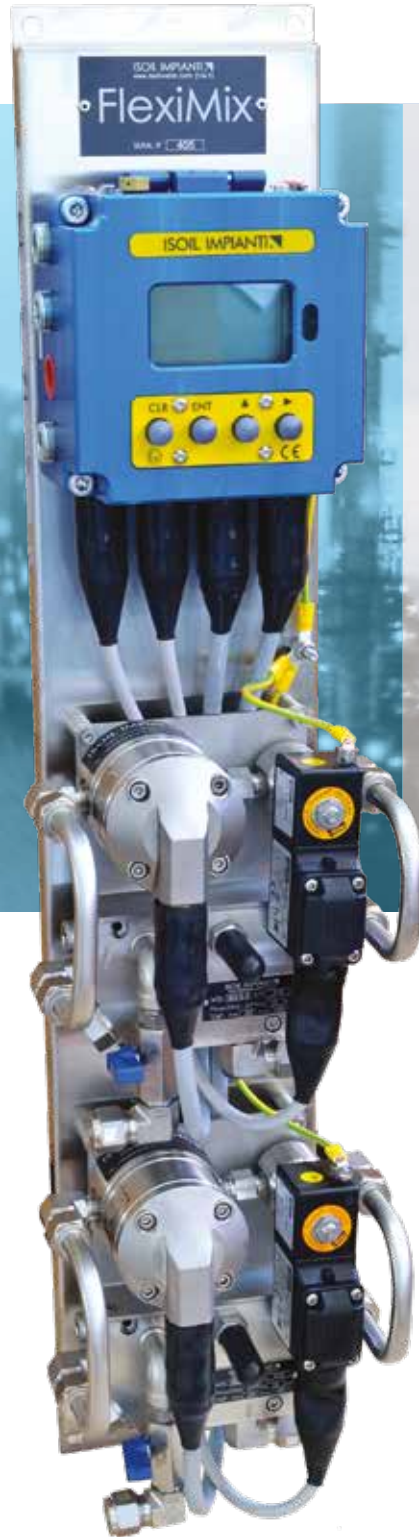


FlexiMix

Modular injection system



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IMPIANTI
The solutions that count

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Modular injection system

The FlexiMix injection system extends the solutions offered by ISOIL IMPIANTI in the field of additive management. The use of additives is dramatically rising in the distribution of fuels, driven by a number of factors and needs, as:

- » dyeing and marking for fiscal reasons
- » enhancing engine performances by modifying chemical and physical properties (anti static, anti foaming, anti icing additives, anti-detonating, odorizing).

Since more needs can coexist, a combination of additives has to be injected according to different recipes. This is a constantly evolving scenario, especially due to the growing importance of bio-fuels. In order to allow maximum operational flexibility it is necessary to reduce storage requirements and, when possible, to avoid product-dedicated delivery points. The solution is therefore to mix fuel and additives at the load rack, as close as possible to the delivery point.

For the above mentioned reasons ISOIL focused on designing a device with the following features:

- » able to interface with ISOIL's as well as with 3rd party equipments
- » modular in order to locate the units where necessary, thus reducing piping and wirings
- » flexible in order to face different needs of customers
- » easy installation in existing gantries thanks to small dimensions and modular design
- » easy and safe configuration both locally and by remote communication.



Overview

The FlexiMix can manage from one to six additives being simultaneously injected. Typical installation is in a loading gantry. Its architecture is modular:

- » one Injection Controller Main Unit (IC-M) can be connected to pulses from one or two meters of the main product and it can drive directly one or two Injection Blocks (IB2), mounted and wired on a stainless steel back plate
- » one or two Injection Controller Extension Unit (IC-E) can be linked to the IC-M. Each IC-E can drive up to four IB2, mounted and wired on a stainless steel back plate

Such a modular architecture makes the FlexiMix suitable for installation close to injection points and allows to choose different sizes of IB according to the required additive/product ratio.





The components

Injection Controller Main Unit (IC-M)

IC-M is a micro-processor based controller with a dedicated software granting a highly accurate and reliable injection of additive according to Customer specifications (recipes).

