

## **Intelligent Actuator Super SEL**

This manual presents installation and handling of the driver Intelligent Actuator Super SEL to the terminals in the E-series.

The functionality in the E-terminals and in MAC Programmer+ are described in the E-manual.

© G & L Beijer Electronics AB 2000, MA00435, 2000-01

G & L Beijer Electronics AB reserves the right to change information in this manual without prior notice. All examples in this manual are used solely to promote understanding of how the program works and its operation. G & L Beijer Electronics AB take no responsibility if these examples are used in real applications.

# Content

<b>1 Introduction</b> .....	3
<b>2 Install and update driver</b> .....	4
2.1 Installation of driver using Internet.....	4
2.2 Installation of driver from disk.....	4
<b>3 Connecting the terminal to the controller</b> .....	5
3.1 Settings in the MAC Programmer+ .....	5
3.2 Connecting the terminal to the controller.....	9
<b>4 Addressing</b> .....	10
<b>5 Efficient communication</b> .....	11
5.1 Signals affecting the communication time.....	11
5.2 How to make the communication more efficient .....	12
<b>6 Appendix</b> .....	14
<b>7 Drawings</b> .....	15

# **1 Introduction**

This manual describes how the Intelligent Actuator Super SEL controller is connected to the terminals in the E-series. For information about the controller we refer to the manual for the current system.

## 2 Install and update driver

When installing MAC Programmer+ the drivers available at the time of release are installed too. A new driver can be added into MAC Programmer+ either with MAC Programmer+ using an Internet connection or from diskette. A driver can be updated to a newer version in the same ways.

### 2.1 Installation of driver using Internet

To update available drivers to the latest version or to install new drivers you can use the function Update terminal drivers, from Internet in the File menu in MAC Programmer+. All projects must be closed before this function is used and the computer must be able to make an Internet connection. You don't need a browser. When the connection is established a list is shown with all drivers that can be downloaded from Internet to the computer. The list shows the version number of available drivers and the version number of installed drivers. Mark the driver/ drivers you want to install in the MAC Programmer+. The function Mark Newer will mark all drivers that are available in a newer version then the one installed and the drivers not installed. Then you select Download. Each drivers is approximately 500 kb and it is ready to use when the download is ready.

### 2.2 Installation of driver from disk

To update available drivers to the latest version or to install new drivers you can use the function Update terminal drivers, from Disk in the File menu in MAC Programmer+. All projects must be closed before this function is used. Select the folder with the new driver and choose to open the mpd-file. A list is shown with all drivers that can be installed showing the version number of available drivers and the version number of installed drivers. Mark the driver/ drivers you want to install in the MAC Programmer+. The function Mark Newer will mark all drivers that are available in a newer version then the one installed and the drivers not installed. Then you select Install.

How to select the Intelligent Actuator Super SEL driver in the project and how to transfer it to the terminal are described in *chapter 3*.

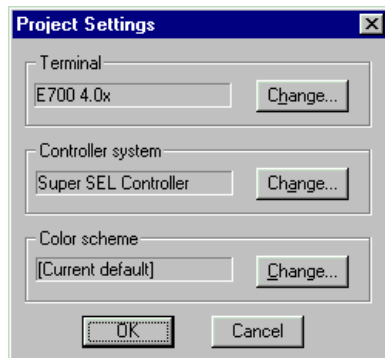
## 3 Connecting the terminal to the controller

### 3.1 Settings in the MAC Programmer+

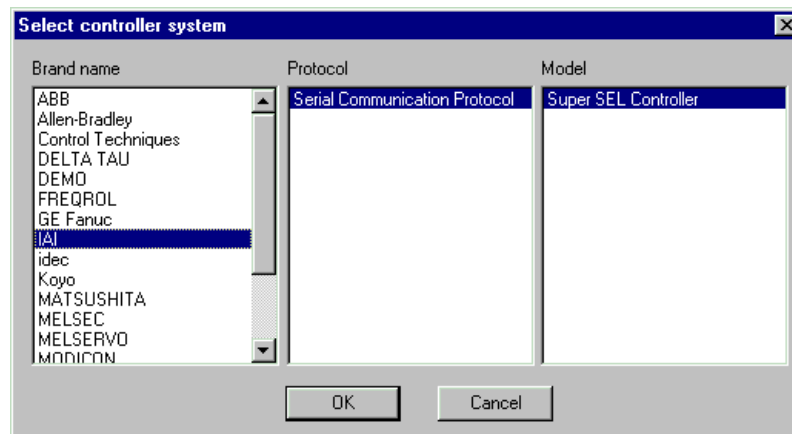
For communication with Intelligent Actuator Super SEL controller the following settings must be made in the programming tool MAC Programmer+.

