HYDAC INTERNATIONAL

# CoMo-Control

## Operating Manual

English (translation of original instructions)

Documentation no.: 3404207a

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All details are subject to technical modifications.

Technical specifications are subject to change without notice.

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# Contents

# Preface

For you, as the owner of a product manufactured by us, we have produced this manual, comprising the most important instructions for its **operation** and **maintenance.**

It will acquaint you with the product and assist you in using it as intended in an optimal manner.

Keep it in the vicinity of the product so it is always available.

Note that the information on the unit's engineering contained in the documentation was that available at the time of publication. There may be deviations in technical details, figures, and dimensions as a result.

If you discover errors while reading the documentation or have additional comments or suggestions, contact us at:

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We look forward to receiving your input.

**“Putting experience into practice”**

## Customer Service

Contact our technical sales department if you have any questions on our product. When contacting us, please always include the model/type designation, serial no. and part-no. of the product:

Fax: ++49 (0) 6897 509 846
Email: filtersysteme@hydac.com

## Modifications to the Product

We would like to point out that changes to the product (e.g. purchasing additional options, etc.) may mean that the information in the operating instructions is no longer applicable or adequate.

After modification or repair work that affects the safety of the product has been carried out on components, the product may not be returned to operation until it has been checked and released by a HYDAC technician.

Please notify us immediately of any modifications made to the product whether by you or a third party.

## Warranty

For the warranty provided by us, please refer to the General Terms of Sale and Delivery of HYDAC Filtertechnik GmbH.

They are available at: www.hydac.com ⇨ Legal information.

## Using the documentation

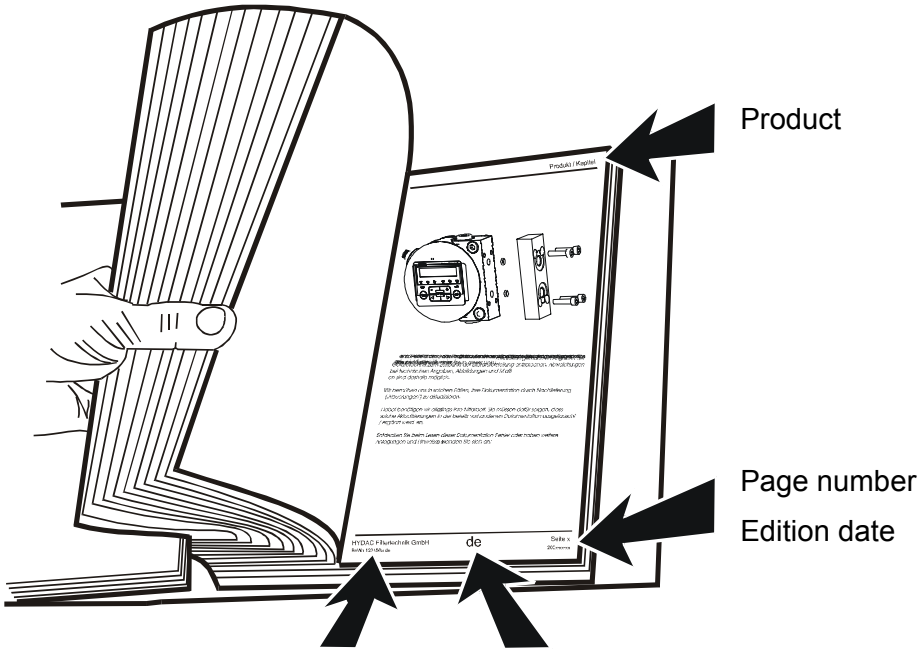
Note that the method described for locating specific information does not release you from your responsibility of carefully reading these instructions prior to starting the unit up for the first time and at regular intervals in the future.

### What do I want to know?

I assign the information I require to a subject area.

### Where can I find the information I'm looking for?

The documentation has a table of contents at the beginning. There, I select the chapter I'm looking for and the corresponding page number.




The documentation number with its index enables you to order another copy of the operating and maintenance instructions. The index is incremented every time the manual is revised or changed.

# 1 General Safety Guidelines

These operating instructions contain the most important information for operating the CoMo-Control in a proper, safe manner.

## 1.1 Obligations and Liability

The basic prerequisite for the safe and proper handling and operation of the CoMo-Control♣ is knowledge of the safety instructions and warnings.

These operating instructions in general, and the safety precautions in particular, are to be adhered by all those who work with the CoMo-Control.

Adherence is to be maintained to pertinent accident prevention regulations applicable at the site where the product is used.

The safety guidelines listed here are restricted to use of the CoMo-Control.

