

## Function

The SYCON 2702, based on the SYCON series, is an online analyser for the automatic determination of water parameters using the colorimetric titration method. Adding an indicator to the water sample produces a colour reaction. Depending on the indicator used, the device evaluates the intensity of the colour. The SYCON 2702 calculates the concentration of the water constituent based on the colour change of the sample during the addition of the indicator. The device can only determine one parameter at a time. The parameter and measuring range are determined by the indicator used.

## General specifications

| Parameters                                              | Value / Range                                                                                                                            |                            |
|---------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|
| Power                                                   | (230 VAC version)                                                                                                                        | 100 - 240 VAC (50/60 Hz)   |
|                                                         | (24 V AC/DC version)                                                                                                                     | 21.6 - 26.4 V AC/DC (50Hz) |
| Power consumption                                       | 25 VA (maximum)<br>8 VA (measurement mode)<br>3.5 VA (standby)                                                                           |                            |
| Load capacity                                           | Load capacity of relays with internal power supply 1 A from terminals 5 to 8<br>Load capacity of relays with external power supply 2.5 A |                            |
| Protection                                              | Open wall mounting                                                                                                                       | IP43                       |
|                                                         | Mounting in housing                                                                                                                      | IP54                       |
| Storage temperature                                     | 0 °C - 45 °C                                                                                                                             |                            |
| Ambient temperature                                     | 10 °C - 45 °C                                                                                                                            |                            |
| Measured water temperature                              | 5 °C - 40 °C                                                                                                                             |                            |
| Air humidity                                            | 20 - 90 % RH<br>(without ice or condensation)                                                                                            |                            |
| Inlet water pressure                                    | min: 0.5 bar - max: 5 bar - recommended 1 - 2 bar                                                                                        |                            |
| Inlet water in general                                  | Clear, colourless, free of solids, without gas bubbles                                                                                   |                            |
| Water quality requirements for measuring water hardness | pH:                                                                                                                                      | 4 - 10                     |
|                                                         | Iron:                                                                                                                                    | < 3 ppm                    |
|                                                         | Copper:                                                                                                                                  | < 0.2 ppm                  |
|                                                         | Aluminium:                                                                                                                               | < 0.1 ppm                  |
|                                                         | Manganese:                                                                                                                               | < 0.2 ppm                  |
|                                                         | Acid capacity:                                                                                                                           | KS 4.3 < 5 mmol/l          |



### Note on oxidising agents:

Oxidising agents such as calcium hypochlorite, chlorine, chlorine dioxide, sodium hypochlorite or ozone above the limits permitted in "TrinkwV 2012" attack the dye contained in the indicator and interfere with the measurement. An accurate determination of the water hardness is therefore no longer guaranteed. An activated carbon filter upstream of the analysis device can remove these oxidising agents from the sample water, enabling the water hardness to be determined correctly.

The capacity of an activated carbon filter is depleted during operation. The activated carbon filter must therefore be replaced at regular intervals. The effectiveness of the activated carbon filter can be checked using Caldur® test kits.



# SYCON 2702 in detail

## Technical data

| Parameter    | Value / Range                                   |
|--------------|-------------------------------------------------|
| Installation | Wall mounting in closed rooms                   |
| Dimensions   | Without housing: 274 x 275 x 129 mm (W x H x D) |
|              | With housing: 332 x 345 x 190 mm (W x H x D)    |
| Weight       | Without housing: approx. 1.9 kg                 |
|              | With housing: approx. 3.8 kg                    |

