



ADA5000 AUTOMATIC DISTILLATION ANALYZER

OPERATION AND INSTRUCTION MANUAL

REV B

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Petroleum Testing & Analysis Instrumentation • Custom Design & Manufacturing

CERTIFICATE OF CONFORMANCE

Automatic Distillation Apparatus, ADA5000 K456XX, K457XX

This certificate verifies that part number K456XX and K457XX, Automatic Distillation Apparatus, ADA5000, was manufactured in conformance with the applicable standards set forth in this certification.

Specifications:

ASTM D86
ASTM D189 Section 10
ASTM D285
ASTM D850
ASTM D1078
ASTM D4737
IP 123
IP 195
ISO 3405
DIN 51751
NF M 07-002
JIS K22541

This unit is tested before it leaves the factory, to ensure total functionality and compliance to the above specifications and ASTM standards. Test and inspection records are on file for verification.



Jesse Kelly
Application Engineer
Koehler Instrument Company

Table of Contents

1	Introduction	1
1.1	<i>Koehler's Commitment to Our Customers.....</i>	1
1.2	<i>Recommended Resources and Publications.....</i>	1
1.3	<i>Instrument Specifications</i>	2
1.4	<i>Software Specifications</i>	2
2	Safety Information and Warnings	2
3	Unpacking & Installation	3
3.1	<i>Packing List</i>	3
3.2	<i>Unpacking.....</i>	3
3.3	<i>Instrument Installation</i>	3
3.4	<i>Software Installation</i>	3
4	Operation	7
4.1	<i>Description of Instrument Controls</i>	7
4.2	<i>Instrument Operation.....</i>	7
4.3	<i>Communication Manager</i>	9
4.4	<i>Distillation Control.....</i>	10
4.5	<i>Current Program.....</i>	12
4.6	<i>Diskstat.exe</i>	16
4.7	<i>Config.exe</i>	16
4.8	<i>ComMgr.....</i>	17
4.9	<i>DistCntl.....</i>	17
5	Safety Features	17
5.1	<i>Flask Heater Compartment and Auto Fire Extinguisher</i>	17
6	Maintenance	18
6.1	<i>Routine Maintenance.....</i>	18
6.2	<i>Replacement Parts</i>	18
7	Service	19
8	Storage.....	19
9	Warranty.....	20
10	Returned Goods Policy.....	20

1 Introduction

The Koehler Automatic Distillation Analyzer is designed to perform optimal distillation analysis of gasolines, fuels, oils, solvents, aromatics, naphthas, kerosenes, hydrocarbons, and other volatile products to ensure conformity to rigid quality control standards. The analyzer automatically performs tests, process results, and produce standard reports according to ASTM, ISO, and related specifications.

This manual provides important information regarding safety, technical reference, installation requirements, operating condition specifications, user facility resource requirements, and operating instructions for the Automatic Distillation Analyzer. This manual should also be used in conjunction with applicable published laboratory procedures. Information on these procedures is given in section 1.2.

1.1 Koehler's Commitment to Our Customers

Providing quality testing instrumentation and technical support services for research and testing laboratories has been our specialty for more than 50 years. At Koehler, the primary focus of our business is providing you with the full support of your laboratory testing needs. Our products are backed by our staff of technically knowledgeable, trained specialists who are experienced in both petroleum products testing and instrument service to better understand your requirements and provide you with the best solutions. You can depend on Koehler for a full range of accurate and reliable instrumentation as well as support for your laboratory testing programs. Please do not hesitate to contact us at any time with your inquiries about equipment, tests, or technical support.

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1.2 Recommended Resources and Publications

1. American Society for Testing and Materials (ASTM)

100 Barr Harbor Drive
West Conshohocken, Pennsylvania 19428-2959, USA
Tel: +1 610 832 9500
Fax: +1 610 832 9555
<http://www.astm.org>
email: service@astm.org

ASTM Publication:

- ASTM D86:
- ASTM D285:
- ASTM D850:
- ASTM D1078:
- ASTM D4737:
- ASTM D189 Section 10:

2. International Organization for Standardization (ISO)
1, rue de Varembe
Case postale 56
CH-1211 Geneva 20, Switzerland
Tel: 41 22 749 01 11
Fax: 41 22 733 34 30
<http://www.iso.org>

ISO Publication:

- ISO 3405:

3. Energy Institute (IP)
61 New Cavendish Street
London, WIM 8AR, United Kingdom
Tel: 44 (0)20 7467 7100
Fax: 44 (0)20 7255 1472
<http://www.energyinstpubs.org.uk/>

IP Publication:

- IP 123:

4. Deutsche International Norm (DIN)
<http://www.din.de>

DIN Publication:

- DIN 51751:

5. Association Française de Normalisation (AFNOR)
<http://www.afnor.fr>

AFNOR Publication:

- NF M 07-002

6. Japanese Industrial Standards (JIS)
<http://www.jisc.go.jp>

JIS Publication:

- JIS J2254I

1.3 Instrument Specifications

Models: K45603, K45604
K45703-TS, K45704-TS

Electrical

Requirements: 120VAC \pm 5%, 50/60Hz
230VAC \pm 5%, 50/60Hz

Distillation Range: 0 - 450°C (\pm 0.1°C)

Condenser: -5 to 60°C (\pm 0.1°C)

Receiver Chamber: 0 to 60 C (\pm 0.1°C)

Distillation Rate: 2-15 mL/min in 0.01mL increments

Receiver Volume: 0 to 100 mL

Barometric Pressure: 550 to 900 mm Hg (\pm 1 mm Hg)

Dimensions (l x w x h) 21 x 21.5 x 27 in (53.3 x 54.6 x 70.5 cm)

Net Weight: 200 lbs (91kg)

Operational

Conditions: 0-45°C (32 to 113°F)

1.4 Software Specifications

PC System

Requirements: Intel Pentium III Processor or similar (minimum)

Operating System: Windows 98/XP

Memory

Requirements: 128 Mb RAM
4Gb hard drive

Communication

Ports: RS-232 (serial), USB, RJ45 (Ethernet)

2 Safety Information and Warnings

Safety Considerations. The use of this equipment may involve hazardous materials and operations. This manual does not purport to address all of the safety problems associated with the use of this equipment. It is the responsibility of any user of this equipment to investigate, research, and establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

Equipment Modifications and Replacement Parts. Any modification or alteration of this equipment from that of factory specifications is

not recommended, voids the manufacturer warranty, product safety, performance specifications, and/or certifications whether specified or implied, and may result in personal injury and/or property loss. Replacement parts must be O.E.M. exact replacement equipment.

Internal Access. If internal access into the instrument is necessary, the analyzer must be disconnected from the main power supply otherwise electrical hazards may be experienced. Be extremely careful because of electrical shock and danger of personal injury.

Unit Design. This equipment is specifically designed for use in accordance with the applicable standard test methods listed in section 1.2 of the operator's manual. The use of this equipment in accordance with any other test procedures, or for any other purpose, is not recommended and may be extremely hazardous.

Fire Safety. This equipment is designed with an automatic fire extinguishing system. The system must be checked periodically for proper operation.

Troubleshooting. In the case of troubleshooting the instrument, it is important to be careful with the electronic boards. They are static sensitive and it is absolutely necessary that the operator has to be grounded before touching the boards.

