

PSA-24/PSA-24L (24V Power Supply)

First Step Guide Second Edition

Thank you for purchasing our product.
 Make sure to read the Safety Guide and detailed Instruction Manual as well as this First Step Guide to ensure correct use.
 This Instruction Manual is original.

Warning : Read the instruction manual carefully and follow the instruction manual when handling this equipment.
 Please download the user's manual from our website.
 You can download it free of charge. User registration is required for first time users.
 URL: www.iai-robot.co.jp/data_dl/CAD_MANUAL/
 Keep a printout of the introduction manual near the equipment in which this product is installed so that it can be checked at all times, or display it on your computer, tablet terminal, etc. so that you can check it immediately.
 If you need a bound copy of the instruction manual, order it from the nearest sales office listed in the First Step Guide or at the end of the instruction manual. It will be provided for a fee.

- Using or copying all or part of this Instruction Manual without permission is prohibited.
- The company names, names of products and trademarks of each company shown in the sentences are registered trademarks.

Caution in Handling

- PSA-24/PSA-24L Power Supplies are the power supply units dedicated for IAI controllers of the 24V DC type.
- Do not attempt to connect in parallel several power supply units in different capacities. Do not attempt to connect PSA-24 (without fan), PSA-24L (with fan) and PS-24 in parallel. Connect PSA-24 with only PSA-24, or PSA-24L only with PSA-24L in parallel.

Product Check

This product is comprised of the following parts if it is of standard configuration.

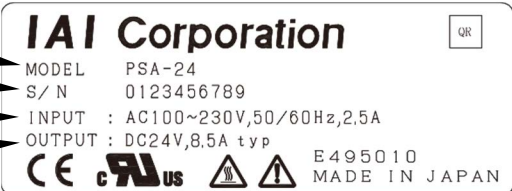
If you find any fault in the contained model or any missing parts, contact us or our distributor.

1. Parts (The option is excluded.)

No.	Part Name	Model
1	24V Power Supply Main Unit	Refer to "2. How to read the model plate", "3. How to read the model No."
Accessories		
2	First Step Guide (This Manual)	ME0380
3	Safety Guide	M0194

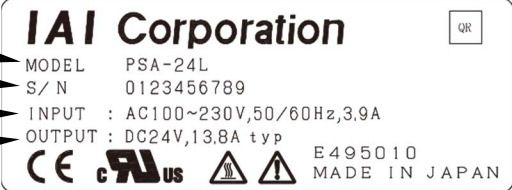
2. How to read the model plate

• PSA-24



Model: IAI Corporation
 MODEL: PSA-24
 S/N: 0123456789
 INPUT: AC100~230V, 50/60Hz, 2.5A
 OUTPUT: DC24V, 8.5A typ
 E495010
 MADE IN JAPAN

• PSA-24L



Model: IAI Corporation
 MODEL: PSA-24L
 S/N: 0123456789
 INPUT: AC100~230V, 50/60Hz, 3.9A
 OUTPUT: DC24V, 13.8A typ
 E495010
 MADE IN JAPAN

3. How to read the model No.

PSA-24-L

PSA: 24V power supply
 24: 24V power supply
 FU: Fan Unit (Unit Itself)

<Type>
 24: 24V power supply
 FU: Fan Unit (Unit Itself)

<Fan-Equipped Option>
 No Description: Standard Type (204W)
 L: Fan-Equipped Type (330W)

* Condition of Use for PSA-24 External Fan
 When forced air cooling is to be conducted, follow the condition when certified by UL.
 As an option to follow the condition when certified by UL, there is PSA-FU.

4. Instruction manuals related to this product

No.	Name	Manual No.
1	PSA-24/PSA-24L (24V Power Supply) Instruction Manual	ME0379

