



**Mechatronic department**

**file:**

**SMART PU – SP01**

**Snowplow machine management**

**Техническое описание**

# SMART PU SP MACHINE MANAGEMENT



An Snowplow is a removable equipment for Service Truck in Road Maintenance. Its installation and removal

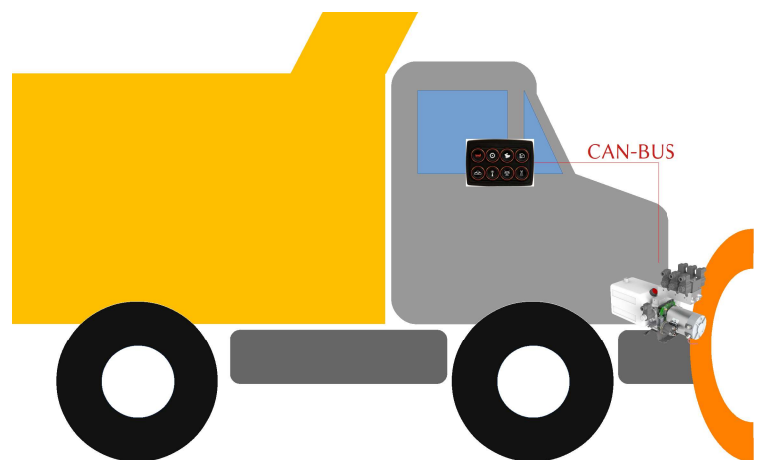
It consist of an hydraulic and electrical system that can include:

- Frame
- Articulated Hydraulic Blade
- DC Hydraulic power pack with directional valves
- Cable Harness
- In-cabin control panel / joystick

Using our patented SMART POWER UNIT technology Hydronit offers a “one-stop-shop” solution for Snowplow.

The Solution consist pf:

- SMART POWER UNIT
  - Hydraulic power pack for all hydraulic movements
  - Embedded SIL 2 programmable PLC
  - Embedded Sensors (see data sheet)
  - WiFi – CAN – Ethernet port
- Control Panels
  - Wired Touchscreen or
  - Wired CAN-BUS Keyboard
- Optional:
  - Spreader control
  - Fleet Management\*

