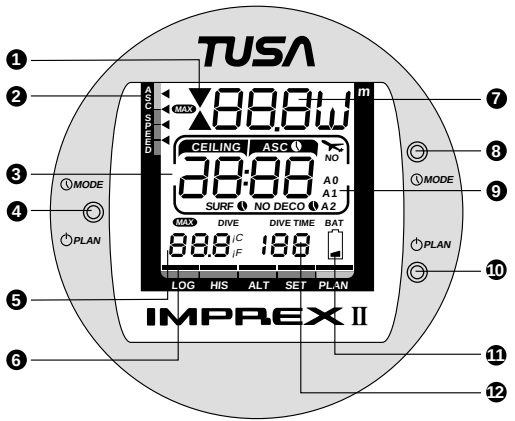
TUSA

IMPREX II IQ-400

Owner's Instruction Manual

Quick Reference Guide



1. Arrows: Decompression Stop at the Ceiling Depth, Ascent Recommended, Must Descend
2. Ascent Rate Indicator
3. Current Time Display, Surface Interval/No Flying Time, No-Decompression Time, Ceiling Depth/Total Ascent Time
4. Common Contact
5. Temperature, Dive Counter, Maximum Depth During Diving, Day of the Month
6. Multifunctional Bar graph: Mode Indicator, Battery Power Indicator, Reverse No-Decompression Time
7. Present Depth, Maximum Depth at the Surface, Fast Ascent Warning (SLOW), Average Depth in the Logbook
8. Time Display! Mode Selection Contact
9. Personal Adjustment/High Altitude Mode
10. Activation/Dive Planning Contact
11. Low Battery Warning
12. Dive Time, Month

The TUSA IQ-400 dive computer features:

- **Built-in calendar clock**
- **Decompression capabilities**
- **Personal adjustment**
- **Adjustment for altitude**
- **Four step ascent rate indicator**
- **Reverse no-decompression time bar graph**
- **Battery power indicator and low battery warning**
- **Complete logbook memory capabilities including 9 most recent dives with average depth and minimum no-decompression time or maximum ascent time**
- **History memory up to 999 dives and 999 dive time hours + maximum depth ever recorded**
- **Visual alarms**
- **Color-coded graphics**
- **Phosphorescent LCD display**
- **Easily replaceable protective shield**
- **Wrist and console models**

DEFINITION OF WARNINGS, CAUTIONS AND NOTES

Throughout this manual, special references are made when deemed important. Three classifications are used to separate these references by their order of importance.

⚠ **WARNING** ⚠

is used in connection with a procedure or situation that may result in serious injury or death.

⚠ **CAUTION** ⚠

is used in connection with a procedure or situation that will result in damage to the product.

⚠ **NOTE** ⚠

is used to emphasize important information.

⚠ WARNING ⚠

READ THIS MANUAL!

Carefully read this instruction manual in its entirety, including Section 1, "For Your Safety". Make sure that you fully understand the use, displays and limitations of the **IQ-400** dive computer.

⚠ WARNING ⚠

NO DIVE COMPUTER WILL PREVENT THE POSSIBILITY OF DECOMPRESSION SICKNESS (DCS)!

All divers must understand and accept that there is no procedure or dive computer that will totally prevent the possibility of a decompression accident. For example, the individual physiological make up can vary within an individual from day to day. The dive computer cannot account for these variations. As an added measure of safety, you should consult a physician regarding your fitness before diving.

⚠ WARNING ⚠

ONLY DIVERS TRAINED IN THE PROPER USE OF SCUBA EQUIPMENT SHOULD USE THE IQ-400!

No dive computer can replace the need for proper dive training.

⚠ WARNING ⚠

NOT FOR PROFESSIONAL USE!

TUSA dive computers are intended for recreational use only. The demands of commercial or professional diving often expose the diver to depths and prolonged exposures including multiday exposures that tend to increase the risk of decompression sickness. Therefore, TUSA specifically recommends that the **IQ-400** be not used for commercial or other severe diving activity.

⚠ WARNING ⚠

PERFORM PRECHECKS!

Always check the **IQ-400** before diving in order to ensure that all LCD segments are completely displayed, that the **IQ-400** has not run out of battery power, and that the personal/ altitude adjustment mode is correct.

⚠ WARNING ⚠

USE BACK-UP INSTRUMENTS!

Make certain that you use back-up instrumentation including a depth gauge, submersible pressure gauge, timer or watch, and have access to decompression tables whenever diving with the **IQ-400**.

Table of Contents

INTRODUCTION

Congratulations on your choice of the **TUSA IQ-400** Dive Computer.The **IQ-400** is a compact and sophisticated dive instrument that will give you years of trouble free and joyful diving. **The IQ-400** dive computer will provide you with important information that you will need during, between, and after your dives.

Key Features

The **IQ-400** monitors and reports vital information such as your dive time, current depth, maximum depth, no-decompression time and ascent rate.

The **IQ-400** will also give you information, if through carelessness or emergency you are forced to exceed the no-decompression limits for any dive.

The **IQ-400** has a built-in calendar and clock. It features versatile logbook memory capabilities and long-term historical data. The instrument can be adjusted for diving at different altitudes or to add an extra level of conservativeness if desired.

The screen is protected against scratches and damage by a replaceable shield.

The **IQ-400** is available either as a wrist unit with an optional protective boot or mounted in two gauge or three gauge console or in a hose mounted boot. The modular construction allows for the separate compass module to be attached to the two gauge console at a later stage.

Metric and Imperial Units

All examples in this manual are shown in metric units, including meters and ˚C. The corresponding imperial units are shown in brackets. **The IQ-400** is also available with imperial units, i.e. feet and ˚F.

⚠ **WARNING** ⚠

VERIFY THAT THE UNITS OF MEASURE, WHETHER METRIC OR IMPERIAL, ARE CORRECT BEFORE STARTING TO DIVE!

Any confusion resulting from improper selection of units may cause the diver to commit errors that may lead to serious injury.

1. For Your Safety

Always remember that **The Diver is Responsible for His or Her Own Safety!**

When used properly the **IQ-400** is an outstanding tool for assisting properly trained, certified divers in planning and executing standard and multi-level sport dives within the described no-decompression limits. It is **Not a Substitute for Certified Scuba Instruction** including training in the principles of decompression.

Do Not attempt to use the **TUSA IQ-400** without reading this entire Instruction Manual. If you have any questions about the manual or the **IQ-400**, contact your **TUSA** dealer before diving with the **IQ-400**.

Back-Up Instruments

> ⚠ **WARNING** ⚠
>
> **USE BACK-UP INSTRUMENTS!**
>
> Make certain that you use back-up instrumentation including a depth gauge, submersible pressure gauge, timer or watch, and have access to decompression tables whenever diving with the **IQ-400**.

Sharing the IQ-400

> ⚠ **WARNING** ⚠
>
> **THE IQ-400 SHOULD NEVER BE TRADED OR SHARED BETWEEN USERS WHILE IT IS IN OPERATION!**
>
> Its information will not apply to someone who has not been wearing it throughout a dive or sequence of repetitive dives. Its dive profiles must match that of the user. If it is left on the surface during any dive, it will give inaccurate information for subsequent dives.

No dive computer can take into account dives made without the computer. Thus any diving activity 48 hours prior to initial use of the computer may give misleading information and must be avoided.

Personal/ High Altitude Adjustment

More information about this is given in Section 3.5, "Personal Adjustment and High Altitude Dives".

⚠ **WARNING** ⚠

SET THE CORRECT PERSONAL/ ALTITUDE ADJUSTMENT MODE!

When diving at altitudes greater than 700 m [2300 ft] the personal/ altitude adjustment feature must be correctly selected in order for the computer to calculate no-decompression status. The diver should also use this option to make the calculation more conservative, whenever it is believed that factors which tend to increase the possibility of decompression sickness exist (see Section 3.5). Failure to properly select the personal/ altitude adjustment mode correctly will result in erroneous data and can greatly increase the risk of decompression sickness.

⚠ **WARNING** ⚠

THE IQ-400 IS NOT INTENDED FOR USE AT ALTITUDES GREATER THAN 2400 m (8000 ft)!

Diving at altitudes above this limit may significantly increase the risk of decompression sickness.

When diving at higher altitudes (above 700 m / 2300 ft), it is essential that the entered altitude mode, i.e. maximum altitude limit of the **IQ-400**, exceeds or is equal to the altitude of the dive site. The altitude mode indicator must show either A1 or A2, depending on the altitude. More information about this is given in Section 3.5, "High Altitude Dives and Personal Adjustment".

Decompression Dives

⚠ **WARNING** ⚠

DO NOT USE THIS INSTRUMENT TO CONDUCT DECOMPRESSION DIVES!

TUSA does not recommend this instrument to be used to conduct decompression dives. However, if through carelessness or emergency a diver is forced to exceed the no-decompression limits on a dive, the **IQ-400** will provide decompression information required for ascent. After this the **IQ-400** will continue to provide subsequent interval and repetitive dive information.

Emergency Ascents

In the unlikely event that the **IQ-400** malfunctions during a dive, follow the emergency procedures provided by your certified dive training agency or, alternatively, immediately ascend at a rate slower than 10 m/min [33 ft/min] to a depth between 3 and 6 meters [10 to 20 ft] and stay there as long as your air supply will safely allow.

