Crystal Bridge to the Future

RoHS Compliant
Directive 2011/65/EU

REFERENCE SPECIFICATION

Customer: JUDE

Item:	Simple Packaged Crystal Oscillator (SPXO)
Type:	NZ2520SH
Nominal Frequency:	24 MHz
Customer's Spec. No.:	---
NDK Spec. No.:	ERG5007B

For your reference we submit this specification.
Please study and keep in your related document file.

Revision Record

Rev.	Date	Items	Contents	Approved	Checked	Drawn
---	24.Sep.2015	Issue	---	Y.Akasaka	---	T.Wada
A	9.Oct.2015	3.Type	Change	Y.Akasaka	---	C.Sakurai
B	24.Oct.2018	5.7 Operating Temperature Range	-40 to +85 °C→-40 to +105 °C	Y.Akasaka	H.Okajima	C.Sakurai
		5.8 Overall Frequency Tolerance	Add (+/-50ppm at -40 to +105 °C)			
		8.1 Dimension drawing	EKD14B-00027(Rev. C→Rev. E)			
		8.2 Marking drawing	EKH11B-00052(Rev. H→Rev. K)			
		8.3 Reliability assurance Item	EKS30B-00060(Rev. C→Rev. E)			
C	8.Oct.2019	5.7 Operating Temperature Range	-40 to +105 °C →-40 to +125 °C	Y.Akasaka	---	R.Saito
		5.8 Overall Frequency Tolerance	Add (+/-80ppm at -40 to +125°C)			
		8.1 Dimension drawing	EKD14B-00027(Rev. E→Rev. F)			

1. Customer's Spec. No. : ----------

2. NDK Spec. No. : ERG5007B

3. Type : NZ2520SH

4. Maximum Ratings

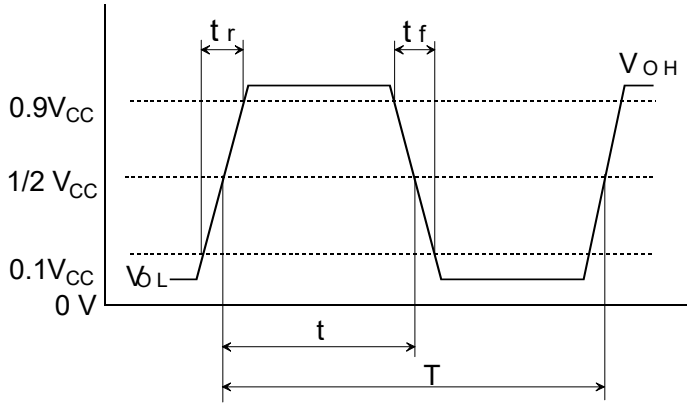
	Item	Ratings			Notes
		min	max	Units	
1	Supply Voltage	-0.3	4.0	V	
2	Storage Temperature Range	-55	+125	°C	

5. Electrical Specifications

(Unless otherwise noted, TA=-40 to +125 °C, V_{CC}=1.8 V, Load=15 pF)

