# ETAMATIC OEM ETAMATIC S OEM





Sensors and Systems for Combustion Engineering

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# **1** General Information

# 1.1 Validity of these Instructions

These instructions apply to the following device(s): ETAMATIC OEM in any configuration. These devices conform to the following standards and regulations:

- DIN EN 298: 2012-11
- DIN EN 1643: 2014-09
- DIN EN 12067-2: 2004-06
- DIN EN 13611:2011-12
- DIN EN 60730-1:2012-10
- DIN EN 60730-2-5: 2015-10
- DIN EN 50156-1:2016-03, clause 10.5.5
- 2014/35/EU Low Voltage Directive
- 2014/30/EU EMC Directive
- 2014/68/EU Pressure Equipment Directive
- (EU)2016/426 Gas Appliance Regulation (GAR)
- 2011/65/EU RoHS

Test symbols: CE-0085 AU 0207

The ETAMATIC OEM is a control unit for combustion systems.

## NOTICE

Respect the national safety regulations and standards.

# 2 Safety

## 2.1 For Your Safety

The following symbols are used in this document to draw the user's attention to important safety information. They are located at points where the information is required. It is essential that the safety information is observed and followed, and that applies particularly to the warnings.

## A DANGER!

This draws the user's attention to imminent danger. If it is not avoided, it will result in death or very serious injury. The plant including its surroundings could be damaged.

### WARNING!

This draws the user's attention to the possibility of imminent danger. If it is not avoided, it may result in death or very serious injury. The plant including its surroundings could be damaged.

# 

This draws the user's attention to the possibility of imminent danger. If it is not avoided, it may result in minor injuries. The plant including its surroundings could be damaged.

## NOTICE

This draws the user's attention to important additional information about the system or system components and offers further tips.

The safety information described above is incorporated into the instructions.

Thus, the operator is requested to:

- 1 Comply with the accident prevention regulations whenever work is being carried out.
- 2 Do everything possible within his control to prevent personal injury and damage to property.

# 3 Brief Description

ETAMATIC OEM/ETAMATIC S OEM is a control system for combustion plants. Depending on the reference variable, the ETAMATIC OEM adjusts up to 4 actuators according to freely programmable curves.

The ETAMATIC OEM hat 4 three point step output.

ETAMATIC S OEM has 3 three point step continuous output and a 0/4-20 mA output.

The ETAMATIC OEM has a 25 pin D-SUB-socket with a serial interface for remote control or remote display via PC (windows Software seperately available). Connections for PROFIBUS-DP, TCP/IP (MODBUS TCP), Interbus-S and Modbus RTUare optionally available. Other BUS systems available on request. The connection to further plant components such as fault indicator systems or O2 trim occurs by LAMTEC SYSTEM BUS interface on a 9 pin D-SUB-socket.

The operation occurs through the optionally available PC software or operating unit. For display to end customers, connect to customer interface via LAMTEC SYSTEM BUS. The operation via PC software is written in a seperate manual.

### 3.1 Life Cycle

The device has a designed lifetime <sup>\*</sup> of 250,000 burner start-up cycles, which, under normal operating conditions in heating mode, correspond to approx. 10 years of usage (starting from the production date given on the type plate).

This lifetime is based on the endurance tests specified in standard EN230/EN298 and the table containing the relevant test documentation as published by the European Association of Component Manufacturers (Afecor) (www.afecor.org).

The designed lifetime is based on use of the device according to the manufacturer's basic documentation. After reaching designed lifetime in terms of number of burner start-up cycles, or the respective time of usage, the device must be replaced by authorized personnel.

The designed lifetime is not the warranty time specified in the Terms of Delivery

# 4 Operating Description

A signal is first fed to terminal 58 (Burner On) indicating when the burner is to start. The ETAMATIC OEM then interrogates the boiler safety interlock chain (ETAMATIC) or the common safety interlock chain (ETAMATIC OEM) and the contact of the air pressure monitor. If it does not detect an "OK" condition, the text of a corresponding message appears and the operating control stops.

If all signals are OK, the fan output is activated and the ducts run to their bottom stop as a check.

Once all channels have reached their bottom stop, they open for aeration. The valve leakage test runs in parallel (gas operation only).