Higher Risk Dive Profiles

The user must understand that all decompression devices (decompression tables and/or dive computers) are based on mathematical models and that many experts are currently concerned that these models may not under certain conditions adequately describe the physiological phenomena. These conditions are presently identified as dives which incorporate the following (Fig. 1.1):

Sawtooth Profiles where the diver alternates between greater and shallower depths repeatedly throughout the dive.

Reverse Profiles where the diver spends most of the dive at shallow depths and then descends to the maximum depth shortly before surfacing.

Consecutive Dives where the diver performs repetitive dives to approximately the same maximum depth with only short surface intervals between dives. The risk of decompression sickness increases when depth and the number of repetitive dives increase and when the surface intervals are decreased.

Multiday Dives repetitive dives performed for several consecutive days.

Decompression Dives any dive during which the no-decompression limit has been exceeded or the diver is advised by the computer that he may not return directly to the surface.

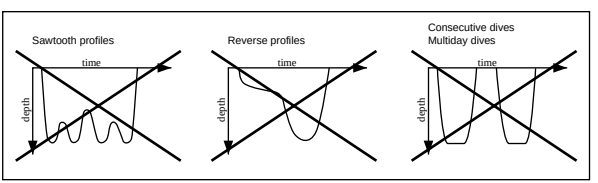


Figure 1.1 Higher Risk Profiles

⚠ WARNING ⚠

DIVE PRACTICES WHICH INCLUDE THE ABOVE DESCRIBED "HIGHER RISK DIVE PROFILES" ARE BELIEVED TO INCREASE THE RISK OF DECOMPRESSION SICKNESS AND AS SUCH CONSIDERED POTENTIALLY DANGEROUS AND SHOULD BE AVOIDED EVEN IF THEY CONFORM TO THE MATHEMATICAL MODEL!

⚠ WARNING ⚠

DO NOT USE THE IQ-400 WITH NITROX MIX!

The mathematical tissue calculation model of the **IQ-400** has been designed for use with standard breathing air only (approximately 21% oxygen and 79% nitrogen by volume). Therefore, the **IQ-400** must not be used for diving with "Nitrox" or other mixed gases.

Dive Computer Limitations

While the **IQ-400** is based on current decompression research and technology, the user/ diver must realize that the computer cannot monitor the actual physiological functions of an individual diver. All decompression schedules currently known to the authors, including the U.S. Navy Tables, are based on a theoretical mathematical model which is intended to serve as a guide to reduce the probability of decompression sickness.

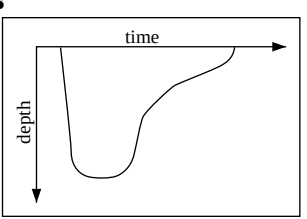


Figure 1.2
Recommended Profile

The mathematical model uses an ascent rate of 10 m/min [33 ft/min]. Therefore it is critical that a proper ascent rate is always used.

The reader/diver is forewarned that individual physiological differences, severe environmental conditions and predive activities, especially those which tend to increase dehydration, may increase the risk of decompression sickness.

As a safety precaution TUSA recommends that divers using the **IQ-400** should maintain no less than 10 minutes no-decompression time remaining at all

times during the dive. This is especially important for divers in poor physical condition, in cold water or other arduous conditions.

Historically divers have been advised to always include a margin of safety in their diving activities. TUSA supports these practices and strongly recommends that the diver make the deepest portion of the dive near the beginning of the dive and gradually progress into shallower depth, allowing time for a 3 to 5 minutes "safety stop" at a depth range of 3 to 6 meters (10 to 20 ft). This is believed to be effective in further reducing the risk of decompression sickness.

Furthermore, the reader/diver is advised that any dive carries some risk of decompression sickness and neither the authors, nor TUSA will assume any responsibility or liability for accidents or injuries which might occur for any reason.

2. GETTING ACQUAINTED WITH THE IQ-400

> ⚠ **WARNING** ⚠
> **READ AND UNDERSTAND**
> **THE ENTIRE OWNER'S MANUAL BEFORE DIVING!**
> Failure to complete this step may result in serious personal injury.

The purpose of this section is to provide the user with initial information to preview the operation of the computer. Since this information is limited, it is imperative that you read and understand the entire owner's manual before attempting to dive.

2.1 Water Contacts

The **IQ-400** has three water contacts on the face of the instrument:

MODE/ PLAN:	common contact	-> **LOG/ON**
PLAN:	activation and dive planning contact	-> **ON**
MODE:	time display and mode selection contact	-> **LOG**

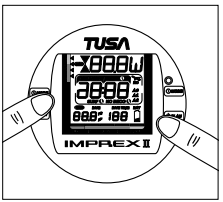


Figure 2.1 Activation
Touch the ⏻ PLAN and ⏲ MODE/ ⏻ PLAN contacts with moistened fingers

On the surface the **IQ-400** is operated by simultaneously touching the MODE/PLAN contact and one or two of the other contacts. When doing this, your finger tips should be wet or moist to establish the necessary electric contact. When submerged these contacts are automatically connected by the conductivity of the water.

2.2 Activation

The calendar clock is always shown on the display, when the dive computer is deactivated. In this mode the power consumption of the **IQ-400** is minimal.

The **IQ-400** is activated by touching the ⏻ PLAN and ⏲ MODE/ ⏻ PLAN contacts (Fig 2.1). The first display, the STARTUP, shows all available elements and immediately after this the battery power indicator. A few seconds later the READY display will appear, showing zero values (Fig. 2.2).

At this time, perform a precheck making sure that the **IQ-400** operates correctly, that the low battery indicator is not on and that the personal/ altitude adjustment setting is correct.

If the battery symbol is displayed <u>and stays on all the time</u> the **IQ-400** should not be used (Fig. 2.3).

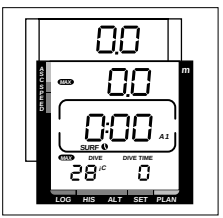


Figure 2.2
Ready Display

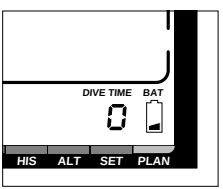


Figure 2.3
Battery Warning
The battery symbol when displayed <u>all the time</u> indicates that the battery is too low for diving

**Refer to figure 3.3 for battery power indicator. (see page13)*

3. Diving with The IQ-400

This section contains instructions on how to operate the **IQ-400** and interpret its displays. Each display has been carefully designed to provide important information you will need to plan your dive or dive series.

You will find that the **IQ-400** is easy to use and read. Each display shows only the data relevant to that specific diving situation. For example, while you are on a dive, surface interval data is irrelevant and therefore not shown. On the other hand, while you are on the surface after a dive, remaining no-decompression time for that dive is irrelevant and therefore replaced with information for your next dive.

3.1 Use of Water Contacts

As described in Section 2.1, "Water Contacts", the **IQ-400** is controlled with the MODE/PLAN,PLAN, and MODE contacts (Fig 3.1), as follows:

Activation:
Touch the ⏻PLAN and 🕒MODE/⏻PLAN contacts.

Dive Planning:
Once the **IQ-400** has been activated, touch the ⏻PLAN and 🕒MODE/⏻PLAN contacts.

Clock:
Once the **IQ-400** has been activated, touch the 🕒MODE and 🕒MODE/⏻PLAN contacts for two seconds. The time is then displayed for four seconds.

When the 🕒MODE and 🕒MODE/⏻PLAN contacts are touched for over three seconds, the display will start to scroll through the following modes. Lift your fingers when the desired mode is displayed:

Logbook Memory:
At *LOG* the logbook memory is accessed.

Dive History Memory:
At *HIS* the history memory is accessed.

Personal/ Altitude Adjustment Setting:
At *Alt* the personal and/or altitude adjustment can be set.

Time Setting:
at *Set* the time and date can be adjusted.

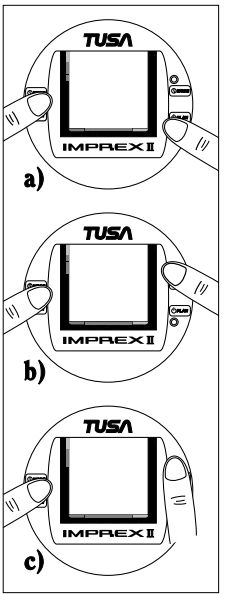


Figure 3.1 Using the Water Contacts
a) Activation and dive planning
b)Time display and menu based modes
c) Exit the modes

Return:
you can at any time exit the above modes by touching all three contacts at the same time. First make contact between the ⏻PLAN and 🕒MODE contacts, e.g. by covering both contacts with your right thumb. Without lifting your right thumb, touch the 🕒MODE/⏻PLAN contact with your left thumb. Alternatively, you can exit the modes simply by submerging the **IQ-400** in water.

You may sometimes encounter problems in using the contacts, or the **IQ-400** may activate on its own. The reason for this is probably contamination or

Figure 3.2 Startup I
All segments shown

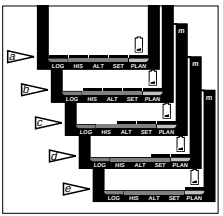


Figure 3.3 Startup II
*Battery power indicator. When two or less bar graph segments are shown the **IQ-400** should not be used for diving*

invisible marine growth that may create an unwanted electric current between the water contacts. It is therefore important that the **IQ-400** be carefully washed in fresh water after the day's diving is completed. The contacts can be cleaned with a soft pencil eraser.

3.2 Before Diving

3.2.1 Activation, Prechecks and Battery

> ⚠ **WARNING** ⚠
>
> The **IQ-400** is always ready for use and will activate if submerged. However, it is necessary to turn it on before diving to check the personal/ altitude adjustment setting, battery power, etc. This is done, either by immersing it in water for a couple of seconds or by connecting the ⏻ PLAN and ⏲MODE/⏻PLAN contacts with fingertips.

