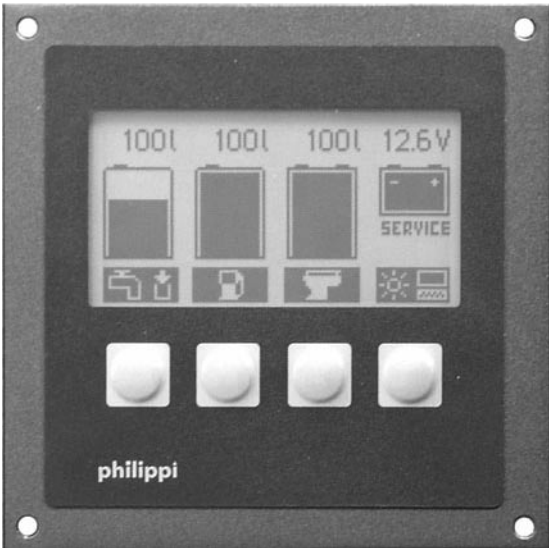

Introduction

The well readable digital tank monitor TCM which can be served easily gives a fast overview of the filling conditions of your tanks.
With the models TCM I, II the voltages of two groups of batteries can be supervised at the same time.
The measuring of the tank level is made by proven immersion tube sensors TRG, which is available in different lengths, and had to be ordered separately.
With the models TCM 2 and TCM3-(p) the level of the water tank is calculated by means of a flow rate sensor DFS over the taken quantity of water. After complete filling up of the water tank by a simple depressing the key the announcement is placed again on full.
The inquiry of the tank givers TRG takes place via a voltage-dependent interval measurement around the power input of the system to reduce (measuring intervals extend with low voltage).
The attitudes of all tanks are stored in case of failure of supply voltage and are immediately again available when restarting.

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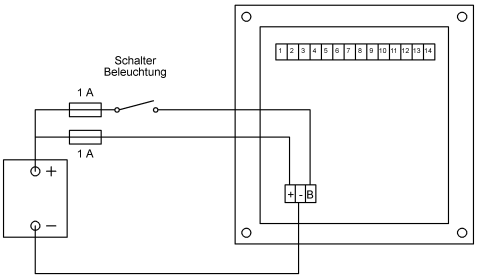
Connection



Rückansicht TCM

The current supply of the display is attached as accompanying shown over secured lines 1,5mm2 directly at the battery or at a distribution circuit.

The sensor wires are attached as follows:

Klemme	TCM 1	TCM 2	TCM 3-2	TCM 3-3	TCM 3-3p	TCM 3-4	TCM 3-4p	TCM 3-H461
1	+ Start	+ Start	nc	nc	nc	nc	nc	nc
2	nc	nc	nc	nc	nc	nc	nc	nc
3	+ Service	+ Service	nc	nc	nc	nc	nc	Tank 5 S
4	nc	nc	nc	nc	nc	nc	nc	Tank 5 -
5	Tank 3 S	Tank 3 S	Tank 2 S	Tank 3 S	Tank 3 S	Tank 4 S	Tank 4 S	Tank 4 S
6	Tank 3 -	Tank 3 -	Tank 2 -	Tank 3 -	Tank 3 -	Tank 4 -	Tank 4 -	Tank 4 -
7	Tank 2 S	Tank 2 S	Tank 1 S	Tank 2 S	Tank 2 S	Tank 3 S	Tank 3 S	Tank 3 S
8	Tank 2 -	Tank 2 -	Tank 1 -	Tank 2 -	Tank 2 -	Tank 3 -	Tank 3 -	Tank 3 -
9	Tank 1 S	DFS S	nc	Tank 1 S	nc	Tank 2 S	Tank 2 S	Tank 2 S
10	nc	DFS +	nc	nc	nc	nc	nc	nc
11	Tank 1 -	DFS -	nc	Tank 1 -	nc	Tank 2 -	Tank 2 -	Tank 2 -
12	nc	nc	nc	nc	DFS S	Tank 1 S	DFS S	Tank 1 S
13	nc	nc	nc	nc	DFS +	nc	DFS +	nc
14	nc	nc	nc	nc	DFS -	Tank 1 -	DFS -	Tank 1 -

Start up

After a first start-up the TCM must be adapted to your system. Therefore the right key of the TCM (S or symbol) must be pressed for 5 seconds, the get access to the setup menu. There the tank sizes for each individual tank in litres, the kind of tank and the display contrast can be adjusted. The capacity of the tanks must be entered, so that the level can be calculated accordingly.

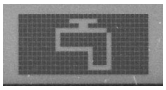
The values of the inverted line can be changed.

