

LANGRY™



APT SERIES

OPERATING INSTRUCTIONS



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Chapter 1 Overview

1.1 Purpose and Characteristics

The Anchor Pull-out Tester developed and produced by Langry Technology Pte. Ltd. is suitable for detecting the anchoring force of anchor rods, steel bars, expansion bolts and other anchoring bodies. It is one of the essential instruments for quality inspection of anchor rod construction and support engineering. The drawing instrument consists of a manual pump, hydraulic cylinder, integrated intelligent digital pressure gauge, and high-pressure oil pipe. The manual pump with a capacity of 10 to 30 tons is designed with a single plunger, while the manual pump with a capacity of 50 to 100 tons is designed with a high and low pressure double plunger, with high pressure and high efficiency. The pump body is made of precision forged steel and has a long service life. The integrated intelligent digital pressure gauge adopts high impedance military grade sensors with high accuracy. The integrated design of the instrument is easy to carry, with intuitive readings and peak retention. When in use, only a quick connector is needed to connect the manual pump to the hydraulic cylinder. This series of Anchor Pull-out Tester a compact structure and is easy to carry. The manual pump of the Anchor Pull-out Tester can also be used as a power source for general low flow high-pressure oil.

The performance characteristics of this instrument are as follows:

- 1.Integrated digital pressure gauge design;
- 2.Zero tracking, peak holding, and automatic shutdown;
- 3.Automatic line correction to improve instrument accuracy.
- 4.Force curve, time and load displayed on the same screen; Complete recording of testing process data;
- 5.Loading speed prompt to make the experiment more in line with regulatory requirements;
- 6.Support Bluetooth data upload.

According to the standard:

GB50367-2013 "Code for Design of Concrete Structure Reinforcement "

JGJ145-2013 "Technical Specification for Post Anchoring of Concrete Structures"

GB50203-2011 "Code for Acceptance of Construction Quality of Masonry Structures"

1.2 Main technical parameters

model		Parameters				
		APT100	APT200	APT300	APT500	APT1000
manual pump	Maximum working pressure	63MPa				
	quality	10			18	
hydraulic cylinder	Maximum pulling force	100kN	200kN	300kN	500kN	1000kN
	central aperture	27	34	45	60	95
	piston stroke	60	70		120	150
	quality	3.5	13.5	15	24.5	75
Oil pipe		Single oil circuit			Dual oil circuit	
accuracy class		EN ISO 7500-1 Class 1 (±1 %, from 20 % of maximum force)				
pressure gauge	measurement range	0-100	0-200	0-300	0-500	0-1000
	power supply	3.7V3200mAh rechargeable lithium battery				
	quality	0.33 (including battery)				
	liquid crystal	2.4-inch color LCD screen				
	Data storage capacity	4000 pieces				
	battery life	18 hours				
Attachme nt	Common Anchors	Φ6-20	Φ6-25	Φ6-32	Φ6-40	Φ25-50
	pull rod	M18	M24	M30	M39	M45
	conversion head	M6-20	M6-22	M6-27	M6-36	M20-42

1.3 Precautions

1. Please read this manual carefully before using the instrument.

2. Work environment requirements:

(1) Environmental temperature: -10 °C~50 °C

(2) Relative humidity:<90% RH

(3) Battery interference: No strong alternating electromagnetic field

(4) Avoid direct sunlight exposure during the use of the instrument

(5) Corrosion prevention: Necessary protective measures should be taken when used in damp, dusty, and corrosive gas environments.

3. Storage environment requirements:

(1) Environmental temperature: -20 °C~50 °C

(2) Relative humidity:<90% RH

(3) If not in use for a long time, please regularly turn on the device for inspection and charging. The instrument should be placed in a ventilated, cool, and dry place, and should not be exposed to direct sunlight for a long time

4. Avoid water ingress and use in strong magnetic field environments, such as near large electromagnets, transformers, frequency converters, etc.

5. Shock resistance: During use and handling, severe vibrations and impacts should be prevented.
6. Charging management: This instrument is powered by rechargeable lithium batteries. When the battery is low, it should be charged in a timely manner to avoid damaging the battery; The indicator light stays on during charging, and turns off when fully charged; Please use the original adapter and data cable for charging, with a charging temperature range of 10-35 °C.
7. Maintenance: After each use, the instrument should be properly cleaned to prevent dust from entering the instrument or connector, which may cause performance degradation or damage. This instrument does not have waterproof function, do not use a damp cloth to scrub! Do not use organic solvents to clean instruments and accessories! Please wipe the instrument and accessories with a clean, soft, dust-free cloth.

