

# 2004 TOTAL STATION SURVEY

MANUFACTURER/DISTRIBUTOR	Leica Technology Inc.	Leica Technology Inc.	Leica Geosystems Inc.	Leica Geosystems Inc.	Leica Geosystems Inc.	Measurement Devices Ltd.
<b>MODEL/family/series</b> (see note 1)	MapStar AE LPS	MapStar CM LPS	TPS400 Basic Series	TPS700 Performance Series	TPS1200 Professional Series	LaserAce 300
<b>Variants possible for base model</b> (see note 2 and 'Other Variations' section below)			Reflectorless	Reflectorless, motorized, automatic targeting	Robotic, reflectorless, motorized, automatic target recognition	
<b>CONFIGURATION:</b> [Self Contained or Modular (Separate EDM Unit)]	Modular [1]	Modular [5]	Total station, coaxial EDM	Total station, coaxial EDM	Total station, coaxial EDM	Modular
<b>DISTANCE MEASURING COMPONENT</b>						
<b>Type</b> (Infrared, Laser, Phase Comparison, Pulse, etc.)	Pulse laser	Pulse laser	Infrared/phase shift	Infrared/phase shift	Infrared/phase shift	Pulse laser
<b>Range</b> (normal conditions), in hundreds of meters: single/triple prism	6/6	6/6	30/54	35/54	>10,000 m to single prism	50
<b>EDM Accuracy</b> , Standard Deviation	50mm+50ppm	50mm+50ppm	2mm+2ppm	2mm+2ppm	2mm+2ppm	10 cm
<b>Displayed Resolution</b> , mm-(single/tracking)	10	10	0.000	0	0.000	10
<b>Measuring Time</b> , sec.: single reading/tracking	0.5/0.5	0.5/0.5	0.3	0.3	0.8/0.15	0.3
Displays Stake-Out Information	No	No	Yes	Yes	Yes	No
Other Distance Measuring Features:	[2]	[2]	Reflectorless, visible laser pointer	Reflectorless, laser pointer	[6]	SD, VD, HD
<b>Theodolite Component</b>						
Telescope (type & magnification)	1-4x Zoom	1-4x Zoom	30x	30x	30x	N/A
Field of View, degrees & minutes	7-30	7-30	1degree 30 minutes	1degree 30 minutes	[11]	N/A
Minimum Focusing Distance, meters	0.1	0.1	1.7	1.7	1.7 to infinity	N/A
Tilt Range (360 deg if fully transitable)/w. elbow	180	180	360	360	360	180
Angle accuracy [Std dev of a direction, dir and rev (DIN Spec. 18723)]	6'	18'	2	2	1	0.1
Smallest Unit Displayed	36	36	1	1	1	0.1
Orientation to Zero or Any Value After Pointing Telescope	Yes	Yes	Yes	Yes	Yes	Yes
Dual-Axis Compensation	No	Yes	Yes	Yes	Yes	No
<b>Other Angle Measuring Features:</b>						
Stores Collimation and Vertical Index Corrections	No	N/A	Yes	Yes	Yes	No
Stores Trunnion Axis Correction	No	N/A	Yes	Yes	Yes	No
Reads Left or Right	Yes	N/A	Yes	Yes	Yes	No
Selectable Display Resolution- Range of Values	No	No	Yes	Yes	Yes	No
Plate Vial Sensitivity per 2mm			6'	6'	6'	N/A
<b>Other Features</b>	[3]	[3] [6]	Continuous angle measurement	[4]	[7]	
<b>ADVANCED FEATURES</b>						
Target Tracking (active/passive)			N/A	Passive	[12]	N/A
Robotic search control (user definable, search window, controllable from rod, etc.)			N/A	N/A	[8]	N/A
Distance at which robotic total station can be controlled from rod			N/A	N/A	800 m	N/A
Number of speeds on servo-driven			N/A	2	2	N/A
Range to 90% Kodak grey card			100 m	170 m	500 m	N/A
Range to 18% Kodak grey card			170 m	100 m	300 m	N/A
<b>MISCELLANEOUS</b>						
<b>User Interface:</b>						
Operation: Menu, Command, Both	Menu	Menu	Both	Both	Both	Menu
Alphanumeric Keyboard	No	No	Yes	Yes	Yes	No
Separate Numeric Key Pad	No	No	No	Yes	Yes	No
<b>Electronic Leveling</b>	No	No	Yes	Yes	Yes	No
<b>Out-of-Level Warning</b>	Yes	Yes	Yes	Yes	Yes	No
<b>Optical Plummet in Alidade, Magnification</b>	No	No	Laser plummet	Laser plummet	Laser plummet	No
Circular Vial Sensitivity per 2mm			6'	6'	6'	N/A
Detachable Tribrach	Optional	Optional	Yes	Yes	Yes	N/A
Leveling Base Plummet, Type	Optical	Optical	Laser plummet	Laser plummet	Laser plummet	N/A
<b>Data Collector:</b>						
On-Board, External, Both	External	External	Both	Both	Both	External
Point Capacity (X, Y, Z, Pt No., Code)	10,000	10,000	10,000 data blocks	> 8000 records	1750 data records per MB	N/A
Programmable	Yes	Yes	Yes	Yes	Yes	N/A
Price, if optional	Varies	Varies	[1]	[1]	[1]	Varies
<b>On-Board Intelligence</b>						
Height Transfer	No	No	Yes	Yes	Yes	No
Missing Line (Tie Distance)	Yes	Yes	Yes	Yes	Yes	Yes
Resection / free station	No	No	Yes	Yes	Yes	No
Setting Out - 2D / 3D	No	No	Yes	Yes	Yes	No
Reference Lines	No	No	Yes	Yes	Yes	No
Automatic Highway Layout - 2D / 3D	No	No	No	No	Yes	No
Remote Object Height	Yes	Yes	Yes	Yes	Yes	Yes
Station & Offset	No	No	Yes	Yes	Yes	No
Traverse Checking	No	No	No	Yes	Yes	No
Angle Sets	No	No	Yes	Yes	Yes	No
Custom Applications Programs (by user or mfr for user):	Yes	Yes	Yes	Yes	Yes	Manufacturer only
Firmware Upgradable	Yes	Yes	Yes	Yes	Yes	Yes
<b>Type of Prism</b> (cube/rect) and target (centric/eccentric) Required:	Cube/rect	Cube/rect	Cube/centric	Cube/centric	Cube/centric	
<b>Rodperson Self-Aligning Aid</b>	N/A	N/A	Optional	Yes	Yes	N/A
<b>Other Features:</b>	[4]	-5	[2]	Small, lightweight, easy to use	Robotic/reflectorless	
<b>BATTERY</b> (built in/removable):	Disposable	Disposable	Removable	Removable	Removable	Disposable
<b>Type</b> (Gel-Cell, NiCd)	2 AA & 2 C alkaline or NiCd	4 AA alkaline or NiCd	NiMH	NiMH	Lithium-ion	2 AA alkaline
<b>Hours Continuous Use</b> (One EDM Meas. Per 30 sec)	7	15	6	4	> 8 [9]	6
<b>Weight</b> (lbs.)	0.5	0.4	0.25	0.25	0.25	N/A
<b>CHARGER:</b>						
<b>Hours to Recharge</b>	N/A	N/A	2	2		N/A
<b>Overcharge Protection</b>	N/A	N/A	Yes	Yes	Yes	N/A
<b>Battery Weight</b> (lbs.)	N/A	N/A	.25	0.25	0.44	
<b>WEIGHT OF INSTRUMENT</b> (incl. EDM, tribrach, battery, etc.), lbs.	5	3	9	11.9	12.75	1.3
<b>WARRANTY</b> , Months	12	12	12	12	12	12
<b>DATE OF INTRODUCTION:</b> Month and Year	Apr-00	Mar-98	Jan-99	Jan-00	Feb-04	Feb-99
<b>Other variations possible within this series</b> (see note 3)			[3]	[5]	[10]	
<b>Additional notes</b>						
<b>Reader Service Number</b>	1	2	3	4	5	6

