



Process Label Print System

Asia-Pacific Driveline

SD-2100

ISSUED
REVISED

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1. SCOPE

The intent of this specification is to introduce NEXTEER Asia-Pacific Driveline Standard Process Label Print System. Vendors are required to understand and follow this specification.

2. GENERAL

2.1 System Architecture

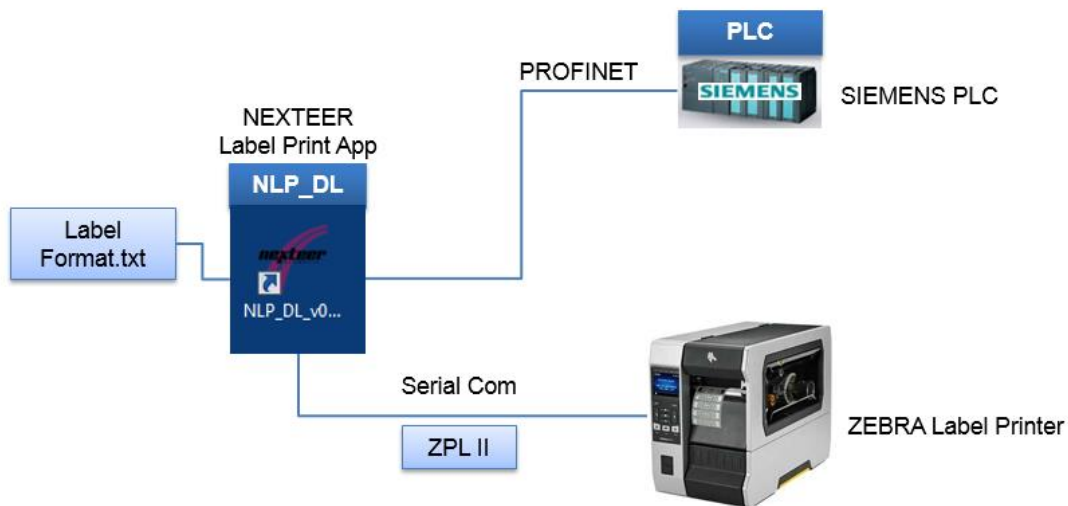


Figure 1: NEXTEER AP Driveline Process Label Print System Architecture

2.1.1 PC is to be connected to PLC through Ethernet (ProfiNet Protocol).

2.1.2 PC is to be connected to Zebra Printer through Serial Communication (RS232) port.

3. System Requirement

3.1 Recommended Hardware & Software

3.1.1 PLC

1. Siemens S7 with ProfiNet

3.1.2 Label Printer

1. Zebra supporting ZPL II Protocol
2. Serial Com Port

3.1.3 OS: Win7 or Later with .NET Framework 4.5 or later

3.2 PLC Data Block

3.2.1 Required Data Block

1. Output (PLC -> PC): 100 bytes array
2. Input (PC -> PLC): 100 bytes array
3. Each address is configurable

3.2.2 DB Assignment

WRITE / PLC -> PC		
Byte[0]	Bit[0]	Request Print
	Bit[1] ~ Bit[7]	Reserved
Byte[1]	Bit[0] ~ Bit[7]	Reserved
Byte[2] ~ Byte[3]	Uint16	Mode
Byte[4] ~ Byte[5]	Uint16	Model No
Byte[6] ~ Byte[99]		Reserved

READ / PC -> PLC		
Byte[0]	Bit[0]	Complete Print
	Bit[1] ~ Bit[7]	Reserved
Byte[1]	Bit[0] ~ Bit[7]	Reserved
Byte[2] ~ Byte[3]	Uint16	Status Code
Byte[4] ~ Byte[5]	Uint16	Model No
Byte[6] ~ Byte[7]	Uint16	Label Format No
Byte[8] ~ Byte[99]		Reserved

Figure 2: DB Assignment

3.2.3 Status Code

1. 1: Print Label Ok
2. 2: No Matched Label Format
3. 3: No Matched Model Info
4. 4: Received Incorrect Data Length
5. 5: No Model Selected

6. 99: Print Label Exception Error. It might be Serial Port Error

3.2.4 DB Address Configuration

1. Configurable at "CONFIGURATION -> PLC"

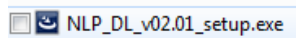
PLC SIEMENS	
PLC ID	SD123456X
OP ID	SD123456X01
IP ADDRESS	192.168.98.2
CPU TYPE	S7-1200/S7-1500
TIME OUT (ms)	500
RACK No.	00
CPU SLOT No.	01
DB ADDRESS (PLCtoPC)	DB3.DBB0
DB ADDRESS (PCtoPLC)	DB3.DBB100

