

2005 Total Station Survey

MANUFACTURER/DISTRIBUTOR	FOIF	FOIF	FOIF	FOIF	FOIF	FOIF	Laser Technology Inc.
MODEL/family/series	OTS238/538	OTS632/635	OTS732/735	RTS238/538	RTS632/635	RTS732/735	MapStar AE LPS
Variants possible for base model (See 'Other Variations' section below)	[1]	[1]	[1]	[1]	[1]	[1]	
CONFIGURATION: [Self Contained or Modular (Separate EDM Unit)]	Self Contained	Self Contained	Self Contained	Self Contained	Self Contained	Self Contained	Modular [6]
DISTANCE MEASURING COMPONENT							
Type (Infrared, Laser, Phase Comparison, Pulse, etc.)	Reflectorless (phase shift)	Reflectorless (phase shift)	Reflectorless (phase shift)	Infrared (phase shift)	Infrared (phase shift)	Infrared (phase shift)	Pulse laser
Range (normal conditions), in hundreds of meters: single/triple prism	[2]	[2]	[2]	18/25	18/25	18/25	6/6
EDM Accuracy, Standard Deviation	3mm+3ppm	3mm+3ppm	3mm+3ppm	3mm+2ppm	3mm+2ppm	2mm+2ppm	50mm+50ppm
Displayed Resolution, mm -(single/tracking)	1/10	1/10	1/10	1/10	1/10	1/10	10
Measuring Time, sec.: single reading/tracking	1.2/0.5	1.2/0.5	1.2/0.5	3/1	3/1	1.2/0.4	0.5/0.5
Displays Stake-Out Information	Yes	Yes	Yes	Yes	Yes	Yes	No
Other Distance Measuring Features:	Visible laser pointer, coaxial	Visible laser pointer, coaxial	Visible laser pointer, coaxial	Coaxial	Coaxial	Coaxial	[2]
Theodolite Component							
Telescope (type & magnification)	Erect 30x	Erect 30x	Erect 30x	Erect 30x	Erect 30x	Erect 30x	1-4x zoom
Field of View, degrees & minutes	1 degree 20 minutes	1 degree 20 minutes	1 degree 20 minutes	1 degree 20 minutes	1 degree 20 minutes	1 degree 20 minutes	7-30
Minimum Focusing Distance, meters	1.7	1.7	1.7	1.8	1.8	1.2	0.1
Tilt Range (360 deg if fully transitable)/w. elbow	360	360	360	360	360	360	180
Angle accuracy, arc-seconds [Std dev of a direction, dir and rev (DIN Spec. 18723)]	[3]	[3]	2	[3]	[3]	2	360
Smallest Unit Displayed	1 s	1 s	1 s	1 s	1 s	1 s	36
Orientation to Zero or Any Value After Pointing Telescope	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Dual-Axis Compensation	Single-axis	Single-axis	Yes	Single-axis	Single-axis	Yes	No
Other Angle Measuring Features:							
Stores Collimation and Vertical Index Corrections	Yes	Yes	Yes	Yes	Yes	Yes	No
Stores Trunnion Axis Correction	N/A	N/A	N/A	No	N/A	N/A	No
Reads Left or Right	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Selectable Display Resolution- Range of Values	[4]	[4]	[4]	[4]	[4]	[4]	No
Plate Vial Sensitivity per 2mm	30 mm	30 mm	30 mm	30 mm	30 mm	30 mm	
Other Features	[5]	[5]	Absolute reading	[5]	[5]	Absolute reading	[3]
ADVANCED FEATURES							
Target Tracking (active/passive)	N/A	N/A	N/A	N/A	N/A	N/A	
Robotic search control (user definable, search window, controllable from rod, etc.)	N/A	N/A	N/A	N/A	N/A	N/A	
Distance at which robotic total station can be controlled from rod	N/A	N/A	N/A	N/A	N/A	N/A	
Number of speeds on servo-driven	N/A	N/A	N/A	N/A	N/A	N/A	
Range to 90% Kodak grey card	60 m	60 m	60 m	N/A	N/A	N/A	
Range to 18% Kodak grey card	N/A	N/A	N/A	N/A	N/A	N/A	
MISCELLANEOUS							
User Interface:							
Operation: Menu, Command, Both	Both	Both	Both	Both	Both	Both	Menu
Alphanumeric Keyboard	N/A	Yes	Yes	N/A	Yes	Yes	No
Separate Numeric Key Pad	N/A	N/A	N/A	N/A	N/A	N/A	No
Electronic Leveling	Yes	Yes	Yes	Yes	Yes	Yes	No
Out-of-Level Warning	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Optical Plummet in Alidade, Magnification	Yes, 3x	Yes, 3x	Yes, 3x	Yes, 3x	Yes, 3x	Yes, 3x	No
Circular Vial Sensitivity per 2mm	8'	8'	8'	8'	8'	8'	
Detachable Tribach	Yes	Yes	Yes	Yes	Yes	Yes	Optional
Leveling Base Plummet, Type	OP(standard)/LP(option)	OP(standard)/LP(option)	OP(standard)/LP(option)	OP(standard)/LP(option)	OP(standard)/LP(option)	OP(standard)/LP(option)	Optical
Data Collector:							
On-Board, External, Both	Onboard	Onboard	Onboard	Onboard	Onboard	Onboard	External
Point Capacity (X, Y, Z, Pt No., Code)	8,000	8,000	[8]	8,000	8,000	[8]	10,000
Programmable	N/A	N/A	N/A	N/A	N/A	N/A	Yes
Price, if optional	N/A	N/A	N/A	N/A	N/A	N/A	Varies
On-Board Intelligence							
Height Transfer	Yes	Yes	Yes	Yes	Yes	Yes	No
Missing Line (Tie Distance)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Resection / free station	Yes	Yes	Yes	Yes	Yes	Yes	No
Setting Out - 2D / 3D	Yes	Yes	Yes	Yes	Yes	Yes	No
Reference Lines	Yes	Yes	Yes	Yes	Yes	Yes	No
Automatic Highway Layout - 2D / 3D	Yes	Yes	Yes	Yes	Yes	Yes	No
Remote Object Height	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Station & Offset	Yes	Yes	Yes	Yes	Yes	Yes	No
Traverse Checking	Yes	Yes	Yes	Yes	Yes	Yes	No
Angle Sets	Yes	Yes	Yes	Yes	Yes	Yes	No
Custom Applications Programs (by user or mfr for user):	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firmware Upgradable	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Type of Prism (cube/rect) and target (centric/eccentric) Required:	Cube/centric or reflective sheet	Cube/centric or reflective sheet	Cube/centric or reflective sheet	Cube/centric	Cube/centric	Cube/centric	Cube/rect
Rodperson Self-Aligning Aid	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Other Features:	[6]	[6]	Professional road survey program	[6]	[6]	Professional road survey program	[5]
BATTERY (built in/removable):	Removable	Removable	Removable	Removable	Removable	Removable	Disposable
Type (Gel-Cell, NiCd)	NiMH	NiMH	Li	NiMH	NiMH	Li	[7]
Hours Continuous Use (One EDM Meas. Per 30 sec)	10	10	12.5	10	10	12.5	7
Weight (lbs.)	0.44	0.44	0.4	0.44	0.44	0.4	0.5
CHARGER:							
Hours to Recharge	3.5	3.5	3	3.5	3.5	3	N/A
Overcharge Protection	Yes	Yes	Yes	Yes	Yes	Yes	N/A
Battery Weight (lbs.)	0.44	0.44	0.4	0.44	0.44	0.4	N/A
WEIGHT OF INSTRUMENT (incl. EDM, tribrach, battery, etc.), lbs.	11.7	11.7	14.4	11.7	11.7	14.4	5
WARRANTY, Months	12	12	12	12	12	12	12
DATE OF INTRODUCTION: Month and Year	Mar-02	Aug-04	May-05	Mar-02	Aug-04	May-05	Apr-00
Other variations possible within this series	[7]	[7]	[9]	[7]	[7]	[9]	
Additional notes							
Reader Service Number	1	2	3	4	5	6	7