When deactivated the time display is always shown. Once activated all display elements will turn on (showing mostly figure 8's and graphical elements) (Fig. 3.2). A few seconds later the battery power bar graph is shown (Fig. 3.3). Next, the screen will alternate between two READY displays, confirming that the activation is complete (Fig. 3.4). At this time, perform your precheck making sure that:

* the **IQ-400** operates and provides a complete display
* the low battery indicator is not on
* the personal/ altitude adjustment setting is correct

The **IQ-400** is now ready for diving. If the **IQ-400** is not taken on a dive after activation, it will automatically switch off to the time display in 10 minutes to conserve the battery power.

The **IQ-400** does not need to be reactivated for repetitive dives. It will remain active until it has calculated that all residual nitrogen has off-gassed. This may take up to 48 hours, as described in Section 6.1, "Operating Principles".

Personal Adjustment and High Altitude Diving

⚠ WARNING ⚠

SET THE CORRECT PERSONAL/ ALTITUDE ADJUSTMENT MODE!

When diving at altitudes greater than 700 m [2300 ft] the personal/ altitude adjustment feature must be correctly selected in order for the computer to calculate no-decompression status. The diver should also use this option to make the calculations more conservative, whenever it is believed that factors which tend to increase the possibility of decompression sickness exist (see Section 3.5). Failure to properly select the personal/ altitude adjustment mode correctly will result in erroneous data and can greatly increase the risk of decompression sickness.

⚠ WARNING ⚠

THE IQ-400 IS NOT INTENDED FOR USE AT ALTITUDES GREATER THAN 2400 m (8000 ft)!

Diving at altitudes above this limit may significantly increase the risk of decompression sickness.

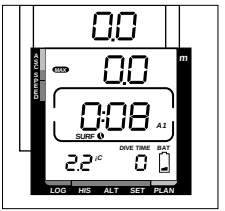


Figure 3.4
Ready Displays

The maximum depth and dive time are zeros (as no dives have yet been made), the surface interval time is 0 hours 8 minutes (in this case eight minutes after activization), the temperature is 22°C [72°F] and the present depth is 0.0m [0ft]. The personal/altitude adjustment mode is A1. The depth display will alternate between present and maximum depth. The Low Battery Warning (battery symbol) indicates that the battery is too low for diving.

If you are diving at higher altitudes, make sure that the altitude mode has been set according to the altitude of your dive site.

For information on how to select the correct altitude setting and how to use the personal adjustment, see Section 3.5, "Personal Adjustment and High Altitude Dives".

Battery Power Indicator And Low Battery Warning

The **IQ-400** has a unique visual Battery Power Indicator designed to give you an advance notice of impending need to change the battery.

The Battery Power Indicator will always be seen during activation. The following table 3.1 shows the various warning levels (see also Fig. 3.3).

Table 3.1. Battery Power Indicator

Battery Voltage	Display After Activation	Operation	Figure
over 3.0V	five bar graph segments	normal, new battery	3.3a)
3.0V – 2.9V	four bar graph segments	normal	3.3b)
2.9V – 2.8V	three bar graph segments	battery change is recommended	3.3c)
2.8V – 2.7V	two bar graph segments	don't dive, change the battery	3.3d)
less than 2.7V	one bar graph segment	don't dive, after three more activations the computer stays deactivated until the battery has been replaced	3.3e)

After activation the Low Battery Warning is indicated by the battery symbol.

If the battery symbol is displayed in the surface mode or if the display is faded or weak, the **IQ-400** should not be used (Fig. 3.4). It indicates that the battery is too low to operate the **IQ-400**. If the low battery symbol appears during a dive, you should abort the dive and begin ascent to the surface.

> ⚠ **NOTE** ⚠
>
> Temperature affects the battery voltage. If the **IQ-400** is stored at temperatures below freezing point, the low battery warning may be displayed even though the battery has enough capacity in warmer conditions. Make sure that the low battery warning disappears before diving.

3.2.2 Dive Planning

It is possible at any time on the surface to enter the DIVE PLANNING mode, simply by touching the ⏻ PLAN and ⏲ MODE/⏻ PLAN contacts. The display will rapidly cycle through the no-decompression limits for various depths from 9 m [30 ft] to 45 m [150 ft] in 3 m [10 ft] increments (Fig. 3.5). It takes about 45 seconds to run through the complete cycle, after which the **IQ-400** will

automatically return to the READY display.

Higher personal/ altitude adjustment modes will shorten the no-decompression time limits. These limits at different personal/ altitude adjustment mode selections are shown in Tables 6.1 and 6.2 in Section 6.1, "OPERATING PRINCIPLES".

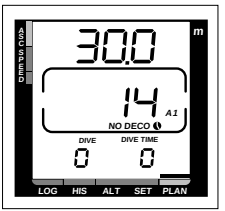


Figure 3.5
Dive Planning
The no-decompression time limit at 30.0m (100ft) is 14 minutes in A1 mode.

Dive Numbering Shown During Dive Planning

Several repetitive dives are considered to belong to the same repetitive dive series when the **IQ-400** has not deactivated itself. The first dive of the series will be numbered as DIVE 1, the second as DIVE 2, the third as DIVE 3 etc. (Fig. 3.6).

When the surface time has been less than 10 minutes, the dives are considered to be the same. The dive number will not change for the second part of such a dive and the dive time will start where it left off.

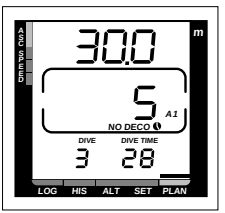


Figure 3.6
Dive Planning
The no-decompression time limit at 30.0m (100ft) is decreased to 5 minutes in A1 mode after the third dive of the series.

3.2.3 Calendar Clock Function

The calendar clock is always shown on the display, when the **IQ-400** is deactivated.

Once the **IQ-400** is activated the TIME display can be retrieved any time on the surface mode by touching the MODE and MODE/PLAN contacts for about two seconds. The current time and date will be shown for four seconds (Fig. 3.7).

When diving, the dive entry time and date is registered in the logbook memory. Remember always to check before diving that the clock is set, especially when traveling to different time zones. For adjusting the clock, refer to Section 4.4, "Setting Time and Date".

In the metric version of the **IQ-400**, the 24-hour time system is used, while in the imperial version the 12-hour time system is used.

3.3 Diving

3.3.1 Basic Dive Data

The **IQ-400** will remain in the SURFACE mode at depths less than 1.8 m [6 feet]. At depths greater than 1.8 m the **IQ-400** will go into the DIVE mode.

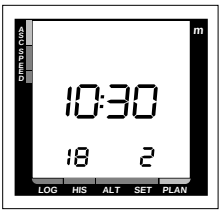


Figure 3.7
Time Display
The time is 10:30 (in case of imperial unit, A for A.M. and P for P.M. would be shown in upper left hand corner of the display). The date is 18.2 or February 18th. PLEASE NOT: The date will always be displayed with the days of the month first, followed by the month.

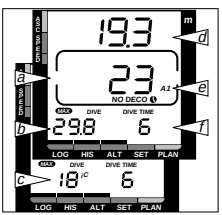


Figure 3.8
Diving Display
The present depth is 19.3m (63 ft) [d], the no decompression time limit is 23 minutes [a] in A1 mode [e] and the dive time is 6 minutes [f]. Maximum depth during this dive 29.8m (98ft) [b] and water temperature 18°C (64°F) [c] are alternating in the lower left corner.

Each piece of information on the display is clearly marked (Fig. 3.8). During a no-decompression dive, the following information will be shown:

- the available no-decompression time (a) in minutes is shown as NO DEC TIME. It is calculated based on the five factors listed in Section 7.1, "OPERATING PRINCIPLES".
- your present depth (d) is shown in meters [ft].
- the elapsed dive time (f) in minutes in the lower right corner, shown as DIVE TIME.
- the personal/ altitude adjustment (e) setting (A0, A1, or A2).

In the lower left corner the following information will alternate:

- the maximum depth during this dive (b) in meters [ft], indicated as MAX, for about 5 seconds.
- the water temperature (c), with °C for Centigrade [or °F for Fahrenheit], for about 3 second.

3.3.2 Reverse No-Decompression Time Bar Graph

The available no-decompression time is also shown visually in the multi-function bar graph in the bottom of the display (Fig. 3.9). When your available no-decompression time decreases below 60 minutes, the first bar graph segment appears. As your body absorbs more nitrogen, more segments start to appear.

Green Zone (a)

As a safety precaution TUSA recommends that divers using the **IQ-400** should maintain the no-decompression bar graph within the green zone.

Yellow Zone (b)

As all of the bars appear (yellow zone), your no-decompression limit is less than 10 minutes and you are getting very close to no-decompression limits. At this point, you should start your ascent towards the surface.

3.3.3 Ascent Rate Indicator

The ascent rate is shown graphically with a pointer in the upper left corner, next to the notation ASC RATE, as follows:

Ascent rate indicator	Ascent speed	Example in Fig. no.
No segments	Below 5 m/min [16 ft/min]	3.8
Segment one	5 – 7 m/min [16 – 23 ft/min]	3.9
Segment two	7 – 9 m/min [23 – 30 ft/min]	3.10
Segment three	9 – 11 m/min [30 – 36 ft/min]	3.11
Segment four	Above 11 m/min [36 ft/min]	3.12
Blinking SLOW	Above 10 m/min [33 ft/min]	3.12

The SLOW warning alternates with the current depth. The SLOW warning is an indication that the maximum ascent rate has been exceeded continuously, whereas the ascent rate indicator shows present ascent speed.

