

L0Z3*** Hydraulic Manifold Flameproof-Certified with in-built electronic control and monitoring (7 Shooter)

- Requires ONLY ONE Control Cable
- Individual flow control and over pressure limit function for each spool
- Solenoids Don't Leak or Fill with Water (Rated to 315 Bar Continuous)
- Safety Isolation Valve - Built in and Automatically Controlled by Firmware to Maintain Safety
- Spool Safety - Built Into Product Firmware
- Pressure monitoring for internal and external functions (No I/O required)
- Temperature Monitoring - Internal Oil Temperature Sensor (No I/O required)
- Replacing a Spool (eg After Swarf Ingestion) and Self Calibration take less than 3 Minutes
- Spool Self Diagnostic Built into Firmware Commanded from Remote Exercises all Circuits Without Oil Pressure
- HBox Diagnostic Road case available

Customised to suit a wide range of applications:

- Custom designed hose-adaptor plate to suit different applications
- Choice between open-centre type and close-centre type DCV spool valves
- Can be supplied with or without manifold plates
- Manifold plates are adaptable for all popular OEM designs
- Built in pilot filter (built into adaptor plate as an option)

The manifold provides seven (7) proportional spool valves for controlling hydraulic cylinders, actuators or motors. Two (2) spools are configured for 180 litres / minute flow output while the remaining spools each deliver 90 litres / minute. The manifold also provides four (4) pilot function outputs to deliver low pressure control signals to machine functions (3 of these provide on/off 35 bar signal and the remaining output can be proportionally controlled between 0 and 20 bar. Five (5) general purpose pressure monitoring ports allow external oil pressures to be monitored.

The internal electronics module continuously monitors the position of each spool to prevent unplanned machine movement if a stuck spool condition occurs. In the case of a stuck spool (either stuck open or stuck closed), the on-board electronics automatically closes the internal isolation valve to prevent unwanted oil flow to the machine actuator.

A CAN field-bus interface supports real-time control and monitoring by a host control system. The simplicity of control and monitoring – and the reduction in hydraulic connections and components – makes the “7UP” a compelling, cost-effective alternative to traditional sandwich-type valves on mobile mining machinery.

Operating successfully for over a decade in Australian and South African mining industry with more than 60 units in operation as of Dec 2019.

Proven Record on 12CM & MB600 Series Continuous Miner & Bolter Miner.

Pempek warrants and supports the complete package through its global partnerships.



Standards Compliance

- IEC 60079 (Ex d)
- AS/NZS 2671
- MDG41
- IEC 61508 SIL 2

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Specifications

General

Parameter	Value
Type	Flameproof-protected hydraulic manifold with integrated electronic control
Explosion-protection	IEC60079-1 – Flameproof – Ex d Group I
Functional Safety	IEC61508-compliant SIL2 Safety Functions Spool valves continuously monitored for stuck spool conditions Isolation element removes fluid power if spool is detected as stuck
Operating Temperature	-10°C to +50°C
Environmental Protection	IP66/67
Mass	220 kilograms

Electrical

Parameter	Value
Supply	24-volts D.C. +/- 10% (200 Watts maximum)
Control Solenoids	15 x Proportional Pressure Reducing Valves (0 - 540 mA each) 4 x On/Off Pilot Function Spool Valves (0 – 700 mA each)
Communications	CAN 2.0B – Copper Twisted Pair (500 kbps)

Hydraulic

Parameter	Value
External Functions (Auto Isolation Protected)	2 x Proportional 3-position Spool Valves (180 litres/minute) 5 x Proportional 3-position Spool Valves (90 litres/minute)
External Functions (Not Isolation Protected)	3 x Spool-type On/Off (Regulated to 35 BAR / Max. Flow = 10 litres/minute) 1 x Proportional Pilot Function Outputs (0 to 20 bar / Max. Flow = 3 litres/minute)
Hydraulic Monitoring	1 x Temperature Sensor (measures internal tank line oil temperature) 5 x General Purpose Pressure Monitoring Ports (0 – 400 bar Range)
Internal Functions	1 x Dual Isolation Element (700 litres / min) – Controlled by internal electronics 1 x Internal Pilot Pressure Transducer 1 x Inlet System Pressure Transducer (monitors before isolation element) 1 x Isolated System Pressure Transducer (monitors after isolation element)
Pilot Pressure Rails	Internal Signal Control: 35 bar (internally generated)
Working Pressure	300 bar nominal / 315 bar maximum
Oil Temperature	-10°C to +70°C
Hydraulic Fluid	Mineral Oil
Filtration Requirements	ISO 4406:1999, class 18/16/13 Recommended Filtration Grade: $\beta_{6..10} \geq 75$

