

Mobile Valves
Proportional - Load Sensing

Model CML60

325 bar
60 L/min

Up to 8 sections
Eaton F(x)[®] Compliant

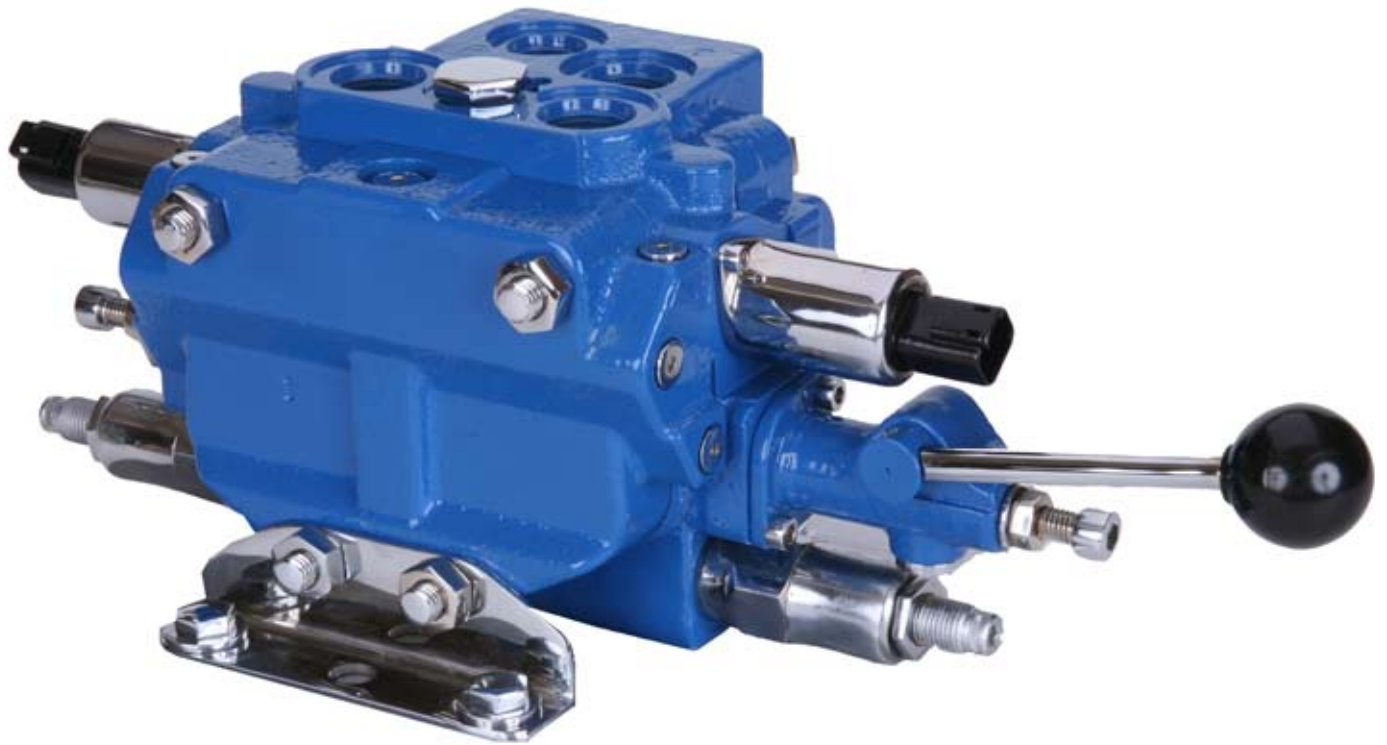


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General Information

Product Overview

The Eaton CML60 mobile valve is a load sensing, sectional proportional valve with a highly versatile design that offers extensive relief options through the use of standard C-10-2 relief cavities. The CML60 valve can be utilized across the breadth of pump types ranging from fixed displacement pumps to pressure compensated, load sensing variable displacement pumps.

Increased productivity is the key user benefit of the CML60 load sensing proportional valve. This operator efficiency is achieved because each valve function is proportional to the spool position under all load conditions and independent of the number of valve functions in operation providing the total demand flow is less than pump flow. Additional benefits of the CML60 load sensing proportional valve include energy savings due to less fuel consumption and heat dissipation.

Features and Benefits

Precise Control

- EH proportional
 - With or without manual handle back-up
 - Can be used on/off
- Hydraulic pilot

Rated Flow:

Inlet: to 100 l/min (26.3 USgpm)
Section: to 60 l/min (15.8 USgpm)

Rated Fatigue Pressure per NFPA T2.6.1:

280 bar (4050 psi) Inlet

- Qualified at 1 million cycles at 325 bar [4700 psi] test pressure

300 bar (4350 psi)

Work Ports

- Qualified for 1 million cycles at 350 bar [5075 psi] test pressure

Standard Circuit Design

Parallel circuit, closed center load sensing, inlet pressure compensated

Actuation Options

- Hydraulic
- Electrohydraulic Proportional



Energy Efficiency

- Load sensing circuit design

Versatile Design

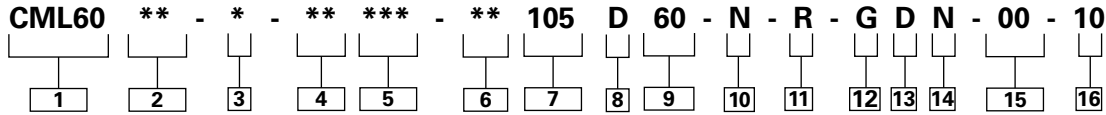
- Sectional design
 - 1-8 sections
 - Spool type, flow and actuation options
- Work ports accept Eaton's Vickers® SiCV cartridges
 - C-10-2 cavities
 - Section pressure limitation available

Eaton F(x)® Compliant

- Control F(x)™ Software
- EFX, and SFX Controllers

- Inlet Options
 - Unload/relief for fixed displacement pump systems
 - Load sensing for variable-displacement flow compensated pumps
- Integral pressure reducing valve for EH pilot supply

