### **CLUTCHES & ACCESSORIES**







STM Strada S.r.l.- Via Campo Archero, 20 -10023 Chieri (TO) Tel.+39 011 9422832 Fax +39 011 9471447 www.stm.to.it - per informazioni: info@stm.to.it

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STM's story begins like many others: a product is developed from an idea, and success is reached as a result of passion, perseverance and inventiveness. STM was founded in 1981 by Oronzo and Vito Strada. In the beginning STM designed and produced robotic components and measuring instruments. STM's successful bid in the two-wheel industry began in the '90s, at first designing and producing high quality components for bicycles. This strategic decision marked the first big change in STM's history.

The second big change follows some years later when STM's R&D Comes up with the conception and development of the first STM slipper clutch prototype. STM's slipper clutch represents a huge change in motorcycle technique and this innovative product ensures the company worldwide success. Thanks to the competence and lengthy experience gained designing and machining high quality components, the firm quickly become the leader in the performance clutch market segment. The slipper clutch era had begun.

The first STM slipper clutch prototypes were originally developed and tested with the Official Ducati World SBK team. These prototypes soon contributed to the victory of two World SBK Championships. Development and tests carried out in the following years allowed STM to extend such technology to wet clutches. In 2003 the "Evoluzione" slipper clutch technology was applied to wet clutch systems on Japanese motorcycles, widely broadening its range of applications. At this point STM's involvement in competitions intensifies considerably and is crowned with extraordinary successes in the various motorcycle competitions. Cooperation with top Honda, Suzuki, Yamaha, and Kawasaki

teams that compete in sport production competitions allow STM to gain experience and improve its product. In the same year STM debuted in Motocross and Supermotard meeting with unanimous approval and contributing to the victory in many races. Today STM offers a particularly broad range of products which are constantly being tested and improved in order to satisfy the requirements of a growing number of riders. Developed and tested in cooperation with top teams, all STM components are designed with the latest technologies and manufactured with the most advanced CNC machinery. STM "Evoluzione" clutches stand out for their technologic and highly innovative design: shaped by their own function to essential lines, they are precious objects, a state of the art expression of Italian design.

## INFOTECH

### ← Spring functioning

Primary spring:

It makes pressure on the disc pack throught the pressure plate;
It replaces the helicoidal springs



Secondary spring: • it makes pressure on the drum; • it regulates the opening of the slipper clutch and regulates the engine brake.

### Spring functioning

The primary and secondary springs are pre-loaded in order to generate an initial elastic strength of contrast.



#### Primary spring functioning

When you operate the clutchlever, the primary spring is compressed. The spring releases an elastic strength of contrast to the lever movement. The next chart shows how the spring load varies with its compression.

#### Secondary spring functioning

The engine brake makes the drum rotate and shift outwards causing the discs to disengage. The secondary spring is compressed in comparison with the initial resting position and generates an elastic strength of contrast. This strength is described in the following graphic.



#### Primary spring load/compression chart

The origin of axes corrisponds to the free height of the spring, i.e when the spring is not loaded. Each mm of compression corresponds to an equal decreasing of the spring height.

# pre-loaded quote



#### Secondary spring load/compression chart

The origin of axes corrisponds to the free height of the spring, i.e when the spring is not loaded. Each mm of compression corresponds to an equal decreasing of the spring height.

## INFOTECH

### Diaphragm springs and helical springs

Operating the clutch lever, the diaphragm spring is compressed and realeases a strenght which is constant, if not inferior in the maximum point of the curve.STM slipper clutchs use this characteristics to let the strenght to be done while actioning the clutch lever constant or even inferior. The helical springs usually present in the majority of standard clutches have a curve with a linear increasing chart. When pulling the clutch lever, the helical spring is compressed and realeases an increasing strenght. This means that the lever becames harder as you pull the lever.

### Spring adjusting #1

In case of downshifting or violent hard breaking the rear wheel generates a back torque. This back torque causes the hub to lift up and shift disengaging the discs. The secondary spring contrasts the hub movement.

Secondary spring: its function is to press the drum against the hub. It regulates the opening of the slipper clutch to control the engine brake. According to the load (expressed in kilos) of the secondary spring, the opening of the clutch is anticipated or deferred, that is the opening arrives at inferior or superior values of back-torque. The biker feels it as low gear effect: when the clutch opening is anticipated, the biker will feel less low gear effect; when the clutch opening is deferred, the biker will feel more low gear effect.

