



License ID 459712  
Client ID 001-NBK-02361  
User Metrohm

Program version viva 2.1 - 60  
2020-07-08 11:34:35 UTC+2

## Method parameters

Method . . . . . Leveler determination (CVS, RC) auto 858  
method 2  
Method saving date . . . . . 2020-07-08 07:16:01 UTC+2  
Method version . . . . . 1  
Method group . . . . . Main group  
Method status . . . . . original  
Method saved by (full name) . . . . . Metrohm International Headquarters  
Method saved by (short name) . . . . . Metrohm

## START

### Main track

#### General

Workplace view

Current view . . . . . on

Track view for live window

Live display 1 . . . . . Main track

Live display 2 . . . . . Main track

Electrode check . . . . . on

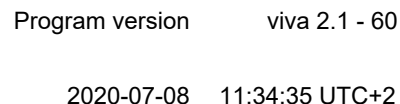
#### Application note

### Sample data variables

Name	Type	Assignment	Fixed value	Comment	Monitoring
ID1	Text	ID1		Sample identification 1	off
ID2	Text	ID2		Sample identification 2	off
ID3	Text	ID3		Sample identification 3	off
Sample type	Text	Sample type		Sample type	off
Sample position	Number	Sample position		Sample position number	off
Sample amount	Number	Sample amount		Sample amount	off
Sample amount unit	Text	Sample amount unit		Sample amount unit	off

Name . . . . . ID1  
Type . . . . . Text  
Assignment . . . . . on, . . . . . ID1  
Fixed value . . . . . off.  
Check at start . . . . . on  
Comment . . . . . Sample identification 1

Name . . . . . ID2  
Type . . . . . Text  
Assignment . . . . . on, . . . . . ID2



Name ..... Sample amount

AB 403: MVA-23 - Determination of leveler by RC with sample dilution

Call text	Track name	Sample type	Condition
Drain	Drain	off Sample	off

Call text	Track name	Sample type	Condition
CALL PREP Standard	PREP Standard	on Standard	off

Call text	Track name	Sample type	Condition
Add VMS	Electrolyte VMS	off Sample	off
Add suppressor	Electrolyte suppressor	off Sample	off
Add brightener	Electrolyte brightener	off Sample	off

Call text	Conditioning
Track name	VA track
Stop criteria	



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Evaluation quantity . . . . . on  
Voltammetry command . . . . . CVS  
Substance . . . . . Leveler  
Standard deviation . . . . . 2 %  
Number of runs . . . . . on  
Number of runs . . . . . 20  
Action . . . . . Cancel command  
Run time . . . . . off  
Condition . . . . . off

**CALL  
ELECTROL  
YTE**

**CALL ELECTROLYTE**

Call text . . . . . Measure electrolyte  
Track name . . . . . VA track  
Condition . . . . . off

**CALL**

**Sample or standard?**

Call text	Track name	Sample type	Condition
RC Determination	RC Determination	on Sample	off
RC Calibration	RC Calibration	on Standard	off

**CALL**

**CALL Final rinsing**

Call text	Track name	Sample type	Condition
Rinsing cycle	Rinsing cycle	off Sample	off

**TRACK**

**RC Determination**

Return immediately . . . . . off  
Delete old data . . . . . off

**CALL**

**Sample addition**

Call text	Track name	Sample type	Condition
Add sample automatically	Add sample automatically	off Sample	off

**CALL**

**CALL**

Call text	Track name	Sample type	Condition
Additional suppressor	Sample suppressor	off Sample	off
Additional brightener	Sample brightener	off Sample	off

**CALL SAMPLE**

Call text . . . . . Measure sample



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**CALL VA** Track name . . . . . VA track

Condition . . . . . off

**CALL CALL Rinse needle**

Call text	Track name	Sample type	Condition
Rinse needle	Go to rinsing position	off Sample	off