In the case of control elements the aeration is used to enter and/or test the range limits. After reaching its top position, the fuel control element runs back into the ignition position. All other channels remain in OPEN position. The ETAMATIC OEM then interrogates the air pressure monitor. If this signal is OK, the parameterised aeration time runs. If a channel is configured for re-circulation, it opens with a time-delay. On reaching the parameterised re-circulation delay time, the aeration time stops. As soon as the re-circulation channel has reached the aeration position, the aeration time is resumed. When this time has expired all the channels run to the programmed ignition position (re-circulation fully closed). After the lapse of the aeration time, all channels run to the programmed ignition position (recirculation closed).

Once all the channels have reached the ignition position the ignition transformer is activated on ist own for 3 seconds.

Before the valves open, the respective fuel safety interlock chain has to be close.

### 4.1 Starting with Pilot Burner

The ignition valve and main gas 1 (in gas operation) or the ignition valve alone (in oil operation) run open. The pilot flame forms and the flame detection detects the flame. The flame detection sends the signal to the burner control device.

On expiry of the 1<sup>st</sup> safety time, the ignition transformer switches off. For 3 sec. (stabilisation time) the pilot burner burns alone. Then main gas 2 or the oil valve opens and remains activated in parallel with the ignition valve for the duration of the 2<sup>nd</sup> safety time. The ignition valve closes again at the end of this period.

3 seconds after ignition, all channels run to the programmed base firing rate point. The ETA-MATIC OEM remains in base firing rate position until control release is given.

After control release the ETAMATIC OEM follows the power control unit's default setting.

A shut off follows the cancelling of the signal of the terminal 58. The main valves close. In gas operation, first main gas 1 and second main gas 2 closes with a delay of approx. 5 sec., in order to allow the test line between the solenoid valves to burn out. In the event of a fault shutdown, both close immediately.

If configured for post-purge, the air channels open again for this period.

Thereafter the ETAMATIC OEM is in the "OFF" mode.

## 4.2 Starting without Pilot Burner

The main valves open and together with the ignition transformer remain activated for the duration of the safety time. During this time the flame signal appears.

# 5 Customer Interface



- Flame intensity
- Operating hours



## 5.1 Display and Operational Controls



70	=	setpoint of firing-rate controller
65	=	actual value of internal firing-rate controller
600	=	external firing-rate input
500	=	internal firing-rate (current status of fuel/air ratio control)

These are sample values, which may differ from real situation.

## 5.2 Contrast Settings

To adjust contrast values of the customer interface display use the arrow keys:

E + Keep RESET key pressed and arrow key up = contrast value +2

 $\bigcirc$  +  $\bigtriangledown$  Keep RESET key pressed and arrow key down = contrast value –2

## 5.3 Key Functions

### 5.3.1 Initial State

press the RESET key, to change the primary status.

In the initial state (e.g. after power on) the display shows the condition of the ETAMATIC OEM in the upper line (burner off, control operation, etc..) At the same time, queuing codes are correctly displayed ("Actuator runs")..

In the lower line of the display, it shows external and internal firing rate. If the parameter settings of the burner firing rate controller is active, it shows setpoints and actual values of the firing rate controller additionally.

In the initial state of the display (not on manual mode) while no fault of ETAMATIC OEM is pending, the upper indicator line switches to:



First of all, the display shows an entry from the fault history including the error code and the firing rate values.

1	147	1	00 487
regular fault	internal firing rate	curve set	operating hours

The history display changes back to its prior display after 5 s.

Fault of the  $O_2$  controller, which lasts longer than 30 s would be saved.

After an idle time of 3 seconds, provided that there is no operation of the keys within this time, the display shows a describing text of the selected entry. The describing text is copied behind the error code. Both, error code and describing text are scrolling through the display.

### **Beispiel:**

" 1->H004 527 527 \*\*\* Flame fault during operation (Op.hours 000172)"

### 5.3.2 Display Level 1

### Effect of the display level key

In the initial state of customer interface, this key indicates different operating values (even in the event of an error).

The indications are called sequentially whenever you press the key:





Faults can be reset through the RESET key.

If the O<sub>2</sub> trim is in fault condition and the lower display line shows the O<sub>2</sub> value, the RESETkey also resets the O<sub>2</sub> trim.

