

TCT-FA-MZ2, TCT-FA-MK2 Controller for comfort ventilation

Functions

- Positioner and controller for comfort ventilation with time schedules
- LCD Touchscreen
- Two analog outputs for 0/2–10VDC with a resolution of 10mV
- TCT-FA-MK2 only: One control input for a measurement signal of 0/2–10 VDC
- One input for exhaust fan override or presence sensor
- Party mode with automatic setback
- Off mode with selectable ventilation interval and ventilation strength
- Selectable step or percentage setpoint resolution
- Password protected controls settings
- Blue background illumination
- Realtime clock with schedule events

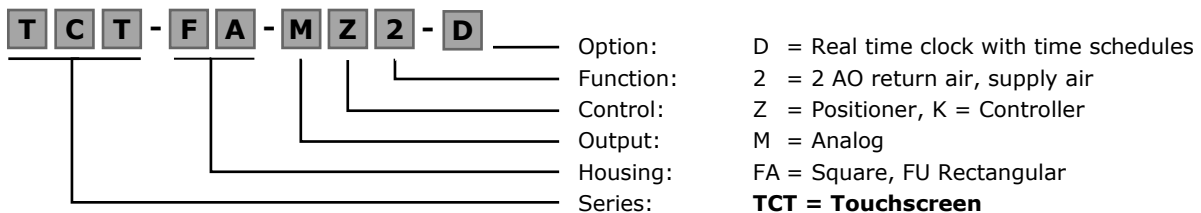
Applications

Control of ventilation systems for comfort and industrial applications.

General description

The TCT-FA-MZ2 is a microprocessor-controlled precision positioner and the TCT-FA-MK2 is a ventilation controller. Both devices feature a real time clock and time schedules. Through user and engineering parameters the devices may be configured to work for most of the standard ventilation applications. They can be configured using the standard operation terminal. No special tool or software is required.

Name



Order

Item Name	Item code	Variant	Features
TCT-FA-MZ2-D	40-10 0237	Real time clock	Compact positioner with two analog outputs and one passive input
TCT-FA-MK2-D	40-10 0238	With control function	Compact positioner and controller with two analog outputs and one input each for one passive and one 0/2...10 VDC Signal

Selection of actuators

Choose actuators with an input signal type of 0–10V DC or 2–10V DC.



Technical Data

Power Supply	Operating Voltage	24 V AC/DC \pm 10 %, 50/60 Hz, Class 2 48VA max
	Power Consumption	Max. 1.5 VA
	Electrical Connection	Terminal Connectors, wire 0.34...2.5 mm ² (AWG 24...12)
Signal input	Passive input X1	For potential-free contact to ground
	For TCT-FA-MK2: Active input X2	0...10 V DC
Signal outputs	Analog Outputs	AO1
	Output Signal	0...10 V DC
	Resolution	9.76 mV (10 bit)
	Maximum Load	10 mA
Environment	Operation	To IEC 721-3-3
	Climatic Conditions	class 3 K5
	Temperature	0...50 °C (32...122 °F)
	Humidity	<95 % rH non-condensing
	Transport & Storage	To IEC 721-3-2 and IEC 721-3-1
	Climatic Conditions	class 3 K3 and class 1 K3
General	Temperature	-25...70 °C (-13...158 °F)
	Humidity	<95 % RH non-condensing
	Mechanical Conditions	class 2MT2
	Degree of Protection	IP30 to EN 60529
	Safety Class	III (IEC 60536)
	Housing material	Fire proof and impact resistant ABS plastic (UL94 class V-0)
	Dimensions (H x W x D)	88 x 88 x 31 mm (3.5" x 3.5" x 1.2")
	Weight (including package)	190 g (6.7 oz)

