

# Digital Titrator

Model 16900



## Ideal for Laboratory or On-Site Titrations

Recent design innovations in the patented Digital Titrator make it easier to use for laboratory or on-site testing. Weighing just 132 grams (less than 4 oz.), this precision dispensing device performs titrations quickly and economically at the bench or in the field.

The Digital Titrator accommodates interchangeable titrant cartridges, so multiple titrations merely involve changing the cartridge and delivery tube. Snapping cartridges in and out saves the time associated with cleaning and assembling cumbersome, fragile glass burets and virtually eliminates the possibilities of cross contamination and over-titrating.

Designed and built for durability, the Digital Titrator comes with a lifetime warranty: Hach Company will repair or replace it free of charge, provided it has not been abused. So carry it to sample sites within the water or wastewater plant; take it to the field for ecology or water quality studies—the Digital Titrator is built to withstand heavy use.

## Other Advantages

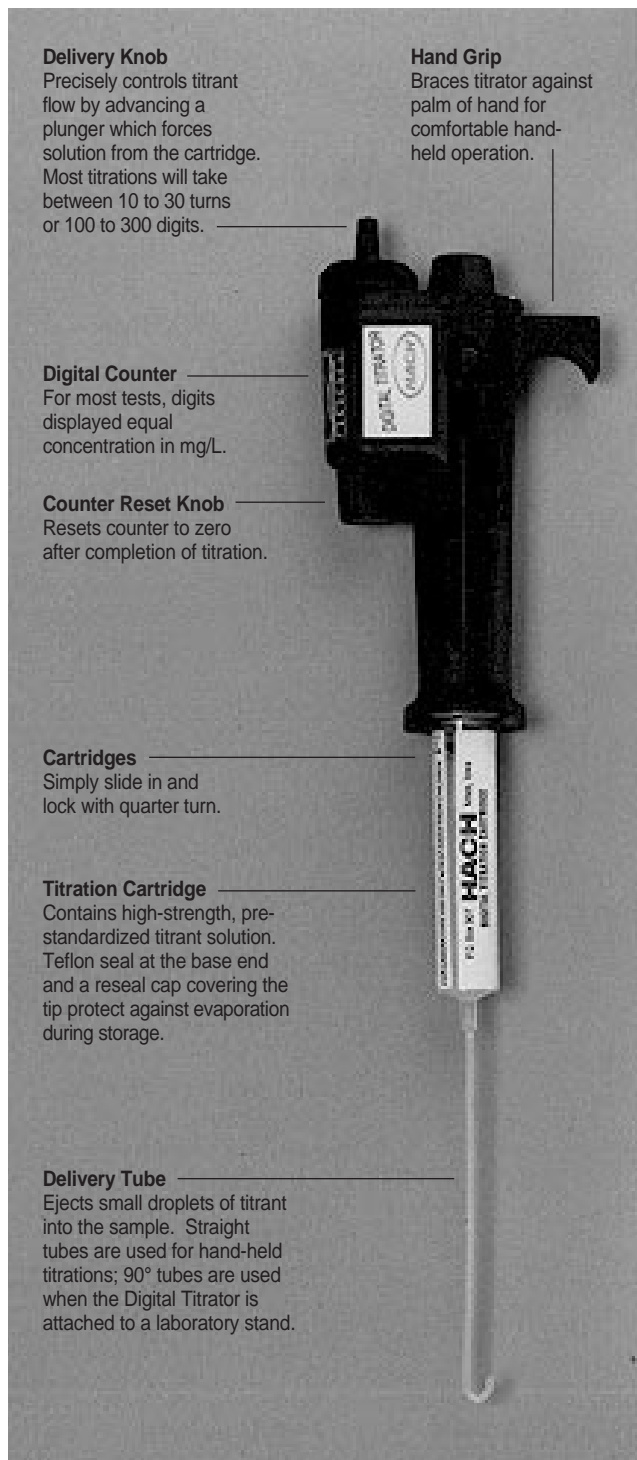
**Completely Portable**—Many kits are built around the Digital Titrator. Kits include the necessary reagents, apparatus and easy-to-follow instructions for fool-proof testing. Use it as a hand-held instrument in your laboratory. Select the optional TitraStir stand for hands-free operation.

**Saves Time**—Because it is quick to set up and eliminates cleaning and assembly chores, the Digital Titrator is a significant time-saver.

**Accurate Results**—Accuracy of  $\pm 1\%$  is typical for most samples. Repeatability and consistency are assured because the Digital Titrator requires less technique than using a buret.

