EUROMAP 75-2	Protocol for Communication with Peripheral Equipment **Demands on EUROMAP 75 Devices**

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14 pages

This recommendation was prepared by the Technical Commission of EUROMAP.

www.euromap.org

EUROMAP Technical Commission
c/o VDMA • FV KuG

Lyoner Str. 18
DE 60528 Frankfurt am Main

Phone + 49 (69) 6603-1833
Fax + 49 (69) 6603-2833
E-Mail:euromap@vdma.org

History

Date	Changes
May 2010	Document published
July 19, 2010	Clause 1.4 "References" updated
March 2012	Clause 1.3 “Definitions, acronyms and abbreviations” deleted (see part 1) Clause 1.4 “References” updated

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1 Introduction

Please note:

When applying EUROMAP 75 please check in your quotation or machine documentation, if there is marked which Ethernet System is used for the device profile.

1.1 Purpose

This document describes the profile for EUROMAP 75 measuring amplifiers.

1.2 Scope

The EUROMAP 75 specification is divided into a general description, the device profile, a definition of the interface between the injection moulding machines and signal converters and the implementation of different (Realtime-) Ethernet Systems.The present part of document describes the demands on EUROMAP 75 devices, the physical layer and the wiring concept.

1.3 References

Short name	Title	Version	Issued by
EUROMAP 75	EUROMAP 75-1 "Protocol for Communication with Peripheral Equipment - Device Profile for Measuring Amplifiers" EUROMAP 75-3 "Protocol for Communication with Peripheral Equipment - Implementation of Different Realtime Ethernet Systems"	1.2 1.3	EUROMAP
CiA 102	CAN Physical Layer for Industrial Applications	3.0	CiA
CiA 301	CANopen Application Layer and Communication Profile	4.2	CiA
CiA 404	Device Profile for Measuring Devices and closed-loop controllers	2.0	CiA
CiA 303-2	Representation of SI Units and Prefixes	1.4	CiA

1.4 Document Overview

This document is divided into:

- Physical layer
- Wiring concept

2 Demands on EUROMAP 75 devices

2.1 Physical layer

Recommended is the use of two 8-pin M12 connectors, with the pinning according to the EUROMAP 75 - M12 interface specification for 24V/2A peripheral devices.

2.1.1 M12 connector

- The following signals are used:

Pin 2	TD+	Transmission Data +	orange/white
Pin 3	TD-	Transmission Data -	orange
Pin 5	RD+	Receiver Data +	green/white
Pin 6	GND	Ground 24V DC	blue
Pin 7	+24V	Power supply 24V DC	brown
Pin 8	RD-	Receiver Data -	green

- Shielding on connector housing
- The master/manager node has a female connector
- All devices (peripheral equipment) have two connectors:
  - one bus-in connector, A-coding, M12-male
  - one bus-out connector, A-coding, M12 female

Also recommended is the use of a hybrid-cable, according to the EUROMAP 75 - M12 interface specifications.

2.1.2 Hybrid-cable

- Construction :

  - Power line 1x2x22/19AWG
    stranded bare copper wire 22/19AWG – nom. cross section 0.38mm²,
    Insulation: solid polypropylene (hardness D/74) – max D 1,5mm,
    Insulation color: blue, brown

  - Flexible LAN data star quad (2 pairs) – 1 x 4 x 24/19AWG
    stranded bare copper wire 24/19AWG - nom. cross section 0.25mm² ,
    Insulations: solid polypropylene (hardness D/74) – nom D 1,35mm,
    Insulation color: orange, orange/white, green, green/white
    Separation: non-woven tape
    shielded with a spiral of tinned copper wires with 95% coverage

    TD+ with TD- (Pin 2 with Pin 3) are twisted pair
    RD+ with RD- (Pin 5 with Pin 8) are twisted pair

  - Overall Separation: helicoidally non-woven tape
    Overall shield: braid of tinned copper wires with 85% coverage
    Overall jacket: halogen free, oil resistant, UL/CSA, flame retardant - IEC 60332, TPE or PUR
    outer D 7,0mm (± 1,0mm) – black color

- Electrical and transmission properties @ 20°C – LAN unit

  - Mutual capacitance @ 1 KHz — 50 nF/km
  - Propagation delay @ 100 MHz — 4,7nsec/m
  - Insulation resistance, min — 5 GΩ x km
  - Characteristic impedance — 100 Ω (± 15%)