## Analysis characteristics

| Parameters                                                                                                                                                                                                                                                                                         | Value / Range                                                                                                                                                                                                                                                           |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Measurement method                                                                                                                                                                                                                                                                                 | Titration with colour change                                                                                                                                                                                                                                            |
| Measuring ranges                                                                                                                                                                                                                                                                                   | Total hardness                                                                                                                                                                                                                                                          |
|                                                                                                                                                                                                                                                                                                    | Carbonate hardness / alkalinity                                                                                                                                                                                                                                         |
|                                                                                                                                                                                                                                                                                                    | °dH 0.012 - 30 0.3 - 22.5                                                                                                                                                                                                                                               |
|                                                                                                                                                                                                                                                                                                    | °f 0.021 - 53.6 0.5 - 40.2                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                    | ppm CaCO <sub>3</sub> 0.21 - 535.7 5.4 - 401.8                                                                                                                                                                                                                          |
|                                                                                                                                                                                                                                                                                                    | mmol/l 0.0021 - 5.36 0.11 - 8.04                                                                                                                                                                                                                                        |
|                                                                                                                                                                                                                                                                                                    | °e 0.015 - 38.6 0.39 - 28.9                                                                                                                                                                                                                                             |
|                                                                                                                                                                                                                                                                                                    | °Ж 0.0043 - 10.7 0.21 - 16.1                                                                                                                                                                                                                                            |
| The measuring range is defined by the indicator used. The entire measuring range of the total hardness is achieved by using different indicators. <i>(The following units are available for the analysis value: °dH, °f, ppm CaCO<sub>3</sub>, mmol/l, °e, °Ж these are shown on the display).</i> |                                                                                                                                                                                                                                                                         |
| Accuracy                                                                                                                                                                                                                                                                                           | Measurement accuracy:                                                                                                                                                                                                                                                   |
|                                                                                                                                                                                                                                                                                                    | ± 5% of the maximum measured value of the indicator used                                                                                                                                                                                                                |
|                                                                                                                                                                                                                                                                                                    | Repeatability:                                                                                                                                                                                                                                                          |
|                                                                                                                                                                                                                                                                                                    | ± 2.5% of the maximum measured value of the indicator used                                                                                                                                                                                                              |
| Current interface                                                                                                                                                                                                                                                                                  | Please note:                                                                                                                                                                                                                                                            |
|                                                                                                                                                                                                                                                                                                    | Depending on the ingredients in the water, shifts in the measured value may occur, which affect the measurement accuracy. In such cases, we recommend performing a hardness measurement by manual titration and calibrating the analysis device to this measured value. |
|                                                                                                                                                                                                                                                                                                    | ± 0.3 mA                                                                                                                                                                                                                                                                |
|                                                                                                                                                                                                                                                                                                    | Approx. 0.05 - 0.5 ml / analysis, depending on the measured water hardness                                                                                                                                                                                              |
| Indicator consumption                                                                                                                                                                                                                                                                              | Approx. 3 min, depending on the water hardness and the set rinsing time                                                                                                                                                                                                 |
| Measuring time                                                                                                                                                                                                                                                                                     | Approx. 10,000 analyses / 500 ml indicator for soft water. Consumption depends on the measured water hardness and the indicator used.                                                                                                                                   |
| Number of analyses                                                                                                                                                                                                                                                                                 | At least 2 years if stored properly (below 25 °C, in a dark place)                                                                                                                                                                                                      |
| Shelf life of indicators                                                                                                                                                                                                                                                                           | Approx. 1 l/analysis at 2 bar. Water consumption varies depending on the inlet pressure and the set rinsing time.                                                                                                                                                       |
| Water consumption                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                         |

## Inputs/outputs

| Parameter       | Value / Range                               |
|-----------------|---------------------------------------------|
| 2 relay outputs | max. 250 VAC / VDC; max 1 A                 |
|                 | (Further information can be found at 1 )    |
|                 | as potential-free outputs NC/NO             |
|                 | The relays provide the following functions: |
| Signal input    | • Limit value alarm                         |
|                 | • Device error                              |
|                 | Galvanically isolated contact input         |
|                 | • Start analysis                            |
| Analogue output | • Flow monitor                              |
|                 | • Interval reset                            |
|                 | 0 - 20 mA / 4 - 20 mA                       |
|                 | Resolution: < 100 µA                        |
|                 | Max. load: 750 Ω                            |



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## Maintenance intervals

| Interval                                            | Maintenance                                                                                                                                                                                                                       |
|-----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Every 6 months                                      | Cleaning the measuring chamber                                                                                                                                                                                                    |
|                                                     |  At high ambient and water temperatures or with water containing high levels of organic matter, the cleaning intervals may need to be shortened. |
| Every 30,000 analyses or after 2 years of operation | Cleaning the measuring chamber (as above),<br>Installation of maintenance kit: Replacement of the peristaltic pump cartridge and seals                                                                                            |