Figure 3: DB Address Configuration

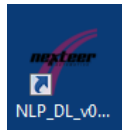
4. NEXTEER Label Print Application (NLP)

4.1 INSTALLATION

4.1.1 Run setup file



4.1.2 You can find the shortcut icon as below at your desktop



4.2 OVERVIEW

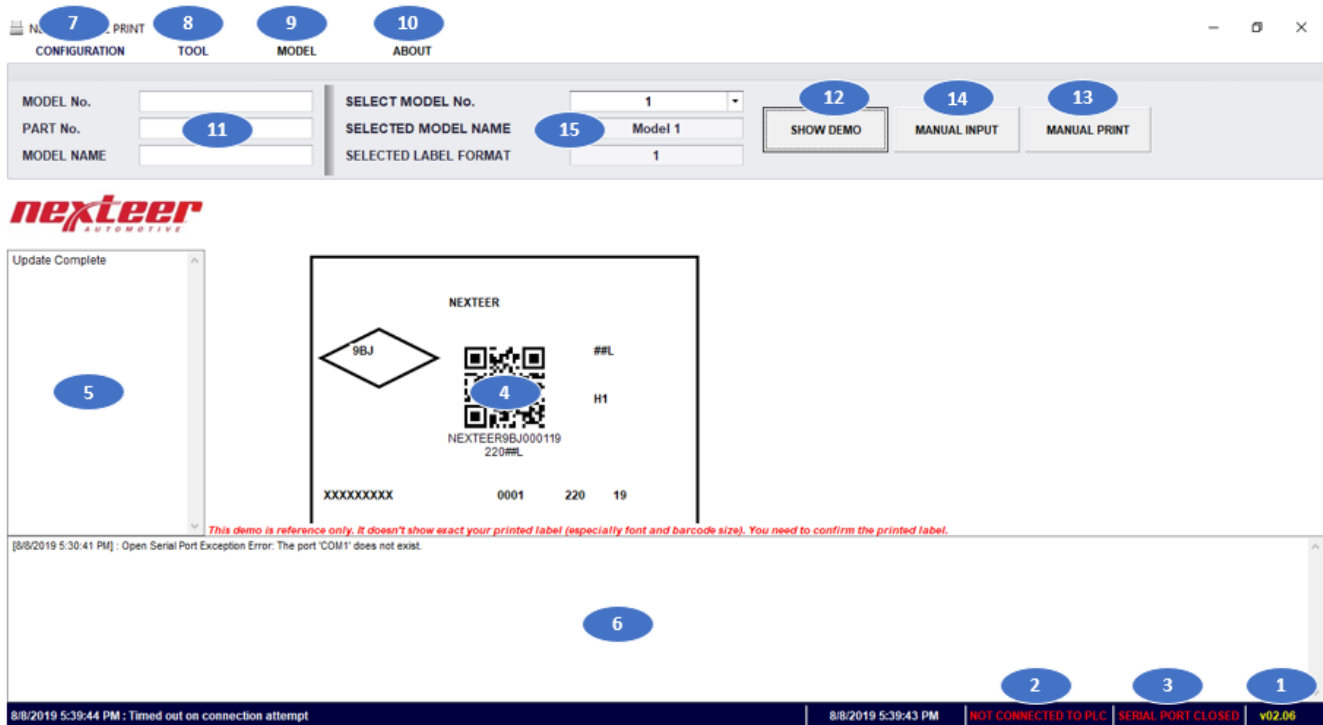


Figure 4: NEXTEER Label Print App Overview

- 4.2.1 1: Application Revision
- 4.2.2 2: Connection Status to PLC
- 4.2.3 3: Label Print Serial Port Status
- 4.2.4 4: Display selected label format demo. It doesn't show exact printed label. It shows reference only.
- 4.2.5 5: Label Format message
- 4.2.6 6: Application message log.
- 4.2.7 7: Configuration edit button / Default Password is "1".
- 4.2.8 8: Tool button. There are several sub menus.
- 4.2.9 9: Model Parameters edit button.
- 4.2.10 10: Shows application revision.
- 4.2.11 11: Shows selected model information by PLC.
- 4.2.12 12: Update manually selected label format demo.
- 4.2.13 13: Manual print button
- 4.2.14 14: Manual input button
- 1. If you want to input contents manually, you can click this button.

