OriLink®
Monitoring System

Tank Control Module, 23408

(Covers TCM with PCB versions 203 02 62 C chip version 1.00.00 or later and 203 02 91 A chip version 2.00.00 or later, some features may be missing in earlier versions)

Table of Contents

1.   Introduction

The OriLink® TCM module, (**T**ank **C**ontrol **M**odule), is used to control pumps and/or measure levels in tanks using floater based level switches. A TCM can be used both for fresh and waste oil tanks.

The TCM (23408) is eighter a MPDM (23400) with another software (early model the chip should be labeled TCM 1.xx.xx) or has the PCB 203 02 91 equipped with a chip marked TCM 2.xx.xx.. Because of this a lot of this manual is similar to the manual of the MPDM.

> **NOTE!**   **The Orilink® installation manual should be available when installing and configuring a TCM.**

2.   Mechanical installation

The TCM is delivered mounted in a metal box with power supply. It can also be delivered as a PCB with mounting kit.

Complete TCM in a box is mounted on a wall or other suitable place using the four-ø5 mm holes in the bottom corners of the box.

If a PCB is used it is important that a power supply with enough performance is used.

3.   Electric installation

The power supply should be connected to mains 230VAC in a proper way following valid rules.

Alentec & Orion AB recommends that the connection be done through a 2-pole working switch.

It has five connectors (**A**) for the OriLink® communication. Two of these connectors, **MPDM IN** and **MPDM OUT** are not connected to **+24V** and are intended for a connection to another TCM, MPDM or other modules that already have +24VDC. This is to prevent connecting +24VDC from two power supplies.

The other three connectors are used to connect external devices without a power source such as a Printer Module (PM), a LED Module (LED) and/or a KeyPad (KP). These connectors can only supply power to a single device. For more detailed information see the **OriLink® Manual**

> **NOTE! If the communication loop begin in one of these modules it must be connected to either MPDM IN or MPDM OUT or +24V must not be connected.**

The RESET-button (**B**) can be used to reset the module or reset the module address. Power supply is connected to the connector (**C**).

> **NOTE!**   **Check polarity, GND is closest to the hole!**

The connector (**D**) is used when you install a chassis-mounted key switch and diode. With the key switch you can set the status of the module to OFF-, NORMAL-, or OVERRIDE-mode. The diodes indicate setting.

There are four connectors (**E**) market +24 V, OC, A, B and GND, one for each pump/tank. Solenoid valves and level sensors are connected to these connectors.

"A" of a TCM port is connected to "order oil/emptying" of the level sensor.

"B" of a TCM port is connected to "Stop level" of the level sensor.

"GND" of a TCM port is connected to common of the level sensor.

"+24V" of a TCM port is connected to one of the terminals of a solenoid valve and "Sol" is connected to the other.
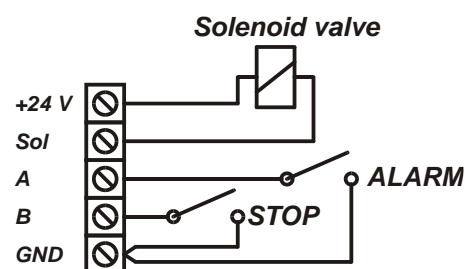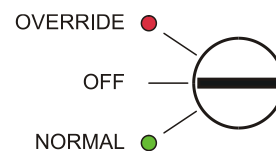
TIP! **If a TCM is used for a tank containing flammable liquid it could be necessary to use an EX protection.**

There are two diodes **(F)** for every port. These indicate the status of entry points A and B, the level in the tank.

One diode **(G)** on each port indicates if the solenoid valve is open or not.

If the diode **(H)** is flashing the module is operational and working properly. A steady light or completely off indicates a problem.

DIL switches for termination and BIAS are located at **(I)**. **(J)** Shows the position of the replaceable communication driver. The **SetupLock** jumper at position **(K)** has no function for a TCM.

A LED **(L)** shows if an analogue sensor is detected or not, lit if detected. The analogue sensors are connected to the 2-pole connectors marked **(M)**. The polarity is marked on the PCB.

