

Solutions for Packaging Machines

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PROMAX

**Motion
&
Control**



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PREFACE

Promax srl has much experience (since 1991) about packaging industry.

The our technological functions, are optimized to packaging machines (Flow Packaging, Cartoning Machines, Case Packer and Plastic Bags Machines).

The our Hardware allows to resolve any request, the NGS (Next Generation System) with canopen and Ethercat, can be interfaced with a lot external products.



DEVELOPMENT TOOLS

Promax offers a Development tools with advanced technological functions

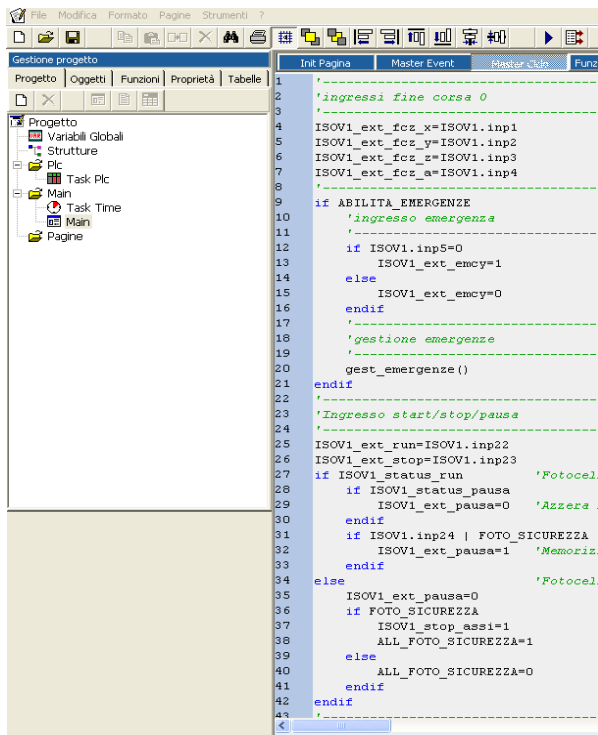
Promax offre un ambiente di sviluppo software con interfaccia windows completo di tante funzioni tecnologiche avanzate.

VTB

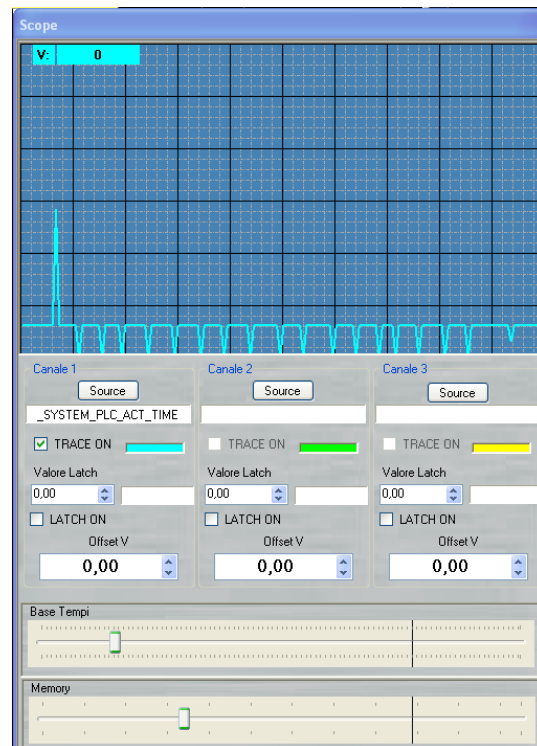
VTB is an integrated development environment for object-oriented programming on all platforms PROMAX. The environment contains within it all the tools required for developing applications in a simple and intuitive. VTB's philosophy is based on the latest technologies RAD (Rapid Application Development) that allows rapid application development by writing a small amount of code thanks to a huge library of objects and functions available technologies.

