EUROMAP 71

Electrical Interface between Injection Moulding Machine and Mould Changing Device

Version 1.5, May 2015
(12 pages)

This recommendation was prepared by the Technical Commission of EUROMAP.

The diagram 'Signal sequence' in clause 3 was modified (v. 1.1).

A further supplier added (v. 1.2).

Supplier's data updated (Ver. 1.3).

A further supplier added (v. 1.4).

List of plug suppliers removed (v. 1.5).
Please visit www.euromap.org/technical-issues/technical-recommendations for the current list.

Content

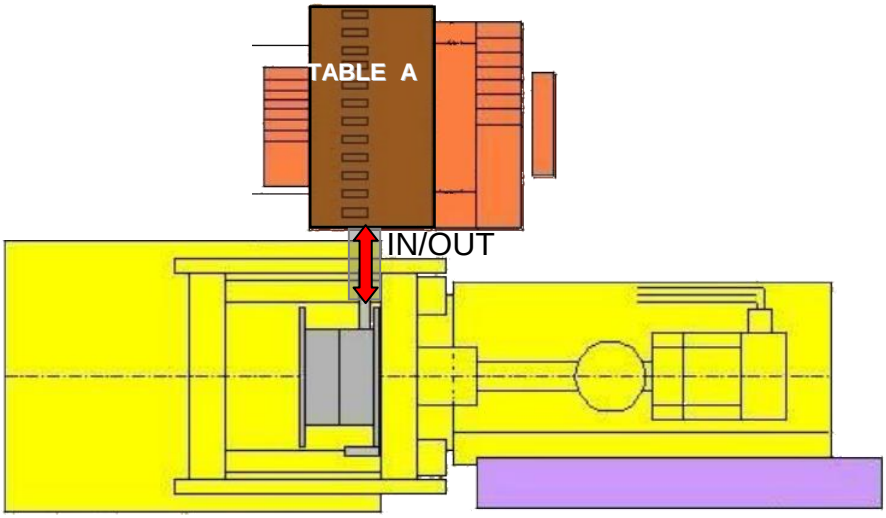
Page

1 Scope and Application

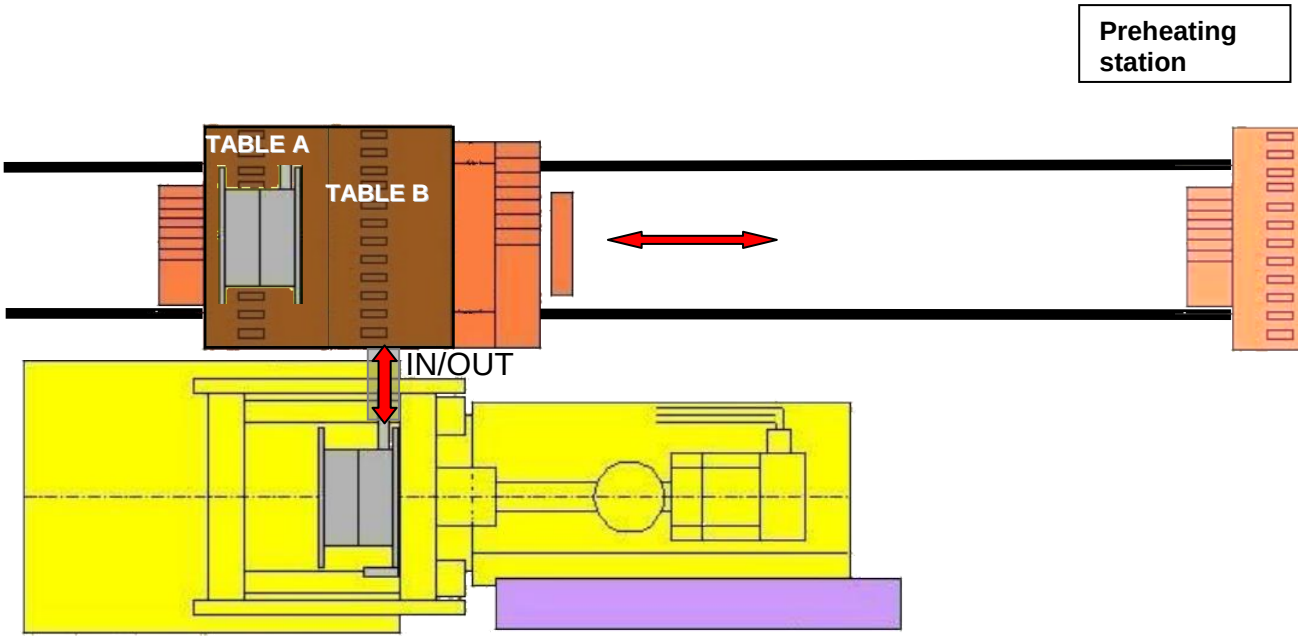
This EUROMAP recommendation defines the connection between the injection moulding machine (IMM) and the mould changing device (MCD). This is intended to provide interchangeability.

