European Plastics and Rubber Machinery

EUROMAP 12

Electrical Interface between Injection Moulding Machine and Handling Device

Version 1.7, May 2015
10 pages

This recommendation was prepared by the Technical Commission of EUROMAP.
However, see also EUROMAP 67.

www.euromap.org

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History

Date	Version	Changes
October 2006	**1.2**	A further supplier added
July 2007	**1.3**	Supplier's data amended
November 2009	**1.4**	A further supplier added
August 2013	**1.5**	Supplier's data updated New layout
February 2015	**1.6**	A further supplier added
May 2015	**1.7**	List of plug suppliers removed. Please visit www.euromap.org/technical-issues/technical-recommendations for the current list.

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1 Scope and Application

This EUROMAP recommendation defines the connection between the injection moulding machine and the handling device. This is intended to provide interchangeability.

In addition recommendations are given for signal voltage and current levels. The mains connection of the handling device is also specified.

2 Description

The signals in both the injection moulding machine and the handling device are given by contacts, e.g. contacts of relays or switches, etc. The contact making is either potential-free or related to a reference potential supplied to a contact of the plug mounted on the injection moulding machine or the handling device (see tables 1 and 2).
The signals shall be available in all injection moulding machines and handling equipment.

2.1 Plug and socket outlet

The connection between the injection moulding machine and the handling device is achieved by the plugs specified below. For the injection moulding machine the plug contacts 1 to 16 are male and the plug contacts 17 to 32 are female. All the plug contacts should be capable of taking a minimum of 250 V and 6 A.

Arrangements of pins and sockets viewed from the mating side (Opposite the wiring side)

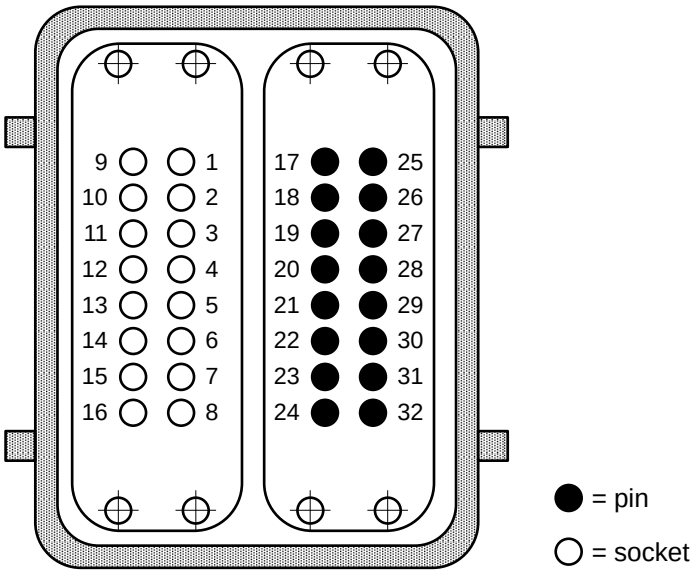


Figure 1: Plug on the handling device

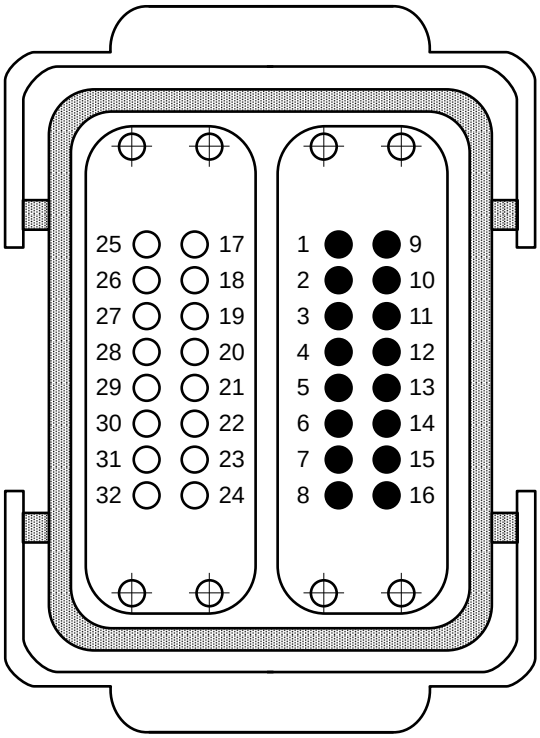


Figure 2: Plug on the injection moulding machine

2.2 Switch contact specification

- The current of the signals must not exceed 200 mA unless otherwise noted.
- A current of at least 10 mA must be maintained during signalling.
- The voltages of the signals must not exceed 50 V DC or 250 V AC.

