MAC Operator Terminal

Human-Machine-Interface

Installation Manual

MAC 10
MAC 12

MITSUBISHI ELECTRIC EUROPE B.V.
FACTORY AUTOMATION

GB

Contents

Safety precautions 2
Introduction 4
Function overview 5
Installation 6
A small example 10
Overview 12
Technical data 14
Drawings A-1

For more detailed information see the manual for the terminals.

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All examples in this manual are used solely to promote understanding of how the equipment works and its operation. Mitsubishi Electric Europe B.V. takes no responsibility if these examles are used in real applications.

Because of the great many application areas for this equipment, the user himself must acquire the appropriate knowledge needed to use the equipment correctly for particular applications. Mitsubishi Electric Europe B.V. absolves itself of all responsibilities for damage and injuries that may occur during installation or use of this equipment.

Mitsubishi Electric Europe B.V. absolves itself of all responsibilities for any type of modification made to the equipment. Only approved spare parts and accessories manufactured according to specifications of Mitsubishi Electric Europe B.V. should be used.

The equipment must not be used in an explosive environment.

GB

Safety precautions

General

– Check the delivery for transport damage. If damage is found, advise your supplier.

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

– Do not use the product in an explosive environment.

– Modifications, changes and additions to the product are forbidden.

– Use only spare parts approved by Mitsubishi Electric Europe B.V.

– Read the user instructions carefully before use.

– This equipment should only be operated by qualified personnel.

At installation

– The product is constructed for stationary installation.

– Install the product according to the accompanying installation instructions.

– The product must be grounded according to the accompanying installation instructions.

– This equipment must be installed by qualified personnel.

– High voltage, signal and supply cables must be separated.

– The product should not be mounted in direct sunlight.

In use

– Keep the equipment clean.

– Emergency stop and other safety functions should not be controlled from the terminal.

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

Service and maintenance

– The agreed warrenty applies.

– Clean the display and face with a soft cloth and mild detergent.

– Repairs should be made by qualified personnel.

At disassembly and scrapping

– Local regulations apply concerning recycling of products or part.

– Please note that the lithium battery, electrolyte condenser and display contain hazardous substances.

GB

Introduction

This leaflet describes the operator´s panels MAC 10/MTA-10 and MAC 12/MTA-12. Hereafter these products are referred to as the terminal. In the manual we refer to the software package MAC Programmer/SW-MTA for DOS and MAC Programmer+/SW-MTA-WIN for Windows. Hereafter these products are referred to as the PC software.

The terminal is operator's panel in a family of terminals developed to satisfy the demands made for man-machine communication. The functions built into the terminal include among other things the possibility to display text with dynamic indication, maneuvring objects and time channel control. MAC 12/ MTA-12 also include function for datalogging and recipes.

A terminal is programmed from a PC with the PC software. The programmed project is stored in the terminal. Terminals have for the most part an object-orientated way of working which makes them easy to use.

Summary of functions

Textblock

Textblock is used to build up dialogs. A Textblock can consist of an arbitrary number of text lines of up to 16 characters long.

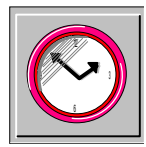
Static text

Static text is text written in textblock which is not changed when executing the program.

Dynamic objects

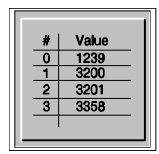
Dynamic objects are fields in the text which are linked to the signals in the PLC system. There are 7 types of dynamic object: **digital**, **analog**, **jump**, **date/time**, **bar graph**, **multiple choice object** and **text object**.

Time channels



Time channels make it possible to set a digital signal ON or OFF controlled by the real time clock, that is, to enable you to ensure that a certain function is ON during certain periods of the day.

Data logging/recipes

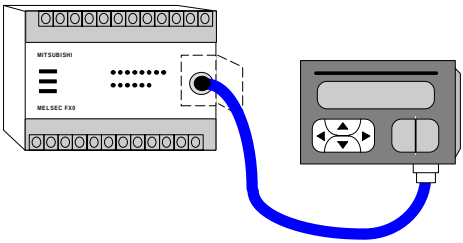


Only valid for MAC 12/MTA-12. A part of the project memory can be set aside for logging data and storing recipes.

Installation

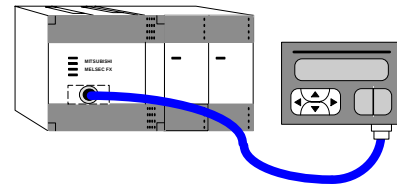
The terminals are connected to FX0, FX0N or FX PLC system.

Connection to a FX0/FX0N PLC system



Connect the MAC 10/12-CAB (8-pin MINI-DIN) cable to the outlet in the bottom of the terminal. The cable is straight; the contact at each end is compatible with both the terminal and the PLC system. The cable has a maximum length of 3 m and the communication speed is 9600 baud. The terminal is powered by the PLC system via the cable supplied. If a longer cable is required, the terminal must be powered from a source other than the PLC system.