Model Code – Valve Section



1 Load Sensing Proportional Valve CML60 –

2 Actuation

- E0** – Electrohydraulic
- H0** – Hydraulic
- EM** – Electrohydraulic w/ manual override
- HM** – Hydraulic w/ manual override

3 Ports

- B** – 1/2 BSP
- D** – Direct port STC, -8
- M** – ISO 6149 metric, M18
- S** – SAE, -8
- T** – SAE, -10

4 Port A Relief Valve

- 00** – No cavities
- P1** – Plugged
- C1** – Check Valve
- L1** – LS Relief Valve (opposite port coding must be the same)
- F1** – Relief Valve, Direct Acting, Poppet Type, Fixed Relief (RV1-10-F-0-30/*-00) (standard for 3000 psi and below)
- S1** – Relief Valve, Direct Acting, Poppet Type, Screw Adjust Relief (RV1-10-S-0-30/*-00)
- A1** – Relief Valve, Direct Acting, Poppet Type, Fixed Relief (RV1-10-F-0-30 Internal Adjust Relief (RV1-10-I-0-30/*-00)
- F2** – Relief Valve, Pilot Operated, Fixed Relief (RV5-10-F-0-50/*-00) (standard for 3000-4000 psi)
- S2** – Relief Valve, Pilot Operated, Screw Adjust Relief (RV5-10-S-0-50/*-00)
- A2** – Relief Valve, Pilot Operated, Internal Adjust Relief (RV5-10-I-0-50/*-00)

5 Pressure setting for Port A

Check valve crack pressure in psi (OR) relief valve nominal setting pressure in psi; available in 50 psi increments from 500 to 4350 psi depending on type.

Coded as in the following examples:

- 005** – 5 psi Anti-Cav Check
- 050** – Relief pressure, 500 psi (72.4 BAR) MIN etc. increments of 50 psi (3.45 BAR)
- 435** – Relief pressure, 4350 psi (300 BAR) MAX

6 Port B Relief Valve

- 00** – No cavities
- P1** – Plugged
- C1** – Check Valve
- L1** – LS Relief Valve (opposite port coding must be the same)
- F1** – Relief Valve, Direct Acting, Poppet Type, Fixed Relief (RV1-10-F-0-30/*-00) (standard for 3000 psi and below)
- S1** – Relief Valve, Direct Acting, Poppet Type, Screw Adjust Relief (RV1-10-S-0-30/*-00)
- A1** – Relief Valve, Direct Acting, Poppet Type, Internal Adjust Relief (RV1-10-I-0-30/*-00)
- F2** – Relief Valve, Pilot Operated, Fixed Relief (RV5-10-F-0-50/*-00) (standard for 3000-4000 psi)
- S2** – Relief Valve, Pilot Operated, Screw Adjust Relief (RV5-10-S-0-50/*-00)
- A2** – Relief Valve, Pilot Operated, Internal Adjust Relief (RV5-10-I-0-50/*-00)

7 Port B Pressure Setting

Check valve crack pressure in psi (OR) relief valve nominal setting pressure in psi; available in 50 psi increments from 500 to 4350 psi depending on type.

Coded as in the following examples:

- 005** – 5 psi Anti-Cav Check
- 050** – Relief pressure, 500 psi (72.4 BAR)
- 435** – Relief pressure, 4350 psi (300 BAR)

8 Spool Type

- D** – 4 way cylinder
- H** – 4 way motor

9 Spool Flow Rating

- 05** – 5 lpm
- 10** – 10 lpm
- 15** – 15 lpm
- 30** – 30 lpm
- 45** – 45 lpm
- 60** – 60 lpm

10 Compensator

- N** – Noncompensated
- C** – Inlet pressure compensated

11 Build Type (Determined by viewing the valve stack from the end cover)

- R** – RH Build. Port A is on the right. Manual override handle, if present, is on the right.
- L** – LH Build (non-standard). Port A is on the left. Manual override handle, if present, is on the left.

12 Coil Voltage

- G** – 12 Vdc
- H** – 24 Vdc
- 0** – No Coil

13 Coil Connector

- D** – Deutsch
- Y** – Amp Jr
- L** – Lead Wires
- 0** – No Coil

14 Wire Lead Length

- 0** – No Lead Wire
- N** – Integrated Connector (Deutsch and Amp Jr.)
- B** – Wire Lead length 24 inch (Standard)

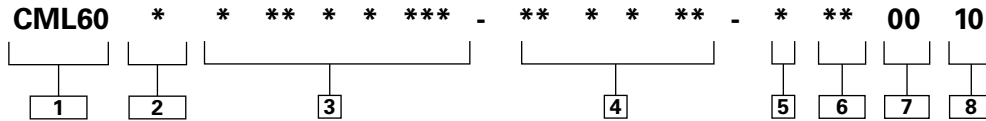
15 Special Features

- 00** – None

16 Design Level

- 10** – Design Level

Model Code – Valve Assembly



1 CML60 Assembly

2 Number of Sections

- 1 – 1 Section
- 2 – 2 Sections
- 3 – 3 Sections
- 4 – 4 Sections
- 5 – 5 Sections
- 6 – 6 Sections
- 7 – 7 Sections
- 8 – 8 Sections

3 Inlet Module Options

Port Location

- C** – Open Center Unload Top Ported
- S** – Load Sensing Side Ported
- T** – Load Sensing Top Ported
- R** – Load Sensing Top Ports w/ Relief

Port Options

- S1** – P port SAE-8, T port SAE-10 (with OC or LS top and side ported)
- S2** – P port SAE-10, T port SAE-12 (LS side ported or LS top ported with full system relief)
- M1** – P port M18, T port M22
- B1** – P Port 1/2 BSP, T port 3/4 BSP
- B2** – P port 3/4 BSP, T port 3/4 BSP
- D1** – P port STC-8, T port STC-10

