BeiJer
E L E C T R O N I C S

E-Key16

Manual

English

Manual for E-Key16

Foreword

This manual describes installation and functions of the extended function keyboard E-Key16.

All configuration of the extended function keyboard is made with E-Designer, version 6.10 or higher.

It is assumed that the reader of this manual is familiar with the E-series concept.

For basic information about using function keys and LEDs, we refer to the E-series operator terminals and E-Designer manual.

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Safety precautions

General

– Read the safety precautions carefully.

– Check the delivery for transportation damage. If damage is found, notify the supplier as soon as possible.

– The product fulfills the requirements of article 4 of EMC directive 89/336/EEC.

– Do not use the product in an environment with high explosive hazards.

– The supplier is not responsible for modified, altered or reconstructed equipment.

– Use only parts and accessories manufactured according to specifications of the supplier.

– Read the installation and operating instructions carefully before installing, using or repairing the product.

– Never pour fluids into any openings in the product. This may cause fire or electrical shock.

– Only qualified personnel may operate the product.

During installation

– The product is designed for stationary installation on a plane surface.

– Put the product on a stable surface during installation. Dropping it or letting it fall may cause damage.

– Install the product according to the accompanying installation instructions.

– Ground the product according to the accompanying installation instructions.

– Only qualified personnel may install the product.

– Separate the high voltage, signal and supply cables.

– Make sure that the voltage and polarity of the power source is correct before connecting the product to the power outlet.

– Do not place the product where it might be exposed to strong magnetic fields.

– Do not install the product in direct sunlight.

– Peripheral equipment must be appropriate for the application.

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UL installation
– Power, input and output (I/O) wiring must be in accordance with Class I, Division 2 wiring methods (Article 501-4 (b) of the National Electrical Code, NFPA 70) and in accordance with the authority having jurisdiction.

During use
– Keep the product clean.

– Emergency stop and other safety functions may not be controlled from the product.

– Do not touch the keys etc. with sharp objects.

Service and maintenance
– The agreed warranty applies.

– Only qualified personnel should carry out repairs.

Dismantling and scrapping
– The product or parts thereof shall be recycled according to local regulations.

– The following components contain substances that might be hazardous to health and the environment: lithium battery and electrolytic capacitor.

Contents

1   Introduction

The extended function keyboard E-Key16 can be used provide an operator terminal with 16 extended function keys and LEDs. A maximum of four extended keyboards can be connected to one operator terminal. The terminal scans all keyboards in the network, detectives changes on function keys and writes new values to the LED register.
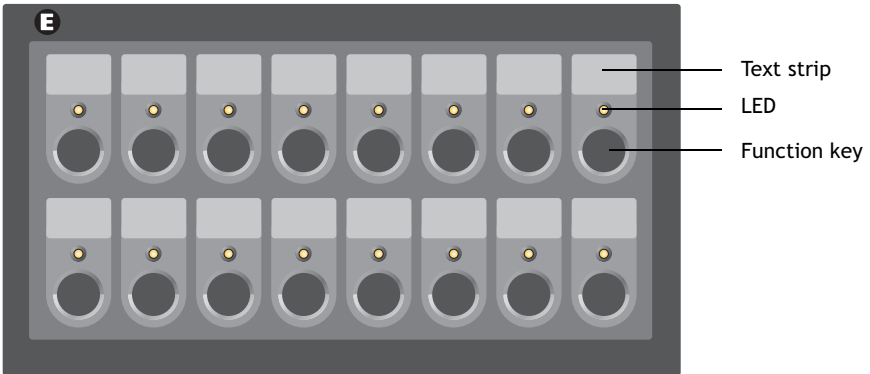
E-Key16, the extended function keyboard.

Parameter	E-Key16
Serial ports*	RS232C, RS422 and RS485
LEDS	16
Function keys	16
Power supply	24 V DC
Baud rate	Max. 38,400
Operator terminal support	E300 - E910
Heart beat function	All LEDs will flash in red if the communication to the operator terminal is broken

* The ports on the keyboard can only be used for communication to an operator terminal and between extended keyboards.

