www.ErikBrinkman.com/Panther

PANTHER MOTORCYCLES

Design / Engineering / Specs / FAQs

SPECIFICATIONS

all the details ....

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Erik Brinkman

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Legend

- The color of the bullets
  indicated the model
  to which the statement pertains ....

  - Common to all.... **BLACK**
  - **Panther** only.... **ORANGE**
  - **Cub** only.... **GREEN**
  - **Twin** only.... **BROWN**
  - Military only.... **GREY**

Question List

General

Avoiding the old "Build it they will come" syndrome

- The "Old School" industry and its supporters see motorcycles as a constant based on the past.
  They see it a brand as an object with style as the key.

- There is a "New Economy" emerging.
  The younger and the more educated customer sees the motorcycle brand not as an object, but as an experience.
  The modern interest is in the RIDE and in LONGEVITY and SERVICEABILITY.

- The new economy cares little about the past.
  Style is no longer primary as we can see from the collapse of the Cruiser and Chopper markets.

Industry .... www.ErikBrinkman.com/Panther/Documents_T1/CH-2_Industry.pdf

- The "Adventure Bike" segment is the fastest growing in the motorcycle industry.
  We set out to make the most capable and highest quality Adventure Bike possible.

- Years of wishes, comments and questions from the public created this bike.

- The design is completely controlled by each customer to their exact wants and needs.
  This adds to the "Independent Spirit" that is at the core of the Panther.

Platform

- Modular
- Always Upgradable
- Harley Mountings for most accessories.
- Harley (SAE) Tooling (never Metric)

Identifications

- V.I.N. (stamped on the frame and engine)
- Insignia (tank, frame and engine)
- Plaque (gold plated personalized)
- Several hidden I.D. chips (in case it is stolen)

Warranty

- 100% covered by an insurance company (so never a worry)
- 100% Transferrable (because it is about the bike, not the owner)

- Panther .... 6 year 60,000 mile (100,000 kilometer)
- Cub .... 3 year, 30,000 mile (50,000 kilometer)

note:
Extended warranties are available.

Models

Electric

- This is the longest range electric vehicle in the world. due to ....
    1. NASA designed battery.
    2. Advanced charging algorithms used.
    3. New Electric Motor Design.

    see also: the Electric Addendum near the end of this brochure.

- This is the company flagship ....

Compare Other Electrics ...www.ErikBrinkman.com/Panther/Panther_Electric/Compare.html

- All the parts the the same as any other Panther
  except for the Brushless Neodymium motor and the Nano-Polymer Lithium-Ion Batteries.
  (it, of course also has no fuel tank, oil tank, intake or exhaust)
    - It charges with 110v or 220v in any outlet.
    - The charger is on-board.
    - The retractable cord plug lights up.

Range

	(est @ $0.12 per kwh)	
Panther 480-E	480 miles .... 8 hrs @ 60 mph on one $3.36 USD charge-up	(28 kwh)
Panther 360-E	360 miles .... 6 hrs @ 60 mph on one $2.52 USD charge-up	(21 kwh)
Panther 240-E	240 miles .... 4 hrs @ 60 mph on one $1.68 USD charge-up	(14 kwh)
Cub 240-E	240 miles .... 4 hrs @ 60 mph on one $1.68 USD charge-up	(14 kwh)
Cub 120-E	120 miles .... 2 hrs @ 60 mph on one $1.08 USD charge-up	(09 kwh)

- A consistent benchmark was needed by which to judge the range of these bikes,
  so it is flat surface, 70 degree F, 425 lb bike with a 175 lb rider.
  The bike is half the width or an ordinary motorcycle for a very small wind profile.

- Hills, changes in temperature, acceleration, etc will effect these ranges.
  Under extreme conditions the ranges may even be half of what is stated.
  Please keep that in mind.

IN CASE OF EMERGENCY

The Electric Panther can be used as a back-up power supply.
The average home uses about 14 kwh of electricity per day.

Compare

SPECS	Brammo (541) 482-9555	Zero (831) 438-3500	E-Panther (650) 488-8365
Motor			
Motor Type	Brushless Permanent Magnet Neodymium	Brushed Permanent Magnet Neodymium	Brushless Permanent Magnet New High Temp (480° F) Neodymium (N52)
Peak Motor Power	13 kwh @ 4,500 rpm 17.4 hp	13.4 kwh @ 3,000 rpm 18 hp	35.0 hp (26.0 kwh) @ 4,500 rpm (Panther) 23.3 hp (17.3 kwh) @ 4,500 rpm (Cub)
Peak Continuous Current	80 amps	70 amps	100 amps (Panther) 66 amps (Cub)
Max Motor Torque	29.5 lb-ft @ 1,450 rpm		50 lb-ft @ 2,200 rpm (Panther) 35 lb-ft @ 2,200 rpm (Cub)
Battery			
Battery Type	Lithium-Ion Phosphate	Lithium-Ion Manganese	Lithium-Ion nano-Polymer Prismatic
Battery Pack Capacity	3.1 kwh = 42 miles	4 kwh = 50 miles	9 kwh = 120 miles (Cub) 14 kwh = 240 miles (Cub or Panther) 21 kwh = 360 miles (Panther) 28 kwh = 480 miles (Panther)
Battery Pack Voltage	76.8 volts	58 volts	262 volts
Recharge Time	4 hours	4 hours	2 to 8 hours @ 110 volt 1 to 4 hours @ 220 volt
Battery Life	2,000 charges	1,000 charges	10,000 charges
Warranty			
Bike	1 year unlimited miles	2 year unlimited miles	6 year - 60,000 mile (Panther) 3 year - 30,000 mile (Cub)
Battery	2 year	1 year	3 year - 30,000 mile
Price			
Base	$ 8,000 USD	$ 9,995 USD	$ 37,080 USD (Panther) $ 17,280 USD (Cub)
Maximum	$ 8,000 USD	$ 9,995 USD	$ 82,000 USD (Panther) $ 26,600 USD (Cub)

Performance			
Top Speed	60 mph	67 mph	90 mph (governed)
Cruising Speed	45 mph	45 mph	60 mph
Average Range	42 miles	50 miles	9 kwh = 120 miles (Cub) 14 kwh = 240 miles (Cub or Panther) 21 kwh = 360 miles (Panther) 28 kwh = 480 miles (Panther)
Acceleration (0-60 mph)	14 seconds	10 seconds	6 seconds
Dimensions			
Weight	324 lbs	273 or 277 lbs	275 to 425 lbs (Panther) 230 to 275 lbs (Cub)
Cargo Capacity	276 lbs	297 or 302 lbs	425 lbs
Seat Height	32 inches	33 or 35 inches	27 to 32 inches
length	81.5 inches	77 inches	71 to 82 inches
Width	19.5 inches	16 inches	12.25 inches (+ 2 x 4 inch leg fall protection)
Components			
Frame	Aluminum	Aluminum	Stainless Steel
Suspension (front)	5 inches manual adjustments	8 or 9 inches	4 to 8 inches automatic adjustment
Suspension (rear)	5 inches manual adjustments	8 inches	4 to 8 inches automatic adjustment
Brakes (front / rear)	Brembo front ..... 2-piston rear ..... 2-piston front disk ....10.7 inch rear disk ..... 8.7 inch	Brand (made by Zero) front caliper .... 2-piston rear caliper ..... 1-piston front disk ..... 10 inch rear disk ..... 9 inch	Brembo front caliper .... 4-piston rear caliper .... 4-piston front disk .....11.25 inch rear disk .....11.25 inch
Wheels (front)	18 inch	17 inch	21 inch
Wheels (rear)	17 inch	16 inch	17 inch
Wheelbase	56.7 inches	57.8 inches	52 to 63 inches
Rake	24 degrees	22 or 24 degrees	22 to 44 degrees
Trail	3.5 inches	3.26 inches	4 to 6 inches
Steering Angle	30 degrees	35 degrees	27 to 51 degrees
Options			
	2	1	140 (Panther) (+ 28 body patterns) 25 (Cub) (+ 28 body patterns)

Single Cylinder

Panther

- This model uses the very finest levels of quality possible.

- It is a 100% rust-free design with absolutely no compromises.
    - Kevlar Body
    - Stainless Steel Frame
    - Tungsten Alloy Engine and Tranny parts

Cub

- This is like a Panther for the budget minded
  It can be upgraded to Panther levels, but starts out at common prices.
  It offers fewer custom choices and does not use Super-Alloys in its construction.

Twin Cylinder

- The twin is a road-only model that is available at either Cub or Panther. The twin does not use Super-Alloys in its engine construction but can come with Panther levels in all other options.

Introduction

- Climb to inseam-stretching seat heights
  straddling one of those fat top-heavy tanks
  to board a 600 pound 2 foot wide Buffalo
  is a good description of today's typical
  "Adventure Touring" motorcycle
  .... Not our idea of an adventure.

- The Key is to ....
    - Improvise
    - Adapt
    - Overcome

The Past

- We feel it is important to have proper respect for great ideas from the past
  while moving boldly forward toward a better performing, higher quality future.

- Having said that, it is important to note that the modern Panther is not in any way
  related to the many old Panther brands of the last century.
  It is designed to a far far higher standard of design and engineering.

Theme

- Mobility .... the freedom to go anywhere, anytime.
  A theme that defines freedom and has endured
  since the cowboy and his mustang on the open range.

Character

- Power, contemporary beauty and the honest soul of a thoroughbred.
  Combining a bold presence with an understated traditional elegance
  expressed thru the highest quality materials and detailed workmanship
  to create extreme reliability and pride of ownership like never before.

- The engine is based on a Harley Davidson motor
  because it is one of the easiest to work on

and there are lots of dealership shops all over the world
since traditionally 1/3 of ALL large motorcycles sold in the world are Harley-Davidson.

- The engine looks a lot like a single cylinder version of a Harley Twin.
  with the different valve covers rounded crankcase and round cylinder
  but still based on Harley tooling and a lot of basic Harley dimensions.

- The quality, smoothness and overall workmanship is several orders higher than any Harley.
  with out Tungsten-Cobalt super-alloys, ceramic coated parts and extreme precision.

Mission

- A new way of thinking about the ride experience
  has resulted in a masterpiece of engineering safety and design.
  It couldn't have become anything else,

- Every feature has been carefully tailored
  to create this, the "world's finest motorcycle" into a stable, timeless legacy.

The "Prime Directive"

- "To make the very finest quality motorcycle possible
  using the best materials and the best technology
  while still keeping the design as pure and simple as possible."

- For example, all metal parts are "Cryogenically Treated"
  to add strength and quality for the longest possible life
  and the best most reliable possible performance.

- You can get the internal engine and tranny parts
  made of the same Alpha-Prime SuperAlloy
  used to make the combustion chambers in Military Jet engines.
  It is many times stronger than any other parts available.

The Promise

- Easily customizable, updatable
- Reliable .... the very best materials and technologies
- Modular construction
- Readily available parts
- Serviceable almost everywhere

- Very easy for the owner to work on
- 100% Recyclable
- 100% Rust Free
- Lowest possible vibration and sound.
- Fewer parts .... pure and simple

- Able to go almost anywhere you need or want to go.
  .... two lane twists, horse trails or the beach
  Go to the corner store,
  or ride 4 days in the saddle on the open road.

- Whatever the ride or rider calls for, it delivers,
  an Enduro bike one minute and a Cruiser the next.
  This motorcycle does not make trade-offs
  between the needs of hi-ways and horse-trails.
  It adjusts it center of gravity, overall geometry
  suspension behavior and engine power curve
  to adapt very specifically to differing riding conditions.

The Relationship

- When you look at the bike, you can see that, unlike most any other bike,
  you can get your hands in anywhere.
  That means that unlike most bikes, you can also easily get your wrench in.
  That level of access and simplicity, means you can work on your own bike
  just like you could decades ago .... and clean it easily.
  This is an important part of the relationship.

Loyalty

- Each module is stand-alone and are always up-datable..
  If a better solution comes out in 5-6 years,
  the rider is able to e-Bay the older solution
  and pop in the latest/greatest
  and still have THEIR OWN same-but-better bike.

  It means the bike is never "dated" and remains timeless art
  and should reflect in a high value lifelong relationship
  based far more on its condition than its age.

Purpose

- Always simple and focused; evolving better and better.
  We use the same attitude Porsche has had with its 911.
  The same yet always evolving to be even better.

- It began with the relationship between the rider and the road,
  the bike and the road, and the rider and the bike.
  It was this triangle that defined the function.
  As functional parameters emerged, form took care of itself.

- It is like designing a motorcycle having never seen one before.
  As a result, the design involves some entirely new approaches.

- Many of the parts do double or triple duty to reduce complexity and weight.

Quality

- The Panther is designed to last a lifetime and beyond.

- In designing a machine that goes anywhere,
  dependability is the most important issue.
  Why settle for trade-offs ?

- It might as well be made of the very best, strongest materials
  and those materials might as well be completely rust proof.
  That way it is a one-time purchase that can be updated over time
  and can be owned for a lifetime .... or more.

- All metal parts are Liquid Nitrogen cryo-treated
  to add strength and quality for the longest possible life
  and the best most reliable possible performance

- All bikes are 100% X-rayed before they leave the factory.

Metal Parts

- Liquid Nitrogen Treated
- X-ray Scanned (for microscopic imperfections)
- Non-Rusting
- Tungsten-Cobalt Alpha-Prime Super Alloys

Frame

- Stainless Steel .... so it never rusts.
- Double-Ladder Space-Frame .... so the balance of rigidity and flexibility can be very precisely controlled for the best feel possible.

- Only 11.75 inches wide at the knees,
  12.25 inches wide at the foot pegs.
  .... it is really narrow for great high-speed wind penetration
  and real narrow for best access in the deep woods.

Suspension Arms

- Multi-Link (Double Wishbone) on BOTH front and back.
  .... so wheel placement and handling stays perfect.

Shocks

- Automatically adjust for frame shape (riding mode).
  .... so the shock behaves strong in the woods and smooth on the hi-way.

- Adjust automatically for speed and load.

- Mono-Shock set-up on both front and back.
  .... the the most accurate and best tracking
  especially in corners.

Handlebars

- Adjustable width handlebars so it fits the rider.
  .... the best fit means the best and most comfortable control.

Lighting

- LED Headlight, tail-light and turn-signals.
  .... so there are no delicate bulbs to break.

- The headlight is 3-beam for super-lighting off-road.

Electrical Connectors

- Gold Plated Connectors only
  .... so there is never any corrosion or short-circuit worries.

- Heat-shrink Teflon sealed .... so moisture can't get in.

Testing / Service

- All wiring goes to a central testing terminus.
  .... so service is quick, accurate and never frustrating.

- The bike has over 70 sensors and will tell you when there is a problem
  what the problem is and with its on-board repair manuals, exactly how to fix it.

- If you get stuck, you can connect to us via wireless internet modem
  and with your on-board iPod camera, you can show us exactly what you see.

- You also use the wireless modem for software / firmware updates.

Battery

- Lithium Ion .... so there is NO battery acid to spill.

Alternator

- 40-amp
- 480-watt
  .... by far the very strongest available on any bike.

Body Modules

- Kevlar and Carbon Fiber
  imbedded in a Ballistic-Grade UV-stable Ultra-Density co-Polymer mix.
  .... so the bodywork is extremely scuff resistant
  even if dropped at highway speeds
  and the tank will not rip open and spill fuel in an accident.

- The colors are inside the polymer mix,
  .... so the body parts never need to be painted or re-painted
  and always look as good as new.

Intake

- Up as high on the bike as reasonably possible.
  .... so it stays away from dirt-road dust and debris
  and you can cross very deep creeks.

- Variable Volume Plenum
  .... so when large, it acts as an intake "flywheel" when cruising,
  yet when small, responds very quickly when in the woods.

- Four-Stage filtration ....
    - Debris Screen at the intake.
      .... for elimination of the largest debris.
    - Double-Back primary Debris Filtration
      Like used in automotive dirt track racing.
      .... so any dust and debris that accidently gets into the intake
      is kicked out.
    - Washable HEPA Filter (**H**igh **E**fficiency **P**article **A**ir)
      ... to filter out the last of the even smallest particles.
    - Electro-Static (another industry first)
      ...to filter out invisible particles
      and ionize the air for better fuel mixture.

Fluids

- Only Mobil-1 synthetics
  .... They have the best patents and the best overall rating.
  Heavier "extreme-use" versions are used.

Engine Cylinders

- Ceramic Alloy lined cylinder
  .... So the sliding wear on the cylinder is incredibly reduced.
- Cylinder studs are locked in from the sides
  .... so they can't come loose even under the most extreme use.
- Cylinder and head are locked together with the upper mounting collar.
- Cylinder and crankcase are locked together with the lower mounting collar.
  .... The engine hangs under the frame from these collars
  that key-lock the head to the cylinder and the cylinder to the crankcase.
  so the engine stays as tight as can possibly be.

Internal Engine Parts

- Internal engine parts are made of the same Alpha-Prime Super-Alloy
  so engine parts are the strongest on the market.

Exhaust

- Stainless Steel so it can't rust.
- Ceramic liner so it can never turn "blue" under extreme heat.

Primary Drive

- Aramid primary belt
  .... Rated at 300 hp. capacity
  although even the Turbo-Hemi SuperAlloy engine is "only" 105 hp.

Transmission

- Transmissions have more than a 250+ hp. capacity
- Huge 3-inch gears rather than Harley's smaller (2.25 inch) diameter
- The gears are near-diamond (DLC) coated to virtually eliminate wear and is 10-times slicker than Teflon for the smoothest shifting.

Clutch

- Hydraulic self-adjusting
  .... So it always feels smooth and predictable.
- Kevlar friction surfaces.
  .... To resist any wear to the clutch.
- 7-inch plates, rather than the normal 5-inch. for almost double the surface area.
- Ceramic plates
  .... So they can't warp under extreme use
  and the clutch can never feel mushy.

Starter

- 3-HP .... in a world where most starters are just 1-hp.
- The Cub has a 1.5 hp starter

Final Drive

- Stainless Steel sprockets
  .... So they don't rust.

- The sprockets on the Panther are Near Diamond (DLC) coated.

- Sealed O-Ring X-Chain
  .... Because it lasts about 12-15 times longer than a standard chain.

- No Chain-Tensioner needed
  .... Because the chain does not lengthen / shorten with the suspension.

Foot Controls

- Height adjustable to the rider's leg length
- Reach adjustable to the rider's foot length.
  .... Because a better fit means much better control and comfort.

Tires

- The Forged Wheels sport Tubeless tires
  .... So if it goes flat, it tends to go flat more slowly and controllably.

- The Wire Wheels cannot sport tubeless tires, but the rims are Bead-Locked.

Engineering

- Some bikes are Engineered and some are just "Black-Smithed" together.
  Sometimes on the surface it is hard to tell the difference.

- Most "Motorcycle Build" TV show are little more than "cake decorating"
  because the balance and feeling of a bike is a very subtle thing
  that requires deep knowledge and careful design and engineering;
  otherwise the end product is at best inconsistent.
  Form and function need to work together .... form alone is nothing.

Systems Approach

- Designing is about systems not parts .... It is about processes.

- Designing a bike is a hugely more complex task than many appreciate
  and it has taken over 9 years to get to this production ready stage.

The Devil is in the Details

- Even little matters such as ....

INTAKE

- The dimpling of the intake port.
- The exact timing between injection ports.

EXHAUST

- The exact initial bend in the exhaust.
- Just the right temperature and back-pressure.
- Just the right distance from the valve seat.

HEAD

- The exact shape of the combustion chamber.

FRAME

- The precise shaping of the frame spar
  So the suspension feedback is just right
- And the controlled flex engineered into the frame
  takes place in a controlled fashion
- Exactly the right distance from the steering linkage
  to place the front tire at exactly the right angle
  at the exactly perfect speed.

- There is so much involved that it boggles the mind.
  That is why there is such a huge difference
  between the bikes of the past and the bikes of the present
  and now just as big a difference between today's bikes and the Panther.

Simplicity

- "The more advanced machine has the fewer parts."
  The Panther has roughly half the parts of conventional motorcycles.
  so you have the space to easily get your hands in and around the parts.
  That makes cleaning and servicing much easier.

Capability

- The Panther is designed to take the rider almost anywhere
  so it shapeshifts and the frame reflects that.
  The criss-cross looks a bit odd at first,
  but the bike is first and foremost about function and longevity.

Compare with other Bikes .... www.ErikBrinkman.com/Panther/Compare.html

- Shape-Shifting technology
  is a breakthrough in the marriage of form and function.
  It can morph it's form into many rides
  to function according to the wants and needs of the rider
  and the conditions of the road or trail at that exact moment.

- From open hi-way to deep-woods and everything in-between;
  it changes its wheelbase, effective swingarm length, rake, trail,
  peg positions, handlebar positions, seat height. center of mass
  suspension behavior and engine power curve.

- Imagine leaving the house with the bike "Standard" mode;
  quite pleasant around town with its comfortable riding position.
  As you leave the side streets and enter the open highway,
  You choose to ShapeShift the bike into a Cruiser.
  You take the highway out of town.
  The ride gets longer so for comfort you switch to Touring mode.
  After many miles, you take an exit onto a rural two-lane twisty road
  and so ShapeShift into more of a tuck for backroad strafing.
  You see a dirt and gravel road on your left,
  so you shape-shift into an Enduro and take the turn ....

Form vs. Function

FAQ: Why does it look the way it does ?

- The Panther R-Bike motorcycle is a modular, simple approach
  in a stable long-term rust-free extremely-over-engineered platform
  so you can develop a relationship that will reliably endure.

Function

- When it comes to function .... safety first.
  The Panther R-Bike (Robotic Bike) is most actively safe two-wheeled machine ever.
  Rather than focusing on passive safety
  or limited active safety such as anti-lock braking alone,
  The Panther R-Bike goes much further with adaptive geometry.
  The function is in its innovative "many-rides-in-one" "ShapeShifting" approach,
  and because conditions can change with little notice, the ShapeShifting is "on the fly".

- Every curve on the body parts are specific in their function.
  The first focus is OFF-ROAD function, because that is the most difficult.
  Then second focus is ON-ROAD needs .... then finally the look.
  The body shapes are very well tested.

Form

- The form is modern, sleek and clean,
  showcasing the best of old-school mechanics
  and the use of timeless classic materials such as brass and wood.
  A motorcycle needs to be a machine; no hidden parts .... yet
  it shows off its gismos, little pieces, nuts, bolts and linkages.
  It looks like there is a lot going on, yet it is still a clean and uncomplicated.

- Mechanically, if any part is mounted even a half inch off,
  it would not work as well .... It is like a perfect puppet.

- The shape of the bodywork is often critical ....

BODY / TANK

1. The tank shape serves as a body-brace in hard braking.

SIDE PODS

2. The side-pods give the leg 4 inches of crush-protection in a fall.

3. The side-pods also serve to deflect wind from the lower torso
in conjunction with the windshield as part of the overall fairing effect.

4. The side-pods also help keep water and debris out of the intakes
while crossing creeks or riding dusty trails.

Style

- There is some flexibility in the design of the tank and side-pods and we welcome sketches on optional bodywork designs.

Sound

- It involves sound and feel and smell as well as sight.
  Barely a vibration to feel, and only lovely sounds
  from the engine mechanicals and the perfect exhaust note
  with its tone and volume adjustable; the volume adjustable on-the-fly.

Dimensions

A shape for every occasion

Shapes

- Rake and Trail
    - Rake 22 degrees - Trail 4 inches @ 52 inch wheelbase
    - Rake 44 degrees - Trail 6 inches @ 63 inch wheelbase

    - The rake and trial work together
      so at any given rake, the trail is always as it should be.

- Wheelbase
    - 52-63 inches .... on-the-fly

- Handlebars
    - Adjustable to the dimensions and preferences of the rider.

- Seat Height
    - 27-34 inches

- Ground Clearance
    - 6-10 inches

- Width
    - 20.5" at it widest (at the SidePods) .... (4 inches on each side)
      The frame is only 12.25 inches wide

    - The bike is as wide as a typical Motorcross Bike
      for easy handling in the woods,
      yet when stretched out forms a long, super-narrow wind profile
      for extreme wind penetration and great fuel efficiency.

    - The Panther has an extremely narrow primary
      and has right side drive to keep the mass centered
      for the best side-to-side balance and maneuverability.

Weights

- Every part and all added material earns its keep.
  It is better to put weight into quality than into complexity.

- A lighter bike will respond more easily to the rider's input
  and the reduced mass means less load on the chassis components
  and so "unwanted" flex will be reduced, (although some flex is important).

- There are disadvantages of course.
  A light machine is more susceptible to disturbance from side winds,
  and the ratio of sprung to unsprung mass can be unfavorably affected,
  making it harder for the suspension to keep wheel-contact with the road
  if it doesn't have a certain amount of frame-mass to push against.

- The R-Bikes weigh in at ....

  (All weights are WET .... (~40 lbs for fuel and oil)

Cub

- 375 lbs .... 500-C (Classic)
- 400 lbs .... 750-C (Classic)

Panther

- 400 lbs .... 750-S (Super)
- 410 lbs .... 750-H (Hemi)
- 425 lbs .... 750 TH (Turbo Hemi)
- 425 lbs .... 750 TD (Turbo Diesel)
- 425 lbs .... 1000-S (Super)
- 435 lbs .... 1000-H (Hemi)
- 450 lbs .... 1000-TH (Turbo Hemi)
- 450 lbs .... 1000-TD (Turbo Diesel)

Compare with others ....

• BMW GS 1200	605 lbs wet	3 yr warranty
• Ducati Multi-Strada	476 lbs wet	2-yr warranty
• Triumph Tiger	550 lbs wet	2-yr warranty
• KTM Adventure	500 lbs wet	6 month warranty
• Panther	425 lbs wet	6-yr warranty

Customization

3

Bodies

- 15 colors
- 4 colors

Patterns

- 28 patterns

Frames

- 4 colors
- 1 color

Springs

- 4 colors
- 1 color

Saddles

- 2 styles

- 3 structures
- 2 fabrics
- 8 colors

- 1 structure
- 1 fabric
- 2 colors

Trims

- 5 types
- 1 type

Hand Levers

- 3 types

Grips

- 2 types
- 1 type

Pegs

- 3 types
- 1-type

Engines

- 4 types
- 2 sizes

- 1-type
- 3 sizes

Transmissions

- 3 types
- 2 type

Brake Calipers

- CNC
- 4 Finished

- Cast
- 1-Finish

Wheel Rims

- 10 Colors
- 1 Color

Wheel Spokes

- 1-Design
    - 5-Spoke
- 3 Designs
    - 7-Spoke
    - Solid
    - Wire

- 1 Color
- 10 Colors
    - Candy Red
    - Warm Yellow
    - Gloss Black
    - Slate Grey
    - Pearl White
    - Navy Blue
    - Powder Blue
    - Jade green
    - Moss Green
    - Army Green
    - Army Khaki
    - Chocolate Brown

Tires

- 5 Treads
    - Street
    - Dual (70% street)
    - Dual (50% street)
    - Off-Road
    - Off-Road (hill climbing)

Body

Colors

- Candy Red
- Warm Yellow
- Gloss Black
- Slate Grey
- Soft-Grey
- Pearl White
- Navy Blue
- Powder Blue
- Jade green
- Moss Green
- Army Green
- Army Khaki
- Chocolate Brown

Patterns

- These are Heat-Shrink Plastic Films.

    - Flames (graphic)
    - Flames (photo)
    - Smoke (photo)
    - Skeletal
    - Scutes / Boney Plates
    - Tribal
    - Camo (28 patterns)

        - Desert Sand (white)
        - Desert Sand (khaki)
        - Desert Sand (red)

        - Scrub / Brush (early spring)
        - Scrub / Brush (late spring)
        - Scrub / Brush (summer)

- Scrub / Brush (fall)
- Scrub / Brush (winter)

- Pine Forest (early spring)
- Pine Forest (late spring)
- Pine Forest (summer)
- Pine Forest (fall)
- Pine Forest (winter)

- Hardwood Forest (early spring)
- Hardwood Forest (late spring)
- Hardwood Forest (summer)
- Hardwood Forest (fall)
- Hardwood Forest (winter)

- Grassland (early spring)
- Grassland (late spring)
- Grassland (summer)
- Grassland (fall)
- Grassland (winter)

- Arctic (summer)
- Arctic (winter)

- Rainforest / Jungle

Styles

- Changing the style of your bike is as easy as changing the body cover. The Tank Cover, Fenders and Seat dictate the style of the bike.

- Style is personal.
  If you have a bike that you can keep for decades, it should look exactly as you like.

  1. Classic Organic Style.
  2. Modern Look
  3. Futuristic facetted angled look.

Classic Look

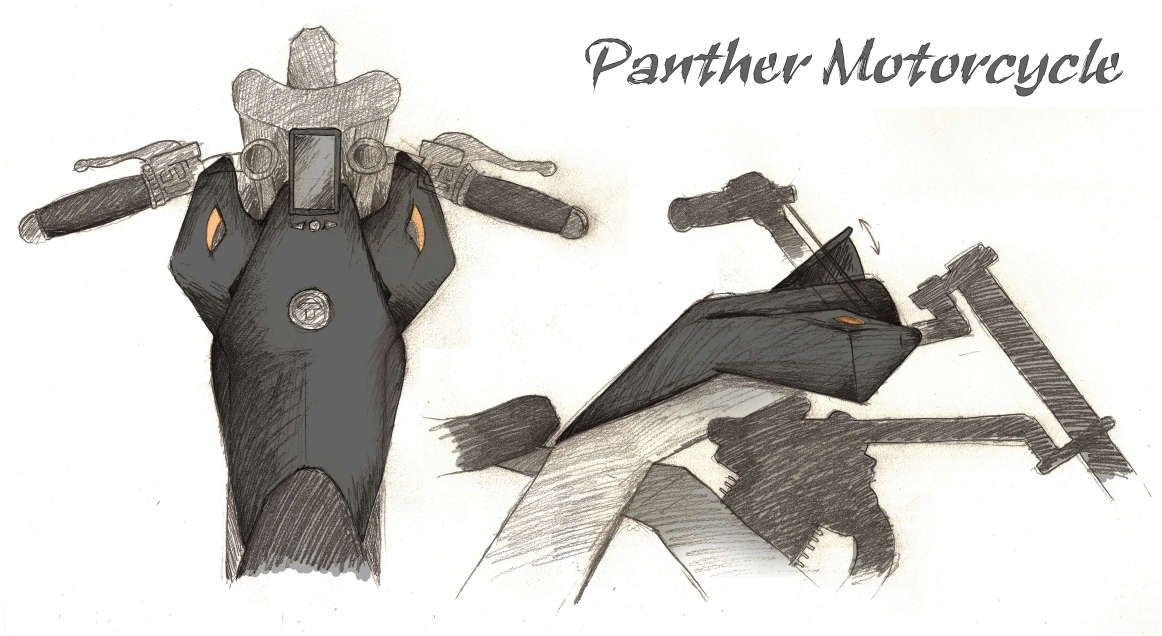
- We begin with the classic look.
  Most people like the organic curves
  That look we use through-out this writing.

Modern Look

- The "look of the day" to match the look of other bikes of the time.
  This will then change over time.

Futuristic Look

- Here is the angular look with planes and facets.
  Some see this as a more "modern" look.



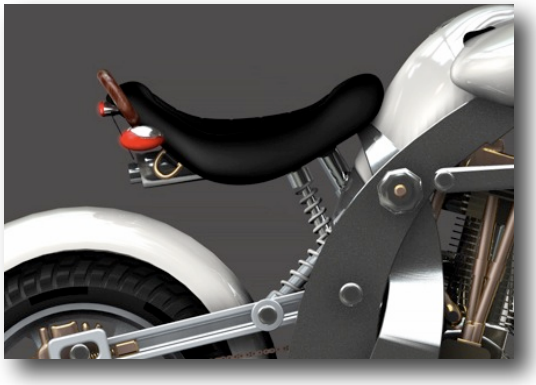
- The styles are determined by our customers.
  You are welcomed and encouraged to send us your sketches.

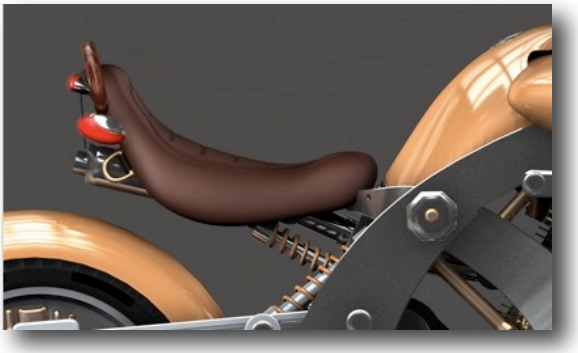
Style Contest .... www.PantherMotorsports.com/Body_Style_Contest.html

- We expect the possibility of after-market body covers by third party vendors as well.

Shapes

- Curve of the body cover is such that
  as the seat-spar shape-shifts and the seat tilts
  the seat always remains in proper position with the body.





Design

Top

- 3+ inch small flat gas-cap.
- A small flat spot, so the rider has a place to set something down

Sides

- The body cover is narrow .... allows the rider to stand and to clench the straddle with legs.

- The body cover is tapered toward the ridge, like the neck of a horse.
  This allows the rider to more smoothly lean to the side when standing
  The riders leg then follows and rests against the side-taper.

Back

- Belly-rest and hard-braking body-brace.

Bottom

- The bottom sports a progressive funnel curve shaped like a cobra's hood
  so as to create a smooth flowing surface
  that accelerates the air flow as it moves rearward ....

  - PULLS air across the engine's head.
  - Gather/funnel air from the front.
  - Accelerate air out the back to suck air thru the engine's fins.

Construction

FAQ: How strong is the bodywork ?

- The Bodywork is made to take the most extreme abuse again and again and still perform without damage ....