# 2004 TOTAL STATION SURVEY

MANUFACTURER/DISTRIBUTOR	Measurement Devices Ltd.	Nikon Instruments Inc.	Nikon Instruments Inc.	Nikon Instruments Inc.	Nikon Instruments Inc.	Northwest Instrument Inc.
<b>MODEL/family/series</b> (see note 1)	TS300 [1]	DTM-302 Series	DTM-502 Series	DTM/NPL-801 Series	NPL-302 Series	NTDM5B
<b>Variants possible for base model</b> (see note 2 and 'Other Variations' section below)		DTM-352 & DTM-332	DTM-522, 532 & 552	NPL-821 (non-prism), DTM-821, 831 & 851	NPL-332 & NPL-352	
<b>CONFIGURATION:</b> [Self Contained or Modular (Separate EDM Unit)]	Modular	Self contained	Self contained	Self contained	Self contained	Self contained
<b>DISTANCE MEASURING COMPONENT</b>						
<b>Type</b> (Infrared, Laser, Phase Comparison, Pulse, etc.)	Reflectorless pulse laser	Infrared	Infrared	Infrared [9]	[15]	Infrared
<b>Range</b> (normal conditions), in hundreds of meters: single/triple prism	50	20/26	24/31	27/36 [10]	50/ N/A	10/3000
<b>EDM Accuracy</b> , Standard Deviation	10 cm	±(3mm+2ppm)	±(2mm+2ppm)	[21]	±(3mm+2ppm)	5±5ppm
<b>Displayed Resolution</b> , mm-(single/tracking)	10	1/10	0.1/1	0.1/1	1/10	1
<b>Measuring Time</b> , sec.: single reading/tracking	0.3	1.6/1.0	1.0/0.5	1.2/0.5 [11]	[16]	3.0/1.5
Displays Stake-Out Information	N/A	Yes	Yes	Yes	Yes	Yes
Other Distance Measuring Features:	HD, VD, VD	Distance averaging and PPM adjustment	[4]	[12]	[17]	
<b>Theodolite Component</b>						
Telescope (type & magnification)	20x	Concentric/33x	Concentric/33x	Concentric/33x (26x on NPL)	Concentric/26x	30x, erect
Field of View, degrees & minutes	1-20	1-20	1-20	1-20, 1-30 on NPL	1-30	1 degree 30 minutes
Minimum Focusing Distance, meters	1.0	1.3	1.3	1.3, 2.0 on NPL	1.6	1.3
Tilt Range (360 deg if fully transitable)/w. elbow	180	360	360	360	360	360
Angle accuracy [Std dev of a direction, dir and rev (DIN Spec. 18723)]	1'	5	1/2/3	1/2/3	5	5
Smallest Unit Displayed	1'	1	1 (0.5 on DTM-552)	1 (0.5 on DTM-851)	1	1
Orientation to Zero or Any Value After Pointing Telescope	Yes	Yes	Yes	Yes	Yes	N/A
Dual-Axis Compensation	No	Yes [1]	Yes	Yes	[18]	N/A
<b>Other Angle Measuring Features:</b>						
Stores Collimation and Vertical Index Corrections	No	Yes	Yes	Yes	Yes	N/A
Stores Trunnion Axis Correction	No	Yes	Yes	Yes	Yes	N/A
Reads Left or Right	Yes	Yes	Yes	Yes	Yes	Yes
Selectable Display Resolution- Range of Values	No	1/5/10	1	1	1/5/10	1 and 5
Plate Vial Sensitivity per 2mm	90	30	30	30	30	30
<b>Other Features</b>						
		[2]	[5]	[5]	[19]	
<b>ADVANCED FEATURES</b>						
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	100 m	200 m	N/A
Range to 18% Kodak grey card	N/A	N/A	N/A	N/A	N/A	N/A
<b>MISCELLANEOUS</b>						
<b>User Interface:</b>						
Operation: Menu, Command, Both	Menu	Direct function keys & menus	Direct function keys & menus	Menu and softkey	Direct function keys & menus	Menu
Alphanumeric Keyboard	No	Yes	Yes	Yes	Yes	Yes
Separate Numeric Key Pad	No	Yes	Yes	Yes	Yes	N/A
<b>Electronic Leveling</b>	No	Yes	Yes	Yes	Yes	N/A
<b>Out-of-Level Warning</b>	No	Yes	Yes	Yes	Yes	N/A
<b>Optical Plummet in Alidade, Magnification</b>	Yes/3x	Yes/3x	Yes/3x	Yes/3x	Yes/3x	Yes/3x
Circular Vial Sensitivity per 2mm	10'	10'	10'	10'	10'	8'
Detachable Tribrach	Yes	Yes	Yes	Yes	Yes	Yes
Leveling Base Plummet, Type	Optical	Option OP, 3 pin tribrach	Optional OP, 3 pin tribrach	Option OP, 3 pin tribrach	Option OP, 3 pin tribrach	Spindle
<b>Data Collector:</b>						
On-Board, External, Both	External	Both	Both	Both	Both	N/A
Point Capacity (X, Y, Z, Pt No., Code)	N/A	10,000 points, 32 jobs	10,000 points, 32 jobs	PCMCIA card	10,000	N/A
Programmable	N/A	No	No	Yes	No	N/A
Price, if optional	Varies	Included	Included	Various program options available	Included	N/A
<b>On-Board Intelligence</b>						
Height Transfer	No	Yes	Yes	Yes	Yes	Yes
Missing Line (Tie Distance)	Yes	Yes	Yes	Yes	Yes	Yes
Resection / free station	No	Yes	Yes [6]	Yes	Yes	Yes
Setting Out - 2D / 3D	No	Yes	Yes	Yes	Yes	Yes
Reference Lines	No	Yes	Yes	Yes	Yes	Yes
Automatic Highway Layout - 2D / 3D	No	No	No	Yes with TDS-800	No	No
Remote Object Height	Yes	Yes	Yes	Yes	Yes	Yes
Station & Offset	No	Yes	Yes	Yes	Yes	Yes
Traverse Checking	No	No	No	Yes	No	Yes
Angle Sets	Yes	Yes	Yes	Yes	Yes	Yes
Custom Applications Programs (by user or mfr for user):	Manufacturer	No	No	Yes	No	No
Firmware Upgradable	Yes	Yes	Yes	Yes	Yes	Yes
<b>Type of Prism</b> (cube/rect) and target (centric/eccentric) Required:	Reflectorless	Cube/centric	Cube/centric	Cube/centric	Cube/centric	Cube
<b>Rodperson Self-Aligning Aid</b>	N/A	No	Yes [7]	Yes	No	N/A
<b>Other Features:</b>		[3]	[8]	[13]	[20]	
<b>BATTERY</b> (built in/removable):	2 xAA + 4 xAA	Removable	Removable	Removable	Removable	Removable
<b>Type</b> (Gel-Cell, NiCd)	Alkaline	NiMH	NiMH	NiMH	NiMH	NiCd
<b>Hours Continuous Use</b> (One EDM Meas. Per 30 sec)	6	27 (Continuous ang/dist measuring)	24	10 [14]	15	6
<b>Weight</b> (lbs.)	N/A	10.8	10.8	11	11.2	0.5 kg
<b>CHARGER:</b>						
<b>Hours to Recharge</b>	N/A	2	2	2	2	3
<b>Overcharge Protection</b>	N/A	Yes	Yes	Yes	Yes	Yes
<b>Battery Weight</b> (lbs.)	N/A	0.9	1.3	1.3	0.9	0.5 kg
<b>WEIGHT OF INSTRUMENT</b> (incl. EDM, tribrach, battery, etc.), lbs.	2.2	11.7	12.1	12.3	12.1	6 kg
<b>WARRANTY</b> , Months	12	24	24	24	24	24
<b>DATE OF INTRODUCTION:</b> Month and Year	Oct-02	Dec-02	Oct-02	Mar-00	Feb-03	2002
<b>Other variations possible within this series</b> (see note 3)						
<b>Additional notes</b>						
<b>Reader Service Number</b>	7	8	9	10	11	12

