



McCoi of the chain oilers

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Lubricate for what chain?

Modern o or x-ring-chains have a grease packing those the highly loaded place between rivets and case lubricate. The role runs however drying and is grateful for a little oil. In addition the steel of high-quality chains is rust sensitive and a lighter oil film serves as rust protection. The following diagram shows the Aubau of a roller chain.

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Technology on the left of

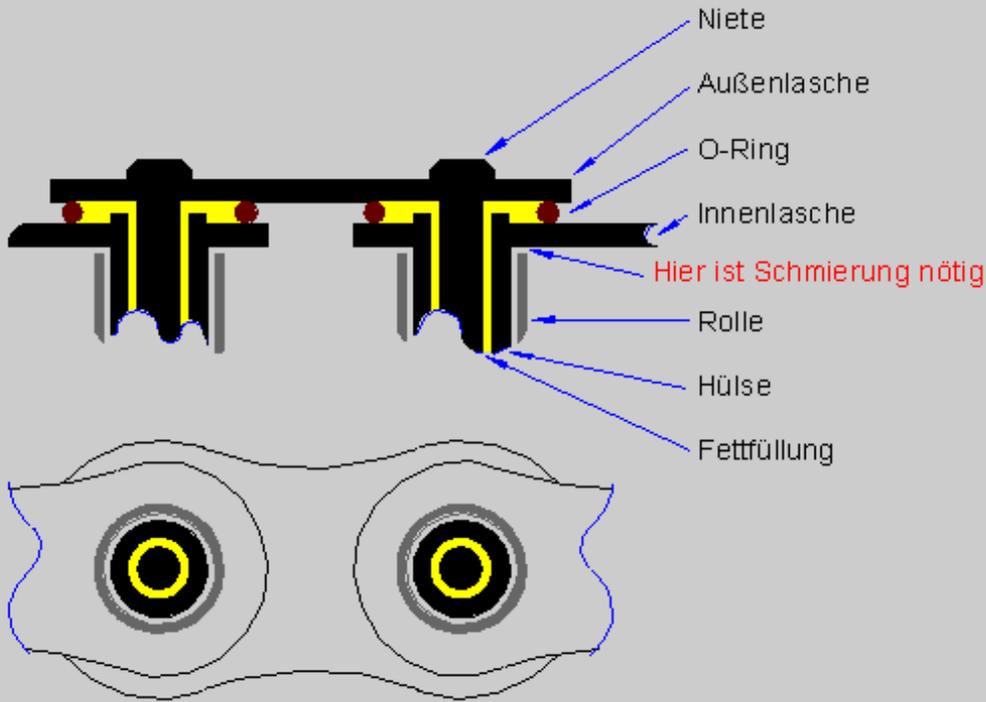
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Which lubricant?

A suitable lubricant should fulfill the following criteria:

- **Lubrication properties:** logo, therefore geht's
- **Creep ability:** in order to arrive under the role
- **Adhesive strength:** in order not to be hydroextracted
- **Corrosion protection:** in order to protect the chain against rust

Most chain sprays fulfill these criteria quite well. The creep ability is reached by solvents, which must evaporate after injecting only times. The adhesive strength is not yet given so long, therefore one should drive off never immediately after injecting.

I made good experiences with Castrol and S100(teurer), bad against it with DryLube and Polo, which did not offer both (for me) sufficient corrosion protection.

The adhesive strength of the chain sprays is to have to importantly over not constantly after-lubricate, however it has also its drawbacks:

- The tough fat produced viscose rayon friction between role and case, the achievement costs.
- At the sticky fat dust and sand remain being able to damage to cling, which work like emery, O-rings, the wear increase and by increased friction also achievement to cost.

With a light oil lubricated the chain keeps therefore longer and it arrives to more achievement at the rear wheel . However must be very frequently after-lubricated because of the bad adhesive strength of these oils then. Best one lubricates continuously, but but one needs **an automatic system**.

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Which gibt's

To me admitted automatic lubrication systems are:

(a short description of my personal impression follows. For detailed information one follows the on the left of.)