Overtemperature Protection. This unit is equipped with Overtemperature Protection (OTP) circuitry to prevent overheating. The unit will automatically interrupt power whether equipment malfunction or operator error causes the temperature to exceed the maximum recommended temperature range. The power can only then be restored by identifying and correcting the problem, allowing the unit to return to normal operating temperatures, and resetting the power to the unit.

Heater Element. The heater element (heating coil) of the distillation unit, installed in the heating area within the flask support has to be inspected at least every 3 months. If any short circuits of the windings are observed, it is necessary to use a new heater element. It is important to do this exchange very carefully. The windings must not have a short circuit and need to be adjusted carefully before operation. Do NOT touch the heater element after a distillation

run. The element could still be extremely hot and one could experience personal injuries.

Ice Formation. Selecting low temperatures in the receiver chamber with level follower system for distillation groups 0,1,2,3 may produce ice on the pipes of the air-heat exchanger system. Ice could decrease the efficiency of cooling and could effect damages to the exchanger. In case of ice, it is absolutely necessary to thaw out the pipes.

3 Unpacking & Installation

The instruction for preparing this equipment assumes that the user is aware of the contents of this document, which lists the warranty conditions and important precautions.

3.1 Packing List

Please refer to the shipping documents for the Automatic Distillation Analyzer regarding items included on the packing list.

3.2 Unpacking

Carefully unpack and place the instrument and accessories in a secure location. Ensure that all parts listed in the previous section are present. Inspect the unit and all accessories for damage. If you find any damage, keep all packing materials and immediately report the damage to the carrier. We will assist you with your claim, if requested. When submitting a claim for shipping damage, request that the carrier inspect the shipping container and equipment. Do not return goods to Koehler without written authorization.

3.3 Instrument Installation

Equipment Placement: Unit must be set on a firm and stable bench capable of supporting at least 250 lbs. It is advisable to place the unit in a location with sufficient ventilation, preferably an exhaust hood. Locate the unit in a non-corrosive atmosphere. Room temperature must be below 86°F.

Electrical: Determine the electrical requirements of the model distillation unit to be installed. Measure the voltage supply for the unit's location and determine if it is correct. Requirements for the different models are:

- **K45603, K45703-TS:** 120VAC +/- 5% 50/60Hz, 20A

- **K45604, K45704-TS:** 230VAC +/- 5% 50/60Hz, 10A

Nitrogen: Nitrogen must be available in order for the automatic fire extinguishing system to work. Connect a ¼" line capable of withstanding 100psi to the valve located in the top/back of the unit. Adjust the line pressure to 70psi.

PC: If an external PC is to be used, locate within 50 ft of the first distillation unit to be connected (See figure below). Connect to the unit by RS232 cable. If PC does not have a COM Port available, use a USB to Serial adapter cable. Connect cable from the PC to the 25 pin PC Adapter Plug that connects to the 25 pin connector at the distillation unit. This adapter **MUST** be installed for communications to work. If multiple units are being installed, the units must have a RS232 cable connected in daisy chain to each unit in series.



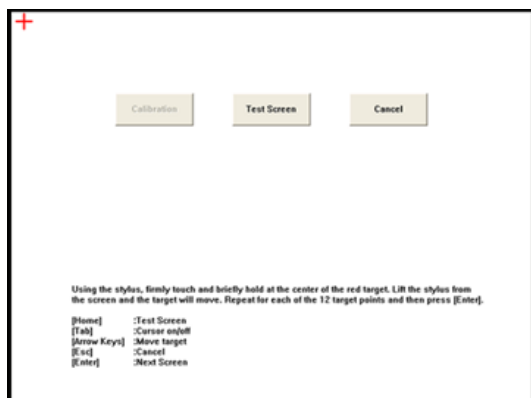
Set/verify the address of the unit if multiple units are to be installed. See section in Descriptions for setting Unit Address.

Connect printer and proceed to install software.

3.4 Software Installation

If the distillation software is not pre-installed, then insert the CD-ROM into the CD tray of the PC. The CD should automatically display the setup screen. If this does not happen within 10 seconds, then browse the files on the CD-ROM and double click on the setup file (setup.exe) to start the installation. Follow the instructions on the screen to setup the software. The setup program will require the PC to be restarted at the end of the installation. Please close any open programs before installing. The next several pages will guide you through the software installation process. Once the installation has been completed, then you are ready to run the software.

Note that on the K457XX-TS models, the software is preloaded and the touch screen has been calibrated at the factory. If you need to recalibrate the screen, the calibration utility can be accessed by clicking on Start >> All Programs >> Fujitsu Touch Panel >> Touch Screen Calibration Utility, as shown in Figure



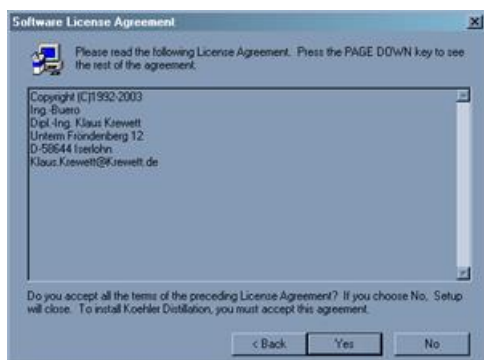
Software installation screen prompts:



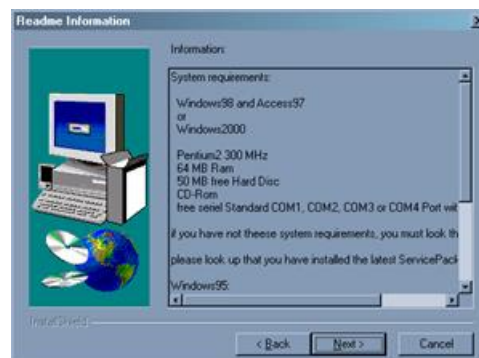
Click on the "Next" button.



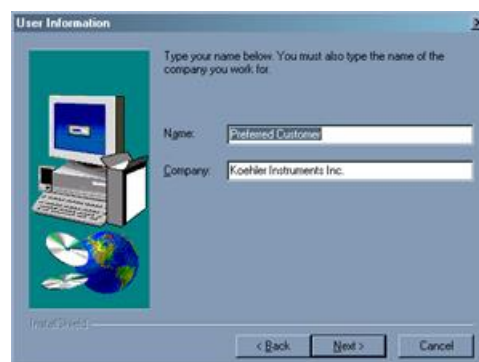
Click on the "Next" button.



Please confirm acceptance of the licensing agreement by clicking on the "Yes" button.



Confirm that the computer meets these minimum requirements and click on the "Next" button.



Enter the name and company information of the user. To utilize the software as a registered version, please type in the company information exactly as written on the software CD. Continue by clicking on the "Next" button.



Utilize the default directory C:\Program Files\Koehler. Click on the "Next" button to continue.



Utilize the default data directory C:\Program Files\Koehler\data. Click on the "Next" button to continue. Then, select "Custom" to copy all programs and a demo database. Click the "Next" button to continue.



Review the program settings. Click "Next" to continue.



Verify that all each box of the four components are checked and click on the "Next" button.



