

X-RAY INSPECTION SYSTEM

Part 3. Operation Manual





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1. Precautions before Using the System

1.1 Basic Notification

Read this manual carefully and operate the system according to the procedure not to have failures (malfunctions, errors, etc.) when using the system.





1.1.1 System Condition

1) Make sure that the keys are inserted into correct slots.



- 2) Check for factors that can cause operational problems in the system.
- 3) Check the computer monitor and keyboard.
 - Display the current system status. Change a parameter and view the updated parameter. You can also manually operate the equipment.



4) Warning Lamp

Indicates the operation status of the system with a red lamp. The red lamp turns on when the system is operating while X-rays are on.





1.1.2 Control Panel



Figure 1-1 Control panel of the PC unit

I	Name	Description			
		Turns on and off the power supply to the system, PC unit,			
POWER		turbo pump, and diaphragm pump unit.			
		(this is not applicable to the power supply to the X-ray unit).			
X-RAY		Turns the X-ray unit on and off.			
	~~~	Used in the event of a serious failure that can damage the			
EMERGENC	, Y	system (to return to normal operation, turn clockwise).			
	X X AXIC	Use the joystick to control movement of the work table			
	X-Y AXIS	right/left (X axis) or front/back (Y axis).			
MOTION	7 4 10	Use the joystick to control movement of the entire work			
MOTION	ZAXIS	table up/down (Z axis)			
		Use the joystick to control rotation (R axis) or tilt (T axis) of			
	ROTATION/TILI	the entire work table.			
		Use the button to move each axis to the spot ideal for			
	LUAD	loading and unloading the target			
	NEXT	Use the button to move each axis step by step to specified			
FUNCTION	NEXI	spots.			
	54.01/	Use the button to move each axis backwards step by step			
	BACK	to specified spots.			
		Use the button to save inspection result for the inspection			
	GOOD	target as "Good."			
		Use the button to save inspection result for the inspection			
	N.G	target as "Not Good."			





## 1.1.3 Safety Devices

XeyeSystem has been designed to ensure maximum safety against X-rays. The system is equipped with a failsafe device that uses a control program to detect opening of door. This device cuts off power to the X-ray generator if the front door is open.

	XeyeSystem guarantees safety from X-rays. But it is still				
	recommended for users to keep in mind the following				
^	cautions:				
	1) Before opening the door, check the power supply status				
	of the X-ray generator.				
	2) Be sure to check the door status before turning on the				
	X-ray generator.				



## **1.2 Emergency Measures**

When a risk or unstable state is detected during operation, press the emergency stop switch on the control panel. Before operating the system, be familiar with the position of the emergency stop switch and its usage.



Figure 1-2 Emergency Stop Switch

Switch Name	Description
Emergency Stop Switch	<ul> <li>When pressed, the X-ray generator and the motors for each axis are stopped.</li> <li>However, power supply to the control PC and the monitor is not disconnected in order to check if the system is normally operational.</li> <li>To apply power and resume operation, turn the Emergency stop switch to release and then turn the POWER and X-RAY switches clockwise up to the STRAT position.</li> </ul>



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# 2. Program Menu

Check the following before launching the operation software.

#### **Power Supply**

	The Operation Software has a separated power supply for each of
$\mathbf{\Lambda}$	the units, including the controller (PC). Turning on the PC unit may
Caution	not turn on the power supply to the equipment motor and I/O, and
	the X-ray unit. Make sure that the POWER switch on the control
	panel unit is On.

# 2.1 Starting up the Program

## 2.1.1 Loading the program



>> Run SMT_AXI_6100P.exe on the desktop.



# 2.2 Main Screen

## 2.2.1 Basic Configuration

> Control program	-20
	2.1(2017-05-22)
Auto D Maria D O II	
Auto Manu Cali	
Re	ady
Start	Stop
0	rigin
×	Ray
- STATUS : Interlock open - VOLTAGE : 0.0 - CURRENT : 0	
- INPUT TRAY: 0 - OUTPUT TRAY: 0 - GOOD COUNT : 0 - NG COUNT : 0 - STOP COUNT : 0	- RUN TIME : 0:00 - STOP TIME : 0:44:11
	PRODUCT TIME
Reset	0:0:0
4	
Operator, Normal run, Use Insp	Connect
USER MODEL STATUS	X-RAY COMM MACHINE

Name	Description
Auto	Automatic operation panel
Manu (Manual)	Manual operation panel
Cali (Calibration)	Calibration panel
USER	Configures user privileges.
Model	Creates or edits a model for inspection.
STATUS	Displays the motor and I/O condition.
X-RAY	Configures and turns on or off the X-ray.
COMM	Changes or views settings for LAN communication between
	loaders and unloaders.
MACHINE	Sets the machine position.



### 2.2.1.1 USER

USER MODEL STATUS	X-RAY COMM MACHINE		
User Password		Dialog	×
SEC •	•••••	User Level	Operator 🔹
Password Change	ок	Current Password	
🗹 English			
Dry run	✓ Use Inspection	New Password	
Use Xray Use Barcode		Password Confirmatior	
☑ Use Loader	Use Unloader		SAVE
	CLOSE		CLOSE

Name	Description
Password Change	Changes the password for a user ID.
English	Changes the display language to English (changes error
	message language from Korean to English).
Dry rup	Turns on or off test run mode (tests operation without an object
Dry full	for inspection).
	Turns on or off the X-ray status checking function (whether the
Use Xray	X-ray current and voltage have reached the threshold can be
	checked).