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MANUFACTURER/DISTRIBUTOR	Northwest Instrument Inc.	Northwest Instrument Inc.	Pentax U.S.A.	Pentax U.S.A.	Pentax U.S.A.	SOKKIA
<b>MODEL/family/series</b> (see note 1)	NTDM10	NTDM05 Total Station	R-300N Series	R-300 Series	R-326	Series 110M
<b>Variants possible for base model</b> (see note 2 and 'Other Variations' section below)		[4]	R-322N/R-323N/R-325N/R-315N	R-322/R-323/R-325/R-315		SET3110M/ SET4110M
<b>CONFIGURATION:</b> [Self Contained or Modular (Separate EDM Unit)]	Self contained	Self contained	Self contained	Self contained	Self contained	Self contained
<b>DISTANCE MEASURING COMPONENT</b>						
<b>Type</b> (Infrared, Laser, Phase Comparison, Pulse, etc.)	Infrared	Infrared/used with prism	Reflectorless (phase shift)	Visible laser (phase shift)	Visible laser (phase shift)	Modulated near infrared
<b>Range</b> (normal conditions), in hundreds of meters: single/triple prism	15/20	15/20	34/45, 34/45, 30/40, 30/40	34/45, 34/45, 30/40, 30/40	20/28	18/24
<b>EDM Accuracy, Standard Deviation</b>	±(5mm+5ppm@D)	±(5mm+3ppm@D)	[1]	[1]	±(5mm+3ppm)	±(2+2ppm x D)mm
<b>Displayed Resolution, mm</b> -(single/tracking)	1/10	1	1/10	1/10	1/10	0.001/0.01
<b>Measuring Time, sec.:</b> single reading/tracking	3.0/1.0	3.0/1.0	1.5/0.4	1.5/0.4	1.5/0.4	2.6/0.4 [1]
Displays Stake-Out Information	Yes		Yes	Yes	Yes	Yes, graphic and numeric
Other Distance Measuring Features:	Continues every 3 seconds	Atmospheric correction	[2]	Ft/in	Ft/in	[2]
<b>Theodolite Component</b>						
Telescope (type & magnification)	30x, erect image	30x, erect	30x	30x	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
Minimum Focusing Distance, meters	1.0		1.0	1.0	1.0	1.2
Tilt Range (360 deg if fully transitable)/w. elbow	360	360	360	360	360	360
Angle accuracy [Std dev of a direction, dir and rev (DIN Spec. 18723)]	10	5	2/3/2005	2	5	3 sec. (3110M); 5 sec. (4110M)
Smallest Unit Displayed	5 or 10 selectable	1 - 5	1	1	1	1 sec
Orientation to Zero or Any Value After Pointing Telescope	Yes	N/A	Yes	Yes	Yes	Both
Dual-Axis Compensation	No	One axis compensation optional	Yes	Yes	Yes	Yes
<b>Other Angle Measuring Features:</b>						
Stores Collimation and Vertical Index Corrections	Yes	N/A	Yes	Yes	Yes	Yes
Stores Trunnion Axis Correction	No	N/A	Yes/Yes/No/No	Yes/Yes/No/No	No	Yes
Reads Left or Right	Yes	Yes	Yes	Yes	Yes	Yes
Selectable Display Resolution- Range of Values	5-10	Yes, 1-5	Yes, 1	Yes, 1	Yes, 1	1 sec/5 sec
Plate Vial Sensitivity per 2mm	30	30	30	30	30	30
<b>Other Features</b>	[1]	[1]	[3]			Auto-indexing
<b>ADVANCED FEATURES</b>						
Target Tracking (active/passive)	N/A	Passive	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	[3]
Distance at which robotic total station can be controlled from rod	N/A	N/A	N/A	N/A	N/A	1200 m
Number of speeds on servo-driven	N/A	N/A	N/A	N/A	N/A	[4]
Range to 90% Kodak grey card	N/A		180 m	N/A	N/A	N/A
Range to 18% Kodak grey card	N/A		120 m	N/A	N/A	N/A
<b>MISCELLANEOUS</b>						
<b>User Interface:</b>						
Operation: Menu, Command, Both	Command	Command	Both	Both	Both	Menu
Alphanumeric Keyboard	N/A	N/A	Yes	Yes	Yes	No
Separate Numeric Key Pad	N/A	N/A	Yes	Yes	Yes	Yes
<b>Electronic Leveling</b>	N/A	N/A	Yes, graphic and numeric	Yes, graphic and numeric	Yes, graphic and numeric	Yes, graphic and numeric
<b>Out-of-Level Warning</b>	N/A	N/A	Yes	Yes	Yes	Yes
<b>Optical Plummet in Alidade, Magnification</b>	Yes/3x	Yes/3x	Laser/optional 3x optical	Laser/optional 3x optical	Laser/optional 3x optical	In alidade, 3x
Circular Vial Sensitivity per 2mm	8'	8'	8'	8'	8'	10'
Detachable Tribach	Yes	Detachable tribach	Yes/Yes/Yes/No	Yes/Yes/Yes/No	Yes	Yes
Leveling Base Plummet, Type	3 leveling screws	3 leveling screws	[4]	[4]	3 pin	Optical plummet tribach
<b>Data Collector:</b>						
On-Board, External, Both	N/A	On-board	Both	Both	Both	Both
Point Capacity (X, Y, Z, Pt No., Code)	N/A	9000 XYZ	7500	7500	7500	About 20,000
Programmable	N/A	N/A	No	No	No	No
Price, if optional	N/A		Included	Included	Included	Included
<b>On-Board Intelligence</b>						
Height Transfer	No	N/A	No	No	No	Yes
Missing Line (Tie Distance)	Yes	Yes	Yes	Yes	Yes	Yes
Resection / free station	No	N/A	Yes	Yes	Yes	Yes
Setting Out - 2D / 3D	No	N/A	Yes	Yes	Yes	Yes
Reference Lines	No	N/A	Yes	Yes	Yes	Yes
Automatic Highway Layout - 2D / 3D	No	N/A	No	No	No	No
Remote Object Height	Yes	Yes	Yes	Yes	Yes	Yes
Station & Offset	No	Yes	Yes	Yes	Yes	Yes
Traverse Checking	No	N/A	No	No	No	No
Angle Sets	No	Yes	Yes	Yes	Yes	Yes
Custom Applications Programs (by user or mfr for user):	No	By manufacturer for user	No	No	No	N/A
Firmware Upgradable	Yes	Yes	Yes	Yes	Yes	Yes
<b>Type of Prism</b> (cube/rect) and target (centric/eccentric) Required:	Cubic	Cube	[5]	Sheet/centric or cube/centric	Sheet/centric or cube/centric	Cube, centric or reflective sheet
<b>Rodperson Self-Aligning Aid</b>	No	N/A	No	No	No	Yes
<b>Other Features:</b>	[2]	[5]	[6]	[6]		[6]
<b>BATTERY</b> (built in/removable):	Removable	Removable	Removable	Removable	Removable	Removable (2 each provided)
<b>Type</b> (Gel-Cell, NiCd)	NiMH	NiMH	NiMH	NiMH	NiMH	NiMH
<b>Hours Continuous Use</b> (One EDM Meas. Per 30 sec)	8	8	6	6	6	[5]
<b>Weight</b> (lbs.)		0.6 kg	0.75	0.75	0.75	14.7
<b>CHARGER:</b>						
<b>Hours to Recharge</b>	3	3.5	3	3	3	2
<b>Overcharge Protection</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Battery Weight</b> (lbs.)	0.76	0.6 kg	0.75	0.75	0.75	0.8
<b>WEIGHT OF INSTRUMENT</b> (incl. EDM, tribach, battery, etc.), lbs.	6.5 kg	6.5 kg	12.6	12.6	12.6	15.6
<b>WARRANTY, Months</b>	24	24	[7]	[7]	[7]	24
<b>DATE OF INTRODUCTION:</b> Month and Year	Jan-01	Nov-02	Dec-02	Dec-02	Feb-03	Apr-02
<b>Other variations possible within this series</b> (see note 3)	[3]					
<b>Additional notes</b>						
<b>Reader Service Number</b>	13	14	15	16	17	18