Basic Specifications

Specifications

Specification Item	PSA-24	PSA-24L
Rated Voltage DC Output	24V±10% (fluctuates depending on duty)	
Rated DC Current Output	8.5A	13.8A
Peak Maximum DC Current Output	17A	
Rated Output Wattage	204W	330W
Efficiency	100V AC : 86% 200V AC : 90%	
Rated Input Voltage (frequency)	100V AC to 230V AC ± 10% [50/60Hz]	
Input Current	100V AC : 2.5A 200V AC : 1.4A (Continuous Rated Output 204W)	100V AC : 3.9A 200V AC : 1.9A (Continuous Rated Output 330W)
Output Holding Time	20ms (Continuous Rated Output 204W)	12ms (Continuous Rated Output 330W)
Protection Circuit	Over current protection, over voltage protection, over temperature protection, over load protection, Input low voltage, Fan rotation drop	
Parallel Operation	Applicable	
Operation Ambient Temp.	0 to 55°C (with derating)	
Operation Ambient Humidity	85%RH or less	
Cooling Method	Natural air-cooling	Forced air cooling
Voltage Durability	3000V AC 1min. (AC Input - DC Output) 2000V AC 1min. (AC Input - FG) 500V AC 1min. (DC Output - FG)	
Insulation Strength	50MΩ min. at 500V DC	
Altitude	2,000m or less	
Overvoltage Category	II	
Pollution Level	2	
Installation Area	Indoor	
Circuit System	LCC Resonant System	
Mass	805g	845g

Installation Environment

Do not use this product in the following environment.

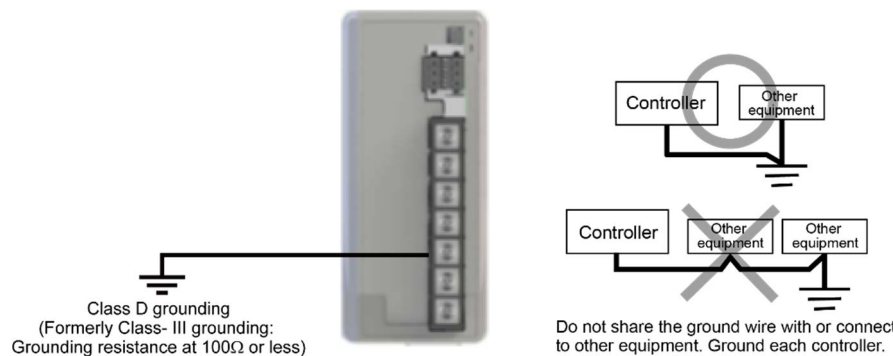
- Location where the surrounding air temperature exceeds the range of 0 to 55°C
- Location where condensation occurs due to abrupt temperature changes
- Relative humidity greater than 85%RH
- Location exposed to corrosive gases or combustible gases
- Location exposed to significant amount of dust, salt or iron powder
- Location subject to direct vibration or impact
- Location exposed to direct sunlight
- Location where the product may come in contact with water, oil or chemical droplets

When using the product in any of the locations specified below, provide a sufficient shield.

- Location subject to electrostatic noise
- Location where high electrical or magnetic field is present
- Location with the mains or power lines passing nearby

Installation and Noise Elimination

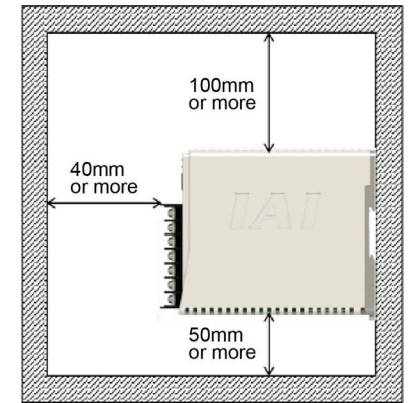
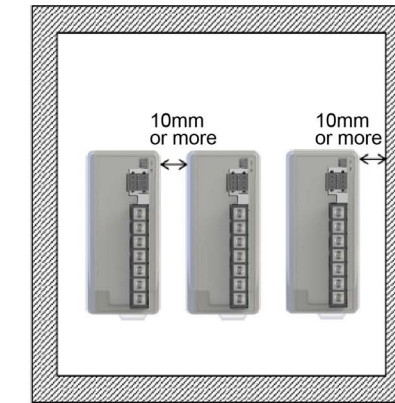
1. Grounding



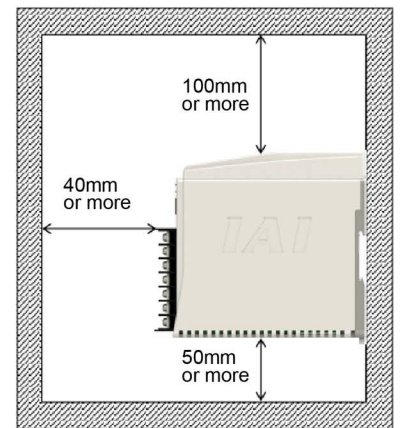
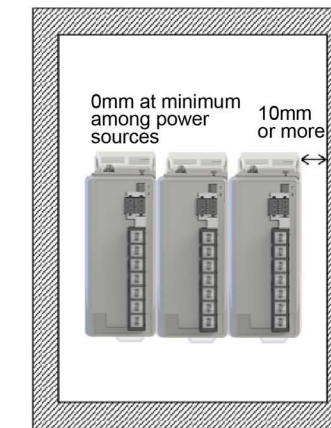
2. Heatsink and Mounting Method

In the figures below show the minimum distance between the control panel and walls and minimum distance among power sources in parallel operation.
 Also, make sure to keep the temperature below the ambient temperature specified for the power source when design and install the control panel.