- Pre-Colored (inside a High Density Ballistic Thermo-Polymer material .... never needs painting)
- Kevlar / Carbon Fiber Matrix (imbedded in ballistic grade Thermo-Polymers)

Mountings

- Connecting hardware (including bolts), made of Stainless Steel and rust-free Alloys.

Locking Bolts ....www.Mcgard.com/security/intimidator.asp

Fenders

Sit on them; pound them.

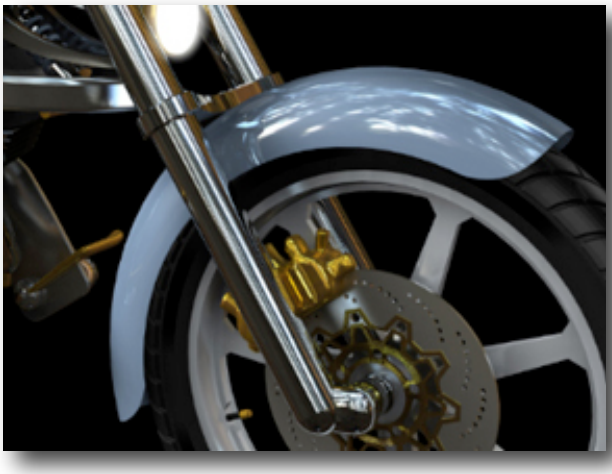
- Fenders are made of an Ultra-high density Ballistic Co-Polymer
  The color of the fender is impregnated into the material
  so they never need painting.

- They are made to be rigid enough to hold up to hi-way speeds
  and yet flexible enough for lots and lots of abuse.

- They are made with a Teflon coating on the inside.
  The teflon inner coating is so that mud won't stick to the inside.

- The rear tip of the the fender has a barely detectable turned lip
  to aid in the smooth release of water (like the drip-proof spout on some teapots).
  It helps keep rain water from splashing all over the engine.

- We are testing a retractable fender extension to better keep dirty road water off the bike.
  When we are satisfied, we shall release the option.
  We hope to have it ready by the start of production,
  but in case we don't, it will be an easy retro-fit on all of our existing bikes.



- Front and rear fenders are the same part number and are, thus, interchangeable.
- As the bike stretches, the front of the front fender lowers via (P) pivot.
  for a better wind penetration profile at higher speeds.

the rod (P)
is actually forward of the A-Arm linkage and so cannot be seen,
so we show a rendering rear of it so you can see the relationship.

Rear Tilt

- Positions in relation to the frame.
  As frame lays down / lengthens, the fender lays down nearer the tire.
  and as the frame raises up/shortens, the fender raises-up off the tire.

Front

SCRUNCH

STRETCH

Rear

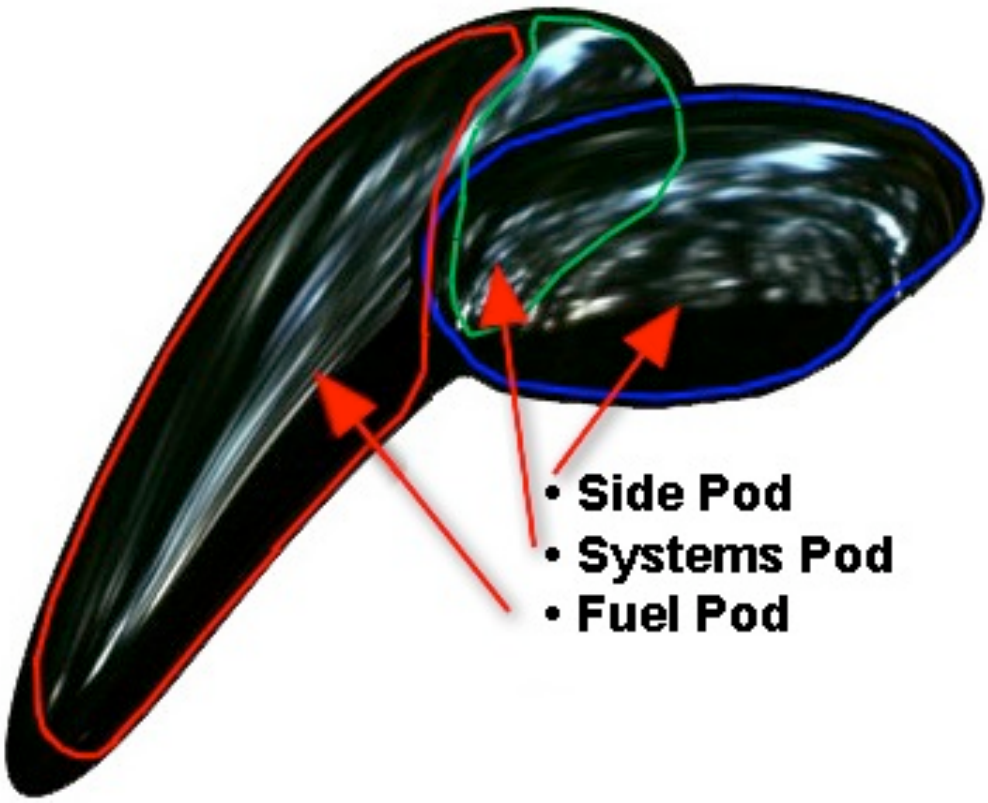
SCRUNCH

STRETCH

- The rear fender sits halfway between the tire and the seat in off-road which places it very near the tire in cruising.

Modules

Tank Cover



Fuel Tank

Specs

- 5-gal with 1-qt. reserve
- Aircraft Style Filler cap (key locked)

Design

- The ergonomically designed tank carries 5 gallons of fuel near the bike's center-of-gravity for good centralization of hat 30 pounds of mass.

Construction

- Inside the Fuel Pod is a Kevlar bag.
  Inside the bag is open-cell foam.
  Inside the bag with the foam is the fuel.

Function

- This arrangement keeps the fuel from foaming
  and keeps the vapor pressure low.
  it also helps filter the fuel.
  (NASCAR and F-1 use a variation of this method)

Service

- To clean the foam filled fuel bag ....

  1. Remove the fuel ring and cap.
  2. Attach the vacuum fitting provided.
  3. The bag with foam will shrink small enough to lift out.

Oil Tank

- Semi-Dry Sump (4-quarts .... 1 in the Engine, 3 in the Tank)
- Brushed Stainless Steel provides greater surface area. (for better cooling)

Side Pods

Construction

- Made of the same material as the Body-Cover.
  (different for the Panther versus the Cub)
  The Cub uses Ultra-High Density Ballistic Grade Co-Polymer
  and the Panther adds a Carbon-Fiber / Kevlar matrix.

- There is an internal side-to-side "crash-bar" inside this module.

Design

FAQ: What is the Side-Pod on the tank all about ?

A:

- By far the most common serious injury to riders is NOT head injuries
  it is the loss of the use of a leg.

- The most important function for the SidePod
  is that it provides space for the knee in case the bike is dropped.

.... All to save your leg in a fall.

note :
You need leg protection in case the bike is dropped,
but you cannot use the tradition side-bars
because that would snag in underbrush off-road.
The SidePods serve that protective function
without fear of snagging in underbrush.

- The SidePod is rounded for the same reason that a ball absorbs impact better.
  Absorbing a side-drop impact also protects the computers and other expensive equipment
  in the Systems Pods mounted between the SidePods.

- The SidePod is tapered for lower wind resistance.

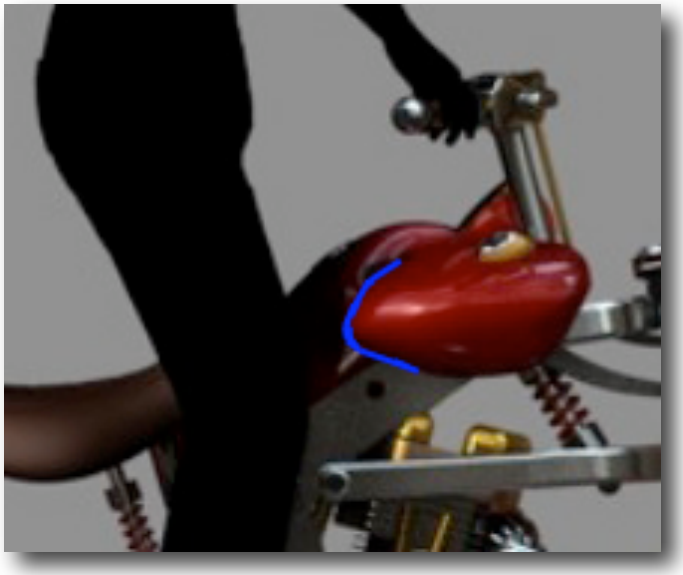
- There is a dent in the lower front of the structure, so that air cascades at that point,
  creating a larger wind-free zone for the lower torso than would otherwise be the case.

- The dents in the front of the SidePod also help center / stabilize the bike at high speeds.

- The SidePods also keep water and debris away from the intakes.

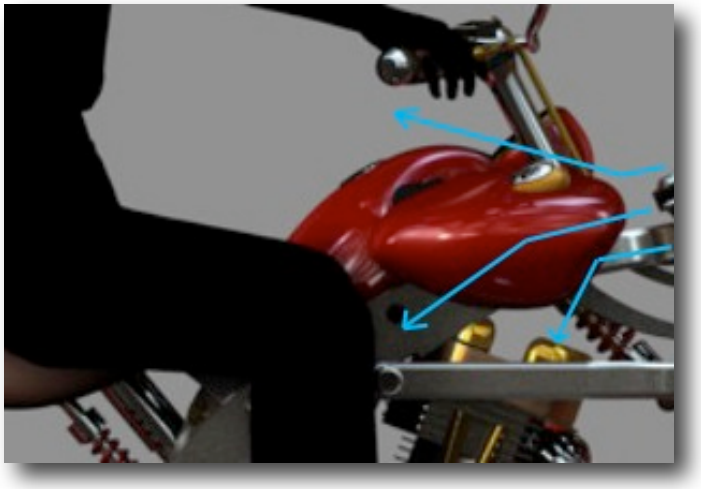
- Great knee tuck while riding.
- Hides the movement of the front suspension's Upper A-arm.

- Allows rider to brace legs while riding standing up.



Function

- Provides front wind-shielding for the rider's lower-torso.



Fuel Systems Pod (wet)

Fuel Injection System

Electrical Systems Pod (dry)

- EM shielded tub-box using a special Metallic Glass Shielding.

- A sealed molded plastic tub/box
  mounted between the long spars,
  high, dry and warm above the engine
  in a sealed molded plastic containing ....

    - Sensor Terminus
    - Engine Management Computer
    - Systems Testing Terminus / breakers with LEDs
    - Charger
    - AC Power Socket
    - DC Plug-in

Instrument Pod

- Holds the iPod / iPhone
- Connects to Fuel and Electrical Pods. (just below)

Engine Design

One for every budget and riding style.

- The engines are not part of the inherent structure of the bike
  and are instead hung under the frame so as to ...
    - Partly isolate vibration
    - Allow the engine mass to move as the frame ShapeShifts keeping the bike balanced.
    - Allow many different engine designs could be used.

- A much improved version of the Harley-Davidson design was chosen.
  There are 10 engines, Classic, Hemi, Turbo Hemi and Turbo Diesel.
  There is also an Electric Motor for the Fully Electric E-Bike Panther.

- Engines are available as a square-bore 1000cc (62 cu in) version
  or a quick-revving, light flywheel, short-stroke 750cc (45 cu in) version.

- There is a 35 hp 500cc for the CUB.
  For some foreign jurisdictions, it is sleeved down to a 25 hp 350cc.

Design

- In order to offer an affordable entry-level package,
  we have 500-750cc classic engines and 6-speed tranny.
  These engines and tranny are NOT made with the Aerospace SuperAlloys.
  The lower price of that package partly reflects that fact.

Character

- Simplicity .... An artfully made monument to simplicity and purity.

- Quality .... Really well made racing quality engine and tranny parts
  made of Alpha-Prime Tungsten, Nickel, Cobalt Super-Alloy
  used to make the combustion chambers
  in military jet fighter engines ....
  many times stronger than any other parts on the market,
  and made with far more precision and detail than expected.

- The cylinder studs have cross-bullets so they CANNOT come loose.
- ALL gaskets are Neoprene so seals can be re-used.
- The top of the cylinder is "proud" so NO gasket is needed for the cylinder head.

Simplicity

- A simple, air/oil cooled overhead valve, solid, proven engine design.
- One cylinder means a much simpler ignition system.
- One cylinder has a much better heat dissipation profile.

The Look

- Looks like a cross between a Harley and a British Thumper Single.

- A machine look, yet a clean and classic look
  that makes you want to touch and rub it,
  so there are elements like brushed stainless, bronze, and nickel parts,
  rounded split rocker boxes, a round cylinder and sculpted cases.

The Sound

- The engine starts out refined with a mellow purring rumble
  with a sense of deep muscularity
  It growls at around 3500 RPM
  then it gets screaming fierce around 5000 RPM
  and eventually downright psychotic howling near redline.

The Feel

FAQ: What about vibration from such a large single cylinder engine ?

- The Panther's giant cylinder has a unique sound and personality
  designed to cruise smooth and balanced all day.

- Normally you get a lot of vibration from a big thumping single cylinder,
  yet the motorcycle is smooth and balanced enough to cruise 12-14 hr days
  for several days in a row without becoming a pain in the butt.

- The vibration needed to decrease as much as possible,
  because vibrations can cause frothing of oil and fuel
  as well as for the sake of extreme longevity, strength and reliability.
  because vibration, over time, weakens the metals of all parts.
  Vibration suppression and elimination is accomplished in several ways ....

- The crankshaft is extremely well balanced to racing specs.
- A twin counterbalancing shafts to counter any residual vibrations.
- A swivel con-rod for both noise and vibration reduction.
- Additional vibration damping primary pulley is added.
- The engine is not directly attached to the tranny/drive-train.

- The extra thick crankcase wall.
  so the crankshaft loads are rigidly absorbed.

- Finally the rider is isolated from that portion of the frame
  that carries the engine and drive systems.
  In addition there is a pad of vibration isolating gel-foam at the criss-cross.

- This is as smooth and vibration-free as a single can get.
  When ridden at speed limits .... 25, 35, 45, 60 mph ....
  there is a silent, smooth rpm (~2200 rpm) / gear ratio for each specific speed.

  - **note :** Power is dialed up/down in 25% increments (thumbwheel at the right grip)

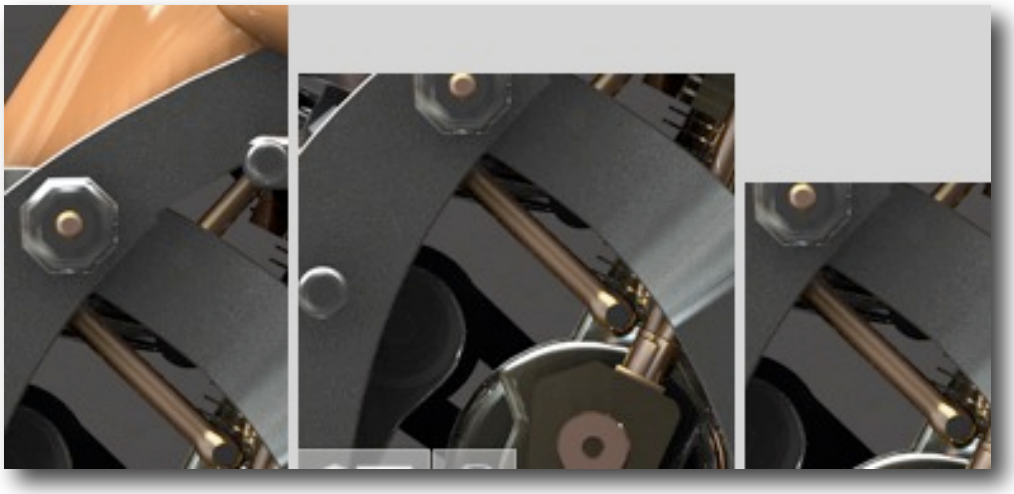
Mounts

FAQ: The engine looks like it is just hanging there ?

- Since the engine is not part of the structure and dimensions of the frame, it allows us to mount several kinds and sizes on the same frame. This provides maximum flexibility for the customer and for future developments.
- At the top the cylinder, the head and cylinder are clamped together. The engine “hangs” from this clamp.
- At the bottom of the cylinder, the crankcase and cylinder are clamped together.
- The engine hangs from the upper clamp and is held in position by the lower clamp.
- Each clamp is attached to 2 rods that terminate at the frame. The rods serve several functions....

Carry Oil

- The rods that connect the clamps to the frame are hollow and carry oil that is fed directly to the valve-train at the upper end and to the engine oil pump and lower end.



Vibration

- The oil in the rods help dampen secondary vibration

ShapeShifting

- At the top where the cylinder head and cylinder are clamped together, the rods are attached to the rails of the lead-screw assembly that controls the ShapeShifting of the frame.

Cooling

- The engine leaning forward as the frame stretches creates a better cooling angle to help better cool the exhaust port on long rides.

Balance

- Moving the engine as the frame ShapeShifts also keeps the center of mass consistent for a better balance for the bike and a moe consistent feel to the braking.

Types

Electric

- The Electric Panther uses a Brushless Neodymium electric motor.
- The Neodymium magnets are stable to 480 degrees F. (250-C)
- The electric motor is 8 inches in diameter and 9 inches long.

Gas

- The Gas powered engine has a polished Aluminum valve cover.

Hemi

- The Hemi has a polished Brass valve cover.

Diesel

- The Diesel has a Peuter looking valve cover.

Styles

Classic Singles

- This type of engine uses the highest quality aircraft aluminum.
  The aluminum used is 356-T6 "A" Aerospace Aluminum
  with a tensile strength of 45,880 psi.

- These are the Cub engines.
  The 350cc is a sleeved version of the 500cc model.
  The 750 is a square bore
  and the 500 and 350 are short stroke
  sharing the same piston and cylinder bore with the 750cc model.

Classic Twins

- The twins are double 350s and double 500s.
  They are NOT Super Alloy models.

  (The Panther version will share all other Panther traits)

Super-Alloy Singles

- This type of engine used a special Tungsten-Cobalt Super-Alloy
  usually used for the construction of combustion chambers in jet turbine engines.
  We use this because it does not expand under extreme heat
  and so we can make the engine very tight.
  This helps provide ....

    - Very low pollution figures
    - Prevents the engine from seizing if overheated under extreme use.
    - Reduced vibration
    - Helps the engine last a very long time.

- The Panther 1000cc is a Square Bore
  and the 750cc is a short-stroke sharing the same piston diameter with the 1000cc models.

Bore & Stroke

Short Stroke Single

- These are smaller displacement versions of their larger brothers and share the same cylinder bore and thus pistons.
  The engines that are short stroke are the 350 and 500 Cub engines and the 750 cc Panther engine.

- The short stroke makes the engines quick revving and very responsive with higher HP but relatively lower torque.

Square Bore Single

- The Cub 750 and the Panther 1000cc are both Square Bore.
  That makes the engines great long distance performers.
  The HP and Torque tend to be about equal.

Short Stroke Twin

- The 700cc and 1000cc twins are both NOT super alloy and are both short stroke.
  This makes them fine for the street where HP is more important.

- The crankshaft rotates the pistons together but one is in the intake stroke while the other is in the exhaust stroke.

Models

Cub

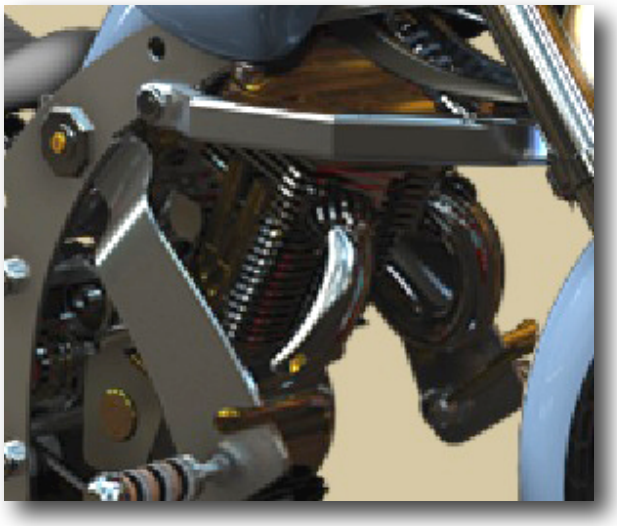
- Classic (500-C)
- Classic (750-C)

Twin

- Twin (700-T)
- Twin (1000-T)

Panther

- Magnum (750-S / 1000-S)
- Hemi (750-H / 1000-H)
- Turbo Hemi (750-TH / 1000-TH)
- Turbo Diesel (750-TD / 1000-TD)



Future Engines

Division-1

- Engine design and improvement is at the very heart of Panther's continued development.
- We have just finished designing our Cyclops Rotary Engine as well.

For details ...

see: www.ErikBrinkman.com/Cyclops/Home.html

- We are also working on a Variable Displacement engine which, when finished, will greatly simplify the line of engines offered.

see: www.ErikBrinkman.com/Engine_VDC/Home.html

Division-3

- 100, 175, 250, 350 Singles are planned
  These are not the same technology
  and will be sold in the "Developing World" nations.
- 200 and 350 Twin
  These are less likely but are being considered.
  They would share internal parts with the 100cc and 175 cc models.

Division-2

- This division would share the bikes from both Div-1 and Div-3.

Engine Construction

Construction

Materials

- The engine cylinder is made of 356-T6 "A"
  Aerospace quality Prime Aluminum with a tensile strength of 45,880 psi.

Quality

- All metal parts are Liquid Nitrogen treated
  to add strength and quality for the longest possible life
  and the best most reliable possible performance.

- Those parts are then Hard-Anodized at 2 mil thick
  for the best in surface hardness for abrasion resistance
  and to prevent it from looking "powdery" as the decades go by.

- The cylinder is lined in a new type of flexible Ceramic-Aluminum Alloy
  for incredible abrasion resistance and extra-long life.

- The valves are made of Stainless Steel and filled with sodium
  so that the valve seat stay cool and well sealed.

Cub

- The Cub engines are made at the same level of quality as the best conventional motorcycle.
  They use high quality materials and use a ceramic line cylinder.

Twin

- The Twins use Cub internal engine parts.

Panther

- The Panther engines use Alpha-Prime Tungesten Cobalt Super-Alloys
  for internal engine parts.
  They also use fat pushrod tubes for oil return and have dual spark plugs.

Sizes

Cub

- 500cc Single
- 750cc Single

Twin

- 700cc Twin
- 1000cc Twin

Panther

- 750cc Single
- 1000cc Single

Power

Cub

- 35 hp for the 500cc Classic
- 45 hp for the 750cc Classic

Twin

- 40 hp for the 700cc Classic
- 60 hp for the 1000cc Classic

Panther

- 50 hp for the 750cc Magnum
- 75 hp for the 1000cc Magnum
- 65 hp for the 750cc Hemi
- 90 hp for the 1000cc Hemi
- 75 hp for the 750cc Turbo Hemi
- 105 hp for the 1000cc Turbo Hemi
- 35 hp for the 750cc Turbo Diesel
- 50 hp for the 1000cc Turbo Diesel

Torque

Cub

- 500cc Single
- 750cc Single

Twin

- 700cc Classic
- 1000cc Classic

Panther

- 50 lb-ft for the 750cc Magnum
- 75 lb-ft for the 1000cc Magnum
- 75 lb-ft for the 750cc Hemi
- 100 lb-ft for the 1000cc Hemi
- 75 lb-ft for the 750cc Turbo Hemi
- 100 lb-ft for the 1000cc Turbo Hemi
- 50 lb-ft for the 750cc Turbo Diesel
- 75 lb-ft for the 1000cc Turbo Diesel

Power Controllers

Panther

- Choose engine power % from handlebar Thumbwheel 5%, 25%, 50%, 75%, 100%

- Power levels can aso be over-all adjusted from the instrument screen via the password ....

    - GREEN (Beginner (25%) for learning mode or economy overdrive. (20 lbs / hp)
    - BLUE (Novice) (50%) power cut in half for off-road. (10 lbs / hp)
    - BLACK (Intermediate) (75%) as Cruiser or Touring. (6.7 lbs / hp)
    - RED (Advanced) (100%) power in sport mode. (5 lbs per hp)
    - GOLD (Service) (100%) limited time and GPS range
    - SILVER (Valet) (25%) limited time and GPS range

RPMs

- 0800-1000 rpm .... idle
- 2000-2200 rpm .... cruising (60 mph / 100 kph)
- 3500-4000 rpm .... passing
- 5000-5500 rpm .... max hp
- 6000-7000 rpm .... redline

Compression Ratios

Cub

- Classic 7.5:1

Twin

- Twins 7.5:1

Panther

- Magnum 9:1
- Hemi 12:1
- Diesel 21:1

Cooling

- Uses both oil and air cooling.
- There is also an optional fan (x2) for extreme use and for the Diesel model.

Oil Flow

- A high-flow (200%) oil system provides the oil cooling thru extra-large passages.
- Main oil feed and return is through the hollow tie-rods at the head and base of the cylinder.

Air flow

- Fins provide the air cooling.
- The shape of the underside of the bike's tank also helps funnel air across the fins.
- An optional fan is provided and mounted at the side of the engine for additional cooling, especially for the diesel engine. (x2)

Tilting

- ShapeShifting the frame tilts the cylinder forward at higher speeds to help cool the hottest spot by letting air glance off the exhaust port, and air hits all fins at a better glancing blow for a better heat transfer rate.

Engine Parts (valvetrain)

Rocker Boxes

- 2 Piece (for easier service)
- Extra Tall (for better valvetrain cooling)

Rockers

Design

- Roller Rockers (lower wear and smoother operation).

- The rockers have a little pocket at the top of each rocker.
  This pools oil and channels it to the roller the moment the rocker moves
  so that oil is always there right where it is needed
  the moment the engine is cranked.

Construction

- Ceramic Coated (lower wear)

Lifters

Design

- Hydraulic ....
    - Self-Adjusting
    - Very Low Maintenance
    - Quieter
    - More Accurate Valve Timing
    - More lift at hi-speeds for better flow
    - More duration at low speeds for better low-end torque control

V.V.T. (Variable Valve Timing)

- Flattens the torque curve
- Decreases fuel consumption
- Quietens the Diesel
- Greatly Reduces Pollutants
- Adjusts as the frame ShapeShifts

- Under heavy loads, if the valves heat up,
  the duration is automatically shortened to cool the valves.

Valves

Design

- OverHead Valves Design is used
  An OHC design is NOT used, because ....
    - The higher center-of-gravity.
    - It has a long chain that changes the classic sound of the engine.
    - Zero Valve Clearance is unforgiving.
    - The proven sturdiness of the push-rod design.
      (longevity is the "prime directive")

- We use 2 valves; fewer parts is better.

- When we wanted to go High-Performance we stayed with 2 valves and went Hemi.

Hemi

- For a high performance model we did not want to go to 4-valves
  so the Hemi Design allows for the use of 2 huge valves instead.

- A 2-valve Hemi design
  provides maximum valve area for optimum flow
  and better breathing for more power at all rpm
  than with a non-Hemi 4-valve design.
  The result is a considerable boost in low-end torque
  and better low and mid-range power.

Construction

- Stainless Steel
- Sodium-Filled Hollow Stem (for cooler valve seats to prevent leaking)

Valve Springs

Design

- Triple nested

Construction

- Alpha-Prime Tungsten-Cobalt Super-Alloy
  because it is very springy, rust proof and extremely strong.
  We do NOT use Titanium springs because they can fail unexpectedly.

- DLC (**D**iamond **L**ike **C**oating) coated sleeves between springs.

Engine Braking System

- Using the V.V.T. (**V**ariable **V**alve **T**iming) to act as a torque limiter under deceleration.

Compression Bleed

- With a displacement of either 750 or 1000cc and compressions of 12:1
  and up to Diesel compression of ~21:1
  a compression bleed is part of the VVT (**V**ariable **V**alve **T**iming) system)
  is used during start-up to help take a load off the starter.

- The Cub models provides a compression bleed via one of the two spark-plug holes provided.
  (since it uses only one for a spark plug)

Engine Parts (head)

Head

- Polished (better flow and stays cleaner)

Classic

- Classic (1 spark plug)

Super Alloy

- Super (2 spark plugs)
- Super Hemi
- Super Diesel

Gaskets

- No seal between the Head and the Cylinder (cylinder is "proud")
- All seals are re-usable Neoprene.

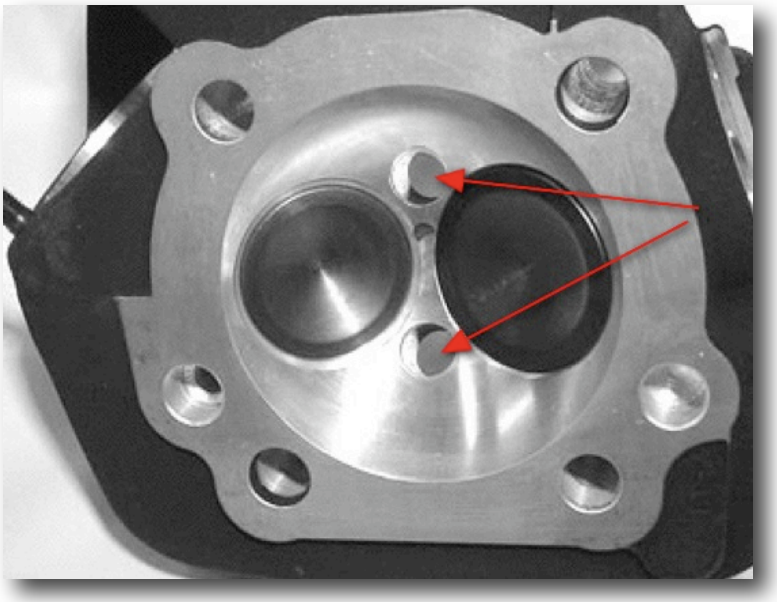
Engine Intake Port

- Golf-ball / shark-scale dimpled pattern in a Teflon liner at the intake port reduces friction and turbulence.
- Polished surfaces upstream from the teflon liner further reduces resistance.
- There is a V-shaped post upstream from the valve stem
- In the gasoline version of the engine,
  There are two direct fuel injectors.
  One for regular and one for a "boost" effect when needed.
- A last minute port constriction at the intake-valve
  helps to accelerate the intake mix.

Fuel Injection

- Fuel Injection creates improved performance and higher torque while it reduces fuel consumption and emissions.
- Combined with "Variable Valve Timing" (VVT) we control combustion while flattening the torque curve for the smoothest response and can meet the most stringent pollution standards.
- Just upstream from the fuel injectors, there is a twisting of the airflow.
- The Panther engine also has engine "Multi-Mapping" (MM) that changes the personality of the engine on-road to off-road as the frame Shape-Shifts to suit the riding conditions.
- The (VHP) **V**ariable **H**orse **P**ower can be manually adjusted from a thumbwheel at the right grip.
  in 25% increments so it is low when cruising and high when needed.

Spark Plugs



Design

- Quad-Tipped Platinum-Iridium Bosch

Construction

- Single (Cub)
- Double (Panther)

Coil

- Direct Ignition .... Coil-at-plugs
- High-output magneto.

Engine Parts (cylinder)

Cylinder

Design

- The bike needs to be very narrow for off-road use,
  and for better wind penetration at high speeds.

- Round (for better cooling)
- Single (for simplicity and better cooling)

Cooling

- Cylinder Fan (x2) option for extreme and Diesel applications.

- There are additional cooling oil-jets under the piston.

Size

- A large single cylinder engine is more efficient
  and turns more of the fuel into power than a multi-cylinder unit
  that wastes power by losing heat.
  Thermodynamically speaking, the fewer the cylinders the better

- The 1-liter is large enough (1000cc/62 cu in)
  for long distance hi-way speeds (75-90 mph all day)
  while the smaller unit (750cc/44 cu in) is perfect for the 2-lane back roads.
  The (500cc/29.3 cu in) is perfect for off-road or around town.

Shape

- Cylinder barrels are round because
    - It provides the best heat dissipation
    - More aerodynamic.
    - The pistons are round
      (external hints of internal .... a persistent theme in the bike)

Construction

- Material (356-T6 "A-Prime" Aerospace Aluminum) .... with a tensile strength of 45,880 psi

- The exterior is HardCoat Anodized to a 2 mil thickness
  so the cylinder surface doesn't get grey and powdery over time.

- The interior is Ceramic Lined (Ceramic-Aluminum Nickel alloy) ....
    - Greater heat dissipation ... cooler running piston rings.
    - More consistent power delivery
    - Greatly reduced friction.
    - Longer Life

Cylinder Studs

Design

- Cylinder stud connection to the crankcase includes set-screw / bullets
  locking the studs in from the sides to keep them from EVER pulling loose.
  There is also a collar that clamps the base of the cylinder to the crankcase
  and the cylinder to the head.

Construction

- 356-T6 "A-Prime" Aerospace Aluminum .... with a tensile strength of 45,880 psi

Piston

- The gap-less top ring allows us to run a large end gap
  so we do not need to worry about ring butting;
  at the same time the gap-less feature eliminates blow-by ....
    - Top ring 1/16 inch gapless Chrome Stainless Steel
    - Scraper Ring(s) 1/16 inch
    - Oil ring(s) 3/16 inch three piece

- Long Skirt (to prevent "chatter" under heavy low-RPM loads)
    - 5-ring
    - 3-ring

Connecting Rods

Design

- Rust-Proof
- One Piece
- Swivel (for lower vibration)

Construction

- Extra-Large Wrist-Pin
- Alpha-Prime Tungsten-Cobalt Super-Alloy Construction

Push-Rods

FAQ: Why does such a futuristic bike use a pushrod engine design ?

A: It is stronger, more forgiving, a lower center of mass and easier to work on.

- Ceramic Tipped (for much lower tip wear).

