

Technical data sheet

## K-365 Kjel Line

## **Kjel Line**

Due to its modular concept the Kjel systems can be adapted to various needs. The different instrument configurations allow to meet different application requirements.

### **A) Three instrument performance levels**

- EasyKjel: Entry level unit
- BasicKjel: Intermediate unit
- MultiKjel: Advanced unit

### **B) Splash protectors**

Devarda splash protector (glass only):

- designed to protect the condenser from splashes caused by the Devarda alloy reaction and the steam distillation

Kjeldahl splash protector:

- designed to protect the condenser from splashes caused by the steam distillation

Advantage of the plastic splash protector:

- increased durability to sodium hydroxide and extended lifetime

Advantage of the glass splash protector:

- visual monitoring of the distillation process makes method development more convenient

### **C) Application versatility**

All Kjel systems are designed to distill analytes of the Kjeldahl method:

- Protein
- Total Kjeldahl Nitrogen (TKN)  
Non-Protein Nitrogen (NPN)  
Total Volatile Basic Nitrogen (TVBN)
- Ammonia
- Nitrate/nitrite
- Casein

### **D) External titrator**

Various titrators can be connected to the MultiKjel systems:

- Metrohm (Eco Titrator and TitrinoPlus 848/877)
- SI Analytics (TitroLine 5000, TitroLine 7000 and Titronic 300)
- Mettler Toledo (G10S, G20S, T5, T7 and T9)

All other titrator models can be used via a semi automated integration.

## Scope of delivery

All configurations are supplied ready to use.

	EasyKjel	BasicKjel	MultiKjel
Instrument	1	1	1
Splash protector	1*	1*	1*
Titration set	-	-	*
External titrator	-	-	*
Recirculating chiller	*	*	*
Power cable	1	1	1
Sample tube (300 mL)	1	1	1
Tanks (10 L)	2	1	2
Cap Set, 10 L tank	2	1	2
Tank (20 L)	-	1	1
Cap Set, 20 L tank	-	1	1
Suction tube tank	1	3	4
Tank labels	1	2	3
Hose for chemical feed (2 m)	2	3	4
Hose for cooling water feed (1.5 m)	1	1	1
Hose for cooling water drain (3 m)	1	1	1
Hose for peristaltic pump (2.5 m)	-	*	2
Pair of glass tongs	1	1	1
Hose for instrument drain	1	*	-
Hose clips reagent pumps	2	3	4
Hose clip peristaltic pumps	-	*	2

\* According to order code

## Order code EasyKjel

Choose the configuration according to your needs:

1 1 K 3 6 5 1 1 0

Splash Protector

- 1 Glass with Dosing Inlet
- 2 Plastic with Dosing Inlet
- 3 Devarda

Recirculation Chiller

- 0 None
- 1 F-314 230V

## Order code BasicKjel

Choose the configuration according to your needs:

1 1 K 3 6 5 2 1

Configuration

- 0 Base Unit
- 1 Base Unit with Sample Tube Aspiration
- 2 Base Unit with Sample Tube Aspiration and I-300 Pro

Splash Protector

- 1 Glass with Dosing Inlet
- 2 Plastic with Dosing Inlet
- 3 Devarda

Recirculation Chiller

- 0 None
- 1 F-314 230V

## Order code MultiKjel

Choose the configuration according to your needs:

1 1 K 3 6 5 3 1

### Configuration

- 0 Base Unit
- 1 Base Unit with Titration Setup and Receiver Waste Aspiration
- 2 Base Unit with Titration Setup, Receiver Waste Aspiration and Metrohm Eco Titrator (potentiometric)
- 3 Base Unit with Titration Setup, Receiver Waste Aspiration and Metrohm Eco Titrator (colorimetric), only with glass splash protector

### Splash Protector

- 1 Glass with Dosing Inlet
- 2 Plastic with Dosing Inlet
- 3 Devarda

### Recirculation Chiller

- 0 None
- 1 F-314 230V

## Technical data

### K-365 Kjel Line

	EasyKjel	BasicKjel	MultiKjel
Dimensions (W x D x H)	320 x 400 x 730 mm	320 x 400 x 730 mm	320 x 400 x 730 mm
Weight	23 kg	23 kg	23 kg
Connection voltage	220 - 240 ± 10 % VAC	220 - 240 ± 10 % VAC	220 - 240 ± 10 % VAC
Power consumption	2100 W	2100 W	2100 W
Frequency	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz
IP Code	IP20	IP20	IP20
Pollution degree	2	2	2
Overvoltage category	II	II	II
Tap water pressure	1 - 10 bar	1 - 10 bar	1 - 10 bar
Tap water condition (If the temperature is more than 25°C use a recirculating chiller)	1 - 25°C	1 - 25°C	1 - 25°C
Tap water consumption	~ 1.2 L/min	~ 1.2 L/min	~ 1.2 L/min
Approvals	CE, CSA	CE, CSA	CE, CSA