#### Driver selection

Choosing **New** in the **File** menu creates a new project and the dialog **Project Settings** is shown. In an existing project, the dialog is shown by selecting **Project Settings** in the **File** menu.

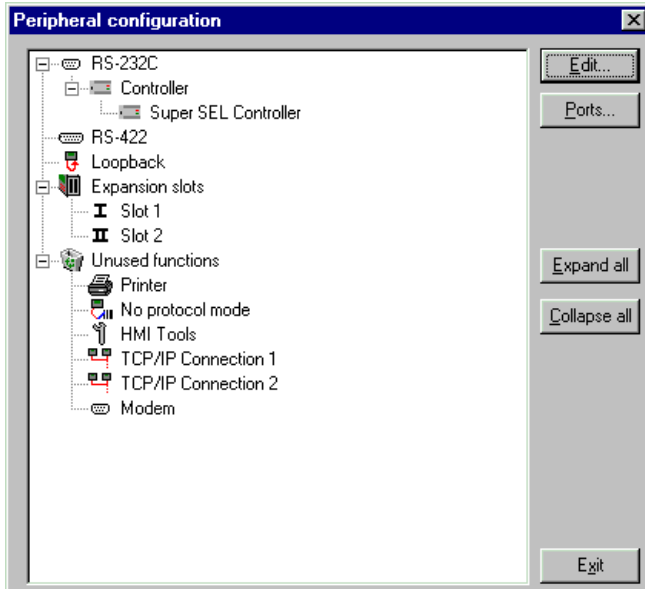


Press **Change...** under **Controller system** to get the choice list of available drivers. Choose **Brand name**, **Protocol** and **Model** and then press **OK**. Press **OK** again to confirm the project settings.



## Communication setup

The settings for the communication between the terminal and the controller are done under **Peripherals** in the **Setup** menu. To change which port the controller is connected to, mark and hold left mouse button down and drag to move it to another communication port. Mark the selected communication port and press **Edit** to change the other communication settings.



The settings should be:

Parameter	Description
Port	RS-232 or RS-422
Baudrate	9600
Data bits	8
Stop bits	1
Parity	none

To make specific settings the selected driver, mark the driver name and press Edit.

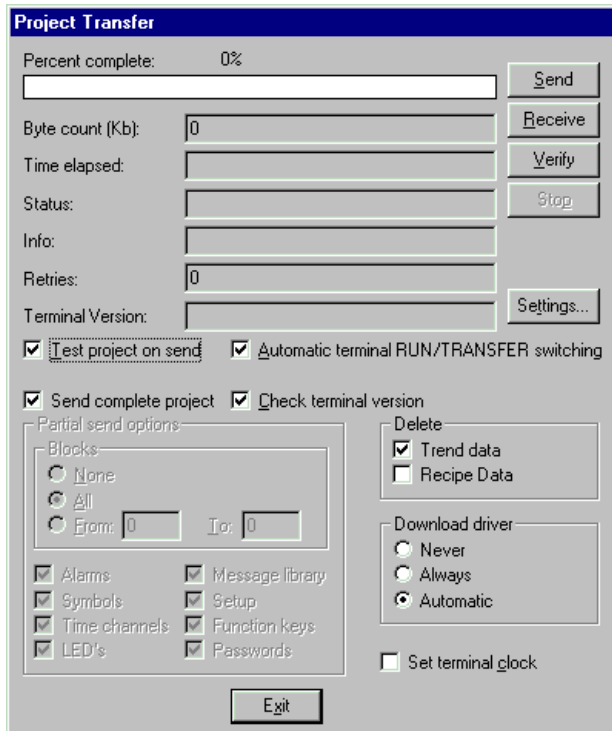
The screenshot shows a 'Driver Configuration' dialog box with a 'Settings' tab selected. The 'Jog Settings' section contains a table of parameters for eight axes. Each axis has an 'Acceleration' field set to '0.3' and a 'Velocity' field set to '30'. At the bottom of the dialog are four buttons: 'OK', 'Avbryt', 'Verkställ', and 'Hjälp'.