	Selects whether to use bar codes (if this option is deselected, a
	password is automatically created using the current time).
	Selects whether to sync with the inspection program (checks the
Use inspection	standby function for the inspection results response).
Use Loader	Turns on or off communication with the loader.
Use Unloader	Turns on or off communication with the unloader.



#### 2.2.1.2 Model

USER	MODEL	STATUS	X-RAY	СОММ	IACHINE						
del Manager				×							
Pos Load		A 27	Z	2		_					×
		00	♥ 🍌 🕨 컴퓨터 🕨	Local Disk (D:) + SMT	AXI_6100  Model	_		• 4• Mode	김색		\$
CITE MEDUIT	-		서 종더			_			911 -		0
SIZE WIDHI	300.000	a -	1 2 1	이름	*	수정한 날짜	유형	크기	0 *		
SIZE HEIGHT	200.000		1971 논로드 1탕 화면			일치하는 (	방목이 없습니다.				
X-ray Voltage	90	·····································	비브러리								
X-ray Current	90	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	이 디오 = 진								
Acq Name	Location X	L 🔮 🖁	악								
0	0.000	0 (분 컴퓨	нei								
1	0.000	0 🏭 🖾	2컬 디스크 (C:)								
2	0.000	0	ocal Disk (D:)								
3	0.000	0	1컬 디스크 (G:)								
4	0.000	0									
5	0.000	0	II 9 0	# (N):				· bt/th	n		
6	0.000	0	-12 -1						~		5
7	0.000	0						열기	(O)	취소	
8	0.000	0.000	0.000		1		and March and 175			1000	-
9	0.000	0.000	0.000								
10	0.000	0.000	0.000								
11	0.000	0.000	0.000								
12	0.000	0.000	0.000								
13	0.000	0.000	0.000								
14	0.000	0.000	0.000								
15	0.000	0.000	0.000								
16	0.000	0.000	0.000								
17	0.000	0.000	0.000								
18	0.000	0.000	0.000								
19	0.000	0.000	0.000								
20	0.000	0.000	0.000								
21	0.000	0.000	0.000								

Name	Description
Dee Lood	Loads a model file (.txt) created using the inspection
	program.
MODEL NAME	Shows the name of the model currently loaded.
SIZE WIDTH / SIZE HEIGHT	Shows the width and height of the tray.
V row Voltage / Current	Shows the voltage and current of the model currently
X-ray voltage / Current	loaded.
Acq Name	Number of each point.
Location X	Shows the X axis coordinate for each point.
Location Y	Shows the Y axis coordinate for each point.
Location Z	Shows the Z axis coordinate for each point.



#### 2.2.1.3 STATUS

USER MODEL STATU	X-RAY COMM MACHINE						
ta base							
tatus	1/0			MOTO	DR.		
		l News	Desilies	_			Durch
INPUT NAME	A NO OUTPUT NAME	Name	Position	Neg P	os Status	Finish	Reset
J INT1 FRONT DOOR (TOP)	0 TOWER LAMP RED	TUBE X	0		AMP ON	(	
1 INT 2 PRONT DOOR (BTM) 2 INTERLOCK ALL CLOSE	TOWER LAMP YELLOW     TOWER LAMP GREEN		ľ				Reset
3 FRONT DOOR LOCKING	TOWER BUZZER	DETECTOR X	0		AMP ON		
X-RAY ON INDICATOR LAMP FAIL	4 LIGHT ON	Delector_x	ľ				Reset
[SMEMA] LD AVAILABLE IN	5 [SMEMA] LD REQUEST OUT	In one of	_		AND ON	_	
[SMEMA] UD REQUEST IN	6 [SMEMA] UnD AVAILABLE OUT	TUBE_Y	0		AMP ON		Reset
OBJ DETECT CONV (SR1 & SR2 : L_JAM)	SMEMA] UnD N.G SIGNAL OUT						
OBJ DETECT CONV (SR1 & SR2 : R_JAM)	SMEMAJ UND GOOD SIGNAL OUT	DETECTOR_Y	0		AMP ON		Reset
OBJ DETECT CONV (WORK)	9 N.C	1					
1 N.C	@ 11 N.C						
2 STOPPER UP CYL'1 (FRONT)	12 STOPPER UP SOL	TUBE_Z	0		AMP ON		Reset
3 STOPPER DN CYL'1 (FRONT)	13 STOPPER DN SOL	J					
4 STOPPER UP CYL'2 (REAR)	@ 14 N.C						
5 STOPPER DN CYL'2 (REAR)	0 15 N.C	CONVEYOR Y	0		AMP ON		Devet
6 CONVEYOR GRIPPER UP CYL'1	16 CONVEYOR GRIPPER UP SOL	-					Reset
CONVEYOR GRIPPER UN CTL 1	17 CONVETOR GRIPPER DIV SOL						
9 CONVEYOR GRIPPER DN CYL'2	9 19 N.C						
0 CONVEYOR WARPAGE ON CYL'1	@ 20 N.C	CONVEYOR_FR	0		AMP ON		Reset
1 CONVEYOR WARPAGE OFF CYL'1	@21 N.C	1					
2 CONVEYOR WARPAGE ON CYL'2	@ 22 N.C	CONVEYOR_RR	0		AMP ON		Decet
3 CONVEYOR WARPAGE OFF CYL'2	@ 23 N.C						Reset
4 CONVEYOR L_GATE UP CYL'SR	24 CONVEYOR L_GATE UP SOL						
5 CONVEYOR L_GATE DN CYL'SR	25 CONVEYOR L_GATE DN SOL						
5 CONVEYOR R_GATE UP CYL'SR	20 CONVEYOR R_GATE UP SOL						
8 TUBE COLLISITION CHK	27 CONVETOR R_GATE DN SOL						
9 MAIN AIR ON CHK	29 TUBE SHUTTER OPEN SOL						
0 X-RAY POWER ON CHK.	@ 30 N.C						
1 MAIN POWER ON CHK.	@ 31 N.C			MOTOR	ETIIP		
2 TUBE SHUTTER CLOSE CYL.	_ @ 32 N.C			MOTORS	LIOP		
	Ann. 11.0						

Name		Description		
		Shows the status in which signals have been received from		
		the outside (sensor status).		