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MANUFACTURER/DISTRIBUTOR	SOKKIA	SOKKIA	SOKKIA	SOKKIA	Topcon	Topcon
<b>MODEL/family/series</b> (see note 1)	Series 30R	Series 10	POWERSET Series 030R	Series 130R	GTS-230W Series	GTS-720 Series
<b>Variants possible for base model</b> (see note 2 and 'Other Variations' section below)	SET230R3/SET330R3/ SET530R3/SET630R	SET210/SET310/SET 510/SET610	SET1030R3/SET203 OR3/SET3030R3	SET1130R3/SET2130R3/ SET3130R3/SET4130R3	4	4
<b>CONFIGURATION:</b> [Self Contained or Modular (Separate EDM Unit)]	Self contained	Self contained	Self contained	Self contained	Self contained	Self contained
<b>DISTANCE MEASURING COMPONENT</b>						
<b>Type</b> (Infrared, Laser, Phase Comparison, Pulse, etc.)	[7]	Modulated near infrared	[7]	[7]	Infrared	Infrared
<b>Range</b> (normal conditions), in hundreds of meters: single/triple prism	50/60 (R3), 40/50 (R)	18/22	50/60 (R3), 40/50 (R)	50/60 (R3), 40/50 (R)	30/40	30/40
<b>EDM Accuracy</b> , Standard Deviation	±(3+2ppm)x D	±(3+2ppm x D) mm	[22]	[22]	2mm+2ppm	2mm+2ppm
<b>Displayed Resolution</b> , mm-(single/tracking)	0.001/0.01	0.001/0.01	0.0001/0.01	0.0001/0.001	0.2	1/10
<b>Measuring Time</b> , sec.: single reading/tracking	1.3/0.3 [8]	1.6/ 0.3 [13]	1.4/0.4 [23]	1.4/0.4 [23]	0.4	0.4
Displays Stake-Out Information	Yes, graphic and numeric	S, V, Hdist, Coord	Yes, graphic and numeric	Yes, graphic and numeric	Yes	Yes
Other Distance Measuring Features:	Visible laser pointer function	[14]	Visible laser pointer function	Visible laser pointer function		
<b>Theodolite Component</b>						
Telescope (type & magnification)	Coaxial, 30x [9]	Coaxial, 30x	Coaxial fully transiting, 30x	Coaxial fully transiting, 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	1.3	1.3	1.3	1.3
Tilt Range (360 deg if fully transitable)/w. elbow	360/-55 to +45 w/ elbow	360	360/-55 to +55	360/-55 to +55	360/45 to 90	360/45 to 90
Angle accuracy [Std dev of a direction, dir and rev (DIN Spec. 18723)]	[10]	[15]	[17]	[20]	3	1
Smallest Unit Displayed	1 sec	1 sec	0.5	0.5	1	0.5
Orientation to Zero or Any Value After Pointing Telescope	Both	Zenith 0, Horiz 0, ±90	Both	Either, selectable	Yes	Yes
Dual-Axis Compensation	Yes, H and V	Yes, H and V	Yes, H and V	Yes, H and V	Yes	Yes
<b>Other Angle Measuring Features:</b>						
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, selectable	Yes	Both	Yes	Yes
Selectable Display Resolution- Range of Values	1 sec/5 sec	1	0.5	Yes, 0.5	Yes, 1	Yes 0.5
Plate Vial Sensitivity per 2mm	30	30	20	20	30	30
<b>Other Features</b>	Sokkia patented absolute encoders	Sokkia patented absolute encoders	Sokkia patented absolute encoders	Sokkia patented absolute encoders		
<b>ADVANCED FEATURES</b>						
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	[11]	N/A	0.3-350 m (-R3); 0.3-150 m (-R)	0.3-350 m (R3); 0.3-150 m (R)	N/A	N/A
Range to 18% Kodak grey card	170 m (R3); 80 m (R)	N/A	170 m (R3); 80 m (R)	170 m (R3); 80 m (R)	N/A	N/A
<b>MISCELLANEOUS</b>						
<b>User Interface:</b>						
Operation: Menu, Command, Both	Menu	Menu	Both	Menu-driven softkeys	Menu	Both
Alphanumeric Keyboard	Optional wireless keyboard SF14	Optional wireless keyboard SF14	Yes	Optional SF14 remote keypad	Yes, external DK-7	Yes
Separate Numeric Key Pad	Optional wireless keyboard SF14	Optional wireless keyboard SF14	No	Yes	Yes, external DK-7	Yes
<b>Electronic Leveling</b>	Yes, graphic and numeric	Dual-axis, graphic and numeric display	Yes, graphic and numeric	Yes, graphic and numeric	Yes	Yes
<b>Out-of-Level Warning</b>	Yes	±3 min (displays out of level warning)	Yes	Yes, visual and audible	Yes	Yes
<b>Optical Plummet in Alidade, Magnification</b>	Yes/3x	Yes/3x	Yes/3x	Yes/3x	Yes	OP (Standard)/3x
Circular Vial Sensitivity per 2mm	10 min	10'	10'	10'	10'	10'
Detachable Tribrach	Yes	Yes	Yes	Yes	Yes	Yes
Leveling Base Plummet, Type	Optical plummet tribrach	Optical plummet tribrach	Optical plummet tribrach	Optical plummet tribrach	Laser/detachable	Laser (option)/detachable
<b>Data Collector:</b>						
On-Board, External, Both	Both, RS-232C interface	Both, RS232C port available	On-board	Both, RS-232C interface	Both [1]	Both
Point Capacity (X, Y, Z, Pt No., Code)	10,000 internal	10,000 internal	[18]	10,000 internal	16,000	Internal/CF card memory
Programmable	User defined menu softkeys	User defined softkeys	User-selectable menus	User defined menu softkey	No	Yes
Price, if optional			Included			
<b>On-Board Intelligence</b>						
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	No	Yes	No	Yes, external	Yes
Remote Object Height	Yes	Yes	Yes	Yes	Yes, external	Yes
Station & Offset	No	No	Yes	No	Yes, external	Yes
Traverse Checking	No	No	Yes	No	Yes, external	Yes
Angle Sets	No	No	Yes	No	Yes	Yes
Custom Applications Programs (by user or mfr for user):	N/A	S-O Line, point projection, area calc	Available from manufacturer	TBD	No	Yes
Firmware Upgradable	Yes	Yes	Yes	Yes	Yes	Yes
<b>Type of Prism</b> (cube/rect) and target (centric/eccentric) Required:	Corner cube, reflective or reflectorless	Cube or reflective target sheet	Cube, centric or reflective sheet	Cube, centric, reflective or reflectorless	Cube/centric	Cube/centric
<b>Rodperson Self-Aligning Aid</b>	Factory option GDL1 guidelight	N/A	Factory option GDL2 guidelight	Factory option GDL2 guidelight	Yes	Yes
<b>Other Features:</b>	[12]	[16]	[19]	[21]	[2]	[3]
<b>BATTERY</b> (built in/removable):	Removable	Removable	Removable, (2 each provided)	Removable (2 each provided)	Yes	On-board/removable
<b>Type</b> (Gel-Cell, NiCd)	Lithium-ion	Lithium-ion	NiMH	NiMH	NiMH	Lithium-ion
<b>Hours Continuous Use</b> (One EDM Meas. Per 30 sec)	5.5	5.5	5.5	6.5	10	7.5
<b>Weight</b> (lbs.)	11.5	11.2	12.4	12.3		0.4
<b>CHARGER:</b>						
<b>Hours to Recharge</b>	70 min	70 min	Approx. 70 min.	Approx. 70 min.	1.5	4
<b>Overcharge Protection</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Battery Weight</b> (lbs.)	0.2	0.2	0.4	0.4	1.8	0.3
<b>WEIGHT OF INSTRUMENT</b> (incl. EDM, tribrach, battery, etc.), lbs.	12	11.4	12.9	12.7		13.6
<b>WARRANTY</b> , Months	24	24	24	24	24	24
<b>DATE OF INTRODUCTION:</b> Month and Year	Feb-04 (R3); Sep-02 (R)	Feb-02	Oct-03	Jan-04	Jun-03	Jan-04
<b>Other variations possible within this series</b> (see note 3)	SET230R/SET330R/SET530R		SET1030R/SET2030R/SET3030R	[25]		
<b>Additional notes</b>						
<b>Reader Service Number</b>	19	20	21	22	23	24

