



## **USER'S MANUAL DC-SERVO-DRIVER TFMxx0 USING AS CURRENT CONTROLLER (NON OPTIONAL EQUIPMENT REQUIRED ON BOARD)**

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## 0 PRECAUTIONS ON SAFETY (DEFINITIONS)

**DANGER** *immediately and imminent DANGER for life and limb  
(possibly including the PRECAUTIONS ON SAFETY WARNING  
and NOTICE)*

**WARNING** *possibility of a dangerous situation for life and limb  
(possibly including the PRECAUTION ON SAFETY NOTICE)*

**NOTICE** *possibility of a dangerous situation for the TFMxx0 or  
an object in its area*

**DANGER:** *Possibility of an electric shock. The nonobservance of the instructions and the precautions on safety written down in this manual shall produce immediately and imminent danger for life and limb or for the TFMxx0 or an object in its area. The handling including mounting, installation and operating has to be carried out by well trained and instructed personal..*

## 1 INTRODUCTION

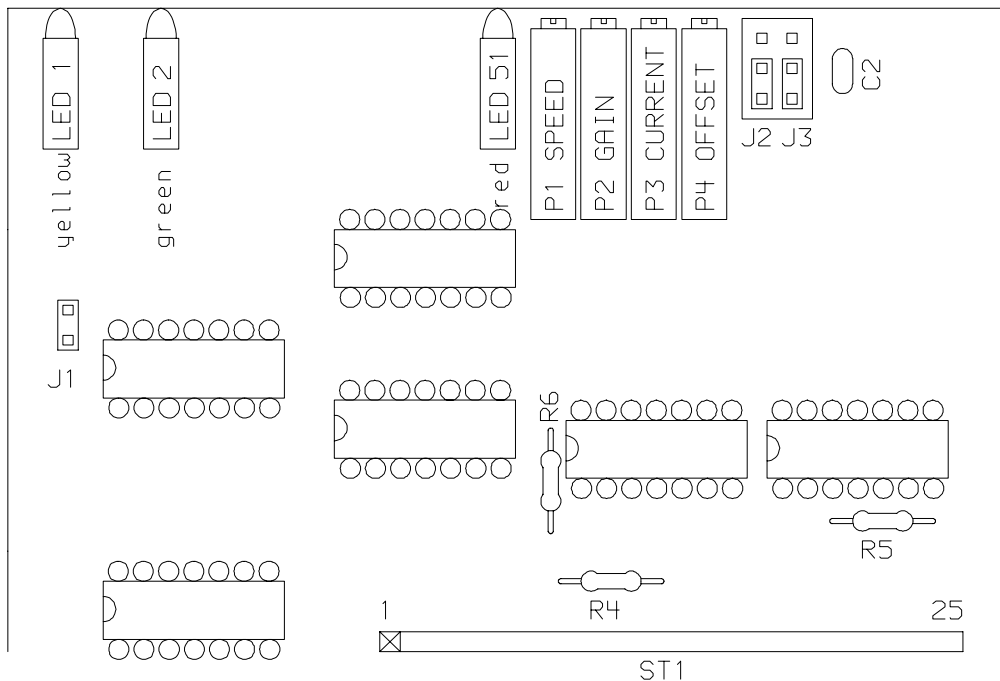
**WARNING:** *To ward off accidents given by electric shock or destruction of TFMxx0 or an object in its area the instructions and the precautions on safety written down in this manual have to be read and fulfilled before mounting, installation and operating the TFMxx0. This manual is a part of the **USER'S MANUAL DC-SERVO-DRIVER TFMxx0-STANDARD**. Both manuals have to be used during handling, mounting, installation and operating.*

**By using the TFMxx0 as current controller non optional equipment is required on board.** The output current is related to the Control Input Voltage (rated value). Therefore no tachometer is required. The output current is limited.

## 2 POSSIBILITIES OF ADJUSTMENT AND LOGIC SIGNALS

**WARNING:** To ward off accidents given by electric shock or destruction of TFMxx0 or an object in its area the instructions and the precautions on safety written down in this manual have to be red and fulfilled before mounting, installation and operating the TFMxx0.