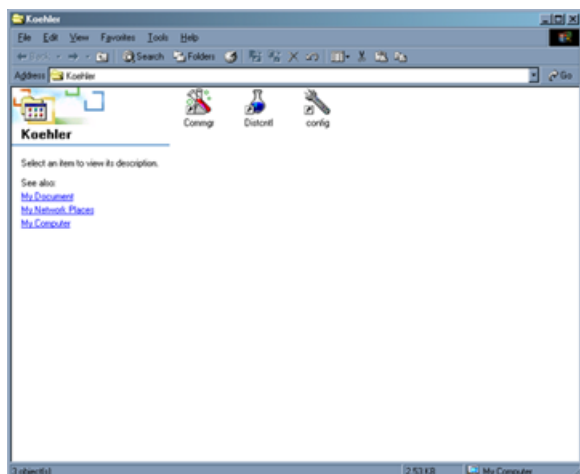
Wait while the setup program installs the needed program files.



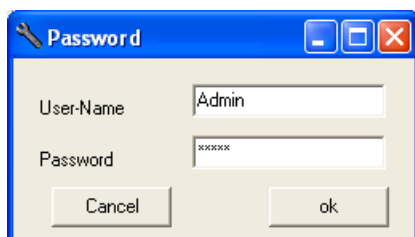
Select or create a folder the add program icons to. Click "Next" to continue.



The setup program will require the PC to be restarted after installation. Please select the radio button next to "Yes" and then click on the "finish button to restart.

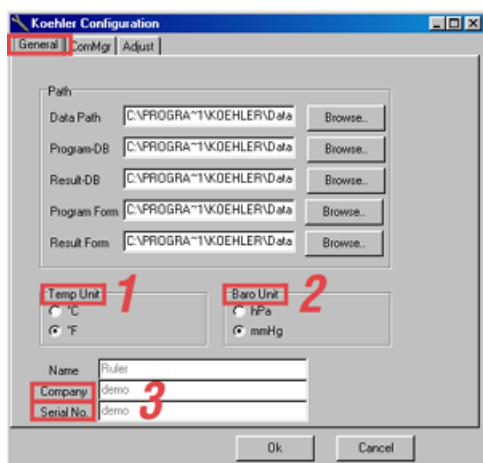


Restarting the program will create a folder with shortcuts for the various programs used to operate the distillation unit. Also, upon restart, the "Config" program will start automatically, and you will be prompted to enter a username and password.



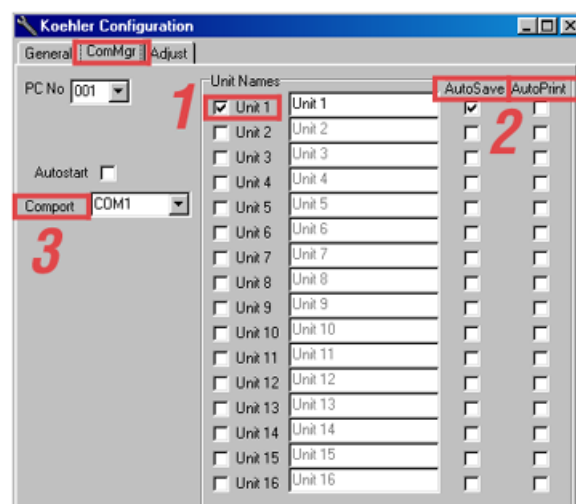
The default username is "admin" and the default password is "admin".

From the "Config" program, you can configure your system. After installation it is possible to run this program and to change parameters as necessary. Only use this program to change parameters, and do not try to make changes in the registry directly.

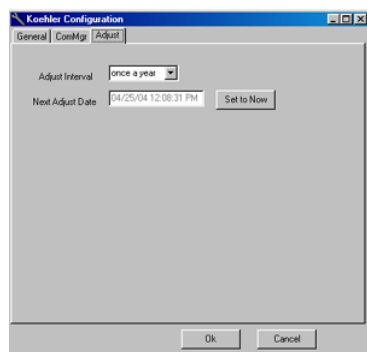


Select the "General" tab at the top of the screen. It is not recommended to alter the various paths; please consult with Koehler technical service. To change the units for temperature (1) and pressure (2), select the desired units by clicking on the corresponding radio buttons.

Registration (3). For demonstration you can input "DEMO" in the company and serial number fields. Upon starting the program, it will display "Demo Version". To register the program, please input the company name and the serial number exactly as listed on the registration code on the CD label. It is important to input the company name and serial number exactly as written; *note that these inputs are case-sensitive*. If not, an error message will appear when starting Commgr.exe that the software isn't correctly registered.



Click on the "ComMgr" tab. Select which analyzer is connected to the PC (1). If the "AutoSave" and "AutoPrint" features are desired, select accordingly for each item (2). Also, select the communication port where the first analyzer is connected (3).

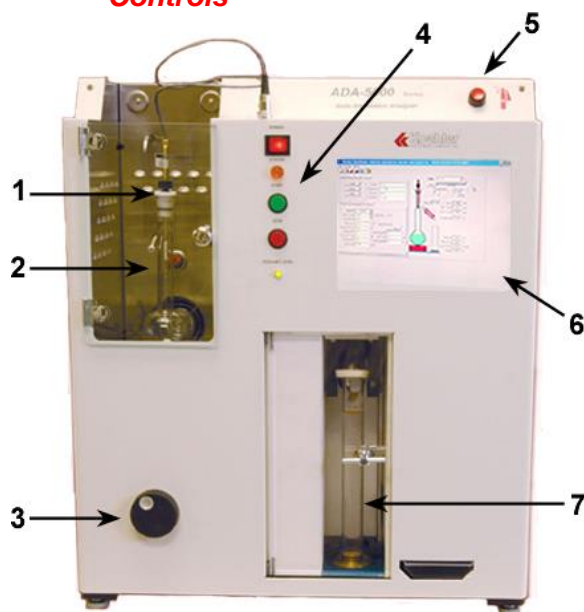


Click on the “Adjust” tab. Set the “Adjust Interval” to the desired interval for displaying a reminder of when the system should be calibrated.

Congratulations, the installation is finished.

and the standard test method before operating the instrument and it's software.

4.1 Description of Instrument Controls



1. Centering Stopper with PT100 probe
2. Distillation Flask
3. Stage Height Adjustment Knob
4. Control Buttons:
 - Power
 - Status
 - Start
 - Stop
 - Coolant Level Warning Light
5. Fire Extinguisher
6. Built in Touch Screen (K457XX-TS models only)
7. Receiver Chamber

4 Operation

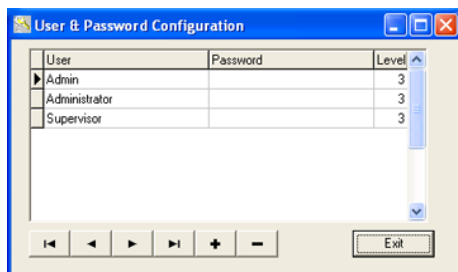
The Koehler Automatic Distillation Analyzer is designed for acquiring test data in accordance with the ASTM D86 and related test specifications. Please be sure to read the safety and hazard warnings, the installation procedure,

4.2 Instrument Operation

1. **Power.** Turn on the main power switch to the unit. Turn on the power switches on the PC and printer, if applicable. Note, the internal computer on the K457XX-TS models has a separate power switch and

must be powered on and off independently of the rest of the unit.

