

# Amberg Tamping VMS 3000

## The long-chord track survey system for demanding track works



### Innovation of a proven principle for track works

- Long chord method
- Combined survey of track and lateral distance offsets in one run
- Absolute accuracy 3 mm
- Greatest operational flexibility – thanks to twin-trolley mode and tripod mode option
- Integrated fixed-point measuring device
- Cost savings of 70 % and more compared to manual / optical chord methods
- Safe digital data handling – from initial data input to final transfer of correction data
- Easy handling and flexible transportation

### High performance for long track sections – twin-trolley mode

- 1st Choice for measurements during track closures
- Measuring performance of up to 2300 m/h
- Length of reference chord of up to 250 m
- Measuring system GRP 3000 consisting of precision sensors for gauge, superelevation and distance, Profiler 120 FX with prism and ruggedized notebook
- Measuring system GRP TSC with automatic tripod for quick and easy self-levelling of tachymeter
- LED lightening bar assuring safe work during night
- User friendly handling specially designed for track workers



### Greatest flexibility under demanding project conditions – tripod mode

- Ideal for short track sections, e.g. turnouts, multi-track sections and projects with limited track access
- Length of reference chord of up to 400 m
- Measuring system GRP 3000
- Tachymeter on tripod (with automatic self-levelling tribrach)
- Flexible measuring mode – as twin-trolley mode – complemented by Flex-Stop functionality
- Immediate measurement stop for rapid track clearance on demand – without impact on performance
- Modular system design allows upgrading at any time e.g. 2nd trolley and other survey applications

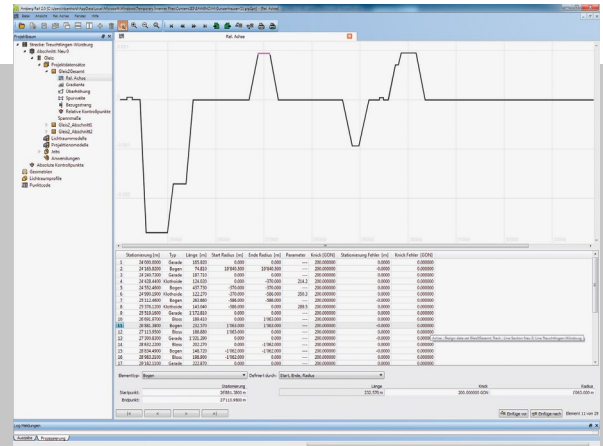


# Easy to use, fully controlled, highly efficient – From preparation through to evaluation

## Project data management

### Simple and quick project data management

- Project setup and track data definition in only a few steps
- Smart input of track data coming from track layout plan or other analogue document
- Direct import of digital alignment data
- Data base model assures immediate access to data input, management and reporting
- Various interfaces for design data transfer
- Integrated track point calculator

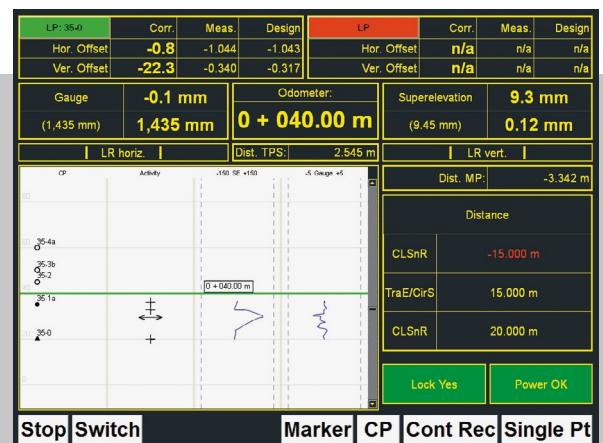


Project data input – intuitive, safe, efficient

## Measurement

### Tamping surveying with highest efficiency

- Easy measuring process – supported by big control screen for complete overview and control at any time
- Track and lateral distance offset survey in one run
- Real-time display of relevant track data
- Kinematic measuring mode
- Single point shots incl. code and note function for relevant track objects (e.g. synchro point, frog)
- Control point measurement including tie-distance control
- Different operation mode for optimal utilisation – during complete track possession or short access windows

