(2012)

HydroTechnic

HYDRAULIC EQUIPMENT AGRICULTURAL IMPLEMENT AND MACHINERY

Quality • Service • Innovation




HydroTechnic

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2012 1st

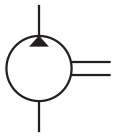
INDEX

Z Hydraulic Equipment

HydroTechnic Hydraulic Pump

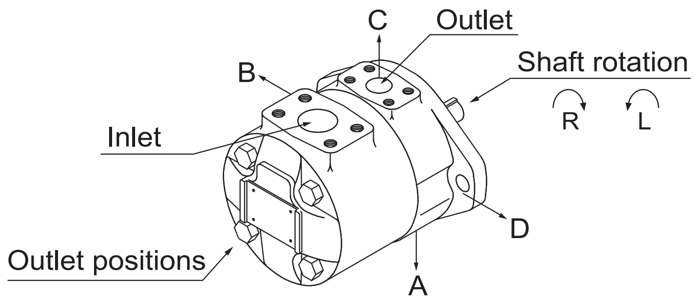
Fixed Displacement Vane Pump

IVPV SERIES



SYMBOL

Outlet positions / Shaft rotation



■ Ordering Index

IVPV2	-17	H	A	M	-F	-R	-11	C	-10
Frame size	Geometric displace-ment •Code	Pressure type	Port conn-ections	Port conn-ections modifier	Mounting form	Shaft rotation	Shaft model Splined Key	Outlet positions	Design
IVPV1	4、5、6 7、8、10 11	H: High pressure	A: SAE 4 bolt flange	M: Metric fixing threads	F: Flange mounting	R: Clockwise L: Anti-Clockwise (Viewed from shaft end of pump)	151	**A :** opposite inlet port **B :** 90°CCW from inlet **C :** inline with inlet **D :** 90°CW from inlet (Viewed from cover end of pump)	10
IVPV2	10、12 14、15 17、19 21						11		10

■ Technical Data

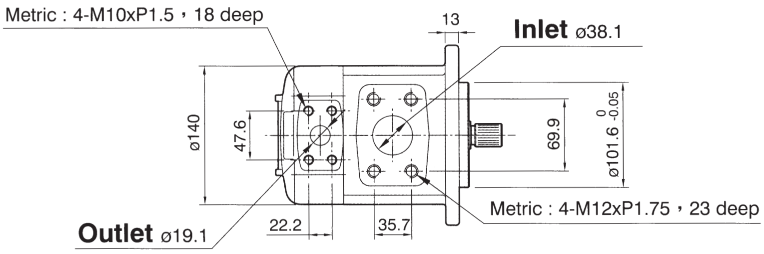
Frame size	Code	Displacement (cm^3/rev)	Max. Pressure (bar)		Speed (r/min)	
			Continuous	Peak	Max.	Min.
IVPV1	4	12.8	210	235	2000	600
	5	16.7				
	6	19.2				
	7	22.9				
	8	26.2				
	10	31.0				
	11	35.0				
IVPV2	10	32.5	210	235	2000	600
	12	38.3				
	14	43.3				
	15	46.7				
	17	52.5				
	19	59.2				
	21	65.0				

- Fluid: Using petroleum base oil & anti-wear hydraulic oil.
- Code (Geometric displacement): Rated capacity in US gpm at 1200 r/min and 6.9 bar (1000 psi)

HydroTechnic Hydraulic Pump

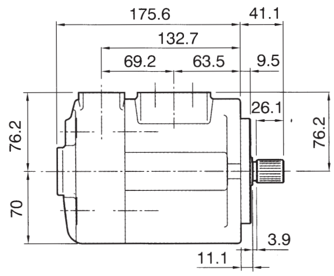
Fixed Displacement Vane Pump

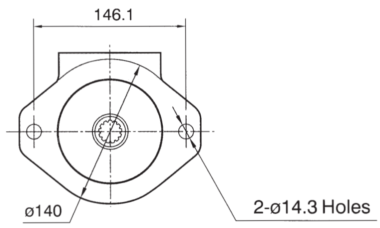
IVPV1 Flange Mounting
Shaft Model No.151



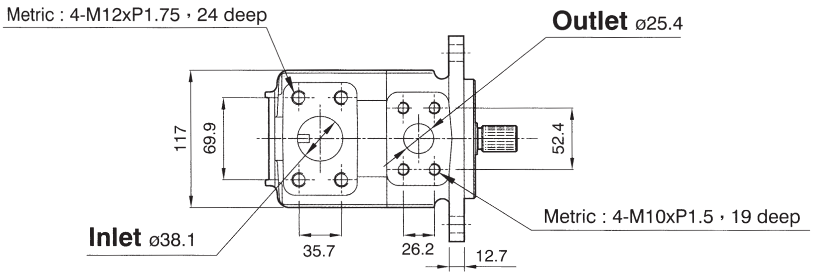
ANSI B92.1 CLASS 5

Module	D.P.16/32
Pressure angle	30°
No. of teeth	**13**
Pitch DIA.	ø20.6375
Major DIA.	ø22.175 $^{+0}_{-0.025}$
Minor DIA.	ø18.63 $^{+0}_{-0.25}$



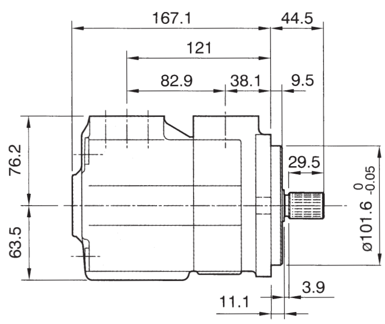


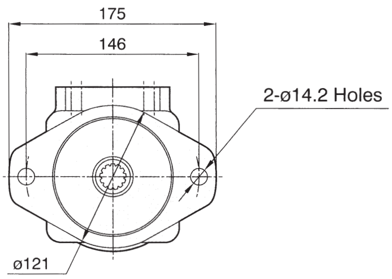
IVPV2 Flange Mounting
Shaft Model No.11



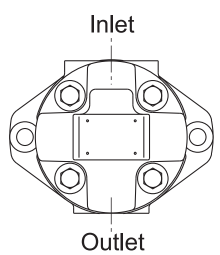
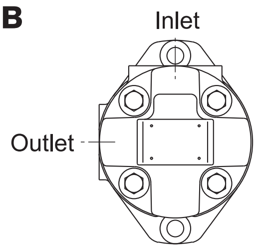
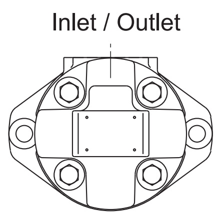
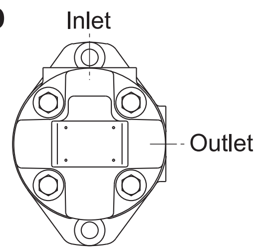
ANSI B92.1 CLASS 5

Module	D.P.16/32
Pressure angle	30°
No. of teeth	**13**
Pitch DIA.	ø20.6375
Major DIA.	ø22.175 $^{+0}_{-0.025}$
Minor DIA.	ø18.63 $^{+0}_{-0.25}$





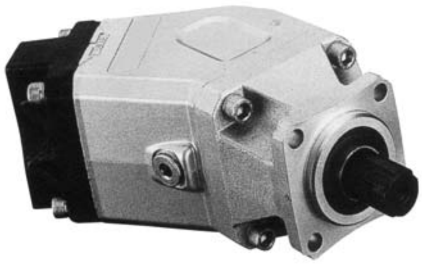
Port Orientation : Viewed from cover end of pump

Opposite Inlet PORT	90° CCW From Inlet	Inline With Inlet	90° CCW From Inlet
A 	**B** 	**C** 	**D** 

HydroTechnic

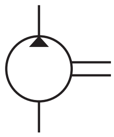
Hydraulic Pump

Fixed Displacement Bent Axis Piston Pump



FEATURE:

- Compact design.
- High volumetric, mechanical and overall efficency.
- Low noise level.
- Reliability.
- Clockwise or anti-clockwise rotation turning the end cover 180°
- Wide displacement range, from 40.9 cm^3/rev to 110 cm^3/rev

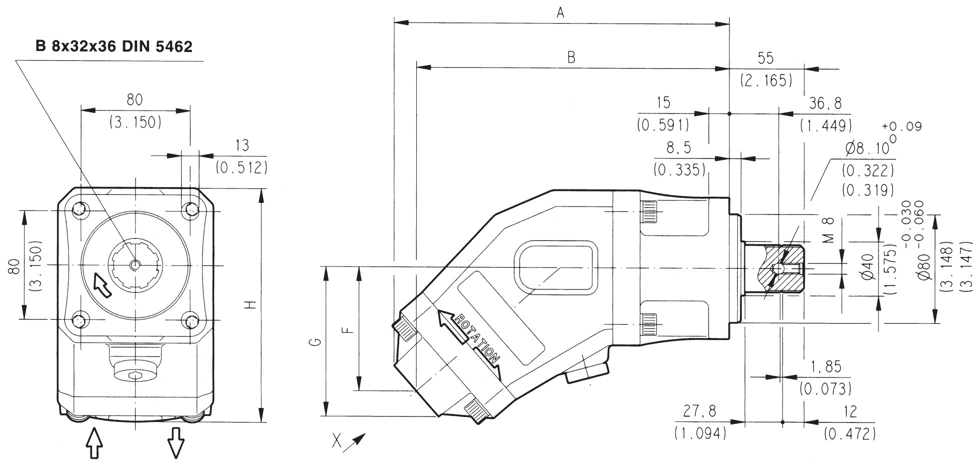


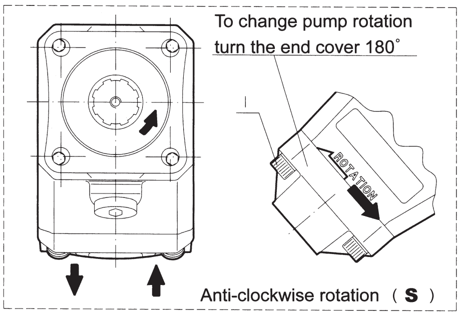
SYMBOL

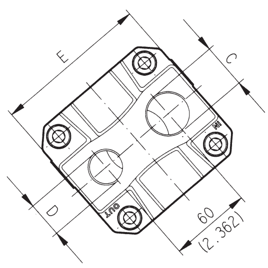
ORDER CODE

BAP – * – S**

- Shaft rotation (looking on drive shaft) **S:** Anti-clockwise **D:** Clockwise
- Displacement code
- Frame size







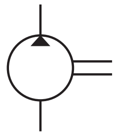
Type	Displacement (cm^3/rev)	Max. Pressure (bar)		Max. Speed (r.p.m)		A	B	C	D	E	F	G	H	I
		Continuous	Peak	Selfpriming	Intermittent	mm	mm	IN	OUT	mm	mm	mm	mm	Nm
BAP-040-*	40.9	350	400	1850	2500	224	228	G1	G3/4	116	91	110	173	40-45
BAP-050-*	50.1	350	400	1700	2400									
BAP-063-*	63	350	400	1600	2200									
BAP-071-*	71.6	315	350	1300	2000									
BAP-080-*	79.1	350	400	1300	2200	269	251	G1 1/4	G1	127	108	129	198	70-75
BAP-110-*	110	300	350	1300	2000									

- Fluid: Mineral oil based hydraulic fluids, Viscosity from 10 to 400 mm^2/s .

Z

HydroTechnic Hydraulic Pump

Fixed Displacement Gear Pump

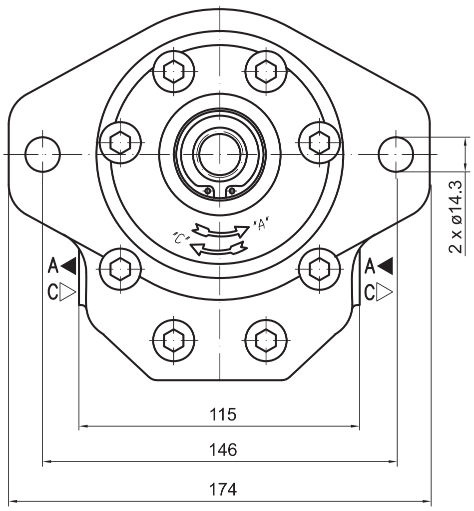


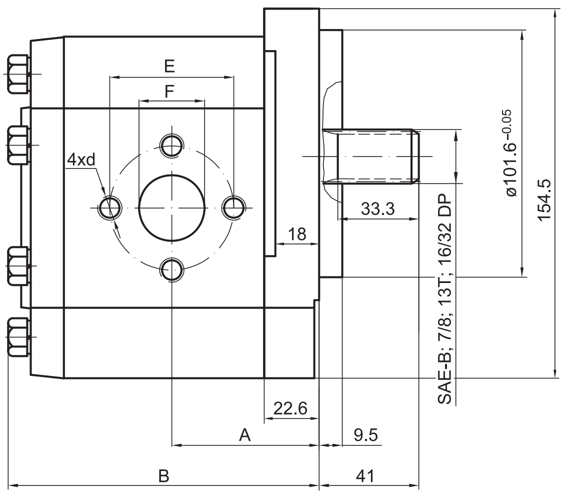
SYMBOL

ORDER CODE

30 A(C) ... X 236 H

- **H** — Port
- **236** — Pomp code
- **X** — Drive shaft
  X: Through the front cover
- **...** — Displacement code
- **A(C)** — Shaft rotation
  (looking on drive shaft)
  A: Anti-clockwise
  C: Clockwise
- **30** — Group:30





Type	Displacement	Flow		Pressure	Max Speed	Dimension							
		at 1500 rpm	at max rpm	P_{nom}	n	A	B	Inlet			Outlet		
	cm³/rev	l/min	l/min	bar	rpm	mm	mm	E	d	F	E	d	F
30A(C)20X236H	20	28.2	56.4	250	3000	56.1	116.7	40	M8	19	40	M8	19
30A(C)22.2X236H	22.5	31.7	63.5	250	3000	57.6	119.7						
30A(C)25X236H	25	35.3	70.5	250	3000	58.3	121.1						
30A(C)28X236H	28	39.5	79.0	250	3000	60.2	124.7						
30A(C)32X236H	32	45.1	90.2	250	3000	66.5	137.3	51	M10	27			
30A(C)36X236H	36	51.3	95.8	250	2800	68.0	140.5						
30A(C)42X236H	42	59.9	99.8	230	2500	70.8	146.1						
30A(C)46X236H	46	65.6	100.5	230	2300	72.7	149.8						
30A(C)50X236H	50	71.3	99.8	200	2100	74.5	153.4						
30A(C)55X236H	55	78.4	91.4	200	1750	76.7	157.9						
30A(C)60X236H	60	85.5	99.8	180	1750	78.7	162.4						

- Fluid: Mineral oil based hydraulic fluids, Viscosity from 16 to 200 mm²/s .

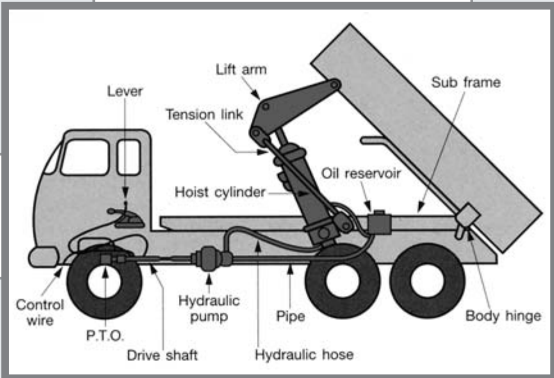
Z

Hydraulic Pump

Dump Truck Pump

KP-35A

KP-55A



KP-75A

KP-1403A/C

Operating Characteristics

Type	Displacement (cm^3/rev)	Min. Speed (r.p.m)	Max. Speed (r.p.m)	Rated Pressure (Kg f/cm^2)	Max. Pressure (Kg f/cm^2)	Valve Control Wire Actuating Force (Kg)	Use Truck Working Power (Ton)
KP-35A	34.7	350	1800	70	210	10	4.5
KP-55A	45	350	1800	100	250	13	6.0
KP-75A	72	350	1800	100	250	14	8.0
KP-1403A/C	136.1	350	1800	100	250	15	12.0

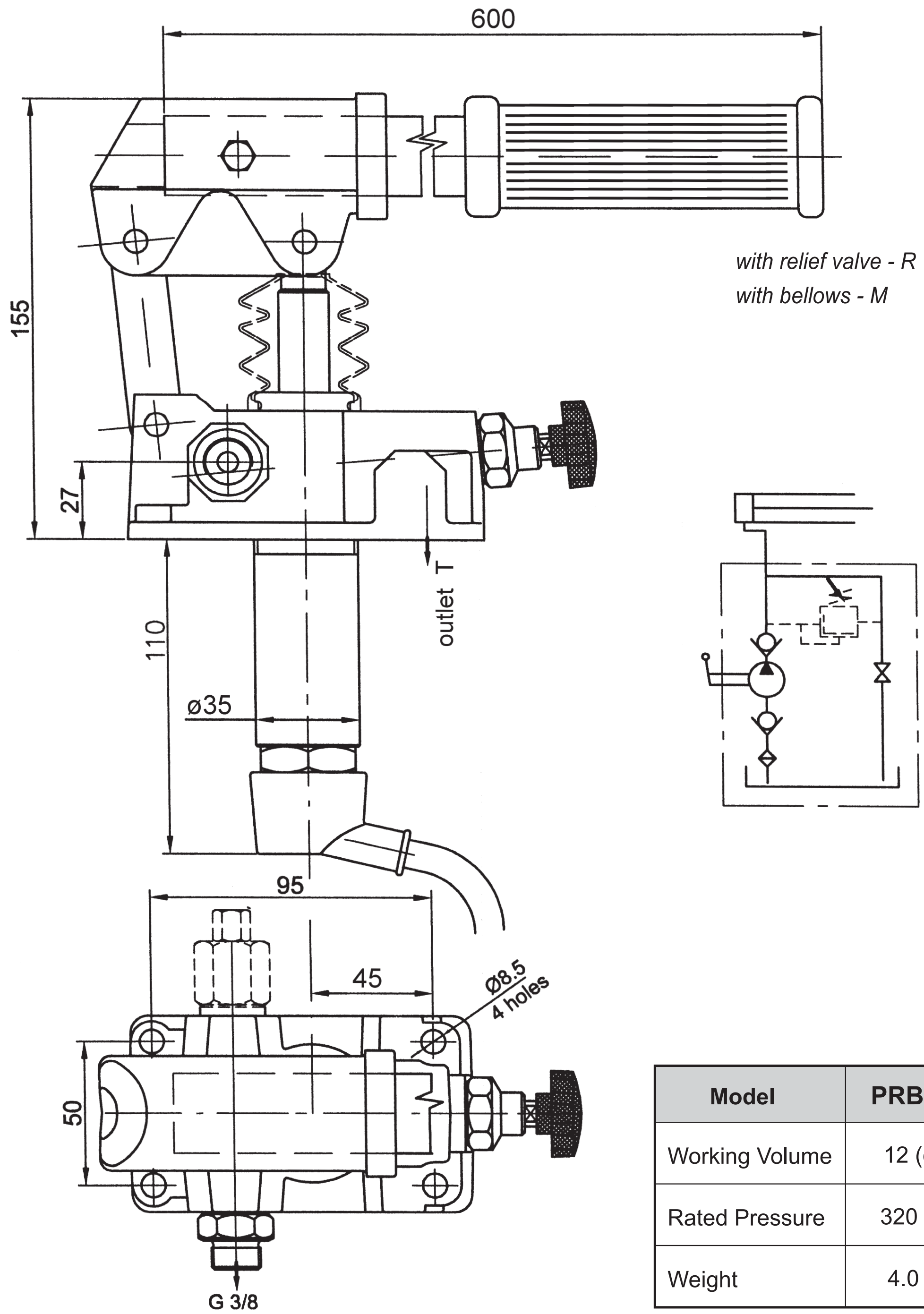
• Fluid : Mobil date 26 or crequivlent.

ORDER CODE

KP – ** – A

- Shaft rotation (looking on drive shaft)
  A: Anti-clockwise
  C: Clockwise
- Displacement code
- Frame size

PISTON HAND PUMP
double acting function
for a single acting cylinder
PRB 12...
PRB 25...

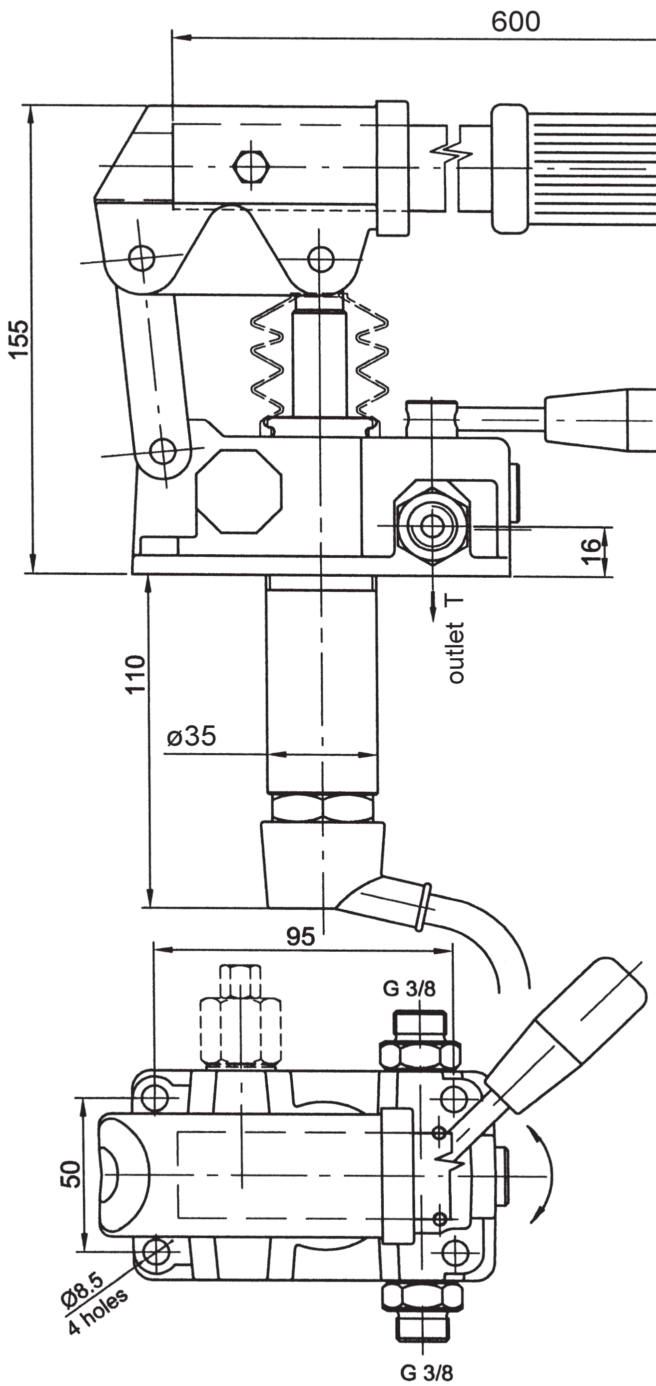


with relief valve - R
with bellows - M

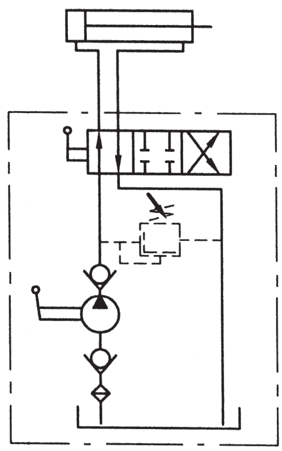
Model	PRB 12..	PRB 25..
Working Volume	12 (cm^3)	25 (cm^3)
Rated Pressure	320 (bar)	250 (bar)
Weight	4.0 (kg)	4.2 (kg)

PISTON HAND PUMP

double acting function
for a double acting cylinder
PRBD 12...
PRBD 25...

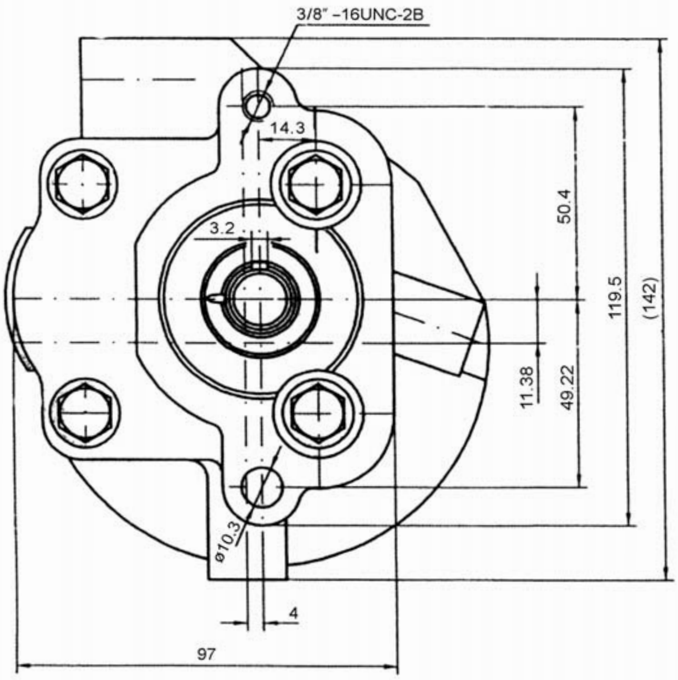


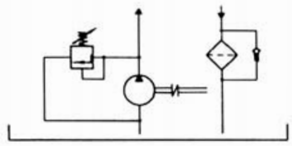
with relief valve - R
with bellows - M



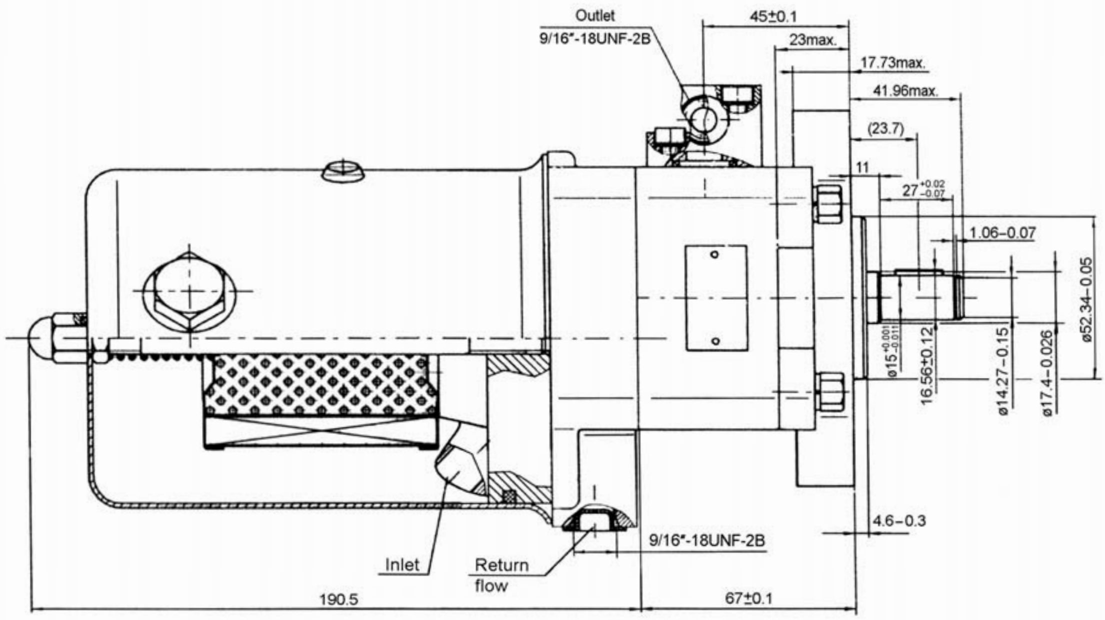
Model	PRBD 12..	PRBD 25..
Working Volume	12 (cm^3)	25 (cm^3)
Rated Pressure	320 (bar)	250 (bar)
Weight	4.0 (kg)	4.2 (kg)

20A6.3X319 / A2A21MF1





Hydraulic Diagram



Pump Type	Displacement	Flow 1500 rpm	Relief Valve-Pressure	Max Speed
	cm^3 / rev	L/min	bar	rpm
20A6.3X319	6.3	9.45	100 - 110	3000

MB-3
Available Sections From 1 to 6

Nominal flow rate		45 l/min	12 US gpm
Operating pressure (maximum)	parallel or tandem circuit	315 Bar	4600 psi
	series circuit	210 Bar	3050 psi
Back pressure (maximum)	on outlet port T	25 Bar	360 psi

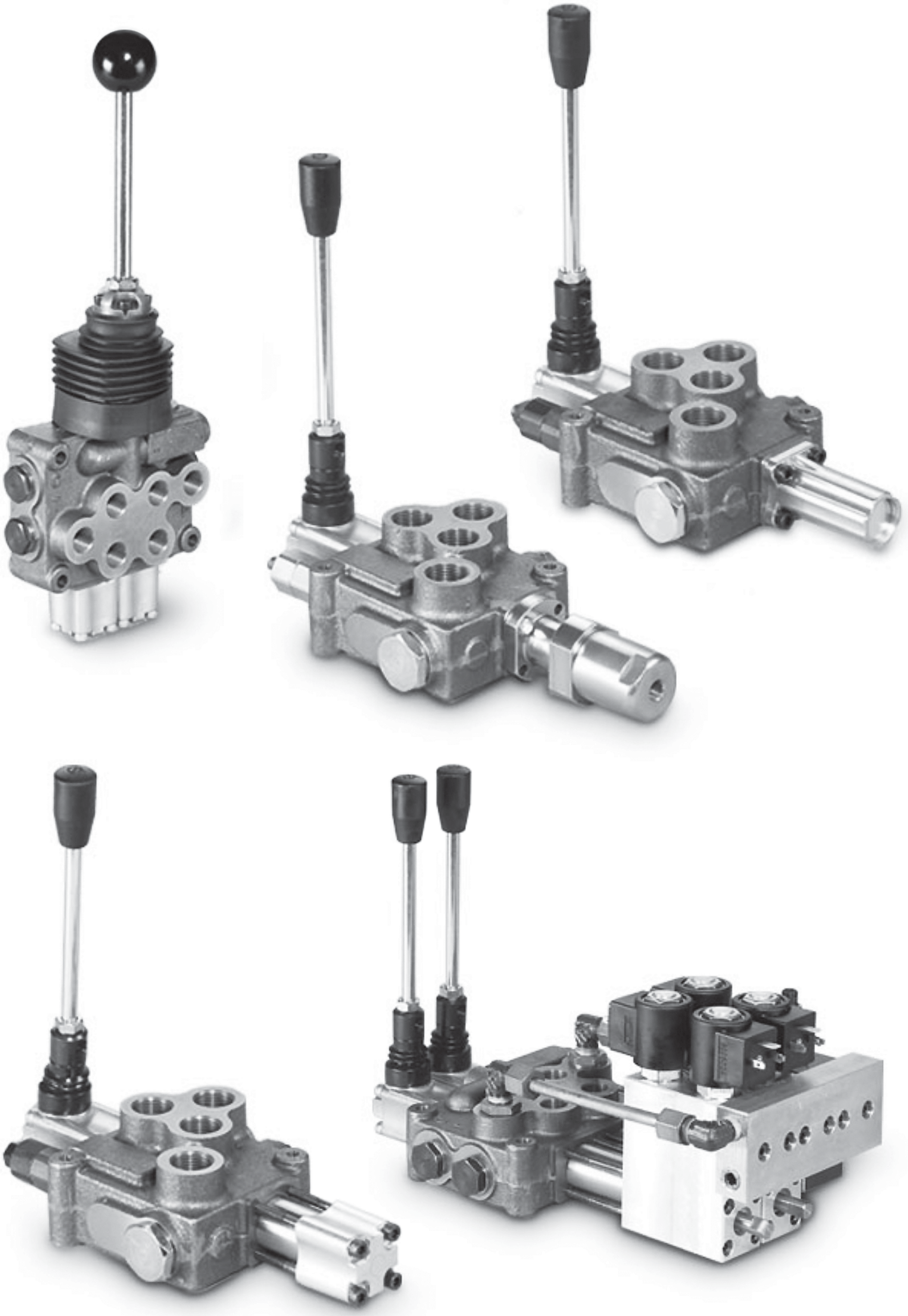
MB-4
Available Sections From 1 to 6

Nominal flow rate		60 l/min	16 US gpm
Operating pressure (maximum)	parallel or tandem circuit	315 Bar	4600 psi
	series circuit	210 Bar	3050 psi
Back pressure (maximum)	on outlet port T	25 Bar	360 psi

MB-5
Available Sections From 1 to 6

Nominal flow rate		80 l/min	21 US gpm
Operating pressure (maximum)	parallel or tandem circuit	315 Bar	4600 psi
	series circuit	250 Bar	3600 psi
Back pressure (maximum)	on outlet port T	25 Bar	360 psi

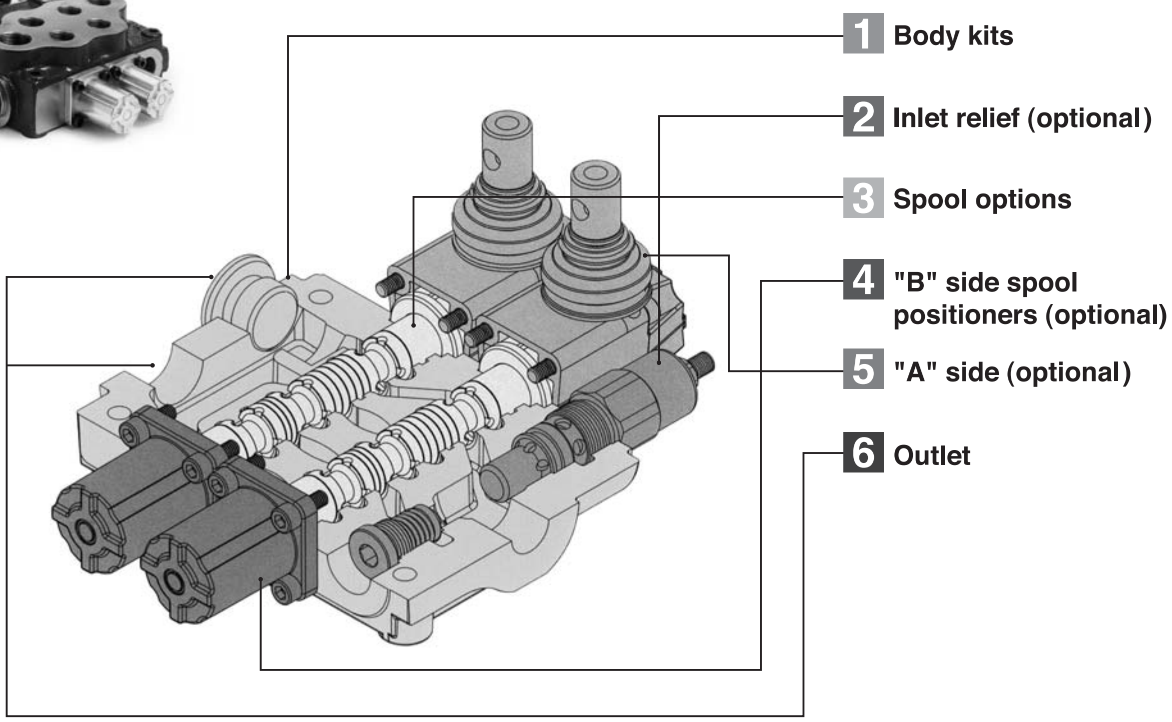
Special accessories



ORDER CODE

MB-5 / 2S - 3 / 1 8 L / G-4-6 / M3 (M13)

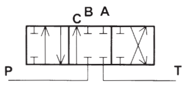
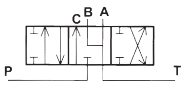
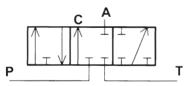
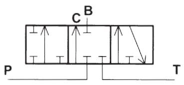
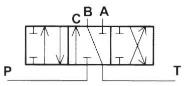
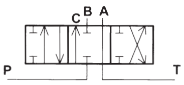
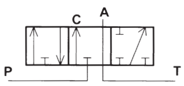
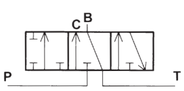
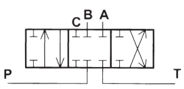
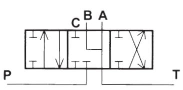
Monoblock Model 1 2 3 4 5 Port size 6



1:	**Body kits** Without service port valves prearrangement (Include body, seals, rings and load check valve.)
TYPE	DESCRIPTION
1 - S	1 section
2 - S	2 sections
3 - S	3 sections
4 - S	4 sections
5 - S	5 sections
6 - S	6 sections

2:	**Inlet relief (optional)**
TYPE	DESCRIPTION
AG-2	80 to 160 bar / 1150 to 2300 psi, standard setting 125 bar / 1800 psi
AG-3	125 to 250 bar / 1800 to 3600 psi, standard setting 175 bar / 2500 psi
AG-4	200 to 315 bar / 2900 to 4600 psi, standard setting 220 bar / 3200 psi

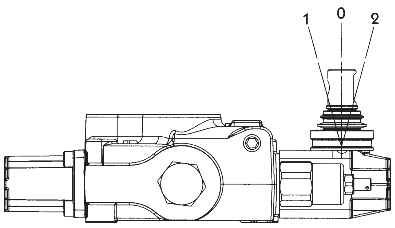
3: Spool options

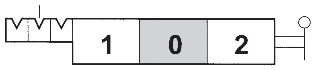
CIRCUIT	TYPE	CIRCUIT DESCRIPTION
	1	3 position double - acting A and B blocked C open
	2	3 position double - acting A and B to tank C open
	3 ("B" port plugged)	3 position single - acting on A blocked C open
	4 ("A" port plugged)	3 position single - acting on B blocked C open
	5	3 position double - acting A blocked B to tank C open
	6	3 position double - acting A to tank B blocked C open
	7 ("B" port plugged)	3 position single - acting on A to tank C open
	8 ("A" port plugged)	3 position single - acting on B to tank C open
	9	3 position double - acting switch port closed A and B blocked C closed
	10	3 position double - acting switch port closed A and B tank C closed

Z

4: "B" Side spool positioners (optional)

TYPE 6

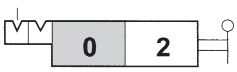




6-1 Kit:

DETENT IN POS. 1-0-2,

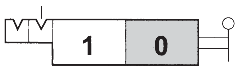
WITHOUT SPRING CENTERED



6-2 Kit:

2 POSITIONS, DETENT IN POS. 0-2,

WITHOUT SPRING CENTERED

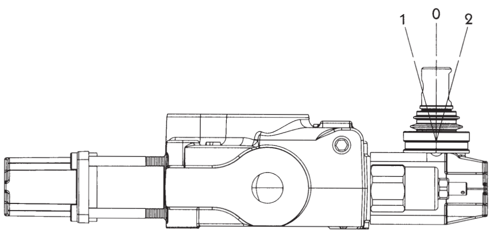


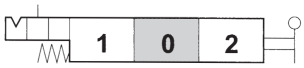
6-3 Kit:

2 POSITIONS, DETENT IN POS. 1-0,

WITHOUT SPRING CENTERED

TYPE 9

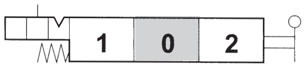




9-1 Kit:

DETENT IN POS. 1, 2 WITH SPRING

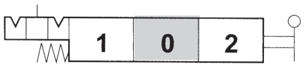
CENTERED



9-2 Kit:

DETENT IN POS. 2 WITH SPRING

CENTERED



9-3 Kit:

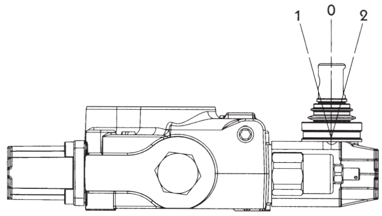
DETENT IN POS. 1 WITH SPRING

CENTERED

Z

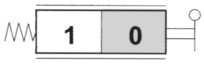
4: "B" Side spool positioners (optional)

TYPE 8



8 Kit:

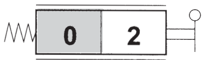
SPRING RETURN TO NEUTRAL POSITION.



8-1 Kit:

SPRING RETURN TO NEUTRAL POSITION.

(2 POSITIONS)

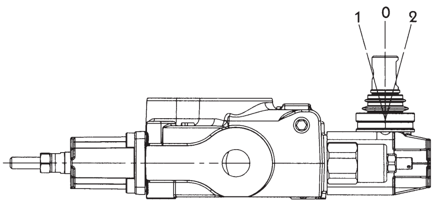


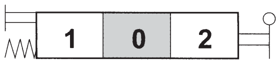
8-2 Kit:

SPRING RETURN TO NEUTRAL POSITION.