PushRod Tubes

- Extra fat tubes for better oil return flow and cooling.

Engine Parts (crankcase)

Crankcase

Design

- Twin Counter-Balancers (to reduce vibration)
- Extra-Thick Walls (for reduced vibration)

- It is shaped to reflect the contents (rounded)
  and for a smooth oil flow as the crankshaft turns.

- It has a 1.5 inch space between the flywheel and the crankcase wall
  to avoid any foaming of the oil due to constriction.

Construction

- Case ... 356-T6 "A" .... Aerospace Aluminum (tensile strength 45,880 psi)

CrankShaft

Design

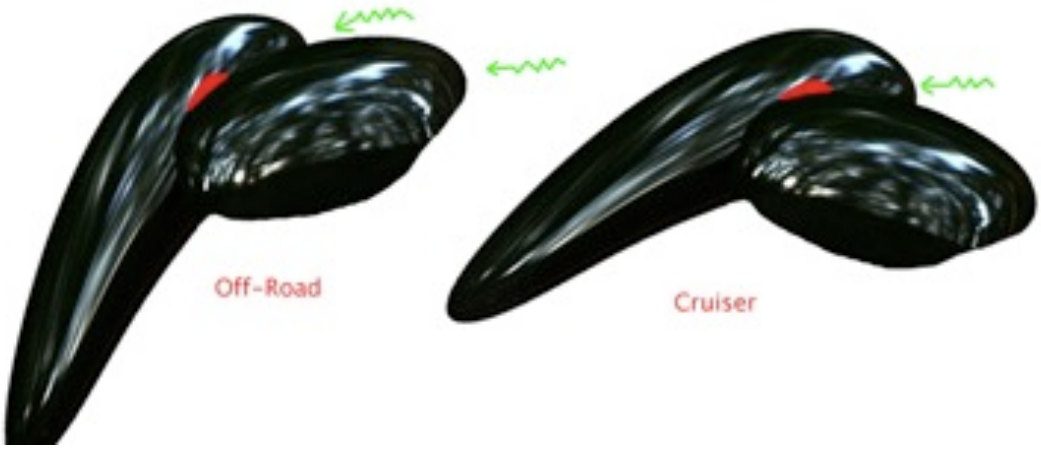
- The exhaust's camshaft has a long exhaust duration
  and the intake open before the exhaust completely closes
  so the chamber flushes out quicker and more completely.

- A blade scrapes off the oil
  as soon as the flywheel emerges from the oil (1 qt. semi-dry sump).
  This wipe-off reduces drag quite a bit (~15%)

- 4-Bolt Roller Main Bearings

Construction

- Alpha-Prime Tungsten-Cobalt Super-Alloy Crankshaft
- Alpha-Prime Tungsten-Cobalt Super-Alloy Main Bearings
- Wide Bearing Saddles (to minimize vibration)
- Transverse Bearing Supports (to minimize vibration)


Off-Road
Cruiser

Camshafts

Design

- The camshaft has a long exhaust duration
  and the intake open before the exhaust completely closes
  so the chamber flushes out quicker and more completely.

Construction

- Alpha-Prime Tungsten-Cobalt Super-Alloy

Twin Counter-balancers

Design

- Two are used .... one at 180° and one at 90°.

- So the engine runs smoothly from idle to redline
  for rider comfort and less fatigue on long rides.

Construction

- Alpha-Prime Tungsten-Cobalt Super-Alloy

Semi-Dry Sump

- 1-quart in the engine; 3-quarts in the oil tank
  for the advantages of a dry-sump
  without the worry of a dry engine if the pumps were to both fail.

Gaskets

Design

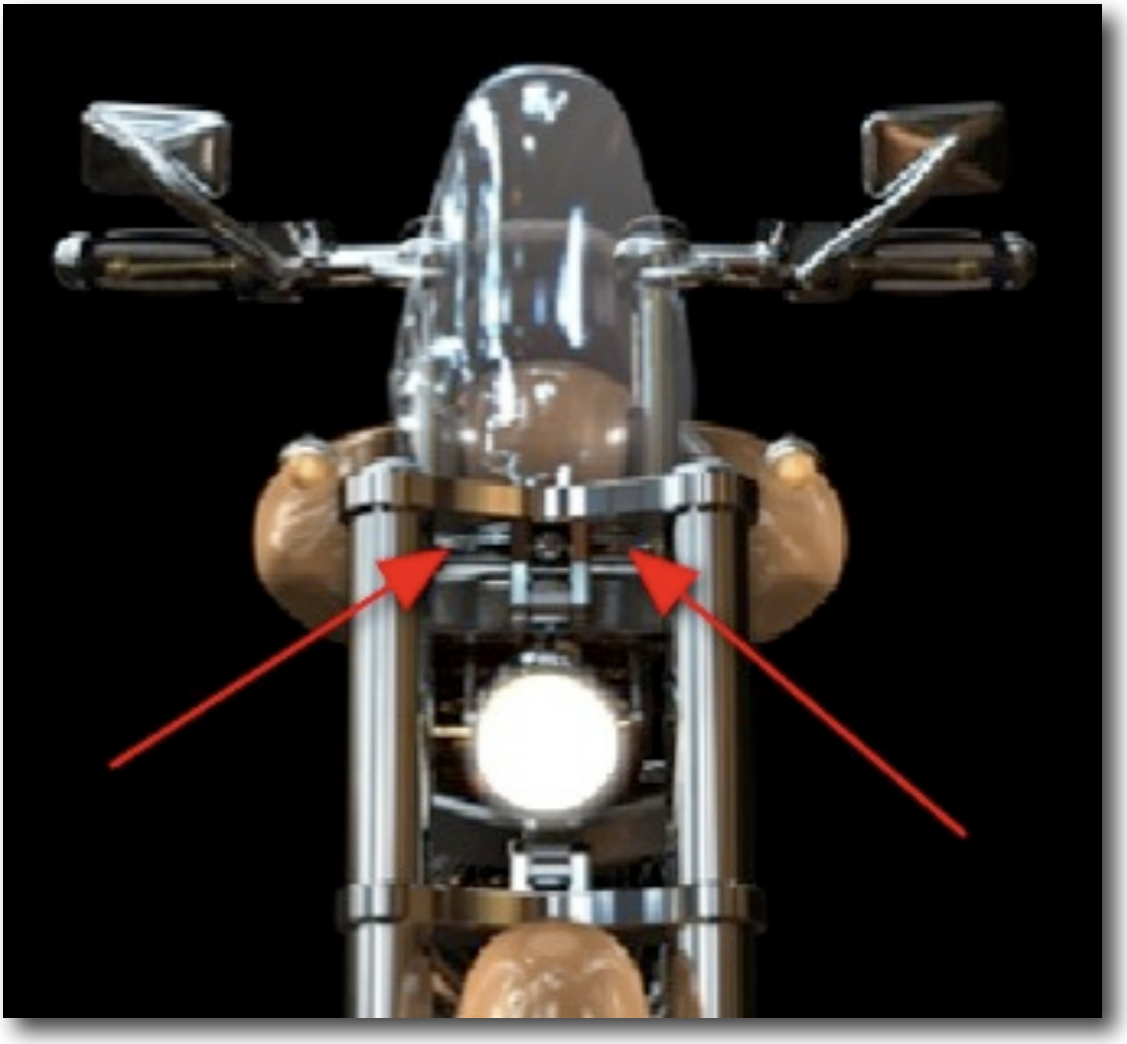
- The goal is the simplicity and owner serviceability of the bike
  We wish to cut down on the need to buy service replacement parts.
  Having to replace the gaskets is one of those.

Construction

- All gaskets are Neoprene O-ring seals
  so they can be used over and over without need for replacement.

Intake

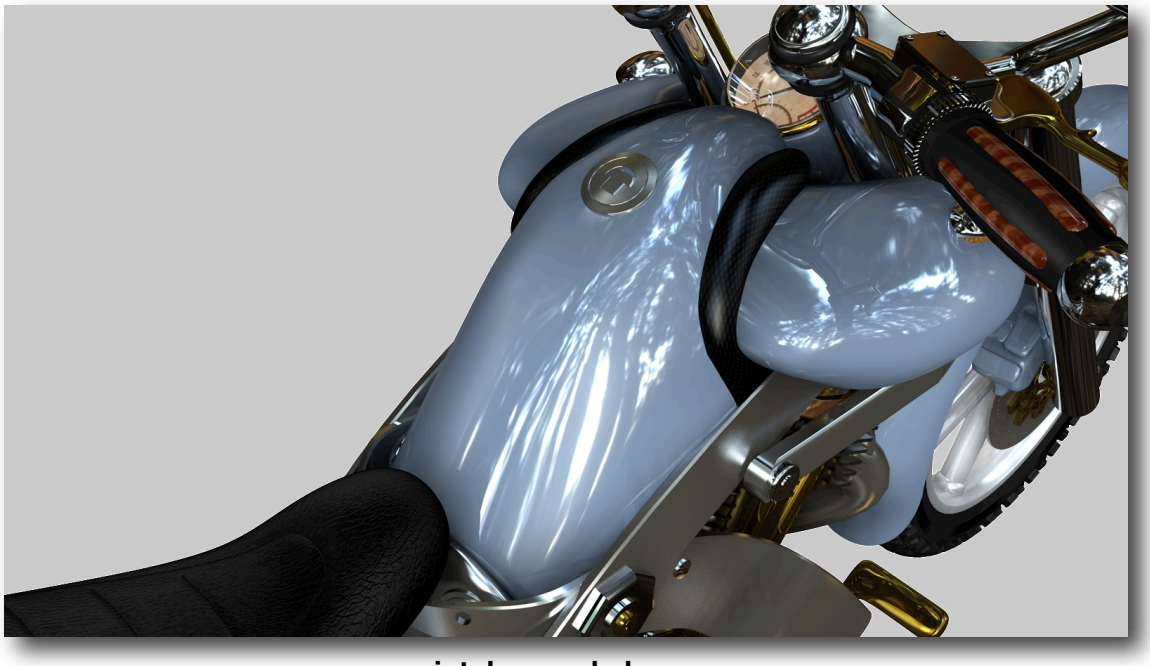
Funneling



- The space between the forks is shaped a bit like a funnel and air is fed between the forks.

Channeling

tilting (as the frame ShapeShifts)



intake snorkels

for deep water crossings and RAM-air

On-Road

- The wing-like shape of the top of the the SidePod then pulls the air up and over itself.
- Since solids in the air are heavier than the air, they do not like to suddenly change direction. They tend to be dropped off and fall below the SidePod and the fresher cleaner air is pulled up and over the top of the SidePod.

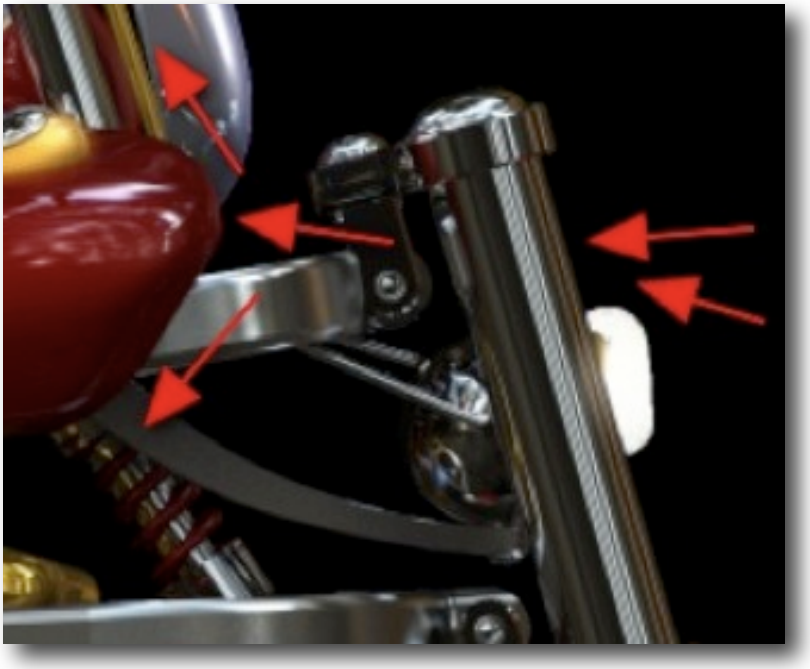
Ram Air

- The top of the SidePod is shaped like the surface of a wing so that when the frame is stretched, the air is accelerated over the top. This creates a Ram-Air effect for the intake
- At the same time, there is a slot between the SidePod and the main Body Cover. This slot channels / pulls the air from over the SidePod toward the intakes.

Off-Road

- Off-Road the SidePod blocks this smooth direct air flow and thus keeps trail dust and water away from the intake.
- As the frame shortens (off-road), so the shortened intake allows for greater power above 4000 rpm and a crisper quicker throttle response.

intake flow when frame stretched



intake flow when frame shortened

Titanium Mesh

- Prevents leaves and large debris from entering the system.

Sound

- The rider can hear the emotion inspiring "animal suckage"
  because the sound is deflected toward the rider by the front module.

- The engine noises are muffled by both of the filter
  and by the 180 degree turnaround that the air takes
  so all you hear is the air sucking in.

Variable Volume Plenum

- (maintains optimal air velocity and capacity
  for smooth low-to-mid RPM throttle response and hi-torque output),

    - Acts as an intake "flywheel".
    - Larger when the frame is stretched .... (for smoother intake)
    - Smaller when the frame is shorter .... (for quicker response)

Longer

- As the frame stretches the Intake volume increases
  The longer length acts as a Plenum Chamber
  to provide even power delivery, but slower throttle response.

- It acts the same way that a heavier flywheel works on the mechanics.
  .... evens the load and improve low to mid range torque below 4000 rpm.

Shorter

As the frame shortens the intake plenum shortens
and allows for quicker throttle response.

Two-Stage Flap

- Longer plenum at low speeds to create a pressure wave
  to increase low-end torque

- Shorter distance = higher hp.

Switchback

- The intake air first goes down the intake tube
  and then doubles-back (180 degrees)
  to act as a "debris trap" to drop-off any dirt, dust etc,
  because such impurities are heavier than air
  and don't change direction as easily.

HEPA (High Efficiency Particle Air) Filter

(washable)

- Made to last the life of the bike.

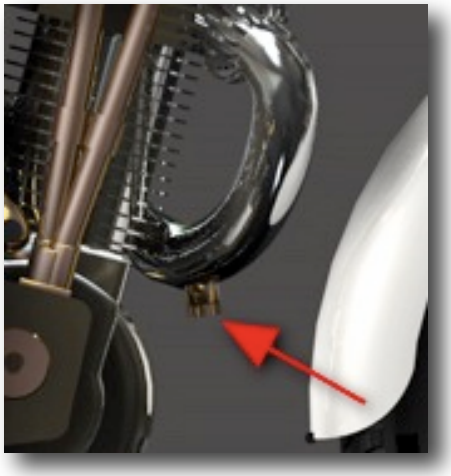
Crankcase Breather System

(Pollution regulations results in the crankcase breather feeding back into the intake)

- Reed-Valve
- Prevents pressure waves in the airbox from reaching the crankcase.

Electro-Static Filtration

- Finally the intake air goes thru an electro-static filter
  to remove any final invisible impurities
  and to ionize the air to make for a better air-fuel mixing.



Exhaust

- The Panther and Cub exhausts meet
  USA, Canadian, Australian and Euro-5 emissions standards.

Construction

- It is made of rust-free 18 gauge 321 Stainless Steel.

- It is ceramic lined so it evens the heat
  and keeps the pipe from "blueing".

Exhaust Port

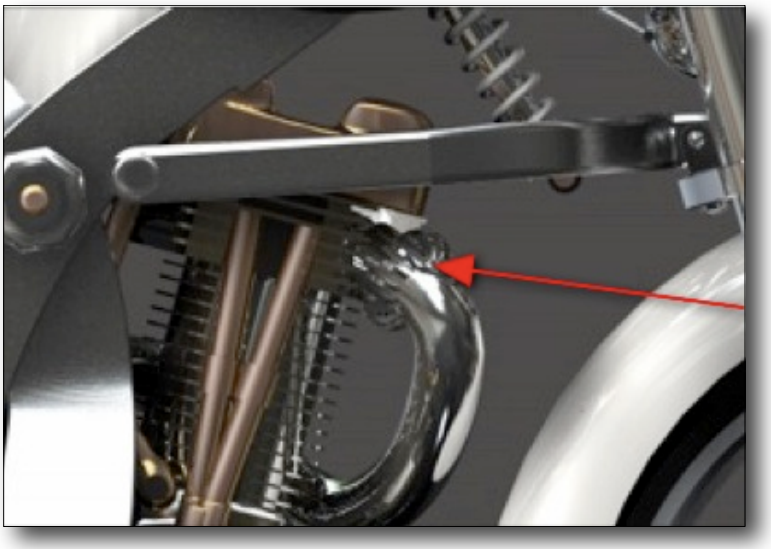
Design

- The Header Pipe exists the Exhaust Port.

- Aluminum head to Exhaust Port separated by a ceramic gasket
  (electrolysis shielding so Stainless Steel never touches Aluminum).

- Being Ceramic, the gasket never needs replacement.

- Header comes off a nicely finned exhaust flange (as in an old Triumph).
  The purpose of the skirt to keep the exhaust port cooled
  and so keeps the valve seat from leaking.



Header

Construction

- Material (stainless steel)
- Inner Coating (ceramic-aluminum alloy)

Design

- It goes in a tight Ram-Horn shape (as in an old Triumph or Enfield) across to the left and over the crankcase (scrambler style).

- A little extra finnage at the exhaust port .... It is a little tricky there. The port has to be kept cool so the valve seal at the seat is maintained, so there is a finned skirt there as in the old British Bikes. Yet .... just past the port a sharp curve creating back pressure and heat resulting in a more complete exhaust burn and a cleaner exhaust-valve.

Air Injection

Design

- It then goes into a sharp bend where it creates a hotspot.

- At that point there is a fresh-air feed to help complete the burn in case any residual gases are unburned. At that point there is also a tiny fresh-air feed. The feed is tiny so as not to cool the gases before they hit the cat convertor. The hotter the gases entering the cat convertor the better.

- This secondary air system between the exhaust port and the Catalytic Convertor is to maximize the burning of residual hydro-carbons prior to entering the Convertor. That increases the life and effectiveness of the converter and keep emissions well ahead of the EPA and EU schedules.

Catalytic Converter

Design

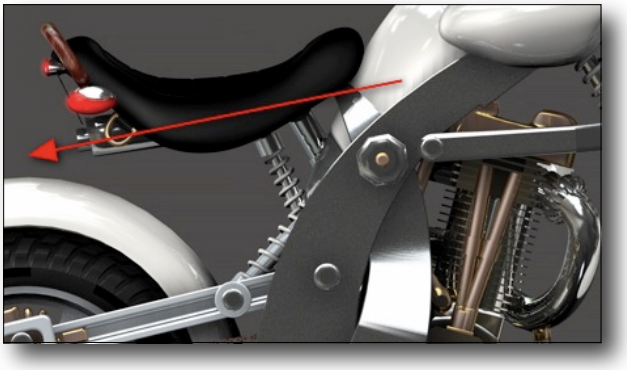
- Oxygen Sensor (Lamda probe).

see: ENGINE MANAGEMENT.

Drain Plug

Design

- When the bike is short for off-road, the tailpipe point down but if the rider crosses a creek and water get in anyway, there is a large diameter drain-plug at the exhaust's low-point.



- In full scrunch, the exhaust plug drains into the drip-pan / skid-plate.

Exhaust Pipe

- Right after the Catalytic Convertor there is another fresh air feed;
  .... bigger this time to cool the gases.

- The pipe in this section is fluted to dissipate even more heat before it reaches the turbo.

Turbo

- Then the turbo version has a fist sized turbo mounted on the long-spar
  that is engaged or bypassed with a toggle on the handlebars.

- High frequencies are already generated by the turbo
  and sending such exhaust frequencies into it creates hi-frequency white noise
  that can decrease the life of the turbo.

- The turbo intake air is partly what pre-cools the air entering the exhaust side of the turbo.

S-Pipe

- Downstream from the turbo (before the seat) another fresh-air feed.
  (all these fresh-air feeds are one way valve to a tube up to the intake)

- These fresh air feeds with one-way valves help draw air into the exhaust
  and create and maintain a speed to the intake flow, acting as an air accelerator.

- The S-Pipe travels close to the Oil Tank.
  This extra cooling air is introduced after the Turbo to cool the exhaust
  before it goes past the oil tank and under the seat.

- We are now just before the point where the pipe crosses the frame's long-spar.
  This is a twisted bend that slides to shorten and lengthen.
  This sliding portion is not sealed and has small holes in the sides.
  This sliding portion is then encased by an accordion cover .... rubber sealed.
  This section of pipe with holes acts to capture high-frequency sound
  in the crevices of the accordion .... A sort of pre-muffler.

- The same technique is used as the exhaust pipe runs under the saddle.
  This triple layer sleeve can be temporarily slid away
  to help warm the oil in winter conditions when starting up.

- There is a triple layer of Mylar with space between each layer.

The hotter the exhaust in the muffler
the more fresh air moves between these 3 cooling layers.

Muffler

FAQ: Is the bike noisy ?

Construction

- Stainless Steel so it cannot rust
- Flexible Ceramic inner coating so it cannot turn blue under extreme heat.
- You can easily open it up and clean it.

Cooling

- Wrapped with header tape under the seat
  and a triple-spaced sandwich of reflective Mylar coated shielding
  between the muffler and the seat pan.

- The spaced triple layers creates convection using the exhaust's heat
  The hotter the exhaust, the greater the convection flow
  to cool the pipe and so keep heat away from the muffler.

Design

- The air then goes into a custom designed high volume vortex muffler.

- Tucked under the seat with no exhaust parts exposed.
  That way the rider cannot be burned.

- The muffler uses muffler-tape to reduce any heat to the seat.

Sound

- Our unique sound is a deep and lovely, low and throaty, Bass Oboe, British Thumper, farm tractor with a touch of American Muscle Car to serenade the rider as it provides the proper musical accompaniment to the engine.

- As the frame stretches, the exhaust system lengthens in the middle and so the tone of the exhaust goes to a lower pitch.

- Every rpm in every gear sounds slightly different; she speaks; the way she .... talks to the rider and creates a sense of animation ....

    - **purr** .... at idle (800 rpm) A mellow throbbing heartbeat
    - **growl** .... while cruising (2-2.5k rpm)
    - **roar** .... when passing (3.5k-4.5k rpm)
      (feels like extra barrels opening on an old 4 barrel carb)
      (actually the second injector kicking in .... at 4.5k rpm)
    - **howl** .... orgasmically as you reach each shift-point limit. (5.5k)
    - **scream** .... painfully when approaching red-line. (7k rpm)
    - **shriek** .... at redline.

.... for the brain-stem level of emotional reaction/communication that these sounds represent.

Sound Control

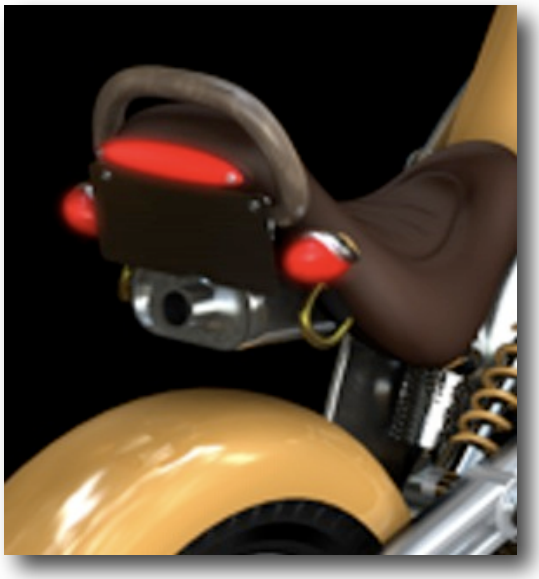
- You can also adjust the tone and volume.
  Volume controlled on-the-fly via a lever under the left side of the saddle.

- There is a knob on the bottom of the muffler
  that allows the baffles to be adjusted so as to adjust the sound volume.

Mount

- All connectors are mechanically locked so the exhaust system cannot vibrate loose.
  The Catalytic Convertor is Key-Locked on since it is expensive and easy to sell.

Tailpipe

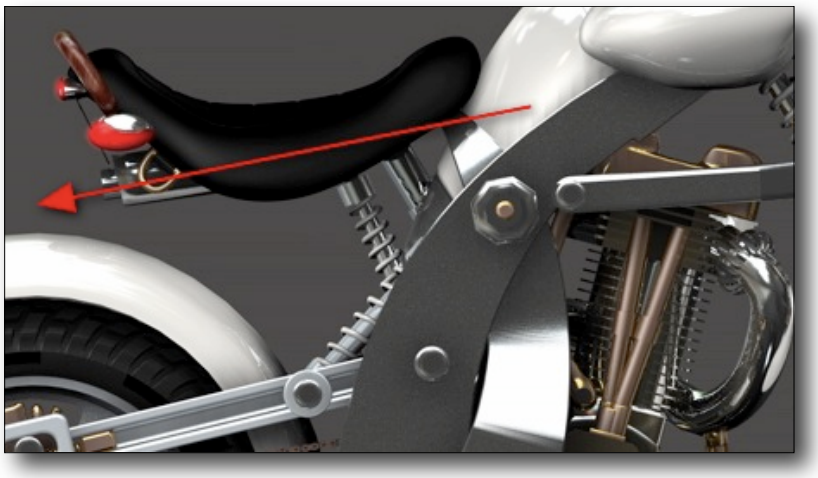


- The exhaust gases finally goes thru a titanium mesh that acts as a final stage spark arrestor that is required by law in most places.

- The exhaust pipe is flexible ceramic coated inside to keep it from blueing.

- The Single Cylinder Models have a single exit to the muffler.
- The Twin Cylinder Models have two exits from the muffler.

- Note that when fully scrunched, the tailpipe aims down to prevent creek water from backing up into the exhaust.



Drive

Sculpture in toughness

(rendering)

Side

- Right-hand drive so the engine pulls evenly left-to-right
  for perfect torque balance.
  and so the primary belt can remove without removing the final drive chain.

Primary

- Super narrow 3/4 inch wide belt
- Aramid construction
- The belt goes OVER the clutch basket
- 300 hp capacity rated (way over-engineered)
    - quiet
    - zero stretch
    - extremely long life.

Clutch

- The clutch is positioned along the arc that the crankcase takes as the engine shifts its position during the frame's shape-shifting.

    - Dry
    - Hydraulic (instead of cable operated)
    - Self-Adjusting
    - Back-Torque Limiter (or smoother downshifts)
    - Extra-Thin Profile

Cub Clutch

- 5-inch Diameter Stainless-Steel Disks
- Kevlar Friction Surfaces

Panther Clutch

- 7-inch Diameter Stainless Steel Disks
- Kevlar Friction Surfaces

Ceramic Clutch

- 7-inch Ceramic Disks (warp proof)
- Kevlar Friction Surfaces

- In extreme off-road or racing use
  the steel plates can warp when slipped and make the clutch feel "mushy"
  so we offer ceramic plates that cannot warp
  and use Kevlar friction surfaces so the clutch should last the life of the bike.

Clutch Springs

- THE CLUTCH MUST BE THE WEAKEST LINK IN THE DRIVE-SYSTEM.
  and so it use slightly weaker clutch-springs.

- The Springs are triple nested so if one breaks,
  the clutch still operates well enough.

Starter

Design

- Other Large motorcycles generally use roughly a 1-hp starter.
- 1.5 hp ..(1.15 kw) (Cub)
- 3 hp (2.3 kw) (Panther)

Mounting

- Mounted on the back/top of the tranny.

Transmission

- The perceived refinement
  is partly reflected by the smoothness and lightness of the shifts
  created by hydraulic controls for a direct intimate connection to the road.

- In the Panther, the smoothness and lightness is increased even further
  by the nano-diamond (DLC) coating of the gears.

- There is constant gear contact so while not shifting, the tranny is silent.
  The rider only hears and feels a gear's engagement.

Design

- Super-Narrow Profile (11.25 inches wide)
- Cassette Design (smoother and easier service)
- Constant mesh (for the best in quiet smoothness)
- Neutral Detent System (no miss-shifts)
- Trap Door and Torque Stabilize

- The "Classic" 6-speed Transmission does NOT use SuperAlloy Gears or Bearings.
  That level of quality is only found on the 7-speed transmissions.

- A separate transmission
  allows for a firmly mounted vibration-isolated drive system
  so the engine is allowed to move/vibrate
  yet maintains isolation between them.

- A distinct unit with its own oil bath.
  .2 quarts. of 70w heavy duty synthetic Mobil-1 (for extreme use)

- Cassette type design with a triangulated shaft layout
  for better power transfer.

Type

- 6-Speed
  - 2.25 inch gears (same as Harley)

- 7-Speed
  - 3-inch gears
  - Alpha-Prime Tungsten-Cobalt Super-Alloy gears
  - DLC (diamond like coating) gears
  - Optional reverse.

Gears

- This is as smooth and vibration-free as a transmission can get.
  When ridden at speed limits .... 25, 35, 45, 60 mph ....
  there is a silent, smooth rpm (~2200 rpm) / gear ratio for each specific speed.

Design

FAQ: Why coat the gears in DLC ?
FAQ: Why not make them out of Carborundum instead ?

A: Because DLC is not just much stronger, but also much slicker, so shifts are far smoother.

- Transmission gears are 3-inch, rather than the usual 2.25 inch.
  They are near-diamond (DLC) coated for the lowest wear
  and 10-times slicker than Teflon for the smoothest possible shifting.

- 1st, 2nd, 3rd (straight-cut for strength)
- 4th, 5th (helical cut for low noise)
- 6th (direct drive)
- 7th (overdrive)

Ratios

- Speeds are estimates and depend on conditions and rider weight.
- The 7-speed versions have both a super-low "granny gear" and an "overdrive".
- The 7-speed version can also come with a REVERSE GEAR

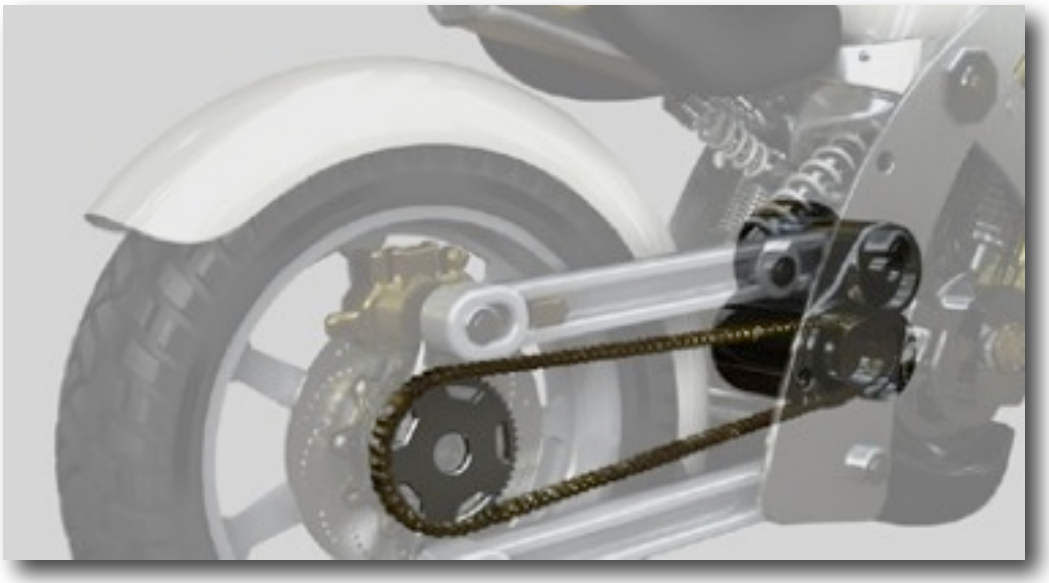
- **1st gear**
  - (5 mph) @ 2200 rpm
  - (10 mph) @ 3500 rpm
  - (15 mph) @ 5000 rpm
- **2nd gear**
  - (10 mph) @ 2200 rpm
  - (20 mph) @ 3500 rpm
  - (30 mph) @ 5000 rpm
- **3rd gear**
  - (25 mph) @ 2200 rpm
  - (35 mph) @ 3500 rpm
  - (45 mph) @ 5000 rpm
- **4th gear**
  - (35 mph) @ 2200 rpm
  - (45 mph) @ 3500 rpm
  - (52 mph) @ 5000 rpm
- **5th gear**
  - (45 mph) @ 2200 rpm
  - (55 mph) @ 3500 rpm
  - (65 mph) @ 5000 rpm
- **6th gear**
  - (55 mph) @ 2200 rpm
  - (70 mph) @ 3500 rpm
  - (80 mph) @ 5000 rpm
- **7th gear**
  - (70 mph) @ 2200 rpm
  - (90 mph) @ 3500 rpm (governor)

Shifting Gears

- When shifting gears, the transmission first matches the revs to the roads speed for the smoothest possible shifting
  and the least possible sudden load changes to the gear set.

- Shifting gears sounds and feels like the sliding of a "rifle bolt".

Final Drive Sprockets



Design

- 3 inch at the Transmission
- 8 inch at the Wheel

Construction

- Stainless Steel
- DLC (diamond like coating)

Final Drive Chain

- Made to last about 12-14 times longer than a standard chain.

- Can remove the chain without having to remove the wheel
  because it does not snake thru the swingarm as with conventional motorcycles.

Design

- 530 Chain

Construction

- Sealed O-Ring X-Chain
- Nickel Plated

Tensioner

- Because the final-drive sprocket is AT the pivot-point for the swing-arms, both the wheel and the swing-arm pivot stay parallel.
  As the wheel moves up and down the chain tension remains constant
  so NO TENSIONER IS NEEDED
  and there is no back-lash nor room to jump-track.

