SattCon 05/OP

Installation and Maintenance

Valid for SattCon 05-25
SattCon 05-45
SattCon OP45

SattControl ⑤

SattCon 05/OP

Installation and Maintenance

Valid for SattCon 05-25
SattCon 05-45
SattCon OP45

Foreword

This booklet describes the basic units SattCon 05-25, SattCon 05-45, SattCon OP45 and the peripherals that can be connected to them. SattCon 05-25 and SattCon 05-45 are different only in terms of software and, consequently, the joint designation SattCon 05-25/45 is used.

The expansion units and accessories which have been designed primarily for use with these basic units are described in full in this booklet.

The expansion units and accessories which have been designed for the older versions of the 05 family, but which can also be connected to SattCon 05-25/45 and SattCon OP45 are also described in this booklet but not comprehensively. These units are described in detail in data sheets.

Malmö 1989

SattControl AB

Contents

1 Introduction

This chapter provides a brief description of SattCon 05-25, SattCon 05-45 and SattCon OP45 and their peripheral equipment. SattCon 05-25 and SattCon 05-45 are different only in terms of software and are therefore described with the common designation SattCon 05-25/45.

1.1 SattCon 05-25/45

SattCon 05-25/45 is a compact unit which contains most of the systems required in a complete control system. The power unit and battery-powered memory are an integral part of the system. The battery-powered memory retains all settings and the program is retained even when the system is switched off.

SattCon 05-25/45 can handle digital and analogue signals (analogue via the expansion unit) and can also receive and count fast pulses from pulse encoders.

The system can communication with other computers and control systems which are fitted with the COMLI communication program. SattCon 05-45 can be both master (general system) and slave (subordinate system) in a COMLI network. SattCon 05-25 can only communication as slave.

The following unit can be connected to SattCon 05-25/45:
- Digital expansion units.
- Digital test panels (PTC05).
- Analogue expansion unit, XACV-B which may have test panels (ATC05) and PT100 sensors (IA05/P05).
- Pulse encoder interfaces (IP05).
- Printers.
- VDU terminals.
- Personal computers with a DOX5 documentation program
- Communication boards for extra COMLI channels (DX232 or DX485).

Personal computer with DOX5

VDU terminal

SattCon 05 or other control system with COMLI

Digital test panels

SattCon 05-25/45

Communication board
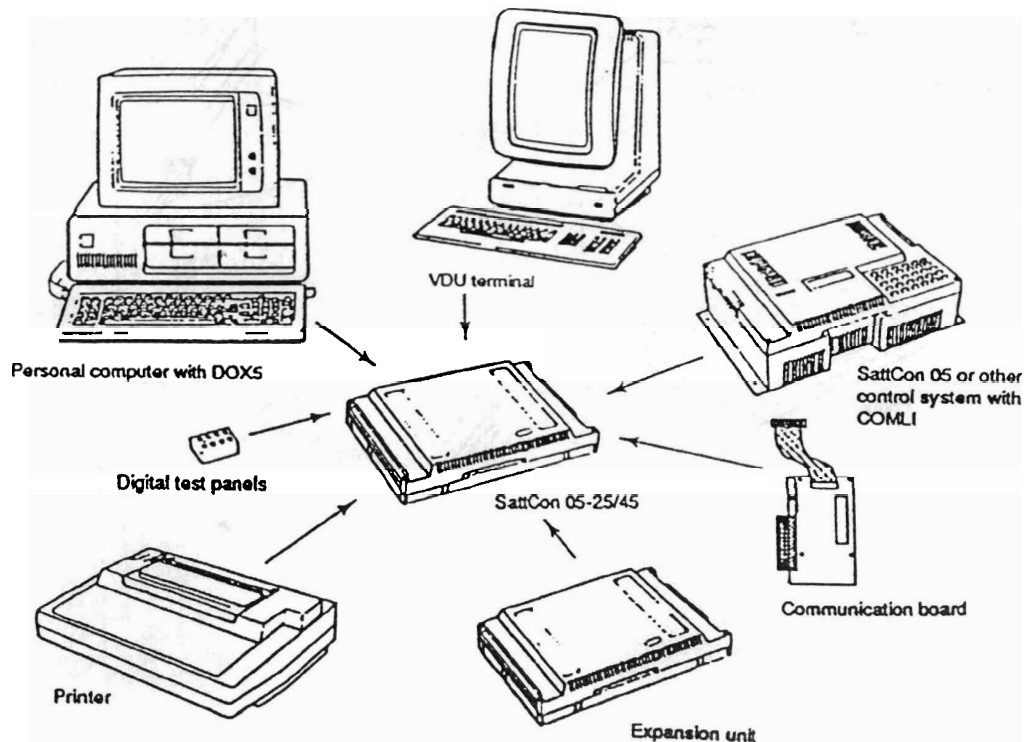
Printer

Expansion unit

1.2 SattCon OP45

SattCon OP45 is a compact unit which contains most of the systems required in a complete operator's control system. The power unit and battery-powered memory are an integral part of the system. The battery-powered memory retains all settings and the program is retained even when the machine is switched off.

SattCon OP45 can handle digital and analogue signals (via the expansion units) and can also receive and count fast pulses from pulse encoders.

The system can communicate with other computers and control systems which are fitted with the COMLI communication program. SattCon OP45 can be both master (general system) and slave (subordinate system) in a COMLI network.

The following unit can be connected to SattCon OP45:
- Digital expansion units which may have digital test panels (PTC05) and pulse encoder interfaces (IP05).
- Analogue expansion unit, XACV-B which may have analogue test panels (ATC05) and PT100 sensors (IA05/P05).
- Printers.
- VDU terminals.
- Personal computers with a DOX5 documentation program.
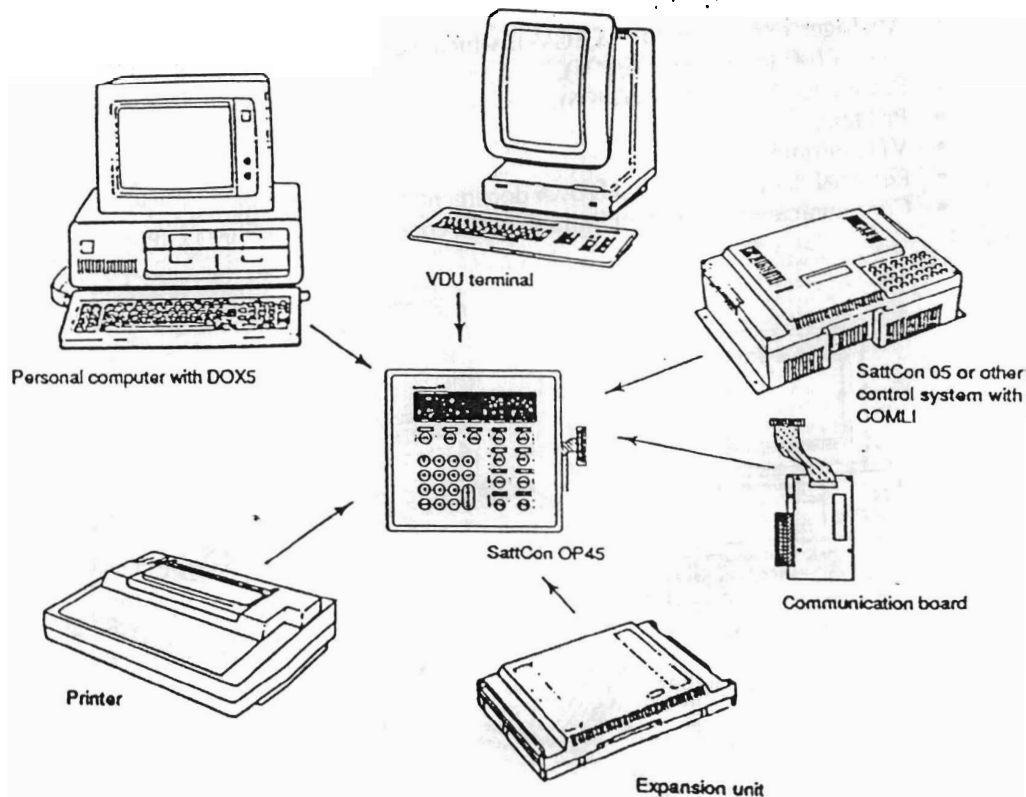- Communication boards for extra COMLI channels (DX232 or DX485).

Personal computer with DOX5

VDU terminal

SattCon OP45

Printer

Expansion unit

SattCon 05 or other control system with COMLI

Communication board

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2 Basic Units

This chapter provides a brief presentation of the parts which comprise the basic units SattCon 05-25/45 and SattCon OP45.

The basic units are supplied with power by connecting 24 VDC to a 3-pole screw terminal on the central unit board.

The screen terminal, printers and other control systems can be connected to the terminal connector which is on the central unit board or to any of the communication boards (DX232 or DX485) which are available as accessories.

More detailed information about the above units is described in the respective section, ie. Sections entitled.Central Unit Board, CU05 and Communication Board, DX232/DX485. The section entitled "Input and Output Board for SattCon 05-25/45" describes how the process signals are connected to the SattCon 05-25/45 basic units.

2.1 Basic Unit SattCon 05-25/45

SattCon 05-25/45 comprises a central unit board, CU05 and an input/output board. A communication board (RS232 or RS485) can be connected to provide access to extra COMLI channels.
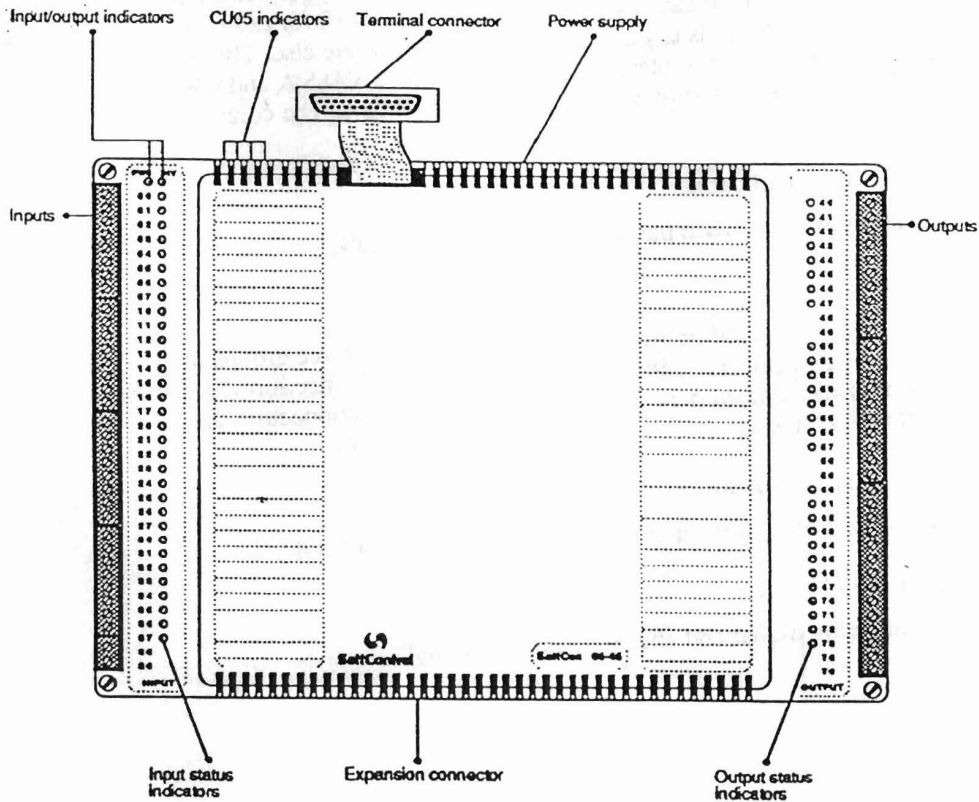
Central Unit Board CU05

Indicators, CU05

PWR	Shows green when the correct voltage is supplied. Flashes if the battery requires changing.
STOP	Shows red when the PBS program has been stopped.
TD and RD	Transmit Data and Receive Data to indicate communication.

Terminal connector

Serial channel for connecting printers, VDU terminals, external programming units and other systems via COMLI.

Power Supply

The unit is supplied with power via a 3-pole jackable screw terminal.

Input/Output Board

Input/Output Board Indicators

PWR	5 V on input/output board
24 V	+24 V on output 038 (output 039=0 V).

Inputs

32 non-opto connected inputs for 24 VDC input signals, divided into four groups of eight. The inputs are addressed octally 100-137. Connection via screw terminals which can easily be unjacked by hand if, for example, SattCon 05-25/45 needs to be reprogrammed somewhere else. The power supply to inputs can take place via output 038 = +24 V/0.5 A and 039=0 V. A test panel, PTC05 and pulse encoder interface IP05 can be connected to the inputs.

Inputs Status Indicators

LED shows yellow when the corresponding input is ON.

Outputs

28 non-opto connected transistor outputs positioned in three groups of 8+8+12. The outputs are addressed octally 140-173. Connection via jackable screw terminal. The outputs can be power supplied by connecting the two lowest outlets in each group to power unit (12-50 V/0 V).

Output Status Indicators

The LED shows yellow when the corresponding output is ON.

Expansion Connector

For connecting digital and analogue expansion units.

