JANOME SCARA/GANTRY ROBOT
JS/JSR4400N/JSG Series
JANOME DESKTOP ROBOT
JR2000N Series

Operation Manual
Features III
(Run Mode Parameter/Sequencer)

Thank you for purchasing a Janome Robot.

● Read this manual thoroughly in order to ensure proper use of this robot. Be sure to read "For Your Safety" before you use the robot. The information will help you protect yourself and others from possible dangers during operation.

● After having read this manual, keep it in a handy place so that you or the operator can refer to it whenever necessary.

● This manual is written according to IEC 62079.

JANOME

FOR YOUR SAFETY

Safety Precautions

The precautions in this manual are provided for the customer to make the best use of this product safely, and to provide preventive measures against injury to the customer or damage to property.

Please follow these instructions

Various symbols are used in this manual. Please read the following explanations of each symbol.

● **Symbols Indicating the Degree of Potential Damage or Danger**

The following symbols indicate the degree of damage or danger which may be incurred if the safety notes are ignored.

⚠ **Warning**	The Warning symbol indicates the possibility of death or serious injury.
⚠ **Caution**	The Caution symbol indicates the possibility of accidental injury or damage to property.

● **Symbols Indicating the Type of Danger and Preventive Measures**

The following symbols indicate the type of safety measures that should be taken.

	Indicates the safety measures that should be taken.
⚠	Be careful. (General caution)
🚫	Indicates a prohibition.
🚫	Never do this. (General prohibition)
🚫	Do not disassemble, modify or repair.
🚫	Do not touch.
●	Indicates a necessity.
❗	Be sure to follow instructions.
⏚	Be sure to unplug power cord from wall outlet.
⏚	Be sure to check grounding.

FOR YOUR SAFETY

JR2000N Series

⚠ Warning

🚫 **Do not use the unit where flammable or corrosive gas is present.**
Leaked gas accumulated around the unit can cause fire or explosion.

❗ **Use the robot in a condensation-free environment between 0 and 40 degrees centigrade with a humidity level of 20 to 95 percent.**
Failure to do so may result in malfunction.
IP Protection Rating: IP30 (IP40 for CE specification models)

❗ **Use the robot in an electric noise-free environment.**
Failure to do so may result in malfunction or breakdown.

❗ **Use the robot in an indoor environment where it is not exposed to direct sunlight.**
Direct sunlight may cause malfunction or breakdown.

❗ **Install the robot in a place which can endure its weight and conditions while running.**
Placing the unit in an insufficient or unstable surface may cause the unit to fall or overturn, thereby causing damage or injury.
Leave a space of at least 30cm between the back of the robot (the side with a cooling fan) and the wall. Insufficient space can lead to overheating or fire.

❗ **Be sure to use within the voltage range indicated on the unit.**
Failure to do so may cause electric shock or fire.

❗ **If your robot has the I/O-S circuit, be sure to install a safeguard such as an area sensor when installing the robot.**
Without a safeguard, going near the robot while it is operating may cause injury.

❗ **Plug the power cord into the wall outlet firmly.**
Failure to do so can cause the plug to heat up and may result in fire.

FOR YOUR SAFETY

JR2000N Series

⚠ Warning

Wipe the power plug with a clean, dry cloth periodically to eliminate dust.
Dust accumulation can undermine the electrical insulation and cause fire.

Ensure that the robot is properly grounded before use. Do not use without grounding.
Insufficient grounding can cause electric shock and/or fire.

Be sure to use within the voltage range indicated on the unit.
Failure to do so may cause fire or unit malfunction.

Keep water and oil away from the robot and power cable.
Contact with water or oil can cause electric shock, fire, or unit malfunction.
IP Protection Rating: IP30 (IP40 for CE specification models)

If tools have been attached (such as the electric screwdriver), make sure they are properly connected.
Failure to do so may result in injury or breakdown.

During prolonged use, be sure to regularly check that the mounting screws are sufficiently tightened.
Loose screws may cause injury or breakdown.

Be sure to check the wiring to the main unit.
Improper wiring may result in malfunction or breakdown.

Be sure to secure the movable parts of the robot before transportation.
Failure to do so may result in injury or breakdown.

FOR YOUR SAFETY

JR2000N Series

⚠ Warning

Do not bump or jar the unit while it is being transported or installed.
Doing so can cause breakdown.

Be sure to check that no danger is around the operator before starting the robot.
Careful attention will protect the operator from injury.

Do not attempt to disassemble or modify the unit.
Disassembly or modification may cause electric shock or malfunction.

Be sure to unplug the power cord from the wall outlet when examining or lubricating the machine.
Failure to do so may cause electric shock or injury.

If anything unusual (e.g. a burning smell or an abnormal sound) occurs, stop operation and unplug the cable immediately. Contact the dealer from whom you purchased the robot or the office listed on the last page of this manual.
Continuous use without repair can cause electric shock, fire, or unit breakdown.

Do not leave the unit plugged in (power cord and connectors) when it is not in use for long periods of time. Accumulated dust can cause fire.
Be sure to shut off the power supply before removing the power cord.

Be sure to turn off the robot before inserting and removing all cables.
Failure to do so may result in electric shock, fire, data loss or unit malfunction.

Keep the emergency stop switch within reach of an operator while teaching or running the robot.
Failure to do so is dangerous since it may not be possible to stop the robot immediately and safely.

FOR YOUR SAFETY

JR2000N Series

⚠ **Warning**
❗   **Regularly check that the emergency stop switch works properly.**   **For models with I/O-S circuits, also check that they work properly.**   Failure to do so is dangerous since it may not be possible to stop the robot immediately and safely.

⚠ Warning

Do not leave the unit plugged in (power cord and connectors) when it is not in use for long periods of time. Accumulated dust can cause fire.
Be sure to shut off the power supply before removing the power cord.

Keep the emergency stop switch within reach of an operator while teaching or running the robot.
Failure to do so is dangerous since it may not be possible to stop the robot immediately and safely.

Regularly check that the emergency stop switch works properly.
For models with I/O-S circuits, also check that they work properly.
Failure to do so is dangerous since it may not be possible to stop the robot immediately and safely.

During prolonged use, check the mounting screws etc, regularly and ensure that they are firmly tightened.
Loose screws may cause injury or breakdown.

Be sure to use within the voltage range indicated on the unit.
Failure to do so may cause fire or unit malfunction.

Keep water and oil away from the robot and power cable.
Contact with water or oil can cause electric shock, fire, or unit malfunction.
IP Protection Rating: IP20

Wipe the power plug with a clean, dry cloth periodically to eliminate dust.
Dust accumulation can undermine the electrical insulation and cause fire.

FOR YOUR SAFETY

JSR4400N Series

INSTALLATION

⚠ Warning

Always set up a safety barrier.
Anyone entering the operating range of the robot may be injured.
Set up an emergency stop interlock system that is triggered when the entrance to the safety barrier is opened.
Use the I/O-S connector included in the package. Ensure there is no other way of entering the restricted area.
Furthermore, **put up a "No Entry" or "No Operating" warning sign** in a clearly visible place.

(An example setup is pictured here.)

