a Delta Power Company

TECNORD

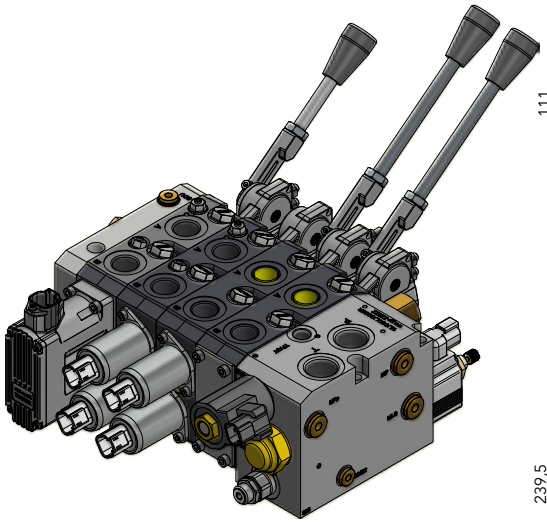
SERVOCOMANDI E REGOLAZIONE

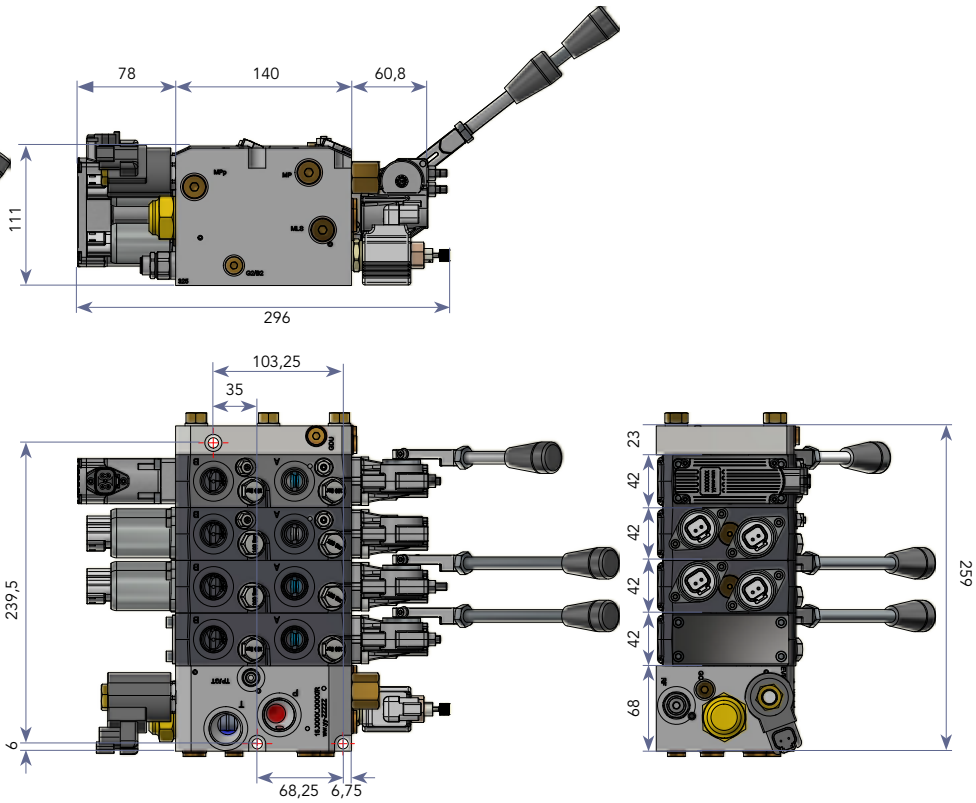
TDV100

Directional/Proportional
Sectional Valve with Load Sense

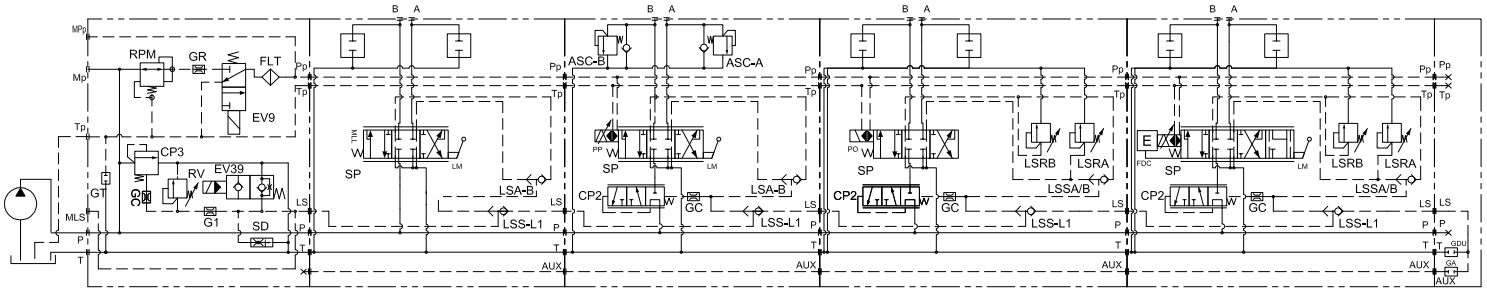
kiwa certified
CERMET
CERTIFIED MANAGEMENT SYSTEM
UNI EN ISO 9001:2015
UNI EN ISO 14001:2015
Body accredited by ACCREDIA