**TRACK RC Calibration**

Return immediately . . . . . off

Delete old data . . . . . off

**LOOP LOOP**

Stop criteria

Max. run number . . . . . on

Max. run number . . . . . 5

Maximum run time . . . . . off

Signal assessment for DT . . . . . off

Condition . . . . . off

**ADD STD ADD STD**

Standard

Solution . . . . . Standard or sample

Addition increments

Number . . . . . 1

Addition volume 1 . . . . . 0.05 mL

Addition

Add manually . . . . . off

Already added . . . . . off

Add with dosing device . . . . . on

Dosing rate . . . . . 2.0 mL/min

Filling rate . . . . . maximum mL/min

**CALL VA CALL STANDARD**

Call text . . . . . Measure standard

Track name . . . . . VA track

Condition . . . . . off

**CALL Clean DU standard**

Call text	Track name	Sample type	Condition
Clean DU standard	Clean DU standard	off Standard	off

**VA track**



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**VA TRACK** Return immediately . . . . . off

**CVS**

**CVS**

**General/Hardware**

**Device**

Device name . . . . . not defined  
Device type . . . . . 884 Professional VA

**Sensors/Electrodes**

Working electrode . . . . . RDE  
Sensor type . . . . . RDE/SSE  
Reference electrode . . . . . Reference electrode  
Auxiliary electrode . . . . . Auxiliary electrode  
Electrode check . . . . . on

**Stirrer**

Stirring rate . . . . . 2500 min<sup>-1</sup>  
Hydrodynamic measurement . . . . . on

**Pretreatment**

Stirring time . . . . . 5.0 s

**Cyclovoltammetric pretreatment**

Start potential . . . . . 0.2 V  
Vertex potential . . . . . 1.625 V  
Sweep rate . . . . . 1 V/s  
Cycles . . . . . off  
Duration . . . . . - s

**Potentiostatic pretreatment**

Potential 1 . . . . . off V  
Waiting time 1 . . . . . 0.0 s  
Potential 2 . . . . . off V  
Waiting time 2 . . . . . 0.0 s  
Potential 3 . . . . . off V  
Waiting time 3 . . . . . 0.0 s  
Potential 4 . . . . . off V  
Waiting time 4 . . . . . 0.0 s  
Potential 5 . . . . . off V  
Waiting time 5 . . . . . 0.0 s  
Equilibration time . . . . . 5.0 s

**Sweep**

Start potential . . . . . 1.625 V  
1st vertex potential . . . . . -0.175 V  
2nd vertex potential . . . . . 1.625 V  
Potential step . . . . . 0.006 V  
Potential step time . . . . . 0.060 s  
Sweep rate . . . . . 0.100 V/s  
Preparation cycles . . . . . 1  
Measuring cycles . . . . . 2



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Sweep duration . . . . . 109.08 s

**Post-treatment**

Cleaning

Cleaning potential . . . . . off V

Cleaning time . . . . . 0.0 s

Standby potential

Standby potential . . . . . off V

**Potentiostat**

Current measuring range

Highest range . . . . . 224 mA

Lowest range . . . . . 20 µA

**TRACK**

**PREP Standard**

Return immediately . . . . . off

Delete old data . . . . . off

**MOVE**

**Move to standard**

Device

Device name . . . . . not defined

Device type . . . . . 858.0020 Professional Sample Processor

Target

Tower . . . . . 1

Move . . . . . Sample position

Beaker test

Display message . . . . . on

Cancel determination . . . . . off

Cancel determination and series . . . . . off

Parameters

Shift rate . . . . . 20 °/s

Shift direction . . . . . auto

Swing rate . . . . . 55 °/s

**LIFT**

**Needle → Work position**

Device

Device name . . . . . not defined

Device type . . . . . 858.0020 Professional Sample Processor

Target

Tower . . . . . 1

Lift position . . . . . Work position mm

Parameters

Lift rate . . . . . 25 mm/s

**LOOP**

**LOOP PREP Standard**

Stop criteria

Max. run number . . . . . on

Max. run number . . . . . 2

Maximum run time . . . . . off



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Signal assessment for DT . . . . . off  
Condition . . . . . off

**PREP PREP Standard**

Dosing device

Dosing unit . . . . . 2 mL Standard or sample

**CALL Rinsing cycle**

Call text	Track name	Sample type		Condition
Rinsing cycle	Rinsing cycle	off	Sample	off

**CALL CALL Empty**

Call text	Track name	Sample type		Condition
Empty measuring vessel	Drain	off	Sample	off

**TRACK Add sample automatically**

Return immediately . . . . . off  
Delete old data . . . . . off

**CALL CALL Next sample**

Call text	Track name	Sample type		Condition
Next sample	Next sample	off	Sample	off