2 Configuration

Connection

A maximum of four extended function keyboards can be connected to an operator terminal. The first keyboard can be connected to the RS232C, RS422 or RS485 port on the operator terminal, independent of Point-to-Point or multidrop configuration. The default setting is the RS232C port.
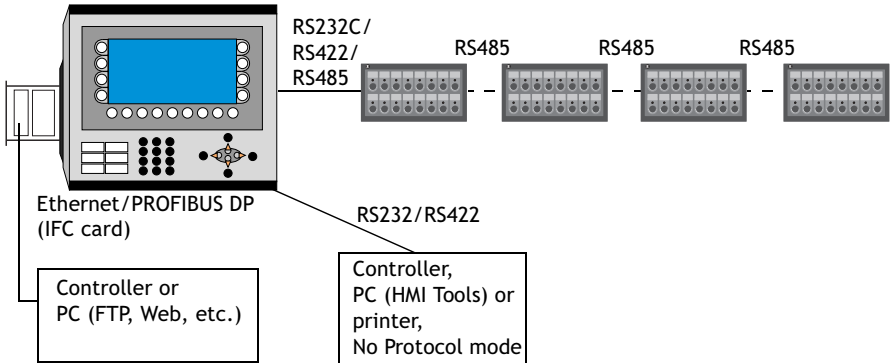
If more than one E-Key16 is connected to an operator terminal, the keyboards are connected in an RS485 multidrop network. Connecting also the terminal in the RS485 multidrop network gives the most efficient communication. Pass through communication must be enabled in the extended keyboard connected to the operator terminal, according to chapter *4.2 Function keys*. Pass through communication is only necessary when the first extended keyboard is connected to the RS422 or the RS232C port on the operator terminal.

For connection to the RS232C port on the operator terminal, the cable CAB21 can be used. The maximum length of the cable is 15 meters.

The converter CAB8 (RS422/RS485) can be used for connection to the RS422 port.

For description of connections and cables, see chapter *7 Drawings*.

Configuration possibilities

RS232C/
RS422/
RS485

RS485   RS485   RS485

Ethernet/PROFIBUS DP
(IFC card)

RS232/RS422

Controller or
PC (FTP, Web, etc.)

Controller,
PC (HMI Tools) or
printer,
No Protocol mode

Four extended keyboards connected to an operator terminal.

Note!
The function *Dual drivers* is supported, but two serial drivers and E-Key16 cannot
be used at the same time.

Example configuration

Operator terminal

E-Key16, stn 1   E-Key16, stn 2

RS422   RS232C (CAB21)   RS485

Controller
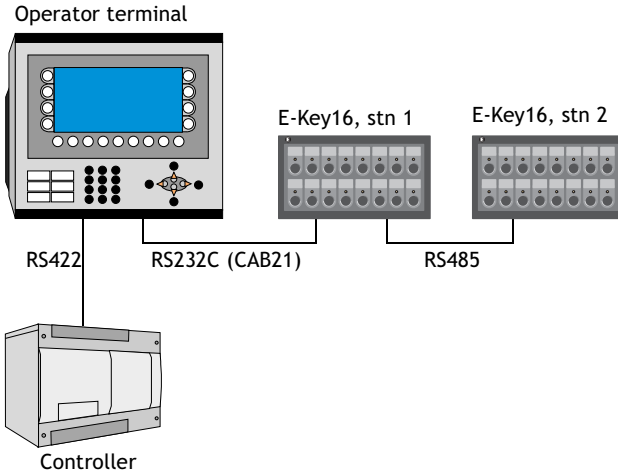
The stations are configured according to the table below. The settings made are indicated by the corresponding LEDs. For configuration instructions, see chapter *3 Setup*.

Keyboard	Station number	Comm. speed	Comm. port	Pass through messages
Station 1	1 *	38,400 bps *	RS232C *	Enabled (F16 + F7)
Station 2	2 (F16 + F2)	38,400 bps *	RS485 (F16 + F15)	Disabled *

 * Default setting

If two additional extended keyboards are added, configure the station numbers 3 and 4 as Station 2.