2.3 Plug contact assignment

Notes on the table below:

- Unless otherwise noted, the switch contacts are switching the reference potential (plug contacts No 16 and 32).
- All signals are continuous signals unless otherwise noted.
- The signals are conducted from the signal source to the respective pin.
- Apart from the handling device signals "Enable mould closure" (17), "Mould area free" (18/26), and "Emergency stop" (19/27), the signals can assume any status when the handling device is switched off.

Table 1: Injection moulding machine signals

Plug contact No	Signal designation	Description
1, 9	Emergency stop of machine	The switch contact must be open when the injection moulding machine emergency stop device (see EN 60204-1) is being actuated. Opening the switch contact causes emergency stop of the handling device. The current of the signal must not exceed 6 A.
2	Mould open position (handling device)	The switch contact is closed when mould opening position is equal or more than required position. Inadvertent alteration to mould opening stroke smaller than that required for the handling device to approach must be impossible. The switch contact must remain closed as long as the mould is open and must not be interrupted by a change of operation mode or safety guard opening.
3, 11	Safety devices of machine	The switch contact is closed when safety devices (e.g. safety guards, footboard safety, etc.) on the injection moulding machine are operative so that dangerous movements of the handling device are possible. The signal is active in any operation mode. The signal must be the result of limit switch contact series of mould area safety devices according to EN 201. The current of the signal must not exceed 6 A.
4	Ejector back position	The switch contact is closed when the ejector has been retracted regardless of the moving platen position. The signal is the acknowledgement for the "Enable ejector retraction" signal (see plug contact No 21), when the ejector sequence is selected. It is recommended to close the switch contact when the ejector sequence is not in use.
5	Ejector forward position	The switch contact is closed when the ejector has been advanced. The signal is the acknowledgement signal for the "Enable ejector advance" (see plug contact No 22). It is recommended to close the switch contact when the ejector sequence is not in use.

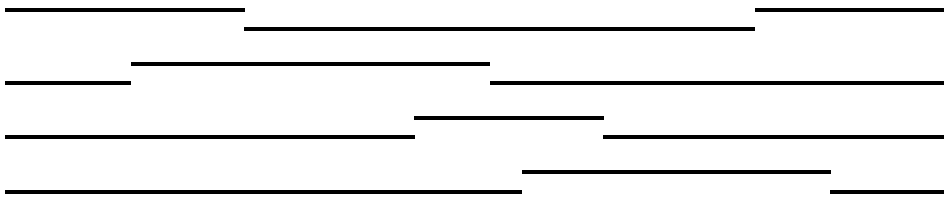
Plug contact No	Signal designation	Description
6 optional	Core pullers in position 1 (Core pullers free for handling device to approach)	The switch contact is closed when the core pullers are in position 1 (see contact No 24, see chapter 4). It is recommended to open the switch contact when the core puller sequence is not in use.
7 optional	Core pullers in position 2 (Core pullers in position to remove moulding)	The switch contact is closed when the core pullers are in position 2 (see contact No 23, see chapter 4). It is recommended to open the switch contact when the core puller sequence is not in use.
8 optional	Reject	The switch contact is closed when the moulding is a reject. The switch contact must close then the mould is open and must remain closed at least until "Enable mould closure" (se plug contact No 17). It is recommended to close the switch contact already when the mould opening starts.
10	Enable operation with handling device (Automatic)	The switch contact is closed when the injection moulding machine is set to semiautomatic or automatic mode. If the switch contact is opened during the operation mode of the handling device "Operation with injection moulding machine", it is recommended that the handling device continues its automatic cycle until the end position.
12	Mould closed	The switch contact is closed when the mould closing is completed. Note: The signal "Enable mould closure" is then no longer required (see plug contact No 17)
13 optional		Not fixed by EUROMAP, manufacturer dependent
14 optional	Intermediate mould opening position	The switch contact is closed when mould opening reaches a set position smaller than mould opening position (see plug contact No 2). The switch contact remains closed to the end of mould opening position. Two sequences are possible with this signal: a) Mould opening stops on intermediate position and gives start signal to handling device. Mould opening restarts with the signal "Enable full mould opening" (see contact No 28). b) Mould opening does not stop on intermediate position, however gives the signal to handling device. The switch contact is open when intermediate mould opening position is not in use.
15 optional	No part available	It is recommended not to use this signal for future applications.
16	Handling device reference potential	(corrected against older version of EUROMAP 12)
17	Enable mould closure	The switch contact is closed when the handling device is retracted enough for start of mould closure. The switch contact must remain closed at least until "Mould closed" (see contact No 12) is available. If the switch contact opens as a result of a fault, mould closing must be interrupted. The signal "Enable mould closure" must not be a logical "or" with either other signals, e.g. "Close safety guard" or a push button in any operation mode. The switch contact must be closed if the handling device is switched off. It is recommended to close the switch contact when the handling device is unselected.

