

Leica Viva TS16 Equipment List



Table of Contents

Total Station	5
1 TS16	5
1.1 Models	5
1.2 Angular Accuracies	5
Additional Options & Accessories	6
2 Additional Options for Total Station	6
2.1 Hardware Options	6
2.2 TS16 I Camera Calibration	6
2.3 Calibration and Producer Certificates	6
3 Leica Captivate Apps & Software Options	6
3.1 Leica Captivate Software for TS	6
3.2 Apps included in Leica Captivate for TS (827 646)	6
3.3 Optional Apps for Leica Captivate for TS	7
3.4 Optional Licences for Leica Captivate for TS	7
Accessories for Total Station	8
4 Power Supply	8
4.1 Internal Batteries	8
4.2 External Batteries	8
4.3 Battery Chargers	8
5 Data Storage and Data Transfer	8
5.1 Memory Devices	8
5.2 Card Reader	8
6 Connectivity	9
6.1 Connector Types	9
6.2 Cables	9
7 Optical Accessories	10
7.1 Eyepiece	10
7.2 Autocollimation Set	10
7.3 Objective	10
8 Instrument Height Meter	10
9 Tribrachs	10
10 Tripods	10
11 Reflector Poles	11
11.1 Standard Poles	11
11.2 Hidden Point Pole	11
11.3 Mini Pole	11
12 Reflector Carriers	11
13 Reflectors	11
13.1 Circular Reflectors	11
13.2 360° Reflectors	12
13.3 Precision Reflectors	12
13.4 Mini Reflectors	12
13.5 Reflector Tapes	12
14 Pen and Screen Protection Foils	12
15 Additional Containers & Accessories for Containers	12
Remote Control	13
16 CS20 Field Controller	13
16.1 CTR20 TS Communication Expansion Pack	13
17 Leica Captivate Software and Apps - CS20 Field Controller	13
17.1 Leica Captivate Software for CS20 Field Controller	13
17.2 Apps included in Leica Captivate for CS20 Field Controller	13
17.3 Optional Apps for Leica Captivate for CS20 Field Controller	14
17.4 Optional Licences for Leica Captivate for CS20 Field Controller	15

18	CS35 Tablet	16
18.1	CS35 Tablet	16
18.2	CTR35 Long-range Radio Device	16
19	Leica Captivate Software and Apps - CS35 Tablet	16
19.1	Leica Captivate Software for CS35 Tablet	16
19.2	Apps included in Leica Captivate for CS35 Tablet	16
19.3	Optional Applications for Leica Captivate for CS35 Tablet	17
19.4	Optional Licences for Leica Captivate for CS35 Tablet	17
Accessories for Field Controller		18
20	Accessories for CS20 Field Controller	18
20.1	Internal Batteries	18
20.2	Battery Chargers	18
20.3	Memory Devices	18
20.4	Card Reader & Adapter	18
20.5	Pen and Screen Protections Foils	18
20.6	Additional Power Accessories	18
20.7	Pole Accessories	18
20.8	Utility Hook and Hand Strap	19
21	Accessories for CS35 Tablet	19
21.1	Internal Batteries	19
21.2	Battery Chargers	19
21.3	Pen and Screen Protection Foils	19
21.4	Pole & Tripod Accessories	19
21.5	Hand Strap	19
22	RadioHandles and TCPS Modems	20
22.1	RadioHandles	20
22.2	TCPS Modems	20
22.3	TCPS Accessories	20
22.4	Cables for TCPS Radio Modems	20
SmartPole & SmartStation		21
23	SmartStation & Smartpole Setup using a GS16 GNSS Receiver	21
23.1	GS16 GNSS Receiver	21
23.2	SmartAntenna Adapter	21
24	SmartPole using GS18 T GNSS Receiver	22
24.1	GS18 T GNSS Receiver	22
Care Packages		23
25	Customer Care Packages	23
Trademarks & Technical Data		24
26	Trademarks	24
27	Technical Data	24
Suggested Equipment Setups		25
28	Conventional Surveying	25
28.1	Two Person Surveying using a TS16 Total Station	25
28.2	Robotic Surveying using a TS16 Total Station and CS20 Field Controller	26
28.3	Robotic Surveying using a TS16 Total Station and CS35 Tablet	27
29	SmartPole Surveying	28
29.1	SmartPole using the GS16 GNSS Receiver and CS20 Field Controller	28
29.2	SmartPole using the GS16 GNSS Receiver and CS35 Tablet	29
29.3	SmartPole using the GS18 T GNSS Receiver and CS20 Field Controller	30
29.4	SmartPole using the GS18 T GNSS Receiver and CS35 Tablet	31
30	SmartStation using the GS16 GNSS Receiver	32

Total Station

1 TS16

1.1 Models




	TS16 M	TS16 A	TS16 G	TS16 P	TS16 I
Angle measurement	●	●	●	●	●
Distance measurement to prism	●	●	●	●	●
Distance measurement to any surface (reflectorless)	●	●	●	●	●
Motorised	●	●	●	●	●
AutoHeight (automatic Instrument height)	●	●	●	●	●
Automatic Target Aiming (ATRplus)	-	●	●	●	●
Lock mode	-	●	●	●	●
DynamicLock	-	-	-	○	○
PowerSearch (PS)	-	-	-	●	●
Overview Camera	-	-	-	-	●
Laser Guide (GUS74)	-	-	●	-	-
RS232, USB and SD card interface	●	●	●	●	●
WLAN	●	●	●	●	●
Bluetooth	●	●	●	●	●
Internal Flash Memory (2 GB)	●	●	●	●	●
Hotshoe interface for RadioHandle	●	●	●	●	●
Guide Light (EGL)	●	●	-	●	●
SmartStation GS16 GNSS receiver	○	○	○	○	○
LOC8	○	○	○	○	○
CS20 Field Controller (with internal TS communication module)	○	○	○	○	○
CS20 with CTR20 TS communication expansion pack	○	○	○	○	○
CS35 Tablet (with internal Bluetooth v4.0)	○	○	○	○	○

- Standard
- Optional
- Not available

1.2 Angular Accuracies

		1" Accuracy	2" Accuracy	3" Accuracy	5" Accuracy
TS16 M	PinPoint R500	917 463	917 464	917 465	917 466
	PinPoint R1000	917 458	917 460	917 461	917 462
TS16 A	PinPoint R500	917 454	917 455	917 456	917 457
	PinPoint R1000	917 450	917 451	917 452	917 453
TS16 G	PinPoint R30	917 467	917 468	917 469	
	PinPoint R1000	917 470	917 471	917 472	
TS16 P	PinPoint R500	917 446	917 447	917 448	917 449
	PinPoint R1000	917 442	917 443	917 444	917 445
TS16 I	PinPoint R500	917 434	917 435	917 436	917 437
	PinPoint R1000	917 429	917 430	917 431	917 432

 All TS16 models are delivered with one 5" WVGA colour touch screen, Quick Guide, documentation USB card (833 146) and container GVP725 (817 058).

