

# WORKmate II

## USER MANUAL



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# Overview

## Introduction

The WORKmate II is a cost effective data capture terminal for connection to the Vicking Electronics concentrator network.

It can be used for:

- a. Real-time job control, at every workstation, the appropriate information can be entered by the operator, using the keyboard or the attached barcode reader.
- b. Time & attendance applications, the employee can identify himself with a proximity key and request information with the function keys.
- c. Access control applications, a proximity key or card is used to grant access, the relays opens a door, the keyboard can be used to enter a password.

## Technical specifications

- New stylish housing which you can use as a table or wall model by rotating the top cover.
- Dimensions: Width 113mm Length 235mm Depth 94mm
- Weight: 450 gram
- LCD display with 4 lines of 16 characters with backlighting.  
The characters are 5.5 mm high.
- Splash water proof membrane keyboard with 4x9 keys. (36 keys total)
- Reads 2/5 interleaved, code 39, UPC and EAN bar-codes.
- Two switch inputs.
- Two Transistor outputs.
- 2 LED's (red, green).
- Built-in beeper with different tones.
- Connection to the concentrator network via RJ 45 or a screw connector.
- Full RS232 serial port.
- The following readers can be connected to the WORKmate:
  - An internal proximity card reader
  - An external proximity card reader
  - Two barcode wand or CCD barcode readers.
  - Two magnetic card readers (ISO track 2)
- External power needed: From 8V to 24V DC
- Optional I/O board
  - Two relays
  - Two opto-isolated inputs with counter possibility.
  - A opto-isolated proximity reader.
  - DIN connector to the concentrator network.
  - Screw connector to the concentrator network.

## Power supply

The WORKmate II draws more power than the old WORKmate 36, If you switch on the extra hardware in the workmate it can be 3 to 4 times more. However the WORKmate II has a switching power regulator which uses the available power more efficiently, also this new regulator will reset the WORKmate if the power drops below the minimum for a short time, this prevents that the microprocessor will hang-up.

| Power consumption of WORKmate elements |        |
|--|--------|
| Workmate                               | 0.5 W  |
| Each relay                             | 0.2 W  |
| Active backlight                       | 0.15 W |
| Barcode wand                           | 0.15 W |
| CCD scanner active                     | 0.8 W  |
| CCD scanner standby                    | 0.3 W  |

The powersupply for the WORKmates can supply about 30 Watts of power, take into account that a part of this power is lost in the cables, the longer the cable the more power is lost. The WORKmate II can measure the voltage on the powerlines, the more this voltage drops the more is lost in the cables. If the voltage becomes to low (lower than 9V) you must use an extra powersupply.

## Workmate II hardware

### Network connection

The terminal must be connected to a Vicking concentrator network, the RJ45 connector on the outside or the screw connector on the inside can be used for this. The I/O board features a DIN connector to connect to the concentrator network.

**Attention!** The RJ45 connector is the same type that is used in Ethernet networks, be careful not to connect the WORKmate II to an ethernet network. We have chosen this type of connector because of lot of people know how to install Ethernet networks and have the right tools.

The WORKmate also draws its power from the network, it uses 6 wires 2 for data transmission, 2 for data reception and 2 for power.

All the WORKmates on 1 line are connected in parallel to the network cable. Each WORKmate needs a unique address to differentiate them from each other, this address is show when the WORKmate starts-up. You can change the address in the settings menu.

You can connect up to 4 lines with maximum 63 WORKmates to the concentrator. The WORKmates on a line must have different addresses, between the lines the addresses can be the same. If you have a network with less that 63 WORKmates, it is better the give all WORKmates unique addresses, so there will be no problem when switching WORKmate from one line to another.

### Barcode readers

The WORKmate can decode 2/5 interleaved, code 39, UPC and EAN bar-codes.

You can connect a barcode pen, CCD reader or barcode badge reader, 2 barcode readers can be used at the same time.

There are 3 connectors in the WORKmate that you can used for barcode readers:

|                |                          |  |
|----------------|--------------------------|--|
| Barcode port 1 | Right DIN connector      | In the default setting the right and left DIN connector gives the same software code, so the user can choose where he plugs in the barcode reader.         |
| Barcode port 2 | Left DIN connector       | Can be programmed to give a different software code as the right connector if the application demands it.  |
|                | Internal molex connector | Can't be used if the left DIN connector is also used. This connector is used if you want to prevent the user from easily disconnecting the barcode reader. |

### Proximity / magnetic card readers

The workmate can read magnetic cards that have data on track2 in accordance with the international standard ISO 2 ABA.

Character encoding: 4 bits plus a parity bit.

Track encoding: START(13) DATA END(15) LRC maximum 38 characters.

The magnetic card readers and the proximity readers both use the same protocol and the same connectors, but some connections are reserved only for proximity.

There are 2 ways to connect a magnetic card reader to the WORKmate:

|              |                          |   |
|--------------|--------------------------|---|
| Prox. port 1 | Internal molex connector | If the reader must be permanently connected to the WORKmate.                            |
| Prox. port 2 | Left DIN connector       | The installation is easier through this connector, but can be disconnected by the user. |

Both connections can be used at the same time.

There are 4 ways to connect a proximity reader to the WORKmate:

|              |   |  |
|--------------|---|--|
| Prox. port 1 | Internal proximity reader               | A proximity module can optionally be mounted directly on the WORKmate mainboard.   |
|              | Internal molex connector                | To connect to an internal proximity board. Or an external proximity reader a short distance from the WORKmate that can't be disconnected easily. |
| Prox. port 2 | Left DIN connector                      | You can connect an external proximity reader a short distance from the WORKmate via the left DIN connector.                                      |
|              | Opto-coupled interface on the I/O board | If you want to connect an external proximity reader a long distance from the WORKmate you need to install the extra I/O board.                   |

Both port can have a reader connected at the same time.

Like the barcode readers, you can setup the ports to generate the same or a different software code.

### Input / Output

Each DIN connector has one output pin. These outputs are not buffered with a relays, they are directly connected to the WORKmate transistors. These outputs are used in special interfaces connected to the WORKmate.

You need the I/O board if you want more powerful outputs.

Each DIN connector has an input pin, you must connect a switch to these inputs (from ground pin 2 to the input pin 7). The inputs are only meant to detect if a switch in on or off. Do not connect an external voltage to the input pins. You need the I/O board if you want more powerful inputs.

The input of the right DIN connector also can be programmed to emulate one key on the keyboard, see the settings chapter. If you press on a external switch, the WORKmate transmits a function code just as if you pressed it on the keyboard. This can be used for example in a job control application, the user hits the switch every time a piece or batch is produced.

## Audio / Visual

The beeper in the WORKmate II can be programmed to give beeps of various durations and frequencies, to make a difference for example between a correct data entry or a wrong one. If you want a louder sound, you can connect a loudspeaker to the main PCB. Connect a small loudspeaker like you find in PC's to CON11.

A red and a green LED can be switched on or off or set to blink, this is the most handy in noisy environments.

The LCD display has 4 lines of 16 characters and has a backlighting that can be used in three modes

1. Always switched off (the default setting)
2. Always switched on
3. Automatic mode. The backlight switches off if no key is pressed for a while.

## Serial line

The WORKmate II has standard a full RS232 serial line on board, this can be used to connect a printer or an external display.

The baudrate can be set to 1200, 2400, 4800 and 9600 baud.

The protocol can be set to 8 no parity, 7 even parity and 7 odd parity.

The RS232 port is also used to program the firmware of the WORKmate.

With the following procedure you can update the software in the WORKmate.

1. Open the WORKmate and disconnect it from the power supply (the network connector)
2. Close the jumper beside the DIN connector that says "CLOSE=PROGAM"
3. Connect a serial cable from the right DIN connector (con7) to the serial port of a PC
4. Reconnect the power supply, the LCD display will show 1 row of black squares.
5. Use the download program on the PC to reprogram the Flash memory of the WORKmate.
6. Disconnect from power and remove the jumper and the serial cable.

## Optional I/O board

An optional Input/Output board can be mounted on the bottom part of the WORKmate.

The user can easily connect cables to the I/O board with the screw connectors.

In low cost screw connectors the screw presses down directly on the cable, this can give bad connections and damage the copper wire. The screws connectors in the WORKmate clamp the copper wire between 2 metal plates for a perfect contact.

The board contains an opto-isolated interface for an external proximity reader.

Opto-isolated means that the signal is transmitted with light not through copper wires, this isolates the 2 circuits and prevent a voltage spike on one circuit to damage the other.

This protection means that the external reader can be placed a long distance away from the WORKmate.

A long distance external reader needs a door-lock interface. This interface takes care of the power for a door-lock, the power for the reader, relays to open the door and connectors to make the wiring easy.

Readers with a cable shorter than  $\pm 2$  meters can be connected directly to the WORKmate, if you don't need to control a door-lock.

This board has 2 relays:

Relais 1 with a normal open (NO) and a normal closed (NC) contact.

Relais 2 with only a normal open contact (NO).

They are software compatible with the outputs in the DIO20.

Be careful when switching inductive loads with the relays, when the power to a coil is switched off it will generate a large voltage spike that can burn out the relays contacts.

This board also has 2 opto-isolated inputs:

The inputs can be used to detect an 'on' or 'off' state or to count pulses (up to 100 pulses a second)

See the control codes for more info about the possibilities of the counters.

They are software compatible with the inputs in the DIO20.

Both inputs are identical and can be configured with 2 jumpers:

1. One jumper in the middle (VOLTAGE)

The input is completely isolated from the WORKmate and has to be activated with a voltage between 5V to 48V.

2. Two jumpers in the sides (SWITCH)

In this configuration the input is protected but not completely isolated from the WORKmate.

You can connect a voltage free switch to the input.

Do not use this setting and connect an external voltage to the input ,it will result in a short circuit.

The I/O board has a DIN connector to connect the WORKmate II to the concentrator network, to be compatible with WORKmate36. You also can connect a cable directly to the WORKmate with a screw connector, if for example your cable comes through a wall.

## Differences with the old WORKmate 36

|                         | <b>WORKmate 36</b>   | <b>WORKmate II</b>  |
|-------------------------|--|---|
| Display                 | 2 Line 16 characters<br>no backlight   | 4 Line 16 characters<br>with backlight  |
| LED's                   | No leds  | Red and green led   |
| Beeper                  | Fixed tone   | Programmable tone   |
| Firmware                | Manually change EPROM  | Download in Flash ROM   |
| Connectors              | Optional barcode   | Standard 2 multifunctional connectors   |
| Input / Ouput           | 1 relays<br>1 input (no counter)<br>1 barcode reader<br>1 proximity reader                   | 2 relays<br>2 inputs (can count pulses)<br>2 barcode readers<br>2 proximity readers<br>2 Switch inputs<br>2 Transistor outputs<br>1 RS232 port standard |
| Badge readers           | Special mode for badge readers<br>The inputs and communication are<br>shut-down in this mode | No special mode for badge readers<br>The whole WORKmate stays functional.   |
| Concentrator<br>Network | Connection with DIN connector  | Connection with RJ-45<br>With DIN or direct cable connection<br>on the I/O board  |
| Power                   | Very low power consumption.<br>Linear power regulator  | WORKmate draws more power.<br>Switching power regulator   |
| Housing                 | Simple housing needs accessories to<br>mount.  | Design housing easy to mount on the wall or<br>place on the table.  |
| Settings                | With DIP switches  | With a menu, the parameters are stored in<br>flash memory.  |

## 1. Software

To change the setting in the previous WORKmate, you needed to open de WORKmate and change dipswitch settings. In the WORKmate II, all the parameters are stored in flash memory, which you can change directly on the WORKmate with keyboard, see the chapter about 'the settings menu'.

New firmware versions are up loadable by PC to flash memory (No more difficult EPROM changing's).

The WORKmates hardware can be tested with a build in self-test menu, including measurement of the input voltage on the network cables.

When the WORKmate is unable to send data to the concentrator, the error message "**Communication time-out error!**" appears and the transmission is aborted. The WORKmate 36 would keep waiting till the concentrator responds, the result is that the WORKmate 36 doesn't react to anything.

The old WORKmate 36 needed to go to a special mode when you wanted to read a magnetic card or a barcode, because of the limitations of the micro-processor. The workmate II has a more powerful 16 bits processor, so no special mode for barcode or magnetic input is necessary. In the WORKmate II the readers are always active, so the software needs to take this into account, for compatibility with older software you can switch the Barcode & Prox. reader mode to SOFTWARE ENABLED in the setting menu.

The software codes of the WORKmate II are compatible with the WORKmate 36 codes, there are some additional commands for the new hardware functionalities. The DIO-20 was a separate terminal without keyboard and display for counting pulses and driving relays outputs. All software functionalities of the DIO-20 are also built in the WORKmate II, for the hardware you need the optional I/O board.

## The terminal command codes

The WORKmate is a dumb terminal, it can not function by itself, a remote program controls it though command codes. The WORKmate responds with function codes and input data.

This chapter describes the command codes, for the codes transmitted by the WORKmate see the chapter “The terminal output function codes”.

You can send 2 types of data to the terminal:

1) Readable text that is displayed from the current cursor position.

If the end of a line has been reached, the cursor will not go to the next line, you need to reposition the cursor with the ‘Position cursor’ command, otherwise the following characters will not be displayed.

2) Command codes that activate special actions.