**Cartridge Packaged Titrants**—Titrant solutions are fresh and free from contamination. More than 30 titrant solutions are available; each is ready to use. Simply install the cartridge on the Digital Titrator, attach a delivery tube and titrate! Concentrations of titrant solutions are adjusted so that results are read directly as mg/L from the counter window on most tests; no calculations are required. Full cartridges weigh less than 57 g (2 oz) and contain enough reagent for 50 to 100 tests (depending on sample strength). Empty cartridges are available for users who prefer to prepare their own reagents.

**Economical**—Use the required titrant and replace the cap on the cartridge. No titrant is wasted because of contamination.

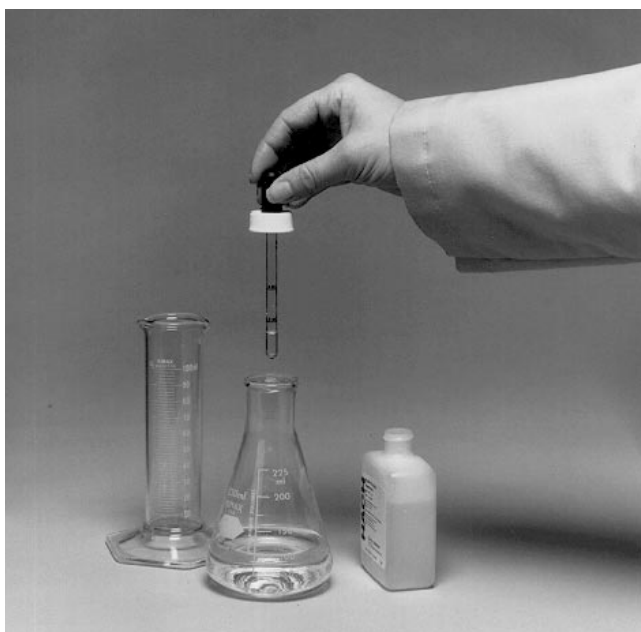


## Easy Operation

**1.** Select an appropriate titrant cartridge. (See Table 2 for the cartridges available.) Slide the cartridge into the titrator receptacle and lock in position with a quarter turn.



**2.** Remove the cap from the cartridge and install a delivery tube. Use a straight delivery tube for hand-held titrations or a 90° delivery tube for titrations using a laboratory stand to hold the titrator. Turn the delivery knob to flush the delivery tube with titrant and reset the counter to zero.



**3.** Measure a sample into a clean erlenmeyer flask and add buffers and/or indicators as required.



**4.** Immerse the tip of the delivery tube below the surface of the prepared sample and turn the delivery knob to begin titration. Continue titration until the end point is reached.



**5.** Read the digits of titrant used from the counter window. Each digit (1/10 turn of the knob) delivers 0.00125 mL of titrant. The normality of the solution in the titrant cartridge is formulated so that digits displayed in the counter window are equal to the concentration of the sample in mg/L, for most tests.

## Specifications

### Digital Titrator

Delivery	800 digits/mL
Accuracy	±1%. Uncertainty of readings is 1 digit. Most samples require more than 100 digits.
Weight	132 g (4 oz)

### Cartridges

Volume	13 mL
Number of Tests	50 to 100. Most reagents are formulated to provide 100 typical titrations. Number of tests may vary depending on sample strength.
Weight (full)	56.75 g (2 oz)

## Order Catalog Number

<b>16900-01</b>	Digital Titrator with plastic case, manual and 5 straight delivery tubes
<b>17205-00</b>	Delivery Tube, straight, 5/pkg
<b>41578-00</b>	Delivery Tube, 90°, 5/pkg
<b>14495-01</b>	Empty Titration Cartridge with blank label
<b>19400-00</b>	TitraStir® Continuous Mixer/Stand, 115V
<b>19400-10</b>	TitraStir Continuous Mixer/Stand, 230V

## Digital Titrator Test Kits

DREL/2000 Portable Laboratories and many single- and multiple-parameter test kits are available with the Digital Titrator for rapid, convenient on-site titrimetric testing. Test kits contain the Digital Titrator, appropriate titration cartridge(s), buffers and/or indicators and necessary beakers, flasks or other labware.

The Universal Digital Titrator Kit can be customized to fit your analysis needs by adding the reagent sets of your choice. Order Catalog Number 22709-00.