KEEP OUT

Make sure the safety barrier is strong enough to protect the operator from flying debris caused during robot operation.
Always wear protective gear (helmet, protective gloves, protective glasses, and protective footwear) when going inside the safety barrier.

If the object the robot is holding is in danger of flying off or falling, make sure **safety precautions adequate for the object's size, weight, temperature and chemical composition have been taken.**

FOR YOUR SAFETY

JSR4400N Series

INSTALLATION

⚠ Warning

Be sure to check grounding before using the unit.
Improper grounding can cause electric shock, fire, unit malfunction, or breakdown.

Install the robot in a place which can endure its weight and conditions while running.
Placing the unit in an insufficient or unstable surface may cause the unit to fall or overturn, and may cause injury or damage.

There is an air intake vent on the lower back of the robot (18mm above the ground). Do not block this vent, or overheating or fire may result.

Do not use the unit in the presence of flammable or corrosive gas.
Leaked gas accumulated around the unit can cause fire or explosion.

For the health and safety of the operator, place the unit in a well-ventilated area.

Use the robot in a condensation-free environment between 0 and 40 degrees centigrade with a humidity level of 20 to 90 percent.
Failure to do so may result in malfunction.
IP Protection Rating: IP20

Use the robot in an electric noise-free environment.
Failure to do so may result in malfunction or breakdown.

Use the robot in an indoor environment where it is not exposed to direct sunlight.
Direct sunlight may cause malfunction or breakdown.

Be sure to use within the voltage range indicated on the unit.
Failure to do so may cause electric shock or fire.

FOR YOUR SAFETY

JSR4400N Series
INSTALLATION

⚠ Warning

Do not attempt to disassemble or modify the unit.
Disassembly or modification may cause electric shock or malfunction.

Be sure to secure the movable parts of the robot before transportation.
Failure to do so may result in injury or breakdown.

Do not bump or jar the unit while it is being transported or installed.
Doing so can cause breakdown.

Be sure to confirm that all the air tubes are connected correctly and firmly.

If tools have been attached (such as the electric screwdriver), make sure they are properly connected.
Failure to do so may result in injury or breakdown.

Be sure to check the wiring to the main unit.
Improper wiring may result in malfunction or breakdown.

Keep the emergency stop switch within reach of an operator while teaching or running the robot.
Failure to do so is dangerous since it may not be possible to stop the robot immediately and safely.

Turn off the unit before inserting and removing cables.
Failure to do so may result in electric shock, fire, or unit malfunction.

Be sure to turn off the robot before plugging it in.

FOR YOUR SAFETY

JSR4400N Series
INSTALLATION

⚠Warning

Plug the power cord firmly into the wall outlet.
Incomplete insertion into the wall outlet causes the plug to heat up and may result in fire. Be sure to turn off the robot y before connecting the power cable.

Place the operation box on a flat surface more than 80 cm above the floor so that it is easier to operate it.

Use the unit in an environment that is not dusty or damp.
Dust or dampness may lead to breakdown or malfunction.
IP Protection Rating: IP20

FOR YOUR SAFETY

JSR4400N Series

DURING OPERATION

⚠ Warning

When lubricating or inspecting the unit, unplug the power cord from the robot.
Failure to do so may result in electric shock or injury.
Be sure to shut off the power supply before removing the power cord from the robot.

Put up a **"Do Not Operate"** sing on the start switch when people are entering the safety barrier.

Keep the emergency stop switch within reach of an operator while teaching or running the robot.
Failure to do so is dangerous since it may not be possible to stop the robot immediately and safely.

Make sure the safety barrier is strong enough to protect the operator from flying debris caused during robot operation.
Always wear protective gear (helmet, protective gloves, protective glasses, and protective footwear) when going inside the safety barrier.

Make sure all the air tubes are connected correctly and firmly.

Always be aware of the robot's movement, even in the Teaching mode.
Careful attention will protect the operator from injury.

FOR YOUR SAFETY

JSR4400N Series
DURING OPERATION

⚠ Warning

❗	When entering the safety barrier, **do not enter the operating range of the robot.**
❗	If you must go inside the safety barrier, make sure you **push the emergency stop switch** and **put a "Do Not Operate" sign** on the start switch.
❗	When activating the robot, check that **no one is inside the safety barrier and that no object will interfere with the robot's operation.**
❗	**Under no circumstances should you go inside the safety barrier or place your hands or head inside the safety barrier while the robot is operating.**
❗	**If anything unusual (e.g. a burning smell or an abnormal sound) occurs, stop operation and turn off the robot. Contact the dealer from whom you purchased the robot or the office listed on the last page of this manual.** Continuous use without repair can cause electric shock, fire, or breakdown of the unit.
❗	**Keep the emergency stop switch within reach of an operator while teaching or running the robot.** Failure to do so is dangerous since it may not be possible to stop the robot immediately and safely.

FOR YOUR SAFETY

JS Series and JSG Series

⚠ Warning

	When not in use for extended periods of time, unplug the power cord from the power source. Accumulated dust leads to fires. **When unplugging the cord, make sure the power is off.**
	Change the robot battery periodically (approximately every three years) to prevent unit malfunction or breakdown.
	Keep the emergency stop switch within reach of an operator while teaching or running the robot. Failure to do so is dangerous since the robot may not be able to be stopped immediately and safely.
	Regularly check that the I/O-S circuits and emergency stop switch work properly. Failure to do so is dangerous since the robot may not be able to be stopped immediately and safely.

FOR YOUR SAFETY

JS Series and JSG Series

⚠ Warning

!	**During prolonged use, check the mounting screws etc, regularly and ensure that they are firmly tightened.** Loose screws may cause injury or breakdown.
!	**Power the unit only with the rated voltage.** Excessive voltage can cause fire or unit malfunction.
⊘	**Keep water or oil away from the robot, control box and power cable.** Contact with water or oil can cause electric shock, fire, or unit malfunction. IP Protection Rating: IP40

FOR YOUR SAFETY

JS Series and JSG Series
INSTALLATION

⚠ Warning

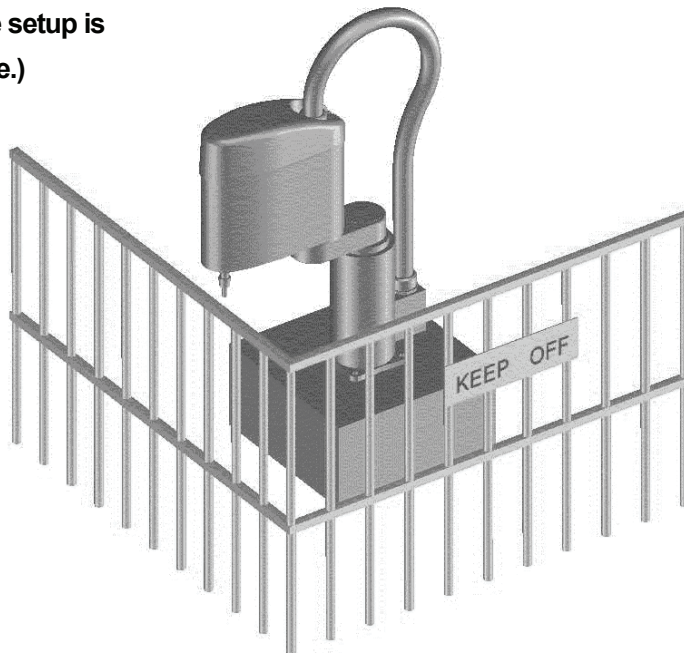**Always set up a safety barrier.**
Anyone entering the operating range of the robot may be injured.
Set up an emergency stop interlock system that is triggered when the entrance to the safety barrier is opened.
Use the I/O-S connector included in the package. Ensure there is no other way of entering the restricted area.
Furthermore, **put up a "No Entry" or "No Operating" warning sign** in a clearly visible place.