In the customer interface the RESET-key effects as follows:

- Leaving the 2nd display level in the lower display line.
- Status report in the upper display line
- Disable manual-mode
- Deactivate mode "set burner firing rate controller"

#### 6 Fault

#### Fault 6

#### **Reading Faults** 6.1

In initial state of customer interface (not MANUAL mode) while no fault state of ETAMATIC OEM occured the upper line is switching over.

In case of a fault a current fault code and corresponding firing-rate values are shown. In the next stage a marquee with the pending fault is displayed (see chapter 5.3.1 Initial State).

You may read off the display values using the SHIFT key (e.g. of operating hours, time) in the event of a fault. All display values are frozen.

#### 6.2 **Recalling Fault History**

The ETAMATIC OEM records the last 10 faults including the corresponding operating hours counter value.

In initial state (not MANUAL mode), provided that no fault message of the ETAMATIC OEM is pending, the upper display line is switching over:



You may scroll through the fault history using the arrow keys. See also chapter 5.3.1 Initial State.

#### 6.3 **Resetting Faults**

Press the RESET key to reset a fault of ETAMATIC OEM.

### NOTICE

This may result in a RESET of the O<sub>2</sub> trim when a fault of O<sub>2</sub> trim is pending (see chapter 5.3.5 RESET).

Contact your service provider in an event of a fault.

# 7 CO/O<sub>2</sub> Control

**Customer Interface Display** 



### Fig. 7-1 O<sub>2</sub> trim display



Display of CO is replacing  $O_2$  display values as soon as CO control is active.



Fig. 7-2 CO control display

Startup-Manager Display

۵	gas	34	
norr Ioad O2: I flam	nal ope defaul 2.1 e ?	ration t S 2. 0	291 or 100



Fig. 7-3 O<sub>2</sub> trim display

Fig. 7-4 CO control display

### Example:





- I O<sub>2</sub> actual value
- II CO<sub>e</sub> value
  - Threshold position: "-"  $\rightarrow$  Reduce air
    - "+"  $\rightarrow$  Raise air
- b  $11 \rightarrow 11$  optimisation steps are already carried out
- c big letter "C" → optimisation with increasing firing rate small letter "c" → optimisation with decreasing firing rate

O<sub>2</sub> actual value 0,7%

- +  $\rightarrow$  CO edge detected, air is increased, 4 optimising steps already carried out
- c  $~\rightarrow~$  small letter "c" means optimisation in the optimisation curve for reduced firing-rate CO\_e 50 ppm

021	3.2	( C O )
-----	-----	---------

Example for deactivated control if O<sub>2</sub> trim may not assume.

O 2 I 0 . 6 D 2 C 1 2 0

Example for active dynamic tests

D2 ... Dynamic test with 20 % change in correction,  $\rm CO_e$  120 ppm

#### 7.1 What happens if a fault occurs in the O<sub>2</sub> trim?

A warning is indicated in case of a fault and the O2 trim is switched off. The preset values are set anew. The burner would not shut-down automatically.

- Fault message is displayed (O<sub>2</sub> controller faulty). 1
- 2 Explaination text is displayed (e.g. O<sub>2</sub> measuring value faulty).
- Settings of preset basic value without control e.g. for air deficiency. 3
- 4 Display of running text (O<sub>2</sub> trim faulty)

### NOTICE

The display texts are shown every 10 - 15 s alternately. Therefore a keypress to call the explanation text is not necessary.

#### 7.2 Resetting O<sub>2</sub> Errors

If the O<sub>2</sub> trim is in fault mode you can read it in the lower display line (siehe Kapitel 5.3.5 *RE-*SET).

By pressing RESET you set back the O<sub>2</sub> fault message.

The O<sub>2</sub> fault is set back with every burner start-up automatically. This is applicable because with every burner start-up a 100% check of O2 trim is carried out. A manual RESET of O2 fault is possible at any time:



 $\bigcirc$  Press RESET  $\rightarrow$  ETAMATIC OEM in mode O<sub>2</sub> trim?

If not, change to the required mode by pressing SHIFT.

#### 7.3 Calling Fault History O<sub>2</sub> trim



With the 'up' key, you will need to browse through the last 10 burner faults before you reach the last O<sub>2</sub> fault.



With the 'AB' key, you can retrieve the oldest O<sub>2</sub> fault.

