# F350-C12E/C41E
Visual Inspection System
Setup Menu

Operation Manual

Revised August 1999
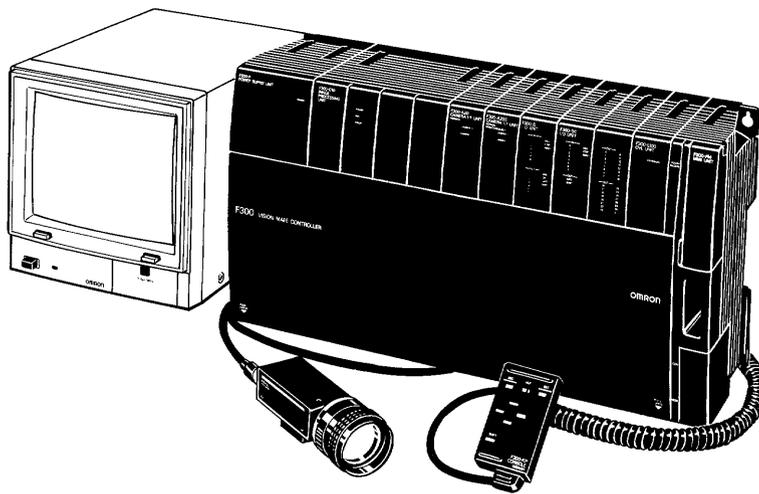
Notice:

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.

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TABLE OF CONTENTS

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 mm^2 (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

The F350 Visual Inspection System provides powerful support to the automation of visual inspection processes.
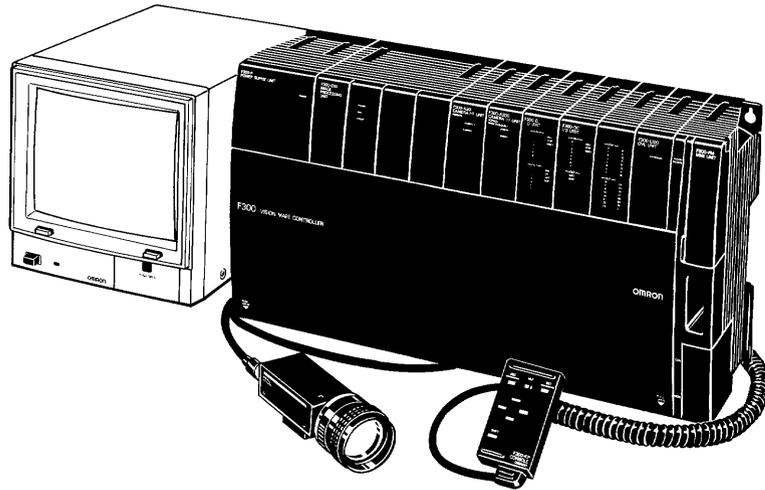
Application Software Developed for Easy Operation

- 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	

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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.

★**F350-C12E**
F350-C41E IMP Unit
Processes images.
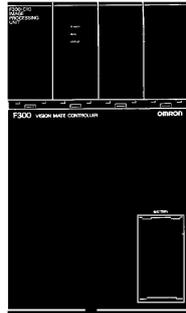
★**F300-FM2 MMI Unit**
Provides Memory Card functions and menu operations via a Video Monitor and Console.

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

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

★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.
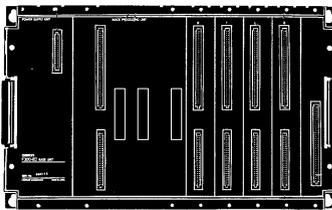
★**F300-B32 (3 slots)**   ★**F300-B52 (5 slots)**
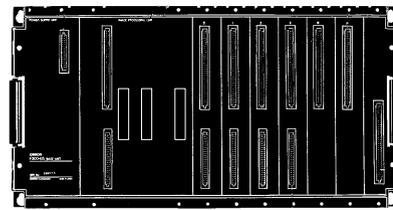
Camera I/F Units (use four maximum)

F300-A20 **Normal Camera I/F Unit**	★**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**
For measuring stationary objects or moving objects using a strobe.	For measuring stationary objects or moving objects using a strobe, and for measuring two places simultaneously using two cameras.	For measuring objects moving at high speed.	For measuring objects moving at high speed, and for measuring two places simultaneously using two cameras.	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

★ F309-VSR2 Camera Cable

★ F309-VSR2 Camera Cable

F200-S **Camera**	★**F300-S** **Camera**	★ **F300-S2R** **Shutter Camera**	**F300-S3DR** **Shutter Camera**	**F300-S4R** **Frame Shutter Camera**	Lens

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

Light

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.)

★F309-VR RS-232C Cable (25 pins)

★**F300-E2 RS-232C I/F Unit**
For saving scene and system data and carrying out menu operations via RS-232C interface.

**IBM PC/AT or Compatible**

★**F300-D2 Terminal Block Unit**
For inputting measurement instructions and outputting judgement results via a terminal block.
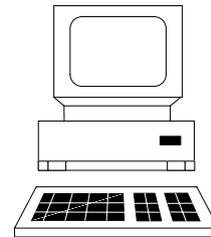
C200HS or CQM1 Programmable Controller

★**F300-DC2 Parallel I/O Unit**
For inputting measurement instructions and outputting measurement values and judgement results via parallel I/O.

Synchronization Sensor

F300-FS Strobe I/F Unit
For flashing the strobe while taking images.
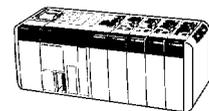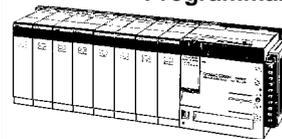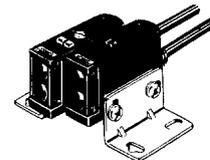
Strobe Device   3Z4S-LT DSX-240 (100 VAC)

★**F300-G Dummy Unit**
For inserting into empty slots to protect and strengthen connectors.
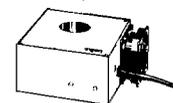
F309-VFS Strobe Cable

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

Setup Menu

- Starts the Application Program.

- Sets the system environments such as the use of an I/O device for communications.

- Stores backup data.

- Formats or edits the memory card.

- Starts the OVL System.

Application Program

- Sets inspection conditions.

- Executes inspection programs.

  - For storing backup data.

  - For setting the system environments such as the use of an I/O device for communications.

OVL System

- Creates OVL programs.

- Executes OVL programs.

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.

∆: 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**	∆	O	O
	F350-C12E	∆	O	O

∆: Criteria must be reset after loading.

ROI Model Data

		Save source		
		F350-C10E	**F350-C41E**	**F350-C12E**
Load destination	**F350-C41E**	∆	O	O
	F350-C12E	∆	O	O

∆: 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

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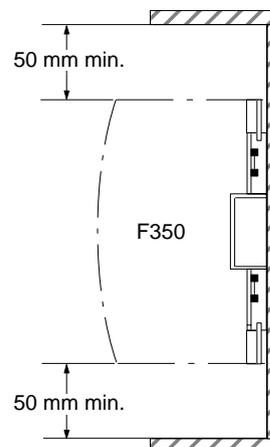
• Do not install the F350 System immediately above strong heat sources, such as heaters, transformers, or large-capacity resistors.

• Provide a forced-air fan or air conditioning if the ambient temperature exceeds 50°C.
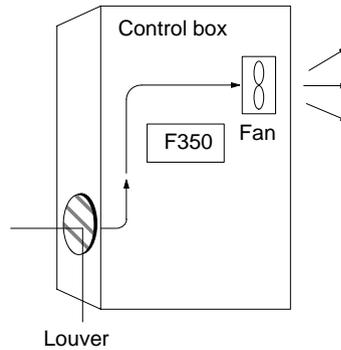
Operation and Maintenance Considerations

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.
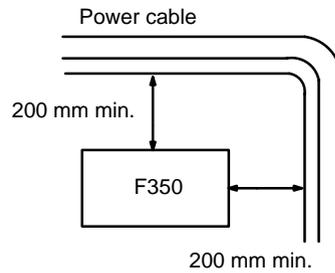
2-1-3 Precautions

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.

11
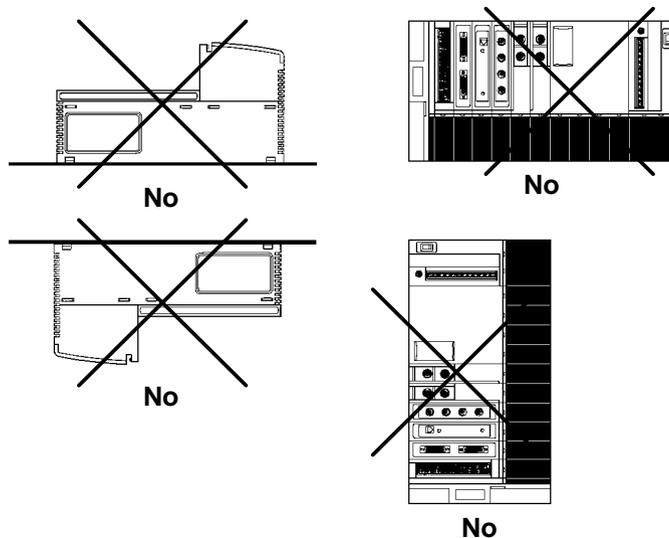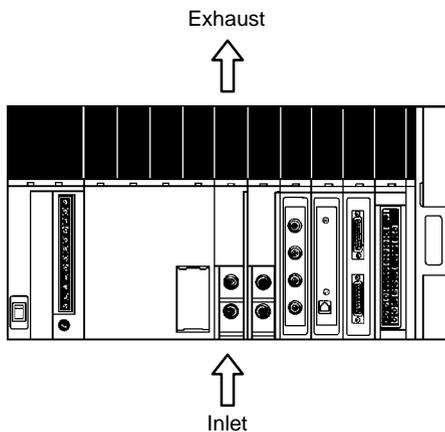
Dimensions and Weight

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
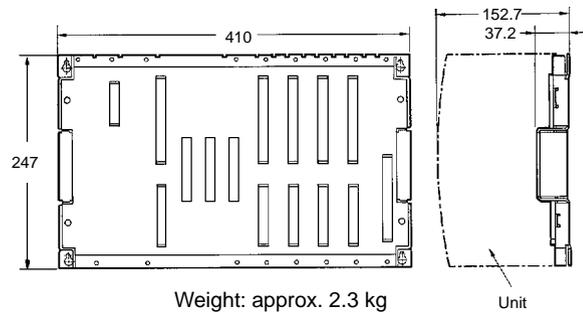
Weight: approx. 2.7 kg   Unit

F300-B32 3-slot Base Unit

Weight: approx. 2.3 kg   Unit

Mounting Hole Dimensions

F300-B52 5-slot Base Unit

Four, M5 holes

F300-B32 3-slot Base Unit

Four, M5 holes
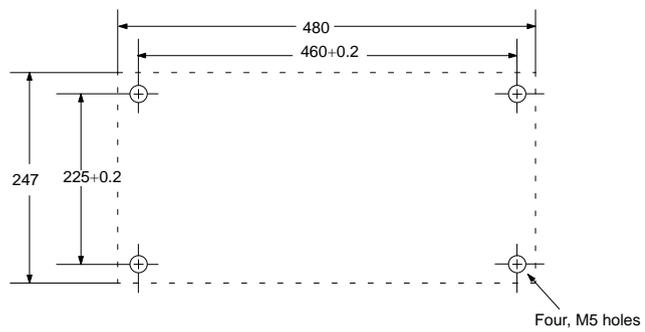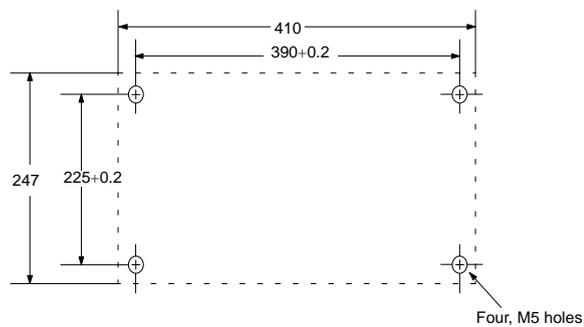
Base Unit Mounting Hole Shape
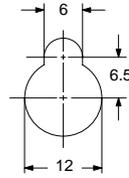
2-2 Mounting the Units

2-2-1 Mounting Positions

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

Required Units

F300-P2/P2E
Power Supply Unit

F350-C12E/C41E

F300-FM2
MMI Unit

F300-B52 Base Unit

F300-B32 Base Unit

F300-A2□□□
Camera I/F Unit

F300-FS
Strobe I/F Unit

F350-L12E
OVL Unit

F300-E2
RS-232C
I/F Unit

F300-DC2
Parallel I/O
Unit

F300-D2
Terminal
Block Unit

F300-G
Dummy Unit

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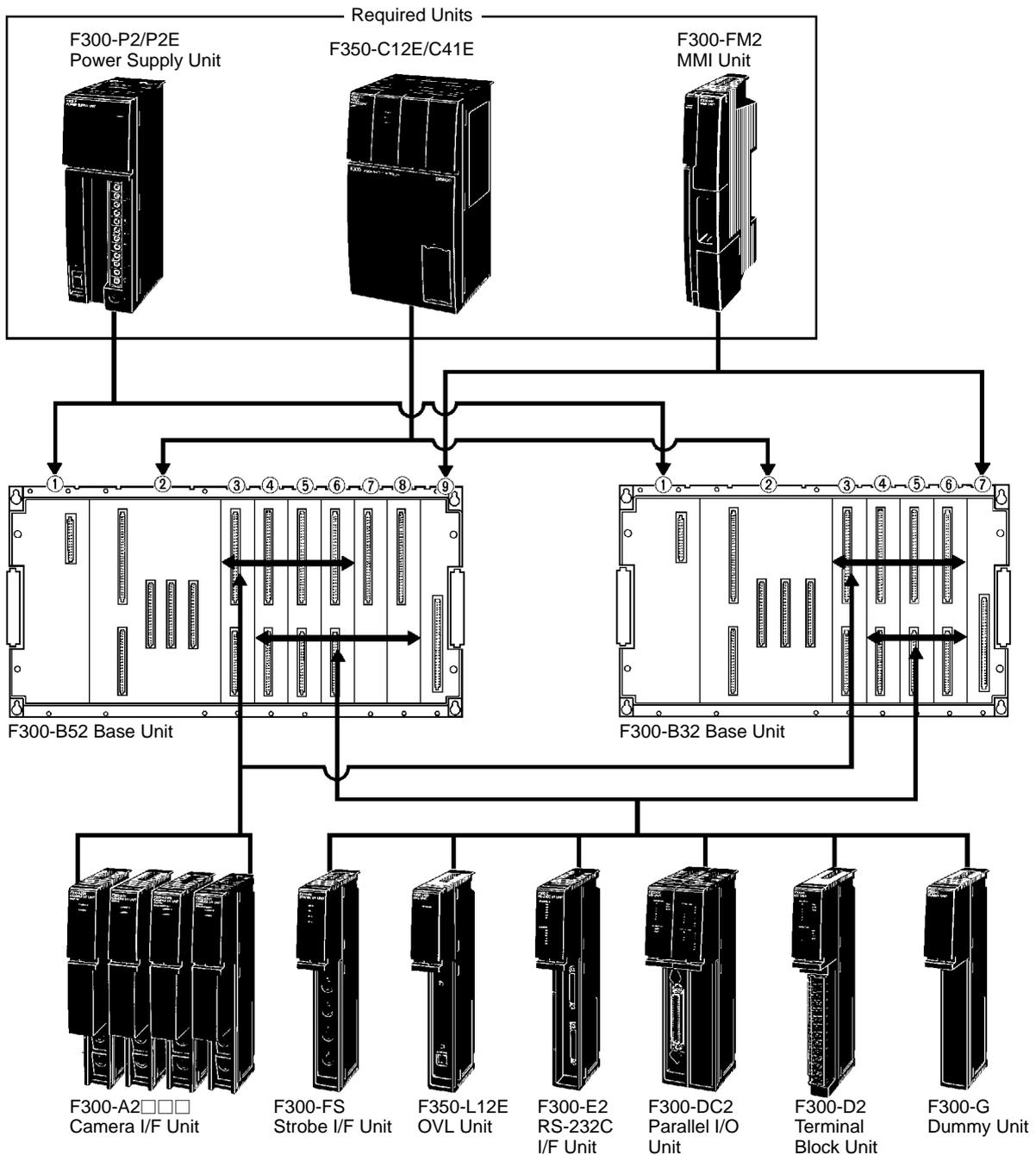
Important Camera numbers are allocated in order from the camera closest to the IMP Unit. If an additional Camera I/F Unit is mounted between two Camera I/F Units that have already been mounted, the newly mounted Camera I/F Unit and those located farther away from the IMP Unit will have new numbers. When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

Upper connector	Camera 0	Camera 2	Camera 4	Camera 6
Lower connector	Camera 1	Camera 3	Camera 5	Camera 7
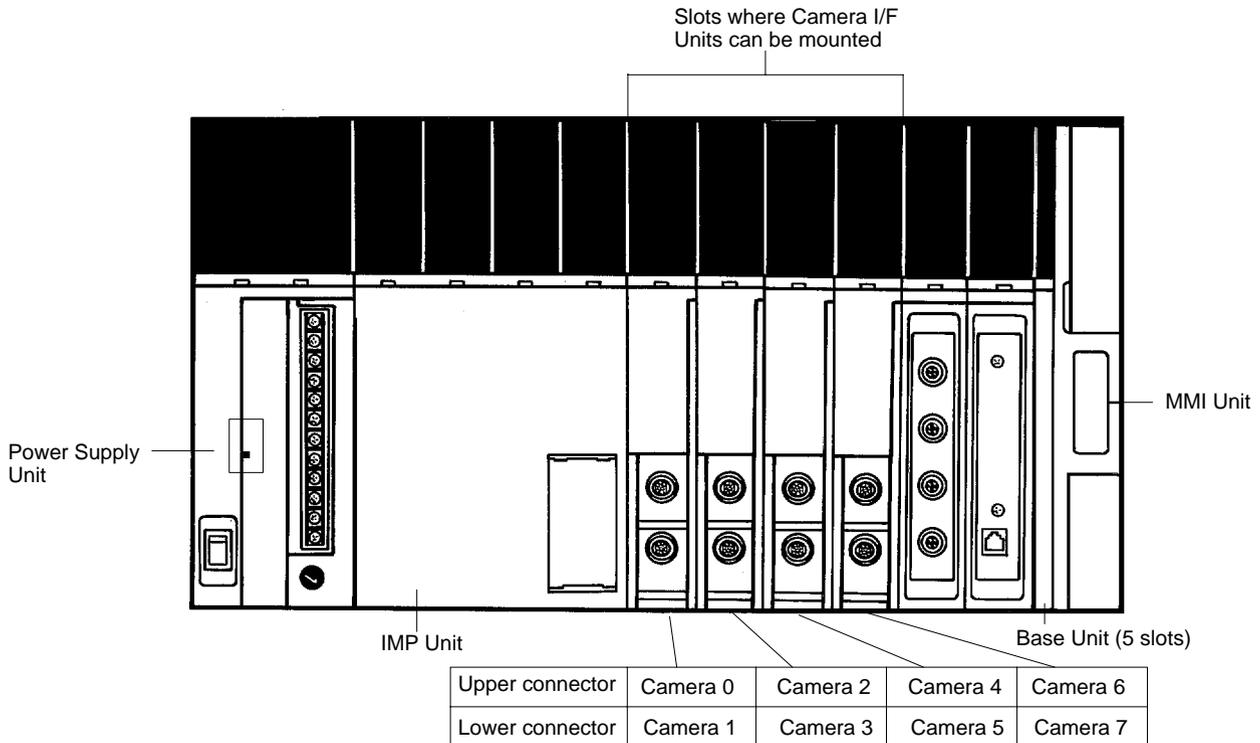
Procedure

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.
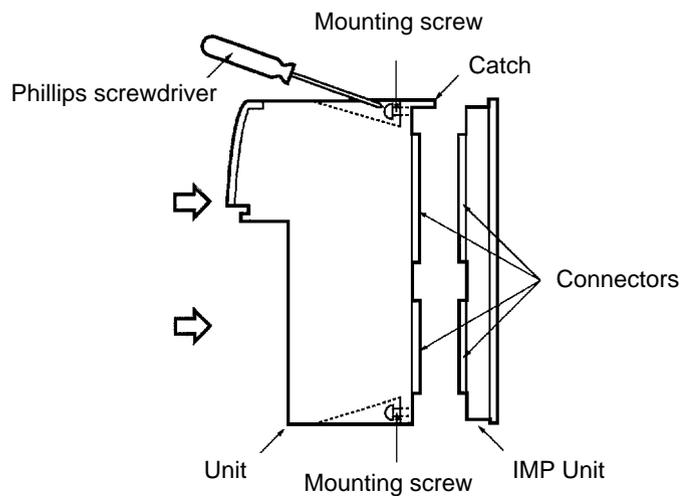
2. Press the Unit horizontally into the IMP Unit.

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.

Connector cover

MMI Unit

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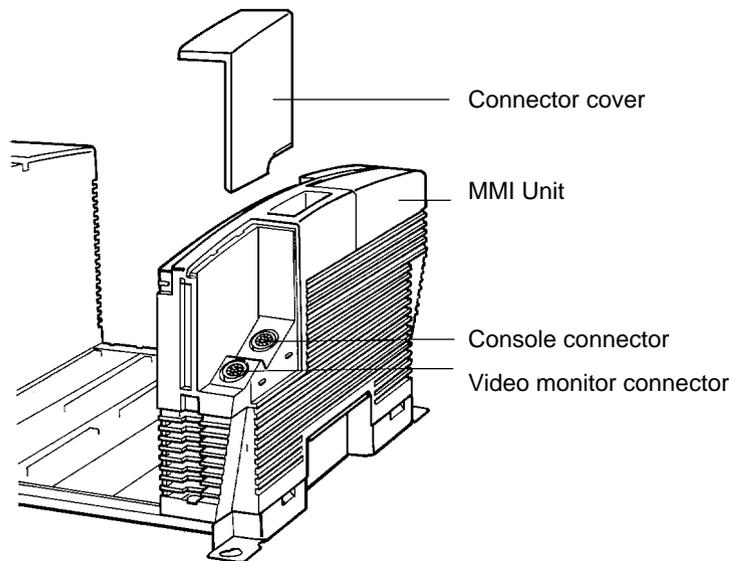
3. Holding the rubber part of the connector, push it in straight ahead until it locks in place.
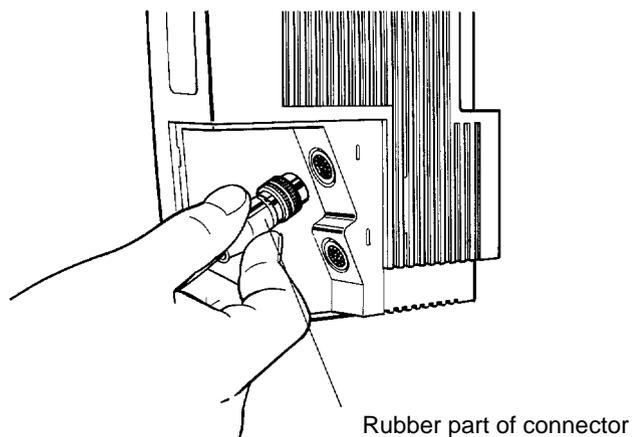
Rubber part of connector

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, a shown in the illustration below.
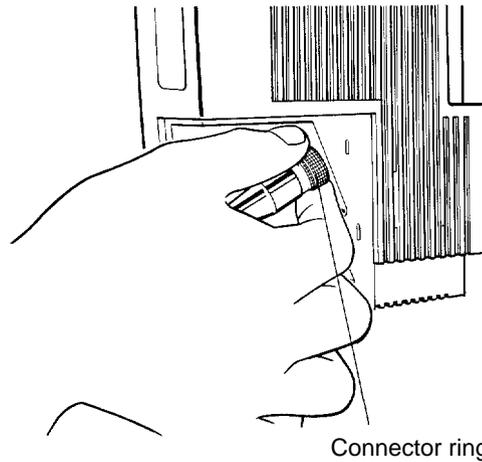
Connector ring

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.

