IKO

Precision Alignment Table

AT

CAT-57121

PATENT PENDING

ISO 14001 Certified

Alignment Table most suitable for use correction mechanism is newly

Rotator converts linear motion into circular motion.

Compact and low height design

As a compact two-axis positioning mechanism…

Precision Positioning Table **CT + AT**

XY-θ (*two-axis specification*)

as a precision angle introduced !

IKO

Precision Alignment Table

AT

As a high rigidity two-axis positioning mechanism···

Precision Positioning Table **CTLH + AT**

XY-θ (*two-axis specification*)

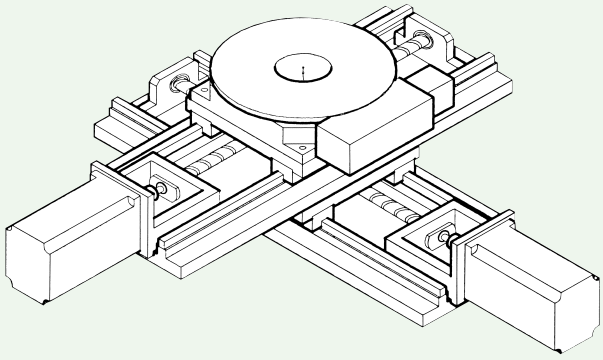
As a compact single-axis positioning mechanism···

Precision Positioning Table **TS + AT**

X-θ (*single-axis specification*)

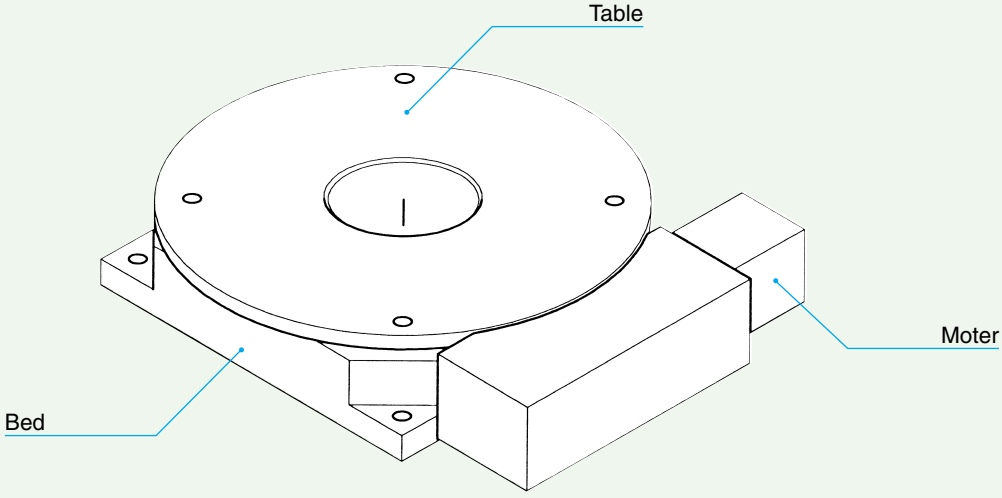
High precision achieved by incorporating Crossed Roller Bearing !

IKO Precision Alignment Table AT is a rotary positioning mechanism for precision angle correction, which consists of a high rigidity steel table and bed assembled with IKO Crossed Roller Bearing as a table support bearing.
Precision Alignment Table AT converts linear motion produced by ball screw drive into circular motion of an operating angle range of ±5 degrees, and performs positioning in the direction of rotation. Linear Way L is assembled as a linear motion rolling guide in the ball screw drive mechanism and serves to achieve high accuracy positioning in combination with the precision ball screw.
Precision Alignment Table AT can be mounted on top of the slide table of IKO Precision Positioning Table to obtain a low height XY-θ multi-axis positioning mechanism, which can be used as an alignment table for precision measuring instruments, inspection equipment, and assemblers.



