



- Comité de fabricants européens d'installation et de distribution de pétrole
- Committee of european manufacturers of petroleum measuring and distributing equipment
- Komitee der europäischen Hersteller von Einrichtungen zur Messung und Verteilung von flüssigen Brennstoffen

CONNECTION OF DISPENSERS WITH SSD and CONSOLES

BEST PRACTICE FOR MI-005 PETROL STATION INSTRUMENTS between Module D pump manufacturers

G010049

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In this specific MID/National approach, this document tries to bring the best non regressive practice proposal to the EU community of member states, to soften the “real life market” of petrol stations in the union, and remove the restrictive/obstructive consequences of MID versus market reality and existing instruments or using already existing national approvals.

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Name	Company	Date of Approval

Informative – countries where W&M authorities see principle of this guide with benevolence		
Country	Name of contact	Date

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SCOPE:

When MID came into force in the Union, it was the perfect tool to create a new mindset for measuring instruments. Barriers to trade were falling, and market was opening.

For the petrol station business, things were not as good as expected. Historically, all dispenser manufacturers had approvals in all countries for dispensers and several SSD. Small SSD manufacturers had approvals in the countries they had to focus on.

MID created a parallel world, not mixable with old world.

As a consequence, common sense practices and market habits (such as adding dispensers on stations from a stock, selling dispensers / SSD / back-office solutions separately) were virtually illegal or just impossible.

WHY?

Before MID, almost all countries had separate approvals for pumps and SSD. SSD was allowed to connect to either dispensers, or calculators of dispensers, or connect to brands of dispensers, or connect to dispensers using a protocol. In some certificates, the list of equipment compatible with SSD was in SSD certificate.

When MID came in force, all dispensers available at that time were certified MID along with available SSD solutions. Technically, there was NO CHANGE... Change was only administrative for MID (marking, seals, documentation).

All these new MID equipments were technically 100% compatible with equipment made under national approvals, BUT were administratively not compatible. Real life of petrol stations was neglected, and counter-acting on practices of existing market. Even worse: life cycles of the various components were ignored (dispensers usually last 15 years while SSD will last around 5 years and payment terminal on pumps will last about 5 years too).

Because of the way MID MI005 was written, module D became very difficult to organize, and more expensive than module F, especially if SSD was coming from a manufacturer different than of dispensers, against the spirit of MID, and creating “new barriers to trade and unfair competition”.

Examples:

On new sites (all new equipment):

- If all equipment (dispensers and SSD) coming from same manufacturer, module D applies rather easy
- If dispensers and SSD are coming from different manufacturers, module D can become rather difficult and expensive (logistics, transport, synchronization), making business for combined manufacturing less competitive, and making installation more difficult (with delays and cost for first verification on site)
→ purpose of this guide: remove barrier to trade here

Existing “MID” sites, adding dispensers using SSD function

- If supplier of dispenser having existing SSD in it's certificate, need to check with local authorities for real need of module F/first verification or concession
- In all cases, extra cost versus “primo delivery” of pumps with SSD (module D)
→ purpose of this guide: remove barrier to trade here

Existing MID sites, changing SSD central device (because SSD has short life cycle)

- Need to apply for module F for each dispenser with extra cost versus “primo delivery” of pumps with SSD (module D)
→ purpose of this guide: remove barrier to trade here

In all above examples, there is no technical reason to create difficulties:

- If equipments in communication use same protocol, the global system operates respecting all rules
- If communication protocol not the same or badly connected, **nothing works.**

In all above, there is extra cost involved

- in any site upgrade versus primo-delivery
- in any mix with 3rd party SSD supplier, creating unfair competition

Building extra unneeded cost, building barriers to trade, creating unfair conditions: all are against EU rules.

Some countries found alternate solutions via concessions, and unintentionally made possible new extra “barriers to trade and unfair competition”.

Note: The consultant report for the interim evaluation of MID pointed out in its overall conclusions as “Rather more important for the effectiveness of the Directive,... the issue of the adoption of a subassembly approach for fuel dispensers (MI-005) which appears to have negative effects that may extend beyond the transition period and should, thus, be addressed.”