	IT.	Shows the status in which signals are being sent from the		
		control program (cylinder/lamp).		
	NAME	Shows the name of each motor.		
	POSITION	Shows the current position coordinates for each motor.		
NEG	NEG	Shows the negative sensor detection status of each motor.		
	POS	Shows the positive sensor detection status of each motor.		
MOTOR	STATUS	Shows the status of each motor (e.g. amp on or off, amp		
	514105	fault).		
		Shows whether returning each motor to home position has		
	HOME FINISH	been completed.		
	RESET	Reset button for use when an amp fault occurs on a motor.		
MOTOR SE	TUP	Sets the parameter for each motor.		



#### 2.2.1.3.1. MOTOR SETUP

	Axis name		
	Addition		
	TUBE_X		
Axis No	0	Home position value	0
Board No	0	14	
Physical Axis no	0	Positive sw limit	400
Motor type	servo motor 🔹	Negative sw limit	0
Sync width (Sync Axis)	1	Home speed 1	0
Sync Inverse dir	sync dir normal 🔹	Home speed 2	0
Sync compensator	unused compensate 💌	Home Offset	0
E-gear ratio	0	Jog Min speed	0
Managed	unused 💌	Jog Med speed	0
Inverse dir	unused 👻	Jog Max speed	0
		Speed (Limit : Jog max speed)	0
Home method		Accel	0
Home direction	Positive direction	Stop rate	0
Amp On MP ON AMP OFF RE	SET Use Offset		Save
	Home X		
001mm 👻	0.000		
ff	+ Off		
11015			

Name	Description
Axis name	Motor name
Axis number	Number of each axis (in the program)
Board No.	Board number set for the axis
Physical Axia No.	Individual number set for the board (individual number
	inside the board)
Motor type	Type of each motor (servo or step)
Sync width (sync Axis)	Axis number for synchronization
Supe Inverse dir	Sets the directional relationship between the master and
Sync inverse ull	slave axes that are synced.



Name	Description			
Sync compensator	Turns on or off the position calibration function for			
	synced axes.			
E-gear ratio	Pulse value used to move 1 mm per axis.			
Managed	This option is set to "used" by default.			
Inverse dir	Sets the direction.			
Home method	Sets the method to return to home position. (HOME			
nome method	NONE, HOME LIMIT, LIMIT ONLY, HOME ONLY).			
Home direction	Sets the direction when returning to home position.			
	(Positive or Negative).			
Home position value	Sets the position value after having returned to home			
	position.			
Positive sw limit	Sets the positive software limit.			
Negative sw limit	Sets the negative software limit.			
Home speed 1	Sets initial feed speed when returning to home position.			
Home aroad 2	Sets specific speed after touching the sensor when			
Home speed 2	returning to home position.			
Hama Offact	Sets the relative movement distance after having			
Home Oliset	returned to home position.			
Jog Min. speed	Sets the minimum jog speed.			
Jog Med. speed	Sets the medium jog speed.			
Jog Max. speed	Sets the maximum jog speed.			
Speed (Limit: Jog Max. speed)	Default speed when moving the machine\			
Accel	Sets the acceleration value.			
Stop rate	Sets the stable stop value.			



#### 2.2.1.3.2. JOG



Name	Description
AMP ON / AMP OFF	Turns on or off the amp for each axis of the motor.
RESET	Resets the alarm when a motor error occurs.
SLOW / MEDIUM / FAST	Selects a jog feed speed.
Home X / Home O	Shows the presence of a home position and the motor
	status.
Lise Offset	Turns on or off the relative movement function in offset
	mode.
+ / - buttons	Triggers a jog movement command.
Home button	Triggers a command to return the motor axis to home
	position.



#### 2.2.1.4 X-RAY

USER MODEL STA	ATUS X-RAY	Сомм	MACHINE	
X-ray status				×
Standby:0 Warmup:0	Interloc:0		Over:0 Heating:0	RESET
Voltage 0 🕢			۰ ،	
Current 0 <			+ 0	ON/OFF
Total time Warming time (s) Auto off time (m)	11 22	0:00:0	DO V USE	RESET
Voltage Tolerance (kV)	0.76			
Current Tolerance	44			Save
COM Port	COM1	•	Connect Disconne	ct

Name	Description		
Standby	Shows the standby status of the X-ray controller.		
Interlock	Views the door lock status.		
Over	Shows the overcurrent status.		
Warmup	Shows whether X-ray stabilization is required.		
Heating	Shows whether X-ray is being heated.		
X-ray voltage/current scroll	Scroll to adjust voltage and current.		
X-RAY ON/OFF	Turns on or off the X-ray.		
Total Time	Total duration of X-ray use		
Warming Time	Duration for which X-ray is stabilized (unit: seconds)		
	Selects "Use" to automatically close the X-ray when		
Auto Off Time / Use	there is no input for a specified period of time (unit:		
Voltage Tolerance	Displays an error message when the X-ray voltage rises		
	above the specified value.		