Example of multi-axis mechanism using Precision Alignment Table AT

Crossed Roller Bearing



Structure of Precision Alignment Table AT

Compact Size Precision Angle Correction Mechanism

Low sectional height of 50mm

Compact size and low sectional height design with a height of only 50mm is realized by making the most of the features of compact and high rigidity Crossed Roller Bearing.

High repeatability

The rotator which converts linear motion into circular motion is accurately guided by Linear Way L in combination with precision ball screws, and achieves a high repeatability of ±1.5 sec.

Hollow structure of table and bed

Hollow structure, featuring a large diameter center through hole from the top surface of the table to the bottom surface of the bed, is useful in various ways, for example, conducting a measurement of transmitted light from the bottom surface of the bed, and using the hole as a cable duct for machines and

Two sizes available as series

Two sizes with a table diameter of 120 mm and 200 mm are available as series. They can be selected meeting the needs for each application.
Also, AC servo motors and stepping motors are available as drive motors.

Sensors provided as the standard specification

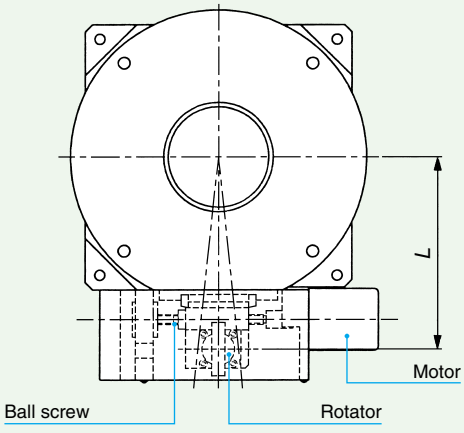
Sensors are provided as the standard specification at the limit positions of the operating angle range of ±5° . These sensors can be used for overrun detection for hazard prevention, and origin setting.

Simple design featuring one-touch connection

Various electric devices for control are available and can be connected by one touch if the delicated connecting cord is used. This contributes to the reduction of man-hours for design of machines and equipment.

Drive Mechanism of Precision Alignment Table AT

Precision Alignment Table AT is driven by stroking the rotator connected to the outer peripheral surface of the table in the linear direction by ball screw drive. The Length from the center of the table to the rotator linear axis and the table angle change by rotator movement. To make adjustment for these changes, the rotator incorporates linear and rotary motion rolling guide mechanisms that follow the rotator movement in accordance with the table angle.
In Precision Alignment Table AT, therefore, even when the rotator is moved with the same pitch, the rotation angle differs depending on the position, and the rotation speed does not become constant when the totator is moved at a uniform speed.



Length *L* from the center of table unit : mm

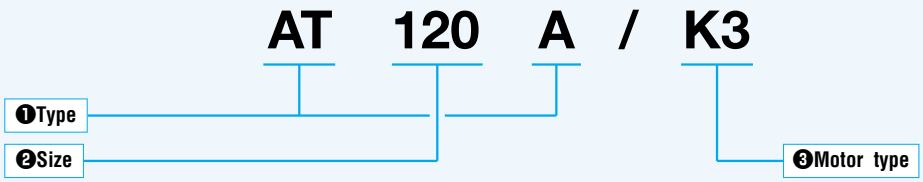
Model number	*L*
AT120A	100
AT200A	130

1N=0.102kgf=0.2248lbs.
1mm=0.001m=0.03937inch

Identification Number

An example of identification number of Precision Alignment Table AT is shown below. Two sizes with a table diameter of 120 mm and 200 mm are available. A stepping motor or an AC servo motor can be selected as a drive motor.

Example of identification number



❶Type	AT···A : Precision Alignment Table AT
❷Size	120 : Table diameter 120mm 200 : Table diameter 200mm
❸Motor type	A5 : AC servo motor SGM-A5B512 (Yaskawa Electric Corporation) M5 : AC servo motor MSM5AZA1A (Matsushita Electric Industrial Co., Ltd.) K3 : Stepping motor PK545-A (Oriental Motor Co., Ltd.)