2. If you use “Manual Input” mode, the app doesn’t record the printed serial in the DB. It can make duplicate serial. It shall be used carefully.

4.2.15 15: Manual model selection.

4.3 CONFIGURATION

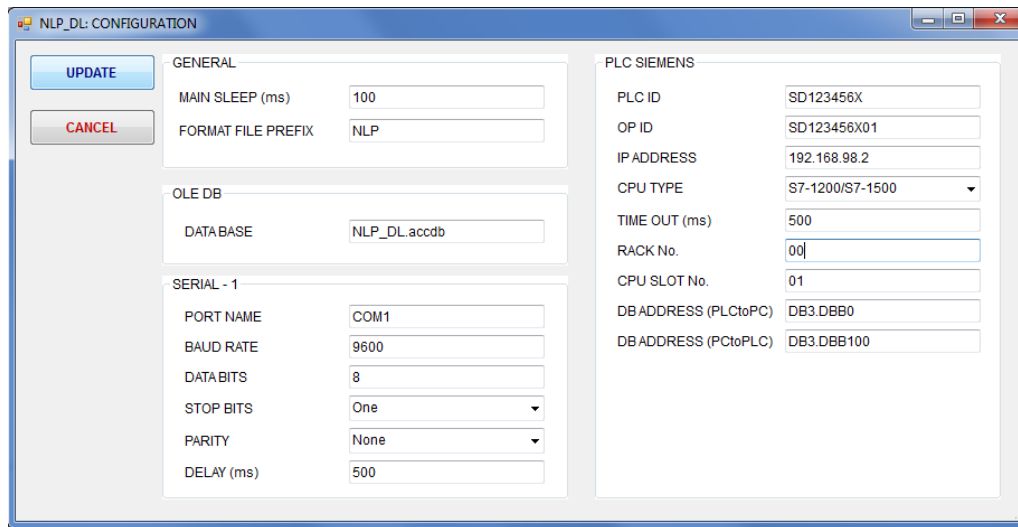
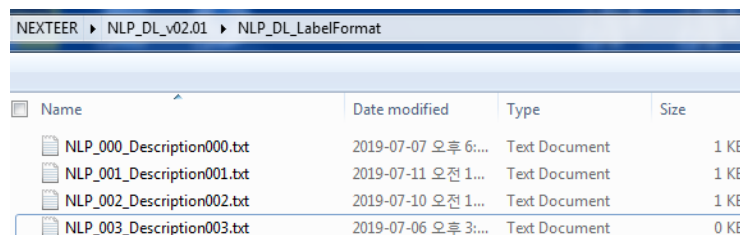


Figure 5: NEXTEER Label Print App Configuration

4.3.1 GENERAL

1. Main Sleep: Specify main cycle (milliseconds)
2. Format File Prefix: Specify label format file prefix. You have label format file folder under your application as below. In the folder, you can save your label format file. The file should follow naming policy. Naming format is: “Prefix” + “Under bar” + “Format Number (3 digits)” + “Under bar” + “Description” + “.txt”. And the Prefix shall match with this. Default prefix is “NLP”. It can be used to specify the machine or project.



Name	Date modified	Type	Size
NLP_000_Description000.txt	2019-07-07 오후 6:...	Text Document	1 KB
NLP_001_Description001.txt	2019-07-11 오전 1:...	Text Document	1 KB
NLP_002_Description002.txt	2019-07-10 오전 1:...	Text Document	1 KB
NLP_003_Description003.txt	2019-07-06 오후 3:...	Text Document	0 KB

Figure 6: Label Format Directory and Files

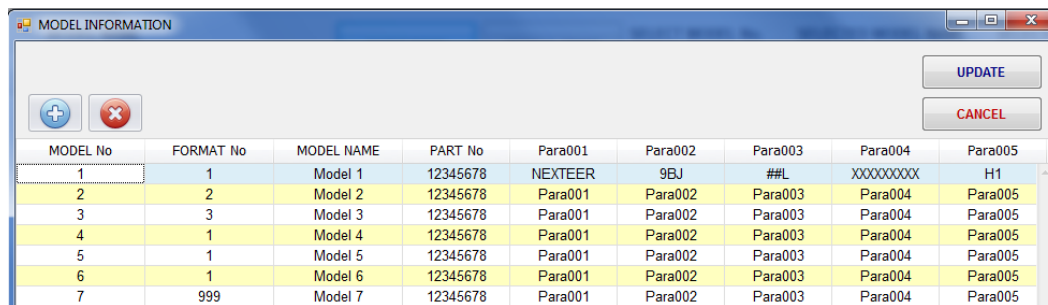
4.3.2 OLE DB: Data Base file name. Default is “NLP_DL.accdb”.