2. **Software.** After the PC has been properly booted, start the distillation software program by double clicking on the Koehler icon located on the computer desktop and set up the parameters as needed.
3. **User Setup.** In order to enter user accounts in the distillation software, go to C:\Programfiles\Koehler\bin\ConfigPW.exe. The software will prompt for a username and password to enter this function. The default username is "admin" and the default password is "admin". Use the "+" and "-" buttons to add and delete users along with their passwords and level access. Note, in order to save a new user to the memory, the "+" must be selected again.

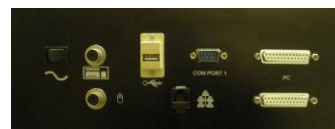


Access Levels:

3	Highest Access
2	Modification of test parameters only
1	No changes possible to test parameters, only operation of unit as already programmed.

4. **Test Summary.** The following steps are a summary of the setup for the distillation system and running the first sample.

1. Fix the PTFE plug with Pt100 to distillation flask and connect cable to the analyzer.
2. Connect the PC to the analyzer. On the K457XX-TS series with an internal PC, connect the adapter cable (25 pin to 9 pin) from port "To PC" to port "Com Port 1" or "Com Port 2". Make sure to select the corresponding "com port" in the software. (Refer to the Config section on page 16).



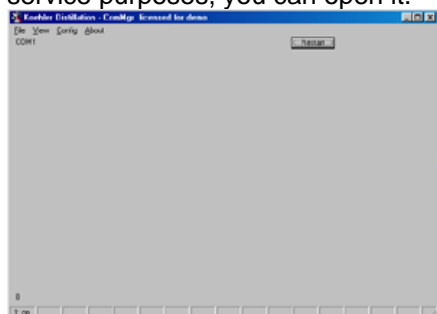
3. Switch on the analyzer. Pay attention that the yellow lamp of the analyzer blinks one time for unit number 1.
4. Install the software on the PC, if not pre-installed
5. To run the software program, double click on the Koehler icon on the computer desktop.
6. Do a calibration of the level follower system. Insert an empty and clean receiver cylinder into the receiver cylinder chamber and close the door. Press the "Stop" button for about 3 seconds. The level follower system starts auto-calibration.
7. Place the CERAN plate on heater.
8. Clean condenser tube.
9. Measure 100mL of a sample in the receiver cylinder.
10. Fill the sample in the flask.
11. Add some boiling stones into the flask, approximately 3 pieces.
12. Fix the Pt100 probe into the flask, paying attention for the correct position. Place the silicone stopper over the side arm of the distillation flask and then place it into the condenser tube.
13. Move the heater carefully under the flask.
14. Place the dropping plate into receiver cylinder.
15. Insert the receiver cylinder into the receiver cylinder chamber and close the door.
16. Select "Load" on "Distcntl.exe" and choose the appropriate program. The program will be loaded and sent automatically to the analyzer. The

yellow lamp on the analyzer starts to blink.

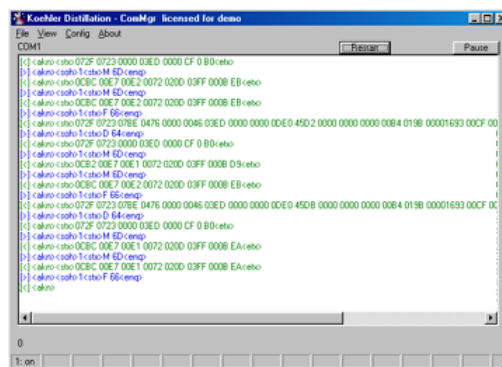
17. Select "Start" or press "Start" button on the analyzer to run your first sample.
18. If distillation is running, then the yellow lamp is continuously on.
19. The distillation run is finished if the yellow lamp is off and the level follower system is in the stand-by position.
20. Select "Save" to store the first run and select "Print" to print out the results to the printer.

4.3 Communication Manager

The program "COMMGR.EXE" is responsible for communication between the distillation analyzer and the PC. The communication runs with information over the RS232 port of the PC. All connected analyzers will be requested one after the other to send their information. A checksum at the end of each communication guarantees that request and answer is correct. If something is wrong, then the request will be sent once again. All information for an analyzer will be written into 2 files. The program into "name_of_unit_X.p2u" and the results into "name_of_unit_X.u2p". The "COMMGR.EXE" program normally runs in the background. For service purposes, you can open it.



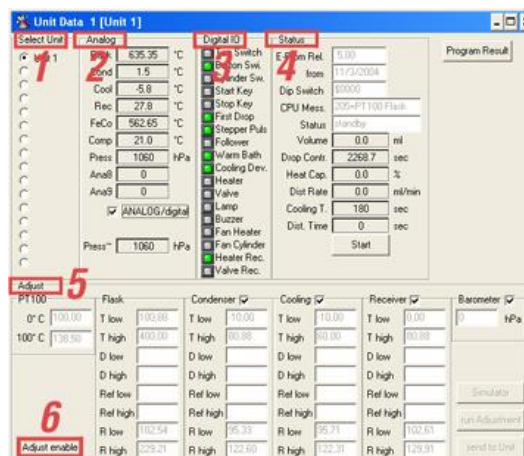
To observe the data transfer process from the PC to the analyzer, select the "View" option and then "Data Transfer".



In this window the data transfer from PC to analyzer (blue color) and answer from analyzer (green color) sent back to PC can be observed. Unit 1 get the order "D" and "64" is the checksum. The answer from unit 1 follows and "BC" is the checksum. The parameters which are set automatically by the configuration program are "9600-8N1" and cannot be changed.

If you select "File – File protocol", then all the data transmission will be written into a file named "..\Koehler\bin\COMMREP.TXT". In case of trouble with the communication, this file can be analyzed. Please don't forget to close the file ("File – File protocol"). Please note: If "Commgr.exe" is seen, then the data communication to read a distillation run will be reduced. It is possible that distilled volume is different than seen on the result window of "distcntl.exe". Use "commgr.exe" only for service and close it as soon as possible.

To observe the status of an analyzer from the PC, select the "View" option and then "Unit Data".



- **Select unit (1).** Select a connected analyzer to see all the important values of this analyzer.
- **Analog (2).** Temperature shown in °C of the flask, condenser tube, cooling device and receiver compartment can be seen. If the automatic dry point kit is installed and a thermocouple is connected, then the two temperatures, FeCo and compensation, can be observed.
- **Digital/IO (3).** The LED's show the status of all internal components. If an LED is "on", then the component is running. If you left click with the mouse on one of these components, then you can switch it on or off for a short moment to check it. A login request screen will appear to change these parameters. You will remain "logged in" until the software program is closed.
- **Status (4).** In the upper section the internal information of the analyzer is shown and the lower section shows information during a distillation run.
- **Adjust / Adjust Enable (5/6).** All calibration values are shown here. To change the calibration values, click on the "adjust enable" button (6). To perform an auto calibration on all temperature readings, click on "Run Adjustment" and follow the instructions in the pop-up boxes. In order to perform the calibration, you will need a Pt-100 simulator.