A key to call up all the text information is not necessary because a running text with all information is displayed automatically.

#### Calling CO/O<sub>2</sub> Control Text Messages 7.4

Switch to display of O2 trim

Press key RESET



#### Internal Burner Firing Rate Controller 8

#### 8.1 Purpose

The internal firing rate controller calculates the burner firing rate against a pre-defined setpoint value (e.g. as a function of temperature or pressure) by comparison with the actual value. This position will be transferred to the electronic fuel/air ratio control as a default value.

#### 8.2 Moving Screen "Actual Temperature is too high"



The Gerät can be started nevertheless by pressing the manual mode key provided that the maximum temperature is not exceeded.

S pressing the manual mode key once more you switch to AUTO mode.

#### 8.3 Changing Setpoint of Burner-Firing-Rate Controller

see chapter 8.5 How to Change the Burner-Firing-Rate Controller with the Customer Interface

#### 8.4 Burner-Firing-Rate specified by hand

 $\overline{\infty}$  Press key MANUAL to move the regular firing rate input of the firing rate controller.

Press the keys 2 and 3 to variegate the burner firing rate.

Ress key MANUAL again to cancel firing rate controller.

It is also possible to switch the ETAMATIC OEM to "Manual Control" with the terminals. By short-circuiting the Pt100 signal (e.g. bridge terminal 19 and 20) the burner firing rate controller is switched off. The fuel/air ratio controller then directly follows the input at the default firing rate input. The display shows LE instead of HA.

### NOTICE

Only use manual control while monitoring the system.

#### 8.5 How to Change the Burner-Firing-Rate Controller with the Customer Interface

Keep pressing the HAND key for more than 5sec., to switch the customer interface to the mode "set setpoints of burner firing rate controller". This is only possible when burner firing rate controller is activated. At the same time, the HAND mode for manual firing rate input ends.

In the mode "setting firing rate controller" the LED in the manual-key flashes. The lower display line shows the output regulator adjustment, the setpoint value and the actual value.

### Active constant controller:

Press the key for 5 s long. Display = actual setpoint 1 or 2. 3

- This depends on the choice of setpoint values of terminal 50:
  - Terminal 50 = 0 V = setpoint value 1
  - Terminal 50 = 24 V = setpoint value 2

$\bigtriangledown$		The required setpoint values can be set through the arrow keys.
র্মি	€	Press HAND or RESET key to leave the SET BURNER FIRING RATE CON- TROLLER mode.
Acti	ve co	ontrol by atmospheric condition:
	K	Press the key for 5 s long. Display = actual setpoint 1 or 2 and actual value. This depends on the choice of setpoint values of terminal 50: Terminal 50 = 0 V = setpoint value 1 Terminal 50 = 24 V = setpoint value 2
	Ŕ	Re-press the key. Display = "LowVal" and actual lower setpoint value.
$\bigtriangledown$		The lower setpoint value can be set through the arrow keys.
	Ŕ	Re-press the key. Display = "HighVal" and actual upper setpoint value.
$\bigtriangledown$		The upper setpoint value can be set through the arrow keys.
Ś	€	Press HAND or RESET key to leave the SET BURNER FIRING RATE CON- TROLLER mode.

## 8.6 Displaying the Running Time Meter

Press SHIFT key to call operating hours on display. The display shows alternately:

- The operating hours would be scrolled automatically after 3 s.
- Op.hours: 000000 (Total)

_	Burner.1: 000000	(burner 1 Op.hours)
	Plant 1: 000000	(burner 1 no. of starts)

- Burner 2: 000000 (burner 2 Op.hours)
  Plant 2: 000000 (burner 2 no. of starts)
- At 2 oil curves, burner 1 + burner 3 instead of burner.2
- At 2 gas curves, burner 2 + burner 4 instead of burner 2

### NOTICE

The sum of operating hours curve set 1 and curve set 2 do not result automatically in the value of operating hours which are displayed in total.

The counter refers to the total sum of operating hours of ETAMATIC OEM. It is started as soon as voltage is applied to the device (this counter also provides basic data to fault history).

The operation hours counter refers to the operating hours of the burner. It starts to run as soon as the burner is in operation with the corresponding curve set (Flame signal is applied).