TCM100 PCB 203 02 62X with chip TCM 1.xx.xx.
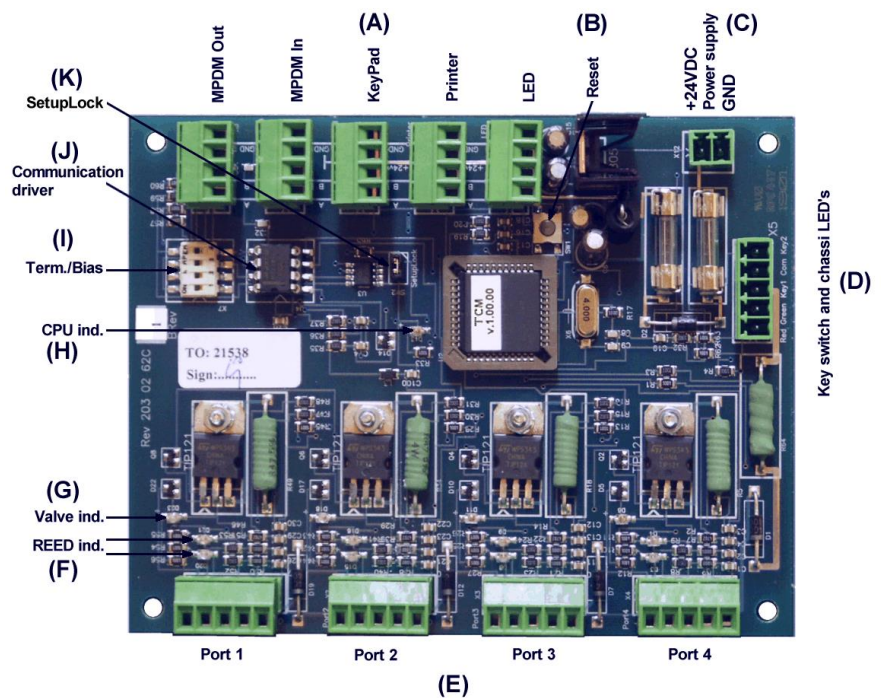
TCM200 PCB 203 02 91X with chip TCM 2.xx.xx.
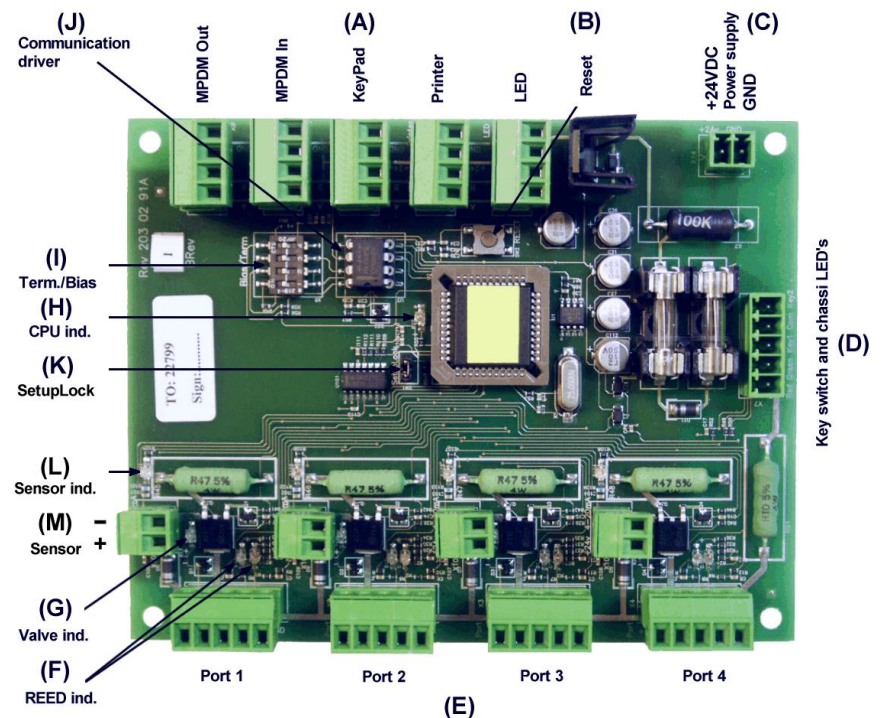
4. Configuration

An Orilink® configuration sheet *should* always be filled or altered during the configuration.

> **NOTE!** **To obtain technical support a copy of the configuration sheet for the complete installation must be sent to Alentec & Orion AB at**
>
> **Alentec & Orion AB**
> **TECHNICAL SUPPORT**
> **Grustagsvägen 4**
> **SE-138 40 ÄLTA**
> **SWEDEN**
>
> **or**
>
> **orilink@alentec.se**

4.1. Check before configuration

Check that the TCM is working and communicating with the system according to the Orilink® *Manual* chapter *Testing modules*.

> **NOTE!** **Do not forget to check and adjust the termination and BIAS according to Orilink® Manual.**

4.2. Addressing the TCM

A new module has a default address when delivered such as MPDM 1000, PM 2000, KP 3000, LED 4000, TCM 8000 and so on. To set an address for a new TCM or a TCM with unknown address press and hold it's RESET button for 5 seconds to set a temporary address. Immediately enter set-up mode from a KP and type 0 and then ENTER to get to the Main menu of the TCM, see below.

> **NOTE!** **Only one new module can be installed at a time. If you press the RESET-button on several terminals simultaneously or in a sequence, only the most recently pressed will be active.**

> **TIP!** **Follow preferably "Recommendation for setting new addresses" when setting addresses.**

4.3. Set-Up mode

Type the word **"SETUP"** on a KeyPad and press **ENTER**.
Type the **password** and press **ENTER**.

Type the address for the TCM that is to be configured and press **ENTER** to access its main menu. It is possible to add the 4-digit menu code to go directly to the desired menu.

Scroll through the TCM sub menus by pressing ↑ or ↓. When the desired menu is shown press ENTER etc.

| Reel:SETUP ‡ |
| EXIT STOP CE ENT |

| PASS:_ ‡ |
| Enter Password |

| Addr:8???_ ‡ |
| Address[CODE] |

| TCM: ‡ |
| TCM MainMenu |

4.4. Change address *[TCM//Address]*

Enter menu **[TCM//Address]** by pressing **ENTER**.

Press **ENTER** to get the cursor.

Type in the **desired address** and acknowledge by pressing **ENTER**. When the cursor disappears it is finished.