Create new program



View distillation status



View distillation results



View reference



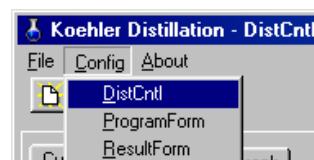
Compare graphical results



Click on this icon to access user password configuration.

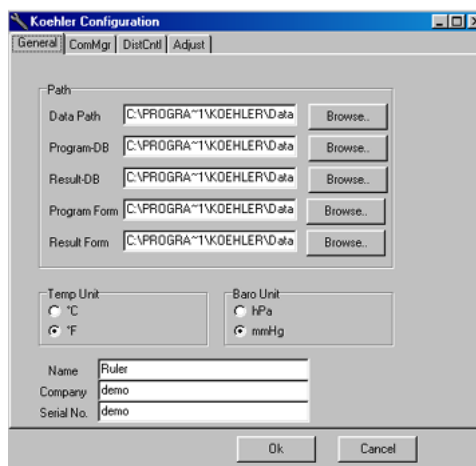
Menu File

To temporarily load a different ACCESS database then what was selected in the Config program go to **Menu Config** (select Config then DistCntl).

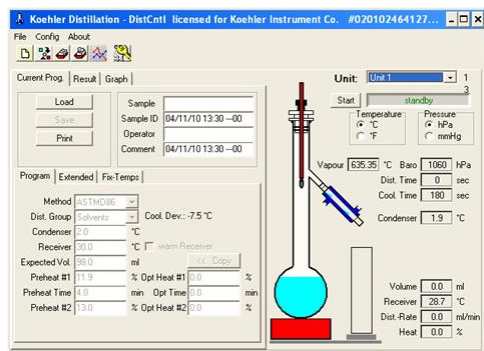


General

Change the path/directory to the database (compare "Config").



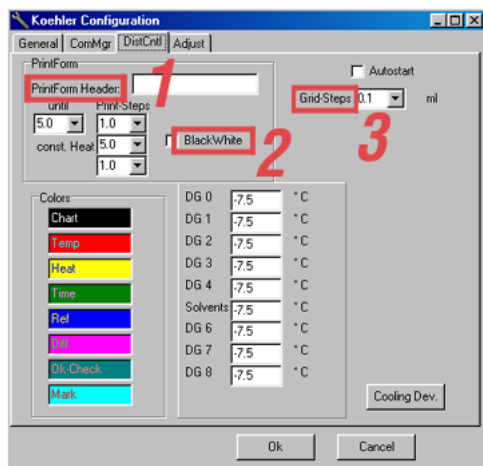
4.4 Distillation Control



This program window will appear after starting "distctnl.exe".

It is possible to change the path of the database, program form and results form. For a normal installation you can use this standard directory. If a PC is connected to a network, it's possible to have the database in a network directory for example. In this case, the customer must guarantee that files are available during the use of the programs; otherwise, an error message will appear and data could be lost. If any

changes are made, it's necessary to start the program again.



The Koehler Configuration dialog box is shown with the 'PrintForm' tab selected. Red numbers 1, 2, and 3 highlight specific fields: 1 points to the 'PrintForm Header' text box, 2 points to the 'BlackWhite' checkbox, and 3 points to the 'GridSteps' dropdown menu.

Print Form Header (1)

Input additional form header for print out form.

BlackWhite (2)

If "black/white" is selected, then the plot of the curve will be printed with a white background. If not, then the background is black.

Grid steps (3)

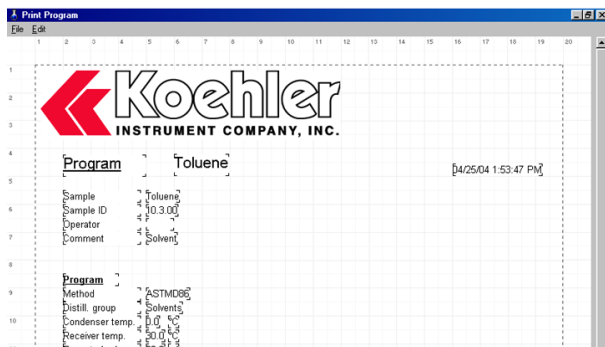
Select grid steps (0.1 – 0.5 – 1.0 – 5.0 – 10.0) for view on click on "Result" then click on "Dist.Data". This point has no influence if using the printer.

Cooling Dev.:

Compare cooling device for more detailed information how to use this point

Program Form

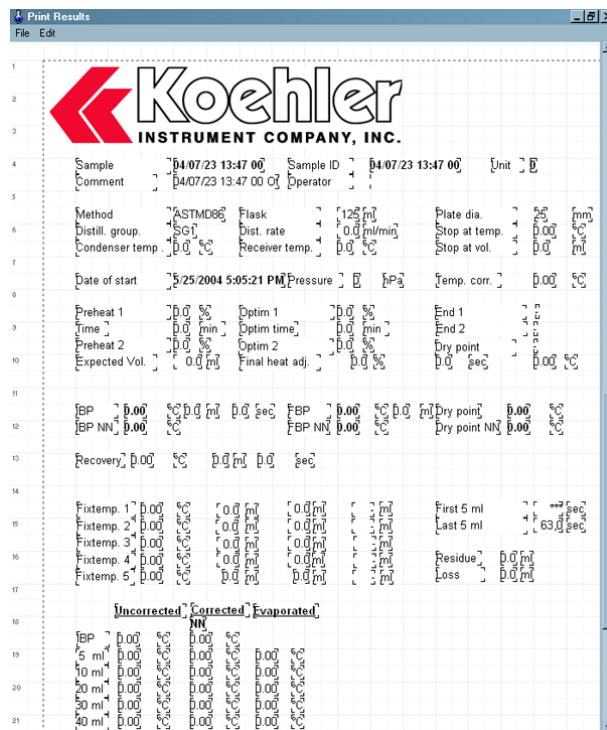
Select this item to change a program form.



The Print Program dialog box is shown with the 'Program' tab selected. It displays a form with fields for Program, Sample, Sample ID, Operator, Comment, Method, Distill. group, Condenser temp., Receiver temp., and Expected volume.

Results Form

Select this item to change a result form.



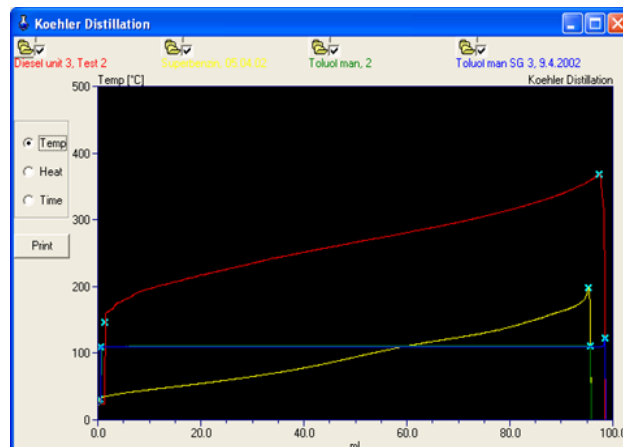
The Print Results dialog box is shown with the 'Print Results' tab selected. It displays a form with fields for Sample, Sample ID, Operator, Method, Distill. group, Condenser temp., Receiver temp., Date of start, Pressure, Temp. corr., Preheat 1, Preheat 2, Expected Vol., BP, BP NN, Recovery, First temp., First temp. 2, First temp. 3, First temp. 4, First temp. 5, First 5 ml, Last 5 ml, Residue, Loss, and various other parameters.

