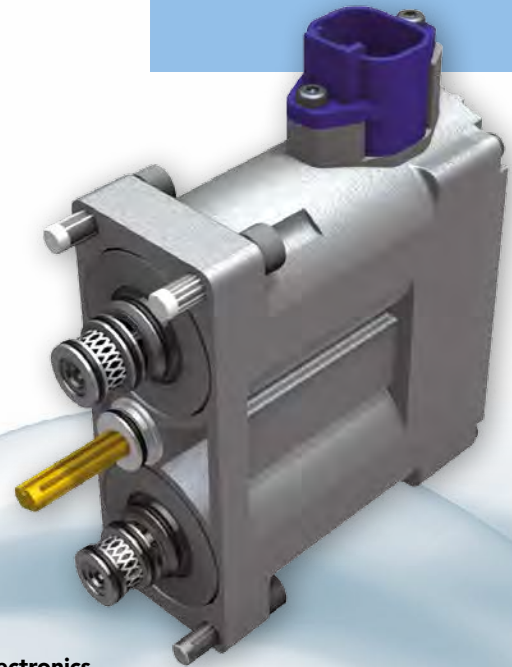
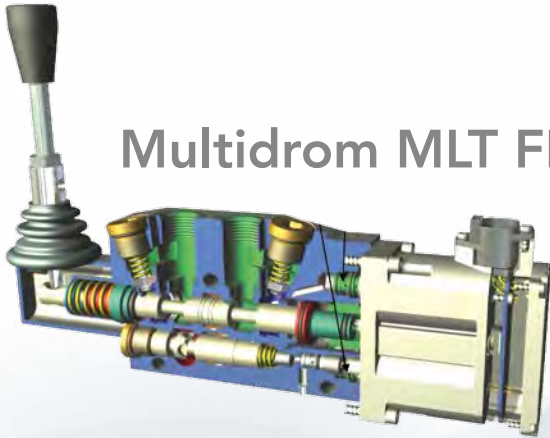


# TECNORD

SERVOCOMANDI E REGOLAZIONE

## Multidrom MLT FD-5



### PRINCIPLE OF OPERATION

The **MLT-FD5/D** electro-hydraulic proportional actuator has been designed to shift a directional control valve spool either directly (**FL version**) or by means of a servo-piston mechanically connected to it (**SP version**). The internal closed loop position control configuration of the makes the valve spool achieve the desired position with accuracy levels approaching the performance of a servo-valve, by continuously comparing the set-point of a remote control device (**Potentiometer, Joystick, Machine Management System**) with the feed-back signal generated by a high-precision hall effect position transducer.

### FEATURES

#### Two Independent Proportional Valves

- **Control Configuration:** bidirectional with MOTOR SPOOL center position for fail-safe return to neutral in case of power loss.
- **Flow Rate:** 0.2 to 0.5 lt/min. max. flow requirement under normal conditions.
- **Work Pressure:** 12 to 35 bar.

#### Hall Effect/Contactless Spool Position Sensor

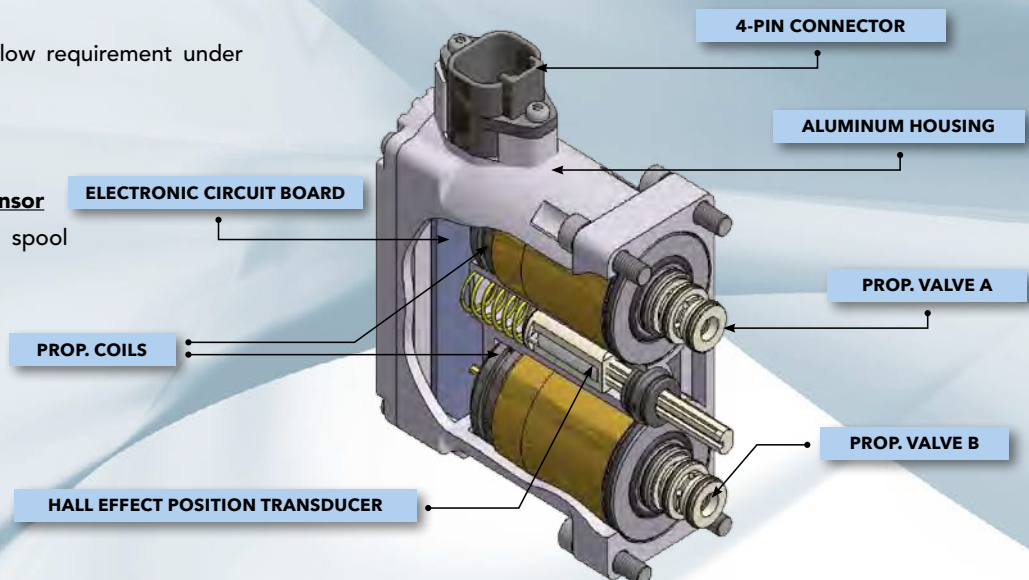
- Excellent linear control on 100% of spool travel.
- 8 mm standard control stroke from each side of NEUTRAL/13 mm for FLOAT position in one direction only.
- No "Cross Talking" between adjacent work sections.