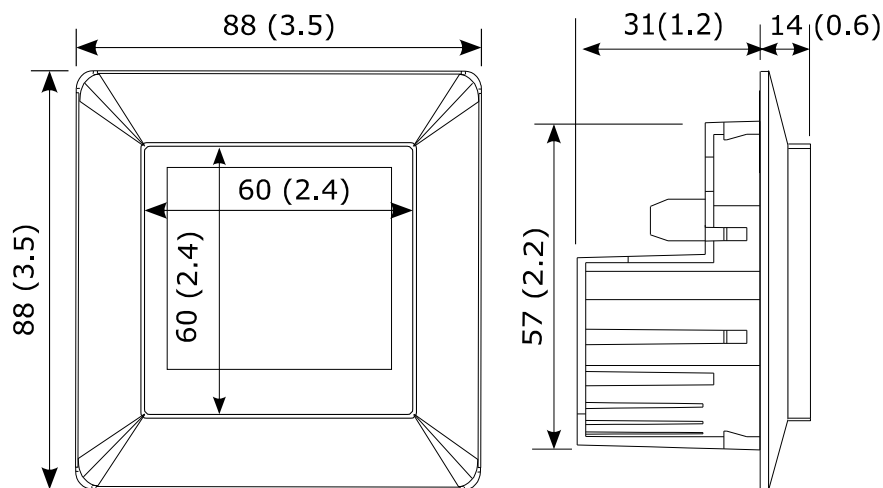
Product testing and certification



Declaration of conformity

Information about the conformity of our products can be found on our website
www.vectorcontrols.com on the corresponding product page under "Downloads"

Dimension [mm] (in)

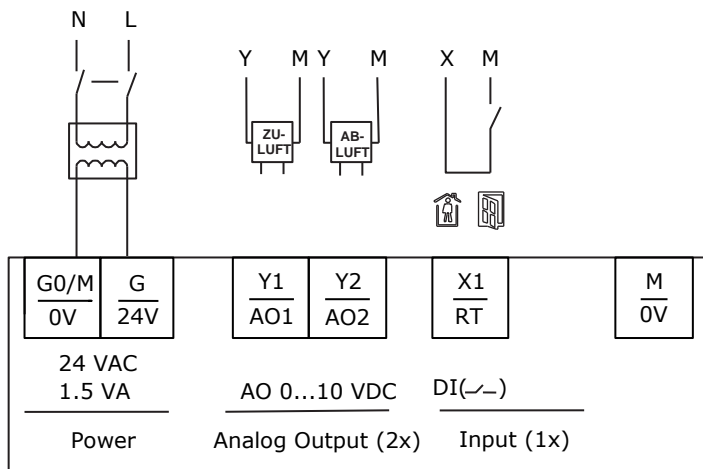


Installation and safety advice

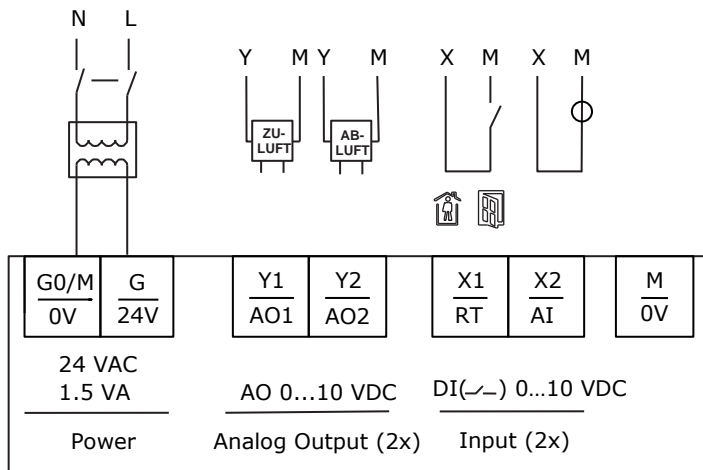
This device is intended to be used as positioner or controller for comfort ventilation systems. It is not a safety device. Where a device failure could endanger human life and property, it is the responsibility of the client, installer and system designer to add additional safety devices to prevent such a device failure. Ignoring specifications and local regulations may cause equipment damage and endangers life and property. Tampering with the device and misapplication will void warranty.