In 2010, CECOD decided to promote as much as possible a change to MID at mid-term... Despite efforts at all levels, this change was found to be impossible.

Mid 2011, after several fruitful meetings with Mr Daniel HANEKUYK, it was decided to promote the idea of a specific guide applicable to MI-005 for petrol stations only, hoping that all member states would accept this initiative as it is driven by the most important association of manufacturers of instruments for that specific domain, and driven by fair common sense.

This approach is the best non regressive (*) and pro-active technical solution to avoid turning MID into a semi-failure for petrol stations.

() Non regressive : nothing will be worse than before, everything is as good or better than before.*

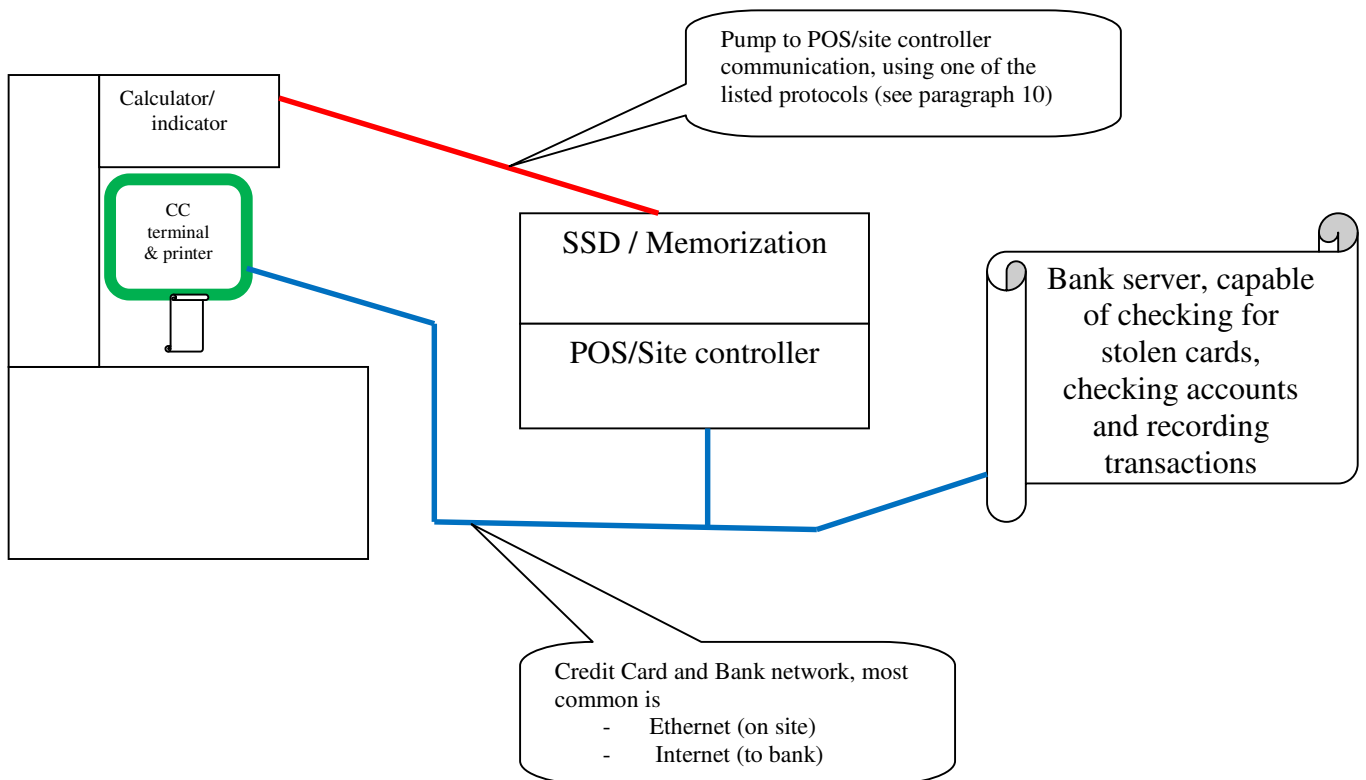
Petrol station domain requires special care. It is a key utility for the community, for our economy, probably the first tax collector of the world, and CECOD represents over 95% of European dispenser sales, and probably over 80% of SSD sales in Europe.