**CALL Transfer sample**

Call text	Track name	Sample type		Condition
Peristaltic pump ON	Peristaltic pump	off	Sample	off

**ADD SAMPLE ADD SAMPLE**

Addition

Add manually . . . . . off  
Already added . . . . . on  
Add with dosing device . . . . . off

**TRACK Go to rinsing position**

Return immediately . . . . . off  
Delete old data . . . . . off

**CALL Empty measuring vessel**

Call text	Track name	Sample type		Condition
Drain	Drain	off	Sample	off



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## MOVE MOVE To rinsing position

### Device

Device name . . . . . not defined  
Device type . . . . . 858.0020 Professional Sample Processor

### Target

Tower . . . . . 1  
Move . . . . . Rack position  
Number . . . . . = 'SD.Sample position' + 28

### Beaker test

Display message . . . . . on  
Cancel determination . . . . . off  
Cancel determination and series . . . . . off

### Parameters

Shift rate . . . . . 20 °/s  
Shift direction . . . . . auto  
Swing rate . . . . . 55 °/s

## LIFT Needle → Work position

### Device

Device name . . . . . not defined  
Device type . . . . . 858.0020 Professional Sample Processor

### Target

Tower . . . . . 1  
Lift position . . . . . Work position mm

### Parameters

Lift rate . . . . . 25 mm/s

## CALL Transfer rinsing solution

Call text	Track name	Sample type	Condition
Peristaltic pump ON	Peristaltic pump	off Sample	off

## TRACK Clean DU standard

Return immediately . . . . . off  
Delete old data . . . . . off

## MOVE MOVE to rinsing position

### Device

Device name . . . . . not defined  
Device type . . . . . 858.0020 Professional Sample Processor

### Target

Tower . . . . . 1  
Move . . . . . Rack position  
Number . . . . . = 'SD.Sample position' + 28

### Beaker test

Display message . . . . . on



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Cancel determination . . . . . off  
Cancel determination and series . . . . . off

Parameters

Shift rate . . . . . 20 °/s  
Shift direction . . . . . auto  
Swing rate . . . . . 55 °/s

**LIFT Needle → work position**

Device

Device name . . . . . not defined  
Device type . . . . . 858.0020 Professional Sample Processor

Target

Tower . . . . . 1  
Lift position . . . . . Work position mm

Parameters

Lift rate . . . . . 25 mm/s

**PREP PREP with water**

Dosing device

Dosing unit . . . . . 2 mL Standard or sample

**LIFT Needle → Shift position**

Device

Device name . . . . . not defined  
Device type . . . . . 858.0020 Professional Sample Processor

Target

Tower . . . . . 1  
Lift position . . . . . Shift position mm

Parameters

Lift rate . . . . . 25 mm/s

**PUMP Peristaltic pump 30 s**

Device

Device name . . . . . not defined  
Device type . . . . . 858.0020 Professional Sample Processor

Pumps

Tower . . . . . 1  
Pump(s) . . . . . Peristaltic  
Rate . . . . . 10

Action

Switch on . . . . . off  
Switch off . . . . . off  
Duration . . . . . on  
Time . . . . . 30 s

**TRACK Next sample**

Return immediately . . . . . off  
Delete old data . . . . . off



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**MOVE MOVE To sample position**

Device

Device name . . . . . not defined  
Device type . . . . . 858.0020 Professional Sample Processor

Target

Tower . . . . . 1  
Move . . . . . Sample position

Beaker test

Display message . . . . . on  
Cancel determination . . . . . off  
Cancel determination and series . . . . . off

Parameters

Shift rate . . . . . 20 °/s  
Shift direction . . . . . auto  
Swing rate . . . . . 55 °/s

**LIFT Needle → Work position**

Device

Device name . . . . . not defined  
Device type . . . . . 858.0020 Professional Sample Processor

Target

Tower . . . . . 1  
Lift position . . . . . Work position mm

Parameters

Lift rate . . . . . 25 mm/s

**TRACK Electrolyte VMS**

Return immediately . . . . . off  
Delete old data . . . . . off

**ADD AUX ADD VMS**

Auxiliary solution

Solution . . . . . VMS  
Volume . . . . . 23.5 mL  
Include volume in calculation . . . . . on