### Spring adjusting #2

The engine brake can be modified according to biker preferences by using a different secondary spring.:

- ► If the biker desires less engine brake while entering turns, and wants low gear effect we should replace the secondary spring with a lower loaded one (less kg).
- Street conditions also influence the set-up choice; different set-up can be choosen according to surface conditions:
   wet ► dry ► Mud

The opening of the clutch also depends on the primary spring: the drum is constrasted by the secondary spring and also by the primary spring when the pressure plate lifts up. The standard set-up of STM clutches should be the ideal one for the most riders, because it results of tests made with the most important teams in many championships. However the spring set-up can be changed according to rideres preferences.

### → Differences between 90 mm and 125 mm primary spring

The main difference is that in the clutch with 125 mm spring, the elastic action of the spring is applied right on the disc pack. With the 90mm spring the pressure is not direct on the plates, because the spring is positioned in the centre of the clutch. The advantage of 125 mm spring is to give a softer clutch lever, being equal the pressure on the plate pack. The slipper clutch with a 125 mm spring is an evolution of the 90 mm spring, that is still supplied.



## INFOTECH

### STM SLIPPERCLUTCH TYPICAL FEATURES

#### Lever ticketing

Clutch lever ticketing is due to the action of the clutch pusher plate, in the moment in which it is raised under the drum pressure. In this case the rider's fingers can feel a small ticketing, indicating the slipperclutch system is working correctly;

#### **Racing pumped engines**

▶In order to use STM slipperclutch on "non standard" engines, with more hp and torque, it is advisable to fit the clutch with a primary spring more loaded (+ 10 kgs.). This to avoid clutch slipping in starting phase.

### WHY TO USE AN STM SLIPPERCLUTCH

#### "Road" use:

- ► To prevent engine overturning;
- ► To prevent rear wheel hopping;
- ► To enable the downshifting without use of clutch lever;
- ► To enable the controlled sliding of rear wheel;
- ► To manage clutch lever release (in bend), in order to avoid unsaddling;
- ► To allow a better clutch lever release in starting phase, due to the diaphragm spring.

#### "Off Road" use:

- ► To prevent engine overturning;
- ► To prevent engine components integrity, gearbox first;
- ► To avoid engine turning-off due to the holes in the track;
- ► To allow a better jump preparation;
- ► To set the shock absorber more easily and efficiently;
- ► To determine a better drive feeling with the motorbike;
- ► To allow a better clutch lever release in starting phase, due to the diaphragm spring.



### ↔ STM slipperclutch components

Secondary spring



**Primary spring** 

centering pin











rasamenti molla primaria e secondaria



hub with fixing pins



Hub with elliptical fixing

## DUCATI SLIPPERCLUTCH SBK EVOLUZIONE

The "Evoluzione SBK" slipper clutch is our Top of the Line clutch. Used by teams and riders who compete in world and national sport production championships, this is definitely the best clutch you can fit on a Ducati. Equipped with a Ø125 mm diaphragm primary spring which offers advantages resulting from applying the spring pressure directly and squarely on the disc pack. Starting in 2008 all "Evoluzione SBK" clutches have also been revised in order to adopt the "Evoluzione" technology for the secondary springs. In addition, all SBK clutches will provide a preset for the use of a starting pin (available separately – P/N ADU-0100) when rear wheel start is necessary.

All STM slipper clutches for Ducati bikes can be fitted with STM baskets (either 12 or 48 tooth, this last P/N ADU-0010) or OEM baskets, using STM or OEM disc packs.

The tool to hold the pressure plate while tightening the clutch is available separately (P/N UTL-0030), as well as the tool to fit the 48 teeth basket is available separately (P/N UTL-0040).

Several teams chose the quality of STM Ducati Evoluzione SBK slipperclutch, starting a mutual profitable cooperation.