Additional Options & Accessories

2 Additional Options for Total Station


2.1 Hardware Options



879 378	GTS49	Full keyboard for 2nd face on TS16 models with Autoheight, fitted. Contains 840 313 KDU
874 451	GTS46	LOC8 theft deterrence and location device for automated total stations, fitted.

2.2 TS16 I Camera Calibration





793 861	Overview camera calibration workflow. Article ensures the predelivery logistics for the calibration of the overview camera of the Leica Viva TPS.  3rd party fees for instrument calibration and licensing of software are not included.
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2.3 Calibration and Producer Certificates



812 535	Calibration Certificate "Gold", Angle
812 536	Calibration Certificate "Gold", A + Dist IR
812 539	Calibration Certificate "Gold", A + Dist, IR&RL
812 542	Calibration Certificate "Silver", Angle
812 543	Calibration Certificate "Silver", A + Dist, IR
812 544	Calibration Certificate "Silver", A + Dist, IR&R

-  Calibration Certificate "Blue" (812 541) is always included in initial order (myWorld download).
-  For Service Calibration Certificates see Standard Service Products (SSPs) document.

3 Leica Captivate Apps & Software Options

3.1 Leica Captivate Software for TS


827 646	Leica Captivate Measure & Stake for TS/MS.
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3.2 Apps included in Leica Captivate for TS (827 646)

<p>Measure includes:</p> <ul style="list-style-type: none"> • Measure • Code points • Automatically measure points • Remote Heights • Target Offset calculations
<p>Setup includes:</p> <ul style="list-style-type: none"> • Get station coordinates from GNSS, from Job or enter manually • Orientation by known Azimuth • Orientation by known Backsight • Orientation & Height transfer to up to 10 target points • Resection up to 10 target points • Resection Helmert • Orientation to Line • Orientate to Object
<p>Stake points includes:</p> <ul style="list-style-type: none"> • Navigate to point using various methods: from and behind instrument, point, base line, arrow, North • Quality control - checking of coordinate differences before storing • Automatically select next closest point • Graphical selection of point from map • Edit heights and offset heights of points • Acoustic beep getting faster when getting closer to point

COGO includes:
<ul style="list-style-type: none"> • Inverse • Traverse • Intersections • Angle calculations • Line & arc calculations • Bearing & distance calculations • Shift, Rotate, Scale (manual & matching points) • Triangle calculations • Rectangle
Determine coordinate system:
<ul style="list-style-type: none"> • 1 step, 2 step, 3D Transformation • All common projections
Alignment Editor:
<ul style="list-style-type: none"> • Horizontal alignments • Vertical alignments • Cross sections • Chainage equations
Control Data:
<ul style="list-style-type: none"> • Create points and lines
Data import:
ASCII, XML, DXF, DTM, alignments
Data export:
ASCII, Custom, DXF, XML, Style Sheets, FBK, RW5, RAW and local formats

3.3 Optional Apps for Leica Captivate for TS

 The following apps require a valid license key.

834 221	Athletics
827 650	Area Division
827 651	Stake DTM
827 648	Measure and Stake to Line
827 649	Measure to Plane / Grid
827 653	Check and Stake Road
827 654	Check and Stake Tunnel
827 655	Check and Stake Rail
827 658	Sets of Angles
827 652	Volume Calculation
827 656	Hidden Point
827 657	Traverse
827 659	QuickVolume
834 229	Auto Setup
834 230	Remote Monitoring
836 522	Machine Control Guidance
839 678	Inspect Surfaces
836 669	Tunnel Profile Generator
846 826	TPS Survey Streaming
850 622	ESRI Shapefile Exporter
834 226	Set Orientation
847 944	Inspect Road
	 Requires 839 678 Inspect Surfaces.
847 945	Inspect Tunnel
	 Requires 839 678 Inspect Surfaces.

3.4 Optional Licences for Leica Captivate for TS

901 400	DynamicLock for TS16P and TS16I
827 661	Leica Active Assist
827 662	Leica Exchange
903 372	ConX 1y
903 373	ConX 2y
903 374	ConX 3y

Accessories for Total Station

4 Power Supply


4.1 Internal Batteries



733 270	GEB221	Lithium-Ion battery, 7.4V/4.4Ah, rechargeable. To be used with TS11/TS12/TS15/TS16.
793 973	GEB222	Lithium-Ion battery, 7.4V/6Ah, chargeable. To be used with TS11/TS12/TS15/TS16.

4.2 External Batteries



818 916	GEB371	External universal battery, Li-Ion, 13 V, 250 Wh, rechargeable.
807 696	GEV270	Power supply unit for TPS/GNSS/DNA. For indoor use only. Input 100-240VAC to output 13.2VDC, with connection for power cables.  Requires a GEV52 or GEV187 cable for Viva TS.

4.3 Battery Chargers



799 185	GKL311	Single-bay Charger Professional 3000. Charger for one Li-Ion battery (GEB211, GEB212, GEB221, GEB222, GEB241, GEB242, GEB331 and GEB361), including AC/DC adaptor and cigarette lighter cable.
799 187	GKL341	Multi-bay Charger Professional 5000. Charges up to 4 batteries (GEB211, GEB212, GEB221, GEB222, GEB241, GEB242, GEB331 and GEB361), including power cable
734 389	GDC221	Car adapter for the GKL341 charger. Allows the use of the GKL341 with a cigarette lighter; 12V/24V DC/DC converter. Can also be used to power CS15 field controller directly from a cigarette lighter.
774 437	GEV242	Charger for GEB371 external battery.

5 Data Storage and Data Transfer

5.1 Memory Devices



767 856	MSD1000	SD memory card 1GB for Leica Viva TPS and Leica Nova instruments and CS10/CS15 field controller, industrial grade.
789 139	MSD08	SD memory card 8GB for Leica Viva TPS and Leica Nova instruments and CS10/CS15 field controller, industrial grade.
765 199	MS1	USB memory stick, 1GB, for Leica Viva TPS and Leica Nova instruments and CS10/CS15 field controller, industrial grade.

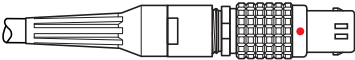

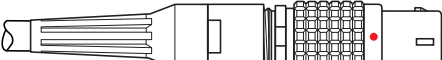

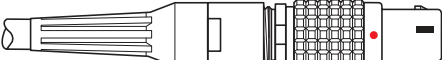



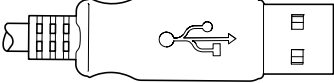



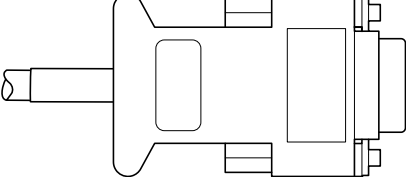
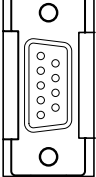
5.2 Card Reader



767 895	MCR7	Card reader for SD/CF cards.
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6 Connectivity