(2 POSITIONS)

TYPE 8D2



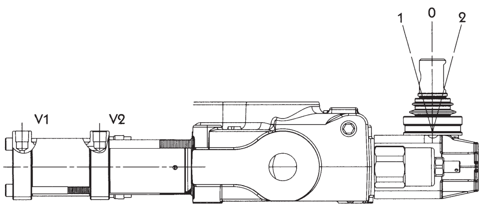


8D2 Kit:

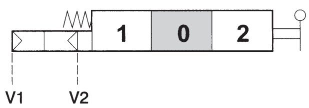
WITH SPRING RETURN TO NEUTRAL POSITION AND PIN WITH M8 MALE THREAD FOR DUAL CONTROL

TYPE 8P

V1 & V2 : NPT 1/8-27



ON/OFF PNEUMATIC KIT



8P Kit:

WITH SPRING RETURN TO NEUTRAL POSITION AND PENUMATIC CONTROL

Operating feature:

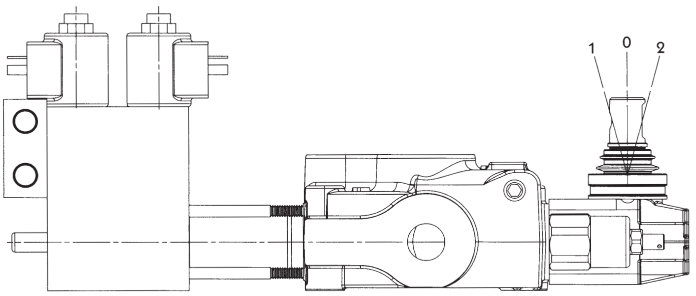
PILOT PRESSURE (MIN.): 6 bar / 87 psi

PILOT PRESSURE (MAX.): 12 bar / 174 psi

Z

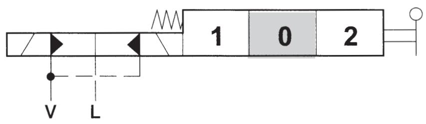
4: "B" Side spool positioners (optional)

TYPE 8ED3



8ED3 Kit:

ON / OFF HYDRAULIC KIT



Operating features :

PILOT PRESSURE : • MIN. 10 bar / 145 psi
• MAX. 50 bar / 725 psi

MAX. BACK PRESSURE ON DRAIN L: 25 bar / 360 psi

Coil features :

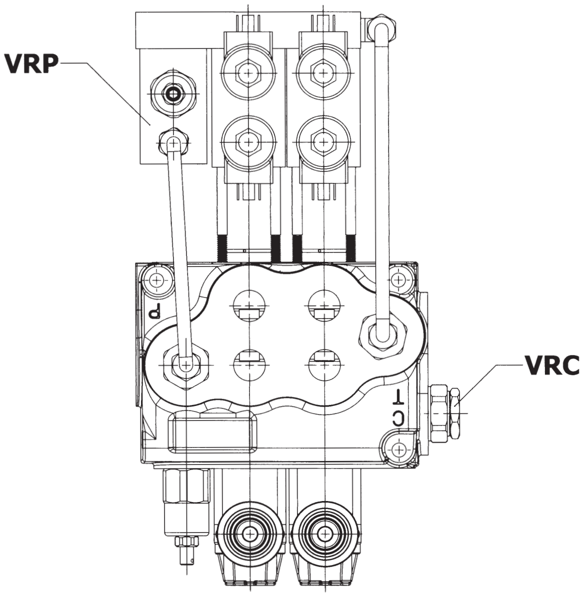
NOMINAL VOLTAGE TOLERANCE: ±10%

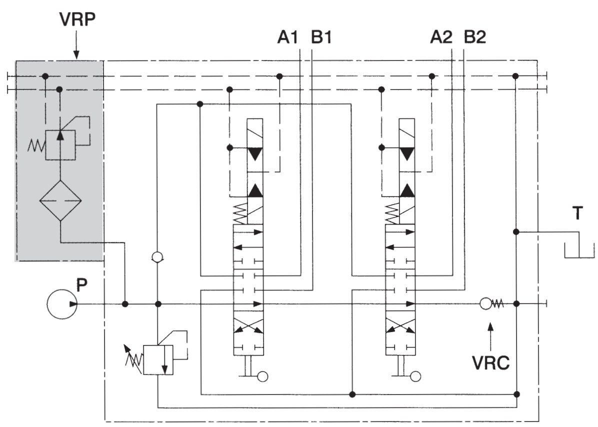
ELECTRIC POWER: 21 W

STANDARD VOLTAGE: 12VDC / 24 VDC

8ED3 Kit:

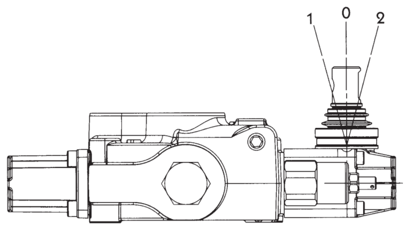
WITH SPRING RETURN TO NEUTRAL POSITION AND HYDRAULIC CONTROL

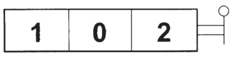




S: "A" Side (optional)

TYPE L

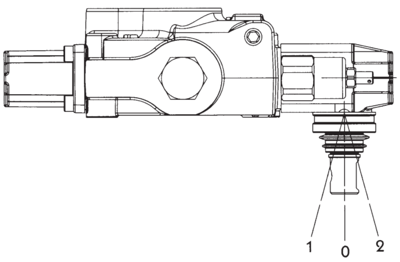


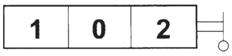


Type L :

STANDART LEVER KIT

TYPE R



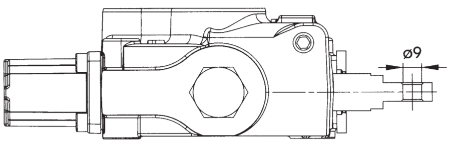


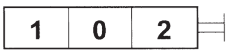
Type R :

STANDART LEVER KIT

(ROTATED 180 DEGREE)

TYPE SLP



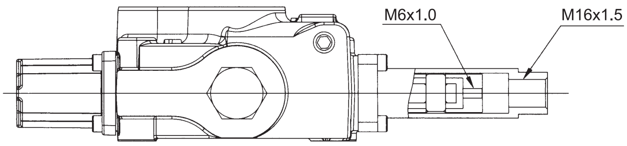


Type SLP :

WITH DUST-PROOF PLATE

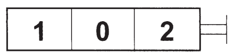
5: "A" Side (optional)

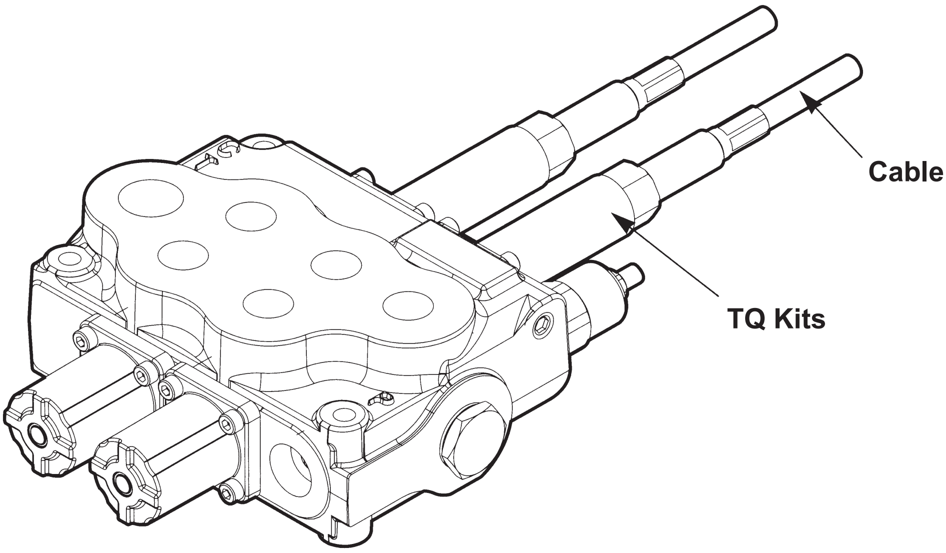
TYPE TQ



Type TQ :

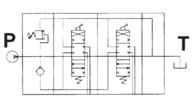
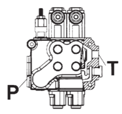
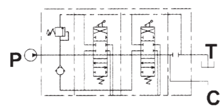
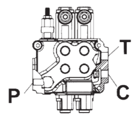
WITH CONNECTION KIT



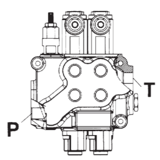
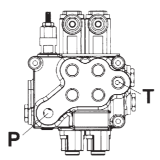


Note: CONNECTION KIT NOT INCLUDE CABLE

6: Outlet

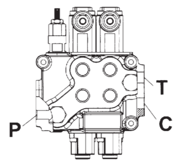
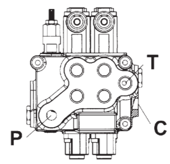
CODE	HYDRAULIC DIAGRAM	LAYOUT	DESCRIPTION
1			Outlet with single return (T)
6			Outlet with two return (T) outlet (C)

TYPE OF THREAD ON INLET - PORTS - OUTLET

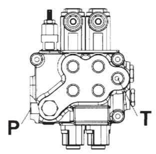
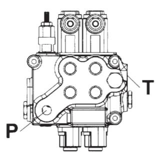
CODE	DESCRIPTION	CODE	DESCRIPTION
2	Side inlet P and outlet T top ports A - B	3	Top inlet P - outlet T top ports A - B

TWO OUTLETS POSITION WITH C AND TYPE OF THREAD ON INLET - PORTS - OUTLET

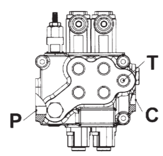
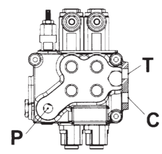
CODE	DESCRIPTION	CODE	DESCRIPTION
7	Side inlet P- outlet T (tank) outlet C top ports A - B	8	Top inlet P- outlet T (tank)- ports A - B side outlet C

SINGLE OUTLET (T) POSITION AND TYPE OF THREAD ON INLET - PORTS - OUTLET

CODE	DESCRIPTION	CODE	DESCRIPTION
4	Side inlet P top ports A-B and outlet T	5	Top inlet P and A -B side outlet T

TWO OUTLETS POSITION WITH C AND TYPE OF THREAD ON INLET - PORTS - OUTLET

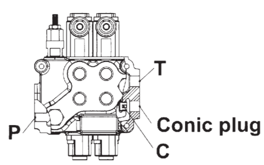



CODE	DESCRIPTION	CODE	DESCRIPTION
9	Side inlet P - outlet C top ports A - B and outlet T (tank)	10	Top inlet P and ports A - B side outlet T (tank) and outlet C

Note: The monoblock MB-4 with single outlet (T) type "1" can be converted to type "6" with C with two outlets with T mounting a conic plug as per the table mentioned below.

For the same application on the monoblock MB-3, a machining is required.

Type of conic plugs to convert a single outlet into a double one



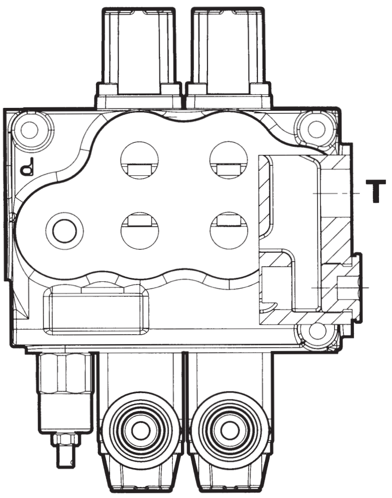
NOTE:
MB-3 : APPLICATION C ON REQUEST
MB-4 : APPLICATION C PREARRANGED
MB-5 : APPLICATION C PREARRANGED

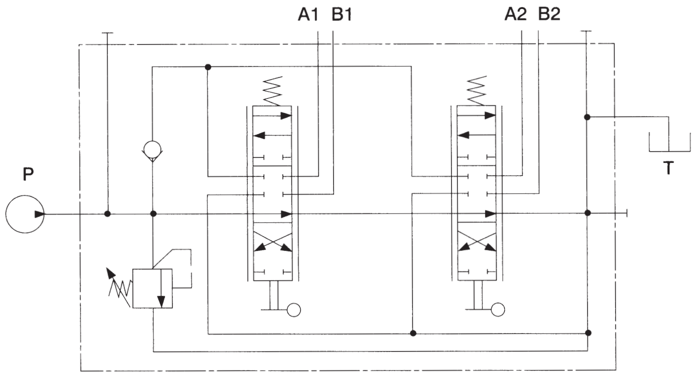
Z

6: Outlet

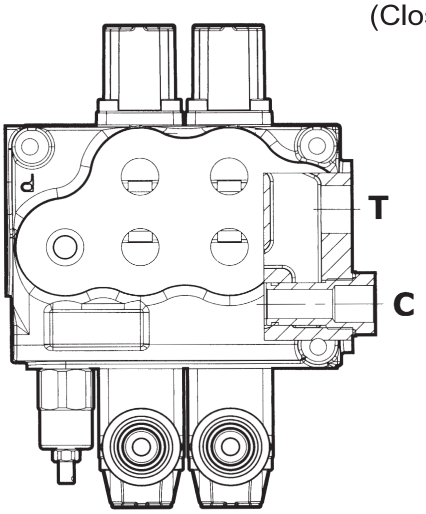
OUTLET SECTION

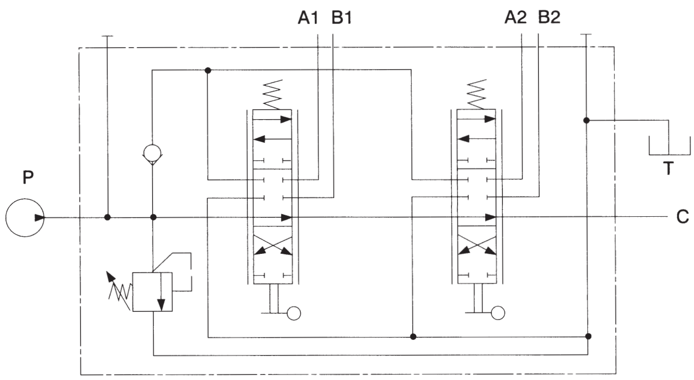
M3 (M13) Power Beyond Conversion plug
(Open center plug)



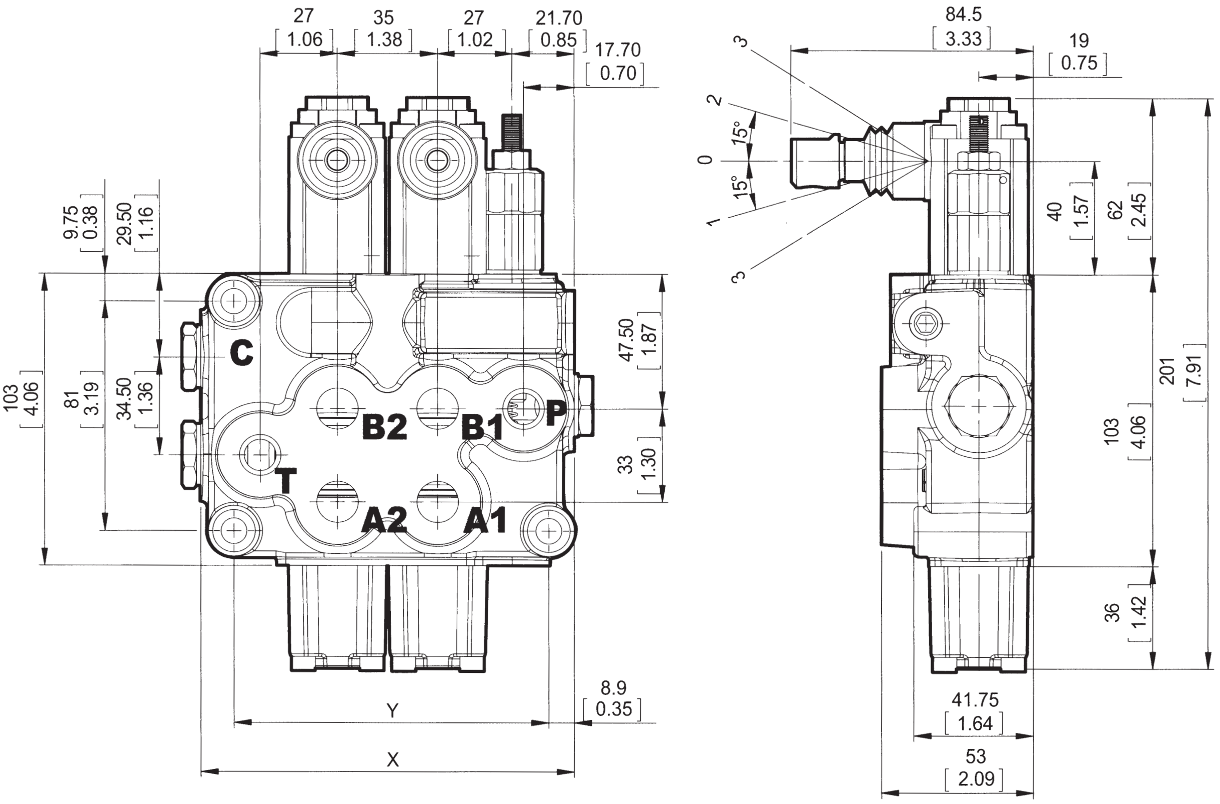


M8 (M68) Power Beyond Conversion plug
Carry-Over C
(Closed center plug)





MB-3 Port and Dimensions



Standard Threads

Ports	Inlet **P**	**A** and **B**	Outlet **T** and carry-over **C**
BSP	G3/8	G3/8	G3/8

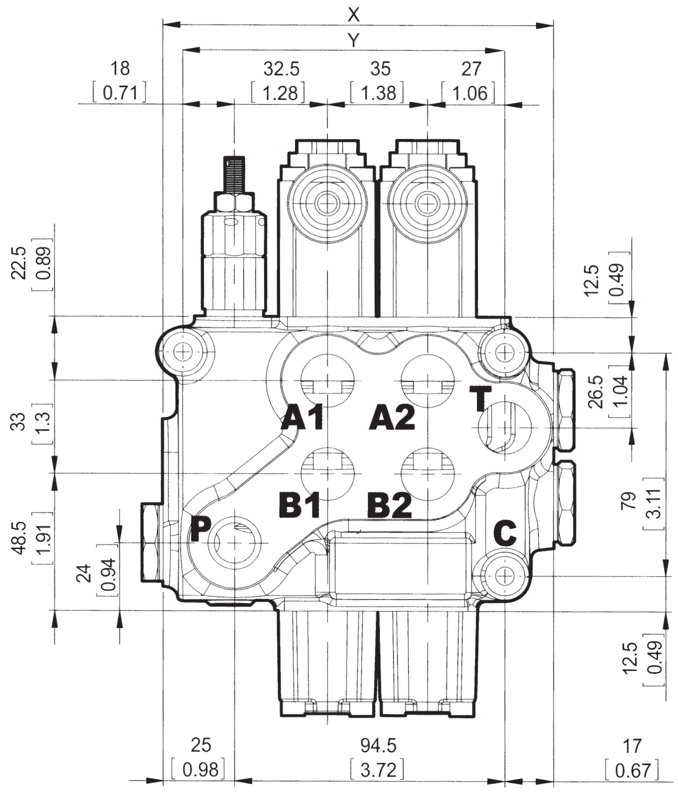
• G-1/2: G4 G-3/8: G3 G-3/4: G6

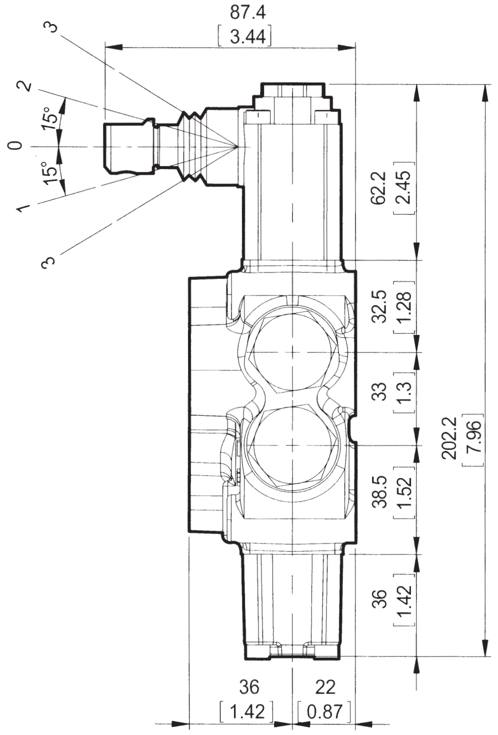
Standard Dimensions

TYPE	X		Y	
	mm	in	mm	in
MB3 / 1S	93.5	3.68	73	2.87
MB3 / 2S	130.5	5.14	110	4.33
MB3 / 3S	165.5	6.52	147	5.79
MB3 / 4S	202.5	7.97	184	7.24
MB3 / 5S	239.5	9.43	221	8.7
MB3 / 6S	276.5	10.89	258	10.16

Z

MB-4 Port and Dimensions





Standard Threads

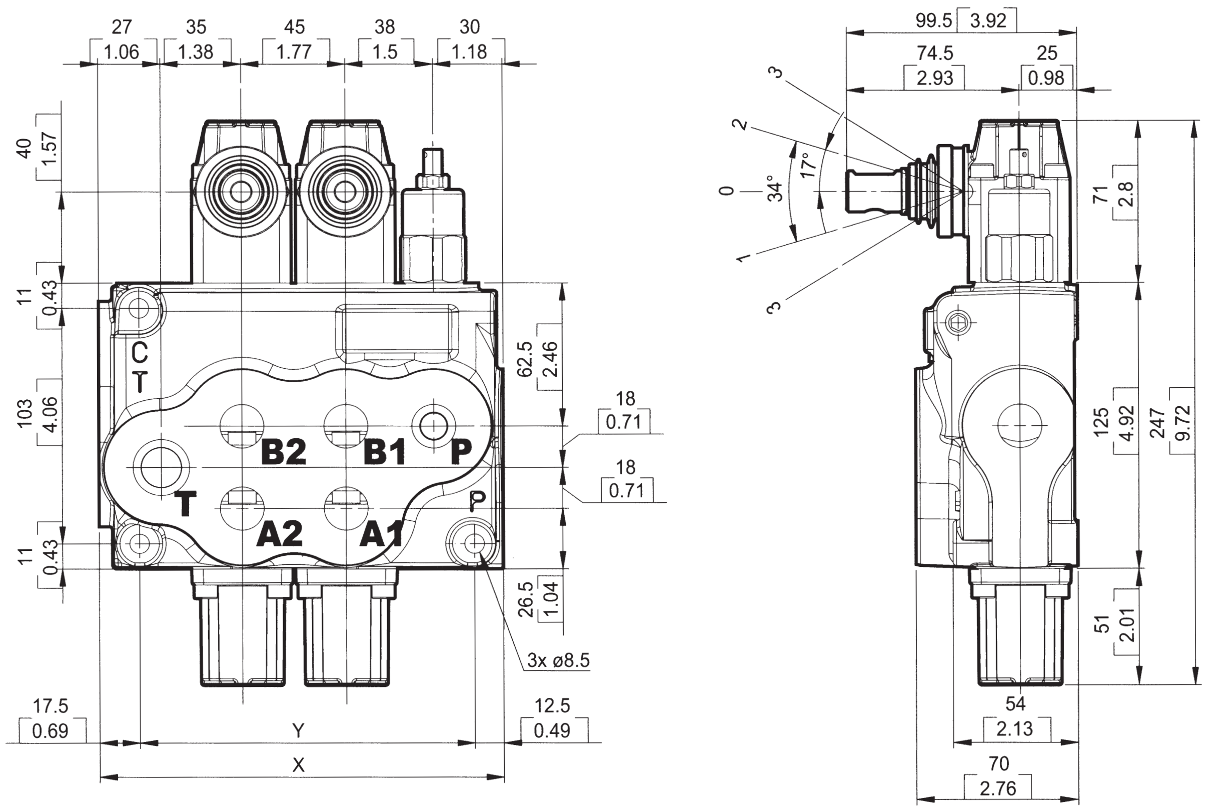
Ports	Inlet **P**	**A** and **B**	Outlet **T** and carry-over **C**
BSP	G1/2	G1/2	G1/2

• G-1/2: G4 G-3/8: G3 G-3/4: G6

Standard Dimensions

TYPE	X		Y	
	mm	in	mm	in
MB4 / 1S	101.5	4	77.5	3.05
MB4 / 2S	136.5	5.37	112.5	4.33
MB4 / 3S	171.5	6.75	147.5	5.81
MB4 / 4S	206.5	8.13	182.5	7.19
MB4 / 5S	241.5	9.51	217.5	8.56
MB4 / 6S	276.5	10.89	252.5	9.94

MB-5 Port and Dimensions



Standard Threads

Ports	Inlet **P**	**A** and **B**	Outlet **T** and carry-over **C**
BSP	G1/2	G1/2	G3/4

• G-1/2: G4 G-3/8: G3 G-3/4: G6

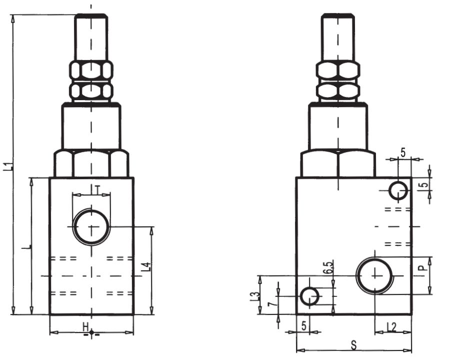
Standard Dimensions

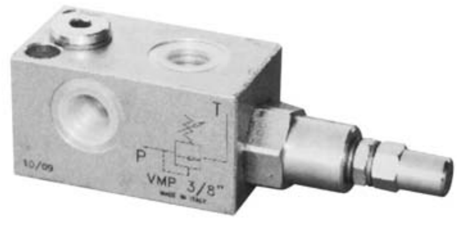
TYPE	X		Y	
	mm	in	mm	in
MB5 / 1S	130	5.12	100	3.94
MB5 / 2S	174.5	6.87	145	5.71
MB5 / 3S	219.5	8.64	190	7.48
MB5 / 4S	264.5	10.41	235	9.25
MB5 / 5S	309.5	12.19	280	11.02
MB5 / 6S	354.5	13.96	325	12.80

Z

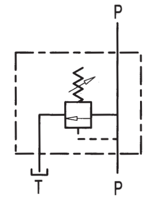
Relief Valve "VMP" Series

VMP...



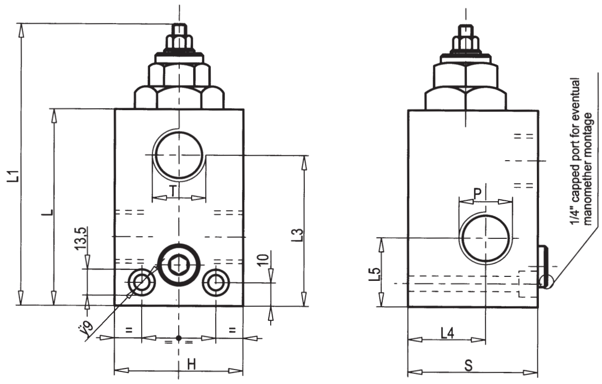


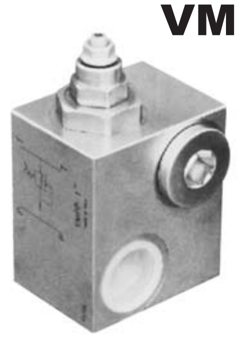
Type	Max. Flow	Max. Pressure	L	L1	L2	L3	L4	H	S
	Lt/min	Bar	mm	mm	mm	mm	mm	mm	mm
VMP 1/4" **L**	30	350	52	114	12	13	34	30	40
VMP 3/8" **L**	40	350	55	117	12	15	35.5	30	40
VMP 1/2"	70	350	77	139	17.5	29.5	54	45	45
VMP 3/4"	120	350	92	154	17.5	35	68	50	50



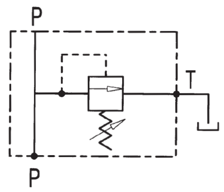
Relief Valve "VMPP" Series

VMPP...



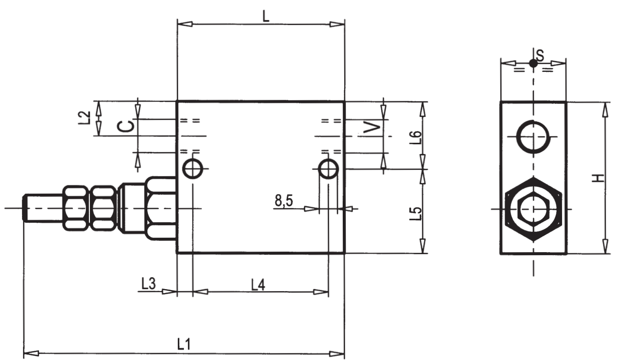


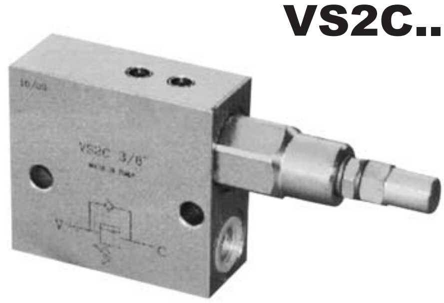
Type	Max. Flow	Max. Pressure	L	L1	L2	L3	L4	L5	H	S
	Lt/min	Bar	mm	mm	mm	mm	mm	mm	mm	mm
VMPP 3/4"	120	350	94	135	32	72	35	32	60	60
VMPP 1"	180	350	94	135	30	69	34	23	60	60



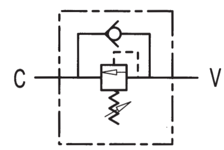
Sequence Valve "VS2C" Series

VS2C...



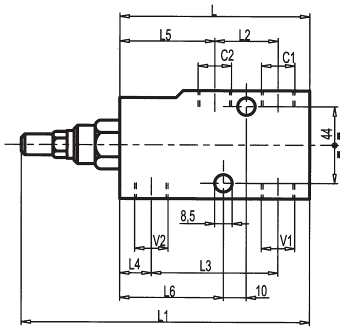


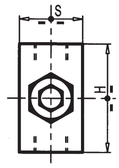
Type	Max. Inlet Flow	Max. Pressure	L	L1	L2	L3	L4	L5	L6	H	S
	Lt/min	Bar	mm	mm	mm	mm	mm	mm	mm	mm	mm
VS2C 3/8"	35	350	74	146	14	7	55	39	31	70	30
VS2C 1/2"	70	350	80	152	15	7	55	37	33	70	30
VS2C 3/4"	110	310	100	164	20	10	80	50	50	100	40



HydroTechnic Hydraulic Control Valve

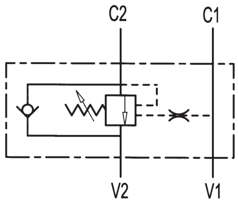
Single Overcentre Valve "VBCD...SE" Series



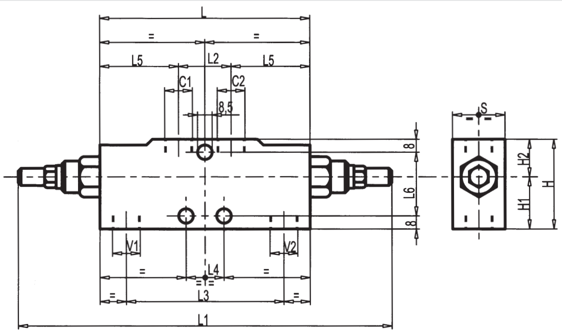


VBCD...SE

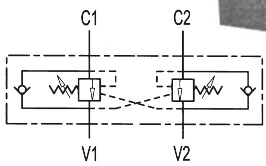
Type	Max. Flow	Max. Pressure	Pilot Ratio	L	L1	L2	L3	L4	L5	L6	H	S
	Lt/min	Bar		mm	mm	mm	mm	mm	mm	mm	mm	mm
VBCD 1/4" **SE/A**	20	350	1 : 4.5	100	149	30	60	20	50	55	60	30
VBCD 3/8" **SE/A**	40	350	1 : 4.5	100	149	30	60	20	50	55	60	30
VBCD 1/2" **SE/A**	60	350	1 : 4.5	100	149	36	65	20	50	57.5	60	30
VBCD 3/4" **SE/A**	95	350	1 : 5.5	100	192	46	85	23.5	62.5	75	80	35



Double Overcentre Valve "VBCD...DE" Series

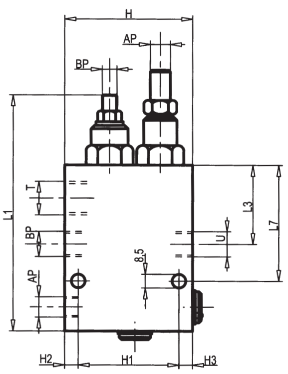


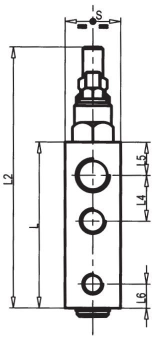
VBCD...DE



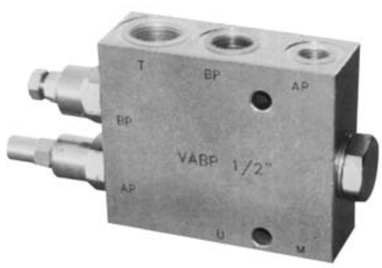
Type	Max. Flow	Max. Pressure	Pilot Ratio	L	L1	L2	L3	L4	L5	L6	H1	H2	H	S
	Lt/min	Bar		mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
VBCD 1/4" **DE/A**	20	350	1 : 4.5	150	248	50	100	30	50	55	32	28	60	30
VBCD 3/8" **DE/A**	40	350	1 : 4.5	150	248	50	100	30	50	55	32	28	60	30
VBCD 1/2" **DE/A**	60	350	1 : 4.5	150	248	50	100	30	50	57.5	32	28	60	30
VBCD 3/4" **DE/A**	95	350	1 : 5.5	190	320	65	143	40	62.5	75	40	40	80	35

Two Pump "Hi-Low" Unloading Valve "VABP" Series

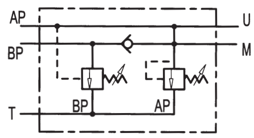




VABP...



Type	Max. Flow		Max. Pressure	L	L1	L2	L3	L4	L5	L6	L7	H1	H2	H3	H	S
	Lt/min		Bar	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
	AP	BP														
VABP 3/8"	15	30	350	100	142	155	50	30	20	13	69	65	8.5	6.5	80	30
VABP 1/2"	25	45	350	105	147	160	54	36	18	15	73	65	17	8	90	35
VABP 3/4"	30	80	350	140	187	212	52.5	42.5	20	20	95	65	27	8	100	40

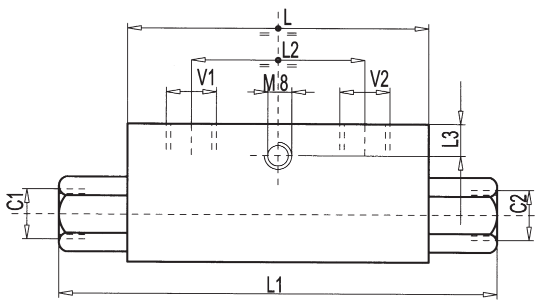


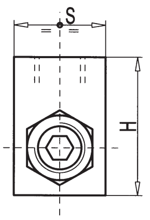
Z

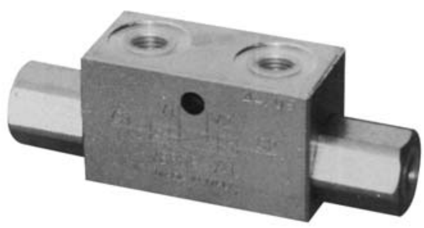
Hydraulic Control Valve

Double Pilot Operated Check Valve "VBPDE" Series

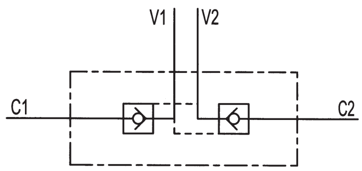
VBPDE...





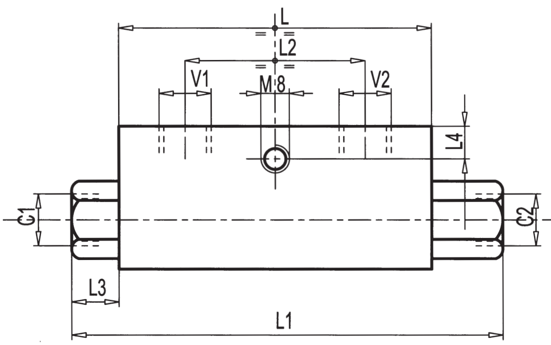


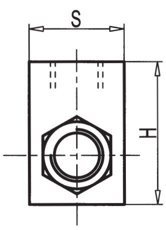
Type	Max. Flow	Max. Pressure	Pilot Ratio	L	L1	L2	L3	H	S
	Lt/min	Bar		mm	mm	mm	mm	mm	mm
VBPDE 1/4" **L**	20	350	1 : 5.5	64	113	36	8	40	30
VBPDE 3/8" **L**	35	350	1 : 5.5	80	128	38	8	40	30
VBPDE 1/2" **L**	50	350	1 : 5	90	142	45	8	45	45
VBPDE 3/4"	100	300	1 : 4	100	192	46	8	60	40



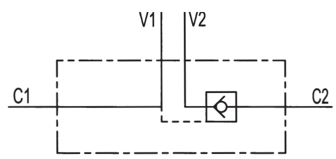
Single Pilot Operated Check Valve "VBPSE...VIE" Series

VBPSE...VIE



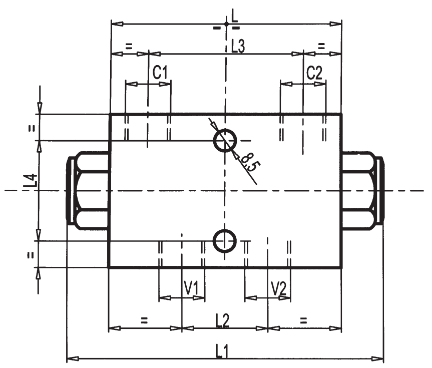


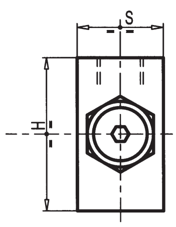
Type	Max. Flow	Max. Pressure	L	L1	L2	L3	L4	H	S
	Lt/min	Bar	mm	mm	mm	mm	mm	mm	mm
VBPSE 1/4" **L 4 VIE**	20	350	64	106	36	18.5	8	40	30
VBPSE 3/8" **L 4 VIE**	35	350	80	120	38	16	8	40	30
VBPSE 1/2" **L 4 VIE**	50	350	90	133	45	17	8	45	35
VBPSE 3/4" **4 VIE**	100	350	100	182	48	36	8	60	40



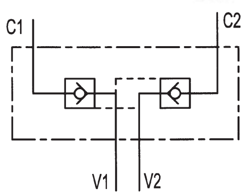
Double Pilot Operated Check Valve "VBPDE" Series

VBPDE...





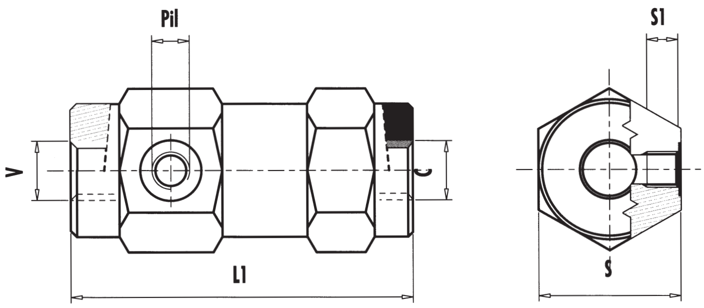
Type	Max. Flow	Max. Pressure	L	L1	L2	L3	L4	H	S
	Lt/min	Bar	mm	mm	mm	mm	mm	mm	mm
VBPDE 1/4" **A**	20	350	80	113	27	52	44	60	30
VBPDE 3/8" **A**	35	350	80	113	30	52	44	60	30
VBPDE 1/2" **A**	55	350	115	147	39	80	40	80	35



Z

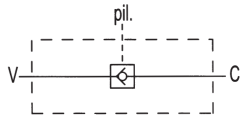
HydroTechnic Hydraulic Control Valve

Single Pilot Operated Check Valve "VBPSL" Series

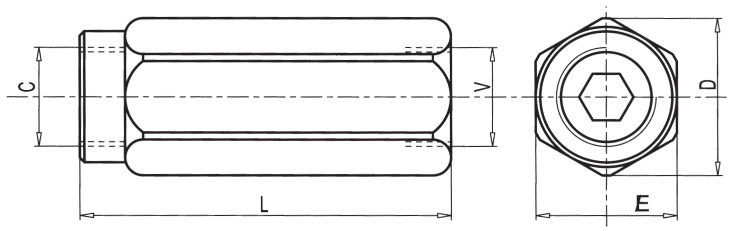


VBPSL...

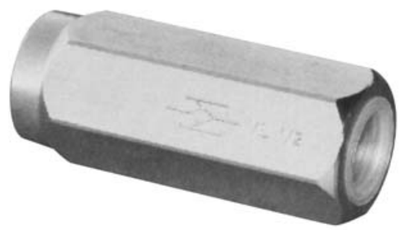
Type	Max. Flow	Max. Pressure	L1	S	S1	Pil.
	Lt/min	Bar	mm	mm	mm	GAS
VBPSL 1/4"	15	350	103	36	11	G 1/4"
VBPSL 3/8"	30	300	109	40	11.5	G 1/4"
VBPSL 1/2"	45	300	120	42	11	G 1/4"
VBPSL 3/4"	80	250	131	55	14	G 1/4"



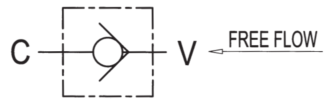
Check Valve "VU" Series



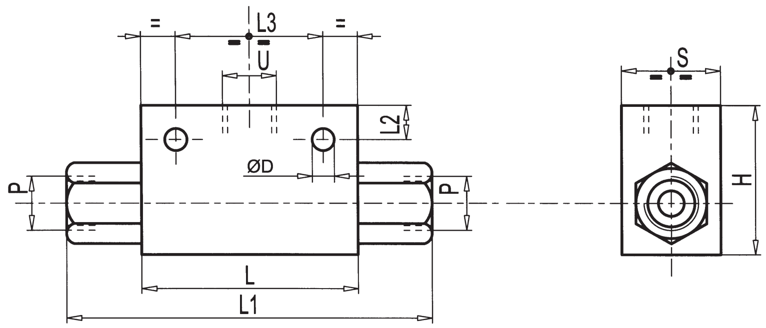
VU...



Type	Max. Flow	Max. Pressure	L	E	D
	Lt/min	Bar	mm	mm	mm
VU 1/4"	20	350	62	19	21
VU 3/8"	45	350	68	24	26.5
VU 1/2"	70	350	77	30	34
VU 3/4"	110	350	88	36	40
VU 1"	160	350	105	41	46

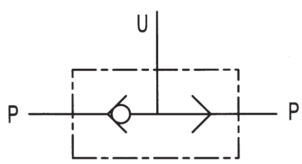


Shuttle Valve "VU2P" Series



VU2P...

Type	Max. Flow	Max. Pressure	L	L1	L2	L3	ØD	H	S
	Lt/min	Bar	mm	mm	mm	mm	mm	mm	mm
VU2P 1/4"	30	450	60	104	9	44	8.5	40	30
VU2P 3/8"	45	450	60	104	9	44	8.5	40	30
VU2P 1/2"	70	450	60	104	12	44	8.5	50	30

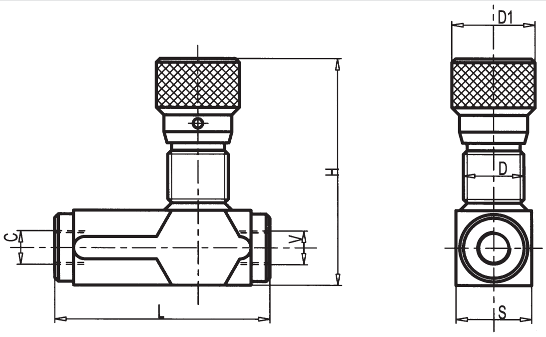


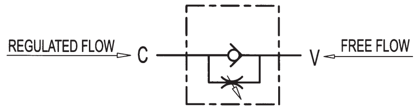
HydroTechnic

Hydraulic Control Valve

Flow Regulator With Check Valve "VRFU 90°" Series

VRFU 90°...

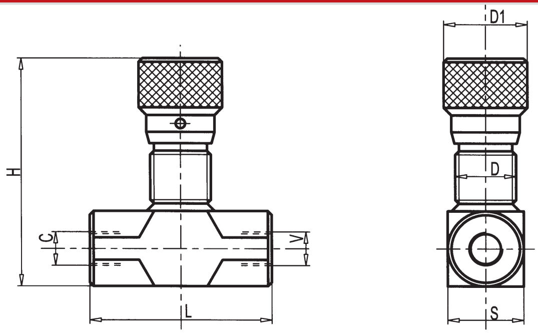


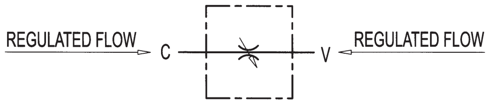


Type	Max. Flow	Max. Pressure	L	D	D1	H	S
	Lt/min	Bar	mm	mm	mm	mm	mm
VRFU 90° 1/4"	15	350	73	M22x1.5	32	82	25
VRFU 90° 3/8"	30	350	83	M22x1.5	32	82	25
VRFU 90° 1/2"	50	350	94	M22x1.5	32	87	30
VRFU 90° 3/4"	60	280	118	M35x1.5	42	108	40

Flow Regulator Valve "VRFB 90°" Series

VRFB 90°...

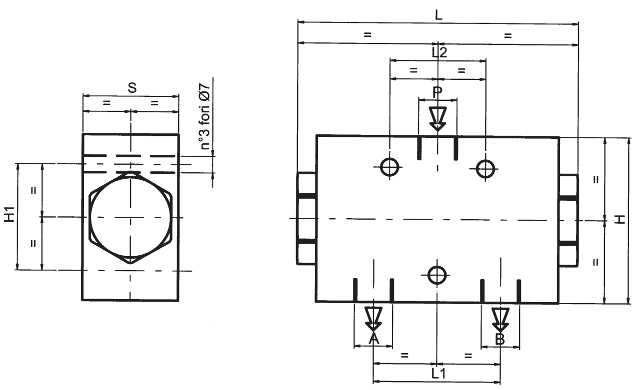


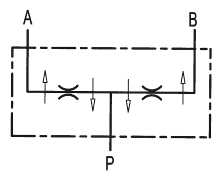


Type	Max. Flow	Max. Pressure	L	D	D1	H	S
	Lt/min	Bar	mm	mm	mm	mm	mm
VRFB 90° 1/4"	15	350	60	M22x1.5	32	82	25
VRFB 90° 3/8"	30	350	61	M22x1.5	32	82	25
VRFB 90° 1/2"	50	350	70	M22x1.5	32	87	30
VRFB 90° 3/4"	60	280	89	M35x1.5	42	108	40

2-Ways Flow Divider Valve "DFL" Series

DFL...

