

DET-2 Construction Theodolite



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- DET-2 stands for Digital Electronic Theodolite, 2 Second
 - 2 Arc Seconds is its angular accuracy
- Contractors may also refer to this instrument as a Digital Transit, or Transit
- Generally used to make sure things are installed perfectly straight, or at right angles to each other



Construction Positioning

- The DET-2 replaces conventional methods like string and batter-boards
- Allows control of alignment and position
- Target Trades:
 - General Contractors
 - Concrete Contractors
 - Residential Contractors
 - Underground/Utilities Contractors



DET-2 Construction Theodolite

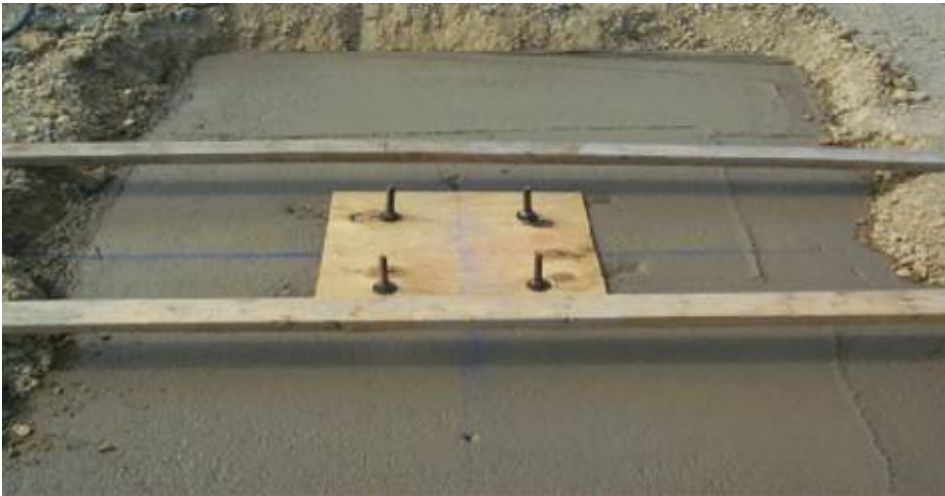
- Highly Featured, Economy Priced
 - 1" or 5" selectable display
 - 2" accuracy
 - Vertical Compensation
 - Dual backlit displays and controls, large LCD characters
 - Easy to use One-Touch buttons
 - Completely configurable via user software
 - Illuminated telescope
 - Recharge and backup alkaline packs included



Theodolite Applications

Alignment

- The DET-2 can be used to align forms, footers and anchor bolts



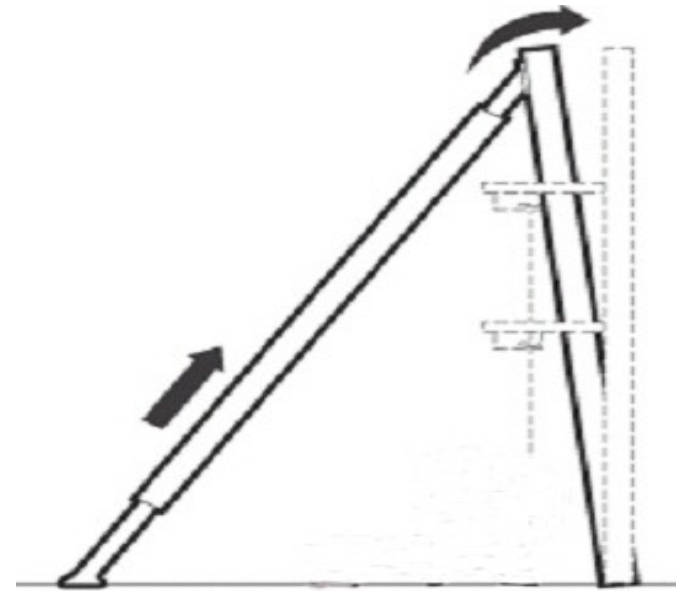
Turning 90's

- The DET-2 can be used to turn 90's and check angles



Checking Plumb / Tilt Up Walls

- A theodolite can be set up on a parallel offset to the line for checking plumb
- A steel scale can be used to check a consistent offset
- Tilt-up walls can be done using a theodolite that's set up on the line of the wall and by checking bottom and top positions