6.1 Connector Types

Name	Used on		
Lemo0 5-pin	Leica Viva TPS		
Lemo1 5-pin	Battery / External power		
Lemo1 8-pin	Leica Viva field controllers / Leica Nova TPS		
Lemo1 8-pin	External TS radios		
USB A	PC / Laptop		
USB Mini	Leica Viva TPS		
9-pin RS232 serial	PC / Laptop		

6.2 Cables



409 678	GEV52	Battery cable, connects Leica Viva Total Stations or DNA Lemo0 5-pin to external battery connector Lemo 1 5-pin.
439 038	GEV71	Car battery cable, connects 12V car battery connector to Lemo1 5-pin female.
563 625	GEV102	Serial data cable for communication to PC, connects Lemo0 5-pin (instrument) to PC (9-pin RS232 serial), 2m.
734 698	GEV187	Serial data Y-cable, connects Lemo0 5-pin connector to PC (9-pin RS232 serial) and external battery (Lemo1 5pin), 2m.
756 367	GEV217	Serial data cable for communication between Leica Viva Total Stations and CS10/CS15, connects Lemo0 5-pin to Lemo1 8-pin, 1.8m.
764 700	GEV223	Data transfer cable connecting TS to PC, USB Mini connector to USB A.
806 093	GEV267	Serial data transfer cable, converter cable USB A to Lemo0 5-pin, connects PC to Leica Viva Total Stations, PC driver included on CD.
707 525	GK1	Lemo Canon converter 30°, for PC (Lemo 0 5-pin to RS232) to be used with GEV186 cable.
734 697	GEV186	Serial data Y-cable for TS robotic setup, Lemo1 5-pin (battery) to Lemo0 5-pin (instrument) and Lemo1 8-pin (external TS radio).

7 Optical Accessories

7.1 Eyepiece



377 802	FOK53	Magnification eyepiece, additional eyepiece for increasing telescope magnification to 42x. ☞ Modification in a workshop necessary.
308 838	FOK53	Magnification eyepiece, additional eyepiece for increasing telescope magnification to 42x. ☞ Modification ex factory. Can only be ordered with a new instrument.
793 979	GFZ3	Diagonal eyepiece for telescope with bayonet connection.
376 236	GOK6	Eyepiece for steep sights, with joint allowing variable sighting angle.

7.2 Autocollimation Set



199 899	GOA2	Autocollimation eyepiece.
394 787	GEB62	Plug-in lamp, with cable for autocollimation eyepiece.
394 792	GEB63	Battery box for autocollimation eyepiece and eyepiece lamp.

7.3 Objective



743 504	GVO13	Objective solar filter for TPS instruments.
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8 Instrument Height Meter



667 718	GHM007	Instrument height meter.
722 045	GHT196	Distance holder for height meter.
60100179		Height Meter set including GHM007 Instrument height meter and GHT196 Distance holder for height meter.

9 Tribrachs



842 061	GDF311	Tribrachs Series 3000, without optical plummet.
842 062	GDF312	Tribrachs Series 3000, with optical plummet.
777 508	GDF321	Tribrachs Series 5000, without optical plummet.
777 509	GDF322	Tribrachs Series 5000, with optical plummet.

10 Tripods



296 632	GST20	Heavy duty tripod, with side clamp screws, carrying strap and plumb bob.
394 752	GST20-9	Heavy duty tripod, with side clamp screws and carrying strap.
667 301	GST120-9	Heavy duty tripod, self-closing, with side clamp screws and carrying strap.
332 200	GST4	Tripod-star, for setting up tripods on hard and slippery surfaces.

11 Reflector Poles


11.1 Standard Poles



754 391	GLS12	Reflector pole, telescopic to 2.00m with circular bubble, cm graduations.
754 389	GLS12F	Reflector pole, telescopic to 2.00m with circular bubble, ft graduations.
766 359	GLS31	Reflector carbon-fibre pole with circular bubble and twist lock. Snap-locks at 2.00m, 1.80m and 1.50m for GPS (GNSS) antennas with GAD31 adapter or GRZ122 reflector (SmartPole setup).
385 500	GLS11	Reflector pole, telescopic, with circular bubble, cm and ft graduation, extends to 2.15m.
667 309	GLS111	Reflector pole, with bull's-eye bubble, cm/ft graduation, extends to 2.60m, with red/white 0.20m graduations.
667 310	GLS112	Reflector pole, with bull's-eye bubble, cm/ft graduation, extends to 3.65m, with red/white 0.20m graduations.
555 720	GSR2	Dual-strut support for GLS11 plumbing pole.
667 319	GSR111	Dual-strut support for all GLS.
403 428	GZW12	Extension 1m long, for reflector pole GLS11 and carriers.

11.2 Hidden Point Pole



742 329	GMP112	Hidden Point pole extension for GMP111 (mini prism pole set). Includes mini prism with holder and 30cm adapter pole.  Additional GMP111 Mini prim (641 615) required for complete Hidden Point pole set with two prisms.
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11.3 Mini Pole



403 427	GLS14	Mini reflector pole, (prism/target 20cm over point), with circular bubble.
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12 Reflector Carriers



667 313	GRT144	Carrier with stub.
874 838	SNLL321	Precision carrier, with longitudinal bubble and zenith-nadir laser plummet.
428 340	GZR3	Precision carrier, with longitudinal bubble and optical plummet.
725 566	GZR103	Carrier, with longitudinal bubble and optical plummet, for reflectors and GPS antenna.
667 217	GAD31	Screw-to-stub adapter for fitting GPS antenna on carriers with stub and poles with stub.

13 Reflectors

13.1 Circular Reflectors



641 617	GPR121	Circular prism, with metal holder and target plate.
362 830	GPR1	Circular prism, in black housing.
362 820	GPH1	Single-prism holder.
400 080	GPH3	Three-prism holder.
362 823	GZT4	Target plate, for GPH1.

13.2 360° Reflectors



754 384	GRZ122	360° reflector with 5/8" thread adapter for mounting of GNSS antenna.
639 985	GRZ4	360° reflector.
644 327	GRZ101	360° mini prism with 1/4" thread fitting. Not supported by PowerSearch.
756 637	MPR122	360° reflector with 5/8" thread adapter and 5/8" screw nut.
742 006	GAD103	Adapter for attaching GRZ101 to all poles with Leica Geosystems stub.

13.3 Precision Reflectors



555 631	GPH1P	Single-prism precision reflector.
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13.4 Mini Reflectors



641 662	GMP101	Mini prism, incl. bubble, target plate and spike, in bag, also suitable for GLS11/GLS12 and GRT144 (same height as GPH1, additive constant +17.5mm).
641 762	GMP104	Mini prism, with L-bar, for fixed installations.

13.5 Reflector Tapes

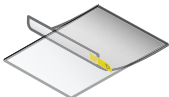


763 532	GZM29	Reflective tape, 20x20mm for short range, pack of 20 pieces.
763 533	GZM30	Reflective tape, 40x40mm for medium range, pack of 20 pieces.
763 534	GZM31	Reflective tape, 60x60mm for long range, pack of 20 pieces.

14 Pen and Screen Protection Foils



Extra pen		
813 914	GDZ71	Pen with tether clip interface for CS20 field controller and TS16/MS60/TS60 instruments.