Characteristics

The characteristics of Precision Alignment Table AT are shown in Table 1. The timing chart of the sensors incorporated in the table is shown in Fig. 1.

Table 1 Characteristics

Item / Size	Ball screw lead	Rotator resolution	Operating angle range	Repeatability	Allowable load
AT120 A	1mm	1 μm (1)	±5°	±1sec.	100N
AT200 A					300N

Note (1) : This is a value when the number of divisions of motor rotation is 1000 pulses.

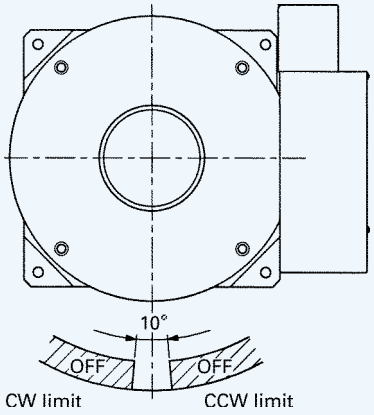
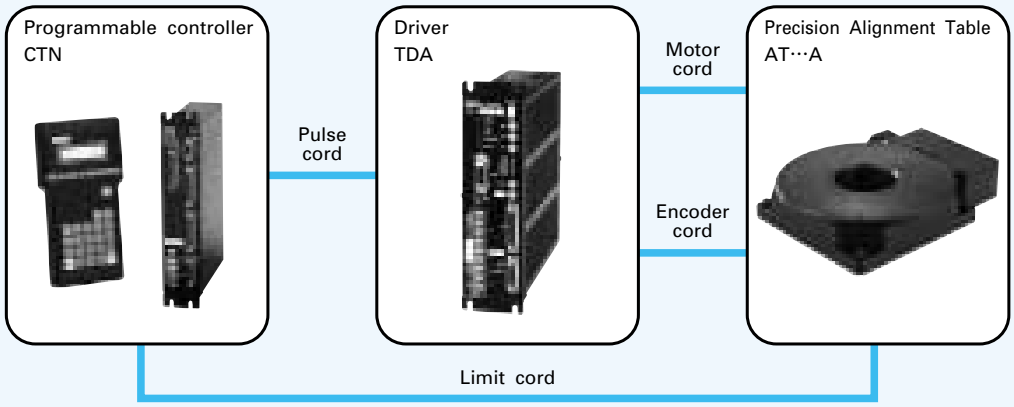


Fig. 1 Timing chart of sensors

System Configuration

Specially designed electric devices for Precision Alignment Table AT are available so as to obtain the full performance of the table. A totally balanced system can be built by using these electric devices in combination with the table.

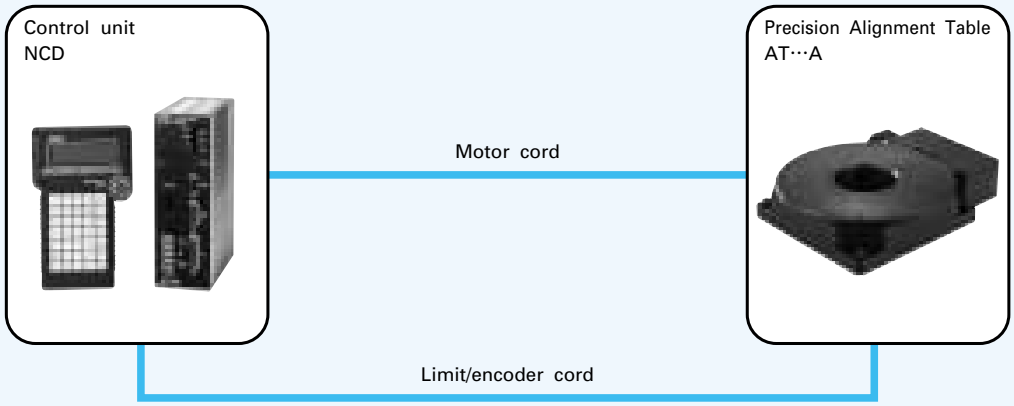
Table 2 System configuration using driver and programmable controller