Axis	Acceleration	Velocity
Axis 1:	0.3	30
Axis 2:	0.3	30
Axis 3:	0.3	30
Axis 4:	0.3	30
Axis 5:	0.3	30
Axis 6:	0.3	30
Axis 7:	0.3	30
Axis 8:	0.3	30

Parameter	Description
Axis 1-8 Acceleration	Defines the jog acceleration for each axis (0.01 G)
Axis 1-8 Velocity	Defines the jog velocity of each axis (mm/sec)

## Transfer the driver to the terminal

The selected driver is down-loaded into the terminal when the project is transferred to the terminal. Choose Project in the Transfer menu.



There are three alternatives when the driver is downloaded into the terminal.

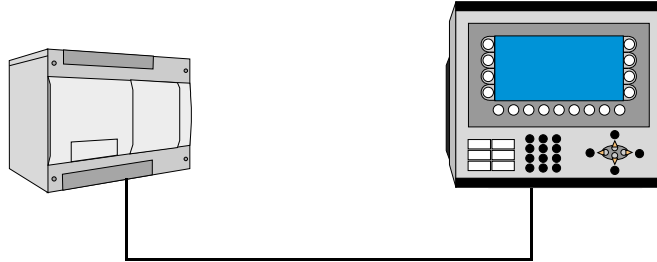
Function	Description
Never	The driver is not down-loaded and the existing driver in the terminal is used.
Always	The driver is down-loaded every time the project is transferred.
Automatic	The driver is down-loaded if the driver in the terminal is not the same as the selected driver in the project. If it is the same the driver is not down-loaded.



## 3.2 Connecting the terminal to the controller

The connection is of the type “point-to-point”.

### Point-to-point



Cable according to drawing K-3340

The cable according to drawing K-3340 in appendix is connected between RS-232 port on the controller and the RS-232 port on the terminal.

## 4 Addressing

The terminal can handle the following data types in the controller

Name	Description	Bit-device	Word-device	Read/Write
I0 – I287	Input	X		R
Q300 – Q587	Output	X		R/W
M600 – M887	Flags	X		R/W
P1 – P64	Starts/stops program	X		R/W
S1 – S8	Servo on/off for each axis	X		R/W
H1 – H8	Home for each axis	X		R/W
F1 – F8	Jog forward/stop for each axis. Jog stop is automatic when released signal.	X		R/W
B1 – B8	Jog backward/stop for each axis. Jog stop is automatic when released signal.	X		R/W
R0	Resets controller when set	X		R/W
E1 – E8	Error code for each axis.		X	R
C1 – C8	Current position for each axis		X	R
01:L0 – 01:L99 . . 64:L0 – 64:L99	Local variables. Signed 16 bit Integer		X	R
01:L100 – 01:L199 . . 64:L100 – 64:L199	Local variables. Float without exponent		X	R
G200 – G299	Global variable. Signed 16bit Integer		X	R
G300 – G399	Global variable Float without exponent.		X	R
PA1.1 – PA1.2000 . . PA8.1 – PA8.2000	Position field for each axis.		X	R/W

---

### Note!

If you choose to maneuver a flag or an output, the terminal handle this by *read before write*. This means that a byte (8 bits) is read and then the bit of interest is changed and the byte is written back. If the controller changes some of the bits in the byte during this communication, the controller change is lost. If possible let the terminal/controller use different bytes.

---

### Note!

Acceleration and velocity for jog can be set in the driver configuration.

---

## 5 Efficient communication

To make the communication between the terminal and the controller quick and efficient the following should be noted about how the signals are read and what that can be done to optimize the reading.

### 5.1 Signals affecting the communication time

It is only signals to objects in the current block that are read continuously. Signals to objects in other blocks are not read, that is the number of blocks does not affect the communication time.

Besides the signals to objects in the current block, the terminal is continuously reading the following signals from the controller:

- Display signals
- Block print-out signals
- LED registers
- Alarm signals
- Remote acknowledge signals on alarms and alarm groups
- Login signal
- Logout signal
- Trend registers at the sample points
- Bargraph registers if using min/max indicators
- New display register
- Buzzer register
- Backlight signal
- Cursor control block
- Recipe control block
- Library index register
- Index registers
- PLC clock register if the PLC clock is used in the terminal
- List erase signal
- No protocol control register
- No protocol on signal

### Signals not affecting the communication time

The following signals do not affect the communication time:

- Signals linked to function keys
- Time channels
- Objects in the alarm messages

## **5.2 How to make the communication more efficient**

### **Group controller signals consecutively**

The signals from the controller are read most rapidly if all signals in the list above are consecutive. If for example, 100 signals are defined, it is quickest to read these if they are linked to, for example, M600-M699. If the signals are spread out (M600, M703, I3 etc) the updating is slower.

