CONTROL TECHNIQUES™

DIGISTART D1 & D2

LOW VOLTAGE SOFT STARTER

Drive specialists
since 1973

Nidec
All for dreams

DIGISTART D1 & D2

Making soft starters simple

Our D1 Series soft starters allow you greater control over the starting and stopping of three phase motors. The D2 is ideal as a simple soft start control device, whilst the D2 provides an advanced soft start system complete with motor protection.

DIGISTART **D1**

D1 soft starter employs a timed voltage ramp system, which provides you with greater control over soft start and soft stop performance, reducing energy costs and enhancing the efficiency of your motor. Simple operation features and the built-in bypass function are housed in a compact package, giving a cost-effective solution for stopping and starting control.

DIGISTART **D2**

D2 soft starter is a constant current system, complete with current measurement and control. In addition to soft start and soft stop, the D2 provides a range of motor protection functions, including motor overload, phase loss and excess start time. The D2 also features a programmable relay.

Compact Design

The D1 and D2 soft starter is a compact unit suitable for mounting in a switchboard or motor control centre without the need for an external bypass contactor. At only 165 mm deep it is easy to mount in shallow switchboards.

For motors up to 60 A the soft starter can be mounted on a DIN-rail, or the D1 may be mounted in a bank horizontally to use less space, often critical in certain switchboards.

Energy Savings

We have made energy savings simple. D1 and D2 soft starters are equipped with an internal bypass function to reduce operating costs. D1 starters are 99.5% efficient during run, produce no harmonics and are the most energy efficient solution for fixed speed applications with variable load.

Simple to Integrate

With features such as dedicated output relays to control the upstream main contactor and power factor correction capacitors, D1 and D2soft starters are easy to integrate into complete motor control solutions.

Protection

The D2 has built-in thermal model motor overload protection. The motor current is continuously monitored and the expected temperature is calculated based on this monitored current.

The user sets the Motor Trip Class, and the D2 will trip when the calculated motor temperature reaches 105%.

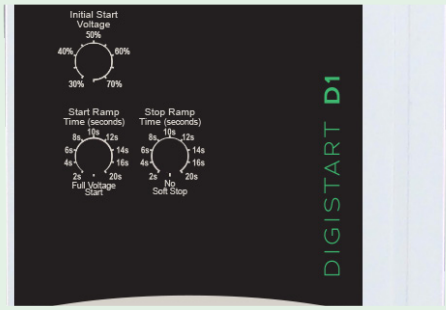
An external motor protection device is not required when using a D2 soft starter.

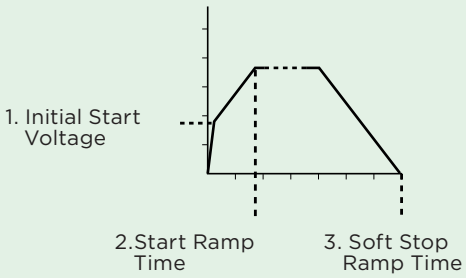
Control made easier

DIGISTART D1 AND D2

Three adjustments can be made on the D1 and D2 soft starter:
–Initial start voltage
–Start ramp time
–Soft stop ramp time

D1 CONTROL PANEL





Trip Messages

The D1 and D2 allows for fast diagnosis of a trip via two LEDs on the front of the unit. LEDs will flash to indicate the trip. (Note: some trip messages available only on the D2 or with an optional accessory).

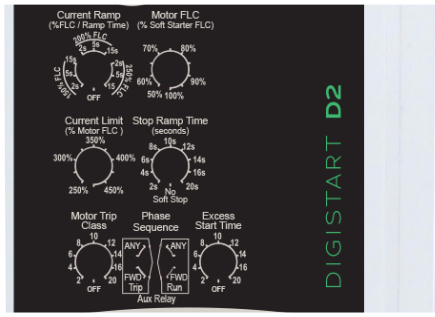
INDICATOR		DESCRIPTION	D1	D2
○		No control power	•	•
●		Ready	•	•
☼		Tripped	•	•
INDICATOR		**DESCRIPTION**		
☼	x 1	Power circuit	•	•
☼	x 2	Excess start time		•
☼	x 3	Motor overload		•
☼	x 4	Motor thermistor		•
☼	x 5	Current imbalance		•
☼	x 6	Supply frequency	•	•
☼	x 7	Phase rotation		•
☼	x 8	Network communication failure	Opt	Opt
☼	x 9	Starter communication failure	Opt	Opt
☼	x 10	Bypass overload		•