- Now, with the chain tension remaining even,
  this suspension design also adds much more chain life.

Adjustment

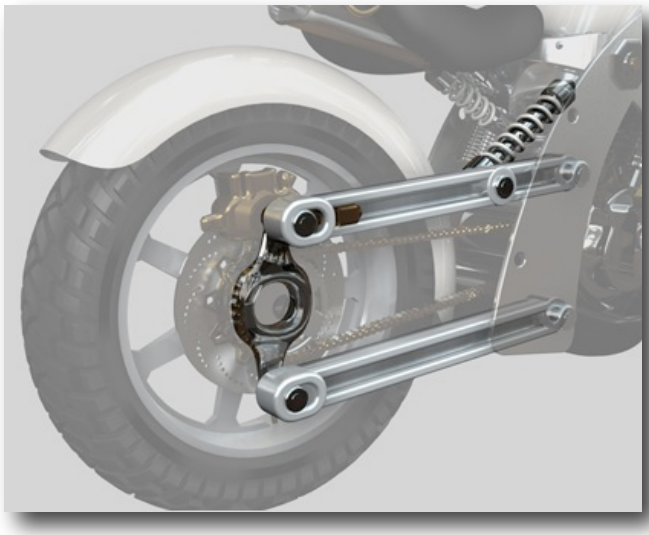
- Chain length is adjusted via a slide-n-screw arrangement.

- Chain can be removed/installed without removing the wheel.
  (In an ordinary bike the swing-arm runs through the path of the chain.)

- The chain is well protected from flying debris
  by tucking between the swingarms.

Wheel Mount

- SwingArm to wheel hub.



- Wheel mount .... pins and one large nut.
  like on a Formula-1 car
  for quick and easy removal
  since the bike cam come with several sets of wheels.

Other Final Drive Options

FAQ: Why not a Belt Drive ?

A: Because a belt drive cannot perform well off-road.
If a stone comes between the Pulley and Aramid belt, the result is destruction.

FAQ: Why not use a Shaft Drive ?

A: We shall offer an easy add-on belt drive about 3 years in.
It requires a lot of extra testing to be sure there are no harmonics.
Keep in mind that you loose 15% of the bike's power to the Shaft
so chain is still a great option, especially with one that is self-lubricating
and last as long as ours .... and a spare is easy to carry.

- Most Militaries prefer a shaft.

Electrical

Systems Pod

- The body's electrical systems
  are sealed molded plastic EM shielded tub-box
  (shielded by metallic glass foil)
  that contains all the essential electricals (CPU etc).
  It is high, dry and tucked warm under the tank and above the engine.

Voltage

- 12 volt

Wiring

- All wiring is woven heavy gauge to Military / Aviation standards.

- The entire bike runs on a simple digital wiring system,
  eliminating the need for a complex wiring harness.

- Wire Colors ....
    - Red - hot
    - Black - negative
    - Green - ground
    - Blue - data
    - Striped (spare wires)

Battery

Design

- Lithium-Ion (super light weight .... room for 2)
    - One
    - Two

- High Capacity
- Automatic Disconnect Trip Switch

Mount

- Mounted away from the oil tank (to keep it cool)

- The primary battery is mounted at the bottom of the long-spar, just below the Transmission. There is an addition storage box above the transmission that can hold a second battery.

- The battery box is ....

W - 11.75 inches
H - 3.01 inches
L - 6.61 inches

Construction

- Gold Plated Connections
- 19 lbs.
- 3 (H) x 6 (W) x 11.34 (L)

Alternator

- 3 Phase
- 40-amp 380 watt (Panther)
- 25 amp 300 watt (Cub)

Charger

- On-Board
- LED Level Meter

Ignition System

Module

- Solid-state "**V**ariable-**I**gnition **T**iming" (VIT)
    - More precisely controls timing no matter how fast the rpm changes.
    - Fewer moving parts for longer, trouble-free life.
- Intelligent Spark Technology
- 3-Stage Ignition Mapping (semi-automatic)
    - **R**-Rain
    - **T**-Touring
    - **S**-Sport

Spark Plug Wires

- Warm orange / yellow plug wires with red plug-caps and coils ....
  (right-brained image connection)

Wire Connectors

- All wire ends are heat-shrink Teflon Sealed
- All Wire Connectors are Gold Plated.

Power Plug

- AC (115 v)

Testing Terminus

- With LED indicators for super-easy trouble shooting

Circuit Breakers

- Toggled 12 volt circuit-breakers (LED turns on if tripped).

Ignition Switch

- Keyless (no key to lose)

Engine Management System

- Precise Ignition Timing Control

Instruments

To suit your tastes.

- The 4 inch by 7 inch iPad should be available before Panther production begins and that unit will be used for the instrument display.
  If that unit is delayed, the smaller 2 inch by 4 inch iPod will be used and will be switched for free when the larger unit is available.

- Practical functionality means no superfluous displays resulting in an elegant simplicity and clarity with a minimum of visual distraction.

Type

Digital

- The Apple iPod is the perfect choice for a digital gauge because so much of the needed software is already available. including engine diagnostic software.

- When riding in an extremely abusive off-road situation it is easy to pop the iPod out and carry it in your jacket pocket,

- When Hiking you can easily pop the iPod out and have a phone, GPS and compass to carry with you.

- The 2" x 4" inch iPod in a water-sealed case.
- It also displays ....
    - Diagnostic Warnings
    - Owner's Manual
    - Repair Manual
    - Wireless HQ Communications via Internet

- Gauges mounted on the front module of the "tank" ....
    - Mounted horizontally.
    - Close to other electricals (shortest wiring)
    - Tucked in for protection in a fall
    - Adjustable LED illumination.
    - Angled more to the rider's face for better viewing.
    - Glare-free clear ballistic grade poly-carbonate face.

Functions

Standard Package

- Speedometer
- Tachometer (engine speed)
- Odometer (distance)
- Trip Odometer
- Gear Indicator
- Fuel Level
- Oil Pressure
- Oil Level
- Transmission Oil Level
- Voltage
- Clock
- Tire Pressure
- Power Level
- Frame Shape
- Diagnostic Codes (or servicing)

Extreme Package

- Fuel Temperature
- Oil Temperature
- Cylinder Temperature
- Clutch Temperature
- Transmission Oil Temperature
- Brake PSI (front and rear)
- Brake Temperature (front and rear)

Explorer Package

- GPS
- Compass
- Ambient Temperature
- Incline angle
- Altitude

SKYPE too

GPS and COMPASS

Sensors

(79 total)

Seat

- Rider Weight (sit / stand / overall weight)
- Seat Side Pressure (rider "side english")
- Seat heat Setting

Frame

- Frame Shape
- Flex / Pressure on the Engine Mount Rods
- Lean Angle
- G-Force (forward)
- G-Force (side)
- Vibration (x4)

Steering

- Steering head Frame Flex (6" back)
- Steering angle

Body

- Side Pod Impact Sensors

Lighting

- Headlight Circuit
- Tail Light Circuit
- Turn Signal Circuits (x4)
- License Plate Light Circuit

Instruments

- IPod Charging Disrupt Indicator

Electrical

- Battery Output
- Battery Reserve
- Indicator if a Circuit breaker has Tripped (LED)

Ignition System

- Spark Plug Resistance

- Coil Output

Intake
- Filter Restriction
- Intake Port

Engine
- Power Level
- RPM
- Load
- Cylinder Head Temperature
- Crankcase Temperature

Primary
- Temperature
- Vibration / Chatter
- Belt Slip

Clutch
- Temperature
- Vibration / Chatter
- Disk Slip

Master Cylinders
- Front Brake Reservoir Level
- Rear Brake Reservoir Level
- Clutch Reservoir Level
- Clutch Temperature

Fuel
- Fuel Level
- Fuel Tank Pressure
- Fuel Pressure
- Fuel Temperature
- Fuel Flow (downstream from the filters)

Starter
- Circuit resistance
- Temperature Sensor

Engine Oil

- Oil Level
- Oil Pressure
- Oil Temperature
- Oil Acidity
- Oil Flow

Exhaust

- Exhaust Port
- Exhaust Header Temperature
- Oxygen Sensor (Lamda)
- TailPipe flow (downstream from the catalytic convertor)

Transmission

- Gear Position
- Load
- Oil Level
- Oil Temperature
- Oil Acidity

Environment

- Ambient Air Temperature
- Altitude (engine control)
- Barometric Pressure (engine control)
- Ambient Light (instruments and lighting)
- Rain (power and anti-spin control)
- GPS
- On-Coming Lights (headlight dimming)
- Incline and Lean Angles

Fuel

- Fuel Level
- Fuel Filter Resistance

Wheel

- Brake Temperature
- Brake Pad Thickness
- Brake Vibration / Chatter
- Lock / Spin Sensor
- Tire Pressure (bluetooth)

Diagnostics

- always knowing.

In addition such matters as the condition of the fluids, wires, and many other systems are checked in the background and the bike notifies when something needs attention.

- Because it is a screen
  and backed up by tons of Applications.

- The iPod contains ....
  - Complete Owner's Manual.
  - Compete Repair Manual.
  - Diagnostic Gauges display as needed.
  - Connection via WiFi to "Homebase Panther"
    for any voice help when trying to repair and getting stuck.
  - Updates easily uploaded.
  - Connects to 69 sensors all over the bike.
  - Connects to the Engine Management System.

Skins

- Parchment
- Titanium
- Gloss Black
- Pearl White
- Warm Yellow
- Powder Blue
- Candy Red
- Soft Grey

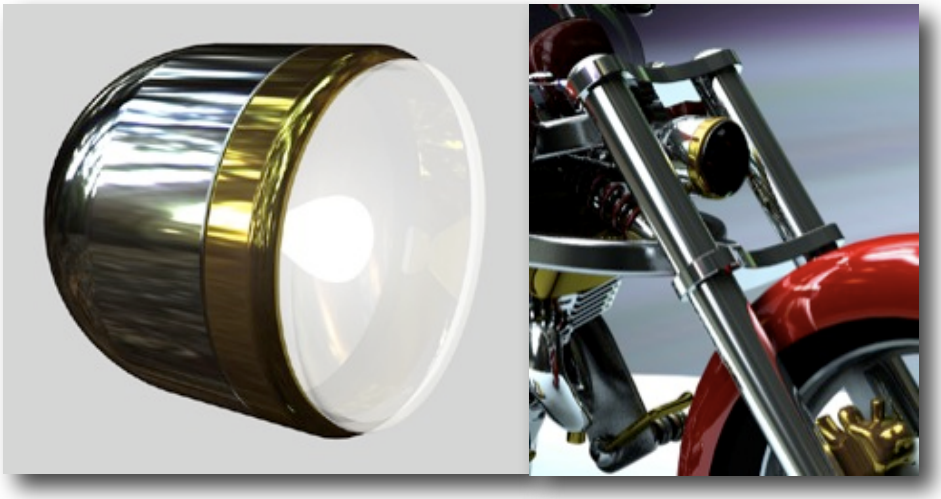
Scale

- USA
- Metric

Lighting

- All lighting is LED so no bulbs to replace
  and so bulbs cannot break when off-road.

Headlight



The actual headlight is not shown.
Because it is not officially released yet, the manufacturer prefers we not show it.

Design

- Special cool-running LED design
  that runs so cool that 3-beams can be housed in a 4 inch housing without over-heating.
  (typical LED technology allows only one bean in a housing that small).

Function

- Stays on all the time .... for extra lighting safety
  and stays on for an adjustable period of time after the bike is shut off
  to light your path from the vehicle at night.

- **Tilts** (so as the frame shapeShifts, the headlight stays level.
  Detaches to serve as a lantern (with an extra internal Lithium battery).

- **Pans** (because it is mounted on the frame rather than the forks
  it pans to follow the steering .... it pans half as much as the steering).

- **Adaptive** so it tilts slightly to correct itself as the bike corners
  so although the bike is leaning,the headlight stays rather level as it pans.
  This prevent the dark spot toward the top of the headlight from darkening the corner.

Construction

- Housed in a 4.5-inch enclosure.
  that lets you carry it as a lantern.

Mount

- It takes three connection point to make it stable, so ....
    - One is attached to the frame.
    - One is attached to the handlebar tilt plate.
    - One is attached to the steering plate.

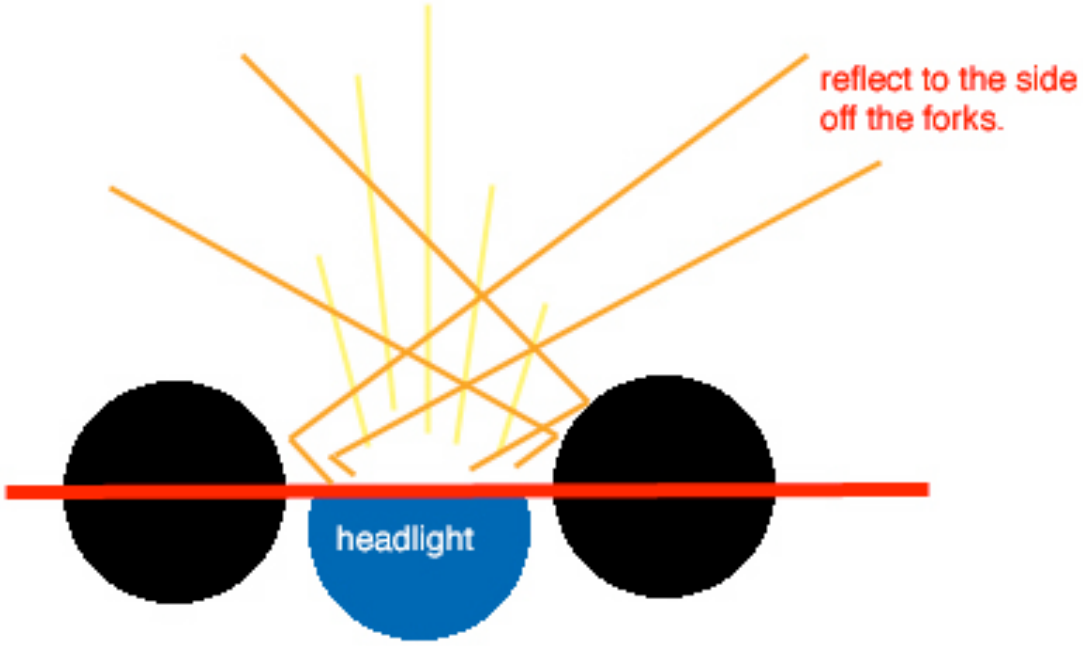
- That way it always stays tilted level as the frame shape-shifts
  and it pans halfway with the steering.
  If the steering pans 30 degrees, the headlight pans 15 degrees
  so you see the corner and still see ahead of you as well.

- Small (4 inch diameter) so it does not block the cooling air
  from the under-tank funnel-like curve.

- There is 9-inches between the upper and lower A-arms at rest.
  The headlight is 4 inches tall with a half-inch clearance needed.

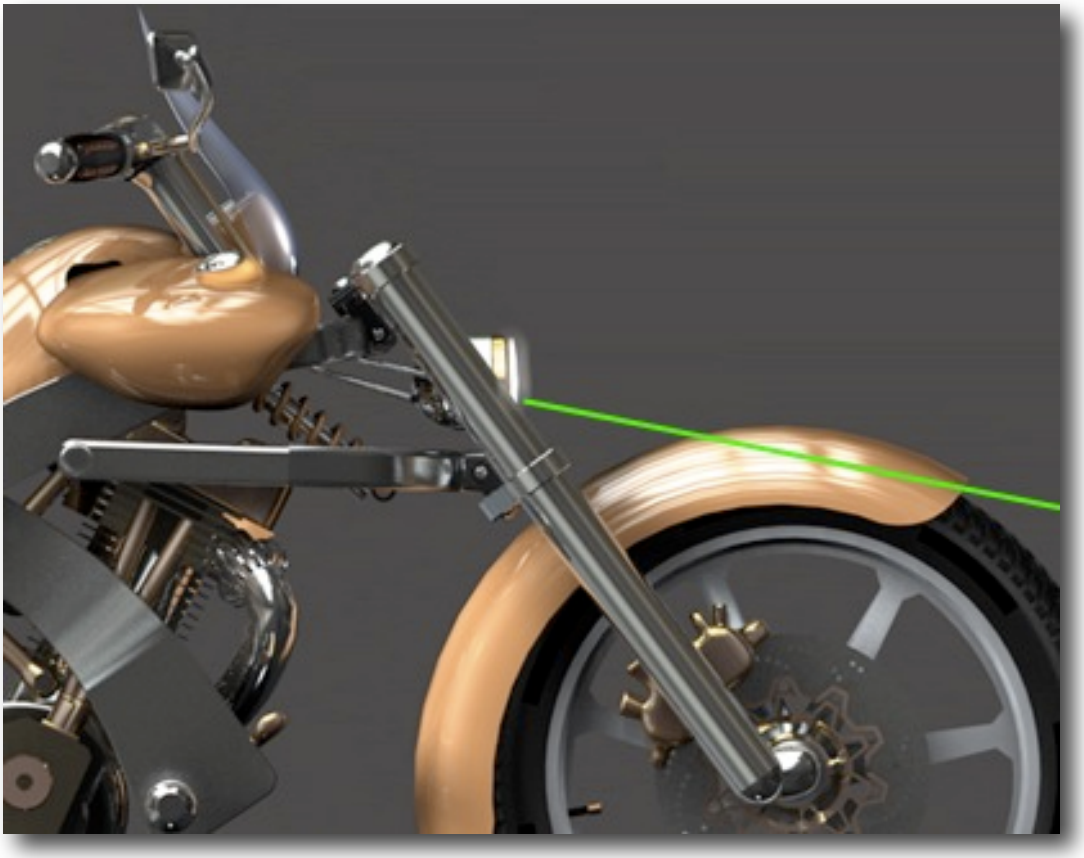
Short Frame

- The headlight is safely recessed between the fork when the frame is shortened.
  It then reflects off the sides of the forks
  to create an even wider scatter light pattern beneficial in off-road riding.



Long Frame

- The headlight moves out forward a bit
  and bike projects a mild half-shadow over the fender onto the road ahead.
  This help traffic better see the bike at night
  and helps the rider relax more in his aim of the bike,
  sort of like a hood ornament aims the car in its lane.



Features

- The headlight is **REMOVABLE** (with a key).
  it has a handle and an internal rechargeable Lithium battery
  so it can be used for hours as a lantern.

- Hi-impact plastic grill-cover for the best lens protection.

- When cornering, the light pans and low beam automatically
  also comes on no matter which beam setting you are on.
  Cornering lights brighten automatically.

Three Beam

1. Low-Beam .... wide pattern (short distance)
   daytime driving light and cornering

2. High-Beam .... narrow pattern (long distance)

3. Both (overlapping beams) .... great off-road

Behavior

- daylights .... Low dim but still on.
- passing signal .... flicker (push-button flash for passing)
- horn .... headlight pulses with the horn.

Turn Signals

Design

- LED
- Stay on and blink off-on for extra lighting safety.

Function

- Running Lights
- Blinker System
- 4-way Flashers
- Turning Signals
- Tire Light (to light the reflective strip)

note: The clear-reflective black-walled tires
have LED light aimed at their reflective sides.
A huge safety advantage in allowing
the bike to be easily and safely seen in the evening,
from the side, such as with intersections
and by side-street emerging traffic
without needing the daytime look of a whitewall.

Tail Lamp

- LED (low power consumption / highest shock resistance)

Function

- Stays on for extra lighting safety
- Blinks twice when down-shifting gears

Mount

- Tail-light mount under rear of seat. (safer if bike is dropped)
- Uses a mount plate
  so that it can be mounted without risking damage to the seat-pan.

License Plate

- Clear protective cover.
- S.S. Frame
- Lighted by the white lens on the underside of the tail-light.
- Locking bolts so nobody can steal your plate.

Brake Lighting

Tail-Lights

- Tail-Light brightens when braking.
- Tail-Light quivers when braking hard.

Turn-Signals

- All four Turn Signals are always lit.
- Turn-Signal lights brighten when braking.
- Turn-Signals Quiver when braking hard.

Body Lighting

- Under tank
- UV Toward wheels (to better light the tire sidewalls)

Fasteners

- There are ONLY three sizes of fasteners on the bike
  so the multi-tool carried by the bike can handle it.

Material

- There is a large family of alloys
  that can be collectively referred to as "Stainless Steel"
  in that they do not rust.

- All of our fasteners are aircraft fasteners and are made of stainless steel.
  Some are even made of extremely strong Alpha-Prime Tungsten-Cobalt Super-Alloys.

- All these alloys begin with Steel and Chrome
  and then add Tungsten, Americum, Zinc and other elements
  to create a variety of alloys that do not corrode.

Design

Mechanically Locked

- All fasteners are mechanically locked so they cannot vibrate loose.

http://www.stage8.com

Key-Locked

- Some fasteners are locked on with a coded key so they cannot be easily stolen.

http://www.Mcgard.com/security/intimidator.asp

Frame

- A Dual-Ladder Space-Frame
is much stronger than a tubular frame.

Colors

- Polished Stainless
- Nickel Satin
- Gloss Black
- Army Green
- Khaki Tan

Design

Look

FAQ: Why does the frame look the way it does ?

- The first part of the bike designed was the frame.
- Because the Seat, Pegs, Handlebars, Front, Rear, and Engine all move at once
  and all relative to each other in a way so as not to adversely effect the balance or handling
  It needed to move in just the right way.
- In addition the relationship between Rake and Trail for every frame opposition
  had to be just right or the handling would be effected.
- It took many months of trying every possibility before the exact frame was created
- We got a comment once that it made the bike look a bit
  like a "rocking horse" or a piece of exercise equipment
  but it is the only way to have it function correctly.
  If someone does not like the look, the frame is available in a powder-coat black
  which easily shifts attention away from the look of the frame.

Sizes

The frame comes in 4 sizes (Small, Medium, Large, X-Large)
The size differences are in the shape of the Short Spar.
That effects the reach and leg length components.

Style

Standard Frame

Racing Frame (rendering)

Construction

Where quality begins.

- Overall frame width is an amazing 11.75 inches I.D. .... 12.25" O.D., (1/4 inch thick)
    1. more comfortable ergonomics
    2. more efficient aerodynamic penetration at high speeds
    3. easier maneuverability in the tight woods.

- The reason the frame is steel is because the feel-of-steel is important since the frame is part of the suspension.

- Stainless Steel (no rust anywhere)

- Twin-Spar chassis in a double-ladder design with several cross-struts / gussets. There are also several diagonal struts to control and redirect torsional loads. to create the advantages of a "space frame / trellis frame".

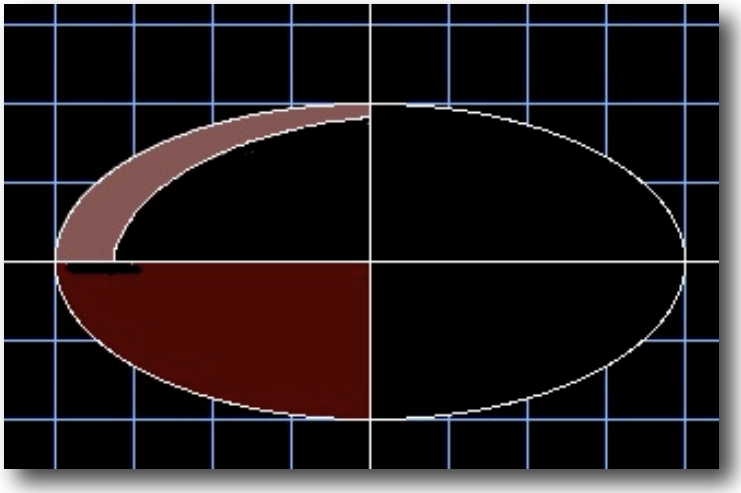
Frame Method

- The criss-crossed frame-blades can be engraved and made very personal.

- The bike uses many mounting points common to Harley Davidson so it benefits from sharing the huge after-markets built-in customer base.

- Where the Blades criss-cross ....
  All bushings/casters are Delrin / Urethane.
  There is a Teflon disk between them.
  There is also a vibration absorbing "blue gel foam" pad.
  It leaves more than a finger-width space so the blades can't pinch.

Blades / Spars



- The blade-pairs are held in slightly curved tension by the gussets so as to create greater strength thru pre-tensioning that helps disperse and even out the loads to the frame.

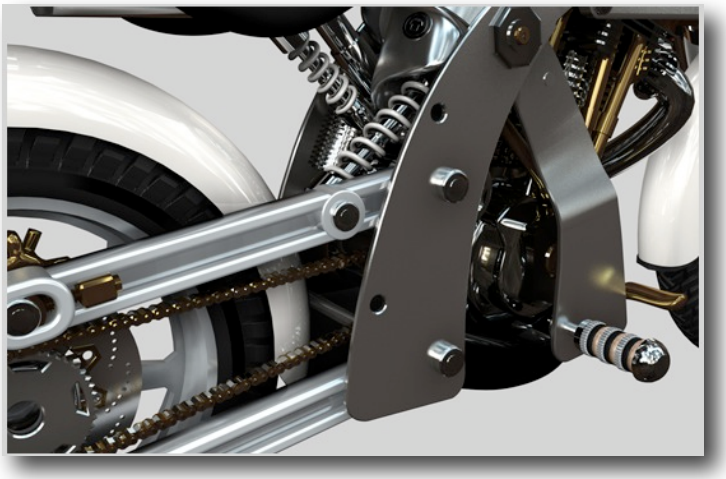
- All cross-strut reinforcement of the blade-spars are very evenly spaced so the flex engineered into the frame is very evenly distributed. (only some of the cross-struts are shown)

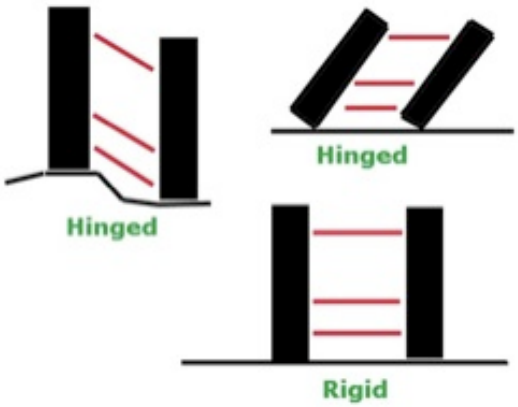
Carting

- Carting" Bikes Together ....
  Using the three holes as a triangular support,
  bikes can be hooked together side-by side.
  (Military, Forest Service, Hunter)

    1. When a bike is disabled, you can transport it back.
    2. Transport a disabled member.
    3. Transport equipment.
    4. Transporting back large game.
    5. Great option if it starts snowing

- The lower two holes on rear of Long Spar for pulling or towing.
  The upper hole is for being towed.





Long Spars

- Internally reinforced twin-spar frame.
  mounts engine, tranny and suspension.

- Overall frame width is an amazing 11.75 inches I.D. .... 12.25" O.D., (1/4 inch thick)

  1. more comfortable ergonomics
  2. more efficient aerodynamic penetration at high speeds
  3. easier maneuverability in the tight woods.

Short Spars

FAQ: Does the Short Frame-Spar interfere with engine cooling ?

- The short spar has many functions ....

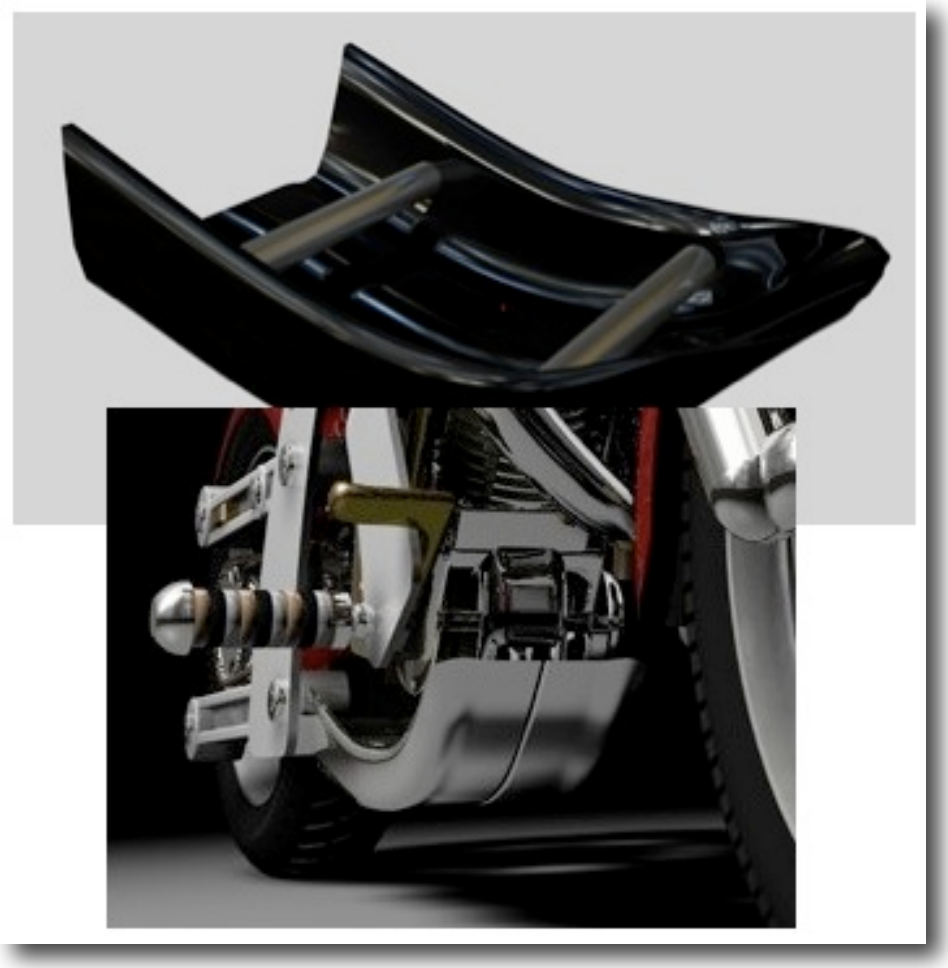
    1. Side protection for the engine in a fall.
    2. Protecting the leg from engine heat.
    3. Funneling air across the engine for cooling.
    4. Hiding the engine heat signature (military).
    5. Isolating the seat and pegs from the long-spar
       so engine and drivetrain vibrations are isolated from the rider.
    6. Easy sliding surface in a fall (to help prevent cart-wheeling)
    7. Creates a saddle "Stirrup" look.

- Leather cover option.

- The Short-Spar is made of a springy Stainless Steel
  to help keep it from deforming in an accident.
  It is made of thinner plate than the Long-Spar

Skid Pan

- The structure is shaped like a with spade with a flat front edge.
- The two cross-braces are flexible so the entire structure absorbs impact.
  On a hard impact the skid-plate curves its sides
  around the side of the engine as the cross-braces bend.
- It also makes the bike quieter and smoother
  The shape creates harmonics and so attracts vibration.
  The idea is to directly attract the vibration from the frame and engine
  and then break it up with the cross-braces
  and absorb it with the acoustic/impact-foam sandwich.



Skid Pan (construction)

features

- The plate is made of a sandwich with
  "rubber" epoxied between two Springy Ballistic Polymer sheets
  that adds additional protection and shock cushioning
  to help prevent engine damage.
  It also helps dampen sound / vibrations.

- Chinning (a corrugated ridge down each side)
  gives it greater overall strength.
  It also provides runners for sliding over logs.
  The springy section between the runners absorbs impacts.

side

- Sides curved up
  - for added strength
  - to prevent cutting the rider's foot in a fall.

back

- Tilted down slightly to form a resting notch at its base
  where it meets the frame (log parking).

- Ridges down the sides contain rods
  that spline with the base of the Long-Spar.

middle

- The transition where the ridges become shallower.
  - tapers back
  - easily slide toward the back.

front

- Almost squared like a spade for center-stand parking.

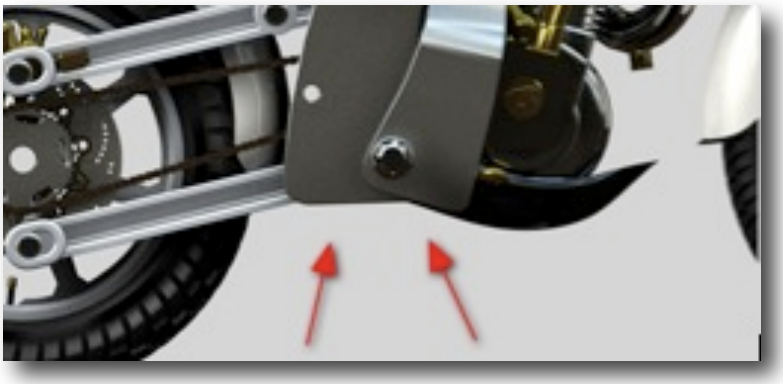
Skid Pan (functions)

- **engine-protector**
    - 2-inches of impact absorbing space.

- **center-stand**
    - Tilts further to act as center-stand with wheel in the air.
    - Pivoting for easy removal of either wheel.

- **oil drip-pan**
    - Pan deep enough to hold all the oil (4 quarts)
      for leak from the engine, tranny, oil lines or oil tank.

- **deep-woods parking**
    - A little indent form at the spar bases in full scrunch
      to help easily park the bike across a log in the woods.



Materials

Where quality begins.

- There are no rusting materials used anywhere on the bike.

The Feel of Steel

FAQ: Why not use Aluminum or Chrome Moly for the frame ?

A: Chrome Moly corrodes and this is a 100% corrosion-free bike.
Aluminum is too rigid for the quality ride-feel we are after.

- Just like with a bicycle .... if it is too rigid, you sacrifice ride quality.

- Steel has more favorable characteristics than aluminum
as far as transmitting certain vibrational frequencies
which the rider's brain processes as "feel",
so riders get better overall feedback with steel-framed bikes.