3   Setup

Settings such as station number, communication speed and port can be changed from the default setting by using the function keys. The power is to be turned on while pressing the function keys. The selected settings will be indicated by the corresponding LEDs.
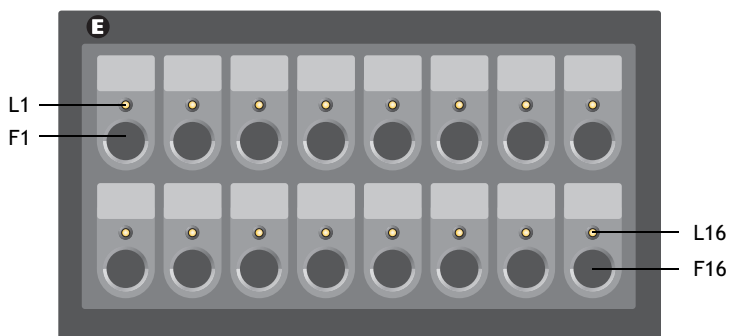
The table below presents an overview of the function keys that can be used in E-Key16.

Function keys	Function
F16 + F1	Sets the station number to 1. Default setting.
F16 + F2	Sets the station number to 2.
F16 + F3	Sets the station number to 3.
F16 + F4	Sets the station number to 4.
F16 + F9	Sets the baud rate to 9,600.
F16 + F10	Sets the baud rate to 19,200.
F16 + F11	Sets the baud rate to 38,400. Default setting.
F16 + F13	Sets RS422 as the communication port used.
F16 + F14	Sets RS232C as the communication port used. Default setting.
F16 + F15	Sets RS485 as the communication port used.
F16 + F7	Enables the E-Key16 connected to the operator terminal to pass through messages to other stations in the RS485 network.
F16 + F8	Clears **F16** + **F7**, and disables pass through. Default setting.
F1 + F2	Prepares for loading of system program.*
F1 + F9	Start of self test.*

 * Functions intended for troubleshooting and updating, normally not used.

Note!
If only one E-Key16 is used, pass through must not be enabled (the LED **L7** must not light up in green when the power is turned on).

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# 4 Settings in E-Designer

4.1 Configuration

The keyboard project application is included in the ordinary operator terminal project.

The functions in the extended keyboard are described below. For further details we refer to the manual for the operator terminals and the programming tool.

Adding an extended keyboard is made under **Setup/Peripherals**. Drag the **EKeyNet** icon from **Unused functions** and drop it on the selected communication port, or right-click on the icon and select which communication port to connect to.
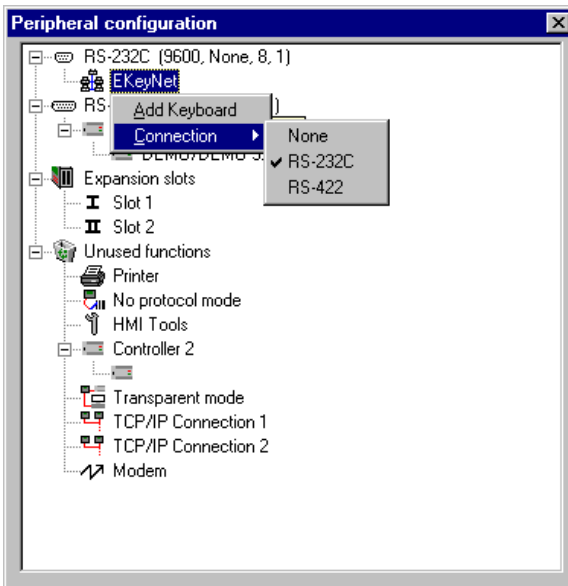
Right-click on the icon and select **Add Keyboard** to add a maximum of four extended keyboards.
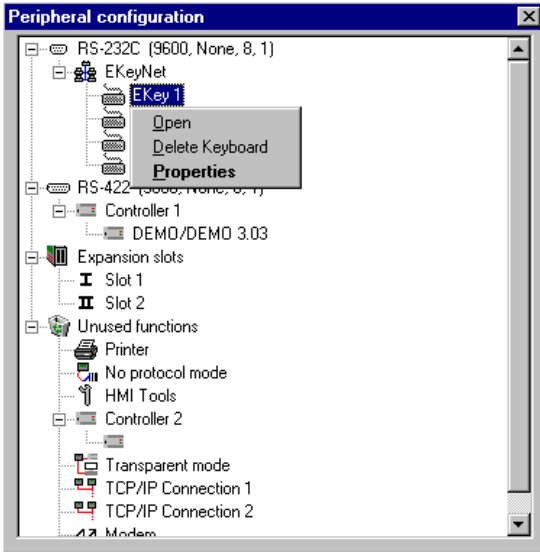
Double-click on the **EKey** icon, or right-click and select **Properties** to configure each of the extended keyboards.
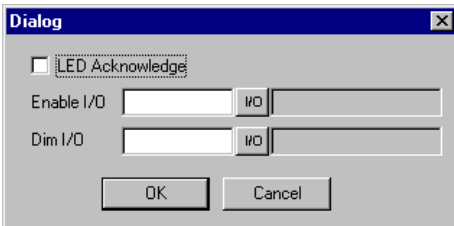
When a function key is pressed, the corresponding LED will light if the **LED Acknowledge** box is checked.