The IC-M receives pulses corresponding to the main product flow and opens a solenoid valve, located on the Injection Block (IB2), thus allowing the additive to be injected. Additive flow is measured by a small PD meter and it is also continuously compared with the main flow. The IC-M controls the solenoid valve in order to maintain additive/product ratio at the specified value.

By means of four digital inputs, the IC-M can manage interlocks or change the injection features according to the programming parameters, as well as drive additive pumps. In case of abnormal conditions an alarm signal is generated.

The IC-M can communicate with a TAS system or with other field devices via serial communication lines.

The IC-M, can receive pulses from one or two PD-meters, and it can directly control one or two IB2 for simultaneous injections. If more additives are required, one or two Injection Controller Extension (IC-E) can be linked via Can-bus channel.

The IC-M's electronics is contained in an explosion proof ATEX-IECEX and IP66 approved enclosure. This cover is fixed to the base with four screws only and it is provided with hinges. Process quantities such as current and total volume of main product and of additive, as well as alarms or status messages can be read on a graphical display.

Parameters setting, alarms acquisition and reset and injector calibration can be easily performed by a four button keypad or by communication serial interface.

Injection Controller Extension Unit (IC-E)

IC-E is a microprocessor based unit acting as logical and electrical interface to enhance the injection capability of the IC-M up to 6 additives. IC-E is powered by IC-M and it communicates with it via a Can-bus channel.

The IC-E can be interfaced directly with the VEGA 3 multi-streams modular flow computer without need to connect an IC-M. In this case, additive injection as well as parameters setting are managed on the VEGA 3 (for more information see the flow computer brochure). The IC-E is therefore able to control up to four Injection Blocks, it can drive 4 additive pumps and 4 additional digital outputs.

All the electronic parts are contained in the "blind" version of IC-M's explosion proof casing.



Injection Block (IB2)

IB2 is the device carrying out control and measurement of additive flow. The stainless steel leak proof block includes a precision oval gear flow meter, a solenoid control valve, a fine mesh strainer, flow regulating needle valves and an outlet check valve.

The standard o-ring material is Teflon™.

The flow meter can be sized in two models:

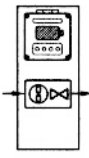
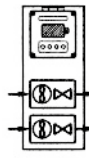
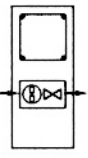
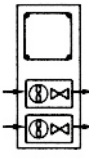
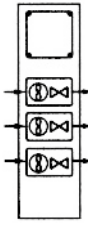
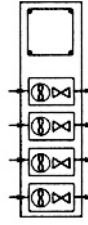
- » considering a typical loading flow rate of 2200 L/min the standard flow meter size allows injections of 50÷3000 ppm (parts per million) with 5÷500 cc per shot.
- » for lower injection rates (15÷500ppm with 3÷50cc per shot) the low flow size meter can be chosen.

Valve assembly and meter are detachable, inlet and outlet elbows can be oriented in three directions.

The block has a 1/8" male quick release coupler as test point for calibrations.



Assemblies and configurations

						
Overall dimensions (mm)	160x700x175	160x700x175	160x700x175	160x700x175	160x850x175	160x850x175
Assembly	M1	M2	E1	E2	E3	E4
FlexiMix1-M1	●					
FlexiMix1-E1*			●			
FlexiMix2-M2		●				
FlexiMix2-M1+E1	●		●			
FlexiMix2-E2*				●		
FlexiMix3-M2+E1		●	●			
FlexiMix3-M1+E2	●			●		
FlexiMix3-M1+E1+E1	●		●●			
FlexiMix3-E3*					●	
FlexiMix4-M2+E2				●		
FlexiMix4-M1+E3	●				●	
FlexiMix4-M1+E2+E1	●		●	●		
FlexiMix4-M2+E1+E1		●	●●			
FlexiMix4-M1+E1+E2	●		●	●		
FlexiMix4-E4*						●
FlexiMix5-M2+E3		●			●	
FlexiMix5-M1+E2+E2	●			●●		
FlexiMix5-M1+E3+E1	●		●		●	
FlexiMix5-M2+E2+E1		●	●	●		
FlexiMix6-M2+E4		●				●
FlexiMix6-M1+E3+E2	●			●	●	
FlexiMix6-M2+E2+E2		●		●●		
FlexiMix6-M2+E1+E3		●	●		●	

* Note: To be used in conjunction with an IC-M (Injection Controller Main) or with FC-M/E modules (VEGA 3).

