| EUROMAP 65 | **Injection Moulding Machines**<br>User Identification |
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Version 1.1, March 2006
(11 pages)

This recommendation was prepared by the Technical Commission of EUROMAP.

Language code ISO 639-2/B selected (v. 1.1).

# Contents

# 1 Objectives

It is the aim of this proposal, to define a user identification system for Injection Moulding Machines (IMM) and other machines and systems in an moulding production environment Thus a hardware medium is proposed, which complies with existing standards, and which is already widely used and accepted.
It is also proposed to define a set of data, which can be stored on existing access control hardware and which covers all the needs of IMM manufacturers and customers. This identification system shall be able to adapt to customer requirements for at least 5 to 10 years.

# 2 Technical Details

## 2.1 Hardware

- Chip-card according to ISO 15693
- Optional chip-card data write capability of the IMM control.

## 2.2 Chip Data Storage

The chip cards must be ISO 15693 standard. All permissible memory capacities and block sizes can be used.

In addition to the data storage the card has a 64 bit Identification Number (UID or Silicon ID). This is a fix and unique identification number, which contains the system release ID of the card. It allows the card reader to check the compatibility with the chip card.

## 2.3 Card Types

The EUROMAP 65 compliant cards are identified and can be distinguished from cards of other applications by the EUROMAP 65 application identifier and norm version, the UID and a computed safety code.

EUROMAP 65 identifies two types of cards : Customer cards and vendor service cards.

| Card Type | Operator | Safety | Usage |
|---|---|---|---|
| Customer | User | Unique Data Identifier (Silicon ID, 64 bit) + Safety Code | Machine operation |
| | Superuser | Vendor specific, not defined by EUROMAP | Management of cards,<br>Set-up of the factory identifier and Safety Key in the machine control. |
| Service | Vendor Service | Vendor specific, not defined by EUROMAP | Service access for all machines from a specific vendor. |

### 2.3.1 Customer Cards

Customer cards for machine operators have to be vendor independent in order to allow access to all machines which provide a EUROMAP 65 compatible card reader.
These cards usually split in two parts: a standardised part (by EUROMAP 65) and a non-standardised part, where one or more vendors can store specific data.
A customer should have the opportunity to read and write customer cards. When modifying a customer card the vendor specific data of other IMM manufacturers must not be changed.
To avoid unauthorised copying or modification of a customer card the UID of the smart card and a computed safety code are used for safety purpose.
Customer cards for superusers are vendor specific and needn't fulfill the EUROMAP 65 requirements.

### 2.3.2 Service Cards

Each vendor is supporting his own service cards, which don't need to fulfill the EUROMAP 65 requirements. So the content of the Service Card is vendor specific and cannot be modified by anyone else.
Thus vendor Service Cards can only be used on machines of the vendor who has issued the vendor service card.

# 3 Data Format

Textual characters are represented in Unicode UTF-8 format. All data are stored in the order low Byte first (Little Endian).

Data is stored in a sequence of parameter sets formatted as shown below.

<ID><len><parameter...><ID><len><parameter..>...

<ID> .. Parameter-Identifier (8-bit-value)
<len> ... Length of parameter payload in 8 bit units (Option, depends on the ID value).
<parameter> Parameter values

## 3.1 Physical Card Layout

UID – Unique Data Identifier (Silicon ID, 64 bit)

User data

| | | |
|---|---|---|
| Block #0 | 32 bit | safety code |
| Block #1 | 32 bit | EUROMAP 65 application identifier and norm version |
| Block #2 ($2^0$ – $2^{15}$) | 16 bit | length of the user data block in Bytes. |
| Block #2 ($2^{16}$ – $2^{31}$) – Block #n | | user data block (n = 63 by 2k bit = 256 Byte cards) |

## 3.2 Parameter-ID Ranges

Reserved ranges for identifiers

| | |
|---|---|
| 000 – 029 | Reserved for general parameters defined by EUROMAP |
| 030 | This ID is for general usage, it is not assigned to a specific manufacturer. |
| 031 – 200 | Identifiers assigned to IMM manufacturers, one ID per manufacturer. |
| 201 – 255 | Reserved for customer specific ID's |

## 3.3 Mandatory Parameter ID's

A valid EUROMAP 65 compliant chip card must have the following 3 parameters. They reside in the first 10 Bytes of the card and always have the same size. So the first optional parameter starts in Block #2 at third Byte (upper 2 Bytes of Block #2).

