HCDC

Hyper-Connected Dryer Controller

Operating Manual

Index

1.   Manufacturer's details

Name and address

Parker Hannifin Manufacturing S.r.l.

Sede Legale:

Via Sebastiano Caboto 1, Palazzina "A" 20094 Corsico (MI) Italy

Sede Operativa:

Gas Separation and Filtration Division EMEA - Strada Zona Industriale, 4

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Web-site: www. parker.com/

2. About these operating instructions

The present Operating Instructions contain basic information regarding safe operation of the controller and are only valid in conjunction with the manual of the respective dryer. For this reason, the present operating instructions are a supplement to the manual of the dryer.

Characters and symbols used

▶   Work steps that you have to carry out in the sequence stated are marked by black triangles.

■   Lists are marked by a small box.

> **Note:**
> **These notes provide tips for safe and efficient handling of the controller.**

⚠	**Caution!** **These safety notes warn against damage to property and help you to avoid such damage.**

⚠	**Danger!** **These danger notes with a grey background warn against personal injury and/or danger to life and limb; danger notes help you to avoid serious or life-threatening situations for yourself and/or third parties.**

Target group for the present operating instructions

The present operating instructions address all persons who work with and on the controller. We assume that these persons must be expert and qualified technicians.

Operating instructions: handling

These operating instructions must be continuously available at the site where the dryer is used. We recommend to prepare a copy and to keep the same in a safe and freely accessible place next to the dryer. Keep the original document in a safe place.

Supplementary documents

The present Operating Instructions represent a supplement to the manual of the dryer. All notes given there must be heeded, in particular all notes on safety.

Warranty notes

Heed the warranty notes given in the enclosed dryer manual. The statements made there also apply to the controller.

3. Technical data

3.1 Technical features

Touch screen LCD (colors)
- Resolution: 7" TFT 16:9 64k 800x480
- Operating temperature: from -0° C to a +50° C
- Storage temperature: from -20° C to a 70° C
- Protection class IP65
- Dimensions (L x A x P: 182 x 140 x 95 mm)

Integrated P&ID flowchart
- Providing excellent overview

Internal memory
- Permanent logging of measured data at 60 seconds minimum
- Evaluation and display in curve chart
- Possibility to download the recorded data to USB memory without having to open the electrical panel.

Ethernet connection
- RJ45 with web service

Communication modules (optional)
- Profibus (DPVO; Profinet)
- Modbus RTU on RS485 and Modbus TCP/IP on RJ45 (standard)

Analog outputs
- 2 analog outputs 4-20 mA, Two measuring points can be selected for transmission.

> **Note**
> **Analogue outputs are not galvanically protected. If required, install an insulated signal amplifier.**
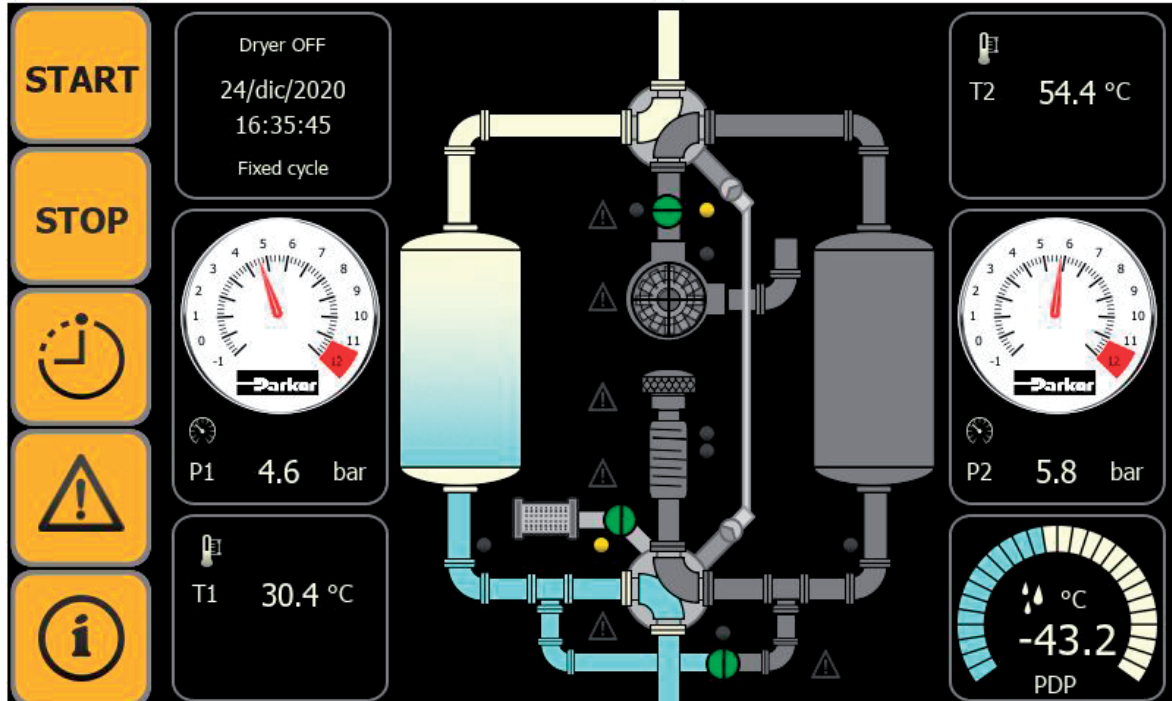
Floating contacts
- Collective alarm

4. Overview of the operating and display elements

The operating panel in the switch cabinet door is used to check the operating status and to edit parameters. The display is a *Touch Screen Panel*.

4.1 The home screen

The dryer status appears on the display after power on.

Home screen

The display shows the following values:

- the dryer status (ON/OFF), and the current cycle of the vessel
- the current vessel pressure in bar (P01/P02)
- the measured temperature at resistance thermometers T1 and T2 in °C
- the current pressure dewpoint in °C .
- the cycle the dryer is in (fixed or dewpoint-dependent)

The main display is also the start display for navigation in the menu.
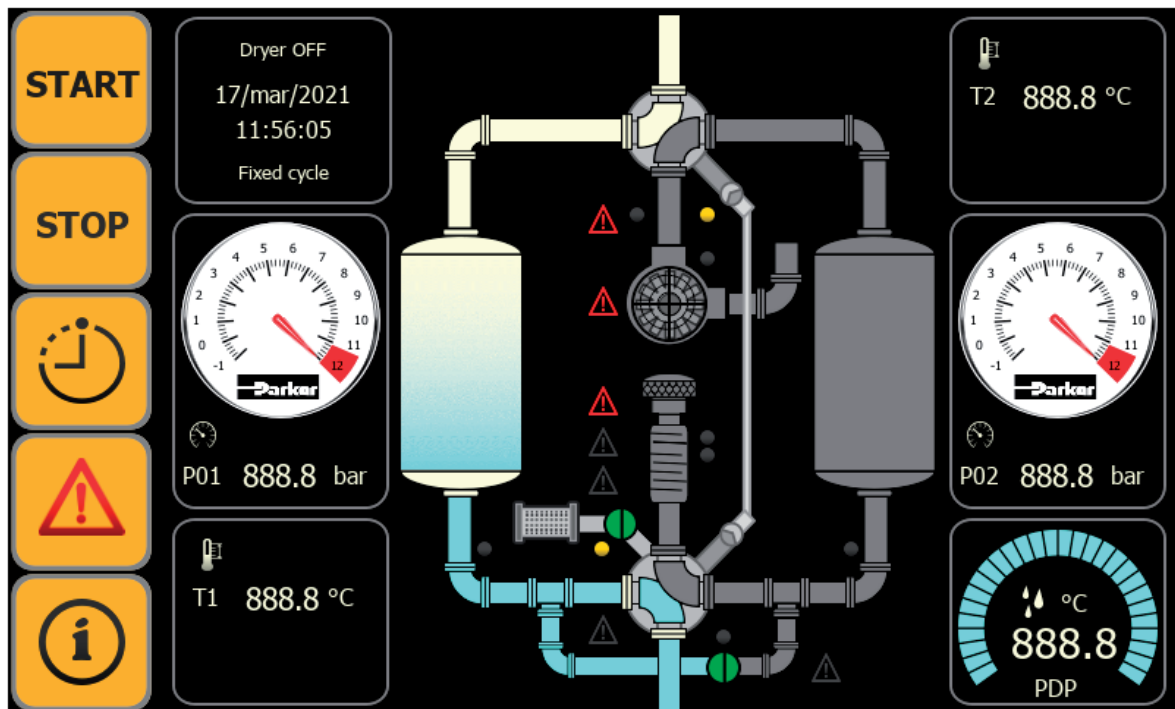
Home screen

The flow chart view provides a graphic overview of the current state of devices and components. Alarms are also attributed to each of the components. The respective component is marked red in the flow chart and an alarm symbol lights up when an error occurs.

START	touch to switch on the dryer
STOP	touch to switch off the dryer
⏲	touch to see the machine status (standby, adsorption, rigeneration, pressurization...)
⚠	touch to see the activated alarms, the icon blinking when an alarm is present.
ⓘ	touch to enter in the system menu

P1 4.6 bar	Shows the pressure vessel N°1
P2 5.8 bar	Shows the pressure vessel N°2
°C -43.2 PDP	Shows the dew point
T1 30.4 °C	Shows the heating temperature T1
T2 54.4 °C	Shows the rigeneration temperature T2
Dryer OFF 24/dic/2020 16:35:45 Fixed cycle	Shows date/hour and dryer condition.

5. Starting and stopping the dryer

Make sure all necessary preparations have been made. For this purpose, follow the attached dryer manual.

The Dryer is equipped with an electrical panel with a main switch that give/remove the supply voltage.

> **Note**
> **For the correct functioning of the installed valves it is necessary that the system is under pressure! The pressure must be higher than 4 bar (sp).**

▶ Set the main switch to "I".

▶ The display lights up on the main screen.

▶ Touch **START** START to start directly the dryer.

The dryer now runs fully automatically according to the stored operating parameters.
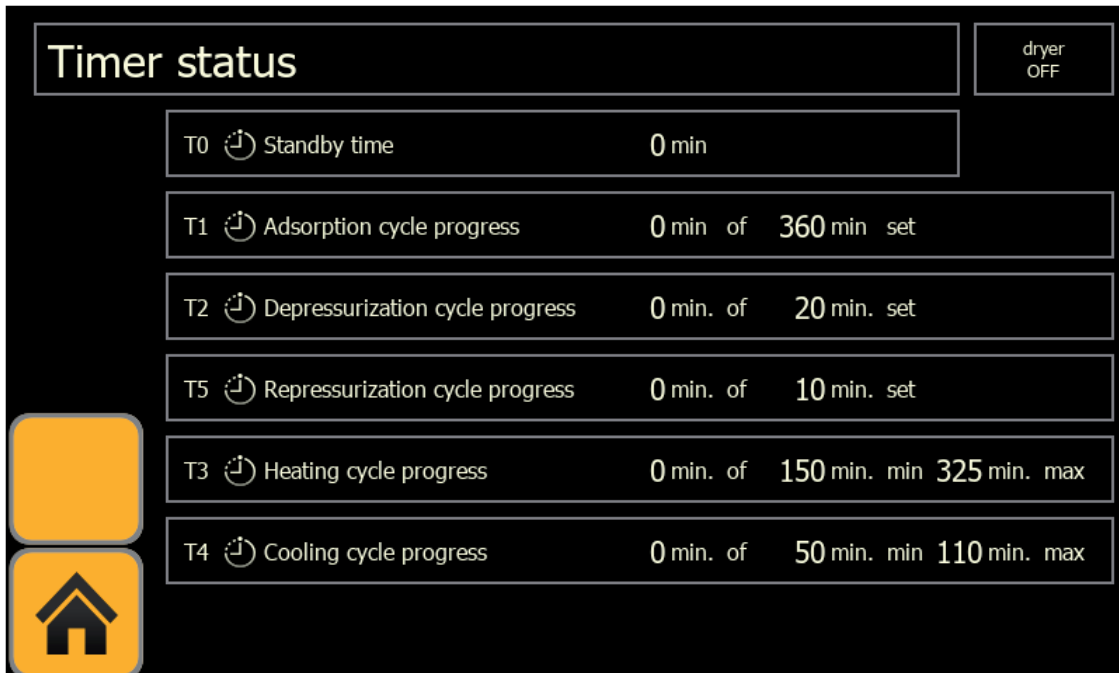
Stopping the dryer (stop program)

▶ Touch **STOP** STOP to stop directly the dryer.