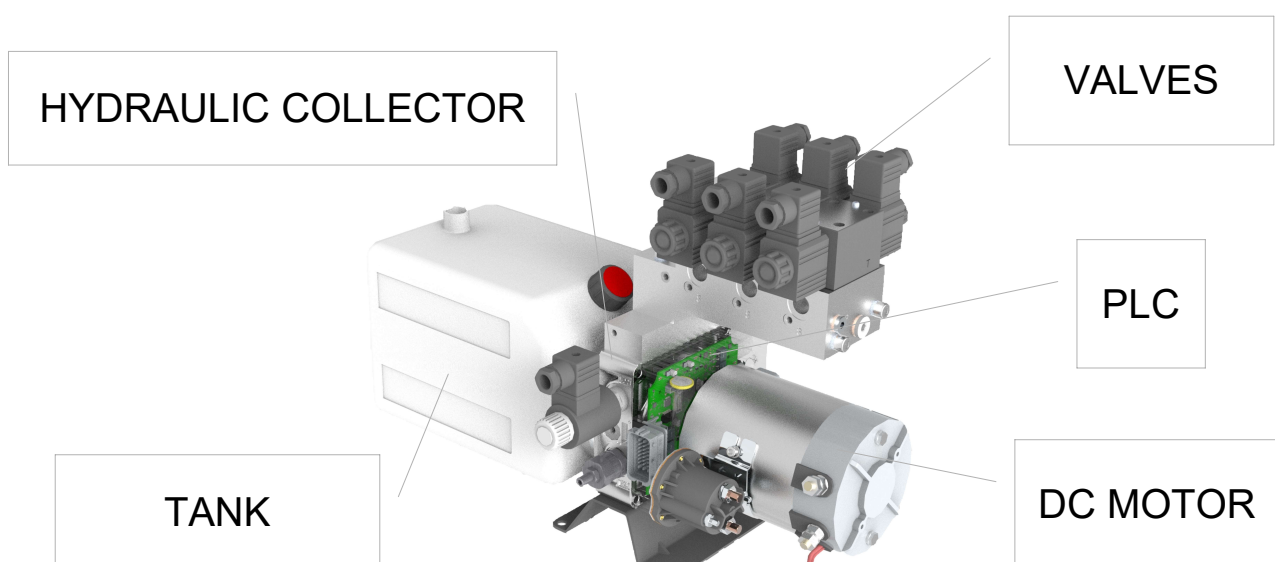


Where allowed by legislation:

- Wireless Control through Android smartphone APP

One SMART POWER UNIT is able to fully manage a machine 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 the manufacturers with



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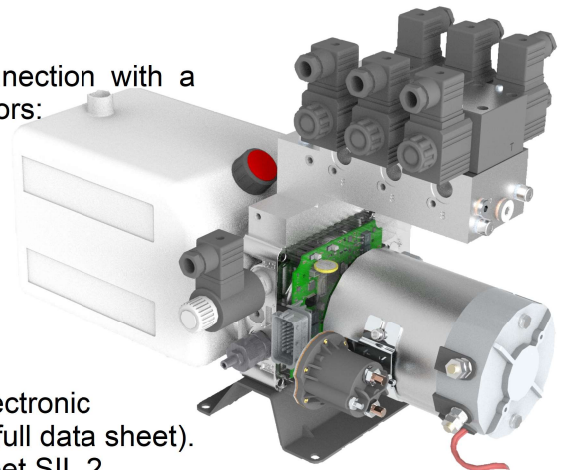


Snowplow are normally powered by a conventional DC Hydraulic power pack driven by a control panel located in cabin. The connection is normally done through a set of multipole bulkhead connectors. Installation requires several hours of on-site work and uneasy modifications to the truck cabin.

In the vehicle cabin a control panel remotely controls the electromechanic system, which requires at least one wire each function + other 3 wires for power. A fully equipped snowplow can have up to 20 poles cable, which requires hard work to be driven from inside the cabin to the snowplow and also requires chassis modification and expansive multiway bulkhead connectors. Moreover, multipole connectors are bulky and expansive.

SPU manages all the snowplow functions through CAN-BUS connection with a CAN-BUS control panel using just 4 poles cable and 4 poles connectors:

- Minor chassis modification = less manufacturing costs
- Higher serviceability
- Lower cables and connectors cost
- Smaller Design
- Wireless Diagnostic features.



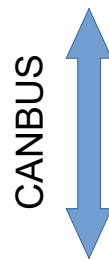
A Smart Power Unit is equipped with all the hydraulic, electric and electronic features required to fully manage a complete complex machine (see full data sheet). The electronic and mechanic architecture is developed in order to meet SIL 2 (safety integrity level) as per EN61508 for or PLC as per EN13849. The smart Power Unit is ready to operate 48VDC, with the related cable harness downsizing (and cost saving).

The smart power unit is programmable with



In a Snowplow, one SMART PU can manage the complete machine, with the following features:

- drive the complete hydraulics thanks to electric motor, pump and embedded valves. The hydraulic scheme corresponds 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.
- preventive maintenance and data logging (for future rental options)
- connection with a smartphone (for example machine control through app)



HMI:

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.