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MANUFACTURER/DISTRIBUTOR	Laser Technology Inc.	Leica Geosystems Inc.	Leica Geosystems Inc.	Leica Geosystems Inc.	Leica Geosystems Inc.	Nikon/Tripod Data Systems	Nikon/Tripod Data Systems
MODEL/family/series	MapStar CM LPS	TPS400 Basic Series	TPS700auto Performance Series	TPS800 Performance Series	TPS1200 Professional Series	Nikon NPL-302 Series	Nikon DTM-302 Series
Variants possible for base model (See 'Other Variations' section below)		Reflectorless	[1]	Reflectorless	[2]	NPL-362, 352,332	DTM-362, 352,332
CONFIGURATION: [Self Contained or Modular (Separate EDM Unit)]	Modular [1]	Total Station, Coaxial EDM	Total Station, Coaxial EDM	Total Station, Coaxial EDM	Total Station, Coaxial EDM	Self Contained	Self Contained
DISTANCE MEASURING COMPONENT							
Type (Infrared, Laser, Phase Comparison, Pulse, etc.)	Pulse laser	Infrared, phase shift	Infrared, phase shift	Infrared, phase shift	Infrared, phase shift	Reflectorless [1]	Infrared
Range (normal conditions), in hundreds of meters: single/triple prism	6/6	30/54	35/54	35/54	>10,000 m to single prism	50/	20/26
EDM Accuracy , Standard Deviation	50mm+50ppm	2mm+2ppm	2mm+2ppm	2mm+2ppm	2mm+2ppm	±(3mm+2ppm)	±(3mm+2ppm)
Displayed Resolution , mm-(single/tracking)	10	0.000	0	0.000	0.000	1/1m	1/10
Measuring Time , sec.; single reading/tracking	0.5/0.5	0.3	0.3	0.3	0.8/0.15	[2]	1.6/1.0
Displays Stake-Out Information	No	Yes	Yes	Yes	Yes	Yes	Yes
Other Distance Measuring Features:		Reflectorless, laser pointer	Reflectorless, laser pointer	Reflectorless, laser pointer	[3]	[3]	[4]
Theodolite Component							
Telescope (type & magnification)	1-4x zoom	30x	30x	30x	30x	Concentric 26x	Concentric 33X
Field of View, degrees & minutes	7-30	1 degree 30 minutes	1 degree 30 minutes	1 degree 30 minutes	1d30'/ 2.7m at 100m	1 degree 30 minutes	1 degree 20 minutes
Minimum Focusing Distance, meters	0.1	1.7	1.7	1.7	1.7 to infinity	1.6	1.3
Tilt Range (360 deg if fully transitable)/w. elbow	180	360	360	360	360	360	360
Angle accuracy, arc-seconds [Std dev of a direction, dir and rev (DIN Spec. 18723)]	1080	2	2	2	1	3/5/5	3/5/5
Smallest Unit Displayed	36	1	1	1	1	1	1
Orientation to Zero or Any Value After Pointing Telescope	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Dual-Axis Compensation	Yes	Yes	Yes	Yes	Yes	[6]	Yes [7]
Other Angle Measuring Features:							
Stores Collimation and Vertical Index Corrections	N/A	Yes	Yes	Yes	Yes	Yes	Yes
Stores Trunnion Axis Correction	N/A	Yes	Yes	Yes	Yes	Yes	Yes
Reads Left or Right	N/A	Yes	Yes	Yes	Yes	Yes	Yes
Selectable Display Resolution- Range of Values	No	Yes	Yes	Yes	Yes	1/5/10	1/5/10
Plate Vial Sensitivity per 2mm		6'	Yes	6'	6'	30	30
Other Features	[3][4]	Continuous angle measurement	[4]	[5]	[6]	[8]	[9]
ADVANCED FEATURES							
Target Tracking (active/passive)		N/A	Passive	N/A	Passive, automatic targeting & tracking	N/A	N/A
Robotic search control (user definable, search window, controllable from rod, etc.)		N/A	N/A	N/A	[7]	N/A	N/A
Distance at which robotic total station can be controlled from rod		N/A	N/A	N/A	800 m	N/A	N/A
Number of speeds on servo-driven		N/A	N/A	2	2	N/A	N/A
Range to 90% Kodak grey card		100 m	170 m	170 m	500 m	200 m	N/A
Range to 18% Kodak grey card		170 m	100 m	100 m	300 m	N/A	N/A
MISCELLANEOUS							
User Interface:							
Operation: Menu, Command, Both	Menu	Both	Both	Both	Both	Direct function keys & menus	Direct function keys & menus
Alphanumeric Keyboard	No	Yes	Yes	Yes	Yes	Yes	Yes
Separate Numeric Key Pad	No	No	Yes	Yes	Yes	Yes	Yes
Electronic Leveling	No	Yes	Yes	Yes	Yes	Yes	Yes
Out-of-Level Warning	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Optical Plummet in Alidade, Magnification	No	Laser plummet	Laser plummet	Laser plummet	Laser plummet	Yes, 3x	Yes, 3x
Circular Vial Sensitivity per 2mm		6'	6'	6'	6'	10'	10'
Detachable Tribrach	Optional	Yes	Yes	Yes	Yes	Yes	Yes
Leveling Base Plummet, Type	Optical	Laser plummet	Laser plummet	Laser plummet	Laser plummet	Optional OP, 3 pin tribrach	Optional OP, 3 pin tribrach
Data Collector:							
On-Board, External, Both	External	Both	Both	Both	Both	Both	Both
Point Capacity (X, Y, Z, Pt No., Code)	10,000	10,000 records	>8,000 records	> 10,000 records	1,750 data records per MB	10,000 in 32 jobs	10,000 in 32 jobs
Programmable	Yes	Yes	Yes	Yes	Yes	No	No
Price, if optional	Varies	[8]	[8]	[8]	[8]	Included	Included
On-Board Intelligence							
Height Transfer	No	Yes	Yes	Yes	Yes	Yes	Yes
Missing Line (Tie Distance)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Resection / free station	No	Yes	Yes	Yes	Yes	Yes	Yes
Setting Out - 2D / 3D	No	Yes	Yes	Yes	Yes	Yes	Yes
Reference Lines	No	Yes	Yes	Yes	Yes	Yes	Yes
Automatic Highway Layout - 2D / 3D	No	No	No	Yes (2D)	Yes	No	No
Remote Object Height	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Station & Offset	No	Yes	Yes	Yes	Yes	Yes	Yes
Traverse Checking	No	No	Yes	No	Yes	No	No
Angle Sets	No	Yes	Yes	No	Yes	Yes	Yes
Custom Applications Programs (by user or mfr for user):	Yes	Yes	Yes	Yes	Yes	No	No
Firmware Upgradable	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Type of Prism (cube/rect) and target (centric/eccentric) Required:	Cube/rect	Cube/centric	Cube/centric	Cube/centric	Cube/centric	Cube/centric	Cube/centric
Rodperson Self-Aligning Aid	N/A	Optional	Yes	Yes	Yes	No	No
Other Features:	[5]	[9]	Small, lightweight, easy-to-use	Small, lightweight, easy-to-use	[10]	[13]	[14]
BATTERY (built in/removable):	Disposable	Removable	Removable	Removable	Removable	Removable	Removable
Type (Gel-Cell, NiCd)	[8]	NiMH	NiMH	NiMH	Lithium-ion	NiMH	NiMH
Hours Continuous Use (One EDM Meas. Per 30 sec)	15	6	4	6	[11]	15	27 [16]
Weight (lbs.)	0.4	0.25	0.25	0.25	0.44	11.2	10.8
CHARGER:							
Hours to Recharge	N/A	2	2	2	1.5 (quick charge)	2	2
Overcharge Protection	N/A	Yes	Yes	Yes	Yes	Yes	Yes
Battery Weight (lbs.)	N/A	0.25	0.25	0.25	0.44	0.9	0.9
WEIGHT OF INSTRUMENT (incl. EDM, tribrach, battery, etc.), lbs.	3	9	11.9	11.9	12.75	12.1	11.7
WARRANTY , Months	12	12	12	12	12	24	24
DATE OF INTRODUCTION: Month and Year	Mar-98	Jan-99	Jan-00	Oct-04	Feb-04	Feb-03	Dec-02
Other variations possible within this series		[12]	[1]	Reflectorless	Integrated dual-frequency GPS	N/A	N/A
Additional notes							
Reader Service Number	8	9	10	11	12	13	14

