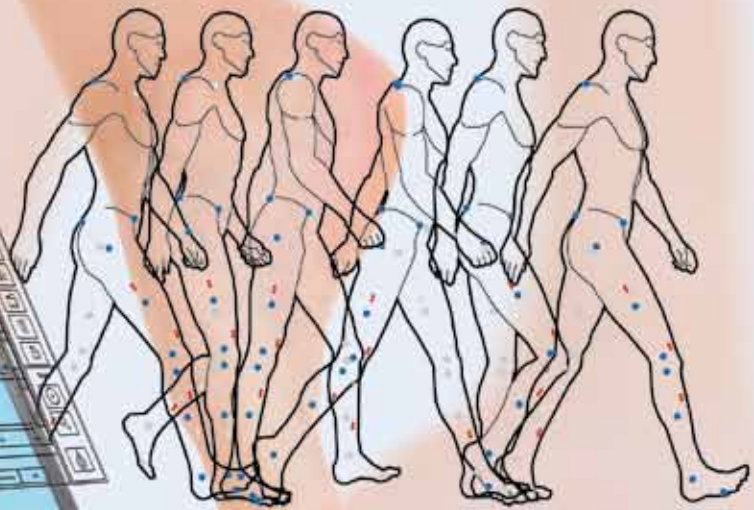
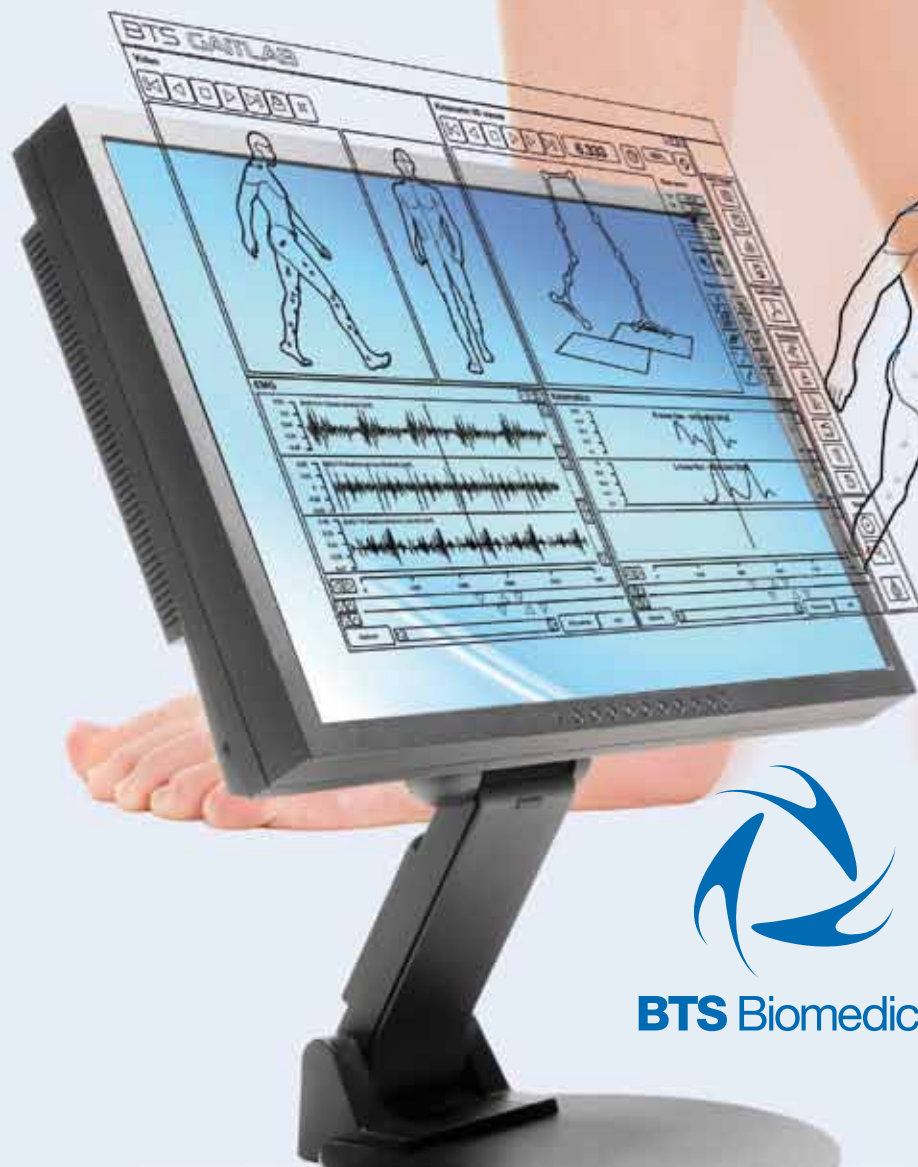