The table below shows the following information:

- If the ASCII code is a command or a displayable character
- A description of the command
- For each command there is an indication what type of WORKmate supports it.
  - W.M. II : The newest WORKmate which this manual is about.
  - W.M. 36 : The older WORKmate in a small low cost housing, with 36 keys
  - W.M. 24 : A WORKmate in a large waterproof housing, with a larger display and 24 keys.
  - DIO20 : A WORKmate type terminal without display and keys, with two outputs and counter inputs.
  -

| ASCII | Type    | Comment                                   | W.M. II | W.M. 36 | W.M. 24 | DIO 20 |
|-------|---------|---|---------|---------|---------|--------|
| 0     | Command |   |         |         |         |        |
| 1     | Command |   |         |         |         |        |
| 2     | Command | Timebase real time clock                  | Y       | Y       | Y       | N      |
| 3     | Command | Activate read time clock display          | Y       | Y       | Y       | N      |
| 4     | Command | Input 1 active detect                     | Y       | Y       | Y       | Y      |
| 5     | Command | Input 1 inactive detect                   | Y       | Y       | Y       | Y      |
| 6     | Command | Universal output (+1 or 2 parameter byte) | Y       | N       | N       | N      |
| 7     | Command | Beeper                                    | Y       | Y       | Y       | N      |
| 8     | Command | Relays 1 on                               | Y       | Y       | Y       | Y      |
| 9     | Command | Relays 1 off                              | Y       | Y       | Y       | Y      |
| 10    | Command | Relays 2 on                               | Y       | N       | Y       | Y      |
| 11    | Command | Relays 2 off                              | Y       | N       | Y       | Y      |
| 12    | Command |   |         |         |         |        |
| 13    | Command |   |         |         |         |        |
| 14    | Command | Input 2 active detect                     | Y       | N       | Y       | Y      |
| 15    | Command | Input 2 inactive detect                   | Y       | N       | Y       | Y      |
| 16    | Command | Activate barcode mode                     | Y       | Y       | N       | N      |
| 17    | Command | Time out (+2 parameter bytes)             | Y       | Y       | Y       | N      |
| 18    | Command | Save cursor position                      | Y       | Y       | Y       | N      |
| 19    | Command | Restore cursor position                   | Y       | Y       | Y       | N      |
| 20    | Command |   |         |         |         |        |
| 21    | Command | Activate magnetic card mode               | Y       | Y       | N       | N      |
| 22    | Command | Relays 1 timed (+1 parameter byte)        | Y       | Y       | Y       | Y      |
| 23    | Command | Relays 2 timed (+1 parameter byte)        | Y       | N       | Y       | Y      |
| 24    | Command |   |         |         |         |        |
| 25    | Command | Input in security mode                    | Y       | N       | Y       | N      |

|           |           |  |   |   |   |   |
|-----------|-----------|--|---|---|---|---|
| 26        | Command   | Start executive protocol for vending machines  | N | N | Y | N |
| 27        | Command   | Cursor normal<br>Use universal output in the WORKmate II                                   | N | Y | Y | N |
| 28        | Command   | Cusor blink<br>Use universal output in the WORKmate II                                     | N | Y | Y | N |
| 29        | Command   | Clear screen   | Y | Y | Y | N |
| 30        | Command   | Position cursor (+1 parameter byte)  | Y | Y | Y | N |
| 31        | Command   | Request all input levels   | N | N | N | Y |
| 32 to 90  | Character | These standard ASCII characters (space to Z) are displayed on the LCD of the WORKmate      |   |   |   |   |
| 91        | Character | The ASCII character [ is shown as Ä  |   |   |   |   |
| 92        | Character | The ASCII character \ is shown as Ö  |   |   |   |   |
| 93        | Character | The ASCII character ] is shown as Ü  |   |   |   |   |
| 94 to 122 | Character | These standard ASCII characters (^ to z) are displayed on the LCD of the WORKmate          |   |   |   |   |
| 123       | Character | The ASCII character { is shown as ä  |   |   |   |   |
| 124       | Character | The ASCII character   is shown as ö  |   |   |   |   |
| 125       | Character | The ASCII character } is shown as ü  |   |   |   |   |
| 126       | Character | The ASCII character ~ is shown as ß  |   |   |   |   |
| 123       | Command   | Reset a counter (+1 parameter byte)  | Y | N | N | Y |
| 124       | Command   | Set upcounter 1 with timeout (+5 parameter bytes)<br>Preset a counter (+9 parameter bytes) | Y | N | N | Y |
| 125       | Command   | Read counter   | Y | N | N | Y |
| 126       | Command   | Read level inputlines directly (+1 parameter byte)   | Y | N | Y | Y |
| 127       | Command   | Send to extra serial line  | Y | Y | Y | N |

| Table of all the displayable characters of the WORKmate |    |    |   |    |   |    |   |    |   |    |   |    |   |    |   |     |   |     |   |     |   |     |   |
|---|----|----|---|----|---|----|---|----|---|----|---|----|---|----|---|-----|---|-----|---|-----|---|-----|---|
| 32  | SP | 40 | ( | 48 | 0 | 56 | 8 | 64 | @ | 72 | H | 80 | P | 88 | X | 96  | ` | 104 | h | 112 | p | 120 | x |
| 33  | !  | 41 | ) | 49 | 1 | 57 | 9 | 65 | A | 73 | I | 81 | Q | 89 | Y | 97  | a | 105 | i | 113 | q | 121 | y |
| 34  | "  | 42 | * | 50 | 2 | 58 | : | 66 | B | 74 | J | 82 | R | 90 | Z | 98  | b | 106 | j | 114 | r | 122 | z |
| 35  | #  | 43 | + | 51 | 3 | 59 | ; | 67 | C | 75 | K | 83 | S | 91 | Ä | 99  | c | 107 | k | 115 | s | 123 | ä |
| 36  | \$ | 44 | , | 52 | 4 | 60 | < | 68 | D | 76 | L | 84 | T | 92 | Ö | 100 | d | 108 | l | 115 | t | 124 | ö |
| 37  | %  | 45 | - | 53 | 5 | 61 | = | 69 | E | 77 | M | 85 | U | 93 | Ü | 101 | e | 109 | m | 117 | u | 125 | ü |
| 38  | &  | 46 | . | 54 | 6 | 62 | > | 70 | F | 78 | N | 86 | V | 94 | ^ | 102 | f | 110 | n | 118 | v | 126 | ß |
| 39  | '  | 47 | / | 55 | 7 | 63 | ? | 71 | G | 79 | O | 87 | W | 95 | _ | 103 | g | 111 | o | 119 | w |     |   |

The WORKmate can be connected to an online or offline concentrator.

The online-concentrator only manages the network, the computer connected to it has the application program that controls the WORKmates. The ONLINE example given with each command shows the data that the computer has to send to achieve the desired effect. Each yellow number block represents a command code of 1 byte, the green text are display characters.

The offline-concentrator manages the network and can run an application program written in VIPRO. VIPRO is a basic like language to control VICKING electronics devices, see the VIPRO manual for more information.

Data is placed in a buffer with the PRINT command and transmitted with the SEND command. Most codes to the terminals can be automatically generated by using the parameter file ( TXT ) this is shown under the heading “OFFLINE parameter example”.

The codes can also be directly inserted in the transmission string, this is shown under the heading “OFFLINE direct example”.

## Relay 1 on

8<sub>(dec)</sub>

Relay 1 becomes active.

The normal open contact is now closed and the normal closed contact will be open.

The I/O board must be installed for this command to be effective.

### ONLINE example

Transmit: 29Relay 1 on08

Clear screen, display 'Relay 1 on' , switch relay 1 on

### OFFLINE direct example

```
CHAIN $RELON%8
```

```
PRINT $ADRES,$RELON : SEND
```

### OFFLINE parameter example

```
PRINT $ADRES : POINT 1,1 : SEND
```

## Relay 1 off

9<sub>(dec)</sub>

Relay 1 becomes inactive.

The normal open contact is now open and the normal closed contact will be closed.

The I/O board must be installed for this command to be effective.

### ONLINE example

Transmit: 29Relay 1 off09

Clear screen, display 'Relay 1 off' , switch relay 1 off

### OFFLINE direct example

```
CHAIN $RELON%9
```

```
PRINT $ADRES,$RELON : SEND
```

### OFFLINE parameter example

```
PRINT $ADRES : POINT 1,2 : SEND
```

## Relays 1 timed

22<sub>(dec)</sub> + timecode

Relay 1 becomes active for a time defined by the 'timecode' byte, then it switches off again and the WORKmate sends a function code back so that the application program knows that the WORKmate is ready to be used again. See the chapter "The terminal output function codes".  
The timecode byte is in units of 0.5 sec and can have a value of 1 to 127.

### ONLINE example

```
Transmit: 29Relay 1 puls22 10
```

Clear screen, display 'Relay 1 puls' , puls relay 1 for 5 seconds

### OFFLINE direct example

```
CHAIN $RELON%22%10  
PRINT $ADRES,$RELON : SEND
```

### OFFLINE parameter example

Field 3 in a TXT file record contains the timecode  
TXT record 5: 000010  
PRINT \$ADRES : POINT 5,3 : SEND

## Relay 2 on

10<sub>(dec)</sub>

Relay 2 becomes active.  
The normal open contact is now closed.  
The I/O board must be installed for this command to be effective.

### ONLINE example

```
Transmit: 29Relay 2 on10
```

Clear screen, display 'Relay 2 on' , switch relay 2 on

### OFFLINE direct example

```
CHAIN $RELON%10  
PRINT $ADRES,$RELON : SEND
```

### OFFLINE parameter example

Is not possible with parameters

## Relay 2 off

11<sub>(dec)</sub>

Relay 2 becomes inactive.  
The normal open contact is now open.  
The I/O board must be installed for this command to be effective.

#### ONLINE example

Transmit: 29Relay 2 off11

Clear screen, display 'Relay 2 off' , switch relay 2 off

#### OFFLINE direct example

```
CHAIN $RELON%11
```

```
PRINT $ADRES,$RELON : SEND
```

#### OFFLINE parameter example

Is not possible with parameters

## Relays 2 timed

23<sub>(dec)</sub> + timecode

Relay 2 becomes active for a time defined by the 'timecode' byte, then it switches off again and the WORKmate sends a function code back so that the application program knows that the WORKmate is ready to be used again. See the chapter "The terminal output function codes".

The timecode byte is in units of 0.5 sec and can have a value of 1 to 127.

#### ONLINE example

Transmit: 29Relay 2 puls23 08

Clear screen, display 'Relay 2 puls' , puls relay 2 for 4 seconds

#### OFFLINE direct example

```
CHAIN $RELON%23%10
```

```
PRINT $ADRES,$RELON : SEND
```

#### OFFLINE parameter example

Is not possible with parameters

## Simple Beep

7<sub>(dec)</sub>

The buzzer beeps for .5 seconds.

See the universal output command for more buzzer functions.

#### ONLINE example

Transmit: 29Error07

Clear screen, display 'Error' , give a beep

#### OFFLINE direct example

```
CHAIN $BEEP%7
```

```
PRINT $ADRES,$BEEP : SEND
```

#### OFFLINE parameter example

Make field 2 in a TXT file record, 00=no beep 01=beep

```
TXT record 5: 170100ENTER ORDER
```

```
PRINT $ADRES,-5 : SEND
```

## Universal output

$6_{(dec)} + \text{Code} + [\text{Time}]$

This command groups together all output functions in one command.

The command is a 2-byte code to expand the amount of possible command codes.

Some commands, like the relay codes, also exist as an older single byte commands. This is for compatibility with older software.

Some commands require a 'Time' parameter they are 3 bytes long.

The codes are grouped together in such a manner that extra commands can be added in the future.

|         |                                      |  |
|---------|--------------------------------------|--|
| BEEPER  | $6_{(dec)}, 32_{(dec)}$              | Short beep with low frequency  |
|         | $6_{(dec)}, 33_{(dec)}$              | Short beep with medium frequency   |
|         | $6_{(dec)}, 34_{(dec)}$              | Short beep with high frequency   |
|         | $6_{(dec)}, 35_{(dec)}$              | Medium length beep with low frequency  |
|         | $6_{(dec)}, 36_{(dec)}$              | Medium length beep with medium frequency   |
|         | $6_{(dec)}, 37_{(dec)}$              | Medium length beep with high frequency   |
|         | $6_{(dec)}, 38_{(dec)}$              | Long beep with low frequency   |
|         | $6_{(dec)}, 39_{(dec)}$              | Long beep with medium frequency  |
|         | $6_{(dec)}, 40_{(dec)}$              | Long beep with high frequency  |
|         | $6_{(dec)}, 41_{(dec)}$              | 3 medium length tones direct after each other with rising frequency. This can be used to attract the attention of the user, during special conditions. |
|         | $6_{(dec)}, 42_{(dec)}$              | 10 short tones direct after each other with rising frequency. This can be used to attract the attention of the user, during special conditions.        |
| LEDS    | $6_{(dec)}, 48_{(dec)}$              | Switch red LED on  |
|         | $6_{(dec)}, 49_{(dec)}$              | Switch red LED off (is also switched off with clear screen)  |
|         | $6_{(dec)}, 50_{(dec)}$              | Let red LED blink  |
|         | $6_{(dec)}, 51_{(dec)}$              | Switch green LED on  |
|         | $6_{(dec)}, 52_{(dec)}$              | Switch green LED off (is also switched off with clear screen)  |
|         | $6_{(dec)}, 53_{(dec)}$              | Let green LED blink  |
| LCD     | $6_{(dec)}, 61_{(dec)}$              | Clear screen without switching off the LED's   |
|         | $6_{(dec)}, 62_{(dec)}$              | Set LCD display cursor to a blinking block<br>You can use this function to especially attract attention to the cursor                                  |
|         | $6_{(dec)}, 63_{(dec)}$              | Set LCD display cursor to normal, a non blinking underscore.<br>(is also switched to normal with clear screen)   |
| OUTPUTS | $6_{(dec)}, 64_{(dec)}$              | Relay 1 on   |
|         | $6_{(dec)}, 80_{(dec)}$              | Relay 1 off  |
|         | $6_{(dec)}, 96_{(dec)}, \text{Time}$ | Relay 1 timed<br>With extra time byte in units of 0.5 sec, with a value of 1 to 127.   |
|         | $6_{(dec)}, 112_{(dec)}$             | Relay 1 toggle<br>The relay will continuously go on and off with a cycle of 1.2 second.<br>This mode is switched off with a clear screen.              |
|         | $6_{(dec)}, 65_{(dec)}$              | Relay 2 on   |
|         | $6_{(dec)}, 81_{(dec)}$              | Relay 2 off  |
|         | $6_{(dec)}, 97_{(dec)}, \text{Time}$ | Relay 2 timed<br>With extra time byte in units of 0.5 sec, with a value of 1 to 127.   |
|         | $6_{(dec)}, 66_{(dec)}$              | Output 3 on  |
|         | $6_{(dec)}, 82_{(dec)}$              | Output 3 off   |
|         | $6_{(dec)}, 98_{(dec)}, \text{Time}$ | Output 3 timed<br>With extra time byte in units of 0.5 sec, with a value of 1 to 127.  |
|         | $6_{(dec)}, 67_{(dec)}$              | Output 4 on  |

|  |   |  |
|--|---|--|
|  | 6 <sub>(dec)</sub> , 83 <sub>(dec)</sub>        | Output 4 off   |
|  | 6 <sub>(dec)</sub> , 99 <sub>(dec)</sub> , Time | Output 4 timed<br>With extra time byte in units of 0.5 sec, with a value of 1 to 127.  |
|  | 6 <sub>(dec)</sub> , 125 <sub>(dec)</sub>       | Identify WORKmate model command.<br>The WORKmate II returns function code 120 with a 4 digit number in the data field. The first number is always 2 for the WORKmate II, the last 3 digits are the firmware version number.<br>See the chapter on output function codes. |

#### ONLINE example

Transmit: 06 50  
Red led blinks

#### OFFLINE direct example

```
CHAIN $REDBLINK%6%50
PRINT $ADRES,$REDBLINK : SEND
```

#### OFFLINE parameter example

Is not possible with parameters

## Time out

17<sub>(dec)</sub> + Time1 + Time2

This command is used as input timeout, for example the program returns to the main menu when the user wait to long to answer a question. This command can also be used to show a message for a certain time, for example when the user types in wrong data, a error message is shown after the timeout is elapsed the program returns to the question.