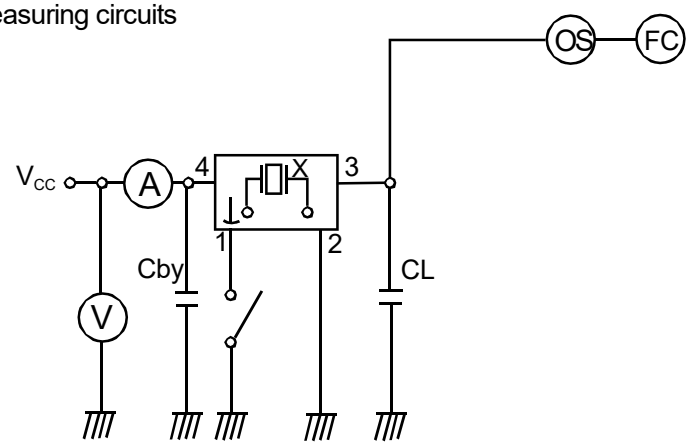
	Parameters	SYM	Electrical Spec.				Notes
			min	typ	max	Units	
1	Nominal Frequency	f_{nom}		24		MHz	
2	Supply Voltage	V_{CC}	1.62	1.8	1.98	V	
3	Current Consumption (Operating)	I_{CC}			4.0	mA	at 25°C
4	Current Consumption (Stand-by)	I_{ST}			20	μA	at 25°C
5	Output Level	-	C-MOS				
6	Load Capacitance	C_L			15	pF	
7	Operating Temperature Range	T_{opr}	-40		+125	°C	
8	Overall Frequency Tolerance	$\Delta f/f_{nom}$	-20		+20	ppm	at -30 to +75 °C*1
			-30		+30	ppm	at -40 to +85 °C*1
			-50		+50	ppm	at -40 to +105 °C*1
			-80		+80	ppm	at -40 to +125 °C*1
9	Output Voltage	V_{OL}			0.1 V_{CC}	V	
		V_{OH}	0.9 V_{CC}			V	
10	Rise Time(t_r), Fall Time(t_f)	t_r/t_f			6	ns	0.1 V_{CC} to 0.9 V_{CC}
11	Symmetry	SYM	45		55	%	at 1/2 V_{CC}
12	Start-up Time	t_{su}			4	ms	
13	Output Wave Form	-	Rectangular				
14	Stand-by Function						
	#1 PAD input			# 3 PAD output			
	H level (0.7 V_{CC} to V_{CC}) or open			Operating			
	L level (0.3 V_{CC} max)			High impedance			

*1 Inclusive of Freq. tolerance (at 25 °C), frequency/temperature characteristics, frequency/voltage coefficient.



Symmetry =t / T ×100 (%)

6. Measuring circuits



CL ; 15pF MAX including input capacity of oscilloscope
Cby ; Bypass capacitor (0.01uF)

7. Test data will not be submitted.

8. Application drawing

8.1 Dimension drawing

EKD14B-00027

8.2 Marking drawing

EKH11B-00052

8.3 Reliability assurance Item

EKS30B-00060

8.4 Taping & Reel drawing

EKK17B-00032

EEK17B-00015

9. Instruction Notice

9.1 Noise

When the NZ2520 series are used, the 0.01 μF capacitor should be connected between V_{CC} and GND line. (Closer to the product terminal is desirable.)

9.2 Resistance to dropping

The NZ2520 series is designed to be impactproof so that no damage occurs when dropped a height(75 cm) three times. However, if dropped from a desk etc., it is advisable to check their performance or contact us to check it.

9.3 Electrostatic protection

The NZ2520 series employ C-MOS ICs for the active element. Please use them in static-free environments.

9.4 High temperature

Normal operation cannot be guaranteed for the NZ2520 series at +125 °C (for 24 hours). Be sure that the units are kept within the specified temperature range.

9.5 Cleaning

Basically, the NZ2520 series are applicable for ultrasonic wave cleaning. However, in some case, during ultrasonic wave cleanings, internal design may get damage. Please check condition carefully beforehand.

9.6 Other

The NZ2520 series are C-MOS applied products. And careful handling(same as with C-MOS IC) are needed to avoid electrostatic problems.

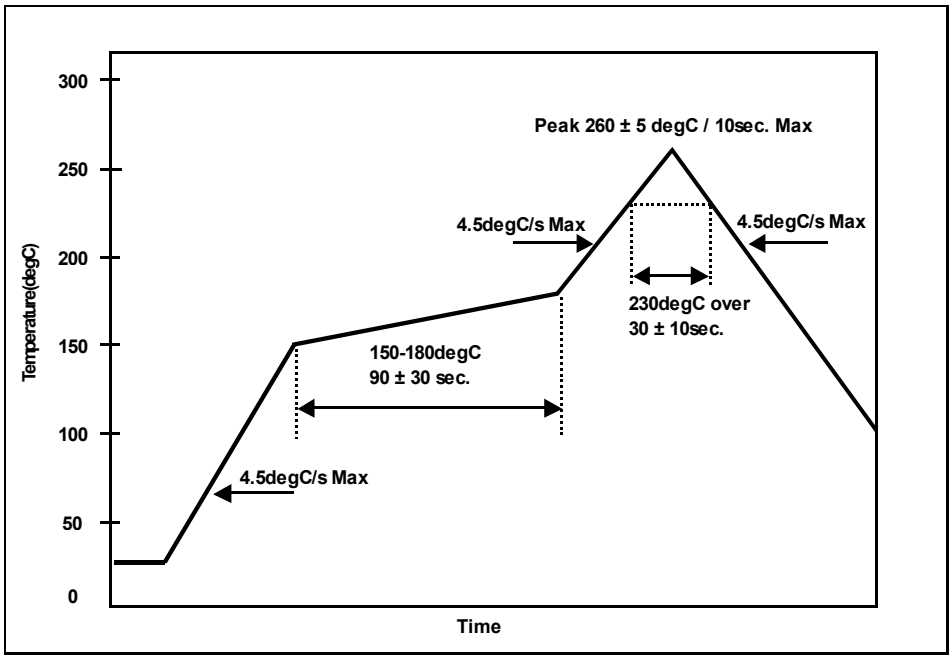
Incorrect PAD connection is cause of trouble. Please make sure to connect correctly as below.

