Flexicon a-s
denmark

BACK

Service Manual MC12

1 Technical Specifications

Contents:

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Flexicon®

Multi Filling System

MC 12

Master Control for the Multi Filling System

- ✓ *Easy-to-clean*
- ✓ *User friendly programming*
- ✓ *Direct logging of production data*
- ✓ *Controls up to 16 individual fillers*
- ✓ *Master control unit for both liquid and cream filling*

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1.3 Technical Specifications

Fuses:

All fuses are 20mm x 5mm cartridge types

Fuse	Situated	Value
Mains socket	Externally	1.0 Amp slow
PCB 20-210-003	Internally	2.5 Amp slow

Interface:

net: net is used for the Flexicon RS-485 multidrop network. All communication with connected drives is performed via this line. Max 16 nodes on the network
Only original Flexicon "Type 3" cables must be used for the line.

RS-232/1:

RS-232/1 is serial interface port number 1.
It is used for documentation prints to e.g. a printer or as interface to a balance in a balance set-up.

RS-232/1 is a 9 pin sub-D socket with the following pin configuration:

Pin 1:	No connection.
Pin 2:	RxD. Receive data.
Pin 3:	TxD. Transmit data.
Pin 4:	+12 VDC output (through 1 kW)
Pin 5:	Ground.
Pin 6:	No connection.
Pin 7:	RTS. Request to send.
Pin 8:	CTS. Clear to send.
Pin 9:	No connection.

RS-232/2:

RS-232/2 is serial interface port number 2. It is identical to RS-232/1.

Consult Flexicon MC10 reference Manual for set-up of serial ports.

external GO:

external GO is used for externally start, e.g. by a foot switch, and for externally registration of status.

external GO is designed as a 5 pin round DIN socket with the following pin configuration:

Pin 1:	Input for start signal. +5 to +50VDC, min. 100msec. positive edge triggered.
Pin 2:	+24VDC output, max. 250mAmps.
Pin 3:	Ground.
Pin 4:	Output status signal. Max +50VDC/250mAmps. Pin 4 is pulled to ground by a relay when a connected drive is active. Follows the drive shown in the MC12 display.
Pin 5:	No connection.

external 1

external 1 is used for externally start, e.g. by a foot switch and for externally registration of status.

external 1 is a 5 pin round DIN socket with the following pin configuration:

Pin 1:	Input for start signal. +5 to +50VDC, min. 100msec. positive edge triggered.
Pin 2:	+24VDC output, max. 250mAmps.
Pin 3:	Ground.
Pin 4:	Output status signal. Max +50VDC/250mAmps. Pin 4 is pulled to ground by a relay when a connected drive is NOT active. Follows the drive shown in the MC12 display.
Pin 5:	No connection.

Port 1

Port 1 is a socket used specifically for Flexicon peripheral equipment such as a bottom-up filling system. The socket may only be used in connection with original Flexicon equipment.

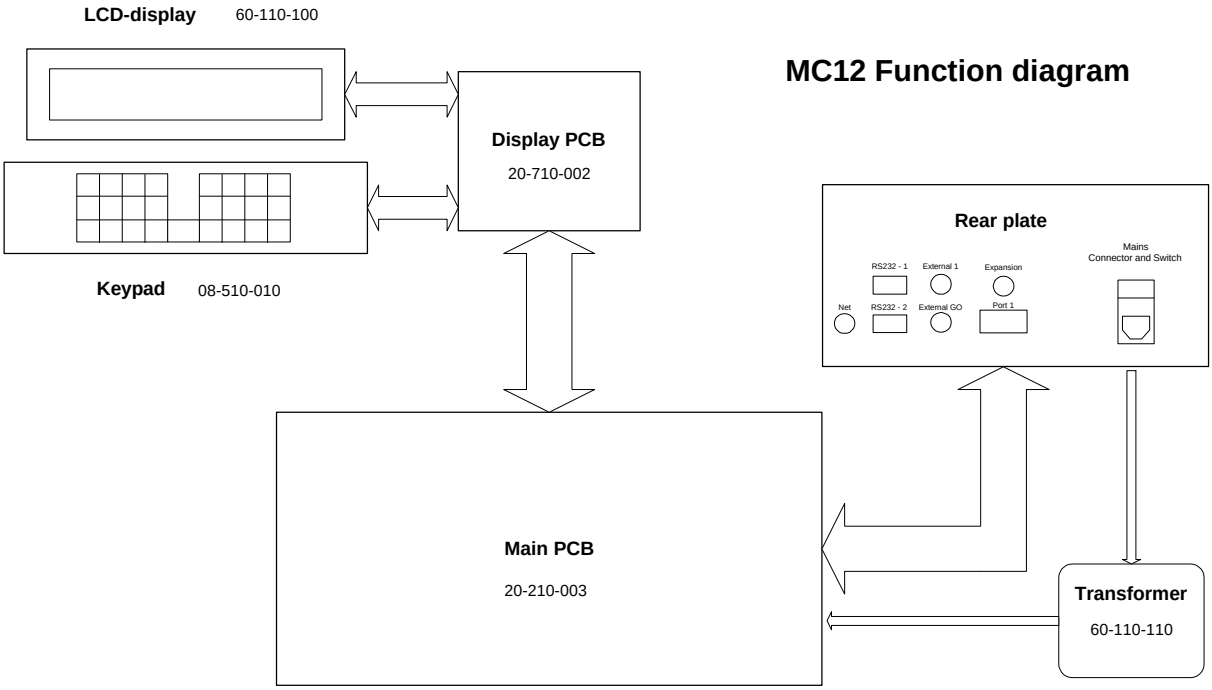
Expansion:

Expansion is a socket for extensions, this is a RS485 communication interface. The socket may only be used in connection with original Flexicon equipment. Presently, no extensions are available

2 Functional Description

Contents:

2.0 Functional Description



MC12 Function diagram

The functional blocks that build up the MC12 are shown in the MC12 functional diagram. The functions of these blocks are described in the following.

Keypad

Manual inputs to MC12 are entered via the keypad, all function are accessed via the Keypad and all parametres are controlled via the Keypad.

LCD-display

The display is a 4 line by 40 characters LCD-display with yellow/green backlit. The display is used for displaying the various functions entered via the keypad, the state of the functions, the controller status and the connected pumps.

Main PCB

The main PCB (part no 20-210-003) is an embedded microprocessor based central processing unit inside the MC12, mounted on the bottom panel of the device.

This PCB is the heart of the Flexicon multi filling system and it controls allmost everything in the system. It handles the user interface (what to write at the display and what to do when a key is pressed on the keypad) and controls all interface connectors on the rear panel of the MC12. By means of the parameters set up by the user (volume, speed, calibrations etc) the processor on the PCB calculates and sets up all parameters needed for a dispense or pump job. These parameters are transmitted to the drive(s) connected to the Flexicon RS-485 multidrop line. From the connected drives, also via the Flexicon multidrop line, status for the current job and the external inputs on the drive(s) is received.

The program controlling these tasks including the functions available for the user, is in the EPROM marked "MC12 VX.YZ" (chip U1).

Where X is major release, which can include change of concepts
Y is major changes but compatible with older versions/releases
Z is minor changes

The main PCB has an internal power supply, supplying all voltages needed by the system (+24VDC, ±12VDC, and +5VDC), from the 18 VAC supply from the transformer.

Display PCB

The display PCB (part no 20-710-002) is used as interface from the main PCB to the LCD-display and the keypad. Data to and from these devices is transmitted directly through the display PCB. The display print includes a trimmer for adjustment of the display contrast, and it generates a 90Vrms, 800Hz voltage for the display backlight.

Power supply

Mains power (230VAC or 110VAC) is connected to the mains power socket combined with the mains switch. The mains power is noise filtered and then led to the power supply. The power supply consists of a transformer that transforms the 230/110VAC to an 18VAC supply used by the master PCB.

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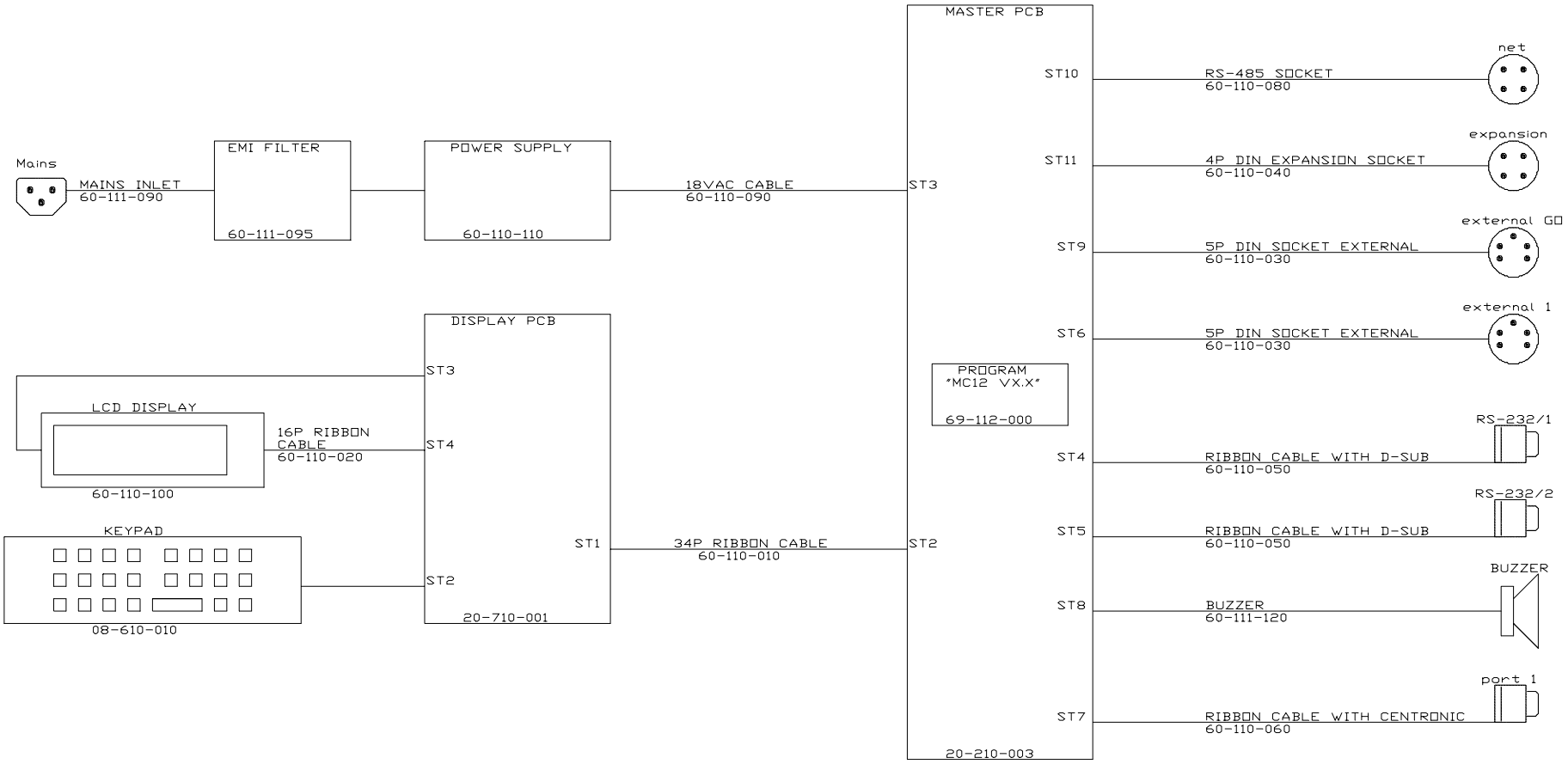
MC12 BLOCK DIAGRAM



Flexicon A/S denmark		
Title: MC12 Block diagram		
Size: B	Document Number: MC12BLOK.SCH	REV: 1.0
Date: November 23, 1998	Sheet 1 of 1	

3 Electrical overview

Contents:

3.0 Electrical description

The electrical component included in the MC12 are shown in section 3.1

The main PCB (20-210-003) is the hearth of the system, it's a 80188 microprocessor based embedded system board with program loaded in E-PROM (U1 - 27C512), and has 2 x 512 KB Nonvolatile RAM memory.
All electrical connections from connectors on the rear panel are connected to the main PCB using BERG connectors. The 18VAC supply from the transformer is connected in a 3 pole Phoenix connector. The support PCB is connected by a 34 leads ribbon cable in box connectors.

The support PCB (20-710-001) is mount on the back of the top panel and is connected to the main PCB by the above mentioned 34 leads ribbon cable.
The support PCB is used to connect the keypad and LCD-display to the main PCB and the only functionality on the board is the backlit voltage generator for the LCD-display and a trimming potentiometer for adjusting the contrast of the LCD-display..

The power supply for the MC12 consists of a 18 VAC tramsformer connected to the mains supply through a combined mains switch and filter (60-110-0775).

All DC voltages +24 VDC, ±12 VDC and +5 VDC are generated on the main PCB.

Layout of main PCB se section 2.3

Layout of support PCB se section 2.4

On the layouts are shown all connectors numbered acording to the electrical overview in section 2.2

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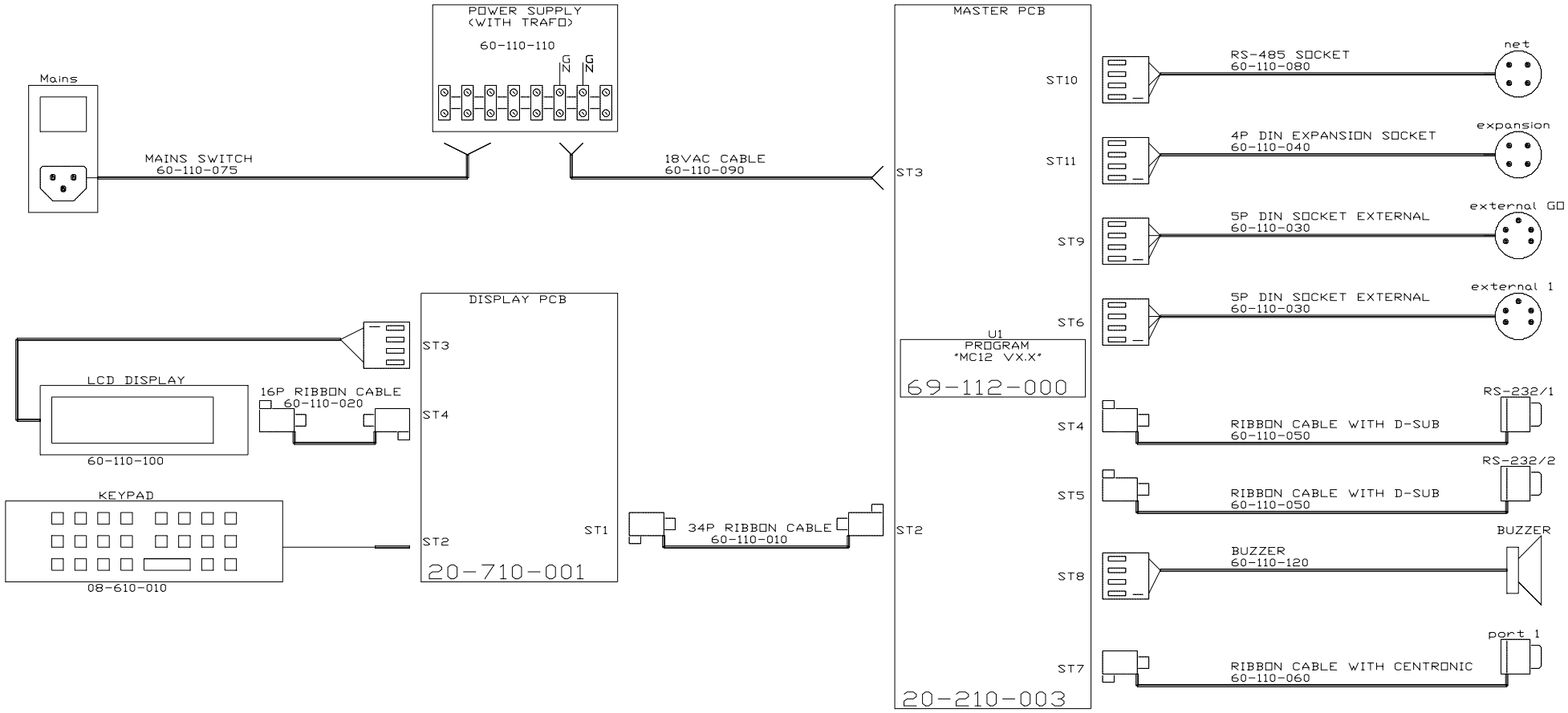
MC12 ELECTRICAL DIAGRAM AND CONDUIT SYSTEM



