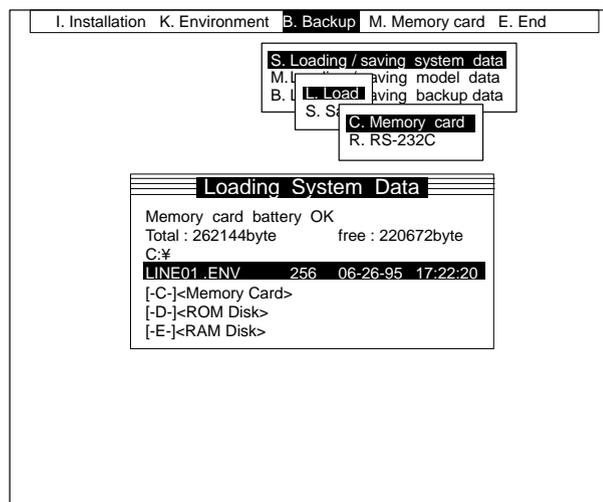
This procedure loads the system data from the Memory Card or RAM Disk. Set in advance the Memory Card that contains the system data.

For details regarding compatibility of the data, refer to *Data Compatibility* on page 7.

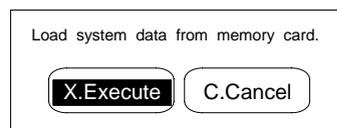
Procedure

- 1, 2, 3...
1. Select “S.Loading/saving system data.”
 2. Select “L.Load.”
 3. Select “C.Memory card.” A list of system data files in the root directory on the Memory Card will be displayed. If there are any subdirectories, the subdirectory names will also be displayed.

To load files from the RAM Disk, follow step 4. To load from the Memory Card, follow step 5.



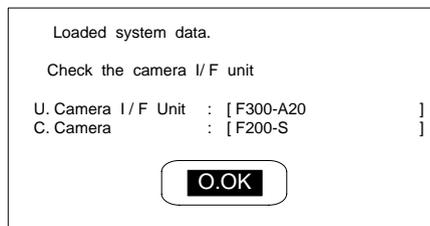
4. Select Drive “[-E-].”
5. Select a filename. A message will be displayed asking for confirmation.



6. Select "X.Execute." The selected file will be loaded.

When loading is complete, a message will be displayed asking for confirmation. Check the Camera I/F Unit and camera settings.

If the settings differ from the specifications of the Camera I/F Unit or camera actually mounted, correct images cannot be taken. Correct the settings. Refer to 5-2-6 *Setting Specifications of the Camera to be Connected.*



7. Select "O.OK."

Important Do not turn off the power while loading is in progress. Otherwise, the data in the F350 memory will be destroyed, resulting in a malfunction at the next startup operation.

Loading via RS-232C

This procedure loads the system data via RS-232C.

For details regarding compatibility of the data, refer to *Data Compatibility* on page 7.

Match the Communications Specifications for the F350 with Those for the External Devices

Refer to 5-2-4 *Setting the RS-232C Communication Specification.*

Transmission Program at the External Device

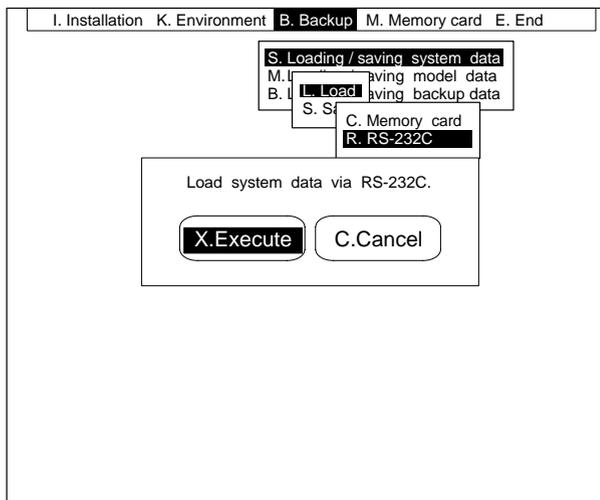
Create a transmission program that matches the data transmission method using the XMODEM/128(SUM) system. Examples of transmission programs using Quick BASIC are shown in *Appendix B RS-232C Data Transmission Program Examples.*

Be Sure to Use Channel 0.

The system data cannot be loaded via Channel 1.

Procedure

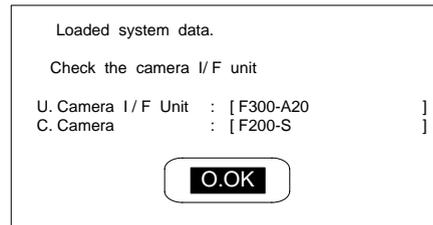
- 1, 2, 3... 1. Select the "S.Loading/saving system data."
- 2. Select "L.Load."
- 3. Select "R.RS-232C." A message will be displayed asking for confirmation.
- 4. Transmit the system data from the external device.



5. Select "X.Execute." The transmitted data will be loaded. During loading, a message indicating data transmission will be displayed.

When loading is complete, a message will be displayed asking for confirmation.

Check the settings for the Camera I/F Unit and camera. If the settings differ from the specifications of the Camera I/F Unit or camera actually mounted, correct images cannot be taken. Correct the settings. Refer to 5-2-6 *Setting Specifications of the Camera to be Connected*.



6. Select "O.O.K."

Important Do not turn off the power while loading is in progress. This will cause the data in the F350 memory to be destroyed, resulting in a malfunction at the next startup operation.

Saving to the Memory Card or RAM Disk

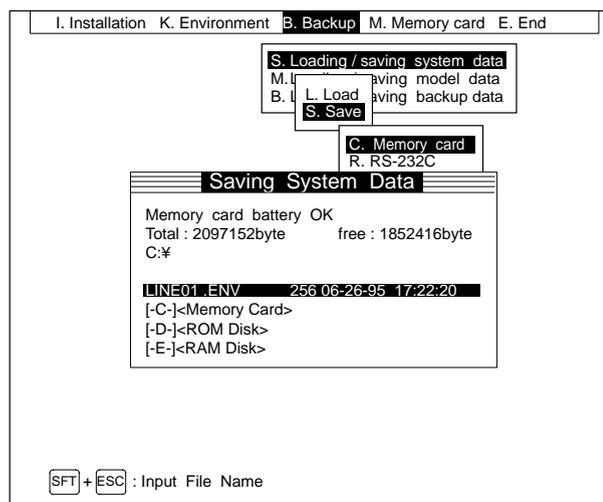
This procedure saves the system data to the Memory Card or RAM Disk.

An extension (.ENV) will be automatically added to the saved filename. If the Memory Card is being used for the first time after being purchased, it must first be initialized. Refer to 5-4-1 *Initializing Memory Cards*.

Procedure

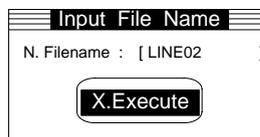
- 1, 2, 3... 1. Select "S.Loading/saving system data."
2. Select "S.Save."
3. Select "C.Memory card." A list of system data files in the root directory on the Memory Card will be displayed. If there are any subdirectories, the subdirectory names will also be displayed.

To save files to the RAM Disk, follow step 4. To save to the Memory Card, follow step 5.

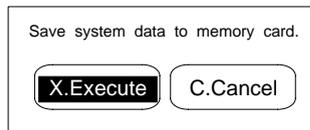


4. Select Drive "[-E-]."
5. Press the Shift and Escape Keys simultaneously. The filename input screen will be displayed.

6. Input a filename.



7. Select "X.Execute." A message will be displayed asking for confirmation.



8. Select "X.Execute." The selected file will be saved. When saving is complete, a message will be displayed asking for confirmation.

9. Select "O.OK."

Important Do not turn off the power while data is being saved, or the data will not be saved correctly.

Saving via RS-232C

This procedure saves the system data via RS-232C.

Match the Communications Specifications for the F350 with Those for the External Devices

Refer to 5-2-4 *Setting the RS-232C Communications Specifications.*

Reception Program at the External Device

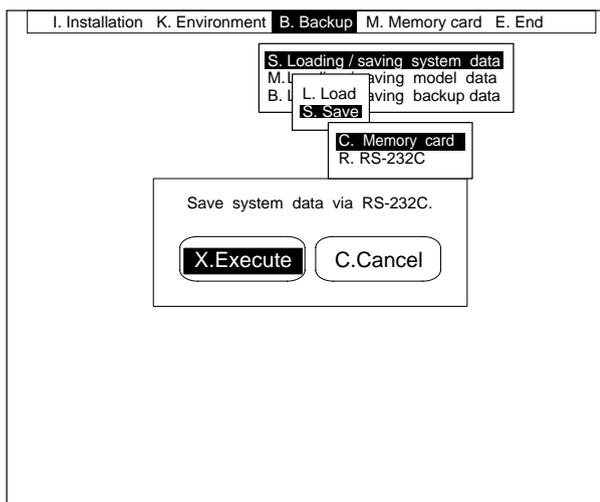
Create a reception program that matches the data transmission method using the XMODEM/128(SUM) system. Examples of reception programs using Quick BASIC are shown in *Appendix B RS-232C Data Transmission Program Examples.*

Be Sure to Use Channel 0.

The system data cannot be saved via Channel 1.

Procedure

- 1, 2, 3...
1. Select "S.Loading/saving system data."
 2. Select "S.Save."
 3. Select "R.RS-232C." A message will be displayed asking for confirmation.
 4. Select "X.Execute."



The received data will be saved. During saving, a message indicating data transmission will be displayed.

When saving is complete, a message will be displayed asking for confirmation.

5. Select "O.OK."

Note Do not turn off the power while data is being saved, or the data will not be saved correctly.

5-3-2 Loading/Saving the Model Data: M.Loading/Saving Model Data

The data used as a reference in the F350 inspection is called the model data. There are two kinds of model data: search model and ROI model. The model data can be loaded or saved via the Memory Card or the RS-232C. When the memory of the F350 is destroyed due to a system failure, data must be set again to restore the memory. Therefore, it is suggested that the model data be saved for so that restoration to the original state occurs easily.

It is also suggested that the backup data together with the model data be saved so that restoration from the system failure occurs easily. Refer to 5-3-3 *Loading/Saving the Backup Data*.

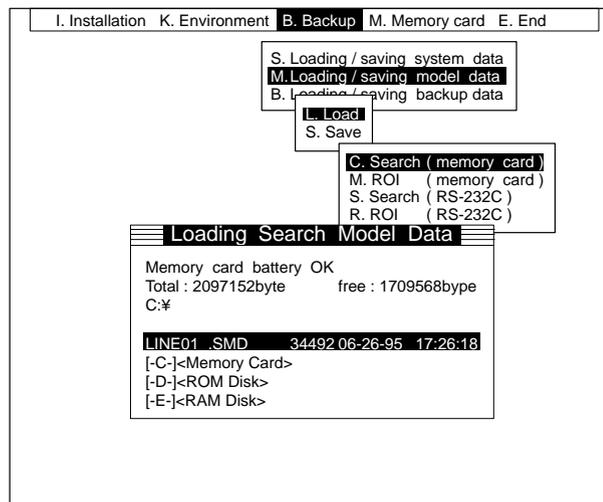
Note Data can be saved to or loaded from the RAM Disk when an F350-C4★E IMP Unit is used.

Loading Search Model Data from the Memory Card or RAM Disk

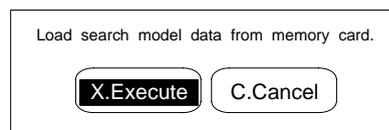
This procedure loads the search model data saved in the Memory Card or RAM Disk. Set in advance the Memory Card that contains the search model data. For details regarding compatibility of the data, refer to *Data Compatibility* on page 7.

Procedure

- 1, 2, 3... 1. Select "M.Loading/saving model data."
2. Select "L.Load."
3. Select "C.Memory card." A list of search model data files in the root directory on the Memory Card will be displayed. If there are any subdirectories, the subdirectory names will also be displayed.
To load files from the RAM Disk, follow step 4. To load from the Memory Card, follow step 5.



4. Select Drive "[-E-]."
5. Select a filename. A message will be displayed asking for confirmation.



6. Select "X.Execute." The selected file will be loaded.
When loading is complete, a message will be displayed asking for confirmation.
7. Select "O.OK."

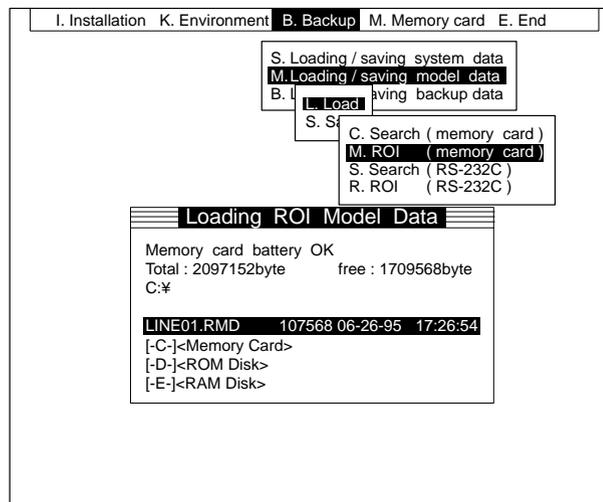
Important Do not turn off the power while loading is in progress. This will cause the data in the F350 memory to be destroyed, resulting in a malfunction at the next startup operation.

Loading ROI Model Data from the Memory Card or RAM Disk

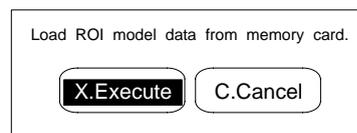
This procedure loads the ROI model data saved in the Memory Card or RAM Disk. Set in advance the Memory Card that contains the ROI model data. For details regarding compatibility of the data, refer to *Data Compatibility* on page 7.

Procedure

- 1, 2, 3... 1. Select "M.Loading/saving model data."
2. Select "L.Load."
3. Select "M.ROI (memory card)." A list of ROI model data files in the root directory on the Memory Card will be displayed. If there are any subdirectories, the subdirectory names will also be displayed.
To load files from the RAM Disk, follow step 4. To load from the Memory Card, follow step 5.



4. Select Drive "[-E-]."
5. Select a filename. A message will be displayed asking for confirmation.



6. Select "X.Execute." The selected file will be loaded.
When loading is complete, a message will be displayed asking for confirmation.
7. Select "O.OK."

Important Do not turn off the power while loading is in progress. This will cause the data in the F350 memory to be destroyed, resulting in a malfunction at the next startup operation.

Loading Search Model Data via RS-232C

This procedure loads the search model data via RS-232C.

For details regarding compatibility of the data, refer to *Data Compatibility* on page 7.

Match the Communications Specifications for the F350 with Those for the External Devices.

Refer to 5-2-4 *Setting the RS-232C Communication Specifications*.

Transmission Program at the External Device

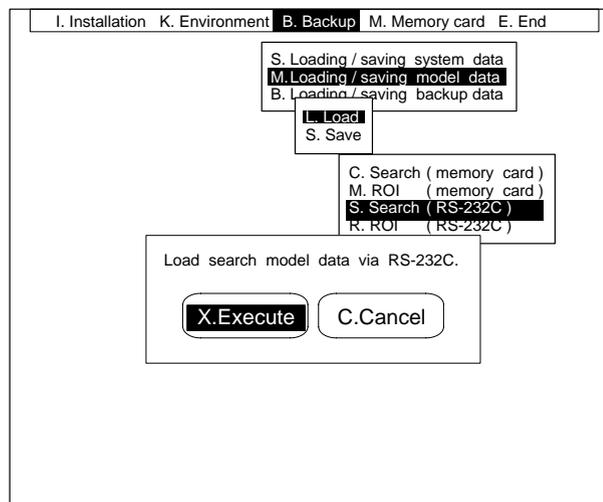
Create a transmission program that matches the data transmission method using the XMODEM/128(SUM) system. Examples of transmission programs using Quick BASIC are shown in *Appendix B RS-232C Data Transmission Program Examples*.

Be sure to use Channel 0.

The search model data cannot be loaded via Channel 1.

Procedure

- 1, 2, 3... 1. Select "M.Loading/saving model data."
2. Select "L.Load."
3. Select "S.Search (RS-232C)." A message will be displayed asking for confirmation.
4. Transmit the search model data from an external device.



5. Select "X.Execute." The transmitted data will be loaded. During loading, a message indicating data transmission will be displayed.
When loading is complete, a message will be displayed asking for confirmation.
6. Select "O.OK."

Important Do not turn off the power while installation is in progress. This will cause the data in the F350 memory to be destroyed, resulting in a malfunction at the next start-up operation.

Loading ROI Model Data via RS-232C

This procedure loads the ROI model data via RS-232C.

For details regarding compatibility of the data, refer to *Data Compatibility* on page 7.

Match the Communications Specifications for the F350 with Those for the External Devices.

Refer to 5-2-4 *Setting the RS-232C Communication Specifications*.

Transmission Program at the External Device

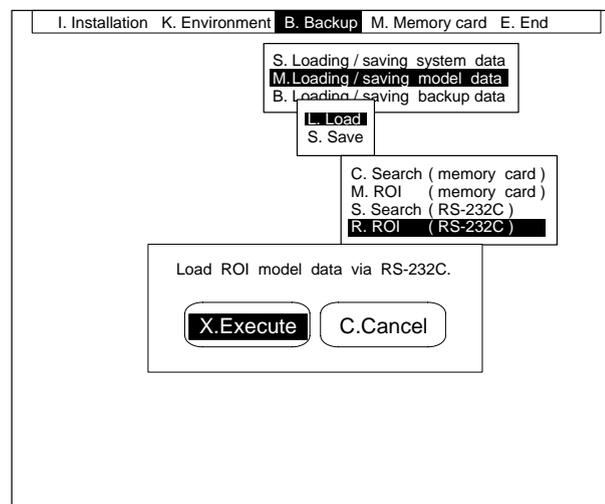
Create a transmission program that matches the data transmission method using the XMODEM/128(SUM) system. Examples of transmission programs using Quick BASIC are shown in *Appendix B RS-232C Data Transmission Program Examples*.

Be Sure to Use Channel 0

The ROI model data cannot be loaded via Channel 1.

Procedure

- 1, 2, 3...
1. Select "M.Loading/saving model data."
 2. Select "L.Load."
 3. Select "R.ROI (RS-232C)." A message will be displayed asking for confirmation.
 4. Transmit the ROI model data from an external device.



5. Select "X.Execute." The transmitted data will be loaded. During loading, a message indicating data transmission will be displayed. When loading is complete, a message will be displayed asking for confirmation.
6. Select "O.OK."

Important Do not turn off the power while loading is in progress. Otherwise, the data in the F350 memory will be destroyed, resulting in a malfunction at the next startup operation.

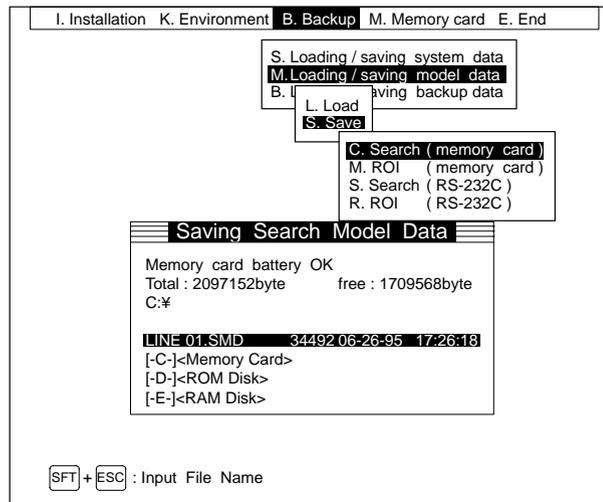
Saving Search Model Data to the Memory Card or RAM Disk

This procedure saves the search model data to the Memory Card or RAM Disk. An extension (.SMD) will be automatically added to the saved filename. When a Memory Card is used for the first time after being purchased, it must be initialized. Refer to 5-4-1 *Initializing Memory Cards*.

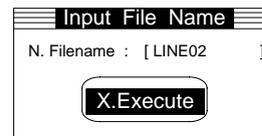
Procedure

- 1, 2, 3...
1. Select "M.Loading/saving model data."
 2. Select "S.Save."
 3. Select "C.Search (memory card)." A list of search model data files in the root directory on the Memory Card will be displayed. If there are any subdirectories, the subdirectory names will also be displayed.

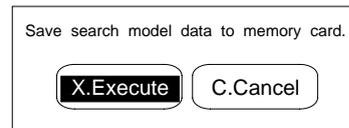
To save files to the RAM Disk, follow step 4. To save to the Memory Card, follow step 5.



4. Select Drive “[-E-].”
5. Press the Shift and Escape Keys simultaneously. The filename input screen will be displayed.
6. Input a filename.



7. Select “X.Execute.” A message will be displayed asking for confirmation.



8. Select “X.Execute.” The selected file will be saved. When saving is complete, a message will be displayed asking for confirmation.
9. Select “O.OK.”

Important Do not turn off the power while data is being saved, or the data will not be saved correctly.

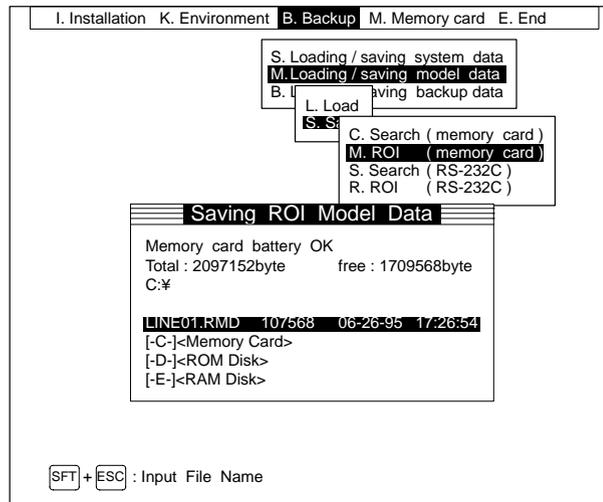
Saving ROI Model Data to the Memory Card or RAM Disk

This procedure saves the ROI model data to the Memory Card or RAM Disk. An extension (.RMD) will be automatically added to the saved filename. When a Memory Card is used for the first time after being purchased, it must be initialized. Refer to 5-4-1 *Initializing Memory Cards*.

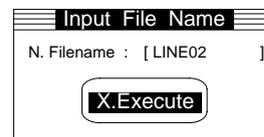
Procedure

- 1, 2, 3... 1. Select “M.Loading/saving model data.”
2. Select “S.Save.”
3. Select “M.ROI (memory card).” A list of ROI model data files in the root directory on the Memory Card will be displayed. If there are any subdirectories, the subdirectory names will also be displayed.

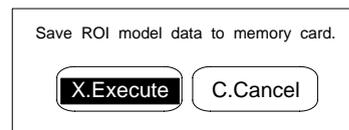
To save files to the RAM Disk, follow step 4. To save to the Memory Card, follow step 5.



4. Select Drive “[-E-].”
5. Press the Shift and Escape Keys simultaneously. The filename input screen will be displayed.
6. Input a filename.



7. Select “X.Execute.” A message will be displayed asking for confirmation.



8. Select “X.Execute.” The selected file will be saved. When saving is complete, a message will be displayed asking for confirmation.
9. Select “O.OK.”

Important Do not turn off the power while data is being saved, or the data will not be saved correctly.

Saving Search Model Data via RS-232C

This procedure saves the search model data via RS-232C.

Match the Communications Specifications for the F350 with Those for the External Devices.

Refer to 5-2-4 *Setting the RS-232C Communication Specifications.*

Reception Program at the External Device

Create a reception program that matches the data transmission method using the XMODEM/128(SUM) system. Examples of reception programs using Quick BASIC are shown in *Appendix B RS-232C Data Transmission Program Examples.*

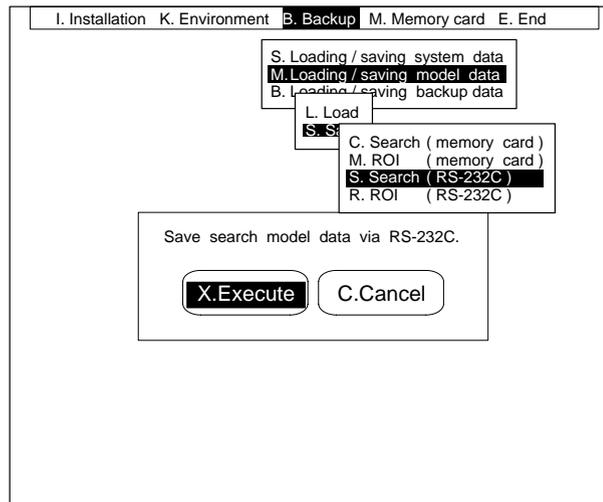
Be Sure to Use Channel 0

The search model data cannot be saved via Channel 1.

Procedure

- 1, 2, 3... 1. Select “M.Loading/saving model data.”

2. Select "S.Save."
3. Select "S.Search (RS-232C)." A message will be displayed asking for confirmation.



4. Select "X.Execute." The data will be saved. During saving, a message indicating data transmission will be displayed. When saving is complete, a message will be displayed asking for confirmation.
5. Select "O.OK."

Important Do not turn off the power while data is being saved. Otherwise, the data will not be saved correctly.

Saving ROI Model Data via RS-232C

This procedure saves the ROI model data via RS-232C.