Gravity Flow Pipe / Utility Work

- The DET-2 can be used for Dialgrade / Pipe Laser setups, including manhole and pipe elevations, layout and line setting
- The unit compliments a Dialgrade sale



Basic Grade Work

- Can be used for short range grade work at very steep angles
- Only along the line of sight
- Can be used for a run of grade stakes



Short Range Leveling

- The telescope can be set at 0.00%, 90° or 0° (depending on Zenith setting) for short range leveling



DET-2 Theodolite

Product Features Benefits

Waterproof Compact Carrying Case



- The DET-2 Model number is clearly displayed on the outside of the case for inventory management
- Molded, closed-cell foam inserts
- O-ring water seal
- Easy to carry, with recharger, backup alkaline battery pack, multi-language comprehensive operating manual, tools and plumb bob in custom pockets

Rechargeable and Alkaline Battery Packs Included



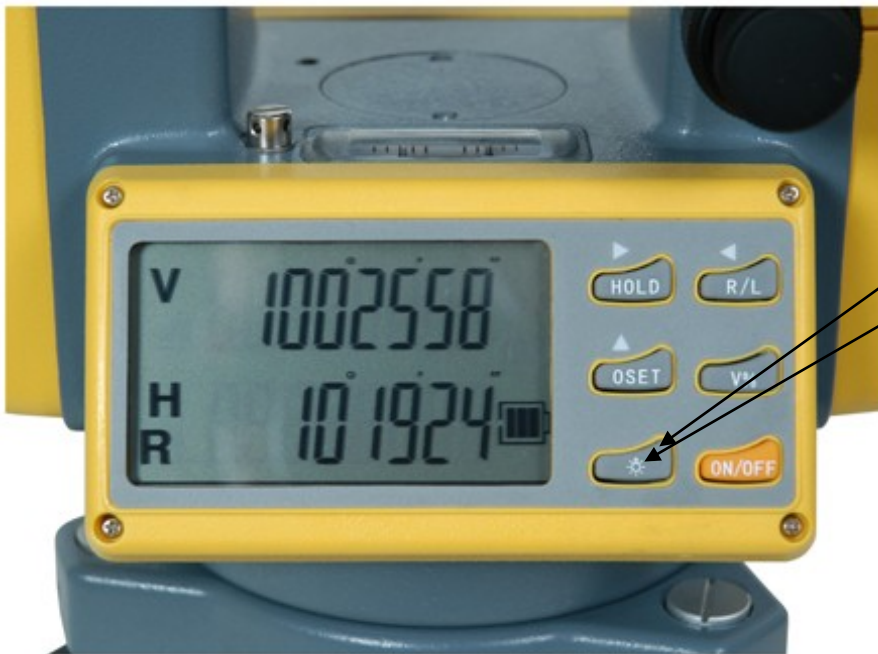
- NiMH Recharge Kit and Backup Alkaline Pack are **BOTH INCLUDED**
- Easy to install and replace, positive locking knob is exclusive to the DET-2
- Very long 36 hour battery life
 - No down time for the user due to power loss
- Battery Strength indicator for better planning
- User configurable Auto-Shutoff
- Lowest Operating Costs Available

Dual Displays and Controls



- Less walking around the instrument, faster operation when turning 90s
- Telescope tangents and locks have a positive “feel”
- Quick release tribrach included

Large LCD Characters, Backlit Display and Telescope



- Largest, easiest to read characters on the market
- Both displays are backlit
- Telescope is also illuminated
 - The DET-2 is useable inside buildings, at dawn and dusk
 - Greatly extended work hours, especially in the winter

User Interface and Selectable Options

- Simple to use and intuitive
- One-touch keys for 0-Set, V%, HOLD, and Horizontal Right/Left
- Large battery status display
- User configurable Parameter Settings to individual preferences or job
 - Unit of Angle (degrees, gon or 6400)
 - 0 or 90° Zenith angle
 - Automatic shutoff (30 minutes or Off)
 - 1" or 5" display resolution
 - Tilt On-Off (Vertical compensation)
 - 90° Beep or No-Beep