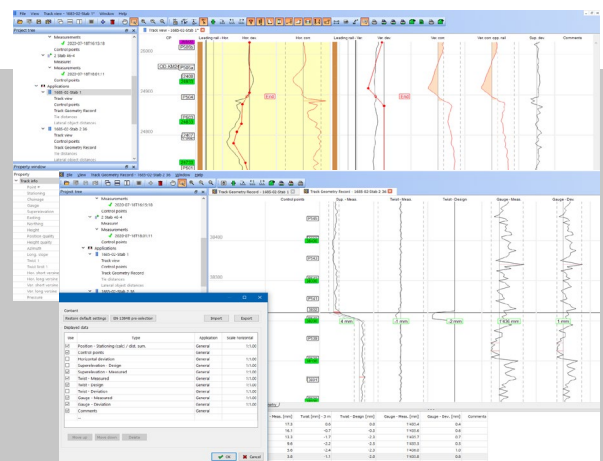


Screen display – clear, meaningful, ergonomic

## Evaluation

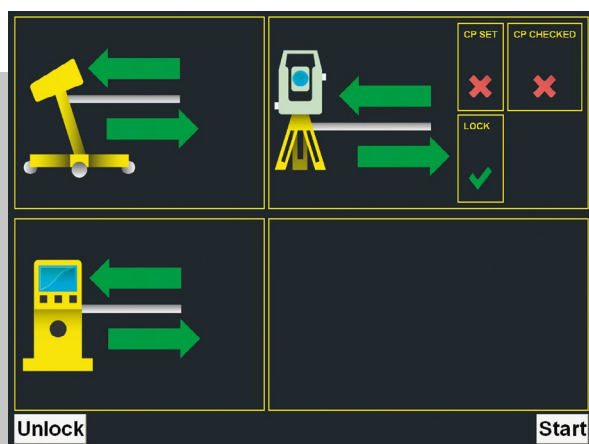
### Automatic evaluation and correction data calculation

- Automatic linking and analysis of measuring sequences
- Clear display of results of actual / nominal track comparison including tolerance levels, cross level, point and code info
- Comprehensive evaluation tool for determination of correction values, lift and slue (shift), including ramping, check of possible ramp slope, maximum lift and slue correction
- Actual / nominal fixed-point check
- Comprehensive documentation and export of results including tamping data files
- Lift & slue report for machine driver



Graphical data analysis – all details at a glance

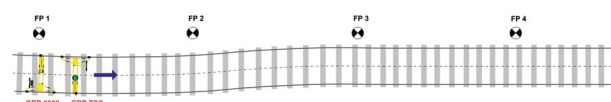
Lage in Bezug auf die Gleise (latente Störung, latente Längs)	Posit	Zeit e Abstand d, Gleise	Veränderung	Veränderung	Länge	Erklärung	Gradiente	Höhe	Wasserstand	Station	Stärke
Nr.	Det.	Zeit	Veränderung	Veränderung	5	Überhöhung		mm	0	St. 4800	Stärke
1	2	3	4	5	6	7	8	9	10	11	12
0.1-38.47	1018	WE	re 9.345	SAK	5.18	-2.500	-2.45%	221.579	221.485	+ 94	23.144.52
0.1-43.65	1019	BW	re 9.524	SAK	1.34	-2.500	-2.45%	221.541	221.429	+ 112	23.149.48
0.1-44.99	1440	101	re 1.61	Kr	0.05	-2.500	-2.45%	221.551	221.382	+ 169	
0.1-45.04	1023	re	9.573	SAK	10.06	-2.500	-2.45%	221.531	221.4	- 178	
0.1-55.10		NW			3.79	-2.500	-2.45%	221.476	221.255	+ 171	23.160.43
0.1-58.10	1020	re	10.028	SAK	15.44	-2.500	-2.45%	221.302	221.089	+ 213	
0.1-74.35	1021	re	10.486	SAK	10.28	-2.500	-2.45%	221.296	221.051	+ 245	
0.1-87.63	1022	re	10.839	SAK	14.43	-2.500	-2.45%	221.065	220.812	+ 253	23.170.05
0.2-6	1024	BW	re 12.725	SAK	20.07	-2.500	-2.45%	220.995	220.721	+ 264	
0.2-24.73	1025	re	11.675	SAK	17.18	-2.500	-2.45%	220.965	220.721	+ 253	
0.2-41.32	1026	AA	re 1.071	SAK	0.01	-2.500	-2.45%	220.965	220.721	+ 253	
0.2-52.36	1027	NW	re 1.598	Kr	11.05	-2.500	-2.45%	220.689	220.621	+ 332	23.152.67
0.2-63.41	1028	AE	re 1.593	Kr	11.05	-2.500	-2.45%	220.627	220.567	+ 340	
0.2-74.79	1029	BW	re 1.601	Kr	5.51	-2.500	-2.45%	220.571	220.501	+ 332	23.173.70
0.2-80.30	1030	AA	re 1.610	Kr	11.32	-2.500	-2.45%	220.545	220.481	+ 336	
0.2-91.62	1031	NW	re 1.617	Kr	11.32	-2.500	-2.45%	220.502	220.445	+ 343	23.189.59
0.3-2.84	1032	AE	re 1.624	Kr	11.32	-2.500	-2.45%	220.475	220.418	+ 346	
0.3-18.85	1033	re	1.626	Kr	15.90	-2.500	-2.45%	220.505	220.421	+ 364	
0.3-36.33	1034	UE	re 1.601	Kr	17.49	-2.500	-2.45%	220.446	220.307	+ 341	23.132.88
0.3-52.78	1035	WE	re 1.597	Kr	16.45	-2.500	-2.45%	220.457	220.398	+ 341	
0.3-67.73	1036	re	1.611	Kr	16.40	-2.500	-2.45%	220.449	220.404	+ 355	
0.3-76.33	1037	UA	re 1.600	Kr	10.06	-2.500	-2.45%	220.439	220.398	+ 355	23.182.84
0.3-76.33	1038	NW	re 1.609	Kr	26.83	-2.500	-2.45%	220.433	220.390	+ 367	23.192.88
0.4-73.22	1039	re	1.621	Kr		-2.500	-2.45%	220.433	220.384	+ 381	