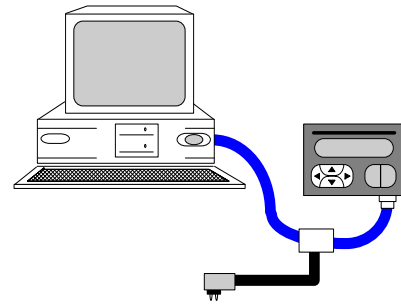
Connection to a FX PLC system



The terminal is connected to a FX PLC system using the FX-20P-CABN cable. The cable has a macimum length of 3 meter and the communication speed i 9600 baud.

The terminal is powered by the PLC system via the cable. If a longer cable is required, the terminal must be powered from a source other than the PLC system.

Connection to a personal computer



The terminal is connected to a personal computer using a SC06N adapter. The maximum cable length is 3 meter and the communication speed is 9600 baud.

Programming from personal computer

You program the terminal with the PC software installed on a personal computer. The terminal will enter the ”Communication with MP” mode if you keep the keys [←] [-] pressed during terminal power up.

The PC software can also be used to make a backup of the terminal project.

Keyboard

The terminal keyboard incorporates 6 membrane keys which are used to performe the following functions:

Set manoeuvrable digital object (ON).
Increase value of manoeuvrable analog object.
Execute jump.
Select/execute choice from a multiple choice object.

Reset manoeuvrable digital object (OFF).
Decreace value of manoeuvrable analog object.

Move up one line.
If the first line of time channel settings return to previous level.

Move to next field (position).

Move to previous field (position).

Move down one line.

Settings

All settings for the terminal must be done in the PC software. It is assumed that the PC software for Windows is installed on your PC and that you have started up with a new project. See the PC software maunal for further details.

A number of basic settings have to be entered before using the terminal. The settings are entered in the PC software. The following settings are necessary:

Choice of PLC system

You must choose to which PLC system the terminal is to be connected. Select **New** in the menu File. In the dialogue box Project settings you select PLC system and type of terminal.

Choice of character set and menu language

The majority of languages have letters which are specific to that language. Various menu languages can be chosen. Select **Country settings** in the menu Setup and then select required character set and menu language. This manual assumes that English has been chosen as menu language.

A small example

The following section gives a small example of how to start creating applications quickly. The example follows the whole sequence from building up an application to executing to the PLC system. The terminal must be connected to a personal computer with the PC software. In this example we shall make a textblock which shows the status of the X0 input.

Start the PC software. First we have to create a project. Select New in the File menu. In the dialogue box displayed you select terminal type and PLC system. Then press OK. (See Settings).

The Block list will now be displayed. Select **New** to create a textblock. Now the Block header is displayed.

In this example we shall define a textblock.

1. Enter the number of the block here, in this case 0.
2. Click on the button **Status...**

3. Mark the alternative **Put cursor at first man. object**.
4. Press OK.
5. Press OK to begin editing the block. A field will be shown.
6. Select **Digital** text in the Object menu.
7. First enter which I/O signal the object is to illustrate. Do this by entering the required address, in this case X0, after the text Digital signal. Press the Tab key to move the cursor to the next field.
8. Enter the text which will be displayed when the signal is 0, in this example OFF. Press the Tab key.
9. Enter the text which will be displayed when

the signal is 1, in this example ON.

10. Press OK to close the dialog box. The dynamic object is now shown by # and two - on the screen.

When the program is ready you can connect the terminal to the PLC system.

Overview

Mode selection

Keep the keys shown to the left pressed during terminal power-up to enter the mode Communication with MP. The terminal normally enters Run mode during power-up.

For a complete list of other modes possible see User´s manual for the terminal.

Dynamic objects

The following dynamic text objects can be used in block and linked to the stated types of signals.

Digital	Digital object (2 states).
Analog	Analog object as value.
Bar graph	Porportional filling of analog object.
Multichoice	Digital object (8 states).
Text	Text strings from PLC.
Jump	Jump to block.
Date/time	Date and/or time.

System block

Certain blocks are reserved for special purposes:

0	Main menu
990	*Reserved for compatibility with other terminals*
991	Time channels
992-999	*Reserved for compatibility with other terminals*

GB

Technical data

Front panel

Width 96 x height 72 x depth 3 mm.

Mounting depth

MAC 10/MTA-10: Max 37 mm.
MAC 12/MTA-12: Max 41 mm.

Mounting holes

92 ±1 mm x 68 ±1 mm.

Front panel seal

IP 65

Rear panel seal

IP 20

Front panel material

1,5 mm anodized aluminium and membrane keyboard. Overlay film of polyester with back-side printing.

Container material

Black varnished steel.

Weight

230 g

PLC system connection

8-pol Mini-DIN contact.

Cable to PLC system

4 pair cable, shielded.

Display

MAC 10/MTA-10:
LCD display (liquid crystal), Supertwist 1 lines of 16 characters each. 8 mm character height. The contrast adjustable with potentiometer inside.

MAC 12/MTA-12:
LCD display (liquid crystal), Supertwist 2 lines of 16 characters each. 5 mm character height. The contrast adjustable with potentiometer inside.

Real time clock

Minimum 10 years lifetime.

Supply voltage

+5 VDC from PLC system CPU port via communication cable.

Internal logic voltage

+5 VDC ±5%.

Power consumption

MAC 10/MTA-10: 70 mA.
MAC 12/MTA-12: 150 mA.