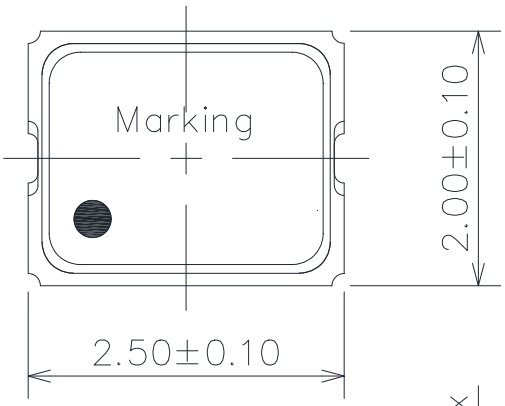
#2 terminal → GND

#4 terminal → V_{CC}

10. Order items are manufactured according to specification. As to conditions, which are not indicated in this specification and unpredictable such as applied condition and oscillation margin, please check them beforehand.

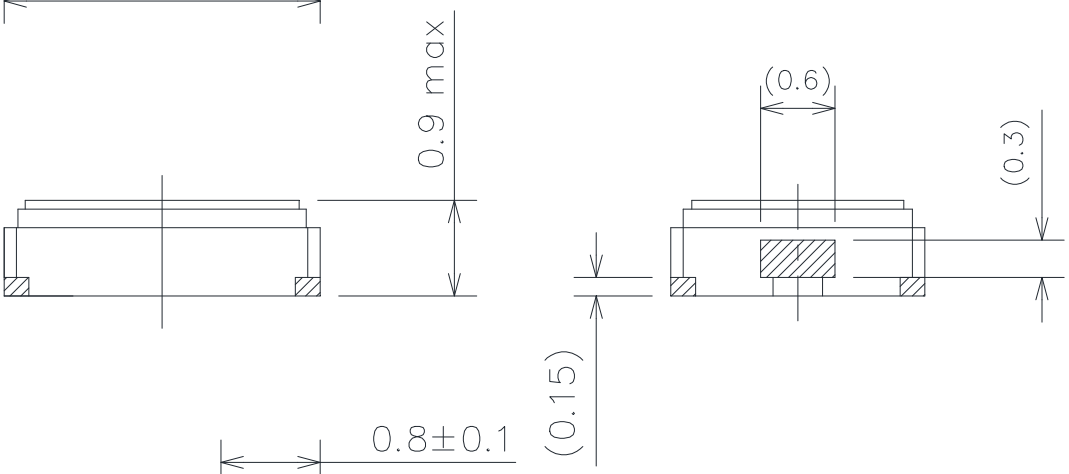
*Example For Soldering Conditions (The below graph corresponds to Pb free solder)

