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WHAT IS DIPTRONIC LIPS?

L = LOAD

I = INTEGRITY

P = PROTECTION

S = SYSTEM

Diptronic LIPS is an add-on Diptronic system which gives additional guarantees of load security by monitoring sensors in the API adaptors, ensuring complete discharge through system logic, and “sealing” the loaded volume at the terminal upon disconnection of the gantry plug.

Additional hardware to simple measurement system includes PPM340 on-board monitor with fibre optic fluid sensors in the API adaptors, and a pressure switch in the ticket printer line.

The system was originally developed to suit the UK market to satisfy specific “Sealed Parcel” requirements.

Diptronic LIPS is being used in UK (3 systems) and Philippines (2 systems) on petroleum tankers.

There is no NSC approval for Diptronic LIPS but it can be easily submitted as a modification of the original approval.

WHY WOULD SOMEONE WANT DIPTRONIC LIPS?

Oil companies and transport fleets seeking to gain an edge over their competitors can use Diptronic LIPS’ security features as a powerful marketing tool, demonstrating to their customers a high level of load security beyond simple measurement.

It removes the “grey” area surrounding the pipeline contents, and ensures complete discharge of the pipelines.

Air system interlocks ensure that the footvalve is always open when printing tickets, guaranteeing that any pilferage of the pipeline contents shows as a change in the cpt volume.

The additional display monitor (PPM340) gives added visual indication of operational status of overfill sensors and API adaptors to confirm that the lines are full.

Anyone transporting liquids wanting measurement and security is a potential customer

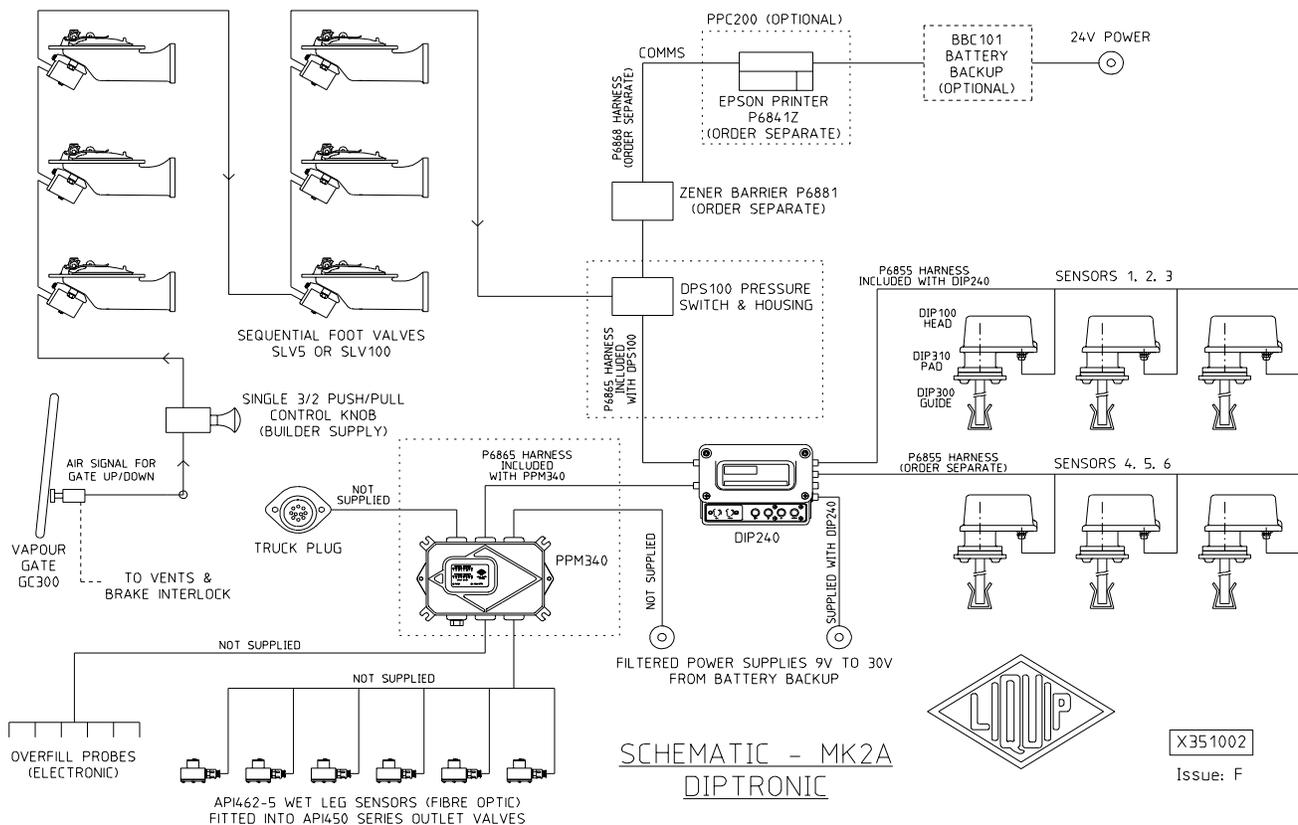


MAJOR FUNCTIONS OF DIPTRONIC LIPS

Guaranteed total discharge of compartment contents. Diptronic LIPS ensures that the driver does not trap fuel in the bottom of the tank by closing the footvalve, by ensuring the footvalve is open at the same time as the API sensor goes dry.