Whenever the SLOW warning appears, you should immediately slow down or stop your ascent until the warning disappears. You must not ascend shallower than 3 m [10 ft] with the SLOW warning on. If you reach this depth with SLOW on, you must stop at this depth and wait until the warning disappears.

⚠ WARNING ⚠
RAPID ASCENTS INCREASE THE RISK OF INJURY!
Do not exceed the maximum recommended ascent rate.

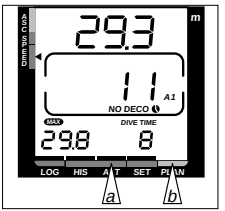


Figure 3.9 Reverse No-Decompression Time Bar Graph
The first bar from the left appears when the available no-decompression time decreases below 60 minutes. The following bars appear when the available no-decompression time decreases below 40, 30, 20 (green zone, a) and 10 minutes (yellow zone, b).

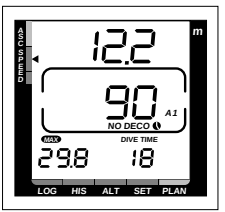


Figure 3.10 Dive Planning
Pointer at position two: ascent rate 7 – 9 m/min. (23 – 30 ft/min.)

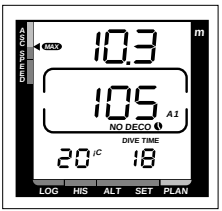


Figure 3.11
Ascent Rate Indicator
Pointer at position three: ascent rate 9 – 11 m/min (30 – 36 ft/min).

You must never surface with the SLOW warning on. If you do this, the warning will continue to flash until the unit deactivates itself in the normal manner. This may take up to 40 hours.

> ⚠ **WARNING** ⚠
> **DO NOT ATTEMPT TO DIVE FOLLOWING A SURFACE INTERVAL DURING WHICH THE SLOW INDICATOR REMAINS ACTIVATED!**
> Violation of the maximum ascent rate may invalidate the calculations for the next dive.

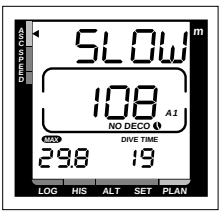


Figure 3.12
Ascent Rate Indicator
Pointer at position four: ascent rate is more than 11 m/min (36 ft/min). blinking SLOW displayed means that the ascent rate 10 m/min (33 ft/min) has been violated continuously. This is a caution to slow down!

> ⚠ **NOTE** ⚠
> **TUSA** highly recommends a safety stop at the end of every dive in the range of 3 m – 6 m [10 ft – 20 ft] for 3 – 5 minutes.

3.3.4 Visual Alarms

The **IQ-400** features visual alarms to alert you when you are approaching dangerous situations.

Potential danger situations during a dive occurs when:

- the no-decompression dive turns into a decompression dive. One arrow pointing upwards and the ascend warning CEILING/ASC TIME will appear (Fig.3.13).

Immediate danger happens when:

- the maximum allowed ascent rate, 10 m/min [33 ft/min], is exceeded. A blinking SLOW warning will alternate with the depth display (Fig. 3.12).
- the ceiling depth is exceeded. A downward pointing arrow and a blinking error warning Er will appear (Fig.3.15). You should immediately descend to or below the ceiling. The **IQ-400** will otherwise enter a permanent error mode in three minutes, indicated by a non-blinking Er.
- the ceiling descends to 10 m [30 ft]. A blinking error warning Er appears. You should immediately ascend to or below the ceiling.

• the ceiling descends to 12 m [39 ft]. A permanent error warning Er appears. In this mode the **IQ-400** can only be used as a depth gauge and timer.

The permanent ERROR MODE is shown by a non-blinking Er in the center display. Once in ERROR MODE, the **IQ-400** will continue to display current depth and dive time. You should immediately ascend to a depth of 3 to 6 m [10 to 20 ft] and remain at this depth until air supply limitations require you to surface. When the surface has been reached, no further diving or flying should take place for a minimum of two days.

3.3.5 Decompression Dives

> ⚠ **WARNING** ⚠
>
> **DO NOT USE THIS INSTRUMENT TO CONDUCT DECOMPRESSION DIVES!**
>
> **TUSA** does not recommend this instrument to be used to conduct decompression dives. However, if through carelessness or emergency a diver is forced to exceed the no-decompression limits on a dive, the **IQ-400** will provide decompression information required for ascent. After this the **IQ-400** will continue to provide subsequent interval and repetitive dive information.

Rather than requiring you to make stops at fixed depths, the **IQ-400** permits you to decompress within a range of depths.

Background

When your NO DEC TIME becomes zero, your dive becomes a decompression dive, i.e. you must perform one or several decompression stops on your way to the surface. The NO DEC TIME on your display will be replaced by a flashing notation CEILING/ ASC TIME (Fig. 3.13).

> ⚠ **WARNING** ⚠
>
> **YOU SHOULD ASCEND AND BEGIN DECOMPRESSION IMMEDIATELY WHEN THE IQ-400 SHOWS YOU THAT DECOMPRESSION IS REQUIRED!**
>
> Note the upward pointing arrow.

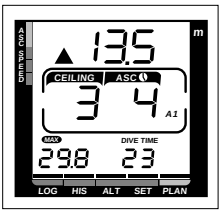


Figure 3.13
Decompression Dive, Below the Ceiling Zone
The minimum ascent time is 4 minutes. The upward pointing arrow tells you to ascend. the ceiling is at 3m (10 ft).

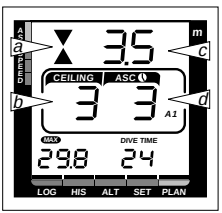


Figure 3.14
Decompression Dive, at the Ceiling Zone
The two arrows [a] point at each other ("hour glass"). You are at the ceiling zone at 3.5m (11ft) [c] and your minimum ascent time is 3 minutes [d]. The ceiling is at 3m (10ft) [b].

The ascent time (ASC TIME) is the minimum amount of minutes needed to reach the surface in a decompression dive. It includes: The time needed to ascend to the ceiling at an ascent rate of 10 m/min [33 ft/min]

plus

The time needed at the ceiling (The ceiling is the shallowest depth to which you should ascend).

plus

The time needed to reach the surface after the ceiling has been removed.

> ⚠ **WARNING** ⚠
> **YOUR ACTUAL ASCENT TIME MAY BE LONGER THAN DISPLAYED ON THE IQ-400.**

The ascent time will increase if you:

- remain at depth
- ascend slower than 10 m/min [33 ft/min], or
- make your decompression stop deeper than at the ceiling.

These factors will also increase the amount of air required to reach the surface.

> ⚠ **WARNING** ⚠
> **NEVER ASCEND ABOVE THE CEILING!**
> You must not ascend above the ceiling. In order to avoid doing so by accident, you should stay slightly below the ceiling. The ceiling zone is the shallowest depth range to which you should ascend when in decompression.

Display Below Ceiling Zone

The CEILING/ASC TIME symbol and upwards pointing arrow indicate that you are below the ceiling zone (Fig. 3.13). You should start your ascent immediately.

Display At Ceiling Zone

When you reach the ceiling zone, the display will show you two arrows pointing toward each other (the "hour glass" icon, Fig. 3.14). The two arrows pointing toward each other will be shown between the minimum ceiling and 1.8 m [6 ft] below the minimum ceiling. All decompression stops must be performed at or below the ceiling depth range.

The depth of the ceiling will depend on your dive profile. It will be fairly shallow when you enter the decompression mode, but if you remain at depth, it will move downward and the ascent time will increase.

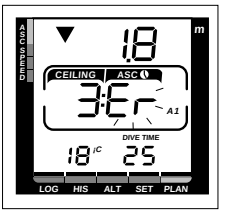


Figure 3.15
Decompression Dive, Above Ceiling
Note the downward pointing arrow and the blinking Er warning, You should immediately (within 3 minutes) descend to or below the ceiling.

The ceiling depth will be shown on the left side of the center window.

When the sea surface is rough, it may be difficult to maintain a constant depth near the surface. In this case it will be more manageable to maintain an additional distance below to the ceiling, to make sure that the waves do not lift you above the ceiling. TUSA recommends that decompression takes place deeper than 4 m [13 ft], even if the indicated ceiling is shallower.

> ⚠ **NOTE** ⚠
>
> It will take more time and more air to decompress below the ceiling than at the ceiling.

Display Above Ceiling

If you ascend above the ceiling, a downward pointing arrow will appear (Fig 3.15). In addition a blinking error warning Er reminds you that you have only three minutes to correct the situation. You must immediately descend to or below the ceiling.

If you continue to violate the decompression requirements, the **IQ-400** goes into a permanent ERROR MODE. In this mode (Fig. 3.16) you must not dive again for at least two days. See also Section 3.6, Error Conditions.

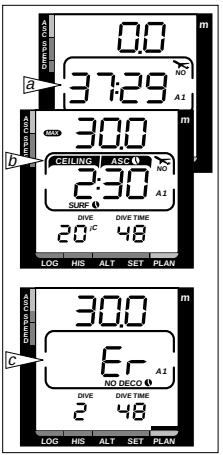


Figure 3.16
Displays After Violated Decompression Dive

The blinking CEILINGS/ASC TIME symbol [a] indicates that you have violated the ceiling for more than three minutes or the maximum ceiling depth of 12m (39ft) was exceeded. The IQ-400 will stay as a depth gauge and timer for 39 hours 59 minutes = no fly time [b]. After 2 hours 30 minutes surface interval time the no fly time is 37 hours 29 minutes. In the dive planning mode the Er warning is displayed instead of the no-decompression time [c]. You must not dive again or fly for at least two days.

