DIT-M, DIT-L, DIT-IR

Photometer for water analysis

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Table of contents

1. General data

DIT-M photometer

TM04 8186 4010

Fig. 1 DIT-M photometer

The DIT photometer is a measuring device combining the mobility of a portable photometer with the characteristics of a laboratory photometer. The high level of accuracy of the Grundfos reagents and the user-friendly nature of the photometer guarantee rapid and reliable analysis of up to 14 parameters in water treatment applications.

DIT-M operates with six interference filters and uses six long-life LEDs as a light source. No moving parts are involved. Measurement takes place in a transparent measurement chamber. Tablet reagents with a durability of up to 5 or 10 years are used.

User calibration is made via software, so the photometer can be used as testing aid.

DIT-M can save up to 1000 data sets. An infrared interface permits the transfer of measured data to a computer or a printer (RS-232) via the optional infrared interface module DIT-IR.

Application

Measuring amplifiers and measuring systems, such as Conex DIA or DIP, can be calibrated with the DIT-M photometer. Fields of application:

- drinking water treatment
- swimming pool and bathing water treatment
- industrial water treatment.

Scope of delivery

- 1 photometer in a plastic case
- 4 batteries (AA/LR6)
- 1 manual (installation and operating instructions)
- 1 Certificate of Compliance
- 3 round vials with cap and gasket, ∅24 mm
- 1 cleaning brush
- 1 plastic stirring rod
- 1 plastic syringe, 5 ml.

DIT-L photometer

TM04 8187 4010

Fig. 2 DIT-L photometer

The DIT-L compact photometer is designed for quick determination of the concentration of chlorine, chlorine dioxide or ozone as well as the pH in water.
High operating convenience, ergonomic design, compact dimensions and safe handling make this device indispensable for water analysis.

DIT-L operates with two interference filters and uses two long-life LEDs as a light source. No moving parts are involved. Measurement takes place in a transparent measurement chamber. Tablet reagents with a durability of up to 5 or 10 years are used.

User calibration is made via software, so the photometer can be used as testing aid.

DIT-L has an internal ring memory for 16 data sets. An infrared interface permits the transfer of measured data to a computer or a printer (RS-232) via the optional infrared interface module DIT-IR.

Application

Measuring amplifiers and measuring systems, such as Conex DIA or DIP, can be calibrated with the DIT-L photometer. Fields of application:

- drinking water treatment
- swimming pool and bathing water treatment.

Scope of delivery

- 1 photometer in a plastic case
- 4 batteries (AAA/LR03)
- 1 manual (installation and operating instructions)
- 1 Certificate of Compliance
- 3 round vials with cap and gasket, ∅24 mm
- 1 cleaning brush
- 1 plastic stirring rod
- 1 Starter kit (100 tablets each: DPD No. 1, DPD No. 3, Glycine, Phenolred Photometer).

DIT-IR infrared interface module

TM04 8188 4010

Fig. 3 DIT-IR interface module

The data measured by a DIT-M or a DIT-L photometer can be transmitted via infrared to the DIT-IR interface module. A serial printer or a PC with USB port can be connected, according to the user's choice. A CD-ROM with data logging software is supplied to provide easy data transfer to a PC.

Scope of delivery

- 1 DIT-IR in a plastic case
- 4 batteries (AA/LR6)
- 1 USB cable
- 1 screwdriver with clip
- 1 manual (installation and operating instructions)
- 1 Certificate of Compliance
- CD-ROM.

2. Functions

Photometric measuring principle

When adding specific reagents to a water sample, the sample takes on a degree of coloration proportional to the substance being analysed.

A LED emits a light beam with the wavelength (colour) needed for analysing the substance. The sample absorbs a part of this light beam, in proportion to the concentration of the substance being analysed.
The photosensor measures the remaining light quantity. The photometer calculates the corresponding concentration of the substance in the sample accordingly.