6. Timer status

▶ Touch [icon] .
The following display appears:

Timer status		dryer OFF
T0 ⏱ Standby time	0 min	
T1 ⏱ Adsorption cycle progress	0 min of 360 min set	
T2 ⏱ Depressurization cycle progress	0 min. of 20 min. set	
T5 ⏱ Repressurization cycle progress	0 min. of 10 min. set	
T3 ⏱ Heating cycle progress	0 min. of 150 min. min 325 min. max	
T4 ⏱ Cooling cycle progress	0 min. of 50 min. min 110 min. max	

Display: Status timer menu

View the working times of the dryer

▶ Touch [icon] to return to home screen.

7.   Alarms

▶   Touch ⚠ .

The following display appears:

Name	Time	Description
aTA1	22/mar/2021 - 12:18:16	current phase 1 sensor broken
aTA3	22/mar/2021 - 12:18:16	current phase 3 sensor broken
aQF1	22/mar/2021 - 13:49:05	vacuum pump motor protection
aTSH	22/mar/2021 - 13:49:07	heater safety thermostat

Display: Alarms menu

Shows which alarms is present.

Touch ◀ to return on the previous display.

▶   Touch 🏠 to return to home screen.

8.   System information menu

The main menu is the entry point for the controller's navigation systematics. You can easily go to any submenu from here. To open the System menu, proceed as follows:

▶   On the main menu touch ⓘ .

The following display appears:
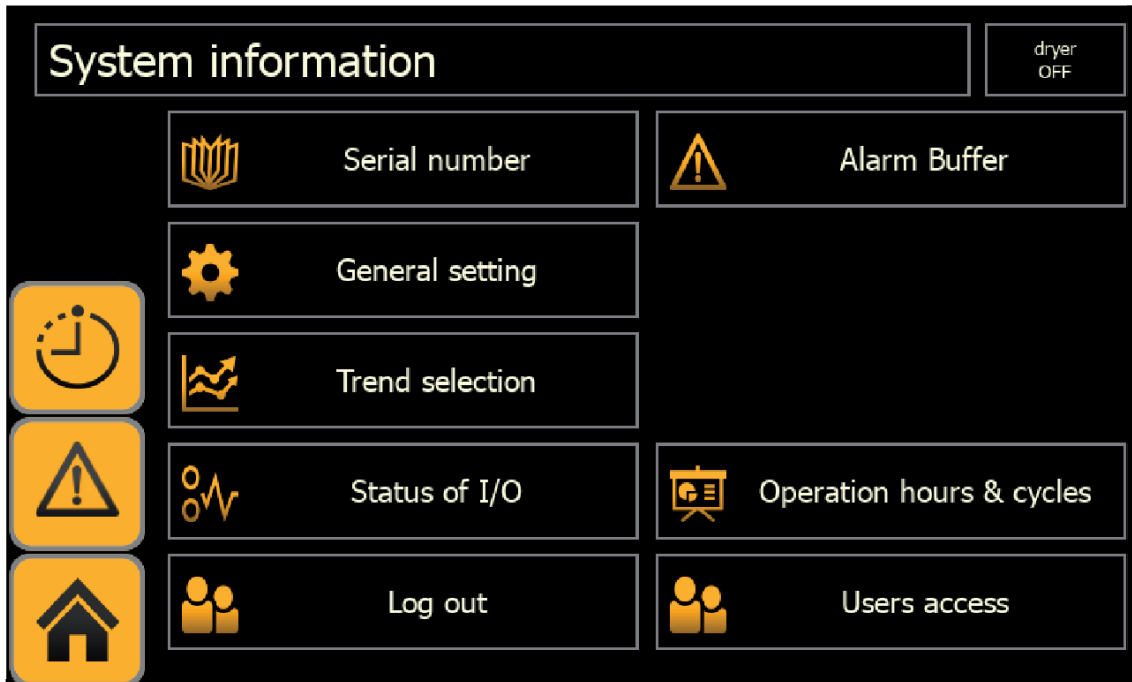
Display: System information

Here you can press the respective key to enter the corresponding submenu.

Serial number	Enter on "serial number " menu: shows release software, serial number, and PLc version.
General setting	Enter on "General setting" menu: to shwos the parameters and configure the dryer.
Trend selection	Enter on Graphics menu: pressure / temperature / dew point graphs, data download, deleted data
Status of I/O	Enter on"status I/O" menu: digital input/output, analogic ouput and set of the analogic output.
Alarm Buffer	Enter on "Historical alarm" menu.
Operation hours & cycles	Enter on "work hour" menu: shows work huors of the dryer, vacuum pump and other parameter.
Users access	For enter on service /maintenance menu
Log out	For exit from service/maintenance menu

8.1   Serial number

▶   Touch [icon] Serial number

Appear the following display:

Display: serial number

View the release software, serial number, and PLC version

▶   Touch [icon] to return on the previous display.

▶   Touch [icon] to return to home screen.

8.2   Alarm buffer

▶   Touch [Alarm Buffer]

Appear the following display:
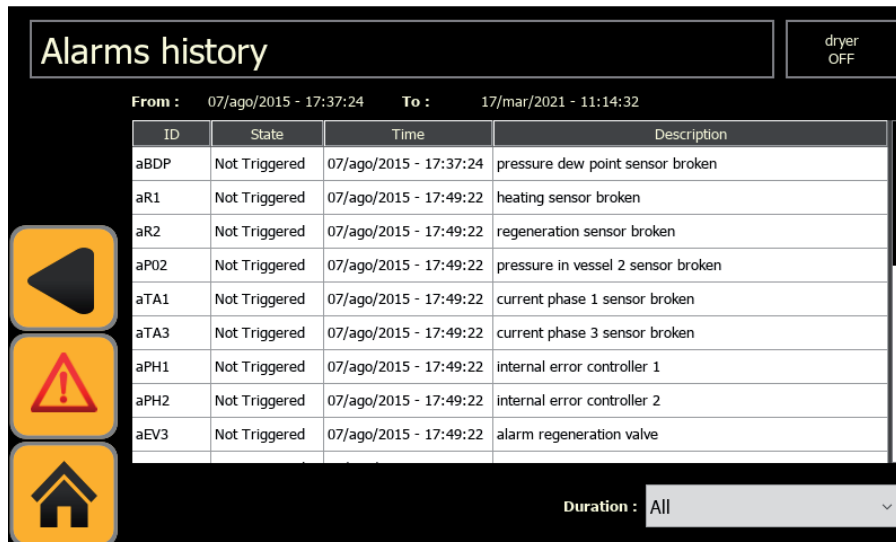
Display: alarms history

View the list of alarms over time.

List of alarms

aR1	heating sensor broken	aLPR	low pressure in vessel in line
aR2	regeneration sensor broken	aTHO	monitoring heater time
aR3	inlet air sensor broken	aWDP	warning high dew point
aR4	outlet air sensor broken	aHDP	alarm high dew point
aP01	pression in vessel 1 sensor broken	aTPR	regeneration valve open
aP02	pression in vessel 2 sensor broken	aPRV	working pressure
aBDP	pressure dew point sensor broken	aEM	emergency button (if installed)
aBFM	flow meter sensor broken	aSTM	service time
aTA1	current phase 1 sensor broken	aEV1	generic alarm main valve (if limit switch instal.)
aTA3	current phase 3 sensor broken	aEV3	generic alarm regeneration valve
aB3	ambient temperature sensor broken (if installed)	aEV4	generic alarm pressurization valve
aRH	ambient humidity sensor broken (if installed)	aEV5	generic alarm expansion valve
aR5	used only in W1230 version	aPRS	pressure alarm
aR6	used only in W1230 version	aQF1	vacuum pump motor protection
aPH1	internal error controller 1	aTSH	heater safety thermostat
aPH2	internal error controller 2 (expansion)		

▶   Touch [◀] to return on the previous display.

▶   Touch [⌂] to return to home screen.

8.3 User access (service)

▶ Touch [Users access] to enter on factory/maintenance menu.

User name: [   ]

Password: [   ]

☐ Show password

[Back]   [Sign In]

Only for technical service.

8.4 Log out (service)

▶ Touch [Log out] to exit from factory/maintenance menu.

8.5 Operation hours & cycle

▶ Touch   Operation hours & cycles

Appear the following display:
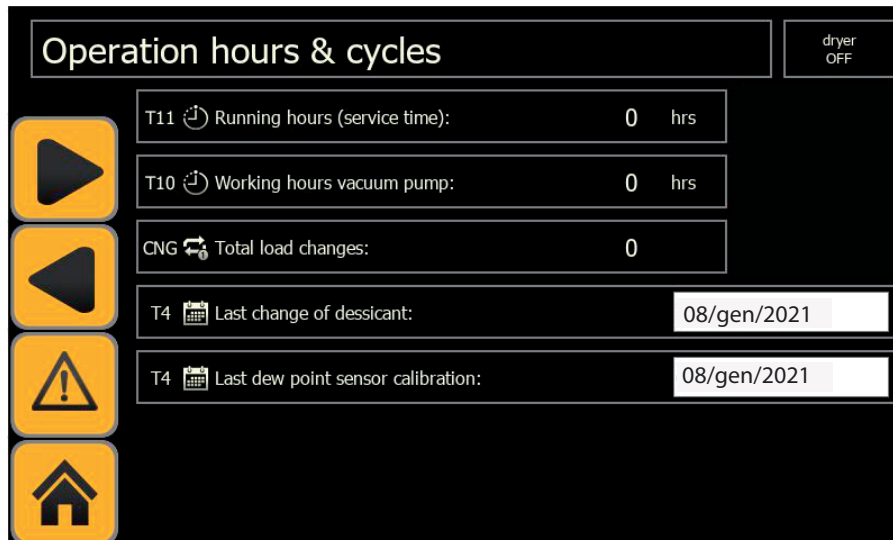
Display: operation hours & cycle 1

▶ Touch ▶

Appear the following display:
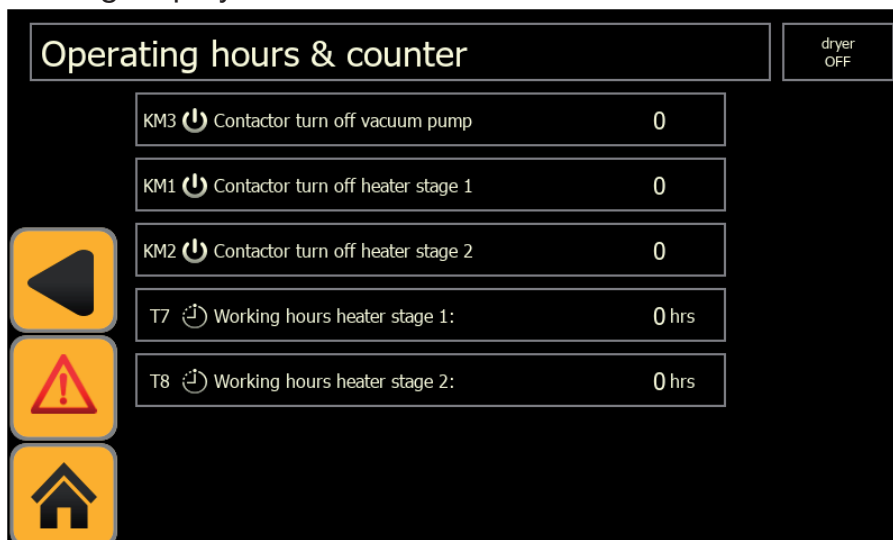
Display: operation hours & cycle 2

▶ Touch ◀ to return on the previous display.

▶ Touch 🏠 to return to home screen.

8.6　Status I/O menu

▶　　touch [Status of I/O]
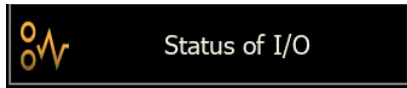
Appear the following display:

Display: Status I/O

Displays digital and analogue inputs, and the set of analogue inputs.

