2. Reference Information

This chapter contains the tools list, list of abbreviations used in this manual, and a guide to the location space required when installing the printer. A definition of tests pages is also included.
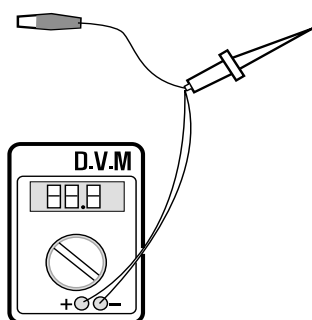
2.1 Tool for Troubleshooting

The following tools are recommended for safe and smooth troubleshooting described in this service manual.
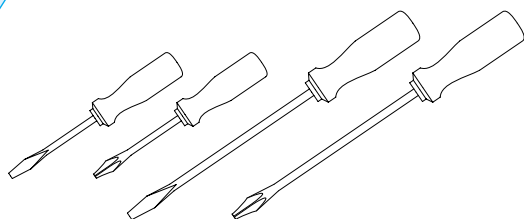
1 **DVM(Digital Volt Meter)**
Standard: Indicates more than 3 digits.

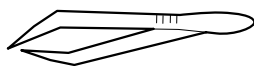**2** **Driver**
Standard : "-" type, "+" type (M3 long, M3 short, M2 long, M2 short).

3 **Tweezers**
Standard : For general home use, small type.

4 **Cotton Swab**
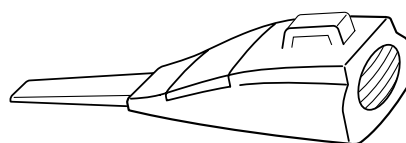Standard : For general home use, for medical service.

5 **Cleaning Equipments**
Standard : An IPA(Isopropyl Alcohol)dry wipe tissue or a gentle neutral detergent and lint-free cloth.
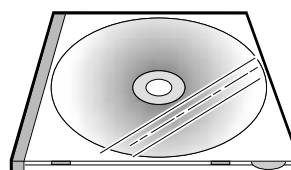

6 **Vacuum Cleaner**

7 **Spring Hook**
Standard : For general use

8 **Software(Driver) installation CD ROM**

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2.2 Acronyms and Abbreviations

The table in the below explains abbreviations used in this service manual.
The contents of this service manual are declared with abbreviations in many parts. Please refer to the table.

ADC	Analog-to-Digital-Conversion	FCOT	First Copy Out Time
AP	Access Point	FFC	FLexiable FLat Cable
AC	Alternating Current	LAN	local area network
ASIC	Application Specific Integrated Circuit	LBP	Laser Beam Printer
ASSY	Assembly	EPP	Enhanced Parallel Port
BIOS	Basic Input Output System	F/W	Firmware
BLDC Motor	Brushless DC Motor	FCF/FCT	First Cassette Feeder/First Cassette Tray
CIS	Contact Image Sensor	FISO	Front-In, Side-Out
CMOS	Complementary Metal Oxide Semiconductor	FPOT	First Print out Time
CN	Connector	GDI	Windows Graphic Device Interface
CON	Connector	GIF	Graphic Interchange Format
CPU	Central Processing Unit	GND	Ground
dB	Decibel	HBP	Host Based Printing
dBA	A-Weighted decibel	HDD	Hard Disk Drive
dBm	Decibel milliwatt	HTML	Hyper Text Transfer Protocol
DC	Direct Current	HV	High Voltage
DCU	Diagnostic Control Unit	HVPS	High Voltage Power Supply
DIMM	Dual In-line Memory Module	I/F	Interface
DPI	Dot Per Inch	I/O	Input and Output
DRAM	Dynamic Random Access Memory	lb	Pound(s)
DVM	Digital Voltmeter	IC	Integrated Circuit
ECP	Enhanced Capability Port	ICC	International Color Consortium
ECU	Engine Control Unit	IDE	Intelligent Drive Electronics or Integrated Drive Electronics
EEPROM	Electronically Erasable Programmable Read Only Memory	IEEE	Institute of Electrical and Electronics Engineers. Inc
EMI	Electro Magnetic Interference	IOT	Image Output Terminal (Color printer, Copier)
EP	Electro photographic		
EPP	Enhanced Parallel Port	IPA	Isopropy Alcohol