Material Flex

- A steel frame absorbs energy not damped by the bike's suspension
and releases it gradually compared to an aluminum-framed bike,
where the whole vibrational shock hits at once.
This means that a steel-framed machine is more forgiving of the
inadequacies of less-than perfect settings than an aluminum-framed ride.

- Because steel-vs-aluminum absorb energy differently,
steel Bikes have a larger "window" of acceptable suspension settings.
An aluminum-framed machine can handle just as well or better
but there is a much narrower range of settings in which it will do so,
leading to more difficulty finding an appropriate setup,
especially with differing riding conditions with a frame that changes shape.

- The two flat plates (long spars) are rigidly mounted
to better resist torsional loads or twisting.
It forms a supporting structure akin to an I-Beam (ladder-frame)
but with the additional torsional advantages of a space-frame.

Balancing Flex

- A flexible frame acts as a spring
  and can absorb and reduce the effects of some types of loading.
  If only parts of the frame are stiffened
  then it may pass more load through to the unstiffened areas
  which may deform locally more than before
  even though the whole frame deforms less.

- There are occasions where the stiffening of one part of the frame
  may lead to increased risk of excess flex in another less stiffened area.
  The stiffness has been very evenly distributed throughout the frame
  creating a very tiny amount of frame-flex near the front of the long-spar
  to help better place the front wheel in a very high-speed cornering.

Gussets

- The amount of flex is proportional to the cube of the unsupported length,
  so reducing flex by half increases the stiffness by a factor of eight.
  Hence even small gussets can stiffen the frame considerably.

- Gussets / Struts act as sensors for frame-flex feedback to the computer.
  They must be placed at top and bottom, front and back
  for a 3D torsional map to emerge.

- There are 12 parallel struts/gussets and several diagonal struts as well.

note:
Some of the gussets (diagonal gussets) are not shown.

- The gussets in the Panther R-Bike frame create a boxed / ladder-frame with many of the added torsional advantages of a space-frame. This allows the frame to be better designed with controlled-flex which is a huge advantage in extreme hi-speed cornering.

- The gussets are made of Stainless Steel for high shear and torsional strengths (twist) and they do not rust.

Long Spar

- base
- lower swingarm
- tranny
- upper swingarm
- seat spring mount
- main spar pivot
- actuator (x2)
    - where the cylinder meets the crankcase.
    - where the engine head meet the cylinder.
- steering head

Short Spar

- at the seat
- at the main spar pivot

ShapeShifting

Moves with you ... it is almost alive

- The problem with "Adventure" or "Enduro" motorcycles that claim to go anywhere is that they go nowhere well.
- They are either 70% road and too heavy to go off-road beyond a gravel road, or they are small light and whiney to travel the distance on large roads.
- The frame geometry is neither perfect for off-road nor perfect for on-road, so the buyer makes a trade-off.
- That trade-off is in handling and ability and enjoyment .... and ultimately safety.

FAQ: How can it ShapeShift without trade-offs ?

- The seat position, peg position, rake and trail stay accurate.
  The only trade-off is the handlebar position
  so that the rider's head, torso and arm positions
  do not move as the bike ShapeShifts under the rider.

- Result ...
    - The rider's perspective stays confident and controlled.
    - The braking feel stays the same.
- The power curve changes as the bike shapeshifts.
- When the frame is short the weight is biased to the rear
  so it can pop over logs
- When it is completely stretched the weight is biased slightly to the front.
  so a stretched front is not a light front, especially in fast corners.
- Compare with other bikes ....

  Compare ..... www.ErikBrinkman.com/Panther/Compare.html
- Look at the videos and see how the bike moves under the rider ....

  Videos .... www.ErikBrinkman.com/Panther/Videos.html

Design

- The frame of the Panther R-Bike motorcycle is a
  shape-shifting robotic adaptive intelligent mechanism
  that feels, responds and adapts as the rider asks and conditions warrant.
  It offers a relationship in a way that a rigid-framed machine can't offer.
- As time goes by (about 3 years) an artificial intelligence will be added
  so if you are stretched and hit a corner too fast,
  it will scrunch enough to provide the ground clearance and wheelbase
  to make sure you can take the turn safely
  (with a rider adjustable intelligence level control).
- It takes as little as 4 seconds .... on-the-fly to shape-shift from Enduro to Touring.
  You must stop the bike to put it in Trials shape.

- As the bike stretches 12 inches, the engine shifts forward 6 inches
  so that the center-of-gravity remains in the center of the bike's length.
  This means handling remains consistent and brake feel stays balanced.
  (almost ... short the weight is slightly rearward and stretched slightly forward)

Imagine:....

1. You leave the house with the bike in **Standard** geometry.

2. As you leave the side streets and enter the open hi-way
   you shape-shift the bike into a **Cruiser**.

3. You take the hi-way out of town and switch to **Touring** mode.

4. After many miles, you take an exit onto two lane "twisties"
   into the countryside, you see a dirt road to your left
   that seems to go toward an interesting looking spot,
   so you shape-shift into **Enduro** and take the turn.

5. The **trail** turns into something very slow and tight, so you
   scrunch into Trials shape and end up at that special spot;
   you are the only one there.

- A relaxed and entirely natural riding pleasure is enhanced
  by having ideal dimensions and proportions for every occasion.

- One bike with the proportions from each category ....
  Trials, Enduro, Scrambler, Standard, Touring, and Cruiser.

- Here is a comparison to the Panther R-Bike
  with several other bikes of different styles.

www.ErikBrinkman.com/Panther/Compare.html

The Shapes

- From short and super-maneuverable, to a long thin arrow in the hi-speed wind, ShapeShifting has many safety and handling advantages.

Deep Woods

Weight toward the rear so the front is super-easy Trials pop-up.

Tight Trails

Front still light for roots and rock popping

Fast Trails

All weight on the feet.
Good for standing up.

Gravel Roads

Most weight on the feet.
Good in loose sliding stuff with some speed.

Tight Paved Roads

Even weight between hands, butt and feet.
Great in downtown traffic.

Suburbs

Even less weight on the hands.
Most comfort on a longer Touring ride.

Two-Lane Hi-ways

Less weight on the hands, good and relaxing.

Four-Lane Hi-ways

A Stretched out long thin arrow in the wind.
The riding position starts putting a load on the spine
and is eventually tiring on a long ride.

Chopper Mode

Looks Cool.

The Feel

Method

- The method is the key.
- The Panther's frame shape-shifts in compound motions to create the proportional relationships that determine the final geometries.
- It becomes all the parts moving in an exact relationships and positions that makes it work.

The Fit

- In designing the Panther's Shape-Shifting frame, it started with what is call the "control quadrangle" ..... the hands, bottom, feet .... and knees.

- Height (handlebar height)
- Shirt size
  - sleeve length (handlebars reach)
  - shoulder width (handlebar width)
- Pants size
  - leg length (peg height)
- Rider weight (suspension fine-tuning)

Rider Isolation / Comfort

- The frame's short-spar carries the rider (seat and pegs). Teflon disks and a dampening (gel/foam) sandwich at the pivot of the two spars isolates vibrations because the engine, transmission and suspension are mounted on the long-spar.

Construction

- The frame is made out of the same high Chrome 304 Stainless Steel. used in the making of extremely strong fittings for sailing yachts.

- Racing Frame is available ONLY for racing and not to the general public .... yet

Function

www.ErikBrinkman.com/Panther/Videos.html

- The Frame ShapeShifts to maintain the perfect shape and balance to provide the safest possible ride in every condition
- It is like having 7-bikes in one bike.
- It can shift from Enduro shape to Cruiser shape in ~4 seconds.

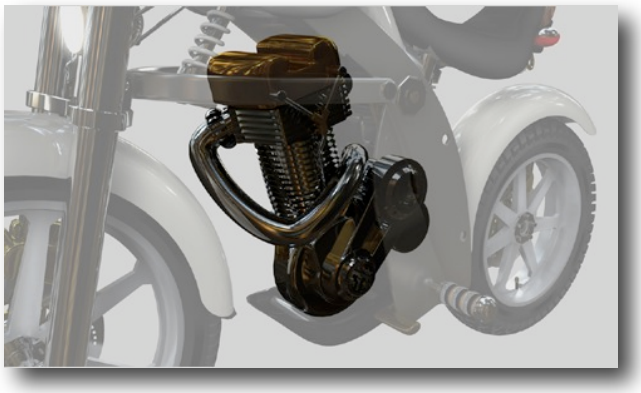
Pivot

- At the pivot point between spars, there is a Teflon Disk sandwiched between two DLC (diamond like coating) surfaces,

- There is an Anti-Vibration disk made of "Blue Foam-Gel" at the pivot point to help prevent the transference of vibration from Long to Short Spars.

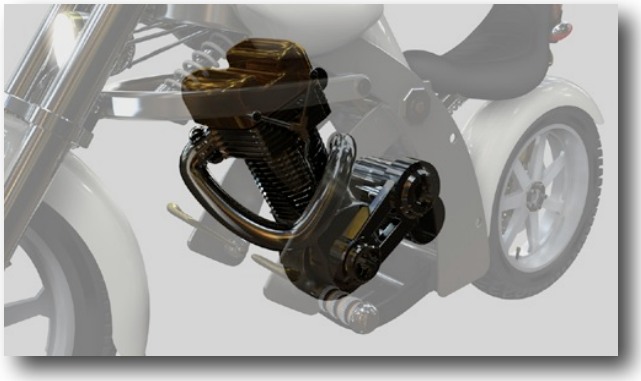
Weight Distribution

scrunch clearance



- Note how the tailpipe, clutch, crankcase, tranny
  are all about an inch apart when fully scrunched;
  .... how's that for centralizing mass !!!

stretched clearance



- The question is not just weight, but were the weight will be.
  The idea is to place the weight lower
  so the bike is more comfortable resting at a stoplight,
  and more easily flickable thru traffic.

- It is also important to keep the weight distribution
  between the wheels the same as it shape-shifts,
  so the braking feels consistent.

ShapeShift (function)

What handling safety is all about.

- ShapeShifting "on-the-fly" has many safety and handling advantages both on and off road.

Compound Movement

- The Shape-Shifting Frame means 7 rides in one bike
  .... all ON-THE-FLY.

    - Chopper (sort of)
    - Cruiser
    - Touring
    - Standard
    - Scrambler
    - Enduro
    - Trials

- The arc that the seat-arm travels
  is much greater than the arc that the forks travel,
  so it's not a true proportional scissors action,
  because the distance between the rider's seat and feet
  increases as the frame stretches

Actuator

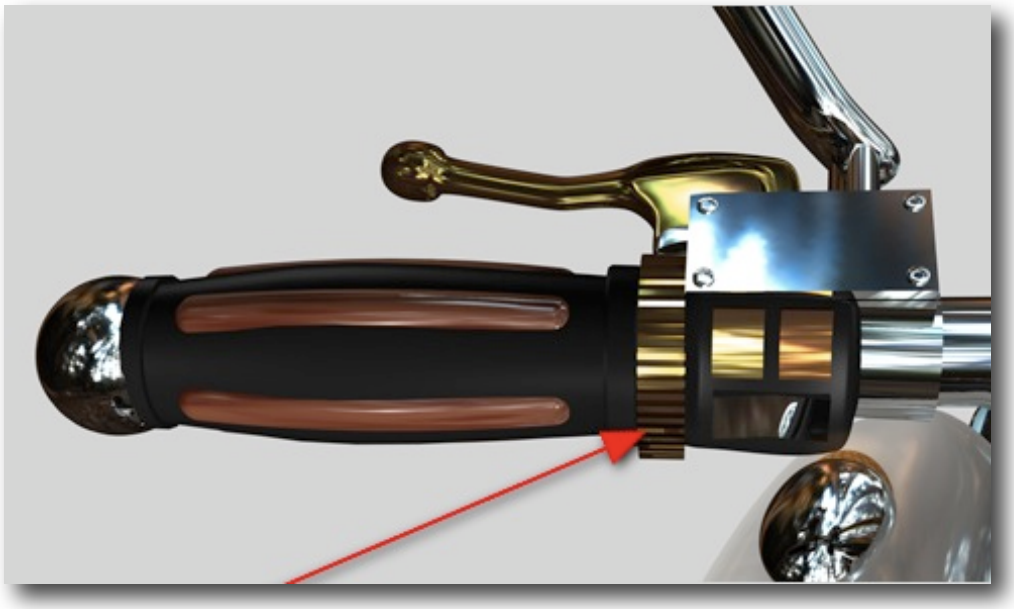
- It uses one 4.5-inch long lead screw (2.25 inches diameter) and is DLC coated.
- The screw is actuated by two servo-motors; one at each end of the screw
- We use two to keep the torque load even which increases longevity
- We also use two just in case one malfunctioned in the middle of nowhere.

Control

ThumbWheel

- Selecting a shape, at speed while riding
  is as safe and easy as selecting a gear
  with a thumb controlled brass ring next to the left handgrip.

- The bike shape-shifts under you.
  Your head, torso and arms remain in position.
  The bike and your leg position changes.
  That way it can't feel "squirrelly".

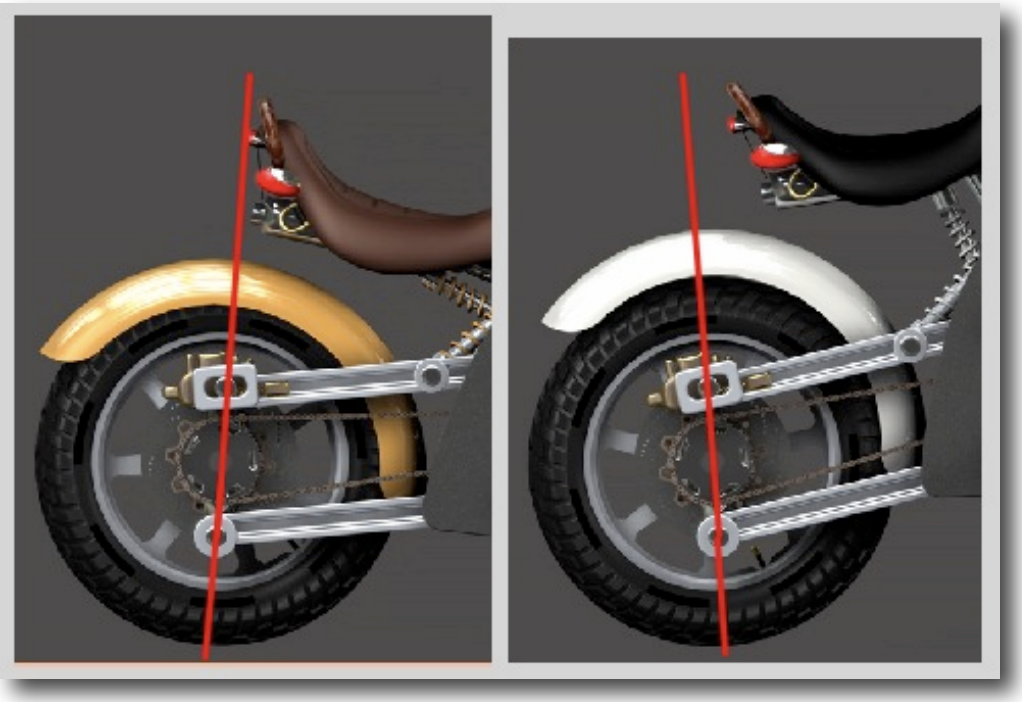


Stretch Effect

Long and low ....

- In soft sand or mud to spread the weight.
  For high speed cruising .... long and narrow is faster.

- About half the stretch is in the frame
  and the other half is in the forks
  with 2 inches of swingarm stretch thrown in.



- The apparent "trail" of the rear changes
  from 1-inch forward to 1-inch back
  for a total shift effect of 2-inches (19-21 inches effective lengths).

- This throw the weight rearward slightly when the frame is short,
  allowing the rear-bias needed to pop over off-road obstacles.
  When the frame is stretched that bias moves forward for a better front wheel plant.

Width to Length

- The 12.25" wide frame's narrow profile
  combine with the long wheelbase for easy and stable high-speed wind penetration.

Forks

- As the front stretches the "trail" goes from 4" out to 6"
  and the rake goes from a deep-woods 22°, to an open road-"chopper" 44°.

- The relationship between rake and trail remains in perfect
  and the transition remains smooth and controllable throughout the ShapeShift.

Saddle

- The seat moves down and back from a height of 34” down to 27”
  and the seat-spring RIGID OFF-ROAD and softer as it tilts down with it.
  The back of the seat tilts up for a saddle bolster for long ride comfort
  and for slipping a small passenger snugly in behind the rider.

see : SADDLE section in this writing

Pegs

- The pegs stretch out and, at the end of their stretch, they lift up as well.
  The distance between the seat and pegs increases as they move forward,
  because the rider wants to sit further back.

Engine

- Engine weight moves forward half the distance of the wheelbase shift
  so the weight stays almost centered on the bike

- Weight slightly rear when short (log popping) thanks to the swingarm 2 inch change.

- Weight slightly forward when stretched, thanks to the swingarm 2 inch change
  making steering more stable while high speed touring or cruising.

- This leaning forward at higher speed / longer frame conditions,
  also creates an engine fin tilt profile to the wind, increasing air cooling.
  The exhaust port is the hottest spot,
  so gets an additional finning and gets cool air first.

Handlebars

- Handlebars pull up almost straight when raising the front of the long-spar and tucking in of the forks.

Suspension

- The ground clearance increases from the low 6” to a high of 10”
- The relative distance of the swingarm shortens 2 inches.
- The angle of the coil-over-shock rear suspension stands up and the spring rate and dampening automatically adjust becoming stiffer.

From Enduro-to-Touring shape in ~4 seconds
.... all in one smooth motion while riding !

note:

You must stand still to go into from Enduro-to-Trials shape, and from Touring-to-Cruiser shape transforms slower.

The Ride

Where the rubber meets the road ..trail.

- The Motorcycle can be ridden with great precision. Communication is stable and predictable because it has an inherently light and stiff structure, perfect weight distribution and finely tuned suspension that creates and maintains a significantly more perfect fusion between the rider and the bike.

Fast Stuff

- The long wheelbase ability and narrow profile (12.25" wide frame) combine for smooth and stable high-speed wind penetration.

Soft Stuff

- In mud or sand the rider can stretch the bike to spread the weight.
- You can even "inch-worm" your way out of deep mud. (stretch, lock front brake, then scrunch)

Tight Stuff

- The 12.25-inch wide frame makes it a lot easier to snake thru the narrows.

ShapeShifting "On the Fly"

- The next 3 years is about playing with some of these,
  hooked to sensors and using A.I. software
  to see where the comfort levels are in automating some of this list.

.... with a variable cut-off option (as with the anti-lock and anti-spin).

- Here is a list ....

1. *Down a Steep Hill:*
   As you start a steep slow descend, you stretch your bike out a bit
   with feet stretched on pointing downhill
   and the seat much lower and you tuck your body rearward.

2. *Up a Steep Hill:*
   As you ascend the hill,
   you start fairly stretchy and slowly scrunch as you go up
   to let the ShapeShift pull-it up
   and you need more tight control as you do those last few feet of climb.

3. *Tight Squeeze:*
   When the trail goes tight between trees you need squeeze it in a bit,
   then stretch it back on the other side.

4. *Sharp Curves:*
   You approach a sharp curve and need a little more belly clearance
   and you need a shorter more nimble wheelbase,
   so you scrunch into the curve and stretch back out of the curve;
   pulling itself out of the curve ....

5. *Creek Crossing:*
   You approach the creek and so you scrunch high
   to keep the intake nostrils tucked high behind the side-pods
   and keep splashes of water deflected from the intake and the rider.
   The tailpipe tilts down to keep water from backing up into it.
   Then you stretch to help pull up onto the other bank.

6. *High Speed Cruising:*
   You are riding in your most comfortable position
   and you want or need to go smoother faster.
   You are only a 10-inch wide frame, so if you stretch it out,
   you have a longer, faster more stable arrow in the wind.

7. *High-Speed Braking:*
   You are stretched out and cruising the open road
   and suddenly a deer pops up onto the road and just stands there.
   So you clamp the binders full-on
   and the bike frame slowly shortens as the bike slows,
   because a shorter wheelbase stops quicker with better control.
   Stopping benefits from a wheelbase best suited
   for hard braking at that momentary speed.

8. *Lock-n-Stretch Over a Log:*
   You kiss up to a log and plant the rear brake and then stretch
   and in so doing "crawl" the bike up and over the log.
   The bike comes with a 21 inch front wheel to help in this option.

9. *Pulling Out of a Hole:*
   There you are stuck in the mud-hole. Seen it a thousand times.
   Now you don't worry about pulling the bike out.
   You can stretch to both spread out the weight
   and use the stretch-crawl method of "inch-worming" your way out
   using the frame's ShapeShifting.

10. *In a Side Slide:*
    The bike might want to ShapeShift toward Enduro shape
    to help make the SideSlide easier to control.

11. *If the Road Gets Rough:*
    The bike might want to raise up a bit
    and shorten its wheelbase for better control.

12. *When Life Leaves You Short:*
    The bike allows anyone to mount with the seat in the lowest position
    and yet still have the flexibility to ride a high seat off-road.

Materials

Strength, Weight and Longevity

General

- We sought the advice of many top metallurgical experts
  from several firms an universities in the selection of our materials.
  The topic is complex and often not that intuitive.

Cost

- Yes,some of the Super-Alloys we use are expensive,
  but the expense in more in the making of something out of it.
  In addition, there is nothing less expensive than something you don't need to re-purchase.

Weight

- Often lighter is considered better,
  but heavier can be more stable and offer less vibration and smoother operation.

- A lighter materials creates a high frequency vibration which are harder to suppress
  than lower frequencies because there is more white-noise present in higher frequencies.

- A bit of weight to the internal components of an engine, for example, creates a smoother engine.
  if that little extra weight results in a far stronger material, then there is a double bonus.

Strength

- Strength alone must be balanced by corrosion issues.

- One reason we often use exotic Alloys is to have corrosion free longevity
  and still have a selection of materials that offer strength and/or flexibility as needed.

Cryogenic Treatment

- This used to be a controversial idea until scientists took a closer look.
  Years ago it was noticed that if you take a brass musical instrument
  and super-cooled it, the sound it made was better.

Annealing

- Normally, to add strength to a metal, it is heated to smooth out any imperfections
  and then flash-cooled (quenched) in cold water to lock atoms and molecules into position.

- Microscopic fractures appear from the stress of the quick temperature change.
  These micro-fractures can be largely eliminated by super-cooling the material.

Cryo-Annealing

- The Electron Microscope images show that as the metal is super-cooled,
  and the molecules and atoms lose their energy,
  they try to position themselves in more comfortable lower energy states.
  These states tend to be a more crystallin matrix
  and in the process micro-fractures align as well and thus "heal" themselves.

- Keep in mind that cryo-treatment is NOT about hardening the material
  but only about repairing any micro-fractures and imperfections.

- It helps sometimes to "pump it a bit" going warmer and then cooling it again.

- It is very common for top racing teams in NASCAR and the Grand Prix circuit
  to use this method for critical metal parts (engine, suspension, transmission, connectors).

- It is used in the making of weapons systems and military aircraft as well.

> **note:**
> There are still a few "old school" people who do not understand
> because they look at metal in a more macro fashion ad so do not believe
> in the advantages of Cryo-Annealing, so it is not 100% accepted.

Stainless Steels

- Stainless Steel is a family of materials known for their rust-free nature.
  They are basically steel doped with Chrome, Nickel and often traces of other elements.

- It is generally non-magnetic, but if it has too little Chrome it often is slightly magnetic
  and can even get a thin rusty film on its surface.

- Stainless Steels can be fairly flexible as in a kitchen pan,
  springy as in the Shock-Spring
  or very very strong as in the rigging on a sailboat.
  On a yacht, a stainless steel shackle can easily handle a sail with tons of pressure
  and handle sudden jolting loads as well.

FAQ: Why not Chrome-Moly Steel for the fasteners ?

- Because although those steels do contain chromium,
  it is not in great enough quantities to provide proper corrosion resistance.

321 Stainless Steel

- Used in the Exhaust System.

304 Stainless Steel

- Used in the construction of the frame

Spring Stainless

- Used for the Suspension Springs.

Super-Alloys

- Tungsten-Cobalt Alpha Prime Super Alloys come in a wide variety
  of hardnesses, flexibilities and overall strengths.

Types

- Crankshaft, ConRod, Piston
- Valve Springs
- Bearings .... 8640 (no carburizing needed to harden)
- Piston Rings

www.ErikBrinkman.com/Documents_Alloys

Bronze

- Used in the construction of the Engine Hollow Support Rods.
- Used as the screen in the Oil Filter

Gold

- All electrical connectors are Gold for total corrosion resistance and complete reliability.

Silver

- All electrical soldering is Silver, because it is the most conductive.

Brass

- Used for disks in the foot-pegs
- Used for the Foot Levers (easy to bend back without weakening)
- Used as washers to isolate Aluminum from making direct contact with Stainless Steel

Aircraft Aluminum

356-T6 "A"

7075

6061-T6

Neoprene

- Used for all seals, so you don't need to replace seals every time.
  The Panther is all about not having to replace,
  whether it is filters, seals or the bike itself.

- They are all strong, re-usable and can stand up to a lot of heat and abrasion.

Kevlar

- Used along with Carbon Fiber in the construction of the Body Cover.

Poly-Ethylene

An ultra high-density Cross-Linked Poly-Ethylene is used for the construction of the ....

- Fuel Tank,
- Systems, Pod
- Fuel Injection Pod
- Instrument Pod
- Fenders
- Body Cover in the Cub Models

Carbon Fiber

- Used along with Kevlar in ....
  - Body Cover
  - Seat Handle
  - Headlight Case

Aramid

- Used for the 3/4 inch Primary Drive Belt

DLC

- Diamond-Like Coating (DLC) used for the friction surfaces on ....
    - Transmission Gears
    - Final-Drive Sprockets
    - Frame ShapeShifting Actuator Screw

Trim Materials

- Materials are not just about feel but also about smell.
  The organic smells of wood and leather are essential
  Add to that the smell of a warm engine.
  She has to smell just right.

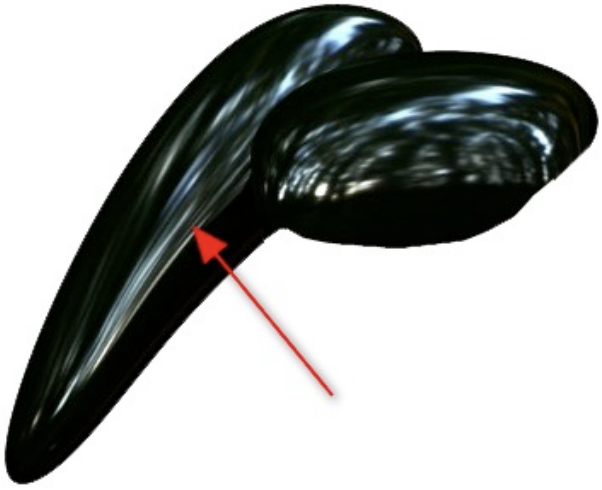
- Wood (grips and pegs) ....
    - Ash
    - Maple
    - Walnut

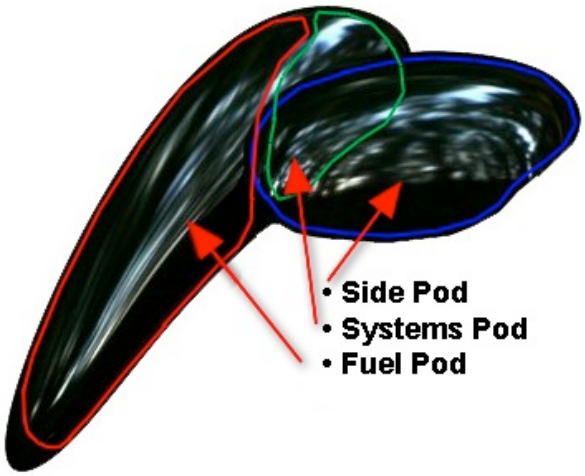
- Bison (thick yet very soft) (seat)

Fuel System

Fuel Tank

- 5 Gallons with 1 Quart reserve





- Seal sealing .... (as in a helicopter).
- Open-cell foam .... in double-layered bag .... in tank .... (NASCAR design)
- Tank has a spark-free locking aircraft-style brass cap.

- You can view the fuel level via a clear tube
  along side the tank at the bottom side.

Design

- A Kevlar bag
- Open Cell Foam Inside

Reserve Tank

- The tank has a "hidden" emergency 1-qt. reserve amount.
  Tip the bike on its side and back again and the extra quart becomes available.

Optional Tank

- Optional extra tank to pop/lock onto the back saddle rack.

Fuel Types

- Gasoline (87-92 Octane)
- Diesel (#1, #2, or Bio-Diesel)
- Military (#1, #2, or Bio-Diesel), Kerosine, JP-5, JP-8

Fuel Lines

- Braided Teflon lined aircraft quality fuel-lines
  for extra safety and great looks with spark-free bronze fuel line fittings.

Fuel Filters

- All filtration is at 10 times normal industry levels.
- All filters are 100% washable.
- Stainless Steel flow-meter casing with clear window,
  so any flow-reduction/restriction/debris can be seen.

Types

- Particle
- Wax (Diesel only)
- Water
  - There is a micro-screen fuel filter that snowmobilers use
    that you can pour water logged fuel into
    and it will allow the fuel to go thru
    but will not let the water go thru.

Fuel Pump

- The dual fuel pumps are extra heavy duty for remote location travel dependability.

Fuel Injection

- Sequencial
- Twelve smaller Hole .... for improved fuel vaporization
- Steeper angle for secondary Injectors

- Throttle port style injection placed very near the intake valve
  rather than direct injection,
  for easier service and cooler operation.

- In the gasoline version of the motor,
  one injector is for low-speed operation
  and both sets for high-RPM operation,
  so throttle response is always quick and exact.
  The second comes on with the feeling of a turbo.

- Fuel Injection creates improved performance and higher torque
  while it reduces fuel consumption and emissions.
  Combined with "Variable Valve Timing" (V.V.T.) we control combustion
  while flattening the torque curve for the smoothest response
  and can meet the most stringent pollution standards. (EU-3 levels).

- The Panther engine also has engine "Multi-Mapping" (M.M.)
  that changes the personality of the engine on-road to off-road
  as the frame Shape-Shifts to suit the riding conditions.

- The (V.H.P.) Variable Horse Power can be manually adjusted
  from a thumbwheel at the right grip.
  in 25% increments so it is low when cruising and high when needed.

Throttle Body

- 52 mm
- 40 mm

Engine Management

- The engine management system continually monitors the relevant input data from a variety of sophisticated sensors
  This data is then compared with a corresponding set of reference values.
  Based on this information, a range of key engine functions,
  such as ignition timing and the timings and quantities of the injections,
  is seamlessly and automatically adjusted.
  Other major functions include automatic compensation for changes in fuel quality,
  and control of the variable-intake manifold geometry.

- Automatic fuel shut-off at 7000 RPM
- Automatic cold-start Idle Control
- Altitude Compensation
- Variable Fuel Injection
- Traction Power Control
- Power management .... 5%, 25%, 50%, 75%, 100% settings
- Engine Mapping (5 settings) **T, S,R,W,L**
  (multiple Engine Mappings)

    - **T**rack (full out)
        - Highly Strung Beast .... wild stallion
        - At the speed of thought

    - **S**ports (limits torque)
        - Limits torque in the first 3 gears
        - Limits torque at lower RPMs
        - Wonderfully, Joyfully Excessive
        - Riding in its purest form

    - **R**oad (limits hp)
        - "R" version (road version)
        - Yet Easy to keep on a leash

    - **W**eather (soft delay in response)
        - Soft response to keep things controlled

    - **L**earning Mode (super soft and forgiving)

  via a thumbwheel next to the throttle grip.

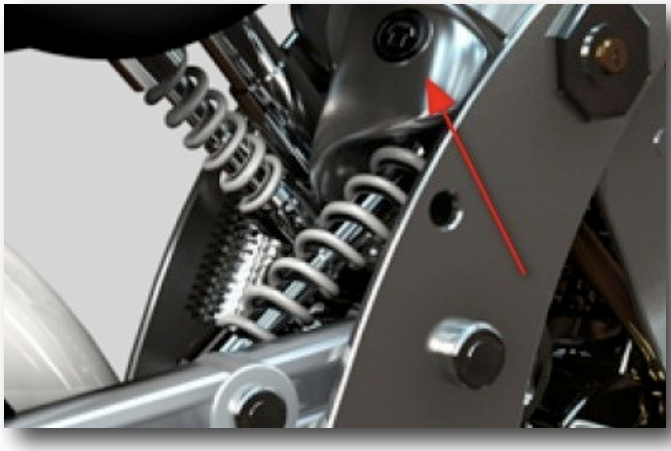
Oil System

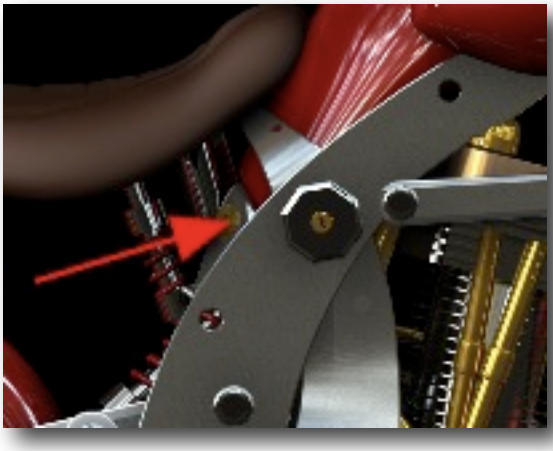
3

- Dry sump results in a lower center-of-gravity,
  as well as quicker starts and more power,
  but it is not trusted enough,
  so an "almost dry" sump is used.
  (1-qt in the engine and 3 qts in the oil-tank)

Tank

- Stainless Steel construction
- Brushed for greater surface area and so better heat transfer.
- Also available in black powder-coat.
- Oil-level gauge is on the lockable cap.