The CoMo-Control has been designed and constructed in accordance with the current state of the art and recognized safety regulations. Nevertheless, hazards may be posed to the life and limb of the individual using the product or to third parties. Risk of damage may be posed to the product or other equipment and property. The CoMo controller is only to be used as follows:

- solely for its designated use
- only when in a safe, perfect condition
- any faults or malfunctions which might impair safety are to be properly repaired or remedied immediately.

Our General Terms and Conditions apply. They are made available to the owner upon concluding purchase of the unit at the latest. Any and all warranty and liability claims for personal injuries and damage to property shall be excluded in the event they are attributable to one or more of the following causes:

- improper use of the CoMo-Control or use deviating from its designated use
- improper assembly, installation, commissioning, operation and maintenance of the CoMo Control
- operating the CoMo Control when the system equipment or systems are defective
- modifications to the CoMo-Control made by the user or purchaser
- improper monitoring of product components subject to wear and tear
- improperly performed repair work

## 1.2 Explanation of Symbols and Warnings

The following designations and symbols are used in this manual to designate hazards, etc.:

### 1.2.1 Basic Symbols


DANGER denotes situations which can lead to death if safety precautions are not observed.


WARNING denotes situations which can lead to death if safety precautions are not observed.


CAUTION denotes situations which can lead to severe injuries if safety precautions are not observed.


TIP denotes situations which can lead to property damage if safety precautions are not observed.

## 1.3 Proper/Designated Use

The CoMo-Control was developed for the continuous monitoring of particulate contamination in hydraulic systems.

## 1.4 Improper Use

Improper use may result in hazard to life and limb.

## 1.5 Informal Safety Precautions

Make sure to always keep the operating instructions in the vicinity of the product.

In addition to the manual, the general and local regulations concerning accident prevention and protection of the environment should be available and observed.

The electrical components of the CoMo Control are to also be regularly checked (visual check once a month). Any loose connections or damaged cables are to be replaced immediately.

## 1.6 Training and Instruction of Personnel

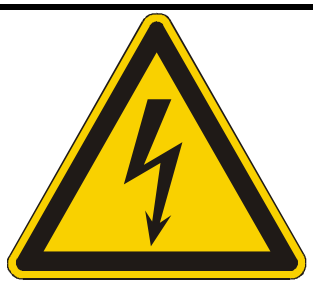
The CoMo-Control may only be operated by properly trained and instructed personnel.

The areas of responsibility of your staff must be established in a clear-cut manner.

Staff undergoing training may not use the CoMo-Control unless supervised by an experienced staff member.

| Individuals<br>Activity | Individuals undergoing training | Individuals with technical training/ engineering background | Electrician | Supervisor with the appropriate authority |
|---|---|---|---|---|
| Packing<br>Transportation | X | X | | X |
| Commissioning | | X | X | X |
| Operation | X | X | X | X |
| Troubleshooting / locating the source of malfunction | | X | X | X |
| Remedying mechanical problem | | X | | X |
| Troubleshooting, electrical problem | | | X | X |
| Maintenance | X | X | X | X |
| Repair work | | | | X |
| Decommissioning /<br>Storage | X | X | X | X |

## 1.7 Electrical Hazards



**WARNING**

**Electric shock**

- The power plug must be pulled before performing work on live parts

## 1.8 Modifications to the CoMo-Control

Do not make any modifications (design modifications, extensions) to the CoMo-Control without the prior consent of the manufacturer.

Immediately replace any unit components which are not in perfect condition.

Use only original spare parts (OEM). When using non-OEM components it cannot be ensured that they have been designed and manufactured so as to comply with loading and safety requirements.