#### 8.7 **Calling the Checksums**

Keep pressed the SHIFT key for a long time. 

 $\rightarrow$  One after the other is shown:

CRC 16 of level 0, 1 and 2  $\rightarrow$  changeable by authorised personnel only

- CRC 16 der Ebene 4  $\rightarrow$  changeable by LAMTEC only
- 1. safety time oil in s
- 2. safety time oil in s
- 1. safety time gas in s
- 2. safety time gas in s

Pre-purge period in s



Press the SHIFT key at the customer interface to abort the process.

When parameters are changed, the check sums can only be refreshed after the restart of the device.

If two customer interfaces were installed at the LSB the check sums may only be called when:

- simultaneously pressing at both customer interfaces the shift key for a long time •
- or
- one customer interfaces is disconnected temporarily.

# 9 Appendix

# 9.1 Mode Abbreviations Used





Fig. 9-1 Status display at customer interface

Fig. 9-2 Display at programming unit

Short text		Description		
BE	$\rightarrow$	READY (signal on terminal 58)		
ZÜ	$\rightarrow$	IGNITION POSITION or IGNITION		
EZ	$\rightarrow$	SETTING/IGNITION position (same as IGNITION, but ETAMATIC OEM on SETTING)		
GL	$\rightarrow$	BASE FIRING RATE		
EG	$\rightarrow$	SETTING/BASE FIRING RATE" (as BASIC FIRING RATE, but ETA- MATIC OEM on SETTING)		
NA	$\rightarrow$	POST-PURGE		
AU	$\rightarrow$	BURNER OFF (no signal present)		
EL	$\rightarrow$	SETTING		
SL	$\rightarrow$	CLEAR MEMORY		
EV	$\rightarrow$	SETTING/PRE-PURGE" (as "PRE-PURGE", but ETAMATIC OEM on SETTING)		
ES	$\rightarrow$	SETTING/CONTROL (as AUTOMATIC but ETAMATIC OEM on SET)		
ST	$\rightarrow$	FAULT		
VO	$\rightarrow$	PRE-PURGE		
HA	$\rightarrow$	MANUAL MODE (burner efficiency may be adjusted manually)		
or Hand				
no display	$\rightarrow$	Burner set to AUTOMATIC during OPERATION		
LE	$\rightarrow$	EXTERNAL FIRING RATE (firing rate controller disabled by digital input)		

## 9.2 Fuses



Fig. 9-3 Rear view ETAMATIC OEM

### NOTICE

PC connection possible only via LAMTEC interface adapter!

## NOTICE

For exchange of the fuses F3, F4, F5 these specifications are to be complied:

### - 2A slow blow

- high breaking capacity according to IEC 60127-2, Sheet 5: 1500A @ 250VAC

- melting integral I<sup>2</sup>t < 40 A<sup>2</sup>s
- e.g. Littelfuse 0215002.(M)XP

Fuses which fulfills these requirements are ceramic tube fuses with the label T2AH 250V.

### 9.3 EU Declaration of Conformity



## EU-Konformitätserklärung

EU Declaration of Conformity Déclaration de Conformité UE

Wir We / Nous LAMTEC Meß- und Regeltechnik für Feuerungen GmbH & Co. KG Josef-Reiert-Straße 26 D-69190 Walldorf (Baden)

erklären, dass das Produkt declare that product declarons que produit

ETAMATIC - Brennersteuerung Equipment part with safety function Accessories for gas appliances/pressure equipment: Burner control (4130)

in den Varianten variants variants ETAMATIC ETAMATIC S ETAMATIC OEM ETAMATIC S OEM 663R1 ... 663R1 ... 663O1 ... 663O1 ...

inklusive inclusive y compris Kundeninterface

663R0935

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Sensoren und Systeme für die Feuerungstechnik

auf welche sich diese Erklärung bezieht, mit den folgenden Norm(en) übereinstimmt (to which this declaration relates conforms to the following standard(s)) (sur laquelle cette déclaration se référe, et conformément aux dispositions de la norme(s))

> DIN EN 298: 2012-11 DIN EN 1643: 2014-09 DIN EN 12067-2: 2004-06 DIN EN 13611: 2011-12 DIN EN 60730-1: 2012-10 DIN EN 60730-2-5: 2015-10 DIN EN 50156-1: 2016-03, clause 10.5.5

gemäß den einschlägigen Harmonisierungsrechtsvorschriften der Europäischen Union: in accordance with the relevant harmonization legislation of the European Union conformément à la législation d'harmonisation pertinente de l'Union européenne:

Nummer (Number / Numéro) 2014/35/EU 2014/35/EU 2014/35/UE

2014/30/EU 2014/30/EU 2014/30/UE

2014/68/EU 2014/68/EU 2014/68/UE

(EU) 2016/426 (EU) 2016/426 (UE) 2016/426

2011/65/EU 2011/65/EU 2011/65/UE

Text (Text / Texte) Niederspannungsrichtlinie Low Voltage Directive Directive basse tension

EMV-Richtlinie EMC Directive Directive CEM

Druckgeräterichtlinie Kat.4 Mod. B+D Pressure Equipment Directive Directive équipements sous pression

Gasgeräte Verordnung (GAR) Gas Appliance Regulation Règlement appareils à gas

RoHS RoHS RoHS

Die notifizierte Stelle 0085 für (EU) 2016/426, DVGW CERT GmbH, Josef-Wirmer-Str. 1-3, 53123 Bonn, hat folgende Bescheinigung ausgestellt:

EU-Baumusterprüfbescheinigung CE-0085AU0207 gültig bis 05.04.2028.

The notified body 0085 for (EU) 2016/426, DVGW CERT GmbH, Josef-Wirmer-Str. 1-3, 53123 Bonn, Germany, has issued the following certificate.

EU Type Examination Certificate CE-0085AU0207 valid until 05.04.2028. L'organisme notifié 0085 pour (UE) 2016/426, DVGW CERT GmbH, Josef-Wirmer-Sir, 1-3, 53123 Bonn, Allemagne, a délivré le certificat suivant: Attestation d'examen de type CE-0085AU0207 valable jusqu'au 05.04.2028.

Die notifizierte Stelle 0036 für 2014/68/EU, TÜV SÜD Industrie Service GmbH, Westendstr. 199, 80686 München, hat folgende Bescheinigung ausgestellt:

EU-Baumusterprüfung (Modul B) Z-IS-TAF-MUC-19-07-2652106-11134230 gültig bis 08.04.2028. The notified body 0036 for 2014/88/EU, TÚV SÜD Industrie Service GmbH, Westendstr. 199, 80686 Munich, has issued the following certificate: EU Type Examination (Module B) Z-IS-TAF-MUC-19-07-2852106-11134230 valid until 08.04.2028.

L'organisme notifié 0036 pour 2014/88/UE, TÚV SÚD Industrie Service GmbH, Westendstr. 199, 80688 Munich, a délivré l'attestation suivante: Examen de type UE (module B) Z-IS-TAF-MUC-19-07-2652106-11134230 valable jusqu'au 08.04.2028.

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Das Datenblatt und gegebenenfalls die Basisdokumentation sind zu beachten. (The data sheet and basic documentation, if any, have to be considered) (La consultation de la fiche technique, et éventuellement de la documentation technique de base, est requise.)

Hinweise zur Anwendung der Richtlinie 2014/35/EU und 2014/30/EU: Die Konformität mit (EU) 2016/426 setzt die Übereinstimmung mit 2014/35/EU voraus und beinhaltet diese. Die Konformität mit 2014/30/EU ist nach Einbau des Bauteils in das Endgerät nachzuweisen und zu erklären.

Remarks regarding the application of directive 2014/35/EU and 2014/30/EU: Conformity with (EU) 2016/426 presupposes that requirements of 2014/35/EC are fulfilled and includes these. Conformity with 2014/30/EC has to be proved and declared after installation of the component.

Remarques sur l'application des directives 2014/35/UE et 2014/30/UE: La conformité avec la (UE) 2016/426 intègre la conformité avec la 2014/35/UE. La conformité avec la 2014/30/UE après l'installation de l'appareil est à prouver et à declarer.

Die alleinige Verantwortung für die Ausstellung dieser Konformitätserklärung trägt der Hersteller.

Rechtsverbindliche Unterschrift

Walldorf, 12.07.2021 Dr. Olaf Winne, Geschäftsführung 111 U

(Authorised signature) (Signature autorisée)

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The information in this publication is subject to technical changes.

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