▶　　touch [Digital Input]

Appear the following display:
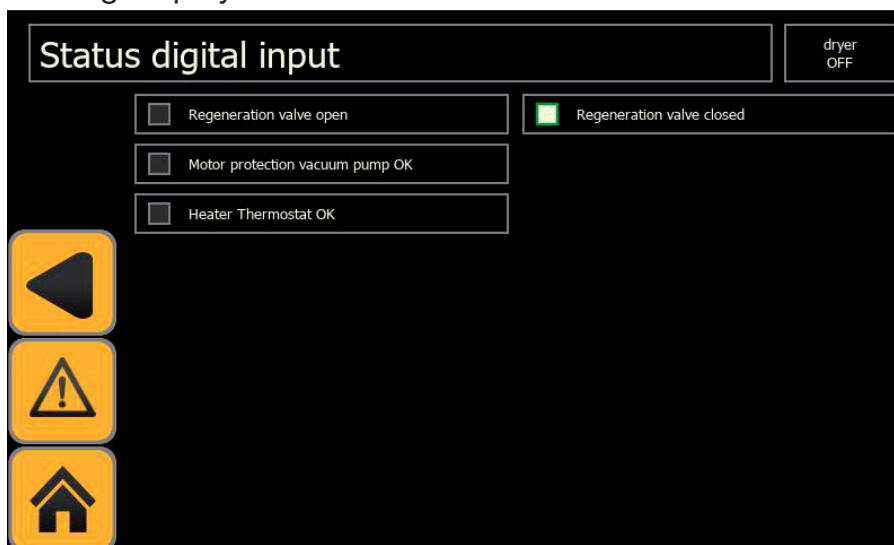
Display:status of digital input

▶   touch   **Digital Output**

Appear the following display:
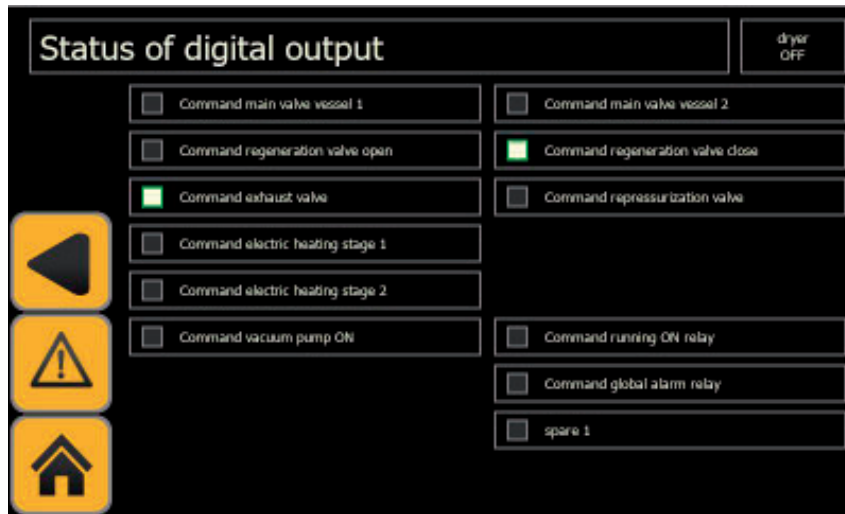
Display: status of digital output

▶   Touch to return on the previous display.

▶   Touch to return to home screen.

▶   touch   **Analog Input**

Appear the following display:
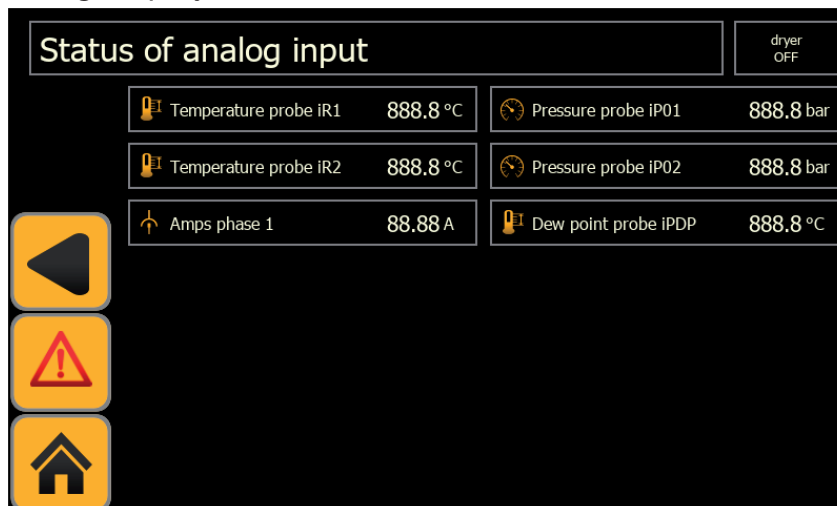
Display: status of analog input

iR1: heating Temperature T1; iR2 : regeneration temperature T2;
iP01: pressure vessel 1; iP02 pressure vessel 2; iPDP: dew point;

▶   Touch to return on the previous display.

▶   Touch to return to home screen.

▶

▶   touch [Setting Analog Input]

Appear the following display:

Configuration analog input		dryer OFF
LP01 Min. pressure sensor vessel 1 — 999.0 bar	HP01 Max. pressure sensor vessel 1 — 999.0 bar	
LP02 Min. pressure sensor vessel 2 — 999.0 bar	HP02 Max. pressure sensor vessel 2 — 999.0 bar	
LPDP Min. value dew point sensor — -999.0 °C	HPDP Max. value dew point sensor — -999.0 °C	
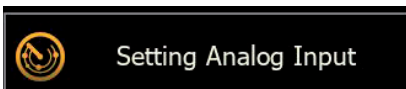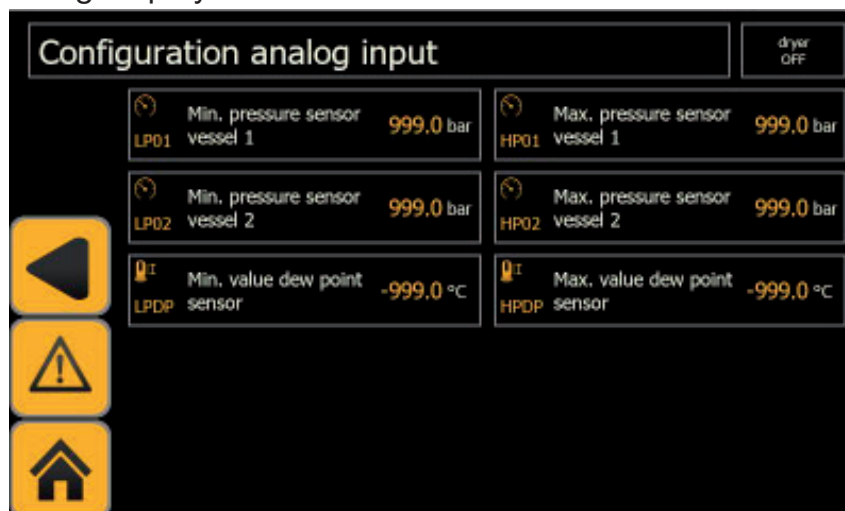
Display: analog input set

▶   On all these screens it is possible to see which inputs / outputs are enabled, and in particular in the case of analogue inputs it is also possible to see the value and set

▶   The parameters can only be configured by authorized service person.

▶   Touch [◀] to return on the previous display.

▶   Touch [⌂] to return to home screen.

8.7   Trend menu

▶   touch [Trend selection]
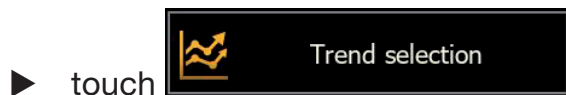
The following display appears:
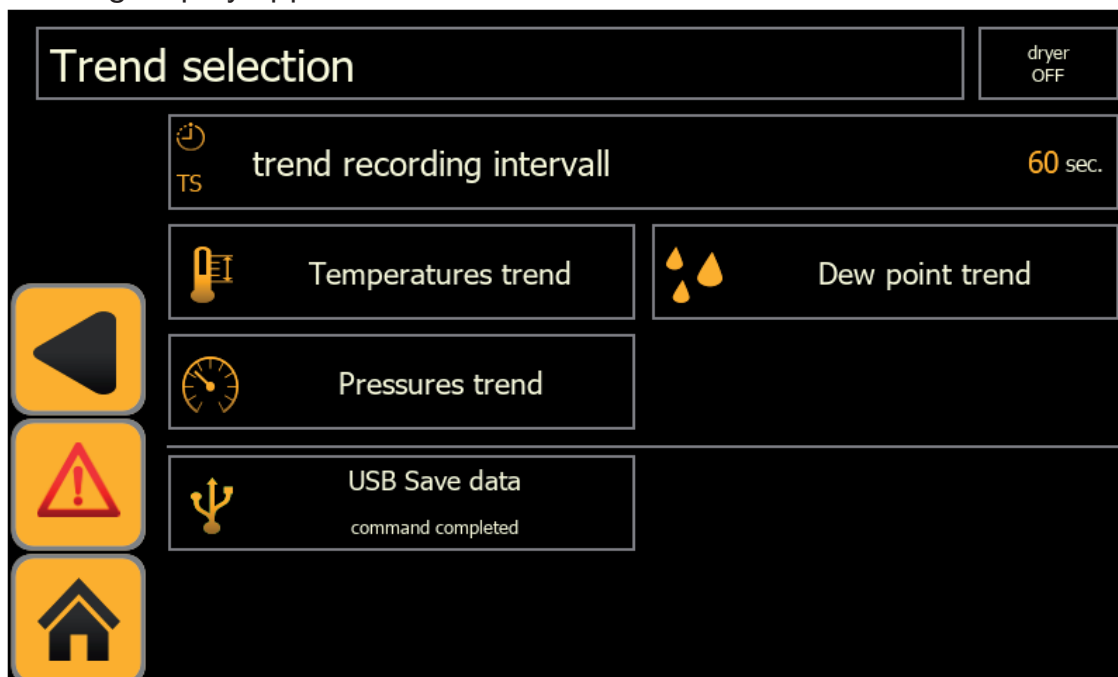
Display: Trend selection

trend recording intervall	Only readable by the user, Adjustable only by technical service (Adjust the sampling time)
Temperatures trend	Shows the trend of the temperature actual and previuos
Pressures trend	Shows the trend of the pressure actual and previuos
USB Save data command completed	Starts the download on a USB key
Dew point trend	Shows the trend of the dew point actual and previuos

8.7.1 Sampling interval (Service)

▶   Touch   `⏱ TS trend recording intervall`

Appear a numeric keybord

▶   Enter the desired sampling time (minimum=60; maximum=3600 seconds).

▶   Touch "Enter" to confirm.

the number fo the Sampling appears on the left of "**trend recording interval**".

8.7.2 Temperature Trend

▶   touch   `🌡 Temperatures trend`

Appear the graphic
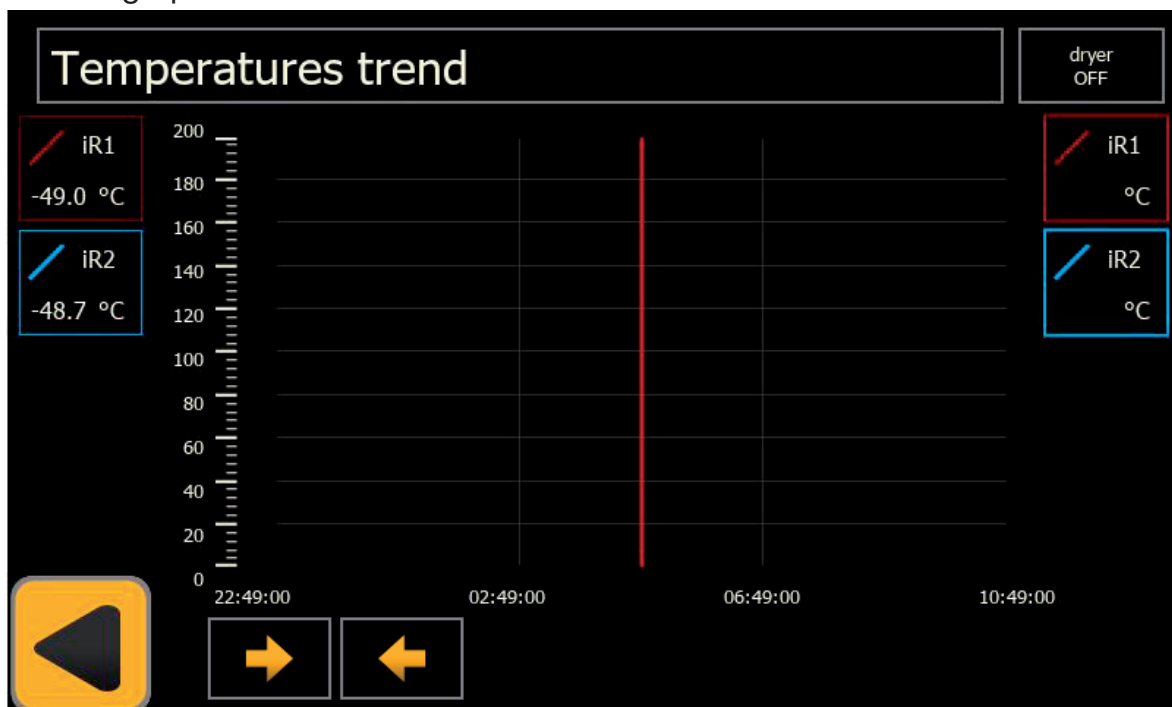
Display: temperature trend

■   on the left the actual value of temperature: T1(iR1), T2(iR2)

■   on the right the value of T1(iR1), T2(iR2), read at the red line, use the arrows

`➡ ⬅` to see the values previously recorded by the dryer. The date and time of the recording indicated by the red line is shown at the bottom right.