Plug contact No	Signal designation	Description
18, 26	Mould area free	The switch contact is closed when the handling device is outside the mould area and does not interfere with mould opening and closing movements. The switch contact must be opened when the handling device leaves its start position. If the switch contact is open neither opening nor closing of the mould may occur. The injection moulding machine must ignore this signal when mould opening is carried out after intermediate stop (see contact No 14), if the optional sequence is selected on the injection moulding machine. The signal must have the described effect even when the handling device is switched off. It is recommended to close the switch contact when the handling device is unselected. The current of the signal must not exceed 6 A.
19, 27	Emergency stop of handling	The switch contact must be open when the handling device emergency stop (see EN 60204-1) is being actuated. The switch contact opening causes emergency stop of the injection moulding machine. The switch contact must be operative if the handling device is switched off. It is recommended that the switch contact is operative when the handling device is unselected. The current of the signal must not exceed 6 A.
20	Handling device operation mode (operation with handling device)	The switch contact is open when the handling device mode switch is "Operation with injection moulding machine". The switch contact is closed when the handling device mode switch is "No operation with injection moulding machine". The switch contact is closed when the handling device is switched off.
21	Enable ejector back	The switch contact is closed when the handling device enables the movement for ejector back. The switch contact must remain closed at least until "Ejector back" signal is given by injection moulding machine (see contact No 4).
22	Enable ejector forward	The switch contact is closed when the handling device enables the movement for ejector forward. The switch contact must remain closed at least until "Ejector forward" signal is given by the injection moulding machine (see contact No 5).
23 optional	Enable movement of core pullers to position 2 (Enable core pullers to remove the moulding)	The switch contact is closed when the handling device is in position to enable the movement of the core pullers to position 2. It is recommended that the switch contact remains closed at least until "Core pullers in position 2" signal is given by injection moulding machine (see contact No 7).
24 optional	Enable movement of core pullers to position 1 (Enable movement for handling device to approach freely)	The switch contact is closed when the handling device is in position to enable the movement of the core pullers to position 1. It is recommended that the switch contact remains closed at least until "Core pullers in position 1" signal is given by injection moulding machine (see contact No 6).
25		Reserved for future use by EUROMAP
28 optional	Enable full mould opening	The switch contact is closed when the handling device has taken the part and allows to continue mould opening. The switch contact must remain closed until "Mould open" signal is given by the injection moulding machine (see contact No 2). If the switch contact is not used it must be open.
29		Reserved for future use by EUROMAP
30		Not fixed by EUROMAP, manufacturer dependent
31		Not fixed by EUROMAP, manufacturer dependent
32	Injection moulding machine reference potential	(corrected against older version of EUROMAP 12)

3 Ejector sequence

The following sequence as shown in the time diagram is used:

4: Ejector back
22: Enable ejector forward
5: Ejector forward
21: Enable ejector retraction



4 Core puller sequences

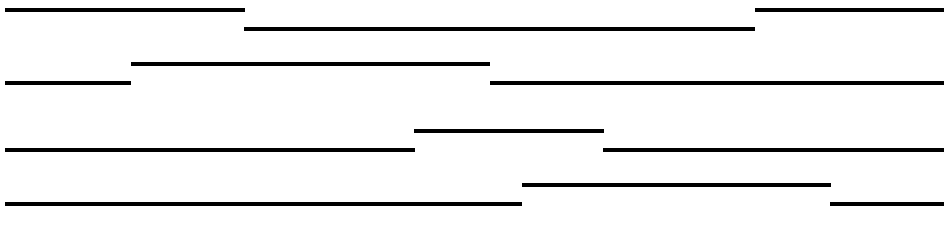
In general position 1 and 2 are used for synchronization between the injection moulding machine and the handling device, where position 1 is preferable the position for free movement of the handling device through the mould area. Position 1 and 2 are used alternating.