The "Evoluzione" slipper clutch is a further development of the "Original". Equipped with a Ø90 mm diaphragm spring that replaces the six coil springs, this Ducati clutch offers all the advantages introduced by the adoption of STM's "Evoluzione" spring technology. Starting in 2008 all "Evoluzione" clutches for Ducati bikes have been revised in order to adopt the "Evoluzione" technology for the secondary springs as well. This enables the clutch to be set up to suit the rider's preference for a multitude of specific circumstances. The smaller the load of the secondary spring, the less engine break the rider will experience when downshifting and vice versa

All STM slipper clutches for Ducati bikes can be fitted with STM baskets (either 12 or 48 tooth, this last P/N ADU-0010) or OEM baskets, using STM or OEM disc packs. The tool to hold the pressure plate while tightening the clutch is available separately (P/N UTL-0020), as well as the tool to fit the 48 teeth basket is available separately (P/N UTL-0040).

STM "Evoluzione" slipperclutch is a real "best seller". No other slipperclutch has the same impact on motorbike riders. You can use this clutch either "on road" either "on track" and you will be always satisfied.



## DUCATI SLIPPERCLUTCH ORIGINAL BAGNO D'OLIO/WET

The STM "Original" clutch for Ducati is the first clutch STM developed for Ducati bikes. "Original" not only because it is the origin from which all further clutch developments followed, but also because with its six rods and coil springs it maintains the look of the stock Ducati clutch. Equipped with a six legged spider secondary spring this clutch does not allow the possibility to perfectly adjust the engine breaking as our other Ducati clutches. This product offers the best price/quality ratio you can find on the market today.

All STM slipper clutches for Ducati bikes can be fitted with STM baskets (either 12 or 48 tooth) or OEM baskets, using STM or OEM disc packs. The tool to hold the pressure plate while tightening the clutch is available separately.

All STM slipper clutches for Ducati bikes can be fitted with STM baskets (either 12 or 48 tooth, this last P/N ADU-0010) or OEM baskets, using STM or OEM disc packs. the tool to fit the 48 teeth basket is available separately (P/N UTL-0040).

### new price!

La frizione STM a bagno d'olio per Ducati rappresenta il "trait d'union" tra il mondo Ducati e la classica frizione a bagno d'olio adottata dai costruttori giapponesi

La prima esperienza di STM su una frizione a bagno d'olio risale al 2002. Gli ottimi risultati ottenuti in termini di facilità di operazione e di totale affidabilità, inducono STM a proseguire nello sviluppo.

Oggi, a distanza di meno di dieci anni, STM è orgogliosa di poter offrire ai suoi clienti la più completa linea di sistemi antisaltellamento per le più popolari moto europee, giapponesi ed americane.



# SLIPPERCLUTCH

STM's first experience with a wet slipper clutch dates back to 2002. The excellent results obtained in terms of smoothness of operation and overall reliability led STM to further their development. Today STM is proud to offer a complete range of slipper-clutch systems for the most popular Japanese and European Sportbikes.

Working with top World SBK teams, STM focused on the possibility to adjust the engine brake dynamics by modulating several clutch system parameters. This led to a research and development program which focused on the characteristics and utilization of different types of diaphragm springs (the "Evoluzione" technology).

STM slipper clutches operate through two "Evoluzione" diaphragm springs which allow for modulation of the clutch : one (the primary spring) that replaces and functions like the coil springs of the OEM clutch; the other (the secondary spring) that controls the operation of the anti-hopping mechanism inside our clutches.

The action of the "Evoluzione" primary diaphragm spring is digressive, as opposed to traditional coil springs. The progressive nature of coil springs means that the more they are compressed the harder they become to compress. Basically with coil springs the clutch pull gets progressively harder as the lever approaches the handlebar. This is not the case with a diaphragm spring which gives the ability to apply a smaller force on the lever to achieve the same amount of spring compression. This results in an easier lever pull towards the end of the range of motion for the lever. Another benefit to the "Evoluzione" primary diaphragm spring is that it applies a greater force on the clutch pack than a coil spring can. The "Evoluzione" primary spring also allows a faster and superior engagement of the clutch under acceleration.

The addition of adopting the "Evoluzione" technology into our secondary springs allows our clutches to be completely adjustable in regards to engine braking. This enables the clutch to be set up to suit the rider's preference for a multitude of specific circumstances. The smaller the load of the secondary spring, the less engine break the rider will experience when downshifting and vice versa.