▶   Touch `◀` to return on the previous display.

8.7.3 Pressure trend

▶   touch [🕐 Pressures trend]

Appear the graphic
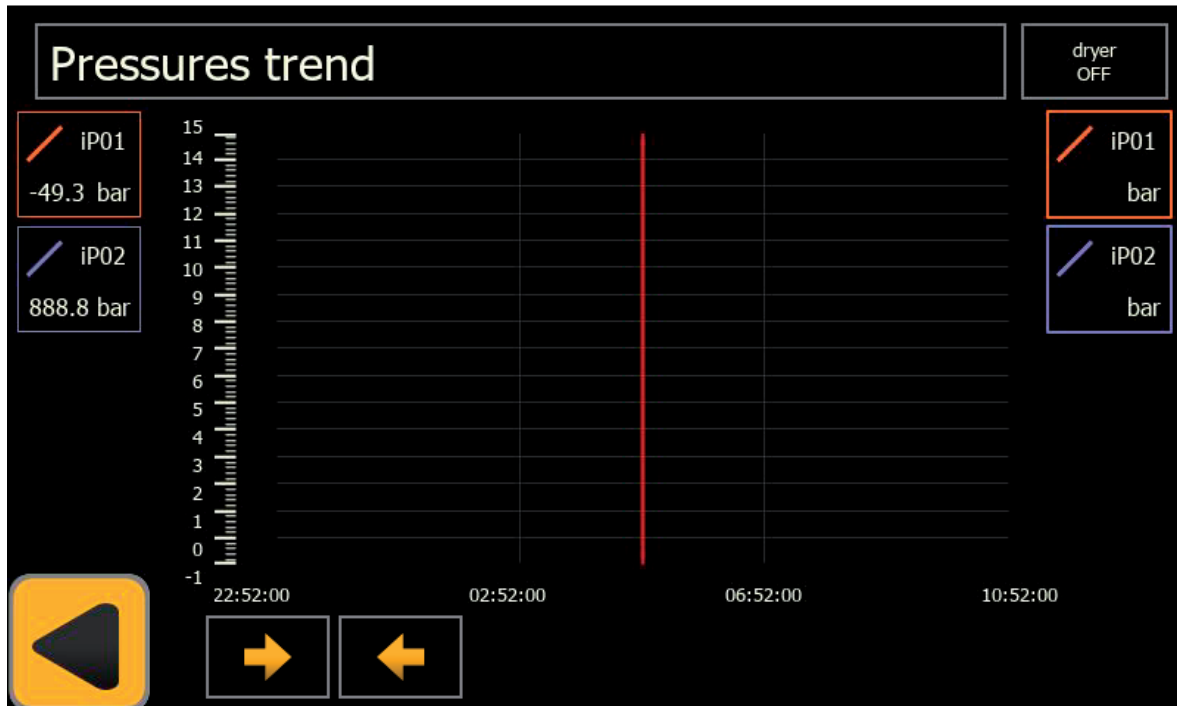
Display: Pressure trend

■   on the left the actual value of pressure iP01, iP02 attuali
■   on the right the value of iP01, iP02 read at the red line, use the arrows

[➡] [⬅] to see the values previously recorded by the dryer. The date and time of the recording indicated by the red line is shown at the bottom right.

▶   Touch [◀] to return on the previous display.

8.7.4 USB

Insert the USB drive in the appropriate hole located in the front panel of the electrical panel.

▶   touch [🔌 USB Save data command completed]

Bliking (green) during the saving.
When stop to blink the download is finished.

▶   Touch [◀] to return on the previous display.

8.7.5 Dew point trend

▶   touch [🌢🌢 Dew point trend]

Appear the graphic

Display: dew point trend

■   on the left the actual value of dew point and temperature iPDP, T2(iR2)
■   on the right the value of iPDP, T2(iR2) read at the red line, use the arrows

[➡ ⬅] to see the values previously recorded by the dryer. The date and time of the recording indicated by the red line is shown at the bottom right.

▶   Touch [◀] to return on the previous display.

8.8   General setting menu

▶   touch   [⚙ General setting]

Appear the follwing display
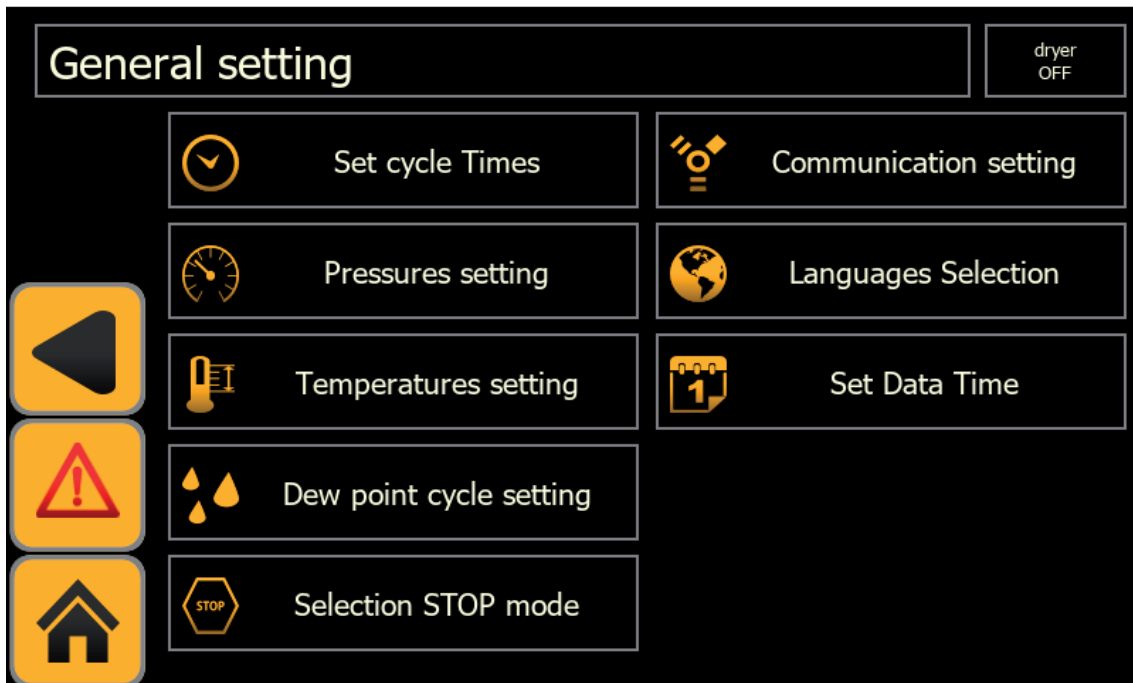
Display: General setting

[⊙ Set cycle Times]	Shows the set time: heating (fixed, variable), cooling and the heater
[⊙ Pressures setting]	Shows the pressure min.max. and the actual value of dessicant beds of the vessel.
[🌡 Temperatures setting]	Shows the set temperature and the actual value of sensor T1 e T2
[💧 Dew point cycle setting]	Shows the dew point set, the cycle and the actual value of the dew point.
[⬡ Selection STOP mode]	Choose the type of the stop.
[📡 Communication setting]	Configuration fo the Modbus (RTU/TCP-IP)
[🌐 Languages Selection]	Choose the language
[📅 Set Data Time]	For set date and hour

8.8.1 Timer setting

▶   touch   ⏲ Set cycle Times

Appear the following display:

Timer setting		dryer OFF
⏲ Z0 Heating time (min) 150 min.	⏲ Z5 Cooling time (min.) 50 min.	
⏲ Z7 Heating time variable cycle (max) 800 min.	⏲ Z10 Cooling time (max.) 110 min.	
⏲ Z4 Heating time fixed cycle (max) 325 min.	⏲ Z13 Cooling heater time 1 min.	
⏲ Z17 Monitoring heater time 30 min.	⏲ Z28 Aftercooling time 10 min.	
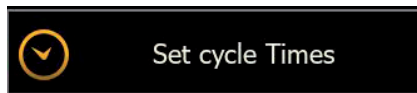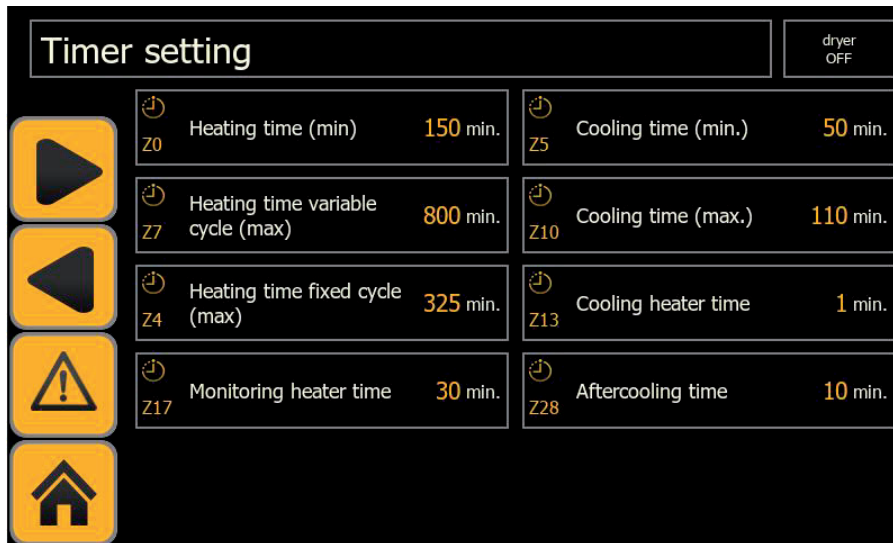
Display: timer setting 1

Parameters only readable.

▶   Touch ▶

Appear the following display:

Timer setting		dryer OFF
⏲ Z2 Pressurization time 10 min.	⏲ Z1 Fixed cycle time (max.) 360 min.	
⏲ Z3 Expansion time 20 min.	⏲ Z6 Variable cycle time (max.) 24 min.	
⏲ Z12 Delay expansion valve 30 sec.	⏲ Z16 Change vessel delay 1 min.	
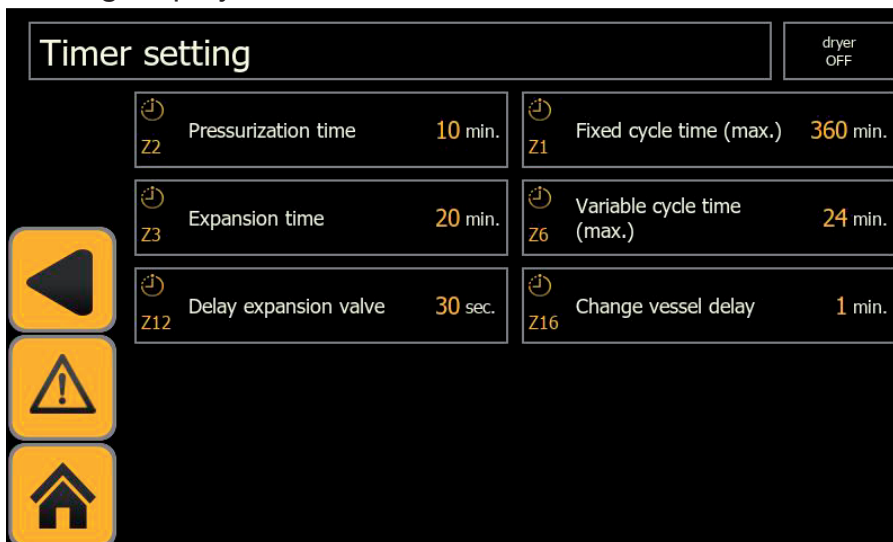
Display: timer setting 2

Appear all cycles timer setting and actual state of the dryer.
Parameters only readable.