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MANUFACTURER/DISTRIBUTOR	Nikon/Tripod Data Systems	Northwest Instrument Inc.	Northwest Instrument Inc.	Northwest Instrument Inc.	Northwest Instrument Inc.	Pentax U.S.A.	Pentax U.S.A.
MODEL/family/series	Nikon DTM-502 Series	NTDM05	NTDM5B	NTDM10	NTDM103	R-300 Series	R-326
Variants possible for base model (See 'Other Variations' section below)	DTM-552, 532, 522					R-322, 323, 325, 315	
CONFIGURATION: [Self Contained or Modular (Separate EDM Unit)]	Self Contained	Self Contained EDM	Self Contained EDM	Self Contained	Self Contained	Self Contained	Self Contained
DISTANCE MEASURING COMPONENT							
Type (Infrared, Laser, Phase Comparison, Pulse, etc.)	Infrared	Infrared/used with prism	Infrared	Infrared	Infrared	Visible laser (phase shift)	Visible laser (phase shift)
Range (normal conditions), in hundreds of meters: single/triple prism	24/31	15/20	10/3000	15/20	Single/3000 ft	34/45, 34/45, 30/40, 30/40	20/28
EDM Accuracy, Standard Deviation	±(2mm+2ppm)	±(5mm+3ppm@D)	5±5ppm	±(5mm+5ppm@D)	3mm+5ppm	[1]	±(5mm+3ppm)
Displayed Resolution, mm -(single/tracking)	0.1/1	1	1	1/10	1/10	1/10	1/10
Measuring Time, sec. : single reading/tracking	1.0/0.5	3/1	3/1.5	3/1	1.5/1	1.5/0.4	1.5/0.4
Displays Stake-Out Information	Yes		Yes	Yes	Yes	Yes	Yes
Other Distance Measuring Features:	[5]	Atmospheric correction		Continues every 3 seconds		Feet & inches	Feet & inches
Theodolite Component							
Telescope (type & magnification)	Concentric 33X	Erect 30x	Erect 30x	Erect image 30x	Erect 30x	30x	30x
Field of View, degrees & minutes	1 degree 20 minutes	1 degree 30 minutes	1 degree 30 minutes	1 degree 30 minutes	1 degree 30 minutes	1 degree 30 minutes	1 degree 30 minutes
Minimum Focusing Distance, meters	1.3	1.0	1.3	1.0	1.3	1.0	1.0
Tilt Range (360 deg if fully transitable)/w. elbow	360	360	360	360	360	360	360
Angle accuracy, arc-seconds [Std dev of a direction, dir and rev (DIN Spec. 18723)]	1/2/3	5	5	10	10	2	5
Smallest Unit Displayed	1 (0.5 on DTM-552)	1 - 5	1	5 or 10 selectable	1	1	1
Orientation to Zero or Any Value After Pointing Telescope	Yes	N/A	N/A	Yes	Yes	Yes	Yes
Dual-Axis Compensation	Yes	One axis compensation optional	N/A	No	N/A	Yes	Yes
Other Angle Measuring Features:							
Stores Collimation and Vertical Index Corrections	Yes	N/A	N/A	Yes	N/A	Yes	Yes
Stores Trunnion Axis Correction	Yes	N/A	Yes	No	N/A	Yes/Yes/No/No	No
Reads Left or Right	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Selectable Display Resolution- Range of Values	1	Yes, 1 - 5	1 & 5	5 - 10	5 & 10	Yes, 1	Yes, 1
Plate Vial Sensitivity per 2mm	30 (20 on DTM-552)	30	30	30	30	30	30
Other Features	[10]	[1]		[1]			
ADVANCED FEATURES							
Target Tracking (active/passive)	N/A	Passive	N/A	N/A	N/A	N/A	N/A
Robotic search control (user definable, search window, controllable from rod, etc.)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Distance at which robotic total station can be controlled from rod	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Number of speeds on servo-driven	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Range to 90% Kodak grey card	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Range to 18% Kodak grey card	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MISCELLANEOUS							
User Interface:							
Operation: Menu, Command, Both	Direct function keys & menus	Command	Menu	Command	Menu	Both	Both
Alphanumeric Keyboard	Yes	N/A	Yes	N/A	N/A	Yes	Yes
Separate Numeric Key Pad	Yes	N/A	N/A	N/A	N/A	Yes	Yes
Electronic Leveling	Yes	N/A	N/A	N/A	N/A	Yes, graphic & numeric	Yes, graphic & numeric
Out-of-Level Warning	Yes	N/A	N/A	N/A	N/A	Yes	Yes
Optical Plummet in Alidade, Magnification	Yes, 3x	3x	3x	Yes, 3x	Yes, 3x	Laser/optional 3x optical	Laser/optional 3x optical
Circular Vial Sensitivity per 2mm	10'	8'	8'	8'	8'	8'	8'
Detachable Tribrach	Yes	Detachable tribrach	Yes	Yes	Yes	Yes/Yes/Yes/No	Yes
Leveling Base Plummet, Type	Optional OP, 3 pin tribrach	3 leveling screws	Spindle	3 leveling screws	OP 3 pin tribrach	[2]	3 pin
Data Collector:							
On-Board, External, Both	Both	Onboard	N/A	N/A	N/A	Both	Both
Point Capacity (X, Y, Z, Pt No., Code)	10,000 in 32 jobs	9000 XY	N/A	N/A	N/A	7500	7500
Programmable	No	N/A	N/A	N/A	N/A	No	No
Price, if optional	Included		N/A	N/A	N/A	Included	Included
On-Board Intelligence							
Height Transfer	Yes	N/A	Yes	No	Yes	No	No
Missing Line (Tie Distance)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Resection / free station	Yes [11]	N/A	Yes	No	N/A	Yes	Yes
Setting Out - 2D / 3D	Yes	N/A		No	N/A	Yes	Yes
Reference Lines	Yes	N/A	Yes	No	N/A	Yes	Yes
Automatic Highway Layout - 2D / 3D	No	N/A		No	N/A	No	No
Remote Object Height	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Station & Offset	Yes	Yes	Yes	No	N/A	Yes	Yes
Traverse Checking	No	N/A	Yes	No	N/A	No	No
Angle Sets	Yes	Yes	Yes	No	N/A	Yes	Yes
Custom Applications Programs (by user or mfr for user):	No	By mfr. for user		No	N/A	No	Yes
Firmware Upgradable	Yes	Yes		Yes	N/A	Yes	Yes
Type of Prism (cube/rect) and target (centric/eccentric) Required:	Cube/centric	Cube	Cube prism	Cube	Cube/rect	Sheet/centric or cube/centric	Sheet/centric or cube/centric
Rodperson Self-Aligning Aid	Yes [12]	N/A	N/A	No	N/A	No	No
Other Features:	[15]	[3]		[5]		[3]	
BATTERY (built in/removable):	Removable	Removable	Removable	Removable	Removable	Removable	Removable
Type (Gel-Cell, NiCd)	NiMH	NiMH	NiCd	NiMH	NiMH	NiMH	NiMH
Hours Continuous Use (One EDM Meas. Per 30 sec)	24	8	6	8	6	6	6
Weight (lbs.)	10.8	0.6 kg	0.5 kg		0.75	0.75	0.75
CHARGER:							
Hours to Recharge	2	3.5	3	3	4	3	3
Overcharge Protection	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Battery Weight (lbs.)	1.3	0.6 kg	0.5 kg	0.76	0.75	0.75	0.75
WEIGHT OF INSTRUMENT (incl. EDM, tribrach, battery, etc.), lbs.	12.1	6.5	6	6.5	6	12.6	12.6
WARRANTY, Months	24	24	24	24	24	[4]	[4]
DATE OF INTRODUCTION: Month and Year	Oct-02	Nov-02	2002	Jan-01	Oct-04	Dec-02	Feb-03
Other variations possible within this series		[2]		[4]			
Additional notes							
Reader Service Number	15	16	17	18	19	20	21