For practical reasons all STM slipper clutches are sold for a specific application with a base primary and secondary set-up that is recommended by our technicians.

Our clutches, however, offer the great advantage of being adjustable to the rider's preferences simply by changing the load of the primary and/or secondary spring.

STM's relentless search for quality allows no aspect of it's products to be excluded. STM technicians view the lubrication of all clutch components as an extremely relevant factor for the durability of the components themselves and for their consistency during races. The lubrication of the clutch is guaranteed by the new FLS (Forced Lubrication System) which assures optimal circulation of engine oil through specifically designed passageways.



All STM wet clutch systems are designed to be fitted with the OEM's stock basket and disc pack. The tool to hold the pressure plate while tightening the clutch is available separately



## SLIPPER CLUTCH CROSS/ENDURO SUPERMOTARD

The increased popularity of four-stroke motorcycles in all off-road disciplines has deeply changed the riding stile and technique of such bikes. The specific characteristics of these engines have brought about the development of many new components, one of the most notable being the slipper clutch. The field of application of the STM clutch on the four-stroke single cylinder engine and the advantages that derive from its use, vary according to the speciality.

All STM off-road clutch systems have been developed in cooperation with top race teams and riders. This allows us to test the materials of our components under the most extreme and demanding conditions. It is our commitment to racing that provides the opportunity for STM technicians to gain experience that will ultimately be transferred directly to our production products. In Supermoto the STM clutch system works in a way that is very similar to streetbike applications: the STM slipper clutch helps increase the level of rider control over the bike by eliminating the rear wheel hop.

Also in this case there is the possibility to vary the low gear effect simply by changing the secondary spring.

# R-EVOLUTION FIXED CLUTCH

The new "MX R-Evolution" is a long-life light-weight clutch specifically designed by STM technicians to bring clutch performance to the next level in terms of precision, response and control.

The new MX R-Evolution clutches contain many of the technical solutions developed by STM in recent years: "Evoluzione" Spring Technology - All "R-Evolution" clutches are equipped with "Evoluzione" springs which are the result of STM's diaphragm spring technology. Years of cooperation with top SX and MX teams have proven the advantages of our "Evoluzione" spring over the traditional coil springs used by OEM clutch manufacturers. The digressive action of the "Evoluzione" spring allows for faster engagement of the clutch and superior precision and control of the clutch when actuating the clutch lever (this also translates into better starts).

Innovative Hub Design - "R-Evolution" clutches have an innovative hub design that allows optimal clutch response when operating the lever and consistent performance throughout the race. The steel guides on the hub guarantee a better disengagement of the disc pack and long life of the clutch hub.

STM Tempered Steel Discs - All "R-Evolution" clutches come with tempered steel plates designed to match the STM hub design and to work with the original friction plates. These discs guarantee a constant rate of consumption of the disc pack inside the clutch and lead to longer life of the hub. Forced Lubrication System (FLS)

- The "R-Evolution" clutch is designed to ensure improved lubrication of the clutch components. STM's forced lubrication System ensures optimal circulation of engine oil trough specifically designed passageways. FLS guarantees consistent clutch performance throughout it's range of use and extends the life of the individual clutch components."R-Evolution" clutches can be fitted with the OEM clutch basket or with STM off-road baskets (sold separately), using OEM friction plates. The new "R-Evolution" clutches are currently available for the following applications: Why waiting for something else when the best has already come?



New STM "coil spring" fixed clutch, for cross and enduro use, has been designed and realized in order to replace the original one, aiming to improve rider's driving feeling.

Due to greater lubrication and different discs pack, the driver can obtain a superlative clutch lever inflection, as well as a very low discs pack overheating.

This STM new clutch has several positive features, if compared with OE one: lower weight and superior lifetime as a consequence of aeronautical aluminium alloy use.





#### "EVOLUZIONE" PRIMARY SPRINGS

STM offers three different kind of primary springs, different not only for diameters, but for the way they work too.

**Evoluzione 90mm diameter** – It fits the long-lived clutches, which have made history of the company, as well as the Evoluzione Ducati.

This spring version have been used then on the Honda CRF 450 R and on the Yamaha YZ 450 F clutches as well, enabling an easy building and operation of the STM clutches. Settings available on this spring go from 120 kg to 200 kg, with step of 10 kg.