Match the Communications Specifications for the F350 with Those for the External Devices.

Refer to 5-2-4 *Setting the RS-232C Communication Specifications.*

Reception Program at the External Device

Create a reception program that matches the data transmission method using the XMODEM/128(SUM) system. Examples of reception programs using Quick BASIC are shown in *Appendix B RS-232C Data Transmission Program Examples.*

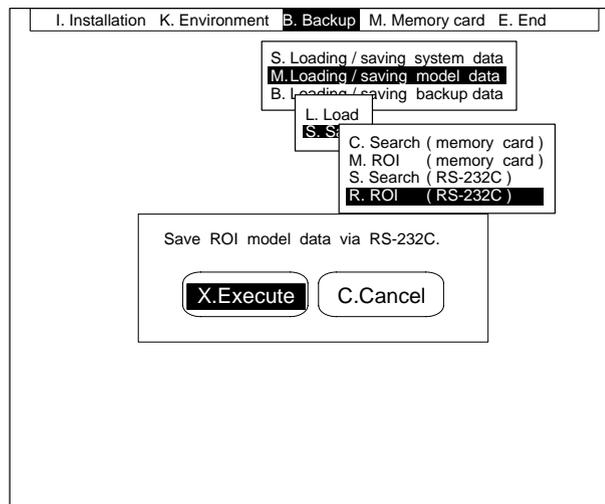
Be Sure to Use Channel 0

The ROI model data cannot be saved via Channel 1.

Procedure

- 1, 2, 3... 1. Select "M.Loading/saving model data."
2. Select "S.Save."

3. Select "R.ROI (RS-232C)." A message will be displayed asking for confirmation.



4. Select "X.Execute." The data will be saved. During saving, a message indicating data transmission will be displayed.
When saving is complete, a message will be displayed asking for confirmation.
5. Select "O.OK."

Important Do not turn off the power while data is being saved, or the data will not be saved correctly.

5-3-3 Loading/Saving the Backup Data: B.Loading/Saving Backup Data

The system data, OVL programs (including variables), and data set in the Application Programs are saved even if the power is turned off. The saved data is called the backup data. The backup data can be loaded or saved via the Memory Card or the RS-232C.

When the memory of the F350 is destroyed due to a system failure, software programs must be installed again and data must be reset to restore the memory. Therefore, it is suggested that the backup data be saved so that restoration to the original state occurs easily.

As the model data is not included in the backup data, it is also suggested that the model data together with the backup data be saved so that restoration from the system failure occurs easily. Refer to 5-3-2 *Loading/Saving the Model Data*.

Note Data can be saved to or loaded from the RAM Disk when an F350-C4★E IMP Unit is used.

Loading Backup Data from the Memory Card or RAM Disk

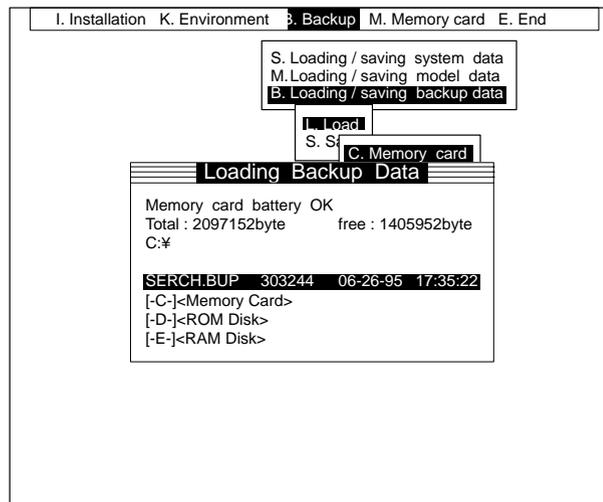
This procedure loads the backup data saved in the Memory Card or RAM Disk. Set in advance the Memory Card that contains the backup data.

For details regarding compatibility of the data, refer to *Data Compatibility* on page 7.

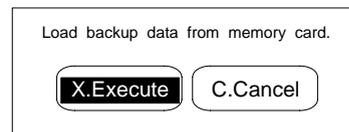
Procedure

- 1, 2, 3... 1. Select "B.Loading/saving backup data."
2. Select "L.Load."
3. Select "C.Memory card." A list of backup data files in the root directory on the Memory Card will be displayed. If there are any subdirectories, the subdirectory names will also be displayed.

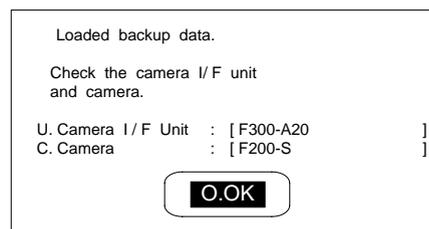
To load files from the RAM Disk, follow step 4. To load from the Memory Card, follow step 5.



4. Select Drive “[-E-].”
5. Select a filename. A message will be displayed asking for confirmation.



6. Select “X.Execute.” The selected file will be loaded. When loading is complete, a message will be displayed asking for confirmation. Check the settings for the camera and Camera I/F Unit. If the settings differ from the specifications of the Camera I/F Unit or camera actually mounted, correct images cannot be taken. Correct the settings. Refer to *5-2-6 Setting Specifications of the Camera to be Connected*.



7. Select “O.OK.”

Important Do not turn off the power while loading is in progress. This will cause the data in the F350 memory to be destroyed, resulting in a malfunction at the next startup operation.

Loading Backup Data via RS-232C

This procedure loads the backup data via RS-232C. For details regarding compatibility of the data, refer to *Data Compatibility* on page 7.

Match the Communications Specifications for the F350 with Those for the External Devices.

Refer to *5-2-4 Setting the RS-232C Communication Specifications*.

Transmission Program at the External Device

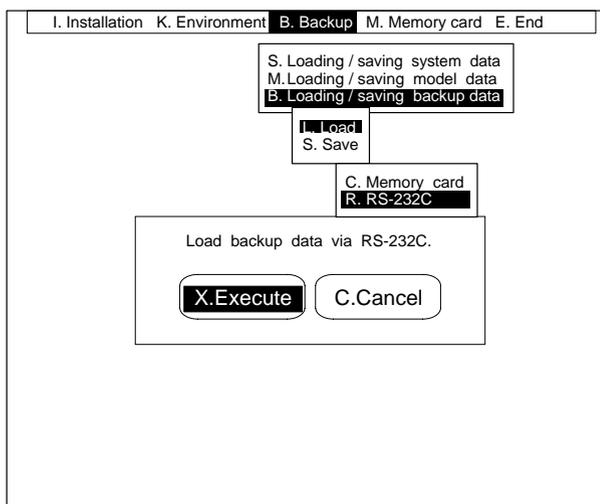
Create a transmission program that matches the data transmission method using the XMODEM/128(SUM) system. Examples of transmission programs using Quick BASIC are shown in *Appendix B RS-232C Data Transmission Program Examples*.

Be Sure to Use Channel 0

The backup data cannot be loaded via Channel 1.

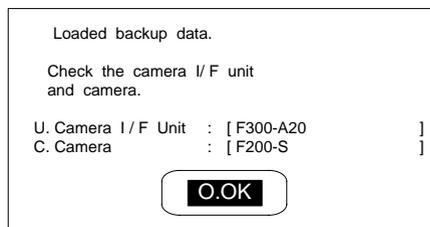
Procedure

- 1, 2, 3... 1. Select "B.Loading/saving backup data."
2. Select "L.Load."
3. Select "R.RS-232C." A message will be displayed asking for confirmation.
4. Transmit backup data from an external device.



5. Select "X.Execute." The transmitted data will be loaded. During loading, a message indicating data transmission will be displayed. When loading is complete, a message will be displayed asking for confirmation.

Check the settings for the camera and Camera I/F Unit. If the settings differ from the specifications of the Camera I/F Unit or camera actually mounted, correct images cannot be taken. Correct the settings. Refer to *5-2-6 Setting Specifications of the Camera to be Connected*.



6. Select "O.OK."

Important Do not turn off the power while loading is in progress. This will cause the data in the F350 memory to be destroyed, resulting in a malfunction at the next startup operation.

Saving Backup Data to the Memory Card or RAM Disk

This procedure saves the backup data to the Memory Card or RAM Disk. An extension (.BUP) will be automatically added to the saved filename. When a Memory Card is used for the first time after being purchased, it must be initialized. Refer to *5-4-1 Initializing Memory Cards*.

Important When using the IMP Unit F350-C1★:

The backup data file is approximately 300 Kbytes. It cannot be saved on the F300-N256 (256 bytes) Memory Card due to a lack of capacity. Be sure to use an F300-N512 (512 bytes) or F300-N2M (2 Mbytes) Memory Card.

When using the IMP Unit F350-C4★:

The backup data file is 2 Mbytes minimum. It cannot be saved on the OMRON Memory Cards due to a lack of capacity. Save the backup data using either one of the following methods.

- Save backup data through the RS-232C.
- Use 4-Mbyte memory cards (PCMCIA type) available in the market.
Be sure to initialize the memory cards on the F350. Memory cards initialized on a personal computer may not be usable.

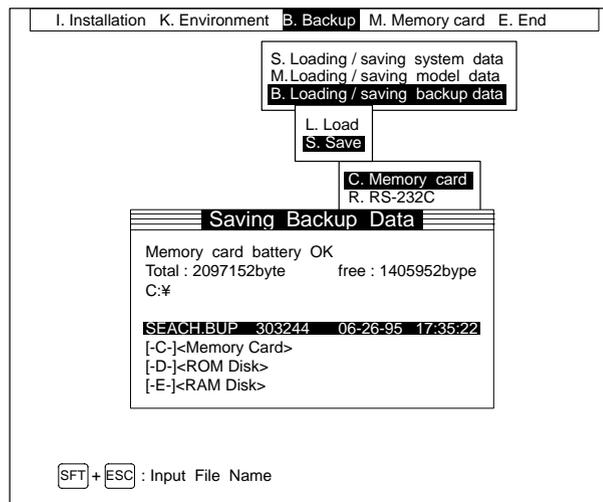
When installing the contents of settings on another F350, save the following two data types instead of the backup data.

- System data (Save/Load on the Setup Menu.)
- Scene data (Save/Load on each Application Program.)

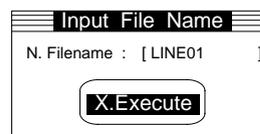
When these two types of data are loaded after installing the Application Program, the same settings as those obtained by loading backup data will be present.

Procedure

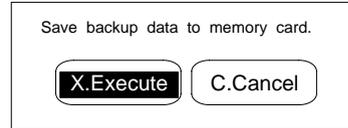
- 1, 2, 3... 1. Select "B.Loading/saving backup data."
2. Select "S.Save."
3. Select "C.Memory card." A list of backup data files in the root directory on the Memory Card will be displayed. If there are any subdirectories, the subdirectory names will also be displayed.
To save files to the RAM Disk, follow step 4. To save to the Memory Card, follow step 5.



4. Select Drive "[-E-]."
5. Press the Shift and Escape Keys simultaneously. The filename input screen will be displayed.
6. Input a filename.



7. Select "X.Execute." A message will be displayed asking for confirmation.



8. Select "X.Execute." The selected file will be saved.

When saving is complete, a message will be displayed asking for confirmation.

9. Select "O.OK."

Important Do not turn off the power while data is being saved. Otherwise, the data will not be saved correctly.

Saving Backup Data via RS-232C

This procedure saves the backup data via RS-232C.

Match the Communications Specifications for the F350 with Those for the External Devices.

Refer to 5-2-4 *Setting the RS-232C Communication Specifications.*

Reception Program at the External Device

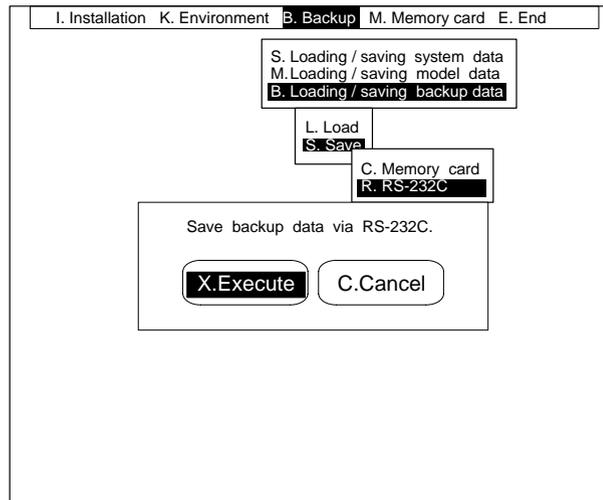
Create a reception program that matches the data transmission method using the XMODEM/128(SUM) system. Examples of reception programs using Quick BASIC are shown in *Appendix B RS-232C Data Transmission Program Examples.*

Be Sure to Use Channel 0

The backup data cannot be saved via Channel 1.

Procedure

- 1, 2, 3...
1. Select "B.Loading/saving backup data."
 2. Select "S.Save."
 3. Select "R.RS-232C." A message will be displayed asking for confirmation.



4. Select "X.Execute." The data will be saved. During saving, a message indicating data transmission will be displayed.

When saving is complete, a message will be displayed asking for confirmation.

5. Select "O.OK."

Important Do not turn off the power while data is being saved, or the data will not be saved correctly.

5-4 M.Memory Card

"M.Memory card" can be used to initialize the Memory Card, to edit the files saved in the Memory Card, or to start up an Application Program stored in the Memory Card.

| | | | |
|-----------|---|----------------------------------|---------|
| F.Format | — | Initializing Memory Cards | Page 79 |
| E.Edit | — | Editing Memory Cards | Page 80 |
| X.Execute | — | Starting Up Application Programs | Page 84 |

Note When an F350-C4_E IMP Unit is used, the operation is the same for files stored on the RAM Disk as for files on the Memory Card.

5-4-1 Initializing the Memory Card or RAM Disk: F.Format

When a Memory Card is to be used for the first time after being purchased, it must be initialized. In addition, if data is lost from a Memory Card due to a drop in the battery voltage, the Memory Card must be re-initialized after the battery has been replaced.

If a Memory Card that has files saved on it is initialized, all of that data will be lost.

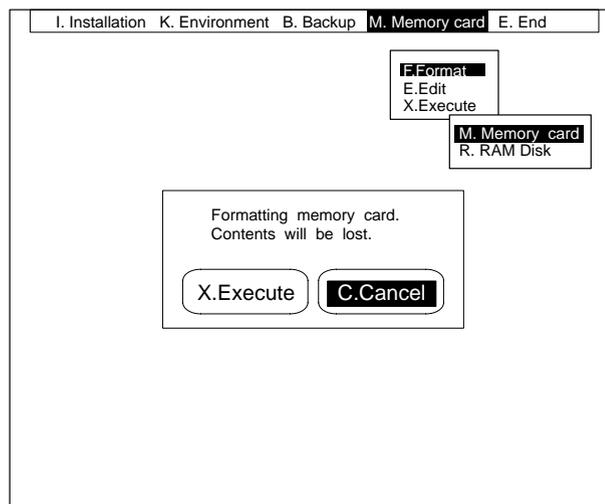
Note The Memory Cards that can be used with the F350 are shown below.

- F300-N256
- F300-N512
- F300-N2M

If you wish to use a Memory Card other than those above, please consult your nearest OMRON sales representative.

Procedure

- 1, 2, 3... 1. Select "F.Format."



2. Select the Memory Card or RAM Disk that is to be initialized. A message will be displayed asking for confirmation.
3. Select "X.Execute." The Memory Card or RAM Disk will be initialized.

5-4-2 Editing the Memory Card or RAM Disk: E.Edit

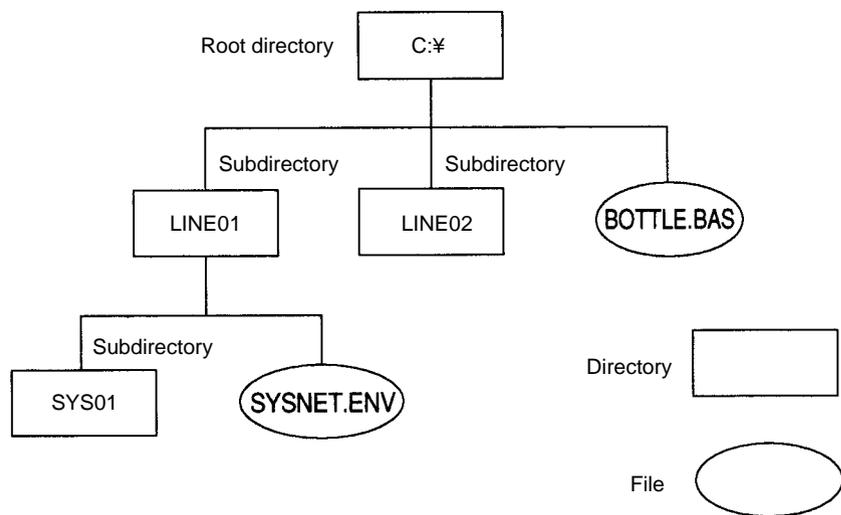
Files saved on the Memory Card or RAM Disk can be edited one at a time. There are four ways to edit a file:

- Copying the file
- Renaming the file
- Creating a directory
- Deleting the file or directory

Copying the File

The directory can be designated using the filename of the copy destination as shown below.

Example



The directory selected as the copy source is called the current directory.

Absolute Path

The directory is designated based on the root directory.

| Format | Function |
|--------------------------|---|
| ¥Directory name | The file under the source filename is copied to the directory name in the root directory. Example Source filename: BOTTLE.BAS Destination filename: ¥LINE01 The file under the filename of BOTTLE.BAS is copied to the directory named LINE01 in the root directory. |
| ¥Directory name¥Filename | The file under the filename is copied to the directory name in the root directory. Example Source filename: BOTTLE.BAS Destination filename: ¥LINE01¥BOT01.BAS The file under the filename of BOTTLE.BAS is copied to the directory named LINE01 in the root directory. |

Relative Path

The directory is designated based on the current directory.

| Format | Function |
|---------------------------|--|
| Filename | The file is copied to the current directory under the filename. Example Current directory: LINE01 Source filename: SYSNET.ENV Destination filename: NET.ENV The file is copied under the filename of NET.ENV to the directory called LINE01. |
| .¥Directory name | “.” indicates the current directory. The file under the source filename is copied to the directory name in the current directory. Example Current directory: LINE01 Source filename: SYSNET.ENV Destination filename: .¥SYS01 The file is copied under the filename of SYSNET.ENV to the directory SYS01 in LINE01. |
| .¥Directory name¥Filename | “.” indicates the current directory. The file under the filename is copied to the directory name in the current directory. Example Current directory: LINE01 Source filename: SYSNET.ENV Destination filename: .¥SYS01¥LABEL.ENV The file is copied under the filename of LABEL.ENV to the directory SYS01 in LINE01. |
| ..¥Directory¥Filename | “..” indicates the directory one level higher in the current directory hierarchy. The file under the filename is copied to the directory name in the directory one level higher in the current directory hierarchy. Example Current directory: LINE01 Source filename: SYSNET.ENV Destination filename: ..¥LINE02¥LABEL.ENV The file is copied under the filename of LABEL.ENV to the directory LINE2 (root directory), one level higher than LINE1 in the hierarchy. |

If the Filename Input as the Copy Destination Already Exists as the Directory Name

The file is copied under the source filename into the directory that has the same name as the filename input as the copy destination.

Example

Current Directory: Root directory
 Source Filename: BOTTLE.BAS
 Destination Filename: LINE01

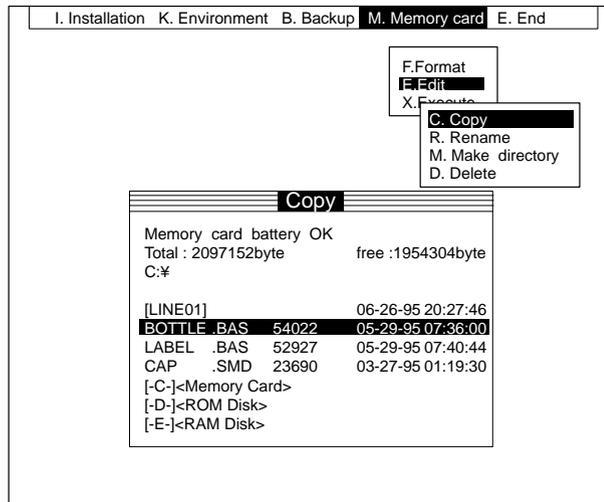
As a directory named LINE01 exists in the root directory, the file is copied under the filename of BOTTLE.BAS into the directory of LINE01.

If the Designated Directory Doesn't Exist

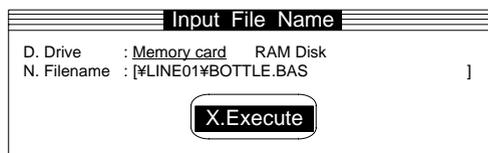
Copy cannot be executed. Create a directory first.

Procedure

- 1, 2, 3... 1. Select "E.Edit."
 2. Select "C.Copy." A list of files in the root directory on the Memory Card will be displayed. If there are any subdirectories, the subdirectory names will also be displayed.
 To copy a file from the RAM Disk, follow step 3. To copy a file from the Memory Card, follow step 4.
 3. Select Drive "[-E-]."
 4. Select the file to be copied.



5. Select the drive of the copy destination.
 6. Enter the filename of the copy destination. The filename of the copy source will be displayed as the default. Change that filename. Enter a new filename including the directory name and extension.



Note When the filename is specified by the relative path, it is copied to the same drive as the copy source file. The "D.Drive" specification is ignored.

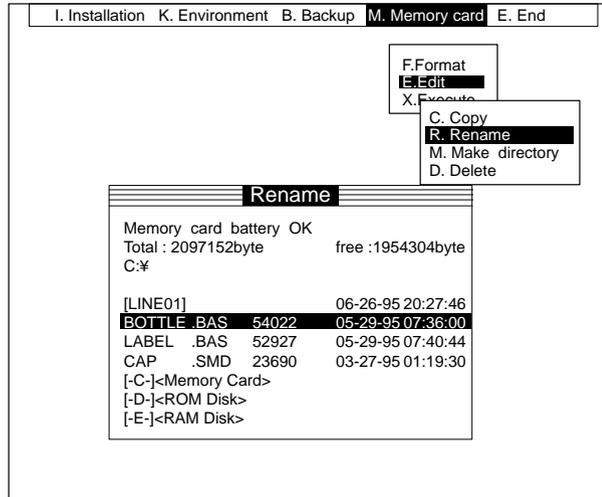
7. Select "X.Execute." The copy source file will be copied under the filename that was entered.

Renaming the File

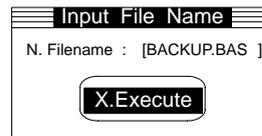
Procedure

- 1, 2, 3... 1. Select "E.Edit."
 2. Select "R.Rename." A list of files in the root directory on the Memory Card will be displayed. If there are any subdirectories, the subdirectory names will also be displayed.
 To rename a file on the RAM Disk, follow step 3. To rename a file on the Memory Card, follow step 4.
 3. Select Drive "[-E-]."

4. Select the file to be renamed.



5. Enter the new filename. The original filename will be displayed as the default, so change that filename. Include the extension with the new filename.



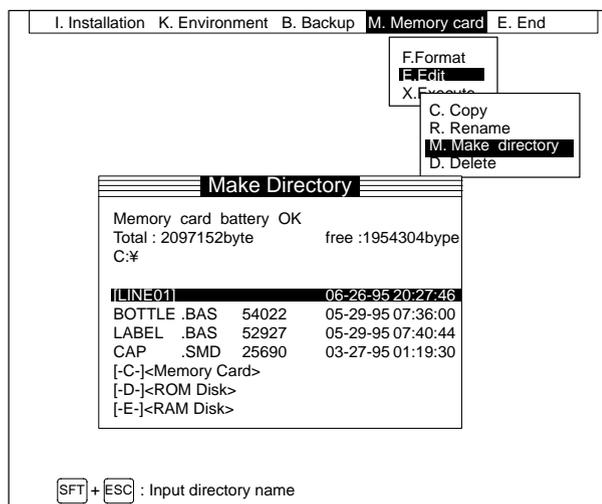
6. Select "X.Execute."

Creating a Directory

Procedure

1, 2, 3...

1. Select "E.Edit."
2. Select "M.Make directory." A list of files in the root directory on the Memory Card will be displayed. If there are any subdirectories, the subdirectory names will also be displayed.
To create a directory on the RAM Disk, follow step 3. To create a directory on the Memory Card, follow step 4.
3. Select Drive "[-E-]"



4. Press the Shift and Escape Keys simultaneously. The directory input screen will be displayed.

5. Enter a directory name.

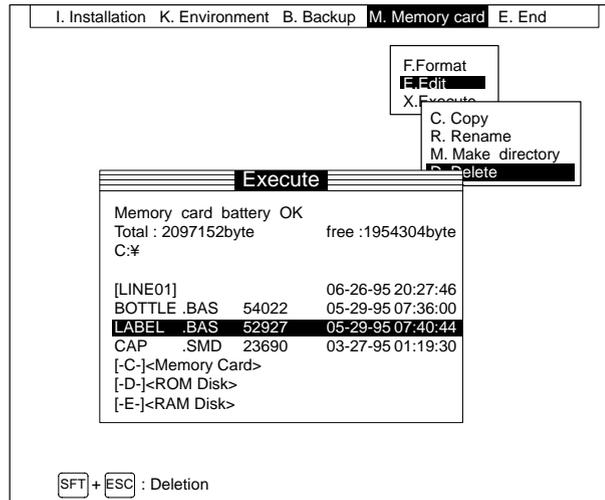


6. Select "X.Execute." A new directory will be created on the Memory Card under the directory name that was entered.

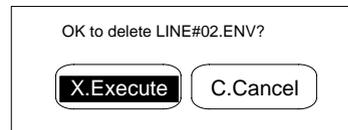
Deleting a File or Directory

Procedure

- 1, 2, 3... 1. Select "E.Edit."
2. Select "D.Delete." A list of files in the root directory on the Memory Card will be displayed. If there are any subdirectories, the subdirectory names will also be displayed.
To delete a file or directory from the RAM Disk, follow step 3. To delete a file or directory from the Memory Card, follow step 4.
3. Select Drive "[-E-]."
4. Move the cursor to the file or directory that is to be deleted.