The workmate sends a function code after both time1 and time2 are elapsed. See the chapter “The terminal output function codes”.

The time unit of the bytes Time1 and Time2 is half a second, Time1 can have a value of 1 to 127 and Time2 can have a value of 1 to 15.

During the first time ‘Time1’ the workmate is quiet, during the second time ‘Time2’ the workmate will beep to attract the attention of the user.

When the user pushes a key, reads a bar code or magnetic card the time-out function will be aborted.

#### ONLINE example

Transmit: 17Input error10 04  
Clear screen, display ‘Input error’ , wait for 5 sec and beep for 2 sec.

#### OFFLINE direct example

```
CHAIN $TIMEOUT%17%10%4
PRINT $ADRES,$TIMEOUT : SEND
```

#### OFFLINE parameter example

Field 2 in a TXT file record is time1, field 3 is time2  
TXT record 5: 001004  
PRINT \$ADRES : POINT 5 : SEND

## Clear screen

29<sub>(dec)</sub>

Clear the entire display and position the cursor at the start of the display.

The red and green LED is also switched off, if you don't want the clear the LED's use the clear screen function in the 'Universal output' command.

### ONLINE example

Transmit: 29

Clear screen

### OFFLINE direct example

```
CHAIN $CLR%29
```

```
PRINT $ADRES,$CLS : SEND
```

### OFFLINE parameter example

Field 2 in a TXT file 00=don't clear 02=clear screen

TXT record 5: 000200

```
PRINT $ADRES,+5 : SEND
```

## Position cursor

30<sub>(dec)</sub> + Pos

Position the cursor on the screen.

The values for the position code Pos are shown in the following table:

|      |     | Columns |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|------|-----|---------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| ROWS | 64  | 65      | 66  | 67  | 68  | 69  | 70  | 71  | 72  | 73  | 74  | 75  | 76  | 77  | 78  | 79  |
|      | 80  | 81      | 82  | 83  | 84  | 85  | 86  | 87  | 88  | 89  | 90  | 91  | 92  | 93  | 94  | 95  |
|      | 96  | 97      | 98  | 99  | 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 | 111 |
|      | 112 | 113     | 114 | 115 | 116 | 117 | 118 | 119 | 120 | 121 | 122 | 123 | 124 | 125 | 126 | 127 |

### ONLINE example

Transmit: 17Row 130 80Row 2

Clear screen, display 'Row 1', Position cursor on row 2  
, display 'Row 2'

### OFFLINE direct example

```
CHAIN $POS2%30%80
```

```
PRINT $ADRES,$POS2 : SEND
```

### OFFLINE parameter example

Field 1 in a TXT file contains the position code

Row 1: 01 to 16

Row 2: 17 to 32

Row 3: 33 to 48

Row 4: 49 to 64

TXT record 5: 170000

```
PRINT $ADRES,+5 : SEND
```

## Send data to RS232 port

### 127<sub>(dec)</sub> + Data string

The WORKmate sends the Data string on the RS232 serial port of the WORKmate.

The baud rate and the protocol of the RS232 port can be set in the setting menu.

The 127 code is followed by the data to be transmitted, the data can not be longer than 95 bytes.

After the 127 code no other workmate commands can be used only data to be transmitted.

After the complete data is transmitted the workmate will respond with a function code, so the software can execute the next task for the workmate. See the chapter "The terminal output function codes".

The characters in the Data string must be between 1 and 127.

The code 13(dec) (Carriage return) can't be used, the online protocol uses 13 as a block terminator.

Use 1(dec) instead, this will be translated to 13 before it is transmitted on the RS232 port.

Long strings of the same characters can be transmitted shorter with this 3 byte code:

**2(dec), Repeat amount + 31, ASCII code of character**

For example a string of 40 times a minus '-' character    2(dec) 71(dec) 45(dec)

#### ONLINE example

Transmit: 127Total time01 10 02 71-

Send to serial line command, send text 'Total time',

Carriage return, Line feed, send 40 times '-'

#### OFFLINE direct example

```
CHAIN $SERIAL%127
```

```
CHAIN $CRLF%1%10
```

```
PRINT $ADRES,$SERIAL,"PRINT TEST",$CRLF : SEND
```

#### OFFLINE parameter example

Is not possible with parameters

## Real time clock display

### 2<sub>(dec)</sub> and 3<sub>(dec)</sub>

A workmate has no real time clock, if you want to show the current time and date on the workmate display it has to be transmitted repeatedly.

Because it would be difficult to program this in VIPRO the concentrator takes care of this.

The codes described below are generated automatically in an off-line concentrator by the VIPRO language.

In an on-line concentrator you have to send them yourself.

#### **3 (dec) activate read time clock display :**

With this command you prepare the WORKmate to display the time and date in a certain way.

The settings are cleared when you clear the screen or when a data input is finished on the WORKmate.

For example you want to see the time in the main menu of an application program. Every time the main screen is send to the WORKmate you also have to send this command, in the sub-dialogs where you don't want to see the time, you don't send this command.

This command has 2 variations.

1) Time and date display. The time and date received through command 02 is shown on the display after formatting.

**3** (dec), **43** (dec), format, timeposition, dateposition

**format** sets the way the time and date are formatted on the LCD display.

48 (dec) = HH:MM:SS DD/MM/YY

49 (dec) = HH:MM DD/MM/YY

50 (dec) = HH:MM:SS DD/MM

51 (dec) = HH:MM DD/MM

52 (dec) = HH:MM with large characters, only line 4 is free for additional text.

The date is not shown. The position parameter is ignored.

**timeposition** sets the position of the time on the display. (can't be 0)

**dateposition** sets the position of the date on the display. (0 disables display of the date)

For the possible position values see the table include with the Position cursor code.

Example: 3 43 48 64 0 sets the time on the first line with the format HH:MM:SS and doesn't display the date.

2) Alarm time countdown. The time received through command 02 is subtracted from the set alarm time.

You get a counter that counts down to zero to the set alarm time. If zero is reached the workmate will respond with a function code. See the chapter "The terminal output function codes". This is used with job registration, the alarm time is set to the time that the job should normally be finished.

After zero the alarm time can go negative so you know the overtime for a job.

**3** (dec), **45** (dec), format, timeposition, HHMMSS

**format** sets the way the alarm counter is formatted on the LCD display.

48 (dec) = HH:MM:SS No negative values, counter stops at 00:00:00

49 (dec) = MM:SS No negative values, counter stops at 00:00

50 (dec) = HH:MM:SS With negative values

51 (dec) = MM:SS With negative values

52 (dec) = HH:MM With large characters, only line 4 is free for additional text.

With negative values. The position parameter is ignored.

**timeposition** sets the position of the alarm counter on the display. (can't be 0)

**HHMMSS** alarm time

## 2 (dec) timebase real time clock :

2 (dec) HHMMSSDDMMYY

The command is followed by a 12 numbers that represent the current Hour Minute Second Day Month Year. With this command the current time and date is transmitted to all the WORKmates.

Only the WORKmate that are prepared with the command 03 will use this information to display the time or and alarm counter.

This command is always send with a public address and you have to repeat it after a set time. If you don't need to display the seconds you can send this command every minute.

### ONLINE example

Transmit: 03 43 48 64 80

Display the time on line 1 and the date on line 2

Transmit: 02123000123001

Send current time (12:30:00) and date (30 December 2001)

### OFFLINE direct example

Is not possible with direct codes

#### OFFLINE parameter example

A complete record in the TXT file contains all settings  
The timebase is transmitted automatically every 4 sec.  
after the first use of the '/' parameter in the print  
instruction.

```
TXT record 5: 011700  
PRINT $ADRES,/5 : SEND
```

## Activate reader mode

21<sub>(dec)</sub> 16<sub>(dec)</sub>

In the old WORKmates the readers are only active in a special mode. These commands (21 for proximity & magnetic cards, 16 for barcodes) are used in the WORKmate 36 to switch on the reader mode.

The new WORKMATE II is always ready to read barcodes or proximity cards, you don't have to use these codes anymore. Be careful when programming an application, it is now possible that you read a barcode in an input that doesn't need barcodes. You must now test for reader data in every input and discard it new you don't need it.

To be compatible with older software you can set the mode to 'SOFTWARE ENABLED', in this mode the readers are only active if they are activated by these codes. See 'Barcode & Prox. reader mode' in the setup menu.

#### ONLINE example

```
Transmit: 29Read barcode16
```

Clear screen, display 'Read barcode', Activate barcode

#### OFFLINE direct example

```
CHAIN $BARCOD%16  
PRINT $ADRES,$BARCOD : SEND
```

#### OFFLINE parameter example

```
Make field 3 in a TXT file record 00=no reader  
01=barcode 02=proximity  
TXT record 5: 170101Read barcode  
PRINT $ADRES,-5 : SEND
```

## The input port commands

The 2 inputs on the Input/Output board can be used with the following methods. It depends on the application which method is the best.

- Read out the input levels directly.  
Use this when you don't want to know when the change occurs, but just the current status.
- The workmate waits for a change on the input line after it receives one of the 'input detect' commands. Use this if you know when the input needs to change and you want to limit the amount of function codes the WORKmate transmits.
- Let the workmate send a function code automatically, during every change on the input line.  
Use this if you don't know when the input is going to change. The chance that you miss input data is smaller with this method. Don't use this method on a device that can generate a lot of pulses, you can overwhelm the concentrator network with the constant transmission of input change codes.  
This mode is switched off by default, see 'input port 1 message mode' in the setup menu how to activate it.

- Let the workmate count the pulses on an input port. See the counter commands. This is useful for counting production amounts. For example: when a person starts working on an order the counter is reset, when the person indicates that he stops working the counter is read and the production amount is known.

## Input 1 active detect

4<sub>(dec)</sub>

The WORKmate sends a function code when input 1 on the Input/Output board becomes active, if input 1 already was active when this command was received, the function code is send immediately. See the chapter “The terminal output function codes”.

Input 1 is active when current flows through the opto-coupler in voltage mode or when the switch is closed in switch mode.

This command is not reset by any other command, it stays active till the input changes or the ‘input 1 inactive detect’ command is send.

### ONLINE example

Transmit: 04  
Wait till input 1 becomes active.

### OFFLINE direct example

```
CHAIN $IN1LOW%4
PRINT $ADRES,$IN1LOW : SEND
```

### OFFLINE parameter example

Is not possible with parameters

## Input 1 inactive detect

5<sub>(dec)</sub>

The workmate sends a function code when input 1 on the Input/Output board becomes inactive, if input 1 already was inactive when this command was received, the function code is send immediately. See the chapter “The terminal output function codes”.

Input 1 is active when no current flows through the opto-coupler in voltage mode or when the switch is open in switch mode.

This command is not reset by any other command, it stays active till the input changes or the ‘input 1 active detect’ command is send.

### ONLINE example

Transmit: 05  
Wait till input 1 becomes inactive.

### OFFLINE direct example

```
CHAIN $IN1HIGH%5
PRINT $ADRES,$IN1HIGH : SEND
```

### OFFLINE parameter example

Is not possible with parameters

## Input 2 active detect

14<sub>(dec)</sub>

The workmate sends a function code when input 2 on the Input/Output board becomes active, if input 2 already was active when this command was received, the function code is send immediately. See the chapter “The terminal output function codes”.

Input 2 is active when current flows through the opto-coupler in voltage mode or when the switch is closed in switch mode.

This command is not reset by any other command, it stays active till the input changes or the ‘input 2 inactive detect’ command is send.

### ONLINE example

Transmit: 14

Wait till input 2 becomes active.

### OFFLINE direct example

```
CHAIN $IN2LOW%14
```

```
PRINT $ADRES,$IN2LOW : SEND
```

### OFFLINE parameter example

Is not possible with parameters

## Input 1 inactive detect

15<sub>(dec)</sub> + Timecode

The workmate sends a function code when input 2 on the Input/Output board becomes inactive, if input 2 already was inactive when this command was received, the function code is send immediately. See the chapter “The terminal output function codes”.

Input 2 is active when no current flows through the opto-coupler in voltage mode or when the switch is open in switch mode.

This command is not reset by any other command, it stays active till the input changes or the ‘input 2 active detect’ command is send.

### ONLINE example

Transmit: 15

Wait till input 2 becomes inactive.

### OFFLINE direct example

```
CHAIN $IN2HIGH%15
```

```
PRINT $ADRES,$IN2HIGH : SEND
```

### OFFLINE parameter example

Is not possible with parameters

## Read level input lines directly

$126_{(dec)} + N$

- N = 48 (Ascii '0') to read the level on input 1.
- N = 50 (Ascii '2') to read the level on input 2.
- N = 51 (Ascii '3') to read the level on input 3.
- N = 52 (Ascii '4') to read the level on input 4.

After the WORKmate receives this command, it will respond immediately with 0 or 1 for the data and no function code. When current flows through the input line the data 48(Ascii '0') is transmitted, otherwise 49(Ascii '1') will be transmitted.

Current flows through the input when

- The switch is closed in switch mode.
- A voltage is applied in voltage mode.

### ONLINE example

Transmit: 126 48

Read the status of input port 1.

### OFFLINE direct example

```
CHAIN $GETIN1%126%48
PRINT $ADRES,$GETIN1 : SEND
```

### OFFLINE parameter example

Is not possible with parameters

## The counter commands

Both inputs on the Input/Output board have counters associated with them; these count the pulses that arrive on the inputs in different ways.

|                                 |                             |  |
|---------------------------------|-----------------------------|--|
| <b>Counters<br/>for input 1</b> | Up counter 1                | Counts each pulse on input 1.<br>The timeout counter is reloaded with the 'timeout value' during every pulse.                    |
|                                 | Up counter 1 timeout value  | If the next pulse on input 1 doesn't arrive during this time a function code is send by the WORKmate.                            |
|                                 | Down counter 1              | Counts down till zero and then next pulse the WORKmate will sends a function code and down counter 1 is set to the reload value. |
|                                 | Reload value down counter 1 | This stores the value that down counter 1 restart at when going past zero.   |
| <b>Counters<br/>for input 2</b> | Up counter 2                | Counts each pulse on input 2.  |
|                                 | Down counter 2              | Counts down till zero and then next pulse the WORKmate will sends a function code and down counter 2 is set to the reload value. |
|                                 | Reload value down counter 2 | This stores the value that down counter 2 restart at when going past zero.   |

## Reset a counter

123<sub>(dec)</sub> + N

- N = 48<sub>(dec)</sub> to reset the Up counter 1, this also resets the Timeout and Pulses per minute functions.
- N = 49<sub>(dec)</sub> to reset the Down counter 1
- N = 50<sub>(dec)</sub> to reset the Up counter 2
- N = 51<sub>(dec)</sub> to reset the Down counter 2
- N = 52<sub>(dec)</sub> to reset the Reload value down counter 1
- N = 53<sub>(dec)</sub> to reset the Reload value down counter 2
- N = 54<sub>(dec)</sub> to reset the Timeout Up counter 1 only
- N = 55<sub>(dec)</sub> to reset the Pulses per minute function for Up counter 1 only

Resetting an up counter will enable it to start counting.