Motor		Driver			Programmable controller			
Type	Motor code	Main body	Motor cord	Encoder cord	Main body	Teaching box	Pulse cord	Limit cord
AC servo motor	A5	TDA1-1004	TAE2052-AM03 (TAE2036-AM03)	TAE2054-AE03 (TAE2038-AE03)	CTN140G	TAE1025-TB	TAE1030-PC	TAE1027-LCA03
Stepping motor	K3	TDS1-5071	TAE2055-SMC03 (TAE2057-SNC03)	—			TAE1026-PCA	

Remark 1. The cords in ( ) have high bending resistance.
2. The standard length of the motor cord, encoder cord, and limit cord is 3 m. The pulse cord is 1.5 m long.

Table 3 System configuration using control unit (AC servo motor specification)



Motor		Control unit			
Type	Motor code	Main body	Teaching box	Motor cord	Limit/encoder cord
AC servo motor	A5	NCD160G-A0500	TAE1050-TB	TAE2065-AM03 (TAE2072-AM03)	TAE2066-AEL03 (TAE2073-AEL03)
	M5				TAE2067-AEL03 (TAE2074-AEL03)

Remark 1. The cords in ( ) have high bending resistance.
2. The standard cord length is 3 m.

1N=0.102kgf=0.2248lbs.
1mm=0.001m=0.03937inch

Electric Devices

Table 4 Specifications of driver

Item \ Type		TDA1-1004	TDS1-5071 (1)
Number of drive axes		One axis	
Applicable motor		AC servo motor (30W、50W、100W)	5-phase stepping motor (0.75 A/phase)
Feedback		Incremental encoder	—
Drive method		—	Bipolar constant-current drive
Excitation method		—	4-5 phase excitation or 4 phase excitation
Command pulse input system		CW/CCW pulse or direction command/forward and reverse pulses	CW/CCW pulse
Command pulse input form		Line driver or open collector (+5 V level)	
General specifications	Supply voltage	AC100V±10% 50/60Hz	DC24V±10%
	Maximum current consumption	10A	3A
	Ambient temperature (during operation)	0～50℃	0～45℃
	Ambient humidity (during operation)	35～85%RH (non-condensing)	
	External dimensions (reference value)	Width 68 mm×Height 220 mm×Depth 220 mm	Width 43 mm×Height 75 mm×Depth 100 mm
	Mass (reference value)	Main body : 2.0kg	Main body : 0.3kg

Note (1) : Two-axis specification and AC 100 V (supply voltage) drivers are also available. Consult IKO for further information.

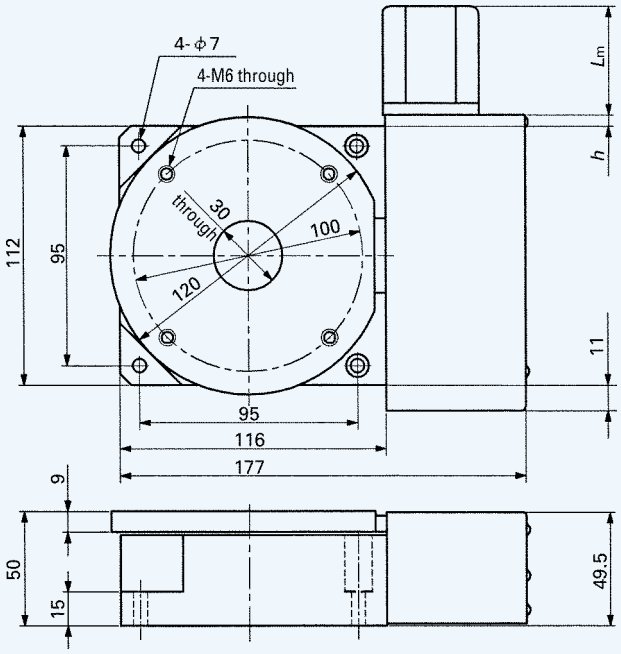
Table 5 Specifications of programmable controller/control unit