Manufacturers of Hydraulics and Electronic Management Systems





ELECTRO-HYDRAULIC SCHEMATIC



STACKABLE DIRECTIONAL CONTROL VALVE SYSTEM

The **TDV100** is a closed center, load sensing, sectional control valve with pre-compensation. The **TDV100** can be configured with 1 to 10 working sections and can be used either with fixed displacement or with pressure/flow compensated variable displacement pumps. When multiple functions are selected, the **TDV100** will automatically resolve the highest function load pressure which is then transmitted to the pump or inlet unloader/by-pass compensator and drained to tank once all spools are returned to neutral. The load sensing system mantains the delta P constant through spool control notches by means of the pressure compensation principle (spool sections are equipped with local 2 ways pressure compensator). Each **TDV100** sectional valve is crossed by a pilot pressure supply line and a return rail to feed around 20-25 bar to the MULTIDROM electro-hydraulic actuators system or proportional pilot pressure valves.

SPECIFICATIONS

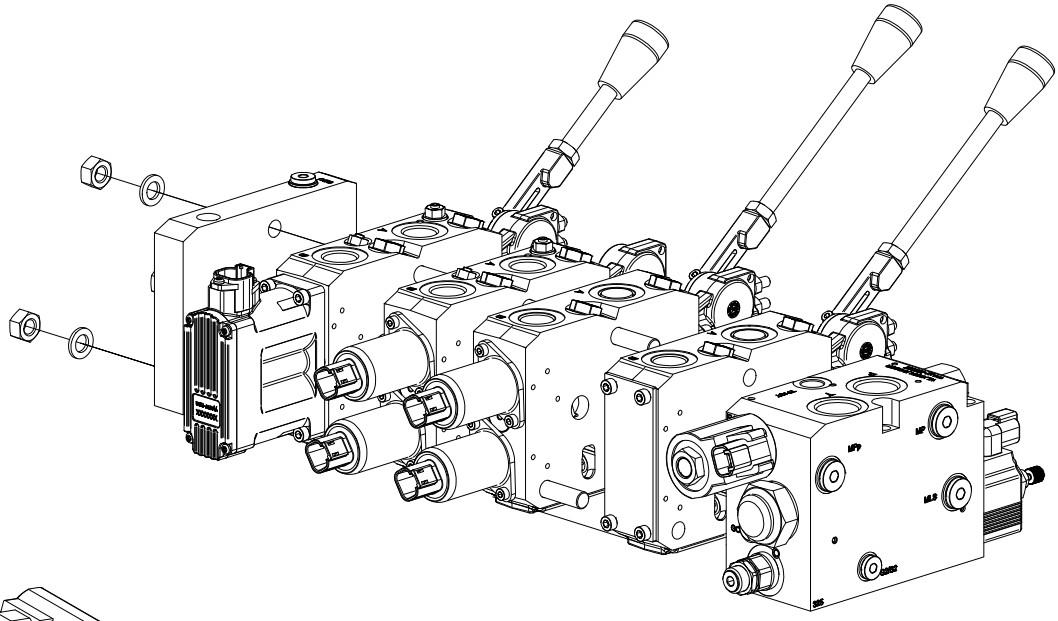
Max. operating flow	120 lt/min
Max. operating flow per section	110 lt/min
Max. working pressure	320 bar
Min. stand-by & pilot pressure	14 bar
Spool stroke	6 mm
Section width	42 mm
P & T Ports	3/4"- BSP
A & B work ports size	1/2"- BSP
Fluid	Mineral based oil
Fluid temperature range	-25°C/+95°C
Optimum fluid viscosity range	3<cSt<648
Max. fluid contamination level	18/15/10 (ISO 4406)
Seals	Buna-N (Std.) / Viton (Opt.)