# BTS GAITLAB

Integrated solution  
for multifactorial clinical  
gait analysis



**BTS** Biomedical

# BTS GAITLAB

## Integrated solution for multifactorial clinical gait analysis

Clinical gait analysis is a recognised, reimbursed daily practice based on standard protocols that have been validated by the international scientific community. It is used to assess various different pathologies.

BTS GAITLAB is the new integrated laboratory developed by BTS with a view to making a solution available to the clinical world that can make gait analysis an accurate, quick, complete and easily-interpreted examination. BTS GAITLAB is a valuable tool that provides the doctor with quantitative data allowing for the examination and analysis of postural and walking-related problems, load abnormalities and muscle deficits that cannot be measured by a mere objective examination and video recording.

### A new threshold in gait analysis

The new, powerful characteristics of this laboratory simplify gait analysis to the point where it becomes a simple, routine examination. Today, in less than half an hour, a complete patient examination can be carried out, including:

- Gait time and distance parameters
- Variations in joint angles
- Reaction forces in contact with the ground
- Joint and power moment
- GDI (Gait Deviation Index)
- Calculation of muscle elongation
- EMG signals
- Video recording

All signals are synchronised, thereby allowing the clinician to simultaneously assess, moment by moment, how the patient moves his joints, uses his muscles and distributes his forces over the resting surfaces during the gait cycle.

### A fundamental aid to the clinician

BTS GAITLAB helps with the recognition, analysis and best treatment of patient motor disorders:

- before treatment, the complete gait analysis helps the specialist decide what type of therapy to employ: orthopaedic surgery, botulinum toxin, orthosis, prosthesis, intrathecal therapy, etc.
- after treatment, a comparative analysis of the data obtained before and after therapy allows for an objective and quantitative assessment with results that can be measured.



1

### Infrared video cameras

8 optoelectronic infrared video cameras follow the passive marker trajectories positioned in specific points of the body according to protocols that have been validated by the international scientific community. Starting from the three-dimensional coordinates of the markers acquired, the system calculates the internal centres of rotation within each joint (shoulder, pelvis, hip, knee and ankle), outputting the changes in angle projected onto the three main planes of the body (frontal, sagittal and transversal).

2

### Walking surface

Modular platform for integration in terms of force platforms.

3

### Force platforms

2 Multi-axial force platforms to record the 3 components of ground reaction force, Centre of Pressure (COP) coordinates and the torsion moment. Integrated with kinematics, the system also calculates moment and powers within the joints.