Screen Protection Foil set		
813 781	SPF05	5" WVGA screen protection foils for CS20 field controller and TS16/MS60/TS60 instruments.

15 Additional Containers & Accessories for Containers



727 589	GVP102	Soft bag with shoulder strap, for prism station, consist of tribrach, prism carrier or laser plummet and prism.
667 451	GVP609	Container for 2 circular prisms GPR111/121, 2 carriers/laser plummets and 2 tribrachs.
833 516	GVP716	Backpack carrying systems for all large TPS and GNSS containers.
833 517	GVP717	Sidebag for container GVP721/722/723/725/728/729/735.
833 518	GVP718	Basic backstrap for container GVP721/722/723/725/728/729/735.
833 519	GVP719	Shoulderstrap for container GVP721/722/723/725/728/729/735.
817 055	GVP722	Hard container for SmartAntenna, CS Field Controller and accessories for a SmartPole and SmartStation setup.
817 057	GVP724	Small-sized hard container for 360° prism and controller for TS Robotic Pole setup.

Remote Control

16 CS20 Field Controller



876 476	CS20 Basic Field Controller	CS20 Field Controller. Ruggedized field controller with 5" WVGA touch display, 4GB eMMC Flash Memory, 2GB SDRAM, SD card slot, 5MP camera and LED flash. Includes internal Bluetooth/WLAN module, QWERTY keypad, stylus.
876 477	CS20 LTE Field Controller	CS20 LTE Field Controller. Ruggedized field controller with 5" WVGA touch display, 4GB eMMC Flash Memory, 2GB SDRAM, SD card slot, 5MP camera and LED flash. Includes internal Bluetooth/WLAN module, 4G GSM/UMTS/LTE module, internal TS communication module, QWERTY keypad, stylus.
876 478	CS20 LTE Disto Field Controller	CS20 LTE Disto Field Controller. Ruggedized field controller with 5" WVGA touch display, 4GB eMMC Flash Memory, 2GB SDRAM, SD card slot, 5MP camera and LED flash. Includes internal Bluetooth/WLAN module, 4G GSM/UMTS/LTE module, internal TS communication module, integrated Disto-Lasermeter QWERTY keypad, stylus.
876 479	CS20 LTE Field Controller (US, CA)	CS20 LTE Field Controller US/CA. Ruggedized field controller with 5" WVGA touch display, 4GB eMMC Flash Memory, 2GB SDRAM, SD card slot, 5MP camera and LED flash. Includes internal Bluetooth/WLAN module, 4G GSM/UMTS/LTE module, internal TS communication module, QWERTY keypad, stylus.
876 480	CS20 LTE Disto Field Controller (US, CA)	CS20 LTE Disto Field Controller US/CA. Ruggedized field controller with 5" WVGA touch display, 4GB eMMC Flash Memory, 2GB SDRAM, SD card slot, 5MP camera and LED flash. Includes internal Bluetooth/WLAN module, 4G GSM/UMTS/LTE module, internal TS communication module, integrated Disto-Lasermeter QWERTY keypad, stylus.

16.1 CTR20 TS Communication Expansion Pack




Not available in EU countries due to EN 300 328 V.1.8.1.



Recommended only for robotic applications systematically exceeding ranges beyond 400 m.



6010023		CTR20 expansion pack set TS communication expansion pack set including CTR20 module and GAT25 radio antenna.
808 038	CTR20	CTR20 TS communication expansion pack CTR20 TS communication expansion pack with integrated radio module for CS20 3.75G field controller variants. Used to establish long range radio connection between CS20 3.75G field controller and TS Total Stations equipped with RH16. GAT25 radio antenna not included (frequency range 2402 - 2480 MHz).  Requires a GAT25 radio antenna.
812 027	GAT25	GAT25 radio antenna for CTR20 module Radio antenna for CTR20 long range TS communication module (frequency range 2402 - 2480 MHz).

17 Leica Captivate Software and Apps - CS20 Field Controller

17.1 Leica Captivate Software for CS20 Field Controller

827 698	Leica Captivate - Measure and Stake for CS20.
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17.2 Apps included in Leica Captivate for CS20 Field Controller




The following apps are included in Leica Captivate for CS20 (827 698).

Measure includes:



- Measure
- Code points
- Automatically measure points
- Remote Heights
- Target Offset calculations

<p>Setup includes:</p> <ul style="list-style-type: none"> • Get station coordinates from GNSS, from Job or enter manually • Orientation by known Azimuth • Orientation by known Backsight • Orientation & Height transfer to up to 10 target points • Resection up to 10 target points • Resection Helmert • Orientation to Line • Orientate to Object
<p>Stake points includes:</p> <ul style="list-style-type: none"> • Navigate to point using various methods: from and behind instrument, point, base line, arrow, North • Quality control - checking of coordinate differences before storing • Automatically select next closest point • Graphical selection of point from map • Edit heights and offset heights of points • Acoustic beep getting faster when getting closer to point
<p>COGO includes:</p> <ul style="list-style-type: none"> • Inverse • Traverse • Intersections • Angle calculations • Line & arc calculations • Bearing & distance calculations • Shift, Rotate, Scale (manual & matching points) • Triangle calculations • Rectangle
<p>Determine coordinate system:</p> <ul style="list-style-type: none"> • 1 step, 2 step, 3D Transformation • All common projections
<p>Alignment Editor:</p> <ul style="list-style-type: none"> • Horizontal alignments • Vertical alignments • Cross sections • Chainage equations
<p>Control data: Create points and lines</p>
<p>Data import: ASCII, XML, DXF, DTM, alignments</p>
<p>Data export: ASCII, Custom, DXF, XML, Style Sheets, FBK, RW5, RAW and local formats</p>
<p>3rd party total station control:</p> <ul style="list-style-type: none"> • Topcon total station control • Nikon total station control • SOKKIA total station control

17.3 Optional Apps for Leica Captivate for CS20 Field Controller

 The following apps require a valid license key.

834 296	Athletics
827 701	Area Division
827 702	Stake DTM
827 699	Measure and Stake to Line
827 700	Measure to Plane / Grid
827 704	Check and Stake Road
827 705	Check and Stake Tunnel
827 706	Check and Stake Rail
827 711	Sets of Angles
827 703	Volume Calculation
827 708	Hidden Point
827 709	Traverse
827 712	QuickVolume
834 305	Auto Setup
839 679	Inspect Surfaces
836 670	Tunnel Profile Generator
834 301	Set Orientation
848 370	Remote Monitoring

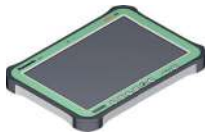
846 827	TPS Survey Streaming
848 372	Inspect Road  Requires 839 679 Inspect surfaces.
848 374	Inspect Tunnel  Requires 839 679 Inspect surfaces.
850 623	ESRI Shapefile Exporter

17.4 Optional Licences for Leica Captivate for CS20 Field Controller


827 714	Active Assist
827 715	Leica Exchange
903 367	ConX 1y
903 369	ConX 2y
903 370	ConX 3y