Press **EXIT** two times to leave Set-Up mode.

| TCM: ‡ |
| TCM MainMenu |

| Address:8XXX ‡ |
| Ange Adress 8??? |

| Address:8XXX ‡ |
| Set Address 8??? |

> **NOTE!** **If two or more TCM's have the same address the system will fail. The TCM's has to be re-addressed.**

> **TIP!** **Follow preferably "Recommendation for setting addresses" when setting addresses.**

4.5. Recommendation for setting addresses

Adress	Module
0000	Forbidden
1000 – 1xxx	MPDM
2000 – 2998	PM
2999	PC-database
3000 – 3xxx	KeyPad
4000 – 4xxx	LED-display
5000 – 5xxx	*Reserved*
6000 – 6xxx	*Reserved*
7000 – 7xxx	*Reserved*
8000 – 8xxx	TCM
9000 – 9xxx	Others
A000 – FFFF	Forbidden

Each module demands a unique 16 bit hexadecimal address. There are some forbidden and some reserved addresses but it is possible to use all addresses between 0001 and 9999. To make it easier to upgrade and support the system we recommend using the chart to the right.

This means that the first TCM should have the address 8001 and the next one 8002 etc. It is a good idea not to use the default address 8000, it makes it easier to add new Tam's

NOTE! It is essential to add modules to the configuration sheet continuously as they are configured to avoid collisions.

NOTE!   Address 0000 is forbidden and addresses above 9999 are reserved for the system.

5.   Configure the ports

A TCM has four ports that are used to control four different pumps/tanks.

5.1. Connect a tank to a port *[TCM//PortX/Tank]*

This is only needed for systems using the service TCmS.dll (early versions).

An OLWT R6 system uses the service WinDB.dll for this and then TankNo is only for informational purpose. Use correct TankNo or set all to "0".

Enter menu **[TCM//PortX]** by scrolling with ↑ or ↓.

TCM: ‡
TCM MainMenu

At **PortX:** press **ENTER**.

PortX: ‡
TCM MainMenu

Press **ENTER** to get the cursor.

Tank:X   ‡
Set TankNo ???

Check the number of the tank that is connected to portX, type that number in and press ENTER to acknowledge. When the cursor disappears it is finished.

Press EXIT two times to leave Set-Up mode.

Tank:<u>X</u>   ‡
Set TankNo ???

5.2. Set the Mask [TCM//PortX/Mask]

Using the Mask each tank function can be set. This is done by adding the values for the desired functions, in the chart to the right.

Function	Value
Waste oil tank	1
Not in use	2
Invert B	4
Invert A	8

EXAMPLE: Port 1 measures the level of a waste oil tank and controls the air to a waste oil pump using an Alentec & Orion AB 2-levels sensor 23132. This is up done by calculating the value of the Mask 1+4+8=13. The Mask should be set to 13.

Enter menu **[TCM//PortX]** by scrolling with ↑ or ↓.

TCM: ‡
TCM MainMenu

At **PortX:** press **ENTER**.

PortX: ‡
TCM MainMenu

Scroll to **Mask:** using ↑ or ↓.

Mask:X   ‡
Set Mask 0-15

Press **ENTER** to get the cursor.

Type the **mask value** and press **ENTER** to acknowledge. When the cursor disappears it is finished.

Mask:<u>X</u>   ‡
Set Mask 0-15

Press **EXIT** two times to leave Set-Up mode.

Mask:X   ‡
Set Mask 0-15

5.3. Analogue sensor settings

5.3.1. Set the input signal filter time constant

This time constant (*Tau*) is used to filter the sensor signal to create an accurate tank level. "0" means no filter and a higher value gives slower response but a more accurate value. The default value of "6" is in most cases good. It means that for a step in the tank level the reading of the level is on 99,9 % after 30 seconds.

| TCM: ‡ |
| TCM MainMenu |

Enter menu **[TCM//PortX]** by scrolling with ↑ or ↓.

| PortX: ‡ |
| TCM MainMenu |

At **PortX:** press **ENTER**.

Scroll to **T:** using ↑ or ↓.

| T:6   ‡ |
| Time constant |

Press **ENTER** to get the cursor.

| T:6   ‡ |
| Time constant |

Type the **time constant** and press **ENTER** to acknowledge. When the cursor disappears it is finished.

Press **EXIT** two times to leave Set-Up mode.

| T:6   ‡ |
| Time constant |

5.3.2. Adjusting the offset

Offset adjusting is used to obtain "0" volume when the tank is empty. If the sensor 23 417 is used a normal value is –0.120. The "-" sign is typed on the keypad by first pressing down arrow (yellow) two times followed by the "?" mark.

| TCM: ‡ |
| TCM MainMenu |

If the tank is empty, put the sensor in the tank at the bottom. If there is fluid in the tank hold the sensor outside the tank at bottom level. Adjust the offset value until the tank level shows "0".

| PortX: ‡ |
| TCM MainMenu |

Enter menu **[TCM//PortX]** by scrolling with ↑ or ↓.

| O:0.000   ‡ |
| Zero adjust |

At **PortX:** press **ENTER**.

Scroll to **O:** using ↑ or ↓.

| O:-0.120_   ‡ |
| Zero adjust |

Press **ENTER** to get the cursor.

Type the **offset value** and press **ENTER** to acknowledge. When the cursor disappears it is finished.

| O:-0.120   ‡ |
| Zero adjust |

Press **EXIT** two times to leave Set-Up mode.

5.3.3. Adjusting the calibration

The calibration factor should normally be set to "1.000" if all other values are set properly. The intention with the calibration factor is to have a quick way to make small adjustments.

| TCM: ‡ |
| TCM MainMenu |

Enter menu **[TCM//PortX]** by scrolling with ↑ or ↓.

| PortX: ‡ |
| TCM MainMenu |

At **PortX:** press **ENTER**.