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2.2 Technical Data, SattCon 05-25/45

Program Memory	32 kbyte CMOS-RAM with battery backup (service life min. 3 years activated; min. 5 years if non-activated at 25°C). Battery type: CR2032.
Power Supply	24 VDC (19-32 VDC), connection via 3-pole terminal.
Power Consumption	Max. 20 V (24 VDC).
Communication	Serial Channel: RS232C/V24, RS485 and RS422. 25-pole D-SUB-connector (Canon). 300-19200 Baud. COMLI master or slave.
Terminals	
Screens	Via terminal connector (VDU). 24 lines of 80 columns. RS232 interface, 7 character bits and even parity. Commando sequences for ANSI, V52 or TEC (Tele Tec). Handshaking with signals RTS-CTS or XON/XOFF.
Printer	Via terminal connector (VDU). RS232 interface, 7 character bits and even parity. Handshaking with CTS signal.
Accessories	Expansion boards which provides two channels (DX232 or DX485).
Digital Inputs	32, 24 VDC, 10 mA. Continuous input voltage with min. 16 V and max. 32 V. Switchover levels <6 V=logic ZERO and >13 V=logic ONE). Filter constant 10 ms, max. 50 Hz square wave. The filter can be disconnected on inputs 35, 36 and 37. Connection via screw terminals.
Digital Outputs	28 transistor. External power supply 12-50 VDC. The groups can be fed together or separately. Peak voltage max. 75 VDC (average value max. 50 VDC as above). Load current max. 0.8 A per output, max. 3.2 A per group and max. 6 A for the entire unit if you use 3.2 A fast per group and 0.8 A fast per output. Peak current max 2 A for 50 ms. Leakage current max 2 mA, typically <0.5 mA. Voltage drop max. 2.5 VDC, typically <1 VDC. Switching on time max. 4 μs, typically 2 μs. Switching off time max. 50 μs, typically 25 μs.
Pulse Input	Max 2 kHz.
Clock Pulse	24 VDC (levels, see digital inputs)
Power supply for sensors	24 VDC, 0.5 A
Expansion	Max. 180 digital inputs/outputs, max. 36/12 analogue inputs/outputs signals or a combination of these.
Interference Resistance	PL3 as per SS 436 15 03 (IEC 801 — 4/2kV) and PE3 as per SS 436 15 22 (IEC 801 — 2/8 kV).
Form of Protection	IP20

Ambient temperature	Normal operation 0-50°C. Storage -25 – +70°C
Relative humidity	10-85% non-condensing
Weight	Approximately 1.7 kg.

Part Numbers:

SattCon 05-25	492-5295-01
SattCon 05-45	492-5296-01
Battery CR2032	260 105
DX232	492-0017-02
DX485	492-0018-02
SD32D	492-5294-01
BRT15	425 101

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2.3 Basic Unit, SattCon OP45

SattCon OP45 comprises a central unit board CU05, keyboard and display.
An expansion board (RS232 or RS485) can be connected to provide access
to an extra COMLI channel.
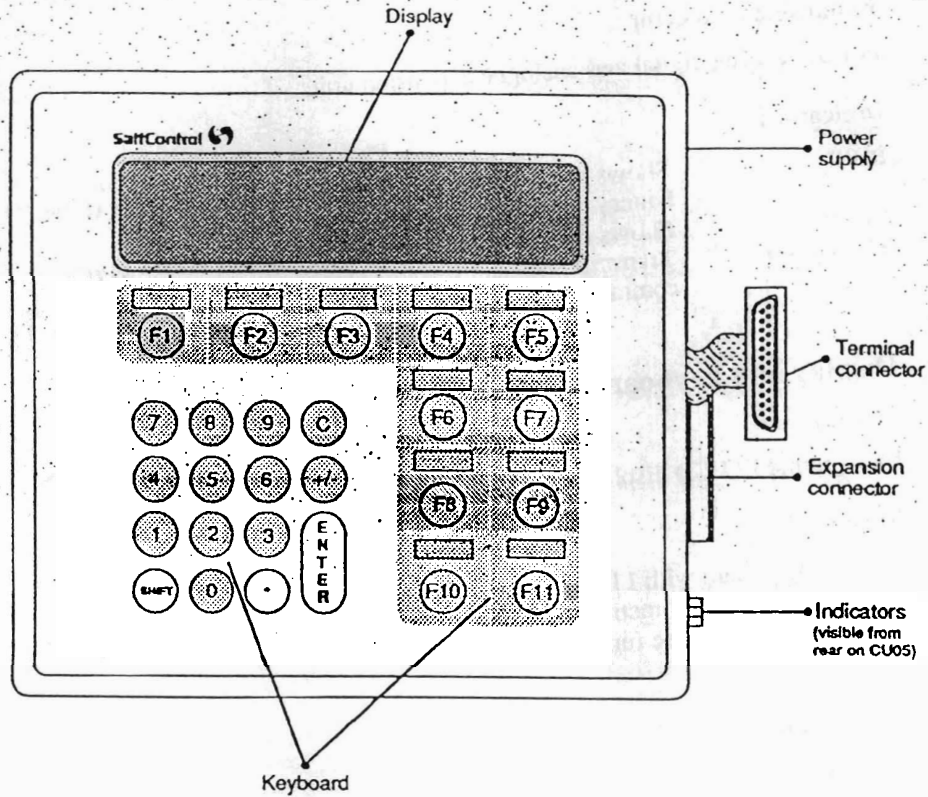
Central Unit Board

Power supply

The unit is supplied with power via a 3-pole jackable screw terminal.

Terminal connector

Serial channel for connecting printer, VDU terminal, external programming unit and other systems via COMLI.

Expansion connector

For connecting digital and analogue expansion units.

Indicators

PWR	Shows green for the correct power supply. Flashes if the battery requires changing.
STOP	Shows red when the PBS programme has been stopped.
TD and RD	Transmit Data and Receive Data for indicating communication.

Display and keyboard

Display

Background lit LCD display. Four lines with 40 columns in each line.

Keyboard

Numeric keyboard with 11 function keys with "shift" providing a total of 22 individually-defined functions. There are pockets for paper strips for your own markings for these function keys (F1-F11).

Accessories

Stainless Frame

A stainless frame, suitable for corrosive environments is available as an accessory. Protection class IP65 is achieved with this frame.

Expansion Cable

A cable which is available as an accessory is required for connecting the expansion unit.

2.4 Technical Data, SattCon OP45

Program Memory	32 kbyte, CMOS-RAM with battery back up (service life min. 3 years activated, min. 5 years if non-activated at 25°C). Battery type: CR2032.
Power Supply	24 VDC (19-32 VDC) connection via a 3-pole terminal.
Power Consumption	Max. 20 W (24 VDC).
Communication	Serial channel: RS232C/V24, RS485 and RS422. D-SUB-connector (Canon). 300-19200 Baud. COMLI master or slave.
Terminals Screen	Via terminal connector (VDU). 24 lines of 80 columns, RS232 interface, 7 character bits and even parity. Command sequences for ANSI, VT25 or TEC (Tele Tec). Handshaking for RTS-CTS or XON/XOFF.
Printer	Via terminal connector (VDU). RS232 interface, 7 character bits and even parity. Handshaking with CTS signal.
Accessories	Expansion board which provides a total of two channels (DX232 or DX485).
Pulse Input	Max. 2 kHz (via expansion unit SD32D).
Clock Pulse	24 VDC (via expansion unit SD32D).
Power Supply for Sensors	24 VDC, 0.5 A (via expansion unit SD32D).
Expansion	Max. 180 digital inputs/outputs, max. 36/12 analogues input/outputs or a combination of these.
Interference Class	PL33 as per Ss 436 15 03 (IEC 801 – 4/2 kV) and PE33 as per SS 436 15 22 (IEC 801 – 2/8 kV).
Form of Protection	IP20 (standard)
Ambient Temperature	Normal operation 0 – 50°C. Storage -25 – +70°C.
Relative humidity	10-85% non-condensing.
Weight	Approximately 1 kg.

Part Number:

SattCon OP45	492-5303-01
Battery CR2032	260 105
DX232	492-0017-02
DX485	492-0018-02
BRT15	425 101
Stainless frame	492-5445-01
Expansion cable	492-5466-01

3 Central Board, CU05

The central board, CU05 which controls and supervises the unit, contains the following in addition to the system program and user memory:

- two serial channels
- screw terminal for power supply
- battery for backup
- connector for communication board
- connector for background lighting and display, SattCon OP45.

If the pulse input is used, a strap must be applied to CU05. Settings for the choice of VDU or COMLI channel and contrast on the display can be made on the central unit board. A real time clock can be mounted on the central unit board as an accessory.
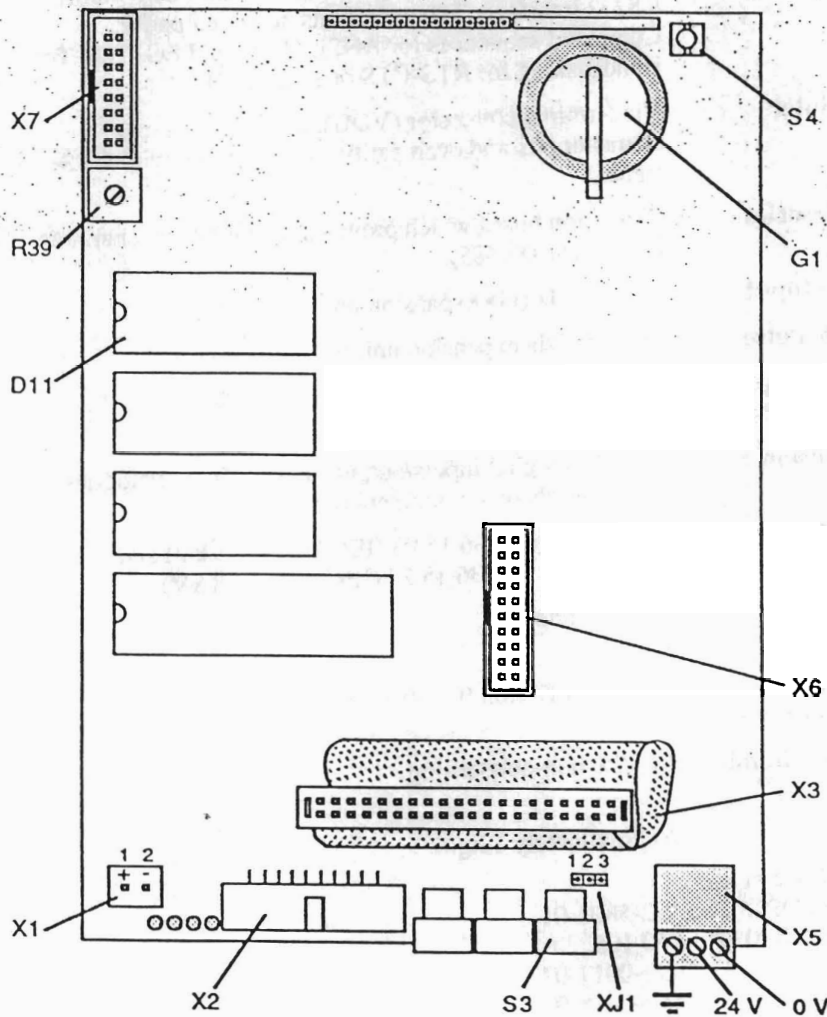
3.1 Connecting the Central Board

SattCon 05-25/45

The central board is connected to the basic unit by connecting the X3 cable on CU05 to the X1 connector on the input/output board (refer to the section entitled Input and Output Board for SattCon 05-25/45). The central board is then screwed in position on the spaces above the input/output board.

The central board for SattCon OP45 is connected by screwing the board to the operator's section (display and keyboard).

3.2 Jumping for Pulse Input and Settings

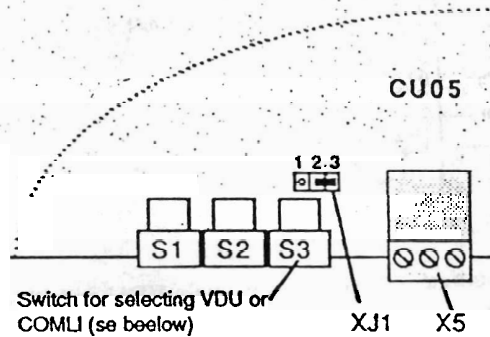XJ1 - if the pulse input and/or run input is to be used, pins 2 and 3 must be jumped.

S3 - switch for selecting VDU or COMLI channel. The following settings can be made on the switch.

0	VDU and printer channel, 512 registers and 255 text (basic settings).
1	COMLI and printer channel, 512 registers and 255 texts.
2	VDU and printer channel, 3320 registers and 100 texts.
3	COMLI and printer channel, 3320 registers and 100 texts.

Switching between VDU and COMLI can take place without switching off the power. The power must be switched off however, if the register area is to be increased from 512 to 3320 registers.

S4 - a button which is used when operating the system has caused it to hang up, eg. when a backward jump is used improperly so that the program has locked itself in an infinite loop. If the system hangs up, switch the power off first. Then press the button and keep it pressed in for approximately 15 seconds while the power is connected.

R39 - trim potentiometer for setting the contrast on the display for SattCon OP45.
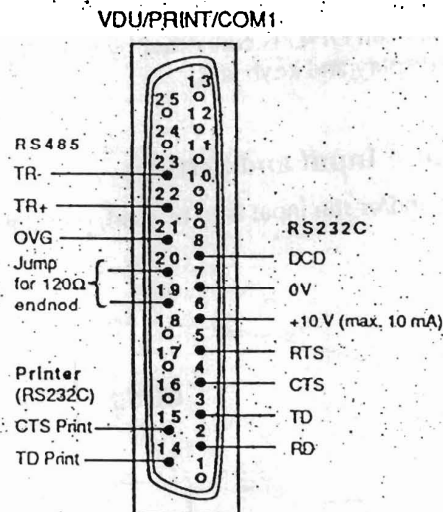
3.3 Serial Channels

X2 - contact where the cable for VDU or COMLI and printer can be connected.