Relief Type

- 0** – No relief
- L** – Load sense relief
- S** – System direct acting relief, screw adjustable, (RV8-10-S) (standard)
- A** – System direct acting relief, internal adjustable (RV8-10-I)
- F** – System direct acting relief, fixed (RV8-10-F)

Pressure Setting Range

- 0** – No relief
- L** – Pressure range 17-175 bar (250-2500 psi)
- H** – Pressure range 38-350 bar (550-5000 psi)

Relief Pressure Setting

Nominal relief valve setting, available in increments of 50 psi (3,5 bar) and coded as in the following examples:

- 000** – no relief setting
- 100** – Relief pressure, 1000 psi (68.9 BAR)
- 405** – Relief pressure, 4050 psi (280 BAR)

4 Valve Sections Abbreviated Code

Section 1

(First and Second Digit)

- E0** – Electrohydraulic
- H0** – Hydraulic

EM – Electrohydraulic w/ manual override

HM – Hydraulic w/ manual override

Port Type (Third Digit)

- B** – 1/2 BSP
- D** – Direct port STC, -8
- M** – ISO 6149 metric, M18
- S** – SAE, -8
- T** – SAE, -10

Spool Type (Fourth Digit)

- D** – 4 way, Cylinder spool
- H** – 4 way, Motor spool

Spool Flow (Fifth and Sixth Digit)

- 05** – 5 lpm
- 10** – 10 lpm
- 15** – 15 lpm
- 30** – 30 lpm
- 45** – 45 lpm
- 60** – 60 lpm

Repeat for Section 2, 3, etc. as applicable. Section 1 is nearest the inlet.

5 End Cover

- E** – Electrohydraulic
- H** – Hydraulic
- P** – Electrohydraulic, external pilot supply port

6 Paint/Coating

- 00** – no paint
 - 0A** – Red oxide primer
 - CD** – Eaton blue
 - AU** – Std. flat black
 - 0K** – Green
 - BN** – Tan
 - CC** – Yellow
- Other colors available upon request

7 Special Features

- 00** – None

8 Design Level

- 10** – Design Level

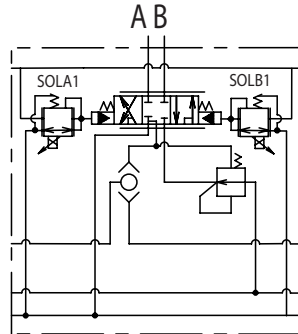
CML60 Proportional Load Sensing Valve

Rated Fatigue Pressure	Inlet	280 bar [4050 psi]
	Work Ports	300 bar [4350 psi]
Maximum Pressure	Inlet	325 bar [4700 psi]
	Work Ports	350 bar [5075 psi]
Rated Inlet Flow		100 lpm [26.3 gpm]
Fluid Cleanliness and Viscosity		See Hydraulic Fluid Recommendations bulletin 03-401
Maximum Fluid Temperature		107°C (225°F)
Construction		Sectional
Work Sections		1-8
Maximum Leakage, Cylinder Workport to Tank		20 cc/min @ 69 bar [1000 psi]
Port Types		SAE o-ring ISO 6149 Metric BSP Direct port STC
Inlet Section Options		Unload/relief for fixed displacement pump systems Load sensing inlet
Work Section Options	General	Accept Eaton SiCV cartridges C-10-2 cavities - work port on port 1, tank on port 2
	Spools	4 way cylinder (work ports closed in neutral) 4 way motor (work ports closed in neutral) Maximum flows, 5 to 60 lpm Adjustable Travel Stops
	Actuation	Electrohydraulic Hydraulic Electrohydraulic w/ manual override Hydraulic w/ manual override
Outlet Section Options		EH with external pilot supply port and integral pressure reducing valve Plain (for hydraulic pilot) Integral pressure reducing valve for EH pilot supply
EH Pilot Coil Voltages		12 Volt DC, 1500 mA current max 24 Volt DC, 750 mA current max
EH Pilot Coil Terminations		Integral Deutsch DT04-2P Integral Amp Jr. Dual Leadwires
Mounting Options		Stamped mounting plate Mounting attitude unrestricted
Electrohydraulic interface		Eaton F(x) compliant, EFX, and SFX Controllers

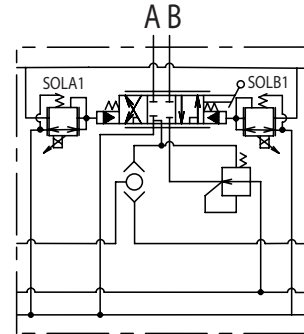
Standard Section Electrohydraulic Schematics

Cylinder Spools

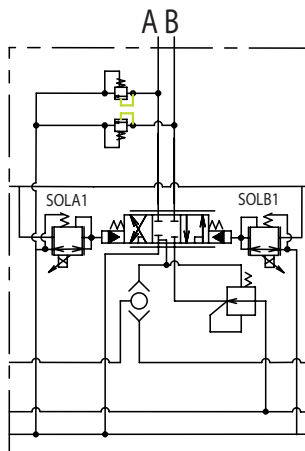
The same configurations are also available with motor spools (work ports open to tank in neutral).