### 2.1 Devices for Adjustment



	name	element	no.
1	Speed	potentiometer	P1
2	Speed Controller Gain	potentiometer	P2
3	Current Limit	potentiometer	P3
4	Offset	potentiometer	P4
5	Integration Rate Speed Controller	capacity	C2
6	Continuous Current	resistor	R6
7	Peak Current	resistor	R4
8	Current Monitor	connector	DIN41612
9	Control Voltage	resistor	R5
10	Set up the Common Fault Monitor	jumper	ST2
11	Set up the Running Mode	jumper	ST1

### 2.1.1 Speed (P1)

**P1 has no function by using the TFMxx0 as current controller.**

### 2.1.2 Speed Controller Gain (P2)

**To adjust the output current (actual value) in relation to the rated value (Control Voltage).** Turning the potentiometer **clock wise increases the sensitivity.** **NOTICE:** *To ward off destruction of the motor (warm up) doe carefully adjust the gain.*

### 2.1.3 Current Limit (P3)

**To adjust the peak current.** Turning the potentiometer **clock wise** to the end touch results in the **maximum peak current.** Turning the potentiometer **counter clock wise decreases the peak current.**

### 2.1.4 Offset (P4)

**To adjust the output current to 0 Ampere.** Common short circuit of both Control Inputs is required. May be that temperature floating makes necessary a correction of first adjustment.

### 2.1.5 Integration Rate Speed Controller (C2)

**C1 has no function by using the TFMxx0 as current controller.**

### 2.1.6 Continuous Current (R6)

**To adjust the continuous current.** The following requirements are fulfilled in standard TFMxx0:

Type	maximum continuous current [A]
TFMxx0-06-	6
TFMxx0-08-	8
TFMxx0-10-	10

Increasing the value of R6 decreases the value of maximum continuous current.

**NOTICE:** *It is not allowed to increase the continuous current. To ward off destruction of the motor never cross its current limit given by the manufacturer.*

### 2.1.7 Peak Current (R4)

**To adjust the peak current.** The following requirements are fulfilled in standard TFMxx0:

Type	maximum peak current [A]
TFMxx0-06-	12
TFMxx0-08-	16
TFMxx0-10-	20

**NOTICE:** It is not allowed to increase the peak current. To ward off destruction of the motor never cross its current limit given by the manufacturer

### 2.1.8 Current Monitor (DIN41612)

**To monitoring the current signal during adjustment** connect an oscilloscope.

**NOTICE:** The output of the integrated circuit is laid out for small loads only.

### 2.1.9 Control Voltage (R5)

**To adjust the sensitivity of the Control Voltage Input (rated value).** To increase the sensitivity of the Control Voltage Input decrease the value of R5.

### 2.1.10 Set up the Common Fault Monitor (ST2)

**To set up the Common Fault Monitor** connect a jumper to both connectors of ST2.

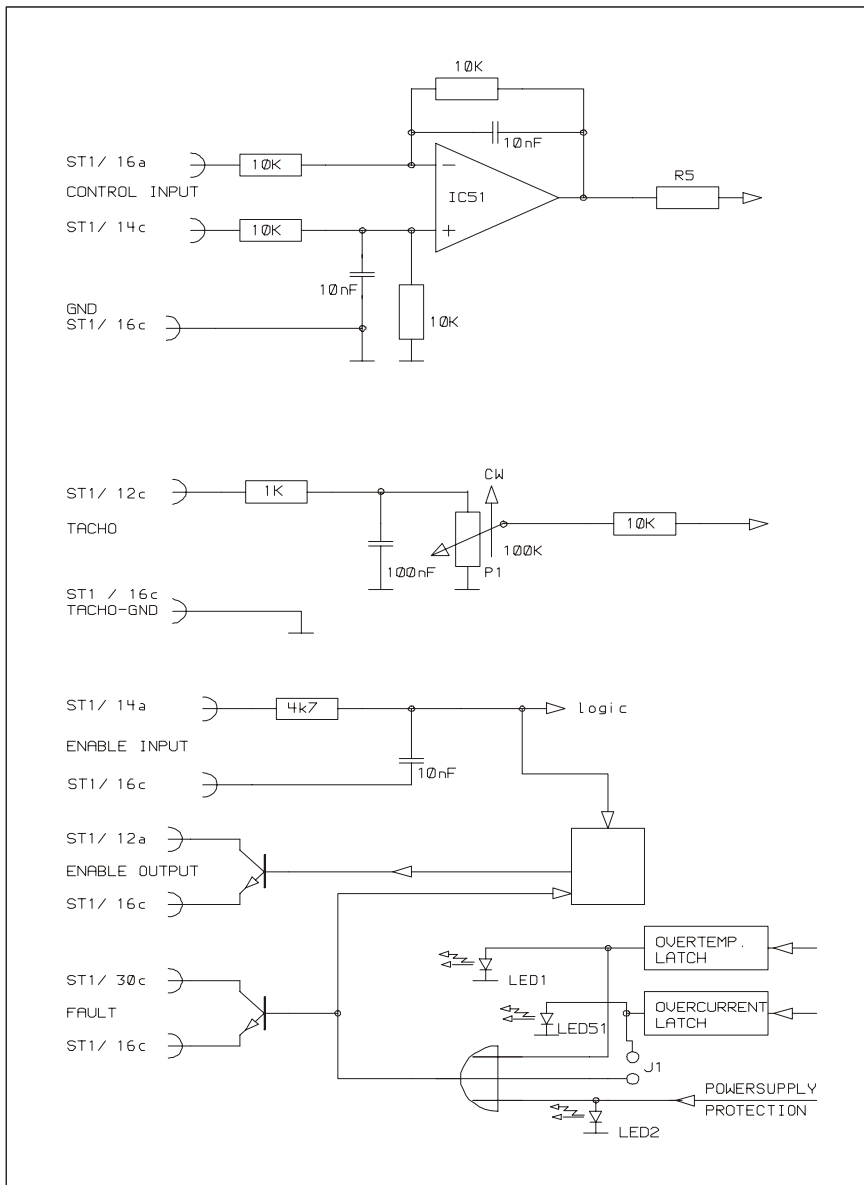
### 2.1.11 Set up the Running Mode (ST1) and Fix Current Limit