Current Tolerance	Displays an error message when the X-ray current rises		



Name	Description
	above the specified value.
SAVE	Saves changed settings.
COM Port	Specifies the COM port to be connected to the X-ray controller.
Connect / Disconnect	Connects or disconnects the controller from the currently selected port.

### 2.2.1.5 COMM

Communication	on setting
Client IP :	127 . 0 . 0 . 1 8100
	/ Client : disconnect
	Connect Disconnect
	Read data (Macheine < )
	Write data (Machine> )

Name	Description		
Client ID and part	Sets the IP and port number for the computer that will		
	communicate with the loader and unloader.		
Client: disconnect	Shows the connection status of LAN communication.		
Connect / Disconnect buttons	Connects or disconnects the communication.		
Read data (machine <)	Displays characters sent from the loader or unloader.		
Write data (Machina	The window to enter data to be sent from the X-ray		
	machine to the loader or unloader.		
Cond button	Sends data under "Write data" to the connected		
	machine.		



#### 2.2.1.6 MACHINE

	SAFTY T				
	SMELLE	UBE POSITION Z		Safty Open	Safty Close
0				Current Pos	ition Load
	AIR			Move Pos	Air Grab
71		244.35		Current Pos	ition Load
	CC	ONVEYOR ON (Speed , Del	ay)	CONVI ALIGN (1	EYOR Offset)
30		20		0	
	CONVEYOR ALIC	3N	Align Set	Align R	elease
5					
			-AXIS	Y	AXIS
		X		1. S. M.	
	Distance	Speed X	Acc/Dec	Speed	Acc/Dec
SLOW	Distance 50	Speed 50	Acc/Dec	Speed 50	Acc/Dec
SLOW	Distance 50 IIDDLE	50 50	Acc/Dec 10 50	Speed           50           100	Acc/Dec 10 50

Name	Description
	Z-axis position value used to shut down the shutter of
	the X-ray tube
	Position value for air image capture (position for image
AIR POSITION	correction)
CONVEYOR DECELERATION	Sets the speed and deceleration of the conveyor when
	the deceleration sensor is detected.
	Sets the offset feed quantity used to activate conveyor
CONVEYOR ALIGN(OFFSET)	alignment when the product reaches the inspection
	position.



Name	Description
CONTINUOUS NG	This function stops the conveyor if the specified number
COUNTERS	of errors occurs.
Shutter Open / Shutter Close	Turns on and off the X-ray tube shutter.
Align Set / Align Release	Checks the conveyor alignment.
SLOW/MIDDLE/FAST	Sets moving speed by distance.
Distance	SLOW: Moves at the speed specified on the right when the moving distance is below the specified value.
	<ul> <li>MIDDLE: Moves at the speed specified on the right when the moving distance is between Slow and Fast.</li> </ul>
	FAST: Moves at the speed specified on the right when the moving distance is above the specified value.



# 2.3 Auto Screen

## 2.3.1 Screen Overview

> Control program	<b>-</b> 3
	2.1(2017-05-22)
📡 Auto 📃 Manu 📉 Calib	•
Rea	ıdy
Start	Stop
Ori	igin
XR	tay
- STATUS : Interlock open - VOLTAGE : 0.0 - CURRENT : 0	
- INPUT TRAY: 0 - OUTPUT TRAY: 0 - GOOD COUNT: 0 - NG COUNT: 0 - STOP COUNT: 0	- RUN TIME : 0:0:0 - STOP TIME : 0:2:40
	PRODUCT TIME
Reset	0:0:0
4	
Operator, Normal run, Use Insp	Connect
USER MODEL STATUS	X-RAY COMM MACHINE

Name	Description
Start	Starts automatic run.
Stop	Stops automatic run.
X-ray On / Warmup-need/Over.	Turns on or off the X-ray.
Count Reset	Resets all counters.
Origin	Restarts all motor axes.



- VOLTAGE : 0.0	Name	Description
- CURRENT : 0	STATUS	Status
	VOLTAGE	Voltage
	CURRENT	Current

- INPUT TRAY: 0
- OUTPUT TRAY : 0
- GOOD COUNT : 0
- NG COUNT : 0
- STOP COUNT : 0

Name	Description
INPUT TRAY.	Number of trays in use
OUTPUT TRAY	Number of discharged trays
GOOD COUNT	Number of individual parts that
	have passed inspection
NG COUNT	Number of individual parts that
	have failed inspection
STOP COUNT	Number of stops

- RUN TIME : 0:0:0 - STOP TIME : 0:2:40

Name	Description
RUN TIME	Operating duration
STOP TIME	Overall time the
	system was not in
	operation

PRODUCT TIME	Name	Description
	PROCUCT TIME	Product discharge
0:0:0		time



# 2.4 Manual Screen

## 2.4.1 Screen Overview

> Control	program			-29		
-			2.1(20	017-05-22)		
2 DH)						
Auto	Manu 🖾 Ca	lib				
Step Motion				-		
	Load		Unload			
ACQ	Location X	Location Y	Location Z			<b>·</b>
0	0.000	0.000 2017-05	0.000			
1	0.000	0.000	0.000	=		
2	0.000	0.000	0.000			
3	0.000	0.000	0.000			$\sim$
4	0.000	0.000	0.000			
5	0.000	0.000	0.000			
6	0.000	0.000	0.000			
7	0.000	0.000	0.000			
8	0.000	0.000	0.000			
9	0.000	0.000	0.000			
10	0.000	0.000	0.000			
11	0.000	0.000	0.000			
12	0.000	0.000	0.000	-		$\sim$
Interlock open						
	Ir	ispect				
Left gate	clamp	o sto	opper Rig	ht gate		
rran o	STOP TIME :	0:2:40				
						$\frown$
						4
Shuttor Open S	Shuttor Close Mo	ve Safty Warp	age Up Warp	age Dn		
leset .						