The digital signal stated in the **Enable I/O** box controls the communication to be on or off.
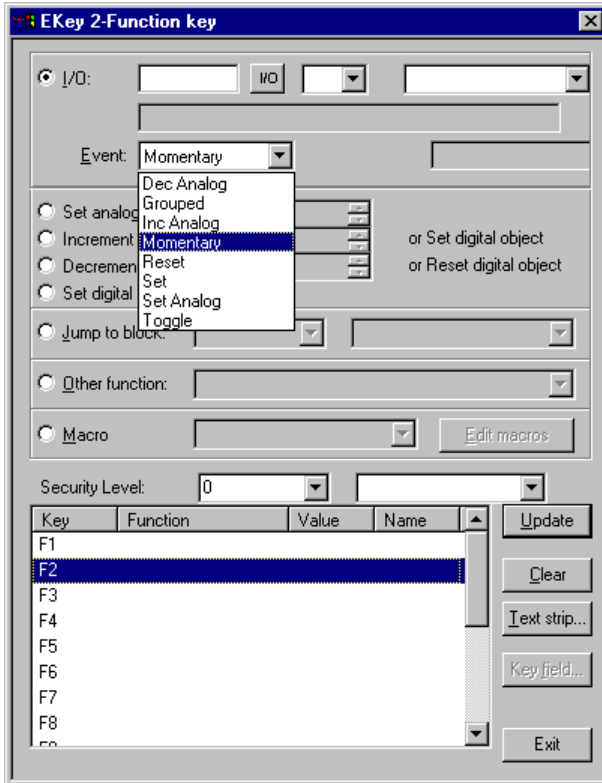
The digital signal stated in the **Dim I/O** box is used to dim all LEDs on the keyboard.

Right-click on each of the extended keyboards and select **Open** to configure the function keys, LEDs and text strips.

4.2 Function keys

The 16 function keys can only be defined as global keys.

Selecting **Open**, as described above, and double-clicking on a function key, displays the function key configuration window.

Parameter	Description
I/O	Each function key can be connected to an I/O, bit or data register. The key activates the signal. Index 1-8 can be specified to a signal.
Events	Determines how the function key will activate the connected signal; as a bit-signal (**Momentary**, **Toggle**, **Set**, **Reset** or **Grouped**), or as a data register (**Set value to...**, **Increment value with...**, or **Decrement value with...**)
Set analog object to	Affects the maneuverable object selected with cursor. We refer to the manual for the operator terminals and the programming tool for further information.
Increment analog object with/ Set digital object	
Decrement analog object with/ Reset digital object	
Set digital object momentary	
Jump to block	Jumps to block with the stated name or number.
Other function	Performs the selected function in the list of options, e.g. **Acknowledge alarm**, **Login to specified security level** or **Zoom up text size**.
Macro	Performs the functions in the selected macro. A macro can contain up to eight operations on I/O signals with different events.