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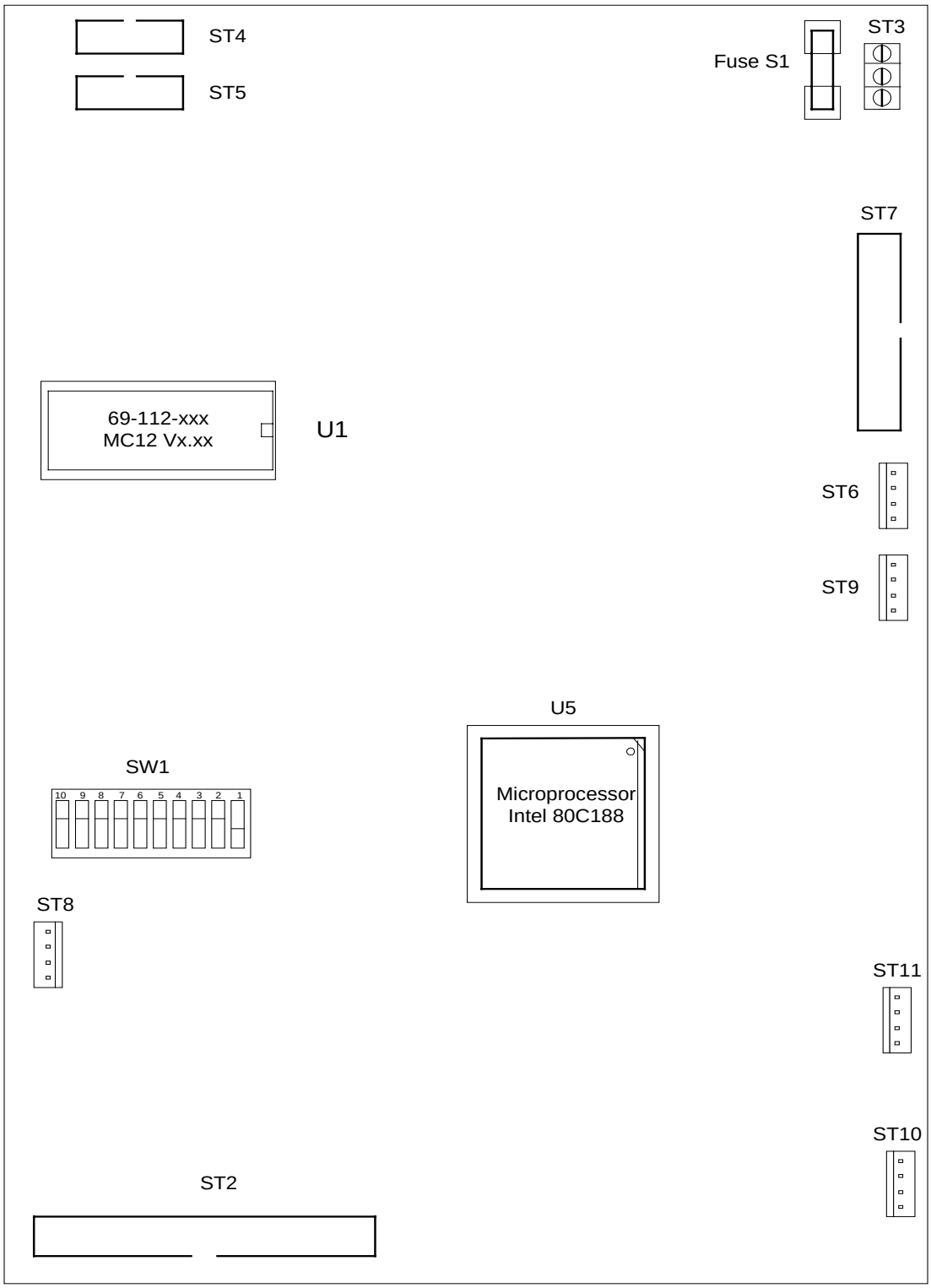
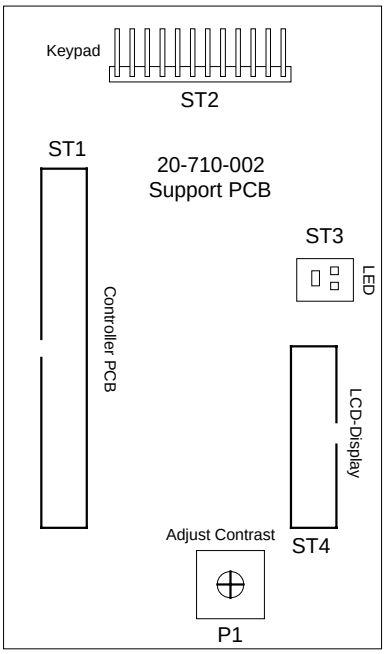
Date: November 23, 1998	Sheet 1 of 1	

Main PCB with Connectors and Replaceable IC's



Support PCB with connections and adjustment



3.4 Internal Cables

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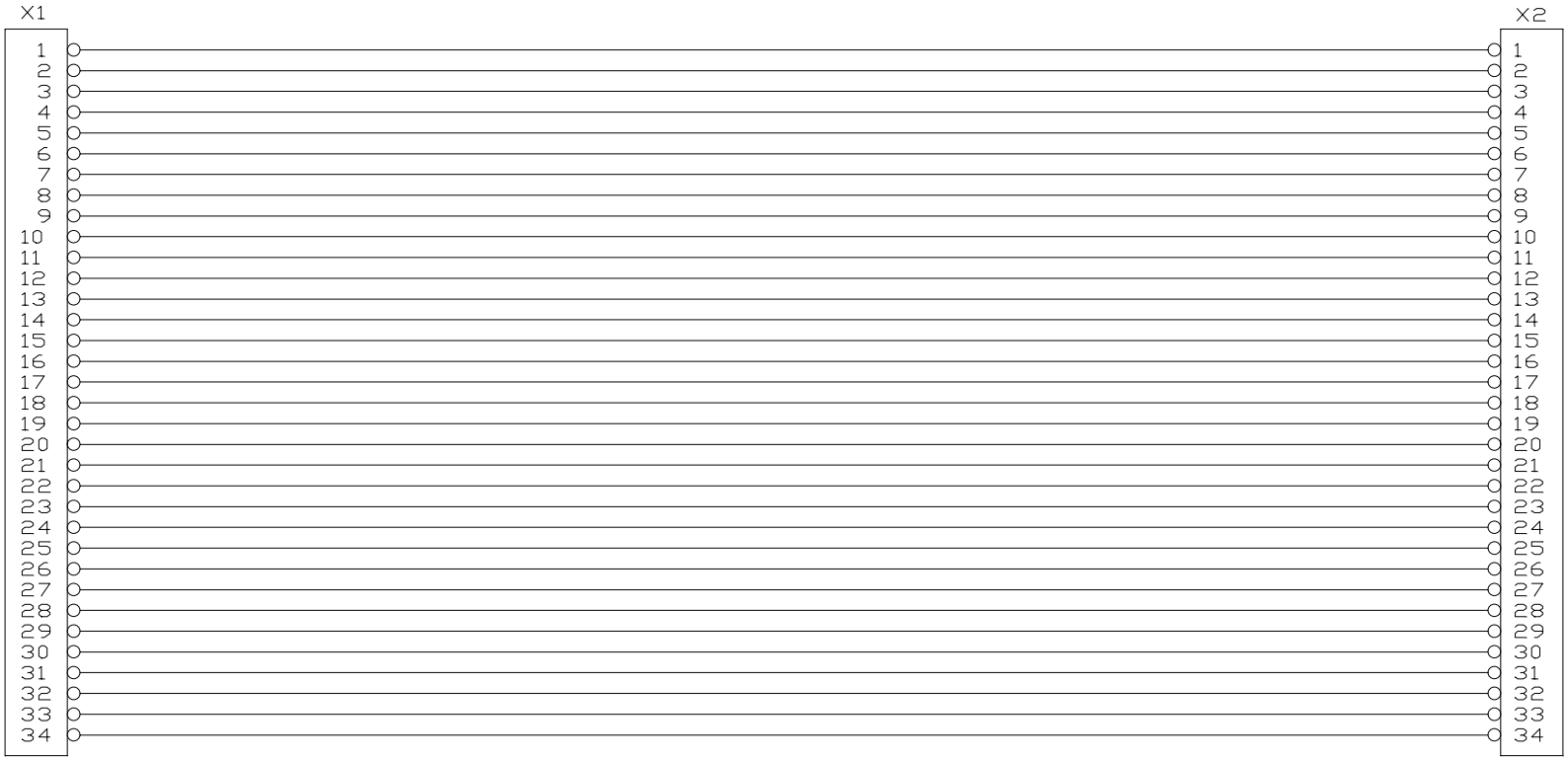

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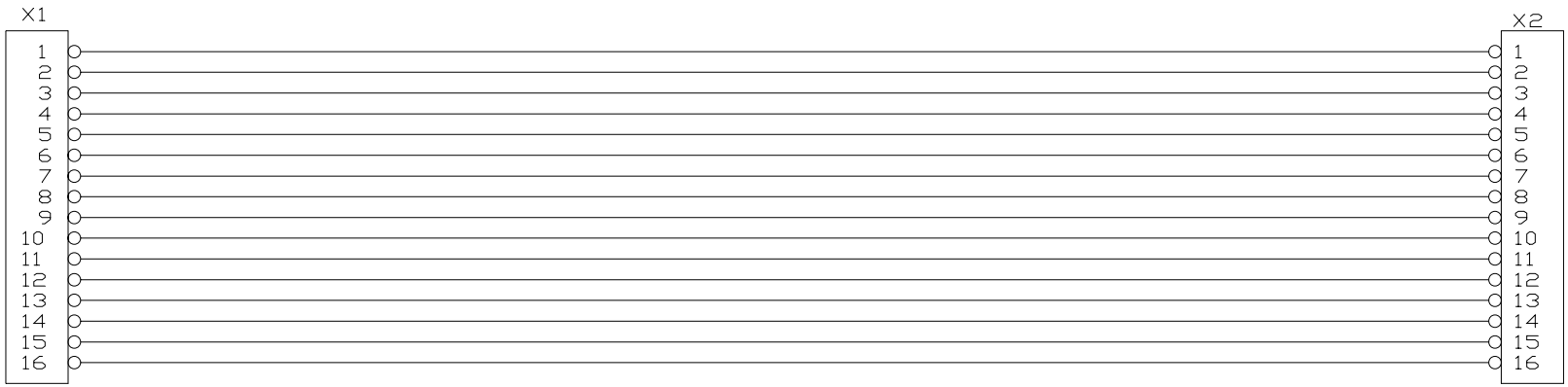

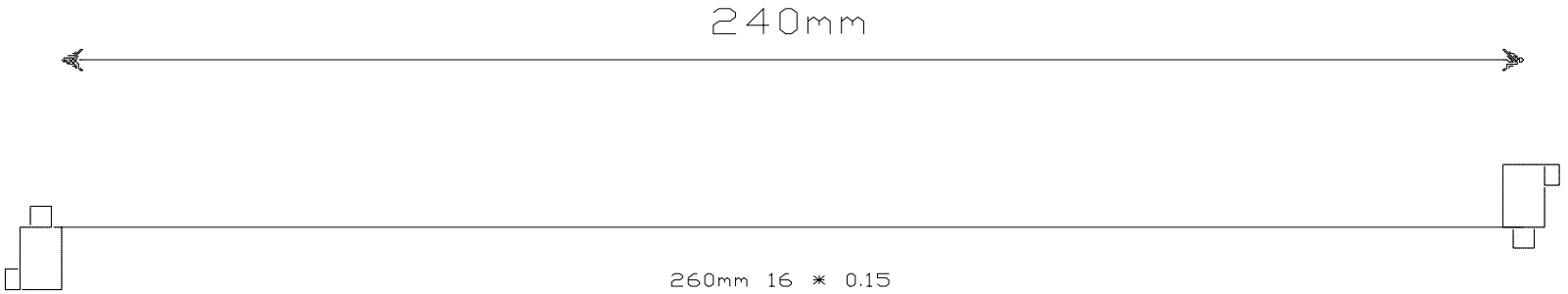

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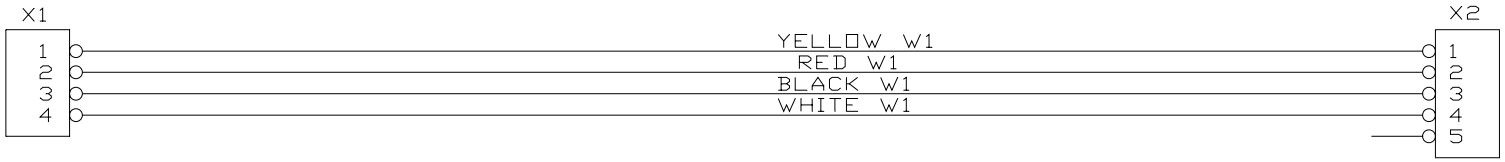

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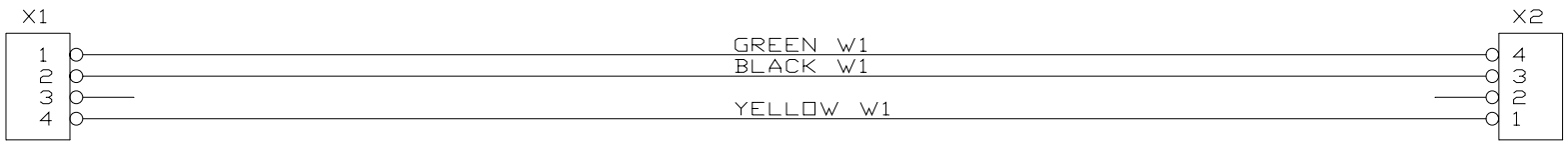

Wires must be plaited

3 * 0.25 PLAITED

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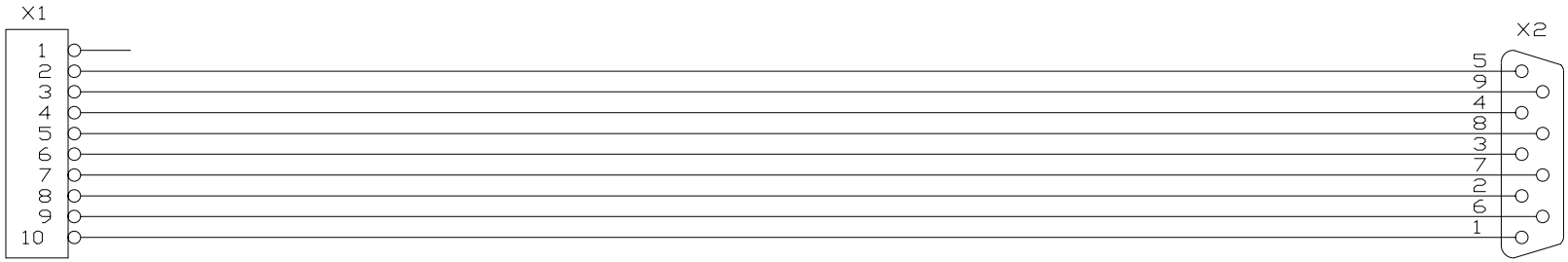
Date: September 26, 1997	Sheet 1 of 1	