Ambient temperature

0º to +50ºC

Storage temperature

-20º to +60ºC

Air humidity

Max 90% without condensation.

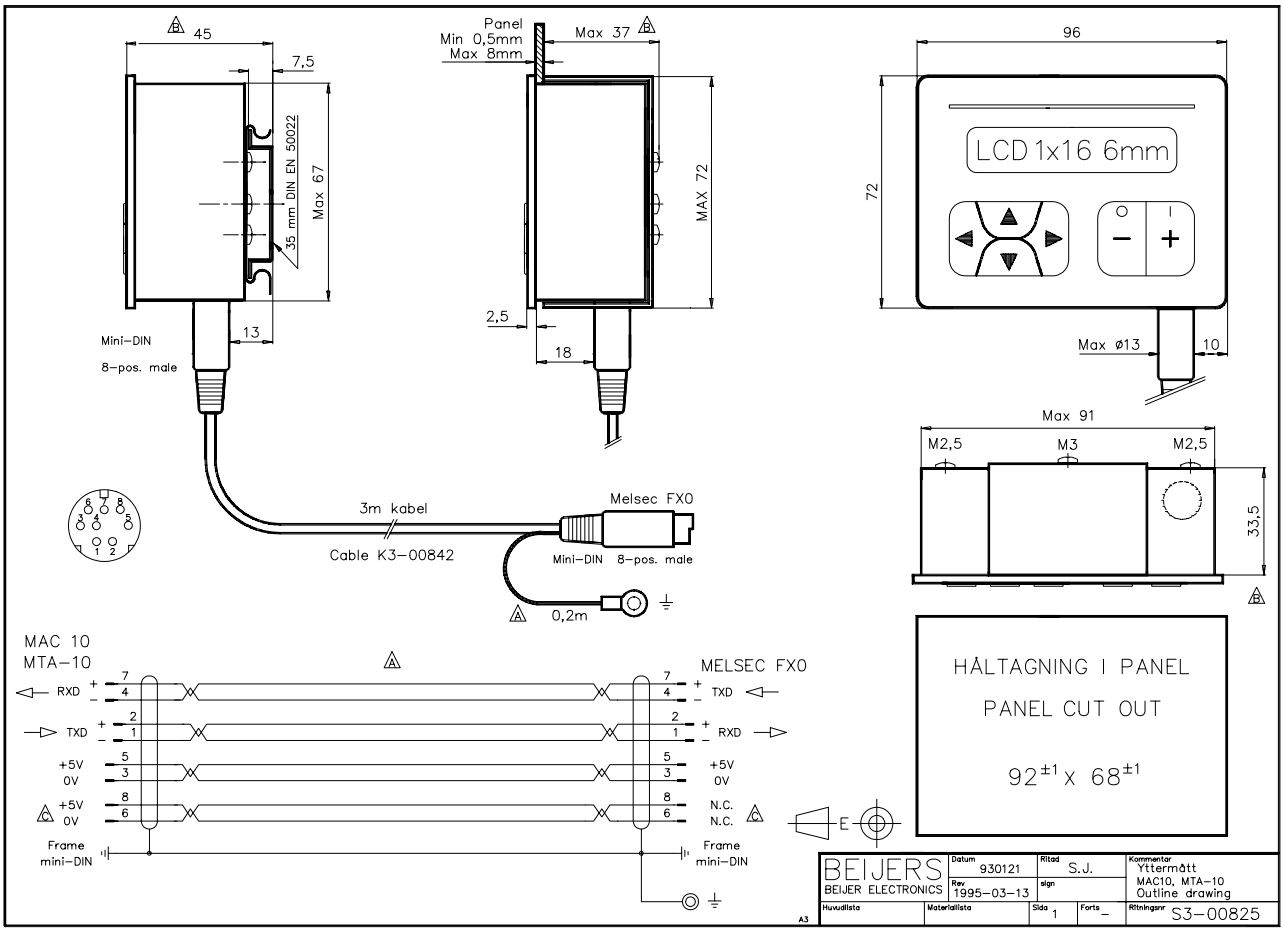
Interference test

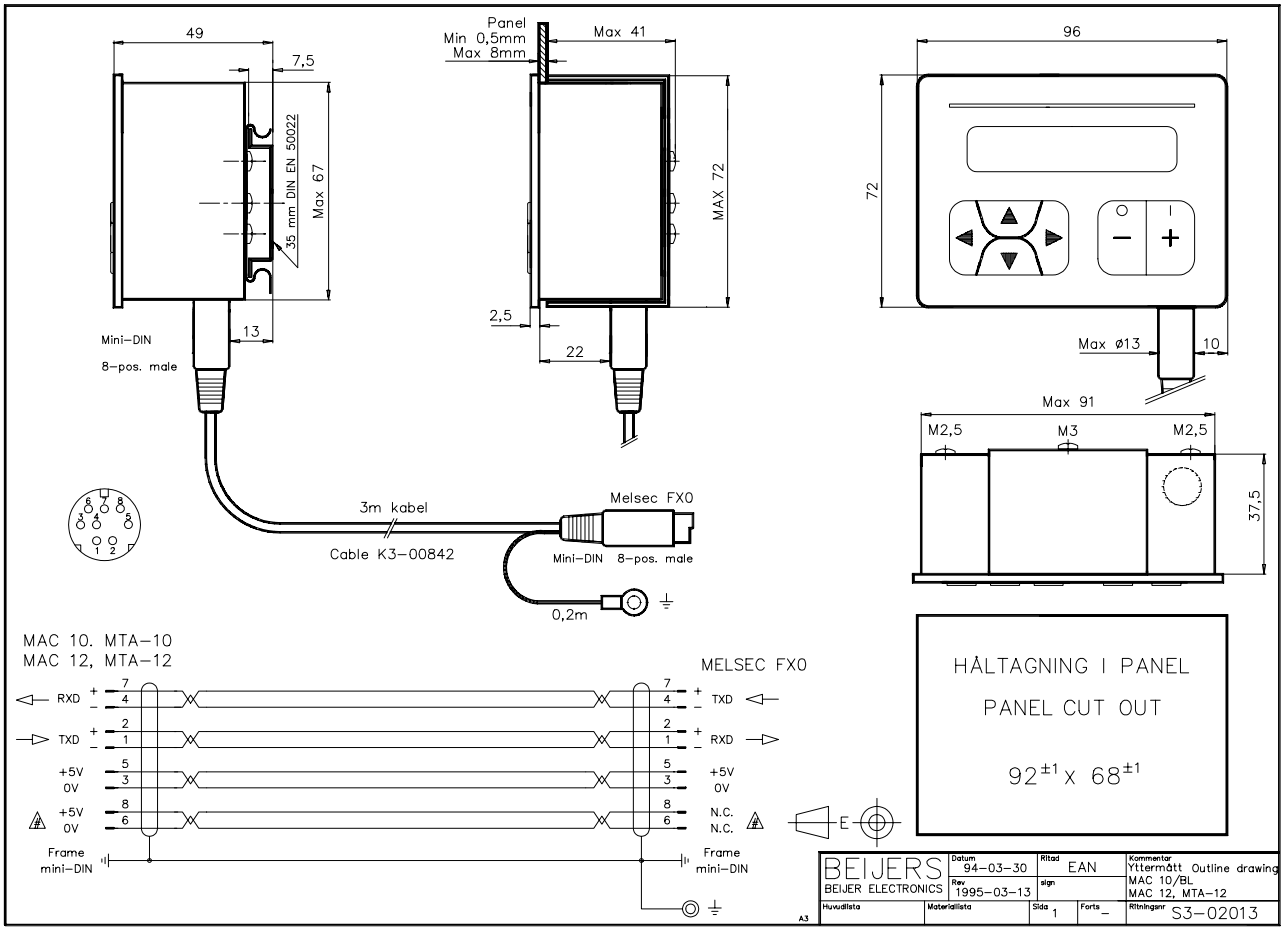
