DIP

Measuring amplifiers and controllers, preassembled systems

Up to 3 parameters (Cl_2, ClO_2, O_3, pH, ORP)

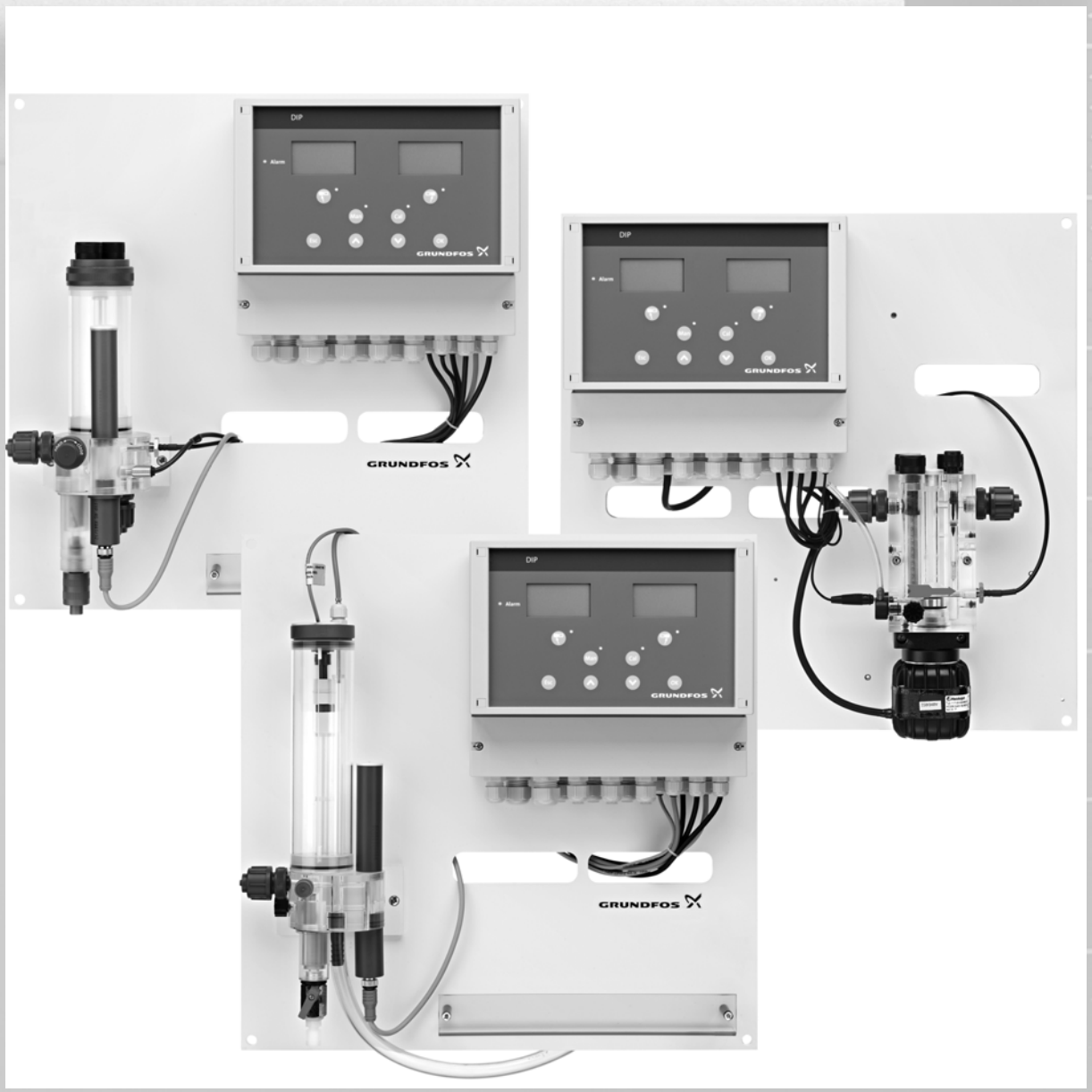

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Table of contents

1. Product introduction

DIP measuring amplifier and controller

The DIP (Dosing Instrumentation Pool) is specially designed for swimming pool applications, but can also be used in water treatment applications. It measures up to three parameters and controls two parameters at the same time, giving you perfect control of the water quality.

The DIP speaks five languages, making it easy for users without previous knowledge to carry out all operations.

Display languages: English, German, French, Polish, Russian.