▶   Touch ◀ to return on the previous display.

▶   Touch 🏠 to return to home screen.

8.8.2 Pressure setting

▶   touch [⊘ **Pressures setting**]

Appear the following display:

Pressure setting		dryer OFF
⊘ **LPE** Low expansion pressure	**0.6** bar	
⊘ **LPV** Minimum pressure in vessel	**5.0** bar	

⊘ **iP01** Actual pressure vessel 1	**888.8** bar	⊘ **iP02** Actual pressure vessel 2	**888.8** bar
☐ Expansion vessel 1 OK		☐ Expansion vessel 2 OK	
☐ NO pressure vessel 1		☐ NO pressure vessel 2	
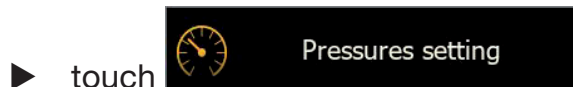
Display: pressure setting
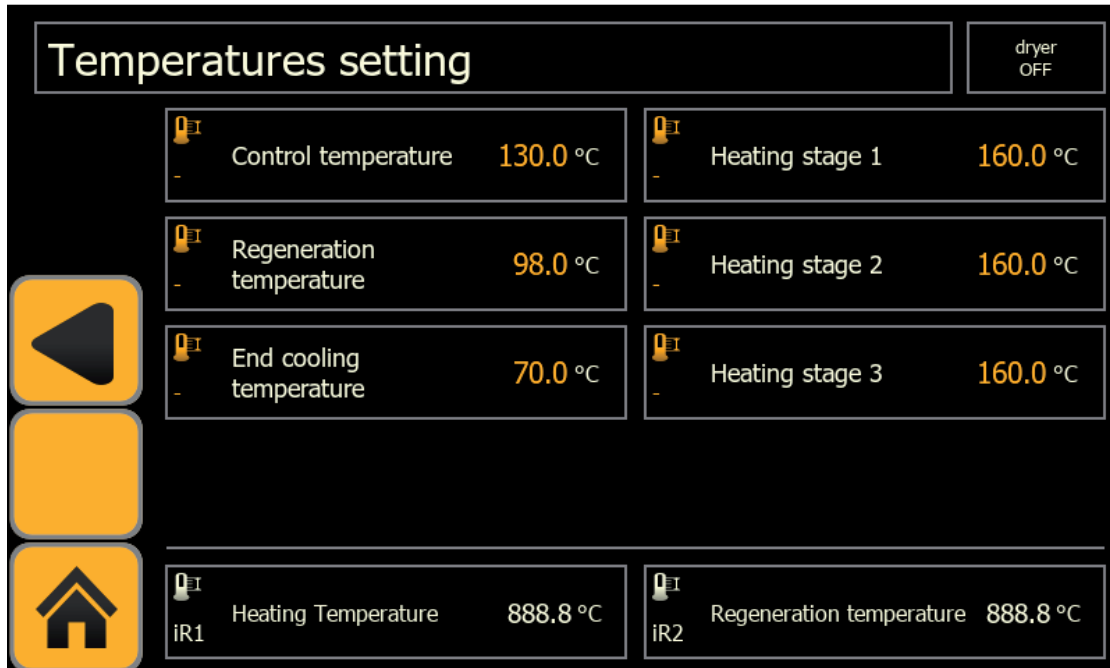
Appear all pressures setting actual state of the dryer.
Parameters only readable.

▶   Touch [◀] to return on the previous display.

▶   Touch [⌂] to return to home screen.

8.8.3 Temperatures setting

▶   touch   Temperatures setting

Appear the following display:

Display: temperatures setting

Appear all temperatures setting and the actual values of the sensors.
Parameters only readable.

▶   Touch to return on the previous display.

▶   Touch to return to home screen.

8.8.4 Dew point-cycle setting

▶ touch [🌢🌢 Dew point cycle setting]

Appear the following display:

Dew point cycle setting	dryer OFF

Dew point switching vessel value **-25.0** °C

Dew point alarm **-20.0** °C

fix cycle

iPDP Actual dew point value **888.8** °C

aBDP Dew point probe alarm. Fix cycle permitted only!
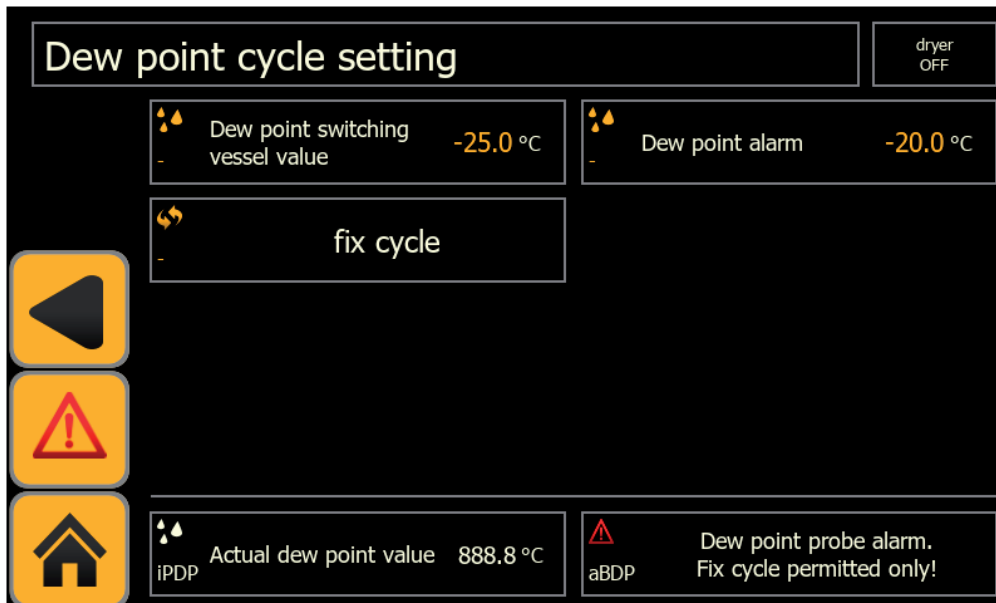
Display: dew point cyle set

Appear the dew point set, type of cycle, option and actual value of the dew point
- Some value are changeble, other value are for service person.

▶ Touch **"fix cycle"** to change the cycle (fixed/variable).

Dew point cycle setting	dryer OFF

Dew point switching vessel value **-25.0** °C

Dew point alarm **-20.0** °C

variable cycle

iPDP Actual dew point value **-40.3** °C
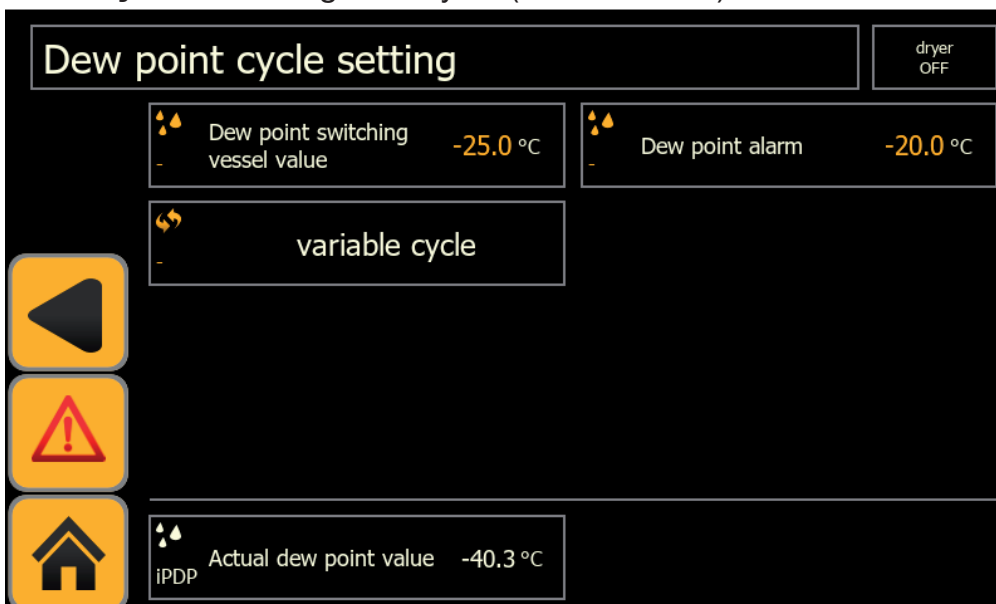
▶ Touch the parameter to see the numeric keyboard and modify the value. Enter to confirm, so the new value appears on the right of the parameter.

▶ If sensor dew point is broken, you could only use "fix cycle".

▶ Touch [◀] to return on the previous display.

▶ Touch [🏠] to return to home screen.

8.8.5 Selection stop mode

▶ touch ⬡ STOP   Selection STOP mode
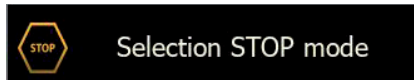
You could choose these options:

Display: selection Stop Mode

> **Note:**
> **You should always prefer the "normal stop" function to ensure the current regeneration cycle can be completed before the dryer shuts down.**

> **Note:**
> **Regeneration will be incomplete when the dryer is stopped with "direct stop" in a phase other than the standby phase (e.g. heating or cooling). As a result, the set pressure dew point may initially not be achieved when re-starting.**
> **When switching off during the heating stage, the safety thermostat on the heater may be triggered. When re-starting, the dryer then runs without heating and does not regenerate properly.**

You can stop the dryer in various ways:

Touch the button "A" to set the condition normal/direct.
Touch the button "B" to set the condition local/remote.

■ **Local shut down with normal stop**
(chose "Normal stop"- "Local")

The dryer is switched off directly via the display. The current regeneration cycle terminates before the program stops. The fully regenerated vessel remains unpressurised. The pressure build-up phase only occurs after the dryer was restarted.

- Under these conditions the regeneration solution of one or both tanks is made available. ("Regeneration of both tanks").

■ **Local shut down with immediate stop**

(chose "Stop directly"- "Local")

The dryer is also switched off via the display. The program stops immediately, the current cycle is not completed.

■ **Remote shut down with normal stop**

(chose "Normal stop"- "Remote")

The dryer is shut down by a control center. The current regeneration cycle will be completed. The fully regenerated vessel remains unpressurised. The pressure build-up phase only occurs after the dryer was restarted.

- Under these conditions the regeneration solution of one or both tanks is made available. ("Regeneration of both tanks").

■ **Remote shut down with direct stop**

(chose "Stop directly"- "Local")

The dryer is also shut down by a control center. The program stops immediately, the current cycle is not completed.

■ **Stopping the dryer**

▶ Touch "**touch here to stop**" in the "start/stop" menu or in the flow chart display.

On the main display, you could see the deactivation fo the dryer.

▶ Touch to return on the previous display.

▶ Touch to return to home screen.