- [Loobman](#)
Not really automatically, but manually pumped. But however very simply and very favorably. Low Tech with high functionality at the small price, ingeniously.
- [HawkeOiler](#)
Likewise manually operated an electrical pump delivers a drop per depressing the key.
- [Scottoiler](#)
The probably most well-known system. A negative pressure relief valve at the intake opens as soon as the engine runs. With an adjustable needle valve a continuous river is proportioned of a few drop per minute. Since the oil viscosity is very temperaturabhaenig, the Duchfluss changes also with the temperature. In addition it drips rather too little while stationary with running engine too much, at high speeds.
[Thorsten](#) collected detailed references to the Scottoiler [on its homepage](#).
- [Chaintec](#) offers different system to two:
They work likewise with continuous flow. That simpler systems possesses a mechanical shaking valve, which in each case opens a drop, which is steered by a needle valve releases during acceleration, bumps, etc. and. The second system possesses an electromagnetic valve, which is headed for over a shaking switch (a steel ball in a coil).
- [CLS200](#)
This Microcontroller steered system works with an electromagnetic valve, which, as far as I understand it, time-steered a given quantity flow through lets. Additionally it is temperature-compensated, so that a constant quantity is really reached. By recognition of the wechselstromanteils of that Lima on it switches itself also only with running engine. The system is however expensive according to my opinion much too.
- [Kettenoeler.com](#)
Works likewise with continuous flow, which is stopped by a throttle valve. The release takes place via an electromagnetic valve, which releases the oil flow during switched on ignition.
- [Pro Oiler](#)
The McCoi commercial imitators found, I feel honoured.

That were (admitted to me) the commercial systems.

With Scottoiler, Chaintec, let CLS and chain oiler flow the temporal steered flow the disadvantage at low speeds too much oil on the chain at high speeds, with which the hydroextracting quantity is besides larger, rather too few.

Now to the not-commercial systems:

- [The HimalayanOiler](#)
Paul Friday developed very favorable, although somewhat skuriles system.
- [Schwaboiler](#)
This is now the first distance-dependent system. Over a Rheed contact the distance is determined and given after given intervals a certain quantity of oil on the chain. By the used pump the quantities of oil are however each mark quite largely, the distances between them accordingly also. Besides the used Microcontroller (Conrad C-control) is largely, expensive and low-power. The Posereffekt of the lit LCD display with complete menu guidance is interesting against it surely for some people. (when flying over the beta program I however the actual pump controlling device missed.)
- [E-chain of Rainer Eisenhuth](#)
This system on Microcontroller basis (PIC) is likewise distance dependent. Rainer uses the Rheed contact of a sigma Tachos also. Opposite the Schwaboiler its pump can very finely proportion and does not pump with a system error not equal the whole quantity of oil to the landscape. In my opinion it developed the almost ideal system.

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Still another system?

Now, actually not, because the system of Rainer is hardly more capable of improvement.

Or actually nevertheless, because for a direct reproduction some data are missing on its homepage and it are nevertheless still possible for a few improvements: The costs of its system are very highly, particularly for Overhead (development system) and pump, there must it also which more favorable give. In addition Rainer writes on its HP "*only in Ireland, 10 days continuous rains, had the distance to ca.1000m per drop to be reduced.*", so was one can make nevertheless also automatic, if one uses eh a Microcontroller; -).

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The McCoI

That stands *for C* for *Microcontrolled Chainoimorer* ; -) and offers the following advantages:

- **Distance-dependently:**
Provides at all speeds for a lubricating dependent on load of the chain. At high speeds drips frequent oils and while stationary drips nix after.
- **Economically:**
That follows directly from the lubrication dependent on load. Since with the Rumstehen at the traffic light and with slow local through traffic nix, and/or little oil is promoted, the oil consumption is also very small.
- **Cleanly:**
Results likewise from the distance principle and the fine dosage. Since only as much oil arrived at the chain as really need becomes, the hydroextracting quantity is very small. Thickness drop on the rim does not give it.
- **Temperature-independently:**
The drip rate is equal large and nearly not on the viscosity and thus the temperature of the oil dependent always. Each oil can be used. It should not be only fresh and clean around the pump to clog.
- **Surely:**
The pump promotes reliably a drop per pumping impact. The pump gets by an electrical connection defect permanent current not the oelvorrat on the road is pumped in such a way, but also only one drop delivered. Since the pump is, the oil tank upright standing, even a jumped off hose between tank can be installed and pump does not lead then to a dangerous oil puddle under the Mopped.
Although no M\$-software runs on it can possibly also such a CONTROLLER times fall, then however the inserted Watchdog provides after 1 s for a RESET and a new initialization. The chain is continued to lubricate.
- **Maintenance arm**
Depending upon tank size the oil level must be controlled and refilled possibly only after some thousand km. That is everything.
- **Fully automatic**
The distance between two drops can be stopped, a change is normally not necessary however, since during travels in the waschkueche the quantity of oil is increased automatically.