Console housing slot

Console
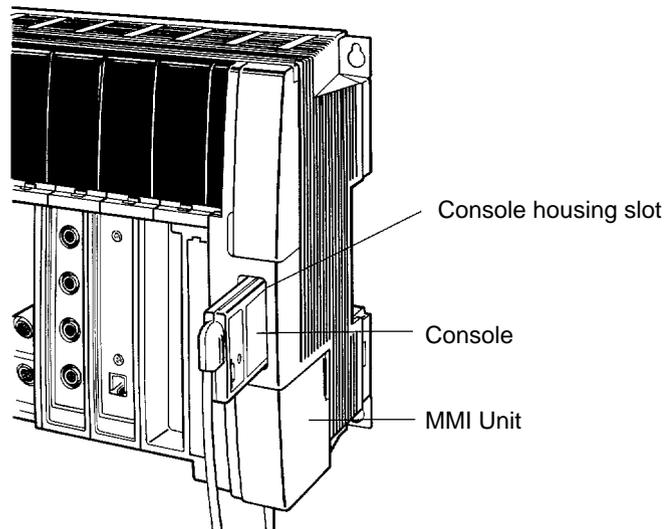
MMI Unit

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.

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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.

Termination resistance switch

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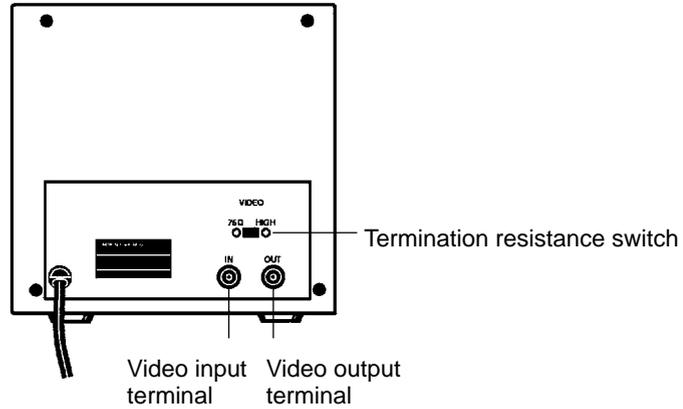
⚠️ **WARNING** Don't open the rear cover of the Video Monitor, or you may receive an electric shock from high tension voltage that runs through some parts behind the cover.

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.

Connector cover

MMI Unit

Console connector
Video monitor connector

17
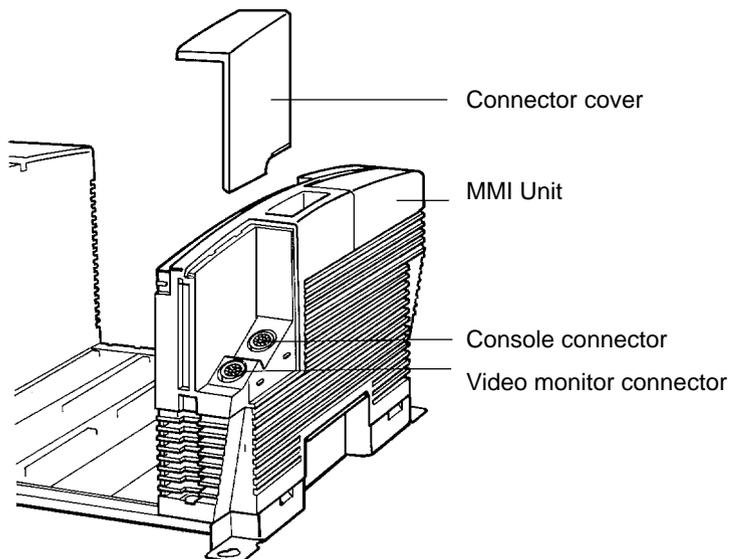
3. Holding the rubber part of the video monitor connector, push the connector in straight ahead until it locks in place.
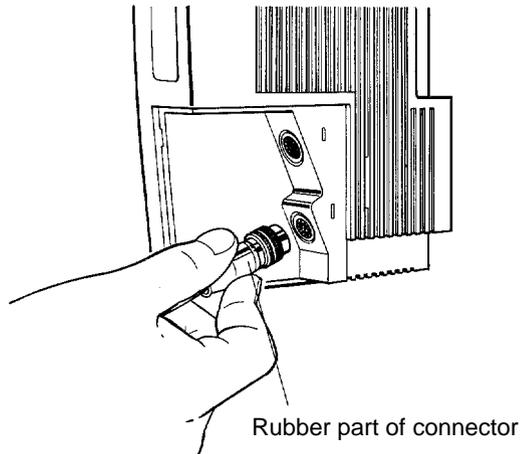
Rubber part of connector

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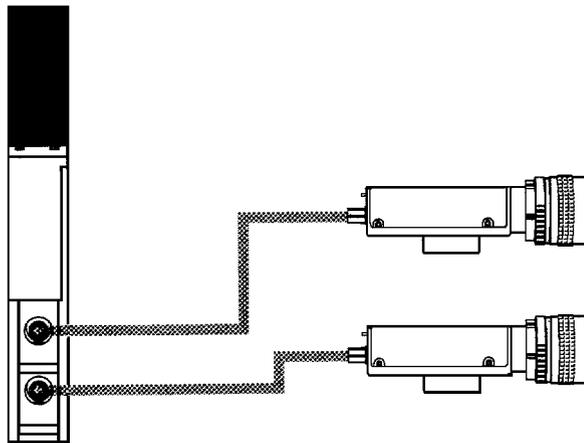
Connection at the Camera To make the connection at the Camera itself, follow one of the procedures outlined below, depending on whether a normal or shutter Camera is to be used.

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.
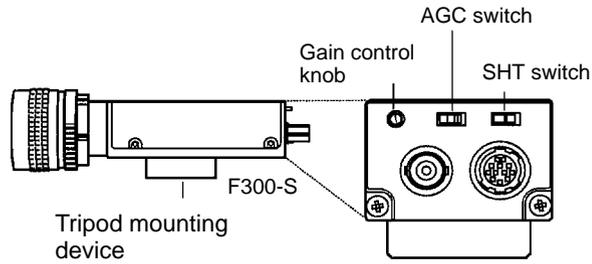
Shutter Cameras

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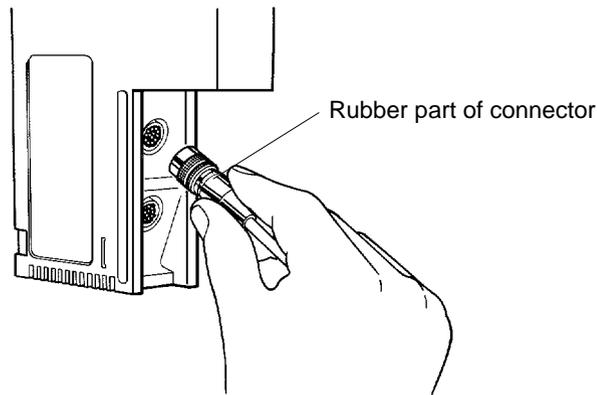
Important Align the notch of the connector with the receptor when inserting the connector. Inserting the connector forcibly without lining up with the receptor may result in damage to the connector.

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.
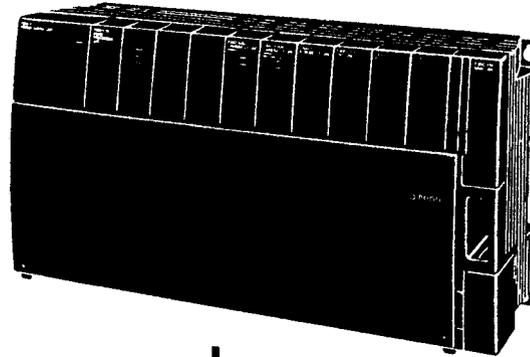
Cables

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.
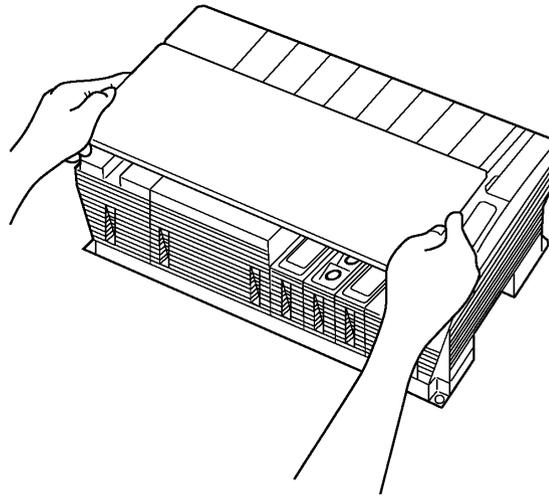
Removing the Cover

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.
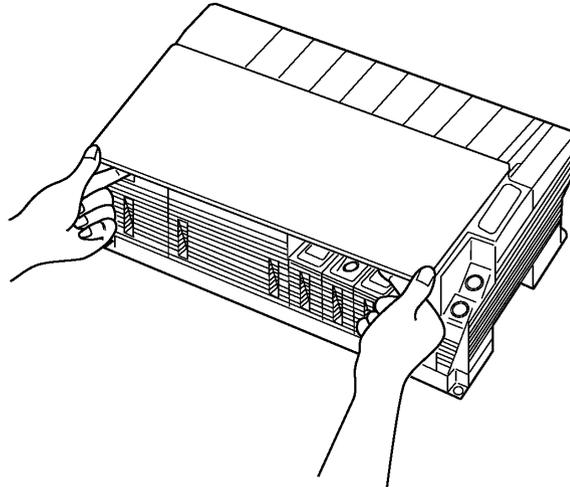
2-3   Power and Protective Conductor (Earth) Wiring

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-mm^2 (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 mm^2 (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

RUN signal output —— ⊗ —— RUN

ERROR signal output —— ⊗ —— ERR

COM —— ⊗ —— COM

DC service power supply —— ⊗ / ⊗ —— 12 VDC OUT 0.3 A max.

Protective conductor terminal —— ⊗ —— ⊕ GR

Line earth terminal —— ⊗ —— LG

Not used (see note) —— ⊗ —— NC

Short-circuit bar (must not be left open.) —— ⊗ / ⊗ —— DO NOT USE / DO NOT USE

Power supply terminals —— ⊗ / ⊗ —— 100 to 120 VAC
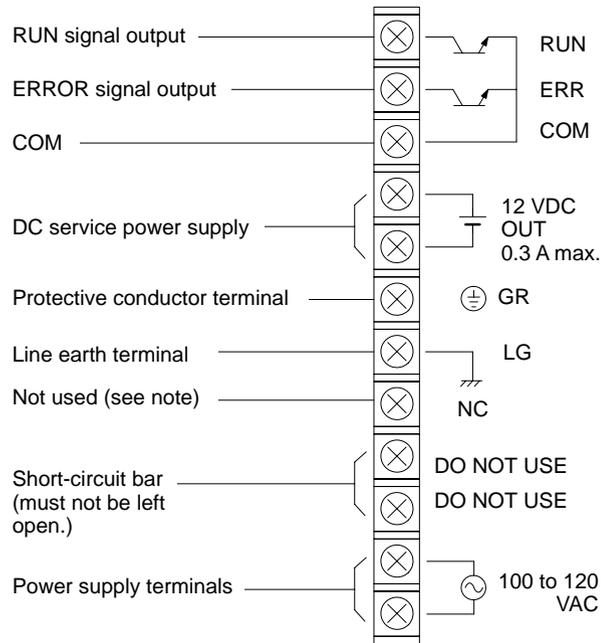
Note The screw hole is for fastening the terminal protection cover (accessory).

F300-P2E Power Supply

RUN signal output —— ⊗ —— RUN

ERROR signal output —— ⊗ —— ERR

COM —— ⊗ —— COM

DC service power supply —— ⊗ / ⊗ —— 12 VDC OUT 0.3 A max.

Protective conductor terminal —— ⊗ —— ⊕ GR

Line earth terminal —— ⊗ —— LG

Not used (see note) —— ⊗ —— NC

Do not connect these live terminals to any other circuit. —— ⊗ / ⊗ —— DO NOT USE / DO NOT USE

Power supply terminals —— ⊗ / ⊗ —— 200 to 240 VAC
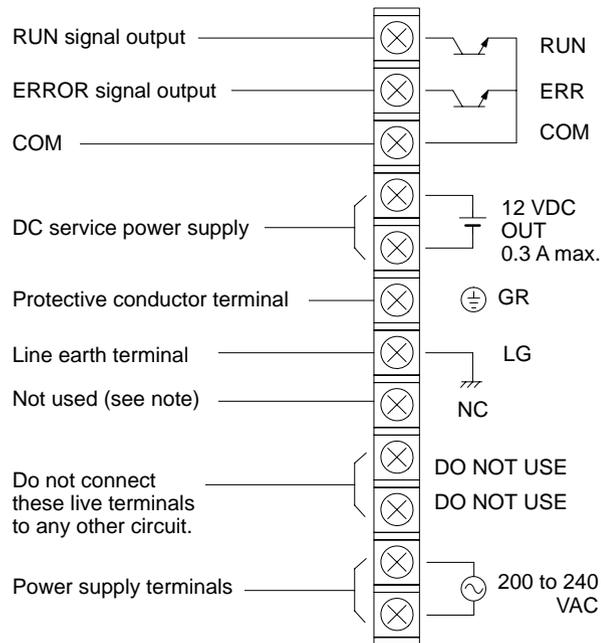
Note The screw hole is for fastening the terminal protection cover (accessory).

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 mm^2 (AWG14).

Important To avoid damage to the equipment due to lighting 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.

Use independent wire of at least 2 mm^2 (AWG14).
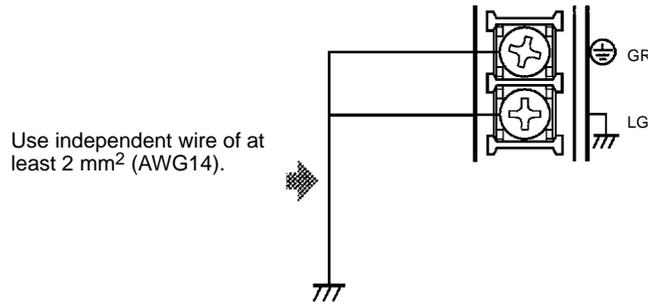
2-4 Connecting Power Supply Unit I/O Terminals

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

7.5 max.   7.5 max.

Applicable wire size: 1.04 to 2.63 mm^2 (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.

23

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

RUN
ERR
COM

+12 V ← 12 VDC
OUT
0 V ← 0.3 A max.
GR
LG
NC

Output voltage: 12 VDC ±5%
Output current: 0.3 A max.
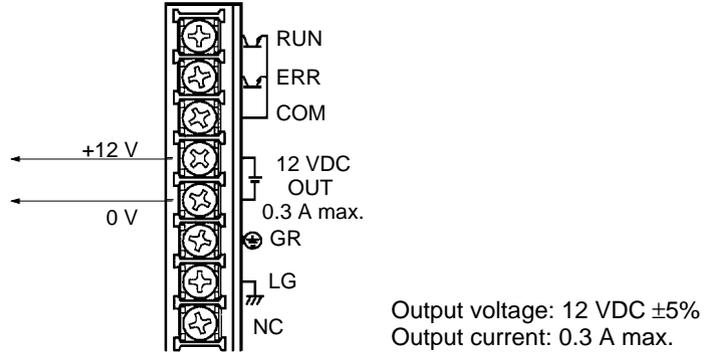
Wiring External Outputs The Power Supply Unit can output RUN and ERR signals. Wire them as shown below.

RUN ←
ERR ←

RUN
ERR
COM

12 to 24 VDC±10%
100 mA max.

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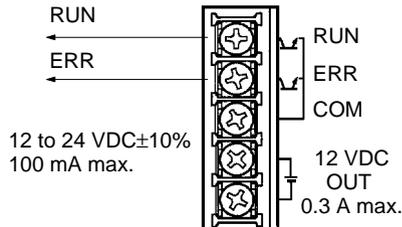
Signal	Remarks
RUN	ON while the System is in operation. The RUN indicator on the front panel of the IMP Unit lights simultaneously with the signal output.
ERR	Can be turned ON when an error occurs in the System. The ERR indicator on the front panel of the IMP Unit lights simultaneously with the signal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

F300-FS Strobe I/F Unit

F309-VFS Strobe Cable, 2 m
(Sold separately)
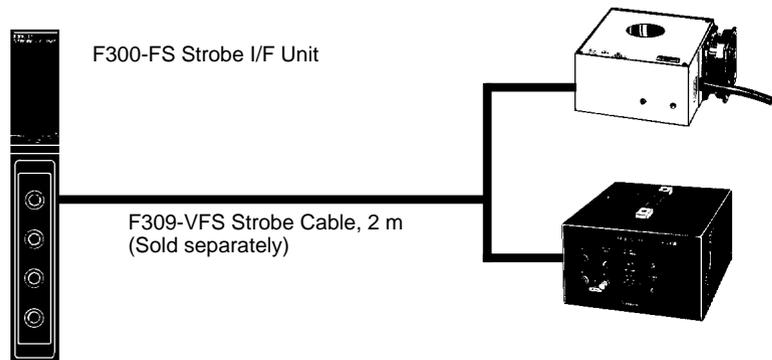
Connecting the Strobe Unit Connect the strobe cable connector to the Strobe Unit.

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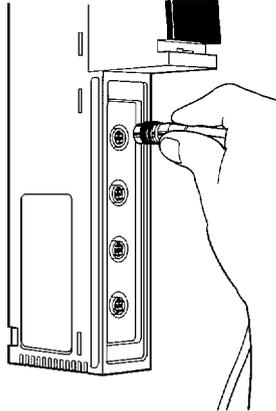
Important Align the notch of the connector with the receptor when inserting the connector. Inserting the connector forcibly without lining up with the receptor may result in damage to the connector.

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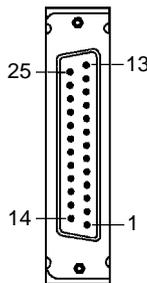
Pin no.	Symbol	Name
1	FG (GND)	Frame ground
2	SD (TXD)	Send Data
3	RD (RXD)	Receive Data
4	RS (RTS)	Request to Send
5	CS (CTS)	Clear to Send
6	DR (DSR)	Data Settings Ready
7	SG (GND)	Signal ground
20	ER (DTR)	Data Terminal Ready

25

Wiring   Use only shielded RS-232C cable.