18 CS35 Tablet

18.1 CS35 Tablet




875 363	CS35-1 EU RU	CS35-1 Tablet, EU RU Ruggedized Win10 64-bit Tablet Computer including: 10" touch-widescreen, 256 GB SSD hard drive, 8 GB SDRAM, WLAN 802.11 b/g/n/a/ac, 4G Integrated Mobile Broadband module, Bluetooth v4.1, Stylus, 1x Battery (4.2Ah), AC/DC adaptor and 8MP camera with flash.
875 364	CS35-2 US CA	CS35-2 Tablet, US CA Ruggedized Win10 64-bit Tablet Computer including: 10" touch-widescreen, 256 GB SSD hard drive, 8 GB SDRAM, WLAN 802.11 b/g/n/a/ac, 4G Integrated Mobile Broadband module, Bluetooth v4.1, Stylus, 1x Battery (4.2Ah), AC/DC adaptor and 8MP camera with flash.
875 365	CS35-3 AUS NZ	CS35-3 Tablet, AUS NZ Ruggedized Win10 64-bit Tablet Computer including: 10" touch-widescreen, 256 GB SSD hard drive, 8 GB SDRAM, WLAN 802.11 b/g/n/a/ac, 4G Integrated Mobile Broadband module, Bluetooth v4.1, Stylus, 1x Battery (4.2Ah), AC/DC adaptor and 8MP camera with flash.

 All CS35 Tablets are delivered with stylus, tether, one GEB235 Lithium-Ion battery (10.8 V/4.1 Ah, rechargeable) and country specific AC/DC adaptor.

18.2 CTR35 Long-range Radio Device

844 474	CTR35	Long-range radio device for CS35.
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 Recommended only for robotic applications requiring extended range.

19 Leica Captivate Software and Apps - CS35 Tablet

19.1 Leica Captivate Software for CS35 Tablet

827 719	Leica Captivate - Measure and Stake for CS35.
---------	---

19.2 Apps included in Leica Captivate for CS35 Tablet

 The following apps are included in Leica Captivate for CS35 (827 719).

Measure includes:

- Measure
- Code points
- Automatically measure points
- Remote Heights
- Target Offset calculations

Setup includes:

- Get station coordinates from GNSS, from Job or enter manually
- Orientation by known Azimuth
- Orientation by known Backsight
- Orientation & Height transfer to up to 10 target points
- Resection up to 10 target points
- Resection Helmert
- Orientation to Line
- Orientate to Object



Stake points includes:

- Navigate to point using various methods: from and behind instrument, point, base line, arrow, North
- Quality control - checking of coordinate differences before storing
- Automatically select next closest point
- Graphical selection of point from map
- Edit heights and offset heights of points
- Acoustic beep getting faster when getting closer to point

COGO includes:
<ul style="list-style-type: none"> • Inverse • Traverse • Intersections • Angle calculations • Line & arc calculations • Bearing & distance calculations • Shift, Rotate, Scale (manual & matching points) • Triangle calculations
Determine coordinate system:
<ul style="list-style-type: none"> • 1 step, 2 step, 3D Transformation • All common projections
Alignment Editor:
<ul style="list-style-type: none"> • Horizontal alignments • Vertical alignments • Cross sections • Chainage equations
Control data:
Create points and lines
Data import:
ASCII, XML, DXF, DTM, alignments
Data export:
ASCII, Custom, DXF, XML, Style Sheets, FBK, RW5, RAW and local formats
3rd party total station control:
<ul style="list-style-type: none"> • Topcon total station control • Nikon total station control • SOKKIA total station control

19.3 Optional Applications for Leica Captivate for CS35 Tablet

 The following apps require a valid license key

827 722	Area Division
834 683	Athletics
834 691	Auto Setup
827 723	Stake DTM
827 720	Measure and Stake to Line
827 721	Measure to Plane / Grid
827 725	Check and Stake Road
827 726	Check and Stake Tunnel
827 727	Check and Stake Rail
827 730	Sets of Angles
827 724	Volume Calculation
827 728	Hidden Point
827 729	Traverse
827 731	QuickVolume
839 681	Inspect Surfaces
836 671	Tunnel Profile Generator
834 688	Set Orientation
848 371	Remote Monitoring
846 828	TPS Survey Streaming
848 373	Inspect Road
	 Requires 839 681 Inspect Surfaces.
848 375	Inspect Tunnel
	 Requires 839 681 Inspect Surfaces.
850 624	ESRI Shapefile Exporter

19.4 Optional Licences for Leica Captivate for CS35 Tablet

827 734	Leica Exchange
889 053	ADSK BIM360 Docs
889 056	ADSK BIM360 1y
903 363	ConX 1y
903 365	ConX 2y
903 366	ConX 3y

Accessories for Field Controller

20 Accessories for CS20 Field Controller

20.1 Internal Batteries



799 190	GEB331	Li-Ion battery, 11.1 V / 2.8 Ah, rechargeable, for CS20.
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20.2 Battery Chargers



799 185	GKL311	Single-bay Charger Professional 3000. Charger for one Li-Ion battery (GEB211, GEB212, GEB221, GEB222, GEB241, GEB242 and GEB331), including AC/DC adaptor and cigarette lighter cable.
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799 187	GKL341	Multi-bay Charger Professional 5000. Charges up to 4 batteries (GEB211, GEB212, GEB221, GEB222, GEB241, GEB242 and GEB331), including power cable.
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734 389	GDC221	Car adapter for the GKL341 charger. Allows the use of the GKL341 with a cigarette lighter; 12V/24V DC/DC converter. Can also be used to power CS15 field controller directly from a cigarette lighter.
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20.3 Memory Devices



767 856	MSD1000	SD memory card 1 GB for Leica Viva TPS and Leica Nova instruments and CS10/CS15 field controller, industrial grade.
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789 139	MSD08	SD memory card 8 GB for Leica Viva TPS and Leica Nova instruments and CS10/CS15 field controller, industrial grade.
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765 199	MS1	USB memory stick, 1 GB, for Leica Viva TPS and Leica Nova instruments and CS10/CS15 field controller, industrial grade.
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20.4 Card Reader & Adapter



767 895	MCR7	Card reader for SD/CF cards.
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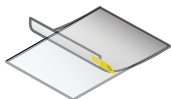
733 258	MCFAD1	CompactFlash PC card adapter.
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20.5 Pen and Screen Protections Foils



Pen

813 914	GDZ71	Pen with tether clip interface for CS20 field controller and TS16/MS60/TS60 instruments.
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813 582	GHT76	Tether to connect GDZ71 Pen to CS20 field controller.
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Screen Protection Foil set

813 781	SPF05	5" WVGA screen protection foils for CS20 field controller and TS16/MS60/TS60 instruments.
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20.6 Additional Power Accessories



822 787	GEV276	Power supply unit for CS20, for indoor use only. Input 100-240 VAC to output 15.0 VDC, 40 W.
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20.7 Pole Accessories



807 157	GHT66	Holder attaching a CS20 with a GHT63 clamp to a pole. GHT63 is not included.
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767 880	GHT63	Clamp arrangement for attaching the GHT66 and GHT78 to all poles.
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20.8 Utility Hook and Hand Strap



Utility hook

807 245	GHT68	Utility hook for CS20 field controller for attaching to belt or tripod.
845 832	GHT70	Clamp arrangement for attaching the GHT66 and GHT78 to all tripods.