(An example setup is pictured here.)

KEEP OFF

Make sure the safety barrier is strong enough to protect the operator from flying debris caused during robot operation.
Always wear protective gear (helmet, protective gloves, protective glasses, and protective footwear) when going inside the safety barrier.

If the object the robot is holding is in danger of flying off or falling, make sure **safety precautions adequate for the object's size, weight, temperature and chemical composition have been taken.**

FOR YOUR SAFETY

JS Series and JSG Series
INSTALLATION

⚠ Warning

Be sure to check grounding before you use the unit.
Improper grounding can cause electric shock, fire, unit malfunction, or breakdown.

Plug the power cord firmly into the wall outlet and check for dust.
Incomplete insertion into the wall outlet causes the plug to heat up and may result in fire.
Be sure to shut off the power supply before connecting the power cable.

Install the robot in a place which can endure its weight and conditions while running.
Placing the unit in an insufficient or unstable surface may cause the unit to fall or overturn, thereby causing damage or injury.
Be sure to leave a space of at least 30cm between the back of the robot (the side with a cooling fan) and the wall. Insufficient space can lead to overheating or fire.

Do not attempt to disassemble or modify the unit.
Disassembly or modification may cause electric shock or malfunction.

Be sure to use within the voltage range indicated on the unit.
Failure to do so may cause electric shock or fire.

Do not use the unit where flammable or corrosive gas is present.
Leaked gas accumulated around the unit can cause fire or explosion.

For the health and safety of the operator, place the unit in a well-ventilated area.

Turn off the unit before inserting and removing cables.
Failure to do so may result in electric shock, fire, or unit malfunction.

JS/JSR4400N SCARA Robot
JSG GANTRY Robot
JR2000N Desktop Robot

FOR YOUR SAFETY

JS Series and JSG Series
INSTALLATION

⚠ Warning

Be sure to confirm that all the air tubes are connected correctly and firmly.

Use the robot in a condensation-free environment between 0 and 40 degrees centigrade with a humidity level of 20 to 90 percent.
Failure to do so may result in malfunction.
IP Protection Rating: IP40

Use the robot in an electric noise-free environment.
Failure to do so may result in malfunction or breakdown.

Be sure to secure the movable parts of the robot before transportation.
Failure to do so may result in injury or breakdown.

Do not bump or jar the unit while it is being transported or installed.
Doing so can cause breakdown.

Use the robot in an indoor environment where it is not exposed to direct sunlight.
Direct sunlight may cause malfunction or breakdown.

If tools have been attached (such as the electric screwdriver unit), make sure they are properly connected.
Failure to do so may result in injury or breakdown.

Check the wiring to the main unit.
Improper wiring may result in malfunction or breakdown.

Keep the emergency stop switch within reach of an operator while teaching or running the robot.
Failure to do so is dangerous since it may not be possible to stop the robot immediately and safely.

JS/JSR4400N SCARA Robot
JSG GANTRY Robot
JR2000N Desktop Robot

FOR YOUR SAFETY

JS Series and JSG Series
INSTALLATION

⚠ Warning

❗ Be sure to turn off both the robot and the power source before plugging in the power cable.

❗ Be sure to remove the eyebolt after installing the robot.
If it is not removed, the Arm may bump into it, thereby causing damage or injury.

❗ Place the control box on a flat surface more than 80 cm above the floor so that it is easier to operate it.

❗ Use the unit in an environment that is not dusty or damp.
Dust or dampness may lead to breakdown or malfunction.
IP Protection Rating: IP40

❗ Use the Clean Room type model in an environment of Clean Class 10* or less.
*: Federal Standard 209D (FED-STD209D)

FOR YOUR SAFETY

JS Series and JSG Series
DURING OPERATION

⚠ Warning

When lubricating or inspecting the unit, unplug the power cord from the robot.
Failure to do so may result in electric shock or injury.
Be sure to shut off the power supply before removing the power cord from the robot.

Put **a "Do Not Operate" sign** on the start switch when people are entering the safety barrier.

Keep the emergency stop switch within reach of an operator while teaching or running the robot.
Failure to do so is dangerous since it may not be possible to stop the robot immediately and safely.

Make sure the safety barrier is strong enough to protect the operator from flying debris caused during robot operation.
Always wear protective gear (helmet, protective gloves, protective glasses, and protective footwear) when going inside the safety barrier.

Make sure all the air tubes are connected correctly and firmly.

Always be aware of the robot's movement, even in the Teaching mode.
Careful attention will protect the operator from injury.

FOR YOUR SAFETY

JS Series and JSG Series
DURING OPERATION

⚠ Warning

❗	When entering the safety barrier, **do not enter the operating range of the robot.**
❗	If you must go inside the safety barrier, make sure you **push the emergency stop switch** and **put a "Do Not Operate" sign** on the start switch.
❗	When starting the robot, check that **no one is within the safety barrier and that no object will interfere with the robot's operation.**
❗	**Under no circumstances should you go inside the safety barrier or place your hands or head inside the safety barrier while the robot is operating.**
❗	**If anything unusual (e.g. a burning smell or an abnormal sound) occurs, stop operation and turn off the robot. Contact the dealer from whom you purchased the robot or the**
❗	**Keep the emergency stop switch within reach of an operator while teaching or running the robot.** Failure to do so is dangerous since it may not be possible to stop the robot immediately and safely.

PREFACE

The Janome Desktop Robot JR2000N Series and pulse motor driven Janome SCARA Robot JSR4400N Series are a new style of low-cost, high-performance robots. We have succeeded in reducing the price while maintaining functionality. Energy- and space-saving qualities have been made possible through the combined use of stepping motors and specialized micro step driving circuits.

The servomotor driven Janome SCARA Robot JS Series and servomotor driven Gantry Robot JSG Series feature diverse applications, high speed, rigidity and precision, and can accommodate a wide variety of requirements.

There are several manuals pertaining to these robots.

Setup	Explains how to set up the robot. ● **Be sure to read this manual before you operate the robot.** ● **This manual is designed for people who receive safety and installation instructions regarding the robot.**
Maintenance	Explains maintenance procedures for the robot. ● **Be sure to read this manual before you operate the robot.** ● **This manual is designed for people who receive safety and installation instructions regarding the robot.**
Basic Instructions	Provides part names, data structures, and the basic knowledge necessary to operate the robot.
Quick Start	Explains the actual operation of the robot with simple running samples.
Teaching Pendant Operation	Explains how to operate the robot via the teaching pendant.
PC Operation	Explains how to operate the robot from a computer (using the JR C-Points software).
Features I	Explains point teaching.
Features II	Explains commands, variables, and functions.
Features III	Explains features such as run mode parameters, sequencer programs, and other functions used during operation.
Features IV	Explains features in the Customizing mode.
External Control I (I/O-SYS)	Explains the I/O-SYS control.
External Control II (COM Communication)	Explains the COM communication control system (COM1 – COM3).
Specifications	Outlines general specifications such as the robot's operating range, weight, etc.