Connection diagram

TCT-FA-MZ2



TCT-FA-MK2



Description:

1	G0/M	0V	Power supply:	0V, -24VDC, internally connected to signal common
2	G	24V	Power supply:	24VAC, +24VDC
3	Y1	AO1	Analog output supply air:	0/2...10 VDC
4	Y2	AO2	Analog output return air:	0/2...10 VDC
5	X1	RT	External passive input:	open contact to signal common
6	X2	AI1	External active input:	0/2...10 V DC (only for TCT-FA-MK2)
7	M	0V	Signal common:	Common 0 potential for analog inputs and analog outputs

Mounting and Installation

Mounting location

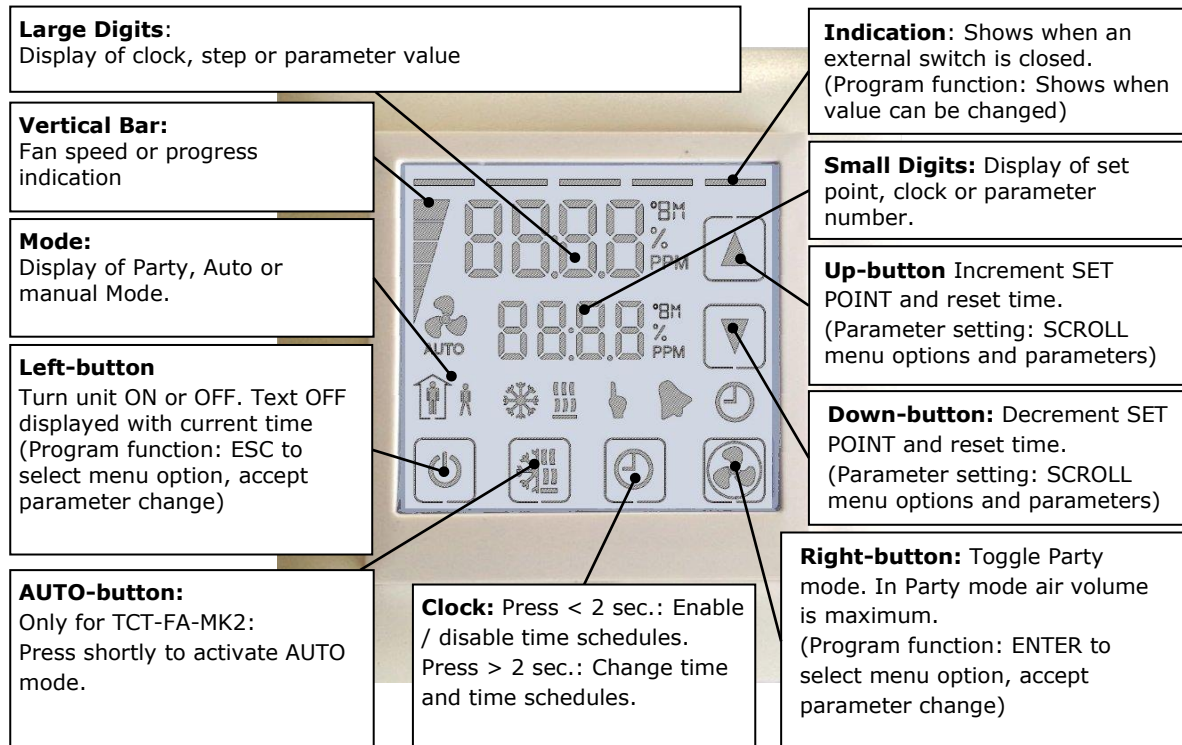
- On a flat, easily accessible wall
- The following mounting locations should be avoided:
 - Protect from direct exposure to sunlight
 - Do not install near heat sources or other heat-generating devices
 - Areas with poor air circulation and niches
 - In the direct influence area of ventilation and fans

Mounting instructions






See the TCT-FA-Mx2 installation sheet, document no. 70-000811 (www.vectorcontrols.com).

Display and Operation



Operation Modes

STEP	Normal mode	The ventilation is operating based on selected values.
OFF	Holiday mode	Ventilation is operated with on and off intervals. The intensity and duration of both on and off intervals may be defined with parameters. The default is 5.5 hours in off mode and 0.5 hours with minimum airflow.
 FULL	Party mode	The ventilation is fully switched on. The reset time is adjustable.
HIGH	Return air mode	Controlled by external contact. The supply air opens fully, the return air is reduced to the minimum. The values of the return air and supply air in this operating mode can be set via parameters.
Auto	Control Mode	Only with TCT-FA-MK2: The ventilation intensity is controlled by the measured signal of a sensor or external transmitter. The measured sensor value is displayed as the measured value. "Auto" is displayed in the setpoint value field.
	Time schedule mode	Ventilation intensity is defined by time schedules.
	Manual override	Short-term manual switching. The timer operation or the auto operation were manually overridden. After the reset time has elapsed, the timer or auto mode determines the output value again. The set ventilation intensity in % or level is displayed under Setpoint.