One-Touch Functions

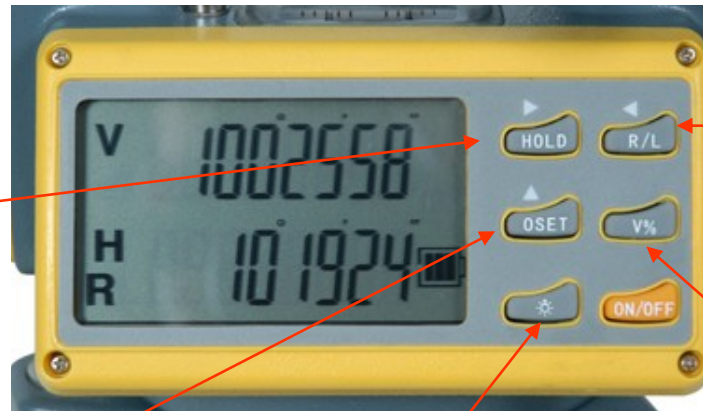
Angle Hold - to hold a particular angle and transfer it to another direction

Zero Reset - to set the horizontal angle to zero

Backlight and Scope illumination

Clockwise / Counter Clockwise angles - for less calculation

%Grade - for slopes



2" Accuracy, 1" or 5" Display Selection



- A True, 2 Arc Second Instrument
- Vertical Compensation
 - Can be turned on or off
- Can be used for any construction application
- Display can be “de-cluttered” by setting to 5” (simplifies appearance)

Vertical Compensation



- **Vertical compensation maintains the accuracy of vertical readings, since the plate vial is perpendicular to the telescope**
 - Grades / Slopes (%)
 - Steep slope
- **Sometimes Vertical Compensation can create problems**
 - Demos: The instrument **MUST** be leveled before demonstrating, and “TILT” is displayed when the instrument is moved around
 - Compensation causes an error when a precise vertical angle between two vertical points is being measured
 - **Can be turned off (TILT ON/OFF)**(See OPERATION AND DEMONSTRATION section)

Summary of Features and Benefits



Summary of Features and Benefits

- **2" Accuracy, Vertical Compensation**
 - Accurate enough for any Construction application
 - Display can be configured for a customers preference of Accuracy vs Complexity
- **Dual Displays and Controls**
 - Easy access and operation, reduced motions per reading
- **Large LCD Characters, Backlit Displays and Telescope**
 - Continue to work in low lighting conditions for more productivity
- **Simple user interface (One-Touch Buttons) and Adjustable Parameter Settings**
 - Very short learning curve, which means it can be used by all crew members with very little instruction. Can be used on multiple applications for faster payback.
- **Rechargeable and Alkaline Battery Packs Included, 36 Hour Battery Life**
 - Low operating cost, reduced downtime
- **Waterproof and Compact Carry Case**
 - Protects the unit and accessories, everything you need is in one case, which means one person can carry all the equipment

Specifications

Key Specifications: Telescope

Specification	DET-2
Telescope	
Image	Erect
Magnification	30x
Aperture	45 mm (1.7 in)
Focus Distance	1.35 m (4.43 ft) to ∞
Field of View	1° 30'

Key Specifications: Optical Plummet

Specification	DET-2
Optical Plummet	
Image	Erect
Magnification	3X
Angle of view	5°
Focusing range	0.5 m ~ ∞ (1.6 ft ~ ∞)
Reticle type	Crosshair



Key Specifications: Angle Measuring System

Specification	DET-2
Angle Measuring System	
Minimum Reading	1" or 5"
Precision	2"
Units	Deg / mil / gon / V %
Display	Dual, Large Character, Backlit LCD both sides



Key Specifications: Compensation, Vials, Environmental, Warranty

Specification	DET-2
Tilt Sensor	
Automatic Compensation	User set On/Off, $\pm 3'$ Range
Vials	
Tubular	30 $\frac{1}{2}$ mm
Circular	8 $\frac{1}{2}$ mm
Dust/Water	IP-54
Operating Temperature	-4° to 122°F (-20° to +50°C)
Size	164 x 154 x 340 mm (6.4 x 6.1 x 13.4 in)
Warranty	1 Year Standard

Operation and Demonstration

Power Up Steps



- When turning on a DET-2 (or any digital theodolite) for a demonstration 5 steps are required:
 1. Mechanically rotate the unit Horizontally until the alignment dots are over one another. This orients the tubular vial to the correct relationship to the leveling screws. **This is how the unit stores in the case, so this step can be eliminated in an actual demonstration.**

Power Up Steps



- When turning on a DET-2 (or any digital theodolite) for a demonstration 5 steps are required:
 2. PRESS and HOLD the power button until the display briefly flashes (about 2 seconds). Immediately raise your finger from the button. "TILT" will be indicated at the top of the display.

