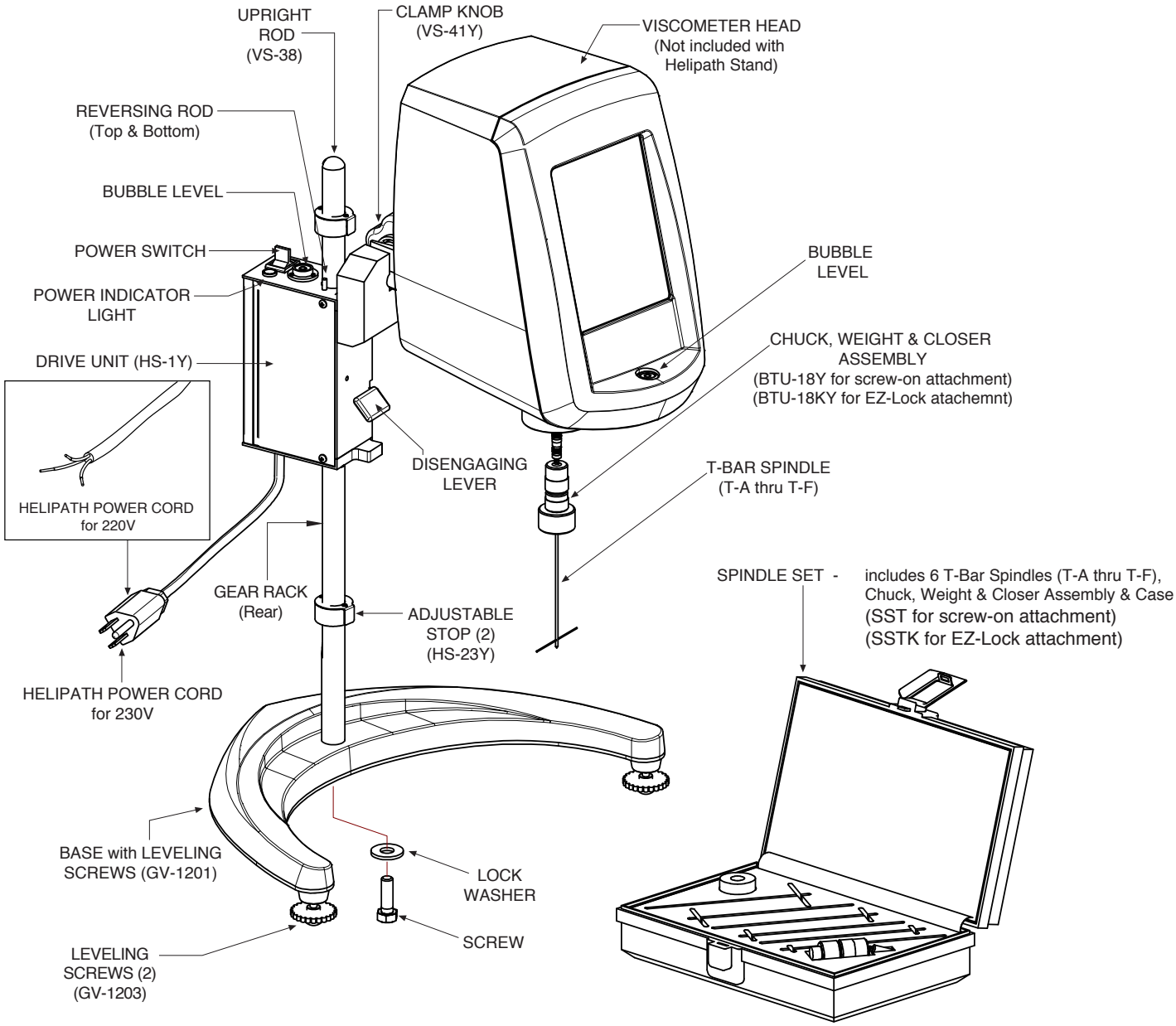
Model D Helipath Stand Parts Identification

These instructions apply to both the Standard and EZ Lock versions.



Check carefully to see that all components are received with no concealed damage.

1 drive unit (HS-1Y)
1 base (GV-1201)
2 leveling screws (GV-1203)
1 upright rod (VS-38)
2 adjustable stops (HS-23Y)

Spindle Set (SST) includes:
- 6 T-bar spindles (T-A — T-F)
- 1 chuck/closer/weight assembly (BTU-18Y)
- 1 spindle box (TU-25Y)

or

Spindle Set (SSTK) for EZ-Lock includes:
- 6 T-bar spindles (T-A — T-F)
- 1 chuck/closer/weight assembly (BTU-18KY)
- 1 spindle box (TU-25Y)

Utilities

Input Voltage:	115 VAC or 230 VAC
Input Frequency:	50/60 Hz
Power Consumption:	50 VA

Power Cord Color Code

	115 VAC	230 VAC
Hot (live)	Black	Brown
Neutral	White	Blue
Ground (earth)	Green	Green/Yellow

Electrical Certifications

Conform to CE Standards:
BSEN 61326: Electrical equipment for measurement, control and laboratory use - EMC requirements.
BSEN 61010-1: Safety requirements for electrical equipment for measurement, control and laboratory use
Airborne Noise Emissions - levels do not exceed 70 dB(A).