Scroll to **C:** using ↑ or ↓.

| C:1.000   ‡ |
| Calibration |

Press **ENTER** to get the cursor.

Type the **calibration value** and press **ENTER** to acknowledge. When the cursor disappears it is finished.

| C:1.000   ‡ |
| Calibration |

Press **EXIT** two times to leave Set-Up mode

| C:1.000   ‡ |
| Calibration |

5.3.4. Set the fluid density

If a pressure sensor is used it is essential to set the true density of the fluid because the pressure at the bottom of the tank depends on fluid level and fluid density. The density is about 1 Kg/l and for water and 0.875 Kg/l for mineral oil at 20°C.

Enter menu **[TCM//PortX]** by scrolling with ↑ or ↓.

At **PortX:** press **ENTER**.

Scroll to **D:** using ↑ or ↓.

Press **ENTER** to get the cursor.

Type the **Density** and press **ENTER** to acknowledge. When the cursor disappears it is finished.

Press **EXIT** two times to leave Set-Up mode

```
TCM:        ‡
TCM MainMenu
```

```
PortX:      ‡
TCM MainMenu
```

```
D:1.000     ‡
Density [kg/L]
```

```
D:1.000     ‡
Density [kg/L]
```

```
D:1.000     ‡
Density [kg/L]
```

5.3.5. Set tank capacity

The tank capacity set in the TCM is used to create a true graphic representation of the analogue sensor status. It should be set to the same value as in the PC database.

Enter menu **[TCM//PortX]** by scrolling with ↑ or ↓.

At **PortX:** press **ENTER**.

Scroll to **TankVol:** using ↑ or ↓.

Press **ENTER** to get the cursor.

Type the **capacity of the tank** and press **ENTER** to acknowledge. When the cursor disappears it is finished.

Press **EXIT** two times to leave Set-Up mode

```
TCM:        ‡
TCM MainMenu
```

```
PortX:      ‡
TCM MainMenu
```

```
TankVol:1000  ‡
Set max vol [L]
```

```
TankVol:1000  ‡
Set max vol [L]
```

```
TankVol:1000  ‡
Set max vol [L]
```

5.3.6. Set LED address

By specifying a LED address (4XXX) it is possible to show the content of the tank in real time on a remote or local LED display. Observe that the addressed LED will not be available for dispensing information.

Enter menu **[TCM//PortX]** by scrolling with ↑ or ↓.

At **PortX:** press **ENTER**.

Scroll to **LED:** using ↑ or ↓.

Press **ENTER** to get the cursor.

Type the **LED address** and press **ENTER** to acknowledge. When the cursor disappears it is finished.

Press **EXIT** two times to leave Set-Up mode.

```
TCM:        ‡
TCM MainMenu
```

```
PortX:      ‡
TCM MainMenu
```

```
LED:        ‡
LED Address 4???
```

```
TankVol:4XXX_  ‡
LED Address 4???
```

```
TankVol:4XXX  ‡
LED Address 4???
```

5.3.7. Set fluid name

The fluid name set in the TCM makes it possible to show the fluid name in the info box for the graphic representation of the analogue sensor. It should be set to the same value as in the PC database.

Enter menu **[TCM//PortX]** by scrolling with ↑ or ↓.

At **PortX:** press **ENTER**.

Scroll to **FN:** using ↑ or ↓.

Press **ENTER** to get the cursor.

Type the **name of the fluid** and press **ENTER** to acknowledge. When the cursor disappears it is finished.

Press **EXIT** two times to leave Set-Up mode

| TCM: ‡ |
| TCM MainMenu |

| PortX: ‡ |
| TCM MainMenu |

| FN: ‡ |
| Name (max 16 ch) |

| FN:_   ‡ |
| Name (max 16 ch) |

| FN:Name   ‡ |
| Name (max 16 ch) |

5.3.8. Set fluid part number

The fluid part number set in the TCM makes it possible to show the fluid part number in the info box for the graphic representation of the analogue sensor. It should be set to the same value as in the PC database.

Enter menu **[TCM//PortX]** by scrolling with ↑ or ↓.

At **PortX:** press **ENTER**.

Scroll to **FP:** using ↑ or ↓.

Press **ENTER** to get the cursor.

Type the **part number of the fluid** and press **ENTER** to acknowledge. When the cursor disappears it is finished.

Press **EXIT** two times to leave Set-Up mode

| TCM: ‡ |
| TCM MainMenu |

| PortX: ‡ |
| TCM MainMenu |

| FP: ‡ |
| Part number |

| FP:_   ‡ |
| Part number |

| FP:XXXXXXXXX ‡ |
| Part number |

5.3.9. Set sensor full scale

The sensor full scale value is the pressure corresponding to 20 mA. If a pressure sensor is used the value should be in [bar]. For sensor part number 23 417 the value should be as default "0.400"

Enter menu **[TCM//PortX]** by scrolling with ↑ or ↓.

At **PortX:** press **ENTER**.

Scroll to **SFS:** using ↑ or ↓.

Press **ENTER** to get the cursor.

Type the **sensor full scale value** and press **ENTER** to acknowledge. When the cursor disappears it is finished.