Ctop.			_			
Stop		Stop	_			
						$\frown$
	<<<		>>>			
					·	5
		STOP	_			
Operator, Nor	mal run, Use Insp		Connect			
<u> </u>						
USER M	ODEL STATUS	X-RAY		ACHINE		

No.	Name	Description
1	Load / Unload	Loads or unloads a product using a step motion.
2	Teaching List	Shows the inspection position and speed of the current model. Move to the next model by a double-click.
3	Inspect button	Grips and inspects a product at the same time.
4	Cylinder sensor status and control buttons	Operates cylinders for the gate, clamp, and stopper.
5	Conveyor sensor status and control buttons	Operates the conveyor roller.



Step Motion	
Load	Unload

> sec

Name	Description
Lood	Moves a product from the loader to the inspection
LOAU	position.
Unload	Discharges a product via the unloader.

Gr	T	ACQ	Locat	Locat	Locat	S	A	D	
0	0	NewModel_0	100	100	10.000	10.0	10	0	
0	1	NewModel_1	0.000 0.000 0.000 10.0 10		10	0			
0	2	NewModel_2 0.000 0.000 0.000 10.0 10		10	0				
0	3	NewModel_3	0.000	0.000	0.000	10.0	10	0	
0	4	NewModel_4	0.000	0.000	0.000	10.0	10	0	
1	0	NewModel_0	0.000	0.000	0.000	10.0	10	0	
1	1	NewModel_1	0.000	0.000	0.000	10.0	10	0	
1	2	NewModel_2	0.000	0.000	0.000	10.0	10	0	
1	3	NewModel_3	0.000	0.000	0.000	10.0	10	0	Ξ
1	4	NewModel_4	0.000	0.000	0.000	10.0	10	0	
2	0	NewModel_0	0.000	0.000	0.000	10.0	10	0	
2	1	NewModel_1	0.000	0.000	0.000	10.0	10	0	
2	2	NewModel_2	0.000	0.000	0.000	10.0	10	0	
2	3	NewModel_3	0.000	0.000	0.000	10.0	10	0	
2	4	NewModel_4	0.000	0.000	0.000	10.0	10	0	
3	0	NewModel_0	0.000	0.000	0.000	10.0	10	0	
3	1	NewModel_1	0.000	0.000	0.000	10.0	10	0	
3	2	NewModel_2	0.000	0.000	0.000	10.0	10	0	
3	3	NewModel_3	0.000	0.000	0.000	10.0	10	0	
3	4	NewModel_4	0.000	0.000	0.000	10.0	10	0	
4	0	NewModel_0	0.000	0.000	0.000	10.0	10	0	
4	1	NewModel 1	0.000	0.000	0 000	10.0	10	n	Ŧ
•			111					•	

Name	Description
Teaching list	Moves to the selected position by a double-click.

Inspect

Name	Description
Inapact	Performs screening and inspection at the position
Inspect	selected under the Teaching list.



left oate	damp	stopper	right gate
		4	2

No.	Name	Description
1		Raises or lowers the cylinder for the left-side gate. Note that
	Left gate	moving the cylinder is not possible if the tube shutter is open.
	Dight gate	Raises or lowers the cylinder for the right-side gate. Note that
Z	Right gate	moving the cylinder is not possible if the tube shutter is open.
3	Clamp	Raises or lowers the cylinder that clamps a product.
4	Otomore	Raises or lowers the cylinder that stops the conveyor when a
	Stopper	product is transported by the conveyor.

#### Shuttor Open Shuttor Close

Name	Description
Tube Shutter Open/Close	This shutter shields X-ray radiation and works only when
	the left and right gates are closed.

Move Safty

Name	Description
Move Safety	Moves the tube to preset safe position.

Warpage Up Warpage Dn

Name	Description
Warpage Up/Down	A cylinder that provides a solid base for a product and
	prevent the bottom from sagging.

* Make sure to move the tube in Warpage Up state to prevent the tube from colliding the cylinder.



Stop	Stop >>>
Name	Description
Conveyor roller operation	Operates the conveyor roller using clockwise/counter clockwise.
	STOP

Name	Description
Stop	Stop button

sec



# 2.5 Calibration Screen

## 2.5.1 Screen Overview

X         Y         Z         Voltage         Current         Convey           0         0         0         0         0         0           0         0         0         0         0         0           0         0         0         0         0         0           0         0         0         0         0         0           0         0         0         0         0         0           0         0         0         0         0         0           0         0         0         0         0         0           0         0         0         0         0         0           0         0         0         0         0         0           0         0         0         0         0         0           0         0         0         0         0         0           0         0         0         0         0         0           0         0         0         0         0         0           0         0         0         0         0         0           0	Auto	🚊 Manu	C:	alib.					