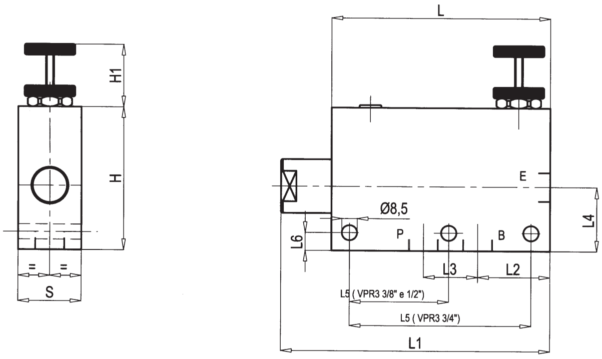




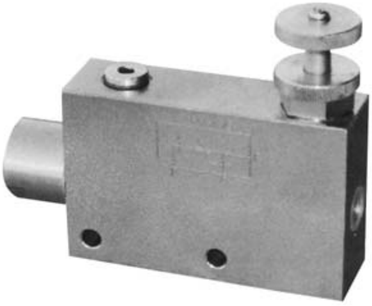
Type	Max. Flow	Nom. Pressure	Max. Pressure	L	L1	L2	H	H1	S
	Lt/min	Bar	Bar	mm	mm	mm	mm	mm	mm
DFL 10-20	10-20	250	300	117	53	40	70	45	40

Z

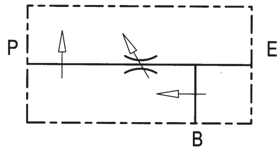
3-Port Flow Control Valve (Ongoing Pressure Line) "VPR 3" Series



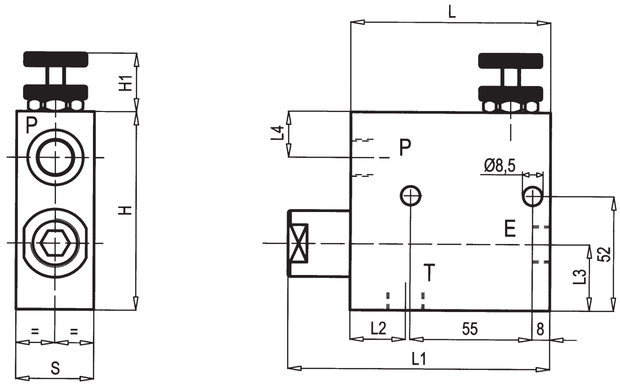
VPR 3...



Type	Max. Inlet Flow	Max. Adjustable Flow	Max. Pressure	L	L1	L2	L3	L4	L5	L6	H	H1	S
	Lt/min	Bar	Bar	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
VPR 3 3/8"	50	40	250	121	147	40	32	36	55	12	80	35	35
VPR 3 1/2"	85	60	250	121	147	37	36	36	55	12	80	35	35
VPR 3 3/4"	150	90	210	155	190	67	44	45	135	8	90	35	50

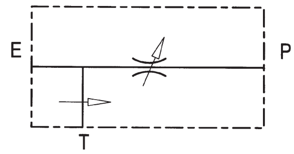


3-Port Flow Control Valve (Excess to Tank) "RFP 3" Series

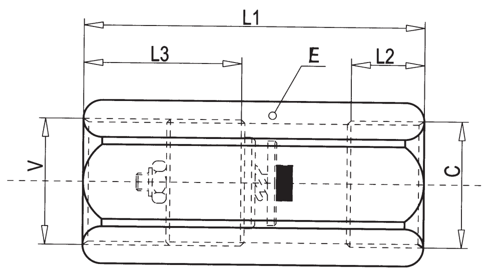


RFP 3...

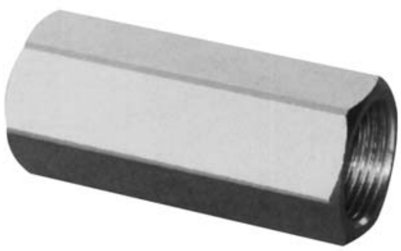
Type	Max. Inlet Flow	Max. Adjustable Flow	Max. Pressure	L	L1	L2	L3	L4	H	H1	S
	Lt/min	Bar	Bar	mm	mm	mm	mm	mm	mm	mm	mm
RFP 3 3/8"	50	30	250	90	116	25	32	20	90	35	35
RFP 3 1/2"	85	50	250	90	116	25	32	20	90	35	35



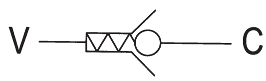
Hose Burst Valve "VUBA" Series



VUBA...



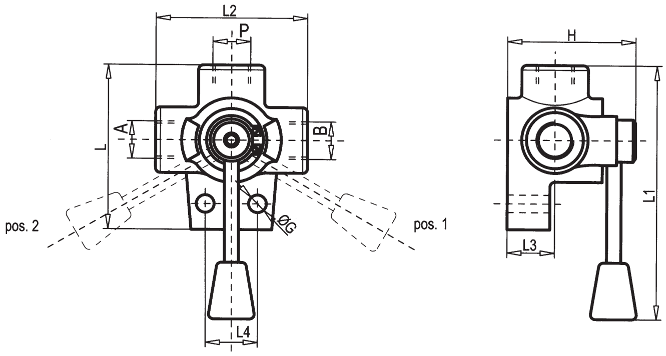
Type	Max. Flow	Max. Pressure	L1	L2	L3	E
	Lt/min	Bar	mm	mm	mm	mm
VUBA 1/4"**+MFF**	25	350	50	16	28	19
VUBA 3/8"**+MFF**	50	350	58	17	31	24
VUBA 1/2"**+MFF**	80	350	62	18	33	27
VUBA 3/4"**+MFF**	140	350	75	21	40	32
VUBA 1" + MFF	180	350	85	26	43	41



Z

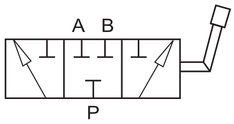
HydroTechnic Hydraulic Control Valve

3-Ways Diverter Valve "DF 3 VIE" Series



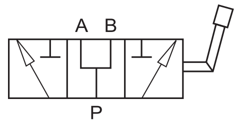
DF 3 VIE...

Type	Max. Flow	Max. Pressure	L	L1	L2	L3	L4	G	H
	Lt/min	Bar	mm	mm	mm	mm	mm	mm	mm
DF 3 VIE 3/8"	40	210	76	140	68	25	26	8.5	67
DF 3 VIE 1/2"	60	210	87	145	80	28	32	8.5	70
DF 3 VIE 3/4"	80	210	103	150	94	30	32	11	78



pos.1 pos.2

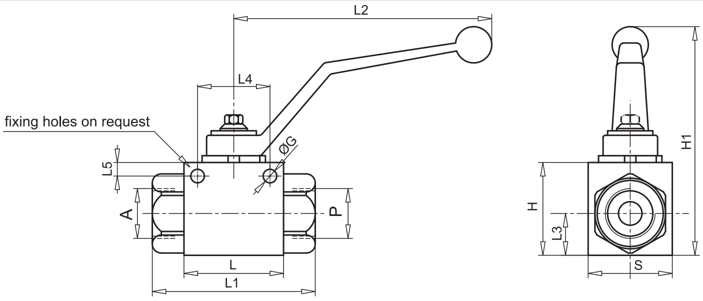
(with closed centre)



pos.1 pos.2

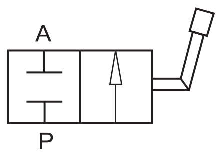
(with opened centre)

2-Ways Ball Valve "RS 2 VIE" Series



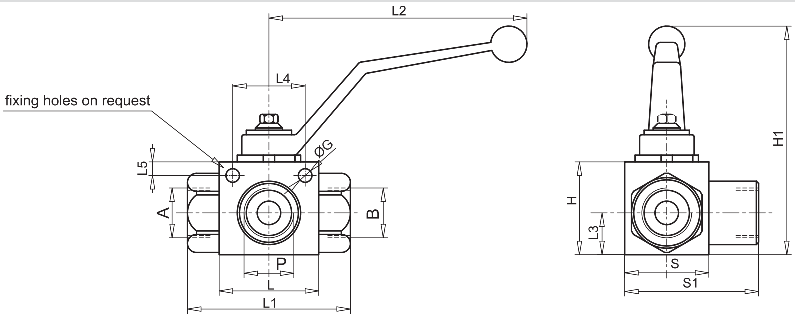
RS 2 VIE...

Type	Max. Flow	Max. Pressure	L	L1	L2	L3	L4	L5	G	H	H1	S
	Lt/min	Bar	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
RS 2 VIE 1/4"	25	500	42	71	110	14	25	5	5.5	35	92	30
RS 2 VIE 3/8"	35	500	44	73	110	17	31	5	5.5	40	97	35
RS 2 VIE 1/2"	60	500	48	83	110	18	34	6	6.5	43	100	37
RS 2 VIE 3/4"	100	400	63	95	180	23	46	6	8.5	55	110	45
RS 2 VIE 1"	180	350	67	112	180	29	49	6	8.5	65	120	55



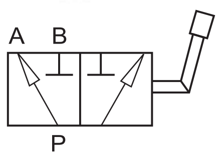
pos.1 pos.2

3-Ways Ball Valve "RS 3 VIE" Series



RS 3 VIE...

Type	Max. Flow	PN	DN	A–B P	L	L1	L2	L3	L4	L5	ØG	H	H1	S	S1
	Lt/min	Bar	mm	GAS	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
RS 3 VIE 1/4"	25	500	6	G 1/4"	42	71	110	14	25	5	5.5	35	90	30	48.5
RS 3 VIE 3/8"	35	500	10	G 3/8"	44	73	110	17	31	5	5.5	40	95	35	54
RS 3 VIE 1/2"	60	500	13	G 1/2"	48	83	110	18	34	6	6.5	43	98	37	58
RS 3 VIE 3/4"	100	400	20	G 3/4"	62	95	180	23	46	6	8.5	55	105	45	75
RS 3 VIE 1"	180	350	25	G 1"	66	112	180	29	49	6	8.5	65	115	55	87

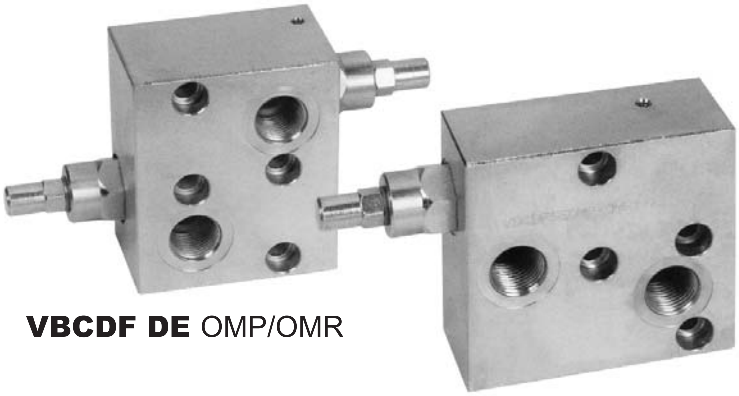


pos.1 pos.2

HydroTechnic

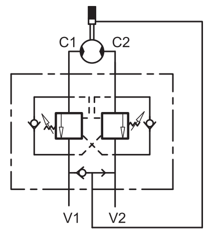
Hydraulic Control Valve

Overcentre Valve Flangeable On Hydraulic Motor



VBCDF DE OMP/OMR

VBCDF SE OMP/OMR



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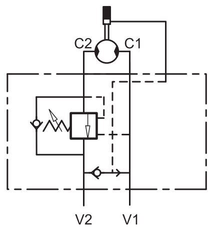
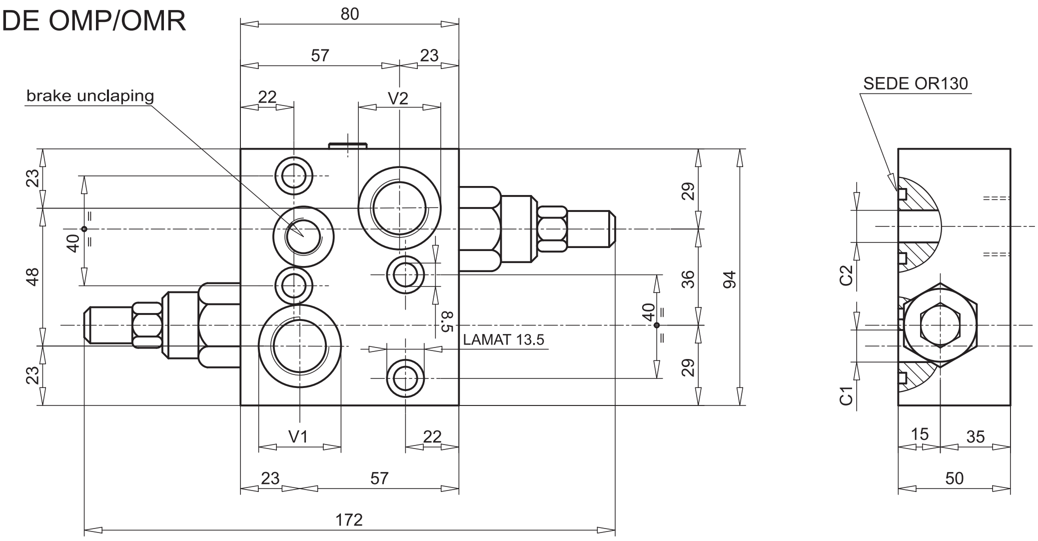
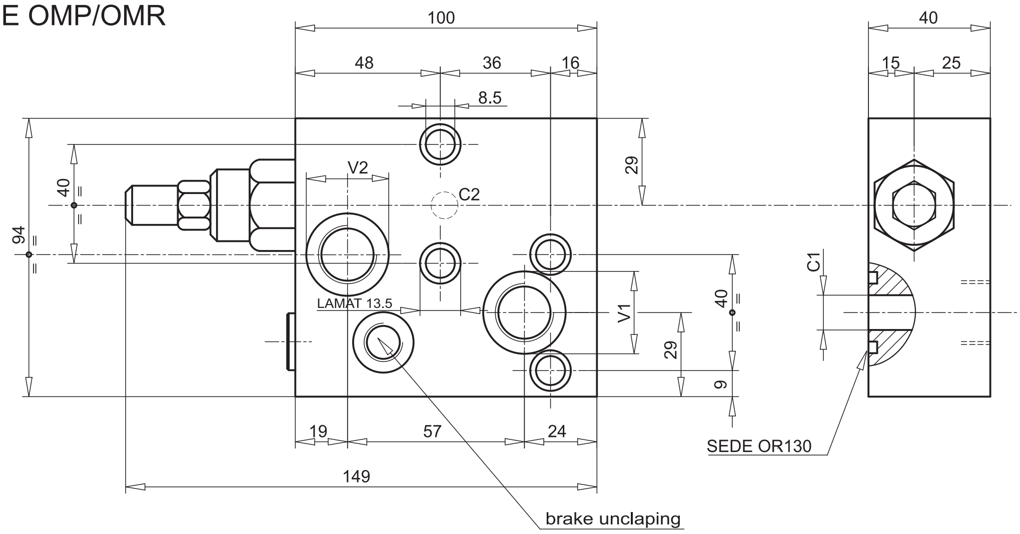


VBCDF SE OMP/OMR

VBCDF DE OMP/OMR



VBCDF SE OMP/OMR



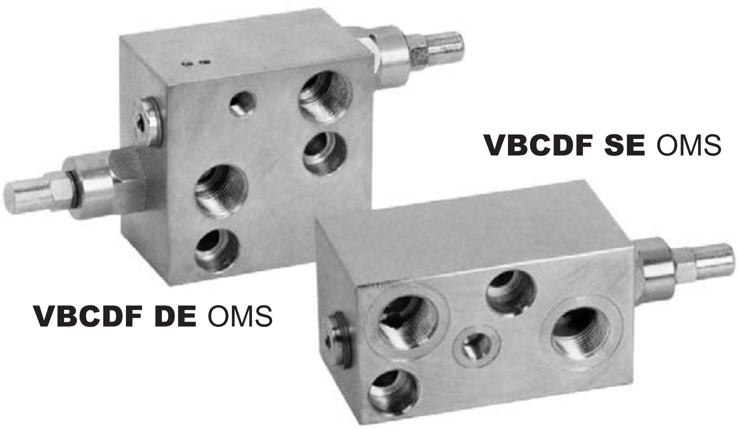
Type	Max. Flow	Max. Pressure	V1-V2	C1-C2	Pilot Ratio
	Lt/min	Bar	GAS	mm	mm
VBCDF 1/2" **SE** OMP/OMR	50	350	G 1/2"	Ø9	1 : 4.5
VBCDF 1/2" **DE** OMP/OMR	50	350	G 1/2"	Ø9	1 : 4.5

Z

HydroTechnic

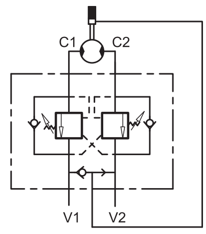
Hydraulic Control Valve

Overcentre Valve Flangeable On Hydraulic Motor

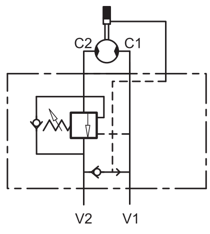


VBCDF SE OMS

VBCDF DE OMS

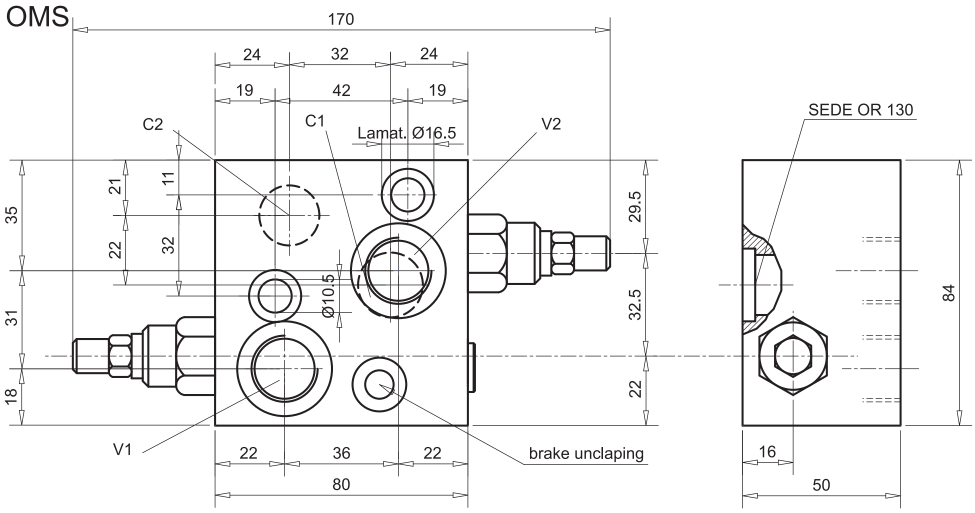


VBCDF DE OMS

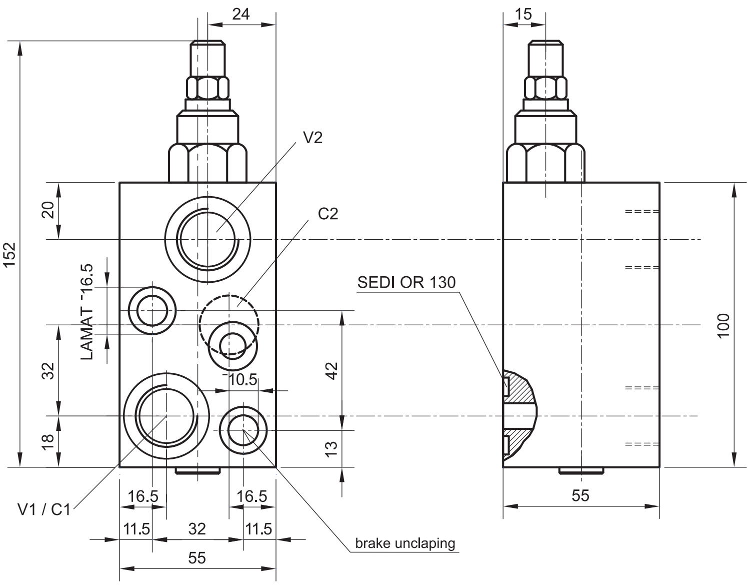


VBCDF SE OMS

VBCDF DE OMS



VBCDF SE OMS

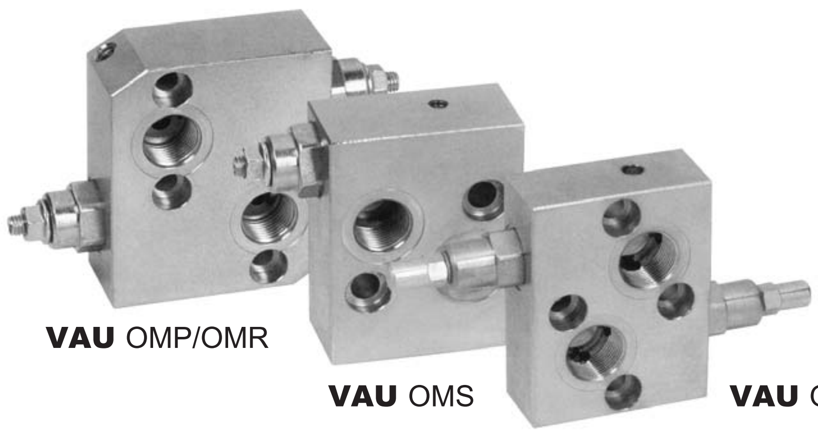


Type	Max. Flow	Max. Pressure	V1-V2	C1-C2	Pilot Ratio
	Lt/min	Bar	GAS	mm	mm
VBCDF 1/2" **SE** OMS	50	350	G 1/2"	Ø9	1 : 4.5
VBCDF 1/2" **DE** OMS	50	350	G 1/2"	Ø9	1 : 4.5

Z

HydroTechnic Hydraulic Control Valve

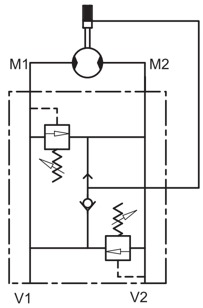
Dual Cross Relief Valve Flangeable On Hydraulic Motor

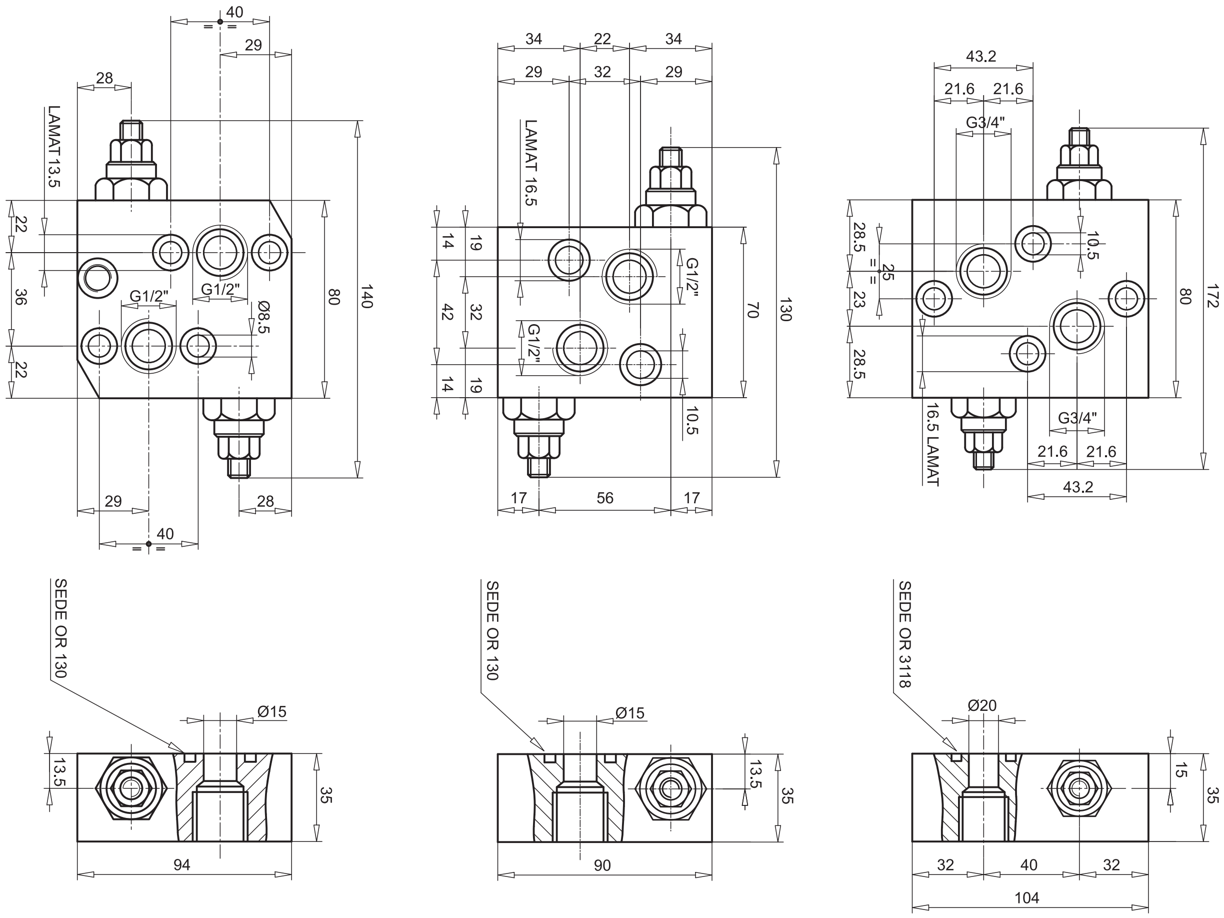


VAU OMP/OMR

VAU OMS

VAU OMT





VAU OMP/OMR

VAU OMS

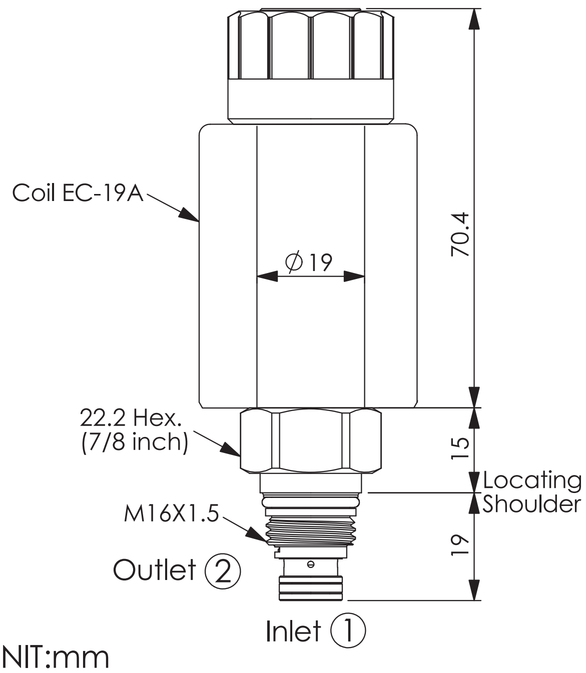
VAU OMT

Type	Max. Flow	Max. Pressure	V1-V2
	Lt/min	Bar	GAS
VAU 1/2" OMS	50	350	G 1/2"
VAU 1/2" OMP/OMR	60	350	G 1/2"
VAU 3/4" OMT	100	350	G 3/4"

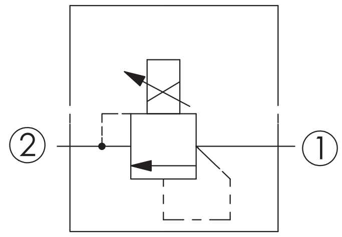
Electro-Proportional Pilot Control Valve " PRB-8A " Series

(Electro-Proportional Pilot Relief)

Ordering Code:	PRB-8A-X-Y-Z

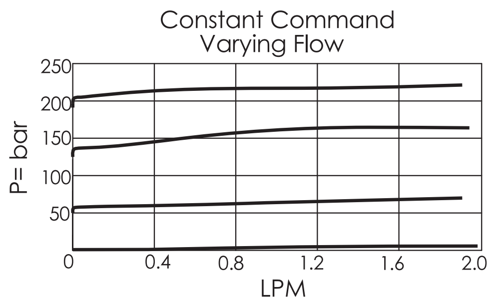


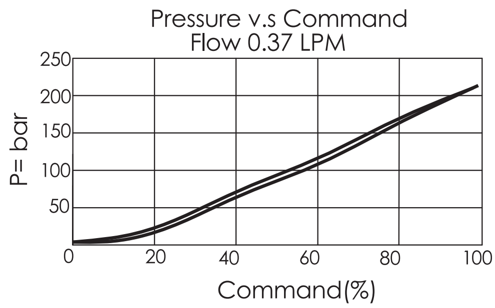
UNIT:mm



TECHNICAL DATA	
Max.Operating pressure:	350 bar
Rated flow:	1 l/min
Cavity-Tooling:	8A-2
Installation torque:	27-33 Nm
Weight:	0.16 kg (Without Coil)
Coils must be ordered separately	

Maximum Valve Leakage at Reseat: 25 c.c./min
Back pressure on the tank port (port 2) is directly additive at a 1:1 ratio to valve setting
Hysteresis with DC input < 8%
Hysteresis with dither < 4%
Linearity with dither < 2%
Dither should be adjustable between 80-300Hz (Recommended dither freguency 140Hz)
Reseat exceeds 85% of cracking pressure.





Y	SPRINGS
	ADJUSTMENT RANGES
A	20 to 210 bar
B	10.5 to 105 bar
W	35 to 350 bar

X	OPERATION
2D	2 Ports、22 Watt. Coil ∅19 mm tube

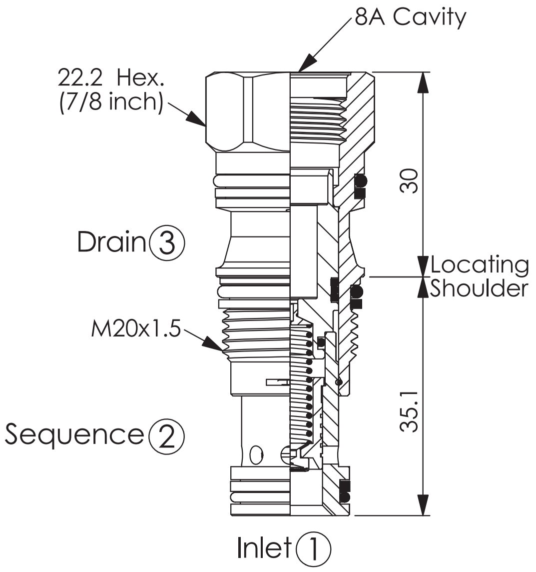
Z	OPTIONS
N	Non-adjustable
P	Push Style Manual Override

Z

Electro-Proportional Relief Valve " RV-11A " Series

(Ventable,balanced piston relief main stage with integral 8A control cavity)

Ordering Code:	**RV-11A-X-Y-8**



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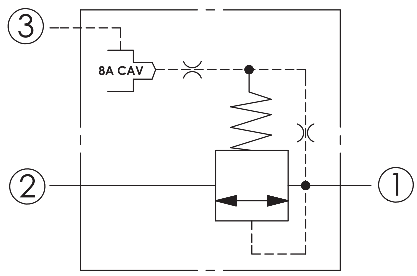
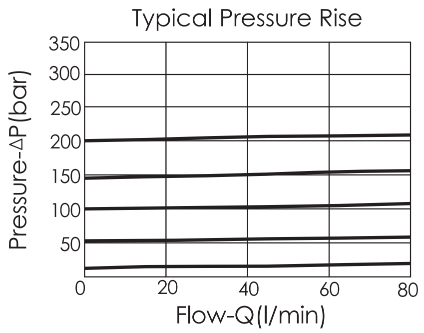


TECHNICAL DATA		
Max.Operating pressure:	350	bar
Rated flow:	60	l/min
Cavity-Tooling:	11A-3	
Installation torque:	40-50	Nm
Weight:	0.10	kg

Will accept maximum pressure at port 2; suitable for use in cross port relief circuits. If used in cross port relief circuits, consider spool leakage.



X	OPERATION
30	Standard Type

Response Time-Typical (10 ms)
Maximum Leakage (33 cc/min./70 bar)

Y	SPRINGS
	MINIMUM CONTROL PRESSURE
D	1.7 bar (25 psi)
W	7 bar (100 psi)

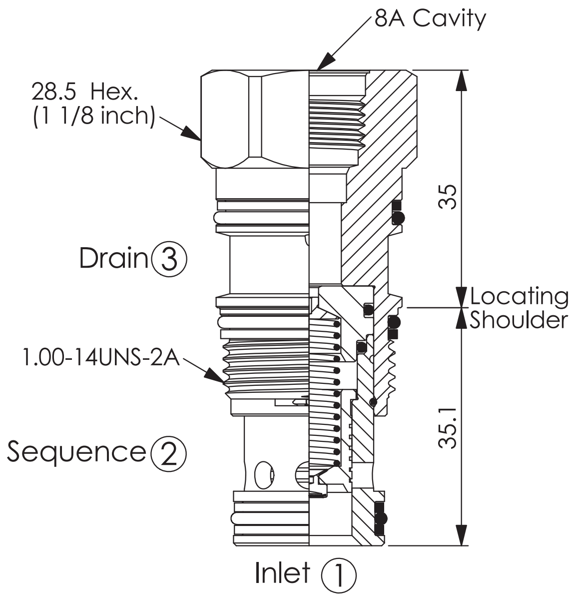
W spring is suit for higher pressure drop application.
Please consult our sales department.

Z

Electro-Proportional Relief Valve " RV-2A " Series

(Ventable,balanced piston relief main stage with integral 8A control cavity)

Ordering Code:	**RV-2A-X-Y-8**



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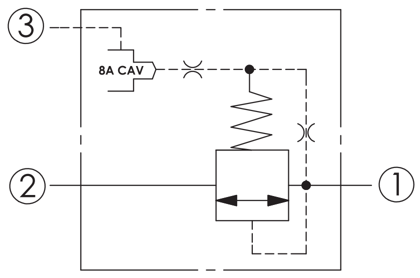
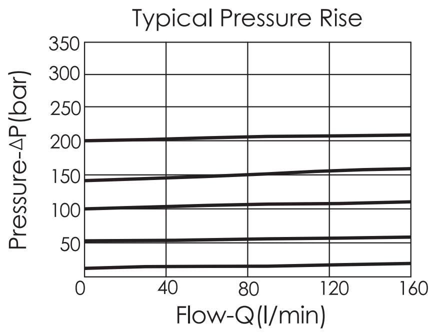


TECHNICAL DATA		
Max.Operating pressure:	350	bar
Rated flow:	120	l/min
Cavity-Tooling:	2A-3	
Installation torque:	60-70	Nm
Weight:	0.20	kg

Will accept maximum pressure at port 2; suitable for use in cross port relief circuits. If used in cross port relief circuits, consider spool leakage.



X	OPERATION
30	Standard Type

Response Time-Typical (10 ms)
Maximum Leakage (50 cc/min./70 bar)

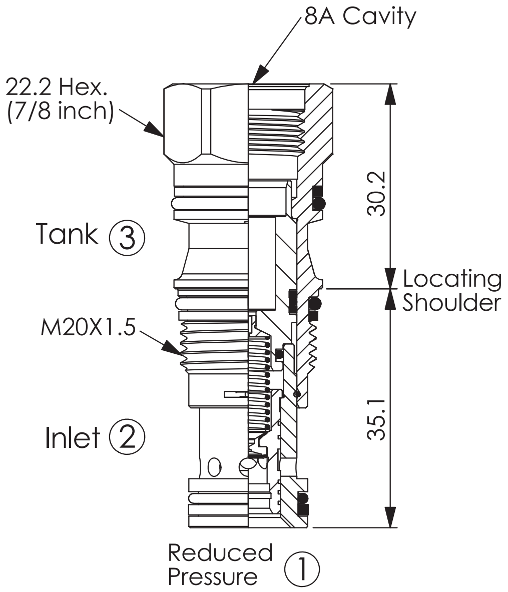
Y	SPRINGS
	MINIMUM CONTROL PRESSURE
D	1.7 bar (25 psi)
W	7 bar (100 psi)

W spring is suit for higher pressure drop application.
Please consult our sales department.

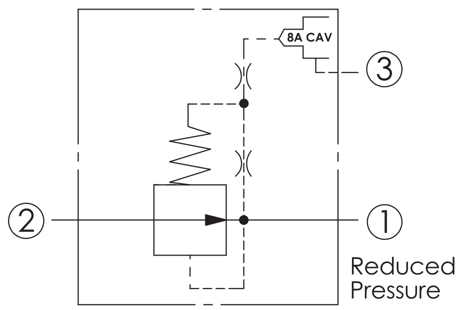
Electro-Proportional Reducing Valve " PB-11A " Series

(Pilot Operated Reducing main stage with integral 8A control cavity)

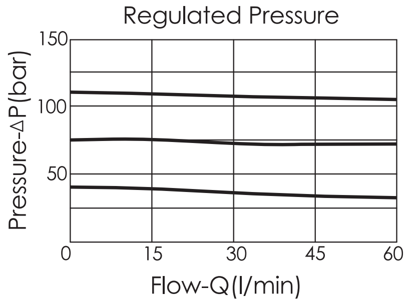
Ordering Code:	**PB-11A-X-Y-8**



UNIT:mm



TECHNICAL DATA		
Max.Operating pressure:	350	bar
Rated flow:	40	l/min
Cavity-Tooling:	11A-3	
Installation torque:	40-50	Nm
Weight:	0.10	kg



X	OPERATION
30	Standard Type

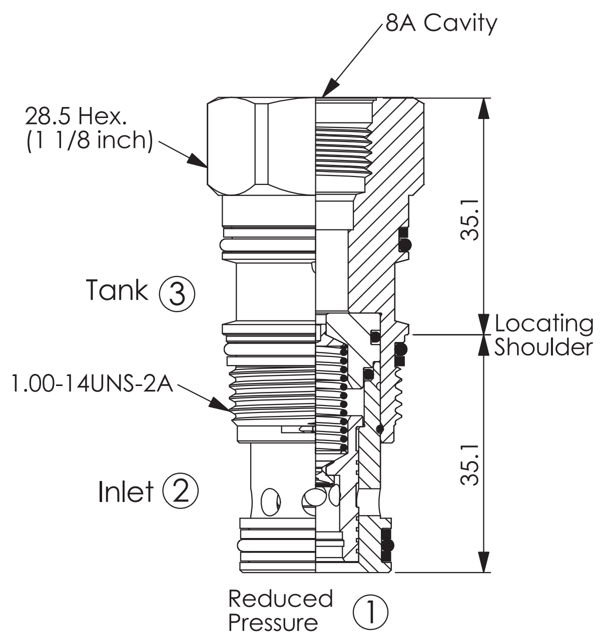
Y	SPRINGS
	MINIMUM CONTROL PRESSURE
D	1.7 bar (25 psi)
W	7 bar (100 psi)
	Maximum inlet pressure is determined by the bias spring. The D spring is limited to 140 bar (2000 psi) maximum differential pressure and the W spring is limited to 350 bar (5000 psi) maximum inlet pressure.

Z

Electro-Proportional Reducing Valve " PB-2A " Series

(Pilot Operated Reducing main stage with integral 8A control cavity)

Ordering Code:	**PB-2A-$\boxed{X}$-$\boxed{Y}$-8**



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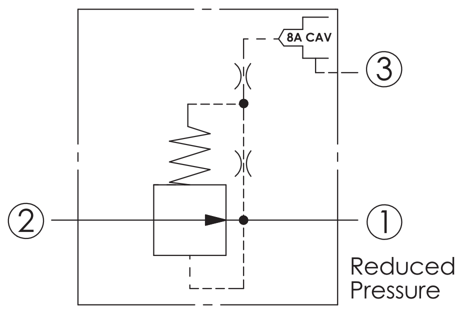
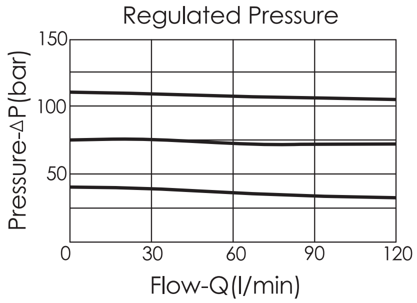


TECHNICAL DATA		
Max.Operating pressure:	350	bar
Rated flow:	80	l/min
Cavity-Tooling:	2A-3	
Installation torque:	60-70	Nm
Weight:	0.21	kg



X	OPERATION
30	Standard Type

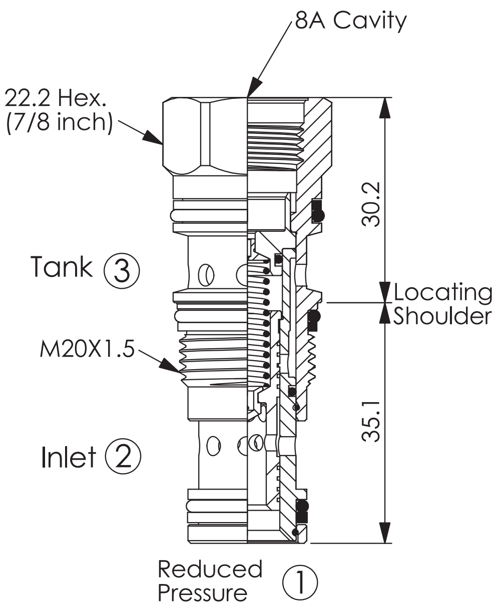
Y	SPRINGS
	MINIMUM CONTROL PRESSURE
D	1.7 bar (25 psi)
W	7 bar (100 psi)
	Maximum inlet pressure is determined by the bias spring. The D spring is limited to 140 bar (2000 psi) maximum differential pressure and the W spring is limited to 350 bar (5000 psi) maximum inlet pressure.

Z

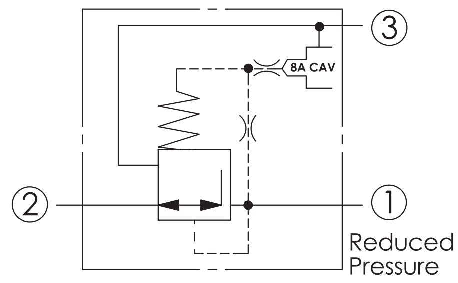
Electro-Proportional Reducing / Relieving Valve " PP-11A " Series

(Pilot operated, pressure reducing/relieving main stage with integral 8A control cavity)

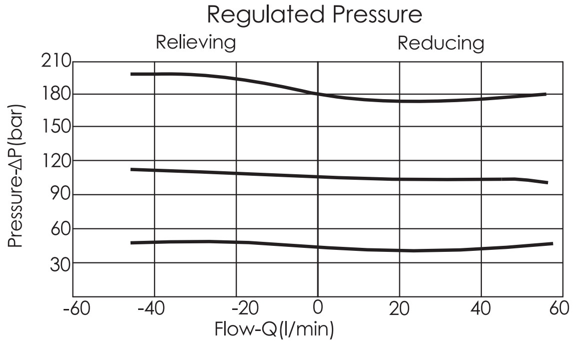
Ordering Code:	**PP-11A-X-Y-8**



UNIT:mm



TECHNICAL DATA		
Max.Operating pressure:	350	bar
Rated flow:	40	l/min
Cavity-Tooling:	11A-3	
Installation torque:	40-50	Nm
Weight:	0.1	kg



X	OPERATION
30	Standard Type Low Leakage
33	Option Type Improved Dynamic Response

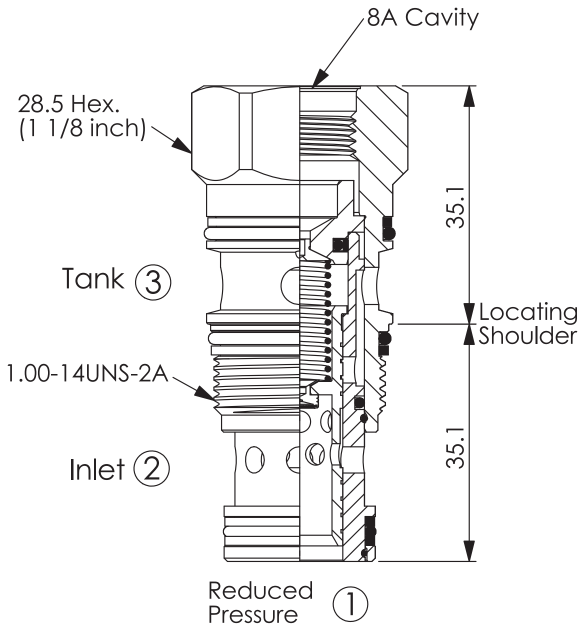
Y	SPRINGS
	MINIMUM CONTROL PRESSURE
D	1.7 bar (25 psi)
W	7 bar (100 psi)
	Maximum inlet pressure is determined by the bias spring. The D spring is limited to 140 bar (2000 psi) maximum differential pressure and the W spring is limited to 350 bar (5000 psi) maximum inlet pressure.