Safety Functions

Function	Demand Mode	Safety Integrity Level (SIL)
Oil Detection in Electronics Cavity	LOW	SIL 2
Pressure Transducer Monitoring	HIGH	SIL 2
Prevent Unplanned Solenoid Activation	HIGH	SIL 2
Prevent Unplanned Spool Movement	HIGH	SIL 2
Stuck Spool Protection	LOW	SIL 2
Not-Responding Spool Protection	LOW	SIL 2
Over-extended Spool Protection	LOW	SIL 2

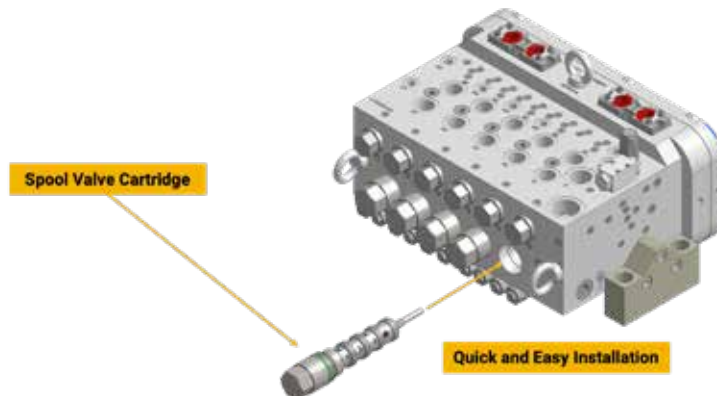
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Dimensions



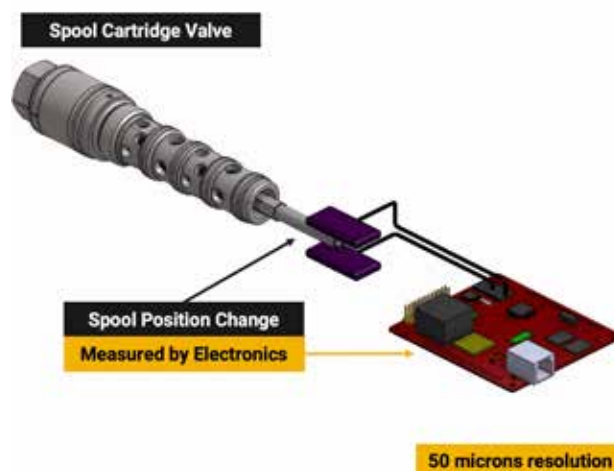
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Replacement Spool - Quick and Easy Installation