## Analysis specifications

	EasyKjel	Basickjel	MultiKjel
Measuring range N	0.02 – 220 mg	0.02 – 220 mg	0.02 – 220 mg
Analytes	Protein, Total Kjeldahl Nitrogen (TKN), Non-Protein Nitrogen (NPN), Total Volatile Basic Nitrogen (TVBN), Ammonia, Nitrate/Nitrite and Casein		
Analysis time for 30 mg N (With Metrohm Eco Titrator without titrator preparation)	-	-	3.5 min
Analysis time for 200 mg N (With Metrohm Eco Titrator without titrator preparation)	-	-	5 min
LOD (Limit of Detection) of N	-	-	0.007 mg
LOQ (Limit of Quantification) of N	-	-	0.02 mg
Recovery (From 1 - 220 mg N)	N: >98% with digestion process N: >99.5% (direct distillation)	N: >98% with digestion process N: >99.5% (direct distillation)	N: >98% with digestion process N: >99.5% (direct distillation)
Measurement reproducibility (Direct distillation of 1 mg N absolute and 300 sec. distillation)	< 0.8 %	< 0.8 %	< 0.8 %

## Instrument specifications

	EasyKjel	Basickjel	MultiKjel
Distillation capacity (100%)	~ 40 mL/min	~ 40 mL/min	~ 40 mL/min
Distillation capacity (10%)	~ 12.5 mL/min	~ 12.5 mL/min	~ 12.5 mL/min
Adjustable distillation power	10 - 100%	10 - 100%	10 - 100%
MaxAccuracy Mode (Compensation of power grid fluctuations by voltage stabilizer)	Yes	Yes	Yes
Distillate reproducibility (RSD) (At 300 seconds distillation time)	<1%	<1%	<1%
AutoDist Mode (Automatic detection of the condensation start)	No	Yes	Yes
NaOH pump	Yes	Yes	Yes
H <sub>2</sub> O pump	No	Yes	Yes
Acid pump	No	No	No
Boric acid pump	No	No	Yes
Automatic sample disposal	No	Optional	Yes
Automatic receiver disposal	No	No	Optional
Safety sensors (safety door sensor, cooling water temperature sensor, sample tube in-place sensor, steam generator overpressure sensor)	Yes	Yes	Yes
Titration vessel	No	No	Optional
Titrator connection	No	No	Optional
IQ/OQ	No	Yes	Yes

## Interface specifications

	Interface	Interface pro
	EasyKjel, Basickjel	Basickjel (option), MultiKjel
Display	LCD color, 4.3 in	LCD color, 7.0 in
Control elements	Buttons / control knob	Touch-screen / control knob
Max. number of methods	8	96
Max. number of determinations	36	512
Max. number of determinations per series	16	32
Max. number of templates	4	16
Max. number of users	4	32
Max. number of determination results	40	256
Language	en, de, fr, it, es, pt, ja, zh, ru, pl, ko, id	en, de, fr, it, es, pt, ja, zh, ru, pl, ko, id

## Connections

	EasyKjel	Basickjel	MultiKjel
LAN port	-	-	1
BUCHI standard communication ports (COM)	2	2	3
Stirrer port	-	-	1
Level detection sensor port	1	1	1
H <sub>2</sub> O tank level sensor port	1	1	1
H <sub>3</sub> BO <sub>3</sub> tank level sensor port	-	-	1
Acid tank level sensor port	-	-	-
NaOH tank level sensor port	1	1	1
Waste tank level sensor port	-	option	2
Dispenser port (RS-232)	-	-	1
Titrator port (RS-232)	-	-	1
USB port	-	option	1

## Ambient conditions

For indoor use only.