**To set up the Running Mode for using the TFMxx0 as current controller and the fix current limit** connect the jumpers on ST1 as follows:

- see the top view of the layout under 2.1 Devices for Adjustment
- connect the jumpers in configuration for current controller and select the Fix Current Limit 50% or 100% (the Fix Current Limit depends on customers' requirements)

## 2.2 Logic Signals

name	element	action	relation to the axles
Common Fault Monitor	transistor	conducting in the case of a failure	common output
Enable-Output	transistor	<b>not</b> conducting in the case of a failure	each axle is equipped with an own output
Enable-Input	resistor	to set up the function a high signal is required	each axle is equipped with an own input



### 3 OPERATING OF TFMxx0 AS CURRENT CONTROLLER

**DANGER:** Possibility of an electric shock. The nonobservance of the instructions and the precautions on safety written down in this manual shall produce immediately and imminent danger for life and limb or for the TFMxx0 or an object in its area. The handling including mounting, installation and operating has to be carried out by well trained and instructed personnel. Measuring instruments has to be connected without electric power. To discharge the capacities the operator has to wait 2 minutes after switch off the power before any manipulation is carried out. To protect the operator the potentiometers has to be adjusted with an isolated screw driver (blade and shank).

**WARNING:** To ward off accidents given by electric shock or destruction of TFMxx0 or an object in its area the instructions and the precautions on safety written down in this manual have to be red and fulfilled before mounting, installation and operating the TFMxx0 (e.g. chapter 2 POSSIBILITIES OF ADJUSTMENT). The TFMxx0 are delivered in defined adjustment. It is not allowed to change specific adjustments given by customer requirements. Variations (e.g. to fulfil customer requirements) of TFMxx0 have different identification numbers.

#### 3.1 Before Power On

**WARNING:** To ward off accidents given by electric shock or destruction of TFMxx0 or an object in its area the instructions and the precautions on safety written down in this manual have to be red and fulfilled before mounting, installation and operating the TFMxx0.

Before power on the following requirements have to be fulfilled:

##### A) Preadjustments

name	element	no.	preadjustment
Speed	potentiometer	P1	no function
Speed Controller Gain	potentiometer	P2	medium
Current Limit	potentiometer	P3	medium
Offset	potentiometer	P4	medium