Resetting a down counter will disable it. The under run code (function 123<sub>(dec)</sub>) will not be transmitted.

Resetting a down counter also resets its reload value.

Resetting a reload value also resets the down counter.

### ONLINE example

Transmit: 123 48

Reset up counter 1

### OFFLINE direct example

```
CHAIN $RESCNT1%123%48
PRINT $ADRES,$RESCNT1 : SEND
```

### OFFLINE parameter example

Is not possible with parameters

## Preset a counter

124<sub>(dec)</sub> + N + CNT

CNT must be a valid counter value, from 00000000 to 99999999 (always 8 digits long)

- N = 48<sub>(dec)</sub> to set the Up counter 1
- N = 49<sub>(dec)</sub> to set the Down counter 1
- N = 50<sub>(dec)</sub> to set the Up counter 2
- N = 51<sub>(dec)</sub> to set the Down counter 2
- N = 52<sub>(dec)</sub> to set the Reload value down counter 1
- N = 53<sub>(dec)</sub> to set the Reload value down counter 2
- N = 54<sub>(dec)</sub> to set the Up counter 1 with timeout (In this case the CNT parameter is a timeout value of 4 digits not a counter!)
- N = 55<sub>(dec)</sub> to set the minimum pulses per minute for input 1 (In this case the CNT parameter is a 4 digits number!)

### **Presetting a upcounter :**

An up counter will start counting up from the CNT value, when it reaches 99999999 its will start again from 00000000.

### **Presetting a downcounter :**

A down counter will start counting down from the CNT value. When the counter goes below 00000000 it transmits a under run message. If no reload value is set the down counter will not count any more pulses and stays at 00000000.

This is 49<sub>(dec)</sub> 123<sub>(dec)</sub> for down counter 1 and 51<sub>(dec)</sub> 123<sub>(dec)</sub> for down counter 2.

In VIPRO you will receive 1 or 3 in the data variable and 28 in the function variable.

### **Presetting a reload value :**

If you preset a reload value, the down counter will restart counting from this value after it has encountered an under run. To stop this cyclic operation reset the counter.

Be aware that the down counter gives a message when it counts beyond zero, so if you want to count 10 pulses, you have to set the counter to 9.

#### **ONLINE example**

Transmit: 124 5200000100

Set the reload value for down counter 1 to 100

#### **OFFLINE direct example**

```
CHAIN $SETDWN1%124%52
```

```
PRINT $ADRES,$SETDWN1,"00000100" : SEND
```

#### **OFFLINE parameter example**

Is not possible with parameters

### **Setting the timeout value for counter 1:**

CNT is not a counter value but a timeout value from 0000 to 9999 (always 4 digits long). Each unit is 65ms (0.065 sec) long, the maximum delay time is about 11 minutes.

Up counter 1 will be reset and activated, also a special timer is activated.

After every pulse on the input line 1 the up counter is incremented and the timer restarts from the defined (time-out) value. When no pulses arrive before the timer is allowed to count to zero, the code 54(dec) 123(dec) is transmitted. In VIPRO you will receive 6 in the data variable and 28 in the function variable. When you reset up counter 1 this function is disabled.

This timeout function can only be used with up counter 1.

The difference with the standard up counter is that the pulses must arrive in the 'time-out' time. For example you can count pulses from a machine every time the machine produces one item. If the machine stops working, the pulses also stop and after the time-out run out a message is transmitted by the WORKmate so you know the machine has stopped. You also know how many pulses were given before it stopped

#### **ONLINE example**

Transmit: 124 541846

Set the a timeout value of 2 minutes (1846 \* 0.065 = 120)

#### **OFFLINE direct example**

```
CHAIN $SETTIME%124%54
```

```
PRINT $ADRES,$SETTIME,"1846" : SEND
```

#### **OFFLINE parameter example**

Is not possible with parameters

### **Pulses per minute mode for input 1:**

This mode is used to detect if there are a certain amount of pulses in 1 minute. This can be used to detect if a machine is in its production cycle not in its maintenance cycle.

The parameter CNT is a 4 digits number that sets minimum pulses that need to occur in 1 minute.

Each minute a special counter counts the pulses that occurred if they are more than the set minimum value this mode is switched off a function code is transmitted.

The internal minute timer starts after this code is received.

Counter 1 still can be used to count the total number of pulses.

## Read counter

$125_{(dec)} + N$

$N = 48_{(dec)}$  to read the Up counter 1

$N = 49_{(dec)}$  to read the Down counter 1

$N = 50_{(dec)}$  to read the Up counter 2

$N = 51_{(dec)}$  to read the Down counter 2

$N = 52_{(dec)}$  to read the Reload value down counter 1

$N = 53_{(dec)}$  to read the Reload value down counter 2

The value of the counter will be transmitted, this will always be 8 digits long, with a function code of 0.

When you want to reset an up counter after reading its value, you have to transmit 'read counter' followed by 'reset counter' in the same data string, so you don't lose pulses.

### ONLINE example

Transmit: 125 48

Read counter 1

### OFFLINE direct example

```
CHAIN $REACNT1%125%48
```

```
PRINT $ADRES,$REACNT1 : SEND
```

### OFFLINE parameter example

Is not possible with parameters

## Using the WORKmate in an application

The workmate operates in a question/answer manner. The computer composes a message and sends this to the workmate in 1 string. The computer then waits till the workmate responds to this message, this can be by a user interaction or a automatically generated event.

A typical data string to a workmate looks like this:

- 1) Clear screen
- 2) Line 1 text
- 3) Position cursor
- 4) Line 2 text
- 5) Activate the Beeper, turn on the LED's or set a Time-out.

### Example 1:

You want the display of the workmate to look like this:

```
START JOB
PERS: _ . . .
```

The cursor is placed in the beginning of the points to indicate to the user that he can enter maximum 4 digits. This string is needed for the above display: `29START JOB30 80PERS: . . . . 30 85`

### Example 2:

Displaying an error message.

```
Incorrect
barcode !
Try again.
```

The red LED blinks to indicate an error. The time-out command is included to return to the main dialog after the message is read.

This string is needed: `29Incorrect30 80barcode !30 96Try again.06 50 17 15 01`

### Example 3:

Displaying a main screen with real time clock.

```
30/05/01
13:45:58
Job 83123901
ACTIVE
Press a key
```

This string is needed: `29 30 80Job 8312390130 96ACTIVE30 112Press a key`

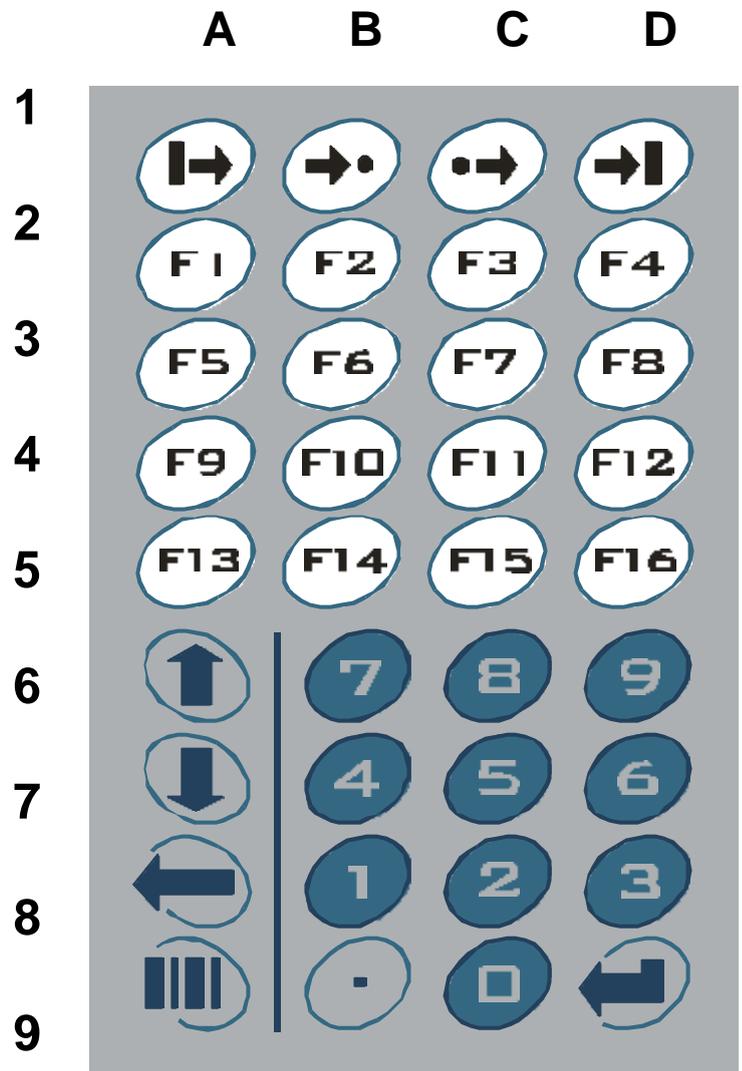
The date and time will be updated on the LCD, every time this string is send to the public address `02134558300501`

# The workmate II keyboard output codes

## List of functionkey codes

| position | key     | VIPRO         | ONLINE        |
|----------|---------|---------------|---------------|
| A1       | →       | 1             | 96            |
| B1       | →O      | 2             | 97            |
| C1       | O→      | 4             | 99            |
| D1       | →       | 5             | 100           |
| A2       | F1      | 6             | 101           |
| B2       | F2      | 7             | 102           |
| C2       | F3      | 8             | 103           |
| D2       | F4      | 9             | 104           |
| A3       | F5      | 10            | 105           |
| B3       | F6      | 11            | 106           |
| C3       | F7      | 12            | 107           |
| D3       | F8      | 13            | 108           |
| A4       | F9      | 14            | 109           |
| B4       | F10     | 15            | 110           |
| C4       | F11     | 16            | 111           |
| D4       | F12     | 17            | 112           |
| A5       | F13     | 18            | 113           |
| B5       | F14     | 19            | 114           |
| C5       | F15     | 20            | 115           |
| D5       | F16     | 21            | 116           |
| A6       | ↑       | 3             | 98            |
| A7       | ↓       | 22            | 117           |
| A8       | ←       | only for edit | only for edit |
| A9       | barcode | 26            | 121           |

## The keyboard layout :



Key **A8** is the backspace key it is used to edit the numerical input, no code is send to the concentrator.

Key **A6** is typically used to go back to the previous step in the dialog.

Key **A7** didn't exits in the older workmates. It can be used in combination with key A6 to walk through lists and menus.

Key **D9** is the enter key, to confirm a numerical input.

With the online concentrator the enter key has no code, you get only the address and the data.

Key **A9** is the barcode key, this key is only use as a function key in the WORKmate II, in the older workmates is was also used to abort the barcode reader mode.

## The terminal output function codes

The data received from the network terminals usually consist of three parts:

- 1) The address of the workmate on the network.
- 2) The numerical data entered on the keyboard or the bar-code data or badge data or automatically generated data like the value of an inputline.  
This part will be empty if only a functionkey was pressed.
- 3) A function code.  
This can be entered manually on the keyboard giving a special meaning to the previous data, or be generated automatically to indicate the type of data like a barcode.

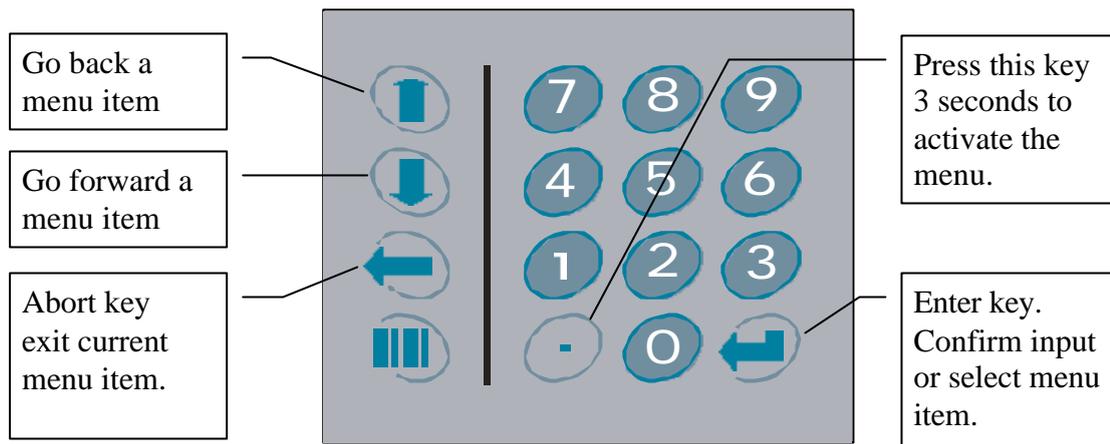
When programming in **VIPRO** the INPUT instruction will give you these 3 parts of the terminal data in 3 different variables.