Note: These products are regularly updated, therefore the product specification outlines in this manual may differ from those of the robot in your possession.

These manuals are based on the standard specifications. Menu items may vary depending on the model.

Please be sure to follow the instructions described in these manuals. Proper use of the robot will ensure continued functionality and high performance.

⚫ **Be sure to turn off the robot and check that the power to the robot is shut off before plugging in the power cord.**

⏚ <u>**BE SURE TO PROPERLY GROUND THE MACHINE WHEN INSTALLING**</u>.

⚫ Be sure to save data whenever it is added or modified.
Any unsaved data will be lost when the robot is turned off.

CONTENTS

<div align="center">

FEATURES III

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RUN MODE PARAMETER

The operation mode environment and functions such as the I/O-SYS function settings, and the jobs in the Ext. Run mode and the Switch Run mode (collectively referred to as *Run modes* in this manual) can be set here.

● Performing [Reset Run Mode Parameter] (in [Teaching Data Copy, Delete, Conversion] menu) will reset all the run mode parameter settings to default. The default run mode parameter settings can be set in the Customizing mode.

TP ▶ MENU [Run Mode Parameter]
　　　　　　　[IO Settings]
　　　　　　　[Job and Sequencer on Run Mode]
　　　　　　　[Point Reset Settings]
　　　　　　　[Other Parameter] (Available only for the JR2000N and JSR4400N Series)

**PC** ▶ [Data] → [Run Mode Parameter]

■ I/O Settings

The following four I/O settings are available:

- Program Number Changing Way
- Program Number Reading Code
- IO-SYS Function Assignment
- IO-S Function Settings

■ Program Number Changing Way

If you wish to switch the program numbers using the digit switch connected to the I/O terminal, select [Loading at Start].

Selection	Description
LOAD/ACK Handshake	Load the status of I/O Signal Program Number bit 1 to 128 when the "Program Number LOAD Signal" comes ON, output the "Program Number ACK Signal", and change program numbers.
Loading at Start	Load the status of I/O Signal Program Number bit 1 to 128 when receiving a start instruction, and change program numbers.
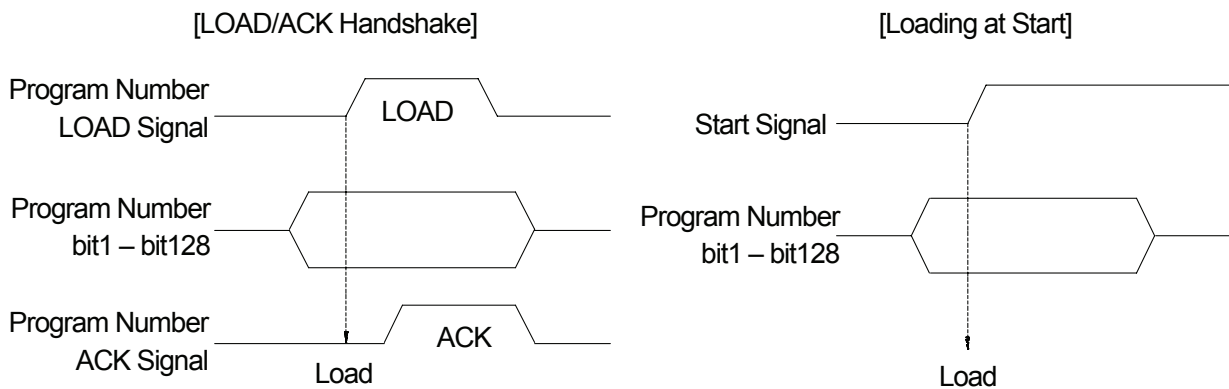
- If you are using JR2000N or JSR4400N Series, the Program Number bit1 – bit64 signals are loaded under the default [Program Number Changing Way] settings.
  If you wish to use the Program Number bit128 signal, you need to change the signal function in the [I/O-SYS Function Assignment] settings.

■ Program Number Reading Code

To load the Program Number bit1 – bit128 signals, you can select between either loading in binary ([Binary Code]) or loading in binary-coded decimal ([BCD]). If you select [BCD], the Program Number bit1 – bit8 are assigned to the lower digits and the Program Number bit16 – bit128 to the upper digits.

- For the JR2000N or JSR4400N Series, if you specify a program number larger than 127 under the [Binary Code] settings or larger than 79 under the [BCD] settings from I/O-SYS, you need to change the [Last Work] (#sysIn11) signal to [Program Number bit7] in [I/O-SYS Function Assignment] settings.

■ IO-SYS Function Assignment

You can change the pre-assigned I/O-SYS signal functions.

For example, the default #sysIn1 signal function has been assigned to [Start]. If you wish to change its function to [Free], you can use this signal for purposes other than [Start]; however, it cannot be used as the [Start] signal any longer.

■ IO-S Function Settings

If [Emergency] is selected, the robot will stop immediately by activating the emergency stop function when the I/O-S signal comes on.

If [Interlock] is selected, the emergency stop function will not be activated even if the I/O-S signal comes on while the robot is stopped. For example, if there is an interlock that turns on the I/O-S signal when the gate of the safety barrier is opened, the emergency stop function will not be activated even if the I/O-S signal comes on, as long as the robot is stopped. However, the robot cannot start while the gate is open.

■ Job and Sequencer on Run Mode

■ Job on Run Mode

You can perform the desired point job data set as the following jobs:

Execution Timing	Menu Item Name
When the robot is turned on in the Run modes	Job on Power ON
When mechanical initialization has been executed after the power is turned on **(Available only for the JR2000N and JSR4400N Series)**	Job after Initialize
When the robot is stopped by the emergency stop function in the Run modes	Job on Emergency Stop
When a playback error occurs	Job on Playback Error
When a system error occurs in the Run modes	Job on System Error
When switching from other modes to the Run modes or when the robot is turned on in the Run modes*	Job on Start of Run Mode
When a program run is started If the cycle mode is set to [Continuous Playback], it is performed only when the [Start] signal comes.	Job on Start of Cycle
When a program run is complete If the cycle mode is set to [Continuous Playback], it is performed only when the [Last Work] signal comes.	Job on End of Cycle
When the robot stops while running a program	Job on Stopping
When the robot restarts after it stopped while running a program	Job on Starting
Executed repeatedly when the robot is stopped before and after running a program	Job while Stopping (Cycle Top)
Executed repeatedly when the robot is stopped during a cycle of operation (running a program)	Job while Stopping (In Cycle)

*: If the robot is turned on in the Run modes, the [Job on Start of Run Mode] is performed after the [Job on Power ON].

⚠ **Warning**	If the *callProg* command or the commands included in the [Move] category are included in point job data, they are ignored (not executed) in the above [Job on Run Mode] jobs.