### Built-in Electronics

- **MLT-FD5-D (digital):** microprocessor-based actuator. Choice between different types of control.
  - Analog control (0 – 5V), with following auxiliary signals available:
    - ✓ spool position feedback.
    - ✓ 5V for external potentiometer or joystick.
  - CANbus control (J1939 or CANopen protocols).
- **MLT-FD5-A (analog):** analog electronics, analog voltage control.
- **MLT-FD5-0 (on-off):** 12 or 24V version.

### APPLICATIONS

- High performance proportional control of stackable or monoblock directional control valves.
- Proportional control of variable displacement pumps and motors.
- Engine governor RPM controls.



## CONTROL CHARACTERISTIC OF MLT-FD5 PROPORTIONAL ACTUATOR (ANALOG OPERATING MODE)

### SPOOL STROKE A

- When the input voltage signal fed to the MLT-FD5 actuator is maintained within 2.25 and 2.75V, the directional valve spool is at rest (Neutral Dead Band).
- When  $V_{in} = 2.75V$ , the spool steps up from NEUTRAL to MINIMUM FLOW control position.
- A linear ramp from MIN. to MAX. spool stroke will follow by increasing  $V_{in}$  from 2.75 to 4.1V
- At  $V_{in} = 4.75V$ , the spool is brought into its FLOAT POSITION, if present.
- By decreasing the input voltage from 4.1 to 2.75V, the spool stroke is linearly reduced and after the oil flow is fully shut-off, a step-down from MINIMUM FLOW to NEUTRAL position takes place.

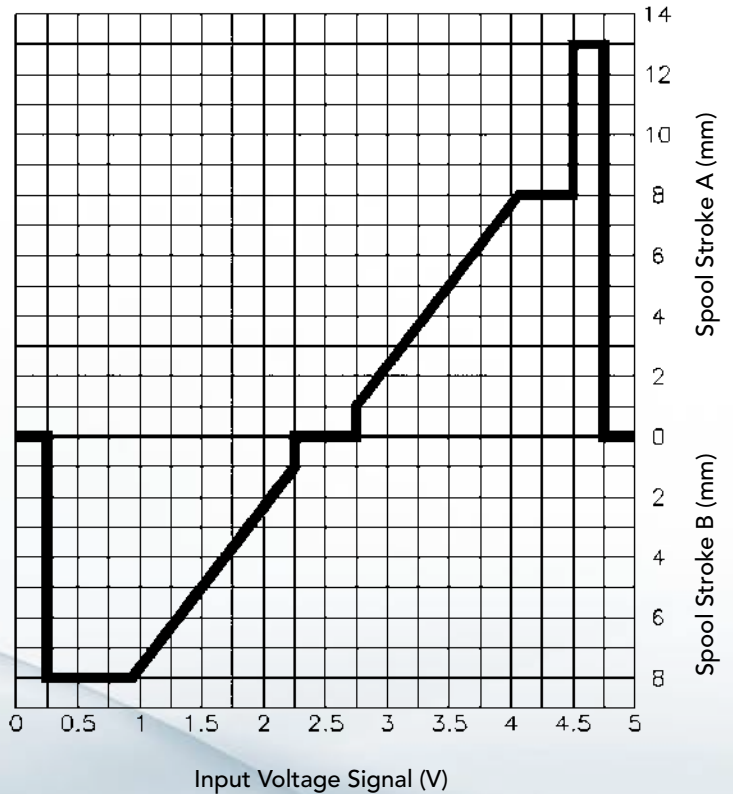
### SPOOL STROKE B

- Same as for STROKE A, by varying  $V_{in}$  from 2.25 to 0.9V, the spool will go from NEUTRAL to MAX. STROKE in the opposite direction.

### ALARM / FAIL - SAFE MODE

- An input voltage variation beyond the calibration range ( $<0.25V$  or  $>4.75V$ ) will bring the system into an ALARM mode, urging the spool to return to its NEUTRAL position until  $V_{in}$  is brought back to its nominal control range.