4.1 Ejector sequence with core puller

Position 1 is equivalent to ejector back, position 2 is equivalent to ejector forward.

The following sequence as shown in the time diagram is used:

6: Core pullers in pos. 1
23: Enable movement of core pullers to pos. 2
7: Core pullers in pos. 2
24: Enable movement of core pullers to pos. 1

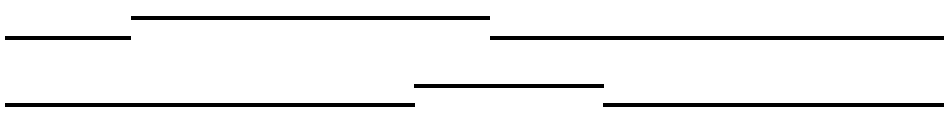


4.2 Core puller sequence for removal of the part

Position 1 means cores are in (injection can take place), position 2 means cores are out (removal of the part).

In this sequence contact No 6 and 24 are not used. The following sequence as shown in the time diagram is used:

23: Enable movement of core pullers to pos. 2
7: Core pullers in pos. 2

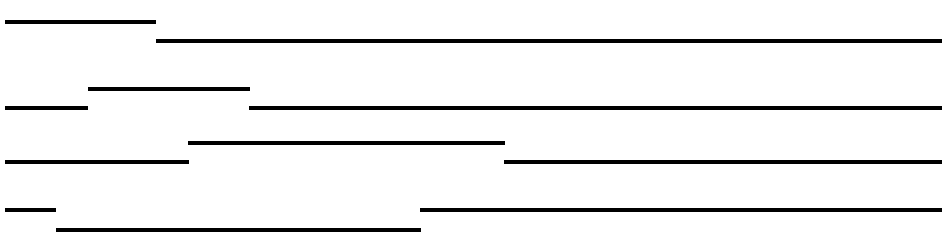


4.3 Core puller sequence for insertion

Position 1 means cores are in position for insertion, position 2 means cores have fixed the insertion.

The following sequence as shown in the time diagram is used:

24: Enable movement of core pullers to pos. 1
6: Core pullers in pos. 1
23: Enable movement of core pullers to pos. 2
7: Core pullers in pos. 2

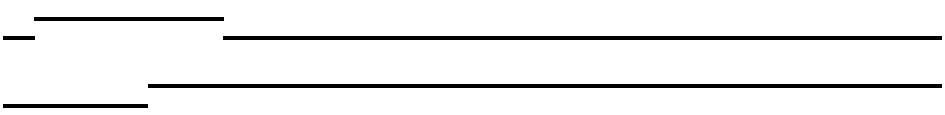


4.4 Core puller sequence for removal of the part and insertion

The following sequence as shown in the time diagram is used:

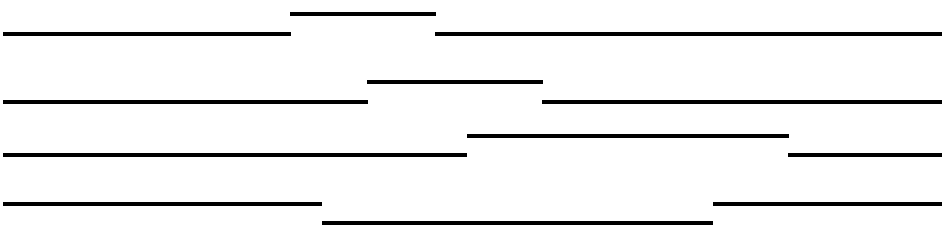
part removal:

23: Enable movement of core pullers to pos. 2
7: Core pullers in pos. 2



insertion:

24: Enable movement of core pullers to pos. 1
6: Core pullers in pos. 1
23: Enable movement of core pullers to pos. 2
7: Core pullers in pos. 2



5 Handling device power supply

Power is supplied through a Cekon socket at a voltage of 3/N/PE 400 V / 16 A (see IEC-Pub. 617 part 2 for the designation).

6 Sources of supply

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

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