4

### Video recording

2 CTVs for video recording and real time display of the patient's movement taken from different viewpoints.

5

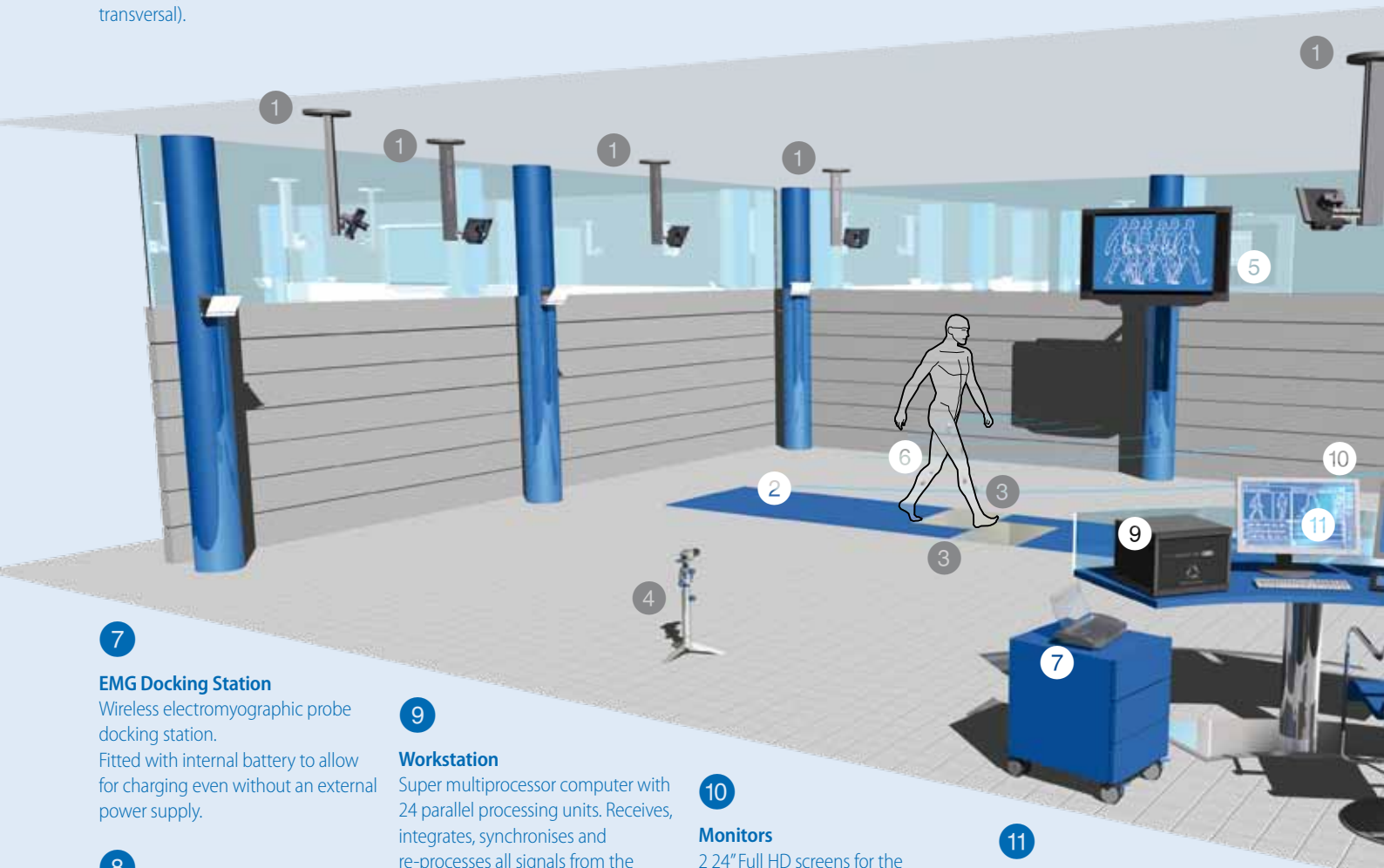
### Control screen

60" plasma monitor. Allows all staff in the laboratory to monitor all stages of acquisition.

6

### Wireless electromyographic probes

8 BTS FREEMG wireless electromyographic probes. Light, miniaturising and wireless, they do not affect the patient's natural movements and can be fixed on by simply applying pressure to the pre-gelled adhesive electrodes. The synchronisation of the electromyographic signal with the kinematics and kinetics allows for an assessment not only of muscle activation but also the exact moment at which this occurs during the gait cycle.



7

### EMG Docking Station

Wireless electromyographic probe docking station. Fitted with internal battery to allow for charging even without an external power supply.

8

### EMG palmtop unit

Wireless palmtop computer with touchscreen display. Receives the signal from the electromyographic probes and transmits it to the workstation. Allows for the configuration of settings and display of signals near the patient or within 50 metres of the patient.