4.3.3 SERIAL: It is to communicate Zebra Printer. It shall be matched with the setting in Printer.

4.3.4 PLC SIEMENS

1. PLC ID / OP ID: Host machine information
2. IP Address: Host PLC IP Address
3. CPU Type: Host PLC CPU Type
4. Timeout: Connection Timeout / milliseconds
5. Rack No: The Rack No CPU installed. It is normally "0"
6. CPU Slot No: CPU Slot No. It can vary depending on where the CPU is installed. If there is no power supplier, it is normally "1". If there is power supplier, it might be "2". It can't be "0".
7. DB Address: Data Block Address that is to be handshake with this app.


4.4 MODEL INFORMATION



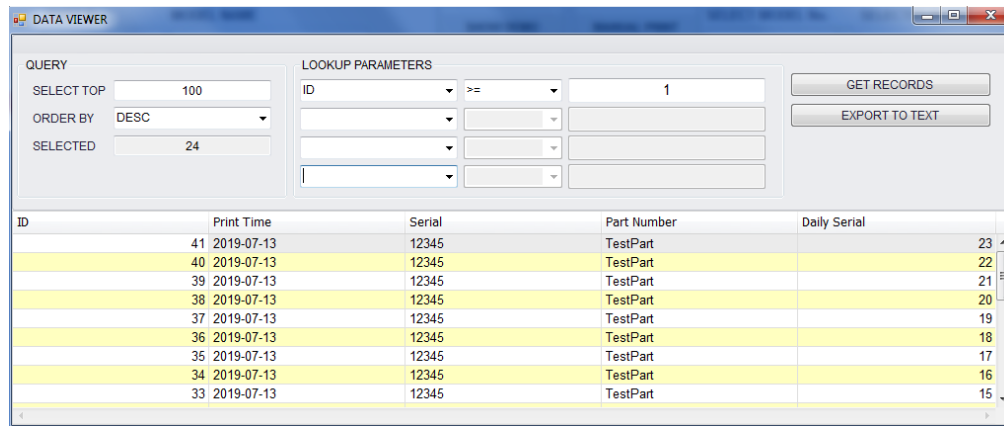
MODEL No	FORMAT No	MODEL NAME	PART No	Para001	Para002	Para003	Para004	Para005
1	1	Model 1	12345678	NEXTEER	9BJ	##L	XXXXXXXX	H1
2	2	Model 2	12345678	Para001	Para002	Para003	Para004	Para005
3	3	Model 3	12345678	Para001	Para002	Para003	Para004	Para005
4	1	Model 4	12345678	Para001	Para002	Para003	Para004	Para005
5	1	Model 5	12345678	Para001	Para002	Para003	Para004	Para005
6	1	Model 6	12345678	Para001	Para002	Para003	Para004	Para005
7	999	Model 7	12345678	Para001	Para002	Para003	Para004	Para005

Figure 7: Model Information

- 4.4.1 You can add or delete model.
- 4.4.2 Each model has 20 model parameters.
- 4.4.3 Model No shall be unique. It can't be duplicate.
- 4.4.4 Format No shows the label format is to be used by the Model No.

1. Ex. above Model No 1 is using Label Format 1  NLP_001_Description001.txt

4.5 TOOL – DATAVIEW



ID	Print Time	Serial	Part Number	Daily Serial
41	2019-07-13	12345	TestPart	23
40	2019-07-13	12345	TestPart	22
39	2019-07-13	12345	TestPart	21
38	2019-07-13	12345	TestPart	20
37	2019-07-13	12345	TestPart	19
36	2019-07-13	12345	TestPart	18
35	2019-07-13	12345	TestPart	17
34	2019-07-13	12345	TestPart	16
33	2019-07-13	12345	TestPart	15

Figure 8: Data Viewer

4.5.1 QUERY:

1. SELECT TOP: Input required data count.
2. ORDER BY: DESC or ASC
3. SELECTED: Shows selected data count.

4.5.2 LOOKUP PARAMETERS:

1. You can make data selection conditions.
2. If you don't change anything, it will get all data.
3. You can select a data field and condition.
4. Multiple conditions can be combined.