Power Up Steps



- When turning on a DET-2 (or any digital theodolite) for a demonstration 5 steps are required:
 3. LEVEL the DET-2 tubular vial by turning the 2 leveling screws at the back of the unit. The screws should be turned in opposite directions of each other. The bubble will “follow” the direction of your left thumb.

Power Up Steps



- When turning on a DET-2 (or any digital theodolite) for a demonstration 5 steps are required:
 4. Rotate the DET-2 Horizontally 90°. LEVEL the DET-2 tubular vial by turning the FRONT leveling screw ONLY. Repeat the leveling steps until the DET-2 can be rotated 360° and the tubular vial stays leveled. "TILT" will go out on the display, and be replaced by "SET0".

Power Up Steps



- When turning on a DET-2 (or any digital theodolite) during a demonstration 5 steps are required:
 5. To clear "SET0" from the display rotate the telescope vertically 360°. This lets the vertical encoder "find" its proper zero point.

The DET-2 is now powered up, initialized and ready to operate.

Power Up Steps: NOTE



- **Steps 3 and 4 can be eliminated in a demonstration by entering the menu system and turning TILT OFF.** This turns off the TILT sensor and Vertical Compensation.
- To turn TILT OFF, see the next section on CHANGING PARAMETER SETTINGS

Demonstration



- **Point out to the Dealer/Customer:**
 - The DET-2 is a 2" instrument, with Vertical Compensation, that is accurate enough for any Construction application. The display can be set to read out in 1" or 5" increments, whichever the customer desires (choice of Accuracy vs Complexity).
 - Both NiMH rechargeable and backup Alkaline battery packs are included for low operating cost. The unit has a long, 36 hour battery life, and Automatic shutoff that can be turned on or off as the customer desires.

Demonstration



Point out to the Dealer/Customer:

- Dual backlit displays and controls for easy operation, especially when turning 90°s
- Unique large LCD characters, about 50% larger than other units, PLUS an illuminated Telescope for easy reading indoors, or at dawn and dusk.
- “One-Touch” buttons for HOLD, R/L angle direction, 0 SET, and Vertical % or degrees for easy operation from application to application.
- There are a total of 6 Parameter Settings that can be stored in the unit by the customer, tailoring the unit to their requirements.

Changing Parameter Settings

Changing Parameter Settings



- Make sure the unit is **OFF**.
- Simultaneously PRESS and HOLD the OSET and HOLD buttons.
- PRESS and HOLD the On/Off button for 2 seconds, until the display flashes on. **Let up** on the On/Off button.
- Let up on the OSET and HOLD buttons. “NO BEEP” or “UNIT A” will be displayed. You are now in the PARAMETER SETTINGS menu.

Changing Parameter Settings



- Use the top buttons to scroll left and right through the PARAMETER OPTIONS.
- Use the 0SET button to change the settings for each option.
- When finished, press V% to store the new settings and exit the PARAMETER SETTINGS menu.

Hands On



Hands On

1) Turning 90's

Setup and level over a point

Sight a control point

Reset angle to zero

Turn a 90

Mark several points on the alignment

2) Short range leveling (Note difference in accuracy between V% and Degrees)

3) Change Parameter Settings

Service and Warranty



Service and Warranty

- 1 year standard warranty
 - Unit is repaired at no charge when under warranty
- Service through authorized service centers