290 mm

9 * 0.15

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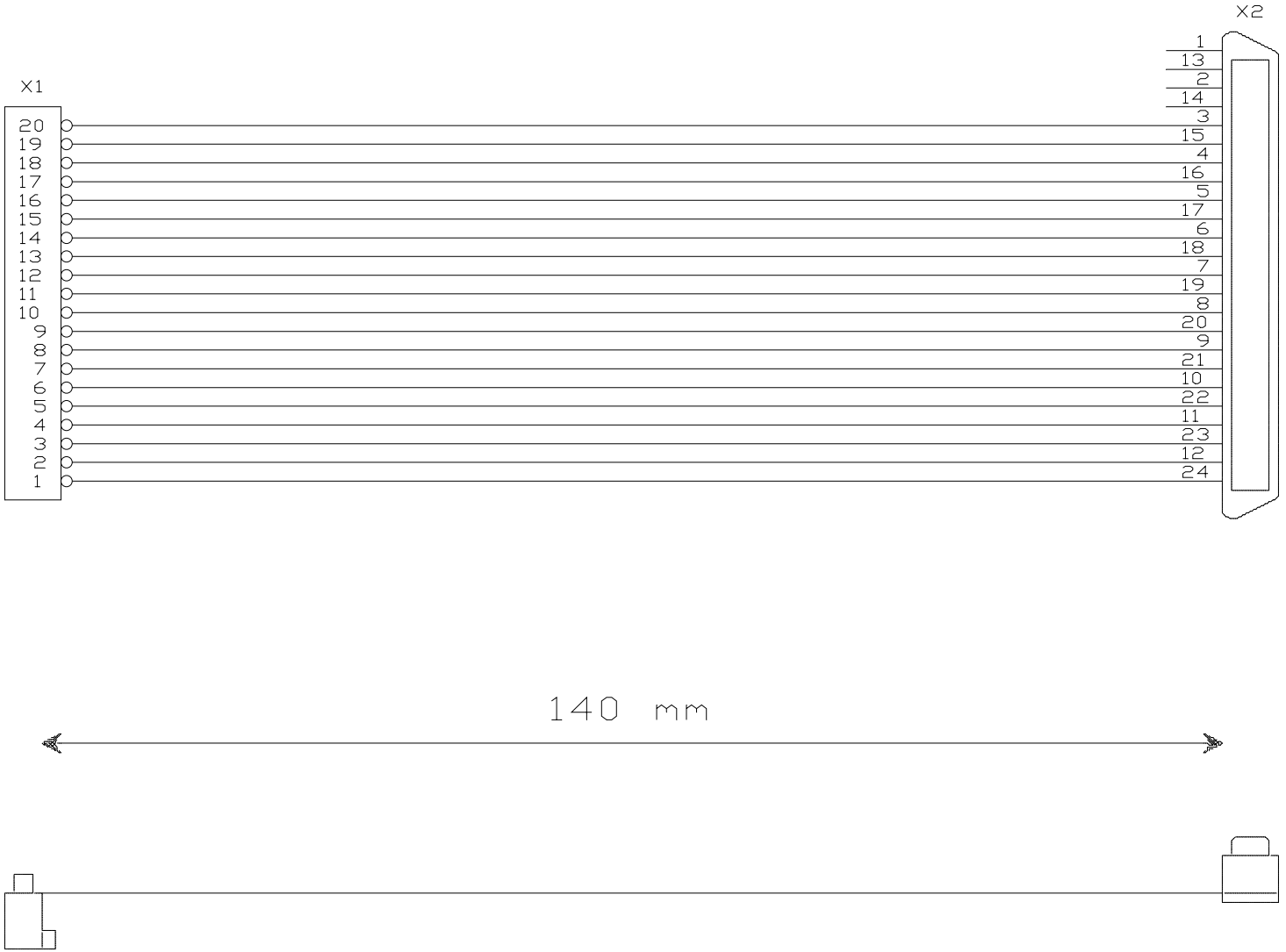

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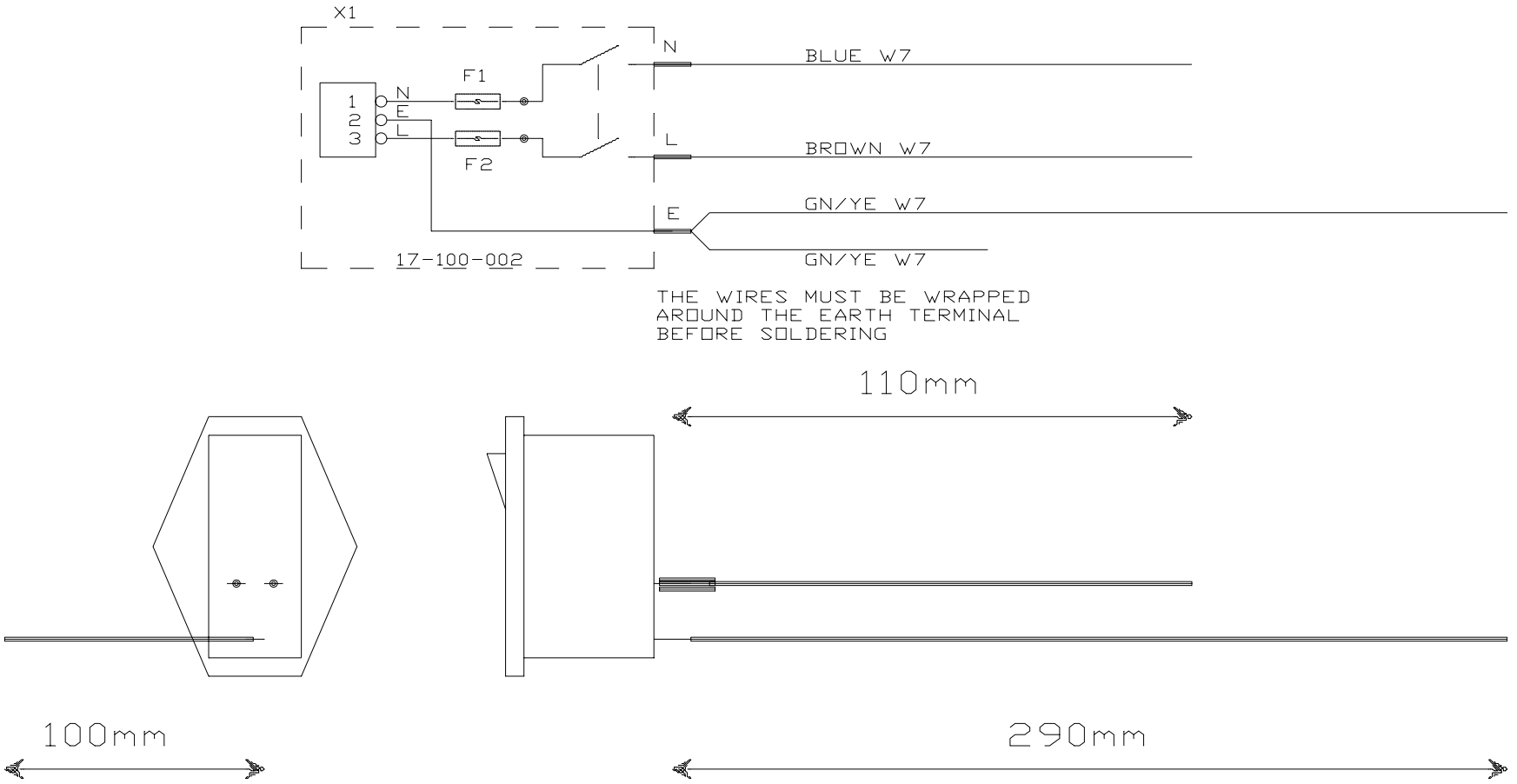

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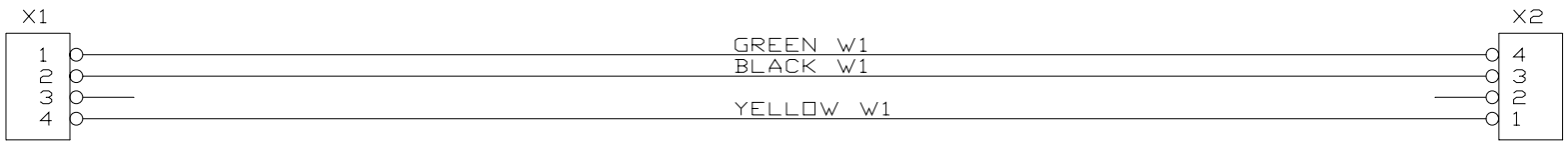

Wires must be plaited

3 * 0.25 PLAITED

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Title: 60-110-080 Cable 4 way RS485		
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Date: November 19, 1997	Sheet 1 of 1	

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Flexicon A/S denmark		
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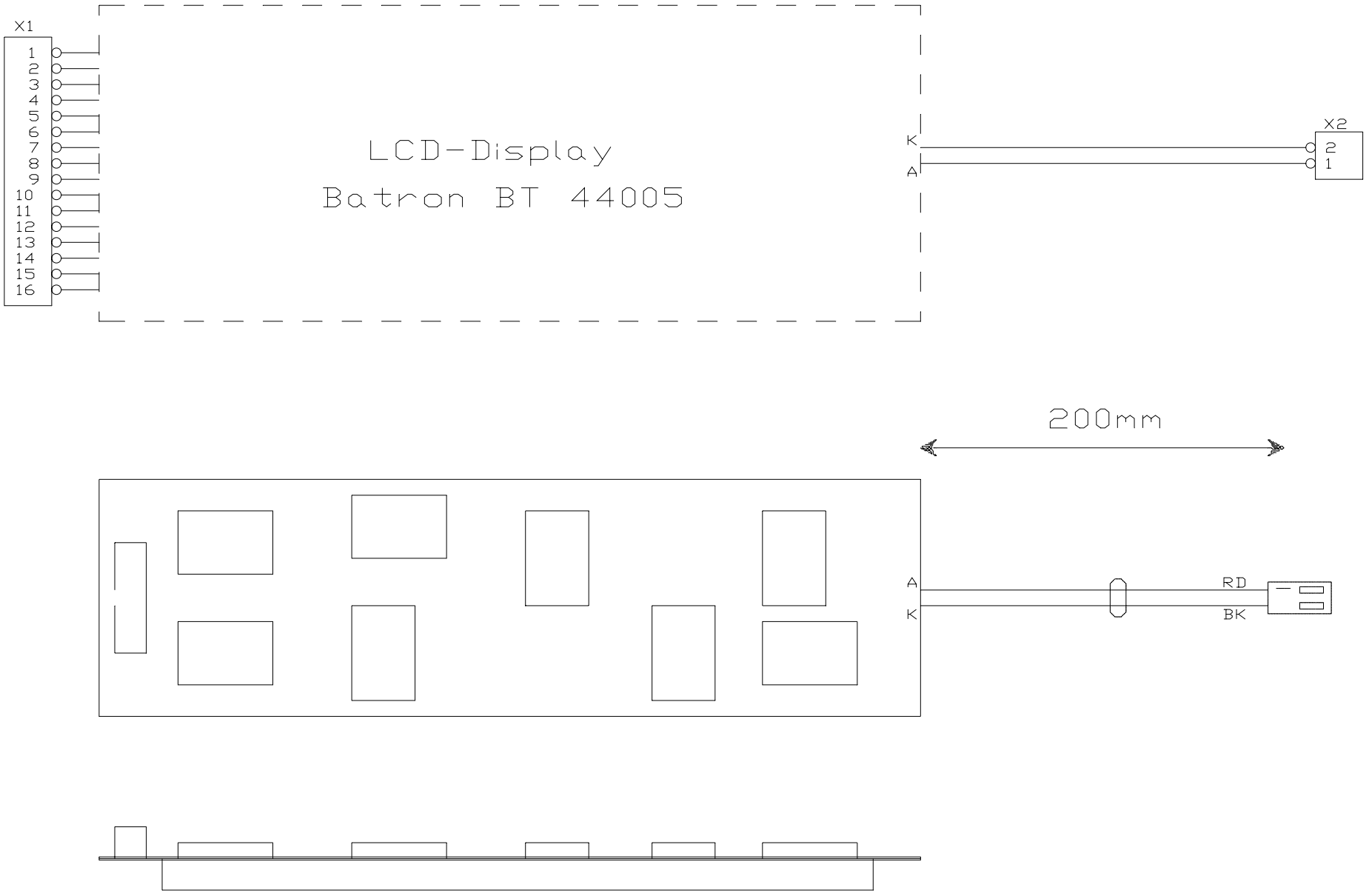
Date: September 26, 1997	Sheet 1 of 1	



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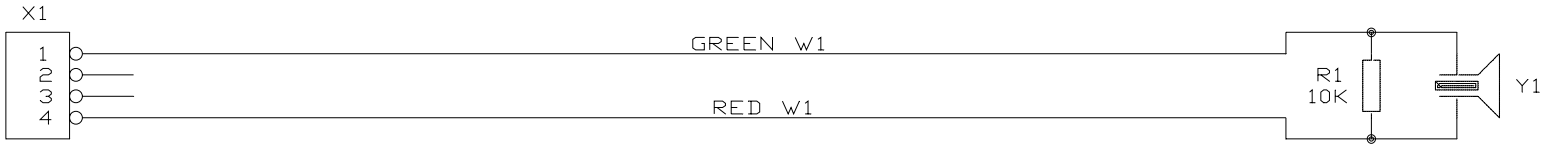

