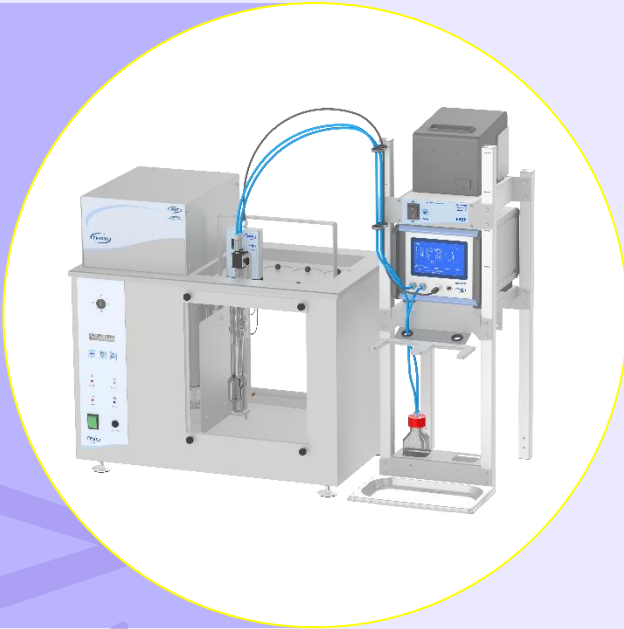


Specifications TV4000AKV EASY

Automated Kinematic Viscosity ASTM D445 - IP71 - ISO 3104



Automated Kinematic Viscosity
ASTM D445, IP71, ISO 3104
User-friendly touch screen
Stability better than $\pm 0.01^{\circ}\text{C}$
Database (up to 254 results)
Customize test configuration

General

The Tamson TV4000AKV EASY determines automated kinematic viscosity which complies with test methods ASTM D445, IP 71 and ISO 3104 using an Ubbelohde viscometer. The viscosity of Newtonian fluids can be most precisely determined using glass capillary viscometers.

Construction

The modular TV4000AKV EASY is a measuring system that includes everything you need to make precise and reproducible measurements. The apparatus consists of a TV4000MKII viscosity bath, the measuring head, the AKV EASY and a tower (consisting of a frame, tubing, printer, fluid trap, power supply and spill tray). The TV4000AKV EASY is supplied with a single automated measuring channel. Filling and cleaning of the viscometer must be done manually. The AKV EASY is operated by a user-friendly touch screen. Please see table 1 for the scope of supply of the TV4000AKV EASY.

Infrared light barriers in the measuring head determine the flow time for a sample to pass two marks on a calibrated glass capillary viscometer. The viscometer is kept at a very precise ($\pm 0.01^{\circ}\text{C}$) temperature in the Tamson TV4000MKII.

Item	Unit	TV4000AKV EASY
P/N		00T0825
230V/50-60Hz		
P/N		00T0835
115V/60Hz		
Item	Unit	AKV EASY
Temperature range		Up to $+120^{\circ}\text{C}$ (248°F)
Viscosity range		From 0.3 up to 10,000 mm^2/s
Number of channels		Single, optional dual, see table 4
Detection		Infra-Red (IR)
Timer	[sec]	0.10 - 9999.99
Resolution	[sec]	0.01
Accuracy	[ppm]	<10 (flowtime > 100 sec)
Pump		Suction pump (<-300 hPa)*
Viscometer		Ubbelohde
Data output		Printer, database up to 254 results
Dimensions tower (LxWxH)	[mm]	500 * 270 * 760
Item	Unit	TV4000MKII
Setting	[$^{\circ}\text{C}$]	0.01
Stability** \pm	[$^{\circ}\text{C}$]	0.01
Bath volume	[L]	40
Dimensions TV4000 (LxWxH)	[mm]	400 * 590 * 590
Weight	[kg]	40
Power max	[kW]	230V: 2.9 / 115V: 2.3
Safety		CE, mechanical safety cut out, float
* Pressure pump available on request		
** Measured in water @ 50°C		

The AKV EASY calculates the kinematic viscosity based on the constant of the viscometer and the measured flow time. The AKV EASY is capable of measuring the kinematic viscosity of oils and other Newtonian liquids that are suitable for Ubbelohde viscometers with a range from 0.3 up to 10,000 mm^2/s (cSt).

Eight different viscometers can be programmed in the system. Changing the viscometer is a very easy task taking less than a minute. Up to 254 results are saved in the database and can be printed at any time. Each result consists of up to 99 runs. These runs can be done sequentially without interference from the user. The maximum time between two sequential runs is four hours. This allows the customer to test how the viscosity changes over time. The system determines the best repeatability from the measuring runs. The kinematic viscosity result is calculated in two decimals. Furthermore, the AKV EASY supports calculation of the dynamic, relative and intrinsic viscosity.