The purpose of this guide is to create simple and easy to understand rules to:

- **clearly identify responsibilities, marking and needed documentation**
- **eliminate all unfair conditions and free business for small companies making SSD**
- **propose rules compatible with national rules in Europe, to transform MID into a natural upgrade of petrol station world**
- **explain “first verification module D” rules CECOD is promoting to split first verification of dispensers and SSD with no risk on quality nor W&M conformity**
- **propose easy and efficient rules for checking (admin) and testing combinations, and eliminate restrictions to business WITH NO regression**

This guide is only applicable to MID (pump) / MID (SSD) arrangements between module D dispenser manufacturers

It is assuming all pump manufacturers have valid module D and are making SSD. This guide explains how they can split delivery to stations in Europe.





How does a petrol station work for credit card (unattended)?

*This is only an example, to help understand global system for a normal ending transaction.
Global sequence includes all failure modes, errors and unexpected changes.*

Operator	Credit Card Terminal	POS/site controller	SSD / memory	Bank server	Pump
1 Customer is parked in front of pump, and inserts his credit card into the terminal on the pump	2 When card in inserted, terminal checks with site controller that such mode (differed post payment) is authorized	3 Site controller collects information from CC terminal and related pump to see if possible to proceed (pump free, bank online, etc...).	4 SSD memorizes event (start of transaction, card number)	5 Bank server checks that card is not stolen	PUMP is ready (available) STEP 1 CANNOT TAKE PLACE IF "PUMP READY" CONDITION IS NOT FULFILLED System might restart at step 18 to close prior transaction (after error/unwanted stop)
	6 CC terminal continues sequences (pin code, ticket request, etc...) Once pin-code validated, CC terminal does checks with bank	Site controller is controlling all events with SSD, using active protocol to communicate with pump when needed	7 SSD memorizes event (Pin validity and status)	8 Bank cross checks for authorization and further random checks	
	9 CC terminal instructs site controller that payment authentication is valid	10 POS/Site controller instructs PUMP it is authorized to start a transaction	11 SSD memorizes event (date/time of start of transaction, bank status, limit to sale, and other legal and informative informations if needed)		12 Pump switches to "ready for a sale" and remains idle
13 Customer lifts the nozzle, and puts it in his tank		Site controller tracks on-going transaction	15 SSD memorizes event (start status)		14 Pump does all checks, and starts transaction
16 Customer ends transaction by hanging nozzle	20 CC terminal Receives text for customer ticket and prints it	Site controller tracks events to make sure all participating equipments behave the expected way	18 SSD memorizes amount/volume for transaction SYSTEM CANNOT REACH STEP 22 IF STEP 18 IS NOT CLOSED PROPERLY	19 Transaction is passed to bank with amount. Bank server generates text for customer ticket	17 Pump stops motor and closes valves, and goes to "ready to pay"
21 Customer can leave		22 POS/Site controller instructs pump that transaction is settled			23 Pump goes to "ready"



What is CECOD:

CECOD is the Committee of European Manufacturers of Petroleum Measuring and Distributing Equipment, a non-profit association, providing facilities for its members to share technical information related to fuel measuring and dispensing technologies and processes.

CECOD members work closely with European Member States and Authorities in all relevant matters in support of its deep commitment to promote the unification of European Legal Metrology, Safety and Environmental legislation together with its subsequent enforcement.

List of members is available on http://www.cecod.eu/Site/member_list.asp

For this specific “MI-005 petrol station” guide, the members of CECOD represent the vast majority of the petrol dispenser manufacturers in Europe, and a strong majority of the sales of Self Service Devices for petrol stations.

The purpose of this guide is to remove pending barriers to trade and potentials for unfair competition in a strategic business for the European Community, even for non CECOD members.

CECOD members are willing to fight any pending barriers to trade and unfair competition possibilities, linked to a very complex existing situation on measuring instruments in the countries of the EU, made even more complicated when need came to incorporate new MID instruments and use instruments from both worlds at same time on petrol stations.