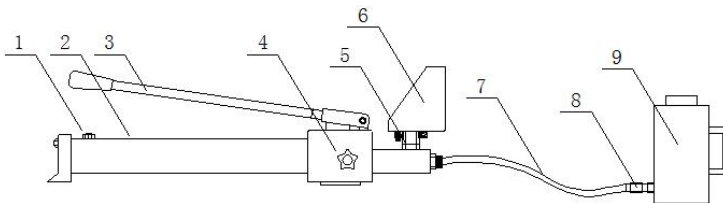
1.4 Responsibility

This instrument is a precision testing instrument, and our company does not assume any corresponding responsibility when the user engages in the following behaviors.

1. Violation of the above work environment requirements or storage environment requirements.
2. Abnormal operation.
3. Open the casing and disassemble any components without permission.
4. Serious damage to the instrument caused by human or accidental accidents.

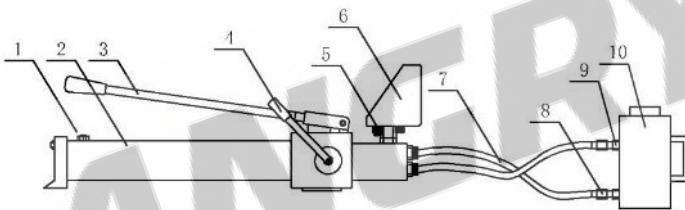
Chapter 2 Operation Steps

The schematic diagram of the structure of the single oil path anchor rod pulling instrument is as follows:



- | | | |
|--------------------|--------------------|--------------------------------------|
| 1. Filling hole | 2. Oil tank | 3. Pressure handle |
| 4. Unloading valve | 5. Pressure sensor | 6. Integrated digital pressure gauge |
| 7. HP hose | 8. Quick adapter | 9. Hollow hydraulic cylinder |

The schematic diagram of the structure of the dual oil path anchor rod pulling instrument is as follows:



- | | | |
|-------------------------------|----------------------------------|--------------------------------------|
| 1. Filling hole, vent valve | 2. Oil tank | 3. Pressure handle |
| 4. Reversing valve | 5. Pressure sensor | 6. Integrated digital pressure gauge |
| 7. HP hose (loading) | 8. Quick adapter at filling port | 9. Return port (at loading) |
| 10. Hollow hydraulic cylinder | | |

·Erect the HP hose for sensor at the oil inlet, and the other one at the oil outlet.

·Switch the reversing valve to a pressurization position when pressurization, and to a depressurization position when depressurization.

Please follow the steps below:

2.1 Oil level inspection

In case that the hydraulic cylinder piston fails to fully retract to position, it should be first connected to the hand pump by a hose. Turn the pump-mounted unloading valve counterclockwise by means of the single-circuit Anchor Pull-out Tester. Switch the reversing valve to an unloading position by means of 50T/60T/100T double-circuit Anchor Pull-out Tester to return the hydraulic fluid in the hydraulic cylinder back to the oil tank of hand pump. Unscrew the filling cover at the end of the hand pump to check oil level. 1/5 space should be seen in the oil tank. If not, fill N42 wear-resistant hydraulic fluid.

2.2 Venting

Air is usually mixed in the oil tank, hose and hydraulic cylinder when the hydraulic system is installed. Air must be purged off to assure the normal operation of the hydraulic system. For the purpose, unscrew the vent valve of filling cover to facilitate air removal out of the oil tank. Put the hand pump at a place slightly higher than the hydraulic cylinder, and tighten the unloading valve clockwise. Press on the hand pump to release the hydraulic cylinder piston to max. stroke. Open the unloading valve to retract the piston. Repeat the above steps for several times. 50T-100T hand pump reversing valve has the front, middle, and rear positions. Put the reversing valve at a loading position, and press on the hand pump to release the hydraulic cylinder piston. Switch the reversing valve to an unloading position when the specified stroke is reached. Continue to press to retract the piston rod. Make several attempts to completely remove the air out of the hydraulic system.

Chapter 3 Operating Instructions for Instruments

3.1 Instrument Usage Instructions

3.1.1 Functional Overview

The instrument primarily functions to perform tasks such as data test, data view, delete, settings, and related operations. The system main interface face, as shown in Figure 3.1. Press (▲) and (▼) to select options, then press (OK) to enter the selection interface.