Z

Electro-Proportional Reducing / Relieving Valve " PP-2A " Series

(Pilot operated, pressure reducing/relieving main stage with integral 8A control cavity)

Ordering Code:	**PP-2A-X-Y-8**



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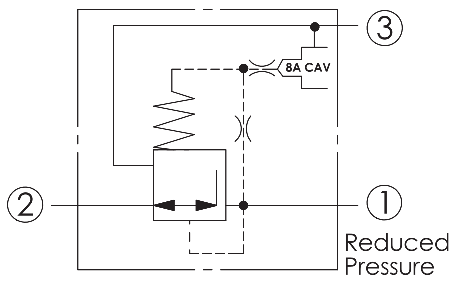
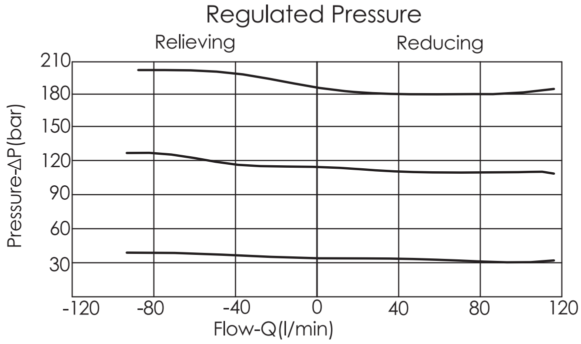


TECHNICAL DATA		
Max.Operating pressure:	350	bar
Rated flow:	80	l/min
Cavity-Tooling:	2A-3	
Installation torque:	60-70	Nm
Weight:	0.19	kg



X	OPERATION
30	Standard Type Low Leakage
33	Option Type Improved Dynamic Response

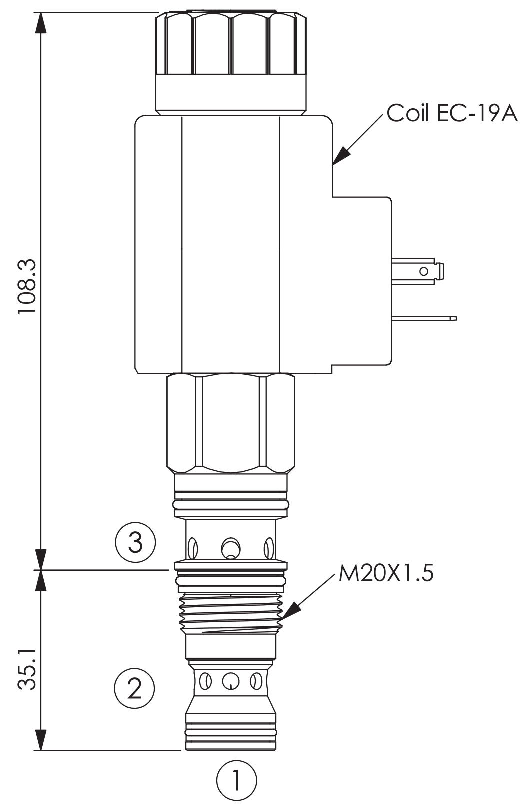
Y	SPRINGS
	MINIMUM CONTROL PRESSURE
D	1.7 bar (25 psi)
W	7 bar (100 psi)
	Maximum inlet pressure is determined by the bias spring. The D spring is limited to 140 bar (2000 psi) maximum differential pressure and the W spring is limited to 350 bar (5000 psi) maximum inlet pressure.

Z

Electro-Proportional Flow Control Valve " PFA-11A " Series

(Electro-Proportional, 3-way Flow Control Meter In Throttle)

Ordering Code: **PFA-11A-X-Y-Z**



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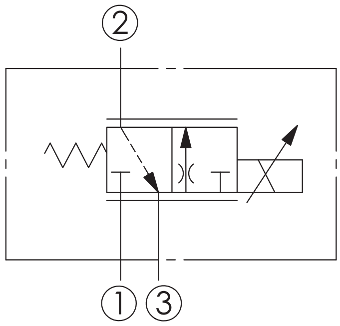
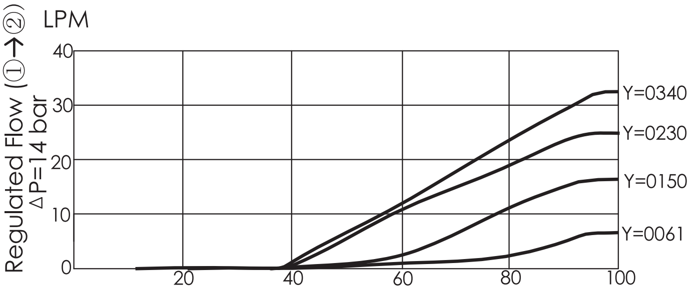
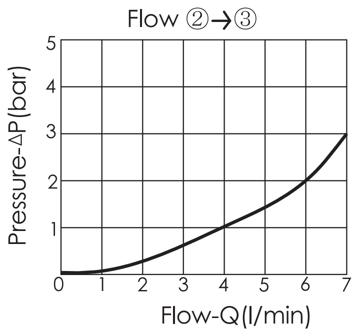




If you need more information
Please contact our sales department

Note: Flow in the ②to③direction is limited to about 5 L/pm



TECHNICAL DATA		
Max.Operating pressure:	350	bar
Rated flow:	34	l/min
Cavity-Tooling:	11A-3	
Installation torque:	40-50	Nm
Linearity (with dither)	<2%	
Repeatibility (with dither)	<2%	
Hysteresis (with dither)	<4%	
Hysteresis with DC input	<8%	
Deadband, nominal (as a percentage of input)	30%	
The transition between positions is closed.		
Weight:(with Coil)	0.57	kg
(without Coil)	0.34	kg

X	OPERATION
3D	3 Ports、22 Watt. Coil ∅19 mm tube

Y	FLOW NOMINAL CAPACITY
0061	0.4~6.1 LPM
0150	0.4~15 LPM
0230	0.4~23 LPM
0340	0.4~34 LPM

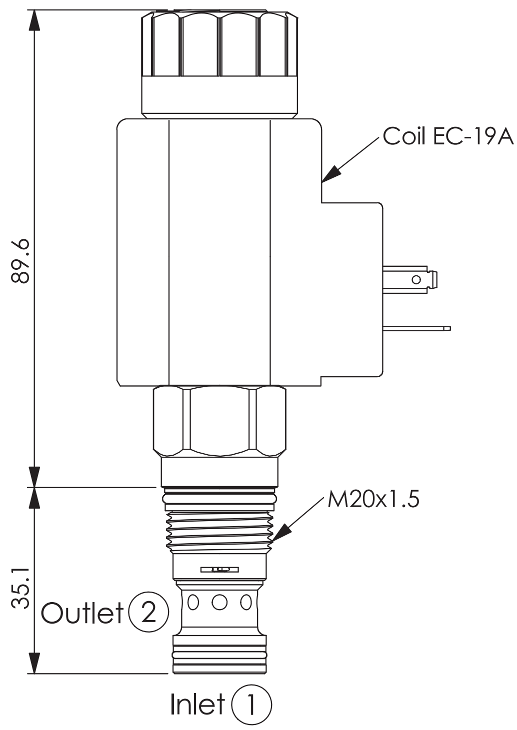
Z	OPTIONS
N	Non-adjustable

Z

Electro-Proportional Flow Control Valve " PFC-13A " Series

(Electro-Proportional Flow Control Valve, Normally Closed Throttle)

Ordering Code:	**PFC-13A-X-Y-Z**



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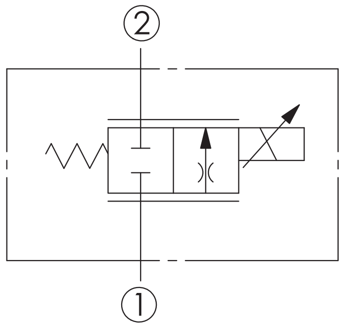
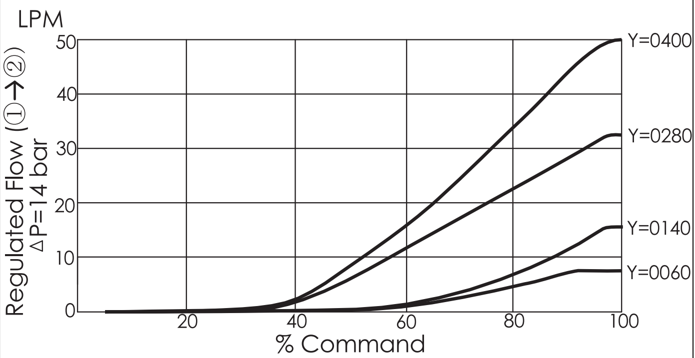


TECHNICAL DATA		
Max.Operating pressure:	350	bar
Rated flow:	40	l/min
Cavity-Tooling:	13A-2	
Installation torque:	40-50	Nm
Linearity (with dither)	<2%	
Repeatibility (with dither)	<2%	
Hysteresis (with dither)	<4%	
Hysteresis with DC input	<8%	
Deadband, nominal (as a percentage of input)	25%	
Weight:(with Coil)	0.53	kg
(without Coil)	0.30	kg



If you need more information
Please contact our sales department

Y	FLOW
	NOMINAL CAPACITY
0030	0.3~3 LPM
0060	0.4~6 LPM
0140	0.6~14 LPM
0280	0.8~28 LPM (Standard)
0400	1~40 LPM

X	OPERATION
2D	2 Ports、22 Watt. Coil ∅19 mm tube

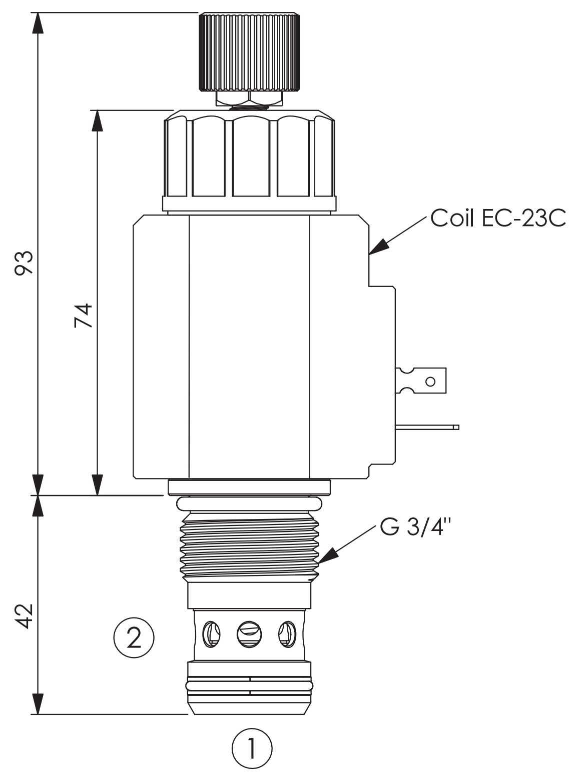
Z	OPTIONS
N	Non-adjustable
P	Push Style Manual Override

Z

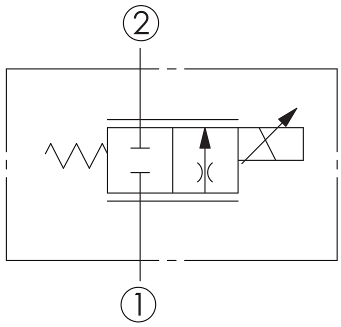
Electro-Proportional Flow Control Valve " PFC-17E " Series

(Electro-Proportional, Normally Closed Throttle)

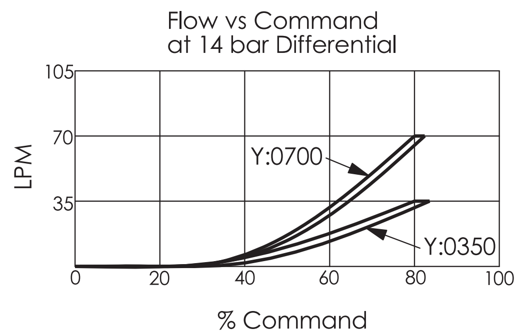
Ordering Code:	**PFC-17E-X-Y-Z**



UNIT:mm



TECHNICAL DATA		
Max.Operating pressure:	350	bar
Rated flow:	70	l/min
Cavity-Tooling:	17E-2	
Installation torque:	45-55	Nm
Weight:(with Coil)	0.70	kg
(without Coil)	0.35	kg



X	OPERATION
2G	2 Ports、30 Watt. Coil

NOTE:Coil must be ordered separately. Use 12V DC or 24V DC (Series EC-23C) coils only.

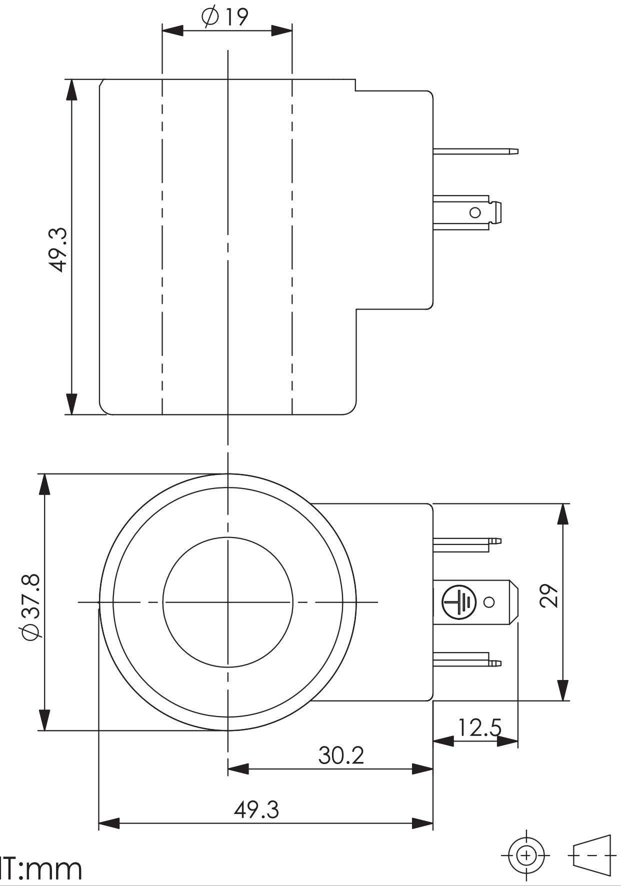
Y	FLOW
	NOMINAL CAPACITY
0350	35 LPM
0700	70 LPM

Z	OPTIONS
M	Manual Override (Standard)

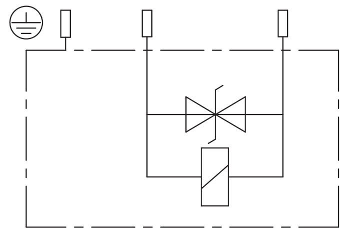
Z

Continuous Duty Coil-ED 100%

Ordering Code:	**EC-19A-X-Y-Z**



UNIT:mm



TECHNICAL DATA	
Weight:	0.23 kg
Encapsulating material:	PET
HEAT INSULATION CLASS H:	
356˚F	(180˚C)
Ambient temperature range:	
-86+140˚F	(-30+60˚C)

Available on request:

Different Voltages -
Different connectors.

Inlet voltage fluctuations must not exceed ± 10% of nominal voltage to obtain correct operation and long life of coils.

X	Power (W)	
220	22 Watt.	

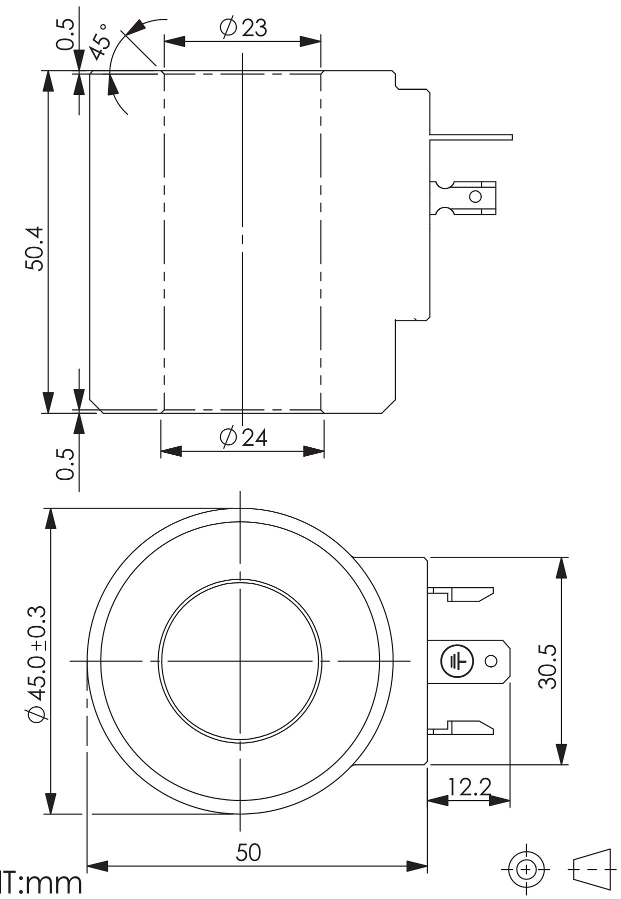
Y	Connections	
H	DIN43650-ISO4400	

Z	Voltage (V)	Resistance (Ω)	Current (A)		Proportional Maximum Current	
	Nominal	20~25˚C	Cold Coil	Hot Coil		
E	12V DC	6.4±8%	1.81	1.22	1150 mA	
D	24V DC	26.2±5%	0.94	0.67	590 mA	

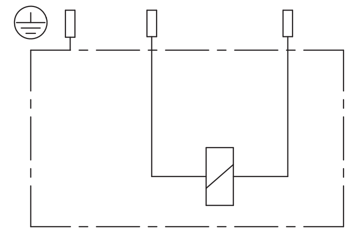
Electro-Proportional Control Valve Coil

Continuous Duty Coil-ED 100%

Ordering Code:	EC-23C-X-Y-Z



UNIT:mm



TECHNICAL DATA	
Weight:	0.35 kg
Encapsulating material:	PET
HEAT INSULATION CLASS H: 356°F	(180°C)
Ambient temperature range: -86+140°F	(-30+60°C)
Available on request: Different Voltages - Different connectors.	
Inlet voltage fluctuations must not exceed ± 10% of nominal voltage to obtain correct operation and long life of coils.	

X	Rating Power (W)	
300	30 Watt.	

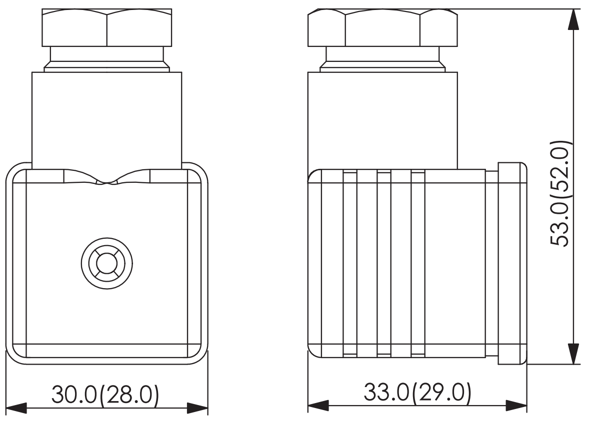
Y	Connections	
H	DIN43650-ISO4400	

Z	Voltage (V)	Resistance (Ω)	Rating Current (A)	
	Nominal	20~25 °C		
E	12V DC	2.5 Ω	2.60 A	
D	24V DC	19.2 Ω	0.95 A	

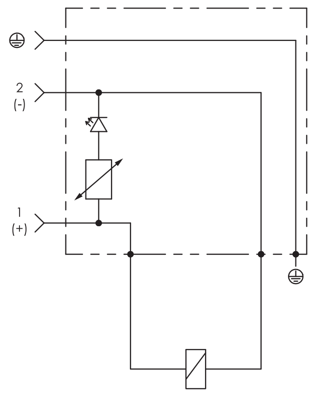
Z

Din 43650 Connector

Ordering Code: **ED-30-X-10-Z**



UNIT:mm



TECHNICAL DATA	
Number of poles	2+Earth
Nominal current capacity	10A
Max. current capacity	16A
Contact resistance	4mΩ
Max. wire section area	$1.5mm^2$
Cable gland thread Pg 9	DIN40430
Tightening torque	3-4 Nm
Cable diameter	6-8mm
Electrical insulation Class C	DIN VED 0110
Protection Class **IP65**	DIN 40050 part9

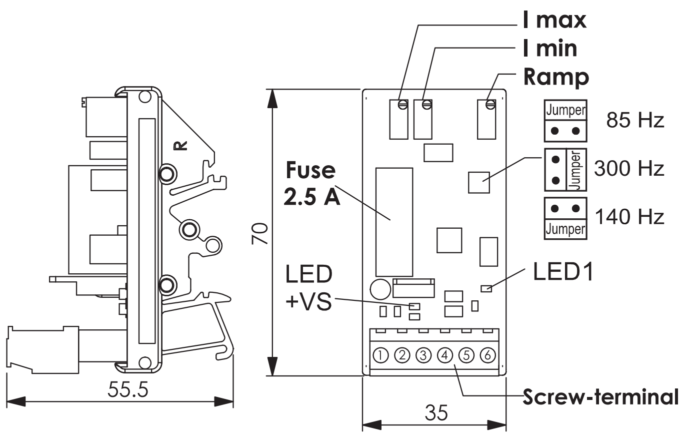
X	CIRCUIT	
D	Standard Circuit with LED	

Z	VOLTAGE	
D	DC 24V	
	DC 12V	

Z

Electro-Proportional Amplifier " PCB-2600 " Series

Ordering Code:	**PCB-2600**



UNIT:mm

VERY IMPORTANT

Do not remove the amplifier from the coil while the power is on.
This will cause a failure in the internal circuits of the amplifier, resulting in loss of output to the coil.

INSTRUCTIONS FOR SETTING

SUPPLY Green LED

RAMP Ramping up/down time adjustment. For long ramping times, turn potentiometers clockwise, for short ramping times, turn potentiometers counter-clockwise.

MAX/MIN I max / I min
There are multi-course potentiometers for adjustment of min-max and also ramp time.

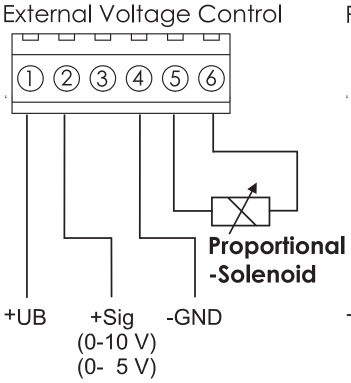
FREQUENCY ADJ.
The dither frequency can be set with a Jumper to 85, 140, or 300 Hz.

TECHNICAL DATA

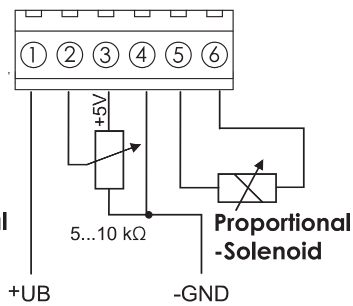
Supply Voltage:	10-35	VDC
Max. Current: 0-2600 mA adjustable for 12 and 24 VDC (Output is a PWM-DC)		
Min. Current: 0-600 mA adjustable		
Ramp Adjustment:	0~5	Sec.
Dither Frequency: 85, 140, 300 Hz to be set by jumper(Standard 140 Hz)		
Ambient Operating temperature	-15~140 ˚F -10~60 ℃	
Weight:	0.05	kg

Connections

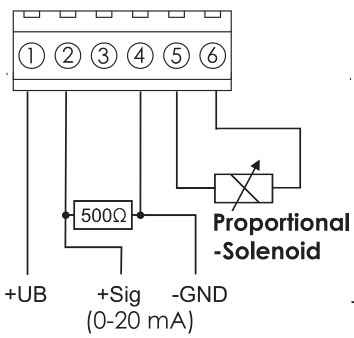
External Voltage Control



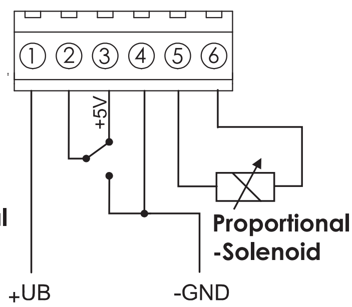
Potentiometer Control



External Current Control



Two Point Control



. Clamp Connections plug in connector
Pin 1 =+ UB; Supply voltage (10-35 VDC)
Pin 2 = control voltage (+ Sig)
Pin 3 = Auxiliary voltage (+ 5 VDC)
Pin 4 = Ground (GND)
Pin 5 = Solenoid (-)
Pin 6 = Solenoid (+)

. Potentiometer
Turn clockwise means increasing current or Extension of ramp time
App. 10 turns for complete range

.Fuse
Standard 20 mm Glass fuse 2.5 A T

.LED's
LED +VS (green) = lights, when voltage supply and fuse are in order
LED1 (red) = lights, if there is an output to the solenoid

Z

Pressure Line Filter

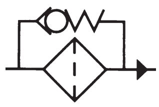
T-06 SERIES

Material : Steel

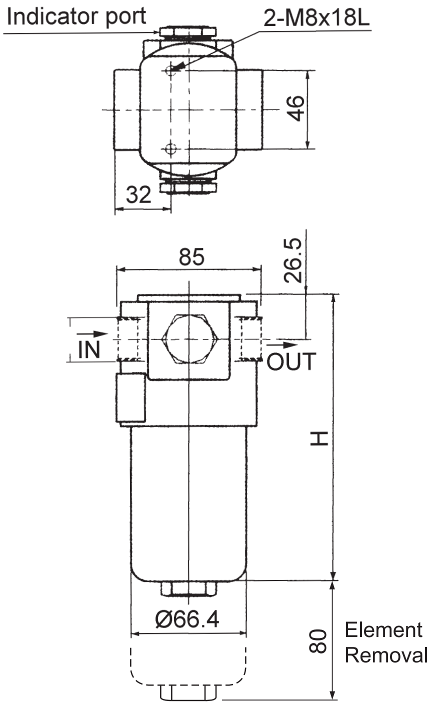
Working Pressure : 280kg/cm^2 (4000psi)

Max Pressure : 350kg/cm^2 (5000psi)

TYPE	Lengths H
2	198 mm
3	298 mm



SYMBOL



Filter Assembly	Flow rate L/min	Type	Port size G / PT / SAE	Weight kg
M03	20	2	3/4"	3.9
M06	35			
M10	50			
M25	70			
W40	90			
M03	35	3	3/4"	5.0
M06	60			
M10	70			
M25	90			
W40	120			

ORDER CODE

T06 - * - ** - * - * - G 3/4"

Series — Port Connection

Code	Length
2	198 mm
3	298 mm

Code	Filter Element
M3	Fiber glass 3μ
M6	Fiber glass 6μ
M10	Fiber glass 10μ
M25	Fiber glass 25μ
W40	Stainless wire mesh 40μ

Code	Indicator
P	Without (plugged)
V	Visual
E	Electrical + Visual

Code	Seal
N	NBR
V	VITON

Z

Pressure Line Filter

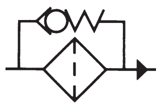
T-08 SERIES

Material : Steel

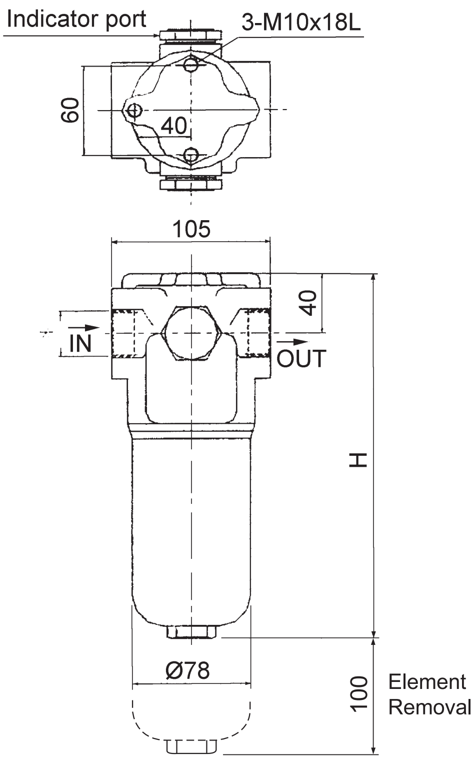
Working Pressure : 280kg/cm^2 (4000psi)

Max Pressure : 350kg/cm^2 (5000psi)

TYPE	Lengths H
1	225 mm
2	335 mm



SYMBOL



Filter Assembly	Flow rate L/min	Type	Port size G / PT / SAE	Weight kg
M03	35	1	1"	6.8
M06	60			
M10	70			
M25	90			
W40	120			
M03	70	2	1"	8.3
M06	90			
M10	120			
M25	150			
W40	200			

ORDER CODE

T08 - * - ** - * - * - G 1"

Series — Port Connection

Code	Length
1	225 mm
2	335 mm

Code	Filter Element
M3	Fiber glass 3μ
M6	Fiber glass 6μ
M10	Fiber glass 10μ
M25	Fiber glass 25μ
W40	Stainless wire mesh 40μ

Code	Indicator
P	Without (plugged)
V	Visual
E	Electrical + Visual

Code	Seal
N	NBR
V	VITON

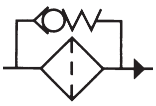
Z

Return Line Filter Spin-on Type

RF SERIES

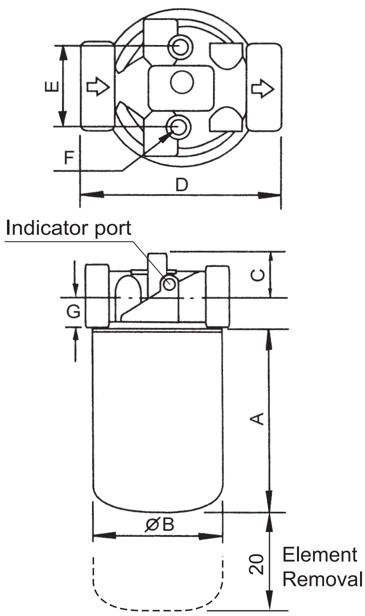
Working Pressure : 13.6 kg/cm^2 (200psi)

Flow Rating : Up to 170 L/min

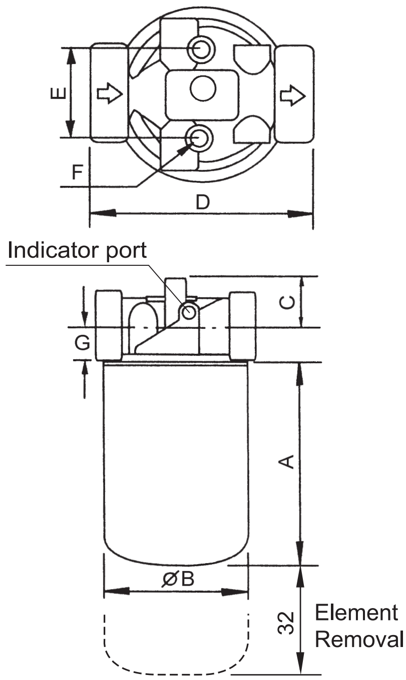


SYMBOL

RF-06 / RF-08



RF-10

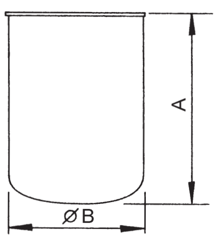


■ Specification

Model	Port size	A mm	øB mm	C mm	D mm	E mm	F	G mm	Weight Kg
RF-06-SE-50-10N	PT 3/4"	133	95	25	94	38	M6x1	24	0.8
RF-06-SE-70-10N	PT 3/4"	219	95	25	94	38	M6x1	24	1.4
RF-08-SE-50-10N	PT 1"	133	95	25	94	38	M6x1	24	0.8
RF-08-SE-70-10N	PT 1"	219	95	25	94	38	M6x1	24	1.4
RF-10-SE-100-10N	PT 1 1/4"	174	129	30	135	47.6	M8x1.25	37	1.84
RF-10-SE-150-10N	PT 1 1/4"	279	129	30	135	47.6	M8x1.25	37	2.44

Z

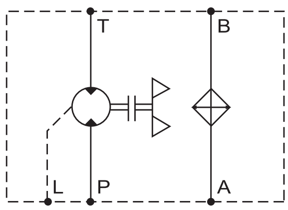
■ Service Element



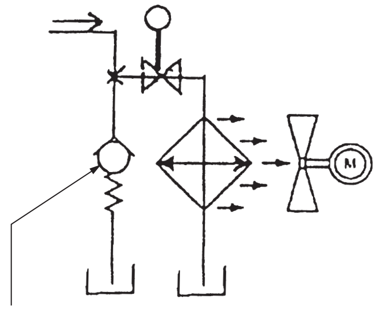
Model	A mm	øB mm	Filteration	Flow rate L/min	Apply to Filter Head
SE-50-10N	133	95	10 μ Cellulose	60	RF-06 / RF-08
SE-70-10N	219	95	10 μ Cellulose	70	RF-06 / RF-08
SE-100-10N	174	129	10 μ Cellulose	150	RF-10
SE-150-10N	279	129	10 μ Cellulose	170	RF-10

Air-oil Cooler

Air-oil Cooler " AE-HM " Series



◆ **Warning**

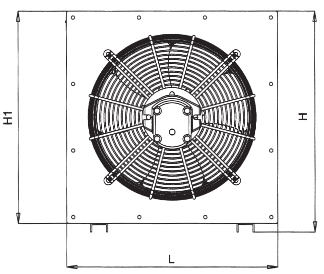


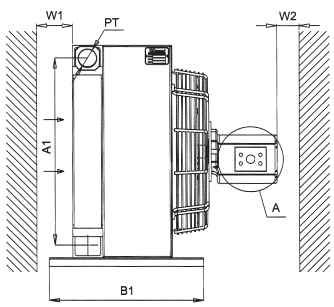
The spring of unload check, suggest 3~5 kgf/cm^2

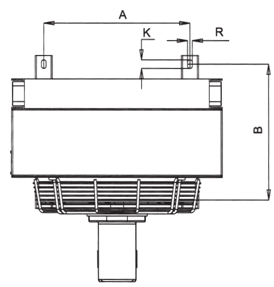
■ Specification

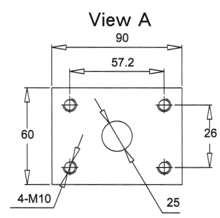
Model	Flow Range L/min	Operating Pressure Bar	Capacity Kcal/h △t=30°C	Hydraulic motor Displacement cc/rev	Hydraulic motor Max. speed r.p.m
AE14 17-HM10	150	35	11100	10	1500
AE14 70-HM10	200	35	15200	10	1500
AE14 90-HM10	250	35	19100	10	1500

■ Dimensions









Model	A	A1	B	B1	H	H1	L	K	R	PT	W1	W2
AE14 17-HM10	320	445	260	300	515	500	440	20	11	G 1"	178	356
AE14 70-HM10	340	440	320	360	520	500	490	20	11	G1-1/4"	178	356
AE14 90-HM10	340	470	320	360	580	560	460	20	11	G1-1/2"	178	356

ORDER CODE

AE – 14 17 – HM 10

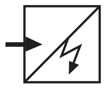
- 10 — Hydraulic motor: Displacement cc/rev
- HM — Power source: Hydraulic motor
- 17 — Width
- 14 — Fan size
- AE — Series number

HydroTechnic Pressure Sensor

Pressure Sensor " PS " Series

FEATURE

- Measurement of vacuum, absolute or gauge pressure
- Zero adjustment as standard (±10% of range)
- Modularity of electrical and hydraulic connections
- Confirms to European EMC Directive, CE approval
- Highly resistant to severe process conditions
- Individual applications due to modular system



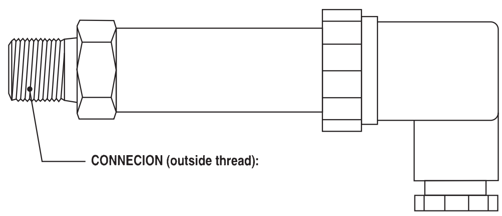
SYMBOL

SPECIFICATIONS

Measurement Range:	-1 … 0 to -1 … 5 bar 0 … 1 to 0 … 600 bar
Overload:	2 x measuring range
Rupture Pressure:	3 x measuring range
Output Signal:	4 ~ 20 mA
Accuracy:	Linearity: < ± 0.5% FS Hysteresis: < ± 0.2% FS Zero point at voltage output: < 50 mV
Zero thermal drift:	< ± 0.012% FS/°C
Zero Adjustment:	< 10% of F.S.
Span Adjustment:	< 10% of F.S.
Response Time:	< 5 msec
Load Cycle:	< 50 Hz
Poewr	
Power Supply:	18 ~ 33 Vdc for 2 wire Loop powered 24 Vdc for 4 wired powered
Maximum Input Current:	< 15 mA
Load Impedance:	< 1000 Ω
Current Consumption:	< 20 mA
Environmental	
Operating temperature:	Standard: -10°C ~ 85°C Option: -25°C ~ 100°C
Operating relative humidity:	< 95% non-condensing
Temperature coefficient:	≤100 PPM/ °C (0~50 °C)
Storage temperature:	-10~70 °C
Enclosure:	IP65 (DIN connector)
Vibration resistance:	1.5 mm (10~55 Hz), 20g
Electrical safety	
Dielectric Strength:	AC 2.0KV for 1 min between Input / Output / Power / Case
Insulation:	≥100M ohm
EMC:	EN50082-1, EN50082-2 EN50081-1, EN50081-2

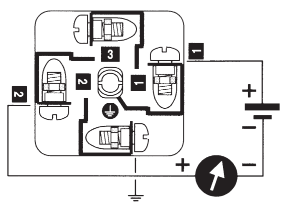
Mechanical	
Materials of Housing:	Standard: Stainless Steel 304 Option: Stainless Steel 316
Materials of Wetted parts:	Stainless Steel 316, Ceramic / Inox 1.4305
Materials of Sealing:	Buna-N Neoprene Viton Fluorosilicone Ethylene Proplylene
Pressure Connection:	Inside thread: G 1/4 Outside thread: Standard: NPT 1/4 Option: NPT 3/8, NPT 1/2 G 1/4, G 3/8, G 1/2 UNF 7/16
Electrical Connection:	DIN connector 43650-A
Weight:	About 280 g

DIMENSIONS

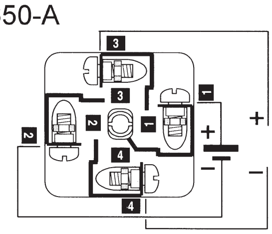


CONNECTION

DIN 43650-A



2 wired connection



4 wired connection

ORDER CODE

PS- Measuring Range — Output Signal — Pressure Connection — Sensor Seal — Electrical Connection

CODE	RANGE	CODE	RANGE
040	0~40 Bar	400	0~400 Bar
100	0~100 Bar	600	0~600 Bar
250	0~250 Bar		
400	0~400 Bar		
600	0~600 Bar		

CODE	OUTPUT
A1	4~20 mA
V1	0~10 V

CODE	CONNECTION
N2	NPT 1/4
P2	PT 1/4
G2	G 1/4

CODE	SENSOR SEAL
1	Buna-N
2	Neoprene
3	Viton

CODE	CONNECTION
1	DIN 43650-A
2	DIN 175301-803A
3	DIN 175301-803C
4	M12x1 , 4-Pin
5	Flying leads

Z

Non-contact Absolute Position Transducer " 1800 " Series

The Advantages of Absopos Sensing

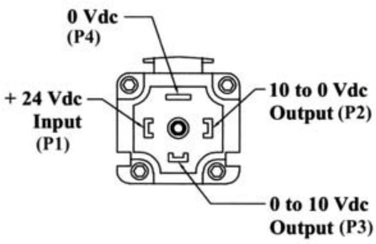
FOR EXTREMELY ACCURATE, LOW-NOISE, AND WEAR-FREE ABSOLUTE POSITION FEEDBACK

- Germanjet transducer adopted the non-contact ultrasonic measuring technology for precise, direct and absolute measurement.
- The absence of electrical contact on the cursor eliminates all wear and guarantees almost unlimited mechanical life expectancy.
- The non-contact (Floating) cursor provides exceptional ease of installation with a varieety of available cursor position target.
- The high versatile profile housing offers full protection against outside agents for use in harsh environments with high contamination and presence of dust.
- Mounting is accomplished using clamps that allow precise mechanical adjustment.

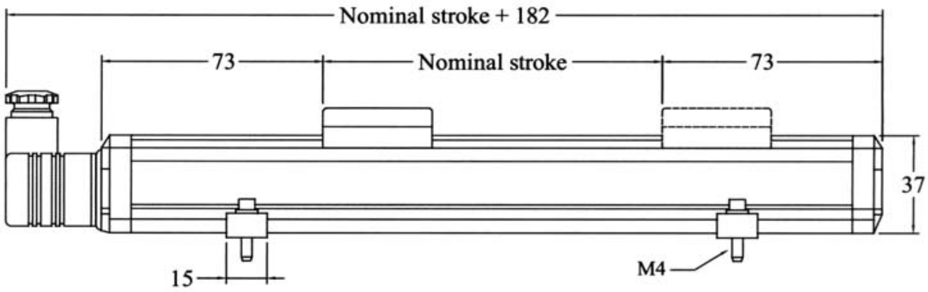
APPLICATIONS

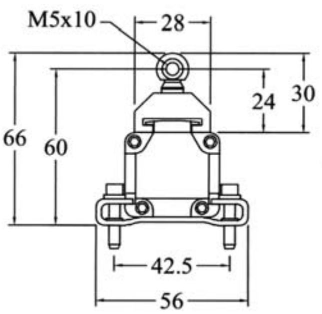


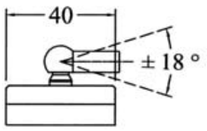

DIMENSIONS



(View toward sensor pins)

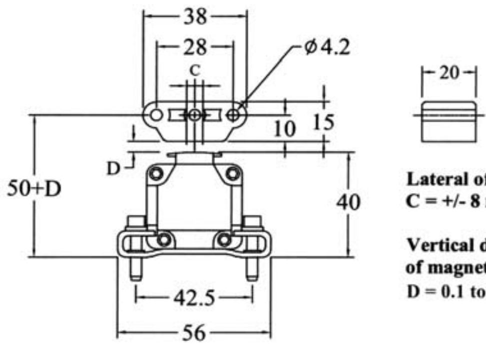






*** Point arrow on magnet toward connector for installation.**

Captive Magnet
Order No: 1800 900 001



Lateral offset:
C = +/- 8 mm

Vertical distance of magnet:
D = 0.1 to 4mm

Floating Magnet
Order No: 1800 900 002

CE

Non-contact Absolute Position Transducer " 1800 " Series

General Specifications

Measurement Type	Linear displacement
Input Voltage	24Vdc nominal (20.4 - 28.8Vdc)
Input Protection	Polarity protection up to - 30Vdc, Overvoltage protection up to 36Vdc
Current Consumption	50 - 140mA (stroke range dependent)
Dielectric Strength	500Vdc (DC ground to machine ground)
Output	0 - 10Vdc and 10 - 0Vdc dual-output, minimum load 5KΩ
Resolution	Infinite, restricted by output ripple
Repeatability	< ± 0.005% of full scale
Non-Linearity	< ± 0.01% of full scale (minimum ± 90μm)
Update Time	0.5 ms up to 1200 mm / 1.0 ms up to 2400 mm 2.0 ms up to 4800 mm / 5.0 ms up to 7600 mm stroke length
Operation Temperature	-40 to +85°C
Sealing	IP 65
Vibration Rating	5g / 10-2000 Hz per IEC standard 68-2-6
Shock Rating	50g single hit per IEC standard 68-2-27

ORDER CODE

1800 1 X XXXX

Magnet Type

1 = Captive

2 = Floating

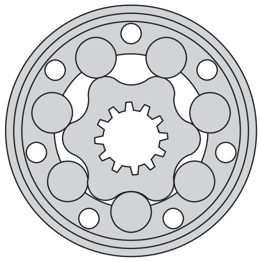
Stroke Length

0100 = 100 mm	0425 = 425 mm	0950 = 950 mm
0130 = 130 mm	0455 = 455 mm	1000 = 1000 mm
0150 = 150 mm	0500 = 500 mm	1100 = 1100 mm
0175 = 175 mm	0525 = 525 mm	1250 = 1250 mm
0200 = 200 mm	0600 = 600 mm	1350 = 1350 mm
0225 = 225 mm	0650 = 650 mm	1500 = 1500 mm
0275 = 275 mm	0750 = 750 mm	1600 = 1600 mm
0300 = 300 mm	0800 = 800 mm	1750 = 1750 mm
0360 = 360 mm	0875 = 875 mm	2000 = 2000 mm
0400 = 400 mm	0900 = 900 mm	• other lenght upon request.

Z

APPLICATION

- Conveyors
- Feeding mechanism of robots and manipulators
- Metal working machines
- Textile machines
- Agriculture machines
- Food industries
- Grass cutting machinery etc.