1) Domain

This document is only to be used for MID / MI-005 instruments placed on petrol stations. The purpose is to define a clear common best practice for various combinations and/or situations of everyday life in the petrol station domain. Above all, its purpose is to give clear non regressive solutions to install, verify and control real life mix of MID pumps and SSD with EC/PC to connect with. This guide is an extract of CECOD G010027 for new stations with mix of pumps and SSD fulfilling MID requirements, and with:

- pump manufacturer having a valid module D in place for the pumps
- SSD manufacturer having a valid module D in place for the pumps made in the company, including test of associated SSD with means such as simulators

The use of this guide is voluntary, to the decision of both dispenser and SSD manufacturers. The use of this guide automatically implies the acceptance of all terms and rules described in this guide, with no possibility of revocation.

CECOD members listed in “endorsing page” implicitly endorse this guide. In case of dispute, claim or authority inspection, both parties (dispenser and SSD manufacturers) take co-responsibility covering the MID instrument covered by such association of instrument/SSD.

Non CECOD members can only apply this guide if they have signed a one to one agreement with a CECOD dispenser manufacturer, and having priory endorsed in writing this guide (such endorsing will need to be made public via CECOD and “endorsing page” of this guide).

When this guide applies, there will be:

- one DoC for the dispenser and
- one DoC for the SSD. DoC for the SSD shall refer to the part or evaluation certificate for it, refer to the quality system of the SSD manufacturer and it's assessment by a notified body (module D for pumps), and refer to this guide (CECOD G010049 and/or G010027 guide).

The known CECOD manufacturers for such are GVR, PETROTEC, S&B, TOKHEIM, WAYNE, LAFON, BENNETT SAUSER (tbc)

Declaration of Conformity (DoC) format:

- **Dispenser: no change to existing format**

- **SSD: in the scope of this guide**, the specific DoC for the SSD shall include all relevant information, among which:

- serial number and type of SSD **(SN to be checked as maybe not used by all, rather part number or other)**
- reference to the applicable part or evaluation certificate for the SSD
- reference to this applicable CECOD guide
- **reference to the quality plan used by SSD manufacturer (not needed if module D is specified)**
- reference to the **module D** (for dispensers) of the SSD manufacturer
- copy of the one-to-one agreement signed with dispenser manufacturer when applicable (when SSD manufacturer is not listed on “endorsing page”)

2) References to standards

OIML R117 (1995)

OIML R117-1 (2007)

Welmec Guide 8.8

It is assumed that R117 is a non regressive community standard, meaning that any revision of the recommendation is considered as better or equal to any prior revision to reach the essential requirements. It is assumed that Welmec guide 8.8 mindset is to help, even if this CECOD guide is promoting actions/decisions going beyond guide 8.8

3) Terms, acronyms and symbols

SSD: Self Service Device – **Equipment capable of being associated to a petrol dispenser to operate together with it and constitute a SSA**

SSA: Self Service Arrangement – **association of equipments (dispenser and SSD) to allow use of instrument in Self Service modes (stacking or credit card)**

DISPENSER: measuring instrument to transfer fuel into the tank of a vehicle, a small boat, a small aircraft or just a jerry can

SSD datasheet: document, established by SSD manufacturer, with relevant data about SSD at time of build or first verification (module D spirit), to identify clearly all relevant information about SSD, its first verification, and its certification



Other terms are usual terms used in the petrol station domain or coming from known references such as R117 or MID.

4) Alternative 1 – SSD mentioned by name in Dispenser certificate

Foreword: this is the historical MID setup for the dispenser/SSD association. SSD name and certificate reference to be mentioned explicitly in the dispenser certificate. This “Alternative 1” chapter is to give more details while understanding and allowing for separate pump manufacturing module D / SSD manufacturing module D split/responsibilities.

a) Rule for SSD – Evaluation Certificate or Test Certificate

*The SSD taken in consideration shall have its own evaluation certificate or part certificate. Such certificate is established in the name of the manufacturer of the SSD. It shall be in validity period at time of manufacturing of SSD. **The certificate shall list all communication protocols the SSD is capable of handling.***

b) Rule for Dispenser Certificate

The dispenser certificate shall mention all SSD’s allowed (Name of SSD and reference of its certificate) to connect to it in its paragraph for “Essential Parts of dispenser”.