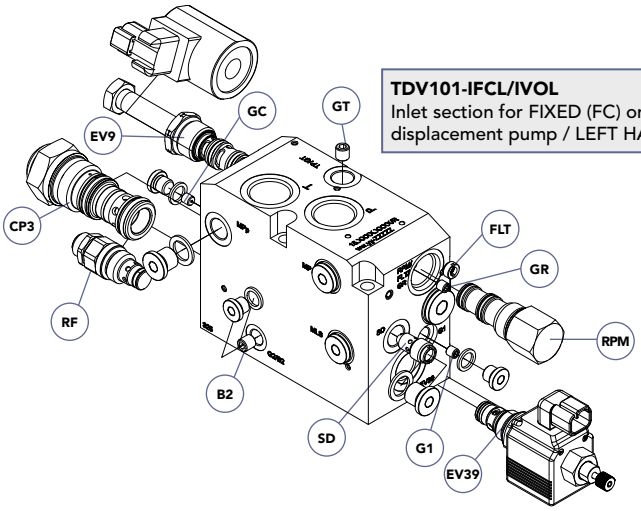
MANUAL AND ELECTRO-HYDRAULIC CONTROLS

TDV102-LM00	Manual control lever.
TDV102-LMPP **TDV102-00PP**	Electro-hydraulic, open loop proportional control, with or without manual lever.
TDV102-LMPO **TDV102-00PO**	Electro-hydraulic, ON-OFF control / PO type, with or without manual lever.
TDV102-LMFD **TDV102-00FD**	Electro-hydraulic, closed loop proportional control, with or without manual lever.

PRODUCT FEATURES AND BENEFITS

- Load-independent simultaneous control of two or more functions, within pump's flow saturation limits.
- Proportional flow control extended to 95% of spool stroke.
- MULTIDROM proportional actuators have built-in electronics requiring only variable voltage signals from a joystick.
- Internal closed loop position control configuration makes the valve spool achieving the desired position with accuracy levels approaching the performance of a servo-valve.
- Built-in CANbus interface working on SAE J1939 protocol.
- Non-feedback proportional and ON-OFF pilot pressure control actuators available.
- Electro-hydraulic, pressure compensated meter-in control of pump flow is available for cost-effective applications.
- Special "craning" spool configuration for overhung load control in conjunction with counterbalance valves.

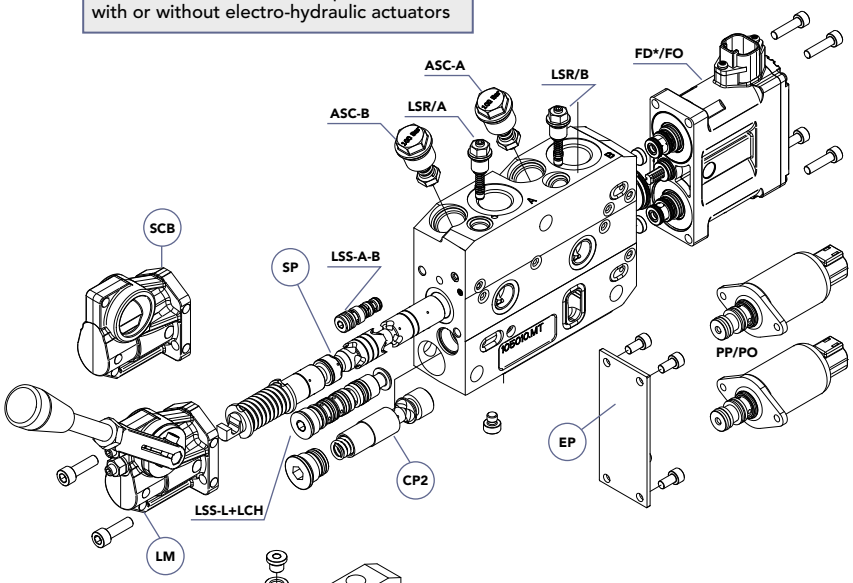




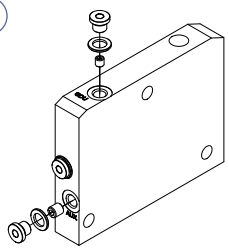
TDV101-IFCL/IVOL
Inlet section for FIXED (FC) or VARIABLE (VO) displacement pump / LEFT HAND version

POSITION	DESCRIPTION
TDV101	**LH INLET SECTION**
CP3	By-pass pressure compensator
GT	Blank plug / Tp to T connection
SD	Pressure Compensated Bleed off orifice
G1	Orifice (fixed displacement pumps)
B2	Blank plug (fixed displacement pumps)
G2	Orifice (variable displacement pumps)
B1	Blank plug (variable displacement pumps)
RF	LS signal relief valve (system relief valve)
EV39	2W2P N.O. solenoid op. LS venting valve
RPM	Mechanical pilot pressure reducing valve
EV9	3W2P solenoid op. pilot pressure dump valve
FLT	Pilot pressure line filter screen

TDV102
Work section / Pressure compensated with or without electro-hydraulic actuators