CONTENTS

OPTIONS

- Model- Spool valve, roll-gerotor
- Flange mount
- Motor with needle bearing
- Side and rear ports
- Shafts- straight, splined and tapered
- Shaft seal for high and low pressure
- Metric and BSPP ports
- Speed sensoring
- Other special features

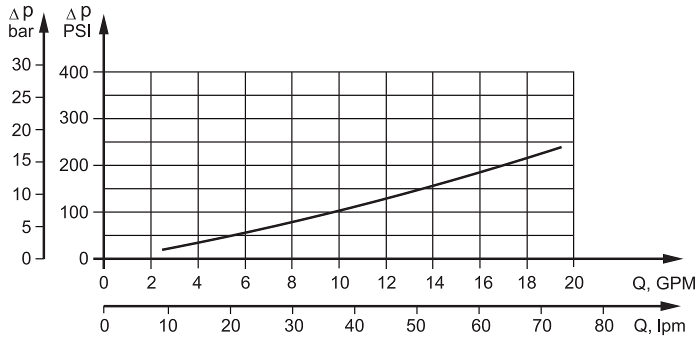
GENERAL

Max. Displacement, cm³/rev [in³/rev]	397 [24.4]
Max. Speed, [RPM]	970
Max. Torque, daNm [lb-in]	cont.: 61 [5400] int.: 69 [6100]
Max. Output, kW [HP]	15 [20.1]
Max. Pressure Drop, bar [PSI]	cont.: 175 [2540] int.: 200 [2900]
Max. Oil Flow, lpm [GPM]	75 [20]
Min. Speed, [RPM]	10
Pressure fluid	Mineral based- HLP(DIN 51524) or HM(ISO 6743/4)
Temperature range, °C [°F]	-40÷140 [-40÷284]
Optimal Viscosity range, mm²/s [SUS]	20÷75 [98÷347]
Filtration	ISO code 20/16 (Min. recommended fluid filtration of 25 micron)

Oil flow in drain line

Pressure drop bar [PSI]	Viscosity mm²/s [SUS]	Oil flow in drain line lpm [GPM]
140 [2030]	20 [98]	2,5 [.660]
	35 [164]	1,8 [.476]
210 [3045]	20 [98]	3,5 [.925]
	35 [164]	2,8 [.740]

Pressure Losses



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SPECIFICATION DATA

Specification Data for MR... motors with **C**, **CO**, **SH**, **K** and **SA** shafts.
(ø28,56 sealing diameter)

Type		MR 50	MR 80	MR 100	MR 125	MR 160	MR 200	MR 250	MR 315	MR 400
Displacement, cm³/rev		51,5	80,3	99,8	125,7	159,6	199,8	250,1	315,7	397
[in³/rev]		[3.14]	[4.90]	[6.09]	[7.67]	[9.74]	[12.19]	[15.26]	[19.26]	[24.4]
Max. Speed,	Cont.	775	750	600	475	375	300	240	190	150
[RPM]	Int.*	970	940	750	600	470	375	300	240	190
Max. Torque	Cont.	10 [900]	20 [1770]	24 [2125]	30 [2655]	39 [3450]	38,5[3410]	39 [3450]	36 [3185]	38 [3360]
daNm [in-lb]	Int.*	13 [1150]	22 [1947]	28 [2480]	34 [3010]	43 [3805]	46 [4070]	47 [4160]	47 [4160]	47 [4160]
	Peak**	17 [1505]	27 [2390]	32 [2832]	37 [3275]	46 [4070]	56 [4960]	60 [5310]	61 [5400]	61 [5400]
Max. Output	Cont.	7 [9.5]	12,5 [17]	13 [17.4]	12,5[16.8]	11,5[15.4]	9 [12]	8 [10.7]	5 [6.7]	4,8 [6.4]
kW [HP]	Int.*	8,5 [11.9]	15 [20.1]	15 [20.1]	14,5[19.5]	14 [18.8]	12 [16.1]	9,5 [12.7]	8 [10.7]	6,8 [9.1]
Max. Pressure Drop	Cont.	140[2030]	175[2540]	175[2540]	175[2540]	175[2540]	140[2030]	110[1600]	85 [1230]	65 [940]
bar [PSI]	Int.*	175[2540]	200[2900]	200[2900]	200[2900]	200[2900]	175[2540]	140[2030]	115[1670]	90 [1300]
	Peak**	225[3260]	225[3260]	225[3260]	225[3260]	225[3260]	225[3260]	200[2900]	150[2175]	115[1670]
Max. Oil Flow	Cont.	40 [10.5]	60 [15.8]	60 [15.8]	60 [15.8]	60 [15.8]	60 [15.8]	60 [15.8]	60 [15.8]	60 [15.8]
lpm [GPM]	Int.*	50 [13.2]	75 [19.8]	75 [19.8]	75 [19.8]	75 [19.8]	75 [19.8]	75 [19.8]	75 [19.8]	75 [19.8]
Max. Inlet Pressure	Cont.	175[2540]	175[2540]	175[2540]	175[2540]	175[2540]	175[2540]	175[2540]	175[2540]	175[2540]
bar [PSI]	Int.*	200[2900]	200[2900]	200[2900]	200[2900]	200[2900]	200[2900]	200[2900]	200[2900]	200[2900]
	Peak**	225[3260]	225[3260]	225[3260]	225[3260]	225[3260]	225[3260]	225[3260]	225[3260]	225[3260]
Max. Return Pres-	Cont.	175[2540]	175[2540]	175[2540]	175[2540]	175[2540]	175[2540]	175[2540]	175[2540]	175[2540]
sure with Drain Line	Int.*	200[2900]	200[2900]	200[2900]	200[2900]	200[2900]	200[2900]	200[2900]	200[2900]	200[2900]
bar [PSI]	Peak**	225[3260]	225[3260]	225[3260]	225[3260]	225[3260]	225[3260]	225[3260]	225[3260]	225[3260]
Max. Starting Pressure with Unloaded Shaft, bar [PSI]		10 [145]	10 [145]	10 [145]	9 [130]	7 [102]	5 [73]	4 [58]	3 [44]	3 [44]
Min. Starting Torque daNm [in-lb]	At max.press. drop Cont.	8 [710]	15 [1330]	20 [1770]	25 [2215]	32 [2832]	33 [2920]	31 [2740]	31,5[2875]	31,5[2875]
	At max.press. drop Int.*	10 [85]	17 [1505]	23 [2035]	28 [2480]	37 [3275]	40 [3540]	48 [4250]	58 [5220]	50 [4425]
Min. Speed*, [RPM]**		10	10	10	10	10	10	10	10	10
Weight, kg [lb]	MR(F)	6,8 [15]	6,9 [15,2]	7,2 [15.9]	7,3 [16.1]	7,5 [15.2]	8 [17.6]	8,4 [18.5]	9,1 [20]	9,8 [21.6]
For rear ports: +0,650 [1.433]	MRQ(N)	6,2 [13.7]	6,3 [13.9]	6,6 [14.6]	6,8 [15]	7,6 [15.4]	7,2 [14.7]	7,8 [17.2]	8,6 [19]	9,3 [20.5]

* Intermittent operation: the permissible values may occur for max. 10% of every minute.
** Peak load: the permissible values may occur for max. 1% of every minute.
*** For speeds lower than given, consult factory or your regional manager.

1. Intermittent speed and intermittent pressure must not occur simultaneously.
2. Recommended filtration is per ISO cleanliness code 20/16. A nominal filtration of 25 micron or better.
3. Recommend using a premium quality, anti-wear type mineral based hydraulic oil HLP(DIN51524) or HM (ISO 6743/4). If using synthetic fluids consult the factory for alternative seal materials.
4. Recommended minimum oil viscosity 13 mm^2/s[70 SUS] at 50°C [122°F].
5. Recommended maximum system operating temperature is 82°C [180°F].
6. To assure optimum motor life fill with fluid prior to loading and run at moderate load and speed for 10-15 minutes.

SPECIFICATION DATA (continued)

Specification Data for MR... motors with CB, KB, OB and HB shafts.
(ø35 sealing diameter)

Type		MR 50	MR 80	MR 100	MR 125	MR 160	MR 200	MR 250	MR 315	MR 400
Displacement, cm^3/rev [in^3/rev]		51,5 [3.14]	80,3 [4.90]	99,8 [6.09]	125,7 [7.67]	159,6 [9.74]	199,8 [12.19]	250,1 [15.26]	315,7 [19.26]	397 [24.4]
Max. Speed, [RPM]	Cont.	775	750	600	475	375	300	240	190	150
	Int.*	970	940	750	600	470	375	300	240	190
Max. Torque daNm [in-lb]	Cont.	10 [900]	20 [1770]	24 [2125]	30 [2655]	39 [3450]	45 [4000]	54 [4780]	55 [4870]	61 [5400]
	Int.*	13 [1150]	22 [1947]	28 [2480]	34 [3010]	43 [3805]	50 [4425]	61 [5400]	69 [6110]	69 [6110]
	Peak**	17 [1505]	27 [2390]	32 [2832]	37 [3275]	46 [4070]	56 [4960]	71 [6280]	84 [7435]	87 [7700]
Max. Output kW [HP]	Cont.	7 [9.5]	12,5 [17]	13 [17.4]	12,5[16.8]	11,5[15.4]	11 [14.8]	10 [13.4]	9 [12]	7,8 [10.5]
	Int.*	8,5 [11.9]	15 [20.1]	15 [20.1]	14,5[19.5]	14 [18.8]	13 [17.4]	12 [16.1]	10 [13.4]	10,6[14.2]
Max. Pressure Drop bar [PSI]	Cont.	140[2030]	175[2540]	175[2540]	175[2540]	175[2540]	175[2540]	175[2540]	135[1960]	110[1600]
	Int.*	175[2540]	200[2900]	200[2900]	200[2900]	200[2900]	200[2900]	200[2900]	175[2540]	140[2030]
	Peak**	225[3260]	225[3260]	225[3260]	225[3260]	225[3260]	225[3260]	225[3260]	210[3045]	175[2540]
Max. Oil Flow lpm [GPM]	Cont.	40 [10.5]	60 [15.8]	60 [15.8]	60 [15.8]	60 [15.8]	60 [15.8]	60 [15.8]	60 [15.8]	60 [15.8]
	Int.*	50 [13.2]	75 [19.8]	75 [19.8]	75 [19.8]	75 [19.8]	75 [19.8]	75 [19.8]	75 [19.8]	75 [19.8]
Max. Inlet Pressure bar [PSI]	Cont.	175[2540]	175[2540]	175[2540]	175[2540]	175[2540]	175[2540]	175[2540]	175[2540]	175[2540]
	Int.*	200[2900]	200[2900]	200[2900]	200[2900]	200[2900]	200[2900]	200[2900]	200[2900]	200[2900]
	Peak**	225[3260]	225[3260]	225[3260]	225[3260]	225[3260]	225[3260]	225[3260]	225[3260]	225[3260]
Max. Return Pressure with Drain Line bar [PSI]	Cont.	175[2540]	175[2540]	175[2540]	175[2540]	175[2540]	175[2540]	175[2540]	175[2540]	175[2540]
	Int.*	200[2900]	200[2900]	200[2900]	200[2900]	200[2900]	200[2900]	200[2900]	200[2900]	200[2900]
	Peak**	225[3260]	225[3260]	225[3260]	225[3260]	225[3260]	225[3260]	225[3260]	225[3260]	225[3260]
Max. Starting Pressure with Unloaded Shaft, bar [PSI]		10 [145]	10 [145]	10 [145]	9 [130]	7 [102]	5 [73]	4 [58]	3 [44]	3 [44]
Min. Starting Torque daNm [in-lb]	At max.press. drop Cont.	8 [710]	15 [1330]	20 [1770]	25 [2215]	32 [2832]	41 [3630]	50 [4425]	50 [4425]	50 [4425]
	At max.press. drop Int.*	10 [885]	17 [1505]	23 [2035]	28 [2480]	37 [3275]	46 [4070]	55 [4870]	66 [5840]	61 [5400]
Min. Speed***, [RPM]		10	10	10	10	10	10	10	10	10
Weight, kg [lb] For rear ports: +0,650 [1.433]		6,9 [15,2]	7 [15,4]	7,3 [16.1]	7,4 [16.3]	7,6 [15.4]	8,1 [18.9]	8,5 [18.7]	9,2 [20.3]	9,9 [21.8]

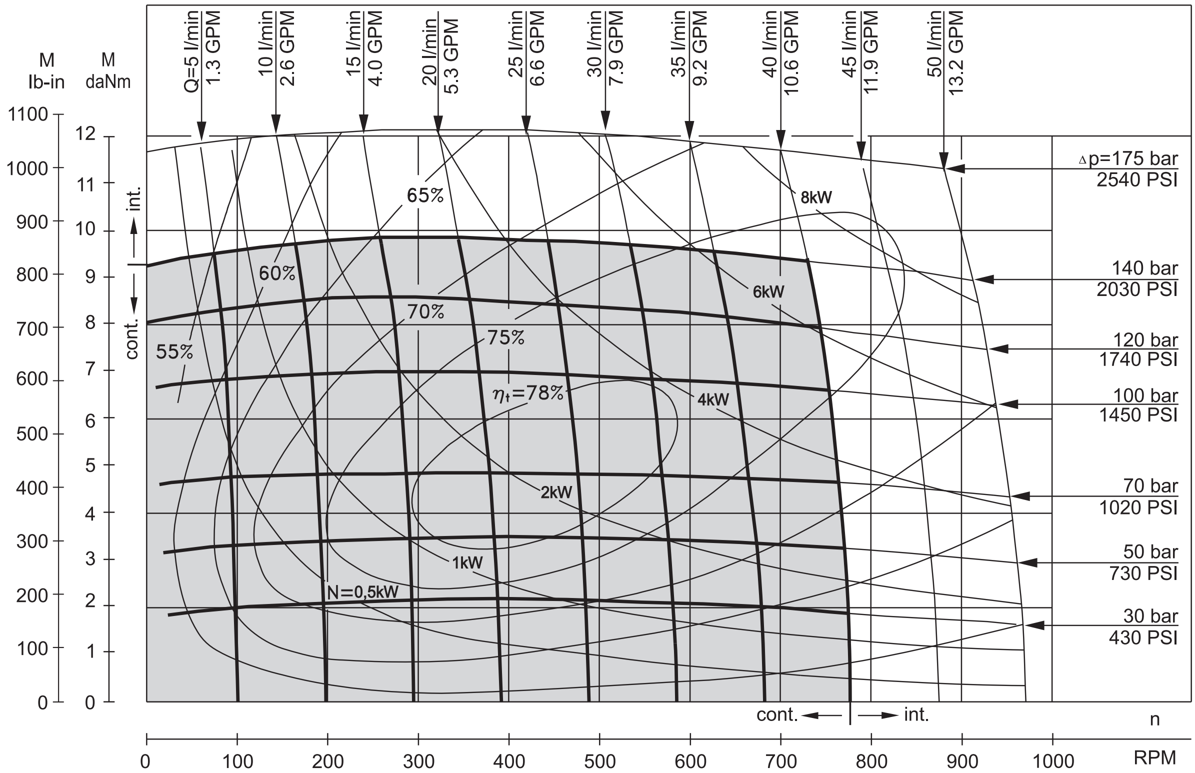
Z

* Intermittent operation: the permissible values may occur for max. 10% of every minute.
** Peak load: the permissible values may occur for max. 1% of every minute.
*** For speeds lower than given, consult factory or your regional manager.

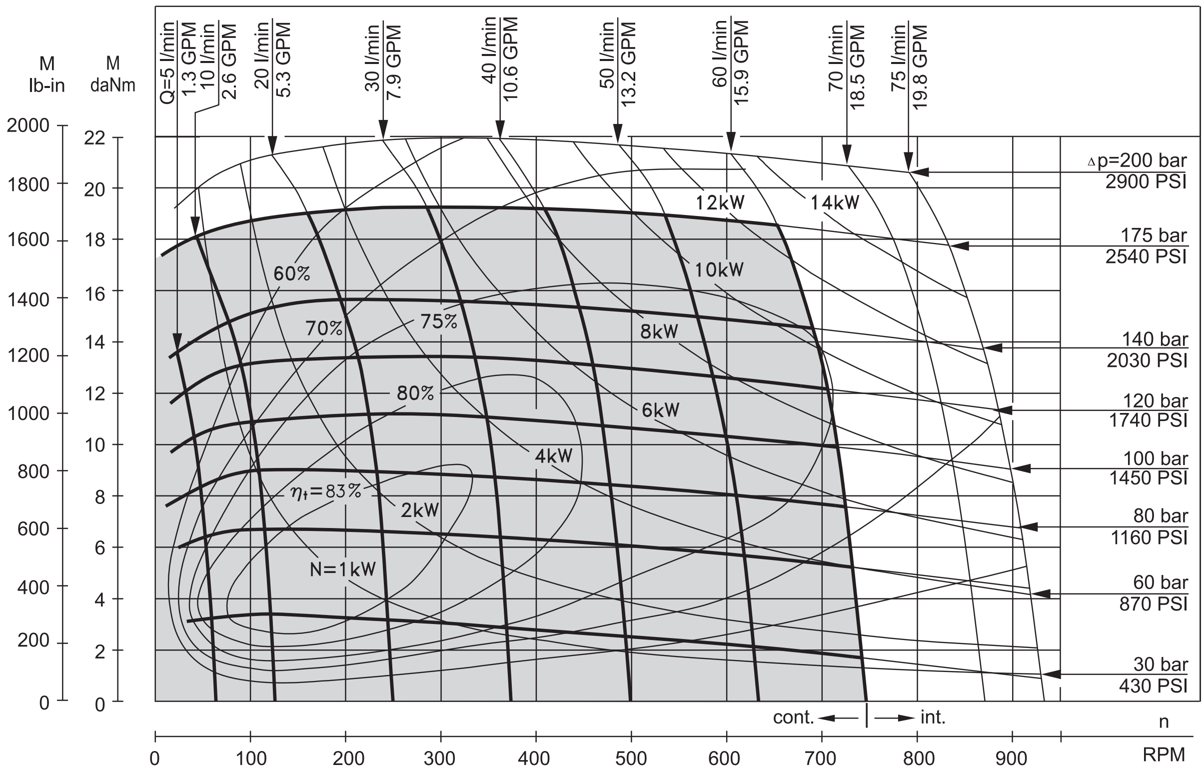
1. Intermittent speed and intermittent pressure must not occur simultaneously.
2. Recommended filtration is per ISO cleanliness code 20/16. A nominal filtration of 25 micron or better.
3. Recommend using a premium quality, anti-wear type mineral based hydraulic oil HLP(DIN51524) or HM (ISO 6743/4). If using synthetic fluids consult the factory for alternative seal materials.
4. Recommended minimum oil viscosity 13 mm^2/s [70 SUS] at 50°C [122°F].
5. Recommended maximum system operating temperature is 82°C [180°F].
6. To assure optimum motor life fill with fluid prior to loading and run at moderate load and speed for 10-15 minutes.

FUNCTION DIAGRAMS

MR 50



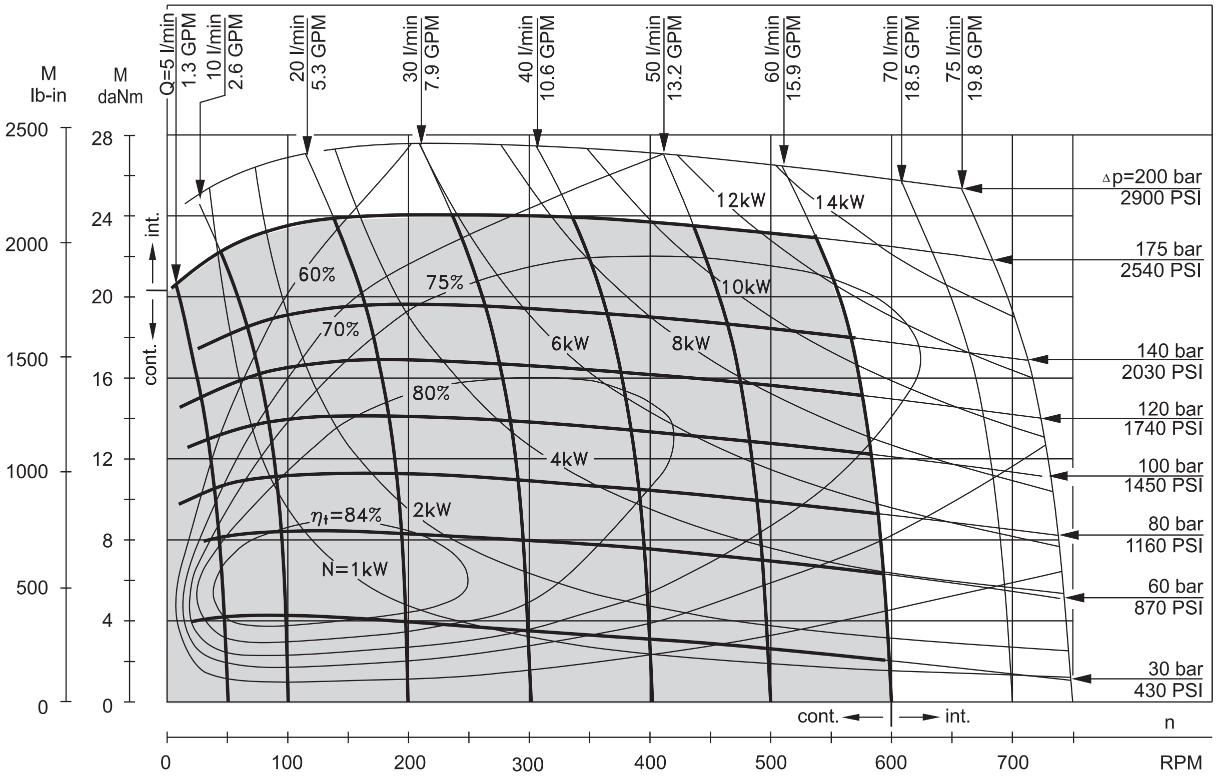
MR 80



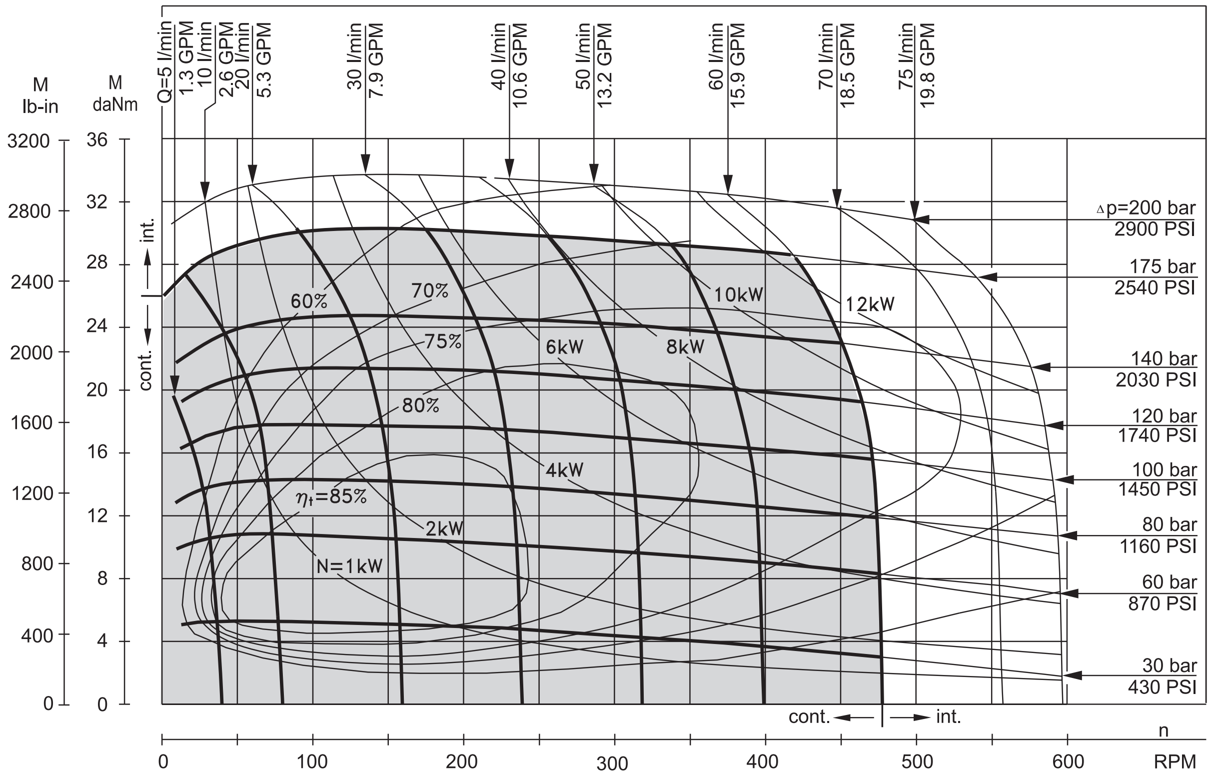
The function diagrams data is for average performance of randomly selected motors at back pressure 5÷10 bar [72.5÷145 PSI] and oil with viscosity of 32 mm²/s [150 SUS] at 50°C [122°F].

FUNCTION DIAGRAMS

MR 100



MR 125

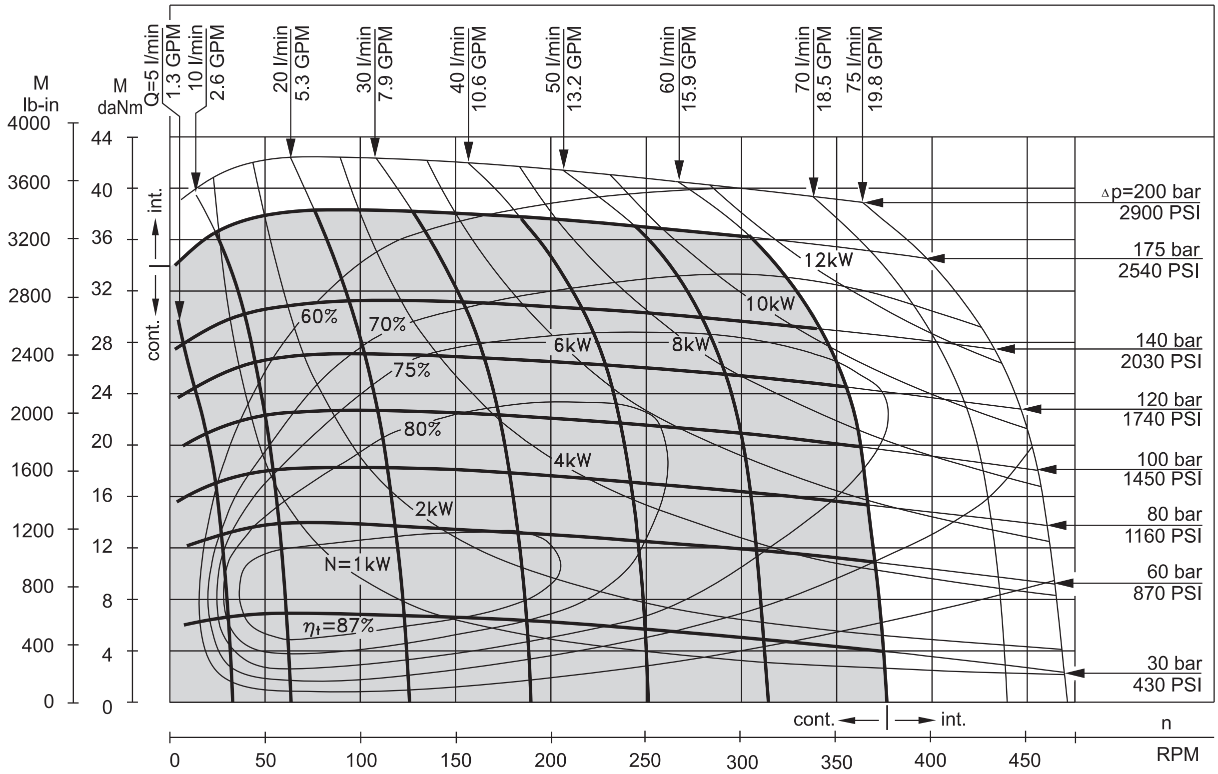


The function diagrams data is for average performance of randomly selected motors at back pressure 5÷10 bar [72.5÷145 PSI] and oil with viscosity of 32 mm²/s [150 SUS] at 50°C [122°F].

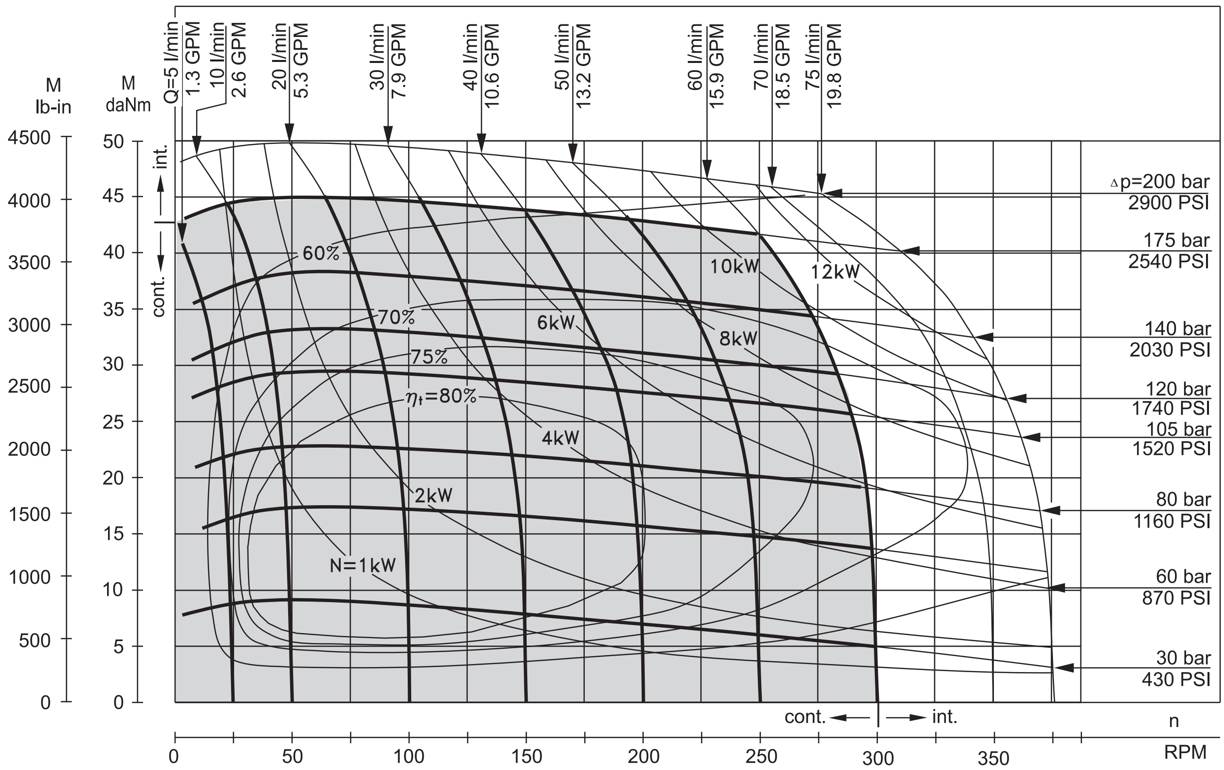
Z

FUNCTION DIAGRAMS

MR 160



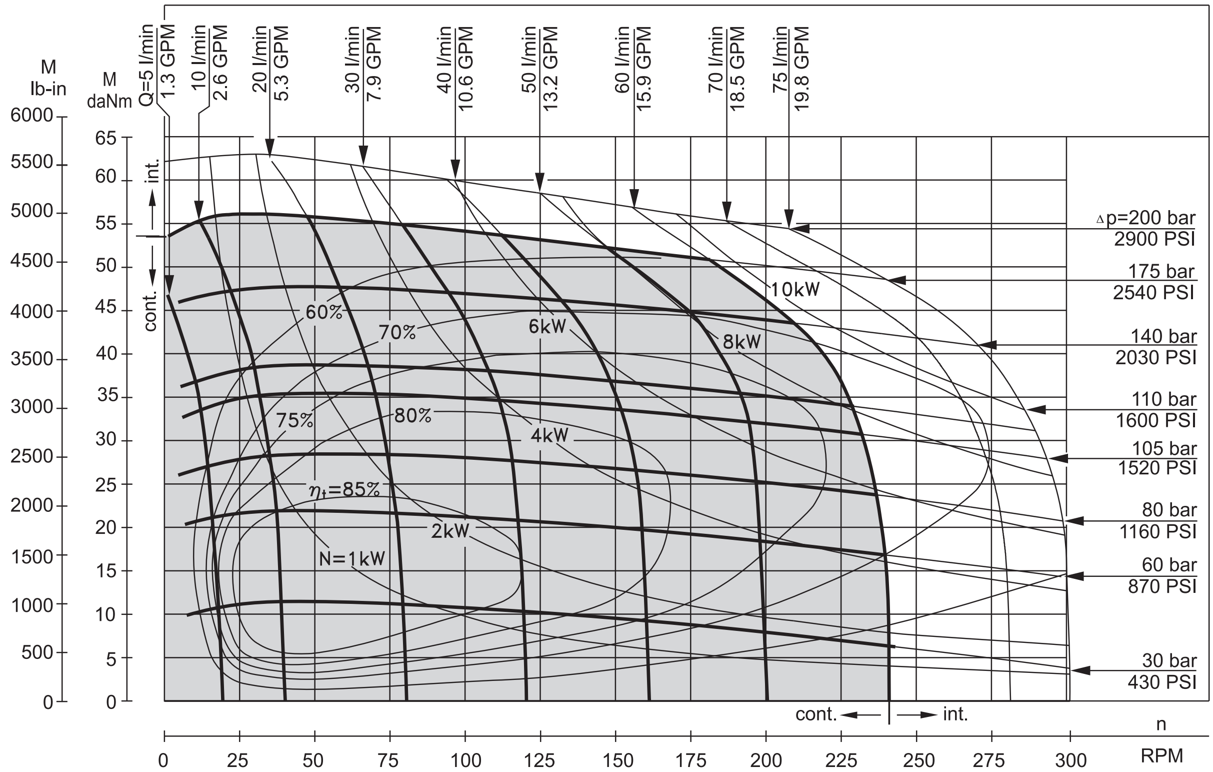
MR 200



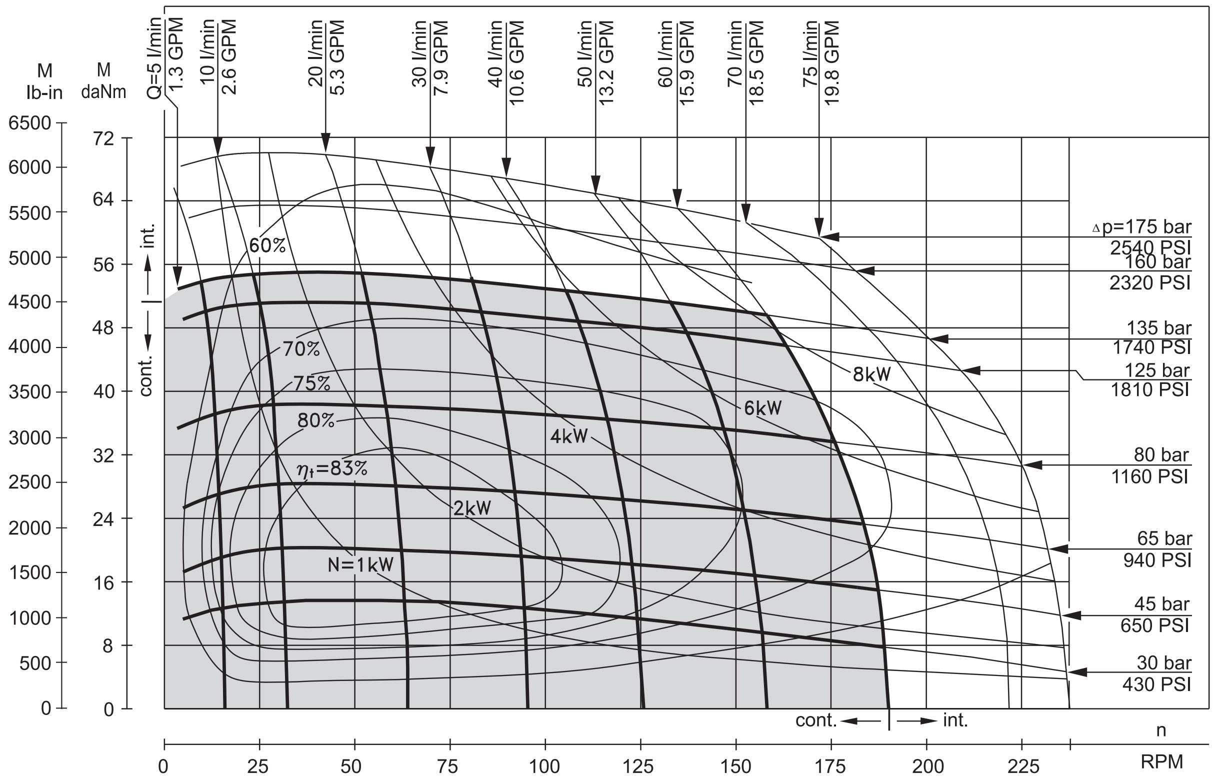
The function diagrams data is for average performance of randomly selected motors at back pressure 5÷10 bar [72.5÷145 PSI] and oil with viscosity of 32 mm²/s [150 SUS] at 50°C [122°F].

FUNCTION DIAGRAMS

MR 250



MR 315



The function diagrams data is for average performance of randomly selected motors at back pressure 5÷10 bar [72.5÷145 PSI] and oil with viscosity of 32 mm²/s [150 SUS] at 50°C [122°F].

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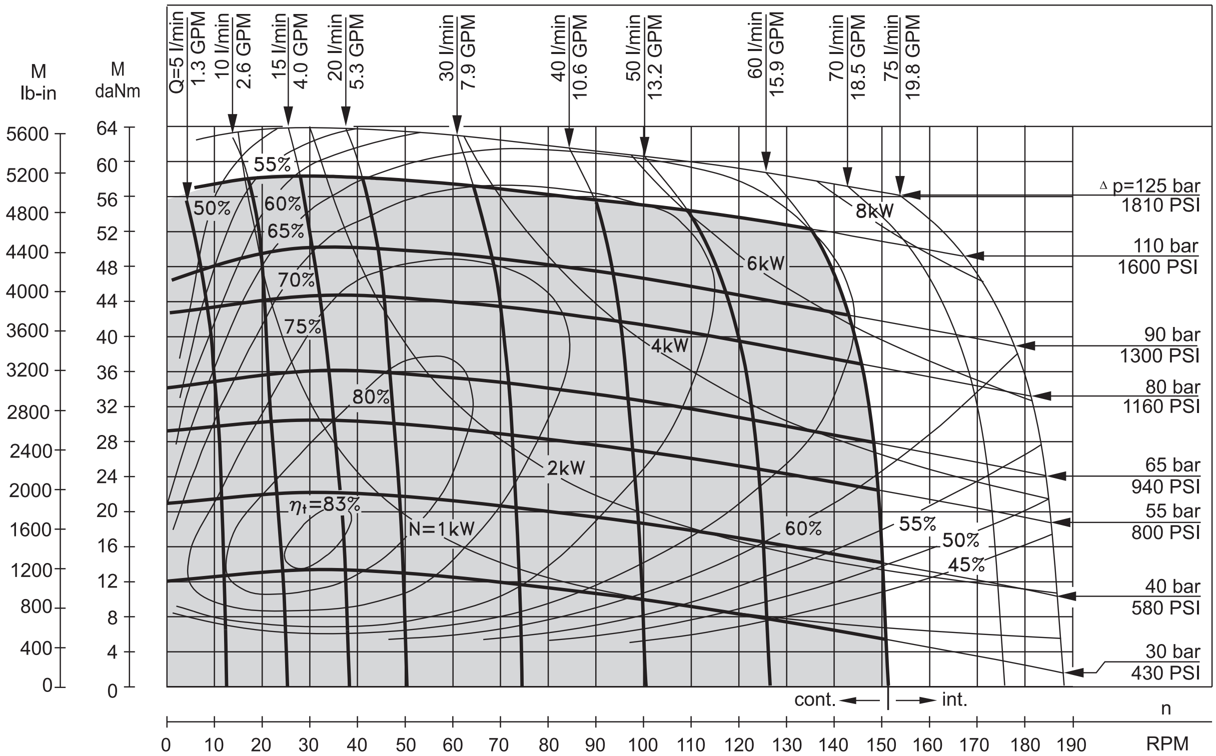
FUNCTION DIAGRAMS

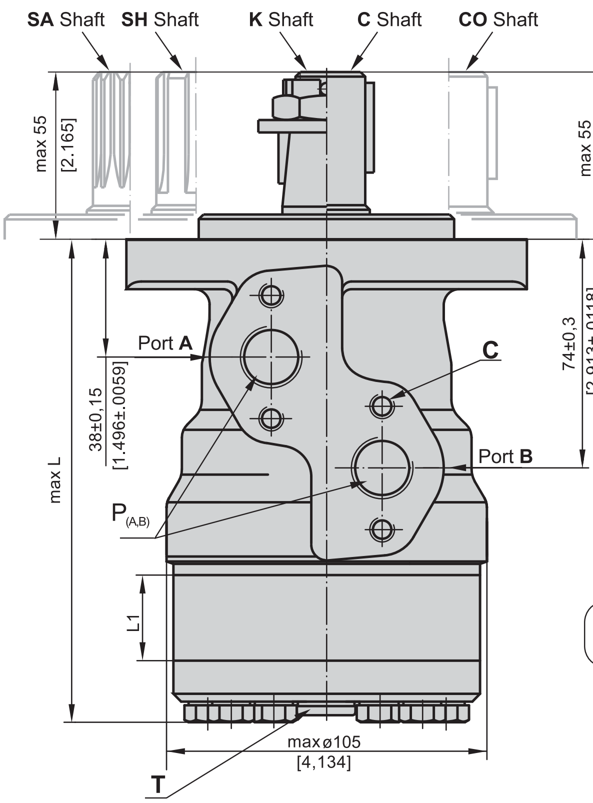
MR 400



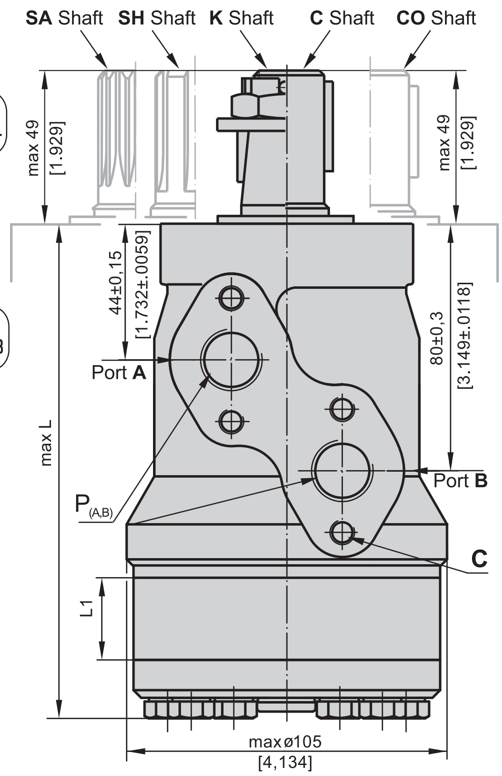
The function diagrams data is for average performance of randomly selected motors at back pressure 5÷10 bar [72.5÷145 PSI] and oil with viscosity of 32 mm²/s [150 SUS] at 50°C [122°F].