With an **ON-LINE** concentrator the 3 parts are send in one string, the first 4 numbers are the address then follows the data and the last character is the function code. It is possible that the data part is empty and when the enter key was pressed there is no function code.

| List of the possible function codes |           |   |
|-------------------------------------|-----------|---|
| VIPRO                               | ON-LINE   | Description   |
| 0                                   | no code   | <b>The enter key on the keyboard</b><br>This key terminates data entry on the keyboard.   |
| 1 to 22                             | 96 to 117 | <b>Function keys on the keyboard.</b><br>These keys also terminate data entry on the keyboard. When they are pressed the number that was entered will be transmitted followed by the function key value.  |
| 26                                  | 121       | <b>The Bar-code key on the keyboard.</b><br>These code is transmitted when you press the bar-code key.<br>In most applications this is regarded as a request to switch from manual input to bar-code input.   |
| 30                                  | 125       | <b>Barcode scan on port 1.</b><br>This indicates that the data is from a barcode on the first barcode port.   |
| 23                                  | 118       | <b>Barcode scan on port 2.</b><br>This indicates that the data is from a barcode on the second barcode port.  |
| 29                                  | 124       | <b>Proximity badge scan on port 1.</b><br>This indicates that the data is from a magnetic badge or a proximity badge on the first (internal) proximity port.  |
| 24                                  | 119       | <b>Proximity badge scan on port 2.</b><br>This indicates that the data is from a magnetic badge or a proximity badge on the second (external) proximity port.   |
| 25                                  | 120       | <b>Workmate Start-up.</b><br>This code is transmitted when a terminal starts-up for the first time.<br>See 'Transmit startup function key' in the setup menu.<br>Workmates can be disconnected when the network is in operation, a newly connected workmate signals with this code that it is present in the network. After which the computer can send the appropriate message to the workmate.<br>This code is also use with the identify WORKmate model command. |

|    |     |  |
|----|-----|--|
| 27 | 122 | <p><b>Input line transition</b></p> <p>This function code is transmitted on every change of the input lines when the 'Input port message mode' is set to 'always active'.</p> <p>The data transmitted with this function can be:</p> <p><b>10</b> when input line 1 is 0 ,current flows through the opto-coupler.</p> <p><b>11</b> when input line 1 is 1 ,no current flows through the opto-coupler.</p> <p><b>20</b> when input line 2 is 0 ,current flows through the opto-coupler.</p> <p><b>21</b> when input line 2 is 1 ,no current flows through the opto-coupler.</p>   |
| 27 | 122 | <p><b>Serial data is transmitted.</b></p> <p>This code is send when the data to the extra serial line is completely transmitted.</p> <p>This is the same code as the one for 'input line transition', the difference is that for the serial line the data part is always empty and not for the input line.</p>   |
| 50 | 18  | <p><b>Data received on serial line 2</b></p> <p>The data must be terminated with carriage return.</p> <p>Only ASCII characters from 32 to 126 are accepted, all the others are ignored.</p> <p>This can be used to connect for example a serial barcode scanner.</p>   |
| 49 | 17  | <p><b>Keyboard input Time-out.</b></p> <p>Transmitted after the time-out timer has counted to its end, see the 'Time-out' command. If data in enter in the keyboard or with the readers the time-out is aborted and this codes will not be transmitted.</p> <p>This code is also transmitted when the time of the timed relay and the timed output is elapsed, this time is not aborted by entering data on the WORKmate.</p> <p>A number in the data field indicates the source of the time-out</p> <p>If the data is empty the time-out is from the keyboard timer</p> <p>If the data is '1' the time-out is from relay 1</p> <p>If the data is '2' the time-out is from relay 2</p> <p>If the data is '3' the time-out is from output 3</p> <p>If the data is '4' the time-out is from output 4</p> |
| 28 | 123 | <p><b>Counter event.</b></p> <p>A data character is also transmitted with this function</p> <p>If the data is '1', downcounter 1 has counted beyond zero.</p> <p>If the data is '3', downcounter 2 has counted beyond zero.</p> <p>If the data is '6', upcounter 1 has given a time-out.</p> <p>If the data is '7', upcounter 1 has more pulses per minute that set.</p>   |
| 32 | 127 | <p><b>Condition on input line 1 reached.</b></p> <p>With control code 4 and 5 you let the WORKmate wait till a change occurs on input line 1. This function code is transmitted when the previously programmed condition occurs on the input line.</p> <p>See 'Input 1 active/inactive detect' commands</p>  |
| 31 | 126 | <p><b>Condition on input line 2 reached.</b></p> <p>With control code 14 and 15 you let the WORKmate wait till a change occurs on input line 2. This function code is transmitted when the previously programmed condition occurs on the input line.</p> <p>See 'Input 2 active/inactive detect' commands</p>  |

## The settings and selftest menu



After pressing the '.' key for at least 3 seconds this menu appears:

```
1=SETUP MENU
2=SELFTEST MENU
3=SHOW VOLTAGE
4=EXIT MENU
```

With the setup menu you can edit all the WORKmate settings.

With the self test menu you can start tools to test the hardware of the WORKmate .

With 'Show voltage' you can monitor the WORKmate power voltage.

This voltage should normally be more than 10Volts, the workmate keeps on working to about 8Volts. The minimum and maximum voltage are also shown so you can check for power fluctuations. A good test is to activate a CCD scanner or connect another WORKmate on the same cable and look if the voltage drops.

## The setup menu

If the address of the WORKmate is not set, it will jump to the setup menu automatically.

You can walk through the setup menu with the up/down arrows.

The last display line show the current setting of the menu item.

Press enter to change the current setting.

### Workmate network address Default: 01

The workmate needs a unique network address to work properly in the concentrator system.

It can be a number from 1 to 63.

### Transmit startup function key Default: YES

When the WORKmate is switched on by connecting it to the network it can send a startup function code to the concentrator. This is useful when you are swapping WORKmates in an active network, the software receives this code and sends the appropriate display to the WORKmate, otherwise the user sees the WORKmate startup screen.

You can switch this function on or off.

#### Readers function key mode Default: EQUAL CODES

You can connect 2 barcode reader or 2 proximity readers to the WORKmate.

When you read a barcode or proximity card the workmate sends a function code with the card number to indicate the data comes from a reader.

You can setup the WORKmate to transmit 'EQUAL CODES' for both reader inputs or 'DIFFERENT CODES' for each reader input.

EQUAL CODES is good when you want the user to choose if he plugs his barcode pen in the left or right connector.

DIFFERENT CODES is needed in an access control situation when one reader is used to enter a building and a second to leave the building.

#### Input port 1 message mode Default: Software enabled

The 2 inputs port on the optional I/O board can work in 2 different modes.

'SOFTWARE ENABLED' is this mode the software has to send a code to the WORKmate to read the input status.

'ALWAYS ACTIVE' is this mode the WORKmate sends the input status automatically each time the input changes.

#### Input port 2 message mode Default: Software enabled

The same as input port 1 message mode.

#### Extern Proximity input mode Default: Inverted

The proximity reader signals on the 2<sup>nd</sup> proximity port can be inverted or not.

'INVERTED' is typical for a proximity reader connected to the I/O board.

'NORMAL' is mostly used for a reader directly connected via the left DIN connector.

#### Define external function key Default: disabled

You can connect a push button to the input pin on the right DIN connector (input 3).

With this setup menu item you can link a keyboard code to this input.

If you press this external push button it is like you press the same key on the keyboard.

The key codes can be found by going to KEYBOARD TEST in the self test menu.

If you enter code 0 this function will be disabled.

#### Barcode & Prox. reader mode Default: always active

In the old WORKmates the readers are only active in a special mode, the new WORKMATE II is always ready to read barcodes or proximity cards, this is the 'ALWAYS ACTIVE' mode.

To be compatible with older software you can set the mode to 'SOFTWARE ENABLED', in this mode the readers are only active if they are activated by a software code.

#### LCD display backlight mode Default: Always off

The backlighting of the LCD display can be set to these modes:

'AUTOMATIC MODE' The backlight is only active if the display has changed, after 10 seconds the light goes off again.

'ALWAYS ON' The backlight is always active, this draws the most power.

'ALWAYS OFF' The backlight is never active, this mode saves power. Use this mode if there is enough ambient light .

#### RS232 port settings Default: 9600 Baud No parity

The WORKmate II has standard a RS232 port on the right DIN connector.

You can set the baudrate to 9600,4800,2400 or 1200 Baud.

And the parity to 8 No, 7 Even or 7 Odd parity.

### Special ASCII characters mode Default: Counter commands

The ASCII characters 123,124,125,126 are used for the counter commands like the DIO20, these ASCII codes are also used to display special foreign characters.

With this setting you can assign the ASCII characters to the counter command or use them to display special characters.

### Save setup

This menu item saves the change you have made to the settings to the flash memory. The changes are not saved if the abort key is pressed.

## The self test menu :

You have to enter the password 1596 to get into the selftest menu.

You select a test with the up/down arrows.

Press enter to start the selected test.

### Barcode and Prox reader test

With this test you can test the barcode readers, proximity reader and the magnetic card reader.

The card data, reader type and the reader port is shown if valid data is received.

With a barcode reader you also get information about the barcode type and

'Bad scan' is shown if pulses are received but no barcode is recognized.

'Decode error' is shown if a barcode is received but it has an error, for example an internal checksum error.

Press the backspace '←' key to abort the reader test.

### Keyboard test

With this test you can if all the keys of the keyboard work correctly.

The key code of the pressed key is shown, the beeper is active as long as the key is pressed.

Press the backspace '←' key to abort the keyboard test.

### Test the four input ports

The 2 input on the I/O board and the 2 inputs on the DIN connectors are scanned for changes.

The status and the input number is shown if an input changes.

Input 1 = The opto isolated input 1 on the I/O board

Input 2 = The opto isolated input 2 on the I/O board

Input 3 = The input on the right DIN connector.

Input 4 = The input on the left DIN connector.

Press the backspace '←' key to abort the input port test.

### Test the six outputports

With this test you can switch on and off these 6 output ports.

1 = Relays 1 is located on the I/O board.

2 = Relays 2 is located on the I/O board.

3 = Output 3 is located on the right DIN connector.

4 = Output 4 is located on the left DIN connector.

5 = The red and green led's above the WORKmate keyboard.

6 = The LCD backlight.

The output port is toggled each time you press the corresponding number key.

Press the backspace '←' key to abort the output port test.

## TEST concentrator network port

This menu item contains 4 tests to check the operation of the concentrator network.  
Only the line to who the WORKmate is currently connected to can be tested!

|                  |   |
|------------------|---|
| 1=Test checksums | Checks for error in the data packets<br><b>DataTrans Adr</b> Address of last data packet<br><b>CHKerrors</b> Checksum error data packets counter<br><b>FRMerrors</b> Byte framing error counter<br><b>Correct</b> Correct data packets counter  |
| 2=Check address  | Monitors the address polling of the concentrator<br><b>DataTrans Adr</b> Address of last data packet<br><b>Counter</b> Counts the number of times the address of this WORKmate is polled.<br><b>Minimum</b> The lowest address the concentrator has polled.<br><b>Maximum</b> The highest address the concentrator has polled.        |
| 3=Loop test      | This is used to check the hardware that drives the concentrator network, Do not use this test on an active network it is normally used in the labo.<br>The code to activate this test is 1596.<br><b>NOTHING</b> No data is received<br><b>OK</b> The data is received correctly<br><b>ERROR</b> Data is received but is not correct. |
| 4=Monitor        | You can monitor data transmitted to another WORKmate address.<br>It is not possible to see the data from WORKmate to concentrator.<br>Control codes are shown as a '°' symbol followed by an 3 digit decimal number. For example clear display will give °029   |

## Test RS232 serial communications port

This test changes the workmate into a mini RS232 terminal.

Data received on the RS232 port is displayed on the LCD screen and send back through the RS232 port. The keys you press on the keyboard are transmitted on the RS232 port and shown on the LCD screen.

If necessary change the baudrate and parity in the setup menu.

Press the barcode key to abort this test.

## WORKmate II demonstration program

With this menu item you can start a demonstration program.

The WORKmate doesn't need to be connected to a concentrator network only to a powersupply.

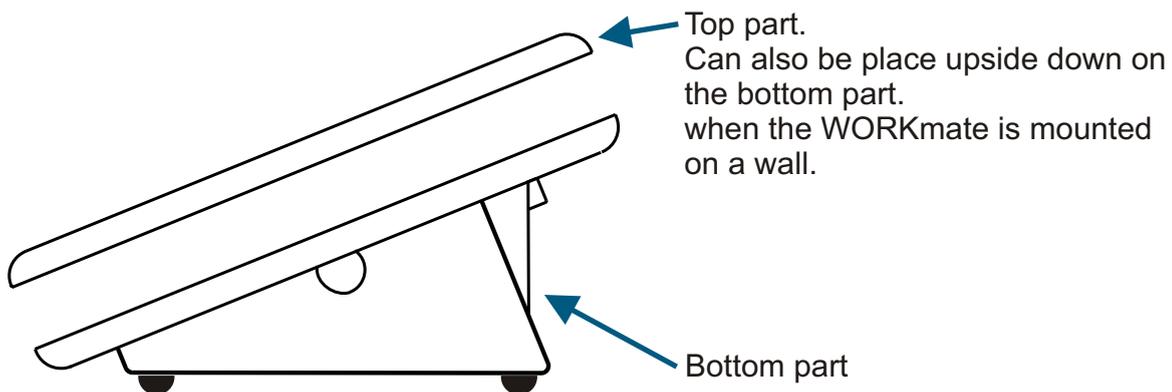
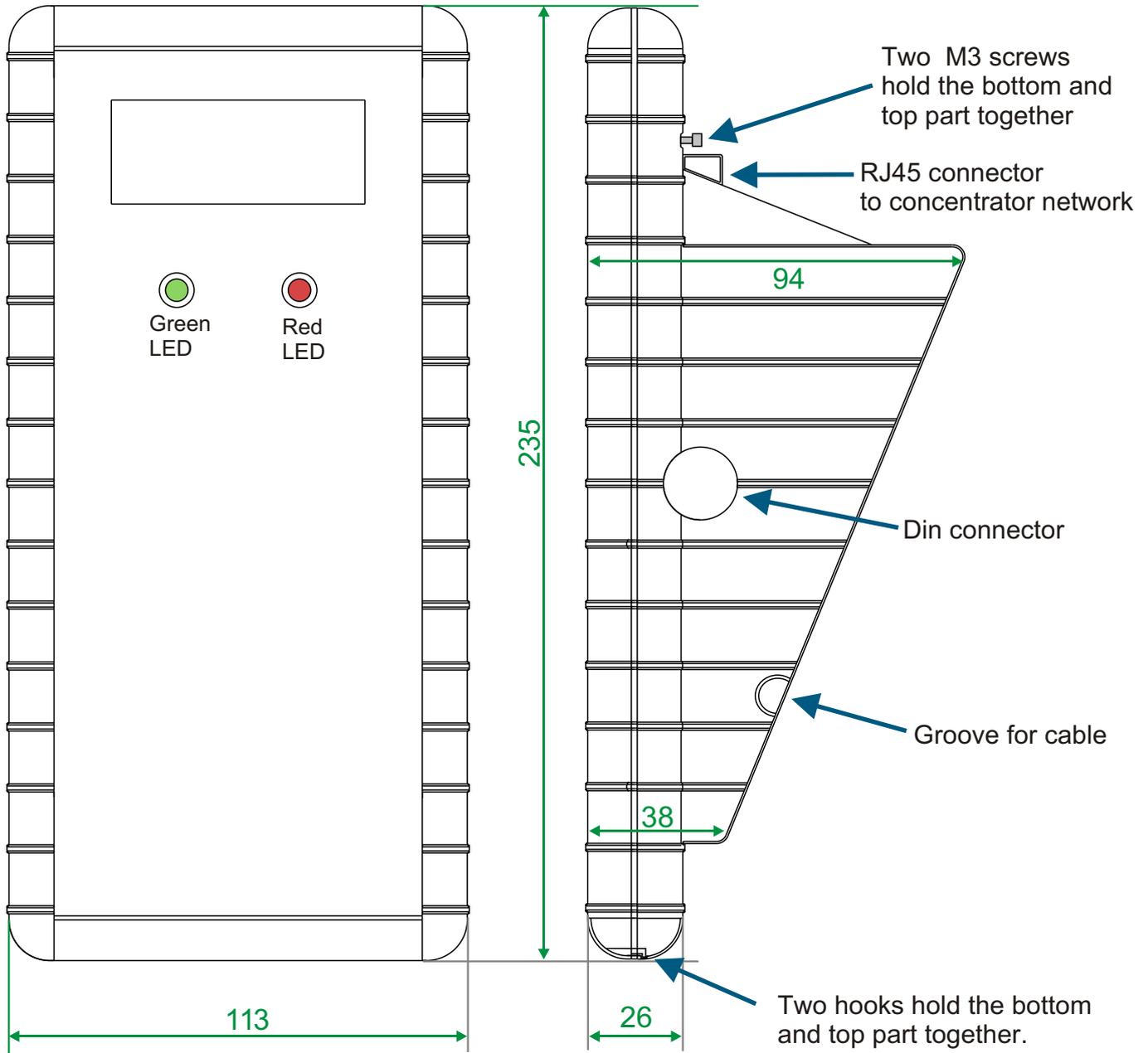
You can choose from 5 languages.