Be careful when changing a form. A backup of these forms can be found on the installation CD in directory \Backup.



Results Comparison

To compare up to 4 distillation results, select the graph button. You can compare temperature, heat, and time for up to four sets of data. Click on the box to make that graph active and click on the folder to open the data file.

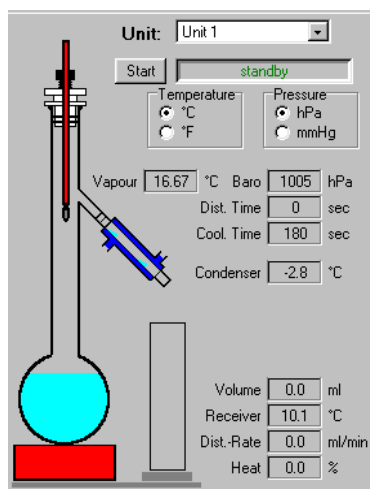


Menu About

A window with version number, programming date and checksum of distcntl appears.



4.5 Current Program

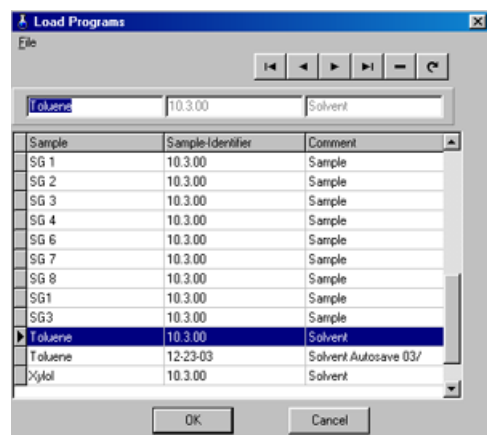


Unit

Select analyzer

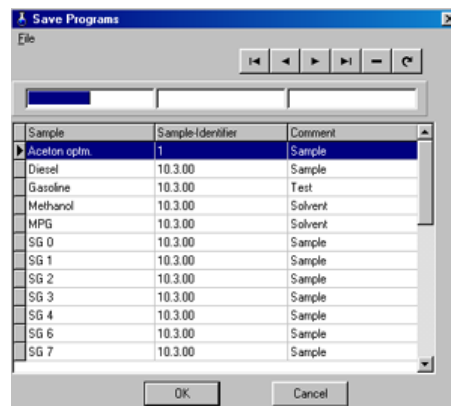
Load

Select item to load a new program from the database. Attention: Program will be sent automatically to selected analyzer and overwrite an existing previous run. If desired, store or print an existing run before loading new program.



Save

Select item to store program into the database.



Print

Select item to print out program of selected analyzer. To change form, go to Config then ProgramForm.

Sample Print Out

Program	Diesel		
Sample	Diesel		
Sample ID	12.9.00		
Operator	Koehler		
Comment	Sample		
Program			
Method	ASTM D86		
Distillation Group	SG4		
Condenser temp.	40.0°C		
Receiver temp.	30.0°C		
Expected volume	98.0 mL		
Preheat 1	29.1%		
Preheat time	3.0 min		
Preheat 2	28.2%		
Extended		Fix-temps.	
Plate hole	50 mm	Fixtemp. 1	170.00 °C
Flask type	125 mL	Fixtemp. 2	180.00 °C
Distill. Rate	4.5 mL	Fixtemp. 3	190.00 °C
Final heat adj.	100.0%	Fixtemp. 4	210.00 °C
Stop at volume	420.00°C	Fixtemp. 5	270.00 °C
Solvent off Time	0.7 sec		
Solvent off Temp	0.0 °C		
Corr. Temp	0.00 °C		

Method

Select method (ASTM D86, D1078, D850, DIN 51751)

Dist.Group

Select distillation group (DG 0-3, DG 4, DG Solvents, DG 7,8, DG 6)

Condenser

Input condenser temperature.

Receiver

Input temperature to cool down the receiver compartment. To warm the receiver chamber, select the box and enter the desired temperature. Note that cooling only works if the condenser setpoint temperature is within 0.5°C of the actual condenser temperature.

Expected Vol.

Input your expected volume.
According to the standard, 5mL before this point heat capacity will not changed

Preheat #1

The first step of the pre-heating for the flask. This step influences mainly the time interval up to the first drop.

Preheat Time

Time in minutes for the adjusted first heating step (standard 3 minutes).

Preheat #2

Second step of the pre-heating capacity for the flask. This step influences mainly the rate of distillation of the first 2 mL. After 2mL the microprocessor of distillation analyzer will regulate the desired distillation rate.

Opt. Heat #1

If distillation run has finished, (min. 30 mL are necessary) microprocessor system of distillation analyzer will calculate optimized value. According to the distillation group a heating rate will be calculated to get a time for IBP of 300 sec in group 1-3, or 600 sec in group 4.

Opt Time

Optimized time for preheat step 1 will be calculated by microprocessor of distillation analyzer.

Opt Heat #2

If distillation run has finished, (min. 30 mL are necessary) microprocessor system of distillation analyzer will calculate optimized value to get desired distillation rate for the first 2 mL.

Select „COPY“ to use optimized values for next distillation run.

Extended

Program	Extended	Fix-Temps
Plate Hole	25	mm
Flask Typ	200	ml
Distillation Rate	0.0	ml/min
Final Heat Adjust	0.00	%
Stop at Vol.	0.0	ml
Stop at Temp	0.00	°C
T.-Corr.	0.00	°C
Stop at Dry Point	no	
Solvents off Time	0.0	sec
Solvents off Temp	0.0	°C

Plate hole

Select ceran plate (25mm, 32mm, 38mm, 50mm)

Flask Type

Select flask type (125mL, 200mL)

Distillation Rate

Input distillation rate. According to the standard, a rate between 4 mL/min and 5 mL/min is requested. Use 4.5 mL/min.

Final Heat Adjust

If last 5 mL of distillation run are not in the time, correction of heating capacity upwards or downwards is possible. Heat capacity at constant heat (5mL before 'Expected volume') is set to 100%. Correction of $\pm 20\%$ is possible.

Stop At Vol.

The distillation run can be interrupted at selected volume if the entire volume is not necessary.

Stop At Temp.

The distillation run can be interrupted at a selected temperature if the entire volume is not necessary.

Stop at Dry Point

Select "No" to stop distillation run after detecting dry point, or "Yes" to wait for FBP.

Solvents off Time

Look at info on dry point on how to set this point.

Solvents off Temp

Look at info on dry point on how to set this point.

Fix-Temps

If a temperature is set, the according volume will be shown.