### 3.3.1 Card Safety

Block #0 32 bit Safety Code

The card safety is provided through a Safety Code (S) stored at Block #0 on the Card. Since the Safety Code is used for proofing the consistency of data and the validity of the Card, there must be only one safety key per customer. This safety key covers all customer sites, machines and access card programming devices. It ensures that the customer will have access to all his EUROMAP 65 compliant machines and devices and denies the access with all foreign chip cards.
This Safety Code is computed out of the checksum of the payload on the card and a secret Safety Key which is stored in each machine control.

The Safety Code is computed as described below:

$S = (C * (X+1) + Y ) / (Z+1)$

Where C is Checksum of the data stored on the Card :

$C = ( UID_{LowBytes} + UID_{HighBytes} + \sum_{i=1}^{n} Block_i )$

$UID_{LowBytes}$ = lower 32 bit of the UID
$UID_{HighBytes}$ = higher 32 bit of the UID

$\sum_{i=1}^{n} Block_i$ = Sum of all used Blocks ( 32 bit values ) beginning at Block #1

n = number of last Block used.
X = hidden factory safety key, first highest 6 bits ($2^{10} – 2^{15}$) range [ 0 - 0x3F ]
Y = hidden factory safety key, next 5 bits ($2^{5} – 2^{9}$) range [ 0 - 0x1F ]
Z = hidden factory safety key, lowest 5 bits ($2^{0} – 2^{4}$) range [ 0 - 0x1F ]

The division by Z can produce decimal places. So the resulting decimal places will be truncated. Overflows will be ignored and the computation continues with the 32 bit value.

### 3.3.2 EUROMAP 65 Application Identifier and Version Number

Block #1 32 bit

identifier 24 bit EUROMAP 65 application identifier
0x45 ‘E‘
0x36 ‘6’
0x35 ‘5’
Defines that the card complies with EUROMAP 65.

version 8 bit EUROMAP 65 version number
0x01 Version #1
Defines the version of EUROMAP 65, to which the card complies with, starting with version 1. The version may be incremented on later versions, e.g. when new parameter ID’s will be added to EUROMAP 65.

### 3.3.3 User Data Block Length

Block #2 (lower 2 Bytes) 16 bit [0...246]

The 16 bit value is the length in Bytes of the user data (optional parameters). When changing the data of the storage this value must be adapted.

## 3.4 Optional Parameter ID’s

**None of the subsequently defined identifiers are mandatory**. It depends on the target system, which parameters are used and it depends on the customer which parameters are provided on the card. Usually, the access cards will contain a set of parameters, covering the needs of all brands of IMM machines at a customers site.
The first optional parameter starts in Block #2 at third Byte (=upper 2 Bytes of Block #2). If the last used block is not completely occupied it has to be filled with null characters.

### 3.4.1 Numerical identification of the card owner

*ID #01 User ID numerical*
ID 0x01
value 32bit binary [ 0 – 4 294 967 295 ]

Numeric User Identification.. E.g. User ID 100000 is represented as hexadecimal value 0x186A0

### 3.4.2 Textual identification of the card owner

*ID #02 User ID textual*

| | |
|---|---|
| ID | 0x02 |
| length | 8bit binary [ 0 – 16 ] Length of textual data in Bytes |
| textual data | [ Unicode UTF-8 format ] |

Textual User Identification. Each character is stored in its UTF-8 equivalent. E.g. User ‚Jörg' is represented by 4 Unicode characters, in this case five 8-bit values:

| | |
|---|---|
| 0x4A | Unicode for ‚J' |
| 0xC3,0xB6 | Unicode for ‚ö' |
| 0x72 | Unicode for ‚r' |
| 0x67 | Unicode for ‚g' |

### 3.4.3 Expiry date

*ID #03 Expiry date*

| | | |
|---|---|---|
| ID | 0x03 | |
| value | 16bit | [ DOS date format ] |
| | | date = ( Year – 1980 ) * 512 + month * 32 + day |

At the end of this day the card looses its validation and the use of this card on IMM's is not granted anymore.