Digistart D2 Series

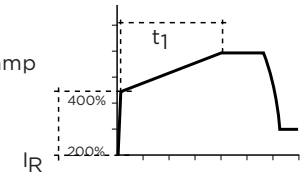
The D2 has several adjustments for more control:

- Current ramp
- Motor FLC
- Current limit
- Stop ramp time
- Motor trip class
- Auxiliary relay
- Phase sequence
- Excess start time

D2 CONTROL PANEL



1. Current Ramp

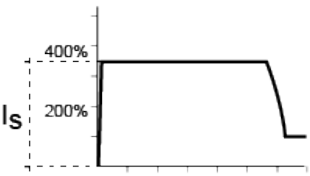


DIGISTART D2 CONTROL PANEL

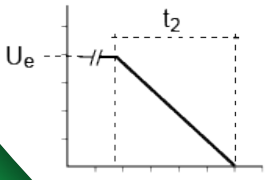
2. Motor FLC

CSXi FLC

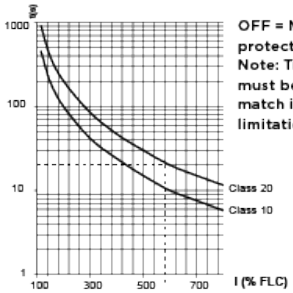
3. Current Limit



4. Stop Ramp Time



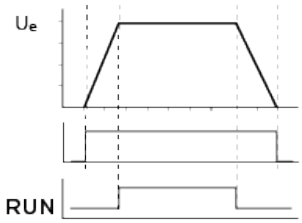
5. Motor Trip Class



OFF = No overload protection.
Note: Trip class must be set to match installation limitations.

Cold start curves

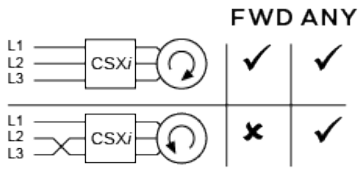
6. Aux Relay Function



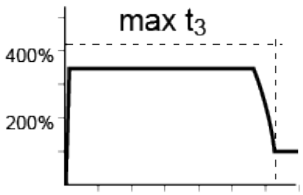
Main Contactor

TRIP = Fault

7. Phase Sequence



8. Excess Start time



Technical Data

Mains Supply

Mains voltage (L1, L2, L3)

Dx-xxx-V4-Cx ..... 3 x 200 VAC ~ 440 VAC (+ 10% / - 15%)

Dx-xxx-V6-Cx ..... 3 x 200 VAC ~ 575 VAC (+ 10% / - 15%)

Mains frequency (at start) ..... 45 Hz to 66 Hz

Rated insulation voltage ..... 600 VAC

Form designation ..... Bypassed semiconductor motor starter form 1

Control voltage (01, 02)

Dx-xxx-Vx-C1 ..... 110-240 VAC (+ 10% / - 15%)

..... or 380-440 VAC (+ 10% / - 15%)

Dx-xxx-Vx-C2 ..... 24 VAC/VDC (± 20%)

Current consumption (during run) ..... < 100 mA

Current consumption (inrush)

Dx-xxx-Vx-C1 ..... 10 A

Dx-xxx-Vx-C2 ..... 2 A

Inputs

Start (terminal 01) ..... Normally open

..... 150 kΩ @ 300 VAC and 56 kΩ @ 24 VAC/VDC

Stop (terminal 02) ..... Normally closed

..... 150 kΩ @ 300 VAC and 56 kΩ @ 24 VAC/VDC

Outputs

Main contactor (terminals 13, 14) ..... Normally open

..... 6 A, 30 VDC / 6 A, 250 VAC resistive

Run relay (terminals 23, 24) ..... Normally open

..... 6 A, 30 VDC / 6 A, 250 VAC resistive

Environmental

Degree of Protection 018 to 100 ..... IP20

Degree of Protection 140 to 200 ..... IP00

Operating temperature ..... - 10 °C to + 60 °C

Storage temperature ..... -25 °C~+ 60 °C (to +70 °C for less than 24 hours)