*The calculating/indicating device used in the dispenser shall have an (evaluation) certificate listing all communication protocols it is capable of using. For the rest of this guide, such list can also be implemented in the dispenser certificate itself as a valid alternative (**).*

*(**) this “marker” will be used in this guide to send back to this sentence of 4b) or 5b)*

c) Rule for module D (first verification) of dispenser

The dispenser shall be verified separately from any SSD under module D. The protocol of communication in use for the dispenser shall be in the list of communication protocols the calculating/indicating device is capable of handling (**). Module D verification shall use specific M marking of the dispenser manufacturer. **Marking only on dispenser.**



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d) Rule for first verification of SSD

The manufacturer of the SSD is also a manufacturer of pumps, and has a module D to cover such activity. Such module D also covers the manufacturer's SSD. The SSD shall pass module D verification by using simulation methods/means representative for communication protocols to be used (see note on simulation of paragraph 7). The protocols of communication in use for the SSD shall be in the list of communication protocols of the certificate. First verification of SSD shall use specific marking/seals of the SSD manufacturer (see datasheet information, paragraph 6 for facsimile of marking/seal). The SSD shall not carry CEM marking from dispenser.

e) Rule for on-site installation check – to be used by installer/commissioner

Check shall be considered positive if all three following conditions are satisfied:

- **The SSD name and certificate is mentioned in dispenser certificate**
 - o See dispenser certificate, “Essential Parts of the dispenser”
- **The SSD shares at least one common communication protocol with the electronic Calculating/Indicating device of the dispenser**
 - o See list of protocols in certificate of SSD
 - o Compare with evaluation certificate of Calculating/indicating device of dispenser (**)
- **The SSD marking/seals is consistent with the SSD manufacturer's marking/seals**

Comment: it is left to National Benevolence to use same process for subsequent on-site verifications, when applicable

f) Adding SSD to MID dispensers already in service

Because SSD and Dispensers are not held under same marketing rules:

- they can reach owner's site at different time
 - SSD can be replaced because of shorter life time than dispensers
- If “alternative 1” SSD is added/connected to MID dispensers already in service, the SSD manufacturer/factory first verification (module D) shall be considered as proof of compliance to essential requirements to authorize use with no extra verification/certification steps, providing**
- o **clause 4 e) on-site installation check and**
 - o **clause 4 i) Rule for marking instruments are fulfilled.**

g) Installing MID dispensers on a site with (MID) SSD already in service

- Because SSD and Dispensers are not held under same marketing rules:**
- they can reach owner's site at different time
 - Dispensers can be replaced/added because of accidents or site improvements
- If MID dispensers are installed while "alternative 1" SSD is already in place on site, the SSD manufacturer/factory first verification (module D) and/or any subsequent verification (national rules) of such existing SSD shall be considered as proof of compliance to essential requirements to authorize use with no extra verification/certification steps, providing
- clause 4 e) on-site installation check and
 - clause 4 i) Rule for marking instruments are fulfilled.

h) Responsibilities in case of claim

In case of claim or trouble, responsibly for investigation, answering authorities and legal consequences is split as follows:

- Dispenser error (accuracy/corrupted display): → Dispenser Manufacturer and owner if maintenance/good keeping of dispenser involved
- SSD error (lost transaction, retrieving corrupted data, erasing prematurely valid records): → SSD manufacturer
- Stacking confusion between consecutive customers: → station owner
- Data transmission error (difference between dispenser and SSD): → Dispenser and SSD manufacturers together

i) Rule for marking instruments

- Dispenser: → as per DISPENSER manufacturer's module D quality plan/module B certificate
- SSD: → as per SSD manufacturer's module D quality plan (see 4 d)
- At matching/commissioning time:
 - When SSD and pumps are matched (address of dispensers using SSA programmed in SSD, electrical interconnection made active), the pumps numbers shall be identified and marked on SSD as "instruments served by the SSD"
 - This is done by installation/commissioning operator by using tick box sticker of SSD (see example at paragraph 7).
 - If tick box sticker already carrying ticks, tick box section of sticker shall be overlaid with a new tick box sticker to execute the above sub-clause