5. Press the Shift and Escape Keys simultaneously. A message will be displayed asking for confirmation.



6. Select "X.Execute."

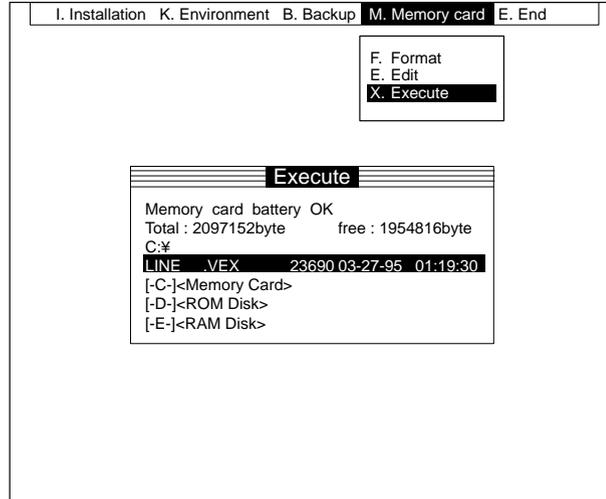
5-4-3 Starting Up Application Programs (*.VEX): X.Execute

This procedure starts up an Application Program stored on the Memory Card or RAM Disk. The extension for an Application Program is ".VEX."

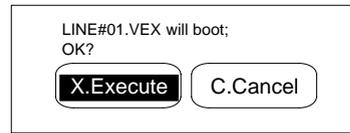
Procedure

- 1, 2, 3... 1. Select "X.Execute." A list of files in the root directory on the Memory Card will be displayed. If there are any subdirectories, the subdirectory names will also be displayed.
To start a file from the RAM Disk, follow step 2. To start a file from the Memory Card, follow step 3.

2. Select Drive [-E-].”



3. Select the Application Program to be started. A message will be displayed asking for confirmation.



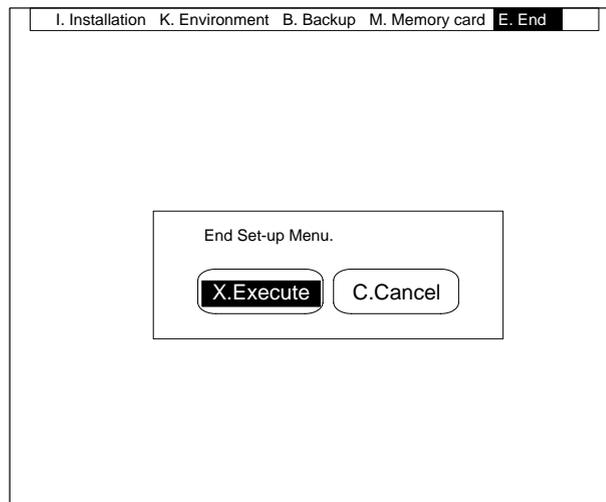
4. Select "X.Execute."

5-5 E.End

Select this mode to quit the Setup Menu and restart the F350 under the initial mode that has been set under the Setup Menu.

Procedure

- 1, 2, 3... 1. Select "E.End." A message will be displayed asking for confirmation.



2. Select "X.Execute."

SECTION 6

Maintenance

This section provides information on maintenance and inspection.

| | |
|-------|--|
| 6-1 | Maintenance Parts and Replacement Parts |
| 6-1-1 | Replacing the Memory Backup Battery for the IMP Unit |
| 6-1-2 | Replacing the Fuse for the Power Supply Unit |
| 6-1-3 | Replacing the Battery for the Memory Card |
| 6-2 | Inspection |

6-1 Maintenance Parts and Replacement Parts

Maintenance parts of the F350 include the following three items.

- Memory backup battery for the IMP Unit
- Short-circuit protection fuse
- Battery for the memory card

Except for the user-serviceable parts above, the user should return the F350 to OMRON for all repairs and servicing.

6-1-1 Replacing the Memory Backup Battery for the IMP Unit

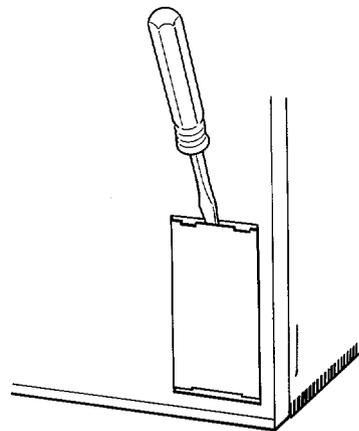
Use the battery recommended by OMRON as shown below.

Recommended Parts

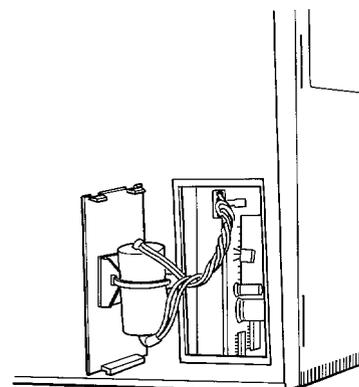
| Model number | Maker |
|--------------|-------|
| 3Z49-BAT1 | OMRON |

Procedure

- 1, 2, 3...**
1. Turn off the F350 System power. If the F350 System is already off, turn it on for 10 seconds then turn it off again.
 2. Insert a small flat-blade screwdriver into the notch at the top of the battery cover and gently remove the cover.
The battery is located inside the battery cover.



3. Detach the battery connector.
4. Cut the battery retaining band and remove the battery from the cover.
5. Mount a new battery. Secure the new battery to the cover with the retaining band and attach the battery connector.
6. Line up the protruding latch of the battery cover with the notch and push it in.



Important Replace the battery within five minutes to prevent loss of the memory contents. If replacement will take more than five minutes, transfer the set data to a Memory Card or to an external device via RS-232C before replacing the battery.

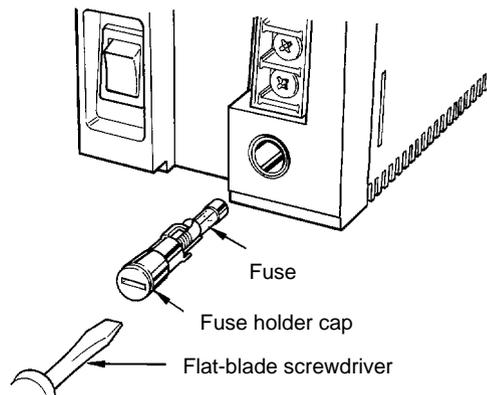
6-1-2 Replacing the Fuse for the Power Supply Unit

Specifications

| Power Supply Unit | Specifications |
|-------------------|--|
| F300-P2 | 6.3 A, 125 V, MF51NM UL and CSA approved. Semi time-lag type |
| F300-P2E | T3.15 A, 250 V, 5.2 dia. x 20 mm UL and CSA approved. According to IEC127 sheet III. |

Procedure

- 1, 2, 3...**
1. Disconnect the power supply before replacing the fuse.
 2. Loosen the fuse holder cap with a flat-blade screwdriver.
 3. Pull out the fuse holder cap. The fuse is located inside the fuse holder cap.
 4. Replace the fuse with a new one.
 5. Put the fuse holder cap back to its original position and tighten the cap with a flat-blade screwdriver.



6-1-3 Replacing the Battery for the Memory Card

The batteries shown in the following table can be used.

Recommended Parts

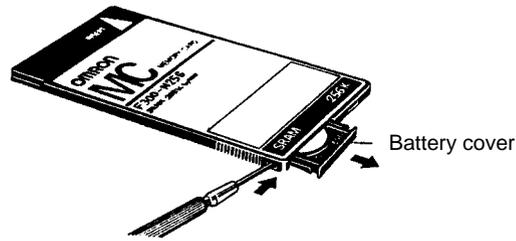
| Memory Card | Model number | Maker |
|-------------|--------------------|-------|
| F300-N256 | HMC-BAT01 (CR2325) | OMRON |
| F300-N512 | | |
| F300-N2M | CR2025 | --- |

Procedure for F300-N256/N512

- 1, 2, 3...**
1. Using a pointed implement such as a pin, push down the battery cover from the hole in the right side.
 2. Replace the battery with a new one.

Important To avoid memory loss, be sure to replace the battery within one minute.

3. Attach the battery cover to the Memory Card.

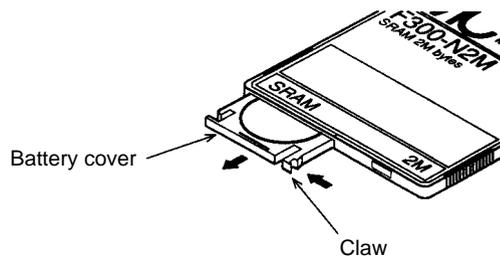


Procedure for F300-N2M

- 1, 2, 3... 1. Hold down the latches and pull out the battery cover.
- 2. Replace the battery with a new one.

Important To avoid memory loss, be sure to replace the battery within five minutes.

3. Attach the battery cover to the Memory Card.



Caution Memory card batteries require care in handling. Do not short-circuit plus and minus battery terminals, attempt to charge batteries, take them apart, deform them, or dispose of them in a fire. Batteries can explode, leak, or combust.

6-2 Inspection

Inspect the F350 System on a regular basis to maintain it in proper working condition. The following should be checked periodically.

| Inspection point | Details | Required tool | | | | | | |
|--------------------------|--|--------------------------|-----------------------|---------|----------------|----------|----------------|----------------|
| Power supply | The voltage measured at the terminal block of the Power Supply Unit must fall in the following range. <table border="1" style="margin-left: 20px;"> <tr> <td><u>Power Supply Unit</u></td> <td><u>Variable Range</u></td> </tr> <tr> <td>F300-P2</td> <td>100 to 120 VAC</td> </tr> <tr> <td>F300-P2E</td> <td>200 to 240 VAC</td> </tr> </table> | <u>Power Supply Unit</u> | <u>Variable Range</u> | F300-P2 | 100 to 120 VAC | F300-P2E | 200 to 240 VAC | Circuit tester |
| <u>Power Supply Unit</u> | <u>Variable Range</u> | | | | | | | |
| F300-P2 | 100 to 120 VAC | | | | | | | |
| F300-P2E | 200 to 240 VAC | | | | | | | |
| Ambient temperature | The ambient temperature inside the cabinet must be 0°C to 50°C. | Thermometer | | | | | | |
| Ambient humidity | The ambient humidity inside the cabinet must be 35% to 85% RH. | Hygrometer | | | | | | |
| Installation | Each Unit must be firmly secured. | Phillips screwdriver | | | | | | |
| | Each cable connector must be correctly inserted and locked. | | | | | | | |
| | The cameras must be firmly secured. | | | | | | | |
| | The camera lens mounts must be firmly secured. | | | | | | | |
| Others | There must be no condensation. | --- | | | | | | |
| | There must be no dust accumulation. | | | | | | | |
| | The camera lenses must be clean. | | | | | | | |

SECTION 7

Troubleshooting

This section lists the errors that may occur, along with their probable causes and remedies. A list of all the error messages is also provided.

- 7-1 Errors
- 7-2 Error Messages

7-1 Errors

Errors at Startup

| Symptom | Probable cause and remedy |
|--|--|
| "BUS ERROR" is displayed. | The Unit is not connected properly. Connect the Unit properly. |
| "CPU HALT" is displayed. | The F350 is not operating properly. Contact the nearest OMRON sales office. |
| "CPU CHECK ERROR" is displayed. | |
| "RAM R/W CHECK ERROR" is displayed. | |
| "ROM SUM CHECK ERROR" is displayed. | |
| "SUB-CPU ROM ERROR" is displayed. | |
| "SUB-CPU RAM ERROR" is displayed. | |
| "SUB-CPU NOT READY" is displayed. | |
| "SUB-CPU INCORRECT" is displayed. | |
| "SUB-CPU ERROR(????)" is displayed. | |
| The application program cannot be started at the startup, instead, the OVL system starts and the prompt is displayed. | The initial mode is set to "OVL prompt." Set the initial mode to "Automatic execution." |
| | The application program is not installed. The OVL system cannot be operated if the OVL standard input device (keyboard) is not connected. Turn off the power supply, start the setup menu, and then install the application program. |
| The OVL program cannot be executed automatically at the startup, instead, the OVL system starts and the prompt is displayed. | The initial mode is set to "OVL prompt." Set the initial mode to "Automatic execution." |
| | The OVL program is not installed. The OVL system cannot be operated if the OVL standard input device (keyboard) is not connected. Turn off the power supply, start the setup menu, and then install the OVL program. |
| The following messages are displayed at the startup. Search Model ??? is broken ROI Model ??? is broken | The F350 memory data is damaged. Contact your nearest OMRON sales representative. |

Power Supply Unit

| Symptom | Probable cause and remedy |
|-------------------------------------|---|
| The POWER indicator does not light. | Power is not being supplied or the supplied voltage is too low. Supply the following power supply voltage: F300-P2: supply 100 to 120 VAC; F300-P2E: supply 200 to 240 VAC. Refer to <i>2-2-3 Power and Protective Conductor (Earth) Wiring</i> . |
| | The fuse is blown. Replace the fuse. Refer to <i>6-1-2 Replacing the Fuse for the Power Supply Unit</i> . |

Video Monitor and Cameras

| Symptom | Probable cause and remedy |
|--|---|
| Nothing appears on the video monitor screen. | The power supply to the video monitor is not turned on. Turn on the power supply. |
| | The cable to the video monitor is not connected. Connect the cable. Refer to 2-2-3 <i>Connecting the Video Monitor</i> . |
| | The video monitor is defective. Replace the video monitor. |
| | The monitor cable is defective. Replace the cable. |
| | The F350-C1□E/C4□E IMP Unit or F300-FM2 MMI Unit is defective. Replace the IMP Unit or the MMI Unit. |
| Images are out of sync. | The camera synchronization method is not correctly set. Set the same synchronization method for all cameras. Refer to 5-2-6 <i>Setting Specifications of the Camera to be Connected</i> . |
| | The contents of K. Environment/C. Camera settings do not coincide with the specifications of the connected Camera. Check the contents of the settings. If you wish to use a camera other than the recommended ones, contact your nearest OMRON sales representative. Refer to 5-2-6 <i>Setting Specifications of the Camera to be Connected</i> . |
| | Camera switches are not correctly set. Set them correctly. Refer to 2-2-4 <i>Connecting Cameras</i> . |
| | The monitor cable is defective. Replace the cable. |
| Camera images do not appear on the screen. | The cameras are not connected. Connect the cameras. Refer to 2-2-4 <i>Connecting Cameras</i> . |
| | Camera lenses are out of focus. Select the appropriate lens. Refer to 8-3 <i>Lens Specifications</i> . |
| | A camera is defective. Replace the camera. |
| | The camera cable is defective. Replace the cable. |
| | The Camera I/F Unit is defective. Replace the Unit. |
| | The wrong camera numbers are set. Select camera numbers to match the cameras that are connected. |
| | The contents of K. Environment/C. Camera settings do not coincide with the specifications of the connected Camera. Check the contents of the settings. |
| The power to the camera control section of the Shutter Camera F300-S3DR is not turned on. Turn on the power to the camera control section. | |

MMI Units

| Symptom | Probable cause and remedy |
|---|--|
| Key inputs from the Console are not being received. | The Console is not connected. Connect the Console to the Console connector. Refer to 2-2-2 <i>Connecting the Console</i> . Key input may be prohibited by the OVL program. Check the program. |
| Indicators do not light when a Memory Card is inserted. | The Memory Card cover is open. After the Memory Card is inserted, close the cover. |
| | The Memory Card is inserted in the wrong direction. Insert it correctly. |
| | The Memory Card is not pushed all the way in. Push it in firmly. |

Terminal Block Units and Parallel I/O Units

| Symptom | Probable cause and remedy |
|---|---|
| Signals cannot be input from outside. | Power is not being supplied. Correct the wiring and provide a power supply. Refer to 2-4-4 <i>Connecting Terminal Block Units</i> and 2-4-5 <i>Connecting Parallel I/O Units</i> . |
| Even when commands are input from outside, they do not function properly. | The command types and timing are not correct. Set the command specifications, and input the commands correctly. Refer to 5-2-5 <i>Setting the Output Specifications for Parallel Data</i> |
| Signals cannot be output externally. | Power is not being supplied. Correct the wiring and provide a power supply. Refer to 2-4-4 <i>Connecting Terminal Block Units</i> and 2-4-5 <i>Connecting Parallel I/O Units</i> . |
| | With the handshaking set to "Yes," the external device is not set to the signal receiving state. Set the external device to the signal receiving state. |
| | Power lines are faulty. Check whether the power lines are disconnected or wired incorrectly, and correct the wiring. |
| Output data is wrong. | The output specifications are set incorrectly. Correct the specifications. Refer to 5-2-5 <i>Setting the Output Specifications for Parallel Data</i> . |

RS-232C I/F Units

| Symptom | Probable cause and remedy |
|--|--|
| Input commands are not being received. | The external device is not connected to channel 0. Refer to 4-1-3 <i>RS-232C</i> . |
| | The communications specifications do not match those of the external device. Correct the specifications. Refer to 5-2-4 <i>Setting the RS-232C Communications Specifications</i> . |
| | The cables are not properly connected. Correct the wiring. Refer to 2-4-3 <i>Connecting RS-232C I/F Units</i> . |
| Output data is not being output. | The external device is not connected to channel 0. Refer to 4-1-3 <i>RS-232C</i> . |
| | The communications specifications do not match those of the external device. Correct the specifications. Refer to 5-2-4 <i>Setting the RS-232C Communications Specifications</i> . |
| | The cables are not properly connected. Correct the wiring. Refer to 2-4-3 <i>Connecting RS-232C I/F Units</i> . |

Strobe I/F Units

| Symptom | Probable cause and remedy |
|-----------------------|--|
| Strobes do not flash. | The power supply is not turned on for the strobe device. Turn on the power supply. |

7-2 Error Messages

The F350's error messages are listed alphabetically. Refer to this list when an error occurs and the user is not sure what remedy is required.

| Error message | Probable cause and remedy |
|---|---|
| Application program installation canceled. | Installation was canceled because the Memory Card was not inserted correctly. The application program previously installed has been deleted. Insert the Memory Card correctly and try the installation again. |
| Application program (*.VEX) startup canceled. | The startup was canceled because the Memory Card was not inserted correctly. Insert the Memory Card correctly and try the operation again. |
| | The application program (*.VEX) format to be started is incorrect. Either the program is corrupted or incorrect program is used. Use a correct program. |
| Backup data cannot be saved. Password required. | The data cannot be saved because a password is set in the OVL program. Reset the password. Refer to <i>OVL Reference Manual, Section 5 PASSWD</i> . |

| Error message | Probable cause and remedy |
|---|---|
| Backup data load canceled. | <p>The load was canceled because the Memory Card was not inserted correctly. Insert the Memory Card correctly and try the operation again.</p> <p>The load via the RS-232C was canceled by pressing the Escape Key during the load operation. The previously set data may be corrupted.</p> |
| Backup data load canceled. Communications error. | Refer to "OVL installation canceled." |
| Backup data save canceled. | <p>The save was canceled because the Memory Card was not inserted correctly. Insert the Memory Card correctly and try the operation again.</p> <p>The save via the RS-232C was canceled by pressing the Escape Key during the save operation.</p> |
| Backup data save canceled. Communications error. | Refer to "OVL installation canceled." |
| Cannot copy to memory card. Not free space. | The space available in the Memory Card is insufficient to copy the data. Insert a Memory Card with sufficient space and try the operation again. |
| Cannot save to memory card. Not free space. | The space available in the Memory Card is insufficient to save the data. Insert a Memory Card with sufficient space and try the operation again. |
| Cannot write to ROM Disk. | It is not possible to edit files stored on the ROM Disk, or to save data to the ROM Disk. If you wish to save data, then save it to the Memory Card. When an F350-C4□E IMP Unit is used, data can also be saved to the RAM Disk. |
| Directory/file deletion canceled. | The file deletion was canceled because the Memory Card was not inserted correctly. Insert the Memory Card correctly and try the operation again. |
| Directory making canceled. | The directory making operation was canceled because the Memory Card was not inserted correctly. Insert the Memory Card correctly and try the operation again. |
| Directory name already exists. | The same directory name already exists in the Memory Card. Change the directory name and try the operation again. |
| File copy canceled. | The copy was canceled because the Memory Card was not inserted correctly. Insert the Memory Card correctly and try the operation again. |
| File does not exist. | There is no file in the Memory Card. Insert the Memory Card in which the file is saved. |
| File(s) exists. | The directory that contains a file cannot be deleted. Delete the file and try the operation again. |
| File format error: data cannot be installed. | The application program or the OVL program used for installation is incorrect. Either the program is corrupted or incorrect program was used for loading. The previously installed application program or the OVL program has been deleted. Install a correct application program or OVL program. |
| File format error: data cannot be loaded. | The format of the file used for loading is incorrect. Either the data is corrupted or incorrect data was used for loading. The previously set data may be corrupted. Load the correct data. |
| Filename already exists. | The same file name already exists in the Memory Card. Change the file name and try the operation again. |
| Filename change canceled. | The filename change was canceled because the Memory Card was not inserted correctly. Insert the Memory Card correctly and try the operation again. |
| File size error: data cannot be loaded. | The size of the file used for loading is incorrect. Either the data is corrupted or incorrect data was used for loading. Load the correct data. The previously set data remains unchanged. |
| Incorrect directory/file name. | The operation cannot be executed because the directory/file name is incorrect. Correct the file name and try the operation again. |

| Error message | Probable cause and remedy | | | | | | | | | | | | | | | | |
|--|---|------------|-------------|------------|-------|-------|-----|------|-------|------|-----|--------|-------|------|------|-------|------|
| Incorrect directory name. Input again. | <p>Either no directory name or invalid directory name has been entered. Enter a valid directory name.</p> <p>The directory name must be entered in 12 characters max. including the extension. If not adding the extension, enter the directory name in 8 characters max.</p> <p>The directory name must be entered in 63 normal characters max. including the directory name that designates the hierarchy from the root directory. Enter the directory name in 63 normal characters max.</p> | | | | | | | | | | | | | | | | |
| Incorrect setting combination. | <p>This combination cannot be set when setting the communications specifications for the RS-232C. Set one of the combinations shown in the table below.</p> <table border="1" data-bbox="683 516 1094 898"> <thead> <tr> <th>Stop bit</th> <th>Data length</th> <th>Parity bit</th> </tr> </thead> <tbody> <tr> <td rowspan="4">1 bit</td> <td rowspan="2">7 bit</td> <td>Odd</td> </tr> <tr> <td>Even</td> </tr> <tr> <td rowspan="2">8 bit</td> <td>None</td> </tr> <tr> <td>Odd</td> </tr> <tr> <td rowspan="3">2 bits</td> <td rowspan="2">7 bit</td> <td>Even</td> </tr> <tr> <td>None</td> </tr> <tr> <td>8 bit</td> <td>None</td> </tr> </tbody> </table> <p>This combination cannot be set when setting the date and time. Enter the day according to the calendar day for the month entered.</p> | Stop bit | Data length | Parity bit | 1 bit | 7 bit | Odd | Even | 8 bit | None | Odd | 2 bits | 7 bit | Even | None | 8 bit | None |
| Stop bit | Data length | Parity bit | | | | | | | | | | | | | | | |
| 1 bit | 7 bit | Odd | | | | | | | | | | | | | | | |
| | | Even | | | | | | | | | | | | | | | |
| | 8 bit | None | | | | | | | | | | | | | | | |
| | | Odd | | | | | | | | | | | | | | | |
| 2 bits | 7 bit | Even | | | | | | | | | | | | | | | |
| | | None | | | | | | | | | | | | | | | |
| | 8 bit | None | | | | | | | | | | | | | | | |
| Incorrect filename. | <p>The operation cannot be executed because the filename is incorrect. Correct the filename and try the operation again.</p> | | | | | | | | | | | | | | | | |
| Incorrect filename. Input again. | <p>Either no filename or invalid filename has been entered. Enter a valid filename and try the operation again.</p> <p>The filename must be entered in 63 normal characters max. including the directory name that designates the hierarchy from the root directory. Enter the filename in 63 normal characters max.</p> <p>The filename must be entered in 12 characters max. including the extension. If not adding the extension, enter the filename in 8 characters max.</p> <p>The directory name that was entered does not exist. Make a directory and try the operation again.</p> | | | | | | | | | | | | | | | | |
| Installation cannot continue. Insufficient memory. | <p>Installation cannot continue because the file size constituting the application program exceeds the memory capacity of the F350. The previously installed application program has been deleted. Reduce the size of the file and try the operation again.</p> | | | | | | | | | | | | | | | | |
| Memory backup battery voltage is low. | <p>The voltage of the memory backup battery for the IMP Unit is low. Replace the battery as soon as possible. Refer to <i>6-1-1 Replacing the Memory Backup Battery for the IMP Unit.</i></p> | | | | | | | | | | | | | | | | |
| Memory card battery voltage is low. | <p>The Memory Card battery voltage is low. Replace the battery as soon as possible. Refer to <i>6-1-3 Replacing the Battery for the Memory Card.</i></p> | | | | | | | | | | | | | | | | |
| Memory card format canceled. | <p>The formatting operation was canceled because the Memory Card was inserted incorrectly. Insert the Memory Card correctly and try the operation again.</p> | | | | | | | | | | | | | | | | |
| Memory card is write protected. | <p>The operation could not be executed because the Memory Card is write protected. Clear the write protection and try the operation again.</p> | | | | | | | | | | | | | | | | |
| Memory card not formatted. | <p>The Memory Card has not been formatted yet. Use a Memory Card that has been formatted.</p> | | | | | | | | | | | | | | | | |
| Memory card not inserted. | <p>The operation could not be executed because no Memory Card was inserted. Insert the Memory Card correctly and try the operation again.</p> | | | | | | | | | | | | | | | | |
| No application program file. | <p>There is no application program file in the Memory Card. Insert the Memory Card in which the application program file is saved.</p> | | | | | | | | | | | | | | | | |