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MANUFACTURER/DISTRIBUTOR	Pentax U.S.A.	Pentax U.S.A.	SOKKIA	SOKKIA	SOKKIA	SOKKIA	SOKKIA
MODEL/family/series	R-300NX Series	R-300EX Series	Series 10	Series 030R	Series 30R	Series 130R	Series 110MC
Variants possible for base model (See 'Other Variations' section below)	[5]	[6]	SET210, 310, 510, 610	[1]	[2]	Self Contained EDM	SET3110MC/ SET4110MC
CONFIGURATION: [Self Contained or Modular (Separate EDM Unit)]	Self Contained	Self Contained	Self Contained	Self Contained	Self Contained EDM		Self Contained
DISTANCE MEASURING COMPONENT							
Type (Infrared, Laser, Phase Comparison, Pulse, etc.)	Reflectorless (phase shift)	Visible laser (phase shift)	Modulated near infrared	[4]	[4]	[4]	Modulated near infrared
Range (normal conditions), in hundreds of meters: single/triple prism	34/45, 34/45, 30/40, 30/40	34/45, 34/45, 30/40, 30/40	27/35	50/60	50/60	50/60	18/24
EDM Accuracy, Standard Deviation	±2mm + 2ppm	±2mm + 2ppm [7]	±(2+2ppm x D) mm	±(2+2ppm x D) mm	±(2+2ppm x D) mm	±(2+2ppm x D) mm	±(2+2ppm x D) mm
Displayed Resolution, mm -(single/tracking)	1/10	1/10	0.001 m/0.01 m	0.0001 m/0.01 m	0.001 m/0.01 m	0.0001 m/0.001 m	0.001 m/0.01 m
Measuring Time, sec.: single reading/tracking	1.2/0.4	1.2/0.4	1.6/0.3, initial 2.8/1.8	1.4/0.4, initial 3.1/2.7	1.3/0.3, initial 2.6/1.6	1.3/0.3, initial 2.6/1.6	2.6/0.4, initial 3.7/1.9
Displays Stake-Out Information	Yes	Yes	S, V, Hdist and coord	Yes, graphic & numeric	Yes, graphic & numeric	Yes, graphic & numeric	Yes, graphic & numeric
Other Distance Measuring Features:	[8]	[8][9]	[5]	[6]	[6]	[6]	[7]
Theodolite Component							
Telescope (type & magnification)	30x	30x	Coaxial 30x	Coaxial, fully transiting 30x	Coaxial 30x (26x SET630R)	Coaxial fully transiting 30x	Coaxial fully transiting 30x
Field of View, degrees & minutes	1 degree 30 minutes	1 degree 30 minutes	1 degree 30 minutes	1 degree 30 minutes	1 degree 30 minutes	1 degree 30 minutes	1 degree 30 minutes
Minimum Focusing Distance, meters	1.0	1.0	1.0	1.3	1.0	1.3	1.2
Tilt Range (360 deg if fully transitable)/w. elbow	360	360	360	360	360	360	360
Angle accuracy, arc-seconds [Std dev of a direction, dir and rev (DIN Spec. 18723)]	2/3/5	2/3/5	[8]	[9]	[10]	[11]	[12]
Smallest Unit Displayed	1	1	1 s	0.5	1 s	0.5 s	1
Orientation to Zero or Any Value After Pointing Telescope	Yes	Yes	Zenith 0, Horiz 0, ±90	Either selectable	both	Either, selectable	Both
Dual-Axis Compensation	Yes [10]	Yes [11]	Yes, H and V	Yes, H and V	Yes, H and V	Yes, H and V	Yes
Other Angle Measuring Features:							
Stores Collimation and Vertical Index Corrections	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Stores Trunnion Axis Correction	Yes/Yes/No/No	Yes/Yes/No/No	Yes	Yes	Yes	Yes	Yes
Reads Left or Right	Yes	Yes	Yes, selectable	Yes	Yes	Both	Yes
Selectable Display Resolution- Range of Values	Yes, 1	Yes, 1	1 sec/5 sec	0.5	1 / 5	0.5/1 (1130R) / 1/5	1
Plate Vial Sensitivity per 2mm	30	30	[13]	20 (1030R) / 30	20 (230R) / 30	20 (1130R) / 30	30
Other Features	[12]	[12]	Sokkia-patented Absolute Encoder	Sokkia-patented Absolute Encoder	Sokkia-patented Absolute Encoder	Sokkia-patented Absolute Encoder	Auto-indexing
ADVANCED FEATURES							
Target Tracking (active/passive)	N/A	N/A	N/A	N/A	N/A	N/A	Active Target Capture
Robotic search control (user definable, search window, controllable from rod, etc.)	N/A	N/A	N/A	N/A	N/A	N/A	[14]
Distance at which robotic total station can be controlled from rod	N/A	N/A	N/A	N/A	N/A	N/A	[15]
Number of speeds on servo-driven	N/A	N/A	N/A	N/A	N/A	N/A	[16]
Range to 90% Kodak grey card	200 m	N/A	N/A	[17]	[17]	[17]	N/A
Range to 18% Kodak grey card	150 m	N/A	N/A	170 m (R3); 80 m (R)	170 m (R3); 80 m (R)	170 m (R3); 80 m (R)	N/A
MISCELLANEOUS							
User Interface:							
Operation: Menu, Command, Both	Both	Both	Menu	Both	Menu	Menu-driven softkeys	Menu
Alphanumeric Keyboard	Yes	Yes	Optional wireless keyboard SF14	Yes	Optional wireless keyboard SF14	Optional SF14 remote keypad	No
Separate Numeric Key Pad	Yes	Yes	Optional wireless keyboard SF14	No	Optional wireless keyboard SF14	Yes	Yes
Electronic Leveling	Yes, graphic & numeric	Yes, graphic & numeric	[18]	Yes, graphic & numeric	Yes, graphic & numeric	Yes, graphic & numeric	Yes, graphic & numeric
Out-of-Level Warning	Yes	Yes	±3 min [19]	Yes	Yes	Yes, visual and audible	Yes
Optical Plummet in Alidade, Magnification	Laser/optional 3x optical	Laser/optional 3x optical	Yes, 3x	Yes, 3x	3x	Yes, 3x	In alidade, 3x
Circular Vial Sensitivity per 2mm	8'	8'	10, 3in	10'	10 min	10'	10'
Detachable Tribach	Yes/Yes/Yes/No	Yes/Yes/Yes/No/Yes	Yes	Yes	Yes	Yes	Yes
Leveling Base Plummet, Type	[2]	[2]	Optical plummet tribrach	Optical plummet tribrach	Optical plummet tribrach	Optical plummet tribrach	Optical plummet tribrach
Data Collector:							
On-Board, External, Both	Both	Both	Both, RS232C port available	Onboard	Both, RS-232C interface	Both, RS-232C interface	Both
Point Capacity (X, Y, Z, Pt No., Code)	20,000 [13]	20,000 [14]	10,000 internal	About 10,000 internal [20]	10,000 internal	10,000 internal	About 20,000
Programmable	No	No	User-defined softkeys	User-selectable menus	User-defined softkey menus	User-defined softkey menus	TBA
Price, if optional	Included	Included		Included			
On-Board Intelligence							
Height Transfer	No	No	Yes	Yes	Yes	Yes	Yes
Missing Line (Tie Distance)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Resection / free station	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Setting Out - 2D / 3D	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Reference Lines	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Automatic Highway Layout - 2D / 3D	No	No	No	Yes	No	No	No
Remote Object Height	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Station & Offset	Yes	Yes	No	Yes	No	No	Yes
Traverse Checking	No	No	No	Yes	No	No	No
Angle Sets	Yes	Yes	No	Yes	No	No	Yes
Custom Applications Programs (by user or mfr for user):	No	No	[21]	Available from mfr.	Available from mfr.	Available from mfr.	N/A
Firmware Upgradable	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Type of Prism (cube/rect) and target (centric/eccentric) Required:	[15]	[15]	Cube or reflective target sheet	[22]	[22]	[22]	Cube, centric or reflective sheet
Rodperson Self-Aligning Aid	No	No	N/A	Factory option guidelight	Factory option guidelight	Factory option guidelight	Yes
Other Features:	[3]	[3][16]	[25]	[26]	[27]	[23]	[28]
BATTERY (built in/removable):	Removable	Removable	Removable	Removable (2 each provided)	Removable	Removable (2 each provided)	Removable (2 each provided)
Type (Gel-Cell, NiCd)	NiMH	NiMH	Li-ion	NiMH	Li-ion	NiMH	NiMH
Hours Continuous Use (One EDM Meas. Per 30 sec)	6	6	7.5	5.5	5.5	6.5	Approx 3.5 [24]
Weight (lbs.)	0.75	0.75	11.4	12.4	12	12.3	16
CHARGER:							
Hours to Recharge	3	3	About 70 min	About 70 min	About 70 min	About 70 min	2
Overcharge Protection	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Battery Weight (lbs.)	0.75	0.75	0.2	0.4	0.2	0.4	0.8
WEIGHT OF INSTRUMENT (incl. EDM, tribrach, battery, etc.), lbs.	12.6	12.6	11.4	12.9	12	12.7	16.8
WARRANTY, Months	[4]	[4]	24	24	24	24	24
DATE OF INTRODUCTION: Month and Year	Mar-05	Mar-05	Feb-02	Oct-03	Feb-04 (-R3); Sept-02 (-R)	Jan-04	Oct-04
Other variations possible within this series			[29]	[30]	[31]	[32]	[33]
Additional notes							
Reader Service Number	22	23	24	25	26	27	28