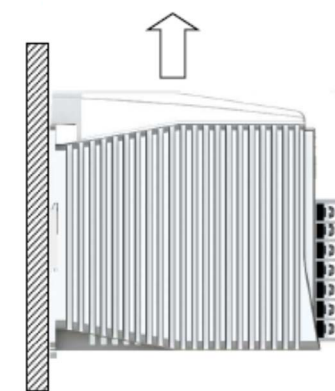
• PSA-24



• PSA-24L



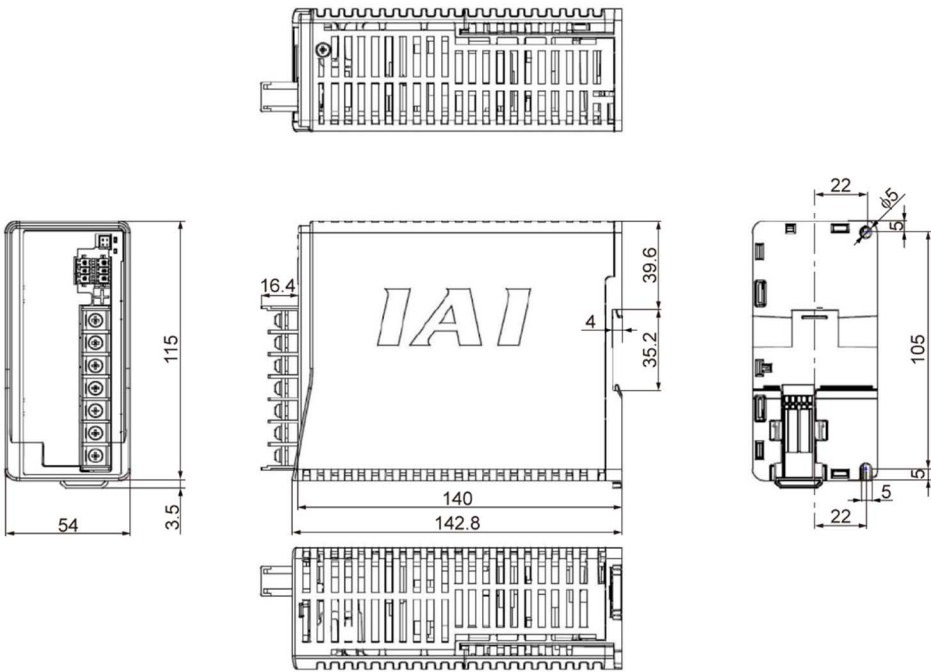
Direction of air flow for forced air cooling (natural convection)



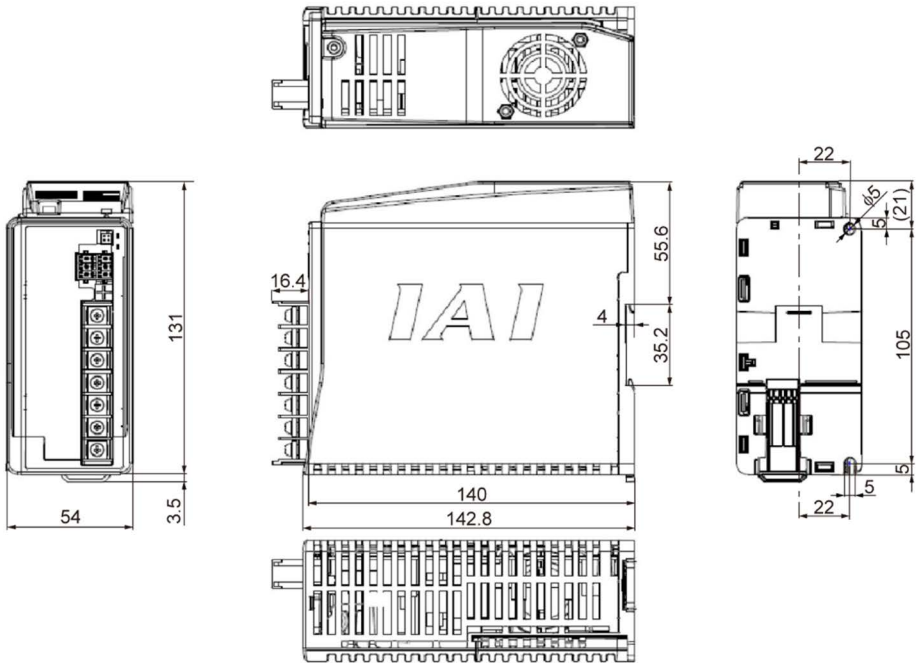
Caution: The main housing of the product gets so hot that it sometimes gives you a burn as it works as a heat sink.
 Do not touch while the power is on, or even after the power is off until the heat calms down.