However, implementing the additional code can handle any type of industrial application. VTB integrates a high-level language like BASIC MOTION LADDER language evolved and a graphical management of PLC cycles faster (I / O). In addition to the CAN protocol ETHERCAT OPEN and can be managed RS232/RS485 serial protocols such as MODBUS. The configuration of an OPEN LINE CAN or EtherCAT is done in a simple and driven by defining any node as an object to make it available to 'VTB environment. Powerful axis movement allows the management of any type of machine using linear interpolation functions, CIRCULAR, LINEAR SPEED, POWER LINES, etc. CAM PROFILE. VTB set up for multi language simply by selecting the USE OF LANGUAGE by an internal variable.

A powerful DEBUG allows you to control the operation of applying a remote location.



```
1 'Ingressi fine corsa 0
2
3
4 ISOV1_ext_fcz_x=ISOV1.inp1
5 ISOV1_ext_fcz_y=ISOV1.inp2
6 ISOV1_ext_fcz_z=ISOV1.inp3
7 ISOV1_ext_fcz_a=ISOV1.inp4
8
9 if ABILITA_EMERGENZE
10 'ingresso emergenza
11
12 if ISOV1.inp5=0
13     ISOV1_ext_emcy=1
14 else
15     ISOV1_ext_emcy=0
16 endif
17 'gestione emergenze
18
19 gest_emergenze ()
20
21 endif
22
23 'Ingresso start/stop/pausa
24
25 ISOV1_ext_run=ISOV1.inp22
26 ISOV1_ext_stop=ISOV1.inp23
27 if ISOV1.status_run 'Fotocell
28     if ISOV1.status_pausa
29         ISOV1_ext_pausa=0 'Azzeraz
30     endif
31     if ISOV1.inp24 | FOTO_SICUREZZA
32         ISOV1_ext_pausa=1 'Memorizz
33     endif
34 else 'Fotocell
35     ISOV1_ext_pausa=0
36     if FOTO_SICUREZZA
37         ISOV1.stop_assei=1
38         ALL_FOTO_SICUREZZA=1
39     else
40         ALL_FOTO_SICUREZZA=0
41     endif
42 endif
43
44
```