Humidity ..... 5%~95% Relative Humidity

Pollution degree ..... Pollution Degree 3

Vibration ..... IEC 60068 Test Fc Sinusoidal

..... 4 Hz to 132 Hz: ± 1 mm displacement

..... 132 Hz to 200 Hz: ± 07 g

EMC Emission

Equipment class (EMC) ..... Class B
Conducted radio frequency emission ..... 015 MHz to 05 MHz: < 56-46 dB (µV)
..... 05 MHz to 5 MHz: < 46 dB (µV)
..... 5 MHz to 30 MHz: < 50 dB (µV)
Radiated radio frequency emission ..... 30 MHz to 230 MHz: < 30 dB (µV/m)
..... 230 MHz to 1000 MHz: < 37 dB (µV/m)

EMC Immunity

Electrostatic discharge ..... 4 kV contact discharge, 8 kV air discharge
Radio frequency electromagnetic field ..... 015 MHz to 1000 MHz: 140 dB (µV)
Rated impulse withstand voltage
(Fast transients 5/50 ns) ..... 2 kV line to earth, 1 kV line to line
Voltage dip and short time interruption ..... 100 ms (at 40% nominal voltage)
Harmonics and distortion ..... IEC61000-2-4 (Class 3), EN/IEC61800-3

Short Circuit

Rated short-circuit current ..... 018 to 048 5 kA 1
Rated short-circuit current ..... 060 to 200 10 kA 1

Heat Dissipation

During Start ..... 3 watts / ampere
During Run ..... 10 watts typical

Operational Life

018~100 ..... 1,000,000 operations
140~200 ..... 30,000 operations

Features and options

FEATURE SETS	D1	D2
STARTING FUNCTIONS		
Timedvoltage ramp	•	
Constant current		•
Current ramp		•
STOPPING		
Coast to stop	•	•
Soft stop	•	•
PROTECTION		
Motor overload		•
Phase loss		•
Excess start time		•
Phase sequence		•
Current imbalance		•
Motor thermistor		•
Power circuit fault	•	•
Supply frequency	•	•
Instantaneous overcurrent		•
Bypass overload		•
Communications failure	•	•
INTERFACE		
Fixed relay output (main contractor relay)	•	•
Programmable relay (trip or run)		•
Run relay output	•	•
ACCESSORIES (OPTIONAL)		
Remote operator	•	•
Modbus	•	•
Profibus	•	•
DeviceNet	•	•
PC software	•	•
Ethernet/IP	•	•
Modbus TCP	•	•
Profinet	•	•

Efficient motor control

Get It Right From The Start

Design of energy efficient systems requires consideration of the system as a whole. Using energy efficient components is important but selection of the correct motor control mode (fixed or variable speed) is also critical. Approximately 80% of motor applications are most efficiently operated at a fixed speed. Using a variable speed drive (VSD) with such a system is hugely inefficient, regardless of the efficiency of the motor you are running.

DIGISTART D1 and D2 – The Most Energy Efficient Outcome For Fixed Speed Applications

99.5%
Efficiency

Internal bypass makes DigiStart D1 and D2 softstarters 99.5% efficient when running.

80%
Reduction on wasted energy

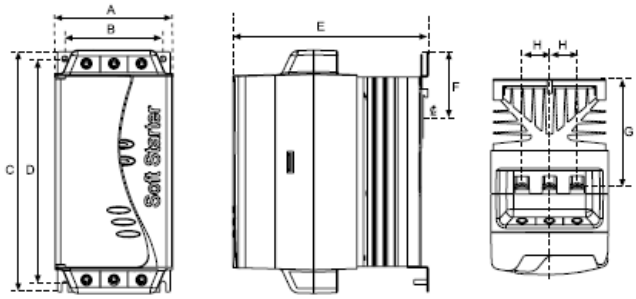
Compared to a misapplied drive, the 99.5% efficiency of DigiStart soft starters equates to around an 80% reduction in waste energy.

0%
Harmonics

DigiStart soft starter produces no harmonics during run, improving overall power quality and eliminating system losses resulting from harmonics.