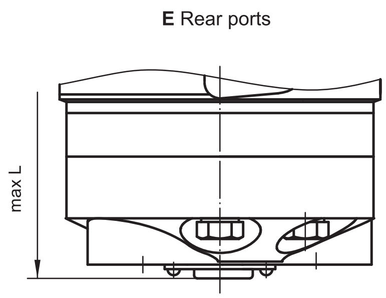
Z

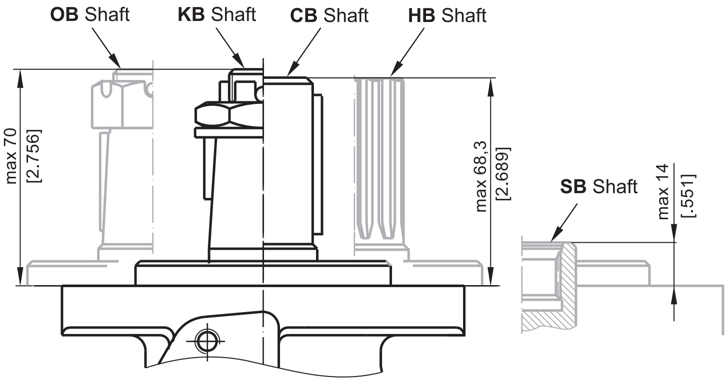
DIMENSIONS AND MOUNTING DATA



Shaft Dim. See Page 64
Flange Dim. See Page 63
Port Dim. See Page 63







mm [in]

C : 4xM8 - 13 mm [.51 in] depth
$P_{(A,B)}$: 2xG1/2 or 2xM22x1,5 - 15 mm [.59 in] depth
T : G1/4 or M14x1,5 - 12 mm [.47 in] depth (plugged)

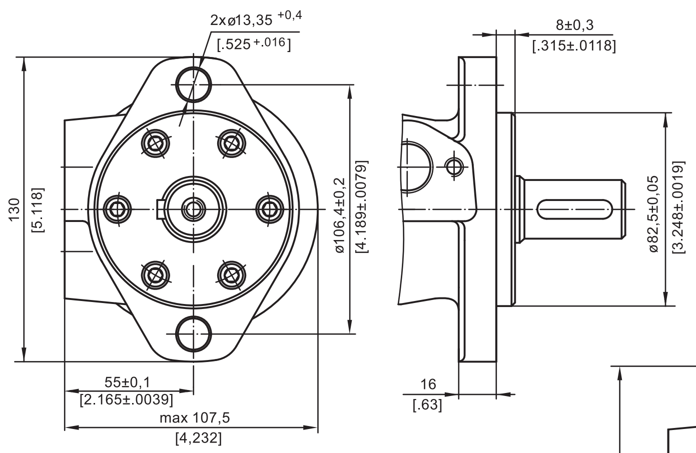
Standard Rotation
Viewed from Shaft End
Port **A** Pressurized - **CW**
Port **B** Pressurized - **CCW**

Reverse Rotation
Viewed from Shaft End
Port **A** Pressurized - **CCW**
Port **B** Pressurized - **CW**

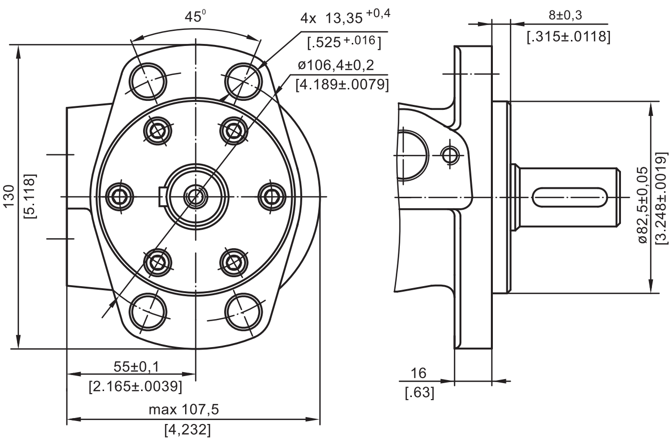
Type	L, mm [in]	Type	L, mm [in]	Type	L, mm [in]	Type	L, mm [in]	L_1, mm [in]
MR(F) 50	138,0 [5.43]	MRQ 50	143,5 [5.65]	MR(F)E 50	157,5 [6.20]	MRQE 50	163,5 [6.44]	9,0 [.35]
MR(F) 80	143,0 [5.63]	MRQ 80	148,5 [5.85]	MR(F)E 80	162,5 [6.40]	MRQE 80	168,5 [6.63]	14,0 [.55]
MR(F) 100	146,0 [5.75]	MRQ 100	152,0 [5.98]	MR(F)E 100	165,5 [6.52]	MRQE 100	171,5 [6.75]	17,4 [.69]
MR(F) 125	150,5 [5.93]	MRQ 125	156,5 [6.16]	MR(F)E 125	170,0 [6.69]	MRQE 125	176,0 [6.93]	21,8 [.86]
MR(F) 160	156,5 [6.16]	MRQ 160	162,5 [6.40]	MR(F)E 160	176,0 [6.93]	MRQE 160	182,0 [7.17]	27,8 [1.09]
MR(F) 200	163,5 [6.44]	MRQ 200	169,5 [6.67]	MR(F)E 200	183,0 [7.20]	MRQE 200	189,0 [7.44]	34,8 [1.37]
MR(F) 250	172,0 [6.77]	MRQ 250	179,0 [7.05]	MR(F)E 250	192,0 [7.56]	MRQE 250	198,0 [7.80]	43,5 [1.71]
MR(F) 315	183,0 [7.20]	MRQ 315	189,0 [7.44]	MR(F)E 315	204,0 [8.03]	MRQE 315	210,0 [8.27]	54,8 [2.16]
MR(F) 400	198,0 [7.80]	MRQ 400	204,0 [8.03]	MR(F)E 400	218,0 [8.58]	MRQE 400	224,0 [8.82]	69,4 [2.73]

MOUNTING

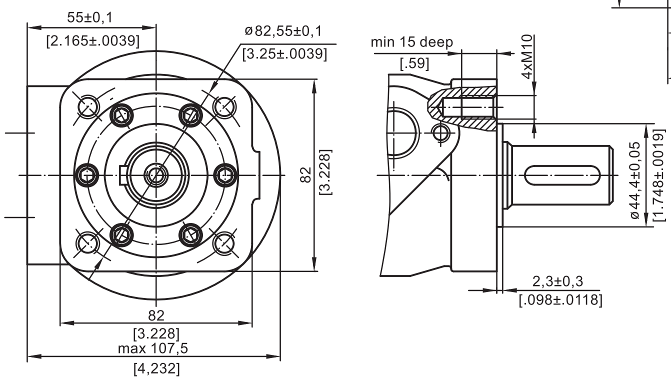
Oval Mount (2 Holes)



F - Oval Mount (4 Holes)



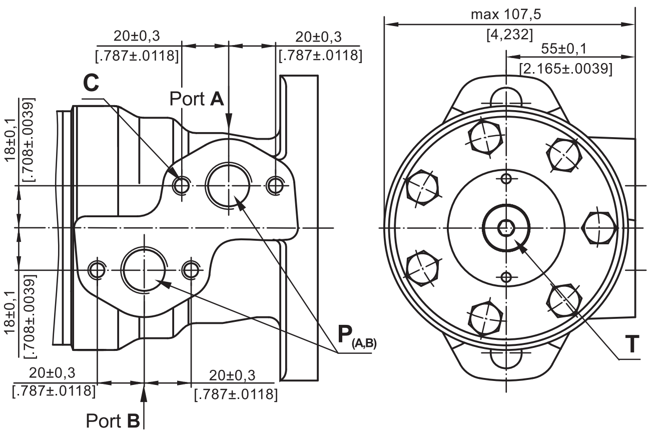
Q - Square Mount (4 Bolts)



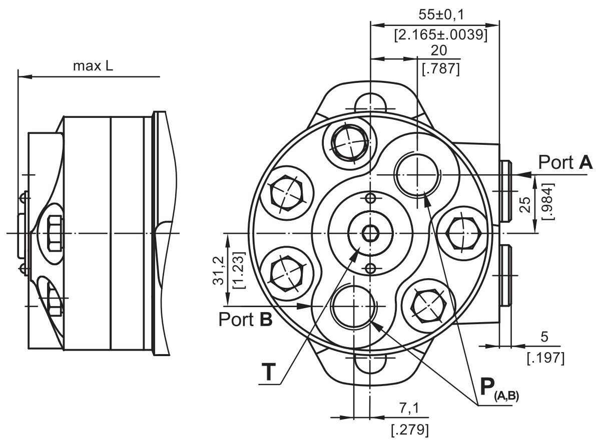
mm [in]

PORTS

Side Ports



E Rear Ports



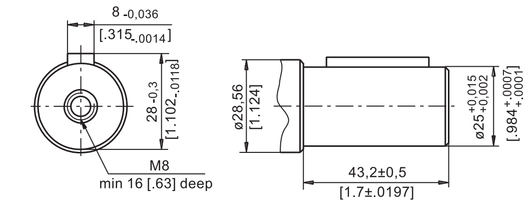
C : 4xM8 - 13 mm [.51 in] depth
$P_{(A,B)}$: 2xG1/2 or 2xM22x1,5 - 15 mm [.59 in] depth
T : G1/4 or M14x1,5 - 12 mm [.47 in] depth (plugged)

Standard Rotation
Viewed from Shaft End
Port **A** Pressurized - **CW**
Port **B** Pressurized - **CCW**

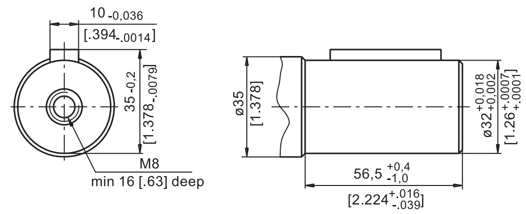
Reverse Rotation
Viewed from Shaft End
Port **A** Pressurized - **CCW**
Port **B** Pressurized - **CW**

SHAFT EXTENSIONS FOR MP AND MR MOTORS

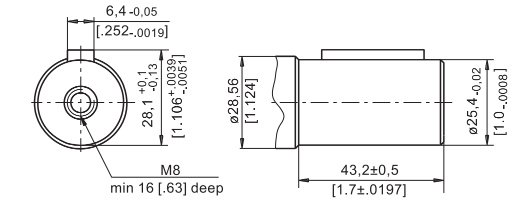
C - ø25 straight, Parallel key A8x7x32 DIN 6885
Max. Torque 34 daNm [3010 lb-in]



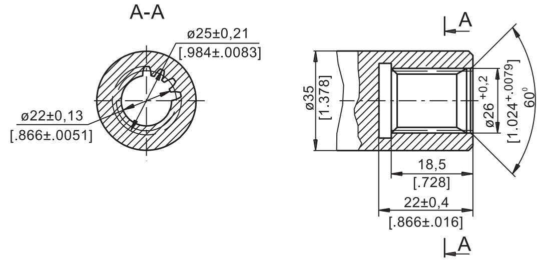
CB - ø32 straight, Parallel key A10x8x45 DIN 6885
Max. Torque 77 daNm [6815 lb-in]



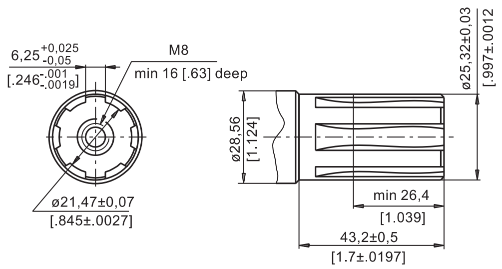
CO - ø1" straight, Parallel key ¼"x¼"x1¼" BS46
Max. Torque 34 daNm [3010 lb-in]



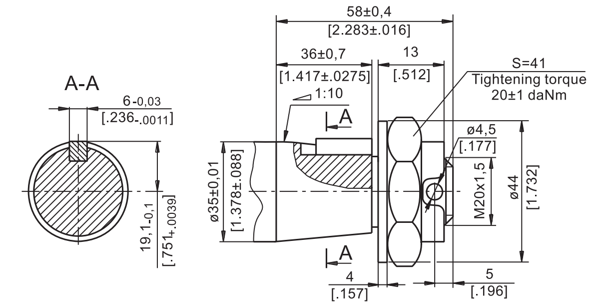
SB - splined A25x22xH10 DIN 5482
Max. Torque 34 daNm [3010 lb-in]



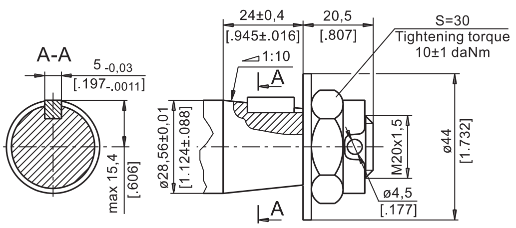
SH - splined, BS 2059 (SAE 6B)
Max. Torque 40 daNm [3540 lb-in]



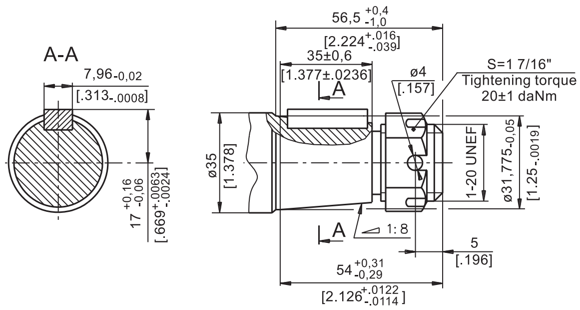
KB - tapered 1:10, Parallel key B6x6x20 DIN 6885
Max. Torque 77 daNm [6815 lb-in]



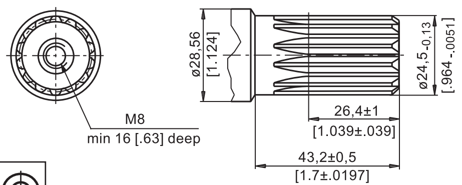
K - tapered 1:10, Parallel key B5x5x14 DIN 6885
Max. Torque 40 daNm [3540 lb-in]



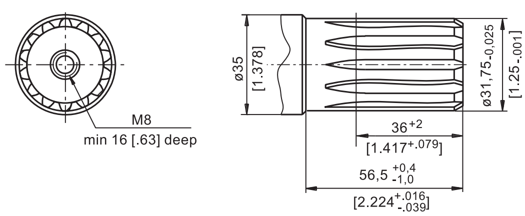
OB - tapered 1:8 SAEJ 501, Parallel key ⁵⁄₁₆"x⁵⁄₁₆"x1¼" BS46
Max. Torque 77 daNm [6815 lb-in]

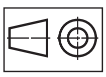


SA - splined, B25x22h9 DIN 5482
Max. Torque 40 daNm [3540 lb-in]



HB - ø1¼" splined 14T, ANSI B92.1-1976 Norm
Max. Torque 77 daNm [6815 lb-in]



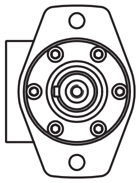
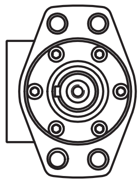
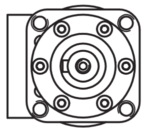


mm [in]

Z

PERMISSIBLE SHAFT LOADS FOR MP AND MR MOTORS

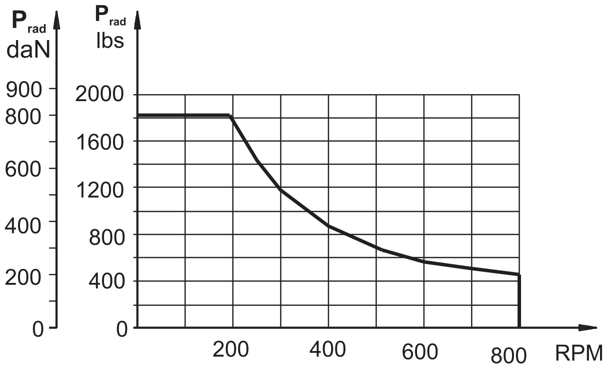
The permissible radial shaft load **P**rad depends on the speed **n**, RPM , distance L from the point of load to the mounting flange and shaft version.

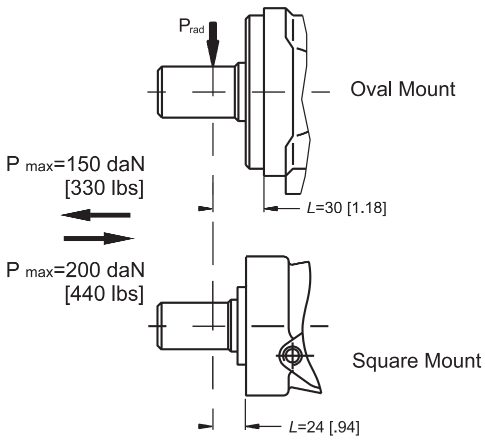
Mounting Flange			
Shaft Version	**cylindrical - C, CO tapered - K, splined - SH**	**splined - HB cylindrical - CB**	**cylindrical - C, CO**
Radial Shaft Load P_{rad}, in mm	$\frac{800}{n} \times \frac{25000}{95+L}$, daN*	$\frac{800}{n} \times \frac{18750}{95+L}$, daN*	$\frac{800}{n} \times \frac{25000}{101+L}$, daN*
Radial Shaft Load P_{rad}, in inch	$\frac{800}{RPM} \times \frac{2215}{3.74+L}$, lbs*	$\frac{800}{RPM} \times \frac{1660}{3.74+L}$, lbs*	$\frac{800}{RPM} \times \frac{2215}{3.98+L}$, lbs*

* n < 200 RPM; max Prad=800 daN [1800 lbs]
n ≥ 200 RPM; L < 55 mm [2.2 in]

MP AND MR

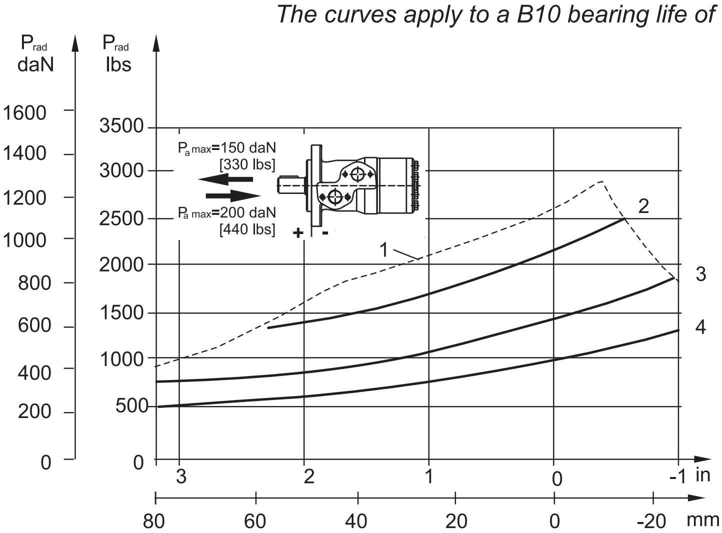
Radial Shaft Load P_{rad} for C, CO Shaft Extensions by L=30 mm [1.18 in] (24 mm [.94 in])





MPN AND MRN

The curves apply to a B10 bearing life of 2000 hours.



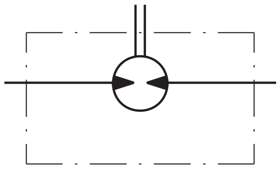
1. Max. radial shaft load
2. n= 50 RPM
3. n=200 RPM
4. n=800 RPM

MAX. PERMISSIBLE SHAFT SEAL PRESSURE FOR MP AND MR MOTORS

MP/MR...U1 motors with high pressure seal and without drain connection:

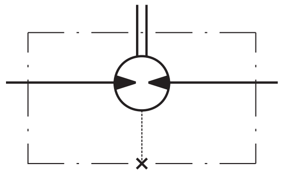
The shaft seal pressure equals the average of input pressure and return pressure.

$$P_{seal} = \frac{P_{input} + P_{return}}{2}$$



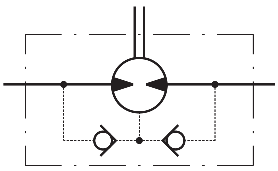
MP/MR...U motors with high pressure seal and drain connection:

The shaft seal pressure equals the pressure in the drain line.



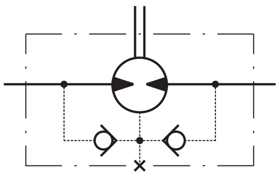
MP/MR...1 motors with low pressure seal or standard shaft seal and without drain connection:

The shaft seal pressure never exceeds the pressure in the return line.

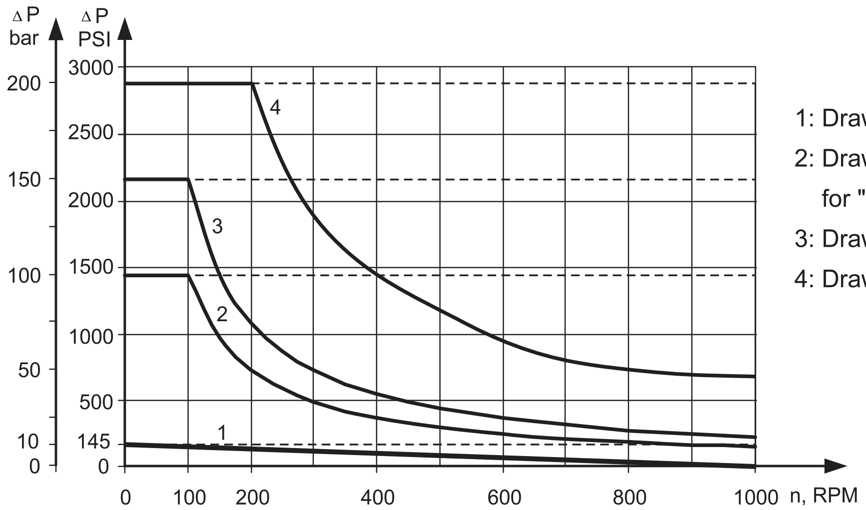


MP/MR... motors with low pressure seal or standard shaft seal and with drain connection:

The shaft seal pressure equals the pressure in the drain line.



Max. return pressure without drain line or max. pressure in the drain line



1: Drawing for Low Pressure Seal
2: Drawing for Standard Shaft Seal for "...B" shafts
3: Drawing for Standard Shaft Seal ("D" Seal)
4: Drawing for High Pressure Seal ("U" Seal)

- continuous operations
- intermittent operations

ORDER CODE

	1	2	3	4	5	6	7	8	9	10
M R										

Pos.1 - Mounting Flange

omit - Oval mount, two holes
F - Oval mount, four holes
Q - Square mount, four bolts
W - Wheel mount

Pos.2 - Option (needle bearings)

omit - none
N - with needle bearings

Pos.3 - Port type

omit - Side ports
E - Rear ports

Pos.4 - Displacement code

50 - 51,5 cm^3/rev [3.14 in^3/rev]
80 - 80,3 cm^3/rev [4.90 in^3/rev]
100 - 99,8 cm^3/rev [6.09 in^3/rev]
125 - 125,7 cm^3/rev [7.67 in^3/rev]
160 - 159,6 cm^3/rev [9.74 in^3/rev]
200 - 199,8 cm^3/rev [12.19 in^3/rev]
250 - 250,1 cm^3/rev [15.26 in^3/rev]
315 - 315,7 cm^3/rev [19.26 in^3/rev]
400 - 397,0 cm^3/rev [24.40 in^3/rev]

Pos.5 - Shaft Extensions*

C - ø25 straight, Parallel key A8x7x32 DIN6885
CO - ø1" straight, Parallel key ¼"x¼"x1¼" BS46
SH - ø25,32 splined BS 2059 (SAE 6B)
K - ø28,56 tapered 1:10, Parallel key B5x5x14 DIN6885
SA - ø24,5 splined B 25x22 DIN 5482
CB - ø32 straight, Parallel key A10x8x45 DIN6885
KB - ø35 tapered 1:10, Parallel key B6x6x20 DIN6885
SB - splined A 25x22 DIN 5482
OB - ø1¼" tapered1:8, Parallel key 5/16"x5/16"x1¼" BS46
HB - ø1¼" splined 14T ANSI B92.1 - 1976

Pos. 6 - Shaft Seal Version

omit - Low pressure shaft seal or Standard shaft seal for "...**B**" shaft
D - Standard shaft seal
U - High pressure shaft seal (without check valves)

Pos. 7 - Drain Port

omit - with drain port
1 - without drain port

Pos. 8 - Ports

omit - BSPP (ISO 228)
M - Metric (ISO 262)

Pos. 9 - Special Features

omit - without speed sensor

Pos.10 - Design Series

omit - Factory specified

Z

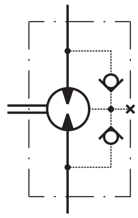
* The permissible output torque for shafts must not be exceeded!

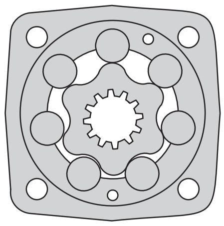
NOTES: The following combinations are not allowed:
- **Q** flange with "**...B**" shafts;
- **N** option with "**...B**" shafts, Low Pressure Seal or **U** option;
- "**...B**" shafts with **D** and **U** shaft seals.

The hydraulic motors are mangano-phosphatized as standard.

APPLICATION

- Conveyors
- Metal working machines
- Agriculture machines
- Road building machines
- Mining machinery
- Food industries
- Special vehicles etc.





CONTENTS

OPTIONS

- Model- Disc valve, roll-gerotor
- Flange and wheel mount
- Motor with Drum Brake MSB
- Speed sensoring
- Side and rear ports
- Shafts- straight, splined and tapered
- SAE, Metric and BSPP ports
- Other special features

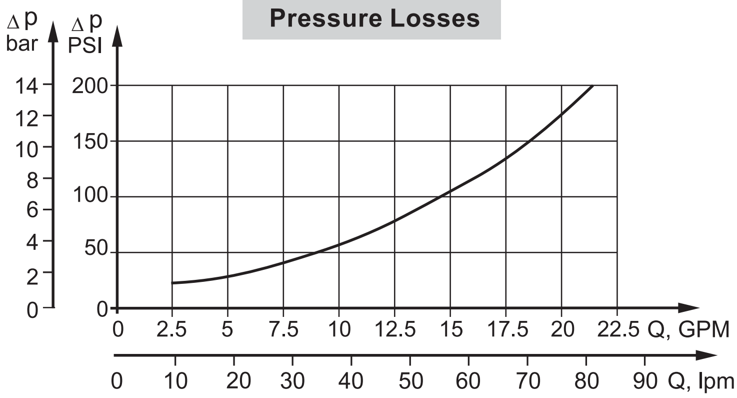
GENERAL

Max. Displacement, cm^3/rev [in^3/rev]	564,9 [34.47]
Max. Speed, [RPM]	1000
Max. Torque, daNm [lb-in]	cont.: 85 [7520] int.: 99 [8760]
Max. Output, kW [HP]	23 [30.8]
Max. Pressure Drop, bar [PSI]	cont.: 210 [3050] int.: 275 [3990]
Max. Oil Flow, lpm [GPM]	90 [24]
Min. Speed, [RPM]	5
Permissible Shaft Loads daN [lbs]	P_a=500 [1125]
Pressure fluid	Mineral based- HLP(DIN 51524) or HM(ISO 6743/4)
Temperature range, °C [°F]	-40÷140 [-40÷284]
Optimal Viscosity range, mm^2/s [SUS]	20÷75 [98÷347]
Filtration	ISO code 20/16 (Min. recommended fluid filtration of 25 micron)

Oil flow in drain line

Pressure drop bar [PSI]	Viscosity mm^2/s [SUS]	Oil flow in drain line lpm [GPM]
140 [2030]	20 [98]	1,5 [.396]
	35 [164]	1 [.264]
210 [3045]	20 [98]	3 [.793]
	35 [164]	2 [.528]

Pressure Losses



SPECIFICATION DATA

Type		MS 80	MS 100	MS 125	MS 160	MS 200
Displacement, cm.³/rev. [in.³/rev.]		80,5 [4.91]	100 [6.1]	125,7 [7.67]	159,7 [9.74]	200 [12.2]
Max. Speed, [RPM]	cont.	810	750	600	470	375
	Int.*	1000	900	720	560	450
Max. Torque daNm [lb-in]	cont.	24 [2120]	30,5 [2700]	37,5 [3320]	49 [4340]	61 [5400]
	Int.*	31 [2740]	39 [3450]	49 [4380]	60 [5310]	72 [6370]
Max. Output kW [HP]	cont.	15,5 [20.8]	18 [24.1]	18 [24.1]	16,5 [22.1]	16,5 [22.1]
	int.*	19,5 [26.2]	22,8 [30.2]	22,5 [30.2]	23 [30.8]	22 [29.52]
Max. Pressure Drop bar [PSI]	cont.	210 [3050]	210 [3050]	210 [3050]	210 [3050]	210 [3050]
	Int.*	275 [3990]	275 [3990]	275 [3990]	275 [3990]	275 [3990]
	peak**	295 [4280]	295 [4280]	295 [4280]	295 [4280]	295 [4280]
Max. Oil Flow lpm [GPM]	cont.	65 [17]	75 [20]	75 [20]	75 [20]	75 [20]
	Int.*	80 [21]	90 [24]	90 [24]	90 [24]	90 [24]
Max. Inlet Pressure bar [PSI]	cont.	230 [3340]	230 [3340]	230 [3340]	230 [3340]	230 [3340]
	Int.*	295 [4280]	295 [4280]	295 [4280]	295 [4280]	295 [4280]
	peak**	300 [4350]	300 [4350]	300 [4350]	300 [4350]	300 [4350]
Max. Return Pressure with Drain Line bar [PSI]	cont.	140 [2030]	140 [2030]	140 [2030]	140 [2030]	140 [2030]
	Int.*	175 [2540]	175 [2540]	175 [2540]	175 [2540]	175 [2540]
	peak**	210 [3050]	210 [3050]	210 [3050]	210 [3050]	210 [3050]
Max. Starting Pressure with Unloaded Shaft, bar [PSI]		12 [175]	10 [145]	10 [145]	8 [115]	8 [115]
Min. Starting Torque daNm [lb-in]	at max. press. drop cont.	18 [1590]	23 [2040]	29 [2570]	37 [3270]	47 [4160]
	at max. press. drop Int.*	23,5 [2080]	30 [2660]	38 [3360]	46 [4070]	56 [4960]
Min. Speed*, [RPM]**		10	10	8	8	6
Weight, kg [lb]	MS(F)	9,9 [21.8]	10,1 [22.2]	10,4 [22.9]	10,8 [23.8]	11,2 [24.7]
	MSW	10,4 [22.9]	10,6 [23.3]	10,9 [24]	11,3 [24.6]	11,7 [25.8]
For Rear Ports + 0,40 [.88]	MSS	7,9 [17.4]	8,1 [17.8]	8,4 [18.5]	8,8 [19.4]	9,2 [20.2]
	MSV	5,8 [12.8]	6 [13.2]	6,3 [13.9]	6,7 [14.8]	7,1 [15.6]
	MSQ	10,3 [22.7]	10,5 [23.2]	10,8 [23.8]	11,2 [24.7]	11,6 [25.6]
	MSB	16,9 [37.3]	17,1 [37.7]	17,4 [38.3]	17,8 [39.2]	18,2 [41.1]

Z

* Intermittent operation: the permissible values may occur for max. 10% of every minute.
** Peak load: the permissible values may occur for max. 1% of every minute.
*** For speeds lower than given, consult factory or your regional manager.

1. Intermittent speed and intermittent pressure must not occur simultaneously.
2. Recommended filtration is per ISO cleanliness code 20/16. A nominal filtration of 25 micron or better.
3. Recommend using a premium quality, anti-wear type mineral based hydraulic oil HLP(DIN51524) or HM (ISO 6743/4). If using synthetic fluids consult the factory for alternative seal materials.
4. Recommended minimum oil viscosity 13 mm²/s [70 SUS] at 50°C [122°F].
5. Recommended maximum system operating temperature is 82°C [180°F].
6. To assure optimum motor life fill with fluid prior to loading and run at moderate load and speed for 10-15 minutes.

SPECIFICATION DATA (continued)

Type		MS 250	MS 315	MS 400	MS 475	MS 525	MS 565
Displacement, cm.³/rev. [in.³/rev.]		250 [15.3]	314,9 [19.2]	397 [24.2]	474,6[28.96]	522,7 [31.88]	564,9[34.47]
Max. Speed, [RPM]	cont.	300	240	190	160	145	130
	Int.*	360	290	230	190	175	160
Max. Torque daNm [lb-in]	cont.	72 [6370]	82,5 [7300]	86,5 [7660]	85 [7520]	85 [7520]	85 [7520]
	Int.*	87 [7700]	100 [8850]	99 [8760]	99 [8760]	99 [8760]	99 [8760]
Max. Output kW [HP]	cont.	14,5 [19.4]	15 [20.1]	11 [14.8]	8,4 [11]	7,6 [10.2]	6,9 [9]
	int.*	18 [24.1]	17 [22.8]	12,5 [16.8]	11,3 [15]	10,4 [13.9]	9,6 [13]
Max. Pressure Drop bar [PSI]	cont.	200 [2900]	200 [2900]	160 [2320]	130 [1880]	115 [1670]	105 [1520]
	Int.*	250 [3630]	240 [3480]	190 [2760]	150 [2180]	135 [1960]	125 [1810]
	peak**	270 [3920]	260 [3770]	210 [3050]	170 [2470]	155 [2250]	145 [2100]
Max. Oil Flow lpm [GPM]	cont.	75 [20]	75 [20]	75 [20]	75 [20]	75 [20]	75 [20]
	Int.*	90 [24]	90 [24]	90 [24]	90 [24]	90 [24]	90 [24]
Max. Inlet Pressure bar [PSI]	cont.	230 [3340]	230 [3340]	230 [3340]	230 [3340]	230 [3340]	230 [3340]
	Int.*	295 [4280]	295 [4280]	295 [4280]	295 [4280]	295 [4280]	295 [4280]
	peak**	300 [4350]	300 [4350]	300 [4350]	300 [4350]	300 [4350]	300 [4350]
Max. Return Pressure with Drain Line bar [PSI]	cont.	140 [2030]	140 [2030]	140 [2030]	140 [2030]	140 [2030]	140 [2030]
	Int.*	175 [2540]	175 [2540]	175 [2540]	175 [2540]	175 [2540]	175 [2540]
	peak**	210 [3050]	210 [3050]	210 [3050]	210 [3050]	210 [3050]	210 [3050]
Max. Starting Pressure with Unloaded Shaft, bar [PSI]		8 [115]	8 [115]	8 [115]	8 [115]	8 [115]	8 [115]
Min. Starting Torque daNm [lb-in]	at max. press. drop cont.	56 [4960]	71 [6280]	71 [6280]	71 [6280]	71 [6280]	71 [6280]
	at max. press. drop Int.*	70 [6200]	85 [7520]	84 [7430]	84 [7430]	84 [7430]	84 [7430]
Min. Speed***, [RPM]		6	5	5	5	5	5
Weight, kg [lb]	MS(F)	11,7 [25.8]	12,4 [27.3]	13,1 [29.3]	14,1 [31]	14,6 [32.2]	15 [33.1]
For Rear Ports + 0,40 [.88]	MSW	12,2 [26.9]	12,9 [28.4]	13,8 [30.4]	14,6 [32.2]	15,1 [33.3]	15,5 [34.1]
	MSS	9,7 [21.4]	10,4 [22.9]	11,3 [24.9]	12.1 [26.7]	12,6 [27.8]	13 [28.6]
	MSV	7,6 [16.7]	8,3 [18.3]	9,2 [20.2]	10 [22]	10,5 [23.1]	10,9 [24]
	MSQ	12,1 [26.7]	12,8 [28.2]	13,7 [30.2]	14,5 [32]	15 [33.1]	15,4 [33.9]
	MSB	18,7 [41.2]	19,4 [42.7]	20,3 [44.7]	21,1 [46.5]	21,6 [47.6]	23 [48.5]

* Intermittent operation: the permissible values may occur for max. 10% of every minute.
** Peak load: the permissible values may occur for max. 1% of every minute.
*** For speeds lower than given, consult factory or your regional manager.

1. Intermittent speed and intermittent pressure must not occur simultaneously.
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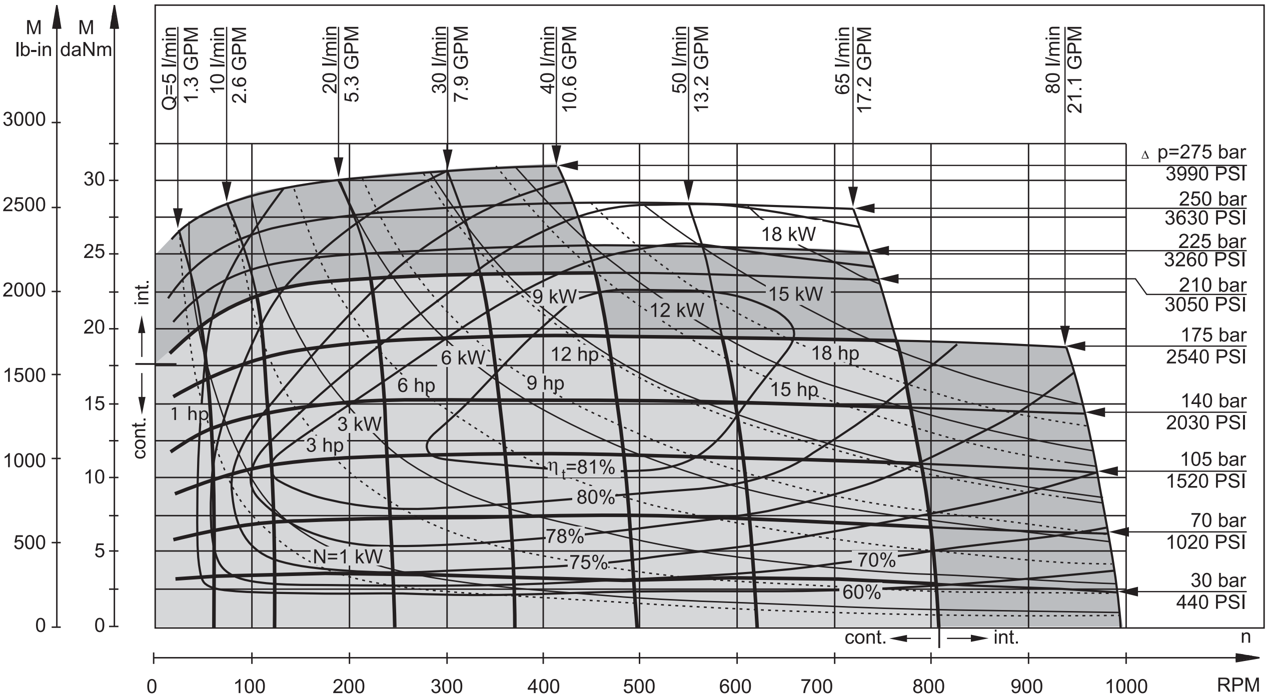
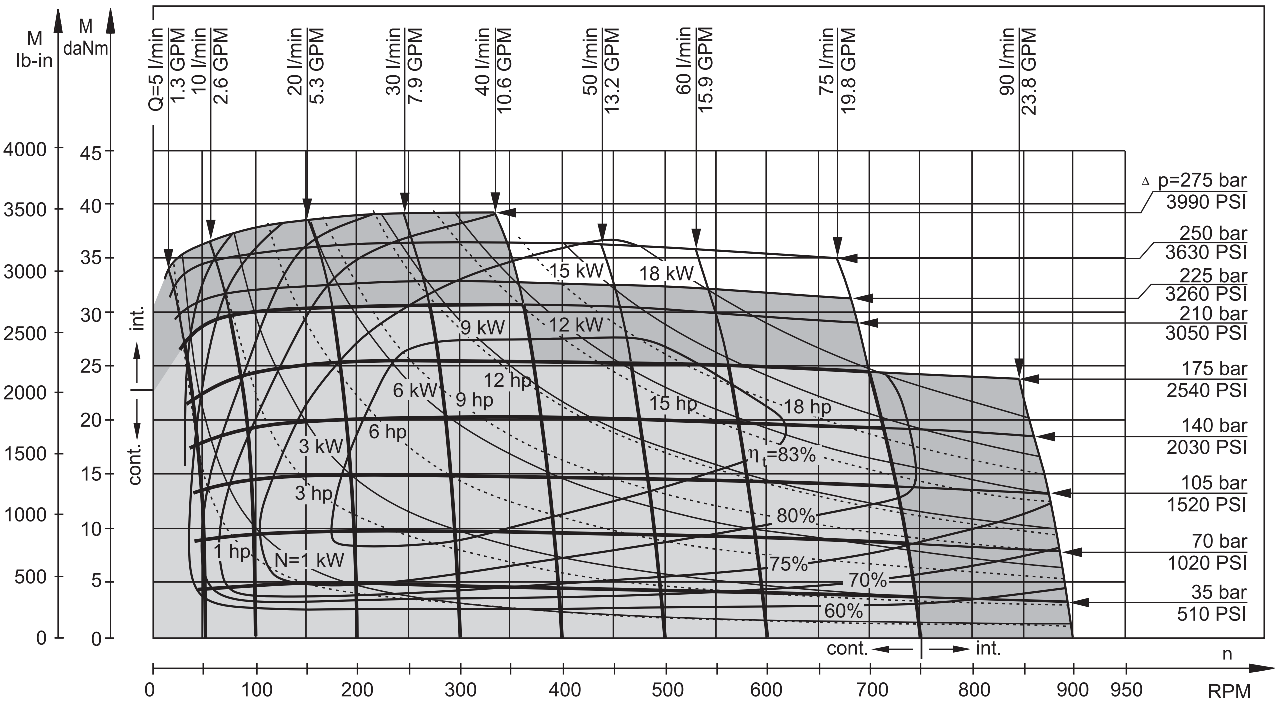
3. Recommend using a premium quality, anti-wear type mineral based hydraulic oil HLP(DIN51524) or HM (ISO 6743/4). If using synthetic fluids consult the factory for alternative seal materials.
4. Recommended minimum oil viscosity 13 mm²/s [70 SUS] at 50°C [122°F].
5. Recommended maximum system operating temperature is 82°C [180°F].
6. To assure optimum motor life fill with fluid prior to loading and run at moderate load and speed for 10-15 minutes.

FUNCTION DIAGRAMS

MS 80



MS 100

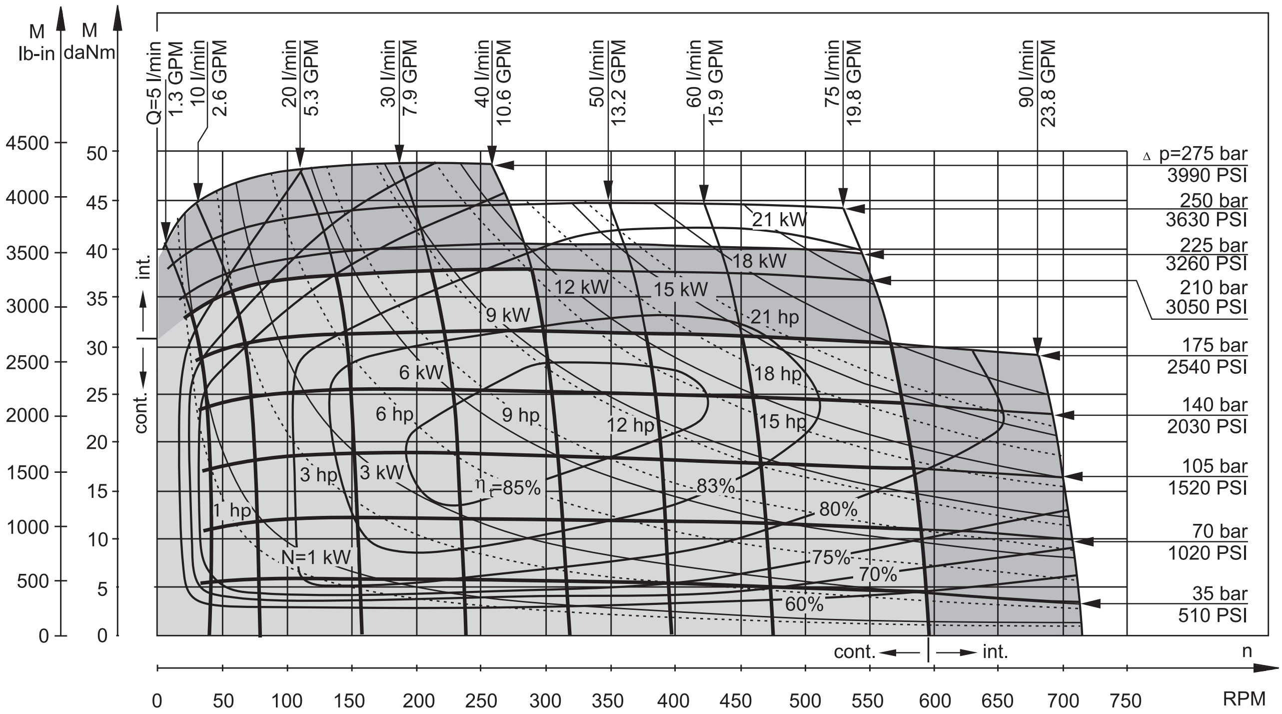


The function diagrams data is for average performance of randomly selected motors at back pressure 5÷10 bar [72.5÷145 PSI] and oil with viscosity of 32 mm²/s [150 SUS] at 50°C [122°F].

