



INMOTION ENERGY (OPC) PRIVATE LIMITED

6-Speed Rotational Viscometer

Direct-Indicating Viscometer for Drilling Fluids, Cements and Completion Brines — Complete with Rotor-Bob Assembly and Sample Cup

Model No: IM-RV-D6

Compliant with API RP 13B-1 & ISO 10414-1

INSTRUCTION MANUAL

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Introduction

Drilling fluid rheology never stands still for long. Plastic viscosity, yield point and gel strength all shift as solids load up, temperatures climb, or a treatment takes hold — and a single ballpark reading isn't enough to catch a hole-cleaning problem, a contamination event, or a treatment that has gone too far. API RP 13B-1 and ISO 10414-1 call for a controlled, multi-speed rotational measurement precisely because rheology is a curve, not a point.

The Inmotion 6-Speed Rotational Viscometer puts that full, standard-compliant shear-rate sweep within reach at the rig site or the mud lab. Six fixed speeds, a direct-reading dial, and a factory-matched rotor, bob and torsion spring deliver plastic viscosity, yield point and gel strength from a single sample, in a few minutes, with no external electronics to calibrate.

Description

The IM-RV-D6 is a direct-indicating, coaxial-cylinder rotational viscometer. A synchronous motor drives a rotor sleeve at six fixed speeds — 3, 6, 100, 200, 300 and 600 RPM — around a stationary bob suspended from a calibrated torsion spring. Fluid sheared in the annular gap between the rotor and bob transmits torque to the spring, and the resulting angular deflection is read directly off the analog dial on the instrument head.

Because the rotor/bob geometry and spring constant are both fixed and factory-matched, dial readings taken at 300 and 600 RPM convert directly to plastic viscosity and yield point, and a 3 RPM reading taken after 10 seconds and 10 minutes of undisturbed rest gives initial and final gel strength — the complete data set API RP 13B-1 asks for, from one sample, on one instrument.

One instrument, six speeds — the full API sweep:

- Fixed rotor/bob geometry (R1 rotor / B1 bob) per API RP 13B-1
- Six fixed test speeds — 3, 6, 100, 200, 300, 600 RPM — selected at the front panel
- Direct-reading dial calibrated in degrees of torsion-spring deflection
- Removable, corrosion-resistant stainless steel sample cup



The IM-RV-D6 head, rotor and bob assembly, mounted on its support column and base

Components	Part Number	Description
	IM-RV-D6-01	Motor / Gearbox Head Assembly — six-speed drive with torsion-spring dial head
	IM-RV-D6-02	Rotor Sleeve (R1) — knurled drive coupling, precision-bore
	IM-RV-D6-03	Bob (B1) — precision-machined, suspended from the torsion spring
	IM-RV-D6-04	Stainless Steel Sample Cup — locking thumbscrew mount
	IM-RV-D6-05	Support Column & Base — cast base with speed-selector panel
	IM-RV-D6-06	Calibration Knob & Dial Reading Gauge
	IM-RV-D6-07	Power Cord & IEC Inlet
		
		<i>Rotor sleeve and bob lowered into the stainless steel sample cup</i>
		
		<i>Stainless steel sample cup</i>
		
		<i>Rotor sleeve — knurled drive coupling with precision bore</i>

Features

- Six API-Standard Speeds — 3, 6, 100, 200, 300 and 600 RPM cover the full shear-rate sweep API RP 13B-1 calls for — gel strength, plastic viscosity and yield point — from one setup.
- Direct-Reading Dial — torque converts straight to a degree-deflection reading; there is no external readout electronics to calibrate or fail in the field.
- Factory-Matched Rotor, Bob & Spring — the geometry and torsion constant are set and verified as a matched set, traceable via the calibration-weight table printed on the instrument head.
- Stainless Steel Sample Cup — corrosion-resistant, sized to the standard fill line, with a locking thumbscrew mount.
- Compact Benchtop Footprint — a single-phase motor and self-contained gearbox mount on a rigid cast base for stable readings on a rig-site bench or lab counter. Runs on AC220V 50Hz (standard) or AC120V 60Hz (USA), $\pm 10\%$.