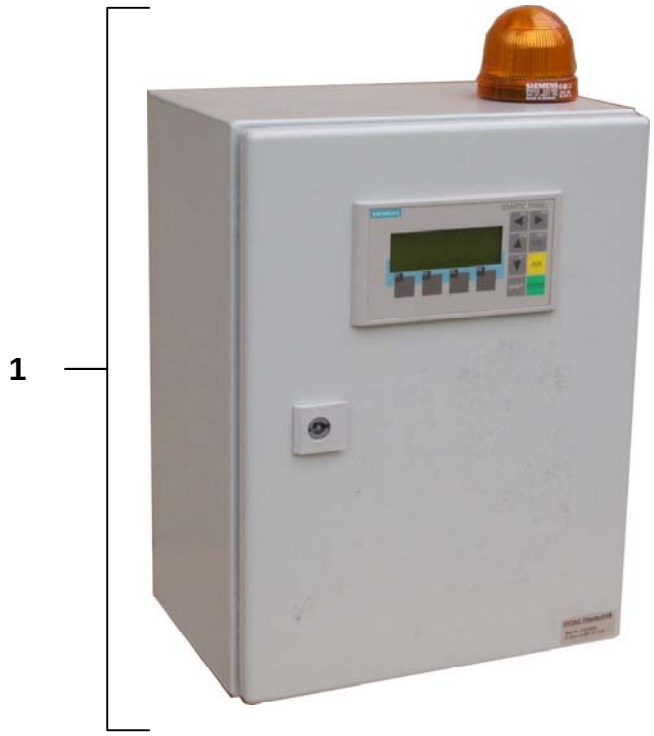
# 2 Checking the scope of delivery

Upon receiving the CoMo-Control check it for any damage in transit. Only a perfectly functioning CoMo controller may be put into operation.

Any damage in transit is to be reported to the forwarding agent or the department in charge immediately; the unit may not be commissioned until this damage is properly remedied.

The following items are supplied:

| Item | Qty | Description |
|---|---|---|
| 1 | 1 | CoMo-Control |
| - | 1 | Operating Manual |




The sensor is not included in the scope of delivery.

# 3 Function description

The CoMo-Control is used for continuous monitoring of hydraulic and lubrication systems. The sensor connected to the CoMo-Control supplies measured values to the SPS Siemens S7-200/300. In the SPS the measured values are permanently compared with the limit values set by the customer. The following are triggered when the limit values are exceeded:

- Plain text message in text display
- Illumination of the alarm lamp and
- Collective malfunction to a relay contact

On the basis of the text messages, inspection and maintenance work can be performed on the hydraulics and lubrication system before increased component wear can result in a system breakdown.

The following measured values are monitored:

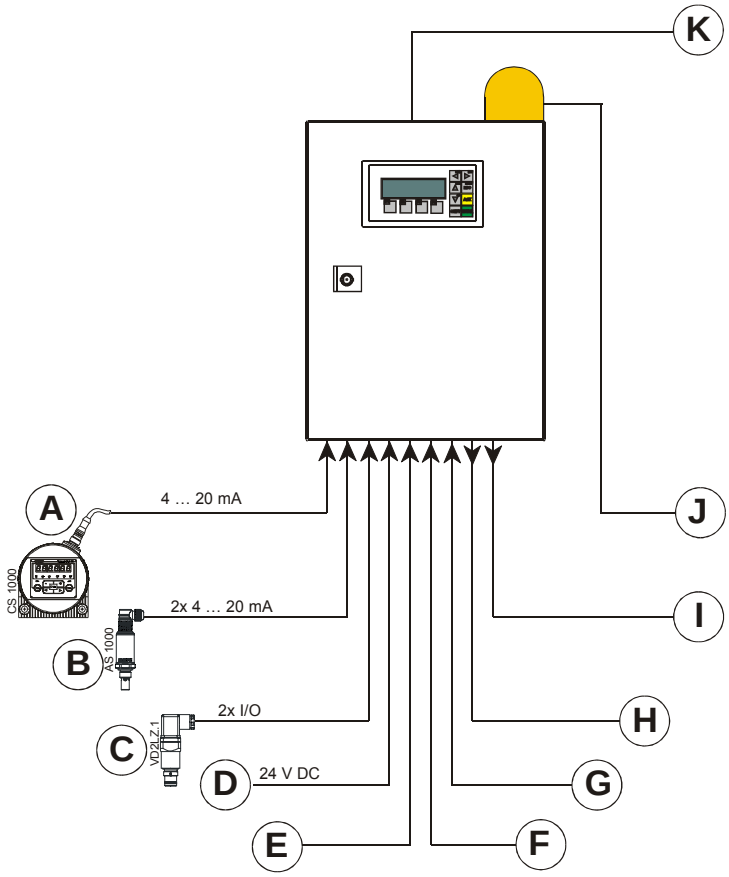
- Contamination of the oil with solid substances/water
- Function of the cooling water valve
- Filter clogging indicator (filter element replacement required)

The Profibus connection can be used for linkage with an external S7 Master controller.