Other features:

- maintenance-free measuring electrodes
- a sample-water sensor to prevent overdosing
- a choice of control functions.

Parameters

The DIP measures up to three parameters at the same time:

- Chlorine, chlorine dioxide or ozone
- pH
- Redox potential (ORP)

The DIP controls two parameters at the same time:

- Chlorine, chlorine dioxide or ozone
- pH

TM04 1823 1108

Fig. 1 DIP

In the following chapters, the DIP measuring amplifiers and controllers are simply referred to as "controllers".

DIP-A preassembled systems

DIP-A preassembled systems combine DIP controllers and tried-and-tested electrodes on a plate ready for quick installation.

Each combination is available with a choice of measuring cells and cleaning methods.

DIP-A preassembled system for chlorine, chlorine dioxide, ozone, pH and redox potential (ORP)

The system is equipped with one of the following measuring cells:

- AQC-D11, pressure-proof, with electric cleaning motor
- AQC-D12, pressure-proof, with hydromechanical cleaning
- AQC-D13, pressureless, with hydromechanical cleaning

For details on AQC-D11, AQC-D12 and AQC-D13, please see the separate data booklet "Measurement and control accessories".

Features

- Mounted on a base plate and wired ready for connection
- With prepared cable sets
- With electrode for disinfection parameter
- With temperature compensation

TM04 8725 0813

Fig. 2 DIP-A with AQC-D11, -D12 and -D13

2. Identification

Type key DIP, controllers

Example:		DIP	1-D	2-P	3-R	-W	-G
Measuring amplifier and controller							
DIP	Dosing Instrumentation Pool						
Parameter group 1							
D	Chlorine, chlorine dioxide or ozone						
Parameter group 2							
P	pH						
Parameter group 3							
R	Redox potential (ORP)						
Mounting							
W	Wall-mounting						
Voltage							
G	230/240 V, 50/60 Hz						
H	115/120 V, 50/60 Hz						

Type key DIP-A, preassembled systems

Example:	DIP	-A	D11	-P	-AU	-PCB	-RRX	-QS	T	W	-H

Measuring amplifier and controller

DIP	Dosing Instrumentation Pool

Assembly

A	Preassembled

Cell type

D11	Pressure-proof, with electric cleaning motor
D12	Pressure-proof, with hydromechanical cleaning
D13	Pressureless, with hydromechanical cleaning

Pressure retention valve

P	With pressure retention valve
X	Without pressure retention valve

Electrodes for disinfection parameters

AU	Gold
PT	Platinum

Electrodes for pH

PCB	pH, ceramic diaphragm, with buffer solution
PTB	pH, PTFE diaphragm, with buffer solution
PKB	pH, KCl filling, with buffer solution
PGB	pH, gel filling, with buffer solution
PCX	pH, ceramic diaphragm, without buffer solution
PTX	pH, PTFE diaphragm, without buffer solution
PKX	pH, KCl filling, without buffer solution
PGX	pH, gel filling, without buffer solution
X	Without electrode

Electrodes for redox potential (ORP)

RRB	Redox potential (ORP), without reference system, with buffer solution
RRX	Redox potential (ORP), without reference system, without buffer solution
X	Without electrode

Water sensor

QS	With water sensor
X	Without water sensor

Temperature sensor

T	With Pt100 temperature sensor
X	Without temperature sensor

Mounting

W	Wall-mounting
P	Panel-mounting

Voltage

G	230/240 V, 50/60 Hz
H	115/120 V, 50/60 Hz

3. Technical data

General data

Electronics	16-bit microprocessor system
Max. distance between DIP and sensors	3 metres
Display	Two high-resolution plain-text LCD displays
Indication mode	Measured value as a physical variable
Relay outputs (max. relay load 250 V/ 6 A, max. 550 VA)	1 alarm relay 1 stand-by relay
	Each parameter of parameter groups 1 and 2 has: • one alarm relay and • two potential-free controller switch relays for chlorine or chlorine dioxide or ozone or pH. The potential-free controller switch relays can be configured as: • limit switch, or • 2-position controller (pulse-pause, pulse frequency), or • 3-position step controller for – chlorine or chlorine dioxide or ozone (with or without feedback signal), or – pH (without feedback signal).
Signal outputs (max. load: 500 Ohm)	Four analog outputs (0-20 mA or 4-20 mA), galvanically isolated from the inputs, for these measuring parameters: • disinfection parameter chlorine/chlorine dioxide/ozone • pH • redox potential (ORP) • temperature.
	Two analog outputs (0-20 mA or 4-20 mA) for continuous controller: • disinfection parameter chlorine/chlorine dioxide/ozone • pH (chlorine and pH).
Interface	CAN bus
Temperature compensation	The temperature can be measured automatically by a Pt100 sensor (-5 to 120 °C, measured in °C or °F) or set manually on the controller.
pH compensation	Automatically by pH measurement
Calibration of pH	A plausibility check function checks whether the pH value of the buffer solution is within acceptable limits. Automatic recognition of the buffer solution ensures that the right buffer solution is used for the calibration. If the user calibrates the pH value with a wrong buffer solution, an error message will be displayed.
Permissible temperature	Operation: 0 to 45 °C (depending on the version) Storage: -20 to +65 °C
Permissible relative humidity	Max. 90 % (non-condensing)
Power consumption	Approx. 15 VA
Enclosure class	IP65
Weight	Approx. 2 kg