- If a command which causes the robot to be unable to start is set to [Job on Power ON], it is not possible to switch between operation modes for the JR2000N Series. In this case, turn off the robot, turn on the spare switch (inside the panel cover on the side of the robot), and then turn on the robot again. The Teaching mode will be started.
- The default setting is [0] (no point job) for all items.
- These jobs are activated only in the Run modes.

■ Sequencer Program on Run Mode

[Sequencer Program on Run Mode] is one of the [Run Mode Parameter] settings. Sequencer program numbers to be executed in the Run mode are set here. The set sequencer number will be repeated while the Run mode is activated. The default setting is [0] (sequencer deactivated).

■ Point Reset Settings

[Point Reset] is used to reset the point number counter. If you reset the point number counter, the point number returns to 1 and the program will return to the top of the cycle (the status before starting a program run).

Items	Contents
Reset at Power ON	Set whether or not to execute the point reset when the power is turned on. If [Invalid] is set, the program can be restarted from the point where due to an error, the power was turned off while running.
Reset at Emergency	Set whether or not to execute the point reset when the program is stopped by the emergency stop function. If [Invalid] is set, the program can be restarted from the point where it was stopped by the emergency stop function.
Reset at Going Home	Set whether to execute the point reset when the robot shifts to work home.

# ■ Other Parameters (For the JR2000N and JSR4400N Series Only)

● The JS and JSG Series are not equipped with the following five settings:

■ Initialize

Select from the following three types of mechanical initialization:

1. Work Home on Start

After the first initialization is complete, press the start switch.

Each Axis moves to the work home position of the selected program and the program run will be ready.

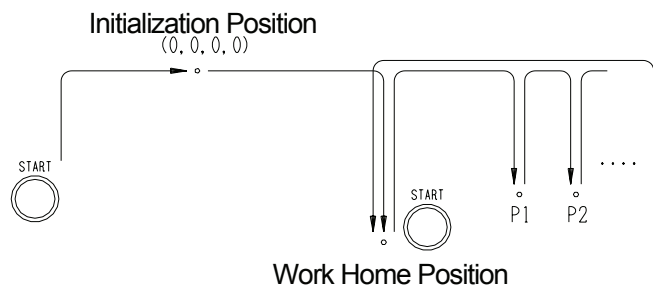Initialization Position
(0, 0, 0, 0)
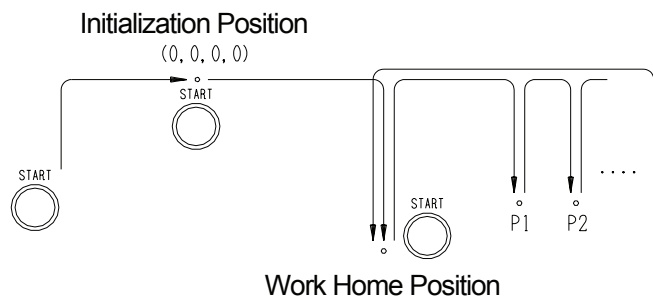
Work Home Position

2. Work Home after First Cycle

After initialization, the operation will start from the initialization position (when the start switch is pressed).

The next operations will start from the work home position of the selected program.

Initialization Position
(0, 0, 0, 0)
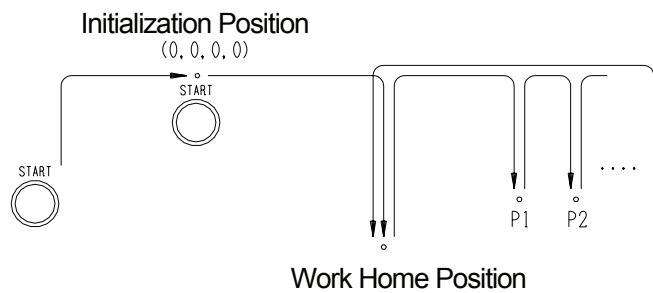
Work Home Position

3. Work Home after Initialize

After initialization, each Axis moves to the work home position of the selected program and the program run will be ready.

Initialization Position
(0, 0, 0, 0)

Work Home Position

■ Initialize at Start (For the JR2000N Series Only)

Select whether the [Initialize at Start] operation is executed ([Valid]) or not executed ([Invalid]) when a program starts.

■ **Position Error Check (For the JR2000N Series Only)**

Select whether the [Position Error Check] operation is executed ([Valid]) or not executed ([Invalid]) when a program run ends.

■ **Order of Initialization (For the JR2000N Series Only)**

Under the default initialization settings, the X- and Y-Axes move simultaneously for initialization.

For example, if the tool unit and the workpiece interfere with each other, it is possible to delay the movement of each Axis.

<u>**Initialization Order for Each Axis**</u>

- [Simultaneously]: Z → R→ XY
- [X before Y]: Z → R→ X → Y
- [Y before X]: Z → R→ Y → X

■ **Stop by Start Switch**

Select the robot's movement from the following options when the start switch is pressed while running a program:

- [Valid]: The program run will temporarily stop. If the start switch is pressed again, the program will restart.
- [Invalid]: The program run will not stop.

For example, the running program includes the point job data that refers to the start switch status (indicated by the system flag 60 (#FstartSW)) and restarts the program when the start switch is pressed. In this case, if [Stop by Start Switch] is set to [Valid], you need to press the start switch twice to restart the program run because the above-mentioned function will be activated when the start switch is pressed.

SEQUENCER

The sequencer program data is a set of logical operation commands for controlling I/O signals, etc. It is always activated in the Run modes.

You can create sequencer program data Nos. 01 – 50 in the Teaching mode. Sequencer program data Nos. 51 – 100 can be created in the Customizing mode. (The default setting is [0] (sequencer deactivated)).

How to Register the Sequencer Program Data

TP **Method 1**

MENU [Sequencer Settings]

Enter a sequencer number.

Method 2

MENU [Run Mode Parameter]

[Job and Sequencer on Run Mode]

[Sequencer Program on Run Mode]

Press the F4 key while the sequencer number you wish to register is displayed.

● The method for entering and editing commands is exactly the same as that for the point job data.

PC [Data] → [Sequencer]

You can enter up to 1000 steps (lines) per item of sequencer program data.

However, the more steps you enter, the longer the scan time (interval of execution) will be, as follows:

10msec (1 – 200 steps)
20msec (201 – 400 steps)
30msec (401 – 600 steps)
40msec (601 – 800 steps)
50msec (801 – 1000 steps)

The commands below can be used for sequencer program data.

Category	Command	Necessary Parameter	Description
Calculate	ld	Boolean variable	Input ON.
	ldi	Boolean variable	Input OFF.
	and	Boolean variable	Input serial ON.
	ani	Boolean variable	Input serial OFF.
	or	Boolean variable	Input parallel ON.
	ori	Boolean variable	Input parallel OFF.
Coil	out	Output Destination	Coil drive
	set	Output Destination	Set the coil drive hold command.
	reset	Output Destination	Reset the coil drive hold command.
	pls	Output Destination	Output the rising edge of pulse.
	plf	Output Destination	Output the falling edge of pulse.
Connection	anb	–	Parallel connection of serial circuit block
	orb	–	Serial connection of parallel circuit block
	mps	–	Store data in process of calculation.
	mrd	–	Read out data in process of calculation.
	mpp	–	Read out and reset data in process of calculation.
Others	nop	–	No operation

Expressions cannot be used in sequencer program data.