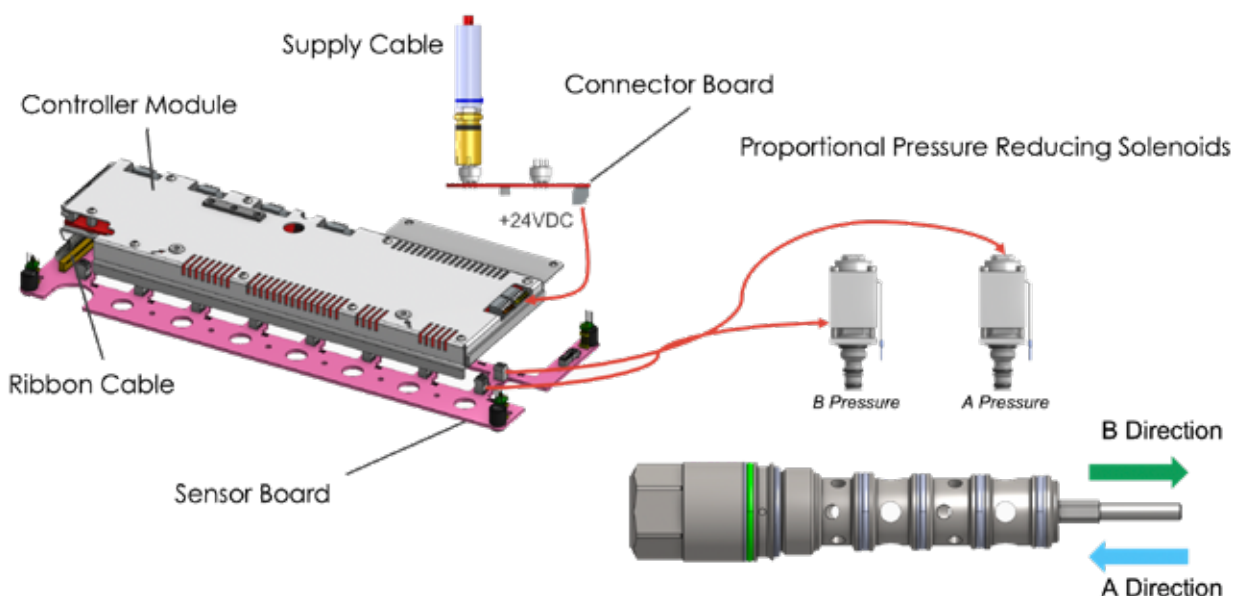


Spool Position Sensing

- Dual Sensors (Redundancy)
- Measures down to 50 microns
- Real-time

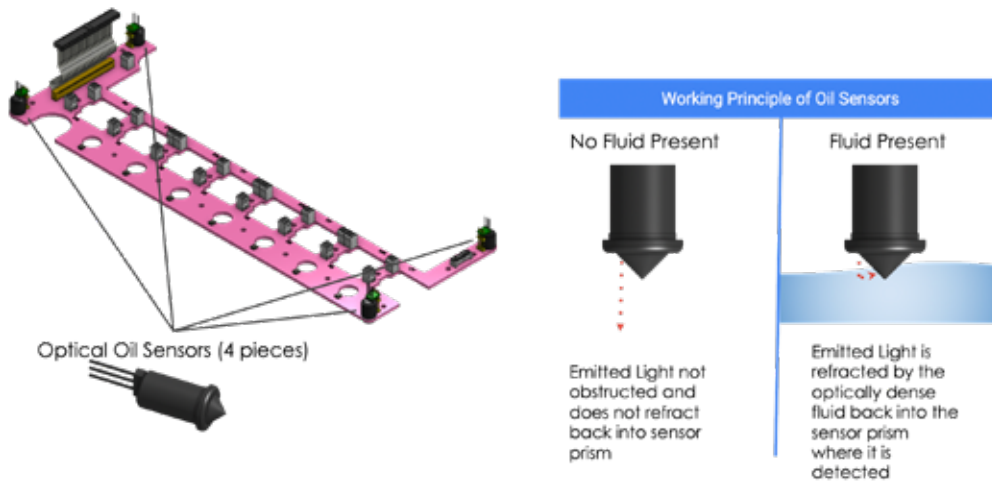


Proportional Spool Control



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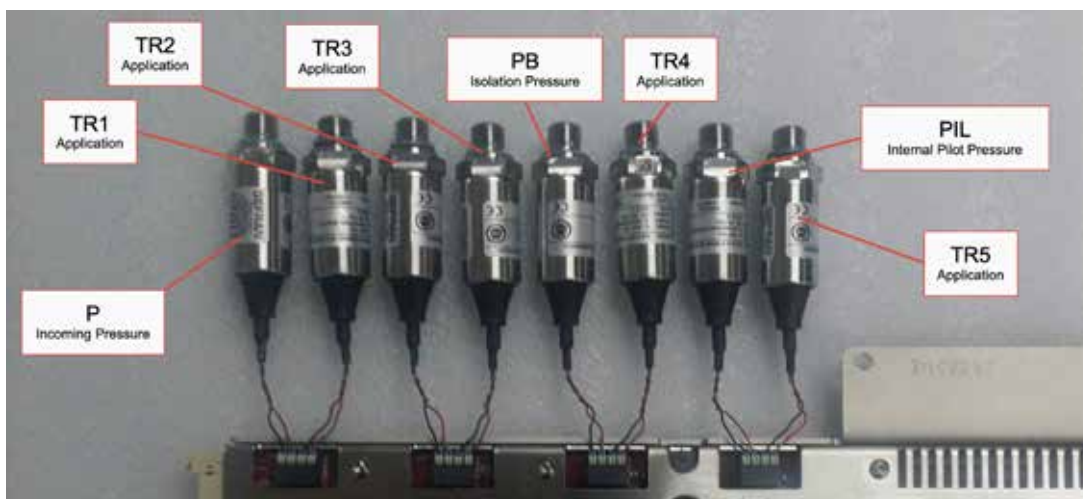
Oil Sensors