Note 1: on site verification process is described in paragraph 7

5) Alternative 2 – Dispenser certificate open to SSD with part certificate

Foreword: this is the open MID setup for the dispenser/SSD association. Alternative 2 is based on the protocol “corner stone function” where any interconnection can only work if both equipments in communication use same protocol and same hardware electrical interface definition. Alternative 2 can be used in combination with alternative 1 in dispenser certificates.

a) Rule for SSD – Part Certificate Only

The SSD taken in consideration shall have its own part certificate. Such certificate is established in the name of the manufacturer of the SSD. It shall be in validity period at time of manufacturing of SSD. The certificate shall list all communication protocols the SSD is capable of handling.

b) Rule for Dispenser Certificate

*The calculating/indicating device used in the dispenser shall have an (evaluation) certificate that lists all communication protocols it is capable of using. For the rest of this guide, such list can also be implemented in the dispenser certificate itself as a valid alternative (**).*

The dispenser certificate shall have the following sentence (or equivalent) in its paragraph for “Essential Parts of dispenser”.

“The fuel dispenser may connect to any Self Service Device with a Part Certificate sharing at least one common communication protocol with its Electronic Calculating/Indicating device”

() this “marker” will be used in this guide to send back to this sentence of 4b) or 5b)**

c) Rule for module D (first verification) of dispenser

The dispenser shall be verified separately from any SSD under module D. The protocol of communication in use for the dispenser shall be in the list of communication protocols the calculating/indicating device is capable of handling (). Module D verification shall use specific M marking of the dispenser manufacturer. Marking only on dispenser.**

d) Rule for first verification of SSD

The manufacturer of the SSD is also a manufacturer of pumps, and has a module D to cover such activity. Such module D also covers the manufacturer's SSD. The SSD shall pass module D verification by using simulation methods/means representative for communication protocols to be used (see note on simulation of paragraph 7). The protocols of communication in use for the SSD shall be in the list of communication protocols of the certificate. First verification of SSD shall use specific marking/seals of the SSD manufacturer (see datasheet information, paragraph 6 for facsimile of marking/seal). The SSD does not need to carry CEm marking from dispenser.

e) Rule for on-site installation check – to be used by installer/commissioner

Check shall be considered positive if all three following conditions are satisfied:

- **The dispenser certificate is open to SSD having Part certificate**
 - **See dispenser certificate, paragraph for “Essential Parts of the dispenser”, where the following sentence (or equivalent) shall appear:**

“The fuel dispenser may connect to any Self Service Device with a Part Certificate sharing at least one common communication protocol with its Electronic Calculating/Indicating device”
- **The SSD shares at least one common communication protocol with the electronic Calculating/Indicating device of the dispenser**
 - **See list of protocols in certificate of SSD**
 - **Compare with evaluation certificate of Calculating/indicating device of dispenser (**)**
- **The SSD marking/seals is consistent with the SSD manufacturer's marking/seals**

Comment: it is left to National Benevolence to use same process for on-site verifications, when applicable

f) Adding SSD to MID dispensers already in service

Because SSD and Dispensers are not held under same marketing rules:

- they can reach owner's site at different time
- SSD can be replaced because of shorter life time than dispensers

→ If "alternative 2" SSD is added/connected to MID dispensers already in service, the SSD manufacturer/factory first verification (module D) shall be considered as proof of compliance to essential requirements to authorize use with no extra verification/certification steps, providing

- clause 5 e) on-site installation check and
- clause 5 i) Rule for marking instruments are fulfilled.

g) Installing MID dispensers on a site with (MID) SSD already in service

Because SSD and Dispensers are not held under same marketing rules:

- they can reach owner's site at different time
- Dispensers can be replaced/added because of accidents or site improvements

→ If MID dispensers are installed while "alternative 2" SSD is already in place on site, the SSD manufacturer/factory first verification (module D) and/or any subsequent verification (national rules) of such existing SSD shall be considered as proof of compliance to essential requirements to authorize use with no extra verification/certification steps, providing