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0       0       0       0       0       0         0       0       0       0       0       0       0         0       0       0       0       0       0       0         0       0       0       0       0       0       0         0       0       0       0       0       0       0         0       0       0       0       0       0       0         0       0       0       0       0       0       0         0       0       0       0       0       0       0         0       0       0       0       0       0       0         0       0       0       0       0       0       0         0       0       0       0       0       0       0         0       0       0       0       0       0       0         0       0       0       0       0       0       0         0       0       0       0       0       0       0         0       0       0       0       0       0 <t< td=""><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td></td><td></td><td></td></t<>	0	0	0	0	0	0			
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0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0	0	0	0	0	0	_		
d Current Position Delete Select Position Save	0	0	0	0	0	0		┝─	
	d Curre	nt Position	Delete S	elect Positi	on	Save			
	EC, Nor	mal run, Use	e Insp		Cor	nnect			

No.	Name	Description				
1	Calibration List	Saves the position, voltage, current, and conveyor width				
	Calibration List	for each point for use during transfer.				
	Lood Current Desition	Loads the current X, Y, Z, voltage, current, and				
0		conveyor width to the selected point.				
2	Delete Select Position	Deletes values saved for the selected point.				
	Save	Saves the current calibration list.				
3	Teaching Tool	Jog moving tool				
4	Auto Calibration	Moves to the target point for calibration and start				
4	Auto Calibration	calibration automatically.				



## 2.5.1.1 Teaching Tool



No.	Name	Description	
1	Current Desition	Shows the current position values for the X, Y, and Z	
1		conveyor width.	
	ABS Move	Enters the target position for moving and moves to the	
2		target position.	
3	Velocity / Offset	Selects a speed and a distance to move using jog.	
4	Jog	Moves each axis.	



# 3. Error Code List

Alarm ID	Category	Alarm Text	How to turn off alarms
		Resetting the I/O board	Check the I/O DeviceNet
I		failed.	communication unit.
0		Resetting the motion	Check the MMC controller
2	Err_wotion_Board_Open	CategoryAlarm TextIO_Board_OpenResetting the I/O board failed.Motion_Board_OpenResetting the motion board failed.Door_OpenSafety door is open.Front_Door_LockingFront door locker is open.Rear_Door_Top_LockingRear [upper] door locker is open.Rear_Door_Bottom_LockingRear [lower] door locker is 	hardware condition.
			Close the door and
10	Err_Door_Open	Safety door is open.	proceed with inspection.
			Close the front door and
11	Err_Front_Door_Locking	Alarm TextResetting the I/O board failed.Resetting the motion board failed.Resetting the motion board failed.Safety door is open.Front door locker is open.Rear [upper] door locker is open.Rear [lower] door locker is open.X-ray power is off.Lamp failure in the X-ray.Problem with the main power source.Problem with the X-ray.Machine is already operating.Response time for the command between control modules has expired.	proceed with inspection.
- 10		Rear [upper] door locker	Close the upper door and
12	Err_Rear_Door_Top_Locking	Resetting the I/O board failed.Resetting the motion board failed.Safety door is open.Safety door is open.Front door locker is open.Rear [upper] door locker is open.Rear [lower] door locker is open.X-ray power is off.Lamp failure in the X-ray.Problem with the main power source.Problem with the X-ray cooler.Machine is already operating.Response time for the command between control	proceed with inspection.
- 10		Rear [lower] door locker is	Close the lower door and
13	Err_Rear_Door_Bottom_Locking	open.	proceed with inspection.
14	Err_Xray_Power_On	X-ray power is off.	Turn on the X-ray power.
	Err_Xray_FailTo_Lamp		Check the X-ray and the
15		Lamp failure in the X-ray.	LED lamp
		Problem with the main	Check that the main
16	Err_Iviain_Power_On	power source.	power is on.
		Deal la se l'ille d'anne and	Check that the main air
17	Err_Main_Air_On	Alarm Text Resetting the I/O board failed. Resetting the motion board failed. Safety door is open. Front door locker is open. Rear [upper] door locker is open. Rear [lower] door locker is open. X-ray power is off. Lamp failure in the X-ray. Problem with the main power source. Problem with the X-ray cooler. Machine is already operating. Response time for the command between control modules has expired. Failed to reset all axes for the machine.	fan is on.
- 10		Problem with the X-ray	
18	Err_XRayCoolerFlow	cooler.	Check the X-ray cooler.
	Err_Machine_In_Working	Machine is already	Stop the machine and
20		operating.	restart it.
		Response time for the	Check the operating
21	Err_Module_Response_Timeout	command between control	speed set for the
		modules has expired.	machine.
	Err Modulo Home Motion	Failed to reset all axes for	Reset the machine. If this
22	EII_IVIOQUIE_FIOITIE_IVIOUON	the machine.	fails, reset it again.



Alarm ID	Category	Alarm Text	How to turn off alarms
30	Err_Axis_Home_Not_Detect	Failed to locate the home position of the axis.	Amp fault or home position sensor malfunction.
31	Err_Axis_Home_Timeout	Home position timeout error for the axis.	Returning to home position has timed out.
32	Err_Axis_Motion_Done	The axis is moving.	Stop the axis and try again.
33	Err_Axis_In_Error	Error in the axis.	Reset the amp for the axis and then reset the machine.
34	Err_Axis_Amp_Disable	The axis is in the AMP off state.	Turn on the axis amp and reset the machine.
35	Err_Axis_Amp_Fault	The axis is in the AMP falter state.	Reset the amp for the axis and then reset the machine.
36	Err_Axis_Motion_Timeout	The axis failed to complete moving within the specified time.	The axis failed to reach home position within specified time.
37	Err_Axis_Cylinder_Timeout	The cylinder failed to complete the action within specified time.	Cylinder sensor malfunctions.
38	Err_Axis_Invalid_Position	The axis did not reach the target position.	The axis failed to reach home position within specified time.