9

### Workstation

Super multiprocessor computer with 24 parallel processing units. Receives, integrates, synchronises and re-processes all signals from the devices connected. An internal master clock ensures synchronism even during very long acquisitions, thereby obtaining a perfect correlation, moment by moment, of all signals.

10

### Monitors

2 24" Full HD screens for the simultaneous display of all kinematic, kinetic and electromyographic data, with picture in picture reproduction of the video shots from the various different angles.

11

### Application software

BTS SMART-Clinic, a solution devoted to gait analysis and the assessment of movements of the body districts. Based on protocols validated by the international scientific community, SMART-Clinic is an advanced tool that is easy to use and allows for the simultaneous, objective, full analysis of neuromuscular and biomechanical parameters of patient movement.

**Quick start**

BTS GAITLAB can be adapted to fit into any existing space (recommended minimum 8x5 metres) and any environmental light conditions. The BTS technicians will completely design and install the laboratory, dealing with all stages from testing to the start-up of clinical activity. This takes just a few days of training thanks to a training method that has been perfected over years of experience in close contact with doctors and physiotherapists.

**Total support**

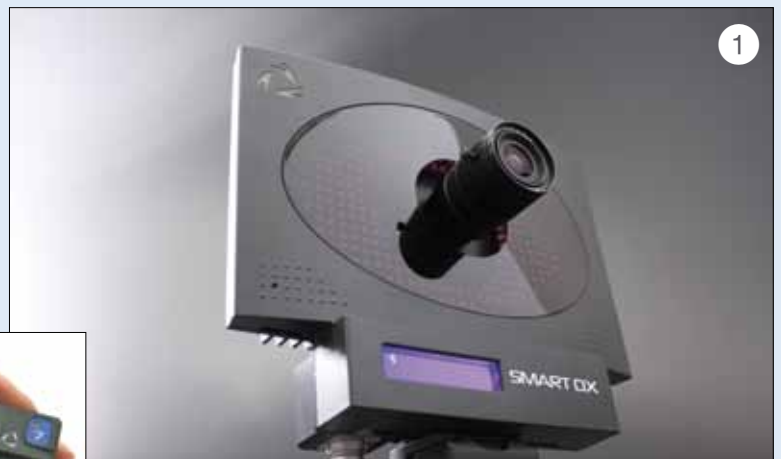
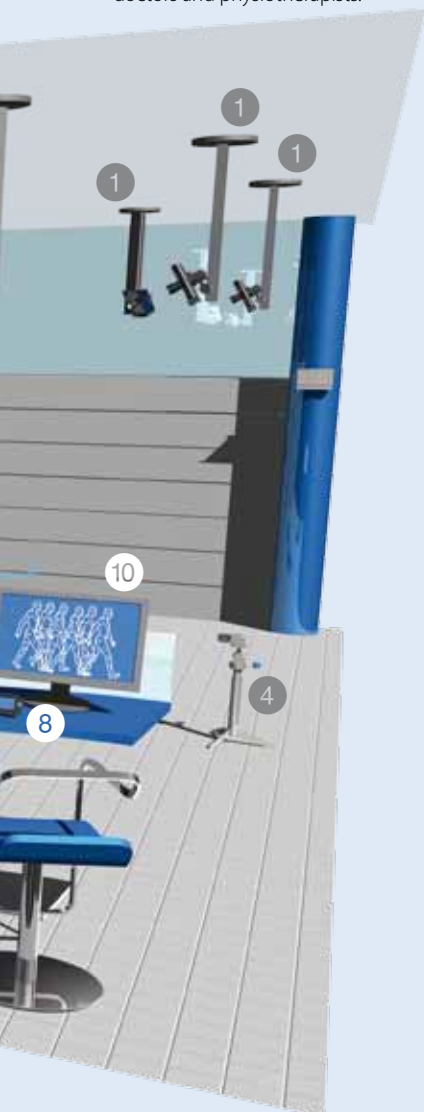
The running of the BTS GAITLAB laboratory does not require the constant presence of a bioengineer. BTS holds regular training courses on the management of the clinical gait analysis laboratory for staff. The BTS service centre is available to provide remote assistance with any query, problem or malfunction that may occur in day-to-day use.