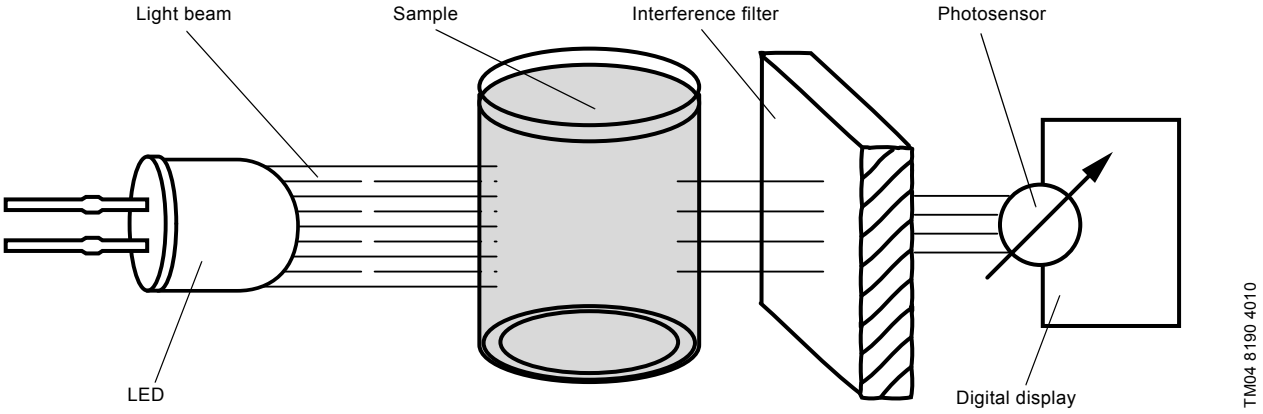


Fig. 4 Photometric measuring principle

DIT-M photometer

Language options

The DIT-M photometer is extremely easy to handle thanks to the multilingual plain-text operator prompting. The user can select the languages English, German, French, Spanish, Italian, Portuguese, or Polish.

Operation mode

Two operation modes can be selected:

- In normal mode, all steps of the analysis are displayed in detail with hints and notes for the untrained user.
- The expert mode for the proficient user shows short text in order to save time.

User method list

When switched on as delivered, the photometer displays a scroll list of all available methods. The user can adapt this method list to his own requirements. This permits quick access to favoured methods.

Zero setting

Zero setting is saved until the photometer is switched off. If several analyses are made with the same water sample and identical conditions, it is not necessary to carry out zero setting before every single analysis. Zero setting can be carried out at any time.

Automatic switch-off

The photometer switches off automatically 20 minutes after a key was last pressed. In the last 30 seconds before switching off, an acoustic alarm is emitted. During that time, switching off can be prevented by pressing a key.

As long as the photometer is working (e.g. during countdown), the automatic switch-off is inactive. When the photometer has finished working, the 20 minutes waiting period for automatic switch-off starts again.

Data transfer to a PC

The DIT-IR module is available as an option for the transfer of present or saved data to a PC.

DIT-L photometer

Operating language

The operator prompting of the DIT-L photometer is language-independent.

Scroll memory

The sequence of the different methods is predetermined. When the photometer is switched on, the method which was last selected before switch-off is displayed automatically. This permits quick access to favoured methods.

Countdown function

For methods including a reaction period, a countdown function can be activated.

Zero setting

Zero setting is saved until the photometer is switched off. If several analyses are made with the same water sample and identical conditions, it is not necessary to carry out zero setting before every single analysis. Zero setting can be carried out at any time.

Automatic switch-off

The photometer switches off automatically ten minutes after a key was last pressed. As long as the photometer is working (e.g. during countdown), the automatic switch-off is inactive.

Data transfer to a PC

The DIT-IR module is available as an option for the transfer of present or saved data to a PC.

DIT-IR infrared interface module

The DIT-IR infrared interface module receives measured data from a DIT-M or DIT-L photometer and transfers them to one of two interfaces:

- USB
- RS-232 (serial). All ASCII printers with a serial interface can be used.

Both interfaces can be connected when switching on the DIT-IR module. The user can switch from one interface to the other using the "Select" key. A LED indicates the availability of the selected interface. When switched on, DIT-IR activates the last selected interface.