### **Efficient block changes**

Block changes are carried out most rapidly and efficiently through the block jump function on the function keys or through a jump object. "Display signals" in the block header should only be used when the controller is to force the presentation of another block. The "New Display" register can also be used if the controller is to change the block. This does not affect communication as much as a larger number of "Display signals".

### **Use the clock of the terminal**


Downloading of the clock to the controller also creates an extra load. The interval between downloadings should therefore be as long as possible.

### **Packaging of signals**

When the signals are transferred between the terminal and the controller, all signals are not transferred simultaneously. Instead they are divided into packages with a number of signals in each package. To decrease the number of packages that have to be transferred and make the communication faster this number has to be considered. The number of signals in each package depends on the used driver. In the Intelligent Actuator Super SEL driver the number is 30 for Global/Local variables and 288 for digital devices. PA devices are not packed.

To make the communication as fast as possible the number of packages has to be minimized. Consecutive signals require a minimum of used packages but it is not always possible to have consecutive signals. In such cases the so-called waste between two signals has to be considered. The waste is the maximum distance between two signals you can have and still keep them in the same package. The waste depends on the used driver. In the Actuator Super SEL driver the number is 7 for Global/Local variables and 72 for digital devices.

Signal	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>
Used	<b>X</b>	<b>X</b>					<b>X</b>	<b>X</b>	<b>X</b>	

  
Waste

## 6 Appendix

Error codes from the controller. The code is shown on the display of the terminal.