4.5.3 GET RECORDS:

1. Click this button to update selected data.

4.5.4 EXPORT TEXT

1. You can export the selected data to *.txt file.
2. Each data is to be separated by comma in the text file.

4.6 TOOL-SET PASSWORD

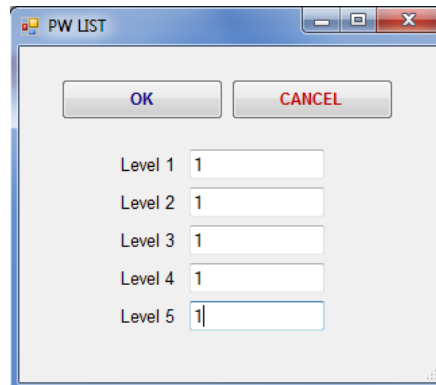


Figure 9: Password List

4.6.1 Level1: Operator

4.6.2 Level5: Admin

4.6.3 Default: "1"

4.7 TOOL-MANUAL PRINT

4.7.1 It enables "Manual Input" and "Manual Print" buttons. Password required.

4.8 LABEL FORMAT PROTOCOL

4.8.1 Common Rule

1. Each parameter shall be separated by semicolon, ";".
2. No Space is allowed.
3. All format file shall have "ORIGIN" protocol at the beginning.
4. Location: Left and upper corner.

4.8.2 You can add and edit label format file following the protocol.

1. Direct ZPL

- a. You can use ZPL protocol directly using this protocol. It shall be located before "Origin" protocol. It is not mandatory. It is optional.

DIRECTZPL / Direct ZPL Protocol			
	Item	Example	Description
1	DIRECTZPL	DIRECTZPL	Direct ZPL Protocol
2	Protocol	^A PW500	Refer to the Zebra ZPL Manual
Ex.	DIRECTZPL; ^A PW500;		

Figure 10: Label Format Protocol : DIRECTZPL

2. Origin

- a. It is specifying the label origin. You can move all contents by changing this origin. All label format shall have this protocol at the beginning.

ORIGIN			
	Item	Example	Description
1	ORIGIN	ORIGIN	Label Origin Protocol
2	Location / X, Y	20,100	0 ~ 32000
Ex.	ORIGIN;20,100;		

Figure 11: Label Format Protocol : ORIGIN

3. TEXT1: Single content text.

TEXT1 / Single Content Text			
	Item	Example	Description
1	TEXT1	TEXT1	Text Protocol #1
2	Contents	contents	See the "CONTENTS GENERATION" Sheet
3	Location / X, Y	20,100	0 ~ 32000
4	Font Size / Height, Width	50,30	10~32000
Ex.	TEXT1;contents;20,100;50,30;		

Figure 12: Label Format Protocol : TEXT1

4. TEXT2: Multi contents text

TEXT2 / Multi Contents Text			
	Item	Example	Description
1	TEXT2	TEXT2	Text Protocol #2
2	Contents	contents	See the "CONTENTS GENERATION" Sheet
3	Location / X, Y	20,100	0 ~ 32000
4	Font Size / Height, Width	50,30	10~32000
Ex.	TEXT2;contents;20,100;50,30;		

Figure 13: Label Format Protocol : TEXT2

5. Code 39

CODE391			
	Item	Example	Description
1	CODE391	CODE391	Code39 Protocol #1
2	Contents	contents	See the "CONTENTS GENERATION" Sheet
3	Location / X, Y	20,100	0 ~ 32000
4	Orientation	N	N = normal R = rotated 90 degrees (clockwise) I = inverted 180 degrees B = read from bottom up, 270 degrees
5	Mod-43 check digit	N	Y = yes / N = no
6	Height	100	1 ~
7	Print Interpretation Line	Y	Y = yes / N = no
8	Print Interpretation Line above code	N	Y = yes / N = no
Ex.	CODE391;contents;20,100;N;N;100;Y;N;		