Internal Wiring



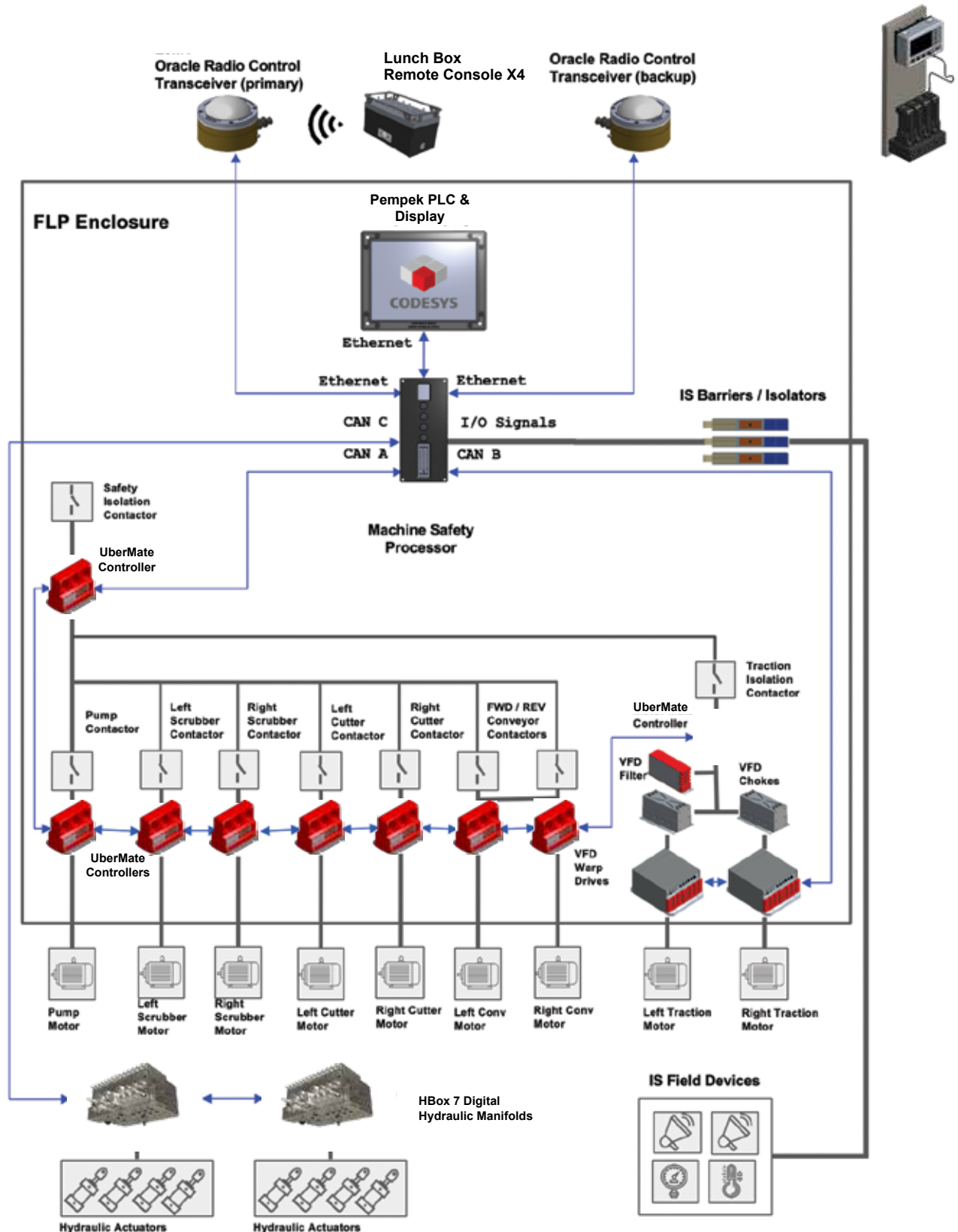
Pressure Transducers



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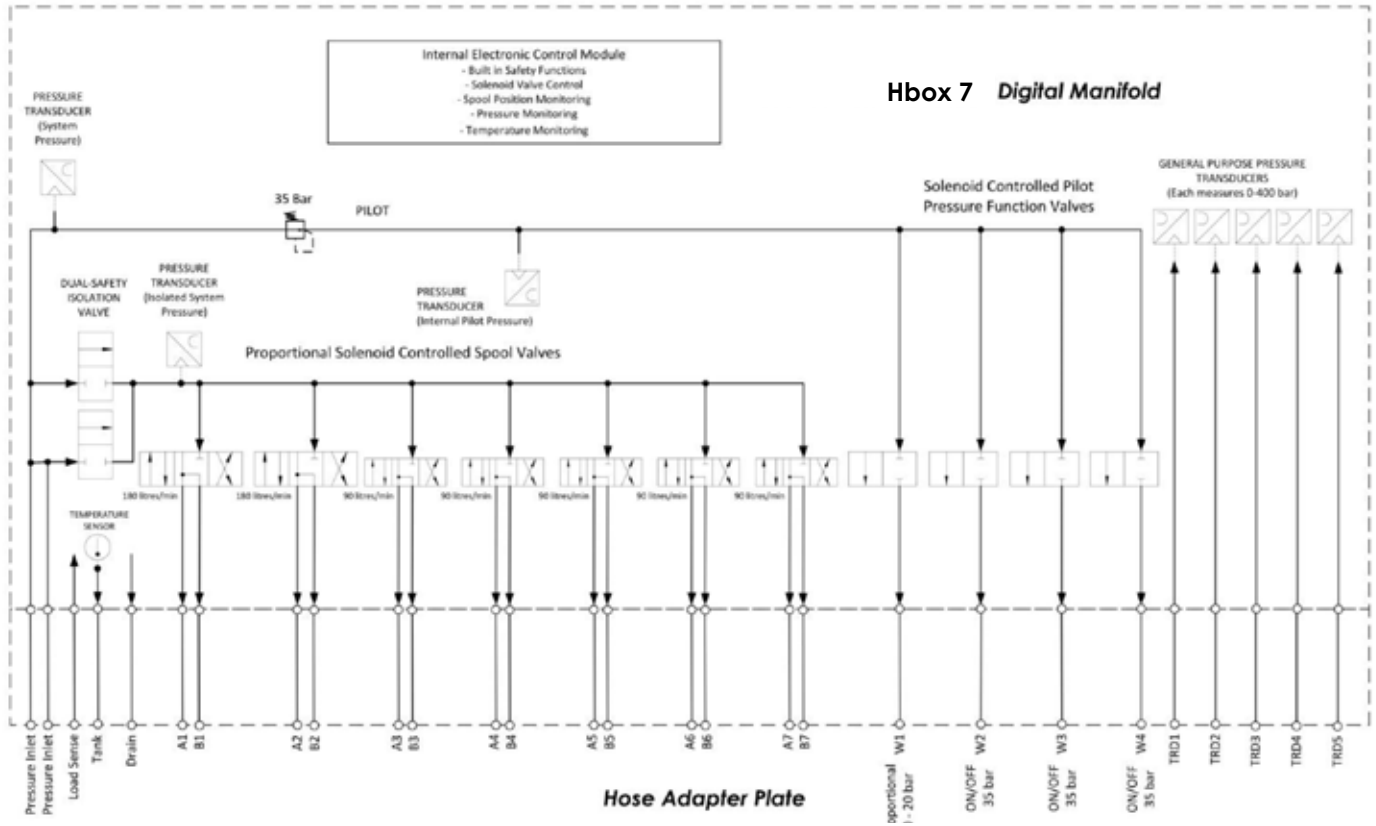
Systems Architecture Example