Standard

25-pin Cable Connection (F309-VR)

| F300-E2 | | | RS-232C Device | |
Symbol	Pin no.		Pin no.	Symbol
SD (TXD)	2		2	SD (TXD)
RD (RXD)	3		3	RD (RXD)
RS (RTS)	4		4	RS (RTS)
CS (CTS)	5		5	CS (CTS)
DR (DSR)	6		6	DR (DSR)
SG (GND)	7		7	SG (GND)
ER (DTR)	20		20	ER (DTR)

9-pin Cable Connection

| F300-E2 | | | RS-232C Device | |
Symbol	Pin no.		Pin no.	Symbol
SD (TXD)	2		2	RD (RXD)
RD (RXD)	3		3	SD (TXD)
RS (RTS)	4		4	ER (DTR)
CS (CTS)	5		5	SG (GND)
DR (DSR)	6		6	DR (DSR)
SG (GND)	7		7	RS (RTS)
ER (DTR)	20		8	CS (CTS)
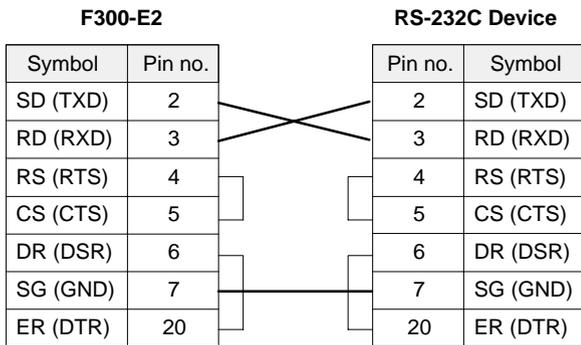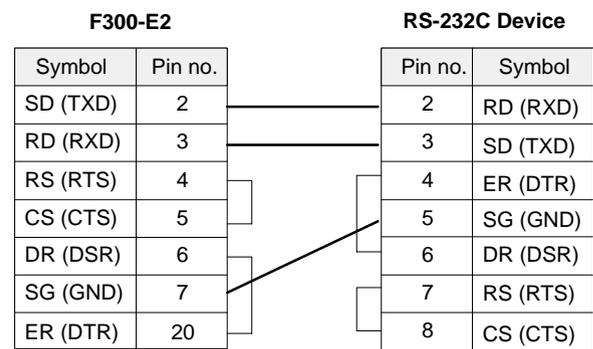
RS/CS Control

25-pin Cable Connection

| F300-E2 | | | RS-232C Device | |
Symbol	Pin no.		Pin no.	Symbol
SD (TXD)	2		2	SD (TXD)
RD (RXD)	3		3	RD (RXD)
RS (RTS)	4		4	RS (RTS)
CS (CTS)	5		5	CS (CTS)
DR (DSR)	6		6	DR (DSR)
SG (GND)	7		7	SG (GND)
ER (DTR)	20		20	ER (DTR)

9-pin Cable Connection

| F300-E2 | | | RS-232C Device | |
Symbol	Pin no.		Pin no.	Symbol
SD (TXD)	2		2	RD (RXD)
RD (RXD)	3		3	SD (TXD)
RS (RTS)	4		4	ER (DTR)
CS (CTS)	5		5	SG (GND)
DR (DSR)	6		6	DR (DSR)
SG (GND)	7		7	RS (RTS)
ER (DTR)	20		8	CS (CTS)
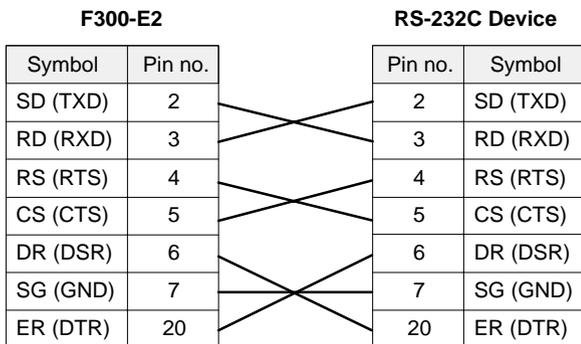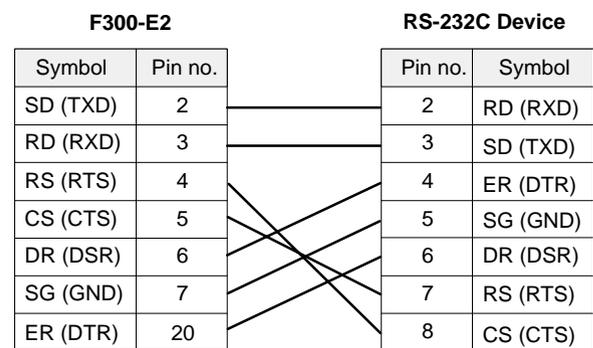
Connecting a Peripheral Device

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 mm^2 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		5	DI 0	
8	DI 3	Data input	7	DI 2	Data input
10	DI 5		9	DI 4	
12	DI 7		11	DI 6	
14	GATE		13	NC	
16	DO 0		15	BUSY	
18	DO 2	Data output	17	DO 1	
20	DO 4		19	DO 3	Data output
22	DO 6		21	DO 5	
24	AND		23	DO 7	
26	OR		25	COM OUT (for output)	

Internal Circuit Diagram
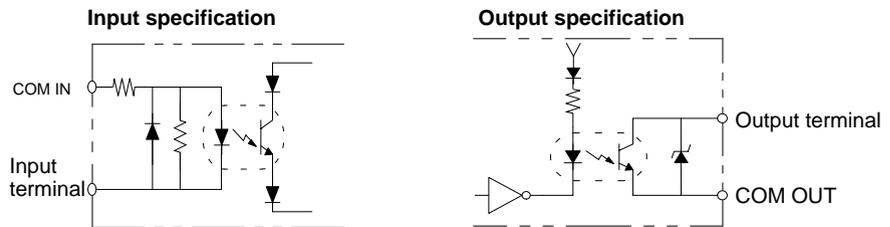
2-4-5 Connecting Parallel I/O Units

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
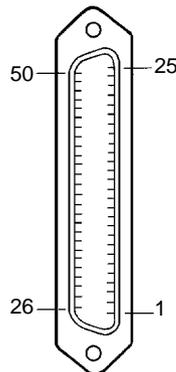
No.	Signal name		No.	Signal name	
1	COM OUT (for output)		26	COM OUT (for output)	
2	DO 31		27	DO 30	
3	DO 29		28	DO 28	
4	DO 27		29	DO 26	
5	DO 25		30	DO 24	
6	DO 23		31	DO 22	
7	DO 21		32	DO 20	
8	DO 19		33	DO 18	
9	DO 17	Data output	34	DO 16	Data output
10	DO 15		35	DO 14	
11	DO 13		36	DO 12	
12	DO 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		44	DI 7	
20	DI 6		45	DI 5	
21	DI 4	Data input	46	DI 3	Data input
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

Input specification

Output specification
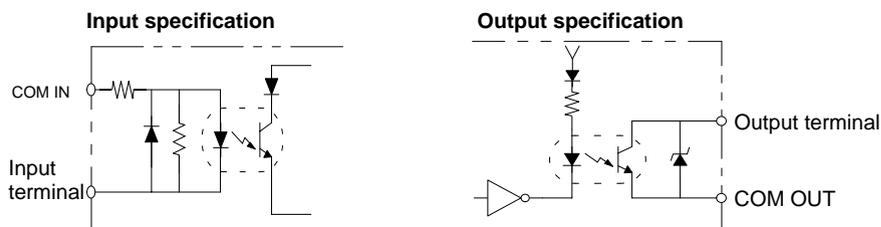
2-5   OVL Unit

Follow the procedure below to connect and disconnect the F300-K Keyboard and the OVL Unit.
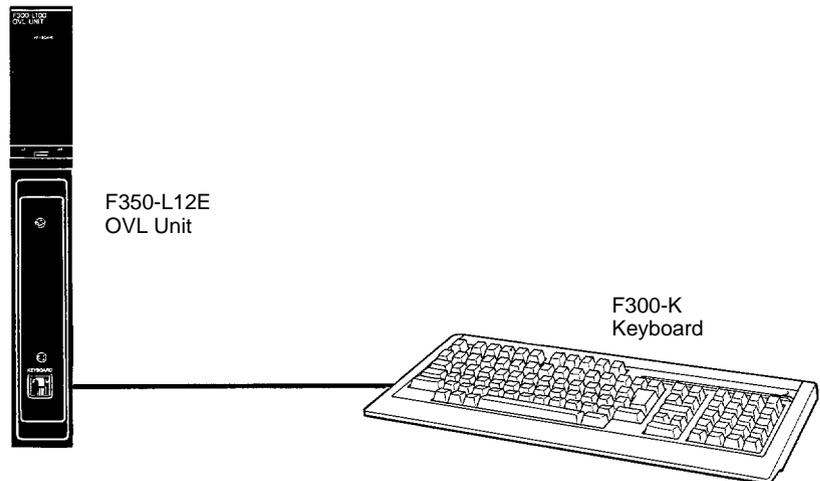
F350-L12E
OVL Unit

F300-K
Keyboard

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.
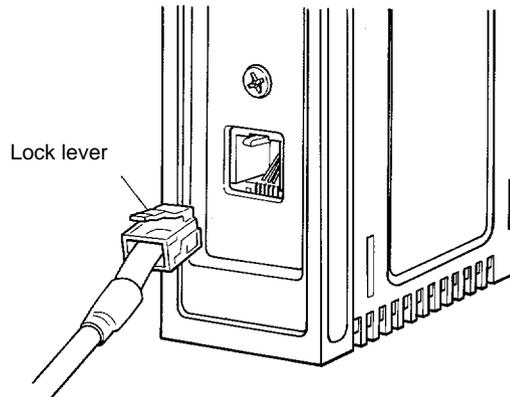
Lock lever

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

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.

```
Set-up Menu will boot.
Release the ENT key.
```
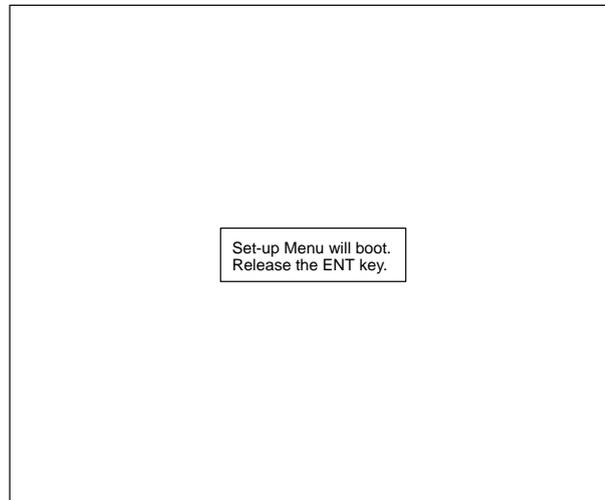
3. Release the Enter Key.

   The Basic Screen of the Setup Menu is displayed.

```
I. Installation  K. Environment  B. Backup  M. Memory card  E. End
```
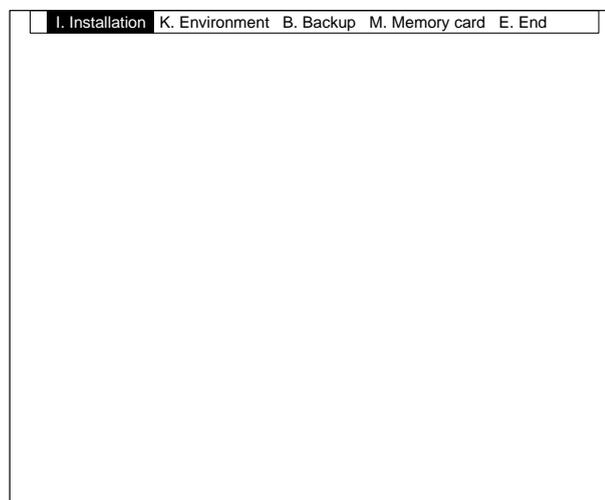
3-2 Ending the Setup Menu

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.

```
┌──────────────────────────────────────────────────────┐
│ I. Installation  K. Environment  B. Backup  M. Memory card │ E. End │
│                                                        │
│                                                        │
│                                                        │
│              ┌─────────────────────────┐              │
│              │      End Set-up Menu.    │              │
│              │                          │              │
│              │ ┌─────────┐  ┌─────────┐ │              │
│              │ │X.Execute│  │C.Cancel │ │              │
│              │ └─────────┘  └─────────┘ │              │
│              └─────────────────────────┘              │
│                                                        │
│                                                        │
└──────────────────────────────────────────────────────┘
```
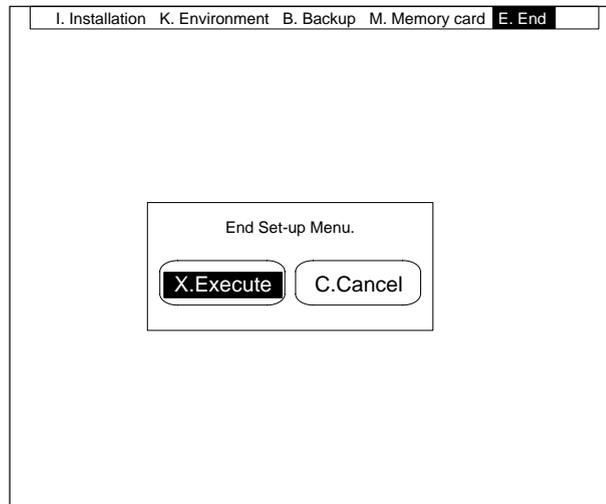
SECTION 4
Basic Operation of the Setup Menu

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

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.

F300-KP Console
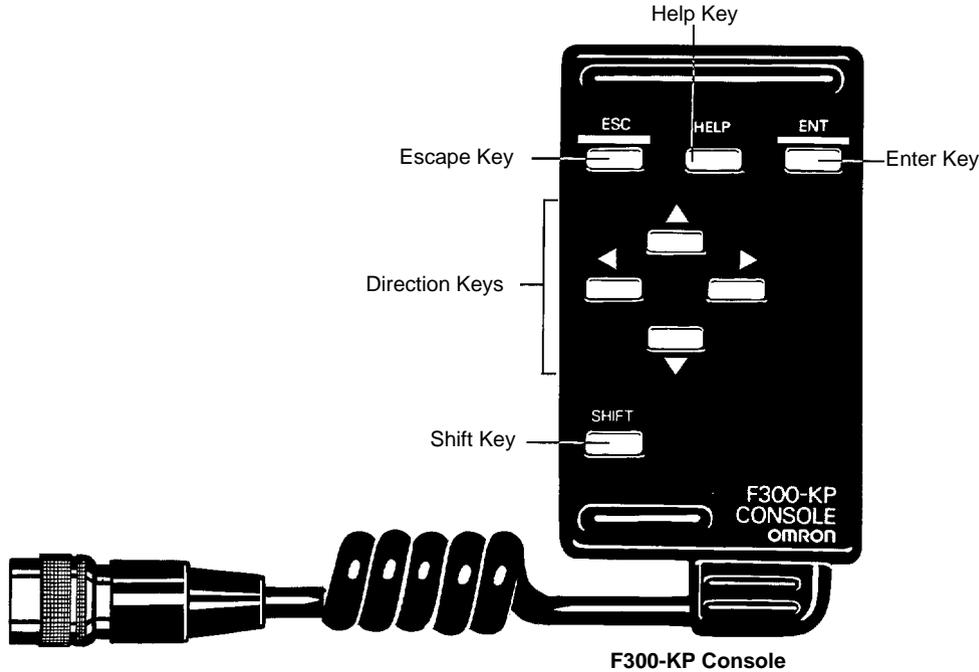
Display	Name	Function
ESC	Escape Key	Interrupts processing and returns the user to the previous menu display.
HELP	Help Key	The Help Key is not used in the Setup Menu.
ENT	Enter Key	Executes cursor position functions. When a menu is being displayed, it displays the next level menu at the cursor position. 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.

Main menu bar
Major functions are comprised
in menus.

Menu box
Menus are displayed in menu boxes.

Dialog box
Used for setting data.

I. Installation K. Environment B. Backup M. Memory card E. End

M. Initial mode
O. OVL standard input / output
U. OVL area size
R. RS-232C
P. I/O Unit

RS-232C (Channel-0)

B. Baud rate   : 1200 2400 4800 <u>9600</u> 19200
L. Data length : 7 bit <u>8 bit</u>
P. Parity bit   : <u>None</u> Even Odd
S. Stop bit   : <u>1 bit</u> 2bit
D. Delimiter   : CR LF <u>CR+LF</u>
F. Flow   : <u>None</u> Xon / off RS / CS
T. Time-out   : [0] × 100 ms

E.End

▶

Comment line
Shows procedure, etc.

Save system data to memory card.

X.Execute   C.Cancel

Message box
Displays confirmation messages
or error messages.

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.

```
I. Installation  K. Environment  B. Backup  M. Memory card  E. End
```
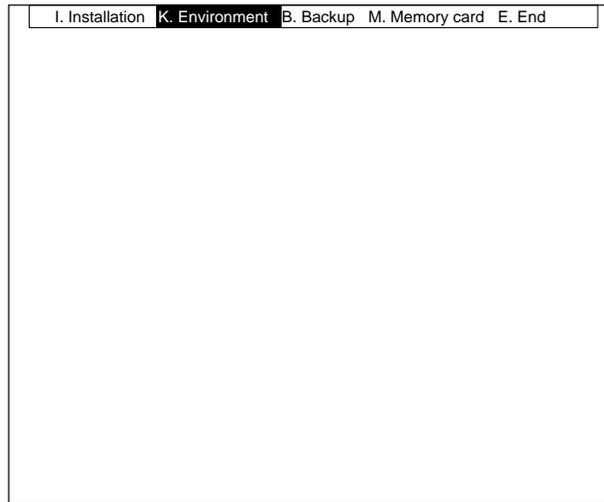
2. Press the Enter Key. The next menu in the hierarchy will then be displayed.

3. Move the cursor to the name of the desired menu.

```
I. Installation  K. Environment  B. Backup  M. Memory card  E. End

        M.  Initial  mode
        O.  OVL  standard  input / output
        U.  OVL area size
        R.  RS-232C
        P.  I /O  Unit
        C.  Camera  settings
        D.  Date / time
        S.  System  status
```
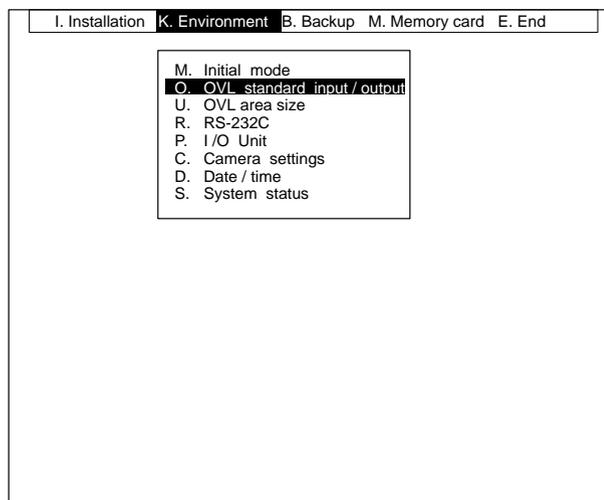
4. Press the Enter Key. The menu will then be displayed. Repeat the above steps 3 and 4 to move to the next menu in the hierarchy.
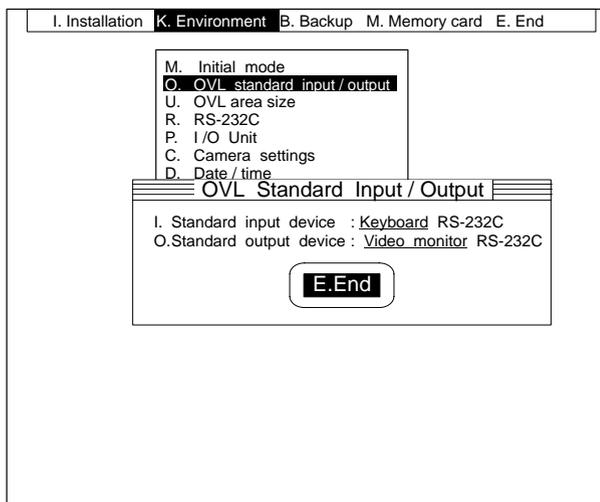
5. Press the Escape Key to return to the previous menu in the hierarchy. Repeat this step to return to the menu before that. This operation can be executed repeatedly until the Basic Screen appears.

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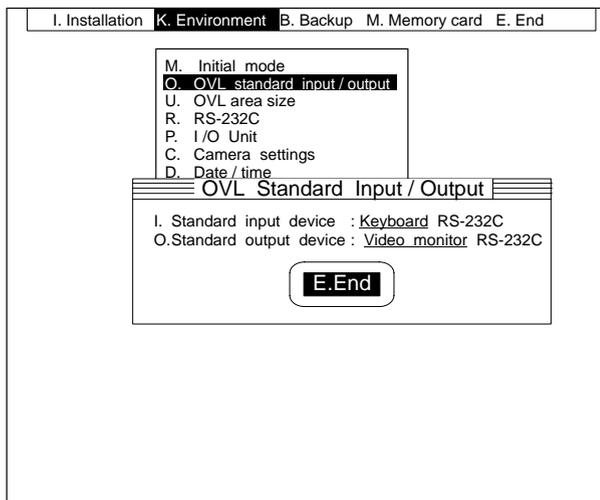
2. Move the cursor to the setting that is to be changed.

```
═══ OVL  Standard  Input / Output ═══
I. Standard  input device   : Keyboard RS-232C
O.Standard  output  device : Video  monitor RS-232C

            ┌─────────┐
            │  E.End  │
            └─────────┘
```
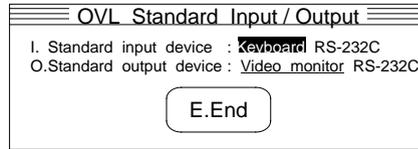
3. Move the cursor to the desired setting.

```
═══ OVL  Standard  Input / Output ═══
I. Standard  input device   : Keyboard  RS-232C
O.Standard  output  device : Video  monitor RS-232C

            ┌─────────┐
            │  E.End  │
            └─────────┘
```
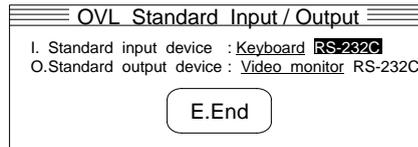
4. Move the cursor to "E.End." The new settings will be underlined.

```
═══ OVL  Standard  Input / Output ═══
I. Standard  input device   : Keyboard RS-232C
O.Standard  output  device : Video  monitor RS-232C

            ┌─────────┐
            │  E.End  │
            └─────────┘
```
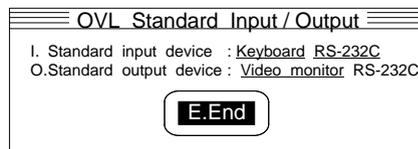
5. Press the Enter Key. The changed data will be set.

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.

```
═══════ I / O  Unit ═══════
P. Output points :  8 16 24 32 40 48 64
H. Handshake    :  Yes None
T. Time-out      :  [  100 ] × 100  ms
C. Output  period :  [  100]} × 100  μs
D. Delay         :  [   10 ] × 100  μs
O. Output time    :  [00050 ] × 100  μs

            ┌─────────┐
            │  E.End  │
            └─────────┘
```
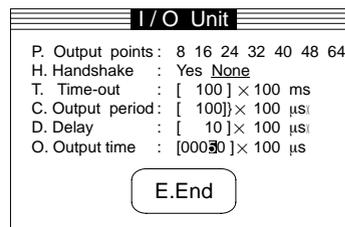
3. Press the Up Key or Down Key to change the number.

Key	Function
▲	Incremented by one.
▼	Decremented 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.

```
═══════ I / O  Unit ═══════
P. Output points :  8  16  24  32  40  48  64
H. Handshake     :   Yes  None
T. Time-out      : [   100 ] × 100  ms
C. Output period : [   100 ]× 100  μs
D. Delay         : [    10 ]× 100  μs
O. Output time   : [  70 ]× 100  μs

          ( E.End )
```
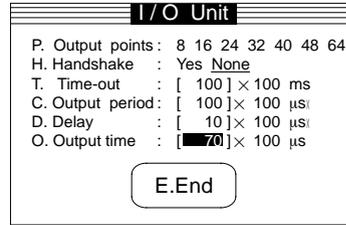
Clearing a Number to 0

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.

```
═══════ I / O  Unit ═══════
P. Output points :  8  16  24  32  40  48  64
H. Handshake     :   Yes  None
T. Time-out      : [   100 ] × 100  ms
C. Output period : [   100 ]× 100  μs
D. Delay         : [    10 ]× 100  μs
O. Output time   : [0005̲0 ]× 100  μs

          ( E.End )
```
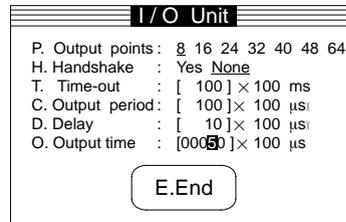
2. Input a number to be newly set. Enter a new number including the decimal point.

```
═══════ I / O  Unit ═══════
P. Output points :  8  16  24  32  40  48  64
H. Handshake     :   Yes  None
T. Time-out      : [   100 ] × 100  ms
C. Output period : [   100 ]× 100  μs
D. Delay         : [    10 ]× 100  μs
O. Output time   : [ 70_  ]× 100  μs

          ( E.End )
```

3. Press the Enter Key. The number will be changed.
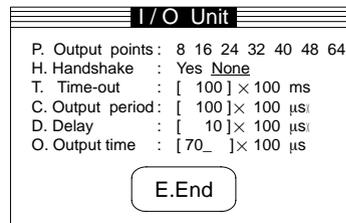
```
═══════ I / O  Unit ═══════
P. Output points :  8  16  24  32  40  48  64
H. Handshake     :   Yes  None
T. Time-out      : [   100 ] × 100  ms
C. Output period : [   100 }× 100  μs
D. Delay         : [    10 }× 100  μs
O. Output time   : [  70 ]× 100  μs

          ( E.End )
```
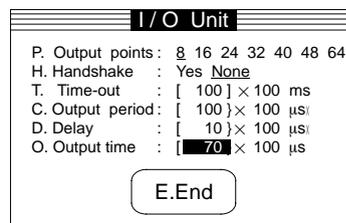
The following function is available when inputting numbers by means of the keyboard or RS-232C.