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MANUFACTURER/DISTRIBUTOR	SOUTH	SOUTH	SOUTH	Topcon	Topcon	Topcon
MODEL/family/series	NTS-320 Series	NTS-350 Series	NTS-660 Series	GTS-220 Series	GTS-230W Series	GTS-720 Series
Variants possible for base model (See 'Other Variations' section below)	NTS-322/NTS-325	NTS-352/NTS-355	NTS-662/NTS-665	4	4	4
CONFIGURATION: [Self Contained or Modular (Separate EDM Unit)]	Self Contained	Self Contained	Self Contained	Self Contained	Self Contained	Self Contained
DISTANCE MEASURING COMPONENT						
Type (Infrared, Laser, Phase Comparison, Pulse, etc.)	Infrared	Infrared	Infrared	Infrared	Infrared	Infrared
Range (normal conditions), in hundreds of meters: single/triple prism	18/26	18/26	18/26	30/40	30/40	30/40
EDM Accuracy, Standard Deviation	3+2ppm	2mm+2ppm	2+2ppm	2mm+2ppm	2mm+2ppm	2mm+2ppm
Displayed Resolution, mm-(single/tracking)	1/10	1/10	1/10	1/10	0.2	1/10
Measuring Time, sec.; single reading/tracking	3/1	3/1	3/1	1.5/0.3	0.4	0.4
Displays Stake-Out Information	Yes	Yes	Yes	Yes	Yes	Yes
Other Distance Measuring Features:	N/A	N/A	N/A			
Theodolite Component						
Telescope (type & magnification)	30x	30x	30x	30x	30x	30x
Field of View, degrees & minutes	1 degree 30 minutes	1 degree 30 minutes	1 degree 30 minutes	1 degree 30 minutes	1 degree 30 minutes	1 degree 30 minutes
Minimum Focusing Distance, meters	1.0	1.0	1.0	0.9	1.3	1.3
Tilt Range (360 deg if fully transitable)/w. elbow	360	360	360	360/45 to 90	360/45 to 90	360/45 to 90
Angle accuracy, arc-seconds [Std dev of a direction, dir and rev (DIN Spec. 18723)]	2/5	2/5	2/5	3	3	1
Smallest Unit Displayed	2/5	2	2/5	1	1	0.5
Orientation to Zero or Any Value After Pointing Telescope	Yes	Yes	Yes	Yes	Yes	Yes
Dual-Axis Compensation	One axis compensation	One axis compensation	Dual axis compensation	Yes	Yes	Yes
Other Angle Measuring Features:						
Stores Collimation and Vertical Index Corrections	Yes	Yes	Yes	Yes	Yes	Yes
Stores Trunnion Axis Correction	Yes	Yes	Yes	Yes	Yes	Yes
Reads Left or Right	Yes	Yes	Yes	Yes	Yes	Yes
Selectable Display Resolution- Range of Values	Yes	Yes	Yes	Yes, 1	Yes, 1	Yes, 0.5
Plate Vial Sensitivity per 2mm	30	30	30	30	30	30
Other Features	N/A	N/A	N/A			Quad index encoder
ADVANCED FEATURES						
Target Tracking (active/passive)	N/A	N/A	N/A	N/A	N/A	N/A
Robotic search control (user definable, search window, controllable from rod, etc.)	N/A	N/A	N/A	N/A	N/A	N/A
Distance at which robotic total station can be controlled from rod	N/A	N/A	N/A	N/A	N/A	N/A
Number of speeds on servo-driven	N/A	N/A	N/A	N/A	N/A	N/A
Range to 90% Kodak grey card	N/A	N/A	N/A	N/A	N/A	N/A
Range to 18% Kodak grey card	N/A	N/A	N/A	N/A	N/A	N/A
MISCELLANEOUS						
User Interface:						
Operation: Menu, Command, Both	Menu	Menu	Both	Menu	Menu	Both
Alphanumeric Keyboard	Yes, dual sides	Yes, dual sides	Yes, dual sides	Yes, external	Yes, external DK-7	Yes
Separate Numeric Key Pad	N/A	Yes	Yes	Yes, external	Yes, external DK-7	Yes
Electronic Leveling	N/A	Yes	Yes	Yes	Yes	Yes
Out-of-Level Warning	N/A	Yes	Yes	Yes	Yes	Yes
Optical Plummet in Alidade, Magnification	Yes, 3x	Yes, 3x	Yes, 3x	Yes [1]	Yes	OP (standard)/3X
Circular Vial Sensitivity per 2mm	8'	8'	8'	10'	10'	10'
Detachable Tribach	Yes	Yes	Yes	Yes	Yes	Yes
Leveling Base Plummet, Type	Optical plummet tribach	Optical plummet tribach	Optical plummet tribach		Laser/detachable	Laser(option)/detachable
Data Collector:						
On-Board, External, Both	Both	Both	Both	Both	Both [2]	Both
Point Capacity (X, Y, Z, Pt No., Code)	8,000	8,000	40,000	16,000	16,000	Internal/CF card memory
Programmable	Yes	Yes	Yes	No	No	Yes
Price, if optional	Contact distributors	Contact distributors	Contact distributors			
On-Board Intelligence						
Height Transfer	Yes	Yes	Yes	Yes	Yes	Yes
Missing Line (Tie Distance)	Yes	Yes	Yes	Yes	Yes	Yes
Resection / free station	Yes	Yes	Yes	Yes	Yes	Yes
Setting Out - 2D / 3D	Yes	Yes	Yes	Yes	Yes	Yes
Reference Lines	Yes	Yes	Yes	Yes	Yes	Yes
Automatic Highway Layout - 2D / 3D	Yes	Yes	Yes	Yes, external	Yes, external	Yes
Remote Object Height	Yes	Yes	Yes	Yes, external	Yes, external	Yes
Station & Offset	Yes	Yes	Yes	Yes, external	Yes, external	Yes
Traverse Checking	Yes	Yes	Yes	Yes, external	Yes, external	Yes
Angle Sets	Yes	Yes	Yes	Yes	Yes	Yes
Custom Applications Programs (by user or mfr for user):	Yes	No	Yes	No	No	Yes
Firmware Upgradable	Yes	Yes	Yes	Yes	Yes	Yes
Type of Prism (cube/rect) and target (centric/eccentric) Required:	Cube/centric	Cube/centric	Cube/centric	Cube/centric	Cube/centric	Cube/centric
Rodperson Self-Aligning Aid	N/A	Yes	N/A	Yes	Yes	Yes
Other Features:	N/A		N/A	[3]	[4]	[5]
BATTERY (built in/removable):	Removable	Removable	Removable	Yes	Yes	Onboard/removable
Type (Gel-Cell, NiCd)	NiMH	NiMH	NiMH	NiMH	NiMH	Li-ion
Hours Continuous Use (One EDM Meas. Per 30 sec)	8	8	8	10	10	7.5
Weight (lbs.)	0.6 kg	0.6 kg	0.6 kg			0.4
CHARGER:						
Hours to Recharge	2	2	2	1.5	1.5	4
Overcharge Protection	Yes	Yes	Yes	Yes	Yes	Yes
Battery Weight (lbs.)	0.6	0.6	0.6	1.8	1.8	0.3
WEIGHT OF INSTRUMENT (incl. EDM, tribach, battery, etc.), lbs.	6.5	9.5	9.5	10.8		13.6
WARRANTY, Months	24	24	24	24	24	24
DATE OF INTRODUCTION: Month and Year	Nov-02	Sep-03	Mar-04	Sep-00	Jun-03	Jan-04
Other variations possible within this series						
Additional notes						
Reader Service Number	29	30	31	32	33	34