Press **EXIT** two times to leave Set-Up mode.

| TCM: ‡ |
| TCM MainMenu |

| PortX: ‡ |
| TCM MainMenu |

| SFS:0.400   ‡ |
| Full Scale [bar] |

| SFS:0.400   ‡ |
| Full Scale [bar] |

| SFS:0.400   ‡ |
| Full Scale [bar] |

Set tank bottom area

Setting the tank bottom area is only usable for a tank with the same projected area throughout the total tank height.

For other tank forms the profil has to be downloaded to the TCM from a PC.

The area should be in square meters. When the area is typed in and <ENTER> is pressed the volume for each step on the scale is calculated and stored in the TCM.

| TCM: ‡ |
| TCM MainMenu |

| PortX: ‡ |
| TCM MainMenu |

| TBA: ‡ |
| Bottom area [m2] |

Enter menu **[TCM//PortX]** by scrolling with ↑ or ↓.

At **PortX:** press **ENTER**.

Scroll to **SFS:** using ↑ or ↓.

| TBA:1.000_   ‡ |
| Bottom area [m2] |

Press **ENTER** to get the cursor.

Type the **sensor full scale value** and press **ENTER** to acknowledge. When the cursor disappears it is finished.

| TBA:1.000   ‡ |
| Bottom area [m2] |

Press **EXIT** two times to leave Set-Up mode.

5.4. Set the type of tank (PC system).

To make it possible for the PC software to handle tank information, volumes, sensor inputs and valve output it is necessary to define which TCM port to use, if it is a fresh oil tank or a waste oil tank, if there are any level sensors connected and of which type if there are.

These settings is done from the PC using the OriLink® WinDB Manager software and is described in detail in the OriLink® WinTools Manual. Below is only a short description.

To tell the system which hardware to use for each PC tank the TCM address and TCM port has to be set for all PC tanks.

Each PC tank could share a TCM port if the same solenoid valve is used to control all pumps. This is not recommended because of the loss of security and redundance.

The system must be told what hardware there is and how to use it properly. This is done through the Tank Type.

Tank type is set by a string of 0 and 1 were the first position sets if it is a fresh or waste oil tank. The second position tells if there is a discrete level sensor present or not and the third position defines if there is an analogue sensor present or not.

Tank type is "0??" for fresh oil and "1??" for waste oil.

Tank type is "?0?" for NO discrete sensor and "?1?" for discrete sensor connected.

Tank type is "??0" for NO analogue sensor and "??1" for an analogue sensor connected.

Example:

TankType = 000, a fresh oil tank without sensors.

TankType = 010, a fresh oil tank with a discrete level sensor.

TankType = 110, a waste oil tank with a discrete level sensor.

TankType = 001, a fresh oil tank with an analogue level sensor.

TankType = 101, a waste oil tank with an analogue level sensor.

TankType = 111, a waste oil tank with both a discrete and an analogue sensor.

6. Menu tree

Reel:_ → SETUP <ENTER> → Pass:?????_ <ENTER>

EXIT ← Address:_<ENTER>

<ENTER> ← Address:8XXX_ <ENTER>

Address:8XXX <ENTER>

Address:8???_ <ENTER>

Address:8XXX

<EXIT>

TCM: → EXIT

▲ ▼

EXIT

Port1:   <ENTER>
Port2:   Tank:Y
Port3:   ▲ ▼
Port4:   Mask:Y

<ENTER>
Tank:Y
Tank:?_ <ENTER>

<ENTER>
Mask:Y
Mask:?_ <ENTER>

<ENTER>
T:6
T:?_ <ENTER>

T:6

Offset:0

<ENTER>
Offset:0
Offset:?_ <ENTER>

<ENTER>
C:1
C:?_ <ENTER>

<ENTER>
D:1
D:?_ <ENTER>

C:1

D:1

<ENTER>
TankVol:1000
TankVol:?_ <ENTER>

TankVol:1000

<ENTER>
LED:_
LED:4???_ <ENTER>

LED:

FN:

<ENTER>
FN:_
FN:?_ <ENTER>

FP:

<ENTER>
SFS:0.4
SFS:?_ <ENTER>

<ENTER>
FN:_
FN:?_ <ENTER>

SFS:0.4

<ENTER>
TBA:_
TBA:?_ <ENTER>

TBA:

7.   Fast Menu codes

With a PC, the OriLink® WinTools software and a SIO, you can customize the quick menu that appear when you press "?" on a keypad. To do this, assign a name to the menu, a module address and then a code. Password is optional. This code can also be used together with the address after you have typed SETUP followed by the password.

For a TCM-module it will look like this,

Set Mask   80000101   YYYYY   where YYYYY=password

Part	Function	Address	Code	Comment
Main menu	Change address		0800	
Ports	Change Tank No.		0X00	Where X is the port number
	Change Mask.		0X01	Where X is the port number
	Only for TCM with analogue sensor support (PCB 203 02 91 A and higher)			
	Change Time constant		0X02	Where X is the port number
	Change Offset		0X03	Where X is the port number
	Change Calibration		0X04	Where X is the port number
	Change Density of fluid		0X05	Where X is the port number
	Change Max volume of tank		0X06	Where X is the port number
	Change LED Address		0X07	Where X is the port number
	Change Name of Fluid		0X08	Where X is the port number
	Change Part number of fluid		0X09	Where X is the port number
	Change Sensor full scale		0X10	Where X is the port number
	Generate Volume array		0X11	Where X is the port number
	Shows current volume [L]		0X60	Where X is the port number
	Show sensor signal [%] & [mA] (Observe! -Does not always reflect the content of tank because it refers to the sensor max scale not the max volume of the tank.)		0X61	Where X is the port number
	Change Tank area		0X62	Where X is the port number