Addition

Add manually . . . . . off  
Already added . . . . . off  
Add with dosing device . . . . . on  
Dosing rate . . . . . maximum mL/min  
Filling rate . . . . . maximum mL/min

**TRACK Electrolyte suppressor**

Return immediately . . . . . off  
Delete old data . . . . . off

**ADD AUX ADD Suppressor**

Auxiliary solution



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Solution . . . . . Suppressor concentrate  
Volume . . . . . 0.5 mL  
Include volume in calculation . . . . . on  
Addition  
Add manually . . . . . off  
Already added . . . . . off  
Add with dosing device . . . . . on  
Dosing rate . . . . . 2.0 mL/min  
Filling rate . . . . . maximum mL/min

**TRACK Electrolyte brightener**

Return immediately . . . . . off  
Delete old data . . . . . off

**ADD AUX ADD Brightener**

Auxiliary solution  
Solution . . . . . Brightener concentrate  
Volume . . . . . 1 mL  
Include volume in calculation . . . . . on  
Addition  
Add manually . . . . . off  
Already added . . . . . off  
Add with dosing device . . . . . on  
Dosing rate . . . . . 2.0 mL/min  
Filling rate . . . . . maximum mL/min

**TRACK Sample suppressor**

Return immediately . . . . . off  
Delete old data . . . . . off

**ADD AUX ADD Suppressor**

Auxiliary solution  
Solution . . . . . Suppressor concentrate  
Volume . . . . . 0.1 mL  
Include volume in calculation . . . . . on  
Addition  
Add manually . . . . . off  
Already added . . . . . off  
Add with dosing device . . . . . on  
Dosing rate . . . . . 2.0 mL/min  
Filling rate . . . . . maximum mL/min

**TRACK Sample brightener**

Return immediately . . . . . off  
Delete old data . . . . . off

**ADD AUX ADD Brightener**

Auxiliary solution



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Solution . . . . . Brightener concentrate  
Volume . . . . . 0.2 mL  
Include volume in calculation . . . . . on  
Addition  
Add manually . . . . . off  
Already added . . . . . off  
Add with dosing device . . . . . on  
Dosing rate . . . . . 2.0 mL/min  
Filling rate . . . . . maximum mL/min

**TRACK**

**Rinsing cycle**

Return immediately . . . . . off  
Delete old data . . . . . off

**LOOP**

**LOOP Rinsing**

Stop criteria

Max. run number . . . . . on  
Max. run number . . . . . 2  
Maximum run time . . . . . off  
Signal assessment for DT . . . . . off  
Condition . . . . . off

**CALL**

**CALL Drain**

Call text	Track name	Sample type	Condition
Drain	Drain	off Sample	off

**CALL**

**CALL Rinse**

Call text	Track name	Sample type	Condition
Rinse	Rinse	off Sample	off

**TRACK**

**Peristaltic pump**

Return immediately . . . . . off  
Delete old data . . . . . off

**PUMP**

**Peristaltic pump ON**

Device

Device name . . . . . not defined  
Device type . . . . . 858.0020 Professional Sample Processor

Pumps

Tower . . . . . 1  
Pump(s) . . . . . Peristaltic  
Rate . . . . . 10

Action

Switch on . . . . . off  
Switch off . . . . . off



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Duration . . . . . on  
Time . . . . . 120 s

**TRACK Rinse**  
Return immediately . . . . . off  
Delete old data . . . . . off

**PUMP PUMP Rinse**  
Device  
Device name . . . . . not defined  
Device type . . . . . 858.0020 Professional Sample Processor  
Pumps  
Tower . . . . . 1  
Pump(s) . . . . . 2  
Action  
Switch on . . . . . off  
Switch off . . . . . off  
Duration . . . . . on  
Time . . . . . 9 s

**TRACK Drain**  
Return immediately . . . . . off  
Delete old data . . . . . off

**PUMP PUMP Drain**  
Device  
Device name . . . . . not defined  
Device type . . . . . 858.0020 Professional Sample Processor  
Pumps  
Tower . . . . . 1  
Pump(s) . . . . . 1  
Action  
Switch on . . . . . off  
Switch off . . . . . off  
Duration . . . . . on  
Time . . . . . 35 s