4.3   LEDs

The keyboard has 16 LEDs, connected to registers. The value of the registers determines the color and blinking frequency of the LEDs. For further information we refer to the section LEDs in the manual for the operator terminals and the programming tool.

The content of the LED register is to be in consecutive order to make the communication between the operator terminal and keyboard quick and efficient.

Right-clicking on the **EKey** icon and selecting **Open** under **Setup/Peripherals** displays a view of the keyboard. Double-click on the LED to display the LED configuration window.
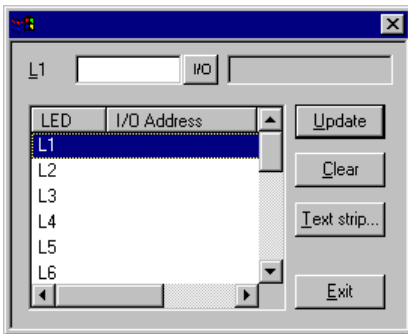
There is no separate heart beat LED, but all LEDs together will flash in red if the communication to the master terminal is broken, i.e. if the E-Key16 has not received any information in a couple of seconds.

The dimmer function can be on or off, controlled by a digital signal. All LEDs will be affected by the dimmer function. See section *4.1 Configuration* for details.

The LEDs are also used to indicate errors. See chapter *6 Error indication* for further information.

When a new system program is loaded, LED **L1** will flash in green. Normally there is no need to load a new system program.

4.4   Text strips

Each set of function key and LED has an associated text area, which fits with a text strip. The text strip can be printed on plastic film and placed in the extended keyboard.

Right-clicking on the **EKey** icon and selecting **Open** under **Setup/Peripherals** displays a view of the keyboard. Double-click on the text strip to display the text strip configuration window.
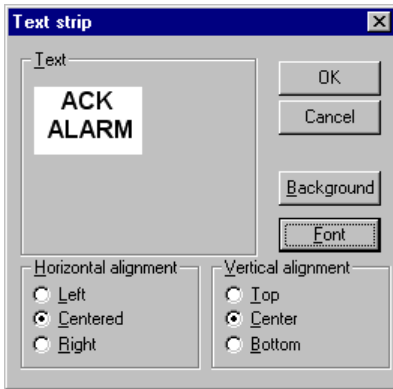
The text strip can be printed by selecting **File/Print** and checking **Text strips**.

5   Hardware specifications

The keyboard is mounted on metal sheet, not down-milled, with standard E-series cabinet mounting.