# 2004 TOTAL STATION SURVEY

MANUFACTURER/DISTRIBUTOR	Topcon	Topcon	Topcon	Topcon	Topcon	Trimble
<b>MODEL/family/series</b> (see note 1)	GPT-6000 Series	GTS-220 Series	GPT-3000 Series	GPT-8000 Series	GTS-820 Series	5600 DR200+
<b>Variants possible for base model</b> (see note 2 and 'Other Variations' section below)	4, D with reflectorless 1	4	4, D	3	3	Servo-driven (base model), autolock, robotic
<b>CONFIGURATION:</b> [Self Contained or Modular (Separate EDM Unit)]	Self contained	Self contained	Self contained	Self contained, coaxial measurement	Self contained, coaxial measurement	Self contained
<b>DISTANCE MEASURING COMPONENT</b>						
<b>Type</b> (Infrared, Laser, Phase Comparison, Pulse, etc.)	Infrared	Infrared	Infrared, pulse laser	Infrared, pulse laser	Infrared	DR200+ (long-range, reflectorless)-pulse
<b>Range</b> (normal conditions), in hundreds of meters: single/triple prism		30/40	30/	70/100	22/28	25/55
<b>EDM Accuracy</b> , Standard Deviation		2mm+2ppm	3mm+2ppm	2mm+2ppm	2mm+2ppm	±(3mm+3ppm)
<b>Displayed Resolution</b> , mm-(single/tracking)		1/10	1/10	10	10	Varies: 0.1 to 1/10
<b>Measuring Time</b> , sec.: single reading/tracking		1.5/0.3	0.3	0.3	0.3	Varies: 3 to 7/0.4
Displays Stake-Out Information	Yes	Yes	Yes	Yes	Yes	Yes
Other Distance Measuring Features:			Prismless to 250 m	Prismless to 120 m	Yes	Surface scanning, monitoring
<b>Theodolite Component</b>						
Telescope (type & magnification)	30x	30x	30x	30x	30x	Coaxial/26x [1]
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	0.9	0.9	1.3	1.3	1.7
Tilt Range (360 deg if fully transitable)/w. elbow	360/45 to 90	360/45 to 90	360/45 to 90	360/45 to 90	360/45 to 90	345/(-60/75)
Angle accuracy [Std dev of a direction, dir and rev (DIN Spec. 18723)]	1	3	2	1	1	Varies: 1
Smallest Unit Displayed	0.5	1	1	0.5	0.5	Varies: 0.1
Orientation to Zero or Any Value After Pointing Telescope	Yes	Yes	Yes	Yes	Yes	Yes
Dual-Axis Compensation	Yes	Yes	Yes	Yes	Yes	Yes
<b>Other Angle Measuring Features:</b>						
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 1	Yes 1	Yes 1	Yes	0.5	0.1
Plate Vial Sensitivity per 2mm	30	30	30	30	30	6
<b>Other Features</b>						Electronic circles
<b>ADVANCED FEATURES</b>						
Target Tracking (active/passive)	N/A	N/A	N/A	CCD array, standard prism	CCD array	Active
Robotic search control (user definable, search window, controllable from rod, etc.)	N/A	N/A	N/A	RC-2II Quick-Lock	RC-2II Quick-Lock	Yes/Yes/Yes
Distance at which robotic total station can be controlled from rod	N/A	N/A	N/A	800 m	800 m	[2]
Number of speeds on servo-driven	N/A	N/A	N/A	7 speed	7 speed	4
Range to 90% Kodak grey card	N/A	N/A	250 m	120 m	N/A	> 600 m
Range to 18% Kodak grey card	N/A	N/A			N/A	> 200 m
<b>MISCELLANEOUS</b>						
<b>User Interface:</b>						
Operation: Menu, Command, Both	Both	Menu	Menu	Both	Both	Both
Alphanumeric Keyboard	Yes	Yes, external	Yes, external DK-7	Yes, dual side	Yes, dual/single side	Yes
Separate Numeric Key Pad	Yes	Yes, external	Yes, external DK-7	Yes, dual side	Yes, dual/single side	Yes
<b>Electronic Leveling</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Out-of-Level Warning</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Optical Plummet in Alidade, Magnification</b>		Yes/3x as option	Yes/3x as option	Yes/3x	Yes/3x	No
Circular Vial Sensitivity per 2mm		laser standard	10'	10'	10'	8'
Detachable Tribrach		10'	Yes	Yes	Yes	Yes
Leveling Base Plummet, Type		Yes	Laser (standard)/OP (optional)	OP (standard), LP (optional)	OP (standard) / LP (option)	Yes/Trimble 3-pin
<b>Data Collector:</b>						
On-Board, External, Both		Both	Both	Both	Both	Both
Point Capacity (X, Y, Z, Pt No., Code)		16,000	16,000	8000	8,000	>10,000
Programmable		No	No	Yes	Yes	Yes
Price, if optional				TopSurv, TDS, Carlson	TopSurv, TDS, Carlson	Varies, contact distributor
<b>On-Board Intelligence</b>						
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, external	Yes, external	Yes	Yes	Yes
Remote Object Height	Yes	Yes, external	Yes	Yes	Yes	Yes
Station & Offset	Yes	Yes, external	Yes, external	Yes	Yes	Yes
Traverse Checking	Yes	Yes, external	Yes, external	Yes	Yes	Yes
Angle Sets	Yes	Yes	Yes	Yes	Yes	Yes
Custom Applications Programs (by user or mfr for user):	Yes	No	No	Yes	Yes	Yes
Firmware Upgradable	Yes	Yes	Yes	Yes	Yes	Yes
<b>Type of Prism</b> (cube/rect) and target (centric/eccentric) Required:	Cube/centric	Cube/centric	Cube/centric	Cube/centric	Cube/centric	Cube/centric
<b>Rodperson Self-Aligning Aid</b>	Yes	Yes	Yes	Yes, RC-2II	Yes	Yes
<b>Other Features:</b>		[4]	[4]	Fully robotic	Fully robotic	Surface scanning, monitoring
<b>BATTERY</b> (built in/removable):	Yes	Yes	Yes	Integrated, removable	Yes	Internal and external
<b>Type</b> (Gel-Cell, NiCd)		NiMH	NiMH	NiMH	NiMH	NiMH
<b>Hours Continuous Use</b> (One EDM Meas. Per 30 sec)		10	4.5	4	3.5	9 hrs robotic with external
<b>Weight</b> (lbs.)				0.9 x 2		0.9 internal
<b>CHARGER:</b>						
<b>Hours to Recharge</b>	1.8	1.5	1.5	Approx. 2.5	2	< 2
<b>Overcharge Protection</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Battery Weight</b> (lbs.)	.66	1.8		0.9	2.2	0.9 internal
<b>WEIGHT OF INSTRUMENT</b> (incl. EDM, tribrach, battery, etc.), lbs.		10.8		17	17	Depends on configuration
<b>WARRANTY</b> , Months	24	24	24	24	24	24
<b>DATE OF INTRODUCTION:</b> Month and Year		Sep-00	Dec-03	Sep-02	Jan-04	Feb-01
<b>Other variations possible within this series</b> (see note 3)				[5]	[5]	Upgradeable [3]
<b>Additional notes</b>						
<b>Reader Service Number</b>	25	26	27	28	29	30