Tank Placement

- Oil tank just above tranny and below the fuel tank.
  .... exact tank shape fine-tunes side-to-side balance needs.

- It is placed halfway between the valves train and the crankshaft
  for a more even oil pressure.

- The tank has internal baffes to further aid in keeping oil pressure even.

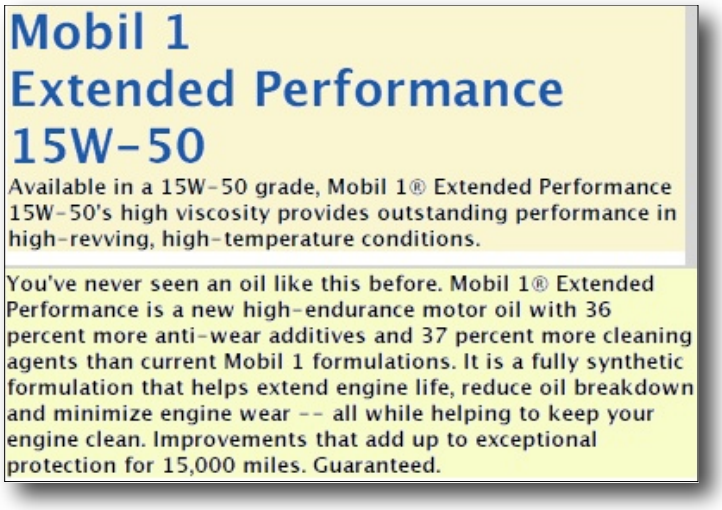
Tank Function

- The heat from the exhaust is use to both heat or cool the oil tank.
  This is done with triple layer Mylar coated stainless steel
  with a space between each layer so while isolating it from the tank
  it also creates cooling CONVECTION using the heat shielding.

- It uses heat from the exhaust side to create convection,
  and so pull cooling air throughout the space between.
  When you slide the shield sleeve up,
  it temporarily exposes the oil tank to the heat of exhaust
  for those really cold mornings.

Types

- Engine 15W50 Mobil-1 synthetic ("extreme use" version)
  4 quarts@ 7.2 lbs/gal (1.2 lbs/qt)



- Transmission 70 weight Mobil-1 synthetic .... 2 quarts

- Brakes / Clutch Hydraulics DOT-4 Mobil-1 synthetic
  (DOT-5 cannot be used with anti-lock brake systems)

note:

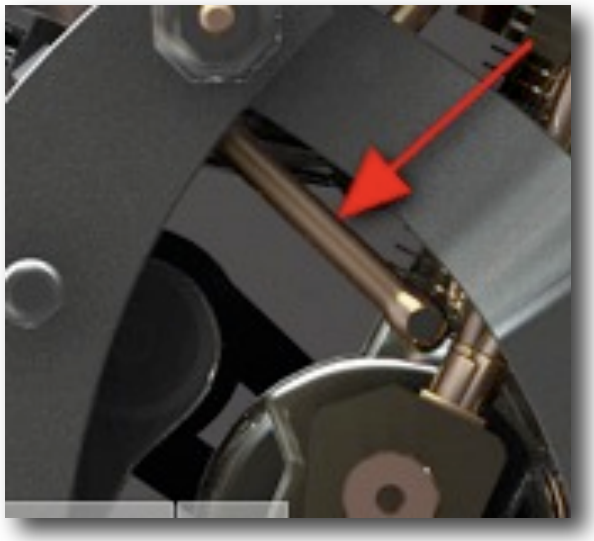
Clutch .... dry design
Forks .... need no oil

Lines

- Clearcoat copper clad Stainless Steel
  so they can be easily differentiated from the Stainless Steel fuel lines.

- Woven

- The oil lines run inside the hollow tie-rods that
  are mounted where the crankcase and the cylinder meet.
  The oil in the rods helps dampen vibration between the engine and frame



Fittings

- Bronze aircraft Fittings

Filters

- Washable rust-free Bronze micro-screen
  and the additional protection of a magnet.

- In the future we shall have a special oil filter available that will filter acids from the oil.

- Cooling fin jacket is surrounding the huge oil filter.
  What is often called a "Beehive" style oil filter.

Pumps

- Largest possible oil passages and an external oil-line for the valvetrain
  .... for the hi-capacity dual oil-pumps (one in the engine, one at the oil-tank).

- We go the extra steps for the most critical systems,
  so even if you ride hundreds of miles from help, you need not worry.

- 9 tooth high output (200% normal flow rate) Mechanical pump at the engine

- Electric pump at the tank

Grease System

- There are no bushings to grease
- All exterior bearings are the same 2.25 inch O.D. Timkin tapered roller bearings. They have a non-corrosion surface and are sealed for life.
- All grease is Mobil-1.

Saddles

Pamper your posterior

Construction

- Handcrafting is not done for merely "traditional" reasons.
  It is done because a skilled craftsman
  can finish wood and leather better than any machine.

Materials

- Most saddles feel good for the first hour,
  but are either too hard or soft by the end of the day.
  This solution has been very carefully designed.
  We choose a glove soft bison leather
  so it is very strong and yet very soft.

EXTERIOR

- Bison Leather
- Also available in a very soft realistic looking Italian faux leather.

INTERIOR

- We choose three levels of additional comfort ....
  - Single layer foam
  - Dual Layer foam
  - Triple Layer (dual foam with gel core)

Design

Dimensions

- 24 inches long x 12 inches wide.
- 10 inches wide at halfway point on the seat.

Heights

- Height is a serious issue in Adventure Touring machines,
  because with all that suspension travel, it is hard to climb aboard.
  A rider should not need to be on tip-toes at a traffic light.
  (The KTM Adventure, for example, has a saddle height of 36 inches)
  The Panther seat has a reasonable adjustable height from 27-32 inches.

FAQ: Why is the Saddle shaped the way it is ?

Styles

- We got a lot of feedback on the saddle
  and as a result we decided to offer a lower back
  while still offering the higher back as an option.

- There are two styles of saddle ....

Classic (low-back) Optional (high-backed)

Classic

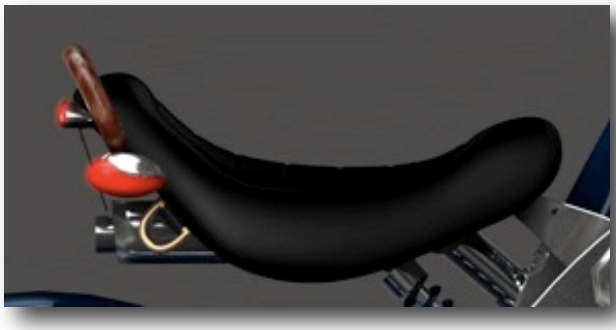
- A good balance between on-road and off-road support.

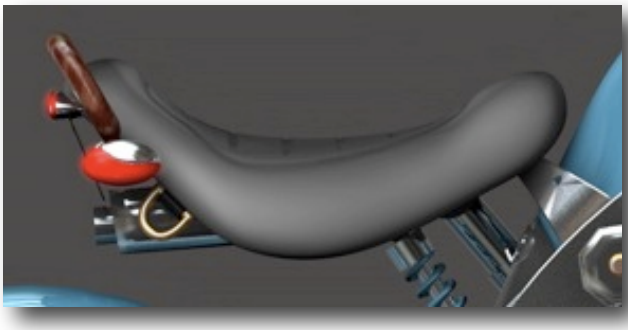
Hi-Back

- A bit more rear support for long cruising
  and extra rear support on step off-road hill climbs.

Colors

- Grey
- Black
- Dark Brown
- Medium Brown
- Light Brown
- Khaki
- Cream
- White



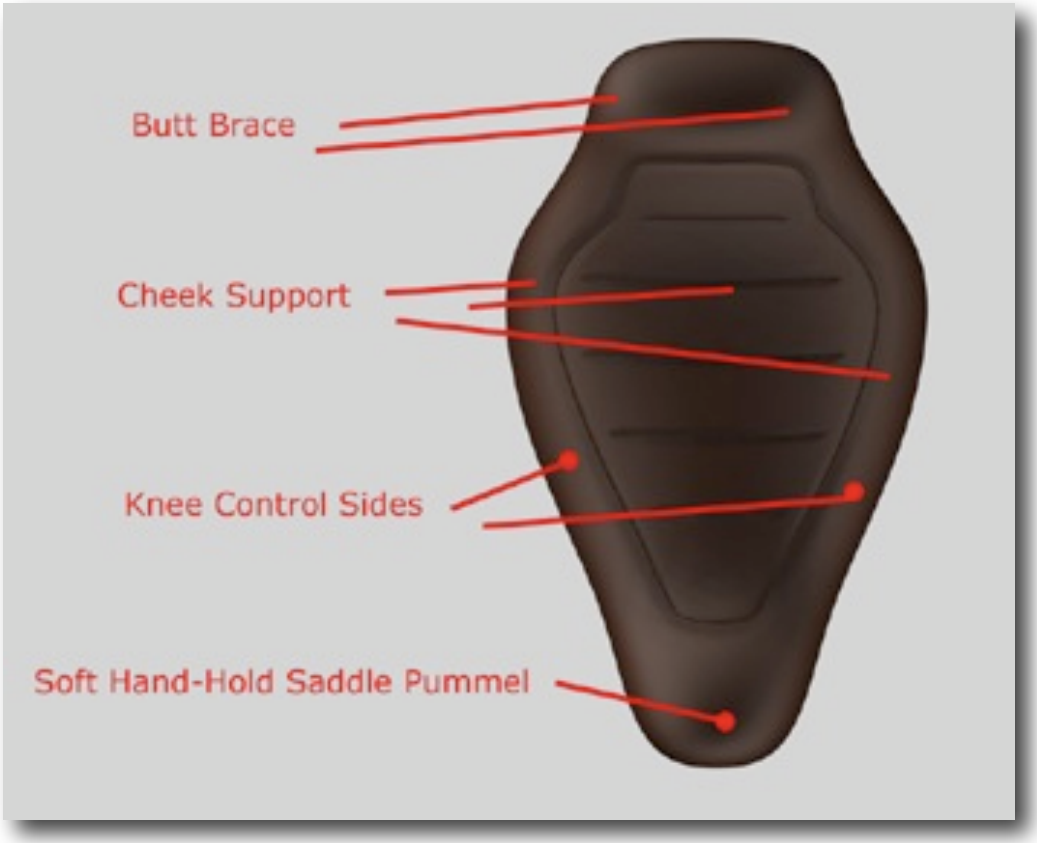


- There have been added two additional seat colors.
  .... cream and a white leather.

- Seat Spring mounts near the rear suspension mount,
  so rear wheel road-feedback produces an accurate
  but highly muted feedback into the rider's butt.
  All the feedback advantages of a rigid frame
  but none of the bone-jarring disadvantages.

FAQ: How does the saddle shape relate to the function as the frame shapeshifts ?

Shapes



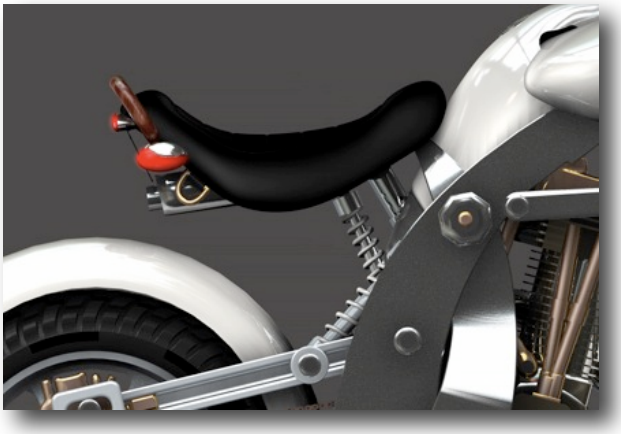
Positions

- The articulated positions of the frame, seat and tank work together.
  As frame shifts, the seat tilts and rides up-and-down
  to transform the ride to suit both conditions and demands.

Full Stretch

- Tilts back-up .... in Cruiser mode for better butt / back support.

Full Scrunch



- Tilts front-up .... for off-road crotch protection.

Features

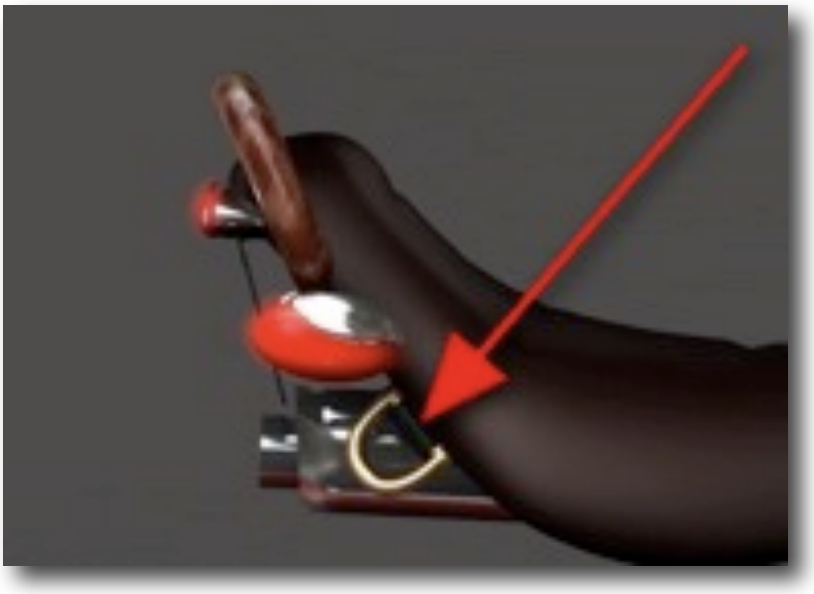
- A soft hand-hold knobby pummel (4-inch wide)
  at the front tip of the saddle.

Saddle Handles

- The handle on the back of the seat
  is right above the rear axle when in off-road shape,
  so it is easier to pull the bike out of a mud-hole.

- There are also two rigid "handle" spots on each side of the saddle,
  at its widest middle point.

Saddle Rings



- The saddle itself keeps the rings from swinging inward.

- With the two rings and the rear handle,
  there are the three points created
  to tie something on and keep it stable.

Pans

Design

- The saddle-pan is simple. Only the mounts are attached.
  All parts, such as the taillight are mounted to a mount,
  which are then mounted to the seat-pan.
  That way alterations can be made without saddle-pan damage.

- Upper Pan (mounts only the saddle itself)
  and provides a space between pans to even better isolate seat from exhaust

- Lower Pan (mount for the handles, tail light assembly etc.)
  so no holes are ever drilled in the seat pan itself.

Construction

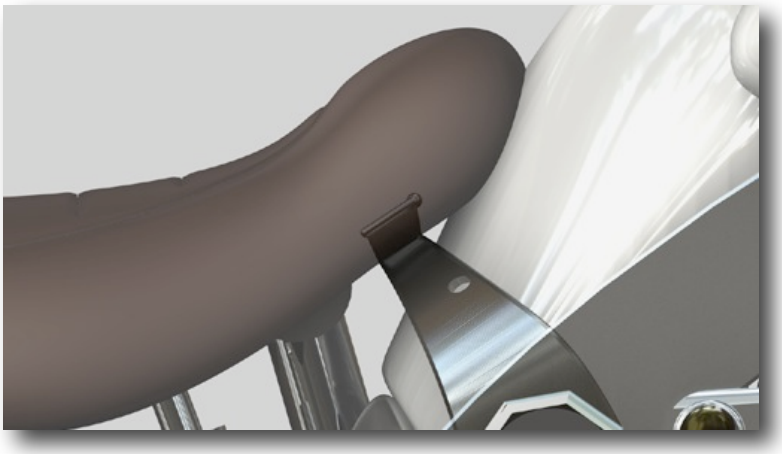
- Stainless Steel

Suspension

- Suspended on-road and rigid off-road.
- The seat is suspended for road use
  and when the frame is shortened, the seat become rigidly mounted.
  This is done using a simple stainless steel commercial quality door hinge.

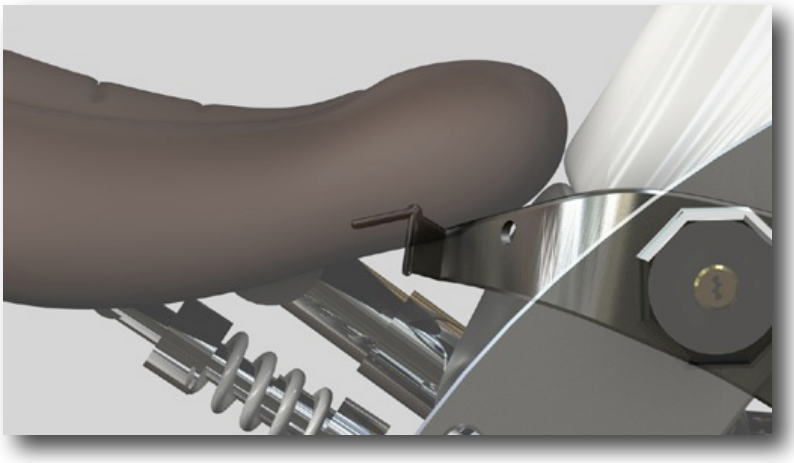
Off-Road

(rigid)



On-Road

(suspended)



- As the frame ShapeShifts long, the saddle acquires suspension
  and as the frame shortens that suspension is reduced.
  When the frame is short enough for off-road, there is no more suspension in the seat.

- Suspension is a critical system, and back-ups of critical systems is important, so ....
  The saddle shock is the same part number as the front and rear shocks,
  just set really soft in comparison,
  so if there if you are in the middle of nowhere and a shock malfunctions,
  you can switch it with the "spare" seat shock.

Heat

- 5-settings
- Plug-in for heated clothing
- Part of the total "Heat" package which includes heated grips.

Brackets

- The handle can be pulled out more for ....
    - carry-all rack
    - extra fuel tank
    - optional rear-trunk
    - cargo shelf/basket
    - buddy seat
    - helmet trunk

- Touring add-on packs can sling across the front and back of the saddle
  and creates a hint of a western-style horse saddle.

Security

Mechanically-Locked Bolts

- Instead of wiring every bolt, all fasteners are mechanically locked so that they cannot accidentally loosen due to off-road abuse or vibration.

MECHANICALLY LOCKED

http://www.Stage8.com/

Key-Locked Bolts

- Critical or expensive components are key-locked with a coded key. The catalytic convertor, engine cases, engine itself etc are all locked.

KEY LOCKED

http://www.Mcgard.com/security/intimidator.asp

Alarm and Immobilizer

- The bike contains a theft and tamper alarm and can immobilize itself. It can also be GPS located and immobilized remotely.

Rescue

- Every Panther comes with a rescue GPS system so the rider is never far from help.

First Aid Kit

- The rider needs to be as secure as the bike so there is a well appointed First-Aid kit.

Storage Compartment

- A small key-locked compartment for keeping little things secure.

Steering

3

Risers

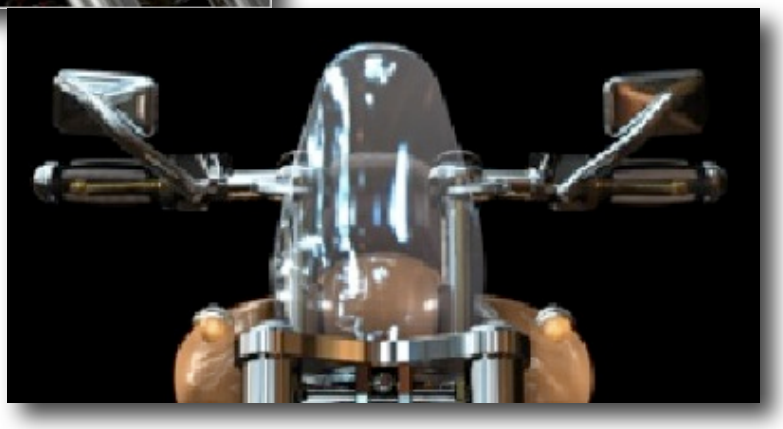
- We use "dog bone" style risers, but use them in a new way.
- The elbow between the risers and the bars slides over both to isolate the bars from the risers and so acts as Vibration Damping functioning in the same as the hand-grip and foot-peg end caps.

Lock to Lock

- The sides of the A-arms serve as the fork-stops for lock-to-lock turning.
- The lock-to-lock turning of the steering varies as the frame shape-shifts. It is almost 90º when fully scrunched and lessens to 57º as the frame stretches.

Windshield

- The windshield is mainly for wind protection and to press the bike down at speed. The narrow profile (12.25" wide frame) of the bike greatly reduces wind buffeting so the long thin bike slips smooth and stable through the wind.



- The windshield presses downward behind the steering pivot, so in higher wind the screen helps stabilize the bike without kicking the steering around.

- A gap under the windscreen to prevent a fog pocket from forming around the instruments.

- The windscreen and tank sides work together to form a fairing effect.
- Polarized to reduce road-glare and keep glare off gauge.
- Used for night-time heads-up display option (can be added in year 2).
- Heated (to prevent icing and fogging).

Handlebars

Shape

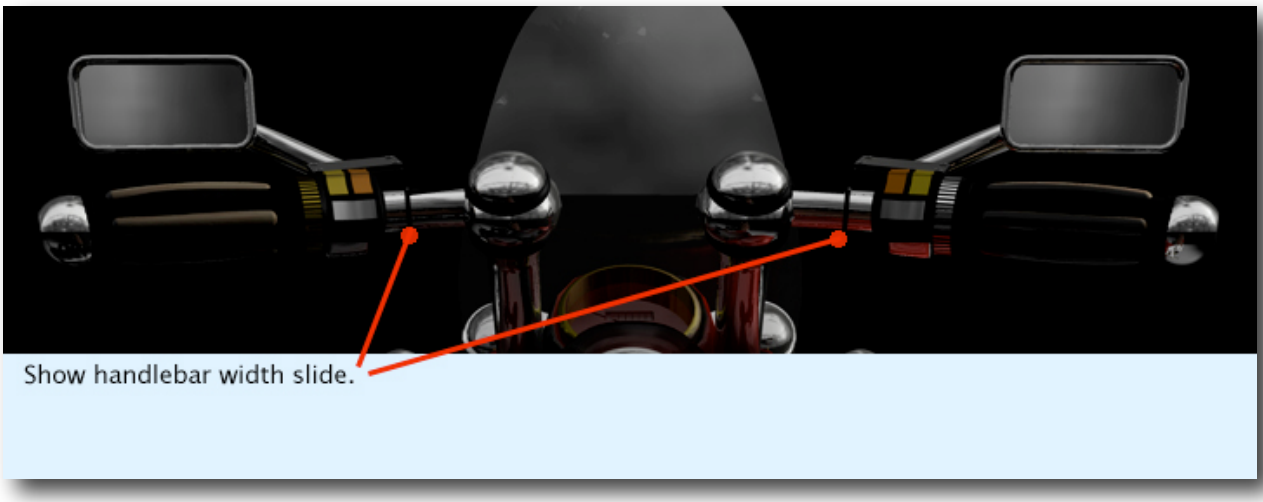
- 1.0 inch diameter bars and 1.5" diameter risers.
  and 1.5" diameter vibration dampeners for each grip-end.

Fold

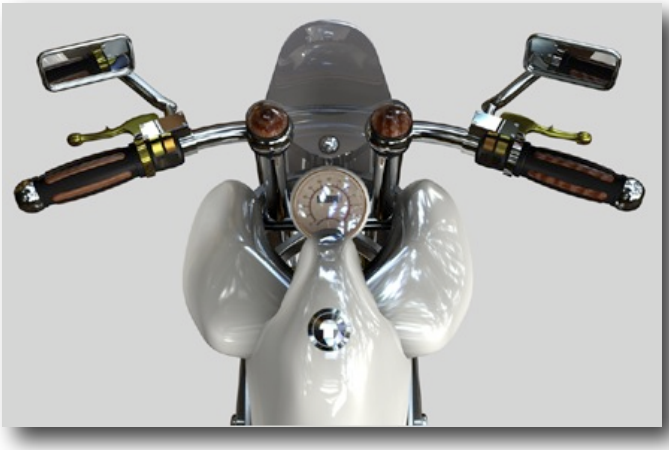
- Fold in at the swivel-elbow joint for ....
    - Secure unsteerable parking
    - Narrow hauling / storing profile
    - Narrowest deep woods navigation.
    - Folds (spring loaded) in a fall.

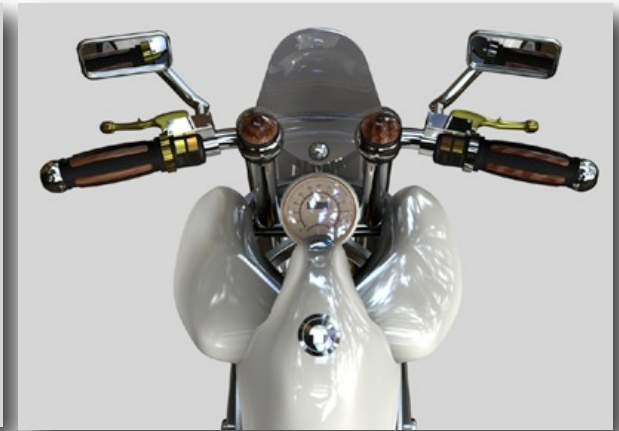
Width

The bars are adjustable to the proportions of the rider
so the bar width has a ..... range. of adjustment.



- The handlebar sliders are slightly curved
  so the wider the bars, the curvier they get
  as the grips change their angle with the rider's hand.





Height

The handlebar riser are also adjustable to the proportions of the rider so the bar height has a ..... range. of adjustment.

note: It is recommended that for long trips (touring mode) the handgrips be at the same level as the rider's heart to keep the hands from tiring or going numb over time.

Damper

- To assure smooth and stable steering in all conditions.

- Damping automatically changes as needed.
  As the frame stretches and the engine tilts forward.

- The steering is light in trials mode
  and becomes heavier as the engine tilts forward.
  Then near the end as it stretches into cruiser mode
  the engine moves little for the amount of final fork extension,
  so the steering gets a bit lighter again
  (lighter than in touring mode).

- Steering Damper Sits right on the tilt-plate
  around the center shaft of the steering plate.
  for additional fine-tuning.

- There is also a vibration damping pad
  between the steering block and the tilting-block.
  for additional vibration dampening without loss of feel.

Hand Coves

- Coves/wind-guards for handgrips
  keeps the heated grips warmer at high speed
  and protect the hands in off-road conditions.
  It hints of a Saber/Scabbard handle.

- Better heat retention for the heated grips
- Hand protection off-road.

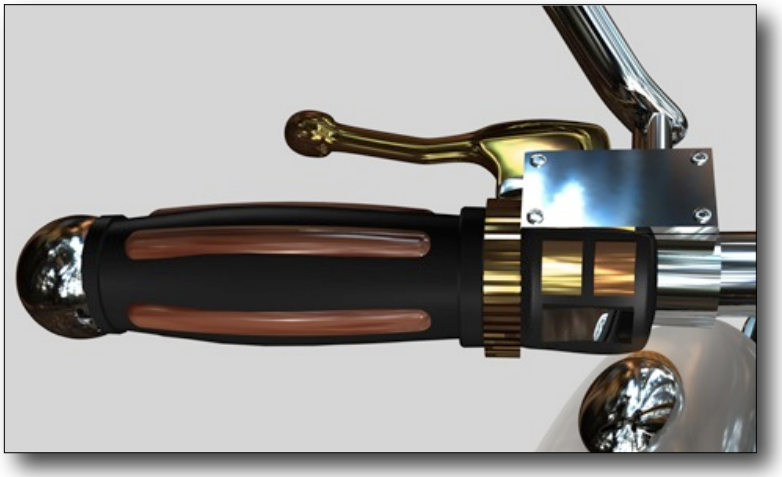
Mirrors

- Adjustable .... (to the rider's proportions)
- Folding .... (for storage, transport or if dropped)
- Very inexpensive and easy to replace.
- Retractable .... (automatically as the frame shortens to off-road proportions) via the brass rod next to the risers.

Hand Controls

A firm, controlled and comfortable grip

(rendering)



Throttle

- Fly-by-Wire (for the most accurate control)
  no cables to adjust, fray, bind or tuck .... or replace.

- Progressive throttle sensitivity
  more precise for off-road, slow or rugged conditions.
  and less precise for cruising.

- Ball Bearing Grip (for best sensitivity)

Grips

- Standard non-Adjustable
- 1 5/8 inch adjustable diameter grips. (the safest perfect fit for any hand)

- Harmonic balancers for grips
  (that twist to adjust the grip diameter).

- Made in partnership with PachMayr, for the ultimate in sure feel.

www.pachmayr.com

Levers

- Adjustable for finger length (for safest perfect fit)

- All levers are hydraulic and 2.5-finger length indents
  so 2 fingers remain on the grips at all times for better safety
  and it is much less exposed and less bend prone in a fall.

- Brake feel stays consistent, even as the frame stretches,
  because the engine tilts forward to keep the front end from getting light
  and requiring the chopper style grabbing the rear and tethering the front,
  instead of the normal grab the front and tethering the back.
  The rider feels consistent braking due to the engine weight shift.

- Folding (to greatly reduce damage if dropped)
- Hydraulic (the easy precise effort)
- Colors (can match body color)

Style

- Shorty

Buttons

- The goal is to make it as simple and intuitive as possible.

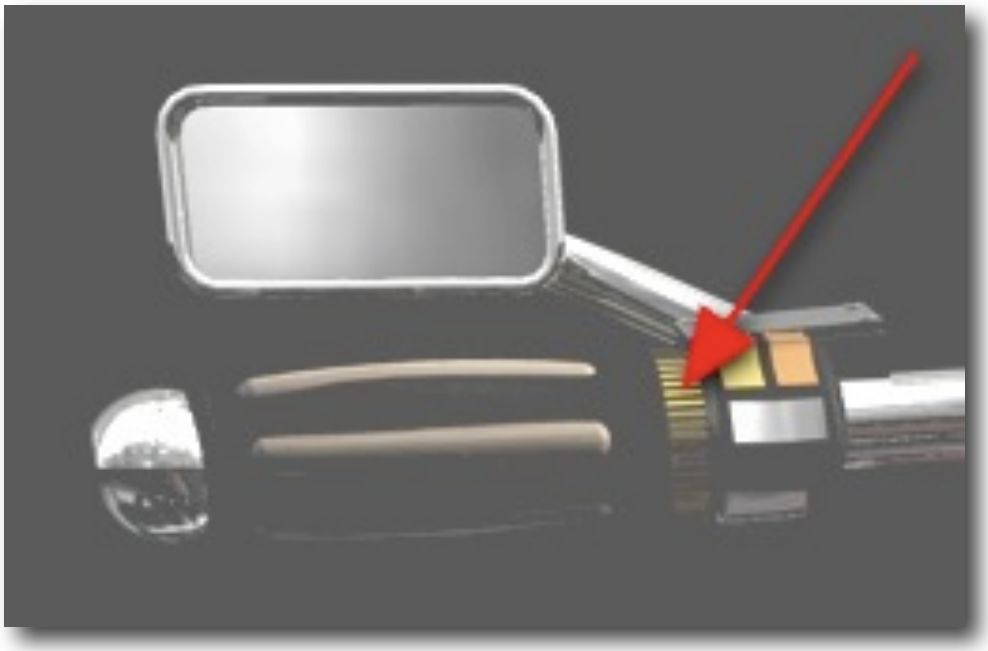
- Some functions are being moved to the touch-screen
  so the final layout is still in flux.

Cruise Control

- Not just for throttle position, but actual speed.

Thumb Wheels

- Left Spring-loaded Thumbwheel ShapeShifts the bike.
- Right Incremental Thumbwheel Chooses Power Level.

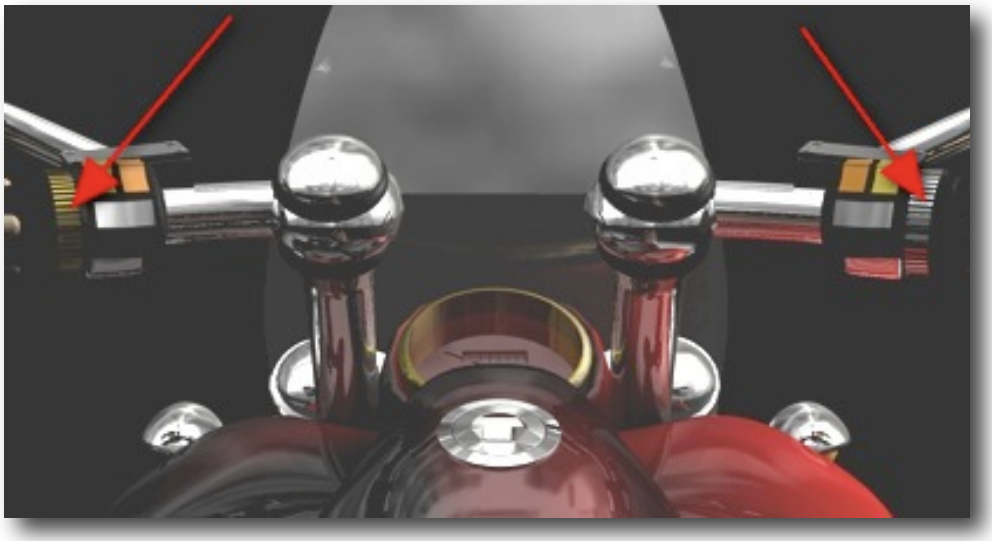


Left Ring

- ShapeShifting thumb-ring

Right Ring

- Power adjusting thumb-ring.