**Highly productive**

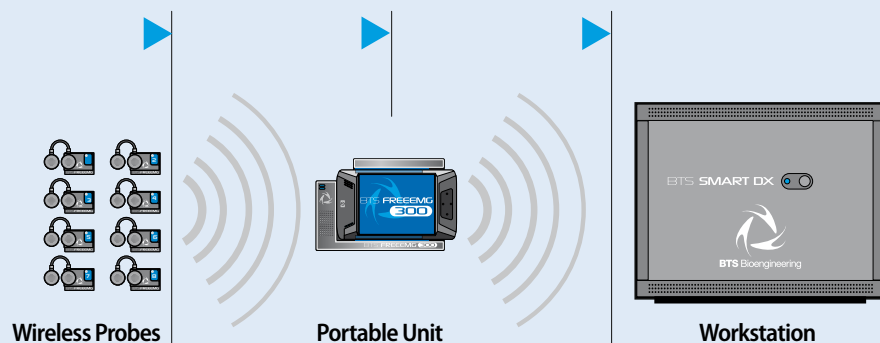
BTS GAITLAB has been designed to withstand intense laboratory use. Patient preparation is quick and easy and data analysis and processing takes place in real time. In less than half an hour, the doctor has all the information he needs to confirm or correct a diagnosis and therapy. The integrated database facilitates patient medical records and report management.

**Maximum precision**

BTS GAITLAB uses HD infrared digital video cameras specifically designed for this use and which are therefore extremely accurate (maximum error less than 0.1 mm). The surface electromyograph is the lightest available in the world and represents the state of the art in terms of non-invasiveness (completely wireless) and data accuracy (noise less than 0.7 microvolts), making it perfect for use with any patient and pathology type.



**Wireless electromyograph - signal transmission**





Founded in 1986 with the mission to develop innovative methods to improve comprehension of the physiological structures and their movement, BTS has developed hundreds of gait analysis laboratories for the most prestigious clinical centres, hospitals and universities worldwide.

Today, BTS GAITLAB represents the synthesis of years of research and experiments into the development and integration of the most advanced technologies for a multifactorial motion analysis.

With GAITLAB, BTS is today the only company worldwide that is able to offer a complete solution for the kinematic and natively-integrated electromyographic analysis, based on exclusive innovations and years of experience spent on the field, working alongside doctors, clinicians and specialists.

### Main functions:

#### Analysis

- Integrated kinematic, electromyographic and dynamic analyses
- Real-time display of all signals synchronised with video shots taken from 2 different viewpoints
- Simultaneous comparison of the action of all muscles acquired
- Comparison with scientifically-validated international protocols
- Comparison of the different sessions of a single patient or different patients on the same graph
- Construction of a statistical group according to customised parameters
- Breakdown of tests and aggregation into groups according to different criteria established by the user
- Automatic calculation of average values of the various parameters for each group
- Automatic comparison of movement with 'normal' class for an immediate visual result showing the difference between the patient and the average