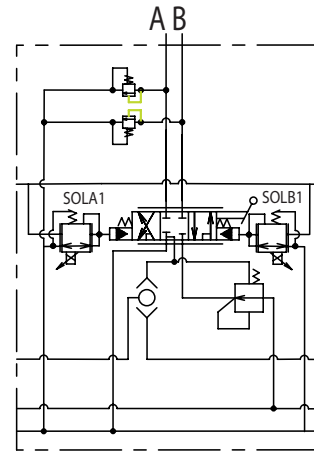
w/o reliefs



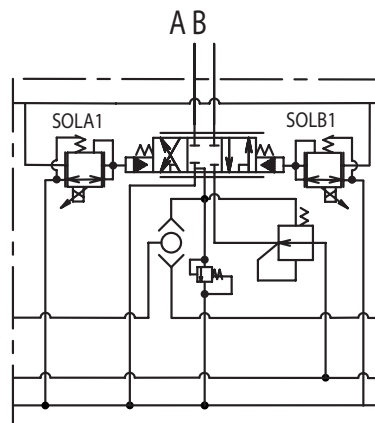
w/o reliefs
w/ manual override



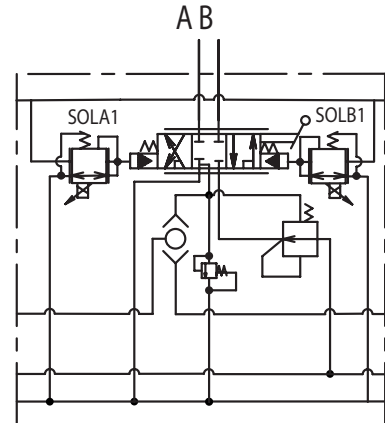
w/ work port reliefs



w/ work port reliefs
w/ manual override



w/ load sense relief

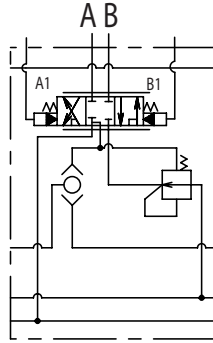


w/ load sense relief
w/ manual override

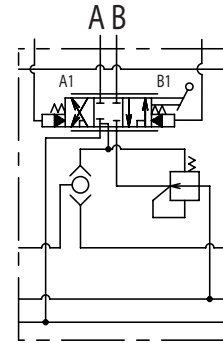
Standard Section Hydraulic Schematics

Cylinder Spools

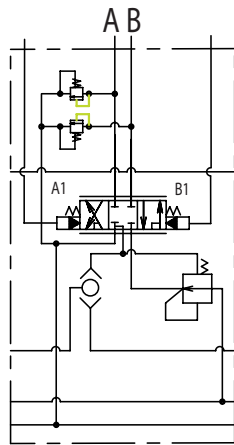
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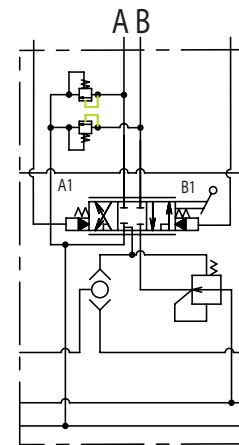
w/o reliefs



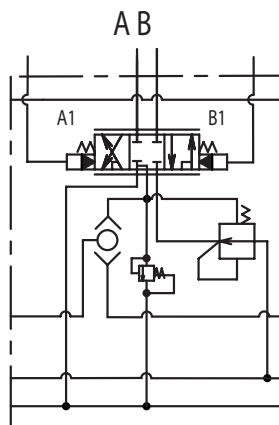
w/o reliefs
w/ manual override



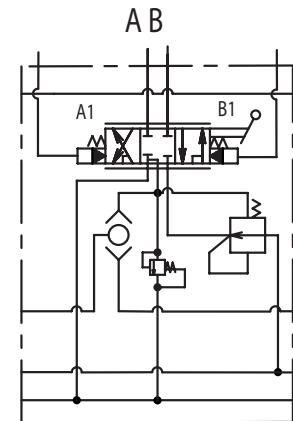
w/ work port reliefs



w/ work port reliefs
w/ manual override



w/ load sense relief

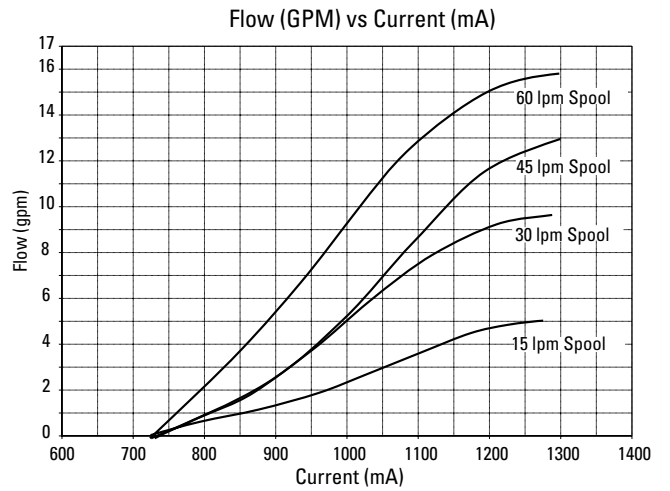
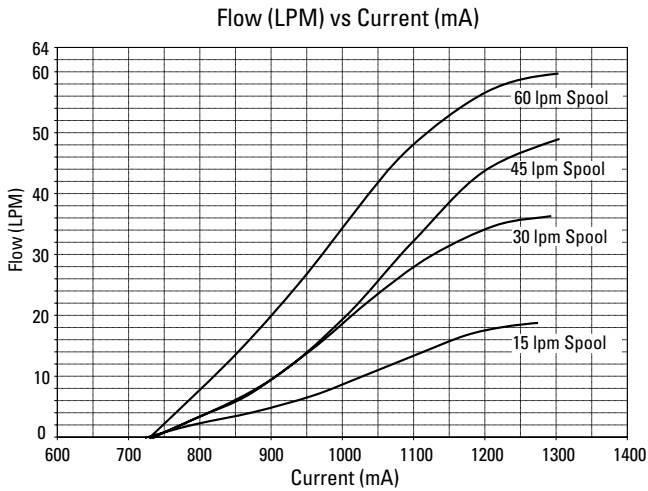