Measuring parameters and ranges

Parameter group	Parameter	Possible measuring range*
1	Chlorine [mg/l]	0.00 - 0.50 0.00 - 1.00 0.00 - 2.00 0.00 - 5.00 0.0 - 10.0 0.0 - 20.0 0.0 - 30.0
	Chlorine dioxide [mg/l]	0.00 - 0.50 0.00 - 1.00 0.00 - 2.00 0.00 - 5.00 0.0 - 10.0 0.0 - 50.0
	Ozone [mg/l]	0.00 - 0.50 0.00 - 1.00 0.00 - 2.00 0.00 - 5.00
2	pH	0.00 - 14.00 2.00 - 12.00 5.00 - 9.00
3	ORP [mV]	-1500 to +1500 0 - 1000

* For preassembled systems, the lower limit of the measuring range can be different, depending on the type of measuring cell.

Control functions

Description	Value
Setpoint	Adjustable as physical variable within the measuring range (for example mg/l)
Hysteresis	0 to 50 % of the upper limit of the measuring range
Setpoint selection	0 to 100 % of the measuring range
Proportional band, X_p	0.1 to 3000 %
Reset time, T_N	1 to 3000 s, resolution 1 s
Derivative action time, T_V	1 to 1000 s, resolution 1 s
Constant load	0 to 50 %
Limitation of the maximum dosing capacity	From the adjusted constant load up to 100 %
Control direction	Upward or downward control

Dimensions

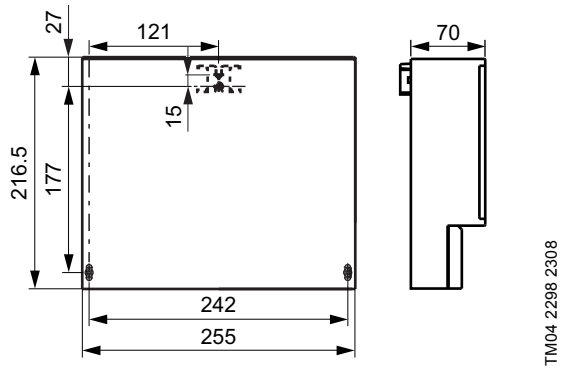


Fig. 3 DIP controller

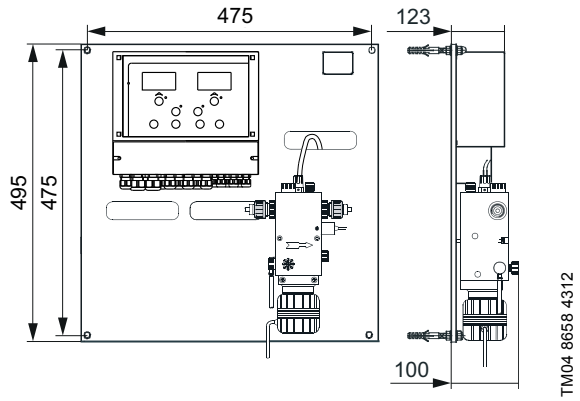


Fig. 4 DIP-A preassembled system

4. Product selection

DIP controllers

Controller	Voltage		Controller mounting	Enclosure material	Enclosure class	Input parameter			Type designation	Product number
						1	2	3		
	115/120 V	230/240 V	Wall-mounting	Polystyrene	IP65	Chlorine, chlorine dioxide, ozone	pH	Redox potential (ORP)		
DIP	•		•	•	•	•	•	•	DIP, 1-D 2-P 3-R, W-H	96622358
		•	•	•	•	•	•	•	DIP, 1-D 2-P 3-R, W-G	96622357