**Evoluzione 121mm and 125mm diameter** – As those before for position and kind of work, but in a different way, cause of the structure of the clutches which contain them.

Usually slipper systems with 121mm Diameter spring work on 600/750cc engine where we find smaller OE clutches, while the 125mm diameter springs are used on the 1000cc engine, making safe specifical needs. Both the springs come from the 90mm springs, but they work better cause they apply pressure on a bigger circumference, allowing a better pressure on the plates, for a faster and better engagement of the clutch. Production of these kind of springs allows STM to machine parts with less bending risks, without extreming look and having lighter parts. Settings go from 90 kg to 190 kg for the 121mm springs, while for the 125mm they go from 110 kg to 230kg.

Function: all the primary springs, known from the first side of the part numbers with 0S1xxx/xxx, repeat the work done by the original coil springs, but in a better way. We said better for the following reasons, the diaphragm spring features allows to work using the same strengh along the stroke of the lever, while in the case of the coil springs, strenght used increases along the stroke.

Also, with the Evoluzione spring, the rider will experience constant performance even if the thickness of the disc pack decreases. So, making safe the structural limits, the Evoluzione

#### "EVOLUZIONE" SECONDARY SPRINGS

In 2003 STM twists the features of the slipper systems, replacing the standard spider springs with those called Evoluzione. In this way it was born the first slipper system totally adjustable to the riders drive styles.

Using the diaphragm spiring to manage the slipper effect it happens the following: the smaller the load of the secondary spring, the less is the engine brake the rider will experience when downshifting and viceversa.

These springs have all the same dimensions talking about diameters, they all have a 85mm diameter, to have them the same for all the systems purposed. This means we can move a secondary spring from one clutch to another one.

Function: all the STM secondary diaphragm springs are listed and engraved with the same first side part numbers, 0S2085/xx, being different just for the load.

This load will set how much engine brake the rider will experience, cause it represent how much backtorque he has to generate to activate the slipper system. This well explains why a 30 kg secondary spring gives back less engine brake than an 80 kg spring: we have to clash a lower strength, so at the first rpm difference experienced, the system will be activated.



Primary spring Ø 125 mm





# ACCESSORIES DUCAT

Clutch cover for Ducati dry clutches: typical STM style, smartness and technology. Flash 180° and 360° are entirely CNC billet machined in Anticorodal 6082 (aeronautic light aluminum alloy), with "thickness" anodization.





Alloy Clutch cover for Ducati



Clutch cover for Ducati Flash 360° black Clutch cover for Ducati Flash racing gold

Clutch cover for Ducati Titanium

Clutch pusher plate for Ducati dry clutches: typical STM style, smartness and technology. Tornado clutch pusher plate can be fitted only on STM Evoluzione clutches; Vertigo and Classic clutch pusher plates can be fitted only on OEM Ducati clutches.











# ACCESSORIES DUCATI

STM oil breather is entirely CNC machined with O-ring and carbon fiber valve.

 Hardcoat anodized aluminum alloy sprocket carrier. Available for Ducati and MV bikes.
 Hardcoat anodized aluminum alloy sprocket. For 520 and 525 chains, with

different toothings.

Oil breather with 30° head for racing engines.





STM Clutch Slave cylinders for Ducati, Honda and MV Agusta: Softer lever on Ducati bikes; better opening of Honda and MV Agusta clutch









## ACCESSORIES FDR

FLUID RESERVOIR PLUG

### **STM STILE ON YAMAHA T-MAX**

Right now, STM could be installed on the European best seller maxi scooter ever.

We bring our experience from the racing field to the city streets, for those guys who look for high quality accessories. STM supplies for YAMAHA T-Max a complete range of accessories CNC billet machined, available in five different colours: Blue, Black, Gold, Lead and Red.

**BAR ENDS** 

**ENGINE** OIL PLUG

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VARIATOR COVERS



SWINGARM PLUG

**REAR WHEEL HUB COVER** SMALL VERSION

**BIG VERSION** 

**REAR WHEEL HUB COVER** 



STM supplies accessories not only for the street customers, but also in off-road field, we have been able to apply our style to the best bikes. In fact STM manufacturer some different kind of accessories with high technological contents STM think how to solve problems, increasing the drive pleasure.

