

**Mechatronic department**

**file:**  
**SMART PU – Undercarriage Levelling**  
**machine management**

**tuorpu**

# SMART PU UI . MACHINE MANAGEMENT



An Undercarriage Levelling dramatically reduce setup time of any machine with electrohydraulic jacks with. Hydraulic leveling system can be applied to any machine with undercarriage, including but not limited to Tower Lights and PLE

A machine consist of mechanic, hydraulic and electrical parts including:

- Frame
- Hydraulic Jacks
- Battery
- Equipment
- Valves
- AC or DC Hydraulic power pack
- One or more electronic controllers
- Control Panel

Using our patented SMART POWER UNIT technology, Hydronit offers a “one-stop-shop” solution for Electric Undercarriage Levelling.

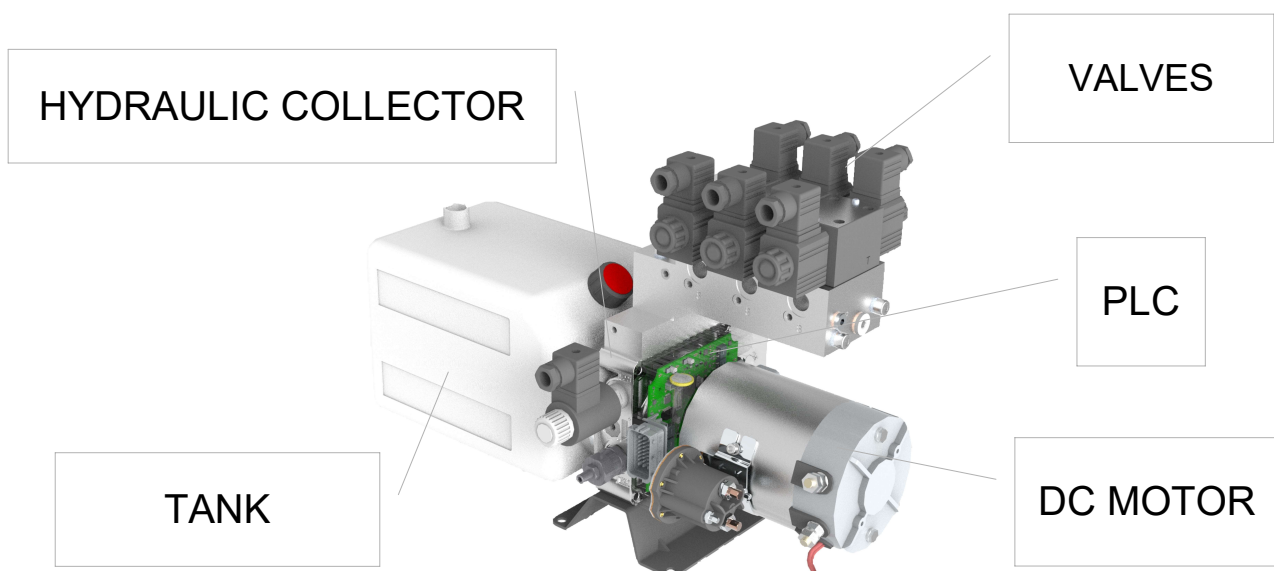
the solution is including:

- SMART POWER UNIT
  - Hydraulic power pack
  - Embedded SIL 2 programmable PLC
  - Embedded Sensors (see data sheet)
  - WiFi – CAN – Ethernet
- A touchscreen display (optional) – Ethernet
- IDE (development and maintenance environment)



One SMART POWER UNIT is able to fully manage one lift from both hydraulic and electric point of view. It allows a consistent reduction of the TCO of the machine reducing assembly time since several sensors are embedded. It Integrates a wide number of I/O which can direct-drive valves both on-off or proportional.

The Smart Power Unit is programmable by CoDeSys



# SMART PU U.I. MACHINE MANAGEMENT



Platform levelling for vehicles is normally developed on a principle of horizontal alignment:

An ideal self-levelling platform is able to compensate for inclination or irregularity of rough terrain and inclined slopes. It is also rigid after performing the levelling motion, so external forces can be applied without losing the horizontal orientation.

SPU (smart power unit) works with the master (inclinometer) and drives the 4 hydraulic cylinders.

Electronic on board manages the cycle (lifting and lowering of the cylinders) to reduce inclination and to reach the levelling of the platform through Directional valves.