The variables below can be used as parameters. (Some variables may not be available for certain commands.)

Available Parameters
#mv (1 – 99)
#mkv (1 – 99)
#sysIn1 – #sysIn15 (#sysIn1 – #sysIn16 for JR2000N and JSR4400N Series)
#genIn1 – #genIn18 (#genIn1 – #genIn8 for JR2000N and JSR4400N Series)
#handIn1 – #handIn4 (Invalid for JR2000N and JSR4400N Series)
#sysOut1 – #sysOut14 (#sysOut1 – #sysOut16 for JR2000N and JSR4400N Series)
#genOut1 – #genOut22 (#genOut1 – #genOut8 for JR2000N and JSR4400N Series)
#handOut1 – #handOut4 (Invalid for JR2000N and JSR4400N Series)
#sysFlag (1 – 999)
#palletFlag (1 – 100)
#seqT (1 – 99)
#seqC (1 – 99)

How to Set the Sequencer Program Data

Before performing the registered sequencer program data, set the registered sequencer number to [Sequencer Program on Run Mode] according to the procedures below:

TP ▶ MENU   [Run Mode Parameter]
                        [Job and Sequencer on Run Mode]
                              [Sequencer Program on Run Mode]
                                    Enter a sequencer number.

PC ▶ [Data] → [Run Mode Parameter]

- Entering [0] (default) will deactivate (not perform) the sequencer program data.
- The set sequencer program data will be activated soon after switching to the Run modes.

Integral or Non-Integral Timer in the Sequencer Program Data

#seqT (1 – 50): 10ms-based integral timer: If it is OFF, the timer value is held.

#seqT (51 – 99): 10ms-based non-integral timer: If it is OFF, the timer is reset.
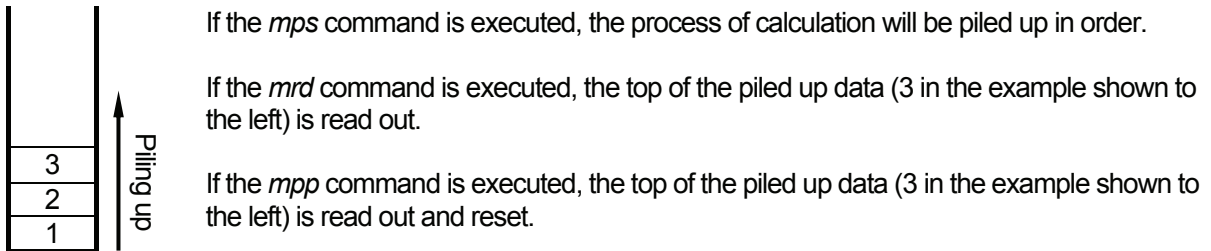
e.g.

```
ld #genIn1
out #seqT(1),1000
ld #seqT(1)
out #genOut1
ldi #genIn1
reset #seqT(1)
```

- You cannot refer to the timer values in the sequencer program data. They can be referred to in point job data as variables #seqTCount (1 – 99).
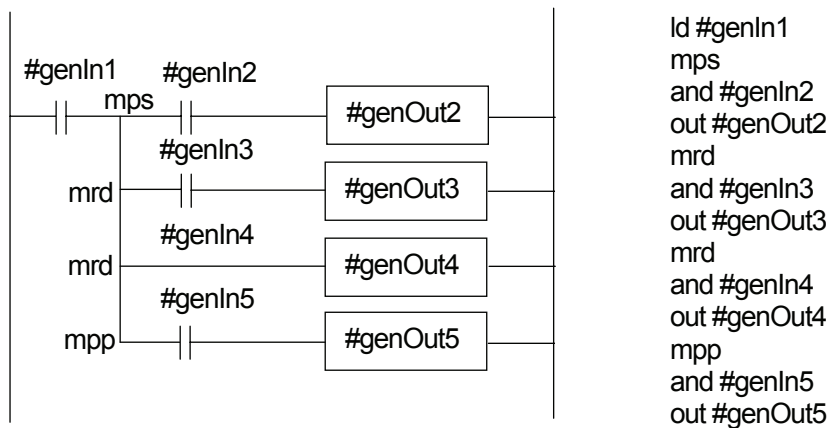
How to Refer to the Process of Calculation Result

Sequencer programs can store and refer to data that is in the process of being calculated.

Category	Command	Name	Parameter Required	Contents of Command
Connection	mps	Memory Push	–	Store the process of calculation.
	mrd	Memory Read	–	Read out the process of calculation.
	mpp	Memory Pop	–	Read out and reset the process of calculation.

If the *mps* command is executed, the process of calculation will be piled up in order.

If the *mrd* command is executed, the top of the piled up data (3 in the example shown to the left) is read out.

If the *mpp* command is executed, the top of the piled up data (3 in the example shown to the left) is read out and reset.

The process of calculation can be piled up and stored up to 11.

e.g.


```
ld #genIn1
mps
and #genIn2
out #genOut2
mrd
and #genIn3
out #genOut3
mrd
and #genIn4
out #genOut4
mpp
and #genIn5
out #genOut5
```
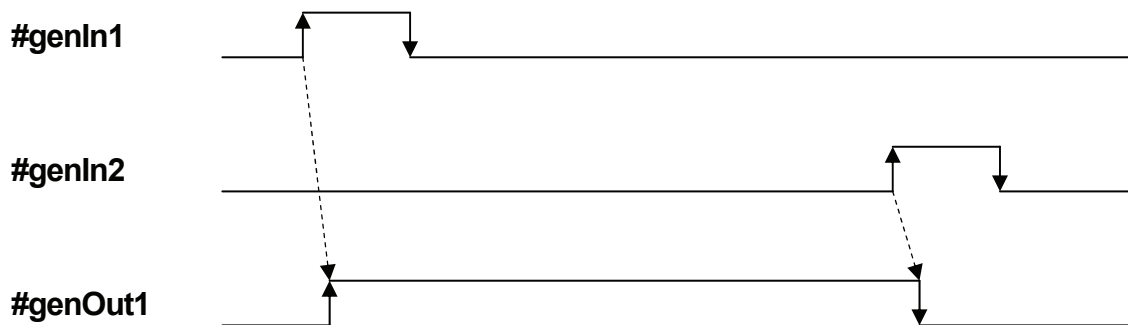
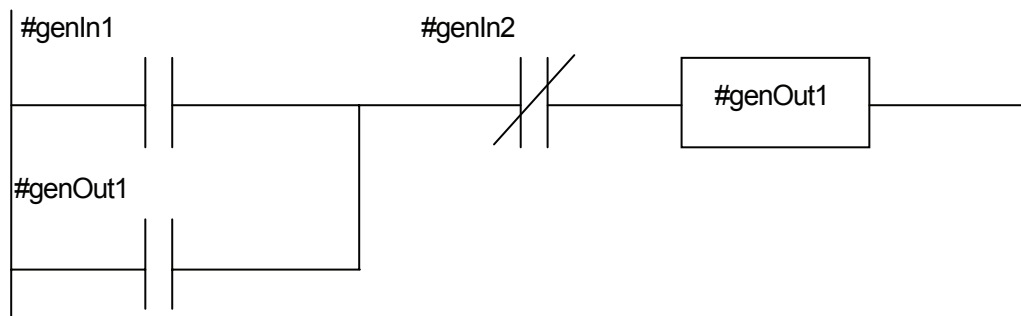## Sequencer Program Data Example 1: Self-Hold Circuit

You can make a self-hold circuit sequence with the external I/O-1 functions.