Notice to customers:

This symbol indicates that this product is to be recycled at an appropriate collection center.

Users within the European Union:
Please contact your dealer or local authorities in charge of waste management on how to dispose of this product properly. All Brookfield offices and out network of representatives and dealers can be found on our website: www.brookfieldengineering.com

Users outside the European Union:
Please dispose of this product according to your local laws.

Stand Assembly

Insert the upright rod in the base, positioning the gear rack facing toward the rear. Thread the screw with lock washer into rod under the base, but do not tighten. Slide one adjustable stop down the upright rod, with locking plate facing up. With the drive unit handle clamp facing forward, depress the disengaging lever and slide the drive unit down the upright rod. Slide the other adjustable stop down the upright rod above the drive unit; again, locking plate of adjustable stop faces up. Center the complete assembly between the base legs and tighten the screw into the upright rod. Install the clamp knob, but do not tighten.

The Helipath Stand must be electrically grounded (earthed) to ensure against electronic failure.

This device may havebeen supplied with a power cord without an end connector. An end connector must be attached prior to operation. Attach the end connector in accordance with local electrical requirements.

Connect the Helipath Stand only to an electrically grounded (earthed) power supply.

Viscometer Mounting

For Dial models with serial numbers below 200,000, lower the Viscometer power cord into the handle clamp slot with the cord passing to the left of the upright rod (Dial viscometers only). For Digital models and Dial models with serial numbers above 200,000, slide the Viscometer handle core into the handle clamp and tighten the clamp knob. Check the lateral position of the Viscometer relative to the base. Make adjustments and retighten the screw as required to center the Viscometer between the base legs. Referring to the stand bubble level, adjust the base leveling screws until the stand is level. Referring to the Viscometer bubble level, position the Viscometer until the bubble is centered and tighten the clamp knob.

CAUTION: Position power cords so that they do not interfere with the travel of the drive unit.

Viscometer Operation

Note: If your viscometer was supplied with a guardleg, this guardleg is not used when using T-bar spindles. Remove it from the viscometer by loosening the round thumbscrew on the back of the guardleg.

With the system assembled and mounted as shown in the illustration, insert the spindle into the chuck before attaching the chuck to the Viscometer. Then connect the chuck/closer/weight assembly, with spindle, to the Viscometer. (Note: the left-hand coupling thread for instruments which require spindle attachment by screwing on. Instruments with EZ-Lock have direct insertion of the spindle assembly into the spring loaded chuck on the viscometer.)

Refer to the Helipath Stand Spindle Ranges sheet and select a T-bar spindle. Slide the spindle into the chuck and tighten. Lower the spindle into the fluid by depressing the disengaging lever on the Helipath Drive Unit. Recommended initial spindle location is achieved when the bottom of the T spindle is 1/4" above the surface of the test material. Push the reversing rod on the drive unit down. Make sure that the drive unit is OFF (the yellow light on the top of the drive unit will not be illuminated).

Turn the Viscometer motor on and allow for one to two revolutions of the spindle before turning on the Helipath Drive Unit which when switched on, will travel 7/8" per minute. Set the adjustable stops to accommodate the travel of the Helipath that will provide the desired penetration of the spindle (do not go closer than 1/4" from the bottom of the test material container). Turn on the Helipath Drive Unit (the yellow light will now be illuminated). NOTE: Brookfield does not recommend operating the Viscometer at RPMs greater than 12, when using the Helipath Stand Accessory.

Observe the dial reading or % torque display (on Digital Models). Record readings where necessary, keeping in mind that low rotational speeds may produce the best results. In this way, a figure will be obtained for the consistency at equal increments of penetration through the material. Operation at low rotational speeds will usually produce optimum readings. Multiple readings should be taken as the T-bar travels through the helical cycle (approximately every 15-20 seconds).

Note: 1) It is recommended that the spindles be cleaned after each measurement.

2) The spindle can be placed anywhere in the sample material's container prior to use, as long as rotation of the spindle is not impeded.

3) It is not recommended to use T-Bar spindles to check calibration of your Viscometer. Use the standard spindles which came with your Viscometer.