# 2004 TOTAL STATION SURVEY

MANUFACTURER/DISTRIBUTOR	Trimble	Trimble	Trimble	Trimble	Trimble
<b>MODEL/family/series</b> (please see note)	3600 Series	ATS (Advanced Tracking Sensor) [5]	5600 DR300+	3300 Series	5600 DR Standard
<b>Variants possible for base model</b> (see below for additional comments)	3600 DR, 3600 DR Arc-tic, 3600 IR	Servo-driven (base model), autolock, robotic	Servo-driven (base model), autolock, robotic	3300 DR, IR optional	Servo-driven (base model), autolock, robotic
<b>CONFIGURATION:</b> [Self Contained or Modular (Separate EDM Unit)]	Self contained	Self contained	Self contained	Self contained	Self contained
<b>DISTANCE MEASURING COMPONENT</b>					
<b>Type</b> (Infrared, Laser, Phase Comparison, Pulse, etc.)	[7]	Infrared	DR300+ (long-range, reflectorless)-pulse	IR/DR (reflectorless)- phase comparison	Phase shift
<b>Range</b> (normal conditions), in hundreds of meters: single/triple prism	30/50	20/28	25/55	30/50	30/75
<b>EDM Accuracy</b> , Standard Deviation	Varies: ± (1mm+1ppm) or ±(2mm+2ppm)	±(3mm+2ppm)	±(3mm+3ppm)	Varies: ±(2mm+2ppm)	Varies: ±(1mm+1ppm) or ±(2mm+2ppm)
<b>Displayed Resolution</b> , mm-(single/tracking)	0.1	1/10	Varies: 0.1 to 1/10	0.1	Varies: 0.1 to 1/10
<b>Measuring Time</b> , sec.: single reading/tracking	< 2.0/< 0.4	3.5/0.4	Varies: 3 to 7/0.4	2.0/1.2	2.0/0.5
Displays Stake-Out Information	Yes	Yes	Yes	Yes	Yes
Other Distance Measuring Features:	Trigger key, laserpointer	Synchronized/1 to 6Hz/low latency	Surface scanning, monitoring	DR (reflectorless), IR option	Surface scanning, monitoring
<b>Theodolite Component</b>					
Telescope (type & magnification)	Coaxial/30x	Coaxial/26x [1]	Coaxial/26x [1]	Coaxial/26x	Coaxial/26x [1]
Field of View, degrees & minutes	1 degree 22 minutes	1 degree 30 minutes	1 degree 30 minutes	2.9 m/100 m, 1 degree 55 minutes	1 degree 30 minutes
Minimum Focusing Distance, meters	1.5	1.7	0.5	1.5	1.7
Tilt Range (360 deg if fully transitable)/w. elbow	360/(90/-55)	345/-60/75	345/(-60/75)	360/90/-55	345/(-60/75)
Angle accuracy [Std dev of a direction, dir and rev (DIN Spec. 18723)]	Varies: 1.5, 2, 3, 5	1	2	Varies: 3	Varies: 1
Smallest Unit Displayed	0.1	0.1	Varies: 0.1	1.0	Varies: 0.1
Orientation to Zero or Any Value After Pointing Telescope	Yes	Yes	Yes	Yes	Yes
Dual-Axis Compensation	Yes	Yes	Yes	No, single	Yes
<b>Other Angle Measuring Features:</b>					
Stores Collimation and Vertical Index Corrections	Yes	Yes	Yes	Yes	Yes
Stores Trunnion Axis Correction	Yes	Yes	Yes	Yes	Yes
Reads Left or Right	Yes	Yes	Yes	Yes	Yes
Selectable Display Resolution- Range of Values	1	0.1	0.1	1	0.1
Plate Vial Sensitivity per 2mm	30	6	6	30	6
<b>Other Features</b>		Synchronized angles/distances	Electronic circles	[6]	Electronic circles
<b>ADVANCED FEATURES</b>					
Target Tracking (active/passive)	N/A	Active, multiple target ID	Active	N/A	Active
Robotic search control (user definable, search window, controllable from rod, etc.)	N/A	Yes/Yes/Yes	Yes/Yes/Yes	N/A	Yes/Yes/Yes
Distance at which robotic total station can be controlled from rod	N/A	[2]	[2]	N/A	[2]
Number of speeds on servo-driven	N/A	4	4	N/A	4
Range to 90% Kodak grey card	120 m	N/A	> 800 m	100 m	70 m
Range to 18% Kodak grey card	80 m	N/A	> 300 m	70 m	50 m
<b>MISCELLANEOUS</b>					
<b>User Interface:</b>					
Operation: Menu, Command, Both	Menu	Both	Both	Menu	Both
Alphanumeric Keyboard	Yes	Yes	Yes	No	Yes
Separate Numeric Key Pad	Yes	Yes	Yes	No	Yes
<b>Electronic Leveling</b>	Yes	Yes	Yes	Yes	Yes
<b>Out-of-Level Warning</b>	Yes	Yes	Yes	Yes	Yes
<b>Optical Plummet in Alidade, Magnification</b>	Yes/2.4x	No	No	Yes/2x	No
Circular Vial Sensitivity per 2mm	8'	8'	8'	10'	8'
Detachable Tribrach	Yes	Yes	Yes	Yes	Yes
Leveling Base Plummet, Type	Trimble 3-pin or DIN	Yes/Trimble 3-pin	Yes/Trimble 3-pin	Trimble 3-pin or DIN	Yes/Trimble 3-pin
<b>Data Collector:</b>					
On-Board, External, Both	Both	Both	Both	Varies with model	Both
Point Capacity (X, Y, Z, Pt No., Code)	>10,000	>10,000	>10,000	Varies with model	>10,000