Spool Stroke (mm) vs. Input Voltage Signal (Volt DC)



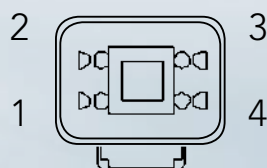
### HYDRAULIC SPECIFICATIONS

- Max. supply pressure ..... 35 bar
- Min. supply pressure ..... 12 bar
- Max. back pressure ..... 1.5 bar
- Pilot flow requirement ..... 0.2 lt/section
- Oil temperature range ..... -20/+95°C
- Oil viscosity range ..... 3-650 cSt
- Filtration ..... 18/15 (ISO 4406)

### ELECTRICAL SPECIFICATIONS

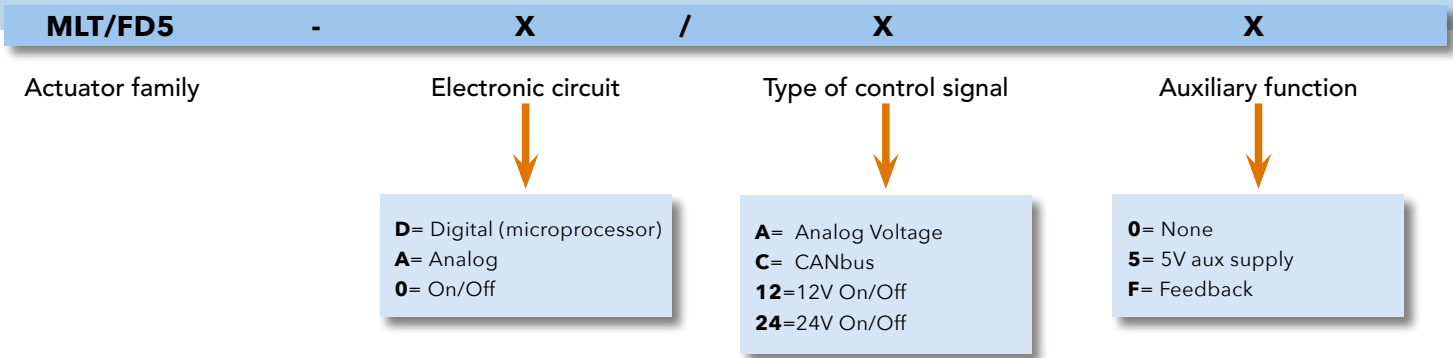
- Operating voltage ..... 8-30 VDC
- Max. current consumption ..... 750mA/section
- Operating temperature ..... -20/+105°C
- Analog input impedance .....  $>40\text{ k}\Omega$
- Typical ctrl pot. resistance ..... 1-10 k $\Omega$
- Analog input signal ..... 0-5V
- Degree of protection ..... IP 68

### CONNECTOR LAYOUT (FRONT VIEW) FOR MLT-FD5 D/AF



1. Power supply
2. Spool position signal
3. Control signal
4. Power supply (GND)

ACTUATORS SELECTION GUIDE



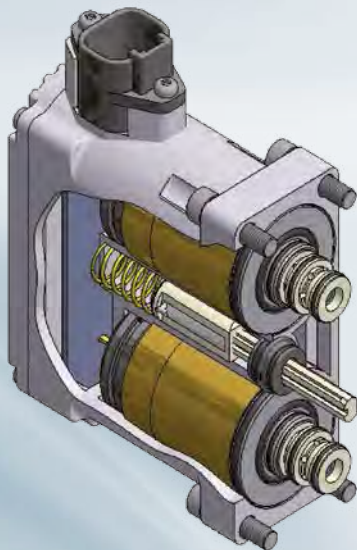
- MLT/FD5-D/A5**  
Proportional actuator  
Digital electronics  
Analog control signal (e.g. Potentiometer)  
+5V auxiliary power supply for the controlling potentiometer
- MLT/FD5-D/A0**  
Proportional actuator  
Digital electronics  
Analog control signal (e.g. Potentiometer)
- MLT/FD5-D/AF**  
Proportional actuator  
Digital electronics  
Analog control signal (e.g. Potentiometer)  
Feedback output (spool position)
- MLT/FD5-D/C0**  
Proportional actuator  
Digital electronics  
CANbus control (J1939)