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The structure

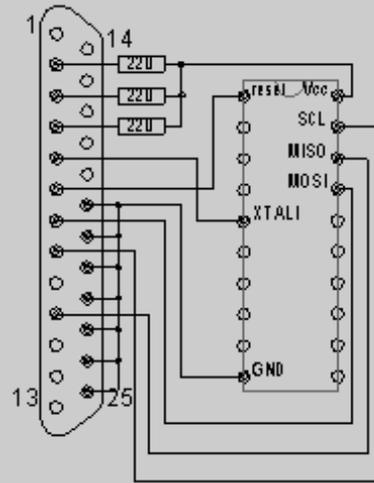
in the detail with purchase prices to the industrious reproduction; -):

- There I desire did not have a stripping from the front to the rear and back to pull around the sigma to tap got **McCoI** its own Rheed contact ([Conrad](#), 503711-88, 2.95 DM + magnet 503665-88, 1.30 DM) at the rear wheel.

- The control is made by a Atmel AVR (AT90S1200, 152960-88, 7.95 DM), for whose programming at the parallel haven computer (LPT) a simple circuit with 3 resistances is sufficient.

The complete data sheets, as well as development tools such as assembler (ASMPack) and simulator (AVR aVR-Studio) for the AVR CONTROLLERS gibts in vain with [Atmel](#).

Around the data into the CONTROLLER to transfer there are various simple circuits and (for the private use) Freeware programs e.g.: [IC Prog](#) of Bonny Gijzen for many different programmers (like the FunCard right). And for in-circuit-programming: [RK Prog](#) of Johann Aichinger



- For a suitable pump I looked for a long time and with ASF Thomas became fuendig. The maintenance-free, very compact and light swinging piston pump SK16F/12V can be headed for by impulses freely and delivers a droplet per pumping impact. By the operational principle it is not only very small and easy, but also absolutely weatherproof.

ASF Thomas does not supply however at final customers, the pump directly can one however e.g. over [butcher technology](#) (stock NR. AHG0016F.024, 73.43 DM+Porto) refer.

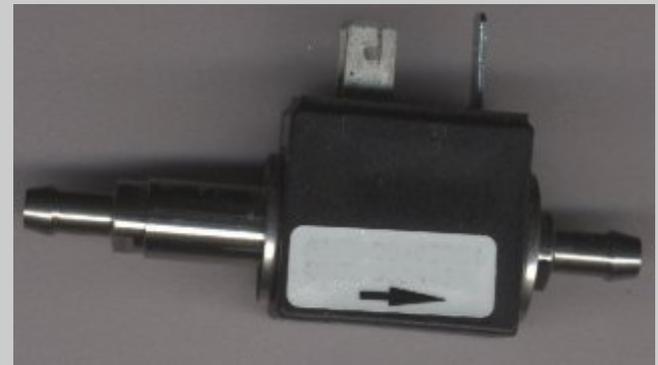
The more favorable standard design (stock NR. AHG0016F.021, 68.45 DM+Porto) of the pump possesses seals from EPDM, which, as I in the meantime unfortunately found out, with mineral oils does not get along. The seals pour up and lock the pump. Either one takes therefore not-mineral oils, or one seizes for mentioned above the chemistry version of the pump.

With the small deliveries and filigranen the pump one should plan an in any case filter. I use a sinter tank filter of Conrad (224308-62, 5.45 DM), but a small gasoline filter from the motorcycle accessories go naturally also.

In addition one should absolutely consider [the assembling instructions](#).