External Dimensions

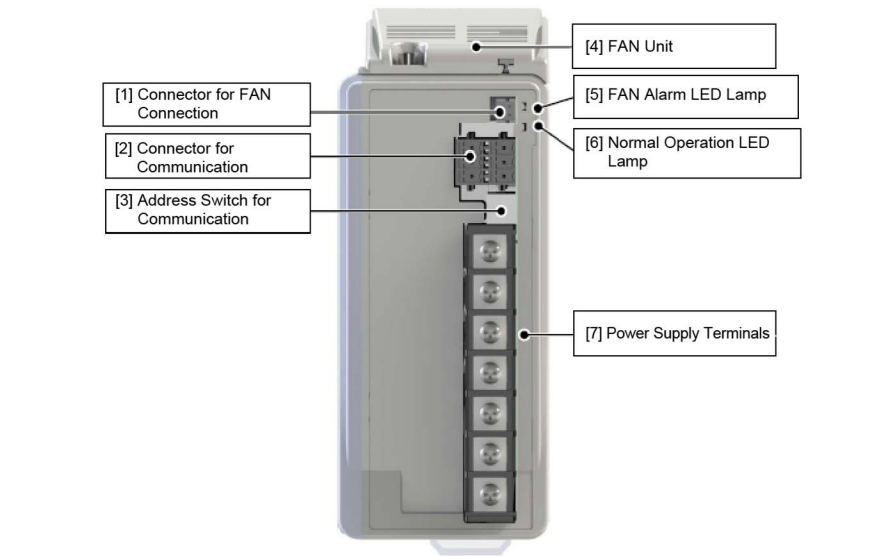
PSA-24



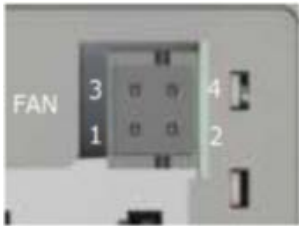
PSA-24L



Name and Function of Each Part

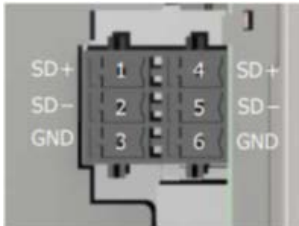


[1] Connector for FAN Connection
It is the connector for fan connection when using at 330W for the continuous rated output.



Connector Names on PCB side : DF11-4DP-2DS (24) (HIROSE ELECTRIC CO., LTD.)		
Pin Number	Signal	Description
1	24V	Fan Power Supply
2	CONNECT	Connection Recognition Signal (Connected : H / Unconnected : L)
3	GND	GND for Fan
4	PULSE	Fan Rotation Pulse

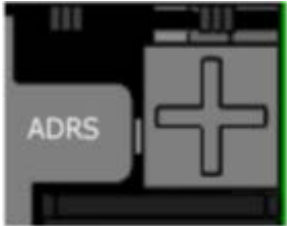
[2] Connector for Communication
It is the connector to monitor the status data inside the power source by communication. There are two inlets in order to enable communication with multiple power sources in multi-drop wiring. It can be connected to either of the inlets because the differential signal on each inlet is short-circuited with each other inside. The connector on the cable is enclosed.



Connector Names on PCB side : 0221-26-6615-06THT (DINKLE)		
Connector Names on Cable Side (Accessories) : 0221-2403 (DINKLE)		
Pin Number	Signal	Description
1	SD+	Positive Side of RS485 Differential Signal
2	SD-	Negative Side of RS485 Differential Signal
3	GND	
4	SD+	Positive Side of RS485 Differential Signal
5	SD-	Negative Side of RS485 Differential Signal
6	GND	

* There is no impact to the operation of the power source itself even if there is no communication connector connected.