**SERIES START Series start track**

**RACK RACK INIT**  
Device  
Device name . . . . . not defined  
Device type . . . . . 858.0020 Professional Sample Processor  
Rack test . . . . . on  
Test rack . . . . . 6.2041.450

**EXIT Exit track**



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## PUMP

### PUMPS OFF

#### Device

Device name . . . . . not defined  
Device type . . . . . 858.0020 Professional Sample Processor

#### Pumps

Tower . . . . . 1  
Pump(s) . . . . . 1+2

#### Action

Switch on . . . . . off  
Switch off . . . . . on  
Duration . . . . . off  
Time . . . . . 8.0 s

## LIFT

### Needle → Shift position

#### Device

Device name . . . . . not defined  
Device type . . . . . 858.0020 Professional Sample Processor

#### Target

Tower . . . . . 1  
Lift position . . . . . Shift position mm

#### Parameters

Lift rate . . . . . 25 mm/s

## LQH

### FILL VMS

#### General/Hardware

##### Dosing device

Dosing unit . . . . . 50 mL VMS

##### Parameters

Function . . . . . Fill  
Port . . . . . 2  
Rate . . . . . maximum mL/min

## LQH

### FILL Suppressor

#### General/Hardware

##### Dosing device

Dosing unit . . . . . 2 mL Suppressor

##### Parameters

Function . . . . . Fill  
Port . . . . . 2  
Rate . . . . . maximum mL/min

## LQH

### FILL Brightener

#### General/Hardware

##### Dosing device

Dosing unit . . . . . 2 mL Brightener

##### Parameters

Function . . . . . Fill



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Port . . . . . 2  
Rate . . . . . maximum mL/min

**ERROR Error track**

**PUMP PUMPS OFF**

Device  
Device name . . . . . not defined  
Device type . . . . . 858.0020 Professional Sample Processor  
Pumps  
Tower . . . . . 1  
Pump(s) . . . . . 1+2  
Action  
Switch on . . . . . off  
Switch off . . . . . on  
Duration . . . . . off  
Time . . . . . 8.0 s

**Evaluation parameters**

**General**

**CVS**

**Data processing**

Smoothing . . . . . 1  
Reversed peaks . . . . . off

**Curve evaluation**

Fixed point evaluation . . . . . off

**Substances**

**CVS**

**Substances - Recognition**

Substance	Active	Characteristic potential	Tolerance	Min. width	Max. width	Min. measured quantity	Sweep direction
Leveler	on	0.2 V	0.2 V	0.01 V	1 V	200 pA	anodic

**CVS**

**Substances - Baseline**

Substance	Baseline type	Start base point	End base point
Leveler	Horizontal	0.8 V	-0.05 V

**Standards**

**Standards**



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Name Standard or sample

Leveler 1000 mL/L

## Calibration

### General

Calibration method . . . . . RC  
Blank value correction with evaluation . . . . . off  
quantity

### CVS

#### Calibration curves

Substance	Evaluation quantity	Curve type for standard	Weighting
Leveler	Area	Linear interpolation	on
Begin of evaluation standard			
1.1			

## Results

### Substance concentration in the sample

#### CVS

Substance	Decimal places	Assignment
Leveler	2	RS01

## Results

### Additional results

Result	Places	Prefix	Unit
Peak potential	3		V
Height	2	#	A
RSD of the heights of all replications	1		%
Area	2	#	C
RSD of the areas of all replications	1		%
Start base point	3		
End base point	3		
Standardized area	3		
Standardized height	3		
Total volume	3	#	L
Zero-order coefficient	3		



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Result	Places	Prefix	Unit
First-order coefficient	3		
Second-order coefficient	3		
Fourth-order coefficient	3		
Coefficient of determination	5		
Substance concentration in measuring vessel	2	#	
RSD of the substance concentration in measuring vessel	1		%
Amount of substance	2	#	
RSD of the substance concentration in the sample	1		%
Effective addition volume of the standard solution for the evaluation ratio	2	#	L
RSD of the effective addition volume of the standard solution for the evaluation ratio	1		%
Calibration factor DT	2	#	
RSD of the calibration factor DT	1		%
Effective addition volume of the sample solution for the evaluation ratio	2	#	L
RSD of the effective addition volume of the sample solution for the evaluation ratio	1		%

#### Database

Name database . . . . . viva