Power Failure

All the parameters and set points are memorized and do not need to be reprogrammed. Depending on **UP03** the unit will remain switched off, switch on automatically or return to the operation mode it was in before the power failure. The controller has to be connected to a power supply for at least 10 hours for the backup function to operate accordingly.

Clock operation


The TCT-FA-MZ2-D and TCT-FA-MK2-D include a time switch. Up to 8 switch events can be programmed. A switch event is defined by specifying the weekdays on which the event is to be executed, the time and the ventilation intensity. A flashing clock indicates that the time has not been set or that the unit has been without supply voltage for more than 48 hours.

Clock setup

Press CLOCK button > 2 sec SEL and current time is displayed Press the RIGHT button to change the time (minute display blinks): Press UP / DOWN button to change minutes, Press RIGHT button to save (hour display blinks): Press UP / DOWN button to change hours, Press RIGHT button to save (day1 flashes): Press UP / DOWN button to change day, Press RIGHT button to save.	SEL 00:00 day1 (Mon)
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Enable / disable time schedules

At least two switch events must be defined for the time programs to function correctly.

Press CLOCK button < 2 sec. Time schedule operation is enabled or disabled alternately.		
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Create time programs (Pr01- Pr08)

Step 1: Adjusting the time of day of the switch event

Press Clock button > 2 sec SEL and current time is displayed. Press UP button and select PRO. Press the right button. Large digits show Pr01, small digits show the time of the first switch event: 00:00 Press RIGHT button to change the time of the event: 00:00 blinks. Press UP/DOWN buttons to set time. Press RIGHT button to save. (1 bar will appear - step 1 completed), day1 will flash.	Pr01 08:00
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Step 2: Adjusting the weekdays of the switch event

While Pr01 is displayed and day1 is flashing: To execute the switch event on Monday (day1), press the UP button. Five horizontal bars will flash at the top. To cancel the Monday switch event, press the LOWER key. The five bars are not visible. Press the RIGHT button to advance to the next day. Repeat this procedure to define day2 - day7 (Tuesday to Sunday).	----- Pr01 dAY1
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Step 3: Definition of the setpoint

The setpoint is flashing. (Step or percentage setting) Press UP/DOWN to adjust the setpoint to the desired level. Press RIGHT button to complete. The switching event is now defined. TCT-FA-MK2 devices can be set to AUTO. Set the setpoint to <0.	Pr01 1
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Default switching times

The following switching times are pre-programmed:

Monday to Sunday:

PR01: 07:00 Step 2

PR02: 17:00 Step 3

Configuration parameters

The TCT-FA-MZ2 and TCT-FA-MK2 is preset to work for most applications. However, it can be fine-tuned for special requirements through a simple parameter setup routine. This is provided by password-protected parameters. The parameters can be changed on the unit without the need of additional equipment.

Identifying the firmware version

The available functionality and parameter selection will depend on the device software version of the controller. It is therefore important to verify that the documentation is conform with the device.

The instrument software version is displayed if the UP and DOWN buttons are pressed simultaneously for longer than 3 seconds. The version is shown in the large digital display, the revision in the small digital display.

Access to parameters

The parameters can be changed as follows:

1. Press UP and DOWN buttons simultaneously for three seconds. The display will indicate the firmware version in the upper large digits and the revision in the lower small digits.
2. After pressing the RIGHT button, a number with 4 digits and CODE below appears.
3. Press the UP or DOWN buttons to select a number. To access the settings, a numeric password must be selected. The password gives access to user or function/control settings. The password number must be confirmed with the RIGHT button.
4. After successful selection, the parameter value appears on the first line and the parameter number below it.
5. The Parameter can now be selected with the UP or DOWN buttons. Pressing the RIGHT button activates the change mode. 4 bars appear at the top. Now the value can be changed by pressing the UP and DOWN buttons. Finally, the changed value is saved by pressing the RIGHT button.
6. Press the LEFT button to leave the configuration menu and complete the changing process.