Item \ Type			CTN140G (1)	NCD160G-A0500
Control specifications	Number of control axes		One axis	
	Applicable motor		—	AC servo motor (30W、50W)
	Feedback		—	Incremental encoder
	Command pulse output system		CW/CCW pulse or direction command/forward and reverse pulses	—
	Command pulse output form		Line driver	—
	Maximum command value		±999999 pulses	±2147483647 μm
	Maximum output frequency		200kpps	—
	Motor speed		—	Rated speed 3,000 rpm, maximum speed 4,500 rpm
Program specifications	Input method		MDI, teaching, and PC input via RS-232C	
	Command input system		Absolute command or incremental command	
	Program capacity		1,000 steps	1,200 steps or more (256 points)
	Functions		Jump, call, repetition, timer control, I/O control, branching by input conditions, various editing functions, etc.	
Input/output specifications	Input	Number of input points	LS input : 4 points, I/O input : 8 points	LS input : 3 points, I/O input : 23 points
		Operation input	Start, stop, emergency stop, forward/reverse manual operation, return to origin, servo control, alarm resetting, interrupt, etc. (Selected and allocated to I/O inputs by parameters)	
		Input method	Photo coupler input (for no-voltage contact or open collector output)	
	Output	Number of output points	I/O outpu : 7 points	I/O output: : 15 points
		Operation output	Automatic operation, limit actuation, emergency stop, completion of return to origin, completion of positioning, etc. (Selected and allocated to I/O outputs by parameters)	
		Output method	Open collector output (DC30V 100mA MAX)	
	Power supply for input and output		For I/O : DC24V 1A	
Protective functions			—	Over-current, over-voltage, overload, acceleration, voltage drop, encoder error, deviation error, overheat, CPU error, etc.
Other major functions			RS-232C (reading, writing, direct execution, etc.), software limit, LS logic change, check functions,	RS-232C (reading, writing, direct execution, etc.), software limit, LS logic change, check functions, speed change during movement, torque limitation, torque monitoring, brake/regenerative unit add-on, etc.
General specifications	Supply voltage		DC24V±10%	AC85～132V 50/60Hz
	Continuous rated current		—	1.0Arms
	Maximum current consumption		1.4A	6A
	Ambient temperature (during operation)		0～50℃	
	Ambient humidity (during operation)		35～85%RH (non-condensing)	
	Counter measure for power failure		Lithium battery Life : approx. 5 years	Flash memory (requiring no battery change)
	External dimensions (reference value)		Width 49 mm×Height 220 mm×Depth 156 mm	Width 70 mm×Height 220 mm×Depth 160 mm
	Mass (reference value)		Main body : 1.2kg Dedicated teaching box (TAE1025-TB) : 0.5kg	Main body : 1.6kg Dedicated teaching box (TAE1050-TB) : 0.5kg

Note (1) : Multi-axis specification, high performance type, and AC 100 V (supply voltage) controllers are also available. Consult IKO for further information.

Dimensions of Table

AT120 A

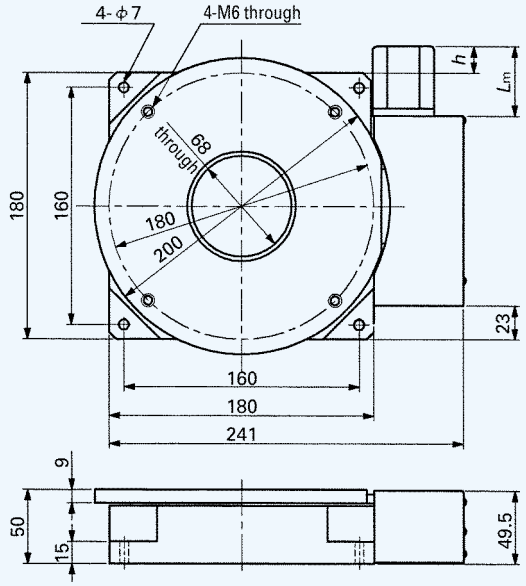


Dimensions of motor L_m unit : mm

Motor code	L_m	h
A5	77	20
M5	73	20
K3	47	5

Mass 4.4 kg (The mass of motor is not included.)