Error: XXX

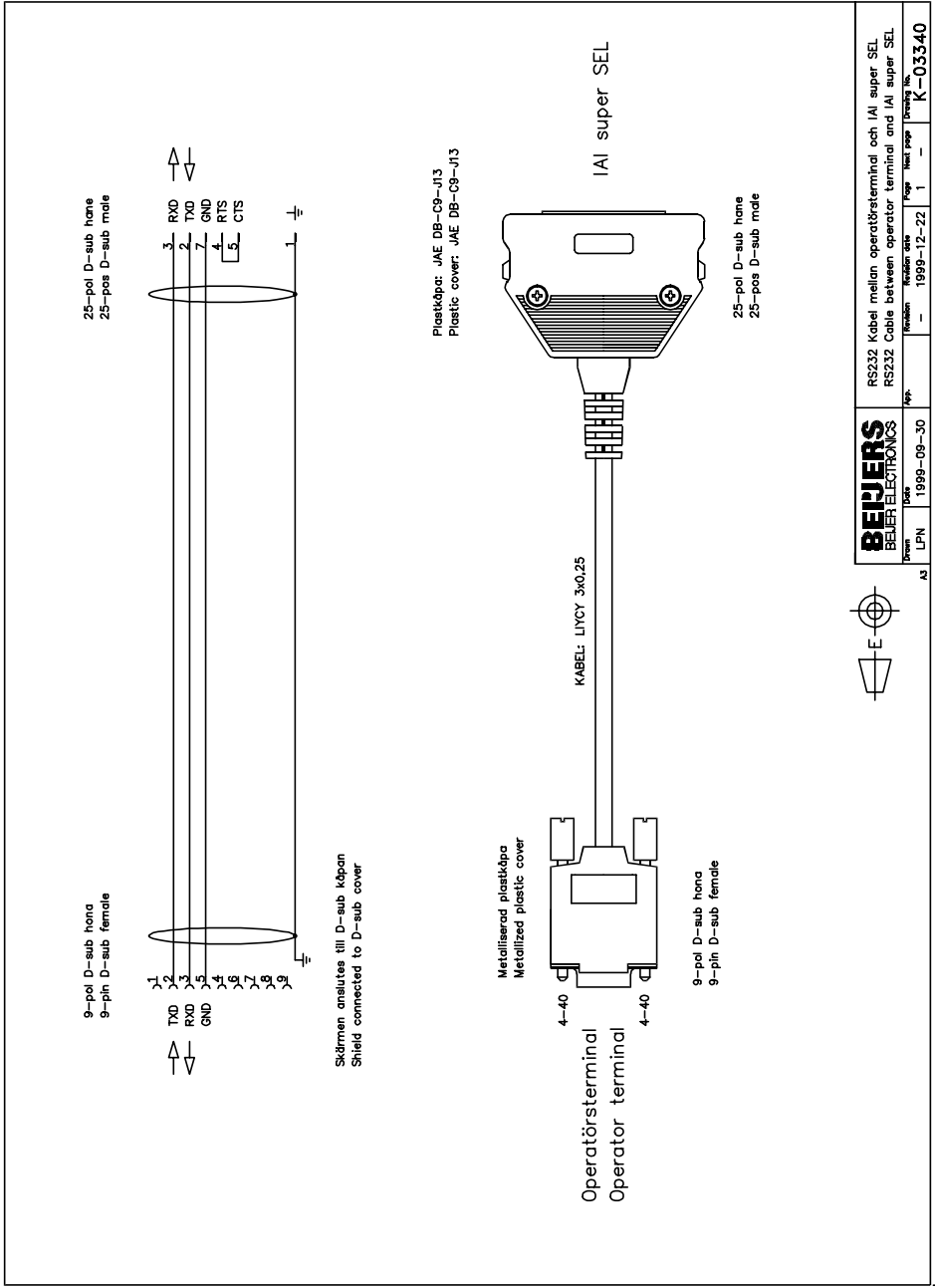
### General Error

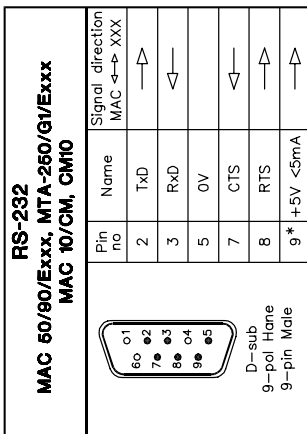
Error code (XXX)	Name	Explanation
01	Command Error	Receiving something other ? or !
02	Receive Length Error	Text length mismatch
03	ID Error	ID mismatch
04	Sum Check Error	Sum Check Error
05	Time Out Error	Time Out occurs
06	Stopper Error	Not in CR, LF order
07	Parity Error	Parity Error
08	Overrun Error	Overrun Error
09	Framing Error	Framing Error

### Other Errors

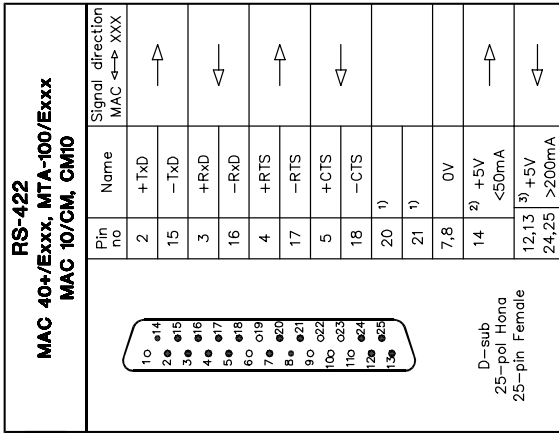
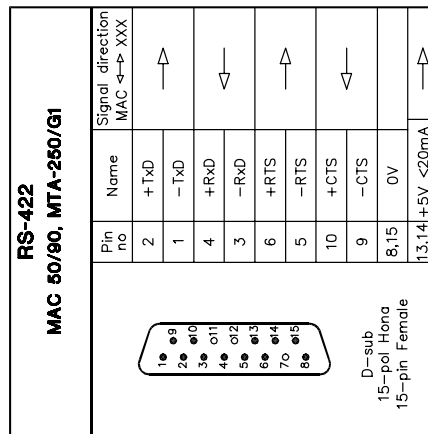
Error code (XXX)	Name	Explanation
10H	Program Number Error	
11H	No Point Data Error	
12H	Point Number Error	
13H	Specified Speed Error	
14H	Specified Position Error	
15H	Specified Acceleration Error	
16H	Specified Axis Error	
17H	Data Error	
18H	Servo Error	
30H	Step Number Error	
31H	Step Number Over Error	

## 7 Drawings





\* Ej i E-serien  
Not in E-series



- 1) Stift 20 är anslutet till stift 21 internt i MAC'en.  
Pin no 20 connected to pin no 21 internal in MAC/MTA.
- 2) Endast i E-serien och med serie nr 9901 eller senare  
Only for E-series and with serial no 9901 or later
- 3) Endast E100/MAC40+/MTA-100  
Only for E100/MAC40+/MTA-100

**BEIJERS**  
BEIJERS ELECTRONICS

MAC/MTA RS-232/RS-422

1993-09-07 BIE 1993-12-01 1 S-00724