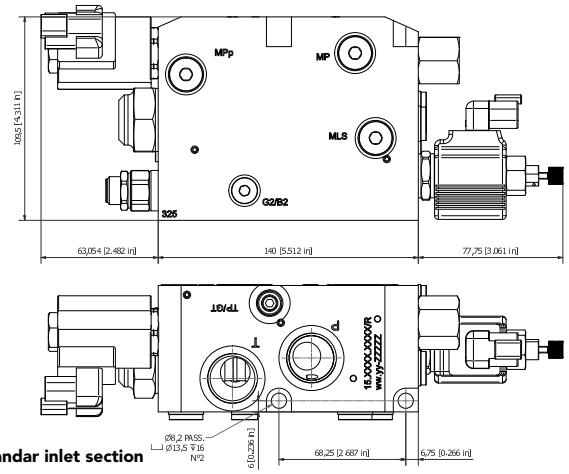
TDV102	WORK SECTION
CP2	Pressure compensator/Reducer
SP	Directional spool
ASC-A/B	Anti-shock/Anti-cavitation valves A/B ports
LSR-A/B	LS relief valve A/B lines
LSS-L	LS shuttle valve - LS common line
LCH	Load check
LSS-A/B	LS Shuttle valve A/B lines
LM	Manual lever control
SCB	Spring cover block w/o manual lever mechanism
NLA	No-leak valve - Port A only
EP	End plate/Blank
PP	Proportional pressure control
PO	ON-OFF control/PO type
FDC	Closed loop control/CAN version
FDA	Closed loop control (5V aux supply)
FDF	Closed loop control (position sensor output)
FDR	Closed loop control/Ratiometric version
FO	ON-OFF control (12 or 24 VDC)



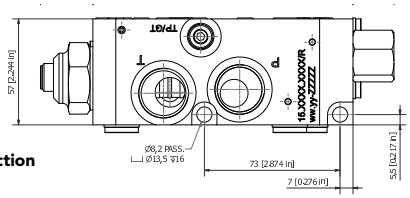
TDV103-ESR
End section / RIGHT HAND version

TDV103	RH END SECTION
ESR	End section/Blank
TR	Tie rods

DIMENSIONAL CHARACTERISTICS

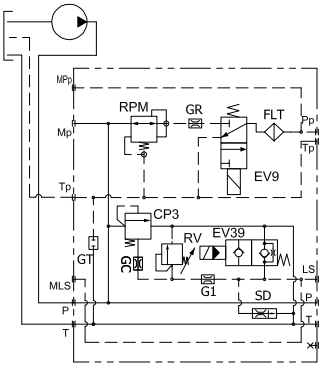


Standar inlet section



Slim inlet section

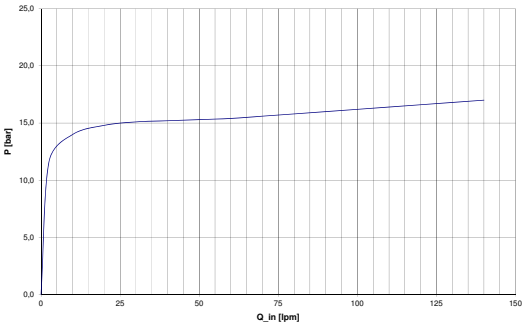
HYDRAULIC SCHEMATIC



Note: slim inlet section has same hydraulic scheme as standard inlet without valves EV9 and EV39

PERFORMANCE CURVES

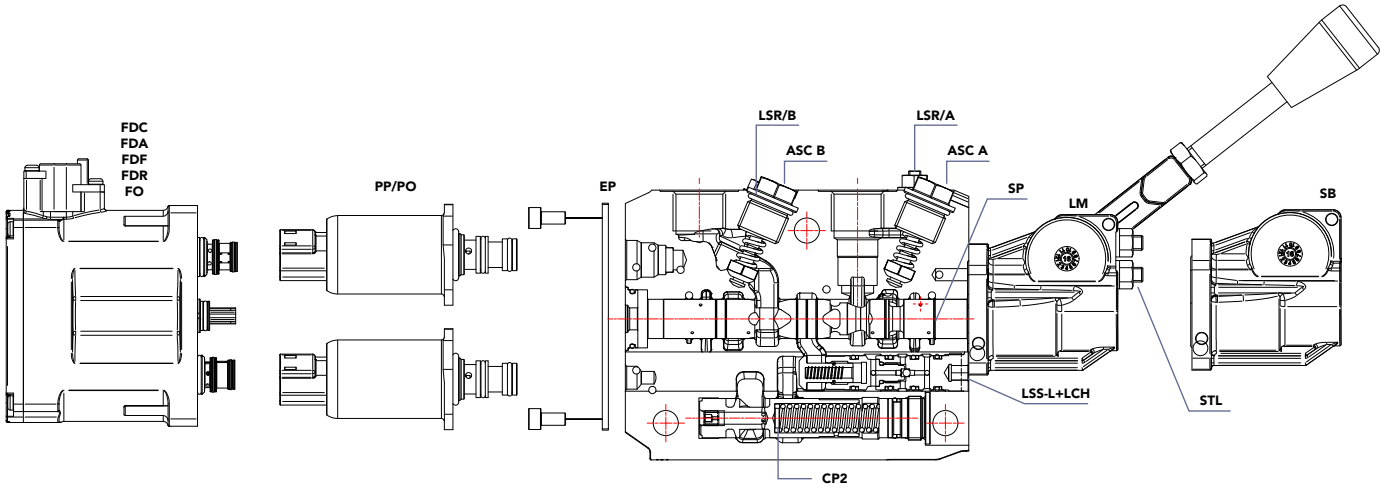
Pressure drop across pressure compensated CP3 (bar) vs. pump flow (lt/min)