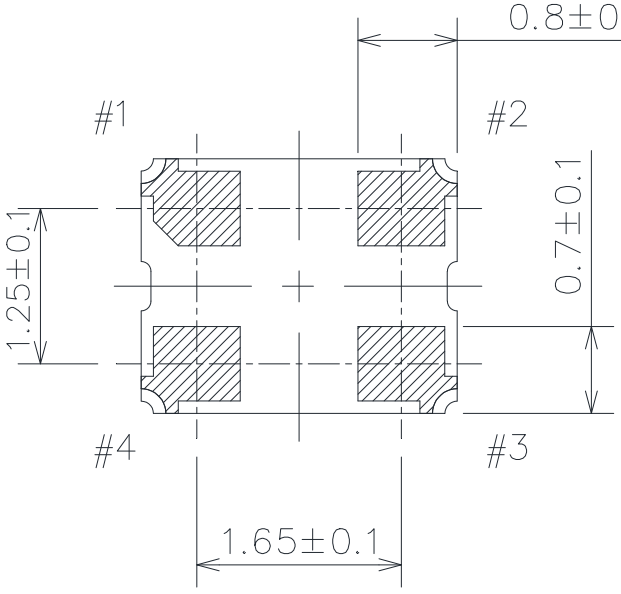




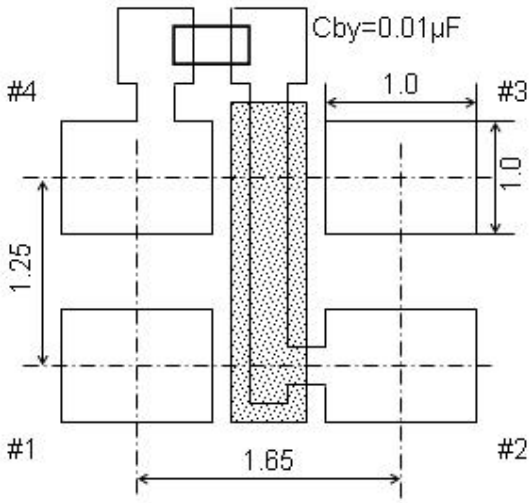
Terminal land connections

#1	STAND-BY
#2	GND
#3	OUTPUT
#4	V_{CC}





Land pattern (Recommended)



	Date of Revise	Charge	Approved	Reason
F	19.Sep.2019	C.Sakurai	Y.Akasaka	Add Land pattern (Recommended)

	Date	Name	Third Angle Projection	Tolerance	Scale
Drawn	23.Oct.2003	M.Yamaguchi	Dimension : mm	-------	--------
Designed	27.Jun.2003	M.Yamaguchi	Title	Drawing No.	Rev.
Checked	-----	-----	**NZ2520S Dimension of External**	**EKD14B-00027**	F
Approved	23.Oct.2003	H.Omata			

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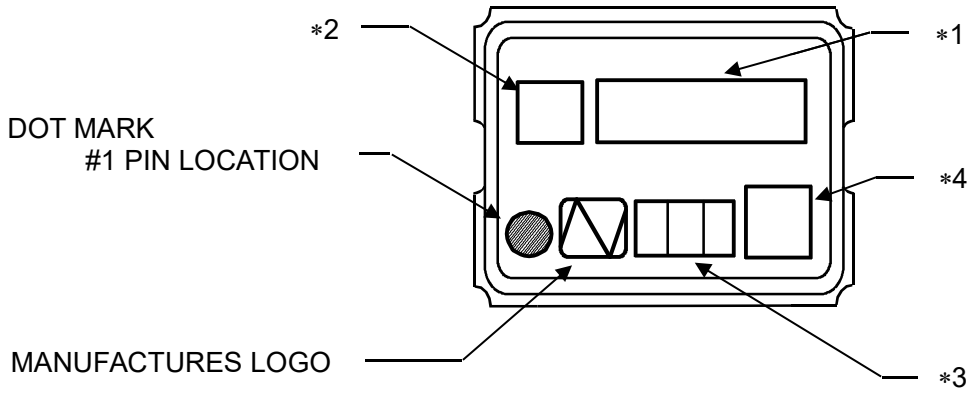

∗1 [FREQUENCY]

Digits are five and 6TH digit will be omitted.
MHz unit sign is not marked.
ex,) 28.63636MHz → 28.636 [Unit sign not marked]

∗2 [MODEL MARK]
A last digit of model is marked. →

[MODEL MARK]

NZ2520SA →	Space
NZ2520SB →	B
NZ2520SC →	C
NZ2520SD →	D
NZ2520SDA→	D
NZ2520SEA→	E
NZ2520SEB→	E
NZ2520SF →	F
NZ2520SG →	G
NZ2520SH →	H
NZ2520SHA→	H
NZ2520SHB→	H
NZ2520SHC→	H
NZ2520SJ →	J

∗3 [WEEK CODE (Digit are three)]

ex1,) In case of 7TH week of 2006

6 0 7

Week No. (Digit are two)
Lower one digit of year

ex2,) In case of 31TH week of 2006

6 3 1

∗4 [Trace code]
Trace code consists of four digits number or letter.
This code indicates production date and production line number.