- Electrical properties @ 20°C – power unit

  - DC conductor resistance, max. — 52,0 Ω/km
  - Test voltage (core/core, core/screen) — 2,0 KVac

- Mechanical characteristics

  - Min. bending radius — 12 x outer cable diameter
  - Max. speed (drag chain) — 1,0 m/sec
  - Max. acceleration (drag chain) — 2,0 m/sec²
  - Number of cycles (drag chain) — 3 millions

- Other characteristics

  - Operating temperature — -20°C/+80°C
  - Max. operating voltage (LAN pairs) — 125V – not for power purposes
  - Max. operating voltage (power core) — 48V

2.2 Wiring concept

2.2.1 RT (realtime Ethernet) Network

Ethernet devices are wired as a bus. The wiring system used, line topology (daisy chain), ring topology or star topology, is dependent on the RT Ethernet system applied in each case.

- The injection moulding machine is the only source of 24 V energy for the complete network, i.e. connected EUROMAP 75 peripheral equipment never feeds into the 24 V power supply.
- The 24 V power supply is to be conducted in accordance with the standard IEC1131.
- The maximum load capacity per machine outlet (source) is 2A. If the sum of connected equipment exceeds the limit of 2A an additional machine outlet is to be used. The topology of the network is to be adapted accordingly.

GND concept of the machine connection:

- The M12 sockets (screened) on the injection moulding machine have a low-impedance connection to the machine ground.
- The GND cable of the 24V supply is always connected to the machine ground with low-impedance.

GND concept of the peripheral equipment:

- The supply cables +24V and GND are connected through to the peripheral device from the M12 connector (BUS IN) to the M12 socket (BUS OUT). This connection must have an ampacity of at least 2A.
- The screened M12 connector (BUS IN) and the screened M12 socket (BUS OUT) are connected together with low impedance.
- Preferably, the screened M12 plug connector and the housing of the peripheral device are also to be connected with low-impedance, i.e. “not isolated”. For this execution an additional, low-impedance connection with large-surface area between the machine ground and the housing of the peripheral device is to be provided (e.g. ground strap).
- Alternatively, e.g. on peripheral devices with an additional external power supply, the M12 plug connectors can be “isolated” from the housing (≥ 1MΩ). The difference in potential between the machine ground and the GND of the peripheral devices must not exceed 3V.

The sketches below illustrate the different wiring concepts.