- clause 5 e) on-site installation check and
- clause 5 i) Rule for marking instruments are fulfilled.

h) Responsibilities in case of claim

In case of claim or trouble, responsibly for investigation, answering authorities and legal consequences is split as follows:

- **Dispenser error (accuracy/corrupted display):** → Dispenser Manufacturer and owner if maintenance/good keeping of dispenser involved
- **SSD error (lost transaction, retrieving corrupted data, erasing prematurely valid records):** → SSD manufacturer
- **Stacking confusion between consecutive customers:** → station owner
- **Data transmission error (difference between dispenser and SSD):** → Dispenser and SSD manufacturers together

i) Rule for marking instruments

- Dispenser: → **as per DISPENSER manufacturer's module D quality plan/module B certificate**
- SSD: → **as per SSD manufacturer's module D quality plan (see 5 d)**
- At matching/commissioning time:
 - When SSD and pumps are matched (address of dispensers using SSA programmed in SSD, electrical interconnection made active), the pumps numbers shall be identified and marked on SSD as "instruments served by the SSD"
 - This is done by installation/commissioning operator by using tick box sticker of SSD (see example at paragraph 7).
 - If tick box sticker already carrying ticks, tick box section of sticker shall be overlaid with a new tick box sticker to execute the above sub-clause

Note 2: on site verification process is described in paragraph 7

6) SSD datasheet

For best practice, each SSD shall have a data sheet available at site of usage.

Such data sheet shall be established

- **at SSD manufacturer's factory when module D quality plan process is applied**

Such data sheet shall contain the following information:

- **Type: (followed by type name of SSD as per certificate)**
- **MID Cert n°: (EC/PC followed by reference of certificate number, e.g.: TC1234)**
- **Serial number and year of manufacturing**
- **First verification information**
 - **Date of module D first verification – conformity check**
 - **Name of company and name of manufacturing site when relevant**
 - **Reference to factory approval for module D activity (eg: “module D approved by xxxx”)**
 - **Facsimile of identification marks (if used) to seal identification plate to SSD or seal SSD**
- **Available source for copy of approvals and/or certificates**
 - **Datasheet shall contain information on where to get a copy of applicable certificates for product, and if applicable, for factory module D activity**
 - **Such information can be an Email address, a physical address or a web site address. Any electronic form of information is to always be preferred to paper in all cases**
- **Optional: Name, date and signature of endorsing operator (manufacturer). Signature can be a traceability to compliance to certificate, endorsed by manufacturer.**

Such data sheet can be kept as quality records by SSD manufacturer (when applicable, and retrieved for further evidence if still available as per manufacturer's quality plan for module D “spirit” activity). Datasheet is to make inspection work easier for enforcers. If datasheet is not available, it is allowed to get a copy from SSD manufacturer.

If datasheet is not available on site of usage, enforcers can trace back first verification operator by reading seal of identification plate of SSD and comparing to manufacturer's identification marks (see manufacturer's factory approval).

Missing datasheet is not a reason to abort verification.

7) Example of SSD identification plate with tick box sticker

CE *Manufacturer Name / Logo*

Type : **NOBO**

Cert N° : **XXXXXX NOBO**

Année N° Série : **2012/GJ1225019**
Year/Serial N° :

TA +5°C to +55°C **Kiosk SSD**
TA -25°C to +55°C **Pump Credit Card**

Dispensers connected (tick box)															
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32

8) On site and factory verification - check dispenser/SSD association ***(this test is suitable for on site verification, subsequent verification, or factory module D)***

Prerequisites:

- a) Verification of association can only be done using
 - valid dispenser(s) on site
 - valid simulation system in factory (see note on simulation) or one (at least) valid dispenser
- b) SSD shall not interfere on verification of dispenser(s) (e.g.: accuracy check)
- c) If petrol station safety rules impose to initiate a SSD transaction (e.g.: unmanned stations) to conduct verification of dispenser(s), it shall not have any influence on accuracy of instruments, and shall allow all legal calibration check operations as per existing national rules.