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.

```
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
```
Input File
N. Filename : [■   ]

E.Execute
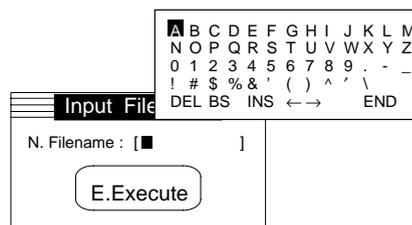
2. Move the cursor to the character that is to be entered.

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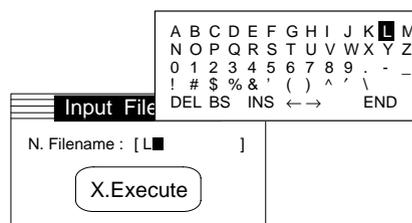
```
A B C D E F G H I  J K L M
N O P Q R S T U V W X Y Z
0 1 2 3 4 5 6 7 8 9 . - _
! # $ % & ' ( ) ^ ' \
DEL BS  INS  ← →     END
```
Input File
N. Filename : [L■   ]

X.Execute

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4. 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.

```
                    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 . - _
                    ! # $ % & ' ( ) ^ ' \
           Input File  DEL BS  INS  ← →      END

        N. Filename : [ LABEL■    ]

                  X.Execute
```
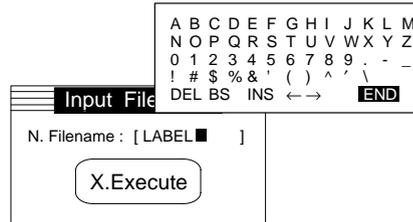
Deleting All Characters
Press the Shift Key and Enter Key simultaneously in the character input mode.

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.

```
                    ▣ 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 . - _
                    ! # $ % & ' ( ) ^ ' \
           Input File  DEL BS  INS  ← →      END

        N. Filename : [ ■          ]

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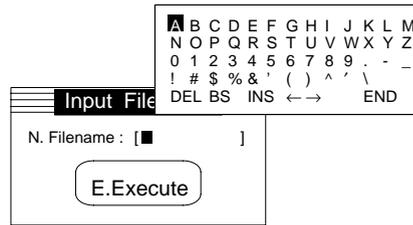
2. Enter the desired characters.
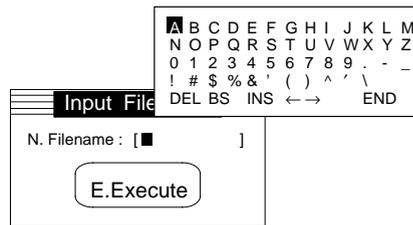
```
                    ▣ B C D E F G H I  J K L M
                    N O P Q R S T U V W X Y Z
                    0 1 2 3 4 5 6 7 8 9 . - _
                    ! # $ % & ' ( ) ^ ' \
           Input File  DEL BS  INS  ← →      END

        N. Filename : [ ■        ]

                  E.Execute
```

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.

```
                    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 . - _
                    ! # $ % & ' ( ) ^ ' \
           Input File  DEL BS  INS  ← →      END

        N. Filename : [ LABEL■   ]

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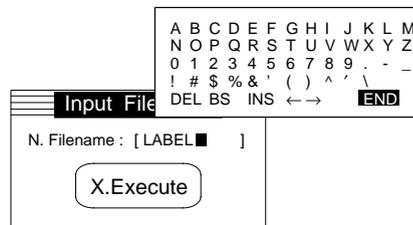
The following functions are available when inputting characters by means of the keyboard or RS-232C.

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

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

M.Application program (memory card) ────── Installing the Application Program   Page 48
P.OVL program (memory card)
R.OVL program (RS-232C) ────── Installing the OVL Program   Page 49
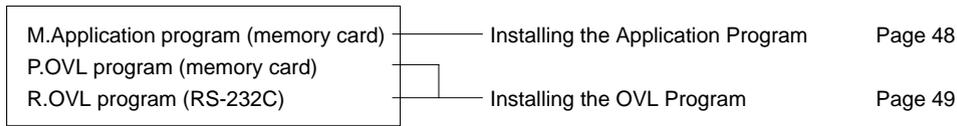
5-1-1   Installing the Application Program: M.Application program

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.

```
I. Installation   K. Environment   B. Backup   M. Memory card   E. End

M. Application  program  ( memory  card )
P. OVL  program  ( memory  card )
R. OVL  program  ( RS-232C )

≣ Application  Program  Installation ≣

Memory  card  battery  OK
Total : 2097152byte   free : 1799168bype
C:¥

DEMO0001 .DEF    368  06-21-95  03:20:14
U001CHAR .DEF    436  06-21-95  03:21:10
U001DATE .DEF    440  06-21-95  03:21:06
U001DTL1 .DEF    436  06-21-95  03:21:14
U001DTL2 .DEF    436  06-21-95  03:21:00
[-C-]<Memory Card>
[-D-]<ROM Disk>
[-E-]<RAM Disk>
```

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

```
Install  application  program  from  memory  card.
Current  application / OVL  program  will  be  deleted, OK ?

   X.Execute      C.Cancel
```

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

```
Application  program  installed.
Application  program  will  boot.

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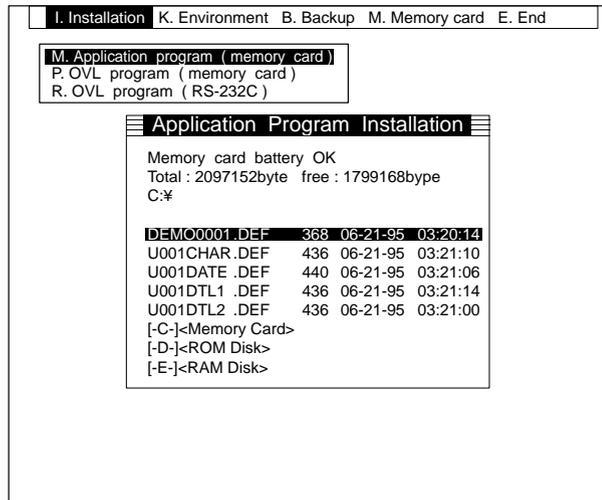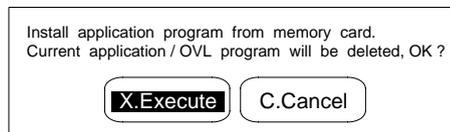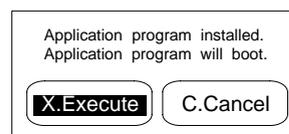
4. Select "X.Execute." The Application Program will start up. Select "C.Cancel" to return to the Basic Screen of the Setup Menu.

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.

```
┌─────────────────────────────────────────────────────────────┐
│ I. Installation  K. Environment  B. Backup  M. Memory card  E. End │
│  ┌──────────────────────────────────────┐                    │
│  │ M. Application  program  ( memory  card ) │                │
│  │ P. OVL  program  ( memory  card )        │                │
│  │ R. OVL  program  ( RS-232C )             │                │
│  └──────────────────────────────────────┘                    │
│              ═══ OVL  Program  Installation ═══               │
│                                                               │
│       Memory  card  battery  OK                               │
│       Total : 2097152byte          free : 1852928bype         │
│       C:¥                                                      │
│                                                               │
│       DEMO001.BAS    15452  05-22-95  05:11:18                │
│       U002GRY1.BAS   56490  06-15-95  11:53:38                │
│       U002PAT1.BAS   52481  06-15-95  06:25:36                │
│       [-C-]<Memory Card>                                       │
│       [-D-]<ROM Disk>                                          │
│       [-E-]<RAM Disk>                                          │
│                                                               │
└─────────────────────────────────────────────────────────────┘
```

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

```
┌─────────────────────────────────────────────────────────────┐
│  Install  OVL  program  from  memory  card.                   │
│  Current  application / OVL  program  will  be  deleted, OK ? │
│                                                               │
│         ┌──────────────┐   ┌──────────────┐                   │
│         │  X.Execute   │   │   C.Cancel   │                   │
│         └──────────────┘   └──────────────┘                   │
└─────────────────────────────────────────────────────────────┘
```
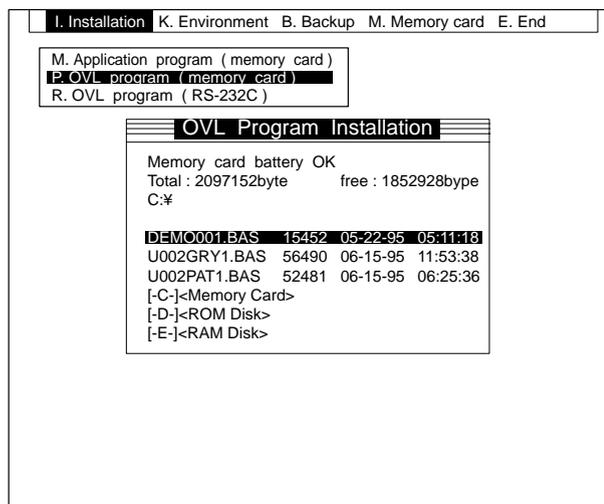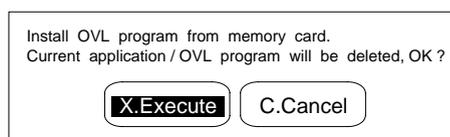
3. Select "X.Execute." The selected program file will be installed. When installation is complete, a message will be displayed asking for confirmation.
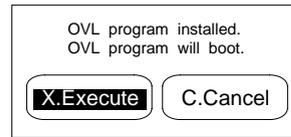
```
┌─────────────────────────┐
│   OVL program installed. │
│   OVL program will boot. │
│ ┌──────────┐ ┌──────────┐│
│ │ X.Execute│ │ C.Cancel ││
│ └──────────┘ └──────────┘│
└─────────────────────────┘
```

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.

```
┌──────────────────────────────────────────────────────────────┐
│ ■I. Installation  K. Environment  B. Backup  M. Memory card  E. End │
│ ┌──────────────────────────────────────────┐                 │
│ │ M. Application  program  ( memory  card ) │                 │
│ │ P. OVL  program  ( memory  card )          │                 │
│ │ R. OVL  program  ( RS-232C )               │                 │
│ └──────────────────────────────────────────┘                 │
│                                                                │
│                                                                │
│                                                                │
│                                                                │
│                                                                │
│                                                                │
│                                                                │
│                                                                │
│                                                                │
│                                                                │
│                                                                │
└──────────────────────────────────────────────────────────────┘
```
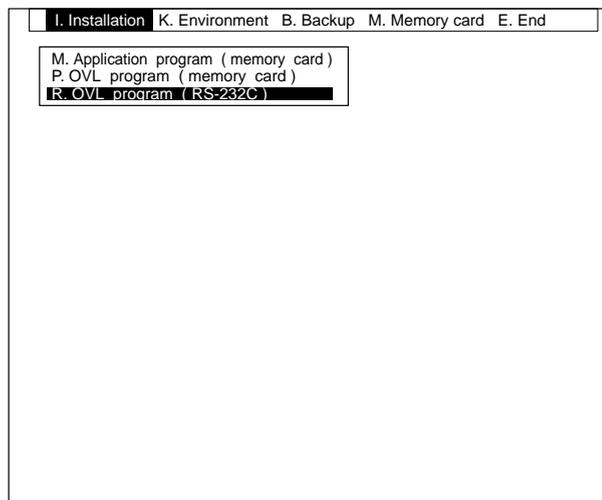
2. Transmit the OVL program from an external device.

```
Install  OVL  program  via  RS-232C.
Current  application / OVL  program  will  be  deleted, OK ?

        X.Execute     C.Cancel
```
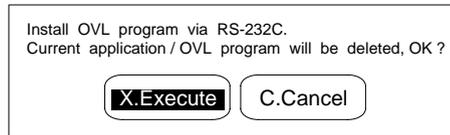
3. Select "X.Execute." During installation, a message indicating transmission is in progress will be displayed. When installation is complete, a message will be displayed asking for confirmation.
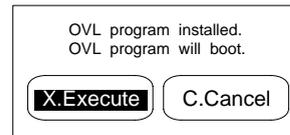
```
        OVL  program  installed.
        OVL  program  will  boot.

    X.Execute    C.Cancel
```

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.

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	If the Application Program has been installed, the program will be started.
	If the OVL program has been installed, the OVL system will start up and the OVL program will be executed automatically.
	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*.

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.

```
┌──────────────────────────────────────────────────────────────┐
│  I. Installation  K. Environment  B. Backup  M. Memory card  E. End │
│            ┌────────────────────────────────┐                 │
│            │ M.  Initial  mode              │                 │
│            │ O.  OVL  standard  input / output │              │
│            │ U.  OVL area size              │                 │
│            │ R.  RS-232C                    │                 │
│            │ P.  I/O  Unit                  │                 │
│            │ C.  Camera  settings           │                 │
│            │ D.  Date / time                │                 │
│            │ S.  System  status             │                 │
│         ┌════════════════════════════════════════┐           │
│         │          Initial  Mode                 │           │
│         │                                        │           │
│  M. Initial  Mode    :  OVL prompt  Automatic  execution      │
│                                                              │
│                   ┌──────────┐                               │
│                   │  E.End   │                               │
│                   └──────────┘                               │
│                                                              │
└──────────────────────────────────────────────────────────────┘
```
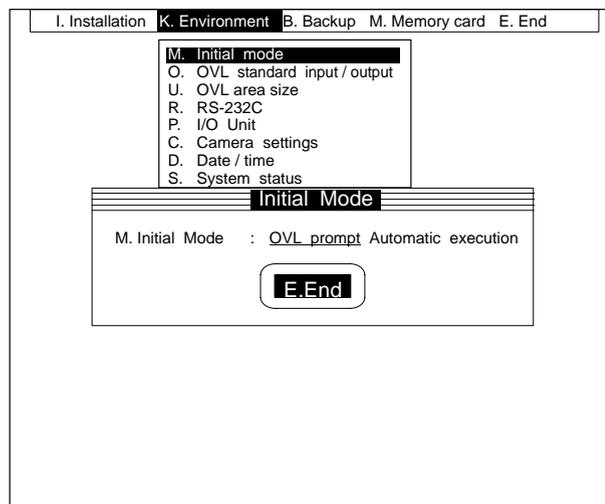
3. Select "E.End." When the power is turned on the next time, the system will start up in the set initial mode.

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."

```
┌──────────────────────────────────────────────────────────────┐
│  I. Installation  │K. Environment│  B. Backup   M. Memory card   E. End │
│         ┌────────────────────────────────────────┐           │
│         │ M.   Initial  mode                     │           │
│         │ O.   OVL  standard  input / output     │           │
│         │ U.   OVL area size                     │           │
│         │ R.   RS-232C                           │           │
│         │ P.   I /O  Unit                        │           │
│         │ C.   Camera  settings                  │           │
│         ├════════ OVL  Standard  Input / Output ════════┐   │
│         │                                        │   │
│         │ I. Standard  input  device  : Keyboard      RS-232C │
│         │ O.Standard  output  device : Video  monitor RS-232C │
│         │                                        │   │
│         │             ┌─────────┐                │   │
│         │             │  E.End  │                │   │
│         │             └─────────┘                │   │
│         └────────────────────────────────────────┘   │
└──────────────────────────────────────────────────────────────┘
```
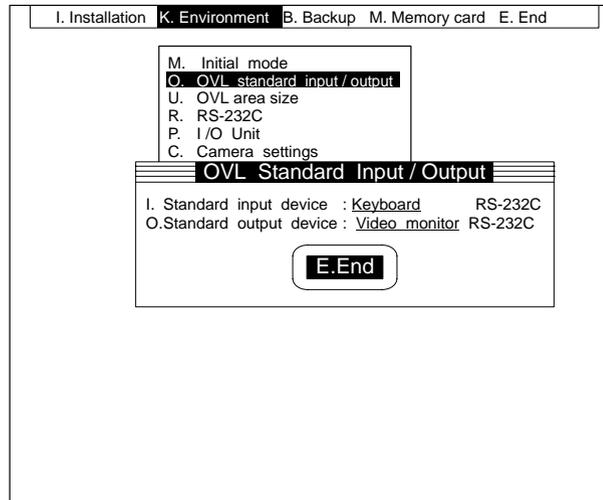
3. Select "E.End."

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

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Procedure

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

```
┌─────────────────────────────────────────────────────────────┐
│  I. Installation  K. Environment  B. Backup  M. Memory card  E. End │
│                                                               │
│            M.   Initial  mode                                 │
│            O.   OVL  standard  input / output                 │
│            U.   OVL  area size                                │
│            R.   RS-232C                                       │
│            P.   I /O  Unit                                    │
│            C.   Camera  settings                              │
│              ═════ OVL Area Size ═════                        │
│                                                               │
│         T. Text area    : [ 256] KB                           │
│         U. User area    : [ 256] KB                           │
│         R. RAM Disk     : [2048] KB                           │
│                                                               │
│                   ( E.End )                                   │
│                                                               │
└─────────────────────────────────────────────────────────────┘
```
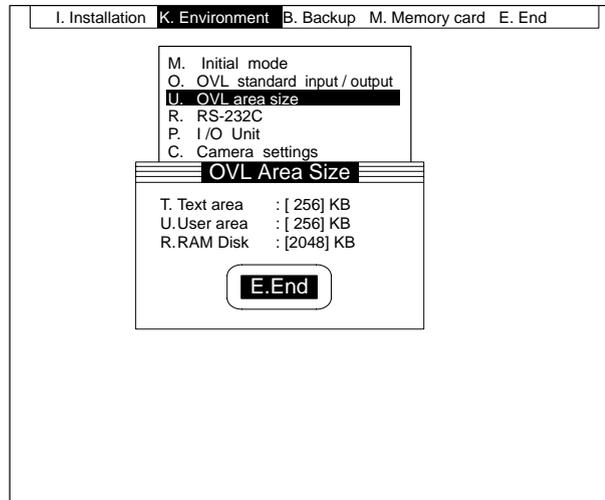
2. Select "E.End."

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	None, Xon/off, RS/CS
	
	Xon/off Flow control is performed using the software program.
	     • 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.
	
	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.
	     • When saving, data is transmitted according to the ON/OFF control of the SC signal from the external device.

T.Time-out	Can be set in units of 100 ms. Input a number between 1 and 255. Inputting "0" means that the time-out function is not executed.

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	Odd
		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.

```
┌──────────────────────────────────────────────────────────────┐
│  I. Installation  K. Environment  B. Backup  M. Memory card  E. End │
│        ┌─────────────────────────────────────────┐           │
│        │ M.  Initial  mode                        │           │
│        │ O.  OVL standard  input / output         │           │
│        │ U.  OVL area size                        │           │
│        │ R.  RS-232C                              │           │
│        │ P.  I/O  Unit        ┌──────────────┐    │           │
│        │ C.  Camera settings  │ 0. Channel 0 │    │           │
│        │ D.  Date / time      │ 1. Channel 1 │    │           │
│     ┌──┴────────────────────────────────────────┴──┐        │
│     │         RS-232C (Channel-0)                    │        │
│     │                                                │        │
│     │  B. Baud  rate   :  1200 2400 4800 9600 19200  │        │
│     │  L. Data  length :  7 bit  8 bit               │        │
│     │  P. Parity  bit  :  None  Even  Odd            │        │
│     │  S. Stop  bit    :  1 bit  2bit                │        │
│     │  D. Delimiter    :  CR  LF  CR+LF              │        │
│     │  F. Flow         :  None  Xon / off  RS / CS   │        │
│     │  T. Time-out     :  [ 0 ] × 100 ms             │        │
│     │                                                │        │
│     │              ┌─────────┐                       │        │
│     │              │  E.End  │                       │        │
│     │              └─────────┘                       │        │
│     └────────────────────────────────────────────────┘       │
└──────────────────────────────────────────────────────────────┘
```
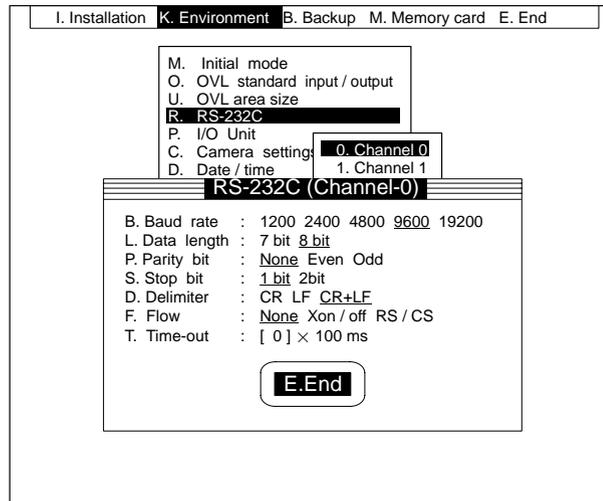
4. Select "E.End."

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

Without Handshaking
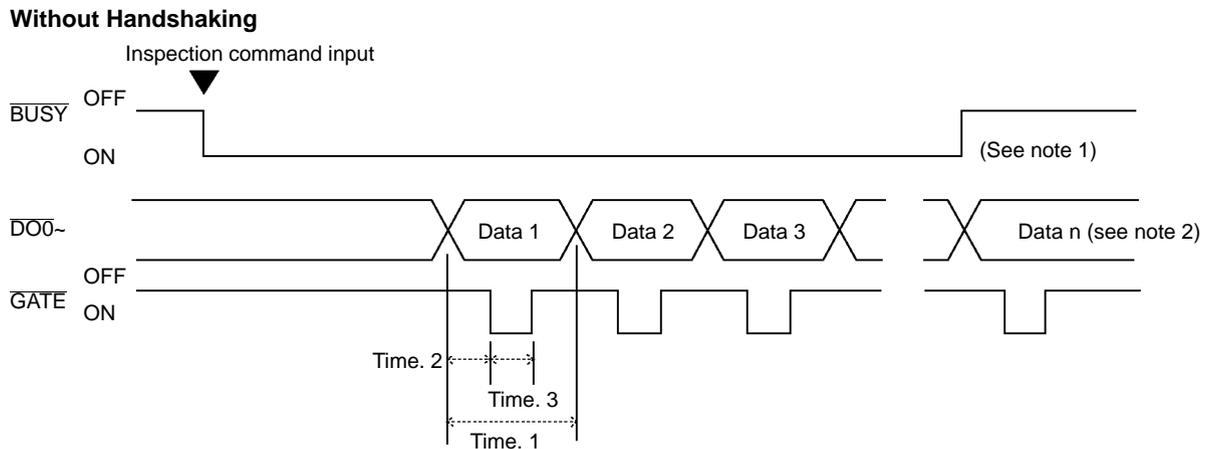
Note   1. The relationship between the timing when the BUSY signal changes from ON to OFF and the timing when the data output starts varies depending on the inspection conditions.

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	**Yes:** Inspection results are output while synchronizing the F350 with an external device. **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.
T.Time-out (Time 4) Valid when the handshake is set to "Yes."	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. 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."
C.Output period (Time 1) Valid when the handshake is set to "No."	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."
D.Delay (Time 2)	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. Default setting is 50. Enter a number between 1 and 65535.
O.Output time (Time 3) Valid when the handshake is set to "No."	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. Default setting is 50. Enter a number between 1 and 65535. This value will be ignored when the handshake is set to "Yes."

Procedure

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

2. Set the output format.
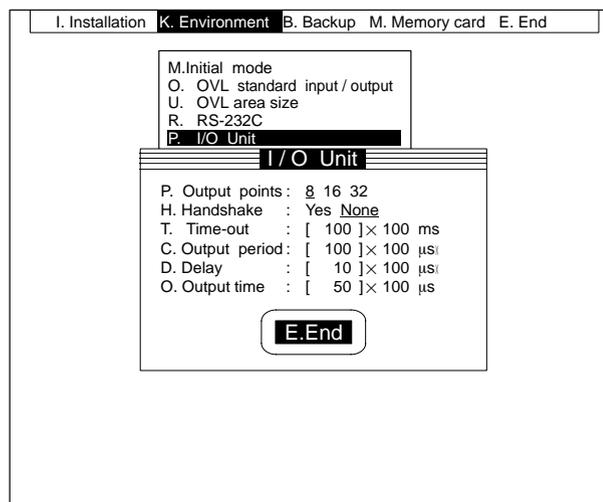
3. Select "E.End."

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	PJLG-50/55/60-Z (Select "O. Other" when using F300-S2R/S3DR.)
		F300-A21RS	PJLG-70-Z
	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 G.Strobe disable, end	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.		

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.