Programmable	Yes	Yes	Yes	Varies with model	Yes
Price, if optional	Varies, contact distributor	Varies, contact distributor	Varies	Varies, contact distributor	Varies, contact distributor
<b>On-Board Intelligence</b>					
Height Transfer	Yes	Yes	Yes	Yes	Yes
Missing Line (Tie Distance)	Yes	Yes	Yes	Yes	Yes
Resection / free station	Yes	Yes	Yes	Yes	Yes
Setting Out - 2D / 3D	Yes	Yes	Yes	Yes	Yes
Reference Lines	Yes	Yes	Yes	Yes	Yes
Automatic Highway Layout - 2D / 3D	Yes	Yes	Yes	No	Yes
Remote Object Height	Yes	Yes	Yes	Yes	Yes
Station & Offset	Yes	Yes	Yes	Yes	Yes
Traverse Checking	Yes	Yes	Yes	No	Yes
Angle Sets	Yes	Yes	Yes	No	Yes
Custom Applications Programs (by user or mfr for user):	Yes	Yes	Yes	No	Yes
Firmware Upgradable	Yes	Yes	Yes	Yes	Yes
<b>Type of Prism</b> (cube/rect) and target (centric/eccentric) Required:	Cube/centric	Cube/centric	Cube/centric	Cube/centric	Cube/centric
<b>Rodperson Self-Aligning Aid</b>	Yes	Yes	Yes	No	Yes
<b>Other Features:</b>	TDS on-board (optional)	Optimized for 3D machine control	Surface scanning, monitoring		Surface scanning, monitoring
<b>BATTERY</b> (built in/removable):	Internal and external	Internal and external	Internal and external	Internal and external	Internal and external
<b>Type</b> (Gel-Cell, NiCd)	NiMH	NiMH	NiMH	NiMH	NiMH
<b>Hours Continuous Use</b> (One EDM Meas. Per 30 sec)	8	9 hrs robotic w/ external battery	9 hrs robotic with external	8	9 hrs robotic w/ external
<b>Weight</b> (lbs.)	1.0 internal	0.9 internal	0.9 internal	0.5 internal	0.9
<b>CHARGER:</b>					
<b>Hours to Recharge</b>	5	< 2	< 2	2	< 2
<b>Overcharge Protection</b>	Yes	Yes	Yes	Yes	Yes
<b>Battery Weight</b> (lbs.)	3	2.8-6.8 (external)	0.9 internal	3	0.9
<b>WEIGHT OF INSTRUMENT</b> (incl. EDM, tribrach, battery, etc.), lbs.	12	18 (excluding battery)	Depends on configuration	7.7	Depends on configuration
<b>WARRANTY</b> , Months	24	12	12	24	24
<b>DATE OF INTRODUCTION:</b> Month and Year	Feb-01	Feb-00	Oct-02	Feb-01	Feb-01
<b>Other variations possible within this series</b>	[4]	Upgradeable [3]	Upgradeable [3]		Upgradeable [3]
<b>Additional notes</b>					
<b>Reader Service Number</b>	31	32	33	34	35

## Note 1, Model:

If series don't have a common "base" model number, list individual numbers, e.g. 100/200/300. May be theodolite or EDM component only, which may be combined with other components

D--with reflectorless      02--2" accuracy  
M--motorized                03--3" accuracy  
S--servo driven              01--1.5" accuracy

## Note 2, Variants:

E.g., manufacturer may want to state how model number suffixes vary depending on technology options selected such as:

## Note 3, Other Variations:

This EDM unit may be combined with Theodolite unit xx to create model # yyyy, with theod zz to create model # www, etc.

## Laser Technology Inc.

1. Separate angle encoder unit.
2. On-board display of HD, VD.
3. Another angle-measuring feature is aiming function.
4. Prisms or reflectors are not required but are available as options.
5. Separate compass unit.
6. Another feature is declination setting.

## Leica Geosystems Inc.

1. Contact your nearest Leica Geosystems representative for a personalized quote:  
<http://construction.leica-geosystems.com/contact/address.asp>
2. On-board application programs/on-board construction specific applications.
3. On-board data collection, off-board data collector.
4. Automated angle sets, field calibration, electronic compensation.
5. Reflectorless, automatic target recognition, motorized.
6. Reflectorless EDM, visible laser pointer, standard mode, fast mode, tracking mode, averaging mode.
7. PowerSearch, auto prism finding, auto angle sets, motorized stakeout, automatic target recognition.
8. PowerSearch, joystick, user definable, compass, working area.
9. PowerSearch/robotic(ATR) internal battery.
10. PowerSearch/robotic/reflectorless/auto target/machine control/reference station.
11. 1 degree 30 minutes/2.7 m at 100 m
12. Passive, automatic targeting and tracking.