#### Protocols

- Davis, Helen Hayes, Lamb, Cast, Foot Model

#### Multimedia records

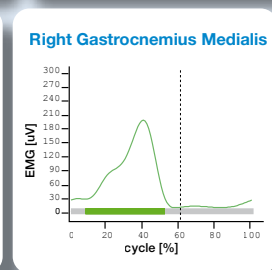
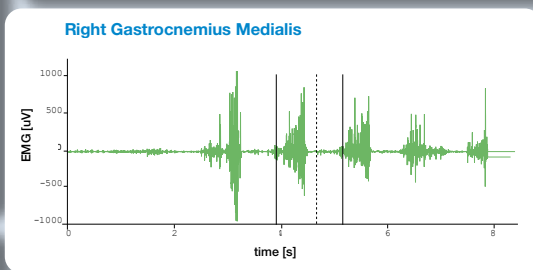
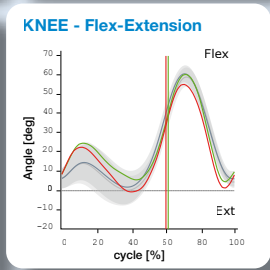
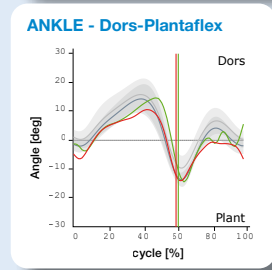
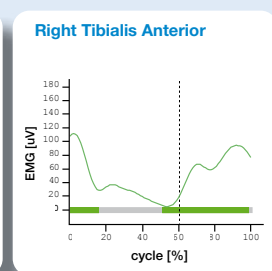
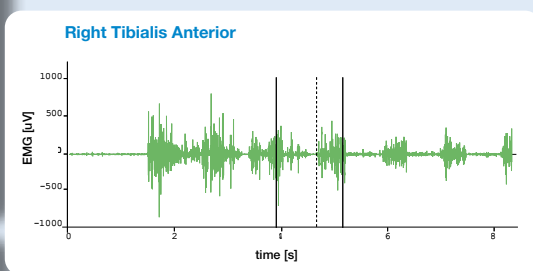
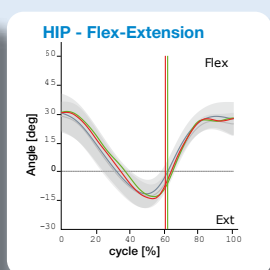
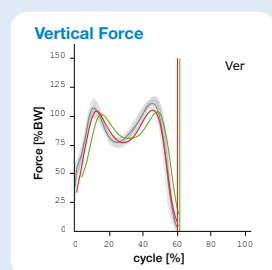
- Integrated storage of data, texts, video and graphics
- Customisable reports
- Creation of re-usable customised models
- GDI (Gait Deviation Index)
- Muscular elongation

#### Video recording

- Export of video frames in relation to the gait cycle events
- Reproduction, processing and zoom of film clips acquired
- Automatic export of video frames relative to pre-defined events during tests
- Entry of notes and comments on the individual frame

#### Data management

- Database with informative tree structure organised according to patients, sessions and tests, which can be queried with various different search criteria
- Quick and easy data organisation, update and export
- Integration with the Hospital computer system or Electronic medical records



**GDI = 75**  
Normal GDI ≥ 100

# BTS GAITLAB

Integrated solution for multifactorial clinical gait analysis

## Components

	Standard	Optional
<b>Workstation</b>		
BTS SMART DX Core for capture, synchronization and data processing	●	
2 LCD Full HD 24"	●	
<b>Kinematics</b>		
BTS SMART DX 8 TVC: High Frequency Digital Optoelectronic System	●	
BTS SMART-Clinic, software solution for the Gait Analysis	●	
BTS SMART-Analyzer, software solution for creating user-defined analysis protocols		●
<b>Electromyography</b>		
BTS surface EMG device namely BTS FREEMG 300 with 8 wireless probes, 16bit/4kHz	●	
BTS Myolab, software solution for muscle activities analysis	●	
BTS EMGenius, software solution for cyclic motion functional evaluation		●
BTS EMG Analyzer, software solution for creating user-defined analysis protocols		●
<b>Force Analysis</b>		
2 force platforms based on piezoelectric or strain gage sensors	●	
BTS Sway, software solution for postural and balance analysis		●
<b>Video Acquisition System</b>		
2 BTS VIXTA video cameras	●	
BTS Digivec Augmented reality software and real time video superimposed force vectors		●
<b>Accessories</b>		
Support mounts for clamping and positioning of cameras	●	
Marker Starting Kit	●	
Line Laser	●	
Pelvimeter	●	
Modular and multi configurable walkway for platforms positioning		●
60 Inch Plasma Display		●
Desk		●
<b>Optional Devices</b>		
Accelerometer		●
Electrogoniometer		●
Treadmill		●
<b>Advice, Support and Training</b>		
Laboratory Design	●	
Installation, initial training and start-up activities	●	
Help Desk Service for 12 months	●	
All inclusive service and support		●



\* Technical specifications are subject to change without prior notice.



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