## Indicators for monitoring total hardness

| Designation<br>Indicator | °dH            | Measuring ranges      |                 | Item<br>500 ml bottle | Item<br>4 x 500 ml<br>bottles |
|--------------------------|----------------|-----------------------|-----------------|-----------------------|-------------------------------|
|                          |                | ppm CaCO <sub>3</sub> | °f              |                       |                               |
| H25-0.02                 | 0.012 ... 0.12 | 0.21 ... 2.14         | 0.021 ... 0.214 | 32-084                | 32-484                        |
| H25-0.05                 | 0.02           | 0.36 ... 3.57         | 0.036 ... 0.357 | 32-084                | 32-484 125                    |
| H25-0.1                  | 0.03 ... 0.3   | 0.54 ... 5.36         | 0.054 ... 0.536 | 32-084                | 32-484 135                    |
| H25-0.2                  | 0.06 ... 0.6   | 1.1 ... 10.7          | 0.11 ... 1.07   | 32-084 145            | 32-484 145                    |
| H25-0.3                  | 0.09 ... 0.9   | 1.6                   | 0.16 ... 1.61   | 32-084 155            | 32-484 155                    |
| H25-0.5                  | 0.15 ... 1.5   | 2.7                   | 0.27 ... 2.68   | 32-084                | 32-484 165                    |
| H25-1                    | 0.3 ... 3.0    | 5.4                   | 0.54 ... 5.36   | 32-084                | 32-484 175                    |
| H25-2                    | 0.6 ... 6.0    | 10.7 ... 107.1        | 1.1 ... 10.7    | 32-084                | 32-484 185                    |
| H25-3                    | 0.9 ... 9.0    | 16.1 ... 160.7        | 1.6 ... 16.1    | 32-084 195            | 32-484 195                    |
| H25-5                    | 1.5 ... 15     | 26.8 ... 267.9        | 2.7 ... 26.8    | 32-084                | 32-484 205                    |
| H25-10                   | 3              | 53.6 ... 535.7        | 5.4 ... 53.6    | 32-084 215            | 32-484 215                    |

(The following units are available for the analysis value: °dH, °f, ppm CaCO<sub>3</sub>, mmol/l, °e, °Ж these are shown on the display)

## Indicators for monitoring carbonate hardness / alkalinity

| Design<br>Indicator | °dH          | Measuring ranges |              | Item<br>500 ml bottle | Item<br>4 x 500 ml<br>bottles |
|---------------------|--------------|------------------|--------------|-----------------------|-------------------------------|
|                     |              | mmol/l           | °f           |                       |                               |
| C25-1               | 0.3 ... 7.5  | 0.11 ... 2.68    | 0.5          | 32-086 125            | 32-486 125                    |
| C25-1.5             | 0.5 ... 11.5 | 0.16 ... 4.11    | 0.8          | 32-086 135            | 32-486 135                    |
| C25-2               | 0.6 ... 15.0 | 0.21 ... 5.36    | 1.1 ... 26.8 | 32-086                | 32-486 145                    |
| C25-3               | 0.9 ... 22.5 | 0.32 ... 8.04    | 1.6 ... 40.2 | 32-086 155            | 32-486 155                    |

(The following units are available for the analysis value: °dH, °f, ppm CaCO<sub>3</sub>, mmol/l, °e, °Ж these are shown on the display).



The measured value to be monitored should be as close as possible to the middle of the indicator's measuring range.

One bottle of indicator is sufficient for approx. 10,000 analyses if the measuring point is in the lower range of the indicator type used.