3. Technical data

DIT-M photometer

General technical data

Display	Graphical display
Optics	6 LEDs, interference filters (IP), photosensor, transparent measurement chamber. Wavelength ranges: λ1 = 530 nm (IF Δλ = 5 nm) λ2 = 560 nm (IF Δλ = 5 nm) λ3 = 610 nm (IF Δλ = 6 nm) λ4 = 430 nm (IF Δλ = 5 nm) λ5 = 580 nm (IF Δλ = 5 nm) λ6 = 660 nm (IF Δλ = 5 nm)
Wavelength accuracy	± 1 nm
Photometric accuracy	2 % FS (Full Scale,T = 20-25 °C), measured with standard solutions
Photometric resolution	0.005 A
Operation	Acid and solvent-resistant touch-sensitive keypad with acoustic signal
Power supply	4 batteries (AA/LR6); battery life: approx. 3500 tests
Auto Off	20 min. after last function, 30 seconds before an acoustic signal is emitted
Storage capacity	Approx. 1000 data sets
Interface	Data transfer via DIT-IR infrared interface module
Time	Real-time clock and date
Calibration	Factory and user calibration. Reset to factory calibration is possible.
Dimensions	Approx. 210 x 95 x 45 mm (L x W x H)
Dimensions (packed)	440 x 305 x 145 mm (L x W x H)
Weight (photometer)	Approx. 450 g (batteries included)
Weight (packed)	2220 g
Operating conditions	5-40 °C, relative humidity: 0-90 % (non-condensing)
Permissible storage temperature	-20 to +70 °C
Language options	English, German, French, Spanish, Italian, Portuguese, Polish
Protection class	IP67

Measured parameters

Parameter	Measuring range
Aluminium	0.01 - 0.3 mg/l
Bromine	0.05 - 13 mg/l
Chlorine	0.01 - 6 mg/l
Chlorine dioxide	0.02 - 11 mg/l
Chlorine dioxide analysis	0.01 - 6 mg/l
Chloride	0.5 - 25 mg/l
Chlorite	0.01 - 6 mg/l
Cyanuric acid	2 - 160 mg/l
Iron	0.02 - 1 mg/l
Fluoride	0.05 - 2 mg/l
Manganese	0.02 - 4 mg/l
Ozone	0.02 - 2 mg/l
Phosphate	0.05 - 4 mg/l
Hydrogen peroxide	0.03 - 3 mg/l
pH value	6.5 - 8.4 (phenol red)
Acid demand KS 4.3	0.1 - 4 mmol/l

To ensure the specified accuracy of the photometer, always use the reagent systems supplied by Grundfos.

DIT-L photometer

General technical data

Display	LCD, backlit when a key is pressed
Optics	2 LEDs, interference filters (IP), photosensor, transparent measurement chamber. Wavelength ranges: λ1 = 530 nm (IF Δλ = 5 nm) λ2 = 560 nm (IF Δλ = 5 nm)
Wavelength accuracy	± 1 nm
Photometric accuracy	3 % FS (Full scale, T = 20-25 °C), measured with standard solutions
Photometric resolution	0.01 A
Operation	Acid and solvent-resistant touch-sensitive keypad
Power supply	4 batteries (AAA/LR03); battery life: approx. 5000 tests
Auto Off	10 min. after last function
Storage capacity	Approx. 16 data sets
Interface	Data transfer via DIT-IR infrared interface module
Time	Real-time clock and date
Calibration	Factory and user calibration. Reset to factory calibration is possible.
Dimensions	Approx. 155 x 75 x 35 mm (L x W x H)
Dimensions (packed)	155 x 75 x 35 mm (L x W x H)
Weight (photometer)	Approx. 260 g (batteries included)
Weight (packed)	1860 g
Operating conditions	5-40 °C, relative humidity: 30-90 % (non-condensing)
Permissible storage temperature	-20 to +70 °C
Protection class	IP67

Measured parameters

Parameter	Measuring range
Chlorine	0.01 - 6 mg/l
Chlorine dioxide	0.02 - 11 mg/l
Chlorine dioxide analysis	0.01 - 6 mg/l
Chlorite	0.01 - 6 mg/l
Ozone	0.02 - 2 mg/l
pH value	6.5 - 8.4 pH

To ensure the specified accuracy of the photometer, always use the reagent systems supplied by Grundfos.