Figure 14: Label Format Protocol : CODE391

6. Code 128

CODE1281			
	Item	Example	Description
1	CODE1281	CODE1281	Code128 Protocol #1
2	Contents	contents	See the "CONTENTS GENERATION" Sheet
3	Location / X, Y	20,100	0 ~ 32000
4	Orientation	N	N = normal R = rotated 90 degrees (clockwise) I = inverted 180 degrees B = read from bottom up, 270 degrees
5	Height	100	1 ~
6	Print Interpretation Line	Y	Y = yes / N = no
7	Print Interpretation Line above code	N	Y = yes / N = no
8	UCC check digit	N	Y = turns on / N = turns off
9	Mode	N	N = No selected mode U = UCC Case Mode A = Automatic Mode D = UCC/EAN Mode
Ex.	CODE1281;contents;20,100;N;100;Y;N;N;N;		

Figure 15: Label Format Protocol : CODE1281

7. QR Code

QRCODE1			
	Item	Example	Description
1	QRCODE1	QRCODE1	QR Code Protocol #1
2	Contents	contents	See the "CONTENTS GENERATION" Sheet
3	Location / X, Y	20,100	0 ~ 32000
4	Maginification Factor	10	1 ~ 10
5	Error Correction	Q	H = ultra-high reliability level Q = high reliability level M = standard level L = high density level
6	Mask Value	7	0 ~ 7
Ex.	QRCODE1;contents;20,100;10;Q;7;		

Figure 16: Label Format Protocol : QRCODE1

8. Data Matrix

DATAMATRIX1			
	Item	Example	Description
1	DATAMATRIX1	DATAMATRIX1	Data Matrix Protocol #1
2	Contents	123456	Para001+Para002+DailySerial+YearX+JulianDate
3	Location / X, Y	20,100	0 ~ 32000
4	Orientation	N	N = normal R = rotated 90 degrees (clockwise) I = inverted 180 degrees B = read from bottom up, 270 degrees
5	Height	10	1 to the width of the label dimensional height of individual symbol elements
6	Quality Level	200	ECC Value: 0, 50, 80, 100, 140, 200
7	Aspect Ratio	1	1 = square 2 = rectangular
Ex.	DATAMATRIX1;123456;20,100;N;10;200;1;		

Figure 17: Label Format Protocol : DATAMATRIX1

9. PDF417

PDF4171			
	Item	Example	Description
1	PDF4171	PDF4171	PDF417 Protocol #1
2	Contents	contents	See the "CONTENTS GENERATION" Sheet
3	Location / X, Y	20,100	0 ~ 32000
4	Orientation	N	N = normal R = rotated 90 degrees (clockwise) I = inverted 180 degrees B = read from bottom up, 270 degrees
5	Height	1	1 ~
6	Security Level	0	Values: 1 to 8 (error detection and correction) Default: 0 (error detection only)
7	Number of data columns to encode	1	Values: 1 to 30 Default: 1:2 (row-to-column aspect ratio)
8	Number of rows to encode	1	Values: 3 to 90 Default: 1:2 (row-to-column aspect ratio)
9	Truncate right row indicators and stop pattern	N	N = no truncation Y = perform truncation
10	Module width (in dots)	2	Values: 2 to 10 Default: 2
Ex.	PDF4171;contents;20,100;N;1;0;1;1;N;2;		

Figure 18: Label Format Protocol : PDF4171

10. Graphic: Diamond

DIAMOND1			
	Item	Example	Description
1	DIAMOND1	DIAMOND1	Graphic Diamond #1
2	Location / X, Y	20,100	0 ~ 32000
3	Width	200	3 ~ 32000
4	Height	100	3 ~ 32000
5	Thickness	3	1 ~ 32000
6	Line Color	B	B: Black / W: White
Ex.	DIAMOND1;20,100;200;100;3;B;		

Figure 19: Label Format Protocol : DIAMOND1

11. Graphic: Rectangle

RECTANGLE1			
	Item	Example	Description
1	RECTANGLE1	RECTANGLE1	Graphic Rectangle #1
2	Location / X, Y	20,100	0 ~ 32000
3	Width	200	3 ~ 32000
4	Height	100	3 ~ 32000
5	Thickness	3	1 ~ 32000
6	Line Color	B	B: Black / W: White
6	Corner Rounding	0	0 (No Rounding) ~ 8
Ex.	RECTANGLE1;20,100;200;100;3;B;0;		

Figure 20: Label Format Protocol : RECTANGLE1

12. Graphic: Circle

CIRCLE1			
	Item	Example	Description
1	CIRCLE1	CIRCLE1	Graphic Circle #1
2	Location / X, Y	20,100	0 ~ 32000
3	Diameter	3	3 ~ 4095
5	Thickness	2	2 ~ 4095
6	Line Color	B	B: Black / W: White
Ex.	CIRCLE1;20,100;3;2;B;		

Figure 21: Label Format Protocol : CIRCLE1

4.8.3 How to generate contents

1. It can be single constant value
2. It can be combination of multiple contents
3. How to use variables:
 - a. "ParaXXX" returns the specific model parameter where "XXX" is the parameter number.
Ex. "Para001".
 - b. "DailySerial" returns 4 digits daily serial.