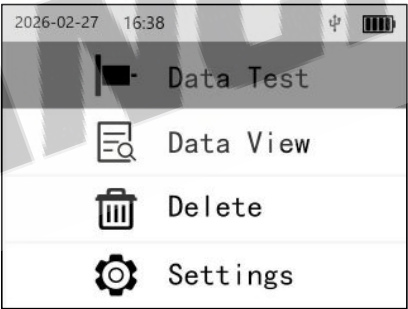


Figure 3.1

3.1.2 Data Test

Select the data test option in the main interface to enter the inspection interface, as shown in Figure 3.2.

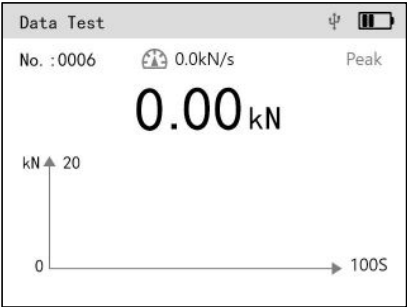


Figure3.2

If no load is applied at this time and the instrument display is not zero, press (▼) to reset the display to zero before applying the load. After pressing (▲), the maximum value will be maintained in real-time, with the peak value displayed in red font. Refer to Figure 3.3.

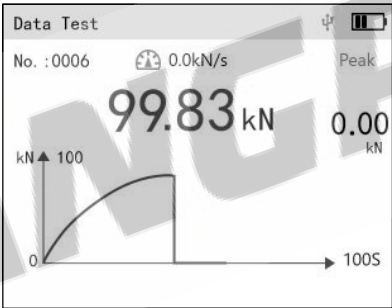


Figure 3.3

After the detection is completed, press (OK) to save the data, and the instrument will record the measurement result. The number in the upper left corner of the screen is the current data number. The instrument can store up to 4000 pieces of data, and after recording for more than 100 seconds, the curve will be displayed in pagination. Press (▲) (▼) on the data view interface to flip through the pages.

3.1.3 Data View

Select "Data View" on the main interface to enter the data view interface as shown in Figure 3.4.

Data View		
0005		
NO.	DD/MM/YY	Data
0005	11-03-2026	202681bf
0004	11-03-2026	99. 8kN
0003	11-03-2026	99. 7kN
0002	11-03-2026	99. 3kN
0001	11-03-2026	100. 3kN

Figure 3.4

Move to the desired data by (▲) (▼), press (OK) to view the saved data in detail as shown in Figure 3.5, and press (BACK) to return to the previous interface.

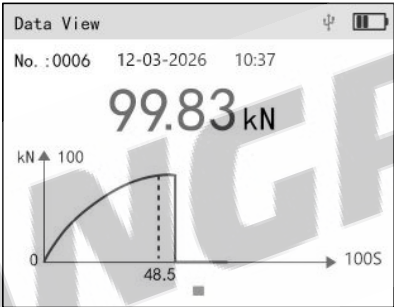


Figure 3.5

3.2.4 Data Delete

Select "Delete" on the main interface to enter the data deletion interface, as shown in Figure 3.6. Long press (OK) to delete all saved data. After the deletion is complete, it will automatically return to the main interface. If the data is not deleted, press (BACK) to return to the main interface.



Figure 3.6

3.2.5 Settings

Select "Settings" on the main interface to enter the system settings interface, as shown in Figure 3.7.

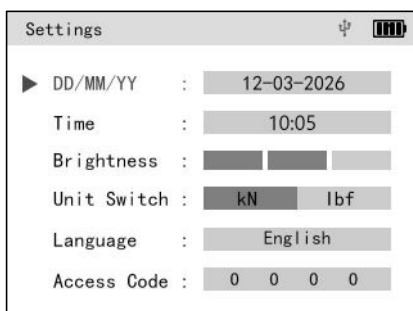


Figure 3.7

If there is no need to modify the system settings parameters, press (BACK) to return to the main interface. If there is a need to modify the system settings parameters, press the function key to make the changes.

3.1.6 Instrument Calibration

Calibration settings are password controlled. Enter password 1111 in the operation password section of the system settings interface, and then press (OK) to enter the calibration state; When the password is incorrect, it is not possible to enter the pressure calibration state. Accidentally entering can be exited by pressing (BACK).

Steps:

1. Press and hold the storage button to turn on the device and enter password 1111. Then press the [OK] button to enter calibration mode.
2. When the instrument displays "0%", make sure that the instrument is not loaded. The standard force gauge displays a value of zero. Press the [OK] button once, and the instrument displays "100%". At this time, operate the manual pump to load until the standard force gauge displays the full range pressure value of the instrument. Press the [OK] button to complete the calibration of the 100% range point. After completion, the instrument will automatically exit the calibration state, and the calibration accuracy can be maintained even when power is lost. If the accuracy of the instrument retest still cannot meet the requirements for use, the above steps can be repeated or segmented line correction can be performed (refer to section 3.17).