w/ load sense relief
w/ manual override

Performance Data

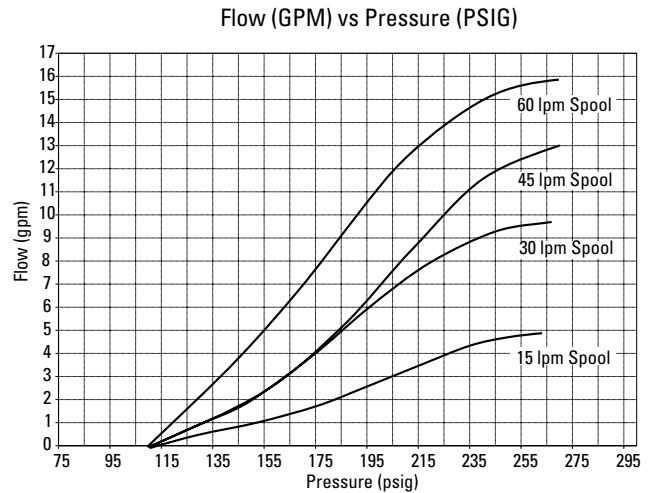
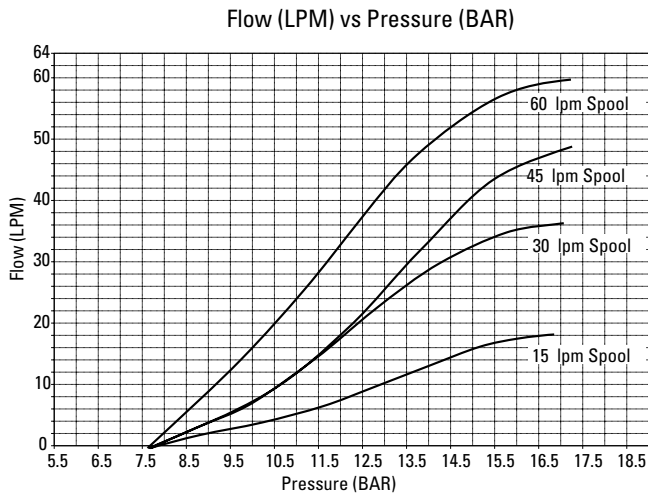
CML60 Flow vs Current

Maximum flow $\pm 5\%$ of rated flow.
 Cracking current ± 0.25 mA.
 Hysteresis $<20\%$



CML60 Flow vs Pressure

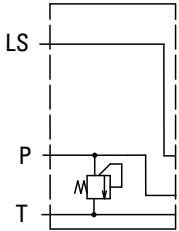
Maximum flow $\pm 5\%$ of rated flow.
 Cracking pressure ± 0.5 bar (± 7 psig)
 Hysteresis $<20\%$



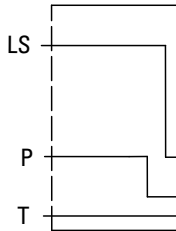
Inlet and End Cover Schematics

Hydraulic and Electrohydraulic

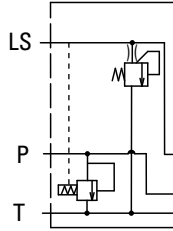
Load Sensing Inlet
w/ Full Relief



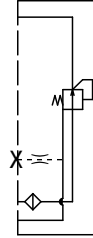
Load Sensing Inlet



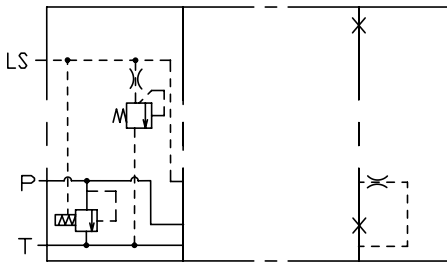
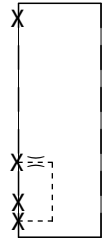
Open Center Inlet
w/ LS Relief



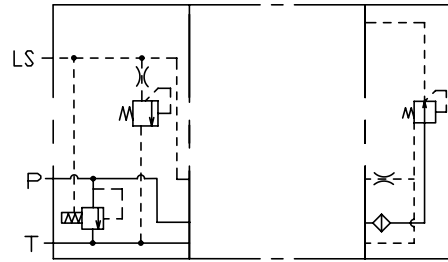
Electrohydraulic
Endcover



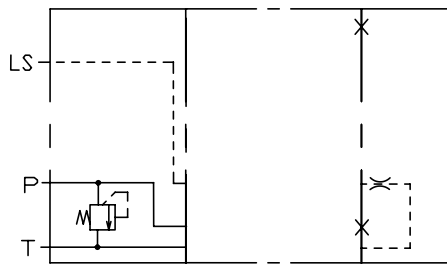
Hydraulic
Endcover



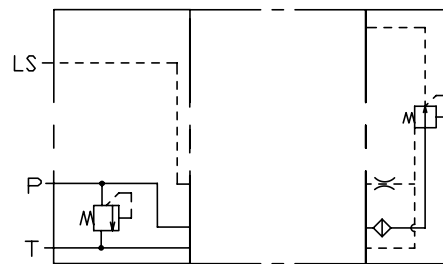
Open Center Inlet & Hydraulic Endcover



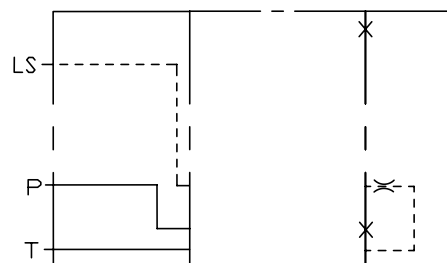
Open Center Inlet & Electrohydraulic Endcover



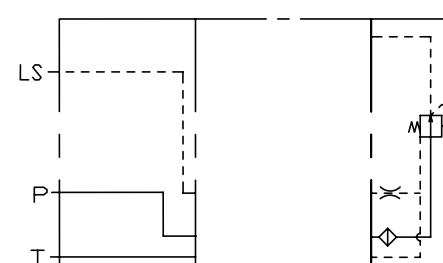
Load Sense Inlet w/Full Relief & Hydraulic Endcover