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MANUFACTURER/DISTRIBUTOR	Topcon	Topcon	Topcon	Topcon	Topcon	Topcon
MODEL/family/series	GTS-820 Series	GPT-8200 Series	GPT-3000LW Series	GPT-3000W Series	GPT-7000 Series	GPT-7000i
Variants possible for base model (See 'Other Variations' section below)	3	4	4	4, D	4	4
CONFIGURATION: [Self Contained or Modular (Separate EDM Unit)]	Self Contained, Coaxial Measurement	Self Contained, Coaxial Measurement	Self Contained	Self Contained	Self Contained	Self Contained
DISTANCE MEASURING COMPONENT						
Type (Infrared, Laser, Phase Comparison, Pulse, etc.)	Infrared	Infrared, pulse laser	Infrared, pulse laser	Infrared, pulse laser	Infrared, pulse laser	Infrared, pulse laser
Range (normal conditions), in hundreds of meters: single/triple prism	22/28	70/100	30	30/	30/40	30/40
EDM Accuracy , Standard Deviation	2mm+2ppm	2mm+2ppm	3mm+2ppm	3mm+2ppm	2mm+2ppm	2mm+2ppm
Displayed Resolution , mm-(single/tracking)	10	0.2/1	0.2/1	1/10	0.2/1	1/0.2
Measuring Time , sec.: single reading/tracking	0.3	0.3	1.2/0.3	0.3	1.2/0.3	1.2/0.3
Displays Stake-Out Information	Yes	Yes	Yes	Yes	Yes	Yes
Other Distance Measuring Features:	Yes	Prismless to 1200 m	Long range reflectorless	Prismless to 250 m	Yes	Built-in digital imaging
Theodolite Component						
Telescope (type & magnification)	30x	30x	30x	30x	30x	30x
Field of View, degrees & minutes	1 degree 30 minutes	1 degree 30 minutes	1 degree 30 minutes	1 degree 30 minutes	1 degree 30 minutes	1 degree 30 minutes
Minimum Focusing Distance, meters	1.3	1.3	0.9	0.9	1.3	1.3
Tilt Range (360 deg if fully transitable)/w. elbow	360/45 to 90	360/45 to 90	360	360/45 to 90	360	360
Angle accuracy, arc-seconds [Std dev of a direction, dir and rev (DIN Spec. 18723)]	1	1, 2, 3, 5	2, 3, 5, 7	2	1, 2, 3, 5	1, 2, 3, 5
Smallest Unit Displayed	0.5	0.5	1 s	1	0.5 s	0.5 s
Orientation to Zero or Any Value After Pointing Telescope	Yes	Yes	Yes	Yes	Yes	Yes
Dual-Axis Compensation	Yes	Yes	Yes	Yes	Yes	Yes
Other Angle Measuring Features:						
Stores Collimation and Vertical Index Corrections	Yes	Yes	Yes	Yes	Yes	Yes
Stores Trunnion Axis Correction	Yes	Yes	Yes	Yes	Yes	Yes
Reads Left or Right	Yes	Yes	Yes	Yes	Yes	Yes
Selectable Display Resolution- Range of Values	0.5	Yes	Yes	Yes, 1	Yes	Yes
Plate Vial Sensitivity per 2mm	30	30	30	30	30	Yes
Other Features			Quad index encoder	Quad index encoder	Quad index encoder	Quad index encoder
ADVANCED FEATURES						
Target Tracking (active/passive)	CCD array	CCD array, standard prism	N/A	N/A	N/A	N/A
Robotic search control (user definable, search window, controllable from rod, etc.)	RC-2II Quick-Lock	RC-2II Quick-Lock	N/A	N/A	N/A	N/A
Distance at which robotic total station can be controlled from rod	800 m	800 m	N/A	N/A	N/A	N/A
Number of speeds on servo-driven	7 speed	7 speed	N/A	N/A	N/A	N/A
Range to 90% Kodak grey card	N/A	1200 m	1200 m	250 m	250 m	250 m
Range to 18% Kodak grey card	N/A	600 m	600 m			
MISCELLANEOUS						
User Interface:						
Operation: Menu, Command, Both	Both	Both	Menu	Menu	Both	Both, Windows CE onboard
Alphanumeric Keyboard	Yes, dual/single side	Yes, dual side	Yes, external	Yes, external DK-7	Yes, Windows CE touchscreen	Yes
Separate Numeric Key Pad	Yes, dual/single side	Yes, dual side	Yes	Yes, external DK-7	Yes	Yes
Electronic Leveling	Yes	Yes	Yes	Yes	Yes	Yes
Out-of-Level Warning	Yes	Yes	Yes	Yes	Yes	Yes
Optical Plummet in Alidade, Magnification	Yes, 3x	Yes, 3x	Yes, 3x	Yes, 3x as option	Yes, 3x	Yes, 3x
Circular Vial Sensitivity per 2mm	10'	10'	10'	10'	10'	10'
Detachable Tribrach	Yes	Yes	Yes	Yes	Yes	Yes
Leveling Base Plummet, Type	OP(standard)/LP(option)	OP(standard)/LP(option)	Laser(standard)/OP(optional)	Laser(standard)/OP(optional)	Laser option/detachable	Laser option/detachable
Data Collector:						
On-Board, External, Both	Both	Both	Both	Both	Both, Windows CE onboard	Both, Windows CE onboard
Point Capacity (X, Y, Z, Pt No., Code)	8,000	8,000	16,000	16,000	>100,000	>100,000
Programmable	Yes	Yes	Yes	No	Yes	Yes
Price, if optional	TopSurv, TDS, Carlson	Program dependent				
On-Board Intelligence						
Height Transfer	Yes	Yes	Yes	Yes	Yes	Yes
Missing Line (Tie Distance)	Yes	Yes	Yes	Yes	Yes	Yes
Resection / free station	Yes	Yes	Yes	Yes	Yes	Yes
Setting Out - 2D / 3D	Yes	Yes	Yes	Yes	Yes	Yes
Reference Lines	Yes	Yes	Yes	Yes	Yes	Yes
Automatic Highway Layout - 2D / 3D	Yes	Yes	Yes	Yes, external	Yes	Yes
Remote Object Height	Yes	Yes	Yes	Yes	Yes	Yes
Station & Offset	Yes	Yes	Yes	Yes, external	Yes	Yes
Traverse Checking	Yes	Yes	Yes	Yes, external	Yes	Yes
Angle Sets	Yes	Yes	Yes	Yes	Yes	Yes
Custom Applications Programs (by user or mfr for user):	Yes	Yes	Yes	No	Yes	Yes
Firmware Upgradable	Yes	Yes	Yes	Yes	Yes	Yes
Type of Prism (cube/rect) and target (centric/eccentric) Required:	Cube/centric	Cube/centric	Cube/centric	Cube/centric	Cube/centric	Cube/centric
Rodperson Self-Aligning Aid	Yes	Yes, RC-2II	Yes	Yes	Yes	Yes
Other Features:	Fully robotic	Fully robotic	[6]	[7]	Color Windows CE touchscreen	[8]
BATTERY (built in/removable):	Yes	Integrated, removable	Built-in/removable	Yes	Built-in removable	Built-in removable
Type (Gel-Cell, NiCd)	NiMH	NiMH	Li-ion	NiMH	Li-ion	Li-ion
Hours Continuous Use (One EDM Meas. Per 30 sec)	3.5	4	4.5	4.5	7.5	7.5
Weight (lbs.)		0.9 x 2	0.7		0.4	0.4
CHARGER:						
Hours to Recharge	2	Approx. 2.5	1.8	1.5	4	4
Overcharge Protection	Yes	Yes	Yes	Yes	Yes	Yes
Battery Weight (lbs.)	2.2	0.9	0.3		0.3	0.3
WEIGHT OF INSTRUMENT (incl. EDM, tribrach, battery, etc.), lbs.	17	17	11.4		13.6	13.8
WARRANTY , Months	24	24	24	24	24	24
DATE OF INTRODUCTION: Month and Year	Jan-04	Jul-04	Jan-05	Dec-03	Jul-04	Jan-05
Other variations possible within this series	[9]	[9]				
Additional notes						
Reader Service Number	35	36	37	38	39	40

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MANUFACTURER/DISTRIBUTOR	Trimble	Trimble	Trimble	Trimble	Trimble	Trimble
MODEL/family/series	3300 Series	3600 Series	ATS [1]	5600 DR Standard	5600	Trimble S6
Variants possible for base model (See 'Other Variations' section below)	3300 DR	3600 DR, 3600 DR Arctic	[2]	[2]	DR200+/DR300+ [2]	Servo, Autolock, Robotic [3]
CONFIGURATION: [Self Contained or Modular (Separate EDM Unit)]	Self Contained	Self Contained	Self Contained	Self Contained	Self Contained	Self Contained, Coaxial
DISTANCE MEASURING COMPONENT						
Type (Infrared, Laser, Phase Comparison, Pulse, etc.)	DR (reflectorless) phase comparison	DR (reflectorless) phase comparison	Infrared	Phase shift laser diode	[4]	[5]
Range (normal conditions), in hundreds of meters: single/triple prism	50/75	50/70	20/28	30/75	55/55	25/55
EDM Accuracy, Standard Deviation	Varies: ±(2mm+2ppm)	[6]	±(3mm+2ppm)	[6]	±(3mm+3ppm)	±(3mm+3ppm)
Displayed Resolution, mm -(single/tracking)	0.1	0.1	1/10	Varies: 0.1 to 1/10	Varies: 0.1 to 1/10	[7]
Measuring Time, sec.: single reading/tracking	2/1.2	<2/<0.4	3.5/0.4	2/0.5	Varies: 3 to 7 / 0.4	1.2/0.4
Displays Stake-Out Information	Yes	Yes	Yes	Yes	Yes	Yes
Other Distance Measuring Features:	DR (reflectorless)	Trigger key, laser pointer	[8]	Surface scanning, monitoring	Surface scanning, monitoring	Coaxial laser pointer
Theodolite Component						
Telescope (type & magnification)	Coaxial 26x	Coaxial 30x	Coaxial 26x [9]	Coaxial 26x [9]	Coaxial 26x [9]	Coaxial 30x
Field of View, degrees & minutes	1 degree 55 minutes	1 degree 22 minutes	1 degree 30 minutes	1 degree 30 minutes	1 degree 30 minutes	1 degree 30 minutes
Minimum Focusing Distance, meters	1.5	1.5	1.7	1.7	1.7	1.5
Tilt Range (360 deg if fully transitable)/w. elbow	360/(-55/90)	360/(-55/90)	345(-60/75)	345(-60/75)	345(-60/75)	360
Angle accuracy, arc-seconds [Std dev of a direction, dir and rev (DIN Spec. 18723)]	Varies: 3, 5	Varies: 1.5, 2, 3, 5	Varies: 1, 2, 3, 5	Varies: 1, 2, 3, 5	Varies: 1, 2, 3, 5	Varies: 1, 2, 3, 5
Smallest Unit Displayed	1	0.1	0.1	0.1	0.1	0.1
Orientation to Zero or Any Value After Pointing Telescope	Yes	Yes	Yes	Yes	Yes	Yes
Dual-Axis Compensation	No, single	Yes	Yes	Yes	Yes	Yes
Other Angle Measuring Features:						
Stores Collimation and Vertical Index Corrections	Yes	Yes	Yes	Yes	Yes	Yes
Stores Trunnion Axis Correction	Yes	Yes	Yes	Yes	Yes	Yes
Reads Left or Right	Yes	Yes	Yes	Yes	Yes	Yes
Selectable Display Resolution- Range of Values	1	1	0.1	0.1	0.1	0.1
Plate Vial Sensitivity per 2mm	30	30	6	6	6	6
Other Features	[10]		Synchronized angles/distances	Electronic circles	Electronic circles	SurePoint [11]
ADVANCED FEATURES						
Target Tracking (active/passive)	N/A	N/A	Active, Multiple target ID	Active	Active	MultiTrack [12]
Robotic search control (user definable, search window, controllable from rod, etc.)	N/A	N/A	Yes/Yes/Yes/Map	Yes/Yes/Yes/Map	Yes/Yes/Yes/Map	Yes/Yes/Yes/Map
Distance at which robotic total station can be controlled from rod	N/A	N/A	Up to 1200 m	Up to 1200 m	Up to 1200 m	700 m
Number of speeds on servo-driven	N/A	N/A	4	4	4	MagDrive [13]
Range to 90% Kodak grey card	100 m	120 m	N/A	70 m	[14]	>800 m
Range to 18% Kodak grey card	70 m	80 m	N/A	50 m	[15]	>300 m
MISCELLANEOUS						
User Interface:						
Operation: Menu, Command, Both	Menu	Menu	Both	Both	Both	Both
Alphanumeric Keyboard	No	Yes	Yes	Yes	Yes	Yes
Separate Numeric Key Pad	No	Yes	Yes	Yes	Yes	Yes
Electronic Leveling	Yes	Yes	Yes	Yes	Yes	Yes
Out-of-Level Warning	Yes	Yes	Yes	Yes	Yes	Yes
Optical Plummet in Alidade, Magnification	Yes, 2x	Yes, 2.4x	No	No	No	Yes, 2.3x
Circular Vial Sensitivity per 2mm	8'	8'	8'	8'	8'	8'
Detachable Tribrach	Yes	Yes	Yes	Yes	Yes	Yes
Leveling Base Plummet, Type	Trimble 3-pin or DIN	Trimble 3-pin or DIN	Yes, Trimble 3-pin	Yes, Trimble 3-pin	Yes, Trimble 3-pin	Optical/laser optional
Data Collector:						
On-Board, External, Both	Varies with model	Both	Both	Both	Both	Both
Point Capacity (X, Y, Z, Pt No., Code)	Varies with model	>10,000	>10,000	>10,000	>10,000	256 MB onboard
Programmable	Varies with model	Yes	Yes	Yes	Yes	Yes
Price, if optional	Varies, contact distributor	Varies, contact distributor	Varies, contact distributor	Varies, contact distributor	Varies, contact distributor	Varies, contact distributor
On-Board Intelligence						
Height Transfer	Yes	Yes	Yes	Yes	Yes	Yes
Missing Line (Tie Distance)	Yes	Yes	Yes	Yes	Yes	Yes
Resection / free station	Yes	Yes	Yes	Yes	Yes	Yes
Setting Out - 2D / 3D	Yes	Yes	Yes	Yes	Yes	Yes
Reference Lines	Yes	Yes	Yes	Yes	Yes	Yes
Automatic Highway Layout - 2D / 3D	No	Yes	Yes	Yes	Yes	Yes
Remote Object Height	Yes	Yes	Yes	Yes	Yes	Yes
Station & Offset	Yes	Yes	Yes	Yes	Yes	Yes
Traverse Checking	No	Yes	Yes	Yes	Yes	Yes
Angle Sets	No	Yes	Yes	Yes	Yes	Yes
Custom Applications Programs (by user or mfr for user):	No	Yes	Yes	Yes	Yes	No
Firmware Upgradable	Yes	Yes	Yes	Yes	Yes	Yes
Type of Prism (cube/rect) and target (centric/eccentric) Required:	Cube/centric	Cube/centric	Cube/centric	Cube/centric	Cube/centric	Cube/centric
Rodperson Self-Aligning Aid	No	Yes	Yes	Yes	Yes	Yes
Other Features:	[16]	TDS on-board (optional)	[17]	Surface scanning, monitoring	Surface scanning, monitoring	Surface scanning, continuous topo
BATTERY (built in/removable):	Internal and external	Internal removable and external	Internal removable and external	Internal removable and external	Internal removable and external	Internal removable and external
Type (Gel-Cell, NiCd)	NiMH	NiMH	NiMH	NiMH	NiMH	Li-ion
Hours Continuous Use (One EDM Meas. Per 30 sec)	8	8	3 (Servo w/ internal battery)	3 (Servo w/ internal battery)	3 (Servo w/ internal battery)	6 (Servo w/ internal battery)
Weight (lbs.)	Internal battery 0.5 lbs	Internal battery 1.0 lbs	Internal battery 0.9 lbs	Internal battery 0.9 lbs	Internal battery 0.9 lbs	0.77 lbs
CHARGER:						
Hours to Recharge	2.5	5	<2	<2	<2	3
Overcharge Protection	Yes	Yes	Yes	Yes	Yes	Yes
Battery Weight (lbs.)	3 lbs	Internal battery 1.0 lbs	Internal battery 0.9 lbs	Internal battery 0.9 lbs	Internal battery 0.9 lbs	0.77 lbs
WEIGHT OF INSTRUMENT (incl. EDM, tribrach, battery, etc.), lbs.	7.7	12	18 (excl. battery)	[18]	[18]	<11.6
WARRANTY, Months	24	24	24	24	24	24
DATE OF INTRODUCTION: Month and Year	Feb-01	Feb-01	Feb-01	Oct-02	Feb-01/Oct-02	Jan-05
Other variations possible within this series		[19]	[20]	[20]	[20]	Upgradeable [3]
Additional notes						
Reader Service Number	41	42	43	44	45	46