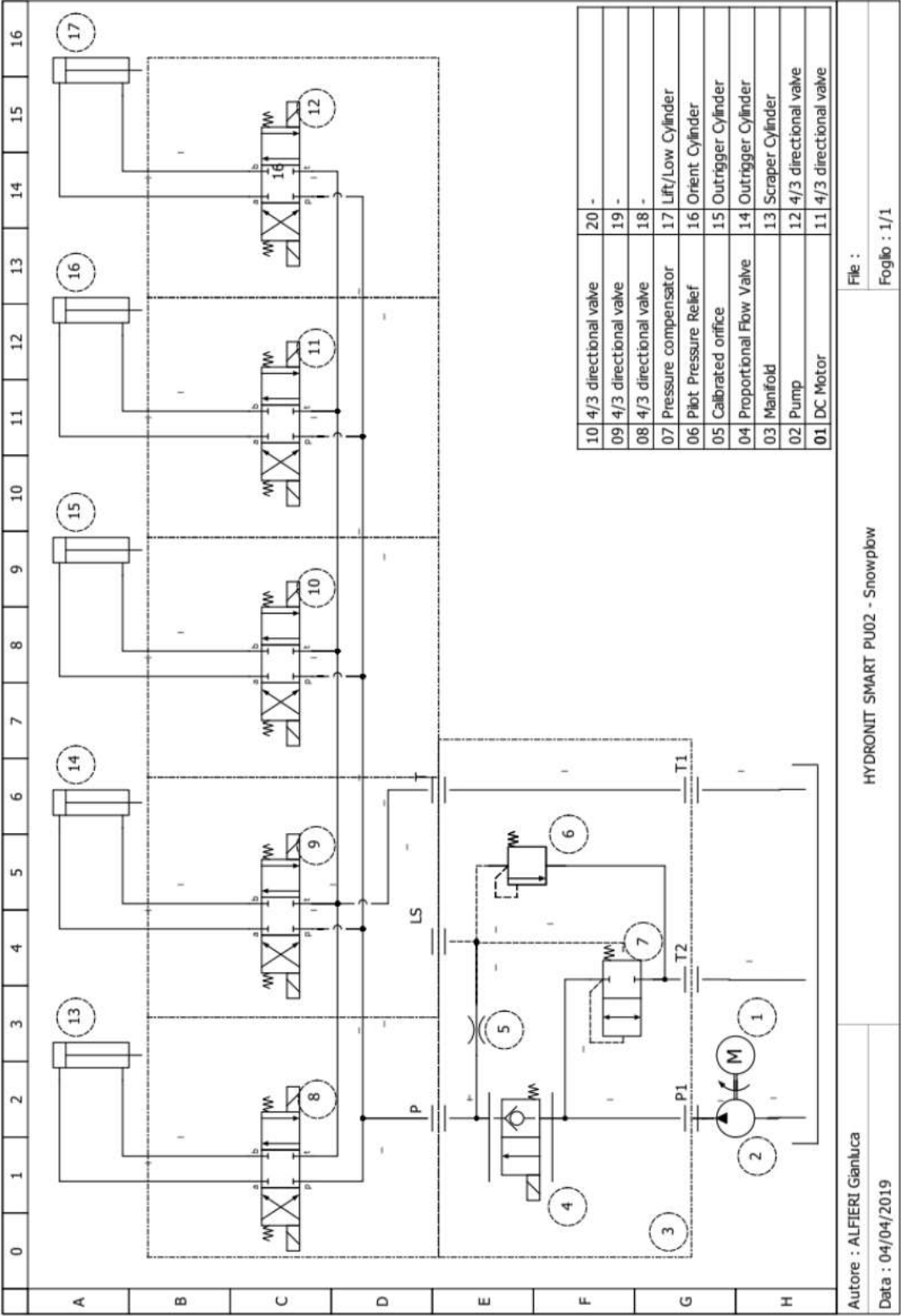


SMART PU SP three speed drive

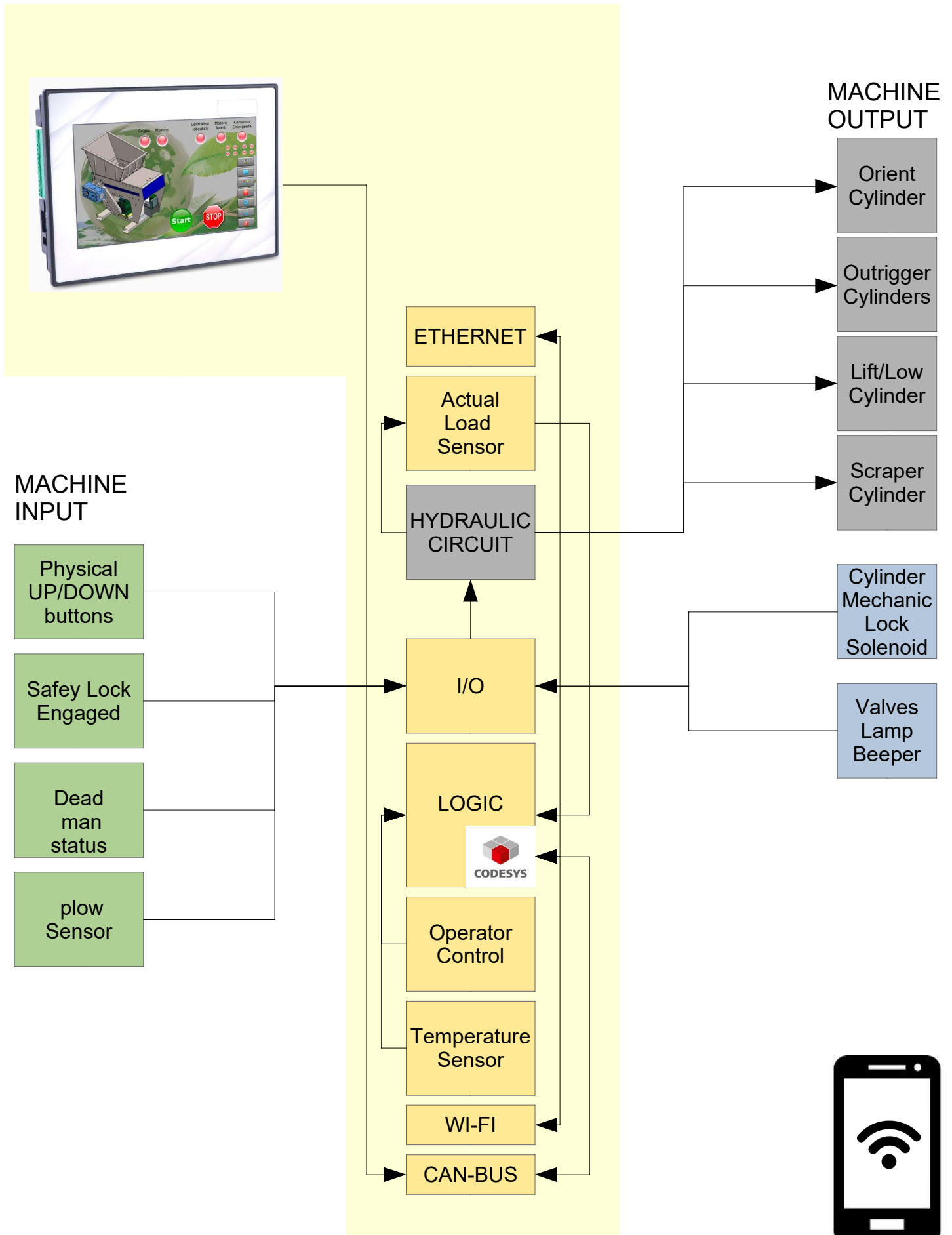


SPU Snowplow Hydraulic Scheme

the scheme allow the following functions: Scraper, Outrigger, Orient and Lift/Low cylinders.