Continuous Miner System (12CM Class / AC Traction)

Remote Console sharing
and data upload station.



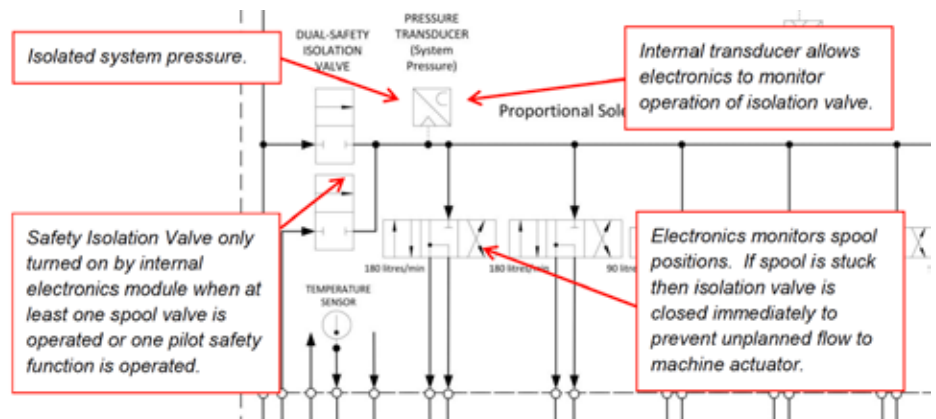
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Block Diagram