1	2	3	4	5	6	7	8

POS.	ORDERING INFORMATION	TDV101-LT	IFCLG34	R25	RPM30	EV39	EV9	12VDT	XXX/Y
1	Inlet Section Model								
2	Configuration and Work Ports Size								
3	System Relief Valve Setting								
4	Mechanical Pressure Reducing Valve								
5	2W2P N.O. Solenoid Operated LS Signal Venting Valve								
6	3W2P Solenoid Operated Pilot Pressure Cut-Off Valve								
7	Voltage and Solenoid Valves Coil Termination								
8	Last 3-digits of the 9-digits Tecnord P/N and Design Level								

POS.	DESCRIPTION	AVAILABLE OPTIONS	
2	**Configuration and Work Ports Size**	**ISFCLG34**	Slim version / with unloader valve for fixed displ. pumps - G3/4" (BSP) ports
		ISV0LG34	Slim version / without unloader valve for variable displ. pumps - G3/4" (BSP) ports
		IFCLG34	Std. version / with unloader valve for fixed displ. pumps - G3/4" (BSP) ports
		IV0LG34	Std. version / without unloader valve for variable displ. pumps - G3/4" (BSP) ports
		ISFCLS12	Slim version / with unloader valve for fixed displ. pumps - 1.1/16"-12UNF (SAE12)
		ISV0LS12	Slim version / without unloader valve for variable displ. pumps - 1.1/16"-12UNF (SAE12)
		IFCLS12	Std. version / with unloader valve for fixed displ. pumps - 1.1/16"-12UNF (SAE12)
		IV0LS12	Std. version / without unloader valve for variable displ. pumps - 1.1/16"-12UNF (SAE12)
3	**System Relief Valve Setting**	**Rxx**	Relief valve setting
4	**Mechanical Pressure Reducing Valve (Slim and Standard Version)**	**RPM14**	Mechanical pilot pressure reducing valve for ON-OFF control (14 bar pilot pressure)
		RPM20	Mechanical pilot pressure reducing valve for closed loop control (20 bar pilot pressure)
		RPM30	Mechanical pilot pressure reducing valve for open loop control (30 bar pilot pressure)
		TCRPM	RPM Cavity plug for closed loop control (30 bar pilot pressure)
5	**LS Signal Venting Valve (Standard version only)**	**EV39**	2W2P N.O. solenoid operated LS signal venting valve
		TC39	Cavity plug
6	**Pilot Pressure Cut-Off Valve (Standard Version only)**	**EV9**	3W2P solenoid operated pilot pressure cut-off valve
		TC9	Cavity plug



	1	2	3	4	5	6	7	8	9	10	11	12
POS.	**ORDERING INFO.**	TDV102-LT	00CP	LMFDA	STL	YO80	F	A18/B15	LSA15/B12	NLA	12VDT	G12	XXX/Y

2	**Work Section Configuration**	**00CP**	Pressure compensated
		00CH	With load check
		CPCH	With pressure compensator and load check
3	**Control Configuration**	**LM00**	Manual lever
		LMPP	Manual lever / Open loop proportional control
		00PP	No manual lever / Open loop proportional control
		LMPO	Manual lever / ON-OFF control
		00PO	No manual lever / ON-OFF control
		LMFD*	Manual lever / Closed loop proportional control
		00FD*	No manual lever / Closed loop proportional control
4	**Dual stroke limiter**	**000**	No stroke limiter
		STL	Dual stroke limiter
5	**Spool Configuration/Flow Rate** (see Tab. A)	**XXxx**	Cylinder spool (P, T, A, B blocked)
		YOxx	Motor spool (P blocked / A&B to T)
		YSxx	Motor spool (P blocked / A&B to T / restricted flow)
		KAxx	Semi-motor spool (P&B blocked / A to T)
		KBxx	Semi-motor spool (P&A blocked / B to T)
		SExx	Single effect spool
		ZZ	Special spool
6	**Float**	**F**	4/th position FLOAT on Port A
7	**Anti-Shock/Anti-Cavitation Valves** (see Tab. B)	**A00/B00**	No anti-shock/anti-cavitation valves
		Axx/B00	ASC valve on A port / No ASC valve on Port B
		A00/Byy	No ASC valve on A port / ASC valve on Port B
		Axx/Byy	ASC valve on A&B ports
		ATC/BTC	ASC cavity plugs on A and/or B ports
8	**LS Relief Valves on A and/or B port** (see Tab. C)	**LSA00/B00**	No Load sensing relief valves
		LSA/B	Load sensing relief valve on Ports A & B - No Factory Pre-setting
		LSAxx/Byy	Load sensing relief valve on Ports A & B (Factory Pre-setting)
9	**NLA**	**000**	Without No-leak valve on Port A
		NLA	No-leak valve on Port A
10	**Voltage & Terminations**	**12VDT**	12VDC - Deutsch DT04 connector for ON-OFF control only
		24VDT	24VDC - Deutsch DT04 connector for ON-OFF control only
11	**Ports Size**	**G12**	A&B ports: 1/2"- BSP
		S10	A&B ports: 7/8"-14UNF (SAE10) *Option available on request*