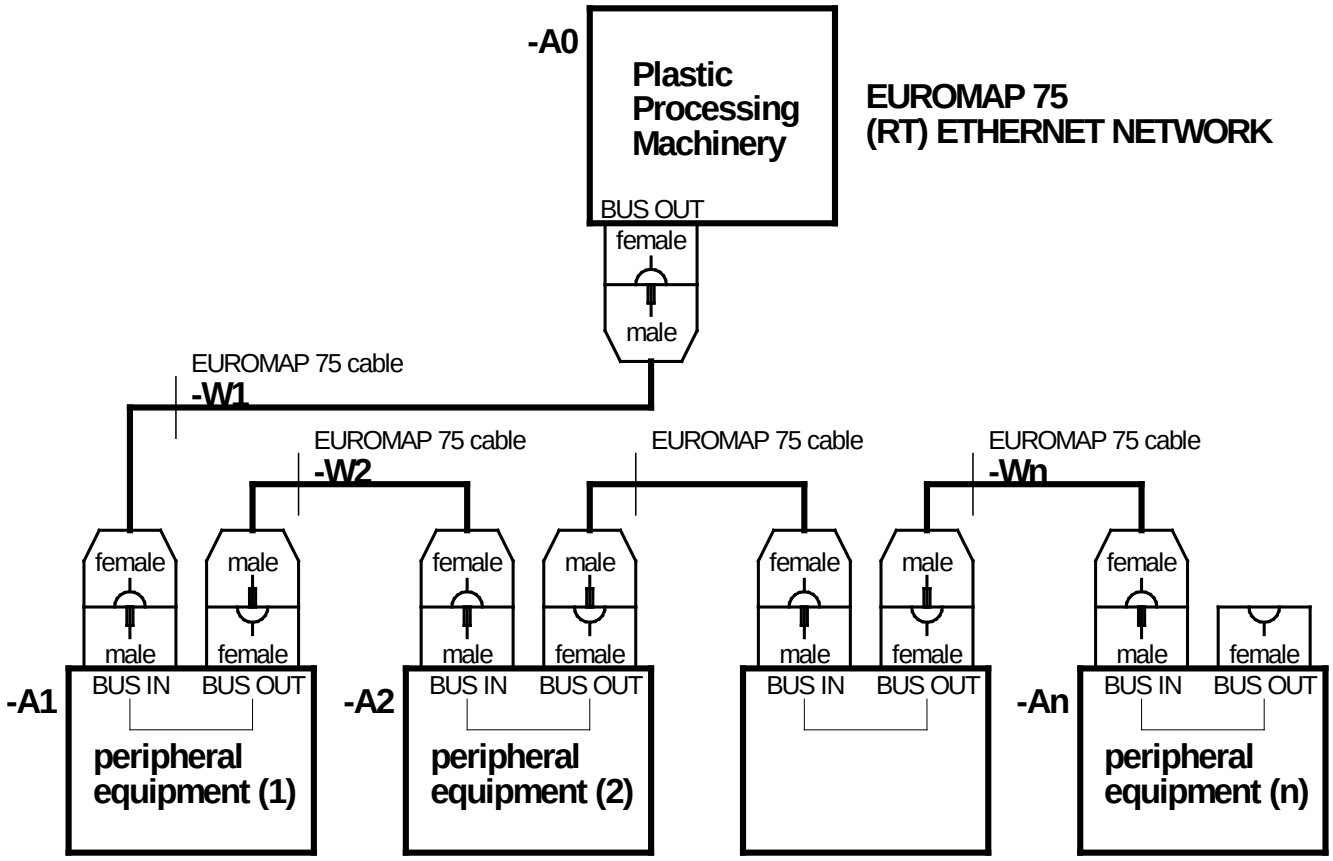

Figure 1: RT Network – Example of a line topology (daisy chain)