Interference tested for external noise according to: EN 50081-1 emission and EN 50082-2 immunity.

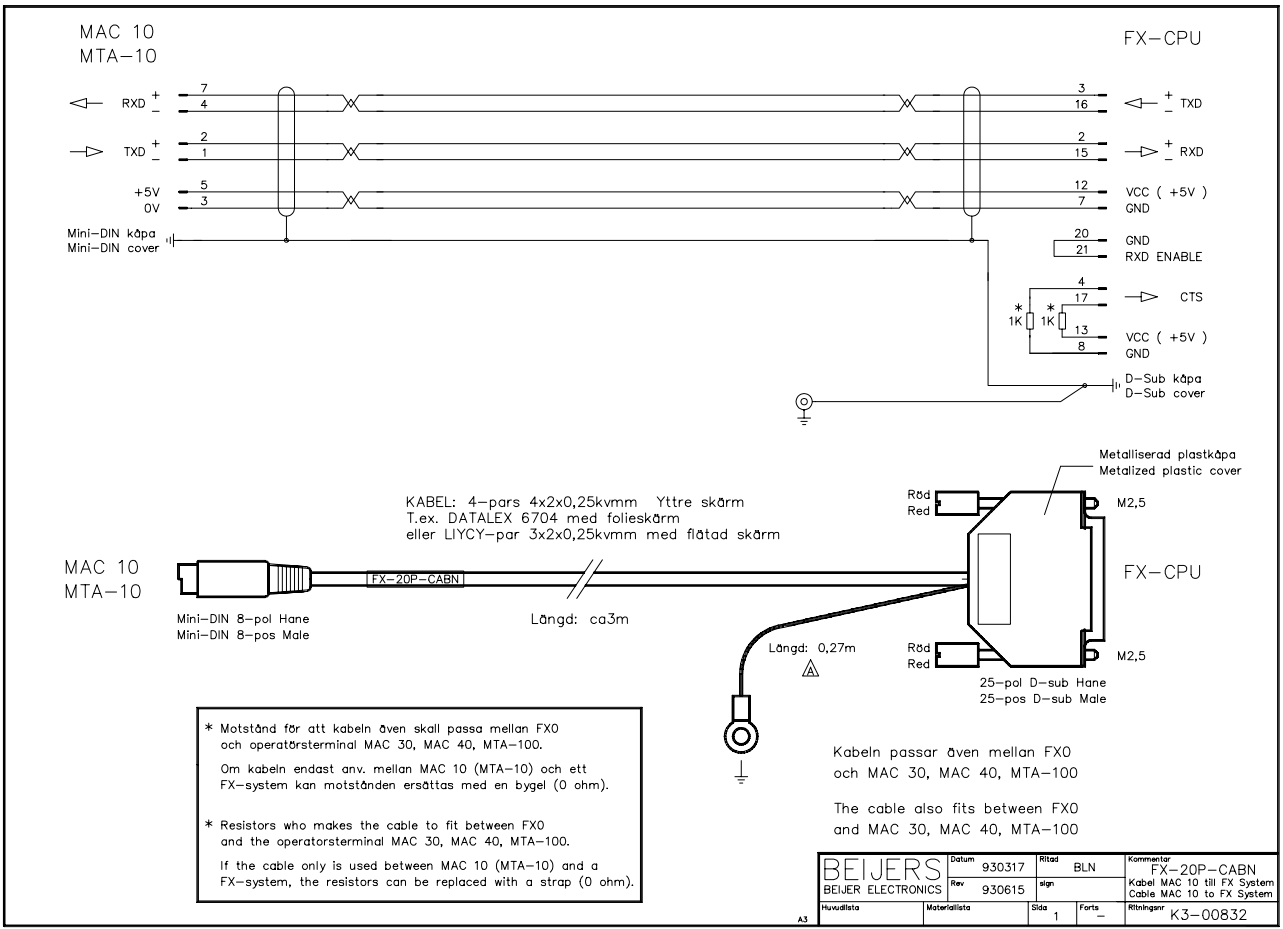
The product have passed and comply with specifications of the above tests. The product must only be used for applications covered by these standards.