Foot Controls

Rider Pegs

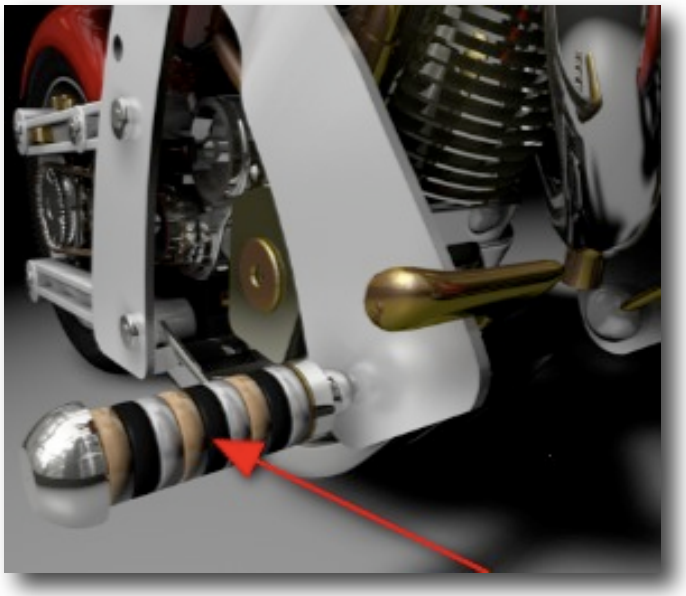
- Folding
- Adjustable up / down and forward / back (for different leg lengths)

- Stainless Steel
  (simple folding one piece)

- Modular

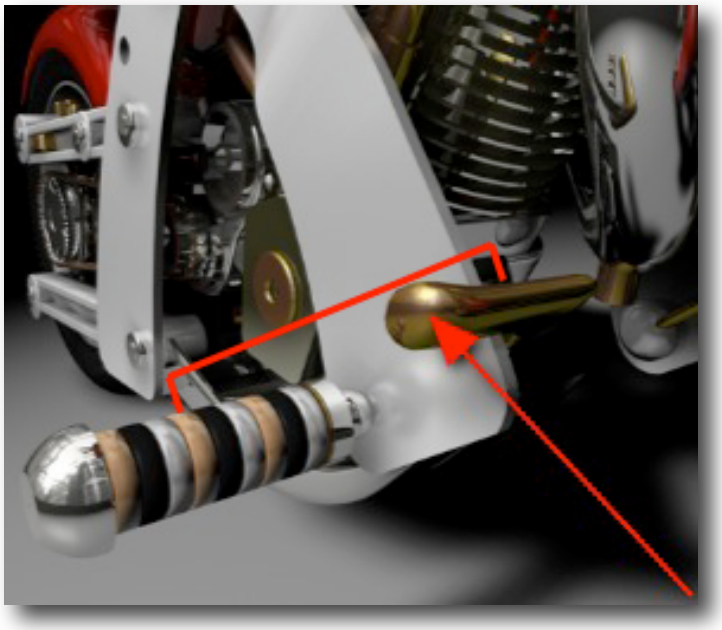
(stack disks to form peg surface)

  - Delrin (rubber)
  - Metal
    - Brass (knurled)
    - Stainless Steel (knurled)
  - Wood
    - Ash (light)
    - Maple (medium)
    - Walnut (dark)



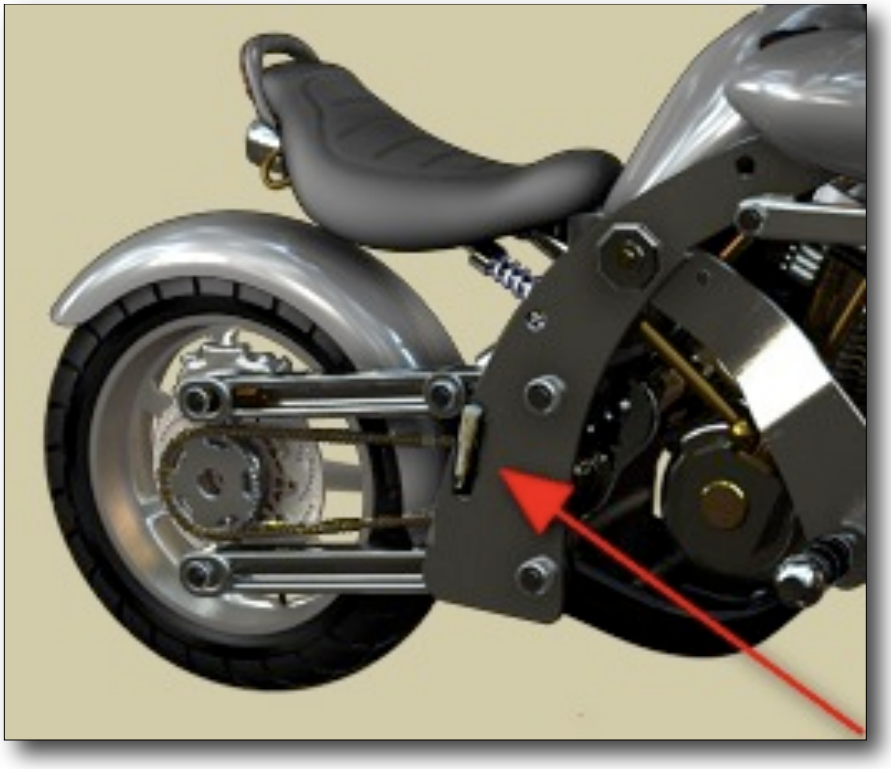
Foot Levers

- RIGHT is and upside down LEFT (same part number).
- Fold inward if the bike is dropped.
- Brass (so if bent, can easily be straightened without weakening)
- Peg-to-Lever distance is 5.5 inches (adjustable).
- Long lever and short throw equals smooth effortless shifts and braking.
- The levers is easy to adjust.
  It is at the very tip-corner of the spar when fully compressed.



Passenger Pegs

- One piece
- Mounted on the Long Frame Spar
- Fold very thin
- Can act as temporary spare is a rider's peg breaks.



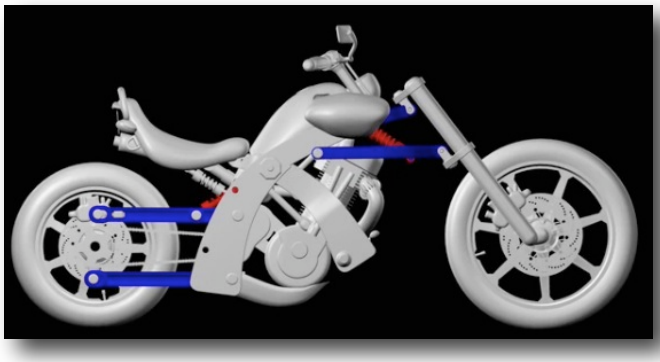
Suspension

Total Precision with no dive..

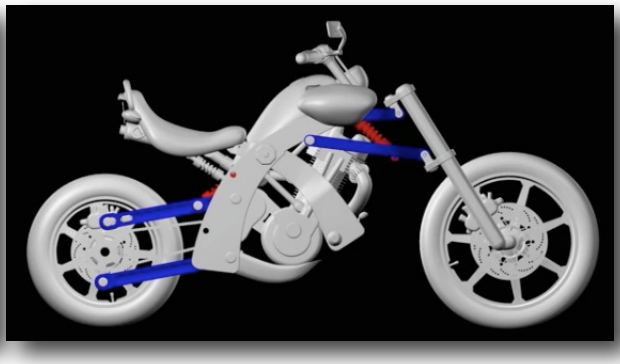
FAQ: Why does the bike have Double Wishbone suspension ?

- Double Wishbone Suspension (parallelogram) offers the most precise handling.
- A Parallelogram keeps the tire patch in the same spot on the pavement as the suspension compresses, while a conventional arced movement changes the tire's patch's position. This effects handling, especially while braking under suspension load.
- With double-wishbone front wheel suspension the weight of the the bike does not dip forward toward instability in hard braking, especially during downhill sharp cornering. It ensures extremely sensitive response together with excellent handling and braking precision. (We engineer a 5% front dip just to give the rider better braking feedback.)

suspension compressed



suspension extended



http://www.PantherMotorcycle.com/Videos.html

Quality

- All metal parts are Liquid Nitrogen cryo-treated
  to add strength and quality for the longest possible life

- The entire bike is X-ray inspected.

Feel

- The "feel" is more about suspension than engine or frame.
  so the bike has a superbly tuned suspension and steering.
  It is a direct intimate connection
  that significantly enhanced comfort and confidence.

- The bike is so refined and seductive with the stability control
  that its Active Suspension Management (ASM) provides.

- In the shortest frame setting,
  the front suspension compression stretches the wheelbase
  as when you hit a hill, and the front compresses,
  and helps itself up the hill.
  Same thing for popping curbs.
  It creates a "leaping effect".

www.ErikBrinkman.com/Panther/Videos.html

- No bike has ever moved like this.
  You can flick it corner-to-corner with confidence.
  It adjusts itself for cornering loads and for grip and road conditions
  The suspension instantly adjusts to loads and speed
  while the Engine Management System (EMS) provides Traction Control,
  so if you accidentally give it too much throttle in a wet, steep downhill corner,
  it helps keep you in complete control.

Feedback

.• Pure flickable agility

- Unlike in telescoping forks, but a bit like the "Springer",
  with the double wishbone design the rider can see forks move
  during normal suspension traveling.

- This provides the rider a visual awareness of suspension behavior that telescoping fork designs cannot provide

- The rider gets a muted/ measured feedback
  from the bike and the road
  thru the seat-spring and handlebars.
  The short-spar is extremely isolated (seat and feet)

- Double-Wishbone would normally eliminate any dive during braking,
  but the rider needs a bit of feedback,
  So the bike gets its stability and the rider gets his tell-tail
  in the form of up to a ~5-degree dive
  to let the rider know better how much brake pressure he is applying,
  but not so much of a dip that it alters the bike's weight balance ....
  especially when braking in hard downhill corners.

- As the upper smaller 10-inch long upper A-arm compresses
  it extends the front to prevent an "endo" under extreme stopping.
  This is very helpful when landing in a jump.

- When a conventional bike's front wheel hits an object,
  the bike pitches forward,
  because it's center of gravity is higher than the impact point.
  As a result, the rider is thrown forward.

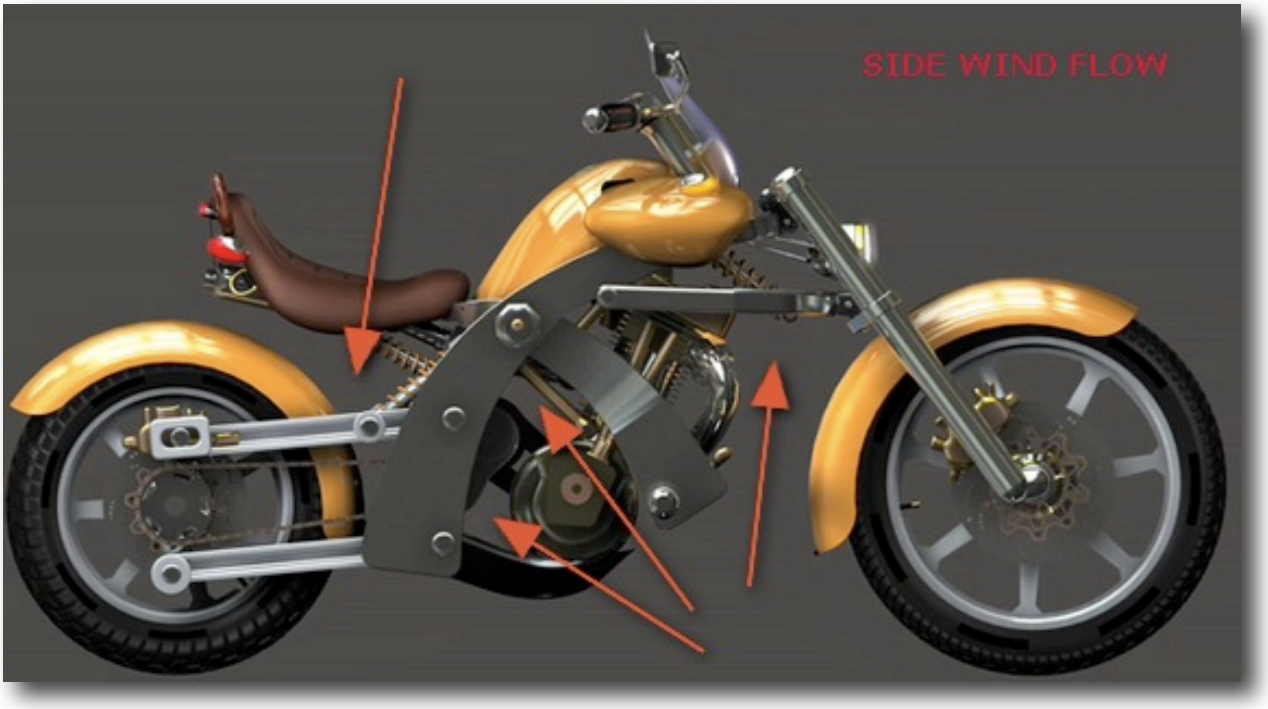
- The panther won't pitch down and forward;
  the side-pods and the tank act as a brace
  and the double-wishbone suspension keeps the bike level
  with the rear wheel firmly on the ground.
  So, instead of being thrown up and over,
  the rider continues in a controlled straight forward travel

- - > FOR SUSPENSION MOVEMENT ..... SEE THE VIDEOS

www.ErikBrinkman.com/Panther/Videos.html

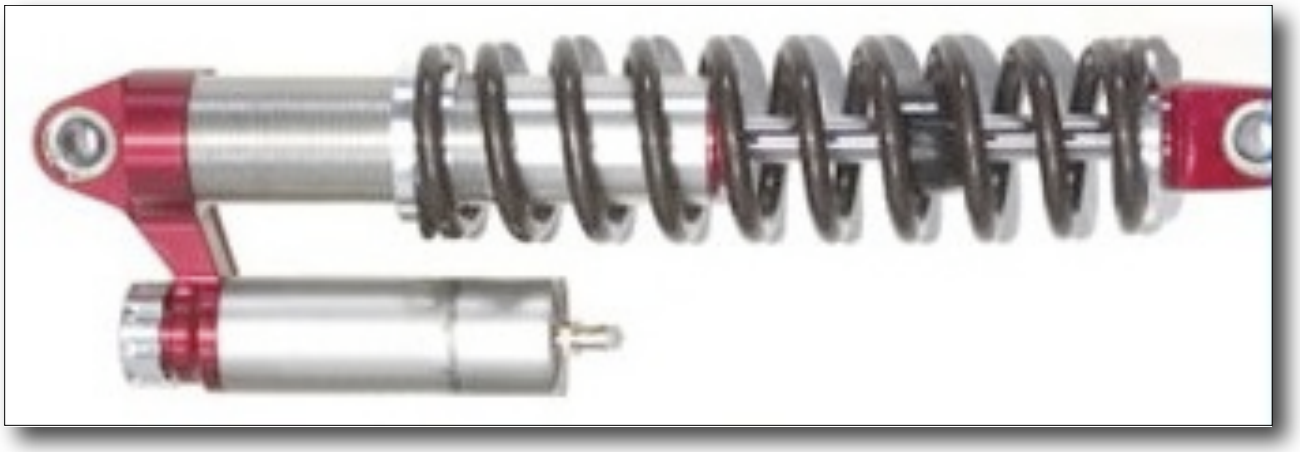
Side Winds

- Long A-arm, mono-suspension, narrow bike profile and open side-profile all combine to create high-speed stability .... even in a strong side-wind.



Shocks

Design



- Mono .... Only one on the front on one on the back
  for perfect side-to-side suspension balance.

- Coil-over Shocks specially designed just or us.
- Rebuildable
- Remote cooling reservoir (for cooler better performance)
- Auto Adjust as frame ShapeShifts

- Auto-Adjust for Speed and Load ....
    - Damping
    - Rebound
    - Pre-Load

- The suspension has three setup modes: **C**omfort, **N**ormal and **S**port.
  It gathers data on lateral acceleration, steering angle, brake pressure and engine torque,
  and automatically modifies to adapt to the conditions,
  enabling greater control and improving comfort and safety

Construction

- Tungsten-Cobalt shaft and (304) Stainless Steel housing.
- (304) Stainless Steel Shaft and T6 Aluminum Housing.

Behavior

- The angle of the coil-over-shock changes
  as the frame shape-shifts.
  so the spring-rate and damping automatically adjust.

- As the shock leans, (frame stretched) the ride gets softer
  and the suspension travel decreases.

- As the shock stands upright (frame shortens)
  the ride gets stiffer and suspension travel increases.

- The shocks automatically adjust damping to speed and load.
  Suspension reads the terrain, anticipates the needs.

Spring

Colors

- Polished Stainless
- Candy Red
- Warm Yellow
- Gloss Black

Design

- Progressively Wound (smooth on the hi-way yet able to take large off-road obstacles)

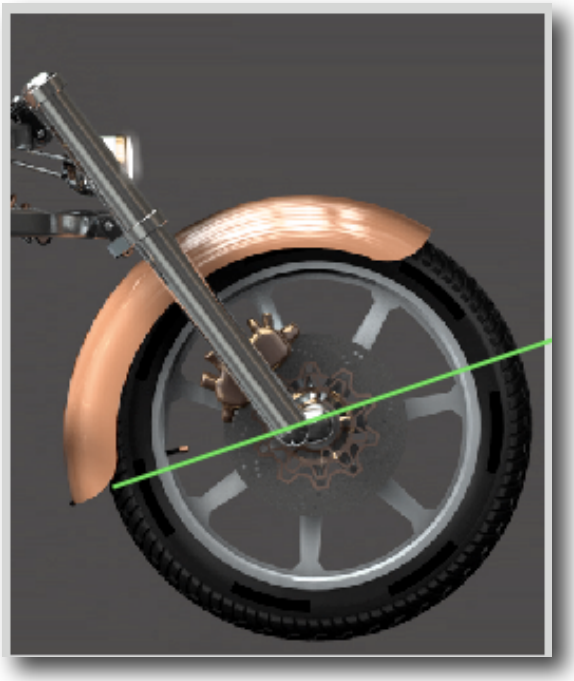
Construction

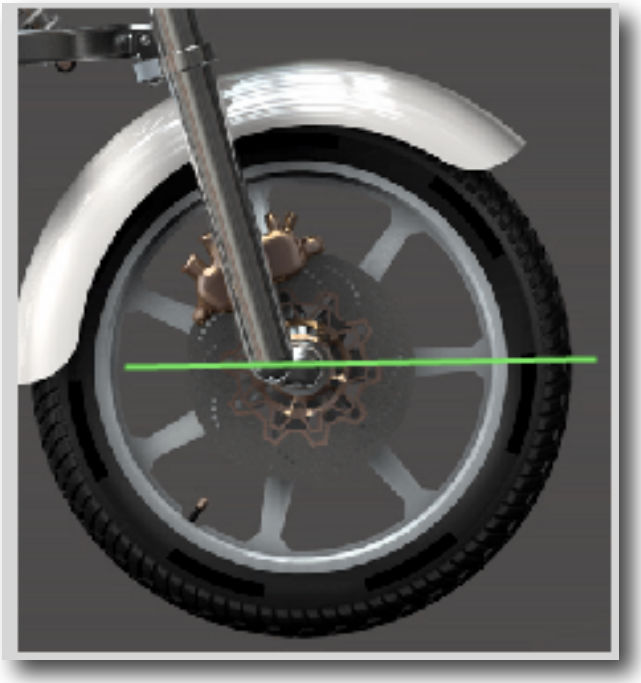
- Stainless Steel (springy Stainless Steel Alloy)

The Front

- These aren't really forks, so there is no need for fork oil and seals
- The fork tubes are 3-inches in diameter for solid landings.
- Long clean seamless spear / lance-like shafts
  create a stout stance for a big-shoulders look
  with nicely rounded full knob ends at the bottom
  and half-rounded knobs at the top.

- Forks are clamped to the tree with triple bolt sets rather than the usual double.
- The idea is to have a mono/single-sided setup
  for better tracking and easier wheel removal
  .... yet the reassuring LOOK of a double arm at the wheel sides.
- Fork Stops (either left and right) .... to the lower a-arm.
- SEMI-Leading axle for a better self-correcting stability on rough surfaces.





- When fully stretched, the forks turn from below the axle
  giving more of a springer feel with maximum directional stability
  when cruising the long open roads.

- Unlike in telescoping forks, but a bit like the "Springer",
  with the double wishbone design the rider can see forks move
  during normal suspension traveling.
  This provides the rider a visual awareness of suspension behavior
  that telescoping fork designs cannot provide.

Front Forks

Design

- 75 mm (beefy for jump landings)

Construction

- 356-T6 "A" .... Aerospace Aluminum
  with a tensile strength of 45,800 psi

Front A-arms

FAQ: Why do the front suspension arms stick out so far ?

A:

- There are three reasons ....

    1. The bike offers up to 8-inches of suspension and needs the clearance.
    2. The 35-lb tank (full) is close to the center of mass for better handling.
    3. The steering needs room for its degrees of movement.

- We have recently (shown in some images)
  tilted the side-pod to hide a bit more of the upper-A-arm
  and give the knee more room.

Design

- This is a "Short-arm/Long-arm Double Wishbone suspension"

both standard and fully stretched in this illustration

- Both A-arms are mounted to the long-spar with bearings, not bushings and use gel-pads to isolate vibration.

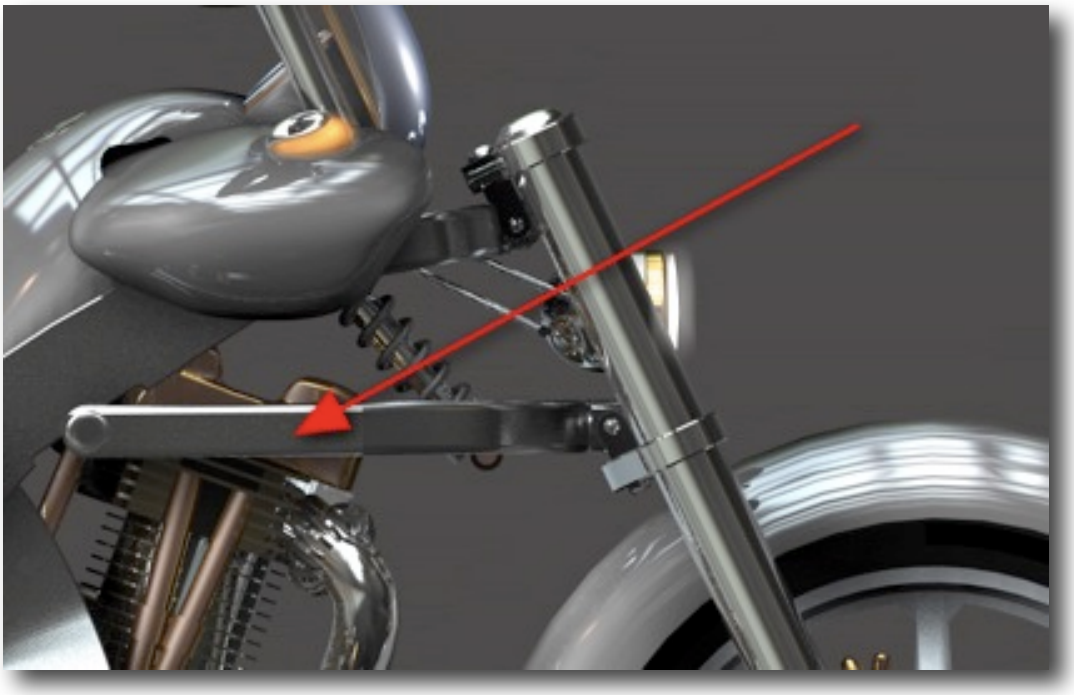
- The lower A-arm has a reinforcing cross-brace.

- The Panther's "double-wishbone" design delivers great steering accuracy, while still maintaining excellent comfort and feedback for the rider.

- The long lower A-arm transfers the braking load to the center of mass, and so dive is reduced to about 5% .... just enough for a tell-tail, but not enough to effect the balance especially in downhill braking while cornering.

Traction Bar

- The long lower A-arm is so long that it acts as a traction-bar / front tailing arm / radius arm / lower control arm. and sends suspension loads toward the center-of-mass .... to help eliminate chance of wheel-hop and so provide a surer grip for the front wheel, especially in cornering and on rough surfaces.



- Where the lower A-arm meets the forks acts as a fork-brace to keep the forks from twisting on a hard landing.

- Since the long A-Arm also connects at the center of vertical mass, it prevents both squat and lift during braking.

Rake and Trail

- Steering angle, rake and trail all change together in harmony.

- Trail adjusts from just under 4" to as much as 6".
- Rake is from ~22 degrees out to ~44 degrees.

- As the shock and spring lay down
  the changing angle makes the ride softer
  which helps smooth the little road irregularities.
  (just as the coil-over-shock standing up helps with bigger bumps)

- Multi-Link for best wheel placement while riding and braking

- Anti-Dive geometry (5% tell-tale dive)

Construction

- 356-T6 "A" .... Aerospace Aluminum
  with a tensile strength of 45,800 psi.

Bearings

- The front suspension uses 2.25 inch O.D. sealed corrosion-free Timken bearings.
  on both ends of each A-arm.

- This bearing is also used for the Wheel bearings.

Rear Swingarms

Design

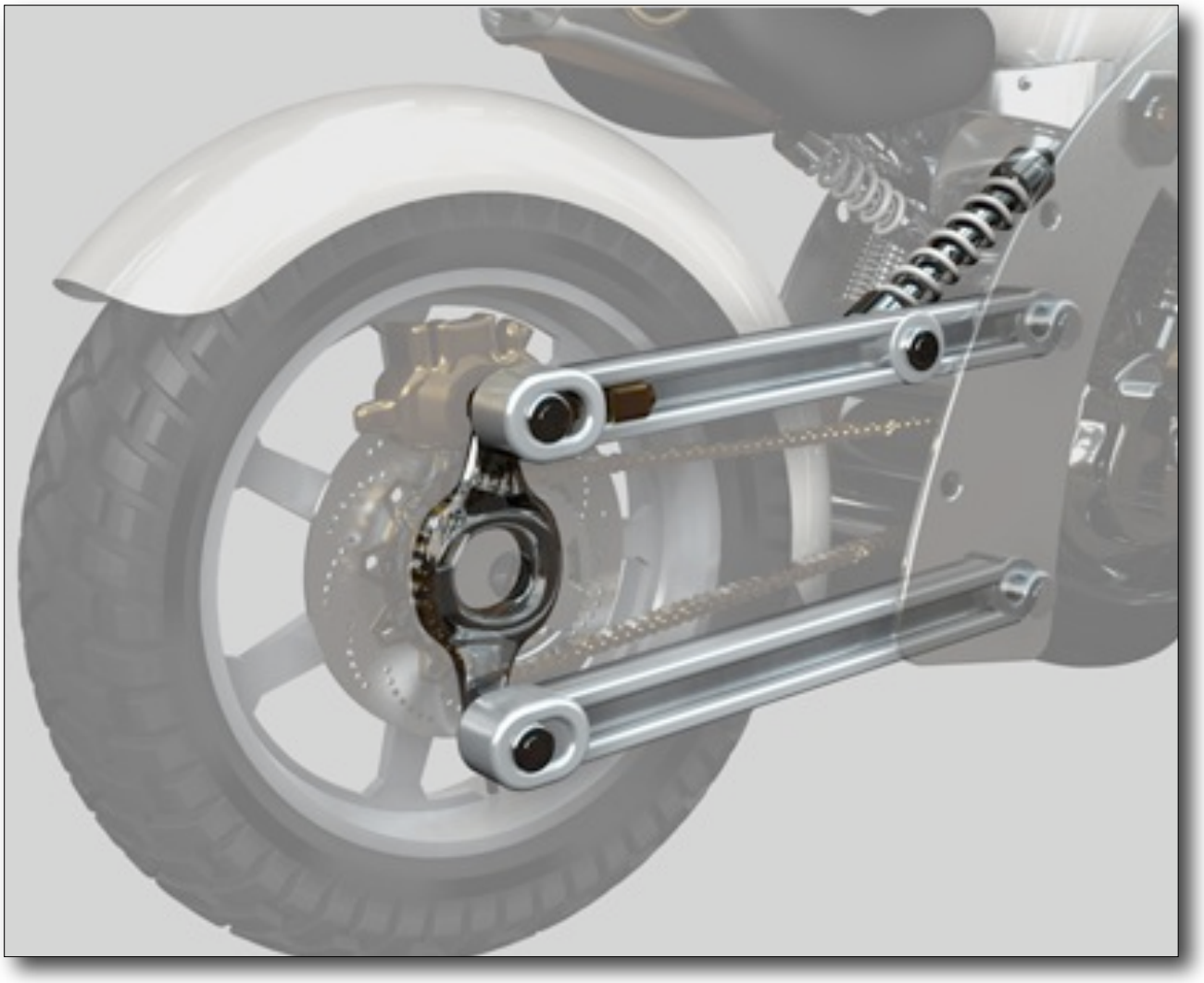
- The rear is a Double-Wishbone swingarm design.

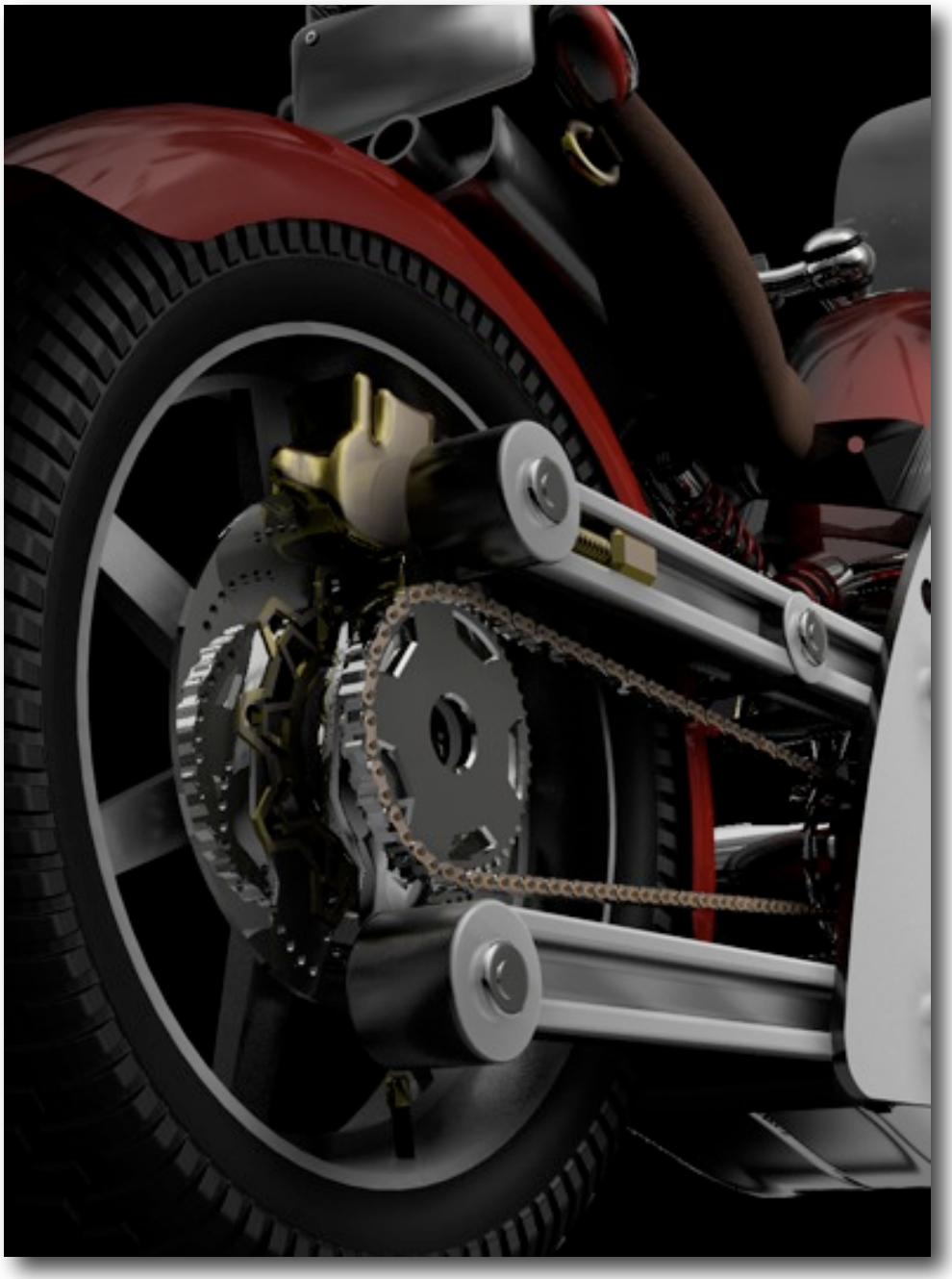
- This version of the Double-Wishbone is single-sided
  Instead of a swingarm down each side,
  there are the same two, but down just one side.
  This allows for a Double Wishbone design with just one more pivot-point
  than a conventional arced movement design, for perfect wheel placement.

- The wheel keeps its profile and does not move in an arc
  so the tire does not move its position of the tire patch on the pavement.

- The result is far better handling and the weight distribution of the bike
  does not change as the suspension compresses,
  making the bike's handling safer and more predictable.

- Both swingarms are mounted to the long-spar with bearings, not bushings
  and use gel-pads to isolate vibration.





- Single Sided for easy Wheel Removal.
- Swing-arms are 9 inches apart
  and helps keep debris/stones away from the chain and sprocket.

- The swing-arms are connected to the INSIDE of the frame
  so in off-road conditions it is protected from impact damage
  when grazing past objects such as rocks and trees.

- Multi-Link (for perfect wheel placement while riding and braking).

- Near where the arms attach to the frame,
  there are cross-members to prevent any torsion of the frame.