DEBUG HIGH LEVEL WITH BREAK POINTS AND STEP BY STEP CODE

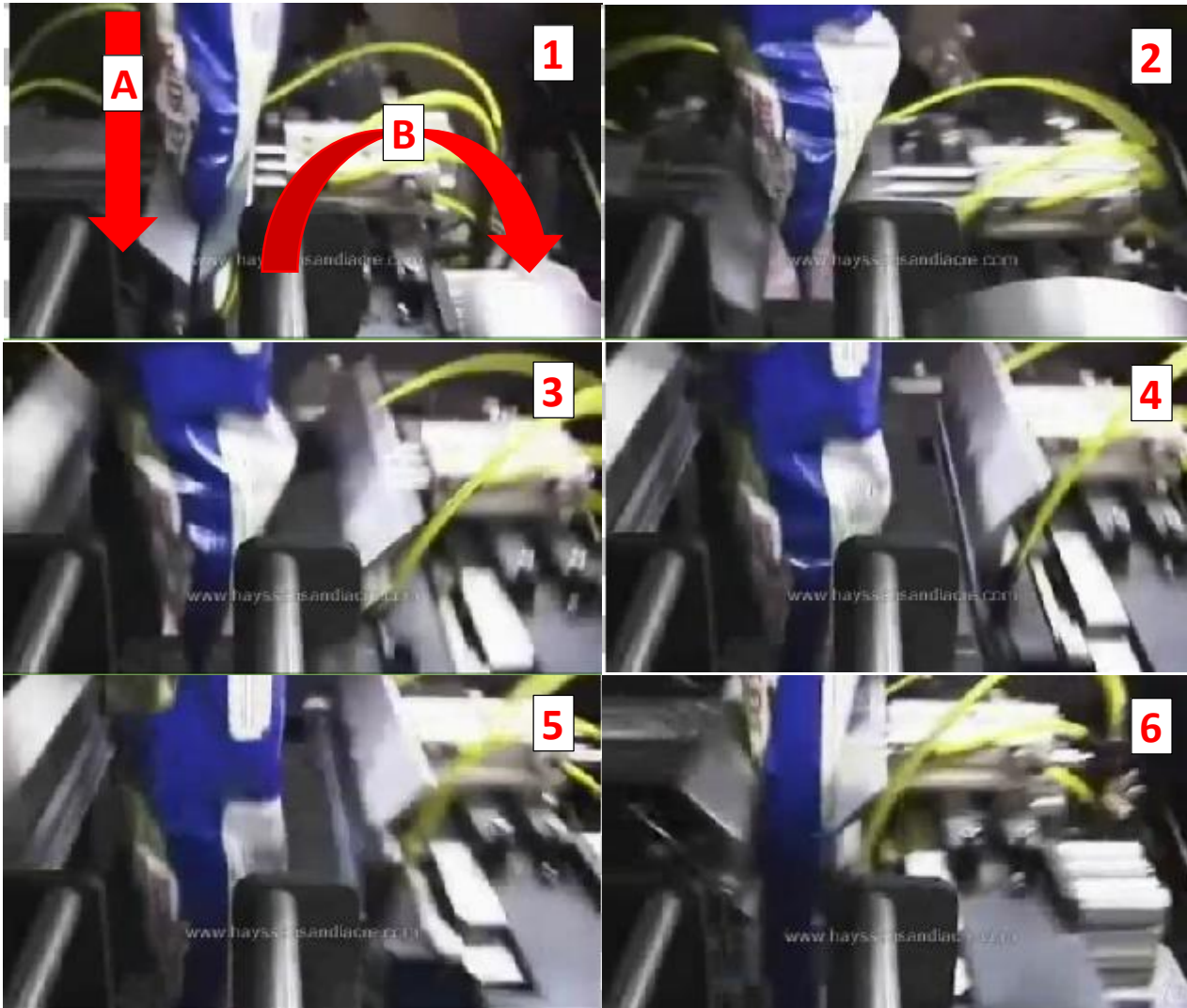
VTB creates a dll for Framework and Compact Framework (Windows CE devices), to simplify the user interface from a PC

TECHNOLOGICAL FUNCTIONS

WELD and CUT On fly without stop

The possibility to WELD and CUT on fly, without stop movement, increases the machinery production.

This function is available on all Hardware Promax, can be change the product length "On Fly", without restart the machine.

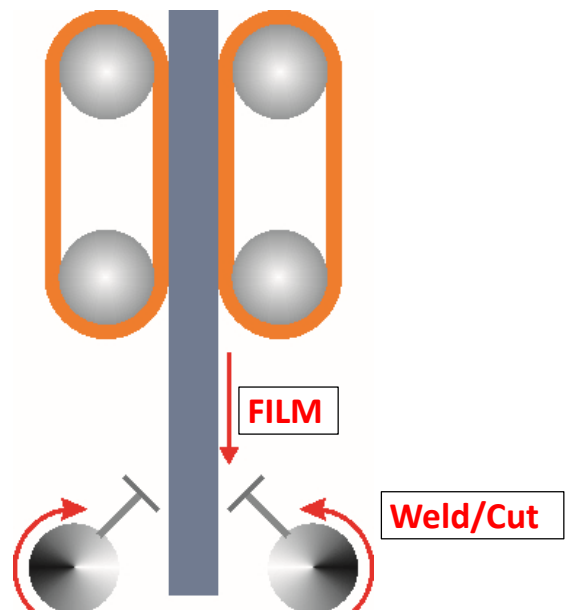


A – Continuous Plastic Film Movement

B – Continuous Rotatory Movement Weld and Cut

- 1) Contact phase to Film and Weld/Cut
- 2) Separation phase
- 3) Separation phase
- 4) Maximum Separation phase
- 5) Weld/Cut Approach phase
- 6) New Contact phase to Film and Weld/Cut