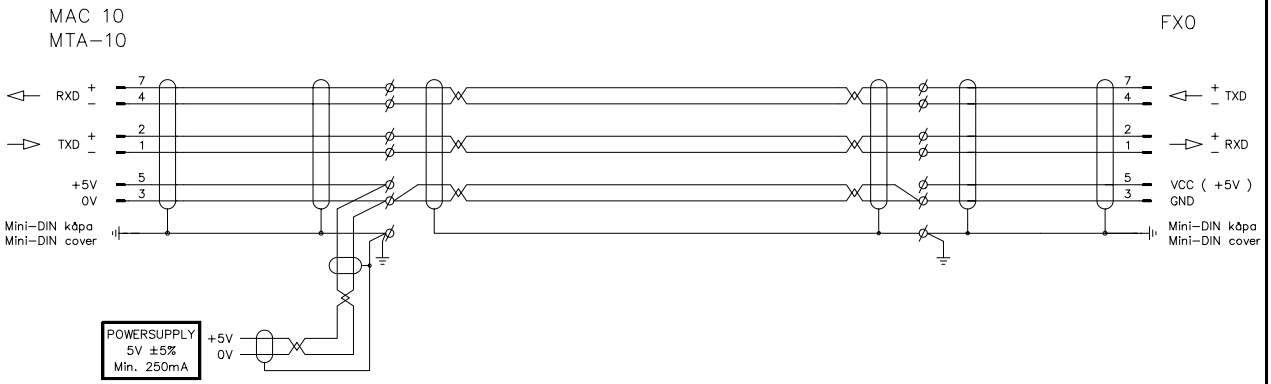
EMC-tests on the terminal

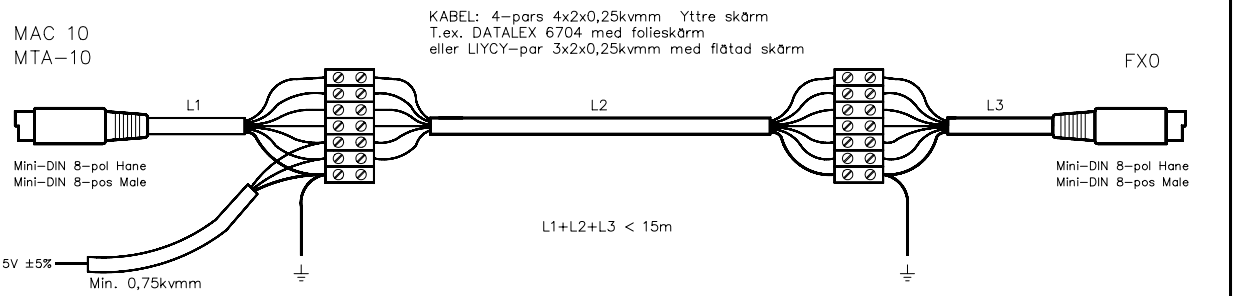
G & L Beijer Electronics AB confirm that the terminals conforms with the essential protection requirements in article four of the directive 89/336/EEC.