	Date of Revise	Charge	Approved	Reason
K	12.Apr.2018	Y.Okajima	S.Murase	Model mark addition.(NZ2520SHB,SHC)

	Date	Name	Third Angle Projection	Tolerance	Scale
Drawn	27.Jan.2006	Y.Oishi	mm	-------	-------
Designed	27.Jan.2006	Y.Okajima	Title	Drawing No.	Rev.
Checked	27.Jan.2006	C.Ishimaru	NZ2520S Marking	**EKH11B-00052**	K
Approved	27.Jan.2006	H.Omata			

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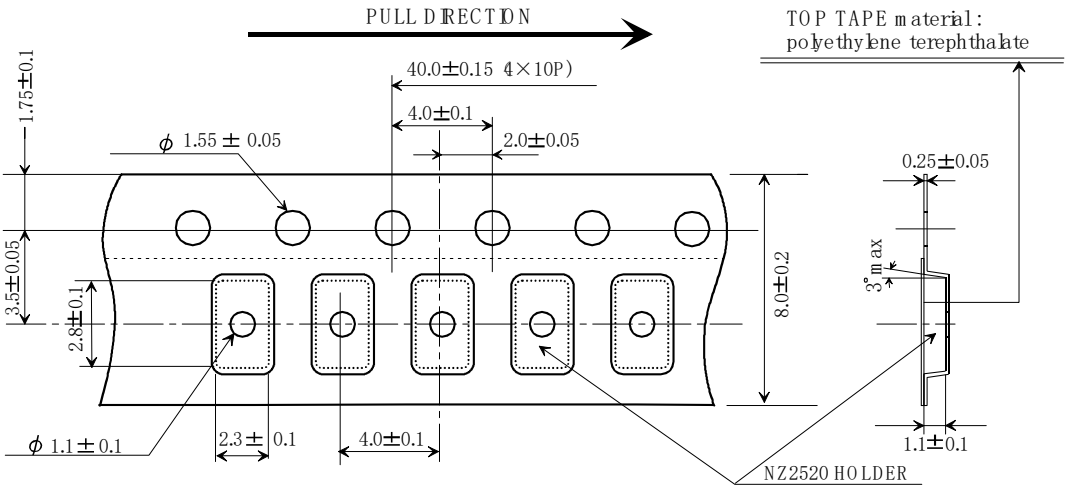
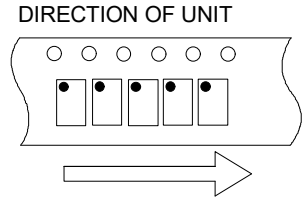
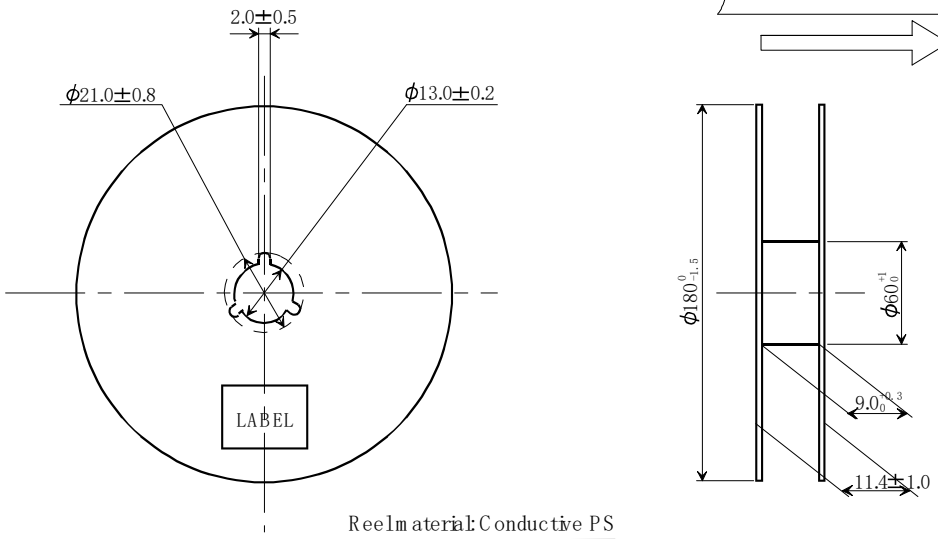
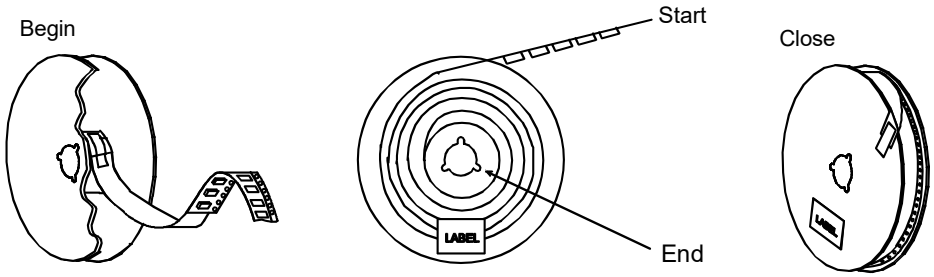
Environmental Test Conditions	Specification
1.Thermal Shock Test 1 cycle: -40°C (30 minutes) ~ +85°C(30 minutes) Number of cycle: 100 cycle.	∗1
2.High Temperature High Humidity Test Temperature : +85°C, Humidity : 80 ~ 85%, Time : 250 hours.	∗1
3.+85°C Aging (Non Operating) Temperature : +85°C, Time : 500 Hours.	∗1
4.Vibration Test MIL-STD-202F test method:204D Test condition : D 10 ~ 2000Hz, 1.52mmp-p, or 196m/s^2 20 minutes/cycle, XYZ 3 directions 4 times.	∗1
5.Shock Test MIL-STD-202F test method : 213B Test condition : Half sinusoidal wave 29400m/s^2, 0.3ms, 3 directions, 3 times each.	∗1