AVAILABLE ACTUATOR TYPES

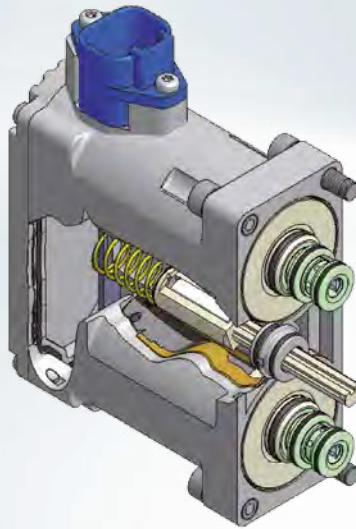
**MLT/FD5-A/A5**  
Proportional actuator  
Analog electronics  
Analog control signal (e.g. Potentiometer)  
+5V auxiliary power supply for the controlling potentiometer

**MLT/FD5-0-12**  
On/Off actuator, 12V coils

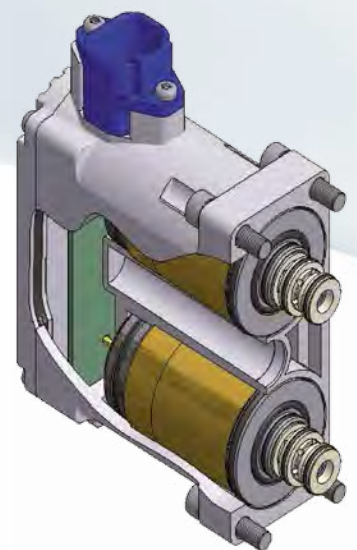
**MLT/FD5-0-24**  
On/Off actuator, 24V coils



**Digital Actuator**  
Black connector



**Analog Actuator**  
Blue connector



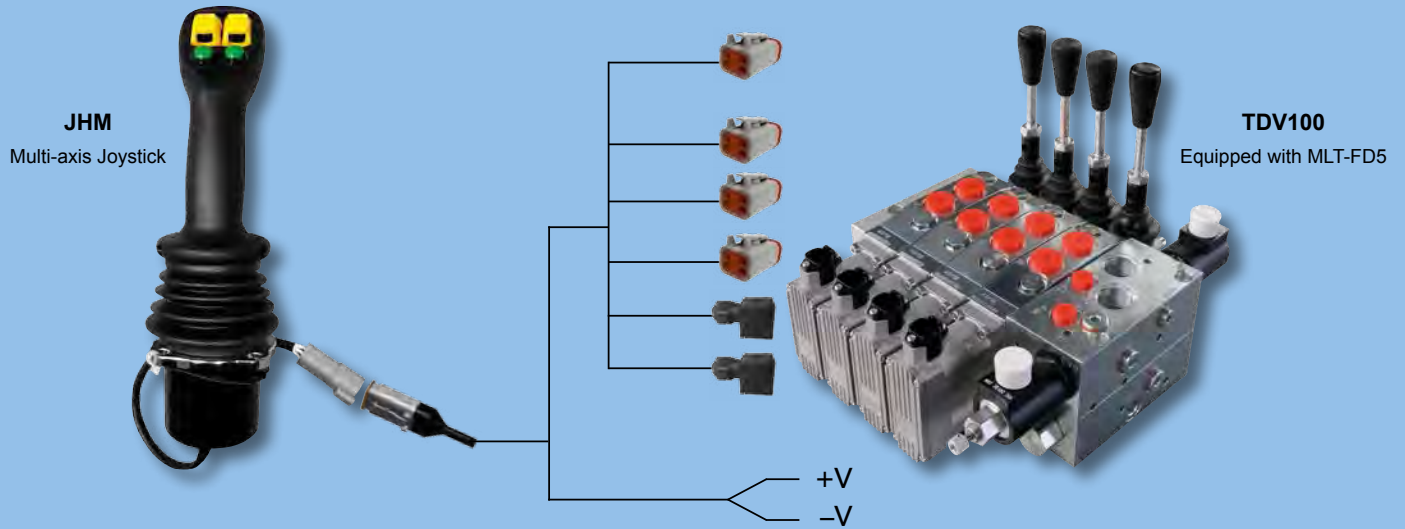
**On/Off Actuator**  
Without hall effect sensor  
Blue connector: 12V  
Green connector: 24V



# APPLICATIONS EXAMPLE

## Tecnord Multi-axis Joystick Mod. JHM driving a 4-Sections valves bank equipped with MLT-FD5 proportional actuators.

- 2 x proportional control signals from X-X and Y-Y main axes of the joystick base.
- 2 x proportional control signals from a pair of FPR proportional rollers lodged on grip.



## Tecnord NBM /DBX Radio System driving MLT-FD5 proportional actuators via CANbus interface.



**TECNORD**

Via Malavolti, 36 - 41122 Modena - Italy - Tel. +39-059-254895 - Fax +39-059-253512  
tecnord@tecnord.com - www.tecnord.com