4. Product selection

DIT-M photometer

Designation	Product No.
DIT-M photometer with case supplied with: 4 batteries (AA/LR6) 1 manual (installation and operating instructions) 1 Certificate of Compliance 3 round vials with cap and gasket, ∅24 mm 1 cleaning brush 1 plastic stirring rod 1 plastic syringe, 5 ml.	95727742

DIT-L photometer

Designation	Product No.
DIT-L photometer with case supplied with: 4 batteries (AAA/LR03) 1 manual (installation and operating instructions) 1 Certificate of Compliance 3 round vials with cap and gasket, ∅24 mm 1 cleaning brush 1 plastic stirring rod 1 Starter kit (100 tablets each: DPD No. 1, DPD No. 3, Glycine, Phenolred Photometer).	95727743

DIT-IR infrared interface module

Designation	Product No.
DIT-IR infrared interface module with case supplied with: 4 batteries (AA/LR6) 1 manual (installation and operating instructions) 1 Certificate of Compliance 1 USB cable 1 screwdriver with clip 1 CD-ROM.	95727744

5. Accessories

Reagents

TM04 8191 4010

Fig. 5 Tablet reagents

Reagents for DIT-M

Analysis	Measuring range	Tolerance	Differentiation	Resolution	Analyses per PU	Description	Product number
Aluminium	0.01 - 0.3 mg/l Al	± 0.04 mg/l		0.01	250	Combi pack Aluminium No. 1/No. 2 250 tablets each	95727755
Bromine	0.05 - 13 mg/l Br	in mg/l: 0 - 2.25: ± 0.09 > 2.25 - 4.5: ± 0.18 > 4.5 - 6.75: ± 0.41 > 6.75 - 9: ± 0.56 > 9 - 13: ± 0.79		0.01	100	DPD No. 1 tablets	95727761
Chlorine, free (high Ca)	0.01 - 6 mg/l Cl_2	in mg/l: 0 - 1: ± 0.04 > 1 - 2: ± 0.08 > 2 - 3: ± 0.18 > 3 - 4: ± 0.25 > 4 - 6: ± 0.35	Free Cl_2	0.01	250	DPD No. 1 tablets	95727747
			Free Cl_2 (high Ca)	0.01	250	DPD No. 1 High Calcium tablets	95727748
Chlorine, total			Total Cl_2, free and combined differentiated	0.01	250	DPD No. 1 tablets or DPD No. 1 High Calcium tablets	95727747 95727748
				0.01	250	DPD No. 3 tablets	95727750
Chlorine, total			Total Cl_2, not differentiated	0.01	250	DPD No. 4 tablets	95727751
Chlorine dioxide	0.02 - 11 mg/l ClO_2	in mg/l: 0 - 1.9: ± 0.08 > 1.9 - 3.8: ± 0.15 > 3.8 - 5.7: ± 0.34 > 5.7 - 7.6: ± 0.48 > 7.6 - 11: ± 0.67	Cl_2 and ClO_2 differentiated	0.01	250	DPD No. 1 tablets	95727747
				0.01	250	DPD No. 3 tablets	95727750
				0.01	250	Glycine tablets	95727752
Chlorine dioxide			ClO_2 in the absence of Cl_2	0.01	250	DPD No. 1 tablets	95727747
Chlorine dioxide analysis*	0.01 - 6 mg/l ClO_2, Cl_2	in mg/l: 0 - 1: ± 0.04* > 1 - 2: ± 0.08* > 2 - 3: ± 0.18* > 3 - 4: ± 0.25* > 4 - 6: ± 0.35*	Chlorine dioxide, chlorite, free chlorine, combined chlorine	0.01	250	DPD No. 1 tablets	95727747
				0.01	250	DPD No. 3 tablets	95727750
				0.01	250	Glycine tablets	95727752
				0.01	100	DPD Acidifying tablets	98032751
				0.01	100	DPD Neutralising tablets	98032752
Chloride	0.5 - 25 mg/l (Cl^-)	in mg/l: 0.5 - 10: ± 2.5 > 10 - 25: ± 3		0.1	250	Combi pack Chloride T 1/T 2 250 tablets each	95727754
Cyanuric acid	2 - 160 mg/l CyA	in mg/l: 0 - 50: ± 10 > 50 - 100: ± 15 > 100 - 160: ± 20		1	100	CyA-TEST tablets	95727760
Iron	0.02 - 1 mg/l Fe	± 0.04 mg/l		0.01	100	Iron LR tablets	95727756
Fluoride	0.05 - 2 mg/l F^-	in mg/l: 0 - 1: ± 0.14 > 1 - 2: ± 0.4		0.01	100	SPADNS reagent	95727757
				0.01	100	Fluoride standard	95727758
Manganese	0.2 - 4 mg/l Mn	± 0.2 mg/l		0.01	100	Combi pack Manganese LR 1/LR 2 100 tablets each	95727759
Ozone	0.02 - 2 mg/l O_3	Like chlorine, with factor 0.677	O_3 in the presence of Cl_2	0.01	250	DPD No. 1 tablets	95727747
				0.01	250	DPD No. 3 tablets	95727750
				0.01	250	Glycine tablets	95727752
Ozone			O_3 in the absence of Cl_2	0.01	250	DPD No. 1 tablets	95727747
				0.01	250	DPD No. 3 tablets	95727750