For example, the STM Off road covers, contain a lot of improvement reducing the working temperature with a better circulation of lubricant, increasing also the oil capacity. The same we made with our Basket, more consistent but ligher than what is available on the market. All these items combined together with our slipper systems or with our MX R-Evolution, give to each rider an incredible weapon.

Another time we kept far away from you concerns, why are you still looking for something else?



front spindle protectors







Off Road clutch cover



Off Road cage



swingarm buttons







engine oil plug













Fork adjusters











been realized by STM: the fluid reservoir for brake and clutch pumps. Completely CNC billet machined in anodized Anticorodal 6082 (aeronautic light aluminum alloy), it gives your bike a "cool" look. Available in 4 colours: blue, black, gold and red.

A terrific accessory has





Bar ends (screw in)

Bar ends (expander)







Plug for OEM fluid reservoir

A brand new line of products "high technology": STM handlebars risers. This product can be fitted on following motard motorbikes: Ducati Hypermotard, Aprila Dorsoduro, KTM (engine LC4). Completely CNC billet machined in anodized Anticorodal 6082 (aeronautic light aluminum alloy), it enables the driver to lift the handlebar 9mm with each couple of spacers. Available in two colours according with the motorbike model to be fitted.









# FRONT REW PROJECTS

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The electronic front brake lever is one of the newest STM development projects. This device has been equipped with an electronic regulation of the distance from the half-handlebars axis, in order to enable the driver not to move his hands away from the same half-handlebars.

This feature is the opposite, if compared with the actual "rebound" system. Its regulation is controlled by a small "time by time" engine, driven by a small lever: by pushing the necessary number of times this small lever with the right thumb, the driver can recovery the pre-defined lever distance. This allows to recovery lever distance drifts due to hard use (race, track days). STM lever has been tested in WSS 2010 season by an important team as well as adopted, in next WSBK season, by another important team.

This product will be on the market in 2011 in "universal fitting version", giving a chance to replace the OE one.

ander development STM handlebars are manufactured in Anticorodal 6082 (aeronautic aluminium alloy). They have been designed to replace OE plastic devices assuring a race/sport "look" and higher stress strength. As usual, STM choosed to produce an "universal – racing oriented" device, offering the possibility to fit its handlebars switches on every motorbike simply by been wired on everyone's need. STM handlebars have been designed and tested in accord with several teams engaged in 2010 WSBK and WSS season. STM handlebars are now available in 3 versions, each one in 3 colours: 5 buttons (left side of handlebars), red, gold, black; 3 buttons (left or right side of handlebars), red, gold, black;

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# NEW PROJECTS

La frizione antisaltellamento "Evo-GP" è l'attuale stadio di sviluppo delle frizioni STM. La forma "a palette" della campana determina una estrazione del calore generato all'interno del carter. Le caratteristiche salienti di questa frizione sono le ridotte dimensioni e la materia prima con la quale è realizzata: acciaio legato, la cui durezza elimina l'usura tra le parti e conferisce al prodotto non solo una eccezionale durata di vita, ma la rende anche estremamente "sensibile".

Naturalmente, anche la frizione antisaltellamento "Evo-GP" è basata sul brevetto "rampe e sfere", come tutti i modelli STM.

Dotata di molla primaria a diaframma del diametro 105 mm, la frizione antisaltellamento "Evo-GP" applica la tecnologia "Evoluzione", ovvero le molle secondarie, anch'esse a diaframma, disponibili in differenti tarature.













# DRUM STOPER HUBLOCK STEEL

#### **DRUM STOPPER HUB LOCK**

In the race, as well as in motorbike maintenance activities, you could be forced to fit and unfit the clutch several times... How can you avoid losing time and pieces? STM updated its clutches with a device called the "drum stopper hub lock". The hub is a coordinate system integral with drum and spheres in order to enhance the entire clutch handling.





**STEEL RAMPS** 

The STM slipper-clutch is a "valuable" object... how can you increase the overall performance while avoiding a decrease in product lifetime? STM is now manufacturing both hub and drum ramps in steel alloy in order to accomplish these goals... The result is a clutch that simultaneously functions better and has longer lasting components.