CU05 has two serial channels:

VDU/COM1   Used for programming and printouts (VDU terminals/personal computers) or for COMLI.

PRINT   Used for printing out on the printer or display on screen.

VDU/PRINT/COM1

```
                    RS232C
RS485
TR-          23  10
TR+          22   9
OVG          21   8   RS232C
Jump         20   7   DCD
for 120Ω     19   6   0V
endnod       18   5   +10 V (max. 10 mA)
             17   4   RTS
Printer      16   3   CTS
(RS232C)     15   2   TD
CTS Print    14   1   RD
TD Print
```

The terminals which are connected to serial channels VDU and PRINT must have the following settings:

- 7 data bits
- 1 stop bit
- Even parity
- The same transmission speed as SattCon 05-25/45/OP45 (300-19200 Baud). "Programmer's manual" shows how to set the transmission speed.

The COMLI channel always has the following setting:

- 8 data bits
- 1 stop bit

The parity and the COMLI channel's transmission speed (300-19200 Baud) must be set by you. This is described in SattCon 05-25/45/OP45, Programmer's manual.

Three different communication interfaces can be used, RS232C, RS485 or RS422.

RS232C

RS232C is used for the VDU terminal, personal computers with DOX5 or printers and for communication via COMLI in point-to-point configuration. RS232C is a communication interface which operate at ±12 VDC. The maximum transmission distance depends on the transmission rate, but is at least 40 meters at 9600 Baud.

Handshaking with the screen can take place either via RTS-CTS or with XON/XOFF. Handshaking with a printer can be carried out with the CTS signal.

RS485 and RS422.

RS485 or RS422 are used for COMLI communication in multi-point configuration. Up to 32 subordinate systems can be connected to SattCon 05-25/45/OP45.

Both the communication interfaces are designed for power-supplied transmission which is differential and operates at TTL level (0 and +5 VDC).

The serial channel must be supplied by a separate galvanically-separated 5 VDC. Both transmission and receiving takes place on the same wire pair (half duplex). RS485 can drive up to 32 receivers and the maximum transmission distance 1200 meters.

The formal communication interface is RS485, but RS422 can also be connected.

Note that the signal ground (GNDE) must always be connected together so that the same reference level is obtained.

GNDE must be referenced to ground, either directly (earth currents can appears) can or through a bipolar capacitor of 0.01 µF ±20% in parallel with a resistor of 20 MΩ ±10% and a voltage rating above the potential difference between GNDE and ground. This is to meet the specified interference standard.

Terminal resistors (120 Ω, 0.5 W) should be jumped. This is done in systems which sit at either end of the communication cable. In SattCon 05-25/45 and SattCon OP45, this jumping is carried out between ends 19 and 20 in the connection terminal.
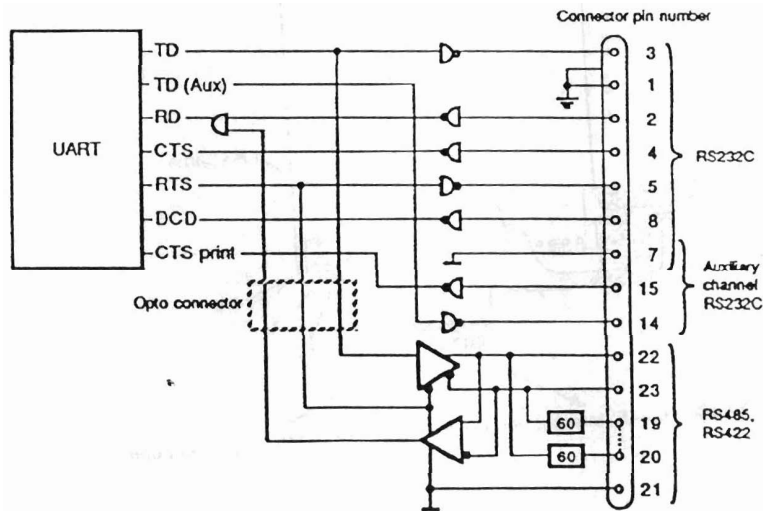
Connection of RS485 and RS422 with transmission/receiving on different wires.

13
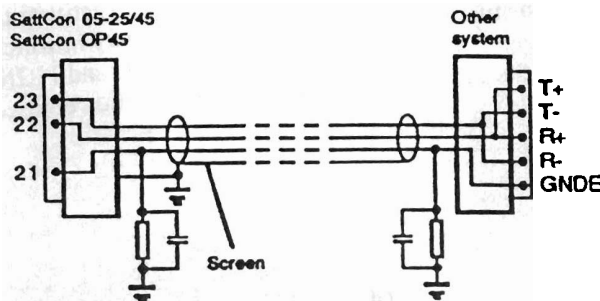
3.4 Power Supply

X5 - terminal for connecting power supply (+24 VDC).

When SattCon 05-25/45/OP45 is supplied with the correct voltage, the PWR LED operates with a fixed green light. If PWR does not light up, either an incorrect connection has been made or the automatic fuse F1 (1.1 AT) has tripped (F1 on CU05). If PWR flashes, the battery voltage is too low and the battery must be changed.

3.5 Battery Backup

G1 - CR2032 battery (3.6 V lithium battery) for battery backup.

The service life is at least three years when activated and at least five years if non-activated (at 25°C). The battery can be changed while the equipment is in use. If the power is switched off when the battery is being changed, a new battery must be inserted within 15 seconds. If this time is exceeded, the contents of the battery-powered memories will disappear. When the battery supply is too low, PWR flashes and the "battery low" memory cell is set.

The battery is replaced by removing the battery cover on the central board (protrudes from the expansion board).

SattCon 05-45: Integral I/O unit   SattCon OP45: Expansion unit
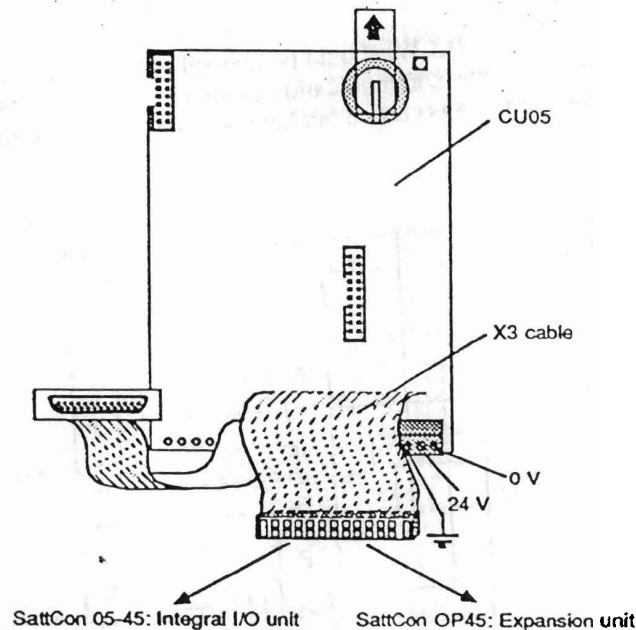
When you start SattCon 05-25/45/OP45 for the first time and activate the battery, it is set for a transmission speed of 300 Baud. The way in which you set the correct terminal type and transmission speed for VDU and PRINT channels is described in the Programmer's manual in the section entitled Installing terminals.

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3.6 Connector for Communication Board

X6 - connector for connecting the communication board.

The communication board (DX232 or DX485) which provides access to extra COMLI channels can be connected as an accessory. This board is described in detail in the section entitled Communication Boards, DX232/DX485.

3.7 Connectors for Background Lighting and Display

X1 - connector for connecting background lighting for the display on SattCon OP45.

X7 - connector for connecting the display for SauCon OP45.

SattCon OP45 has a background lit 4 lines LCD display with 40 columns per line.

The background lighting in the display is a standard fixed light but can also be set with the aid of an external supply.

External Supply for Fixed Background Lighting
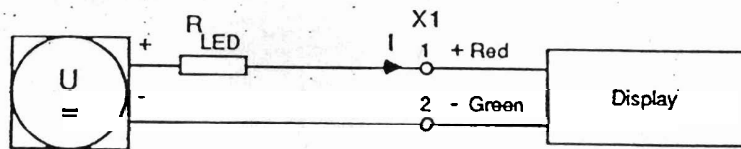
$$R_{LED} = \frac{U_{max} - 4V}{I_{max}}$$

$$U_{min} = 5V$$

$$P_{R_{LED}} = I_{max}^2 * R_{LED}$$

Power sensitivity for selected resistor:

$$P_{mot} > 1,5 * P_{R_{LED}}$$

$$I_{max} \leq 900 \text{ mA}$$

Amblent temperature
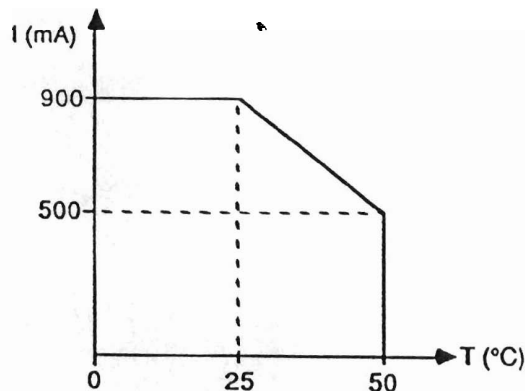
External supply with variable background lighting
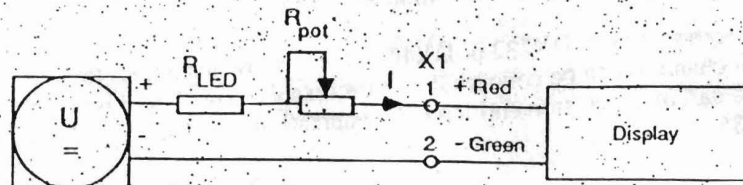
$$R_{LED} = \frac{U_{max} - 4\,V}{I_{max}}$$

(The resistor is necessary to prevent the potentiometer and the display from being damaged)

$$R_{pot} = \frac{U_{max} - 4\,V}{I_{min}} - R_{LED}$$

$$P_{R_{LED}} = I_{max}^2 * R_{LED}$$

Power sensitivity for selected resistor:

$$P_{mot} > 1.5 * P_{R_{LED}}$$

$$P_{R_{pot}} = I_{max}^2 * R_{pot}$$

Current sensitivity $R_{pot} = I_{max}$

$$I_{max} \leq 900\,mA$$

(see I_{max} for fixed background lighting)

$$I_{min} \geq 100\,mA$$

$$U_{min} = 6\,V$$

3.8 Accessories

BRT15 - Real time clock, for correct date, time and weekday after a power failure.

BRT15 is available as an accessory and is located under the EPROM enclosure D11 for providing this function.

4 Input and Output Board for SattCon 05-25/45

The input/output board has 32 octal addressed inputs and 28 transistor outputs. The connection is via removable screw terminals.

The inputs are divided into four groups of eight (00-07, 10-17, 20-27 and 30-37) with a common 0 V. The outputs are divided into two groups of eight (40-47, 50-47) and a group of 12 (60-67 and 70-73). Status of the inputs and outputs is indicated by LEDs which show yellow when the input/output is set.

4.1 Connection of Input/Output Board

The input/output board is connected to the central unit board CU05 by the X3 cable on CU05 being connected to the 50-pole X1 connector on the input/output board. The lower X2 connector on the input and output board is used for connecting any expansion units.
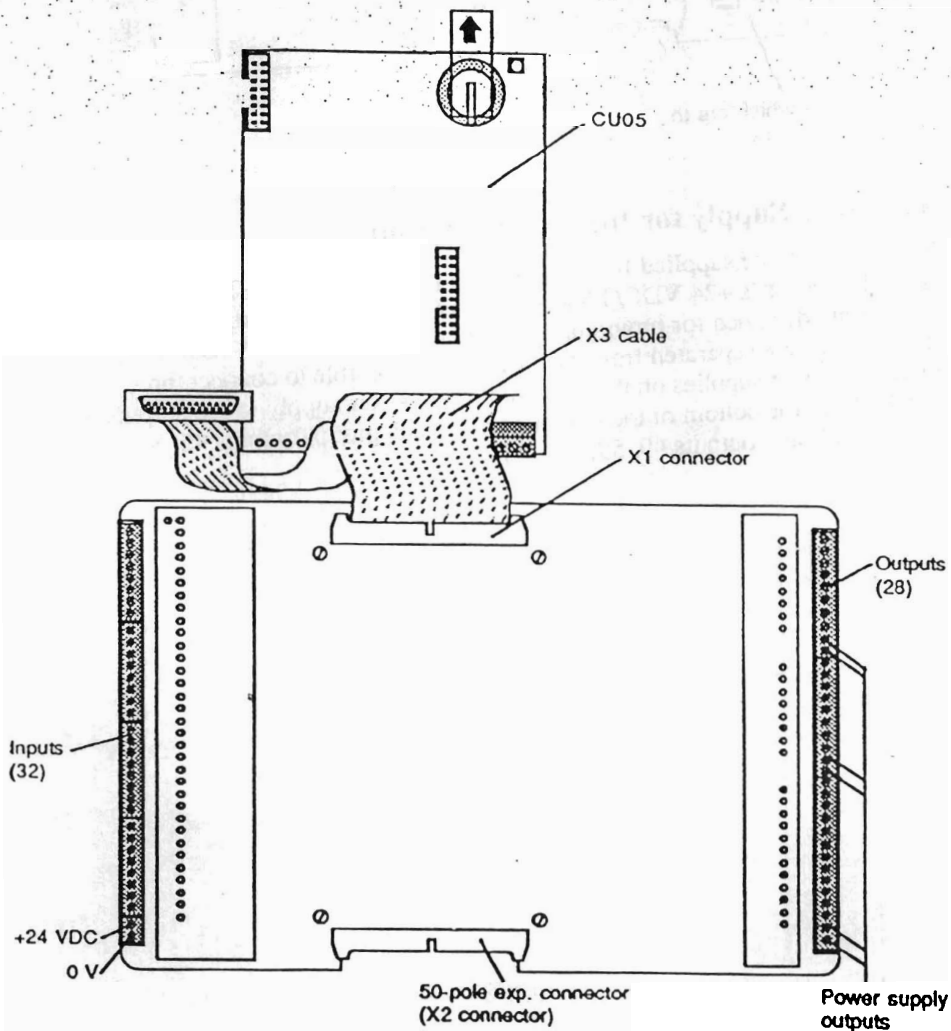
4.2 Jumpers

If inputs 37-39 are to be used as pulse inputs, the jumpers for XJ1, XJ2 and XJ3 must be cut away on the input board.