Analysis	Measuring range	Tolerance	Differentiation	Resolution	Analyses per PU	Description	Product number
Phosphate	0.05 - 4 mg/l PO4	± 0.4 mg/l		0.01	100	Combi pack Phosphate No. 1 LR/No. 2 LR, 100 tablets each	95727764
pH value	6.5 - 8.4 pH	± 0.1		0.01	250	Phenol red Photometer tablets	95727753
Acid demand K (S 4.3)	0.1 - 4 mmol/l	± 0.4 mmol /l		0.01	100	Alka-M-Photometer tablets	95727763
Hydrogen peroxide	0.03 - 3 mg/l	Like chlorine, with factor 0.5		0.01	100	Hydrogen peroxide LR tablets	95727762

LR = low range; PU = packing unit

* The measurements are performed with method "chlorine" and differentiation "free", because the photometer doesn't supply a specific method for the determination of these parameters. The values of tolerance apply to the individual measurement. For calculation with multiple values, be aware of error propagation.

Reagents for DIT-L

Analysis	Measuring range	Tolerance	Differentiation	Resolution	Analyses per PU	Description	Product number
Chlorine, free	0.01 - 6 mg/l Cl_2	in mg/l: 0 - 1: ± 0.05 > 1 - 2: ± 0.1 > 2 - 3: ± 0.2 > 3 - 4: ± 0.3 > 4 - 6: ± 0.4	Free Cl_2	0.01	250	DPD No. 1 tablets	95727747
Chlorine, free (high Ca)			Free Cl_2 (high Ca)	0.01	250	DPD No. 1 High Calcium tablets	95727748
Chlorine, total			Total Cl_2, free and combined differentiated	0.01	250	DPD No. 1 tablets or DPD No. 1 High Calcium tablets	95727747 95727748
				0.01	250	DPD No. 3 tablets	95727750
Chlorine, total			Total Cl_2, not differentiated	0.01	250	DPD No. 4 tablets	95727751
Chlorine dioxide	0.02 - 11 mg/l ClO_2	in mg/l: 0 - 1.9: ± 0.08 > 1.9 - 3.8: ± 0.15 > 3.8 - 5.7: ± 0.34 > 5.7 - 7.6: ± 0.48 > 7.6 - 11: ± 0.67	ClO_2 in the absence of Cl_2	0.01	250	DPD No. 1 tablets	95727747
Chlorine dioxide			ClO_2 in the presence of Cl_2	0.01	250	DPD No. 3 tablets	95727750
				0.01	250	Glycine tablets	95727752
Chlorine dioxide analysis*	0.01 - 6 mg/l ClO_2, Cl_2	in mg/l: 0 - 1: ± 0.05* > 1 - 2: ± 0.1* > 2 - 3: ± 0.2* > 3 - 4: ± 0.3* > 4 - 6: ± 0.4*	Chlorine dioxide, chlorite, free chlorine, combined chlorine	0.01	250	DPD No. 1 tablets	95727747
				0.01	250	DPD No. 3 tablets	95727750
				0.01	250	Glycine tablets	95727752
				0.01	100	DPD Acidifying tablets	98032751
				0.01	100	DPD Neutralising tablets	98032752
Ozone	0.02 - 2 mg/l O_3	Like chlorine, with factor 0.677	O_3 in the absence of Cl_2	0.01	250	DPD No. 1 tablets	95727747
				0.01	250	DPD No. 3 tablets	95727750
Ozone			O_3 in the presence of Cl_2	0.01	250	Glycine tablets	95727752
				0.01	250	DPD No. 3 tablets	95727750
				0.01	250	Glycine tablets	95727752
pH, photometric	6.5 - 8.4 pH	± 0.1		0.01	250	Phenol red Photometer tablets	95727753