39	Err_Axis_Homing_Already_InProgre ss	The axis is already returning to the origin point.	The axis is initializing
40	Err_Axis_TargetPos_Is_Over_Limit	The target position is beyond the limit.	Specified movement value went over the limit.
41	Err_Axis_HW_Neg_Limit	"Hardware limit (Negative)" is currently selected.	The axis has been detected by the limit (Negative) sensor.



Alarm ID	Category	Alarm Text	How to turn off alarms
42	Err_Axis_HW_Pos_Limit	"Hardware limit (Positive)" is currently selected.	The axis has been detected by the limit (Positive) sensor.
43	Err_Axis_SW_Neg_Limit	"Software limit (Negative)" is currently selected.	The axis has been detected by the software limit (Negative) sensor.
44	Err_Axis_SW_Pos_Limit	"Software limit (Positive)" is currently selected.	The axis has been detected by the software limit (Positive) sensor.
200	Err_Viewer_Home_Not_Detect	The viewer module reset has not been completed.	The viewer module reset is required.
201	Err_Viewer_Teach_Pos	Viewer module failed to move to specified position.	Viewer module failed to move (interference due to collision).
202	Err_Viewer_ZAxis_Limit	Z axis limit problem during SOD movement of the viewer module.	Viewer module failed to move along Z axis (interference due to collision).
203	Err_Viewer_Motion_Done	Viewer module is operating.	Stop the viewer module before performing a command.
204	Err_Viewer_AxisTX_Error	Problem with the viewer tube X axis.	Viewer tube failed to move along X axis (interference due to collision).
205	Err_Viewer_AxisDX_Error	Problem with the viewer detector X axis.	Viewer detector failed to move along X axis (interference due to collision).
206	Err_Viewer_AxisTY_Error	Problem with the viewer tube Y axis.	Viewer tube failed to move along Y axis (interference due to collision).



Alarm ID	Category	Alarm Text	How to turn off alarms
207	Err_Viewer_AxisDY_Error	Problem with the viewer detector Y axis.	Viewer detector failed to move along Y axis (interference due to collision).
208	Err_Viewer_AxisTZ_Error	Problem with the viewer tube Z axis.	Viewer tube failed to move along Z axis (interference due to collision).
400	Err_Conveyor_Home_Not_Detect	Reset of the conveyor module has not been completed.	Reset of the conveyor module is required.
401	Err_Conveyor_L_Gate_Open	The conveyor's left gate is open.	Check that the left gate is closed.
402	Err_Conveyor_R_Gate_Open	The conveyor's right gate is open.	Check that the right gate is closed.
403	Err_Conveyor_L_Gate_Close	The conveyor's left gate is closed.	Check that the left gate is open.
404	Err_Conveyor_R_Gate_Close	The conveyor's right gate is closed.	Check that the right gate is open.
405	Err_Conveyor_L_Gate_Diff	Problem with the conveyor's left gate sensors.	Sensors fail to detect difference when the left gate is open and closed.
406	Err_Conveyor_R_Gate_Diff	Problem with the conveyor's right gate sensors.	Sensors fails to detect difference when the right gate is open and closed.
407	Err_Conveyor_Safty_Shutter_Open	Conveyor X-ray shutter is open.	Check the conveyor X-ray shutter open status sensor.
408	Err_Conveyor_Safty_Shutter_Close	Conveyor X-ray shutter is closed.	Check the conveyor X-ray shutter closed status sensor.



Alarm ID	Category	Alarm Text	How to turn off alarms
409	Err_Conveyor_Safty_Shutter_Diff	Problem with the conveyor X-ray shutter status sensors.	Sensors fail to detect difference when the conveyor X-ray shutter is open and closed.
410	Err_Conveyor_L_Stopper_Up	Conveyor stopper is raised.	Check that the conveyor stopper sensors detect properly when the stopper is raised and lowered.
411	Err_Conveyor_L_Stopper_Dn	Conveyor stopper is lowered.	Check that the conveyor stopper sensors detect properly when the stopper is raised and lowered.
412	Err_Conveyor_L_Stopper_Diff	Problem with the conveyor stopper sensors.	Sensors fail to detect difference when the conveyor stopper is raised and lowered.
413	Err_Conveyor_Clamp1_Up	Conveyor clamp 1 is raised.	Check that the conveyor clamp 1 sensors detect properly when the clamp is raised and lowered.
414	Err_Conveyor_Clamp1_Dn	Conveyor clamp 1 is lowered.	Check that the conveyor clamp 1 sensors detect properly when the clamp is raised and lowered.
415	Err_Conveyor_Clamp1_Diff	Problem with the conveyor clamp 1 sensors.	Sensors fail to detect difference when conveyor clamp 1 is raised and lowered.
416	Err_Conveyor_Clamp2_Up	Conveyor clamp 2 is raised.	Check that the conveyor clamp 2 sensors detect properly when the clamp is raised and lowered.



Alarm ID	Category	Alarm Text	How to turn off alarms
417	Err_Conveyor_Clamp2_Dn	Conveyor clamp 2 is lowered.	Check that the conveyor clamp 2 sensors detect properly when the clamp is raised and lowered.
418	Err_Conveyor_Clamp2_Diff	Problem with the conveyor clamp 2 sensors.	Sensors fail to detect difference when conveyor clamp 2 is raised and lowered.
419	Err_Conveyor_Warpage1_On	Conveyor warpage 1 is raised.	Check that the conveyor warpage 1 sensors detect properly when the warpage is raised or lowered.