45
7,5
35 mm DIN EN 50022
Max 67
Mini-DIN
8-pos. male
13
Panel
Min 0,5mm
Max 8mm
Max 37
MAX 72
2,5
18
96
LCD 1x16 6mm
72
Max ø13
10
Max 91
M2,5
M3
M2,5
33,5
3m kabel
Cable K3-00842
Melsec FX0
Mini-DIN 8-pos. male
0,2m
MAC 10
MTA-10
MELSEC FX0
RXD
TXD
+5V
0V
N.C.
Frame
mini-DIN
HÅLTAGNING I PANEL
PANEL CUT OUT
92±1 x 68±1
BEIJERS
BEIJER ELECTRONICS
Datum 930121
Rev 1995-03-13
Ritad S.J.
sign
Kommentar Yttermått
MAC10, MTA-10
Outline drawing
Huvudlista
Materiallista
Sida 1
Forts –
Ritningsnr S3-00825
A3


49
7,5
35 mm DIN EN 50022
Max 67
Mini–DIN
8–pos. male
13
Panel
Min 0,5mm
Max 8mm
Max 41
MAX 72
2,5
22
96
72
Max ø13
10
Max 91
M2,5
M3
M2,5
37,5
3m kabel
Cable K3–00842
Melsec FX0
Mini–DIN 8–pos. male
0,2m
MAC 10. MTA–10
MAC 12, MTA–12
MELSEC FX0
RXD
TXD
+5V
0V
+5V
0V
TXD
RXD
+5V
0V
N.C.
N.C.
Frame
mini–DIN
Frame
mini–DIN
HÅLTAGNING I PANEL
PANEL CUT OUT
92±1 x 68±1
BEIJERS
BEIJER ELECTRONICS
Datum 94–03–30
Rev 1995–03–13
Ritad EAN
sign
Kommentar Yttermått Outline drawing MAC 10/BL MAC 12, MTA–12
Huvudlista
Materiallista
Sida 1
Forts –
Ritningsnr S3–02013
A3