In this example, when the input signal #genIn1 comes on, the output signal #genOut1 will turn on and stay on. When the input signal #genIn2 comes on, the output signal #genOut1 will turn off.

Timing Chart

Relay Ladder

Commands

```
ld #genIn1
or #genOut1
ani #genIn2
out #genOut1
```
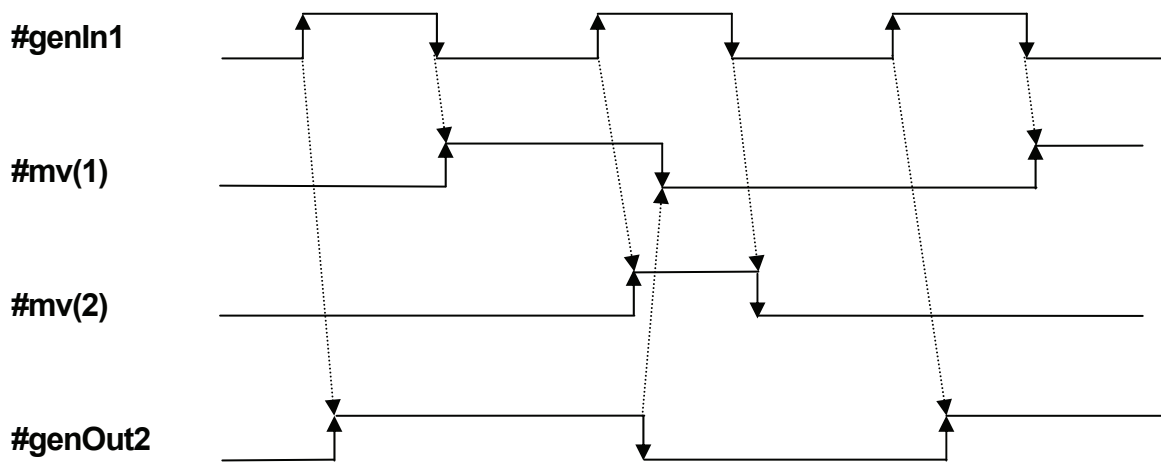
Sequencer Program Data Example 2: Alternating Pulse Output Circuit

You can switch an output signal on and off each time an input signal comes on using the external I/O-1 functions.
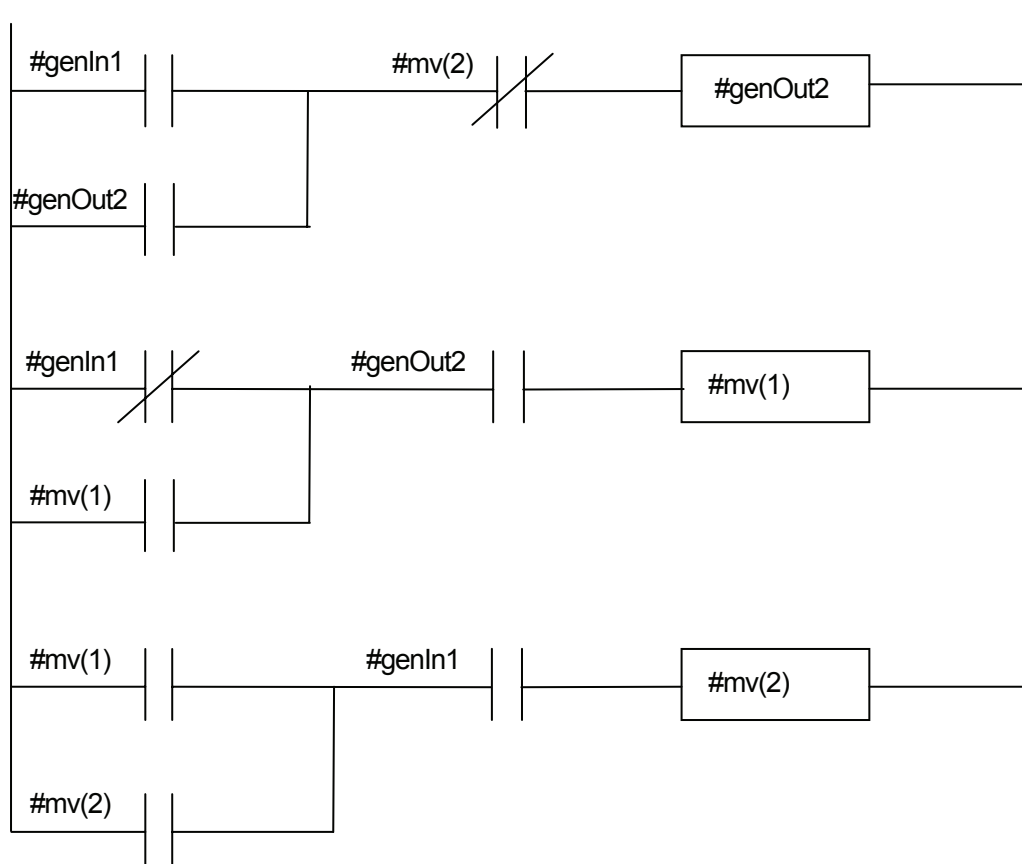
In this example, the input signal #genIn1 and the output signal #genOut2 are used.
Each time the #genIn1 comes on, the #genOut2 will turn on (odd-numbered times) and off (even-numbered times).

Timing Chart

Relay Ladder

```
    #genIn1                  #mv(2)              ┌─────────┐
  ───┤├───┬─────────────────────┤/├─────────────┤ #genOut2├──────┐
         │                                       └─────────┘      │
    #genOut2                                                      │
  ───┤├───┘                                                       │
                                                                  │
    #genIn1        #genOut2                      ┌─────────┐       │
  ───┤/├───┬────────┤├───────────────────────────┤ #mv(1)  ├──────┤
         │                                       └─────────┘      │
    #mv(1)                                                        │
  ───┤├───┘                                                       │
                                                                  │
    #mv(1)         #genIn1                       ┌─────────┐       │
  ───┤├───┬────────┤├───────────────────────────┤ #mv(2)  ├──────┤
         │                                       └─────────┘      │
    #mv(2)                                                        │
  ───┤├───┘                                                       │
```

Commands

```
ld #genIn1
or #genOut1
ani #mv(2)
out #genOut1
ldi #genIn1
or #mv(1)
and #genOut1
out #mv(1)
ld #mv(1)
or #mv(2)
and #genIn1
out #mv(2)
```

Sequencer Program Data Example 3: Counting the Parts on the Conveyor Belt

You can count the parts being carried on the conveyor belt using external I/O-1 functions. When the specified numbers of parts are counted, the conveyer stops.

