

K-LINE

INDUSTRIAL KEYBOARDS



TECHNICAL OVERVIEW

Description and Application

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[**TIPRO**]

keyboards focusing on your future needs.

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A. GENERAL INFORMATION

K-Line keyboards are robust/rugged input devices for application in harsh industrial environments. Omron's B3F short-travel mechanical keyswitches covered by a protective embossed polyester membrane provide a good tactile feedback when typing as well as a high functional reliability. The front side is resistant to dust, moisture, alcohol, diluted acids, diluted alkalis, esters, hydrocarbons, ketones and household cleaning agents, what makes K-Line keyboards suitable for various industrial and medical/healthcare applications.

A.1. Highlights

FEATURES

- ◆ compact keyboards with 101/102 or 104/105 keys
- ◆ various national/country layouts available
- ◆ integrated pointing devices: trackball or touchpad
- ◆ desktop, panel-mount and rack-mount versions
- ◆ Omron's B3F short-travel mechanical keyswitches
- ◆ IP 65 protection from the front
- ◆ USB or PS/2 interface
- ◆ supported by generic drivers
- ◆ programmable keys with enable/disable function
- ◆ implemented "Protect" function provides several access levels (security)

APPLICATIONS

- ◆ control panels in industrial environments
- ◆ Point-of-Information consoles
- ◆ Medical/healthcare equipment

PROGRAMMABILITY

- ◆ all keys are programmable (default is selected national layout)
- ◆ individual key enable/disable function
- ◆ different access levels protected by passwords

VERSATILITY

- ◆ desktop versions (K-54y)
- ◆ rack-mount versions (K-64y) for standard industrial racks (95 TE x 4 HE) – associated bolts and nuts are enclosed within the packaging

- ◆ panel-mount versions (K-84y) for permanent installation in a control panel – fixing bolts are inserted in the front metal mask
- ◆ different national layouts
- ◆ optional pointing devices: trackball or touchpad

A.2. Versions (Variants)

A.2.1. Desktop Versions



Figure 1. – Standard layout (K-545)



Figure 2. – Standard layout with integrated touchpad (K-547)



Figure 3. - Compact layout with integrated touchpad (K-548)

A.2.2. Rack-Mount and Panel-Mount Versions



Figure 4. - Standard layout (K-645 and K-845)



Figure 5. - Compact layout with integrated touchpad (K-648 and K-848)



K-647

Figure 6. - Standard layout with integrated touchpad (K-647 and K-847)

K-842

Figure 7. - Standard layout with integrated 38mm trackball (K-642 and K-842)

K-844

Figure 8. - Standard layout with integrated 50mm trackball (K-644 and K-844)

A.3. National Layouts

Standard offering includes two national layouts: US English and German. Other national layouts are available on request, as a customization. An example layout is shown in the Figure 9 below.



Figure 9. – K-847 – US English layout

A.4. Technical Characteristics

ELETRICAL

- ◆ **power supply:** 5V ± 5% (from USB or PS/2 interface)
- ◆ **current consumption (PS/2 interface):** see Table 1 below for details:
 - keyboards without a pointing device: up to 35 mA (20 mA_{TYP})
 - keyboards with integrated touchpad: up to 45 mA (25 mA_{TYP})
 - keyboards with integrated trackball: up to 55 mA (35 mA_{TYP})
- ◆ **current consumption (USB interface):** see Table 1 below for details:
 - keyboards without a pointing device: up to 65 mA (40 mA_{TYP})
 - keyboards with integrated touchpad or trackball: up to 100 mA (70 mA_{TYP})
- ◆ **interface connectors (at the computer end of the cable):**
 - mini DIN 6 (PS/2 keyboards without a pointing device)
 - 2 x mini DIN 6 (PS/2 keyboards with a pointing device)
 - USB A (all USB keyboards)

	<i>Typical current consumption [mA]</i>	
	<i>PS/2 interface</i>	<i>USB interface</i>
K-545	20	40
K-645	20	40
K-845	20	40
K-547	25	70
K-647	25	70
K-847	25	70
K-548	25	70
K-648	25	70
K-848	25	70
K-642	35	70
K-842	35	70
K-644	35	70
K-844	35	70