Jumps which are to
be cut away
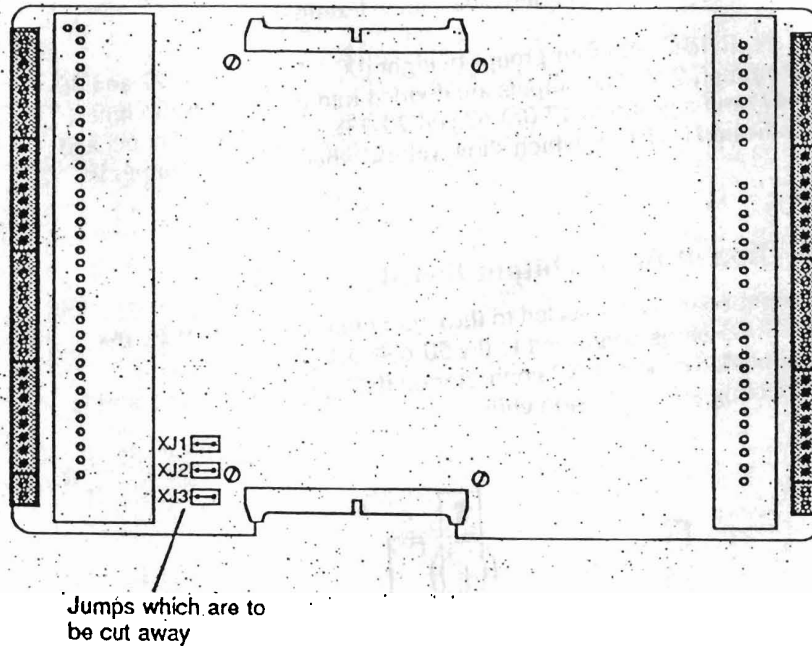
4.3 Power Supply for Inputs and Outputs

The inputs can be supplied from an external power unit with +24 VDC or from the system's +24 VDC/0.5 A at output 038 and 0 V at output 039. The outputs are designed for providing power between 12-15 V/0 V. Since the three groups are separated from each other, it is possible to connect three different power supplies on the same unit. The power supply to the outputs is available on the bottom of the two outputs in each group (outputs 48, 58, 78=12-50 V and outputs 49, 59, 79=0 V).

5 Communication Boards DX232/DX485

To provide access to an extra COMLI channel, a Communication Board which is available as an accessory can be connected. This communication board also has the COMLI channel (COM1) which was previously obtained from the central unit's X2-connector. Thus there is access to two COMLI channels on the communication board (COM1 and COM2). A VDU terminal and printer are usually connected to the central unit's connector (X1).

CAUTION: It is not possible to use the VDU channel for COMLI if communication boards is connected to the system.

The COMLI channels always have the following settings:

* 8 data bits
* 1 stop bit

The parity and the COMLI channels' transmission speed (300-19200 Baud) can be set. This is described in Programmer's manual.

Two different communication boards with RS232C or RS485 interfaces can be used (DX232 or DX485).

5.1 Connecting a Communication Board

The communication board is connected to CU05 and is installed in the system according to the following description.

SattCon 05-25/45

- Unscrew the cover.
- Unscrew the central unit board from its spacers.
- Connect the cable on the communication board to the connector (X6) on the central unit board and screw CU05 on its spacers.
- For communication board DX485: Check that XJ1 is jumped between pins 1 and 2.
- Before the board is screwed tight on its spacers, connect the communication cable to one of the board's connectors according to the above instructions.
- If flat cable is used, it is folded so that it comes out between the spacers on the top side of the communication board.
- Screw the board on its spacers and re-fit the cover.

Communication board

X6

Connection of communication cable

Spacer for CU05   Spacer for communication board

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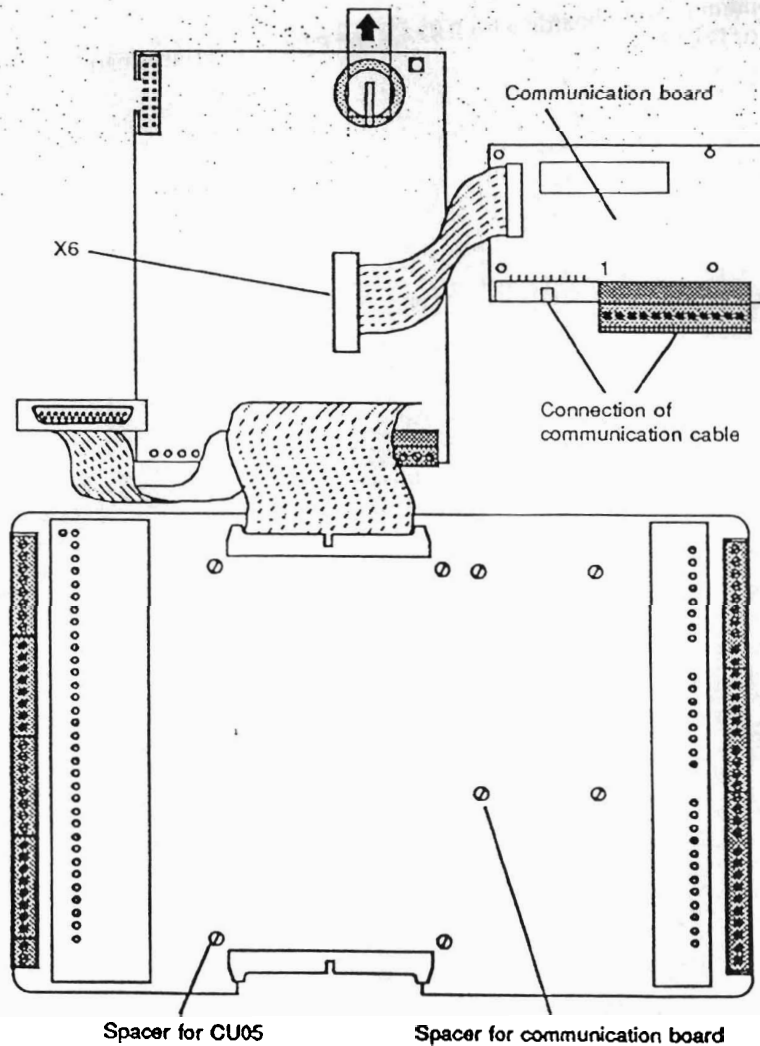
The cable between the communication board and the central unit and the communication board to the 34-pole connector is folded under the board as illustrated below:

Communication cable
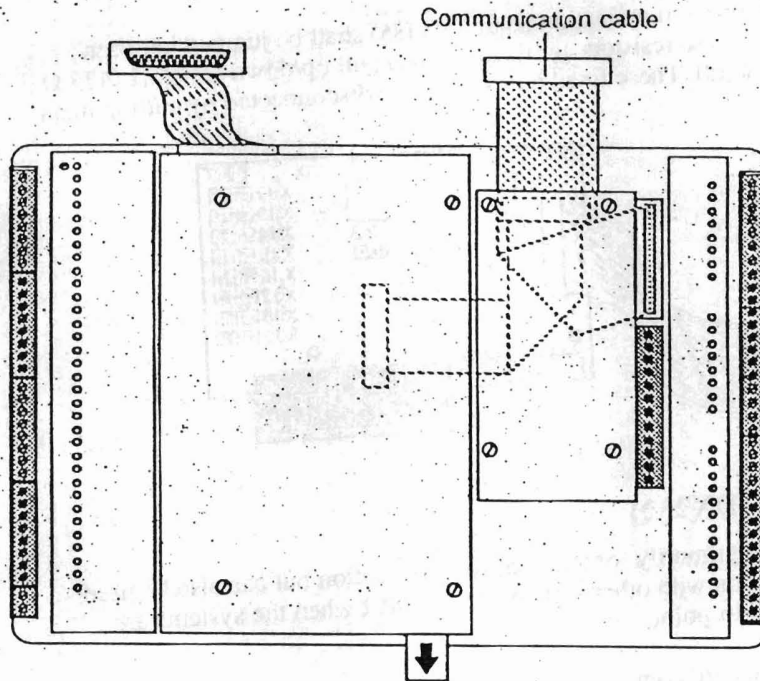
SattCon OP45

- Unscrew the protective cover on the rear side of SattCon OP45.
- Connect the cable of the communication board to the connector (X6) on the central unit board.
- Screw the communication board tight in the spacers.
- Connect the communication cable to one of the board's connectors as shown in the above description.
- Re-fit the protective cover.

X6
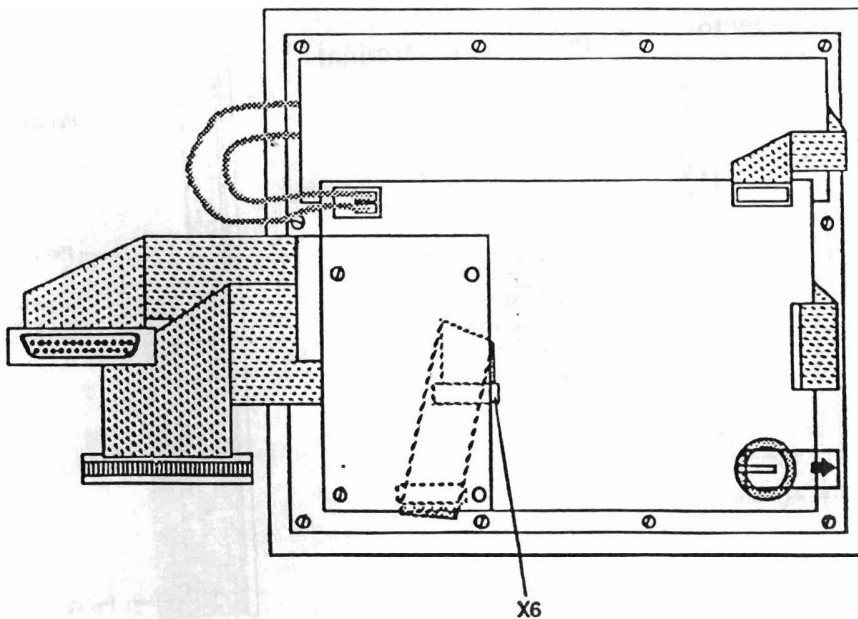
5.2 Straps and jumpers

The communication board for RS485 (DX485) shall be strapped for DTE in the case of SattCon 05-25/45 and SattCon OP45. In other words, XJ1 on the board shall be strapped between pins 1 and 2.

XJ2-XJ9 on the communication board (RS485) shall be jumped between pins 1 and 2. These resistors are fixed jumped pull up/down resistors (475 Ω terminal resistors). These fixed jumpers can be disconnected by cutting them away.
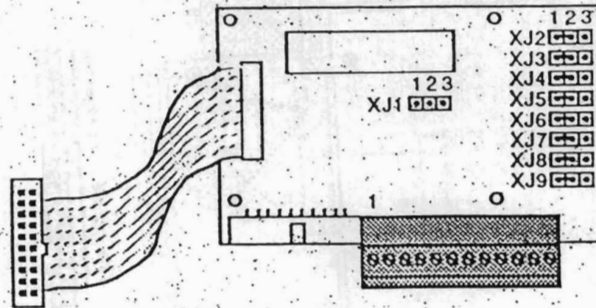
5.3 RS232C (DX232)

RS232C is used primarily for terminal communication but can also be used for communication with other systems via COMLI when the systems are connected point-to-point.

RS232C is a standard communication interface designed for -12 V and +12 V signal levels. The maximum transmission distance depends on the transmission speed but at 9600 Baud is at least 40 meters.

Handshaking with the terminal is either via the signals RTS-CTS or with XON-XOFF.