A Smart Power Unit is equipped with all the hydraulic, electric and electronic features required to fully manage a complete complex machine (see full data sheet). The electronic and mechanic architecture is developed in order to meet SIL 2 (safety integrity level) as per EN61508 for or PLC as per EN13849

The smart Power Unit is ready to operate up to 48VDC, with the related cable harness downsizing (and cost saving)

The smart power unit is programmable with



In a Undercarriage Levelling device, one SMART PU can manage the complete machine, with the following features:

- drive the complete jacks' hydraulics thanks to electric motor, pump and embedded valves. The hydraulic scheme correspond with the strictly necessary circuit to lift and lower the vehicle and the vertical mast.
- The same electronic controller can manage proportional valves
- Detects load, thanks to embedded pressure sensor
- Detect actual temperature of the fluid (optional)
- Up to 12 embedded sensors/buttons for the machine operation, such as UP/DOWN and Emergency switches, end strokes proximity switches, machine ground pressure, battery status and so on.



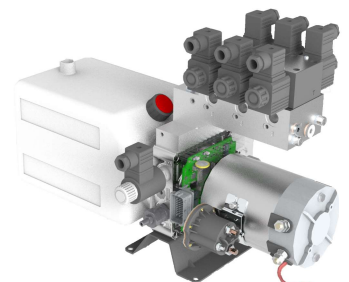
The Embedded Electronic controller allow also the following features:

- preventive maintenance and data logging (for future rental options)
- connection with a smartphone (for example machine control through app)

HMI (optional):

The Smart-Power-Unit range can be completed by a touchscreen display which is connected to the PLC through a CANOPEN network.

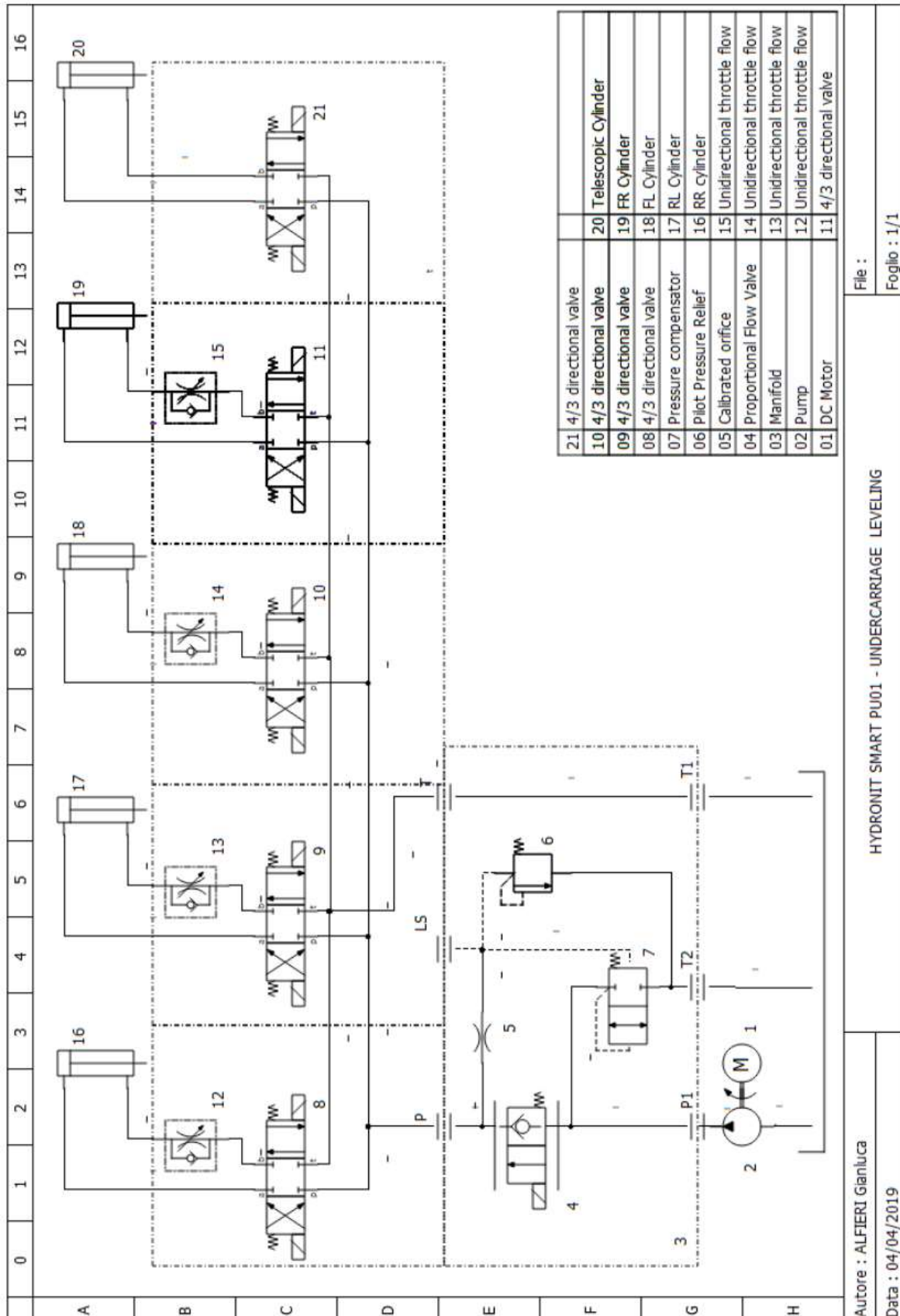
Our Touchscreens are programmable through a proprietary IDE based on QT which is open-source.