Step 1 - Check of Certificates:

- a) Get access to SSD certificate
- b) Get access to Dispenser certificate, and its calculating/indicating device certificate
- c) Check that at least one communication protocol is common between SSD and Electronic/Indicating device of dispenser (**)

Step 2 – Check good transmission of one transaction for each dispenser fuelling position (each side) (see note 3) – Compare display of dispenser with memorized (or printed when applicable) information at SSD (see note 4)

Step 3 – Check good retrieving of last transaction (one per site) for memorizing when applicable

Note 3: this check can be done on transaction initiated for clause c) of Prerequisites

Note 4: this check can be conducted also on ticket printer at credit card payment terminal when applicable

Note on simulation:

When simulation means/tools are used during module D “spirit” checks on SSD in factory, the simulation means are most of the time a set of one to several calculators/indicators organized with simulators for volume and other arrangements (nozzle switch, status bulbs for motors/valves). Simulation means can also be fully automated and integrated in one special computer. It is the responsibility of the manufacturer using such simulation tools to fairly demonstrate that his simulation tools are behaving like calculators using the considered protocols.

When using the simulation tools (see 4d) and 5d), the functional test shall cover step 2 and step 3 of the above paragraph 7).

9) List of most commonly known protocols (informative). Updated on 26/10/2011

Warning: this is only informative, and is not to infringe on intellectual property of owner of protocol(s). The purpose of this list is only to demonstrate the rigidity tools used for protocols, proving that protocols are the corner stones of any SSD/Dispenser communication reliability

<i>Name of protocol</i>	<i>Owner</i>	<i>Type of data/flow control</i>
IFSF/LON	Community	-CRC16 checking
IFSF/ TCP/IP	Community	-CRC16 checking and TCP/IP controls
TOKHEIM/ UDC	Tokheim	-Double Talk = every character is transmitted twice: normal / inverted
GILBARCO 2 WIRE	GVR	-Parity checking -LRC: Longitudinal Redundancy
PUMALAN (known also as LOGITRON)	GVR	-Parity checking -bcc: block check character = exclusive OR of all data characters
NUOVO PIGNONE	Wayne	-Parity checking -Data characters are transmitted twice: normal / inverted
EIN	Tokheim	-Parity checking, LRC: Longitudinal Redundancy Check character = exclusive OR of all data characters
M3000	Tokheim	-Parity checking -CRC16: Cyclic redundancy check word
82D	Tokheim	-Parity checking, LRC: Longitudinal Redundancy Check character = sum of all data characters
ZSR	Tokheim	-LRC: Longitudinal Redundancy Check character = sum of all data characters
DUNCLARE	Tokheim	-Parity checking -bcc: block check character = exclusive OR of all data characters
EPS	Tokheim	-Parity checking -BCC: Block Check Character = sum of all data characters
AUTOTANK	GVR	-Parity checking -CRC16: Cyclic redundancy check word
DRESSER	Wayne	-Parity checking -CRC16: Cyclic redundancy check word
TATSUNO/METAX	Tatsuno	-Parity checking, LRC: Longitudinal Redundancy Check character = exclusive OR of all data characters
Scheidt&Bachmann V11	S&B	-Parity checking of each Byte, LRC: Longitudinal Redundancy Check character = exclusive OR of all data characters
Scheidt&Bachmann T02 (see ER3)	S&B	-Data character is transmitted in special bit format: D (not)D C (not)C B (not)B A (not)A
KIENZLE ER3	Hectronic	-Data character is transmitted in special bit format: D (not)D C (not)C B (not)B A (not)A
PETROTEC	Petrotec	-Parity checking , BCC: Block Check Character = exclusive OR of all data characters and message length verification
HDX	Petrotec	-Parity checking, LRC: Longitudinal Redundancy Check character = exclusive OR of all data characters and field identifiers inside message

Comment:

- Protocols define both software logic and hardware interface
- The combination is the corner stone protecting the communication link between SSD and Dispensers from EMC disturbances
- The logic of the protocol is the corner stone making the “hand in hand” work of dispenser and SSD possible. Any gap or divergence between both equipments creates a lock when handling SSD functions, and disables any further transaction.