The pump with single pulses is headed for by a field-effect transistor (BUZ11, [Conrad](#) 159441-88, 1.35 DM). Through relatively long pulses of 50 ms a viscosity dependence of the delivered flow is approximately avoided.

- As rain sensor a favorable resistive humidity sensor ([Conrad](#), SHS A3, 187631-88 6.95 DM) in a bridge connection at the comparator entrance of the CONTROLLER serves, with satisfied humidity the distance automatically too shortened. The alternating voltage of 2 kHz, needed with condensation, is produced by the CONTROLLER, has eh hardly which to do.



- As oil tank a model construction aerobatics tank of [Conrad](#) (oil - , gasoline-steadily, independent on position installation) serves with me, which there is in sizes of 100 ml until 1000 ml:

BestNr.	Abm. mm (LxBxH)	Contents	Price DM
227200-62	90 x 40 x 50	100 ml	8,95
227218-62	100 x 48 x 50	150 ml	9,25
227226-62	110 x 55 x 55	250 ml	10,45
227234-62	120 x 55 x 61	300 ml	10,75
227242-62	135 x 55 x 65	350 ml	10,95
227250-62	135 x 67 x 65	500 ml	11,75
227153-62	145 x 80 x 65	600 ml	12,95
227129-62	160 x 84 x 71	700 ml	12,95
227196-62	185 x 95 x 75	1005 ml	13,90



Pipes or cable straps can be led by the slots in the tank, which facilitates the safe attachment at the Mopped. Model construction catalogs offer there however still infinitely alternatives, e.g. highly polished aluminum tanks then however the factor 5-10 more expensive are.

An old brake fluid container from box or Mopped (small!) goes naturally also.

The specified parts add up on approximately 100 DM, small articles and assembly material I eh in the cellar had. In as far as preisfaktor to take into account is depends on the personal preferences and Qualitaetsabspruechen. A plastic housing costs 3 around DM, high-quality aluminum housings 10-15. Flat pins for the electrical connections settle with amounts of Pfennig, AMD super+seal with more than 10 DM, etc..

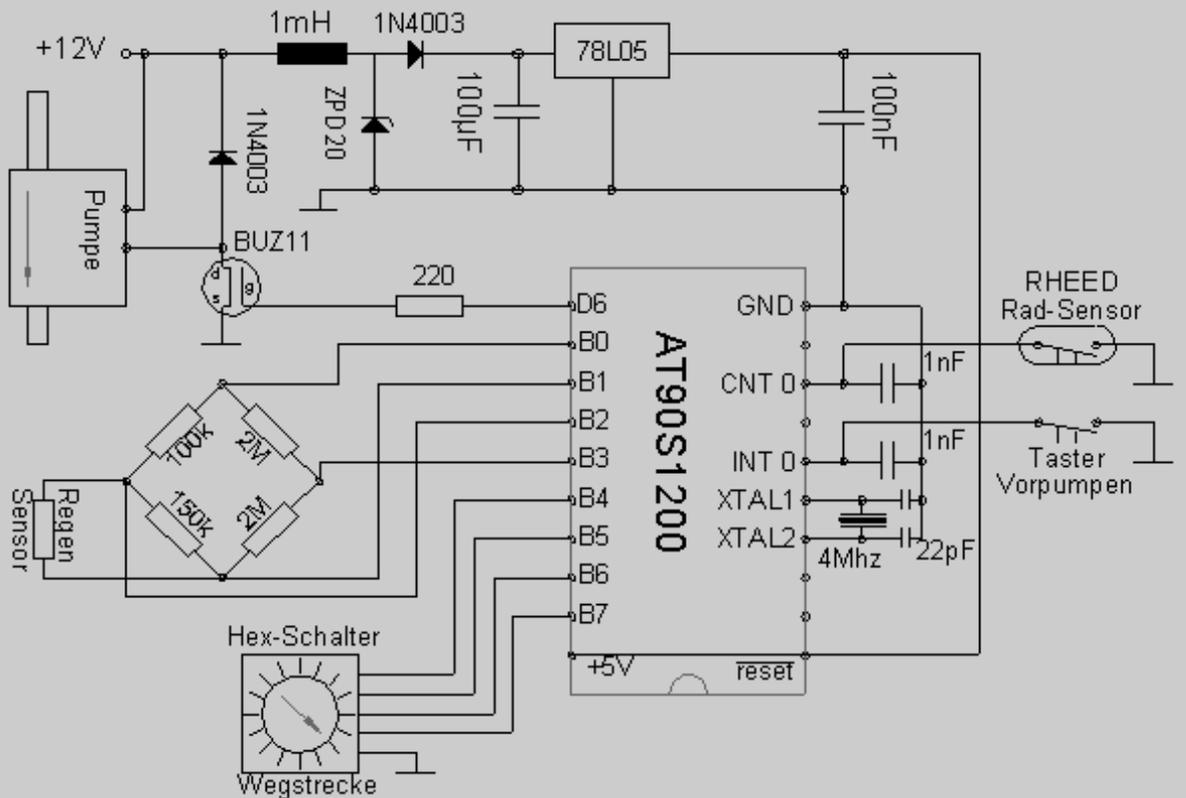
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The circuit