**B) The Enable Inputs has to be connected together** (0V between the two connectors).

**C) No signal at the Control Voltage Input** (0V between the two connectors).

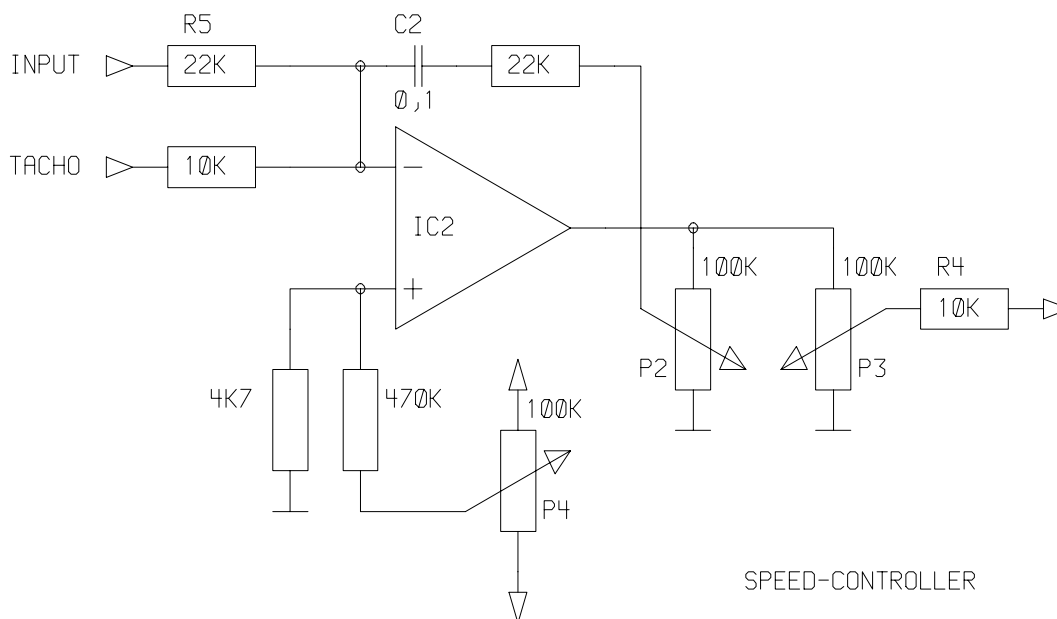
**D) Power and intermediate circuit voltage has to be checked.**

E) Cooling in the case (e.g. ventilator) runs correct.

F) Switch the power off.

### 3.2 Put into Operation and Adjustment

**DANGER:** Possibility of an electric shock. Measuring instruments has to be connected without electric power. To discharge the capacities the operator has to wait 2 minutes after switch off the power before any manipulation is carried out. To protect the operator the potentiometers has to be adjusted with an isolated screw driver (blade and shank).



A) Step by step carry out the step 3.1.

B) Connect the TFMxx0. After switch on the power the following requirements have to be fulfilled:

- I **LED green** (intermediate circuit voltage) **has on after 3 seconds.**
- II **After step I only the LED green** has on. **The other LED's have to be inactive.**

C) Have special attention during the first put into operation. **WARNING:** To ward off accidents given by electric shock or destruction of TFMxx0 or an object in its area (e.g. machines or electric equipment) the following instructions have to be carried out step by step.



I **Equipment to detect end touches and other security elements and cooling equipment have to be installed, controlled and tested.**

II **To check the polarities is a requirement for correct operation of the TFMxx0.**

- a) No signal at the Control Voltage Input. (0V between the two connectors).
- b) Switch on the Enable Input (high signal) to set up the function of TFMxx0.
- c) After step II.b) the output current has to be 0A.

**If the output current is not zero or a motor accelerates (having a tendency to high speed) adjust the Offset (P4).**

To control the motor current use an ampere meter.

- d) To control the **polarity of the output current** in relation to the Control Input Voltage slowly increase the Control Input Voltage (rated value).

**If the polarity of the output current is wrong two possibilities to change it are given:**

- Change the polarity of the connectors of the Control Input.
- Change the polarity of the connectors of the actor.
- After this operation go back to the step 3.2.C.

**D) To ensure a correct operation of TFMxx0 the adjustment has to be carried out with high attention.** To monitor the current signal at the Current Monitor use an oscilloscope or an voltage meter. **NOTICE:** *It is possible that an incorrect adjustment results in destruction of the motor or objects in its area.*

I **To adjust the output current** a signal at the Control Input is needed. The voltage range depends on the source. The maximum value is +/-10VDC.

- a) Set the Current Limit (P3) to maximum current (clock wise to the end touch).
- b) After switch on the power and the Enable Input (high signal) **slowly increase** the Control Input Voltage watching the Current Monitor.
- c) Adjust the Speed Controller Gain (P2) step by step. To achieve the correct output current in relation to the rated value repeat the steps I.d) and I.c) as long as necessary.

### 3.3 To take into Account

**A)** If the TFMxx0 is well adjusted before mounting and installation there is no more adjustment necessary after mounting and installation. It may be necessary to repeat the step 3.2.C).

**B)** If the manufacturer changes performances, mounting, installation or operating given by customers request the differences are written down in the product documents (plans, part lists and so on).

**C)** Contact the manufacturer in the case of unclearness or having troubles.

CH-8200 Schaffhausen  
the 26 th of January 1998  
the General Manager

Lucas Egloff