## 3.1 CoMo display elements


| Item | Designation |
|---|---|
| [1] | Alarm lamp/signal lamp |
| [2] | Text display (TD200/SIMATIC PANEL) |

## 3.2 Function plan




| Item | | Description |
|---|---|---|
| A | 4 ... 20 mA input | for CS 1000 as ISO Signal |
| B | 4 … 20 mA input | for AS 1000 |
| C | Switching input | for filter contamination display<br>70% Warning/100% Alarm |
| D | 24 V DC input | Voltage supply |
| E | Switching contact | Cooling water valve |
| F | Switching contact | Flow monitor |
| G | Switching contact | Pressure switch (operation) |
| H | Switching contact (K0.0) | Collective malfunction for master display |
| I | Switching contact (K0.2) | Pressure switch (No pressure) |
| J | Switching contact (K0.1) | for alarm lamp |
| K | Bus connection | Profibus |

## 3.3 Checking CS 1000 settings

In order for the CoMo-Control to be able to evaluate the data of the CS 1000, the analog output (ANA .OUT) must be set to ISO (time-coded).

# 4 Warnings/Alarms/Messages

The CoMo-Control distinguishes between warnings/alarms and system malfunctions.

**Warnings** are displayed by the flashing of the signal lamp and as plain text on the text display. Diese Warnings can be deleted by acknowledging with the F1/RESET key. If no change is made, then another warning will ensue after 50 minutes.

The triggering of a warning ensues as soon as a filter is 75% or 100% clogged. This means that the clogging indicator is announcing a clogging of 75% during a 5-minute period. (The 75% message must be activated beforehand in the Setup Menu.)

**Alarms** are displayed by the flashing of the signal lamp and as plain text on the text display. The cause of the alarm must be eliminated. The alarm can be deleted afterwards by acknowledging with the F1/RESET key.

The triggering of an alarm takes place as soon as one of the set values > the set ISO value for each channel or saturation in % has been reached for at least 5 minutes.

**Messages** are malfunctions during which the CoMo-Control controller receives no signals from the system. The sensors and the system must be inspected in such cases.

## 4.1 Switching contacts in the controller

### 4.1.1 Collective malfunction (K0.0)

The malfunction switching contact is designed as a potential-free directional contact.

The directional contact switches the relay K0.0 (X1: 1,2,3) as soon as a warning, an alarm or a system malfunction occurs.

The signal is to be processed by an external system controller.

### 4.1.2 Malfunction (K0.2)

The malfunction swtiching contact is designed as a potential-free directional contact.

The relay K0.2 (X1: 5,6,7) is switched after a 1-minute time delay whenever as the pressure falls below the set minimum pressure (B0.5) or exceeds the minimum pressure (B0.6).

The signal is to be processed by an external system controller, e.g. for switching off the conveyor pump.

## 4.2 Setting ISO code alarm

For example, an alarm is triggered by:

| | | | | |
|---|---|---|---|---|
| ISO channels | | 4µ | 6µ | 16µ |
| ISO limit value | TGT | 16 | 14 | 12 |
| ISO actual value | ACT | 18 | 14 | 11 |

The ISO actual value "ACT" is updated in accordance with the measuring intervals of the CS.

The alarm cannot be reset unless the CS limit value in all channels is greater than the ISO actual value.

If the limit value is set to a particular value, then the values of the CS 1000 and the display screen can be time-delayed by 5 minutes and varied by +/- 1 class because of the analogue-digital conversion.

In the event of a modification of the limit values - ISO Code on the SIEMENS text display, all 3 channels (4µ/6µ/14 µ) in the menu must be run through. It is not until the AS-MAX is displayed that the SETUP Menu can be exited with the F2 key (Setup). This is the only way to guarantee that all modifications to the ISO values will be applied.

In addition, the values will be monitored logically, so that the values for the individual channels 4 µm > 6 µm > 14 µm must correspond.

### 4.2.1 ISO Code alarm - delete/reset

The alarm which was triggered when the limit values were reached can be reset by:

Filter change on the fluid filter

CS 1000 reports cleaner values

Set ISO limit values higer in SETUP

Every alarm can be reset or deleted by actuating the F1/RESET key.

## 4.3 Checking/setting water content alarm

The alarm will be triggered if the set limit value is > the actual value for a period of 5 minutes.

For example, an alarm is triggered by:

| | | |
|---|---|---|
| Water content | | |
| % limit value | TGT | 50 % |
| % actual value | ACT | 60 % |

The AquaSensor AS continues to supply actual values to the CoMo-Control controller on a permanent basis.

HYDAC also offers corresponding dewatering units for continuous reduction of water content. Please contact us for more information.

### 4.3.1 Water content alarm - delete/reset

The water content alarm can be reset only when actual value > limit value. This means that either:

The AS 1000 reports a lesser actual value or

The limit values % in the SETUP Menu is to be set higher.

Every alarm can be reset or deleted by actuating the F1/RESET key.