Specifications TV4000AKV EASY

Automated Kinematic Viscosity ASTM D445 - IP71 - ISO 3104

Optional dual channel or rinsing

Optionally the TV4000AKV EASY can be equipped with a dual channel. Two measuring heads are needed to use a dual channel.

By the end of 2020, Tamson will introduce a single measuring channel equipped with a semi-automated cleaning module. The system will rinse the viscometer with the manually inserted cleaning solvent. Please see table 4 for an overview of the options.

Application

The TV4000AKV EASY is ideal for users that don't run a lot of different samples in a day but also don't want to perform labor intensive manual determinations. The system also reduces operator to operator variability. The apparatus eliminates subjective measurement errors. The great advantage of the AKV EASY is that the system is flexible. Up to eight custom-made test configurations can be predefined. This allows users to adapt the system to their testing requirements. The number of runs, preheating time, maximum flow time and acceptable deviation of flow time are examples of variables that can be preset. For a complete overview, please see the user manual.

The TV4000AKV EASY is ideal for testing the viscosity of Newtonian fluids, such as formulated oils, lubricants, diesel, hydraulic oils, additives, base oils, light fuels, waxes, light crude oils and glycols.

Operating range

Working temperature span ranges from ambient temperature +5°C up to +120°C. With the use of the Tamson TLC15-5 cooling circulator and the built-in cooling coil the minimum working temperature can be lowered down to +10°C. The working temperature can be set in steps of 0.01°C. The apparatus includes the Tamson TV4000MKII, which creates a very stable temperature of $\pm 0.01^\circ\text{C}$. With the offset function the temperature reading can be trimmed with a resolution of 0.01°C.

Viscosity of polymer solutions

The TV4000AKV EASY can be used to determine the viscosity of polymer solutions. Please see table 5 for an overview of the available test methods. For some methods, Cannon-Fenske routine viscometers are necessary, which can be supplied on request. Please contact us for more information.

Upgrade kit

Thousands of TV2000MKII, TV4000MKII, TV4000DC and OEM baths are used worldwide. For these baths, there is an upgrade kit available. This upgrade kit makes it possible to upgrade the manual viscosity bath to an automated system.

Primary benefits of Tamson TV4000AKV EASY:

- Meets ASTM, IP, ISO and DIN standards related to kinematic viscosity
- Suitable for Newtonian fluids like lubricants, fuels and polymer solutions
- Easy viscometer exchange
- Chemically resistant to an extended range of fluids and solvents
- Extremely accurate temperature control using well-known Tamson TV4000MKII
- Very precise flow-time measurement independent of fluid type
- Up to 12 mL sample volume (Ubbelohde)
- Budget sensitive way of determining viscosity automated
- User-configurable reports are saved and can be viewed and printed at any time
- Modular bath for easy maintenance access
- Use of suspended level viscometer (Ubbelohde) allows single temperature calibration point, saving time and money on multiple calibration points
- Subjective measurement errors by operators are eliminated
- Manual determinations can also be performed with TV4000AKV EASY
- Up to 99 runs can be done sequentially without interference from the user, allowing to test viscosity changes over time
- Up to eight test configurations can be predefined and saved



Specifications TV4000AKV EASY

Accessories

Table 1: Apparatus TV4000AKV EASY P/N 00T0825 (230V/50~60Hz) and P/N 00T0835 (115V/60Hz) consists of the following parts:

P/N	Picture	Description
00T0772		TV4000MKII viscosity bath (230V/50~60Hz). Please see specification sheet "tv series" for more details
00T0774		TV4000MKII viscosity bath (115V/60Hz). Please see specification sheet "tv series" for more details
23T2414		Cover for TV4000MKII, two openings for measuring head AKV E/A. Additionally four ø51mm openings with lids are included for manual determinations
00T0870		Measuring head AKV E/A Ubbelohde
16T0001		AKV EASY with single channel, pump with suction mode
01T5000		Tower to support AKV EASY. The tower is delivered with tubing, power supply, spill tray, fluid traps and printer

Table 2: Necessary accessories
AKV E/A Ubbelohde viscometer for transparent liquids

P/N	Size	Nom. Constant	Range
25T0600	Size 0	Nom. Constant 0.001	Range from 0.3 to 1 mm ² /s
25T0601	Size 0C	Nom. Constant 0.003	Range from 0.6 to 3 mm ² /s
25T0602	Size 0B	Nom. Constant 0.005	Range from 1 to 5 mm ² /s
25T0603	Size 1	Nom. Constant 0.01	Range from 2 to 10 mm ² /s
25T0604	Size 1C	Nom. Constant 0.03	Range from 6 to 30 mm ² /s
25T0605	Size 1B	Nom. Constant 0.05	Range from 10 to 50 mm ² /s
25T0606	Size 2	Nom. Constant 0.1	Range from 20 to 100 mm ² /s
25T0607	Size 2C	Nom. Constant 0.3	Range from 60 to 300 mm ² /s
25T0608	Size 2B	Nom. Constant 0.5	Range from 100 to 500 mm ² /s
25T0609	Size 3	Nom. Constant 1.0	Range from 200 to 1000 mm ² /s
25T0610	Size 3C	Nom. Constant 3.0	Range from 600 to 3000 mm ² /s
25T0611	Size 3B	Nom. Constant 5.0	Range from 1000 to 5000 mm ² /s
25T0612	Size 4	Nom. Constant 10	Range from 2000 to 10000 mm ² /s