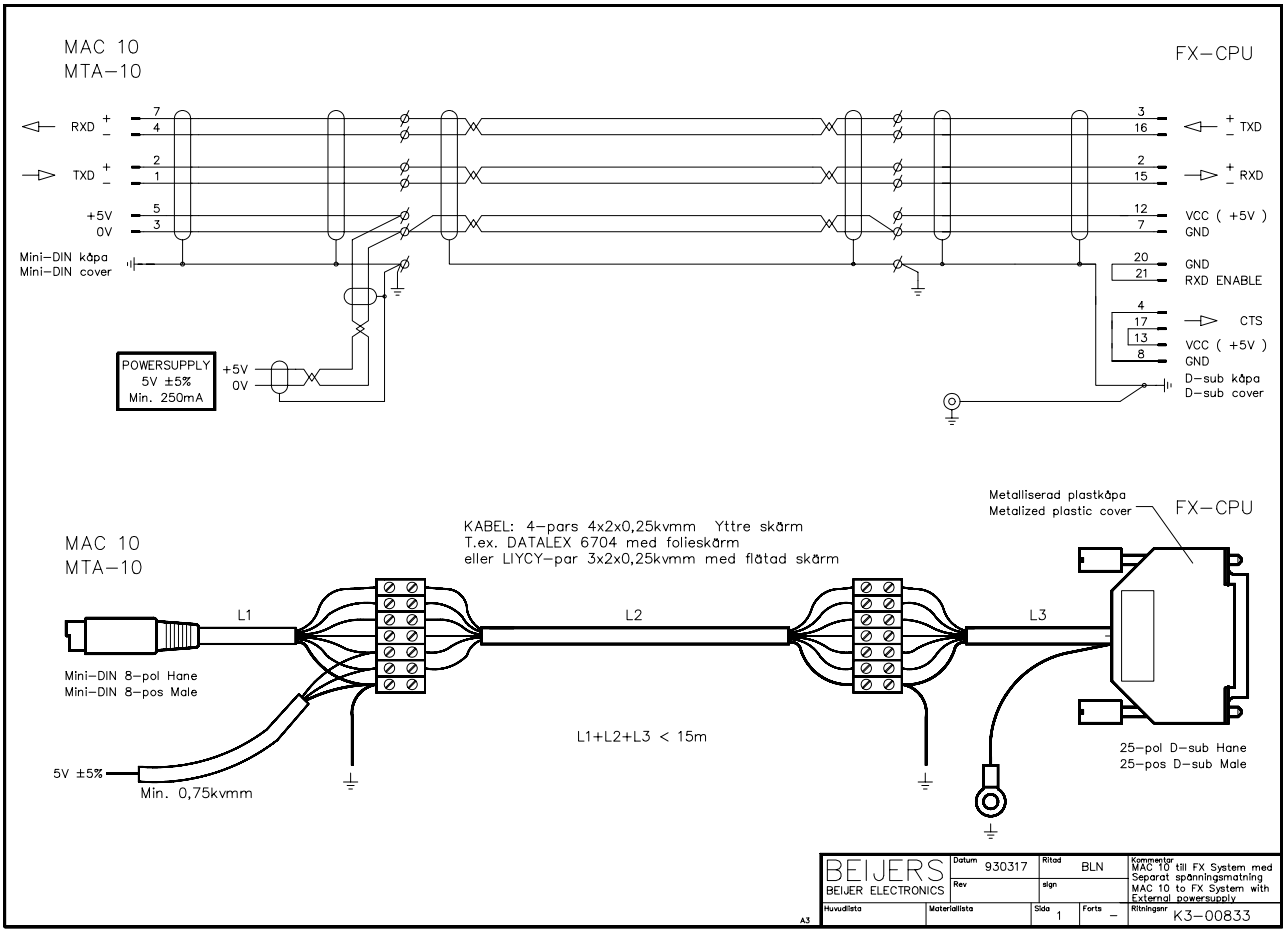

MAC 10
MTA–10
FX–CPU
RXD + –
TXD + –
+5V
0V
Mini–DIN kåpa
Mini–DIN cover
7
4
2
1
5
3
3
16
2
15
12
7
TXD + –
RXD + –
VCC (+5V)
GND
20
21
GND
RXD ENABLE
4
17
CTS
1K
1K
13
8
VCC (+5V)
GND
D–Sub kåpa
D–Sub cover
Metalliserad plastkåpa
Metalized plastic cover
KABEL: 4–pars 4x2x0,25kvmm Yttre skärm
T.ex. DATALEX 6704 med folieskärm
eller LIYCY–par 3x2x0,25kvmm med flätad skärm
Röd
Red
M2,5
MAC 10
MTA–10
FX–20P–CABN
FX–CPU
Mini–DIN 8–pol Hane
Mini–DIN 8–pos Male
Längd: ca3m
Längd: 0,27m
Röd
Red
M2,5
25–pol D–sub Hane
25–pos D–sub Male
* Motstånd för att kabeln även skall passa mellan FX0
och operatörsterminal MAC 30, MAC 40, MTA–100.
Om kabeln endast anv. mellan MAC 10 (MTA–10) och ett
FX–system kan motstånden ersättas med en bygel (0 ohm).
* Resistors who makes the cable to fit between FX0
and the operatorsterminal MAC 30, MAC 40, MTA–100.
If the cable only is used between MAC 10 (MTA–10) and a
FX–system, the resistors can be replaced with a strap (0 ohm).
Kabeln passar även mellan FX0
och MAC 30, MAC 40, MTA–100
The cable also fits between FX0
and MAC 30, MAC 40, MTA–100
BEIJERS
BEIJER ELECTRONICS
Datum 930317
Rev 930615
Ritad BLN
sign
Kommentar
FX–20P–CABN
Kabel MAC 10 till FX System
Cable MAC 10 to FX System
Huvudlista
Materiallista
Sida 1
Forts –
Ritningsnr K3–00832
A3