| Error message | Probable cause and remedy |
|---|---|
| No application program files (*.VEX). | There is no application program file (*.VEX) in the Memory Card. Insert the Memory Card in which the application program (*.VEX) file is saved. |
| No backup data file. | There is no backup data file in the Memory Card. Insert the Memory Card in which the backup data file is saved. |
| No OVL program file. | The OVL program file does not exist in the Memory Card. Insert a Memory Card that contains the OVL program file. |
| No RAM Disk area. | The F350-C1□E does not have a RAM Disk area, so there is no RAM Disk area to initialize. Refer to 5-2-3 <i>Changing the OVL Area Size: U.OVL Area Size</i> . |
| | The RAM Disk area is set to "0," so it cannot be initialized. |
| No ROI model data file. | There is o ROI model data file in the Memory Card. Insert the Memory Card in which the ROI model data file is saved. |
| No search model data file. | There is no search model data file in the Memory Card. Insert the Memory Card in which the search model data file is saved. |
| No such directory/file. | There is no directory/file in the Memory Card. Insert the Memory Card that contains the file to be saved. |
| No system data file. | There is no system data file in the Memory Card. Insert the Memory Card in which the system data file is saved. |
| OVL installation canceled. Communications error. | <p>The transmission was aborted as the result of a communications error. Check the following points, and then try the transmission again.</p> <ul style="list-style-type: none"> • A time-out error occurred. • The communications specifications do not match. • The communications path is interrupted. • A cable is disconnected. • An error occurred in the XMODEM/128(SUM) system. (Either the block number is incorrect or the check sum is faulty.) |
| OVL program installation canceled. | Installation was canceled because the Memory Card was not inserted correctly. The OVL program previously installed has been deleted. Insert the Memory Card correctly and try the installation again. |
| OVL Unit not connected. | The OVL Unit is not connected. Turn off the power supply to the F350 and connect the OVL Unit. |
| ROI model data load canceled. | The load was canceled because the Memory Card was not inserted correctly. The previously set data may be corrupted. Insert the Memory Card correctly and try the operation again. |
| | The load via the RS-232C was canceled by pressing the Escape Key during the load operation. The previously set data may be corrupted. |
| ROI model data load canceled. Communications error. | Refer to "OVL installation canceled." |
| ROI model data save canceled. | The save was canceled because the Memory Card was not inserted correctly. Insert the Memory Card correctly and try the operation again. |
| | The save via the RS-232C was canceled by pressing the Escape Key during the save operation. |
| ROI model data save canceled. Communications error. | Refer to "OVL installation canceled." |
| RS-232C Unit is not connected. | The RS-232C Unit is not connected. Turn off the power supply to the F350 and connect the RS-232C Unit. |
| | The "K.Environment/O.OVL standard input/output/I. Standard input device" is set to "RS-232C." Change the setting to "Keyboard" if the application program or the OVL program needs to be executed automatically at the startup of the F350. |

| Error message | Probable cause and remedy |
|---|---|
| Search model data load canceled. | The load was canceled because the Memory Card was not inserted correctly. The previously set data may be corrupted. Insert the Memory Card correctly and try the operation again. |
| | The load via the RS-232C was canceled by pressing the Escape Key during the load operation. The previously set data may be corrupted. |
| Search model data load canceled. Communications error. | Refer to "OVL installation canceled." |
| Search model data save canceled. | The save was canceled because the Memory Card was not inserted correctly. Insert the Memory Card correctly and try the operation again. |
| | The save via the RS-232C was canceled by pressing the Escape Key during the save operation. |
| Search model data save canceled. Communications error. | Refer to "OVL installation canceled." |
| Set output period to value greater than delay plus output time. | Numeric settings are incorrect. Set the output period to a value greater than the delay plus the output time. |
| System data load canceled. | The load was canceled because the Memory Card was not inserted correctly. The previously set data may be corrupted. Insert the Memory Card correctly and try the operation again. |
| | The load via the RS-232C was canceled by pressing the Escape Key during the load operation. The previously set data may be corrupted. |
| System data load canceled. Communications error. | Refer to "OVL installation canceled." |
| System data save canceled. | The save was canceled because the Memory Card was not inserted correctly. Insert the Memory Card correctly and try the operation again. |
| | The save via the RS-232C was canceled by pressing the Escape Key during the save operation. |
| System data save canceled. Communications error. | Refer to "OVL installation canceled." |
| Wrong model memory. Clear model memory? | The model memory data is corrupted. Clear the model memory and load the model data. |

SECTION 8

Specifications

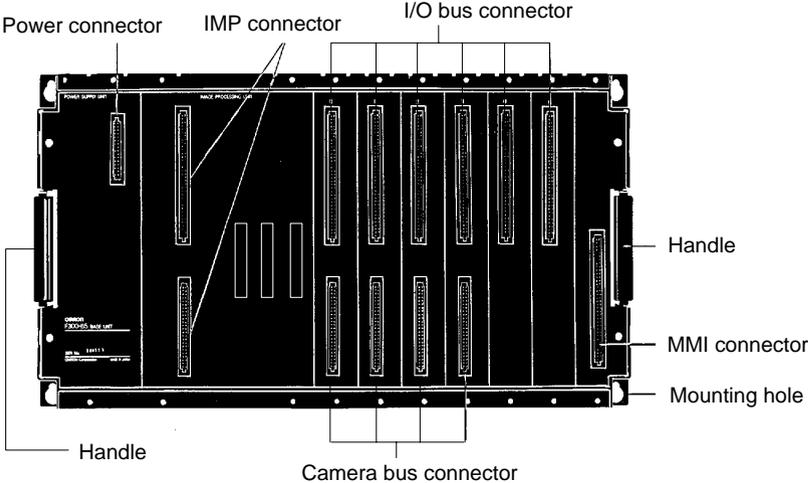
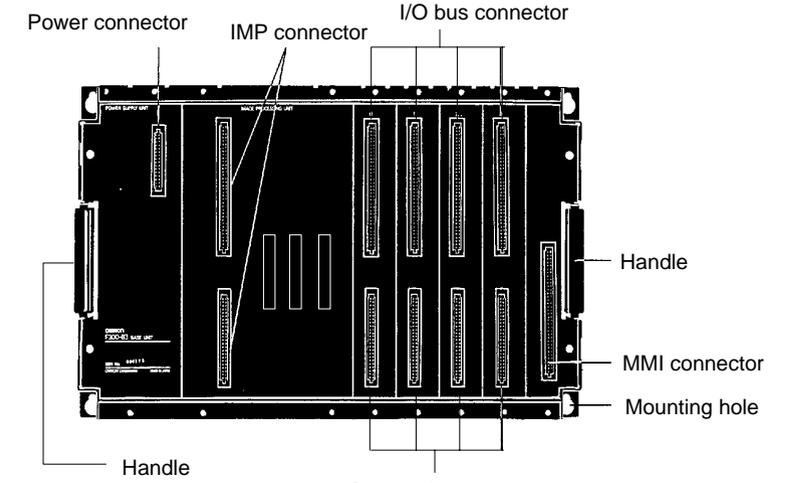
This section provides the specifications of Units used with the F350 Visual Inspection System.

| | |
|-------|---------------------------|
| 8-1 | Specifications |
| 8-1-1 | Units |
| 8-2 | Dimensions |
| 8-3 | Lens Specifications |

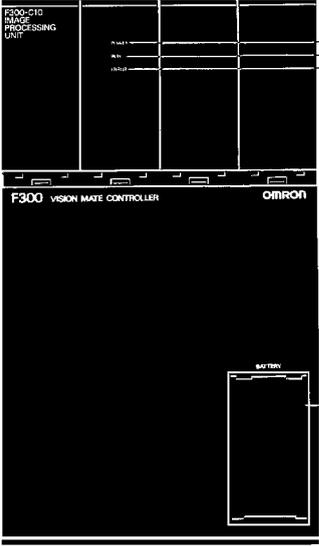
8-1 Specifications

8-1-1 Units

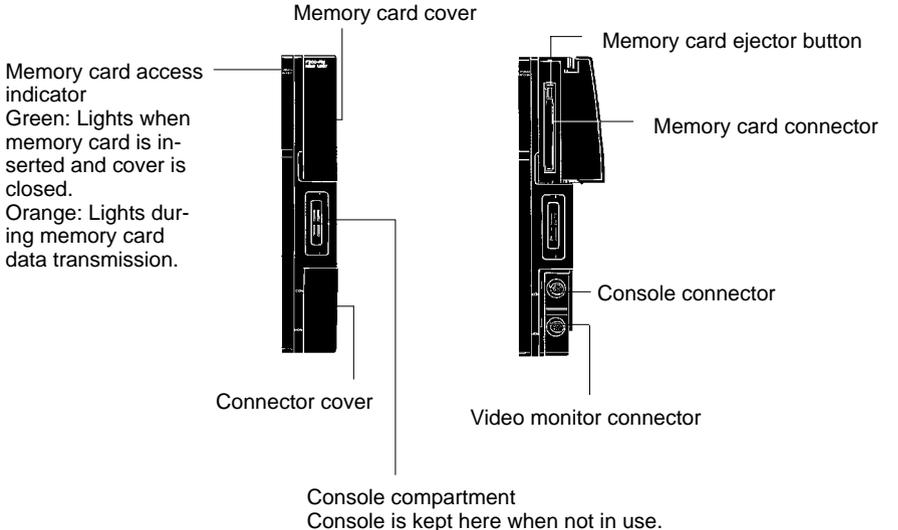
Base Units

| Item | F300-B□2 Base Unit |
|-----------------------------------|--|
| Description | Used for connecting various Units. Choose either one of them depending on the number of Units to be connected. The Base Unit is essential for the basic configuration of the F350. |
| Outer appearance and nomenclature | <p>5-slot Base Unit (F300-B52)</p>  <p>3-slot Base Unit (F300-B32)</p>  |
| Vibration resistance | Vibration frequency: 10 to 150 Hz; single amplitude: 0.15 mm |
| Impact resistance | 196 m/s ² (20 G) |
| Ambient operating temperature | 0°C to 50°C |
| Ambient operating humidity | 35% to 85% RH (no condensation) |
| Ambient environment | No corrosive gases |
| Storage temperature | -25°C to 65°C |
| Degree of protection | IP20 (in-panel) |
| Weight | F300-B52: Approx. 2,800 g F300-B32: Approx. 2,400 g |

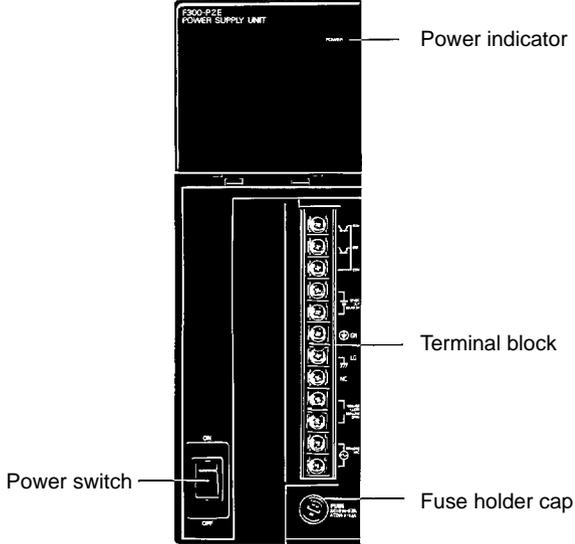
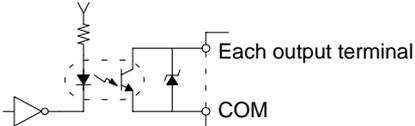
IMP Unit

| Item | F350-C12E | F350-C41E |
|---|---|-----------------|
| Description | The F350-C12E/C41E Image Processing Unit is the controller for processing measurements. It is an integral part of the basic F350 configuration. | |
| Outer appearance and nomenclature |  <p data-bbox="970 281 1412 380">Operation indicators POWER (green): Lit while power is on RUN (orange): Lit during processing ERROR (red): Lights when an error occurs</p> <p data-bbox="922 680 1118 751">Battery holder cover. Contains battery for memory back-up.</p> | |
| Vibration resistance | Vibration frequency: 10 to 150 Hz; single amplitude: 0.15 mm | |
| Impact resistance | 196 m/s ² (20 G) | |
| Ambient operating temperature | 0°C to 50°C | |
| Ambient operating humidity | 35% to 85% RH (no condensation) | |
| Ambient environment | No corrosive gases | |
| Storage temperature | -25°C to 65°C | |
| Degree of protection | IP20 (in-panel) | |
| Effective life of battery when stored (at an ambient temperature of 20°C) | 10 years | |
| Weight | Approx. 1,700 g | Approx. 1,850 g |

MMI Unit

| Item | F300-FM2 MMI Unit |
|-----------------------------------|---|
| Description | The F300-FM2 Man Machine Interface Unit connects to the Console and receives key inputs. Connected to the Video Monitor, it displays menus and outputs images. In addition, it saves data to and loads data from memory cards. It is an integral part of the basic F350 configuration. |
| Outer appearance and nomenclature |  <p>The diagram shows two views of the F300-FM2 MMI Unit. The left view shows the front panel with a 'Memory card access indicator' at the top, a 'Memory card cover' below it, and a 'Connector cover' at the bottom. The right view shows the back panel with a 'Memory card ejector button' at the top, a 'Memory card connector' below it, a 'Console connector' at the bottom left, and a 'Video monitor connector' at the bottom right. A 'Console compartment' is also indicated at the bottom, with the note 'Console is kept here when not in use.'</p> <p>Memory card access indicator Green: Lights when memory card is inserted and cover is closed. Orange: Lights during memory card data transmission.</p> <p>Memory card cover</p> <p>Memory card ejector button</p> <p>Memory card connector</p> <p>Console connector</p> <p>Connector cover</p> <p>Video monitor connector</p> <p>Console compartment Console is kept here when not in use.</p> |
| Vibration resistance | Vibration frequency: 10 to 150 Hz; single amplitude: 0.15 mm |
| Impact resistance | 196 m/s ² (20 G) |
| Ambient operating temperature | 0°C to 50°C |
| Ambient operating humidity | 35% to 85% RH (no condensation) |
| Ambient environment | No corrosive gases |
| Storage temperature | -25°C to 65°C |
| Degree of protection | IP20 (in-panel) |
| Weight | Approx. 660 g |

Power Supply Unit

| Item | F300-P2 Power Supply Unit | F300-P2E Power Supply Unit |
|---|---|----------------------------|
| Description | The F300-P2/P2E Power Supply Unit takes an AC power supply and provides a DC power supply to each Unit. It is an integral part of the basic F350 configuration. | |
| Outer appearance and nomenclature |  | |
| Supply voltage | 100 to 120 VAC | 200 to 240 VAC |
| Supply frequency | 50/60 Hz | |
| Power consumption | 200 VA max. | |
| Insulation resistance | 20 MΩ min. between all AC external terminals and GR terminal (at 500 VDC) | |
| Dielectric strength | 1,500 VAC, 50/60 Hz for 1 minute between all AC external terminals and GR terminal | |
| Leakage current | 10 mA max. | |
| Noise resistance | 1500 Vp-p; pulse width: 1 μs; rising time: 1 ns (pulse) | |
| Vibration resistance | Vibration frequency: 10 to 150 Hz; single amplitude: 0.15 mm | |
| Impact resistance | 196 m/s ² (20 G) | |
| Ambient operating temperature | 0°C to 50°C | |
| Ambient operating humidity | 35% to 85% RH (no condensation) | |
| Ambient environment | No corrosive gases | |
| Storage temperature | -25°C to 65°C | |
| Protection class | Class I (with protective conductor terminal) | |
| Degree of protection | IP20 (in-panel) | |
| Power supply provided (for Units) | DC + 5 V ± 3%; 7A/DC + 13 V ± 1%; 4.5A/DC - 12 V ± 5%; 0.9 A | |
| Power supply provided (for service) | DC + 12 V ± 5%; 0.3 A | |
| AC power interrupt detection | 10 ms min. | |
| Output type | Photocoupler output | |
| Output voltage | 12 to 24 VDC ± 10% | |
| Load current | 100 mA | |
| Residual voltage | 2 V max. | |
| Leakage current | 0.1 mA max. | |
| Internal circuit diagram for output section |  | |
| Weight | Approx. 1.7 kg | |

| Item | F300-P2 Power Supply Unit | F300-P2E Power Supply Unit |
|---|---|----------------------------|
| Environmental conditions according to IEC1010-1 | Indoor use Maximum altitude of 2,000 m Supply voltage fluctuations of $\pm 10\%$ of the rated voltage Installation category II Pollution degree 2 | |

Camera I/F Unit

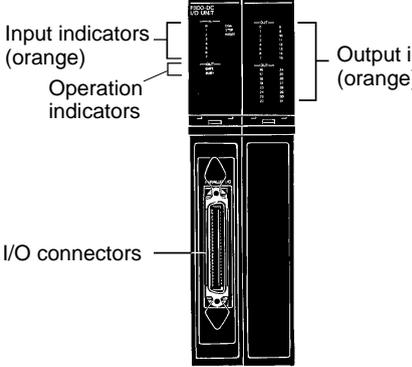
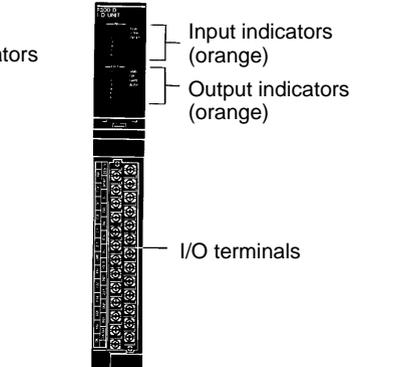
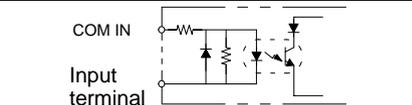
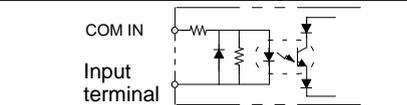
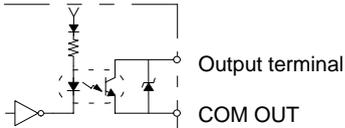
The Camera I/F Unit is an integral part of the F350 System. Any of several types can be used. Select the most suitable Camera I/F Unit based on the cameras that are to be used and the objects that are to be measured.

| Item | F300-A20 Normal Camera I/F Unit | F300-A22S Normal Simultaneously Camera I/F Unit |
|-----------------------------------|--|---|
| Description | Connects normal cameras and takes the camera images. Can measure stationary objects or moving objects using a strobe. | Connects normal cameras and takes the camera images. Can measure stationary objects or moving objects using a strobe. When two cameras are used, they can measure objects with synchronized timing. |
| Outer appearance and nomenclature |  <p>Operation indicators CAMERA 0 (orange): Lit when camera is connected to camera connector #0 CAMERA 1 (orange): Lit when camera is connected to camera connector #1</p> <p>Camera connector #0 Camera connector #1</p> | |
| Vibration resistance | Vibration frequency: 10 to 150 Hz; single amplitude: 0.15 mm | |
| Impact resistance | 196 m/s ² (20 G) | |
| Ambient operating temperature | 0°C to 50°C | |
| Ambient operating humidity | 35% to 85% RH (no condensation) | |
| Ambient environment | No corrosive gases | |
| Storage temperature | -25°C to 65°C | |
| Degree of protection | IP20 (in-panel) | |
| Connectable cameras | F300-S, F200-S | F300-S |
| Number of connectable cameras | Two max. | |
| Sync signal output frequency | HD, VD both dependent on camera bus synchronous signal. | |
| Output amplitude | 4 Vp-p, 1-K Ω negative pulse | |
| Output pulse width | HD, VD both dependent on camera bus synchronous signal. | |
| Camera power output | +12 V, 0.8 A (for 2 cameras) | |
| Weight | Approx. 400 g | Approx. 400 g |

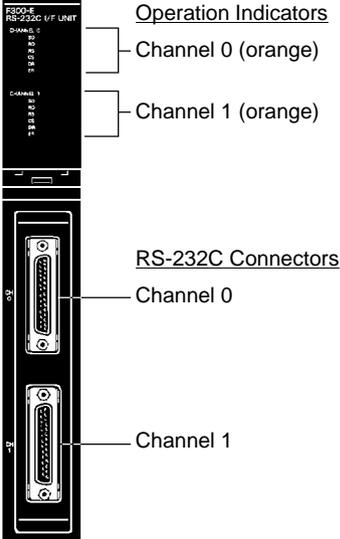
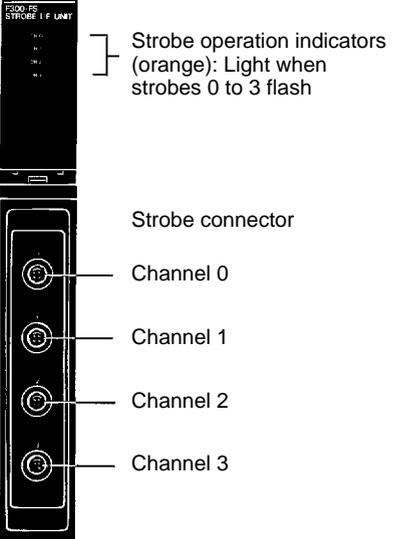
| Item | F300-A20R Shutter Camera I/F Unit | F300-A22RS Shutter Simultaneously Camera I/F Unit |
|-----------------------------------|---|---|
| Description | Connects shutter cameras and takes the camera images. Can measure moving objects at high speed. | Connects shutter cameras and takes the camera images. Can measure moving objects at high speed. When two cameras are used, they can measure objects with synchronized timing. |
| Outer appearance and nomenclature |  <p>Operation indicators CAMERA 0 (orange): Lit when camera is connected to camera connector #0 CAMERA 1 (orange): Lit when camera is connected to camera connector #1</p> <p>Camera connector #0 Camera connector #1</p> | |
| Vibration resistance | Vibration frequency: 10 to 150 Hz; single amplitude: 0.15 mm | |
| Impact resistance | 196 m/s ² (20 G) | |
| Ambient operating temperature | 0°C to 50°C | |
| Ambient operating humidity | 35% to 85% RH (no condensation) | |
| Ambient environment | No corrosive gases | |
| Storage temperature | -25°C to 65°C | |
| Degree of protection | IP20 (in-panel) | |
| Connectable cameras | F300-S2R/S3DR | |
| Number of connectable cameras | Two max. | |
| Sync signal output frequency | HD: 15.734 kHz; VD: 59.94 Hz | |
| Output amplitude | 4 Vp-p, 75-Ω negative pulse | |
| Output pulse width | HD: 6.27 μs; VD: 9 H | |
| Camera power output | +12 V, 0.8 A (for 2 cameras); -12 V, 0.2 A (for 2 cameras) | |
| Weight | Approx. 400 g | |

| Item | F300-A23RS Frame Shutter Camera I/F Unit |
|-----------------------------------|---|
| Description | Connects F300-S4R Frame Shutter Cameras and takes the camera images. Used for taking images of moving objects. |
| Outer appearance and nomenclature |  <p>Operation indicators CAMERA 0 (orange): Lit when camera is connected to camera connector #0 CAMERA 1 (orange): Lit when camera is connected to camera connector #1</p> <p>Camera connector #0 Camera connector #1</p> |
| Vibration resistance | Vibration frequency: 10 to 150 Hz; single amplitude: 0.15 mm |
| Impact resistance | 196 m/s ² (20 G) |
| Ambient operating temperature | 0°C to 50°C |
| Ambient operating humidity | 35% to 85% RH (no condensation) |
| Ambient environment | No corrosive gases |
| Storage temperature | -25°C to 65°C |
| Degree of protection | IP20 (in-panel) |
| Connectable cameras | F300-S4R |
| Number of connectable cameras | Two |
| Sync signal output frequency | HD: 15.734 kHz; VD: 59.94 Hz |
| Output amplitude | 4 Vp-p, 75-Ω negative pulse |
| Output pulse width | HD: 6.27 μs; VD: 9 H |
| Camera power output | +12 V, 0.8 A (for 2 cameras); -12 V, 0.2 A (for 2 cameras) |
| Weight | Approx. 400 g |