8. Technical specification

Printed circuit board

Net ports:	5 OriLink® ports **(A)** for data communication, 2 without +24VDC.
Discrete level inputs:	4 **(F),** for one or two levels. Switch or active signal max 50 V. Supports reorder and stop set-up for both fresh and waste oil.
Control outputs:	4 **(F)** for solenoid valve 24 VDC max 1,25 A. Closes after about 30 s when short circuited, this is logged in the database.
Analogue level inputs:	4 **(G)** 4 - 20mA, 24VDC with 10-bit A/D-converters.
Other:	RISC-based microprocessor EEPROM, 64 KB. Connector **(E)** for 3-pos key switch. Connector **(C)** for 24 VDC 6.3A power supply. SetupLock jumper **(H)**, not used.
Fuses:	T6.3A **(D)** and F1.6A **(B)**
Max current:	500 mA + 4x1.25 A for solenoid valves.
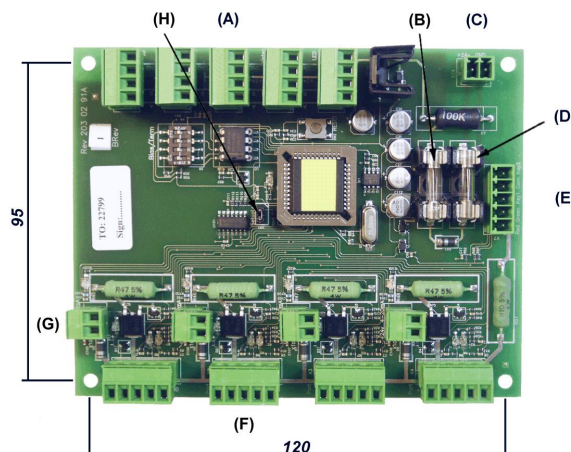
Casing

Power supply:	Primary 230 VAC / 50Hz / 550mA. Fuse T630mA
Casing:	Strong black powder painted steel box
Outer measures:	303 x 228 x 65 mm.
Fitting:	4 x ø5mm CC = 250 x 175 mm
Weight:	3,9 kg.

Environment

Use:	Indoors. Temperature 0 - +55°C Humidity 90-95%, not condensing
Transport:	Temperature –40 - +70°C Humidity 90-95%, not condensing
Storage:	Temperature –40 - +70°C Humidity 90-95%, not condensing

9.   PM PCB mounted in a TCM box

In a small system or at limited space it is possible to mount for example a printer / database module PCB in a TCM. To do this the TCM PCB has to be moved and turned one quarter of a turn. The plastic distances by packed with the PM are a little shorter than the ones for the TCM PCB and they shall be used for the PM. The PM should be mounted towards the key switch. *See pictures below:*

Make sure that the TCM is disconnected from the mains power supply and the **ORILINK®** network before any work is started. Use a voltmeter to make sure that there is no power.

To the left is how the standard TCM looks like inside.

Turn the TCM PCB a quarter of a turn and place it at the top of the box. Move the plastic distances to the holes that makes it possible to place the PCB as shown in the picture to the right. Do not damage the cabling.

Fasten the short plastic distances so the new card can be placed closest to the bottom like in the picture. The printer module cable is then easily installed in the correct position.

10. To connect discrete level sensors 23 132/138/171 and solenoid valves

10.1. Fresh oil tank, 23138 (2-levels)

To achieve a proper function, that is the pump starts only if there are enough oil in the tank, a dispense point is open and the sensor works properly, the following connection should be made.
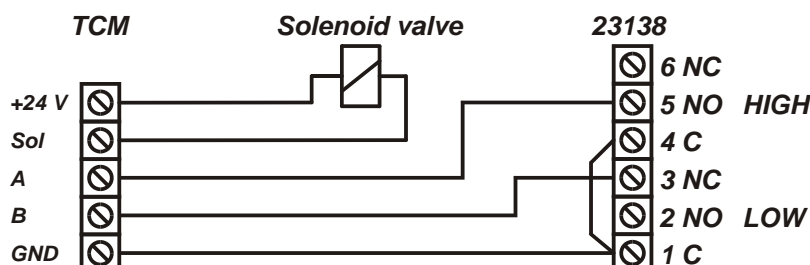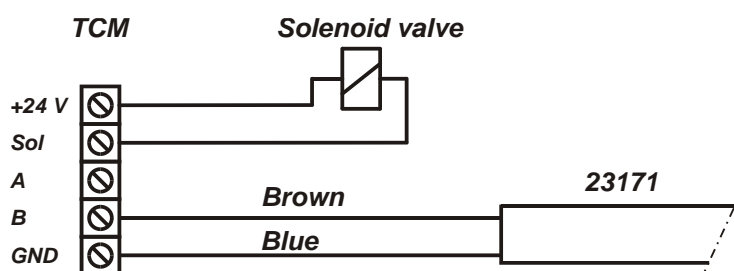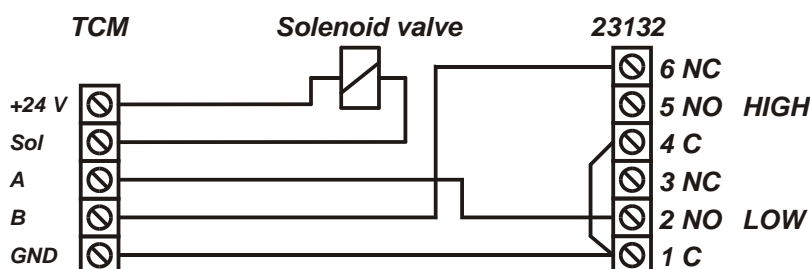

The TCM port should be set to control the appropriate PC tank in relation to the physical tank. Correct TankType, TCMAddress and TCMPort should be set using with WinDB Manager.