[illegible]

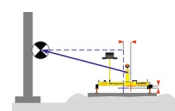
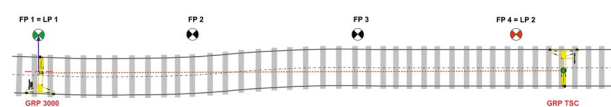
Numerous output options – from printout through to digital data

## Innovation of a proven principle for track works: The VMS long chord method

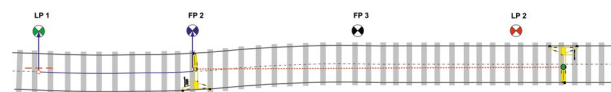
### Twin-Trolley Mode



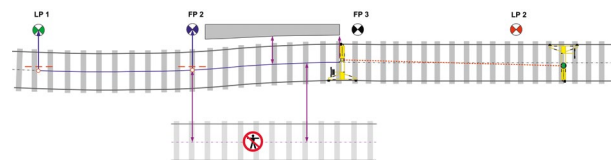
GRPTSC trolley moves to the end of the first section. Preparing the laser tachymeter within seconds by pushing one button.



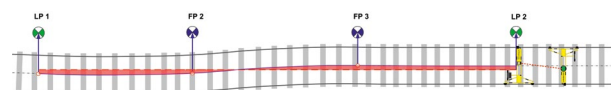
Start of chord measurement: Initial lift and slue calculation at fixed point LP I with GRP 3000



Kinematic track recording at walking speed. Survey of synchro points, other POI and additional fixed-point measurements possible at any time.

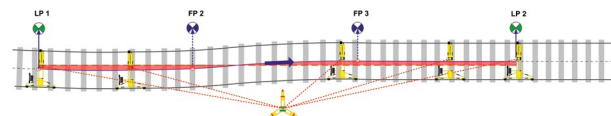


Optional: Non-contact measurement of parallel track distance, platform offset or position of contact wire.



Complete actual/nominal comparison at the end of the measuring section.

## Tripod Mode



Identical sequence of operation for tripod mode – combined with higher flexibility for track access and high productivity at turnouts and multi-track sections.

# Amberg Tamping VMS 3000

## System performance and technical data

Systemkonfiguration	
System configuration	1000, 1067, 1435, 1520/24, 1600, 1668/76
Amberg GRP 3000	
Gauge measuring range	-25 to +65 mm
▪ for nominal gauges	
Cross level (cant)	+/- 260 mm
▪ at 1435 mm	
Fixed-point measuring device	Profiler 120 FX
Fixed-point distance	< 20 m
Weight	30 kg
▪ incl. computer, batteries	
Amberg GRP TSC	
Self-levelling tribrach	< 5 s
▪ time	
Weight	33 kg
▪ incl. total station, batteries	
Total station	
Leica total station	TS15/16, TS30, TS50/60, MS50/60
▪ motorized, ATR	
▪ radio modem	
System accuracy	
Survey of track position and height <sup>1)</sup>	
▪ Stop & Go mode	+/- 1 mm
▪ Kinematic mode	+/- 3 mm
Crosslevel	
▪ Stop & Go mode	+/- 0.5 mm
▪ Kinematic mode	+/- 1 mm
Fixed-point measurement	+/- 3 mm
▪ relative to track axis	
▪ at 5 m distance	
Measuring frequency	
Track geometry	
▪ 3D track position, gauge, crosslevel	
▪ Stop & Go	< 5 s / measurement
▪ Kinematic	< 7 measurements / s

Environmental specifications	
Working temperatur range	-10° to +50°
Humidity	< 80 %
▪ non-condensing	
Typical performance	
Twin-trolley mode	1000–2300 m/h
Tripod mode	700–1100 m/h
Tamping data (lift & slue)	
Tamping data preparation	< 15 min/500 m
▪ Correction data calculation incl. ramping	
Tamping data formats	Plasser WinALC, ALC CGV5 Framafer BAO3 Matisa
System approvals	
CE Conformity	EN 61326-1:2013 EN 61000-6-2:2005 EN 61000-6-4:2007/A1:2011 EN 60825-1:2014 EN 13977:2011 Directives 2014/30/EU Directives 2014/35/EU Directives 2011/65/EU
GRP System FX approvals from	Network Rail / London Underground (UK), Deutsche Bahn (DE), SBB (CH), SNCF (FR), ÖBB (AT), RFI (IT), Adif (ES), ProRail (NL), Infrabel (BE)
Extract of references	
Amberg's railway surveying solutions have proven their high performance all over the world. Demanding projects have been successfully realised in e.g. Germany, Austria, Belgium, the Netherlands, Denmark, France, Italy, Spain, Greece, Turkey, Australia, United Kingdom, Saudi Arabia, UAE, Korea, USA, PR China.	

<sup>1)</sup> Depending on e.g. chord length, atmospheric conditions, control point quality, positioning sensor and project conditions.