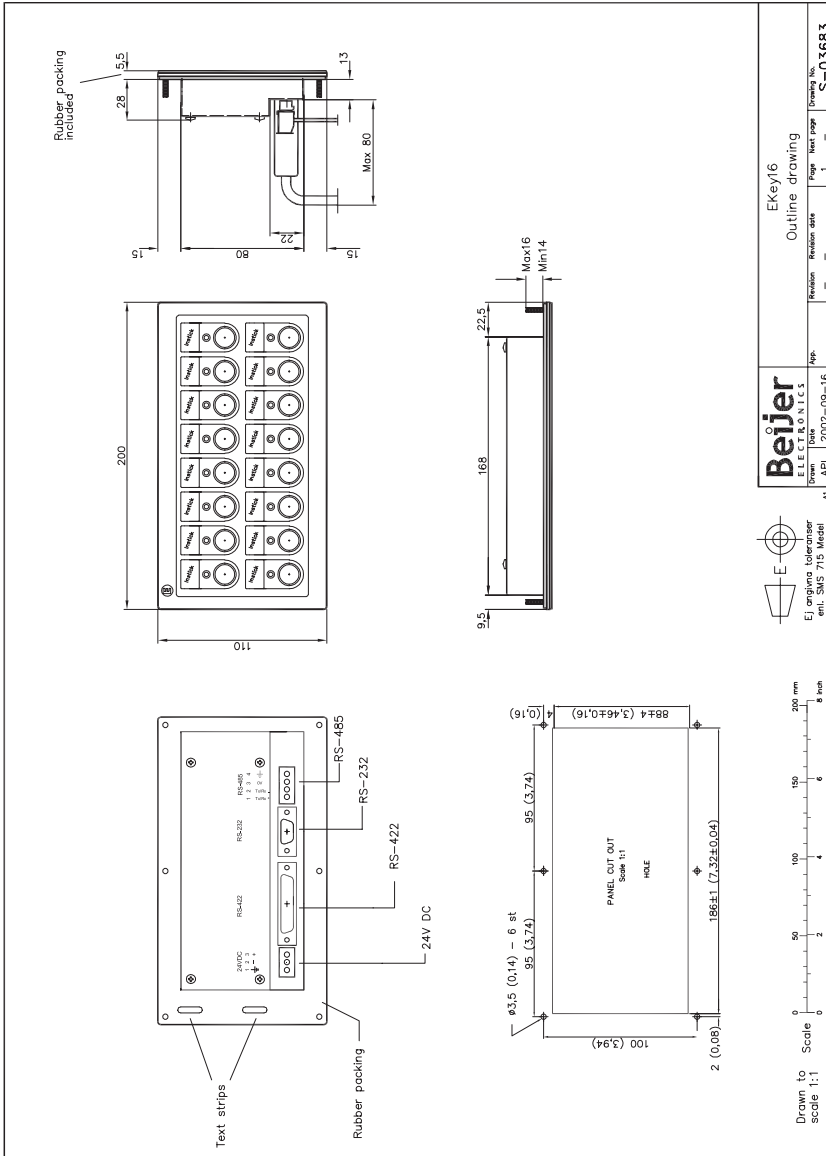| Parameter	Specification
Size, W x H x D	200 x 110 x 28 mm
Weight	360 g
Encapsulation	IP 65
Function keys	F1 - F16, located in two rows on the keyboard
LEDs	L1 - L16, located above each of the function keys, red or green, flashing, two-step dimmer
Text strips	Located above each row of LEDs, replaceable
Serial port RS232C	9-pin D-sub contact, male
Serial port RS422	25-pin D-sub contact, female
Serial port RS485	Phoenix 4-pole connector
Power supply	24 V DC Phoenix 3-pole connector
Operating temperature	0 to +50 °C
Storage temperature	-20° to +70 °C
Relative humidity	85 % non-condensed
EMC tests	The product conforms with the essential protection requirements in article 4 of the directive 89/336/EEC. Noise tested according to: EN50081-1 emission and EN61000-6-2 immunity.

6   Error indication

Errors in the extended keyboard are indicated by a LED, or a combination of LEDs, shining in solid red. In addition, LED L16 will flash in red.

Indicating LED	Error number	Error name	Steps to take
All LEDs		E_STACK_OVERRIDE	If the error occurs repeatedly, contact Beijer Electronics.
L8	00000001	BUFFEROVERFLOW1	
L7	00000010	BUFFEROVERFLOW2	
L7 + L8	00000011	STX_MISSING	
L6	00000100	OUTOFTIMERS	
L6 + L8	00000101	FLASHERROR1	
L6 + L7	00000110	FLASHERROR2	
L6 + L7 + L8	00000111	FLASHERROR3	
L5	00001000	FLASHERROR4	
L5 + L8	00001001	FLASHERROR5	
L5 + L7	00001010	FLASHERROR6	
L5 + L7 + L8	00001011	UART_STAT_GENERAL_ERROR	Remove equipment that may cause electrical disturbance.
L5 + L6	00001100	UART_BUFFOVERRUN	
L5 + L6 + L8	00001101	UART_PARITY	
L5 + L6 + L7	00001110	UART_FRAMING	
L5 + L6 + L7 + L8	00001111	E_UART_OVERRUN	
L4	00010000	E_DRIVERERROR	If the error occurs repeatedly, contact Beijer Electronics.