TAB. A	Spool Metering Characteristics		
10=	0 to 10 lt/min	60=	0 to 60 lt/min
20=	0 to 20 lt/min	80=	0 to 80 lt/min
40=	0 to 30 lt/min	100=	0 to 100 lt/min

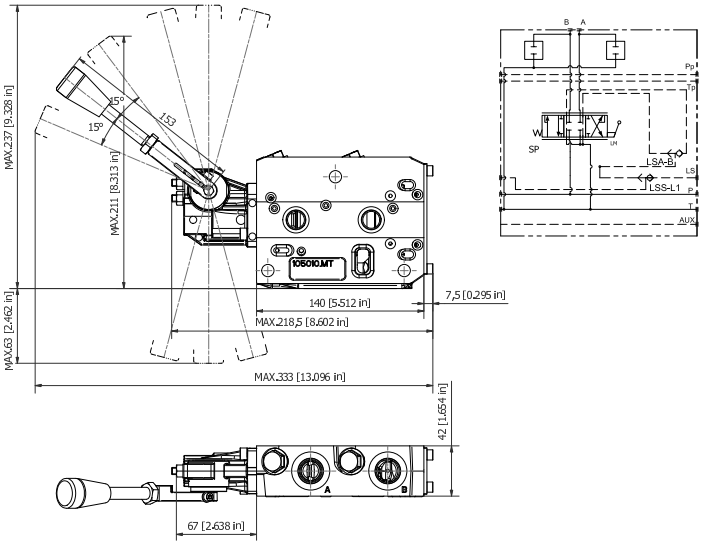
TAB. B	Anti-Shock Valves Setting		
A00=	No port relief	B00=	No port relief
A07=	Port A/70 bar	ATC=	Cavity plug on A
B28=	Port B/280 bar	BTC=	Cavity plug on B

TAB. C	LSA/LSB Relief Valves Setting		
LSA00	No LS relief	LSB00	No LS relief
LSA12	120 bar	LSB08	80 bar
LSA25	250 bar	LSB28	280 bar

Port relief valve standard settings: 70-100-120-140-160-180-200-220-240-260-280 Different settings available on request