## 4.4 Warning filter clogged

The 75% filter warning is issued only if:

- the clogging indicator has a switching point for 75%
- the warning is activated in the Setup Menu.

| View | Cause(s) | Remedy |
|---|---|---|
| FILTER 1 100% CLOGGED | Filter 1 clogged | Prepare for change of filter element |
| FILTER 2 75% CLOGGED | Filter 2 clogged | Prepare for change of filter element |

Every alarm can be reset or deleted by actuating the F1/RESET key.

## 4.5 Alarm filter clogged

The 100% alarm filter is issued when the clogging indicator reports the contamination.

| View | Cause(s) | Remedy |
|---|---|---|
| FILTER 1 100% CLOGGED | Filter 1 clogged | Changing the Filter Element |
| FILTER 2 100% CLOGGED | Filter 2 clogged | Changing the Filter Element |

## 4.6 Messages

| View | Cause(s) | Remedy |
|---|---|---|
| NO COOLING WATER | The cooling water valve has switched on and the flow monitor displays no flow<br>cooler clogged,<br>cooling water valve defective,<br>cooling water blocked | Check cooler and periphery |
| TEMP CABLE BREAK | No analogue signal present | Check supply voltage at AS 1000 and connection cable |
| AS CABLE BREAK | No analogue signal present | Check supply voltage at AS 1000 and connection cable |
| CS CABLE BREAK | No analogue signal present | Check supply voltage at CS 1000 and connection cable<br>Check ANAOUT for ISO |

| View | Cause(s) | Remedy |
|---|---|---|
| OPERATING PHASE NOT REACHED | Pressure switch after the pump does not switch | Check adjustable pressure switch<br>Check function of motor-pump assembly |
| FILTER 1 75%/100% | Clogging indicator at Filter 1 is defective | Check clogging indicator, replace if necessary |
| FILTER 2 75%/100% | Clogging indicator at Filter 1 is defective | Check clogging indicator, replace if necessary |
| CS NOT READY | Imprecise SPS read-in | RESET key |
| CS VALUE UNDEFINED | Fault with automatic comparison or error in the sensor cell | Perform reset on the CS. (Disconnect CS from the voltage supply and then reconnect.) |
| CS FLOW HIGH | Flow CS 1000 too high | Check and throttle if necessary the flow at the outlet of the CS1000 |
| CS FLOW LOW | Flow CS 1000 too low | Check flow through the CS1000 and/or increase pressure at the CS inlet |
| PUMP ERROR | Pressure too low or pressure too high | Check motor-pump assembly for proper functioning and leakage |

Every message can be reset or deleted by actuating the F1/RESET key.

# 5 Address overview of the Profibus interfaces

The CoMo-Control system is a slave at the Profibus DP (Profile: DP; 1.5 Mbit/s; Address 20) and writes 10 WORD starting with Address AW100.

YOU CAN READ THE VALUES AT THE FOLLOWING INPUTS ON YOUR DP-MASTER:

| | |
|---|---|
| **EW100** | AS value physical 0-100% |
| **EW102** | Temperature physical –25° ... 100° |
| **EW104** | ISO Value 14µ |
| **EW106** | ISO Value 6µ |
| **EW108** | ISO Value 4µ |
| **EW112** | Reserve |

| **EW112** | |
|---|---|
| E112.0 | Pump error |
| E112.1 | CS cable break |
| E112.2 | AS cable break |
| E112.3 | Temporary cable break |
| E112.4 | Filter 1 hardware error |
| E112.5 | Filter 2 hardware error |
| E112.6 | Flow monitor |
| E112.7 | Collective error AS |
| E113.0 | Collective error CS |
| E113.1 | Error ISO 14µ |
| E113.2 | Error ISO 6µ |
| E113.3 | Error ISO 4µ |

| **EW114** | |
|---|---|
| E114.0 | Warning filter 1 70% |
| E114.1 | Error filter 1 100% |
| E114.2 | Warning filter 2 70% |
| E114.3 | Error filter 2 100% |
| E114.4 | Warning CS not ready |

| | |
|---|---|
| E114.5 | Warning CS value not defined |
| E114.6 | Warning CS  Flow High |
| E114.7 | Warning CS  Flow Low |
| E115.0 | CS collective malfunction |
| E115.1 | AS warning value reached |
| E115.2 | CS warning value reached |