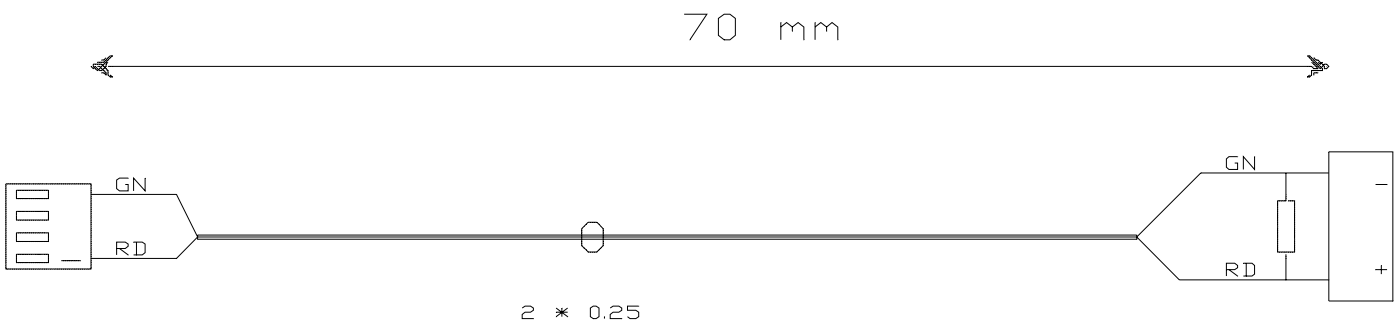

Flexicon A/S denmark		
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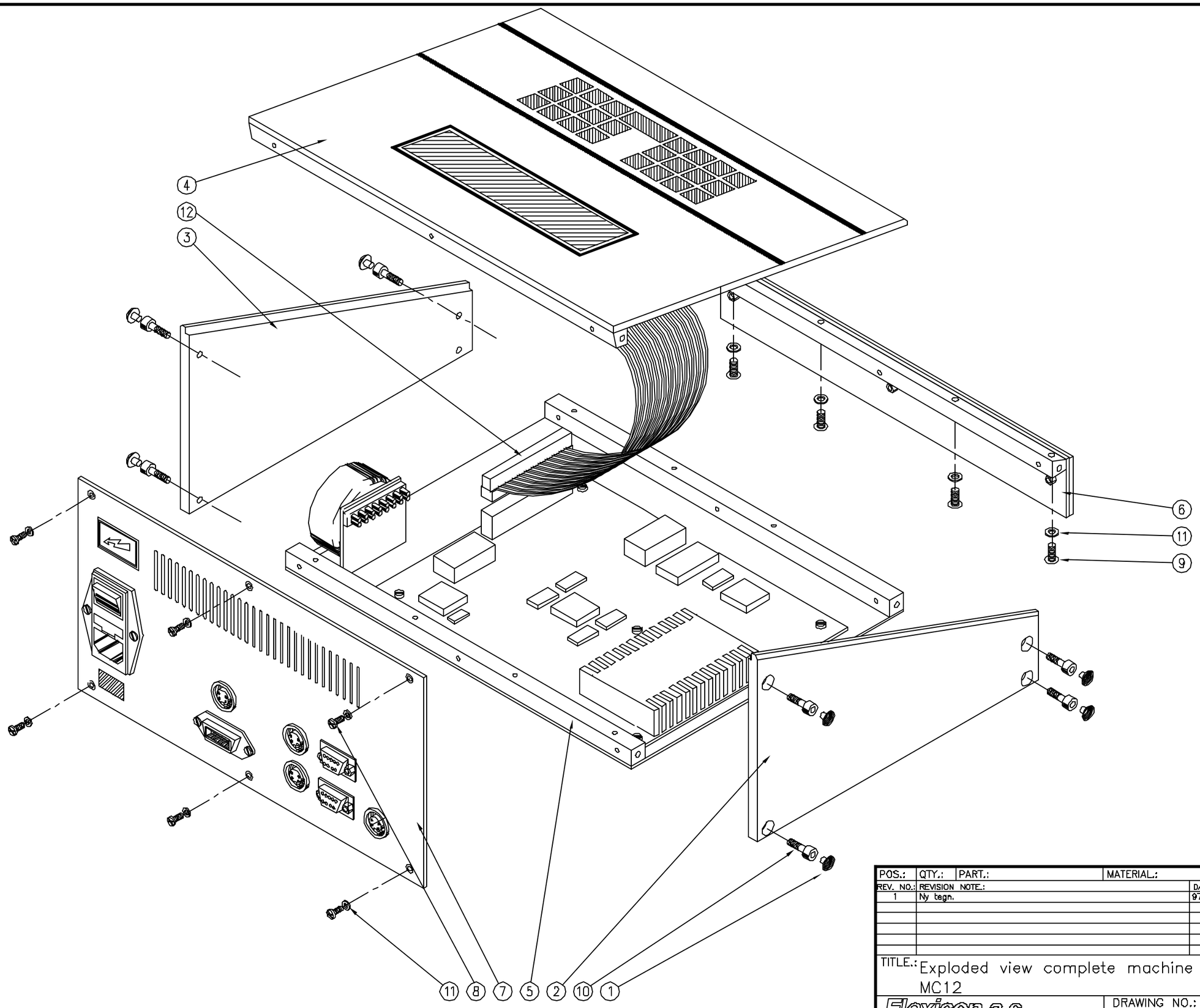
Date: September 26, 1997	Sheet 1 of 1	

4 Detailed Mechanical parts

Contents:



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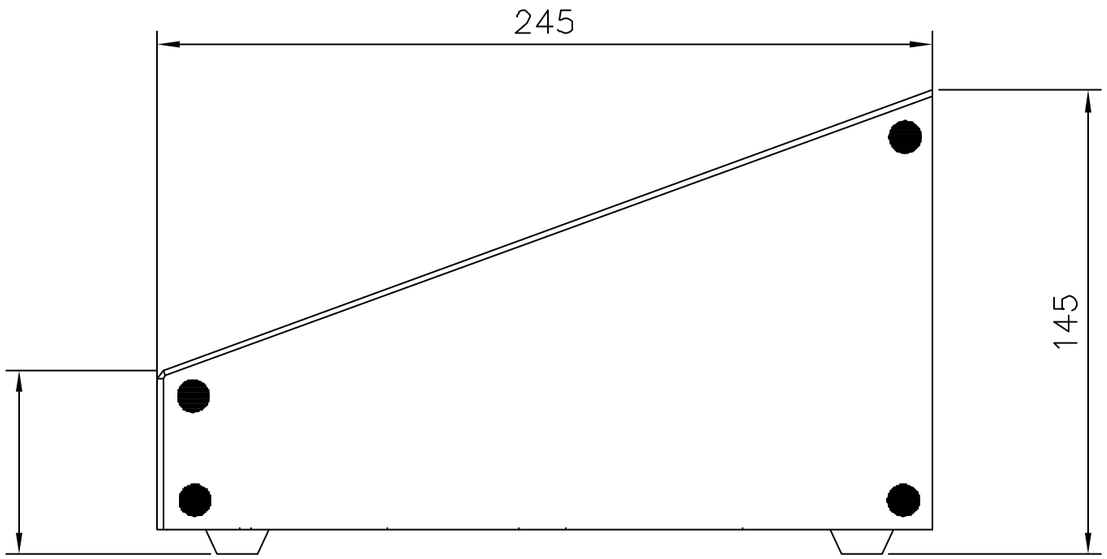
					DESIGNED BY - DATE: MDN 09-97
					SIZE.: A2

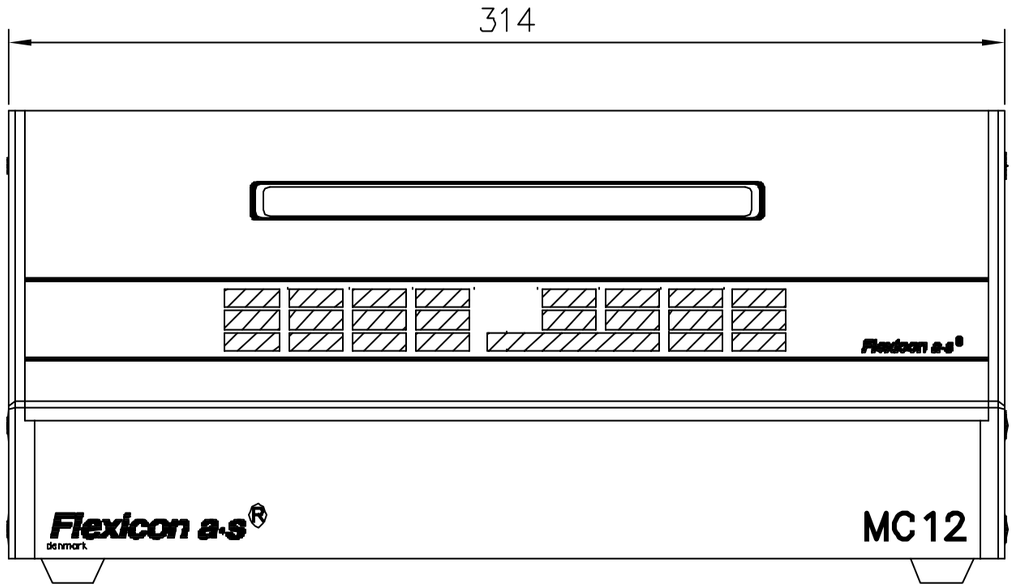
TITLE.: Exploded view complete machine MC12

Flexicon a-s denmark
DDINSVEJ 5 * DK-4100 RINGSTED (+45) 57671155

DRAWING NO.: 61-110-012

SHEET.: 1 OF 2





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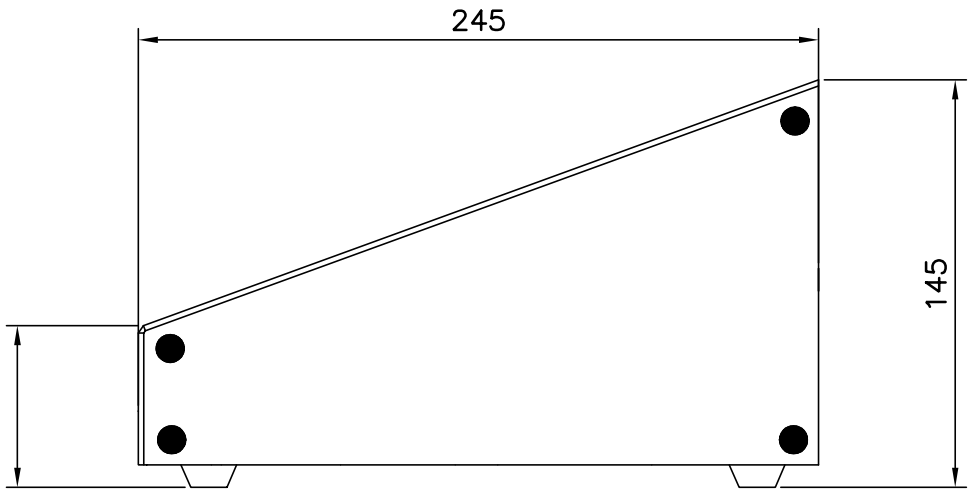
					DESIGNED BY - DATE: MDN 09-97
					SIZE.: A3

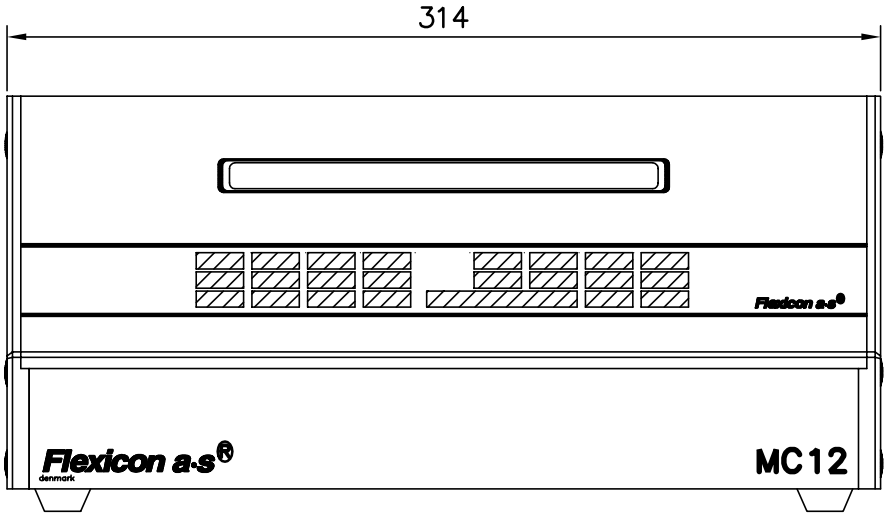
TITLE.: Dimensions
MC12

Flexicon a-s
denmark
ODINSVEJ 5 * DK-4100 RINGSTED (+45) 57671155

DRAWING NO.: 61-110-012

SHEET.: 2 OF 2





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						DESIGNED BY – DATE JOJ 06-01
						SIZE.: A3

TITLE.: Dimensions
Master Controller MC12-B

Flexicon a-s denmark
ODINSVEJ 5 * DK-4100 RINGSTED (+45) 57671155

DRAWING NO.: 61-110-014

SHEET.: 2 OF 2

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Product No 61-110-012 Rev.: 0
Description MC 12.

Pos.	Sparepart No	Rev	Description	Quantity	Specification	
01	05-954-010	0	Ø10 BLACK PLASTIC PLUG	8,00		sort
02	32-110-031	2	LEFT SIDE MC12	1,00		
03	32-110-033	2	RIGHT SIDE MC12	1,00		
04	32-110-052	2	TOP PLATE COMPLETE MC12	1,00		
05	32-110-054	1	BOTTOM PLATE COMPLETE MC12	1,00		
06	32-110-056	2	FRONT PLATE COMPLETE MC12	1,00		
07	32-110-058	2	REAR PLATE COMPLETE MC12	1,00		
08	51-003-308	0	SKRUE PAN POZD.M3X8	6,00		
09	51-003-316	0	SCREW MUSHROOM POZD.M3X16	4,00		
10	51-204-010	0	UNBRAKO CYL M4X10	8,00		
11	51-403-300	0	WASHER TOOTH LOCK 3MM	10,00	M3	SS
12	60-110-010	1	RIBBON CABLE, 34 WAY	1,00		

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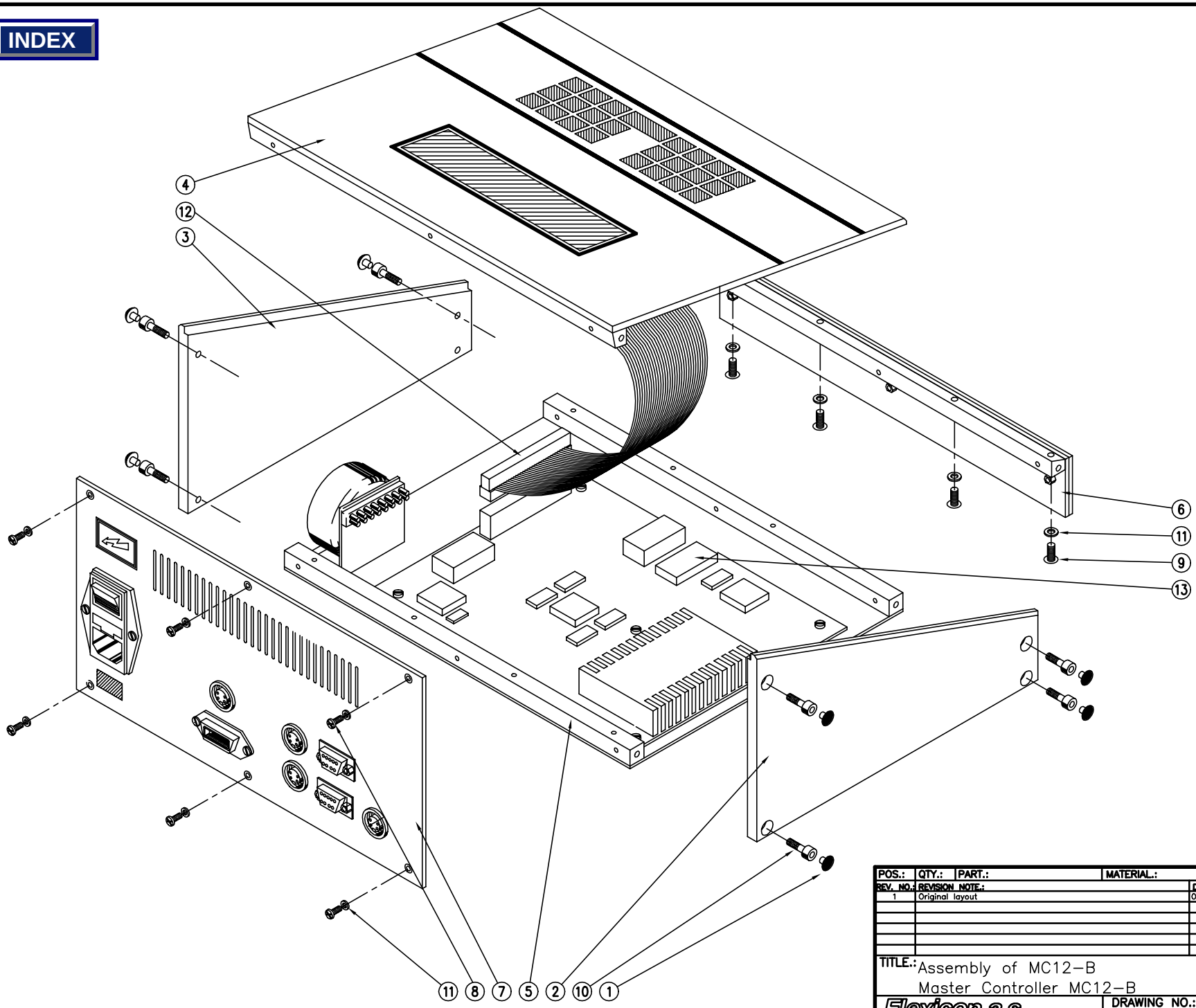

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					DESIGNED BY - DATE: JOJ 01-06
					SIZE.: A2