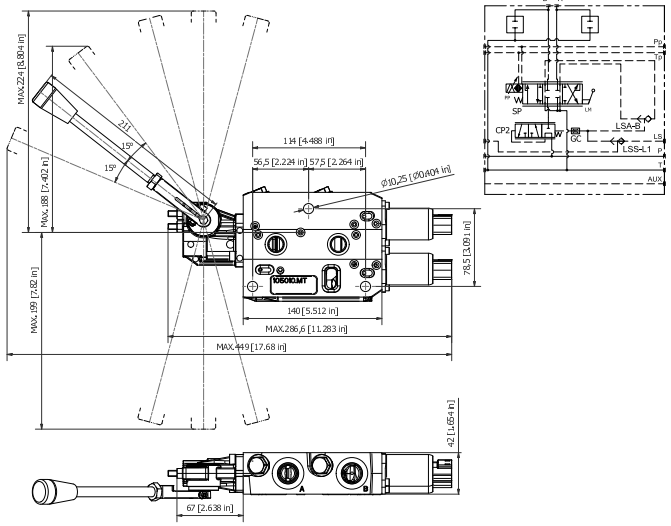
TDV102-LM00

Directional valve section with manual control

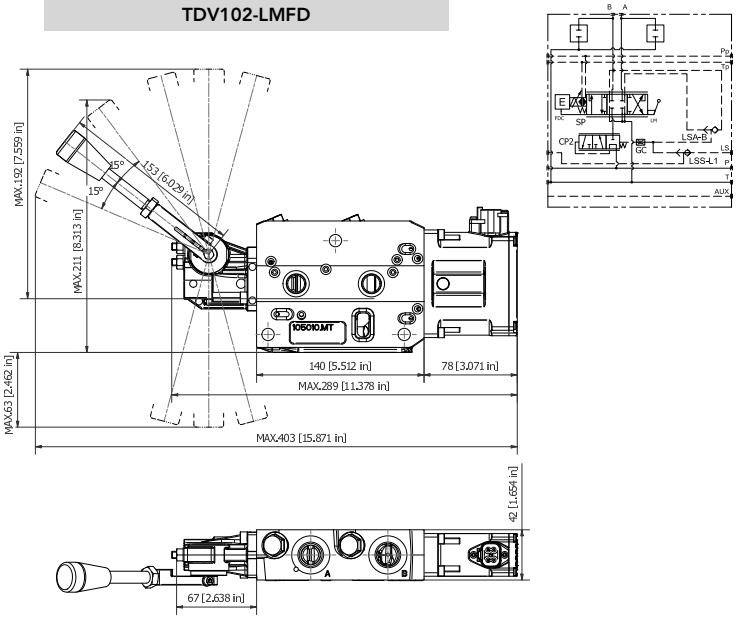


TDV102-LMPP

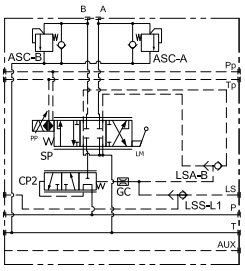
Directional valve section with dual proportional pilot pressure reducing valves for PWM open loop control of spool stroke and manual lever



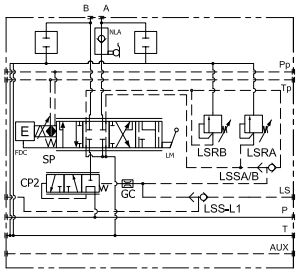
TDV102-LMFD



OPTIONAL FEATURES



ASC: anti-shock / anticavitation valves
Axx/B00: ASC valve on port A
A00/Bxx: ASC valve on port B
Axx/Bxx: ASC valves on ports A and B
ATC/BTC: cavity plug on ports A and B

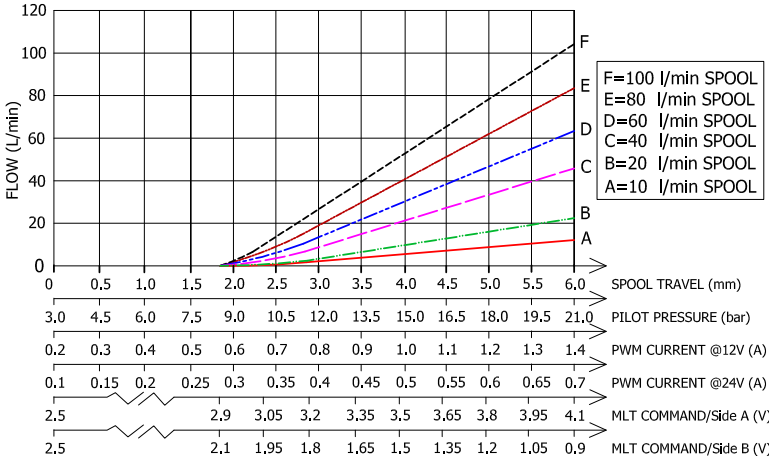


LSR A/B-Load Sensing Relief Valves
LSRA: load sensing relief valve on line A
LSRB: load sensing relief valve on line B

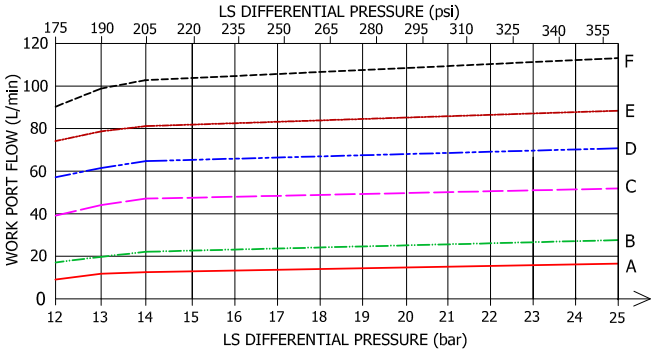
NLA: no-leak valve on port A

F: 4th position FLOAT

Work port flows vs. spool travel & various control parameters



Spool flows vs. differential pressure



PRINCIPLE OF OPERATION

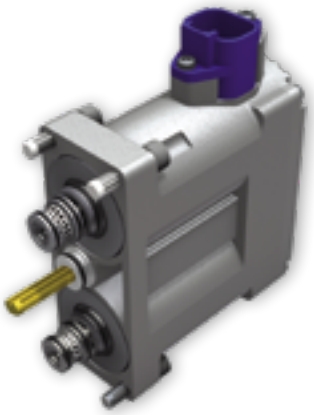
The MLT-FD5/D electro-hydraulic proportional actuator has been designed to shift a directional control valve spool either directly (FL version) or by means of a servo-piston mechanically connected to it (SP version). The internal closed loop position control configuration of the MLT-FD5/D makes the valve 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 (e.g. potentiometer, joystick, Machine Management System controller) with the feed-back signal generated by a high-precision hall effect position transducer.