Hand strap


807 158	GHT67	Hand strap for CS20 field controller.
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21 Accessories for CS35 Tablet

21.1 Internal Batteries




832 119	GEB235	Lithium-Ion battery, 10.8 V/4.1 Ah, rechargeable, for CS35 Tablet.
832 120	GEB236	Lithium-Ion battery, 10.8 V/8.7 Ah, rechargeable, for CS35 Tablet.

 All CS35 Tablets are delivered with one GEB235 Lithium-Ion battery (10.8 V/4.1 Ah, rechargeable).

21.2 Battery Chargers



832 118	GKL235	Charger for CS35 batteries GEB235 and GEB236. Country specific AC/DC adaptor (GEV280-x) not included.
832 113	GEV280-1	AC/DC adaptor, EU. Power Supply for CS35 Tablet.
8321 14	GEV280-2	AC/DC adaptor, UK. Power Supply for CS35 Tablet.
832 115	GEV280-3	AC/DC adaptor, US. Power Supply for CS35 Tablet.
832 116	GEV280-4	AC/DC adaptor, AUS. Power Supply for CS35 Tablet.
832 117	GEV280-5	AC/DC adaptor, CH. Power Supply for CS35 Tablet.
842 648	GEV280-6	AC/DC adaptor, JP, Power Supply for CS35 Tablet.

 Country specific AC/DC adaptor (GEV280-x) is delivered with CS35 Tablet.

21.3 Pen and Screen Protection Foils




Pen

832 121	GDZ75	Digitiser Pen for CS35 Tablet.
851 539	GDZ76	Digitiser Pen for CS35 Tablet, MK4 models.
832 122	GHT77	Tether to tie GDZ75 Digitiser Pen to CS35 Tablet.

Screen Protection Foil set

832 126	SPF06	Screen protection foils for CS35 Tablet.
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 All CS35 Tablets are delivered with one GDZ75 Digitiser Pen and a GHT77 Tether.

21.4 Pole & Tripod Accessories



832 127	GHT78	Tablet holder for attaching a CS35 Tablet with a GHT63 clamp to a pole. GHT63 is not included.
767 880	GHT63	Clamp arrangement for attaching the GHT66 and GHT78 to all poles.
845 832	GHT70	Holder for attaching a CS35 to a tripod with attached GHT78 tablet holder.

21.5 Hand Strap



833 343	GHT79	Hand strap for CS35 Tablet. Including 4 high corner guards.
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22 RadioHandles and TCPS Modems

22.1 RadioHandles



788 853	RH16	RadioHandle with integrated Bluetooth module and radio antenna. Used as radio modem for Leica Viva TPS and Leica Nova instruments. Establishes communication to CS20/CS35 or CS15 field controller equipped with CTR16/17 or external radio modem TCPS29/30 attached to PC. Frequency range 2402 - 2480 MHz. Not available in EU countries due to EN 300 328 V.1.8.1.
818 467	RH17	RadioHandle with integrated long range Bluetooth module and radio antenna. Used as radio modem for Leica Viva TPS and Leica Nova instruments. Establishes communication to CS20/CS35 or CS15 field controller equipped with CTR16/17 or external radio modem TCPS29/30 attached to PC. Frequency range 2402 - 2480 MHz. Fulfills EN 300 328 V.1.8.1.

22.2 TCPS Modems



788 854	TCPS29	Bluetooth radio modem with antenna. Used as external radio modem for Leica Viva TPS and Leica Nova instruments or PCs. Frequency range 2402 - 2480 MHz. Not available in EU countries due to EN 300 328 V.1.8.1.
818 469	TCPS30	Bluetooth radio modem with antenna. Used as external radio modem for Leica Viva TPS and Leica Nova instruments or PCs. Frequency range 2402 - 2480 MHz. Fulfills EN 300 328 V.1.8.1.

22.3 TCPS Accessories



734 163	GHT43	Adapter for mounting TCPS radio module on GST20/GST120 tripod.
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22.4 Cables for TCPS Radio Modems

For an overview of the different connector types, refer to chapter 6.1.

734 697	GEV186	Serial data Y-cable for TS Robotic setup, Lemo1 5-pin (battery) to Lemo0 5-pin (instrument) and Lemo1 8-pin (external TCPS radio).
707 525	GK1	Lemo Converter 30° for PC (9-pin RS232 serial). Use GK1 in combination with GEV186 to connect TCPS with PC for configuration or communication.
771 057	GEV236	Y-cable Lemo1 8-pin (CS20 Field Controller) to Lemo1 5-pin (battery) and Lemo1 8-pin (external TCPS radio), 1.8 m.

SmartPole & SmartStation

23 SmartStation & Smartpole Setup using a GS16 GNSS Receiver

23.1 GS16 GNSS Receiver



851 142	GS16	Leica GS16 Basic SmartAntenna *
843 496	GS16	Leica GS16 3.75G Basic SmartAntenna *
838 033	GS16	Leica GS16 3.75G Performance SmartAntenna
838 037	GS16	Leica GS16 3.75G Unlimited SmartAntenna
843 497	GS16	Leica GS16 3.75G & UHF Basic SmartAntenna *
838 034	GS16	Leica GS16 3.75G & UHF Performance SmartAntenna
838 035	GS16	Leica GS16 3.75G & UHF Performance SmartAntenna (NAFTA)
838 036	GS16	Leica GS16 3.75G & UHF Performance SmartAntenna (JP)
869 397	GS16	Leica GS16 3.75G & UHF900 Performance *
838 039	GS16	Leica GS16 3.75G & UHF Unlimited SmartAntenna

* Available in selected countries only.


	Leica GS16 Basic *	Leica GS16 Performance	Leica GS16 Unlimited
Supported GNSS Systems			
Multi-frequency (L2, L5, L-band)	○	●	●
GLONASS	○	○	●
Galileo	○	○	●
BeiDou	○	○	●
QZSS	○	○	●
RTK performance			
DGPS	○	●	●
RTK unlimited	○	●	●
Network RTK	○	●	●
SmartLink fill	○	○	●
SmartLink	○	○	○
Position update & data recording			
5 Hz positioning	●	●	●
20 Hz positioning	○	●	●
Raw data logging	●	●	●
RINEX logging	○	○	●
NMEA out	○	○	●
Additional features			
RTK Reference Station functionality	○	●	●


● Standard

○ Optional

23.2 SmartAntenna Adapter



767 802	GAD110	SmartAntenna adapter to mount GS15 and GS16 SmartAntenna.  BT module to connect the TS to the GS15 and GS16 GNSS receiver is standard on all Leica Viva TPS and Leica Nova instruments.
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 Please refer to the Leica Viva GNSS Equipment list for GS16 related options and accessories.