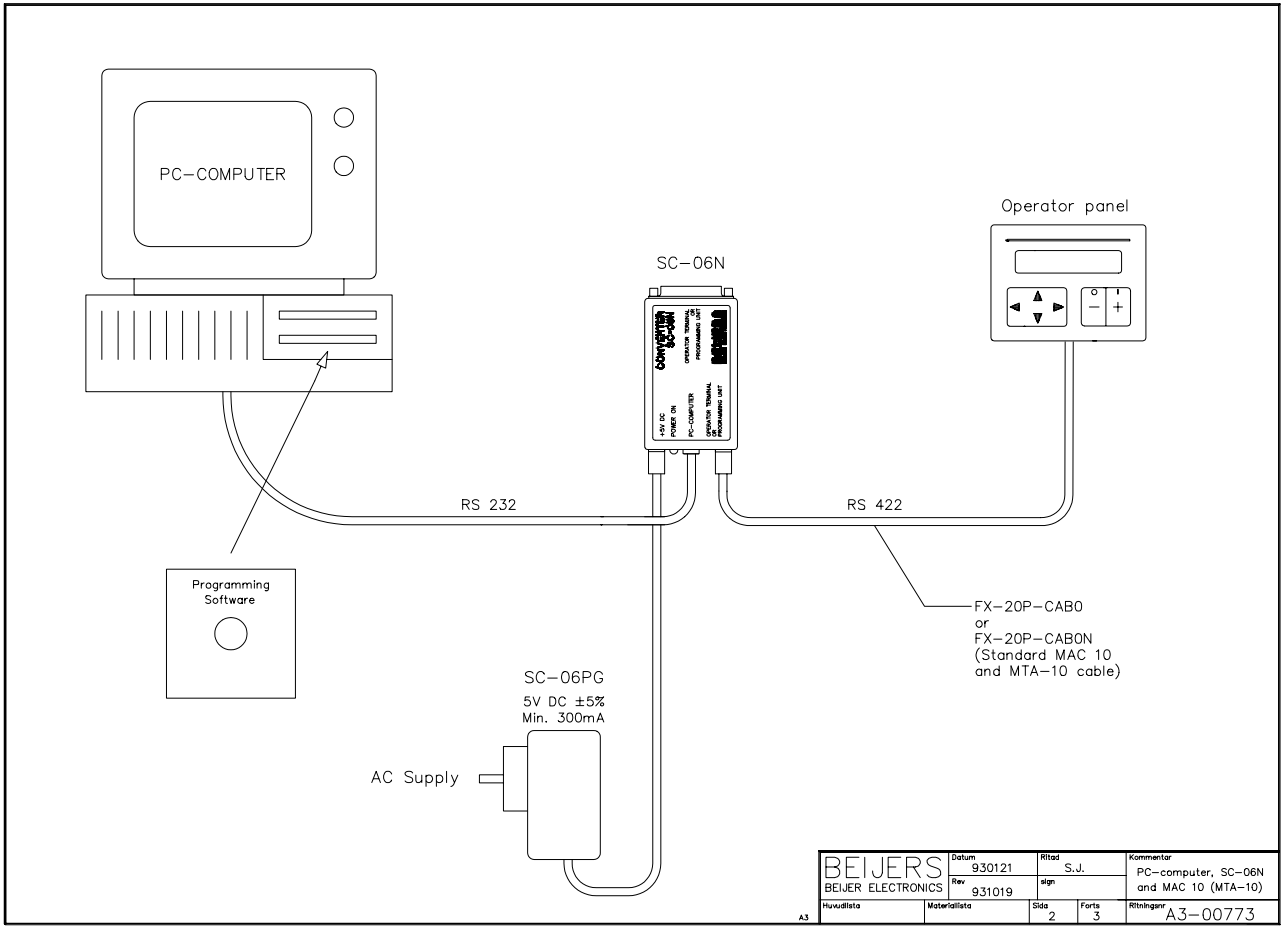




BEIJERS BEIJER ELECTRONICS	Datum 930317	Ritad BLN	Kommentar MAC 10 till FX0 med Separat spänningsmatning MAC 10 to FX0 with External powersupply	
	Rev	sign		
Huvudlista	Materiallista	Sida 1	Forts –	Ritningsnr K3–00834

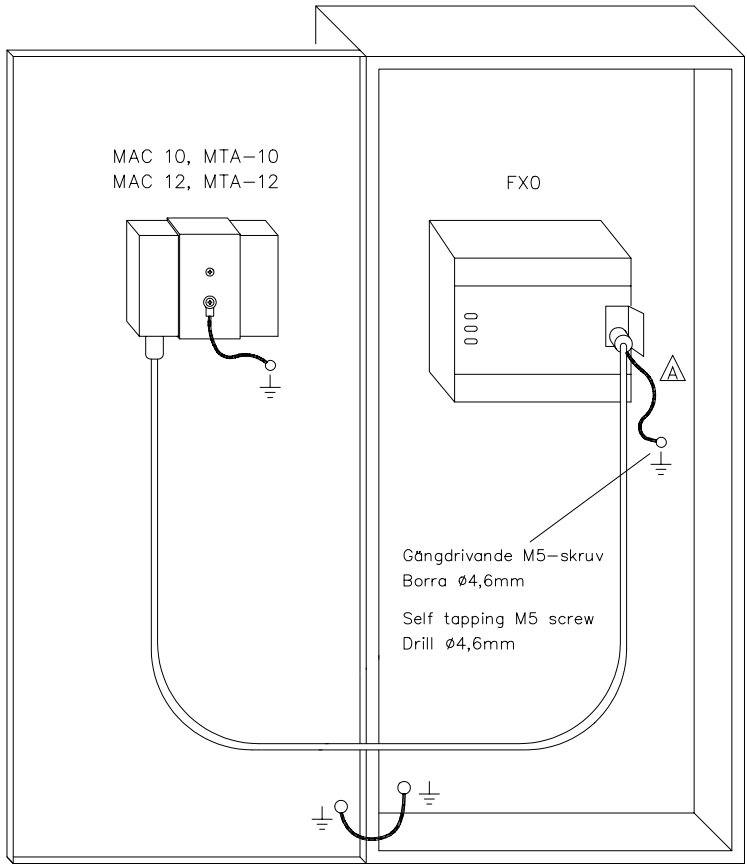
A3


MAC 10
MTA–10
FX–CPU
RXD + 7 4 –
TXD + 2 1 –
+5V 5
0V 3
Mini–DIN kåpa
Mini–DIN cover
POWERSUPPLY
5V ±5%
Min. 250mA
+5V
0V
3 16 + – TXD
2 15 + – RXD
12 VCC (+5V)
7 GND
20 GND
21 RXD ENABLE
4 CTS
17
13 VCC (+5V)
8 GND
D–sub kåpa
D–sub cover
MAC 10
MTA–10
KABEL: 4–pars 4x2x0,25kvmm Yttre skärm
T.ex. DATALEX 6704 med folieskärm
eller LIYCY–par 3x2x0,25kvmm med flätad skärm
Metalliserad plastkåpa
Metalized plastic cover
FX–CPU
L1
L2
L3
Mini–DIN 8–pol Hane
Mini–DIN 8–pos Male
5V ±5%
Min. 0,75kvmm
L1+L2+L3 < 15m
25–pol D–sub Hane
25–pos D–sub Male
BEIJERS
BEIJER ELECTRONICS
Datum 930317
Ritad BLN
Rev
sign
Kommentar
MAC 10 till FX System med Separat spänningsmatning
MAC 10 to FX System with External powersupply
Huvudlista
Materiallista
Sida 1
Forts –
Ritningsnr K3–00833
A3



BEIJERS BEIJER ELECTRONICS	Datum 930121	Ritad S.J.	Kommentar PC–computer, SC–06N and MAC 10 (MTA–10)	
	Rev. 931019	sign		
Huvudlista	Materiallista	Sida 2	Forts 3	Ritningsnr A3–00773

A3



BEIJERS BEIJER ELECTRONICS	Datum 930513	Ritad BLN		Kommentar Installation MAC 10, MTA–10 MAC 12, MTA–12
	Rev 950216	sign		
A4 Huvudlista	Materiallista	Sida 1	Forts –	Ritningsnr S3–00837

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