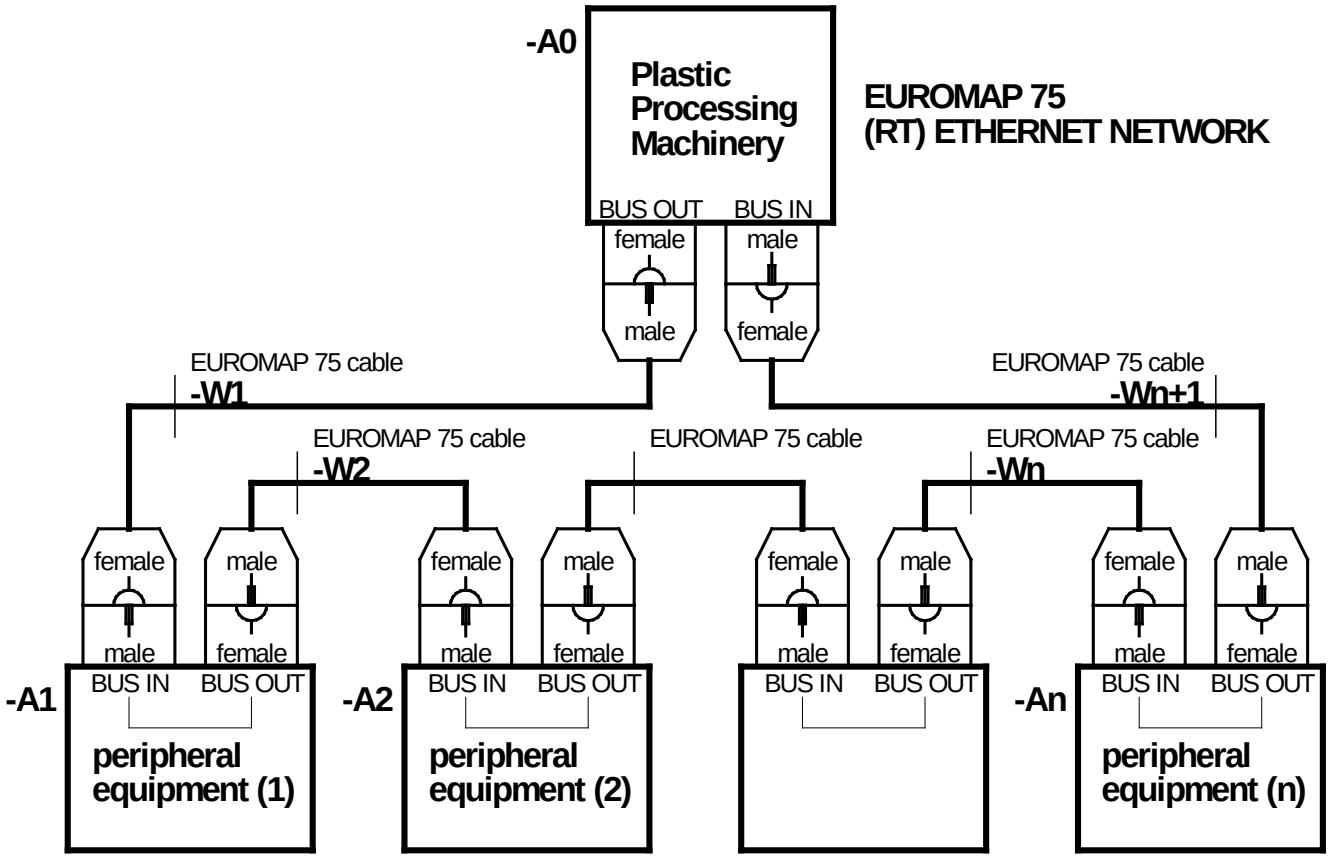

Figure 2: RT Network – Example of a ring topology

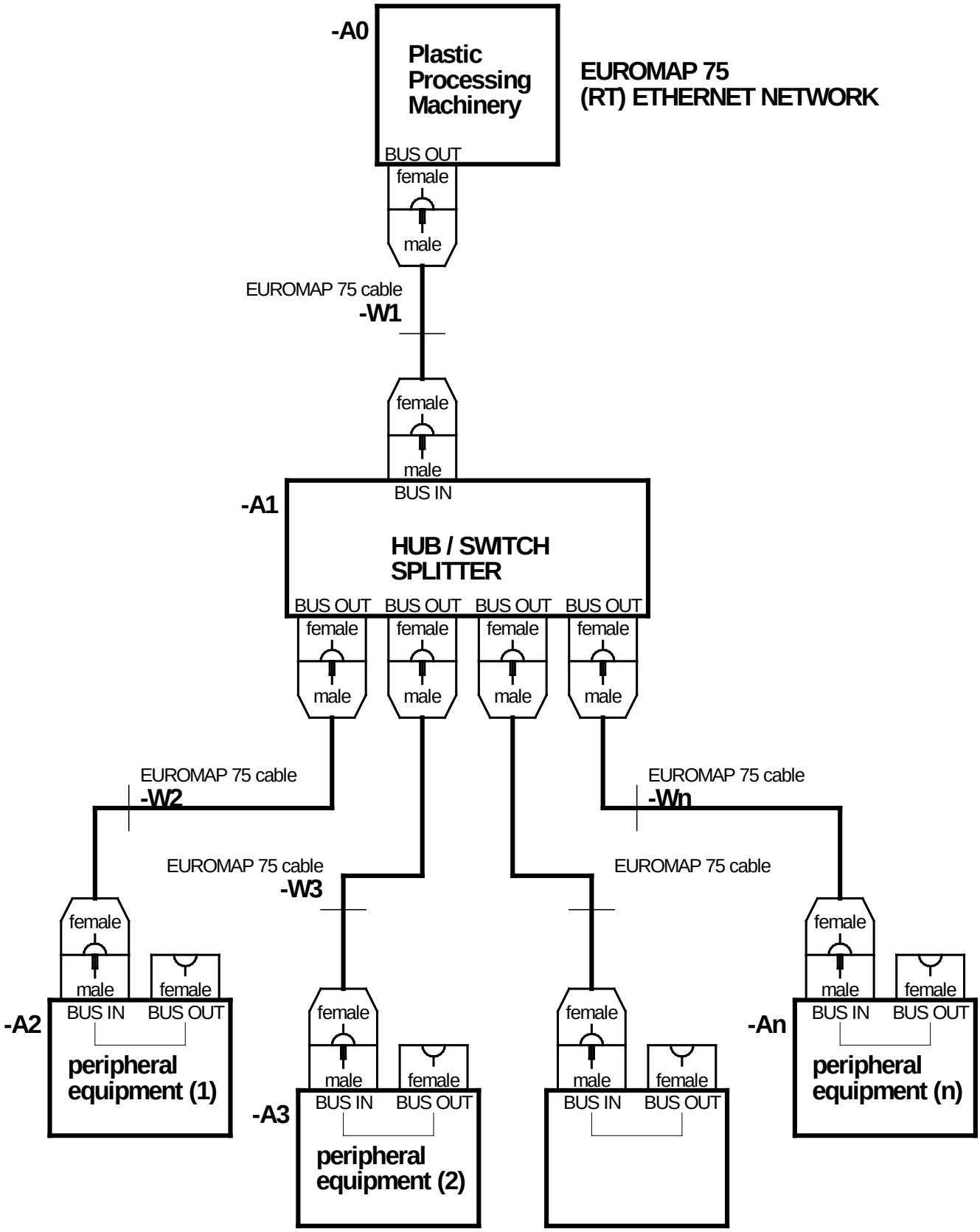

Figure 3: RT Network – Example of a star topology

2.2.2 EUROMAP 75 cable

The EUROMAP 75 cable is defined as follows:

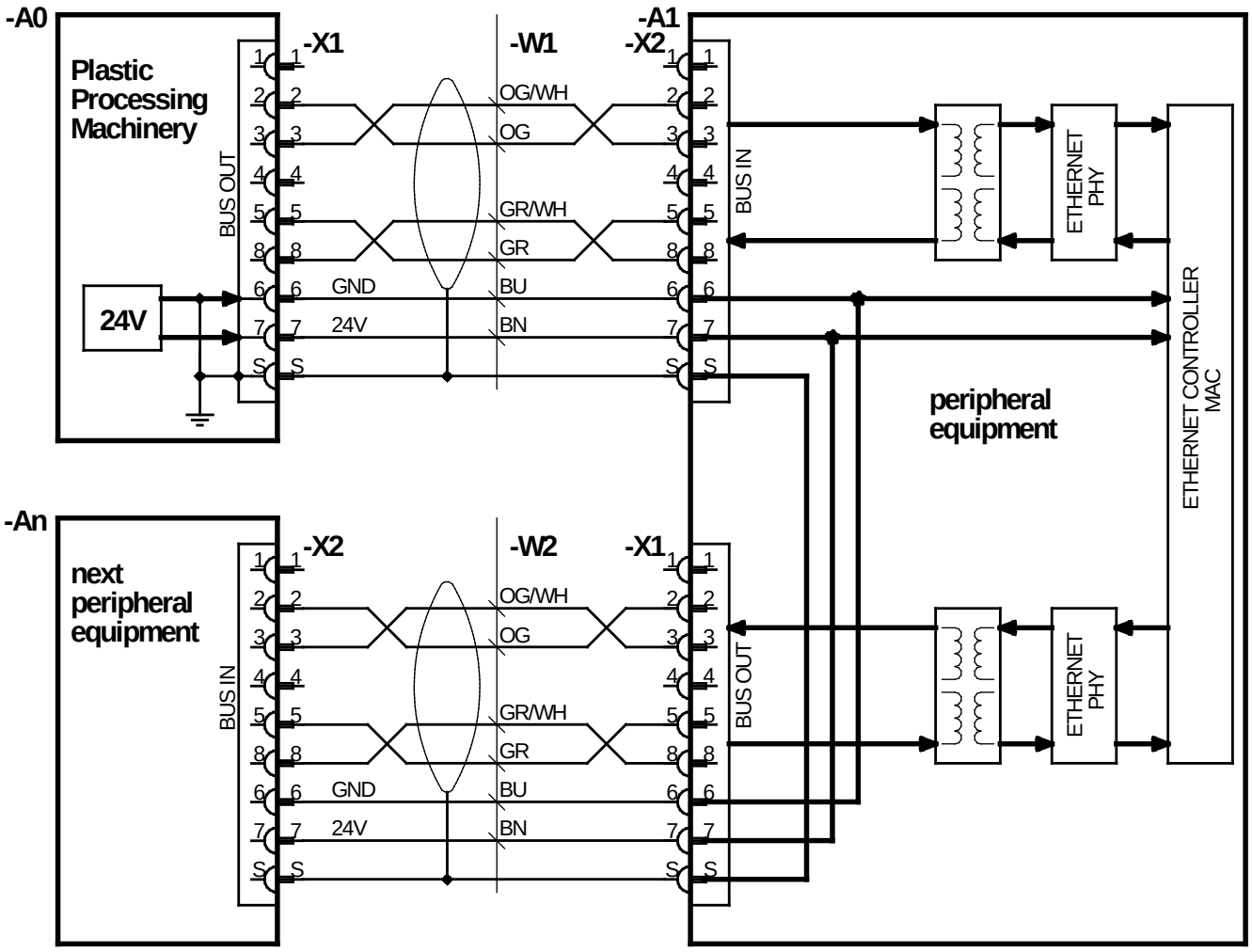

Figure 4: EUROMAP 75 cable – “isolated” wiring

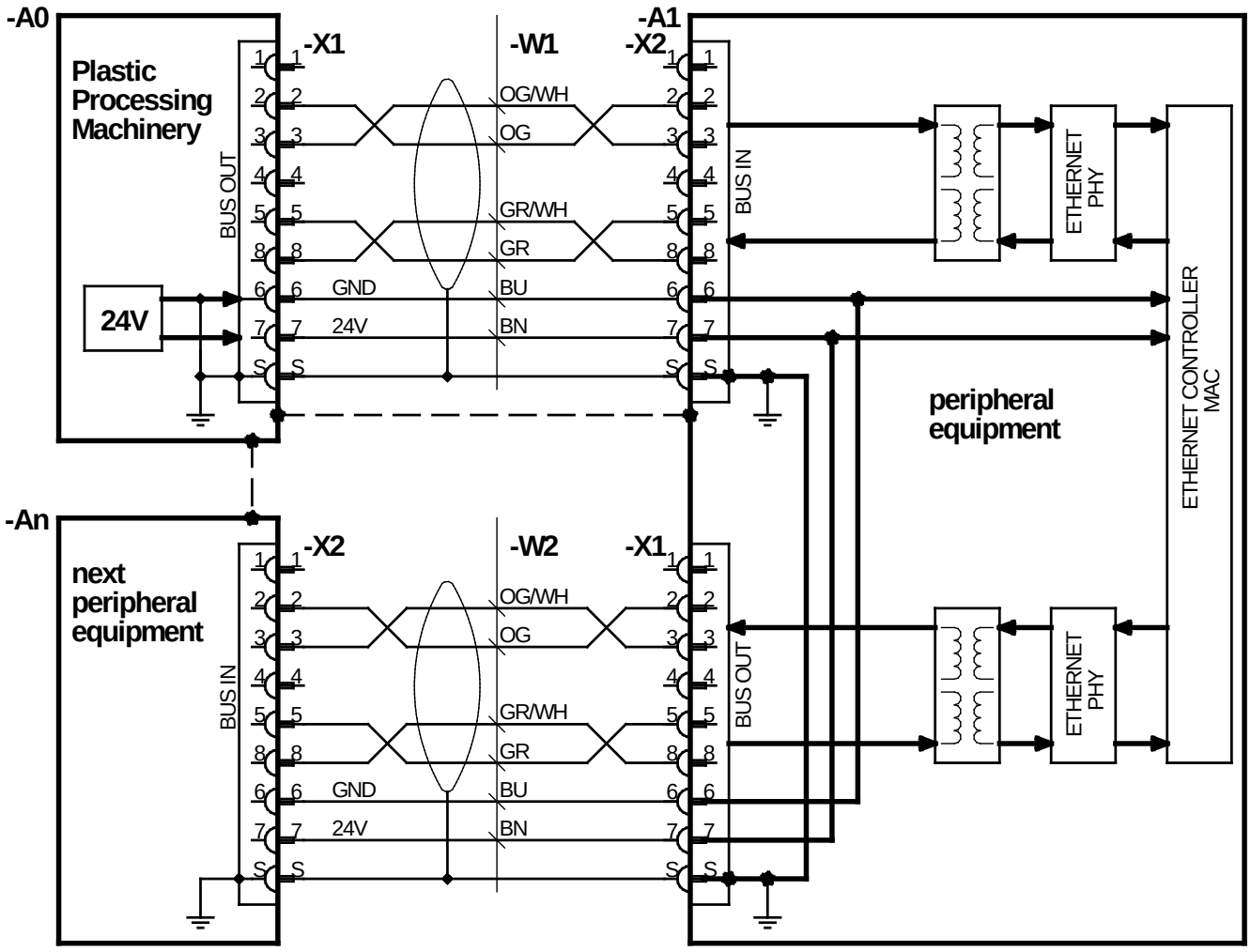

Figure 5: EUROMAP 75 cable – “not isolated” wiring

Figure 6: Example of a hybrid-cable

EUROMAP

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