In addition recommendations are given for signal voltage and current levels.

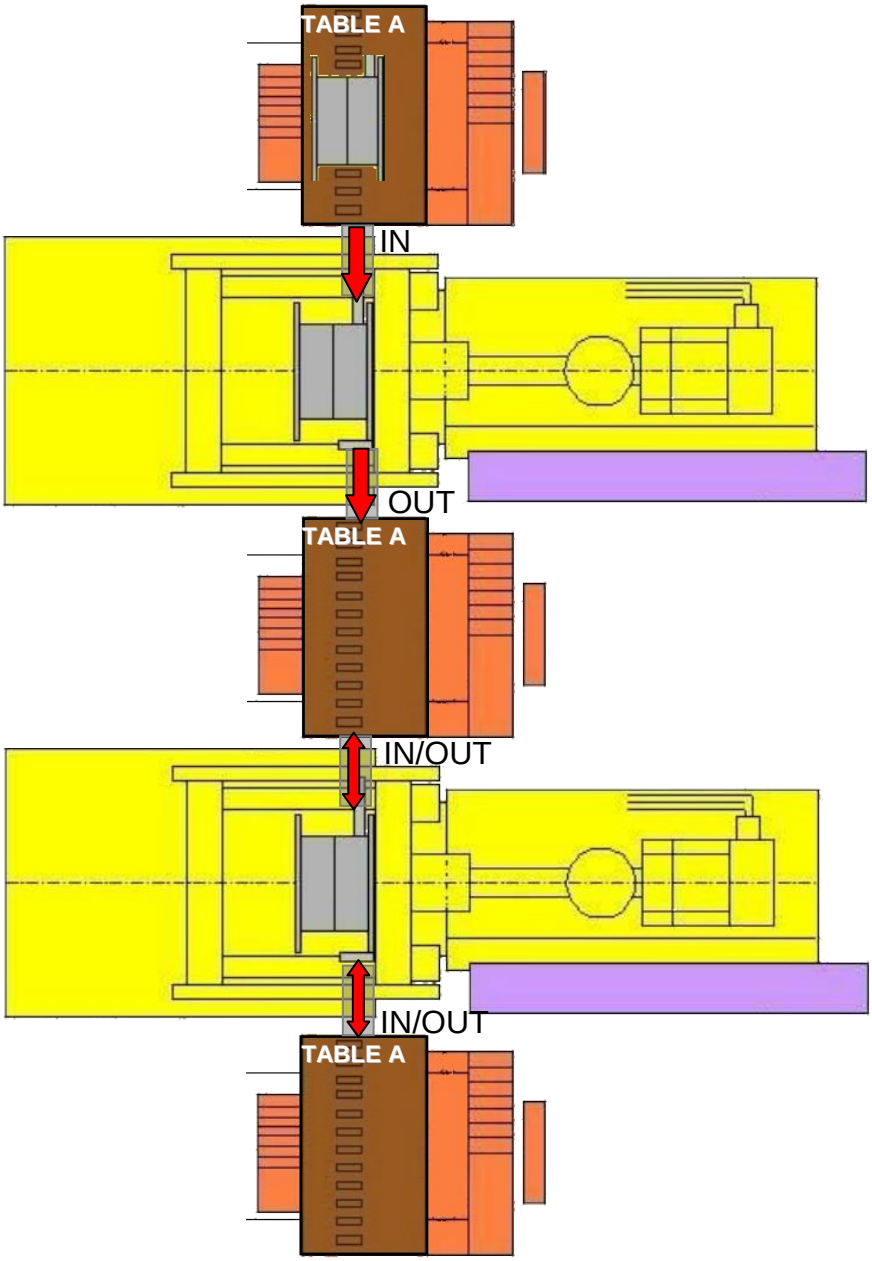
The following situations are covered:



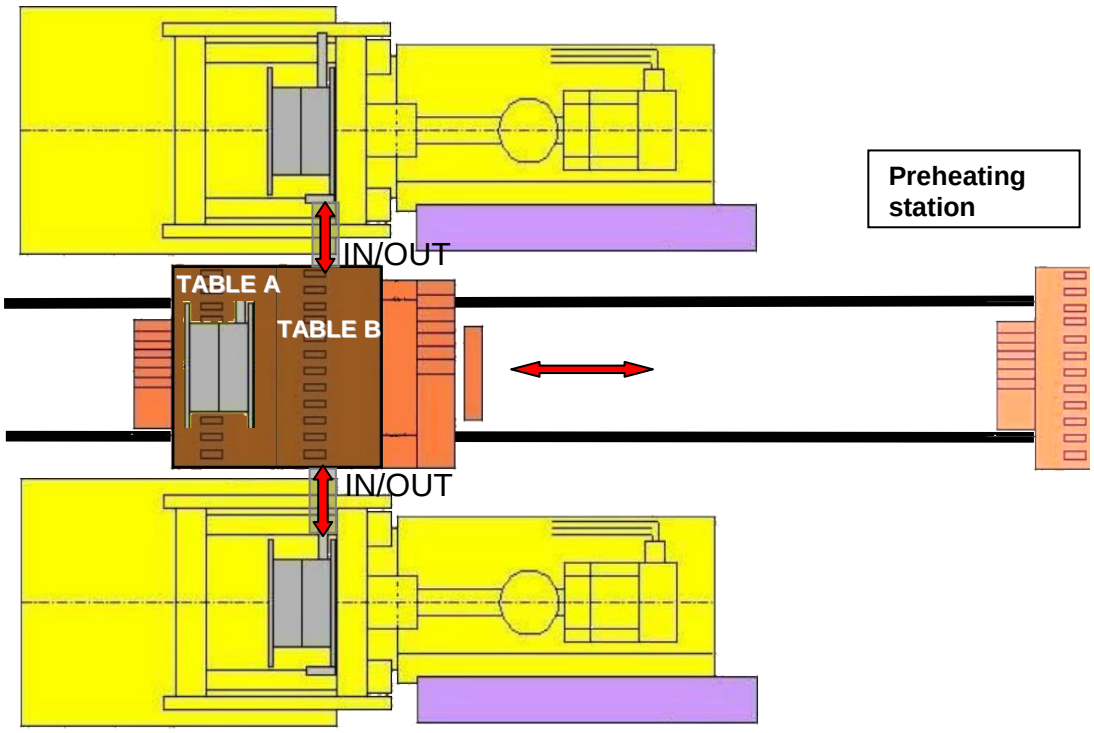
IMM and MCD with one table on the rear side of the IMM



IMM and MCD with two tables on the rear side of the IMM



IMMs with MCDs on front and rear side of IMM



Two IMMs and one MCD with two tables

2 Description

The signals in both the IMM and the MCD are given by contacts, e.g. contacts of relays or switches, semiconductors, etc. The contact making is either potential-free or related to a reference potential supplied to a contact of the plug mounted on the IMM or the MCD (see Tables 1 and 2). All signals which are not optional shall be supported by all IMMs and MCDs.

2.1 Plug and socket outlet

The connection between the IMM and the MCD is achieved by the plugs specified below. For the IMM (see Figure 2) and the MCD (see Fig. 1) the plug contacts should be capable of taking a minimum of 250 V and 10 A. Arrangements of pins and sockets viewed from the mating side (opposite the wiring side).