IPC	Inter Process Communication		RAM	Random Access Memory
IPM	Images Per Minute		ROM	Read Only Memory
LCD	Liquid Crystal Display		SCF/SCT	Second Cassette Feeder/Second Cassette Tray
LED	Light Emitting Diode		SMPS	Switching Mode Power Supply
LSU	Laser Scanning Unit		SPGP	Samsung Printer Graphic Processor
MB	Megabyte		SPL	Samsung Printer Language
MFP	Multi-Functional Product		Spool	Simultaneous Peripheral Operation Online
MHz	Megahertz			
MPBF	Mean Prints Between Failure		SURF	Surface Rapid Fusing
MPF/MPT	Multi Purpose Feeder/Multi Purpose Tray		SW	Switch
			sync	Synchronous or Synchronization
NIC	Network Interface Card		T1	ITB
NPC	Network Printer Card		T2	Transfer Roller
NVRAM	Nonvolatile Random Access Memory		TBD	To Be Determined
			TRC	Toner Reproduction Curve
OPC	Organic Photo Conductor		TTM	Time to Market
PBA	Printed Board Assembly		PnP	Universal Plug and Play
PCL	Printer Command Language , Printer Control Language		UMC	Unit Manufacturing Cost
			URL	Uniform Resource Locator
PCI	Peripheral Component Interconnect by Intel 1992/6/22, is a local bus standard developed by Intel and introduced in April, 1993 : A60, B60 Pins		USB	Universal Serial Bus
			VCCI	Voluntary Control Council for Interference Information Technology Equipment
PDF	Portable Document Format			
PDL	Page Description Language		WECA Alliance	Wireless Ethernet Compatibility
Ping	Packet internet or Inter-Network Groper		Wi-Fi	Wireless Fidelity
PPD	Postscript Printer Discription			
PPM	Page Per Minute			
PS	Post Script			
PTL	Pre-Transfer Lamp			
PWM	Pulse Width Moduration			
Q'ty	Quantity			
QCD	Quality, Cost, and Delivery			

2.3 Select a location for the printer

• Leave enough room to open the printer trays, covers, and allow for proper ventilation. (see diagram below)

• Provide the proper environment :
  - A firm, level surface
  - Away from the direct airflow of air conditioners, heaters, or ventilators
  - Free of extreme fluctuations of temperature, sunlight, or humidity
  - Clean, dry, and free of dust
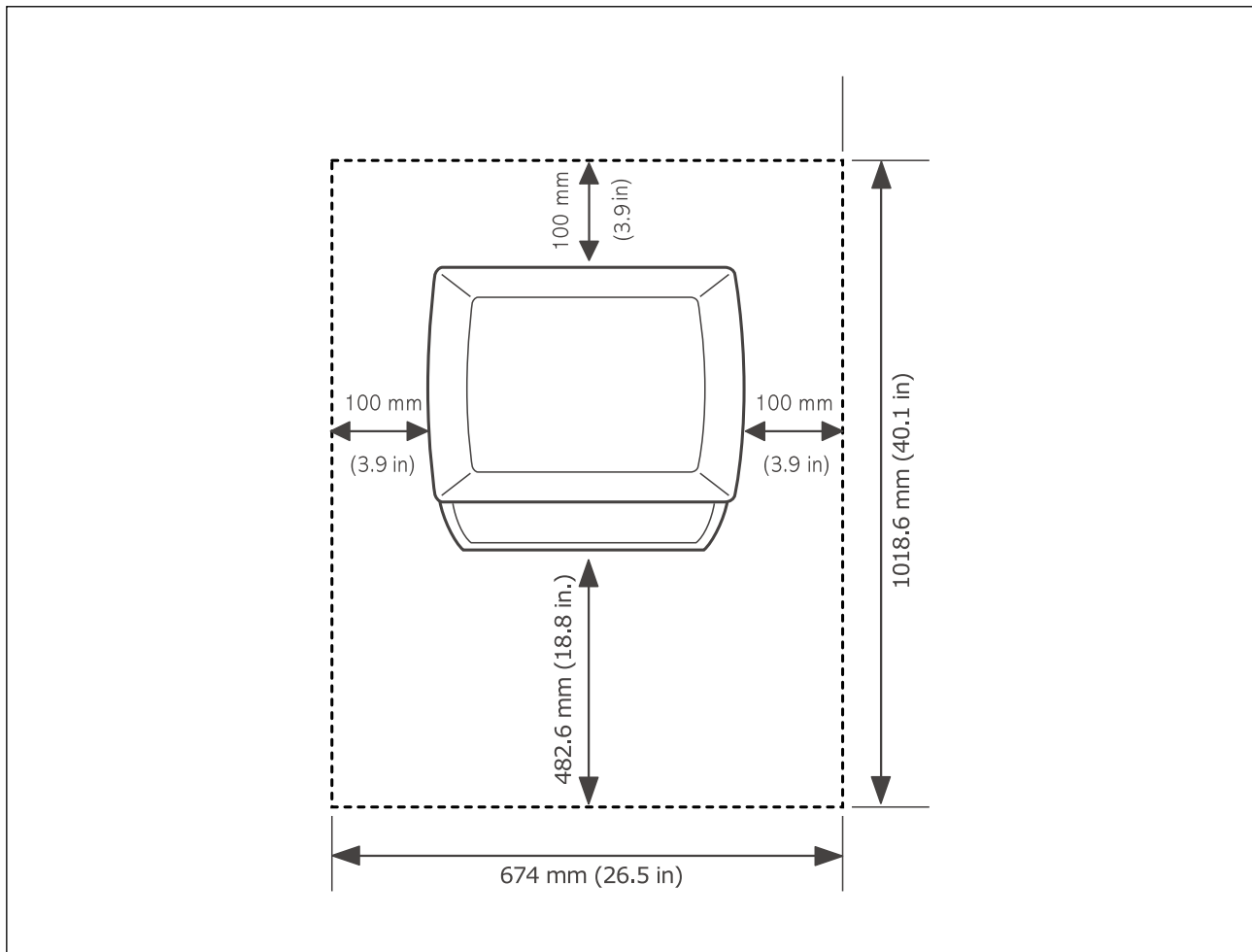
2.4 The Sample Pattern for the Test