```
I. Installation  K. Environment  B. Backup  M. Memory card  E. End

        M. Initial  mode
        O. OVL  standard  input / output
        U. OVL  area size
        R. RS-232C
        P. I/O  Unit
        C.  Camera  settings
                  ┌─────── Camera  Settings ───────┐

        U. Camera I /F Unit     :  [ F300-A20    ]
        C. Camera               :  [ F300-S    ]
        Y. Camera  sync         :  External  Internal
        S. Strobe  disable, start  :  [ 6 ]H (−20    1. F300-S
        G. Strobe  disable, end    :  [ 8 ]H (−18    2. F200-S
                                                     O. Other

                        ┌─────────┐
                        │  E.End  │
                        └─────────┘
```
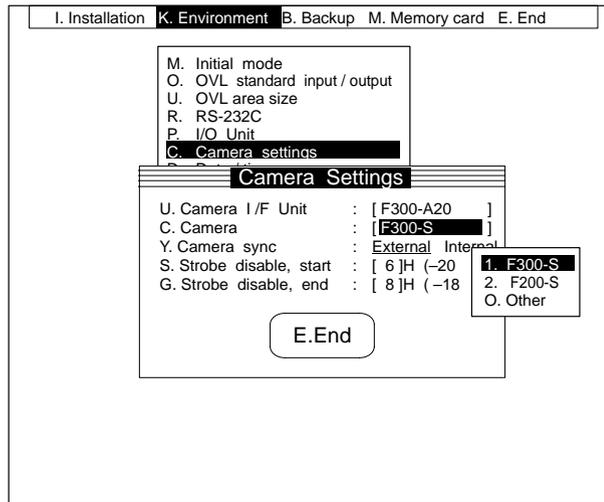
3. Select "E.End."

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.

```
I. Installation  K. Environment  B. Backup  M. Memory card  E. End

        M. Initial  mode
        O. OVL  standard  input / output
        U. OVL  area size
        R. RS-232C
        P. I/O ┌───── Date / Time ─────┐
        C. Car
        D.  Dat    Y. Year    :  [ 1980 ]
        S. Sys    M. Month  :  [ 1 ]
                   D. Day     :  [ 1 ]

                   H. Hour    :  [ 0 ]
                   F. Minute  :  [ 0 ]

                        ┌─────────┐
                        │  E.End  │
                        └─────────┘
```
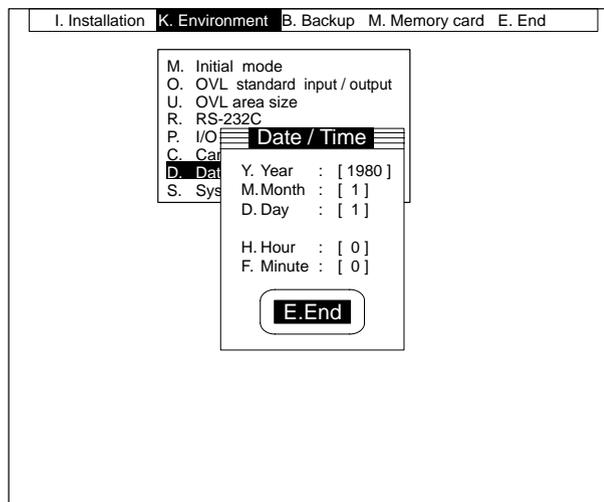
3. Select "E.End."

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.

Version
The ROM version of the F350 is displayed here.

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.

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.

```
 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
```

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

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.

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*.

```
┌─────────────────────────────────────────┐
│      Loaded  system  data.               │
│                                          │
│    Check  the  camera  I/F  unit         │
│                                          │
│   U. Camera I / F  Unit  :  [ F300-A20      ]│
│   C. Camera              :  [ F200-S        ]│
│                                          │
│            ┌──────────────┐              │
│            │    O.OK       │              │
│            └──────────────┘              │
└─────────────────────────────────────────┘
```
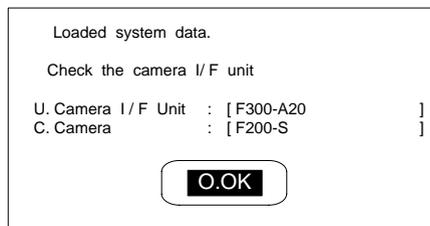
7. Select "O.OK."

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.
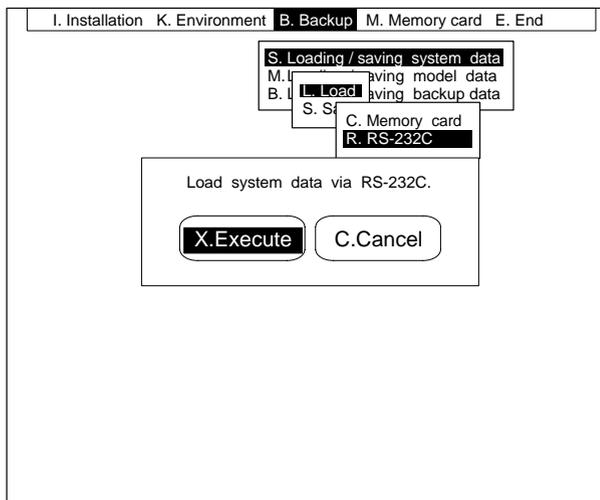
```
┌──────────────────────────────────────────────────────────┐
│ I. Installation  K. Environment  B. Backup  M. Memory card  E. End │
│                        ┌──────────────────────────────┐   │
│                        │ S. Loading / saving  system  data │
│                        M.L        aving  model  data      │
│                        B. L  L. Load  aving  backup data  │
│                          S. S┌──────────────────────┐    │
│                              │ C. Memory  card        │    │
│                              │ R. RS-232C             │    │
│                        ┌──────────────────────────────┐   │
│                        │   Load  system  data  via  RS-232C. │
│                        │                                │   │
│                        │  ┌──────────┐  ┌──────────┐   │   │
│                        │  │ X.Execute │  │ C.Cancel  │   │   │
│                        │  └──────────┘  └──────────┘   │   │
│                        └──────────────────────────────┘   │
│                                                           │
└──────────────────────────────────────────────────────────┘
```

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*.

```
┌─────────────────────────────────────────────┐
│                                             │
│     Loaded  system data.                    │
│                                             │
│     Check  the  camera  I / F  unit         │
│                                             │
│   U. Camera I / F Unit   :  [ F300-A20    ] │
│   C. Camera              :  [ F200-S      ] │
│                                             │
│              ┌──────────────┐               │
│              │    O.OK       │              │
│              └──────────────┘               │
│                                             │
└─────────────────────────────────────────────┘
```
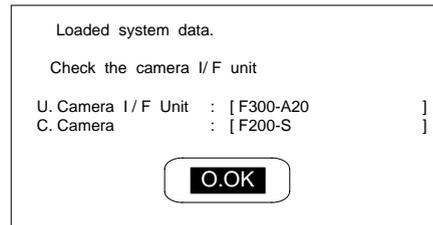
6. Select "O.OK."

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 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.

```
┌──────────────────────────────────────────────────────┐
│ I. Installation  K. Environment  B. Backup  M. Memory card  E. End │
│                    ┌────────────────────────────────┐ │
│                    │ S. Loading / saving  system  data │
│                    │ M.           aving  model  data  │ │
│                    │ B.  ┌──────┐ aving  backup data  │ │
│                    │     │L. Load│                    │ │
│                    │     │S. Save│                    │ │
│                    │     └──────┘ ┌──────────────────┐│ │
│                    │              │ C.  Memory  card  ││ │
│                    │              │ R. RS-232C        ││ │
│   ┌────────────────────────────────────────────────┐ │
│   │══════ Saving  System  Data ══════              │ │
│   │                                                │ │
│   │ Memory card battery OK                         │ │
│   │ Total : 2097152byte      free : 1852416byte    │ │
│   │ C:¥                                            │ │
│   │                                                │ │
│   │ LINE01 .ENV        256 06-26-95  17:22:20      │ │
│   │ [-C-]<Memory Card>                             │ │
│   │ [-D-]<ROM Disk>                                │ │
│   │ [-E-]<RAM Disk>                                │ │
│   │                                                │ │
│   │                                                │ │
│   │ ▶ SFT + ESC : Input File Name                  │ │
│   └────────────────────────────────────────────────┘ │
└──────────────────────────────────────────────────────┘
```

4. Select Drive "[-E-]."

5. Press the Shift and Escape Keys simultaneously. The filename input screen will be displayed.

6. Input a filename.

```
═══ Input File Name ═══
N. Filename :  [ LINE02        ]
              ┌─────────┐
              │ X.Execute │
              └─────────┘
```

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

```
   Save  system  data  to  memory  card.

   ┌─────────┐  ┌─────────┐
   │ X.Execute │  │ C.Cancel │
   └─────────┘  └─────────┘
```

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."

```
┌──────────────────────────────────────────────────────────┐
│ I. Installation  K. Environment  B. Backup  M. Memory card  E. End │
│                    ┌────────────────────────────────┐      │
│                    │ S. Loading / saving  system  data │      │
│                    M.L        aving  model  data     │      │
│                    B. │ L. Load │ aving  backup  data │     │
│                        S. Save                        │     │
│                          ┌──────────────────┐         │     │
│                          │ C. Memory  card   │         │     │
│                          │ R. RS-232C        │         │     │
│                   ┌──────────────────────────────┐    │     │
│                   │  Save  system  data  via  RS-232C. │  │     │
│                   │                                │    │     │
│                   │  ┌─────────┐  ┌─────────┐     │    │     │
│                   │  │ X.Execute │  │ C.Cancel │    │    │     │
│                   │  └─────────┘  └─────────┘     │    │     │
│                   └──────────────────────────────┘    │     │
│                                                        │     │
└──────────────────────────────────────────────────────────┘
```

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.

```
I. Installation   K. Environment   B. Backup   M. Memory card   E. End

                        S. Loading / saving  system  data
                        M.Loading / saving  model  data
                        B.            aving  backup data
                           L. Load
                        S. S
                              C. Search  ( memory  card )
                              M. ROI     ( memory  card )
                              S. Search  ( RS-232C )
                              R. ROI     ( RS-232C )

              Loading  ROI  Model  Data

        Memory  card  battery  OK
        Total : 2097152byte        free : 1709568byte
        C:¥

        LINE01.RMD      107568 06-26-95  17:26:54
        [-C-]<Memory Card>
        [-D-]<ROM Disk>
        [-E-]<RAM Disk>
```

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

```
        Load  ROI  model  data  from  memory  card.

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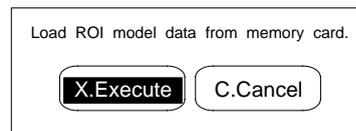
6. Select "X.Execute." The selected file will be loaded.

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 tol 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.
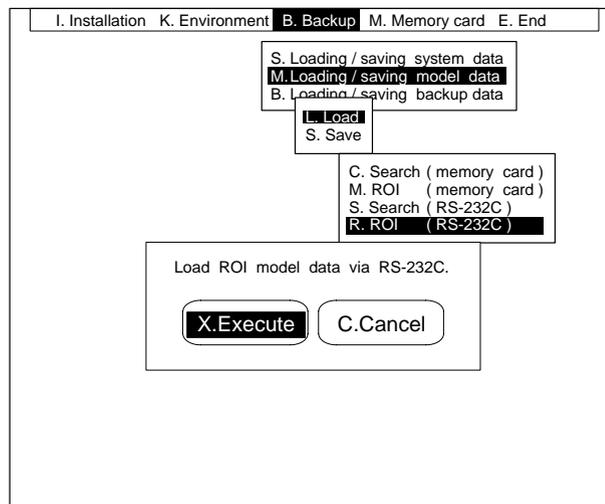
```
I. Installation   K. Environment   B. Backup   M. Memory card   E. End

                    S. Loading / saving  system  data
                    M.Loading / saving  model  data
                    B. Loading / saving  backup data
                        L. Load
                        S. Save
                            C. Search ( memory  card )
                            M. ROI    ( memory  card )
                            S. Search ( RS-232C )
                            R. ROI    ( RS-232C )

    Load  ROI  model  data  via  RS-232C.

        X.Execute       C.Cancel
```

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.

```
 I. Installation   K. Environment   B. Backup   M. Memory card   E. End

                          S. Loading / saving  system  data
                          M.Loading / saving  model  data
                          B. L        aving  backup data
                              L. Load
                              S. Save
                              C. Search ( memory  card )
                              M. ROI     ( memory  card )
                              S. Search ( RS-232C )
                              R. ROI     ( RS-232C )

                    ≡ Saving  Search  Model  Data ≡

             Memory  card  battery  OK
             Total : 2097152byte          free : 1709568byte
             C:¥

             LINE 01.SMD       34492 06-26-95  17:26:18
             [-C-]<Memory Card>
             [-D-]<ROM Disk>
             [-E-]<RAM Disk>


   ▶ SFT + ESC : Input  File  Name
```

4. Select Drive "[-E-]."

5. Press the Shift and Escape Keys simultaneously. The filename input screen will be displayed.

6. Input a filename.

```
           ≡ Input  File  Name ≡
       N. Filename  :  [ LINE02      ]
                    X.Execute
```

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

```
      Save  search  model  data  to  memory  card.
          X.Execute      C.Cancel
```

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.

```
 I. Installation  K. Environment │B. Backup│ M. Memory card  E. End

                        S. Loading / saving  system  data
                       │M.Loading / saving  model  data│
                        B. L          aving  backup data
                            L. Load
                           S. S
                                     C. Search ( memory  card )
                                    │M. ROI      ( memory  card )│
                                     S. Search ( RS-232C )
                                     R. ROI      ( RS-232C )

                    ═══  Saving  ROI  Model  Data  ═══

            Memory  card  battery  OK
            Total : 2097152byte          free : 1709568byte
            C:¥

            │LINE01.RMD   107568    06-26-95  17:26:54│
            [-C-]<Memory Card>
            [-D-]<ROM Disk>
            [-E-]<RAM Disk>


        ▶ │SFT│+│ESC│ : Input  File  Name
```

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

```
        ═══  Input  File  Name  ═══

        N. Filename :  [ LINE02        ]

                  │X.Execute│
```

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

```
        Save  ROI  model  data  to  memory  card.

            │X.Execute│  │ C.Cancel │
```

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.

```
 I. Installation   K. Environment   B. Backup   M. Memory card   E. End

                           S. Loading / saving  system  data
                           M.Loading / saving  model  data
                           B. Loading / saving  backup  data
                             L. Load
                             S. S
                                   C. Search ( memory  card )
                                   M. ROI     ( memory  card )
                                   S. Search ( RS-232C )
                                   R. ROI     ( RS-232C )

              Save  search  model  data  via  RS-232C.


                 ┌──────────┐  ┌──────────┐
                 │ X.Execute │  │ C.Cancel │
                 └──────────┘  └──────────┘
```

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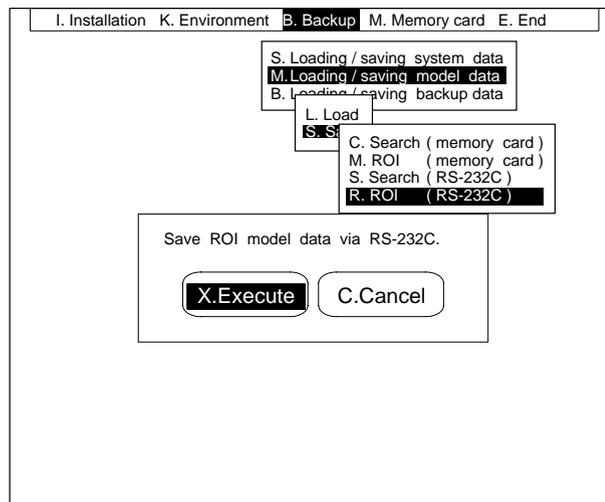
4. Select "X.Execute." The data will be saved. During saving, a message indicating data transmission will be displayed.

   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.

```
┌──────────────────────────────────────────────────────────────┐
│  I. Installation  K. Environment  B. Backup  M. Memory card  E. End │
│                           ┌─────────────────────────────────┐   │
│                           │ S. Loading / saving system data │   │
│                           │ M.Loading / saving model data   │   │
│                           │ B. Loading / saving backup data │   │
│                           └──────┬──────────────────────────┘   │
│                              ┌───────────┐                       │
│                              │ L. Load   │                       │
│                              │ S. Sa ┌──────────────┐            │
│                              └───────│ C. Memory card │          │
│          ═══════════ Loading  Backup  Data ═══════════           │
│                                                                  │
│          Memory card battery OK                                  │
│          Total : 2097152byte        free : 1405952byte           │
│          C:¥                                                     │
│                                                                  │
│          SERCH.BUP   303244   06-26-95  17:35:22                 │
│          [-C-]<Memory Card>                                      │
│          [-D-]<ROM Disk>                                         │
│          [-E-]<RAM Disk>                                         │
│                                                                  │
└──────────────────────────────────────────────────────────────┘
```

4. Select Drive "[-E-]."

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

```
┌────────────────────────────────────────┐
│  Load  backup  data  from  memory card. │
│                                         │
│      ( X.Execute )  ( C.Cancel )        │
│                                         │
└────────────────────────────────────────┘
```

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*.

```
┌────────────────────────────────────────┐
│   Loaded  backup  data.                 │
│                                         │
│   Check  the  camera  I/ F  unit        │
│   and  camera.                          │
│                                         │
│  U. Camera I / F  Unit  :  [ F300-A20      ] │
│  C. Camera              :  [ F200-S        ] │
│             ( O.OK )                    │
│                                         │
└────────────────────────────────────────┘
```

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.

```
 I. Installation   K. Environment   B. Backup   M. Memory card   E. End

                              S. Loading / saving  system  data
                              M. Loading / saving  model  data
                              B. Loading / saving  backup data

                                L. Load
                                S. Save

                                     C. Memory  card
                                     R. RS-232C

           Load  backup  data  via RS-232C.

              X.Execute       C.Cancel
```

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*.

```
    Loaded  backup  data.

    Check  the  camera  I / F  unit
    and  camera.

    U. Camera I / F  Unit   :  [ F300-A20            ]
    C. Camera               :  [ F200-S             ]

                    O.OK
```

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.

```
┌──────────────────────────────────────────────────────────┐
│ I. Installation   K. Environment  B. Backup  M. Memory card  E. End │
│              ┌────────────────────────────────────┐        │
│              │ S. Loading / saving  system data   │        │
│              │ M.Loading / saving  model data     │        │
│              │ B. Loading / saving  backup data   │        │
│              └────────────────────────────────────┘        │
│                    ┌──────────────┐                        │
│                    │ L. Load      │                        │
│                    │ S. Save      │                        │
│                    └──────────────┘                        │
│                         ┌──────────────────┐               │
│                         │ C. Memory  card  │               │
│                         │ R. RS-232C       │               │
│              ┌──────────────────────────────────────┐      │
│              │ ═══ Saving  Backup  Data ═══          │      │
│              │ Memory  card  battery  OK             │      │
│              │ Total : 2097152byte    free : 1405952bype │  │
│              │ C:¥                                   │      │
│              │ SEACH.BUP   303244    06-26-95  17:35:22 │   │
│              │ [-C-]<Memory Card>                    │      │
│              │ [-D-]<ROM Disk>                       │      │
│              │ [-E-]<RAM Disk>                       │      │
│              │                                       │      │
│              │ ▶ SFT + ESC : Input File  Name        │      │
│              └──────────────────────────────────────┘      │
└──────────────────────────────────────────────────────────┘
```

4. Select Drive "[-E-]."

5. Press the Shift and Escape Keys simultaneously. The filename input screen will be displayed.

6. Input a filename.

```
┌────────────────────────────┐
│ ═══ Input  File  Name ═══   │
│ N. Filename :  [ LINE01    ] │
│                             │
│        ( X.Execute )        │
│                             │
└────────────────────────────┘
```

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

```
Save  backup  data  to  memory  card.

   X.Execute     C.Cancel
```

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.

```
I. Installation   K. Environment   B. Backup   M. Memory card   E. End

                        S. Loading / saving  system  data
                        M. Loading / saving  model  data
                        B. Loading / saving  backup data

                             L. Load
                             S. Save
                                  C. Memory  card
                                  R. RS-232C

              Save  backup  data  via  RS-232C.

                 X.Execute     C.Cancel
```

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."

```
┌─────────────────────────────────────────────────────────┐
│  I. Installation   K. Environment   B. Backup  M. Memory card  E. End  │
│                                                           │
│                                   ┌──────────┐            │
│                                   │ F.Format │            │
│                                   │ E.Edit   │            │
│                                   │ X.Execute│            │
│                                   └──────────┘            │
│                                      ┌──────────────┐     │
│                                      │ M. Memory card│    │
│                                      │ R. RAM Disk   │    │
│                                      └──────────────┘     │
│                                                           │
│           ┌─────────────────────────────────┐            │
│           │   Formatting  memory card.       │            │
│           │   Contents  will  be  lost.      │            │
│           │                                  │            │
│           │  ( X.Execute )   [ C.Cancel ]    │            │
│           └─────────────────────────────────┘            │
│                                                           │
└─────────────────────────────────────────────────────────┘
```
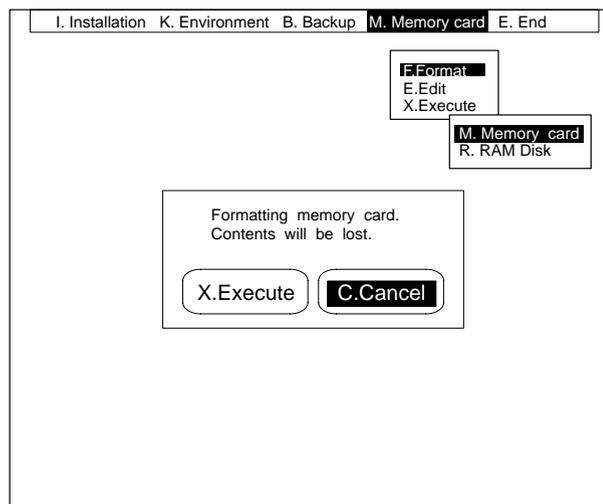
2. Select the Memory Card or RAM Disk that is to be initialized. A message will be displayed asking for confirmation.
3. Select "X.Execute." The Memory Card or RAM Disk will be initialized.