The welding clamp phased is automatically controlled, and resetting after any stop machine



ELECTRONIC CAM

The electronic CAM (eCAM) replaces the traditional mechanical CAM

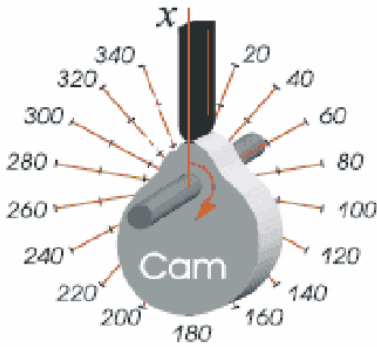
The eCAMs are more flexible because these can be changed by software parameters, and can be adapted immediately to actual work type.

The eCAMs are used in the some type of packaging machines (ex:Cartoning machines).

The eCAM can be programmed with any type of curve, and can use any type of master source external (ex: encoder, Brushless motor etc.) or internal to CNC (ex: virtual encoder)

The eCAM can be applied to simple digital outputs, in this mode is possible control the START angle (ON Digital Outputs) and END angle (OFF Digital Outputs)

Can be managed many eCAM (it depend by CNC memory)



eCAM Advantages

- Great flexibility
- Curve modelling
- Curve editor by PC
- Possibility to import curve data ex: by Excel
- Possibility to use a master virtual encoder internal to CNC
- High functionality
- Possibility to change immediately curve points

ELECTRONIC GEAR

The Electronic Gear (eGEAR), replaces and simplifies, the traditional mechanical parts.

The advantage is that if possible change immediately the mechanical ratio, also during the work.

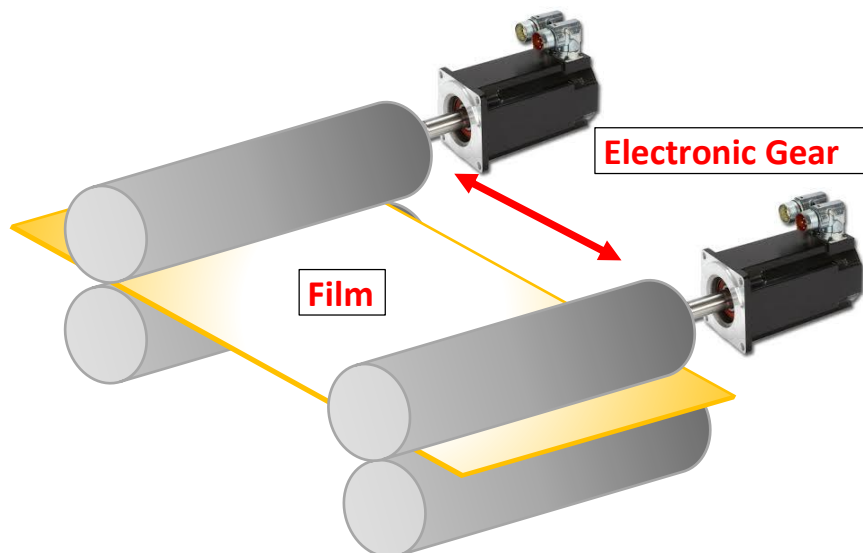
It is many used, in some type of packaging machines (ex: Plastic Bags)

How for the eCAM, the master source can be used external to CNC (ex: encoder, Brushless motor etc.) or internal to CNC (Virtual encoder)



eGEAR Advantages

- Great flexibility
- Possibility to change the ratio also during the work
- Simple use
- Possibility to use a master virtual encoder internal to CNC
- High precision
- Simplification to mechanical parts