MASK =12, TankType = 0

10.2. Fresh oil tank, 23171/23183 (1-level)

To achieve a proper function, that is the pump starts only if there are enough oil in the tank, a dispense point is open and the sensor works properly, the following connection should be made.

The TCM port should be set to control the appropriate PC tank in relation to the physical tank. Correct TankType, TCMAddress and TCMPort should be set using with WinDB Manager.

Mask = 4, TankType=0

10.3. Waste oil tank, 23132 (2-levels)

To achieve a proper function, that is the pump stops if the physical tank is full or if the sensor is disconnected, the following connection should be made.

The TCM port should be set to control the appropriate PC tank in relation to the physical tank. Correct TankType, TCMAddress and TCMPort should be set using with WinDB Manager

MASK = 13, TankType = 1

One TCM port controls a number of pumps

It is possible to control several pumps with only one solenoid valve, that is all pumps starts if one dispense point is opened. To do this the solenoid valve is connected between +24V and Sol of a TCM port. The port is set to a tank that does not exist in the PC database and the Mask is set to 0.

For all PC tanks that should be controlled by this solenoid valve the TCMAddress and TCMPort should be set to this port. Using the WinDB Manager does this.

If this method is used of coarse no level sensor can be used.

11. EX-barrier 23187

In some countries an EX-barrier is needed between the level sensor and the tank module if the liquid is classed as flammable. For this purpose the EX-barrier 23178 and a special EX approved cable 23164 can be used.

The EX-barrier, the solenoid valve that controls the air to the pump and the tank module should be placed outside the EX-classed area. The EX approved cable should be used to connect the level sensor on the tank inside the EX-classed area with the EX-barrier outside the EX-classed area.

11.1. Connecting a fresh oil tank 23171/23183 (1-Level).

To achieve a proper function, that is the pump starts only if there are enough oil in the tank, a dispense point is open and the sensor works properly, the following connection should be made.

The TCM port should be set to control the appropriate PC tank in relation to the physical tank.

 Correct TankType, TCMAddress and TCMPort should be set using with WinDB Manager.

Mask = 4, TankType=0
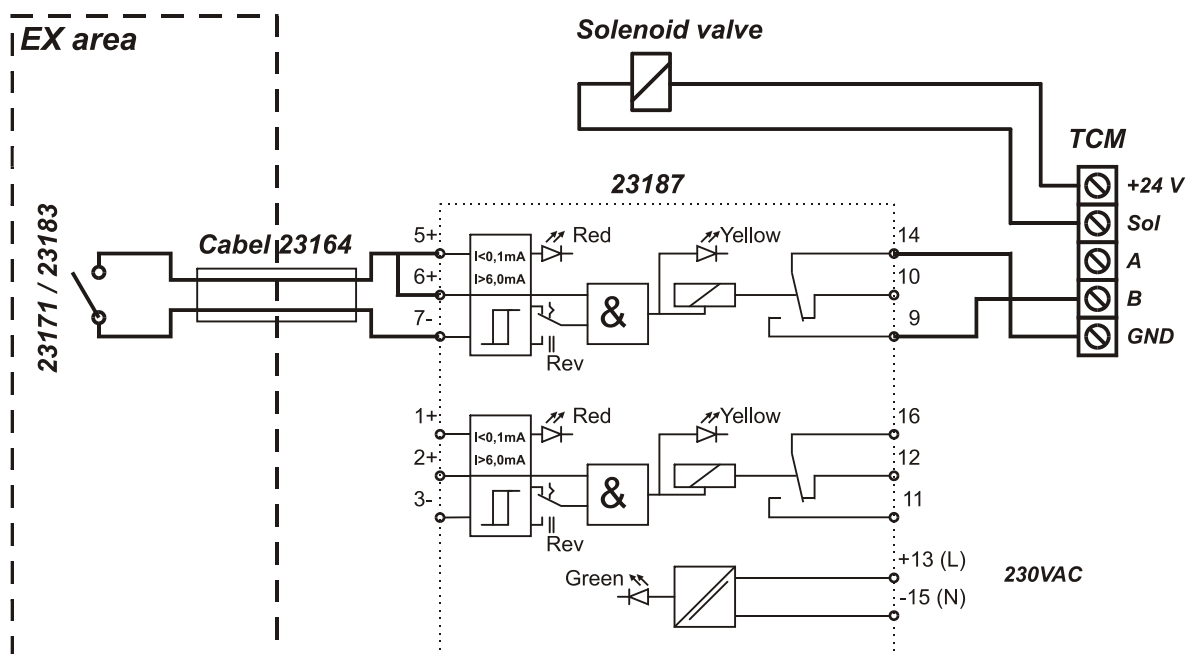
11.2. Connecting a waste oil tank 23132 (2-Nivåer)

To achieve a proper function, that is the pump stops if the physical tank is full or if the sensor is disconnected, the following connection should be made.