Table 1. – Typical current consumption

MECHANICAL

- ◆ **caseing:** plastic polystyrene, light-grey colour RAL 7044
- ◆ **net dimensions** (W/D/H) [mm]: see Table 2 below for details
- ◆ **weight** [g]: see Table 2 below for details
- ◆ **protection (sealing) grade:** according to EN 60529
 - desktop versions: IP 40 (IP 65 from the front)
 - rack and panel-mount versions: up to IP 65 (depending on the integration)

	<i>Dimensions [mm]:</i>	<i>Weight [g]:</i>
K-545	370.0 x 180.0 x 28.0	1750
K-645	482.6 x 177.8 x 42.5	1290
K-845	482.6 x 177.8 x 42.5	1290
K-547	478.5 x 180.0 x 28.0	2260
K-647	482.6 x 177.8 x 42.5	1480
K-847	482.6 x 177.8 x 42.5	1480
K-548	370.0 x 180.0 x 28.0	1850
K-648	482.6 x 177.8 x 42.5	1390
K-848	482.6 x 177.8 x 42.5	1390
K-642	482.6 x 177.8 x 38.0	1490
K-842	482.6 x 177.8 x 38.0	1490
K-644	482.6 x 177.8 x 50.0	1520
K-844	482.6 x 177.8 x 50.0	1520

Table 2. – Dimensions and weight

ENVIRONMENTAL

- ◆ **operating ambient temperature range:** 0°C to +40°C
- ◆ **storage ambient temperature range:** -10° C to +50°C
- ◆ **relative humidity range:** 10% to 90% (non-condensing)

B. INTEGRAL PARTS AND FUNCTIONALITY

B.1. Keyswitches

All keys in industrial keyboards utilize Omron B3F-4005 short travel mechanical keyswitches with a fair tactile feedback and long lifetime.

- ◆ **model:** Omron B3F-4005
- ◆ **key travel:** $0.3^{+0,2}/_{-0,1}$ mm
- ◆ **lifetime:** 1×10^6 operations (minimal)
- ◆ **actuating force:** 255 ± 69 cN

B.2. Metal Mask

The metal mask (made of a 1.5mm thick soft steel) is affixed to the PCB to improve overall mechanical properties (hardness, strength, toughness) of the keyboard as well as to provide a smooth surface to glue the protective membrane.

B.3. Protective Membrane

K-Line keyboards are protected with a membrane which is glued on top of the metal mask. The membrane is made of a high-quality textured polyester film printed with a layout and thermally embossed. It is resistant to chemicals, abrasion and scratches and has a long flex life.

- ◆ **material:** AUTOTEX® V150
- ◆ **colour:** Pantone Warm Grey 2C
- ◆ **thickness:** $150 \mu\text{m} \pm 10\%$
- ◆ **switch life:** 5×10^6 flexes (typical)
- ◆ **tensile strength:** 160 MPa - 250 MPa
- ◆ **pencil hardness:** 2H
- ◆ **dielectric strength:** 15 kV
- ◆ **chemical resistance:** diluted acids, diluted alkalis, esters, hydrocarbons, ketones, household cleaning agents

B.4. Pointing Devices

B.4.1. Touchpad (K-x47, K-x48)

Industrial keyboards (K-x47-xxx and K-x48-xxx) comprise the Cirque's TSM 9925 capacitive touchpad:

- ◆ **model:** Cirque TSM 9925
- ◆ **active area:** 62.5 × 46.5 mm
- ◆ **resolution:** 40 counts/mm
- ◆ **sample rate:** 100 samples/s
- ◆ **lifetime:** 1×10⁷ strokes (500 km) (typical)

B.4.2. 38mm Trackball (K-x42)

Industrial keyboards (K-x42-xxx) comprise the Cursor Controls' trackball:

- ◆ **model:** Cursor Controls P38
- ◆ **ball size:** Ø38.10 mm (1½")
- ◆ **protection (sealing) grade:** IP65 (statically)
- ◆ **resolution (nominal):** 241 pulses per ball revolution
- ◆ **ball material:** Thermoset Phenolic

B.4.3. 50mm Trackball (K-x44)

Industrial keyboards (K-x44-xxx) comprise the Traxsys' D50 trackball:

- ◆ **model:** Traxsys (Penny & Giles) D50
- ◆ **ball size:** Ø50.80 mm (2")
- ◆ **protection (sealing) grade:** IP65 (statically)
- ◆ **resolution (nominal):** 960 pulses per ball revolution
- ◆ **ball material:** Thermoset Phenolic

B.5. Connection

B.5.1. USB

USB industrial keyboards (K-xxx-xxU) incorporate a captive (affixed) cable with the USB (Type A) connector at the computer end (to be connected into a downstream port of a USB hub).