TITLE.: Assembly of MC12-B
Master Controller MC12-B

Flexicon a-s denmark
ODINSVEJ 5 • DK-4100 RINGSTED (+45) 57671155

DRAWING NO.: 61-110-014

SHEET.: 1 OF 2

Product No 61-110-014 Rev.: 1
Description MASTER CONTROLLER MC12-B

INDEX

Pos.	Sparepart No	Rev	Description	Quantity	Specification	
01	05-954-010	0	Ø10 BLACK PLASTIC PLUG	8,00		sort
02	32-110-031	2	LEFT SIDE MC12	1,00		
03	32-110-033	2	RIGHT SIDE MC12	1,00		
04	32-110-052	2	TOP PLATE COMPLETE MC12	1,00		
05	32-110-060	1	BOTTOM PLATE COMPLETE MC12	1,00		
06	32-110-056	2	FRONT PLATE COMPLETE MC12	1,00		
07	32-110-058	2	REAR PLATE COMPLETE MC12	1,00		
08	51-003-308	0	SKRUE PAN POZD.M3X8	6,00		
09	51-003-316	0	SCREW MUSHROOM POZD.M3X16	4,00		
10	51-204-010	0	UNBRAKO CYL M4X10	8,00		
11	51-403-300	0	WASHER TOOTH LOCK 3MM	10,00	M3	SS
12	60-110-010	1	RIBBON CABLE, 34 WAY	1,00		
13	69-112-300	1	PROGRAM 'MC12-' V1.XX SERIES B	1,00		

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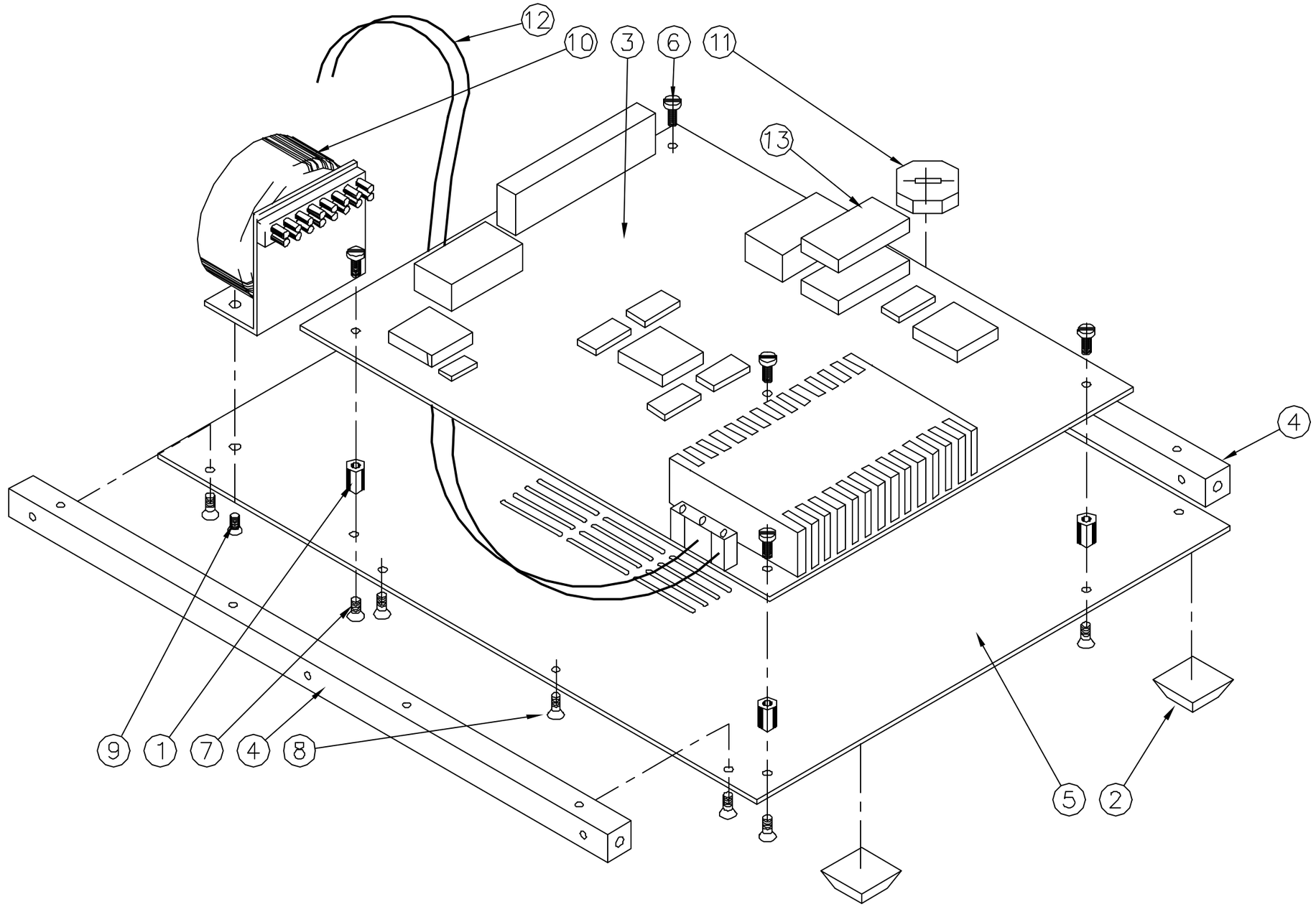

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					DESIGNED BY - DATE MDN 09-97
					SIZE.: A3

TITLE.: Bottom plate complete MC12

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ODINSVEJ 5 * DK-4100 RINGSTED (+45) 57671155

DRAWING NO.: 32-110-054

SHEET.: 1 OF 1

Product No 32-110-054 Rev.: 1
Description BOTTOM PLATE COMPLETE MC12

INDEX

Pos.	Sparepart No	Rev	Description	Quantity	Specification	
1	05-810-510	0	SPACER, STEEL HEXAGON M3X10	5,00		
10	60-110-110	1	POWER SUPPLY, 18V 30VA	1,00	FAST 15 STK PR.MD.	DK-11501-B
11	60-110-120	1	BUZZER ASSEMBLY 70mm MC12	1,00		
12	60-110-090	1	CABLE AC PCB POWERSUPPLY GREY	1,00		
13	69-112-000	1	PROGRAM 'MC12-' V1.XX	1,00		
2	05-967-501	1	RUBBER FOOT GREY	4,00		
3	20-210-003	3	MASTER PCB, MC10/MC12	1,00		
4	32-110-011	7	BOTTOM PROFILE	2,00		
5	32-110-030	1	BOTTOM PLATE	1,00		
6	51-003-305	0	SCREW MUSHROOM POZD.M3X5	5,00		
7	51-003-206	0	SCREW SUNK POZD.M3X6	5,00		
8	51-003-208	0	SCREW SUNK POZD.M3X8	8,00		
9	51-004-110	0	SCREW LINSE POZD.M4X10	2,00		

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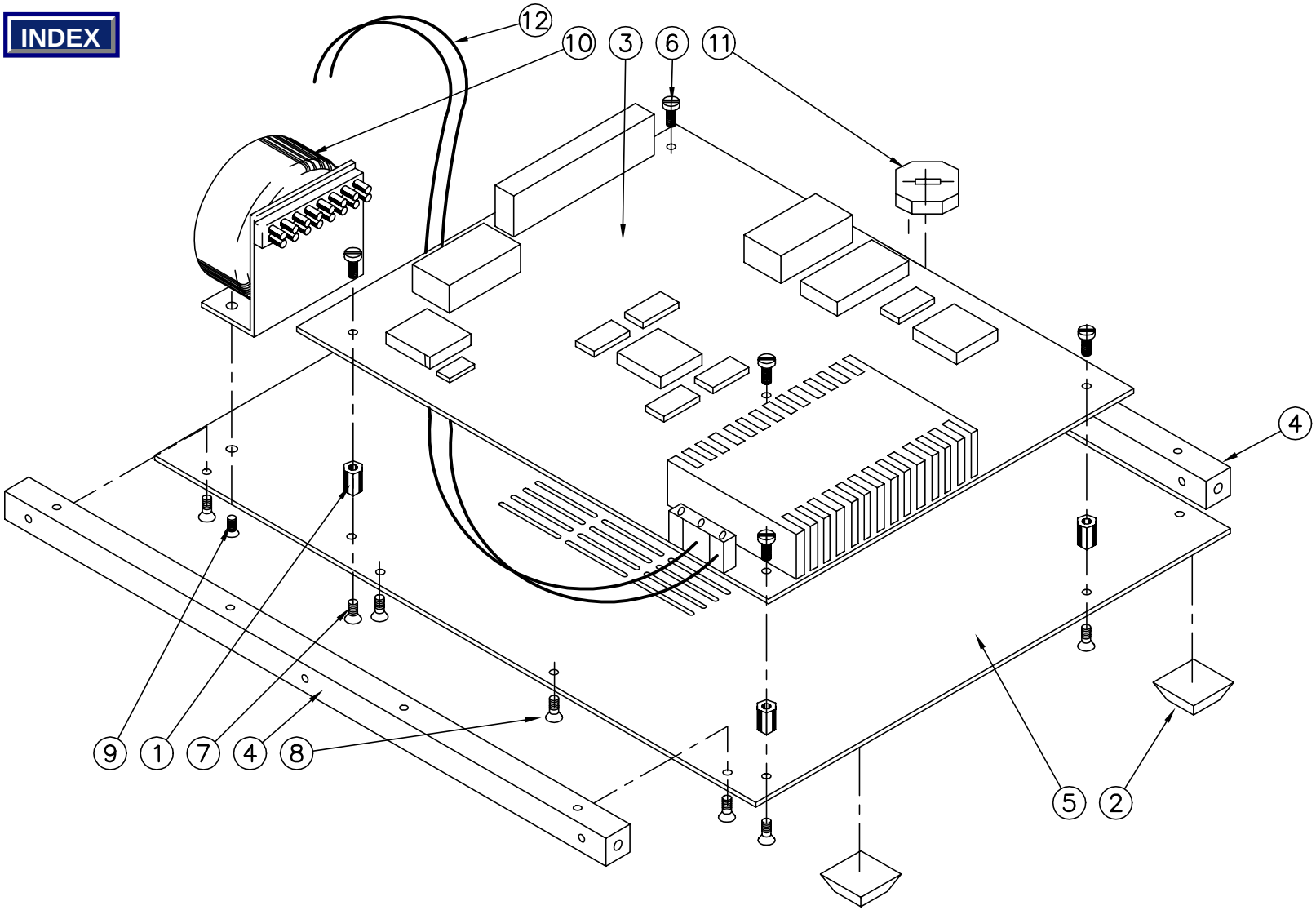

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					DESIGNED BY - DATE: JOJ 01-06
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TITLE.: Assembly of bottom plate MC12-B

Flexicon a.s denmark
ODINSVEJ 5 * DK-4100 RINGSTED (+45) 57671155

DRAWING NO.: 32-110-060

SHEET.: 1 OF 1

Product No 32-110-060 Rev.: 1
Description BOTTOM PLATE COMPLETE MC12

INDEX

Pos.	Sparepart No	Rev	Description	Quantity	Specification	
01	05-810-510	0	SPACER, STEEL HEXAGON M3X10	5,00		
02	05-967-501	1	RUBBER FOOT GREY	4,00		
03	20-210-003	3	MASTER PCB, MC10/MC12	1,00		
04	32-110-011	7	BOTTOM PROFILE	2,00		
05	32-110-030	1	BOTTOM PLATE	1,00		
06	51-003-305	0	SCREW MUSHROOM POZD.M3X5	5,00		
07	51-003-206	0	SCREW SUNK POZD.M3X6	5,00		
08	51-003-208	0	SCREW SUNK POZD.M3X8	8,00		
09	51-004-110	0	SCREW LINSE POZD.M4X10	2,00		
10	60-110-110	1	POWER SUPPLY, 18V 30VA	1,00	FAST 15 STK PR.MD.	DK-11501-B
11	60-110-120	1	BUZZER ASSEMBLY 70mm MC12	1,00		
12	60-110-090	1	CABLE AC PCB POWERSUPPLY GREY	1,00		

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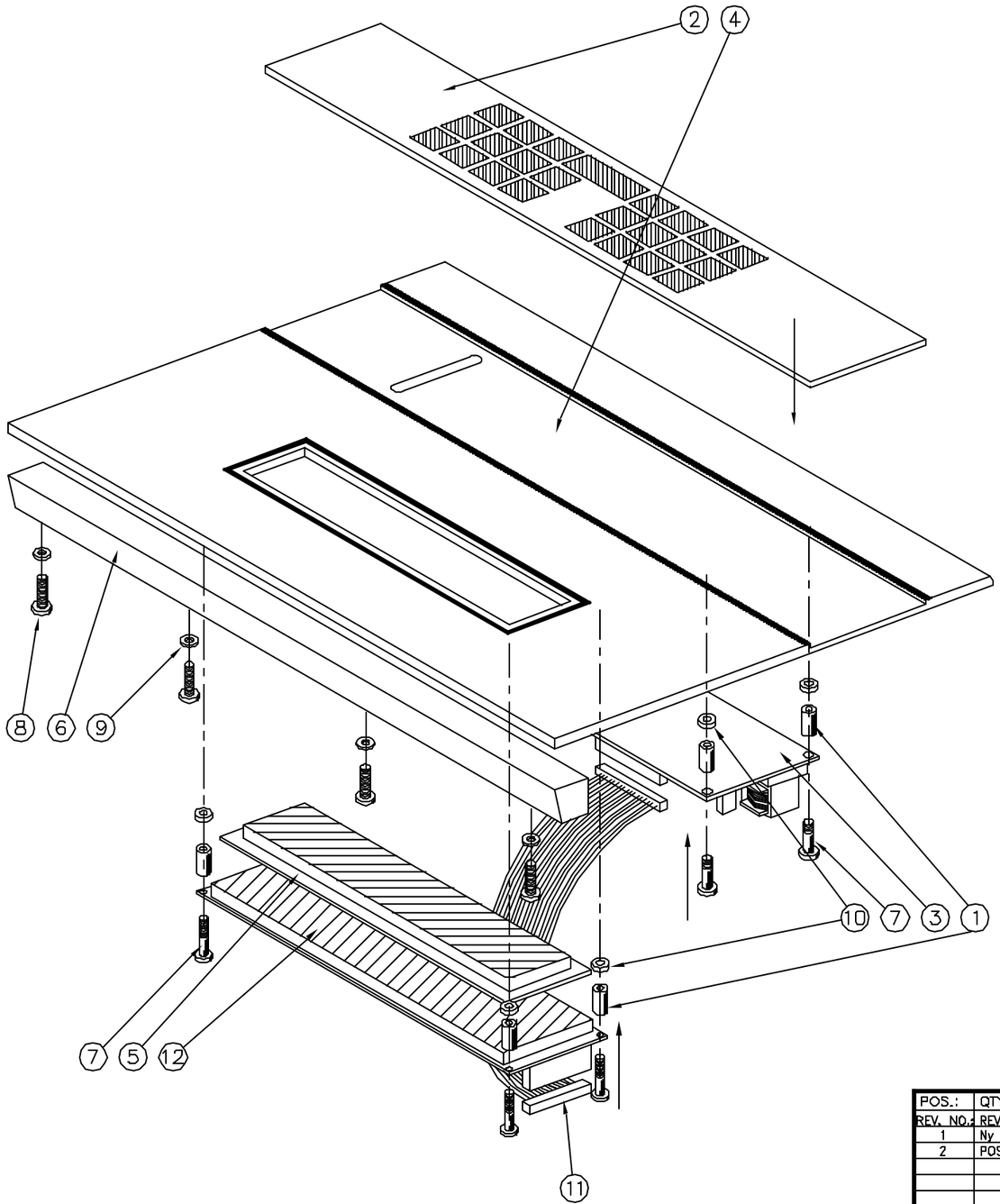

POS.:	QTY.:	PART.:	MATERIAL.:		
REV. NO.:	REVISION NOTE.:			DATE.:	APPROVED.:
1	Ny tegn.			97.09.19	PAH
2	POS:2 ændre fra 08-610-012 til 08-610-013			99.04.19	MDN