Specifications TV4000AKV EASY

Accessories


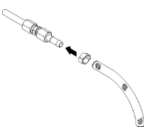

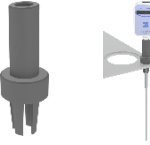




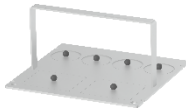





Table 3: Optional accessories			
P/N	Picture	Description	
00T0565		Cooling circulator TLC15-5 (230V/50Hz)	To work at sub-ambient temperatures
00T0567		Cooling circulator TLC15-5 (230V/60Hz)	
00T0570		Cooling circulator TLC15-5 (115V/60Hz)	
12T1075		Tubing with connectors and clamps to be used between the TLC15-5 and the TV4000AKV EASY	
19T4023		E20 digital contact thermometer two decimal reading, precision $\pm 0.02^{\circ}\text{C}$, short PT-100 probe with range $+20 \dots +120^{\circ}\text{C}$ including a works calibration certificate. (Please see specification sheet "E20 thermometer" for more details)	
14T0303		Adapter to insert an E20 thermometer in the opening of the cover	
00T0908		Illuminator "Z41" backpanel (85 ~ 230V/50-60Hz), if TV4000AKV EASY is also used for manual determination of kinematic viscosity	
08T0001		Silicon oil 200-10 mm ² /s 20 ltrs transparent (20..150°C). Two cans required for TV4000AKV EASY	
Viscosity reference standards		Please see our "Viscosity accessories" specification sheet.	

Table 4: Recommended set-up for two channel AKV EASY or AKY EASY with rinsing module

P/N	Picture	Suggested quantity for dual channel	Suggested quantity for single channel with rinsing	Description
00T0772		1	1	TV4000MKII viscosity bath (230V/50~60Hz)
00T0774				TV4000MKII viscosity bath (115V/60Hz)
23T2414		1	1	Cover for TV4000MKII, two openings for measuring head AKV E/A. Additionally four ø51mm openings with lids are included
00T0870		2	0	Measuring head AKV E/A Ubbelohde
00T0872		0	1	Measuring head AKV E/A Ubbelohde with rinsing
16T0002		1	0	AKV EASY with dual channel, pump with suction mode
16T0003		0	1	AKV EASY with one channel with rinsing module, pump with pressure and suction mode. Available by the end of 2020
01T5000		1	1	Tower for AKV EASY. The tower is delivered with tubing, power supply, spill tray, fluid trap and printer

Specifications TV4000AKV EASY

Polymer solutions

Table 5: Accessories for TV4000AKV EASY for polymer solutions

P/N	Description	ASTM D789	ASTM D1243	ASTM D2857	ASTM D3591	ASTM D4603	TAPPI T230
00T0772	TV4000MKII 230V/50-60Hz	•	•	•	•	•	•
00T0774	TV4000MKII 115V/60Hz						
00T0565	TLC15 230V/50Hz	•	•	•	•	•	•
00T0567	TLC15 230V/60Hz						
00T0570	TLC15 115V/60Hz						
23T2414	Cover for TV4000MKII	•	•	•	•	•	•
16T0001	AKV EASY single channel	•	•	•	•	•	•
01T5000	Tower for AKV EASY	•	•	•	•	•	•
00T0870	Measuring head E/A Ubbelohde	•	•	•	•	•	•
00T0871	Measuring head E/A Cannon Fenske Routine	•	•	•	•	•	•
25T0603	AKV E/A Ubbelohde size 1	•	•	•	•	•	•
25T0604	AKV E/A Ubbelohde size 1C	•	•	•	•	•	•
25T0609	AKV E/A Ubbelohde size 3	•	•	•	•	•	•
25T0621	AKV E/A CFR size 50	•	•	•	•	•	•
25T0622	AKV E/A CFR size 75	•	•	•	•	•	•
25T0623	AKV E/A CFR size 100	•	•	•	•	•	•
25T0624	AKV E/A CFR size 150	•	•	•	•	•	•
25T0625	AKV E/A CFR size 200	•	•	•	•	•	•
14T0303	Adapter for E20 Thermometer	•	•	•	•	•	•
19T4023	E20 thermometer with range +20°C up to +120°C	•	•	•	•	•	•
08T0001	Silicon oil 20L	•	•	•	•	•	•

TV4000AKV