User Parameters (Password 009)

Parameter	Description	Range	Default
UP 00	OFF: Access to the operating modes is disabled ON: The operating mode can be changed with the LEFT button	ON, OFF	ON
UP 01	OFF: Access to the setpoint is disabled ON: The setpoint value can be changed with the UP/DOWN buttons	ON, OFF	ON
UP 02	OFF: Access to the clock timer is blocked ON: The clock timer can be changed	ON, OFF	ON
UP 03	State after power failure: 0 = protective mode, 1 = normal mode, 2 = same operating mode as before power failure	0, 1, 2	2 (same mode)
UP 04	Default reset time for "party" mode 0 = no auto-reset, party mode remains active until manually reset or until the next time schedule event	0...255 min	10 min
UP 05	Reset time for manual override mode during time schedules 0 = no auto-reset, manual stage remains active until the next switch event	0...255 min	60 min
UP 06	Step switching or percent OFF: Step switching, number defined under UP07 ON: Range in percent, resolution 0.5%	ON, OFF	OFF (Steps)
UP 07	Number of steps in addition to minimum step, if UP06 = OFF Up to 4 levels are individually defined with CP13...CP18 5-10 steps: The steps are evenly distributed	0...10	4
UP 08	Time format: OFF 24H, ON 12H (AM/PM)	ON, OFF	OFF (24h)
UP 09	For step switching (UP06 = OFF) see table below OFF: Level minimum is displayed as 0 ON: Level minimum is displayed as 1	ON, OFF	ON (1)

Step numbers on the screen		
Step (UP07)	UP09 = OFF	UP09 = ON
Minimum	0	1
Minimum +1	1	2
Minimum +2	2	3
Minimum +3	3	4
Minimum +4	4	5

Control Functions (Password 241)

Warning! Only experts should change these settings! See user parameters for login procedure!

Parameter	Description	Range	Default
CP 00	Control signal: OFF = 0...10V, ON = 2...10V	OFF, ON	ON (2...10V)
CP 01	Min output for AO1 (Supply air)	0...100 %	0% (2.0 VDC)
CP 02	Max output for AO1 (Supply air)	0...100 %	100% (10 VDC)
CP 03	Min output for AO2 (Return air)	0...100 %	0% (2.0 VDC)
CP 04	Max output for AO2 (Return air)	0...100 %	100% (10 VDC)
CP 05	Absence mode: Length of the enabled interval	0...25.5 h	0.5 h
CP 06	Absence mode: Length of the disabled interval	0...25.5 h	5.5 h
CP 07	Absence mode: Output value during the enabled interval OFF = 0V, 0...100% according to control signal	OFF, 0...100 %	20 %
CP 08	Absence mode: output value during the disabled interval OFF = 0V, 0...100% according to control signal	OFF, 0...100 %	0 %
CP 09	Configuration of external input (X1) 0 = Disabled 1 = Normal / Absence mode changeover 2 = Return air mode	0...2	2
CP 10	Activation delay (seconds): If CP 09 = 1: The time the binary input needs to be open before absence mode is activated If CP 09 = 2: The time the binary input needs to be connected to signal ground before return air mode is activated	0...1275 sec	60
CP 11	Return air mode: Volume for supply air OFF = 0V, 0...100% according to input signal	OFF, 0...100%	100%
CP 12	Return air mode: Volume for return air OFF = 0V, 0...100% according to input signal	OFF, 0...100%	OFF
CP 13	Step level when UP06 = OFF and UP07 ≤ 4: Step Minimum	OFF, 0...100%	0% (2 VDC)
CP 14	Step level when UP06 = OFF and UP07 ≤ 4: Step Minimum +1	OFF, 0...100%	20% (3.6 VDC)
CP 15	Step level when UP06 = OFF and UP07 ≤ 4: Step Minimum +2	OFF, 0...100%	40% (5.2 VDC)
CP 16	Step level when UP06 = OFF and UP07 ≤ 4: Step Minimum +3	OFF, 0...100%	60% (6.8 VDC)
CP 17	Step level when UP06 = OFF and UP07 ≤ 4: Step Minimum +4	OFF, 0...100%	80% (8.4 VDC)
CP 18	Output level in party mode Note: Party mode is deactivated when set to OFF.	OFF, 0...100%	100% (10 VDC)