NOTE.:
TOLERANCE.: DS/ISO 2768-m
SCALE.: —
DESIGNED BY - DATE: MDN 09-97
SIZE.: A2

TITLE.: Top plate complete
MC12

Flexicon a.s
denmark
DDINSVEJ 5 * DK-4100 RINGSTED (+45) 57871155

DRAWING NO.: 32-110-052

SHEET.: 1 OF 1

Product No 32-110-052 Rev.: 2
Description TOP PLATE COMPLETE MC12

INDEX

Pos.	Sparepart No	Rev	Description	Quantity	Specification	
1	05-801-310	0	SPACER, STEEL Ø3X10	8,00		
10	51-403-500	0	WASHER LOCK NYLON Ø3MM	8,00		
11	60-110-021	1	RIBBON CABLE, 16 WAY	1,00		
12	60-110-101	1	LCD-DISPLAY ASSEMBLY F. MC12	1,00	BATRON	BT 44005
2	08-610-013	2	KEYPAD, PF6/MC12/P GREY	1,00		
3	20-710-002	0	DISPLAY PCB, MC12	1,00	FLEXICON A/S	20-710-002
4	32-110-035	2	TOP PLATE MC12	1,00		
5	32-110-037	2	DISPLAY GLASS	1,00		
6	32-110-045	1	TOP PROFILE MC12	1,00		
7	51-003-314	1	SCREW MUSHROOM POZD.M3X14	8,00		
8	51-003-316	0	SCREW MUSHROOM POZD.M3X16	4,00		
9	51-403-300	0	WASHER TOOTH LOCK 3MM	4,00	M3	SS

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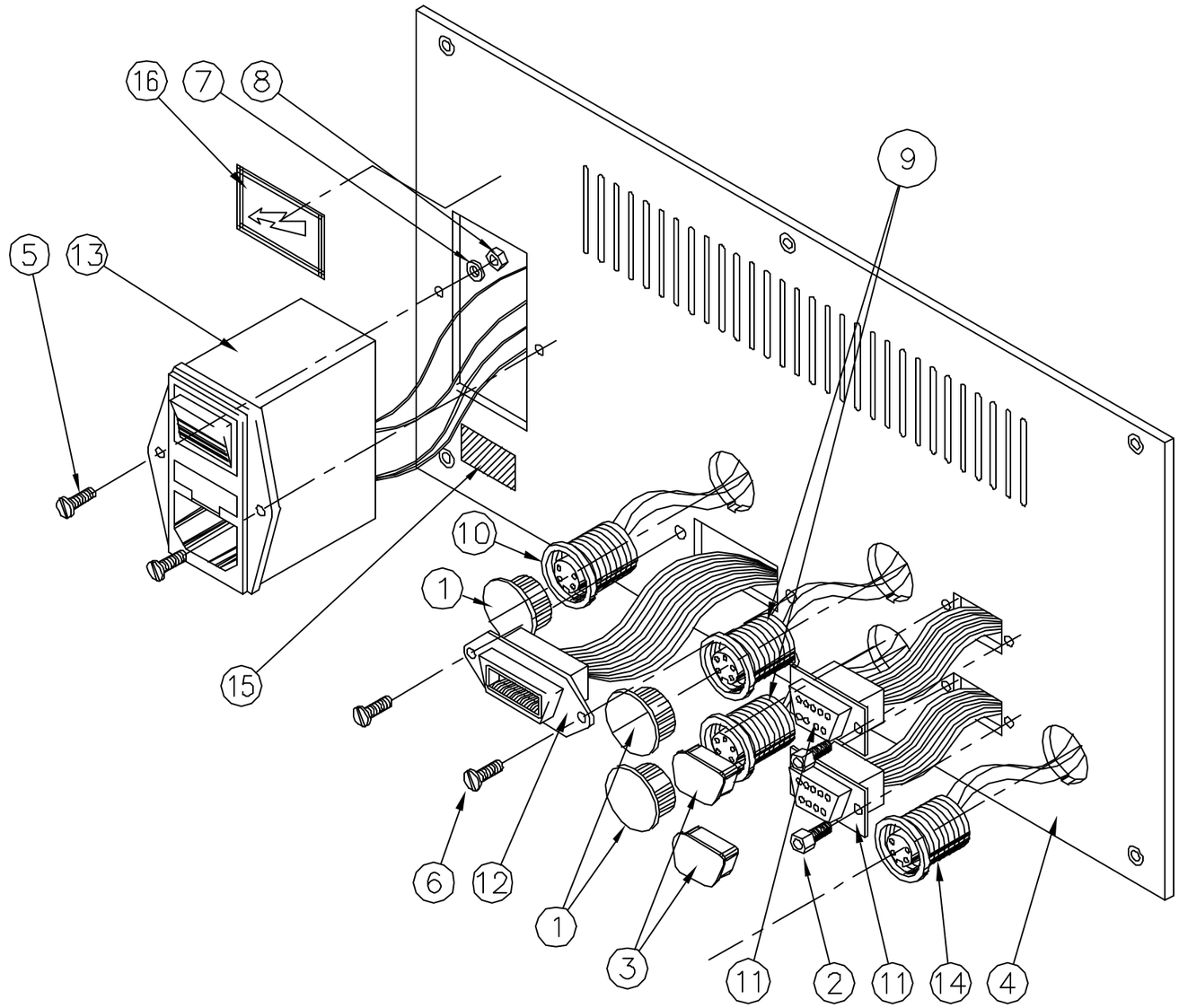

POS.:	QTY.:	PART.:	MATERIAL.:		NOTE.:
REV. NO.:	REVISION NOTE.:		DATE.:	APPROVED.:	TOLERANCE.: DS/ISO 2768-m
1	Ny tegn.		97.09.19	PAH	
2	Indfør 3 stk DIN hætter – Indfør 2 stk D-sub 9pol hætter		97.11.21	PAH	SCALE.: —
					DESIGNED BY – DATE: A A 09-97
					SIZE.: A3

TITLE.: Rear plate complete
MC12

Flexicon a.s
denmark
ODINSVEJ 5 * DK-4100 RINGSTED (+45) 57671155

DRAWING NO.: 32-110-058

SHEET.: 1 OF 1

Product No 32-110-058 Rev.: 2
Description REAR PLATE COMPLETE MC12

INDEX

Pos.	Sparepart No		Rev	Description	Quantity	Specification	
1	06-159-001		0	DIN CAP PLASTIC	3,00		
10	60-110-040		1	4P DIN SOCK. EXPANSION	1,00		
11	60-110-050		1	RIBBON CABLE W/ D-SUB	2,00		
12	60-110-060		1	RIBBON CABLE, 24 POL,CENTRONIC	1,00		
13	60-110-075		2	MAINS SWITCH W/NOISE FILTER	1,00		
14	60-110-080		2	CABLE 4 WAY RS485 SOCKET	1,00		
15	74-990-230		0	STICKER WARNING ’230V’	1,00		
16	74-990-403		0	STICKER, YE/BK, HIGH VOLTAGE	1,00		
2	06-329-000		0	CHASSIS MOUNTING SCREWS, SUB-D	2,00	EDA	UN4-40
3	06-329-001		0	CAP PLASTIC FOR 9-POL D-SUB	2,00		
4	32-110-039		4	REAR PLATE MC12	1,00		
5	51-003-110	!	0	SCREW MUSHROOM POZD.M3X10	2,00		
6	51-003-310		0	SCREW PAN POZD.M3X10	2,00		
7	51-403-300		0	WASHER TOOTH LOCK 3MM	4,00	M3	SS
8	51-503-000		0	NUT, M3	4,00	M3	SS
9	60-110-030		1	5P DIN SOCK. EXTERNAL	2,00		

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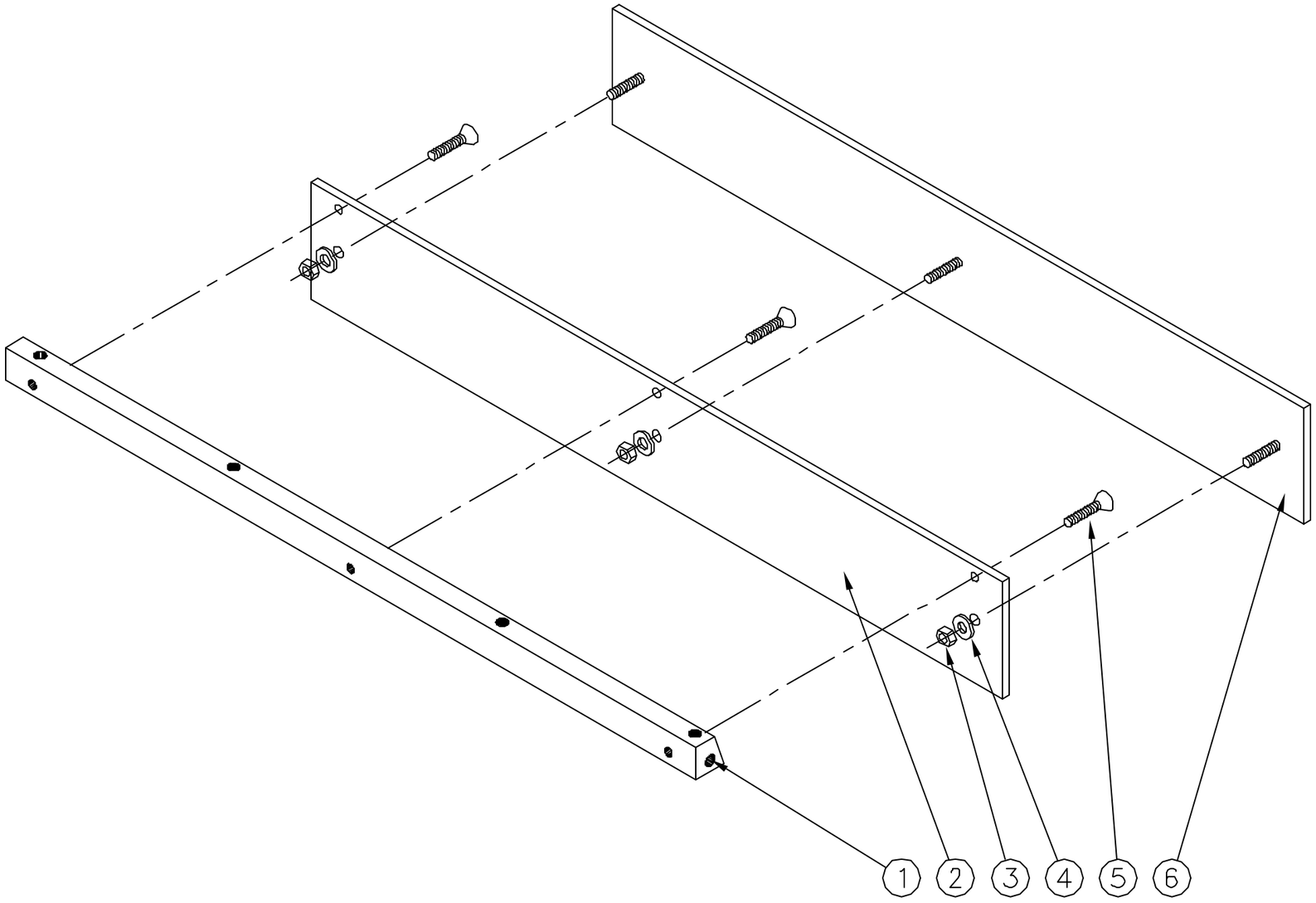

POS.:	QTY.:	PART.:	MATERIAL.:		NOTE.:
REV. NO.:	REVISION NOTE.:		DATE.:	APPROVED.:	TOLERANCE.: DS/ISO 2768-m
1	Ny tegn.		97.09.19	PAH	SCALE.: —
					DESIGNED BY - DATE: 09-97
					SIZE.: A3

TITLE.: Front plate complete
MC12

Flexicon a.s denmark
ODINSVEJ 5 * DK-4100 RINGSTED (+45) 57671155

DRAWING NO.: 32-110-056

SHEET.: 1 OF 1

Product No 32-110-056 Rev.: 2
Description FRONT PLATE COMPLETE MC12

INDEX

Pos.	Sparepart No	Rev	Description	Quantity	Specification
1	32-110-045	1	TOP PROFILE MC12	1,00	
2	32-110-041	2	FRONT PLATE MC12	1,00	
3	51-503-000	0	NUT, M3	3,00	M3 SS
4	51-403-300	0	WASHER TOOTH LOCK 3MM	3,00	M3 SS
5	51-003-208	0	SCREW SUNK POZD.M3X8	3,00	
6	32-110-043	1	FRONT COVER PLATE MC12	1,00	

5. Accessories

Contents

ACCESSORIES LIST

INDEX

Foot switch

Foot switch		88-010-020

Printer

Citizen iDP562-RSL printer		88-050-010
Paper roll for Citizen printer		88-051-010
Cable to Citizen printer, 1.5m		86-051-150

Manuals

MC12 / MC12P	Operators manual, DK	74-111-111
MC12 / MC12P	Operators manual, GB	74-111-112
MC12 / MC12P	Operators manual, D	74-111-113
MC12	EU manual	74-111-115
MC12P	EU manual	74-111-120
MC12 / MC12P	Reference manual, DK	74-111-011
MC12 / MC12P	Reference manual, GB	74-111-012
MC12 / MC12P	Reference manual, D	74-111-013

Balance set-up

Cable	MC12 to Mettler balance, 1.5m	86-053-150
Cable	MC12 to Sartorius balance, 1.5m	86-054-150

Mains cables

Mains cable	with DK plug	86-201-200
Mains cable	with EURO plug	86-202-200
Mains cable	with USA plug	86-202-250

Multidrop network

Net cable, type 3,	RS-485, 1.5m	86-103-150
Net cable, type 3,	RS-485, 1.5m, IP67	86-203-150
Net terminator,	RS-485	86-119-001

Fuses

1.0 Amp.	slow 5x20mm	15-100-010
2.5 Amp.	slow 5x20mm	15-100-025

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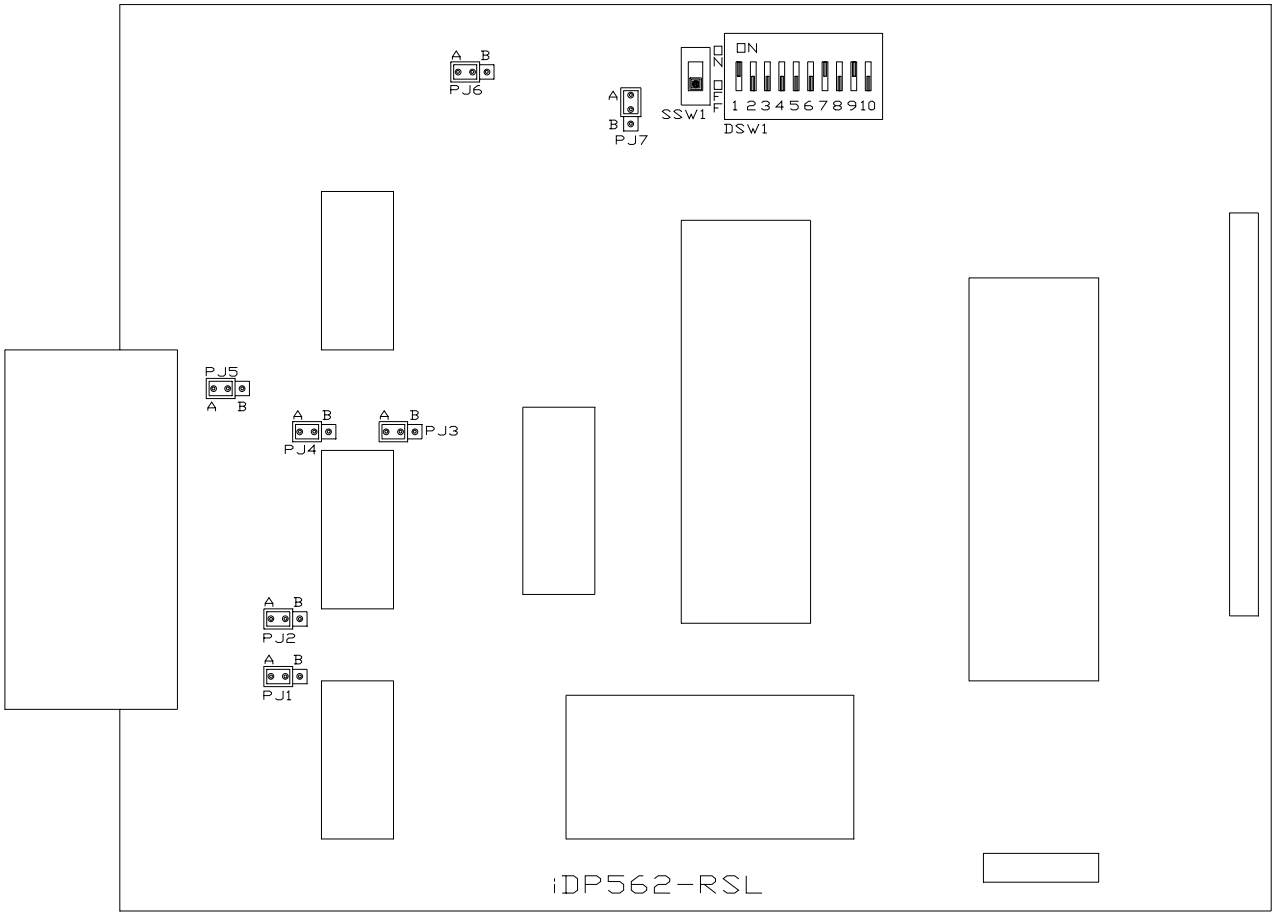
MC12/PF6 – iDP562-RSL

iDP562RSL DIP-switches and jumper settings



DIP- SWITCHES:

DSW1

1	ON	: CR CODE IGNORED, LF CODE VALID (DSW-2 AND 3)
2	OFF	: LF CODE VOID AFTER FULL BUFFER
3	OFF	: LF CODE VALID WHEN BUFFER IS BLANK
4	OFF	: USA CHARACTER SELECTION
5	OFF	: – " –
6	OFF	: NO PARITY CHECK
7	ON	: – " –
8	OFF	: 8 DATA BIT
9	ON	: 2400 BAUD (SSW1 OFF)
10	OFF	: – " –

SSW1 OFF : 1200 – 9600 BAUD AVAILABLE ON DSW1 (DEFAULT)

JUMPERS

PJ1 A : RS-232C (DEFAULT)
PJ2 A : – " –
PJ3 A : – " –
PJ4 A : – " –
PJ5 A : – " –
PJ6 A : DATA TRANSFERRED AT DTR = SPACE (DEFAULT)
PJ7 A : SEL AUTOMATIC/ALWAYS ON (DEFAULT)

THE DIP-SWITCHES DSW1 IS SET THROUGH THE HOLE AT THE BOTTOM OF PRINTER

REMOVE THE METAL PLATE ON THE BOTTOM OF THE PRINTER PRINTER TO CHANGE THE SSW1 AND THE JUMPER SETTINGS

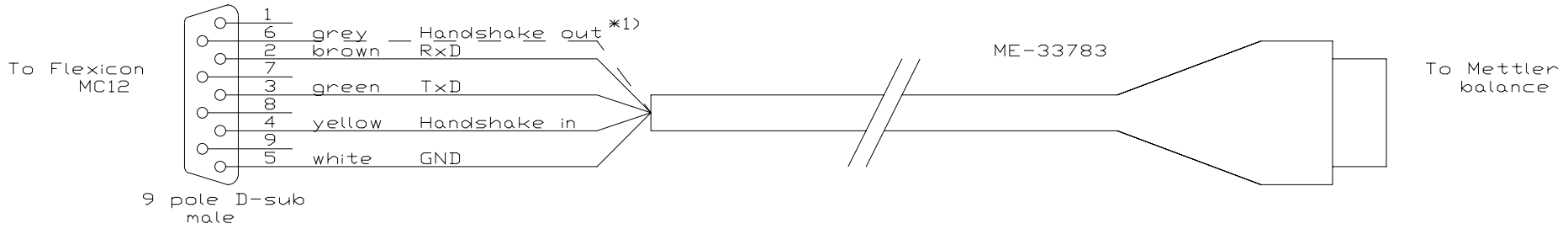
THE DEFAULT SETTINGS ARE THE FACTORY SETTINGS. THUS IT IS NOT NECESSARY TO REMOVE THE METAL PLATE AT THE BOTTOM TO CHANGE ANY OF THE SSW1 AND JUMPER SETTINGS TO CONNECT THE PRINTER TO A MC10 OR A PF5 !

THE 10 DIP-SWITCHES PRESENT AT THE BOTTOM OF THE PRINTER HAVE TO BE SET ACCORDING TO THE ABOVE DESCRIPTION !

Flexicon a/s denmark		
Title: iDP562-RSL SETTINGS FOR MC12 OR PF6		
Size: B	Document Number: IDP562	REV: 1
Date: March 10, 1998	Sheet 1 of 1	

5.4 Balance Interface Cables

MC12 - Mettler AM/PM/SM/AT balances interface cable



Cable ready for use can be ordered from Flexicon, part no 86-053-150

Cable with the 9 pole D-sub male to be delivered and mounted by the user can be ordered from the Mettler balances distributor, part no ME-33783

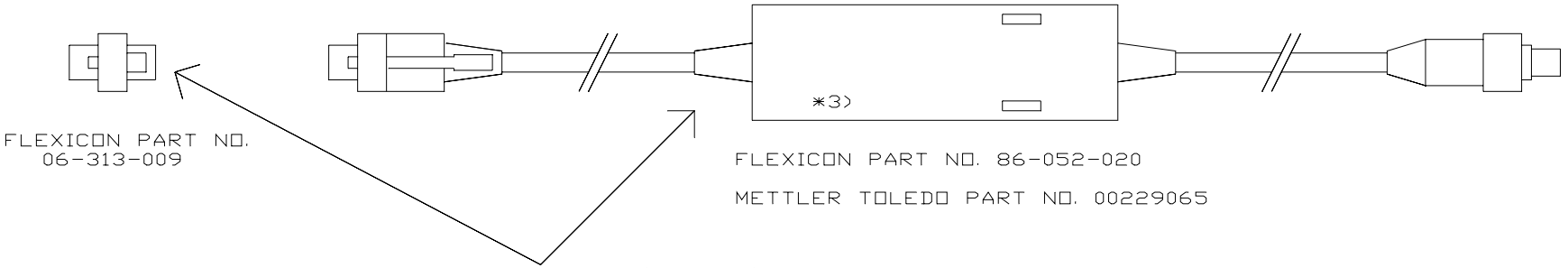
*1) The grey Handshake out wire may or may not be present in the Mettler cable. If it is present, connect the wire to pin 6 on the D-sub connector for the MC12

Flexicon a/s - denmark		
Title: MC12 - Mettler AM/PM/SM/AT interface cable		
Size: A	Document Number: 86053150.SCH	REV: 1
Date: November 23, 1998	Sheet 1 of 1	

MC12 - Mettler PB/AB/SB/PR/PG balances interface

D-SUB 9-PIN *1)
MALE/MALE ADAPTER

METTLER TOLEDO LC-RS9 CABLE *1)
LocalCAN interface cable with 9-pin D-sub



FLEXICON PART NO.
06-313-009

FLEXICON PART NO. 86-052-020

METTLER TOLEDO PART NO. 00229065

FLEXICON PART NO. 86-053-020

METTLER TOLEDO LC-B UNIVERSAL INTERFACE *2)
LocalCAN universal interface

FLEXICON PART NO. 86-053-010

METTLER TOLEDO PART NO. 00228110

*1) USED BY BALANCES TYPE PB, AB, SB, PR, AND PG

*2) USED BY BALANCES TYPE PB, AB, AND SB

*3) The LC-B cable must be configured to the default settings:
Switch left: Pos 0, Host (PC)
Switch middle: Pos 3, 2400 Baud
Switch right: Pos 0, 7 Bit, Even parity, CTS/DTR

Flexicon a/s - denmark		
Title: MC12 - Mettler PB/AB/SB/PR/PG interface		
Size: A	Document Number: LOCALCAN.SCH	REV: 2
Date: November 23, 1998	Sheet 1 of 1	

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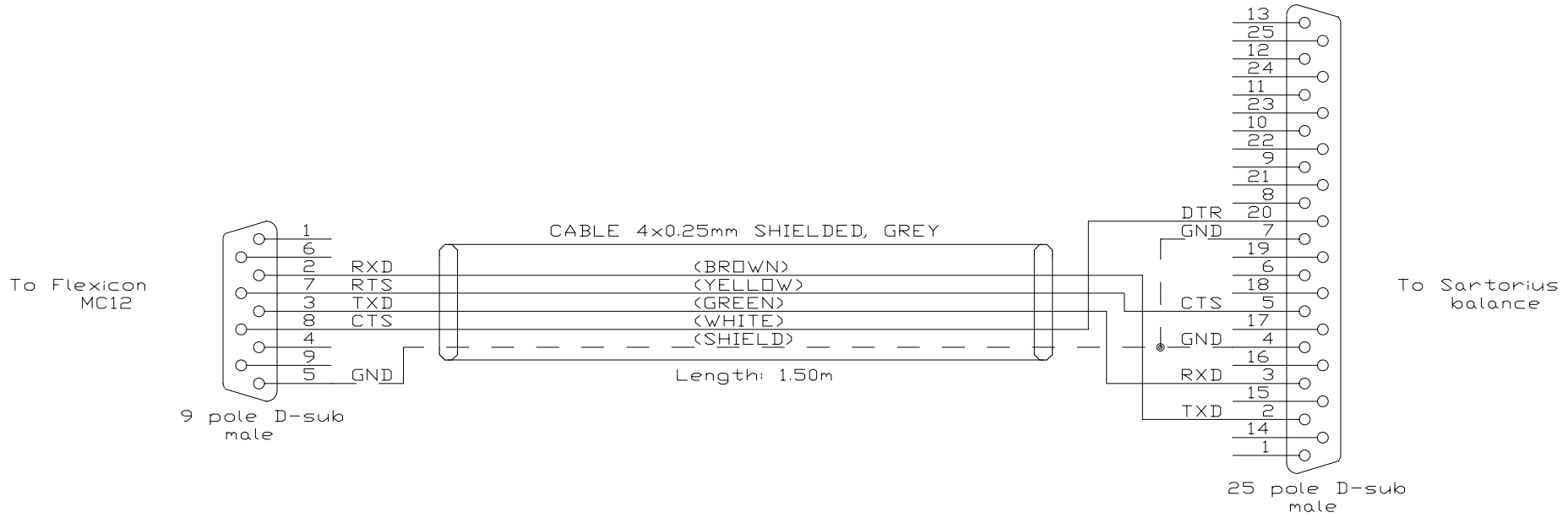
MC12 - Sartorius balance interface cable

Flexicon Part number 86-054-150



Flexicon a/s - denmark		
Title: MC12 - Sartorius interface cable		
Size: A	Document Number: 86054150.SCH	REV
Date: November 23, 1998	Sheet 1 of 1	

6 Kits

Contents

Presently, no kits available.

7 Adjustments / Maintenance

Contents

INTERNALLY SERVICING THE MC12

To internally service the MC12, e.g. when updating the software, replacing a fuse on the master PCB, or replacing a PCB, the top cover has to be removed. This is carried out according to the following description:

Detailed mechanical drawing: 61-110-012 is found in section 4

1) Disconnect the mains supply.

2) Remove the three M3 pozidrive screws on the top of the rear panel (pos. 7 on drawing)

3) Remove the two black plastic caps (pos. 1 on drawing) on each of the side panels (pos. 2 on drawing) with a knife and the upper two Allen screws which are hidden under the caps.

4) Lift off the top panel and remove the ribbon cable from plug ST2 on the main PCB. It is now possible to remove the top panel (pos. 4 on drawing).

After end of service, the top cover is remounted as follows:

1) Place the ribbon cable plug back in socket ST2 , and put the top panel back in position.

2) Secure the side panels with the four Allen screws on both sides and press the four plastic caps back in place to cover the Allen screws.

3) Secure the back panel with the three pozidrive screws at the top of the panel.

7.2 MC12 Software updating

The MC12 standard software is denoted:

Name	Number	Component i.d.
MC12 VX.YZ	69-112-000	U1

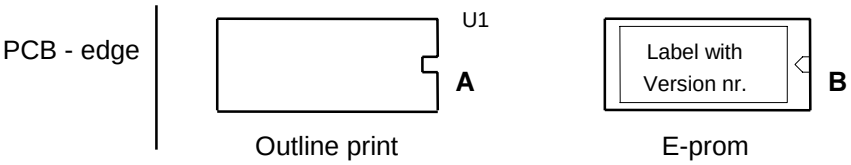
X.YZ is identifying the version of the software. The name is labelled on the EPROM.

The procedure for updating the MC12 software is as follows:

1) Open the MC12 according to the description in section 7.1 of this manual.

2) With an IC-extraction tool or in an emergency situation with a screwdriver, remove the old EPROM U1 (pos. 13 on drawing 32-110-054 in section 4) from the socket on the master PCB.

3) Insert the new EPROM. It is imperative that the new EPROM is polarized correctly. The small notch **A** on the one end of the EPROM must match the mark **B** on the socket and on the PCB components outline print.



If the EPROM is not oriented correctly when the board is powered up again, it will be damaged! and **must** be discarded.
Care should be taken when inserting the EPROM checking that all pins are inserted correctly into the socket. When the EPROM is inserted check visually that all the pins are inserted in the socket.
If any pins are incorectly positioned in the socket, the MC12 will not operate or will malfunction.

Hold a finger under the PCB when pressing the EPROM into the socket.

4) Remount the MC12 top panel according to the description in section 7.1 of this manual.

7.3 MC12 Display contrast adjusment

The contrast of the display on the MC12 is factory adjusted by Flexicon, normally it is not necessary to change the settings. If the display contrast for some reason has changed, it is possible to adjust the contrast by following the desciption below.

1) Open the MC12 according to the description in section 7.1 of this manual.
   However, do not disconnect the ribbon cable from ST2.

2) Turn on the MC12. Adjust on the trimmer R1 on the display PCB 20-710-001 mounted on the back of the top panel.
   (You can see the position of R1 on the PCB layout for the 20-710-001 in section 3 of this manual).
   Adjust R1 until the characters on the MC12 display are sharp and clear and without black squares being visible in the background.

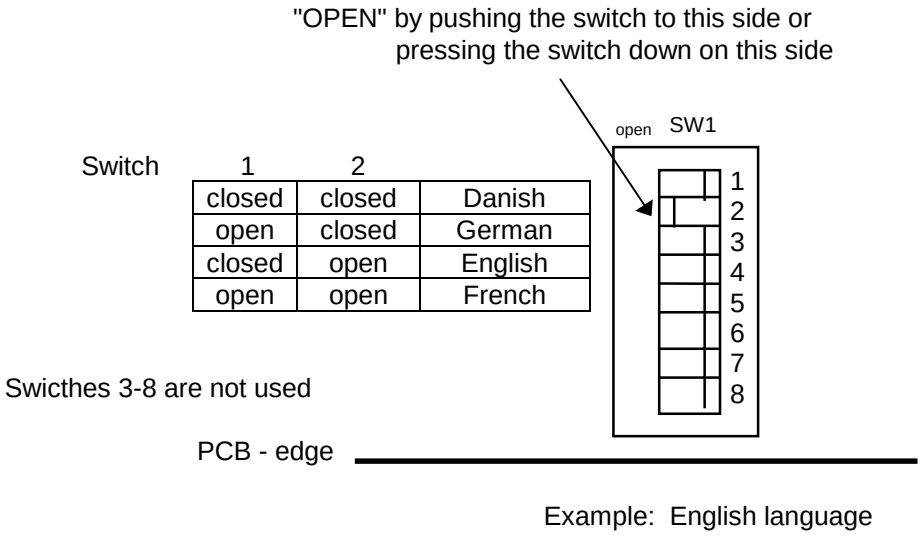
3) Disconnect the mains supply.