AT200 A



Dimensions of motor L_m unit : mm

Motor code	L_m	h
A5	77	3
M5	73	3
K3	47	18

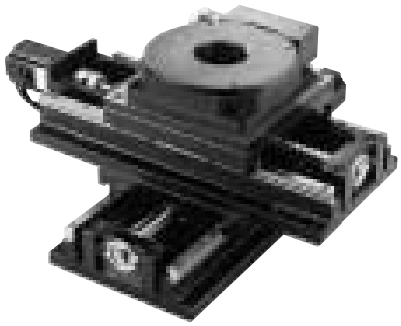
Mass 9.9 kg (The mass of motor is not included.)

1N=0.102kgf=0.2248lbs.
1mm=0.001m=0.03937inch

Configuration of XY-θ Multi-axis Positioning Mechanism

When Precision Alignment Table AT is combined with IKO Precision Positioning Table of single-axis/multi-axis specification, an XY-θ multi-axis positioning mechanism can be readily formed. This positioning mechanism has a compact structure with low assembly height, and can be used to perform high accuracy positioning as an alignment table for precision measuring instruments, inspection machines, assemblers, etc. Table 6 shows examples of configuration of multi-axis positioning mechanism using Precision Alignment Table AT. Various other multi-axis configurations are also available to meet the requirement for each application. Consult IKO for further information.

Table 6 Examples of configuration of multi-axis positioning mechanism

Appearance of multi-axis positioning mechanism	Models of IKO Precision Positioning Table that can be combined with Precision Alignment Table AT			Stroke length	
				X axis	Y axis
	Precision Positioning Table TS and CT	Single-axis specification	**TS125/125**	50	
			TS125/220	120	
			TS220/220	120	
			TS220/310	180	
			TS260/350	250	
		Two-axis specification	**CT125/125**	50	50
			CT220/220	120	120
			CT260/350	150	250
			CT350/350	250	250
	Precision Positioning Table LH TSLH and CTLH	Single-axis specification	**TSLH120H**	100, 150	
				200	
				250	
				300	
			TSLH220H	150	
				200, 250, 300	
				400	
			TSLH320H	300	
				400, 500	
			TSLH420H	500	
				600	
				800	
		Two-axis specification	**CTLH120H**	100	100
				200	100
				200	200
				320	200
				300	300
			CTLH220H	200	200
				300	200
				300	300
				400	300
				400	400
			CTLH320H	300	300
				400	300
				400	400
				500	400
				500	500

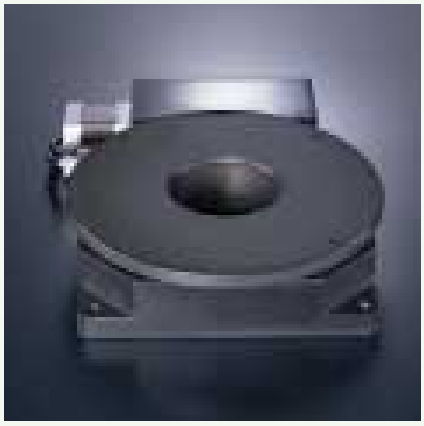
Remark The above table shows specifications and performance of IKO Precision Positioning Table. For the specifications and performance to be obtained by combining it with Precision Alignment Table AT, consult IKO for further information.