If RS232C is used, terminals or other control systems can be connected to the 12-pole screw terminal (designed primarily for RS232C and telephone modem) or the 34-pole connector on the communication board. The 34-pole flat cable can also be split for connecting two RS232C interfaces. The connections are as follows:

34-pole connector

1			2
3	TD1		4
5	RD1		6
7	RTS1		8
9	CTS1		10
11			12
13	0 V		14
15	DCD1		16
17			18
19	TD2		20
21	RD2		22
23	RTS2		24
25	CTS2		26
27			28
29	0 V		30
31	DCD2		32
33	N.C	N.C	34

Position of the signals

12-pole screw terminal

1	TD1
2	RD1
3	RTS1
4	CTS1
5	DCD1
6	0 V
7	TD2
8	RD2
9	RTS2
10	CTS2
11	DCD2
12	GND

Pin 34
Pin 1
12-pole
Pin 1
Pin 12

22
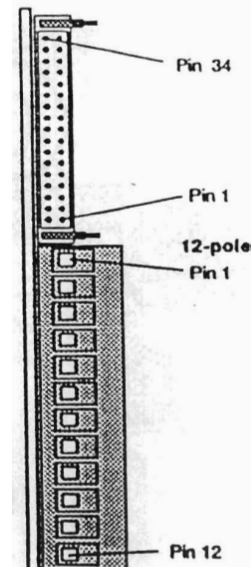
5.4 RS485 (DX485)

RS485 is used primarily for COMLI communication with several systems (multi point) but can also be used for terminal communication when the transmission distances are long or if there is a risk of interference.

RS485 is a standardized communication interface designed for 0 V and 5 V signal levels. In DX485, the serial channels COM1 and COM2 are supplied with 5 VDC. Transmission and receiving can take place on the same wire pair (half duplex).

If an RS485 interface is used, SattCon 05-25/45 or SattCon OP45 can be connected to other systems. The connection must be via connection unit SICT or similar (connections can also take place to SICB). Connection via SICT is via separate galvanic separation on each channel. In addition, SICT can handle both RS232 and RS485.

More information about the connection units is found in the data sheet for SICT (MOD485G/SICT and MOD232G/SICT). These data sheets also show which connector terminals are to be used when terminals and other systems are connected via RS485.

The connection units are connected to the communication board (DX485) with a 34-pole flat cable (full interface). The 12-pole screw terminal can also be used (TD/RD). Connection to the 34-pole connector or the 12-pole screw terminal on the communication board is carried out as follows:

34-pole connector

1	0V	0V	2	
3	+TD1	-TD1	4	Out
5	+RTS1	-RTS1	6	
7	+RD1	-RD1	8	In
9	+CTS1	-CTS1	10	
11	+DCD1	-DCD1	12	
13			14	
15			16	
17	0V	0V	18	
19	+TD2	-TD2	20	Out
21	+RTS2	-RTS2	22	
23	+RD2	-RD2	24	In
25	+CTS2	-CTS2	26	
27	+DCD2	-DCD2	28	
29			30	
31			32	
33	N.C	N.C	34	

Position of the signals

12-pole screw terminal

1	+TD1	Out
2	-TD1	
3	+RD1	In
4	-RD1	
5		
6	0 V	
7	+TD2	Out
8	-TD2	
9	+RD2	In
10	-RD2	
11		
12	GND	

Pin 34
Pin 1
12-pole
Pin 1
Pin 12
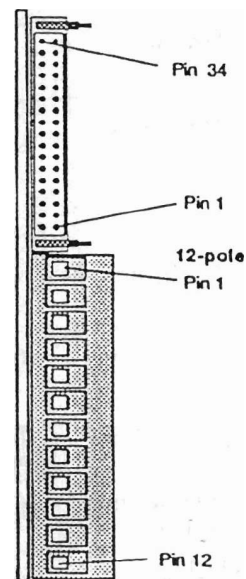
5.5. Technical Data

DX232

Maximum transmission speed	19200 Baud
Cable	Screened multi-conductor
Maximum length	40 m (9600 Baud)
Power con-sumption	0.75 W
Interference Class	PL2 as per SS 436 15 03 (IEC 801 — 4/1 kV) at 40 m cable length and 9600 Baud.
Ambient tem-perature	0-50°C
Relative humidity	10-90% non-condensing
Power Supply	5 VDC from CU05
Dimensions	B125 x H65 x D18
Part Number	492-0017-02

DX584

Maximum transmission speed	19200 Baud
Cable	Screened, rolled flat cable
Maximum length	1 m
Power Con-sumption	0.75 W
Interference Class	Together with a galvanically separated modem: PL3 as per SS 436 15 03 (IEC 801 — 4/2 kV).
Ambient tem-perature	0-50°C
Relative humidity	10-90% non-condensing
Power supply	5 VDC from CU05.
Dimensions	B125 x H65 x D18
Part Number	492-0018-02

6 Digital Expansion Units

The maximum of three digital expansion units can be connected to
SattCon 05-25/45 and SattCon OP45.

The digital expansion units which can be connected to the systems are:
- SD32D
- XD24R(S)
- XD23R(S)-B
- XD23D

The following text describes the SD32D unit. Other digital expansion units
are described in their respective data sheets.

6.1 Inputs/Outputs, SD32D

SD32D has 32 inputs and 28 transistor outputs. Connection is via removable
screw terminals. The inputs are divided into four groups of eight (00-07, 10-
17, 20-27 and 30-37) with common 0 V. The outputs are divided into groups
of eight (40-47 and 50-57) and a group of 12 (60-67 and 70-73). The status
of the inputs/outputs is indicated by LEDs which show yellow when an
input/output is set.

I/O addresses for the expansion unit are determined by the numerical
sequence they have (in the chain of expansion units). I/O addresses which do
not correspond to inputs/outputs can be used as working memory. If, for
example, two expansion units are connected, all the I/O addresses 300-477
can be used as the working memory.

| Expansion Unit's | I/O-addresses | | |
Sequence Number	Inputs	Outputs	
1	100-137	140-173	*
2	200-237	240-273	
3	300-337	340-373	
4	400-437	440-473	**

* If SattCon 05-25/45 is used, these addresses are in the basic
unit.

** Applies only to SattCon 05-25/45 (max. 128/112 inputs/outputs can
be obtained for SattCon 05-25/45 and max. 96/84 inputs/outputs for
SattCon OP45).

6.2 Connecting SD32D to the Basic Unit

The expansion unit is connected via the upper 50-pole connector on the
expansion unit to the expansion connector on SattCon 05-25/45 or
SattCon OP45. The lower connector on the expansion unit is used to connect
the next expansion unit that may be used. Each expansion unit is supplied
with a flat cable for this connection. A cable which is available as an
accessory is necessary for connecting the expansion unit to SattCon OP45.

Expansion units are fitted with the recommended spacing between them of 20 mm.
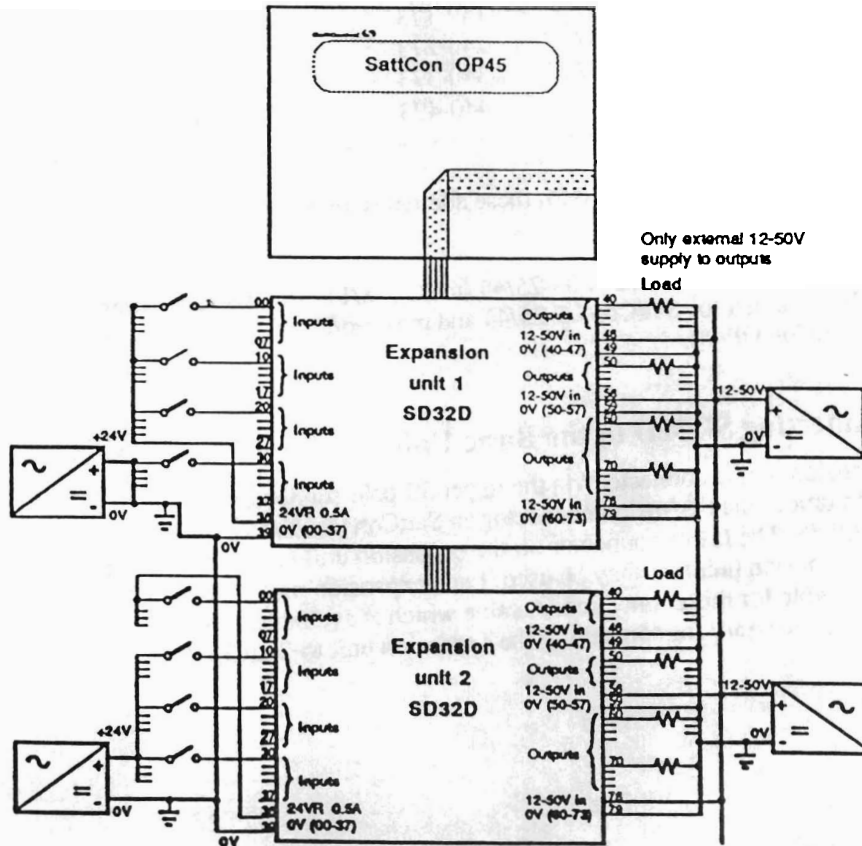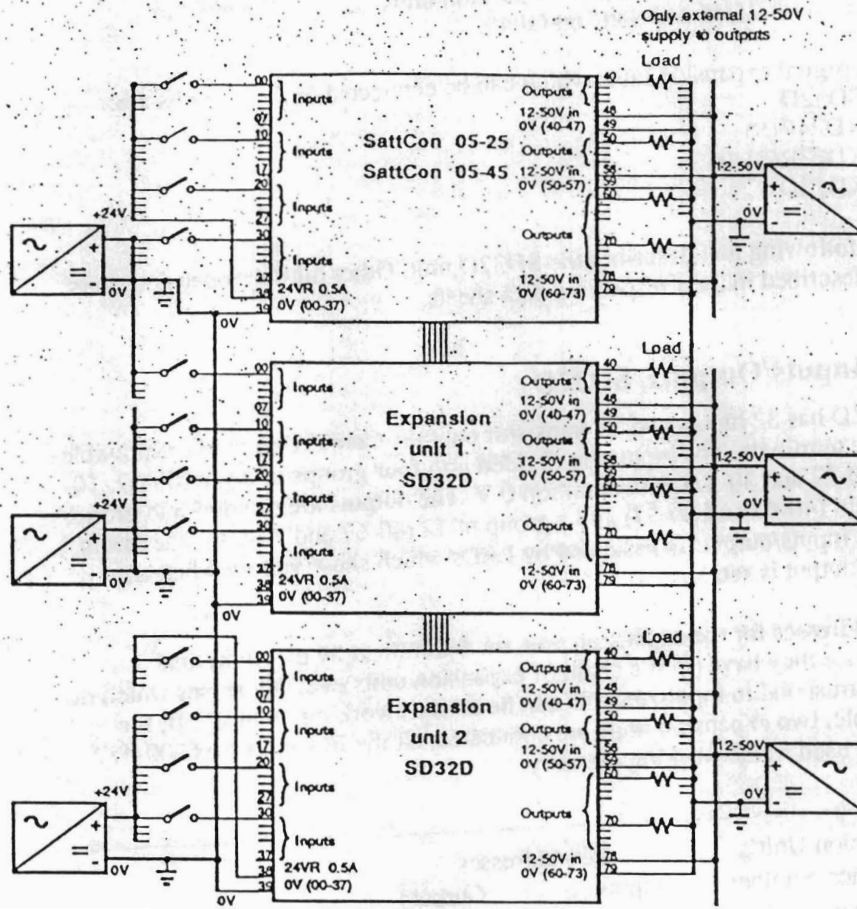
6.3 Power Supply to SD32D

The expansion unit is supplied with power from SattCon 05-25/45 via the flat cable between the units.

Power supply to inputs/outputs

The expansion units can be supplied from an external power unit or from the system's (SattCon 05-25/45 or SattCon OP45) supply +24 VDC/0.5 A at outlet 38 and 0 V at outlet 39. The total current consumed are 2.0 A for SattCon 05-25/45 and 1.5 A for SattCon OP45.

Note that 24 VR must not be used when expansion unit XD24RS is connected.

The expansion unit's outputs is designed for supplying power between 12-50 V. Since the three groups are separated from each other, it is possible to use three different supply voltages in the same unit. Several outputs can be connected to the same load if they are supplied from the same power unit. Otherwise they must have a protective diode in series with the output.

To comply with the interference standards referred to, 0 V from inputs, outputs and supply must be referred to ground. This takes place either directly or via a bipolar capacity of 1 µF parallel with a resistor of 10 kΩ.

Input channel

32 pcs.

Output channel

28 pcs.
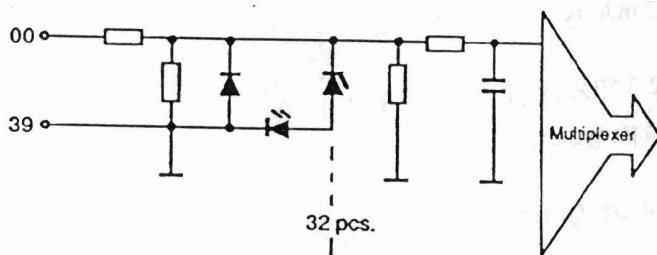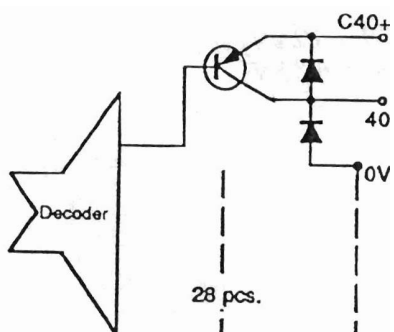
6.4 Technical Data, SD32D

Inputs	32, 24 VDC, 10 mA
No. of groups	4
Continuous input voltage	Min 16 V, max. 32 V
Switching levels	<6 V=logic ZERO >13 V=logic ONE
Filter constant	10 ms, max. 50 Hz square wave. The filter can be disconnected at inputs 35, 36 and 37.
Connection	Removable screw terminal
Outputs	28
No. of groups	3
Power supply (external)	12-50 VDC The groups can be supplied together or separately.
Peak voltage	Max. 75 VDC (average value max. 50 VDC as above).
Load current	Max. 0.8 A per output, max. 3.2 A per group and max. 6 A per expansion unit.
Fuses	3.2 A fast per group and 0.8 A per output.
Current spikes	Max. 2 A for 50 ms.
Leakage current	Max 2 mA, typically <0.5 mA.
Voltage drop	Max 2.5 VDC, typically <1 VDC.
Switching on time	Max. 4 µs typically 2 µs.
Switching off time	Max. 50 µs, typically 25 µs.
Power Supply	Internally from SattCon 05-25/45 or SattCon OP45.
Potential Difference 0 V	None
Interference Class	PL3 as per SS 436 15 03 (IEC 801 – 4/2 kV) and PL3 as per SS 436 15 22 (IEC 801 – 4/8 kV).
Form of protection	IP20.