The sample pattern shown in below is the standard pattern used in a factory.
The contents of the life span and the printing speed are measured with the pattern shown in below.
(The picture in the manual is 70% size of the actual A4 size.)

2.4.1   A4 5% Pattern

```
i  o    o e  /   A  K    O6    cs  hh     r  m    E     ei     *·0  Y  s    r      a  i
      r   a)     (    Y   b  S          lM*     s     g      ·3    A  A4  r    n
   t   Leyi   Rs ·   s             d  u    XO  0    lg  P      t   f   l
N  l   0t      f   ′  t  psF  Ott    O  2  ux⁻s  o   i  t  Anvp  N    0  tQ
tl  ti    uso  w·i   aG·    1  u  p  O ·    n        X0t    li   at
   L  ey  oH     m     m    n    N:   lC     T   c  hrry   x   i  t
    ia*  X  0  t·         utst⁻   N*Qir  ep     n  b  pepa  We   t
eo  t  s    IT·  i  ′e    dn   o    S      b*     te  *   G  *  srx  isn
    ·auo      s  t  s  e 1    A  cko         o        9  0  gs
ne  3    o  n    1*  r  a/n  i     0p    r   r         i    *  ee
s    O  aeoCs  p  *  *  Ke·0  sn*s  z        e0  cr        O    0  ma  go
   FpT  sonm  da    t  s  l  xopr    a   r  p · o    o  ′  -   u
ac⁻n  *  /    sac     Y    t     e  (ty*  mlaI   p   b   t2  (l
i    edu  ar   ⁻0   l    DPr e  Dse  ag   c   e  sa6g   p  p·
 */mn0ov    P   se*   W  a   0  r   *    9m  0  P   p   r    P00
n  t*n      su     n  h*xV  ri  tp′  o  rg  c0    Ine  s  v0  ⁻0    1  T
    y    01       m    ′  (10   M  ′  u/    r  ne     o    p  e
    0b       d  t  nu  e     n  e        lA      apr0  i0tre
s      o  e    d  0  u· I  si  eSC    o        i  X·ee
pe   e    t  i  md    0Pc e  Letyo   aoI    t  nn  1  tm   e  B
   x  i  Xlo   )   c  aIcn   fern   i)x  i   p  n*  n   0i  e  u  in  D  W
X   y  X  r    eo  0o1  dE    bs        PB  teo      *  RO   H   g  u*K
d  s  Fxr   rCF  a   bh   s   p   gs  le  r  roJ   n      e      pp
   a        p     tr  ps(s    oadrr   la  s      p  z  uis      n  oa
   ·m     d   t   E  *F  i*   opn    E   h   i     rudc  r  s      0
   a  petya  b  d   e     V″  d      t·e·P)     ·  r0 ·h   n  s  t
n  p  t      e  v  t   ho  *f0x*a  0  ic  0   em  i   a     c4     FA0
   i2q  n/   s8·   i   )    BZ     P  cd~  Pso  o   30a       Or    Y  *h
dr  ⁻e   tu9  t      F  iet3  rhP        *  e   mo   dt        x  De
wTpp   xix  n  m(       Wd  lAacC         a  ⁻0  z)l  i   i  n  e
5   e   *   sn  o       Pd ·Xl       o   ic  sa  y     X       Pk
i⁻  PO0  P       h   Yb  olO)   C   e  (  w  sc0″o  o  ynn   !Xnj
   i  Va3   Ac  H  a    C    Xt0rP   ow ·     ersIco   s  l0   a
PlPlaIe        a   tid    eP/tF  t  )s      pn     F ′t  g(eD   e
so   ss       w  l0h    yXt    0S    p)  Dn0⁻         o        r
*dynM    0  u  ii     Tp  nly    ne′  l      C  X    s(se0  0·c
i    O8    BW  ouCH   ue  k    EX  t2·    i     sonn   *       oP
  is1   n  g  ir   r        Q    o   X  gr  ny*  tu    0  mxsar   uj*
a  0/*      p     8      ur    f   o  t  a      ip  P  no       e
  es       pn ·*i*  i   ·t) ·t   W   5A  *  iyn  t  I    O  stn  rtx
       n  te·  s  ev    s   n   x  (  Xen  eo   Xw    td  l· -
   Ui   c  i7       e  )SPX   m  uros3*is  s   ·n  n  M   o   l    L⁻g
   at  *sUrn2      7e  u   l  X    o   o  tH⁻res  c    p  eo       W
5*    oe      O(  Q   F0P  nN  *     em·r*ud  e   t     mM   c  i0X5
  i0g    s⁻  a      os  on    d  b  so′6p    s  6At   e0 ·  n  s
HiST      0   J   t  R   6   ei   T    rJ  iil ′  i  0       ank′
   p   r  er0   F     Bui      oP  mM  e0M  0    00  1Ee  u    e  B   u
q   t  i  o  XB  iO  *hn  t   r  i    a  ses  ″       t  X  t   t   s      n
m)  g    p  d  G    F  I   soy  Ors  fE*0  o     Ie  hd   e       n
p       gn0·  t   H    r  s   nzE   e    iea   p   *  t   ⁻  P/4e  l
   t   E  oo      w  a  g    e    s6  n  0c  xpc      -w   n
d     X    er   s   t        o  t  idt  *o  s  0·  P   e    t  1l/R
  XX   i  g      i  e fg  s   P   C  ·  m  x  h  te  C   g  os  ta       e
Pa(o0  n/t00′ozdI       dno      x·p    O  W  ae   or  R   t  icF
(l   xa  B    co  o  s    )r  s    8Y*x   toe·   ie   t        o    ah
r         B  0     rlr         d     t ·l   Ei  et0Da  h      n  s7
    C   ⁻  s  oolo  t    ga ′r    FM  *d   i*s  0  X   o  pe           *



    Current Printing Page is :    1  Of   1
```