# 6 Operating the CoMo

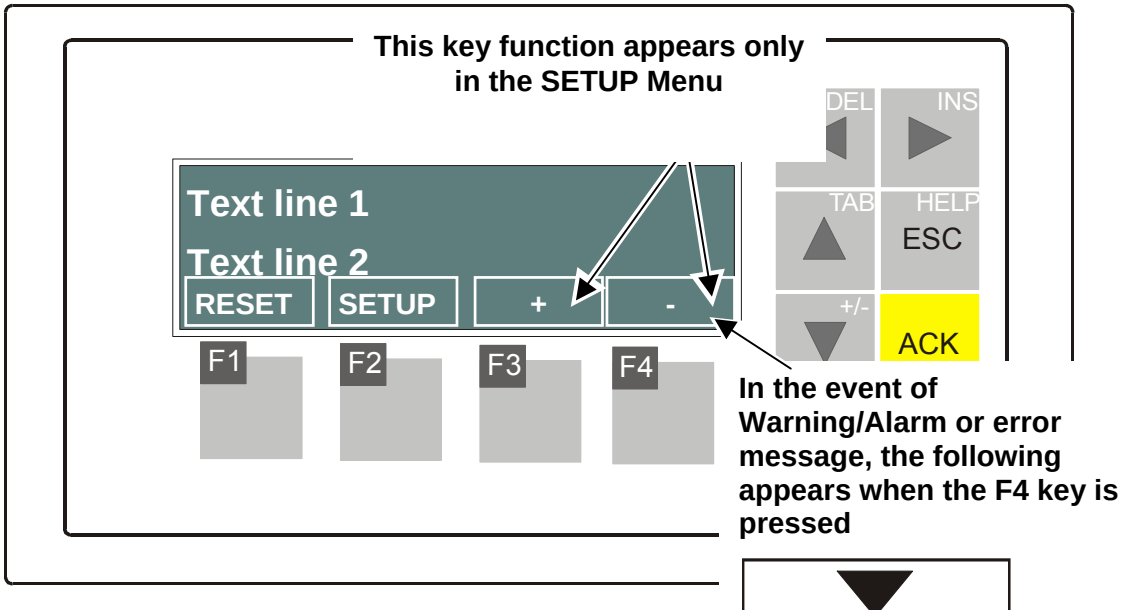
Depending on the version, the CoMo-Control is equipped with the text display TD200 or SIMATIC PANEL.

## 6.1 Text display - TD 200


### 6.1.1 Key assignment - TD200

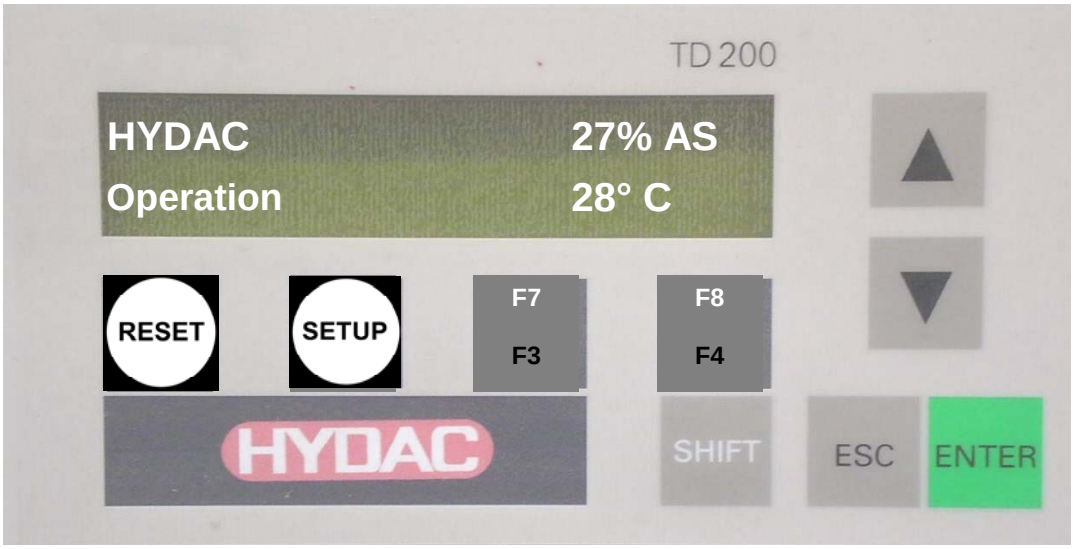
| Key | Description |
|---|---|
| RESET | For resetting Warnings/Alarms and error messages |
| SETUP | To open the SETUP Menu (See Chapter SETUP Menu) |
| F7 F3 | Has no function |
| F8 F4 | Has no function |
| ▲ | Increase values |
| ▼ | Reduce values |
| ESC | Has no function |
| ENTER | The value currently shown on the display will be applied with the ENTER key is pressed |