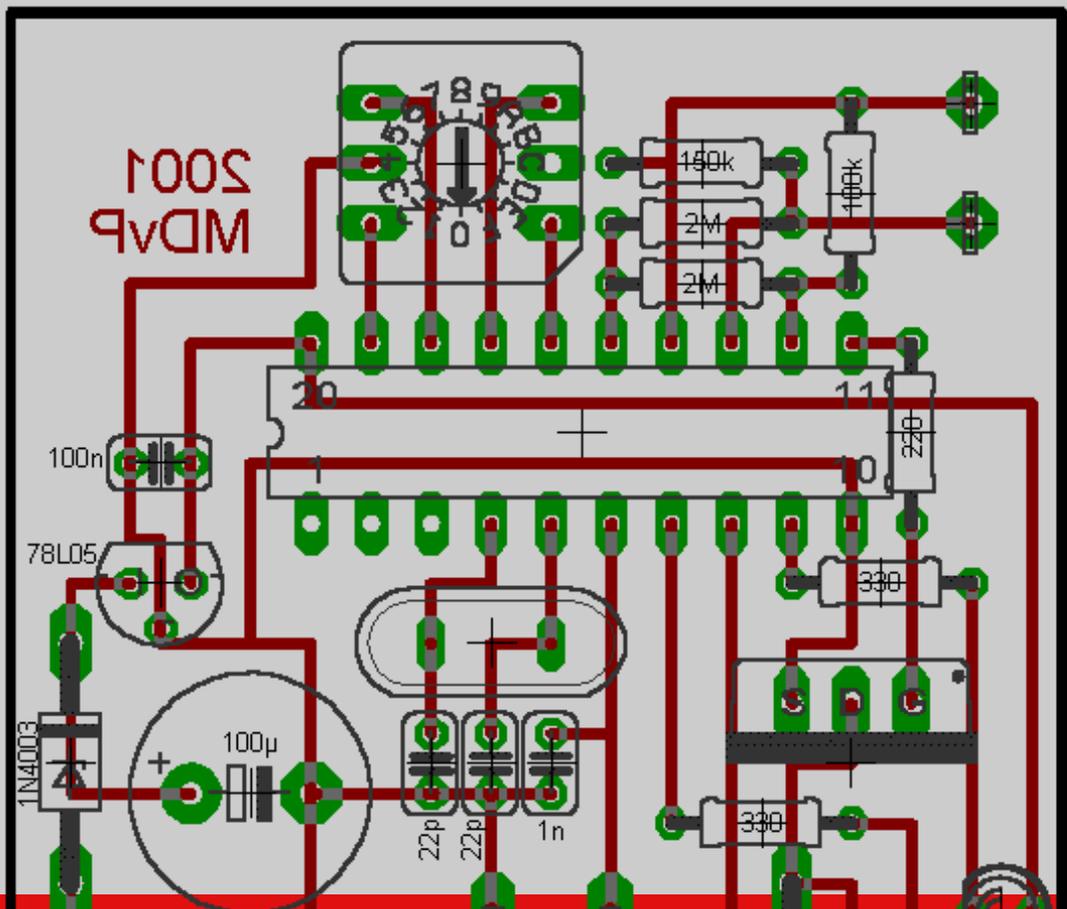
By generator, ignition and switched consumers motorcycles high tension pulses can occur with. These are filtered by a coil and a breakdown diode. When verpoltem connecting the McCoi the coil will dissolve however in Rauchwoelkchen, who is convinced of its double left-handedness, should therefore still two diodes in the entrance as verpolungsschutz plan.