3.1.7 Line Correction

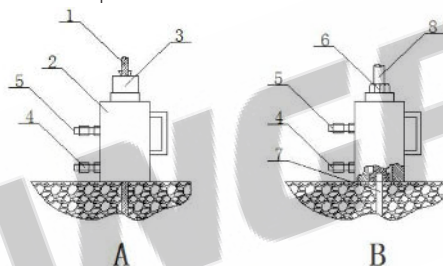
In the "Settings" interface, enter password 3333 and press the save button to enter the line correction mode. By pressing the [▲] and [▼] keys, you can adjust to any line point that needs to be corrected. Operate the manual pump to add load, and when the pressure value corresponds to the line point, press the store key to save the current line point.

Taking APT100 as an example, the full range of this model of instrument is 100KN. Line correction is required for the 10KN-20KN range. The instrument enters the line correction state and displays 0%. Press the up button to adjust it to 10%, and then apply a load of 10KN to the standard force gauge. Press the store button, and the instrument displays 20%. Then, when the load is applied to the standard force gauge at 20KN, press the [OK] to complete the correction.

Chapter 4 Anchor Rod Testing

When connecting the oil cylinder of the dual oil path anchor rod pulling instrument, place the reversing valve in the middle position, that is, the middle gear. Connect the oil cylinder to the measured anchor rod as shown in the following figure. If the anchor rod is a threaded steel bar, refer to Figure A for connection. If the anchor rod is made of round steel with threads on the exposed part, it can be connected according to Figure B. Our company produces 14 different specifications of anchors ranging from 6 to 50, as well as various sizes of extension rods. Users can choose according to their actual needs.

Tighten the unloading valve in a timely manner and slowly press the manual pump to extend the piston rod by about 10mm. The purpose is to avoid damaging the piston rod when installing the anchor and knocking on the wedge, and also to facilitate anchor removal. Install the anchor or nut that matches the anchor rod and fix it reliably. Press (ON/OFF) to open the instrument and enter the detection interface. Apply pressure evenly to the manual pump until the pressure reaches the maximum value, and then stop loading. When the peak is turned on, record or store the pressure gauge data and then turn off the power.



- 1.Anchor being measured (deformed rebar) 2. Hydraulic cylinder 3. Anchorage device
4. Oil inlet (at loading) 5. Oil outlet (at loading) 6. Nut
7. Anchor shank being measured (round rebar) 8. Extension bar

After the inspection is completed, loosen the unloading valve and the piston can automatically retract into the hydraulic cylinder. When the connection state shown in Figure 4A needs to be disassembled, the anchor shell can be tapped to detach the clip from the shell, and then the hydraulic cylinder can be removed. When the connection state shown in Figure 4B needs to be disassembled, the nut can be removed first, and then the hydraulic cylinder can be removed. After the double oil path anchor rod pulling instrument completes the inspection, turn the reversing valve to the unloading position, press the manual pump to retract the piston rod, and remove the anchor or nut and hydraulic cylinder.

Chapter 5 Common faults and troubleshooting methods

Fault phenomenon	cause of failure	treatment method
The pressure gauge has no pressure display	Lack of oil in the oil cylinder	Open the oil injection valve and add oil
	The relief valve is not tightened	Turn clockwise to tighten
	Oil leakage at the joint	Tighten the connector
	The manual pump is not placed horizontally	Add load after leveling the water
	Pressure gauge damaged	Remove for inspection or calibration
The pressure cannot be reached	Insufficient oil in manual pump	Come on
	Oil leakage at the joint	Check the joints and sealing rings
	Incorrect oil quality or dirty oil used	Change oil
Hydraulic cylinder oil leakage	The sealing ring inside the cylinder block is damaged	Replace the sealing ring
The reading on the pressure gauge has significantly decreased	Serious oil leakage at the joint	Tighten or replace the sealing ring
	Seal failure	Replace the same type of sealing ring
	The oil quality is too dirty	Clean the oil cylinder, pump body, oil pipe, and oil cylinder with kerosene before changing the oil
	Poor sealing of one-way valves inside the pump body	Return to the factory for maintenance
The pressure gauge has a reading, but the hydraulic cylinder has no pressure	Oil pipe blockage	Clear the rubber hose
	Connector blockage	Clean the connector