Ambient temperature
  Normal operation
  Storage
	
	0 – 50°C.
	-25 – +70°C.

Relative humidity	10-90% non-condensing
Dimensions	B300 x H200 x D40 mm
Weight	Approximately 1.7 kg.

Part Numbers
  SD32D
  Exp. cable
	
	492-5294-01
	492-5466-01 (SattCon OP45)

7 Digital Test Panel, PTC05

The Digital Test Panel, PTC05, is used to simulate status changes for eight inputs. PTC05 can be connected to the outputs on SattCon 05-25/45 (or to the digital expansion unit).

7.1 Connection

If PCT05 is connected to the ten bottom inputs (30-39) on SattCon 05-25/45, a power supply is obtained automatically via input 38 (+24 VDC) and 39 (0 V). The test panel can also be connected to ten of the other inputs in the system but then the two lower inputs for the 10-group which the test panel is connected to will be forced to ONE and ZERO respectively. If a PTC05 is connected to inputs 16-27, this will mean that input 26 will remain set and input 27 will remain reset (the power supply must be connected to the input 38 (+24 VDC) and 39 (0 V).

PTC05 is connected to SattCon 05-25/45 as follows:
- Unjack screw terminal for the inputs with a screwdriver.
- Jack in PTC05.

More information about PTC05 is given in the data sheet.
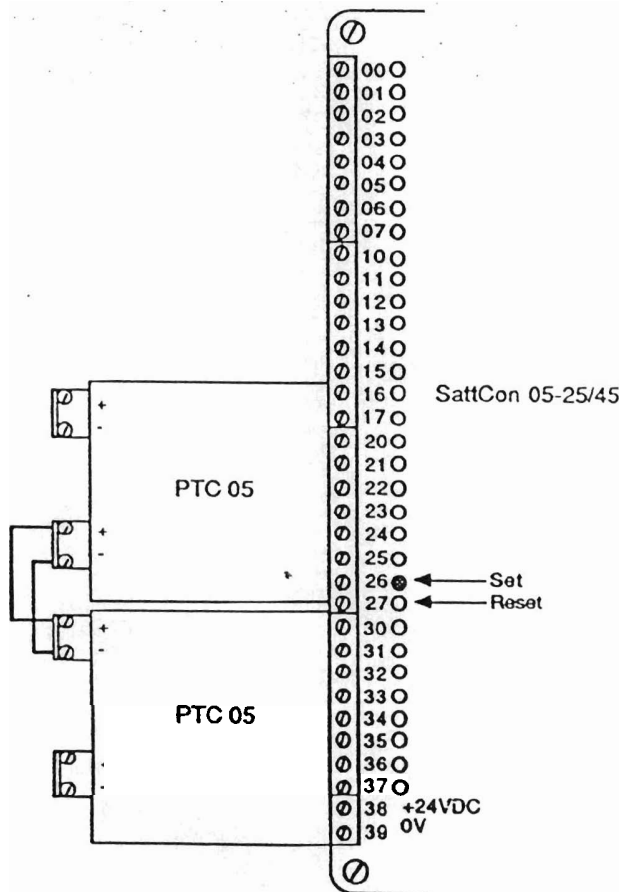
7.2 Technical Data

Outputs	8 jackable screw terminal
Power Supply	+24 VDC
Form of Protection	IP20
Dimensions	B80 x H50 x D30 mm
Weight	70 g.
Part Number	978-015-001

8 Analogue Expansion Unit, XACV-B

A maximum of three analogue expansion units type XACV-B can be connected to SattCon 05-25/45 and SattCon OP45.

The address for XACV-B are determined by which sequence number in the chain of expansion units it has.

Expansion Units Sequence No.	Addresses for XACV-B
	Inputs
1	AI100, AI104,..., AI154
2	AI200, AI204,..., AI254
3	AI300, AI304,..., AI354
	Outputs
1	AO100, AO120, AO140 AO160
2	AO200, AO220, AO240 AO260
3	AO300, AO320, AO340 AO360

Outputs 30-36 and 60-66 can be used as a connection point.

8.1 Connection

The enclosed flat cable is connected between the expansion unit's upper connector and SattCon 05-25/45 or SattCon OP45. The lower connector on the expansion unit is used for connecting the next possible expansion units in the chain. The expansion units are mounted with a recommended spacing of 20 mm between each other. Note that analogue and digital expansion units can be positioned optionally. An analogue expansion unit cannot supply power to a digital expansion unit but does not otherwise affect the power supply of digital units. For example, a digital unit with power can be positioned as expansion unit 1, followed by an analogue unit which has number 2 and a digital unit without power has number 3.

8.2 Power Supply

The expansion unit has an integral power unit which is supplied with 220 VAC (mains fuse 0.8 A) via a standard 3-pin apparatus socket. The power unit can also supply an un-regulated power supply of +24 VDC for external measurement converters.

More information about the XACV-B analogue expansion unit is found in the data sheet.

8.3 Technical Data

Inputs	12 Common signal ground (single ended).0-10 V (>1 MΩ, max. 15 V continuous) or 0-20 mA/4-20 mA (50 Ω, max. 50 mA, continuous). Filter constant 100 ms. Voltage drop during current supply max 1 V. 10 bit resolution. Accuracy ±0.4% at full deflection (0-50°C). Jackable screw terminals.
Outputs	4 0-10 V (max. 10 mA) and 0-20 mA/4-20 mA. External load <750 Ω. 8 bit resolution. Binary data format. Accuracy ±0.5% at full deflection (0-50°C). Internal power supply. Jackable screw terminals.
Power Supply	220 VAC ±15% 50/60 Hz.
Power Consumption	50 VA.
Interference Class	PL3 as per SEN 36 15 03 (IEC 801 – 4/2 kV) and PE3 as per SS 436 15 22 (IEC 801 – 2/8 kV)
Form of protection	IP20
Ambient Temperature	0-50°C.
Relative humidity	10-85% non-condensing
Weight	2 kg.
Part Number	978-005-002

9 Analogue Test Panel, ATC05

An analogue test panel, ATC05, can be connected to the inputs on the analogue expansion unit XACV-B. ATC05 can simulate for analogue input signals 0-10 V.

Note that the inputs to XACV-B must be strapped for 0-10 V (see the data sheet for XACV-B).

9.1 Connection

The test panel can be connected to the analogue expansion unit on three different places, outputs 00-09, 10-19 or 20-29.
- Unjack the screw terminal for the inputs.
- Jack in ATC05.

9.2 Power Supply

The power supply (+24 V) is provided automatically via connection of the test panel to XACV-B providing that the power supply is strapped to XACV-B's input terminal. This strapping is carried out on straps S2, S4 and S6 respectively (see the data sheet for XACV-B) where in the correct power supply is obtained from outlets 05, 15 and 25.
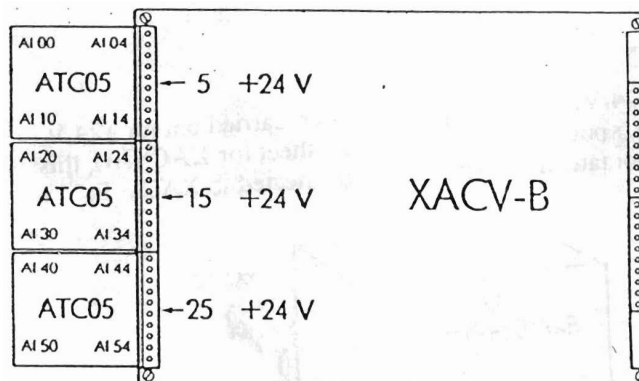
More information about the analogue test panel is described in the data sheet.

9.3 Technical Data

Outputs	4, 0 – 10 V jackable screw terminal.
Power Supply	+24 VDC, direct from XACV-B.
Form of Protection	IP20.
Dimensions	B70 x H50 x D30 mm.
Weight	70 g.
Part Number	978-020-001

10 PT100 Interface, IA05

An analogue interface, IA05 with four channels which are used to receive and convert signals from PT100 sensors can be connected to XACV-B. The signal converters, P05, are separate units which are connected to the channels on IA05 which are to be used. P05 is available for six different temperature ranges.

IA05 is connected directly to the inputs on the analogue expansion unit, XACV-B and four different temperature ranges can be handled at the same time.

If not all the four channels on IA05 are used, a by-pass module for getting access to the analogue inputs can be connected to the channels that not are used. By-pass module is available as an accessory.

10.1 Connection

IA05 is connected to outlets 0-9, 10-19 or 20-29 on XACV-B.
- Remove the screw terminal for the inputs.
- Connect IA05.
- Undo the screw on the front panel and remove the panel.
- Push in P05 in IA05. Check that the board slides in the groove and that the pins on the rear of the board are connected to the connector on the mother board.

10.2 Power Supply

IA05 is supplied with 24 VDC. If strapping has been carried out for +24 V supply via XACV-B's input terminal (see the data sheet for XACV-B), this voltage is obtained automatically when IA05 is connected to XACV-B.

Terminal allocation: 1 Measured signal
2 Compensation signal
3 Analogue GND (connect to earth point in immediate vicinity of connection block).
4 Optional 24V DC. Select with strap.
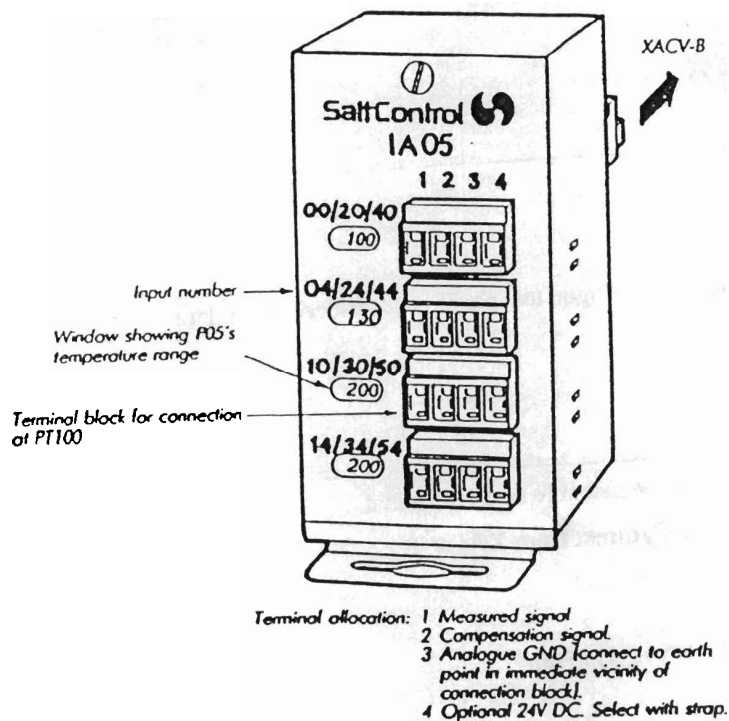
More information about the PT100 interface, IA05/P05 is given in the data sheet.

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10.3 Technical Data

IA05

Power Supply	18-32 V
Current Con- sumption	Max. 150 mA.
Protection Class	IP20
Dimensions	B50 x H96 x D79 mm.
Weight	245 g.

P05

Measurement range

P100	$0 - 100°C$
P130	$-30 - 30°C$
P160	$0 - 160°C$
P200	$0 - 200°C$
P600	$0 - 600°C$

Output Signal	0-10 V
Response Time*	275 ms
Measurement current	Typically 3 mA.
Input Impe- dance	Min. 10 MΩ
Output Current	Max 10 mA.
Output Ripple (44 kHz)	Max. 200 m Vp-p
Accuracy at 25°C	±0.4% of full deflection
Temperature stability at 0-50°C	±0.05% of full deflection/°C

Effect of conductor resistance

P100	±0.1% of full deflection/10 Ω
Others	±0.05% of full deflection/10 Ω

Current Consumption

P160	Max 15 mA
P600	Max 10 mA
Others	Max 12 mA

Weight	25 g.

* Time at 63% of full deflection. A second order filter with first break point
at 0.7 Hz and second break point at approximately 3 Hz.

Common Data

Ambient Temperature	0-55°C
Relative humidity	10-85%
Interference Class	PL3 as per SS 436 15 03

Part Numbers

IA05	978-030-001
P100	978-031-001
P130	978-032-001
P160	978-032-001
P200	978-034-001
P600	978-035-001
By-pass module	978-036-001

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11 Pulse Interface, IP05

A pulse interface, IP05, can be connected to the pulse input 35-37 on SattCon 05-25/45. IP05 is used to receive signals from an incremental pulse transducer.

IP05 cannot be connected to SattCon 05-25/45 without first changing to a high bottom (accessory) or connection with an adapter cable.