### 3.4.4 Personal preferences of the card owner

*ID #4 Preferred language*

| | | |
|---|---|---|
| ID | 0x04 | |
| value | 24bit | [ Language code = Alpha-3 (three-letter) code according to ISO 639-2/B ] |
| | 16bit | [ Country code = Alpha-2 (two-letter) code according to ISO 3166-1 ] |

ISO name (abbreviation) for the preferred language. According to the ISO abbreviation, the language is represented by three 8 bit values and the country by two 8 bit values, for example:
Language English = eng and Country United Kingdom = GB.
When the preferred language is not available, the language settings on the machine will not be changed.

### 3.4.5 Customer Factory identifier

*ID #05 Factory identifier*

| | |
|---|---|
| ID | 0x05 |
| length | 8bit binary [ 0 – 16 ] Length of textual data in Bytes |
| textual data | [Unicode UTF-8 format] |

The aim of this parameter is to protect the customers IMM's against unauthorised access from personnel.
The textual factory identifier is stored as Unicode UTF-8 string and should represent the customers company name and if necessary the departement and group. When a customer wants to use this feature it must be stored also on each IMM to be accessed. The factory identifier on the card must be identically (case sensitive) with that one on the machine, otherwise no access is granted.

This parameter can also be used to limit the use of the access card to specific groups of IMM's by using a dot separated factory identifier string. The string can be divided by dots into several substrings to describe a group of machines like this: *"company.department.group"*
The access will be granted to all machines with the identical company, department and group-names. The order of the organisational entities is hierarchical (topmost first).
With wildcards ( * ) at the end of the string it is possible to generate keys for group spanning access, e.g. with the general key *"company.*"* the access to the machines of all departements and groups of the *"company"* is possible.

### 3.4.6 Access rights

*ID #06 Access rights*

| | |
|---|---|
| ID | 0x06 |
| value | 8bit binary [ 0 – 3 ]. Defines access rights for the card owner within a range from 0 to 3 assigned to access levels on the target system. |

Recommendation for using the levels of access rights:
0 = No access, 1 = lowest, 2 = middle and 3 = highest level.

These levels are not assigned to specific access rights on a machine. More advanced systems of access rights have to be defined in the manufacturer specific data areas.

### 3.4.7 Reserved parameter ID's

| | |
|---|---|
| ID #7 - 29 | ID's reserved for future general parameters defined by EUROMAP in new versions of this standard |
| ID | 0x07 – 0x1D |
| length | 16 bit binary [ 0 – n ] Length of Block in Bytes |
| value | n Bytes<br>The internal structure of the data block is to be defined in future versions of this standard. |

These ID's are defined so that current software will be able to successfully extract all currently defined parameters even if the card contains as of yet undefined parameters (written by future software supporting future versions of this standard)

### 3.4.8 General purpose ID

| | |
|---|---|
| *ID #30* | *general purpose ID* |
| ID | 0x1E |
| length | 16 bit binary [ 16 – 16+n ]<br>Number of Bytes of the subsequently following company specific data block including a 16 Byte company name. |
| name | 16 Bytes [ UTF8 Textstring] Name of the company who uses this data block. |
| value | n Bytes company specific data block.<br>The internal structure of the data is defined by the company who uses this block.<br>The ID #30 can be used several times on one card by using different company names. |

This general purpose ID can be used by manufacturers others then IMM manufacturer. The maximum size of this block is the remaining free space of the card (the vendor specific data of other IMM manufacturers must remain on the card!).