MAJOR FUNCTIONS OF DIPTRONIC LIPS

- **Retained product monitoring.** Prevents contamination and overfill situations. Sensors in the API outlet valve detect liquid and will not allow reloading until they are dry.
- **Sealed Parcel Delivery.** Detects draining of pipelines, changes in volume of tank contents. Also detects power loss. All events are logged and printed out on ticket. If level changes by more than 10mm (non-temperature compensated) or 3mm (with temperature compensation), the system will alert that the fuel level has “broken” and this will be printed on the ticket.
- **History.** Special software package will include history of most recent 2,000 events can be recalled at any time.
- **Overfill protection.** Overfill sensors can be integrated into Diptronic’s on-board monitor (PPM340) to provide visual display of sensor status. Diptronic’s PPM340 liaises with the terminal monitor to ensure all sensors are dry and operational before and during loading.
- **Footvalve operational check.** Each time a ticket is printed, the footvalves must all open (part of guaranteed total discharge). This is an important operational check to ensure they are in working condition.
- **Programmable level controls.** In conjunction with a Liquip PLC, Diptronic can have up to 3 programmable levels at which an output is activated via the PLC. Commonly used for load control in aviation refuellers.





UPGRADING TO DIPTRONIC LIPS

Converting a standard Diptronic MK1 measuring system to Diptronic LIPS involves installing additional hardware, and upgrading software to V11.00.04 (difference countries have different versions) or later versions by changing the EPROM on the PCB.

Additional hardware to install includes PPM340 monitor, API462 API outlet adaptors, DPS100 pressure switch assembly. Existing overflow sensors and truck plug is used.

Because Diptronic LIPS interfaces with the terminal monitor, check to ensure compatibility between PPM340 and existing terminal monitor.

LIPS SYSTEM COMPONENTS EXTRA TO MK1 SYSTEM

DIP240 - Special software for Diptronic CPU with LIPS program.

PPM340 - PPM3XX series Lightguard monitor with Diptronic enabling software. One per tanker handles up to 8 compartments. Cpt number is set at commissioning stage. Use PPM300-6 installation kit.

DPS100 - pressure switch assembly with cables to DIP240 and to zener barrier, and 6mm push-in air fitting for footvalve connection. One per tanker.

API462 - 450 series API adaptor with fibre optic fluid sensor. One per compartment. It costs about \$390 EXTRA for API461 as opposed to API450 which would otherwise be used. Be sure to point this out to the customer.

To add LIPS to a new 5 cpt tanker already budgeted for Diptronic MK1, add approx \$ 4500 for the added security benefits (excludes ticket printer).

SWOT ANALYSIS

We are in the fortunate position of having no comparable systems from other manufacturers on the market. However this leads to our customers comparing it to other Sealed Parcel systems for lack of a true competitive system.

Strengths - Compared to other Sealed Parcel systems Diptronic LIPS is a far more effective system. Not only does it monitor the actual fuel level for breaks (as opposed to just the compartment access points), but its myriad of other useful functions makes it a far more flexible and useful system.

Weaknesses - compared to other SPDS price is generally higher due to a requirement for metrological approval which other SPDS systems are not burdened with.

Compared with conventional meters, Diptronic's measuring principle has many advantages, with exception of ability to enable a true preset capability.

Opportunities - Diptronic LIPS represents an opportunity to establish Diptronic as the central fluid management system of the tanker. In conjunction with Diptronic PLC and GPS, LIPS is an all encompassing fluid and equipment management system.

Threats - The biggest threat to the future success of Diptronic is customer and installer lack of experience and education. Because we are the first to market with a system of this kind, we need to educate our customers, installation and support networks. The next biggest threat could ironically be the lack of a competitive system, leading some customer's to reject Diptronic due to non-availability of comparable systems, and customer ignorance.

Some competitors exist with similar systems. These are:

DeziData - German system using ultrasonics. Some metrological approvals in Europe. Many disadvantages of the ultrasonic measuring



principle.

Bartec - "Ultrakoust" by Bartec is another ultrasonic measurement system approved for use in some Eastern European countries.

Electronic - Using capacitive sensors by Honeywell.

Titan - The only other company using GWR but with no metrological approvals they concentrate on chemical, rail and aviation applications.

Why isn't everyone using lips?

1. They don't know it exists.
2. They don't understand it's benefits or why they would need it.
3. They have a high level of trust with their customers.

Why should we promote the lips system?

Because LIPS ties into so many of the tanker's "normal" functions, by introducing LIPS, we can dictate or have influence with the rest of the tanker equipment.

LIPS integrates the footvalves, API adaptors and overfill protection system, (and the Sealed Parcel and Retained Product Monitoring systems). The only other system which remains outside the realm of LIPS is vapour recovery, and it can be tied into LIPS through overfill system interlocks. The manhole covers are loosely related, being the mount position of the DIP100 sensors and vapour recovery vents.