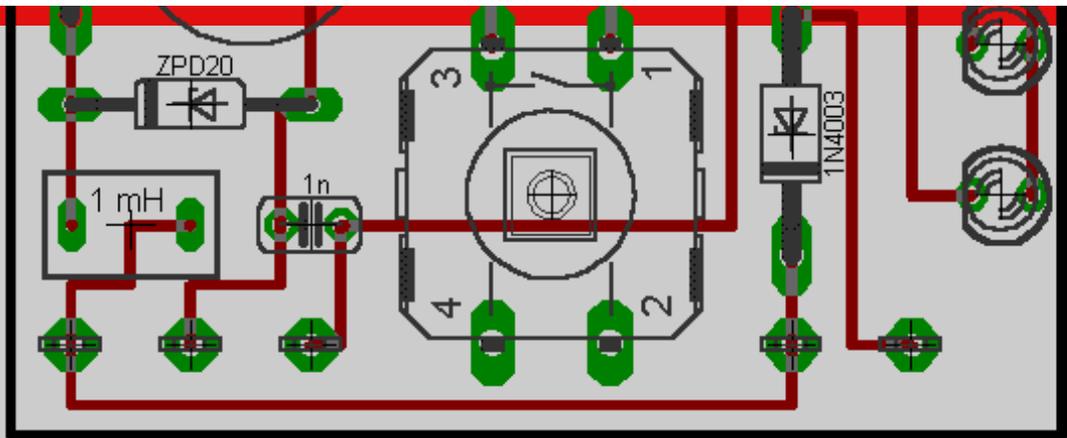
All switches are supplied via in the CONTROLLER of inserted Pull UP resistances and pulled externally on mass. With the Hex switch (705462-88 6.60 DM) the distance between two pumping impacts can be adjusted in 250 m steps and covers the range from 750 m - to 4500 m. A basic adjustment around 2500 m showed good results with me. With satisfied air humidity, as it arises with rains, nebulas or humidity, if it arrives at the hot engine, the adjusted distance around 500 m reduction to it again drier becomes. On recommend from Arno H. received the pump now also still ne flywheeling diode around the transistor to protect. Thx again here. Further improvement suggestions are always welcome.

The tracer serves for backing pumps.