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2.4.2   A4 2% Pattern
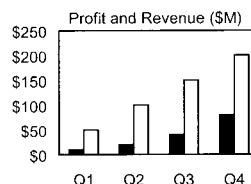
Current printing page is :   1   of   1
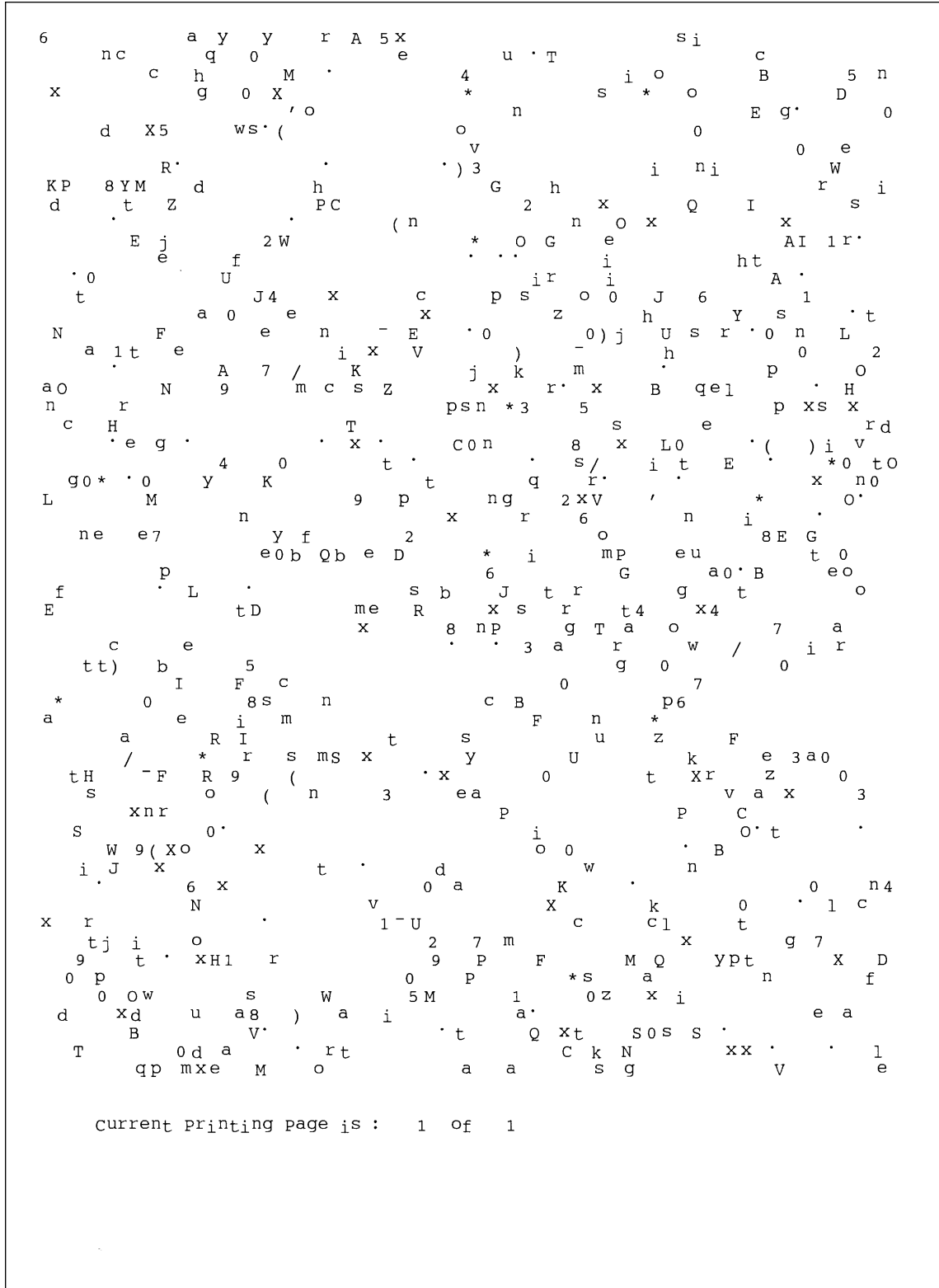
2.4.3 A4 IDC 5% Patten

INTEROFFICE MEMORANDUM

TO: Cathy Scott
FROM: Lane Wolters
SUBJECT: The Typical Printed Page
DATE: 07/14/09

What does the typical laser printer document look like? Well, across the diverse business community it would be impossible to capture all aspects of printing style within a single page document.   However, if attention is focused on the majority of printing volume, text and simple business graphics would stand out as the most prevalent output from laser printers.   This sample memo represents a reasonable example of the typical business document. This memo covers approximately 5% of a letter or A4-sized piece of paper. This number (5%) has historically been called the "average" page coverage by laser printer manufacturers.   It may seem to the naked eye that there is much more than 5%, but in fact, alphanumeric characters rely on a large portion of white space for their composition.

Mileage Chart

City	London	Los Angeles	New York	Tokyo
London	--	5456	3453	5975
Los Angeles	5456	--	2468	5451
New York	3453	2468	--	6736
Tokyo	5975	5451	6736	--

There are many factors that can influence the actual page coverage of a document as well as the page-yield of a toner cartridge. Testing parameters such as font size and style, internal printer settings, print environment, paper stock, sample size, job length and criteria for determining "end of life", can all influence how long a toner cartridge will last. The best competitive analysis of printer page yield should occur under similar conditions using industry standards for the variables listed above.

1 of 1

MEMO