The demo program has the following functionality.

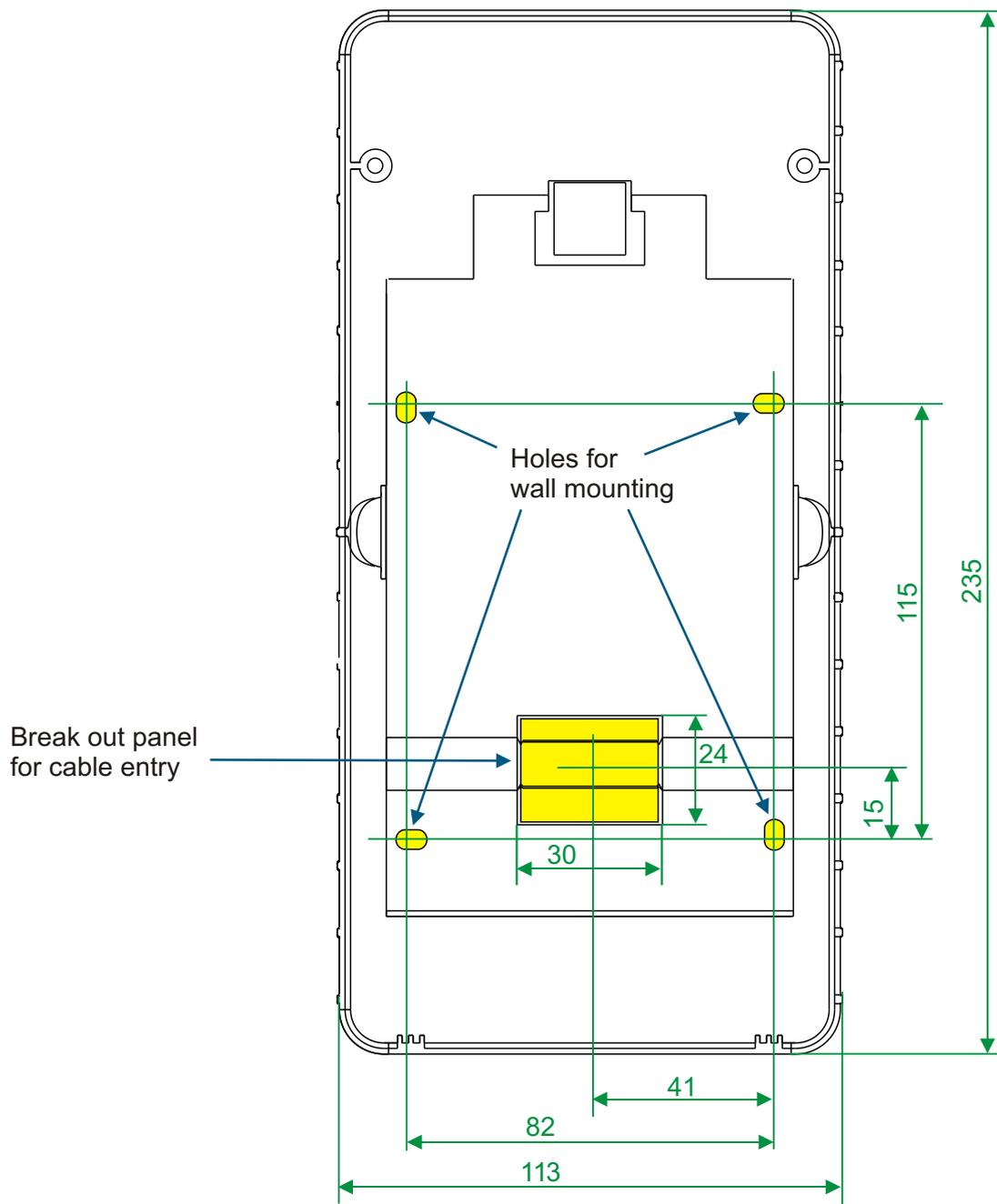
|     |  |
|-----|--|
| →   | Start job<br>Asks for PERSON, ORDER and ACTIVITY input.              |
| →●  | Interruption<br>You have to press F1 to F14 for the interrupt reason |
| ●→  | Restart after interruption.  |
| →   | End of job   |
| F15 | Shows Pieces made and time worked.                                   |
| F16 | Shows effeciency   |

Press the backspace '←' key in the main menu to abort the demonstration program.

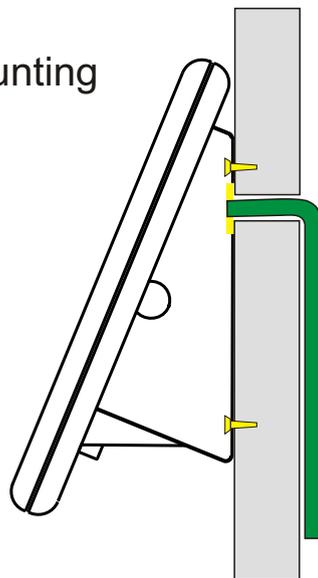
# Dimensions WORKmate II housing



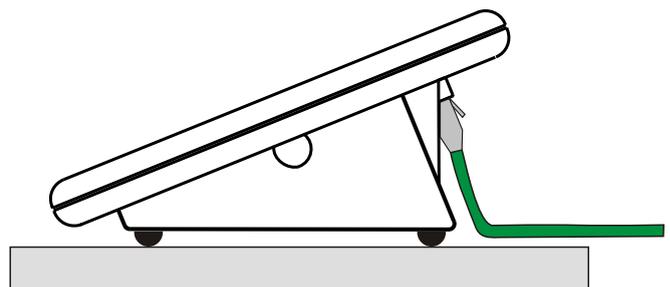
# Dimensions WORKmate II back side



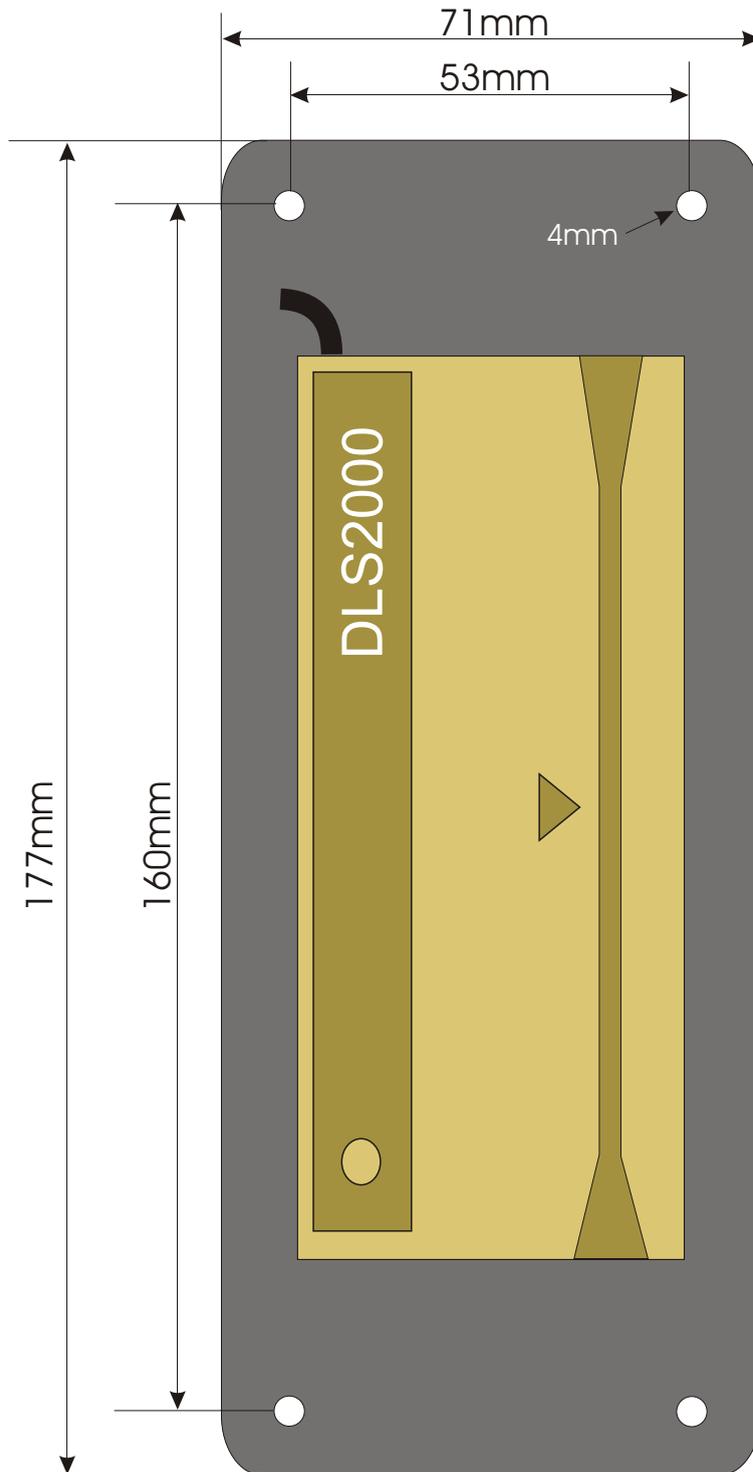
Wall mounting



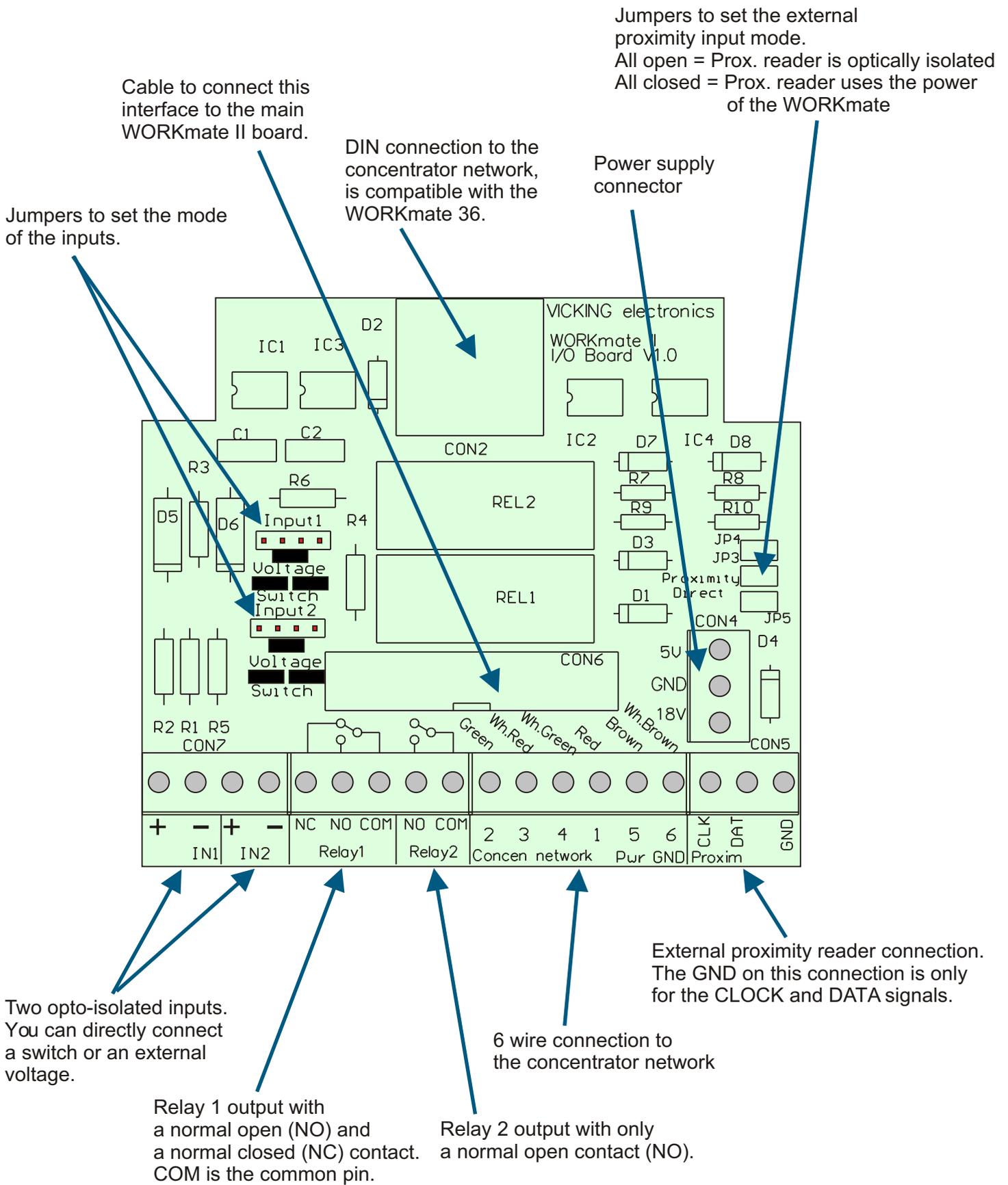
Used as a table model



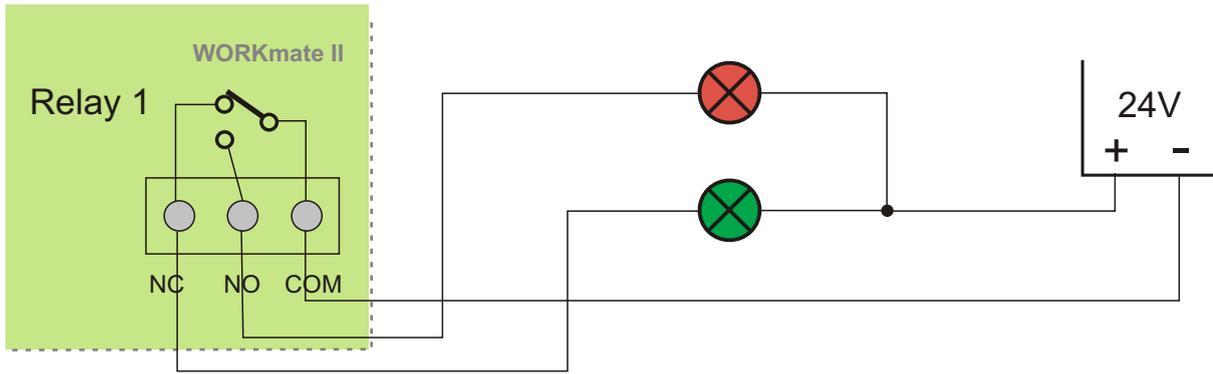
# Wall mounting plate for barcode bage reader