In this example, the input signal #genIn2 is used to count the parts and the input signal #genIn3 is used to reset the counter signal #seqC.

The input signal #genIn1 is used to turn on the conveyor. When this signal is turned on, the #genIn2 will detect the parts and the #seqC will count them. When the specified numbers of parts (50 in this example) are counted, the #genOut2 is turned on to stop the conveyor.

Timing Chart
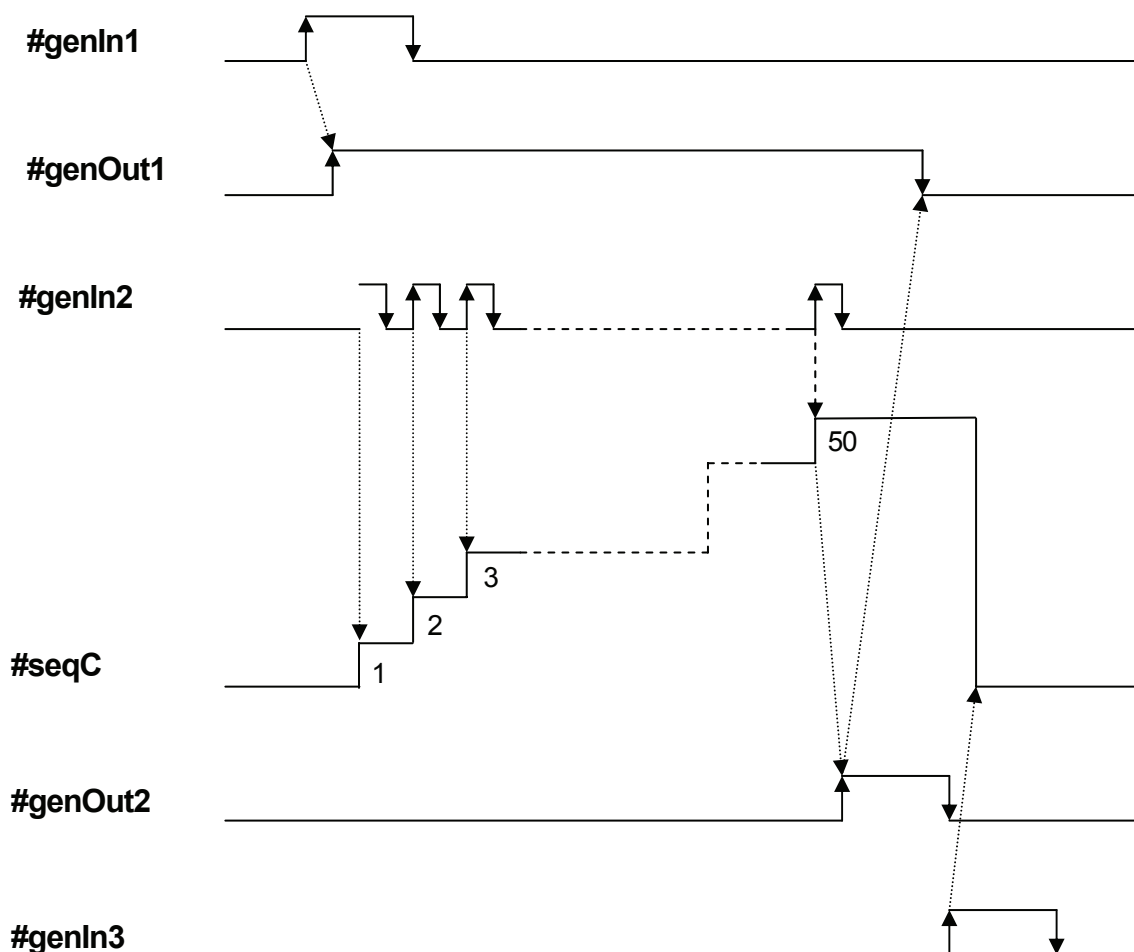
Relay Ladder
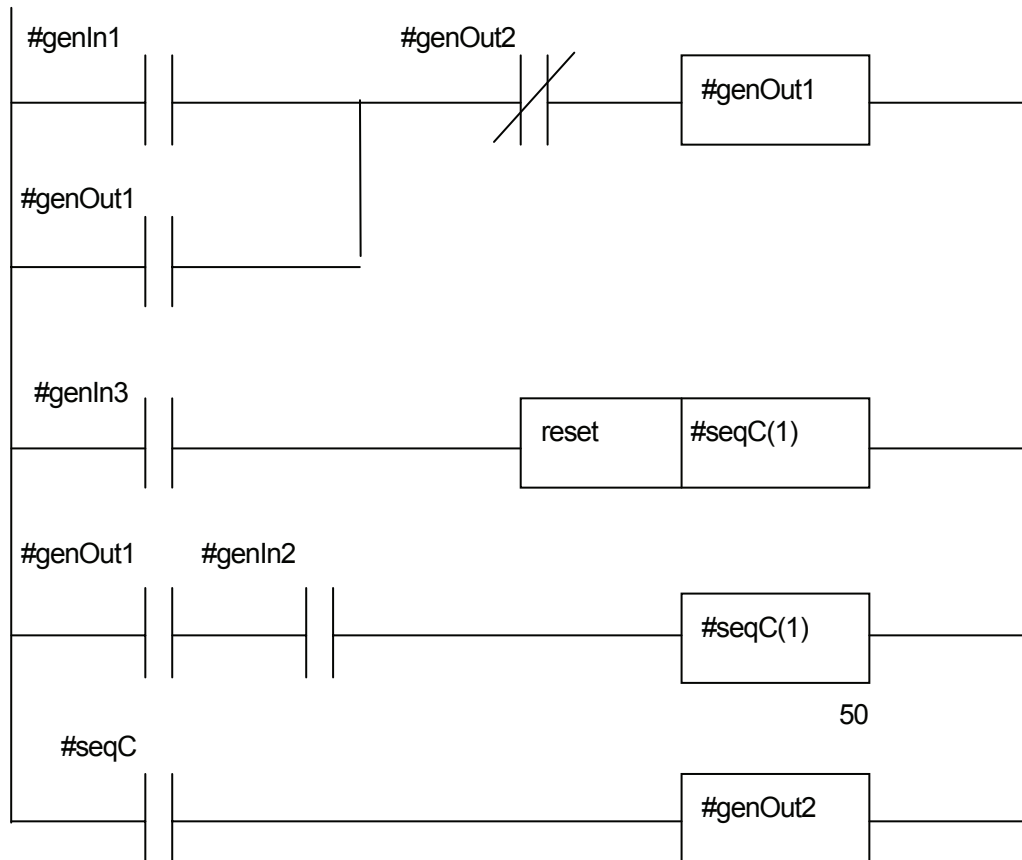
Commands

```
ld #genIn1
or #genOut1
ani #genOut2
out #genOut1
ld #genIn3
reset #seqC(1)
ld #genOut1
and #genIn2
out #seqC(1),50
ld #seqC(1)
out #genOut2
```

MEMO

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