6. Drop Test (JIG attachment) Dummy load : 200g, Height : 1.5m, Fall conditions : On concrete The number of times of fall : Six directions and 1 time each are made into 1 cycle, and it is 10 cycle.	∗1
7.Soldering Test (Reflow) Pre heat : 150±10°C, 60~120sec. Main heat : 30±1 seconds after amounting to 215 °C. Peak temperature : 240°C	More than 90% of should be covered by solder.
8.Soldering Resistance (Reflow) Pre heat : 180±10°C, 120 sec min, Main heat : 225°C min, 70sec max. Peak temperature : 260°C . Reflow time : 3 times.	∗1
∗1 After the test mentioned above, the electrical specifications are satisfied. Also frequency deviation before and after test should be $\leqq \Delta F/F \quad \pm 10 \times 10^{-6}$ The electrical specifications are I_{CC}, Tr/Tf, V_{OL}/V_{OH}, duty cycle, stand-by current consumption.	









3000pcs MAX-Product Tape

	Date of Revise	Charge	Approved	Reason
C	5.Sep.2012	Y.Oishi	C.Ishimaru	3000pcs-Product Tape→3000pcs MAX-Product Tape.

	Date	Name	Third Angle Projection	Tolerance	Scale
Drawn	7.Oct.2003	Y.Okajima	Dimension:mm		/
Designed	7.Oct.2003	Y.Okajima	Title	Drawing No.	Rev.
Checked			**NZ2520 Taping and Reel Spec.**	**EKK17B-00032**	C
Approved	7.Oct.2003	H.Omata			