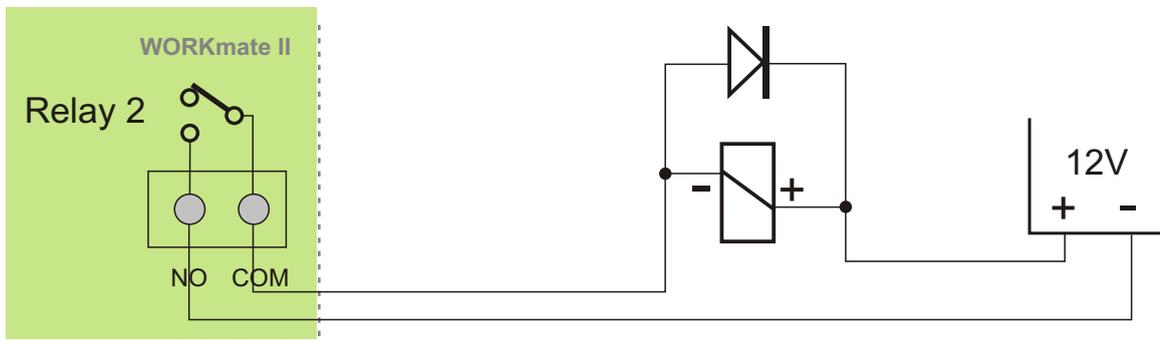
# Overview WORKmate II Input/output board



## Relay connection examples



A good / bad indicator in a production environment.  
In rest the green lamp glows, when the relay is activated the red lamp glows.



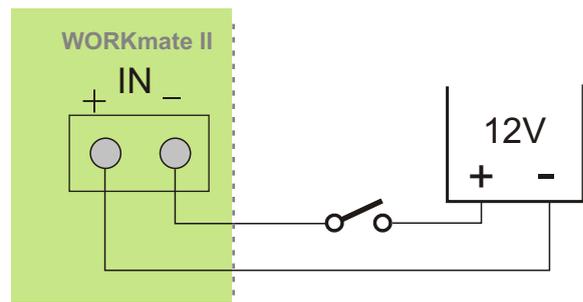
The connection of a electric doorlock coil. A Direct Current coil must all ways have a suppressor diode placed over it.

## The Input modes with example

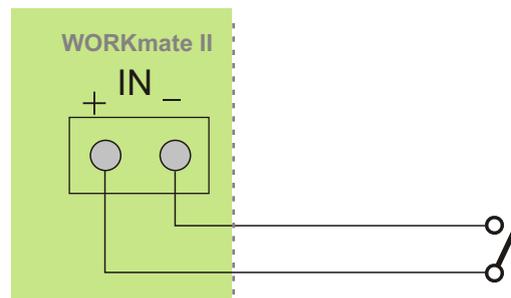


Place 1 jumper like this to use the input with an external power supply

In this mode the input is completely isolated from the WORKmate. It can be used with long wires the input voltage must be between 5V to 48V



Place 2 jumpers like this to use the input with a powerless switch. This can be a contact from a relay.



# Overview WORKmate II main board

Connection for extra speaker (8ohm 0.5 Watt). If the build in beeper is not loud enough.

LCD display connections.

RJ45 connection to the concentrator network, Standard UTP cable can be used.

Connection to the concentrator network with screw contacts. To connect the cable wires directly to the WORKmate.

If this jumper is open the WORKmate works normally. If the jumper is closed the WORKmate goes to program mode. You can download new software to flash memory. Only close this jumper with the power off.

Internal RS232 connector.

Right DIN connector.

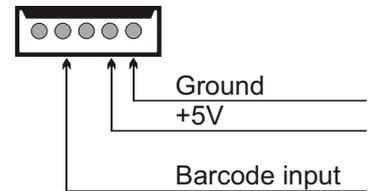
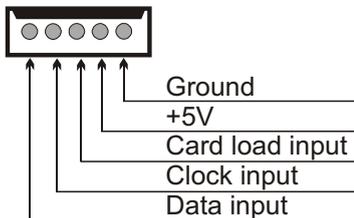
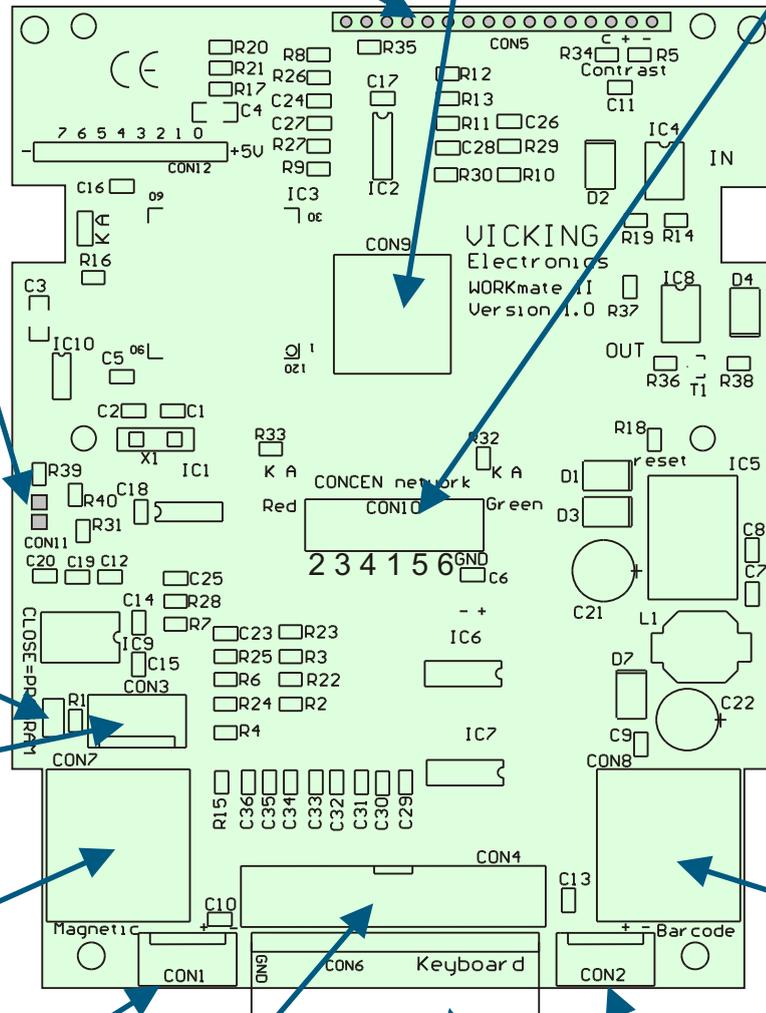
Cable to connect the input/output board to this board.

Connector to foil keyboard

Left DIN connector. This board is mounted upside down in de WORKmate, so this site becomes left.

Molex connector for a magnetic Badge reader or Proximity reader. This connector is pin compatible with Omron readers.

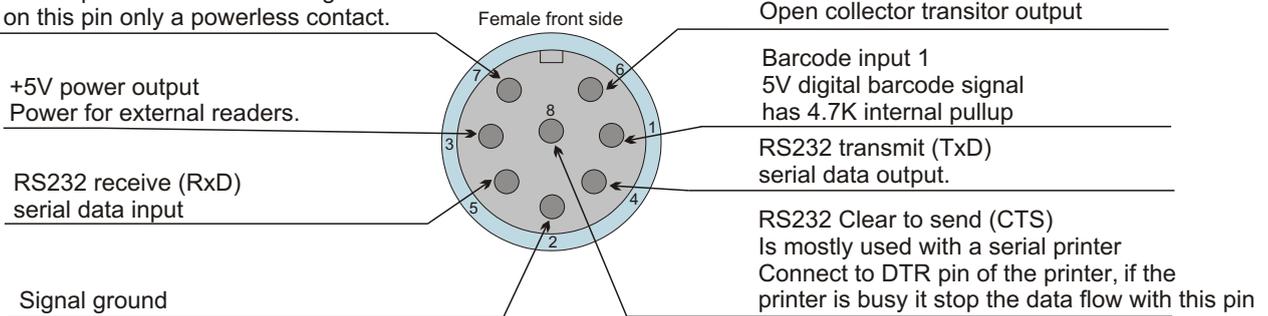
Molex connector for a barcode badge reader.



## The DIN connectors signals

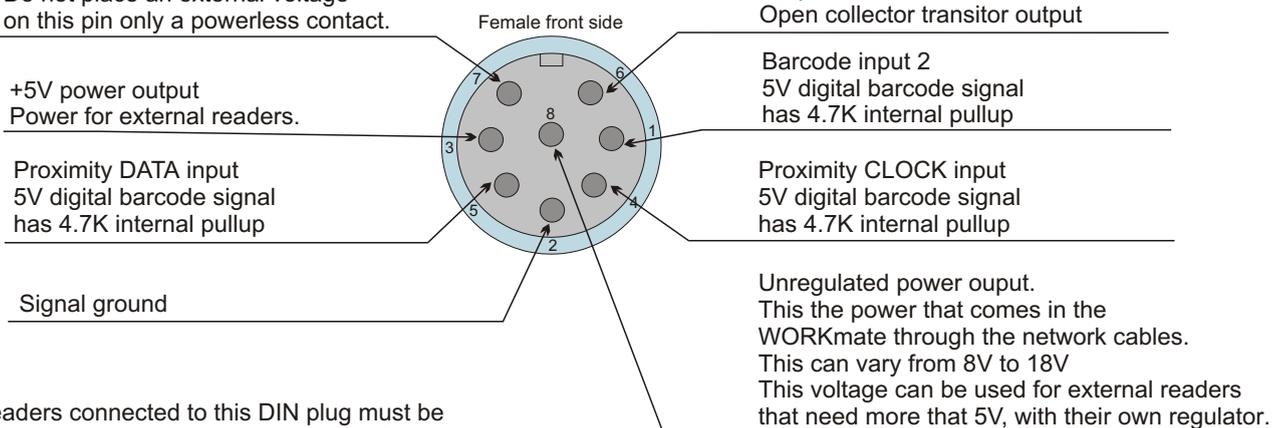
Input 3. To connect an external switch to the WORKmate.  
Do not place an external voltage on this pin only a powerless contact.

### Right DIN connector



Input 4. To connect an external switch to the WORKmate.  
Do not place an external voltage on this pin only a powerless contact.

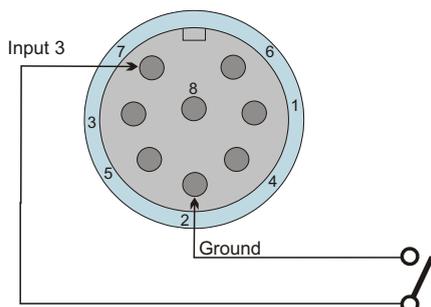
### Left DIN connector



The readers connected to this DIN plug must be near the WORKmate ( $\pm$  a cable of 3 meter)  
If you want to connect a proximity reader a long distance from the WORKmate use opto-isolated interface on the I/O board.

## Using the inputs on the DIN connectors

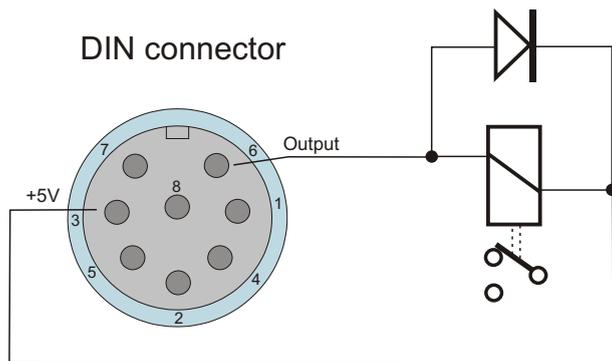
### DIN connector



On the right DIN connector pin 7 is input 3, a switch connected to this input can be programmed to emulate a key on the WORKmate keyboard.

On the left DIN connector pin 7 is input 4 it has no special function at the moment.

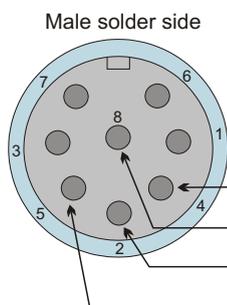
## Using the outputs on the DIN connectors



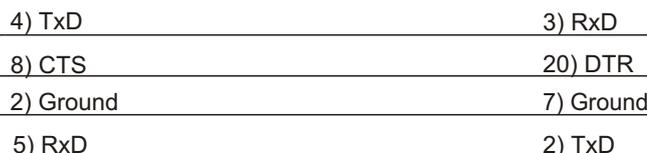
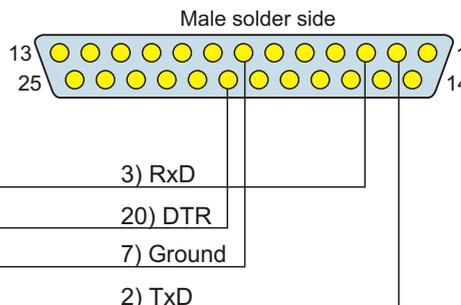
Pin 6 on each DIN connector is an open collector output that can drive a 5 volt relay.  
 On the right DIN connector pin 6 is output 3 on the left DIN connector pin 6 is output 4.