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 Vin = 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 Vin from 2.75 to 4.1V. At Vin = 4.50V, 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

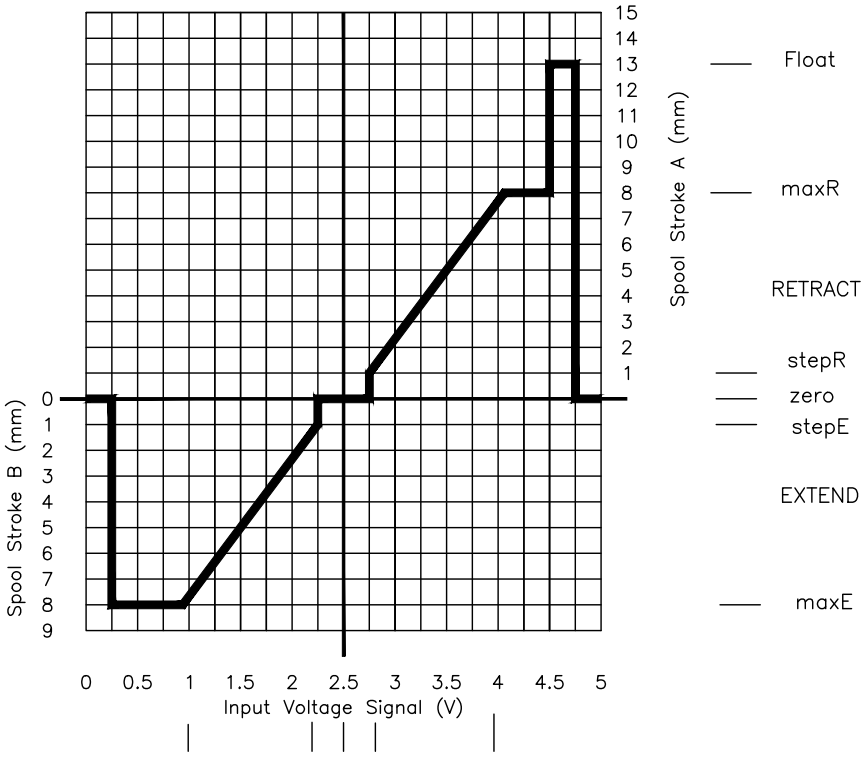
Same as for STROKE A, by varying Vin from 2.25 to 0.9V, the spool will go from NEUTRAL to MAX. STROKE in the opposite direction.



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 Vin is brought back to its nominal control range.

VALVE SPOOL STROKE vs. INPUT SIGNAL



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	18/15/10 (ISO 4406)

ELECTRICAL SPECIFICATIONS

Operating voltage	8-30 VDC
Max. current consumption	750mA/section
Operating temperature	-40/+125°C
Analog input impedance	>40 kOhm
Typical ctrl pot. resistance	1-10 kOhm
Degree of protection	IP 68

AVAILABLE CONFIGURATIONS AND MODEL DESIGNATION

FDC
Proportional actuator
Digital electronics
CANbus control (J1939)

FDA
Proportional actuator
Digital electronics
Analog control signal
(e.g. Potentiometer)
+5V auxiliary power
supply for the control
potentiometer

FDF
Proportional actuator
Digital electronics
Analog control signal
(e.g. Potentiometer)
Feedback output
(spool position): 0-5V

FDR
Proportional actuator
Digital electronics
Ratiometric control signal
(% of supply voltage)

FO12
On/Off actuator,
12V coils

FO24
On/Off actuator,
24V coils

CONNECTOR PINOUT (FRONT VIEW)

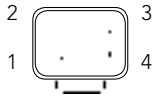
FDC
1. +Power Supply
2. CANL
3. CANH
4. -Power Supply (GND)

FDA
1. +Power Supply
2. +5V Aux. Supply voltage
3. Control Signal
4. -Power Supply (GND)

FDF
1. +Power Supply
2. Sensor Feedback Output
3. Control Signal
4. -Power Supply (GND)

FDR
1. +V Power Supply
2. Do not Connect
3. Control Signal
4. -V Power Supply (GND)

FO12/FO24
1. +Power Supply coil A
2. -Power Supply (GND) coil A
3. +Power Supply coil B
4. -Power Supply (GND) coil B



TECNORD

COMPREHENSIVE RANGE OF REMOTE CONTROL ELECTRONICS

EC-PWM-A1-MPC1

Microprocessor - based PWM
electronic drivers

FINGERTIP PROPORTIONAL LEVERS

Potentiometric and hall effect
single-axis control levers and roller switches

ERGONOMIC GRIPS

Multi-function ergonomic grips with
on-off and proportional switches

HEAVY DUTY JOYSTICKS

Potentiometric and hall effect
multi-axes control joysticks

EC - MMS

Microprocessor-based Machine
Management Systems for the integrated
control of electro-hydraulic and safety functions

ECOMATIC

GPS ground-speed oriented salt
spreader control systems

RC - SHW

Combined on-off and proportional radio
control system with single hand wander

RC - PTM

Multi-function proportional
Radio Control with shoulder-strap transmitter
and CANbus receiver

ARM-REST CONTROLLER

Arm-rest control unit
for Hedge Cutter

TECNORD

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