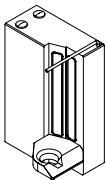
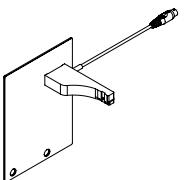
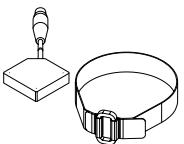
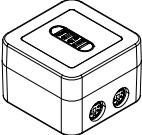
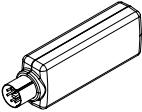
Max. altitude above sea level	2000 m
Ambient and storage temperature	5–40 °C
Maximum relative humidity	80% for temperatures up to 31 °C decreasing linearly to 50 % relative humidity at 40 °C

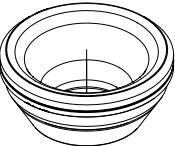
## Materials

Component	Materials of construction
Housing	Polyurethane
Housing electric	Stainless steel
Steam generator housing	Stainless steel
Housing stirrer	Glass fiber reinforced polypropylene
Rear cover	Polyvinyl chloride
Glass parts	Borosilicate 3.3
Plastic splash protector	Glass fiber reinforced polypropylene
Protective cover	PMMA
Sealing	CSM
NaOH hose	EPDM
Three-way valve	PP / PE

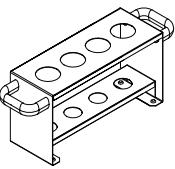
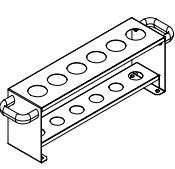
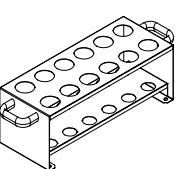
## Spare parts and accessories

### Accessories

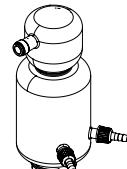
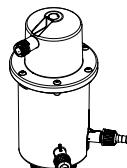
	Order no.	Image
Reaction detection sensor	11072666	
Detects the optimal alkalization point, saves up to 30 % of NaOH in every determination, saves resources and reduces the ecological footprint		
OnLevel sensor	11070270	
Sensor to set the desired distilled volume in the receiving vessel, for most reproducible results in every determination		
Tank level sensor kit	11072294	
Detects the current reagent / water / waste level in the tank, for higher convenience and smooth operation during runs		
Eco Titrator	11072748	
Including pre-defined methods for MultiKjel / MultiDist and connection to enable automatic titration		
StatusLight cpl., incl. communication cable	11068959	
Indicates the status of the instrument (instrument is ready to use, has an error or is in operation).		
BUCHI Bluetooth® Dongle, connects instrument to smartphone via Bluetooth®	11067770	

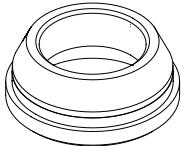
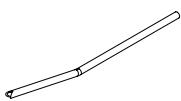
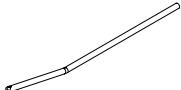
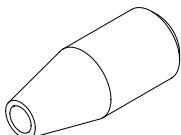
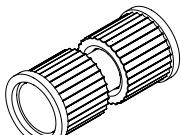
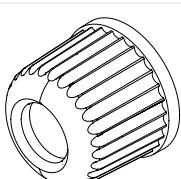
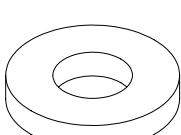
	Order no.	Image
Adapter for 3rd party sample tubes Adapter setup for other sample tubes (250 mL), sealing included	11072398	
Sealing for sample tube 3rd party adapter	11072180	

## Racks and rack parts

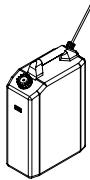
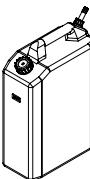
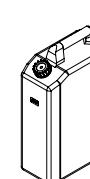
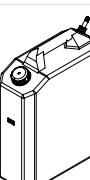
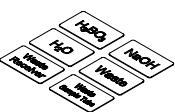
	Order no.	Image
Sample tube holder (4x 500 mL tubes)	016951	
Sample tube holder (6 x 300 mL tubes)	043039	
Sample tube holder (12 x 300 mL tubes)	043041	
Dispenser unit Titronic 300 For back titration, including connection cable to distillation unit	11075111	

## Splash protector spare parts

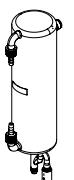
	Order no.	Image
Glass splash protector For visible distillation processes.	11071013	
Plastic splash protector The most durable splash protector.	11070670	