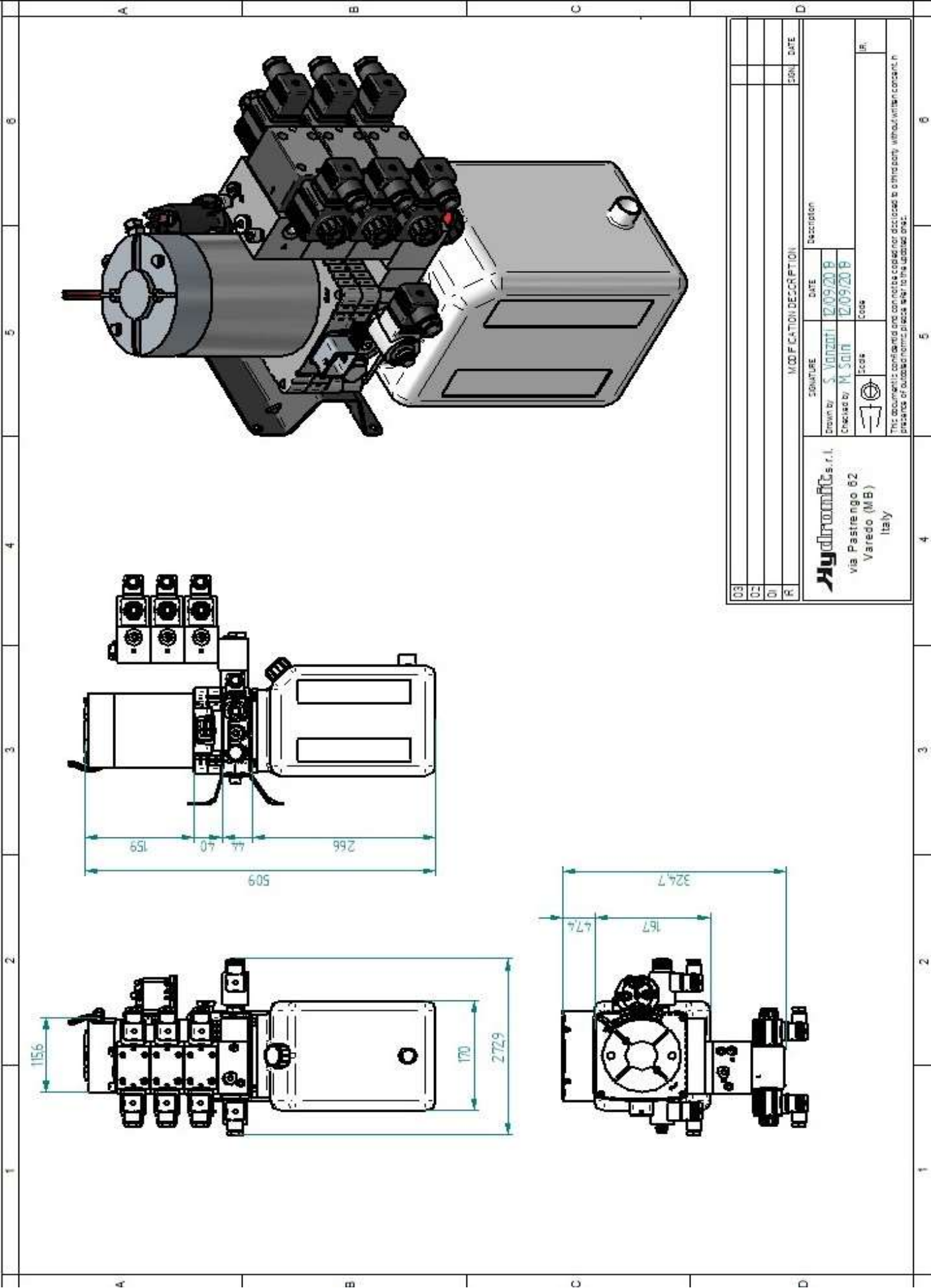


## SMART PU SP BLOCK UNIT





SMART PU TTC OVERALL DIMENSIONS





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