⚠ WARNING ⚠

NEVER LET THE CEILING DEPTH DESCEND DEEPER THAN 9 m (30 ft).

When the ceiling is deeper than 9 m [30 ft], a blinking error warning Er will appear and when the 12 m [39 ft] ceiling is reached the **IQ-400** will go into a permanent error mode.

3.4 At Surface

3.4.1 Surface Interval

An ascent to any depth shallower than 1.8 m [6 ft] will cause the DIVING display to be replaced by the two SURFACE displays, giving the following information:

Display I (Fig. 3.17)

- The surface time in hours and minutes (separated by a colon), telling the duration of the present surface interval. It is shown above SURF TIME in the center window of the display (Fig. 3.17, b).
- The dive time in minutes, i.e. the total duration of the most recent dive, is displayed next to DIVE TIME in the lower right corner (Fig. 3.17, f).
- The maximum depth of your most recent dive in meters [ft] is shown in the same position as your depth readings during the dive. MAX indicator is then shown in front of the value (Fig. 3.17, a). The SLOW warning will blink over the maximum depth, if you have surfaced with the SLOW warning on (Fig. 3.17, d).
- The temperature in °C [°F] is shown in the lower left corner (Fig. 3.17, c).
- The no-flying warning is indicated by a blinking airplane (Fig. 3.17, e).

Display II (Fig. 3.18)

- The present depth in meters [ft] (Fig. 3.18, a).
- The desaturation/ no-flying time in hours an

minutes is shown next to the non-blinking airplane in the center window of the display (Fig. 3.18, b).

If you start a new dive after less than 10 minutes at the surface, the **IQ-400** interprets this as a continuation of the previous dive. The DIVING display will return, the DIVE number will remain unchanged, and DIVE TIME will begin where it left off. After 10 minutes on the surface, subsequent dives are by definition repetitive. The DIVE counter displayed in the dive planning mode will progress to the next higher number if you make another dive after 10 minutes of surface interval time.

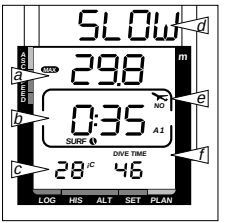


Figure 3.17
Surface Mode After a Dive, Display I
You have surfaced with a SLOW warning on [d] 35 minutes ago [b] from a 46 minute dive [f] that reached a maximum depth of 29.8m (98ft) [a]. The blinking airplane symbol [e] indicates that you should not fly. the temperature is 28°C (82°f) [c].

Dive Planning

You may, at any time on the surface, enter the DIVE PLANNING mode in the manner described in Section 3.2.2, by touching the ⏻PLAN and ⏲MODE/⏻PLAN contacts.
The **IQ-400** will take into account the residual nitrogen caused by your previous dives. The no-decompression times given for different depths will therefore be shorter than before your first dive (Fig. 3.6).

You may also read the time by touching the ⏲MODE and ⏲MODE/⏻PLAN contacts, as described in Section 3.2.3 (Fig. 3.7).

3.4.2 Flying After Diving

The no-flying time is shown in the center window next to the non-blinking airplane image. The blinking airplane is a reminder, when the alternative display showing surface time is on (Figures 3.17 and 3.18). Flying or traveling to a higher altitude should be avoided anytime the airplane symbol is displayed.

The no-flying time displayed by the **IQ-400** is always at least 12 hours or equivalent to the so-called desaturation time (if longer than 12 hours). When this time has elapsed, the residual nitrogen is no longer a factor for subsequent dives. At this time the **IQ-400** will automatically deactivate itself.

In the permanent ERROR mode the no-flying time displayed is 39 hours 59 minutes.

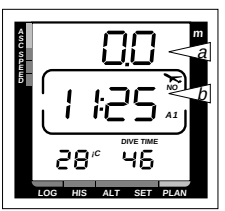


Figure 3.18
Surface Mode After a Dive, Display II
The desaturation time / no-flying time, indicated by a non-blinking airplane symbol, is 11hr, 25min [b]. The present depth is 0.0m (o ft) [a].

Flying or traveling to a higher altitude after a dive may significantly increase the risk of decompression sickness.

> ⚠ **WARNING** ⚠
> **YOU ARE ADVISED TO AVOID FLYING ANYTIME THE COMPUTER DISPLAYS THE DO NOT FLY WARNING - INDICATED BY AN AIRPLANE!**
> Further, the Divers Alert Network (DAN) advises as follows:
> • A minimum surface interval of 12 hours would be required in order to be reasonably assured a diver will remain symptom free upon ascent to altitude in a commercial jetliner (altitude up to 2400 m [8000 ft]).
> • Divers who plan to make daily, multiple dives for several days, or make dives that require decompression stops, should take special precautions and wait for an extended interval beyond 12 hours before flight.
> **TUSA** recommends that flying be avoided until both the DAN guidelines and the **IQ-400** wait to fly conditions are satisfied.

3.5 Personal Adjustment and High Altitude Dives

The **IQ-400** can be adjusted for increasing the conservatism of the mathematical model or for diving at altitude.

> ⚠ **WARNING** ⚠
> **SET THE CORRECT PERSONAL/ ALTITUDE ADJUSTMENT MODE!**
> When diving at altitudes greater than 700 m [2300 ft] the personal/ altitude adjustment feature must be correctly selected in order for the computer to calculate no-decompression status. The diver should also use this option to make the calculations more conservative, whenever it is believed that factors which tend to increase the possibility of decompression sickness exist. Failure to properly select the personal/ altitude adjustment mode correctly will result in erroneous data and can greatly increase the risk of decompression sickness.

⚠ **WARNING** ⚠

THE IQ-400 IS NOT INTENDED FOR USE AT ALTITUDES GREATER THAN 2400 m (8000 ft)!

Traveling to a higher elevation can temporarily cause a change in the equilibrium of dissolved nitrogen in the body with the surroundings. It is recommended that the diver allow the body conditions to stabilize over a period of at least three hours before beginning to dive at altitude.

Altitude Adjustability

When programming the **IQ-400** for the correct altitude, the diver needs to select the correct altitude mode according to Table 3.2. As a result the **IQ-400** adjusts its mathematical model according to the entered altitude, giving shorter no-decompression times at higher altitudes (Tables 6.1 and 6.2).

The entered personal/ altitude adjustment mode is indicated by A0, A1, or A2. Section 4.3, Personal/ Altitude Adjustment Setting describes how the altitude mode is adjusted.

Table 3.2 Altitude Ranges.

Altitude Mode	Altitude Range	
A0	0 – 700 m	[0 – 2300 ft]
A1	700 – 1500 m	[2300 – 5000 ft]
A2	1500 – 2400 m	[5000 – 8000 ft]

Personal Adjustability

The factors, which tend to increase the possibility of decompression sickness, include but are not limited to:

- cold exposure — water temperature less than 20 ˚C [68 ˚F]
- the diver is below average physical fitness level
- multiday or repetitive dive exposure
- diver fatigue
- dehydrated conditions
- previous history of decompression sickness

This feature should be used to adjust the computer to intentionally introduce a factor to make it more conservative according to personal preference by entering a higher altitude mode than required in table 3.2 (i.e. diving at sea level

with the personal/ altitude adjustment set at A1 or A2). The no-decompression limits are then shortened accordingly (Tables 6.1 and 6.2).

> ⚠ **WARNING** ⚠
> **DO NOT USE THIS INSTRUMENT TO CONDUCT DECOMPRESSION DIVES!**
> **TUSA** does not recommend this instrument to be used to conduct decompression dives. However, if through carelessness or emergency a diver is forced to exceed the no-decompression limits on a dive, the **IQ-400** will provide decompression information required for ascent. After this the **IQ-400** will continue to provide subsequent interval and repetitive dive information.

3.6 Error Conditions

The **IQ-400** is provided with warning indicators that advise the user to react to certain situations that would otherwise give rise to a significantly increased risk of decompression sickness if left unattended. If you do not respond to its warnings, it will enter a permanent ERROR MODE, indicating that the risk of decompression sickness has greatly increased. If you understand and operate the **IQ-400** sensibly, it is unlikely that you will ever put the **IQ-400** into the ERROR MODE.

The permanent ERROR MODE is shown by a non-blinking Er in the center display. Once in ERROR MODE, the **IQ-400** will continue to display current depth and dive time. You should immediately ascend to a depth of 3 to 6 m [10 to 20 ft] and remain at this depth until air supply limitations require you to surface. When the surface has been reached, no further diving or flying should take place for a minimum of two days.

Omitted Decompression

The most common ERROR MODE results from omitted decompression, when the diver stays above the ceiling for more than three minutes. During this three-minute period the Er warning will blink alternating with the CEILING/ASC TIME display. The **IQ-400** will continue to function normally, if the diver descends below the ceiling within three minutes.

After this the **IQ-400** will enter a permanent ERROR MODE. In the permanent ERROR MODE the **IQ-400** will not show no-decompression or ascent times. Only a permanent Er warning is shown in the center window. However, all the other displays will function as before, to provide information for ascent.

At the surface mode, the CEILING/ASC TIME symbol will blink in the center window and at the dive planning mode a permanent Er is shown instead of no-decompression times .