I/O Unit

| Item | F300-DC2 Parallel I/O Unit | F300-D2 Terminal Block Unit |
|-----------------------------------|--|---|
| Description | Connects to devices such as Programmable Controllers via parallel I/O. Inputs measurement commands and outputs data (measured values and judgement results). | Connects to devices such as Programmable Controllers via terminal blocks. Inputs measurement commands and outputs data (measured values and judgement results). |
| Outer appearance and nomenclature |  |  |
| Vibration resistance | Vibration frequency: 10 to 150 Hz; single amplitude: 0.15 mm | |
| Impact resistance | 196 m/s ² (20 G) | |
| Ambient operating temperature | 0°C to 50°C | |
| Ambient operating humidity | 35% to 85% RH (no condensation) | |
| Ambient environment | No corrosive gases | |
| Storage temperature | -25°C to 65°C | |
| Degree of protection | IP20 (in-panel) | |
| Weight | Approx. 800 g | Approx. 550 g |
| Input Specifications | | |
| Number of input points | Data input: 8; control input: 3 | |
| Input voltage | 12 to 24 VDC ±10% | |
| ON current | 3 to 15 mA | |
| ON voltage | 8.8 V max. | |
| OFF current | 0.1 mA min. | |
| OFF voltage | 4.5 V min. | |
| ON delay | Reset input: 10 ms max.; other inputs: 0.5 ms max. | |
| OFF delay | Reset input: 15 ms max.; other inputs: 0.7 ms max. | |
| Internal circuit diagrams |  |  |
| Output Specifications | | |
| Number of output points | Data output: 32; control output: 2 | Data output: 8; control output: 2; AND/OR output: 2 |
| Output voltage | 12 to 24 VDC ±10% | |
| Load current | 100 mA max. | |
| ON residual voltage | 2 V max. | |
| OFF leakage current | 0.1 mA max. | |
| Internal circuit diagram |  | |

RS-232C I/F Unit and Strobe I/F Unit

| Item | F300-E2 RS-232C I/F Unit | F300-FS Strobe I/F Unit |
|--------------------------------------|---|---|
| Description | Connects to devices such as personal computers via RS-232C interface. Enables data communications and menu operations via RS-232C. | Connects to strobe devices. Used for taking images using strobes. |
| Outer appearance and nomenclature |  <p>Operation Indicators</p> <ul style="list-style-type: none"> Channel 0 (orange) Channel 1 (orange) <p>RS-232C Connectors</p> <ul style="list-style-type: none"> Channel 0 Channel 1 |  <p>Strobe operation indicators (orange): Light when strobes 0 to 3 flash</p> <p>Strobe connector</p> <ul style="list-style-type: none"> Channel 0 Channel 1 Channel 2 Channel 3 |
| Vibration resistance | Vibration frequency: 10 to 150 Hz; single amplitude: 0.15 mm | |
| Impact resistance | 196 m/s ² (20 G) | |
| Ambient operating temperature | 0°C to 50°C | |
| Ambient operating humidity | 35% to 85% RH (no condensation) | |
| Ambient environment | No corrosive gases | |
| Storage temperature | -25°C to 65°C | |
| Degree of protection | IP20 (in-panel) | |
| Weight | Approx. 400 g | |
| Communications Specifications | | |
| Number of channels | Two | — |
| Electrical specifications | EIA RS-232C conforming | |
| Synchronization method | Start stop | |
| Baud rate | 1,200 to 19,600 bps | |
| Performance Specifications | | |
| Number of connectable strobes | — | Four |
| Strobe trigger output | — | Photocoupler output; 20 mA max. per unit |
| Strobe flash error input | — | Photocoupler input |
| Input ON current | — | 3 mA min. |
| Input OFF current | — | 1.5 mA max. |

OVL Unit

| Item | F350-L12E OVL Unit |
|-----------------------------------|---|
| Description | Used to create a program using the dedicated BASIC programming language OVL. The OVL Unit allows more sophisticated measurements. |
| Outer appearance and nomenclature |  |
| Vibration resistance | Vibration frequency: 10 to 150 Hz; single amplitude: 0.15 mm |
| Impact resistance | 196 m/s ² (20 G) |
| Ambient operating temperature | 0°C to 50°C |
| Ambient operating humidity | 35% to 85% RH (no condensation) |
| Ambient environment | No corrosive gases |
| Storage temperature | -25°C to 65°C |
| Weight | Approx. 320 g |

Dummy Unit

| Item | F300-G Dummy Unit |
|-----------------------------------|---|
| Description | Dummy Units can be inserted into empty slots to protect connectors and reinforce the F350. Dummy Units also serve to give the F350 a neater appearance. |
| Outer appearance and nomenclature |  |
| Vibration resistance | Vibration frequency: 10 to 150 Hz; single amplitude: 0.15 mm |
| Impact resistance | 196 m/s ² (20 G) |
| Ambient operating temperature | 0°C to 50°C |
| Ambient operating humidity | 35% to 85% RH (no condensation) |
| Ambient environment | No corrosive gases |
| Storage temperature | -25°C to 65°C |
| Weight | Approx. 200 g |

Cables

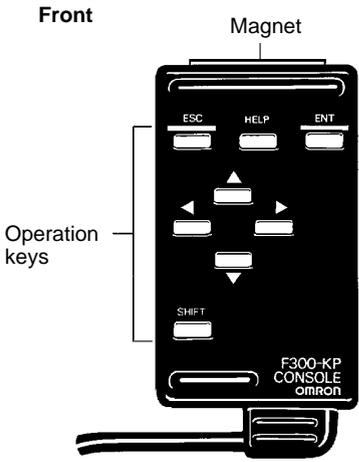
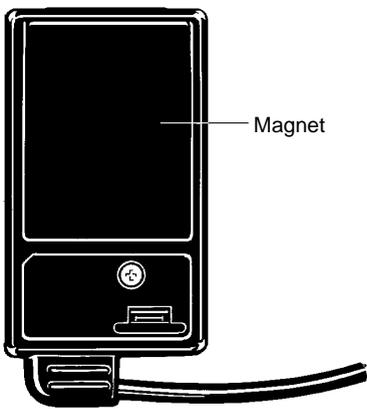
| Item | F309-VM Monitor Cable | |
|-------------------------------|--|--|
| Description | Connects the MMI Unit and the Video Monitor | |
| Vibration resistance | Vibration frequency: 10 to 150 Hz; single amplitude: 0.15 mm | |
| Impact resistance | 196 m/s ² (20 G) | |
| Ambient operating temperature | 0°C to 50°C | |
| Ambient operating humidity | 35% to 85% RH (no condensation) | |
| Ambient environment | No corrosive gases | |
| Storage temperature | -25°C to 65°C | |
| Length | 2 m, or 5 to 30 m in multiples of 5 m | |
| Minimum bending diameter | 150 mm | |

| Item | F309-VSR2 Camera Cable | |
|-------------------------------|--|--------------------------------|
| Description | Connects the Camera I/F Units to standard Cameras (F300-S/F200-S), Shutter Cameras (F300-S2R/S3DR), or Frame Shutter Cameras (F300-S4R). | |
| Vibration resistance | Vibration frequency: 10 to 150 Hz; single amplitude: 0.15 mm | |
| Impact resistance | 196 m/s ² (20 G) | |
| Ambient operating temperature | 0°C to 50°C | |
| Ambient operating humidity | 35% to 85% RH (no condensation) | |
| Ambient environment | No corrosive gases | |
| Storage temperature | -25°C to 65°C | |
| Length | 5 m, or 10 to 40 m in multiples of 5 m | 5 to 15 m in multiples of 5 m. |
| Minimum bending diameter | 150 mm | |

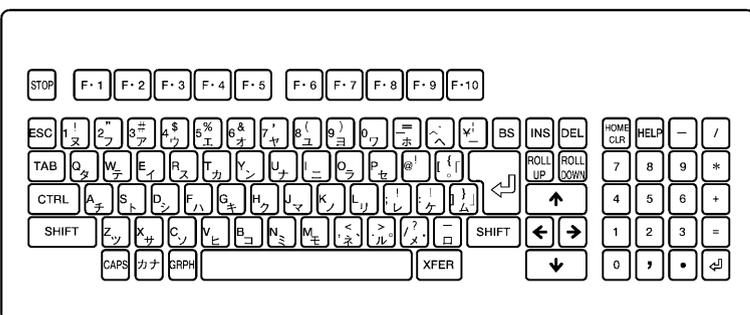
Note Do not remove the core attached to the Camera Cables.

| Item | F309-VR RS-232C Cable | F309-VFS Strobe Cable |
|-------------------------------|---|--|
| Description | Connects RS-232C I/F Units to devices such as personal computers. | Connects Strobe I/F Units to strobe devices. |
| Vibration resistance | Vibration frequency: 10 to 150 Hz; single amplitude: 0.15 mm | |
| Impact resistance | 196 m/s ² (20 G) | |
| Ambient operating temperature | 0°C to 50°C | |
| Ambient operating humidity | 35% to 85% RH (no condensation) | |
| Ambient environment | No corrosive gases | |
| Storage temperature | -25°C to 65°C | |
| Length | 5 m | 2 m |
| Minimum bending diameter | 150 mm | |

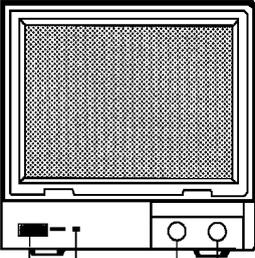
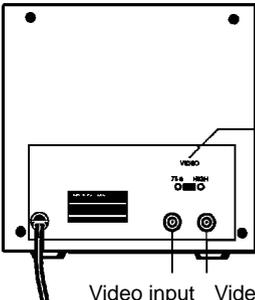
Console

| Item | F300-KP Console |
|-----------------------------------|---|
| Description | The console is used for carrying out menu operations. It is an integral part of an F350 System. |
| Outer appearance and nomenclature | <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Front</p>  </div> <div style="text-align: center;"> <p>Rear</p>  </div> </div> |
| Vibration resistance | Vibration frequency: 10 to 150 Hz; single amplitude: 0.15 mm |
| Impact resistance | 196 m/s ² (20 G) |
| Ambient operating temperature | 0°C to 50°C |
| Ambient operating humidity | 35% to 85% RH (no condensation) |
| Ambient environment | No corrosive gases |
| Storage temperature | -25°C to 65°C |
| Degree of protection | IP20 (in-panel) |
| Weight | Approx. 240 g (excluding accessories) |

Keyboard

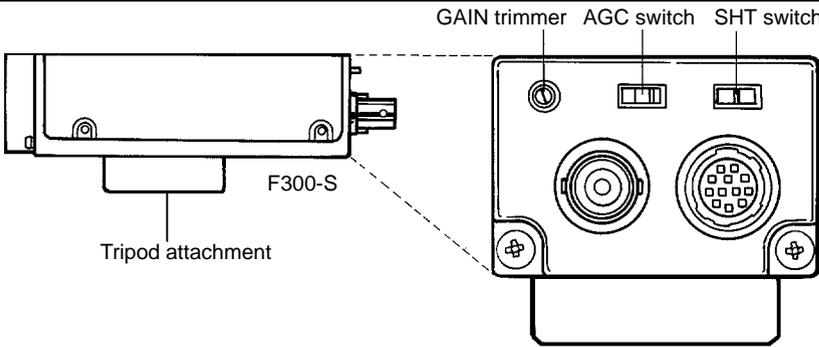
| Item | F300-K Keyboard |
|-----------------------------------|---|
| Description | Used for inputting the dedicated BASIC programming language OVL. |
| Outer appearance and nomenclature | <p>Key Arrangement</p>  |
| Ambient operating temperature | 0°C to 50°C |
| Ambient operating humidity | 20% to 90% RH (no condensation) |
| Ambient environment | No corrosive gases |
| Storage temperature | -20°C to 60°C |
| Degree of protection | IP20 (in-panel) |
| Weight | Approx. 1.4 kg |

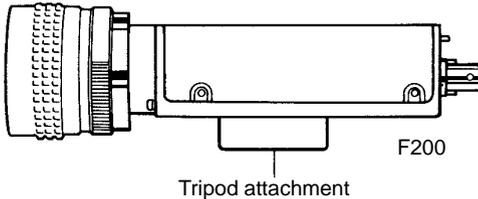
Video Monitor

| Item | F300-M09 Video Monitor | |
|-----------------------------------|---|--|
| Description | The Video Monitor displays menus and camera images, and is used for outputting data such as measured values and judgement results. It is an integral part of an F350 System. | |
| Outer appearance and nomenclature | <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Front</p>  <p>Power switch indicator Contrast control Brightness control</p> </div> <div style="text-align: center;"> <p>Rear</p>  <p>Terminal resistance switch Video input terminal Video output terminal</p> </div> </div> | |
| Power supply voltage | 100 VAC | |
| Current consumption | Approx. 300 mA | |
| Vibration resistance | Vibration frequency: 10 to 150 Hz; single amplitude: 0.15 mm | |
| Impact resistance | 196 m/s ² (20 G) | |
| Ambient operating temperature | 0°C to 40°C | |
| Ambient operating humidity | 10% to 90% RH (no condensation) | |
| Ambient environment | No corrosive gases | |
| Storage temperature | -25°C to 65°C | |
| Weight | Approx. 5.8 kg | |
| Performance Specifications | | |
| Rating | System | Number of scanning lines: 525 Horizontal frequency: 15.75 kHz Field frequency: 60 Hz |
| | I/O impedance | 75Ω, high impedance (selectable) |
| | I/O level and polarity | Image: 0.7 V (peak to peak), positive Synchronization: 0.3 V (peak to peak), negative |
| | Screen size | 164 x 123 mm (W x H), monochrome (light-holding type) |
| Performance | Resolution | 700 TV min. (at center) |

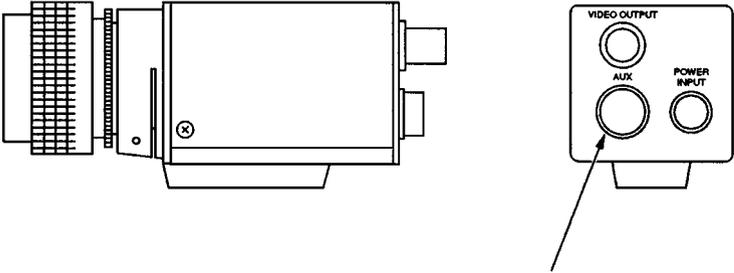
 **Caution** Do not open the back cover of the video monitor. The video monitor contains high-voltage components, so there is a risk of electrical shock.

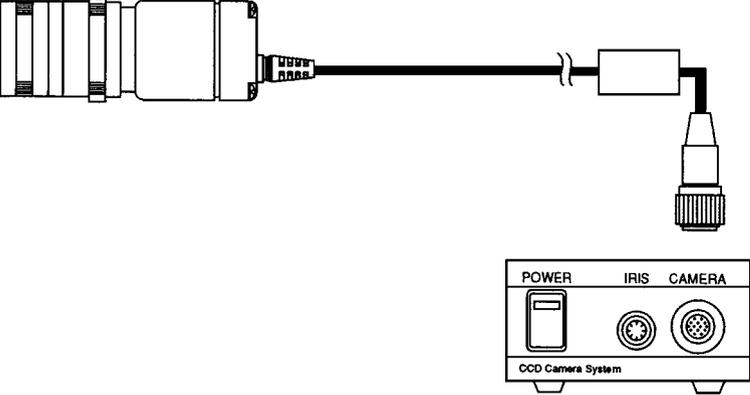
Normal Camera Specifications

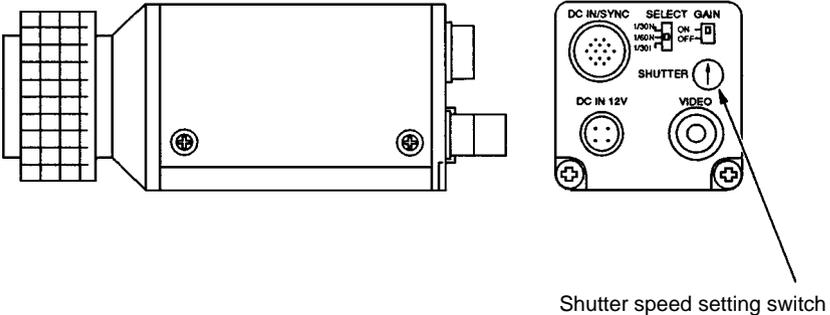
| Item | F300-S |
|-----------------------------------|--|
| Description | Takes images of stationary objects or moving objects using strobes. |
| Outer appearance and nomenclature |  |
| Power supply | 12 VDC \pm 10% |
| Vibration resistance | Vibration frequency: 10 to 150 Hz; single amplitude: 0.15 mm |
| Impact resistance | 196 m/s ² (20 G) |
| Ambient operating temperature | 0°C to 50°C |
| Ambient operating humidity | 35% to 85% RH (no condensation) |
| Ambient environment | No corrosive gases |
| Storage temperature | -25°C to 65°C |
| Picture element | 2/3" Interline CCD |
| Effective pixels | 768 (H) x 493 (V) |
| Synchronization | External/Internal synchronization (automatically switched) Input impedance: 1 k Ω |
| Object illumination | Standard: 200 lux; F4 (3,200°K) AGC: ON; γ = 1.0 Minimum: 0.5 lux; F1.4 GAIN: MAX; γ = 0.45 |
| Resolution | Horizontal: 570 lines; Vertical: 350 lines |
| S/N ratio | 50 dB _{p-p} /rms |
| AGC | Switchable ON/OFF with selector on panel. OFF on delivery. |
| Electronic shutter | Switchable ON/OFF with selector on panel. OFF on delivery. |
| Lens mounting | C mount |
| Weight | Approx. 200 g |

| Item | F200-S |
|-----------------------------------|--|
| Description | Takes images of stationary objects or moving objects using strobes. |
| Outer appearance and nomenclature |  |
| Power supply | 10 to 16 VDC |
| Vibration resistance | Vibration frequency: 10 to 150 Hz; single amplitude: 0.75 mm |
| Impact resistance | 196 m/s ² (20 G) |
| Ambient operating temperature | 0°C to 50°C |
| Ambient operating humidity | 35% to 85% RH (no condensation) |
| Ambient environment | No corrosive gases |
| Storage temperature | -25°C to 65°C |
| Picture element | 1/3" Interline CCD |
| Effective pixels | 512 (H) x 492 (V) |
| Synchronization | Internal sync |
| Object illumination | Standard: 330 lux; F8 Minimum: 3 lux; F1.4 |
| Resolution | Horizontal: 350 lines (center) |
| S/N ratio | 50 dB _{p-p} /rms |
| AGC | OFF |
| Electronic shutter | — |
| Lens mounting | C mount |
| Weight | Approx. 150 g |

Shutter Cameras

| Item | F300-S2R |
|---------------------------------------|--|
| Description | Used for picking up images of high-speed moving objects. |
| Outer appearance and nomenclature |  <p style="text-align: right; margin-right: 100px;">Camera cable connector</p> |
| Power supply | 12 VDC, 0.16 A (10.5 to 20 VDC, ripple of 1 Vp-p max.) |
| Ambient operating temperature | 0°C to 50°C |
| Ambient operating humidity | 35% to 85% RH |
| Ambient environment | No icing |
| Picture element | 1/2" Interline CCD (black and white) |
| CCD charge storage mode | Field storage |
| Effective pixels | 756 (H) x 484 (V) |
| Synchronization | External/Internal synchronization (automatically switched) |
| External synchronization input signal | Sync system: HD/VD Input level: 2 to 5 Vp-p Input impedance: 75 Ω |
| Image output | VS: 1.0 Vp-p/75 Ω |
| Resolution | Horizontal: 570 lines min.; Vertical: 350 lines |
| S/N ratio | 56 dB |
| Shutter speed | 1/1000 s, 1/2000 s, 1/4000 s, 1/10000 s (Default: 1/2000 s) |
| Shutter trigger input signal | Capture timing: falling edge |
| Shutter mode | Sync non-reset mode |
| Lens mounting | C mount |
| Weight | Approx. 200 g |

| Item | F300-S3DR |
|---|--|
| Description | Used for picking up images of high-speed moving objects. |
| Outer appearance and nomenclature |  |
| Power supply | 12 VDC±1.2 V |
| Power consumption | 3.2 VA±0.4 VA |
| Ambient operating temperature | 0°C to 50°C |
| Ambient operating humidity | 35% to 85% RH |
| Ambient environment | No icing |
| Picture element | 1/2" Image area sensor (black and white) |
| CCD charge storage mode | Field storage |
| Effective pixels | 768 (H) x 494 (V) |
| Synchronization | External/Internal synchronization (automatically switched) |
| External synchronization input signal | Sync system: HD/VD Input level: 2 to 4 Vp-p Input impedance: 75 Ω |
| Image output | VS: 1.0 Vp-p/75 Ω |
| Resolution | Horizontal: 570 lines min.; Vertical: 350 lines |
| S/N ratio | 56 dB |
| Shutter speed | 1/1000 s, 1/2000 s, 1/4000 s, 1/10000 s (Default: 1/2000 s) |
| Shutter trigger input signal | Capture timing: falling edge |
| Shutter mode | Sync non-reset mode |
| Lens mounting | C mount |
| Cable length between the head and amplifier | 2±0.2 m |
| Weight | Camera head: approx. 220 g (including cable); Body: approx. 510 g |

| Item | F300-S4R |
|---------------------------------------|---|
| Description | Used for picking up images of high-speed moving objects. |
| Outer appearance and nomenclature |  <p style="text-align: right;">Shutter speed setting switch</p> |
| Power supply | 12 VDC, 0.3 A (10.8 to 13.2 VDC, ripple of 1 Vp-p max.) |
| Ambient operating temperature | 0°C to 50°C |
| Ambient operating humidity | 35% to 85% RH |
| Ambient environment | No icing |
| Picture element | 1/2" Interline CCD (black and white) |
| CCD format | Field storage VGA format |
| Effective pixels | 659 (H) x 494 (V) |
| Synchronization | External/Internal synchronization (automatically switched) |
| External synchronization input signal | Sync system: HD/VD Input level: 1.5 to 4.5 Vp-p Input impedance: 75 Ω |
| Image output | VS: 1.0 Vp-p/75 Ω |
| Resolution | Horizontal: 490 lines min.; Vertical: 480 lines |
| S/N ratio | 56 dB |
| Shutter speed | 1/1000 s, 1/1500 s, 1/2000 s, 1/3000 s, 1/4000 s, 1/6000 s, 1/8000 s, 1/10000 s 1/30000 s, 1/50000 s (Default: 1/2000 s) |
| Shutter trigger input signal | Capture timing: falling edge |
| Shutter mode | Full-frame mode |
| Lens mounting | C mount |
| Weight | Approx. 160 g |

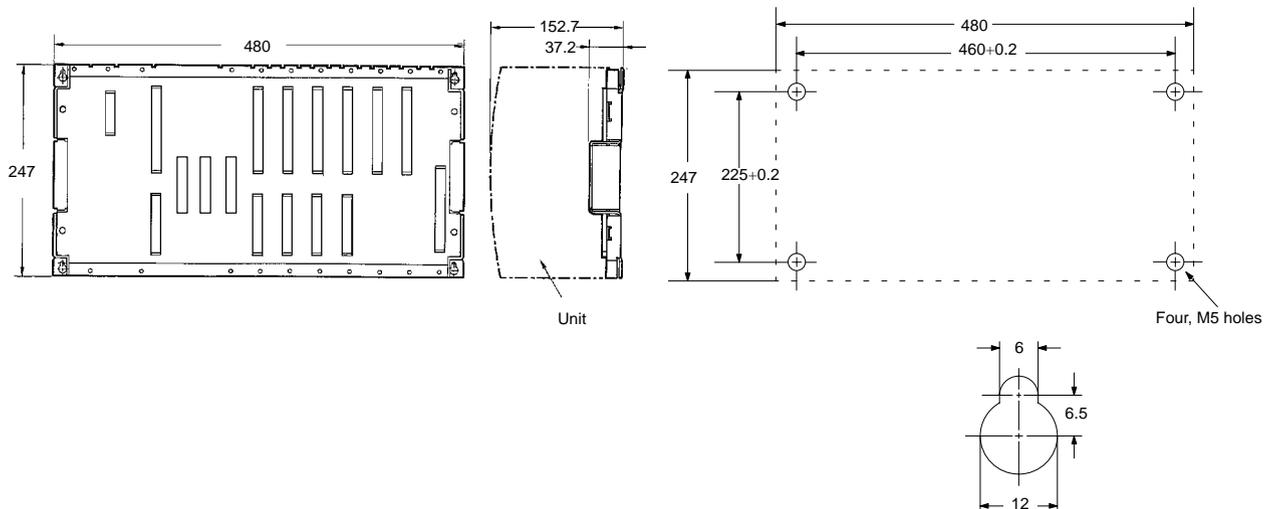
Memory Card

| Item | F300-N256 | F300-N512 | F300-N2M |
|---|---|------------|----------|
| Description | Used for storing the system data, model data, backup data, scene data, etc. | | |
| Outer appearance and nomenclature | | | |
| Vibration resistance | Vibration frequency: 10 to 150 Hz; single amplitude: 0.15 mm | | |
| Impact resistance | 196 m/s ² (20 G) | | |
| Ambient operating temperature | 0°C to 50°C | | |
| Ambient operating humidity | 35% to 85% RH (no condensation) | | |
| Ambient environment | No corrosive gases | | |
| Storage temperature | -25°C to 65°C | | |
| Capacity | 256K bytes | 512K bytes | 2M bytes |
| Effective life of battery when stored (at an ambient temperature of 20°C) | 5 years | 4 years | 4 years |

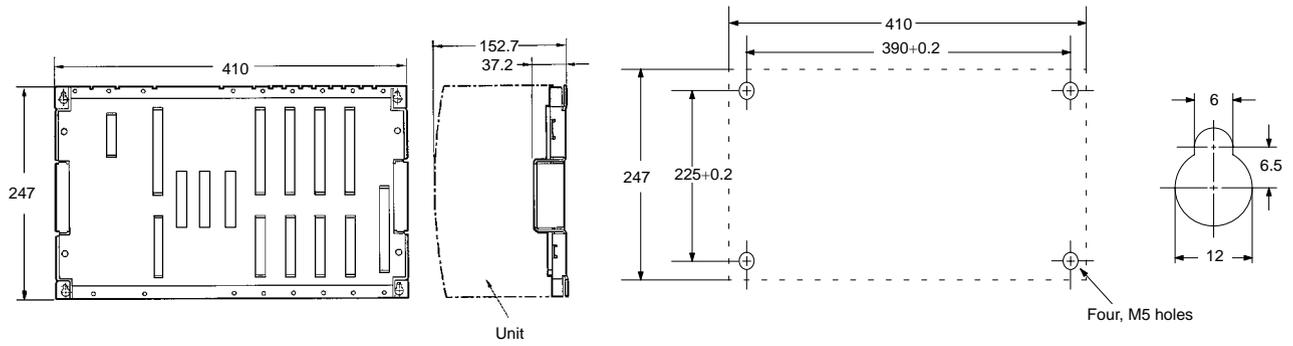
! Caution Memory Card batteries require care in handling. Do not short-circuit plus and minus battery terminals, attempt to charge batteries, take them apart, deform them, or dispose of them in a fire. Batteries can explode, leak, or combust.