Load Sense Inlet w/Full Relief & Electrohydraulic Endcover



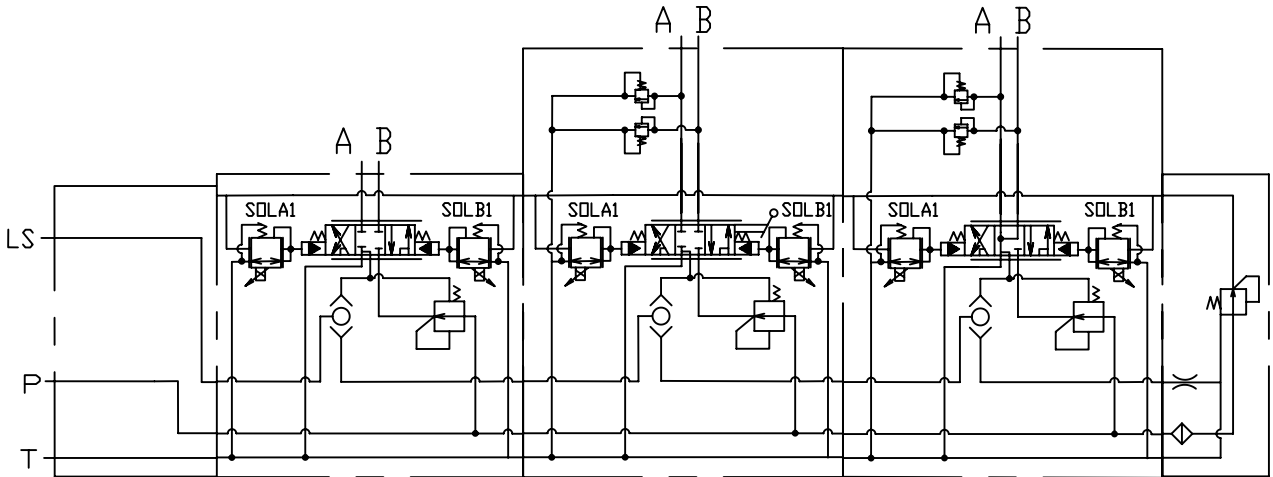
Load Sense Inlet & Hydraulic Endcover



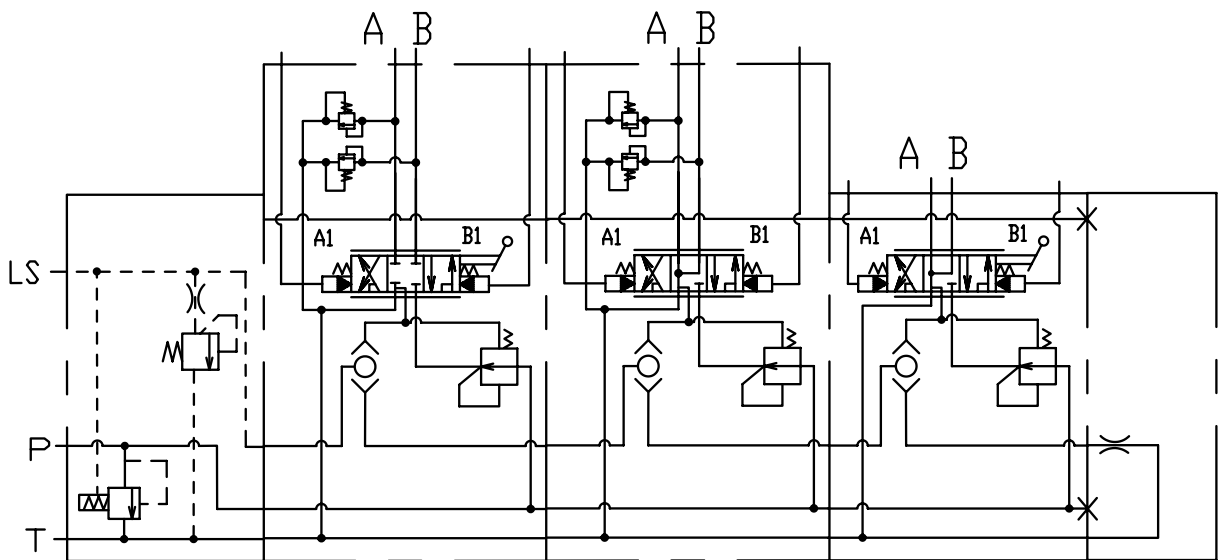
Load Sense Inlet & Electrohydraulic Endcover