Extreme Ceiling Depth Or Decompression Range

When the ceiling descends to the depth of 10 m [30 ft] or when the ASCent TIME is longer than 63 minutes, the Er warning will start to blink in the center window. If the diver immediately ascends, the **IQ-400** will continue to function normally after the ceiling is back to below 10 m [30 ft] or the ASCent TIME is shorter than 63 minutes.

If the ceiling descends to the depth of 12 m [39 ft] even momentarily the **IQ-400** will enter the permanent ERROR MODE.

4. Menu Based Modes

The menu based functions include the logbook and history memories, the personal/ altitude adjustment setting, and the date and time setting. The menu based functions are activated using the water contacts. Keep your fingers on the MODE and MODE/PLAN contacts while the **IQ-400** scrolls through the menu (Fig. 4.1).

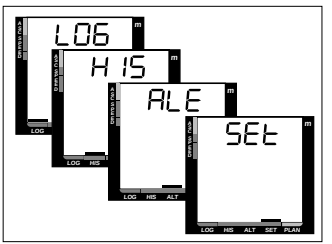


Figure 4.1 Menu
The IQ-400 will scroll through the above displays.

The desired mode is selected by breaking the finger contact when the desired mode appears on the display:

- LOG: Logbook Memory. The Logbook gives a summary of the nine most recent dives.
- HIS: Dive History Memory. The Dive History is a summary of all dives recorded by the **IQ-400**.
- Alt: Personal/ Altitude Adjustment setting
- Set: Date and Time Setting

When scrolling through the menu, a bar segment on the bottom of the display will indicate the scrolling sequence. Make sure that the contacts and the instrument itself are dry and clean before trying to use the menu based modes.

> ⚠ **NOTE** ⚠
>
> The menu based modes can be activated only when 10 minutes have elapsed after the dive.

All menu based modes can be deactivated by the RETURN command, i.e. by connecting all three contacts simultaneously, or by immersing the **IQ-400** in water.

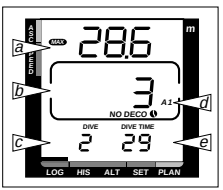


Figure 4.2
Logbook, Display I
The display will alternate between DISPLAYS II and III. The maximum depth [a] of the recent dive [c] was 28.6 m (94ft) and the total dive time 29 min [e]. The personal/altitude adjustment mode was set to A1 [d] and the minimum no-decompression time during the dive was 3 minutes [b].

4.1 Logbook Memory

The **IQ-400** has a sophisticated high capacity Logbook Memory. Dives shorter than one minute are not registered.

The logbook memory is activated by touching the MODE and MODE/PLAN contacts until LOG appears. It will give access to the nine most recent dives made.

The following information will be shown on three alternating displays (Fig. 4.2 - 4.5):

Display I, Main Display (Fig. 4.2):

- maximum depth (a)
- dive number (c)
- dive time (e)
- personal/ altitude adjustment setting (d)
- the minimum NO DEC TIME or maximum ASC TIME reached during the dive (b)
- SLOW if the diver has surfaced with this warning on
- downward pointing arrow if the ceiling was violated
- Er in the center window, if the ceiling was violated permanently (over 3 min) or if the 12 m [39 ft] ceiling was reached or if the ASC TIME was over 63 min.

DISPLAY II (Fig. 4.3):

- average depth (a)
- surface interval time before dive (b)
- temperature at the maximum depth (c)
- dive time

DISPLAY III (Fig. 4.4):

• dive entry time and date

The data of the most recent dive is shown first as DIVE 1 (the first dive in the memory). Preceding dives are recalled by touching the MODE and MODE/PLAN contacts. A brief touch of the contact will bring you to the previous dive (DIVE 2), continuous contact scrolls backwards through the dives (DIVE 3, ... DIVE 9, DIVE 1 again etc.). Only DISPLAY I is shown, while scrolling the dives. The desired dive is selected by breaking the contact when that dive appears on the display.

When new dives are added after nine dives, the oldest dives are deleted. The memory will always retain the nine most recent dives. The contents of the memory will remain even when the battery is changed (assuming that the replacement has been done according to the instructions).

> ⚠ **NOTE** ⚠
>
> The dive numbers shown in the dive planning mode do not match the ones shown in the logbook.

In the dive planning mode the dives are numbered according subsequent repetitive dives within a dive series, whereas in the logbook the dives are numbered according memory address.

> ⚠ **NOTE** ⚠
>
> The logbook contains test dives made in the factory. These dives will be deleted after you have performed nine dives.

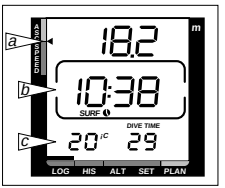


Figure 4.3
Logbook, Display II
The average depth of the dive was 18.2m (60ft) [a], surface interval time before the dive 10 hr 38 min [b] and temperature at the maximum depth 20°C (68°F) [c].

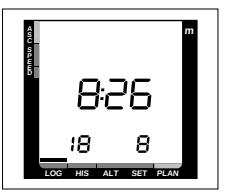


Figure 4.4
Logbook, Display III
The dive started on the 18th of August [8] at 8:26 (when set to imperial version, A for A.M. or P for P.M. are also shown in the upper left corner of the display).

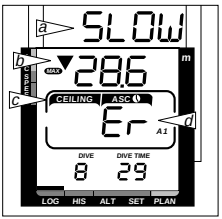


Figure 4.5 Violation Displays in the Logbook, Display I
Display I shows SLOW warning [a] for surfacing with the SLOW warning on, a downward pointing arrow for a violated ceiling [b], CEILING/ASC TIME symbol [c] for decompression dive. Er in the ASC TIME display [d] is shown, if the ceiling was violated over 3 min, or if the ceiling depth was over 12m (39ft) or if the ascent time was over 63 min.

4.2 Dive History Memory

The Dive History is activated by touching the MODE and MODE/PLAN contacts until HIS appears. This mode will show (Fig. 4.6):

- the maximum depth ever reached (a)
- the total number of dives (b)
- the total accumulated dive time in hours (c)

999 dives and 999 hours of diving can be registered. When these maximum values are reached, the counters will start again from 0.

> ⚠ **NOTE** ⚠
>
> The maximum depth will be zeroed, if the depth of 97.6 m [320 ft] is exceeded.

> ⚠ **NOTE** ⚠
>
> The dive and dive time counters in the History Memory contain some test dives made in the factory (e.g. DIVE 2, DIVE TIME 1 h). The maximum depth is, however, zeroed.

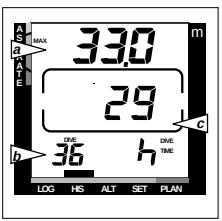


Figure 4.6 Dive History
The maximum depth ever reached is 33.0m (108ft) [a], the total accumulated dive time 29 hours [c], and the total number of dives 36 [b].

4.3 PERSONAL/ ALTITUDE ADJUSTMENT SETTING

The current personal/ altitude adjustment mode is shown when diving as well as on the surface display. If the mode is not correct (see Chapter 3.5), it is imperative that the diver enter the correct selection before diving.

The new personal/ altitude adjustment setting is entered in the following way. In these figures the contacts which are connected are shadowed.

1. Activate the personal/ altitude adjustment setting mode by connecting the ⏲MOD and ⏲MODE/⏻PLAN contacts continuously. Release your fingers immediately when Alt appears on the display. Within a couple of seconds the present personal/ altitude adjustment setting is shown (Fig. 4.7).

2. Connect the ⏻PLAN and ⏲MODE/⏻PLAN contacts until all three personal/ altitude adjustment modes appear. Release your fingers immediately at this point. The current mode is now blinking (Fig. 4.8). Wait at least two seconds but not more than four seconds before the next step.
3. Connect again the ⏻PLAN and ⏲MODE/⏻PLAN contacts until the blinking personal/ altitude adjustment mode starts to scroll. Release your fingers when the desired mode is blinking (Fig. 4.9). Wait at least two seconds but no more than four seconds before next step.
4. Connect the ⏲MODE and ⏲MODE/⏻PLAN contacts to confirm this new personal/ altitude adjustment mode (Fig. 4.10). The blinking will stop and the other mode indicators will disappear.
5. The process is ended by the RETURN command, i.e. by connecting all three contacts at the same time (Fig. 4.11). The **IQ-400** will return to the surface mode.

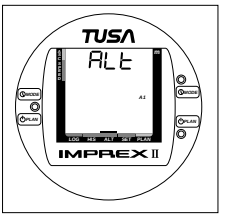


Figure 4.7
Personal / Altitude Adjustment Setting, Step 1
The current mode is A1.

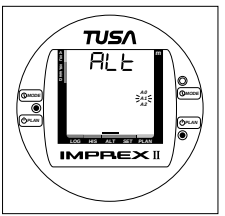


Figure 4.8
Personal / Altitude Adjustment Setting, Step 2
The current mode A1 is blinking. Lift your fingers.

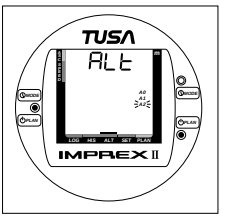


Figure 4.9
Personal / Altitude Adjustment Setting, Step 3
Release your fingers when the desired mode is blinking.

⚠ WARNING ⚠
ALWAYS RECHECK THE PERSONAL/ALTITUDE ADJUSTMENT SETTING TO ENSURE THAT IT IS NOT SET FOR AN ALTITUDE LESS THAN THAT OF THE DIVE SITE!