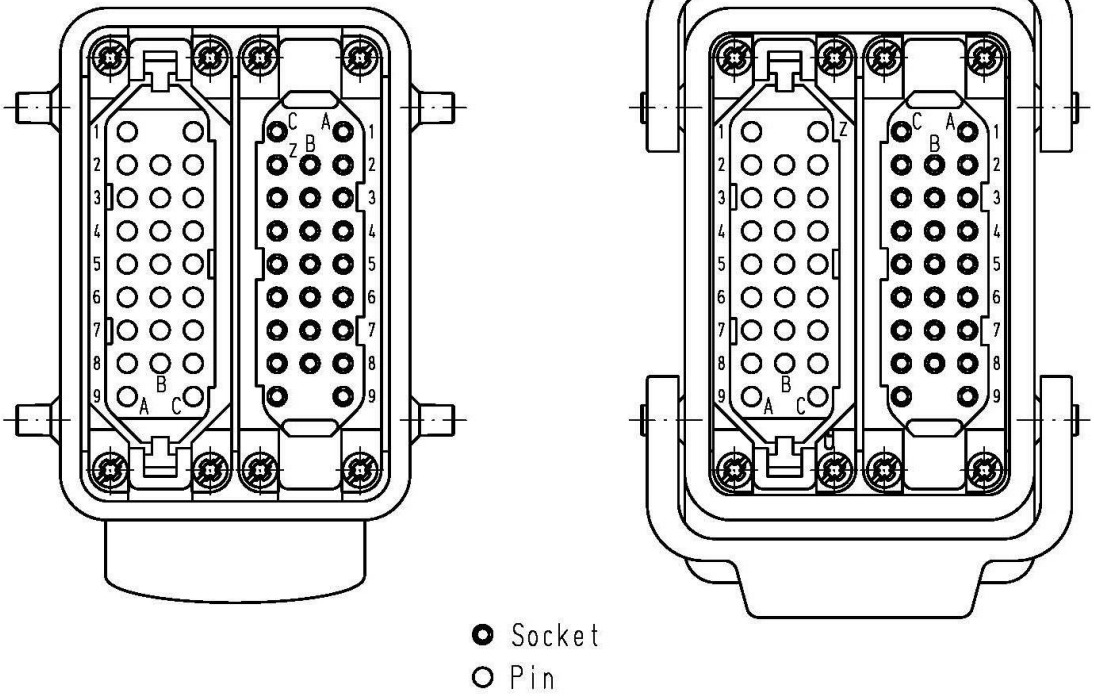


Figure 1 = Plug on the MCD

Figure 2 = Plug on the IMM

2.2 Contact specification

2.2.1 Emergency stops, safety devices

- The voltages of the signals must not exceed 50 V DC
- A current of at least 6 mA must be maintained during signalling.
- The maximum current is 6 A.

2.2.2 Logical Signals

- These signals shall be in accordance with clause 3.3.1 of EN 61131-2, Table 9, Type 2 or with clause 3.3.3 of EN 61131-2,Table 11, 0,1 A max.

2.2.3 Reference potential (Table 1: ZA9, ZC9 and Table 2: A9, C9)

— Voltage	18 – 36 V DC	
— Overlayed ripple	max. 2,5 Vpp	
— Withstand against overvoltage	up to 60 V	min. 10 ms
— Current	max. 2 A	

2.3 Plug contact assignment

Notes on the tables below:

- Unless otherwise noted, the switch contacts are switching the reference potential on plug contacts: Table1 / No ZA9 (IMM signal) and Table 2 / No A9 (MCD signal).
- All signals are continuous signals unless otherwise noted.
- The signals are conducted from the signal source to the respective pin.
- Apart from the MCD signal "Emergency stop " (Table 2; A1/C1) the signals can assume any status when the MCD is switched off.
- Apart from the IMM signals "Emergency stop " (Table 1; ZA1/ZC1) and “Safety devices ” (Table 1; ZA3,ZC3) the signals can assume any status when the MCD is switched off.