Viscometer Range Data

Range Data* (T-Bar Spindles) - applicable to Dial Reading & Digital Viscometers/Rheometers

	DIAL READING	DV-I/DV-II	** DV-1+ / II+ / DV-II+ Programmable / DV-II+ Pro/DV2T	**DV-III / DV-III+ / DV-III ULTRA/ DV3T
LV	156 - 3.1M	156 - 3.1M	156 - 9.3M	156 - 9.3M
RV	2K - 20M	2K - 20M	2K - 100M	2K - 100M
HA	4K - 40M	4K - 40M	4K - 200M	4K - 200M
HB	16K - 160M	16K - 160M	16K - 800M	16K - 800M

* Ranges in centiPoise (cP) 1 cP = 1 mPa•s
** Maximum range shown is at 0.1 RPM
K = 1000
M = 1,000,000

Note: Max. viscosity at 0.3 RPM for LV with T-F; Min. for LV at 12 RPM with T-A at 10% FSR. Max. viscosity at 0.1 RPM for RV/HA/HB with T-F; Min. for RV/HA/HB at 10 RPM with T-A at 10% FSR.

Spindle Range Data

This **Universal Spindle Range** table lists the Spindle Range Coefficients for all (6) T-bar spindles. Dividing the coefficient number by any rotational speed will give the full scale viscosity range for a Viscometer/Rheometer spindle/speed combination. (The Auto Range key on DV-E, DV-I+, DV-II+ or DV=III+ instruments provides this information in the digital display).

		Spindle Range Coefficient			
Spindle	**Entry Code**	LV	RV	HA	HB
T-A	91	18,750	200,000	400,000	1,600,000
T-B	92	37,440	400,000	800,000	3,200,000
T-C	93	93,600	1,000,000	2,000,000	8,000,000
T-D	94	187,200	2,000,000	4,000,000	16,000,000
T-E	95	468,000	5,000,000	10,000,000	40,000,000
T-F	96	936,000	10,000,000	20,000,000	80,000,000

(Analog/Dial Viscometer)

Example: 1) Determine the full scale viscosity range (100% of scale) of a T-C spindle running on a RV Series @ 5 RPM.

$$\text{Full Scale Range} = \frac{\text{Spindle Coefficient}}{\text{Spindle Speed}} = \frac{1{,}000{,}000}{5\ \text{RPM}} = 200{,}000\ \text{cP}$$

1) Determine minimum viscosity range (10% of full scale) at above conditions.

$$\text{Min. Visc. Range} = \frac{\text{Full Scale Range}}{10} = \frac{200{,}000}{10} = 20{,}000\ \text{cP}$$

Note: Maximum operable speed when using Helipath Stand is 10 or 12 RPM depending on speeds available on your viscometer.

Spindle Factors (for Analog/Dial Viscometers)

Speed (RPM)	LVT Viscometer					
	T-A	T-B	T-C	T-D	T-E	T-F
12	15.6	31.2	78	156	390	780
6	31.2	62.4	156	312	780	1.56K
3	62.4	124.8	312	624	1.56K	3.12K
1.5	124.8	249.6	624	1.248K	3.12K	6.24K
0.6	312	624	1.56K	3.12K	7.8K	15.6K
0.3	624	1.248K	3.12K	6.24K	15.6K	31.2K

Speed (RPM)	RVT Viscometer					
	T-A	T-B	T-C	T-D	T-E	T-F
10	200	400	1K	2K	5K	10K
5	400	800	2K	4K	10K	20K
4	500	1K	2.5K	5K	12.5K	25K
2.5	800	1.6K	4K	8K	20K	40K
2	1K	2K	5K	10K	25K	50K
1	2K	4K	10K	20K	50K	100K
0.5	4K	8K	20K	40K	100K	200K

Speed (RPM)	HAT Viscometer					
	T-A	T-B	T-C	T-D	T-E	T-F
10	400	800	2K	4K	10K	20K
5	800	1.6K	4K	8K	20K	40K
2.5	1.6K	3.2K	8K	16K	40K	80K
1	4K	8K	20K	40K	100K	200K
0.5	8K	16K	40K	80K	200K	400K

Speed (RPM)	HBT Viscometer					
	T-A	T-B	T-C	T-D	T-E	T-F
10	1.6K	3.2K	8K	16K	40K	80K
5	3.2K	6.4K	16K	32K	80K	160K
2.5	6.4K	12.8K	32K	34K	160K	320K
1	16K	32K	80K	160K	400K	800K
0.5	32K	64K	160K	320K	800K	1.6M

K = 1,000
M= 1,000,000

Spindle	Crossbar Length - Inches (mm)	
T-A	1,894	(48.1)
T-B	1,435	(36.4)
T-C	1,065	(27.1)
T-D	0.804	(20.4)
T-E	0.604	(15.3)
T-F	0.430	(10.9)

To calculate viscosity in centipoise (cP), multiply the dial reading by the factor corresponding to the viscometer spindle and speed combination utilized. 1cP = 1mPa•s