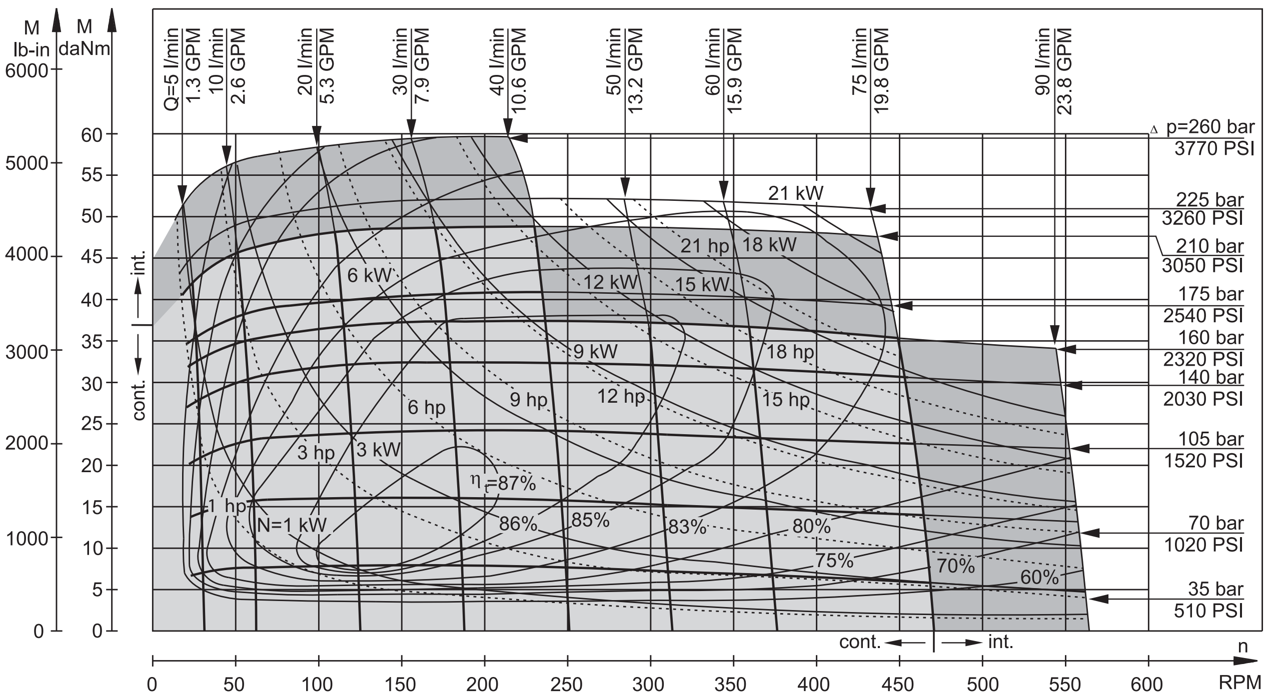
Z

FUNCTION DIAGRAMS

MS 125



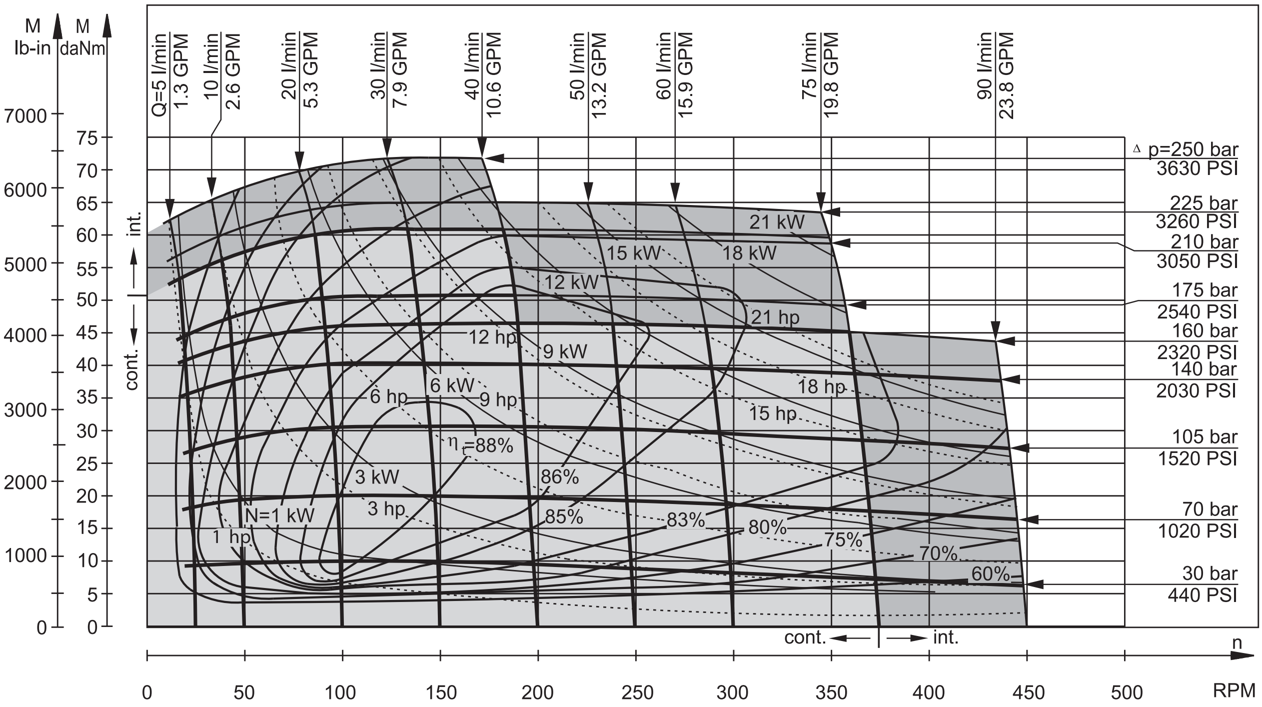
MS 160



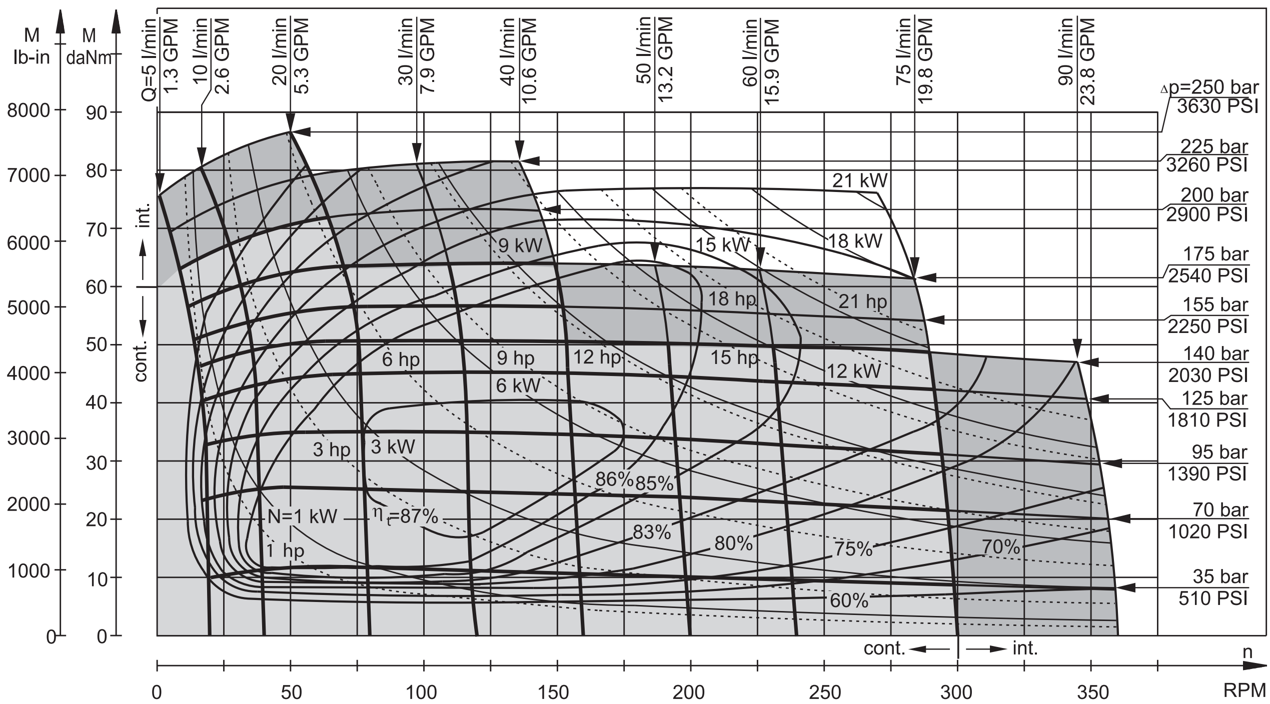
The function diagrams data is for average performance of randomly selected motors at back pressure 5÷10 bar [72.5÷145 PSI] and oil with viscosity of 32 mm²/s [150 SUS] at 50°C [122°F].

FUNCTION DIAGRAMS

MS 200



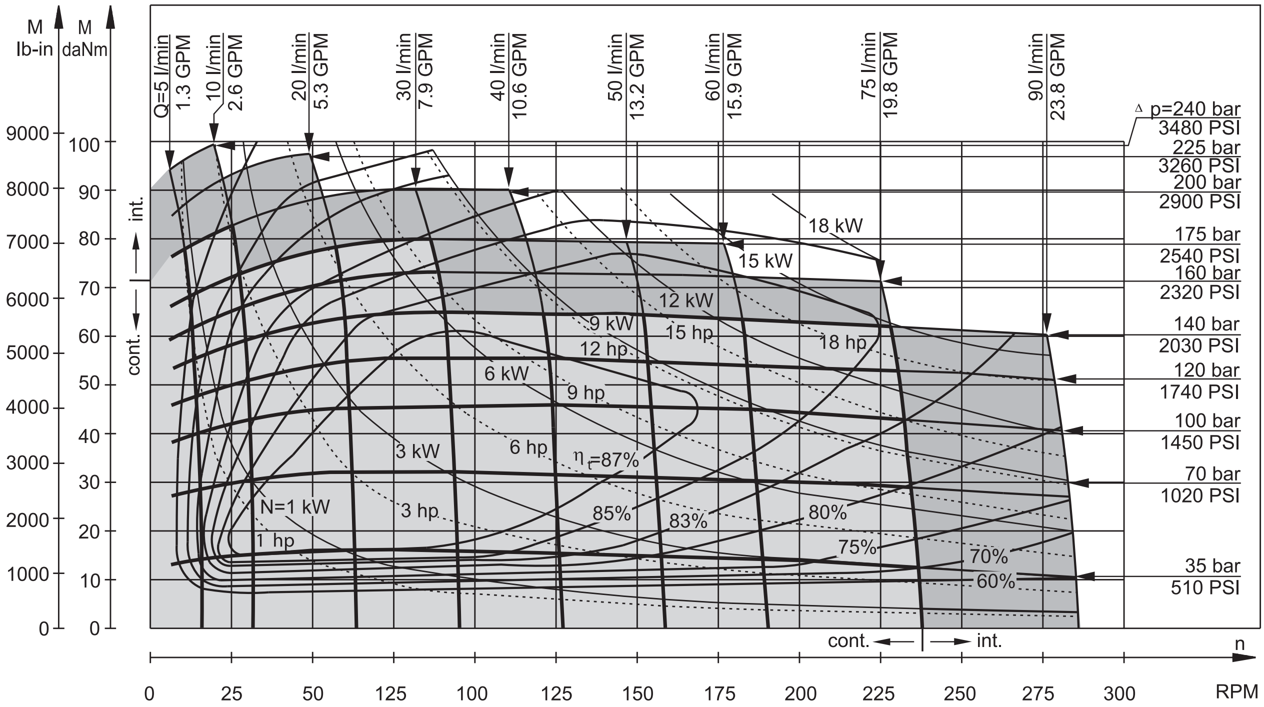
MS 250



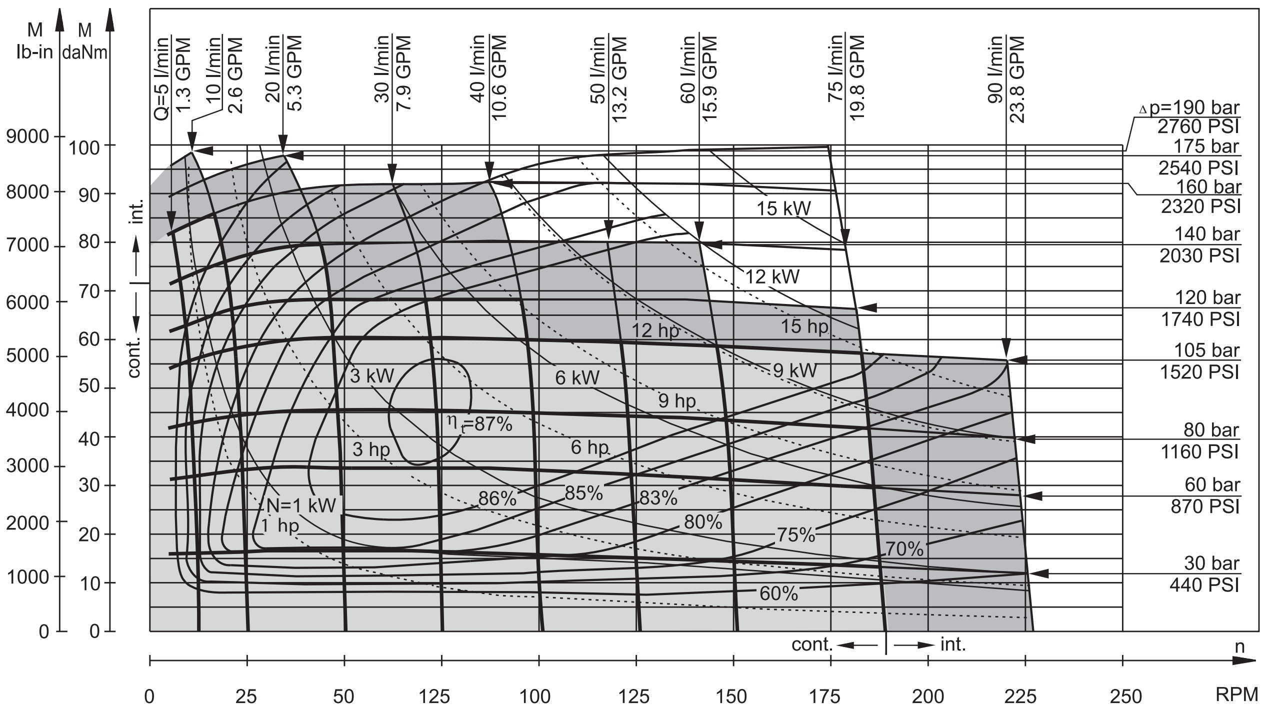
The function diagrams data is for average performance of randomly selected motors at back pressure 5÷10 bar [72.5÷145 PSI] and oil with viscosity of 32 mm²/s [150 SUS] at 50°C [122°F].

FUNCTION DIAGRAMS

MS 315



MS 400

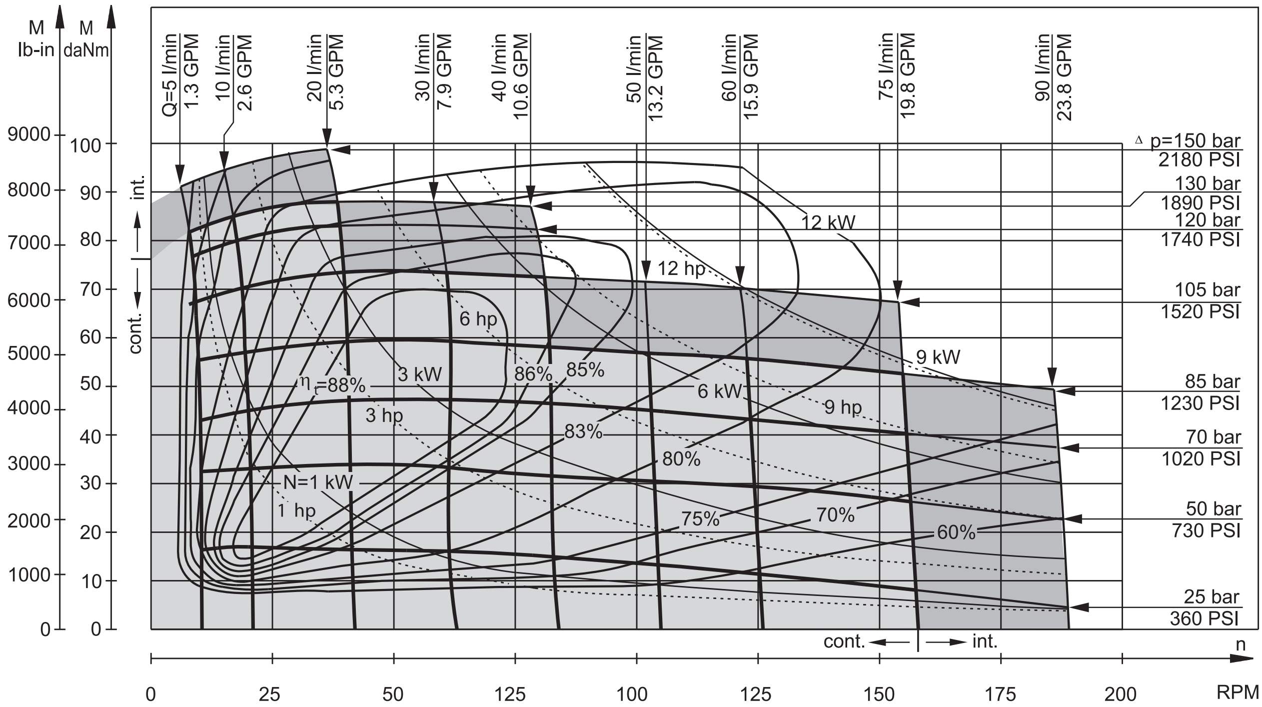


The function diagrams data is for average performance of randomly selected motors at back pressure 5÷10 bar [72.5÷145 PSI] and oil with viscosity of 32 mm²/s [150 SUS] at 50°C [122°F].

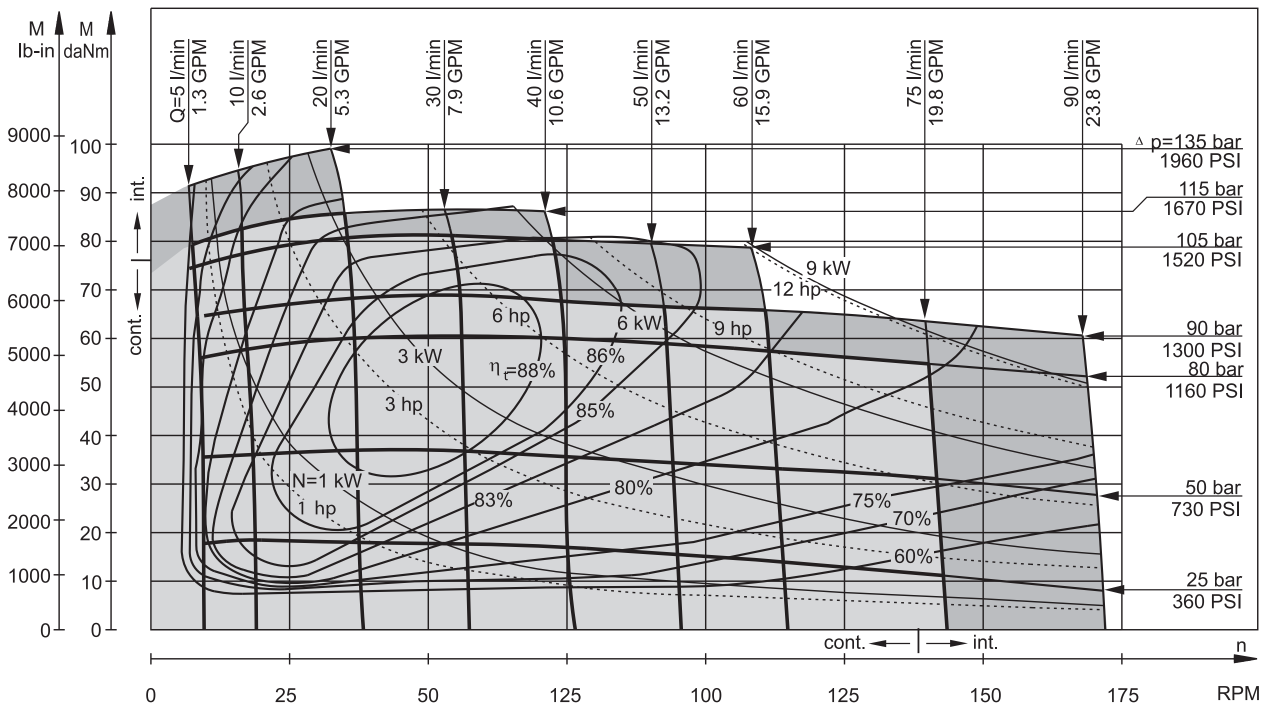
Z

FUNCTION DIAGRAMS

MS 475



MS 525

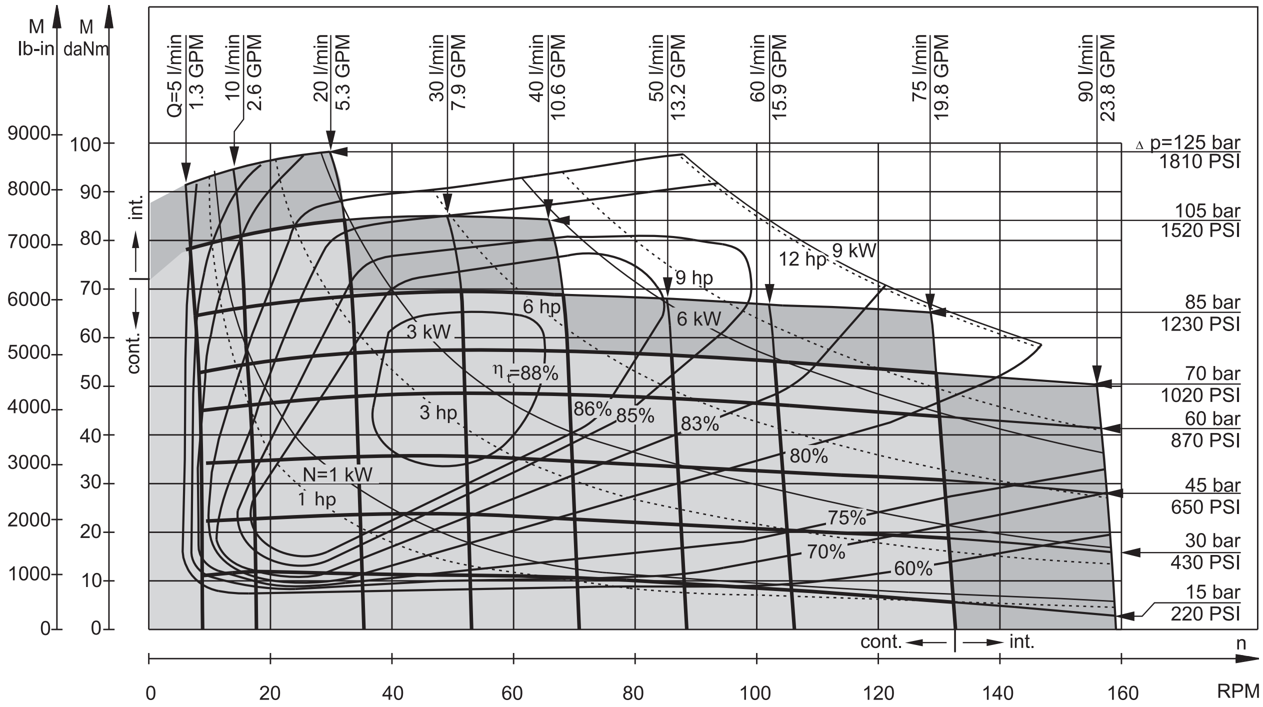


Z

The function diagrams data is for average performance of randomly selected motors at back pressure 5÷10 bar [72.5÷145 PSI] and oil with viscosity of 32 mm²/s [150 SUS] at 50°C [122°F].

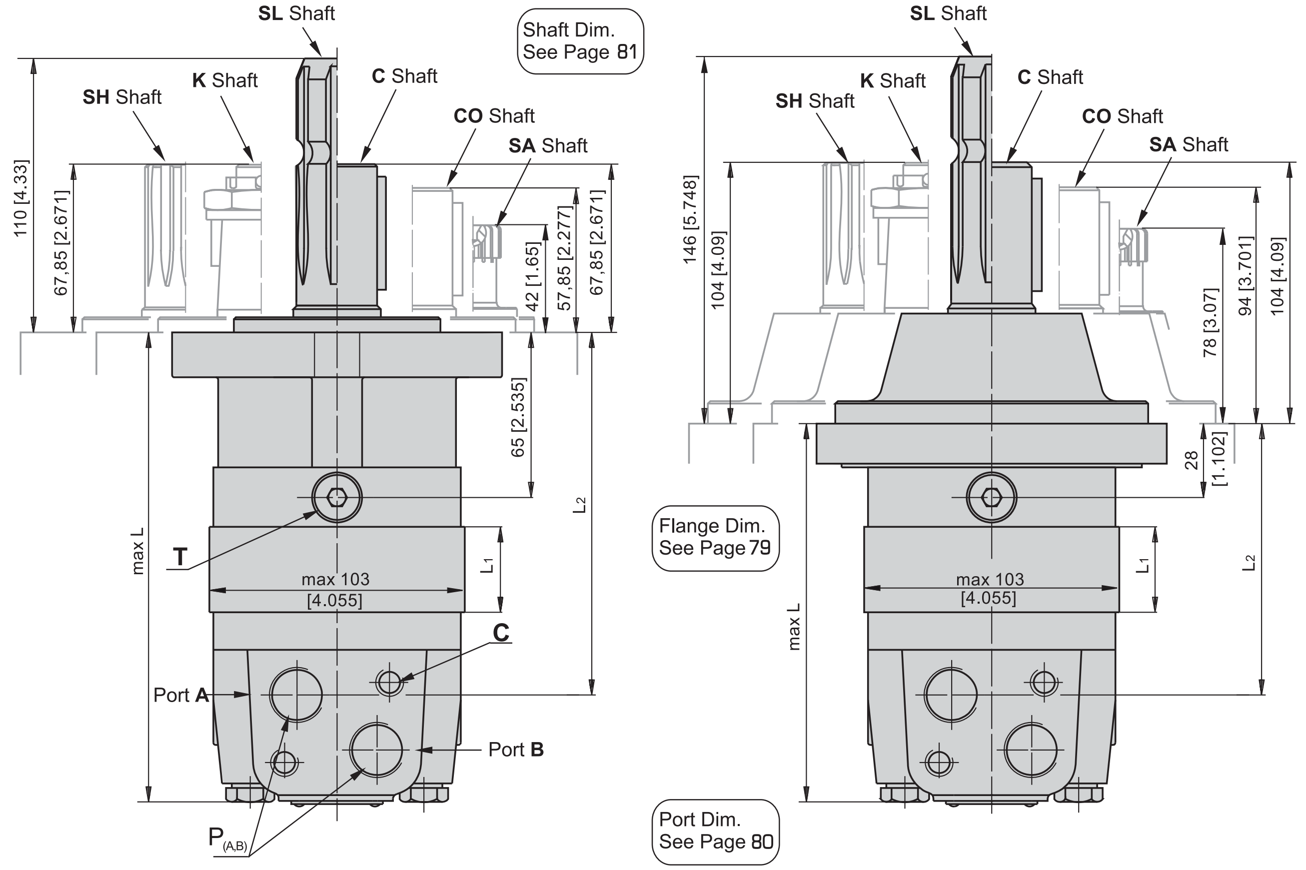
FUNCTION DIAGRAMS

MS 565

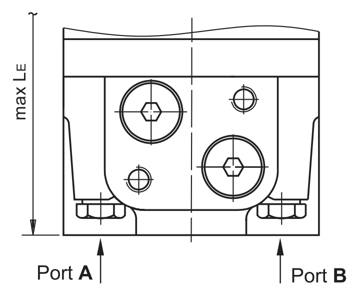


The function diagrams data is for average performance of randomly selected motors at back pressure 5÷10 bar [72.5÷145 PSI] and oil with viscosity of 32 mm²/s [150 SUS] at 50°C [122°F].

DIMENSIONS AND MOUNTING DATA MS, MSF, MSA, MSW



E Rear ports



mm [in]

C: 2xM10-12 mm [.47 in] depth
$\mathbf{P}_{(A,B)}$: 2xG1/2 or 2xM22x1,5-15 mm [.59 in] depth
T: G ¼ or M14x1,5- 12 mm [.47 in] depth (plugged)

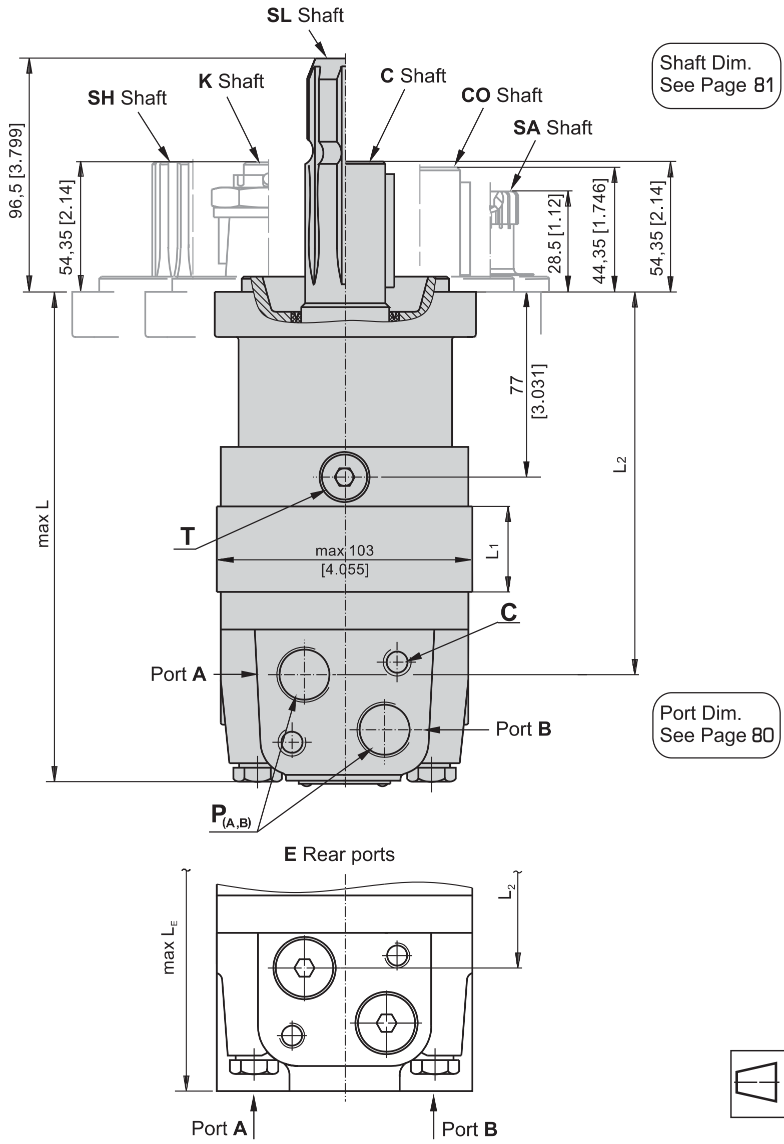
Standard Rotation
Viewed from Shaft End
Port **A** Pressurized - **CW**
Port **B** Pressurized - **CCW**

Reverse Rotation
Viewed from Shaft End
Port **A** Pressurized - **CCW**
Port **B** Pressurized - **CW**

Type	L,mm[in.]	L_2,mm[in.]	*L_E, mm[in.]	Type	L, mm[in.]	L_2,in.[mm]	*L_E,mm[in.]	L_1,mm[in.]
MS(F, A) 80	168 [6.61]	124 [4.88]	173 [6.81]	MSW 80	129 [5.08]	87 [3.43]	138 [5.43]	14,0 [.55]
MS(F, A) 100	171 [6.73]	128 [5.04]	177 [6.97]	MSW100	133 [5.23]	91 [3.58]	142 [5.59]	17,4 [.69]
MS(F, A) 125	176 [6.93]	132 [5.20]	181 [7.13]	MSW 125	137 [5.39]	95 [3.74]	146 [5.75]	21,8 [.86]
MS(F, A) 160	182 [7.17]	138 [5.43]	187 [7.36]	MSW 160	143 [5.63]	101 [3.98]	152 [5.99]	27,8 [1.09]
MS(F, A) 200	189 [7.44]	145 [5.71]	194 [7.64]	MSW 200	150 [5.91]	108 [4.25]	159 [6.26]	34,8 [1.37]
MS(F, A) 250	197 [7.76]	154 [6.06]	203 [7.99]	MSW 250	159 [6.26]	117 [4.61]	168 [6.62]	43,5 [1.71]
MS(F, A) 315	209 [8.23]	165 [6.50]	214 [8.43]	MSW 315	170 [6.69]	128 [5.04]	179 [7.05]	54,8 [2.16]
MS(F, A) 400	223 [8.78]	179 [7.05]	228 [8.98]	MSW 400	184 [7.24]	143 [5.63]	194 [7.64]	69,4 [2.73]
MS(F, A) 475	237 [9.33]	193 [7.60]	242 [9.53]	MSW 475	198 [7.79]	156 [6.14]	207 [8.15]	82,6 [3.25]
MS(F, A) 525	229 [9.02]	185 [7.28]	234 [9.21]	MSW 525	190 [7.48]	148 [5.83]	199 [7.84]	74,5 [2.93]
MS(F, A) 565	235 [9.25]	191 [7.52]	240 [9.45]	MSW 565	196 [7.72]	154 [6.06]	205 [8.07]	80,2 [3.16]

* -For Rear Ported Motors.

DIMENSIONS AND MOUNTING DATA - MSQ



mm [in]

C: 2xM10-12 mm [.47 in] depth
P$_{(A,B)}$: 2xG1/2 or 2xM22x1,5-15 mm [.59 in] depth
T: G ¼ or M14x1,5- 12 mm [.47 in] depth (plugged)

Standard Rotation
Viewed from Shaft End
Port **A** Pressurized - **CW**
Port **B** Pressurized - **CCW**

Reverse Rotation
Viewed from Shaft End
Port **A** Pressurized - **CCW**
Port **B** Pressurized - **CW**

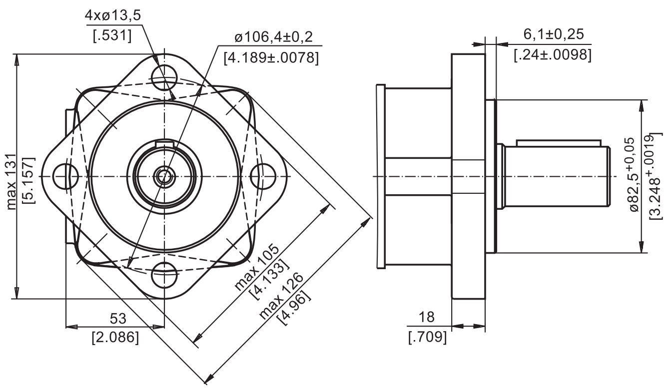
Type	L, mm [in.]	L_2, mm [in.]	*L_E, mm [in.]	L_1, mm [in.]
MSQ 80	179 [7.05]	136 [5.35]	185 [7.28]	.55 [14,0]
MSQ 100	183 [7.21]	140 [5.51]	189 [7.44]	.69 [17,4]
MSQ 125	187 [7.36]	144 [5.67]	193 [7.60]	.86 [21,8]
MSQ 160	193 [7.60]	150 [5.91]	199 [7.83]	1.09 [27,8]
MSQ 200	200 [7.87]	157 [6.18]	206 [8.11]	1.37 [34,8]
MSQ 250	209 [8.23]	166 [6.54]	215 [8.46]	1.71 [43,5]
MSQ 315	220 [8.66]	177 [6.67]	226 [8.90]	2.16 [54,8]
MSQ 400	235 [9.25]	192 [7.56]	241 [9.49]	2.73 [69,4]
MSQ 475	247 [9.72]	205 [8.07]	254 [10.0]	3.25 [82,6]
MSQ 525	240 [9.45]	197 [7.76]	246 [9.69]	2.93 [74,5]
MSQ 565	246 [9.69]	203 [7.99]	252 [9.92]	3.16 [80,2]

* -For Rear Ported Motors.

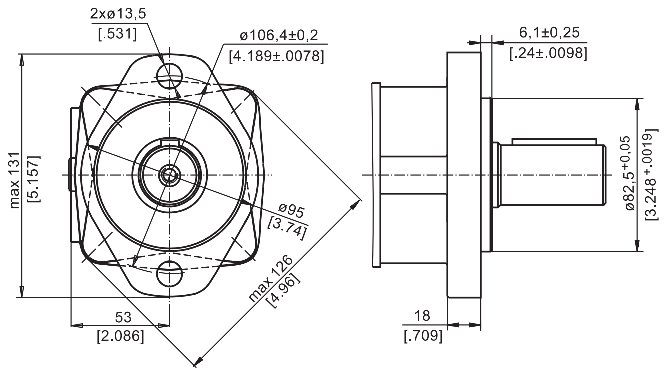
Z

MOUNTING

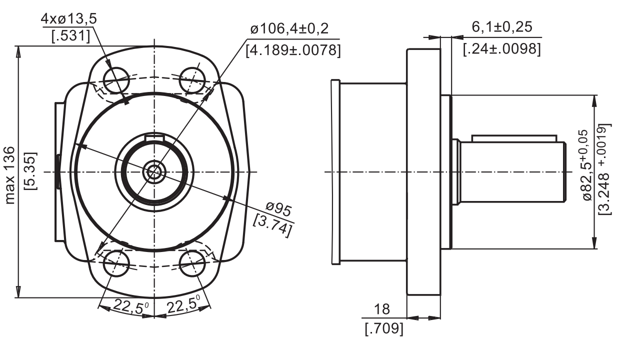
SAE A-4 Mount (4 Holes)



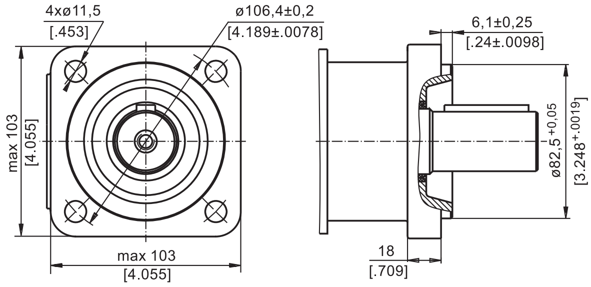
A SAE A-2 Mount (2 Holes)



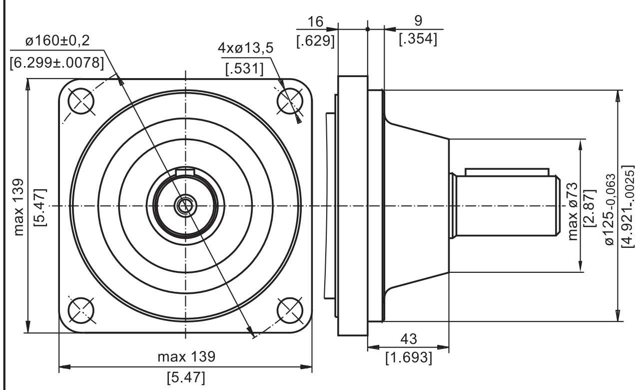
F Magneto Mount (4 Holes)



Q Square Mount (4 Holes)

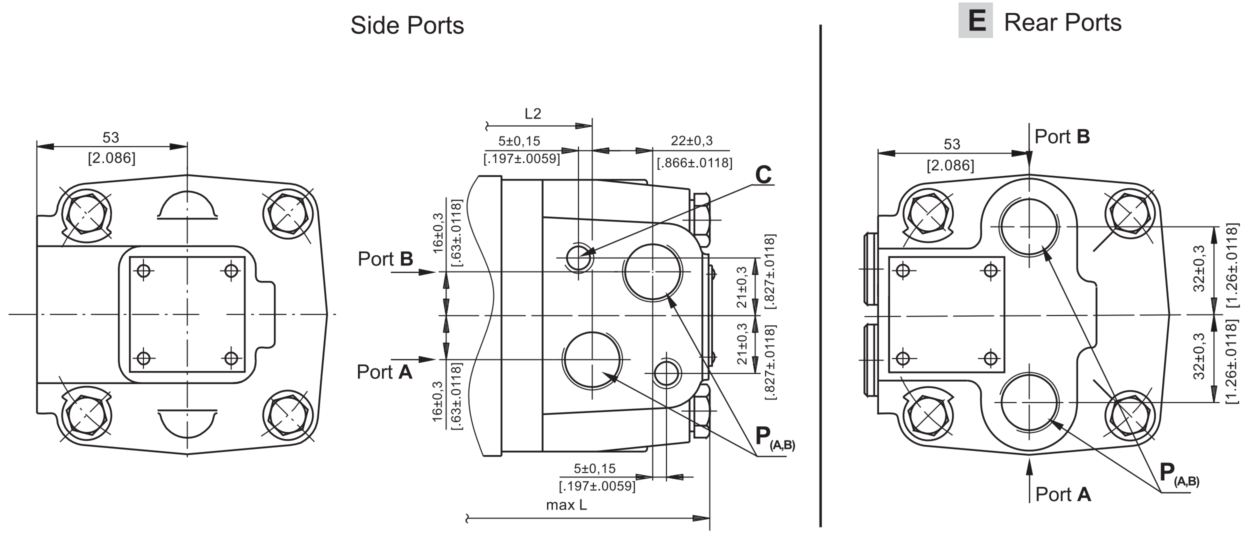


W Wheel Mount



mm [in]

PORTS



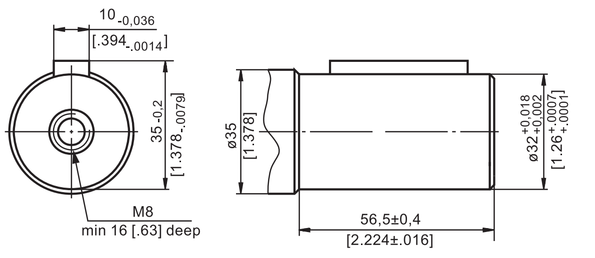
Standard Rotation
Viewed from Shaft End
Port **A** Pressurized - **CW**
Port **B** Pressurized - **CCW**

Reverse Rotation
Viewed from Shaft End
Port **A** Pressurized - **CCW**
Port **B** Pressurized - **CW**

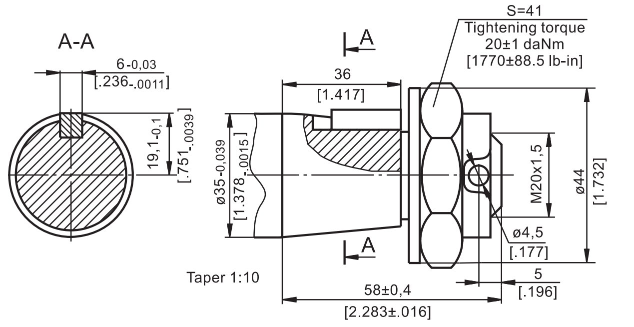
C: 2xM10-12 mm [.47 in] depth
P$_{(A,B)}$: 2xG1/2 or 2xM22x1,5-15 mm [.59 in] depth
T: G ¼ or M14x1,5- 12 mm [.47 in] depth (plugged)

SHAFT EXTENSIONS

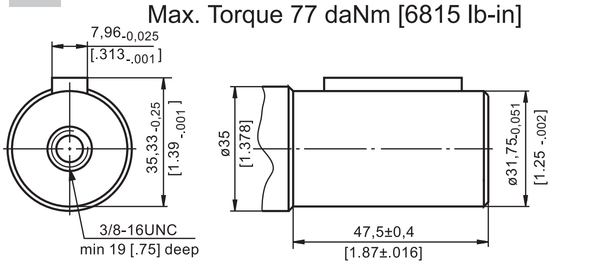
C - ø32 straight, Parallel key A10x8x45 DIN 6885
Max. Torque 77 daNm [6815 lb-in]



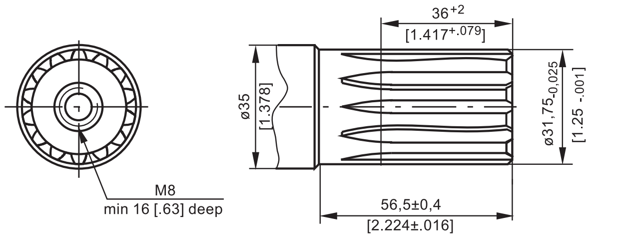
K - tapered 1:10, Parallel key B6x6x20 DIN 6885
Max. Torque 95 daNm [8400 lb-in]



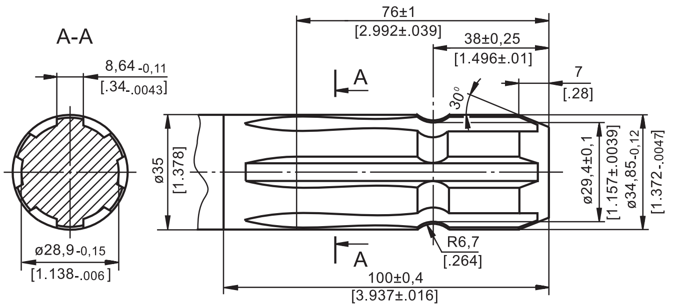
CO - ø1¼" straight, Parallel key 5⁄16"x 5⁄16"x 1¼"BS46
Max. Torque 77 daNm [6815 lb-in]



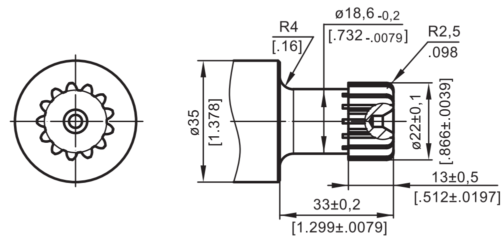
SH - ø1¼" splined 14T, DP12/24 ANS B92.1-1970
Max. Torque 95 daNm [8400 lb-in]



SL - ø34,85 p.t.o. DIN 9611 Form 1
Max. Torque 77 daNm [6815 lb-in]



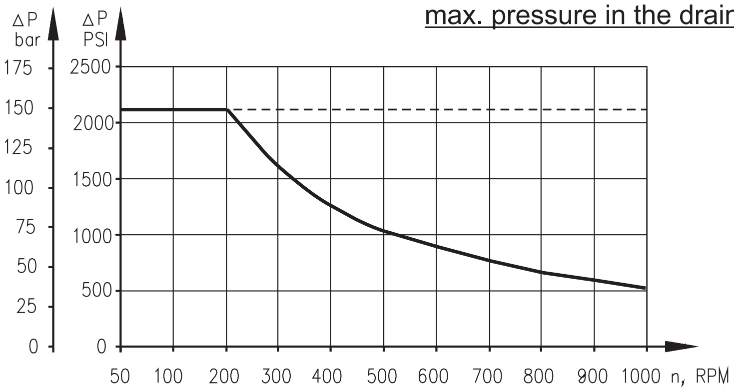
SA - 7/8"-13T splined DP16/32 ANS B92.1-1970
Max. Torque 20 daNm [1770 lb-in]



mm [in]

MAX. PERMISSIBLE SHAFT SEAL PRESSURE

Max. return pressure without drain line or
max. pressure in the drain line



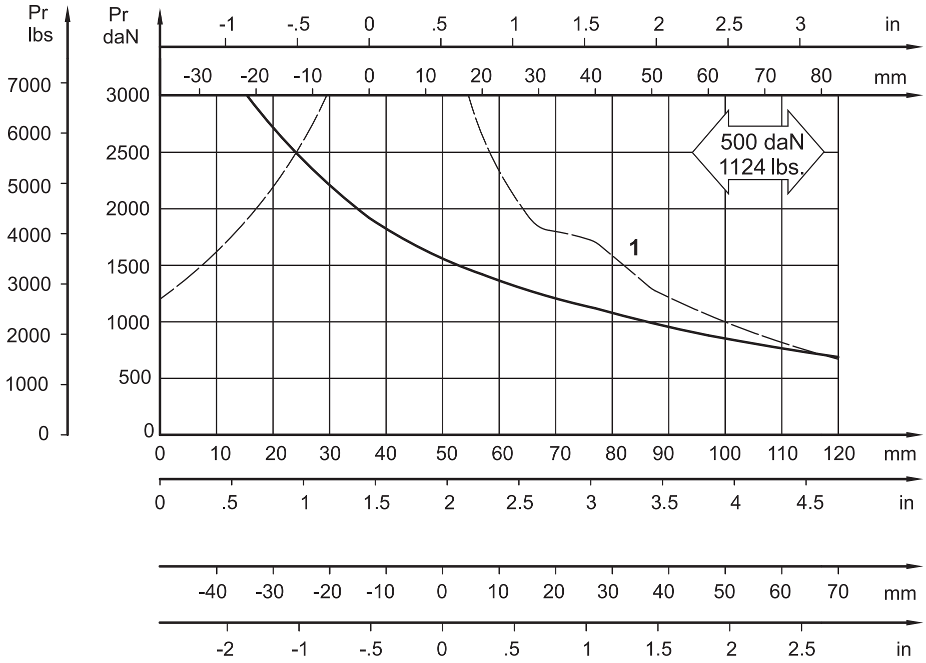
- continuous operations
- intermittent operations

Z

PERMISSIBLE SHAFT LOADS

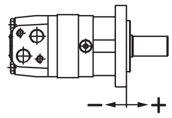
The output shaft runs in tapered bearings that permit high axial and radial forces. The permissible radial load on the shaft is shown for an axial load of 0 N as function of the distance from the mounting flange to the point of load application. The curves apply to a B10 bearing life of 2000 hours at 100 RPM .