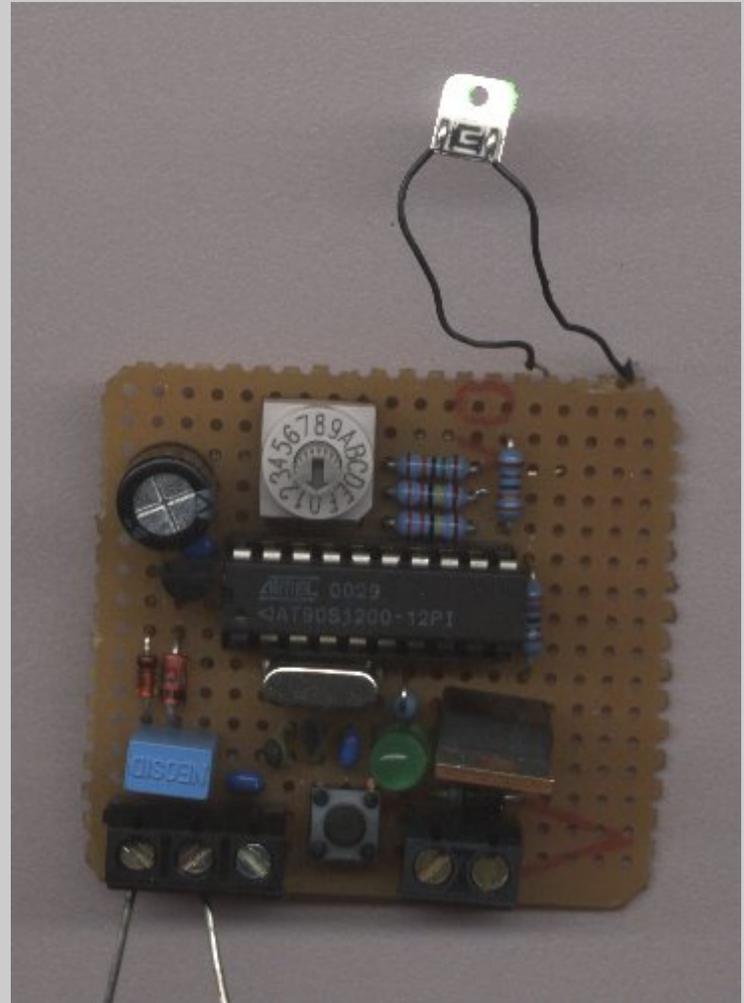


The first layout possesses only short degrees of leader connections and can therefore also simply and fast on hole rasters be developed. Additionally D5 LEDs (with 330 ohms pre-resistor against +5V) can be attached to pin D3 and, which indicate the function of the Rheed contact and the rain sensor. Particularly the Rheed LED facilitates the assembly and adjustment of the Rheed sensor at the wheel substantially.





And in such a way the first, roughly together-roasted prototype looks developed, after also the sensor is attached. The Platinchen measures degrees times $45 \times 45 \text{mm}^2$. Here it is equipped with an LED, which indicates the sensor condition. With water vapour in the form of Anhauchen of the sensor the CONTROLLER switches reliably, with water drops directly on the sensor however not, since the conductivity of the water resistance-lowers. Best one places the sensor therefore into the waste heat range of the engine, in which with rain travels or wet road enough water vapour is present, the splash-water and dirt load for it is however small. I installed the c-clamps mainly for the tests, represent for continuous use at the motorcycle that naturally no safe connection.



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The program

[The small Prograemmchen for the oiler sees so out \(assembler source text\).](#)

I use 4 MHz quartz, if one has the possibility a AT90S1200A with pre-programmed internal 1 MHz oscillator to get, or to a parallel programmer, with whom set themselves the RCEN bit leaves, can one approaches without the quartz do, must however the Timinig loops according to the lower frequency adapt.

Now on suggestion of Thorsten O. the zero position of the Hex switch (aka 750m) became a test and an installation position. In this position it only an individual drop takes place on depressing the key continuous pumps, in all different pumps. The LEDS shine also only in position '0' damit's not with each travel to the light organ become.

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Assembly

I accommodated the oil tank as low as possible in the framework triangle. On the one hand one wants to keep the emphasis low, whereby however 200g oil really do not fall in the weight. On the other hand the check valves of the pump are quite weak, so that a high downward gradient pressure can lead to inadvertent flow. The difference in height between tank and outlet should not amount to any more than **50 cm**. Who must install the tank absolutely more highly, a stronger, spring-tensioned check valve should install on the print page of the pump, thus the exit. The pump has only a maximum saugdruck of < 0.1 bar, can however against 0,9 bar stagnation pressure still promote. In an elevator difference expressed that means that the pump from a 1m could deeper container suck in and behind the pump still 9m press can. It knows however only about 50cm elevator downward gradient in river direction off, i.e. it may not be pressure on the container and it may too be not highly installed. Whether the check valve is suitable by Conrad (229393-62) for it, or suitably to modify leaves myself, I yet did not try out. After past user reports it is however rather unsuitable.

[Butcher technology](#) offers a check valve suitably the pump, which I did not try out likewise, since with me no Nachtropfprobleme emerges, of which however some in the meantime reported. Matthias Tieben tried further valve out. It wrote me:

Check valve with kind No.: B-6C-MM-1 price: 19.40 euro one needs additionally 2 support sleeves B-6M5-4M, if one silicone hose with approx.. uses 6 mm in diameter (price 1.40 euro). to refer of B.E.S.T. Valve + fitting; Tel.: (0 2131) 12478-30; www.swagelok.com/bestduesseldorf. Unfortunately B.E.S.T. however 10 euro (!) require shipping charges with orders under 50 euro. Is thus an expensive solution.