8-2 Dimensions

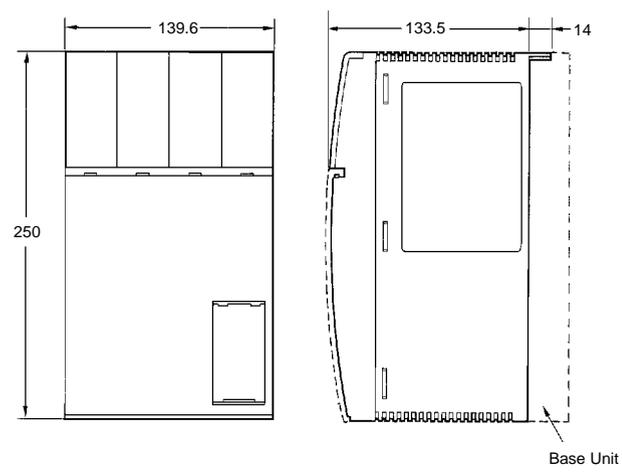
F300-B52 5-slot Base Unit



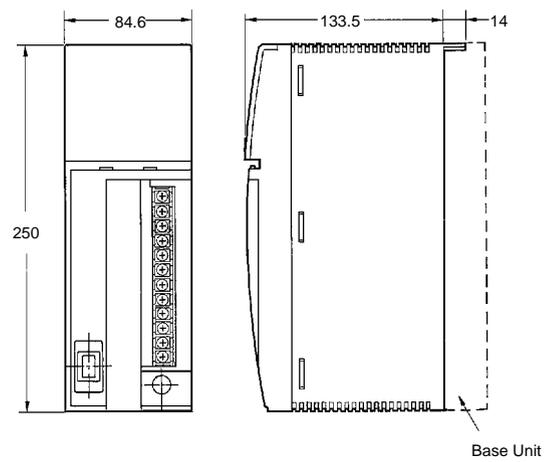
F300-B32 3-slot Base Unit



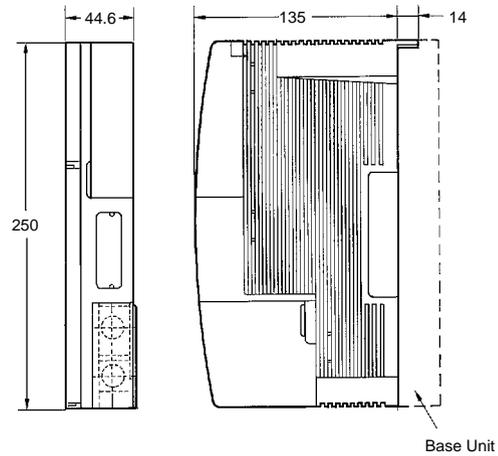
F350-C12E/C41E IMP Unit



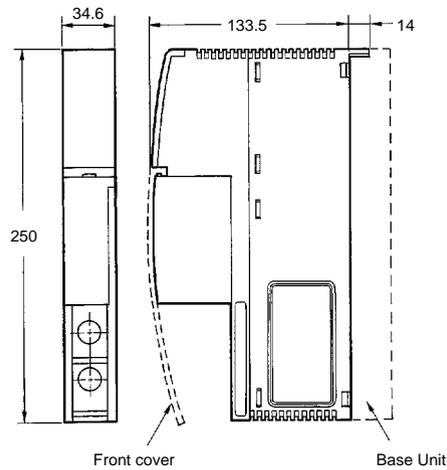
F300-P2/P2E Power Supply Unit



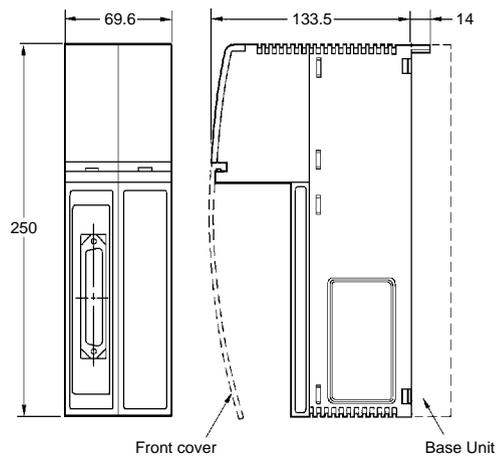
F300-FM2 MMI Unit



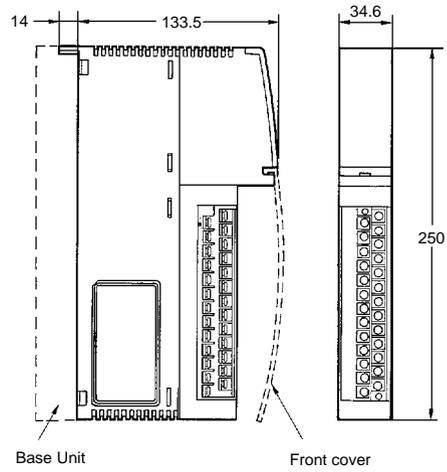
- F300-A20 Normal Camera I/F Unit**
- F300-A22S Normal Simultaneously Camera I/F Unit**
- F300-A20R Shutter Camera I/F Unit**
- F300-A22RS Shutter Simultaneously Camera I/F Unit**
- F300-A23RS Frame Shutter Camera I/F Unit**



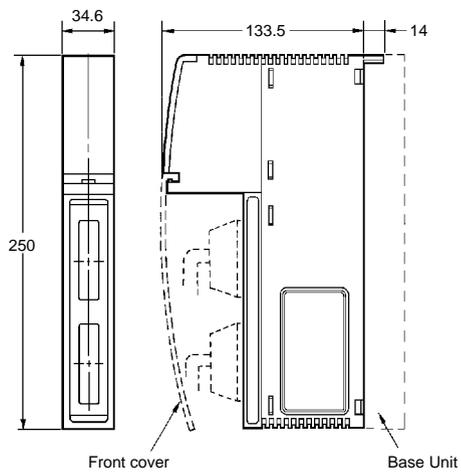
F300-DC2 Parallel I/O Unit



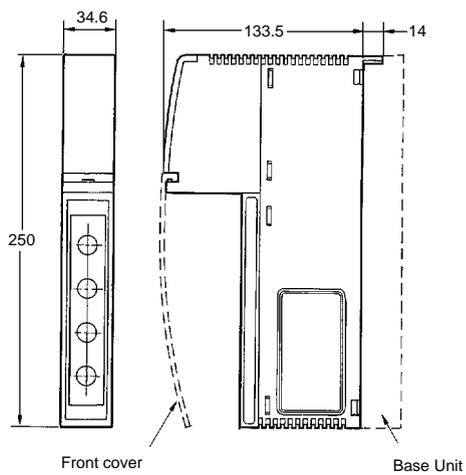
F300-D2 Terminal Block Unit



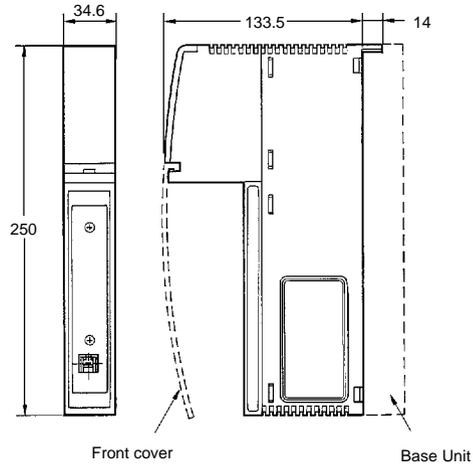
F300-E2 RS-232C I/F Unit



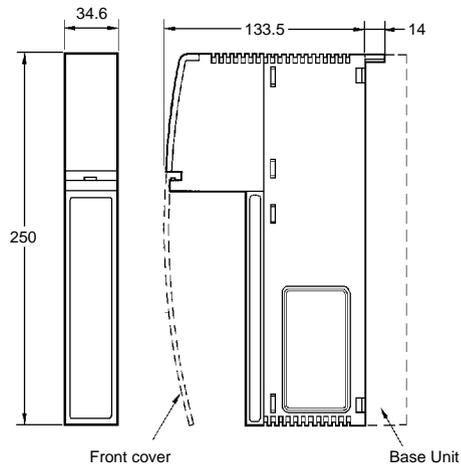
F300-FS Strobe I/F Unit



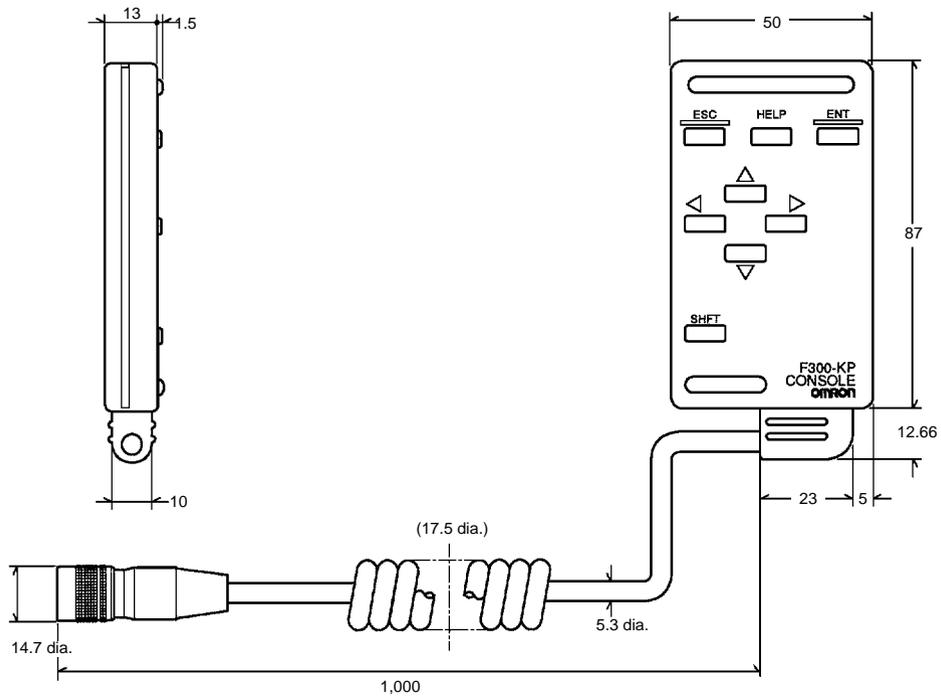
F350-L12E OVL Unit



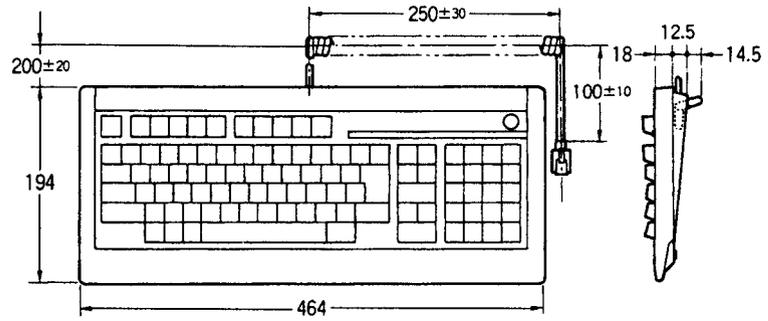
F300-G Dummy Unit



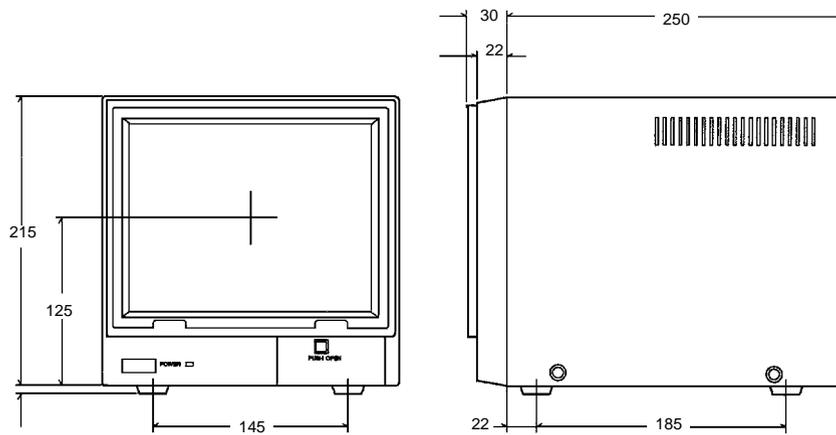
F300-KP Console



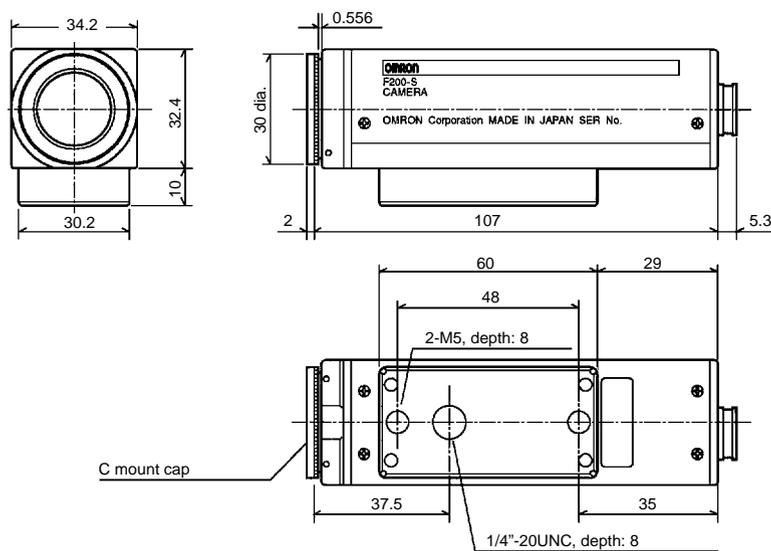
F300-K Keyboard



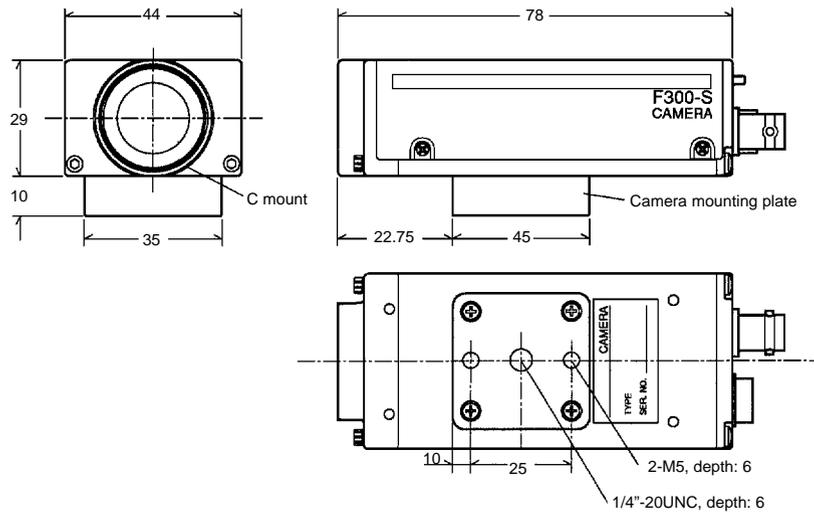
F300-M09 Video Monitor



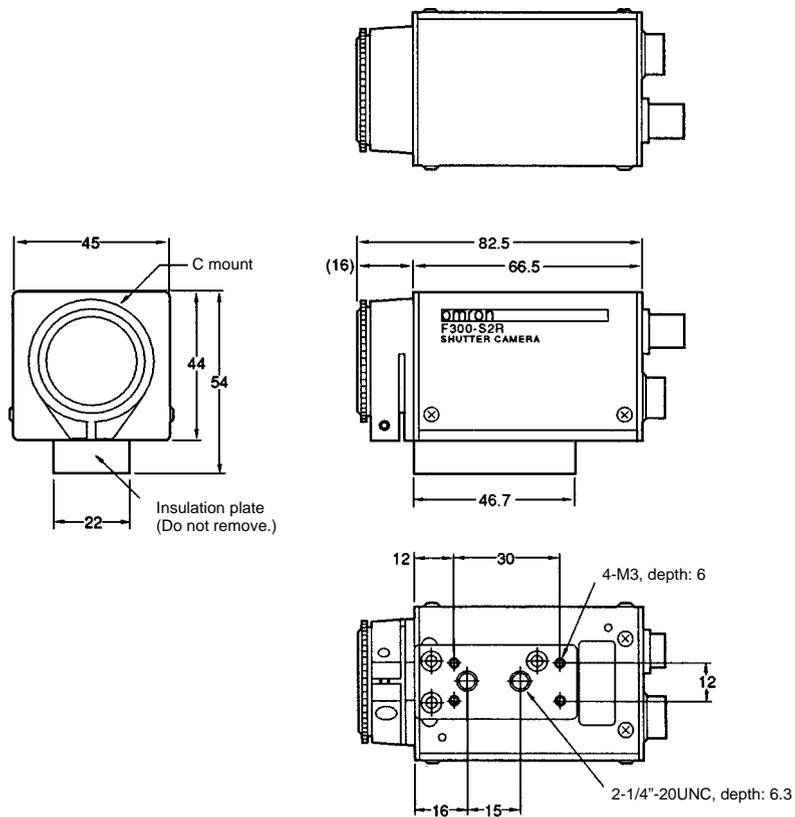
F200-S Normal Camera



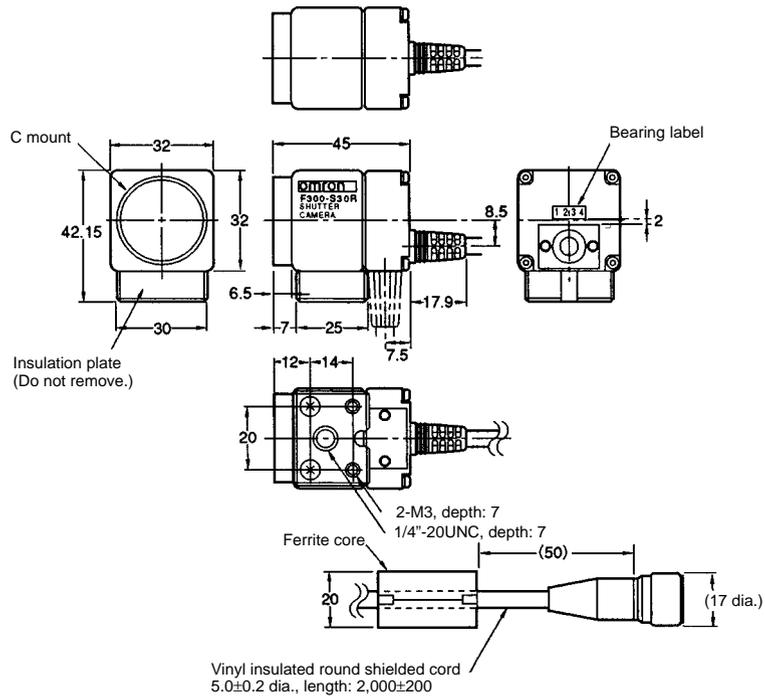
F300-S Normal Camera



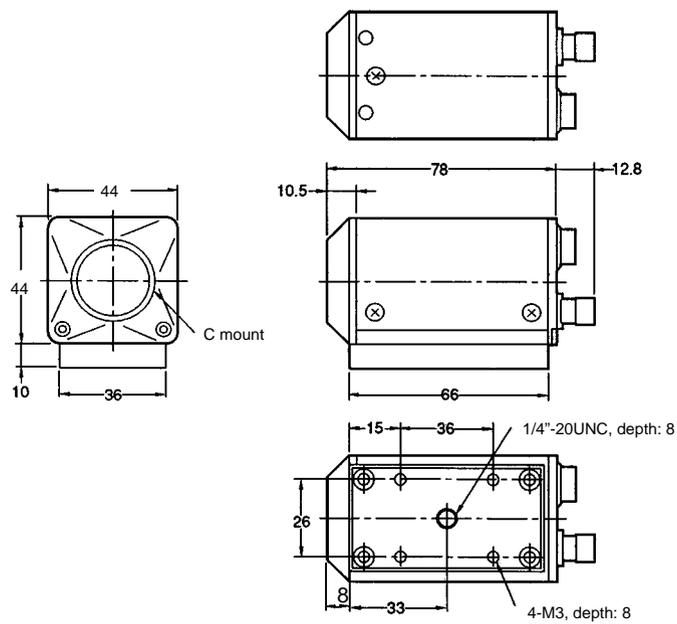
F300-S2R Shutter Camera



F300-S3DR Shutter Camera



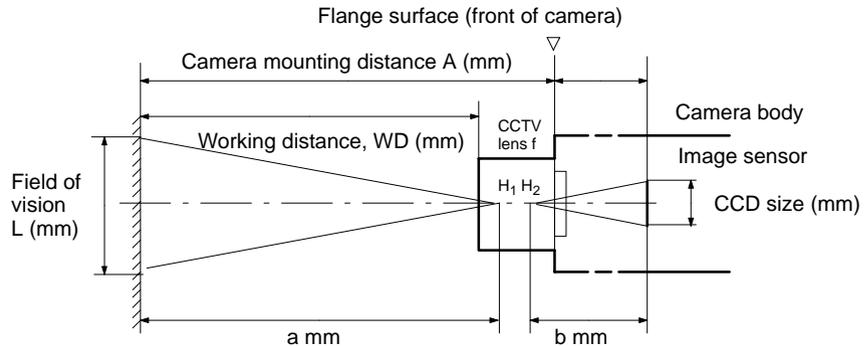
F300-S4R Shutter Camera



8-3 Lens Specifications

This section provides specifications for the various types of lens that can be used with an F350 System, and explains how to perform the calculations for optical systems.

Imaging Formula



If “f” in the illustration above is made to represent the actual focal distance, then the imaging formula will be as follows:

$$\frac{1}{a} + \frac{1}{b} = \frac{1}{f}$$

$$\frac{b}{a} + \frac{1}{L} = \frac{\text{Effective screen of image sensor}}{\text{Field of vision}}$$

H₁ and H₂ in the illustration are called “principal points,” and they are the standards for distance in the imaging formula. The principal points are fixed according to the lens, so the image will fade out of focus if the object is in at a distance other than “a.” For that reason, the lens is ordinarily provided with an adjustment mechanism which allows the focus to be maintained by changing the value of “b.”

Extension Tubes

$$\frac{1}{a} + \frac{1}{b} = \frac{1}{f}$$

The lens is normally provided with a range-finder mechanism so that the imaging formula can be satisfied by adjusting the value of “b” by means of moving the lens. For taking images of objects at infinite distance, b = f. When it is necessary to move the camera closer to the object than can be achieved by adjusting the value of “b” (that is, closer than b = f + Δb when the range finder is fully played out), however, then an extension tube can be used for that purpose. In other words, extension tubes can be used to move the camera closer to the object, outside the focal adjustment range of the lens. The extension tube thickness can be calculated as follows:

First find the required value of “b” by optical calculation.