Diptronic and LIPS turns an array of loose equipment into a cohesive system.

FAQ's

Aside from standard Diptronic, the following applies to the LIPS system:

Q) I cannot get a green light in the terminal.

- A) First check overfill protection sensors. You can do this via the PPM340. If any of the top row of LEDs are on, then the corresponding probe is not working, or fault in AVV switch.
- B) If any of the bottom row are on, then you have fuel in the API adaptor which must be drained before loading can begin. As an alternative you can use the over-ride key PPM300-7 to over-ride the bottom sensors.
- C) If the API adaptors are empty and any of the bottom LEDs are still lit, then check the fibre optic cable for damage, kinks, poor polishing etc. Any faulty installation will default to non-permissive.
- D) Check vapour recovery system interlocks and air pressure.

Q) The terminal monitor stays red even when all lights on the PPM340 are out, and one cpt has a steady light on the PD106.

- A) This is because the PPM340 gives only a single output signal. All pins need to be linked at the back of the truck plug so all pins share the signal. You do not need a dummy probe with a PPM310 or PPM340 on-board monitor.

Q) I can't print a ticket.

- A) The DPS100 is designed to break the circuit between the CPU and the ticket printer until all footvalves are open, as part of the discharge guarantee. The pressure switch inside it needs a min of 4 bar to activate and close the circuit. With all footvalves open, system pressure needs to be above 4 bar.



Q) Can I convert my existing API adaptors to Diptronic LIPS?

- A) Yes. API450 series adaptors with sightglasses can accept the API462-5 sensor (\$ 270) without any other modifications. If the sensor ever needs replacing simply undo 3 bolts and change over with new one.
- B) For other API adaptors such as API403, the fluid sensor may be installed just upstream in the pipeline.

Q) Can I use my existing PPM310 monitor?

- A) No. The PPM340 has special software to converts the digital output of the PPM310 into a comms output. It also has a mil spec connector on a cable for connection to the DIP240 CPU.

Q) What overfill sensors are compatible?

- A) Generally speaking all optic sensors are in theory compatible. For complete assurance use Liquip optic sensors.

Q) Where do I mount the PPM340?

- A) To get maximum benefit of it's diagnostic capabilities position it near the API outlets and where it can be seen while viewing the
- B) DIP240 screen.

Q) What special tools do I need now?

- A) You will need a fibre optic polishing kit and some joiners.

Q) Should I install my PPM340 for active or diagnostic mode?

- B) Either. As long as it gets a signal from the terminal monitor so it can "seal" upon disconnection.
- C) Check your company policy to decide.

Q) Do I need to re-enter calibration data when I insert a new eeprom?

- A) If using DipRecall, it is a simple matter of downloading all data before changing, and then uploading the data after changing.
- B) If you don't have DipRecall (currently still undergoing changes) then you will need to re-enter calibration data (be sure to take a print-out before you begin any work!).

Q) My printer won't print on my new system.

- A) Do you have 24 volt power supply? Diptronic will operate from 9 - 30 volts, but the Epson printer only operates on 24 volts.

Q) My printer is printing gibberish.

- A) Check the dipswitch settings underneath the printer. 1 and 3 should be ON, the rest OFF.



DELIVERY DOCKETS

More informative than standard MK1 tickets, Diptronic LIPS delivery dockets include the following messages:

SEALED—date and time stamped against loaded volume.

BROKEN—date and time stamped to indicate when volume changed.

COMPARTMENT NOW EMPTY—when footvalves are open and wet leg is dry.

INVALID DELIVERY—when either start or finish volumes are both within the MIN- range/MAX+ range.

CODES AND REGULATIONS

Metrological — Diptronic LIPS is approved for use as a custody transfer measurement device in the UK, with approvals to section 12 of the Weights and Measures Act 1985 under certificate number 2672, valid to 31 January 2013. This document is also a concise summary of Diptronic LIPS operating system.

Electrical — Diptronic is approved for use in hazardous areas according to ATEX Directive 94/9/EC, Annex 22,1.0.6 and includes special conditions as part of our approval number Sira 02ATEX3323X and Sira 02ATEX2322X. Among other things, these special conditions specify that Diptronic must be installed “by suitably trained personnel”.

MORE INFORMATION

More information on Diptronic LIPS can be found in the manuals:

7326 - Calibration Manual Issue A Dec 02

7327 - Automatic Calibration Rig Manual Issue A Dec 02

7328 - Driver's Manual Issue A Dec 02

7330 - Diptronic LIPS Installation Manual Issue A Dec 02

7331—General Information Issue A Dec 02

7333 - CPU Software Upgrade Information Issue A Dec 02

7334 - CPU Replacement Instructions Issue A Dec 02

7335 - Sensor Replacement Instructions Issue A Dec 02

6439 - PPM3XX Series Manual Issue L Sep 02

The following are also useful sources of information on Diptronic LIPS

Diptronic Tip sheets

UK W&M Approval Document