24 SmartPole using GS18 T GNSS Receiver

24.1 GS18 T GNSS Receiver



855 299	GS18	Leica GS18 T LTE Basic SmartAntenna *
855 300	GS18	Leica GS18 T LTE Performance SmartAntenna
855 301	GS18	Leica GS18 T LTE Unlimited SmartAntenna
855 302	GS18	Leica GS18 T LTE & UHF Basic SmartAntenna *
855 303	GS18	Leica GS18 T LTE & UHF Performance SmartAntenna
855 304	GS18	Leica GS18 T LTE & UHF Performance SmartAntenna (NAFTA)
865 980	GS18	Leica GS18 T LTE & UHF Performance SmartAntenna (JP)
855 305	GS18	Leica GS18 T LTE & UHF Unlimited SmartAntenna

* Available in selected countries only.

	Leica GS18 Basic *	Leica GS18 Performance	Leica GS18 Unlimited
Supported GNSS Systems			
Multi-frequency (L2, L5, L-band)	○	●	●
GLONASS	○	○	●
Galileo	○	○	●
BeiDou	○	○	●
QZSS	○	○	●
RTK performance			
DGPS	○	●	●
RTK unlimited	○	●	●
Network RTK	○	●	●
SmartLink fill	○	○	●
SmartLink	○	○	○
Position update & data recording			
20 Hz positioning	●	●	●
Raw data logging	●	●	●
RINEX logging	○	○	●
NMEA out	○	○	●
Additional features			
Tilt compensation	●	●	●
RTK Reference Station functionality	○	●	●

● Standard
○ Optional

Care Packages

25 Customer Care Packages



A wide selection of comprehensive Customer Care Packages (CCPs) is available bundling Hardware Maintenance, Software Maintenance, Customer Support and Extended Warranty.

For more information about the CCP offering in your country please contact your local Leica Geosystems organization or distribution partner.

Trademarks & Technical Data

26 Trademarks

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27 Technical Data

Guide light (EGL):

LED class 1 in accordance with IEC 60825-1 resp. EN 60825-1

Distance meter (Prism), ATRplus and PowerSearch:

Laser class 1 in accordance with IEC 60825-1 resp. EN 60825-1

Laser plummet:

Laser class 2 in accordance with IEC 60825-1 resp. EN 60825-1

Distance meter (Non-Prism):

Laser class 3R in accordance with IEC 60825-1 resp. EN 60825-1



Suggested Equipment Setups

28 Conventional Surveying

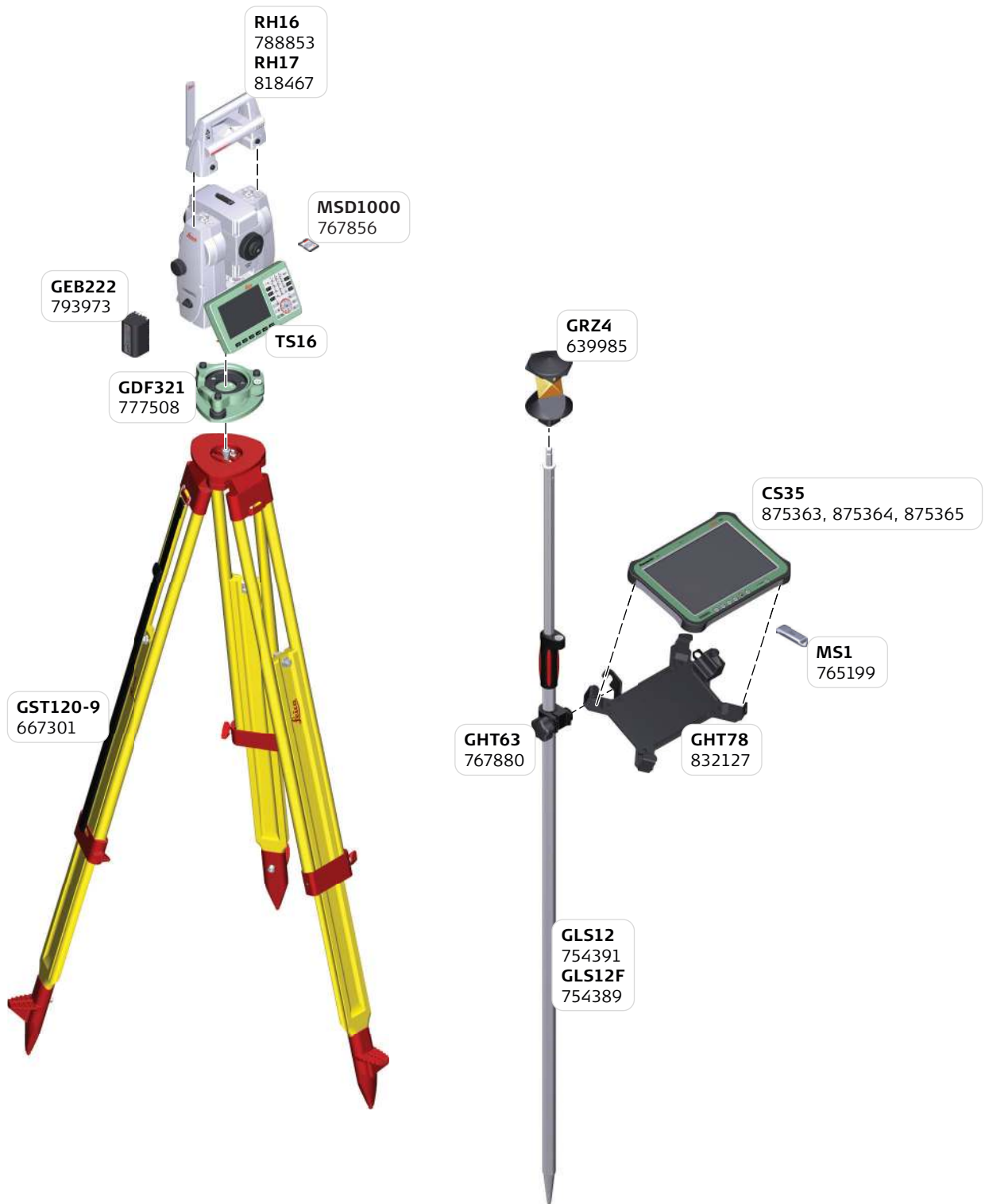
28.1 Two Person Surveying using a TS16 Total Station