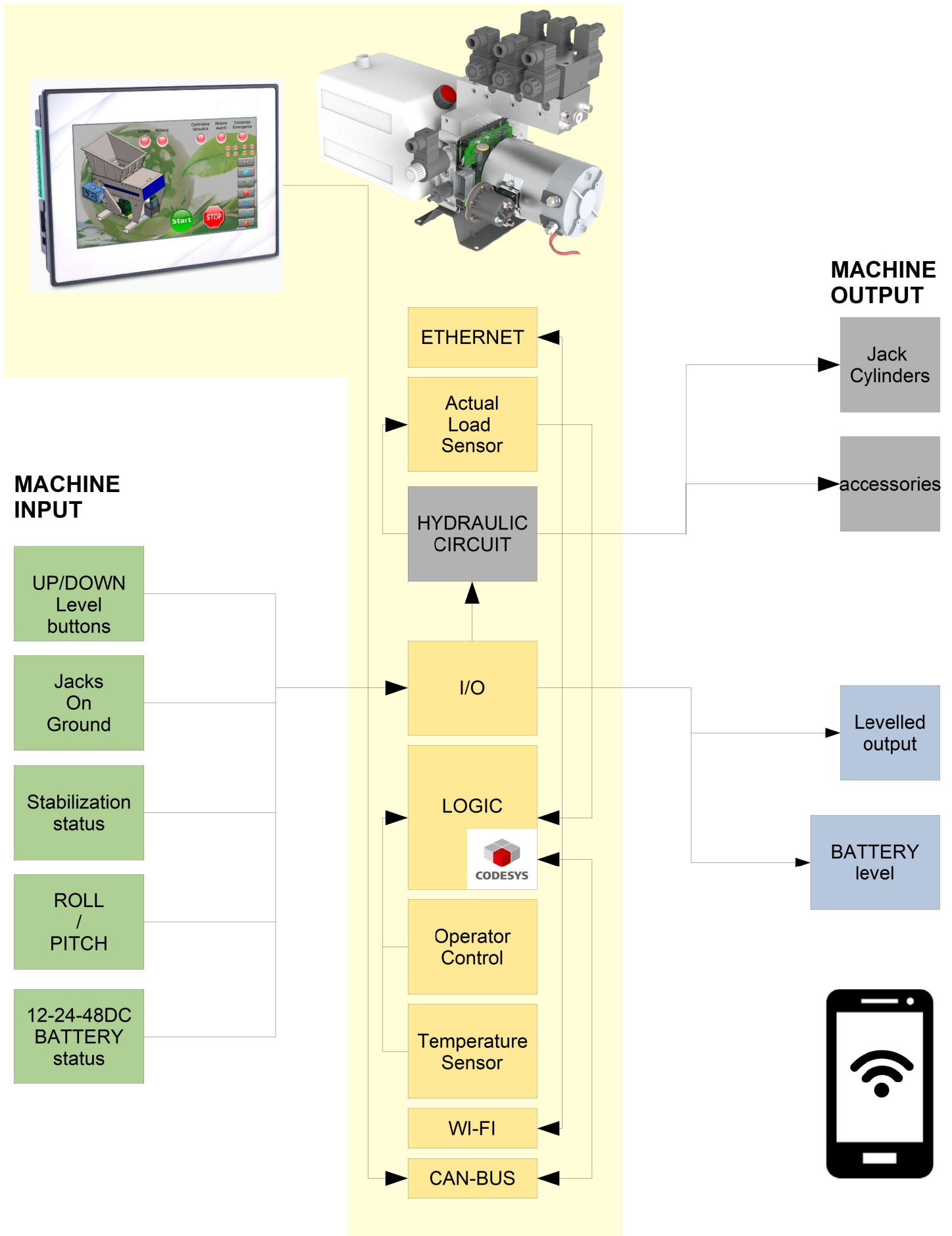
SMART PU UI , three speed drive

## HYDRAULIC SCHEME of the SPU Undercarriage Levelling

the scheme allow several functions: Lift/Lower the jacks and the eventually other hydraulic actuators on the vehicle.



## SMART PU UI BLOCK DIAGRAM



# Hydronit®







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