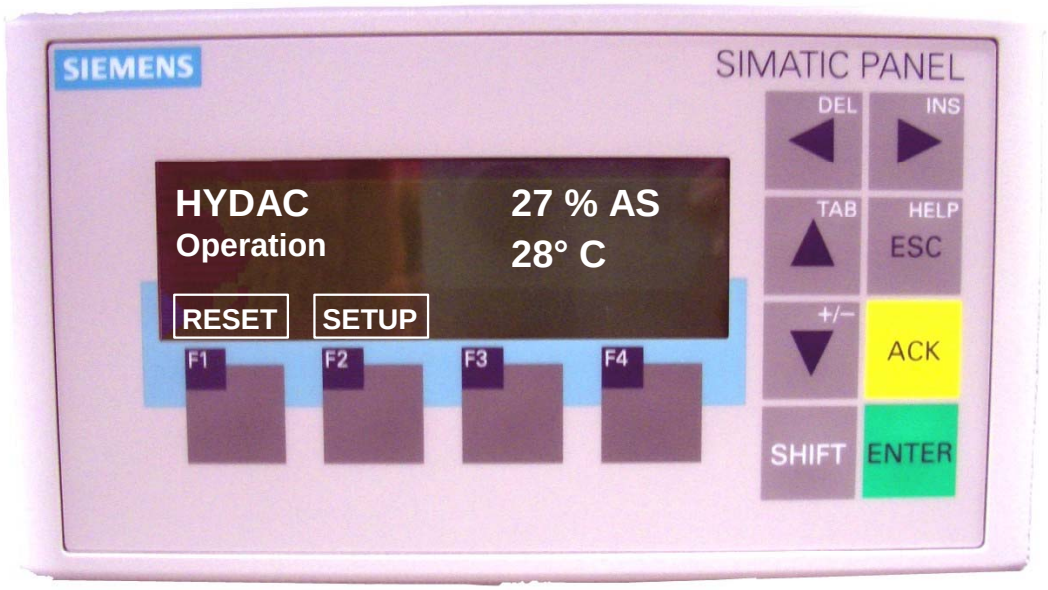
## 6.2 Text display – SIMATIC PANEL




| Key | Description |
|---|---|
| F1 RESET | For resetting Warnings/Alarms and error messages |
| F2 SETUP | To open the SETUP Menu (See Chapter SETUP Menu) |
| F3 + | Increase values |
| F4 - | Reduce values |
| ▲ | Scroll upwards in the display or jump back one level |
| ▼ | Scroll downward through display |
| ◀ ▶ | Has no function |
| HELP ESC ACK | Has no function |
| SHIFT ENTER | Has no function |

## 6.3 Display screen in operation




In the event of error messages, it is possible to jump back to the text display by pressing the TAB key.

## 6.4 SETUP Menu – Text display TD200

The limit values and the language of the text display can be set in the Setup Menu.


| | | | |
|---|---|---|---|
| ISO Code 4 µ **16** | ▲ ▼ | ENTER | Enter limit value for 4µ channel. |
| ISO Code 6 µ **14** | ▲ ▼ | ENTER | Enter limit value for 6µ channel. |
| ISO Code 14 µ **12** | ▲ ▼ | ENTER | Enter limit value for 14µ channel. |
| AS-MAX **80** % | ▲ ▼ | ENTER | Limit value for water content as saturation percentage |
| TEMP-MAX **99** °C | ▲ ▼ | ENTER | This value has no influence on the controller |
| ENGLISH -> **0** | ▲ ▼ | ENTER | Display language:<br>0= deactivated<br>1= activated |
| GERMAN -> **1** | ▲ ▼ | ENTER | Display language:<br>0= deactivated<br>1= activated |