Valve Bank Schematic Examples

Electrohydraulic Load Sense Valve Bank Example



Hydraulic Open Center Valve Bank Example

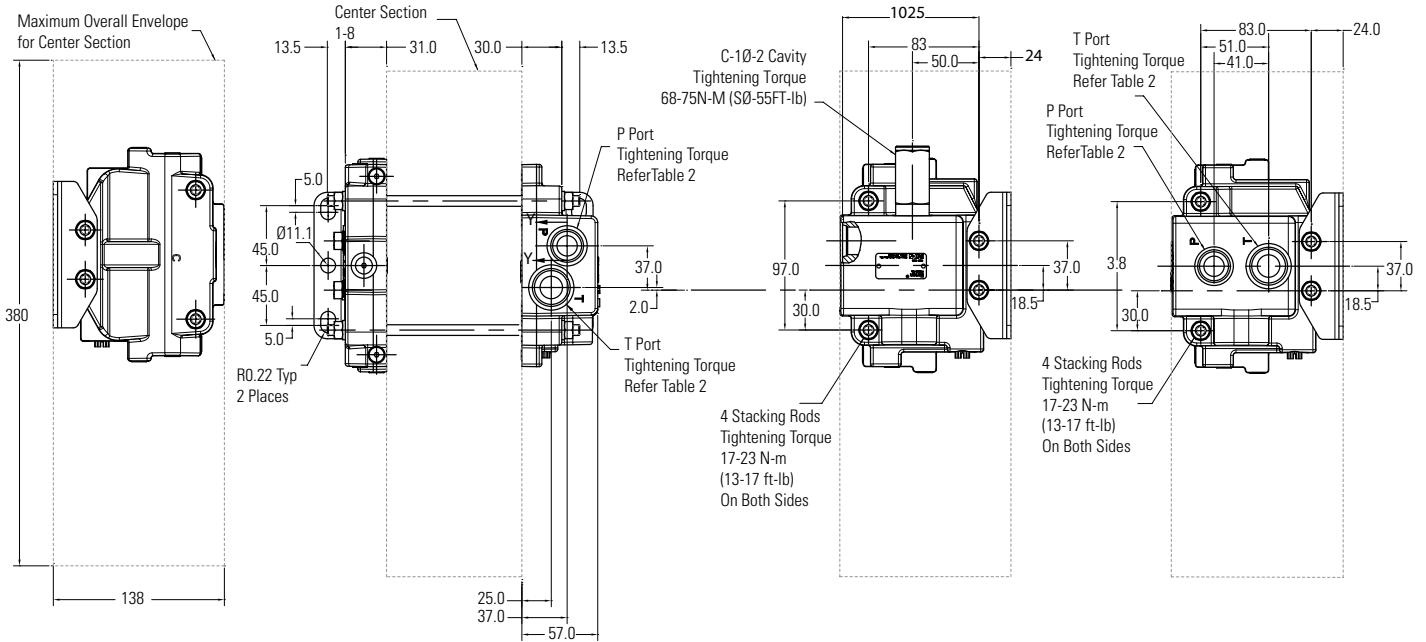


Valve Bank Installation Dimensions

Load Sensing with Full System Relief and Open Center Inlet Port Configuration

Note: Dimensions are in mm

Hydraulic and Electrohydraulic Endcover Configuration



Load Sensing Inlet with Full System Relief Configuration

Note: Dimensions are in mm

Open Center Inlet Configuration

Note: Dimensions are in mm

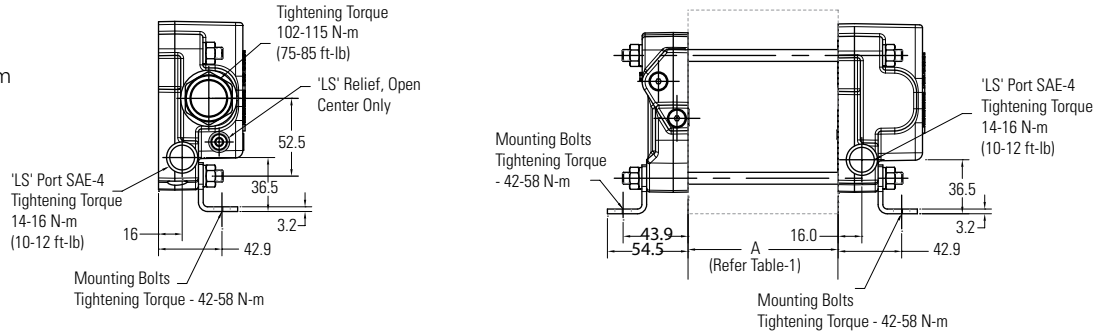


Table 1

No. of Center Sections	1	2	3	4	5	6	7	8
Dimension "A" (mm)	38	76	114	152	190	228	266	304
Dimension "A" (in)	1.5	3.0	4.5	6.0	7.5	9.0	10.5	12.0