CAUTION: It is not possible to have communication boards as an accessory if a pulsed input is used.

11.1 Connection

The input signals which are normally connected to inputs 30-34 in the basic unit are connected to terminals 10-14 on IP05. IP05 is connected to inputs 30-39 on SattCon 05-25/45.
- Unjack the screw terminal for inputs 30-39.
- Connect IP05.
- Screw IP05 tight.
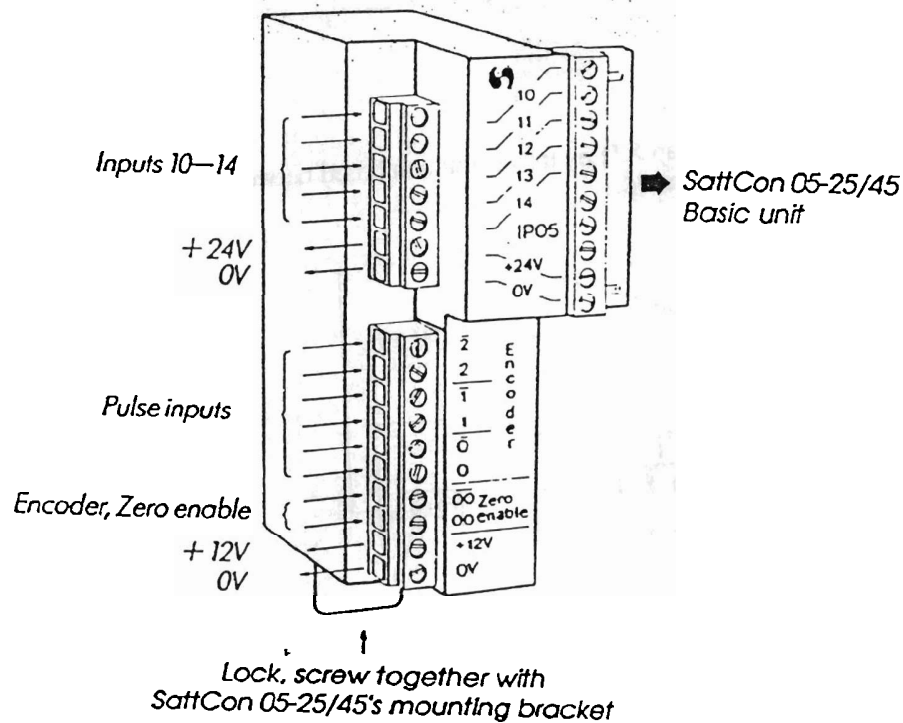
11.2 Jumpers and straps

For inputs 35-37 to be used as pulse inputs, jumpers on XJ1, XJ2 and XJ3 must be cut away on the input and output board.
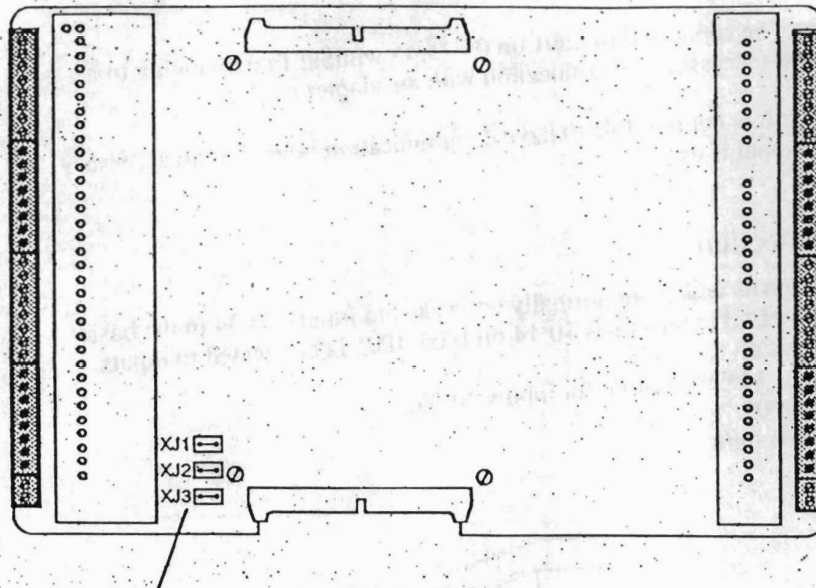
Jumps which are to be cut away

It is also necessary to strap XJ1 on the central unit board between pins 2 and 3 for the pulse unit to be used.

Switch for selecting VDU or COMLI   XJ1   X5
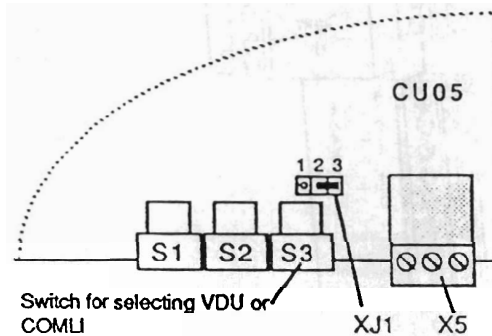
11.3 Power Supply

Terminal +12 V on IP05 is used to supply power to the pulse transducer. To provide this voltage in IP05, SattCon 05-25/45's +24 V is used for the inputs. The power supply is obtained automatically when IP05 is connected to SattCon 05-25/45.

More information about IP05 is found in the data sheet.

11.4 Technical Data

Inputs	3 pulse transducer inputs (Channel 1, 2 and zero pulse). One input for ZERO ENABLE. Differential or simple signals. Simple signals: Active high or low.
Input Voltage	12-24 VDC
Pulse Numbers for SattCon 05	3 options: Pulse numbers from pulse transducer x1 Pulse numbers from pulse transducer x2 Pulse numbers from pulse transducer /2
Pulse frequency to SattCon 05.	Max 2 kHz
Power Supply	24 VDC from SattCon 05-25/45. The pulse transducer is supplied from terminal +12 V (permitted current approximately 100 mA).
Power Consumption	Approximately 2.5 W
Form of Protection	IP20.
Ambient temperature	0-50°C.
Dimensions	B45 x H110 x D70 mm.
Weight	170 g.
Other information	Screened cable between pulse transducer and IP05 should be used.
Part Number	978-025-001

12 Cable

To avoid false signals to and from a control system, you should first sort all the cables into groups depending on how sensitive they are to interference (see below).

The principal rule is to have cables with different signal types properly separated from each other. Do not mix different signal types in the same cable and make sure that cables of different groups run parallel over as short a distance as possible. Never place the signal cables on the same cable racks as high voltage cables.

When passing through walls, it may be difficult to separate different groups so you should at least separate the cables on both sides of the wall immediately before and after passage through the wall. Similar signals however should be kept together. A transducer's to and from conductors should always be in the same cables. All cables should also lie as near to the mounting plate (ground) as possible.

If any signal is more sensitive than the others, it has to be separated from the others even if they are of the same signal types. The most sensitive conductor is always placed nearest ground.

All signal cables should be screened. The screen must be connected to the ground rail which is as near SattCon 05-25/45/SattCon OP45 as possible. The screen must not be connected to the external equipment (transducers, connection boxes, etc.) Unused conductors must be connected to the screen at both ends or cut away. They must not lie loose outside the screen.

Do not use aluminum-sheathed 220 V installation cable for signals in groups I or II. This type of cable has a slit along the whole length of the cable which makes it sensitive to interference.

Groups I and II cables which pass through heavy magnetic fields can be screened by routing the cable through a steel conduit which is grounded.

Suitable Group Division for Different Cables

Group I	Fast signals with voltage levels 0 – ±10 V.
	eg. terminal cables for printers and screens.
	Very sensitive to interference. Should be properly screened.
Group II	Medium-speed signals with voltages levels 0-50 V.
	This applies to signals from angle transducers, electronic pulse
	transducers without relay outputs
	Sensitiv to heavy interference.
Group III	Slow signals with voltage levels 0-220 V.
	Such as mains connections, signals from relays, connectors and
	lamps.
	Not normally sensitive to interference but can emit heaving interference
	pulses.

Necessary Cable Properties

		Cable that cause interference		
		Group I	Group II	Group III
Cable's useful signal	Group I	Pair twinned conductors with completely enclosed screen		
	Group II	Straight cables with plaited screen	Straight cables with fully enclosed screen	
	Group III	Unscreened cables		

Recommended Minimum Spacing between parallel cables.

|		Cables which produce interference			
		Non-controlled control or supply cables, less than 250 V		Supply cables with phase-voltage 250 V or more	
		Length <3 m	>3 m	<3 m	>3 m
Cable's useful signal	Group I	0.3 m	1.0 m	0.3 m	1.0 m
	Group II	0.1 m	0.3 m	0.3 m	1.0 m
	Group III	-	-	0.1 m	0.3 m

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13 Power Supply to External Equipment

The 24 V power unit to SattCon 05-25/45/SattCon OP45 should be placed in the same cabinet. The cable must be screened if the power unit is placed outside the cabinet or if the cable is longer than 2 m. The screen should be connected to ground at either end of the cable.

External equipment such as transducers, relays, connectors, lamps, etc. should be supplied with power from an external power unit. It is also possible to supply the inputs with power from the 24 VDC with which SattCon 05-25/45 or SattCon OP45 is supplied bearing in mind that the maximum permitted load is 0.5 A.

The power unit which is used to supply the inputs must provide stabilized voltage. The voltage must be stable so that the system is able to differentiate between "signal" and "non-signal". The power unit need not have such a high output since the inputs do not normally consume more than 10 mA (24 VDC).

The loads on the outputs however may demand a considerable amount of power but, on the other hand, the voltage need not be so accurate. The voltage can vary quite considerably without the function of lamps and relays being changed. It is also possible to convert a course rectified power unit for supplying the outputs (12-50 VDC).
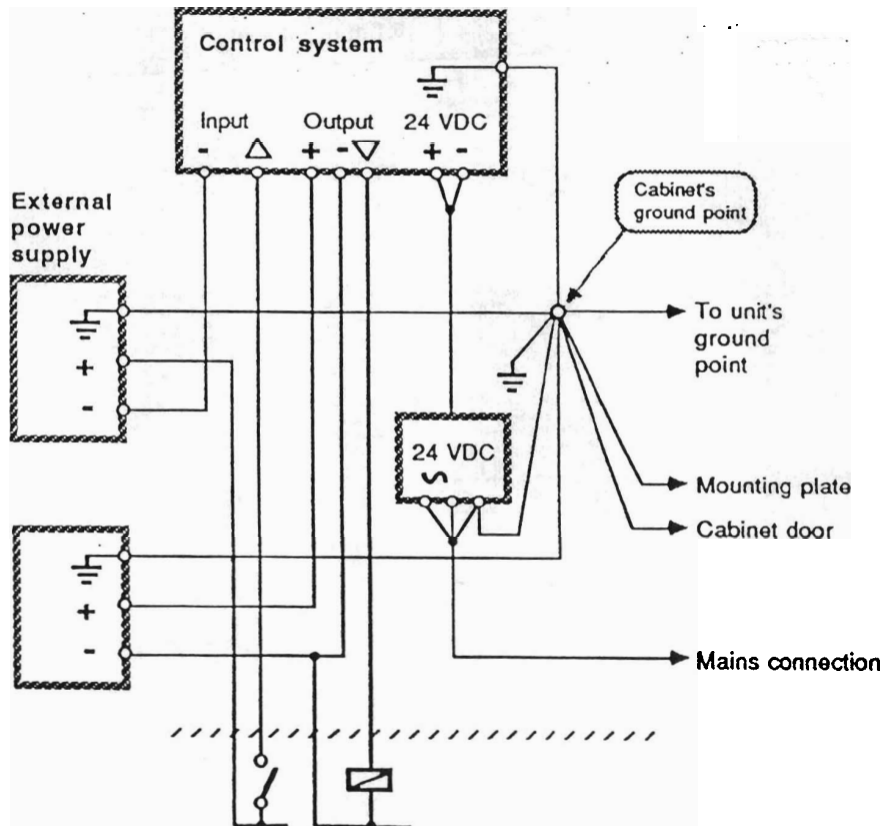
14 Interference Sources, Cabinet Mountings and Grounding

14.1 Interference Sources

A few common interference sources are relays, connectors, solenoids, thyristor-controlled controls equipment, ground faults, static discharge, etc.

Protect your control system from all these sources of interference by planning before you commence the installation.
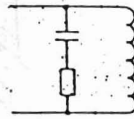
Position connectors, solenoids, magnetic stabilizers and similar equipment in separate cabinets or at least separated from the system by a grounded intermediate wall.

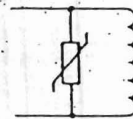Fuses for heavy currents should be positioned at least 30 cm from the system.

Fit interference protection on all inductive loads (coils) such as solenoids:
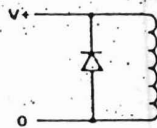
Diode (DC)	RC Network (AC)	Varistor (AC/DC)

14.2 Cabinet Mounting

The following are recommendations and some good advice which should be followed when SattCon 05-25/45 or SattCon OP45 are mounted in a cabinet:

- Where possible, the cabinet should be mounted in the immediate vicinity of the machine that is being controlled (short cable routes).
- SattCon 05-25/45/SattCon OP45 must be placed on a stable sheet metal base (grounded metal plate).
- Furnish the cabinets so that there is plenty of space. As a result there will be less risk of electrical interference.
- Consider ventilation. The temperature may become too high on a hot summers day or at night when ventilation is reduced. Note that the amount of heat is greatest at the top of the cabinet.
- Toothed plate connector must be used at mounting, so the unit get contact with the mounting plate.