420	Err_Conveyor_Warpage1_Off	Conveyor warpage 1 is lowered.	Check that the conveyor warpage 1 sensors detect properly when the warpage is raised or lowered.
421	Err_Conveyor_Warpage1_Diff	Problem with the conveyor warpage 1 sensors.	Sensors fail to detect difference when conveyor warpage 1 is raised and lowered.
422	Err_Conveyor_Warpage2_On	Conveyor warpage 2 is raised.	Check that the conveyor warpage 2 sensors detect properly when the warpage is raised or lowered.
423	Err_Conveyor_Warpage2_Off	Conveyor warpage 2 is lowered.	Check that the conveyor warpage 2 sensors detect properly when the warpage is raised or lowered.



Alarm ID	Category	Alarm Text	How to turn off alarms
424	Err_Conveyor_Warpage2_Diff	Problem with the conveyor warpage 2 sensors.	Sensors fail to detect difference when conveyor warpage 2 is raised and lowered.
425	Err_Conveyor_Left_Tray_Jam_Exist	Conveyor's left jam sensor detected an object.	Conveyor's left jam sensor detected something.
426	Err_Conveyor_Left_Tray_Jam_No_ Exist	Conveyor's left jam sensor did not detect an object.	Conveyor's left jam sensor detected nothing.
427	Err_Conveyor_Right_Tray_Jam_Exi st	Conveyor's right jam sensor detected an object.	Conveyor's right jam sensor detected something.
428	Err_Conveyor_Right_Tray_Jam_No _Exist	Conveyor's right jam sensor did not detect an object.	Conveyor's right jam sensor detected nothing.
429	Err_Conveyor_Work_Tray_Exist	Conveyor work detected an object.	Conveyor work sensor detected something.
430	Err_Conveyor_Work_Tray_No_Exist	Conveyor work did not detect an object.	Conveyor work sensor detected nothing.
431	Err_Conveyor_Work_PCB_Not_Dat a_Exist	Product data is present in conveyor work (check the sensor).	Conveyor work shows that there is no product but data exists.
432	Err_Conveyor_Left_Timeout	Product failed to reach the (left) conveyor in time.	Load of the product to the left conveyor has failed. Check the machine.
433	Err_Conveyor_Right_Timeout	Product failed to reach the (right) conveyor in time.	Discharge of the product to the right conveyor has failed. Check the machine.
434	Err_Conveyor_Right_Tray_Exist_etc	Conditions related to presence of a product on the (right) conveyor do not match.	Presence of a product on the right conveyor does not match the sensor detection results. Check the machine.



Alarm ID	Category	Alarm Text	How to turn off alarms
435	Err_Conveyor_Motion_Done	Conveyor module is operating.	Stop the conveyor and restart it.
436	Err_Conveyor_AxisY_Error	Problem with the conveyor width axis.	There is a problem with the conveyor width control axis.
437	Err_Conveyor_AxisFR_Error	Problem with the conveyor roller front axis.	Conveyor roller alarm has gone off (Front).
438	Err_Conveyor_AxisRR_Error	Problem with the conveyor roller rear axis.	Conveyor roller alarm has gone off (Rear).
439	Err_Conveyor_ModelSize_Height	Conveyor height axis does not match the model size.	Conveyor width does not match the actual product (check width adjustment).
500	Err_XRay_FailTo_TurnOn	Failed to turn on the X- ray.	Failed to turn on the X-ray (check the X-ray controller).
426	Err_XRay_Check_Status	Failed to check the X-ray status.	X-ray status check failed (check the X-ray controller).
427	Err_XRay_FailTo_Set_Voltage	Failed to set the X-ray voltage and current.	X-ray voltage and current do not reach the set values.
428	Err_XRay_Not_StandBy	X-ray is not in STAND BY mode.	X-ray is not in standby state.
429	Err_Xray_Over	X-ray is in Over state.	X-ray is in Over state. Reset the X-ray.
430	Err_Xray_Heating	X-ray is being heated.	X-ray is being heated (X- ray radiation starts after heating is completed).
431	Err_Xray_Need_Warmup	X-ray warm-up has not been completed.	Perform X-ray warm-up.



Alarm ID	Category	Alarm Text	How to turn off alarms
432	Err_Xray_Temp_Interlock	X-ray temperature is not stable.	X-ray is being heated (X- ray radiation starts after heating is completed).
433	Err_Xray_Interlock_L_Gate	Impossible to open the left gate and shutter at the same time when the X-ray is on.	X-ray shutter and left gate cannot be opened at the same time.
434	Err_Xray_Interlock_R_Gate	Impossible to open the right gate and shutter at the same time when the X-ray is on.	X-ray shutter and right gate cannot be opened at the same time.
435	Err_Xray_ON	X-ray is on.	Turn off the X-ray and proceed.
436	Err_Xray_ON_TIMEOUT	Failed to turn on the X- ray.	Failed to turn on the X-ray (check the X-ray controller).
437	Err_Xray_OF_TIMEOUT	Failed to turn off the X-ray.	Failed to turn off the X-ray (check the X-ray controller).
600	Err_A2M_Group_Index	Incorrect group number from inspection.	Incorrect group number is found when synced with the inspection program.
601	Err_A2M_Teach_Index	Incorrect teaching number from inspection.	Incorrect teaching number is found when synced with the inspection program.
602	Err_A2M_Inspection_Finish	There is a product that has not been inspected.	There is a product that has failed to acquire inspection results.
700	Err_Barcode_Read	Failed to read bar code.	Bar code cannot read.
701	Err_Barcode_Info	No bar code information	Remove the product and reload it.

## Part 3. Operation Manual

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