B.5.2. PS/2 (without a pointing device)

PS/2 industrial keyboards without a pointing device (K-xxx-xx5) incorporate a captive (affixed) cable with Mini DIN 6 (PS/2) connector at the computer end (to be connected into a PS/2 keyboard port).

B.5.3. PS/2 (with a pointing device)

PS/2 industrial keyboards with integrated pointing device (K-xxx-xx9) incorporate a captive (affixed) cable with two Mini DIN 6 connectors at the computer end (one to be connected into a PS/2 keyboard port, another into a PS/2 mouse port).

B.6. Drivers

K-Line keyboards do not require proprietary drivers to operate, but rather generic PS/2 or USB HID drivers (keyboard and mouse) of the operating system in use.

B.7. Packaging

See Table 3 below for package content, approximate dimensions and weight.

	<i>Dimensions</i> [mm]:	<i>Weight</i> [g]:	<i>Content:</i>
K-545	394 x 229 x 70	2000	keyboard
K-645	505 x 186 x 45	1475	keyboard, rack fixing bolts and nuts (4 pieces)
K-845	505 x 186 x 45	1475	keyboard
K-547	508 x 238 x 58	2410	keyboard
K-647	505 x 186 x 45	1665	keyboard, rack fixing bolts and nuts (4 pieces)
K-847	505 x 186 x 45	1665	keyboard
K-548	394 x 229 x 70	2100	keyboard
K-648	505 x 186 x 45	1575	keyboard, rack fixing bolts and nuts (4 pieces)
K-848	505 x 186 x 45	1575	Keyboard
K-642	508 x 238 x 58	1735	keyboard, rack fixing bolts and nuts (4 pieces)
K-842	508 x 238 x 58	1735	keyboard
K-644	508 x 238 x 45	1765	keyboard, rack fixing bolts and nuts (4 pieces)
K-844	508 x 238 x 45	1765	keyboard

Table 3. - Packaging

B.8. Physical Integration

Technical drawings of all K-Line keyboards are available for download from Tipro Internet site at <http://www.tipro.net/support/Documentation.html>

C. ORDERING CODES

 1 2 3 4 5 6 7
K - **5** **45** - **B** **T** **U** - **US** - **xxx**

K : Industrial keyboard (**K-Line**)

1 – Mounting/Integration Method

5 : Desktop
6 : Rack-Mount
8 : Panel-Mount

2 – Keyboard Type (Layout)

42 : Standard layout with built-in 38 mm trackball
44 : Standard layout with built-in 50 mm trackball
45 : Compact layout
47 : Standard layout with built-in touchpad
48 : Compact layout with built-in touchpad

3 – Keyswitch Technology

B : Omron B3F-4005

4 – Housing

0 : Panel-Mount or Rack-Mount version without back cover
C : Panel-Mount or Rack-Mount version with back cover
T : Desktop version in plastic housing

5 – Interface & Cable Connector(s)

5 : PS/2 - MiniDIN6
9 : PS/2 - MiniDIN6 for keyboard + MiniDIN6 for pointing device
U : USB - USB Type A

6 – National (County) Layout**Standard:**

US : US English

DE : German

Upon request:

UK : UK English

FR : French

CH : Swiss (French/German)

DK : Danish

ES : Spanish

NO : Norwegian

BE : Belgian

SE/FI : Swedish/Finish

BE : Belgian

SI/HR : Slovenian/Croatian

7 – Custom Version

Three-digit number reserved for product customizations. It is omitted in case of standard version.

D. REFERENCES

1. “INDUSTRIAL KEYBOARDS” – Technical Specification
2. “ChangeMe” – User’s Manual
3. “Security/Protect Feature” – Technical Overview

E. NOTICES

E.1. Disclaimer

Information furnished by Tipro is believed to be accurate and reliable. However, Tipro makes no representations or warranties regarding the accuracy or completeness of the contents of this document and reserves the right to make changes to specifications and product descriptions at any time without notice.

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