2.3.1 Table 1: Plug on the IMM Signals from the IMM to the MCD

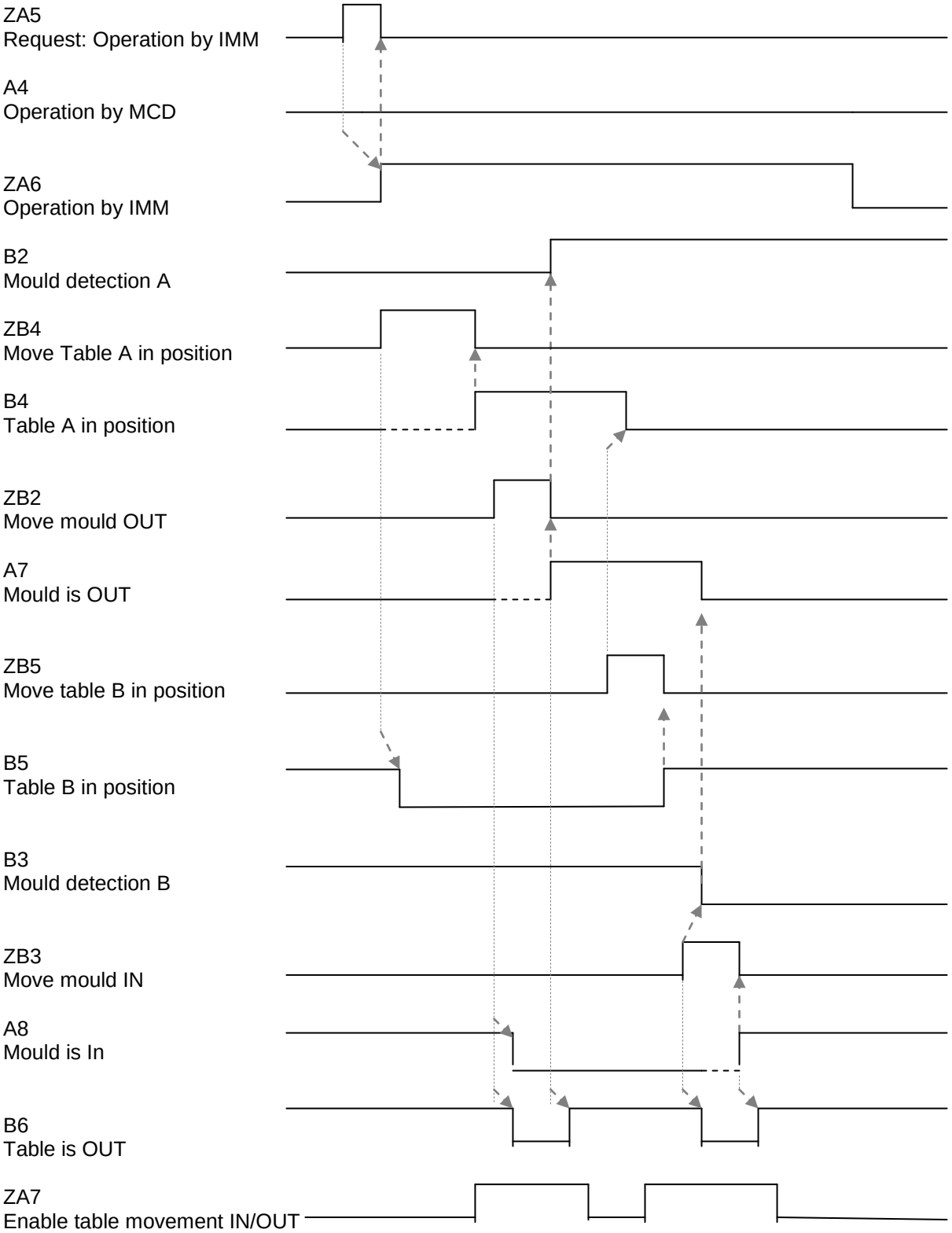
Contact No (male), see fig. 2	Signal designation	Description
ZA1 ZC1	Emergency stop of IMM	The switch contact must be open when the IMM emergency stop device is being actuated. Opening the switch contact causes emergency stop of the MCD.
ZA2 ZC2		Reserved for future use of EUROMAP
ZA3 ZC3	Safety devices of IMM	The switch contact is closed when safety devices on the IMM are operative (e.g. guard of the mould area opposite the mould change side is closed and/or sensitive floor in the mould area is not actuated) so that dangerous movements of the MCD are possible. The signal is active in any operation mode.
ZA4 ZC4		Reserved for future use of EUROMAP
ZA5	Request: Operation by IMM	HIGH signal when there is a request to operate the MCD by the IMM.
ZA6	Operation by IMM	HIGH signal when the operation of the MCD by the IMM is active. (The IMM is either in the automatic mould change mode or the movements of the MCD are controlled by actuators on the IMM.)
ZA7	Enable table movement IN/OUT	HIGH signal when the IMM is ready for the table to move into or out of the IMM (mould in position and unclamped, ejector not connected, guard of the mould area at the mould side open). This signal shall not be used to start the movement.
ZA8		Reserved for future use of EUROMAP
ZA9	Supply from MCD	24 V DC (Reference potential)
ZB2	Move mould OUT	HIGH signal when the IMM is ready to move the mould out of the IMM (e.g. mould unclamped, guard of the mould area at the mould change side open, MCD in change position). This signal is used to start the movement. The movement shall continue as long as the signal is HIGH.
ZB3	Move mould IN	HIGH signal when the IMM is ready to move the mould into the IMM (e.g. no mould in IMM, guard of the mould area at the mould change side open, correct mould height). This signal is used to start the movement. The movement shall continue as long as the signal is HIGH.
ZB4	Move table A in position	To move table A in position in front of the guard of the mould area. The signal shall remain HIGH until B4 changes to HIGH.
ZB5	Move table B in position	To move table B in position in front of the guard of the mould area. The signal shall remain HIGH until B5 changes to HIGH.
ZB6		Reserved for future use of EUROMAP
ZB7		Reserved for future use of EUROMAP
ZB8		Reserved for future use of EUROMAP
ZC5		Reserved for future use of EUROMAP
ZC6		Reserved for future use of EUROMAP
ZC7		Reserved for future use of EUROMAP
ZC8 **Optional**	Mould preparation	HIGH signal for preheating the mould
ZC9	Supply from MCD	0 V (Reference potential)