Curve "**1**" shows max. radial shaft load. Any shaft load exceeding the values quoted in the curve will seriously reduce motor life.

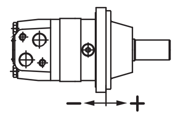


Shaft: All type shafts except SA

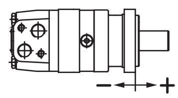
Mounting Flange:



Standard
A-2
Magneto



W - Wheel



Q - Square

Z

ORDER CODE

MS	1	2	3	4	5	6	7	8
M S								

Pos.1 - Mounting Flange

omit	- SAE A-4 mount, four holes
A	- SAE A-2 mount, two holes
F	- Magneto mount, four holes
Q	- Square mount, four holes
W	- Wheel mount

Pos.2 - Port type

omit	- Side ports
E	- Rear ports

Pos.3 - Displacement code

80	- 80,5 cm^3/rev [4.91 in^3/rev]
100	-100,0 cm^3/rev [6.10 in^3/rev]
125	-125,7 cm^3/rev [7.67 in^3/rev]
160	- 159,7 cm^3/rev [9.74 in^3/rev]
200	- 200,0 cm^3/rev [12.20 in^3/rev]
250	- 250,0 cm^3/rev [15.30 in^3/rev]
315	- 314,9 cm^3/rev [19.20 in^3/rev]
400	- 397,0 cm^3/rev [24.20 in^3/rev]
475	- 474,6 cm^3/rev [28.96 in^3/rev]
525	- 522,7 cm^3/rev [31.88 in^3/rev]
565	- 564,9 cm^3/rev [34.47 in^3/rev]

Pos.4 - Shaft Extensions*

omit	- for **B**, **S**, **U** and **V** mounting flange
C	- ø32 straight, Parallel key A10x8x45 DIN6885
CO	- ø1¼" straight, Parallel key 5⁄16"x5⁄16"x1¼" BS46
K	- ø35 tapered 1:10, Parallel key B6x6x20 DIN6885
SL	- ø34, 85 p.t.o. DIN 9611 Form 1
SH	- ø1¼" splined 14T ANS B92.1-1970
SA	- 7/8"-13T splined ANS B92.1-1970

Pos. 5 - Ports

omit	- BSPP (ISO 228)
M	- Metric (ISO 262)

Pos. 6 - Actuating Direction** (only for MSB)

/R	- Right
/L	- Left
omit	- Without drum brake

Pos. 7 - Special Features

omit	- Without speed sensor

Pos. 8 - Design Series

omit	- Factory specified

Z

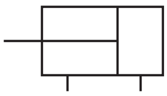
NOTES:

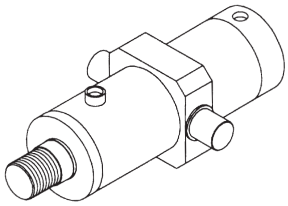
* The permissible output torque for shafts must not be exceeded!

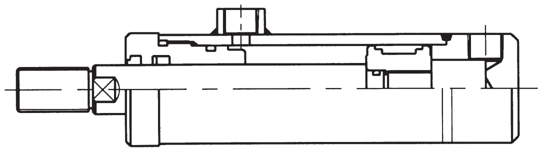
The hydraulic motors are mangano-phosphatized as standard.

HC5 Series Hydraulic Cylinder

Specially employed in the vehicle


SYMBOL

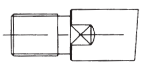
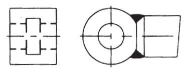




Specifications

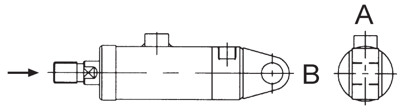
Model / Item	HC5 Series
Cylinder Bore mm	ø40, ø50, ø60, ø63, ø70, ø80, ø90, ø100, ø110, ø125
Mounting	FA, FB, FD, TC, CA, CD
Operating Pressure	140 kgf/cm^2
Testing Pressure	210 kgf/cm^2
Min. Operating Pres.	3 kgf/cm^2
Fiuid	Mineral oil
Max. Operating Speed	500 mm/sec
Min. Operating Speed	10 mm/sec
Range of Ambient Temperoutre	-10°C ~ +80°C
Rod End Type	A TYPE & B TYPE

Rod End Type

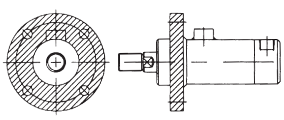
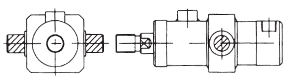
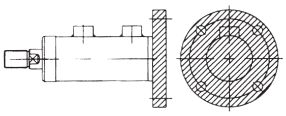
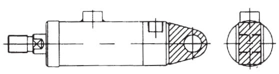
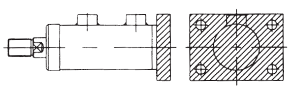
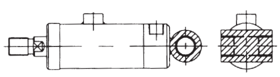
Configuration	
TYPE A	TYPE B
	

Port Position

View from Rod cover



Mounting

Symbol	Description	Configuration	Symbol	Description	Configuration
FA	Flange at cylinder head		TC	Centre Trunnion mounting	
FB	Flange at cylinder cap		CA	Plaie clevis at cylinder cap	
FD	Rectangular flange at cylinder cap		CD	Tube clevis at cylinder cap	

Z

Ordering Index

HC5	-CA	-40	-22.4	-100	-A	-A	-U	*
Series Number	Mounting	Cylinder Bore mm	Rod Type mm	Stroke mm	Rod end Type	Port Position	Piston Seal	Design
HC5: Series hyd. Cylinder	**FA** **FB** **FD** **TC** **CA** **CD**	ø40 ø50 ø60 ø63 ø70 ø80 ø90 ø100 ø110 ø125	ø22.4 ø30 ø30 ø35 ø40 ø45 ø50 ø55 ø65 ø70	Max. Permissible stroke	TYPE A TYPE B	A: Standard B: Right or Left	U: U Type Piston seal T : T Type Piston seal	

Technical Data

Cylinder Bore mm	Rod Dia. mm	Action	Effective Area cm^2	Output Power kgf					Flow Rate to Speed 10 L/min mm/sec	Speed to Flow Rate 10 mm/sec L/min
				10 kgf/cm^2	30 kgf/cm^2	70 kgf/cm^2	105 kgf/cm^2	140 kgf/cm^2		
40	22.4	Extend	12.6	126	377	879	1319	1758	132	0.8
		Retract	8.6	86	259	603	905	1207	193	0.5
50	30	Extend	19.6	196	589	1374	2061	2748	85	1.2
		Retract	12.6	126	377	879	1319	1758	132	0.8
60	30	Extend	28.3	283	848	1978	2967	3956	59	1.7
		Retract	21.2	212	636	1484	2225	2967	79	1.3
63	35	Extend	31.2	312	935	2181	3271	4362	53	1.9
		Retract	21.5	215	646	1508	2262	3016	77	1.3
70	40	Extend	38.5	385	1154	2693	4039	5385	43	2.3
		Retract	25.9	259	777	1813	2720	3627	64	1.6
80	45	Extend	50.3	503	1507	3517	5275	7034	33	3.0
		Retract	34.3	343	1030	2404	3606	4808	49	2.1
90	50	Extend	63.6	636	1908	4451	6676	8902	26	3.8
		Retract	44.0	440	1319	3077	4616	6154	38	2.6
100	55	Extend	78.5	785	2355	5495	8243	10990	21	4.7
		Retract	54.8	548	1643	3833	5749	7666	30	3.3
110	65	Extend	95.0	950	2850	6649	9973	13298	18	5.7
		Retract	61.8	618	1855	4327	6491	8655	27	3.7
125	70	Extend	122.7	1227	3680	8586	12879	17172	14	7.4
		Retract	84.2	842	2526	5893	8840	11787	20	5.0

Hydraulic Cylinder Tube (Inside Honed)

Features: Tubes are cold drawn & stress relieve annealed to get homogeneous & superior mechanical properties and to be honed by precise honing machine to match required I. D. surface condition, smoothness and tolerance of any standard.

Grade(Chemical Composition, Mechanical Properties)

Specification	Grade	Chemical Composition%					Mechanical Properties		
		C	Si	Mn	P	S	Tensile Strength kg/mm^2	Yield Strength kg/mm^2	Elongation %
DIN 2391 Carbon steel tube for machine structural purposes	St 52 BK+S	0.13 I 0.18	0.15 I 0.30	1.20 I 1.40	0.025 max.	0.025 max.	60min.	52min.	15min.
JIS 3445 Carbon steel tube for machine structural purposes	STKM 13C	0.25 max.	0.35 max.	0.3 I 0.9	0.04 max.	0.04 max.	52min.	39min.	15min.

Specification:

1. I.D. SURFACE ROUGHNESS : Ra 0.8 μm max.
2. I.D. TOLERANCE : ISO H9,H7/H8 upon request.
3. TOLERANCE OF WALL THICKNESS : ±10% of wall thickness
4. STRAIGHTNESS : 1/1000 max.
5. LENGTH : 3 ~ 8 M

(Formula for cylinder design pressure):

$$P=\frac{200 \times \frac{Y}{S} \times \frac{t}{1.11}}{di + \frac{2t}{1.11}}$$

P : Design Pressure kg/cm^2

Y : Yield Strength kg/cm^2

t : Wall Thickness mm

S : Safety Factor

di: Inside Diameter mm

Hydraulic Cylinder Tube (Inside Honed)

■ Production size

I.D. x O.D. (mm)	Service Pressure (kg/cm²)	I.D. x O.D. (mm)	Service Pressure (kg/cm²)	I.D. x O.D. (mm)	Service Pressure (kg/cm²)
40 x 50	317	85 x 95	166	130 x 142	133
40 x 55	439	85 x 100	237	130 x 150	212
40 x 60	538			130 x 155	256
		90 x 100	158		
45 x 55	290	90 x 105	227	140 x 153	136
45 x 60	400	90 x 110	289	140 x 160	198
				140 x 165	241
50 x 58	218	95 x 110	216		
50 x 60	265	95 x 115	276	150 x 160	99
50 x 65	369			150 x 163	127
50 x 70	459	100 x 110	144	150 x 168	169
		100 x 114	194	150 x 170	187
55 x 65	244	100 x 116	218	150 x 175	227
55 x 70	341	100 x 120	265		
		100 x 125	319	160 x 172	109
60 x 70	227	100 x 130	369	160 x 178	159
60 x 75	319			160 x 185	213
60 x 80	400	105 x 120	198	160 x 190	251
		105 x 125	254		
63 x 73	217			180 x 202	172
63 x 76	272	110 x 120	132	180 x 212	239
		110 x 125	189	180 x 216	265
65 x 75	212	110 x 130	244		
65 x 80	298	110 x 135	295	200 x 216	116
				200 x 232	218
70 x 80	198	115 x 130	182	200 x 242	276
70 x 82	232	115 x 135	235		
70 x 85	281	115 x 140	284	220 x 250	190
70 x 90	355				
		120 x 135	175	225 x 254	180
75 x 85	185	120 x 140	227		
75 x 90	265			250 x 267	100
		125 x 140	170	250 x 298	265
80 x 90	175	125 x 145	218		
80 x 95	251	125 x 152	283	300 x 318	89
80 x 100	326				

• Special size and length are available upon request.
• Above recommanded service pressure are based on S.F.3 for St52 grade.
For grade STKM13C, only 75% pressure are recommanded.

HydroTechnic

Hydraulic Cylinder Rod

Piston Rod (Hard Chrome)

★ Steel : JIS S45C, DIN CK45

★ Tolerance : f7, f8

★ Roughness : Ra 0.07～0.20 μm

★ Straightness : $8 \leqq ø < 20$ ≤ 0.3 mm/m
$20 \leqq ø \leqq 240$ ≤ 0.1 mm/m

★ Chrome Thickness : $8 \leqq ø < 20$ $\geqq 14$ μm
$20 \leqq ø \leqq 240$ $\geqq 20$ μm

★ Surface Hardness : ≧HV800 (Minimum)

★ Length : 3～7 M

■ Production size

Outside Diameter (mm)	**Theoretic Weight** (kg/m)	**Outside Diameter** (mm)	**Theoretic Weight** (kg/m)
6	0,220	36	7,986
8	0,394	38	8,898
9	0,499	40	9,859
10	0,616	42	10,870
11	0,745	45	12,470
12	0,887	50	15,400
13	1,041	52	16,660
14	1,207	55	18,640
15	1,386	56	19,320
16	1,577	60	22,180
17	1,780	65	26,030
18	1,996	70	30,190
19	2,224	75	34,660
20	2,464	80	39,430
22	2,982	85	44,520
24	3,549	90	49,910
25	3,851	95	55,610
26	4,165	100	61,620
28	4,831	110	74,600
29	5,182	115	81,540
30	5,546	120	88,600
32	6,310	125	96,300
33	6,710	130	104,000
34	7,123	140	121,000
35	7,548	150	139,000

• Special size and length are available upon request.
• Special steel are available upon request.

Z

Seamless Tube Fitting (BITE Type)

Structure, function & material of "BITE Type" Fitting :

Structure:
According to fig. 1, "BITE Type" Fitting consists of three parts-main body, screw nut, and ferrule.

Function:
As shown in Fig. 2, insert tube into the connecting place, and put on the bag screw nut. Press the pointed portion of joint main body in front of the ferrule and contract the ferrule's front end. Cutting edge dipped in on the outside tube as shown in Fig 3, on the other hand, the ferrule's back end contacts tightly onto the tube, which can prevent fluid leakage and separation from the connecting place of the tube. As shown in Fig. 4, ferrule is of the dip-in condition, and acts as a spring due to the elasticity on the inside. Therefore, press down the screw nut forcefully to avoid any loosening from vibration.

Material:
The joint main body and the screw nut are made of S25C and S45C. The ferrule is made of low carbon steel.

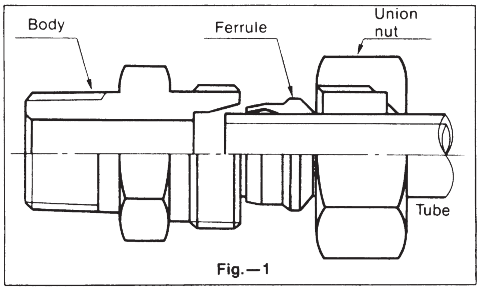


Fig.—1

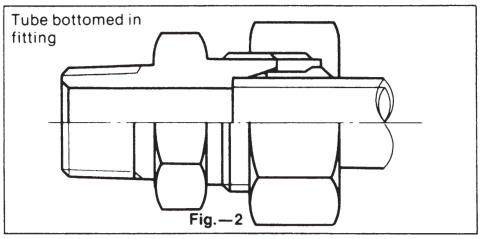


Fig.—2

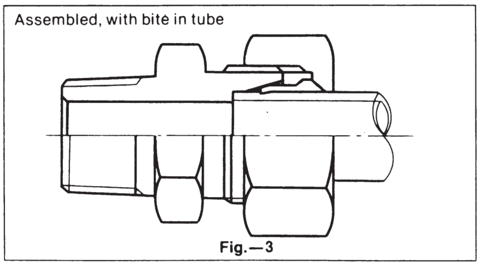


Fig.—3

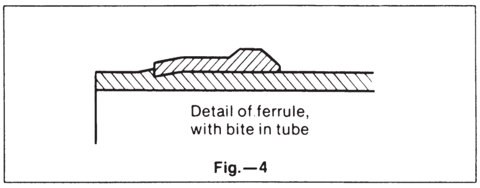


Fig.—4

ADVANTAGES OF "BITE TYPE" FITTINGS

(1) Excellent Performance
- a. Perfectly free from leakage, by the biting action of sleeve.
- b. Withstands high pressures, severe vibration.

(2) Economical installation
- a. No threading, no flaring and no welding. (no soldering)
- b. No special tools are needed for assembly.
- c. Easy to dis-assemble, and to re-assemble completely tightened.
- d. The fitting can be made without loss of strength or sealing qualities when reused.

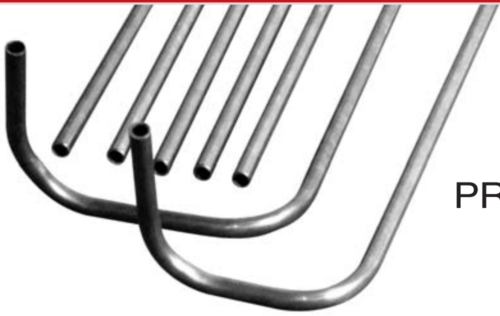
DIAMETER RANGE

Seamless tube connection: OD – 6mm ~ OD – 38mm
Port end outside thread : PT 1/4" ~ PT 1-1/2"
G 1/4" ~ G 1-1/2"

Z

Seamless Tube

Seamless Tube (Carbon Steel Seamless Cold Drawn Tube)



SEAMLESS COLD DRAWN TUBES FOR PRESSURE LINES IN HYDRAULIC SYSTEMS

Steel Grade

ST 37.4 DIN 1630/84 - Tolerance DIN 2391/C - NBK
Chemical composition % (cast analysis):
C max: 0,17%
Mn : ≥ 0,35%
P max: 0,040%
S max: 0,040%
Si : ≤ 0,35%
Mechanical properties of supply:
Tensile strength **R**: 350-480 N/mm2
Yeld strength: **ReH min** 235 N/mm2
Elong **A min**: 25%

Treatment conditions

Tubes are normalized under controlled atmosphere (NBK)

Lenght

Tubes are supplied in random lengths from 5 to 6 mts.

Test

Tubes are submitted to non destructive test by means of ultrasounds inspection.

Delivery conditions

Tubes are bonderised oiled and capped.

Standards

Upon special request tubes can be delivered according to one of the following steel standards:
- Tu37b
- Fe35.2 UNI 663-68

Certificates

As a rule a certificate according to the DIN 50049 3.1 B. standard is issued from the plant of origin.

Z

Seamless Tube (Carbon Steel Seamless Cold Drawn Tube)

Production size

SERIE MILLIMETRICA

Outside diameter mm	Tolerances ±mm	inside diameter mm	Tolerances ±mm	Wall thickness mm	Weight kg / m	Max. proof pressure Bars	Admitted Working pressure Bars	Bursting pressure Bars
6	0.10	4	0.25	1	0.123	762	509	1 385
6		3	0.30	1.5	0.166	1 237	825	2 250
6		2	0.40	2	0.197	1 800	1 200	3 273
8	0.10	6	0.20	1	0.173	550	367	1 000
8		5	0.30	1.5	0.240	874	583	1 589
8		4	0.35	2	0.296	1 238	825	2 250
8		3	0.40	2.5	0.339	1 650	1 100	3 000
10	0.10	8	0.20	1	0.222	430	287	783
10		7	0.25	1.5	0.314	676	450	1 229
10		6	0.30	2	0.395	943	628	1 714
10		5	0.35	2.5	0.462	1 237	825	2 250
12	0.08	10	0.15	1	0.271	354	236	643
12		9	0.20	1.5	0.388	550	367	1 000
12		8	0.25	2	0.493	762	508	1 385
12		7	0.30	2.5	0.586	990	660	1 800
12		6	0.40	3	0.666	1 237	825	2 250
14	0.08	12	0.08	1	0.321	300	200	545
14		11	0.15	1.5	0.462	464	309	844
14		10	0.20	2	0.592	639	426	1 161
14		9	0.25	2.5	0.709	825	550	1 500
14		8	0.30	3	0.814	1 026	684	1 865
15	0.08	13	0.08	1	0.345	279	186	507
15		12	0.15	1.5	0.499	430	287	783
15		11	0.20	2	0.641	591	394	1 075
15		10	0.25	2.5	0.771	761	508	1 385
15		9	0.30	3	0.888	943	628	1 714
16	0.08	14	0.08	1	0.370	261	174	474
16		13	0.08	1.5	0.536	402	268	730
16		12	0.15	2	0.691	550	367	1 000
16		11	0.20	2.5	0.832	707	471	1 286
16		10	0.30	3	0.962	874	583	1 589
18	0.08	16	0.08	1	0.419	230	153	419
18		15	0.08	1.5	0.610	354	236	643
18		14	0.08	2	0.789	483	322	878
18		13	0.20	2.5	0.956	619	412	1 125
18		12	0.20	3	1.11	761	508	1 385
20	0.08	18	0.08	1	0.469	206	137	375
20		17	0.08	1.5	0.684	316	211	575
20		16	0.08	2	0.888	432	288	783
20		15	0.15	2.5	1.08	550	367	1 000
20		14	0.20	3	1.26	676	451	1 229
20		13	0.30	3.5	1.42	806	538	1 466
20		12	0.35	4	1.58	943	629	1 714
22	0.08	20	0.08	1	0.518	187	125	340
22		19	0.08	1.5	0.758	286	191	519
22		18	0.08	2	0.986	388	259	706
22		17	0.15	2.5	1.20	495	330	900
22		16	0.15	3	1.41	606	404	1 103
22		15	0.20	3.5	1.60	723	482	1 314
22		14	0.30	4	1.78	843	562	1 532
25	0.08	22	0.08	1.5	0.869	250	167	454
25		21	0.08	2	1.13	338	225	615
25		20	0.08	2.5	1.39	430	287	783
25		19	0.15	3	1.63	526	351	956
25		17	0.20	4	2.07	726	484	1 321
25		16	0.20	4.5	2.28	834	556	1 516
25		15	0.30	5	2.47	943	629	1 714

HydroTechnic

Seamless Tube

Seamless Tube (Carbon Steel Seamless Cold Drawn Tube)

Outside diameter mm	Tolerances ±mm	inside diameter mm	Tolerances ±mm	Wall thickness mm	Weight kg / m	Max. proof pressure Bars	Admitted Working pressure Bars	Bursting pressure Bars
28	0.08	25	0.08	1.5				
28		24	0.08	2				
28		23	0.08	2.5				
28		22	0.20	3				
28		20	0.20	4				
28		18	0.08	5				
30	0.08	26	0.08	2				
30		25	0.08	2.5				
30		24	0.15	3				
30		22	0.20	4				
30		20	0.30	5				
30		18	0.35	6				
35	0.15	31	0.08	2				
35		30	0.08	2.5				
35		29	0.08	3				
35		27	0.15	4				
35		25	0.15	5				
35		23	0.20	6				
38	0.15	34	0.30	2				
38		33	0.08	2.5				
38		32	0.08	3				
38		30	0.08	4				
38		28	0.15	5				
38		26	0.20	6				
38		24	0.20	7				
42	0.20	38	0.30	2				
42		36		3				
42		34		4				
42		32		5				
42		26		8				

Other sizes upon request

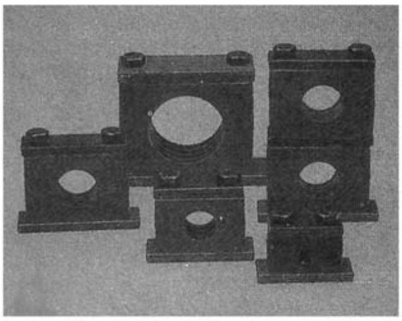
Z

Clamp (Pipe Clamp)

Selection of a particular range will depend on the load for which the clamp is intended, we recommend the following as a guideline :

HEAVY RANGE —— For high pressure hydraulics, heavy duty operation, intermitter loads and high oil speeds.

STANDARD RANGE —— For standard hydraulics, general pipe construction and electric cables.



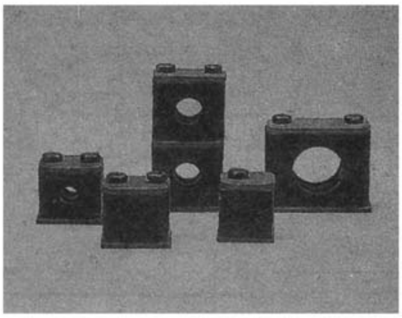
HEAVY RANGE

Diameter range : 6 to 510 mm

11 groups

Material : PP, PA, AL

Type: HTH Series



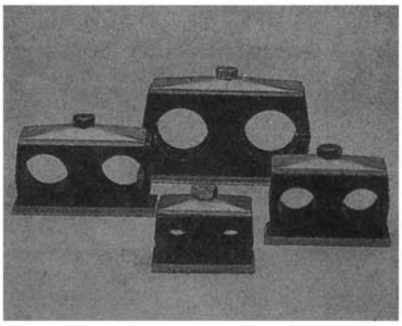
STANDARD RANGE

Diameter range : 6 to 50 mm

7 groups

Material : PP, PA

Type: HTS Series



TWIN RANGE

Diameter range : 6 to 42 mm

5 groups

Material : PP, PA

Type: HTT Series

HydroTechnic

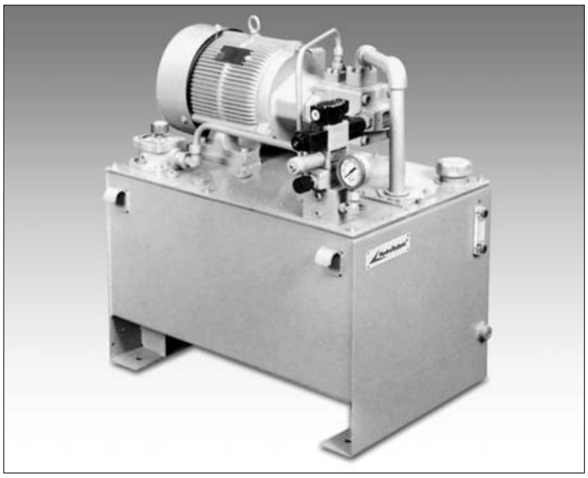
Hydraulic Power Unit

LYM Pack

Specifications

- Geometric Displacement......8.6/15.6 cm³/rev
- Reservoir Capacity...............10/20 L
- Electric Motor.......................0.75/1.5/2.2 KW

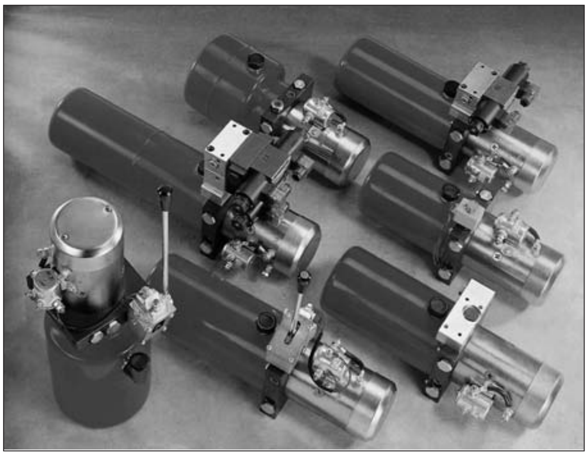
LYA Pack



Specifications

- Geometric Displacement......10/15.8/22.2/37 cm³/rev
- Reservoir Capacity................20/30/40/60/100/160 L
- Electric Motor........................0.75/1.5/2.2/3.7/5.5/7.5 KW

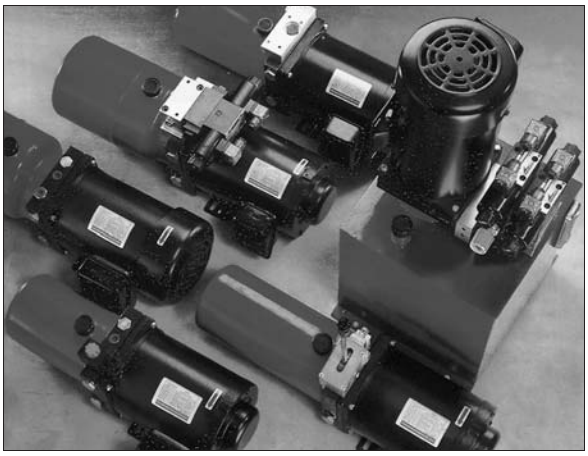
DC Hydraulic power pack



Specifications

- Geometric Displacement......1.0/1.5/1.9/2.3/3.0 cm³/rev
- Reservoir Capacity...............1.6~8.0 L
- Electric Motor.......................DC12V/1.5kw, DC24V/2.0kw

AC Hydraulic power pack



Specifications

- Geometric Displacement......1.0/1.5/1.9/2.3/3.0 cm³/rev
- Reservoir Capacity................1.6~8.0 L
- Electric Motor........................1HP, 2HP, 3HP
(AC110V, AC220V, AC440V)

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HydroTechnic Portable Filter Cart

Portable Filter Cart

Applications:

1. To use periodically as a supplement filtration system for all hydraulic systems in the plant.
2. To clean the hydraulic system before and after the periodical maintainance or repair.
3. To fill the oil for a new hydraulic system.
4. To reclaim the contaminated oil.

Features:

1. Dirt indicator instructs when the filtering element needs replacement. No special tool needed for the change of element.
2. Installed with 1/2 HP, 1 HP, 110/220V AC single phase motor for convenient plug-in application.
3. Buggy is loaded on a portable hand-push cart, one unit can serve many stations.
4. 10 micron and 25 micron elements available for selection.

NAS 1638 – maximum levels of contamination – Sample of 100 ml														
Size	*Classes*													
	00	0	1	2	3	4	5	6	7	8	9	10	11	12
5-15μm	125	250	500	1000	2000	4000	8000	16K	32K	64K	128K	256K	512K	1.024M
15-25μm	22	44	89	178	356	712	1425	2.85K	5.7K	11.4K	22.8K	45.K	91.2K	182.4K
25-50μm	4	8	16	32	63	126	253	506	1012	2025	4050	8.1K	16.2K	32.4K
50-100μm	1	2	3	6	11	22	45	90	180	350	720	1.44K	2.88K	5.76K
< 100μm	0	0	1	1	2	4	8	16	32	64	128	256	512	1024

$K=10^3$; $M=10^6$

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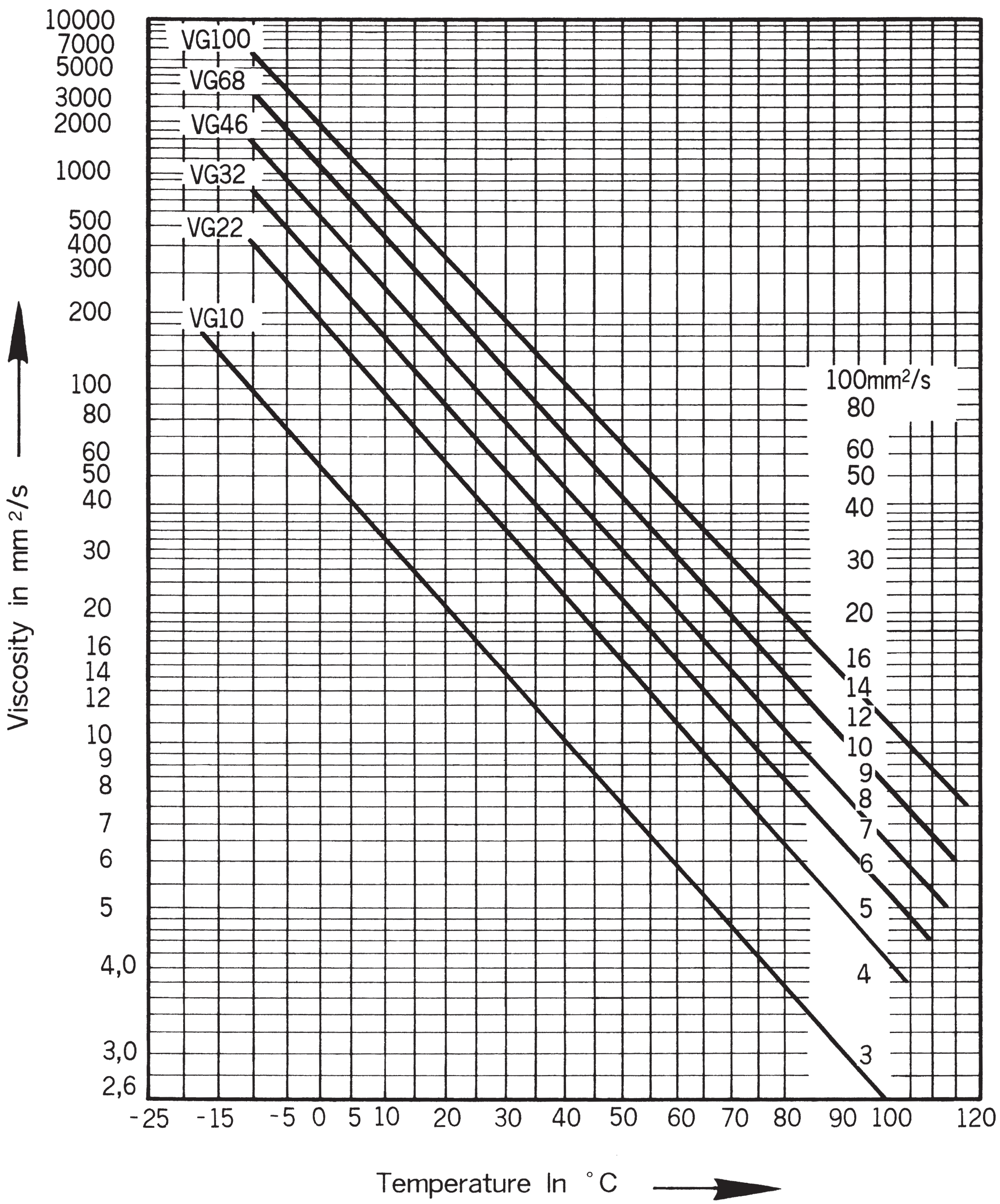
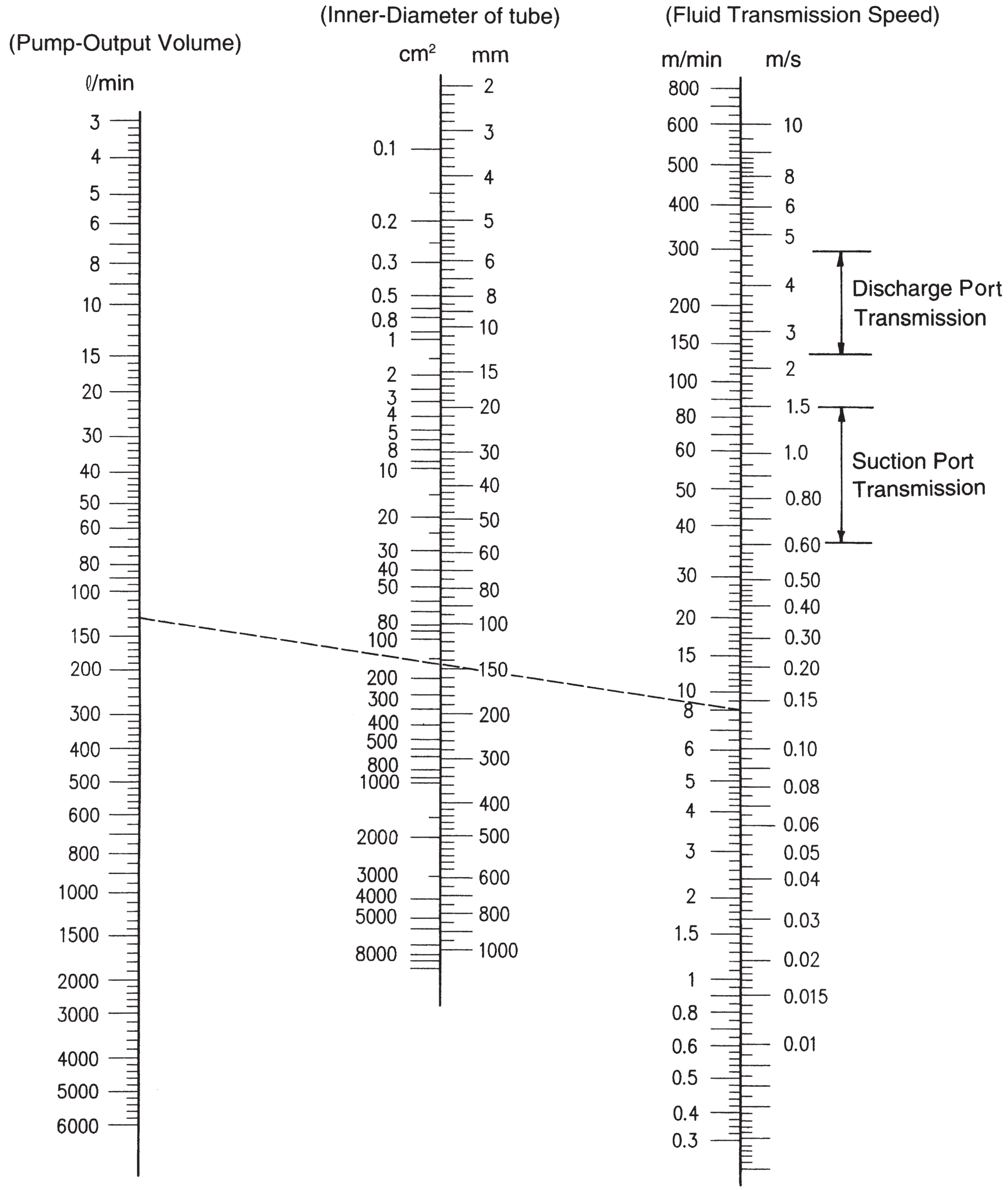
Viscosity - Temperature Diagram



Piping Diameter - Fluid Transmisson - Flow Volume Drawing



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SI and USA Measurement Units

	SI International System	*British and US Units*	*Conversion SI → USA*	*Conversion USA → SI*
Length	Metre -m-	Inch -in- Foot -ft-	1m=39.37in 1mm=0.039in 1m=3.28084ft 1mm=0.003ft	1in=0.0254m 1in=25.4mm 1ft=0.3048m 1ft=304.8mm
Surface	m^2	in^2 ft^2	$1m^2=1550.4in^2$ $1m^2=10.76ft^2$	$1in^2=0.000645m^2$ $1ft^2=0.0929m^2$
Volume	cm^3 m^3 dm^3 or Litre	in^3 ft^3 Gallon -gal-	$1cm^3=0.061in^3$ $1m^3=35.31ft^3$ $1dm^3$=1litre= 0.265gal	$1in^3=16.39cm^3$ $1ft^3=0.02832m^3$ $1gal=3.78dm^3$
Mass	kg	Pound -lb-	1kg=2.2046lb	1lb=0.4536kg
Force	newton -N-	lbf (lb force)	1N=0.225lbf	1lbf=0.4483N
Density	kg/m^3	lbf/ft^3	$1kg/m^3=$ $0.0624lbf/ft^3$	$1lbf/ft^3=$ $16.02kg/m^3$
Speed	m/s	ft/s	1m/s=3.3ft/s	1ft/s=0.3048m/s
Torque	N•m	lbf•ft	1N•m= 0.737lbf•ft	1lbf•ft= 16.02N•m
Pressure	pascal -Pa- $bar=10^5Pa$	psi (Pound/ Square Inch- lbf/in^2-)	1bar=14.5psi	1psi=0.069bar
Work	Joule – J-	lbf•ft	1J=0.737lbf•ft	1lbf•ft=1.356J
Heat	Joule –J- (1cal=4.187J) (1J=0.239cal)	BTU	1J=0.0009BTU	1BTU=1055.1J
Power	Watt –W- Horse power (Cavalli vapore) -CV-	ft•lbf/s Horse power -HP-	1W= 0.73ft•lbf/s 1CV=735W	1ft•lbf/s= 1.3558W 1HP=745.7W
Kinematic Viscosity	m^2/s cSt $-mm^2/s$	ft^2/s	$1m^2/s=0.15ft^2/s$	$1ft^2/s=6.896m^2/s$
Temperature	Degree Celsius -°C-	Degree Fahrenheit -°F-	°C= (°F-32)/1.8	°F= °C•1.8 + 32
Flow Oil hydraulic flow	m^3/s 1litre/min= $1/60000m^3/s$	in^3/min gallons/min -GPM-	$1m^3/s=$ $2^{-7}in^3/min$ 1l/min= 0.265GPM	$1in^3/min=$ $0.273•10^{-6}m^3/s$ 1GPM= 3.78l/min

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