28.2 Robotic Surveying using a TS16 Total Station and CS20 Field Controller




28.3 Robotic Surveying using a TS16 Total Station and CS35 Tablet



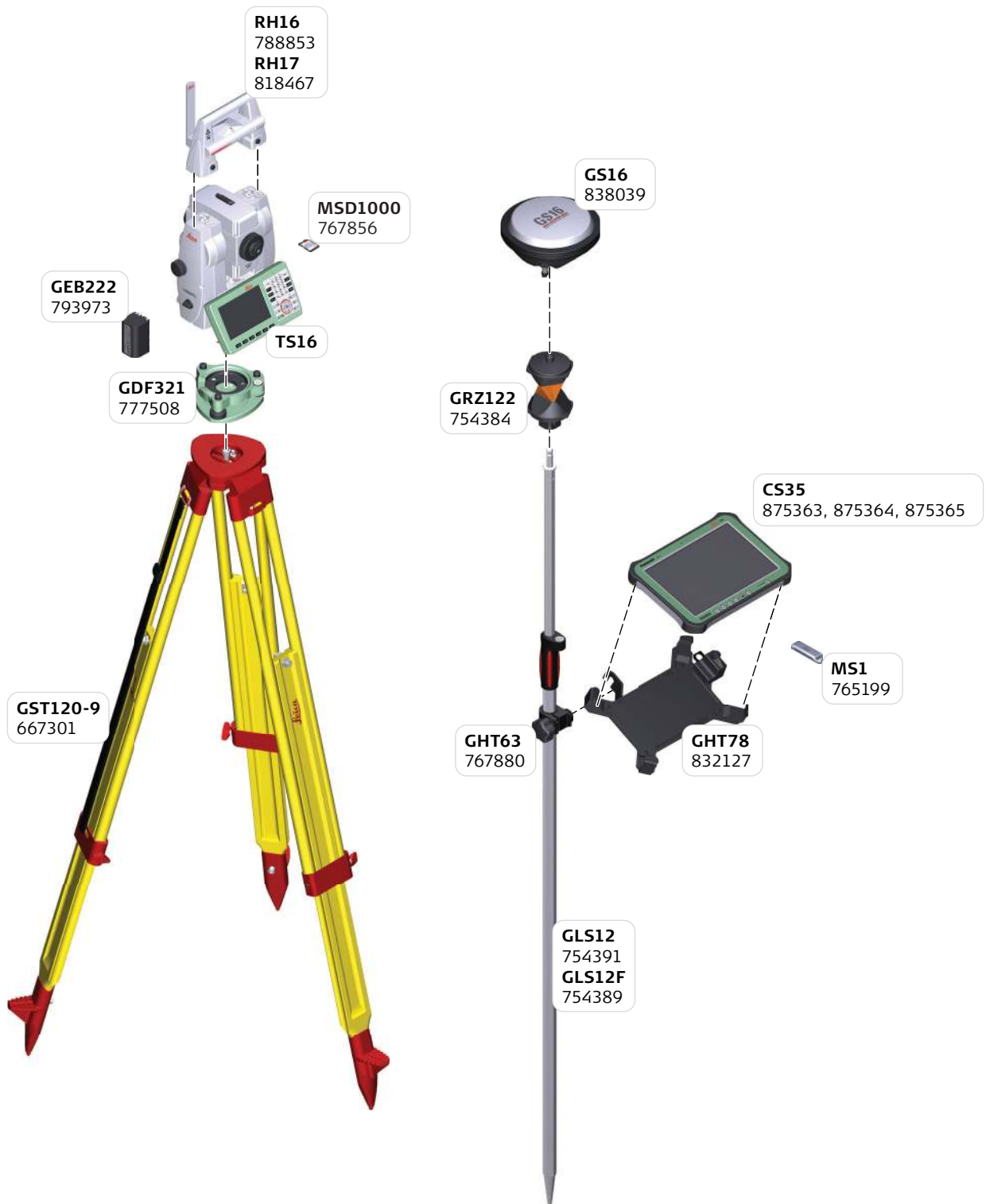
29 SmartPole Surveying


29.1 SmartPole using the GS16 GNSS Receiver and CS20 Field Controller



 For GNSS antenna configuration (RTK Antennas and Modems / Radios) and GNSS accessories refer to Leica Captivate GNSS Equipmentlist.

29.2 SmartPole using the GS16 GNSS Receiver and CS35 Tablet



 For GNSS antenna configuration (RTK Antennas and Modems / Radios) and GNSS accessories refer to Leica Captivate GNSS Equipmentlist.


29.3 SmartPole using the GS18 T GNSS Receiver and CS20 Field Controller



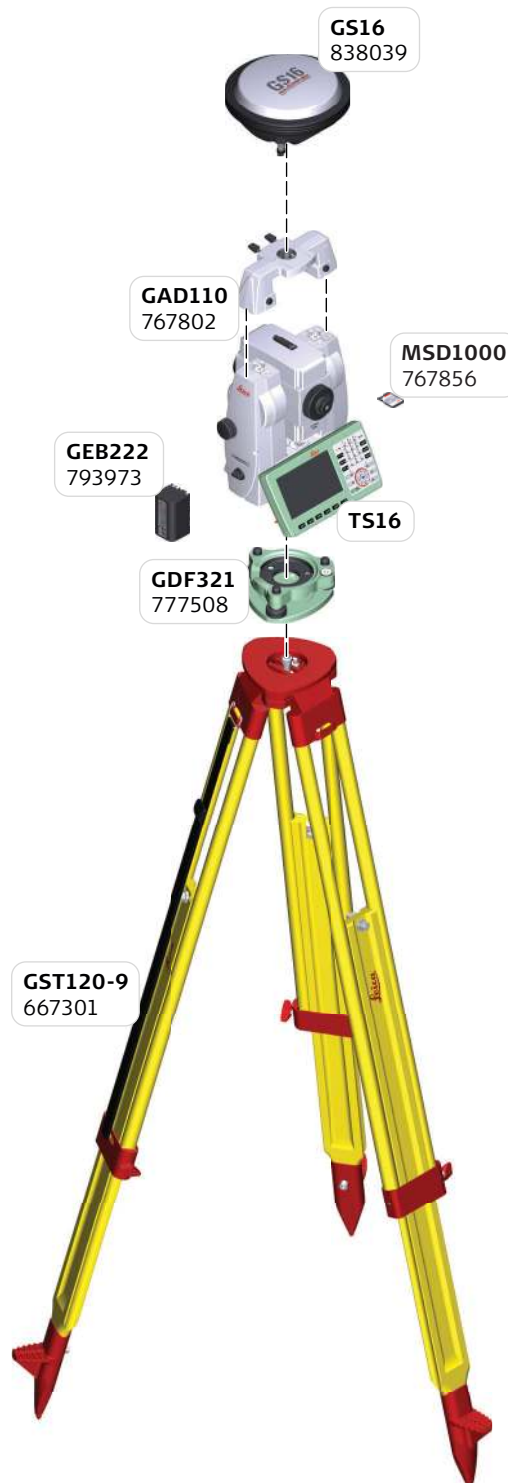
☞ For GNSS antenna configuration (RTK Antennas and Modems / Radios) and GNSS accessories refer to Leica Captivate GNSS Equipmentlist.


29.4 SmartPole using the GS18 T GNSS Receiver and CS35 Tablet



 For GNSS antenna configuration (RTK Antennas and Modems / Radios) and GNSS accessories refer to Leica Captivate GNSS Equipmentlist.

30 SmartStation using the GS16 GNSS Receiver



 For GNSS antenna configuration (RTK Antennas and Modems / Radios) and GNSS accessories refer to Leica Captivate GNSS Equipmentlist.

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- when it has to be right