Increase current value

Reduce current value

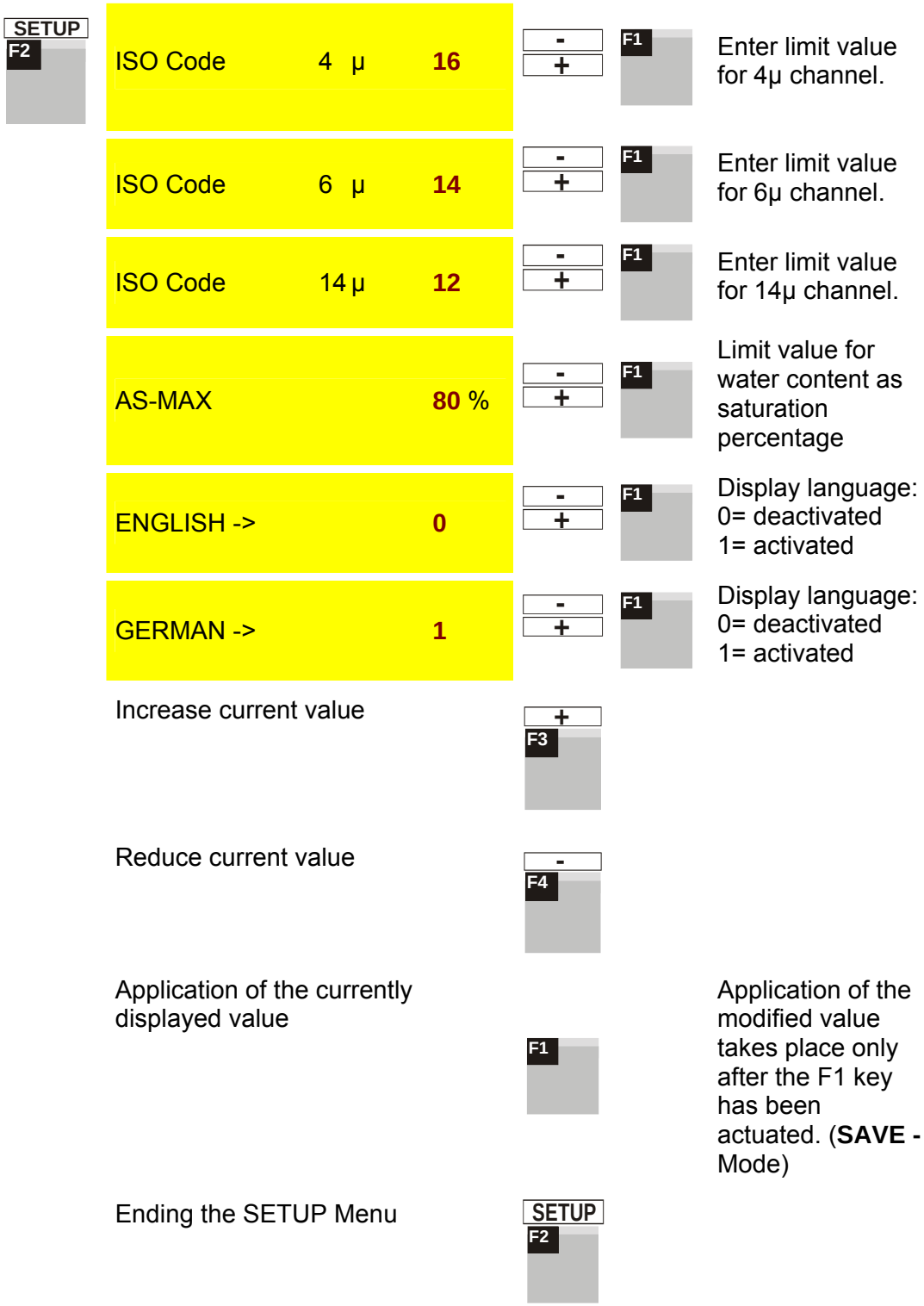
Application of the currently displayed value


Application of the modified value takes place only after the ENTER key has been actuated.

Ending the SETUP Menu

## 6.5 SETUP Menu - SIMATIC PANEL

The limit values and the language of the text display can be set in the Setup Menu.



# 7 Starting up the CoMo

A constant pressure of at least 1 bar for a period of 1 minute must prevail in the hydraulics system during the commissioning and/or installation of the CoMo-Control.

Afterwards, the controller switches automatically from "STARTUP" to "OPERATION".

Should this not be the case, then the message "OPERATING PHASE NOT ACHIEVED" will appear on the display after 1 minute.

# 8 Factory default settings

| Description | | Value |
|---|---|---|
| ISO Code | 4 µ | 16 |
| ISO Code | 6 µ | 14 |
| ISO Code | 14µ | 12 |
| AS-MAX | | 80 |
| ENGLISH | | 0 |
| ENGLISH | | 1 |

# 9 Maintenance

The CoMo-Control is almost entirely maintenance-free.

## 9.1 Disposing of the CoMo

When decommissioning and/or disposing of the CSM, adherence is to be maintained to local guidelines and regulations pertaining to occupational safety and environmental protection.

After disassembling the unit and separating the various materials, they can be reused or disposed of properly in accordance with local regulations.

# 10 Technical data

| | |
|---|---|
| Power supply voltage | 24 V DC +/- 15 % |
| Power consumption | ≈ 1.5 A |
| Ambient temperature | 10 ... 40° C |
| Storage temperature | 10 ... 40° C |
| Relative humidity | min. 5% - max. 95%, non-condensing |
| Switchbox material | Lacquered corrugated steel (RAL 7035) |
| IP class | IP 54 |

## Notes

## Notes

## Notes

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