I developed the oil guidance mainly by thin 2,5mm-Messingroehrchen (building market, approx.. 2-4 DM/m) and at the connections high-quality and thick-walled silicone hose ([Conrad Blue LINE](#)) uses, which remains flexible and is rotting. At the rocker I the tube above along led, so that it does not come with the rocker stand into conflict. The end of the tube zieht at the chain wheel there, where the chain accumulates. Thus by the turn of the role with the chain circulation the oil is carried under the role.

The first tests with in the meantime 12 mm to [the Ducati](#) already failed to my fullest satisfaction. The chain rollers gleam easily oilily, the latches look drying, one can however a light oil film feel that the rust protection guarantee and the rim, which I had specially times deseamed, hardly oil pencil sharpeners abgekriegt. Pictures of the cultivation gib'ts in the meantime on [the assembly side](#).

If it with you after-dripped checkt asks folgende points:

- Does it really drip from the line? If the chain is oily wet, the surplus oil at the chain runs along to the deepest point and drips there.
- The tube must be very thin at the outlet, so that no air can penetrate. (the surface tension of the oil must lock the tube.) Otherwise the line behind the pump runs dry and that is **some** drops.
- The elevator downward gradient between tank and outlet may not be to large. It is all the same whether the pump at the tank or at the lower opening sits, which is downward gradient pressure only by the overall height certainly.
- No particles may be sucked in, pfe on steel seal hard on hard and cannot not flexibly to a particle adapt.

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McCoi 2

A new, improved version can be attached directly to the battery. A Low drop potential transformer LP2950 is more durable as the 78L05 and saves river. The processor falls after short time into a currentsaving power down condition and wakes up with an Rheed impulse again, it is lost no impulse. Therefore the Rheed hangs now also on the interrupt pin

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FAQ

Question	Answer
Can I buy McCoi also finished?	<p>No But Steffen Koberitz has the selling of kits and programmed control-learns now taken over, after numerical control step had adjusted him due to other priorities. To find under www.McCoi.de</p> <p>By the way I earn nix to, the McCoi project remain not commercial there. Owing to numerical control steps and McCoi.de it in addition, a electronics layman are accessible.</p>
During the pump order by butcher a circuit was offered to me named MT 16, which corresponds exactly to the McCoi specifications. Is that a McCoi?	<p>My knowledge after: NO Circuit and program are subject to copyright and a commercial use must with me be agreed upon (see note), what did not happen in the case of butcher, the idea and the principle of the McCoi are however not protected. Therefore everyone can naturally develop its own circuit and an appropriate program. Since I know so far only the specifications of the MT 16, I go differing from it from the layout and program from the McCoi. If someone else should have information, he may communicate her to me.</p>
How does the circuit look to to program the CONTROLLER?	<p>Depending upon used program very differently. Appropriate circuits are on the homepage of the programs.</p>
What do I need of the Atmel homepage?	<p>Minimum only the compiler (Asmpack.exe). In addition, that is in the integrated development environment AStudio (Astudio3.exe) contained, the development of own programs simplified.</p>
The compiler announces an error (file ACCESS error)	<p>He does not find the Include file. It participates in the compiler and lies in the Appnotes listing. Either you copy it into your McCoi listing, or adapt the path in the McCoi program. With long path name gib'ts also problems.</p>
I have an improvement suggestion. Am I to send it to you?	<p>Yes! Always ago with it. Send ne Mail to me</p>
I have a stupid question. May I send it to you?	<p>No, Mach you smartly.</p>
Why don't you answer to my questions?	<p>s.o.</p>
Where bekome I then support?	<p>On my existenten commercial side.</p>
It always drips something oil after, which I can do?	<p>See under assembly</p>
It drips nevertheless oil after!!!!1 < stamps >	<p>You should not fill in better oil soup!</p>

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Left

- www.McCoi.de Steffen Koberitz drives out kits and programmed CONTROLLERS
- [Hendrik C Lorenz](#) wrote a user report.
- [Sabu](#) has pictures of the assembly at v-river
- [Wolfgang](#) likewise wrote an empiric report.
- [Christoph Hakert](#) likewise tried the structure; -).

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Press comments

- [MOTORCYCLE NEWS](#) presented chain lubrication systems.

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Reference

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