DIP-A preassembled systems

- Preassembled systems for swimming pool water include measurement of temperature, pH and ORP
- Preassembled systems with cell type AQC-D11 or D12 (pressure-proof) include a pressure retention valve

Standard range

230/240 V

Controller	Cell type				Type designation*	Product number	
	D11, pressure-proof, cleaning motor	D12, pressure-proof, hydromechanical cleaning	D13, pressureless, hydromechanical cleaning	Water sensor		Electrode code AU (gold)	Electrode code PT (platinum)
DIP-A	•			•	DIP-A, D11-P-**AU**-PCB-RRB-QS-T, W-G	95738051	95738052
	•				DIP-A, D11-P-**AU**-PCB-RRB-X-T, W-G	95738053	95738054
		•		•	DIP-A, D12-P-**AU**-PCB-RRB-QS-T, W-G	95738055	95738056
			•	•	DIP-A, D13-X-**AU**-PCB-RRB-QS-T, W-G	95738057	95738058
			•		DIP-A, D13-X-**AU**-PCB-RRB-X-T, W-G	95738059	95738060

* Also available with platinum electrode **PT**

115/120 V

Controller	Cell type				Type designation*	Product number	
	D11, pressure-proof, cleaning motor	D12, pressure-proof, hydromechanical cleaning	D13, pressureless, hydromechanical cleaning	Water sensor		Electrode code AU (gold)	Electrode code PT (platinum)
DIP-A	•			•	DIP-A, D11-P-AU-PCB-RRB-QS-T, W-H	95738061	95738062
	•				DIP-A, D11-P-AU-PCB-RRB-X-T, W-H	95738063	95738064
		•		•	DIP-A, D12-P-AU-PCB-RRB-QS-T, W-H	95738066	95738065
			•	•	DIP-A, D13-X-AU-PCB-RRB-QS-T, W-H	95738067	95738068
			•		DIP-A, D13-X-AU-PCB-RRB-X-T, W-H	95738069	95738070

* Also available with platinum electrode **PT**

Non-standard range

Pressure retention valve	Electrodes			Water sensor	Temperature sensor	Mounting	Voltage
	Disinfection	pH	ORP				
P: with pressure retention valve X: without pressure retention valve	AU: gold PT: platinum	PCB: ceramic diaphragm, with buffer solution PTB: PTFE diaphragm, with buffer solution PKB: KCl filling, with buffer solution PGB: gel filling, with buffer solution PCX: ceramic diaphragm, without buffer solution PTX: PTFE diaphragm, without buffer solution PKX: KCl filling, without buffer solution PGX: gel filling, without buffer solution X: without electrode	RRB: without reference system, with buffer solution RRX: without reference system, without buffer solution X: no electrode	QS: with water sensor X: without water sensor	T: with Pt100 temperature sensor X: without temperature sensor	W: wall-mounting P: panel-mounting	G: 230/240 V, 50/60 Hz H: 115/120 V, 50/60 Hz

DIP-A with AQC-D11

Pressure retention valve	Electrodes			Water sensor	Temperature sensor	Mounting	Voltage
	Disinfection	pH	ORP				
P X	AU PT	PCB PTB PKB PGB PCX PTX PKX PGX X	RRB RRX X	QS X	T X	W P	G H

DIP-A with AQC-D12

Pressure retention valve	Electrodes			Water sensor	Temperature sensor	Mounting	Voltage
	Disinfection	pH	ORP				
P X	AU PT	PCB PTB PKB PGB PCX PTX PKX PGX X	RRB RRX X	QS	T X	W P	G H

DIP-A with AQC-D13

Pressure retention valve	Electrodes			Water sensor	Temperature sensor	Mounting	Voltage
	Disinfection	pH	ORP				
X	AU PT	PCB PTB PKB PGB PCX PTX PKX PGX X	RRB RRX X	QS X	T X	W P	G H

5. Accessories

Cables

Description	Length [m]	DIP	Product number
Special cable (coaxial), single screening, N screw plug for pH, ORP or reference electrode	1	•	96609182
	3	•	96609183
	10	•	96701441
	25	•	95703576

Note: If the length of the cable between controller and electrode exceeds 3 metres, an impedance converter is necessary.