Construction

- The Swingarm is made of an ultra-high pressure forged aluminum.

Strength

FAQ: The swing-arms look like I-Beams.
Does that cause torsional weakness ?

A:

- The swing-arms start as I-Beams.
  A plate is welded on the inside/back-side creating a "boxed I-Beam".
  (The rear brake-line runs inside the upper swing-arm).

- The swing-arms are far enough apart (9")
  to provide exceptional torsional stability (twist prevention) to the rear wheel.

- The swing-arms are connected to the INSIDE of the frame
  so in off-road conditions it is protected from impact damage
  when grazing past objects such as rocks and trees.

Bearings

- The rear suspension uses 2.25 inch sealed corrosion-free Timken bearings
  on both ends of each arm.

- This bearing is also used for the Wheel Bearings.

Shape

- Swing-arms effectively lengthen/shorten. (effect due to arm/frame tilt).
  Axle tilts forward as frame stretches,
  but the distance between the center-of-gravity along the bike's length
  and the axle position actually increases

for better pavement traction under hard acceleration.

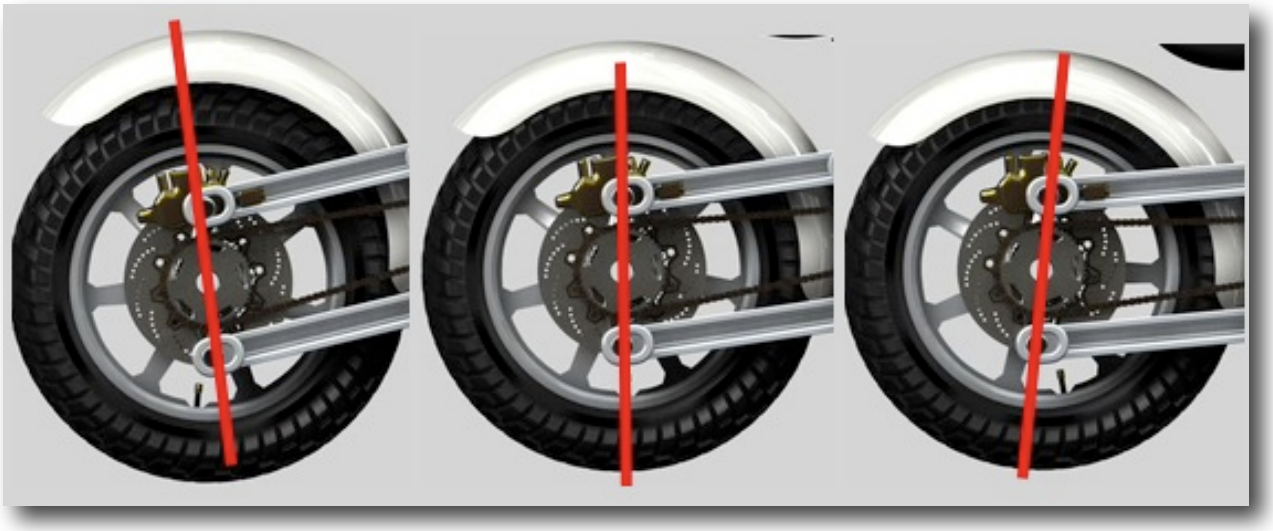
- The "trail" of the rear changes from 1-inch forward to 1-inch back
  the swingarm goes from leading to trailing
  for a total shift effect of 2-inches (19-21 inches effective lengths).

Behavior

- This design means the tire-patch does not move as the suspension compresses.
  This assures maximum predictable control.

- Trailing axle .... shorter lower swingarm makes rear tracks quicker.

- Leading axle effect lengthens the swingarm and lets it track surer.
  for superior traction under hard acceleration.



- Suspension STOPS are on BOTH swing-arms
  so the load between the twin swing-arms remains even.

- The plate welded on the back to create the strength of a "Boxed i-Beam".
  is made of 356-T6 "A" .... Aerospace Aluminum with a tensile strength of 45,800 psi

Travel

- 4-8 inches adjustable as the frame ShapeShifts.

Brakes

- The Front and Rear brakes are identical .... Same part numbers.

Types

- All brakes are stainless steel so they will not rust.

- They are always "full floating"
  and are available in two floating types.

- We do NOT offer a carbon-ceramic brake option.
  They have the advantage in that they feel consistant
  and do not fade with heavy use,
  but they need to be warmed up before they work well enough
  and so do not work well when cold or when in the cold.
  They also seem either disengaged or engaged and very little in-between.
  Brakes need a far more subtle feel to them.

Disks

- Brembo
- 11.25 inch
- Stainless Steel
- Floating (2 types)
- Ventilated and Grooved

Calipers

- Brembo
- Radial
- 4-piston
- Tucked for Protection off-road and if dropped.

- CNC Calipers (Panther)
- Cast Calipers (Cub)

Colors

- Polished Aluminum
- Gloss Black

- Brass / Gold
- Candy Red

Behavior

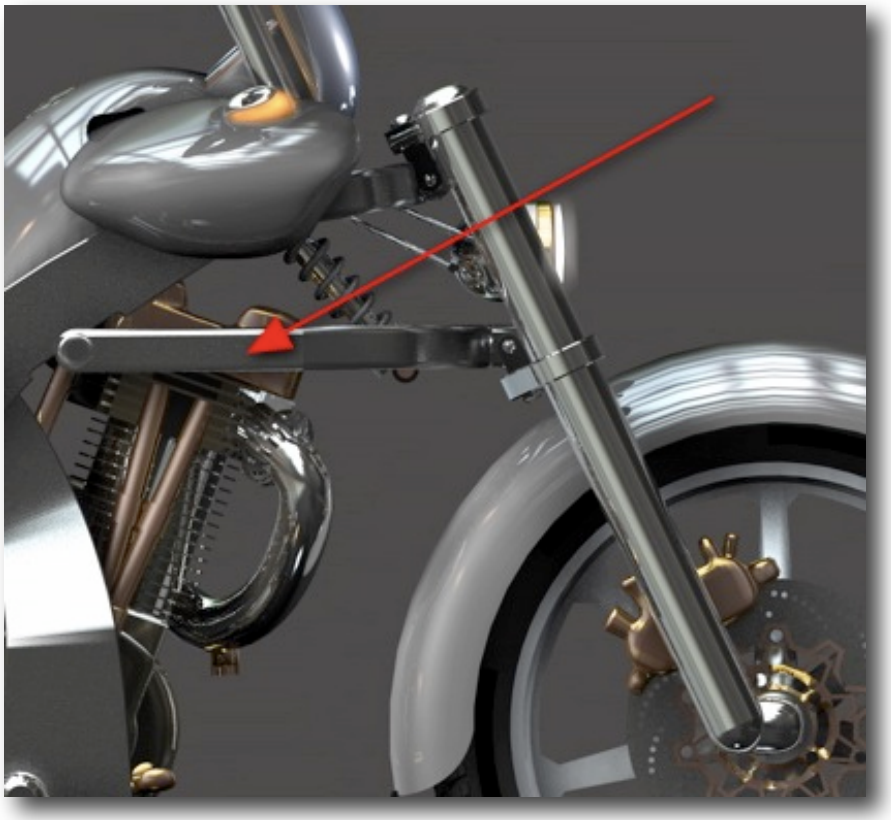
- When a conventional bike's front wheel hits an object,
  the bike pitches forward,
  because it's center of gravity is higher than the impact point.
  As a result, the rider is thrown forward.

  The panther won't pitch down and forward;
  the side-pods and the tank act as a brace
  and the double-wishbone suspension keeps the bike level
  with the rear wheel firmly on the ground.
  So, instead of being thrown up and over,
  the rider continues in a controlled straight forward travel.

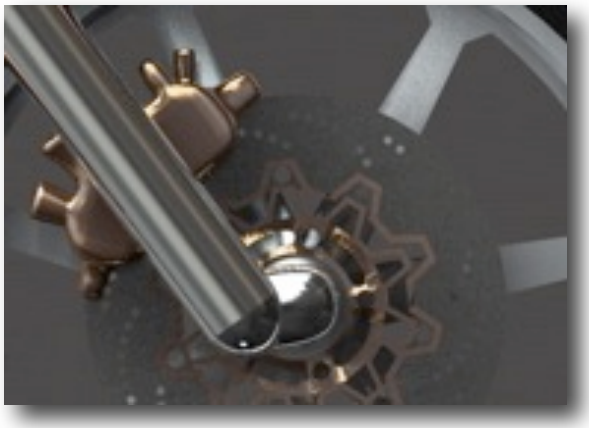
  Ceramic disks stop the bike very fast .... often too fast.
  We have chosen to limit the braking speed
  so as to prevent cars from plowing into the back of the bike.
  Our bikes stop from 60 mph in 100 feet.

Future

- We are working on liquid-cooled brakes.



- The braking distance is 100 ft from 60 mph when frame stretched standard or longer. This makes sure the bike stops in harmony with the rest of traffic and you don't so easily get rear-ended by a car.



Front

- The caliper is tucked behind the fork tube to protect it in a fall.

Rear

- The caliper is tucked behind the swingarm to protect it in a fall.

- The disk is also tucked behind the rear swingarms.

Calipers

- The Panther calipers are CNC.
  The Cub calipers are Forged one-piece.

- Calipers are identical part numbers (front and back)
    - Front calipers: 4 piston
    - Rear calipers: 4 piston

Traction Control

- Anti-Lock Brakes (Bosch)
- Traction Control (Bosch)
- Toggle off and on (because you may not want it when off-road).

- Because the Panther is designed for extreme abuse,
  the typical sensors would be easily damaged after just a few years
  so we are working with Bosch to design a special system
  that overcomes these weaknesses.

Active Handling

Endo Control

- Does not allow too much front brake pressure.
- Front extends when suspension is extremely compressed.

Wheelie Control

- Drops power in an over-extended "wheelie".
- Apply rear brake slightly if over-extended.

Brake Lines

- Woven
- Stainless Steel
- Aircraft Hoses and Fittings

front

- Front hydraulic line goes into the right hollow fork tube
  and exits at the upper a-arm,
  where it runs in the inside of the arm to its pivot
  and then doubles back to the handlebar plate
  and up the hollow risers and through the bars.

Back

- The back brake line is in the groove on the inside of the upper swingarm
  and then runs up the inside of the long spar to the spar-pivot
  and then down the inside of the short spar to the foot controls.

Disks

- All brake disks are "Full Floating" Stainless Steel Brembos.
  Back and Front disks are the same part number (11.25-inch).

Wheels

Designs

- Direct intimate connection to the road

Axles

- Axle .... One inch
- Wide for better lateral load absorption and stability

Rims

- The forged wheels have tubeless rims.
- The Stainless Steel wire-wheel rims are not tubeless but are bead-lock.

- Colors
    - Polished
    - Brass / Gold
    - Gloss Black
    - Pearl White
    - Candy red
    - Warm Yellow
    - Moss Green
    - Army Green
    - Khaki Tan
    - Chocolate Brown

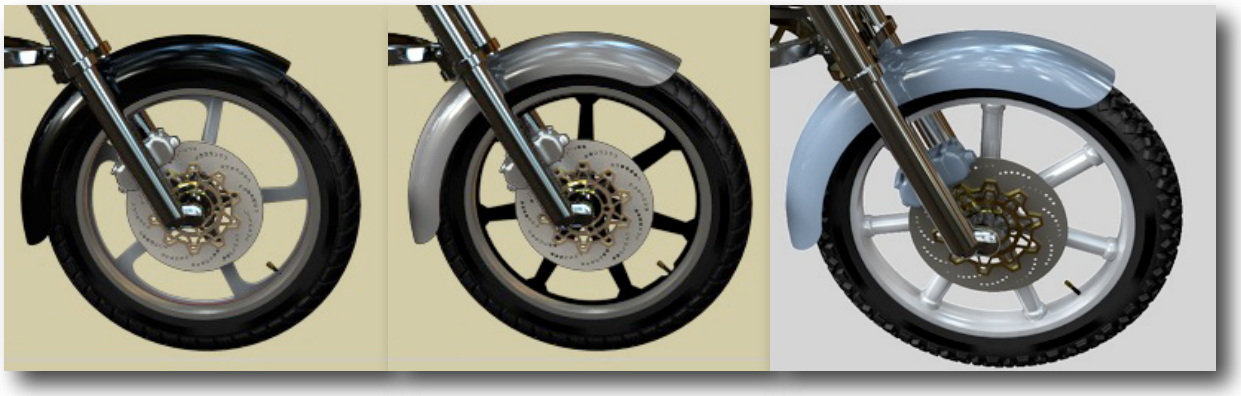
Spokes

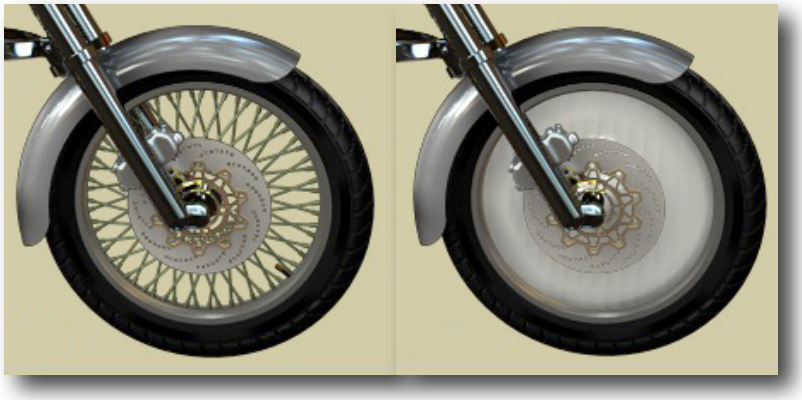
- Polished
- Brass / Gold
- Gloss Black
- Pearl White
- Candy red
- Warm Yellow
- Moss Green
- Army Green
- Khaki Tan
- Chocolate Brown

Styles

- 5-Spoke (Cub only)
- 7-Spoke
- Wagon Wheel (new adventure wheel)

- Wire
- Solid





Sizes

Front

- 21 inch diameter
- 3.5 inch wide rim to fit a 4.5 inch wide tire.

Rear

- 17 inch diameter
- 4.25 inch wide rim to fit a 5.4 inches wide tire.

Construction

Materials

- The 5 and 7-Spoke designs are forged Aluminum

- The Solid Wheel is forged Aluminum.
  (remember that solid wheels do not work well in creek crossings although they work well in deep mud).

- The Wire Wheel is Stainless Steel.
  Remember that you cannot use Tubeless Tires with wire wheels although they do come with Bead-Lock Rims.

Tires

German Metzeler tires

note:

Footprint profile is critical (lbs/in2 at the pavement)
psi of tire footprint must be the first consideration.
If the tire is too wide, the PSI on the road is too light for proper traction.
This determines the final tire width.

Size

- Front 21 inches x 4.25 inches (90 mm)
- Rear 17 inches x 5.4 inches (140 mm)

- Once the front tire cuts a path in the mud or sand,
  the wider rear still has bite on its sides as it widens that path.
  This difference in widths from front to rear
  provides added traction and directional stability for the rear wheel.

Sidewalls

- Clear Reflective Mylar side-wall tire,
  in a pulsed (broken) pattern for easier attention
  and visual determination of speed and acceleration.

  invisible during the day, but highly reflective at night.
  A huge safety advantage in allowing Panther's R-Bike
  to be easily and safely seen from the side,
  such as at intersections and by side-street emerging traffic.

- The strip is a non-continuous pattern so it attracts attention
  by pulsing intermittently at slow speed.
  It becomes a visually continuous line over 25 mph or so.

Styles

- Street
- Dual Purpose (level-1) (gravel roads)
- Dual Purpose (level-2)
- Off-Road (level-1)
- Off Road (level-2) (hill climbing)

- With other Adventure Bikes you get one set of tires (usually 70% street).
  With the Panther,the wheels pop on and off with one large nut and 5 pins.
  so you can change wheels (tires) in mere moments.

- If you are planning a hunting trip, you might want to leave the house with Enduro tires.
  If you are going to work, you may want street tires.
  If you want to go play in the dirt after dinner, you pop on the knobbies.
  You can now chose the wheels for the kind of ride you are planning.
  That makes for a far safer and more enjoyable experience.

Traction

- Traction is of course a whole lot more than just tires ....

1. It is about gear ratios and getting the torque to the tires in the right amounts.

2. It is about Bosch's Traction Control and Anti-Lock for the Brembos.

3. It is about changing the Torque curve as the frame Shapeshifts
   so it moves to the lower RPM range when the frame is shortened
   and toward the midrange when the frame is lengthened.

4. Yes it is about changing wheel / tire choices in moments

5. It is also about the tranny
   such as the 7 speed coming with both a granny gear
   and an over-drive and even an option reverse for deep woods.

Options

- In addition to fitting many Harley aftermarket options ....

Weather Shielding

Touring Weather Package

Abuse Shielding

Brush Shielding
Fire Shielding
Armor Shielding

Accessories

Bike Cover
Rifle Scabbard

- Unlike other motorcycles, the Panther can easily carry a rifle without it either sticking out or getting in the way of the rider. In fact it can easily carry two, so the rider can take both his rifle and his shotgun.

Storage Tube

- Dry Storage ... ex: For fishing Pole

Tool Holder
Warn Winch

Rear Rack Options

- see: Saddle Section

Special Kits

Tool Kit
Medical Kit
Explorer Kit

Service

- nothing could be easier

FAQ: What guarantee and post-sale service will the bikes have ?

- It is made to the very highest standards
  so a 6 year-60k mile quality and workmanship warranty is provided.
  (2-year for electronics)
- The Cub gets a 3 year -30k mile warranty
- That is by far the best warranty in the industry.
  BMW is only 3-years; Honda and Harley are only 2-years.
- The bike is constructed with "American Standard" SAE tooling in mind
  so anyone who can work on a Harley can work on this bike.
  Most all of the bike is owner serviceable.

Tucked / Removable

- Protecting vital pieces like the gauge, headlight and taillight.
  - Headlight is tucked between the forks
    and can be easily removed as a lantern or to stow away.
  - Tail-light is tucked under the seat.
  - Gauge on the "tank" between the risers of the handlebars.
    with the iPod that you can easily remove.

Parts

- With everything so easy to get to
  and the parts feel so nice to the touch (polished) and are so well made,
  service becomes a matter of pride and pleasure rather than a chore.

Tools

- There are ONLY 3 wrench sizes in one multi-tool kept on-board and wrapped in a rag.

Repair Manual

- The complete repair manual is on-board displaying on the iPod screen
  along with all the diagnostic auges you need.
  If you get lost anyway, we are a WiFi connection away.

Cleaning is easy

- ALL parts are easy to reach,; you can get a hand in anywhere.
  all surfaces are easy to clean (no toothbrush needed)
  and all parts have a form that is pleasant to the touch.

Service Key

- Cases and covers are locked using a key operated bolt system.
  (**see:** SECURITY below)

- Engine is key-locked at the collar
  where it is attached to the long-blade
  so it can't be removed.

- You need a key to open the engine.

- You need a key to open the electronics pod that holds the computers.

Carting Bikes

- Using the three holes as a triangular support.
  Two bikes can be hooked together side-by side.
  (Military, Forest Service, Hunter)

    1. When a bike is disabled, you can transport it back.
    2. Transport a disabled member.
    3. Transport equipment.
    4. Transporting back large game.
    5. Great option if it starts snowing

Security

- Keep what's yours

Bike Locator

- If the bike is stolen, we can locate it and disable it.
  We can also take a picture of the thief and record his voice
  via the iPhone / iPod instrument pod
  and wirelessly send it back to us for evidence.

Steering Lock

- The steering locks at an angle (like on any motorcycle)

Kevlar Cover

- The bike can be covered and the cover can be locked.

Nuts and Bolts

- All bolts are stainless steel or an Aerospace Super-Alloy
- Bolts have Bronze washers
  to help prevent electrolysis between the Aluminum and Stainless Steel
- Bolts are locked (by Stage-8) so they don't come loose.

MECHANICALLY LOCKED

www.Stage8.com/

- Major parts, expensive parts and parts that are easy to steal one should have limited access are KEY-locked on (8 lock-bolts on the same key) ....
    - Front Wheel
    - Rear Wheel
    - Tranny (lower frame)
    - Seat
    - Modules
    - Headlight
    - Catalytic Convertor
    - Engine (upper frame)
    - Engine and transmission covers
    - Electronics Pod

KEY LOCKED

www.Mcgard.com/security/intimidator.asp

Engine Service

- Engine cases and head are key-locked (service-key) including the two collars (head-collar and cylinder-to-crankcase collar).

- The collar where the cylinder and head meet is actually attached to the long-spar of the frame so the head can be serviced with the engine still in the frame !

Locks / Security

- Emergency rescue/theft system.
  .... (if the bike is stolen it can be located and/or disabled)

- The alarm chirps a warning when touched,
  fully sounding when lifted or tilting
  which means less worry of any false alarming.

Skid Plate Locks

- Locks in a down position

Handlebars Fold

- Secure unsteerable parking
- Narrow hauling/storing profile
- Component damage reduction if dropped.

Safety

A safer rider is more enjoyable.

FAQ: Does the bike meet Government safety standards ?

- The Panther R-Bike exceeds all government standards and expectations by introducing the birth of the ACTIVE safety of ShapeShifting.
- The Panther R-Bike is delivered environmentally certified in North America, Europe and Australia.

FAQ: If the bike is dropped, can it easily be ridden again ?

- The body is Kevlar,
- The pegs fold,
- The Handlebars fold to protect the controls from impact.
- The brake calipers are tucked
- The instruments are tucked
- The computers are sealed and protected between the SidePods.
- The Engine is protected by the Short Frame-Spars

Active

(the best safety is active safety)

- The Body Cover acts as a rider's body brace
  To help hold the rider more secure and help maintain control.
- ShapeShifts to safest proportions for the conditions.
  To have the best balanced proportions suited for that moment.
- Anti-Lock Brakes
  Because it the least we can do.
- Anti-Spin / Traction Control (great in wet corners)
  Not active in the woods, but perfect for fast wet corners on the road.

- Power level control
  not just for economy on the hi-way where you don't need much,
  but also in the deep woods where too much power can get you in a lot of trouble.
  Dial the power .... not too much, not too little for that moment.

- If it starts snowing, you can hook two bikes together side-by-side
  and create a 4-wheeled vehicle stable in the snow. (**see:** CARTING below)
  An ATV if a bike breaks down or if you are carrying a large load.

- Several sets of wheels
  So you easily have the tires you need
  for the kind of riding you are planning for that trip.
  Designed to pops on and off in a few easy minutes.

Passive

The Bike

To minimize damage....

- Handlebars fold
- Pegs and foot levers fold
- Mirrors fold
- Brake calipers tucked
- Instruments tucked and protected
- Headlight tucked and protected
- Short Spar (protects the engine if the bike is dropped)

The Rider

- Under extreme braking, the front end extends slightly
  reducing the chance of the bike cart-wheeling (endo).

- The side-module protrudes (4.5 inches)
  just enough to actively protect the knee and leg bone in a fall
  and keep it from being pinned under the fallen bike
  with no/little damage risk to the bike's vital systems.

- Short spar protects leg from engine heat and protects engine in a fall.
  It also helps bike slide so it lessens chance of cartwheeling in a fall.

- The tucked exhaust keeps the leg from being burned in a fall.

- Fuel storage has open-foam, baffled in a bladder within the tank as per NASCAR and Prix-Cart racing rules.

Water Crossing

Pods

- Blown chambers (Pods) help keep bike upright ....

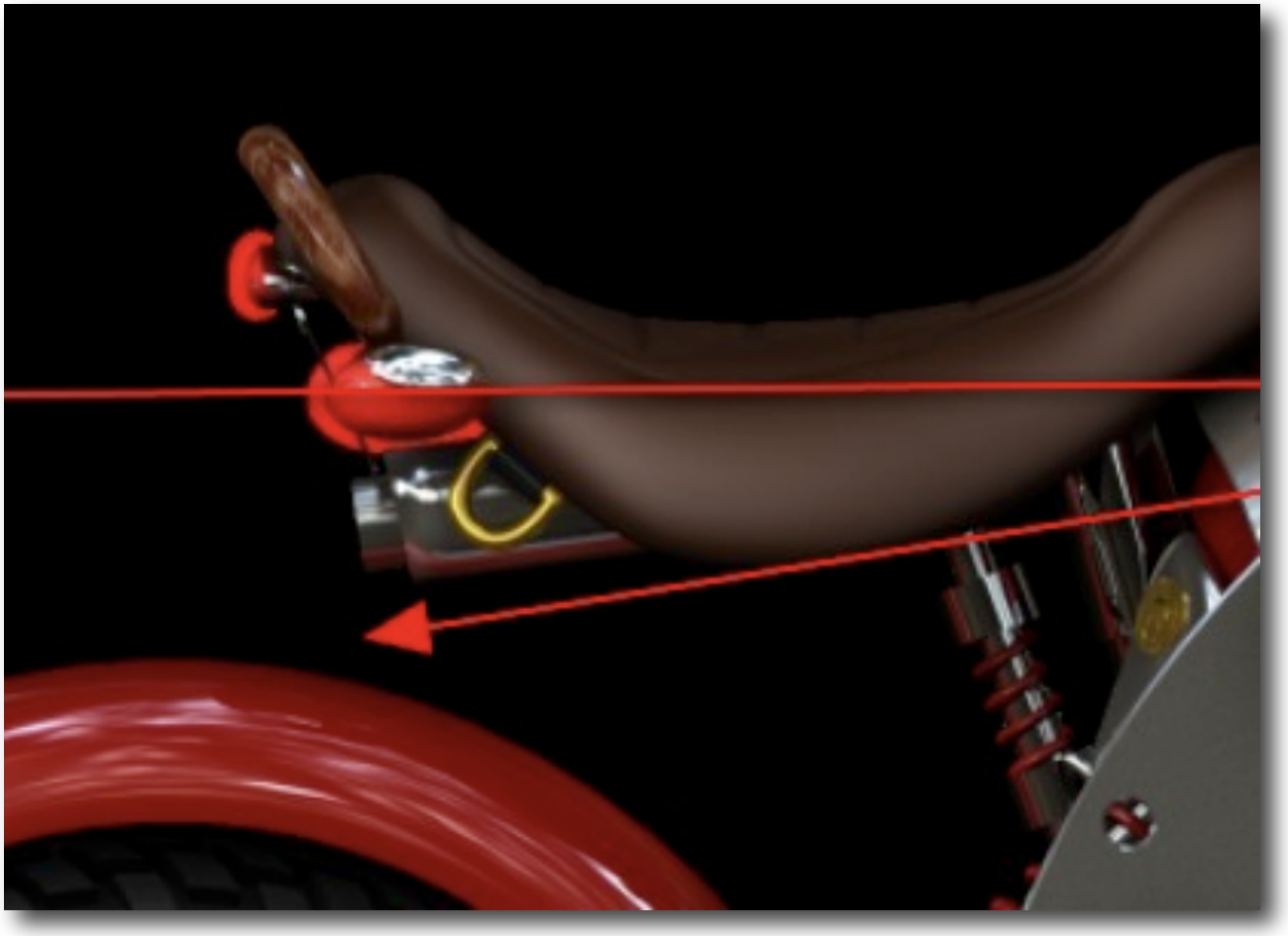
1. Fuel Tank module
2. Electronics module
3. Fuel Injection module
4. Storage module

Intake

- Intakes hopefully stays above water because it is at the body's highest point and is protected by the floatation of the SidePod. (snorkels are available)

Exhaust

- The exhaust tilts down when the frame is short,
  so it is harder for water to get into the pipe as long as you stay on the throttle.



First-Aid Kit

- First aid (Band-Aids, super-glue, sterilizer, etc)

E-Panther Addendum

- The E-Panther and E-Cub are are at the very edge of electric vehicle design and so the batteries, motors and control systems are subject to change as battery design and capacities change.

Motors

- The motor used is our own design and are extremely small and light weight. They are both only 9 inches long and 8 inches in diameter.

- The Panther uses a 35 hp motor (75 lb-ft of torque) and the Cub uses a 24 hp motor (52 lb-ft of torque). and run at 288 volts.

- In the past, such a high output would require the motors to be liquid cooled. The motors we use are AIR COOLED to keep the design simple. In the past, such HP figures would have produced so much heat that not liquid cooling them would have resulted in damage to the wiring and a demagnetizing of the magnets. Not so with our motors.

- The motor does not drag on the system when the throttle is closed and only regenerates when the brakes are applied, so it is easy and comfortable to coast along for long distances, thus increasing the range and making the ride more relaxing.

Batteries

- There are huge developments on the horizon in battery technology, and we have on the the inventors of Lithium Battery Technology available to assure that we stay on the reliable cutting edge of these developments.

Price

- Even with such stunning new technologies and a max range of ~480 miles per charge, the E-Panther and E-Cub are at the same price-point as our fuel driven versions.

Development

Forever and ever

Core Theme

The Panther is a Canadian / American Brand designed to take the rider anywhere and back.

Process

- The Panther has been designed with the help of the public.
  We posted the original images over 2 years ago
  because rather than having "Madison Avenue" tell us what customers want,
  we decided to get everyone involved.

- The result of this inclusive process
  is a bike with well over 100 options, and several more body style options on the way.

- As you can see from the enormous amount of design and engineering detail
  this is a product that has been very slowly and carefully crafted.
  That is an attitude that will continue because development never ever stops.

Core Priorities

- In order of importance ....

  1. Lifespan
  2. Strength
  3. Cost

Wildly Different ?

- The only things wildly different with the Panther is ....

  - Double Wishbone Suspension
  - ShapeShifting to safely adapt to the ride.

  .... The rest is all about much better quality materials and Systems Engineering.

- To keep the bike as simple as possible, proven technology is often used,
  but often used in new innovative ways.

Fewer Parts

- Components often play multiple roles,
  such as the engine support rods being hollow
  and serving as ....

    1. Oil lines both feed and return for the top and bottom ends
    2. Oil dampening of engine vibration before it gets to the frame.
    3. Engine supports
    4. Shapeshifting members to keep the overall balance.

American vs. Metric

FAQ: Why not Metric ?

- The Panther uses Harley tooling.

- Harley has traditionally sold about a third of all large motorcycles worldwide.
  They have a huge dealer network and that network is suffering
  because they are selling cruisers to a generation
  most of whom have already bought their last bike.

- This option becomes a perfect way for such dealers
  to bring in a whole new younger, well-educated fresh group of customers.

Production

Delay

FAQ: When does production begin ?

- We originally planned to begin production in 2008.
  The Economic Collapse in 2008 made that unreasonable.

- The exact start time depends on the expected health of the economy.

Designing the Operation

Starting a company such as Panther requires designing several parts ....

- Product
- Company
- Factory
- Distribution
- Service
- Systems

Product

- It took over nine years to design and engineer the Panther.

  www.ErikBrinkman.com/Panther/Documents

Company

- We carefully designed the company to be flexible
  and we gathered a top shelf team of the best talent.

  www.ErikBrinkman.com/Panther/Documents

Manufacturing

- We had to design a factory floor
  that would allow for a "Custom Mass Produced" product.

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- Factories are generally either one or the other, but not both
  and certainly not both efficiently.
- Parts and systems assemblies Manufactured in dozens of location and many suppliers
  but assembly is another matter.
- The final assembly facility is divided by product culture and facility size.
  We have a policy that a facility must be small enough
  so that all the employees and their families be able to attend a BBQ.
  It needs to be small and tight and about relationships and families.
- The Electric is a different culture than the Military
  so they get assembled in different facilities.

Distribution

- Our desire is to distribute both via the Internet and via Dealers
  but we are running into State laws that take away out control of dealers
  and thus control over the quality of the customer experience.
- The quality customer / dealer experience is half the value of the Brand,
  so we are still deciding what to do.

Service

- Part of the service issue is connected with the Dealer issue.
- The bike has enough sensors on-board to be very self-aware
  of its condition and service needs.
- It also has a complete service manual on-board.
  In addition it can data, voice and video connect to us.

Systems

- The Panther is operated via an Apple iPod / iPhone
  partly because of its extreme reliability
  and partly because it has all the diagnostic software available.

Marketing

Show and Tell

Images

FAQ: Are the images photographs or renderings ?

- The images you see are a combination of ....
    - Photos
    - Production ready files (to one ten thousandths of an inch)
    - A few renderings of items not yet ready,
      such as the custom Brembo calipers and our handlebar buttons
    - Items not allowed to be shown yet (such as the headlight)

- Showing the bike this way allows us to show undistorted detail in the best lighting
  so the smallest detail of every part is very clear for the viewer.
  This is common practice in any magazine shot or TV commercial as well.

- These images are to help TELL.
  When we are ready to deliver bikes, we shall SHOW the actual bikes in a proper venue.
  It makes no sense to show bikes not yet in production.
  It just frustrates everyone.

Sales

FAQ: When are they for sale ?

1. Decide whether you want an Electric or Fuel version
   and go to the "Design-a-Bike" page for that version.

2. Design your own bike.
   - Go to each BLUE heading
     and make your choices under that heading.
     If you "mouse-over" a selection, it often describes it to you.
     After you have gone through all the Blue Headings,
     you have designed your bike.

3. After you have designed it the way you like, push NEXT.

4. Choose ....

   - **Just Interested ....**
     - You are just playing .... Do this all you like.
     - Designing a bike is fun.
       You can do it as many times as you like.

   - **Expression of Interest ....**
     - We send you a list of your design choices
     - We notify you when orders begin.

   - **Pre-Order ....**
     - Allows you to "save your place in line".
     - Your 5% deposit is placed in an Escrow Account.
     - You may transfer your place in line to someone else if your wish
     - Your deposit is 100% refundable up to the time that we notify you
       that your specific build is about to begin.

- If you chose to Pre-Order, it takes you to PayPal where you may make your deposit.
  That automatically gives you a dependable record of your purchase.