- If the required value of “b” satisfies the following formula, then an extension tube is not required: (f + Δb) > b > f
- If the required value of “b” is greater than (f + Δb), then an extension tube is required. The extension tube of the minimum required thickness, “t,” can be found by “b – (f + Δb).”

The required extension tube thickness can thus be found by means of the following formula: [b – (f + Δb)] < t < (b – f)

Note The screw section of an extension tube is 3.5 mm. Therefore, an extension of only 1.5 mm to 5 mm cannot be achieved. If the extension is to exceed 30 mm, reinforcement may be required depending on the vibration conditions.

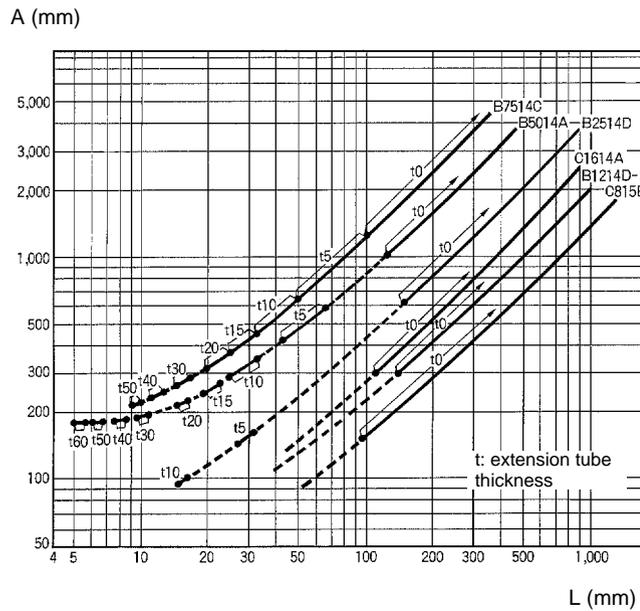
Magnification Lens

The imaging formula is set up such that images are magnified at the image sensor by increasing distance “b.” The magnification lens does not have a helicoid, so the magnification WD is fixed. To focus, adjust the camera position. There is low illumination, so use a strong light source such as fiber optic.

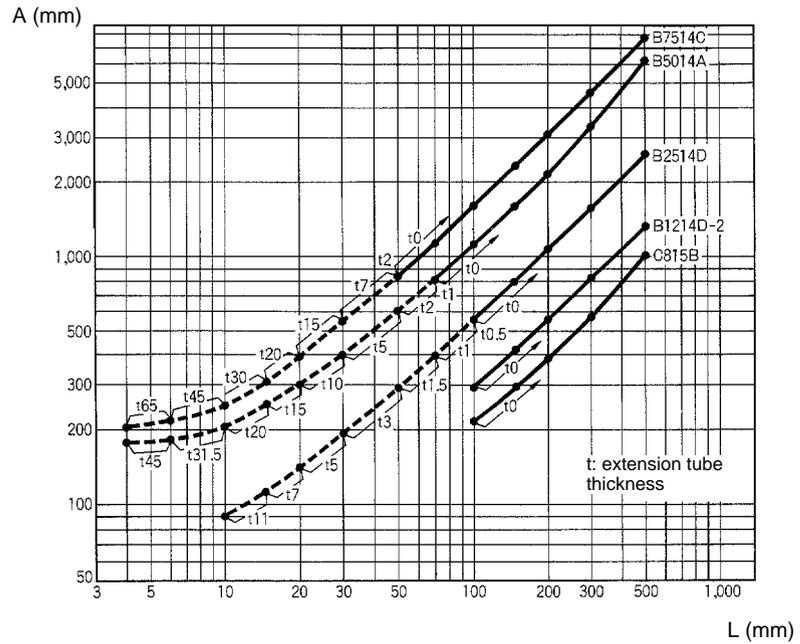
Optical Charts

An optical chart shows the relationship between the lens (the diagonal lines on the graph), camera distance (A), extension tube thickness (t), and field of vision (L). Logarithms are written for the field of vision along the horizontal axis and the camera distance along the vertical axis. Use optical charts as references for selecting the lens appropriate for a particular measured object. Optical charts vary according to the camera’s CCD size, so be sure to use an optical chart that conforms to the camera that is being used.

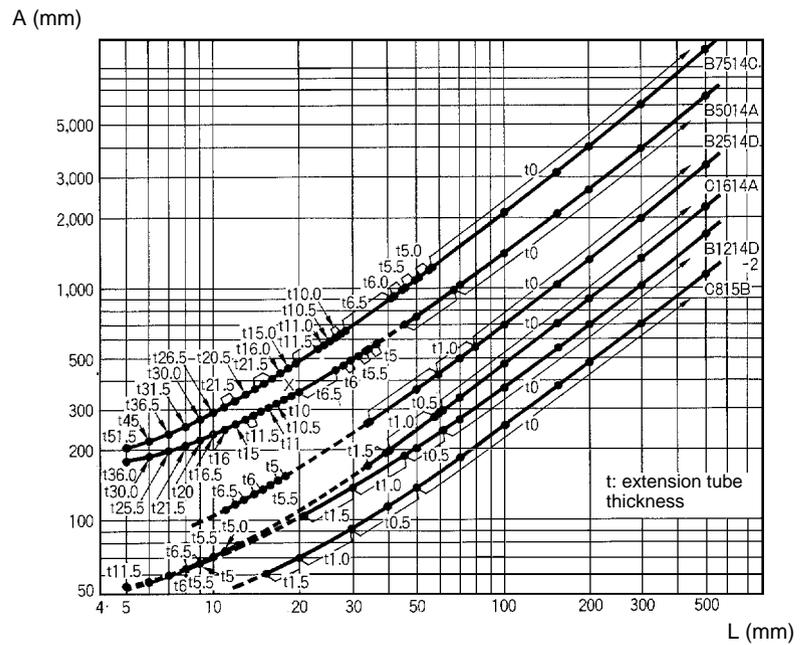
F300-S Cameras



F300-S2R/S3DR/S4R Cameras



F200-S Cameras



Lens Types and Dimensions

The cameras used with the F350 System can use a 4.8 to 7-mm CCTV lens or a 2x to 6x magnification lens. A wide-angle or narrow field of vision can be set depending on which lens is selected. Select a lens and mounting distance to conform to the desired field of vision. Lenses other than those shown here can also be used with a C-mount lens. In that case, determine the field of vision and mounting distance by trial and error.

CCTV Lens

| Model | Focal distance | Illumination | Max. external diameter | Total length | Filter size |
|------------------|----------------|--------------|------------------------|--------------|--------------|
| 3Z4S-LE C418DX | 4.8 mm | F1.8 | 40.5 mm dia. | 35.5 mm | — |
| 3Z4S-LE B618CX | 6.5 mm | F1.8 | 48 mm dia. | 42 mm | |
| 3Z4S-LE C815B | 8.5 mm | F1.5 | 42 mm dia. | 40 mm | M40.5 x P0.5 |
| 3Z4S-LE B1214D-2 | 12.5 mm | F1.4 | 42 mm dia. | 50 mm | |
| 3Z4S-LE C1614A | 16.0 mm | F1.4 | 30 mm dia. | 40 mm | |
| 3Z4S-LE B2514D | 25.0 mm | F1.4 | 30 mm dia. | 40 mm | |
| 3Z4S-LE B5014A | 50.0 mm | F1.4 | 48 mm dia. | 48 mm | M46 x P0.75 |
| 3Z4S-LE B7514C | 75.0 mm | F1.4 | 62 mm dia. | 79 mm | M58 x P0.75 |

Magnification Lens

| Model | Magnification | Illumination | End diameter |
|-----------------|---------------|--------------|--------------|
| 3Z4S-LE MML2-65 | 2.0 | F5.6 | 16 mm dia. |
| 3Z4S-LE MML4-65 | 4.0 | F5.7 | |
| 3Z4S-LE MML6-65 | 6.0 | F6.1 | |

Zoom Lens

| Model | Operation | Focal distance | Filter size |
|-----------------|-----------|----------------|-------------|
| 3Z4S-LE C6Z1218 | Manual | 12.5 to 75 mm | M49 x P0.75 |

CCTV Lens, Field of Vision and Mounting Distance

In these tables, A = camera distance, WD = working distance, and t = extension tube thickness. The figures are approximate, when the 2/3-inch CCD dimension l = 6.546 mm.

F300-S Cameras

(Unit: mm)

| Field of vision Lens | | 5 | 7 | 10 | 15 | 20 | 30 | 50 | 70 | 100 | 150 | 200 | 300 | 500 |
|----------------------|----|-------|-------|-------|-------|-------|-------|-------|-------|---------|---------|---------|---------|---------|
| 3Z4S-LE C815B | A | | | | | | | 88.5 | 114.3 | 153.2 | 218.2 | 283.3 | 413.7 | 674.4 |
| | WD | | | | | | | 47.4 | 73.5 | 112.6 | 177.8 | 243.0 | 373.5 | 634.3 |
| | t | | | | | | | 1.0 | 0.5 | --- | --- | --- | --- | --- |
| 3Z4S-LE B1214D-2 | A | | | | | | | 127.8 | 166.0 | 223.7 | 320.1 | 416.6 | 609.9 | 996.5 |
| | WD | | | | | | | 76.1 | 114.8 | 172.8 | 269.5 | 366.2 | 559.6 | 946.4 |
| | t | | | | | | | 1.5 | 1.0 | 0.5 | --- | --- | --- | --- |
| 3Z4S-LE C1614A | A | | | | | 73.5 | | 144.6 | 193.5 | 267.2 | 390.6 | 514.1 | 761.4 | 1,256.2 |
| | WD | | | | | 35.2 | | 109.4 | 158.9 | 233.2 | 356.9 | 480.6 | 728.1 | 1,233.0 |
| | t | | | | | 5.0 | | 1.5 | 1.0 | --- | --- | --- | --- | --- |
| 3Z4S-LE B2514D | A | | | 87.4 | 101.0 | 117.4 | 152.8 | 226.9 | 302.2 | 415.9 | 606.1 | 796.5 | 1,177.6 | 1,940.1 |
| | WD | | | 33.8 | 52.8 | 71.9 | 110.0 | 186.3 | 262.6 | 377.0 | 567.7 | 758.4 | 1,139.8 | 1,902.5 |
| | t | | | 15 | 10 | 6 | 5 | 1.5 | --- | --- | --- | --- | --- | --- |
| 3Z4S-LE B5014A | A | 183.3 | 179.9 | 188.7 | 216 | 248.7 | 319.5 | 467.7 | | 845.9 | 1,226.2 | 1,607.1 | 2,369.3 | 3,894.6 |
| | WD | 69.9 | 85.2 | 108 | 146.2 | 184.3 | 260.6 | 413.2 | | 794.6 | 1,176 | 1,557.4 | 2,320.2 | 3,845.9 |
| | t | 65 | 45 | 30 | 20 | 15 | 10 | 5 | | 1.5 | --- | --- | --- | --- |
| 3Z4S-LE B7514C | A | | 204.4 | 217.7 | 258.6 | 307.7 | 414.1 | 636.7 | 863 | 1,204.6 | 1,775.8 | 2,347.8 | 3,492.6 | 5,783.2 |
| | WD | | 55.2 | 89.6 | 146.9 | 204.2 | 318.7 | 547.9 | 777 | 1,120.7 | 1,693.5 | 2,266.3 | 3,411.9 | 5,703.2 |
| | t | | 70 | 50 | 31 | 25 | 15 | 10 | 6 | 5 | 5 | --- | --- | --- |

F300-S2R/S3DR/S4R Cameras

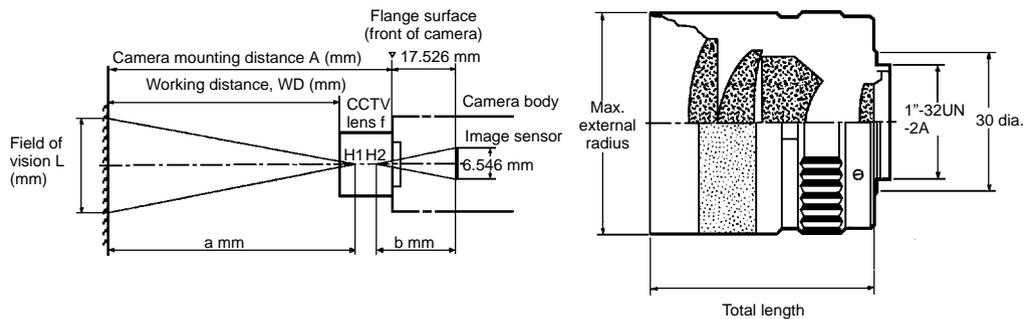
(Unit: mm)

| Field of vision | | 5 | 7 | 10 | 15 | 20 | 30 | 50 | 70 | 100 | 150 | 200 | 300 | 500 |
|---------------------|----|-------|-------|-------|-------|-------|-------|-------|---------|---------|---------|---------|---------|---------|
| Lens | | | | | | | | | | | | | | |
| 3Z4S-LE C815B | A | | | | | | 76.9 | 111.9 | 147.3 | 200.5 | 289.3 | 378.1 | 555.9 | 911.6 |
| | WD | | | | | | 35.5 | 71.1 | 106.7 | 160.0 | 249.0 | 337.9 | 515.8 | 871.5 |
| | t | | | | | | 1.0 | 0.5 | --- | --- | --- | --- | --- | --- |
| 3Z4S-LE B1214D-2 | A | | | | | | 110.6 | 162.5 | 214.9 | 293.8 | 425.4 | 557.2 | 820.8 | 1,348.2 |
| | WD | | | | | | 58.6 | 111.3 | 164.1 | 243.2 | 375.0 | 506.9 | 770.6 | 1,298.1 |
| | t | | | | | | 1.5 | 1.0 | 0.5 | --- | --- | --- | --- | --- |
| 3Z4S-LE C1614A | A | | | | 74.5 | | 122.6 | 189.0 | 256.1 | 357.0 | 525.4 | 694.0 | 1,031.4 | 1,706.2 |
| | WD | | | | 36.3 | | 87.0 | 154.5 | 221.9 | 323.2 | 491.9 | 660.6 | 998.1 | 1,673.0 |
| | t | | | | 5.0 | | 1.5 | 1.0 | --- | --- | --- | --- | --- | --- |
| 3Z4S-LE B2514D | A | | 86.5 | 96.9 | 118.9 | 142.9 | 193.0 | 295.4 | 398.7 | 554.2 | 813.9 | 1,073.7 | 1,593.6 | 2,633.7 |
| | WD | | 32.0 | 47.6 | 73.6 | 99.7 | 151.7 | 255.7 | 359.7 | 515.7 | 775.8 | 1,035.8 | 1,555.9 | 2,596.2 |
| | t | | 15.0 | 10.0 | 6.0 | 5.0 | 1.5 | --- | --- | --- | --- | --- | --- | --- |
| 3Z4S-LE B5014A | A | 179.7 | 186.8 | 207.8 | 251.8 | 299.8 | 399.8 | | 811.4 | 1,122.5 | 1,641.8 | 2,161.6 | 3,201.5 | 5,281.8 |
| | WD | 83.8 | 104.6 | 135.8 | 187.8 | 239.8 | 343.8 | | 760.0 | 1,072.1 | 1,592.2 | 2,112.4 | 3,152.7 | 5,233.3 |
| | t | 46.0 | 31.5 | 21.5 | 15.0 | 10.0 | 6.0 | | 1.5 | --- | --- | --- | --- | --- |
| 3Z4S-LE B7514C | A | 204.2 | 214.8 | 246.3 | 312.4 | 384.5 | 534.8 | 842.4 | 1,152.8 | 1,620.0 | 2,400.0 | 3,180.6 | 4,742.3 | 7,866.5 |
| | WD | 53.2 | 84.4 | 131.3 | 209.4 | 287.5 | 443.8 | 756.2 | 1,068.7 | 1,537.4 | 2,318.6 | 3,099.8 | 4,662.1 | 7,786.8 |
| | t | 70 | 50 | 35 | 25 | 16 | 10 | 6 | 5 | 5 | --- | --- | --- | --- |

F200-S Cameras

(Unit: mm)

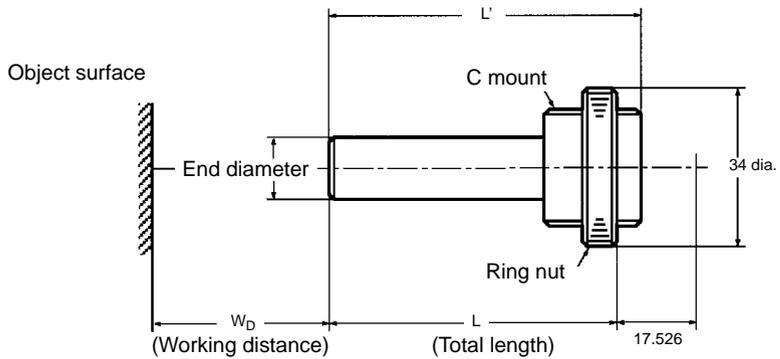
| Field of vision | | 5 | 7 | 10 | 15 | 20 | 30 | 50 | 70 | 100 | 150 | 200 | 300 | 500 |
|---------------------|----|-------|-------|-------|-------|-------|-------|---------|---------|---------|---------|---------|---------|----------|
| Lens | | | | | | | | | | | | | | |
| 3Z4S-LE C815B | A | | | | | | 92.6 | 138.5 | 184.6 | 253.9 | 369.5 | 485.1 | 716.4 | 1,179.1 |
| | WD | | | | | | 51.6 | 97.9 | 144.1 | 213.6 | 329.2 | 444.9 | 676.3 | 1,139.1 |
| | t | | | | | | 0.5 | 0.5 | --- | --- | --- | --- | --- | --- |
| 3Z4S-LE B1214D-2 | A | | | | | | 133.9 | 201.9 | 270.3 | 373.0 | 544.3 | 715.8 | 1,058.8 | 1,744.8 |
| | WD | | | | | | 82.4 | 151.0 | 219.6 | 322.5 | 494.0 | 665.6 | 1,008.6 | 1,694.8 |
| | t | | | | | | 1.0 | 0.5 | --- | --- | --- | --- | --- | --- |
| 3Z4S-LE C1614A | A | | | | | | 152.4 | 239.4 | 326.9 | 458.3 | 677.6 | 897.0 | 1,335.8 | 2,213.7 |
| | WD | | | | | | 117.4 | 205.2 | 293.0 | 424.7 | 644.2 | 863.7 | 1,302.6 | 2,180.6 |
| | t | | | | | | 1.5 | 0.5 | --- | --- | --- | --- | --- | --- |
| 3Z4S-LE B2514D | A | | 93.5 | | 140.6 | | 239.0 | 373.1 | 507.8 | 710.4 | 1,048.4 | 1,386.5 | 2,062.9 | 3,415.9 |
| | WD | | 43.0 | | 97.1 | | 198.6 | 333.9 | 469.2 | 672.2 | 1,010.5 | 1,348.7 | 2,025.3 | 3,378.4 |
| | t | | 11.0 | | 5.0 | | 1.0 | --- | --- | --- | --- | --- | --- | --- |
| 3Z4S-LE B5014A | A | 184.3 | 200.8 | 233.5 | 295.0 | 359.6 | 491.9 | 760.1 | 1,029.7 | 1,434.8 | 2,110.9 | 2,787.2 | 4,140.1 | 6,846.4 |
| | WD | 99.4 | 126.5 | 167.1 | 234.7 | 302.4 | 437.7 | 708.4 | 979.0 | 1,385.0 | 2,061.6 | 2,738.3 | 4,091.5 | 6,798.0 |
| | t | 35.0 | 25.0 | 16.0 | 10.0 | 6.5 | 5.0 | 1.5 | --- | --- | --- | --- | --- | --- |
| 3Z4S-LE B7514C | A | 211.0 | 235.8 | 285.0 | 377.3 | 474.3 | 673.0 | 1,057.7 | 1,480.6 | 2,089.1 | 3,104.4 | 4,120.1 | 6,152.0 | 10,216.3 |
| | WD | 76.7 | 117.3 | 178.3 | 279.9 | 381.5 | 584.7 | 991.2 | 1,397.7 | 2,007.4 | 3,023.5 | 4,039.7 | 6,072.0 | 10,136.7 |
| | t | 55 | 40 | 25 | 16 | 15 | 10 | 5 | 5 | --- | --- | --- | --- | --- |



The above figures are approximate standards. Allow for some fine adjustment at the time of installation.

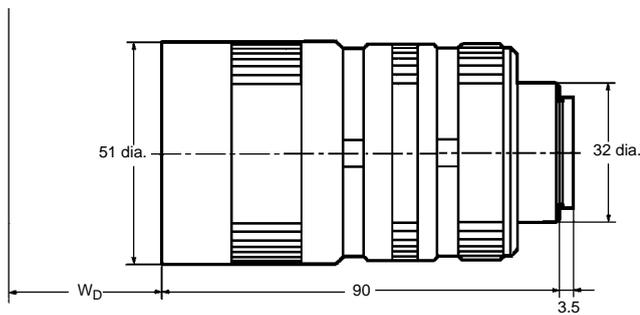
Magnification Lens, Field of Vision and Working Distance

| Model | Magnification | Field of vision | Working distance (W_D) | Total length L | L' | End diameter |
|-----------------|---------------|-----------------|----------------------------|----------------|------|--------------|
| 3Z4S-LE MML2-65 | 2.0 | V3.3 x H4.4 | 65.0 | 67.6 | 71.6 | 16 mm dia. |
| 3Z4S-LE MML4-65 | 4.0 | V1.2 x H1.6 | 65.7 | 66.7 | 70.7 | |
| 3Z4S-LE MML6-65 | 6.0 | V0.8 x H1.06 | 65.0 | 82.5 | 86.5 | |



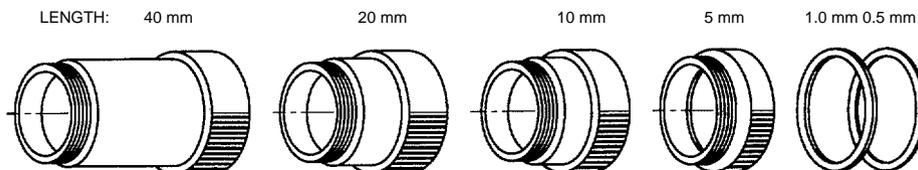
Zoom Lens, Working Distance

| Model | Operation | Focal distance | W_D | Face angle (2/3-in. picture elements) | Filter size |
|-----------------|-----------|----------------|-------------------|--|-------------|
| 3Z4S-LE C6Z1218 | Manual | 12.5 to 75 mm | 1.0 m to ∞ | Horizontal: 39°43' to 6°40' Vertical: 30°02' to 5°01' | M49 x P0.75 |



Extension Tubes

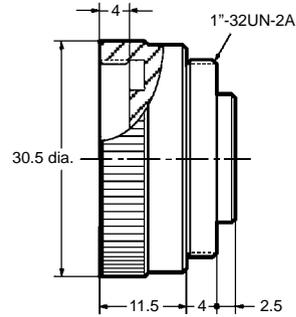
| Model | Max. external diameter | Thickness | Comment |
|---------------|------------------------|---|--|
| 3Z4S-LE EX-C6 | 31-dia. | 0.5 mm, 1 mm, 5 mm, 10 mm, 20 mm, 40 mm | Use a combination of tubes to give the required thickness. |



Teleconverter

Insert the Teleconverter between the lens and the camera to double the focal length.

| Model | Max external diameter | Thickness |
|--------------|-----------------------|-----------|
| 3Z4S-LE 2-EX | 30.5 mm dia. | 11.5 mm |



Note The focal distance and brightness change in proportion to the teleconverter magnification. Note that the markings on the lens focus ring and aperture ring are not accurate when the teleconverter is used. These settings must be adjusted to compensate for the teleconverter magnification factor

Appendix A

Comparison of New and Old Models

Modified Units

The Units shown in the following table have been modified to conform to the EC Directives.

| Unit name | New model number | Old model number |
|--|-------------------------------------|------------------|
| IMP Unit | F350-C12E | F350-C10E |
| | F350-C41E (see note) | --- |
| Power Supply Unit | F300-P2 (100 to 120 VAC) (see note) | F300-P |
| | F300-P2E (200 to 240 VAC) | F300-PE |
| MMI Unit | F300-FM2 | F300-FM |
| Base Unit | F300-B52 | F300-B5 |
| | F300-B32 | F300-B3 |
| Normal Simultaneously Camera I/F Unit | F300-A22S | F300-A20S |
| Shutter Simultaneously Camera I/F Unit | F300-A22RS | F300-A20RS |
| Parallel I/O Unit | F300-DC2 | F300-DC |
| Terminal Block Unit | F300-D2 | F300-D |
| RS-232C I/F Unit | F300-E2 | F300-E |
| OVL Unit | F350-L12E | F350-L100E |
| Camera Cable | F309-VSR2 | F309-VS |
| | | F309-VSR |

Note The model has been changed but does not conform to the EC Directives.