Table 2

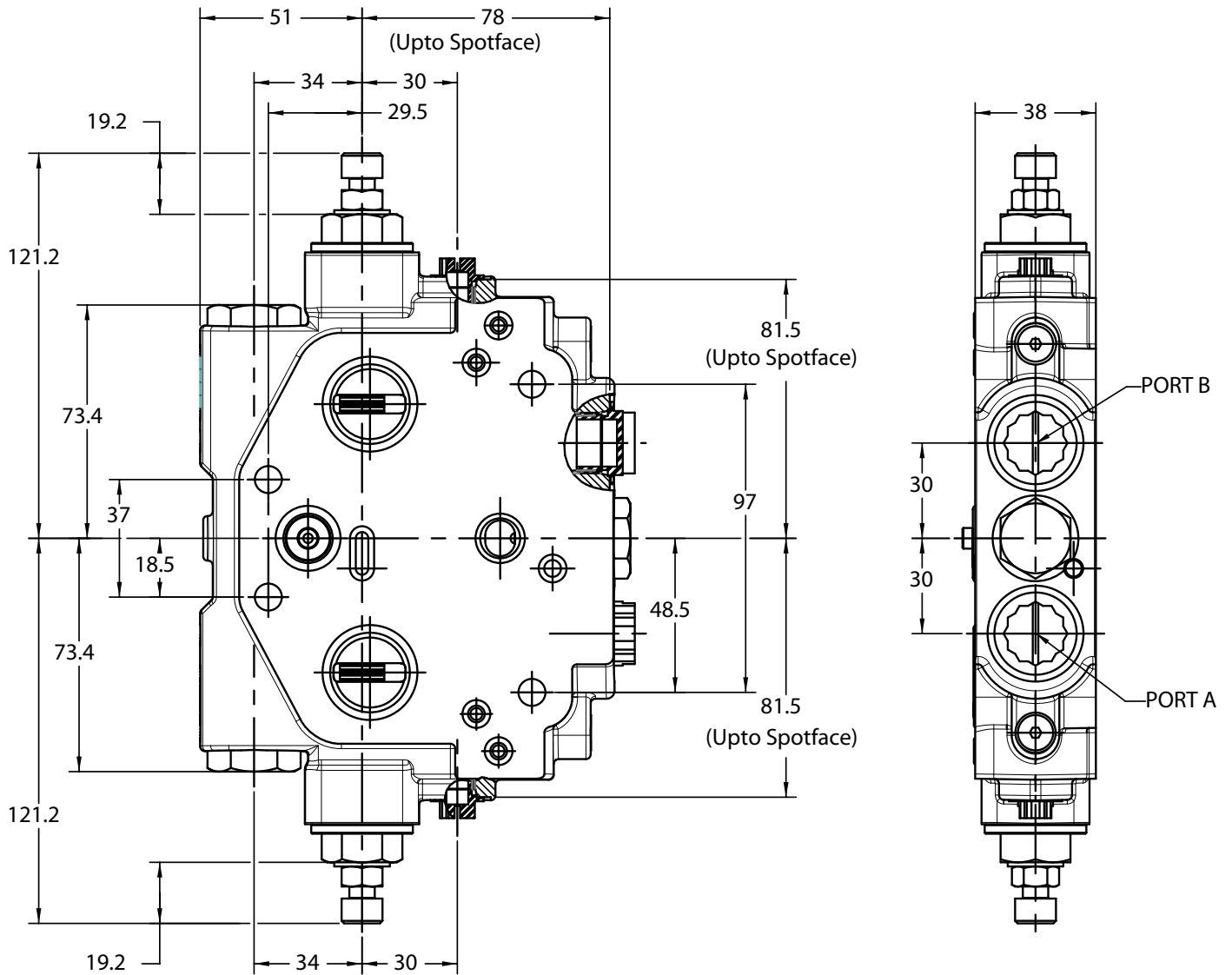
For Open Center Inlet Only

P-Port	Tightening Torque	T-Port	Tightening Torque
SAE-10	42-46 N-m (30-35 ft-lb)	SAE-12	88-100 N-m (65-75 ft-lb)
SAE-8	34-41 N-m (25-30 ft-lb)	SAE-10	68-75 N-m (50-55 ft-lb)
M18	42-46 N-m (30-35 ft-lb)	M22	68-75 N-m (50-55 ft-lb)

Section Installation Dimensions

Hydraulic Section Installation Dimensions Minimum Envelope

Note:
Dimensions are in mm

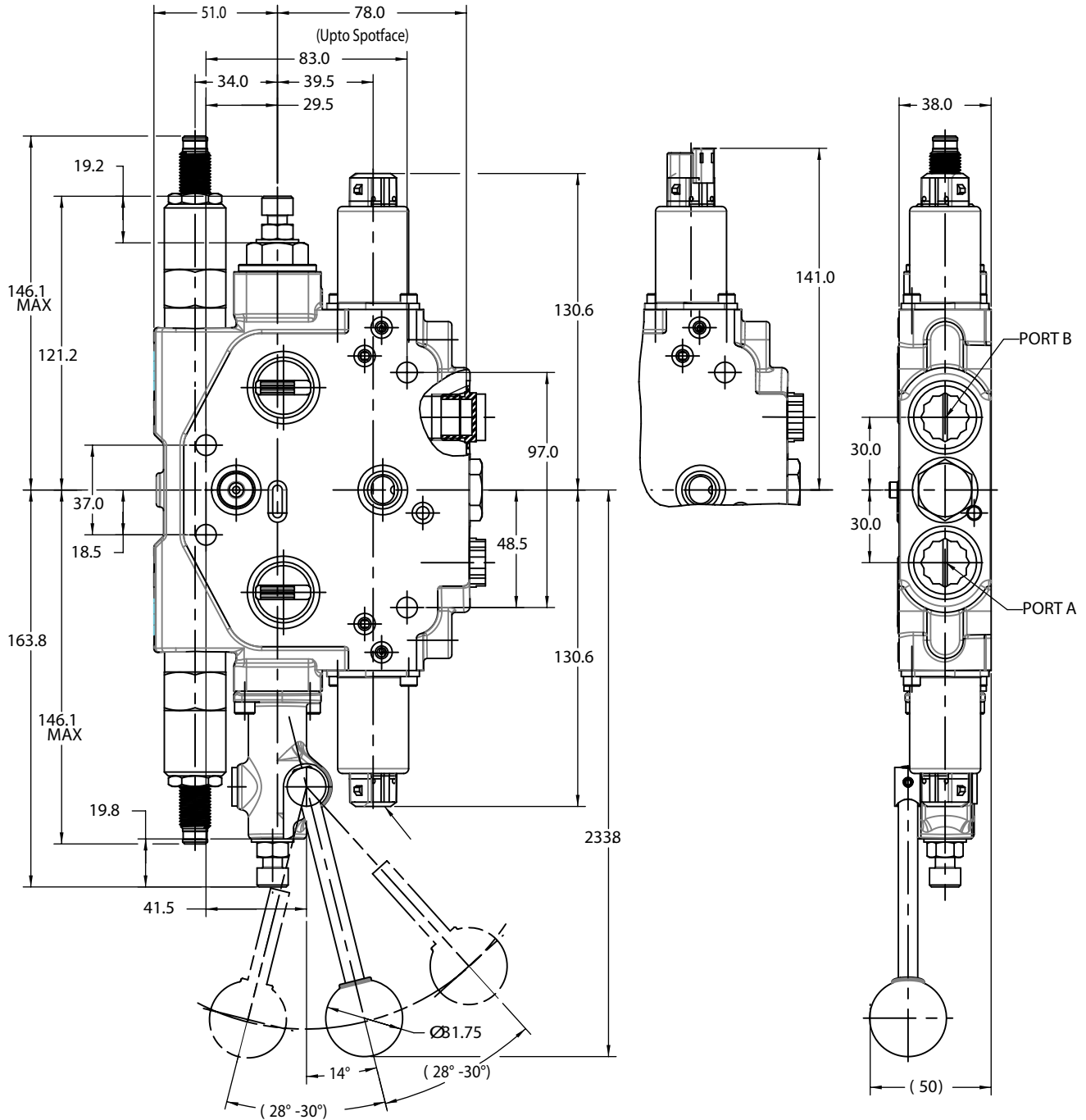


Section Installation Dimensions

Electrohydraulic Section Installation Dimensions Maximum Envelope

Note:

Dimensions are in mm



Application Notes

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