- c. "YearX" returns year code. X is the length of year code. Ex. "Year2" returns "19".
 - d. "JulianDate" returns Julian date.
 - e. "MonthX" returns month code. X is the length of month code. Ex. In August, "Month2" returns "08". If you input 1 for X, it returns hex string (December -> C).
 - f. "DateX" returns date code. X is the length of date code. Ex. August 10, "Date2" returns "10".
4. How to combine multiple contents:
- a. Combine contents using "+"
 - b. ex. Para001+Para002+DailySerial+JulianDate+Year2+NEXTEER+Para003

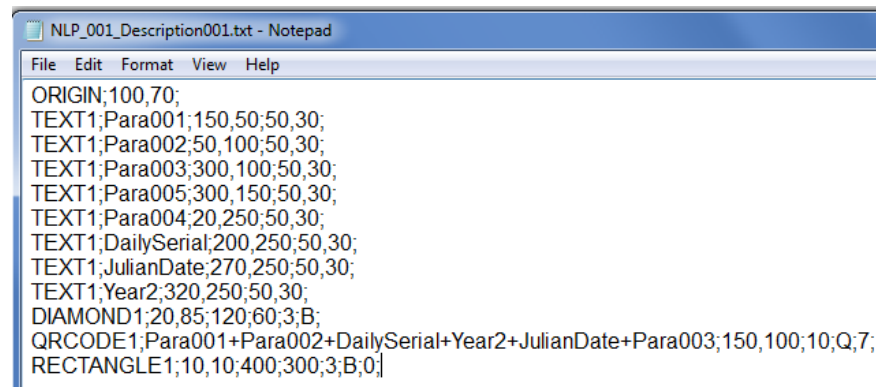
4.8.4 Label Format Example

1. Ex. Model Parameter

MODEL No	FORMAT No	MODEL NAME	PART No	Para001	Para002	Para003	Para004	Para005	Para006	Para007
1	1	Model 1	12345678	NEXTEER	9BJ	##L	XXXXXXXXXX	H1	Para006	Para007

Figure 22: Ex. Model Parameter

2. Ex. Label Format



```

NLP_001_Description001.txt - Notepad
File Edit Format View Help
ORIGIN;100,70;
TEXT1;Para001;150,50;50,30;
TEXT1;Para002;50,100;50,30;
TEXT1;Para003;300,100;50,30;
TEXT1;Para005;300,150;50,30;
TEXT1;Para004;20,250;50,30;
TEXT1;DailySerial;200,250;50,30;
TEXT1;JulianDate;270,250;50,30;
TEXT1;Year2;320,250;50,30;
DIAMOND1;20,85;120;60;3;B;
QRCODE1;Para001+Para002+DailySerial+Year2+JulianDate+Para003;150,100;10;Q;7;
RECTANGLE1;10,10;400;300;3;B;0;
  
```

Figure 23: Ex. Label Format

3. Label Example

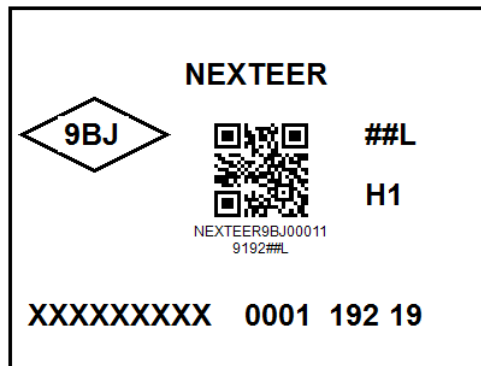


Figure 24: Ex Label

5. Deliverables

5.1 Label Print App: NLP_DL_vxx.xx.exe

5.2 NLP_DL_Instruction.xlsx

RECORD OF REVISIONS

Revision No	Date	Section	Description
001	20AU19	ALL	Initial release.
002			
003			
004			
005			
006			
007			
008			
009			
010			
011			
012			
013			
014			
015			
016			
017			
018			
019			
020			