## Measurement Devices Ltd.

1. Unit consists of the MDL LaserAce 300 plus an electronic theodolite to provide the angles.

## Nikon Instruments Inc.

1. Single-axis on DTM-332.
2. DTM-352 features dual encoders for horizontal; single on DTM-332.
3. Custom codelist, quick code system, vertical plane, sloped plane, offset programs, advanced stakeout. IPX6 waterproof construction total stations with 16-hour battery life and advanced on-board system. DTM-332 is price competitive with F1 only display and single-axis compensation. Both models feature easy-to-use, powerful on-board collection and staking features at no additional cost. Also feature Nikon optics, backlit graphics display and 25-key alpha-numeric keyboard.
4. 1.0 second initial measurement at full 2mm+2ppm accuracy.
5. Patented digital diametric detection for H&V.
6. Max 10 point with least squares adjustment.

7. Lumi-Guide with distance control.
8. The 502 models feature fast EDM technology (1.0 s for 2mm+2ppm accuracy) and IPX4 all-weather construction. Advanced on-board system features multiple jobs, control jobs, custom codelist, quick code system, offset programs, vertical plane, sloped plane, curve staking, F1/F2 averaging, advanced stakeout & much more. Also features Nikon optics and two speed tangent mechanisms, backlit graphics display and 25-key alpha-numeric keyboard.
9. NPL-821 uses pulse laser, Class 1, eyesafe.
10. NPL-821 measures 5000 m to a single.
11. NPL measures in 3 modes (7.5/2.5/1.5).
12. NPL utilizes Nikon's exclusive focused beam non-prism EDM.
13. The 801 series is Nikon's 3rd generation high-end on-board system. Several program options are available including TDS onboard. Large graphics display provides advanced program interface and onscreen plotting. The NPL-821 features Nikon's exclusive focused beam non-prism EDM. The system minimizes return signal from objects out of focus. Combined with the measuring beam indicator on the reticle, the NPL provides positive target identification in non-prism applications.
14. 7.6 for NPL (continuous ang/dist with 2 batteries included).
15. Reflectorless (Class 1, completely eyesafe).
16. 1.5/0.5 prism mode, 2.5/1.0 non-prism.
17. Utilizes Nikon's exclusive focused beam non-prism EDM.
18. Dual-axis on NPL-352, single on NPL-332.
19. NPL-352 has dual horizontal angle encoders; NPL-332 has single only.
20. 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 provides positive target identification in non-prism applications. Advanced on-board 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. Also features Nikon optics, backlit graphics display and 25-key alpha-numeric keyboard.
21.  $\pm(2\text{mm}+2\text{ppm})$  for DTM,  $\pm(3\text{mm}+3\text{ppm})$  for NPL.

## Northwest Instruments Inc.

1. 360 degree, 400 gon and 6400 mil selectable.
2. Stakeout by distance and coordinates. 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 cannot afford a high-priced, full-featured total station.
3. NTDM05, 5" unit with data port and vertical compensation.
4. NTDM05B: a basic model without vertical compensation.
5. Northwest NTDM05 is one level up from NTDM10 introduced 2001. Additional features include: RS-232C data port, internal memory and vertical compensation, etc.

## Pentax U.S.A.

1.  $\pm(2\text{mm}+2\text{ppm})$ ,  $\pm(3\text{mm}+2\text{ppm})$ ,  $\pm(5\text{mm}+3\text{ppm})$ ,  $\pm(5\text{mm}+3\text{ppm})$
2. Visible laser, feet and inches.
3. Diametric detection--H&V, dual speed tangent on 2 and 3" models, auto focus.
4. 3 pin/3 pin/3 pin/fixed
5. Target, sheet or prism-centric.
6. Dual keyboards on 2", optional on others.
7. All units have automatic atmospheric corrections (temp/pres/ppm). Electronics 24, optical/mechanical limited lifetime.

## SOKKIA

1. Initial: 3.7/1.9
2. Fine, rapid, and tracking, averaging options.
3. 4 types: Slight (1 degree 30 minutes), H Wide (6 degrees), V Wide, HV Wide.
4. 6 user controlled, 10 internal aiming speeds.
5. Approximately 3.5 (tested with face1/face2 motor movement).
6. The SET110M Series is the first in a new line of high-efficiency motorized total stations from Sokkia. Can be operated remotely via data radio kit. Selectable mode prism autpoint.
7. RED-tech visible and infrared phase shift reflectorless.
8. Initial 2.6/1.6
9. SET630R: 26x
10. 2 sec (230R3/R); 3 sec (330R3/R); 5 sec (530R3/R); 6 sec (630R)
11. 0.3-350 m (R3); 0.3-150 m (R); 100 m (SET630R)
12. Series 30R3 is rated IP66 waterproof and dustproof. Factory option SCR2A CF card reader.
13. Initial 2.8/1.8
14. Displays ft/in, fine, rapid, tracking and AVG.
15. 2 sec (SET210); 3 sec (SET310); 5 sec (SET510); 6 sec (SET610)
16. SET10 Series is rated IP66 waterproof and dustproof. The SET10 can be used with optional wireless keyboard and optional SCR2A Compact Flash card slot.
17. 1 sec (1030R3/R); 2 sec (2030R3/R); 3 sec (3030R3/R)
18. About 10,000 internal (plus CF memory cards).
19. The PowerSet 30R includes complete SDR Expert Data Collection software on-board. Also features SCRC3 CF card reader standard.
20. 1 sec (1130R3/R); 2 sec (2130R3/R) 130R3/R); 3 sec (3130R3/R); 5 sec (4130R3/R)
21. New model for 2004 with optional wireless SF14 remote keypad interface.
22.  $\pm(2+2\text{ppm} \times D)$  mm prism;  $\pm(3+2\text{ppm})$  reflectorless.
23. Initial: 3.1/2.7
24. Initial: 3.5/2.7
25. SET1130R/SET2130R/SET3130R/SET4130R

## Topcon

1. Supports wireless communications (Bluetooth).
2. Waterproof and dustproof to IP66. Cable-free Bluetooth communications.
3. Windows CE Net 4.2 operating system; waterproof and dustproof to IP54.
4. 100% waterproof and dustproof to IP66.
5. Unit can be operated as fully robotic by adding comm link and controller.

## Trimble

1. 30x magnification optional.
2. Up to 1200 m depending on type of RMT.
3. Compatible with leading data collectors for servo, autolock and robotic operation.
4. Various faceplates to suit application; internal laser plummet.
5. The ATS is optimized for 3D Machine Control applications, but equally well suited for the measurement needs of today's contractor. High measurement rate (1-6Hz), 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.
6. Very light weight, very low power consumption.
7. DR (reflectorless)-phase comparison; infrared (used w/ prism).

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