2.3.2 Table 2: Plug on the IMM Signals from the MCD to the IMM

Contact No (female), see fig. 2	Signal designation	Description
A1 C1	Emergency stop of MCD	The switch contact must be open when the MCD emergency stop is being actuated. The switch contact opening causes emergency stop of the IMM. The switch contact must be operative if the MCD is switched off.
A2 C2		Reserved for future use of EUROMAP
A3	Request: Operation by MCD	HIGH signal when there is a request to operate the mould changing by the MCD.
A4	Operation by MCD	HIGH signal when the operation of the mould change by the MCD is active. (The MCD is either in its manual mould change mode or the movements of the MCD are controlled by another IMM.) An automatic mould change cannot be started.
A5	MCD failure status	HIGH signal when the MCD has no failures e.g. guards of the MCD are closed.
A6		Reserved for future use of EUROMAP
A7	Mould is OUT	HIGH signal when the mould has been moved out of the IMM.
A8	Mould is IN	HIGH signal when the mould has been moved into the IMM and is centred. (The mould is now ready for clamping; the closing movement of the platen is enabled.)
A9	Supply from IMM	24V DC (Reference potential)
B2	Mould detection A	HIGH signal when a mould is on table A .
B3	Mould detection B	HIGH signal when a mould is on table B .
B4	Table A in position	HIGH signal when table A is in position in front of the guard of the mould area.
B5	Table B in position	HIGH signal when table B is in position in front of the guard of the mould area.
B6	Table is OUT	HIGH signal when the table is in a position to enable the closing movement of the guard of the mould area of the IMM on mould change side .
B7 **Optional**	MCD failure 0	HIGH signal when the MCD has a failure – code bit 0.
B8 **Optional**	MCD failure 1	HIGH signal when the MCD has a failure – code bit 1.
C3 **Optional**	MCD failure 2	HIGH signal when the MCD has a failure – code bit 2.
C4 **Optional**	MCD failure 3	HIGH signal when the MCD has a failure – code bit 3.
C5 **Optional**	MCD failure 4	HIGH signal when the MCD has a failure – code bit 4.
C6		Reserved for future use by EUROMAP
C7		Reserved for future use by EUROMAP
C8 **Optional**	Enable mould preparation	HIGH signal when MCD is ready for preheating the mould.
C9	Supply from IMM	0 V (Reference potential)

3 Signal sequence

Example: In the example this signal sequence of a MCD with two tables on the rear side of IMM is shown: The mould being clamped in the IMM is unclamped and moved out to table A, then the mould being already available on table B is moved into the mould area of the IMM to be clamped.



NOTE: With the switching on the signal ZA5 to HIGH, the signal A5 shall be monitored.

4 Sources of supply

A list of plug suppliers is available for download on the EUROMAP website:
www.euromap.org/technical-issues/technical-recommendations

EUROMAP

Europäisches Komitee der Hersteller von Kunststoff- und Gummimaschinen

European Committee of Machinery Manufacturers for the Plastics and Rubber Industries

Comité Européen des Constructeurs de Machines pour Plastiques et Caoutchouc

Comitato Europeo Costruttori Macchine per Materie Plastiche e Gomma

See you again

http://www.euromap.org