- ➔ Signal limitation for VAV systems:
By changing the upper and lower signal limits, the minimum and maximum volume flows can be adjusted on the control valve. The upper and lower limits can be differentiated for supply and return air.
- ➔ Absence mode:
Ventilation is activated according to adjustable time intervals. Time intervals and ventilation intensity during the on/off time can be configured. Standard cycle time is 6 h with 0.5 h active time and 5.5 h inactive time. The standard ventilation intensity during the enabled time is 20%, during the disabled time 0%.
- ➔ Step switching:
The steps can be individually defined with CP13 - CP18 if not more than 5 steps are set under UP07. With 6 or more stages, the stages are divided evenly over the whole range.

Input configuration for X1

- ➔ Normal-Unoccupied Switchover:
The operating mode can be remote controlled by an external switch. Normal operation is activated when the external switch is closed (the signal input is connected to the measurement zero). When the switch is open for the time period of CP10, it automatically switches to the unoccupied mode. An application would be, for example, a motion sensor for a meeting room with a window contact in series.
- ➔ Return air control:
If this contact closes, the supply air is operated according to setpoint CP11 and the return air according to setpoint CP12. A time delay can be defined with CP10.
This function is used when an extractor hood is switched on in the kitchen or a ventilation fan is used in the bathroom.

Controller settings for auto-mode (only for TCT-FA-MK2)

Parameter	Description	Range	Default
CP 19	Configuration of the external control input (X2) 0 = Switched off 1 = CO2 0...2000 ppm 2 = VOC 0...2000 ppb 3 = Dehumidification 0...100 % RH.	0...3	1
CP 20	Calibration Measuring signal	-10.0...10.0	0.0
CP 21	Control signal OFF = 0...10 VDC, ON = 2...10 VDC	OFF, ON	OFF
CP 22	Switching limit for stage Minimum +1 In Percent mode or with more than 4 steps, this is the setpoint	Acc. CP19	600 ppm
CP 23	Switching limit for stage Minimum +2 0 = Stage is not activated in AUTO mode	Acc. CP19	800 ppm
CP 24	Switching limit for stage Minimum +3 0 = Stage is not activated in AUTO mode In percentage mode or with more than 4 steps, this is the value at which the output is 100%	Acc. CP19	1000 ppm
CP 25	Switching limit for stage Minimum +4 0 = Stage is not activated in AUTO mode	Acc. CP19	0 ppm
CP 26	Switching hysteresis for stage switching	Acc. CP19	100 ppm
CP 27	Reset to auto mode if in manual mode 0 = no automatic reset	0...255 Min	0 Min

- ➔ The input control signal is interpreted by parameter CP19 as follows:
 CP19 = 1 ⇨ 0/2 VDC = 0 ppm CO₂; 10 VDC = 2000 ppm CO₂
 CP19 = 2 ⇨ 0/2 VDC = 0 ppb VOC; 10 VDC = 2000 ppb VOC
 CP19 = 3 ⇨ 0/2 VDC = 0 % r.F.; 10 VDC = 100 % r.F.
- ➔ Control in auto-mode:
 The TCT-FA-MK2 has a control input. If an controller or transmitter connected to this input, the ventilation intensity can be controlled by the signal of this input.
 The controller behaves differently depending on the number of stages or percentage selection (UP06).
 - In step operation with 4 or lower steps, the controller is controlled via switching limits CP22...CP26. If the controller signal exceeds one switching limit, the next higher step is activated. If the value falls below a switching limit minus the switching hysteresis, the next lower level is activated.
 - For step operation with 5 steps and more or for percentage control (UP06 = ON), the controller acts as proportional control. The setpoint is set with CP22. CP24 defines the value at which the output signal is 100%. CP24 minus CP22 thus results in the proportional band.
- ➔ Do not enable large steps automatically:
 For the higher steps, it may be appropriate if they are not activated automatically by a sensor signal. This is achieved by setting the parameter for the switching limit to 0 %.
- ➔ Reset:
 If a measurement signal is present at the control input, AUTO operation can be reactivated after an adjustable reset time has passed. The reset time is set with CP 27.
 While the reset time is elapsing, the hand symbol is displayed.
 This reset can be deactivated by setting CP 27 = 0.