Functions

- » Stand alone or remotely controlled operation
- » Managing of pulse inputs scaling from main product and additive flow meters
- » Digital inputs managing of load permission , additive and recipes selection, line flushing signal, flow switch
- » Additive solenoid valves control
- » Additive pump start/stop
- » Digital outputs managing: block valves, alarms, interlocks
- » Display: main product and additive partial and total quantities, injected additives and ratio, solenoid valve & pump status, alarms
- » Alarms and errors: additive no flow; additive over or under tolerance; unauthorized flow of additive; no main product flow; communication time out, microprocessor watch dog
- » Autocalibration procedure
- » Line cleaning – flushing function
- » Data trasmission via communication serial line
- » Communication with Extension Units via Can-Bus channel



Technical specifications

Electrical	IC-M	IC-E	IB2
Main power:	115/230VAC (self adjusting) -10W or 24VDC-10W	Fed by IC-M	Solenoids: as mains
Display:	Graphic 128x64	-	-
Counting inputs:	N° 2 from main product flow meters N°2 from IB2 flow meters	N° 4 from IB2 flow meters	-
Additional inputs:	N°4 D/I	N°4 D/I	-
Power outputs:	N° 2 SSR to solenoids N° 2 Relays for additive pumps N°4 D/O	N° 4 SSR to solenoids N° 4 Relays for additive pumps N°4 D/O	-
Communications:	N°2 RS485 N°1 CAN-bus	N°1 CAN-bus	-
Keypad:	N° 4 buttons solid state activated	-	-
Cable entries:	N° 12x1/2"NPT	N° 12x1/2"NPT	1/2"NPT
Mechanical			
Dimensions:	148x148x94 mm	148x148x94 mm	148x107x125mm
Materials:	Anodised alluminium alloy (casing)	Anodised alluminium alloy (casing)	- 316 Stainless Steel (meter, valves, strainer) - 303 Stainless Steel (block) - PTFE (Teflon™) /FFKM (Chemraz™)
Materials (Backplate):	304 Stainless Steel	304 Stainless Steel	304 Stainless Steel
Process Inlet/Outlet:	-	-	3/8"NPT
Environment			
Temperature/Humidity:	-25÷+55°C /95% without condensation	-25÷+55°C /95% without condensation	-20÷+55°C
Protection class:	IP66	IP66	IP67
Ex protection ATEX-IECEx:	II 2 G Ex db IIB T6 Gb	II 2 G Ex db IIB T6 Gb	II 2G Ex db mb IIC T4 (solenoid) II 2G Ex d IIC T6 (meter)
Metering			
Meter accuracy @3cp:	-	-	±0,5%
Meter repeatability:	-	-	0,25%
Flow rate mod. standard:	-	-	min 0.25- max 9.17 L/min (6.87 pulsating)
Flow rate mod. Low Flow:	-	-	min 0.03- max 1.67 L/min (1.25 pulsating)
Max working pressure:			2000 kPa
Max differential pressure:			1200 kPa (230 VAC), 1000 kPa (24 VDC)
Min differential pressure:	-	-	500 kPa (between upstream elbow and main product)

Order code

FlexiMix N-A-MXX-EXXXX-EXXXX

N= total n° of additives/injection blocks (1 ÷ 6)

A= power supply for ICM and solenoids = **5** (230VAC) ; **6** (115VAC) ; **7** (24VDC)

X= flow meter: **S**=Standard (0,25÷9,17L/min) **L**=LowFlow (0,03÷1,67L/min) **0**=None

- Examples: 1) FlexiMix 2-5-MSS-E0000-E0000
 2) FlexiMix 6-5-MSS-ESS00-ESS00
 3) FlexiMix 2-5-M00-ESS00-E0000*

Your code:

F	L	E	X	I	M	I	X	-	-	M	-	E	-	E
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