## Using the RS232 port with a printer

Male DIN connector



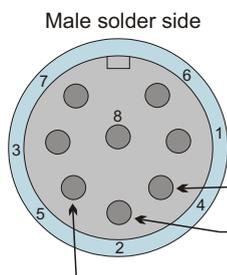
Male 25 pins SUB-D connector



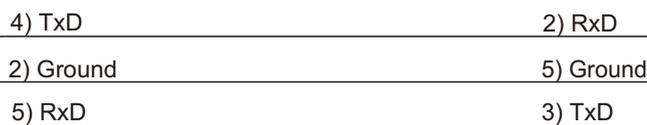
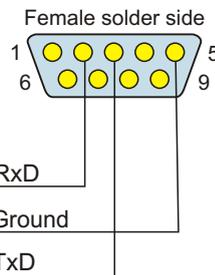
This cable can be used to connect a small ticket printer to the WORKmate II  
 Only the right Din connector has a serial port.  
 The CTS to DTR wire is only necessary if the printer is to slow and loses data.

## Programming the WORKmate with the RS232 port

Male DIN connector



Female 9 pins SUB-D connector

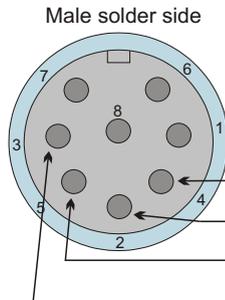


This cable can be used to connect the WORKmate II to a PC serial port.  
 With the following steps you can upgrade the operating software of the WORKmateII:  
 1. Open the WORKmate and disconnect it from the power supply (the network connector)  
 2. Close the jumper beside the DIN connector that says "CLOSE=PROGAM"  
 3. Connect a serial cable from the right DIN connector to the serial port of a PC  
 4. Reconnect the power supply, the LCD display will show 1 row of black squares.  
 5. Use the download program on the PC to reprogram the Flash memory of the WORKmate.  
 6. Disconnect from power and remove the jumper and the serial cable.

# Connecting readers to the WORKmate II

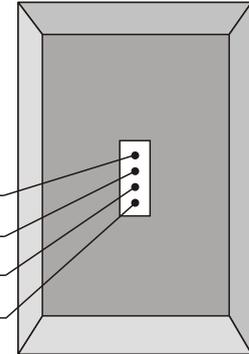
## Connect a proximity reader to the main board

Male DIN connector



- 4) Clock
- 2) Ground
- 5) Data
- 3) +5V

External proximity reader Microprox



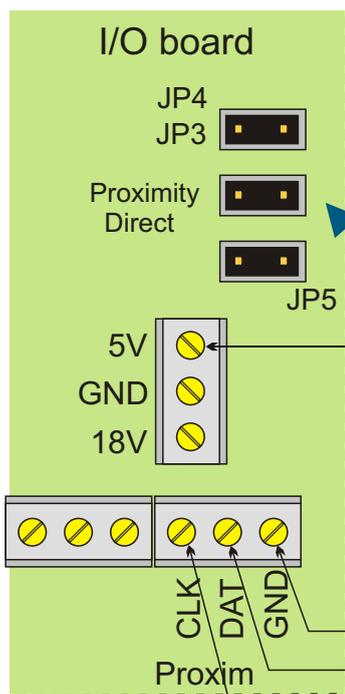
- (Green) Clock
- (Black) Ground
- (Grey) Data
- (Red) Power

There are 3 ways to connect a proximity read to the main board:

- 1) Connect an external reader to the left DIN connector. (see drawing above)  
This method is only for short distances, only use the cable already connected to the proximity module.
- 2) A proximity module can be mounted directly on the main board.  
You hold the proximity badge in front of the keyboard (in the middle of the 2 upper function key rows)
- 3) A proximity module can also be internally connected to the 5 pins Molex connector (CON1) see overview main board. This connector is compatible with Omron magnetic card readers.

The proximity readers used by Vicking electronics use a magnetic card track2 ABA compatible interface So if you want to use a magnetic card reader with the WORKmate you can use the same connections as for the proximity readers.

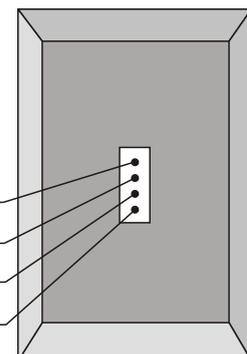
## Connect a proximity reader to the I/O board (short)



This method is only for short distances, only use the cable already connected to the proximity module.  
The advantage of this method is that you don't need a doorlock interface.

All 3 jumpers must be closed.

External proximity reader Microprox

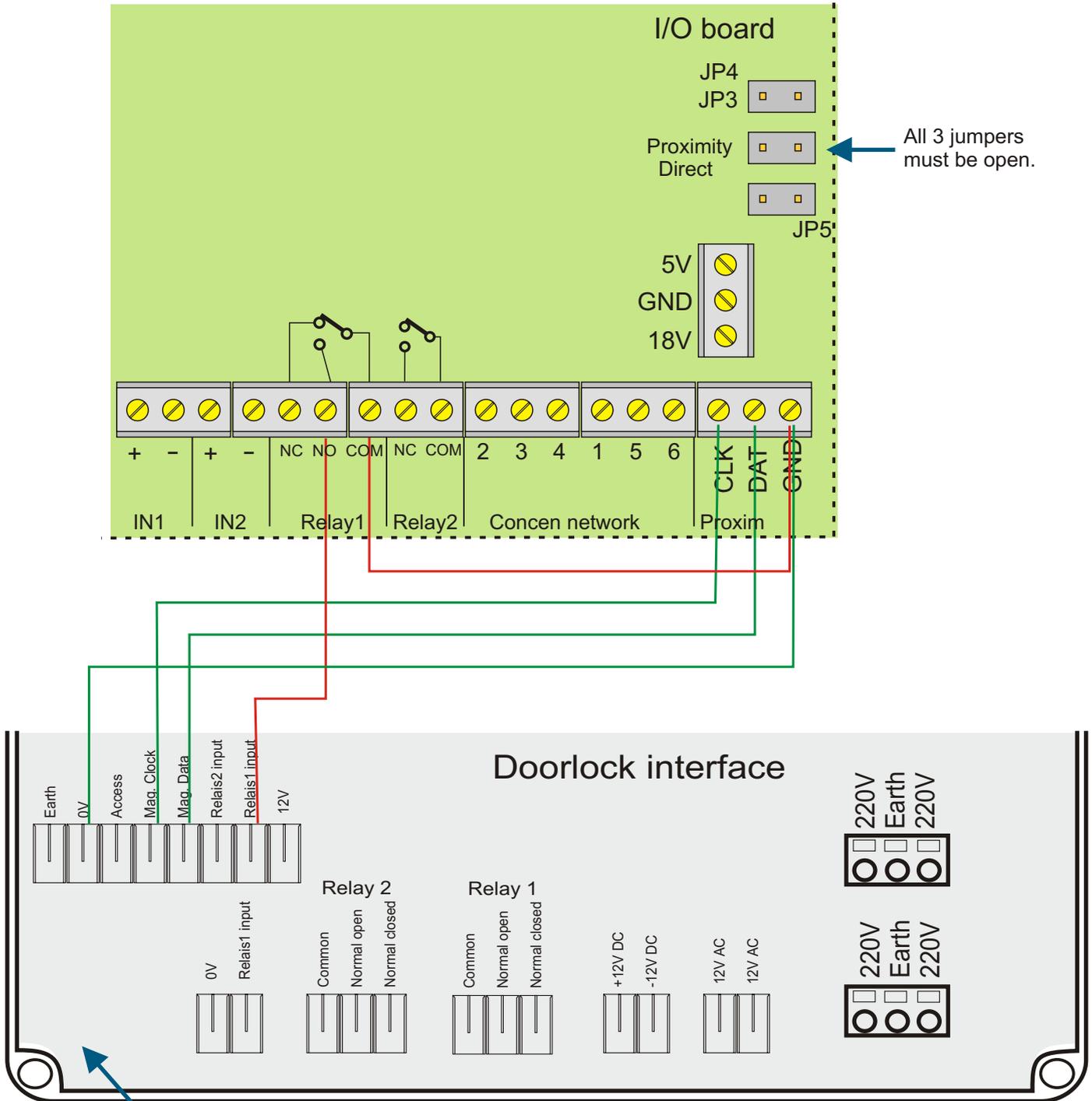


- (Red) Power
- (Black) Ground
- (Grey) Data
- (Green) Clock

## Connect a proximity reader to the I/O board (long)

This method is for long distances, maximum  $\pm 50$  meter.  
 The proximity reader is connected to the WORKmate through a doorlock interface.  
 The reader is now optically isolated from the whole concentrator network.  
 Make sure to check that the 3 jumpers on the I/O board are open!

Below you can see the wiring for the WORKmate to the doorlock interface.  
 The green wires are needed for the proximity data.  
 The additional red wires are needed to activated the relay on the doorlock interface, if you also want to drive an electric doorlock.

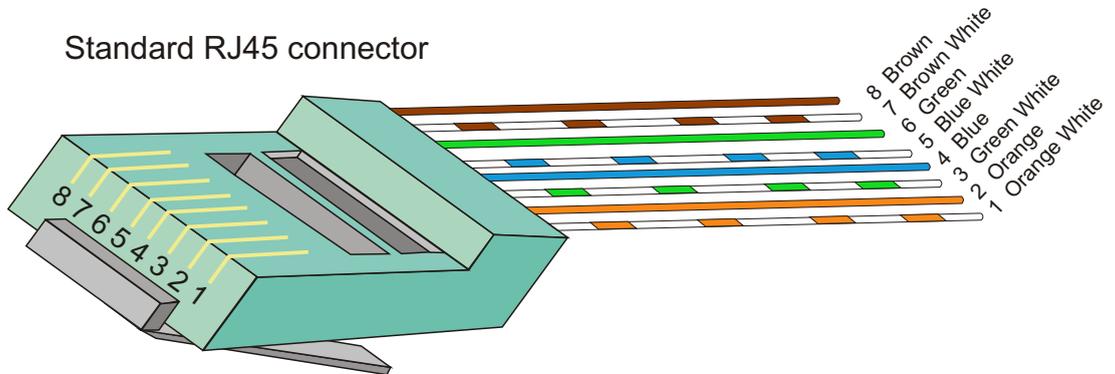


The proximity reader is connected to the doorlock interface.  
 See doorlock interface manual.

# Connecting the WORKmate II to a concentrator network

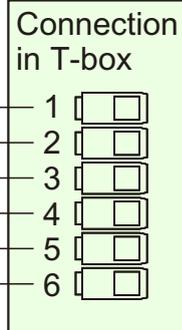
## Connecting with a UTP cable

Standard RJ45 connector



RJ45 connector

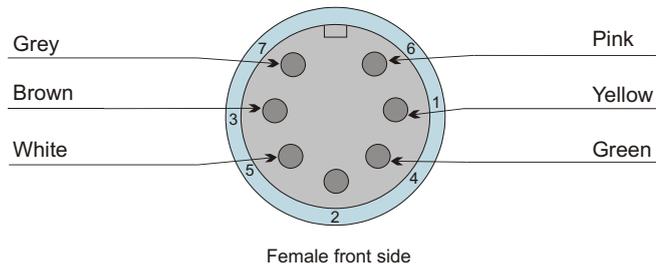
|                |                     |
|----------------|---------------------|
| 2 Orange       | WM transmitter loop |
| 6 Green        | WM receiver loop    |
| 1 Orange White | WM transmitter loop |
| 3 Green White  | WM receiver loop    |
| 8 Brown        | Power               |
| 7 Brown White  | Ground              |



Cable from WORKmate to T-block.  
To connect to WORKmate to the concentrator network.

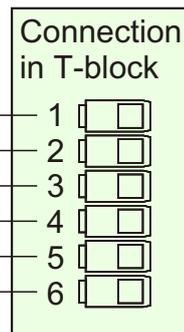
## Connecting with the DIN connector

DIN connector at the I/O board



DIN connector

|          |                     |
|----------|---------------------|
| 1 Yellow | WM transmitter loop |
| 3 Brown  | WM receiver loop    |
| 4 Green  | WM transmitter loop |
| 5 White  | WM receiver loop    |
| 6 Pink   | Power               |
| 7 Grey   | Ground              |

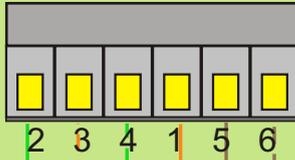


Cable from WORKmate to T-block.  
To connect to WORKmate to the concentrator network.  
VICKING sells this cable ready made with a standard length of 7 meters.

## With the screwconnector on the mainboard

Connector in the middle of the main board

CONCEN network



WM transmitter loop  
WM receiver loop  
WM transmitter loop  
WM receiver loop  
Power  
Ground

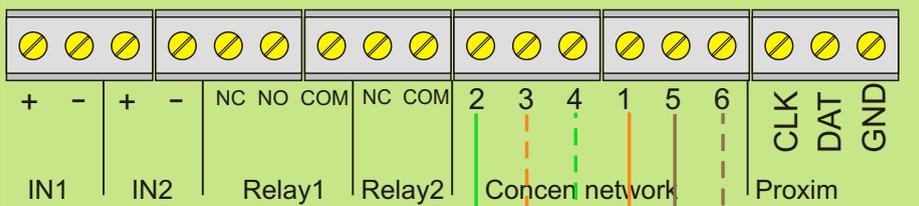
Connection in T-block



The WORKmate is connected to the concentrator network with a cable from a T-block to the removable screw connector on the main board. This is used when the network cable enters the WORKmate via the back side and the workmate has no optional I/O board

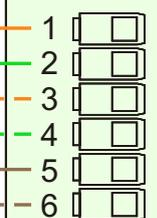
## With the screw connector on the I/O board

Screw connections on the I/O board



WM transmitter loop  
WM receiver loop  
WM transmitter loop  
WM receiver loop  
Power  
Ground

Connection in T-block



The WORKmate is connected to the concentrator network with a cable from a T-block to the screw connector on the I/O board. This is used when the network cable enters the WORKmate via the back side. The cable can be pulled through a pipe or the wall and cut to size because no connectors are needed with this method..