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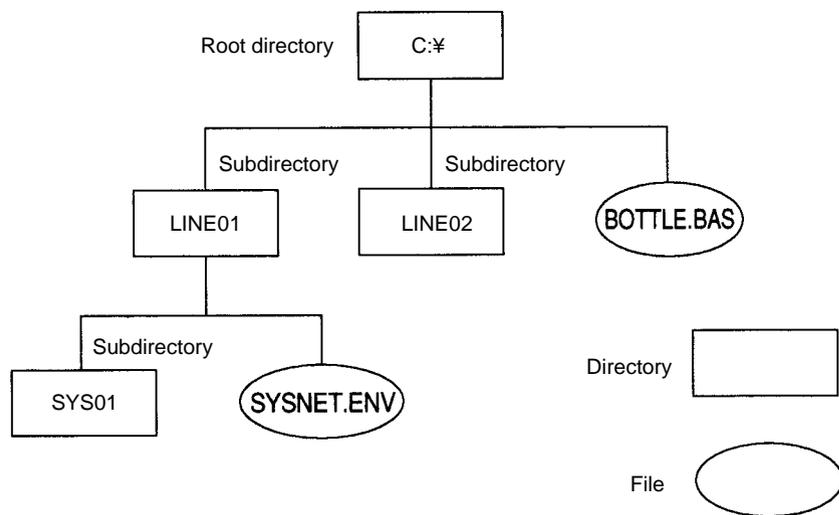
The directory selected as the copy source is called the current directory.

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.

```
┌──────────────────────────────────────────────────────────┐
│ I. Installation  K. Environment  B. Backup │M. Memory card│ E. End │
│                                      ┌─────────────────┐   │
│                                      │ F.Format        │   │
│                                      │ E.Edit          │   │
│                                      │ X.Execute       │   │
│                                         ┌──────────────────┐│
│                                         │ C. Copy          ││
│                                         │ R. Rename        ││
│                                         │ M. Make  directory││
│                                         │ D. Delete        ││
│                                         └──────────────────┘│
│            ┌════════════════ Copy ════════════════┐        │
│            │                                        │        │
│            │ Memory  card  battery  OK              │        │
│            │ Total : 2097152byte    free :1954304byte│       │
│            │ C:¥                                     │        │
│            │                                         │        │
│            │ [LINE01]            06-26-95 20:27:46   │        │
│            │ BOTTLE .BAS  54022  05-29-95 07:36:00   │        │
│            │ LABEL  .BAS  52927  05-29-95 07:40:44   │        │
│            │ CAP    .SMD  23690  03-27-95 01:19:30   │        │
│            │ [-C-]<Memory Card>                      │        │
│            │ [-D-]<ROM Disk>                         │        │
│            │ [-E-]<RAM Disk>                         │        │
│            └─────────────────────────────────────────┘       │
└──────────────────────────────────────────────────────────┘
```
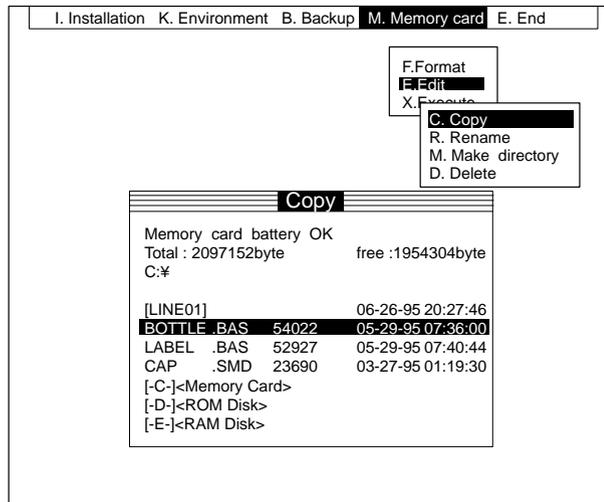
5. Select the drive of the copy destination.

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.

```
┌═══════════ Input  File  Name ═══════════┐
│                                          │
│ D. Drive    : Memory card    RAM Disk    │
│ N. Filename : [¥LINE01¥BOTTLE.BAS      ] │
│                                          │
│              ┌─────────────┐             │
│              │  X.Execute  │             │
│              └─────────────┘             │
└──────────────────────────────────────────┘
```
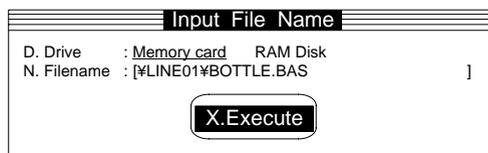
Note   When the filename is specified by the relative path, it is copied to the same drive as the copy source file. The "D.Drive" specification is ignored.

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.

```
 I. Installation  K. Environment  B. Backup  M. Memory card  E. End
                                          ┌──────────────┐
                                          │ F.Format     │
                                          │ E.Edit       │
                                          │ X.Execute    │
                                       ┌──────────────────┐
                                       │ C. Copy          │
                                       │ R. Rename        │
                                       │ M. Make directory│
                                       │ D. Delete        │
                                       └──────────────────┘
          ══════════ Rename ══════════
          Memory card battery OK
          Total : 2097152byte        free :1954304byte
          C:¥

          [LINE01]                06-26-95 20:27:46
          BOTTLE .BAS    54022    05-29-95 07:36:00
          LABEL  .BAS    52927    05-29-95 07:40:44
          CAP    .SMD    23690    03-27-95 01:19:30
          [-C-]<Memory Card>
          [-D-]<ROM Disk>
          [-E-]<RAM Disk>
```
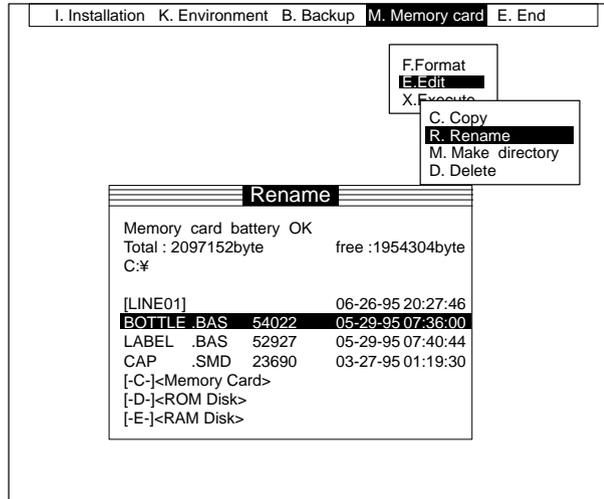
5. Enter the new filename. The original filename will be displayed as the default, so change that filename. Include the extension with the new filename.

```
          ══════ Input  File  Name ══════
          N. Filename  :  [BACKUP.BAS ]

                     ┌──────────┐
                     │ X.Execute│
                     └──────────┘
```
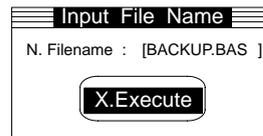
6. Select "X.Execute."

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-.]"

```
 I. Installation  K. Environment  B. Backup  M. Memory card  E. End
                                          ┌──────────────┐
                                          │ F.Format     │
                                          │ E.Edit       │
                                          │ X.Execute    │
                                       ┌──────────────────┐
                                       │ C. Copy          │
                                       │ R. Rename        │
                                       │ M. Make directory│
                                       │ D. Delete        │
                                       └──────────────────┘
          ══════ Make Directory ══════
          Memory card battery OK
          Total : 2097152byte        free :1954304bype
          C:¥

          [LINE01]                06-26-95 20:27:46
          BOTTLE .BAS    54022    05-29-95 07:36:00
          LABEL  .BAS    52927    05-29-95 07:40:44
          CAP    .SMD    25690    03-27-95 01:19:30
          [-C-]<Memory Card>
          [-D-]<ROM Disk>
          [-E-]<RAM Disk>

          ▶ SFT + ESC : Input directory name
```
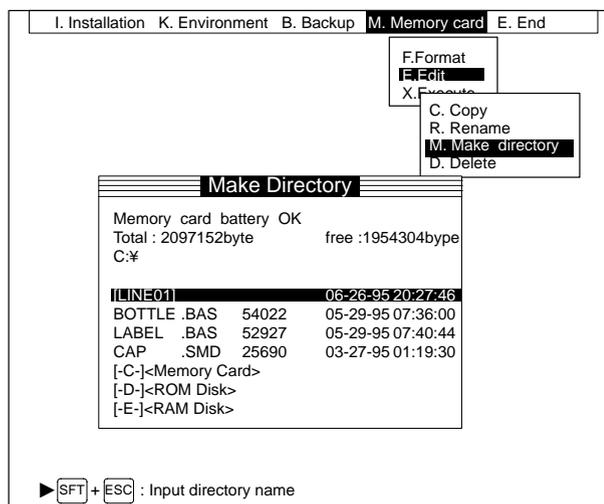
4. Press the Shift and Escape Keys simultaneously. The directory input screen will be displayed.

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5. Enter a directory name.

```
≣ Input Directory Name ≣

D. Directory name :[LINE02    ]

        X.Execute
```

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.

```
 I. Installation   K. Environment   B. Backup   M. Memory card   E. End

                                          F.Format
                                          E.Edit
                                          X.Execute
                                               C. Copy
                                               R. Rename
                                               M. Make  directory
                                               D. Delete
                  ≣ Execute ≣

        Memory  card  battery  OK
        Total : 2097152byte            free :1954304byte
        C:¥

        [LINE01]                       06-26-95 20:27:46
        BOTTLE .BAS     54022          05-29-95 07:36:00
        LABEL   .BAS    52927          05-29-95 07:40:44
        CAP     .SMD    23690          03-27-95 01:19:30
        [-C-]<Memory Card>
        [-D-]<ROM Disk>
        [-E-]<RAM Disk>


    ▶ SFT + ESC : Deletion
```
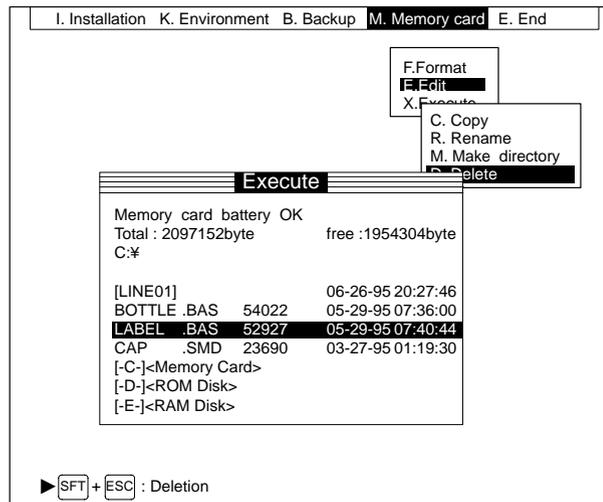
5. Press the Shift and Escape Keys simultaneously. A message will be displayed asking for confirmation.

```
        OK to delete LINE#02.ENV?

        X.Execute    C.Cancel
```
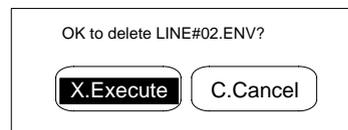
6. Select "X.Execute."

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-]."

```
┌─────────────────────────────────────────────────────┐
│ I. Installation  K. Environment  B. Backup  M. Memory card  E. End │
│                                                       │
│                              ┌──────────────────┐     │
│                              │ F.  Format       │     │
│                              │ E.  Edit         │     │
│                              │ X. Execute       │     │
│                              └──────────────────┘     │
│                                                       │
│                 ┌─────────────────────────────────┐   │
│                 │▬▬▬▬▬▬▬▬▬ Execute ▬▬▬▬▬▬▬▬▬│   │
│                 │ Memory  card  battery  OK       │   │
│                 │ Total : 2097152byte   free : 1954816byte │
│                 │ C:¥                             │   │
│                 │ LINE    .VEX    23690 03-27-95  01:19:30 │
│                 │ [-C-]<Memory Card>              │   │
│                 │ [-D-]<ROM Disk>                 │   │
│                 │ [-E-]<RAM Disk>                 │   │
│                 └─────────────────────────────────┘   │
│                                                       │
└─────────────────────────────────────────────────────┘
```
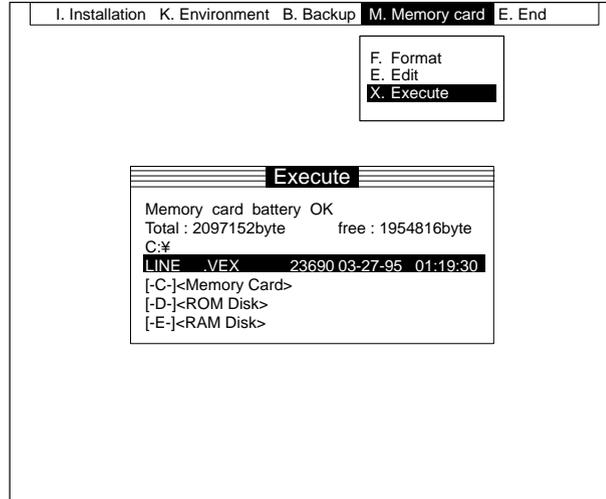
3. Select the Application Program to be started. A message will be displayed asking for confirmation.

```
┌─────────────────────────────────┐
│ LINE#01.VEX will boot;           │
│ OK?                              │
│  ┌───────────┐ ┌───────────┐     │
│  │ X.Execute │ │ C.Cancel  │     │
│  └───────────┘ └───────────┘     │
└─────────────────────────────────┘
```
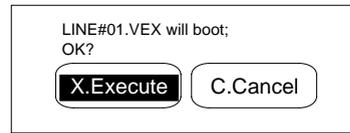
4. Select "X.Execute."

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.

```
┌─────────────────────────────────────────────────────┐
│ I. Installation  K. Environment  B. Backup  M. Memory card  E. End │
│                                                       │
│                                                       │
│                                                       │
│                 ┌─────────────────────────────────┐   │
│                 │                                 │   │
│                 │    End Set-up Menu.             │   │
│                 │                                 │   │
│                 │  ┌───────────┐ ┌───────────┐    │   │
│                 │  │ X.Execute │ │ C.Cancel  │    │   │
│                 │  └───────────┘ └───────────┘    │   │
│                 │                                 │   │
│                 └─────────────────────────────────┘   │
│                                                       │
│                                                       │
└─────────────────────────────────────────────────────┘
```
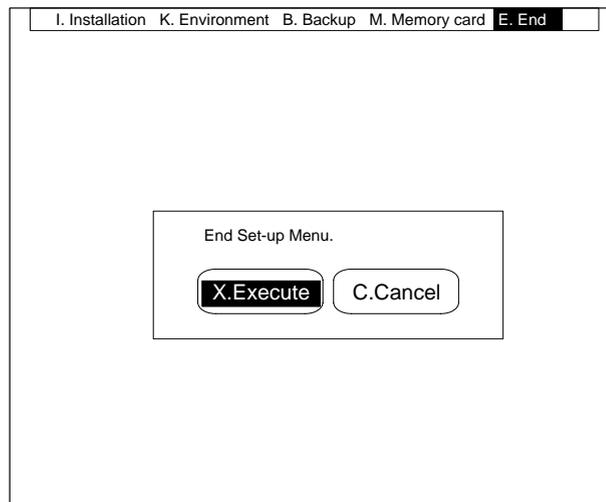
2. Select "X.Execute."

SECTION 6
Maintenance

This section provides information on maintenance and 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.
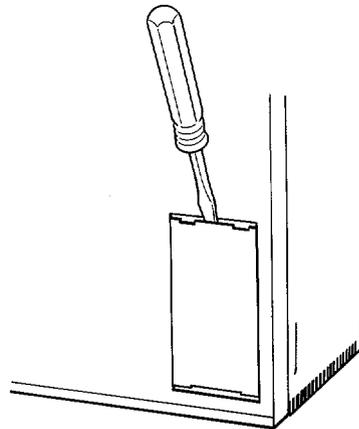
3. Detach the battery connector.

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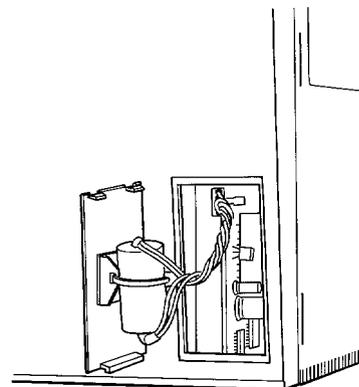
Important Replace the battery within five minutes to prevent loss of the memory contents. If replacement will take more than five minutes, transfer the set data to a Memory Card or to an external device via RS-232C before replacing the battery.

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.

Fuse

Fuse holder cap

Flat-blade screwdriver
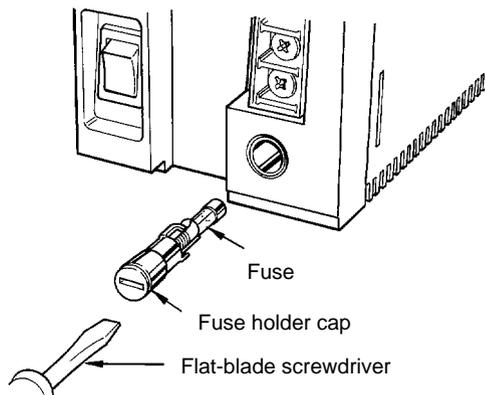
6-1-3 Replacing the Battery for the Memory Card

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.
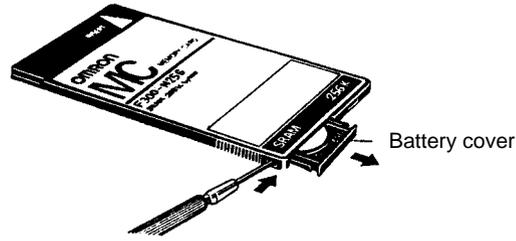
Battery cover

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.
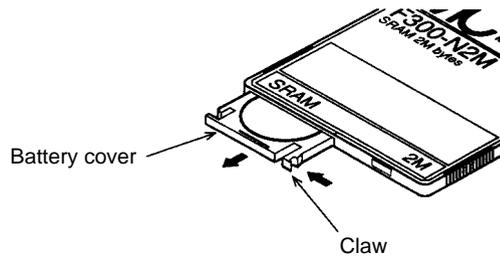
Battery cover

Claw

⚠ **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. Power Supply Unit Variable Range F300-P2 100 to 120 VAC F300-P2E 200 to 240 VAC	Circuit tester
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

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 *2-2-3 Power and Protective Conductor (Earth) Wiring*.
	The fuse is blown. Replace the fuse. Refer to *6-1-2 Replacing the Fuse for the Power Supply Unit*.

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 Connecting the Video Monitor*.
	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 Setting Specifications of the Camera to be 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. If you wish to use a camera other than the recommended ones, contact your nearest OMRON sales representative. Refer to *5-2-6 Setting Specifications of the Camera to be Connected*.
	Camera switches are not correctly set. Set them correctly. Refer to *2-2-4 Connecting Cameras*.
	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 Connecting Cameras*.
	Camera lenses are out of focus. Select the appropriate lens. Refer to *8-3 Lens Specifications*.
	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 Connecting the Console*. 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 Connecting Terminal Block Units* and *2-4-5 Connecting Parallel I/O Units*.
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 Setting the Output Specifications for Parallel Data*
Signals cannot be output externally.	Power is not being supplied. Correct the wiring and provide a power supply. Refer to *2-4-4 Connecting Terminal Block Units* and *2-4-5 Connecting Parallel I/O Units*.
	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 Setting the Output Specifications for Parallel Data*.

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 RS-232C*.
	The communications specifications do not match those of the external device. Correct the specifications. Refer to *5-2-4 Setting the RS-232C Communications Specifications*.
	The cables are not properly connected. Correct the wiring. Refer to *2-4-3 Connecting RS-232C I/F Units*.
Output data is not being output.	The external device is not connected to channel 0. Refer to *4-1-3 RS-232C*.
	The communications specifications do not match those of the external device. Correct the specifications. Refer to *5-2-4 Setting the RS-232C Communications Specifications*.
	The cables are not properly connected. Correct the wiring. Refer to *2-4-3 Connecting RS-232C I/F Units*.

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 *OVL Reference Manual, Section 5 PASSWD*.