Digistart D1 and D2 Specifications

Dimensions And Weights



	A	B	C	D	E	F	G	H	Weight kg (lbs)	
	mm (inches)								D1	D2
Dx-018-Vx-Cx										
Dx-034-Vx-Cx										
Dx-042-Vx-Cx	98 (3.85)	82 (3.22)	201 (7.91)	188 (7.40)	165 (6.49)	55 (2.16)	90.5 (3.6)	23 (0.9)	2.1 (4.6)	
Dx-048-Vx-Cx										
Dx-060-Vx-Cx										
Dx-075-Vx-Cx										
Dx-085-Vx-Cx	145 (5.70)	124 (4.88)	215 (8.46)	193 (7.71)	193 (7.59)	-	110.5 (4.4)	37 (1.5)	3.8 (8.4)	
Dx-100-Vx-Cx										
Dx-140-Vx-Cx										
Dx-170-Vx-Cx	200 (7.87)	160 (6.30)	240 (9.44)	216 (8.43)	214 (8.43)	-	114.5 (4.50)	51 (2.0)	6.1 (13.45)	
Dx-200-Vx-Cx										

Current Ratings

	AC53B 4-6:354 < 1000 M		AC53B 4-20:340 < 1000 M	
	40°C	50°C	40°C	50°C
Dx-018-Vx-Cx	18 A	17 A	17 A	15 A
Dx-034-Vx-Cx	34 A	32 A	30 A	28 A
Dx-042-Vx-Cx	42 A	40 A	36 A	33 A
Dx-048-Vx-Cx	48 A	44 A	40 A	36 A
Dx-060-Vx-Cx	60 A	55 A	49 A	45 A

	AC53B 4-6:594 < 1000 M		AC53B 4-20:580 < 1000 M	
	40°C	50°C	40°C	50°C
Dx-075-Vx-Cx	75 A	68 A	65 A	59 A
Dx-085-Vx-Cx	85 A	78 A	73 A	67 A
Dx-100-Vx-Cx	100 A	100 A	96 A	87 A
Dx-140-Vx-Cx	140 A	133 A	120 A	100 A
Dx-170-Vx-Cx	170 A	157 A	142 A	130 A
Dx-200-Vx-Cx	200 A	186 A	165 A	152 A

Model Guide

Dx - xxx - Vx - Cx

DIGISTART type: x = 1 or 2

Current Rating

Mains Voltage: x = 4, 200-440 VAC ; x = 6, 200-575 VAC

Control voltage: x = 1, 110-240 VAC or 380-440 VAC
x = 2, 24 VAC/VDC

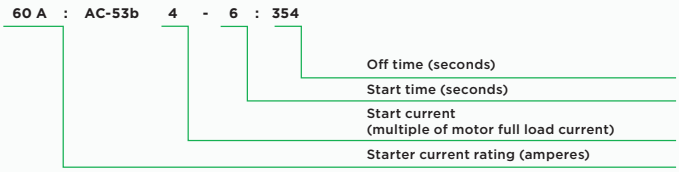
AC53b Utilisation Code

The AC53b utilisation code defines the current rating and standard operating conditions for a bypassed soft starter (internally bypassed, or installed with an external bypass contactor).

The softstarter's current rating determines the maximum motor size it can be used with. The soft starter's rating depends on the number of starts per hour, the length and current level of the start, and the amount of time the soft starter will be off (not passing current) between starts.

The soft starter's current rating is only valid when used within the conditions specified in the utilisation code. The soft starter may have a higher or lower current rating in different operating conditions.

Figure 2-2 AC53b utilisation code



Start current rating: The full load current rating of the soft starter given the parameters detailed in the remaining sections of the utilisation code.

Start current: The maximum available start current.

Start time: The maximum allowable start time.

Off time: The minimum allowable time between the end of one start and the beginning of the next start.

Other solutions

Control Techniques offers a complete range of soft starters. Whether you need a simple product for starting only, or a comprehensive motor control panel you can trust Control Techniques to offer a product to match.

	Soft Start	Motor Protection	Advanced Interface	Internal Bypass	Current Range	Voltage Range
D1	•			•	≤ 200 A	≤ 575 VAC
D2	•	•		•	≤ 200 A	≤ 575 VAC
D3	•	•	•	•	≤ 1600 A	≤ 690 VAC
D4	•	•	•	•	≤ 580 A	≤ 690 VAC
D5	•	•	•	•	≤ 580 A	≤ 690 VAC
D1000	•	•	•	Option	<=540 A	<=11K VAC
D2000	•	•	•	Option	<=1700 A*	<=13.8K VAC**

*Up to 10 kA available on request.
**Up to 15KV available on request

Nidec
All for dreams

#1 FOR ADVANCED MOTOR AND DRIVE TECHNOLOGY

Nidec Corporation is a global manufacturer of electric motors and drives. Founded in 1973, Nidec has worldwide operations and a workforce of more than 110,000 who develop, manufacture and install motors, drives and control systems in industrial plants, automobiles, home appliances, office equipment and information technology.