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Installation Example

Cable Duct

Cables are drawn at rightangles to the cable duct which must not nearer to 05-25/45/OP45 than 50 mm. The cable duct must be mounted directly in the bottom plate. It may be necessary to provide further cable ducts for reciperation of cables.

Grounding of 0 V

Ground all digital input signal's ground (0 V) directly to the mounting plate or to ground rail. Do not ground analogue input signals here.

Protection Zone

Respect the minimum distances for the protection zones around the different units.

Terminal Blocks, Fuses etc.

Ground rail

Terminal connector

D-SUB connector (Cannon Connector) with metal sheath. The screen is soldered to pin 1 and to the metal casing at pin 1. The connector must always be screwed tightly in position.

Grounding of 0 V

Ground all digital output signal's ground (0 V) directly to the mounting plate or to ground rail.

Expansion Connector

05-25/45/OP45 and any expansion units must sit tightly together. The recommended spacing is 20 mm.

Protective Ground

Make the protective ground connection as far down in in the cabinet as possible at floor level. Also ground the door (frame) and ground rail.

SattCon 05-25
SattCon 05-45
SattCon OP45

24 VDC
20-70W

Dimensions, SattCon 05-25/45
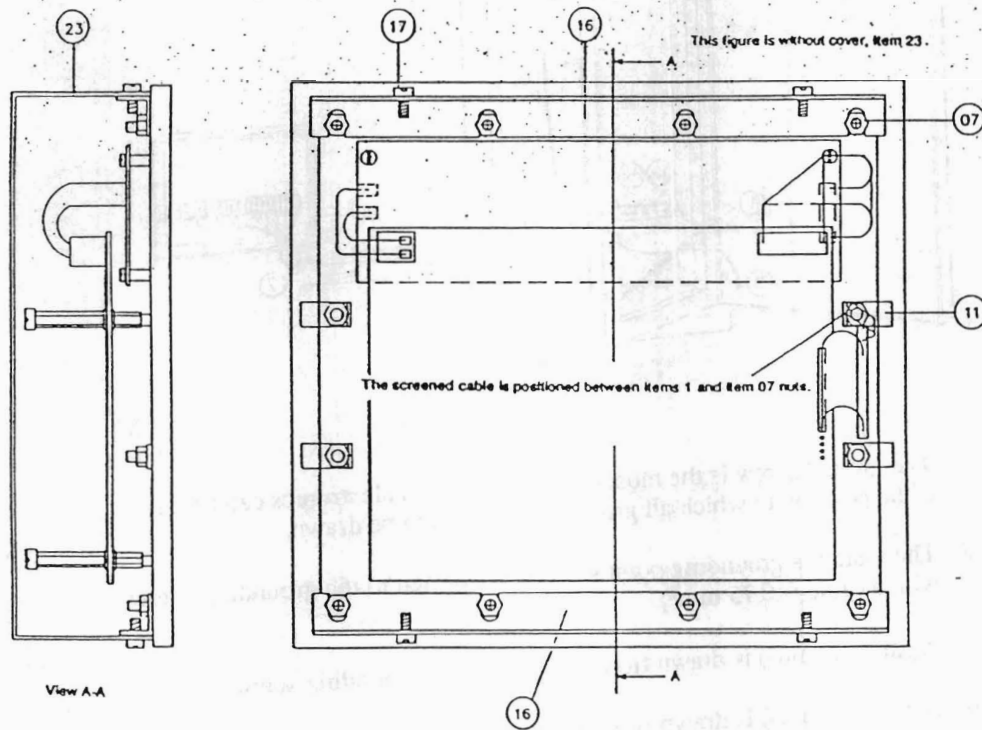
Ø 6,5
Ø 12
20
276
47
342
320
300
15
25
150
204
25

44
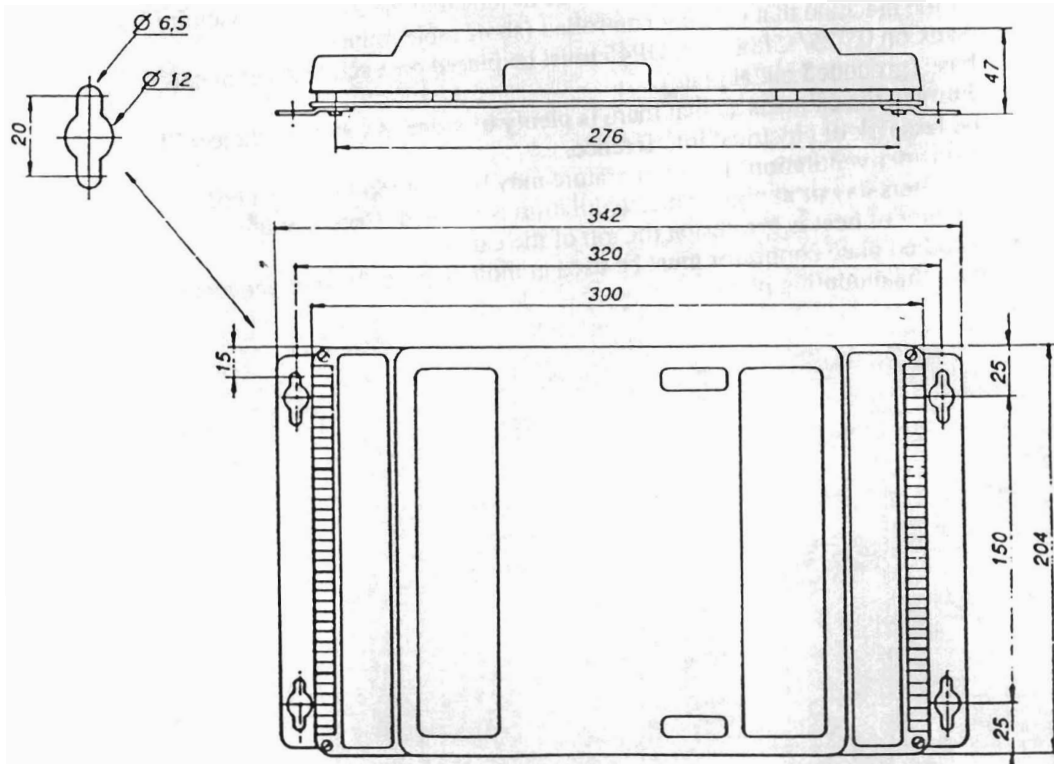
Drilling Holes and Mounting SattCon OP45 in Cabinets

The holes to be drilled for SattCon OP45 in a cabinet shall be rectangular with dimensions H177 ±0.5 x B198.5 ±0.5 mm.

- Undo the two holders (16) by undoing the eight nuts (07).
- Undo the nuts on the four holders (11) and push the holders to one side so that they do not stick out.
- Place SattCon OP45 in the rectangular hole in the cabinet from the front.
- Move the holders backwards (11) to their original position and fit the holders (16) from the rear.
 Tighten all nuts so that SattCon OP45 sits properly in position.

CAUTION. The protective cabinet is mounted over the whole of the rear of SattCon OP45 and is attached with screws 17 (4).

This figure is without cover, item 23.

The screened cable is positioned between items 1 and item 07 nuts.

View A-A

14.3 Grounding

All units must be connected to the installation's common grounding point with a sufficiently thick cable (>10 mm^2) which goes the shortest way to the grounding point. This reduces the risk for uncontrolled ground currents which can produce serious interference which is difficult to get to.

The figure below shows important grounding points in and underneath the electronics cabinet.

SattCon 05-25/45
or
SattCon OP45
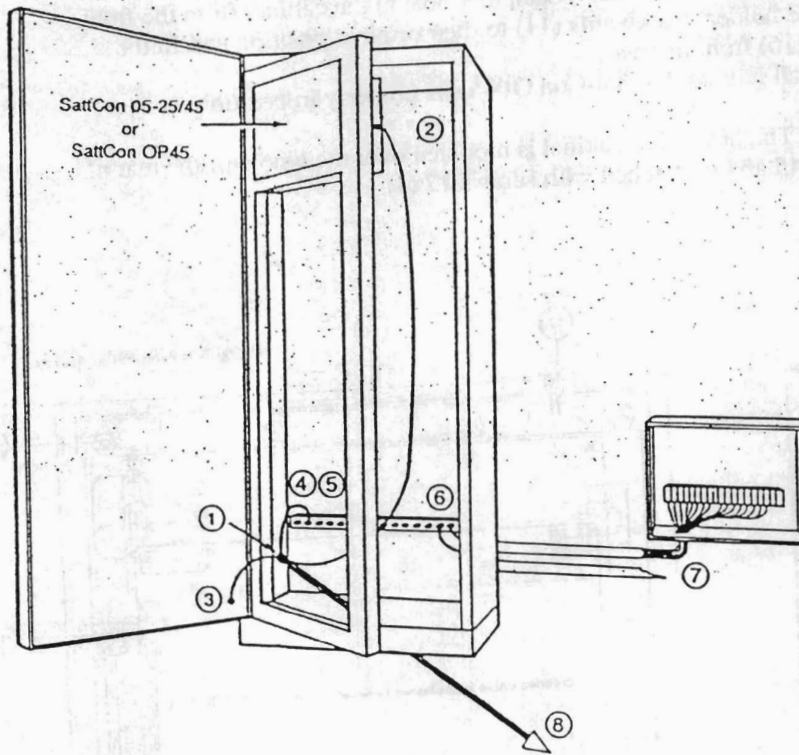
1   The ground screw is the most central point in an electronics cabinet and is the position to which all ground cables should be drawn.

2   The system's grounding point shall be connected to the grounding screw with a cable (≥0.75 mm^2).

3   A cable (6 mm^2) is drawn from the door to the grounding screw.

4   A cable (6 mm^2) is drawn from the mounting plate to the grounding screw.

5   The grounding screw is connected with a cable (6 mm^2) to the grounding screw.

6   The screen in screened cable is connected to the grounding rail. The screen must not be connected to the external equipment. (Screened cables' internal in the cabinet must be connected to ground at either end.)

7   Cut away the screen at the external equipment.

8   The electronic cabinet's grounding screw is connected to the installation's common grounding point by a thick cable (≥10 mm^2).

The power unit's grounding point must be connected to the grounding screw with a cable (≥1.5 mm^2).

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15 Service

This section provides a summary of the fuses, how to change batteries and how to adjust the indicator's contrast on SattCon OP45. All other servicing should be carried out by SattControl.

15.1 Fuses

SattCon 05-25/45 has two automatic fuses. F1 on the input and output board provides a fuse for +24 VDC for digital inputs (output 38). F1 which is positioned outside the X5 connector on the central unit board provides a fuse for 24 VDC on the central unit. SattCon OP45 has an automatic fuse, F1 on the central unit board.

15.2 Changing Batteries

The contents of SattCon 05-25/45's or SattCon OP45's CMOS memory is retained in the event of a power failure because of the integral lithium battery. A battery voltage which falls below the permitted level is indicated in the following manner:

The PWR LED flashes.
- The I/O address 1674 (BATTERY LOW) is set.
- When starting up the system (when the mains is switched on) error message "B" is displayed (SattCon 05-25/45: on the screen which is connected to the VDU panel, SattCon OP45: on display).

The battery CR2032 is connected in the following manner:

- Unscrew the cover
- Unscrew the central unit board from its spacers (applies to SattCon 05-25/45).
- Remove the old battery with the help of a screwdriver.
- Fit a new battery in the holder.

The new battery then supplies the memory with power. If the voltage to the system is disconnected, the memory is supplied for 15 seconds, in other words you have 15 seconds to change the battery.

SC 05-45: Input/output board   SC OP45: Expansion unit
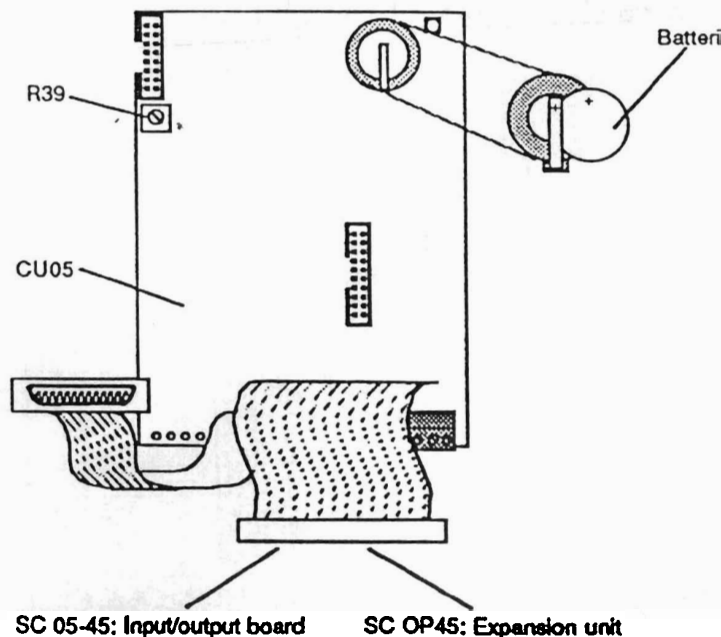
15.3 SattCon OP45, Display Contrast

SattCon OP45's display (alphanumeric indicator) is a floating crystal display which means that it does not light up itself but reflects the light shone upon it.

The contrast is easily adjusted via a potentiometer with the help of a small screwdriver.

- Remove the protective cover.
- Adjust the potentiometer R39.

15.4 Unjacking the Screw Terminals

Use a screwdriver when unjacking the screw terminals.

XJ1
XJ2
XJ3