[3] Address Switch for Communication
Set up the slave address assignment in communication for when connecting multiple power sources in multi-drop wiring and monitoring the status by communication.



Switch Names : DRR7016C (NIDEC COPAL ELECTRONICS CORPORATION)	
Item	Description
Initial Setting	"0"
Range for Setting	"0" to "F"

[4] Fan Unit
Unit to connect when using at 330W for continuous rated output (PSA-24L)

[5] FAN Alarm LED Lamp

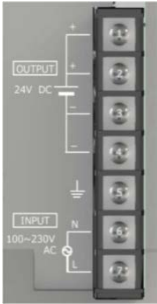
[6] Normal Operation LED Lamp
This power source is equipped with two types of LED lamps as shown below.



Description on Panel	Display Color	Status	Description
FAN	Orange	Illuminated	Error in Fan Rotation
		Flashing	Warning for Fan Rotation
		Off	Fan in Normal Operation *1
SYS	Green	Illuminated	In Normal Operation
		Off	Operation Suspended *2

*1 LED lamp should be off when the fan is not connected.
*2 There may be a case that this LED lamp is off even if there is an input of AC power when in parallel operation in low load as there is a case that only some of the power sources are in operation. It should turn on when load increases and all the power source starts working.

[7] Power Supply Terminals
Terminals to connect cables for AC power input, frame grounding and output voltage



Connector Names : DT-5C-B84W-6717-07 (DINKLE)		
Pin Number	Signal	Description
1	+24V	24V Output Terminals (Pin 1 and 2 are connected inside)
2	+24V	
3	0V	0V Output Terminals (Pin 3 and 4 are connected inside)
4	0V	
5	FG	Frame Grounding Terminal (grounding terminal connected to the body of power source) *1
6	AC (N)	AC Input Neutral Terminal (on grounding)
7	AC (L)	AC Input Live Terminal (on non-grounding)

*1 "FG" means functional grounding terminals.

* Recommended cable size : From AWG14 to 18

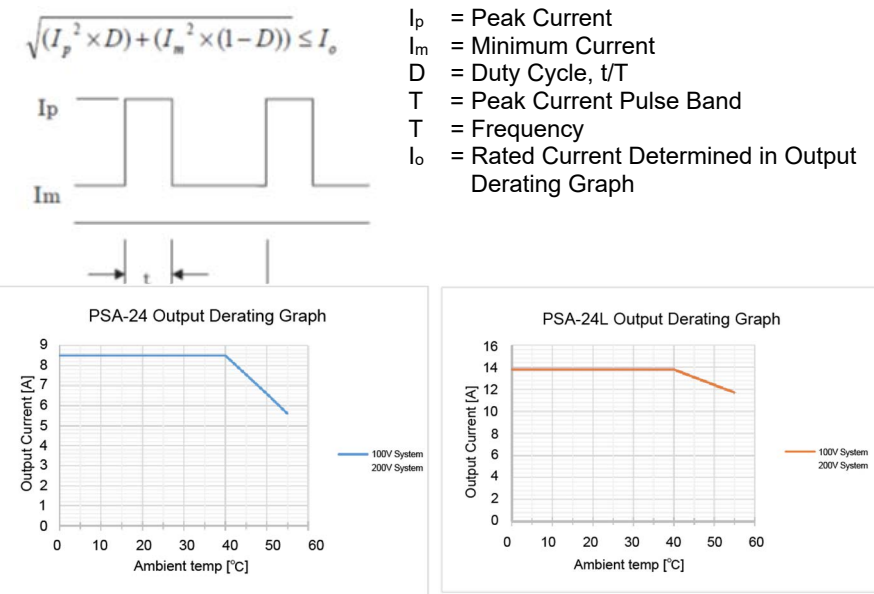
Output Voltage

This power supply is able to be used in a parallel operation, and the output voltage fluctuates within the range of 24V±10% even in a normal operation.
The voltage is set to around 25.5V at no duty. This voltage fluctuation does not influence the operation of IAI 24V controller at all.

Output Current

It should be available to have the peak current output only when it satisfies the following conditions.

- The duty cycle of the peak current should be 30%.
 $D \leq 0.3$
- The communication time of the peak current should be 10 seconds or less.
 $t \leq 10$ [sec]
- The average current should be I_0 or less which is the continuous rated current determined by the output derating.



Protective Functions

(1) Over Current Protection Circuit

The voltage suddenly drops when the current more than the peak maximum current output is output (includes short circuit). Power output automatically recovers when the over current condition is cancelled.