Buffer solutions

pH and redox potential (ORP)

Description	pH	ORP	Product number
Buffer solutions for calibrating the pH single-rod measuring chain: • 1 set per 100 ml for pH 4.01, 7.00 or 9.18	•		96609165
Buffer solutions for checking the ORP single-rod measuring chain or electrodes: • 100 ml (+220 mV)		•	96609166

Impedance converter

pH and redox potential (ORP)

- An impedance converter is necessary, if the length of the cable between controller and electrode exceeds 3 metres.
- Connection: N cap.
- The plug connector suits the Grundfos electrode caps with cable socket N and most of the usual electrode caps.
- Installed between the electrode and the cable.
- Internal power supply by a lithium battery (can be replaced), CR-1/3N-P (or equivalent). Service life: at least 5 years (at 25 °C). The service life can be affected by external factors, such as fluctuating temperatures during operation and storage.

Description	pH	ORP	Product number
Impedance converter for pH/ORP measurement • Permissible ambient temperature: -10 to +60 °C • Permissible storage temperature: -10 to +60 °C	•	•	95704730

Dimensions

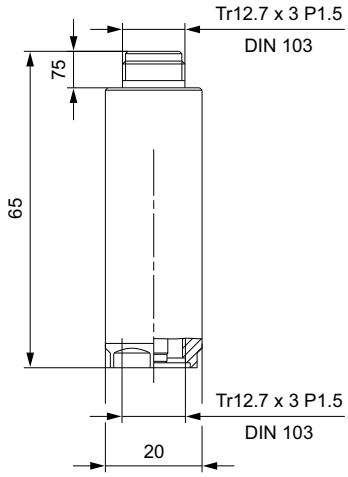


Fig. 5 Impedance converter

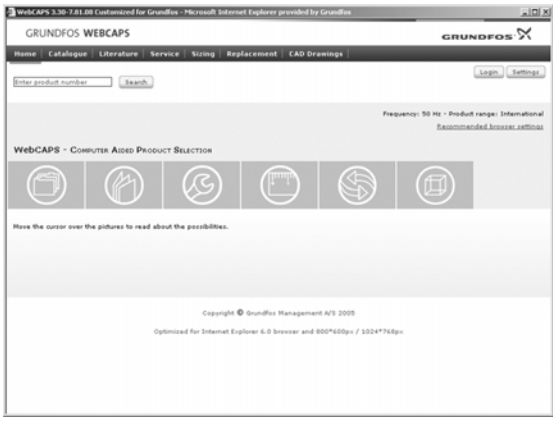
Interface converter

Description	Product number
CAN bus/RS232 converter for bidirectional connection of DIP to a PLC	95702009

For more accessories, please see the separate data booklet "Measurement and control accessories".

6. Further product information

WebCAPS

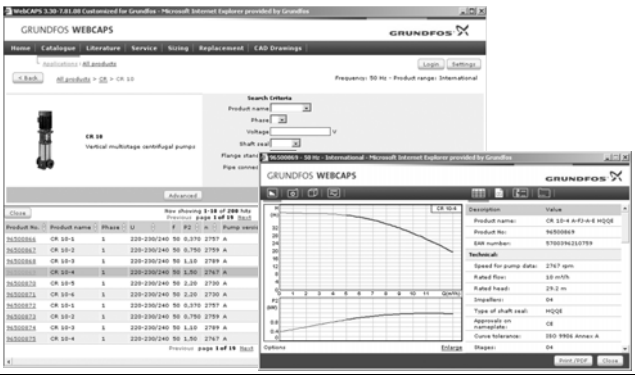


WebCAPS is a **Web**-based **C**omputer **A**ided **P**roduct **S**election program available on www.grundfos.com.

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

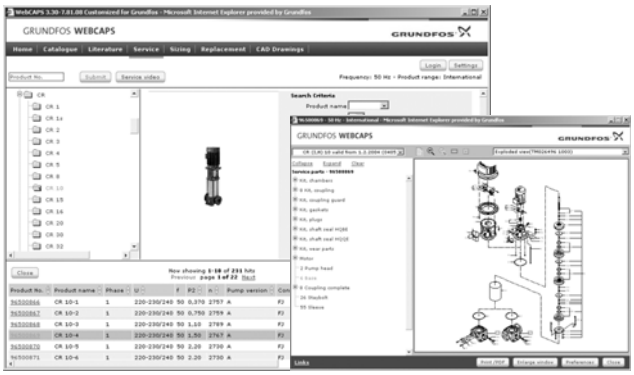
Based on fields of application and pump types, this section contains the following:

- 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. 6 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.

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