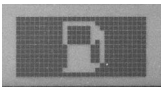
The functions of the keys are as follows:

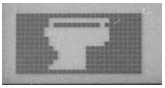
arrow: selection of the input line
plus: increase of the value
minus: decrease of the value
return: store the values and return

Values:

Tanksize 5...4000 Litres in 5 l steps
Tankart For each tanks the following symbols are available:


water


fuel


waste water

Tankart	0-2:	Sensor TRG System philippi:	Water (0), Fuel (1), Waste water (2)
Tankart	3-5:	Sensor 3-180 Ohm (VDO):	Water (3), Fuel (4), Waste water (5)
Tankart	6-8:	Sensor 4-20 mA:	Water (6), Fuel (7), Waste water (8)
Tankart	9-11:	Sensor 0-10V:	Water (9), Fuel (10), Waste water (11)
Tankart	12-14:	Sensor 240-33 Ohm:	Water (12), Fuel (13), Waste water (14)

Please change the values only within a sensor system (e.g. 0-2, 3-5, 12-14 for resistance sensors). The kind of tank does not agree with the sensor system wrong values in the display is in such a way indicated. Are sensor with ouput (0-10V) or (4-20mA) to be attached, this must be considered on the hardware side. This hardware attitude can take place only at the philippi facilities when ordering.

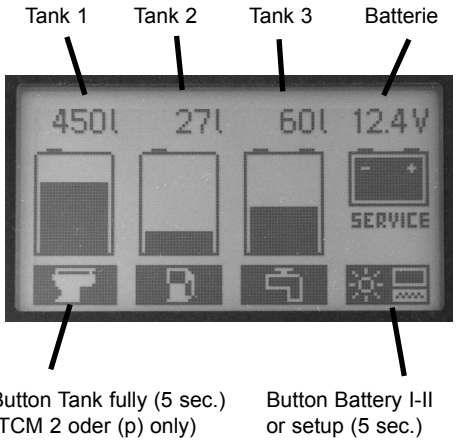
Kontrast Display brightness + = dark, - = light

Operation

With pressing the keys the display back lighting is switched on, which will be itself automatically after approximately 1 min again deactivated (except if externally by the connection B the lighting was constantly activated). The following actions are released by manipulation of the keys:

Tank fully **Key must be operated approx. 5 sec**
tank level is set to 100 %
(TCM 2 oder (p) only!)

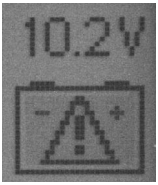
Setup **Key must be operated approx. 5 sec**
Setup



The model TCM 3-5 (5 tanks) can be switched by a short pressing of any button between the two pages since more than 4 tanks can be represented not at the same time.

Consider please:
- the models with flow sensor the operation of the sensor is shown by a dripping tap.
- the inquiry of the tank sensor takes place in intervals, which are dependent on supply voltage, in order to reduce the power consumption. Thus the actualization of the level of fuel in the tank takes place not always immediately, but can take place up to 2min retarded.
- with the level sensors sereis TRG the level will be shown in steps of (0, 12, 25, 37, 50, 75, 100 %)

Low voltage alarm (TCM 1, 2 only)



Is the battery voltage under (Starter- or Service-Battery) 10,8V or 21,6V or more than 15V or 30V a flashing warning symbol will be displayed.

Safety

- no change in the equipment may be made, otherwise the CE indication expires
- the connection of the distribution circuit may only by electrical specialists be made.
- before the connection of the distribution circuit the battery inlets are to be clamped. To the correct polarity of the batteries pay attention!
- the automatic circuit breakers built in the distribution circuits serve for securing the inlets for the consumers. The security of the attached consumers takes place via the safety devices built in the devices.

The assembly and operating instruction are a component of the component supply. It must importantly for later maintenance work - well to be kept and to possible subsequent owners of the distribution circuit be passed on.

Non-liability

both the adherence to the operating instruction, and the conditions and methods when installation, enterprise, using and maintenance the distribution circuit cannot be supervised of philippi elektrische systeme. Therefore we do not take any responsibility and adhesion for losses, damage or costs, which develop themselves from incorrect installation and inappropriate enterprise.

Warranty

we carry out due to our "general trading conditions" warranty for the supplied distribution circuits. These trading conditions are basis of all sales and delivery offers, them are printed and attached to all offers and confirmation of orders in our catalogs.

CE-Mark

CE this equipment fulfills the requirements of the European Union:

89/336/EWG “Elektromagnetische Verträglichkeit”

The conformity of the equipment is confirmed by the CE mark.

scope of supply

Display, manual
terminals

Accessories (to be ordered separately)

flow sensor	DFS
level sensors	TRG 200-800

Technical datas

Dimensions	B 105 x H 105 x T 35 mm
Rated voltage	DC 10-30 V
Consuption	2,5 mA at 13V, with illumination 50 mA
	4 mA at 26V, with illumination 38 mA