Program	Extended	Fix-Temps
Fix Temp. 1	0.00	°C
Fix Temp. 2	0.00	°C
Fix Temp. 3	0.00	°C
Fix Temp. 4	0.00	°C
Fix Temp. 5	0.00	°C
Fix Temp. 6	0.00	°C
Fix Temp. 7	0.00	°C
Fix Temp. 8	0.00	°C
Fix Temp. 9	0.00	°C
Fix Temp. 10	0.00	°C

Fix Temp 1-5

First 5 fix temperatures are generated in the distillation analyzer and available after the distillation run. These temperature points can be written in print out form.

Fix Temp 6-100

These fix temperatures are stored in a memo field of the database and are online available.

Program – Extended - Fix-Temps

Final Results

All important values are shown online here. That means if the IBP was detected, it can be seen immediately. After a distillation run has finished (yellow lamp at front panel is off and level follower is in the standby position), the residue can be input to calculate the loss and evaporated volume. "First 5ml" and "Last 5ml" will be calculated to check for a standard distillation run.

Current Prog.	Result	Graph
Load	Sample: 04/07/23 13:47 00	
Save	Sample ID: 04/07/23 13:47 00	
Print	Operator:	
	Comment: 04/07/23 13:47 00 Of	
Program	Extended	Fix-Temps
Start	5/25/2004	5:05:21 P
	0.0	ml
IBP	0.0	ml
FBP	0.0	ml
Rec	0.0	ml
Loss	0.0	ml
1st 5ml		sec
End 1:		

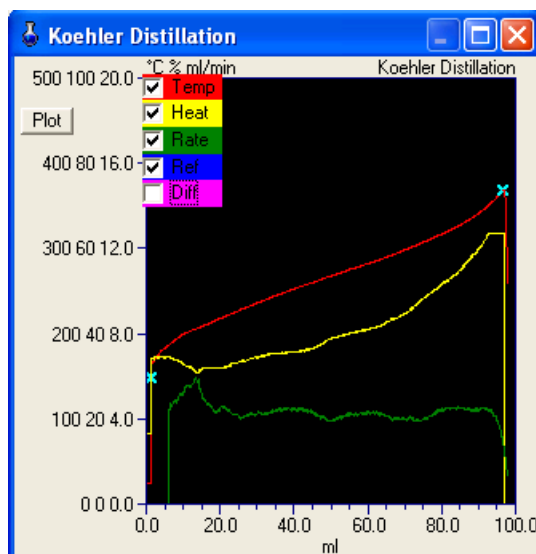
Dist.Data

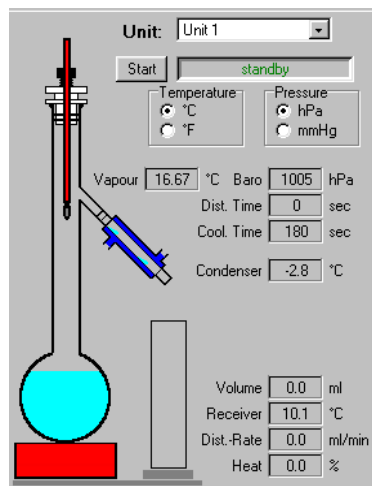
Volume, recovered temp., corrected temp., evaporated temp., dist rate and heat capacity will be printed. Steps can be changed in "Config" then "Menu".

Result	Graph
Load	Sample: Results
Save	Sample ID:
Print	Operator:
	Comment:
Extended	Fix-Temps
Final Results	Dist. Data
Volume	Recover
Corrected	Evaporated
Rate	Heat

Graph

Temperature, heat and rate curves are shown online during the distillation run. Scale of all 3 curves can be changed by pressing right mouse button.





Unit: Select analyzer

Start/Stop button: Click button, to start or to stop a distillation run of selected analyzer. Status of analyzer will be shown.

Temperature: Temperatures in °C or °F are possible. Please note, that program works internally with °C and all temperatures stored in the data base are also in °C. If a distillation run is to be recalled, it is shown in the units that it was run. A recalled distillation run made in °F will shown in °F. To export values out of the ACCESS database by an installed full version of ACCESS, it must manually calculated to °F if desired.

Pressure: Pressure in hPa and mmHg can be selected.

Flask: Actual flask temperature is shown according selected unit.

Baro: Actual pressure is shown according selected unit.

Dist Time: Complete distillation time since start is shown.

Cool Time: Timer for cooling device.

Condenser: Shows actual temperature of condenser tube

Volume: Shows actual volume of selected analyzer

Receiver: Shows actual temperature of receiver compartment

Dist. Rate: Shows actual dist. rate

Heat: Shows actual heat capacity.

4.6 Diskstat.exe

A graphical overview of all connected analyzers is shown. If "AutoSave" is selected, then it is necessary to start this program. At start-up of the program, it's possible that an error-message appears with "PT100 defective". Select OK (three times) to run the program.



4.7 Config.exe

It is possible to store the database and forms in any chosen directory. In a normal case use the local directory. Koehler software can also be used in a network system.

DataPath - Program-DB - Result-DB -
ProgramForm - ResultsForm

Temp Unit: Select unit: °C °F

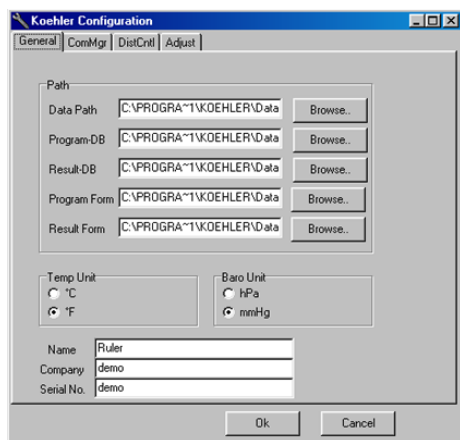
Baro Unit: Select unit hPa or mmHg

Name: Input your name

Company: Input company name exactly as is shown on the registration form

Serial No: Input serial number exactly as is shown on the registration form.

Compare "Install of software" for details.



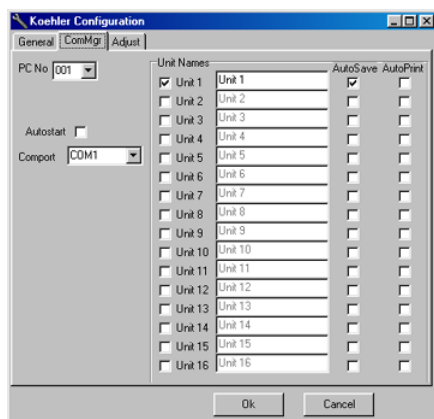
4.8 ComMgr

PC No: Input PC number. (standard 001)

Communication Port: Select “com port” where interface adapter is connected.

Unit Names: Select which analyzers are connected.

AutoSave: If autosave is desired, select analyzer. Each analyzer can be selected separately.

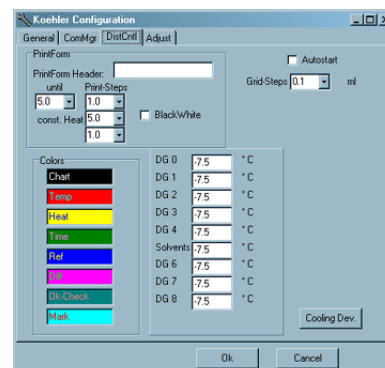


4.9 DistCntl

Grid Steps – PrintForm – PrintFormHeader

Data Base: The Koehler software uses a standard ACCESS database to store programs and results. “Program.mdb” contains all stored programs and “Result.mdb” contains all made distillation runs. It is not allowed to manipulate or change values in the database by an external programs because of possible data loss. It is only allowed to read data out of the data base

for export or a LIMS system. In this case a full installed version of ACCESS is necessary (not included). For backup use these files.