To restart the extended keyboard after an error, press function key F16.
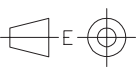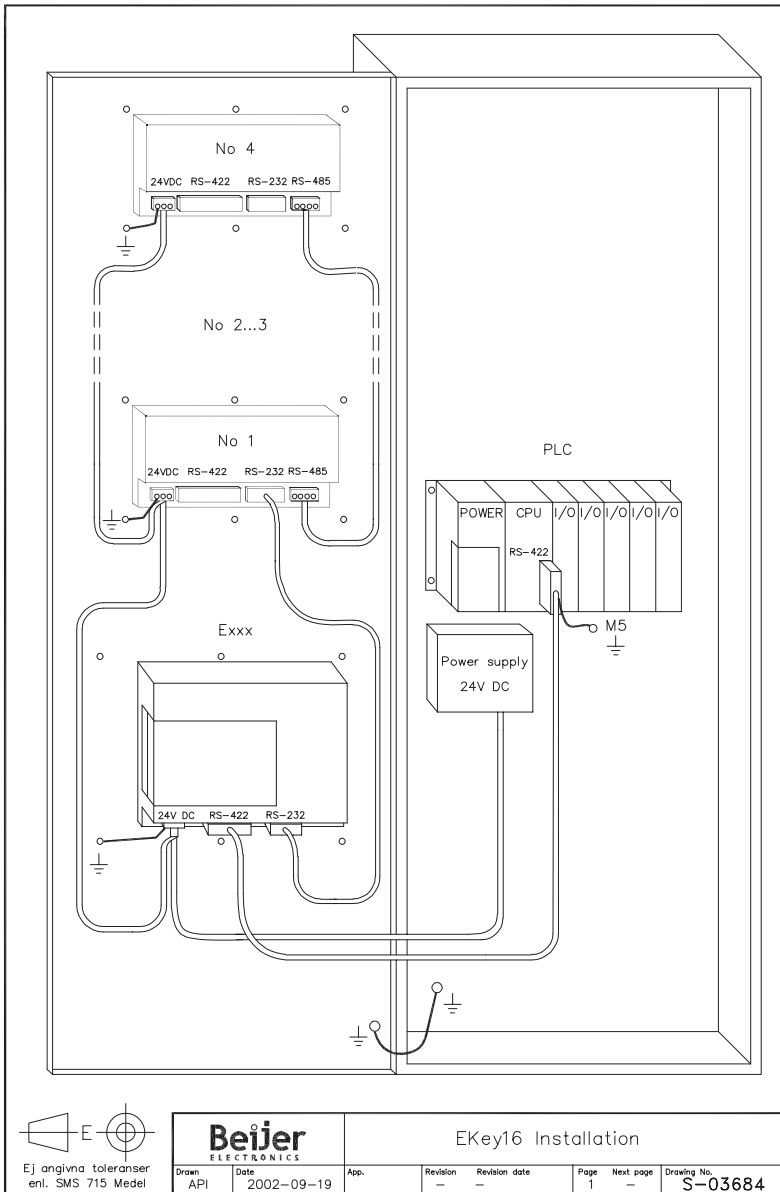
7   Drawings

Outline drawing

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E-Key16 installation

No 4

24VDC RS-422 RS-232 RS-485

No 2...3

No 1

24VDC RS-422 RS-232 RS-485

PLC

POWER CPU I/O I/O I/O I/O I/O

RS-422

M5

Exxx

Power supply
24V DC

24V DC RS-422 RS-232

Ej angivna toleranser enl. SMS 715 Medel	**Beijer** ELECTRONICS		EKey16 Installation					
	Drawn	Date	App.	Revision	Revision date	Page	Next page	Drawing No.
	API	2002−09−19		−	−	1	−	S−03684

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Connection drawing

CAB8

CAB21

Cable CAB21

Drawing No. K-03321

RS-232
9-pin D-sub Female

RXD
TXD
GND

Shield connected to D-sub cover

RS-232
9-pin D-sub Female

TXD
RXD
GND

Shield connected to D-sub cover

OPERATOR terminal

Extended keyboard

Cable: LIYCY 3x0,25 mm^2 (24AWG)

Lenght: 1m, 3m, 5m

Text: CAB21

Gra
Gray

Ej angivna toleranser
enl. SMS 715 Model

Drawn API Date 2002-10-01

Text strips

Text max 19x12

EKey16
Insticksremsa, Text Strip

Drawing No. S−03687

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Drawn to scale 1:1

2001−11−30

API

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