8.8.6 Communication setting

▶   touch [⚙ Communication setting]
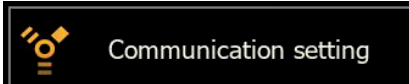
Appear the configuration of the Modus
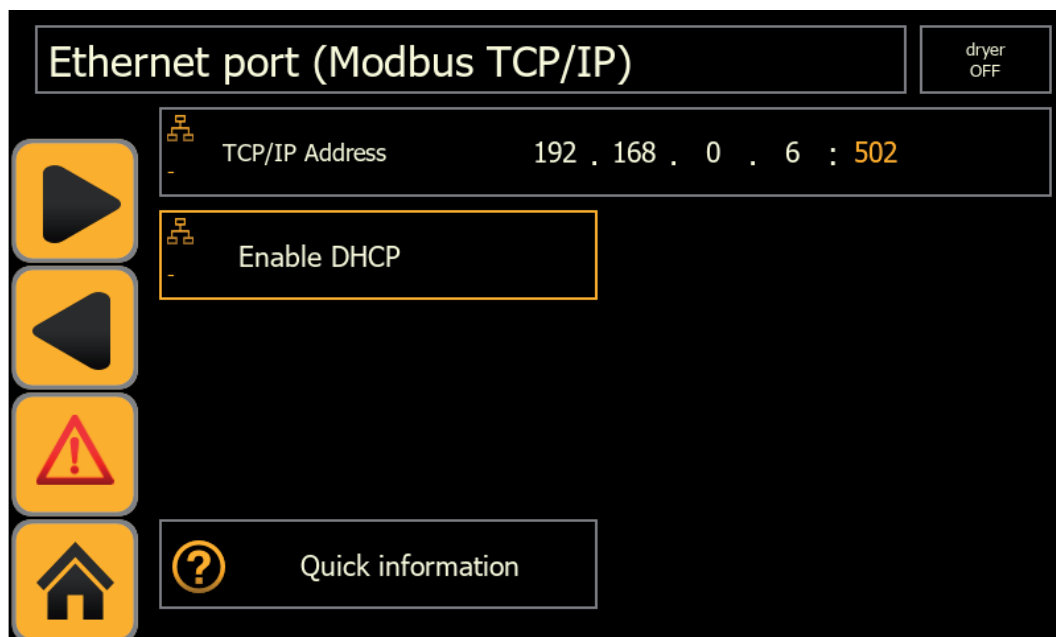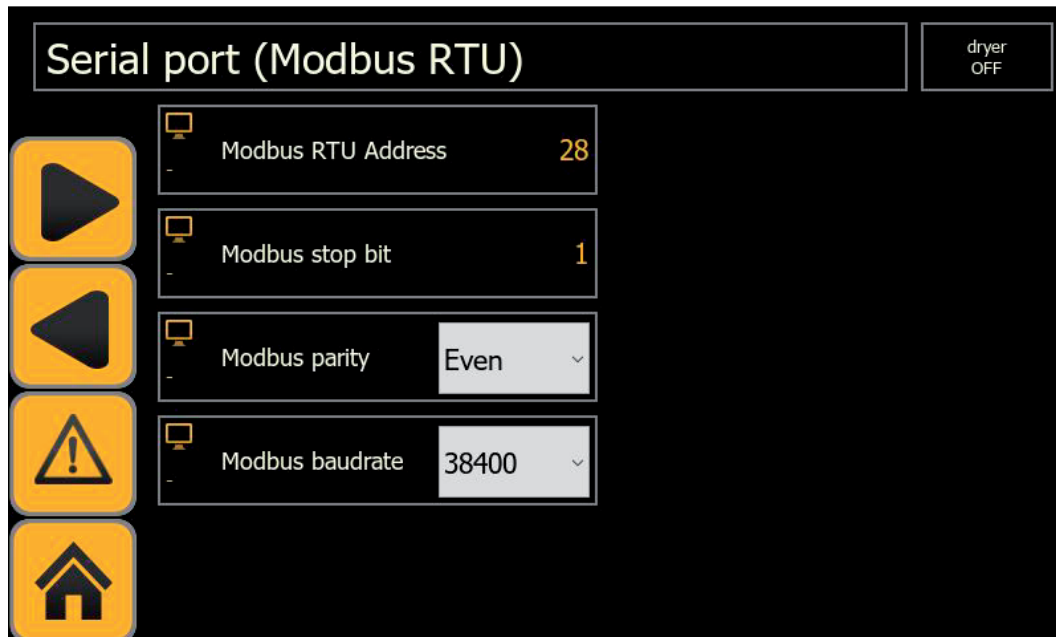
Display: Modbus menu
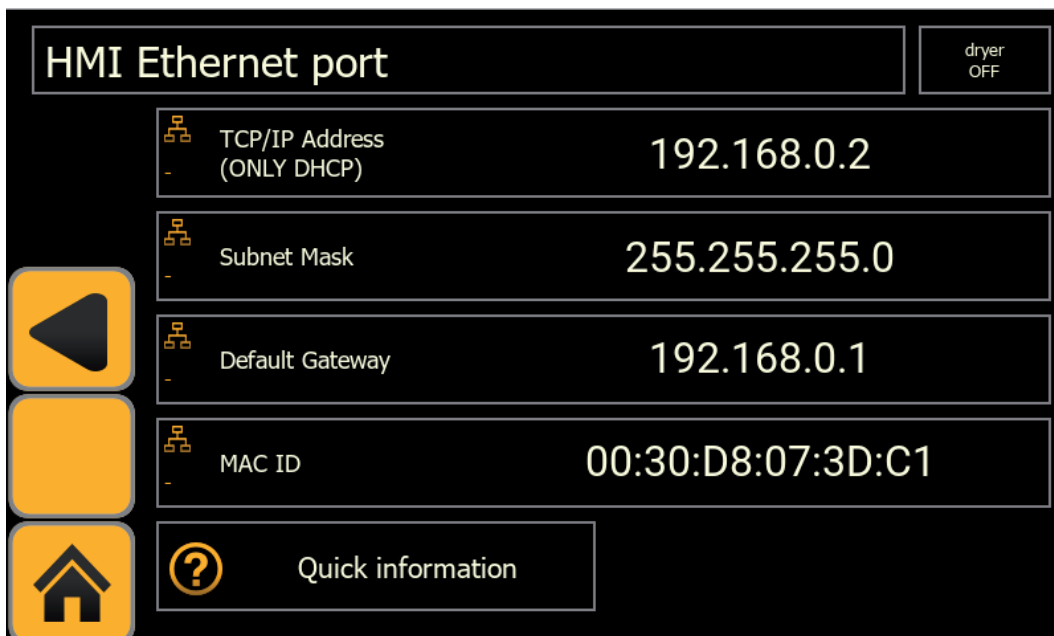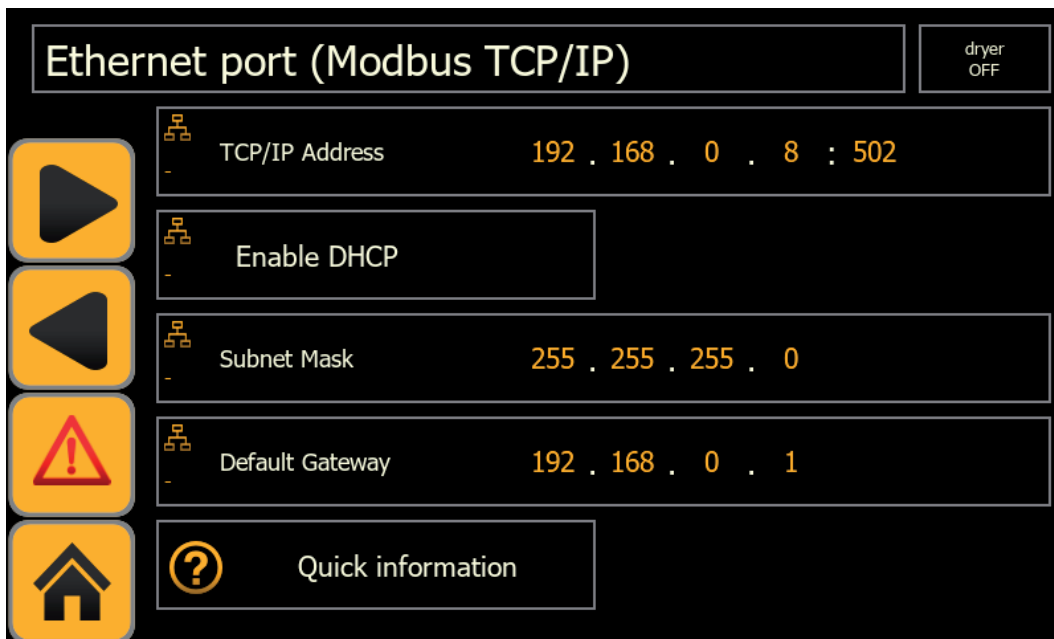
Display: Modbus menu

▶ For Modbus (RTU) it is possible to choose and change each parameter.

▶ For Modbus (TCP/IP) it is possible to change Address, Getway and Netmask;

▶ If you select **"Enable DHCP"** automatically will be fixed the address.

▶ For enable or disable **"Enable DHCP"** it is necessary to switch OFF and ON the dryer (from main switch I/O).

▶ Touch [◀] to return on the previous display.

▶ Touch [⌂] to return to home screen.

▶   touch to see the TCP/IP connection,
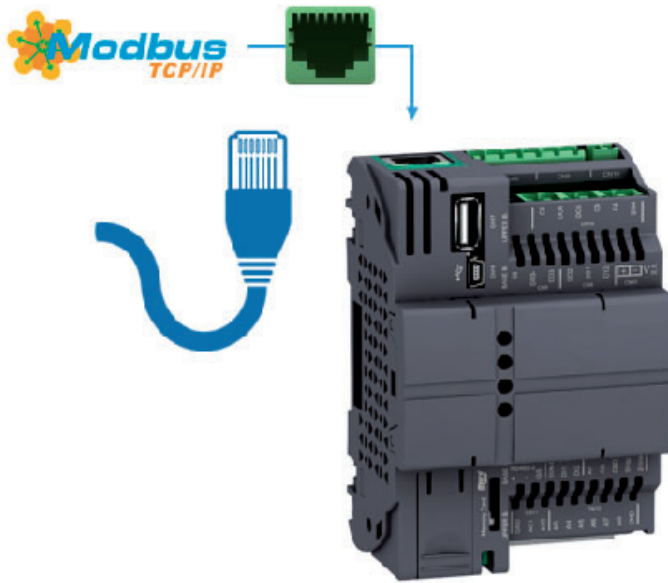
and the cloud connection.
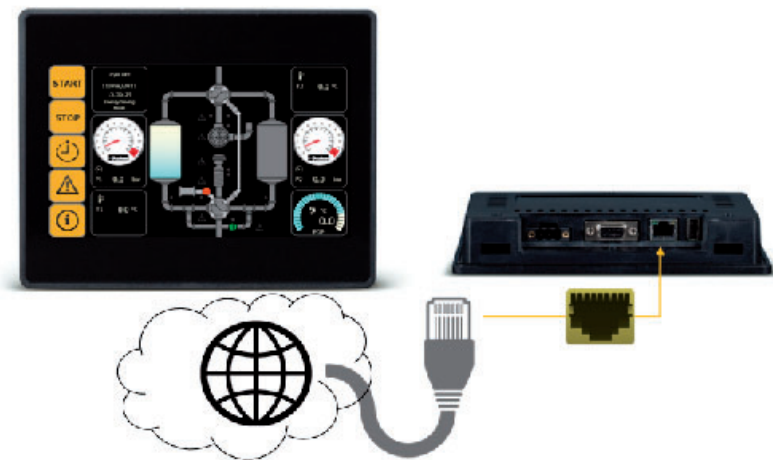
8.8.7 Languages setting

▶　　touch [🌐 Languages Selection]

Appear the languages available
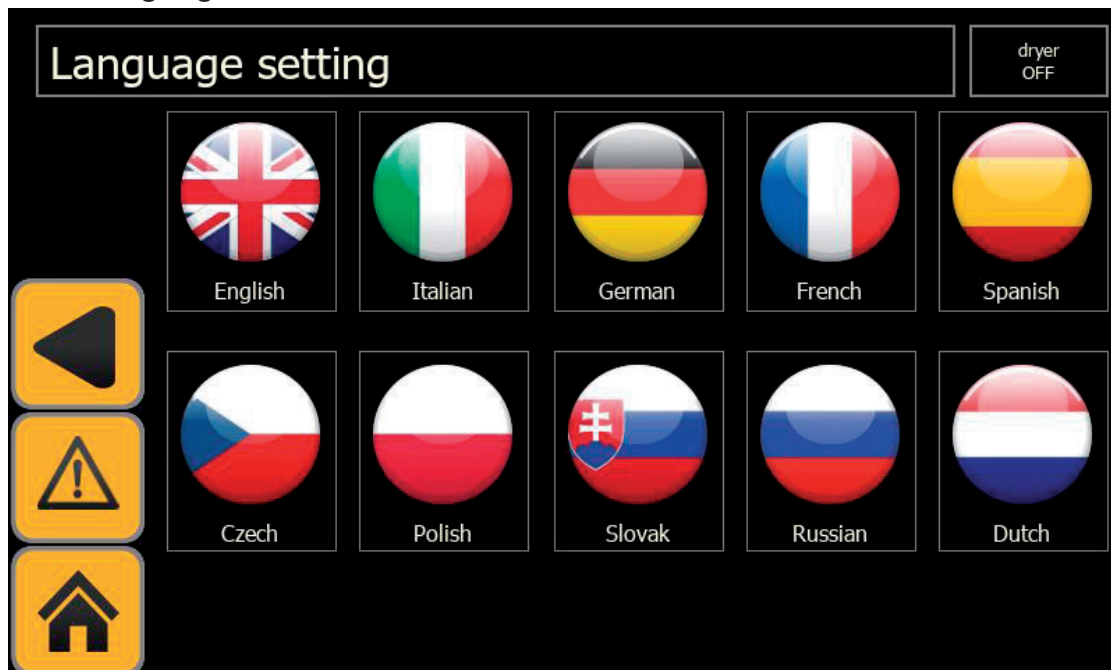
Display: languages selection

▶　Touch the language to select it.