## Reagent Sets

Order additional reagent sets to extend testing capability or to replenish kits. Most sets contain enough reagents for approximately 100 tests (may vary depending on sample strength) and instructions. Glassware and other apparatus are not included in the sets—except the dissolved oxygen set, which includes a dissolved oxygen bottle.

**Table 1: Digital Titrator Kits and Reagent Sets**

Kit Cat. No.	Model	Description	Reagent Set Cat. No.
20640-00	AC-DT	Acidity	22728-00
20637-00	AL-DT	Alkalinity	22719-00
20641-00	CA-DT	Carbon Dioxide	22727-00
20635-00	CD-DT	Chloride (Mercuric Nitrate)	22726-00
25806-00	CDS-DT	Chloride (Silver Nitrate)	22880-00
20632-00	CN-DT	Chlorine	22725-00 (high range)
20634-00	CH-DT	Chromate	22724-00
20631-00	OX-DT	Dissolved Oxygen (Winkler Method)	22722-00
20636-00	HA-DT	Hardness, Total	22720-00
20639-00	HAC-DT	Hardness, Total & Calcium	22721-00
24218-00	SA-DT	Salinity	24396-00
20633-00	SU-DT	Sulfite	22723-00

## Multiple-Parameter Kits

**Kits are equipped with reagents for tests listed. Order replacement reagents as identified in each kit.**

20638-00	AL-36DT	Ecology Test Kit. Includes acidity, alkalinity, carbon dioxide, dissolved oxygen, hardness; colorimetric pH also included.
23506-00	BT-DT	Professional Boiler Treatment/Boiler Feed Kit. Includes alkalinity, chloride, hardness, sulfite, phosphate, and pH.
23507-00	PBC-DT	Professional Boiler Treatment/Boiler Feed and Cooling Water Kit. Includes all tests in BT-DT plus iron, silica, chlorine, nitrite, and TDS.
2430-01	FF-2	Fish Farming Test Kit. Includes acidity, alkalinity, carbon dioxide, chloride, dissolved oxygen, hardness. Colorimetric ammonia, nitrite and pH also included.
2430-03	FF-3	Saltwater Fish Farming Test Kit. Includes acidity, alkalinity, carbon dioxide, dissolved oxygen, hardness, nitrate pH and salinity.

## Surface Finishing Kits

22752-00	EB-1	Etch Bath Kit. Includes acidity (sulfuric acid), copper, and hydrogen peroxide tests
22795-00		Electromaster Kit for Surface Finishing. Does not include reagents, kit can be customized with required reagents. A wide selection of reagent sets for bath and rinse control parameters are available, including: chromium, copper, cyanide, formaldehyde/hydroxide, hypophosphite and nickel. For a complete list of reagent sets for surface finishing, request literature number 1210.