Chapter 6 Safety Warning

1. Operators of the anchor rod Anchor Pull-out Tester shall understand the structural requirements and take up their posts after understanding this manual.
2. Before use, the dynamo meter shall be loaded by air pressure, and shall not be used in case of any abnormality.
3. No one is allowed to stand around the oil cylinder during Anchor Pull-out Tester. Pay attention to safety.
4. The hydraulic pump operator shall slowly boost the pressure.
5. The valve of the hydraulic pump has been adjusted before delivery, and shall not be adjusted randomly during use.
6. In case of abnormal conditions such as oil leakage during use, shut down the machine for inspection, and use the machine after the maintenance personnel check and eliminate the fault.
7. The oil reservoir shall be filled with clean L-HM32 wear-resistant hydraulic oil, and the oil filling volume shall not be too full. A certain space (about 1/5 space) shall be reserved in the oil pipe to exhaust the air.

Chapter 7 Precautions

1. The anchor rod puller must be used within the measurement range, otherwise the detection accuracy will be affected or permanent damage will be caused.
2. Keep the hydraulic system clean. Unscrew the unloading valve of the manual pump after the oil cylinder is used to retract the piston, and frequently add oil on the inner and outer diameter of the piston rod to prevent rust. The nipple joint shall be dustproof and anti-collision.
3. When the oil cylinder is working, the bottom must be leveled and placed stably and vertically stressed; Overtravel operation is not allowed.

Chapter 8 Packaging, Transportation and Storage

The anchor rod puller shall be packed in an iron box, and the packing box shall be attached with product instructions, product certificates, packing lists and accessories. Please pay attention to inspection.

The puller can be transported by common vehicles after being packaged, and throwing and rain and snow shall be avoided during transportation. The Anchor Pull-out Tester shall be placed in a place without rain and snow immersion and with good air circulation.

Chapter 9 Accessories and Warranty

The standard configuration of this instrument is

1. Hydraulic cylinder (with packing box) 1
2. Manual pump (with packaged iron box) 1 set
3. One copy of product certificate and one copy of operation manual
4. Optional accessories of Anchor Pull-out Tester include anchorage, pull rod and adapter
5. Power Adapter and Type-C Data Cable

The product is warranted for one year under the specified service conditions, with lifetime maintenance. In case of product problem, please contact us in time. Contact with.

Chapter 10 Use of Online System

10.1 Introduction

The pressure detection online system management software is a multi-functional analysis software developed by Langry Technology Pte. Ltd. for the data processing of adhesive strength and anchoring force detection. The software has a friendly interface and is easy to operate. It is designed for the engineering testing personnel.

10.2 Software installation

For the first use, open the official website www.langryndt.com, find the corresponding model in the product and enter its product details page. After downloading and installing the online system software, you can start using it.

10.3 Data transmission

When the instrument and computer host are connected by USB data line, ensure the instrument is powered on, open the online system software, click the "Online" option on the title bar, select the "Automatic Import" option in the drop-down menu and click, select to import all or part of the components in the pop-up dialog box, and click "Import" after selection. The instrument will automatically upload the selected component data. The upload process requires no manipulation of the instrument.

10.4 Data processing

The online system can process all components, data, etc.

10.4.1 Test component data

1. Click any component in the component list area to view the curve of the component;
2. Right click the mouse at any position of the curve graph to copy, save, print, zoom, automatically adjust and set properties of the curve; The title, axis tag mark, scale tag and other items of the graph can be adjusted through attribute settings.

10.4.2 Test report

1. Used to generate the report document of the currently opened data file.
2. To create a new test report, right-click the "Test Report" node on the tree or select the data processing menu.
3. Select one test report and right click or select data processing menu to delete the selected test report; The composition of the test report can also be changed.

10.4.3 Member deletion

Select the component to be deleted, right click or select the data processing menu to delete the selected component.

The deleted component data can be viewed and restored in the deleted component; The deleted test report cannot be viewed and recovered.

10.5 Printing and preview

Select the report to be previewed and printed, right click and select data processing menu or file menu for printing preview; Print operation can also be performed on the print preview interface.

10.6 Data storage

Select the file menu and click "Save" or "Save As" to save the current data file. The file extension is .you can save the current data file.

10.7 Version upgrade of instrument

Select "Online" menu after connecting the instrument and click "Firmware Upgrade" to download and upgrade the instrument version.

10.7.1 Software version upgrade

Select the help menu and click "Version update" to check or upgrade the version of online system software.

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