▶　Touch [◀] to return on the previous display.

▶　Touch [🏠] to return to home screen.

8.8.8 Date/hour setting

▶   touch | 📅   Set Data Time |

Appear the follwing display
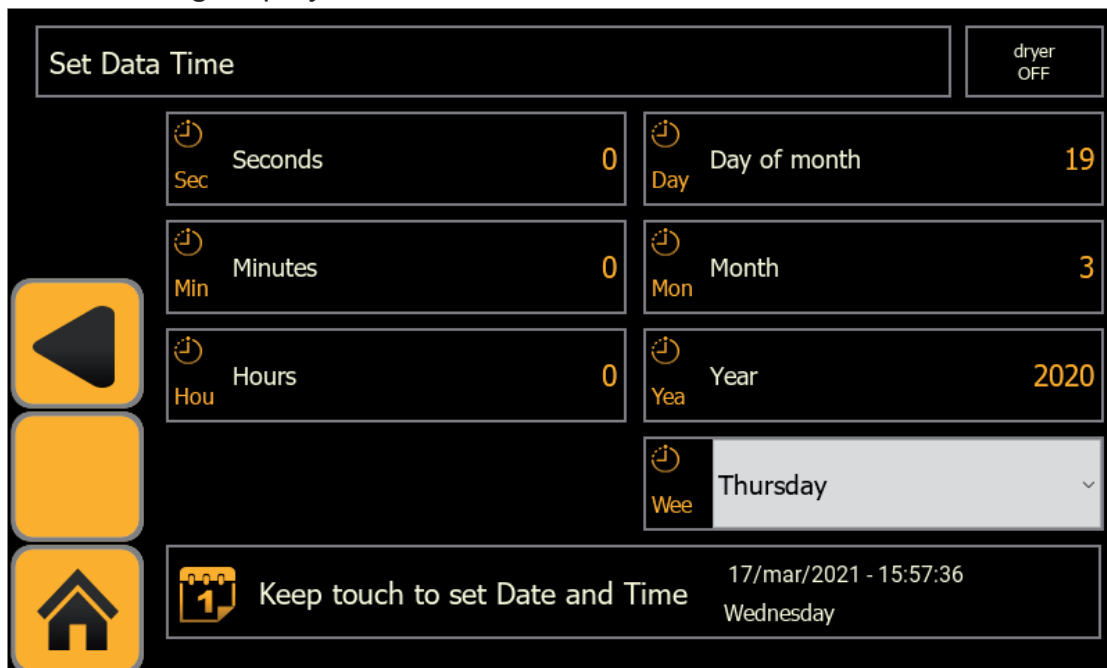
Display: Set data time

▶   Set hours, minutes,seconds, day, month, year.

▶   Touch the fields to confirm.

▶   Touch ◀ to return on the previous display.

▶   Touch 🏠 to return to home screen.

9.　　Modbus variables

9.1　DESCRIPTION OF MODBUS VARIABLES

■　The Modbus on WVM 5th generation is Modicon standard (so 1-based addresses).

■　All the variables are access as Holding register (Modbus function FC03, 40000).

■　As standard configuration, RS-485 baudrate 19200, 8bit, Even, stop 1 address 16, you can change it by the touch screen. When the standard configuration was change the PLC must be reboot (de-energized).

■　As standard configuration, IP address 10.0.0.10, port 502, you can change it by the touch screen.

Tag	Adress		Type	Access	Description	u.m.
iVER	8960		UINT	ReadOnly	PLC software version	x
x	8961		INT	ReadOnly	not used	x
x	8962		INT	ReadOnly	not used	x
x	8963		UDINT	ReadOnly	not used	x
x	8965		UDINT	ReadOnly	not used	x
iR1	8967		INT	ReadOnly	current value of heating temperature	1/10 °C
iR2	8968		INT	ReadOnly	current value of regeneration temperature	1/10 °C
iR3	8969		INT	ReadOnly	current value of inlet air temperature	1/10 °C
iR4	8970		INT	ReadOnly	current value of outlet air temperature	1/10 °C
iP01	8971		INT	ReadOnly	current value of pression in vessel 1	bar
iP02	8972		INT	ReadOnly	current value of pression in vessel 2	bar
iPDP	8973		INT	ReadOnly	current value of pressure dew point	1/10 °C
iSp1	8974		INT	ReadOnly	not used	x
iTA1	8975		INT	ReadOnly	current value of total current phase 1	1/10 A
iTA3	8976		INT	ReadOnly	current value of total current phase 3 (if installed)	1/10 A
iB3	8977		INT	ReadOnly	current value of ambient temperature (if installed)	1/10 °C
iRH	8978		INT	ReadOnly	current value of ambient humidity (if installed)	"1/10 RH%"
iR5	8979		INT	ReadOnly	used only in W1230 version	1/10 °C
iR6	8980		INT	ReadOnly	used only in W1230 version	1/10 °C
x	8981		INT	ReadOnly	not used	x
x	8982		INT	ReadOnly	not used	x
sDI1	8983		WORD	ReadOnly	status of digital input, word 1	x
xLS11		8983.0	BIT	ReadOnly	main valve in vessel 1 (if limit swith installed) - if true	x
xLS12		8983.1	BIT	ReadOnly	main valve in vessel 2 (if limit swith installed) - if true	x
xLS31		8983.2	BIT	ReadOnly	regeneration valve open - if true	x
xLS32		8983.3	BIT	ReadOnly	regeneration valve closed - if true	x
xQVP		8983.4	BIT	ReadOnly	circuit breaker vacuum pump (closed if true)	x
xEH1		8983.5	BIT	ReadOnly	safety thermostat of heater (good if true)	x
xRO		8983.6	BIT	ReadOnly	remote ON/OFF phisical contact (ON if true)	x
xEM		8983.7	BIT	ReadOnly	emergency button (if installed) - good if true	x
x		8983.8	BIT	ReadOnly	not used	x
x		8983.9	BIT	ReadOnly	not used	x

x		8983.10	BIT	ReadOnly	not used	x
x		8983.11	BIT	ReadOnly	not used	x
x		8983.12	BIT	ReadOnly	not used	x
x		8983.13	BIT	ReadOnly	not used	x
x		8983.14	BIT	ReadOnly	not used	x
x		8983.15	BIT	ReadOnly	not used	x
sDI2	8984		WORD	ReadOnly	status of digital input, word 2	x
x		8984.0	BIT	ReadOnly	not used	x
x		8984.1	BIT	ReadOnly	not used	x
x		8984.2	BIT	ReadOnly	not used	x
x		8984.3	BIT	ReadOnly	not used	x
x		8984.4	BIT	ReadOnly	not used	x
x		8984.5	BIT	ReadOnly	not used	x
x		8984.6	BIT	ReadOnly	not used	x
x		8984.7	BIT	ReadOnly	not used	x
x		8984.8	BIT	ReadOnly	not used	x
x		8984.9	BIT	ReadOnly	not used	x
x		8984.10	BIT	ReadOnly	not used	x
x		8984.11	BIT	ReadOnly	not used	x
x		8984.12	BIT	ReadOnly	not used	x
x		8984.13	BIT	ReadOnly	not used	x
x		8984.14	BIT	ReadOnly	not used	x
x		8984.15	BIT	ReadOnly	not used	x
sDO1	8985		WORD	ReadOnly	status of digital output, word 1	x
yEV11		8985.0	BIT	ReadOnly	main valve on vessel 2 - if true	x
yEV12		8985.1	BIT	ReadOnly	main valve on vessel 1 - if true	x
yEV31		8985.2	BIT	ReadOnly	regeneration valve open - if true	x
yEV32		8985.3	BIT	ReadOnly	regeneration valve closed - if true	x
yEV4		8985.4	BIT	ReadOnly	pressurization valve	x
yEV5		8985.5	BIT	ReadOnly	expansion valve	x
yEV6		8985.6	BIT	ReadOnly	steam regeneration valve	x
yEV8		8985.7	BIT	ReadOnly	spare	x
yEV9		8985.8	BIT	ReadOnly	cooling loop valve	x
yKM1		8985.9	BIT	ReadOnly	contactor heater stage 1	x
yKM2		8985.10	BIT	ReadOnly	contactor heater stage 2	x
yKM3		8985.11	BIT	ReadOnly	contactor vacuum pump	x
yKM4		8985.12	BIT	ReadOnly	contactor Ystart (if installed)	x
yKM5		8985.13	BIT	ReadOnly	contactor Dstart (if installed)	x
yAL		8985.14	BIT	ReadOnly	free contact general alarm	x
yON		8985.15	BIT	ReadOnly	dryer is ON	x
sDO2	8986		WORD	ReadOnly	status of digital output, word 2	x
x		8986.0	BIT	ReadOnly	not used	x
x		8986.1	BIT	ReadOnly	not used	x
x		8986.2	BIT	ReadOnly	not used	x
x		8986.3	BIT	ReadOnly	not used	x
x		8986.4	BIT	ReadOnly	not used	x
x		8986.5	BIT	ReadOnly	not used	x

x		8986.6	BIT	ReadOnly	not used	x
x		8986.7	BIT	ReadOnly	not used	x
x		8986.8	BIT	ReadOnly	not used	x
x		8986.9	BIT	ReadOnly	not used	x
x		8986.10	BIT	ReadOnly	not used	x
x		8986.11	BIT	ReadOnly	not used	x
x		8986.12	BIT	ReadOnly	not used	x
x		8986.13	BIT	ReadOnly	not used	x
x		8986.14	BIT	ReadOnly	not used	x
x		8986.15	BIT	ReadOnly	not used	x
sST1	8987		WORD	ReadOnly	status of dryer, word 1	x
bON		8987.0	BIT	ReadOnly	dryer ON (only status)	x
bVAR		8987.1	BIT	ReadOnly	cycle fixed (if true) or dew point depend (if false)	x
bEV11		8987.2	BIT	ReadOnly	main valve in vessel 1 (without hardware feedback) - if true	x
bEXP		8987.3	BIT	ReadOnly	expansion phase - if true	x
bEOK		8987.4	BIT	ReadOnly	expansione finished good - if true	x
bREG		8987.5	BIT	ReadOnly	regeneration phase - if true	x
bRG1		8987.6	BIT	ReadOnly	regeneration vessel 1 - if true	x
bRG2		8987.7	BIT	ReadOnly	regeneration vessel 2 - if true	x
bHON		8987.8	BIT	ReadOnly	heating phase - if true	x
bCL		8987.9	BIT	ReadOnly	cooling phase - if true	x
bVCL		8987.10	BIT	ReadOnly	vessel cooled - if true	x
bPRS		8987.11	BIT	ReadOnly	pressurization phase - if true	x
bEXV1		8987.12	BIT	ReadOnly	in expansion vessel 1 - if true	x
bEXV2		8987.13	BIT	ReadOnly	in expansion vessel 2 - if true	x
bNV1		8987.14	BIT	ReadOnly	no pressure vessel 1 - if true	x
bNV2		8987.15	BIT	ReadOnly	no pressure vessel 2 - if true	
sST2	8988		WORD	ReadOnly	status of dryer, word 2	x
x		8988.2	BIT	ReadOnly	not used	x
x		8988.2	BIT	ReadOnly	not used	x
x		8988.2	BIT	ReadOnly	not used	x
x		8988.3	BIT	ReadOnly	not used	x
x		8988.4	BIT	ReadOnly	not used	x
x		8988.5	BIT	ReadOnly	not used	x
x		8988.6	BIT	ReadOnly	not used	x
x		8988.7	BIT	ReadOnly	not used	x
x		8988.8	BIT	ReadOnly	not used	x
x		8988.9	BIT	ReadOnly	not used	x
x		8988.10	BIT	ReadOnly	not used	x
x		8988.11	BIT	ReadOnly	not used	x
x		8988.12	BIT	ReadOnly	not used	x
x		8988.13	BIT	ReadOnly	not used	x
x		8988.14	BIT	ReadOnly	not used	x
x		8988.15	BIT	ReadOnly	not used	x
sST3	8989		WORD	ReadOnly	status of dryer, word 3	x
x		8989.0	BIT	ReadOnly	not used	x