110,000 EMPLOYEES WORLDWIDE

$14.B GROUP TURNOVER

70+ COUNTRIES

250+ COMPANIES

CONTROL TECHNIQUES™

DRIVE SPECIALISTS SINCE 1973

Drives: they're what we do. Whether you're designing a new machine or installing a replacement, we know you need quick delivery and an easy set up, with the confidence that your drive's going to keep on performing with accurate control.

So leave it to the specialists. We've dedicated ourselves to designing and manufacturing variable speed drives since 1973. This means quick set up, high reliability, maximum motor control and fast, efficient service.

1000+ OEM CUSTOMER

5M+ INSTALLED DRIVES

1000+ EMPLOYEES WORLDWIDE

70 COUNTRIES

Outstanding performance

The outstanding performance of our drives is the fruit of over 45 years of engineering experience in drive design.

Embedded intelligence

Precision motor control is combined with the highest embedded intelligence, ensuring maximum productivity and efficiency of your machinery.

Technology you can rely

Robust design and the highest build quality ensure the enduring reliability of the millions of drives installed around the world.

Global reach, local support

Highly experienced, locally based Application Engineers design and support drive technology to provide maximum value, wherever you are in the world.

Open design architecture

Based on open design architecture, our drives integrate with all primary communication protocols.

SERVICE WITHOUT BORDERS

As a company we aim to provide our customers with the best possible support wherever and whenever it may be required.

Quality

- Commissioning, Troubleshooting, Repairing and Technical Support
- Recognise customer's needs, define our offering and match customer expectation to generate excellence in customer satisfaction.

APAC Time Zone Response

- Dedicated support team stationed in APAC zone for response within 24 hours. **HOTLINE NO: +65 9617 3556**
- Ease of contact through popular messaging platforms

Regional Services by Regional Centers

- As APAC is geographically separated, localized support is the key for fast response on after-sales support i.e. commissioning, trouble shooting, repairs & etc.
- Growing number localized service centers in the region with centralized point of contact.

Technical Competence

- Serve customers looking for answers, while reducing the costs associated with service and support.
- Increase technical competence of business partners.

GEOGRAPHICAL LOCATION

A global presence that benefits all our customers.

Control Techniques has an extensive global presence that provides comprehensive local support and services, including:

23 Sales/Service Offices

Providing local customer support for products, automation, control needs and service support

23 Manufacturing sites

Producing a comprehensive range of high quality products, optimized for industry-specific customer requirements