4.4 Setting Time and Date

The current date and time is read by connecting the MODE and MODE/PLAN contacts for about two second, as described in Section 3.2.3, "Calendar Clock Function".

Once the Time Setting mode is activated the principle when adjusting the clock is that:

- the ⏲MODE and ⏲MODE/⏻PLAN contacts scroll through the different displays.

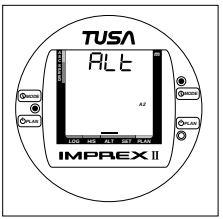


Figure 4.10
Personal / Altitude Adjustment Setting, Step 4
The desired mode A2 is confirmed by connecting the MODE and MODE/ PLAN contacts.

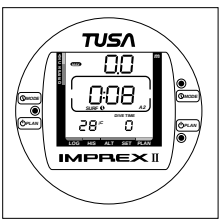


Figure 4.11
Personal / Altitude Adjustment Setting, Step 5
Return to the surface mode. Check that the selected mode A2 is displayed..

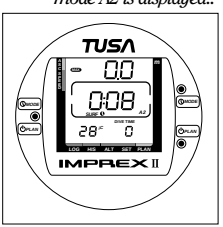


Figure 4.12 Time Setting
Ready to adjust the hour reading (blinking).

• the PLAN and MODE/ PLAN contacts change the values of the selected display.

In these figures the contacts which are connected are shadowed.

Thus, to correct the time, do as follows:

1. Activate the Time Setting mode by connecting the MODE and MODE/ PLAN contacts continuously to scroll through the menu. Release your fingers immediately when Set appears on the display. The Time Setting display will now be shown (Fig. 4.12).
2. The hour display starts to blink immediately (Fig. 4.12). If you want to change it, keep the PLAN and MODE/ PLAN contacts connected. The hours will start to scroll (Fig. 4.13). Release your fingers immediately when the correct value is displayed. [To change the A or P for a.m. or p.m. scroll the hours past 12:00].
3. To scroll through the minute, month and date, keep the MODE and MODE/ PLAN contacts connected. Release your fingers when the display you wish to change is blinking (Fig. 4.14). Repeat step 2 to change this value (Fig. 4.15).
4. Repeat steps 2 and 3 to change any additional values.

> ⚠ **NOTE** ⚠
>
> In case of the minutes and date, the change is made separately for both digits, as shown by the blinking digit. In case of the hours and month, the complete number is changed simultaneously.

5. Exit the Time Setting mode with the RETURN command, i.e. by connecting all three contacts at the same time. First make contact between the PLAN and MODE contacts and after that with the MODE/ PLAN contact.

> ⚠ **NOTE** ⚠
>
> The clock is on (time is elapsing) when setting it and exiting the Time Setting mode. It is not possible to reset the seconds.

Remember to regularly check that the clock is on time especially when traveling to different time zones, as the entry time of all dives is stored in the logbook memory.

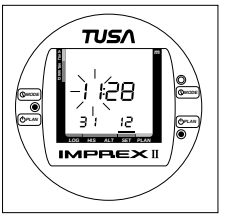


Figure 4.13 Time Setting *Adjusting the hour reading, ⏻ PLAN & ⏲ MODE/ ⏻ PLAN.*

5. Care and Maintenance

The TUSA **IQ-400** diving computer is a sophisticated precision instrument. Remember to treat it as such! It has been designed to withstand the rigors of scuba diving. It can be installed in a durable thermoplastic console boot and its display can be protected by a replaceable display shield.

The user should wash and rinse the unit in fresh water after every use. Protect it from shocks, extreme heat or direct sunlight and chemical attack. The **IQ-400** cannot withstand the impact of heavy objects like scuba cylinders, nor chemicals like acetone and alcohols (ethanol, isopropanol).

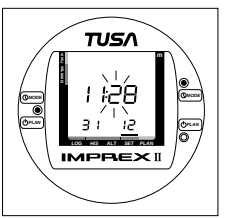


Figure 4.14 Time Setting *Scrolling through hours, minutes, month and date, ⏲ MODE & ⏲ MODE/ ⏻ PLAN.*

> ⚠ **NOTE** ⚠
>
> Keep the water contacts clean to assure correct operation of the I**Q-400**. Store the **IQ-400** in a dry place.

> ⚠ **NOTE** ⚠
>
> Frequently check the battery compartment for moisture through the transparent battery cover of the **IQ-400** especially after the battery replacement.

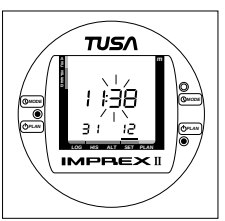


Figure 4.15 Time Setting *Adjusting the ten minute reading (blinking), ⏻ PLAN & ⏲ MODE/ ⏻ PLAN.*

The **IQ-400** should be serviced every two years or after 300 dives (whichever comes first) by an authorized dealer. This service will include a general operational check and battery replacement. The service requires special tools and training. Therefore, it is advisable to contact an authorized TUSA dealer for biennial service. Do not attempt to do any servicing that you are not trained for.

The **IQ-400** will display a battery symbol as a warning when the power gets too low. When this happens, the **IQ-400** should not be used until the battery has been replaced (see also chapter 3.2.1 /Battery warning).

5.1 Maintenance

If left without care for an extended period, a thin film (often invisible to the eye) will cover the unit. Much like the buildup on the glass of an aquarium, this film is the result of organic contaminates found in both salt and fresh water. Suntan oil,silicone spray and grease will speed up this process. As a result of this buildup, moisture will be trapped next to the contacts and will not allow your **IQ-400** to operate properly.

The water contacts can be cleaned with a soft pencil eraser.

IMPORTANT: The **IQ-400** should be soaked, then thoroughly rinsed with fresh water after each dive.

If the unit is mounted in a console boot, the entire console should be soaked in fresh water and then rinsed. Make sure that all salt crystals and sand particles have been flushed out of the console.

At the end of a dive trip, the **IQ-400** should be rinsed thoroughly and then dried with a soft towel. If the unit is mounted into a console boot, the computer unit will need to be removed from the console and cleaned before storage.

IMPORTANT: When removing the computer from the console, check the battery compartment for possible moisture or water. This is easily done through the transparent lid covering the compartment. DO NOT use the **IQ-400** if you detect any moisture or water inside.

⚠ CAUTION ⚠

USE BACK-UP INSTRUMENTS!

- do not use compressed air to blow water off the unit
- do not use solvents or other cleaning fluids that might cause damage
- do not test or use the **IQ-400** in pressurized air

5.2 Battery Compartment Inspection

Frequently check for leaks in the battery compartment. This is important especially after the battery has been replaced. If you find moisture inside the transparent battery compartment lid, there is a leak.

A leak must be corrected without delay, as moisture will seriously damage the computer, even beyond repair. TUSA does not take any responsibility for damage caused by moisture in the battery compartment, if the instructions of this manual are not carefully followed.

In case of a leak immediately bring the **IQ-400** to an authorized TUSA dealer/distributor.

6. Technical Description

6.1 Operating Principles

The TUSA **IQ-400** is a multi-functional sport diving instrument, which provides information on depths, times and decompression requirements. Its electronic microprocessor mathematically models the absorption and release of nitrogen during all phases of diving, including ascents, surface intervals and repetitive dives.

> ⚠ **WARNING** ⚠
>
> **DO NOT ATTEMPT TO USE THE IQ-400 WITHOUT FIRST READING THE ENTIRE OWNER'S MANUAL!**
>
> The IQ-400 must be activated before diving and operated correctly to provide accurate and correct information.

No-Decompression Limits

The no-decompression limits displayed by the **IQ-400** upon activation are for most dives to a single depth slightly more conservative than those permitted by the U.S. Navy tables, Tables 6.1-2.

Table 6.1 No-Decompression Time Limits (min) for Various Depths [m] for the First Dive of a Series.

Personal/ high altitude adjustment mode

Depth [m]	A0	A1	A2
9		153	104
12	125	89	66
15	71	57	42
18	52	39	30
21	37	29	23
24	29	24	19
27	22	18	15
30	18	14	12
33	13	11	9
36	11	9	8
39	9	7	6
42	7	6	5
45	6	5	5

Table 6.2 No-Decompression Time Limits (min) for Various Depths [ft] for the First Dive of a Series.

Personal/ high altitude adjustment mode

Depth [ft]	A0	A1	A2	U.S. Navy
30		149	102	
40	120	86	65	200
50	69	56	41	100
60	51	38	29	60
70	36	29	23	50
80	28	23	19	40
90	22	18	15	30
100	17	14	11	25
110	13	11	9	20
120	10	9	8	15
130	9	7	6	10
140	7	6	5	10
150	6	5	4	5

Unlike the U.S. Navy tables, the **IQ-400** interpolates between depths, giving a diver "credit" for time spent in shallower water, rather than calculating no-decompression limits based on the maximum depth of a dive. As a result, multi-level no-decompression dive times permitted by the **IQ-400** are often

longer than those that would be allowed by the U.S. Navy tables.

⚠ WARNING ⚠

THE USER SHOULD BE AWARE THAT ANY DIVE, INCLUDING ONES WITHIN THE U.S. NAVY TABLES OR IQ-400 LIMITS, DOES CARRY SOME RISK OF DECOMPRESSION SICKNESS.

Compartments and Half Times

When you dive with the **IQ-400**, it measures and displays depths and times as your dive progresses. It shows you available no-decompression time and possible decompression required based upon the following five factors:

1. your present depth,

2. excess nitrogen absorbed during earlier portions of the dive,

3. residual nitrogen remaining from previous dives,

4. the no-decompression limits that apply to that depth,

5. the personal/ altitude adjustment mode in use.