The TCM port should be set to control the appropriate PC tank in relation to the physical tank.

Correct TankType, TCMAddress and TCMPort should be set using with WinDB Manager

MASK = 13, TankType = 1
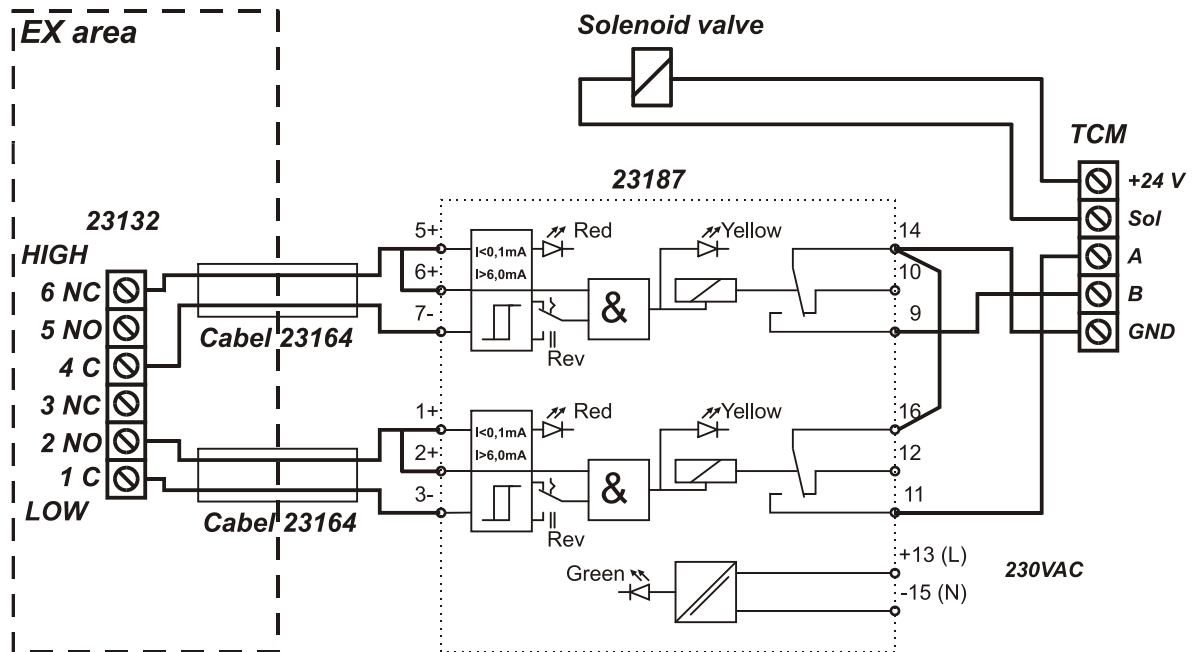

12. To connect analogue level sensor 23 417

The four analogue inputs on the TCM supports any standard industrial 2-lead / 4-20mA / 24VDC sensors. To connect sensors a 2-pole connector is used.

The submergeable pressure based level sensor 23 417 is a robust sensor that can be used with good accuracy for tanks with a height of 1 – 5 meters. Max height depends on density of fluid. The measuring resolution for a TCM with a 23 417 sensor is 4 mm for water and about 4.5 mm for mineral oil.

Connect the red wire to +24VDC and the black wire to Sense. +24VDC and Sense are printed on the PCB.

If the sensor cable (6.5 m) is to short to reach the TCM it can be lengthen using a standard 2-lead wire with copper area of 0.5 mm2 for each lead. For this purpose use the by-packed connection box.

It is not necessary to use the shield to obtain a good signal because the signal is current based. The shield can be used for protection grounding purposes if needed.
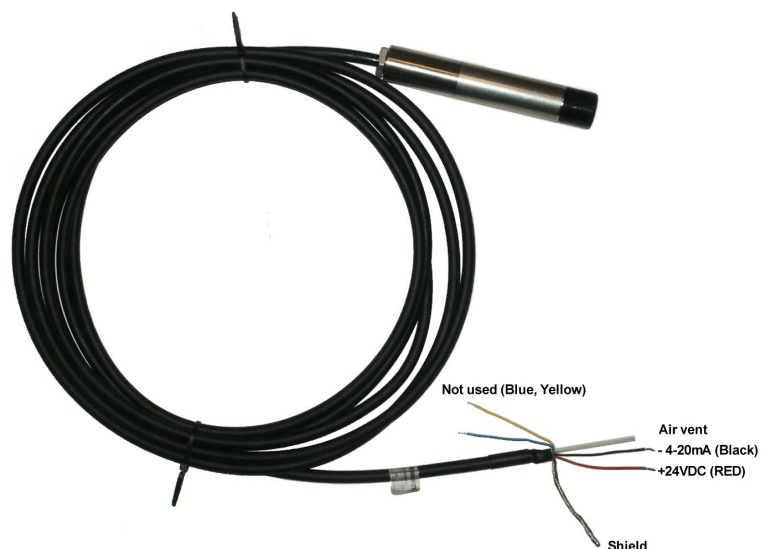
> **Observe! – It is important that the transparent tube is not blocked and that the humidity protection filter is used.**
> **A blocked tube will cause measuring failure.**
> **Not using the humidity protection could cause sensor malfunction due to corrosion caused by condensed water.**