**Table 2: Titration Cartridges Available\***

Parameter	Application†	Description	Ranges (vary with sample volume)	Cat. No.
Acid-Base	4	HCl, 8.00 N	10-40-80-200-400-800-2000-4000 meq/L	14390-01
	4	H <sub>2</sub> SO <sub>4</sub> , 8.00 N	10-40-80-200-400-800-2000-4000 meq/L	14391-01
	4	NaOH, 8.00 N	10-40-80-200-400-800-2000-4000 meq/L	14381-01
Acidity	1,2,3	NaOH, 0.1600 N	10-40-160 mg/L CaCO <sub>3</sub>	14377-01
	1,2,3	NaOH, 1.600 N	100-400-800-2000-4000 mg/L CaCO <sub>3</sub>	14379-01
Alkalinity, P and Total	1,2,3	H <sub>2</sub> SO <sub>4</sub> , 0.1600 N	10-40-160 mg/L CaCO <sub>3</sub>	14388-01
	1,2,3	H <sub>2</sub> SO <sub>4</sub> , 1.600 N	100-400-800-2000-4000 mg/L CaCO <sub>3</sub>	14389-01
Ca, Mg, Total Hardness	1,2,3	EDTA, 0.0800 M	10-40-160 mg/L CaCO <sub>3</sub>	14364-01
	1,2,3	EDTA, 0.800 M	100-400-800-2000-4000 mg/L CaCO <sub>3</sub>	14399-01
	1,2,3	CDTA‡, 0.0800 M	10-40-160 mg/L CaCO <sub>3</sub>	14402-01
	1,2,3	CDTA‡, 0.800 M	100-400-800-2000-4000 mg/L CaCO <sub>3</sub>	14403-01
	1,2,3	EDTA, 0.1428 M	1-4-16 German degrees of hardness	14960-01
	1,2,3	EDTA, 0.714 M	10-40-25-100-200 German degrees of hardness	14959-01
Calcium (soils)	4	EDTA, 0.0499 M	0.1% Ca on 0.25-g sample	21253-01
Carbon Dioxide	1,2	NaOH, 0.3636 N	10-50-100 mg/L CO <sub>2</sub>	14378-01
	1,2	NaOH, 3.636 N	100-400-1000 mg/L CO <sub>2</sub>	14380-01
Chloride	1,2,3	AgNO <sub>3</sub> , 0.2256 N	10-40-100 mg/L as Cl <sup>-</sup>	14396-01
	1,2,3	AgNO <sub>3</sub> , 1.128 N	100-400-1000-4000-10,000 mg/L as Cl <sup>-</sup>	14397-01
	1,2,3	Hg(NO <sub>3</sub> ) <sub>2</sub> , 0.2256 N	10-40-160 mg/L as Cl <sup>-</sup>	14393-01
	1,2,3	Hg(NO <sub>3</sub> ) <sub>2</sub> , 2.256 N	100-400-800-2000-4000-8000 mg/L as Cl <sup>-</sup>	921-01
Chlorine	1,2,3	PAO**, 0.00451 N	0.001-1 mg/L as Cl <sub>2</sub>	22599-01
	1,2,3	PAO**, 0.0451 N	0.01-10 mg/L as Cl <sub>2</sub>	21420-01
	1,2,3	PAO, 0.02256 N	1-4-8-20-100-400 mg/L as Cl <sub>2</sub>	14395-01
Chlorine	1,2	PAO**, 0.00564N	0-1000 ppb	1999-01
	4	Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> , 0.113 N	20-80-200-400-2000 mg/L as Cl <sub>2</sub>	22673-01
	4	Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> , 2.00 N	0.2-0.9-1.8-3.5-7.0 % Cl <sub>2</sub>	14401-01
	1,2	FEAS, 0.00564 N	0.01-3 mg/L as Cl <sub>2</sub>	22923-01
Chlorine***	1,2	Iodine titrant**, 0.0282N	0-1000 ppb	23333-01
Chromate	4	Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> , 0.2068 N	20-80-200-400-800 mg/L as CrO <sub>4</sub> <sup>2-</sup>	22676-01
EDTA, Residual	4	MgCl <sub>2</sub> , 0.0800 M	1-200 mg/L as 38% Na <sub>4</sub> EDTA	20625-01
EDTA, Deficiency	1,2,3	EDTA, 0.0800 M	1-200 mg/L deficiency as 38% Na <sub>4</sub> EDTA	14364-01
Iron	1,4	TitraVer® 0.0716 M	10-40-100 mg/L as Fe	20817-01
	1,4	TitraVer 0.716 M	100-400-1000 mg/L as Fe	20818-01
Oxidants	1,2,3	Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> , 2.00 N	0-0.5 meq/L	14401-01
Oxygen, Dissolved	1,2,3	Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> , 0.2000 N	1-5-10 mg/L as O <sub>2</sub>	22675-01
	1,2,3	Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> , 2.00 N	10-100 mg/L as O <sub>2</sub>	14401-01
Salinity	3	Hg(NO <sub>3</sub> ) <sub>2</sub> , 2.570 N	0.1-100 ppt salinity	23937-01
Sulfite	1,2,3	KIO <sub>3</sub> /KI, 0.3998 N	100-160-400-1600 mg/L as SO <sub>3</sub> <sup>2-</sup>	14961-01
Turbidity Standard	1,2,4	Formazin, 4000 NTU	makes 1,4,10,40,100 NTU standards	2461-01
Volatile Acids	4	NaOH, 0.9274 N	100-400-800-2400 Acetic acid equivalents	14842-01

\*Other cartridges are available. Note that other reagents are required in addition to these titration cartridges to complete a test procedure.

†Suitable for but not limited to analysis in the following application: 1 = water; 2 = wastewater; 3 = seawater; 4 = other.

‡CDTA is substituted for EDTA when samples contain iron.

\*\*For use with Amperometric Titrator

TitraVer is a registered trademark of Hach Company.

\*\*\*Accepted by USEPA (United States Environmental Protection Agency)

**In the United States, call 800-227-4224 toll-free for current prices or technical assistance. Outside the United States, contact the Hach office or distributor serving you.**

## **HACH** Systems for Analysis

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