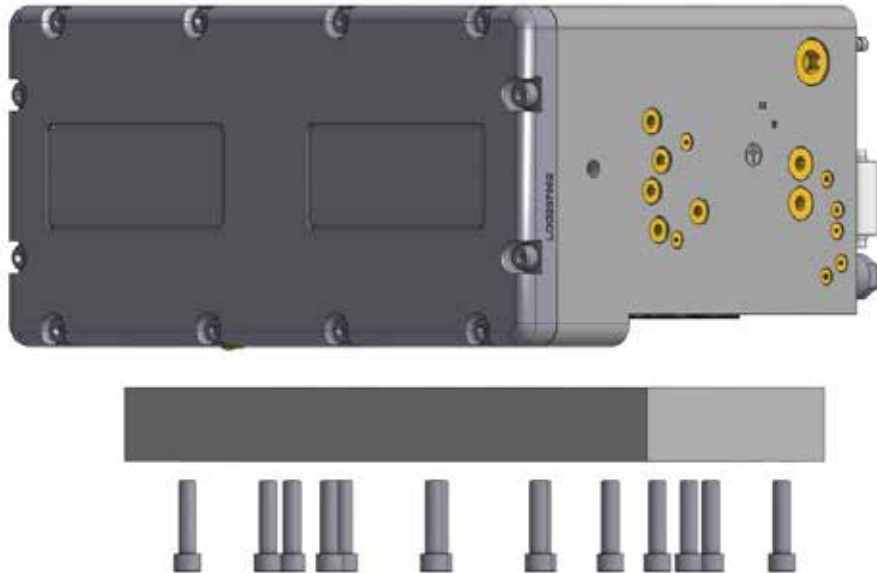
Spool Safety is Built In!

- Built in Safety Functions
- Solenoid Valve Control
- Spool Position Monitoring
- Pressure Monitoring
- Temperature Monitoring
- No Unplanned Movements

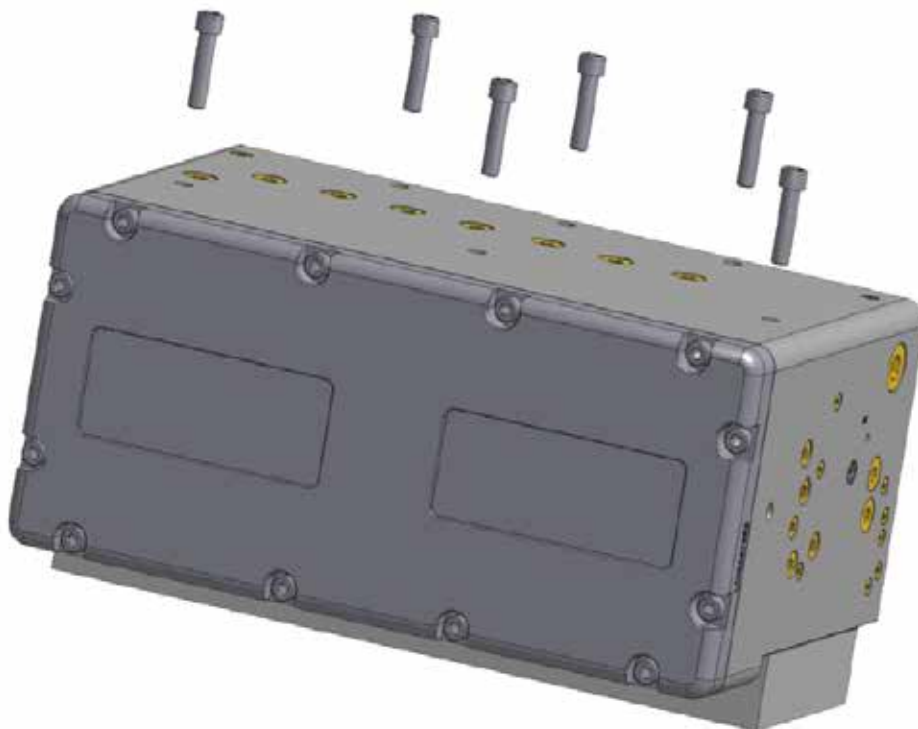


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Hose Adapter Plate Installation



Machine Mounting Concept



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Hydraulic and Electrical Connections