Back on the surface, the **IQ-400** will continue to calculate the no-decompression dive times available for various depths on the next dive. As the surface interval increases, so does the available dive time for the next dive.

To perform these calculations, the **IQ-400** continuously models the absorption and release of excess nitrogen from theoretical compartments. Each compartment absorbs and releases nitrogen at a different rate. The compartments that absorb and release nitrogen rapidly are believed to have a high tolerance for excess nitrogen, whereas compartments that absorb and release nitrogen more slowly are believed to be more sensitive.

The no-decompression limits in the U.S. Navy tables are based upon six theoretical compartments for single dives, and one compartment for surface intervals and repetitive dives. If you are familiar with table theory, you may know that they are characterized by half times (i.e. the time required for 50 % equilibration to a pressure change) ranging from 5 minutes to 120 minutes.

The **IQ-400** includes the same six compartments, and two additional compartments for an increased range of the mathematical model. The calculations are based on all eight compartments for all phases of diving, including surface intervals and repetitive dives. The **IQ-400**'s half times range from 2.5 to 320 minutes. The multi-level tissue calculations are based on modified Haldanean principle.

Altitude Diving

The atmospheric pressure is lower at high altitudes than at sea level. After traveling to a higher altitude, the diver will have additional nitrogen in his body, compared to the equilibrium situation at the original altitude. This "additional" nitrogen is released gradually in time and equilibrium is reached within a couple of days.

Before high altitude diving the **IQ-400** must be set to high altitude diving mode to take this into account. The maximum partial pressures of nitrogen allowed by the mathematical model of the **IQ-400** are reduced according to the lower ambient pressure. As a result the allowed no-decompression limits are considerably reduced.

Surface Intervals

The **IQ-400** requires a minimum surface interval of 10 minutes between dives. If a surface interval is shorter than 10 minutes, the **IQ-400** dive counter and dive timer treat the next dive as a continuation of the previous dive. It adds the dive times, and calculates no-decompression limits or decompression stops based on excess nitrogen absorbed on both dives. In this regard, it is similar to the U.S. Navy tables.

Depth Limits

> ⚠ **WARNING** ⚠
> **TUSA STRONGLY RECOMMENDS THAT SPORT DIVERS LIMIT THEIR MAXIMUM DEPTH TO 40 m [130 ft]!**

However, the **IQ-400** will calculate below that depth to provide a wide margin of flexibility if, through carelessness or emergency, you are forced to exceed this recommended depth limit for a dive.

6.2 Technical Specifications

Dimensions and weight (wrist model):

- Diameter: 61.5 mm [2.42 in]
- Depth: 29 mm [1.14 in]
- Weight: 105 g [0.23 lb]

Depth Gauge:

- Temperature compensated pressure sensor
- Salt water calibrated (in fresh water the readings are about 3% smaller)
- Depth display range: 0 to 90 m [295 ft]
- Accuracy: ± 1 % FS (0 to 60 m [200 ft] at 20°C [68°F])
- Resolution: 0.1 m [1 ft]

Temperature Display:

- Resolution: 1°C [1.5°F]
- Display range: - 20 ... +50°C [- 40 ... +122°F]
- Accuracy: ± 2°C [± 3.6°F] within 20 minutes of temperature change

Calendar Clock:

- Accuracy:± 2.5 s /24 h
- 24 h clock display [12 h display in imperial version]
- day and month

Other Displays:

- Dive time: 0 to 199 min (999 dive hours in the history memory)
- Surface time: 0 to 39 h 59 min
- Dive counter: 0 to 255 dives (999 dives in the history memory)
- No-decompression time: 0 to 199 min (- - after 199)
- Ascent time: 0 to 63 min (- -/Er after 63)
- Ceiling range: 3 to 9 m [10 to 30 ft]: blinking Er (ERROR) from 10 to 12 m [30 to 39 ft], after that permanent Er (ERROR) mode

Operating Conditions

- Normal altitude range: 0 to 2400 m [8000 ft] above sea level
- Operating temperature: 0 to 40°C [32°F to 104°F]
- Storage temperature: -20°C to +50°C [-4°F to +122°F]

It is, however, recommended that the unit be stored in a dry place at room temperature.

⚠ **NOTE** ⚠

Do not leave the **IQ-400** in direct sunlight!

Battery

- One 3.0 V lithium battery (Varta CR 1/2 AA), size 1/2 AA (ANSI) or 1/2 R6 (IEC), spare part number K5546 + O-ring 26.7 mm x 1.78 mm 70 ShA, spare part number K5508
- Battery life: typically more than 3000 hours (at 20˚C [68˚F])

7. WARRANTY

⚠ **NOTE** ⚠

The warranty arrangements are different in different countries. Information is contained in the **IQ-400** packaging regarding the warranty benefits and requirements applicable to your purchase.

The TUSA **IQ-400** is warranted against defects in workmanship and materials for a period of two years after purchase to the original owner subject to and in accordance with the terms and conditions set forth below:

This warranty does not cover damage to the product resulting from improper usage, improper maintenance, neglect of care, alteration or unauthorized repair. This warranty will automatically become void if proper preventive maintenance procedures have not been followed as outlined in the use and care instructions for this product.

If a claim under this or any other warranty appears to be necessary, return the product, freight prepaid, to your TUSA Dealer or qualified repair facility. Include your name and address, proof of purchase and/or service registration card, as required in your country. The claim will be honored and the product repaired or replaced at no charge and returned in what your TUSA Dealer determines a reasonable amount of time, provided all necessary parts are in stock. All repairs made, not covered under the terms of this warranty, will be made at the owner's expense. This warranty is non-transferable from the original owner.

All implied warranties, including but not limited to the implied warranties of merchantability and fitness for a particular purpose, are limited from date of

purchase and in scope to the warranties expressed herein. TUSA shall not be liable for loss of use of the product or other incidental or consequential costs, expenses or damage incurred by the purchase. All warranties not stated herein are expressly disclaimed.

Some states do not allow the exclusion or limitation of implied warranties of consequential damages, so the above exclusions or limitations may not apply to you. This warranty gives you specific legal rights, and you may also have other rights that vary from state to state.

This warranty does not cover any representation or warranty made by dealers or representatives beyond the provisions of this warranty. No dealer or representation is authorized to make any modifications to this warranty or to make any additional warranty.

This Instruction Manual should be kept with your **IQ-400**.

8. GLOSSARY

Altitude dive — A dive made at an elevation above 700 m [2300 ft] above sea-level.

Ascent rate — The speed at which the diver ascends toward the surface.

ASC RATE — Abbreviation for ascent rate.

Ascent time — The minimum amount of time needed to reach the surface in a decompression dive.

ASC TIME — Abbreviation for ascent time.

Ceiling — On a decompression dive the shallowest depth to which a diver may ascend based on computer nitrogen load.

Ceiling Zone — On a decompression dive the zone between the ceiling and the ceiling plus 1.8 m [6 ft]. This depth range is displayed with the two arrows pointing toward each other (the "hourglass" icon).

Compartment — See "Tissue group".

DCS — Abbreviation for decompression sickness.

Decompression — Time spent at a decompression stop or range before surfacing, to allow absorbed nitrogen to escape naturally from tissues.

Decompression sickness	Any of a variety of maladies resulting either primarily or secondary from the formation of nitrogen bubbles in tissues or body fluids, as a result of inadequately controlled decompression. Commonly called "bends" or "DCS".
Dive series	A group of repetitive dives between which the **IQ-400** indicates some nitrogen loading is present. When nitrogen loading reaches zero the **IQ-400** deactivates.
Dive time	Elapsed time between leaving the surface to descend, and returning to the surface at the end of a dive.
Half-time	After a change in ambient pressure, the amount of time required for the partial pressure of nitrogen in a theoretical compartment to go half-way from its previous value to saturation at the new ambient pressure.
Multi-level dive	A single or repetitive dive that includes time spent at various depths and whose no-decompression limits are not determined solely by the maximum depth attained.
No-decompression time	The maximum amount of time a diver may remain at a particular depth without having to make decompression stops or remain below a ceiling during the subsequent ascent.
No-decompression dive	Any dive which permits a direct, uninterrupted ascent to the surface at any time.
NO DEC TIME	Abbreviation for no-decompression time limit.
Repetitive dive	Any dive whose no-decompression time limits are affected by residual nitrogen absorbed during previous dives.
Residual nitrogen	The amount of excess nitrogen remaining in a diver after one or more dives.
SURF TIME	Abbreviation for surface interval time.
Surface interval time	Elapsed time between surfacing from a dive and beginning a descent for the subsequent repetitive dive.
Tissue group	Theoretical concept used to model bodily tissues for the construction of decompression tables or calculations.

Service Record — Retain with IQ-400

Date Purchase_____

IQ-400 Serial Number _____

Where Purchased _____

City _____

State _____

Name_____

Address _____

City _____

State, ZIP _____

Other_____

Insp. Date _____ Dealer Name_____

Insp. Date _____ Dealer Name_____

Insp. Date _____ Dealer Name_____

Insp. Date _____ Dealer Name_____

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T.E.C. (TABATA EUROPE CORPORATION) B.V.
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TEL: 20-681-5955 / FAX: 20-682-4527

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Balser Strabe 1579639 Grenzach-Wyhlen F.R. GERMANY
TEL: 07621-669466 / FAX: 07621-669431

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