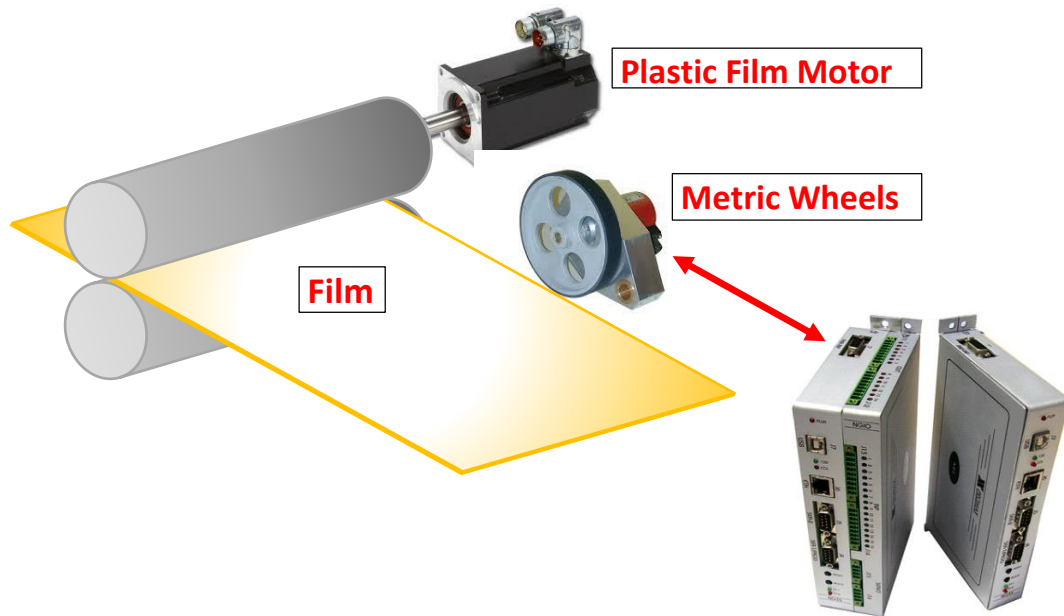
EXTERNAL ENCODER

This technological function, allows to read a external encoder (metric wheels – generally inserted on top of the plastic film) for real measurement of the plastic film.

Normally this function is used to packaging machines with START STOP FILM movement.

The CNC reads the external encoder and corrects the FILM shift.

The correction is in real time and not decreases the speed machine.



External encoder Advantages

- High precision
- Without the MARKER

MARKER

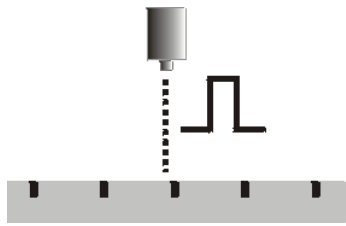
This function is very important for packaging machines.

In the machines where the speed is high (pack/min) is necessary a continuous movement to plastic film (without start/stop) during the phase Weld and Cut.

In this case, for have the same length to pack, is necessary use the MARKER, it is a sign in the plastic film, to constant and precise interval.

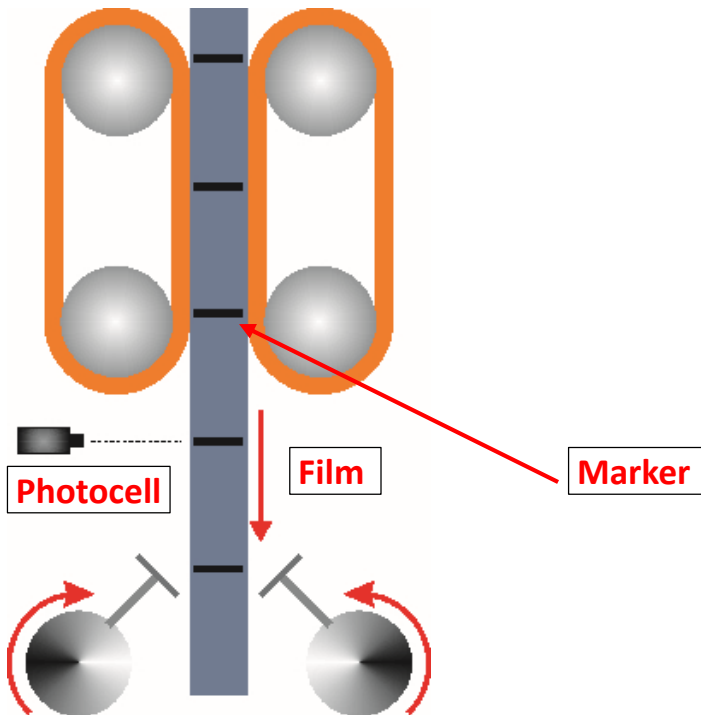
Trough a high speed input to CNC and a external photocell, the MARKER is read and the plastic film is positioned in precise mode.