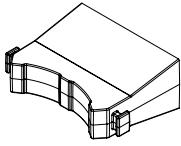
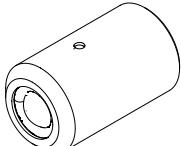
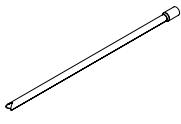
	Order no.	Image
Devarda splash protector Prevents from foaming into the condenser.	11071014	
Sealing sample tube to splash protector	11073674	
Steam inlet tubing to sample tube	043424	
Steam inlet tubing to sample tube (750 mL)	043119	
Connecting piece (CSM) Rubber piece between splash protector and steam outlet tube, alkali-resistant.	019002	
Bridge splash protector to condenser	11070620	
Cap nut GL14	033577	
Hose barbs, set. 4 pcs, straight, GL 14, FPM seal Content: Hose barbs, cap nuts, seals.	040296	
Seals, set. 10 pcs, for hose barbs GL 14, FPM, green	040040	

## Tank spare parts

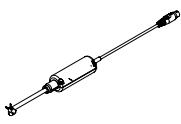
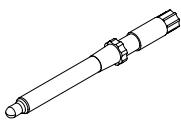
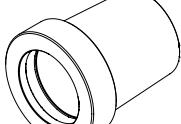
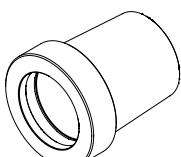
	Order no.	Image
Cap set, 10L tank	11073639	
Storage tank (10 L) for chemicals	043468	
Storage tank (10 L) for waste	043470	
Storage tank (10 L) with level sensor for waste	043474	
Cap Set, 20 L tank	11072174	
Storage tank (20 L) for chemicals	043469	
Caps included		
Storage tank (20 L) for waste	043471	
Caps included		
Tank labels	043434	

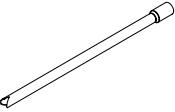
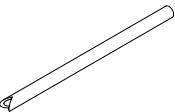
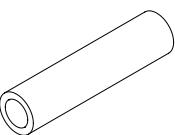
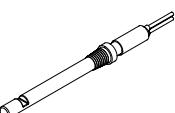
## Condenser spare parts

	Order no.	Image
Glass condenser with check valve	11072183	

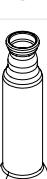
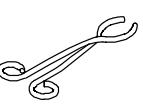
	Order no.	Image
Clamp for condenser	11066868	
Rubber band	11070669	
Holding the glass condenser		
Check valve	11071740	
For overpressure safety		
Dist. Outlet PTFE L=300 for receiver side	11071940	

## Titration related parts

	Order no.	Image
Receiving vessel 420 mL	043390	
Stirrer	11070246	
For the receiving vessel.		
pH Electrode glass, refillable	11065834	
For potentiometric titrations.		
pH Electrode gel, maintenance-free	11056842	
For potentiometric titrations.		
Clamp cone pH-electrode	11069793	

	Order no.	Image
Hose Tygon Ø 8.0 x 4.8 Hose to receiving module (waste aspiration, boric acid dosing)	043364	
Receiving support For attaching the receiving vessel to the distillation unit	11071003	
Condensate outlet to receiving module, PTFE	11071941	
Aspiration tubing receiving vessel	11072589	
H <sub>3</sub> BO <sub>3</sub> tubing receiving vessel For dosing H <sub>3</sub> BO <sub>3</sub>	11072637	
Colorimetric sensor (Optrode) For colorimetric titrations.	11066601	
Kit colorimetric titration (Optrode) Includes all Optrode accessories (w/o Optrode sensor and receiving vessel).	11068260	
Receiving vessel (Optrode) For colorimetric titrations with Optrode sensor.	11068263	

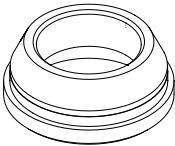
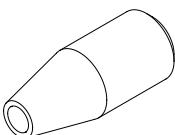
## Sample tubes

	Order no.	Image
Sample tubes micro (100 mL) 4 pcs.	11057442	
Sample tubes 300 mL 20 pcs.	11059690	
Sample tubes 300 mL For sample volumes up to 200 mL or 5 g in weight 4 pcs.	037377	
Sample tubes graduated 300 mL 4 pcs.	043049	
Sample tube 500 mL	026128	
Sample tubes 500 mL 4 pcs.	043982	
Set sample tube 750 mL with long suction tubing	11058999	
Pair of glass tongs	002004	

## Cable and tubing

Specification	Order no.	Image
Hose peristaltic pump out (2.5 m)	11071630	
Hose clips peristaltic pump hose	043586	
Hose to NaOH/ H <sub>2</sub> O/ H <sub>3</sub> BO <sub>3</sub> pumps or drain (2 m)	11072687	
Hose clip to NaOH/H <sub>2</sub> O/ H <sub>3</sub> BO <sub>3</sub> pumps or drain	043841	
Suction to tube tank (0.58 m)	043407	
Tap water hose cpl.	037780	
Cable to Metrohm & Mettler (T-series) titrator	043617	
To connect the Metrohm Titrino plus, a Metrohm remote box is needed, see also quick guide.		
Set of sealings tap water hose	040043	
Connection cable to SI-Analytics TitroLine/Titronic for K-365	043618	
Tubing to peristaltic pump	11070015	
Communication cable RJ45, 2 m	044989	
Connection between vacuum controller/interface and recirculating chiller, vacuum controller/interface and vacuum pump or steam distillation unit and Eco titrator.		