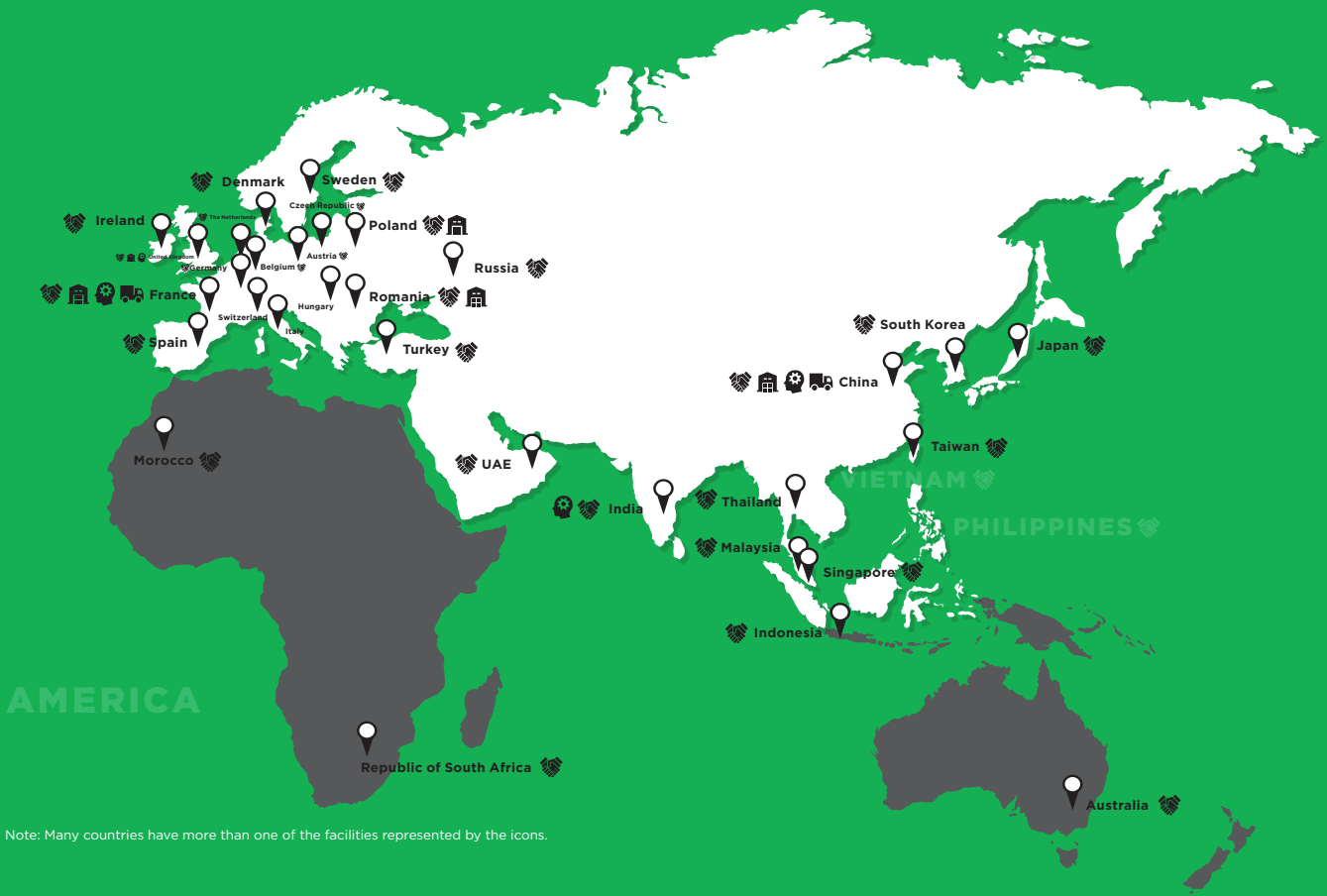
8 Engineering and Design facilities

Developing market leading products and feature-sets using the latest design technology

3 Regional dispatch hubs

Delivering products quickly through regional distribution hubs

Our extensive sales and service networks in the Americas, Europe and Asia Pacific are backed-up by hundreds of carefully selected distributors and service partners, often in remote locations, all over the world.



Note: Many countries have more than one of the facilities represented by the icons.

Connect with us at:

www.controltechniques.com

ASIA PACIFIC

Australia
Email: info.au@mail.nidec.com
T: +612 9 838 7222

India
Email: sales.india@mail.nidec.com
T: +917387007699

Indonesia
Email: info.sg@mail.nidec.com
T: +62 8111 296388

Malaysia
Email: info.sg@mail.nidec.com
T: +6016 2113202

Philippines
Email: info.sg@mail.nidec.com
T: +632 754 7000

Korea
Email: info.kr@mail.nidec.com
T: +82 2 6748 4377
F: +82 2 6748 4394

Singapore
Email: info.sg@mail.nidec.com
T: +65 9617 3556

Bangladesh & Pakistan
Email: sales.india@mail.nidec.com
T: +91 (0) 7358798609

Sri Lanka & Maldives
Email: sales.india@mail.nidec.com
T: +919382321395

Taiwan
Email: info.tw@mail.nidec.com
T: +886 2 2393 1850

Thailand
Email: info.ctt@mail.nidec.com
T: +66 (0)95 463 9000

Vietnam
Email: info.ctt@mail.nidec.com
T: +84 (0)98 390 1050

Cambodia, Laos & Myanmar
Email: info.ctt@mail.nidec.com
T: +66 (0)85 155 1924

Japan
Email: info.japan@mail.nidec.com
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