There is a case that the over current protection circuit works due to the in-rush current caused by turning on multiple controllers at the same time.

Described above is concerned as the cause of the phenomenon of sudden voltage drop occurring when turning on each actuator controller, emergency stop being cancelled, and so on.

(What happens as the influence of the voltage drop is that it takes comparatively long time at the start-up of the controllers or canceling the emergency stop.)

In the case this is occurred, it is necessary to boost the controllers one by one, or add another power supply.

(2) Over Voltage Protection Circuit

The over voltage protection circuit works when the output voltage rises abnormally high. If the voltage continues to rise, it shuts down the output. To recover, shut down the input power first, leave it for approximately 2 minutes, and then input the power again.

When the over voltage protection works, internal devices may break. If output does not work properly even though trying to turn on the power several times, it may require a repair.

(3) Over Temperature Protection Circuit

The over temperature protection circuit detects an abnormal rise of the ambient temperature and internal temperature, and shuts down the output.

To recover, shut down the input power first, leave it for a while till it cools down, and then input the power again. If the over temperature protection works often, lower the ambient temperature and the duty ratio.

(4) Over Load Detection

The threshold for the current approximately 8.7A should be as shown below with and without fan.

For PSA-24 : Approx. 9.8A

For PSA-24L : Approx. 14.2A

(5) Input Low Voltage Protective Function

The input low voltage protection circuit starts working when the input voltage gets lower than the specified range.

The output voltage should be shut off when the input voltage gets lower than 82V AC. The operation comes back normal if the input voltage gets more than 82V AC.

(6) Fan Rotation Drop Function

A warning and error should be notified when the rotation of the fan gets low in PSA-24L.

Warning :Notification by warning bit with LED lamp flashing and communication when 70% or lower continues for 15 seconds or more

Error :Notification by error bit with LED lamp flashing and communication when 50% or lower continues for 15 seconds or more

also, when an error is detected due to drop of the fan rotation, as there is a concern of remarkable drop of the production life because of abnormal overheat, the threshold for overload detection inside should be compulsorily switched to the setting for PSA-24 (natural cooling), and continuous operation at 330W should become unavailable. It should be recovered after shutting down the power, replace the fan and reboot the AC power.

⚠ Caution: Use of the product in a way that is not stated in the first step guide or the instruction manual should lose the protection performance which the product possesses.

Simple Troubleshooting

Contents	Treatment
Voltage does not output	• Is the connected input voltage within the specification? • Any short circuit or grounding fault on the output circuit? • Time delay too short after over voltage or over temp protection activated. • Did you turn on the power supply units at the same time for parallel operation? • Did you check that the ambient temperature is not high? • Is the load too big?
Output voltage is low.	• Is the load too big?



IAI Corporation

Head Office: 577-1 Obane Shimizu-KU Shizuoka City Shizuoka 424-0103, Japan

TEL +81-54-364-5105 FAX +81-54-364-2589

website: www.iai-robot.co.jp/

IAI America, Inc.

Head Office: 2690 W. 237th Street, Torrance, CA 90505

TEL (310) 891-6015 FAX (310) 891-0815

Chicago Office: 110 East State Parkway, Schaumburg, IL 60173

TEL(847) 908-1400 FAX (847) 908-1399

Atlanta Office: 1220 Kennestone Circle, Suite 108, Marietta, GA 30066

TEL (678) 354-9470 FAX (678) 354-9471

website: www.intelligentactuator.com

IAI Industrieroboter GmbH

Ober der Röth 4, D-65824 Schwalbach am Taunus, Germany

TEL 06196-88950 FAX 06196-889524

website: www.iai-automation.com

Technical Support available in Great Britain



Duttons Way, Shadsworth Business Park, Blackburn, Lancashire, BB1 2QR, United Kingdom

TEL 01254-685900

website: www.lcautomation.com

IAI (Shanghai) Co., Ltd.

SHANGHAI JIAHUA BUSINESS CENTER A8-303, 808, Hongqiao Rd. Shanghai 200030, China

TEL 021-6448-4753 FAX 021-6448-3992

website: www.iai-robot.com

IAI Robot (Thailand) Co., Ltd.

825 PhairojKijja Tower 7th Floor, Debaratana RD., Bangna-Nuea, Bangna, Bangkok 10260, Thailand

TEL +66-2-361-4458 FAX +66-2-361-4456

website:www.iai-robot.co.th

Manual No.: ME0380-2B