2005 Total Station Survey Notes

POB does not assume responsibility for any errors or omissions that may be contained within the survey.

FOIF

- OTS238/538 series, reflectorless EDM and function keyboard; OTS600 series, reflectorless EDM and alphanumeric keyboard; OTS700 series reflectorless EDM, alphanumeric keyboard, absolute reading, USB interface, large graphic and touchscreen display. RTS238/538 series, infrared EDM and function keyboard; RTS600 series, infrared EDM and alphanumeric keyboard; RTS700 series fast infrared EDM, alphanumeric keyboard, absolute reading, USB interface, large graphic and touchscreen display.
- Reflectorless: 1 to 60 m; reflective sheet/30 mm x 30 mm: 1 to 500 m; reflective sheet/60 mm x 60 mm: 1 to 700 m; mini-prism: 1 to 1200 m; single prism: 1 to 5000 m.
- OTS238, RTS238, OTS632, RTS632, RTS732 and OTS732 angle accuracy: 2 s; OTS538, RTS538, OTS635, RTS635, RTS735 and OTS735 angle accuracy: 5 s.
- 360 degree, 400 gon and 6400 mil selectable. Mini-reading: degree 1°/5"/10"; gon: 0.2 mgon/1 mgon/2 mgon; mil: 0.005 mil/0.02 mil/0.05 mil.
- Waterproof to IP4.
- Temperature unit: °C and °F; selectable. Atmospheric pressure unit: hpa, mmHg, inch Hg selectable.
- File management function; the internal memory can record 8 jobs.
- 16 M internal memory, USB or RS-232C selectable.
- Special charger and car lighter socket charger selectable. Large graphic and touchscreen display.

Laser Technology Inc.

- Separate compass unit.
- On-board display of HD, VD.
- Another angle-measuring feature is aiming function.
- Another feature is Declination setting.
- Prisms or reflectors are not required but are available as options.
- Separate angle encoder unit.
- 2-AA and 2-C alkaline or NiCd.
- 4-AA alkaline or NiCd.

Leica Geosystems

- Reflectorless, motorized, automatic target recognition.
- Robotic, reflectorless, motorized, automatic target recognition, PowerSearch.
- Reflectorless EDM, visible laser pointer, standard mode, fast mode, tracking mode, averaging mode.
- Automated sets of angles, field calibration, electronic compensation.
- Field calibration, electronic compensation, continuous angle measurement
- PowerSearch, auto prism finding, auto angle sets, motorized stakeout, automatic target recognition.
- PowerSearch, joystick, user definable, compass, working area.
- Contact your nearest Leica Geosystems representative for a personalized quote: www.leica-geosystems.com.
- Onboard application programs/onboard construction specific applications.

10. Robotic/long range reflectorless/Smartstation ready.
11. >8 (PowerSearch/robotic/ATR) internal battery.
12. Onboard data collection, offboard data collector.

Nikon/TDS

- Class 1, completely eyesafe.
- 1.6/0.6 prism mode, 1.6/0.8 non-prism.
- Utilizes Nikon's exclusive focus beam system.
- Distance averaging and PPM adjustment.
- 1.0 second initial measurement at full 2mm+2ppm accuracy.
- Dual-axis on NPL-362/352, single on NPL-332.
- Single-axis on DTM-332.
- NPL-362/352 have dual horizontal angle encoders; NPL-332 has single only.
- DTM-362/352 features dual encoders for horizontal; single on DTM-332.
- Patented digital diametric detection for H&V.
- Max 10 point with least squares adjustment.
- With distance control (Lumi-Guide).
- The NPL-302 series features Nikon's exclusive focused beam non-prism EDM. This unique system minimizes signal return from targets out of focus. The reticle clearly shows the measuring beam location. This system is unmatched in its ability to provide positive target identification in non-prism applications. Advanced onboard system features multiple jobs, control jobs, custom codelist, quick code system, offset programs, vertical plane, sloped plane, curve staking, F1/F2 averaging, advanced stakeout and much more. Nikon quality, featuring superior Nikon optics, backlit graphics display and 25-key alphanumeric keyboard.
- Custom codelist, quick code system, vertical plane, sloped plane, offset programs, advanced stakeout. IPX6 waterproof construction total stations with superlong battery life (16 hours) and advanced onboard system. DTM-332 is price competitive with F1 only display and single-axis compensation. All models feature easy-to-use, powerful onboard collection and staking features at no additional cost. Nikon quality featuring superior Nikon optics, backlit graphics display and 25-key alphanumeric keyboard.
- The 502s feature the fastest EDM technology available (1.0 s for 2mm+2ppm accuracy). IPX4 all-weather construction. Advanced onboard system features multiple jobs, control jobs, custom codelist, quick code system, offset programs, vertical plane, sloped plane, curve staking, F1/F2 averaging, advanced stakeout and much more. Nikon quality featuring superior Nikon optics and two-speed tangent mechanisms, backlit graphics display and 25-key alphanumeric keyboard.
- Angle and distance every 30 seconds.

Northwest

- 360 degree, 400 gon or 6400 mil selectable.
- NTDM05B: a basic model without vertical compensation.
- Northwest NTDM05 is one level up from the NTDM10 introduced in 2001. Additional features include: RS-232C data port, internal memory and vertical compensation.