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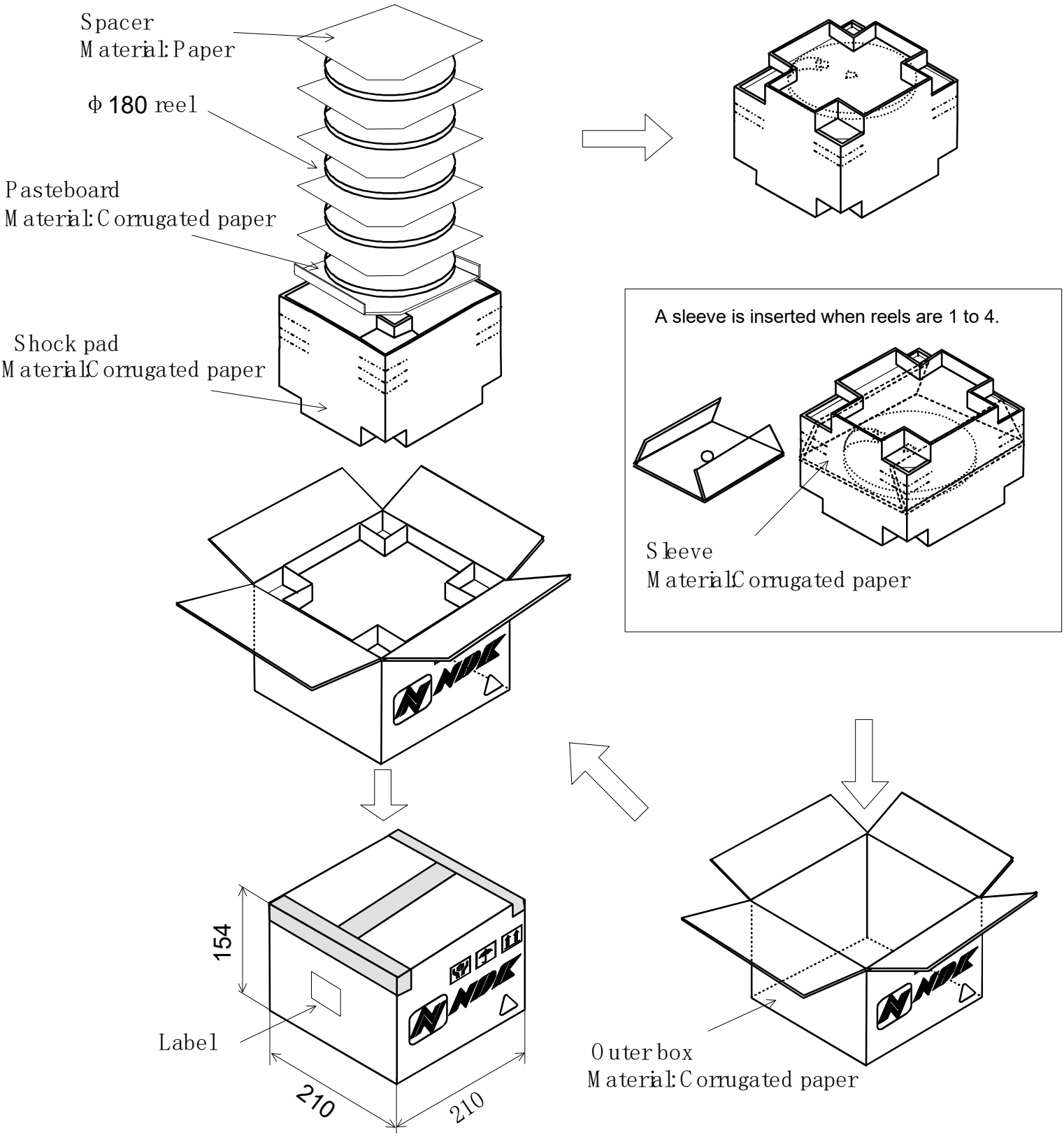

	Date of Revise	Charge	Approved	Reason
C	4 Jul. 2012	H.Ohkubo	K.Oguri	Addition of condition when reels are 1 to 4.

	Date	Name	Third Angle Projection	Tolerance	Scale
Drawn	26 Feb. 2010	H. Ohkubo	Dimension:mm	---------	---------
Designed	26 Feb. 2010	K.Oguri	Title	Drawing No.	Rev.
Checked	26 Feb. 2010	K.Oguri	**180 dia. Reel package**	**EEK17B-00015**	C
Approved	26 Feb. 2010	J. Nakamura			

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