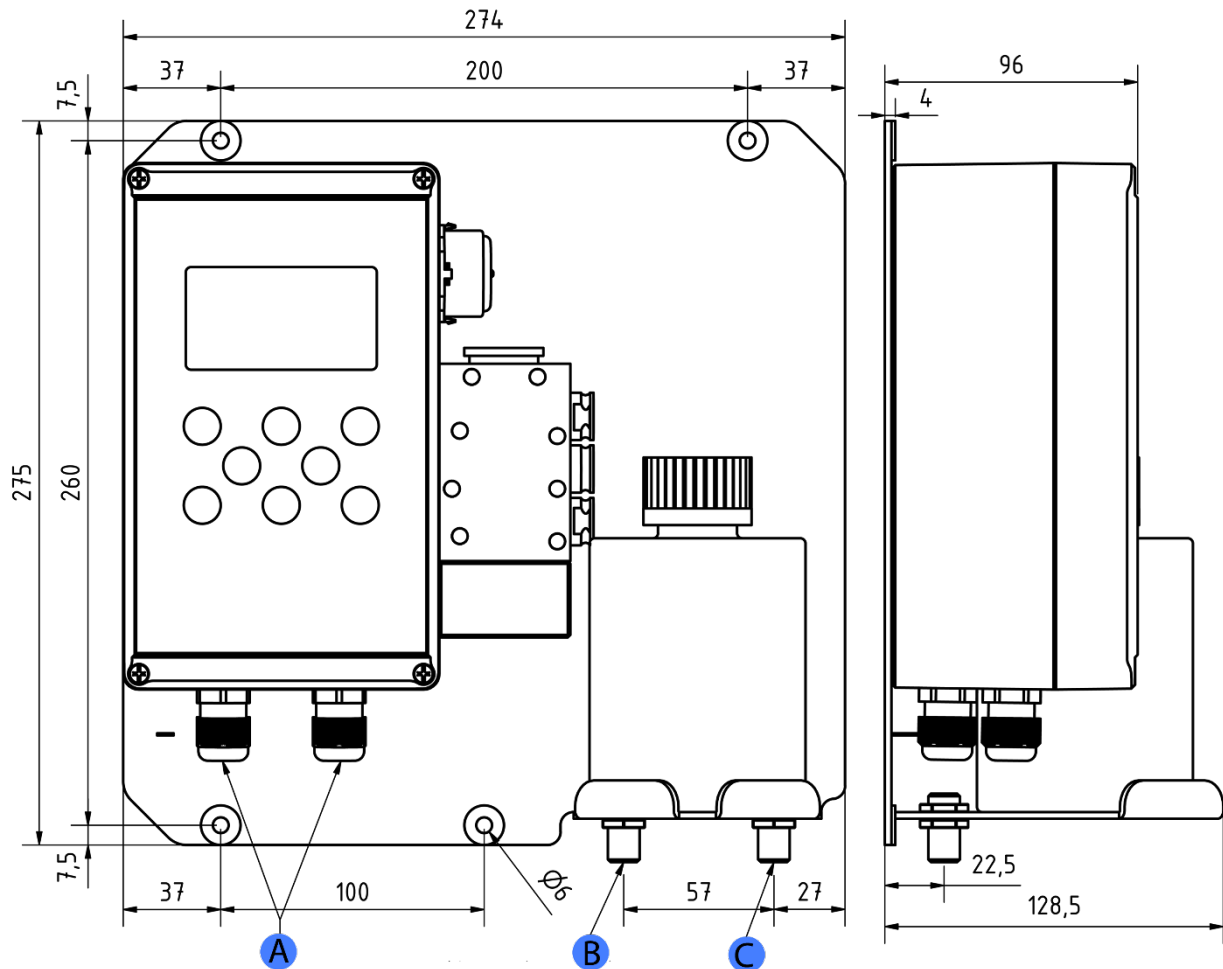
The exact number of analyses possible with one indicator bottle depends on the respective degree of hardness and the indicator used.



## SYCON 2702 in detail

### Drawing of wall bracket

The SYCON 2702 must be installed upright. The wall bracket has four 6 mm holes for mounting the analyser.