Competitive Comparisons

Competitive Summary



Manufacturer	Construction Tools	Nikon	Geo-Fennel	Nedo	CST	David White	Northwest Instruments	Theiss	Targetec
Model	SP DET-2 / Apache ADT-2	NE-100	FET 405K	ET-5	DGT02 / DGT10	DWT-10	NETH 203	DT 5	JTD2
Comments	July 2009 Introduction	CI introduction was 2006	Made by Laisai (Model LS4100)?	Seems to come also from Laisai	Same as SETL, CST, DW and Northwest?	Same as SETL, CST, DW and Northwest?	Same as SETL, CST, DW and Northwest?	Unique to Theiss	
MKT.	GC Layout	GC Layout	GC Layout	GC Layout	GC Layout	GC Layout	GC Layout	GC Layout	
Accuracy	2 arc seconds	10 arc seconds	5 arc seconds	5 arc seconds	10 arc seconds	10 arc seconds	10 arc seconds	5 arc seconds	
Reading	1 / 5 arc seconds	10 arc seconds			2 / 10 arc seconds	10 / 20 arc seconds	10 / 20 arc seconds		
Compensation	Vertical Electronic, 3' Leveling	Vertical Electronic, 3' Leveling	Vertical Electronic	Vertical Electronic, 3' Leveling	Vertical Electronic, 3' Leveling	None	None		
Displays / Controls	2X Backlit LCDs	2X Backlit LCDs	2X Backlit LCDs	2X Backlit LCDs	2X Backlit LCDs	2X Backlit LCDs	2X Backlit LCDs	2X Backlit LCDs	
Circular Bubble	8' / 2mm	10' / 2mm		8' / 2mm	8' / 2mm	8' / 2mm / NA	8' / 2mm	8' / 2mm	
Spirit Level	30" / 2mm	30" / 2mm		30" / 2mm	30" / 2mm	30" / 2mm / 60" / 2mm	30" / 2mm	30" / 2mm	
Telescope Magnification	30X	30X (Superior Optics)	30X	30X	30X	30X	30X	30X	
Optical Plunmet									
Magnification	4X	3X	3X	3X	3X	3X	3X	2.5X	
Shortest Focus Distance	1.3 m	1.4 m		1.3 m	1.3 m	1.3 m	1.3 m	2.0 m	
Clear Objective Aperture	45 mm	45 mm	45 mm	45 mm	45 mm	45 mm	45 mm	42 mm	
Stadia Constant	100	100	100	100	100	100	100		
(Multiplication Factor)									
Horizontal Measuring Units	400 gon or 360 degrees	400 gon or 360 degrees	400 gon or 360 degrees	400 gon or 360 degrees or MIL	400 gon or 360 degrees	400 gon or 360 degrees	360 degrees		
Vertical Measuring Units	400 gon, 360 degrees or %	400 gon, 360 degrees or %	400 gon, 360 degrees or %	400 gon, 360 degrees or %	400 gon, 360 degrees or %	400 gon, 360 degrees or %	360 degrees or %		
Functions	Hz Circle Set CW or CCW, 0-set and Hold, 0, 10, 20 or 30 Minute Auto Shutoff	Hz Circle Set CW or CCW, 0-set and Hold, 20 or 30 Minute Auto Shutoff	Hz Circle Set CW or CCW, 0-set and Hold	Hz Circle Set CW or CCW, 0-set and Hold, 20 or 30 Minute Auto Shutoff, smallest resolution 1' / 5"	Hz Circle Set CW or CCW, 0-set and Hold, 20 or 30 Minute Auto Shutoff, smallest resolution 1' / 5"	Hz Circle Set CW or CCW, 0-set and Hold, 20 or 30 Minute Auto Shutoff	Hz Circle Set CW or CCW, 0-set and Hold	Hz Circle Set CW or CCW, 0-set and Hold	
Removable		Removeable	Removeable	Removeable	Removeable	Removeable	Removeable	Removeable	
Battery Life	36 Hours	22 Hours	15 Hours	15 Hours	15 Hours	15 Hours	40 "working" Hours	20 Hours	
Battery Type	4 X AA or NiMH Pack	4 X AA or NiMH Pack	4 X AA	4 X AA or NiMH Pack	4 X AA or NiMH Pack	4 X AA	4 X AA	4 X AA	
Operating Temperature Range	-20 to +50 C	-20 to +50 C plus IP-67	-20 to +45 C	-20 to +50 C	-20 to +50 C	-20 to +50 C	-10 to +45 C	-20 to +50 C	
Weight (Instrument)	4.4 kg	5.2 kg	4.0 kg	4.7 kg	4.5 kg			4.7 kg	
MFG'd	China	Japan	China	China					
Warranty (months)	12 / 12	12	12	12	12	12	12		

Absolute vs Incremental Encoders



- Most units in the DET-2 class have Incremental Encoders, which means they need the vertical and horizontal angles reset when they are turned on after power down or AUTO SHUTOFF
- Some competitive units may have Absolute Encoder systems, that “remember” their last angles and don’t require initialization
 - Although accuracy can degrade over time with these systems
- The DET-2 “solution” to this is to disable AUTO-SHUTOFF (SEE the PARAMETER SETTING section)



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