### 3.4.9 Parameter ID's assigned to IMM manufacturers

*ID #31 - 200 ID's assigned to IMM manufacturers*
ID 0x1F – 0xC8
length 16 bit binary [ 0 – n ] Length of IMM manufacturer specific data block in Bytes.
value n Bytes Manufacturer specific data block.
The internal structure of the data block is defined by the manufacturer.

These ID's are assigned to IMM manufacturers, one ID per manufacturer. The maximum size of this block is the remaining free space of the card (the vendor specific data of other IMM manufacturers must remain on the card!).

Parameter ID's will be assigned by EUROMAP ( **http://www.euromap.org** ) and only this organization can assign new ones.

### 3.4.10 *Customer specific ID's*

*ID #201 - 255 Customer specific ID's*
ID 0xC9 – 0xFF
length 16 bit binary [ 0 – n ] Length of the customer specific data block in Bytes.
value n Bytes customer specific data block.
The internal structure of the data block is defined by the customer.

These ID's are available for general use on the customers site. The maximum size of this block is the remaining free space of the card (the vendor specific data of other IMM manufacturers must remain on the card!).

## 3.5 Example:

User Johnson has the 8-digit user ID: 13071959. The use of this card is limited to machines with factory identifier = “EUROMAP”, Expiry date is 1.1.2004, Language is English and Country is United Kingdom.

| Value | Comment |
|---|---|
| | **Mandatory data block for cards complied to EUROMAP 65** |
| | **Block #0** |
| 0xC25C<br>0x229F | 32 bit safety code, calculated with Safety Key = 0x0401 (X=1, Y=0, Z=1) and UID 0x70758f8a00000000 in this example = 0x229FC25C |
| | **Block #1** |
| 0x45 | ‘E‘ Defines that the card complies with EUROMAP 65. |
| 0x36 | ‘6’ |
| 0x35 | ‘5’ |
| 0x01 | EUROMAP 65 version #1 |
| | **Block #2 low Bytes** |
| 0x0022 | 16 bit length of the user data block |
| | **User data block** |
| | **Block #2 high Bytes – Block #n** |
| **0x01** | <ID> 1 = User-ID numerical |
| 0x7657<br>0x00C7 | <parameter> = user ID 13 071 959 (which is 0xC77657) |
| **0x02** | <ID> 2 = User ID textual |
| 0x07 | <length> Length of textual data in Bytes |
| 0x4A | ‚J‘ textual data [Unicode UTF-8 format] |
| 0x6F | ‚o‘ |
| 0x68 | ‚h‘ |
| 0x6E | ‚n‘ |
| 0x73 | ‚s‘ |
| 0x6F | ‚o‘ |
| 0x6E | ‚n‘ |
| **0x03** | *<ID>3 = Expiry date* |
| 0x3021 | 16bit [ DOS date format ] e.g. 1.1.2004 = 12321 = 0x3021 |
| **0x04** | <ID> 4 = Language and Country code |
| 0x65 | ‘e’ 3 Bytes textual data language code |
| 0x6E | ‘n’ |
| 0x67 | ‘g’ |
| 0x47 | ‘G’ 2 Bytes textual data country code |
| 0x42 | ‘B’ |
| **0x05** | <ID> 05 = Factory identifier |
| 0x07 | <length> Length of textual data in Bytes |
| 0x45 | ‚E‘ textual data [Unicode UTF-8 format] |
| 0x75 | ‚u‘ |
| 0x72 | ‚r‘ |
| 0x6F | ‚o‘ |
| 0x6D | ‚m‘ |
| 0x61 | ‚a‘ |
| 0x70 | ‚p‘ |
| **0x06** | <ID> 06 = *Access rights* |
| 0x03 | 3 = highest level |

Used space is 44 of 256 Bytes by using a 2k bit chip-card.

# EUROMAP

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