Front-panel speed selector — 3, 6, 100, 200, 300, 600 RPM

Specifications

Test Speeds	3, 6, 100, 200, 300, 600 RPM (six fixed speeds)
Dial Reading Range	0–300° deflection (typical)
Shear Rate	$\approx 1.703 \text{ sec}^{-1}$ per RPM (nominal, R1/B1 geometry)
Rotor / Bob	R1 Rotor / B1 Bob, per API RP 13B-1
Spring Torsion Constant	$\approx 386.0 \text{ dyne}\cdot\text{cm}/^\circ$ deflection (F1 spring, nominal)
Sample Cup Capacity	$\approx 350 \text{ mL}$ to fill line
Sample Cup Material	Stainless steel
Calibration Check	Dead-weight torque check — see printed Dial Reading for Calibration Weight table
Power Supply	AC220V 50Hz (standard) or AC120V 60Hz (USA), $\pm 10\%$
Motor	Synchronous, six-speed gear-selected drive

Applicable Standard	API RP 13B-1, Section 6; ISO 10414-1
Overall Dimensions (approx.)	200 (W) × 260 (D) × 460 (H) mm
Weight (approx.)	6.5 kg

Values shown reflect standard factory specification for this instrument class per API RP 13B-1. Please confirm exact figures against the calibration certificate shipped with each unit serial number.



6-Speed Rotational Viscometer, IM-RV-D6

Operation

1. Place the instrument on a firm, level, vibration-free bench.
2. Collect a fresh sample, taken as close to the test point as practical so the reading reflects current conditions.
3. Fill the stainless steel sample cup to the fill line, mount it on the base, and raise it so the rotor and bob are immersed to the scribed line on the bob shaft.
4. Select the desired test speed at the front-panel speed selector. A typical sweep starts at 600 RPM and steps down through 300, 200, 100, 6 and 3 RPM.



Rotor sleeve immersed in the sample; select the test speed before switching on

5. Switch the motor on and allow the dial reading to stabilize for a few seconds at each speed before recording it.

- Record the dial reading at each of the six speeds: 0600, 0300, 0200, 0100, 06, 03.

✓ TIP

Take readings from 600 RPM down to 3 RPM in one continuous run — working down through the speeds keeps the sample from settling or gelling between readings and gives a more consistent sweep.

- Calculate Plastic Viscosity (PV) and Yield Point (YP) from the 300 and 600 RPM readings: $PV \text{ (cP)} = 0600 - 0300$; $YP \text{ (lb/100 ft}^2\text{)} = 0300 - PV$.
- For gel strength, stop the rotor, let the sample rest undisturbed for 10 seconds, then switch to 3 RPM and record the peak dial deflection as the initial gel (Gel-10s). Repeat after a 10-minute undisturbed rest for the final gel (Gel-10min).

⚠ IMPORTANT

Drilling fluids, cements and completion brines can be caustic or irritating on contact. Gloves and eye protection should be worn any time samples are handled.

- Switch off, raise the cup clear of the rotor and bob, and clean the rotor, bob and cup immediately after testing.

Reporting Results

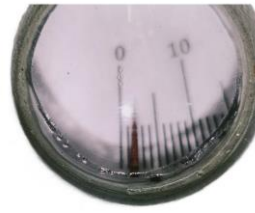
Report each dial reading against its speed, together with the sample temperature, so later readings can be compared on a like-for-like basis.

Calibration

Basic Calibration

Every rotor, bob and torsion spring set leaves the factory matched and verified together. The dead-weight torque check below confirms the spring hasn't drifted out of tolerance and is good practice before any critical test run.

- With the rotor/bob removed from the sample cup and the instrument level, hang each calibration weight in turn from the calibration point beneath the head, starting with the lowest weight.
- Read the degree deflection off the dial reading gauge on the front of the head.



Dial reading gauge — read the degree deflection at eye level for an accurate stop point

3. Compare the reading to the Min/Max range in the table below for that weight. A reading inside the printed band confirms the torsion spring is within factory tolerance.

Dial Reading for Calibration Weight

Weight (g)	Min Reading	Max Reading
5	21.55	22.21
10	43.11	44.42
15	64.66	66.63
20	86.23	88.85
25	107.78	111.06
30	129.34	133.28
35	150.89	155.49
40	172.45	177.70
45	194.00	199.90
50	215.57	222.13
55	237.12	244.30
60	258.68	266.56
65	280.23	288.77



Factory calibration-weight table, printed on the instrument head

Out-of-Calibration Units

If a reading falls outside the Min/Max band for its weight, check that the bob hangs free and true and that the calibration weight is seated properly, then repeat the check. If the discrepancy persists, the torsion spring has likely drifted or been damaged, and the unit should be returned to Inmotion Energy for spring and dial recalibration.

When to Recalibrate

- Before any test run where the reading will be used for a critical decision
- After a drop, impact, or any other physical shock to the instrument
- If field results begin looking inconsistent between otherwise identical samples
- On whatever routine schedule your facility's QA/QC program calls for

⚠️ IMPORTANT

Never force the calibration knob or attempt to disassemble the torsion-spring head in the field. The spring is a matched, factory-set component, and disturbing it invalidates the calibration table printed on the unit.