x		8989.1	BIT	ReadOnly	not used	x
x		8989.2	BIT	ReadOnly	not used	x
x		8989.3	BIT	ReadOnly	not used	x
x		8989.4	BIT	ReadOnly	not used	x
x		8989.5	BIT	ReadOnly	not used	x
x		8989.6	BIT	ReadOnly	not used	x
x		8989.7	BIT	ReadOnly	not used	x
x		8989.8	BIT	ReadOnly	not used	x
x		8989.9	BIT	ReadOnly	not used	x
x		8989.10	BIT	ReadOnly	not used	x
x		8989.11	BIT	ReadOnly	not used	x
x		8989.12	BIT	ReadOnly	not used	x
x		8989.13	BIT	ReadOnly	not used	x
x		8989.14	BIT	ReadOnly	not used	x
x		8989.15	BIT	ReadOnly	not used	x
sST4	8990		WORD	ReadOnly	status of dryer, word 4	x
x		8990.0	BIT	ReadOnly	not used	x
x		8990.1	BIT	ReadOnly	not used	x
x		8990.2	BIT	ReadOnly	not used	x
x		8990.3	BIT	ReadOnly	not used	x
x		8990.4	BIT	ReadOnly	not used	x
x		8990.5	BIT	ReadOnly	not used	x
x		8990.6	BIT	ReadOnly	not used	x
x		8990.7	BIT	ReadOnly	not used	x
x		8990.8	BIT	ReadOnly	not used	x
x		8990.9	BIT	ReadOnly	not used	x
x		8990.10	BIT	ReadOnly	not used	x
x		8990.11	BIT	ReadOnly	not used	x
x		8990.12	BIT	ReadOnly	not used	x
x		8990.13	BIT	ReadOnly	not used	x
x		8990.14	BIT	ReadOnly	not used	x
x		8990.15	BIT	ReadOnly	not used	x
sAL1	8991		WORD	ReadOnly	status of alarm, word 1	x
aR1		8991.0	BIT	ReadOnly	heating sensor broken	x
aR2		8991.1	BIT	ReadOnly	regeneration sensor broken	x
aR3		8991.2	BIT	ReadOnly	inlet air sensor broken	x
aR4		8991.3	BIT	ReadOnly	outlet air sensor broken	x
aP01		8991.4	BIT	ReadOnly	pression in vessel 1 sensor broken	x
aP02		8991.5	BIT	ReadOnly	pression in vessel 2 sensor broken	x
aPDP		8991.6	BIT	ReadOnly	pressure dew point sensor broken	x
aSp1		8991.7	BIT	ReadOnly	not used	x
aTA1		8991.8	BIT	ReadOnly	current phase 1 sensor broken	x
aTA3		8991.9	BIT	ReadOnly	current phase 3 sensor broken	x
aB3		8991.10	BIT	ReadOnly	ambient temperature sensor broken (if installed)	x
aRH		8991.11	BIT	ReadOnly	ambient humidity sensor broken (if installed)	x
aR5		8991.12	BIT	ReadOnly	used only in W1230 version	x
aR6		8991.13	BIT	ReadOnly	used only in W1230 version	x

aPH1		8991.14	BIT	ReadOnly	internal error controller 1	x
aPH2		8991.15	BIT	ReadOnly	internal error controller 2	x
sAL2	8992		WORD	ReadOnly	status of alarm, word 2	x
aLPR		8992.0	BIT	ReadOnly	low pressure in vessel in line	x
aTHO		8992.1	BIT	ReadOnly	monitoring heater time	x
aWDP		8992.2	BIT	ReadOnly	warning high dew point	x
aPDP		8992.3	BIT	ReadOnly	alarm high dew point	x
aTPR		8992.4	BIT	ReadOnly	regeneration valve open	x
aPRV		8992.5	BIT	ReadOnly	working pressure	x
aEM		8992.6	BIT	ReadOnly	emergency button (if installed)	x
aSTM		8992.7	BIT	ReadOnly	service time	x
aEV1		8992.8	BIT	ReadOnly	generic alarm main valve (if limit swith installed)	x
aEV3		8992.9	BIT	ReadOnly	generic alarm regeneration valve	x
x		8992.10	BIT	ReadOnly	not used	x
aEV5		8992.11	BIT	ReadOnly	generic alarm expansion valve	x
aPRS		8992.12	BIT	ReadOnly	pressure alarm	x
aQVP		8992.13	BIT	ReadOnly	alarm vacuum pump motor protection	x
aTSH		8992.14	BIT	ReadOnly	alarm safety thermostat electrical heater	x
aGL		8992.15	BIT	ReadOnly	general alarm	x
sAL3	8993		WORD	ReadOnly	status of alarm, word 3	x
x		8993.0	BIT	ReadOnly	not used	x
x		8993.1	BIT	ReadOnly	not used	x
x		8993.2	BIT	ReadOnly	not used	x
x		8993.3	BIT	ReadOnly	not used	x
x		8993.4	BIT	ReadOnly	not used	x
x		8993.5	BIT	ReadOnly	not used	x
x		8993.6	BIT	ReadOnly	not used	x
x		8993.7	BIT	ReadOnly	not used	x
x		8993.8	BIT	ReadOnly	not used	x
x		8993.9	BIT	ReadOnly	not used	x
x		8993.10	BIT	ReadOnly	not used	x
x		8993.11	BIT	ReadOnly	not used	x
x		8993.12	BIT	ReadOnly	not used	x
x		8993.13	BIT	ReadOnly	not used	x
x		8993.14	BIT	ReadOnly	not used	x
x		8993.15	BIT	ReadOnly	not used	x
sAL4	8994		WORD	ReadOnly	status of alarm, word 4	x
x		8994.0	BIT	ReadOnly	not used	x
x		8994.1	BIT	ReadOnly	not used	x
x		8994.2	BIT	ReadOnly	not used	x
x		8994.3	BIT	ReadOnly	not used	x
x		8994.4	BIT	ReadOnly	not used	x
x		8994.5	BIT	ReadOnly	not used	x
x		8994.6	BIT	ReadOnly	not used	x
x		8994.7	BIT	ReadOnly	not used	x
x		8994.8	BIT	ReadOnly	not used	x
x		8994.9	BIT	ReadOnly	not used	x

x		8994.10	BIT	ReadOnly	not used	x
x		8994.11	BIT	ReadOnly	not used	x
x		8994.12	BIT	ReadOnly	not used	x
x		8994.13	BIT	ReadOnly	not used	x
x		8994.14	BIT	ReadOnly	not used	x
x		8994.15	BIT	ReadOnly	not used	x
cWd1	8995		WORD	Read/Write	command word 1	x
x		8995.0	BIT	Read/Write	not used	x
x		8995.1	BIT	Read/Write	not used	x
x		8995.2	BIT	Read/Write	not used	x
cHRS		8995.3	BIT	Read/Write	reset working hours	x
cSTM		8995.4	BIT	Read/Write	reset service time	x
cHVP		8995.5	BIT	Read/Write	reset hours vacuum pump	x
cCNG		8995.6	BIT	Read/Write	reset counter change vessel	x
cES1		8995.7	BIT	Read/Write	reset counter expansion vessel 1	x
cES2		8995.8	BIT	Read/Write	reset counter expansion vessel 2	x
cKVP		8995.9	BIT	Read/Write	reset counter contactor vacuum pump	x
cKH1		8995.10	BIT	Read/Write	reset counter contactor heater stage 1	x
cKH2		8995.11	BIT	Read/Write	reset counter contactor heater stage 2	x
cHH1		8995.12	BIT	Read/Write	reset hours heater stage 1	x
cHH2		8995.13	BIT	Read/Write	reset hours heater stage 2	x
cHHS		8995.14	BIT	Read/Write	reset hours steam heater	x
x		8995.15	BIT	Read/Write	not used	x
cWd2	8996		WORD	Read/Write	command word 2	x
x		8996.0	BIT	Read/Write	not used	x
x		8996.1	BIT	Read/Write	not used	x
x		8996.2	BIT	Read/Write	not used	x
x		8996.3	BIT	Read/Write	not used	x
x		8996.4	BIT	Read/Write	not used	x
x		8996.5	BIT	Read/Write	not used	x
x		8996.6	BIT	Read/Write	not used	x
x		8996.7	BIT	Read/Write	not used	x
x		8996.8	BIT	Read/Write	not used	x
x		8996.9	BIT	Read/Write	not used	x
x		8996.10	BIT	Read/Write	not used	x
x		8996.11	BIT	Read/Write	not used	x
x		8996.12	BIT	Read/Write	not used	x
x		8996.13	BIT	Read/Write	not used	x
x		8996.14	BIT	Read/Write	not used	x
x		8996.15	BIT	Read/Write	not used	x
sT0	8997		UINT	ReadOnly	time of standby in current cycle	hrs
sT1	8998		UINT	ReadOnly	time of adsorption in current cycle	hrs
sT2	8999		UINT	ReadOnly	time of expansion in current cycle	min
sT3	9000		UINT	ReadOnly	time of heating in current cycle	min
sT4	9001		UINT	ReadOnly	time of cooling in current cycle	min
sT5	9002		UINT	ReadOnly	time of pressurization in current cycle	min
sT6	9003		UDINT	ReadOnly	hours working of dryer	hrs

sT7	9005		UDINT	ReadOnly	hours working heater stage 1	hrs
sT8	9007		UDINT	ReadOnly	hours working heater stage 2 (if installed)	hrs
sT9	9009		UDINT	ReadOnly	hours working steam stage (with optional steam regeneration)	hrs
sT10	9011		UDINT	ReadOnly	hours working of vacuum pump	hrs
sT11	9013		UDINT	ReadOnly	hours count down service time	hrs
sKM1	9015		UDINT	ReadOnly	number of switch off contactor heater stage 1	n x100
sKM2	9017		UDINT	ReadOnly	number of switch off contactor heater stage 2 (if installed)	n x100
sKM3	9019		UDINT	ReadOnly	number of switch off contactor vacuum pump	n x100
sEX1	9021		UINT	ReadOnly	number of expansion vessel 1	n
sEX2	9022		UINT	ReadOnly	number of expansion vessel 2	n
sCHG	9023		UINT	ReadOnly	number of change of vessels	n
sSH1	9024		INT	ReadOnly	set (read only) of heating temperature stage 1	1/10 °C
sSH2	9025		INT	ReadOnly	set (read only) of heating temperature stage 2	1/10 °C
sSH3	9026		INT	ReadOnly	set (read only) of heating temperature stage 3	1/10 °C
sSRT	9027		INT	ReadOnly	set (read only) of regeneration temperature	1/10 °C
sSCO	9028		INT	ReadOnly	set (read only) of end cooling temperature	1/10 °C
setWd1	16387		WORD	Read/Write	set word 1	x
x		16387.0	BIT	Read/Write	reserviert darf nicht verwendet werden	x
x		16387.1	BIT	Read/Write	reserviert darf nicht verwendet werden	x
x		16387.2	BIT	Read/Write	reserviert darf nicht verwendet werden	x
x		16387.3	BIT	Read/Write	reserviert darf nicht verwendet werden	x
x		16387.4	BIT	Read/Write	reserviert darf nicht verwendet werden	x
x		16387.5	BIT	Read/Write	reserviert darf nicht verwendet werden	x
x		16387.6	BIT	Read/Write	reserviert darf nicht verwendet werden	x
x		16387.7	BIT	Read/Write	reserviert darf nicht verwendet werden	x
x		16387.8	BIT	Read/Write	reserviert darf nicht verwendet werden	x
x		16387.9	BIT	Read/Write	reserviert darf nicht verwendet werden	x
x		16387.10	BIT	Read/Write	reserviert darf nicht verwendet werden	x
x		16387.11	BIT	Read/Write	reserviert darf nicht verwendet werden	x
x		16387.12	BIT	Read/Write	reserviert darf nicht verwendet werden	x
x		16387.13	BIT	Read/Write	reserviert darf nicht verwendet werden	x
x		16387.14	BIT	Read/Write	reserviert darf nicht verwendet werden	x
cm-dON		16387.15	BIT	Read/Write	comand ON/OFF dryer (true is ON or false is OFF)	x

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