PU = packing unit

* The measurements are performed with method "chlorine", because the photometer doesn't supply a specific method for the determination of these parameters. The values of tolerance apply to the individual measurement. For calculation with multiple values, be aware of error propagation.

Verification Standard for DIT-M

Stable colour solutions for checking the absorption depending on the wavelength. The case contains one standard colour solution (one vial) for each wavelength as well as one standard for zero setting.

TM04 8245 4510

Fig. 6 Case with Verification Standard solutions

Description	Product No
Verification Standard	95727746

Reference Standard for DIT-L

Stable colour solutions for checking measured values that are specific to the device and method. The case contains one 1 mg/l and one 4 mg/l chlorine standard as well as one standard for zero setting.

TM04 8246 4510

Fig. 7 Case with Reference Standard solutions

Description	Product No
Reference Standard	95727745

Spare parts for DIT-M

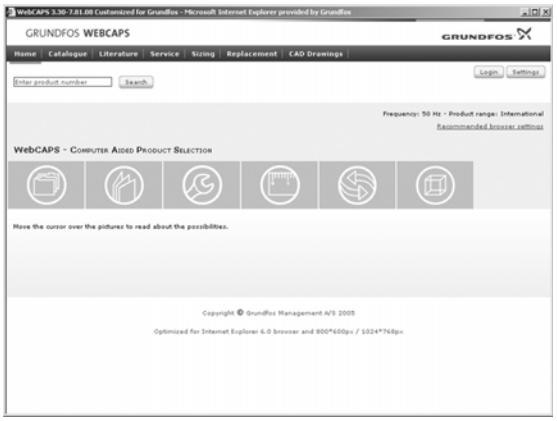
Designation	Quantity	Product No
Round vial, ∅24 mm, with cap and gasket	Pack of 5	95727768
	Pack of 12	95727769
Plastic stirring rod, length 13 cm	1 piece	95727771
Brush, length 11 cm	1 piece	95727772
Plastic syringe, 5 ml	1 piece	95727773

Spare parts for DIT-L

Designation	Quantity	Product No
Round vial, ∅24 mm, with cap and gasket	Pack of 5	95727768
	Pack of 12	95727769
Plastic stirring rod, length 13 cm	1 piece	95727771
Brush, length 11 cm	1 piece	95727772

6. Further product information

WebCAPS

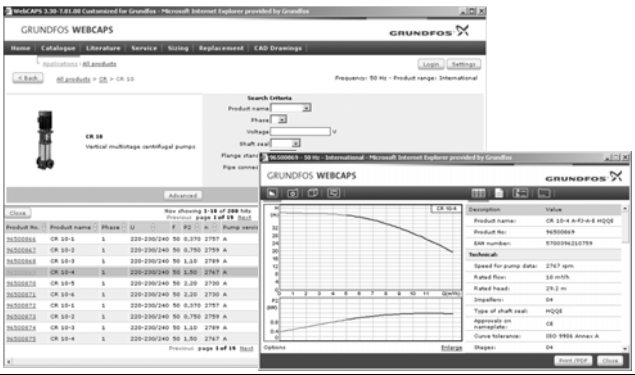


WebCAPS is a **Web**-based **C**omputer **A**ided **P**roduct **S**election program available on www.grundfos.com.

WebCAPS contains detailed information on more than 220,000 Grundfos products in more than 30 languages.