unit : mm

Dimensions of slide table		Height	Positioning accuracy	Repeatability	Parallelism A in table operation	Parallelism B in table operation	Straightness	Perpendicularity between X and Y motions
Width	Length							
125	125	60	0.005	±0.002	0.005	0.015	—	—
125	220	60	0.008					
220	220	65						
220	310	70	0.015		0.008	0.020		
260	350	100						
125	125	85	0.005	±0.002	0.005	0.015	—	0.005
220	220	100	0.008					
260	350	150	0.015		0.008	0.020		0.008
350	350	150						
120	135	65	0.010	±0.002	0.010	—	0.005	—
			0.015		0.015		0.010	
			0.020		0.020			
220	220	90	0.010	±0.002	0.010	—	0.005	—
			0.015		0.015			
			0.020		0.020		0.010	
320	320	120	0.015	±0.002	0.015	—	0.005	—
			0.020					
420	420	140	0.025	±0.002	0.025	—	0.015	—
			0.030		0.030			
			0.035		0.035		0.020	
120	135	130	0.015	±0.002	0.015	—	0.005	0.005
			0.020		0.020		0.010	0.010
					0.025			
			0.030		0.030		0.025	
220	220	180	0.020	±0.002	0.025	—	0.010	0.010
			0.030		0.035		0.020	0.015
320	320	240	0.020	±0.002	0.020	—	0.005	0.010
			0.025		0.025		0.010	0.015
			0.030					

1N=0.102kgf=0.2248lbs.
1mm=0.001m=0.03937inch

AT



See you again at
Planet IKO
http://www.ikont.co.jp/

NIPPON THOMPSON CO., LTD.

Head office :19-19 Takanawa 2-chome
Minato-ku, Tokyo 108-8586, Japan
Phone :Tokyo(03)3448-5850
Fax :(03)3447-7637
E-mail :ntt@ikonet.co.jp
URL :http://www.ikont.co.jp/
Plant :Gifu, Kamakura

IKO International, Inc.

● P.O. BOX 5897
91 Walsh Drive
Parsippany, NJ 07054
U.S.A.
Phone:(973)402-0254
Toll Free:1-800-922-0337
Fax:(973)402-0441
E-mail:eco@ikonet.co.jp

● 500 East Thorndale Avenue
Wood Dale, IL 60191
U.S.A.
Phone:(630)766-6464
Toll Free:1-800-323-6694
Fax:(630)766-6869
E-mail:mwo@ikonet.co.jp

● 20170 South Western Avenue
Torrance, CA 90501
U.S.A.
Phone:(310)609-3988
Toll Free:1-800-252-3665
Fax:(310)609-3916
E-mail:wco@ikonet.co.jp

● 2150 Boggs Road, Suite 100
Duluth, GA 30096
U.S.A.
Phone:(770)418-1904
Toll Free:1-800-874-6445
Fax:(770)418-9403
E-mail:seo@ikonet.co.jp

● 8105 N. Beltline Road
Suite 130, Irving, TX 75063
U.S.A.
Phone:(972)929-1515
Toll Free:1-800-295-7886
Fax:(972)915-0060
E-mail:swo@ikonet.co.jp

Nippon Thompson Europe B.V.

● Sheffieldstraat 35-39
3047 AN Rotterdam
The Netherlands
Phone:010-4626868
Fax:010-4626099
E-mail:nte@ikonet.co.jp

● Mündelheimer Weg 56
40472 Düsseldorf
Germany
Phone:0211-414061
Fax:0211-427693
E-mail:ntd@ikonet.co.jp

Donaustaufer Str. 200
93059 Regensburg
Germany
Phone:0941-447737
Fax:0941-447747

● 2 Vincent Avenue, Crownhill
Milton Keynes Bucks MK8 OAB
United Kingdom
Phone:01908-566144
Fax:01908-565458
E-mail:ntu@ikonet.co.jp

● Autovia Madrid-Barcelona, Km. 43,700
Polig. Ind. AIDA, A-8, Ofic. 2, 1ª
19200-Azuqueca de Henares
Guadalajara, Spain
Phone:949-263390
Fax:949-263113
E-mail:nts@ikonet.co.jp

● Roissypole Le Dôme
2 rue de La Haye
BP 10950 Tremblay en France
95733 Roissy C. D. G. Cedex
France
Phone:01-48165739
Fax:01-48165746
E-mail:ntf@ikonet.co.jp

Printed in Japan © 2001.10(OKU)