4) Remount the MC12 top panel according to the description in section 7.1 of this manual.

7.4 MC12 Language settings

By means of function 46 on the MC12, the language on the display and on the printer printouts can be selected to be Danish, German, English or French. The selected language is stored in memory until the MC12 is reset by function 80 or function 86. This will reset the MC12 to the default language.

The default language is determined by the settings of the DIP switches 1 and 2 of the 8 DIP switches labelled SW1 on the master PCB 20-210-003 (See if nessesary PCB layout for the 20- 210-003 PCB in section 3 of this manual).



Example: English language

DIP switches 3 to 8 have no functions and are intended for future use. They are normally set to be closed.

The default language of the MC12 is changed as follows:

1) Open the MC12 according to the description in section 7.1 of this manual.

2) Set the DIP switches 1 and 2 according to the above table.

3) Remount the MC12 top panel as described in section 7.1 of this manual.

4) Turn on the MC12 and do a Function 86 to invoke the change.

7.5 MC12 Mains voltage setting

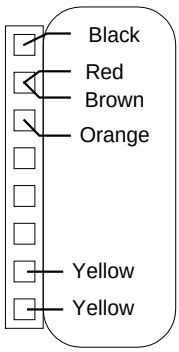
The MC12 can be set to a mains supply voltage of either 110/120VAC or 220/240VAC.

The mains voltage setting can be changed by following the description below:

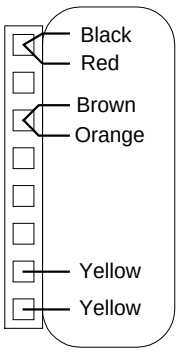
1) Open the MC12 according to the description in section 7.1 of this manual.

2) On the trafo mounted on the bottom plate (pos. 10 on drawing 32-110-054 in section 4), the Black, Red, Brown and Orange wires are mounted at the shown positions for the applyed mains supply voltage.

Mains 220/240 VAC



Mains 110/120 VAC



The mounting positions for the colorcoded wires from the transformer

8 Troubleshooting

Contents: **Examples:**

The MC12 cannot activate drive(s) and not all drive numbers are listed at startup

The MC12 cannot activate drive(s) but the drive numbers are listed at startup

The MC12 periodically looses connection to the drive(s).

The MC12 has an periodical error but does not loose connection to the drive(s).

Function 2 (tube i.d.) does not operate properly.

The MC12 and the drive(s) are dispensing with inadequate filling accuracy.

The MC12 is difficult to calibrate.

The MC12 is completely “dead”.

The display is blank but the buzzer beeps at power on.

It is difficult to read the text written in the display.

The display writes black squares all over the screen but the buzzer operates properly.

Display writes garbage, black quadrangles, or just a flashing cursor.

The MC12 does not respond on any key commands.

The MC12 does not respond on one or some of the keys.

The display operates correctly but the MC12 does not beep when a key is pressed.

The MC12 cannot be activated by the external GO or the external 1 port.

External devices cannot be activated by the external GO or the external 1 ports.

The external device starts when it should stop and vice versa.

Paper printout from the MC12 to a printer is not operating.

The MC12 balance set-up is not operating.

The balance continuously beeps.

The MC12 is operating unexpectedly.

8 Troubleshooting

Problem: **The MC12 cannot activate drive(s) and not all drive numbers are listed at startup**.

Reasons:

1) The drive(s) were not all turned on before the MC12 was turned on.

2) The drives have not all been set to different addresses (only when more than one drive is used).

3) The RS-485 net cable(s) are not connected properly.

4) One of the drives is defective (when more than one drive is used).

5) The MC12 or the drive is defective.

Actions:

1) Turn on the drive(s). Then on the MC12 either press <STOP> twice or switch it off and then on again. Press <GO> and check that all drive numbers are listed.

2) Set drives to different addresses (see operators manual for the drive for instructions).

3) Check the RS-485 cable(s) and their connections to the MC12 and to the drive(s).

4) If the error is still present, try to connect only one of the drives and check if the MC12 does list this drive at start-up one drive is used). Repeat this procedure for the rest of the drives and check if one of the drives has a problem.

5) If the error is still present, try to exchange either the MC12 or the drive with another one to see if either the MC12 or the drive has a problem. If the drive is defective: Refer to the service manual for the drive.

   If the MC12 is defective: Check the RS-485 cable and the connectors to the cable internally in the MC12. If this does not correct the error, change the Main PCB 20-210-003.

Problem: **The MC12 cannot activate drive(s) but the drive numbers are listed at startup.**

Reasons:
1) The drive/one of the drives is defective.
2) The MC12 is not set up with the correct mode (individual, parallel, or serial) or a wrong drive number is chosen.
3) The MC12 microprocessor has somehow got confused.

Actions:
1) If only one drive is connected: Service the drive according to the instructions in the service manual for the drive.
If more than one drive is connected: Choose individual mode in function 40. Then for each of the drive numbers, select the drive by function 41 and press <pump> and <GO>. This way it is possible to find out if all drives can be activated. If one of the drives will not run, service this drive according to the guidelines in the service manual for the drive.
2) Check if the right mode is selected. In the upper right corner, the mode (I for individual, P for parallel and S for serial) and the number of the selected drive are indicated. (0 is used as common drive number for the drives in parallel and serial mode). Set the MC12 to the right mode by function 40.
If only one drive is connected, individual mode (mode 1) should be used.
If more than one drive is used, either mode (individual, parallel, or serial mode) can be selected.

Individual mode: In individual mode only the selected drive (identicated in the upper right corner of the display by the number) will be activated by <disp><GO> or <pump><GO> or a start signal in one of the MC12 external ports. A start signal in the external port of one of the drives will activate that specific drive, but only if <disp> for that drive number has previously been pressed. This is done by first selecting the drive by function 41 and then pressing <disp>.

Parallel mode: In parallel mode drive number 0 is used to operate and activate all drives. Only drives that are of identical type to the drive with the lowest drive number are activated by a <disp><GO>, a <pump><GO>, or a start signal in one of the external ports on the MC12 or on one of the drives.

Serial mode: This mode is operated excactly as parallel mode except for the tube size. In serial mode the tube size is selected specifically for each drive by first selecting the drive number by function 41 and then setting the tube size. To activate the drives, switch back to drive 0.

3) Try to run function 80 to reset the MC12.

Problem: **The MC12 periodically looses connection to the drive(s).**

Reasons:
1) The RS-485 cable(s) are not connected properly.
2) If only one drive causes problems, this drive may be defective.
3) The cable to the net connector is not connected properly internally in the MC12.
4) The Main PCB is defective.

Actions:
1) Check the RS-485 cable(s) and the connections.
2) Service the drive according to the instructions in the service manual for the drive.
3) Internally in the MC12, check the RS-485 cable and its connections.
4) Change the Main PCB 20-210-003.

Problem: **The MC12 has an periodical error but does not loose connection to the drive(s).**

Reasons:
1) The electromagnetic emission from the surroundings exceeds the generic standards of EN 50082-2.
2) The Main PCB is defective.

Actions:
1) Try to operate the MC12 in another environment to check if noise is the problem. Modify or eliminate the noise generator in the environment.
2) Change the Main PCB 20-210-003.

Problem: **Function 2 (tube i.d.) does not operate properly.**

Reasons:
1) Serial mode has been selected.
2) MC12 has lost connection to drive.

Actions:
1) Choose either individual mode by function 40, or use function 41 to select the drive for which the tube size should be set.
2) See previously described problem of the MC12 not being able to activate drives.

Problem: **The MC12 and the drive(s) are dispensing with inadequate filling accuracy.**

Reason: This is a problem related to the drive.

Aktion: See service manual for the drive.

Problem: **The MC12 is difficult to calibrate.**

Reasons:
1) This problem may occur for the same reasons as when inadequate filling accuracy is a problem. If the volume is varying from one fill to another, the problem is related to the drive.

Actions:
1) See service manual for the drive.
2) Update the MC12 to the latest version.

Problem: **The MC12 is completely "dead".**

Reason: The mains supply is defective, the mains fuses on the MC12 are blown, or the fuse on the main PCB 20-210-003 is blown.

Actions: Check the mains supply.
Check the mains fuses by removing the mains cable and pulling out the fuse holder just above the socket for the mains cable.
Check the fuse and the fuse clips on PCB 20-210-003.
If the error is still not corrected, change the Main PCB 20-210-003.

Problem: **The display is blank but the buzzer beeps at power on.**

Reasons:
1) The display contrast needs adjustment
2) The ribbon cable between the Main PCB 20-210-003 and the display PCB 20-710-001 or the ribbon cable between the display PCB and the display is not connected properly.

Actions:
1) Adjust the display contrast according to the description given in section 7 of this manual.
2) Check the two ribbon cables and their connections.
If the error is still present change the PCB 20-710-001.
If this does not correct the error, change the PCB 20-210-003.
If the error is still not corrected, change the display.

Problem: **It is difficult to read the text written in the display.**

Reason: The display contrast needs to be adjusted.

Aktion: Adjust the display contrast according to the description given in section 7 of this manual.

Problem: **The display writes black quadrangles all over the screen but the buzzer operates properly.**

Reasons: The contrast needs to be adjusted.

Action: Adjust the display contrast according to the description given in section 7 of this manual. If this does not correct the error, change the display PCB 20-710-001.

Problem: **Display writes garbage, black quadrangles, or just a flashing cursor.**

Reason: The microprocessor has somehow got confused or the Main PCB 20-210-003 is defective.
Aktion: Switch off power to the MC12, and wait for approx. 20 sec. then press the <C> key on the keyboard and keep it pressed while turning on the mains power again. This will reset the microprocessor.
If this does not correct the error, change the PCB 20-210-003.

Problem: **The MC12 does not respond on any key commands.**
Reasons: The microprocessor has somehow got confused, the ribbon cable between the Main PCB 20-210-003 and the display PCB 20-710-001 is not connected properly, the Main PCB or the display PCB is defective.
Actions: Switch off power to the MC12, and wait for approx. 20 sec. then press the <C> key on the keyboard and keep it pressed while turning on the mains power again. This will reset the microprocessor.
Check the ribbon cable and its connections.
If this does not correct the error, change the PCB 20-210-003.
If this still does not correct the error, change the PCB 20-710-001.

Problem: **The MC12 does not respond on one or some of the keys.**

Reason: The keypad is defective.

Aktion: Change the keypad.

Problem: **The display operates correctly but the MC12 does not beep when a key is pressed.**

Reasons The buzzer is not connected properly.

Actions Check the connector and the wires to the buzzer.

Problem: **The MC12 cannot be activated by the external GO or the external 1 port.**

Reasons:
1) The <disp> key has not been activated on the MC12.
2) The external switch is defective.
3) The external ports are not connected properly to the PCB 20-210-003.

Actions:
1) Press the <disp> key and then the external switch.
2) Check that external switch short circuit between pin 1 and 2 on the 5 poled DIN connector when the switch is activated.
3) Check that the connector to the external GO and the external 1 ports are connected to the connectors ST9 and ST6, respectively, on the Main PCB 20-210-003 and check the wires to the external connectors.
If the error is still present, change PCB 20-210-003.

Problem: **External devices cannot be activated by the external GO or the external 1 ports.**

Reasons:
1) The external device does not operate at 24VDC.
2) The external device is not connected with + to pin 2 and - to pin 4 of the external connector of the MC12.
3) The external ports are not connected properly to the PCB 20-210-003.

Actions:
1) Use another external device or use a 24VDC realy to run the external device.
2) Connect the external device to the proper pins at the external port.
3) Check that the connector to the external GO and the external 1 ports are connected to the connectors ST9 and ST6, respectively, on the Main PCB 20-210-003 and check the wires to the external connectors.
If the error is still present, change PCB 20-210-003.

Problem: **The external device starts when it should stop and vice versa.**

Reason: The wrong external port on the MC12 is used.

Aktion: Use the other external port.

Problem: **Paper printout from the MC12 to a printer is not operating.**

Reasons:
1) The printer cable is not connected properly or it is of the wrong type.
2) The baud rate or controlword on the MC12 do not match the printer set-up.
3) The printer is not set up correctly.

Actions:
1) Check that the printer cable is the correct one. If the standard printer delivered by Flexicon, the Citizen iDP562-RSL, is used, check that the printer cable is cable number 5. If another printer is used, check that the pin configuration of the cable meets the specifications of the RS-232 interface on the MC12 (see section 1 of this manual). Check the printer cable and its connections.
Check that the port number selected by function 47 is actually the one connected to the printer cable.
2) Check that the baud rate and the control word (number of data bits, number of stop bits, and parity) are the same for the MC12 and the printer. For further information, see MC12 reference manual, function 47.
3) If the Citizen iDP562-RSL printer is used, see section 5 of this manual for set-up of the printer.

Problem: **The MC12 balance set-up is not operating.**

Reasons:
1) The MC12 software version does not include the balance set-up.
2) The samples used for recalibration are not within the recalibration interval set on the MC12 (by dynamic recalibration).
3) The MC12/balance interface cable is not connected properly or it is of the wrong type.
4) The RS232 protocol on the MC12 do not match the protocol of the balance.

Actions:
1) Update MC12 to software 2.03 or later.
2) Either enlarge the recalibration interval by function 49 or manually recalibrate the MC12 until samples for balance recalibration are within the specified dynamic recalibration interval.
3) Check the balance interface cable is the correct one (specifically by a Sartorius balance, check that the cable is marked number 9). Check the connections of the cable (For urther information, see section 5 of this manual). Check that the port number chosen by function 49 match the one connected to the interface cable.
4) When a Mettler balance is selected by function 49, the MC12 uses 2400 baud, 7 data bits, 1 stop bit, and even parity. When a Sartorius balance is selected, 1200 baud, 7 data bits, 1 stop bit, and odd parity is used. The protocol on the balance must be set to match this configuration. Furthermore, most Sartorius balances can be set to send 16 characters data words or data words of 22 characters including ID code. The balance must be set-up to 16 characters data words.

Problem: **The balance continuously beeps.**

Reason: The Sartorius balance by default beeps every time data is transferred on the RS232 serial interface.

Actions: Turn off the acoustic signal on the balance. See instructions for the balance for further information.

Problem: **The MC12 is operating unexpectedly.**

Reason: The microprocessor has somehow got erroneous data.

Actions: Run function 80 to reset the microprocessor.

9 Changes

Contents

9.1 Software Versions / Revisions

Software versions since May, 1997

Date	Version	Description
	V1.00	Name and Revision changed from MC10 Rev. 2.08 to MC12 Rev. V1.00 Time constant for fills / min reduced, initializing of bottom-up settings on load of program (F32).
	V1.01	Flow value moved from F11 to F12, accumulated volume moved from F9 to F11, Specific gravity implemented in F9 and removed from calibration. Printout of all drives tube sizes at login in seriel mode.
000415	V1.01FMB	Specially adapted V1.01, which is only used with FMB200 monoblocks and has added functionallty for interface with the OMRON PLC.
001001	V1.02B	Saving of Function 41, 51 and 53 in programs and in warm startup Improvements of: Calib Enter. Scale interface. Parallel mode Ability to handle series B pumps with Speed increased to 600 rpm and acceleration increased to 200.
001001	V1.02FMB	With the addad functionality in V1.01FMB. and improvements of V1.02B.

9.2 HardwareVersions / Revisions

Hardware revisions since May, 1997

Date	Version	Description

9.3 Parts list changes

	Reference	Pos.	From	To	Changed from machine no.
1	36-110-058	5	52-410-140	51-003-112	----------

10 Miscellanious

Contents

Not any subject at the moment