## Spare part bundles

	Order no.	Image
Sealing (CSM) with ring 4 pcs.	11085448	
Connecting piece (CSM) 4 pcs.	11085449	

## Consumables

	Order no.
2% boric acid pH 4.65 +/- 0.15 with Sher indicator, 5 L	11064972
4% boric acid pH 4.65 +/- 0.15 with Sher indicator, 5 L	11064973
4% boric acid pH 4.65 +/- 0.15 with bromocresol green / methyl red mixed indicator, 5 L	11064976
Buffer solution pH 4.00 ± 0.01	11064974
twin-neck bottle, 250 mL	
Buffer solution pH 7 ± 0.01	11064975
twin-neck bottle, 250 mL	
KCl electrolyte, saturated	11064978
Electrode storage solution, 250 mL	
Sher indicator 100 mL	003512
Color indicator for colorimetric titrations.	
Ammonium phosphate monobasic, 25 g	045527
Reference substance for the verification and OQ of the Kjeldahl distillation units.	
Weighing boats	11060522
Nitrogen-free weighing paper 58 x 10 x 10 mm, 100 pcs.	
Kjeldahl Tablets Titanium	11072627
For efficient digestions, 1000 tablets (3.5 g K <sub>2</sub> SO <sub>4</sub> / 0.105 g CuSO <sub>4</sub> * 5 H <sub>2</sub> O / 0.105 g TiO <sub>2</sub> )	
Kjeldahl Tablets Titanium Micro	11072628
For small sample sizes, 1000 tablets (1.5 g K <sub>2</sub> SO <sub>4</sub> / 0.045 g CuSO <sub>4</sub> * 5 H <sub>2</sub> O / 0.045 g TiO <sub>2</sub> )	
Kjeldahl Tablets Missouri	11072629
For efficient digestions without Titanium, 1000 tablets (4.98 g K <sub>2</sub> SO <sub>4</sub> / 0.02 g CuSO <sub>4</sub> * 5 H <sub>2</sub> O)	
Kjeldahl Tablets ECO	11072630
For eco-friendly digestions with minimum amount of copper, 1000 tablets (3.998 g K <sub>2</sub> SO <sub>4</sub> / 0.002 CuSO <sub>4</sub> * 5 H <sub>2</sub> O)	
Kjeldahl Tablets Antifoam	11072631
For foaming samples in digestions to avoid cross contamination due to foaming, 1000 tablets (0.97 g Na <sub>2</sub> SO <sub>4</sub> / 0.03 g Silicone)	
Kjeldahl Tablets Copper Micro	11072632
For small sample sizes without Titanium, 1000 tablets (1.5 g K <sub>2</sub> SO <sub>4</sub> / 0.15 g CuSO <sub>4</sub> * 5 H <sub>2</sub> O)	

## Maintenance kit

	Order no.
Customer Kit for Kjel Line	11073024
Including suction tube with connecting piece, gaskets and CSM seal with ring	

## Upgrade kits

We offer the following upgrade kits:

- Upgrade Basic base unit with aspiration pump
- Upgrade Basic base unit and aspiration pump with I-300 Pro
- Upgrade Basic base unit with aspiration pump and I-300 Pro
- Upgrade Multi base unit with titration vessel
- Upgrade MultiKjel to MultiDist unit with acid-resistant pump

For ordering these upgrades please contact your local service support.

## Documentation

	Order no.
IQ/OQ set BasicKjel & MultiKjel en	11073604
Including Eco Titrator if available	
Rep. OQ BasicKjel & MultiKjel en	11073605
Including Eco Titrator if available	
Kjeldahl Knowledge Base (EN)	11595478
Comprehensive guide covering all aspects of the theoretical and practical know-how.	
Kjeldahl Practice Guide (EN)	11592548
Provides theoretical background information, useful hints and calculation tables for daily routine work	
Kjeldahl Practice Guide (DE)	11592547
Kjeldahl Practice Guide (CN)	11592549



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