Conformance to EC Directives

Use only the following Units when installing a Visual Inspection System that must conform to the EC Directives.

| Unit name | Model number |
|--|-----------------|
| IMP Unit | F350-C12E |
| Power Supply Unit | F300-P2E |
| MMI Unit | F300-FM2 |
| Base Unit | F300-B52 |
| | F300-B32 |
| Normal Simultaneously Camera I/F Unit | F300-A22S |
| Shutter Simultaneously Camera I/F Unit | F300-A22RS |
| Parallel I/O Unit | F300-DC2 |
| Terminal Block Unit | F300-D2 |
| RS-232C I/F Unit | F300-E2 |
| OVL Unit | F350-L12E |
| Dummy Unit | F300-G |
| Console | F300-KP |
| Normal Camera | F300-S |
| Shutter Camera | F300-S2R |
| Memory Card | F300-N256 |
| | F300-N512 |
| | F300-N2M |
| Keyboard | F300-K |
| Monitor Cable | F309-VM (2 m) |
| Camera Cable | F309-VSR2 (5 m) |
| RS-232C Cable | F309-VR (5 m) |

Non-conformance to EC Directives

| Unit name | Model number |
|-------------------------------|--------------------------|
| IMP Unit | F350-C41E |
| Power Supply Unit | F300-P2 (100 to 120 VAC) |
| Normal Camera I/F Unit | F300-A20 |
| Shutter Camera I/F Unit | F300-A20R |
| Frame Shutter Camera I/F Unit | F300-A23RS |
| Strobe I/F Unit | F300-FS |
| Video Monitor | F300-M09 |
| Normal Camera | F200-S |
| Shutter Camera | F300-S3DR |
| Frame Shutter Camera | F300-S4R |
| Strobe Cable | F309-VFS |

Interface Compatibility

Some old IMP Units cannot be connected to some new Base Units as shown in the following table.

| Base Unit | IMP Unit | |
|--------------|--|--|
| | F350-C10 <input type="checkbox"/> F350-C40 <input type="checkbox"/> | F350-C12 <input type="checkbox"/> F350-C41 <input type="checkbox"/> |
| F300-B3/B5 | Connectable | Connectable |
| F300-B32/B52 | Not connectable | Connectable |

Appendix B

RS-232C Data Transmission Program Examples

Saving Data

This is a sample program for saving system data, model data, and backup data at a personal computer via the RS-232C. The program is in Quick BASIC.

The communications specifications for the F350 and the personal computer are listed in the table below.

| | |
|--------------|-----------|
| Baud rate | 9,600 bps |
| Data length | 8 bits |
| Parity | None |
| Stop bits | 1 |
| Flow control | None |

```

' *****
'                                     (c)Copyright OMRON Co.1995
'                                     All Rights Reserved
'                                     Sample Program
' -----
'Sample program for saving data.
' *****
BLKDATA = 128: BLKSIZE = 132
ACK$ = CHR$(&H6): NAK$ = CHR$(&H15): SOH$ = CHR$(&H1)
EOT$ = CHR$(&H4): CAN$ = CHR$(&H18)
DIM DAT$(BLKDATA)
CLS
GOSUB FILEOPN
GOSUB DATARCV
GOSUB ENDMMSG
CLOSE
END

FILEOPN:                                     'Open the file.
  INPUT "Input filename for saving.>", SAVEFILE$
  OPEN SAVEFILE$ FOR OUTPUT AS #1
  OPEN "COM2:9600,N,8,1,BIN" FOR RANDOM AS #2 LEN = 256
RETURN

DATARCV:                                     'Accepting data
  PRINT #2, NAK$;
  BLK = 1: NAKCNT = 0: TOTAL = 0
  DO
    CHK = 1
    COD$ = INPUT$(1, #2)
    IF COD$ = EOT$ THEN RETURN
    BNUM$ = INPUT$(1, #2)
    RBNUM$ = INPUT$(1, #2)
    BNUM = ASC(BNUM$)
    RBNUM = ASC(RBNUM$)
    IF BNUM + RBNUM <> 255 THEN
      CHK = 4
    ELSEIF BNUM <> BLK AND BNUM <> BLK - 1 THEN
      CHK = 4

```

```

ELSEIF BLK <> 0 AND BNUM = BLK - 1 AND CHK = 1 THEN
    CHK = 2
ELSEIF BLK = 0 AND BNUM = 255 AND CHK = 1 THEN
    CHK = 2
END IF
SUM = 0
FOR BYTE = 1 TO BLKDATA
    DAT$(BYTE) = INPUT$(1, #2)
    SUM = SUM + ASC(DAT$(BYTE))
NEXT BYTE
CHKSUM = ASC(INPUT$(1, #2))
IF CHK = 1 AND CHKSUM <> (SUM MOD 256) THEN
    CHK = 3
ELSEIF CHK = 3 AND NAKCNT >= 10 THEN
    CHK = 4
END IF

GOSUB SNDACK

GOSUB DATASAVE

IF CHK <> 3 AND CHK <> 2 THEN BLK = (BLK + 1) MOD 256
LOOP WHILE CHK < 4
RETURN

ENDMSG:                                'End
IF CHK <> 4 THEN
    PRINT #2, ACK$;
    PRINT "Saved the data."
ELSE
    PRINT "The data save canceled."
END IF
RETURN

SNDACK:                                  'Accept code
SELECT CASE CHK
    CASE IS <= 2
        PRINT #2, ACK$;
    CASE 3
        PRINT #2, NAK$;
    CASE 4
        PRINT #2, CAN$;
END SELECT
IF CHK = 3 THEN
    NAKCNT = NAKCNT + 1
ELSE
    NAKCNT = 0
END IF
RETURN

DATASAVE:                                'Save the data.
IF CHK <> 1 THEN RETURN
BUF$ = ""
FOR BYTE = 1 TO BLKDATA
    BUF$ = BUF$ + DAT$(BYTE)
NEXT BYTE
PRINT #1, BUF$;
TOTAL = TOTAL + BLKDATA
LOCATE 6, 1: PRINT TOTAL; "Bytes transfered"
RETURN

```

Loading Data

This is a sample program for loading system data, model data, and backup data from a personal computer via the RS-232C. The program is in Quick BASIC.

The communications specifications for the F350 and the personal computer are listed in the table below.

| | |
|--------------|-----------|
| Baud rate | 9,600 bps |
| Data length | 8 bits |
| Parity | None |
| Stop bits | 1 |
| Flow control | None |

```
*****
'
'           (c)Copyright OMRON Co.1995
'           All Rights Reserved
'           Sample Program
'-----
'Sample program for loading data.
'*****
BLKDATA = 128: BLKSIZE = 132
ACK$ = CHR$(&H6): NAK$ = CHR$(&H15): SOH$ = CHR$(&H1)
EOT$ = CHR$(&H4): CAN$ = CHR$(&H18)
DIM DAT$(BLKSIZE)
CLS
GOSUB FILEOPN
GOSUB DATASND
GOSUB ENDMSG
CLOSE
END

FILEOPN:                               'Open the file.
  INPUT "Input filename for loading.>", LOADFILE$
  OPEN LOADFILE$ FOR BINARY AS #1
  OPEN "COM2:9600,N,8,1,BIN" FOR RANDOM AS #2 LEN = 256
RETURN

DATASND:                               'Transfer data
  NAKFLG = 0
  WHILE NAKFLG = 0
    DAT$ = INPUT$(1, #2)
    IF DAT$ = NAK$ THEN NAKFLG = 1
  WEND

  BLK = 1: TOTAL = 0: DAT$(1) = SOH$
  ENDFLG = 0
  WHILE ENDFLG = 0
    DAT$(2) = CHR$(BLK MOD 256)
    DAT$(3) = CHR$(255 - (BLK MOD 256))
    SUM = 0
    FOR BYTE = 4 TO BLKSIZE - 1
      IF ENDFLG = 1 THEN
        DAT$(BYTE) = CHR$(&H1A)
      ELSE
        DAT$(BYTE) = INPUT$(1, #1)
      END IF
      IF EOF(1) THEN
        ENDFLG = 1
      ELSE
        SUM = SUM + ASC(DAT$(BYTE))
      END IF
    NEXT BYTE
  WEND
  PRINT "TOTAL="; TOTAL; "SUM="; SUM
  PRINT "END"
  RETURN
END
```

```
NEXT BYTE
DAT$(BLKSIZE) = CHR$(SUM MOD 256)
IF ENDFLG = 0 THEN
  DO
    FOR BYTE = 1 TO BLKSIZE
      PRINT #2, DAT$(BYTE);
    NEXT BYTE
    GOSUB RCVACK
    LOOP WHILE CHK = 2
    IF CHK = 3 THEN ENDFLG = 1
    BLK = BLK + 1
    TOTAL = TOTAL + BLKDATA
    LOCATE 6, 1: PRINT TOTAL; "Bytes transfered"
  END IF
WEND
RETURN
ENDMSG:                                     'End
  IF CHK <> 3 THEN
    PRINT #2, EOT$;
    PRINT "Loaded the data."
  ELSE
    PRINT "The data load canceled."
  END IF
RETURN
RCVACK:                                     'Accept code
  COD$ = INPUT$(1, #2)
  SELECT CASE COD$
    CASE ACK$
      CHK = 1
    CASE NAK$
      CHK = 2
    CASE CAN$
      CHK = 3
  END SELECT
RETURN
```

Installing OVL Program

This is a sample program for installing the OVL program from a personal computer via the RS-232C. The program is in Quick BASIC.

The communications specifications for the F350 and the personal computer are listed in the table below.

| | |
|--------------|-----------|
| Baud rate | 9,600 bps |
| Data length | 8 bits |
| Parity | None |
| Stop bits | 1 |
| Delimiter | CR |
| Flow control | Xon/off |

```
' *****
'
'           (c)Copyright OMRON Co.1995
'           All Rights Reserved
'           Sample Program
' -----
'Sample program for installing OVL program.
' *****

CLEAR : CLS
DO
  INPUT "Input filename for installing.>", F$
LOOP WHILE F$ = ""
OPEN F$ FOR INPUT AS #1
OPEN "COM1:9600,N,8,1" FOR RANDOM AS #2
WHILE EOF(1) = 0
  LINE INPUT #1, D$
  PRINT #2, D$
WEND
CLOSE #1
PRINT #2, CHR$(&H1A);
CLOSE #2
```

Glossary

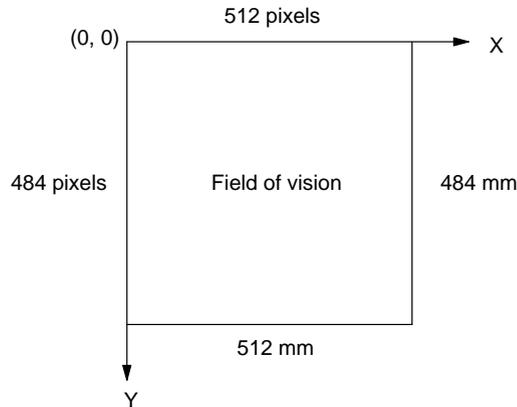
| | |
|--------------------------------------|--|
| Backup Data | <p>The data which is stored when the F350 switch is turned off is called backup data. The extension “.BUP” is appended to backup data file names. The following information can be saved and loaded as backup data via the memory card or RS-232C.</p> <ul style="list-style-type: none">• System data• OVL programs• Application Program setting data <p>(Model data is not included in backup data.)</p> |
| Camera Synchronization Method | <p>When images from the Camera are input to the F350, the Camera and F350 must operate on the same timing to ensure correct communication of the images. Therefore, the Camera and F350 must be synchronized. External and internal synchronization methods are available as camera synchronization. Correct communications are possible only if the standards match for the synchronization signals of the F350 and Camera. The synchronization method each type of Camera must use with the F350 is fixed, and is automatically set to match the type of Camera connected. Make sure that the synchronization method set at the Camera matches the F350.</p> |
| Correlation Image | <p>The image from the Camera is digitized and the image is represented as 256 density levels from 0 to 255. The F350 processes the correlation images. Binary conversion is not required, permitting inspection of scratches and chips for which binary conversion is difficult.</p> |
| Extension Tube | <p>This is a tube inserted between the Camera and lens for close-up photography. It allows focussing outside the normal focus adjustment range. These tubes are used for inspecting small objects and in other cases where the Camera has to be close to the inspected object.</p> |
| Model Data | <p>The reference data used by the F350 for inspections is known as the model data. The following information can be saved and loaded as model data via the memory card or RS-232C.</p> <ul style="list-style-type: none">• Search models (extension: .SMD)• ROI models (extension: .RMD) |
| Normal Camera | <p>The type of video camera which is normally used. It inputs images in 1/60 s per field or 1/30 s per frame. It is used to take the images of stationary or slow-moving objects. Use a strobe or a shutter camera to take the image of rapidly moving objects.</p> |
| Optical Chart | <p>A chart showing the relationship between the lens used, the camera distance, the extension tube thickness, and the field of vision. The horizontal axis represents the field of vision and the vertical axis the camera distance. Refer to the optical chart to select the appropriate lens for the size of inspected object. The optical diagram is different for each Camera CCD lens size. Select the applicable optical chart for the Camera you are using.</p> |
| OVL (OMRON Vision Language) | <p>This is a BASIC programming language, developed for OMRON Visual Inspection Systems. In addition to the standard BASIC instructions, additional instructions and functions are provided for efficient image processing. Use OVL to write programs for applications not handled by the application menus.</p> |

Pixels

Images are made up of a large number of bright elements called pixels. F350 images are 512 pixels horizontally by 484 pixels vertically.

Resolution

This is a number which indicates the fineness of detail which can be expressed in an image. The F350 Camera image is 512 pixels x 484 pixels, totalling approximately 25,000 pixels. If the field of vision of the image were 512 mm x 484 mm, then the resolution would be 1 mm/pixel.

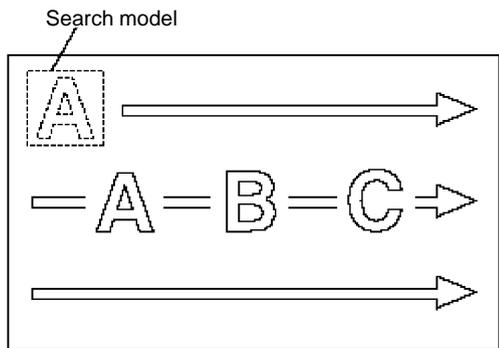


ROI Models

ROI (Region Of Interest) processing refers to processing selected regions of the image instead of the entire image. The conditions such as the processing region and processing details must be set before starting ROI processing. The conditions set for ROI processing are called ROI models.

Search

Searching for the same pattern as a registered image from in the input image. First, register the reference image. This is called the search model. The correlation of the input image and the search model is calculated sequentially throughout the specified search area to determine the position with the highest correlation value.



Search Model

Searching refers to finding the same pattern as a registered image in the input image. The reference image used for the search is known as the search model.

Shutter Camera

A video camera which freezes the motion of a rapidly moving object to form a static image.

The exposure time is much shorter than a standard camera (1/5600 s max. compared to 1/30 s for a standard camera), to create images with very little blurring.

Strobe

Used to take images of rapidly moving objects.

When taking images of a rapidly moving object with a standard camera a blurred image results because of the long exposure time (1/60 s per field, 1/30 s per frame). However, if a strobe is used with the standard camera, the image is taken during the instant the strobe flashes, and no blurring results.

A dark time is required in addition to the strobe flash time.

Sub-pixel

A unit smaller than one pixel is called a sub-pixel. When searching in a region set for ROI processing, sub-pixels allow search positions to be determined to greater than one pixel accuracy.

System Data

Setting data related to the F350 system environment is called system data. The extension “.ENV” is appended to system data file names.

The following information can be saved and loaded as system data via the memory card or RS-232C.

- F350 start-up mode
- OVL standard I/O device
- RS-232C communications specifications
- Parallel data output specifications
- Specifications of connected camera

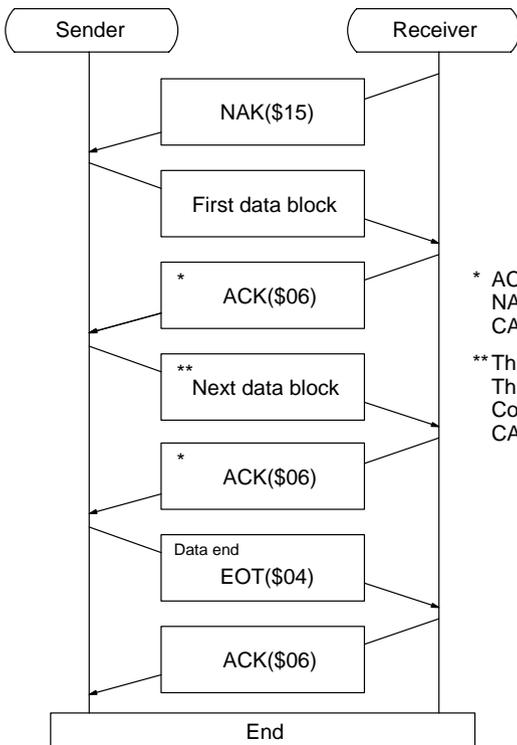
XMODEM Protocol

XMODEM/128(SUM) is used at the F350 as the communications protocol to save and load system data, model data, and backup data. The data is divided into 128-byte blocks for reliable transmission. The configuration of the data blocks is shown below.

| | | | | |
|-----------|--------|----------|-----------|----------|
| 1 byte | 1 byte | 1 byte | 128 bytes | 1 byte |
| SOH(\$01) | BLK# | 255-BLK# | Data | Checksum |

- SOH : The data block header.
- BLK# : Block number. Indicates the number of the block from the first block. Numbering runs from \$01 to \$FF. If \$FF is reached numbering restarts at \$00.
- 255-BLK# : 1's complement of BLK#
- Data : The binary data.
- Checksum : The least-significant 8 bits of the the sum of the 128 bytes of data.

Communications Flowchart:



- * ACK (\$06) sent if the data received by the receiver is normal.
- NAK (\$15) sent if the data received by the receiver causes a checksum error.
- CAN (\$18) sent if the data received by the receiver causes a block-number error.
- ** The next block is sent if the sender receives ACK (\$06). The previous block is resent if the sender receives NAK (\$15). Communications interrupted due to a communications error if the sender receives CAN (\$18).

Index

A

Application Program
 installing,
 starting,
automatic execution,

B

backup data. *See* data
Base Units,
 dimensions, ,
 mounting hole dimensions,
 specifications,
 weight,
battery,
 memory backup, IMP Unit,
 Memory Card,

C

cables, specifications
 Camera Cable,
 Monitor Cable,
 RS-232C Cable,
 Strobe Cable,
Camera I/F Units, ,
 connecting Cameras,
 dimensions,
 specifications,
 setting,
Cameras, ,
 connecting,
 specifications, , ,
CCTV lens,
characters, inputting,
 directly,
 from the character list,
communications, ,
 specifications,
 setting RS-232C,
connectors
 Console,
 crimped,
 MMI Unit,
 Video Monitor,
Console, , ,
 connector,
 dimensions,
 housing slot,
 specifications,
copying, files,

correlation images, definition,
cover
 attaching,
 removing,

D

data, , ,
 backup,
 compatibility,
 loading from the Memory Card,
 loading via RS-232C,
 saving in the Memory Card,
 saving via RS-232C,
 compatibility,
 model,
 program examples
 loading,
 saving,
 ROI model,
 compatibility,
 loading from the Memory Card,
 loading via RS-232C,
 saving in the Memory Card,
 saving via RS-232C,
 scene, compatibility,
 search model
 compatibility,
 loading from the Memory Card,
 loading via RS-232C,
 saving in the Memory Card,
 saving via RS-232C,
 setting,
 system
 compatibility,
 definition,
 loading from the Memory Card,
 loading via RS-232C,
 saving on the Memory Card,
 saving via RS-232C,
date, setting,
deleting, files,
dimensions
 Base Units, ,
 mounting holes,
 Camera I/F Units,
 Console,
 IMP Unit,
 Keyboard,
 lens,
 MMI Unit,
 Normal Cameras,
 OVL Unit,
 Parallel I/O Unit,
 Power Supply Unit,
 RS-232C I/F Unit,
 Shutter Cameras,
 Strobe I/F Unit,
 Terminal Block Unit,
 Video Monitor,

directories,
 absolute path,
 creating,
 deleting,
 relative path,

Down Key,

Dummy Unit,
 specifications,

E

earth, wiring,

EC Directives, conforming models,

editing, Memory Cards,

ending, ,
 procedure,

Enter Key,

errors,
 at startup,
 Cameras,
 messages,
 MMI Unit,
 Parallel I/O Unit,
 Power Supply Unit,
 RS-232C I/F Unit,
 Strobe I/F Unit,
 Terminal Block Unit,
 Video Monitor,

Escape Key,

extension tubes, , ,

external outputs, wiring,

external power supply, wiring,

F

F200-S,

F300-S2R,

F300-A22RS,

F300-S3DR,

F300-S4R,

F309-VSR2,

files
 copying,
 deleting,
 renaming,

formatting, Memory Cards,

fuse, Power Supply Unit,

H-I

Help Key,

I/O devices,

imaging formula,

IMP Unit, ,
 battery, memory backup,
 dimensions,
 specifications,

initialization, Memory Cards. *See* formatting

inspection,

installation
 Application Program,
 direction,
 environment,
 location,
 mounting,
 See also mounting
 noise,
 OVL program,
 precautions,
 temperature,

K

Keyboard
 corresponding Console keys,
 dimensions,
 specifications,

L

Left Key,

lens
 CCTV,
 dimensions,
 field of vision, ,
 magnification, ,
 specifications,
 types,
 zoom, ,

loading
 backup data
 from the Memory Card,
 via RS-232C,
 ROI model data
 from the Memory Card,
 via RS-232C,
 search model data
 from the Memory Card,
 via RS-232C,
 system data
 from the Memory Card,
 via RS-232C,

M

magnification lens,

manuals, F350,

Memory Cards, ,
battery,
editing,
initializing,
loading
 backup data,
 ROI model data,
 search model data,
 system data,
saving
 backup data,
 ROI model data,
 search model data,
 system data,
specifications,

menus,
 inputting characters,
 inputting numbers,
 directly,
 incrementally or decrementally,
 selecting,
 setting data,

MMI Unit,
 connecting, to Video Monitor,
 dimensions,
 specifications,

model data. *See* data

Monitor Cable,

mounting, positions,

mounting holes
 dimensions, Base Units,
 shape,

N

noise, installation,

Normal Camera I/F Units,
 specifications,

Normal Cameras
 definition,
 dimensions,
 specifications,

Normal Simultaneously Camera I/F Units,
 specifications,

numbers, inputting,

O

optical charts, ,

output time charts,
 with handshaking,
 without handshaking,

OVL, , ,
 I/O devices, setting,
 programs,
 installing,
 installing from the Memory Card,
 installing via the RS-232C,
 starting,

OVL Unit,
 connecting,
 dimensions,
 specifications,

P

parallel data output,
 specifications, setting,

Parallel I/O Unit,
 connecting,
 dimensions,
 output data specifications, setting,
 specifications,

personal computer,

pixels, definition,

PLC. *See* Programmable Controller

Power Supply Unit, ,
 dimensions,
 I/O terminals,
 RUN and ERR signals,
 specifications,
 wiring, ,

precautions,

Programmable Controller,

R

RAM Disk,
 checking available capacity,
 copying files,
 creating directories,
 deleting directories,
 deleting files,
 initializing,
 renaming files,

renaming, files,

resolution, definition,

Right Key,

ROI, definition,

ROI model data. *See* data

ROI models, definition,

RS-232C,
communications specifications, setting,
corresponding Console keys,
data transmission program examples
 installing OVL program,
 loading data,
 saving data,
loading
 backup data,
 ROI model data,
 search model data,
 system data,
saving
 backup data,
 ROI model data,
 search model data,
 system data,

RS-232C Cable,

RS-232C I/F Unit, ,
connecting,
dimensions,
specifications,

S

saving
 backup data
 Memory Card,
 via RS-232C,
 ROI model data
 Memory Card,
 via RS-232C,
 search model data
 Memory Card,
 via RS-232C,
 system data
 on the Memory Card,
 via RS-232C,

scene, compatibility,

search model, definition,

search model data. *See* data

Shift Key,

Shutter Camera I/F Unit,

Shutter Cameras
 definition,
 dimensions,
 specifications,

Shutter Simultaneously Camera I/F Unit,

specifications, ,
 Base Units,
 cables,
 Camera I/F Units, , ,
 Cameras, ,
 communications,
 Console,
 Dummy Unit,
 IMP Unit,
 Keyboard,
 lens,
 Memory Cards,
 MMI Unit,
 OVL Unit,
 parallel data output, setting,
 Parallel I/O Unit,
 Power Supply Unit,
 RS-232C I/F Unit,
 Strobe I/F Unit,
 Terminal Block Unit,
 Video Monitor,

starting,
 Application Program,
 operations when power is turned on, designating,
 procedure,

STEP signals, wiring method, ,

strobe, definition,

Strobe Cable,

strobe device,

Strobe I/F Unit,
 connecting,
 dimensions,
 specifications,

sub-pixel, definition,

synchronization method, Camera,

synchronization sensor,

system configuration
 hardware,
 software,

system data. *See* data

system status, checking,

T

Teleconverter,

temperature, installation,

Terminal Block Unit,
 connecting,
 dimensions,
 output data specifications, setting,
 specifications,

time, setting,

troubleshooting,

U–Z

Units, mounting,
See also mounting

Up Key,

Video Monitor,
connecting,
dimensions,
specifications,
weight, Base Units,
XMODEM protocol,
zoom lens,