Maintenance

1. Wipe the rotor, bob and cup clean immediately after each test — dried mud or cement residue left in the rotor/bob gap will bind the mechanism and skew every subsequent reading.
2. Inspect the bob and rotor sleeve for dents, scoring or corrosion before each test series; a bent bob shaft will not hang true and will bias the reading.
3. Keep the torsion spring, calibration knob and gearbox housing free of dust and grit; do not lubricate the spring housing.
4. Store the instrument upright, sample cup removed and dried, in a dry cabinet away from vibration and direct heat.

5. Re-run the calibration-weight check (page 8) any time the mechanism has been dropped, jarred, or readings begin to drift.

NOTE

Never use a wire brush, metal pick, or sharp tool to clean the rotor or bob — use a soft cloth or a soft pipe cleaner only. Scoring the rotor bore or bob surface, even slightly, will throw off every reading afterward.

Troubleshooting

Symptom	Possible Cause	Recommended Action
Dial reading stuck at zero	Rotor not engaged, or motor not running	Confirm the speed selector is set to a valid speed and the unit is powered; check the drive coupling
Readings drift or won't settle	Sample still shearing, or bob not fully immersed	Immerse to the scribed line and allow the reading to stabilize before recording
Calibration check falls outside table range	Bent bob shaft, worn spring, or weight not hanging freely	Re-check weight placement; if still out of range, contact Inmotion Energy for spring service
Rotor won't turn	Debris in the rotor/bob gap, or gearbox fault	Clean sample residue from the rotor/bob gap; if the motor runs but the rotor doesn't turn, contact Inmotion Energy
Inconsistent PV/YP between runs	Cup not filled to a consistent level, or worn rotor/bob	Standardize sample volume and fill level; inspect the rotor and bob for wear

Still stuck after trying the above? Set the instrument aside and get in touch with Inmotion Energy (see Company & Contact Information, page 12).

Warranty and Return Policy

Warranty

Inmotion Energy (OPC) Private Limited stands behind the materials and workmanship of every instrument it ships. For eighteen (18) months from the invoice date, if a product turns out not to meet its stated specifications through no fault of the buyer, and we're notified in writing once the issue is found, we'll repair or replace it at our discretion, subject to the exclusions below.

This coverage assumes normal use, in line with the operating conditions described in this manual. It does not stretch to cover use outside those

conditions, nor to flaws that were plainly visible on arrival but went unreported.

Beyond what's stated here, Inmotion Energy doesn't offer any other express or implied warranty — including, to the extent the law allows, implied warranties of merchantability or fitness for a particular purpose.

Coverage does not extend to damage or loss caused by:

- Installation, operation, or upkeep that doesn't follow this manual
- Misuse, carelessness, or accidental damage
- Adjustment, disassembly or repair of the torsion-spring head carried out by anyone other than Inmotion Energy or an authorized service provider
- Storage conditions or exposure beyond what normal field use implies
- Parts or components sourced from outside Inmotion Energy
- Ordinary wear items — the rotor sleeve, bob and sample cup, for example

Returns and Repairs

Pack anything you're sending back carefully — Inmotion Energy can't take responsibility for damage caused by inadequate packaging in transit.

If you're returning a unit that isn't defective, do so within thirty (30) days of your invoice; a restocking charge may apply, and the item needs to arrive in its original condition to qualify for a refund.

Before shipping anything back, reach out to us with your invoice number, a description of the issue, and your contact details so we can set expectations. Send equipment to:

Inmotion Energy (OPC) Private Limited

Attn: Service & Repair

186, 1st Main Road, Vijaya Bank Layout, Bilekahalli

Bangalore, Karnataka – 560076, India

Questions before then? Reach our support team at info@inmotionenergy.in.

**Ordering &
Replacement Parts**

Send the Inmotion Energy sales team a note about what you're working on, and we'll get back with a recommendation and a quote. Spares, including replacement rotors, bobs, sample cups and power cords, are kept in stock and shipped on request.

Have this ready when you reach out:

- Model / catalog number (IM-RV-D6)
- The part number and description you need (see Components, page 4)

- How many you need
- Your company name, shipping address, and a contact point



IEC power inlet — quote the model number when ordering a replacement power cord



Power cord, supplied with each unit

Company & Contact Information

Inmotion Energy has spent years supplying precision testing instruments and drilling tools to operators working with drilling fluids, cements, and completion fluids. Working out of our Bangalore facility, we serve customers across India and the Middle East. Being an independent manufacturer means our customers come first, not a parent company's agenda.

Industries We Serve

- Onshore & offshore drilling contractors
- National & independent oil companies
- Mud engineering & testing laboratories
- Well completion & workover operations

Why Choose Us

- Every unit goes through rigorous checks before it ships
- Spares and replacements move fast, so downtime doesn't stack up
- Designs proven in the field, built to keep working

Contact Details

Inmotion Energy (OPC) Private Limited

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