Error message	Probable cause and remedy
Backup data load canceled.	The load was canceled because the Memory Card was not inserted correctly. 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.
Backup data load canceled. Communications error.	Refer to "OVL installation canceled."
Backup 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.
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.	Either no directory name or invalid directory name has been entered. Enter a valid directory name.
	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.
	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.
Incorrect setting combination.	This combination cannot be set when setting the communications specifications for the RS-232C. Set one of the combinations shown in the table below.

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

Error message	Probable cause and remedy
	This combination cannot be set when setting the date and time. Enter the day according to the calendar day for the month entered.
Incorrect filename.	The operation cannot be executed because the filename is incorrect. Correct the filename and try the operation again.
Incorrect filename. Input again.	Either no filename or invalid filename has been entered. Enter a valid filename and try the operation again.
	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.
	The filename must be entered in 12 characters max. including the extension. If not adding the extension, enter the filename in 8 characters max.
	The directory name that was entered does not exist. Make a directory and try the operation again.
Installation cannot continue. Insufficient memory.	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.
Memory backup battery voltage is low.	The voltage of the memory backup battery for the IMP Unit is low. Replace the battery as soon as possible. Refer to *6-1-1 Replacing the Memory Backup Battery for the IMP Unit.*
Memory card battery voltage is low.	The Memory Card battery voltage is low. Replace the battery as soon as possible. Refer to *6-1-3 Replacing the Battery for the Memory Card.*
Memory card format canceled.	The formatting operation was canceled because the Memory Card was inserted incorrectly. Insert the Memory Card correctly and try the operation again.
Memory card is write protected.	The operation could not be executed because the Memory Card is write protected. Clear the write protection and try the operation again.
Memory card not formatted.	The Memory Card has not been formatted yet. Use a Memory Card that has been formatted.
Memory card not inserted.	The operation could not be executed because no Memory Card was inserted. Insert the Memory Card correctly and try the operation again.
No application program file.	There is no application program file in the Memory Card. Insert the Memory Card in which the application program file is saved.

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 Changing the OVL Area Size: U.OVL Area Size*.
	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.	The transmission was aborted as the result of a communications error. Check the following points, and then try the transmission again. • 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

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	**5-slot Base Unit (F300-B52)** **3-slot Base Unit (F300-B32)**
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
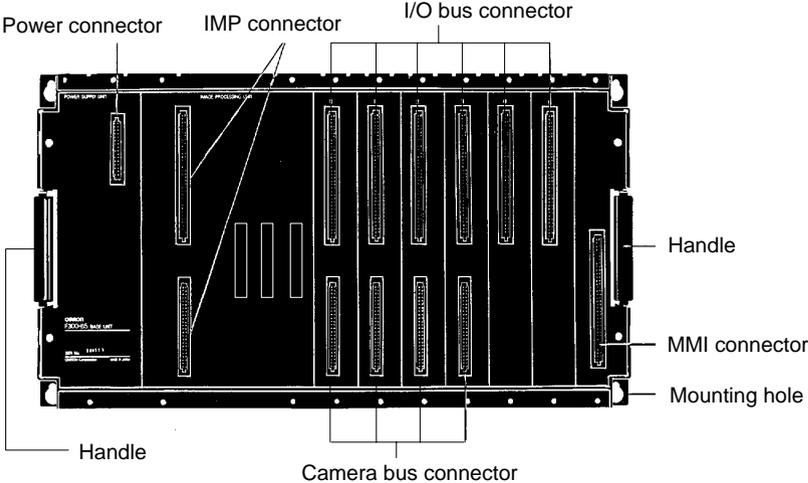
100

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	Operation indicators POWER (green): Lit while power is on RUN (orange): Lit during processing ERROR (red): Lights when an error occurs F300 VISION MATE CONTROLLER OMRON Battery holder cover. Contains battery for memory back-up.	
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
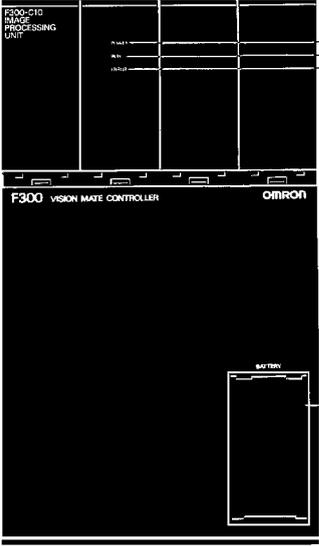
MMI Unit

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	Memory card cover Memory card access indicator Green: Lights when memory card is inserted and cover is closed. Orange: Lights during memory card data transmission. Memory card ejector button Memory card connector Console connector Connector cover Video monitor connector Console compartment Console is kept here when not in use.
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	
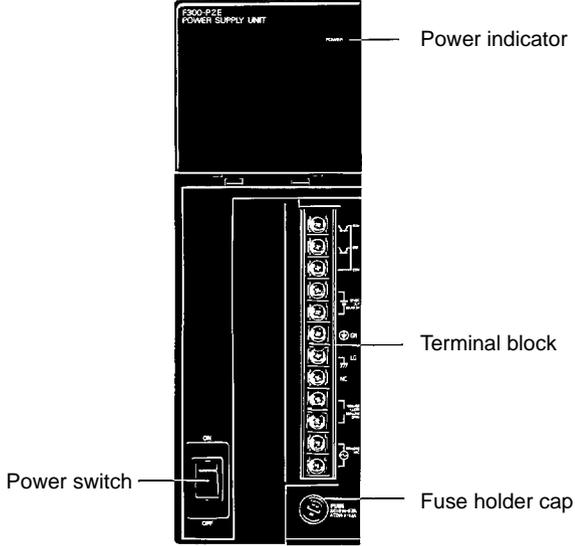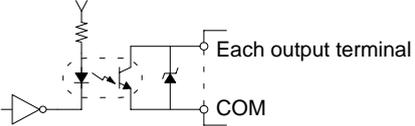
Item	F300-P2 Power Supply Unit	F300-P2E Power Supply Unit
Environmental conditions according to IEC1010-1	Indoor use	
	Maximum altitude of 2,000 m	
	Supply voltage fluctuations of ±10% of the rated voltage	
	Installation category II	
	Pollution degree 2	

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	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 Camera connector #0 Camera connector #1	
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-KΩ 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	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 Camera connector #0 Camera connector #1	
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	
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		
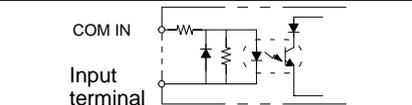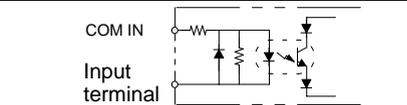
RS-232C I/F Unit and Strobe I/F Unit

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	Operation Indicators Channel 0 (orange) Channel 1 (orange) RS-232C Connectors Channel 0 Channel 1	Strobe operation indicators (orange): Light when strobes 0 to 3 flash Strobe connector 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.
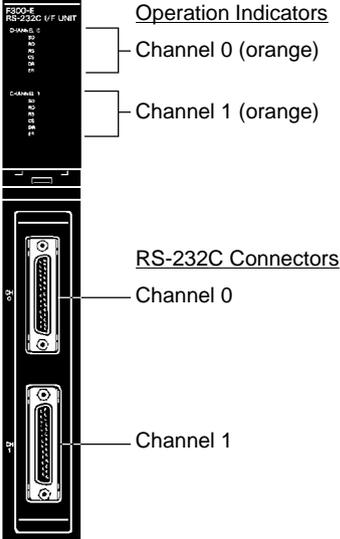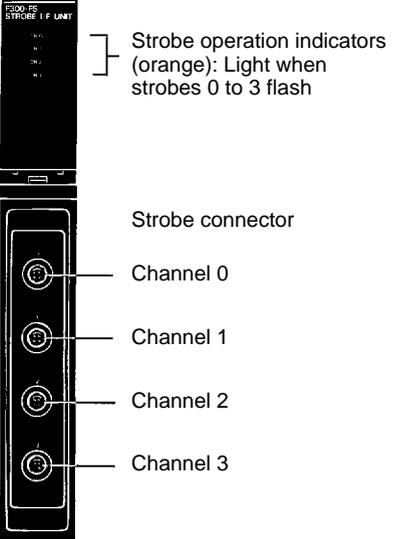
OVL Unit

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	
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	Key Arrangement
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
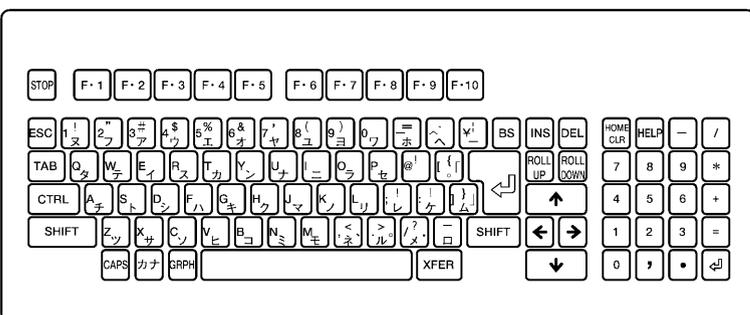
Video Monitor

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		
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 ± 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 kΩ
Object illumination	Standard: 200 lux; F4 (3,200°K) AGC: ON; $\gamma = 1.0$ Minimum: 0.5 lux; F1.4 GAIN: MAX; $\gamma = 0.45$
Resolution	Horizontal: 570 lines; Vertical: 350 lines
S/N ratio	50 dB$_{p\text{-}p}$/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
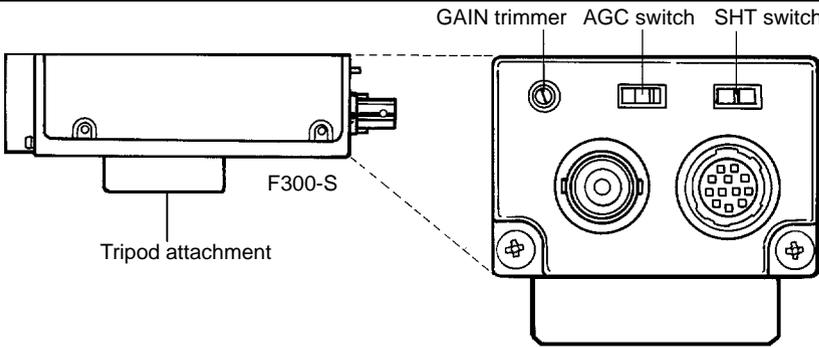
Item	F200-S
Description	Takes images of stationary objects or moving objects using strobes.
Outer appearance and nomenclature	 F200 Tripod attachment
Power supply	10 to 16 VDC
Vibration resistance	Vibration frequency: 10 to 150 Hz; single amplitude: 0.75 mm
Impact resistance	196 m/s^2 (20 G)
Ambient 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
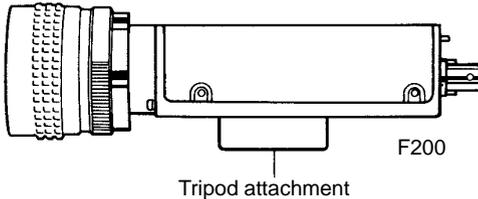
Shutter Cameras

Item	F300-S2R
Description	Used for picking up images of high-speed moving objects.
Outer appearance and nomenclature	 Camera cable connector
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
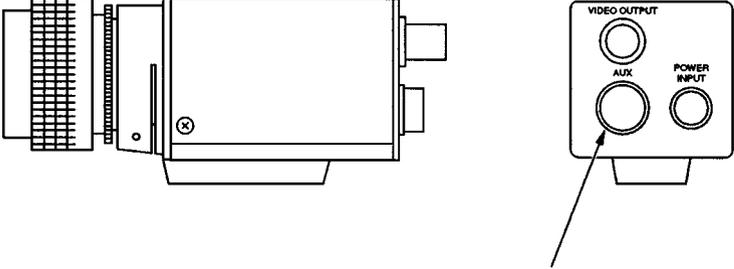
Item	F300-S3DR
Description	Used for picking up images of high-speed moving objects.
Outer appearance and nomenclature	
Power supply	12 VDC±1.2 V
Power consumption	3.2 VA±0.4 VA
Ambient operating temperature	0°C to 50°C
Ambient operating humidity	35% to 85% RH
Ambient environment	No icing
Picture element	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
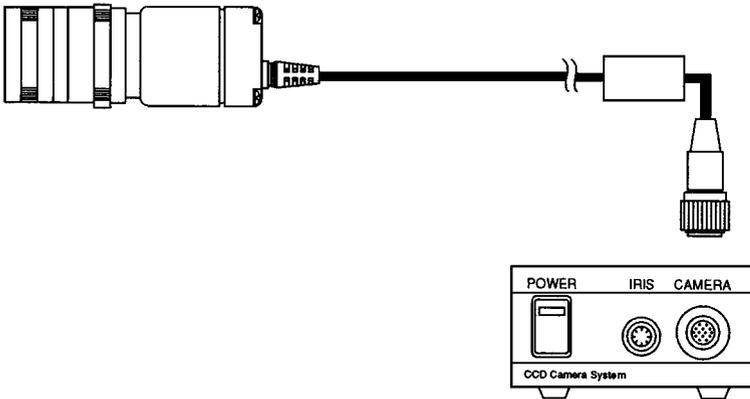
Item	F300-S4R
Description	Used for picking up images of high-speed moving objects.
Outer appearance and nomenclature	 Shutter speed setting switch
Power supply	12 VDC, 0.3 A (10.8 to 13.2 VDC, ripple of 1 Vp-p max.)
Ambient operating temperature	0°C to 50°C
Ambient operating humidity	35% to 85% RH
Ambient 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
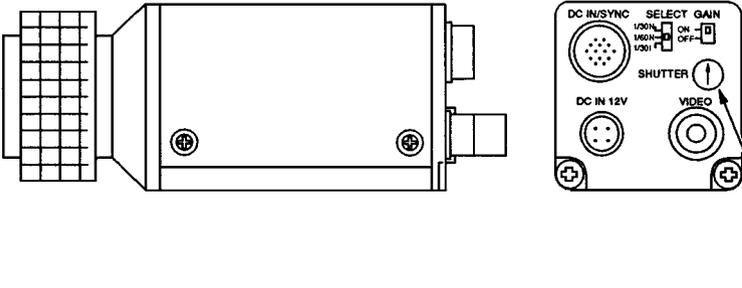
Memory Card

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	Connector / OMRON MC MEMORY CARD F300-N256 SRAM 256K bytes / SRAM 256K / Write-protect switch		
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

410

152.7

37.2

247

247

225+0.2

410

390+0.2

6

6.5

12

Four, M5 holes
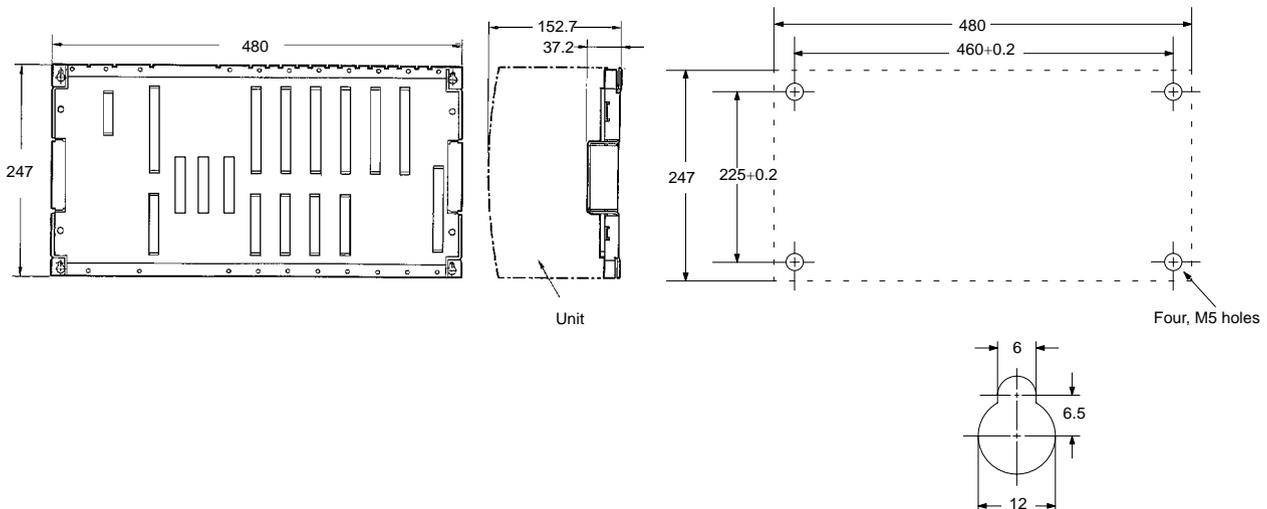
Unit

F350-C12E/C41E IMP Unit

139.6

133.5

14

250
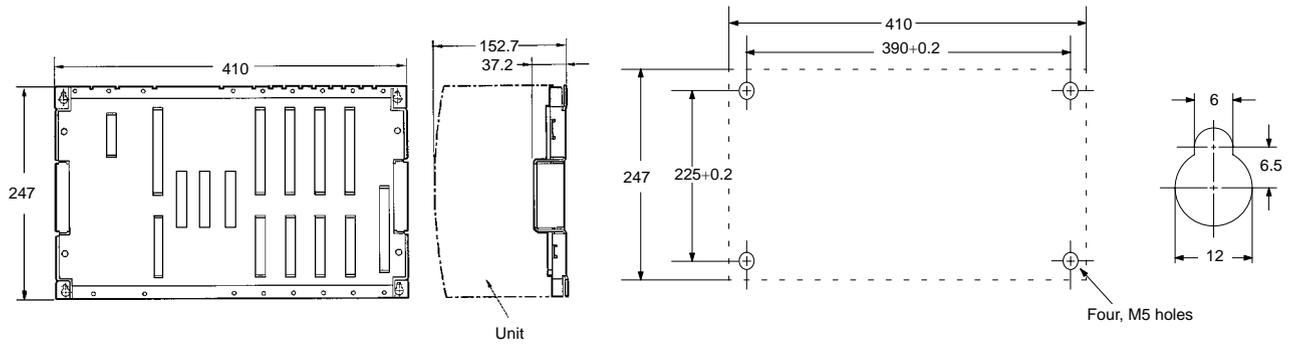
Base Unit

F300-P2/P2E Power Supply Unit

84.6

133.5

14

250
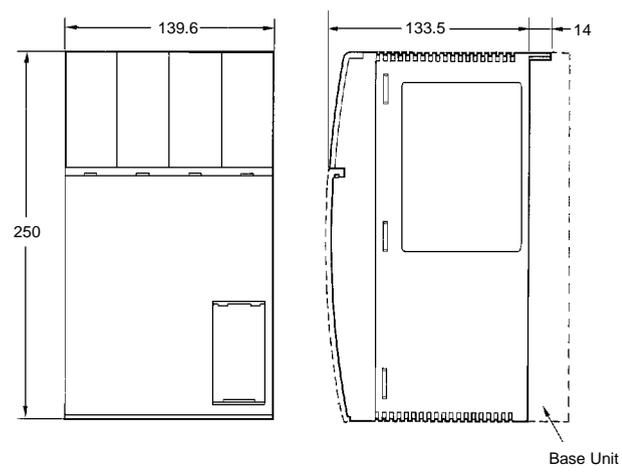
Base Unit

F300-FM2 MMI Unit
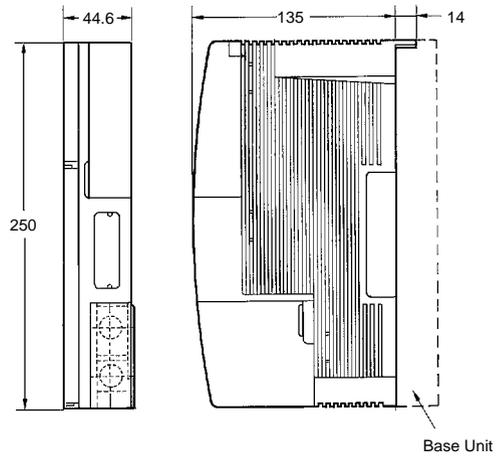
44.6   135   14

250

Base 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

34.6   133.5   14

250

Front cover   Base Unit

F300-DC2 Parallel I/O Unit

69.6   133.5   14

250

Front cover   Base Unit

120

F300-D2 Terminal Block Unit

Base Unit   Front cover

F300-E2 RS-232C I/F Unit

Front cover   Base Unit

F300-FS Strobe I/F Unit

Front cover   Base Unit

F350-L12E OVL Unit

34.6　133.5　14

250

Front cover　Base Unit

F300-G Dummy Unit

34.6　133.5　14

250

Front cover　Base Unit

F300-KP Console

13　1.5

50

ESC　HELP　ENT

SHFT

F300-KP
CONSOLE
omron

87

12.66

10

23　5

(17.5 dia.)

5.3 dia.

14.7 dia.