- NTDM05, 5" unit w/ data port and vertical compensation.
- An accurate, reliable and economical measurement tool for contractors on jobs related to stakeout, distance control and alignment. Especially for those who do not need or afford a high-priced full-featured total station. Stakeout by distance and coordinates

Pentax

- ±(2mm+2ppm), ± (3mm+2ppm), ± (5mm+3ppm), ± (5mm+3ppm).
- 3 pin /3 pin /fixed.
- Dual keyboards on 2"; optional on others.
- Electronics 24; optical/mechanical limited lifetime.
- R-322NX/R-323NX/R-325NX/R-315NX.
- R-322EX/R-323EX/R-325EX/R-315EX/R-326EX.
- R-326EX ±3mm+2ppm
- Visible laser, feet and inches.
- All unit have automatic atmospheric corrections (temp/pres/PPM).
- Tri-axis compensation on R-322NX, R-323NX.
- Tri-axis compensation on R-322EX, R-323EX.
- Diametric detection H&V, dual-speed tangent on 2 and 3" models, auto focus.
- R-322NX, R-323NX, 16,000 points R-325NX, R-315NX
- 20,000 R-322EX, R-323EX; 16,000 R-325EX, R-315EX; 12,000 R-326EX.
- Target, sheet or prism-centric.
- Date clock included for data collection.

SOKKIA

- SET1030R3, SET2030R3, SET3030R3.
- SET230R3, SET330R3, SET530R3, SET630R.
- SET1130R3, SET2130R3, SET3130R3, SET4130R3.
- RED-tech Infrared and visible phase shift reflectorless EDM.
- Displays m/ft/inch, fine, rapid, tracking, AVG.
- Visible laser pointer narrow beam EDM.
- Fine, rapid, and tracking, averaging options.
- 2 sec (SET210) / 3 sec (SET310) / 5 sec (SET510) / 6 sec (SET610).
- 1 sec (1030R3/R); 2 sec (2030R3/R); 3 sec (3030R3/R).
- 2 sec (230R3/R) / 3 sec (330R3/R) / 5 sec (530R3/R) / 6 sec (630R).
- 1 sec (1130R3/R); 2 sec (2130R3/R) 130R3/R); 3 sec (3130R3/R); 5 sec (4130R3/R).
- 3 s (3110M) / 5 s (4110M).
- 20 sec (SET210)/ 30 sec (SET310/510).
- 4 types: Sight (1deg 30 min), H Wide, (6 deg), V Wide, HV Wide.
- 350 m capture, 800 m autopoint, 1200 m servo.
- 6 user controlled, 10 internal aiming speeds.
- 0.3 – 350 m (R3); 0.3 – 150 m (R).
- Dual-axis, graphic and numeric display.
- Displays out of level warning.
- Plus CF memory cards.
- S-O line, point projection, area calc.
- Cube, centric, reflective sheet or reflectorless.
- The Series 130R3 includes the longest range

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reflectorless phase shift EDM available. Keyboard includes additional direct function keys. Wireless SF14 remote keypad interface.

- 24. Tested with face1/face2 motor movement.
- 25. The SET10 Series is rated IP66 waterproof and dustproof. The SET10 can be used with the SF14 wireless keyboard and optional Compact Flash card slot.
- 26. The Series 030R includes complete SDR Expert Data Collection software onboard. CF card reader standard.
- 27. The Series 30R3 is the longest working range reflectorless phase EDM available, and is rated IP66 waterproof and dustproof. Factory option CF card reader.
- 28. The SET110MC Remotocatcher System is an auto-target capture single operator remote total station. Selectable mode prism autopoint.
- 29. SET610, 26x telescope and single keyboard.
- 30. SET1030R / SET2030R / SET3030R.
- 31. SET230R / SET330R / SET530R/SET630R.
- 32. SET1130R / SET2130R / SET3130R / SET4130R
- 33. SET3110M/SET4110M (servo autopoint).

Topcon

- 1. 3x as option laser standard.
- 2. Supports wireless communications (Bluetooth).
- 3. Total station is 100 percent waterproof and dustproof to IP66.
- 4. Waterproof and dustproof to IP66. Cable-free,

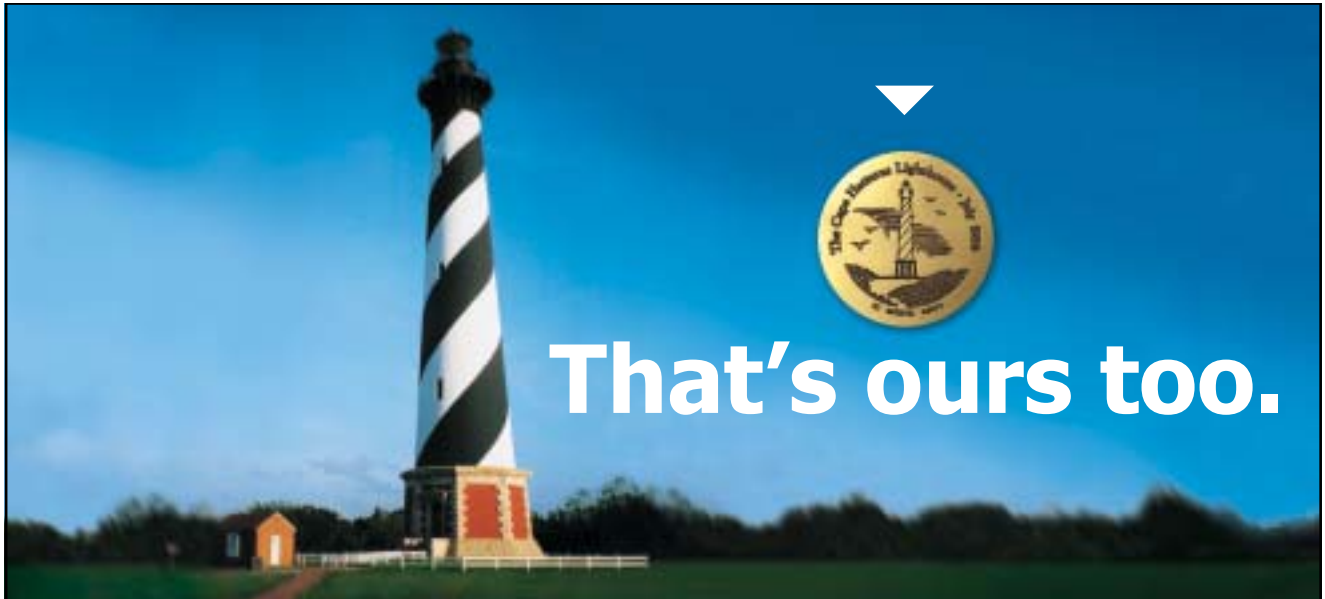
Bluetooth communications

- 5. Total station with Windows CE Net 4.2 operating system. Waterproof and dustproof to IP54.
- 6. Bluetooth wireless. Instruments are 100% waterproof.
- 7. Bluetooth wireless. Instruments are 100 % waterproof and dustproof to IP66.
- 8. Built-in digital imaging.
- 9. Unit can be upgraded to fully robotic by adding external communication link and data collector.

Trimble

- 1. The Advanced Tracking Sensor (ATS) is optimized for 3D machine control applications, but equally well suited for the measurement needs of today's contractor. High measurement rate (1-6 Hz), low latency, synchronized angle and distance measurements, and multiple target ID are all standard features. Target ID enables the ATS to differentiate between four different targets, ensuring only the intended target is tracked.
- 2. Servo (base model), autolock, robotic.
- 3. Fully upgradeable from servo to autolock to robotic.
- 4. Long-range, reflectorless pulse laser diode
- 5. DR300+ long-range reflectorless pulse.
- 6. Varies: ±(1mm+1ppm) or ±(2mm+2ppm).
- 7. Varies: 0.1 to 100/0.1 to 100.
- 8. Synchronized/1 to 6 Hz/low latency.

- 9. 30X magnification optional.
- 10. Very light-weight, low power consumption.
- 11. SurePoint accuracy assurance guards against the sinkage, vibration and handling that can affect an instrument after setup. SurePoint automatic pointing correction monitors and corrects the effects of trunnion axis collimation and mislevelment so that users can measure with speed and confidence.
- 12. MultiTrack combines passive prism tracking with active Target ID to provide exceptional flexibility and performance. The instrument will lock and track a wide variety of targets and conventional prisms to exceptional range. The active Target ID ensures that the correct target is located.
- 13. MagDrive servo technology provides exceptional speed and control. The instrument can be automatically positioned in less than 3 seconds. Servo knobs are configured to provide 5 servo speeds.
- 14. DR200+ >600 m / DR300+ >800 m.
- 15. DR200+ >200 m / DR300+ >300 m.
- 16. Certified DIN ISO 9001/EN 29001.
- 17. Optimized for 3D machine control.
- 18. Depends on configuration <16.5.
- 19. Various control units and application software to suit specific market and user application. Internal laser plummet.
- 20. Compatible with leading data collectors for servo, autolock and robotic operation.



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