1 : Drilling plan for mounting the analysis device without housing

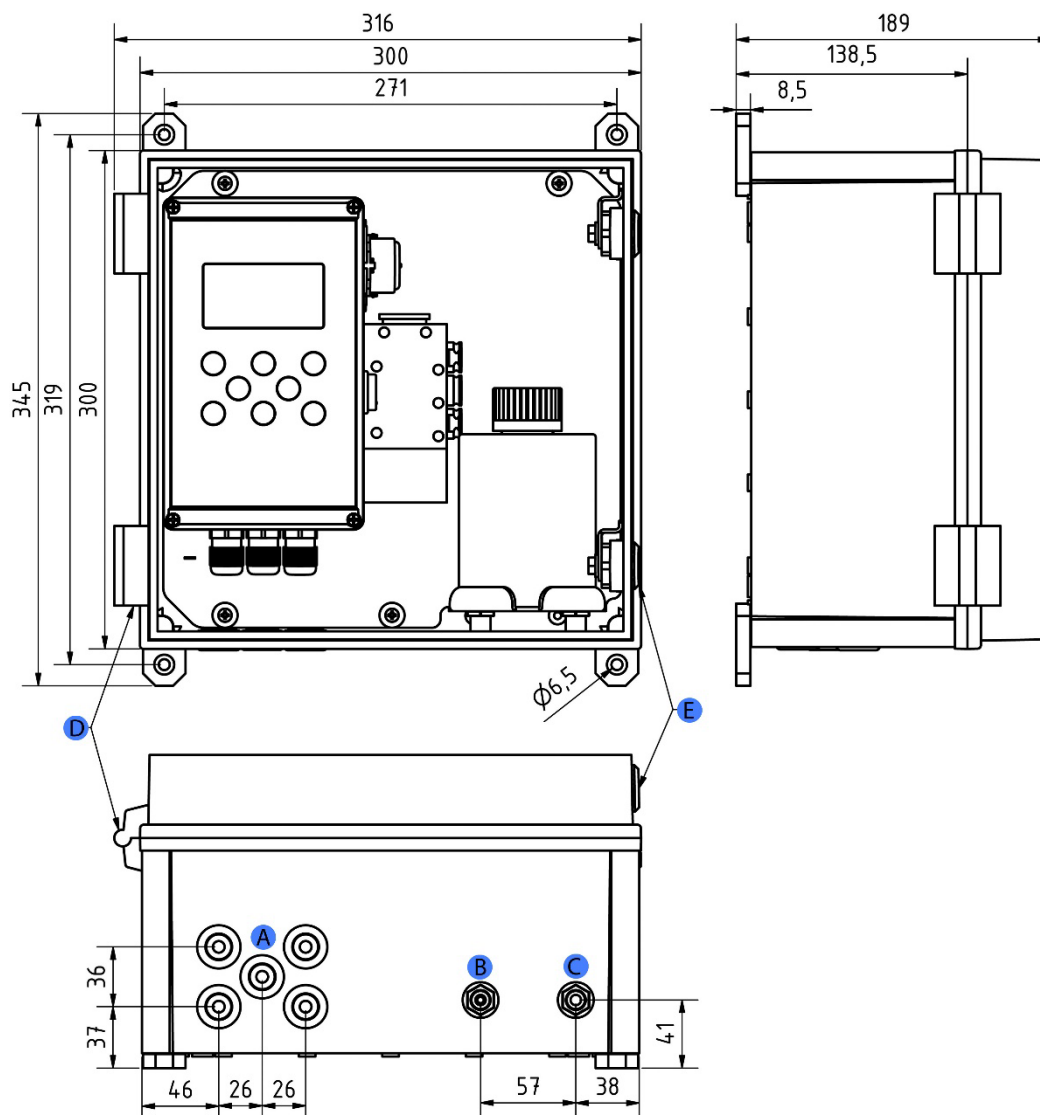
| Position | Description                                                |
|----------|------------------------------------------------------------|
| A        | Cable glands for electrical connection                     |
| B        | Water inlet connection for hose with 6 mm outer diameter   |
| C        | Water drain - connection for hose with 6 mm outer diameter |

## SYCON 2702 in detail

### Housing drawing

The analyser is optionally supplied with a suitable housing. The package includes 4 mounting brackets with 6.5 mm holes, which are attached to the rear of the housing.

To open the device, the available space should be at least 450 x 350 mm (W x H).



2 : Drilling plan for mounting the analyser in the housing

| Position | Description                                              |
|----------|----------------------------------------------------------|
| A        | Cable glands for electrical connection                   |
| B        | Water inlet connection for hose with 6 mm outer diameter |
| C        | Water drain connection for hose with 6 mm outer diameter |
| D        | Door hinge                                               |
| E        | Door locks                                               |

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