1,000
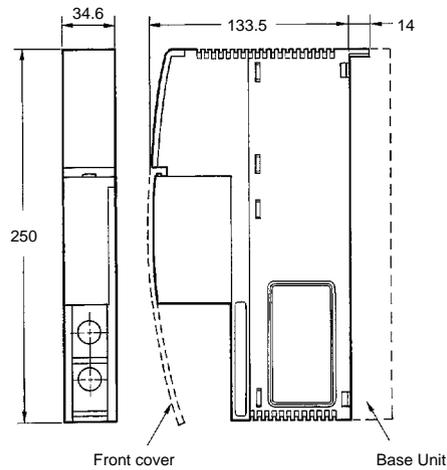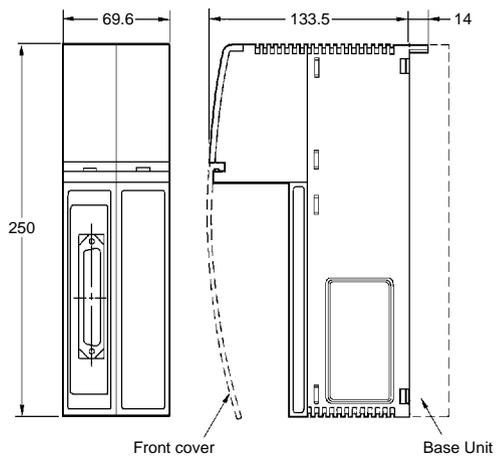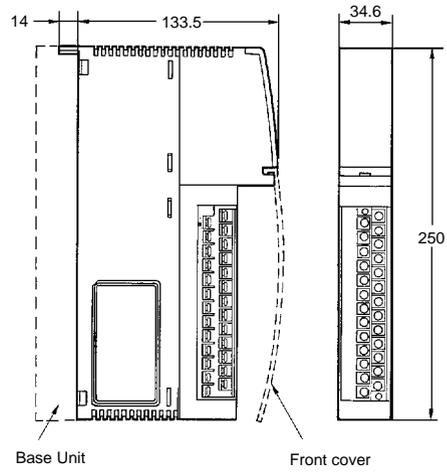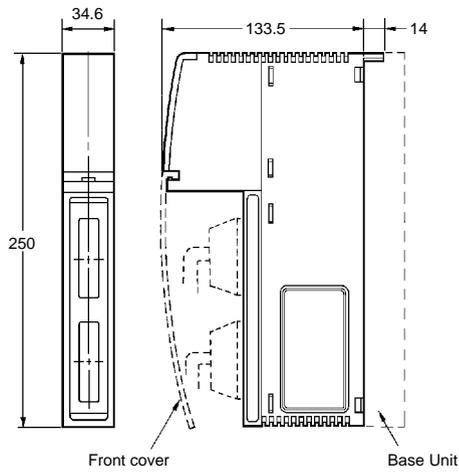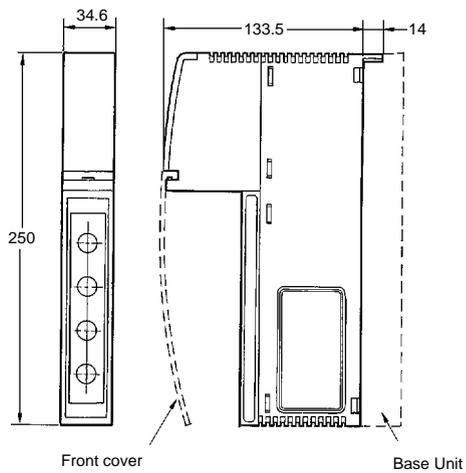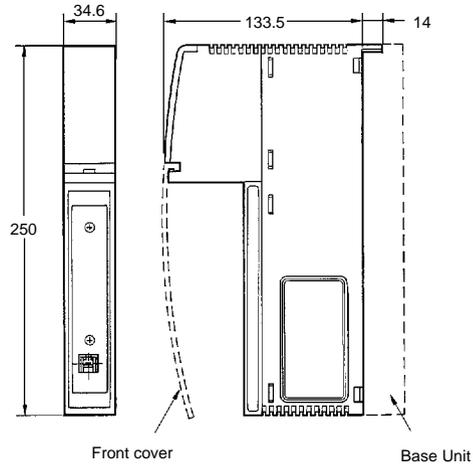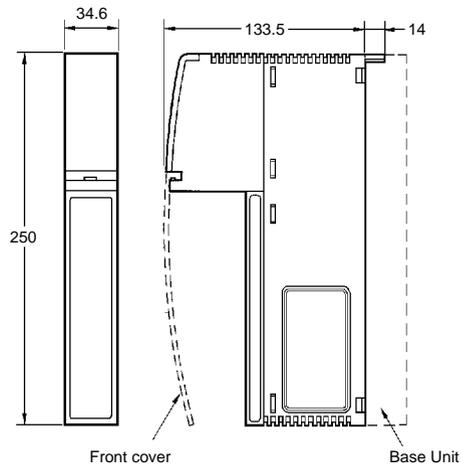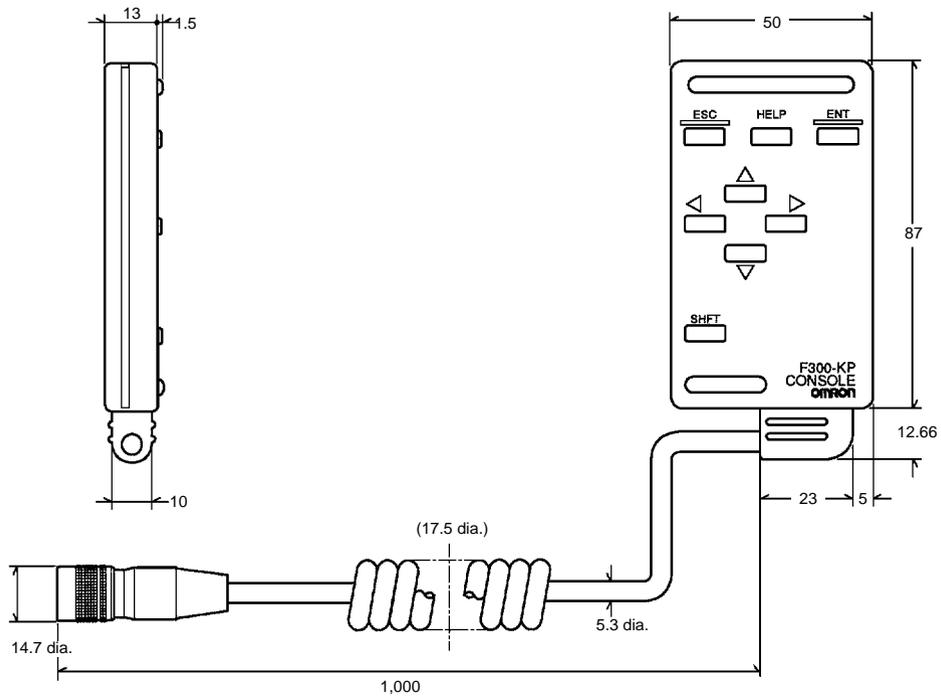
F300-K Keyboard
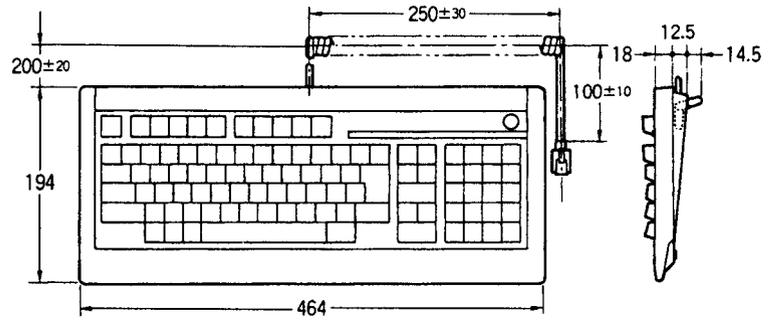
F300-M09 Video Monitor
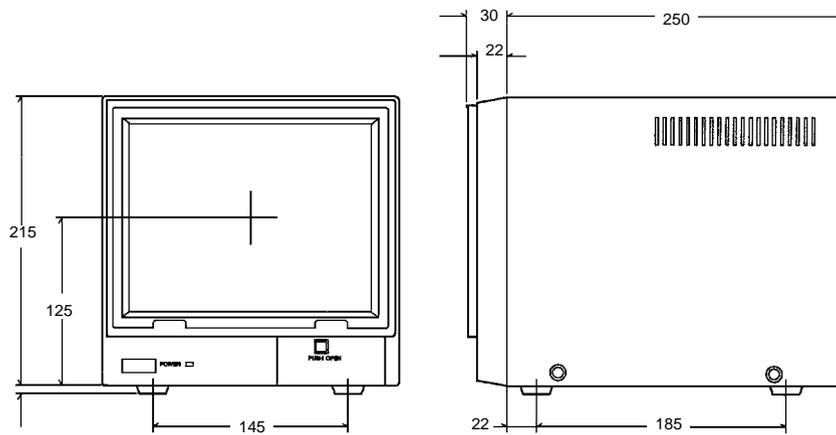
F200-S Normal Camera

F300-S Normal Camera

29

44

10

35

C mount

78

22.75   45

F300-S
CAMERA

Camera mounting plate

CAMERA

TYPE
SER. NO.

10   25

2-M5, depth: 6

1/4"-20UNC, depth: 6

F300-S2R Shutter Camera

45

C mount

44   54

22

Insulation plate
(Do not remove.)

82.5

(16)   66.5

omron
F300-S2R
SHUTTER CAMERA

46.7

12   30

4-M3, depth: 6

12

16   15

2-1/4"-20UNC, depth: 6.3

F300-S3DR Shutter Camera

C mount

32

42.15   32

8.5

Bearing label

2

6.5

7   25

17.9

7.5

Insulation plate
(Do not remove.)

30

omron
F300-S30R
SHUTTER
CAMERA

45

1 2 3 4

12   14

20

2-M3, depth: 7
1/4"-20UNC, depth: 7

Ferrite core

(50)

20

(17 dia.)

Vinyl insulated round shielded cord
5.0±0.2 dia., length: 2,000±200

F300-S4R Shutter Camera

44

44

10   36

C mount

78   12.8

10.5

66

15   36   1/4"-20UNC, depth: 8

26

8   33   4-M3, depth: 8

125

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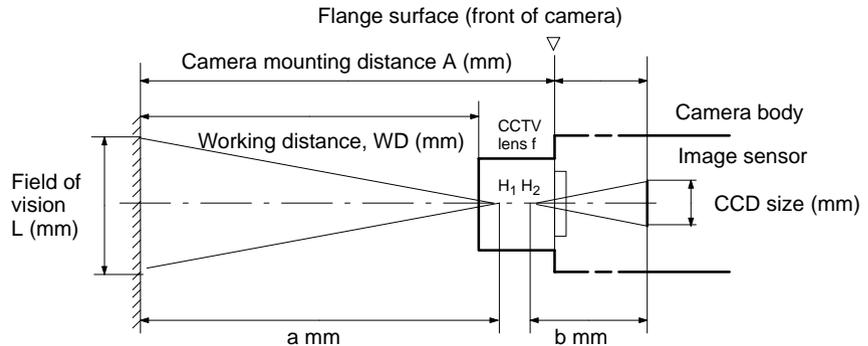
If "f" in the illustration above is made to represent the actual focal distance, then the imaging formula will be as follows:

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

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

H_1 and H_2 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

A (mm)

L (mm)
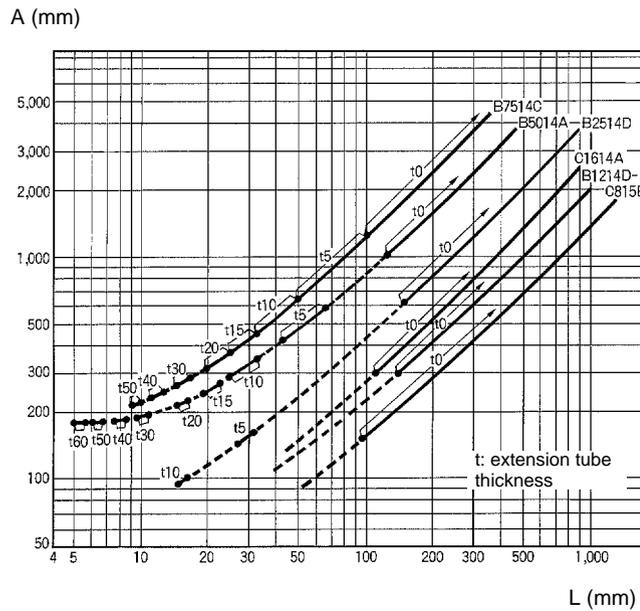
F300-S2R/S3DR/S4R Cameras
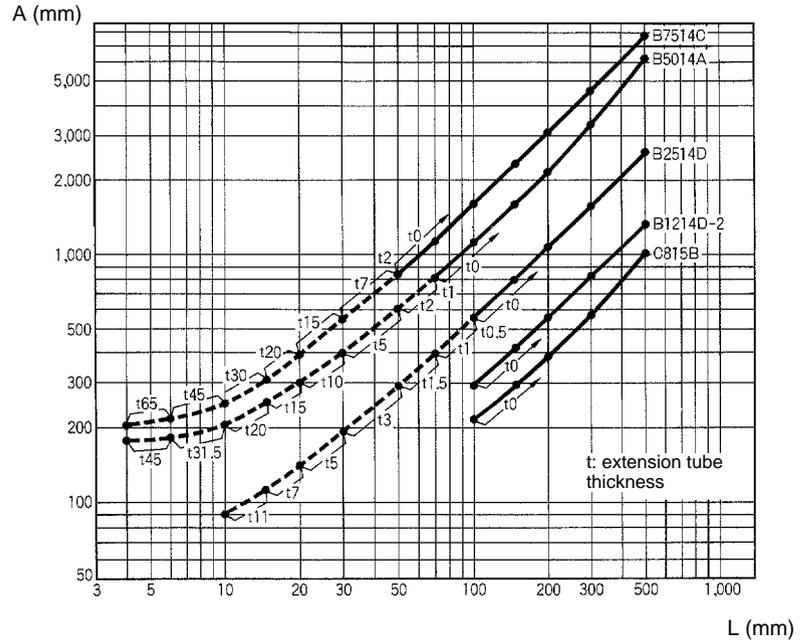
F200-S Cameras
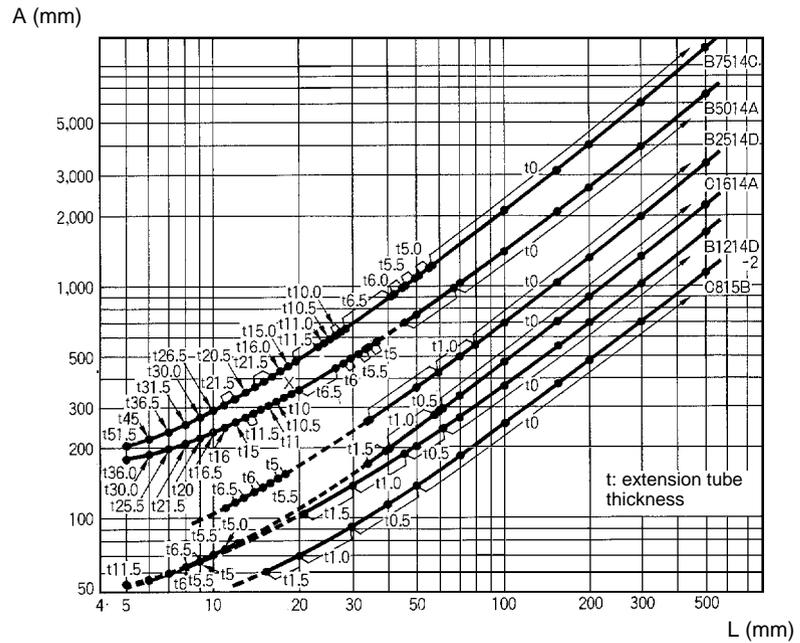
Lens Types and Dimensions

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 I = 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 / Lens		5	7	10	15	20	30	50	70	100	150	200	300	500
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 / Lens		5	7	10	15	20	30	50	70	100	150	200	300	500
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	---	---	---	---	---
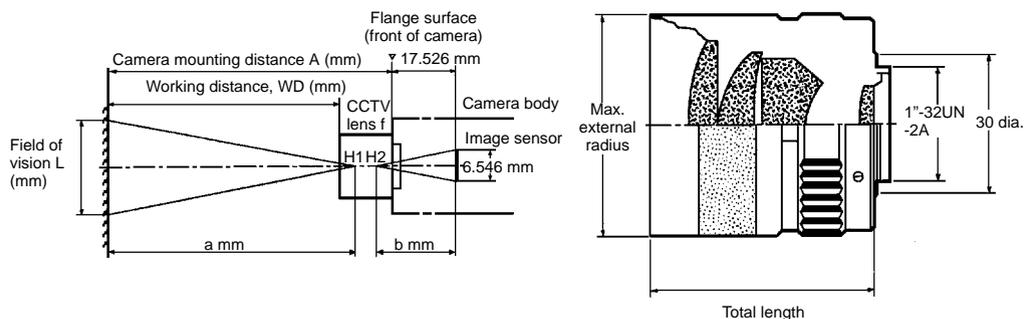
The above figures are approximate standards. Allow for some fine adjustment at the time of installation.

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	
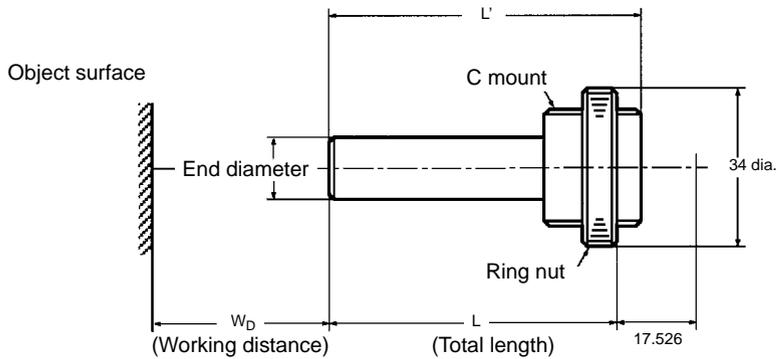
Zoom Lens, Working Distance

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
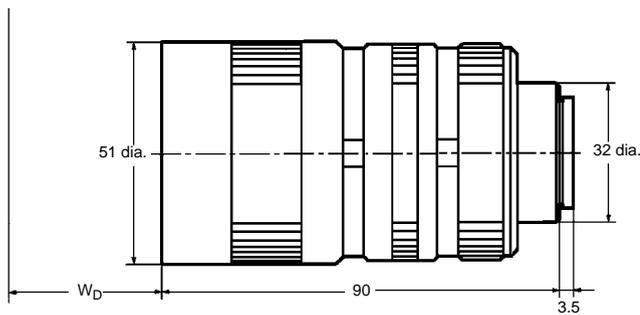
Extension Tubes

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.

LENGTH: 40 mm   20 mm   10 mm   5 mm   1.0 mm 0.5 mm
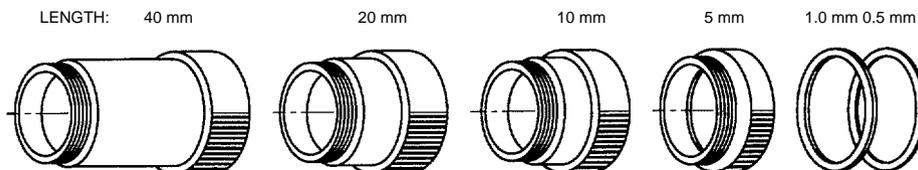
Teleconverter

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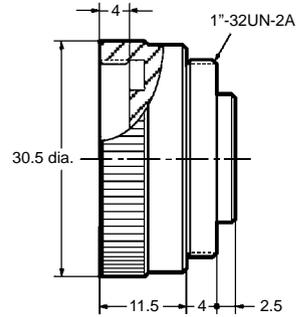
Note The focal distance and brightness change in proportion to the teleconverter magnification. Note that the markings on the lens focus ring and aperture ring are not accurate when the teleconverter is used. These settings must be adjusted to compensate for the teleconverter magnification factor

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☐ **F350-C40☐**	**F350-C12☐** **F350-C41☐**
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 ENDMSG
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
    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

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.

- System data
- OVL programs
- Application Program setting data

(Model data is not included in backup data.)

Camera Synchronization Method

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.

Correlation Image

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.

Extension Tube

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.

Model Data

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.

- Search models (extension: .SMD)
- ROI models (extension: .RMD)

Normal Camera

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.

Optical Chart

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.

OVL (OMRON Vision Language)

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.

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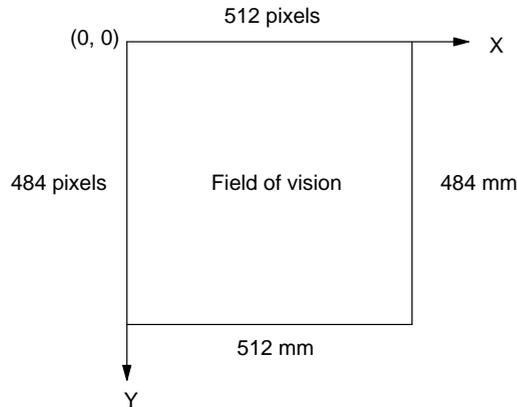
ROI Models
ROI (Region Of Interest) processing refers to processing selected regions of the image instead of the entire image. The conditions such as the processing region and processing details must be set before starting ROI processing. The conditions set for ROI processing are called ROI models.

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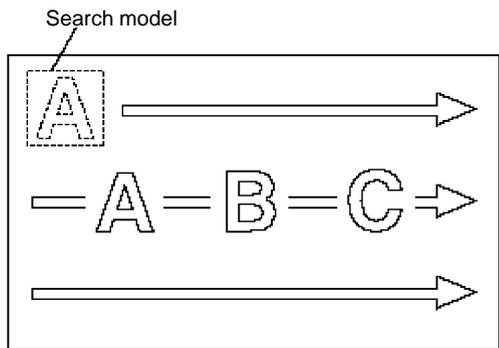
Search Model
Searching refers to finding the same pattern as a registered image in the input image. The reference image used for the search is known as the search model.

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.

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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:
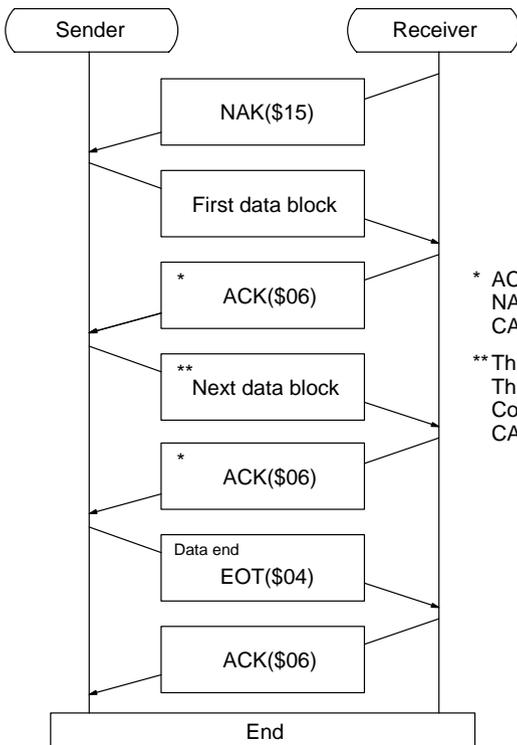
* ACK ($06) sent if the data received by the receiver is normal.
NAK ($15) sent if the data received by the receiver causes a checksum error.
CAN ($18) sent if the data received by the receiver causes a block-number error.

** 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).

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Revision History

A manual revision code appears as a suffix to the catalog number on the front cover of the manual.

Cat. No. Z108-E1-2A

Revision code

The following table outlines the changes made to the manual during each revision. Page numbers refer to the previous version.

Revision code	Date	Revised content
1	August 1995	Original production
2	April 1997	Major revision.
2A	August 1999	**Page 58:** "Time 1" corrected to "Time 4" in the chart and table.
		Page 59: Output specifications settings in the table changed.
		Page 96: Section references added to messages relating to low memory card battery voltage and low memory backup battery voltage.
		Page 100: The weights for the Base Units corrected.
		Page 112: "Cycle" corrected to "Synchronization" for the I/O level and polarity of the Video Monitor ratings.
		Page 125: Dimension drawings for the F300-S3DR and F300-S4R Shutter Cameras corrected.