Information in WebCAPS is divided into six sections:

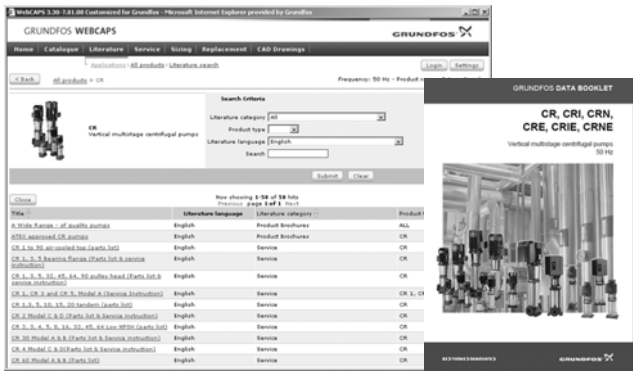
- Catalogue
- Literature
- Service
- Sizing
- Replacement
- CAD drawings.



Catalogue

Based on fields of application and pump types, this section contains the following:

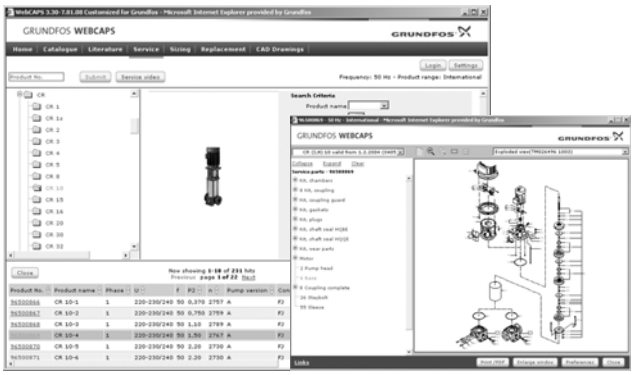
- technical data
- curves (QH, Eta, P1, P2, etc.) which can be adapted to the density and viscosity of the pumped liquid and show the number of pumps in operation
- product photos
- dimensional drawings
- wiring diagrams
- quotation texts, etc.



Literature

This section contains all the latest documents of a given pump, such as

- data booklets
- installation and operating instructions
- service documentation, such as Service kit catalogue and Service kit instructions
- quick guides
- product brochures.



Service

This section contains an easy-to-use interactive service catalogue. Here you can find and identify service parts of both existing and discontinued Grundfos pumps.
Furthermore, the section contains service videos showing you how to replace service parts.

Sizing

This section is based on different fields of application and installation examples and gives easy step-by-step instructions in how to size a product:

- Select the most suitable and efficient pump for your installation.
- Carry out advanced calculations based on energy, consumption, payback periods, load profiles, life cycle costs, etc.
- Analyse your selected pump via the built-in life cycle cost tool.
- Determine the flow velocity in wastewater applications, etc.

Replacement

In this section you find a guide to selecting and comparing replacement data of an installed pump in order to replace the pump with a more efficient Grundfos pump.
The section contains replacement data of a wide range of pumps produced by other manufacturers than Grundfos.

Based on an easy step-by-step guide, you can compare Grundfos pumps with the one you have installed on your site. When you have specified the installed pump, the guide will suggest a number of Grundfos pumps which can improve both comfort and efficiency.

CAD drawings

In this section, it is possible to download 2-dimensional (2D) and 3-dimensional (3D) CAD drawings of most Grundfos pumps.

These formats are available in WebCAPS:

2-dimensional drawings:

- .dxf, wireframe drawings
- .dwg, wireframe drawings.

3-dimensional drawings:

- .dwg, wireframe drawings (without surfaces)
- .stp, solid drawings (with surfaces)
- .eprt, E-drawings.

WinCAPS

Fig. 8 WinCAPS DVD

WinCAPS is a **Win**dows-based **C**omputer **A**ided **P**roduct **S**election program containing detailed information on more than 220,000 Grundfos products in more than 30 languages.

The program contains the same features and functions as WebCAPS, but is an ideal solution if no internet connection is available.

WinCAPS is available on DVD and updated once a year.

GO CAPS

Mobile solution for professionals on the GO!

CAPS functionality on the mobile workplace.

Available on the App Store

Subject to alterations.

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