5 Safety Features

The Koehler Automatic Distillation Analyzer is equipped with several safety and protection features, which are described in the following sections.

5.1 Flask Heater Compartment and Auto Fire Extinguisher

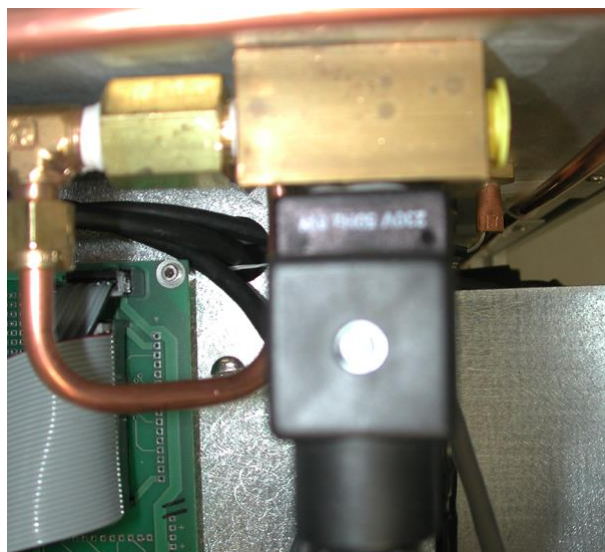
The design of the flask heater compartment makes this instrument one of the safest automatic distillation units available. The physical dimensions of the heater compartment are in compliance with the ASTM suggested specifications. The side walls are insulated with asbestos-free heat resistant material and the door is made of polycarbonate.

The heater compartment has an optical fire sensor mounted on the back wall. This sensor continuously monitors the compartment to watch for flask fires that are usually caused by cracked or broken boiling flasks. In the event of a fire, the instrument will automatically turn off power to the critical components. Because of the fire potential, it is recommended that the instrument be operated within visual and audible range of the operators. The instrument should not be located under or near ceiling mounted sprinkler type fire extinguishing heads. The area above the distillation unit should be fireproof also. From time to time, especially after a fire, the sensor must be cleaned and checked (possibly with a lighter) to determine if the function is ok. The part wears over time. Therefore it must be changed in case of malfunction!

The automatic nitrogen fire extinguishing system will inject a 3.0 second burst of nitrogen gas into the compartment to remove all oxygen from the heater compartment thus extinguishing the flame. The spilled volume is collected in the stainless steel collection pan just below the heater assembly. This liquid can then be drained out of the pan by opening the stopcock on the left side of the instrument. Instead of nitrogen, a CO₂ supply can also be used.

CAUTION!

The stop cock should be kept in the closed position during normal operation. Take care not to burn yourself when removing spilled materials from the catch pan.



The nitrogen supply can be connected to the valve behind the distillation compartment. To access this area, remove the top panel. Connect the nitrogen supply where the yellow plug is shown in the above photo.

6 Maintenance

WARNING. Disconnect power to the unit before servicing to avoid exposure to high voltages and/or temperatures which may result in personal injury or death. If you have any questions about maintaining your equipment, please do not hesitate to contact the Koehler technical service department.

6.1 Routine Maintenance

The Koehler Automatic Distillation Analyzer requires routine maintenance to provide many years of continuous service. Over the course of time, some instrument parts may need to be replaced.

6.2 Replacement Parts

When ordering replacement part(s), please provide the model number, serial number, and product shipment date of your equipment so that we can ensure you will receive the proper replacement part(s).

Part Number	Replacement Part
354-040-003	TRIAC 40A
300-000-002	Emitter Diode
300-000-001	Receiver Diode
K45601-03014	Wiper for condenser tube
K45650	Resistance Thermometer PT100 with cable & plug for detection of distillation temperature
K45658	Heating coils for flask heater
K45658-A	Ceramic Coil Supports (set of four (4))
K45651-D	(Thiokol) Viton O-ring for use with K45651-E
K45614	Stepper Motor PC Board
K45623	Main Power Supply PC Board
K45681	Power PC Board w/ Heat Option
K45632	Fire Sensor Assembly for Nitrogen System
354-002-010	Power Resistor, 10Ω, Aluminum
481-004-002	Fuse Base for Heater
K45630	1.0A, time lag
K45631	0.63A, time lag
K45662-A	6.3A, time lag
K45663	1.6A, time lag

7 Service

Under normal operating conditions and with routine maintenance, the Automatic Distillation Analyzer should not require service. Any service problem can be quickly resolved by contacting Koehler's technical service department either by letter, phone, fax, or email. In order to assure the fastest possible service, please provide us with the following information.

Model Number: _____

Serial Number: _____

Date of Shipment: _____

8 Storage

This laboratory test instrument is equipped with electrical components. Storage facilities should be consistent with an indoor laboratory environment. This testing equipment should not be subjected to extremes of temperature and/or moisture.

This equipment was shipped from the factory in a corrugated cardboard container. If long term storage is anticipated, re-packing the instrument in a water-resistant container is recommended to ensure equipment safety and longevity.

9 Warranty

We, at Koehler, would like to thank you for your equipment purchase, which is protected by the following warranty. If within one (1) year from the date of receipt, but no longer than fifteen (15) months from the date of shipment, Koehler equipment fails to perform properly because of defects in materials or workmanship, Koehler Instrument Company, Inc. will repair or, at its sole discretion, replace the equipment without charge F.O.B. its plant, provided the equipment has been properly installed, operated, and maintained. Koehler Instrument Company must be advised in writing of the malfunction and authorize the return of the product to the factory. The sole responsibility of Koehler Instrument Company and the purchaser's exclusive remedy for any claim arising out of the purchase of any product is the repair or replacement of the product. In no event shall the cost of the purchaser's remedy exceed the purchase price, nor shall Koehler Instrument Company be liable for any special, indirect, incidental, consequential, or exemplary damages. KOEHLER INSTRUMENT COMPANY, INC. DISCLAIMS ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING ANY IMPLIED WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE. Please save the shipping carton in the event the equipment needs to be returned to the factory for warranty repair. If the carton is discarded, it will be the purchaser's responsibility to provide an appropriate shipping carton.

10 Returned Goods Policy

To return products for credit or replacement, please contact Koehler Customer Service with your purchase order number, our packing list/invoice number, the item(s) to be returned and the reason for the return. You will be issued a Returned Authorization (RA) number, which must be prominently displayed on the shipping container when you return the material to our plant. Shipping containers without an RA number prominently displayed will be returned to the sender. Goods must be returned freight prepaid. Returns will be subject to a restocking charge, the application of which will depend upon the circumstances necessitating the return. Some returns cannot be authorized, including certain products purchased from outside vendors for the convenience of the customer, products manufactured on special order, products shipped from the factory past ninety (90) days, and products which have been used or modified in such a way that they cannot be returned to stock for future sale.



Notes

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.