Internal algorithms to CNC, are can manipulate the MARKER signal (shift position), for adapt to pack.



Marker Advantages

- High precision to position
- High speed to pack/min
- Simple use
- Not necessity to external encoder



Typologies of packaging management

Every typology of packing, uses a special technological functions.

Following are listed several packaging typology management to Promax CNC.

Flow Packaging

- High speed machines for various materials
- Packaging without start/stop plastic Film
- Vertical and Horizontal machines
- Weld and Cut controlled automatically to pack length and pack/min speed
- Use of MARKER for precise film position
- Use a external encoder for precise film position



Cartoning Machines

- Use a cartons boxes for various materials
- Use eCAM
- Use eGEAR



Case Packer

- Horizontal or vertical filling
- Use eCAM
- Use eGEAR



Plastic Bags

This is a special packaging typology, but the work is the same to traditional packaging.

These machines produce the plastic bags for various uses.

The principal parts, are the plastic film movement and the weld and cut control.

The Film is positioned under the Weld/Cut at speed calculated automatically on number pack/min.

The plastic film movement is in Start/Stop mode, but synchronous with Weld/Cut.

- Machines with high performances
- Weld and Cut controlled on pack length and pack/min
- Use of Marker for precise film position.
- Use eCAM
- Use eGEAR



Promax Hardware

Promax uses two hardware tipology for packaging machines.

NGMEVO

NG35

NGMEVO

Used for machines with *medium/low* performances, and for the following packaging tipologies:

- Flow Packaging
- Cartoning machines
- Case packer

Axes management

- *Pulse/Direction*
- *CanOpen*

Features

- *Limited PLC cycle*
- *HMI link with Ethernet port 10/100 Mb*
- *MARKER reading “Not high speed”*
- *Capability to use a external encoder*
- *Max Axes Number - 6*
- *Limited eCAM Number (typically 1-2)*
- *Limited eGEAR Number*

NG35

Used for machines with *medium/high* performances, and for the following packaging tipologies:

- Flow Packaging
- Cartoning machines
- Case packer
- Plastic Bags

Axes management

- *Pulse/Direction*
- *CanOpen*
- *Ethercat*
- *+/-10V*

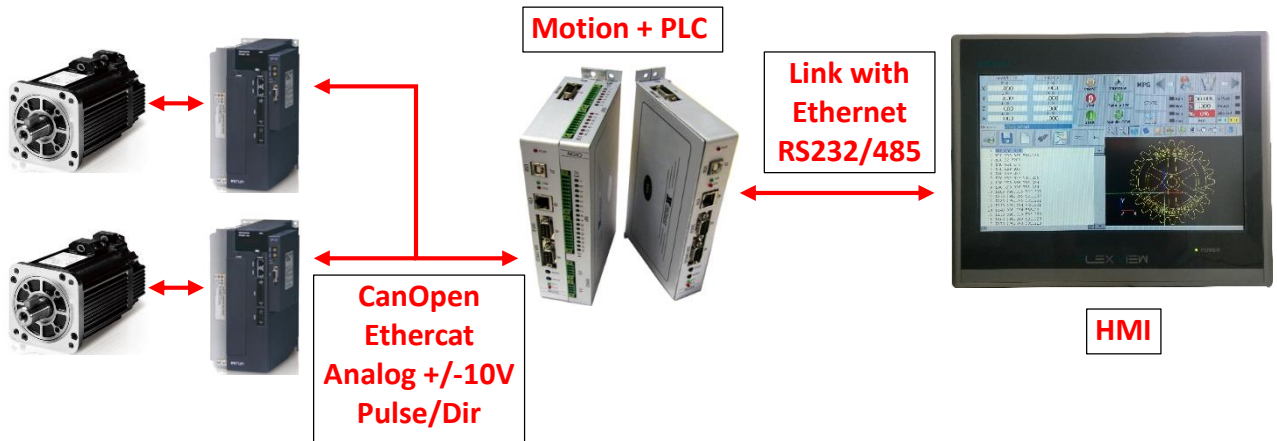
Features

- *Unlimited PLC cycle*
- *HMI link with Ethernet port 10/100 Mb*
- *MARKER reading “high speed”*
- *Capability to use a external encoder*
- *Max Axes Number - 64*
- *Unlimited eCAM Number*
- *Unlimited eGEAR Number*

SOLUTIONS

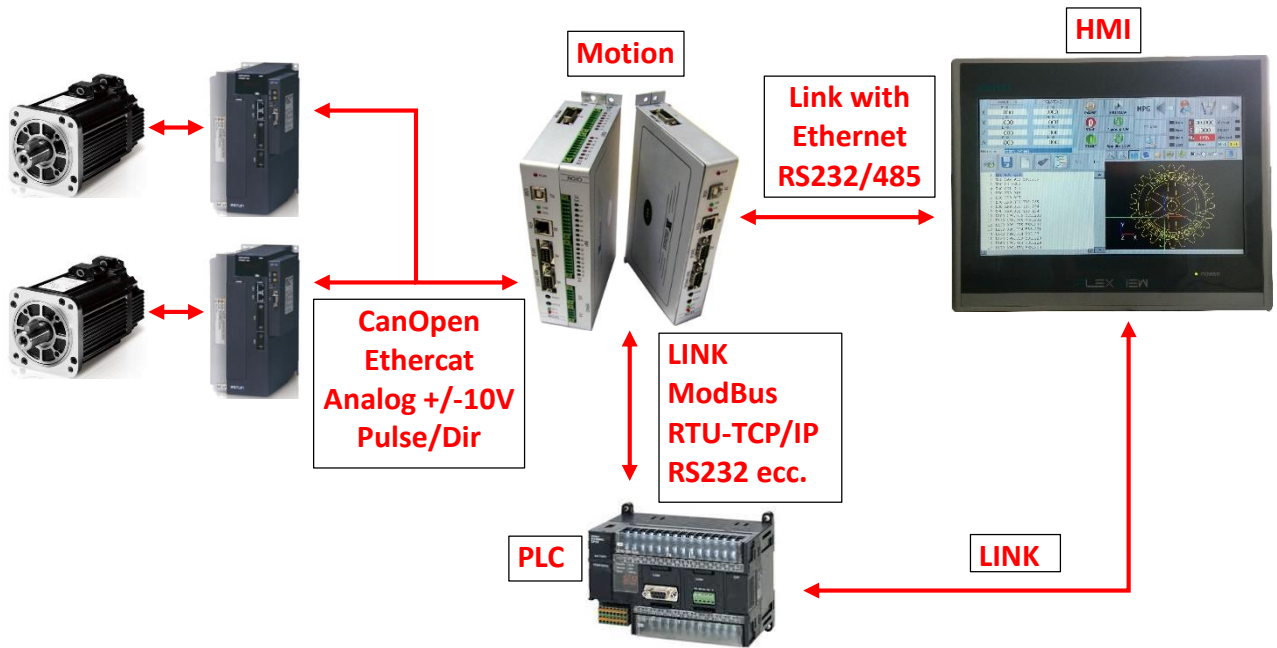
1) Solution

PLC and Motion integrated in the NG35/NGMEVO



2) Solution

PLC separated, Motion managed in the NG35/NGMEVO



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